EXECUTIVE SUMMARY

This Systems Interchange Modification Report (SIMR) documents the proposed improvements to the existing interchanges along SR 8 (I-10) at Nine Mile Road and at Pine Forest Road. The Florida Department of Transportation (FDOT) District 3 is conducting a Project Development and Environment (PD&E) Study for I-10 from east of the Alabama State Line to west of SR 95 (US 29) (FPID 437905-1). As a part of the PD&E Study, this section of I-10, a distance of approximately ten miles, is being assessed for widening from a four-lane to a six-lane typical section. This section of I-10 encompasses two existing interchanges – at Nine Mile Road and at Pine Forest Road – and one future planned interchange – at Beulah Beltway.

This project (FPID 437905-1) is being developed concurrently with a separate PD&E Study (FPID 433113-1) for the Beulah Interchange ("Beulah Interchange PD&E") that includes an associated segment of I-10 from the Alabama State Line (MP 0.357) to the existing Weigh Station (MP 3.461), and Beulah Road (CR 99) from US 90A (West Nine Mile Road) to West of Kingsfield Road (CR 186). To avoid duplication of recommendations, this project (437905-1) considers only no-build and build alternatives from the east end of the Beulah Interchange PD&E (MP 3.461) to west of SR 95 (MP 9.926).

Project 437905-1 has been further divided into three segments for design and construction, including work on I-10 proposed as part of the Beulah Interchange PD&E:

- FPID 433113-1: I-10 from the Alabama State Line (MP 0.357) to the existing Weigh Station (MP 3.461) including a new interchange at Beulah Road
- FPID 437905-2: I-10 from the existing Weigh Station (MP 3.461) to east of US 90A (West Nine Mile Road (MP 6.211) including interchange reconstruction at US 90A (West Nine Mile Road)
- FPID 437905-3: I-10 from east of US 90A (West Mile Road) (MP 6.211) to west of SR 95 (MP 9.926) including interchange reconstruction at SR 297 (Pine Forest Road).

Figure A shows the location of the Beulah Interchange PD&E, the limits of analysis, and the segments identified for design and construction. This SIMR document serves to provide determination of safety, operational, and engineering (SO&E) acceptability per Federal Highway Administration (FHWA) to advance the project and for inclusion in



subsequent National Environmental Policy Act (NEPA) documentation with the PD&E study.



Figure A. Project Segments and Limits of Analysis

E.1 BACKGROUND

I-10 is a Strategic Intermodal System (SIS) facility and is the only east-west limited access highway in the region. This section of I-10 is partly within the urban boundary; the urban boundary extends from just west of Nine Mile Road to the east through the project limits. The remaining section from the Alabama State line to just west of Nine Mile Road is outside of the urban boundary.

This section of I-10 encompasses two existing interchanges – at Nine Mile Road and at Pine Forest Road – and one future planned interchange – at Beulah Beltway. The existing I-10 interchanges at Nine Mile Road and at Pine Forest Road are approximately 1.5 miles apart. In addition to the interchanges being closely spaced, Nine Mile Road and Pine Forest Road intersect at a signalized intersection located about one (1) mile away from both interchanges. This signalized intersection currently experiences operational and



queuing issues which impede the operation of the two interchanges during peak times of congestion. Due to existing operational issues, improvements at both interchanges will be evaluated as a part of this PD&E project.

E.2 PURPOSE AND NEED

The purpose and need of the PD&E study is provided below, from the April 25, 2018 Efficient Transportation Decision Making (ETDM) Summary Report for Project 14240.

Purpose

The purpose of this project is to address capacity and safety issues on I-10 between the Alabama State Line and US 29 in Escambia County. Currently, I-10 is a fourlane limited access roadway (two travel lanes in each direction) from the Alabama State Line to US 29, a distance of approximately ten miles. This project is intended to address existing and future congestion and delay on I-10 with the goal of making the I-10 corridor operate safer and more efficiently throughout Escambia County.

Need

This project is needed to address capacity and safety issues on I-10 from east of the Alabama State Line to US 29 in Escambia County.

E.3 METHODOLOGY

The traffic methodology for this analysis is consistent with the approved Methodology Letter of Understanding (MLOU) (see **Appendix A**). The Area of Influence (AOI) includes the two existing interchanges at Nine Mile Road and at Pine Forest Road, and also includes the proposed Beulah Beltway Interchange. The analysis years are Existing 2018, Opening 2026, and Design 2046. The analysis tool is Vissim 11 which was used to conduct detailed operational analyses for the freeway, interchanges, and intersections.



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E.4 ALTERNATIVES

Consistent with the approved MLOU, the following alternatives were considered in this SIMR:

- No-Build Alternative: The No-Build (no action) alternative includes planned and programmed improvements (as of April 2020), including the recommended Beulah Road interchange alternative from the I-10 and Beulah Road IJR.
- Build Alternative: Based on the project goals, objectives, and in coordination with FDOT, one Build Alternative was developed for the SIMR AOI.

Based on the results of the Vissim analysis, the preliminary conceptual design, surrounding

project status as of April 2020, and in coordination with FDOT, the following improvements

were selected for the Build Alternative:

- Interchange of I-10 at Pine Forest Road
 - A Diverging Diamond Interchange at I-10 and Pine Forest Road.
 - Realign Wilde Lake Boulevard further south.
 - Eliminate left turns from W. Detroit Boulevard and install a northbound Median U-turn north of W. Detroit Boulevard along Pine Forest Road.
- Interchange of I-10 at Nine Mile Road
 - A Diverging Diamond Interchange at I-10 and Nine Mile Road.
- Intersection of Nine Mile Road and Pine Forest Road
 - Operational improvements at this intersection, e.g., eliminate left turns at main intersection and install Median U-turns east and west of the intersection along Nine Mile Road.
- Intersection of Nine Mile Road at Navy Federal Way
 - A signalized intersection at Navy Federal Way.
 - A six-lane cross-section along Nine Mile Road between Navy Federal Way and the I-10 interchange. (2026 Build Alternative only)
 - A six-lane cross-section along Nine Mile Road from east of Beulah Road to Pine Forest Road. (2046 Build Alternative only)

Note the intersection of Nine Mile Road and Navy Federal Way and the intersection of Nine Mile Road and Pine Forest Road are within the AOI, but outside of the scope of the PD&E. Both intersections will be addressed by separate FDOT projects (FPIDs 218605-4, 218519-2, 421012-2, and 441056-1). The intersections were evaluated to determine the feasibility of solutions that would not adversely impact operations at the I-10 and Nine Mile Road, and the I-10 and Pine Forest Road interchanges. These improvements were included for analysis purposes; however, they will be determined by separate projects and are subject to change as those projects progress.



E.5 COMPLIANCE WITH FHWA GENERAL REQUIREMENTS

The FHWA Policy on Access to the Interstate System provides the requirements for the justification and documentation necessary to substantiate any proposed changes in access to the Interstate System. The policy is published under the Federal Register, Volume 74, Number 43743, dated May 22, 2017. The responses provided herein for each of the two policy statements demonstrate compliance with these requirements and justification for the proposed SIMR in support of the I-10 from east of the Alabama State Line to west of SR 95 (US 29) PD&E Study in Escambia County, Florida. The following two FHWA Policy Criteria (effective May 22, 2017) are addressed below:

Policy

It is in the national interest to preserve and enhance the Interstate System to meet the needs of the 21st Century by assuring that it provides the highest level of service in terms of safety and mobility. Full control of access along the interstate mainline and ramps, along with control of access on the crossroad at interchanges, is critical to providing such service. Therefore, FHWA's decision to approve new or revised access points to the Interstate System under Title 23, United States Code (U.S.C.), Section 111, must be supported by substantiated information justifying and documenting that decision. The FHWA's decision to approve a request is dependent on the proposal satisfying and documenting the following requirements.

Policy Point 1: The proposal does not adversely impact operations or safety of the existing freeway.

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, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations (CFR), paragraphs 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, should 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 should 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 should 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)).



Response:

Operational Analysis

This SIMR consists of existing interchanges at Nine Mile Road and at Pine Forest Road that are planned to be modified. An in-depth traffic operational analysis for the Existing Year (2018), Opening Year (2026) and Design Year (2046) conditions was conducted to study the impacts of the Build Alternative within the AOI. Analyses were conducted for the mainline, and the intersections at the ramp terminals and crossroads.

Several performance measures were used to compare the operations of the existing system under No-Build and Build conditions. Key measures included network travel time, freeway speeds, intersection delays, and queues. Based on the operational analysis conducted for the SIMR, the following high-level operational analysis observations were made and detailed results are provided in Future Traffic Operational Analysis section of this report:

- The operational analysis shows that the Design Year 2046 Build Alternative does not adversely impact the operations of the interstate network or the local streets.
- The Design Year 2046 No-Build Alternative cannot accommodate the future traffic growth and results in sharp speed drops along I-10 in both the eastbound and westbound directions, primarily due to off-ramp queuing at the interchanges locations and the mainline merge locations.
- Intersection LOS E or worse is expected at 10 of the 19 study intersections in the Design Year 2046 No-Build AM or PM peaks.
- The Design Year 2046 Build Alternative is able to accommodate the future traffic and I-10 speeds remain consistently near 70 mph.
- Only one of the study intersections operates at LOS E or worse in the Design Year 2046 Build Alternative, and that location is outside of the scope of this project.
- The proposed Build interchange configurations provide benefit to the network and do not adversely impact operations.



Safety Analysis

A safety analysis was completed for this project and includes an existing conditions safety analysis to review the crash history, and a quantitative safety analysis using the Highway Safety Manual (HSM) predictive method to assess future conditions. The Enhanced Interchange Safety Analysis Tool (ISATe) was used for the HSM predictive analysis to assess future conditions. The future proposed diverging diamond interchanges (DDI) were modeled to the extent possible in ISATe since it does not include an interchange option specifically for DDI's nor does it include crash modification factors (CMF) to predict crashes.

Using this methodology, analysis results found that the total crashes decrease in the future Build Alternative compared to the No-Build Alternative. The mainline crashes decrease in the Build Alternative due to a lower density of traffic spread across more lanes and the ability to maneuver more freely. There is a slight increase in predicted ramp crashes due to the longer ramps that were modeled, consistent with the proposed DDI design.

Although the ISATe does not address DDI's, a recent addition to the CMF Clearinghouse shows a significant safety increase when converting a diamond interchange to a DDI. This specific CMF applies to the overall interchange and has a star rating of 4/5 stars (i.e. high reliability) and a value of 0.59 (i.e. 41% decrease in crashes). Thus, a DDI should result in safety improvements at crossroad ramp terminals, and along the crossroads serviced by the ramps.

A benefit / cost analysis showed a favorable B/C ratio (greater than 1.0) for both future years 2026 and 2046 with the proposed improvements in place. The B/C ratios were determined by comparing the predicted crashes for the No-Build and Build Alternatives, per HSM methodologies. The 2026 annual benefit cost ratio is 1.792, and the 2046 annual benefit cost ratio is 3.525.

Conceptual Signing Plan

Conceptual signing plans were developed and are included in Appendix J.



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Policy Point 2: A full interchange with all traffic movements at a public road is provided.

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, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (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.

Response:

I-10 is a public facility and all interchanges within the AOI provide full access. The interchange improvements will occur at the I-10 at Nine Mile Road and Pine Forest Road interchanges. Additional improvements are also being proposed at the adjacent intersections to improve traffic flow at the interchanges. All basic movements are currently provided at both interchanges. The proposed improvements at the interchanges will continue to provide full access.

