

Executive Summary

The Florida Department of Transportation (FDOT) District Seven, in coordination with Hillsborough County, prepared an Interchange Operational Analysis Report (IOAR) to document the safety, operational and engineering acceptability of improving the I-75 (SR 93A) at CR 582A (Fletcher Avenue) interchange in Hillsborough County, Florida. The proposed improvements are needed to alleviate existing traffic congestion and improve highway safety. The following summarizes the results of an evaluation of existing and future traffic operating and safety conditions with and without the proposed improvements.

A. Existing Conditions

The stop-controlled southbound I-75 off-ramp at Fletcher Avenue exhibits failing Levels of Service (LOS) and excessive vehicle queuing under existing conditions. During the morning peak period, there is a high demand of traffic (1,073 vehicles per hour) traveling from southbound I-75 to westbound Fletcher Avenue, causing significant delays (LOS F) and inefficient intersection traffic control and queue storage at the southbound I-75 ramp terminal intersection. Vehicle queues spillback into the southbound I-75 mainline during the morning peak period. The reciprocal traffic movements occur in the afternoon peak period, with a heavy demand (1,017 vehicles per hour) from eastbound Fletcher Avenue to northbound I-75. The heavy demand on eastbound Fletcher Avenue causes a major conflicting movement for the permitted left turning vehicles from westbound Fletcher Avenue to southbound I-75. Historical crash data from FDOT Crash Analysis Reporting (CAR) Online for the five-year period from 2015 to 2019 reveals that there is a disproportionate number of left turn crashes (38 percent of the total crashes) at the Fletcher Avenue and southbound I-75 ramp terminal intersection. Of the left turn crashes, 74 percent (25 out of 34 crashes) resulted in an injury or fatality.

B. Future Conditions

In order to alleviate existing operational and safety deficiencies, the addition of a traffic signal at Fletcher Avenue and the southbound I-75 ramp terminal intersection is proposed. The following summarizes the results of the operational and safety analysis conducted to evaluate the future conditions of the I-75 at Fletcher Avenue interchange with (Build Alternative) and without (No Build Alternative) the proposed improvements under opening year (2025) and design year (2035) traffic conditions.

Opening Year (2025)

No Build Alternative – The No Build Alternative assumes that the existing traffic control and geometric features of the I-75 at Fletcher Avenue interchange are maintained by the year 2025. The benefit of this alternative is that there are no additional costs associated with implementing the proposed transportation improvements. However, it is anticipated that the operational and safety deficiencies identified under existing conditions will be further exacerbated with increasing levels of traffic; and the purpose and need of the project are not met. The following conclusions are derived from the opening year (2025) traffic analysis:

- The stop-controlled southbound I-75 off ramp is projected to experience excess overall vehicle delays that are greater than the LOS F threshold of 50 seconds (sec) per vehicle (veh) in both the AM and PM peak hours; and
- The estimated vehicle queue of the southbound I-75 to westbound Fletcher Avenue right turn movement is projected to exceed the storage of the ramp, thereby spilling back into the southbound I-75 mainline during the AM peak hour.

Build Alternative – The Build Alternative consists of adding a traffic signal at the Fletcher Avenue and southbound I-75 ramp terminal intersection, as well as lengthening of the westbound to southbound I-75 left turn lane and coordinating the new traffic signal with the Hidden River Parkway/Morris Bridge Road and northbound I-75 ramp terminal intersections. The results of the operational analysis for opening year (2025) traffic conditions are listed below:

- The southbound I-75 off ramp is projected to experience decreased delays as compared to the No Build Alternative, but will still have overall vehicle delays that are greater than 80 sec/veh (LOS F) for the AM peak hour;
- The traffic signal at the southbound I-75 off ramp will create large gaps in the stream of traffic on westbound Fletcher Avenue for the yield-controlled southbound to westbound right turn movement to turn right onto westbound Fletcher Avenue unimpeded when the heavy volume westbound through movement on Fletcher Avenue receives a red signal indication; and
- Queue lengths for the southbound I-75 off ramp are not anticipated to exceed the storage of the ramp.

Design Year (2035)

No Build Alternative – The No Build Alternative assumes that the existing traffic control and geometric features of the I-75 at Fletcher Avenue interchange remain unchanged by the design year (2035). The following conclusions are derived from the design year (2035) No Build traffic analysis:

- The stop-controlled southbound I-75 off ramp is projected to experience excess overall vehicle delays that are greater than the LOS F threshold of 50 sec/veh in both the AM and PM peak hours; and
- The estimated vehicle queue of the southbound I-75 to westbound Fletcher Avenue right turn movement is projected to exceed the storage of the ramp, thereby spilling back into the southbound I-75 mainline during the AM peak hour.

Build Alternative – The Build Alternative consists of adding a traffic signal at the Fletcher Avenue and southbound I-75 ramp terminal intersection, as well as lengthening of the westbound to southbound I-75 left turn lane and coordinating the new traffic signal with the Hidden River Parkway/Morris Bridge Road and northbound I-75 ramp terminal intersections. The results of the operational analysis for design year (2035) traffic conditions are listed below:

- The southbound I-75 off ramp is projected to experience decreased delays as compared to the No Build Alternative, but will still have overall vehicle delays that are greater than 80 sec/veh (LOS F) for the AM peak hour; and
- Queue lengths for the southbound I-75 off ramp are not anticipated to exceed the storage of the ramp.

Safety Analysis

A quantitative safety analysis, using procedures from the *Highway Safety Manual (HSM)*, was conducted to estimate the safety benefits of the proposed improvements. The quantitative safety analysis revealed that adding a signal to the Fletcher Avenue at southbound I-75 ramp terminal intersection is projected to marginally reduce crashes within the study area.

C. FHWA Policy Points

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, Federal Highway Administrations (FHWA's) decision to approve new or revise access points to the Interstate System under 23 U.S.C. 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.

The following two FHWA Policy Criteria (dated May 22, 2017) are addressed in this IOAR:

Policy Point 1: 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)).

With the proposed signalization and coordination of the southbound I-75 ramp terminal intersection at Fletcher Avenue, operations along Fletcher Avenue and along the southbound I-75 off ramp are anticipated to improve, as compared to a No Build condition. The queues along the southbound I-75 off ramp currently exceed the length of the ramp and spillback into the I-75 mainline, causing a safety concern as fast-moving through vehicles [70 miles per hour (mph)] must navigate around stopped/slow moving vehicles trying to access the southbound off ramp. These conditions are expected to become more severe by the design year (2035) as traffic demand increases through the area. However, the southbound to westbound right turn movement from the southbound I-75 off ramp will be able to benefit from the green indication of the southbound to eastbound left turn movement under the Build Alternative. This southbound left turn green indication will create gaps in the heavy westbound through traffic stream along Fletcher Avenue, thereby allowing the southbound to westbound right turn movement to navigate through the intersection unimpeded. In the design year (2035), the queue length of the southbound I-75 off ramp is not anticipated spillback into the I-75 mainline under the Build Alternative. Additionally, the southbound I-75 off ramp is projected to experience overall vehicle delays that are less than the No-Build Alternative for both the AM and PM peak hours and the northbound I-75 ramp terminal intersection is projected to experience overall decreased vehicle delays that are less than 20 sec/veh (LOS B) for both the AM and PM peak hours.

Additionally, the proposed modification to provide signalization at the southbound I-75 at Fletcher Avenue ramp terminal intersection is expected to marginally reduce crashes within the study area. Signalizing the southbound I-75 at Fletcher Avenue ramp terminal intersection and providing permissive/protected left turn signal phasing for the westbound Fletcher Avenue to southbound I-75 left turn movement would enhance safety by periodically allowing left-turning vehicles to safely cross Fletcher Avenue to gain access to southbound I-75 without having to conflict with the high-speed (50 mph) opposing vehicles on eastbound Fletcher Avenue. Additionally, the proposed Build Alternative would improve safety for other traffic movements within the area of influence of the interchange, including the southbound I-75 to eastbound Fletcher Avenue unsignalized left turn movement and the southbound I-75 to westbound Fletcher Avenue yield-controlled right turn movement. In the case of the left turn movement on the southbound I-75 off ramp, a dedicated signal phase would assign right of way to the previously stop-controlled left turn movement and help

traffic safely cross over the high volume/high speed westbound Fletcher Avenue lanes to gain access to eastbound Fletcher Avenue.

Policy Point 2: 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.

The proposed modifications documented in this IOAR maintain the existing full interchange configuration and do not modify access at the I-75 at Fletcher Avenue interchange. The highway safety and operations of the southbound I-75 ramp terminal intersection is enhanced with the Build Alternative by providing new traffic signalization, a permissive/protected signal phase for the westbound to southbound left turn movement, a protected-only signal phase for the southbound to eastbound left turn movement, and additional vehicle queue storage and deceleration distance for the westbound to southbound left turn movement. Reducing the median shoulder width on westbound Fletcher Avenue beneath the southbound I-75 bridge from 14 feet (ft) to two ft would require a design variance, but a design exception is not required with the recommended Build Alternative. The Build Alternative also enhances safety at the I-75 at Fletcher Avenue interchange by providing upgraded wrong-way driver signage on the southbound off ramp and improved signal coordination on Fletcher Avenue between the existing signalized Hidden River Parkway/Morris Bridge Road and northbound I-75 ramp terminal intersections.