STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

OFFICE OF PLANNING AND ENVIRONMENTAL MANAGEMENT

SR 9 (I-95) & SW 10th Street (SR 869)
SYSTEMS INTERCHANGE MODIFICATION REPORT
Sample Road to Hillsboro Boulevard

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 4
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

September 2020

Interstate 95 and SW 10th Street (S.R. 869)
Systems Interchange Modification Report

Sample Road to Hillsboro Boulevard

Financial Project No: 436964-1-22-02

Systems Interchange Modification Report

Determination of Engineering and Operational Acceptability

Acceptance of this document indicates successful completion of the review and the Interchange Access. Request is considered acceptable for engineering and operations. Approval is contingent upon compliance with applicable Federal requirements, specifically the National Environmental Policy Act (NEPA) or Department Project Development and Environment (PD&E) Procedures. Completion of NEPA/PD&E process is considered acceptance of the general project and concepts described in the environmental document.

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QUALITY CONTROL CERTIFICATION FOR INTERCHANGE ACCESS REQUEST SUBMITTAL

Submittal Date: September 14, 2020

FM Number: 436964-1-22-02

Project Title: SR 9 (I-95) Systems Interchange Modification Report – Sample Road to Hillsboro Boulevard

District: Four

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Status of Document (Only complete documents will be submitted for review; however, depending on the complexity of the project, interim reviews may be submitted as agreed upon in the MLOU)

Draft Submittal

Quality Control (QC) Statement

This document has been prepared following FDOT Procedure Topic 525-030-260 (New or Modified Interchanges) and complies with the FHWA's two policy requirements. Appropriate District-level quality control reviews have been conducted, and all comments and issues have been resolved to their satisfaction. A record of all comments and responses provided during QC review is available in the project file or Electronic Review Comments (ERC) system.

Requestor: _____ Date: _____

IRC: _____ Date: _____

Engineer's Certification

I, Pramod Choudhary, PE, PTOE, PE number 61641, certify that I currently hold an active Professional Engineer's License in the State of Florida and I am competent through education or experience to provide engineering services in the civil and traffic engineering disciplines contained in this report. I further certify that this report was prepared by me or under my responsible charge as defined in Chapter 61G15-18.001 F.A.C. and that all statements, conclusions and recommendations made herein are true and correct to the best of my knowledge and ability.

Project Description: SR 9 (I-95) Systems Interchange Modification Report – Sample Road to Hillsboro Boulevard

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EXECUTIVE SUMMARY

The primary purpose of the I-95 Systems Interchange Modification Report (SIMR) project is to identify the long-term needs of I-95 interchange at SW 10th Street (SR 869) and the adjacent interchanges at Hillsboro Boulevard (SR 810) and Sample Road (SR 834) through 2040 and to develop design concepts to address traffic spillbacks onto I-95, improve interchange operations, reduce congestion, and enhance safety. This SIMR evaluates the traffic operations of the No-Build, Build 1, Build 2 and Build 2A alternatives.

The information and analysis indicate that several of the merge, diverge and weaving areas have been designated as High Crash Locations at some point within the last three years of analysis (2013-2015). Similarly, the No-Build Alternative is projected to experience operational failures at multiple merge, diverge and weave locations along I-95 within the study interchanges. It is important to note that all three Build alternatives have similar interchange modifications and differ only in their forecast traffic volumes depending on the direct-connect ramps between I-95 Express Lanes and SW 10th Street connector lanes. Build 1 has no direct-connect ramps, Build 2 has direct-connect ramps terminating west of Military Trail, and Build 2A has direct-connect ramps connecting to Sawgrass Expressway (Please refer to Conceptual Plans in Appendix J). The following modifications have been made to the SW 10th Street interchange configuration:

- Southbound Ramp Terminal at SW 10th Street:
  - The traffic signal for the westbound left-turn from SW 10th Street traffic to southbound I-95 has been eliminated and combined with the I-95 southbound off-ramp signal.
  - The existing single westbound left turn lane has been converted into dual westbound left-turn lanes and the storage has been extended approximately 250 feet east of the northbound off-ramp signal.
  - A barrier separation has been provided between the eastbound through lanes and the eastbound to northbound right turn movement to eliminate weaving and allow for concurrent movement of the southbound left turn and eastbound right turn movement. The single lane eastbound to northbound loop ramp has been widened to provide for two lanes.
  - The existing single free-flow southbound right turn lane has been widened to provide for signal controlled dual right-turn lanes to improve operations and safety in the westbound direction. The free-flow right turn movements are always a safety concern for the pedestrians in the cross-walk. Also, due to the proximity of the signalized intersection at Newport Center Drive, the free-flow right turn induces weaving with the westbound traffic. This condition is likely to become worse with the introduction of the access to the westbound connector lanes immediately west of the Newport Center Drive.

- Northbound Ramp Terminal at SW 10th Street:
  - The westbound to northbound left-turn movement has been converted to a free-flow westbound to northbound right turn movement. This eliminates the westbound left turn phase and provides more green time to the eastbound movement.
  - The northbound off-ramp has been widened to provide for triple left turn and triple right turn lanes.
  - The eastbound to northbound loop ramp and the westbound to northbound slip ramp will merge together before merging with the I-95 mainline traffic.

Proposed modifications to the interchange are recommended to address projected deficiencies in the future. Listed below are specific modifications and projected benefits:

- The proposed Build 1, 2 and 2A alternatives with a 7,900 foot SB auxiliary lane on I-95 between the SB entrance ramp from SW 10th Street and the SB exit ramp to Sample Road creates a 4-lane mainline segment on SB I-95 and is projected to significantly improve the operations in the SB direction.
- The proposed NB braided ramps at the SW 10th Street interchange and the SB braided ramps at Hillsboro Boulevard not only reduce the number of merge and diverge points along I-95 but also provides for longer off-ramp storage lengths. Freeway analysis projects significant improvements over the No-Build conditions in the merge, diverge and mainline operations in both directions.
- As discussed above, the SW 10th Street interchange ramp terminal improvements proposed under the Build 1, 2 and 2A alternatives are projected to significantly improve the operations at the ramp terminals and potentially eliminate the possibility of off-ramp queues spilling on to the mainline.
- The proposed elimination of the SB on-ramp signal at SW 10th Street and the proposed improvements along SW 10th Street are expected to significantly improve the flow of traffic along the arterial, particularly at the interchange. The improved operations are projected to improve the safety along the corridor.
- The intersection of SW 10th Street and Newport Center Drive is located less than 900 feet west of the SB off-ramp terminal and the westbound queues affect the ramp operations. In order to provide more green time for the east-west movements at this intersection, the northbound and southbound approaches have been modified to allow only right turn movements. Triple right turn lanes have been provided on the northbound and southbound approaches. The northbound and southbound through and left turn movements have been reassigned based on their destination to SW 12th Avenue/Newport Center Drive local road.

These improvements address the traffic operation deficiencies by eliminating or improving the failing conditions within the interchange influence area and improving safety by reducing congestion and improving operating conditions along SW 10th Street and Hillsboro Boulevard. A traditional crash reduction analysis shows that the proposed improvements are likely to reduce approximately 42 crashes per year resulting in an annual safety benefit of more than six (6) million dollars.

Considering the overall operations along I-95, ramp terminals, and along Hillsboro Boulevard and SW 10th Street, all three Build alternatives are projected to provide better operating conditions than the No-Build. However, the operational improvements under the Build 2 and Build 2A alternatives are better than Build 1. The MOEs for Build 2 and Build 2A are very similar despite the highest traffic demand under Build 2A. In terms of Strategic Intermodal System (SIS) connectivity, Build 2A provides better connectivity. Build 2A provides a direct and logical system-to-system connection between Sawgrass Expressway and I-95 and Florida's Turnpike. VISSIM analysis conducted under the SW 10th Street Connector PD&E Study confirms that the Build 2A alternative is expected to provide better operations than the No-Build alternative in 2040.

The Federal Highway Administration's (FHWA's) newly adopted policy on *Access to the Interstate System* became effective on May 22, 2017 and replaces the policy of August 27, 2009 on *Access to the Interstate System*, published at 74 Federal Register 43743. The changes in this policy are made to ensure this policy focuses on safety, operational, and engineering issues. The consideration of social, economic, and environmental impacts discussed in the 2009 policy are removed from this policy. However, the removal from this policy does not eliminate the need to consider those matters. Those issues will be addressed under the National Environmental Policy Act and other statutes and regulations applicable to the approval process.

This policy is effective as of May 22, 2017.

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, the Federal Highway Administration's (FHWA) 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:

Considerations and Requirements

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)).*

The operational analysis conducted for the SIMR confirmed that the proposed interchange modifications are not expected to have any significant adverse impacts on safety and operations on the interstate facility (I-95). The proposed elimination of the loop ramp in the northeast quadrant of the Hillsboro Boulevard interchange will remove the weaving movement between the ramp terminals and thereby improve the safety and flow of traffic along Hillsboro Boulevard. The proposed improvements along SW 10th Street under the Build alternatives are expected to significantly improve the operations at the NB off-ramp terminal intersection from LOS E and F to LOS B. The 2040 No-Build queuing results for the NB off-ramp at SW 10th Street show the queues to be exceeding the available storage lengths which could adversely impact the flow of traffic along I-95. The proposed improvements under the 2040 Build conditions are projected to significantly increase the available storage length for this ramp and should prevent the queue from adversely affecting the operations along I-95. The comparison between No-Build and Build Alternative 2A shows that the annual travel time saving is approximately $98 million. Compared to the No-Build Alternative, the Build Alternative 2A is expected to reduce the total delay by 75% and 92% and increase the average speed by 50% and 413% during the AM and PM peak hours, respectively. The Build Alternative 2A is projected to significantly improve the LOS at the intersections along SW 10th Street from LOS E and F to LOS D or better. The projected failing conditions under the No-Build Alternative are expected to increase future crash

risk within the project corridor. This potential for increased crash risk is alleviated by the capacity improvements proposed in the Build Alternatives.

Many of the improvements proposed for this project are unconventional and unique. The limitations in the Highway Safety Manual (HSM) analysis methodology fail to capture the benefits of the proposed operational and capacity improvements proposed under the Build alternatives and consequently fail to quantify the crash reduction in a meaningful way for this project. Therefore, a traditional crash reduction analysis was conducted to estimate the potential safety benefits of the proposed freeway, interchange, and arterial improvements. The analysis shows that the proposed improvements are likely to reduce approximately 42 crashes per year resulting in an annual safety benefit of more than six (6) million dollars.

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.*

This SIMR does not propose any new interchanges along I-95. These existing interchanges provide access to public roads only. The improvements proposed at the interchanges will maintain full access to the existing cross streets and accommodate all movements.

1 PROJECT OVERVIEW

1.1 Introduction

At the request of the Department and as part of Financial Project ID 436964-1, a traffic analysis was undertaken to identify the long-term needs of the project area through 2040 and to develop design concepts to address traffic spillbacks onto I-95, improve interchange operations, reduce congestion, and enhance safety at the study interchange of I-95 at SW 10th Street (SR 869) and adjacent interchanges at Hillsboro Boulevard (SR 810) and Sample Road (SR 834). The study area is located within the City of Deerfield Beach in northeast Broward County, Florida. The project area includes I-95 (SR 9) from south of Sample Road (SR 834) (MP 21.601) to north of Hillsboro Boulevard (SR 810) (MP 24.641). **Figure 1.1** provides a Project Location Map. This System Interchange Modification Report (SIMR) provides the justification documentation for the proposed interchange access modifications to the SW 10th Street and Hillsboro Boulevard interchanges along I-95.

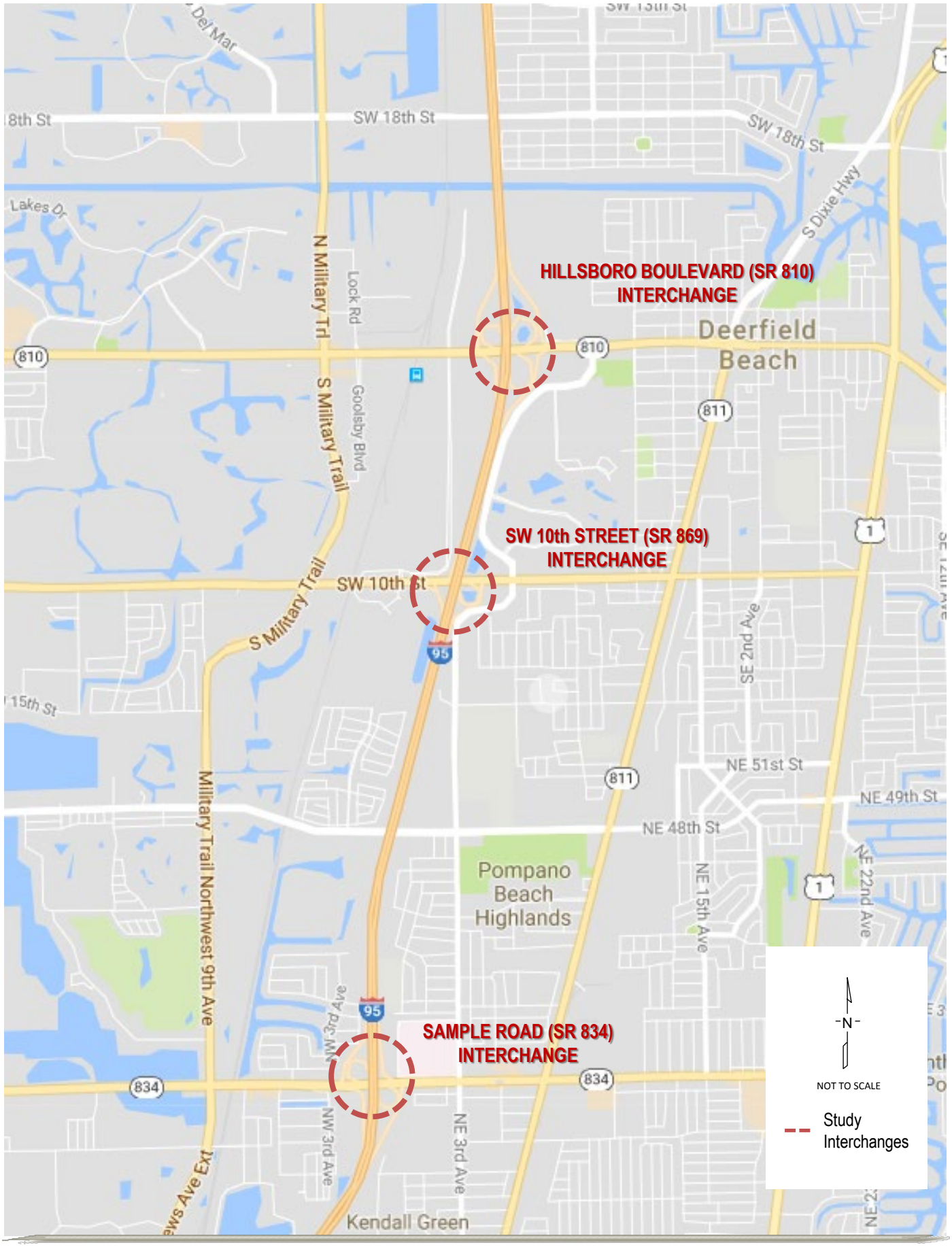
1.2 Purpose and Need for Project

The purpose of this project is to eliminate various existing operational and safety deficiencies along I-95 between and including the interchanges at SW 10th Street and Hillsboro Boulevard, and also on SW 10th Street and Hillsboro Boulevard in the vicinity of I-95. The primary need for the project is based on capacity/operational and safety issues, with secondary considerations for the needs of evacuation and emergency services, transportation demand, system linkage, modal interrelationships, and social demands and economic development.

1.3 Planned and Programmed Transportation Projects

Applicable Master Plans, Strategic Intermodal System (SIS) Plans, Florida Department of Transportation's (FDOT's) Five (5) Year Work Program, interchange planning and safety studies performed by FDOT District Four and future projects identified in the Palm Beach Metropolitan Planning Organization (MPO) Transportation Improvement Program (TIP), Palm Beach MPO 2040 Long Range Transportation Plan (LRTP), local government comprehensive plans, and active Development of Regional Impact (DRI) applications were reviewed to identify any planned and programmed improvements within the study limits of the SIMR. Additionally, the I-95 Express Lanes Phase 3 Design was also reviewed to identify planned and programmed improvements within the SIMR limits. The SIMR improvements will be developed to be consistent with these plans or steps will be taken to achieve consistency.

Figure 1.1: Project Location Map



1.3.1 FDOT Plans and Projects

The I-95 Express Phase 3B-2 project from Stirling Road to Linton Boulevard is currently under preliminary design and will be let in FY 2019 as a Design-Build project. This project will introduce 2 tolled, express lanes in place of the existing High Occupancy Vehicle lane. The I-95 Corridor Design Consultant (CDC) is analyzing this project to ensure its compatibility with the I-95 SIMR.

In addition, there is an ongoing SW 10th Street Connector PD&E Study (FPID 439891-1) which is studying the feasibility of connecting the existing Sawgrass Expressway from Florida's Turnpike to I-95 through managed lanes. Every effort has been taken to maintain consistency between this SIMR and the ongoing PD&E Study.

The following FDOT planned projects have been identified within the SIMR study limits:

I-95 Interchange Improvements from Hillsboro Boulevard to SW 10th Street

Financial Number: 430932-1-52-01
Project Length: 1.5 miles
Project Limits: I-95 from the Hillsboro Boulevard entrance ramp to SW 10th Street
Start Date: January 5, 2015
Completed: Spring 2018
Contractor: Community Asphalt Corp.
Estimated Construction Cost: $4.5 million
Scope of Work:

This is 1 of 5 interchange improvements throughout Broward and Palm Beach Counties. Work at this location included the following:

- Added SB auxiliary lane on I-95 from eastbound Hillsboro Boulevard to I-95 southbound entrance ramp to the SW 10th Street exit ramp.
- Widened the SB I-95 exit-ramp to provide a two-lane exit from I-95 with free-flow southbound right turn and two exclusive southbound left turn lanes at the SW 10th Street SB off-ramp terminal.
- The free-flow southbound right turn lane was extended to the Newport Center Drive intersection as an exclusive westbound right turn lane.
- Utility relocation, milling and resurfacing of existing pavement, bridge widening, and installation of barrier walls, curbs, sidewalks, guardrail, drainage, overhead signs, signing and pavement marking, signals, lighting and retaining walls.

Hillsboro Boulevard Improvements Project in Deerfield Beach

Financial Number: 430602-1-52-01
Project Length: 2.32 miles
Project Limits: Hillsboro Boulevard from Military Trail to US 1 in Deerfield Beach
Start Date: January 3, 2017
Completion Date: Early 2018
Contractor: General Asphalt Co.
Estimated Construction Cost: $9.4 million
Scope of Work:

The improvements under this project consisted of the following:

- Improved the off-ramp from NB I-95 to EB Hillsboro Boulevard including the addition of a new signalized intersection and second lane to increase capacity.
- Relocated and upgraded drainage structures, upgraded crosswalk ramps to meet ADA requirements, constructed new stamped asphalt crosswalks from east of Natura Boulevard to US 1.
- Upgraded existing pedestrian signals to countdown timers, upgraded signalized intersections to mast arms, and installed new decorative lighting.
- Constructed new medians east of SE 2nd Avenue, removed old asphalt and resurfaced the roadway, upgraded signs and pavement markings to reflect the new roadway configuration as follows: (1) Military Trail to Dixie Highway - three 11-foot lanes in each direction (2) NE / SE 2nd Avenue to US 1 - two 11-foot lanes in each direction with a bike lane or sharrows in each direction as follows: (i) Military Trail to NW/SW 2nd Terrace - 4-foot bike lane (ii) NW / SW 2nd Terrace to NE / SE 2nd Avenue - Sharrow symbols to designate that the outside travel lane will be shared with vehicles (iii) NE / SE 2nd Avenue to US 1 - 7-foot bike lane.

Sample Road Interchange Ramp Improvements:

Financial Number: 436958-1-52-01
Project Length: 1.12 miles
Project Limits: I-95/SR-9 @ Sample Road Interchange

The improvements under this project consisted of the following:

- Combine the WB to SB loop on-ramp from Sample Road with the EB to SB slip on-ramp from Sample Road to create a single on-ramp merge on the mainline.
- Combine the EB to NB loop on-ramp from Sample Road with the WB to NB slip on-ramp from Sample Road to create a single on-ramp merge on the mainline.

1.4 Requestor Information

This I-95 Systems Interchange Modification Report (SIMR) has been prepared for the Florida Department of Transportation, District Four. For information on the SIMR, please contact the Department's Project Manager at the following address:

Robert E. Bostian, Jr., PE, Project Manager FDOT- District 4

3400 West Commercial Boulevard Fort Lauderdale, FL 33309-3421

Phone: (954) 777-4427

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2 METHODOLOGY

The methodology applied for the I-95 SIMR is documented in the Methodology Letter of Understanding (MLOU) dated November 2019 which includes Amendments #1 and #2 to the original MLOU signed in May 2017. The MLOU was approved by FDOT District 4, Systems Implementation Office of FDOT Central Office, and Federal Highway Administration (FHWA). The MLOU outlines the criteria, assumptions, processes, analyses and documentation requirements for the project. The project has changed from being a programmatic project to a non-programmatic project due to the system-to-system connection between I-95 and Sawgrass Expressway. The approved MLOU is included in **Appendix A** for ease of reference. The following summarizes some of the more prominent topics covered under the MLOU.

2.1 Area of Influence

2.1.1 I-95 Mainline

The Area of Influence (AOI) along I-95 (SR 9) will include the freeway merge/diverge ramps at the adjacent interchanges to the south and north of SW 10th Street including ingress/egress ramps to/from I-95 Express lanes. For existing conditions, the adjacent interchange south of SW 10th Street is Sample Road (SR 834) and the adjacent interchange north of SW 10th Street is Hillsboro Boulevard (SR 810). **Figure 2.1** provides a graphical representation of the AOI.

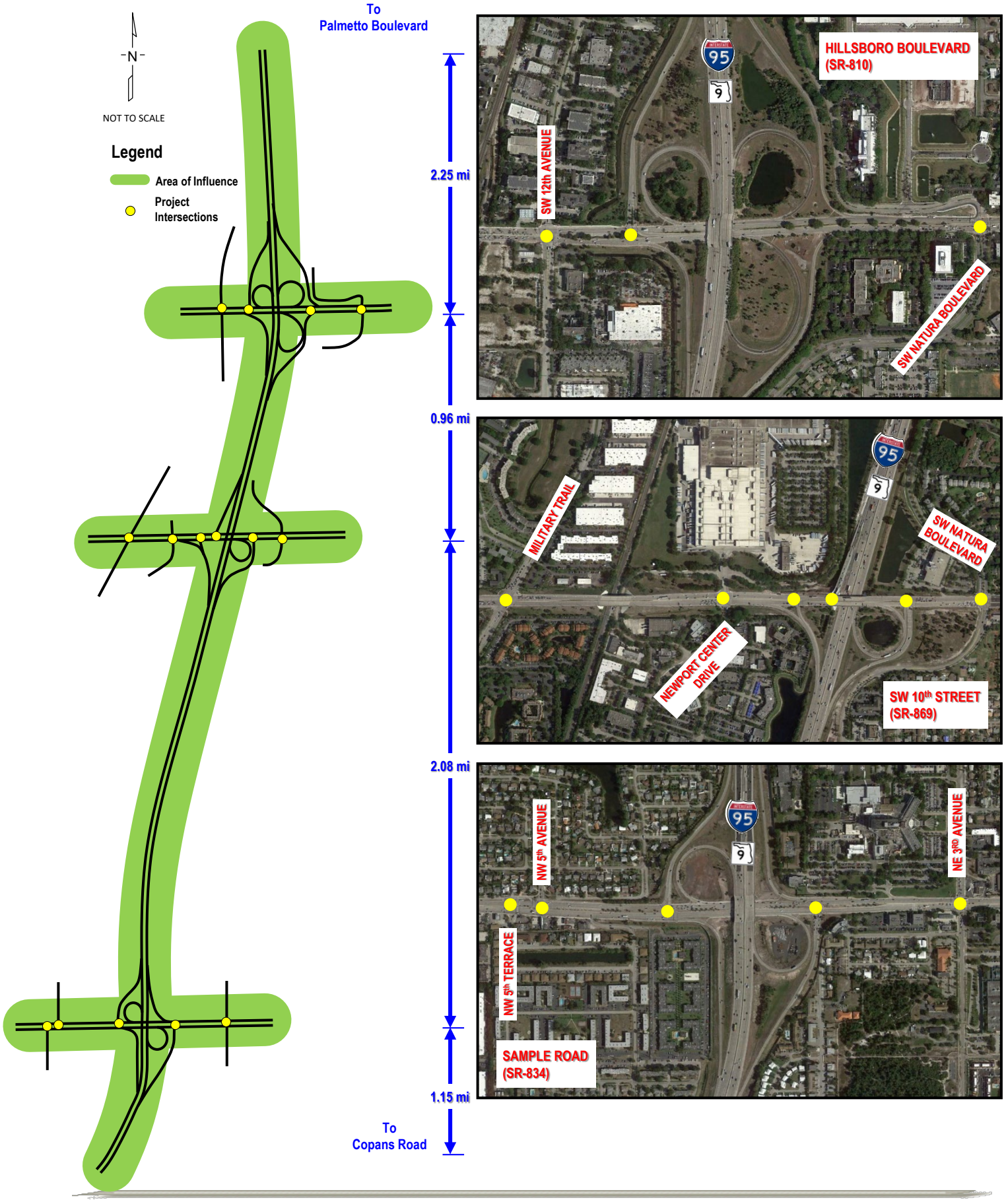
2.1.2 Along Crossroads

The AOI will include the intersections identified in **Table 2.1** below.

Table 2.1: Proposed Study Intersections

Interchange	List of Intersections
Sample Road (SR 834)	• I-95 NB off ramp at Sample Road • I-95 SB off ramp at Sample Road • Sample Road at NW 5th Terrace • Sample Road at NW 5th Avenue • Sample Road at NE 3rd Avenue
SW 10th Street (SR 869)	• I-95 NB off ramp at SW 10th Street • I-95 SB off ramp at SW 10th Street • SW 10th Street at S. Military Trail • SW 10th Street at Newport Center Drive • SW 10th Street at Natura Boulevard
Hillsboro Boulevard (SR 810)	• I-95 NB off ramp at Hillsboro Boulevard • I-95 SB off ramp at Hillsboro Boulevard • Hillsboro Boulevard at SW 12th Avenue • Hillsboro Boulevard at Natura Boulevard/Fairway Drive

Figure 2.1: Area of Influence



2.2 Analysis Years

The analysis years for the project were determined as follows:

For Traffic Forecasting:

- Base year 2005
- Horizon year 2035

For Traffic Operational Analysis:

- Existing year 2016
- Opening year 2020
- Design year 2040

2.3 Travel Demand Forecasting

2.3.1 Selected Travel Model

The modeling effort was coordinated between FDOT District 4 and Florida's Turnpike to produce a consistent traffic forecasts for various traffic studies on major corridors - I-95, SW 10th Express Lanes Street, Sawgrass Expressway Widening, and Florida's Turnpike Widening. The travel demand forecasts for the SW 10th Street SIMR were prepared by Florida's Turnpike in conjunction with the SW 10th Street PD&E and Sawgrass Widening PD&E studies. At the beginning of the forecast effort in late-2016, the Florida's Turnpike developed the project-level SERPM 6.54 FTE for use in this study. The SERPM 6.54 FTE included network and socioeconomic data updates consistent with SERPM 7. District 4 approved the use of the SERPM 6.54 model at the onset of the project since the effort was being conducted by the Florida's Turnpike. Additionally, District 4 conducted a reasonability test comparing SERPM 7 with SERPM 6.54 in anticipation of future questions. As documented in the SW 10th Street Subarea Model validation dated December 2017, the comparative analysis found the models to be relatively similar indicating reliability of forecasted volume along the corridor.

The project traffic forecasts for this study were developed through a multi-step process. With the need to estimate dynamically tolled express lane traffic for the Build scenarios, the methodology used two modeling tools:

- SERPM Travel demand model
- Express Lanes Time-of-Day Model

Forecasted AADT and EL hourly traffic were derived from these two models. This information was used to derive future year directional design hour traffic (DDHV). Model-generated origin-destination trip matrices also provided inputs to operational simulation models for the No-Build and Build scenarios.

As mentioned above, the study used the FTE version of the Southeast Regional Planning Model (SERPM-FTE) 6.5.4, which has been used for various studies, including the I-95 Express Lanes Traffic and Revenue study and the Sawgrass Expressway Widening PD&E study. The SERPM covers a three-county region in Southeast Florida: Palm Beach, Broward, and Miami-Dade. SERPM-FTE includes model network enhancements such as the recoding of interchange configurations along the major freeway networks in Southeast Florida and updates to the future land use data to reflect the best known information at the time. The SERPM produces travel demand forecasts at a daily level and by three time periods: AM Peak (6:30 AM – 9:30 AM), PM Peak (3:30 PM – 6:30 PM), and off-peak (remainder of the day).

The Express Lane Time of day (ELToD) model works in conjunction with the SERPM and is designed to take daily and peak period subarea trip tables and produce traffic estimates by hour, by direction, for both the general purpose lanes (GPLs) and ELs for each roadway segment. The model is considered state-of-the-practice for forecasting travel demand on Express Toll lanes in Florida.

2.3.2 Model Validation Methodology

The model development for this project consisted of enhancing the local subarea by recoding intersection configurations, splitting Traffic Analysis Zones (TAZs), and adding local streets important to local circulation around the study corridor. Within the subarea, the highway network coding was reviewed and corrected as needed using aerial imagery. The SERPM was validated to 2010 traffic conditions in an iterative fashion by first adjusting link speeds at the regional level and using the Cube Analyst process at the subarea level.

A Cube Analyst process was used at the subarea level to adjust the origin-destination matrices to obtain a better correlation between observed counts and model estimates. The Cube Analyst process is a matrix estimator that uses a seed origin-destination matrix along with link level traffic counts to develop an origin-destination matrix in an iterative fashion that corresponds to model-estimated volumes which closely match the provided link counts.

The adjustments to origin-destination tables by the Cube Analyst process were calculated by subtracting the original subarea origin-destination table from the adjusted origin-destination table by time period. This adjustment (also known as validation Delta) was applied to the future year model estimated origin-destination tables.

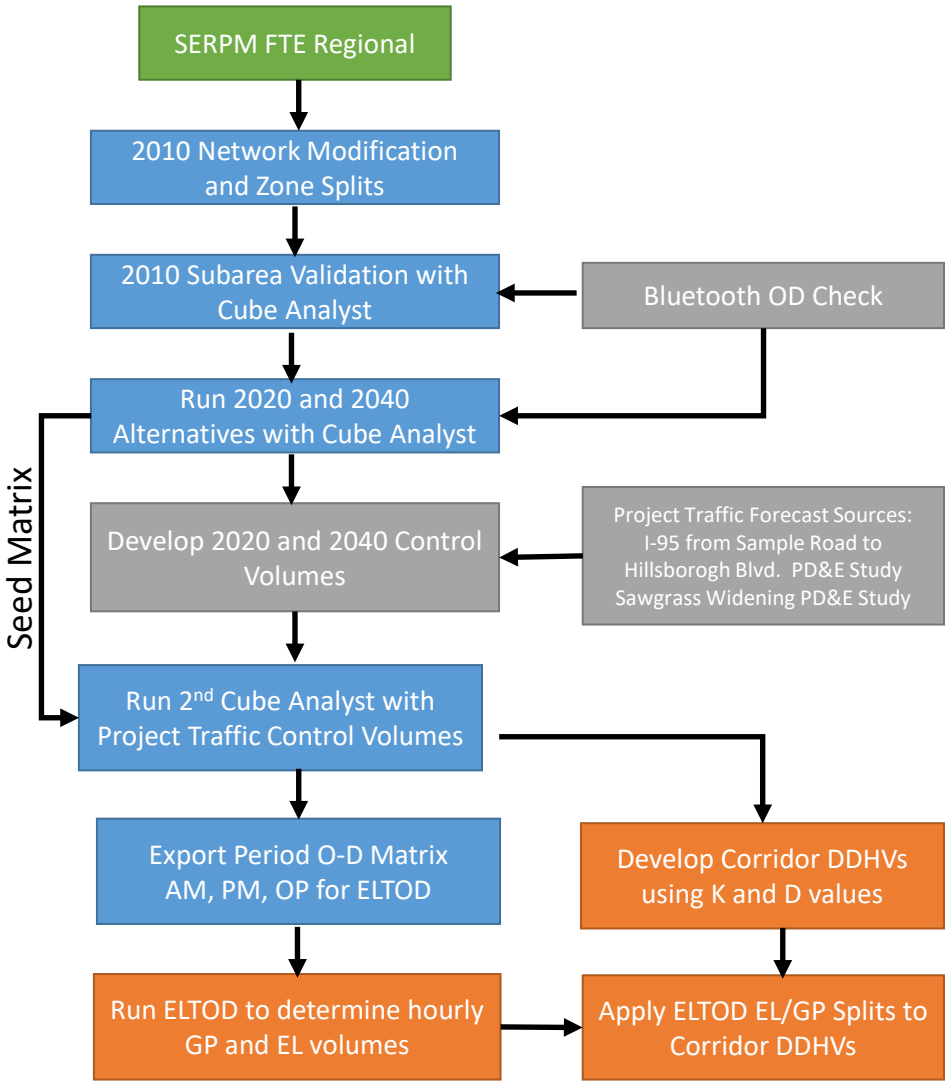
2.3.3 Project Traffic Forecast Development Methodology

The development of the project traffic forecast was a multi-step effort involving a combination of internal modeling procedures and post-model evaluation. **Figure 2.2** illustrates the process beginning with the regional model. After the SERPM-FTE project model was validated against the 2010 traffic conditions, the future year model runs were conducted for the 2020 and 2040

No-Build and Build alternatives. The results of the future year Build scenarios were checked against the Bluetooth Origin-Destination data to see if the traffic between the Turnpike and I-95 Corridors that diverted to the SW 10th Street from the other interchanges was reasonable.

The traffic forecasting methodology used for each approach of each intersection was based on the 2016 AADT (from the field), and 2010 and 2040 SERPM model volumes. The recommended 2040 AADTs were calculated by applying the model growth rate to the 2016 AADT. For all the roadway links, the 2016 and 2040 AADT have been compared, and a minimum compound growth rate of 0.5% has been adopted. Then the 2020 and 2030 volumes were interpolated using 2016 AADT and recommended 2040 volumes.

Figure 2.2: Project Traffic Forecast Development Process



Once the No-Build forecast was determined for 2040, the Build project forecast was determined by applying the model differences to the No-Build project forecast. For example, 2040 Build 2 project traffic forecasts = 2040 No-Build project traffic + (2040 Build 2 Model – 2040 No-Build Model). The Build 2A project traffic was determined by taking the difference between the Build 2 and Build 2A model values and adding this impact layer to the Build 2 project forecast. This process was also used to develop 2020 and 2040 Build 2 and Build 2A forecast volumes along I-95 mainline, all ramps, and arterials.

Once project traffic forecast volumes were established as control values, a second Cube Analyst step was implemented to adjust the initial trip tables to match with the forecast values at selected links in the subarea. The final adjusted trip tables were assigned to the subarea networks for each scenario to produce the 2020 and 2040 forecasts on all links with and without control totals. Finally, the second Cube Analyst assignment results were checked, smoothed, and rounded to produce the project forecast AADTs.

The final forecasted AADTs from the subarea model, along with K-factors and D-factors, were used to develop corridor-level directional design hour volume (DDHV). For express lane locations, the Subarea model peak period trip tables were then exported to ELToD to determine hourly traffic for the general purpose and express toll lanes.

2.3.4 Adjustment Procedures

If the model growth rate was less than the recommended 0.5% growth rate, a 0.5% growth rate was utilized. Otherwise, the growth factor calculated based on the model volumes was used. Then the 2020 and 2030 volumes were interpolated using 2016 AADT and recommended 2040 volumes. For the roadway segments where the 2040 model volumes are lower than the 2010 model volumes, or are not included in the model network, the future 2020, 2030, and 2040 AADTs were calculated using 2016 AADT and a compound growth factor of 0.5%.

The No-Build scenario for the I-95 PD&E study and the SW 10th Street PD&E study is the same. Hence, there is a need to achieve a consistent project forecast between the two projects. The forecast approach discussed with FDOT District 4 and Turnpike staff was to determine a project forecast for the No-Build scenario consistent with the I-95 PD&E study and pivot from these forecasts using the impacts identified from the SW 10th Street PD&E model. The methodology outlined in the Traffic Data Collection and Traffic Projections Report for the I-95 PD&E study was to apply a growth rate of 0.5 percent or model growth (whichever is greater) to the 2016 traffic volumes. Since the SW 10th Street Study I-95 study limits extend beyond the I-95 PD&E study limits (from Sample Road to Hillsboro Boulevard), a 0.5 percent growth rate was applied for the interchanges south of Sample Road, and the raw subarea SW 10th Street model results were used north of Hillsboro.

2.4 Traffic Factors

The directional design hour volumes (DDHV) development process for the I-95 IMR involved the application of the standard procedure of adjusting the Annual Average Daily Traffic (AADT) volumes with the Standard K and D30 traffic factors. However, it was adjusted to produce AM and PM peak hour volumes along the different corridors as follows:

- Standard K was applied to the highest peak hour period between AM or PM; the other period K factor was determined as a ratio based on existing counts.
- I-95 mainline Calculated K = 7.0% was proposed
- Standard K = 8.0 was applied to I-95 ramps and along the crossing corridors between the I-95 Ramps. Other K factors were based on existing and historical counts. D factors were calculated by link for each peak period based on existing and historical data.
- 24T and DHTf were calculated for each intersection or link based on existing and historical data. A minimum DHTf factor of 2.0% was used.
- PHF for Existing Year Analysis was based on existing counts. PHF for Future Year Analyses: PHF=0.95 for I-95 Mainline; PHF=0.92 for ramp movements and cross streets.
- TMTool, rounding and balancing were conducted; therefore, the final K and D may not match the initial values.

The proposed Traffic factors for this SIMR are summarized on **Table 2.2**

Table 2.2: Existing Traffic Factor Values

Roadway	K%	D%	24T%	DHTf(1)%	PHF(2)
I-95 Mainline	7.0	50.5 to 56.7	4.0 to 6.0	2.0 to 3.0	0.85 to 0.99
I-95 Ramps	8.0	100	4.0 to 6.0	2.0 to 3.0	0.85 to 0.99
SW 10th Street	5.7 to 12.8	50.0 to 83.4	3.0 to 8.0	2.0 to 3.0	0.93 to 0.97
Hillsboro Boulevard	3.6 to 9.0	50.0 to 93.3	3.0 to 9.0	2.0	0.94 to 0.96
Sample Road	3.9 to 9.5	50.7 to 71.2	3.0 to 7.0	2.0 to 3.0	0.92 to 0.96

Source: AECOM preliminary calculations based on existing and historical volume data.

(1) A minimum DHT_f factor of 2.0% will be used.

(2) PHF for Future Year Analyses: PHF=0.95 for I-95 Mainline; PHF=0.92 for ramp movements and cross streets.

2.5 Traffic Operational Analysis

Traffic operational analyses were performed for the Existing Conditions and future No-Build and Build Alternatives. Analyses were performed using the Highway Capacity Software (HCS2010), Version 6.9 and Synchro Version 9. In order to maintain consistency between the three projects viz. SW 10th Street Connector PD&E (439891-1), I-95/SW 10th Street SIMR (436964-1) and Sawgrass Expressway PD&E, within the study area, Synchro 9 was used for all three projects. HCS2010 was used for operational analyses of freeway segments - mainline, ramps, merge,

diverge and weaving segments. Synchro analyses were performed for adjacent signalized intersections and interchange ramp terminal intersections. Synchro software results were reported utilizing the HCM 2000 module outputs. It is important to note that HCM2000 delays can be reported for unconventional intersection designs and signal timings. HCM 2010 fails to provide this information. In order to maintain consistency between the SW 10th Street Connector PD&E Study, I-95/SW 10th Street SIMR and Sawgrass Expressway PD&E Study, HCM 2000 was reported for all intersections.

The HCS and Synchro operations analyses were performed for the following conditions:

- Existing year 2016 conditions, AM and PM peak hours
- Year 2020 conditions for No-Build, Build 1, Build 2, and Build 2A Alternatives, AM and PM peak hours
- Year 2040 conditions for No-Build, Build 1, Build 2, and Build 2A Alternatives, AM and PM peak hours
- Existing year Synchro analysis was conducted using the existing signal timing data
- All future year Synchro analysis for both the No-Build and Build conditions included signal optimization.

2.5.1 Measures of Effectiveness (MOEs)

Analyses of the interchange ramp terminals and adjacent intersections were conducted using Synchro 9 software and results were reported utilizing the HCM 2000 output. Since HCM methodology does not report queues, 95th percentile queues were obtained from Synchro report.

FDOT Topic No. 000-525-006-c provides Level of Service (LOS) Targets for the State Highway System (SHS). The following LOS criteria are considered acceptable for the SIMR. The following LOS criteria were considered for the I-95 IMP analysis since the study area is considered to be an "Urbanized Areas over 500,000".

- SIS Facilities – LOS D
- Other State Roads – LOS D

It should be noted that the traffic operational objectives were to maintain or improve the No-Build operations; therefore, the Build Alternatives may not meet the Department's LOS D target in urbanized areas because of the design constraints.

In addition to the signalized intersection LOS criteria stated above, operational analysis criteria also included the following:

- Density (passenger cars/mile/lane) for HCS analysis
- Delay (seconds per vehicle)

- Maximum volume-to-capacity (v/c) ratio: Where possible, each intersection movement was designed to have a v/c ratio of 1.0 or less.
- Interchange off-ramp queue lengths: The 95th percentile queue was utilized to determine the required storage length for all interchange off-ramp queue lengths. Since HCM methodology does not report queues, 95th percentile queues were obtained from Synchro report. The 95th percentile queue was calculated utilizing Synchro queue results which are reported in feet by lane. In order to obtain the total queue length, Synchro reported queue length was multiplied by the number of turn lanes and the lane utilization factor.

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3 EXISTING CONDITIONS

3.1 Existing Road Characteristics

The general characteristics of the roadway facilities located within the project limits are described in the sections below. The data below is based on information gathered from the FDOT's Roadway Characteristics Inventory, Straight Line Diagrams (SLDs), Broward County MPO, Broward County Traffic and Engineering Division and field reviews. The existing roadway and intersection lane configurations are depicted in **Figure 3.1**. The Aerial views of the interchanges are presented in **Figures 3.2 through 3.4**.

3.1.1 SR 9/I-95 from north of Palmetto Park Road to south of Yamato Road (SR 794)

Facility Type: Freeway, Limited Access, SIS Facility
Functional Classification: Urban Principal Arterial - Interstate
Access Management Classification (FDOT): Class 1
Typical Section:

North of Sample Road to North of Hillsboro Boulevard Interchange:

Northbound and Southbound: 3 GP, 1 HOV / BW

South of Sample Road Interchange:

Northbound and Southbound: 1 AUX, 3 GP, 1 HOV / BW

Note: AUX-Auxiliary Lane/GP-General Purpose Lane/HOV-High Occupancy Vehicle Lane/BW-Barrier Wall Median

Posted Speed Limit: 65 mph

3.1.2 Sample Road, SW 10th Street, and Hillsboro Boulevard

Facility Type: Arterial
Functional Classification: Urban Principal Arterial - Other
Access Management Classification (FDOT): Class 5
Typical Section: EB & WB: 3 Lanes/ Raised Median
Posted Speed Limit: 45 mph

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Figure 3.1: 2016 Existing Roadway and Intersection Lane Configurations

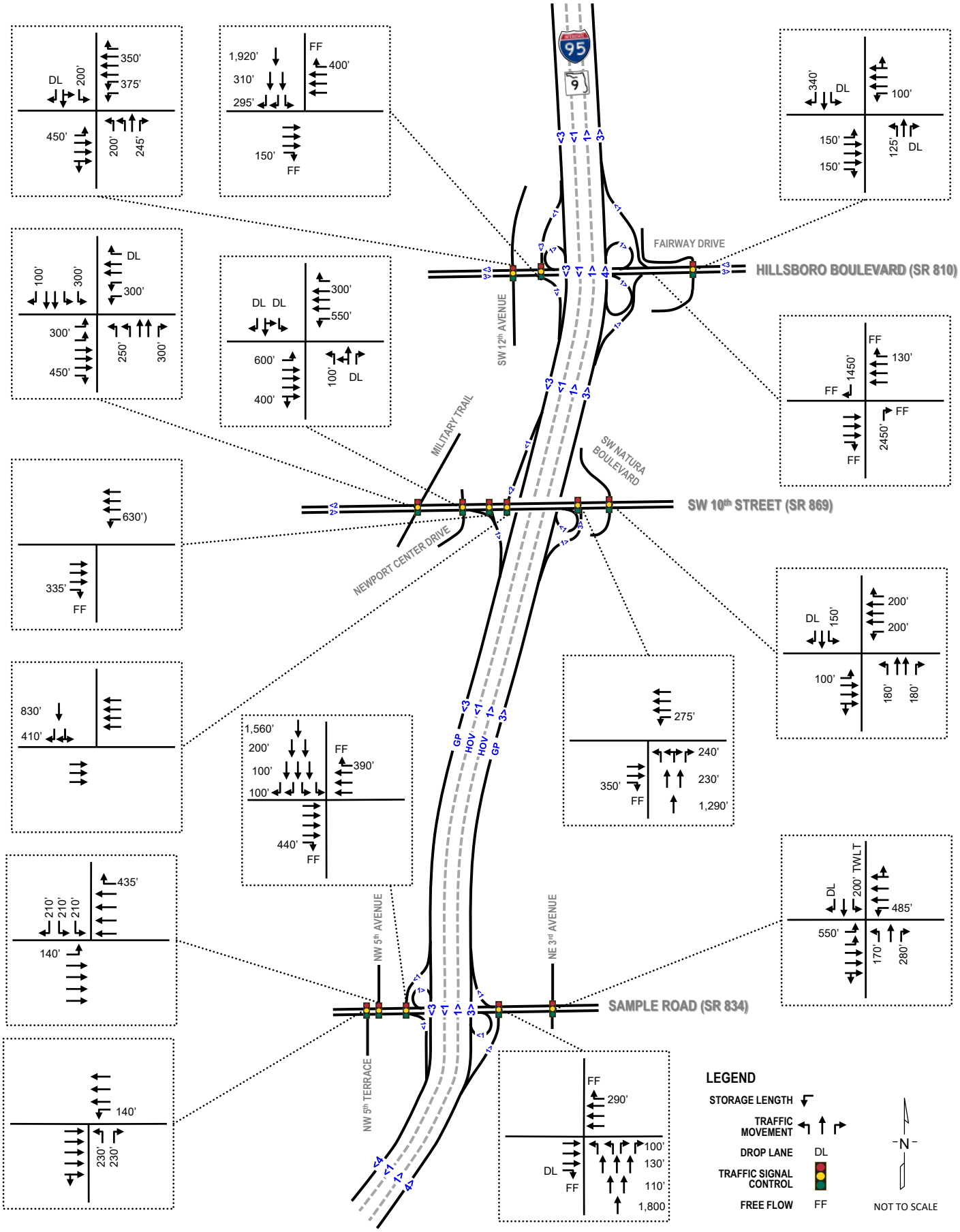


Figure 3.2: Aerial View - Hillsboro Boulevard (SR 810)

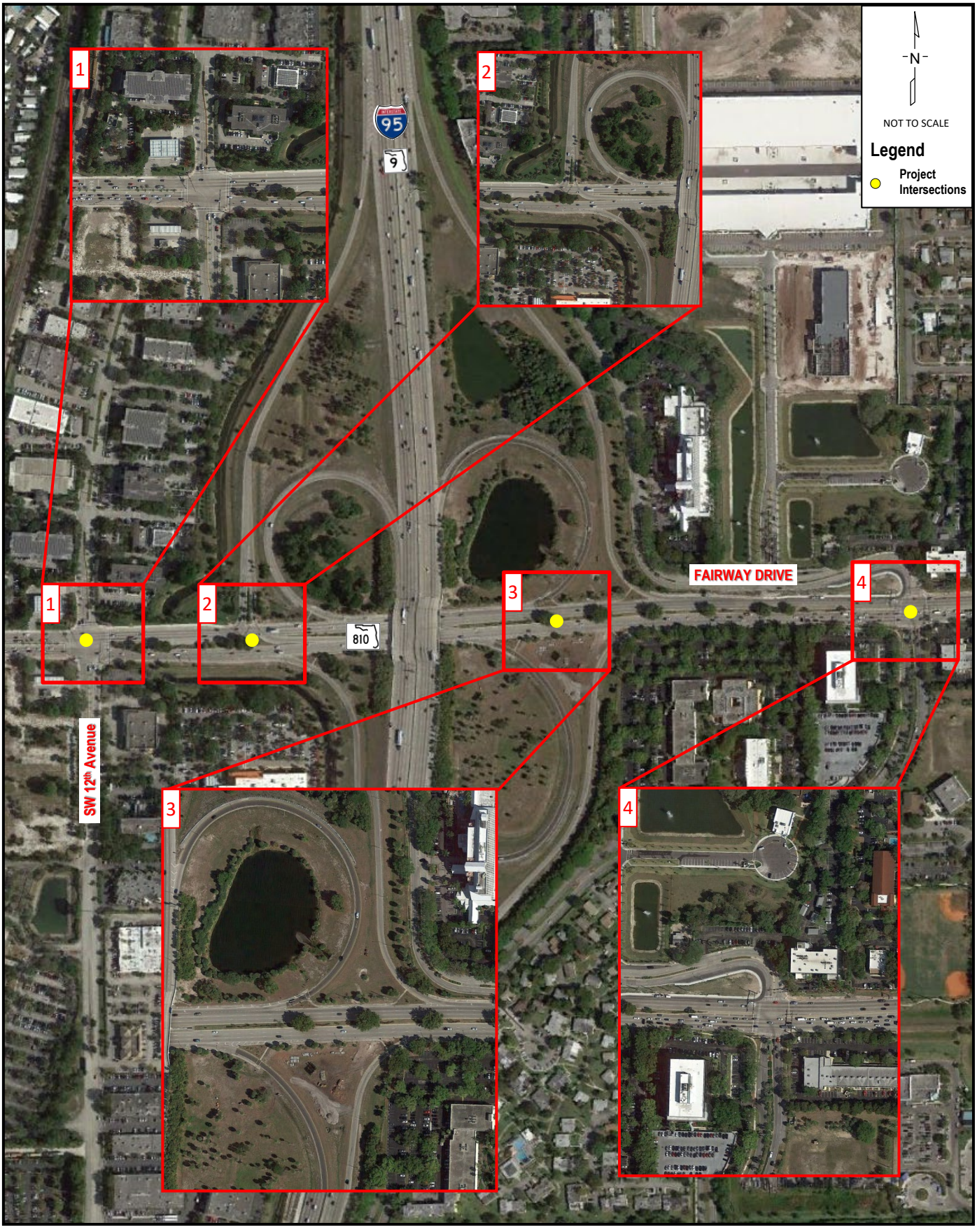


Figure 3.3: Aerial View - SW 10th Street (SR 869)

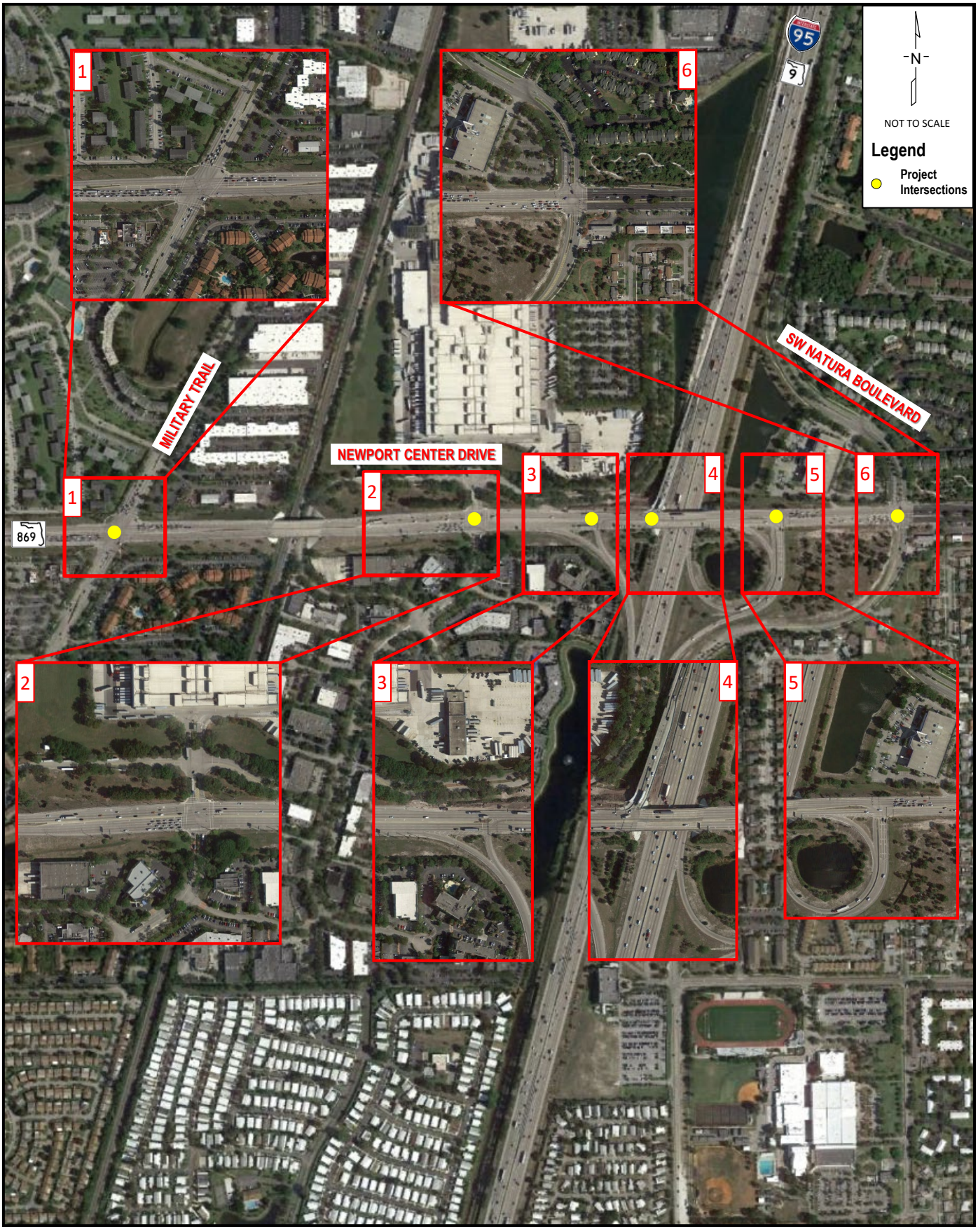


Figure 3.4: Aerial View – Sample Road (SR 834)

3.2 Existing Traffic Data

FDOT District 4 provided existing 2016 volumes that had been summarized in the *Traffic Data Collection & Traffic Projections for I-95 PD&E Study from SW 10th Street to Hillsboro Boulevard,* dated May 19, 2016. The data collection effort was completed March 8 through March 10, 2016.

As part of the SW 10th Street Connector PD&E Study (FPID 439891-1), a comparison of these volumes with volumes from previous studies revealed significant differences. In most cases, the District's March 2016 data showed lower volumes. In order to address the discrepancies and to supplement existing data, additional 4-hour turning movement counts were conducted at 16 locations and 2-day to 7-day directional machine counts were collected at 3 locations. These additional counts were collected by Florida's Turnpike Enterprise (FTE) between October 18 and October 25, 2016. The locations and summaries are documented in the *SW 10th Street PD&E Project Traffic Forecast Memorandum dated January 2019* prepared by FTE and included in Appendix F.

The additional counts verified that the March 2016 data presented lower volumes. Therefore, adjustments were made to develop balanced existing 2016 traffic volumes throughout the study area. I-95 ramp volumes were adjusted to volumes obtained as part of the Broward County Interchange Master Plan reports.

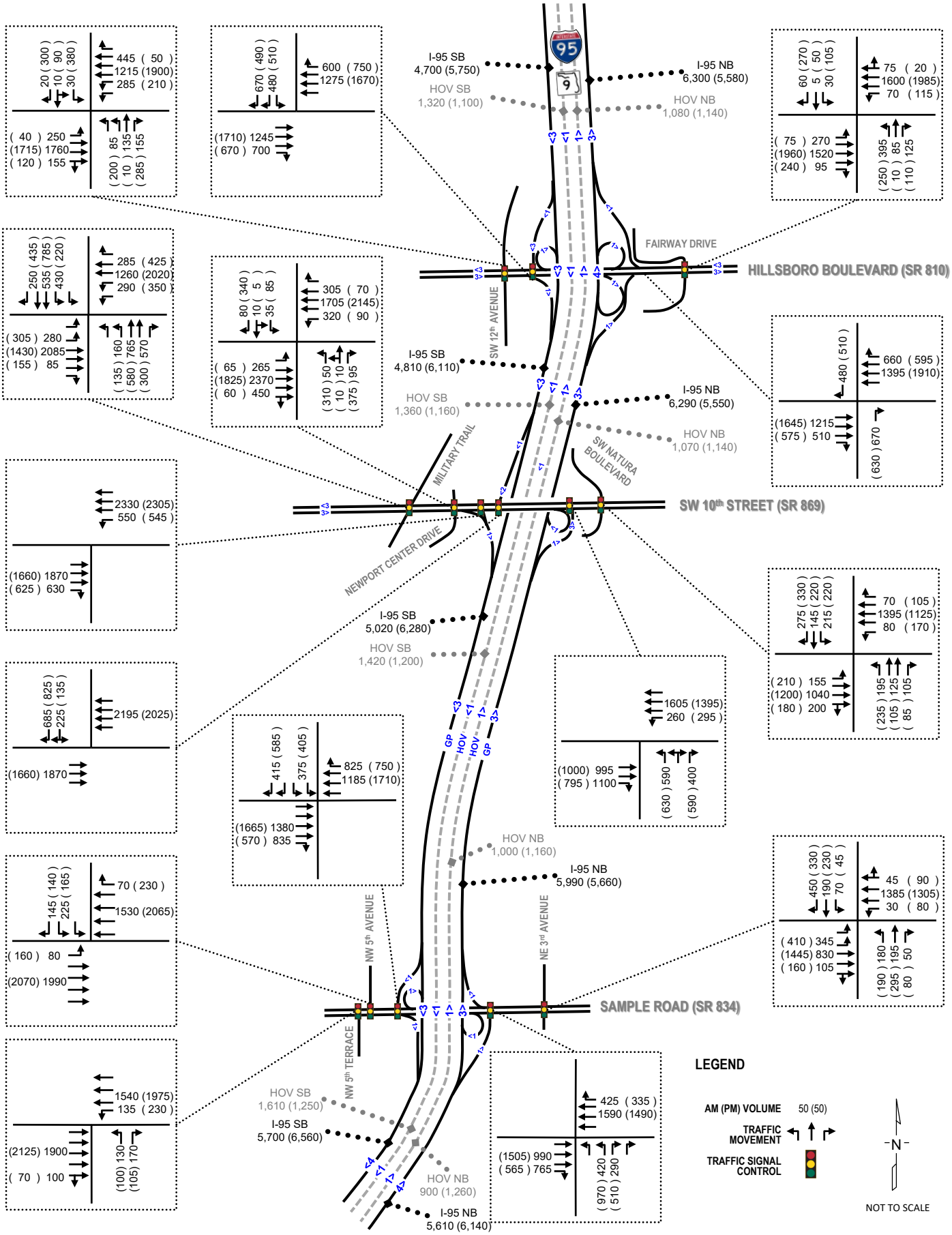
3.2.1 Existing Traffic Volumes

Figure 3.5 presents a summary of the balanced 2016 existing traffic volumes. The raw traffic counts and the existing signal timing is provided in **Appendix B**. These volumes are consistent with the ongoing SW 10th Street Connector PD&E Study.

3.3 Existing Traffic Operational Analysis

A traffic operational analysis was conducted to evaluate the existing conditions in the study area. Major analysis parameters include volume, design hour truck percentage, peak hour factor (PHF) and roadway geometry. The existing intersection PHFs were used for the intersection analysis. Design Hour Truck (DHT) values were calculated based on historical data from the FDOT count sites within the study area, mechanical classification counts and turning movement counts conducted as part of the I-95 PD&E Study data collection efforts. Peak hour values from mechanical counts were calculated as half the daily value in accordance with the FDOT Project Traffic Forecasting Handbook. The calculated DHT used for the I-95 mainline was 3.0%. The calculated DHT used was 2.0% for the ramps and for the interchange cross-streets.

Figure 3.5: 2016 Existing Volumes



3.3.1 Existing Traffic Freeway Operational Analysis – I-95

The measure of effectiveness used to estimate the LOS was density and volume to capacity ratio. The LOS for each freeway segment was determined using the corresponding HCS Freeways, Weaving or Ramps modules when applicable.

The HOV lane and corresponding volumes were excluded for the HCS analysis in order to be able to analyze the operating conditions of the general purpose lanes. The HOV lane demand was based on the data collection and analysis documented in the 2010 I-95 High-Occupancy Vehicle Lane Monitoring Report, dated May 2011. The report documents that the HOV northbound lane demand is approximately 16% of the total traffic for the AM and PM peak hours and the HOV southbound lane demand is approximately 16% and 18% for AM and PM peak hours, respectively. The percentile demand was applied to the provided existing volumes.

The mainline/basic, weaving, and ramp merge/diverge analysis results are summarized on **Figures 3.6** and **3.7** for Northbound and Southbound directions, respectively. Documentation of the existing traffic freeway operational analysis is provided in **Appendix C**. The results indicate that eight (8) of the sixteen (16) northbound freeway segments in the study area operate at LOS E or F during one or both of the peak hours and three (3) of the fifteen (15) southbound freeway segments in the study area operate at LOS E only during the PM peak hour.

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Figure 3.6: 2016 Existing Year Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,300 (5,580)	E (39.1)	D (30.4)
Merge from Hillsboro Boulevard WB	6,310 (5,580)	E (35.9)	D (30.8)
Basic Freeway	5,650 (4,985)	D (32.3)	C (25.7)
Weave - Entry Hillsboro Blvd EB to Exit Hillsboro Blvd WB	6,130 (5,495)	D (30.6)	C (27.1)
Basic Freeway	5,620 (4,920)	D (32.0)	C (25.3)
Diverge to Hillsboro Boulevard EB	6,290 (5,550)	E (37.6)	D (33.7)
Basic Freeway	6,290 (5,550)	E (39.0)	D (29.9)
Merge from SW 10th Street EB & WB	6,360 (5,530)	D (31.4)	C (25.8)
Basic Freeway	5,000 (4,440)	D (27.0)	C (22.3)
Diverge to SW 10th Street EB & WB	5,990 (5,660)	E (36.4)	E (35.7)
Basic Freeway	5,990 (5,660)	E (35.6)	D (32.4)
Merge from Sample Road WB	6,090 (5,560)	F (36.6)	D (30.4)
Basic Freeway	5,665 (5,225)	E (39.5)	D (29.1)
Merge from Sample Road EB	5,665 (5,225)	D (33.3)	C (27.5)
Basic Freeway	4,900 (4,660)	D (30.7)	C (24.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,610 (6,140)	C (27.4)	D (32.5)

GPL: General Purpose Lane

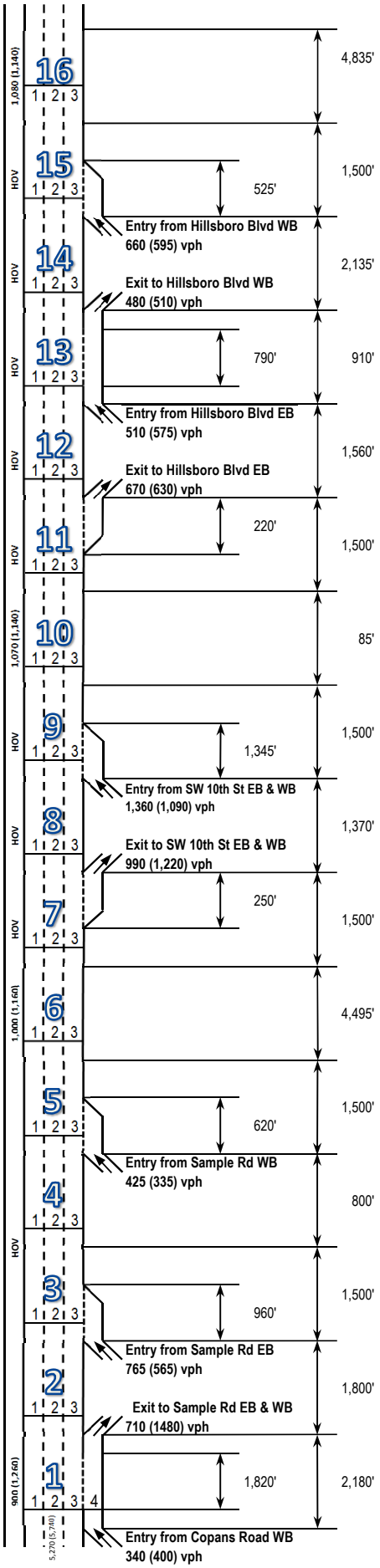
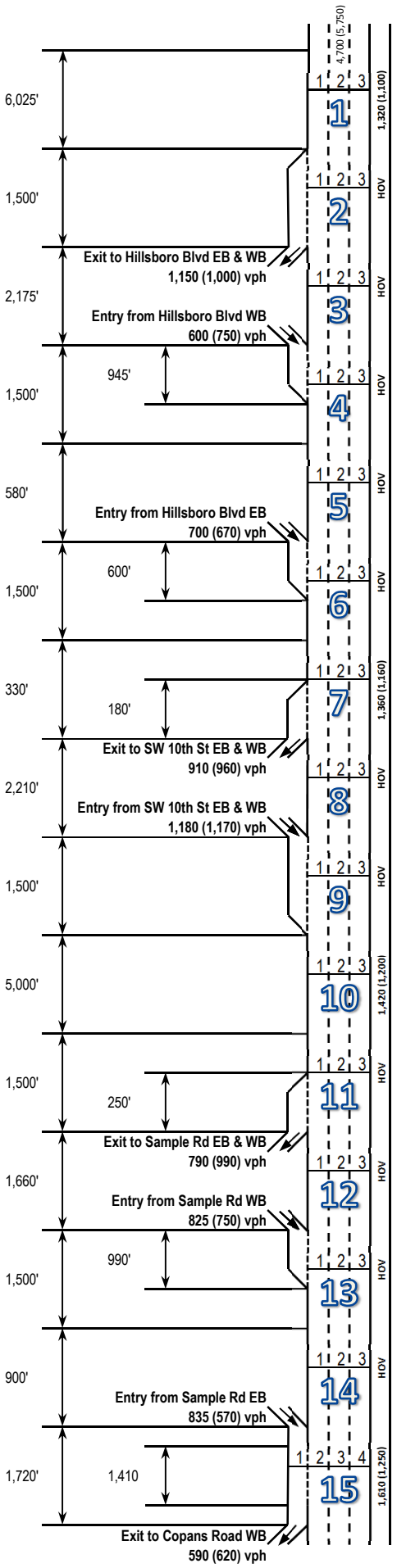


Figure 3.7: 2016 Existing Year Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,700 (5,750)	C (24.5)	D (32.6)
Diverge to Hillsboro Boulevard EB & WB	4,700 (5,750)	C (20.0)	C (24.0)
Basic Freeway	3,550 (4,750)	B (17.9)	C (24.8)
Merge from Hillsboro Boulevard WB	4,150 (5,500)	C (22.3)	D (29.5)
Basic Freeway	4,150 (5,500)	C (21.1)	D (30.4)
Merge from Hillsboro Boulevard EB	4,850 (6,170)	D (28.3)	D (34.0)
Diverge to SW 10th Street EB & WB	4,810 (6,110)	D (31.9)	E (37.4)
Basic Freeway	3,900 (5,150)	C (19.7)	D (27.7)
Merge from SW 10th Street EB & WB	5,080 (6,320)	C (24.9)	D (34.1)
Basic Freeway	5,020 (6,280)	D (27.1)	E (38.9)
Diverge to Sample Road EB & WB	5,020 (6,280)	D (31.8)	E (36.6)
Basic Freeway	4,230 (5,290)	C (21.6)	D (27.5)
Merge from Sample Road WB	5,055 (6,040)	C (27.7)	D (31.1)
Basic Freeway	5,055 (6,040)	D (27.0)	D (33.6)
Weave - Entry Sample Road EB to Exit Copans Road WB	5,700 (6,560)	D (30.0)	D (33.8)

GPL: General Purpose Lane

3.3.2 Existing Traffic Intersection Operational Analysis

Intersection analysis for ramp-terminals and adjacent intersections was performed using existing turning movement volumes, existing lane geometry, and signal timing observations and information obtained from Broward County. Analyses of the interchange ramp terminals and adjacent intersections were conducted using Synchro 9 software and results were reported utilizing the HCM 2000 output. The intersection analyses are presented in **Appendix D**.

Tables 3.1 through **3.3** provide a detailed summary of the results of the signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. The results include delays (in seconds per vehicle) and Level of Service (LOS) by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. The intersection analysis results indicate the following:

- Hillsboro Boulevard: One of the three signalized intersections operates at LOS E during the AM peak hour. The I-95 southbound off-ramp approach operates at LOS E during both peak hours.
- SW 10th Street: Two of the six signalized intersections operate at LOS F during one or both peak hours. The I-95 northbound and southbound off-ramp approaches operate at LOS F during both peak hours.
- Sample Road: All five signalized intersections operate at LOS D or better during both peak hours. The I-95 northbound and southbound off-ramp approaches operate at LOS D or better during both peak hours.

Table 3.4 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours. HCM methodology does not provide queue lengths, therefore, the 95th percentile queues were obtained from Synchro reports. The Synchro reported queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length. The results present the queue length in feet for each lane group movement. The available storage length was calculated from the stop bar at the ramp terminal intersection to the gore with I-95 mainline minus 615 feet for the required stopping distance for a design speed of 70 mph per FDOT's 2016 GreenBook (Table 3-22), and accounting for the changes in number of lanes. The analysis and field observations show that queues on the northbound and southbound off-ramps at SW 10th Street interchange exceed the available storage lengths and back up to the I-95 mainline through lanes during one or both peak hours. These queues exceeding the available storage are shown in red.

Table 3.1: 2016 Existing – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (128.2)	C (23.2)		F (80.8)	B (14.4)	A (7.6)	E (66.2)	F (81.7)	D (51.8)	E (74.4)	E (74.4)	D (53.8)	C (32.8)
			Approach	D (35.3)			C (22.5)			E (65.8)			E (67.7)			
		Volume to Capacity ratio	Movement	1.02	0.67		0.70	0.44	0.39	0.25	0.74	0.22	0.27	0.28	0.01	
		Queue Length 95th (ft)	Movement	#479	665		m198	305	m159	72	218	101	55	57	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.8)		B (14.3)					F (80.4)		E (59.4)	C (22.2)
			Approach	A (0.3)			B (14.3)						E (68.2)			
		Volume to Capacity ratio	Movement		0.26	0.47		0.41					0.95		0.84	
		Queue Length 95th (ft)	Movement		0	71		m262					#733		480	
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (144.2)	B (18.5)	B (13.3)	E (72.8)	C (21.1)		F (518.7)	E (70.9)	E (66.8)	E (69.7)	E (74.0)	E (73.8)	E (77.4)
			Approach	D (36.3)			C (23.2)			F (362.5)			E (72.5)			
		Volume to Capacity ratio	Movement	1.10	0.48	0.06	0.53	0.59		1.97	0.53	0.08	0.27	0.07	0.07	
		Queue Length 95th (ft)	Movement	m#505	455	m21	130	494		#784	152	68	60	20	4	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (71.1)	C (34.6)		F (89.3)	B (19.9)	A (1.7)	E (76.2)	E (66.8)	F (87.2)	F (84.2)	F (84.7)	E (63.1)	D (42.0)
			Approach	D (35.4)			C (26.2)			F (82.4)			E (76.1)			
		Volume to Capacity ratio	Movement	0.34	0.77		0.62	0.74	0.03	0.70	0.07	0.87	0.85	0.86	0.73	
		Queue Length 95th (ft)	Movement	86	772		173	838	m3	156	32	339	361	371	244	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.6)		B (18.8)					E (71.1)		D (44.3)	B (17.8)
			Approach	A (0.3)			B (18.8)						E (58.0)			
		Volume to Capacity ratio	Movement		0.36	0.45		0.57					0.92		0.56	
		Queue Length 95th (ft)	Movement		0	0		500					#738		312	
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	E (75.3)	C (22.7)	B (13.0)	F (81.2)	C (24.0)		E (74.6)	E (63.4)	E (63.6)	E (62.2)	E (72.0)	E (77.2)	C (32.4)
			Approach	C (23.4)			C (27.1)			E (71.0)			E (72.9)			
		Volume to Capacity ratio	Movement	0.54	0.70	0.23	0.71	0.70		0.85	0.05	0.07	0.46	0.41	0.59	
		Queue Length 95th (ft)	Movement	m126	667	m115	197	730		#333	31	61	145	97	155	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 3.2: 2016 Existing – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (94.3)	D (55.0)	C (27.4)	F (176.5)	D (52.5)	C (34.3)	F (81.3)	F (88.0)	F (235.0)	F (150.0)	E (57.3)	D (52.6)	F (84.8)
			Approach	E (58.6)			E (69.2)			F (143.3)			F (89.2)			
		Volume to Capacity ratio	Movement	0.83	0.94	0.06	1.13	0.86	0.30	0.58	0.95	1.33	1.09	0.58	0.32	
		Queue Length 95th (ft)	Movement	#248	952	23	#318	837	182	140	#625	#1012	#426	380	188	
	East Newport Center Drive	LOS (Delay)	Movement	E (70.1)	C (23.5)		F (172.5)	B (10.9)	B (14.3)	E (75.0)	E (74.9)	E (72.8)	E (75.2)	E (74.5)	E (72.6)	C (32.2)
			Approach	C (27.5)			C (33.5)			E (73.6)			E (73.4)			
		Volume to Capacity ratio	Movement	0.95	0.75		1.17	0.51	0.21	0.39	0.38	0.06	0.38	0.33	0.06	
		Queue Length 95th (ft)	Movement	#361	707		#618	328	41	73	72	9	58	58	0	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		D (35.1)	A (0.6)	E (65.9)	A (0.2)								B (19.1)
			Approach	C (26.4)			B (12.8)									
		Volume to Capacity ratio	Movement		0.71	0.42	0.88	0.48								
		Queue Length 95th (ft)	Movement		554	0	m470	m0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (4.1)			A (5.4)					F (156.9)		F (191.3)	D (35.7)
			Approach	A (4.1)			A (5.4)						F (173.8)			
		Volume to Capacity ratio	Movement		0.61			0.57					1.17		1.25	
		Queue Length 95th (ft)	Movement		5			m75					#795		#846	
	I-95 Northbound Ramps	LOS (Delay)	Movement		C (25.3)	A (2.5)	F (221.0)	C (24.8)		F (104.7)		F (143.2)				D (48.6)
			Approach	B (13.4)			D (52.2)			F (116.7)						
		Volume to Capacity ratio	Movement		0.54	0.75	1.30	0.70		1.03		1.10				
		Queue Length 95th (ft)	Movement		m348	m1066	m#547	m300		#551		#653				
	FAU Research Park Boulevard	LOS (Delay)	Movement	B (15.7)	B (17.7)		B (10.5)	B (18.1)	B (12.8)	F (160.8)	E (64.6)	E (62.6)	F (99.8)	E (75.7)	F (86.0)	D (38.4)
			Approach	B (17.5)			B (17.5)			F (108.3)			F (88.3)			
		Volume to Capacity ratio	Movement	0.56	0.41		0.30	0.49	0.05	1.11	0.32	0.07	0.92	0.70	0.78	
		Queue Length 95th (ft)	Movement	m143	m353		50	402	13	#350	98	58	#298	229	245	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (178.1)	D (44.3)	C (31.6)	E (67.1)	F (169.1)	D (53.6)	F (100.6)	E (68.2)	E (59.8)	F (81.2)	E (67.2)	E (67.6)	F (95.4)
			Approach	E (64.9)			F (138.7)			E (70.0)			E (69.4)			
		Volume to Capacity ratio	Movement	1.14	0.69	0.10	0.77	1.24	0.47	0.77	0.74	0.41	0.66	0.83	0.77	
		Queue Length 95th (ft)	Movement	#332	615	24	m267	m#1715	m407	#142	434	223	181	555	492	
	East Newport Center Drive	LOS (Delay)	Movement	E (62.9)	B (15.4)		F (94.2)	B (19.0)	A (4.7)	E (73.4)	E (73.7)	F (108.9)	E (70.7)	E (70.6)	F (195.3)	D (40.9)
			Approach	B (17.0)			C (21.5)			F (92.7)			F (169.1)			
		Volume to Capacity ratio	Movement	0.62	0.60		0.61	0.80	0.05	0.62	0.62	0.92	0.24	0.24	1.17	
		Queue Length 95th (ft)	Movement	m87	158		175	560	6	278	284	#443	102	102	#548	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		C (33.5)	A (0.6)	D (40.4)	A (0.2)								B (15.3)
			Approach	C (24.5)			A (7.9)									
		Volume to Capacity ratio	Movement		0.78	0.42	0.67	0.48								
		Queue Length 95th (ft)	Movement		301	m51	m416	m0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.0)			A (8.9)					F (183.6)		F (209.5)	D (46.2)
			Approach	A (5.0)			A (8.9)						F (196.3)			
		Volume to Capacity ratio	Movement		0.55			0.53					1.22		1.28	
		Queue Length 95th (ft)	Movement		23			m86					#958		#1001	
	I-95 Northbound Ramps	LOS (Delay)	Movement		D (40.6)	A (1.1)	E (70.4)	C (30.1)		F (272.2)		F (326.4)				F (97.2)
			Approach	C (23.1)			D (37.2)			F (289.3)						
		Volume to Capacity ratio	Movement		0.63	0.53	0.75	0.57		1.42		1.52				
		Queue Length 95th (ft)	Movement		m508	m467	472	479		#863		#984				
	FAU Research Park Boulevard	LOS (Delay)	Movement	B (14.2)	B (19.4)		B (18.7)	B (19.4)	B (15.3)	F (317.2)	E (60.1)	E (58.7)	E (73.4)	F (87.7)	F (86.0)	D (49.2)
			Approach	B (18.7)			B (19.0)			F (202.0)			F (82.9)			
		Volume to Capacity ratio	Movement	0.62	0.49		0.66	0.41	0.07	1.51	0.21	0.06	0.81	0.85	0.83	
		Queue Length 95th (ft)	Movement	119	387		117	301	31	#454	85	38	301	#338	#338	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 3.3: 2016 Existing – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (15.0)		E (74.2)	A (1.6)		E (79.8)		E (64.4)				B (16.1)
			Approach		B (15.0)			A (7.5)			E (71.1)					
		Volume to Capacity ratio	Movement		0.45		0.66	0.41		0.73		0.12				
		Queue Length 95th (ft)	Movement		329		191	33		213		74				
	NW 5th Avenue	LOS (Delay)	Movement	E (59.1)	A (1.7)			B (18.6)	C (32.8)				E (71.4)		E (64.3)	B (15.9)
			Approach		A (4.0)			B (19.2)						E (68.6)		
		Volume to Capacity ratio	Movement	0.56	0.42			0.39	0.05				0.65		0.10	
		Queue Length 95th (ft)	Movement	155	46			362	43				169		68	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (9.4)	A (1.3)		A (9.6)					C (26.2)		C (29.1)	B (11.3)
			Approach		A (6.3)			A (9.6)						C (27.7)		
		Volume to Capacity ratio	Movement		0.37	0.56		0.40					0.48		0.65	
		Queue Length 95th (ft)	Movement		198	366		225					118		151	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (8.7)			A (6.1)	A (0.3)	C (29.4)		C (28.2)				B (10.5)
			Approach		A (8.7)			A (4.9)			C (28.9)					
		Volume to Capacity ratio	Movement		0.32			0.51	0.28	0.60		0.51				
		Queue Length 95th (ft)	Movement		191			100	m0	137		109				
	NE 3rd Avenue	LOS (Delay)	Movement	E (61.9)	B (19.7)		E (74.4)	D (36.9)		D (48.3)	E (56.3)	D (49.7)	D (51.6)	E (68.5)	F (95.8)	D (45.6)
			Approach		C (31.0)			D (37.7)			D (52.2)			F (84.1)		
		Volume to Capacity ratio	Movement	0.75	0.37		0.36	0.68		0.66	0.53	0.03	0.28	0.69	0.90	
		Queue Length 95th (ft)	Movement	256	308		70	621		211	268	0	91	277	#365	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (17.2)		F (80.8)	A (0.8)		F (80.0)		E (67.2)				B (15.9)
			Approach		B (17.2)			A (9.1)			E (73.4)					
		Volume to Capacity ratio	Movement		0.50		0.81	0.49		0.68		0.07				
		Queue Length 95th (ft)	Movement		369		#369	26		171		60				
	NW 5th Avenue	LOS (Delay)	Movement	E (67.7)	A (1.4)			B (10.6)	C (20.4)				E (71.9)		E (67.4)	B (12.8)
			Approach		A (6.1)			B (11.6)						E (69.8)		
		Volume to Capacity ratio	Movement	0.80	0.41			0.51	0.15				0.58		0.09	
		Queue Length 95th (ft)	Movement	#296	34			264	m50				127		69	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (18.8)	A (0.6)		B (15.3)					C (24.7)		C (33.9)	B (17.8)
			Approach		B (14.2)			B (15.3)						C (30.1)		
		Volume to Capacity ratio	Movement		0.46	0.38		0.59					0.46		0.81	
		Queue Length 95th (ft)	Movement		404	34		m306					129		#228	
	I-95 Northbound Ramps	LOS (Delay)	Movement		C (22.6)			B (13.1)	A (0.2)	D (50.8)		C (25.3)				C (24.1)
			Approach		C (22.6)			B (10.7)			D (42.0)					
		Volume to Capacity ratio	Movement		0.57			0.56	0.22	0.98		0.64				
		Queue Length 95th (ft)	Movement		467			171	0	#392		189				
	NE 3rd Avenue	LOS (Delay)	Movement	E (66.1)	D (39.7)		E (73.3)	D (38.7)		D (52.0)	E (60.0)	D (47.1)	D (52.5)	E (75.0)	E (59.5)	D (47.5)
			Approach		D (45.1)			D (40.6)			E (55.5)			E (64.9)		
		Volume to Capacity ratio	Movement	0.79	0.67		0.56	0.68		0.72	0.70	0.05	0.25	0.78	0.37	
		Queue Length 95th (ft)	Movement	291	629		143	582		219	396	0	63	331	150	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 3.4: 2016 Existing – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Available Storage (ft)	Queue (ft)	
				AM	PM
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	1,255	#733	#738
		R (WB)	1,550	845	549
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	310	#795	#958
		R (WB)	720	#846	#1001
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	925	#802	#1,256
		R (EB)	925	#862	#1,299
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	1,010	229	250
		R (WB)	1,010	266	#401
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	1,095	266	#760
		R (EB)	1,095	192	333

Queue Notes:

Queue lengths exceeding the available storage are shown in Red.

Synchro queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length.

#: 95th percentile volume exceeds capacity

Example of Storage Length Calculation for SBRT at Hillsboro Blvd. = [{(1920-615)/2} + 310+ (295*2)] = 1,552.5 feet rounded to 1,550 feet.

3.4 Existing Crash Data

Crash data was collected from the FDOT Crash Analysis Reporting System (CARS) for the three most recent years (from January 2013 to December 2015). Crash data along I-95 was collected between MP 21.000 and MP 25.317 including ramp segments and terminals. It was further segregated by interchange: Sample Road (SR 834) from MP 21.000 – MP 22.623; SW 10th Street (SR 869) from MP 22.623 – MP 24.150; and Hillsboro Boulevard (SR 810) from MP 24.150 – MP 25.317. Crash data for Sample Road (between NW 5th Terrace and NE 3rd Avenue), SW 10th Street (between Military Trail and SW Natura Boulevard), and Hillsboro Boulevard (between SW 12th Avenue and SW Natura Boulevard) was also obtained from the FDOT CARS. Historical Crash Maps and statistical summaries are included in **Appendix E**. **Table 3.5** presents the aggregated summary for I-95.

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Table 3.5: Crash Data Summary – 2013-2015

Crash Type	Hillsboro Blvd Interchange			SW 10th Street Interchange			Sample Road Interchange		
	Crashes	Annual Avg	Percent	Crashes	Annual Avg	Percent	Crashes	Annual Avg	Percent
Rear End	393	131	63.2%	269	90	53.6%	308	103	53.8%
Head On	2	1	0.3%	2	1	0.4%	6	2	1.0%
Angle/Left/Right Turns	17	6	2.7%	23	8	4.6%	21	7	3.7%
Sideswipe	71	24	11.4%	79	26	15.7%	94	31	16.4%
Peds & Bicycle	1	0	0.2%	2	1	0.4%	0	0	0.0%
Fixed Object	69	23	11.1%	74	25	14.7%	64	21	11.2%
Others	69	23	11.1%	53	18	10.6%	79	26	13.8%
Total Crashes	622	207	100.0%	502	167	100.0%	572	191	100.0%
PDO Crashes	386	129	62.1%	317	106	63.1%	366	122	64.0%
Injury Crashes	234	78	37.6%	184	61	36.7%	205	68	35.8%
Fatal Crashes	2	1	0.3%	1	0	0.2%	1	0	0.2%
Daylight	445	148	71.5%	324	108	64.5%	396	132	69.2%
Dark	152	51	24.4%	153	51	30.5%	148	49	25.9%
Dawn/Dusk	25	8	4.0%	24	8	4.8%	28	9	4.9%
Unknown	0	0	0.0%	1	0	0.2%	0	0	0.0%
Dry	457	152	73.5%	365	122	72.7%	426	142	74.5%
Wet	165	55	26.5%	136	45	27.1%	146	49	25.5%
Others	0	0	0.0%	1	0	0.2%	0	0	0.0%
Contributing Causes	Hillsboro Blvd Interchange			SW 10th Street Interchange			Sample Road Interchange		
	Crashes	Annual Avg	Percent	Crashes	Annual Avg	Percent	Crashes	Annual Avg	Percent
No Contributing Action	64	21	10.3%	69	23	13.7%	90	30	15.7%
Careless Driving	319	106	51.3%	226	75	45.0%	249	83	43.5%
Failed to Yield ROW	5	2	0.8%	4	1	0.8%	5	2	0.9%
Improper Turn	1	0	0.2%	1	0	0.2%	0	0	0.0%
Drove Too Fast for Conditions	32	11	5.1%	16	5	3.2%	18	6	3.1%
Others	201	67	32.3%	186	62	37.1%	210	70	36.7%

Of the 1,696 reported crashes from 2013 through 2015, 970 (57%) were rear end crashes followed by 244 (14%) side-swipe crashes and 207 (12%) crashes involving fixed objects. Based on crash severity, of the 1,696 reported crashes, 1,069 (63%) were property damage only crashes, 623 (37%) were injury type crashes, and 4 (0%) were fatal crashes. There were a total of 530 (31%) night/dusk/dawn crashes reported, which is lower than the statewide average for all roadways of 34 percent; and 447 (26%) of the total crashes occurred under wet/slippery pavement conditions, which is higher than the statewide average for all roadways of 13 percent. Among the contributing causes documented in the crash data, Careless Driving (794 - 49%) and All Other (597 – 35%) were among the highest. There were 3 crashes involving pedestrians and bicycles. These types of crashes are atypical since pedestrians and bicycles are not allowed in access controlled facilities. It is important to note that the percentages for the major crash types and the contributing factors are almost similar across the three interchanges.

A High Crash Location List review was also conducted. The high crash location lists were obtained from FDOT District 4 Traffic Operations. The data was extracted from CARS, which uses crash coefficient levels over 99.95 % and crash rates over 1.00 to establish and rank high crash locations. The high crash locations within the 3-year analysis period for I-95 and Arterials based on the lists provided by FDOT are depicted on **Figure 3.8**. These locations are listed below and the years are identified within the parentheses.

High Crash Spots along I-95 from Sample Road to Hillsboro Boulevard (2013-2015)

- MP 21.280 – NB I-95 Off-Ramp to EB & WB Sample Road (2014)
- MP 21.330 - SB I-95 On-Ramp from EB Sample Road (2013, 2014)
- MP 21.522 – NB I-95 On-Ramp from EB Sample Road (2014)
- MP 21.910 – NB I-95 On-Ramp from WB Sample Road (2014, 2015)
- MP 24.400 – SB I-95 On-Ramp from EB Hillsboro Boulevard (2013, 2014, 2015)
- MP 24.711 – SB I-95 On-Ramp from WB Hillsboro Boulevard (2013, 2014, 2015)
- MP 24.732 – NB I-95 Off-Ramp to WB Hillsboro Boulevard (2013, 2015)

High Crash Spots along SW 10th Street from Military Trail to Natura Boulevard (2013-2015)

- MP 1.427 – at Military Trail (2013, 2014, 2015)
- MP 1.955 – at WB exit to SB I-95 (2013)
- MP 2.01 – at Natura Boulevard (2013, 2015)

High Crash Spots along Sample Road from NW 5th Terrace to NE 3rd Avenue (2013-2015)

- MP 7.410 – at NW 5th Terrace (2013, 2014, 2015)
- MP 7.443 – at the Driveway between NW 5th Terrace and NW 5th Avenue (2013, 2014)
- MP 7.459 – at NW 5th Avenue (2013, 2014)
- MP 7.659 – at SB I-95 Off-Ramp terminal (2015)
- MP 7.911 – east of NB I-95 Off-Ramp terminal (2015)
- MP 8.135 – at NE 3rd Avenue (2013, 2014)

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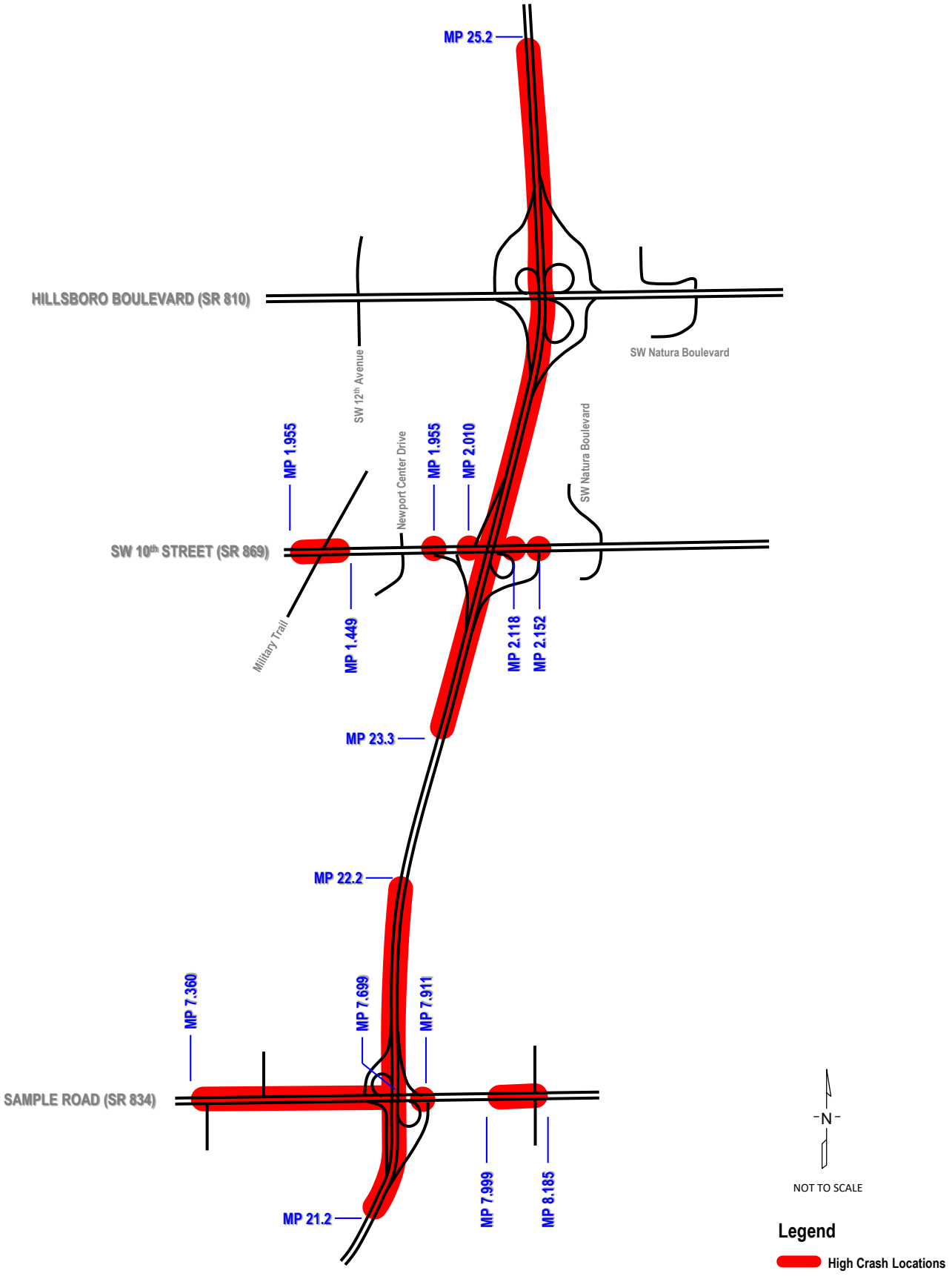
Figure 3.8: FDOT CARS High Crash Locations 2013 – 2015



Safety can be assessed by tracking either the raw frequency of crashes or by calculating crash rates, which are normalized by exposure. Using both crash frequencies and crash rates in analysis provides a more comprehensive assessment of a roadway. Crash frequencies are able to convey the magnitude of the crash problem. While the crash rates are better for identifying crash risk, average crash rates can be calculated for a large subset of roadways (i.e. all 4-lane divided urban arterials within the State or District), The average crash rate is used to calculate the critical crash rate, which establishes a threshold for comparison.

The safety ratio is based on the crash rate (based on total number of crashes). A safety ratio equal to or greater than one is considered high crash locations. The level of statistical significance indicates the confidence level at which the study intersection can be considered as a High Crash Location when compared to similar locations. The level of statistical significance is calculated using the formula below. The threshold value for an abnormally high crash location in an urban area is 99.95%.

$$Level\ of\ Statistical\ Significance = \frac{ACR - A + \frac{1}{2M}}{\sqrt{\frac{A}{M}}}$$

Where:

ACR = Actual crash rate for the study location (crashes per million entering vehicles)

A = Districtwide average crash rate for highway category being tested (crashes per million entering vehicles)

M = Average vehicle exposure (million entering vehicles) = [(ADT * 365 * L) / 1,000,000]

L = Length of the Segment for Segment Analysis, 1 for Spot Analysis

Table 3.6 provides a comparison of the crash rates at the I-95 interchanges and along the cross-streets within the Area of Influence. It can be observed that all three interchanges within the Area of Influence have a crash ratio of more than 1.0 indicating higher than average crash rate for similar facilities. The crash ratio for the cross-streets (Hillsboro Boulevard, SW 10th Street and Sample Road) is below 1.0 indicating lower than average crash rate for similar facilities. The proposed interchange improvements are expected to significantly improve the safety and operations at the interchanges.

Section 5.7 of this report documents the safety analyses that were conducted using the Highway Safety Manual (HSM) methodology and the traditional Crash Reduction Analysis to determine the benefits of the proposed improvements under the Build alternatives.

Table 3.6: Crash Rate Comparison – 2013-2015

Crast Rate	I-95 & Hillsboro Blvd Interchange			I-95 & SW 10th Street Interchange			I-95 & Sample Road Interchange		
	2013	2014	2015	2013	2014	2015	2013	2014	2015
Number of Crashes	190	188	244	148	187	167	178	183	211
Average Daily Traffic (ADT)	200,000	200,000	200,000	202,024	204,186	209,176	196,757	198,248	204,150
Actual Crash Rate (ACR)	2.230	2.207	2.864	1.314	1.643	1.432	1.527	1.558	1.745
District 4 Average Crash Rate (A)	0.934	0.942	0.934	0.934	0.942	0.934	0.934	0.942	0.934
Average Vehicle Exposure (M)	85.191	85.191	85.191	112.599	113.804	116.585	116.558	117.441	120.937
Critical Crash Rate (CCR)	1.272	1.282	1.273	1.229	1.236	1.225	1.224	1.232	1.219
Safety Ratio	1.753	1.722	2.250	1.070	1.329	1.170	1.248	1.265	1.431
Statistical Significance	12.440	12.091	18.483	4.229	7.762	5.612	6.678	6.935	9.267
Confidence Level	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
Statewide Averge Crash Rate	0.887	0.908	0.992	0.887	0.908	0.992	0.887	0.908	0.992

Crast Rate	Hillsboro Blvd from SW 12th Ave to SW Natura Blvd			SW 10th Street from Military Trail to SW Natura Blvd			Sample Road from NW 5th Terr to NE 3rd Ave		
	2013	2014	2015	2013	2014	2015	2013	2014	2015
Number of Crashes	25	39	38	57	72	88	71	92	88
Average Daily Traffic (ADT)	52,520	48,228	47,944	46,125	50,280	49,701	51,778	56,287	55,727
Actual Crash Rate (ACR)	1.876	3.188	3.124	4.369	5.062	6.259	4.554	5.428	5.244
District 4 Average Crash Rate (A)	3.751	4.195	4.827	3.751	4.195	4.827	3.751	4.195	4.827
Average Vehicle Exposure (M)	13.323	12.234	12.162	13.048	14.223	14.059	15.592	16.949	16.781
Critical Crash Rate (CCR)	5.460	6.082	6.859	5.478	5.947	6.720	5.334	5.803	6.562
Safety Ratio	0.344	0.524	0.456	0.798	0.851	0.931	0.854	0.935	0.799
Statistical Significance	-3.463	-1.651	-2.637	1.223	1.661	2.505	1.701	2.537	0.833
Confidence Level	50.00%	50.00%	50.00%	85.00%	95.00%	99.00%	95.00%	99.00%	75.00%
Statewide Averge Crash Rate	4.089	4.538	4.869	4.089	4.538	4.869	4.089	4.538	4.869

ADT – Average Daily Traffic

ACR – Actual Crash Rate = No. of crashes in a year / Average Vehicle Exposure (M)

M – Average Vehicle Exposure (million vehicles or million vehicles miles) = [(ADT * 365 * L) / 1,000,000]

L = Length of the Segment for Segment Analysis, 1 for Spot Analysis

A – Average Crash Rate

CCR – Critical Crash Rate = A + K * (SQRT[A/M]) - (1/[2 * M])

(Ref: FDOT Highway Safety Improvement Program Guidelines)

K = 3.291 for Urban, 1.960 for Suburban, 1.645 for Rural

Safety Ratio = ACR/CCR

Level of statistical significance = (ACR - A + (1/2M))/SQRT(A/M)

Confidence Level = Percent probability that the crash rate is abnormally high for the location under study, using the district-wide average as a bas

CL Threshold = 99.95%

4 FUTURE NO-BUILD CONDITIONS

4.1 Future Land Use

As previously stated, the three interchanges are located within the City of Deerfield Beach and the City of Pompano Beach. **Figure 4.1** presents the City of Deerfield Beach Future Land Use Map. The City of Pompano Beach Future Land Use Map is presented in **Figure 4.2**. The zoning maps show the following zone classifications for each interchange:

4.1.1 Hillsboro Boulevard Interchange

The City of Deerfield Beach Future Land Use Map shows the northwest quadrant of the Hillsboro Boulevard Interchange as Industrial and Commercial while the northeast quadrant is shown as Industrial, Commercial, Recreation Open Space and Employment Center. The southeast quadrant shows as Commercial, Residential Moderate (10 DU/AC) and Recreation Open Space. The southwest quadrant shows as Commercial, Industrial and the York Residential Transit Oriented Development.

4.1.2 SW 10th Street Interchange

The City of Deerfield Beach Future Land Use Map shows the area west of the SW 10th Street interchange as Industrial. The northeast quadrant of the interchange is shown as Residential Moderate (10 DU/AC), Commercial and Conservation. The southeast quadrant shows as Community Facility, Recreation Open Space, Residential Low (5 DU/AC), Residential Moderate (10 DU/AC), and Residential Medium (15 DU/AC).

4.1.3 Sample Road Interchange

The City of Deerfield Beach Future Land Use Map shows the northwest quadrant of the interchange as Low Density Residential Low (5 DU/AC) and the northeast quadrant as Community Facility, Office Park and Commercial. The City of Pompano Boulevard Future Land Use Map shows the Southeast quadrant as Commercial, Community Facilities and Residential – Low (1-5 DU/AC), Low-Medium (5-10 DU/AC) and Medium (10-16 DU/AC). The Southeast quadrant shows as Commercial and Residential – Medium (10-16 DU/AC) and Medium High (16-25 DU/AC).

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Figure 4.1: Zoning Map – City of Deerfield Beach Future Land Use Map

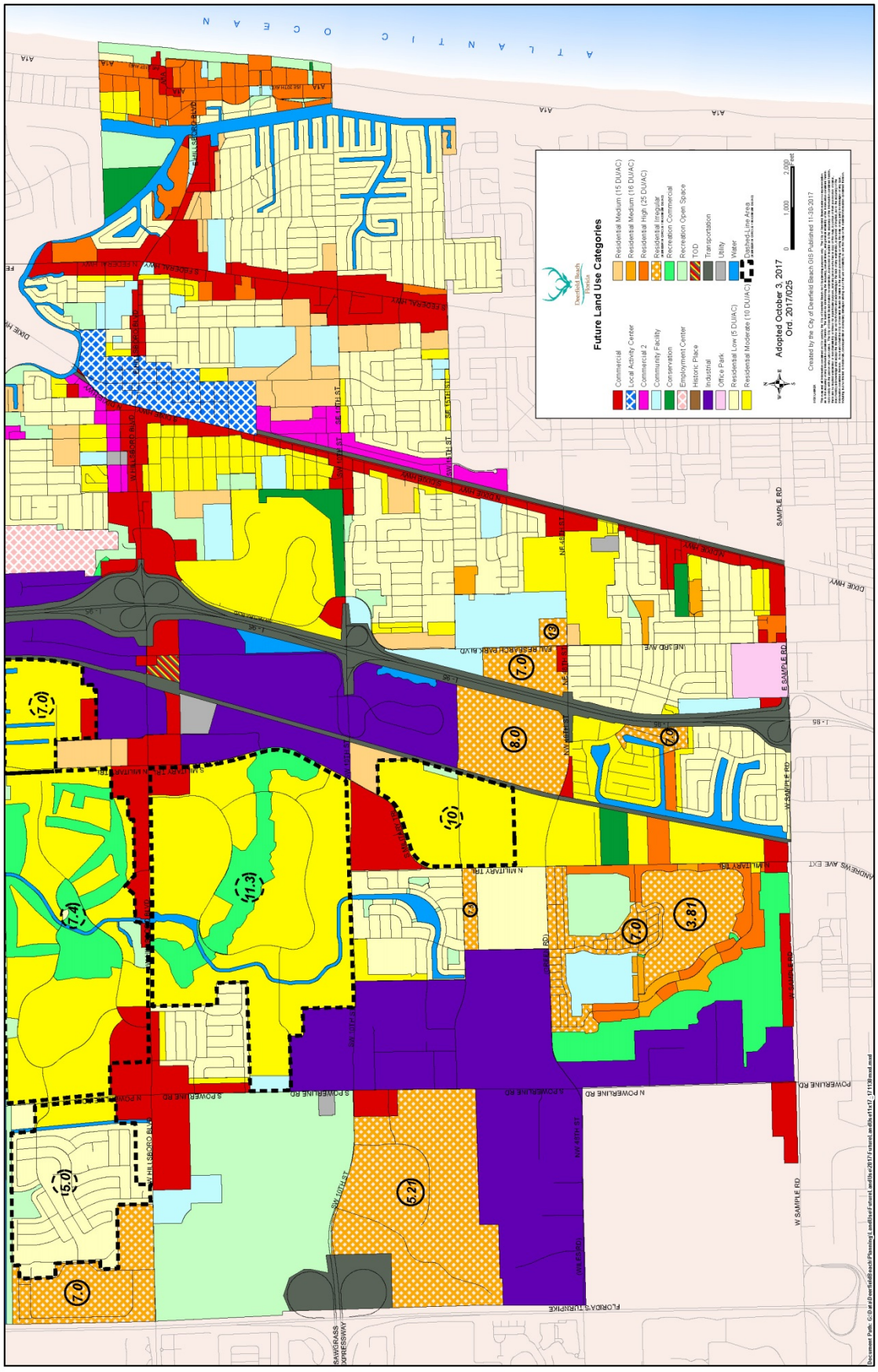
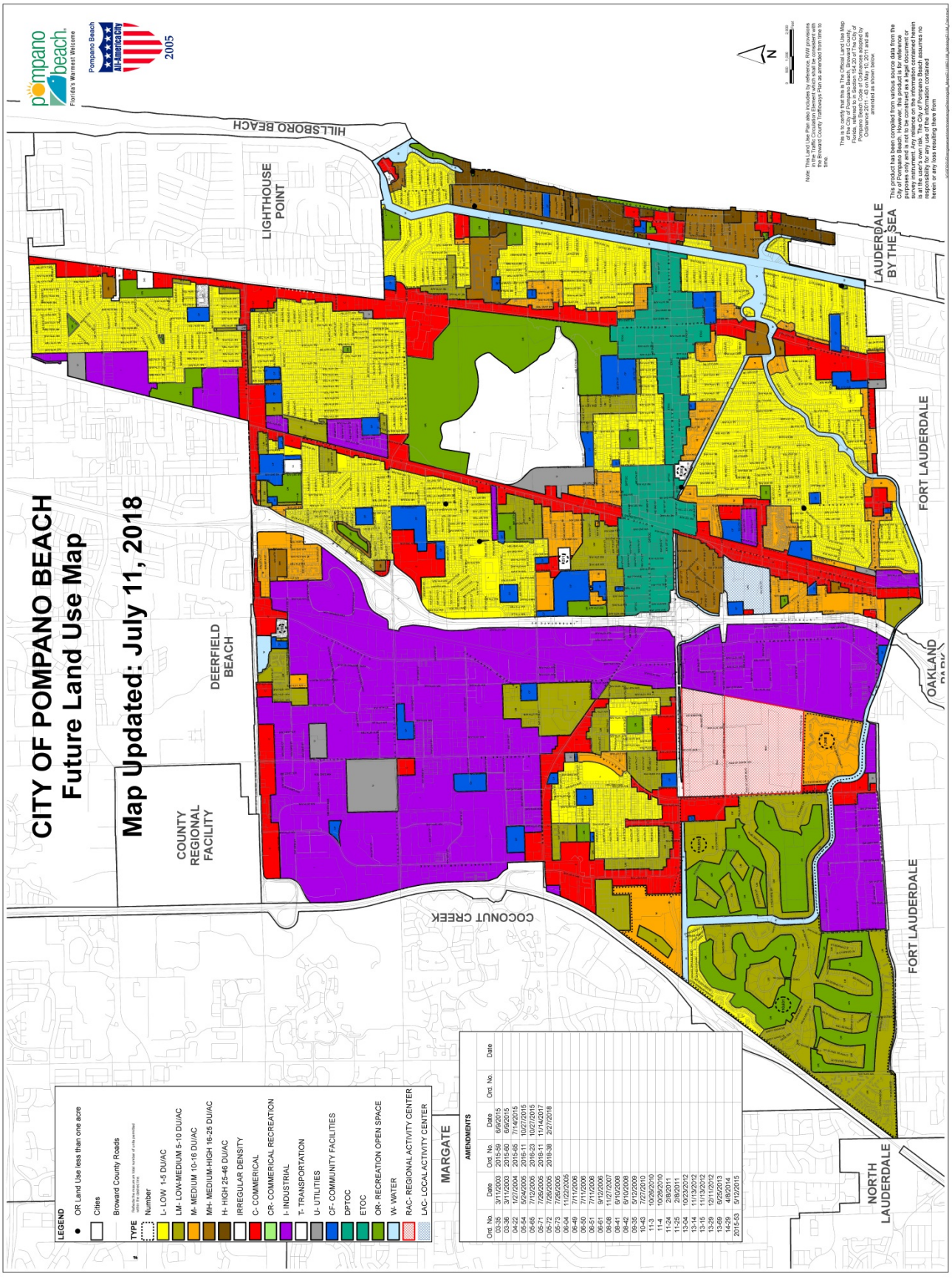


Figure 4.2: Zoning Map – City of Pompano Beach Future Land Use Map



4.2 Land Use Change

No significant future land use changes were identified in the project area. For traffic projection purposes, the base SERPM Version 6.5 model utilizes MPO developed 2005 base year and 2035 LRTP horizon year data; therefore, TAZ data for the 2010 and 2040 analysis years were interpolated/extrapolated from the available 2005 and 2035 data. The interpolated 2010 and extrapolated 2040 TAZ data developed for the I-95 PD&E Study (Stirling Road to Linton Boulevard) was used for this project. The 2040 TAZ data was developed by extrapolation of the MPO-approved 2035 TAZ data, via benchmarking the County Control totals to Bureau of Economic and Business Research (BEBR) projections, consistent with previous revisions of the I-95 Corridor Planning Study (CPS) Model.

4.3 No-Build Alternative – Transportation Network

The future year No-Build Alternative network includes the existing (2015/2016) roadway conditions plus all funded and committed projects within the study corridor as described in Section 1.3-Planned and Programmed Transportation Projects of this SIMR. **Figure 4.3** presents the Future No-Build Alternative Lane Configuration.

4.4 Future Traffic Forecast

As mentioned previously, traffic forecasting was a coordinated effort between FDOT District 4 and the Turnpike. In order to maintain consistency with the on-going SW 10th Street Connector PD&E Study, traffic projections for both the No-Build and Build conditions were obtained from the recently published *SW 10th Street Connector PD&E Study Project Traffic Forecast Memorandum (PTFM)* dated January 2019 (FPID 439891-1). Section 4 of the PTFM provides a detailed description of the modeling methodology and the development of the Directional Design Hour volumes (DDHVs). The complete document is included in **Appendix F**. **Figure 4.4** depicts the Opening Year 2020 and Design Year 2040 No-Build AADTs. **Figures 4.5** and **4.6** present the No-Build Peak Hour Volumes for Opening Year 2020 and Design Year 2040, respectively.

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Figure 4.3: No-Build Roadway and Intersection Lane Configurations

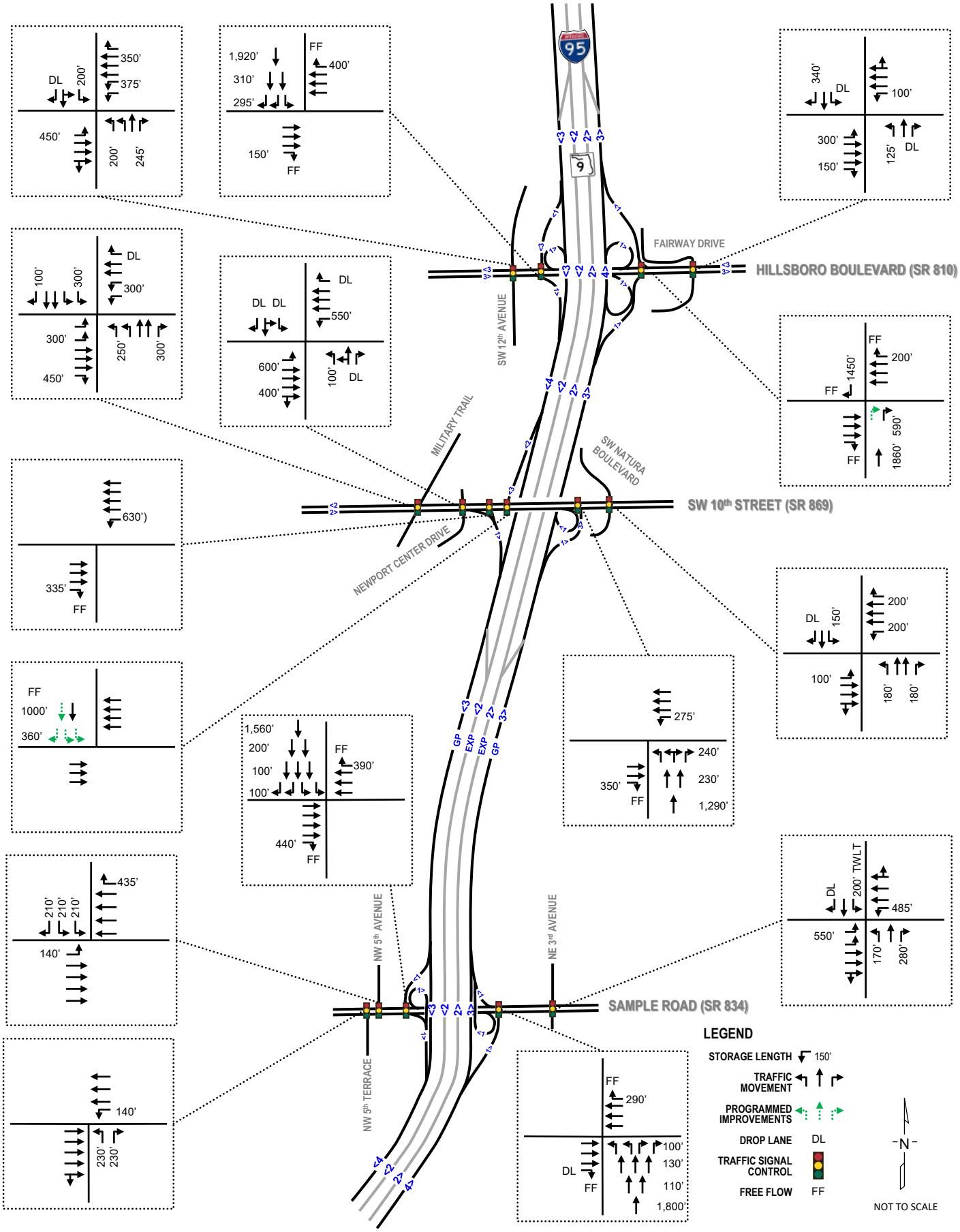


Figure 4.4: 2020 & 2040 No-Build AADT Volumes

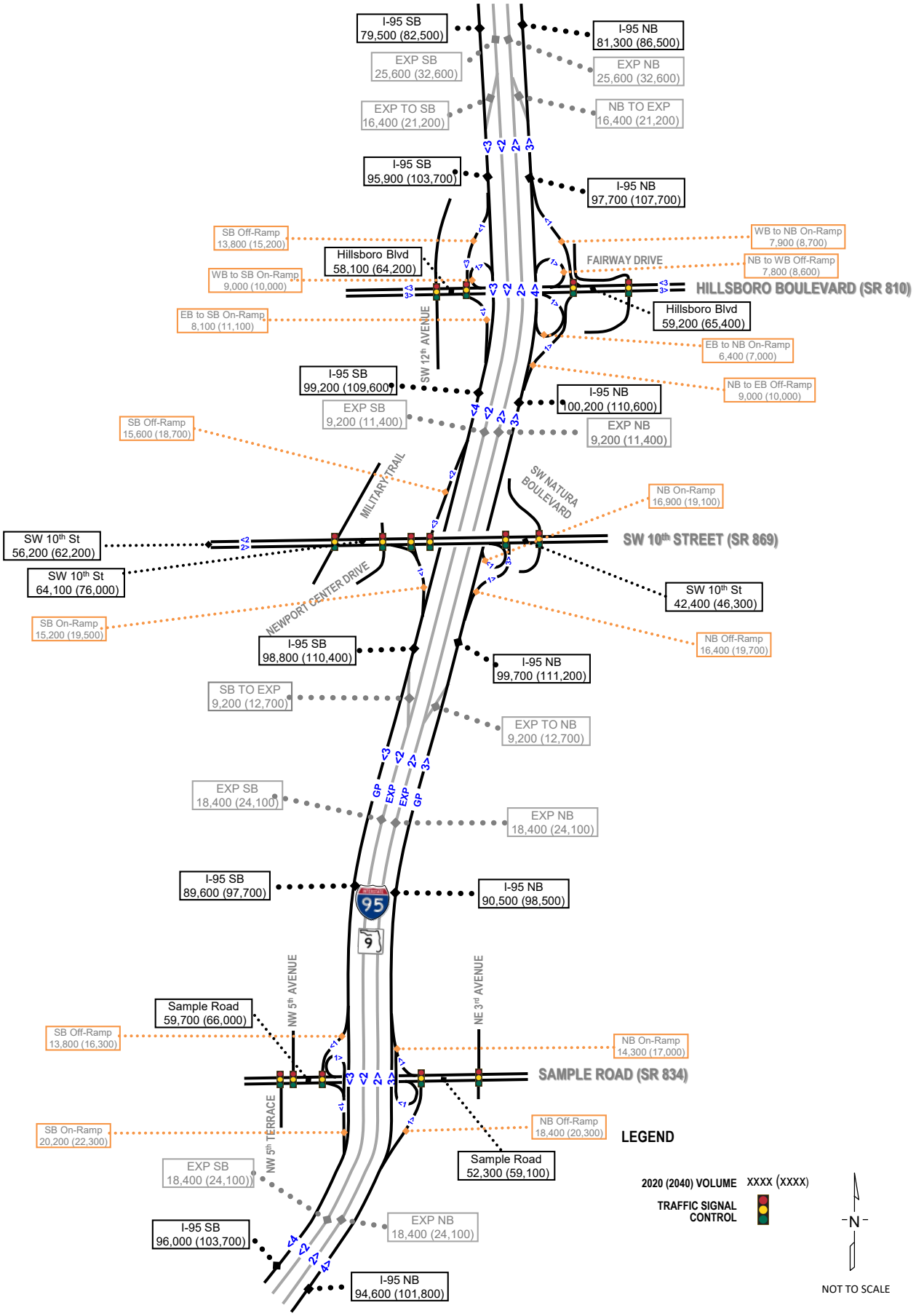


Figure 4.5: 2020 No-Build Peak Hour Volumes

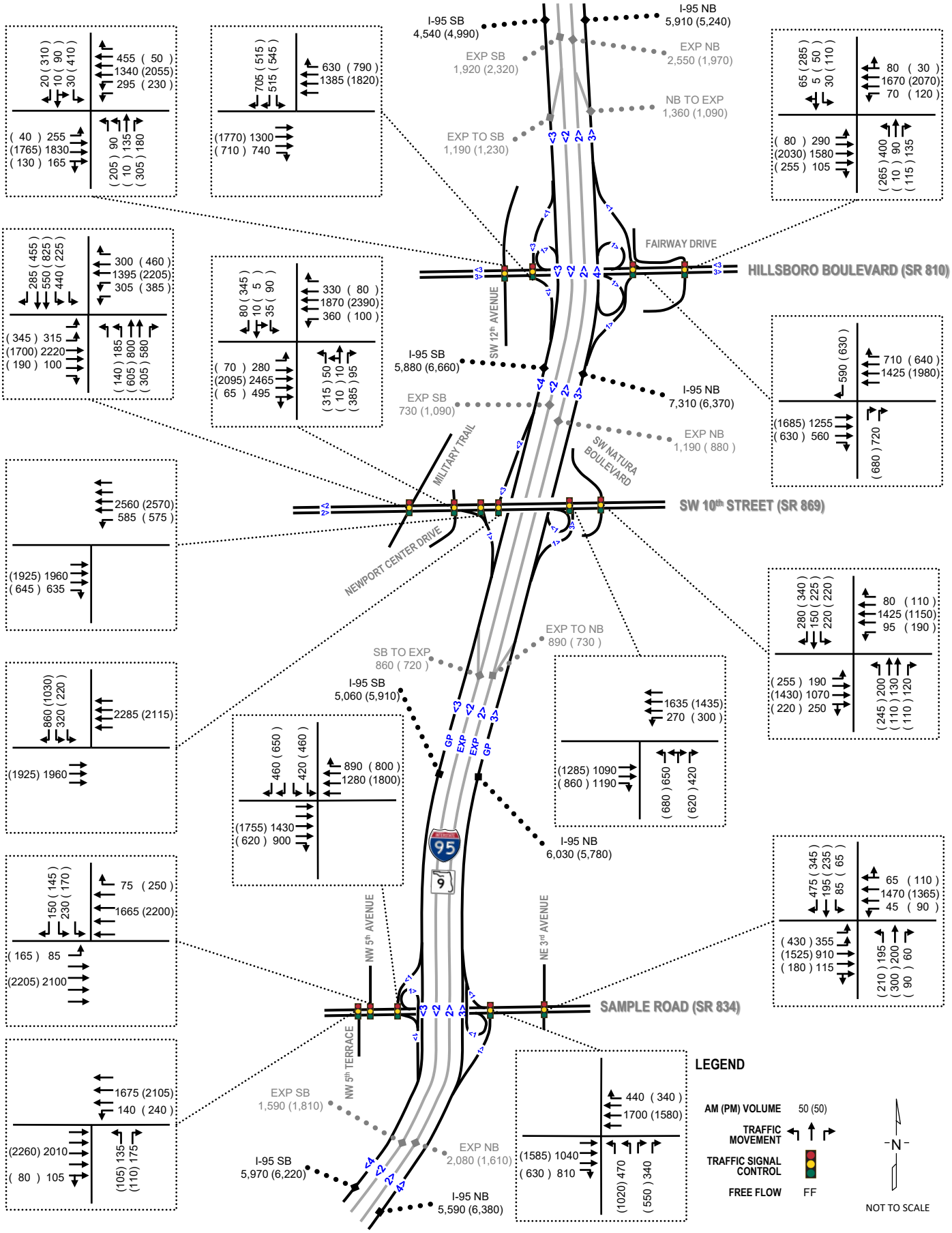
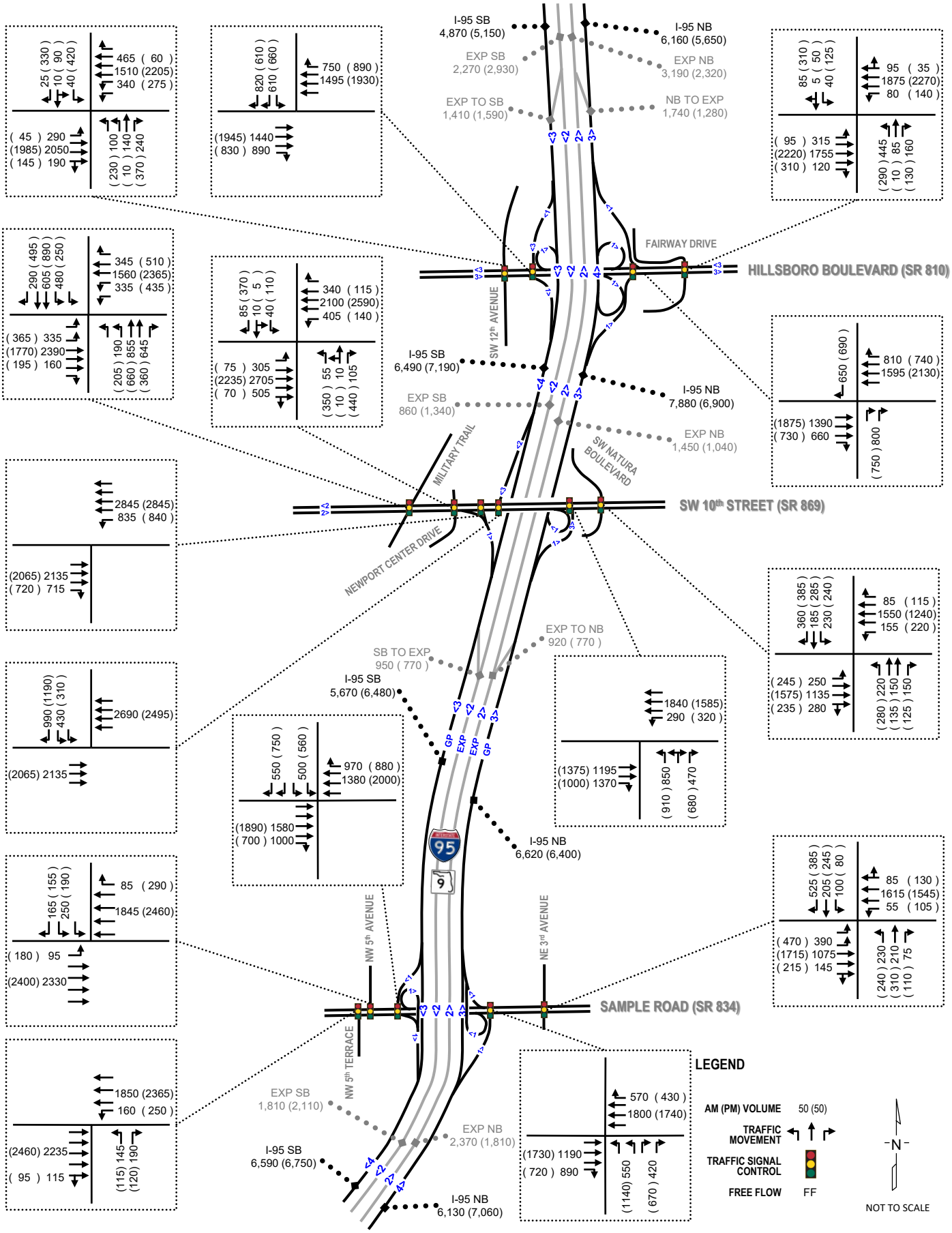


Figure 4.6: 2040 No-Build Peak Hour Volumes



4.4.1 2020 & 2040 No-Build – Freeway Analysis – I-95

The No-Build analysis includes the implementation of I-95 Express Lanes. The mainline/basic, weaving, and ramp merge/diverge analysis results for Opening Year 2020 are summarized and depicted on **Figures 4.7** and **4.8** for the NB and SB directions, respectively. The Design Year 2040 analysis results are summarized and depicted on **Figures** in **4.9** and **4.10** for the NB and SB directions, respectively. Documentation of the 2020 and 2040 No-Build Alternative traffic freeway operational analysis is provided in **Appendix G**. The Design Year 2040 No-Build Alternative analysis indicates that 15 of the 16 freeway segments in the NB direction are projected to operate at LOS E or F during one or both peak hours. Similarly, 9 of the 14 freeway segments in the SB direction are projected to operate at LOS E or F during one or both peak hours.

4.4.2 2020 & 2040 No-Build - Intersection Analysis

Intersection analysis for ramp-terminals and adjacent intersections was performed in a similar manner as for the existing conditions. The No-Build Alternative includes the existing intersection control and lane geometry. **Figure 4.3**, previously presented, presents the No-Build Alternative Lane Configuration and **Figures 4.5** and **4.6**, previously presented, show the AM and PM intersection volumes for 2020 and 2040 conditions, respectively. Signal timing was optimized to reflect routine maintenance operations. **Appendix H** presents the intersection analysis worksheets.

Tables 4.1 through **4.3** summarize the results of the 2020 No-Build signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. **Tables 4.4** through **4.6** summarize the results of the 2040 No-Build signalized intersection analyses for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. The results include delays (in seconds per vehicle) and Level of Service (LOS) by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. The intersection analysis results indicate the following for the 2040 Design Year:

- Hillsboro Boulevard: Two of the three signalized intersections are expected to operate at LOS E during the AM or PM peak hours. The I-95 northbound and southbound off-ramp intersections are expected to operate at LOS C or better during both the AM and PM peak hours.
- SW 10th Street: Three of the six signalized intersections are expected to operate at LOS E or F during one or both peak hours. The I-95 northbound off-ramp approach is expected to operate at LOS F during both peak hours. The I-95 southbound off-ramp approach is expected to operate at LOS C or better during both peak hours.

Figure 4.7: 2020 No-Build Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	5,910 (5,240)	E (35.1)	D (28.8)
Weave - Hillsboro Boulevard WB to I-95 Express Lanes	7,270 (6,330)	F (N/A)	E (39.4)
Basic Freeway	6,560 (5,690)	E (42.4)	D (32.6)
Weave - Entry Hillsboro Blvd EB to Exit Hillsboro Blvd WB	7,150 (6,320)	E (37.3)	D (32.9)
Basic Freeway	6,590 (5,690)	E (42.9)	D (32.6)
Diverge to Hillsboro Boulevard EB	7,310 (6,370)	F (46.2)	E (37.6)
Basic Freeway	7,310 (6,370)	F (55.2)	E (40.0)
Merge from SW 10th Street EB & WB	7,310 (6,370)	F (36.7)	D (31.2)
Basic Freeway	5,850 (5,210)	D (34.2)	D (28.5)
Diverge to SW 10th Street EB & WB	6,920 (6,510)	F (42.4)	E (39.0)
Basic Freeway	6,920 (6,510)	F (47.9)	E (41.8)
Merge from I-95 Express Lanes	6,920 (6,510)	F (42.9)	E (40.8)
Basic Freeway	6,030 (5,780)	E (36.1)	D (33.5)
Merge from Sample Road WB	6,030 (5,780)	E (36.0)	D (33.9)
Basic Freeway	4,780 (4,810)	C (25.4)	C (25.6)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,590 (6,380)	C (27.7)	E (35.5)

GPL: General Purpose Lane

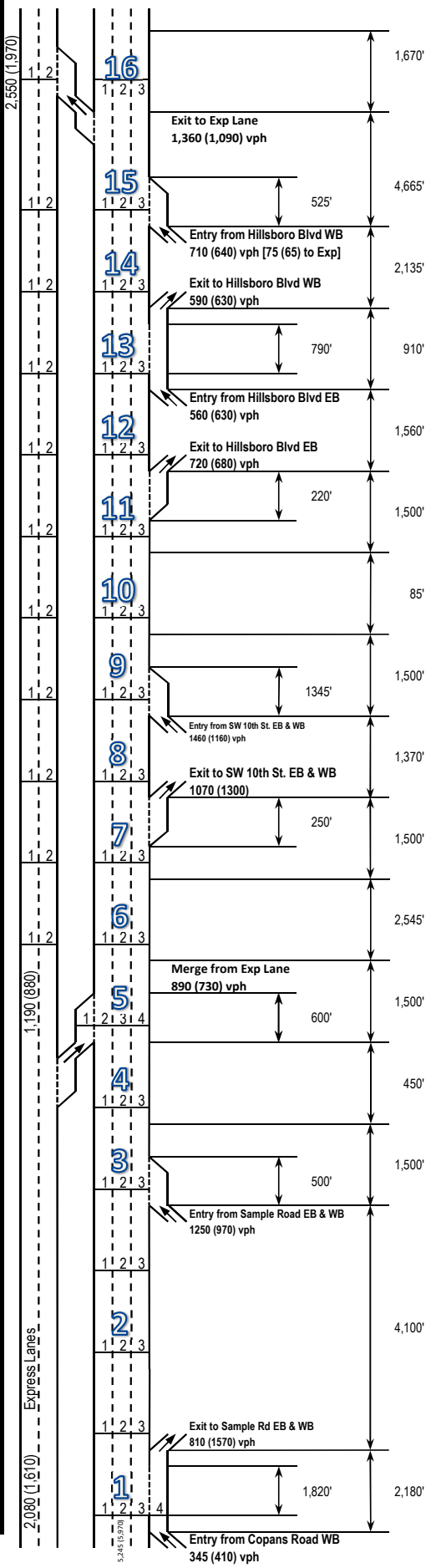
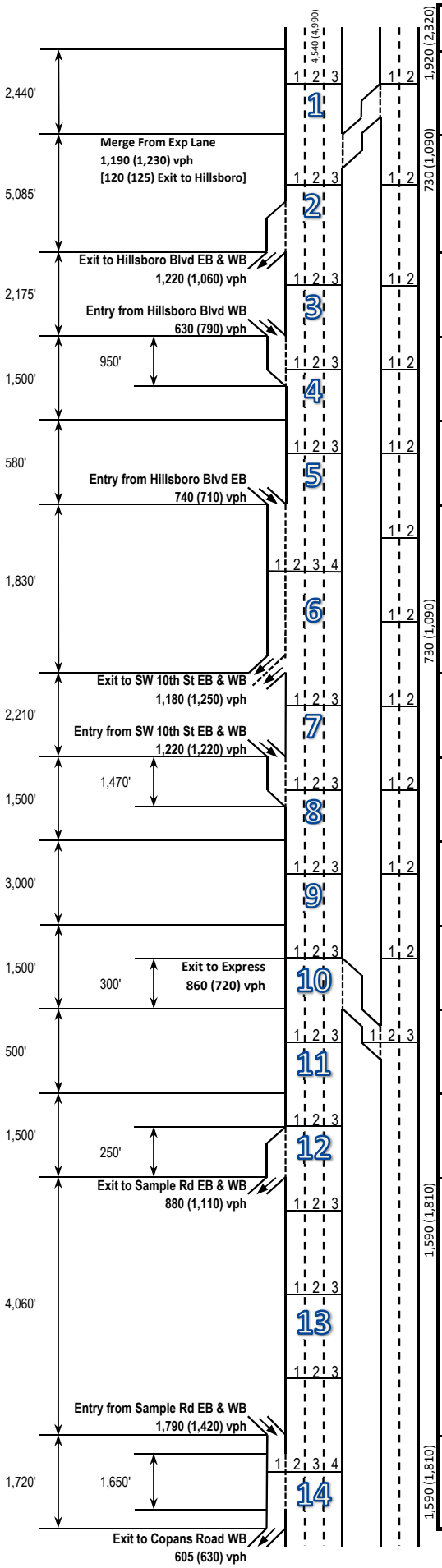


Figure 4.8: 2020 No-Build Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,540 (4,990)	C (23.9)	D (27.1)
Weave I-95 Express Lanes to Hillsboro Boulevard EB & WB	5,730 (6,220)	D (33.7)	E (39.6)
Basic Freeway	4,510 (5,160)	C (23.6)	D (28.2)
Merge from Hillsboro Boulevard WB	5,140 (5,950)	C (27.3)	D (31.9)
Basic Freeway	5,140 (5,950)	D (28.0)	E (35.2)
Weave - Entry Hillsboro Blvd EB to Exit SW 10th Street EB & WB	5,880 (6,660)	C (27.7)	D (31.8)
Basic Freeway	4,700 (5,410)	D (24.8)	D (30.2)
Merge from SW 10th Street EB & WB	5,920 (6,630)	D (30.3)	D (33.5)
Basic Freeway	5,920 (6,630)	D (34.9)	E (43.4)
Diverge to I-95 Express Lanes	5,920 (6,630)	E (37.2)	E (41.1)
Basic Freeway	5,060 (5,910)	D (27.4)	D (34.8)
Diverge to Sample Road EB & WB	5,060 (5,910)	D (34.0)	E (38.1)
Basic Freeway	4,180 (4,800)	C (21.6)	C (25.5)
Weave - Entry Sample Road EB to Exit Copans Road WB	5,970 (6,220)	F (N/A)	D (34.8)

GPL: General Purpose Lane

Figure 4.9: 2040 No-Build Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,160 (5,650)	E (37.8)	D (32.3)
Weave - Hillsboro Boulevard WB to I-95 Express Lanes	7,900 (6,930)	F (N/A)	F (N/A)
Basic Freeway	7,090 (6,190)	F (50.9)	E (37.8)
Weave - Entry Hillsboro Blvd EB to Exit Hillsboro Blvd WB	7,740 (6,880)	E (41.9)	E (37.1)
Basic Freeway	7,080 (6,150)	F (50.7)	E (37.4)
Diverge to Hillsboro Boulevard EB	7,880 (6,900)	F (51.5)	F (42.5)
Basic Freeway	7,880 (6,900)	F (70.0)	F (47.6)
Merge from SW 10th Street EB & WB	7,880 (6,900)	F (41.2)	F (34.2)
Basic Freeway	6,220 (5,580)	E (38.2)	D (31.6)
Diverge to SW 10th Street EB & WB	7,540 (7,170)	F (48.1)	F (44.7)
Basic Freeway	7,540 (7,170)	F (60.4)	F (52.4)
Merge from I-95 Express Lanes	7,540 (7,170)	F (47.3)	F (45.6)
Basic Freeway	6,620 (6,400)	E (43.3)	E (40.3)
Merge from Sample Road WB	6,620 (6,400)	E (39.5)	E (37.5)
Basic Freeway	5,160 (5,250)	D (28.2)	D (28.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	6,130 (7,060)	D (31.6)	F (N/A)

GPL: General Purpose Lane

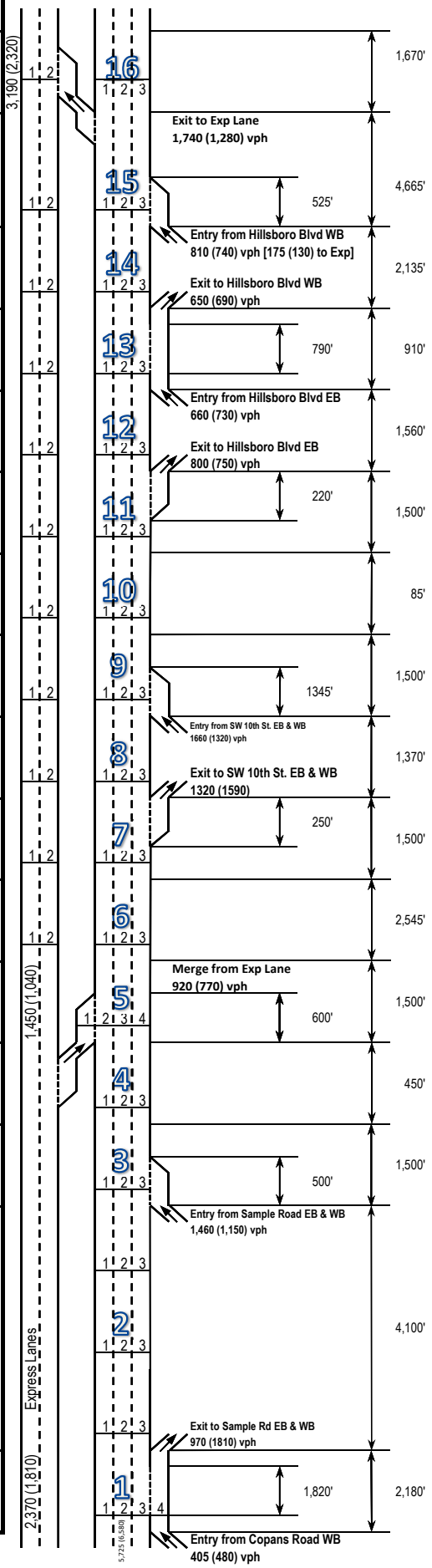
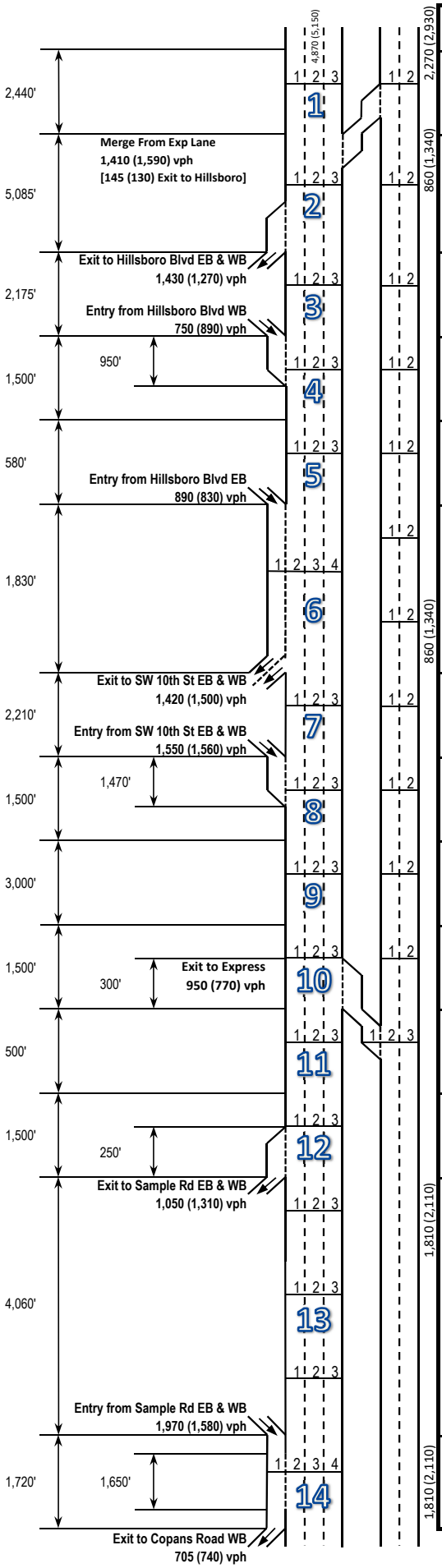


Figure 4.10: 2040 No-Build Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,870 (5,150)	D (26.0)	D (28.1)
Weave I-95 Express Lanes to Hillsboro Boulevard EB & WB	6,280 (6,740)	E (40.5)	F (N/A)
Basic Freeway	4,850 (5,470)	C (25.9)	D (30.7)
Merge from Hillsboro Boulevard WB	5,600 (6,360)	D (30.0)	D (34.2)
Basic Freeway	5,600 (6,360)	D (31.8)	E (39.8)
Weave - Entry Hillsboro Blvd EB to Exit SW 10th Street EB & WB	6,490 (7,190)	F (N/A)	F (N/A)
Basic Freeway	5,070 (5,690)	D (27.5)	D (32.6)
Merge from SW 10th Street EB & WB	6,620 (7,250)	D (34.4)	F (37.2)
Basic Freeway	6,620 (7,250)	E (43.3)	F (54.0)
Diverge to I-95 Express Lanes	5,670 (6,480)	E (41.0)	F (47.1)
Basic Freeway	5,670 (6,480)	D (32.4)	E (41.4)
Diverge to Sample Road EB & WB	5,670 (6,480)	E (37.0)	E (40.8)
Basic Freeway	4,620 (5,170)	C (24.3)	D (28.2)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,590 (6,750)	F (N/A)	F (N/A)

GPL: General Purpose Lane

Table 4.1: 2020 No-Build – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (98.6)	C (22.5)		F (106.1)	B (18.2)	A (5.0)	E (74.6)	F (93.6)	E (59.7)	F (84.5)	F (84.4)	E (56.8)	C (33.8)
			Approach	C (31.1)			C (27.7)			E (74.3)			E (75.2)			
		Volume to Capacity ratio	Movement	0.90	0.68		0.90	0.51	0.40	0.28	0.77	0.12	0.31	0.30	0.01	
		Queue Length 95th (ft)	Movement	#473	723		#290	443	102	85	247	67	63	63	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.8)		B (16.7)					E (59.7)		D (50.9)	B (19.3)
			Approach	A (0.4)			B (16.7)						D (54.6)			
		Volume to Capacity ratio	Movement		0.28	0.49		0.51					0.83		0.72	
		Queue Length 95th (ft)	Movement		0	62		515					653		448	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (18.2)			A (0.1)				B (18.5)				B (10.6)
			Approach	B (18.2)			A (0.1)			B (18.5)						
		Volume to Capacity ratio	Movement		0.61			0.30				0.58				
		Queue Length 95th (ft)	Movement		280			m0				230				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (98.1)	B (12.9)	A (8.0)	F (86.8)	C (31.2)		F (414.1)	E (71.7)	E (68.5)	F (82.6)	F (83.3)	F (83.2)	E (66.4)
			Approach	C (25.2)			C (33.3)			F (290.0)			F (83.0)			
		Volume to Capacity ratio	Movement	0.96	0.51	0.07	0.61	0.69		1.73	0.40	0.09	0.40	0.07	0.05	
		Queue Length 95th (ft)	Movement	#570	386	9	150	630		#924	177	72	70	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (55.5)	C (32.4)		F (212.0)	C (25.8)	A (0.0)	D (54.6)	D (48.8)	F (155.2)	E (63.2)	E (63.9)	D (40.9)	D (48.0)
			Approach	C (32.9)			D (43.6)			F (113.5)			D (54.9)			
		Volume to Capacity ratio	Movement	0.42	0.86		1.25	0.93	0.03	0.64	0.06	1.14	0.84	0.84	0.52	
		Queue Length 95th (ft)	Movement	72	#701		m#213	#784	m0	124	26	#324	306	313	146	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		B (16.3)					D (43.4)		C (28.7)	B (12.7)
			Approach	A (0.2)			B (16.3)						D (36.2)			
		Volume to Capacity ratio	Movement		0.38	0.47		0.72					0.85		0.51	
		Queue Length 95th (ft)	Movement		0	m0		402					499		213	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (16.0)			A (0.2)				B (17.5)				A (9.0)
			Approach	B (16.0)			A (0.2)			B (17.5)						
		Volume to Capacity ratio	Movement		0.76			0.42				0.68				
		Queue Length 95th (ft)	Movement		275			m0				177				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (84.3)	B (16.8)	B (10.2)	F (136.9)	C (21.5)		F (149.6)	D (44.2)	D (44.5)	D (42.5)	D (44.5)	E (62.2)	C (32.2)
			Approach	B (18.4)			C (27.7)			F (115.9)			E (55.3)			
		Volume to Capacity ratio	Movement	0.81	0.77	0.24	1.01	0.78		1.14	0.04	0.08	0.44	0.19	0.78	
		Queue Length 95th (ft)	Movement	m#103	540	m120	#234	660		#294	23	36	116	68	215	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.2: 2020 No-Build - SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (179.1)	F (99.2)	C (25.5)	F (171.3)	D (52.7)	C (26.1)	E (71.0)	E (74.7)	F (166.2)	F (237.6)	D (48.8)	D (44.9)	F (97.1)
			Approach	F (106.0)			E (66.8)			F (108.1)			F (113.0)			
		Volume to Capacity ratio	Movement	1.18	1.11	0.07	1.20	1.01	0.33	0.67	0.96	1.20	1.34	0.62	0.39	
		Queue Length 95th (ft)	Movement	#310	#1069	0	#301	#934	138	144	#578	#819	#429	339	197	
	East Newport Center Drive	LOS (Delay)	Movement	D (54.9)	B (11.8)		F (95.7)	B (14.2)	A (6.2)	E (72.4)	E (72.5)	E (69.5)	E (71.7)	E (71.4)	E (69.4)	C (21.9)
			Approach	B (15.5)			C (24.6)			E (70.6)			E (70.2)			
		Volume to Capacity ratio	Movement	0.82	0.95		0.91	0.67	0.27	0.48	0.49	0.07	0.40	0.38	0.08	
		Queue Length 95th (ft)	Movement	m195	m285		#548	635	21	#77	#78	54	60	62	31	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		B (15.5)	A (0.3)	E (60.5)	A (0.2)								B (11.6)
			Approach	B (11.8)			B (11.4)									
		Volume to Capacity ratio	Movement		0.76	0.44	1.00	0.43								
		Queue Length 95th (ft)	Movement		m335	m0	#675	0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (12.4)			C (20.3)					E (55.2)		A (1.6)	B (16.6)
			Approach	B (12.4)			C (20.3)						B (16.2)			
		Volume to Capacity ratio	Movement		0.63			0.58					0.53		0.58	
		Queue Length 95th (ft)	Movement		179			289					159		0	
	I-95 Northbound Ramps	LOS (Delay)	Movement		D (41.3)	A (3.9)	D (44.9)	B (18.0)		E (59.0)		E (76.0)				C (30.5)
			Approach	C (21.8)			C (21.8)			E (64.3)						
		Volume to Capacity ratio	Movement		0.94	0.82	0.66	0.63		0.85		0.90				
		Queue Length 95th (ft)	Movement		686	1090	m377	410		468		#586				
	FAU Research Park Boulevard	LOS (Delay)	Movement	C (26.8)	C (22.4)		B (12.6)	C (22.2)	B (14.0)	D (35.6)	C (31.9)	C (30.7)	C (27.8)	D (36.2)	C (31.4)	C (24.7)
			Approach	C (22.9)			C (21.2)			C (33.3)			C (31.3)			
		Volume to Capacity ratio	Movement	0.74	0.66		0.44	0.76	0.05	0.74	0.40	0.08	0.68	0.67	0.52	
		Queue Length 95th (ft)	Movement	m98	440		44	285	0	#157	59	4	147	131	#136	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (182.9)	C (34.3)	C (21.4)	D (53.7)	F (174.3)	C (25.9)	E (74.4)	F (95.2)	D (48.1)	F (143.1)	F (216.0)	F (119.5)	F (113.5)
			Approach	E (56.2)			F (136.7)			E (78.7)			F (175.9)			
		Volume to Capacity ratio	Movement	1.22	0.81	0.13	0.79	1.32	0.48	0.76	1.02	0.42	1.08	1.34	1.05	
		Queue Length 95th (ft)	Movement	#302	542	47	m177	m#1421	m137	#119	#433	160	#206	#650	#505	
	East Newport Center Drive	LOS (Delay)	Movement	D (46.8)	B (10.8)		E (75.7)	D (35.6)	A (6.6)	E (61.8)	E (60.2)	F (154.0)	D (50.6)	D (50.6)	F (163.6)	D (43.7)
			Approach	B (11.9)			D (36.3)			F (111.4)			F (139.3)			
		Volume to Capacity ratio	Movement	0.63	0.80		0.60	0.98	0.06	0.73	0.71	1.13	0.23	0.23	1.14	
		Queue Length 95th (ft)	Movement	m38	m211		159	#919	1	#260	#253	#461	85	85	#408	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		B (13.8)	A (0.5)	F (97.6)	A (0.2)								B (14.6)
			Approach	B (10.5)			B (18.0)									
		Volume to Capacity ratio	Movement		0.71	0.44	1.10	0.44								
		Queue Length 95th (ft)	Movement		m181	m11	#615	0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (9.4)			C (29.5)					D (43.5)		A (2.7)	B (17.6)
			Approach	A (9.4)			C (29.5)						A (9.9)			
		Volume to Capacity ratio	Movement		0.66			0.58					0.33		0.71	
		Queue Length 95th (ft)	Movement		144			m374					66		0	
	I-95 Northbound Ramps	LOS (Delay)	Movement		E (76.0)	A (1.3)	E (68.3)	B (13.8)		E (61.1)		F (92.3)				D (44.6)
			Approach	D (46.0)			C (23.2)			E (70.9)						
		Volume to Capacity ratio	Movement		1.08	0.59	0.94	0.61		0.95		1.02				
		Queue Length 95th (ft)	Movement		#791	110	m#442	157		#542		#664				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (41.5)	B (10.6)		D (55.0)	C (30.9)	C (23.3)	E (67.9)	D (46.7)	D (45.7)	D (42.3)	E (73.5)	E (55.9)	C (32.2)
			Approach	B (14.7)			C (33.4)			E (57.6)			E (57.1)			
		Volume to Capacity ratio	Movement	0.76	0.78		0.84	0.59	0.08	0.90	0.20	0.08	0.60	0.85	0.64	
		Queue Length 95th (ft)	Movement	m145	m287		#249	375	9	#306	75	7	230	#319	#223	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.3: 2020 No-Build – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.2)		D (53.4)	A (1.2)		E (56.6)		D (46.9)				B (14.0)
			Approach		B (16.2)			A (5.2)			D (51.1)					
		Volume to Capacity ratio	Movement		0.54		0.64	0.48		0.67		0.12				
		Queue Length 95th (ft)	Movement		325		#155	27		170		64				
	NW 5th Avenue	LOS (Delay)	Movement	D (49.6)	A (2.0)			A (9.3)	A (5.8)				D (51.2)		D (47.0)	A (10.0)
			Approach		A (3.8)			A (9.1)						D (49.6)		
		Volume to Capacity ratio	Movement	0.70	0.47			0.45	0.05				0.59		0.13	
		Queue Length 95th (ft)	Movement	#153	43			250	m6				130		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.2)	A (1.5)		A (7.6)					B (20.0)		C (23.7)	A (8.4)
			Approach		A (3.8)			A (7.6)						C (21.9)		
		Volume to Capacity ratio	Movement		0.43	0.60		0.48					0.52		0.70	
		Queue Length 95th (ft)	Movement		124	360		156					108		138	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.1)			A (4.8)	A (0.2)	C (22.1)		C (21.3)				A (7.8)
			Approach		A (5.1)			A (3.9)			C (21.8)					
		Volume to Capacity ratio	Movement		0.38			0.62	0.29	0.63		0.56				
		Queue Length 95th (ft)	Movement		56			141	m0	124		104				
	NE 3rd Avenue	LOS (Delay)	Movement	E (58.0)	B (18.6)		E (56.3)	D (38.8)		D (38.8)	D (37.7)	C (33.4)	C (32.9)	D (39.3)	E (70.7)	D (39.1)
			Approach		C (28.7)			D (39.3)			D (37.6)			E (58.4)		
		Volume to Capacity ratio	Movement	0.85	0.48		0.49	0.85		0.66	0.45	0.04	0.29	0.47	0.92	
		Queue Length 95th (ft)	Movement	#229	279		79	#558		177	208	0	83	208	#438	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (18.4)		E (72.6)	A (1.3)		E (62.8)		D (53.2)				B (15.4)
			Approach		B (18.4)			A (8.6)			E (57.9)					
		Volume to Capacity ratio	Movement		0.60		0.87	0.57		0.65		0.08				
		Queue Length 95th (ft)	Movement		395		#360	27		152		57				
	NW 5th Avenue	LOS (Delay)	Movement	E (55.4)	A (1.6)			B (11.9)	A (10.0)				E (56.7)		D (53.4)	B (11.4)
			Approach		A (5.3)			B (11.7)						E (55.2)		
		Volume to Capacity ratio	Movement	0.82	0.48			0.61	0.17				0.54		0.10	
		Queue Length 95th (ft)	Movement	#278	35			336	m34				112		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (13.3)	A (0.7)		B (14.7)					B (18.5)		C (26.3)	B (14.4)
			Approach		B (10.1)			B (14.7)						C (23.1)		
		Volume to Capacity ratio	Movement		0.57	0.41		0.73					0.46		0.81	
		Queue Length 95th (ft)	Movement		357	18		330					116		#211	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (12.5)			B (13.3)	A (0.2)	D (39.5)		C (31.4)				B (19.3)
			Approach		B (12.5)			B (11.0)			D (36.7)					
		Volume to Capacity ratio	Movement		0.64			0.64	0.23	0.81		0.54				
		Queue Length 95th (ft)	Movement		239			m194	m0	451		248				
	NE 3rd Avenue	LOS (Delay)	Movement	E (73.7)	C (23.3)		E (76.7)	D (35.9)		F (81.4)	D (53.4)	D (39.0)	D (43.3)	E (57.5)	D (52.2)	D (40.9)
			Approach		C (33.4)			D (38.2)			E (61.4)			D (53.2)		
		Volume to Capacity ratio	Movement	0.86	0.75		0.74	0.77		0.94	0.76	0.06	0.43	0.74	0.63	
		Queue Length 95th (ft)	Movement	#288	390		#171	#542		#210	342	0	74	279	223	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.4: 2040 No-Build – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (113.9)	C (26.3)		F (128.0)	C (21.7)	B (15.0)	E (74.4)	F (93.9)	E (61.4)	F (84.5)	F (84.4)	E (55.3)	D (40.0)
			Approach	D (36.3)			D (36.0)			E (73.6)			E (74.7)			
		Volume to Capacity ratio	Movement	0.97	0.77		1.02	0.59	0.42	0.30	0.77	0.30	0.36	0.35	0.02	
		Queue Length 95th (ft)	Movement	#583	914		#356	325	95	93	255	140	72	72	1	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (1.1)		C (26.1)					D (52.9)		D (43.6)	C (20.4)
			Approach	A (0.5)			C (26.1)						D (47.6)			
		Volume to Capacity ratio	Movement		0.31	0.59		0.62					0.84		0.71	
		Queue Length 95th (ft)	Movement		0	197		534					719		473	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (13.1)			A (0.1)				C (27.4)				B (10.5)
			Approach	B (13.1)			A (0.1)			C (27.4)						
		Volume to Capacity ratio	Movement		0.58			0.34				0.77				
		Queue Length 95th (ft)	Movement		319			m0				268				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (136.8)	B (14.1)	A (4.2)	F (88.4)	C (32.7)		F (532.4)	E (72.4)	E (69.5)	F (84.2)	F (83.3)	F (83.3)	F (80.0)
			Approach	C (31.2)			C (34.9)			F (368.6)			F (83.6)			
		Volume to Capacity ratio	Movement	1.07	0.57	0.08	0.64	0.76		1.99	0.39	0.11	0.52	0.07	0.06	
		Queue Length 95th (ft)	Movement	#653	449	8	167	739		#1063	169	79	85	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (69.3)	D (39.8)		F (228.0)	C (22.0)	A (0.3)	E (65.3)	E (56.5)	F (246.5)	F (84.7)	F (85.6)	E (65.3)	E (60.2)
			Approach	D (40.4)			D (43.8)			F (175.0)			E (77.4)			
		Volume to Capacity ratio	Movement	0.56	0.92		1.29	0.91	0.04	0.70	0.06	1.36	0.91	0.91	0.81	
		Queue Length 95th (ft)	Movement	#98	#897		m#254	#900	m0	157	29	#516	#415	#425	#333	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		C (25.0)					D (50.4)		C (29.3)	B (16.7)
			Approach	A (0.2)			C (25.0)						D (40.3)			
		Volume to Capacity ratio	Movement		0.42	0.55		0.83					0.90		0.53	
		Queue Length 95th (ft)	Movement		m0	m0		586					733		286	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (15.2)			A (0.1)				C (24.1)				A (9.8)
			Approach	B (15.2)			A (0.1)			C (24.1)						
		Volume to Capacity ratio	Movement		0.73			0.46				0.78				
		Queue Length 95th (ft)	Movement		273			m0				228				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (115.6)	C (23.0)	B (11.9)	F (136.9)	C (28.7)		F (131.4)	D (48.5)	D (49.1)	D (46.9)	D (48.9)	E (73.9)	D (38.0)
			Approach	C (25.0)			C (34.9)			F (104.6)			E (64.4)			
		Volume to Capacity ratio	Movement	0.92	0.86	0.32	1.00	0.86		1.08	0.03	0.10	0.43	0.16	0.84	
		Queue Length 95th (ft)	Movement	m#160	#919	200	#290	#954		#351	25	56	144	75	291	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.5: 2040 No-Build - SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (326.4)	F (148.6)	C (25.4)	F (294.3)	F (112.6)	D (48.0)	E (64.9)	E (68.2)	F (187.4)	F (332.8)	D (46.3)	D (41.1)	F (140.5)
			Approach	F (162.4)			F (129.8)			F (113.3)			F (145.2)			
		Volume to Capacity ratio	Movement	1.54	1.23	0.11	1.47	1.15	0.39	0.65	0.95	1.27	1.57	0.66	0.38	
		Queue Length 95th (ft)	Movement	#342	#1151	37	#337	#1071	213	138	#574	#877	#462	352	178	
	East Newport Center Drive	LOS (Delay)	Movement	E (60.2)	C (32.8)		F (114.4)	B (18.1)	A (6.5)	E (67.4)	E (67.4)	E (64.5)	E (66.8)	E (66.4)	E (64.4)	C (34.5)
			Approach	D (35.2)			C (30.4)			E (65.6)			E (65.2)			
		Volume to Capacity ratio	Movement	0.90	1.05		1.04	0.77	0.28	0.49	0.49	0.07	0.42	0.39	0.08	
		Queue Length 95th (ft)	Movement	m191	m222		#639	666	11	#80	#80	11	61	61	0	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		B (14.6)	A (0.1)	F (156.0)	A (0.2)								C (24.8)
			Approach	B (11.0)			D (35.6)									
		Volume to Capacity ratio	Movement		0.91	0.49	1.26	0.48								
		Queue Length 95th (ft)	Movement		m345	m0	#1253	0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (16.0)			B (17.1)					E (68.2)		A (2.4)	B (17.9)
			Approach	B (16.0)			B (17.1)						C (22.3)			
		Volume to Capacity ratio	Movement		0.67			0.67					0.85		0.68	
		Queue Length 95th (ft)	Movement		256			m311					#241		0	
	I-95 Northbound Ramps	LOS (Delay)	Movement		F (129.3)	A (9.6)	D (35.4)	B (18.3)		F (94.3)		F (132.9)				E (58.5)
			Approach	E (65.4)			C (20.6)			F (106.3)						
		Volume to Capacity ratio	Movement		1.18	0.94	0.61	0.72		1.05		1.12				
		Queue Length 95th (ft)	Movement		#850	#1270	m239	458		#638		#748				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (46.8)	C (26.7)		B (14.9)	C (22.7)	B (13.0)	E (57.5)	C (29.2)	C (28.1)	C (34.7)	D (41.2)	D (50.1)	C (30.1)
			Approach	C (29.8)			C (21.6)			D (40.8)			D (43.4)			
		Volume to Capacity ratio	Movement	1.00	0.75		0.62	0.83	0.06	0.90	0.41	0.10	0.78	0.77	0.83	
		Queue Length 95th (ft)	Movement	m118	m351		#90	293	0	#200	62	16	#144	#178	#217	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (210.5)	D (38.7)	C (21.7)	D (43.0)	F (236.6)	B (13.3)	F (124.7)	F (124.7)	D (45.7)	F (144.3)	F (260.4)	F (152.3)	F (141.4)
			Approach	E (64.2)			F (176.8)			F (101.5)			F (209.9)			
		Volume to Capacity ratio	Movement	1.30	0.90	0.13	0.84	1.46	0.54	1.03	1.13	0.50	1.11	1.45	1.16	
		Queue Length 95th (ft)	Movement	#304	574	42	m165	m#1381	m124	#177	#461	178	#212	#668	#534	
	East Newport Center Drive	LOS (Delay)	Movement	E (55.7)	B (12.6)		F (80.9)	E (58.3)	A (5.2)	E (61.0)	E (61.9)	F (214.6)	D (49.7)	D (49.7)	F (273.9)	E (64.5)
			Approach	B (13.9)			E (57.3)			F (145.7)			F (220.7)			
		Volume to Capacity ratio	Movement	0.62	0.86		0.78	1.06	0.09	0.77	0.78	1.30	0.34	0.34	1.42	
		Queue Length 95th (ft)	Movement	m30	m406		#222	#979	2	#272	#278	#517	94	96	#430	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		B (14.7)	A (0.5)	F (237.2)	A (0.2)								D (35.6)
			Approach	B (11.0)			D (54.2)									
		Volume to Capacity ratio	Movement		0.83	0.49	1.45	0.48								
		Queue Length 95th (ft)	Movement		m256	m17	#1169	0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (9.1)			C (20.2)					D (48.0)		A (4.8)	B (14.8)
			Approach	A (9.1)			C (20.2)						B (13.7)			
		Volume to Capacity ratio	Movement		0.67			0.65					0.61		0.82	
		Queue Length 95th (ft)	Movement		173			m283					133		0	
	I-95 Northbound Ramps	LOS (Delay)	Movement		F (174.6)	A (1.9)	D (50.4)	B (16.5)		F (109.1)		F (148.9)				F (81.3)
			Approach	F (101.9)			C (22.2)			F (121.5)						
		Volume to Capacity ratio	Movement		1.32	0.69	0.89	0.71		1.12		1.20				
		Queue Length 95th (ft)	Movement		#864	150	M#371	m208		#681		#792				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (45.6)	B (10.5)		F (82.3)	C (32.8)	C (23.6)	F (105.6)	D (41.8)	D (40.7)	D (36.6)	F (84.4)	F (88.4)	D (38.8)
			Approach	B (14.7)			D (39.0)			E (74.6)			E (71.8)			
		Volume to Capacity ratio	Movement	0.83	0.92		0.97	0.69	0.08	1.06	0.23	0.09	0.61	0.95	0.93	
		Queue Length 95th (ft)	Movement	m110	m167		#303	379	34	#392	83	51	230	#414	#390	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.6: 2040 No-Build – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.9)		E (70.6)	A (1.5)		E (57.1)		D (46.4)				B (15.1)
			Approach		B (16.9)			A (7.0)			D (51.0)					
		Volume to Capacity ratio	Movement		0.60		0.79	0.53		0.69		0.13				
		Queue Length 95th (ft)	Movement		377		#237	32		181		65				
	NW 5th Avenue	LOS (Delay)	Movement	E (58.5)	A (2.2)			B (10.3)	A (4.9)				D (51.2)		D (47.0)	B (10.6)
			Approach		A (4.4)			B (10.1)						D (49.5)		
		Volume to Capacity ratio	Movement	0.78	0.53			0.50	0.06				0.61		0.22	
		Queue Length 95th (ft)	Movement	m#174	46			298	m6				140		82	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.2)	A (2.0)		A (7.9)					C (20.2)		C (26.7)	A (9.4)
			Approach		A (4.6)			A (7.9)						C (23.6)		
		Volume to Capacity ratio	Movement		0.48	0.67		0.53					0.59		0.80	
		Queue Length 95th (ft)	Movement		159	486		168					127		#189	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.7)			A (7.1)	A (0.2)	C (22.6)		C (22.1)				A (9.3)
			Approach		A (6.7)			A (5.5)			C (22.4)					
		Volume to Capacity ratio	Movement		0.45			0.68	0.38	0.68		0.64				
		Queue Length 95th (ft)	Movement		97			m160	m0	143		126				
	NE 3rd Avenue	LOS (Delay)	Movement	F (86.0)	C (21.2)		E (58.0)	E (60.4)		D (42.9)	D (36.1)	C (31.9)	C (29.6)	D (36.1)	F (101.3)	D (52.8)
			Approach		D (36.9)			E (60.3)			D (38.5)			E (76.5)		
		Volume to Capacity ratio	Movement	0.85	0.48		0.49	0.85		0.66	0.45	0.04	0.29	0.47	0.92	
		Queue Length 95th (ft)	Movement	#281	307		91	#645		#224	225	0	98	219	#604	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.7)		F (161.1)	A (1.6)		E (57.4)		D (48.2)				B (18.3)
			Approach		B (16.7)			B (16.8)			D (52.7)					
		Volume to Capacity ratio	Movement		0.63		1.15	0.66		0.65		0.08				
		Queue Length 95th (ft)	Movement		405		#413	33		152		56				
	NW 5th Avenue	LOS (Delay)	Movement	F (129.6)	A (1.8)			B (12.7)	B (15.3)				D (51.8)		D (48.4)	B (14.2)
			Approach		B (10.7)			B (13.0)						D (50.3)		
		Volume to Capacity ratio	Movement	1.11	0.53			0.68	0.20				0.56		0.11	
		Queue Length 95th (ft)	Movement	#326	38			393	m44				113		63	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (11.1)	A (0.9)		C (21.3)					C (31.6)		D (42.2)	B (19.2)
			Approach		A (8.4)			C (21.3)						D (37.7)		
		Volume to Capacity ratio	Movement		0.57	0.47		0.75					0.50		0.83	
		Queue Length 95th (ft)	Movement		173	53		549					226		382	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (17.0)			C (23.2)	A (0.2)	D (36.1)		C (28.2)				C (22.7)
			Approach		B (17.0)			B (18.7)			C (33.2)					
		Volume to Capacity ratio	Movement		0.75			0.76	0.29	0.84		0.61				
		Queue Length 95th (ft)	Movement		339			m343	m0	488		292				
	NE 3rd Avenue	LOS (Delay)	Movement	F (92.8)	C (22.1)		F (127.1)	D (40.3)		F (136.4)	E (58.6)	D (37.5)	D (36.9)	D (48.5)	D (53.3)	D (46.4)
			Approach		D (36.0)			D (45.4)			F (83.4)			D (49.8)		
		Volume to Capacity ratio	Movement	0.99	0.86		0.97	0.90		1.12	0.84	0.08	0.50	0.69	0.75	
		Queue Length 95th (ft)	Movement	#329	#685		#210	#662		#314	336	0	81	265	267	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

- Sample Road: All five signalized intersections are expected to operate at LOS D or better during both peak hours. The I-95 northbound and southbound off-ramp approaches are expected to operate at LOS D or better during both peak hours.

Table 4.7 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours for 2040 No-Build conditions. HCM methodology does not provide queue lengths. The 95th percentile queues were obtained from Synchro reports. The Synchro reported queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length. The results present the queue length in feet for each lane group movement. The available storage length was calculated from the stop bar at the ramp terminal intersection to the gore with I-95 mainline minus 615 feet for the required stopping distance for a design speed of 70 mph per FDOT's 2016 Greenbook (Table 3-22), and accounting for the changes in number of lanes. The analysis indicates that the queues on the northbound off-ramp at SW 10th Street are expected to exceed the available storage lengths during the PM peak hour.

Table 4.7: 2040 No-Build – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Available Storage (ft)	Queue (ft)	
				AM	PM
2040 No-Build					
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	1,255	719	733
		R (WB)	1,550	832	503
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	R (EB)	2,730	472	401
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	1,410	#468	258
		R (WB)	1,050	0	0
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	925	#928	#991
		R (EB)	925	#987	#1,045
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	1,010	246	438
		R (WB)	1,010	#333	672
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	1,095	277	947
		R (EB)	1,095	222	514

Queue Notes:

Synchro queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length. Queue lengths exceeding the available storage are shown in Red.

#: 95th percentile volume exceeds capacity

Example of Storage Length Calculation for SBRT at Hillsboro Blvd. = [{(1920-615)/2} + 310+ (295*2)] = 1,552.5 feet rounded to 1,550 feet.

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5 FUTURE BUILD CONDITIONS

5.1 Build Alternative – Transportation Network

The future Build Alternative network incorporates all the roadway improvements described under Section 4.3 and depicted in Figure 4.3 for the No-Build Alternative plus the proposed improvements to mitigate deficiencies identified in the No-Build Alternative, when feasible. The Build Alternative maintains the typical section from the No-Build Alternative along I-95 between interchanges (i.e., no through lanes along I-95 are added.)

5.2 Future Build Alternative Traffic Forecast

Traffic projections were obtained from the *Project Traffic Forecast Memorandum (PTFM)* dated January 2019 for the SW 10th Street Connector PD&E Study (FPID 439891-1) and from the Memorandum dated May 26, 2020 for the SW 10th Street Connector & I-95 Interchange Supplemental Traffic Forecast Scenarios.

5.3 Development and Screening of Build Alternatives

Based on the evaluation of the No-Build conditions, various Build alternatives were developed and analyzed for the I-95 and SW 10th Street SIMR (FPID 436964-1) and the SW 10th Street Connector PD&E Study (FPID 439891-1). Traffic evaluations were conducted for two different Build Alternatives (a Center Alignment and a Northern Alignment for the proposed managed lanes), with six different managed lane ingress and egress configurations resulting in a total of twelve (12) Build Alternatives.

The fifteen scenarios (existing 2016 conditions, 2040 No-Build conditions, 2040 Partial Build conditions, and twelve 2040 Build conditions) were first analyzed by conducting a Tier 1 volume to capacity ratio analysis of the SW 10th Street general use lanes and proposed managed lanes. In addition, the vehicle-miles traveled in the managed lanes during the peak hours for each of the twelve Build alternatives were calculated and compared. Subsequently, a Tier 2 intersection operations analysis was completed for the signalized intersections along SW 10th Street. A Tier 2 freeway analysis of the proposed managed lanes connecting the Sawgrass Expressway, Florida's Turnpike and I-95 was also completed. The peak hour traffic operations analysis results were reviewed to screen the twelve Build alternatives for any traffic operations fatal flaws, and a comparison of results was used to identify the most advantageous Build Alternatives to be considered further.

Overall, Tier 1 and Tier 2 analyses resulted in the selection of the North Build Alternative 3D-1.3 and the Center Build Alternative 3D-1.3 as the top ranked alternatives. VISSIM microsimulation was conducted to further evaluate these two shortlisted alternatives. The North

Build Alternative 3D-1.3 was projected to provide better operating conditions than the Center Build Alternative. Hence, the PTFM identified the North Build Alternative 3D-1.3 as the best Build Alternative based on projected traffic operations and was further refined to improve the overall operations. An *Alternatives Analysis Memorandum* documenting the development and screening of various alternatives for SW 10th Street and I-95 was submitted to FDOT District 4 on June 29, 2018 and is included in **Appendix I**. Subsequently, at the request of FDOT District 4, Florida's Turnpike Enterprise (FTE) staff was tasked with evaluating additional forecast scenarios addressing potential modifications to the SW 10th Street Connector ramps to and from I-95. The new forecast has been documented in a Memorandum dated May 26, 2020 and is also included in Appendix I. Based on the conclusions of the PTFM, Alternatives Analysis Memorandum, May 26, 2020 Memorandum, and directions received from the Department, the following three Build Alternatives were considered for this SIMR.

Build 1 Alternative: This Build alternative has been identified as an alternative without the direct-connect ramps to and from I-95 but includes all other freeway and arterial improvements proposed under Build 2 and Build 2A alternatives below. The traffic forecast for this alternative is similar to the No-Build forecast.

Build 2 Alternative: This Build alternative has been identified as the Partial Build alternative in the PTFM dated January 2019 and in the *Alternatives Analysis Memorandum* dated June 2018. The Partial-Build/Build 2 alternative provides for grade-separated managed lanes to and from I-95 extending just west of Military Trail. Also, there are no entry or exits ramps on the direct-connect ramps between Military Trail and I-95. The SW 10th Street connector connects to and from I-95 General Use Lanes (GULs) as well as the I-95 Express Lanes (Els).

Build 2A Alternative: This Build alternative is similar to Build 2 except that it provides for an EB exit ramp and a WB entrance ramp on the express lanes between Military Trail and I-95 and the express lanes extend to Sawgrass Expressway. This alternative has been identified as Build C2 in the May 26, 2020 Memorandum which was prepared by Florida's Turnpike Enterprise for evaluating additional forecast scenarios addressing potential modifications to the SW 10th Street Connector ramps to and from I-95. This memorandum included in Appendix I provides supplemental traffic forecast scenarios to the Project Traffic Forecast Memorandum (PTFM) dated January 2019.

It is important to note that except for the direct-connect ramps and connections to I-95 General Use Lanes and Express Lanes, the geometric configuration along the interchange cross-streets and the I-95 mainline lanes and ramps for Build 1, Build 2 and Build 2A alternatives are similar within the SIMR study limits and the area of influence. However, the traffic projections for Build 1 are the same as the No-Build but the Build 2 traffic projections are different than Build 2A. This is primarily due to the express lanes under Build 2 terminating immediately west

of Military Trail whereas under Build 2A, these lanes extend all the way to Sawgrass Expressway. The conceptual and signing plans for the Build 1, Build 2, and Build 2A alternatives are included in **Appendix J**.

Figure 5.1 shows the Roadway and Intersection Lane Configuration for Build 1 and **Figure 5.2** shows it for both Build 2 and Build 2A alternatives and includes the following improvements in addition to the No-Build improvements:

I-95 Improvements:

- I-95 NB and SB auxiliary lanes between Hillsboro Boulevard and Palmetto Park Road. (FPIDs 433108-6-52-01 and 433109-4-52-01)
- I-95 southbound auxiliary lane between SB entrance ramp from SW 10th Street and the SB exit ramp to Sample Road. This creates a 4-lane mainline segment on SB I-95. (FPID 433108-5-52-01)
- Eliminate the SB auxiliary lane between Hillsboro Boulevard and SW 10th Street. The proposed braided ramps in the southwest quadrant of interchange as discussed below eliminate the need for this auxiliary lane.

SW 10th Street Interchange Ramp Improvements:

- Provide a slip on-ramp for WB SW 10th Street to I-95 NB. Combine the EB to NB loop on-ramp from SW 10th Street with the new WB to NB slip on-ramp from SW 10th Street to create a single on-ramp merge on the mainline.
- Widen the EB to NB loop on-ramp to two lanes.
- Provide a braided NB off-ramp for Hillsboro Boulevard upstream of the NB on-ramp merge from SW 10th Street.
- Provide a two-lane NB off-ramp exit for SW 10th Street.
- Provide for 3 left-turn lanes and 3 right-turn lanes on the NB off-ramp approach.
- Provide for 2 left-turn lanes and 2 right-turn lanes on the SB off-ramp approach.
- Eliminate the existing WB to SB on-ramp signal on SW 10th Street by aligning it with the SB off-ramp signal. Widen the WB to SB on-ramp to two lanes.

Hillsboro Boulevard Interchange Ramp Improvements:

- Combine the WB to SB loop on-ramp from Hillsboro Boulevard with the EB to SB slip on-ramp from Hillsboro Boulevard to create a single on-ramp merge on the mainline.
- Provide a braided SB off-ramp for SW 10th Street upstream of the SB on-ramp merge from Hillsboro Boulevard.

SW 10th Street Intersection Improvements:

- At Newport Center Drive, eliminate the N-S left and through movements and provide for

triple NB and triple SB right turn lanes. Provide dual EB and WB left turn lanes and an exclusive EB right turn lane.

- Provide barrier separated two EB through lanes for EB to NB I-95 traffic from east of Newport Center Drive to west of NB off-ramp intersection. Widen the loop on-ramp in the southeast quadrant to two lanes.
- At the SB ramp intersection, provide dual WB left turn lanes extending 250 feet east of the NB ramp intersection.
- Widen the existing single free-flow southbound right turn lane to provide for signal controlled dual right-turn lanes to improve operations and safety in the westbound direction. The free-flow right turn movements are always a safety concern for the pedestrians in the cross-walk. Due to this safety concern, many municipalities and FDOT districts are not in favor of free-flow right turns. Also, due to the proximity of the signalized intersection at Newport Center Drive, the free-flow right turn induces weaving with the westbound traffic. This condition is likely to become worse with the introduction of the access to the westbound connector lanes immediately west of the Newport Center Drive.
- At Natura Boulevard, provide dual EB and WB left turn lanes and an exclusive EB right turn lane.

The 2020 and 2040 AADT traffic volumes for the Build 1, Build 2, and Build 2A Alternatives are shown in **Figures 5.3, 5.4** and **5.5**, respectively. The 2020 and 2040 peak hour traffic volumes for Build 1 Alternative are shown in **Figures 5.6** and **5.7**, respectively. The 2020 and 2040 peak hour traffic volumes for Build 2 Alternative are shown in **Figures 5.8** and **5.9**, respectively. The 2020 and 2040 peak hour traffic volumes for Build 2A Alternative are shown in **Figures 5.10** and **5.11**, respectively.

These improvements address the traffic operation deficiencies by improving or eliminating failing merge, diverge and weaving segments; and may reduce crash rates by reducing congestion. Improvements at the ramp terminal intersections are projected to eliminate queue spillbacks on to the I-95 mainline. In addition, pedestrian and bicycle mobility is maintained or enhanced through improved design.

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Figure 5.1: Build 1 - Roadway and Intersection Lane Configurations

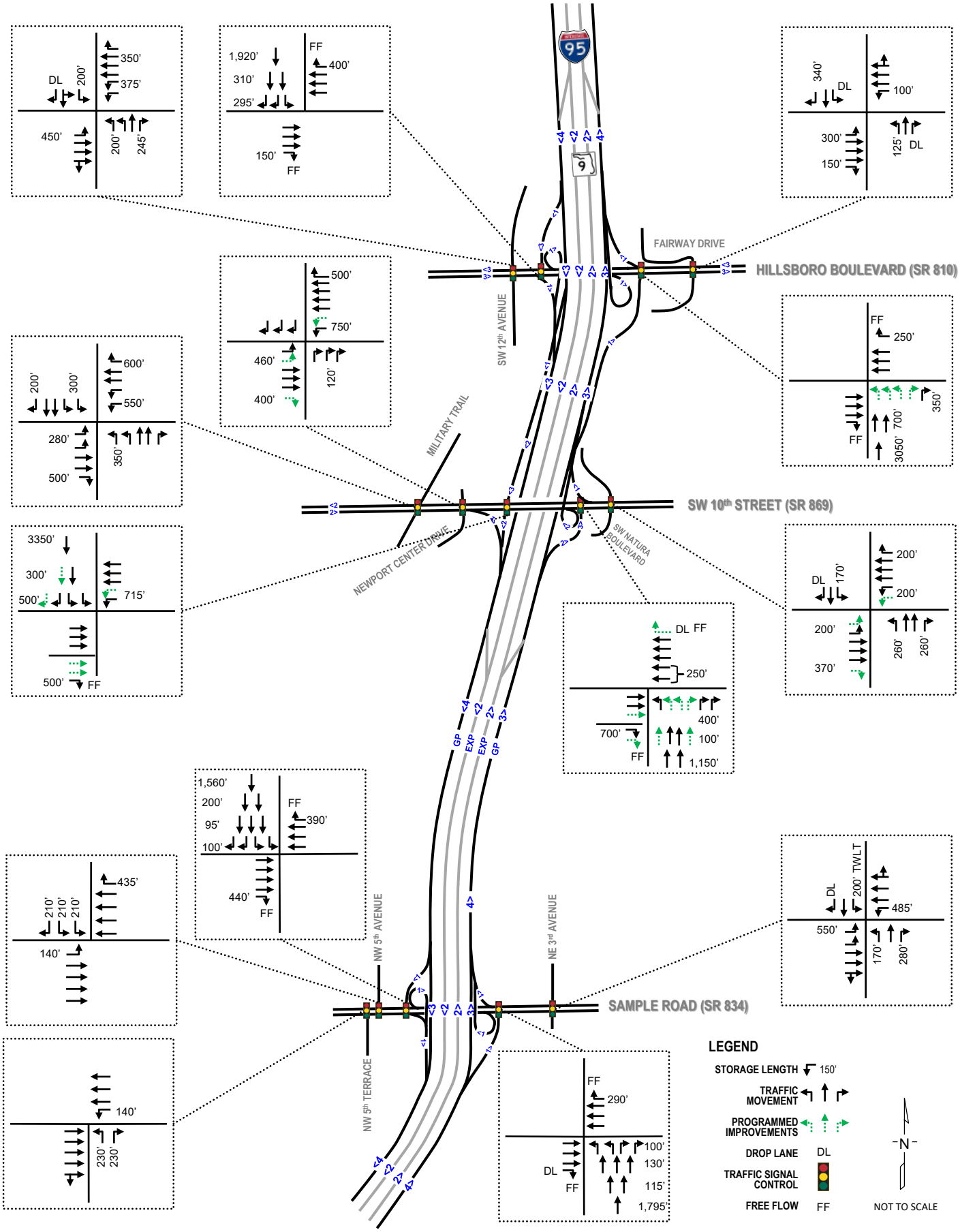


Figure 5.2: Build 2 & Build 2A - Roadway and Intersection Lane Configurations

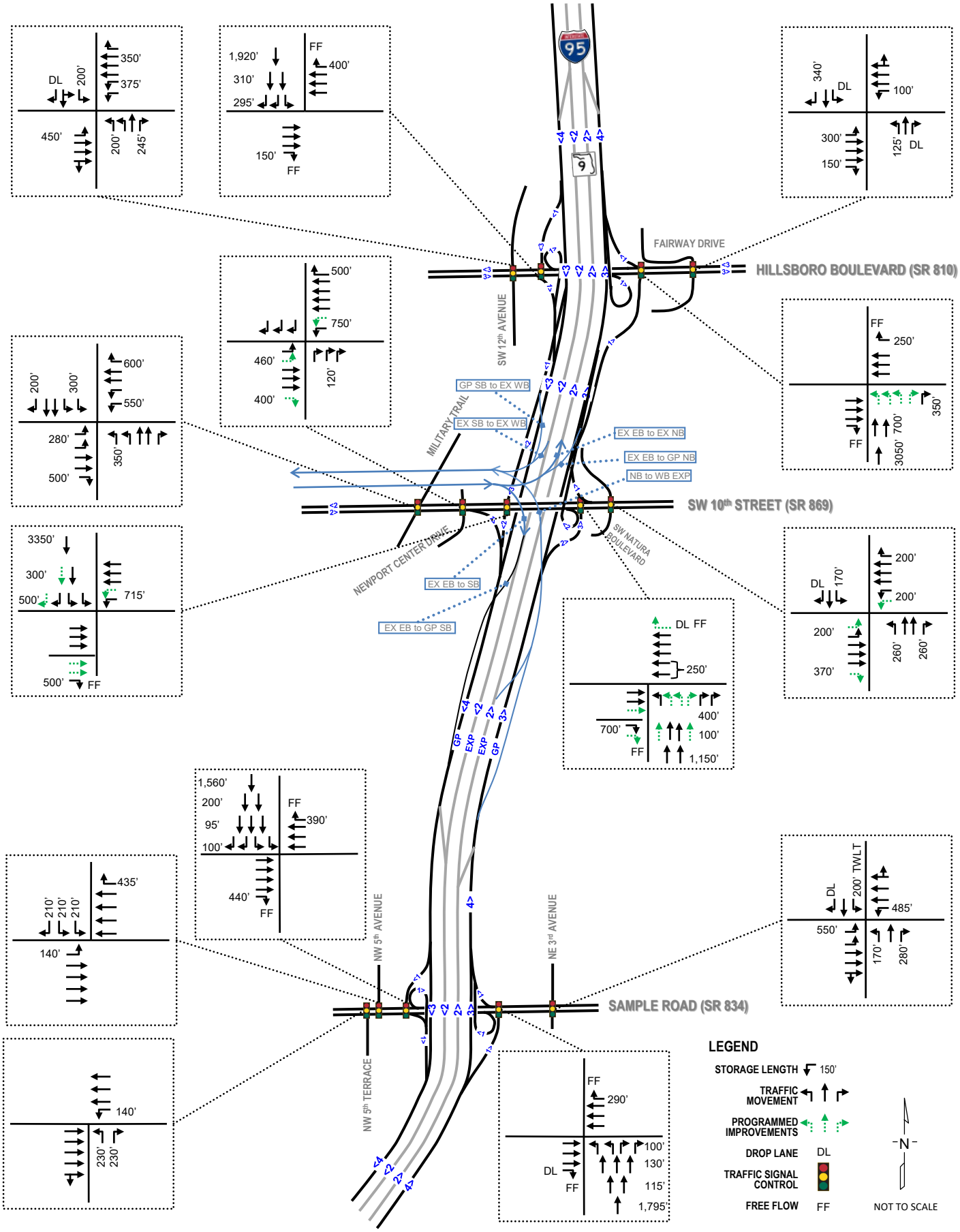


Figure 5.3: 2020 & 2040 Build 1 AADT Volumes

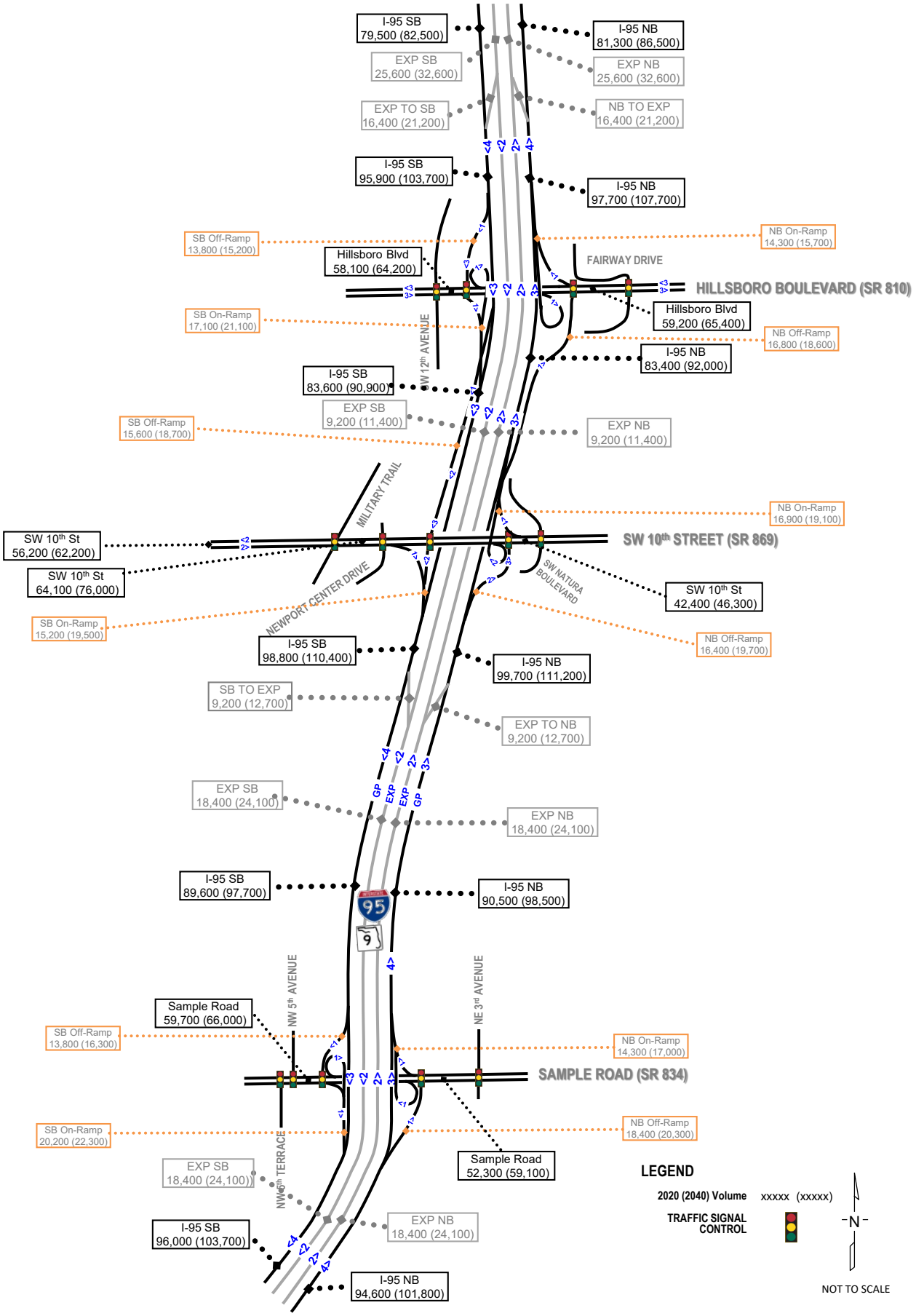


Figure 5.4: 2020 & 2040 Build 2 AADT Volumes

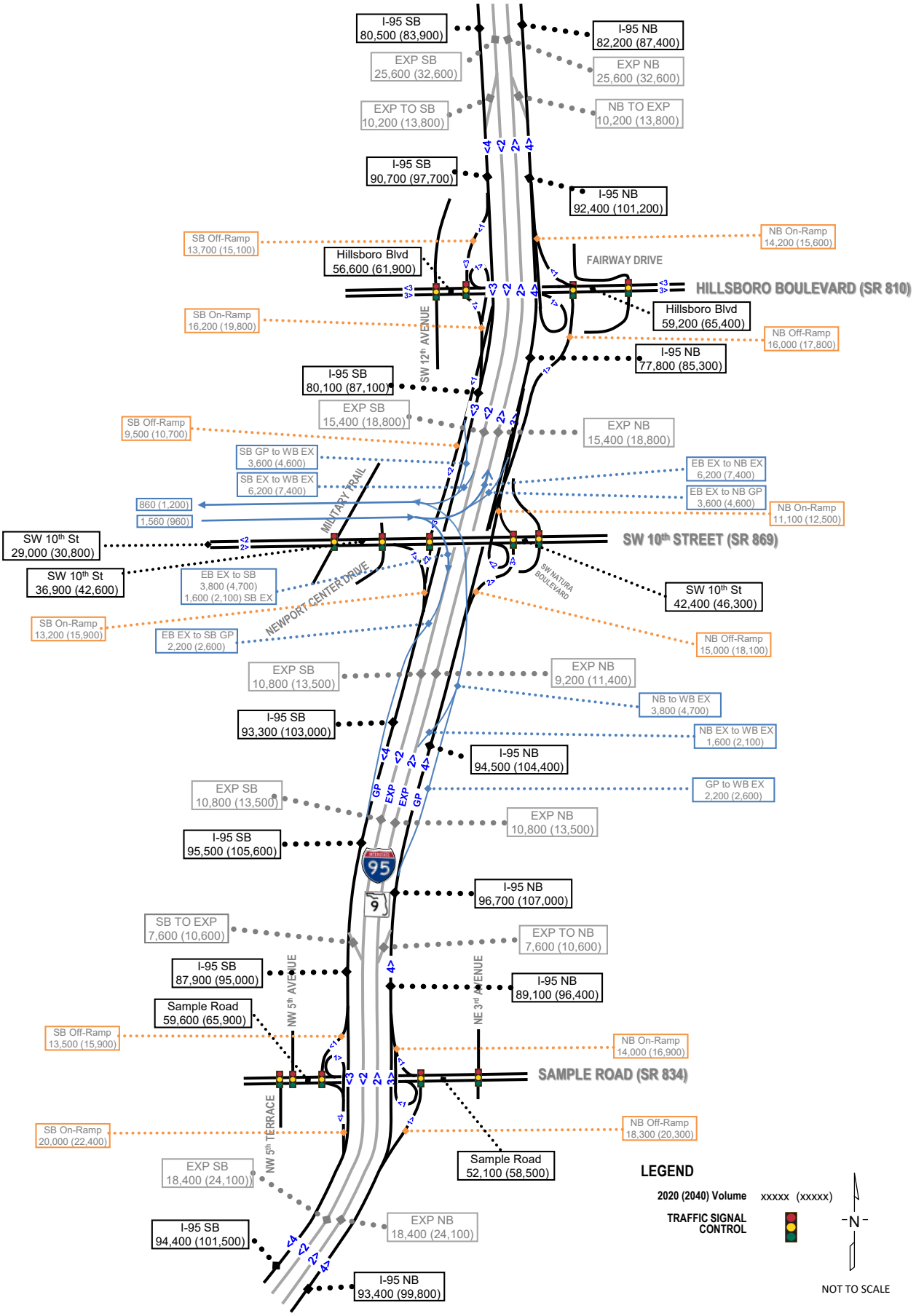


Figure 5.5: 2020 & 2040 Build 2A AADT Volumes

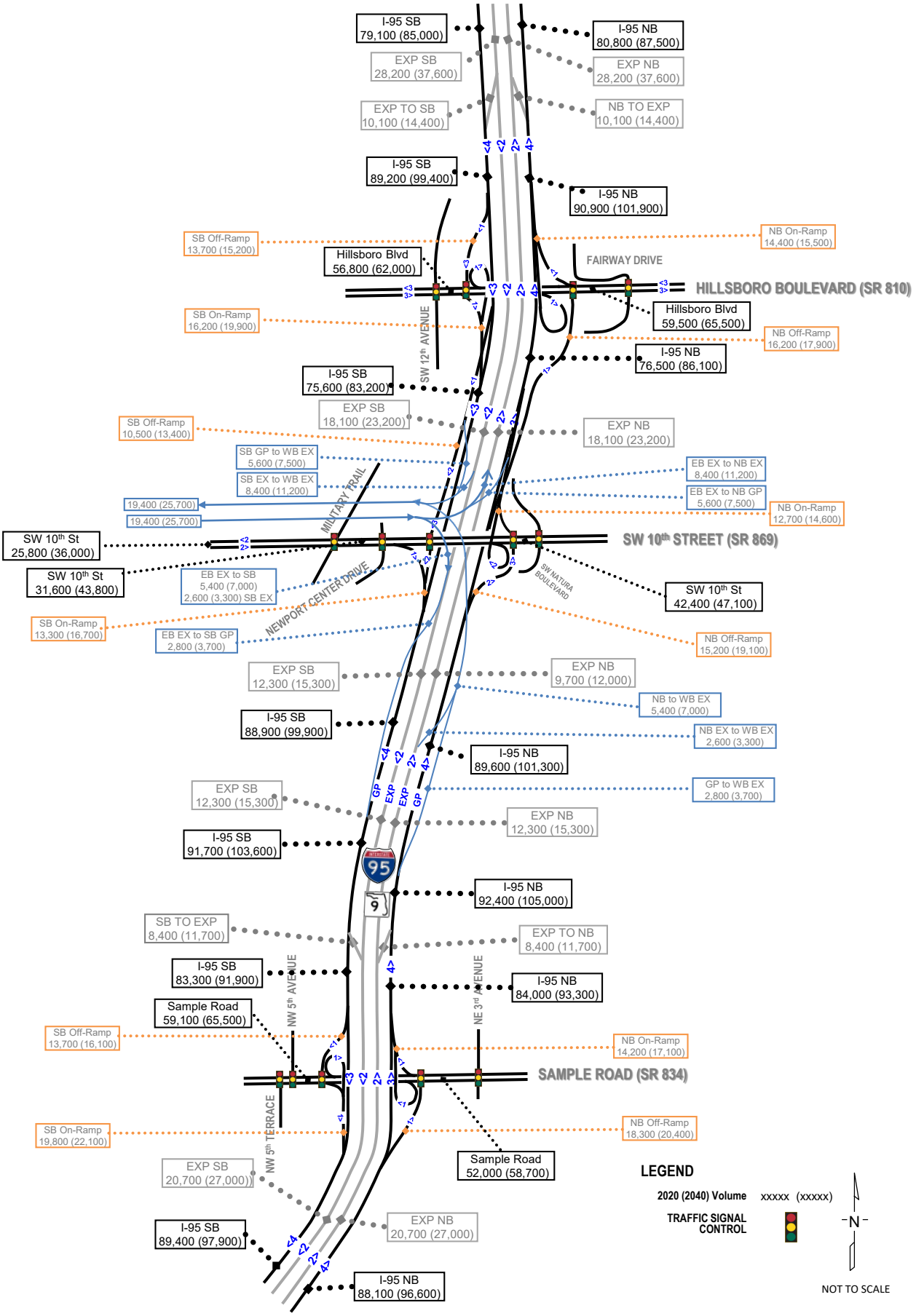


Figure 5.6: 2020 Build 1 Peak Hour Volumes

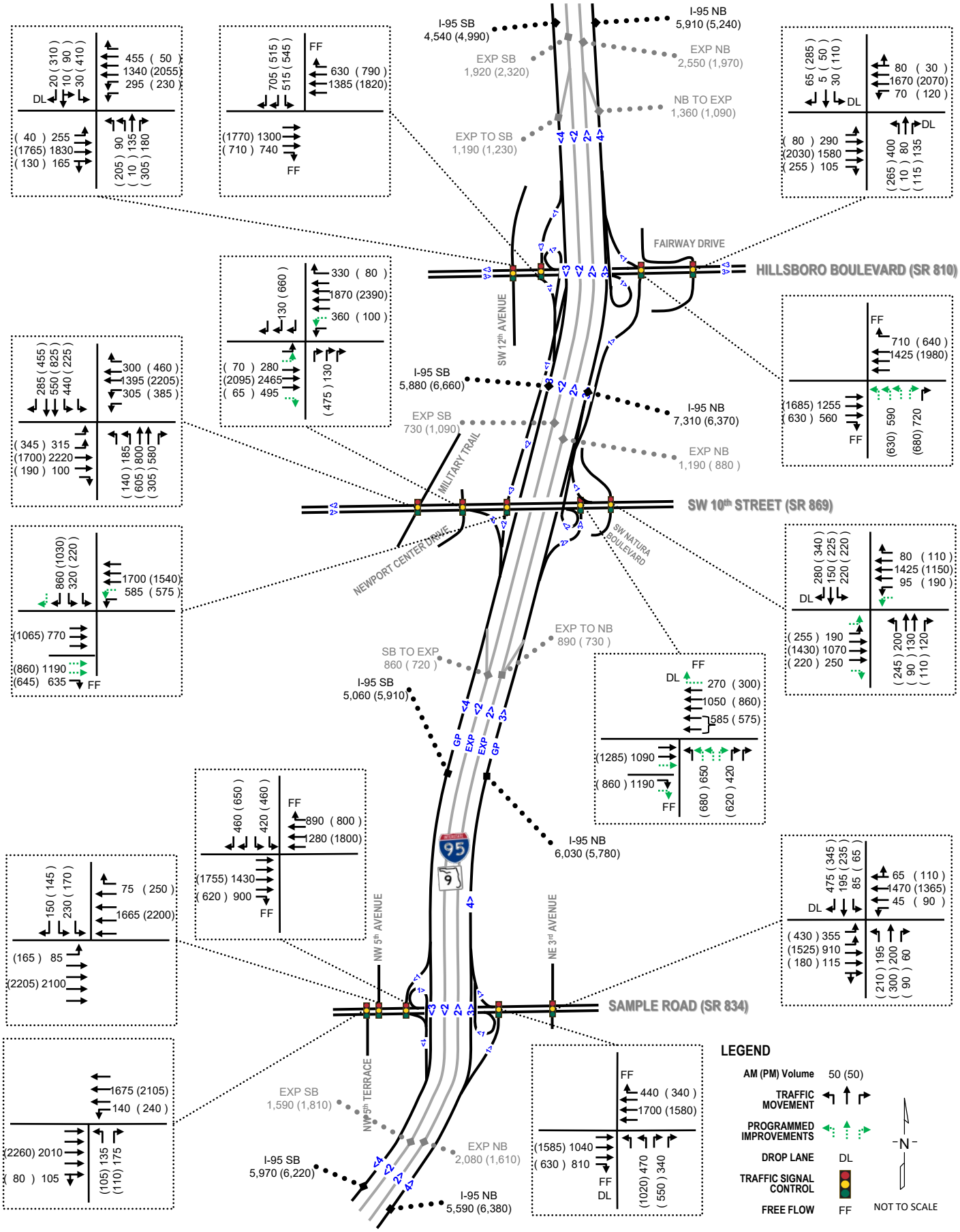


Figure 5.7: 2040 Build 1 Peak Hour Volumes

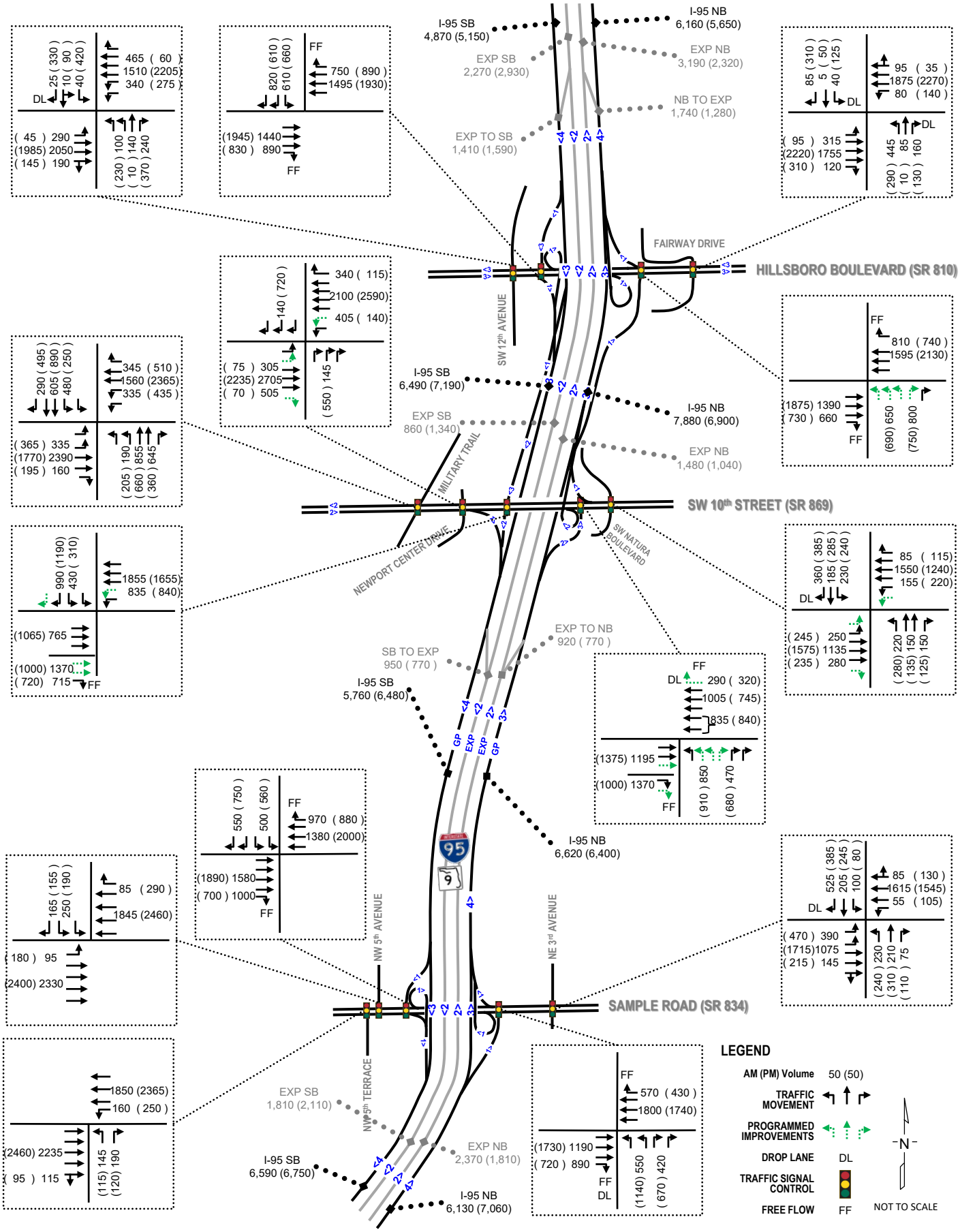


Figure 5.8: 2020 Build 2 Peak Hour Volumes

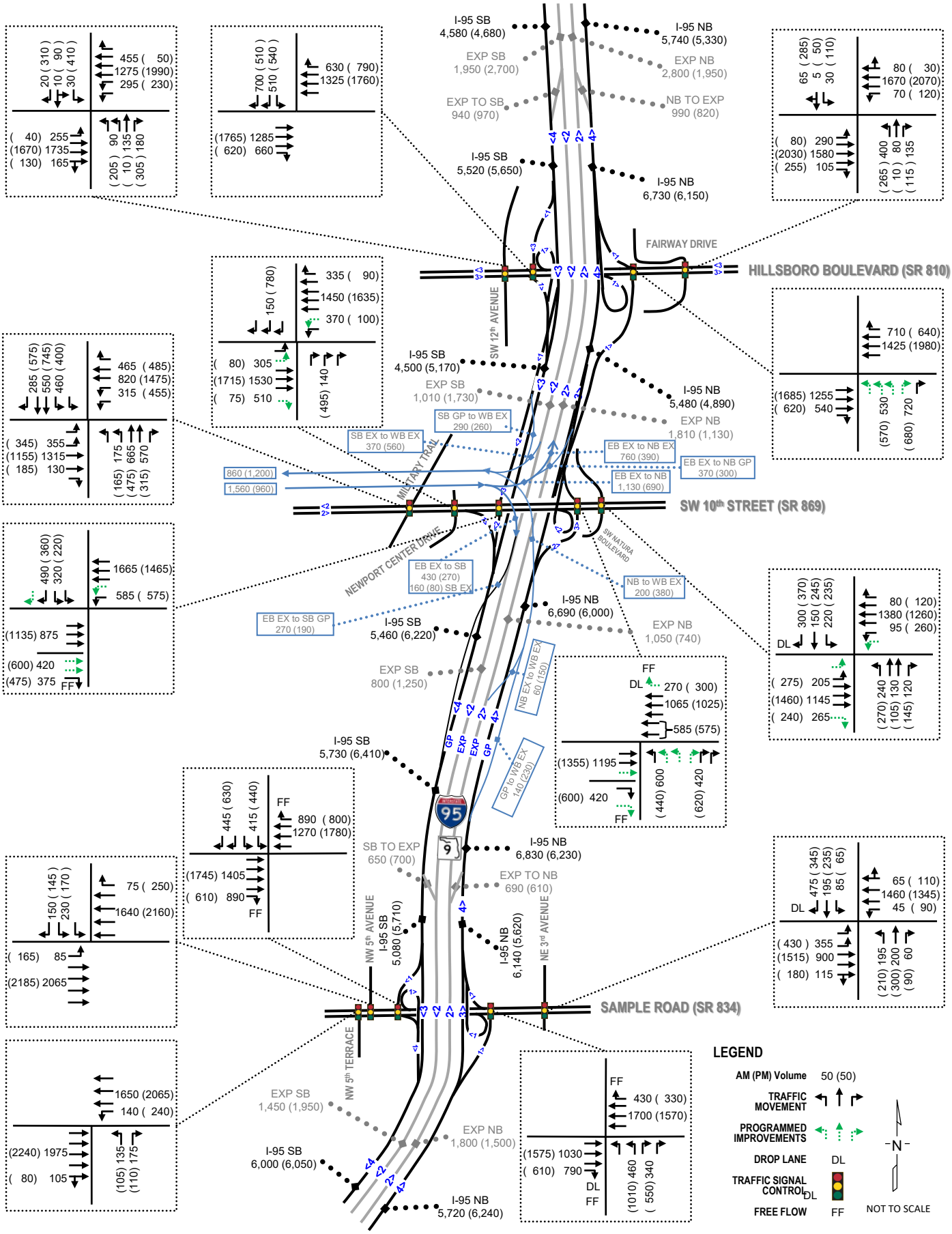


Figure 5.9: 2040 Build 2 Peak Hour Volumes

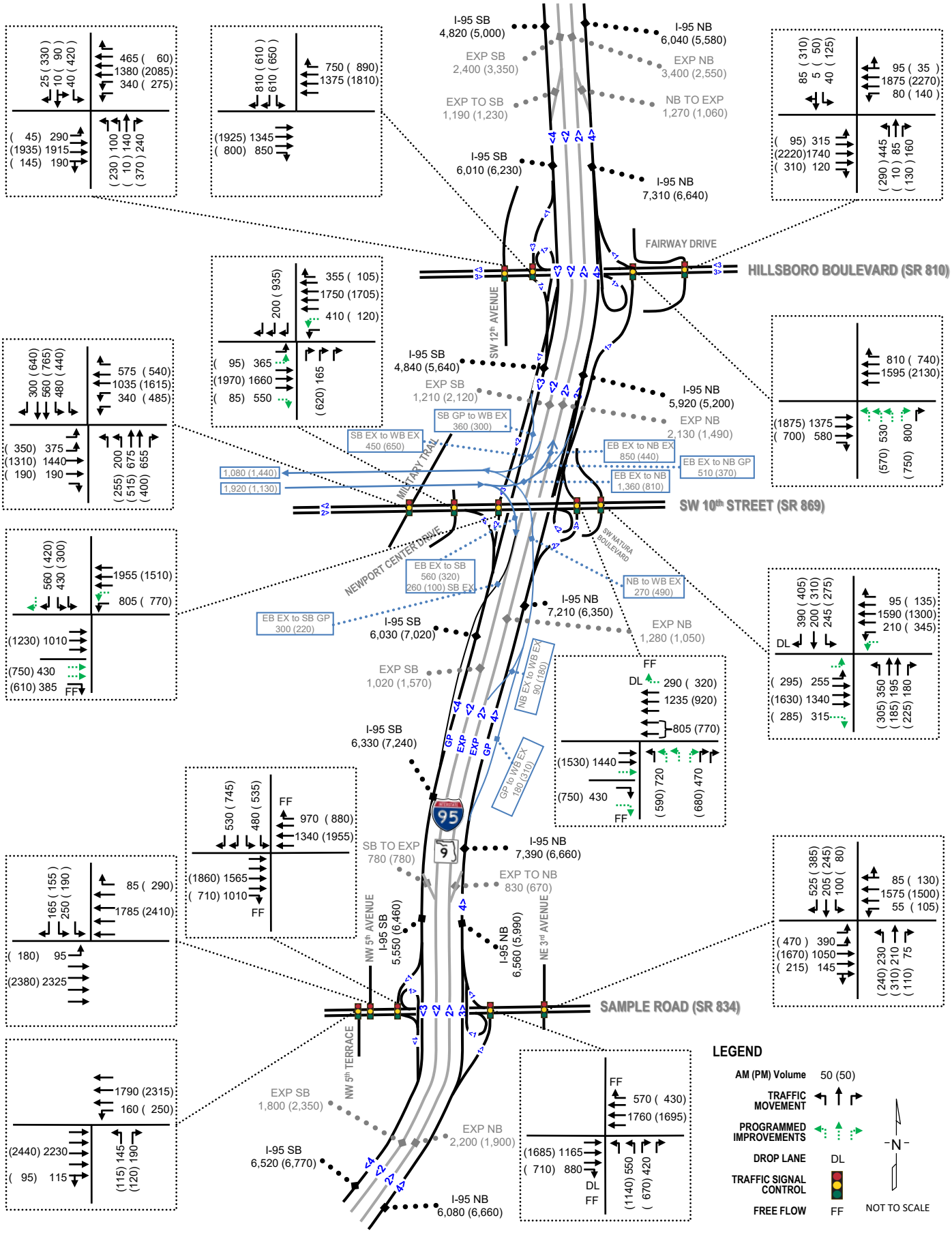


Figure 5.10: 2020 Build 2A Peak Hour Volumes

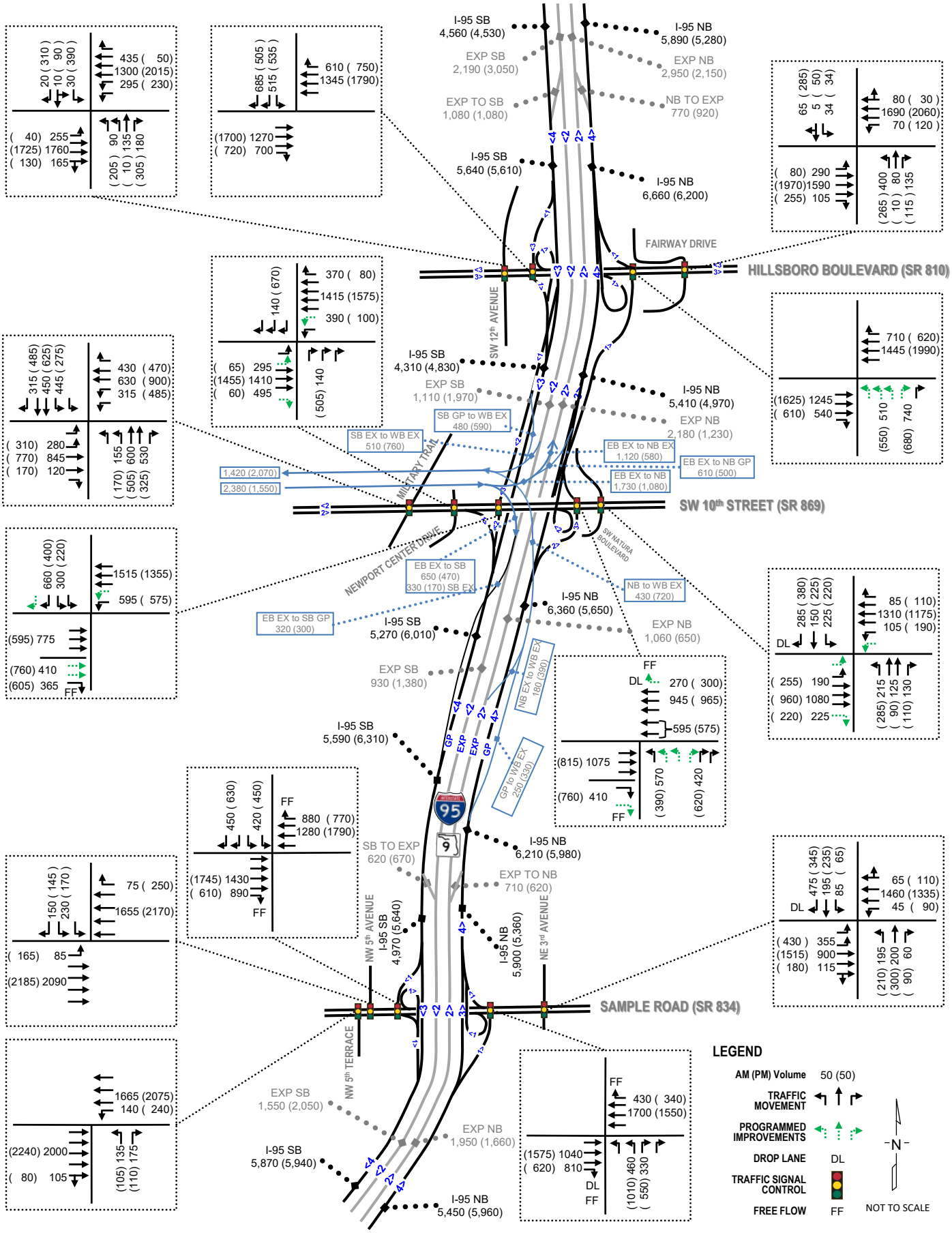
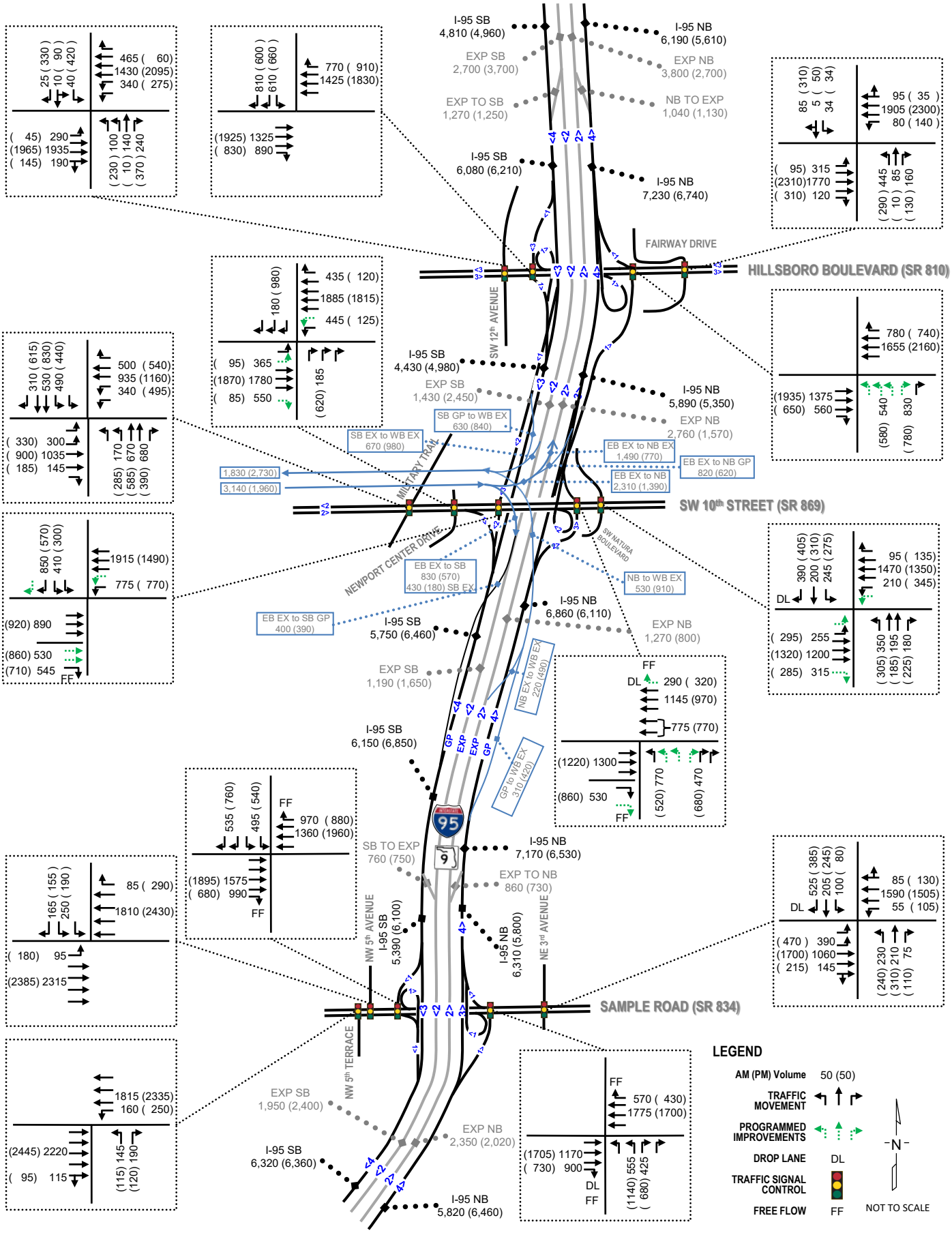


Figure 5.11: 2040 Build 2A Peak Hour Volumes



5.4 Build 1 Alternative – Traffic Operational Analysis

The proposed improvements are expected to provide better operating conditions than the No-Build conditions and prevent any spillbacks from the ramp terminals on to the mainline. These improvements are also likely to improve safety by reducing congestion and the number of conflict points.

5.4.1 2020 & 2040 – Freeway Analysis – I-95

The mainline/basic, weaving, and ramp merge/diverge analysis results for Opening Year 2020 are summarized and depicted on **Figures 5.12** and **5.13** for the NB and SB directions, respectively. The Design Year 2040 analysis results are summarized and depicted on **Figures 5.14** and **5.15** for the NB and SB directions, respectively. Documentation of the 2020 and 2040 Build 1 Alternative traffic freeway operational analysis is provided in **Appendix K**. The Design Year 2040 Build 1 Alternative analysis indicates that 7 of the 14 freeway segments in the NB direction are projected to operate at LOS E or F during one or both peak hours. In the SB direction, 3 of the 14 freeway segments are projected to operate at LOS E or F during one or both peak hours.

5.4.2 2020 & 2040 - Intersection Analysis

Tables 5.1 through **5.3** summarize the results of the 2020 Build 1 signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. **Tables 5.4** through **5.6** summarize the results of the 2040 Build 1 signalized intersection analyses for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. Signal timing was optimized for all intersections. The results include delays (in seconds per vehicle) and LOS by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. **Appendix L** presents the intersection analysis worksheets. The intersection analysis results indicate the following for the 2040 Design Year:

- Hillsboro Boulevard: Two of the four signalized intersections are expected to operate at LOS E or worse during the AM or PM peak hours. The I-95 northbound and southbound off-ramp intersections are expected to operate at LOS C or better during both the AM and PM peak hours.
- SW 10th Street: Of the five signalized intersections, only the intersection at Military Trail is expected to operate at LOS F during both peak hours. The I-95 NB and SB off-ramp approaches are expected to operate at LOS E or worse during both peak hours.
- Sample Road: All five signalized intersections including the I-95 NB and SB off-ramp approaches are expected to operate at LOS D or better during both peak hours.

Figure 5.12: 2020 Build 1 Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	5,910 (5,240)	C (23.2)	C (20.2)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	7,270 (6,330)	D (34.0)	C (29.0)
Basic Freeway	6,000 (5,060)	E (35.7)	D (27.4)
Merge from SW 10th St EB & WB	6,000 (5,060)	D (32.8)	C (27.2)
Basic Freeway	4,540 (3,900)	C (23.8)	C (20.0)
Diverge to Hillsboro Blvd EB & WB	5,850 (5,210)	E (37.1)	D (34.5)
Basic Freeway	5,850 (5,210)	D (34.2)	D (28.5)
Major Diverge to SW 10th Street EB & WB	6,920 (6,510)	D (32.3)	D (30.4)
Basic Freeway	6,920 (6,510)	F (47.9)	E (41.8)
Merge from I-95 Express Lanes	6,920 (6,510)	C (27.4)	C (25.1)
Basic Freeway	6,030 (5,780)	C (23.7)	C (22.5)
Lane Add from Sample Road WB*	6,030 (5,780)	Under Capacity v/c: u/s, Ramp, d/s 0.71, 0.63, 0.67	Under Capacity v/c: u/s, Ramp, d/s 0.71, 0.49, 0.64
Basic Freeway	4,780 (4,810)	C (25.4)	C (25.6)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,590 (6,380)	C (27.6)	E (35.2)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

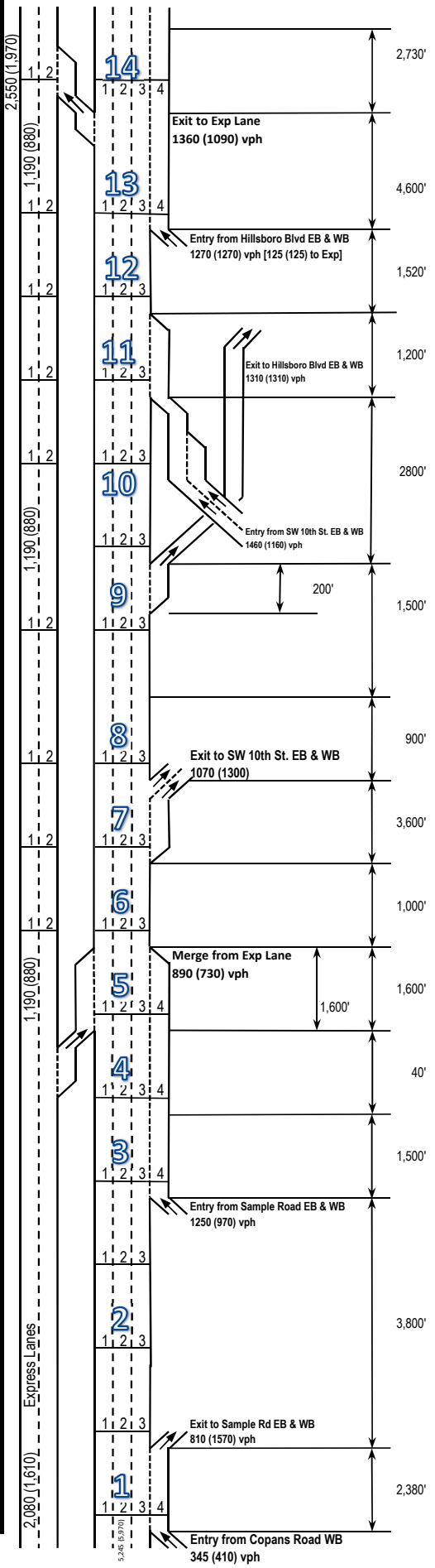
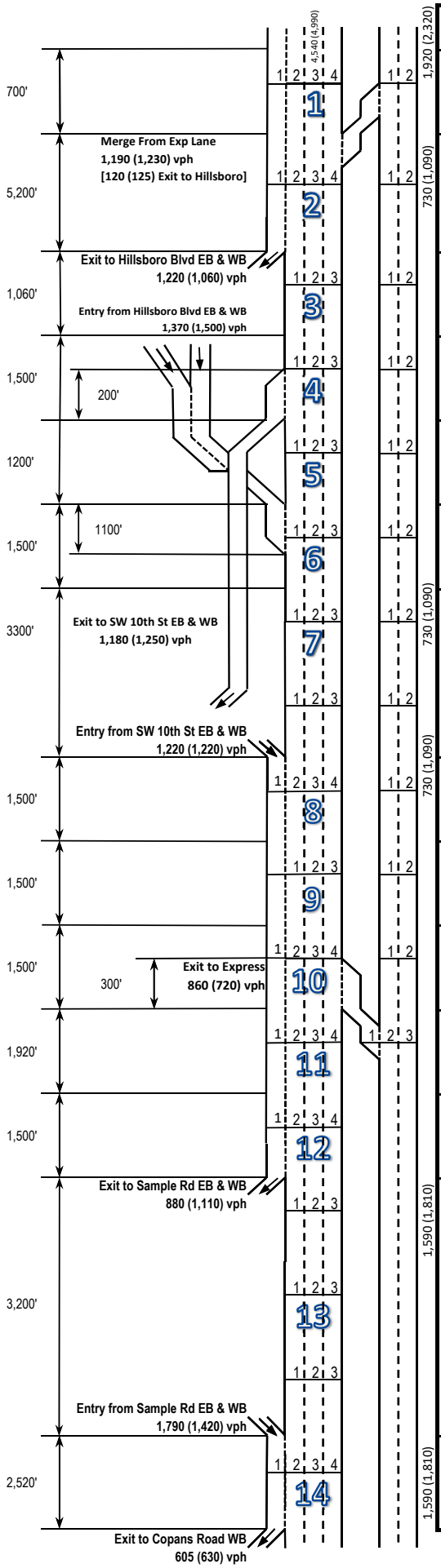


Figure 5.13: 2020 Build 1 Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,540 (4,990)	B (17.3)	C (19.1)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	5,730 (6,220)	C (25.9)	D (28.4)
Basic Freeway	4,510 (5,160)	C (23.6)	D (28.2)
Diverge to SW 10th St EB & WB	4,510 (5,160)	D (31.2)	D (34.2)
Basic Freeway	3,330 (3,910)	B (16.8)	C (20.0)
Merge from Hillsboro Blvd EB & WB	4,700 (5,410)	C (25.3)	D (29.3)
Basic Freeway	4,700 (5,410)	C (24.8)	D (30.2)
Lane Add Merge from SW 10th Street EB & WB*	5,920 (6,630)	Under Capacity v/c: u/s, Ramp, d/s 0.70, 0.62, 0.66	Under Capacity v/c: u/s, Ramp, d/s 0.80, 0.62, 0.74
Basic Freeway	5,920 (6,630)	C (23.1)	D (26.7)
Diverge to I-95 Express Lanes	5,920 (6,630)	D (32.7)	D (35.0)
Basic Freeway	5,060 (5,910)	C (19.4)	C (23.1)
Diverge - Lane Drop to Sample Road EB & WB	5,060 (5,910)	C (23.7)	D (27.6)
Basic Freeway	4,180 (4,800)	C (21.6)	D (25.5)
Weave - Entry Sample Road EB to Exit Copans Road WB	5,970 (6,220)	F (N/A)	D (34.4)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Figure 5.14: 2040 Build 1 Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,160 (5,650)	C (24.4)	C (22.0)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	7,900 (6,930)	E (40.6)	D (34.0)
Basic Freeway	6,430 (5,460)	E (40.7)	D (30.6)
Merge from SW 10th St EB & WB	6,430 (5,460)	E (35.6)	D (29.7)
Basic Freeway	4,770 (4,140)	C (25.3)	C (21.3)
Diverge to Hillsboro Blvd EB & WB	6,220 (5,580)	E (38.8)	E (36.3)
Basic Freeway	6,220 (5,580)	E (38.2)	D (31.6)
Major Diverge to SW 10th Street EB & WB	7,540 (7,170)	E (35.2)	D (33.5)
Basic Freeway	7,540 (7,170)	F (60.4)	F (52.4)
Merge from I-95 Express Lanes	7,540 (7,170)	D (30.0)	C (27.9)
Basic Freeway	6,620 (6,400)	D (26.7)	C (25.5)
Lane Add from Sample Road WB*	6,620 (6,400)	Under Capacity v/c: u/s, Ramp, d/s 0.77, 0.74, 0.74	Under Capacity v/c: u/s, Ramp, d/s 0.78, 0.58, 0.71
Basic Freeway	5,160 (5,250)	D (28.2)	D (28.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	6,130 (7,060)	D (31.4)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

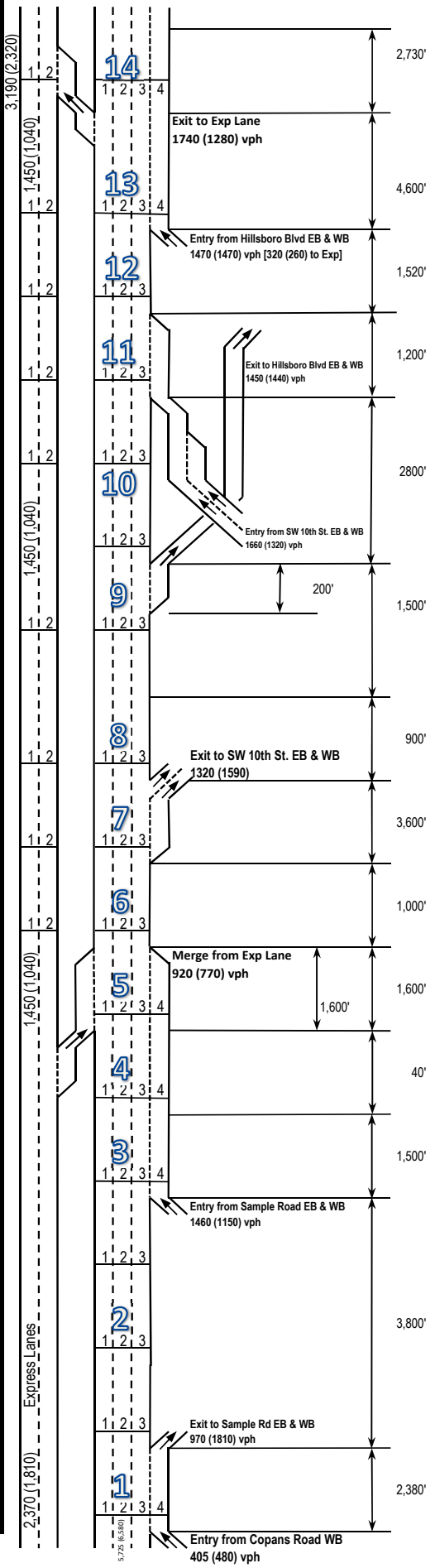
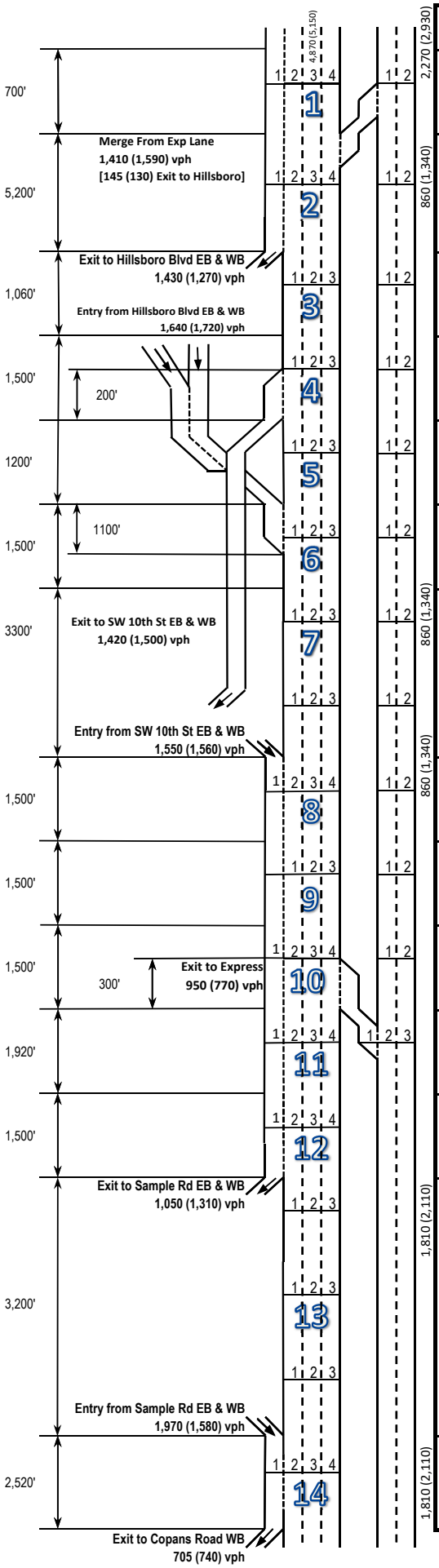


Figure 5.15: 2040 Build 1 Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,870 (5,150)	C (18.6)	C (19.8)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	6,280 (6,740)	D (29.0)	D (41.3)
Basic Freeway	4,850 (5,470)	C (25.9)	D (30.7)
Diverge to SW 10th St EB & WB	4,850 (5,470)	D (33.3)	E (36.0)
Basic Freeway	3,430 (3,970)	B (17.5)	C (20.4)
Merge from Hillsboro Blvd EB & WB	5,070 (5,690)	D (28.1)	D (31.3)
Basic Freeway	5,070 (5,690)	D (27.5)	D (32.6)
Lane Add Merge from SW 10th Street EB & WB*	6,620 (7,250)	Under Capacity v/c: u/s, Ramp, d/s 0.75, 0.78, 0.74	Under Capacity v/c: u/s, Ramp, d/s 0.84, 0.79, 0.81
Basic Freeway	6,620 (7,250)	D (26.7)	D (30.4)
Diverge to I-95 Express Lanes	6,620 (7,250)	E (36.3)	E (38.0)
Basic Freeway	5,670 (6,480)	C (22.0)	D (25.9)
Diverge - Lane Drop to Sample Road EB & WB	5,670 (6,480)	C (26.5)	D (30.3)
Basic Freeway	4,620 (5,170)	C (24.3)	D (28.2)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,590 (6,750)	F (N/A)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Table 5.1: 2020 Build 1 – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (98.6)	C (22.5)		F (101.2)	B (19.9)	A (8.3)	E (74.6)	F (93.6)	E (59.7)	F (84.5)	F (84.4)	E (56.8)	C (34.3)
			Approach	C (31.1)			C (28.9)			E (74.3)			E (75.2)			
		Volume to Capacity ratio	Movement	0.90	0.68		0.90	0.51	0.40	0.28	0.77	0.12	0.31	0.30	0.01	
		Queue Length 95th (ft)	Movement	#473	723		#295	496	133	85	247	67	63	63	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.8)		B (15.0)					E (59.7)		D (50.9)	B (18.8)
			Approach	A (0.4)			B (15.0)						D (54.6)			
		Volume to Capacity ratio	Movement		0.28	0.49		0.51					0.83		0.72	
		Queue Length 95th (ft)	Movement		0	62		435					653		448	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		A (8.6)			A (6.9)	A (0.5)	C (21.3)		C (27.5)				B (11.3)
			Approach	A (8.6)			A (4.8)			C (24.7)						
		Volume to Capacity ratio	Movement		0.47			0.54	0.49	0.36		0.72				
		Queue Length 95th (ft)	Movement		243			m163	m0	110		242				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (106.4)	B (14.5)	B (13.9)	F (86.8)	C (31.2)		F (414.1)	E (71.2)	E (68.5)	F (82.6)	F (83.3)	F (83.2)	E (67.6)
			Approach	C (27.9)			C (33.3)			F (293.5)			F (83.0)			
		Volume to Capacity ratio	Movement	0.96	0.51	0.07	0.61	0.69		1.73	0.35	0.09	0.40	0.07	0.05	
		Queue Length 95th (ft)	Movement	#587	368	19	150	360		#924	160	72	70	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (55.5)	C (32.4)		F (206.7)	C (23.9)	A (0.1)	D (54.6)	D (48.8)	F (155.2)	E (63.2)	E (63.9)	D (40.9)	D (47.1)
			Approach	C (32.9)			D (41.4)			F (113.5)			D (54.9)			
		Volume to Capacity ratio	Movement	0.42	0.86		1.25	0.93	0.03	0.64	0.06	1.14	0.84	0.84	0.52	
		Queue Length 95th (ft)	Movement	72	#701		m#213	#785	m0	124	26	#324	306	313	146	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		B (18.3)					D (43.4)		C (28.7)	B (13.4)
			Approach	A (0.2)			B (18.3)						D (36.2)			
		Volume to Capacity ratio	Movement		0.38	0.47		0.72					0.85		0.51	
		Queue Length 95th (ft)	Movement		0	m0		550					499		213	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (10.1)			A (9.2)	A (0.5)	B (16.8)		C (23.3)				B (11.0)
			Approach	B (10.1)			A (7.1)			C (20.1)						
		Volume to Capacity ratio	Movement		0.62			0.73	0.44	0.44		0.78				
		Queue Length 95th (ft)	Movement		188			m259	m0	96		#193				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (85.9)	B (15.5)	A (7.6)	F (136.9)	C (21.5)		F (149.6)	D (44.2)	D (44.5)	D (42.5)	D (44.5)	E (62.2)	C (31.7)
			Approach	B (17.3)			C (27.7)			F (115.9)			E (55.3)			
		Volume to Capacity ratio	Movement	0.81	0.77	0.24	1.01	0.78		1.14	0.04	0.08	0.44	0.19	0.78	
		Queue Length 95th (ft)	Movement	m#124	521	m103	#234	660		#294	23	36	116	68	215	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.2: 2020 Build 1 – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (126.1)	F (100.8)	B (19.2)	E (70.1)	E (57.0)	B (12.1)	E (79.2)	F (173.7)	F (138.7)	F (187.5)	E (55.2)	A (0.3)	F (95.9)
			Approach	F (100.7)			D (52.3)			F (149.6)			F (88.6)			
		Volume to Capacity ratio	Movement	1.03	1.11	0.07	0.83	0.96	0.29	0.76	1.23	1.15	1.22	0.71	0.20	
		Queue Length 95th (ft)	Movement	#288	#1072	12	#239	#916	86	#159	#685	#708	#411	355	0	
	East Newport Center Drive	LOS (Delay)	Movement	C (33.7)	A (5.9)	A (2.7)	C (29.8)	A (3.0)	A (2.7)			C (27.2)			C (29.7)	A (8.2)
			Approach	A (7.8)			A (6.7)			C (27.2)			C (29.7)			
		Volume to Capacity ratio	Movement	0.64	0.74	0.46	0.64	0.42	0.30			0.05			0.08	
		Queue Length 95th (ft)	Movement	m82	m106	m33	m113	m60	m27			21			22	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		D (45.7)	A (0.6)	D (38.9)	A (7.6)					D (38.8)		F (87.6)	D (35.1)
			Approach	C (34.9)			B (15.4)						E (74.4)			
		Volume to Capacity ratio	Movement		0.97	0.42	0.64	0.61					0.31		1.02	
		Queue Length 95th (ft)	Movement		#570	0	208	204					172		#679	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (7.6)	A (0.2)		A (4.1)	A (0.2)	E (57.7)		E (56.3)				B (14.4)
			Approach	A (3.8)			A (3.5)			E (57.1)						
		Volume to Capacity ratio	Movement		0.38	0.45		0.32	0.18	0.69		0.61				
		Queue Length 95th (ft)	Movement		m113	m375		86	0	270		225				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (35.6)	B (18.7)	D (44.7)	C (33.9)	C (23.3)	B (14.5)	C (30.6)	C (31.4)	C (30.3)	C (27.8)	D (38.7)	C (29.6)	C (26.0)
			Approach	C (25.2)			C (23.5)			C (30.7)			C (31.1)			
		Volume to Capacity ratio	Movement	0.57	0.54	0.17	0.43	0.78	0.05	0.67	0.37	0.08	0.67	0.70	0.19	
		Queue Length 95th (ft)	Movement	76	187	52	46	281	0	#138	58	0	147	#148	60	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (192.0)	C (34.8)	B (18.8)	E (63.1)	F (163.9)	B (12.7)	F (126.5)	F (105.9)	D (40.9)	F (189.1)	F (209.2)	A (0.5)	F (105.9)
			Approach	E (57.7)			F (128.4)			F (89.8)			F (143.1)			
		Volume to Capacity ratio	Movement	1.22	0.76	0.16	0.86	1.28	0.44	0.95	1.03	0.47	1.18	1.31	0.31	
		Queue Length 95th (ft)	Movement	#338	601	68	#284	#1672	111	#152	#491	203	#240	#726	0	
	East Newport Center Drive	LOS (Delay)	Movement	C (21.2)	A (3.7)	A (2.9)	C (22.1)	B (11.1)	B (10.4)			C (28.1)			C (33.7)	B (12.6)
			Approach	A (4.3)			B (11.5)			C (28.1)			C (33.7)			
		Volume to Capacity ratio	Movement	0.07	0.67	0.04	0.14	0.69	0.06			0.57			0.84	
		Queue Length 95th (ft)	Movement	m24	m165	m6	m33	m343	m19			114			155	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		F (88.8)	A (0.6)	D (50.9)	B (10.6)					C (33.7)		F (109.2)	E (56.7)
			Approach	E (67.2)			C (21.3)						F (95.9)			
		Volume to Capacity ratio	Movement		1.09	0.43	0.63	0.59					0.19		1.10	
		Queue Length 95th (ft)	Movement		#621	0	0	220					114		#831	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (1.1)	A (0.1)		A (2.9)	A (0.2)	E (58.6)		E (73.6)				B (17.3)
			Approach	A (0.7)			A (2.5)			E (65.8)						
		Volume to Capacity ratio	Movement		0.43	0.32		0.28	0.20	0.72		0.90				
		Queue Length 95th (ft)	Movement		m4	m30		53	m0	283		#366				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (38.7)	B (15.4)	B (10.4)	D (38.3)	C (25.0)	B (17.4)	D (52.4)	C (31.9)	C (31.1)	B (18.6)	D (39.1)	C (27.9)	C (24.8)
			Approach	B (18.0)			C (26.2)			D (43.0)			C (28.5)			
		Volume to Capacity ratio	Movement	0.70	0.85	0.15	0.69	0.74	0.08	0.88	0.30	0.08	0.53	0.77	0.39	
		Queue Length 95th (ft)	Movement	m78	267	m26	#93	232	2	#190	45	0	141	#225	#108	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.3: 2020 Build 1 – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.2)		D (53.6)	A (1.2)		E (56.6)		D (46.9)				B (14.0)
			Approach		B (16.2)			A (5.2)			D (51.1)					
		Volume to Capacity ratio	Movement		0.54		0.64	0.48		0.67		0.12				
		Queue Length 95th (ft)	Movement		325		#155	27		170		64				
	NW 5th Avenue	LOS (Delay)	Movement	D (49.6)	A (2.0)			A (9.1)	A (4.8)				D (51.2)		D (47.0)	A (9.9)
			Approach		A (3.8)			A (8.9)						D (49.6)		
		Volume to Capacity ratio	Movement	0.70	0.47			0.45	0.05				0.59		0.13	
		Queue Length 95th (ft)	Movement	#153	43			251	m5				130		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.2)	A (1.5)		A (6.9)					B (20.0)		C (23.7)	A (8.2)
			Approach		A (3.8)			A (6.9)						C (21.9)		
		Volume to Capacity ratio	Movement		0.43	0.60		0.48					0.52		0.70	
		Queue Length 95th (ft)	Movement		124	360		144					108		138	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.1)			A (4.6)	A (0.2)	C (22.1)		C (21.3)				A (7.7)
			Approach		A (5.1)			A (3.7)			C (21.8)					
		Volume to Capacity ratio	Movement		0.38			0.62	0.29	0.63		0.56				
		Queue Length 95th (ft)	Movement		56			m145	m0	124		104				
	NE 3rd Avenue	LOS (Delay)	Movement	E (66.7)	B (18.0)		E (56.4)	D (39.7)		D (40.0)	D (36.9)	C (32.7)	C (30.7)	D (36.8)	E (78.5)	D (40.7)
			Approach		C (30.6)			D (40.1)			D (37.7)			E (62.4)		
		Volume to Capacity ratio	Movement	0.91	0.49		0.49	0.87		0.65	0.44	0.04	0.29	0.43	0.97	
		Queue Length 95th (ft)	Movement	m243	263		79	505		183	214	0	86	209	#517	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.1)		F (122.2)	A (1.6)		E (56.5)		D (48.8)				B (16.7)
			Approach		B (16.1)			B (14.0)			D (52.6)					
		Volume to Capacity ratio	Movement		0.58		1.04	0.58		0.63		0.08				
		Queue Length 95th (ft)	Movement		355		#380	30		142		54				
	NW 5th Avenue	LOS (Delay)	Movement	F (134.4)	A (1.6)			A (9.9)	A (3.7)				D (51.8)		D (48.9)	B (12.5)
			Approach		B (10.9)			A (9.3)						D (50.5)		
		Volume to Capacity ratio	Movement	1.10	0.48			0.59	0.17				0.53		0.10	
		Queue Length 95th (ft)	Movement	#309	35			382	m6				104		61	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.4)	A (0.7)		A (8.7)					B (19.5)		D (41.2)	B (11.8)
			Approach		A (4.9)			A (8.7)						C (32.2)		
		Volume to Capacity ratio	Movement		0.54	0.41		0.69					0.54		0.94	
		Queue Length 95th (ft)	Movement		187	37		167					118		#243	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (15.8)			B (11.1)	A (0.2)	D (36.1)		C (28.7)				B (18.6)
			Approach		B (15.8)			A (9.2)			C (33.5)					
		Volume to Capacity ratio	Movement		0.65			0.65	0.23	0.80		0.53				
		Queue Length 95th (ft)	Movement		358			m147	m0	416		230				
	NE 3rd Avenue	LOS (Delay)	Movement	E (68.6)	C (25.7)		E (74.6)	C (34.7)		F (87.6)	D (51.1)	D (36.2)	D (37.5)	D (47.9)	D (46.4)	D (40.0)
			Approach		C (34.4)			D (37.0)			E (61.6)			D (46.0)		
		Volume to Capacity ratio	Movement	0.92	0.78		0.76	0.79		0.96	0.77	0.06	0.42	0.68	0.63	
		Queue Length 95th (ft)	Movement	#290	420		#165	#537		#248	321	0	68	254	217	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.4: 2040 Build 1 – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (113.9)	C (26.3)		F (125.2)	C (20.4)	B (12.1)	E (74.4)	F (93.9)	E (61.4)	F (84.5)	F (84.4)	E (55.3)	D (39.3)
			Approach	D (36.3)			C (34.2)			E (73.6)			E (74.7)			
		Volume to Capacity ratio	Movement	0.97	0.77		1.02	0.59	0.42	0.30	0.77	0.30	0.36	0.35	0.02	
		Queue Length 95th (ft)	Movement	#583	914		#353	354	118	93	255	140	72	72	1	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (1.1)		C (27.8)					D (52.9)		D (43.6)	C (20.9)
			Approach	A (0.5)			C (27.8)						D (47.6)			
		Volume to Capacity ratio	Movement		0.31	0.59		0.62					0.84		0.71	
		Queue Length 95th (ft)	Movement		0	239		429					719		473	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (13.9)			A (9.4)	A (0.4)	C (20.1)		C (27.5)				B (13.2)
			Approach	B (13.9)			A (6.4)			C (24.1)						
		Volume to Capacity ratio	Movement		0.55			0.63	0.56	0.37		0.76				
		Queue Length 95th (ft)	Movement		255			m256	m0	121		282				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (137.4)	B (14.6)	A (10.0)	F (88.4)	C (32.7)		F (532.4)	E (72.4)	E (69.5)	F (84.2)	F (83.3)	F (83.3)	F (80.4)
			Approach	C (32.0)			C (34.9)			F (368.6)			F (83.6)			
		Volume to Capacity ratio	Movement	1.07	0.57	0.08	0.64	0.76		1.99	0.39	0.11	0.52	0.07	0.06	
		Queue Length 95th (ft)	Movement	#667	428	m23	167	739		#1063	169	79	85	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (69.3)	D (39.8)		F (228.9)	B (19.1)	A (0.3)	E (65.3)	E (56.5)	F (246.5)	F (84.7)	F (85.6)	E (65.3)	E (59.2)
			Approach	D (40.4)			D (41.4)			F (175.0)			E (77.4)			
		Volume to Capacity ratio	Movement	0.56	0.92		1.29	0.91	0.04	0.70	0.06	1.36	0.91	0.91	0.81	
		Queue Length 95th (ft)	Movement	#98	#897		m#253	#900	m0	157	29	#516	#415	#425	#333	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		C (28.8)					D (50.4)		C (29.3)	B (17.9)
			Approach	A (0.2)			C (28.8)						D (40.3)			
		Volume to Capacity ratio	Movement		0.42	0.55		0.83					0.90		0.53	
		Queue Length 95th (ft)	Movement		m0	m0		661					733		286	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (13.3)			B (12.1)	A (0.6)	B (18.4)		C (26.3)				B (13.4)
			Approach	B (13.3)			A (9.1)			C (22.4)						
		Volume to Capacity ratio	Movement		0.70			0.80	0.51	0.45		0.80				
		Queue Length 95th (ft)	Movement		273			m319	m0	118		#240				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (111.6)	C (22.6)	B (12.0)	F (136.9)	C (28.7)		F (131.4)	D (48.5)	D (49.1)	D (46.9)	D (48.9)	E (73.9)	D (37.8)
			Approach	C (24.6)			C (34.9)			F (104.6)			E (64.4)			
		Volume to Capacity ratio	Movement	0.92	0.86	0.32	1.00	0.86		1.08	0.03	0.10	0.43	0.16	0.84	
		Queue Length 95th (ft)	Movement	m#162	#919	m180	#290	#954		#351	25	56	144	75	291	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.5: 2040 Build 1 – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (178.3)	F (150.1)	C (21.7)	F (92.9)	E (76.5)	B (12.1)	F (84.2)	F (195.2)	F (155.8)	F (212.6)	E (59.1)	A (0.3)	F (121.8)
			Approach	F (146.3)			E (69.0)			F (167.7)			F (100.3)			
		Volume to Capacity ratio	Movement	1.17	1.22	0.13	0.87	1.07	0.33	0.77	1.27	1.19	1.28	0.75	0.20	
		Queue Length 95th (ft)	Movement	#342	#1295	58	#286	#1168	149	#169	#780	#810	#474	413	0	
	East Newport Center Drive	LOS (Delay)	Movement	D (37.6)	A (6.3)	A (4.3)	C (33.3)	A (5.5)	A (4.7)			C (28.3)			C (31.0)	A (9.9)
			Approach	A (8.7)			A (9.3)			C (28.3)			C (31.0)			
		Volume to Capacity ratio	Movement	0.65	0.82	0.47	0.67	0.48	0.31			0.09			0.13	
		Queue Length 95th (ft)	Movement	m99	m209	m80	m138	m213	m92			27			27	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		F (92.4)	A (0.6)	E (77.9)	B (10.2)					D (39.3)		F (104.0)	E (57.6)
			Approach	E (69.9)			C (30.7)						F (84.4)			
		Volume to Capacity ratio	Movement		1.08	0.48	0.98	0.70					0.38		1.08	
		Queue Length 95th (ft)	Movement		#718	0	m#424	m275					234		#838	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (8.2)	A (0.2)		A (3.1)	A (0.2)	F (84.1)		E (65.5)				B (19.4)
			Approach	A (4.0)			A (2.7)			E (77.5)						
		Volume to Capacity ratio	Movement		0.40	0.52		0.35	0.19	0.96		0.73				
		Queue Length 95th (ft)	Movement		m112	m489		80	m0	#420		272				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (43.9)	B (19.9)	D (49.9)	C (34.4)	C (24.6)	B (14.6)	D (48.3)	C (32.9)	C (31.6)	C (32.2)	D (44.3)	D (35.4)	C (29.7)
			Approach	C (28.5)			C (25.0)			D (39.1)			D (36.6)			
		Volume to Capacity ratio	Movement	0.74	0.59	0.19	0.48	0.81	0.06	0.84	0.39	0.10	0.72	0.76	0.60	
		Queue Length 95th (ft)	Movement	112	191	60	71	334	0	#161	69	0	#177	#188	#178	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (219.8)	D (41.4)	C (20.4)	E (65.5)	F (209.7)	B (14.9)	F (183.9)	F (122.8)	D (45.2)	F (223.4)	F (256.5)	A (0.6)	F (130.5)
			Approach	E (67.6)			F (160.7)			F (110.3)			F (174.0)			
		Volume to Capacity ratio	Movement	1.28	0.83	0.15	0.87	1.38	0.53	1.14	1.08	0.63	1.26	1.41	0.34	
		Queue Length 95th (ft)	Movement	#381	705	52	#335	#2001	228	#232	#570	315	#282	#850	0	
	East Newport Center Drive	LOS (Delay)	Movement	C (21.4)	A (6.0)	A (3.7)	C (23.3)	B (14.1)	B (13.7)			C (30.2)			D (36.9)	B (15.3)
			Approach	A (6.4)			B (14.5)			C (30.2)			D (36.9)			
		Volume to Capacity ratio	Movement	0.07	0.73	0.05	0.18	0.77	0.08			0.64			0.86	
		Queue Length 95th (ft)	Movement	m23	m196	m39	m47	m411	m21			142			189	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		F (114.9)	A (0.7)	E (77.2)	B (11.9)					C (34.8)		F (152.6)	E (75.8)
			Approach	F (86.1)			C (33.4)						F (128.3)			
		Volume to Capacity ratio	Movement		1.14	0.48	0.98	0.65					0.26		1.21	
		Queue Length 95th (ft)	Movement		#730	0	m0	m232					161		#1055	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (1.3)	A (0.0)		A (2.6)	A (0.2)	F (100.8)		F (116.3)				C (29.7)
			Approach	A (0.8)			A (2.2)			F (107.5)						
		Volume to Capacity ratio	Movement		0.45	0.38		0.30	0.21	1.02		1.06				
		Queue Length 95th (ft)	Movement		m5	m68		m57	m0	#470		#470				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (39.9)	C (26.1)	B (17.7)	E (55.5)	C (28.6)	B (18.7)	E (60.1)	C (29.7)	C (28.8)	C (22.0)	E (63.9)	C (33.0)	C (32.6)
			Approach	C (26.8)			C (31.6)			D (45.3)			D (39.8)			
		Volume to Capacity ratio	Movement	0.71	0.95	0.16	0.84	0.80	0.08	0.94	0.26	0.09	0.57	0.93	0.61	
		Queue Length 95th (ft)	Movement	m86	m395	m43	#123	277	7	#272	64	0	154	#304	#198	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.6: 2040 Build 1 – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.9)		E (70.6)	A (1.5)		E (57.1)		D (46.4)				B (15.1)
			Approach		B (16.9)			A (7.0)			D (51.0)					
		Volume to Capacity ratio	Movement		0.60		0.79	0.53		0.69		0.13				
		Queue Length 95th (ft)	Movement		377		#237	32		181		65				
	NW 5th Avenue	LOS (Delay)	Movement	E (58.5)	A (2.2)			B (10.3)	A (4.9)				D (51.2)		D (47.0)	B (10.6)
			Approach		A (4.4)			B (10.1)						D (49.5)		
		Volume to Capacity ratio	Movement	0.78	0.53			0.50	0.06				0.61		0.22	
		Queue Length 95th (ft)	Movement	m#174	46			298	m6				140		82	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.2)	A (2.0)		A (7.9)					C (20.2)		C (26.7)	A (9.4)
			Approach		A (4.6)			A (7.9)						C (23.6)		
		Volume to Capacity ratio	Movement		0.48	0.67		0.53					0.59		0.80	
		Queue Length 95th (ft)	Movement		159	456		168					127		#189	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.7)			A (7.1)	A (0.2)	C (22.6)		C (22.1)				A (9.3)
			Approach		A (6.7)			A (5.5)			C (22.4)					
		Volume to Capacity ratio	Movement		0.45			0.68	0.38	0.68		0.64				
		Queue Length 95th (ft)	Movement		97			m160	m0	143		126				
	NE 3rd Avenue	LOS (Delay)	Movement	F (86.0)	C (21.2)		E (58.0)	E (60.4)		D (42.9)	D (36.1)	C (31.9)	C (29.6)	D (36.1)	F (101.3)	D (52.8)
			Approach		D (36.9)			E (60.3)			D (38.5)			E (76.5)		
		Volume to Capacity ratio	Movement	1.00	0.62		0.55	1.01		0.73	0.45	0.05	0.32	0.44	1.05	
		Queue Length 95th (ft)	Movement	#281	307		91	#645		#224	225	0	98	219	#604	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (19.2)		F (94.8)	A (2.1)		E (63.3)		D (52.6)				B (16.9)
			Approach		B (19.2)			B (11.0)			E (57.8)					
		Volume to Capacity ratio	Movement		0.65		0.95	0.65		0.67		0.08				
		Queue Length 95th (ft)	Movement		448		#397	45		164		58				
	NW 5th Avenue	LOS (Delay)	Movement	F (105.3)	A (1.8)			B (12.8)	A (6.3)				E (56.7)		D (52.7)	B (13.3)
			Approach		A (9.0)			B (12.1)						D (54.9)		
		Volume to Capacity ratio	Movement	1.03	0.52			0.67	0.20				0.57		0.11	
		Queue Length 95th (ft)	Movement	#335	38			470	m11				122		65	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (10.9)	A (0.9)		B (13.9)					B (18.9)		C (33.8)	B (14.4)
			Approach		A (8.2)			B (13.9)						C (27.5)		
		Volume to Capacity ratio	Movement		0.62	0.47		0.83					0.55		0.90	
		Queue Length 95th (ft)	Movement		304	60		291					143		#279	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (17.9)			B (14.6)	A (0.2)	D (38.6)		C (30.4)				C (21.0)
			Approach		B (17.9)			B (11.8)			D (35.6)					
		Volume to Capacity ratio	Movement		0.74			0.75	0.29	0.84		0.61				
		Queue Length 95th (ft)	Movement		411			m213	m0	522		311				
	NE 3rd Avenue	LOS (Delay)	Movement	F (82.4)	C (27.7)		F (120.6)	D (40.8)		F (126.7)	E (60.4)	D (40.3)	D (41.9)	E (58.0)	E (67.9)	D (48.7)
			Approach		D (38.4)			D (45.5)			F (81.1)			E (61.5)		
		Volume to Capacity ratio	Movement	0.97	0.84		0.93	0.88		1.09	0.82	0.08	0.51	0.76	0.83	
		Queue Length 95th (ft)	Movement	#343	#602		#217	#690		#280	358	0	87	291	303	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Tables 5.7 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours for 2040 Build 1 conditions. HCM methodology does not provide queue lengths. The 95th percentile queues were obtained from Synchro reports. The Synchro reported queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length. The results present the queue length in feet for each lane group movement. The available storage length was calculated from the stop bar at the ramp terminal intersection to the gore with I-95 mainline minus 615 feet for the required stopping distance for a design speed of 70 mph per FDOT's 2016 Greenbook (Table 3-22), and accounting for the changes in number of lanes. The analysis indicates that the queues on the off-ramps are not expected to exceed the available storage lengths and are not likely to affect the I-95 mainline operations.

Table 5.7: 2040 Build 1 – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Available Storage (ft)	Queue (ft)	
				AM	PM
2040 Build 1					
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	1,255	719	733
		R (WB)	1,550	833	503
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	L (WB)	2,965	341	333
		R (EB)	2,615	496	#422
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	2,615	454	312
		R (WB)	2,615	#1,475	#1,856
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	2,240	#1,184	#1,325
		R (EB)	2,240	620	#1,072
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	1,010	246	277
		R (WB)	1,010	#333	#491
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	1,095	277	1,013
		R (EB)	1,095	222	547

Queue Notes:

Synchro queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length. Queue lengths exceeding the available storage are shown in Red.

#: 95th percentile volume exceeds capacity

Example of Storage Length Calculation for SBRT at Hillsboro Blvd. = [{(1920-615)/2} + 310+ (295*2)] = 1,552.5 feet rounded to 1,550 feet.

5.5 Build 2 Alternative – Traffic Operational Analysis

The proposed improvements under Build 2 are similar to Build 1 and are expected to provide better operating conditions than the No-Build conditions. They are also likely to prevent any spillbacks from the ramp terminals on to the mainline and improve safety by reducing congestion and the number of conflict points.

5.5.1 2020 & 2040 – Freeway Analysis – I-95

The mainline/basic, weaving, and ramp merge/diverge analysis results for Opening Year 2020 are summarized on **Figures 5.16** and **5.17** for the NB and SB directions, respectively. **Figures 5.18** and **5.19** summarize the Design Year 2040 analysis results for NB and SB directions, respectively. Documentation of the Build 2 Alternative traffic freeway operational analysis is provided in **Appendix M**. The Design Year 2040 Build 2 Alternative analysis indicates that 3 of the 14 freeway segments in the NB direction are projected to operate at LOS E during the AM peak hour and only one segment is expected to operate at LOS F during the PM peak hour. In the SB direction, only 1 of the 14 freeway segments is projected to operate at LOS F during the AM peak hour and 3 segments are expected to operate at LOS E or F during the PM peak hour.

5.5.2 2020 & 2040 - Intersection Analysis

Tables 5.8 through **5.10** summarize the results of the 2020 Build 2 signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. **Tables 5.11** through **5.13** summarize the results of the 2040 Build 2 signalized intersection analyses for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. Signal timing was optimized for all intersections. The results include delays (in seconds per vehicle) and LOS by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. **Appendix N** presents the intersection analysis worksheets. The intersection analysis results indicate the following for the 2040 Design Year:

- Hillsboro Boulevard: Two of the four signalized intersections are expected to operate at LOS E or worse during the AM or PM peak hours. The I-95 NB and SB off-ramp intersections are expected to operate at LOS D or better during both peak hours.
- SW 10th Street: All five signalized intersections are expected to operate at LOS D or better during the AM and PM peak hours. The I-95 NB and SB off-ramp approaches are expected to operate at LOS D or better during both peak hours.
- Sample Road: All five signalized intersections including the I-95 NB and SB off-ramp approaches are expected to operate at LOS D or better during both peak hours.

Figure 5.16: 2020 Build 2 Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	5,740 (5,330)	C (22.3)	C (20.5)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	6,730 (6,150)	D (31.1)	D (28.1)
Basic Freeway	5,480 (4,890)	C (21.2)	C (18.7)
Lane Add from SW 10th St EB & WB*	5,480 (4,890)	Under Capacity v/c: u/s, Ramp, d/s 0.66, 0.54, 0.61	Under Capacity v/c: u/s, Ramp, d/s 0.55, 0.61, 0.54
Basic Freeway	4,420 (3,690)	C (23.0)	C (18.8)
Diverge to Hillsboro Blvd EB & WB	5,670 (4,940)	E (36.2)	D (33.2)
Northbound Express to Westbound Express SW 10th Street - 60 (150) vph SW 10th Street Eastbound SW 10th Street Express to Northbound Express - 760 (390) vph			
Basic Freeway	5,670 (4,940)	D (32.4)	D (26.5)
Major Diverge to SW 10th Street EB & WB	6,690 (6,000)	D (31.3)	D (28.0)
Basic Freeway	6,690 (6,000)	D (27.1)	C (23.5)
Diverge from GP Lane to WB 10th St Ex Lane	6,830 (6,230)	D (30.6)	D (28.6)
Merge from I-95 Express Lanes	6,830 (6,230)	C (26.2)	C (23.5)
Lane Add from Sample Road WB*	6,140 (5,620)	Under Capacity v/c: u/s, Ramp, d/s 0.73, 0.62, 0.68	Under Capacity v/c: u/s, Ramp, d/s 0.69, 0.48, 0.63
Basic Freeway	4,920 (4,680)	D (26.4)	C (24.7)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,720 (6,240)	D (28.3)	D (34.3)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

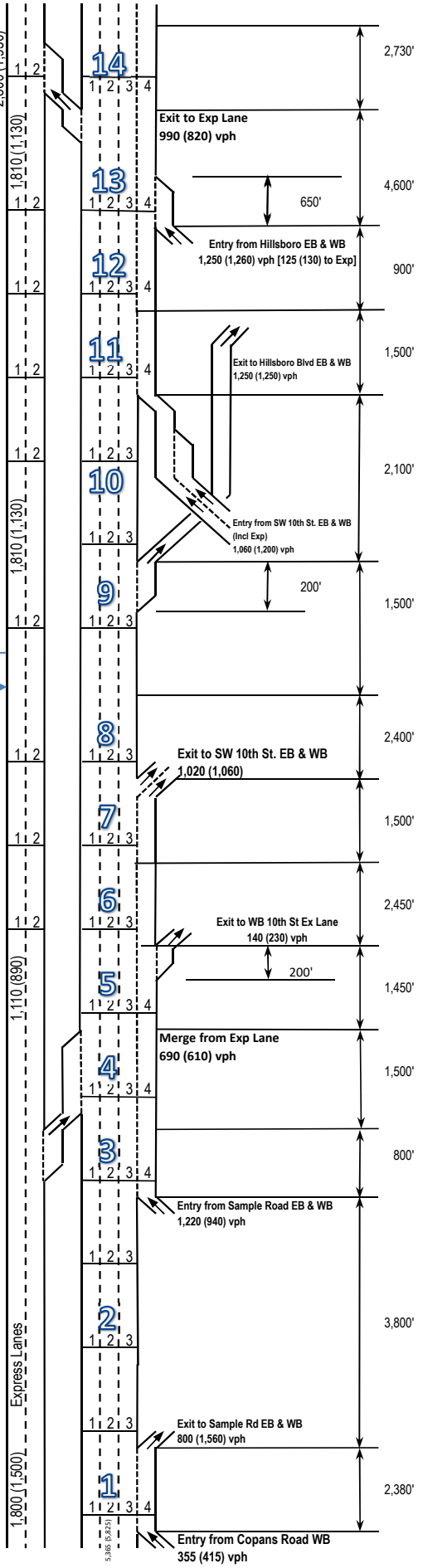
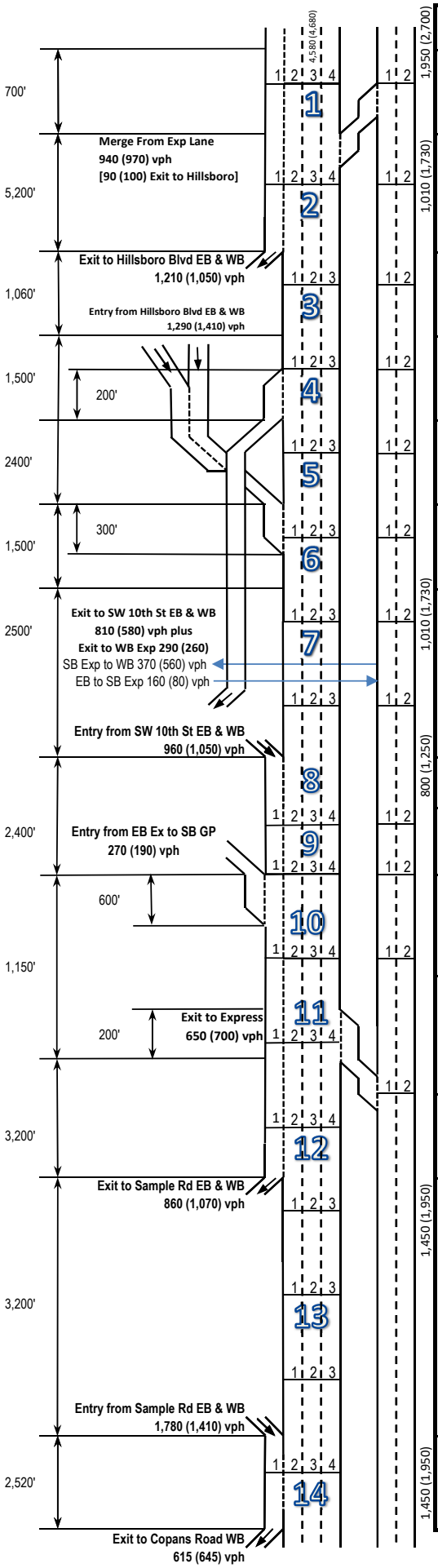


Figure 5.17: 2020 Build 2 Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,580 (4,680)	B (17.5)	B (17.9)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	5,520 (5,650)	C (24.5)	C (25.2)
Basic Freeway	4,310 (4,600)	C (22.3)	C (24.2)
Diverge to SW 10th St EB & WB	4,310 (4,600)	D (30.1)	D (30.8)
Basic Freeway	3,210 (3,760)	B (16.3)	C (19.2)
Merge from Hillsboro Blvd EB & WB	4,500 (5,170)	D (29.7)	D (33.3)
Basic Freeway	4,500 (5,170)	C (23.5)	D (28.2)
Lane Add Merge from SW 10th St EB & WB*	5,460 (6,220)	Under Capacity v/c: u/s, Ramp, d/s 0.67, 0.49, 0.61	Under Capacity v/c: u/s, Ramp, d/s 0.77, 0.53, 0.69
Basic Freeway	5,460 (6,220)	C (21.1)	C (24.6)
Merge from EB Ex to SB GP Lane	5,730 (6,410)	C (22.1)	C (24.0)
Diverge to I-95 Express Lanes	5,730 (6,410)	D (31.5)	D (34.8)
Diverge - Lane Drop to Sample Road EB & WB	5,080 (5,710)	C (23.7)	C (26.7)
Basic Freeway	4,220 (4,640)	C (21.8)	C (24.4)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,000 (6,050)	F (N/A)	D (33.3)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Figure 5.18: 2040 Build 2 Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,040 (5,580)	C (23.7)	C (21.6)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	7,310 (6,640)	E (36.7)	D (32.2)
Basic Freeway	5,920 (5,200)	C (23.1)	C (20.0)
Lane Add from SW 10th St EB & WB*	5,920 (5,200)	Under Capacity v/c: u/s, Ramp, d/s 0.70, 0.62, 0.66	Under Capacity v/c: u/s, Ramp, d/s 0.56, 0.73, 0.58
Basic Freeway	4,690 (3,760)	C (24.8)	C (19.2)
Diverge to Hillsboro Blvd EB & WB	6,020 (5,080)	E (37.8)	D (34.0)
Northbound Express to Westbound Express SW 10th Street - 90 (180) vph SW 10th Street Eastbound SW 10th Street Express to Northbound Express - 850 (440) vph			
Basic Freeway	6,020 (5,080)	E (35.9)	D (27.5)
Major Diverge to SW 10th Street EB & WB	7,210 (6,350)	D (33.7)	D (29.7)
Basic Freeway	7,210 (6,350)	D (30.1)	C (25.3)
Diverge from GP Lane to WB 10th St Ex Lane	7,390 (6,660)	D (33.0)	D (30.8)
Merge from I-95 Express Lanes	7,390 (6,660)	D (29.0)	C (25.4)
Lane Add from Sample Road WB*	6,560 (5,990)	Under Capacity v/c: u/s, Ramp, d/s 0.76, 0.73, 0.73	Under Capacity v/c: u/s, Ramp, d/s 0.72, 0.58, 0.67
Basic Freeway	5,110 (4,850)	D (27.8)	C (25.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	6,080 (6,660)	D (31.2)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

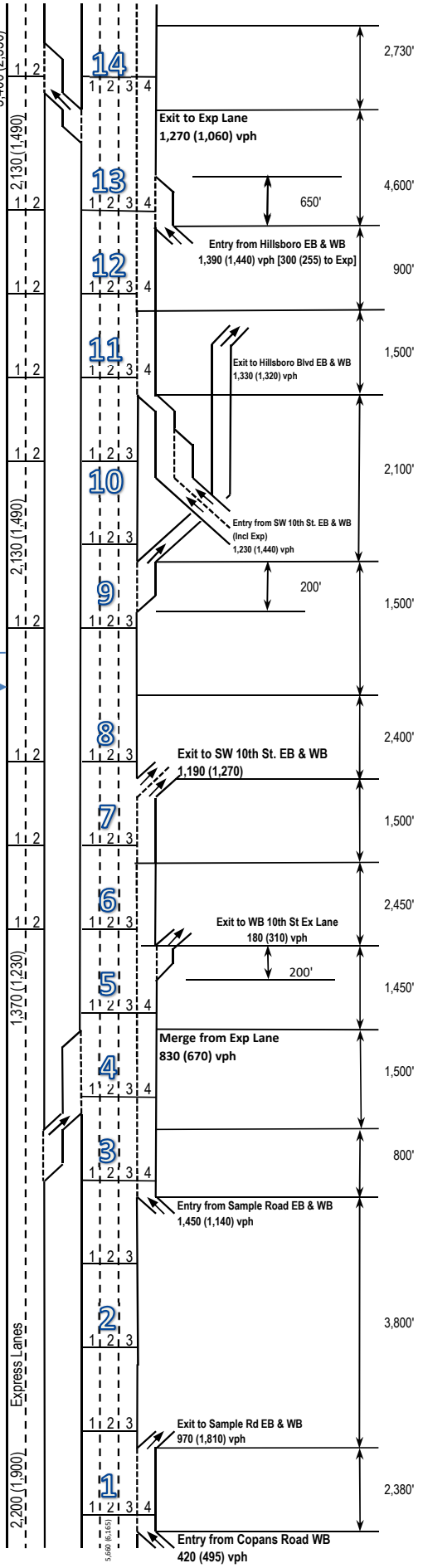
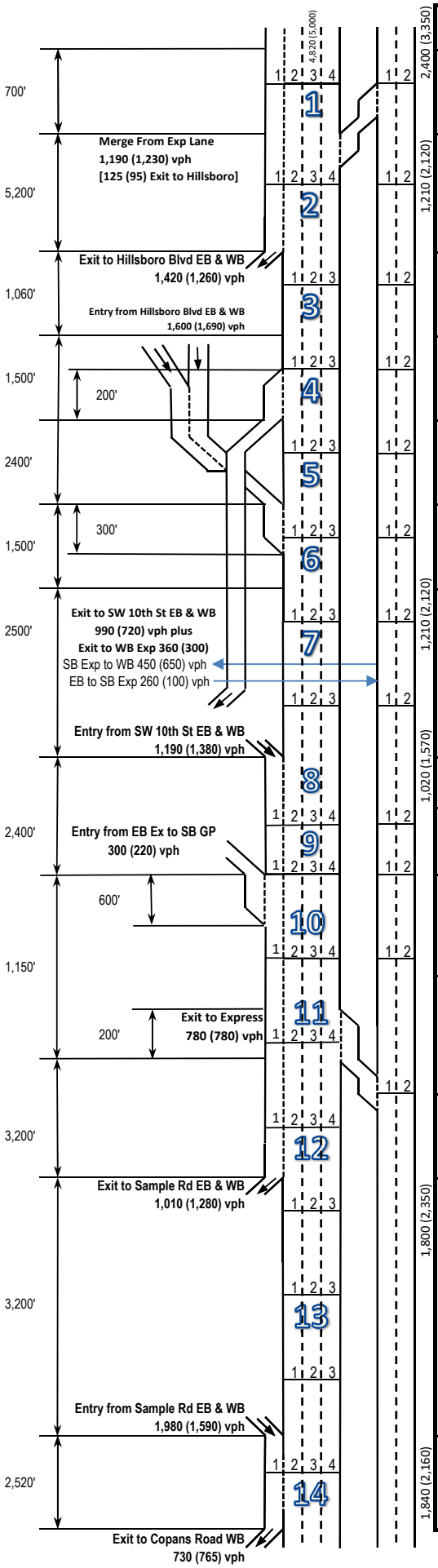


Figure 5.19: 2040 Build 2 Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,820 (5,000)	C (18.4)	C (19.1)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	6,010 (6,230)	C (27.4)	D (28.2)
Basic Freeway	4,590 (4,970)	C (24.1)	D (26.7)
Diverge to SW 10th St EB & WB	4,590 (4,970)	D (32.0)	D (32.8)
Basic Freeway	3,240 (3,950)	B (16.5)	C (20.2)
Merge from Hillsboro Blvd EB & WB	4,840 (5,640)	D (30.5)	E (36.5)
Basic Freeway	4,840 (5,640)	D (25.8)	D (32.2)
Lane Add Merge from SW 10th St EB & WB*	6,030 (7,020)	Under Capacity v/c: u/s, Ramp, d/s 0.72, 0.60, 0.67	Under Capacity v/c: u/s, Ramp, d/s 0.84, 0.70, 0.78
Basic Freeway	6,030 (7,020)	C (23.7)	D (29.0)
Merge from EB Ex to SB GP Lane	6,330 (7,240)	C (24.2)	C (26.9)
Diverge to I-95 Express Lanes	6,330 (7,240)	D (34.9)	E (38.9)
Diverge - Lane Drop to Sample Road EB & WB	5,550 (6,460)	C (25.9)	D (30.2)
Basic Freeway	4,540 (5,180)	C (23.8)	D (28.3)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,520 (6,770)	F (N/A)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Table 5.8: 2020 Build 2 – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (92.6)	C (21.5)		F (98.4)	B (20.0)	A (9.0)	E (70.3)	F (87.6)	E (56.4)	E (79.4)	E (79.3)	D (53.3)	C (33.5)
			Approach	C (29.9)			C (29.0)			E (69.9)			E (70.7)			
		Volume to Capacity ratio	Movement	0.89	0.66		0.91	0.50	0.39	0.27	0.75	0.12	0.29	0.29	0.01	
		Queue Length 95th (ft)	Movement	#452	649		#282	474	130	81	236	66	60	60	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.7)		B (14.3)					E (56.5)		D (48.1)	B (18.1)
			Approach	A (0.3)			B (14.3)						D (51.6)			
		Volume to Capacity ratio	Movement		0.27	0.44		0.49					0.82		0.71	
		Queue Length 95th (ft)	Movement		0	9		430					609		420	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		A (7.8)			A (6.3)	A (0.5)	B (19.7)		C (26.1)				B (10.3)
			Approach	A (7.8)			A (4.4)			C (23.3)						
		Volume to Capacity ratio	Movement		0.48			0.54	0.49	0.32		0.72				
		Queue Length 95th (ft)	Movement		241			m143	m0	93		230				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (110.7)	B (13.8)	B (15.1)	F (80.7)	C (28.4)		F (463.3)	E (66.9)	E (66.1)	E (77.3)	E (78.3)	E (78.2)	E (70.6)
			Approach	C (28.1)			C (30.4)			F (324.7)			E (77.9)			
		Volume to Capacity ratio	Movement	0.99	0.51	0.07	0.59	0.68		1.84	0.38	0.09	0.38	0.06	0.04	
		Queue Length 95th (ft)	Movement	#579	357	16	143	582		#900	155	72	66	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (55.5)	C (30.4)		F (206.4)	C (21.6)	A (0.2)	D (54.6)	D (48.8)	F (155.2)	E (63.2)	E (63.9)	D (40.9)	D (46.1)
			Approach	C (30.9)			D (39.9)			F (113.5)			D (54.9)			
		Volume to Capacity ratio	Movement	0.42	0.82		1.25	0.90	0.03	0.64	0.06	1.14	0.84	0.84	0.52	
		Queue Length 95th (ft)	Movement	72	#640		#215	#742	m0	124	26	#324	306	313	146	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.4)		B (19.1)					D (42.4)		C (28.5)	B (13.7)
			Approach	A (0.2)			B (19.1)						D (35.6)			
		Volume to Capacity ratio	Movement		0.38	0.41		0.69					0.84		0.50	
		Queue Length 95th (ft)	Movement		0	m0		563					484		207	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		A (9.8)			A (9.2)	A (0.5)	B (16.5)		C (23.3)				B (10.8)
			Approach	A (9.8)			A (7.1)			C (20.1)						
		Volume to Capacity ratio	Movement		0.62			0.73	0.44	0.40		0.78				
		Queue Length 95th (ft)	Movement		183			m259	m0	87		#193				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (85.7)	B (15.7)	A (7.8)	F (136.9)	C (21.5)		F (149.6)	D (44.2)	D (44.5)	D (42.5)	D (44.5)	E (62.2)	C (31.8)
			Approach	B (17.3)			C (27.7)			F (115.9)			E (55.3)			
		Volume to Capacity ratio	Movement	0.81	0.77	0.24	1.01	0.78		1.14	0.04	0.08	0.44	0.19	0.78	
		Queue Length 95th (ft)	Movement	m#125	522	m103	#234	660		#294	23	36	116	68	215	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.9: 2020 Build 2 – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (88.3)	F (99.1)	C (22.6)	E (55.1)	D (49.0)	B (15.3)	E (69.4)	F (117.7)	F (80.7)	F (121.9)	D (54.7)	A (0.3)	E (74.8)
			Approach	F (93.4)			D (42.2)			F (96.7)			E (66.6)			
		Volume to Capacity ratio	Movement	0.91	1.10	0.09	0.65	0.92	0.47	0.64	1.08	0.98	1.06	0.70	0.20	
		Queue Length 95th (ft)	Movement	#297	#936	33	227	#682	136	137	#544	#509	#392	356	0	
	East Newport Center Drive	LOS (Delay)	Movement	C (33.8)	A (3.9)	A (1.8)	C (26.4)	A (2.7)	A (2.4)			C (26.2)			C (28.3)	A (7.4)
			Approach	A (6.6)			A (6.1)			C (26.2)			C (28.3)			
		Volume to Capacity ratio	Movement	0.59	0.66	0.48	0.60	0.43	0.30			0.07			0.14	
		Queue Length 95th (ft)	Movement	m85	m131	m18	m132	72	m31			23			27	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		D (35.6)	A (0.7)	D (40.5)	A (8.8)					D (36.6)		D (52.3)	C (25.8)
			Approach	C (25.6)			B (16.3)						D (47.6)			
		Volume to Capacity ratio	Movement		0.86	0.44	0.64	0.67					0.29		0.84	
		Queue Length 95th (ft)	Movement		392	0	208	219					167		501	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.5)	A (0.2)		A (3.8)	A (0.2)	E (61.0)		E (56.3)				B (16.3)
			Approach	A (4.1)			A (3.3)			E (59.3)						
		Volume to Capacity ratio	Movement		0.42	0.28		0.32	0.18	0.78		0.61				
		Queue Length 95th (ft)	Movement		133	3		83	m0	309		225				
	FAU Research Park Boulevard	LOS (Delay)	Movement	C (33.5)	B (19.0)	D (41.6)	C (33.9)	C (25.3)	B (15.6)	C (30.8)	C (30.7)	C (29.7)	C (25.9)	D (38.7)	C (29.8)	C (26.4)
			Approach	C (24.6)			C (25.4)			C (30.5)			C (30.5)			
		Volume to Capacity ratio	Movement	0.57	0.60	0.18	0.43	0.81	0.05	0.72	0.34	0.08	0.62	0.70	0.24	
		Queue Length 95th (ft)	Movement	77	218	47	46	280	0	#173	58	0	142	#148	75	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	B (15.5)	D (35.3)	B (18.6)	E (56.3)	F (132.2)	B (17.7)	F (119.2)	F (134.3)	D (39.9)	F (159.3)	F (171.5)	A (0.7)	F (90.1)
			Approach	D (52.6)			F (101.4)			F (100.6)			F (111.6)			
		Volume to Capacity ratio	Movement	1.14	0.80	0.13	0.86	1.22	0.48	0.97	1.12	0.59	1.17	1.23	0.39	
		Queue Length 95th (ft)	Movement	#292	524	25	#285	#1291	136	#156	#378	#201	#331	#573	0	
	East Newport Center Drive	LOS (Delay)	Movement	B (14.2)	A (3.1)	A (1.8)	B (19.5)	B (13.1)	B (13.2)			C (25.7)			C (27.8)	B (12.4)
			Approach	A (3.4)			B (13.4)			C (25.7)			C (27.8)			
		Volume to Capacity ratio	Movement	0.07	0.70	0.05	0.15	0.71	0.06			0.61			0.85	
		Queue Length 95th (ft)	Movement	m16	m121	m0	m32	317	m19			102			154	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		D (40.2)	A (0.6)	D (40.6)	A (4.9)					D (40.0)		E (67.9)	C (27.9)
			Approach	C (30.5)			B (13.6)						E (60.4)			
		Volume to Capacity ratio	Movement		0.94	0.44	0.55	0.57					0.28		0.93	
		Queue Length 95th (ft)	Movement		#452	0	0	179					120		#423	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (0.5)	A (0.1)		A (4.4)	A (0.1)	D (46.6)		D (52.0)				B (13.3)
			Approach	A (0.4)			A (3.8)			D (49.1)						
		Volume to Capacity ratio	Movement		0.50	0.32		0.33	0.20	0.65		0.78				
		Queue Length 95th (ft)	Movement		m4	m8		m84	m0	249		288				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (43.8)	C (23.0)	B (14.2)	D (48.9)	C (25.8)	B (15.7)	E (56.1)	C (24.4)	C (23.9)	C (23.1)	E (64.1)	C (25.1)	C (29.6)
			Approach	C (24.9)			C (28.7)			D (40.7)			D (35.8)			
		Volume to Capacity ratio	Movement	0.85	0.95	0.16	0.87	0.84	0.08	0.94	0.22	0.10	0.65	0.94	0.37	
		Queue Length 95th (ft)	Movement	m#120	#296	m20	#120	#236	0	#201	42	0	#135	#235	#119	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.10: 2020 Build 2 – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.1)		D (53.2)	A (1.1)		E (56.6)		D (46.9)				B (14.0)
			Approach		B (16.1)			A (5.2)			D (51.1)					
		Volume to Capacity ratio	Movement		0.53		0.64	0.47		0.67		0.12				
		Queue Length 95th (ft)	Movement		318		#154	27		170		64				
	NW 5th Avenue	LOS (Delay)	Movement	D (49.7)	A (2.0)			A (9.1)	A (4.4)				D (51.2)		D (47.0)	A (10.0)
			Approach		A (3.8)			A (8.9)						D (49.6)		
		Volume to Capacity ratio	Movement	0.70	0.47			0.44	0.05				0.59		0.13	
		Queue Length 95th (ft)	Movement	#152	42			238	m4				130		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.2)	A (1.5)		A (6.7)					B (20.0)		C (23.2)	A (8.1)
			Approach		A (3.8)			A (6.7)						C (21.6)		
		Volume to Capacity ratio	Movement		0.42	0.59		0.47					0.52		0.69	
		Queue Length 95th (ft)	Movement		126	363		145					107		134	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.0)			A (4.5)	A (0.2)	C (22.0)		C (21.4)				A (7.6)
			Approach		A (5.0)			A (3.7)			C (21.8)					
		Volume to Capacity ratio	Movement		0.37			0.62	0.29	0.62		0.56				
		Queue Length 95th (ft)	Movement		56			m143	m0	121		104				
	NE 3rd Avenue	LOS (Delay)	Movement	E (67.5)	B (18.9)		E (56.4)	D (40.6)		D (37.6)	D (36.3)	C (32.2)	C (30.9)	D (37.0)	F (81.2)	D (41.6)
			Approach		C (31.5)			D (41.1)			D (36.3)			E (64.1)		
		Volume to Capacity ratio	Movement	0.91	0.49		0.49	0.87		0.63	0.43	0.04	0.28	0.44	0.98	
		Queue Length 95th (ft)	Movement	#243	259		79	501		183	214	0	86	212	#526	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (18.2)		E (72.1)	A (1.4)		E (62.8)		D (53.2)				B (15.5)
			Approach		B (18.2)			A (8.8)			E (57.9)					
		Volume to Capacity ratio	Movement		0.59		0.87	0.56		0.65		0.08				
		Queue Length 95th (ft)	Movement		389		#359	30		152		57				
	NW 5th Avenue	LOS (Delay)	Movement	E (55.7)	A (1.6)			B (11.5)	A (5.2)				E (56.7)		D (53.4)	B (11.1)
			Approach		A (5.4)			B (10.8)						E (55.2)		
		Volume to Capacity ratio	Movement	0.82	0.47			0.59	0.17				0.54		0.10	
		Queue Length 95th (ft)	Movement	#277	35			382	m23				112		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (10.0)	A (0.7)		B (13.8)					B (18.5)		C (25.4)	B (12.8)
			Approach		A (7.7)			B (13.8)						C (22.5)		
		Volume to Capacity ratio	Movement		0.56	0.41		0.72					0.45		0.79	
		Queue Length 95th (ft)	Movement		290	33		m226					111		#196	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (7.5)			A (9.0)	A (0.2)	D (45.1)		C (20.8)				B (16.3)
			Approach		A (7.5)			A (7.5)			D (36.5)					
		Volume to Capacity ratio	Movement		0.65			0.65	0.22	0.98		0.66				
		Queue Length 95th (ft)	Movement		61			267	m0	#338		167				
	NE 3rd Avenue	LOS (Delay)	Movement	E (64.0)	C (24.2)		E (76.6)	D (37.2)		E (67.9)	D (51.1)	D (38.1)	D (42.9)	E (57.4)	D (51.7)	D (40.0)
			Approach		C (32.3)			D (39.5)			D (55.0)			D (52.9)		
		Volume to Capacity ratio	Movement	0.87	0.76		0.74	0.79		0.89	0.74	0.06	0.40	0.74	0.62	
		Queue Length 95th (ft)	Movement	#282	511		#173	#566		#245	339	0	73	280	219	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.11: 2040 Build 2 – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (96.0)	C (25.2)		F (127.3)	C (27.6)	B (11.8)	E (74.4)	F (93.9)	E (60.6)	F (84.5)	F (84.4)	D (53.5)	D (40.6)
			Approach	C (33.8)			D (39.8)			E (73.2)			E (74.1)			
		Volume to Capacity ratio	Movement	0.91	0.73		0.98	0.55	0.43	0.30	0.77	0.29	0.36	0.35	0.02	
		Queue Length 95th (ft)	Movement	#525	827		#347	520	52	93	255	136	72	72	1	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (1.0)		C (22.3)					D (50.9)		D (42.0)	B (19.2)
			Approach	A (0.5)			C (22.3)						D (45.8)			
		Volume to Capacity ratio	Movement		0.29	0.57		0.58					0.82		0.69	
		Queue Length 95th (ft)	Movement		0	605		523					693		448	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (10.5)			B (10.5)	A (0.4)	B (19.4)		C (27.5)				B (12.4)
			Approach	B (10.5)			A (7.1)			C (24.2)						
		Volume to Capacity ratio	Movement		0.54			0.63	0.56	0.30		0.76				
		Queue Length 95th (ft)	Movement		345			m249	m0	98		282				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (136.5)	B (14.3)	A (8.6)	F (88.4)	C (32.7)		F (532.4)	E (72.4)	E (69.5)	F (84.2)	F (83.3)	F (83.3)	F (80.4)
			Approach	C (31.7)			C (34.9)			F (368.6)			F (83.6)			
		Volume to Capacity ratio	Movement	1.07	0.56	0.08	0.64	0.76		1.99	0.39	0.11	0.52	0.07	0.06	
		Queue Length 95th (ft)	Movement	#666	382	m18	167	739		#1063	169	79	85	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (69.3)	D (39.5)		F (172.4)	C (20.7)	A (1.1)	E (65.3)	E (56.5)	F (220.1)	F (84.7)	F (85.6)	E (64.7)	E (56.3)
			Approach	D (40.2)			D (37.5)			F (159.0)			E (77.1)			
		Volume to Capacity ratio	Movement	0.56	0.91		1.16	0.86	0.04	0.70	0.06	1.30	0.91	0.91	0.81	
		Queue Length 95th (ft)	Movement	#98	#873		m#258	538	m1	157	29	#506	#415	#425	#330	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		C (31.6)					D (47.9)		C (29.1)	B (18.3)
			Approach	A (0.2)			C (31.6)						D (38.8)			
		Volume to Capacity ratio	Movement		0.41	0.53		0.78					0.88		0.53	
		Queue Length 95th (ft)	Movement		m0	m0		704					693		277	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (10.9)			B (11.6)	A (0.6)	B (17.9)		C (26.8)				B (12.5)
			Approach	B (10.9)			A (8.8)			C (22.9)						
		Volume to Capacity ratio	Movement		0.70			0.79	0.51	0.37		0.81				
		Queue Length 95th (ft)	Movement		263			m327	m0	97		#240				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (110.0)	C (23.5)	B (12.6)	F (136.9)	C (28.7)		F (131.4)	D (48.5)	D (49.1)	D (46.9)	D (48.9)	E (73.9)	D (38.1)
			Approach	C (25.4)			C (34.9)			F (104.6)			E (64.4)			
		Volume to Capacity ratio	Movement	0.92	0.86	0.32	1.00	0.86		1.08	0.03	0.10	0.43	0.16	0.84	
		Queue Length 95th (ft)	Movement	m#162	#919	m176	#290	#954		#351	25	56	144	75	291	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.12: 2040 Build 2 – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	D (54.9)	D (52.2)	C (24.2)	D (43.4)	D (40.0)	B (15.9)	E (59.0)	E (75.5)	D (53.3)	E (79.7)	D (42.3)	A (0.3)	D (48.5)
			Approach	D (50.7)			C (33.7)			E (64.4)			D (46.3)			
		Volume to Capacity ratio	Movement	0.70	0.91	0.09	0.62	0.81	0.51	0.61	0.97	0.89	0.94	0.62	0.20	
		Queue Length 95th (ft)	Movement	#238	#516	24	175	454	306	120	#447	#385	#324	298	0	
	East Newport Center Drive	LOS (Delay)	Movement	B (13.4)	A (2.4)	A (2.0)	C (27.0)	A (5.3)	A (5.2)			C (22.1)			B (19.8)	A (7.1)
			Approach	A (3.8)			A (9.0)			C (22.1)			B (19.8)			
		Volume to Capacity ratio	Movement	0.38	0.49	0.49	0.56	0.40	0.34			0.04			0.08	
		Queue Length 95th (ft)	Movement	m78	m57	m32	138	64	42			17			21	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		C (30.4)	A (0.3)	D (43.9)	A (7.2)					D (38.1)		D (43.9)	C (23.3)
			Approach	C (23.8)			B (16.5)						D (41.6)			
		Volume to Capacity ratio	Movement		0.69	0.25	0.55	0.57					0.36		0.68	
		Queue Length 95th (ft)	Movement		241	0	275	212					162		290	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (1.7)	A (0.1)		A (3.3)	A (0.2)	D (44.1)		D (44.0)				B (11.3)
			Approach	A (1.3)			A (2.8)			D (44.0)						
		Volume to Capacity ratio	Movement		0.45	0.16		0.34	0.18	0.54		0.52				
		Queue Length 95th (ft)	Movement		11	0		54	m0	207		189				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (38.8)	A (8.4)	A (6.1)	C (28.7)	C (20.6)	B (12.8)	D (46.3)	C (27.6)	C (26.5)	C (29.9)	D (41.9)	C (26.3)	C (20.8)
			Approach	B (11.9)			C (20.7)			D (36.5)			C (31.0)			
		Volume to Capacity ratio	Movement	0.71	0.62	0.18	0.38	0.77	0.05	0.87	0.39	0.08	0.74	0.77	0.21	
		Queue Length 95th (ft)	Movement	#86	114	9	41	237	0	#166	53	0	#132	#152	48	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (104.3)	D (45.7)	C (28.1)	D (44.1)	D (52.6)	B (18.0)	F (103.1)	F (85.3)	C (31.2)	F (89.2)	F (85.0)	A (0.1)	D (54.2)
			Approach	E (55.8)			D (44.1)			E (70.6)			E (57.8)			
		Volume to Capacity ratio	Movement	0.99	0.76	0.13	0.61	1.01	0.53	0.90	0.95	0.41	0.95	1.00	0.39	
		Queue Length 95th (ft)	Movement	#285	411	23	288	#917	194	#158	#361	147	#310	#533	0	
	East Newport Center Drive	LOS (Delay)	Movement	B (16.5)	A (2.6)	A (0.1)	B (13.1)	A (6.6)	A (5.6)			C (24.1)			C (25.9)	B (10.2)
			Approach	A (3.1)			A (6.9)			C (24.1)			C (25.9)			
		Volume to Capacity ratio	Movement	0.07	0.58	0.05	0.12	0.55	0.06			0.52			0.82	
		Queue Length 95th (ft)	Movement	m13	m56	m0	m30	182	m15			112			149	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		C (29.5)	A (0.4)	D (50.7)	A (5.8)					D (47.6)		D (53.6)	C (24.5)
			Approach	C (23.4)			B (18.1)						D (51.3)			
		Volume to Capacity ratio	Movement		0.74	0.32	0.52	0.45					0.33		0.67	
		Queue Length 95th (ft)	Movement		313	0	326	189					134		245	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (0.9)	A (0.1)		A (4.4)	A (0.2)	D (43.1)		D (50.3)				B (11.7)
			Approach	A (0.6)			A (3.8)			D (47.3)						
		Volume to Capacity ratio	Movement		0.51	0.23		0.34	0.20	0.37		0.71				
		Queue Length 95th (ft)	Movement		5	0		73	m0	158		297				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (47.3)	C (23.7)	B (13.2)	D (48.4)	C (26.0)	B (16.5)	D (51.9)	C (26.6)	C (26.1)	C (22.1)	E (57.0)	C (27.2)	C (29.7)
			Approach	C (25.7)			C (28.9)			D (39.6)			C (34.4)			
		Volume to Capacity ratio	Movement	0.86	0.93	0.16	0.85	0.82	0.08	0.91	0.22	0.10	0.60	0.90	0.46	
		Queue Length 95th (ft)	Movement	#139	#302	18	#125	248	2	#217	45	0	139	#242	#142	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.13: 2040 Build 2 – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.9)		E (69.5)	A (1.4)		E (57.1)		D (46.4)				B (15.2)
			Approach		B (16.9)			A (7.0)			D (51.0)					
		Volume to Capacity ratio	Movement		0.60		0.79	0.51		0.69		0.13				
		Queue Length 95th (ft)	Movement		376		#237	32		181		65				
	NW 5th Avenue	LOS (Delay)	Movement	E (58.4)	A (2.2)			A (9.8)	A (4.2)				D (51.2)		D (47.0)	B (10.4)
			Approach		A (4.4)			A (9.5)						D (49.5)		
		Volume to Capacity ratio	Movement	0.78	0.53			0.49	0.06				0.61		0.22	
		Queue Length 95th (ft)	Movement	m#173	46			278	m5				140		81	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.0)	A (2.0)		A (7.6)					C (20.4)		C (26.7)	A (9.2)
			Approach		A (4.5)			A (7.6)						C (23.7)		
		Volume to Capacity ratio	Movement		0.47	0.67		0.51					0.58		0.79	
		Queue Length 95th (ft)	Movement		157	466		160					123		#182	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.3)			A (7.0)	A (0.2)	C (22.6)		C (22.1)				A (9.2)
			Approach		A (6.3)			A (5.4)			C (22.4)					
		Volume to Capacity ratio	Movement		0.44			0.66	0.38	0.68		0.64				
		Queue Length 95th (ft)	Movement		75			m157	m0	143		126				
	NE 3rd Avenue	LOS (Delay)	Movement	F (86.8)	C (21.0)		E (58.0)	D (54.8)		D (41.3)	D (36.1)	C (31.9)	C (30.3)	D (36.9)	F (111.2)	D (52.0)
			Approach		D (37.2)			D (54.9)			D (37.8)			F (83.1)		
		Volume to Capacity ratio	Movement	1.00	0.61		0.55	0.98		0.72	0.45	0.05	0.32	0.45	1.08	
		Queue Length 95th (ft)	Movement	#280	299		91	#619		#220	225	0	98	222	#611	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (19.1)		F (94.3)	A (2.0)		E (63.3)		D (52.6)				B (16.9)
			Approach		B (19.1)			B (11.0)			E (57.8)					
		Volume to Capacity ratio	Movement		0.64		0.95	0.64		0.67		0.08				
		Queue Length 95th (ft)	Movement		443		#396	42		164		58				
	NW 5th Avenue	LOS (Delay)	Movement	F (105.7)	A (1.8)			B (12.3)	A (5.7)				E (56.7)		D (52.7)	B (13.1)
			Approach		A (9.1)			B (11.6)						D (54.9)		
		Volume to Capacity ratio	Movement	1.03	0.52			0.65	0.20				0.57		0.11	
		Queue Length 95th (ft)	Movement	#334	38			450	m12				122		65	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (10.7)	A (0.9)		B (13.7)					B (18.7)		C (33.1)	B (14.1)
			Approach		A (8.0)			B (13.7)						C (27.0)		
		Volume to Capacity ratio	Movement		0.61	0.47		0.81					0.52		0.90	
		Queue Length 95th (ft)	Movement		295	78		276					136		#276	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (17.6)			B (15.9)	A (0.2)	D (38.0)		C (30.1)				C (21.3)
			Approach		B (17.6)			B (12.8)			C (35.0)					
		Volume to Capacity ratio	Movement		0.73			0.73	0.29	0.83		0.60				
		Queue Length 95th (ft)	Movement		396			m232	m0	513		307				
	NE 3rd Avenue	LOS (Delay)	Movement	F (84.5)	C (26.7)		F (120.6)	D (39.4)		F (126.7)	E (60.4)	D (40.3)	D (41.9)	E (58.0)	E (67.9)	D (48.4)
			Approach		D (38.2)			D (44.3)			F (81.1)			E (61.5)		
		Volume to Capacity ratio	Movement	0.97	0.82		0.93	0.85		1.09	0.82	0.08	0.51	0.76	0.83	
		Queue Length 95th (ft)	Movement	#343	479		#217	#658		#280	358	0	87	291	303	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Tables 5.14 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours for 2040 Build 2 conditions. HCM methodology does not provide queue lengths. The 95th percentile queues were obtained from Synchro reports. The Synchro reported queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length. The results present the queue length in feet for each lane group movement. The available storage length was calculated from the stop bar at the ramp terminal intersection to the gore with I-95 mainline minus 615 feet for the required stopping distance for a design speed of 70 mph per FDOT's 2016 Greenbook (Table 3-22), and accounting for the changes in number of lanes. The analysis indicates that the queues on the off-ramps are not expected to exceed the available storage lengths and are not likely to affect the I-95 mainline operations.

Table 5.14: 2040 Build 2 – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Available Storage (ft)	Queue (ft)	
				AM	PM
2040 Build 2					
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	1,255	693	693
		R (WB)	1,550	789	488
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	L (WB)	2,965	276	274
		R (EB)	2,615	496	#422
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	2,615	400	299
		R (WB)	2,615	561	#486
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	2,240	643	522
		R (EB)	2,240	440	659
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	1,010	239	264
		R (WB)	1,010	#320	#486
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	1,095	277	995
		R (EB)	1,095	222	540

Queue Notes:

Synchro queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length. Queue lengths exceeding the available storage are shown in Red.

#: 95th percentile volume exceeds capacity

Example of Storage Length Calculation for SBRT at Hillsboro Blvd. = [{(1920-615)/2} + 310+ (295*2)] = 1,552.5 feet rounded to 1,550 feet.

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5.6 Build 2A Alternative – Traffic Operational Analysis

The proposed improvements under Build 2A are similar to Build 1 and Build 2 and are expected to provide better operating conditions than the No-Build conditions. They are also likely to prevent any spillbacks from the ramp terminals on to the mainline and improve safety by reducing congestion and the number of conflict points.

5.6.1 2020 & 2040 – Freeway Analysis – I-95

The mainline/basic, weaving, and ramp merge/diverge analysis results for Opening Year 2020 are summarized on **Figures 5.20** and **5.21** for the NB and SB directions, respectively. **Figures 5.22** and **5.23** summarize the Design Year 2040 analysis results for NB and SB directions, respectively. Documentation of the Build 2A Alternative traffic freeway operational analysis is provided in **Appendix O**. The Design Year 2040 Build 2A Alternative analysis indicates that 3 of the 14 freeway segments in the NB direction are projected to operate at LOS E or F during one or both peak hours. In the SB direction, 2 of the 14 freeway segments are projected to operate at LOS E or F during one or both peak hours.

5.6.2 2020 & 2040 - Intersection Analysis

Tables 5.15 through **5.17** summarize the results of the 2020 Build 2A signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. **Tables 5.18** through **5.20** summarize the results of the 2040 Build 2A signalized intersection analyses for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. Signal timing was optimized for all intersections. The results include delays (in seconds per vehicle) and LOS by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. **Appendix P** presents the intersection analysis worksheets. The intersection analysis results indicate the following for the 2040 Design Year:

- Hillsboro Boulevard: Two of the four signalized intersections are expected to operate at LOS E or worse during the AM or PM peak hours. The I-95 NB and SB off-ramp intersections are expected to operate at LOS D or better during both the AM and PM peak hours.
- SW 10th Street: One of the five signalized intersections is expected to operate at LOS E during the AM peak hour. The I-95 NB and SB off-ramp approaches are expected to operate at LOS E or better during both peak hours.
- Sample Road: All five signalized intersections including the I-95 NB and SB off-ramp approaches are expected to operate at LOS D or better during both peak hours.

Figure 5.20: 2020 Build 2A Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	5,890 (5,280)	C (23.0)	C (20.3)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	6,660 (6,200)	D (30.7)	D (28.3)
Basic Freeway	5,410 (4,970)	C (20.9)	C (19.0)
Lane Add from SW 10th St EB & WB*	5,410 (4,970)	Under Capacity v/c: u/s, Ramp, d/s 0.61, 0.65, 0.60	Under Capacity v/c: u/s, Ramp, d/s 0.51, 0.79, 0.55
Basic Freeway	4,120 (3,410)	C (21.2)	B (17.3)
Diverge to Hillsboro Blvd EB & WB	5,370 (4,640)	E (35.0)	D (31.9)
Northbound Express to Westbound Express SW 10th Street - 180 (390) vph			
SW 10th Street			
Eastbound SW 10th Street Express to Northbound Express - 1,120 (580) vph			
Basic Freeway	5,370 (4,640)	D (29.8)	C (24.4)
Major Diverge to SW 10th Street EB & WB	6,360 (5,650)	D (29.7)	C (26.4)
Basic Freeway	6,360 (5,650)	C (25.3)	C (21.9)
Diverge from GP Lane to WB 10th St Ex Lane	6,610 (5,980)	D (30.3)	D (28.2)
Merge from I-95 Express Lanes	6,610 (5,980)	C (25.4)	C (22.5)
Lane Add from Sample Road WB*	5,900 (5,360)	Under Capacity v/c: u/s, Ramp, d/s 0.69, 0.63, 0.66	Under Capacity v/c: u/s, Ramp, d/s 0.65, 0.49, 0.60
Basic Freeway	4,660 (4,400)	C (24.6)	C (22.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,450 (5,960)	C (26.8)	D (32.5)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

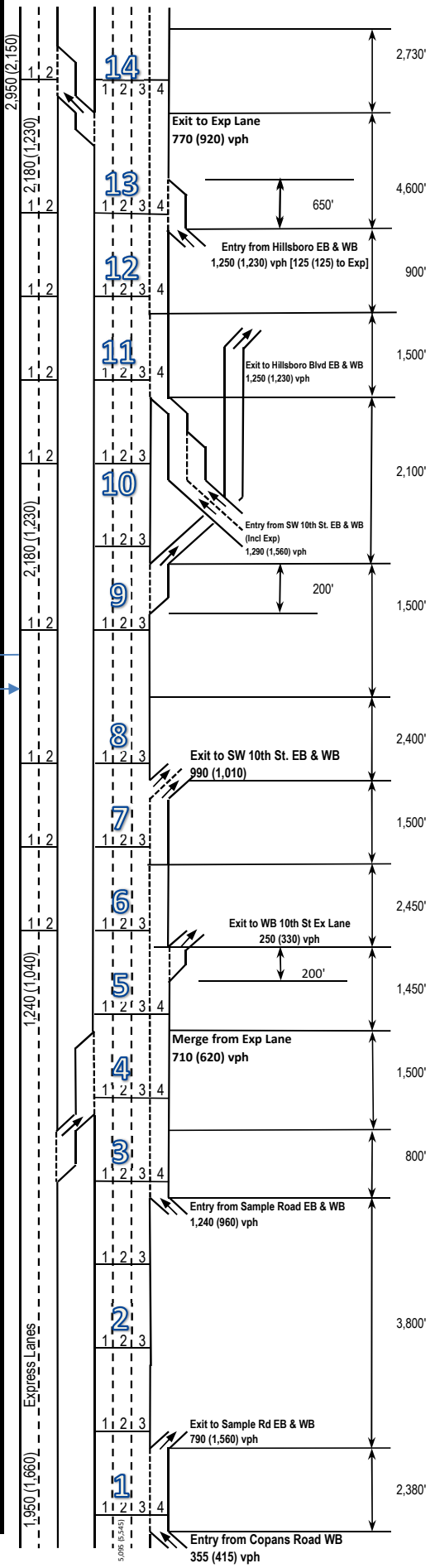
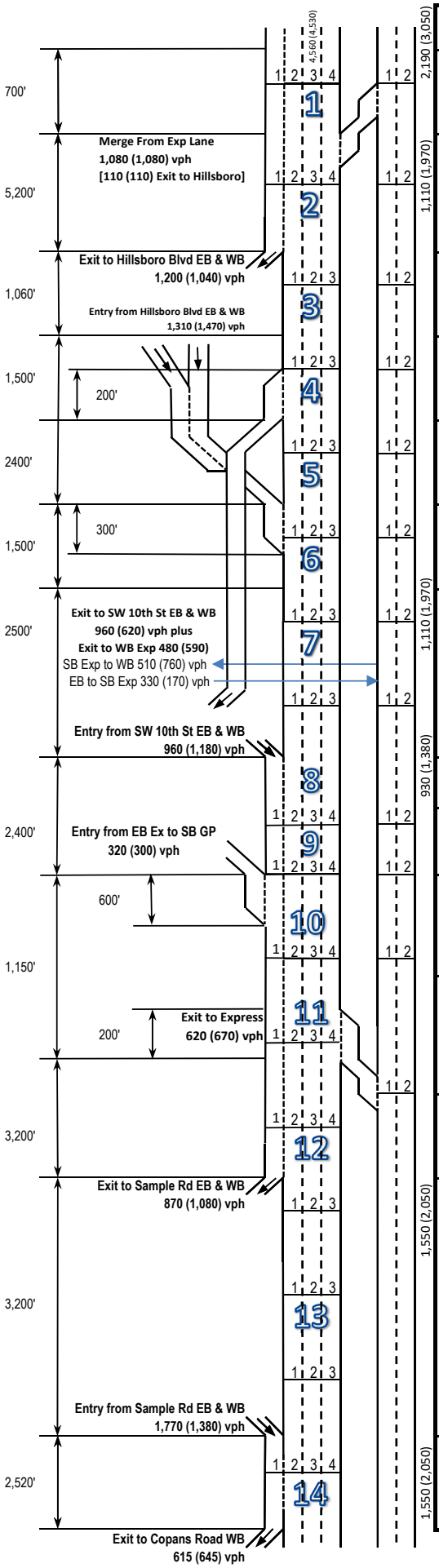


Figure 5.21: 2020 Build 2A Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,560 (4,530)	B (17.4)	B (17.3)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	5,640 (5,610)	C (25.3)	C (25.2)
Basic Freeway	4,440 (4,570)	C (23.1)	C (24.0)
Diverge to SW 10th St EB & WB	4,440 (4,570)	D (31.5)	D (31.5)
Basic Freeway	3,000 (3,360)	B (15.3)	B (17.1)
Merge from Hillsboro Blvd EB & WB	4,310 (4,830)	D (28.8)	D (31.8)
Basic Freeway	4,310 (4,830)	C (22.3)	C (25.7)
Lane Add Merge from SW 10th St EB & WB*	5,270 (6,010)	Under Capacity v/c: u/s, Ramp, d/s 0.64, 0.49, 0.59	Under Capacity v/c: u/s, Ramp, d/s 0.72, 0.60, 0.67
Basic Freeway	5,270 (6,010)	C (20.3)	C (23.6)
Merge from EB Ex to SB GP Lane	5,590 (6,310)	C (21.9)	C (24.2)
Diverge to I-95 Express Lanes	5,590 (6,310)	D (30.7)	D (34.2)
Diverge - Lane Drop to Sample Road EB & WB	4,970 (5,640)	C (23.2)	C (26.4)
Basic Freeway	4,100 (4,560)	C (21.1)	C (23.9)
Weave - Entry Sample Road EB to Exit Copans Road WB	5,870 (5,940)	F (N/A)	D (32.5)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Figure 5.22: 2040 Build 2A Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,190 (5,610)	C (24.4)	C (21.7)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	7,230 (6,740)	E (36.0)	D (32.7)
Basic Freeway	5,890 (5,350)	C (23.0)	C (20.6)
Lane Add from SW 10th St EB & WB*	5,890 (5,350)	Under Capacity v/c: u/s, Ramp, d/s 0.63, 0.83, 0.66	Under Capacity v/c: u/s, Ramp, d/s 0.53, 0.91, 0.60
Basic Freeway	4,250 (3,550)	C (22.0)	C (18.1)
Diverge to Hillsboro Blvd EB & WB	5,620 (4,910)	E (36.3)	D (33.4)
Northbound Express to Westbound Express SW 10th Street - 220 (490) vph			
SW 10th Street			
Eastbound SW 10th Street Express to Northbound Express - 1,490 (770) vph			
Basic Freeway	5,620 (4,910)	D (32.0)	D (26.3)
Major Diverge to SW 10th Street EB & WB	6,860 (6,110)	D (32.1)	D (28.6)
Basic Freeway	6,860 (6,110)	D (28.0)	C (24.1)
Diverge from GP Lane to WB 10th St Ex Lane	7,170 (6,530)	D (32.8)	D (30.8)
Merge from I-95 Express Lanes	7,170 (6,530)	D (28.2)	C (25.1)
Lane Add from Sample Road WB*	6,310 (5,800)	Under Capacity v/c: u/s, Ramp, d/s 0.72, 0.74, 0.70	Under Capacity v/c: u/s, Ramp, d/s 0.69, 0.59, 0.65
Basic Freeway	4,840 (4,640)	C (25.8)	C (24.4)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,820 (6,460)	D (29.7)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

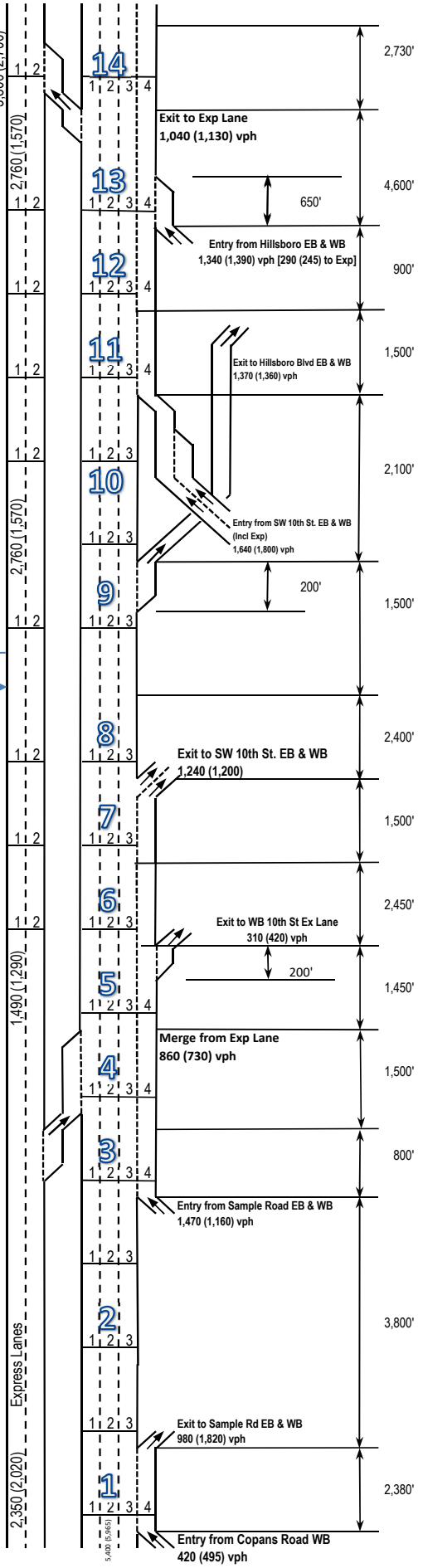
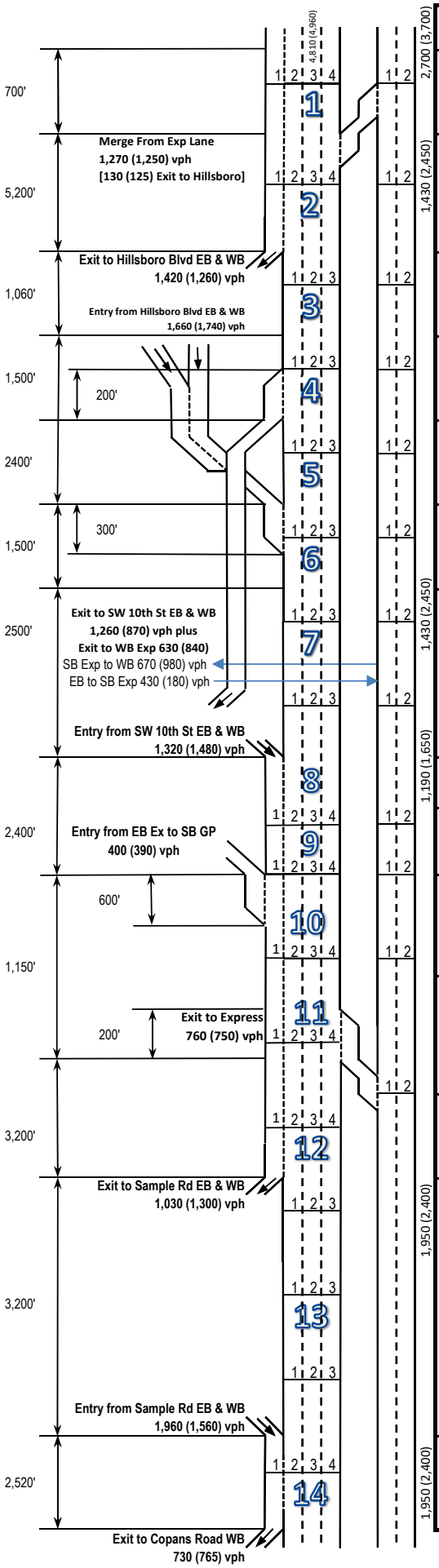


Figure 5.23: 2040 Build 2A Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,810 (4,960)	C (18.4)	C (19.0)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	6,080 (6,210)	C (27.8)	D (28.4)
Basic Freeway	4,660 (4,950)	C (24.6)	D (26.6)
Diverge to SW 10th St EB & WB	4,660 (4,950)	D (33.8)	D (34.5)
Basic Freeway	2,770 (3,240)	B (14.1)	B (16.5)
Merge from Hillsboro Blvd EB & WB	4,430 (4,980)	D (32.3)	D (33.4)
Basic Freeway	4,430 (4,980)	C (23.1)	D (26.8)
Lane Add Merge from SW 10th St EB & WB*	5,750 (6,460)	Under Capacity v/c: u/s, Ramp, d/s 0.66, 0.67, 0.64	Under Capacity v/c: u/s, Ramp, d/s 0.74, 0.75, 0.72
Basic Freeway	5,750 (6,460)	C (22.4)	C (25.8)
Merge from EB Ex to SB GP Lane	6,150 (6,850)	C (24.1)	C (26.4)
Diverge to I-95 Express Lanes	6,150 (6,850)	D (34.0)	E (37.0)
Diverge - Lane Drop to Sample Road EB & WB	5,390 (6,100)	C (25.2)	D (28.5)
Basic Freeway	4,360 (4,800)	C (22.7)	C (25.5)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,320 (6,360)	F (N/A)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Table 5.15: 2020 Build 2A – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (87.5)	C (21.2)		F (102.4)	B (18.8)	B (15.0)	E (65.9)	F (82.0)	D (53.6)	E (74.4)	E (74.3)	D (49.8)	C (33.1)
			Approach	C (29.0)			C (30.1)			E (65.8)			E (66.2)			
		Volume to Capacity ratio	Movement	0.88	0.67		0.96	0.52	0.37	0.27	0.75	0.12	0.28	0.28	0.01	
		Queue Length 95th (ft)	Movement	#430	639		#278	272	83	77	224	64	57	57	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.8)		B (15.5)					D (53.3)		D (44.3)	B (17.4)
			Approach	A (0.3)			B (15.5)						D (48.1)			
		Volume to Capacity ratio	Movement		0.27	0.47		0.50					0.82		0.69	
		Queue Length 95th (ft)	Movement		0	0		300					583		384	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (10.7)			A (6.5)	A (0.5)	B (17.9)		C (24.2)				B (10.7)
			Approach	B (10.7)			A (4.5)			C (21.6)						
		Volume to Capacity ratio	Movement		0.49			0.56	0.49	0.30		0.72				
		Queue Length 95th (ft)	Movement		211			m153	m0	84		224				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (113.2)	B (13.4)	B (13.7)	E (76.8)	C (27.2)		F (484.8)	E (65.6)	E (62.9)	E (72.4)	E (73.3)	E (73.2)	E (71.4)
			Approach	C (28.0)			C (29.1)			F (337.6)			E (73.0)			
		Volume to Capacity ratio	Movement	1.01	0.52	0.07	0.59	0.69		1.90	0.39	0.09	0.39	0.06	0.04	
		Queue Length 95th (ft)	Movement	#552	364	11	137	558		#859	148	65	70	21	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (55.5)	C (30.6)		F (210.2)	C (22.2)	A (0.0)	D (54.6)	D (48.8)	F (155.2)	E (63.8)	E (62.6)	D (41.6)	D (46.2)
			Approach	C (31.1)			D (40.5)			F (113.5)			D (54.7)			
		Volume to Capacity ratio	Movement	0.42	0.83		1.25	0.90	0.03	0.64	0.06	1.14	0.84	0.83	0.54	
		Queue Length 95th (ft)	Movement	72	#676		#214	#757	m0	124	26	#324	295	297	146	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.6)		B (16.4)					D (43.3)		C (28.9)	B (12.8)
			Approach	A (0.2)			B (16.4)						D (36.3)			
		Volume to Capacity ratio	Movement		0.36	0.48		0.70					0.84		0.50	
		Queue Length 95th (ft)	Movement		0	m0		507					486		209	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (10.8)			A (9.3)	A (0.5)	B (16.4)		C (23.3)				B (11.2)
			Approach	B (10.8)			A (7.2)			C (20.2)						
		Volume to Capacity ratio	Movement		0.60			0.73	0.43	0.39		0.78				
		Queue Length 95th (ft)	Movement		189			m262	m0	84		#193				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (86.8)	B (16.3)	A (8.2)	F (131.4)	C (23.7)		F (97.4)	D (40.0)	D (40.4)	D (40.0)	D (42.4)	D (52.8)	C (29.5)
			Approach	B (17.8)			C (29.5)			E (79.1)			D (50.2)			
		Volume to Capacity ratio	Movement	0.81	0.77	0.25	0.99	0.80		0.99	0.03	0.08	0.13	0.17	0.70	
		Queue Length 95th (ft)	Movement	m#130	492	m101	#233	654		#306	22	36	46	68	215	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.16: 2020 Build 2A – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	D (52.7)	D (45.0)	C (22.2)	D (45.4)	C (30.7)	B (16.0)	D (54.0)	E (63.7)	D (40.3)	E (64.9)	D (37.3)	A (5.3)	D (41.3)
			Approach		D (44.5)			C (29.5)			D (52.9)			D (39.1)		
		Volume to Capacity ratio	Movement	0.67	0.82	0.08	0.68	0.59	0.53	0.56	0.92	0.76	0.89	0.51	0.26	
		Queue Length 95th (ft)	Movement	163	432	7	188	297	309	102	#372	225	#282	223	55	
	East Newport Center Drive	LOS (Delay)	Movement	C (26.3)	A (4.2)	A (4.4)	B (19.8)	A (3.0)	A (3.5)			C (20.1)			C (22.1)	A (7.6)
			Approach		A (7.2)			A (6.1)			C (20.1)			C (22.1)		
		Volume to Capacity ratio	Movement	0.53	0.47	0.49	0.57	0.35	0.35			0.04			0.06	
		Queue Length 95th (ft)	Movement	m86	113	m107	m121	63	m48			14			16	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		D (47.9)	A (0.3)	B (19.9)	A (7.0)					C (32.0)		D (44.4)	C (25.6)
			Approach		D (37.0)			B (10.6)						D (40.5)		
		Volume to Capacity ratio	Movement		0.83	0.24	0.52	0.55					0.30		0.82	
		Queue Length 95th (ft)	Movement		283	0	128	186					135		367	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (15.3)	A (0.1)		A (2.9)	A (0.2)	D (38.7)		D (39.0)				B (13.7)
			Approach		B (11.2)			A (2.5)			D (38.8)					
		Volume to Capacity ratio	Movement		0.45	0.16		0.33	0.18	0.48		0.49				
		Queue Length 95th (ft)	Movement		165	m0		58	m0	179		172				
	FAU Research Park Boulevard	LOS (Delay)	Movement	C (30.1)	B (17.5)	D (49.8)	C (26.2)	C (26.9)	B (14.5)	D (42.0)	C (26.6)	C (25.5)	C (21.4)	C (28.6)	C (23.6)	C (25.8)
			Approach		C (24.0)			C (26.2)			C (33.4)			C (24.0)		
		Volume to Capacity ratio	Movement	0.50	0.66	0.15	0.38	0.88	0.06	0.84	0.46	0.09	0.66	0.64	0.31	
		Queue Length 95th (ft)	Movement	84	152	47	41	216	0	#156	48	0	#150	#140	#101	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	E (56.1)	D (42.6)	C (23.9)	E (55.9)	D (35.6)	B (12.8)	E (61.4)	D (54.6)	C (29.4)	E (58.9)	D (51.8)	A (6.1)	D (39.8)
			Approach		D (43.4)			D (35.1)			D (47.6)			D (37.2)		
		Volume to Capacity ratio	Movement	0.69	0.73	0.13	0.82	0.75	0.54	0.64	0.78	0.42	0.70	0.80	0.43	
		Queue Length 95th (ft)	Movement	195	414	29	262	488	77	120	299	193	175	355	115	
	East Newport Center Drive	LOS (Delay)	Movement	B (13.2)	A (7.8)	A (6.7)	A (9.7)	A (5.0)	A (3.8)			B (18.9)			C (25.5)	B (10.8)
			Approach		A (8.0)			A (5.2)			B (18.9)			C (25.5)		
		Volume to Capacity ratio	Movement	0.06	0.56	0.04	0.10	0.49	0.06			0.42			0.79	
		Queue Length 95th (ft)	Movement	m19	143	m7	m23	110	m11			98			120	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		C (33.1)	A (0.7)	C (32.9)	A (6.3)					D (41.7)		D (47.7)	C (22.3)
			Approach		C (23.3)			B (14.0)						D (45.6)		
		Volume to Capacity ratio	Movement		0.67	0.40	0.50	0.43					0.30		0.66	
		Queue Length 95th (ft)	Movement		288	0	160	186					122		248	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.9)	A (0.2)		A (4.3)	A (0.2)	D (39.1)		D (46.0)				B (12.4)
			Approach		A (3.2)			A (3.7)			D (43.4)					
		Volume to Capacity ratio	Movement		0.34	0.29		0.33	0.20	0.32		0.70				
		Queue Length 95th (ft)	Movement		54	72		63	m0	131		277				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (37.1)	B (19.1)	D (36.7)	C (29.4)	C (29.5)	B (17.2)	D (45.4)	C (26.7)	C (26.1)	B (15.7)	C (34.9)	C (24.3)	C (27.7)
			Approach		C (25.0)			C (28.6)			D (37.5)			C (24.9)		
		Volume to Capacity ratio	Movement	0.80	0.72	0.15	0.59	0.87	0.08	0.89	0.25	0.08	0.50	0.76	0.40	
		Queue Length 95th (ft)	Movement	#130	186	68	#79	#224	0	#176	38	0	119	#208	#129	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.17: 2020 Build 2A – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.2)		D (53.6)	A (1.2)		E (56.6)		D (46.9)				B (14.0)
			Approach		B (16.2)			A (5.2)			D (51.1)					
		Volume to Capacity ratio	Movement		0.54		0.64	0.47		0.67		0.12				
		Queue Length 95th (ft)	Movement		323		#154	27		170		64				
	NW 5th Avenue	LOS (Delay)	Movement	D (49.5)	A (2.0)			A (9.1)	A (4.3)				D (51.2)		D (47.0)	A (9.9)
			Approach		A (3.8)			A (8.9)						D (49.6)		
		Volume to Capacity ratio	Movement	0.70	0.47			0.45	0.05				0.59		0.13	
		Queue Length 95th (ft)	Movement	#152	43			242	m4				130		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.3)	A (1.5)		A (6.7)					C (20.1)		C (23.5)	A (8.1)
			Approach		A (3.8)			A (6.7)						C (21.8)		
		Volume to Capacity ratio	Movement		0.42	0.59		0.48					0.53		0.70	
		Queue Length 95th (ft)	Movement		131	356		146					108		135	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.0)			A (4.5)	A (0.2)	C (22.0)		C (21.2)				A (7.5)
			Approach		A (5.0)			A (3.7)			C (21.7)					
		Volume to Capacity ratio	Movement		0.38			0.62	0.29	0.62		0.55				
		Queue Length 95th (ft)	Movement		56			m143	m0	121		101				
	NE 3rd Avenue	LOS (Delay)	Movement	E (67.5)	B (18.9)		E (56.4)	D (40.6)		D (37.6)	D (36.3)	C (32.2)	C (30.9)	D (37.0)	F (81.2)	D (41.6)
			Approach		C (31.5)			D (41.1)			D (36.3)			E (64.1)		
		Volume to Capacity ratio	Movement	0.91	0.49		0.49	0.87		0.63	0.43	0.04	0.28	0.44	0.98	
		Queue Length 95th (ft)	Movement	#243	260		79	501		183	214	0	86	212	#526	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (18.2)		E (72.7)	A (1.5)		E (62.8)		D (53.2)				B (15.5)
			Approach		B (18.2)			A (8.9)			E (57.9)					
		Volume to Capacity ratio	Movement		0.59		0.87	0.56		0.65		0.08				
		Queue Length 95th (ft)	Movement		389		#359	31		152		57				
	NW 5th Avenue	LOS (Delay)	Movement	E (55.7)	A (1.6)			B (12.1)	A (4.1)				E (56.7)		D (53.4)	B (11.3)
			Approach		A (5.4)			B (11.2)						E (55.2)		
		Volume to Capacity ratio	Movement	0.82	0.47			0.60	0.17				0.54		0.10	
		Queue Length 95th (ft)	Movement	#277	35			406	m15				112		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (9.2)	A (0.7)		B (13.6)					B (18.5)		C (25.4)	B (12.4)
			Approach		A (7.1)			B (13.6)						C (22.5)		
		Volume to Capacity ratio	Movement		0.56	0.41		0.73					0.46		0.79	
		Queue Length 95th (ft)	Movement		263	29		m238					114		#196	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.8)			A (9.4)	A (0.2)	D (45.1)		C (20.8)				B (16.2)
			Approach		A (6.8)			A (7.8)			D (36.5)					
		Volume to Capacity ratio	Movement		0.65			0.64	0.23	0.98		0.66				
		Queue Length 95th (ft)	Movement		62			m283	m0	#338		167				
	NE 3rd Avenue	LOS (Delay)	Movement	E (60.9)	C (21.1)		E (76.7)	D (35.3)		F (81.4)	D (53.4)	D (39.0)	D (43.3)	E (57.5)	D (52.2)	D (38.9)
			Approach		C (29.2)			D (37.8)			E (61.0)			D (53.2)		
		Volume to Capacity ratio	Movement	0.86	0.74		0.74	0.76		0.94	0.76	0.06	0.43	0.74	0.63	
		Queue Length 95th (ft)	Movement	#284	483		#171	523		#210	342	0	74	279	223	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.18: 2040 Build 2A – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (96.0)	C (25.5)		F (126.1)	C (27.6)	B (11.5)	E (74.4)	F (93.9)	E (60.6)	F (84.5)	F (84.4)	D (53.5)	D (40.4)
			Approach	C (33.9)			D (39.3)			E (73.2)			E (74.1)			
		Volume to Capacity ratio	Movement	0.91	0.74		0.98	0.57	0.43	0.30	0.77	0.29	0.36	0.35	0.02	
		Queue Length 95th (ft)	Movement	#526	839		#347	532	57	93	255	136	72	72	1	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (1.2)		C (23.2)					D (51.6)		D (42.5)	B (19.7)
			Approach	A (0.5)			C (23.2)						D (46.4)			
		Volume to Capacity ratio	Movement		0.28	0.59		0.60					0.83		0.70	
		Queue Length 95th (ft)	Movement		0	715		540					702		454	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (11.1)			B (10.7)	A (0.4)	B (18.8)		C (27.2)				B (13.1)
			Approach	B (11.1)			A (7.4)			C (23.8)						
		Volume to Capacity ratio	Movement		0.55			0.66	0.54	0.30		0.77				
		Queue Length 95th (ft)	Movement		345			m295	m0	98		292				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (136.1)	B (15.2)	A (9.6)	F (88.4)	C (33.2)		F (532.4)	E (72.4)	E (69.5)	F (83.0)	F (83.3)	F (83.3)	F (80.2)
			Approach	C (32.4)			D (35.3)			F (368.6)			F (83.2)			
		Volume to Capacity ratio	Movement	1.07	0.57	0.08	0.64	0.77		1.99	0.39	0.11	0.45	0.07	0.06	
		Queue Length 95th (ft)	Movement	#666	400	m21	167	759		#1063	169	79	77	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (61.8)	D (42.4)		F (239.8)	C (23.2)	A (0.4)	E (60.0)	D (52.2)	F (236.1)	E (72.3)	E (73.1)	D (52.5)	E (60.1)
			Approach	D (42.8)			D (47.2)			F (166.7)			E (64.7)			
		Volume to Capacity ratio	Movement	0.52	0.95		1.33	0.91	0.04	0.68	0.06	1.35	0.87	0.88	0.72	
		Queue Length 95th (ft)	Movement	#90	#873		m#248	#823	m0	146	27	#475	#369	#377	249	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		C (24.7)					D (45.2)		C (26.4)	B (15.6)
			Approach	A (0.2)			C (24.7)						D (36.3)			
		Volume to Capacity ratio	Movement		0.41	0.55		0.80					0.89		0.51	
		Queue Length 95th (ft)	Movement		m0	m0		645					669		256	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (13.2)			B (11.8)	A (0.6)	B (16.7)		C (27.2)				B (13.3)
			Approach	B (13.2)			A (9.0)			C (22.7)						
		Volume to Capacity ratio	Movement		0.73			0.81	0.51	0.38		0.84				
		Queue Length 95th (ft)	Movement		236			m315	m0	92		#263				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (139.2)	C (22.2)	A (9.9)	F (195.3)	C (28.9)		F (114.9)	D (42.9)	D (43.4)	D (41.7)	D (44.7)	E (62.5)	D (37.4)
			Approach	C (24.9)			D (38.3)			F (91.6)			E (58.4)			
		Volume to Capacity ratio	Movement	1.01	0.90	0.32	1.18	0.88		1.05	0.03	0.09	0.12	0.16	0.78	
		Queue Length 95th (ft)	Movement	m#150	#915	m175	#295	#919		#343	23	52	47	70	265	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.19: 2040 Build 2A – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	E (61.2)	E (73.9)	C (29.1)	D (49.4)	D (41.1)	B (17.1)	E (74.1)	F (115.7)	F (90.9)	F (115.7)	D (53.7)	A (4.8)	E (65.8)
			Approach	E (66.9)			D (36.0)			F (99.9)			E (65.1)			
		Volume to Capacity ratio	Movement	0.55	0.97	0.12	0.55	0.82	0.63	0.64	1.06	1.02	1.03	0.63	0.25	
		Queue Length 95th (ft)	Movement	228	#781	57	178	565	89	141	#571	#889	#428	353	66	
	East Newport Center Drive	LOS (Delay)	Movement	C (29.4)	A (8.2)	A (8.2)	C (26.4)	A (3.8)	A (4.0)			C (26.3)			C (29.2)	B (10.4)
			Approach	B (11.1)			A (7.4)			C (26.3)			C (29.2)			
		Volume to Capacity ratio	Movement	0.63	0.56	0.54	0.62	0.45	0.41			0.14			0.22	
		Queue Length 95th (ft)	Movement	m95	m351	m272	m196	186	m146			35			36	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		D (46.9)	A (0.6)	E (63.7)	B (16.3)					D (36.8)		E (55.7)	D (35.4)
			Approach	C (34.4)			C (29.7)						D (49.6)			
		Volume to Capacity ratio	Movement		0.81	0.36	0.86	0.74					0.34		0.88	
		Queue Length 95th (ft)	Movement		427	0	457	427					216		601	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (1.6)	A (0.1)		A (2.9)	A (0.1)	E (70.0)		E (64.3)				B (17.1)
			Approach	A (1.2)			A (2.6)			E (67.9)						
		Volume to Capacity ratio	Movement		0.43	0.20		0.37	0.19	0.85		0.72				
		Queue Length 95th (ft)	Movement		10	0		m62	m0	347		271				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (52.2)	B (14.7)	C (24.1)	D (38.0)	C (30.5)	B (17.1)	E (66.6)	C (29.2)	C (28.0)	C (31.4)	E (56.8)	D (47.7)	C (32.3)
			Approach	C (21.8)			C (30.7)			D (46.9)			D (45.1)			
		Volume to Capacity ratio	Movement	0.85	0.73	0.22	0.66	0.88	0.07	0.99	0.35	0.12	0.72	0.86	0.77	
		Queue Length 95th (ft)	Movement	#127	195	46	#104	#347	0	#304	81	7	#169	#222	#226	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (92.6)	D (53.7)	C (23.0)	E (55.3)	D (44.6)	B (17.5)	F (92.7)	E (58.9)	C (30.4)	E (73.4)	E (69.8)	A (8.2)	D (50.3)
			Approach	E (58.7)			D (40.4)			E (57.7)			D (50.5)			
		Volume to Capacity ratio	Movement	0.97	0.91	0.13	0.94	0.99	0.61	0.96	0.88	0.54	0.93	0.98	0.57	
		Queue Length 95th (ft)	Movement	#242	#505	52	m#300	#661	m205	#216	#353	152	#291	#506	183	
	East Newport Center Drive	LOS (Delay)	Movement	B (10.3)	A (5.6)	A (1.6)	B (16.5)	B (14.9)	B (14.5)			C (25.4)			C (28.2)	B (15.0)
			Approach	A (5.7)			B (15.0)			C (25.4)			C (28.2)			
		Volume to Capacity ratio	Movement	0.07	0.64	0.06	0.16	0.76	0.09			0.72			0.92	
		Queue Length 95th (ft)	Movement	m15	m186	m272	m42	m193	m10			116			#243	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		D (45.4)	A (0.8)	C (31.6)	A (5.4)					D (39.3)		E (66.2)	C (29.0)
			Approach	C (32.9)			B (14.2)						E (56.9)			
		Volume to Capacity ratio	Movement		0.92	0.47	0.68	0.46					0.40		0.94	
		Queue Length 95th (ft)	Movement		411	0	184	143					151		#383	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (18.0)	A (0.2)		A (4.7)	A (0.2)	D (38.2)		D (47.1)				B (15.3)
			Approach	B (10.8)			A (4.0)			D (43.2)						
		Volume to Capacity ratio	Movement		0.51	0.32		0.39	0.21	0.44		0.79				
		Queue Length 95th (ft)	Movement		m1382	m33		m73	m0	163		289				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (52.2)	C (27.7)	D (50.6)	E (65.4)	D (38.6)	C (26.1)	E (66.7)	D (38.7)	D (37.8)	C (33.3)	E (71.2)	E (57.9)	D (43.3)
			Approach	C (35.0)			D (42.7)			D (50.4)			E (55.2)			
		Volume to Capacity ratio	Movement	0.83	0.82	0.20	0.85	0.81	0.11	0.95	0.26	0.16	0.62	0.91	0.80	
		Queue Length 95th (ft)	Movement	m#188	382	m96	#225	442	51	#388	104	67	236	#412	#341	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.20: 2040 Build 2A – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.8)		E (69.9)	A (1.4)		E (57.1)		D (46.4)				B (15.1)
			Approach		B (16.8)			A (7.0)			D (51.0)					
		Volume to Capacity ratio	Movement		0.59		0.79	0.52		0.69		0.13				
		Queue Length 95th (ft)	Movement		374		#237	32		181		65				
	NW 5th Avenue	LOS (Delay)	Movement	E (58.5)	A (2.2)			A (9.9)	A (3.9)				D (51.2)		D (47.0)	B (10.5)
			Approach		A (4.4)			A (9.7)						D (49.5)		
		Volume to Capacity ratio	Movement	0.78	0.53			0.49	0.06				0.61		0.22	
		Queue Length 95th (ft)	Movement	m#175	46			278	m5				140		81	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.0)	A (1.9)		A (7.5)					C (20.7)		C (27.0)	A (9.3)
			Approach		A (4.5)			A (7.5)						C (24.0)		
		Volume to Capacity ratio	Movement		0.47	0.66		0.52					0.60		0.80	
		Queue Length 95th (ft)	Movement		164	453		164					128		#185	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.6)			A (7.1)	A (0.2)	C (22.5)		C (22.0)				A (9.3)
			Approach		A (6.6)			A (5.4)			C (22.3)					
		Volume to Capacity ratio	Movement		0.44			0.67	0.38	0.69		0.65				
		Queue Length 95th (ft)	Movement		102			m158	m0	144		127				
	NE 3rd Avenue	LOS (Delay)	Movement	F (86.7)	C (21.5)		E (58.0)	E (56.7)		D (41.3)	D (36.1)	C (31.9)	C (30.3)	D (36.9)	F (111.8)	D (52.8)
			Approach		D (37.4)			E (56.8)			D (37.8)			F (83.4)		
		Volume to Capacity ratio	Movement	1.00	0.61		0.55	0.99		0.72	0.45	0.05	0.32	0.45	1.08	
		Queue Length 95th (ft)	Movement	#281	301		91	#628		#220	225	0	98	222	#613	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (19.1)		F (93.5)	A (1.8)		E (63.3)		D (52.6)				B (16.7)
			Approach		B (19.1)			B (10.7)			E (57.8)					
		Volume to Capacity ratio	Movement		0.64		0.95	0.64		0.67		0.08				
		Queue Length 95th (ft)	Movement		444		#394	41		164		58				
	NW 5th Avenue	LOS (Delay)	Movement	F (105.6)	A (1.8)			B (12.0)	A (6.1)				E (56.7)		D (52.7)	B (13.0)
			Approach		A (9.1)			B (11.4)						D (54.9)		
		Volume to Capacity ratio	Movement	1.03	0.52			0.66	0.20				0.57		0.11	
		Queue Length 95th (ft)	Movement	#335	38			429	m21				122		65	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (12.4)	A (0.8)		B (15.4)					B (18.6)		C (34.8)	B (15.5)
			Approach		A (9.4)			B (15.4)						C (28.1)		
		Volume to Capacity ratio	Movement		0.62	0.45		0.81					0.52		0.91	
		Queue Length 95th (ft)	Movement		346	47		294					137		#285	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (15.9)			B (17.8)	A (0.2)	D (38.6)		C (30.7)				C (21.5)
			Approach		B (15.9)			B (14.3)			D (35.7)					
		Volume to Capacity ratio	Movement		0.73			0.73	0.29	0.84		0.62				
		Queue Length 95th (ft)	Movement		315			m272	m0	522		318				
	NE 3rd Avenue	LOS (Delay)	Movement	F (87.5)	C (27.6)		F (120.6)	D (39.6)		F (126.7)	E (60.4)	D (40.3)	D (41.9)	E (58.0)	E (67.9)	D (48.9)
			Approach		D (39.4)			D (44.5)			F (81.1)			E (61.5)		
		Volume to Capacity ratio	Movement	0.97	0.84		0.93	0.86		1.09	0.82	0.08	0.51	0.76	0.83	
		Queue Length 95th (ft)	Movement	#343	#611		#217	#662		#280	358	0	87	291	303	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Tables 5.21 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours for 2040 Build 2A conditions. HCM methodology does not provide queue lengths. The 95th percentile queues were obtained from Synchro reports. The Synchro reported queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length. The results present the queue length in feet for each lane group movement. The available storage length was calculated from the stop bar at the ramp terminal intersection to the gore with I-95 mainline minus 615 feet for the required stopping distance for a design speed of 70 mph per FDOT's 2016 Greenbook (Table 3-22), and accounting for the changes in number of lanes. The analysis indicates that the queues on the off-ramps are not expected to exceed the available storage lengths and are not likely to affect the I-95 mainline operations.

Table 5.21: 2040 Build 2A – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Available Storage (ft)	Queue (ft)	
				AM	PM
2040 Build 2A					
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	1,255	702	669
		R (WB)	1,550	454	256
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	L (WB)	2,965	98	92
		R (EB)	2,615	292	#263
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	2,615	419	293
		R (WB)	2,615	1,058	#674
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	2,240	979	460
		R (EB)	2,240	618	659
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	1,010	128	137
		R (WB)	1,010	#185	#285
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	1,095	144	522
		R (EB)	1,095	127	318

Queue Notes:

Synchro queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length. Queue lengths exceeding the available storage are shown in Red.

#: 95th percentile volume exceeds capacity

Example of Storage Length Calculation for SBRT at Hillsboro Blvd. = [{(1920-615)/2} + 310+ (295*2)] = 1,552.5 feet rounded to 1,550 feet.

5.6.3 VISSIM Analysis of 2040 No-Build and Build 2A Alternatives

Some of the Synchro analysis results did not appear to be reasonable probably because of its limitations pertaining to over-saturated traffic conditions, closely spaced intersections, unconventional intersection treatment, and free-flow right turn lane treatment. Synchro analysis failed to fully capture the operational benefits of the proposed improvements. For example, the analysis results for the southbound right turn movement from the I-95 southbound off-ramp to SW 10th Street, did not appear reasonable under the No-Build and Build conditions. Tables 4.5 and 5.19, presented earlier, provide a summary of the Synchro intersection analysis results for SW 10th Street for the 2040 No-Build and 2040 Build 2A alternatives, respectively. Table 4.5

shows that the free-flow southbound right turn movement from the I-95 southbound off-ramp will have a delay of less than 5 seconds per vehicle and practically zero queue length. With the heavy westbound traffic, weaving movements, and the proximity of the Newport Center Drive intersection, it is very unlikely that this movement will not experience any operational issues as indicated by the Synchro results. Similarly, Table 5.19 shows that the proposed signal controlled dual southbound right turn lanes will operate at LOS E despite the elimination of the signal for the westbound to I-95 southbound movement and the reconfiguration of the ramp terminal to physically separate the eastbound to I-95 northbound traffic from the eastbound through traffic. Therefore, in order to reasonably compare the No-Build and Build alternatives, additional traffic analysis such as traffic simulation was needed to make an informed decision. VISSIM traffic simulation analysis results for the SW 10th Street interchange were obtained from the ongoing SW 10th Street Connector PD&E Study. The traffic forecast and the Build alternative included in the SW 10th Street Connector PD&E Study are identical to the forecast and Build 2A alternative of the SIMR project.

Table 5.22 below shows a comparison of the Synchro and VISSIM analysis results for the SW 10th Street interchange ramp approaches and movements. It can be observed that Synchro analysis shows zero queue and LOS A for the free-flow southbound right turn movement under the 2040 No-Build conditions whereas VISSIM shows 28 and 106 seconds of delay during the AM and PM peak hours, respectively, and much longer queues for the same movement. Similarly, under the 2040 Build 2A conditions, Synchro analysis shows LOS E for the signal controlled dual southbound right turn movement whereas VISSIM shows this movement to operate at LOS C. The reliability of the results from VISSIM analysis is much higher than the results from Synchro analysis. Therefore, it can be concluded that the I-95 ramps at SW 10th Street are expected to operate much better under the Build 2A conditions than under the No-Build conditions in 2040.

Table 5.22: 2040 Comparison of SYNCHRO and VISSIM Results
SW 10th Street Interchange Ramp Approaches

Intersection	Approach	Movt.	SYNCHRO MOEs				VISSIM MOEs [1]			
			Available Storage	AM (PM) Queue	AM (PM) Delay	AM (PM) LOS	Available Storage	AM(PM) Queues	AM (PM) Delay	AM (PM) LOS
No-Build Alternative										
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	1,410	#468 (258)	68 (48)	E (D)	1,410	284 (158)	102 (127)	E (F)
		R (WB)	1,050	0 (0)	2 (5)	A (A)	1,050	284 (158)	28 (106)	C (F)
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	925	#928 (#991)	94 (109)	F (F)	925	288 (9,565)	48 (200+)	D (F)
		R (EB)	925	#987 (#1,045)	133 (149)	F (F)	925	207 (1,191)	44 (200+)	D (F)
Build 2A Alternative										
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	2,665	419 (293)	37 (39)	D (D)	2,665	333 (233)	72 (111)	E (F)
		R (WB)	2,665	1,058 (#674)	56 (66)	E (E)	2,665	333 (233)	33 (26)	C (C)
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	2,240	979 (460)	70 (38)	E (D)	2,240	364 (232)	58 (48)	E (D)
		R (EB)	2,240	618 (659)	64 (47)	E (D)	2,240	228 (294)	52 (52)	D (D)

(1) VISSIM MOEs obtained from the Project Traffic Analysis Report (PTAR) dated June 2020 for SR 869/SW 10th Street Connector PD&E Study.

Synchro Queue Notes:

All lengths are in feet. Queue lengths exceeding the available storage are shown in Red.

Synchro queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length.

#: 95th percentile volume exceeds capacity

Table 5.23 provides a comparison of the network-wide MOEs for the 2040 No-Build and Build 2A alternatives. These MOEs were obtained from VISSIM analysis documented in the PTAR dated June 2020 for the SW 10th Street Connector PD&E Study. The comparison clearly shows the Build 2A alternative to be better than the No-Build for all MOEs.

Table 5.23: 2040 Network-Wide Output (VISSIM)

AM PEAK	No-Build Alternative	Build 2A Alternative	
	Value	Value	Difference
Total Delay (hr)	4,803	1,283	-73%
Total Travel Time (hr)	10,807	8,073	-25%
Total Stops	484,927	84,137	-83%
Latent Demand	3,383	1	-100%
Average Delay (mm:ss)	3:09	0:47	-75%
Average Speed (mph)	28	42	50%
PM PEAK	**No-Build Alternative**	**Build 2A Alternative**	
	Value	Value	Difference
Total Delay (hr)	21,577	1,685	-92%
Total Travel Time (hr)	26,000	9,124	-65%
Total Stops	2,755,216	134,793	-95%
Latent Demand	35,161	2	-100%
Average Delay (mm:ss)	17:31	0:57	-95%
Average Speed (mph)	8	41	413%
2040 Horizon	**Daily TT Savings (hr)**	**Ann. TT Savings (hr)**	**Ann. Benefits ($)**
Build Alt*	19,610	5,098,600	$ 97,893,120

*Benefits over 2040 No-Build Alternative using AM & PM Peak Period at 260 days.

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5.7 Safety Analysis of the 2040 No-Build and Build Alternatives

5.7.1 HSM Analysis

As discussed earlier under Section 3.4, the crash data was obtained from FDOT Crash Analysis Reporting System (CARS) and summarized in Table 3.5. It was found that the percentages of the major crash types and the contributing factors were found to be very similar across the three interchanges. In order to assess the benefits of the proposed interchange and roadway design improvements as part of the three Build Alternatives, the theories and methods contained in Part C of the American Association of State and Highway Transportation Officials (AASHTO) Highway Safety Manual (HSM) were used. Part C of the HSM outlines procedures to estimate the frequency of crashes expected on a roadway based on geometric and traffic characteristics. The crash frequency is estimated based on predictive methods using Safety Performance Functions (SPFs) to determine base condition performance. Then Crash Modification Factors (CMFs) are applied to account for the unique characteristics of the site being analyzed. The Empirical Bayes (EB) Method is applied to determine the expected crash frequency for the "No-Build" condition. The EB Method combines the predicted average crash frequency, determined as part of the predictive method, and the observed crash frequency to determine the expected crash frequency. The addition of the observed crash frequency provides a more statistically reliable estimate of the expected average crash frequency. The HSM Arterial Spreadsheets and Excel file provided by FDOT for use on Freeways and Ramps were utilized to conduct this analysis. The limits of this analysis included:

- I-95 from south of Sample Road to north of Hillsboro Boulevard
  Including: Three freeway segments (including associated weaving sections), seven ramp terminals, nine merging segments, and seven diverging segments
- Sample Road from NW 5th Terrace to NE 3rd Avenue
  Including: Three arterial segments and three arterial intersections
- SW 10th Street from South Military Trail to Natura Boulevard
  Including: Five arterial segments and three arterial intersections
- Hillsboro Boulevard from SW 12th Avenue to Natura Boulevard
  Including: Three arterial segments and two arterial intersections

The primary modifications along the freeway segments include the addition of collector-distributor (C-D) roads at the SW 10th Street and Hillsboro Blvd Interchanges and the resultant reorganization of freeway entry and exit points, which contributed to changes in the predicted crash frequencies. Additionally, the ramp terminals at SW 10th street were re-designed.

While the HSM predictive method is a very useful tool in assessing the safety impacts of new and modified roadways, there are still some limitations. These methods are relatively new and

research is still being conducted to determine the safety impacts and predictive methods for some of the new and developing traffic management strategies and innovative roadway designs being produced at this time. One of the major factors that impacted the analysis, primarily in the vicinity of SW 10th Street, is the SPFs dependency on length and AADT. A good example of this is seen when comparing the freeway segments for the SW 10th Street No-Build and Build 1 conditions, where the AADT is the same and only the geometry changes. In the No-Build condition, SW 10th Street is a traditional interchange with merge and diverge points in both directions, resulting in an effective freeway length (total length minus merge and diverge areas) of 1.45 miles. However, in the Build conditions, these merge and diverge areas are relocated or eliminated through the use of C-D roads (braided ramps) and auxiliary lanes resulting in two freeway segments that have a total effective length of 1.88 miles. Due to the SPFs reliance on length and AADT, this increase in length results in 26 more crashes predicted in Build 1 vs. No-Build. Therefore, even though from an operational standpoint, the re-organization of the merge and diverge points will most likely yield good results with increased safety, better average speeds and travel time reliability through the interchange, these benefits cannot be reflected in the HSM analysis.

The CMFs that have the biggest impact are the presence of turn lanes, protected only left-turn signal phasing and channelized right turns. When turn lanes or protected only left-turn phasing are present a CMF of lower than 1 is applied, which reduces the predicted crash rate. When a channelized right-turn is present a CMF higher than 1 is applied, which increases the predicted crash rate. In the No-Build condition, at SW 10th Street, left-turn lanes with protected only signal phasing are present for the westbound approach (entering the loop ramp to northbound I-95) and a channelized right-turn is present on the eastbound approach (entering the loop ramp to northbound I-95). However, in the Build condition this westbound left-turn movement is eliminated and replaced by an exclusive westbound to northbound ramp with a channelized right-turn entry. Based on the geometric and signal related features for the No-build condition the final CMFs are 0.55 for fatal crashes and 0.68 for Property Damage Only crashes, whereas the final CMFs for the Build Condition are 1.21 for fatal and property damage only crashes. As with the freeway segment, the potential operational benefits of eliminating the westbound left-turn movement in the Build condition are not able to be reflected by the HSM analysis and are actually being negatively represented by an increase in predicted crashes. Some of the other limitations that may have impacted this analysis include innovative arterial intersection designs, no analysis for six-lane arterial segments, and Express Lanes.

The arterial intersections' SPFs are based on classic three and four leg intersection designs and as such the innovative designs being proposed at SW 10th Street and Newport Center Drive cannot be accurately reflected. The proposed design eliminates the northbound and southbound left-turn and through movements and redirects them to a loop road that connects the north and south sides of Newport Center Drive. While we know that both safety and operational impacts

should be seen by eliminating these movements there is currently no way to reflect the elimination of a major movement in the HSM analysis. Additional research was conducted to see if any CMFs exist to account for this change, however, nothing could be found. When individual sites along SW 10th Street are looked at, most sites show either the same or a lower crash frequency for the Build condition vs. the No-Build condition.

All three of the arterials being analyzed are six-lane divided arterials. However, the HSM only includes SPFs for four-lane divided arterials. When conducting this analysis all arterials were shown as four-lane divided arterials and then an additional Crash Modification Factor (CMF) was applied to account for the six-lane condition. The CMF used was determined via the CMF Clearing House website, details of this CMF can be found in **Appendix Q**.

5.7.2 Crash Reduction Analysis

As discussed above, the limitations in the HSM methodology could not quantify the safety benefits of the proposed improvements under the Build conditions. Therefore, in consultation with FDOT and District 4 Safety staff, it was determined that a traditional crash reduction analysis will need to be conducted to determine the safety benefits of the proposed improvements.

In order to estimate the potential safety benefits associated with proposed freeway, interchange, and arterial improvements, the crash reduction analysis utilized the following steps:

1. Identifying applicable crash reduction factors (CRF)
2. Identifying potentially correctable crashes for each improvement with an applicable CRF
3. Applying the CRFs to potentially correctable crashes to estimate the crash reduction per year.

This analysis was conducted based on historic crash data for the years 2012 to 2016. Life cycle analysis, which takes into account the project life in years and capital recovery factor, was not included in this analysis.

The following available resources in the order listed, were used to determine the applicable CRFs:

- FHWA Desktop Reference for Crash Reduction Factors
- FDOT approved Technical Report "Update of Florida Crash Reduction Factors and Countermeasures to improve the Development of District Safety Improvement Projects"
- CMFClearinghouse.org website
- Literature Review for any recent studies that may provide applicable CRFs

Based on the available CRF data, applicable CRFs were identified for the following nine of the proposed improvements under the Build alternatives:

1. I-95 NB auxiliary lanes between Hillsboro Boulevard and Palmetto Park Road.
2. I-95 SB auxiliary lanes between Hillsboro Boulevard and Palmetto Park Road.
3. I-95 SB auxiliary lane between SW 10th Street and Sample Road.
4. Widen NB off-ramp to SW 10th Street from one lane to two lanes.
5. Provide two right-turn lanes on the SB off-ramp to SW 10th Street.
6. Convert SW 10th Street/Newport Center Drive intersection from conventional intersection to RCUT Style intersection.
7. Provide an additional WB left-turn lane at the SW 10th Street and SB entry/exit ramp intersection.
8. Provide dual EB and WB left turn lanes and an exclusive EB right turn lane at the SW 10th Street/Natura Blvd Intersection

It is important to note that appropriate CRFs are not available for many of the proposed improvements under the Build alternatives. These improvements are very likely to improve the operations and consequently the safety, the benefits of which cannot be quantified due to the lack of available data. Some of the improvements for which no appropriate CRFs could be obtained are:

1. Removal of the traffic signal for the WB to SB movement at the SW 10th Street interchange. This signal is being combined with the SB off-ramp signal.
2. Elimination of the weaving between the EB Hillsboro Boulevard to I-95 NB loop ramp and the NB I-95 to WB Hillsboro Boulevard loop ramp.
3. Elimination (through braided ramps) of the conflict between the NB On-ramp from SW 10th Street and NB Off-Ramp to Hillsboro Boulevard.
4. Elimination (through braided ramps) of the conflict between the SB On-ramp from Hillsboro Boulevard and the SB Off-Ramp to SW 10th Street.
5. Elimination of the WB to SB I-95 loop ramp merge with I-95 mainline lanes at Hillsboro Boulevard
6. Increasing the storage length of the NB Off-Ramp to Hillsboro Boulevard from 2450’ to 4100’ to prevent queue spillback onto I-95 mainline.
7. Increasing the storage length of the SB Off-Ramp to SW 10th Street from 1360’ to 4150’ to prevent queue spillback onto I-95 mainline.

The 2012 to 2016 crash data related to the eight improvements for which CRFs were available was obtained and a high-level review was conducted to determine those crashes that may be correctable as a result of each of the nine improvements. Crash data for all but one of the improvements was obtained from the FDOT Crash Analysis Reporting System (CARS). SW 10th Street is not a State Road east of the NB I-95 on/off ramp intersection. As such, the

crash data for the SW 10th Street/Natura Boulevard intersection had to be obtained from Signal Four Analytics. The crash data was filtered to include only those crashes that would be applicable to the associated improvements. For example, only the crashes that occurred in the southbound direction were used in the analysis for the SB auxiliary lane improvements. All pertinent data is included in **Appendix Q**. The results of this analysis are summarized in **Table 5.24**. The analysis results show that approximately 42 crashes per year may be reduced by the proposed improvements resulting in an annual safety benefit of $6,159,918. The safety benefit per year was calculated based on the average cost per crash provided in the FDOT Design Manual which is based on the 2012 to 2016 crash data.

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Table 5.24: Crash Reduction Analysis Summary

Improvement	BMP	EMP	CRF[1]	Source	Potentially Correctable Crashes[2] (2012-2016)	Estimated Crash Reduction (per year)	Cost per crash[3]	Estimated Safety Benefit (per year)
I-95 NB auxiliary lanes between Hillsboro Boulevard and Palmetto Park Road.	25.013/0.000	25.334/1.354	21%	CMF Clearing House	227	9.534	$153,130	$1,459,941.42
I-95 SB auxiliary lanes between Hillsboro Boulevard and Palmetto Park Road.	25.334/1.337	24.980/0.000	21%	CMF Clearing House	278	11.676	$153,130	$1,787,945.88
I-95 SB auxiliary lane between SW 10th Street and Sample Road.	23.526	21.983	21%	CMF Clearing House	201	8.442	$153,130	$1,292,723.46
Widen NB off-ramp to SW 10th Street from one lane to two lanes	-	-	25%	FDOT Report	57	2.85	$153,130	$436,420.50
Provide two right-turn lanes on the SB off-ramp to SW 10th Street	-	-	17%	FDOT Report	52	1.768	$153,130	$270,733.84
Convert SW 10th Street/Newport Center Drive intersection from conventional intersection to RCUT Style intersection	1.774	1.874	15%	FHWA-HRT-17-082	86	2.58	$123,598	$318,882.84
Provide an additional WB left-turn lane at the SW 10th Street and SB entry/exit ramp intersection	1.955	2.135	17%	FDOT Report	44	1.496	$123,598	$184,902.61
Provide dual EB and WB left turn lanes and an exclusive EB right turn lane at the SW 10th Street/Natura Blvd Intersection[4]	n/a	n/a	28%	FDOT Report	59	3.304	$123,598	$408,367.79
					Total	**41.65**		**$6,159,918.34**

1. See appendix Q for CRF Reference Information

2. See Appendix Q for Crash Data

3. Cost per crash based on FDOT Design Manual Section 122.6.1 Table 122.6.1

4. This portion of SW 10th Street is not part of the SHS, crash data was obtained from Signal Four Analytics

6 OTHER CONSIDERATIONS

6.1 Potential Design Exceptions and Variations

Improvements along the I-95 mainline and ramps will require a border width variation, as there are several locations where the 94' minimum width cannot be achieved without further right-of-way acquisition, and a horizontal alignment variation due to several curves that do not meet the minimum curve length of 400'. Improvements along SW 10th Street may require a border width variation from the I-95 interchange to Military Trail where the minimum 8' cannot be established, a median width variation at several locations where the minimum 15.5' width is not provided, and a shoulder width variation for each direct connect bridge over I-95 and SW 10th Street connecting managed lanes and express lanes. All other improvements along the mainline, ramps, SW 10th Street and Hillsboro Boulevard should be designed using minimum standards established in the latest editions of AASHTO's A Policy on Geometric Design of Highways and Streets and the FDOT Design Manual.

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7 PROJECT JUSTIFICATION

7.1 FHWA's Policy on Access to the Interstate System

The Federal Highway Administration's (FHWA's) newly adopted policy on *Access to the Interstate System* became effective on May 22, 2017 and replaces the policy of August 27, 2009 on *Access to the Interstate System*, published at 74 Federal Register 43743. The changes in this policy are made to ensure this policy focuses on safety, operational, and engineering issues. The consideration of social, economic, and environmental impacts discussed in the 2009 policy are removed from this policy. However, the removal from this policy does not eliminate the need to consider those matters. Those issues will be addressed under the National Environmental Policy Act and other statutes and regulations applicable to the approval process.

This policy is effective as of May 22, 2017.

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, the Federal Highway Administration's (FHWA) 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:

Considerations and Requirements

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)).

The operational analysis conducted for the SIMR confirmed that the proposed interchange modifications are not expected to have any significant adverse impacts on safety and operations on the interstate facility (I-95). The proposed elimination of the loop ramp in the northeast quadrant of the Hillsboro Boulevard interchange will remove the weaving movement between the ramp terminals and thereby improve the safety and flow of traffic along Hillsboro Boulevard. The proposed improvements along SW 10th Street under the Build alternatives are expected to significantly improve the operations at the NB off-ramp terminal intersection from LOS E and F to LOS B. The 2040 No-Build queuing results for the NB off-ramp at SW 10th Street show the queues to be exceeding the available storage lengths which could adversely impact the flow of traffic along I-95. The proposed improvements under the 2040 Build conditions are projected to significantly increase the available storage length for this ramp and should prevent the queue from adversely affecting the operations along I-95. The comparison between No-Build and Build Alternative 2A shows that the annual travel time saving is approximately $98 million. Compared to the No-Build Alternative, the Build Alternative 2A is expected to reduce the total delay by 75% and 92% and increase the average speed by 50% and 413% during the AM and PM peak hours, respectively. The Build Alternative 2A is projected to significantly improve the LOS at the intersections along SW 10th Street from LOS E and F to LOS D or better. The projected failing conditions under the No-Build Alternative are expected to increase future crash risk within the project corridor. This potential for increased crash risk is alleviated by the capacity improvements proposed in the Build Alternatives.

Many of the improvements proposed for this project are unconventional and unique. The limitations in the Highway Safety Manual (HSM) analysis methodology fail to capture the benefits of the proposed operational and capacity improvements proposed under the Build alternatives and consequently fail to quantify the crash reduction in a meaningful way for this project. Therefore, a traditional crash reduction analysis was conducted to estimate the potential safety benefits of the proposed freeway, interchange, and arterial improvements. The analysis shows that the proposed improvements are expected to reduce approximately 42 crashes per year resulting in an annual safety benefit of more than six (6) million dollars.

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.

This SIMR does not propose any new interchanges along I-95. These existing interchanges provide access to public roads only. The improvements proposed at the interchanges will maintain full access to the existing cross streets and accommodate all movements.

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8 CONCEPTUAL FUNDING

A funding plan for the proposed project has been developed and the right of way phase has been programmed. The interchange improvements will be constructed as part of a Design/Build project under FM number 436964-2 as follows:

- Construction Programmed in FY 2023
- Letting Date July 3, 2024
- Open to Traffic – July 2027

Funding has been identified in the Work Program for the preliminary design, right of way, utility and design build phases in FY 2019 through FY 2024. The total estimated construction cost is $309 million. Cost estimates have been developed based on an engineer's opinion of probable cost using current FDOT Long Range Estimates (LRE) base costs.

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9 CONCLUSION AND RECOMMENDATION

The primary purpose of the I-95 Systems Interchange Modification Report (SIMR) project is to identify the long-term needs through 2040 and to develop design concepts to address traffic spillbacks onto I-95, improve interchange operations, reduce congestion, and enhance safety at the I-95 interchange at SW 10th Street (SR 869) and adjacent interchanges at Hillsboro Boulevard (SR 810) and Sample Road (SR 834). This SIMR evaluates the traffic operations of the No-Build, Build 1, Build 2, and Build 2A alternatives.

The information and analysis indicate that several of the merge, diverge and weaving areas have been designated as High Crash Locations at some point within the last three years of analysis (2013-2015). Similarly, the No-Build Alternative is projected to experience operational failures at multiple merge, diverge and weave locations along I-95 within the study interchanges. Proposed modifications to the interchange are recommended to address projected deficiencies in the future. Listed below are specific modifications and projected benefits:

- The proposed Build alternatives with a 7,900 foot SB auxiliary lane on I-95 between the SB entrance ramp from SW 10th Street and the SB exit ramp to Sample Road creates a 4-lane mainline segment on SB I-95 and is projected to significantly improve the operations in the SB direction.
- The proposed NB braided ramps at the SW 10th Street interchange and the SB braided ramps at Hillsboro Boulevard not only reduce the number of merge and diverge points along I-95 but also provides for longer off-ramp storage lengths. Freeway analysis projects significant improvements over the No-Build conditions in the merge, diverge and mainline operations in both directions.
- The interchange ramp terminal improvements proposed under the Build alternatives are projected to significantly improve the operations at the ramp terminals and potentially eliminate the possibility of off-ramp queues spilling on to the mainline.
- The proposed elimination of the SB on-ramp signal at SW 10th Street and the proposed improvements along SW 10th Street are expected to significantly improve the flow of traffic along the arterial, particularly at the interchange. The improved operations are projected to improve the safety along the corridor.
- The intersection of SW 10th Street and Newport Center Drive is located less than 900 feet west of the SB off-ramp terminal and the westbound queues affect the ramp operations. In order to provide more green time for the east-west movements at this intersection, the northbound and southbound approaches have been modified to allow only right turn movements. Triple right turn lanes have been provided on the northbound and southbound approaches. The northbound and southbound through and left turn

movements have been reassigned based on their destination to SW 12th Avenue/Newport Center Drive local road.

These improvements address the traffic operation deficiencies by eliminating or improving the failing conditions within the interchange influence area and improving safety by reducing congestion and improving operating conditions along SW 10th Street and Hillsboro Boulevard. A traditional crash reduction analysis shows that the proposed improvements are likely to reduce approximately 42 crashes per year resulting in an annual safety benefit of more than six (6) million dollars.

Table 9.1 provides a comparison of the Design Year 2040 intersection analysis results. It is evident from this summary table that the Build alternatives are projected to provide better operating conditions than the No-Build in Design Year 2040. Among the Build alternatives, both Build 2 and Build 2A provide better MOEs than Build 1. Build 2 and Build 2A appear to provide similar MOEs despite higher volumes under Build 2A due to the system-to-system connection between Sawgrass Expressway in the west and I-95 in the east.

Table 9.2 provides a comparison of the off-ramp queuing analysis results for Design Year 2040. The analysis indicates that under the Build alternatives, it is highly unlikely for the off-ramp queues to exceed the available storage lengths. It is also important to note that the Build queues are shorter than the No-Build queues in most instances.

Considering the overall operations along I-95, ramp terminals, and along Hillsboro Boulevard and SW 10th Street, all three Build alternatives are projected to provide better operating conditions than the No-Build. However, the operational improvements under the Build 2 and Build 2A alternatives are better than Build 1. The MOEs for Build 2 and Build 2A are very similar despite the highest traffic demand under Build 2A. In terms of Strategic Intermodal System (SIS) connectivity, Build 2A provides better connectivity. Build 2A provides a direct and logical system-to-system connection between Sawgrass Expressway and I-95 and Florida's Turnpike. VISSIM analysis conducted under the SW 10th Street Connector PD&E Study confirms that the Build 2A alternative is expected to provide better operations than the No-Build alternative in 2040.

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Table 9.1: 2040 Comparison of No-Build and Build Alternatives - Intersection Analysis Results

Arterial	Signal Controlled Intersections	Existing 2016	2040			
			No-Build	Build 1	Build 2	Build 2A
		LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)
AM Peak						
Hillsboro Blvd	SW 12th Avenue	C (32.8)	D (40.0)	D (39.3)	D (40.6)	D (40.4)
	I-95 Southbound Off-ramp	C (22.2)	C (20.4)	C (20.9)	B (19.2)	B (19.7)
	I-95 Northbound Off-ramp		B (10.5)	B (13.2)	B (12.4)	B (13.1)
	SW Natura Blvd/Fairway Dr	E (77.4)	F (80.0)	F (80.4)	F (80.4)	F (80.2)
PM Peak						
Hillsboro Blvd	SW 12th Avenue	D (42.0)	E (60.2)	E (59.2)	E (56.3)	E (60.1)
	I-95 Southbound Off-ramp	B (17.8)	B (16.7)	B (17.9)	B (18.3)	B (15.6)
	I-95 Northbound Off-ramp		A (9.8)	B (13.4)	B (12.5)	B (13.3)
	SW Natura Blvd/Fairway Dr	C (32.4)	D (38.0)	D (37.8)	D (38.1)	D (37.4)
AM Peak						
SW 10th Street	South Military Trail	F (84.8)	F (140.5)	F (121.8)	D (48.5)	E (65.8)
	East Newport Center Drive	C (32.2)	C (34.5)	A (9.9)	A (7.1)	B (10.4)
	I-95 Southbound On-ramp	B (19.1)	C (24.8)			
	I-95 Southbound Off-ramp	D (35.7)	B (17.9)	E (57.6)	C (23.3)	D (35.4)
	I-95 Northbound Ramps	D (48.6)	E (58.5)	B (19.4)	B (11.3)	B (17.1)
	FAU Research Park Blvd	D (38.4)	C (30.1)	C (29.7)	C (20.8)	C (32.3)
PM Peak						
SW 10th Street	South Military Trail	F (95.4)	F (141.4)	F (130.5)	D (54.2)	D (50.3)
	East Newport Center Drive	D (40.9)	E (64.5)	B (15.3)	B (10.2)	B (15.0)
	I-95 Southbound On-ramp	B (15.3)	D (35.6)			
	I-95 Southbound Off-ramp	D (46.2)	B (14.8)	E (75.8)	C (24.5)	C (29.0)
	I-95 Northbound Ramps	F (97.2)	F (81.3)	C (29.7)	B (11.7)	B (15.3)
	FAU Research Park Blvd	D (49.2)	D (38.8)	C (32.6)	C (29.7)	D (43.3)
AM Peak						
Sample Road	NW 5th Terrace	B (16.1)	B (15.1)	B (15.1)	B (15.2)	B (15.1)
	NW 5th Avenue	B (15.9)	B (10.6)	B (10.6)	B (10.4)	B (10.5)
	I-95 Southbound Off-ramp	B (11.3)	A (9.4)	A (9.4)	A (9.2)	A (9.3)
	I-95 Northbound Ramps	B (10.5)	A (9.3)	A (9.3)	A (9.2)	A (9.3)
	NE 3rd Avenue	D (45.6)	D (52.8)	D (52.8)	D (52.0)	D (52.8)
PM Peak						
Sample Road	NW 5th Terrace	B (15.9)	B (18.3)	B (16.9)	B (16.9)	B (16.7)
	NW 5th Avenue	B (12.8)	B (14.2)	B (13.3)	B (13.1)	B (13.0)
	I-95 Southbound Off-ramp	B (17.8)	B (19.2)	B (14.4)	B (14.1)	B (15.5)
	I-95 Northbound Ramps	C (24.1)	C (22.7)	C (21.0)	C (21.3)	C (21.5)
	NE 3rd Avenue	D (47.5)	D (46.4)	D (48.7)	D (48.4)	D (48.9)

Table 9.2: 2040 No-Build & Build - Off-Ramp Signals Queing Analysis Results

Intersection	Approach	Movt.	No-Build Queue Lengths		Build Queue Lengths			
			Available Storage	AM (PM) Queue	Available Storage	Build 1 AM(PM)	Build 2 AM(PM)	Build 2A AM(PM)
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	1,255	719 (733)	1,255	719 (733)	693 (693)	702 (669)
		R (WB)	1,550	832 (503)	1,550	833 (503)	789 (488)	454 (256)
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	L (WB)	N/A	N/A	2,965	341 (333)	276 (274)	98 (92)
		R (EB)	2,730	472 (401)	2,615	496 (#422)	496 (#422)	292 (#263)
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	1,410	#468 (258)	2,615	454 (312)	400 (299)	419 (293)
		R (WB)	1,050	0 (0)	2,615	#1,475 (#1,856)	561 (#486)	1,058 (#674)
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	925	#928 (#991)	2,240	#1,184 (#1,325)	643 (522)	979 (460)
		R (EB)	925	#987 (#1,045)	2,240	620 (#1,072)	440 (659)	618 (659)
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	1,010	246 (438)	1,010	246 (277)	239 (264)	128 (137)
		R (WB)	1,010	#333 (672)	1,010	#333 (#491)	#320 (#486)	#185 (#285)
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	1,095	277 (947)	1,095	277 (1,013)	277 (995)	144 (522)
		R (EB)	1,095	222 (514)	1,095	222 (547)	222 (540)	127 (318)

Queue Notes:

All lengths are in feet. Queue lengths exceeding the available storage are shown in Red.

Synchro queue was multiplied by the number of turn lanes and the lane utilization factor to calculate the total queue length.

#: 95th percentile volume exceeds capacity

Example of Storage Length Calculation for SBRT at Hillsboro Blvd. = [{(1920-615)/2} + 310+ (295*2)] = 1,552.5 feet rounded to 1,550 feet.

APPENDIX A

Amended Methodology Letter of Understanding (MLOU)

APPENDIX B

Raw Traffic Data & Signal Timing Data

APPENDIX C

2016 Existing Freeway HCS Operational Analysis

APPENDIX D

2016 Existing Synchro Intersection Analysis

APPENDIX E

2013 – 2015 Historical Crash Maps and Statistical Summaries

APPENDIX F

Travel Demand Forecast – SW 10th Street PD&E PTFM, January 2019

APPENDIX G

2020 & 2040 No-Build Freeway HCS Analysis

APPENDIX H

2020 & 2040 No-Build Synchro Intersection Analysis

APPENDIX I

SW 10th Street Connector & I-95 Interchange Supplemental Traffic Forecast Scenarios

SW 10th Street at I-95 – Alternatives Analysis Memorandum

APPENDIX J

Build 1, Build 2, and Build 2A Conceptual and Signing Plans

APPENDIX K

2020 & 2040 Build 1 Freeway HCS Operational Analysis

APPENDIX L

2020 & 2040 Build 1 Synchro Intersection Analysis

APPENDIX M

2020 & 2040 Build 2 Freeway HCS Operational Analysis

APPENDIX N

2020 & 2040 Build 2 Synchro Intersection Analysis

APPENDIX O

2020 & 2040 Build 2A Freeway HCS Operational Analysis

APPENDIX P

2020 & 2040 Build 2A Synchro Intersection Analysis

APPENDIX Q

2040 No-Build and Build Safety Analysis