SR 9/I-95 Project Development and Environment (PD&E) Study from S. of Woolbright Road to N. of Woolbright Road Palm Beach County, Florida

FPID No.: 437279-1-22-02 | ETDM No.: 14341

LOCATION HYDRAULICS REPORT

October 2020

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016 and executed by FHWA and FDOT.

LOCATION HYDRAULICS REPORT

SR 9/I-95 Project Development and Environment Study
From South of Woolbright Road to North of Woolbright Road
Boynton Beach, Palm Beach County, Florida
(From Mile Post 13.560 to Mile Post 13.995)

FPID: 437279-1-22-02
ETDM No.: 14341

Prepared for:

Florida Department of Transportation
District Four
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Fort Lauderdale, FL 33309

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October 2020

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1. SUMMARY OF PROJECT

1.1. Project Description

This report contains information regarding the SR 9/I-95 (I-95) from South of Woolbright Road to North of Woolbright Road Project Development and Environment (PD&E) Study (Mile Post 13.560 to Mile Post 13.995). This project has been developed in compliance with Title VI of the Civil Rights Act of 1964 and other related federal and state nondiscrimination authorities. Neither the Florida Department of Transportation (FDOT) nor this project will deny the benefits of, exclude from participation in, or subject to discrimination anyone on the basis of race, color, national origin, age, sex, disability, or family status.

The FDOT, District Four is conducting a PD&E Study to identify long-term needs of I-95 and develop design concepts to address traffic spillback onto I-95, reduce congestion at the I-95 and Woolbright Road interchange, improve interchange operations, and improve safety at the study interchange through the 2045 design year horizon. This study will also consider Strategic Intermodal System (SIS) connector improvements needed within the project area and is consistent with plans for the I-95 mainline, including the potential extension of I-95 Managed Lanes through Palm Beach County. This proposed study will investigate alternatives to improve the overall operating conditions and enhance safety within the interchange.

The improvements to the I-95 Interchange at Woolbright Road will provide additional capacity for vehicles travelling east-west as well as operational improvements north-south through the interchange. Local and network connectivity for the City of Boynton Beach will be improved.

The Interchange of I-95 at Woolbright Road is located in Palm Beach County in the City of Boynton Beach. The project limits along I-95 extend from just south of Woolbright Road at SW 23rd Avenue to just north of Woolbright Road about 2,000-ft north of the interchange. The project limits along Woolbright Road extend from the SW 18th Street on the west to just east of I-95 at SW 2nd Street. The project area includes the signalized intersections at SW 8th Street, and the I-95 southbound and northbound ramps. The South Florida Rail Corridor (SFRC)/CSX Railroad is adjacent to the project corridor and runs parallel along the west side of I-95. Tri-Rail operates along this rail corridor, with the nearest station; Boynton Beach Tri-Rail Station located 2.68 miles to the north of Woolbright Road, just north of the Gateway Boulevard interchange. (Figure 1 – Project Location Map).

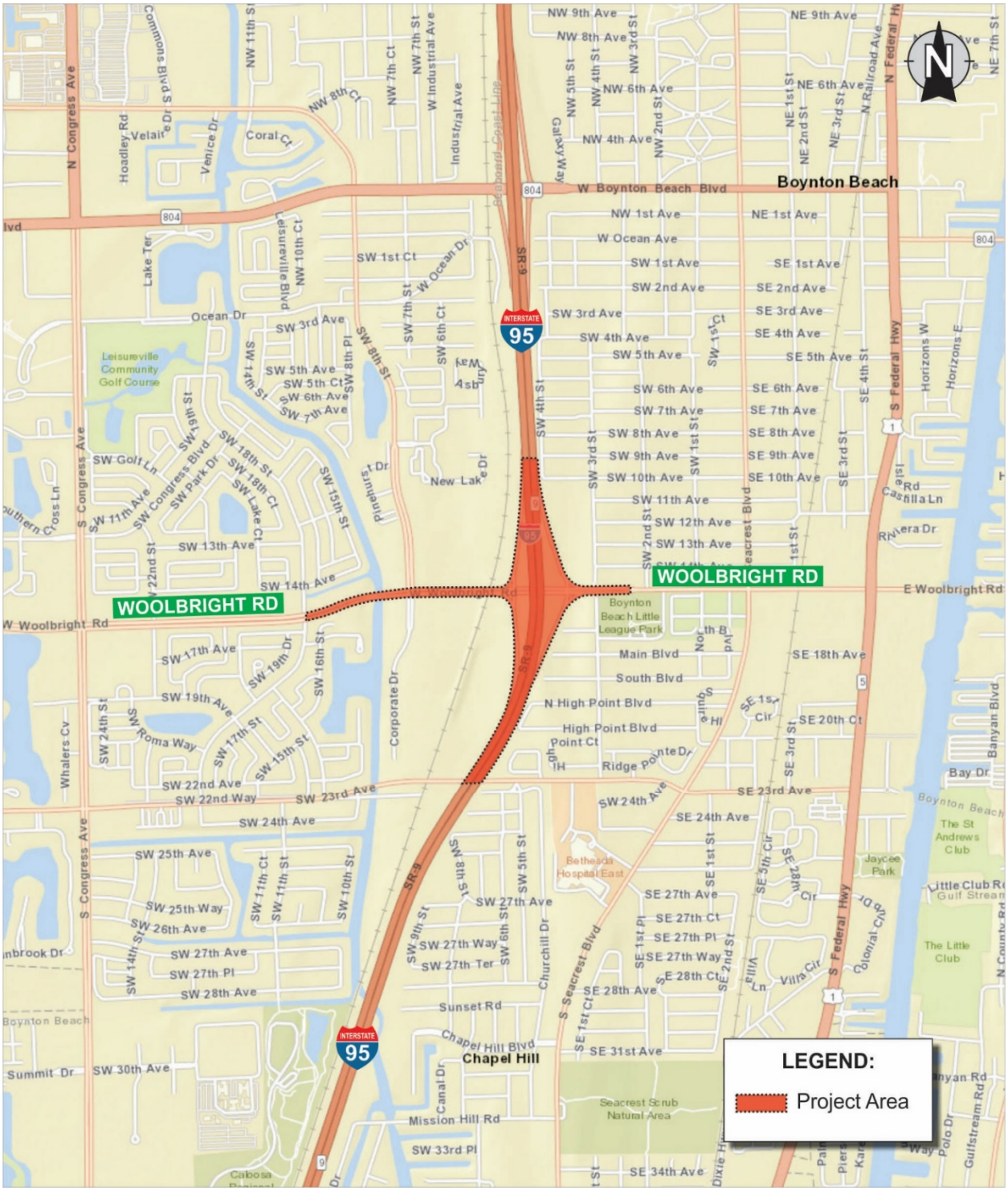


Figure 1 – Project Location Map

Within the project limits, I-95 is a ten-lane divided interstate freeway providing four general purpose lanes and one high occupancy vehicle (HOV) lane in each direction. The project will be designed to complement the I-95 interim interchange design-build project recently completed, which constructed one additional left-turn lane onto I-95 in both the eastbound and westbound directions; a free-flow right-turn lane from the southbound off-ramp; and designated bicycle lanes along Woolbright Road within the limits of the interchange.

Woolbright Road is currently a six-lane urban divided minor arterial to the west of I-95 and a four-lane urban divided minor arterial to the east of I-95. There is a raised median from SW 18th Street west of I-95 to just west of SW 2nd Street east of I-95. At SW 2nd Street, Woolbright Road transitions to a five-lane roadway section with a two-way left-turn lane in the middle. There are sidewalks on both sides of Woolbright Road throughout the project area and designated bicycle lanes within the limits of the interchange.

The land use adjacent to the interchange is zoned as Public Usage, Single Family, Duplex, Neighborhood Commercial, and Light Industrial. The area southeast of the interchange is zoned Recreation, Multi Family, Public Usage, and Planned Unit Development. Zoning northwest of the interchange consists of Planned Commercial Development, Planned Unit Development, Light Industrial, Office Professional, Neighborhood Commercial, and Single Family, and southwest of the interchange is zoned Community Commercial, Office Professional, Planned Industrial Development, and Single Family.

Improvement to the I-95 interchange at Woolbright Road is consistent with the Cost Feasible Plan of the Palm Beach County Transportation Planning Agency (TPA's) 2045 Long Range Transportation Plan (LRTP). "The purpose is to improve interchange operations and reduce congestion, reduce potential for traffic spillback onto I-95, and increase safety. The improvements are needed to ensure that the I-95 interchange will meet FDOT Level-of-Service standards through year 2045."

This project has been screened through the Efficient Transportation Decision Making (ETDM) process. The Advance Notification (AN) was distributed during the programing screening event, which occurred on October 23, 2017. The Program Screen Summary Report was re-published on May 3, 2018 and can be viewed under the ETDM # 14341.

1.2. Background

The FDOT made improvements to the I-95 mainline in Palm Beach County in the 1990s and 2000s, adding High Occupancy Vehicle (HOV) lanes and auxiliary lanes from south of Linton Boulevard to north of PGA Boulevard.

Minor interchange improvements were also made to eight of the existing 18 interchanges along this section of the corridor. At the time of the project, FDOT committed to re-examine the need for long-term improvements at those interchanges that were not improved during the I-95 mainline project. FDOT District Four also identified the need to re-examine the 2003 I-95 Master Plan Study for Palm Beach County to develop new improvements to interchanges based on changes in traffic volumes and updated design standards since the Master Plan was developed.

A Concept Development Report (CDR) was prepared by the FDOT District Four Office of Planning and Environmental Management in August of 2014. The following are the recommendations identified for short-term improvements that have been recently completed as part of the Design-Build project:

- One additional left-turn lane onto I-95 in both the eastbound and westbound directions;
- A free-flow right-turn lane from the southbound off-ramp; and
- Designated bicycle lanes along Woolbright Road within the limits of the interchange.

1.3. Purpose and Need

The purpose of this study is to identify long-term needs of I-95 and develop concepts to address traffic spillback onto I-95, reduce congestion on I-95 and Woolbright Road, improve interchange operations, and improve safety at the I-95 and Woolbright Road interchange through the 2045 design year horizon. This project will also consider SIS connector improvements needed within the project area and will be consistent with plans for the I-95 mainline, including the potential extension of I-95 managed lanes through Palm Beach County.

Additional considerations for the purpose and need for this project are further described in the following sections that include System Linkage, Capacity, Transportation Demand, Social Demands/Economic Development, Modal Interrelationships, and Safety.

System Linkage: I-95 is a part of the state's Strategic Intermodal System (SIS) and the National Highway System (NHS). A need exists to ensure that I-95 continues to meet the minimum requirements as a component of those two systems. The project is not proposing to change system linkage; however, the interchange modifications would improve movements within the existing systems. The proposed project at I-95 and Woolbright Road will help improve connectivity and capacity within the roadway network by addressing traffic spillback onto I-95 and improving interchange connections.

Capacity: Using field review data collected in 2018, A.M. and P.M. peak conditions were observed at all intersections in the study area. At the Corporate Drive/SW 8th Street intersection, during the P.M. peak hour, all approaches experienced minimal queues, except for the westbound and eastbound directions. The westbound left-turn queue experienced spillback into the through lanes and the eastbound direction experienced long queues. During the P.M. peak hour on the I-95 southbound ramp intersection, the eastbound approach experienced long queues, but all queues cleared the intersection during each signal cycle. The southbound approach experienced significant queues, with the queue not clearing during one signal cycle. During the P.M. peak hour at the I-95 northbound ramps intersection, the eastbound approach experienced minimal queue buildup and the northbound and westbound approaches experienced long queues; however, all queues cleared the intersection in one signal cycle for all approaches.

Transportation Demand: Interchange improvements to I-95 at Woolbright Road is included in the Palm Beach County TPA's 2045 LRTP under projects funded with SIS revenues, which includes federal funds. The project is consistent with the plans for the I-95 mainline, including the extension of express lanes into Palm Beach County.

Social Demands/Economic Development: Social and economic demands on the I-95 corridor will continue to increase as population and employment increase. The Palm Beach County TPA 2040 LRTP states that the population would grow 27 percent from 1.32 million in 2010 to 1.68 million in 2040. The employment was also forecasted to grow from 571,000 to 820,000 employees in the same 30 year period for an increase of nearly 44 percent. The predicted increase in population and employment will increase congestion in the study area.

Modal Interrelationships: Currently, sidewalks and crosswalks are provided on both sides of Woolbright Road. Palm Tran Route 70 services Seacrest Boulevard both north and south of Woolbright Road east of the interchange, as well as the Boynton Beach Tri-Rail station 2.68 miles north of Woolbright Road. The project proposes to provide undesignated bicycle lanes on both sides of Woolbright Road. Capacity improvements at the interchange will enhance the mobility of people and goods by alleviating current and future congestion at the interchange and the surrounding freight and transit networks. Reduced congestion will serve to maintain and improve viable access to the major transportation facilities and businesses in the area.

Safety: The crash data for the latest available five-year period (2012 to 2016) along Woolbright Road (93220000) from SW 8 Street to S. Seacrest Boulevard was retrieved from FDOT's Crash Analysis Reporting System (CARS) on-line database and from Signal 4 Analytics database. The study corridor encompasses the I-95 Interchange. The crash data from both databases were summarized separately for the entire corridor and for the I-95 interchange.

Overall, there was a total of 680 crashes during the 5-year period. Based on crash severity, of the 680 crashes reported, 240 (35.5%) were injury type crashes, 437 (64.3%) were property damage only crashes, and three fatal crashes were reported. Two of the fatal crashes occurred in 2012 and were classified as overturn and collision with parked vehicle type and the third fatal crash occurred in 2016 and it was classified as angle collision. There were 150 wet pavement crashes (22.1%) reported. The frequency of wet pavement crashes was constant through the 5-year analysis period. This may indicate a crash pattern of wet pavement crashes. There were 171 nighttime/dusk/dawn/dark crashes (25.1%) reported. The leading crash type was rear-end with a total of 338 crashes (49.7%) followed by sideswipe with a total of 94 crashes (13.8%). Careless driving or negligent manner was the most predominate contributing causes of these crashes. Most of the crashes (178) occurred during the morning hours (6 AM to 9 AM), which correspond to the typical morning rush period.

2. PROPOSED ALTERNATIVES

The following describes the alternatives considered for this project.

No Build Alternative

- This alternative would keep the existing interchange roadway network into the future without improvements.
- The No Build Alternative has a number of positive aspects, since it would not require expenditure of public funds for design, right-of-way acquisition, construction, or utility relocation. Traffic would not be disrupted due to construction, therefore, avoiding inconveniences to local residents and businesses. Also, there would be no direct or secondary impacts to the environment, the socio-economic characteristics, or community cohesion of the area.
- The No Build Alternative fails to fulfill the purpose and need of the project. Operational and safety conditions within the interchange area will become progressively worse as traffic volumes continue to increase, thereby increasing the number of crashes and deteriorating access of this interchange.

Alternative 1 – Tight Diamond Interchange (TDI)– Recommended Alternative

- Modify the existing Diamond Interchange by widening the existing Woolbright Road bridge over I-95 and the bridge over the South Florida Rail Corridor to accommodate one additional through lane in each direction through the interchange
- Add one additional left-turn lane (triple lefts) at the northbound and southbound I-95 off-ramp intersections
- Add one additional westbound through lane at the Corporate Drive/SW 8th Street intersection
- Add one additional left-turn lane in the eastbound and westbound direction at the Corporate Drive/SW 8th Street intersection
- Widen the existing bridge over the E-4 Canal to accommodate the additional westbound through lane and bicycle lanes
- Extend the bicycle lanes from the interchange to SW 18th Street
- Refer to Figure 2.

Alternative 2 – Diverging Diamond Interchange (DDI)

- Reconstruct the existing Diamond Interchange to a Diverging Diamond Interchange (DDI) configuration, which provides three continuous through lanes through the interchange with two free flow left-turn lanes into the I-95 on-ramps
- Add one additional westbound through lane at the Corporate Drive/SW 8th Street intersection

- Add one additional left-turn lane in the eastbound and westbound direction at the Corporate Drive/SW 8th Street intersection
- Widen the existing bridge over the E-4 Canal to accommodate the additional westbound through lane and bicycle lanes
- Extend the bicycle lanes from the interchange to SW 18th Street
- Refer to Figure 3

Alternative 3 – Single Point Urban Interchange (SPUI)

- Reconstruct the existing Diamond Interchange to a Single Point Urban Interchange (SPUI) configuration, which provides two continuous through lanes through the interchange
- Add one additional left-turn lane (triple lefts) at the southbound I-95 off-ramp intersection
- Add one additional westbound through lane at the Corporate Drive/SW 8th Street intersection
- Add one additional left-turn lane in the eastbound and westbound direction at the Corporate Drive/SW 8th Street intersection
- Widen the existing bridge over the E-4 Canal to accommodate the additional westbound through lane and bicycle lanes
- Extend the bicycle lanes from the interchange to SW 18th Street
- Refer to Figure 4

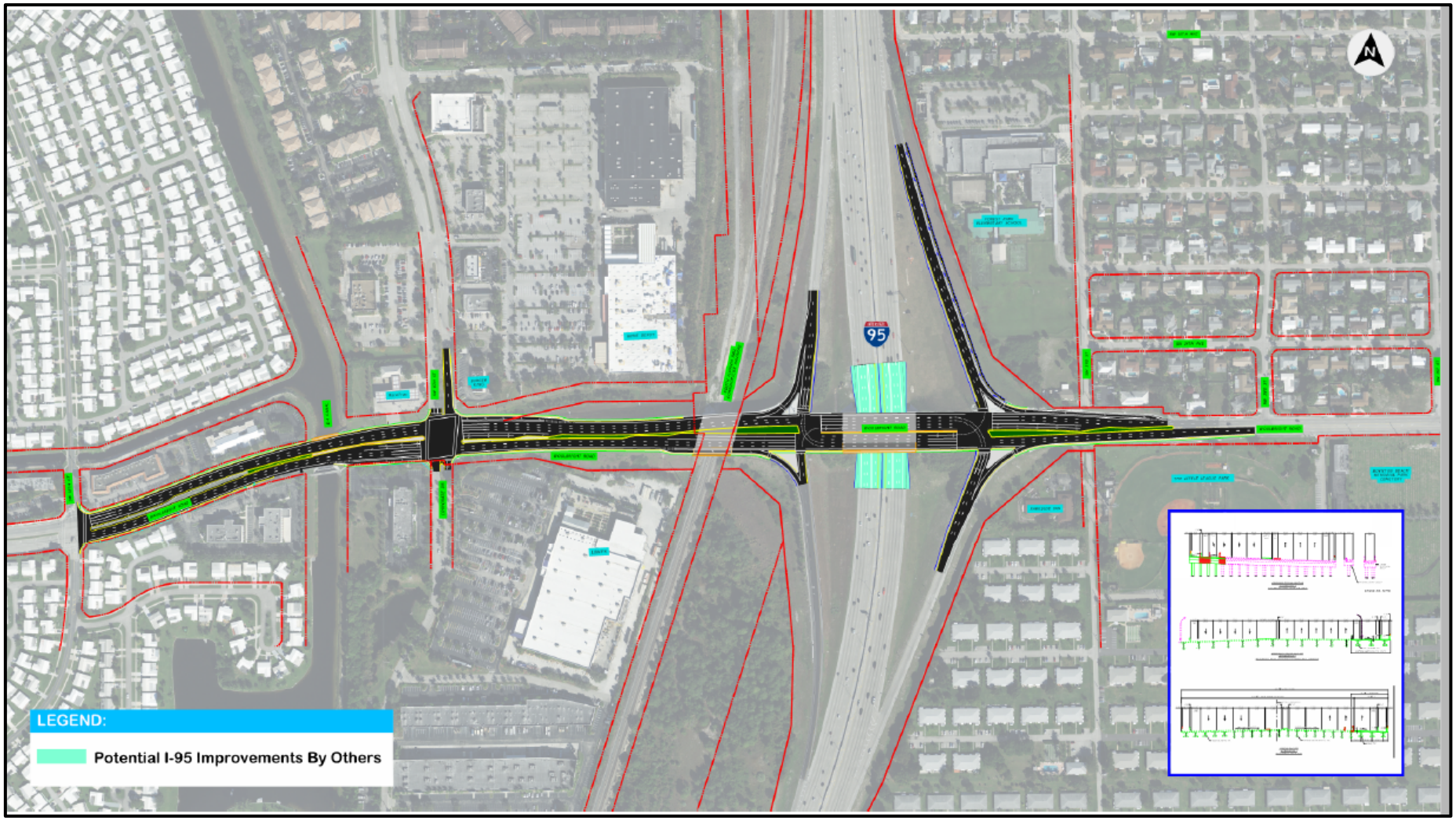


Figure 2 - Alternative 1 - TDI

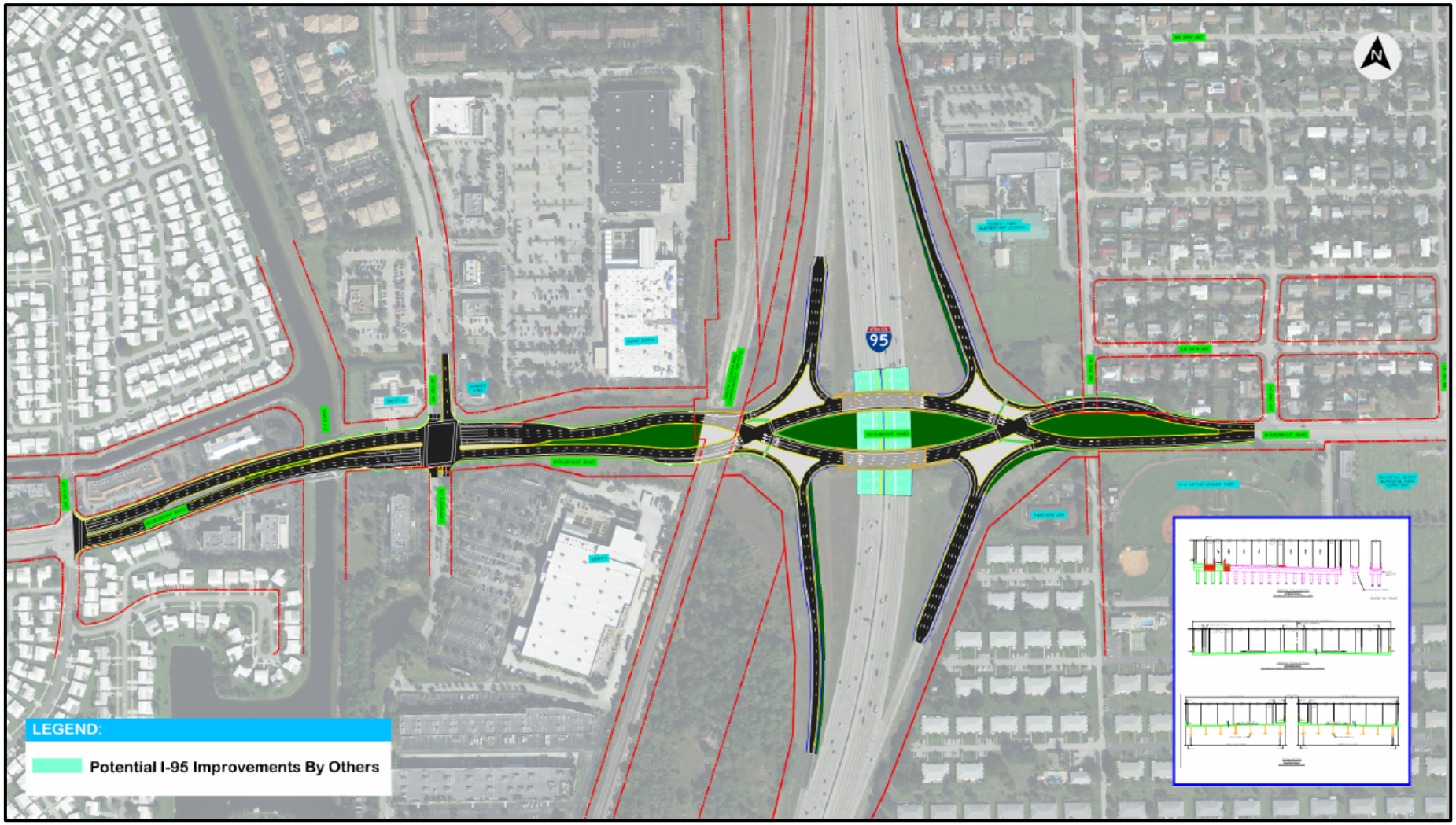


Figure 3 - Alternative 2 - DDI

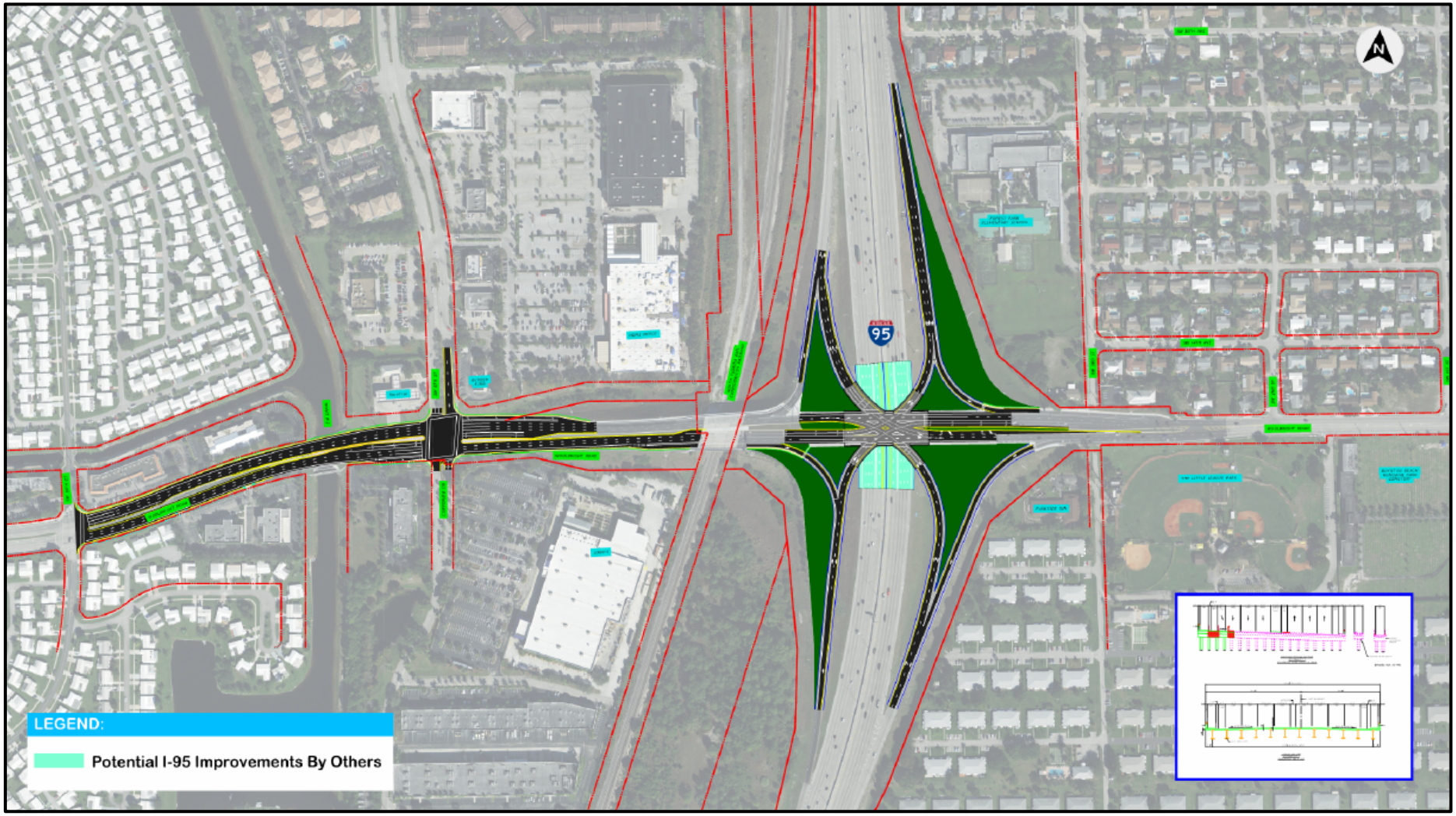
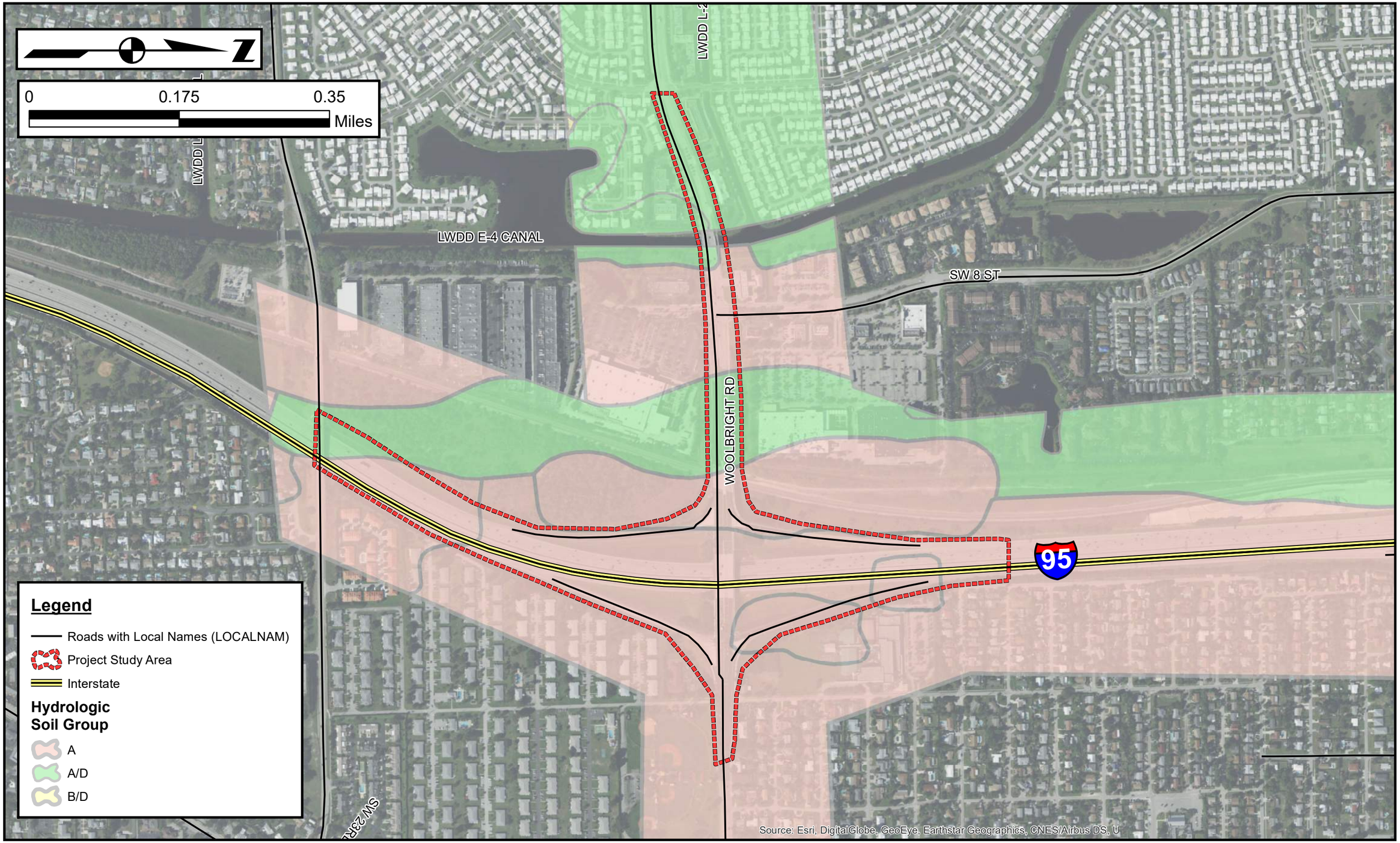


Figure 4 - Alternative 3: SPUI

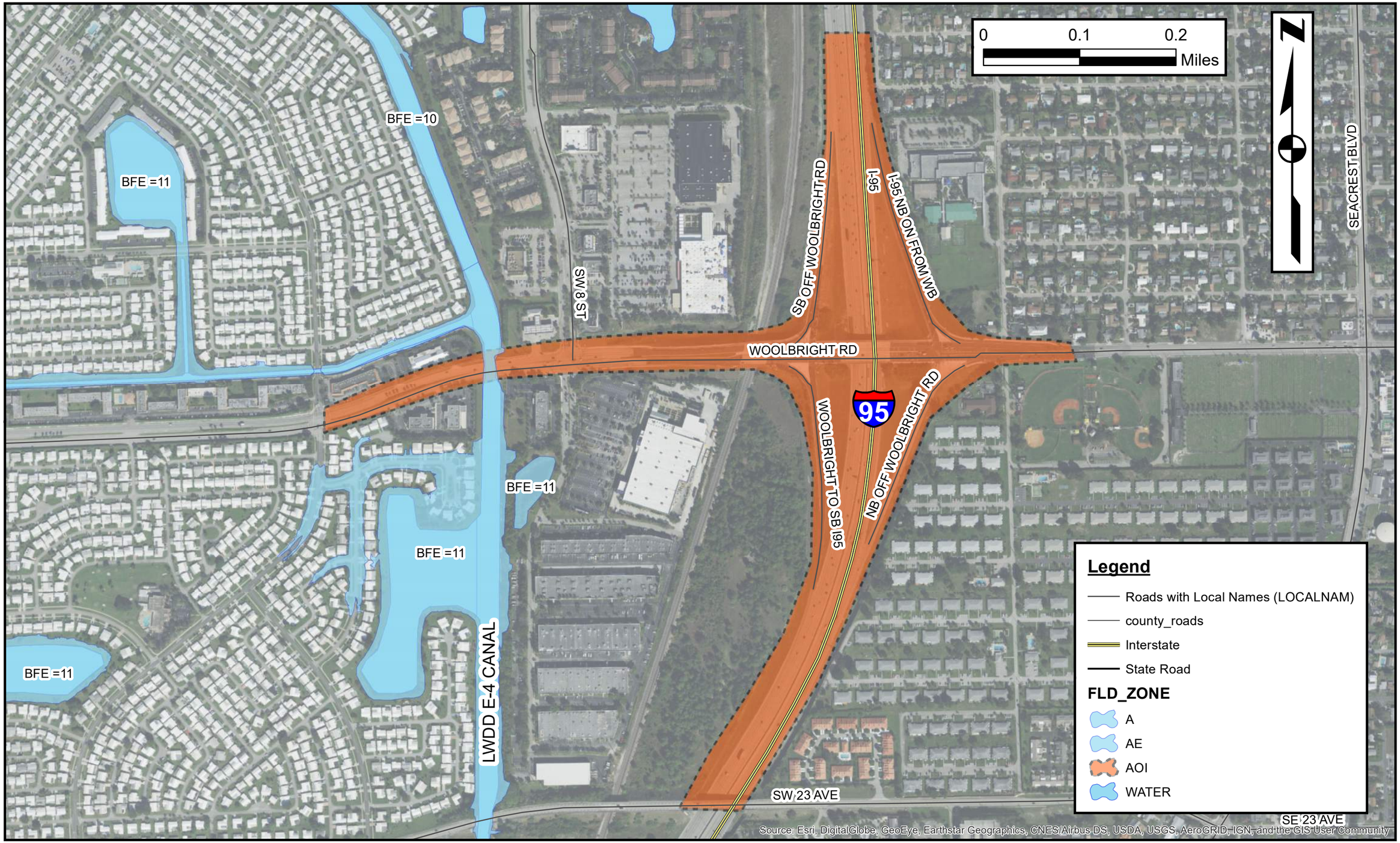
3.0 EXISTING CONDITIONS

I-95 within the project area is a ten-lane divided principal arterial interstate from the southern project limit to north of the W Boynton Beach Boulevard interchange (northern limit). There are 4 general purpose and 1 High Occupancy Vehicle (HOV) lane in each direction. Woolbright Road, in the vicinity of I-95, is a six-lane divided urban other principal arterial maintained by Palm Beach County.

The soil within the corridor primarily consist of a mixture of well drained type A and A/D sandy soils along with urban land. The surrounding area consist of a mixture of commercial and business park land use. Refer to **Figure 5** for Soils Map. There is extensive existing stormwater management within the interchange area consisting primarily of dry detention ponds inside the interchange infields and roadside swales. The project area lies within the E-4 Canal Woolbright Road. The study area is approximately 0.83 miles along I-95 with a right of way width that generally varies between 300 and 1000 feet. I-95 exhibits a sag vertical curve as it passes under Woolbright and generally the area north and south of Woolbright Road drains to the south and west to the E-4 Canal. All four of the existing dry detention ponds in the infield are interconnected and discharge to an existing FDOT ditch that routes flow to the canal. Existing ground elevations vary from approximately 0 to 46 feet NAVD. I-95 and associated bridges and embankments are generally higher in elevation than the surrounding ground and since Woolbright Road passes over the rail corridor and I-95 it is elevated on bridge and embankment to an elevation significantly higher than the natural ground elevation. According to the FEMA Effective and Preliminary Flood Insurance Rate Maps, the majority of the study limits are in an Area of Minimal Flood Hazard, Zone X. Woolbright road does cross the E-4 canal on the west side of the interchange which is designated as an AE zone with a Base Flood Elevation (BFE) of 11.0 feet NAVD 88. Refer to **Figure 6** for the FEMA Flood Zones. There are no cross drains under I-95 or Woolbright Road within the study limits.



Florida Department of Transportation District Four 3400 West Commercial Boulevard Fort Lauderdale, FL 33309	**I-95/SR 9 Interchange at Woolbright Road** Project Development & Environment Study FPID No: 437279-1-22-02 ETDM No.: 14341	Title: **SOILS MAP**	Figure: **5**



Florida Department of Transportation District Four 3400 West Commercial Boulevard Fort Lauderdale, FL 33309	**I-95/SR 9 Interchange at Woolbright Road** Project Development & Environment Study FPID No: 437279-1-22-02 ETDM No.: 14341	Title: **FEMA FLOODZONE MAP**	Figure: **6**

4.0 PROPOSED CONDITIONS

The proposed interchange improvement alternatives will impact the existing stormwater management facilities to varying degrees. The existing facilities provide approximately 1.2 Ac-ft of excess treatment volume that can be used for the proposed alternatives. There are three alternatives that are being evaluated by the PD&E study. Alternative 1, which includes widening of Woolbright Road. Alternative2, which includes a Diverging Diamond Interchange (DDI) configuration, and Alternative 3 which includes a Single Point Urban Interchange (SPUI) configuration. Except for the Alternative 3, it was assumed that all the ponds within the existing limited access right of way will be available, to some degree, in the proposed condition. The SPUI configuration impacts all of the existing detention ponds. However, it does also provide sufficient room within the existing R/W to re-grade new ponds to meet the stormwater requirements. None of the alternatives will impact any cross drains but all will widen the Woolbright Road bridge over the E-4 Canal. E-4 is under the jurisdiction of the Lake Worth Drainage District (LWDD) and has an established low member elevation of 12.8-ft NGVD (11.3-ft NAVD).

5.0 FLOODPLAIN ENCROACHMENT

Most of the modifications associated with the alternatives lie outside of FEMA Flood Zones. However, there are some areas within the project limits where flood zone Impacts are possible. Encroachments into the floodplain will be transverse and primarily confined within the existing right-of-way. In accordance with Executive Order 11988, FHWA TECHNICAL ADVISORY T 6640.8A, 23 CFR 771, and Chapter 24 of the PD&E manual, the Department must take the appropriate measures to protect floodplains and minimize impacts. For this reason compensating storage will be provided to offset any fill within the floodplain. As a result, the project will result in no increased risks associated with flooding. The project will also result in no adverse impacts to water quality, groundwater recharge, fish and wildlife habitat, plants, open spaces or natural beauty, recreation, agriculture and aquaculture, or forestry. Floodplain and

land use development plans are not necessary since the project is a modification to an existing road.

6.0 SUMMARY

It is assumed that the interchange improvement will not alter the existing profile. These improvements will have no adverse effects to the existing floodplain. It has been determined that there is no significant net floodplain encroachment by this project.