

Executive Summary

Background

The Florida Department of Transportation (FDOT) conducted a Project Development and Environmental (PD&E) Study to evaluate improvement alternatives along Interstate 75 (I-75) from south of State Route (SR) 681 to north of University Parkway in Sarasota County, Florida. Due to changes in projected traffic volumes since the approval of the I-75 PD&E Study, FDOT undertook a reexamination of the PD&E Preferred Alternative for the I-75/SR 758 (Bee Ridge Road) interchange to determine the adequacy of the concept to accommodate future traffic demand. Another concept has since been developed that is expected to adequately accommodate future traffic volumes and provide enhanced operations when compared to the I-75 PD&E Study's Preferred Alternative. This new concept is a Diverging Diamond Interchange (DDI) variant with a partial Continuous-Flow Intersection (CFI) at Bee Ridge Road/Cattlemen Road. This Interchange Modification Report (IMR) documents the benefits of the proposed geometric improvements and the information necessary to confirm the need for this project, as well as traffic impacts associated with the interchange improvement as they relate to surrounding transportation facilities.

Purpose and Need

I-75, a north/south facility, is an integral part of the Strategic Intermodal System (SIS) providing for high-speed, high-volume traffic movements within the State. I-75 improvements are needed to provide relief from existing and projected traffic congestion and to improve safety. I-75 also serves as a hurricane evacuation route. Therefore, there is a need for I-75 to operate at an acceptable Level of Service (LOS) at all times to ensure that a viable escape route is provided to local residents in the event of an emergency. Improvements to this facility will also increase regional connectivity and enhance freight mobility and goods movement.

The purpose of this project is to relieve existing and future operational and safety deficiencies along the I-75 corridor. The proposed I-75 mainline and I-75/Bee Ridge Road interchange modification improvements provide additional capacity along the interstate system as well as the surrounding arterials and local roads. The I-75/Bee Ridge Road interchange needs to be modified to accommodate the I-75 ten-lane Ultimate cross section and future traffic volumes. It needs to be reconfigured to address delay and queuing deficiencies associated with the future traffic volume projections, close proximity of the Bee Ridge Road/Cattlemen Road intersection to the I-75/Bee Ridge Road interchange, and lane utilization issues caused by the partial clover leaf interchange due to the northbound I-75 loop on ramp.

The Project Development Summary Report (PDSR) that was submitted in July 2009 as part of the I-75 PD&E Study recommended improvements to the I-75/Bee Ridge Road interchange. These improvements included the addition of a second lane to the northbound and southbound off-ramps, as well as triple left-turn lanes at the southbound ramp terminal intersection. On Bee Ridge Road, additional travel lanes were recommended in both directions, as well as improvements to the intersection with Cattlemen Road. Location Design Concept Acceptance (LDCA) for the I-75 PD&E Preferred Alternative was received from the Federal Highway Administration (FHWA) on December 8, 2009.

The Final I-75 Systems Interchange Modification Report (SIMR) from Laurel Road to North of Moccasin Wallow Road, dated May 2012, re-analyzed the I-75/Bee Ridge Road interchange and recommended several modifications by 2038. These included two-lane ramps at the northbound off, southbound off, and southbound on-ramp junctions, and the addition of auxiliary lanes north and south of the interchange on I-75. As documented in the I-75 PD&E study, the previously adopted Sarasota-Manatee-Charlotte (SMC) Cost Feasible (CF) Model with a horizon year in 2030 considered an average growth rate of more than 2 percent per year along the intersecting cross streets of I-75. However, based on a review of the traffic forecasts from the currently adopted SMC horizon year (2035) CF Model plus the I-75 ten-lane Ultimate cross section included (SMC CF+ Model) that was provided for use in volume development, the traffic projections are considerably lower than the previous estimates.

This Interchange Modification Report (IMR) reevaluates the future traffic operations of the I-75/Bee Ridge Road interchange based on revised SMC population and traffic growth projections and identifies the optimal I-75/Bee Ridge Road interchange configuration to maximize safety and operations. This IMR analyzes the I-75 SIMR Preferred Alternative and the newly Proposed Build Alternative in order to identify the most suitable interchange configuration to meet the demands of future travelers while minimizing project costs and impacts.

Existing Conditions

The existing I-75/Bee Ridge Road interchange is a partial cloverleaf interchange with a northbound loop on ramp in the southeast quadrant of the interchange to service eastbound-to-northbound traffic. The northbound off ramp includes one left-turn lane and one free-flow right-turn lane. The southbound off-ramp includes one left-turn lane and dual right-turn lanes operated under signal control. The northbound on ramp includes one free-flow right-turn lane and the southbound on ramp includes one free-flow right-turn lane and one receiving lane for the westbound left-turn movement at the west ramp terminal. Both on ramps are reduced to one lane before merging into I-75.

The existing configuration of the project study area was analyzed in the existing year (2013) to document the deficiencies of the existing configuration. The I-75 mainline was analyzed in Highway Capacity Software (HCS) 2010 using density thresholds specified in Exhibit 11-5 of the Highway Capacity Manual (HCM) 2010. The I-75/Bee Ridge Road ramp merge and diverge areas were analyzed in HCS 2010 using density thresholds specified in Exhibit 13-2 of the HCM 2010. Ramp capacities, expressed as passenger cars per hour (pc/h), were checked and compared to the demand volumes. The I-75 mainline and I-75/Bee Ridge Road ramp merge and diverge areas perform at an acceptable LOS (LOS D or better) in the existing year (2013) during both the AM and PM peak hours. The volume-to-capacity ratio (v/c) of each I-75/Bee Ridge Road ramp was also checked and all operate well under capacity.

Average speeds were extracted from VISSIM in order to conduct the arterial segment operational analysis. The Bee Ridge Road/Cattlemen Road intersection approaches experience low average travel speeds during both the AM and PM peak periods. Low travel speeds may be attributed to red-time delays at signalized intersections. Intersections in the project area were analyzed in VISSIM in order to establish a baseline for comparing future traffic operations and determining if the interchange improvements would adversely impact intersection operations. The Bee Ridge Road/Cattlemen Road and Bee Ridge Road/Maxfield Drive intersections have overall delays in excess of 55.0 seconds/vehicle (s/veh) (or equivalent to LOS E or worse operations, according to HCM 2010 LOS thresholds) during the PM peak periods. All other intersections operate at an acceptable level overall during both the AM and PM peak periods. The northbound and southbound