Executive Summary

The purpose of this Systems Interchange Modification Report (SIMR) re-evaluation is to provide the required technical documentation for obtaining Federal Highway Administration (FHWA) approval of capacity improvements along I-95 between International Golf Parkway and the interchange with Atlantic Boulevard, which covers approximately 25.5 miles. This study area has been evaluated in two previously approved SIMRs, which include the I-95 Express Phase 1: International Golf Parkway to I-295 SIMR, which included the I-95 at FCE interchange re-evaluation, approved in October 2016 and the I-95 Express Lanes Analysis: I-295 to Atlantic Boulevard SIMR approved September 2018. While the preferred concepts in the previously approved SIMRs implemented express lanes on I-95 within the study area, this SIMR presents a concept that replaces the express lanes with expanded general use lane capacity. The project limits extend from south of the interchange with International Golf Parkway to the interchange with Atlantic Boulevard, which encompasses the study areas for the following projects:

- I-95 between International Golf Parkway and First Coast Expressway (422938-9)
- SR 23 (First Coast Expressway) from I-95 to East of CR 16A (422938-8)
- I-95 between First Coast Expressway and Duval/St. Johns County Line (424026-4)
- I-95 between St. Johns County/Duval County Line to I-295 (424026-5)
- I-95 between I-295 and SR 152/Baymeadows Road (435577-2)
- I-95 between SR 152/Baymeadows Road and SR 202/Butler Boulevard (446153-1)
- I-95 between SR 202/Butler Boulevard and Atlantic Boulevard (432259-2)
- SR 202/Butler Boulevard at Belfort Road (446386-1)

The Methodology Letter of Understanding (MLOU) was approved in May 2020. The primary basis for traffic projections in this SIMR is Version 2 of the adopted Northeast Regional Planning Model (NERPM) Activity Based Model (ABM) which has a base year of 2010 and a cost feasible year of 2040. The analysis years for the study include Existing Year 2019, Opening Year 2030, and Design Year 2045. The operational analysis for this study is performed primarily using microsimulation (VISSIM).

The purpose of the construction projects is to add capacity on I-95 from the International Golf Parkway interchange to the Atlantic Boulevard interchange in order to provide long-term improvements in traffic operations and safety.

Two alternatives will be evaluated in this SIMR for future conditions – an Original Build Alternative and a Modified Build Alternative. The Original Build Alternative represents the previously approved I-95 Express SIMRs and provides two express lanes in each direction from north of International Golf Parkway to Atlantic Boulevard with at-grade, slip ramp access to and from the express lanes in the Design Year 2045. It should be noted that in the Opening Year 2030, the Original Build Alternative does not include capacity improvements on I-95 between I-295 and Butler Boulevard. The Modified Build alternative replaces the express lanes with expanded general use lane capacity in the form of added lanes or auxiliary lanes on I-95 within the study area, during both the Opening Year and Design Year horizons.

Currently, the I-95 mainline carries a high volume of traffic with daily traffic ranging from 85,000 vehicles to 155,000 vehicles. The I-95 study area serves as a main route for commuters who reside in St. Johns County and travel to major employment centers located in Duval County, as well as for commuters who both live and work in Duval County. Currently, pockets of congestion occur along the facility during both the AM and PM peak periods.

During the Opening Year 2030, analysis of the Original Build Alternative showed that traffic operations are expected to degrade significantly and severe congestion with system-wide impacts will take place along I-95 northbound during the AM peak period. The PM peak period also showed significant congestion along I-95 southbound. This congestion also will impact the I-295 mainline. The congestion occurs due to bottlenecks that originate between I-295 and Butler Boulevard, since the Original Build does not provide capacity improvements in that area by 2030. The Modified Build, which provides general use lane capacity improvements through the extent of the study area, shows significant operational improvements over the Original Build, with travel speeds remaining at or near free-flow through the entirety of I-95 within the study area. In addition to the expanded general use lanes, other improvements include auxiliary lanes and improvements at several of the study area interchanges. The Modified Build also provides significant travel time savings along I-95 when compared to the Original Build. During the 2030 AM peak hour, the Modified Build alternative provided a 56% reduction in travel time along I-95 northbound (peak direction of flow) general use lanes. During the PM peak, it provided a 11% reduction in travel time for the I-95 southbound general use lanes. In terms of network-wide performance, the Modified Build alternative provided substantial improvements over the Original Build in Opening Year 2030. When comparing total delay time to the Original Build, the Modified Build provided AM and PM peak period reductions of 68% and 28%, respectively. In terms of average speed, the Modified Build increased speed over the Original Build by 30% (12 mph) in the AM peak and 6% (3 mph) during the PM peak. In addition, the Modified Build alternative reduced total stops for the AM and PM peak by 94% and 34%, respectively.

The Design Year 2045 operational analysis results also show that the Modified Build Alternative improved traffic operations within the I-95 study area compared to the Original Build. While the Original Build provides expanded capacity along the entire I-95 study corridor in the design year, it still showed pockets of congestion on I-95 northbound at the merge from University Boulevard and on I-95 southbound at the merge from Emerson Street during both peak periods. By providing expanded general use lane capacity (as opposed to express lanes) the Modified Build increases the overall capacity and experiences free-flow conditions at those areas as well as the entirety of I-95 within the study area. During the 2045 AM peak hour, the Modified Build alternative provided a 4% reduction in travel time along I-95 northbound general use lanes. During the PM peak, it provided a 3% reduction in travel time for the I-95 southbound general use lanes. In terms of network-wide performance, the Modified Build alternative provided substantial improvements over the Original Build in Design Year 2045. When comparing total delay time to the Original Build, the Modified Build provided AM and PM peak period reductions of 12% and 25%, respectively. In addition, the Modified Build alternative reduced total stops for the AM and PM peak by 16% and 32%, respectively.

In terms of safety, the Modified Build Alternative is expected to reduce crashes due to the improvement in traffic operations, hence providing safer travel conditions. The proposed capacity improvements will improve congestion and assist in reducing rear-end crashes, which are the predominate type of crash along the facility. In addition, several geometric improvements are proposed to improve safety, such as improvements to vertical and horizontal curves, vertical clearances, reducing conflict points, etc. Moreover, the Highway Safety Manual (HSM) analysis of the mainline reported a reduction in annual predicted crashes of 21% (152.3 crashes per year) for the Modified Build (in comparison with No-Build conditions).

In conclusion, the Modified Build Alternative showed significant operational improvements over the Original Build in both the Opening Year 2030 and the Design Year 2045. Based on the safety and traffic operations benefits of the Modified Build, it is considered the preferred alternative for this SIMR.

This SIMR has been developed in accordance with FDOT Policy No. 000-525-015: Approval of New or Modified Access to Limited Access Highways on the State Highway System (SHS), FDOT Procedure No. 525-030-160: New or Modified Interchanges, 2020 Interchange Access Request User's Guide and the 2019 FDOT Traffic Forecasting Handbook (Procedure No. 525-030-120).

E.1 Compliance with FHWA General Requirements

The following requirements serve as the primary decision criteria used in approval of interchange modification projects. Responses to the FHWA policy points are provided to show that the proposed project is viable based on the analysis performed to date.

E.1.1 The request does not have a significant adverse impact on the safety and operation of the freeway system

An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d), and 23 CFR 655.603(d)).

The safety analysis performed for this SIMR showed that there are several high crash locations on I-95 within the project area. The predominant crash types along I-95 within the study area were rear end and fixed object crashes. Along I-95 from throughout the project study area, rear end crashes were the most common type of crash accounting for 57% of total crashes in the Duval County segment of I-95 and 30% of total crashes in the St. Johns County segment. Fixed object crashes were also common in both segments of I-95 accounting for 13% of all crashes in the Duval County segment and 24% of all crashes in the St. Johns County segment. Current safety concerns pertaining to the existing facility within the study area may be related to the peak period congestion; congested conditions can be a major factor in the rear end crash occurrences. From a safety perspective, the recommended alternative for this study should result in a reduction of crashes due to the significant improvement in traffic operations, hence providing safer travel conditions. In addition, several geometric improvements are proposed to improve safety, such as improvements to vertical and horizontal curves, vertical clearances, reducing conflict points, etc. Moreover, the HSM analysis of the mainline reported a reduction in annual predicted crashes of 21% (150.9 crashes per year) for the Modified Build Alterative (in comparison with No-Build conditions).

The Modified Build Alternative alleviated or significantly reduced all areas of congestion during both the Opening Year 2030 and Design Year 2045 analysis, and therefore is expected to lower crash rates in the study area by reducing the number of stops on the freeway facility. In addition, the Modified Build is expected to reduce the number of crashes due to vehicle conflicts during lane-change and weaving maneuvers by removing all express lane access points, which require many lane change maneuvers between the express lane access points and the study area interchanges.

During the Opening Year 2030, analysis of the Original Build Alternative showed that traffic operations are expected to degrade significantly and severe congestion with system-wide impacts will take place along I-95 northbound during the AM peak period. The PM peak period also showed significant congestion along I-95 southbound. This congestion also will impact the I-295 mainline. The congestion occurs due to bottlenecks that originate between I-295 and Butler Boulevard, since the Original Build does not provide capacity improvements in that area by 2030. The Modified Build, which provides general use lane capacity improvements through the extent of the study area, shows significant operational improvements over the Original Build, with travel speeds remaining at or near free-flow through the entirety of I-95 within the study area. The Modified Build provides a 94% reduction in total stops during the 2030 AM peak period, and a 36% reduction in total stops during the PM peak period. In terms of total network delay, the Modified Build provided AM and PM peak period reductions of 68% and 28%, respectively. These improvements indicate a significant reduction in vehicle conflicts (due to both lane-change maneuvers and stops) and are expected to contribute to lower crash rates and improved safety within the study area, particularly in the northbound direction during the AM peak period, which was shown to experience severe gridlock under Original Build conditions.

The Design Year 2045 operational analysis results also show that the Modified Build Alternative improved traffic operations within the I-95 study area compared to the Original Build. While the Original Build provides expanded capacity along the entire I-95 study corridor in the design year, it still showed pockets of congestion on I-95 northbound at the merge from University Boulevard and on I-95 southbound at the merge from Emerson Street during both peak periods. By providing expanded general use lane capacity (as opposed to express lanes) the Modified Build increases the overall capacity and experiences free-flow conditions at those areas as well as the entirety of I-95 within the study area. The Modified Build provides an 16% reduction in total stops during the 2045 AM peak period, and a 32% reduction in total stops during the PM peak period. In terms of total network delay, the Modified Build provided AM and PM peak period reductions of 12% and 25%, respectively. These improvements indicate a reduction in vehicle conflicts (due to both lane-change maneuvers and stops) and are expected to contribute to lower crash rates and improved safety within the study area.

E.1.2 The proposed access connects to a public road only and will provide for all traffic movements

The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards for federal-aid projects on the interstate system (23 CFR 625.2(a), 625.4(a) (2), and 655.603(d)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety

analyses to the partial-interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.

The proposed capacity improvements will maintain current access for all traffic movements for the project interchanges. I-95 is proposed to be reconstructed from International Golf Parkway to Atlantic Boulevard. The design criteria proposed for the projects are based on a mainline design speed of 70 mph between International Golf Parkway and Old Saint Augustine Road and 65 mph between Old Saint Augustine Road and Atlantic Boulevard. Most of the Modified Build Alternative concept evaluated in this SIMR is designed to meet current standards for federal-aid projects on the interstate system and conform to American Association of State Highway Transportation Officials (AASHTO) design standards and the 2020 Florida Design Manual (FDM). However, because the project is in an aging urban area, right-of-way constraints contribute to the need for design exceptions and variations in order to create a reasonable alternative. The design exceptions and variations that exist for the proposed project are provided in the following sections.

Design Exceptions

- The inside shoulder width for the northbound direction will be reduced to 8 feet minimum under the I-295 bridges for a length of no more than 150 feet.
- The inside and outside shoulders for the southbound direction will be reduced to 4 feet minimum (not concurrently) under the I-95 northbound to I-295 northbound (West Beltway) flyover ramp bridge. The inside and outside shoulders will have a 4-foot width for a length of no more than 30 feet and 120 feet, respectively.
- Currently, the vertical clearances of the I-95 bridges over the railroad line south of US-1 do not meet the design criteria for AASHTO. The proposed outside widening will require shallower beams to maintain the existing clearance.
- The inside shoulders will be reduced to 8 feet minimum for the pedestrian bridge pier (located between University Boulevard and Emerson Street) for a length of no more than 160 feet.
- The outside shoulder width for the northbound exit ramp to Atlantic Boulevard is proposed to be reduced from a required 12 feet to 6 feet to avoid impacts to the newly placed noise wall constructed as part of the Overland Bridge project.

Design Variations

- The stopping sight distance and K values for the proposed vertical curves will not meet FDOT 70 mph criteria for the crest curves of the CR 210 bridges.
- The stopping sight distance and K values for the proposed vertical curves will not meet FDOT 65 mph criteria for 5 bridges between Bowden Road and San Diego Road.
- The lane cross slope for the proposed design will have 6 lanes of travel for approximately 1,600 feet in both the northbound and southbound directions between Old Saint Augustine Road and I-295. In the northbound direction, the two-lane on-ramp from Old Saint Augustine Road creates a 6 lane section for approximately 1,600 feet, which is when one of the on-ramp lanes completes its merge creating a 5 lane section. In the southbound direction, the two-lane on-ramp for I-295 creates a 6 lane section for approximately 1,600 feet, which is when one of the on-ramp lanes completes its merge creating a 5 lane section.
- The outside shoulder width for the northbound direction will be reduced to 10 feet minimum under the I-295 bridges for a length of no more than 475 feet.
- The horizontal curve for the realigned southbound direction within the I-295 interchange will have a length of 780 feet.
- Currently, the vertical clearances of the I-95 bridges over SR 152/Baymeadows Road meet the design criteria for AASHTO. The proposed outside widening will require shallower beams to maintain the existing clearance.

The design exceptions and variations proposed will minimize reconstruction, right-of-way acquisition, and motorist inconvenience. The benefits of the operational improvements are expected to outweigh any potential impacts related to the design exceptions/variations.