Noise Study Report

SR-9/I-95 from South of SW 10th Street (MP 22.00)
to North of Hillsboro Boulevard (MP 25.10)
Project Development & Environment Study
Broward County, Florida

Financial Management Number: 436964-1-22-01
Federal Aid Project Number: 0202-054-P
ETDM Number: 14244

Prepared For:
Florida Department of Transportation, District IV

September 2020

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.

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EXECUTIVE SUMMARY

A traffic noise analysis was conducted in accordance with Title 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (July 13, 2010) and Part 2, Chapter 18 – *Highway Traffic Noise* of the FDOT PD&E Manual. Traffic noise levels were predicted for noise sensitive locations along the project corridor for the existing conditions and the design year (2040) No-Build and recommended Build Alternatives. Build Alternative traffic noise levels are expected to range from approximately 43.7 to 75.9 dB(A) during the project's design year. Worst-case design year traffic noise levels with the Build Alternative are predicted to be no more than 13.0 dB(A) greater than existing traffic noise levels.

Design year traffic noise levels with the planned improvements are predicted to approach or exceed the FHWA NAC for residential use [67 dB(A)] at 116 residences and three special use/non-residential sites. Therefore, planned improvements were determined to generate noise impacts at noise sensitive sites within the project study area. In accordance with traffic noise study requirements set forth by both the FHWA and FDOT, noise barriers were considered for all noise sensitive receptor sites where design year Build Alternative traffic noise levels were predicted to equal or exceed the NAC. Noise barriers were evaluated at eight locations to mitigate these predicted noise impacts. At this time, noise barriers are recommended for further consideration and public input at three of these locations:

- **Highland Village** – East side of I-95 north of NE 48th Street. This noise barrier would replace an existing 14-foot tall noise barrier in its entirety and benefit 66 sites, including all 35 impacted residences.
- **Spring Lake and Lake Island** – West side of I-95 south of NW 48th Street. This noise barrier will replace-in-kind a segment of the existing noise barrier that is being removed to accommodate the project. Will benefit two impacted residences.
- **Country Knoll and Highland Meadows Estates** – West side of I-95 north of NW 48th Street. This noise barrier will replace an existing 16-foot tall noise barrier that will be removed to accommodate the project. Will benefit 84 sites, including 55 impacted residences.

Noise barriers evaluated for the remaining five locations either did not meet FDOT's Noise Reduction Design Goal and/or FDOT's Noise Barrier Cost Reasonableness Criteria. Therefore, at this time, noise barriers are not recommended for further consideration or construction at the following locations:

- **Deerfield Beach Teen Center Basketball Court** - east side of I-95 at SW 11th Court (greater than $995,935 $/person-hours/square-foot).
- **Deerfield Highlands** - east side of I-95 from SW 12th Court to SW 11th Court [6.7 dB(A) maximum and ($188,925 per benefited site)].
- **Tivoli Sand Pine Preserve Walking Trail** - north side of SW 10th Street between Natura Boulevard and the eastern project limit (greater than $995,935 $/person-hours/square-foot).
- **JM Family Daycare Center Playground** - west side of I-95 at NW 6th Street (greater than $995,935 $/person-hours/square-foot).
- **Lakes at Deerfield Apartments** - SW 10th Street at S Military Trail [6.2 dB(A) maximum and ($47,550 per benefited site)].

1.0 INTRODUCTION

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 48th [Mile Post (MP) 22.0] to north of the Hillsboro Boulevard interchange (MP 25.10), in Broward County, Florida.

The project extends along I-95 from just south of NE 48th Street to just north of Hillsboro Boulevard and along both SW 10th 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 10th Street and Hillsboro Boulevard and along I-95 from just south of NE 48th Street to just north of the Hillsboro Boulevard interchange. SW 10th Street provides a direct connection between I-95 and the Sawgrass Expressway. The study also evaluated improvements along both SW 10th Street and Hillsboro Boulevard near I-95.

Alternatives were also evaluated to modify the existing merge and diverge ramp areas at the SW 10th Street and Hillsboro Boulevard interchanges. Replacement of the existing SW 10th 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**.

As part of this PD&E Study, a traffic noise analysis was conducted in accordance with Title 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (July 13, 2010) and Part 2, Chapter 18 – *Highway Traffic Noise* of the FDOT PD&E Manual. The primary objectives of this noise study were to: 1) describe the existing site conditions, including noise sensitive land uses within the project study area, 2) document the methodology used to conduct the noise assessment, 3) assess the

significance of traffic noise levels on noise sensitive sites for the No-Build and Build Alternatives, and 4) evaluate abatement measures for those noise sensitive sites that, under the Build Alternative, approach or exceed the Noise Abatement Criteria (NAC) set forth by the FDOT and FHWA. Other objectives of this study include consideration of construction noise and vibration impacts and the development of noise level isopleths, which can be used in the future by local municipal and county government agencies to identify compatible land uses. The methods and results of the noise study performed for the project are summarized in this report.

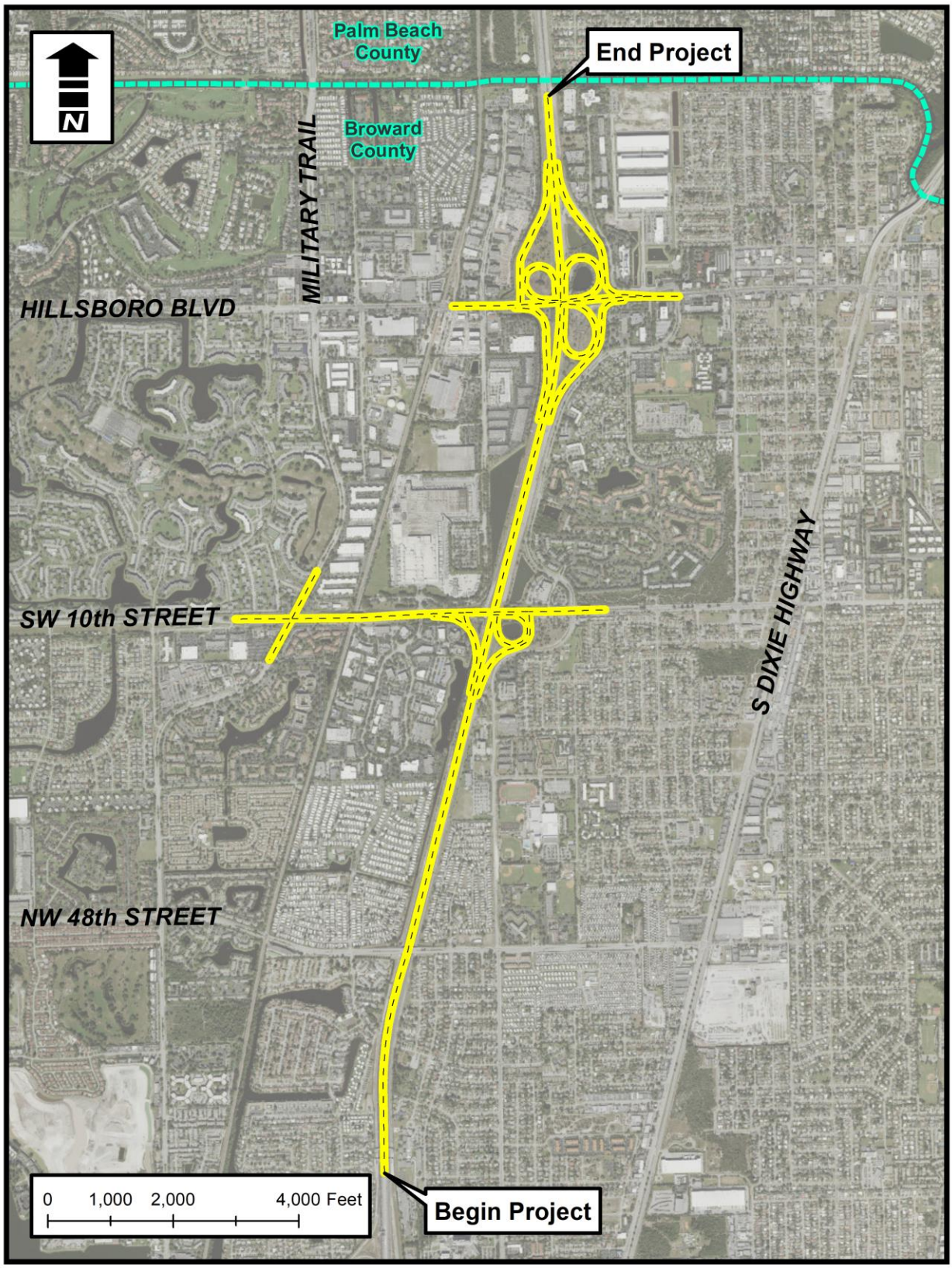


Figure 1 - 1: Project Study Area

1.1 Purpose and Need

The purpose of this project is to eliminate existing operational and safety deficiencies along I-95 from south of NE 48th Street to north of Hillsboro Boulevard including the interchanges at SW 10th Street and Hillsboro Boulevard, and on SW 10th 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.

1.1.1 Capacity/Operational Deficiencies

A need exists to improve traffic operations along I-95 in the vicinity of the SW 10th 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 10th 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 10th Street eastbound (EB) and westbound (WB) during the AM and PM peak periods;
- The I-95 mainline segment between I-95 southbound on-ramp from SW 10th Street eastbound and westbound and I-95 southbound off-ramp to Sample Road eastbound and westbound during the PM peak period;
- The I-95 mainline between I-95 southbound On-Ramp from Palmetto Park Boulevard eastbound and I-95 southbound Off-Ramp to Hillsboro Boulevard eastbound and westbound during the AM peak period;
- The merge at I-95 southbound on-ramp from Hillsboro Boulevard westbound during AM and PM peak periods; and
- The diverge segment at I-95 northbound (NB) off-ramp to Hillsboro Boulevard eastbound 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 (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 southbound On-Ramp from westbound Hillsboro Boulevard would operate at LOS D during the PM peak hour.

1.1.2 Safety

A need exists to resolve safety issues within the project limits along I-95 as well as SW 10th 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 10th 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.

1.1.3 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 10th 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.

1.1.4 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 Preliminary Engineering (design phase) is scheduled for fiscal year 2022. The project is also included in the Broward County MPO Commitment 2045 Metropolitan Transportation Plan [previously known as the Long Range Transportation Plan (LRTP)] for fiscal years 2020-2024. Additionally, the project is included in the Broward County MPO Transportation Improvement Program (TIP) for fiscal year 2020-2024.

1.1.5 System Linkage

A need exists to ensure that I-95 continues to meet the minimum requirements of a component of the state's 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 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.

1.1.6 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 10th 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.

1.1.7 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 Commitment 2045 Metropolitan Transportation Plan predicted that the population would grow from 1.9 million in 2018 to 2.2 million by 2045, an increase of 16 percent. Jobs were predicted to increase by 25 percent during the same time period. A need exists for the proposed improvements to support the predicted social and economic travel.

2.0 PROJECT STUDY AREA

The project study area consists of the existing and proposed right-of-way (ROW) limits for the viable Build Alternatives and also includes the No-Action Alternative. The study area is of sufficient size to identify potential direct and indirect effects of the viable Build Alternatives on communities that may occur within or adjacent to the project corridor. For the purpose of this study, the viable Build Alternatives discussed for SW 10th Street are the Modified North alignment (herein after referred to as the North alignment) and Center Alignment, which encompass all proposed roadway improvements along I-95, SW 10th Street, and Hillsboro Boulevard. The project footprint is the same for both Alternatives along I-95 and Hillsboro Boulevard. The project footprint varies slightly between the Build Alternatives along SW 10th Street.

2.1 Environmental Setting

The project is located within a densely developed urban region of northern Broward County. Along the existing I-95 corridor within the project study area, adjacent lands are characterized by residential subdivisions, individual residences, commercial developments, institutional, recreational, and business and industrial complexes.

2.2 Existing Land Use

The project is located in northern Broward County and traverses the northern region 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 at the interchanges. Additional land uses west of I-95 include City of Deerfield government offices located west of the CSX railroad and south of Hillsboro Boulevard, and a residential development southwest of SW 10th 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.

2.3 Future Land Use

The City of Deerfield Beach Future Land Use Map (adopted December 3, 2013) 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.

2.3.1 SW 10th Street Interchange

The City of Deerfield Beach Future Land Use Map shows the area west of the SW 10th 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).

2.3.2 Hillsboro Boulevard Interchange

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.

3.0 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 10th 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. Assessment of the existing conditions began with the collection and review of all data pertaining to the existing facilities which included conducting on-site field inventories, review of existing documents, as well as, review of other pertinent data used for the evaluation of these transportation facilities.

3.1 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.

3.1.1 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 SIS and NHS networks. Within the limits of the project, I-95 has six general purpose lanes (three in each direction) and two Express (EP) lanes (one in each direction).

3.1.2 SW 10th Street

SW 10th Street has a functional classification as an urban principal arterial other. SW 10th 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 SHS and SIS systems being classified as a SIS corridor.

3.1.3 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 corridor classification as an urban principal arterial from the intersection at Goolsby Boulevard (MP 4.760) to I-95 (MP 5.365) Hillsboro Boulevard since it connects the I- 95 Expressway to South Florida Rail Corridor.

3.2 Access Management

3.2.1 I-95

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

3.2.2 SW 10th Street

Southwest 10th Street is designated as Class 3 for access management.

3.2.3 Hillsboro Boulevard

Hillsboro Boulevard is designated as Class 5 for access management.

3.3 Typical Sections

The following **Table 3-1** depicts the existing typical section characteristics for each corridor.

Table 3 - 1: Existing Typical Section Characteristics

Typical Section Element	Roadway		
	I-95	SW 10th Street	Hillsboro Boulevard
Number of Travel Lanes	8	6	6
Travel Lane Width	12 ft	11-12 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 - 8 ft	Varies 4-6 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

3.3.1 I-95

Within the limits of the study, I-95 is an eight-lane divided limited access facility consisting primarily of a two and a half-foot center barrier wall with two twelve-foot paved inside shoulders (one in each direction). The inside lane in each direction is a twelve-foot wide EP lane with a two-foot striped buffer area separating the EP lane from the three twelve-foot general purpose lanes. In each direction, along the outside of the general purpose lanes is a twelve-foot shoulder [ten-foot paved and two-foot unpaved]. In the northbound direction, a twelve-foot auxiliary lane exists between the SW 10th Street on-ramp and Hillsboro Boulevard off-ramp. Additionally, in the southbound direction a twelve-foot auxiliary lane exists between the Hillsboro Boulevard on-ramp and SW 10th Street off-ramp. The existing roadway segment is depicted in **Figure 3-1** and typical section for this corridor is shown in **Figure 3-2**.

Figure 3 - 1: Existing Roadway Segment – I-95 Corridor

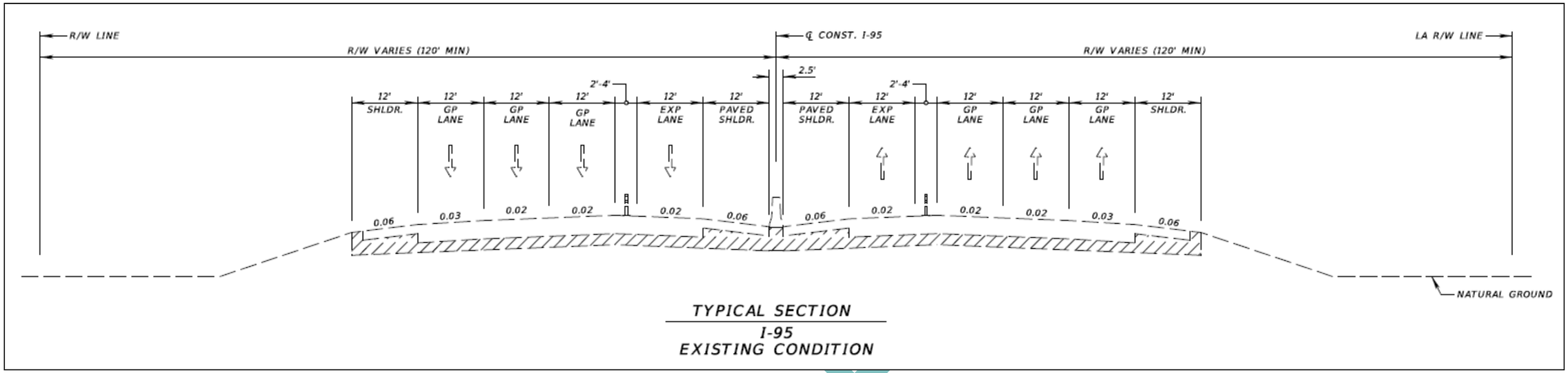


Figure 3 - 2: Existing Typical Section – I-95

3.3.2 SW 10th Street

EB along SW 10th Street from approximately 1000-feet west of the intersection at Military Trail to the intersection there are three twelve-foot lanes, a four to five-foot bike lane, and an eight-foot (four-foot paved and four-foot unpaved) outside shoulder. In the center, there is a raised curb and gutter median that varies in width from 17.5 feet.

WB along SW 10th Street from approximately 1000-feet west of the intersection at Military Trail to the intersection there are two twelve-foot lanes, a four- foot bike lane and four-foot unpaved shoulder.

In each direction, from the intersection at Military Trail to East Newport Center Drive there are three twelve-foot lanes, a four-foot bike lane, two-foot curb and gutter with a five-foot 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 14.0 to 17.5 feet. In the westbound 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 eastbound direction a fourth (outside) twelve to 14-foot wide lane exists as an auxiliary lane used for right turns and/or acceleration and terminates at the southbound on-ramp to I-95.

From East Newport Center Drive to SW Natura Boulevard/FAU Research Park Boulevard there are three eleven-foot lanes in each direction, two-foot curb and gutter with a six- foot concrete sidewalk running along at the back of curb with no bicycle lane or shoulder. eastbound the third lane (outside) terminates at the northbound entrance ramp to I-95 and then remerges west of the northbound I-95 off-ramp intersection continuing on to the FAU Research Park Boulevard intersection. westbound are three eleven-foot lanes, two-foot curb and gutter with a six-foot concrete sidewalk running along at the back of curb with no bike lane or shoulder present. A fourth westbound lane emerges at the southbound 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 to 17.5 feet.

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

Figure 3 - 3: Existing Roadway Segment – SW 10th Street

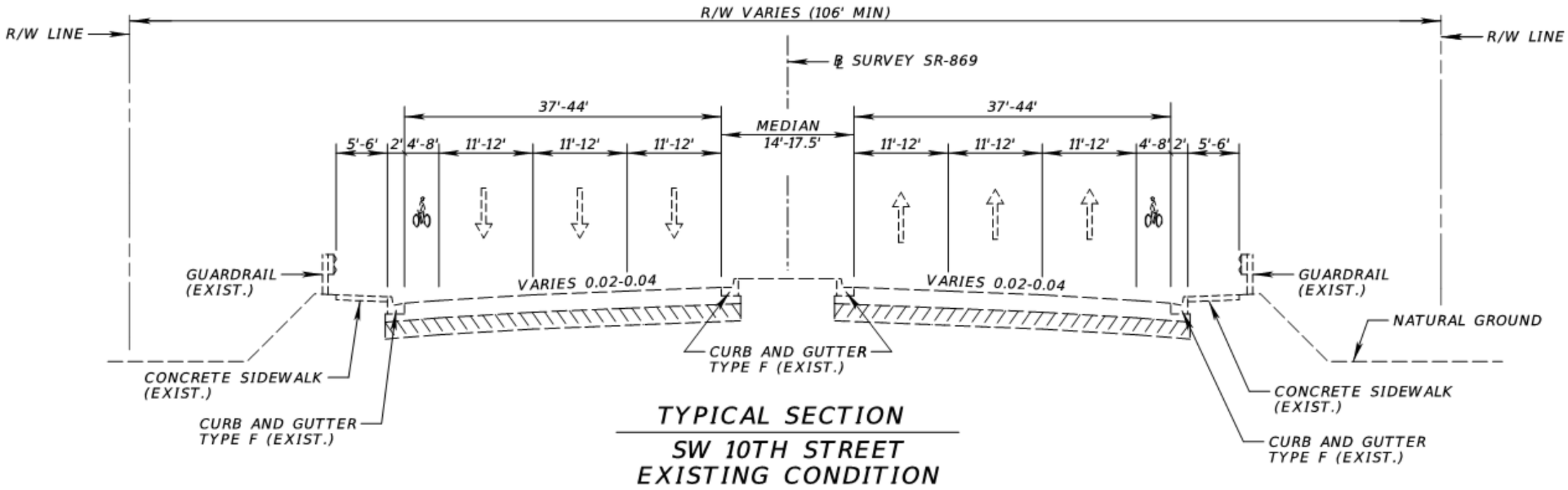


Figure 3 - 4: Existing Typical Section – SW 10th Street

3.3.3 Hillsboro Boulevard

Along Hillsboro Boulevard from east of Military Trail intersection to the intersection with Natura Boulevard/Fairway Drive is an urban arterial typical section having a fifteen and a half-foot raised median, six eleven-foot thru lanes (3 lanes in each direction) and two four-foot 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 two-foot curb and gutter with six-foot concrete sidewalk running along at the back of curb. Total right-of-way width varies.

The existing roadway segment is depicted in **Figure 3-5** and typical section for this corridor is shown in **Figure 3-6**.

Figure 3 - 5: Existing Roadway Segment – Hillsboro Boulevard

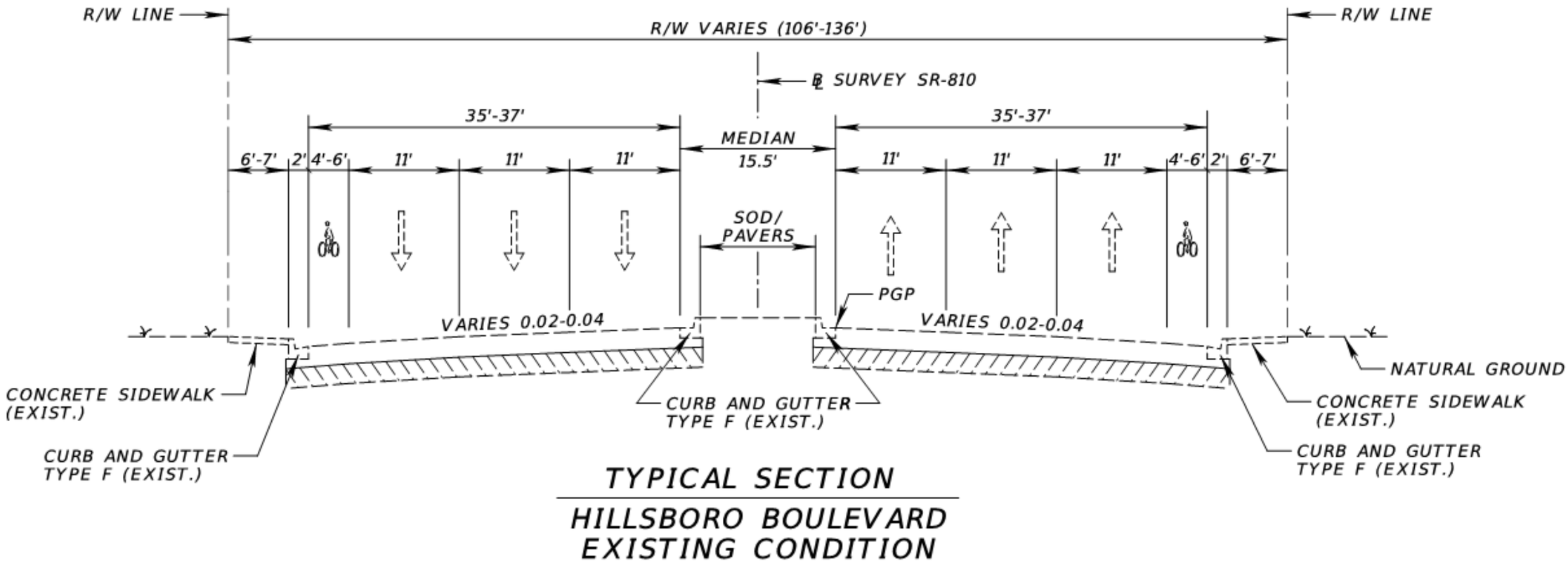


Figure 3 - 6: Existing Typical Section – Hillsboro Boulevard

3.4 Right-of-Way

3.4.1 I-95

The existing ROW along I-95 varies from 240 to 300 feet and varies based on shoulder width and natural ground.

3.4.2 SW 10th Street

The existing ROW along SW 10th Street varies with a minimum of 125 feet and varies based on median width, shoulder width and natural ground with a typical width between 180 to 250 feet.

3.4.3 Hillsboro Boulevard

The existing ROW along Hillsboro Boulevard varies from 106 to 136 feet and varies based on median width.

Please refer to the Preliminary Engineering Report for additional details of existing roadway conditions and typical sections.

3.5 Pavement Type and Operational Conditions

3.5.1 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 roadway as well as to predict future rehabilitation needs.

3.5.1.1 I-95 Pavement Type and Condition

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 northbound lanes along I-95 have adequate pavement ratings. The southbound 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.

3.5.1.2 SW 10th Street Pavement Type and Condition

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

3.5.1.3 Hillsboro Pavement Type and Condition

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 eastbound and westbound lanes have adequate pavement ratings.

4.0 PROJECT ALTERNATIVES

Alternatives evaluated during the PD&E Study include the No-Action Alternative, the Transportation Systems Management and Operations (TSM&O) Alternative, and the Build Alternatives as described below. Alternatives were developed and evaluated based on the ability to meet the project purpose and needs.

4.1 No-Build 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 MPO, Cost Feasible Metropolitan Transportation Plan (previously known as 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 requires no expenditure of public funds for design, right-of-way acquisition, construction or utility relocation. In addition, there would be no 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 and operational and safety conditions within the project area will become progressively worse as traffic volumes continue to increase.

4.2 Transportation Systems Management and Operations (TSM&O)

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.

TSM&O improvements alone will not significantly enhance the capacity issues through the corridor by the design year 2040. Long-term improvements are necessary to mitigate the existing traffic conditions and increase capacity to accommodate future travel demand.

4.3 Build Alternatives

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

4.3.1 Interstate 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

4.3.1.1 Alternative 1

Alternative 1 provides a 2-lane, physically separated northbound collector distributer (CD) road on the east side of I-95 between SW 10th Street and Hillsboro Boulevard that combines the eastbound to northbound and westbound to northbound on-ramps. A braided ramp is proposed for the northbound 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 eastbound to southbound and westbound to

southbound on-ramps. A braided ramp is proposed to separate the traffic destined to I-95 mainline from traffic exiting at SW 10th Street. All the services interchange ingress and egress ramps remain configured similar to the existing except for the new westbound SW 10th Street to northbound ingress ramp which is provided as a free-flow right turn in the NE quadrant. Alternative 1 is shown in **Figure 4-1**.

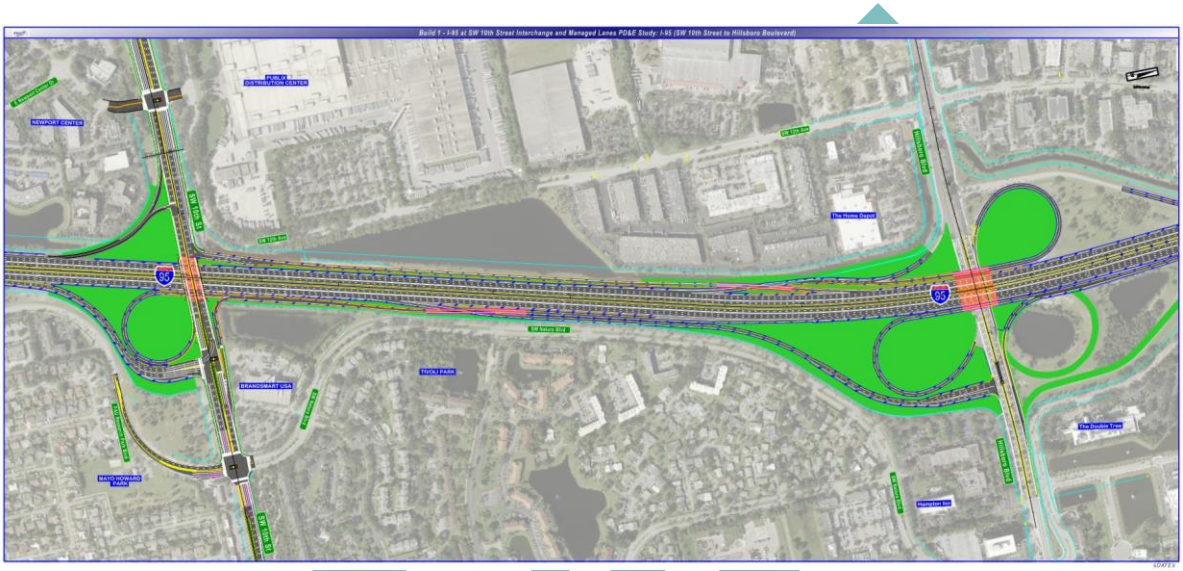


Figure 4 - 1: I-95 Alternative 1 (SW 10th Street to Hillsboro Boulevard)

4.3.1.2 Alternative 2

Alternative 2 provides the northbound CD road and southbound auxiliary lane as described for Alternative 1. Additionally, Alternative 2 also provides direct access from the SW 10th Street Connector to both the I-95 express lanes and general-purpose lanes compatible with the SW 10th Street 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-foot to 4-foot wide buffer.

In the northbound direction, an egress point is proposed for the northbound express lanes north of the Sample Road interchange for traffic destined to the northbound I-95 general-purpose lanes. A second egress point south of the SW 10th Street interchange is proposed for traffic destined to the

westbound SW 10th Street Connector lanes which braids over the general-purpose lanes and merges with the northbound CD road on the east side of I-95.

Access from eastbound SW 10th Street Connector to I-95 northbound 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 10th Street interchange. A new I-95 northbound on-ramp is introduced for westbound SW 10th Street as a free-flow right turn on the northeast quadrant of the interchange relocating the existing left turn movement at the current intersection. The new I-95 northbound on-ramp merges with eastbound on-ramp and the eastbound SW 10th Street Connector traffic destined to the I-95 general-purpose lanes on the northbound CD road. The northbound CD road braids over the northbound Hillsboro Boulevard off-ramp to merge with the I-95 northbound 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 southbound direction, an egress point is proposed from the express lanes south of Hillsboro Boulevard interchange for the traffic destined to the westbound SW 10th Street Connector. Access to the SW 10th 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 southbound traffic entering from eastbound/westbound 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 10th Street Connector.

Access from the eastbound SW 10th Street Connector to I-95 southbound 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 10th Street interchange which braids over the general-purpose lanes to merge with the I-95 mainline on the west side of I-95.

Figure 4-2 shows the proposed improvements south of the SW 10th Street interchange, and **Figure 4-3** shows the proposed improvements north of the SW 10th Street interchange.

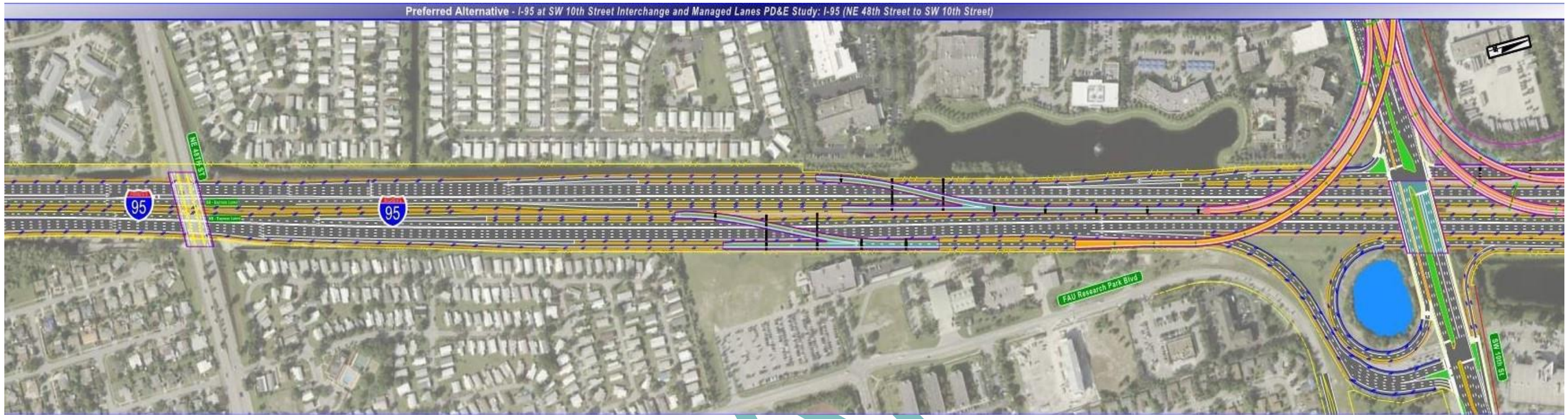


Figure 4 - 2: I-95 – Preferred Alternative Concept Plan (South of SW 10th Street)

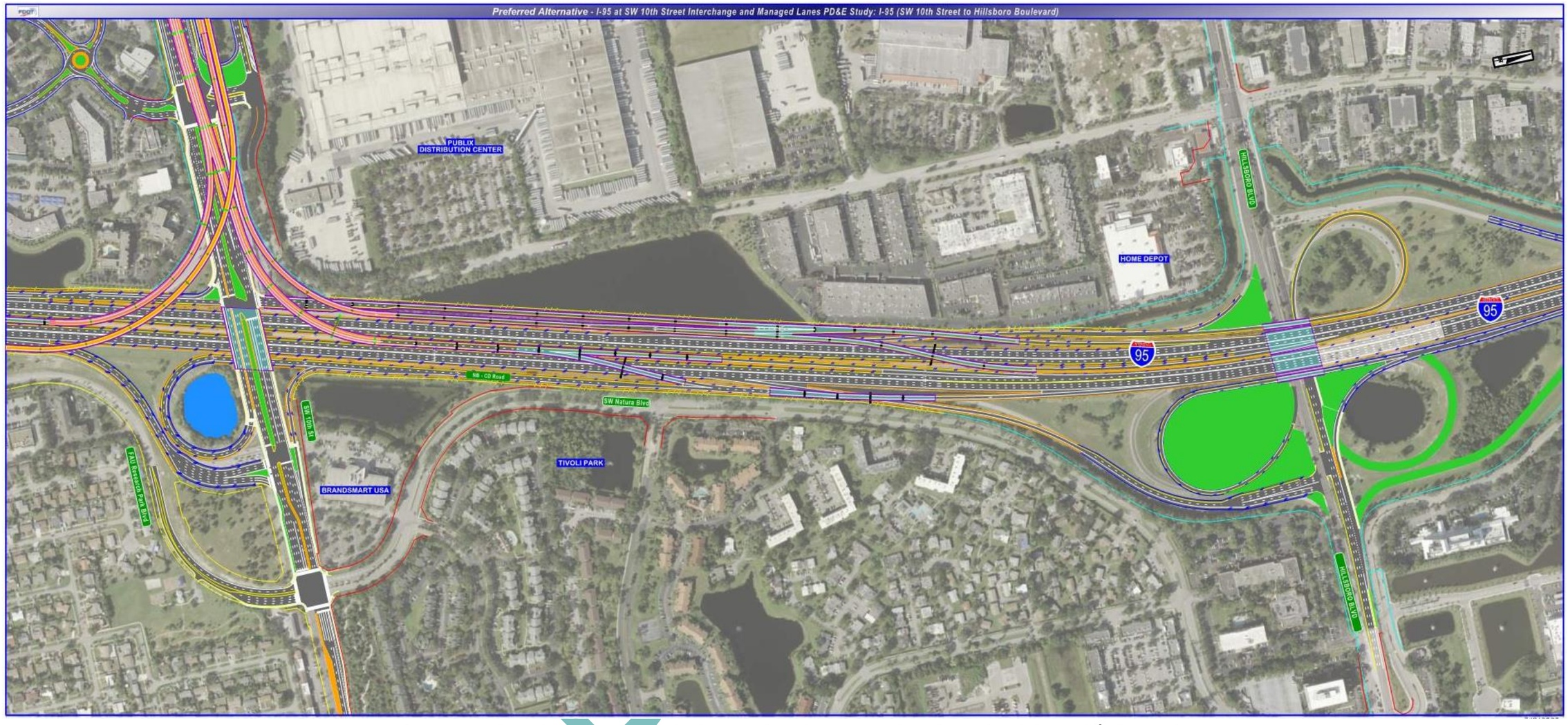


Figure 4 - 3: I-95 – Preferred Alternative Concept Plan (North of SW 10th Street)

4.3.2 SW 10th Street

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

Two alignments were considered for the connector lanes: the Center Alignment, and the North Alignment. The Center Alignment includes three 11-foot lanes with a 7-foot buffered bike lane and 6-foot sidewalk in each direction along SW 10th Street. However, no sidewalk is provided along the north side from East Newport Center Drive/SW 12th 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 northbound and southbound legs of the SW 12th Avenue/E. Newport Center Drive intersection with SW 10th Street.

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 4-4 shows the Center Alignment concept. The top figure illustrates the proposed SW 10th Street Connector to be constructed above local SW 10th Street. The lower figure illustrates the local SW 10th Street configuration and intersection design.

Both North and Center Alignment options have a similar configuration. The North Alignment provides three 11-foot lanes with a 7-foot buffered bike lane and 6-foot sidewalk in the westbound direction. A 12-foot shared use path is provided in the eastbound direction along SW 10th Street for local pedestrian and bike traffic. However, no sidewalk is provided along the north

side from East Newport Center Drive/SW 12th Avenue intersection to Military Trail. Two 12-foot 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 eastbound direction along the connector lanes an egress ramp departs from the connector lanes west of the Military Trail intersection braiding over the eastbound SW 10th Street local lanes connecting along the outside lane. The egress ramp allows access to the Newport Center and local SW 10th Street east of the I-95 Interchange.

On SW 10th Street at the northbound and southbound 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 eastbound and westbound movements at this intersection. This configuration allows improved operations and mitigates congestion for the intersection, the interchange ramp intersections and along SW 10th 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 12th Avenue that connects directly to the SW 10th Street Connector lanes to improve operations of the East Newport Center Drive intersection with SW 10th Street by allowing westbound traffic making a right turn to bypass the signal.

At I-95, the northbound 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 4-5** shows the North Alignment concept. The top figure illustrates the proposed SW 10th Street Connector to be constructed above local SW 10th Street. The lower figure illustrates the local SW 10th configuration and intersection design.

Minor right-of-way acquisition is required on the north and south sides of SW 10th Street including six privately owned and three government owned parcels. No relocations are required.

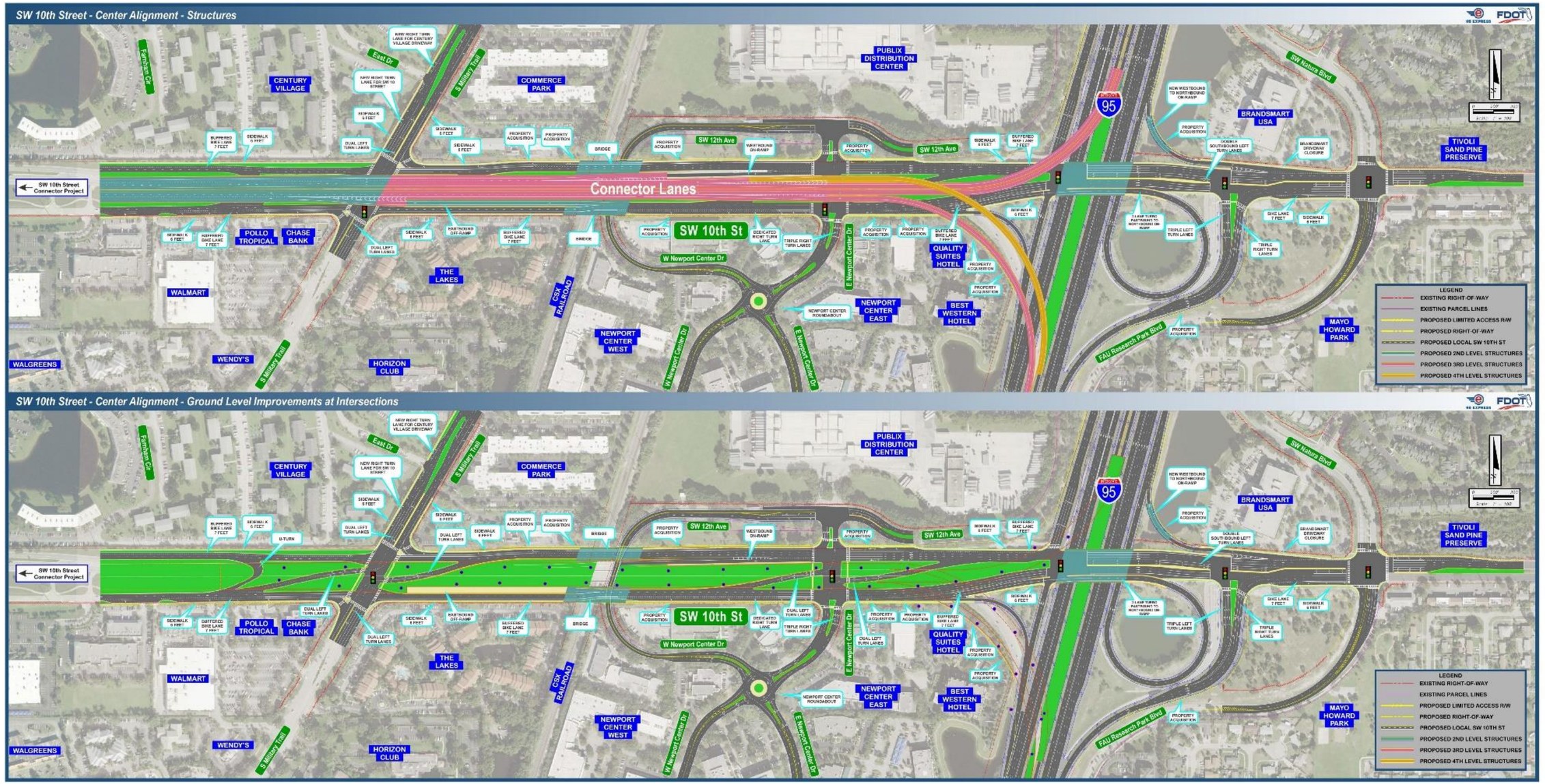


Figure 4 - 4: SW 10th Street – Center Alignment Concept Plan

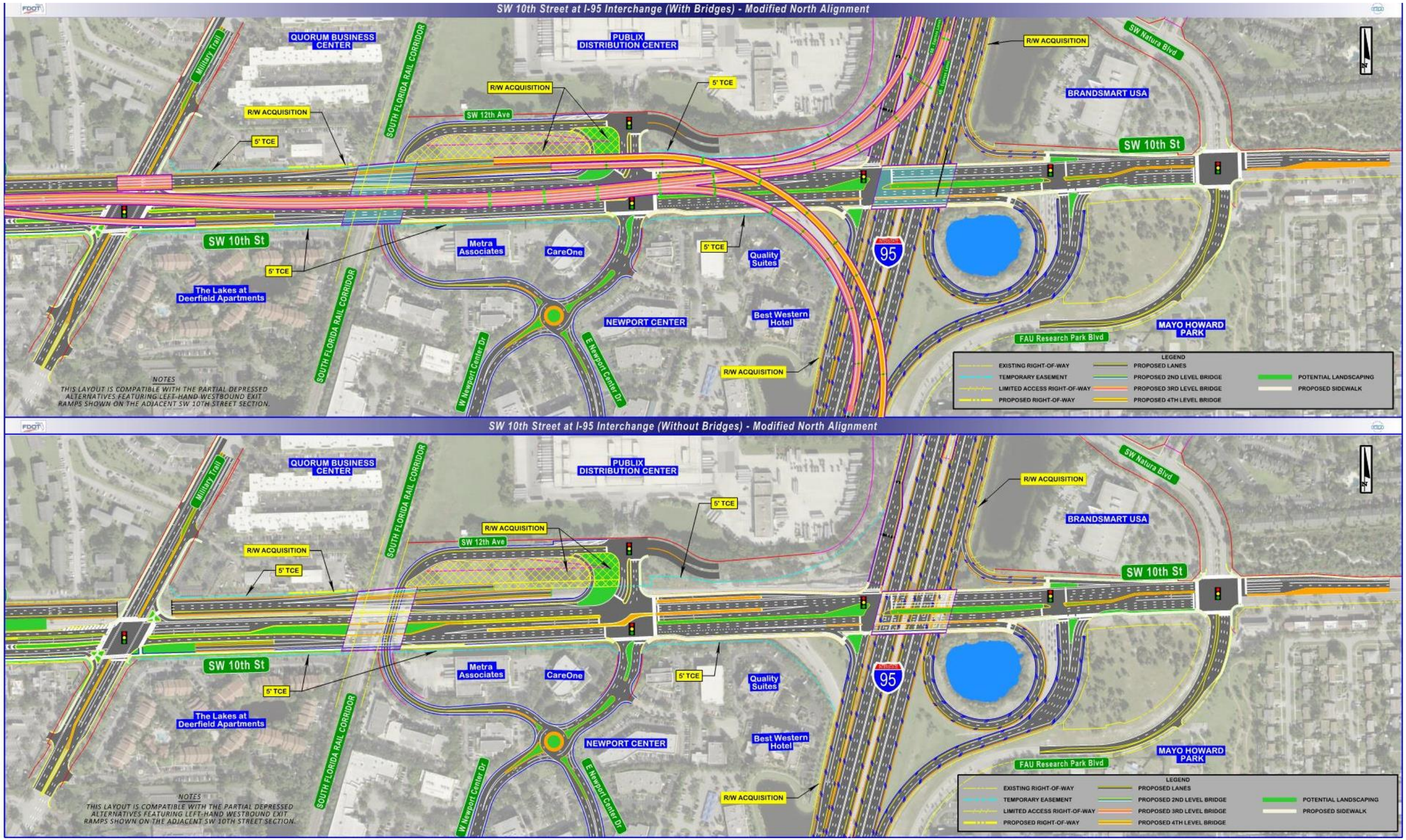


Figure 4 -5: SW 10th Street - North Alignment Concept Plan

4.3.3 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 northbound exit ramp combining both exit ramps into a single ramp with a signal controlled. The northbound 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 southbound double left and double right turn lanes, extending the northbound to westbound left turn lane storage and the eastbound to southbound right turn storage at Natura Boulevard.

4.3.3.1 Alternative 1

Alternative 1 proposes a depressed section from Goolsby Boulevard to SW 12th Avenue with two 11-foot lanes in each direction and a 7.5-foot inside shoulder. An access road is proposed on each side with one 11-foot lane, 7-foot buffered bike lane and 6-foot sidewalk (**Figure 4-6**). This Alternative was deemed not viable due to impacts to the SFRC line and access to adjacent properties.

4.3.3.2 Alternative 2

Alternative 2 proposes an elevated section from Goolsby Boulevard to SW 12th Avenue with two 11-foot lanes in each direction, a 7.5-foot inside shoulder, and 13-foot median. An access road is proposed on each side with one 11-foot lane, 7-foot buffered bike lane and 6-foot sidewalk (**Figure 4-7**). 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.

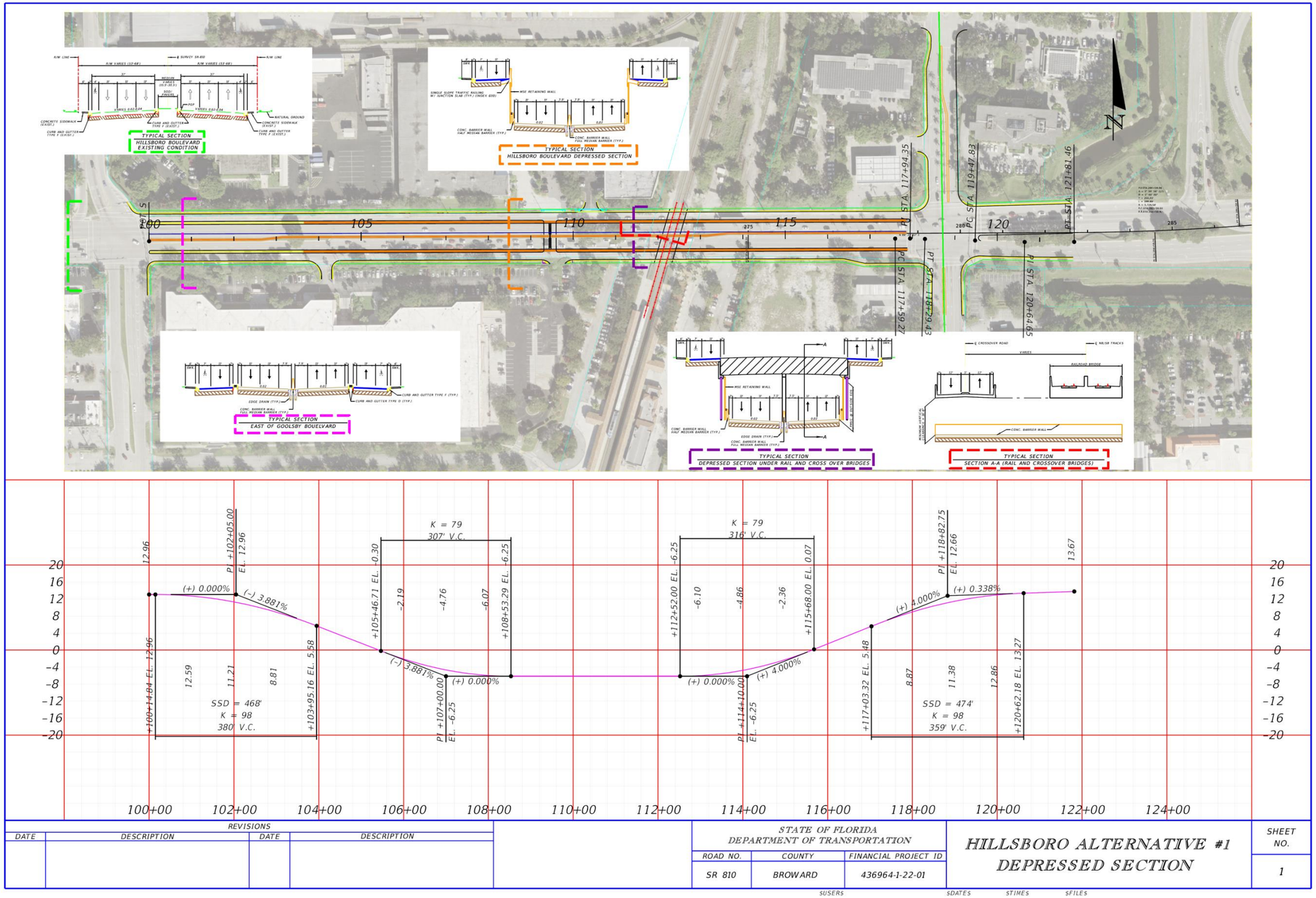
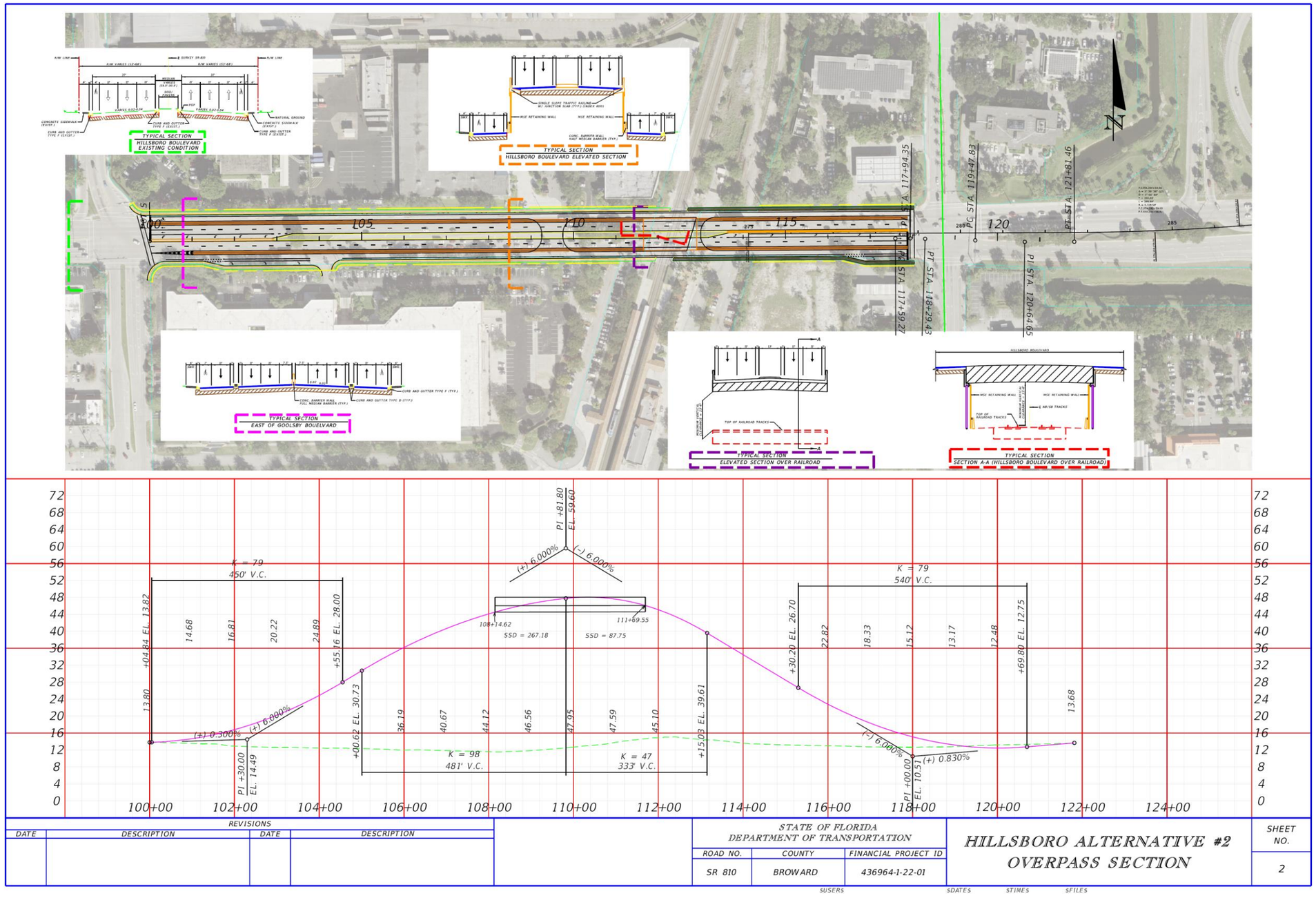


Figure 4 -6: Hillsboro Boulevard Alternative 1



REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			HILLSBORO ALTERNATIVE #2 OVERPASS SECTION	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				SR 810	BROWARD	436964-1-22-01		2

$USER$ $DATE$ $TIME$ $FILE$

Figure 4 –7: Hillsboro Boulevard Alternative 2

As discussed above, Alternatives 1 and 2 along Hillsboro Boulevard evaluated a depressed profile and an elevated section from Goolsby Boulevard to SW 12th 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 northbound exit ramp with a signal controlled and expanded storage for a triple-left turn movement for the northbound to westbound egress ramp terminal while maintaining the dual right turn movement for the eastbound traffic. This improvement resulted in the elimination of the northbound off-ramp loop to westbound Hillsboro Boulevard combining both northbound egress ramps into one location. In addition, the northbound on-ramp from westbound Hillsboro Boulevard was realigned to be within the proximity of I-95. A new configuration is proposed for the eastbound to southbound and the westbound to southbound on-ramp to minimize the weaving maneuvers within the interchange area.

4.3.4 Bridge Structure Improvements

With either Alternative, the existing bridges were 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 northbound over Hillsboro Boulevard are determined to be replaced due to proposed roadway geometrics and alignments. The I-95 northbound 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 respective locations of the proposed bridges are depicted in **Figures 4-8** through **4-10**.

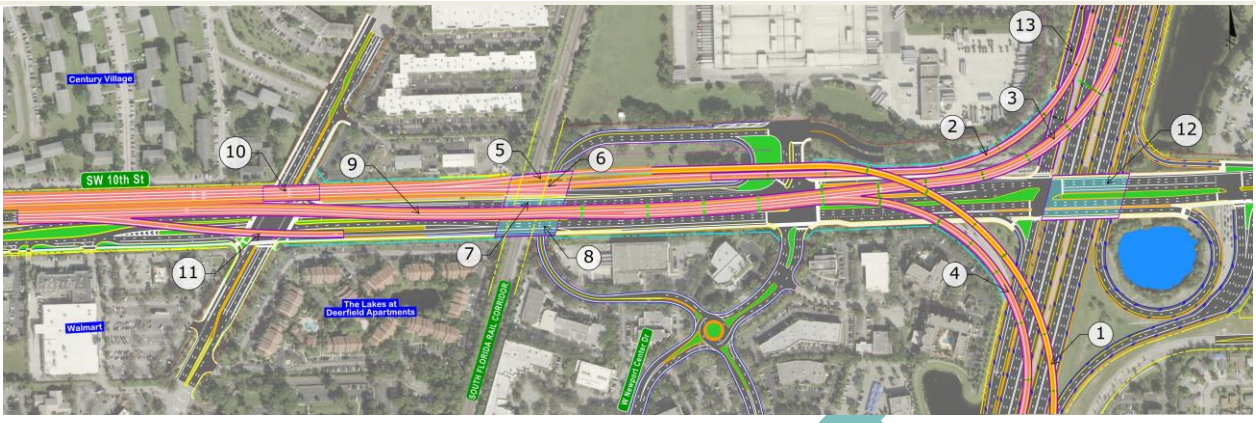


Figure 4 - 8: Proposed Bridge Locations (1 of 3)

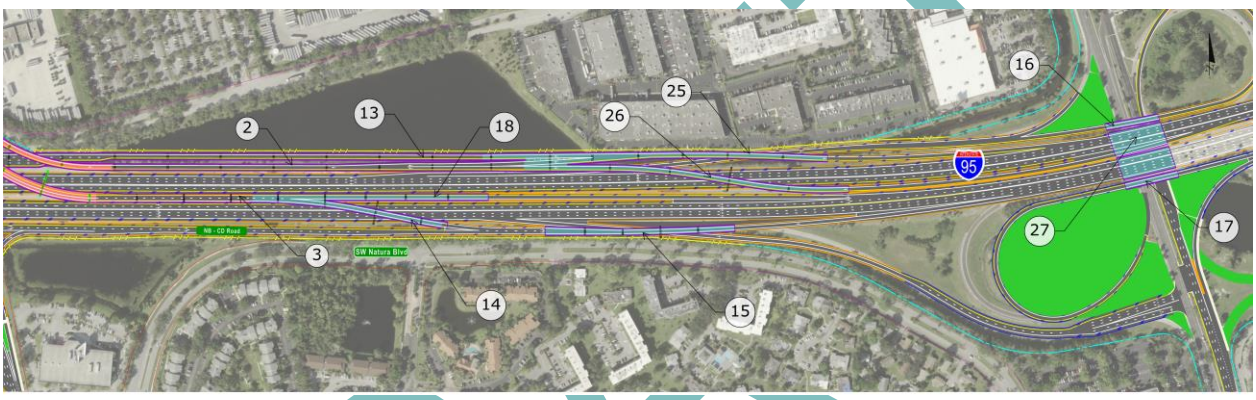


Figure 4 - 9: Proposed Bridge Locations (2 of 3)

Figure 4 - 10: Proposed Bridge Locations (3 of 3)

The proposed bridges are divided into the following categories:

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

Please refer to the Preliminary Engineering Report for details of the engineering analysis performed for these bridges.

5.0 TRAFFIC NOISE ANALYSIS

Prior to conducting a detailed noise analysis, a desk-top review of the project was performed to determine if noise levels will likely increase as a result of the proposed improvements, if noise sensitive receptor sites are located within the project area, or if noise impacts are likely to occur. The desk-top review indicated that the proposed improvements associated with the project may cause design year (2040) traffic noise levels to approach or exceed the FHWA NAC at noise sensitive sites within the project limits. Therefore, in accordance with Part 2, Chapter 18 – *Highway Traffic Noise* of the FDOT PD&E Manual, a more detailed noise analysis was performed. The methods and results of this traffic noise analysis are summarized within this section and involved the following procedures:

- Identification of noise sensitive receptor sites;
- Field measurement of noise levels and noise model validation;
- Prediction of existing and future noise levels;
- Assessment of traffic noise impacts; and,
- Evaluation of the feasibility and reasonableness of noise abatement.

The recommended Build Alternative (herein referred to as the *Build Alternative*) is Alternative 2 along I-95 and the North Alignment along SW 10th Street. All design year alternatives include the improvements currently being constructed with the I-95 Express Lanes Phase III Project.

The FHWA Traffic Noise Model (TNM) Version 2.5 (February 2004) was used to predict traffic noise levels and to analyze the effectiveness of noise barriers. This model estimates the acoustic intensity at a noise sensitive site (the receptor) from a series of roadway segments (the source). Model-predicted noise levels are influenced by several factors, such as vehicle speed and distribution of vehicle types. Noise levels are also affected by characteristics of the source-to-receptor site path, including the effects of intervening barriers, obstructions (houses, trees, etc.), ground surface type (hard or soft) and topography. Elevation data for the existing travel lanes and the limited-access ROW lines were obtained from existing roadway plans where available.

Noise levels presented in this report represent the hourly equivalent sound level [Leq(h)]. The Leq(h) is the steady-state sound level, which contains

the same amount of acoustic energy as the actual time-varying sound level over a one-hour period. The Leq(h) is measured in A-weighted decibels [abbreviated as dB(A)], which closely approximate the range of frequencies a human ear can hear.

5.1 Noise Sensitive Receptor Sites

The FHWA has established NAC for seven land use activity categories. These criteria determine when an impact occurs and when consideration of noise abatement is required. Maximum noise level thresholds have been established for five of these activity categories. These maximum thresholds, or criteria levels, represent acceptable traffic noise level conditions. The NAC levels are presented in **Table 5-1**. Noise abatement measures must be considered when predicted noise levels approach or exceed the NAC levels or when a substantial noise increase occurs. The FDOT defines "approach" as within one dB(A) of the FHWA criteria. A substantial noise increase is defined as when the existing noise level is predicted to be exceeded by 15 dB(A) or more as a result of the transportation improvement project.

The developed lands along the project corridor were evaluated to identify the noise sensitive receptor sites that may be impacted by traffic noise associated with the proposed improvements. Noise sensitive receptor sites represent any property where frequent exterior human use occurs and where a lowered noise level would be of benefit. This includes residential units (FHWA Noise Abatement Activity Category B), other noise sensitive areas including parks, playgrounds, medical facilities, schools, and places of worship (Category C) and certain commercial properties (Category E). Noise sensitive sites also include interior use areas where no exterior activities occur for facilities such as auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, recording studios and schools (Category D).

5.1.1 I-95 - Southern Project Terminus to SW 10th Street (SR 869)

Noise sensitive sites along the segment of the I-95 project corridor from the southern project terminus near NW 40th Court to SW 10th Street are depicted in **Figure 5-1**. Noise sensitive sites are found along both sides of this project segment. These noise sensitive sites include over 400 residences; including single-family homes, mobile-homes and condominiums. Nearby

Table 5 - 1: Noise Abatement Criteria

Activity Category	Activity Leq(H)[1]		Evaluation Location	Description of Activity Category
	FHWA	FDOT		
A	57	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[2]	67	66	Exterior	Residential
C[2]	67	66	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[2]	72	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	–	–	–	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–	–	–	Undeveloped lands that are not permitted.

(Based on Table 1 of 23 CFR Part 772)

[1] The Leq(h) Activity Criteria values are for impact determination only, and are not a design standard for noise abatement measures.

[2] Includes undeveloped lands permitted for this activity category.

Note: FDOT defines that a substantial noise increase occurs when the existing noise level is predicted to be exceeded by 15 decibels or more as a result of the transportation improvement project. When this occurs, the requirement for abatement consideration will be followed.

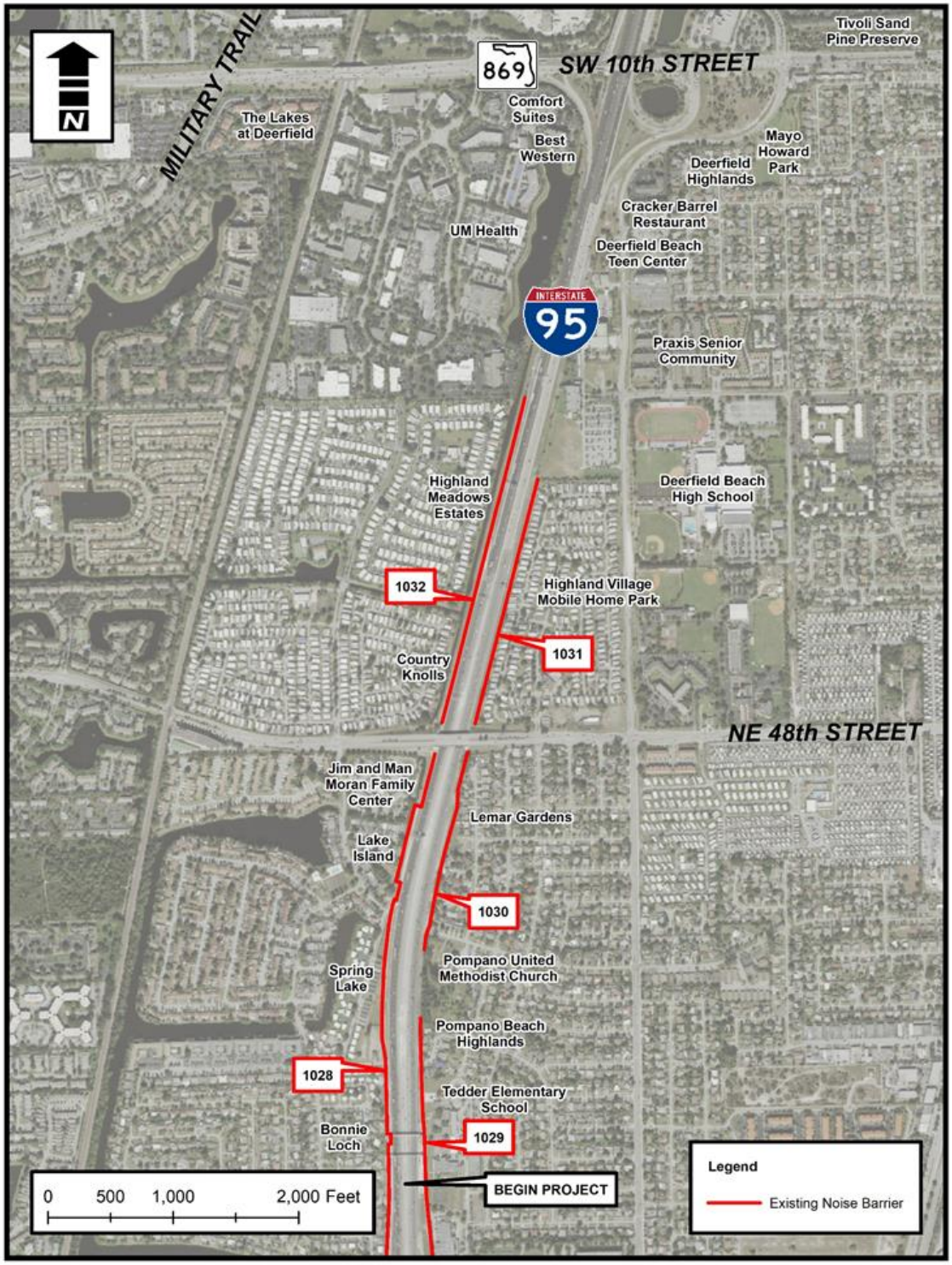


Figure 5 - 1: Noise Sensitive Sites from Southern Project Terminus to SW 10th Street (SR 869)

communities include; Pompano Beach Highlands, Lemar Gardens, Highland Village, Praxis, Deerfield Highlands, Bonne Loch, Spring Lake, Lake Island and Country Knolls. Two (2) schools are located along the east side of this project segment, Tedder Elementary School and Deerfield Beach High School. Other noise sensitive sites along the east side of this project segment include Parkway United Methodist Church at 100 NE 44th Street, a Cracker Barrel Restaurant at 1250 FAU Research Park Boulevard and Deerfield Beach Teen Center at 1303 FAU Research Park Boulevard. Other noise sensitive sites west of this project segment also include two hotels, the Best Western Plus at 1050 East Newport Center Drive and a Comfort Suites at 1040 East Newport Center Drive. This segment of the project also includes office buildings and institutional uses that are not considered noise sensitive (i.e., Activity Category F).

Four (4) noise barriers are located along this project segment, one along each side of the corridor. These noise barriers are as follows:

- 1029/1030 - Eastern limited-access ROW line, North of SR 834/W Sample Road to NE 48th Street, 4,650 feet long, 14 to 16 feet tall.
- 1031 – Eastern limited-access ROW line, NE 48th Street to NE 52nd Street, 2,015 feet long, 14 feet tall.
- 1028 – Western limited-access ROW line, SR 834/W Sample Road to NE 48th Street, 10,550 feet long, 7 to 16 feet tall.
- 1032 – Western limited-access ROW line, NW 48th Street to NE 53rd Place, 2,675 feet long, 16 feet tall.

5.1.2 I-95 - SW 10th Street (SR 869) To Hillsboro Boulevard (SR 810)

Noise sensitive sites along this segment of the I-95 project corridor are shown on **Figure 5-2**. Noise sensitive sites are found only along the east side of this segment of I-95 and include over 150 residences, primarily condominiums or apartments. Several single-family homes are included in this number. Pools at the Tivoli Park and Natura communities was also considered to be noise sensitive. This segment of the project also includes retail stores, office buildings and warehouses that are not considered noise sensitive (i.e., Activity Category F).

A new noise barrier has recently been constructed along the east side of the corridor as part of the FDOT's I-95 Express project, as follows:

- CD3-E10 (I-95 Express) – Eastern limited-access ROW line, north SW 10th Street to south of Hillsboro Boulevard, 4,335 feet long, 20 feet tall.

Figure 5 - 2: Noise Sensitive Sites from SW 10th Street (SR 869) To Northern Project Terminus

5.1.3 I-95 – Hillsboro Boulevard (SR 810) to Northern Project Terminus

Noise sensitive sites along this segment of the I-95 project corridor are shown on **Figure 5-2**. No residences are found along this project segment. Non-residential noise sensitive sites are found on both sides of this project segment. The Double Tree by Hilton Hotel Deerfield Beach, located at 100 Fairway Drive, is located to the east. To the west, a playground at JM Family Daycare located at 640 Jim Moran Boulevard and a walking trail at the JM&A Group office campus located at 700 Jim Moran Boulevard are found. This segment of the project also includes office buildings, warehouses and industrial/light industrial enterprises that are not considered noise sensitive (i.e., Activity Category F).

There are no existing or planned noise barriers along this segment of I-95.

5.1.4 SW 10th Street (SR 869)

Noise sensitive sites along SW 10th Street are shown on **Figure 5-1**. The residential noise sensitive sites west of I-95 along SW 10th Street (SR 869) include over 200 apartments in the two and three-story Lakes at Deerfield Apartments located at 1100 S Military Trail. A pool and tennis courts at the Lakes at Deerfield Apartments and a walking trail at the Tivoli Sand Pines Preserve are the only non-residential noise sensitive site along SW 10th Street within the limits of the project. This corridor also includes commercial use, office buildings and institutional uses that are not considered noise sensitive (i.e., Activity Category F).

5.1.5 Hillsboro Boulevard (SR 810)

There are no noise sensitive sites along Hillsboro Boulevard within the limits of this project. This corridor primarily includes commercial use, office buildings and institutional uses that are not considered noise sensitive (i.e., Activity Category F).

5.2 Field Measurement of Noise Levels and Model Validation

Measurements of sample existing noise levels along the project corridor were performed using procedures defined in the FHWA report *Measurement*

of Highway-Related Noise (FHWA-PD-96-046). Field measurements of existing noise levels were conducted on May 2, 2018 at four locations within the project study area. The locations of the field measurement sites are depicted on **Figure 5-3** and described in **Table 5-2**.

Three repetitions of ten-minute readings were measured at each site to ensure reasonable results. Where possible, readings were taken at the first and second rows of homes in residential communities. Unusual noises were documented to facilitate identification of any atypical noise sources along the alignment. Rion Model NL-21 Type-II integrating sound level meters were used to collect noise level data. Foam wind screens and adjustable tripods were also used. The sound level meters were calibrated to 94 dB at 1000 Hertz using a Rion Model NC-73 acoustical calibrator.

Traffic data was collected by the project team during each measurement period. Traffic speeds were measured using Bushnell Model# 101911 radar speed measuring equipment. Traffic volumes, speed data and noise levels were collected during 12 ten-minute sampling periods. The ambient temperature during the measurement periods was approximately 80 to 88 degrees Fahrenheit, and the wind generally from the east/southeast; and the average wind speed generally remained less than approximately seven miles per hour (MPH) throughout the measurement periods. The relative humidity was approximately 57 to 66 percent and the cloud cover varied between 10 to 90 percent throughout the measurement periods. All roadway surfaces remained clean and dry during the measurements. The data collected were then used as inputs to the TNM. The dates, times, traffic data and the measured and TNM-predicted noise levels are presented in Error! Reference source not found.

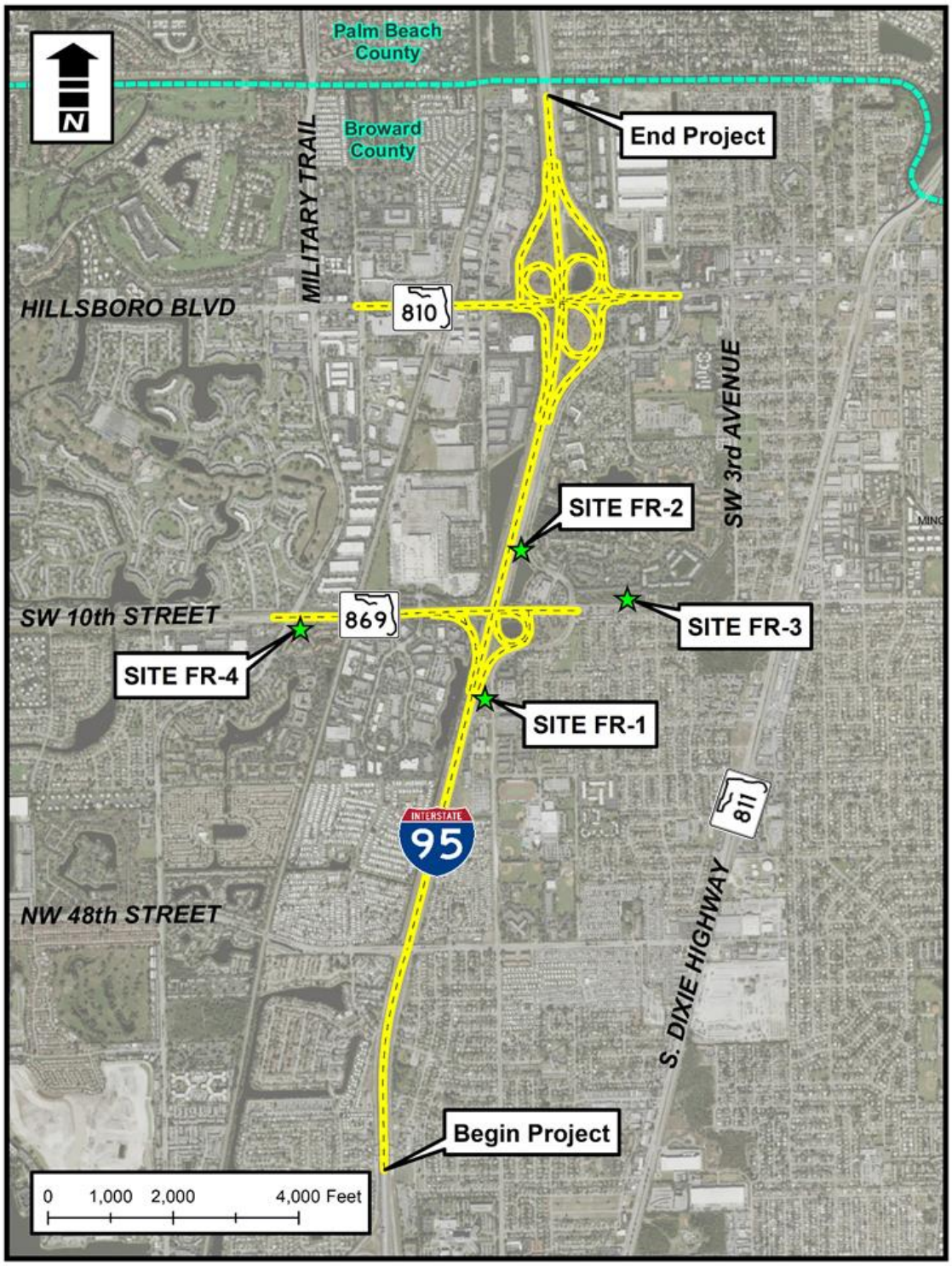


Figure 5 - 3: Site FR-1

Table 5 - 2: Field Measurement Data

Field Receptor	Location	Sample Run	Time/ Date	Measured 10-Minute Traffic Volume (Auto/MT/HT/B/ Mcy)	Distance From Roadway (Feet)	Measured Traffic Noise Level [dB(A)]	Modeled Traffic Noise Level [dB(A)]	Difference (Measured - Modeled) [dB(A)]
FR-1	Deerfield Beach Teen Center 1303 FAU Research Park Blvd	A	2:21PM 05-02-18	NB: 1020/35/51/0/1 SB: 1031/39/36/0/0	53	74.9	75.9	-1
					137	69.4	72.3	-2.9
		B	2:36PM 05-02-18	NB: 1156/36/40/1/0 SB: 1049/35/36/0/0	53	74.6	75.1	-0.5
					137	69.4	71.5	-2.1
		C	2:52PM 05-02-18	NB: 1091/29/55/0/2 SB: 1169/40/29/3/0	53	76.5	75.1	1.4
					137	68.7	71.4	-2.7
FR-2	Single-family homes along the east side of I-95. Near I-95 Station 1371+20.	A	11:03AM 05-02-18	NB: 825/32/66/1/1 SB: 970/31/36/0/1	60	74.9	76.1	-1.2
					120	72.0	74.3	-2.3
		B	11:21AM 05-02-18	NB: 916/41/56/0/1 SB: 1016/37/56/1/0	60	74.8	76.1	-1.3
					120	72.2	74.3	-2.1
		C	11:36AM 05-02-18	NB: 869/36/58/2/1 SB: 1062/36/37/2/0	60	75.0	76.2	-1.2
					120	72.3	74.4	-2.1
FR-3	Tivoli Sand Pines Preserve. Near SW 10th Street Station 45+10.	A	9:45AM 05-02-18	EB: 153/9/0/0/2 WB: 172/3/0/0/1	100	57.6	57.4	0.2
		B	10:00AM 05-02-18	EB: 152/5/5/0/2 WB: 126/1/0/2/1	100	57.2	56.8	0.4
		C	10:14AM 05-02-18	EB: 125/6/3/0/1 WB: 130/3/1/1/2	100	57.8	57.0	0.8
FR-4	The Lakes at Deerfield apartment homes located at 1100 S. Military Trail. Near SW 10th Street	A	12:32PM 05-02-18	EB: 307/12/4/1/0 WB: 339/12/7/1/0	40	66.2	68.2	-2
					130	65.0	64.0	1
		B	12:48PM 05-02-18	EB: 261/10/9/1/0 WB: 293/11/6/1/0	40	70.9	68.5	2.4
					130	66.2	64.5	1.7
		C	1:23PM 05-02-18	EB: 260/10/11/0/0 WB: 286/8/7/0/0	40	67.7	68.5	-0.8
					130	66.4	64.5	1.9

Notes: MT = Medium Trucks, HT = Heavy Trucks, B = Bus, Mcy = Motorcycles, northbound = Northbound, southbound = Southbound, eastbound = Eastbound, westbound = Westbound

5.2.1 Field Measurements Sites

5.2.1.1 Site FR-1

This measurement site is located along the east side of I-95, at the Deerfield Beach Teen Center located at 1303 FAU Research Park Boulevard (See **Figure 5-3**). This site is representative of noise sensitive single-family homes located east of I-95 between the southern project terminus and SW

10th Street. Traffic noise levels at this site were measured approximately 98 and 180 feet from the near edge of the outside northbound I-95 travel lane in order to be representative of nearby first and second row residences. Noise level readings were taken between 2:05 and 2:52 PM. Existing traffic noise levels were found to range from 74.6 to 76.5 dB(A) at the near location and 68.7 to 69.4 dB(A) at the far location.

5.2.1.2 Site FR-2

This measurement site is located along the east side of I-95, between the northbound lane of I-95 and SW Natura Boulevard (See **Figure 5-3**). This site is representative of noise sensitive single-family homes located east of the corridor between SW 10th Street and Hillsboro Boulevard. Traffic noise levels at this site were measured approximately 60 and 120 feet from the near edge of the outside northbound I-95 travel lane in order to be representative of nearby first and second row residences. Noise level readings were taken between 11:03 AM and 11:52 AM. Existing traffic noise levels were found to range from 74.8 to 75.0 dB(A) at the near location and 72.0 to 72.3 dB(A) at the far location.

5.2.1.3 Site FR-3

This measurement site is located within Tivoli Sand Pines Preserve along the north side of SR 869/SW 10th Street, at the intersection of SW 6th Avenue and SR 869/SW 10th Street (See **Figure 5-3**). This site is representative of noise sensitive sites located north of SR 869/SW 10th Street between I-95 and S. Dixie Highway. Traffic noise levels at this site were measured approximately 100 feet from the near edge of the westbound SW 10th Street travel lane in order to be representative of visitors on nature trail at Tivoli Sand Pines Preserve. Noise level readings were taken between 9:45 AM and 10:28 AM. Existing traffic noise levels were found to range from 57.2 to 57.8 dB(A) at the noise level reading location.

5.2.1.4 Site FR-4

This measurement site is located along the south side of SR 869/SW 10th Street, at the Lakes at Deerfield apartments (See **Figure 5-3**). This site is representative of noise sensitive multi-family homes located south of the SR 869/SW 10th Street between I-95 and Military Trail. Traffic noise levels at

this site were measured approximately 40 and 130 feet from the near edge of the eastbound SW 10th Street travel lane in order to be representative of the nearby residences. Noise level readings were taken between 12:32 and 1:23 PM. Existing traffic noise levels were found to range from 66.2 to 67.7 dB(A) at the near location and 65.0 to 66.4 dB(A) at the far location.

5.2.1.5 Field Measurement Summary

Existing noise levels were measured at four sites along the project corridor during 12 ten-minute long sampling periods. Traffic noise levels were found to range from 68.7 to 75.0 dB(A) at the two sites along I-95 (FR-1 and FR-2) and from 57.2 to 67.7 dB(A) at the two sites along the arterial roadways (FR-3 and FR-4 along SR 869/SW 10th Street). In all cases, traffic noise from either I-95 or the arterial roadways was the predominant source of noise at the nearby noise sensitive sites.

5.3 Computer Noise Model Validation

Site conditions and traffic data gathered during the field measurements were used to develop inputs to the FHWA's TNM 2.5 for computer models representative of the existing conditions. Additional geometric information necessary for these models was developed from aerial photographs and/or MicroStation files of the existing conditions in the project study area. The TNM results were then compared to the noise level data collected for each field measurement sample. The results of this analysis are shown in **Table 5-2**. The model inputs for the field conditions are deemed to be within an acceptable level of accuracy if the predicted noise levels are within ±3.0 dB(A) of the measured noise levels. These model inputs are then used as a basis for additional model runs used to predict existing and future noise levels at representative nearby noise sensitive locations. The difference for each of the field measurements falls within the ±3.0 dB(A) verification limit in accordance with Chapter 18 of the FDOT PD&E Manual. Thus, further use of the TNM model on this project is supported.

5.4 Noise Model Development

After verification of the prediction methodology, computer models were developed for the existing year (2018) conditions, and the design year (2040) No-Build Alternative and recommended Build Alternative. The TNM

models for all Alternatives were developed using geometric information from the project master plans. Traffic data used in the TNM models were derived from traffic data provided by the FDOT traffic consultant for the project and from data contained in the 2012 FDOT Quality/Level of Service Handbook tables. These data may be found in **Appendix A**. According to Chapter 18 of the PD&E Manual, "Maximum peak-hourly traffic representing Level of Service (LOS) "C", or demand LOS of "A", "B", or "C" will be used (unless analysis shows that other conditions create a "worst-case" level)". In cases where traffic volumes on project roadways were predicted to operate at worse than LOS C, the LOS C project data were used. In overcapacity situations, this represents the highest traffic volume traveling at the highest average speed, which typically generates the highest noise levels at a given site during a normal day.

Representative receptor sites were used in the TNM model inputs to estimate noise levels associated with existing and future conditions within the project study area. These sites were chosen based on noise sensitivity, roadway proximity, anticipated impacts from the proposed project, and homogeneity (i.e., the site is representative of other nearby sites). For single-family homes, traffic noise levels were predicted at the edge of the dwelling unit closest to the nearest primary roadway. For other noise sensitive sites that may be impacted, traffic noise levels were predicted where the exterior activity occurs. For the prediction of interior noise levels, receptor sites were placed ten feet inside the building at the edge closest to roadway. Building noise reduction factors identified in *Figure 18-3* of Chapter 18 of the PD&E Manual and window conditions were used to estimate the noise reduction due to the physical structure. All receptor sites were modeled five feet above the local ground elevation. Two-hundred four model receptors representative of approximately 610 residential noise sensitive sites and the 22 non-residential noise sensitive locations described in **Section 5.1** of this report were input into the TNM model. These locations are described in **Table 5-3**.

5.5 Predicted Noise Levels

The TNM results for the worst-case traffic conditions for the existing (2018) conditions and the Design Year (2040) No Build and Build Alternatives are summarized in the following sections. Predicted noise levels for individual model receptors are presented in **Table 5-3** and shown in **Appendix B**.

Table 5 - 3: Modeled Noise Receptor Locations and Noise Analysis Results

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Build/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Build	Build
I-95 - Southern Project Terminus to SW 10th Street (SR 869) East Side										
TES-PG	Tedder Elementary School	Playground	Playground (C)	66	16+50	1	110/110/105	64.0	65.6	65.3
PBH-1	Pompano Beach Highlands	SFH	Residential (B)	66	19+00	4	75/75/75	63.1	65.3	65.0
PBH-2		SFH	Residential (B)	66	19+85	6	170/170/165	61.7	63.0	62.8
PBH-3		SFH	Residential (B)	66	19+85	6	280/280/275	59.0	59.2	59.0
PBH-4		SFH	Residential (B)	66	20+70	4	200/200/195	61.7	62.9	62.6
PBH-5		SFH	Residential (B)	66	21+45	1	60/60/60	61.8	64.5	64.1
PBH-6		SFH	Residential (B)	66	22+75	6	355/355/355	60.2	61.4	61.2
PUMC	Parkway United Methodist Church	Church	Church (C)	66	28+00	SLU	205/205/265	60.0	61.5	61.2
LG-1	Lemar Gardens	SFH	Residential (B)	66	31+50	4	80/80/100	60.0	62.6	61.4
LG-2		SFH	Residential (B)	66	31+25	4	180/180/195	60.9	62.5	61.8
LG-3		SFH	Residential (B)	66	31+00	4	275/275/295	57.9	58.8	58.3
LG-4		SFH	Residential (B)	66	34+00	3	300/300/320	58.3	59.0	58.5
LG-5		SFH	Residential (B)	66	34+70	6	180/180/205	61.3	62.9	62.2
LG-6		SFH	Residential (B)	66	35+00	3	85/85/110	59.9	62.5	61.2
LG-7		SFH	Residential (B)	66	38+65	3	155/155/180	61.7	63.3	62.4
LG-8		SFH	Residential (B)	66	39+00	5	305/305/340	58.6	59.3	58.7
LG-9		SFH	Residential (B)	66	41+00	4	110/110/140	61.6	63.3	62.1
LG-10		SFH	Residential (B)	66	42+20	5	225/225/250	60.3	61.1	60.5
LG-11		SFH	Residential (B)	66	44+00	1	75/75/95	60.5	61.4	60.1
HV1	Highland Village Mobile Home Park	SFH	Residential (B)	66	47+60	2	100/80/90	69.7	71.7	**67.4**
HV2		SFH	Residential (B)	66	50+35	5	90/60/65	62.6	64.7	64.1
HV3		SFH	Residential (B)	66	53+00	10	90/55/60	62.4	64.8	**66.5**
HV4		SFH	Residential (B)	66	57+70	10	85/50/40	62.1	64.6	**74.6**
HV5		SFH	Residential (B)	66	61+00	6	95/60/40	62.8	65.1	**72.8**
HV6		SFH	Residential (B)	66	64+15	7	95/65/40	63.3	65.6	**69.0**
HV7		SFH	Residential (B)	66	66+60	2	105/75/50	70.4	72.5	64.6

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Build/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Build	Build
HV8	Highland Village Mobile Home Park	SFH	Residential (B)	66	48+20	3	220/195/210	62.4	63.7	62.1
HV9		SFH	Residential (B)	66	51+00	5	215/185/190	59.7	61.7	61.2
HV10		SFH	Residential (B)	66	53+25	6	220/190/190	58.7	60.1	61.7
HV11		SFH	Residential (B)	66	58+00	11	225/190/180	59.2	60.3	64.1
HV12		SFH	Residential (B)	66	60+40	5	215/180/160	58.8	59.9	62.4
HV13		SFH	Residential (B)	66	63+00	4	215/180/160	60.6	61.9	64.5
HV14		SFH	Residential (B)	66	66+40	2	205/175/150	66.9	68.5	63.3
DBHSTennis	Deerfield Beach High School	Tennis Courts	Active Sports Area (C)	66	66+25	1	890/860/835	58.6	60.1	57.7
DBHSFootball		Sports Field	Active Sports Area (C)	66	70+00	1	880/855/825	57.2	58.3	58.1
PRAX1(a)	Praxis Senior Community	MFH	Residential (B)	66	77+00	2	610/590/535	58.9	60.7	59.5
PRAX1(b)		MFH	Residential (B)	66	77+00	2	610/590/535	62.1	63.3	61.9
PRAX1(c)		MFH	Residential (B)	66	77+00	2	610/590/535	63.4	64.3	62.7
PRAX1(d)		MFH	Residential (B)	66	77+00	2	610/590/535	63.9	65.2	63.1
PRAX2(a)		MFH	Residential (B)	66	78+25	2	600/575/515	59.5	61.5	60.1
PRAX2(b)		MFH	Residential (B)	66	78+25	2	600/575/515	63.1	64.3	62.8
PRAX2(c)		MFH	Residential (B)	66	78+25	2	600/575/515	64.3	65.2	63.3
PRAX2(d)		MFH	Residential (B)	66	78+25	2	600/575/515	64.8	66.1	63.7
PRAX3(a)		MFH	Residential (B)	66	77+00	2	590/565/600	59.3	61.3	60.2
PRAX3(b)		MFH	Residential (B)	66	77+00	2	590/565/600	62.8	64.0	62.7
PRAX3(c)		MFH	Residential (B)	66	77+00	2	590/565/600	64.1	65.0	63.4
PRAX3(d)		MFH	Residential (B)	66	77+00	2	590/565/600	64.6	66.0	63.9
PRAX4(a)		MFH	Residential (B)	66	78+25	2	570/545/590	60.2	62.1	60.3
PRAX4(b)		MFH	Residential (B)	66	78+25	2	570/545/575	63.4	64.6	62.6
PRAX4(c)		MFH	Residential (B)	66	78+25	2	570/545/575	64.6	65.5	63.2
PRAX4(d)		MFH	Residential (B)	66	78+25	2	570/545/575	65.1	66.5	63.7
PRAX5(a)		MFH	Residential (B)	66	77+75	2	570/545/515	58.8	60.7	59.4
PRAX5(b)		MFH	Residential (B)	66	77+75	2	570/545/515	62.0	63.2	61.8

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Build/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Build	Build
PRAX5(c)	Praxis Senior Community	MFH	Residential (B)	66	77+75	2	570/545/515	63.2	64.1	62.5
PRAX5(d)		MFH	Residential (B)	66	77+75	2	570/545/515	63.8	65.1	63.0
PRAX6(a)		MFH	Residential (B)	66	79+00	2	550/525/495	60.0	61.9	58.8
PRAX6(b)		MFH	Residential (B)	66	79+00	2	550/525/495	63.2	64.4	61.0
PRAX6(c)		MFH	Residential (B)	66	79+00	2	550/525/495	64.4	65.3	61.6
PRAX6(d)		MFH	Residential (B)	66	79+00	2	550/525/495	65.0	66.3	62.0
PRAX7(a)		MFH	Residential (B)	66	75+75	2	685/660/630	54.6	56.5	55.5
PRAX7(b)		MFH	Residential (B)	66	75+75	2	685/660/630	58.7	60.0	58.6
PRAX7(c)		MFH	Residential (B)	66	75+75	2	685/660/630	60.6	61.5	59.8
PRAX7(d)		MFH	Residential (B)	66	75+75	2	685/660/630	61.3	62.3	60.4
PRAX8(a)		MFH	Residential (B)	66	77+75	2	635/610/580	53.7	55.4	54.0
PRAX8(b)		MFH	Residential (B)	66	77+75	2	635/610/580	56.4	57.6	56.5
PRAX8(c)		MFH	Residential (B)	66	77+75	2	635/610/580	57.5	58.3	57.1
PRAX8(d)		MFH	Residential (B)	66	77+75	2	635/610/580	58.4	59.7	57.6
PRAX9(a)		MFH	Residential (B)	66	79+00	2	605/585/550	53.0	54.9	49.8
PRAX9(b)		MFH	Residential (B)	66	79+00	2	605/585/550	56.1	57.4	51.3
PRAX9(c)		MFH	Residential (B)	66	79+00	2	605/585/550	57.2	58.1	51.8
PRAX9(d)		MFH	Residential (B)	66	79+00	2	605/585/550	58.0	59.5	52.1
DBTCBBall	Deerfield Beach Teen Center Basketball Court	Public Institution Structure	Active Sports Area (C)	66	88+10	1	75/75/65	77.1	78.9	**76.6**
CBpatio	Cracker Barrel Restaurant	Restaurant Exterior Patio	Sensitive Commercial (E)	71	89+00	1	410/390/385	65.2	67.0	66.6
DH1	Deerfield Highlands	SFH	Residential (B)	66	613+40	3	410/395/395	58.9	60.7	59.4
DH2		SFH	Residential (B)	66	614+00	1	235/215/215	65.0	67.7	64.6
DH3		SFH	Residential (B)	66	614+80	1	150/135/135	66.1	69.2	**66.5**
DH4		SFH	Residential (B)	66	616+00	3	155/140/140	65.7	67.6	**66.0**
DH5		SFH	Residential (B)	66	617+00	3	50/50/50	62.5	63.5	62.9
DH6		SFH	Residential (B)	66	615+45	3	330/310/310	63.5	64.5	57.4

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Build/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Build	Build
MayoPark1	Mayo Howard Park	Park	Park (C)	66	619+00	1	95/90/90	59.5	60.5	62.2
MayoPark2		Park	Park (C)	66	618+00	1	120/120/120	58.5	59.3	61.1
West Side										
BL-1	Bonnie Loch	SFH	Residential (B)	66	13+00	1	95/95/95	63.6	64.7	64.6
BL-2		SFH	Residential (B)	66	13+55	2	170/170/170	59.5	60.0	59.9
BL-3		SFH	Residential (B)	66	14+10	1	105/105/105	63.0	64.1	64.1
SL-1	Spring Lake	SFH	Residential (B)	66	16+50	2	80/80/80	62.2	63.9	63.8
SL-2		SFH	Residential (B)	66	17+00	4	230/230230	59.3	59.7	59.6
SL-Pool		SFH	Residential (B)	66	17+55	SLU	95/95/95	63.0	64.5	64.4
SL-3		SFH	Residential (B)	66	17+65	3	120/120/125	61.9	63.3	63.2
SL-4		SFH	Residential (B)	66	20+45	2	85/85/85	61.7	63.7	63.6
SL-5		SFH	Residential (B)	66	20+70	3	270/270/270	60.4	61.7	61.5
SL-6		SFH	Residential (B)	66	22+00	2	235/235/235	60.8	62.3	62.1
SL-7		SFH	Residential (B)	66	23+20	6	180/180/180	61.4	63.1	62.9
SL-8		SFH	Residential (B)	66	23+35	3	310/310/310	57.7	58.7	58.6
SL-9		SFH	Residential (B)	66	24+65	4	355/355/350	57.3	58.3	58.1
SL-10		SFH	Residential (B)	66	25+35	2	260/260/255	59.0	59.3	59.4
SL-11		SFH	Residential (B)	66	25+35	5	115/115/110	61.8	63.9	63.9
SL-12		SFH	Residential (B)	66	27+15	3	75/75/65	60.0	62.5	62.9
SL-13		SFH	Residential (B)	66	27+80	4	205/205/190	59.8	61.4	61.5
SL-14		SFH	Residential (B)	66	28+00	5	265/265/255	57.9	58.9	59.0
SL-15		SFH	Residential (B)	66	30+30	2	160/160/145	61.2	63.1	63.6
SL-16		SFH	Residential (B)	66	31+65	1	180/180/165	61.1	62.9	64.0
SL-17		SFH	Residential (B)	66	32+30	2	280/280/260	58.9	60.2	61.4
LI-1	Lake Island	SFH	Residential (B)	66	33+60	2	115/115/90	62.6	64.5	**70**.2
LI-2		SFH	Residential (B)	66	34+85	5	215/215/185	61.2	62.7	64.6
LI-3		SFH	Residential (B)	66	35+65	10	295/295/270	59.0	60.4	61.6
LI-4		SFH	Residential (B)	66	36+30	4	265/265/235	58.5	59.9	60.9
LI-5		SFH	Residential (B)	66	36+15	1	165/165/135	61.3	62.9	64.0

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Build/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Build	Build
LI-6	Lake Island	SFH	Residential (B)	66	38+75	2	125/125/90	62.4	64.0	65.6
LI-7		SFH	Residential (B)	66	38+85	5	255/255/215	58.0	58.9	60.8
LI-8		SFH	Residential (B)	66	39+00	2	385/385/350	55.6	56.2	56.1
MFC	Jim and Man Moran Family Center	Medical	Medical (C)	66	41+40	SLU	295/295/260	58.0	57.6	59.7
CK1	Country Knolls	SFH	Residential (B)	66	48+40	3	155/140/105	67.8	69.1	**72.1**
CK2		SFH	Residential (B)	66	51+50	10	145/125/95	62.9	64.3	**73.3**
CK3		SFH	Residential (B)	66	55+65	4	160/140/100	62.7	63.9	**73.1**
CK4		SFH	Residential (B)	66	50+65	4	255/235/205	60.1	60.6	62.8
CK5		SFH	Residential (B)	66	52+80	7	260/245/210	56.7	57.3	63.2
CK6		SFH	Residential (B)	66	55+65	3	270/250/210	59.0	59.9	**67.5**
HM1	Highland Meadows Estates	SFH	Residential (B)	66	58+30	4	150/130/90	62.9	64.3	**75.9**
HM2		SFH	Residential (B)	66	63+70	12	155/135/80	62.8	64.2	**73.5**
HM3		SFH	Residential (B)	66	67+60	15	155/135/75	63.6	65.1	**69.7**
HM4		SFH	Residential (B)	66	71+15	4	155/135/75	65.3	67.1	**66.4**
HM5		SFH	Residential (B)	66	58+70	6	255/235/195	57.0	57.6	64.1
HM6		SFH	Residential (B)	66	64+00	6	280/260/230	56.7	57.2	63.3
HM7		SFH	Residential (B)	66	67+85	6	255/235/175	57.0	57.6	63.2
HM8		SFH	Residential (B)	66	70+35	3	275/255/195	58.5	59.5	63.3
HMPool		Pool	Res. Pool (C)	66	68+65	1	495/475/415	61.1	62.1	58.5
UMHealth(Int)	UM Health	Medical Office	Interior (D)	51	87+45	1	355/340/300	45.0	46.7	43.7
BWPool	Best Western Pool	Pool	Sensitive Commercial (E)	71	94+75	1	270/275/225	65.8	67.0	65.6
CSPool	Comfort Suites Pool	Pool	Sensitive Commercial (E)	71	98+25	1	175/170/180	62.2	62.9	63.9

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Build/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Build	Build
I-95 - SW 10th Street (SR 869) To Hillsboro Boulevard (SR 810)										
East Side										
TIV1(a)	Tivoli Park	MFH	Residential (B)	66	109+00	4	620/590/575	56.4	57.1	58.0
TIV1(b)		MFH	Residential (B)	66	109+00	4	405/375/580	62.7	63.5	63.3
TIV2(a)		MFH	Residential (B)	66	110+45	2	405/375/360	57.5	58.1	59.3
TIV2(b)		MFH	Residential (B)	66	110+45	2	540/510/360	63.6	64.4	64.3
TIV6(a)		MFH	Residential (B)	66	111+20	6	540/510/495	54.0	54.7	54.9
TIV6(b)		MFH	Residential (B)	66	111+20	6	340/310/495	57.7	58.6	58.2
TIV3(a)		MFH	Residential (B)	66	111+20	2	340/310/295	57.8	58.5	59.8
TIV3(b)		MFH	Residential (B)	66	111+20	2	260/230/295	63.6	64.3	64.3
TIV4(a)		MFH	Residential (B)	66	113+00	2	260/230/220	59.2	59.9	61.0
TIV4(b)		MFH	Residential (B)	66	113+00	2	420/385/220	64.0	64.8	64.5
TIV7(a)		MFH	Residential (B)	66	113+30	4	420/385/375	55.6	56.4	57.3
TIV7(b)		MFH	Residential (B)	66	113+30	4	240/210/374	58.2	59.1	58.3
TIV5(b)		MFH	Residential (B)	66	114+25	2	240/210/189	64.6	65.3	64.8
TIV5(a)		MFH	Residential (B)	66	114+25	2	570/535/189	57.8	58.1	58.2
TIV8(b)		MFH	Residential (B)	66	115+70	4	570/535/515	57.7	58.3	58.4
TIV8(a)		MFH	Residential (B)	66	115+70	4	620/590/515	56.2	56.8	57.5
TIV9(a)		MFH	Residential (B)	66	117+50	4	590/560/535	56.7	57.5	57.1
TIV9(b)		MFH	Residential (B)	66	117+50	4	590/560/535	57.7	58.4	58.9
TIV10		MFH	Residential (B)	66	120+85	1	455/435/390	56.8	57.6	58.1
TIV Pool		Pool	Res. Pool (C)	66	122+00	1	535/510/480	54.5	55.1	58.0
NAT1	Natura	MFH	Residential (B)	66	127+50	4	250/230/195	58.7	59.3	61.4
NAT2		MFH	Residential (B)	66	127+30	4	335/315/280	57.8	58.0	60.9
NAT3		MFH	Residential (B)	66	128+75	4	290/270/235	59.3	59.7	61.8
NAT4(a)		MFH	Residential (B)	66	129+75	1	245/230/195	58.1	58.7	59.8
NAT4(b)		MFH	Residential (B)	66	129+75	1	245/230/195	61.0	61.7	62.4
NAT4(c)		MFH	Residential (B)	66	129+75	1	245/230/195	62.9	63.2	64.1
NAT5(a)		MFH	Residential (B)	66	62+90	2	305/305/285	55.4	56.2	56.3

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Build/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Build	Build
NAT5(b)	Natura	MFH	Residential (B)	66	62+90	2	305/305/285	58.9	59.8	59.5
NAT5(c)		MFH	Residential (B)	66	62+90	2	305/305/285	63.5	64.3	63.8
NAT6		MFH	Residential (B)	66	64+20	2	225/225/210	62.0	62.4	62.5
NAT7		MFH	Residential (B)	66	65+25	2	230/230/220	62.7	62.1	61.9
NAT8		MFH	Residential (B)	66	67+00	2	210/205/215	61.4	62.0	62.6
NAT9		MFH	Residential (B)	66	70+00	3	200/200/205	61.1	61.5	63.1
NAT10		MFH	Residential (B)	66	72+00	2	210/200/205	62.0	62.4	62.1
NAT11		MFH	Residential (B)	66	73+00	3	235/235/240	61.7	62.0	62.1
NAT12		MFH	Residential (B)	66	74+00	2	360/360/365	60.3	60.7	60.6
NAT13		MFH	Residential (B)	66	74+75	4	335/335/325	52.5	53.2	53.7
NAT14		MFH	Residential (B)	66	66+90	2	285/275/285	58.0	58.6	58.7
NAT15		MFH	Residential (B)	66	69+00	4	290/290/295	57.6	58.1	58.6
NAT16		MFH	Residential (B)	66	72+20	3	295/290/295	58.4	59.1	58.7
NAT17		MFH	Residential (B)	66	73+25	4	350/350/355	58.6	59.3	58.4
NATPool		Pool	Res. Pool (C)	66	60+00	1	535/535/500	52.8	53.2	54.8
Hillsboro Boulevard (SR 810) to northern project terminus										
East Side										
HiltonPool	Hilton Pool	Pool	Sensitive Commercial (E)	71	159+25	1	265/265/265	61.2	61.0	62.2
West Side										
JM-Pg	JM Family Daycare Playground	Playground	Playground (C)	66	182+00	1	355/355/350	66.5	68.5	68.8
JM-WT	JM&A Group Walking Trail	Trail	Trail (C)	66	186+00	1	575/575/580	61.8	63.4	64.8
SW 10th Street (SR 869)										
South Side										
LD1(a)	The Lakes at Deerfield	MFH	Residential (B)	66	173+45	4	130/130/135	60.9	62.0	63.5
LD1(b)		MFH	Residential (B)	66	173+45	2	130/130/135	63.4	64.1	**66.2**
LD1(c)		MFH	Residential (B)	66	173+45	4	130/130/135	64.1	64.9	65.1
LD2(a)		MFH	Residential (B)	66	174+15	4	135/135/140	62.0	63.1	65.0
LD2(b)		MFH	Residential (B)	66	174+15	4	135/135/140	64.6	65.3	**66.3**

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Build/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Build	Build
LD2(c)	The Lakes at Deerfield	MFH	Residential (B)	66	174+15	2	135/135/140	65.3	66.0	**67.4**
LD3(a)		MFH	Residential (B)	66	175+60	4	175/175/110	64.6	65.3	65.3
LD3(b)		MFH	Residential (B)	66	175+60	4	175/175/110	64.7	65.3	**67.1**
LD3(c)		MFH	Residential (B)	66	175+60	2	175/175/110	64.7	65.4	**68.2**
LD4(a)		MFH	Residential (B)	66	177+00	4	300/300/260	56.6	57.2	57.9
LD4(b)		MFH	Residential (B)	66	177+00	4	300/300/260	59.4	60.0	58.9
LD4(c)		MFH	Residential (B)	66	177+00	2	300/300/260	61.0	61.6	63.5
LD5(a)		MFH	Residential (B)	66	177+70	1	215/215/180	61.2	62.2	62.5
LD5(b)		MFH	Residential (B)	66	177+70	4	215/215/180	64.1	64.6	63.5
LD5(c)		MFH	Residential (B)	66	177+70	2	215/215/180	65.1	65.7	65.7
LD6(a)		MFH	Residential (B)	66	179+50	4	175/175/140	61.3	62.0	63.6
LD6(b)		MFH	Residential (B)	66	179+50	4	175/175/140	64.3	65.0	65.0
LD6(c)		MFH	Residential (B)	66	179+50	2	175/175/140	65.9	66.4	**67.0**
LD7(a)		MFH	Residential (B)	66	181+00	4	180/180/125	60.5	61.1	63.6
LD7(b)		MFH	Residential (B)	66	181+00	4	180/180/125	62.6	63.2	64.8
LD7(c)		MFH	Residential (B)	66	181+00	2	180/180/125	65.2	65.8	**66.1**
LD8(a)		MFH	Residential (B)	66	181+30	4	360/360/300	50.8	51.4	58.9
LD8(b)		MFH	Residential (B)	66	181+30	4	360/360/300	53.3	53.9	59.1
LD8(c)		MFH	Residential (B)	66	181+30	2	360/360/300	58.4	59.0	63.1
LD9(a)		MFH	Residential (B)	66	180+00	4	400/400/360	51.3	51.9	59.0
LD9(b)		MFH	Residential (B)	66	180+00	4	400/400/360	54.2	54.8	60.6
LD9(c)		MFH	Residential (B)	66	180+00	2	400/400/360	57.9	58.5	62.4
LDPool		Pool	Res. Pool (C)	66	175+00	1	385/385/340	51.7	52.3	57.2
LDTennis		Tennis Courts	Active Sports Area (C)	66	175+35	1	280/280/240	54.7	55.5	59.4
North Side										
TSPPark	Tivoli Sand Pine Preserve	Trail	Trail (C)	66	103+00	1	70/70/60	66.4	67.1	**67.7**

Notes: * = To existing edge-of-pavement of the nearest travel lane.
Shaded cells/bold numbers indicate Build Alternative noise levels equal or exceeding FDOT Noise Abatement Criteria
SFH = Single-Family Home, MFH = Multi-Family Home (i.e., apartments, condominiums), SLU = Special Land Use site

5.5.1 I-95

Existing traffic noise levels at the residences along I-95 are predicted by TNM to range from 52.5 to 70.4 dB(A) during peak periods. Design year worst-case traffic noise levels with the No-Build Alternative are predicted to range from 53.2 to 72.5 dB(A) and to be no more than 3.1 dB(A) greater than existing levels at these residences. Design year worst-case traffic noise levels at the residences are predicted to range from 49.8 to 75.9 dB(A) with the recommended Build Alternative. These predicted levels are no more than 13.0 dB(A) greater than the existing levels and 11.6 dB(A) greater than those of the No-Build Alternative. Existing traffic noise levels at the non-residential noise sensitive sites along I-95 are predicted to range from 45.0 dB(A) inside the UM Health offices to 77.1 dB(A) at the Teen Center Basketball court during peak periods. Design year worst-case traffic noise levels with the No-Build Alternative are predicted to range from 46.7 to 78.9 dB(A) at the same locations, no more than 2.0 dB(A) greater than existing levels at these sites. Design year worst-case traffic noise levels with the recommended Build Alternative are predicted to range from 43.7 to 76.6 dB(A); no more than 3.5 dB(A) greater than the existing levels and 2.9 dB(A) greater than those of the No-Build Alternative.

5.5.2 SW 10th Street (SR 869)

Existing traffic noise levels at residences along SR 869/SW 10th Street are predicted by TNM to range from 50.8 to 65.9 dB(A) during peak periods. Design year worst-case traffic noise levels with the No-Build Alternative are predicted to range from 51.4 to 66.4 dB(A) and to be no more than 1.1 dB(A) greater than existing levels at these residences. Design year worst-case traffic noise levels at the residences are predicted to range from 57.9 to 68.2 dB(A) with the recommended Build Alternative. These predicted levels are no more than 8.1 dB(A) greater than the existing levels and 7.5 dB(A) greater than those of the No-Build Alternative. Existing traffic noise levels at the non-residential noise sensitive sites along SR 869/SW 10th Street are predicted to range from 51.7 to 66.4 dB(A) during peak periods. Design year worst-case traffic noise levels with the No-Build Alternative are predicted to range from 52.3 to 67.1 dB(A), no more than 0.8 dB(A) greater than existing levels at these sites. Design year worst-case traffic noise levels with the recommended Build Alternative are predicted to range from 57.2 to

67.7dB(A); up to 5.5 dB(A) greater than the existing levels and up to 3.8 dB(A) greater than those of the No-Build Alternative.

5.6 Noise Impact Analysis

Approximately 610 residences with the potential to be impacted by the proposed improvements were identified along I-95, SR 869/SW 10th Street, and SR 810/Hillsboro Boulevard. within the project study area. These residences include single-family homes, mobile-homes, two to four-unit multi-family homes and apartment/condominium complexes. Also, 22 noise sensitive non-residential/special-use locations were identified in the project study area. These include parks, playgrounds, hotel and residential pools, tennis courts, sports fields, basketball courts, restaurant outdoor seating areas and medical office interiors. Under the existing conditions, the primary source of noise at the nearby noise sensitive sites is traffic on the subject roadways (I-95 and SW 10th Street) but also FAU Research Park Boulevard, Natura Boulevard, S Military Trail and Hillsboro Boulevard.

During the design year, the primary source of noise in the area is expected to remain traffic on the nearby roadways listed above. The planned improvements will add elevated direct-connect ramps between I-95 and SW 10th Street and a new CD system along the east side of I-95 between NE 48th Street and Hillsboro Boulevard. Predicted design year traffic noise levels for the Build Alternative were compared to the NAC and to noise levels predicted for the existing conditions, to assess potential noise impacts associated with the proposed project (see **Table 5-3**).

Build Alternative traffic noise levels at the residences are expected to range from approximately 49.8 to 75.9 dB(A) during the project's design year. Build Alternative traffic noise levels at the non-residential/special-use sites are expected to range from approximately 43.7 dB(A) inside the UM Health facility to 76.6 dB(A) at the basketball court located at the Deerfield Beach Teen Center. The worst-case design year traffic noise levels with the Build Alternative are predicted to be no more than 13.0 dB(A) greater than existing levels and 11.6 greater than the design year No Build noise levels.

5.6.1 I-95 - Southern Project Terminus to SW 10th Street (SR 869)

Build Alternative traffic noise levels are predicted to approach or exceed the FHWA NAC - 67 dB(A) at 96 residences along the segment of the I-95 project corridor between the southern project terminus and SW 10th Street. Build Alternative traffic noise levels at the non-residential noise sensitive sites along this project segment are predicted to approach or exceed the FHWA NAC - 67 dB(A) at the Teen Center basketball court. No other sites are predicted to be impacted by Build Alternative traffic noise.

5.6.2 I-95 - SW 10th Street (SR 869) to Hillsboro Boulevard (SR 810)

Build Alternative traffic noise levels are not predicted to approach or exceed the FHWA NAC - 67 dB(A) at any of the residences along the segment of the I-95 project corridor between SW 10th Street and Hillsboro Boulevard. All of these sites are located behind a recently constructed 20-foot tall noise barrier along the eastern limited-access ROW line. No other sites are predicted to be impacted by Build Alternative traffic noise. With the current recommended Build Alternative, the southern 950 feet of this noise barrier (between Sta. 34+50 and 44+00) will be removed to accommodate the project. However, the structure of the elevated northbound CD system (MSE/Retaining Wall) will block much of the noise from the I-95 mainline.

5.6.3 I-95 – Hillsboro Boulevard (SR 810) to the Northern Project Terminus

The Build Alternative traffic noise level at the playground at the JM Family Daycare Center is predicted to approach or exceed the FHWA NAC – 67 dB(A). No other sites are predicted to be impacted by Build Alternative traffic noise.

5.6.4 SW 10th Street (SR 869)– Western Project Terminus to the Eastern Project Terminus

Build Alternative traffic noise levels are predicted to approach or exceed the FHWA NAC - 67 dB(A) at 20 residences along SW 10th Street. Build Alternative traffic noise levels at the non-residential noise sensitive sites

along this project segment are predicted to approach or exceed the FHWA NAC - 67 dB(A) along the walking trail at the Tivoli Sand Pines Preserve.

5.7 Noise Impacts Summary

Build Alternative traffic noise levels are predicted to approach or exceed the FHWA NAC - 67 dB(A) at a total of 116 residences within the limits of the project. For the non-residential noise sensitive sites within the limits of the project, Build Alternative traffic noise levels are predicted to approach or exceed the correlating FHWA NAC at three such sites, basketball courts at the Deerfield Beach Teen Center, the walking trail at the Tivoli Sand Pines Preserve and the playground at the JM Family Daycare Center [NAC = 67 dB(A) for all]. Therefore, based on the FHWA and FDOT methodologies used to evaluate traffic noise levels in this study, modifications proposed with this project were determined to generate noise impacts at noise sensitive sites within the project study area and consideration of noise abatement is required to mitigate these impacts. An analysis of noise abatement measures considered for the sites that approach or exceed the NAC is presented in **Section 6**. Although a number of sites approach or exceed the NAC, the proposed improvements do not result in any substantial noise increases [i.e., greater than 15 dB(A) over existing levels].

6.0 NOISE BARRIER ANALYSIS

As described above in **Section 5.7**, predicted design year traffic noise levels with the Build Alternative will approach or exceed the NAC at 116 residences and a basketball court at the City of Deerfield Beach Teen Center, the walking trail at the Tivoli Sand Pine Preserve park and the playground at the JM Family Daycare Center. The FDOT requires that the reasonableness and feasibility of noise abatement be considered when the NAC is approached or exceeded. Noise abatement was considered for impacted sites in the three areas identified in **Table 6-1** by Common Noise Environment (CNE). A CNE represents a group of impacted receptor sites that would benefit from the same noise barrier or barrier system (i.e., overlapping/continuous barriers) and are exposed to similar noise sources and levels, traffic volumes, traffic mix, speeds and topographic features. Generally, CNEs occur between two secondary noise sources, such as interchanges, intersections and/or cross-roads or where defined by ground features such as canals. Noise abatement was considered for the impacted residences, basketball court, walking trail and playground listed above.

The most common and effective noise abatement measure for projects such as this is construction of a noise barrier as close as possible to the impacted sites. Noise barriers reduce noise by blocking the sound path between a roadway and a noise sensitive area. To be effective, noise barriers must be long, continuous, and have sufficient height to block the path between the noise source and the receptor site.

According to FHWA guidelines, in cases where traffic noise impacts are predicted to occur behind an existing noise barrier as a result of planned improvements, the reasonableness and feasibility of the existing noise barrier should be reassessed to determine if the noise barrier will satisfy FDOT's current noise policy requirements. This is accomplished by comparing the predicted noise levels with the existing noise barrier to the levels predicted without the noise barrier. If the existing noise barrier still meets the FDOT's current policy requirements, then no further analysis is necessary. This is the case even if noise levels are predicted to exceed the NAC behind the existing noise barrier since the goal of noise abatement is to achieve a substantial reduction in noise levels, not to reduce noise levels below the NAC. In cases where an existing noise barrier do not comply with

FDOT's current requirements, the feasibility and reasonableness of extending, supplementing, retrofitting or replacing the existing noise barrier will be considered in order to satisfy those requirements.

Table 6 - 1: Locations Evaluated for Noise Barriers

Common Noise Environment Identification Number	General Location (Address or Cross Streets)	Relative Location	Type of Noise Sensitive Site (Noise Abatement Activity Category)	Number of Impacted Receptors	Noise Barrier Analysis Section in Report
I95HV	Highland Village (NE 48th Street to NE 52nd Street)	East of I-95	Residential (Activity Category B)	35	6.1
I95Teen	City of Deerfield Beach Teen Center (1303 FAU Research Park Boulevard)	East of I-95	Sports Field (Activity Category C)	1 Special Use	6.2
I95DH	Deerfield Highlands (SW 12th Court to SW 11th Court)	East of I-95	Residential (Activity Category B)	3	6.3
TSPPark	Tivoli Sand Pines Preserve (501 SW 10th Street)	North of SW 10th Street	Park Walking Trail (Activity Category C)	1 Special Use	6.4
I95SL_LI	Spring Lake and Lake Island (NW 43rd Place to NW 48th Street)	West of I-95	Residential (Activity Category B)	2	6.5
I95CK_HM	Country Knolls and Highland Meadows (NW 48th Street to NE 53rd Place)	West of I-95	Residential (Activity Category B)	55	6.6
JMPG	JM Family Daycare Center (640 Jim Moran Boulevard)	West of I-95	Playground (Activity Category C)	1 Special Use	6.7
LAKES	Lakes at Deerfield Apartments (1100 S. Military Trail)	South of SW 10th Street	Residential (Activity Category B)	20	6.8

A wide range of factors are used to evaluate the feasibility and reasonableness of noise abatement measures. Feasibility primarily concerns the ability to reduce noise levels by at least five dB(A) at the impacted receptor sites using standard construction methods and techniques. Engineering considerations typically assessed during the feasibility analysis include access, drainage, utilities, safety and maintenance.

Current FDOT structural standards require that noise barriers located within the roadway clear recovery zone (e.g., at the edge-of-pavement) meet crash test requirements stipulated by National Cooperative Highway Research Program (NCHRP) 350 Test Level 4 criteria. They must either be constructed of a crash-approved noise barrier design or be protected by a supplemental traffic barrier or guardrail meeting Level 4 criteria offset a minimum of five feet from the front face of the noise barrier. Crash-approved noise barrier designs currently permitted by FDOT are limited to a maximum height of eight feet on structures and 14 feet on fill. Ground-mounted noise barriers not located within the roadway clear recovery zone are limited by FDOT to a maximum height of 22 feet.

Reasonableness implies that common sense and good judgment were applied in a decision related to noise abatement. A reasonableness analysis includes consideration of the cost of abatement, the amount of noise abatement benefit, and the consideration of the viewpoints of the impacted and benefited property owners and residents. The FDOT's current Statewide average noise barrier unit cost is $30 per square-foot. To be deemed reasonable, a noise barrier must, at a minimum, meet two important FDOT criteria:

- The estimated construction cost cannot exceed the FDOT's reasonable cost criteria of $42,000 per benefited receptor site; and,
- According to the FDOT's noise reduction reasonableness criteria, the noise barrier must reduce noise levels by at least seven dB(A) at one or more impacted receptor sites.

As part of the reasonableness cost analysis, various conceptual noise barrier designs were evaluated for each impacted area to determine the most effective location, length and height that will achieve the desired noise level reduction at reasonable cost. In addition, the primary method for determining the cost of noise abatement involves a review of the cost per benefited receptor site for the construction of a noise barrier benefiting a single location or common noise environment (e.g., a subdivision or contiguous impact area).

The locations of the noise barriers that were considered are shown in **Appendix C**. The following discussion provides the details of the feasibility

and reasonableness analysis for noise barriers considered for each of the impacted sites.

6.1 CNE I95HV–Highland Village East of I-95 between NE 48th Street to NE 52nd Street

Thirty-five (35) residences along the east side of I-95 between NE 48th Street and NE 52nd Street are expected to experience design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 2** in **Appendix B**. The existing 14-foot tall ground-mounted noise barrier along the eastern limited-access ROW line between NE 48th Street and NE 52nd Street must be removed north of Sta. 306+00 to accommodate the northbound direct-connect ramps to SW 10th Street. This will leave an approximately 630-foot long noise barrier segment at the southern end of the existing noise barrier. With the Build Alternative, the design year traffic noise levels in this community are predicted to range from 61.2 to 74.6 dB(A), an average increase of approximately 2.8 dB(A) over existing levels [12.5 dB(A) maximum increase where the existing noise barrier is being removed].

The primary planned improvement near the residences is the construction of the northbound direct-connect ramps between I-95 and NE 48th Street. These improvements will move traffic along the northbound lanes of I-95 up to 25 feet closer to the residences in Highland Village. NE 48th Street is elevated over I-95 just south of this community. Also, an overhead powerline corridor runs between the current southern terminus of the existing noise barrier and NE 48th Street.

As stated above, the planned improvements will require removal of much of the existing 14-foot tall noise barrier along this segment of I-95. Due to the limited available ROW between the limited-access ROW line and the roadway shoulder, the most effective means of providing noise abatement for the impacted sites would be to either:

- Replace only the segment of the existing noise barrier that will be removed with a new noise barrier extending along approximately the same limits; or,

- Remove all of the existing noise barrier and construct a new noise barrier in its place.

In either case, the new noise barrier segments would be constructed along the shoulder of the northbound direct-connect ramp to westbound SW 10th Street. The maximum height of the new noise barrier segments would be limited to no more than 14 feet on the shoulder and 8 feet on structure. Two noise barrier design concepts were evaluated for these communities. The results of this analysis are presented in **Table 6-2**.

Although the project as currently proposed will allow retention of the southernmost 630 feet of the existing noise barrier, removal of the existing noise barrier in its entirety and construction of a new noise barrier is considered the most feasible and reasonable noise abatement alternative for this community. A 2,115-foot long, 8 to 14-foot tall shoulder and structure-mounted replacement noise barrier (referred to as I95HV-CD-2 in **Table 6-2**) would be located along the outside of the northbound direct-connect ramp between mainline Sta. 46+50 and ramp Sta. 413+15. The recommended noise barrier design concept for this site is shown on **Sheet 2** in **Appendix C**.

Build Alternative noise levels with this noise barrier design concept are predicted to range from 57.6 to 64.8 dB(A). This design concept is predicted to reduce noise levels at the impacted sites by an average of 9.2 dB(A) and a maximum of 10.7 dB(A) compared to the predicted noise levels without any noise abatement. All 35 of the impacted homes were predicted to experience a noise level reduction of at least 5.0 dB(A) compared to the conditions with no noise barrier and would thus be benefited by this noise barrier design concept. Thirty-one (31) non-impacted homes were predicted to be benefited incidentally. The estimated cost of this noise barrier design concept is $834,300 overall and $12,641 per benefited site. Therefore, the cost per benefited site of this noise barrier is within the FDOT's noise barrier cost criteria ($42,000 per benefited site) and it will attain the FDOT's noise reduction design requirement of 7 dB(A) at one or more sites.

Therefore, replacement of the existing noise barrier with a new 8 to 14-foot tall, 1,815-foot long noise barrier (I95HV-CD2) along the shoulder of the northbound direct - connect ramp is recommended for further consideration

Table 6 - 2: Noise Barrier Analysis for Common Noise Environment-I95HV

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95HV Highland Village East Side of I-95 from NE 48th Street to NE 52nd Street.	I95HV-CD1	Shoulder-Mounted	14	1,195	305+00	410+15	35	6.2 (10.4)[A]	23[A]	11[A]	34[A]	5.8 (10.4)[A]	$573,900	$16,879[A]	**Recommended** – This design concept would supplement the remaining 630-foot long segment of the existing noise barrier. Thus, data compared this noise barrier concept to a baseline condition that includes the remaining noise barrier segments. Predicted Build Alternative noise levels range from 57.6 to 67.4 dB(A).
		Structure-Mounted	8	300	410+15	413+15									
	I95HV-CD2	Shoulder-Mounted	14	1,815	46+50	410+15	35	9.2 (10.7)[B]	35[B]	31[B]	66[B]	8.1 (10.7)[B]	$834,300	$12,641[B]	This design concept would replace all of the existing noise barrier with a new noise barrier along the roadway shoulder. Thus, data compares this noise barrier concept to a baseline condition where all of the exiting noise barrier is removed. Predicted Build Alternative noise levels range from 57.6 to 64.8 dB(A).
		Structure-Mounted	8	300	410+15	413+15									

Note: Cells shaded in green denote the recommended noise barrier design concept. [A] = Compared to the baseline case of the remainder of existing noise barrier being retained.
[B] = Compared to baseline case of the entire existing noise barrier removed.

Table 6 - 3: Noise Barrier Analysis for Common Noise Environment-I95Teen

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95Teen Deerfield Beach Teen Center East side of I-95 between NE 15th Street and NE 14th Street	I95Teen-CD1	Ground-Mounted	8	275	339+45	342+20	1 SLU	7.0 (8.6)	1 SLU	0	1 SLU	7.0 (8.6)	$66,000	See Table 6-4	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	I95Teen-CD2	Ground-Mounted	10	225	339+45	341+70	1 SLU	8.3 (10.8)	1 SLU	0	1 SLU	8.3 (10.8)	$67,500		**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	I95Teen-CD5	Ground-Mounted	14	225	339+45	341+70	1 SLU	10.1 (13.4)	1 SLU	0	1 SLU	10.1 (13.4)	$94,500		**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.

and public input. This new noise barrier will generally match the height of the existing noise barrier, but will be constructed at a slightly higher base elevation along the roadway shoulder. This noise barrier concept satisfies the other reasonableness and feasibility factors considered in the evaluation of noise abatement measures including safety, constructability, utilities and drainage. This noise barrier concept does not have any sight distance issues, any substantial conflicts with utilities or drainage facilities and it can be constructed using standard construction methods.

At this time, sufficient ROW will not exist with the recommended project Build Alternative to construct a taller replacement ground-mounted noise barrier at this location. If during project design it is determined that sufficient ROW will remain such that construction of a new ground-mounted noise barrier is feasible, consideration should be given to construction of a taller noise barrier adjacent to this community.

6.2 CNE I95Teen–City of Deerfield Beach Teen Center

The results of the noise barrier analysis for the City of Deerfield Beach Teen Center located at 1303 FAU Research Park Boulevard east of I-95 are summarized in **Table 6-3**. The teen center is shown on **Sheet 2** in **Appendix B**. With the Build Alternative, the design year traffic noise level at a basketball court on the north side of the teen center is predicted to be 76.6 dB(A), greater than the FHWA NAC [67 dB(A)]. This noise level is lower than the predicted existing traffic noise level by 0.5 dB(A).

The primary planned improvements near the teen center is the construction of the direct-connect ramps between I-95 and SW 10th Street. These improvements will move traffic along the northbound lanes of I-95 approximately 10 feet closer to the courts. The new direct-connect ramps will be elevated on MSE/retaining wall to the south and on bridge adjacent to this facility.

The most feasible location to provide noise abatement for this basketball court was determined to be along the eastern limited-access ROW line directly adjacent to the court. Several noise barrier design concepts were evaluated. Noise barrier design concept I95Teen-CD1 is considered the most reasonable and feasible noise barrier design for this basketball court. This 8-

foot tall, 275-foot long noise barrier concept would be the most cost reasonable design that would reduce traffic noise levels at the basketball court by at least 7.0 dB(A). The estimated cost of this noise barrier is $66,000 overall.

The FDOT's special land use methodology was used to determine if the cost of this noise barrier would be reasonable based on the level of activity of the basketball court. The results of this analysis are shown in **Table 6-4**. The usage rate of the basketball courts necessary to meet the FDOT's cost reasonableness criteria for special land use was evaluated based on the noise barrier design concept described above. It was determined that at least 93 people per day, based on each spending one hour would be necessary to meet the FDOT's cost reasonableness requirements for this noise barrier. The teen center's operating hours are currently from 10AM to 7PM; therefore, a usage rate of more than 10 people per hour would be needed for the noise barrier to be cost reasonable. Based on this requirement, actual consistent usage of the basketball court is expected to be below a level sufficient to meet the cost criterion for construction of a noise barrier at this location. Therefore, noise abatement is not recommended for further consideration and public input for the teen center's basketball court due to expected insufficient usage.

Table 6 - 4: Special Use Site Noise Barrier Analysis for Common Noise Environment-I95Teen

Item	Criteria	Input	Units
		I95Teen-CD1	
1	Enter Length of Proposed Barrier	275	feet
2	Enter Height of Proposed Barrier	8	feet
3	Multiply item 1 by item 2	2,200	$feet^2$
4	Enter the average amount of time that a person stays at the site per visit	1	hours
5	Enter the average number of people that use this site per day that will receive at least 5 dB(A) benefit from abatement at the site	**93**	persons
6	Multiply item 4 by item 5	93	person-hours
7	Divide item 3 by item 6	23.71	$feet^2$/person-hours
8	Multiply item 7 by $42,000	$995,935	$/person-hours/$ft^2$
9	Does item 8 exceed the "abatement cost factor" of: $995,935/person-hour/$ft^2$?	N/A	Yes/No
10	If item 9 is no, abatement is reasonable.	N/A	
11	If item 9 is yes, abatement is not reasonable.	N/A	

6.3 CNE I95DH–Deerfield Highlands East of FAU Research Park Boulevard between NE 12th Court and NE 11th Court

Three (3) single-family residences in the Deerfield Highlands community along the east side of I-95 and FAU Research Park Boulevard between NE 12th Court and NE 11th Court are expected to experience design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 2** in **Appendix B**. The design year traffic Build Alternative traffic noise levels at the residences in this community are predicted to range from 57.4 to 66.5 dB(A), representing an increase of up to 0.8 dB(A) from existing levels.

The primary improvements near these residences include realigning the northbound I-95 off-ramp to SW 10th Street and the northbound mainline to accommodate the direct-connect ramps between I-95 and SW 10th Street and new turn lanes at the terminus of the off-ramp. The off-ramp lanes will be moved up to approximately 10 feet closer to the residences and heavily-trafficked FAU Research Park Boulevard is located directly adjacent to these residences.

The most feasible location within the limits of the project for noise abatement for these residences is along the eastern limited-access ROW line of the offramp. However, this places the noise barrier more than 100 feet from the nearest residences, with traffic noise from FAU Research Park Boulevard also further diminishing the effectiveness of this noise barrier. The results of the noise barrier analysis for these residences are summarized in **Table 6-5**.

A 22-foot tall, 1,145-foot long ground mounted noise barrier located along the limited access ROW line of the off-ramp between Sta. 606+00 and 617+60 was considered to be the most feasible and effective noise abatement alternative for the impacted residences. This noise barrier design concept is referred to as I95DH-CD2 in **Table 6-5**. The noise barrier design concept for this site is shown on **Sheet 2** in **Appendix C**. This concept would reduce noise levels at the impacted sites by up to 6.7 dB(A). Only one of the seven impacted sites is predicted to experience a noise level reduction of at least 5.0 dB(A) and thus be benefited by this noise barrier concept. Three (3) non-impacted sites were predicted to be benefited incidentally.

The estimated cost of this noise barrier is $755,700 overall and $188,925 per benefited site. Therefore, the cost per benefited site of this noise barrier exceeds the FDOT's $42,000 per benefited site noise barrier cost criteria.

Based on the results of this analysis, a noise barrier is not recommended for further consideration and public input for the Deerfield Highlands community since it was not possible to reduce noise levels by at least 7 dB(A) at one or more sites in accordance with the FDOT's noise reduction design requirement and it was not possible to provide reasonable noise abatement performance at a cost within the FDOT's noise barrier cost criteria. Changes to the height or length of the noise barrier did not provide a feasible and/or reasonable noise barrier option. Therefore, at this time, this noise barrier is recommended for further consideration during Final Design.

Table 6 - 5: Noise Barrier Analysis for Common Noise Environment-I95DH

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95DH Deerfield Highlands East side of I-95 from SW 12th Court to SW 11th Court.	I95DH-CD1	Ground-Mounted	16	1,145	606+00	617+60	3	3.4 (4.2)	0	1	1	5.2 (5.2)	$684,000	$684,000	**Not Recommended** – Only benefits one site. Does not achieve 7.0 dB(A) at any of the benefited sites.
	I95DH-CD2	Ground-Mounted	22	800	606+00	617+60	3	4.0 (5.0)	1	3	4	5.8 (6.7)	$755,700	$188,925	**Not Recommended** – Residences are more than 100 feet from the near lane of the northbound I-95 off-ramp to SW 10th Street. FAU Research Park Boulevard is located adjacent to these residences. Cost exceeds FDOT's cost reasonableness criteria. Does not achieve 7.0 dB(A) at any of the benefited sites.

Table 6 - 6: Noise Barrier Analysis for Common Noise Environment-TSPPark

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
TSPPark Tivoli Sand Pine Preserve North side SW 10th Street from Natura Boulevard to Eastern Project Limit	TSPPark-CD1	Ground-Mounted	8	600	410+00	416+00	1 SLU	5.6 (5.9)	1 SLU	N/A	1 SLU	5.6 (5.9)	$144,000	See Table 6-7	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	TSPPark-CD2	Ground-Mounted	10	600	410+00	416+00	1 SLU	6.6 (6.9)	1 SLU	N/A	1 SLU	6.6 (6.9)	$180,000		**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	TSPPark-CD3	Ground-Mounted	12	600	410+00	416+00	1 SLU	7.1 (7.5)	1 SLU	N/A	1 SLU	7.1 (7.5)	$216,000		**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	TSPPark-CD4	Ground-Mounted	14	600	410+00	416+00	1 SLU	7.5 (7.9)	1 SLU	N/A	1 SLU	7.5 (7.9)	$252,000		**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.

6.4 CNE TSPPark–Tivoli Sand Pine Preserve North of SW 10th Street between Natura Boulevard and the Eastern Project Limit

The results of the noise barrier analysis for the Tivoli Sand Pine Preserve located north of SW 10th Street between Natura Boulevard and the Eastern Project Limit are summarized in **Table 6-6**. The park is shown on **Sheet 3** in **Appendix B**. The design year traffic Build Alternative noise level along a walking trail along the interior of the park closest to SW 10th Street is predicted to be 67.7 dB(A), greater than the FHWA NAC [67 dB(A)]. This noise level exceeds the predicted existing traffic noise level by 1.3 dB(A).

The park is located at the eastern terminus of the project. The primary planned improvement near the park is the extension of the westbound right-turn lane onto Natura Boulevard. This improvement will move traffic along the westbound lanes of SW 10th Street less than 10 feet closer to the walking trail.

The most feasible location to provide noise abatement for the park was determined to be along the south ROW line of SW 10th Street between Natura Boulevard and the eastern project limit.

Several noise barrier design concepts were evaluated. Noise barrier design concept TSPPark-CD3 is considered the most reasonable and feasible noise barrier design for this walking trail. A 12-foot tall, 600-foot long noise barrier would be the most cost reasonable design that would reduce traffic noise levels in the park by at least 7.0 dB(A). The estimated cost of this noise barrier is $216,000 overall.

The FDOT's special land use methodology was used to determine if the cost of this noise barrier would be reasonable based on the level of activity in the impacted portions of the walking trail. The results of this analysis are shown in **Table 6-7**. The usage rate of the park necessary to meet the FDOT's cost reasonableness criteria for special land use was evaluated based on the noise barrier design concept described above. It was determined that at least 921 people per day, based on each spending a conservatively estimated 20 minutes walking the approximately 1,000 feet of the walking trail within the abated areas of the park would be necessary to meet the FDOT's cost reasonableness requirements for this noise barrier. This would

require that over the course of 14 hours per day, 66 people per hour used the walking trail. Based on this requirement, actual usage of this park is expected to be well below a level sufficient to meet the cost criterion for construction of a noise barrier at this location. Therefore, noise abatement is not recommended for further consideration and public input for the Tivoli Sand Pine Preserve due to insufficient usage.

Table 6 - 7: Special Use Site Noise Barrier Analysis for Common Noise Environment-TSPPark

Item	Criteria	Input	Units
		TSPPARK-CD3	
1	Enter Length of Proposed Barrier	600	feet
2	Enter Height of Proposed Barrier	12	feet
3	Multiply item 1 by item 2	7,200	$feet^2$
4	Enter the average amount of time that a person stays at the site per visit	0.33	hours
5	Enter the average number of people that use this site per day that will receive at least 5 dB(A) benefit from abatement at the site	**921**	persons
6	Multiply item 4 by item 5	304	person-hours
7	Divide item 3 by item 6	23.71	$feet^2$/person-hours
8	Multiply item 7 by $42,000	$995,935	$/person-hours/$ft^2$
9	Does item 8 exceed the "abatement cost factor" of: $995,935/person-hour/$ft^2$?	N/A	Yes/No
10	If item 9 is no, abatement is reasonable.	N/A	
11	If item 9 is yes, abatement is not reasonable.	N/A	

6.5 CNE I95SL_LM-Spring Lake and Lake Island West of I-95 between NW 43rd Place and NW 48th Street

Two (2) residences along the west side of I-95 between NW 43rd Place and NW 48th Street are expected to experience design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 1** in **Appendix B**. These impacted noise sensitive sites are located adjacent to a section of the existing 16-foot tall ground-mounted noise barrier between Sample Road and NW 48th Street that transitions from the limited-access ROW line to closer to the southbound lanes of I-95 and will be removed to accommodate the realignment and widening of the southbound travel lanes. The northernmost approximately 475-foot long segment of this noise barrier also

transitions to the ROW line and will be removed as well. With the Build Alternative, the design year traffic noise levels behind this noise barrier are predicted to range from 56.1 to 70.2 dB(A), an average increase of approximately 0.6 dB(A) over existing levels. Based on the results of this noise analysis, the existing noise barrier will continue to meet the FDOT's current noise policy requirements with the Build Alternative at the other residences west of I-95 and south of NW 48th Street.

The primary planned improvement near the residences is realignment of the southbound lanes to the west to accommodate the direct-connect ramps north of NW 48th Street. The planned improvements will move traffic along the southbound lanes of I-95 up to 40 feet closer to the nearby residences. A non-impacted healthcare facility is located between these communities and NW 48th Street. NW 48th Street is elevated over I-95 just north of this community.

Several options were evaluated to replace the section of noise barrier that would be removed. The results of this analysis are shown in **Table 6-8**. These included the following:

- **I95SL_IL-CD1** - Replacing only the southern gap in the noise barrier with a ground-mounted noise barrier "in-kind" with an approximately 180 foot-long, 16-foot tall noise barrier behind the solid-concrete traffic railing along the outside of the southbound lanes. The section at the north end would not be replaced.
- **I95SL_IL-CD2** - Constructing a new 14-foot tall, 500-foot long shoulder-mounted noise barrier along the southbound lanes between Sta. 30+50 and 35+50. The section at the north end would not be replaced.; and,
- **I95SL_IL-CD3** - Constructing a new 14-foot tall, 1,420-foot long shoulder-mounted noise barrier along the southbound lanes between Sta. 30+50 and 44+70. The section at the north end would be replaced with this option.

Table 6 - 8: Noise Barrier Analysis for Common Noise Environment-I95SL_LI

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95SL_LI Spring Lake and Lake Island West side of I-95 from Southern Project Terminus to NW 48th Street	I95SL_LI-CD1	Ground Mounted	16	180	32+40	33+90	2	5.3 (5.3)	2	0	2	5.3 (5.3)	$86,400	Not Applicable - Replacement Noise Barrier	Replaces only the southern gap in the noise barrier with a new 16-foot tall ground-mounted noise barrier segment.
	I95SL_LI-CD2	Shoulder-Mounted	14	500	30+50	35+50	2	7.5 (7.5)	2	0	2	7.5 (7.5)	$210,000	Not Applicable - Replacement Noise Barrier	Recommended design concept. Replaces only the southern gap in the noise barrier with a new 14-foot tall shoulder-mounted noise barrier segment.
	I95SL_LI-CD3	Shoulder-Mounted	14	1,420	30+50	44+70	2	7.8 (7.8)	2	0	2	7.8 (7.8)	$596,400	Not Applicable - Replacement Noise Barrier	Replaces all of the existing noise barrier north of Sta. 32+40 with a new 14-foot tall shoulder-mounted noise barrier segment.

Table 6 - 9: Noise Barrier Analysis for Common Noise Environment-I95CK_HM

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95CKHM Country Knoll and Highland Meadows Estates West side of I-95 from NE 48th Street to NE 53rd Place.	I95CK_HM-CD1	Structure-Mounted	8	2,805	45+90	118+50	55	6.1 (7.2)	33	0	33	6.1 (7.2)	$661,200	$20,036	**Not Recommended.** Benefits 33 of the 55 impacted sites. Achieves a 7.0 dB(A) noise reduction at 4 of the benefited sites.
	I95CK_HM-CD2	Structure-Mounted	14	2,805	45+90	118+50	55	9.1 (11.8)	55	29	84	7.7 (11.8)	$1,178,100	$14,025	**Recommended** – Benefits all of the impacted sites. Achieves a 7.0 dB(A) noise reduction at 51 of the benefited sites.

I95SL_IL-CD2 was considered to be the most feasible alternative for the two impacted residences. The noise barrier design concept for this site is shown on **Sheet 1** in **Appendix C**. This concept would reduce noise levels at the impacted sites by up to 7.5 dB(A). The estimated cost of this replacement noise barrier is $210,000. Since this replaces a short segment of the existing noise barrier that will be removed and the noise level reduction at the two impacted receivers will be similar to those of the existing noise barrier, this design concept is recommended for further consideration and public input.

6.6 CNE I95CK_HM–Country Knolls and Highland Meadows West of I-95 between NE 48th Street to NE 53rd Court

Fifty-five (55) residences in the Country Knolls and Highland Meadows communities along the west side of I-95 between NW 48th Street and NW 53rd Court are expected to experience design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 2** in **Appendix B**. The existing 2,675-foot long, 16-foot tall ground-mounted noise barrier along the eastern limited-access ROW line between NE 48th Street and NE 52nd Street will be removed in its entirety to accommodate the improvements along I-95. With the Build Alternative, the design year traffic noise levels in these communities are predicted to range from 62.8 to 75.9 dB(A), an average increase of approximately 7.0 dB(A) over existing levels [13.0 dB(A) maximum increase due to removal of the existing noise barrier].

The primary planned improvement near the residences is construction of the westbound to southbound direct-connect ramp crossover to the general-purpose lanes along the west side of I-95 and realignment of the southbound lanes to the west to accommodate other direct-connect ramps south of SW 10th Street. These improvements will move traffic along the southbound lanes of I-95 up to 60 feet closer to the nearby residences. NW 48th Street is elevated over I-95 just south of this community. Also, an overhead powerline corridor runs along the north side of NW 48th Street.

As stated above, the planned improvements will require removal of all of the existing 16-foot tall noise barrier currently providing noise abatement for these communities. The most effective means of providing noise abatement for the impacted sites would be to replace the existing noise barrier with a

new noise barrier extending along generally the same limits on the shoulder of the direct-connect ramp crossover. Since this replacement noise barrier would be located on structure (i.e., MSE and/or retaining wall), the maximum height of the noise barrier design would normally be limited to no more than 8 feet without acquiring a design variation. Two noise barrier design concepts were evaluated for these communities. The results of this analysis are presented in **Table 6-9**.

A 2,805-foot long, 8-foot tall, structure-mounted noise barrier (referred to as I95CK_HM-CD-1 in **Table 6-9**) was initially evaluated along the outside of the direct-connect ramp crossover and the southbound lanes between mainline Sta. 45+90 and ramp Station 118+50. This design concept is predicted to reduce noise levels at the impacted sites by an average of 6.1 dB(A) and a maximum of 7.2 dB(A) compared to the predicted noise levels without any noise abatement. The estimated cost of this noise barrier design concept is $673,200 overall and $20,400 per benefited site. Therefore, the cost per benefited site of this noise barrier is within the FDOT's noise barrier cost criteria ($42,000 per benefited site) and it will attain the FDOT's noise reduction design requirement of 7 dB(A) at one or more sites. However, only 33 of the 55 impacted homes were predicted to experience a noise level reduction of at least 5.0 dB(A) and would thus be benefited by this noise barrier design concept. Additionally, this design concept would be much shorter than the noise barrier it replaces.

In order to more closely match the height of the existing noise barrier, a taller, 14-foot tall design concept (referred to as I95CK_HM-CD-2 in **Table 6-9**) was evaluated along the same limits. The noise barrier design concept for this site is shown on **Sheet 2** in **Appendix C**. This design concept is predicted to reduce noise levels at the impacted sites by an average of 7.7 dB(A) and a maximum of 11.8 dB(A) compared to the predicted noise levels without any noise abatement. The estimated cost of this noise barrier design concept is $1,178,100 overall and $14,025 per benefited site. Therefore, the cost per benefited site of this noise barrier is within the FDOT's noise barrier cost criteria ($42,000 per benefited site) and it will attain the FDOT's noise reduction design requirement of 7 dB(A) at one or more sites. In this case, all 55 of the impacted homes were predicted to experience a noise level reduction of at least 5.0 dB(A) and would thus be benefited by this noise barrier design concept.

Based on the results of this analysis, I95CK_HM-CD-2 is recommended for further consideration and public input. This conceptual noise barrier design does not have any sight distance issues, any substantial conflicts with utilities or drainage facilities, or obstruct any existing, conforming and legally permitted outdoor advertising signs along I-95. As noted above, noise barriers constructed on structures are normally restricted to heights no greater than 8 feet. However, the 14-foot tall noise barrier design concept is predicted to benefit all of the impacted sites. Therefore, it is considered necessary to construct the replacement noise barriers at a height of 14-feet, which will require a design-variation.

6.7 CNE JMPG-JM Family Daycare Center Playground

The results of the noise barrier analysis for the JM Family Daycare Center playground located west of I-95 at 640 Jim Moran Boulevard are summarized in **Table 6-10**. The playground is shown on **Sheet 4** in **Appendix B**. The design year traffic Build Alternative noise level at the playground is predicted to be 68.8 dB(A), greater than the FHWA NAC [67 dB(A)]. This noise level exceeds the predicted existing traffic noise level by 2.3 dB(A).

The primary planned improvements near the daycare center is minor realignment of I-95 to accommodate the new ramps to the south. These improvements will move traffic along the northbound lanes of I-95 approximately 5 feet closer to the playground.

The most feasible location to provide noise abatement for the playground was determined to be along the west limited-access ROW line of I-95 from south of SW 6th Street to the Hillsboro Canal. Several noise barrier design concepts were evaluated, design concept I95JMPG-CD2 is considered the most reasonable and feasible noise barrier design for this playground. A 16-foot tall, 1,040-foot long noise barrier would be the most cost reasonable design that would reduce traffic noise levels in the playground by at least 7.0 dB(A). The estimated cost of this noise barrier is $499,200 overall.

Table 6 - 10: Noise Barrier Analysis for Common Noise Environment-I95JMPG

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
JMPG JM Family Daycare Center Playground West side of I-95 at NW 6th Street	I95JMPG-CD1	Ground-Mounted	14	1,200	174+70	186+70	1 SLU	4.5 (4.5)	1 SLU	N/A	1 SLU	5.7 (6.1)	$504,000	See Table 6-11	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	I95JMPG-CD2	Ground-Mounted	16	1,040	176+30	186+70	1 SLU	5.0 (5.0)	1 SLU	N/A	1 SLU	6.3 (7.5)	$499,200		**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	I95JMPG-CD3	Ground-Mounted	18	960	177+10	186+70	1 SLU	5.0 (5.0)	1 SLU	N/A	1 SLU	6.7 (8.2)	$518,400		**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	I95JMPG-CD4	Ground-Mounted	22	900	177+70	186+70	1 SLU	5.0 (5.0)	1 SLU	N/A	1 SLU	6.9 (8.5)	$594,000		**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.

Table 6 - 11: Noise Barrier Analysis for Common Noise Environment-Lakes

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
LAKES Lakes at Deerfield Apartments South side of SW 10th Street at Military Trail.	LAKES-CD1	Ground-Mounted	22	525	142+35	147+60	20	5.0 (5.0)	0	10	10	5.5 (6.0)	$346,500	$34,650	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	LAKES-CD2	Ground-Mounted	22	545	142+35	147+60	20	5.5 (5.5)	4	10	14	5.8 (6.2)	$665,700	$47,550	**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria. Also, does not achieve 7.0 dB(A) at any of the benefited sites.
		Structure-Mounted	14	830	174+10	182+40									
		Structure-Mounted	8	500	95+00	100+00									

The FDOT's special land use methodology was used to determine if the cost of this noise barrier would be reasonable based on the level of activity in the playground. The results of this analysis are shown in **Table 6-11**. The usage rate of the playground necessary to meet the FDOT's cost reasonableness criteria for special land use was evaluated based on the noise barrier design concept described above. It was determined that at least 702 children per day, each spending one hour per day would be necessary to meet the FDOT's cost reasonableness requirements for this noise barrier. This would require that over the course of an 8-hour day, 88 children per hour used the playground. Based on this requirement, actual usage of this playground is expected to be well below a level sufficient to meet the cost criterion for construction of a noise barrier at this location. Therefore, noise abatement is not recommended for further consideration and public input for the JMPG noise barrier due to insufficient usage.

Table 6 - 12: Special Use Site Noise Barrier Analysis for Common Noise Environment-JMPG

Item	Criteria	Input	Units
		JMPG-CD2	
1	Enter Length of Proposed Barrier	1,040	feet
2	Enter Height of Proposed Barrier	16	feet
3	Multiply item 1 by item 2	16,640	$feet^2$
4	Enter the average amount of time that a person stays at the site per visit	1	hours
5	Enter the average number of people that use this site per day that will receive at least 5 dB(A) benefit from abatement at the site	**702**	persons
6	Multiply item 4 by item 5	702	person-hours
7	Divide item 3 by item 6	23.71	$feet^2$/person-hours
8	Multiply item 7 by $42,000	$995,935	$/person-hours/$ft^2$
9	Does item 8 exceed the "abatement cost factor" of: $995,935/person-hour/$ft^2$?	N/A	Yes/No
10	If item 9 is no, abatement is reasonable.	N/A	
11	If item 9 is yes, abatement is not reasonable.	N/A	

6.8 CNE Lakes–Lakes at Deerfield Apartments South of SW 10th Street between Military Trail and the Railroad

Twenty (20) apartments in the Lakes at Deerfield Apartments along the south side of SW 10th Street at Military Trail are expected to experience

design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 5** in **Appendix B**. The design year traffic Build Alternative noise levels at these apartments are predicted to range from 57.9 to 68.2 dB(A), representing an increase of up to 8.1 dB(A) from existing levels.

The primary improvements near these apartments include realignment of SW 10th Street, construction of elevated direct-connect ramps to/from I-95, construction of new ramp connections between the elevated direct-connect ramps and SW 10th Street, new turn-lanes on Military Trail and other intersection improvements. The near edge of pavement will be less than approximately 5 feet closer to the apartments along Military Trail and up to approximately 65 feet closer to the apartments along SW 10th Street.

Most of the noise impacts are predicted to occur at apartments located along S Military Trail since the elevated portions of the eastbound direct-connect off-ramp to SW 10th Street block traffic noise from SW 10th Street to the lower-level apartments on the north side of the complex. The most feasible location within the limits of the project for noise abatement for these apartments is along the ROW line on the east side of Military Trail and along the sidewalk on the south side of SW 10th Street and the off-ramp as it climbs to cross the adjacent rail corridor. Noise barriers were also considered along the elevated structures of the eastbound direct-connect off-ramp to SW 10th Street and at the back of the sidewalk along the southern perimeter between Military Trail and the rail corridor. The results of the noise barrier analysis for these apartments are summarized in **Table 6-12**.

Due to the elevation of the eastbound direct-connect off-ramp, a 22-foot tall, 525-foot long ground mounted noise barrier located along the eastern ROW line of Military Trail between Sta. 142+35 and 147+60 and a 14-foot tall, 830-foot long structure-mounted noise barrier at the back of the sidewalk along the north side of the apartment complex combined with an 8-foot tall, 500-foot long structure-mounted noise barrier on the off-ramp was considered to be the most feasible and effective noise abatement Alternative for the impacted residences. This noise barrier design concept is referred to as LAKES-CD2 in **Table 6-12**. The noise barrier design concept for this site is shown on **Sheet 5** in **Appendix C**. This concept would reduce noise levels at the impacted sites by up to 6.2 dB(A). Four (4) of the 20 impacted sites

were predicted to experience a noise level reduction of at least 5.0 dB(A) and thus be benefited by this noise barrier concept. Ten (10) non-impacted sites were predicted to be benefited incidentally. It was not possible to reduce noise levels further with longer noise barriers or additional noise barriers. The estimated cost of this noise barrier design concept is $665,700 overall and $47,550 per benefited site.

Based on the results of this analysis, a noise barrier is not recommended for further consideration and public input for the Lakes at Deerfield apartments since it was not possible to reduce noise levels by at least 7 dB(A) at one or more sites in accordance with the FDOT's noise reduction design requirement and the cost per benefited site of this noise barrier exceeds the FDOT's $42,000 per benefited site noise barrier cost criteria. Changes to the height or length of the noise barrier did not provide a feasible and/or reasonable noise barrier option. Therefore, at this time, this noise barrier is not recommended for further consideration during Final Design.

7.0 SUMMARY AND CONCLUSIONS

In summary, traffic noise levels were predicted for noise sensitive locations along the project corridor for the existing conditions and the design year (2040) No-Build and recommended Build Alternatives. Build Alternative traffic noise levels at the residences are expected to range from approximately 49.8 to 75.9 dB(A) during the project's design year. Build Alternative traffic noise levels at the non-residential/special-use sites are expected to range from approximately 43.7 dB(A) inside the UM Health medical offices to 76.6 dB(A) on the basketball court at the Deerfield Beach Teen Center. The worst-case design year traffic noise levels with the Build Alternative are predicted to be no more than 13.0 dB(A) greater than existing levels and 11.6 dB(A) greater than the design year No-Build levels.

Design year traffic noise levels with the planned improvements are predicted to approach or exceed the FHWA NAC for residential use [67 dB(A)] at 116 residences. The design year traffic noise level with the planned improvements is predicted to exceed the NAC at a basketball court at the City of Deerfield Beach Teen Center, the walking trail at the Tivoli Sand Pine Preserve park and the playground at the JM Family Daycare Center for [All Activity Class C sites, NAC = 67.0 dB(A)]. Therefore, based on the FHWA and FDOT methodologies used to evaluate traffic noise levels in this study, modifications proposed with this project were determined to generate noise impacts at noise sensitive sites within the project study area and consideration of noise abatement is required to mitigate these impacts. An analysis of noise abatement measures considered for the sites that approach or exceed the NAC is presented in **Section 6**. Although a number of sites approach or exceed the NAC, the proposed improvements do not result in any substantial noise increases [i.e., at least 15 dB(A) over existing levels].

In accordance with traffic noise study requirements set forth by both the FHWA and FDOT, noise barriers were considered for all noise sensitive receptor sites where design year Build Alternative traffic noise levels were predicted to equal or exceed the NAC. Noise barriers were evaluated at eight locations to mitigate noise impacts. **Table 7-1** summarizes the results of the noise barrier analyses and recommendations for each of the eight locations where noise barriers were evaluated. The locations where barriers were evaluated or planned are depicted in the figures in **Appendix B.**

Table 7 - 1: Noise Barrier Summary and Recommendations

General Location (Cross Streets or Address)	Noise Barrier Conceptual Design	Noise Barrier Type	Height (feet)	Length (feet)	Limits (Begin/ End Station Number)	Number of Benefited Receptors (Impacted/ Not Impacted/ Total)	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Estimated Overall Cost ($30 per square foot)	Estimated Cost/Site Benefited	Meets FDOT's Reasonable Cost Criteria of $42,000/ Site Benefited	Meets FDOT's Noise Reduction Design Goal	Noise Barrier Recommended for Further Consideration and Community Input	Comments
Highland Village East Side of I-95 from NE 48th Street to NE 52nd Street.	I95HV-CD2	Shoulder-Mounted	14	1,815	46+50 to 410+15	35/31/66	8.1 (10.7)	$834,300	$12,641	Yes	Yes	Yes	**Recommended** – This design concept would replace all of the existing noise barrier with a new noise barrier along the roadway shoulder.
		Structure-Mounted	8	300	410+15 to 413+15								
Deerfield Beach Teen Center East side of I-95 between NE 15th Street and NE 14th Street	I95Teen-CD1	Ground-Mounted	8	275	339+45 to 342+20	1 SLU	7.0 (8.6)	$66,000	N/A	Cost exceeds reasonableness criteria for Special Use Sites	Yes	No	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
Deerfield Highlands East side of FAU Research Park Boulevard from SW 12th Court to SW 11th Court.	I95DH-CD2	Ground-Mounted	22	800	606+00 to 617+60	1/3/4	5.8 (6.7)	$755,700	$188,925	No	No	No	**Not Recommended** – Residences are more than 100 feet from the near lane of the northbound I-95 off-ramp to SW 10th Street. FAU Research Park Boulevard is located adjacent to these residences. Cost exceeds FDOT's cost reasonableness criteria. Does not achieve 7.0 dB(A) at any of the benefited sites.
Tivoli Sand Pine Preserve North side SW 10th Street from Natura Boulevard to Eastern Project Limit	TSPPark-CD3	Ground-Mounted	12	600	410+00 to 416+00	1 SLU	7.1 (7.5)	$216,000	N/A	Cost exceeds reasonableness criteria for Special Use Sites	Yes	No	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
Spring Lake and Lake Island West West side of I-95 from Southern Project Terminus to NW 48th Street	I95SL_LI-CD2	Shoulder-Mounted	14	500	30+50 to 35+50	2/0/2	7.5 (7.5)	$210,000	Not Applicable. Replacement Noise Barrier	Not Applicable. Replacement Noise Barrier	Not Applicable. Replacement Noise Barrier	Yes	**Recommended** - This design concept replaces only the southern gap in the noise barrier with a new 14-foot tall shoulder-mounted noise barrier segment.
Highland Meadows Estates and Country Knolls West side of I-95 from NE 48th Street to NE 53rd Place	I95CK_HM-CD2	Structure-Mounted	14	2,805	45+90 to 118+50	55/29/84	7.7 (11.8)	$1,178,100	$14,025	Yes	Yes	N/A	**Recommended** - Benefits all of the impacted sites. Achieves a 7.0 dB(A) noise reduction at all 55 of the benefited sites. Expected to require a design variation for constructing a 14-foot tall noise barrier on structure.
JM Family Daycare Center Playground West side of I-95 at NW 6th Street	I95JMPG-CD2	Ground-Mounted	16	1,040	176+30 to 186+70	1 SLU	6.3 (7.5)	$499,200	N/A	Cost exceeds reasonableness criteria for Special Use Sites	Yes	No	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
Lakes at Deerfield Apartments South side of SW 10th Street at S Military Trail	LAKES-CD2	Ground-Mounted	22	545	142+35 to 147+60	4/10/14	5.8 (6.2)	$665,700	$47,550	No	No	No	**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria. Also, does not achieve 7.0 dB(A) at any of the benefited sites.
		Structure-Mounted	14	830	174+10 to 182+40								
		Structure-Mounted	8	500	95+00 to 100+00								

7.1 Recommended Noise Barriers

At this time, noise barriers are recommended for further consideration and public input at three locations:

- **I95HV** – East side of I-95 north of NE 48th Street. This noise barrier would replace an existing 14-foot tall noise barrier in its entirety and benefit 66 sites, including all 35 impacted residences.
- **I95SL_LI** – West side of I-95 south of NW 48th Street. This noise barrier will replace a segment of the existing noise barrier that is being removed to accommodate the project with a new shoulder-mounted 16-foot tall noise barrier. Will benefit two impacted residences.
- **I95CK-HM** – West side of I-95 north of NW 48th Street. This noise barrier will replace an existing 16-foot tall noise barrier that will be removed to accommodate the project. Will benefit 84 sites, including 55 impacted residences.

The FDOT is committed to the construction of feasible and reasonable noise abatement measures at the noise-impacted locations identified in **Table 7-1** contingent 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; and,
- Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved.

It is likely that the noise abatement measure for this location will be constructed if found feasible based on the contingencies listed above. If, during the Final Design phase, any of the contingency conditions listed above cause abatement to no longer be considered reasonable or feasible for

a given location(s), such determination(s) will be made prior to requesting approval for construction advertisement. Commitments regarding the exact abatement measure locations, heights, and type (or approved Alternatives) will be made during project reevaluation and at a time before the construction advertisement is approved.

7.2 Noise Barriers Found Not Feasible or Reasonable

The noise level reduction provided by the noise barrier design concepts for the following CNEs did not meet FDOT's Noise Reduction Design Goal and/or FDOT's Noise Barrier Cost Reasonableness Criteria:

- **I95Teen** – Deerfield Beach Teen Center, east side of I-95 at SW 11th Court (greater than $995,935 $/person-hours/square-foot).
- **I95DH** – Deerfield Highlands, east side of I-95 from SW 12th Court to SW 11th Court [6.7 dB(A) maximum and ($188,925 per benefited site)].
- **TSPPark** - Tivoli Sand Pine Preserve, north side of SW 10th Street between Natura Boulevard and the eastern project limit (greater than $995,935 $/person-hours/square-foot).
- **JMPG** - JM Family Daycare Center Playground, west side of I-95 at NW 6th Street (greater than $995,935 $/person-hours/square-foot).
- **LAKES** – Lakes at Deerfield Apartments, SW 10th Street at S Military Trail [6.2 dB(A) maximum and ($47,550 per benefited site)].

Therefore, noise barriers are not recommended for further consideration or construction at these locations. Based on the noise analyses performed to date, there are no apparent solutions available to mitigate the noise impacts at 12 residences in Highland Village, 3 residences in Deerfield Highland, 20 apartments in the Lakes at Deerfield and three special land use sites. The traffic noise impacts to these noise sensitive sites are considered to be an unavoidable consequence of the project.

8.0 CONSTRUCTION NOISE AND VIBRATION

During construction of the project, there is the potential for noise impacts to be substantially greater than those resulting from normal traffic operations due to the heavy equipment typically used to build roadways. In addition, construction activities may result in vibration impacts. Therefore, early identification of potential noise/vibration sensitive sites along the project corridor is important in minimizing noise and vibration impacts. The project area does include residences, schools, parks, hotels, places of worship and medical offices that may be affected by noise and vibration associated with construction activities. These sites are identified in **Table 5-3**. Construction noise and vibration impacts to these sites will be minimized by adherence to the controls listed in the latest edition of the FDOT's *Standard Specifications for Road and Bridge Construction*. According to Section 335.02 of the Florida Statutes, the FDOT is exempt from compliance with local ordinances. However, it is the FDOT's policy is to follow the requirements of local ordinances to the extent that is considered reasonable. Also, the contractor will be instructed to coordinate with the project engineer and the District Noise Specialist should unanticipated noise or vibration issues arise during project construction.

9.0 COORDINATION WITH LOCAL OFFICIALS

Agency coordination to obtain noise-related information for this project occurred through the ETDM Programming Screening (ETDM #14244) and the Advance Notification process. The ETDM review occurred between September 9, 2015 to October 24, 2015, and the Programming Screen Summary Report was published on December 21, 2015. No comments were received on noise-related issues.

To aid in promoting land use compatibility, a copy of the NSR, which provides information that can be used to protect future land development from becoming incompatible with anticipated traffic noise levels, will be provided to Broward County. In addition, generalized future noise impact contours for properties in the immediate vicinity of the project have been developed for Noise Abatement Activity Categories B/C and E (i.e., residential/other sensitive land uses and sensitive commercial, respectively). These contours represent the approximate distance from the edge of the nearest proposed travel lane of a roadway to the limits of the area predicted to approach [i.e., within 1 dB(A)] or exceed the NAC in the Design Year 2040. These contours do not consider any shielding of noise provided by structures between the receiver and the proposed travel lanes. Contours were generally developed for portions of the project that are located away from significant ground features such as existing noise barriers. Within the project corridor, the distance between the proposed edge of the outside travel lane and the contour at various locations are presented in **Table 9-1**. To minimize the potential for incompatible land use, noise sensitive land uses should be located beyond this distance.

Table 9 - 1: Design Year (2040) Noise Impact Contour Distances

Location	Distance from Proposed Nearest Travel Lane to Noise Contour Line (Feet)	
	51/71 dB(A) – Activity Category D/E	66 dB(A) – Activity Category B/C
I-95 – South of NW 48th Street East of I-95 Sta. 26+00	N/A*	N/A*
I-95 – South of SW 10th Street East of I-95 Sta. 73+00	155	355
I-95 –SW 10th Street to Hillsboro Boulevard West of I-95 Sta. 129+00	105	385
I-95 – North of Hillsboro Boulevard East of I-95 Sta. 178+00	300	530
SW 10th Street – East of I-95 East of Natura Boulevard Sta. 412+00	25	70

Notes N/A = Impact level not met due to existing noise barrier.

10.0 REFERENCES

Florida Department of Transportation, "*Project Development and Environment Manual, Part 2, Chapter 18-Highway Traffic Noise*", January 14, 2019.

23 CFR Part 772, "*Procedures for Abatement of Highway Traffic Noise and Construction Noise*", Federal Register, Vol. 75, No. 133, Tuesday, July 13, 2010; pages 39834-39839.

Federal Highway Administration Report FHWA-HEP-10-025, "*Highway Traffic Noise: Analysis and Abatement Guidance*", June 2010 (revised December 2010); 76 pages.

Florida Statute 335.17, "*State highway construction; means of noise abatement*". 1989; 1 page.

Florida Department of Transportation Policy, "*Noise Abatement*". Topic 000-360-005-f; Effective September 20, 2007; 1 page.

Federal Highway Administration Report Number FHWA-PD-96-046, "*Measurement of Highway-Related Noise*". Cynthia S.Y. Lee and Gregg Fleming; May 1996; 206 pages.

Florida Department of Transportation, "*Standard Specifications for Road and Bridge Construction*". 2010; 996 pages.

Federal Highway Administration Report FHWA-HEP-06-015, "*FHWA Highway Construction Noise Handbook: Final Report*". August 2006; 185 pages.

Appendix A

TNM Traffic Data

Traffic Data Used in TNM Model†

Roadway Segment	# of Lanes				Design Year (2045) No-Build				Design Year (2045) Build			
	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data
I-95												
I-95 (Express Lanes are Separate) Northbound Southern Project Terminus to Express Lanes Crossover	4	6,990	6,030	6,030	3	6,620	4,570	4,570	4	6,310	5,547	5,547
I-95 (Express Lanes are Separate) Northbound Express Lanes Crossover to Combined EB/WB SW 10th St Off-Ramp (Existing Conditions and No Build Alternative Only)	4	6,990	6,030	6,030	3	7,540	4,570	4,570	4	7,130	5,859	5,859
I-95 (Express Lanes are Separate) Northbound Combined EB/WB SW 10th St Off-Ramp to SW 10th St On-Ramp (Existing Conditions and No Build Alternative Only)	4	6,000	6,030	6,000	3	6,220	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound SW 10th St On-Ramp to Hillsboro Blvd Off-Ramp (Existing Conditions and No Build Alternative Only)	4	7,360	6,030	6,030	3	7,880	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound EB Hillsboro Blvd Off-Ramp to EB Hillsboro Blvd On-Ramp (Existing Conditions and No Build Alternative Only)	4	6,690	6,030	6,030	3	7,080	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound EB Hillsboro Blvd On-Ramp to WB Hillsboro Blvd Off-Ramp (Existing Conditions and No Build Alternative Only)	4	7,200	6,030	6,030	3	7,740	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound WB Hillsboro Blvd Off-Ramp to WB Hillsoboro Blvd On-Ramp (Existing Conditions and No Build Alternative Only)	4	6,720	6,030	6,030	3	7,090	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound WB Hillsboro Blvd On-Ramp to Express Lanes Crossover (Existing Conditions and No Build Alternative Only)	4	7,380	6,030	6,030	3	7,900	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound Express Lanes Crossover to Northern Project Terminus (Existing Conditions and No Build Alternative Only)	4	7,380	6,030	6,030	3	6,160	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound Express Lanes Crossover to NB/WB Direct-Connect Off-Ramp (Build Alterntaive Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	7,170	5,547	5,547
I-95 (Express Lanes are Separate) Northbound NB/WB Direct-Connect Off-Ramp to Combined EB/WB SW 10th St Off-Ramp (Build Alterntaive Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	6,860	5,547	5,547
I-95 (Express Lanes are Separate) Northbound Combined EB/WB SW 10th St Off-Ramp to Combined EB/WB Hillsboro Off-Ramp (Build Alterntaive Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	5,620	4,883	4,883
I-95 (Express Lanes are Separate) Northbound Combined EB/WB Hillsboro Off-Ramp to Combined SW 10th St and EB/NB Direct-Connect On-Ramp (Build Alterntaive Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	4,250	4,883	4,250
I-95 (Express Lanes are Separate) Northbound Combined SW 10th St and EB/NB Direct-Connect to Combined EB/WB Hillsboro On-Ramp (Build Alterntaive Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	5,890	5,547	5,547
I-95 (Express Lanes are Separate) Northbound Combined EB/WB Hillsboro On-Ramp to Express Lanes Crossover (Build Alterntaive Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	7,230	5,547	5,547
I-95 (Express Lanes are Separate) Northbound Express Lanes Crossover to Northern Project Terminus (Build Alterntaive Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	6,190	5,547	5,547

Traffic Data Used in TNM Model†

Roadway Segment	# of Lanes				Design Year (2045) No-Build				Design Year (2045) Build			
	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data
I-95 (Express Lanes are Separate) Southbound Northern Project Terminus to Express Lanes Crossover (Existing Conditions and No Build Alternative Only)	4	6,020	6,030	6,020	3	4,870	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound Express Lanes Crossover to Combined Hillsoboro Blvd Off-Ramp (Existing Conditions and No Build Alternative Only)	4	6,020	6,030	6,020	3	6,280	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound Combined Hillsboro Blvd Off-Ramp to WB Hillsboro Blvd On-Ramp (Existing Conditions and No Build Alternative Only)	4	4,870	6,030	4,870	3	4,850	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound WB Hillsboro Blvd On-Ramp to EB Hillsboro Blvd On-Ramp (Existing Conditions and No Build Alternative Only)	4	5,470	6,030	5,470	3	5,600	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound EB Hillsboro Blvd On-Ramp to Combined SW 10th St Off-Ramp (Existing Conditions and No Build Alternative Only)	4	6,170	6,030	6,030	3	6,490	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound Combined SW 10th St Off-Ramp to Combined EB/WB SW 10th St On-Ramp (Existing Conditions and No Build Alternative Only)	4	4,560	6,030	4,560	3	4,180	4,570	4,180	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound Combined EB/WB SW 10th St On-Ramp to Express Lanes Crossover (Existing Conditions and No Build Alternative Only)	4	5,260	6,030	5,260	3	5,070	4,570	4,570	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound Northern Project Terminus to Express Lanes Crossover (Build Alternative Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	4,810	5,547	4,810
I-95 (Express Lanes are Separate) Southbound Express Lanes Crossover to Combined EB/WB Hillsboro Blvd Off-Ramp (Build Alternative Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	6,080	5,547	5,547
I-95 (Express Lanes are Separate) Southbound Combined EB/WB Hillsboro Blvd Off-Ramp to Combined EB/WB SW 10th Street Off-Ramp (Build Alternative Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	4,660	4,883	4,660
I-95 (Express Lanes are Separate) Southbound Combined EB/WB SW 10th Street Off-Ramp to Combined EB/WB Hillsboro Blvd On-Ramp (Build Alternative Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	2,770	4,883	2,770
I-95 (Express Lanes are Separate) Southbound Combined EB/WB Hillsboro Blvd On-Ramp to Combined EB/WB SW 10th Street On-Ramp (Build Alternative Only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	4,430	4,883	4,430
I-95 (Express Lanes are Separate) Southbound Combined EB/WB SW 10th St On-Ramp to Direct-Connect Ramp (Build Alternative Only)	4	7,350	6,080	6,080	3	8,040	4,580	4,580	4	5,750	5,547	5,547
I-95 (Express Lanes are Separate) Southbound Direct-Connect Ramp to Express Lanes Crossover (Build Alternative Only)	4	6,440	6,080	6,080	3	6,620	4,580	4,580	4	6,150	5,547	5,547
I-95 (Express Lanes are Separate) Southbound Express Lanes Crossover to Southern Project Terminus	4	6,440	6,030	6,030	3	5,670	4,570	4,570	4	5,390	5,547	5,390

Traffic Data Used in TNM Model[†]

Roadway Segment	# of Lanes				Design Year (2045) No-Build				Design Year (2045) Build			
	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data
Express Lanes												
I-95 Express Lanes Northbound Southern Project Terminus to GU Lanes Crossover	N/A	N/A	N/A	N/A	2	2,370	3,320	2,370	2	2,350	3,320	2,350
I-95 Express Lanes Northbound GU Lanes Crossover to NB/WB Direct-Connect Off-Ramp	N/A	N/A	N/A	N/A	2	2,370	3,320	2,370	2	1,490	3,320	1,490
I-95 Express Lanes Northbound NB/WB Direct-Connect Off-Ramp to EB/NB Direct-Connect On-Ramp	N/A	N/A	N/A	N/A	2	1,810	3,320	1,810	2	1,270	3,320	1,270
I-95 Express Lanes Northbound EB/NB Direct-Connect On-Ramp to GU Crossover	N/A	N/A	N/A	N/A	2	1,450	3,320	1,450	2	2,760	3,320	2,760
I-95 Express Lanes Northbound GU Crossover to Northern Project Terminus	N/A	N/A	N/A	N/A	2	860	3,320	860	2	3,800	3,320	3,320
I-95 Express Lanes Southbound Northern Project Terminus to GU Lanes Off-Ramp Crossover	N/A	N/A	N/A	N/A	2	1,450	3,320	1,450	2	2,700	3,320	2,700
I-95 Express Lanes Southbound GU Lanes Off-Ramp Crossover to SB/WB Direct-Connect Off-Ramp	N/A	N/A	N/A	N/A	2	860	3,320	860	2	1,430	3,320	1,430
I-95 Express Lanes Southbound SB/WB Direct-Connect Off-Ramp to EB/SB Direct-Connect On-Ramp	N/A	N/A	N/A	N/A	2	1,450	3,320	1,450	2	760	3,320	760
I-95 Express Lanes Southbound EB/SB Direct-Connect On-Ramp to GU Lanes Off-Ramp Crossover	N/A	N/A	N/A	N/A	2	860	3,320	860	2	1,190	3,320	1,190
I-95 Express Lanes Southbound GU Lanes Off-Ramp Crossover to Southern Project Terminus	N/A	N/A	N/A	N/A	2	1,450	3,320	1,450	2	1,950	3,320	1,950
SW 10th St Express Lanes (Build Alternative Only) Eastbound Western Project Terminus to Crossover	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	3,630	3,320	3,320
SW 10th St Express Lanes (Build Alternative Only) Eastbound Crossover to Ramp Diverge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	3,140	3,320	3,140
SW 10th St Express Lanes (Build Alternative Only) Westbound Ramp Merge to Crossover	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	1,830	3,320	1,830
SW 10th St Express Lanes (Build Alternative Only) Westbound Crossover to Western Project Terminus	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	2,120	3,320	2,120
SR 869/SW 10th Street												
SR 869/SW 10th St (General Use Lanes Only) Eastbound Western Project Terminus to S Military Trail	2	2,450	2,940	2,450	2	2,885	2,940	2,885	2	1,480	1,910	1,480
SR 869/SW 10th St (General Use Lanes Only) Westbound Direct-Connect Crossover to Western Project Terminus	2	1,670	1,910	1,670	2	2,040	1,910	1,910	2	1,415	1,910	1,415

Traffic Data Used in TNM Model†

Roadway Segment	# of Lanes	AM Peak	LOS C	TNM Data	Design Year (2045) No-Build # of Lanes	AM Peak	LOS C	TNM Data	Design Year (2045) Build # of Lanes	AM Peak	LOS C	TNM Data
SR 869/SW 10th St (General Use Lanes Only) Eastbound S Military Trail to Direct-Connect Crossover	3	3,085	3,970	3,085	3	3,515	3,970	3,515	2	2,205	1,910	1,910
SR 869/SW 10th St (General Use Lanes Only) Westbound S Military Trail to Direct-Connect Crossover	3	1,835	2,940	1,835	3	2,240	2,940	2,240	3	1,775	2,940	1,775
SR 869/SW 10th St (General Use Lanes Only) Eastbound Direct-Connect Crossover to E Newport Center Dr	3	3,085	3,970	3,085	3	3,515	3,970	3,515	3	2,695	2,940	2,695
SR 869/SW 10th St (General Use Lanes Only) Westbound E Newport Center Dr to S Military Trail	3	1,835	2,940	1,835	3	2,240	2,940	2,240	3	2,065	2,940	2,065
SR 869/SW 10th St (General Use Lanes Only) Eastbound E Newport Center Dr SB I-95 On-Ramp	3	2,500	3,970	2,500	3	2,850	3,970	2,850	3	890	2,940	890
SR 869/SW 10th St (General Use Lanes Only) Westbound SB I-95 Off-Ramp to E Newport Center Dr	3	2,330	2,940	2,330	3	2,845	2,940	2,845	3	2,765	2,940	2,765
SR 869/SW 10th St (General Use Lanes Only) Eastbound SB I-95 On-Ramp to NB I-95 On-Ramp	2	2,095	1,910	1,910	2	2,565	1,910	1,910	3	1,300	2,940	1,300
SR 869/SW 10th St (General Use Lanes Only) Westbound NB I-95 On-Ramp to SB I-95 Off-Ramp	3	2,195	2,940	2,195	3	2,690	2,940	2,690	3	2,690	2,940	2,690
SR 869/SW 10th St (General Use Lanes Only) Eastbound NB I-95 On-Ramp to FAU Research Park Blvd	3	1,395	2,940	1,395	3	1,665	2,940	1,665	3	1,770	2,940	1,770
SR 869/SW 10th St (General Use Lanes Only) Westbound SW Natura Park Blvd to NB I-95 On-Ramp	3	1,865	2,940	1,865	3	2,130	2,940	2,130	3	2,210	2,940	2,210
SR 869/SW 10th St (General Use Lanes Only) Eastbound FAU Research Park Blvd to Eastern Project Terminus	3	1,360	2,940	1,360	3	1,515	2,940	1,515	3	1,625	2,940	1,625
SR 869/SW 10th St (General Use Lanes Only) Westbound Eastern Project Terminus to FAU Research Park Blvd	3	1,545	2,940	1,545	3	1,790	2,940	1,790	3	1,775	2,940	1,775
SR 810/Hillsboro Boulevard												
Hillsboro Blvd Eastbound Western Project Terminus to SB I-95 Ramps	3	1,945	2,940	1,945	3	2,330	2,940	2,330	3	2,215	2,940	2,215
Hillsboro Blvd Westbound SB I-95 Off-Ramp to Western Project Terminus	3	1,945	2,940	1,945	3	2,315	2,940	2,315	3	2,235	2,940	2,235
Hillsboro Blvd Eastbound SB I-95 Ramps to EB Hillsboro Blvd/NB I-95 On-Ramp	3	1,725	2,940	1,725	3	2,050	2,940	2,050	3	1,935	2,940	1,935
Hillsboro Blvd Westbound WB Hillsboro Blvd/SB I-95 On-Ramp to SB I-95 Off-Ramp	3	1,275	2,940	1,275	3	1,495	2,940	1,495	3	1,425	2,940	1,425

Traffic Data Used in TNM Model†

Roadway Segment	# of Lanes	AM Peak	LOS C	TNM Data	Design Year (2045) No-Build # of Lanes	AM Peak	LOS C	TNM Data	Design Year (2045) Build # of Lanes	AM Peak	LOS C	TNM Data
Hillsboro Blvd Eastbound EB Hillsboro Blvd/NB I-95 On-Ramp to NB I95/EB Hillsboro Blvd Off-Ramp	3	1,215	2,940	1,215	3	1,390	2,940	1,390	3	1,375	2,940	1,375
Hillsboro Blvd Westbound NB I-95/WB Hillsboro Blvd Off-Ramp to WB Hillsboro Blvd/SB I-95 On-Ramp	3	1,875	2,940	1,875	3	2,245	2,940	2,245	3	2,195	2,940	2,195
Hillsboro Blvd Eastbound NB I95/EB Hillsboro Blvd Off-Ramp to Eastern Project Terminus	3	1,885	2,940	1,885	3	2,190	2,940	2,190	3	2,205	2,940	2,205
Hillsboro Blvd Westbound WB Hillsboro/NB I-95 On-Ramp to NB I-95/WB Hillsboro Blvd Off-Ramp	3	1,395	2,940	1,395	3	1,595	2,940	1,595	3	1,655	2,940	1,655
Hillsboro Blvd Westbound Eastern Project Terminus to WB Hillsboro/NB I-95 On-Ramp	3	2,055	2,940	2,055	3	2,405	2,940	2,405	3	2,435	2,940	2,435
S. Military Trail												
S. Military Trail Southbound South of SW 10th St	2	910	1,910	910	2	1,100	1,910	1,100	2	1,015	1,910	1,015
S. Military Trail Northbound South of SW 10th St	2	1,495	1,910	1,495	2	1,690	1,910	1,690	2	1,520	1,910	1,520
S. Military Trail Southbound North of SW 10th St	2	1,215	1,910	1,215	2	1,375	1,910	1,375	2	1,330	1,910	1,330
S. Military Trail Northbound North of SW 10th St	2	1,330	1,910	1,330	2	1,535	1,910	1,535	2	1,470	1,910	1,470
E Newport Center Drive												
E Newport Center Dr Southbound South of SW 10th St	2	780	730	730	2	920	730	730	2	1,005	730	730
E Newport Center Dr Northbound South of SW 10th St	2	155	730	155	2	170	730	170	2	220	730	220
E Newport Center Dr Southbound North of SW 10th St	2	125	730	125	2	135	730	135	2	165	730	165
E Newport Center Dr Northbound North of SW 10th St	2	580	730	580	2	655	730	655	2	810	730	730
SW Natura Park Boulevard												
SW Natura Park Blvd Southbound North of SW 10th St	2	635	730	635	2	775	730	730	2	835	730	730
SW Natura Park Blvd Northbound North of SW 10th St	2	350	730	350	2	485	730	485	2	545	730	545

Traffic Data Used in TNM Model†

Roadway	# of Lanes				Design Year (2045) No-Build				Design Year (2045) Build			
Segment	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data
FAU Research Park Boulevard												
FAU Research Park Blvd Southbound South of SW 10th St	1	425	370	370	1	620	370	370	1	725	370	370
FAU Research Park Blvd Northbound South of SW 10th St	1	425	370	370	1	520	370	370	1	725	370	370
Ramps												
NB I-95 GU to NB/WB Direct-Connect Off-Ramp (Build Alternative Only) NB to WB Off-Ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	310	N/A	310
NB I-95 Express Lanes to NB/WB Direct-Connect Off-Ramp (Build Alternative Only) NB to WB Off-Ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	220	N/A	220
NB I-95 to SW 10th St NB to EB/WB Off-Ramp	1	990	N/A	990	1	1,320	N/A	1,320	2	1,240	N/A	1,240
EB/WB SW 10th St to NB I-95 (Existing Conditions and No Build Alternative Only) EB/WB to NB On-Ramp	1	1,360	N/A	1,360	1	1,660	N/A	1,660	N/A	N/A	N/A	0
EB SW 10th St to NB I-95 (Build Alternative Only) EB to NB On-Ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	530	N/A	530
WB SW 10th St to NB I-95 (Build Alternative Only) WB to NB On-Ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	290	N/A	290
EB/NB Direct-Connect to NB I-95 Express Lanes (Build Alternative Only) EB to NB On-Ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1,490	N/A	1,490
EB/NB Direct-Connect to NB I-95 GU Lanes (Build Alternative Only) EB to NB On-Ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	820	N/A	820
NB I-95 to EB Hillsboro Blvd NB to EB Off-Ramp	1	670	N/A	670	1	800	N/A	800	1	1,370	N/A	1,370
EB Hillsboro Blvd to NB I-95 EB to NB On-Ramp	1	510	N/A	510	1	660	N/A	660	1	560	N/A	560
NB I-95 to WB Hillsboro Blvd NB to WB Off-Ramp	1	480	N/A	480	1	650	N/A	650	1	See NB to EB	N/A	0
WB Hillsboro Blvd to NB I-95 WB to NB On-Ramp	1	660	N/A	660	1	810	N/A	810	1	780	N/A	780
SB I-95 to EB/WB Hillsboro Blvd SB to EB/WB Off-Ramp	1	1,150	N/A	1,150	1	1,430	N/A	1,430	1	1,420	N/A	1,420
WB Hillsboro Blvd to SB I-95 WB to SB On-Ramp	1	600	N/A	600	1	750	N/A	750	1	770	N/A	770

Traffic Data Used in TNM Model†

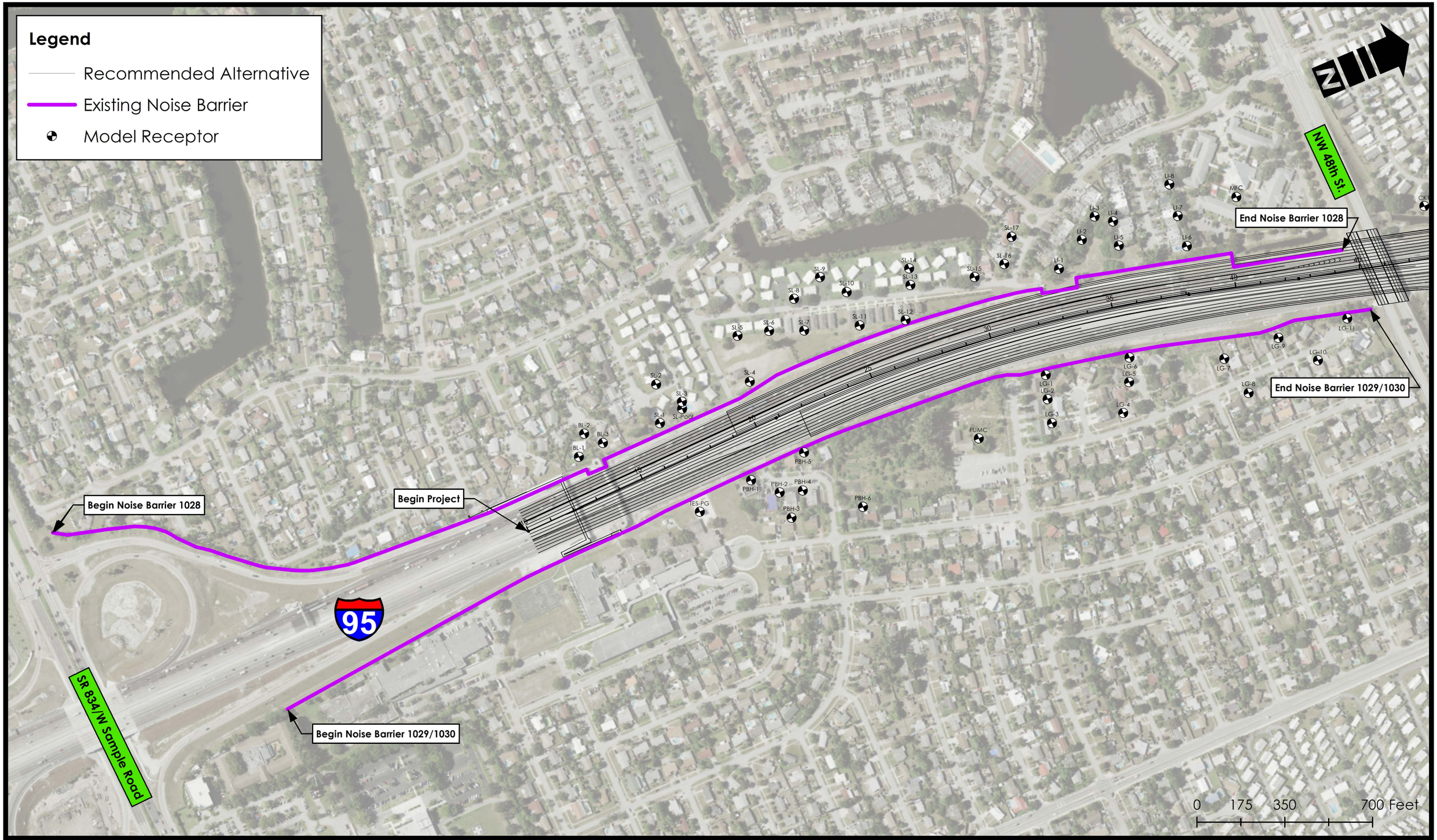
Roadway Segment	# of Lanes				Design Year (2045) No-Build				Design Year (2045) Build			
	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data	# of Lanes	AM Peak	LOS C	TNM Data
EB Hillsboro Blvd to SB I-95 EB to SB On-Ramp	1	700	N/A	700	1	890	N/A	890	1	890	N/A	890
SB I-95 to SW 10th St SB to EB/WB Off-Ramp	1	910	N/A	910	1	1,420	N/A	1,420	1	1,260	N/A	1,260
EB/WB SW 10th St to SB I-95 EB/WB to SB On-Ramp	1	1,180	N/A	1,180	1	1,550	N/A	1,550	1	1,320	N/A	1,320
SB I-95 Express Lanes to SB/WB Direct-Connect Off-Ramp (Build Alternative Only) SB to WB Off-Ramp	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	670	N/A	670
SB I-95 GU Lanes to SB/WB Direct-Connect Off-Ramp (Build Alternative Only) SB to WB Off-Ramp	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	630	N/A	630
EB/SB Direct-Connect to SB I-95 Express Lanes (Build Alternative Only) EB to SB Off-Ramp	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	430	N/A	430
EB/SB Direct-Connect to SB I-95 GU Lanes (Build Alternative Only) EB to SB Off-Ramp	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	400	N/A	400
EB SW 10th St Express Lanes Crossover to SW 10th Street (Build Alternative Only) EB to EB Off-Ramp	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	490	N/A	490
WB SW 10th St Crossover to WB SW 10th Street Express Lanes Crossover (Build Alternative Only) EB to EB Off-Ramp	0	N/A	N/A	N/A	0	N/A	N/A	N/A	1	290	N/A	290

Notes:

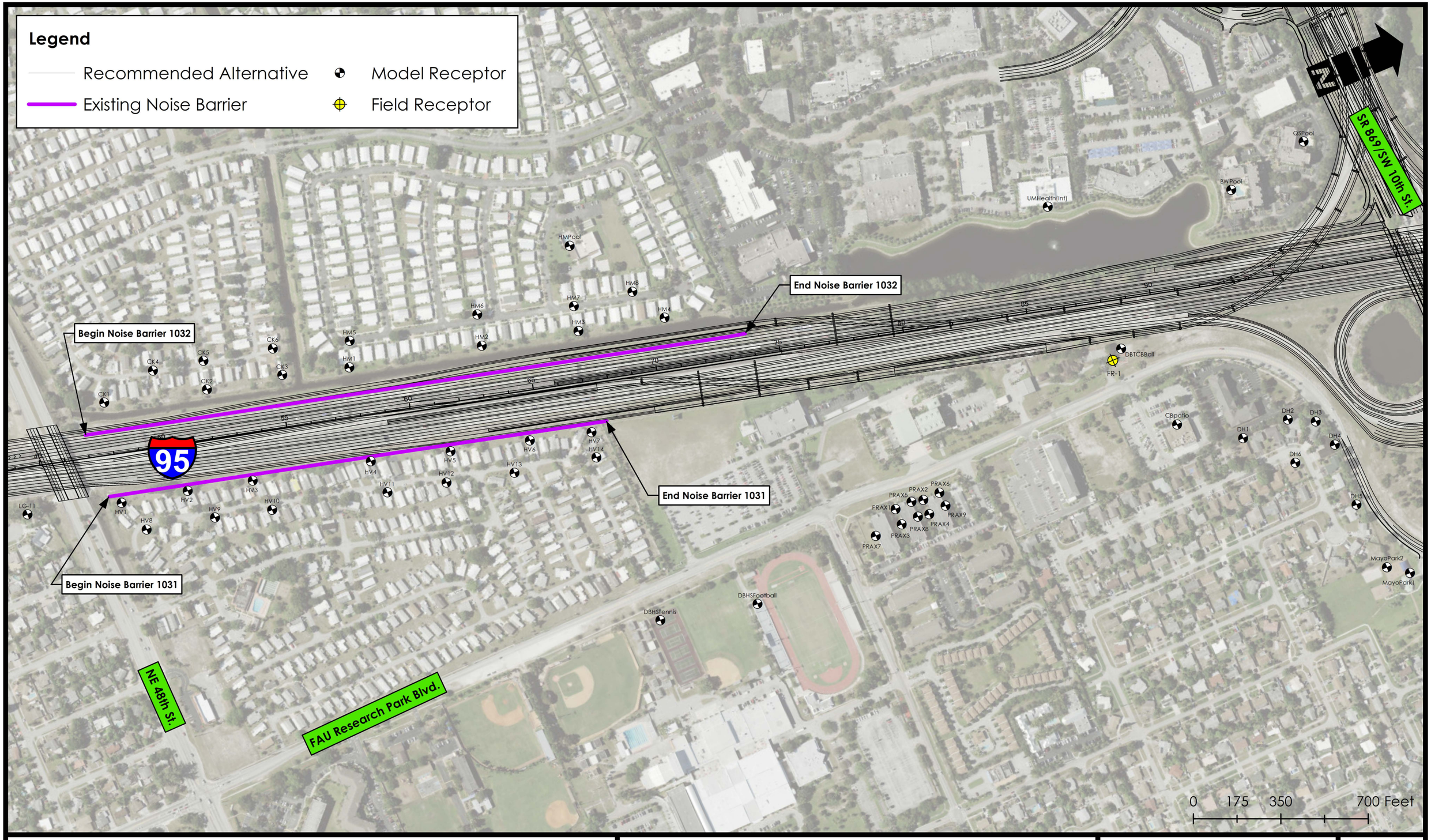
TNM By-Lane Data is either AM Peak-Hour Volume or Level of Service C Capacity, whichever is less.
PHD = Peak-Hour Demand
LOS C = Level-of-Service C
N/A = Not applicable
I-95 Express Lanes LOS C Capacity = 1,660 vehicles per hour based on capacity used in I-95 Express PD&E.

Appendix B

Noise Analysis Maps

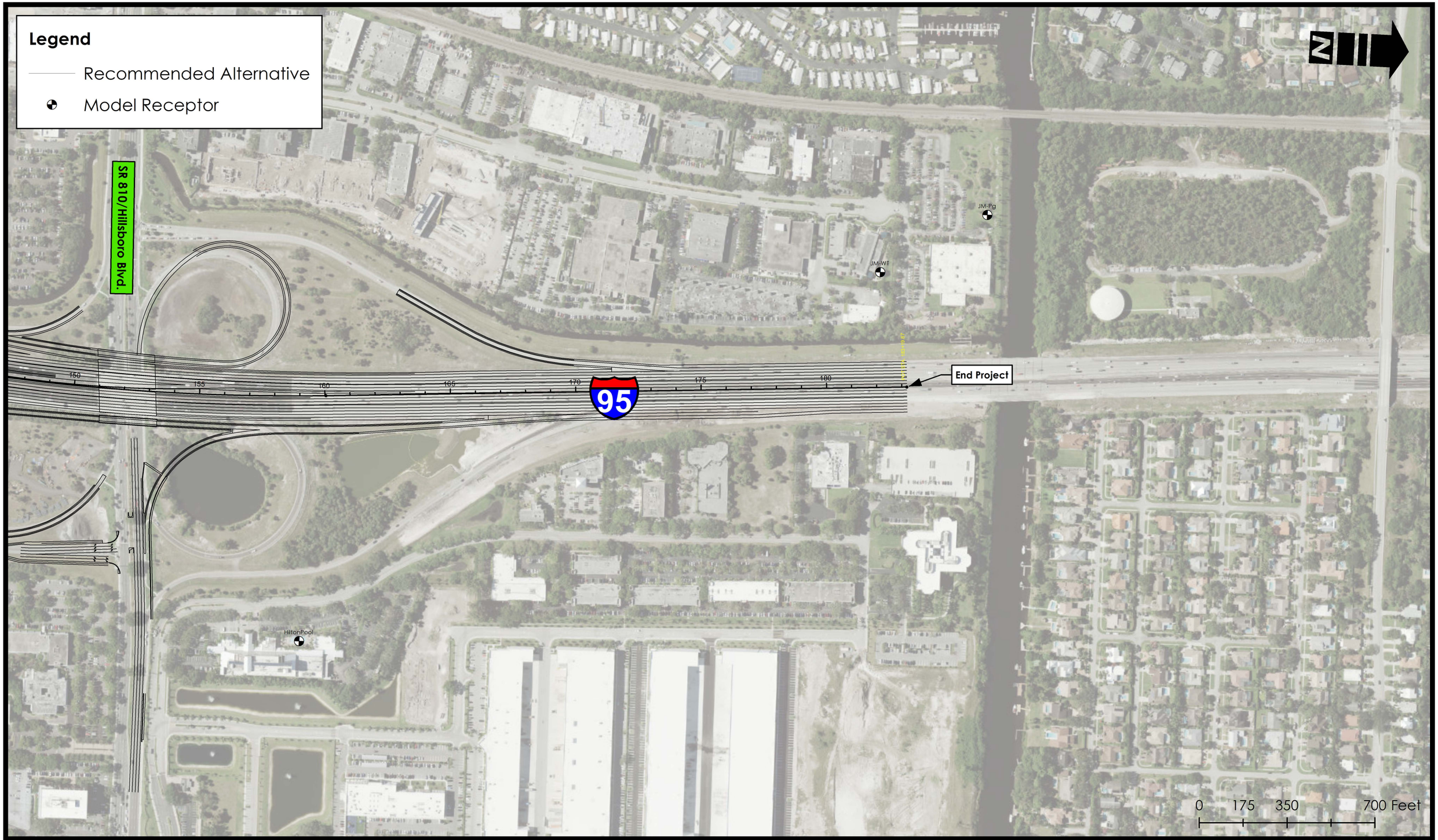


FDOT Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street to North of Hillsboro Boulevard	Noise Analysis Maps Southern Project Terminus to NW 48th Street	Page 1 of 5



FDOT Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street to North of Hillsboro Boulevard	Noise Analysis Maps NW/NE 48th Street to SR 869/SW 10th Street	Page 2 of 5

Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street to North of Hillsboro Boulevard	Noise Analysis Maps SR 869/SW 10th Street to SR 810/Hillsboro Blvd	Page 3 of 5



Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street to North of Hillsboro Boulevard	Noise Analysis Maps SR 810/Hillsboro Blvd to Northern Project Terminus	Page 4 of 5

Legend

- Recommended Alternative
- Model Receptor
- Field Receptor

Military Trail

SR 869/SW 10th St.

Tri-Rail

I-95

N

LD1
LD2
LD3
FR-4
LD4
LD5
LD6
LD7
LD8
LD9
LDTennis
LDPool
QSPool
BWPool
UMHealth(Int)
OBTCBBall
R-1

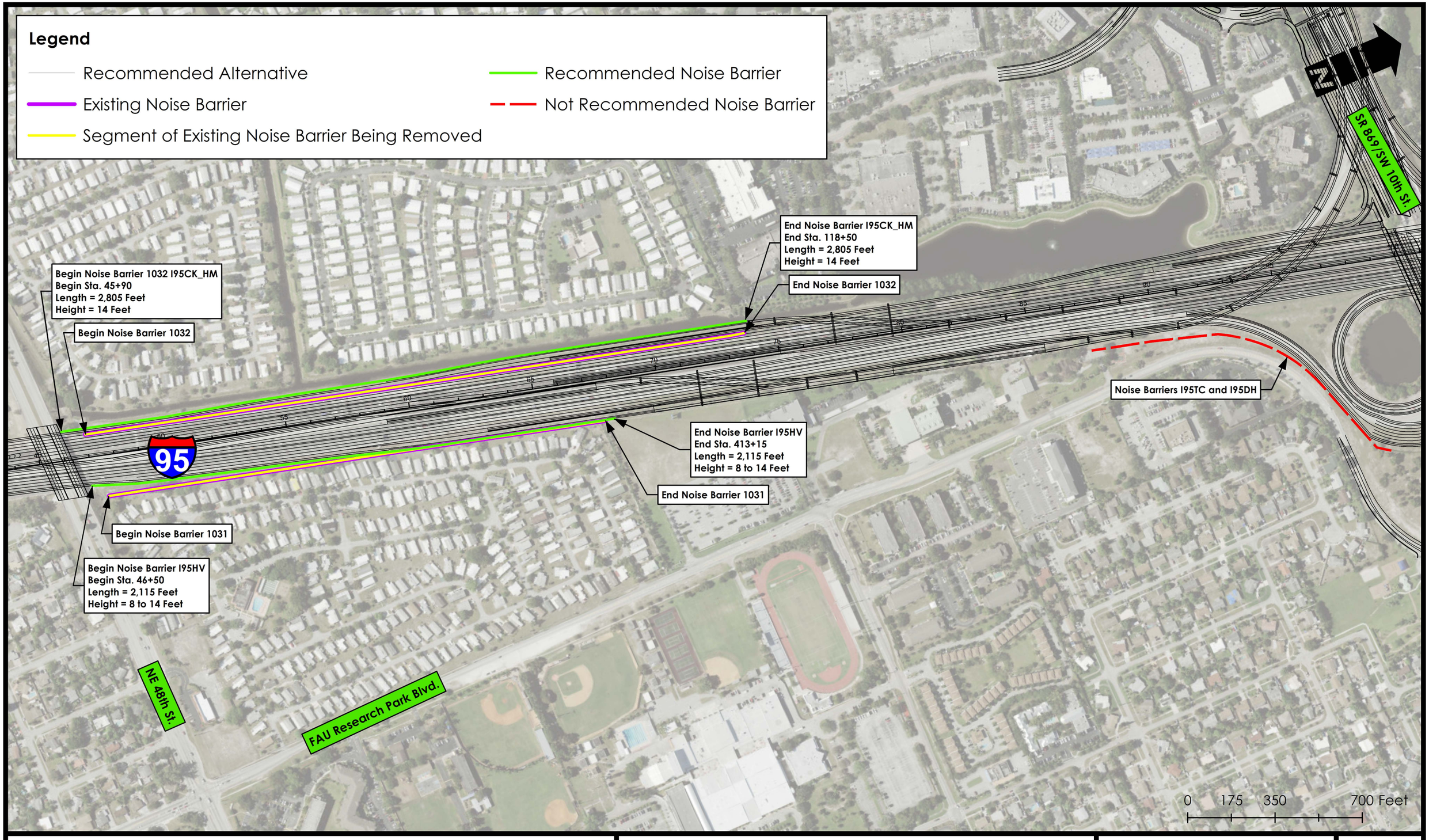
0 150 300 600 Feet

Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street to North of Hillsboro Boulevard	Noise Analysis Maps SW 10th Street - Western Terminus to I-95	Page 5 of 5

Appendix C

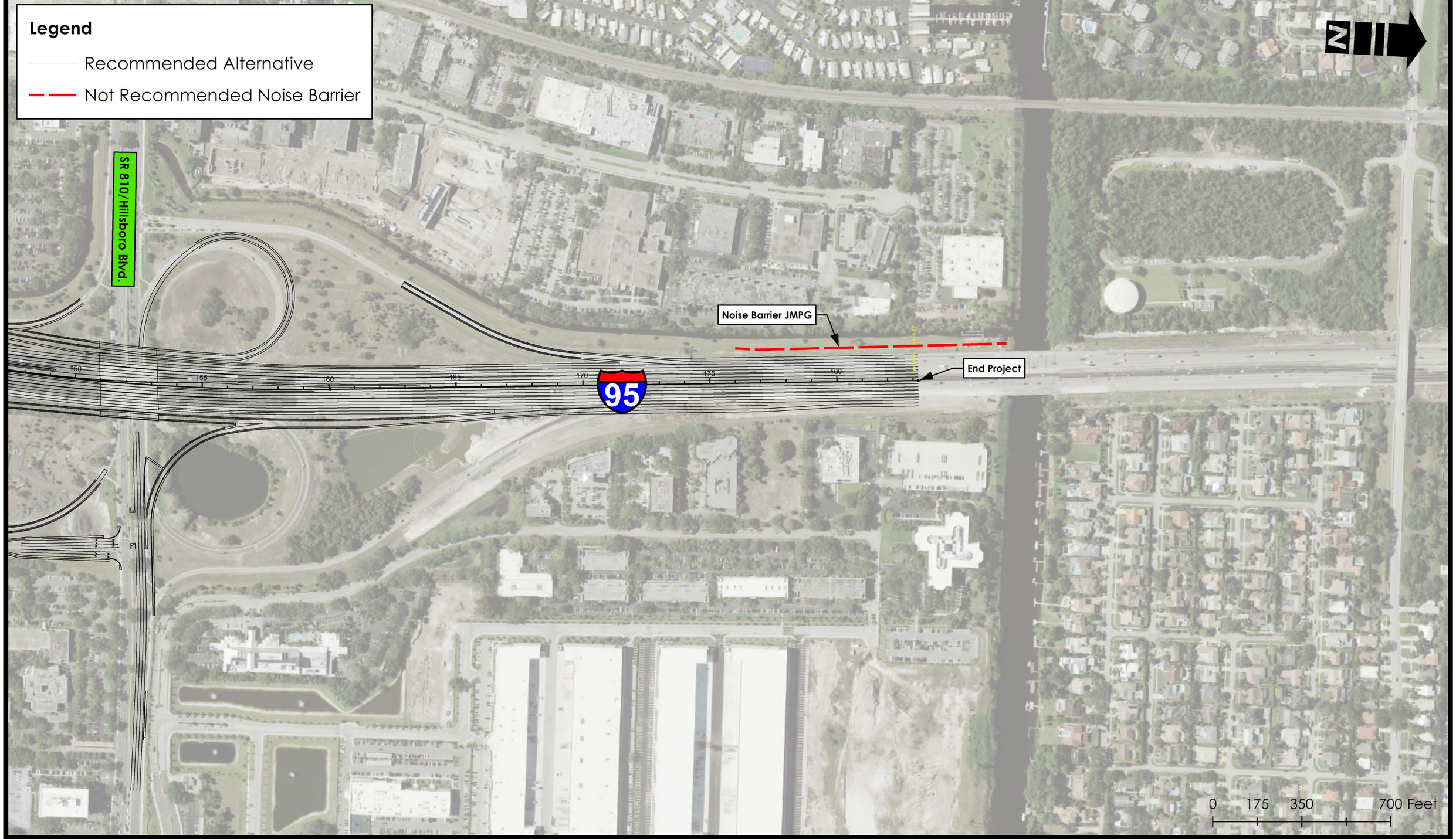
Noise Barrier Recommendations

Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street to North of Hillsboro Boulevard	Noise Barriers Southern Project Terminus to NW 48th Street	Page 1 of 5



FDOT Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street to North of Hillsboro Boulevard	Noise Barriers NW/NE 48th Street to SR 869/SW 10th Street	Page 2 of 5

Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street to North of Hillsboro Boulevard	Noise Barriers SR 869/SW 10th Street to SR 810/Hillsboro Blvd	Page 3 of 5



Florida Department of Transportation, District IV
3400 West Commercial Boulevard
Fort Lauderdale, Florida 33309

Interstate 95 (I-95) PD&E Study
SR 9/I-95 from South of SW 10th Street
to North of Hillsboro Boulevard

Noise Barriers

SR 810/Hillsboro Blvd to
Northern Project Terminus

Legend

Recommended Alternative

Not Recommended Noise Barrier

N

Tri-Rail

Military Trail

SR 869/SW 10th St.

Noise Barrier Lakes Part C

Noise Barrier Lakes Part B

Noise Barrier Lakes Part A

95

0 150 300 600 Feet

Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street to North of Hillsboro Boulevard	Noise Barriers SW 10th Street - Western Terminus to I-95	Page 5 of 5