EXECUTIVE SUMMARY

In 2014, as part of the SR 9/I-95 Interchange Master Plan Study (IMP), an Interchange Concept Development Report (ICDR) was completed by FDOT. The ICDR identified short-term and long-term needs developing design concepts to address the traffic spillback onto I-95 and improve interchange operations and safety at the interchange. Some of the short-term improvements have been implemented through the I-95 at Hypoluxo Road Interim Interchange Improvement Project (Financial Project ID [FPID] #413257-2) and have been included as part of the No-Build Alternative. As part of the I-95 at Lantana Road pre-PD&E effort (FPID #413258-1-22-01), in September 2017, FDOT conducted data collection and prepared project traffic for the No-Build conditions for the Hypoluxo Road interchange and other adjacent interchanges. The Department programmed the ultimate IMP recommendations for design phase in fiscal year 2021 (FPID #413257-1-52-01). To implement the recommendations from the ICDR, an Interchange Operational Analysis Report (IOAR) study was required to advance the project to the Design phase.

During the IOAR process and through coordination meetings with the District Interchange Review Coordinator (DIRC) and Central Office (CO), a Diverging Diamond Interchange (DDI) concept was proposed for the I-95 at Hypoluxo Road Interchange to determine whether it is a better option to address the safety and operational issues by year 2045 than the proposed improvements in the ICDR, and whether it will make the interchange ready for potential additional managed lanes along I-95. Therefore, an Interchange Modification Report (IMR), instead of an IOAR, was conducted for the study interchange. The purpose of the IMR study is to obtain safety, operational, and engineering (SO&E) acceptability to proceed to the Design phase and obtain NEPA approval. The IMR would be conducted in coordination with the following existing and on-going FDOT projects in the area:

1. Interim Interchange Improvement Project for I-95 at Hypoluxo Road Interchange (FPID #413257-2);
2. Design Project to improve I-95 at Hypoluxo Road Interchange (FPID #413257-1);
3. PD&E Project for I-95 at Lantana Road Interchange (FPID #413258-1);
4. Design Project for I-95 at Gateway Boulevard Interchange (FPID #231932-1-32-01);

5. I-95 Managed Lanes Project (FPID #444202-1).

A Methodology Letter of Understanding (MLOU) was prepared to describe the methodology for the analysis and evaluation of this Interchange Modification Report. The MLOU was approved by the FDOT District 4 Interchange Review Coordinator (IRC) in April 2020. The traffic projections used in the IMR were developed using existing field traffic counts and the South East Regional Planning Model (SERPM) Version 7.071. SERPM 7.071 is calibrated to base year 2010 conditions and includes a future year scenario for 2040. The analysis years for this study include Existing Year 2017, Opening Year 2025, and Design Year 2045. The operational analysis for this study was performed using the Highway Capacity Software (HCS) Version 7.7 and SYNCHRO Version 10.

Traffic data was collected in September 2017 as part of the I-95 at Lantana Road PD&E Study. The 2017 turning movement counts were used for existing condition analysis. The existing condition analysis indicates that the ramp terminals at the I-95/Hypoluxo Road Interchange are still over capacity after the construction of the short-term improvements identified in the ICDR (FPID #413257-2). The I-95 southbound ramp terminal is operating at LOS D during the AM peak hour and LOS C during the PM peak hour. The I-95 northbound ramp terminal at the Hypoluxo Road Interchange is currently operating at LOS E during the AM peak period and LOS F and during the PM peak period. The intersections of Hypoluxo Road at High Ridge Road and at Seacrest Boulevard/S 14th Street are currently operating at LOS D during the AM and PM peak periods. The northbound and southbound movements are operating at LOS E. These delays are expected to worsen in the future with the projected growth of traffic in the area.

Crash analysis was performed using the five-year crash data from 2013 to 2017. The crash data were obtained from the FDOT Crash Analysis Reporting System database and Signal Four Analytics. The crash analysis indicated that rear-end, left-turn, sideswipe, and angle crashes are the most prominent crash types within the study area and are an indicator of congested roadway conditions.

Several alternatives were evaluated to address the needs identified for this project. The alternatives include the No-Build Alternative and two Build Alternatives (Build Alternative 1 and 2). The Build

Alternative 1 improvements were obtained from the long-term improvements identified in the ICDR, with exception to the improvements already implemented under the I-95 at Hypoluxo Road Interim Interchange Improvement Project (FPID #413257-2). The remaining recommended improvements for the Build Alternative 1 include:

- Add a second left-turn lane on the I-95 southbound off-ramp;
- Add a third left-turn lane on the I-95 northbound off-ramp;
- Add a receiving lane on the I-95 northbound on-ramp;
- Add one right-turn lane on eastbound, northbound, and southbound approaches at the High Ridge Road intersection; and
- Add a third westbound through lane on Hypoluxo Road from Seacrest Boulevard/S 14th Street to the existing six-lane section of Hypoluxo Road at the median opening east of High Ridge Road; extend the westbound right-turn lane from Seacrest Boulevard to I-95 northbound on-ramp; and add one southbound through lane and restripe the southbound approach as left-turn, through, and right-turn lanes (currently there is a shared left-through lane and right-turn lane).

The Build Alternative 2 will reconfigure the existing Tight Urban Diamond Interchange (TUDI) to a Diverging Diamond Interchange (DDI).

The mainline I-95 is currently operating over capacity. FDOT has programmed a PD&E Study (FPID #444202-1) in its fiscal year 2022 to evaluate the implementation of Managed Lanes to improve the mainline I-95 mobility and operations. Therefore, no improvements are recommended on the mainline I-95 (including the merge, diverge, and weaving sections) under this study, as the I-95 main line improvement project will address those deficiencies. An I-95 ramp merge/diverge/weaving analysis was performed for future years. The lane geometry and volumes on the I-95 and the I-95 ramps at the junction areas will be the same in future years in this study. In 2045, the weaving segments of I-95 northbound and southbound between Hypoluxo Road and Lantana Road are predicated to operate at LOS F during the AM and PM peak hours. The volume-to-capacity (v/c) ratio at the weaving section is greater than 1. The I-95 southbound on-ramp during the AM peak hour and I-95 northbound off-ramp during the PM peak hour will operate at LOS F. The I-95 northbound off-ramp during the AM peak hour and I-95 southbound on-ramp

during the PM peak hour will operate at LOS B and LOS C, respectively.

Under the No-Build Alternative, the I-95 southbound ramp terminal will operate at LOS D by 2045. However, the I-95 northbound ramp terminal will operate at E or F by 2045. The northbound and southbound off-ramps will operate at LOS E or F during the AM and PM peak hours. The queue on the eastbound left-turn movement from eastbound Hypoluxo Road to I-95 northbound on-ramp will spill back to the west of the interchange termini during the AM peak hour. The intersection of Hypoluxo Road at High Ridge Road will operate at LOS E during the AM peak hour and LOS D during the PM peak hour in 2045. The intersection of Hypoluxo Road and Seacrest Boulevard/S 14th Street will operate at LOS D during the AM peak hour and LOS E during the PM peak hour. By 2045, the queues on the I-95 southbound off-ramp and northbound off-ramp will not extend to the I-95 mainline.

Under the Build Alternative 1, the interchange termini intersections will operate at LOS D or better during the AM and PM peak hours in 2045. However, the southbound and northbound approaches will operate at LOS E during the AM and PM peak hours in 2045. Under the Build Alternative 1, the queues on the I-95 southbound off-ramp and northbound off-ramp will not extend to the I-95 mainline. With the proposed improvements at the nearby intersections, the operation at the nearby intersections will subsequently be improved. The intersections of Hypoluxo Road at High Ridge Road, and at Seacrest Boulevard/S 14th Street will operate at LOS D or better during the AM and PM peak hours in 2045. The eastbound and westbound through movement will operate at LOS D or better in 2045 as well.

Under the Build Alternative 2 with the proposed Diverging Diamond Interchange (DDI), the I-95 at Hypoluxo Road Interchange termini intersections will operate at LOS C or better during the AM and PM peak hours in 2045. All movements at these intersections will operate at LOS D or better. The queues on I-95 southbound off-ramp and northbound off-ramp will not extend to the I-95 mainline.

Future 2045 crash analysis was performed for the No-Build and Build Alternatives 1 and 2. Based on the future predicted 2045 number of crashes, the No-Build expected number of crashes in the study area will be 152.2. The Build Alternative 1 expected number of crashes will be 147.9. Under

the DDI Build Alternative 2, there will be 27.7 crashes decrease as compared to the No-Build Alternative and 23.4 crashes decrease as compared to the Build Alternative 1 in 2045. The Build Alternative 2 expected number of crashes will be 124.5. The Build Alternative 2 will improve the safety performance of the I-95 mainline, the ramp terminals, ramp segments, and Hypoluxo Road as compared to the No-Build Alternative and the Build Alternative 1.

Based on the analysis of the No-Build and Build Alternatives, the Build Alternative 2 significantly improves traffic operations and safety conditions as compared to the No-Build Alternative and Build Alternative 1. The Build Alternative 2 is selected as the preferred alternative.

The Federal Highway Administration (FHWA) Interchange Access Policy was checked to assure that the adequate level of service is provided in terms of safety and mobility.

FHWA Policy Points 1

With the recommended Build Alternative 2 - DDI Interchange concept, the interchange termini intersections will operate at LOS C or better in 2025 and 2045, and all approaches will operate at LOS C or better. Compared to the No-Build Alternative, the delay at the interchange termini intersections will significantly decrease during the AM and PM peak hours in 2045. The future year 2045 safety analysis shows that there will be 27.7 decrease on the expected number of crashes as compared to the No-Build Alternative, and 23.4 decrease as compared to the Build Alternative 1. The Build Alternative 2 is anticipated to improve the safety and operations of mainline I-95, I-95 ramps, and the interchange termini.

FHWA Policy Points 2

The proposed DDI concept will provide full access and accommodate all traffic movements between Hypoluxo Road and I-95. The proposed improvements were designed to meet the current standards for federal-aid projects on the interstate system and to conform to the American Association of State and Transportation Officials (AASHTO) and FDOT design standards.