PRELIMINARY ENGINEERING REPORT

Florida Department of Transportation

District 6

SR 994/SW 200th Street/Quail Roost Drive PD&E Study

From West of SW 137th Avenue to East of SW 127th Avenue

Miami-Dade County, Florida

Financial Management Number: 445804-1-22-01

ETDM Number: 14429

June 21, 2024

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by FHWA and FDOT.

PRELIMINARY ENGINEERING REPORT
(FINAL DRAFT)

SR 994 / SW 200th St / Quail Roost Drive
Project Development & Environment Study
From West of SW 137th Avenue to East of SW 127th Avenue
Miami-Dade County, Florida

Financial Management Number: 445804-1-22-01
FAP Project Number: Not Assigned
Efficient Transportation Decision-Making Number: 14429

Prepared for:
Florida Department of Transportation
District 6
1000 NW 111th Avenue
Miami, Florida 33172

June 21, 2024

PROFESSIONAL ENGINEER CERTIFICATION

PRELIMINARY ENGINEERING REPORT

Project: SR 994/SW 200 St/Quail Roost Drive PD&E Study from SW 137 Ave to SW 127 Ave

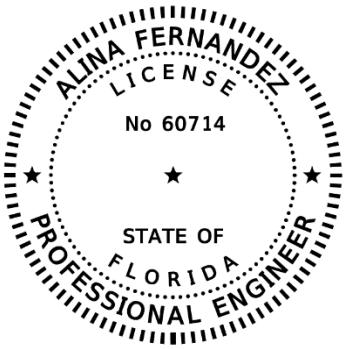
ETDM Number: 14429

Financial Project ID: 445804-1-22-01

Federal Aid Project Number: TBD

This preliminary engineering report contains engineering information that fulfills the purpose and need for the SR 994/SW 200 St/Quail Roost Drive Project Development & Environment Study from SW 137 Avenue to SW 127 Avenue in Miami-Dade County, Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Gannett Fleming, Inc., and that I have prepared or approved the evaluation, findings, opinions, conclusions or technical advice for this project.



This item has been digitally signed and sealed by Alina Fernandez, P.E. on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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1.0 PROJECT SUMMARY

1.1 PROJECT DESCRIPTION

A Project Development and Environment (PD&E) Study is being conducted by the Florida Department of Transportation (FDOT) to evaluate the potential impacts of widening State Road (SR) 994/SW 200th Street/Quail Roost Drive from west of SW 137th Avenue to east of SW 127th Avenue from two lanes to four lanes. The project is located in southwest Miami-Dade County at SR 994/SW 200th Street/Quail Roost Drive, from west of SW 137th Avenue to east of SW 127th Avenue. The project corridor is approximately 1.69 miles in length. Within the project limits, the roadway is locally known as Quail Roost Drive. See ***Figure 1-1*** for details.

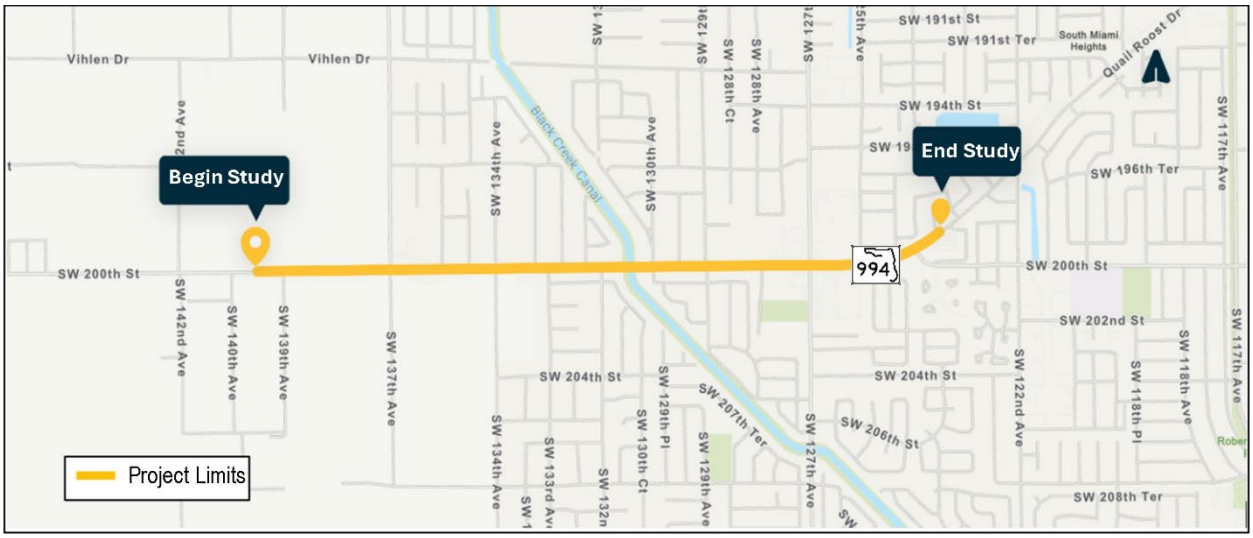


Figure 1-1 Project Location Map

In addition to widening, the proposed roadway improvements include operational enhancements at the existing intersections, removal and replacement of the bridge structure (#870633) over Black Creek Canal (C-1W), access management measures, and stormwater management facilities. The PD&E Study evaluates typical section alternatives based on design criteria, safety, and operational needs, and the minimization of environmental effects and right-of-way (ROW) needs. The PD&E Study evaluates the provision of Americans with Disabilities Act (ADA) compliant facilities as well as new/enhanced pedestrian and bicycle infrastructure, including paved shoulders/designated bicycle lanes, sidewalks, and/or a shared-use path connection to the existing Black Creek Trail. Improvements at four intersections/cross streets are also proposed as part of this project:

- SR 994 and SW 137th Avenue
- SR 994 and SW 134th Avenue
- SR 994 and SW 132nd Avenue
- SR 994 and SW 127th Avenue

The project is located in southwest unincorporated Miami-Dade County and occurs within the Miami Urbanized Area (as defined by the Miami-Dade County 2015 Urban Development Boundary). The project corridor primarily serves existing residential land uses and provides local east-west access and connectivity. Outside of the project limits, SR 994 connects directly to two Strategic Intermodal System (SIS) Highway Corridors at SR 997/Krome Avenue (west of study limits) and SR 821/HEFT (east of study limits). SR 994 also connects to SR 5/US-1/South Dixie Highway, a National Highway System (NHS) route, to the east of the project.

Within the project limits, SR 994 is classified as a rural major collector to the west of SW 137th Avenue and an urban minor arterial to the east of SW 137th Avenue. The corridor primarily has a C3R Suburban Residential Context Classification and a posted speed of 40 miles per hour, which will be maintained. Four major intersections are located along the project corridor, including two signalized intersections (SW 137th Avenue and SW 127th Avenue) and two unsignalized intersections (SW 134th Avenue and SW 132nd Avenue). Eight other minor (unsignalized) intersections are located within the study corridor.

Currently, SR 994 is a two-lane undivided roadway (one lane in each direction) from west of 137th Avenue to west of 127th Avenue. From west of SW 127th Avenue to SR 821/HEFT, SR 994 is a five-lane roadway. The existing SR 994 typical section consists of two undivided 11.5-foot travel lanes with unpaved shoulders and open drainage. Curb and gutter exist at the SR 994/SW 134th Avenue intersection and east of SW 127th Avenue within the study limits. Sidewalks, varying in width, are noncontinuous and generally located at residential subdivisions along the study corridor. There are no existing designated bicycle lanes on SR 994 within the study limits. There is one unrecorded historic bridge within the study limits that spans over the Black Creek Canal (C-1W). There is a pedestrian crossing just east of the bridge for access to the Black Creek Trail, which intersects SR 994. The right-of-way along the study corridor varies from 30 to 100 feet. See ***Figure 1-2*** for details.

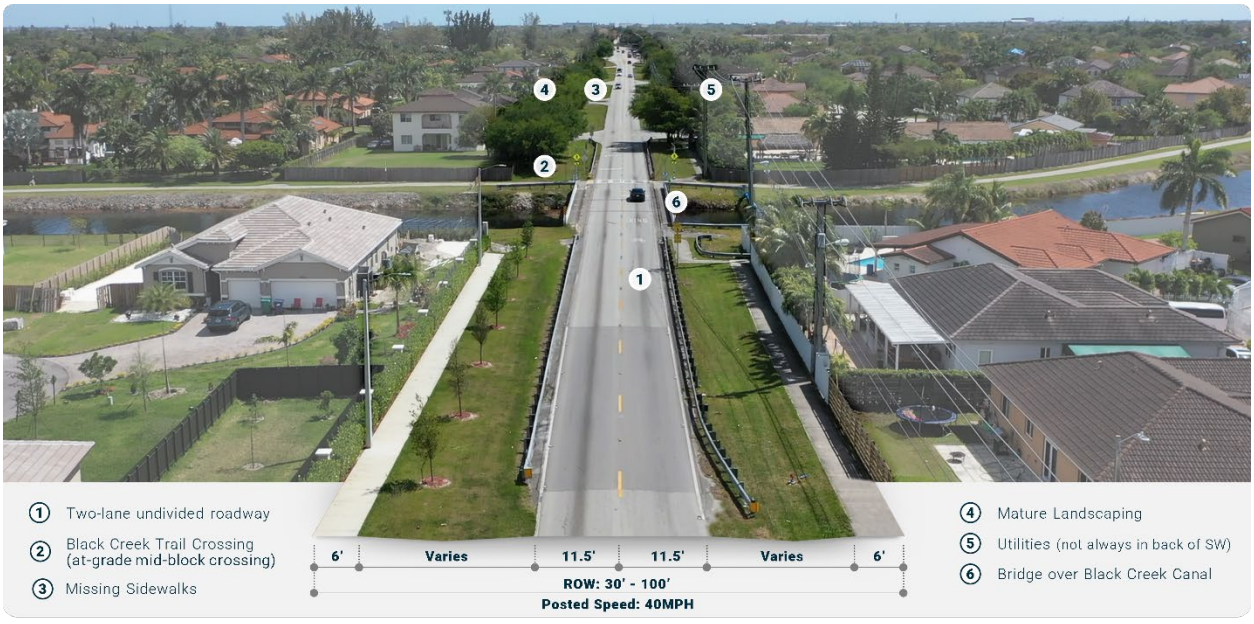


Figure 1-2 Existing Typical Section

1.2 PURPOSE AND NEED

The purpose of this project is to address traffic operations and capacity constraints on SR 994 from west of SW 137th Avenue to east of SW 127th Avenue in unincorporated Miami-Dade County to accommodate future travel demand projected as a result of population and employment growth along the corridor. Other goals of the project are to 1) improve multimodal safety conditions along the corridor, including emergency evacuation and response times, and 2) enhance mobility options and multimodal access. Each of the elements of need is described further below:

1.2.1 Capacity/Transportation Demand

This project is anticipated to improve traffic operations along SR 994 by increasing the capacity to meet projected travel demand as a result of Miami-Dade County population and employment growth. Miami-Dade County is the most populous county in Florida with over 2.6 million residents in 2022. By 2045, the county's population is expected to grow by over 33% to over 3.5 million residents. Employment growth in the county is expected to increase from 960,000 workers in 2021 to more than 1.8 million workers by 2045.

Between SW 137th Avenue and SW 127th Avenue, the corridor has experienced a 7% increase in Annual Average Daily Traffic (AADT) from 2015 to 2019 with traffic volumes growing from 17,900 to 19,200 vehicles per day. Traffic is anticipated to continue to increase due to population growth and residential development in the area.

A traffic Level of Service (LOS) analysis was conducted for Year 2021 and Future Year 2045. The analysis determined that some intersections along the corridor and several intersecting roads that are operating at acceptable LOS D or better in Year 2021, are expected to operate at LOS F during the AM and PM Peak periods in 2045, if no improvements are implemented.

1.2.2 Safety

A crash analysis was conducted from west of SW 137th Avenue to east of SW 127th Avenue. The crash data for the latest five-year period (January 2014 to December 2018) was downloaded from the FDOT's Crash Analysis Reporting System (CARS) and summarized for the project segment. A total of 390 crashes were documented for the five-year period within the project limits. The leading types of crashes along the corridor were rear-end (with 187 crashes), angle (with 77 crashes), and sideswipe (with 43 crashes). Based on crash severity, 65% (254 crashes) were property-damage-only crashes, 35% (135 crashes) were injury crashes, and <1% (1 crash) were fatal. Based on FDOT's 2014–2018 High Crash Lists, the following locations were considered high-crash spots/segments:

Spots

- SR 994 at SW 137th Avenue
- SR 994 at SW 134th Avenue
- SR 994 at SW 132nd Avenue

Segment

- SR 994 from SW 137th Avenue to west of SW 127th Avenue

According to the safety review, congestion/lack of capacity and lack of left-turn lanes serve as the probable causes of the safety issues within the corridor. Providing additional multimodal capacity

and improving intersections along the corridor are anticipated to result in reduced crashes and safety benefits. Improved traffic operations due to increased capacity are also anticipated to decrease emergency response times for emergency response vehicles.

SR 994 connects directly to two Strategic Intermodal System (SIS) Highway Corridors at SR 997/Krome Avenue (west of the project limits) and SR 821/HEFT (east of the project limits). According to the Florida Division of Emergency Management, both SR 997/Krome Avenue and SR 821/HEFT are designated emergency evacuation routes. SR 997/Krome Avenue additionally provides regional connectivity to US 1, which is a major evacuation route for the Florida Keys. The project is anticipated to enhance emergency evacuation capabilities by improving the capacity of the roadway and, thereby, increasing the number of residents that can be evacuated safely during an emergency event and enhancing access from the residential areas along the corridor to designated emergency evacuation routes.

1.2.3 Modal Interrelationships

There are no existing designated bicycle lanes within the project limits. Sidewalks are noncontinuous and generally located at residential subdivisions along the project corridor. The Black Creek Trail intersects the project corridor just east of the Black Creek Canal (C-1W). The trail is a 17-mile-long greenway corridor that connects the Everglades Levee (L-31N Canal) with Black Point Park and Marina in Homestead. There is a pedestrian crossing equipped with Rectangular Rapid Flashing Beacons (RRFBs) and pavement markings to facilitate pedestrian/bicycle crossing and alert drivers of the pedestrian traffic, just east of the bridge for access to the Black Creek Trail.

Based on the 2020 United States Census Data, approximately 2% of the housing units within the project study area (below 3.3% average for Miami-Dade County) are transit-dependent (no vehicle available); in addition, approximately 96 housing units identified within the 2021 census tracts located within the project study area use public transportation for work. This noted transit-dependent population has a higher propensity to walk, bike, or take transit to access essential services. The project is anticipated to improve multi-modal connectivity and mobility options for the transit-dependent population and the overall residential population within the project area by providing continuous bicycle and pedestrian facilities along the entire corridor and improving access to the Black Creek Trail.

The project is nearing completion of the PD&E phase. Throughout the development process, the project has been coordinated with multiple agencies via the Efficient Transportation Decision Making (ETDM) tool and through various agency and public meetings as documented in ***Section 5.0***. A preferred alternative has been selected and will be presented at a Public Hearing scheduled for July 15, 2024. Location and Design Concept Acceptance (LDCA) is anticipated in February 2025. After Public Notice of LDCA, the project will move forward to the Final Design phase.

1.3 COMMITMENTS

The following commitments have been made by the FDOT and will be adhered to during the final design and construction phases:

- Prior to commencing construction activities, the FDOT is committed to re-surveying the

project study area for features that could serve as potential roosting habitat and signs of the Florida bonneted bat. If any signs of the Florida bonneted bat are observed, the FDOT is committed to initiating consultation with the USFWS to determine the appropriate course of action.

- During the construction phase of this project, the FDOT will adhere to the most recent version of the USFWS' *Standard Manatee Conditions for In-Water Work* to minimize the potential for adverse effects.
- During the construction phase of this project, the FDOT will adhere to the most recent version of the USFWS' *Standard Protection Measures for the Eastern Indigo Snake* to minimize the potential for adverse effects.
- If the listing status of the tricolored bat is elevated by USFWS to Threatened or Endangered and the Preferred Alternative is located within the consultation area during the design and permitting phase of the proposed project, FDOT commits to re-initiating consultation with the USFWS to determine the appropriate survey methodology and to address USFWS regulations regarding the protection of the tricolored bat.
- If the listing status of the monarch butterfly is elevated by USFWS to Threatened or Endangered and the Preferred Alternative is located within the consultation area, during the design and permitting phase of the proposed project, FDOT commits to re-initiating consultation with the USFWS to determine the appropriate survey methodology and to address USFWS regulations regarding the protection of the monarch butterfly.

1.4 ALTERNATIVES ANALYSIS SUMMARY

A range of alternatives were considered for the study corridor including the No-Build option, Transportation System Management & Operations (TSM&O) improvements and three Build alternatives as described below. All alternatives were evaluated in terms of engineering, environmental, and socioeconomic aspects.

No-Build: The No-Build (No-Action) Alternative proposes to keep the existing configuration throughout the corridor without further improvements. No operational, safety, or traffic capacity improvements would be implemented throughout the project limits. The No-Build Alternative has a number of positive aspects since it would not require the expenditure of public funds for design, construction, right of way, and/or utility relocation. Traffic would not be temporarily disrupted due to construction, avoiding disruptions to local residents and businesses. Also, there would be no direct or secondary impacts to the environment, the socio-economic characteristics, community cohesion, or system linkage of the area. However, this alternative does not address existing and future congested traffic conditions or existing safety deficiencies. Travel demand and truck traffic will increase significantly over time, given the continued growth expected in this area of Miami-Dade County and future adjacent projects further connecting the corridor with high-volume roadways nearby. An example of a recently completed project nearby is the widening of SW 137 Avenue, a direct connection to SR 994. Furthermore, this alternative does not address safety concerns and multimodal deficiencies along the corridor.

The No-Build alternative is not a viable alternative as it fails to fulfill the purpose and need of the project. However, it is included throughout the evaluation for comparison purposes.

The No-Build roadway typical section within the study limits, is the same as the existing typical section. SR 994, between SW 137 Avenue and SW 127 Avenue, consists of two 11.5-ft wide general use lanes (one lane in the westbound direction and one lane in the eastbound direction). Sidewalk sections are scattered throughout project limits and are mostly present near residential areas adjacent to the corridor. See ***Figure 1-2*** for details.

TSM&O: This alternative is a strategy aimed at improving the overall performance of the transportation network without resorting to large-scale, capital improvements. This alternative maintains one lane of traffic in both directions and proposes the following improvements:

- Signal optimization and one additional eastbound left-turn lane at the intersection of SW 137th Avenue and SR 994
- New signal and one additional left-turn lane on all approaches of the intersection of SW 134th Avenue and SR 994
- One additional westbound left-turn lane at the intersection of SW 132nd Ave and SR 994.
- New sidewalk on missing segments
- 5-ft outside paved shoulder along the study limits

This alternative presents substantial impacts to the right of way and historic resources within the study limits, and it also requires the widening/replacement of the bridge over the Black Creek Canal to accommodate the WB left turn lane at SW 132nd Ave. All of this while still not addressing the purpose and need of the project. The alternative was therefore considered non-viable as a TSM&O option. The beforementioned TSM&O improvements are accommodated under each build alternatives with the exception of the 5-ft shoulder, since the build alternatives feature curb and gutter.

Build Alternative 1: This alternative maintains one lane of traffic in each direction, while adding a 16.5-ft median with exclusive left turn lanes along SR 994. Curb and Gutter Type F is being proposed on the outside of the travel lanes while Type E curb is the typical condition on the median. This alternative proposes sidewalks with sidewalk level Separated Bicycle Lanes (SBLs) along both sides of the corridor. A minimum 4.5-ft buffer is proposed from the back of curb to the front of the sidewalk level SBLs and a 2-ft buffer is proposed between the sidewalk and the bicycle lane. A traffic signal is proposed at the intersection of SR 994/Quail Roost Drive and SW 134th Avenue. See ***Figure 1-3*** for typical section details.

Figure 1-3 Build Alternative 1 Typical Section

Build Alternative 2: This alternative proposes one additional travel lane in each direction, for a total of two 11-ft lanes on each bound, and a 16.5-ft median with exclusive left turn lanes along SR 994. Curb and Gutter Type F is proposed on the outside of the travel lanes while Type E curb is the typical condition on the median. This alternative also proposes sidewalks with sidewalk level SBLs along both sides of the corridor. A minimum 4.5-ft buffer is proposed from the back of curb to the front of the sidewalk level SBLs and a 2-ft buffer is proposed between the sidewalk and the bicycle lane. A traffic signal is proposed at the intersection of SR 994/Quail Roost Drive and SW 134th Avenue. See ***Figure 1-4*** for typical section details.

Figure 1-4 Build Alternative 2 Typical Section

Build Alternative 3: Similar to Build Alternative 2, this alternative proposes adding one travel lane in each direction along SR 994 for a total of two 11-ft lanes on each bound. A 22-ft-wide raised median with exclusive left turn lanes is provided along the corridor, restricting access to the minor roads and driveways connecting to SR 994. At the intersections, a striped buffer is proposed between the left turn lanes and the through traffic. Curb and Gutter Type F is being proposed on the outside of the roadway while Type E curb is the typical condition on the median. This alternative also proposes sidewalks with sidewalk level SBLs along both sides of the corridor. A minimum 4.5-ft buffer is proposed from the back of curb to the front of the sidewalk level SBLs and a 2-ft buffer is proposed between the sidewalk and the bicycle lane. A traffic signal is proposed at the intersection of SR 994/Quail Roost Drive and SW 134th Avenue. This alternative has the greatest impact to the existing right-of-way and also the most access management restrictions. See ***Figure 1-5*** for typical section details.

Figure 1-5 Build Alternative 3 Typical Section

The evaluation methodology used in this study involved a combination of both comparative qualitative and quantitative analyses to select a preferred alternative, which focused on engineering, socio-economic, environmental and project cost. Key components of the alternatives analysis were the purpose and need, travel demand forecasting, geometrics, right of way impacts, construction cost and operational analysis. The alternatives analysis was geared to determining the capacity improvements needed to improve safety, traffic operations, and multi-modal options while minimizing potential environmental impacts.

1.5 DESCRIPTION OF PREFERRED ALTERNATIVE

Build Alternative 2 was selected as the preferred alternative based on the evaluation results documented in this report. Build Alternative 1 does not fully address the purpose and need of the project while Build Alternative 3 does, but results in greater impacts than Build Alternative 2.

The preferred alternative proposes one additional travel lane in each direction, for a total of two 11-ft lanes on each bound, and a 16.5-ft raised median with exclusive left turn lanes along SR 994. Curb and Gutter Type F is proposed on the outside of the travel lanes while Type E curb is the typical condition on the median. This alternative also proposes sidewalks with sidewalk level SBLs along both sides of the corridor, that are intended to be utilized by pedestrians as well as bicyclists. A minimum 4.5-ft buffer is proposed from the back of curb to the front of the sidewalk level SBLs and a 2-ft buffer is proposed between the sidewalk and the bicycle lane. The signalized intersections at SW 137 Avenue and SW 127 Avenue will be widened to accommodate auxiliary turn lanes to meet future travel demand. A traffic signal is proposed at the intersection of SR 994/Quail Roost Drive and SW 134th Avenue. From SW 127 Ave to east of SW 200 St. the proposed typical section transitions from a divided typical section to match the existing 5-lane undivided section, with two 11-ft lanes in each direction and a painted median/center left tun lane. A 10-ft shared use path is proposed along the south side from SW 127 Ave to SW 200 St to provide a future connection to a proposed shared use path (by Miami-Dade County) along SW 200 St.

1.6 LIST OF TECHNICAL DOCUMENTS

The following engineering technical documents were prepared for the PD&E study.

- Traffic and Safety Methodology Technical Memorandum – *August 24, 2021*
- Preliminary Geotechnical Report for Roadway – *September 17, 2021*
- Preliminary Geotechnical Report for Bridge Widening/Replacement – *September 17, 2021*
- Intersection Control Evaluation Stage 1 at SW 134 Avenue – *January 5, 2022*
- Intersection Control Evaluation Stage 1 at SW 137 Avenue – *January 5, 2022*
- Intersection Control Evaluation Stage 2 at SW 134 Avenue – *August 2022*
- Location Hydraulics Report – *June 2024*
- Bridge Hydraulics Report – *June 2024*
- Conceptual Drainage Report – *June 2024*
- Utilities Assessment Package – *January 2023*
- Value Engineering Study Report – *June 2023*
- Draft Typical Section Package – *June 2024*
- Bridge Analysis Report – *June 2024*
- Design Variations and Exceptions Package – *March 2024*
- Project Traffic Analysis Report – *June 2024*
- Preliminary Engineering Report – *June 2024*

2.0 EXISTING CONDITIONS

The methodology utilized for evaluating existing conditions at SR 994/Quail Roost Drive within the study limits consists of data gathered in the areas of roadway and bridge characteristics. This includes the collection and review of data pertaining to the existing facility through review of existing documents, on-site inventories and collection of pertinent data that would serve as a basis for evaluation. Existing documents reviewed for the analysis include the following:

- FDOT Intersection Qualitative Assessment and Signal Warrant Analysis and Conceptual Design Alternatives Report for SR 994 at SW 134th Avenue (June 2017) (FM No. 249726-4-32-01).
- FDOT Resurfacing, Restoration and Rehabilitation (RRR) Safety Review for SR 994 from west of SW 137th Avenue to west of SW 127th Avenue (June 2019) (FM No. 250650-4-32-01).
- PD&E Study Scoping Report for SR 994 from west of SW 137th Avenue to west of SW 127th Avenue (January 2021).

Figure 2-1 SR 994/Quail Roost Drive, west of Black Creek Canal - Looking East

2.1 ROADWAY

2.1.1 Typical Sections

The existing typical section from west of SW 137th Avenue to SW 127th Avenue (See ***Figure 2-2***) consists of two undivided 11.5-foot (ft)-wide travel lanes, with normal crown cross-slopes and unpaved shoulders on both sides of the roadway at varying widths. Throughout the corridor, sidewalks exist intermittently to the north and south. The ROW along the corridor varies from 30 to 100 ft. Curb and gutter exist at the intersections of SW 137th Avenue and SW 134th Avenue. The existing typical section along SR 994 from west of SW 127th Avenue to west of SW 123rd Place (see ***Figure 2-3***) is a five-lane undivided roadway with 11-ft-wide travel lanes, a 10-ft-wide center left-turn lane, 6-ft-wide concrete sidewalks and Type F curb and gutter on both sides. This section was recently resurfaced as part of a RRR project, FM No: 429341-3-52-01.

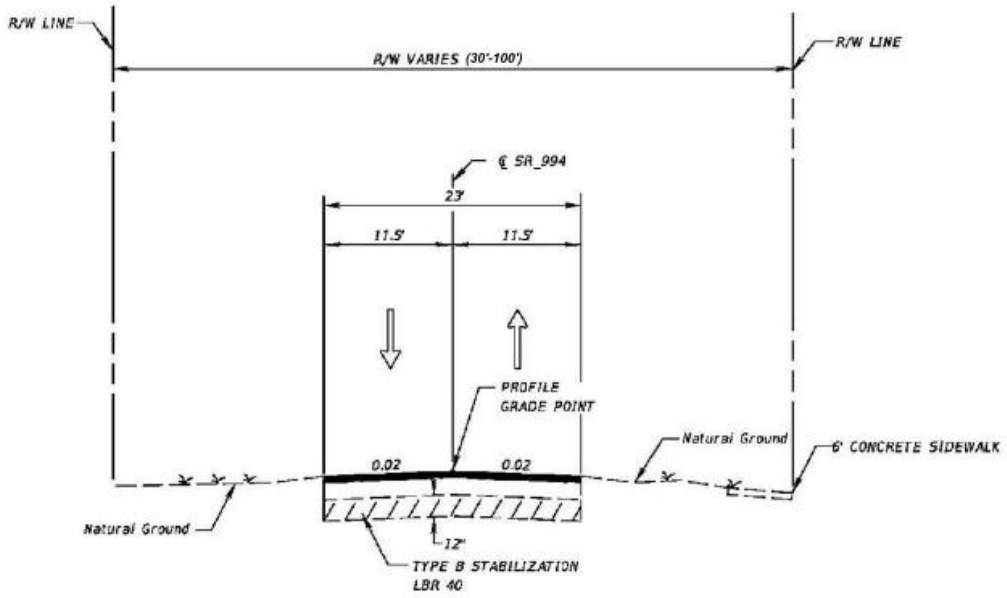


Figure 2-2 Existing Typical Section SR-994 from SW 137 Ave to SW 127 Ave

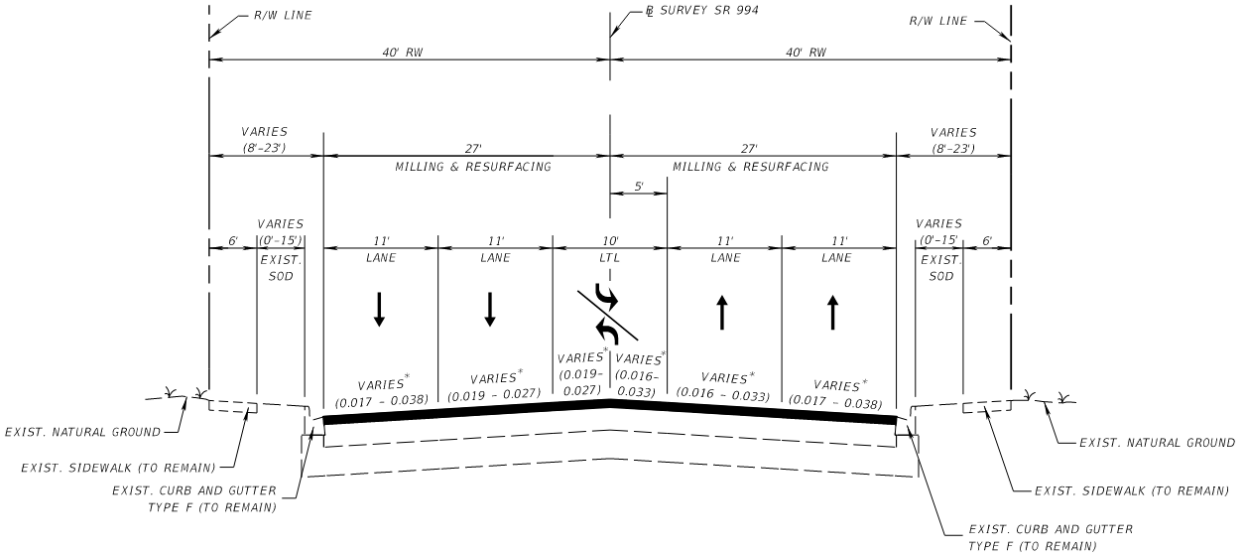


Figure 2-3 Existing Typical Section SR-994 from SW 127 Ave to SW 123 Place

2.2 RIGHT OF WAY

The existing right-of-way (ROW) width varies from 30 to 100 feet within the corridor limits as shown in ***Table 2-1*** below.

Table 2-1 Existing Right of Way

Location		ROW (ft)
From	To	
Begin Project	West of SW 137th Avenue	30
East of SW 137th Avenue	West of SW 135th Avenue	80
East of SW 134th Avenue	West of SW 133rd Court	55
East of SW 133rd Avenue	West of SW 132nd Place	60
East of SW 132nd Place	West of Black Creek Canal	80
East of Black Creek Canal	East of SW 129th Avenue	90
West of SW 127th Avenue	East of SW 127th Avenue	100
West of SW 125th Avenue	East of SW 125th Avenue	85
East of SW 125th Avenue	End Project	80

2.3 ROADWAY CLASSIFICATION AND CONTEXT CLASSIFICATION

2.3.1 Functional Classification

SR 994 has a functional classification of urban minor arterial for most of the study limits, between SW 137th Avenue and SW 127th Avenue. West of SW 137th Avenue, the corridor is classified as a rural major collector. Urban minor arterials typically provide service for trips of moderate length and at a lower level of through traffic movement than principal arterials. They connect with urban principal arterial roads and rural collector routes.

Table 2-2 SR 994 Functional Classification

From	To	Functional Classification
West of SW 137th Avenue (MP 3.740)	SW 137th Avenue (MP 4.075)	Rural Major Collector
SW 137th Avenue (MP 4.075)	East of SW 127th Avenue (MP 5.430)	Urban Minor Arterial

2.3.2 Context Classification

A Project-Level Context Classification (PLCC) and Future Context Classification review was recently conducted by the District Six Planning Office for the study corridor (March 2023). The purpose of the review was to re-evaluate at a more granular level the Context Classification (CC) originally assigned through the systemwide process. Recommendations from the PLCC re-evaluation are summarized below. Additional details are provided in ***Appendix A***.

Table 2-3 SR 994 Context Classification

From	To	Original Systemwide Context Classification	PLCC Recommendation	Future CC Recommendation
West of SW 137th Avenue (MP 3.740)	SW 137th Avenue (MP 4.075)	C2-Rural	C2-Rural	C2-Rural
SW 137th Avenue (MP 4.075)	SW 128th Ave (MP 4.960)	C3R-Suburban Residential	C3R-Suburban Residential	C3R-Suburban Residential
SW 128th Ave (MP 4.960)	East of SW 127th Ave (MP 5.430)	C3R-Suburban Residential	C3C-Suburban Commercial	C3C-Suburban Commercial

C2-Rural corridors serve sparsely settled lands and may include agricultural land, grassland, woodland, and wetlands. C3R corridors are characterized by low-density residential land uses and typically do not have any land uses directly fronting or accessed from the state road. Buildings are often set back from the state road with fences, walls and/or heavy landscaping between the roadway and the residences. C3R development tends to be static and less likely to change over time. In C3C corridors, the development fronting the roadway (immediately adjacent) is commercial uses, typically with large building footprints and large surface parking lots in front of buildings. C3C environments generally attract trips to and from retail and commercial establishments.

2.4 ADJACENT LAND USE

The project is located within unincorporated Miami-Dade County and within the 2015 Miami-Dade County Urban Development Boundary. The existing land use in the surrounding area is primarily residential and agricultural with some commercial and industrial uses as well. See ***Figure 2-4*** below for details. A new single-family residential housing development, located on the west bank of Black Creek Canal and just north of SR 994/SW 200th Street/Quail Roost Drive, was recently constructed and comprises an area of approximately 420,000 square feet. The development added 24 single-family homes along the corridor.

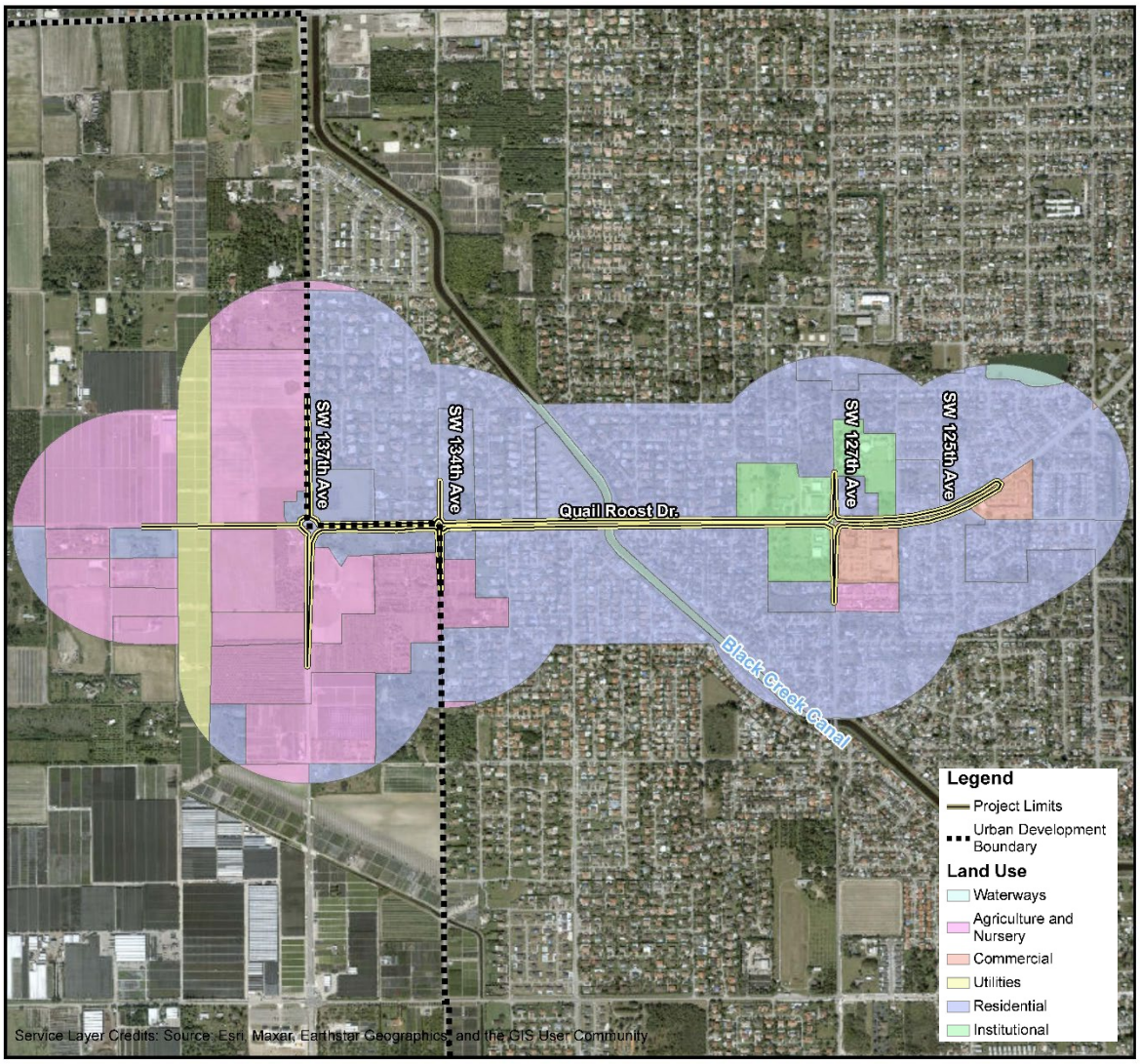


Figure 2-4 Existing Land Use

2.5 ACCESS MANAGEMENT

SR 994/SW 200th Street/Quail Roost Drive is currently assigned an Access Class 4 within the project limits. Access Class 4 roadways are controlled access facilities where direct access to abutting land is controlled to maximize the operation of the through traffic movement. The land adjacent to these roadways is generally not extensively developed and/or the probability of significant land use change exists. These roadways are distinguished by existing or planned non-restrictive median treatments. Access Class 4 is compatible with the C3-R (Suburban Residential) context classification of the study corridor. However, the addition of a restrictive median will warrant a modification to the access class of the corridor. See access management standards in ***Table 2-4*** below.

Table 2-4 Access Management Standards for Controlled Access Facilities

Roadway Access Class	FDOT Context Classification	Movement Type	Multimodal Mix	Network Density	Median Type	Connection/ Driveway Spacing (feet)		Median Opening Spacing (feet)		Minimum Signal Spacing (feet)***
						≤45mph Posted	>45mph Posted	Directional	Full	
4	C3R Suburban Residential, C3C Suburban Commercial	Regional	Moderate	Low	Non-Restrictive**	440	660	N/A	N/A	2,640

***It is recommended that additional safety/operational analysis is completed for non-restrictive medians*

****Traffic signals, proposed at intervals closer than the access management standard for the designated access class, will only be approved where the need for such signal(s) is clearly demonstrated for the safety and operation of the roadway through the signal warrant process. (F.A.C. Rule Chapter: 14-97.003) Applicants requesting or requiring the addition, removal, or modification of a traffic signal for Category E, F, and G connections, must submit an Intersection Control Evaluation Form, Form 750-010-30 (F.A.C. Rule Chapter: 14-96.003). This language is in the draft version of rule 14-96.*

The signal spacing requirement of 2,640-ft is met in the current condition with signals at SW 137th Avenue and SW 127th Avenue, approximately 5,360-ft apart.

The minimum connection spacing of 440-ft is not met at multiple locations along the corridor in the current condition. See ***Figure 2-5*** for details.

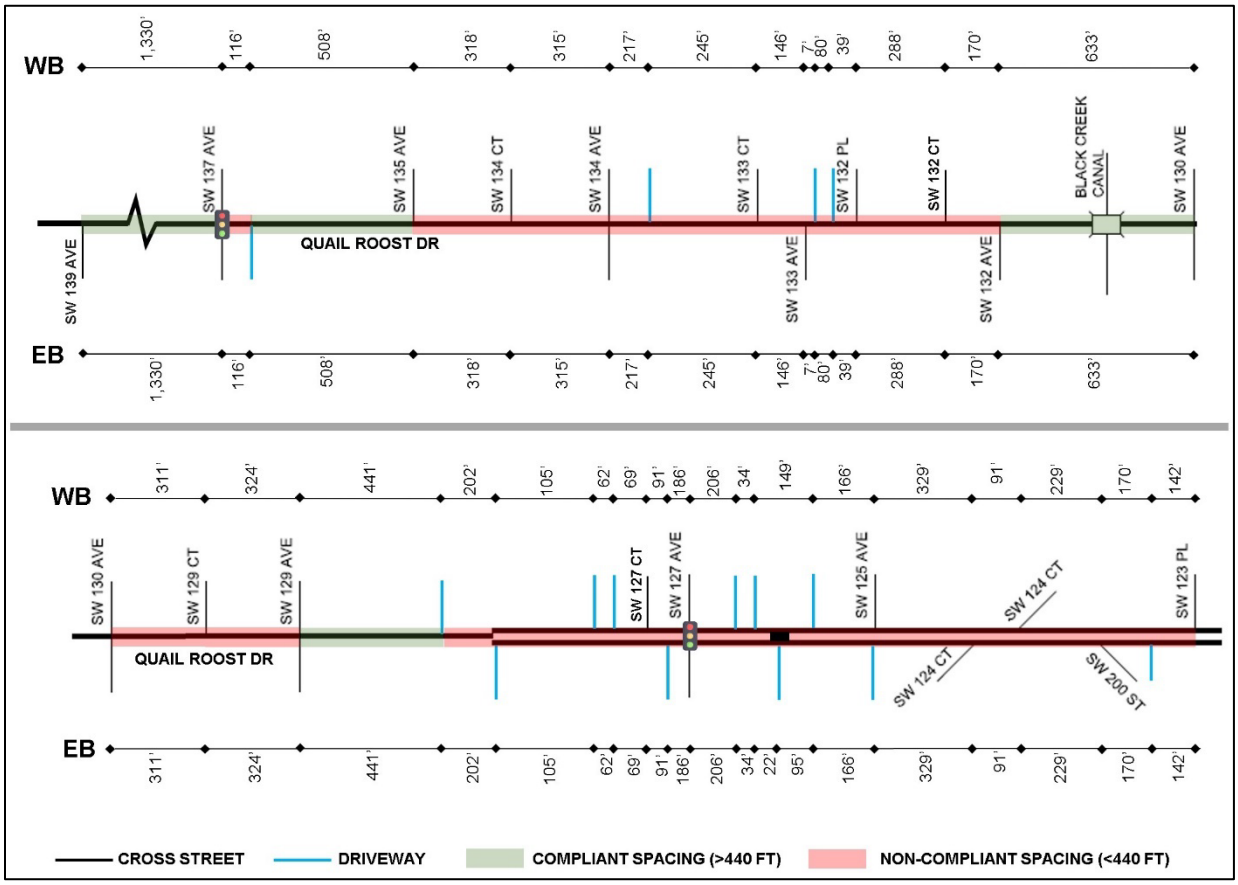


Figure 2-5 Existing Connection Spacings

2.6 DESIGN, POSTED AND TARGET SPEEDS

The SR 994 corridor is posted at 40 miles per hour (mph), east of SW 137 Ave and 45 mph, west of SW 137 Ave. The design speed is assumed to be 40 mph, east of SW 137 Ave and 50 mph, west of SW 137 Ave.based on the current posted speed and design speed from available as-built plans. As-built information was not available for the corridor between SW 137 Ave and SW 127 Ave. Design speed east of SW 127 Ave. is selected from FPID 429341-3, resurfacing project completed in 2022 as well as FPID 249899-1, the reconstruction project that implemented the current typical section from 1997. Both project used a 40 mph design speed. Design speed west of SW 137 Ave. is selected from FPID 443907-1, resurfacing and shoulder widening project completed in 2024. The project used a Design Speed of 50 mph and a posted speed of 45 mph.

A Target Speed review was conducted by the District Six Planning Office for the study corridor in March 2023. Target Speed is defined in the FDOT Design Manual (FDM) as “the highest speed at which vehicles should operate on a thoroughfare in a specific context, consistent with the level of multi-modal activity generated by adjacent land uses, to provide both mobility for motor vehicles and a supportive environment for pedestrians, bicyclists, and public transit users.”

The Target Speed review concluded that given the bicycle and pedestrian activity crash history, the context classification, and guidance from the FDM and FDOT Context Classification Guide, a Target Speed of 40-mph was recommended for the SR 994 corridor within the study limits. See ***Appendix A*** for additional details.

2.7 HORIZONTAL AND VERTICAL ALIGNMENT

2.7.1 Horizontal Alignment

SR 994/SW 200th Street/Quail Roost Dr. from west of 137th Avenue to 127th Avenue runs east-west with mostly tangents throughout the corridor’s horizontal alignment and within the project limits. Due to the lack of survey and the absence of as-built plans, the alignment within the project limits was estimated by recreating the existing roadway centerline, as the baseline of survey is not representative of the alignment of the road. The maximum horizontal alignment deflection identified was 0°34'11". There is a curve with a radius of 1,909.86 ft about 500 ft east of SW 127th Avenue intersection that extends for a length of 1,273.11 ft.

2.7.2 Vertical Alignment

As there were no as-built plans available, the grades and vertical curves throughout the project limits had to be estimated based on the analysis of a profile running along the centerline of the existing roadway’s terrain obtained from the survey Digital Terrain Model (DTM). Vertical curves seem to be present immediately east of SW 137th Avenue and at the center of SW 135th Avenue, with west/east approach grades estimated to be 0.6%/1.7%, and 1.1%/1.2%, respectively. A further examination of the vertical profile revealed that the changes in the grades throughout the project limits were not drastic. In general terms, the study corridor exhibits a relatively flat (substandard at times) profile ranging between 0.05% to 0.84%, which is provided for drainage purposes. Therefore, the vertical alignment for this section of the corridor can be rated as smooth to flat. The section of the the corridor with existing curb and gutter (east of SW 127th Ct), features longitudinal slopes that range from 0.3% to 0.47%, which comply with the minimum longitudinal slope criteria.

2.8 PEDESTRIAN ACCOMODATIONS

Sidewalks throughout the corridor are noncontinuous and generally located at residential subdivisions along the north and south sides of SR 994. There is a midblock pedestrian crossing controlled by Rectangular Rapid Flashing Beacons (RRFB) just east of SW 132nd Avenue for access to the Black Creek Trail. Special high emphasis pavement markings are provided at the crossing (see ***Figure 2-6***). The Black Creek Trail intersects SR 994 and is located along the Black Creek Canal (C-1W), on the east side. The trail is an 8.7-mile-long greenway corridor that begins at Black Point Park and Marina and ends near Larry and Penny Thompson Park. See ***Figure 2-6*** for details.

Figure 2-6 Existing Black Creek Trail

2.9 BICYCLE FACILITIES

There are no existing designated bicycle lanes along SR 994 within the study limits. Miami-Dade County DTPW recently completed Project No. PW20040343 along SW 137th Avenue, to provide two lanes from US-1 to SR 994/Quail Roost Drive with on-street bicycle lanes on both sides of

SW 137th Avenue. Similarly, DTPW is planning two roadway projects in the area that will provide bicycle facilities connectivity to Quail Roost Drive: Project No. PW168 along SW 137th Avenue from US-1 to SW 184th Street, to widen the road to four lanes with a median and on-street bicycle lanes) and Project No. PW0001115 (SW 200th Street from Quail Roost Drive to US-1, to widen the road from two to four lanes with a new shared-use path along the west side).

2.10 TRANSIT FACILITIES

Miami-Dade County provides a mass transit system that includes Metrobus, Metrorail, Metromover and Special Transportation Service (STS). The following is a summary of the transit services available in the project area. For more information, visit www.miamidade.gov/transit.

Metrobus

Currently, there are no Metrobus routes serving the SR 994/Quail Roost Drive corridor within the study limits. The following are the closest Metrobus routes serving the corridor. See ***Figure 2-7*** for details.

- Route 137 (West Dade Connection): this route provides local service seven days a week and it travels from South Dade Government Center to Dolphin Mall Metrobus terminal along SW 137 Ave. The route provides accommodations for people with disabilities and the buses are equipped with bicycle racks.
- Route 52: this route provides local service seven days a week and it travels from Dadeland South Metrorail station to Cutler Bay along the South Dade Transitway and through Richmond Heights, Perrine, and South Miami Heights. The route provides accommodations for people with disabilities and the buses are equipped with bicycle racks.
- Route 31 (Busway Local): this route provides local service seven days a week and it travels from Dadeland South Metrorail Station to the South Dade Government Center along the South Dade Transitway. The route provides accommodations for people with disabilities and the buses are equipped with bicycle racks.
- Route 34 (Express): this route provides limited-stop express service during weekdays in the morning and afternoon. The route travels between Florida City and Dadeland South Metrorail station along the South Dade Transitway. The route provides accommodations for people with disabilities and the buses are equipped with bicycle racks.

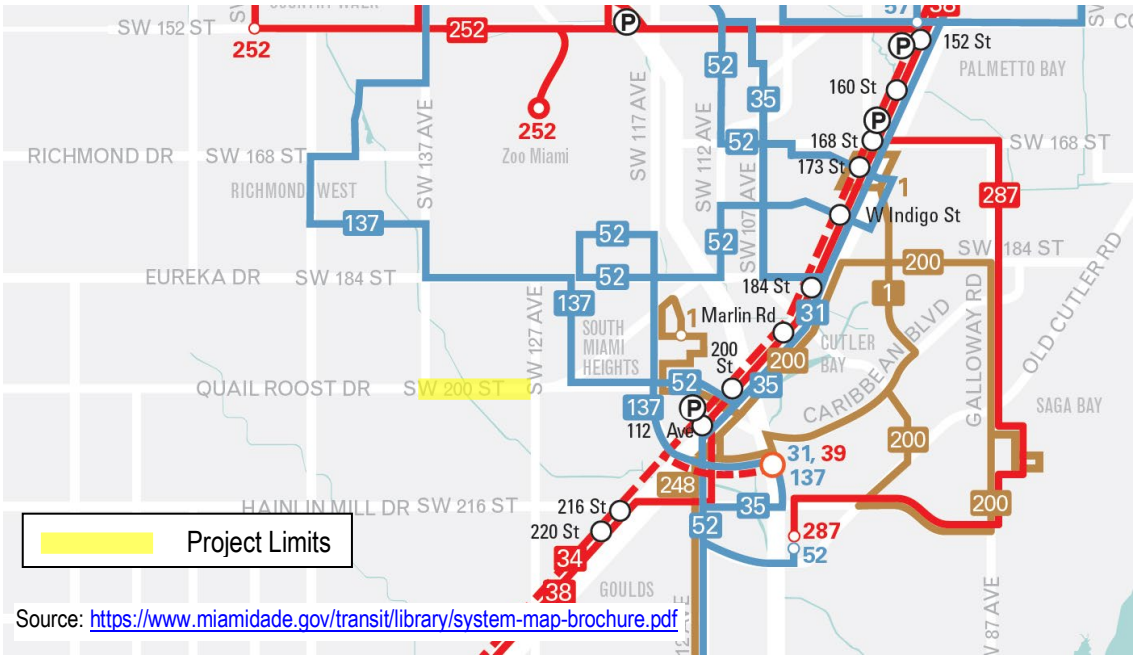


Figure 2-7 Miami-Dade County Transit System

Metrobus Park and Ride Lots

Metrobus Park and Ride Lots are available at multiple locations throughout the County. Transit users can park free at these locations and ride public transit to reach their destinations. The closest park-and-ride lot is located at 20500 SW 112 Avenue, next to the Transitway. Metrobus routes 31 (Busway Local) and 34 (Busway Flyer) have stops at this park-and-ride location.

Metrorail

The Metrorail system is a 25-mile dual track that provides service to Miami International Airport (MIA) and runs from Kendall through South Miami, Coral Gables, and downtown Miami; to the Civic Center/Jackson Memorial Hospital area; and to Brownsville, Liberty City, Hialeah, and Medley in northwest Miami-Dade. Dadeland South, located at 9090 South Dixie Highway, is the Metrorail station closest to the project. Metrobus routes 31, 34 and 52 provide connection to this station.

Special Transportation Service (STS)

Special Transportation Service is a shared-ride public transportation service of Miami-Dade County. It offers door-to-door transportation service for eligible residents with physical or mental disabilities that prevent them from using accessible public transportation independently. For additional information including eligibility, visit www.miamidade.gov/transit.

2.11 PAVEMENT CONDITION

The FDOT Pavement Condition Unit conducts annual surveys of the entire State Highway System in support of FDOT's Pavement Management Program. The data collected (in terms of crack and ride measurements) is used to assess the condition and performance of the State's roadways as well as to predict future rehabilitation needs. Each section of pavement is rated on a 0-10 scale with 0 being the worst and 10 the best. A crack rating of 6.4 or less is considered deficient. The

minimum threshold for the ride criteria is 5.5 for speed limits less than 45 MPH and 6.5 for speed limits greater than 45 MPH. Pavement condition ratings for roadway segments within the study limits were extracted from the 2022 FDOT Pavement Condition Survey Report and are summarized in ***Table 2-5*** below.

Table 2-5 SR 994/Quail Roost Drive Pavement Condition Survey

Section BMP*	Section EMP*	2024		2029 (Forecast)	
		Cracking	Ride	Cracking	Ride
0.000	4.075	7.0	7.1	7.0	6.8
4.075	5.000	8.0	6.1	6.0	5.6
5.000	6.811	10	7.6	N/A	N/A

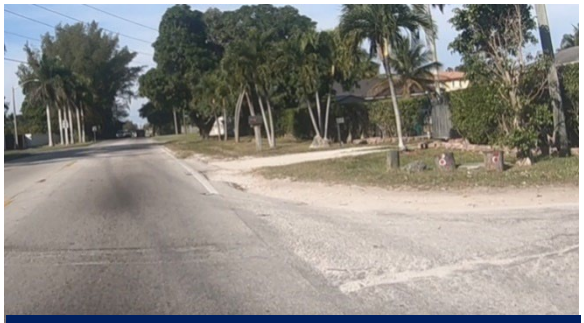
*BMP – Beginning Milepost EMP – Ending Milepost
**Ratings shown are from year 2021. Ratings for 2022 are not available.

The study limits are from MP 3.740 to MP 5.430. Based on the ratings from the 2024 FDOT Pavement Condition Survey Report, most of the corridor is rated at acceptable levels for both criteria (cracking and ride). The segment of the corridor from MP 4.075 to MP 5.000 is forecasted to be deficient by 2029 with a cracking rate of 6.0 and ride rate of 5.6. Upcoming project FM 443907-1-52-01 (Quail Roost Dr. from East of Krome Ave to West of SW 137 Ave) will enhance pavement conditions between MP 0.000 to MP 4.075 to an expected 10 since it will resurface the limits mentioned above. Additionally, pavement conditions between mileposts 5.000 and 6.811 are favorable due to FM 429341-3-52-01 (MP 4.953 to MP 6.825) recently completed.

Pavement along SR 994/Quail Roost Drive was visually inspected during a field review of the project, and it was found to be in fair condition. The lanes to the east of SW 127th Avenue have recently undergone rehabilitation work and upon further inspection were deemed to be in excellent condition. The main deficiency identified consists of erosion and pavement delamination near sections of the edge of pavement. This is potentially due to the lack of paved shoulders and vehicles turning at return radii sections or parking on the swales. See ***Figure 2-8***.

SW 127 Ave, south of SR 994
Looking North

NE corner of SR 994 and SW 129 Ave
Looking West



NW corner of SR 994 and SW 132 PL
Looking West

SW corner of SR 994 and SW 132 Ave
Looking East

Figure 2-8 Existing Pavement Deficiencies

2.12 TRAFFIC VOLUMES AND OPERATIONAL CONDITIONS

2.12.1 Data Collection

The traffic data collection efforts are documented in the Project Traffic Analysis Report (PTAR), a companion document to this study (***Appendix B***). Traffic data was obtained from FDOT's portable and permanent (telemetered) traffic monitoring sites. In addition, 72-hour approach and turning movement counts were collected to analyze current traffic conditions at the intersections within the study corridor.

2.12.1.1 Seventy-Two (72)-Hour Bi-directional Machine Counts

72-hour bi-directional machine counts were collected on typical weekdays from Tuesday, August 31, 2021, through Thursday, September 2, 2021. Counts were verified for reasonableness against previous FDOT studies and FDOT Traffic Count Station No. 87-1116 (SR 994 just west of SW 127th Avenue), adjusted for seasonal variation, and corrected for vehicle axle.

72-hour data was collected at the following main locations:

- SR 994 at SW 137th Avenue
- SR 994 at SW 134th Avenue
- SR 994 at SW 132nd Avenue
- SR 994 at SW 127th Avenue

The traffic data sheets, and hourly distribution of the traffic volumes are included in ***Appendix B***. The peak traffic periods have been identified in the data sheets. The main intent was to determine the overall peak traffic period for AM and PM for the study corridor.

2.12.1.2 Six (6)-Hour Intersection Turning Movement Counts (TMCs)

Six-hour TMCs were collected during a typical commuting day of the week (i.e., Tuesday, Wednesday, or Thursday) from September 8, 2021, to September 14, 2021. The data was recorded in 15-minute intervals. The six-hour data collection period was selected based on a review of the daily traffic volumes for the study corridor. The overall typical AM and PM commuting times were determined to be from 6:30 AM to 9:30 AM and from 3:30 PM to 6:30 PM. The collected data included pedestrian and bicycle counts, as well as heavy vehicle counts summarized separately by movement. The pedestrian and bicycle counts were very low. The traffic data was collected for the following 12 intersections within the study corridor and is included in ***Appendix B***.

1. SR 994 at SW 137th Avenue
2. SR 994 at SW 135th Avenue
3. SR 994 at SW 134th Court
4. SR 994 at SW 134th Avenue
5. SR 994 at SW 133rd Court
6. SR 994 at SW 133rd Avenue
7. SR 994 at SW 132nd Place
8. SR 994 at SW 132nd Avenue
9. SR 994 at SW 130th Avenue
10. SR 994 at SW 129th Court
11. SR 994 at SW 129th Avenue
12. SR 994 at SW 127th Avenue

Based on the TMCs collected at the study intersections, the AM and PM periods were determined to be from 7:30 AM to 8:30 AM and from 3:30 PM to 4:30 PM, respectively. Based on a review of the traffic data collected as part of the FDOT RRR Safety Review (completed in 2019), traffic data collected in March 2021 and FDOT daily counts from 2019 and 2020 from FDOT Count Station No. 87-1116, it was determined that a 3% percent growth rate could be applied to the TMCs collected in late 2021 to account for COVID-19 traffic conditions. It is noted that the 2020 FDOT Synopsis report was from February 11, 2020, and the COVID-19 traffic impact was estimated to have started in March 2020. Subsequently, the TMCs were balanced within +/- 10% based on typical industry practice with most being balanced within 0%, particularly where driveway activity between intersections was less severe.

The peak AM and PM adjusted and balanced traffic volumes for 2021 traffic conditions for the study corridor are presented in ***Table 2-6***, ***Table 2-7***, ***Figure 2-9,*** and ***Figure 2-10***. The two locations where the volumes were not balanced within 0% include the eastbound departure side at SW 137th Avenue due to some unauthorized vehicles using the northbound approach which is under construction, and between SW 129th Avenue and SW 127th Avenue for both eastbound and westbound directions due to a few commercial driveways and a minor street serving a church.

2.12.1.3 Traffic Factors

The traffic factors to be used to develop volumes consist of the Standard K factors in addition to Directional (D) and Truck (T) factors obtained from the Florida Traffic Online website, nearby telemetry stations, as well as new classification counts from the data collection effort. Standard K and D factors will be used to develop future directional design hour volumes (DDHVs), as presented in ***Table 2-8*** and ***Table 2-9*** obtained from the FDOT's Project Traffic Forecasting Handbook (2019). A K factor of 9% and a D factor of 56% were selected for this study which fall between the allowable ranges for an urban arterial such as SR 994. These values were used to develop future traffic volumes.

Table 2-6 Existing AM Peak-Hour Traffic Volumes (Balanced)

Intersection Approach	Movement	2021 Existing - AM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	67	0	0	15	4	---	21	---	116	---	4	134
	Thru	386	762	774	650	724	715	777	822	906	918	906	891
	Right	0	---	---	111	---	13	---	12	3	---	8	47
	Appr. Total	*453*	*762*	*774*	*777*	*728*	*728*	*797*	*834*	*1026*	*918*	*918*	*1072*
Westbound	Left	2	---	---	57	---	13	---	67	0	---	19	174
	Thru	396	893	895	796	955	857	858	839	809	823	808	526
	Right	500	4	3	108	10	---	22	---	25	22	2	146
	Appr. Total	*897*	*897*	*898*	*961*	*965*	*870*	*880*	*906*	*833*	*845*	*828*	*847*
Northbound	Left	N/A	---	---	99	---	108	---	40	4	---	35	192
	Thru	N/A	---	---	36	---	---	---	---	0	---	1	197
	Right	N/A	---	---	32	---	82	---	204	0	---	62	315
	Appr. Total	*N/A*	---	---	*167*	---	*191*	---	*244*	*4*	---	*98*	*703*
Southbound	Left	339	11	3	46	4	---	58	---	11	---	6	93
	Thru	2	---	---	42	---	---	---	---	0	---	0	182
	Right	36	4	2	3	6	---	12	---	94	10	2	46
	Appr. Total	*377*	*15*	*5*	*92*	*10*	---	*70*	---	*105*	*10*	*8*	*321*
	Int. Total	*1727*	*1675*	*1677*	*1996*	*1704*	*1789*	*1747*	*1985*	*1968*	*1773*	*1852*	*2944*

Table 2-7 Existing PM Peak-Hour Traffic Volumes (Balanced)

Intersection Approach	Movement	2021 Existing - PM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	41	1	0	0	6	---	0	---	42	---	1	49
	Thru	402	849	856	648	713	711	732	696	716	727	677	630
	Right	0	---	---	210	---	8	---	55	4	---	49	89
	Appr. Total	*443*	*850*	*856*	*858*	*719*	*719*	*732*	*751*	*762*	*727*	*727*	*768*
Westbound	Left	4	---	---	65	---	30	---	174	0	---	22	246
	Thru	373	727	732	632	713	706	730	718	829	837	832	565
	Right	355	5	5	18	12	---	12	---	29	5	5	97
	Appr. Total	*732*	*732*	*737*	*715*	*725*	*735*	*743*	*892*	*858*	*843*	*859*	*908*
Northbound	Left	N/A	---	---	103	---	20	---	25	1	---	8	147
	Thru	N/A	---	---	24	---	---	---	---	0	---	0	198
	Right	N/A	---	---	40	---	22	---	66	1	---	16	169
	Appr. Total	*N/A*	---	---	*167*	---	*41*	---	*91*	*2*	---	*25*	*514*
Southbound	Left	489	7	2	31	6	---	19	---	10	---	4	131
	Thru	3	---	---	23	---	---	---	---	3	---	0	284
	Right	40	5	0	2	2	---	5	---	62	21	2	65
	Appr. Total	*533*	*12*	*2*	*56*	*8*	---	*24*	---	*75*	*21*	*6*	*480*
	Int. Total	*1708*	*1594*	*1595*	*1795*	*1452*	*1496*	*1499*	*1733*	*1697*	*1590*	*1617*	*2671*

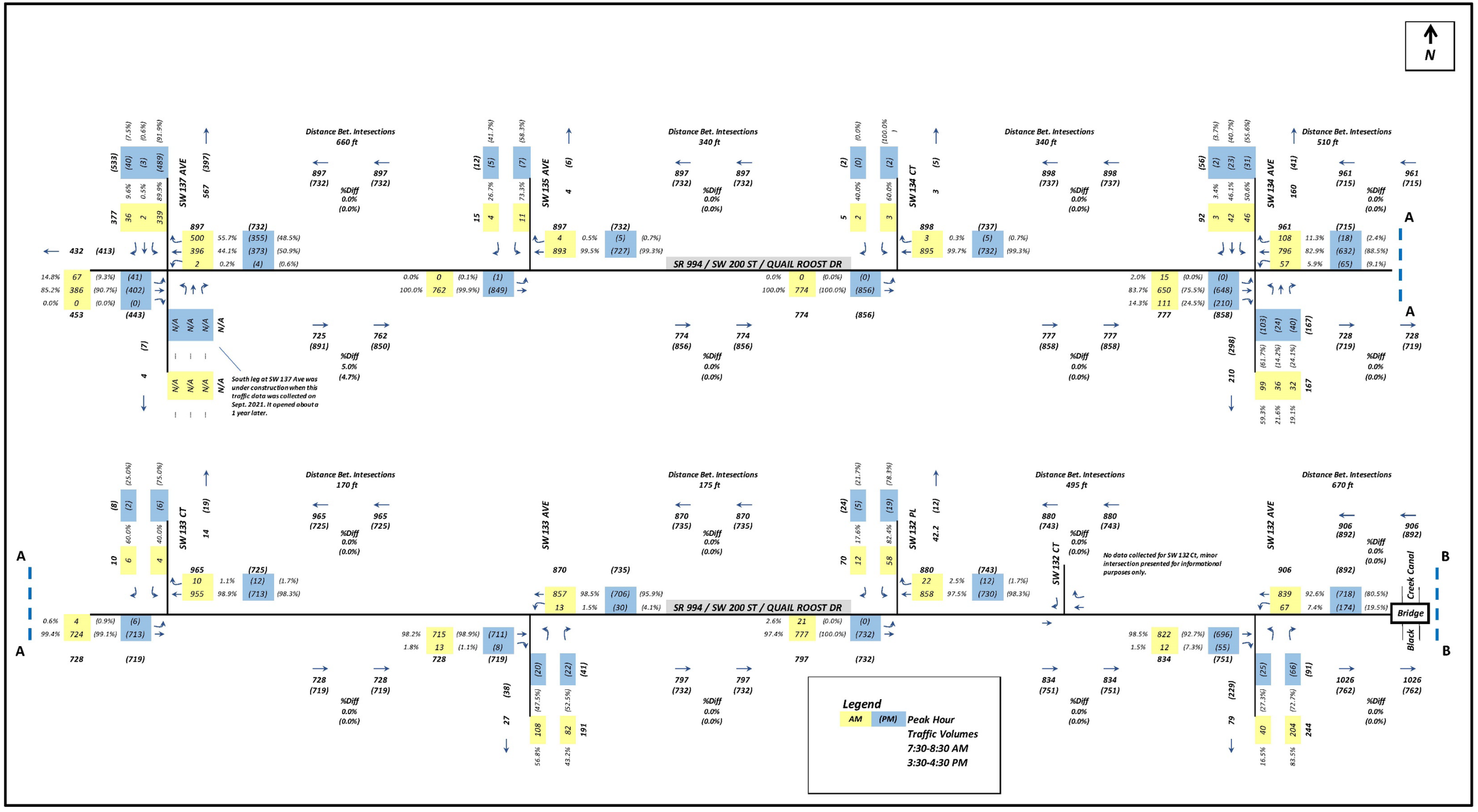


Figure 2-9 Existing AM & PM Peak-Hour Traffic Volumes (Balanced) – SW 137 Avenue to SW 132 Avenue

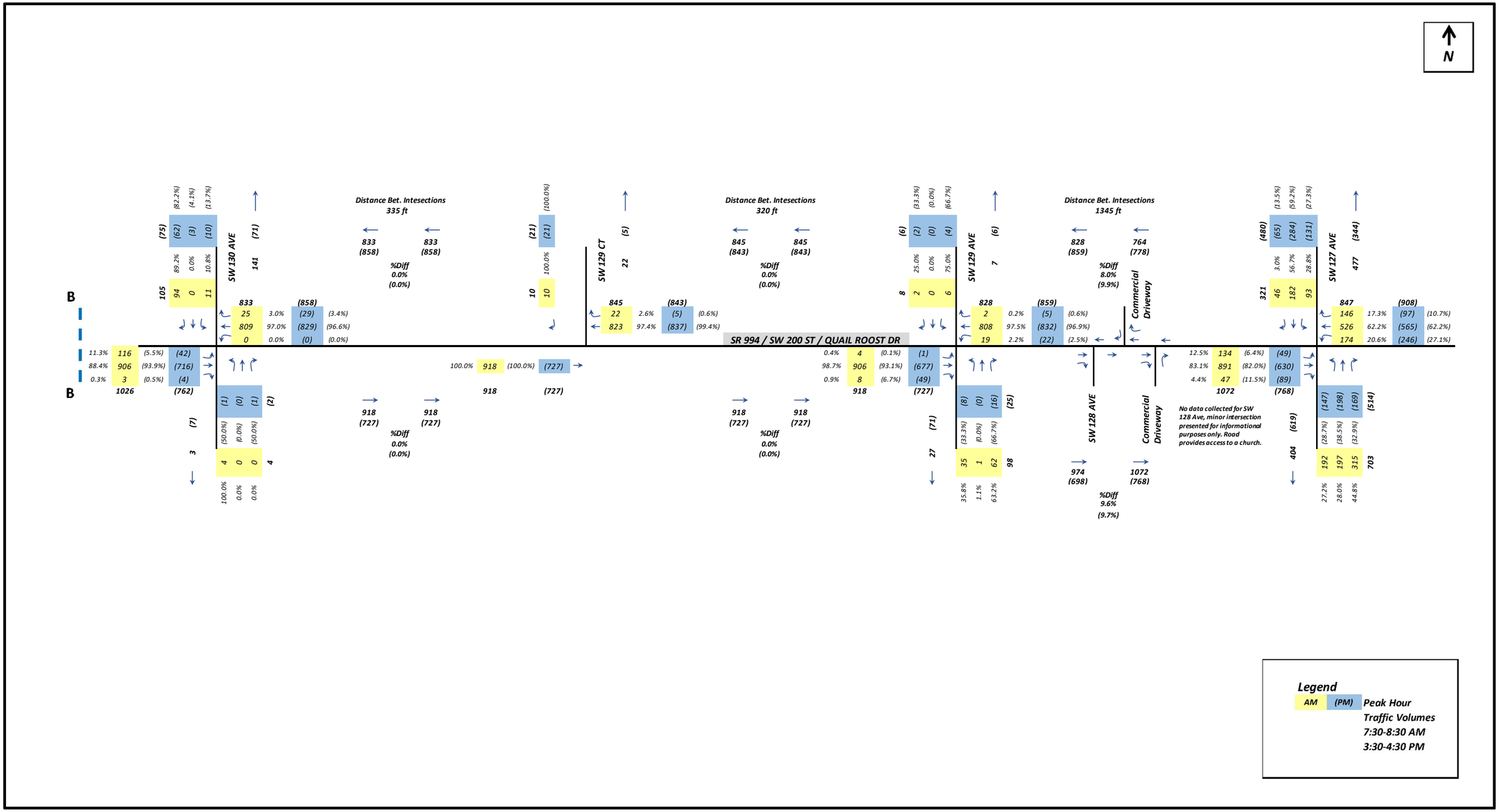


Figure 2-10 Existing AM & PM Peak-Hour Traffic Volumes (Balanced) - SW 132 Avenue to SW 127 Avenue

Table 2-8 FDOT Standard K Factors

Area Type	Facility Type	K_{std}
Large Urban Areas with Core Freeways	Freeways	8.0-9.0
	Arterials	9.0
Other Urbanized Areas	Freeways	9.0
	Arterials	9.0

Table 2-9 FDOT Recommended D Factor Ranges

Road Type	Low D	Medium D	High D	Standard Deviation
Urban Freeways	50.4	55.8	61.2	4.11
Urban Arterials	50.8	57.9	67.1	4.60

Annual Average Daily Traffic (AADT) for existing conditions was determined from the collected 72-hour bi-directional counts by multiplying the Average Daily Traffic (ADT) obtained from the counts by the Seasonal Factor (SF) and Axle Correction Factor (ACF).

$$AADT = ADT \times SF \times ACF$$

The SF and ACF used are 1.01 and 0.98, respectively, since the 72-hour counts were collected in late August and early September. These values were obtained from FDOT 2020 Peak Season Factor Category Report and FDOT 2020 Weekly Axle Factor Category Report. This SF value covers data collected from August 30 to September 5. The ACF value covers data collected from January 1 through December 31.

The truck percentages (T factors) were calculated per each intersection movement based on the TMCs collected. The Peak Hour Factors (PHFs) for each study intersection were based on an overall intersection average.

2.12.2 Traffic Operational Analysis

An operational analysis of the study corridor was performed utilizing Synchro, Version 11, to evaluate the performance of existing traffic conditions for the weekday AM and PM hours. The operational assessment was performed in accordance with the FDOT's Traffic Analysis Handbook (2021) and consistent with the Highway Capacity Manual (HCM). The operational analysis included intersection and arterial evaluations. The results are based on the HCM 6th Edition, except the arterial analysis which is based on Synchro. In addition, the results for the signalized intersection of SW 137th Avenue are based on the HCM 2000 since latest versions (HCM 6th and 2010) do not support the current signal operation of a leading left-turning arrow for the eastbound direction without an exclusive left-turn bay. For consistency, the results for SW 137th Avenue for future conditions are also based on the HCM 2000.

Intersection geometry (lane assignments), posted speed limits, peak hour turning traffic volumes, truck percentages, PHFs, and signal timing/phase data were coded into the Synchro models. The

signal timing and phasing information were obtained from the Miami-Dade County Traffic Signals & Signs Division. The timing/phasing data sheets are included in ***Appendix B***. The truck percentages by intersection movement and an overall average PHF by intersection were used in the analysis.

The following guidelines as presented in the FDOT handbook were followed for the Synchro models:

- Lost time adjustment factor should be adjusted to replicate field observed queue lengths, as needed.
- Default gap acceptance factor should be checked and modified to replicate field conditions, as needed.
- All link terminals will extend at least 1,000 feet from the last node to reasonably calculate queueing in the model.
- 95th percentile queue lengths that are tagged with "#" or "m" will be assessed for the extent of queueing problems. The "#" indicates that the volume for the 95th percentile cycle exceeds capacity. The "m" indicates that volume for the 95th percentile queue is metered by an upstream signal.

The following Measures of Effectiveness (MOEs) were generated based on the HCM 6th Edition (except for SW 137th Avenue, HCM 2000 was used) and the Synchro outputs and summarized for the traffic models:

- Intersection:
  - Level of Service
  - Average Vehicle Delay (seconds/vehicle)
- Vehicle Movement:
  - Level of Service
  - Average Vehicle Delay (seconds/vehicle)
  - Volume/Capacity (v/c) Ratio (for signalized intersections only)
  - 95th Percentile Queue (feet)
- Arterial:
  - Level of Service
  - Average Vehicle Speed (miles/hour)
  - Travel Time (seconds)
  - Delay (hours)

The HCM utilizes LOS as the quantitative measure to represent the level of service at an intersection or arterial. The LOS grading criteria ranges from LOS A to LOS F, where LOS A is under-saturated/free-flow conditions and LOS F is over-saturated conditions. The Synchro output sheets are included ***Appendix B***.

2.12.2.1 Arterial Analysis Results

Based on 2021 traffic data, the study arterial of SR 994 is operating at LOS C or better for both eastbound and westbound directions during the AM and PM hours, as presented in ***Table 2-10***.

The average vehicle speed for eastbound during the AM and PM hours is 21-27 MPH, whereas in the westbound direction for both periods is slightly higher at 28-33 MPH. These speeds are below the 40 MPH posted speed limit of SR 994. The total arterial travel time is 5.5 minutes for eastbound and 3.5 minutes for westbound during the AM and PM peak hours.

Table 2-10 Existing Operational Results (AM & PM) for SR 994 Arterial

Dir.	Peak Hour	MOE	EXISTING	Dir.	Peak Hour	MOE	EXISTING
Eastbound	AM	LOS	C	Westbound	AM	LOS	B
		Speed (mph)	21			Speed (mph)	28
		Travel Time (min)	2.6			Travel Time (min)	1.9
	PM	LOS	C		PM	LOS	B
		Speed (mph)	27			Speed (mph)	33
		Travel Time (min)	2.0			Travel Time (min)	1.6
	Total Arterial Travel Time (min)		5.5		Total Arterial Travel Time (min)		3.5

Notes: Summarized results are based on Synchro. Units for speed are miles per hour.

2.12.2.2 Intersection Analysis Results

Signalized Intersection of SW 137th Avenue:

At the beginning of the study, the south leg at the four-legged intersection of SW 137th Avenue was under construction and therefore not in operation. As presented in ***Table 2-11***, this intersection is being serviced at LOS B during the AM peak hour. All intersection movements are operating at LOS D or better. Although the southbound left-turn movement is operating at LOS D, it is experiencing long vehicle queues and taking a few signal cycles for vehicles to complete the left-turn onto SR 994 eastbound. This movement is being serviced with a single left-turn lane under protected/permitted phasing. During the PM peak hour, the intersection operation at SW 137th Avenue degrades to LOS C due to the high volume (489 vehicles) of southbound left-turning traffic onto SR 994 eastbound. The southbound left-turn movement is operating at LOS F and over capacity. The assigned green time for this movement is not sufficient to clear the long vehicle queues. All other movements at this intersection are operating at LOS C or better during the PM peak hour.

Signalized Intersection of SW 127th Avenue:

During both the AM and PM hours, the four-legged intersection of SW 127th Avenue is operating at LOS D, as presented in ***Table 2-11***. Most intersection movements are also being serviced at LOS D, except:

- Northbound approach for the AM and PM hours at LOS E or worse.
- Southbound through movement for the PM peak hour at LOS E.

The northbound approach experiences significant queues due to the high volume (315 vehicles) of right turns during the AM peak hour. A single northbound lane services the northbound approach with no exclusive right-turn lane. It takes several signal cycles for a vehicle joining the back of queue to clear the intersection. Although the right-turn volume decreases during the PM peak hour, the northbound through movement is being serviced at LOS E due to the single lane operation and signal progression priority of SR 994 over SW 127th Avenue. Approximately 14% more of the signal cycle is assigned to east/west over north/south. The southbound through movement experiences an increase in delay due to the slightly higher volume during the PM peak hour when compared to the earlier period.

Stop-Controlled Intersection of SW 134th Avenue:

Although the intersection of SW 134th Avenue is stop controlled for north/south, the operational results are presented separately from the rest of the stop-controlled intersections due to being upgraded to signal control in the future analysis as discussed later in this report. As presented in ***Table 2-11***, the through movements on SR 994 are free and not under traffic control. The eastbound and westbound left-turn volumes are low and would block the single through lanes on SR 994 when turning left due to the lack of exclusive left-turn lanes. Based on the HCM methodology, the eastbound and westbound left-turns are serviced at LOS B or better. The critical movements are the northbound and southbound single lane approaches operating at LOS F with excessive delay, except for the southbound during the PM peak hour.

Stop-Controlled Intersections:

The critical movements at the stop-controlled intersections within the study limits include making a left-turn from the side street or mainline SR 994. ***Table 2-12*** presents a summary of the average vehicular delay, 95th percentile queue length, and level of service per movement at each intersection.

During the AM peak hour, the noticeable movements operating at LOS F include the southbound left-turn at SW 130th Avenue with a queue of 132 feet and the northbound left-turns at SW 132nd Avenue and SW 133rd Avenue with 308 feet and 264 feet of queue, respectively. Although there are other movements operating at LOS F during this period, these movements experience short queues.

Based on a weighted average, left-turning vehicles to and from the side streets within the study corridor take approximately 1.5 minutes to execute their turn during the AM peak hour, with some locations taking longer. During the PM peak hour, this maneuver takes approximately 20 seconds on average. However, at the intersections of SW 133rd Court, SW 132nd Avenue, SW 130th Avenue, and SW 129th Avenue, the left-turning maneuver from the side street onto the SR 994 mainline takes about a minute to execute during the PM peak hour. The cumulative vehicular delay for left-turning movements at the unsignalized intersections within the study corridor is approximately 14 hours during the AM peak hour and 2 hours during the PM peak hour.

Table 2-11 Existing Traffic Operations (AM & PM) for SW 137 Ave, SW 134 Ave & SW 127 Ave

AM PEAK HOUR
SR 994/QUAIL ROOST DR AT SW 137 AVE (SIGNAL CONTROL)
EXISTING

Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Queue (ft)	v/c	LOS
EBLT	67	*	*	*	*	*
EBT	386	14.6	1.8	383	0.61	B
EBRT	N/A	N/A	N/A	N/A	N/A	N/A
WBLT	N/A	N/A	N/A	N/A	N/A	N/A
WBT	396	13.4	1.5	287	0.45	B
WBRT	500	13.5	1.9	135	0.45	B
NBLT	N/A	N/A	N/A	N/A	N/A	N/A
NBT	N/A	N/A	N/A	N/A	N/A	N/A
NBRT	N/A	N/A	N/A	N/A	N/A	N/A
SBLT	339	40.9	3.9	343	0.80	D
SBT	N/A	N/A	N/A	N/A	N/A	N/A
SBRT	36	24.7	0.2	<25	0.03	C
Int	**1724**	**19.4**	**9.3**			**B**

AM PEAK HOUR
SR 994/QUAIL ROOST DR AT SW 134 AVE (STOP CONTROL)
EXISTING

Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
EBLT	15	10.9	0.0	<25	0.03	B
EBT	650	0.2	0.0	N/A	N/A	N/A
EBRT	111	0.2	0.0	N/A	N/A	N/A
WBLT	57	9.2	0.1	<25	0.07	A
WBT	796	0.5	0.1	N/A	N/A	N/A
WBRT	108	*	*	*	*	*
NBLT	99	*	*	*	*	*
NBT	36	208.0	9.6	350	0.90	F
NBRT	32	*	*	*	*	*
SBLT	46	*	*	*	*	F
SBT	42	87.4	2.2	380	0.65	F
SBRT	3	*	*	*	*	F
Int	**1995**	**N/A**	**12.2**			****F**

AM PEAK HOUR
SR 994/QUAIL ROOST DR AT SW 127 AVE (SIGNAL CONTROL)
EXISTING

Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
EBLT	134	25.9	1.0	123	0.36	C
EBT	891	44.3	11.5	564	0.69	D
EBRT	47	*	*	*	*	*
WBLT	174	33.9	1.6	189	0.65	C
WBT	526	32.3	4.7	278	0.36	C
WBRT	146	25.2	1.0	39	0.20	C
NBLT	192	39.9	2.1	196	0.53	D
NBT	197	107.4	15.3	762	1.04	F
NBRT	315	*	*	*	*	*
SBLT	93	50.2	1.3	101	0.71	D
SBT	182	48.4	3.1	276	0.47	D
SBRT	46	*	*	*	*	*
Int	**2943**	**50.9**	**41.7**			**D**

PM PEAK HOUR
SR 994/QUAIL ROOST DR AT SW 137 AVE (SIGNAL CONTROL)
EXISTING

Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
EBLT	41	*	*	*	*	*
EBT	402	13.9	1.7	263	0.48	B
EBRT	N/A	N/A	N/A	N/A	N/A	N/A
WBLT	N/A	N/A	N/A	N/A	N/A	N/A
WBT	373	14.4	1.5	218	0.43	B
WBRT	355	12.2	1.2	44	0.26	B
NBLT	N/A	N/A	N/A	N/A	N/A	N/A
NBT	N/A	N/A	N/A	N/A	N/A	N/A
NBRT	N/A	N/A	N/A	N/A	N/A	N/A
SBLT	489	81.2	11.0	589	1.01	F
SBT	N/A	N/A	N/A	N/A	N/A	N/A
SBRT	40	26.8	0.3	<25	0.03	C
Int	**1700**	**33.3**	**15.7**			**C**

PM PEAK HOUR
SR 994/QUAIL ROOST DR AT SW 134 AVE (STOP CONTROL)
EXISTING

Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
EBLT	0	0.0	0.0	N/A	N/A	N/A
EBT	648	0.0	0.0	N/A	N/A	N/A
EBRT	210	0.0	0.0	N/A	N/A	N/A
WBLT	65	9.9	0.2	<25	0.10	A
WBT	632	0.9	0.2	N/A	N/A	N/A
WBRT	18	*	*	*	*	*
NBLT	103	*	*	*	*	F
NBT	24	183.6	8.5	320	0.80	F
NBRT	40	*	*	*	*	F
SBLT	31	*	*	*	*	D
SBT	23	54.3	0.8	250	0.60	D
SBRT	2	*	*	*	*	D
Int	**1796**	**N/A**	**9.7**			****F**

PM PEAK HOUR
SR 994/QUAIL ROOST DR AT SW 127 AVE (SIGNAL CONTROL)
EXISTING

Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
EBLT	49	24.7	0.3	52	0.15	C
EBT	630	37.5	7.5	413	0.58	D
EBRT	89	*	*	*	*	*
WBLT	246	30.2	2.1	233	0.75	C
WBT	565	27.2	4.3	292	0.38	C
WBRT	97	17.2	0.5	32	0.06	B
NBLT	147	51.2	2.1	157	0.74	D
NBT	198	72.6	7.4	468	0.88	E
NBRT	169	*	*	*	*	*
SBLT	131	49.5	1.8	140	0.70	D
SBT	284	69.2	6.7	458	0.85	E
SBRT	65	*	*	*	*	*
Int	**2670**	**44.0**	**32.6**			**D**

Notes: "v/c" indicates volume over capacity; values greater than 1 indicates over capacity. "" indicates movement is shared. "**" LOS estimated per side street traffic operation, since no intersection delay is computed by the traffic analysis software due to main road being free flow. "N/A" indicates movement does not exist or results are not calculated by Synchro. LOS E and F are highlighted in orange and red, respectively. Although SW 134th Avenue is not signalized, it is presented together with SW 137th Avenue and SW 127 Avenue since it would be under signal control in 2025. All other stop-controlled intersections are presented in the next table.*

Table 2-12 Existing Traffic Operations for Critical Movements at Unsignalized Intersections

	Intersection	Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS
AM Peak Hour	SW 135 Ave	SBLT	11	45.1	0.14	~25 ft	E
		EBLT	0	0.0	0.00	~25 ft	A
	SW 134 Ct	SBLT	3	38.2	0.03	~25 ft	E
		EBLT	0	0.0	0.00	~25 ft	A
	SW 133 Ct	SBLT	4	33.7	0.04	~25 ft	D
		EBLT	4	10.3	0.01	~25 ft	B
	SW 133 Ave	NBLT	108	236.4	7.09	264	F
		WBLT	13	9.4	0.03	~25 ft	A
	SW 132 Pl	SBLT	58	108.3	1.74	88	F
		EBLT	21	10.0	0.06	~25 ft	A
	SW 132 Ave	NBLT	40	199.6	2.22	308	F
		WBLT	67	10.2	0.19	~25 ft	B
	SW 130 Ave	NBLT	4	325.6	0.36	~25 ft	F
		SBLT	11	109.4	0.33	132	F
		EBLT	116	11.0	0.35	~25 ft	B
		WBLT	0	0.0	0.00	~25 ft	A
	SW 129 Ave	NBLT	35	148.9	1.45	66	F
		SBLT	6	83.5	0.14	~25 ft	F
		EBLT	2	9.5	0.01	~25 ft	A
		WBLT	19	10.4	0.05	~25 ft	B
		Total	**522**	**98.3**	**14.25**	**N/A**	**N/A**

	Intersection	Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS
PM Peak Hour	SW 135 Ave	SBLT	7	32.0	0.06	~25 ft	D
		EBLT	1	9.2	0.00	~25 ft	A
	SW 134 Ct	SBLT	2	38.7	0.02	~25 ft	E
		EBLT	0	0.0	0.00	~25 ft	A
	SW 133 Ct	SBLT	6	52.3	0.09	~25 ft	F
		EBLT	6	10.2	0.02	~25 ft	B
	SW 133 Ave	NBLT	20	33.7	0.19	~25 ft	D
		WBLT	30	9.5	0.08	~25 ft	A
	SW 132 Pl	SBLT	19	34.5	0.18	~25 ft	D
		EBLT	0	0.0	0.00	~25 ft	A
	SW 132 Ave	NBLT	25	69.7	0.48	88	F
		WBLT	174	10.6	0.51	~25 ft	B
	SW 130 Ave	NBLT	1	47.9	0.01	~25 ft	E
		SBLT	10	34.5	0.10	44	D
		EBLT	42	10.3	0.12	~25 ft	B
		WBLT	0	0.0	0.00	~25 ft	A
	SW 129 Ave	NBLT	8	65.4	0.15	~25 ft	F
		SBLT	4	46.1	0.05	~25 ft	E
		EBLT	1	9.7	0.00	~25 ft	A
		WBLT	22	9.3	0.06	~25 ft	A
		Total	**378**	**20.2**	**2.12**	**N/A**	**N/A**

Notes: LOS E and F are highlighted in orange and red, respectively.

2.13 INTERSECTION LAYOUT AND TRAFFIC CONTROL

There are two signalized and 11 unsignalized intersections within the study limits. A mid-block pedestrian crossing with Rectangular Rapid Flashing Beacon (RRFB) is located at the Black Creek Trail, approximately 450 feet east of SW 132nd Avenue). See ***Figure 2-11*** for details on lane configurations and traffic control.

Signalized Intersections

- SW 137th Avenue
- SW 127th Avenue

Un-signalized Intersections (stop-controlled)

- SW 135th Avenue
- SW 134th Court
- SW 134th Avenue
- SW 133rd Court
- SW 133rd Avenue
- SW 132nd Place
- SW 132nd Court
- SW 132nd Avenue
- SW 130th Avenue
- SW 129th Court
- SW 129th Avenue

Mid-Block Pedestrian Crossing (RRFB)

- Black Creek Trail (Approximately 450 feet east of SW 132nd Avenue)

To provide adequate transition on both ends of the project, roadway improvements were extended to approximately MP 3.740 to the west and MP 5.430 to the east. The following intersections are located within the expanded limits, but were not included in the traffic analyses.

- SW 139th Avenue (un-signalized)
- SW 125th Avenue (un-signalized)
- SW 124th Court (un-signalized)
- SW 200th Street (signalized)
- SW 123rd Place (un-signalized)

2.14 RAILROAD CROSSINGS

There are no railroad crossings within the study corridor limits.

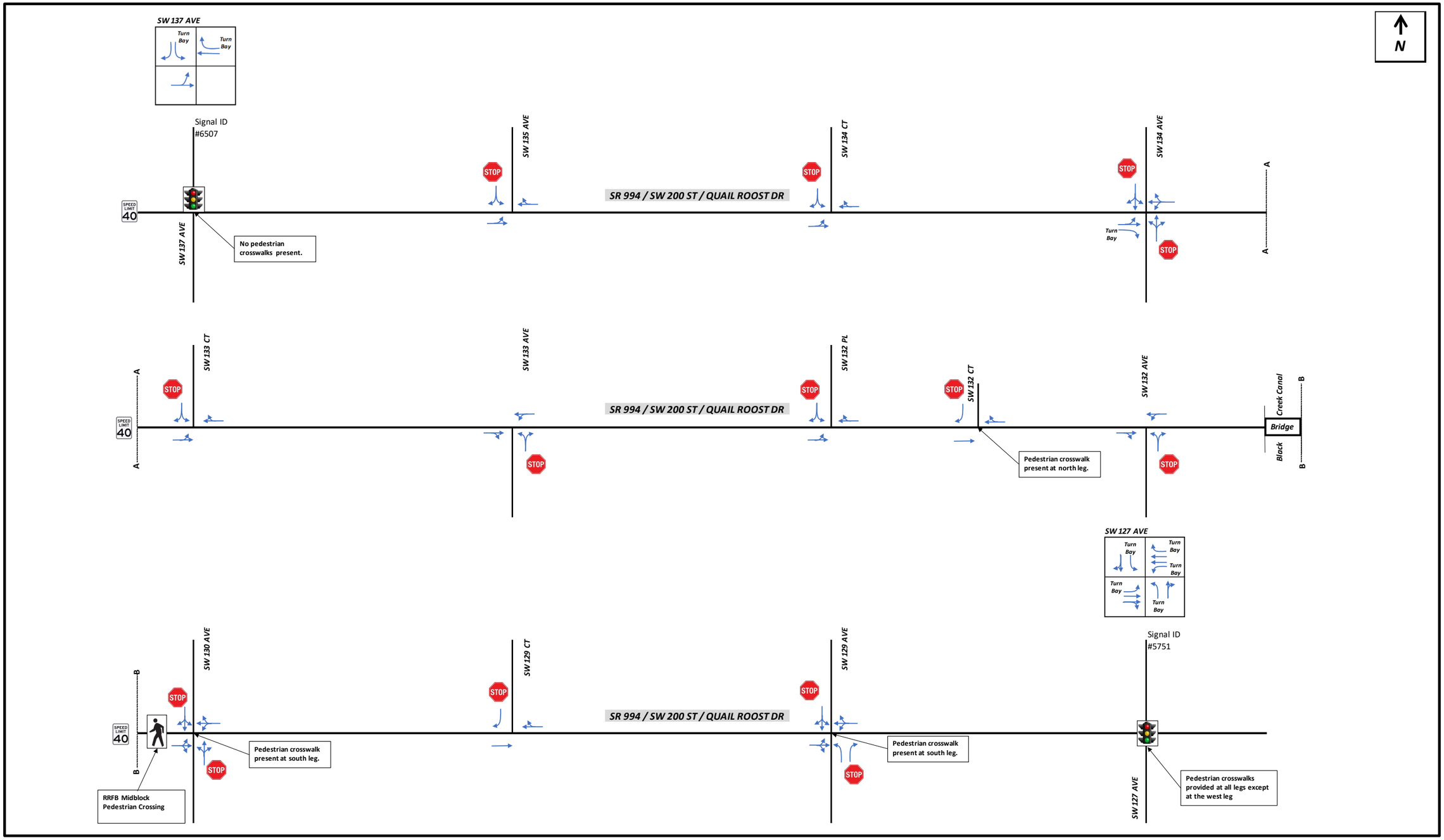


Figure 2-11 Existing Intersection Lane Configurations and Traffic Controls

2.15 CRASH DATA AND SAFETY ANALYSIS

Crash data for the five most recent and official years (from January 2014 to December 2018) at the beginning of this study was obtained from the FDOT's Crash Analysis Reporting (CAR) Online for SR 994/SW 200th Street/Quail Roost Drive (87091000) from 400 feet west of SW 137th Avenue (MP 4.000) to 645 feet east of SW 127 Avenue (MP 5.212).

The police reports for all crashes were downloaded from CAR Online to verify the crash location and update the crash data information such as crash type. Based on the crash data and police reports, crash summaries and collision diagrams were developed for the five-year study period. The crash summaries, CAR data, and collision diagrams are included in ***Appendix B***.

In addition, Signal Four Analytics was used as a supplemental source for the same five-year study period of 2014 to 2018. Signal Four Analytics is "an interactive, web-based system designed to support the crash mapping and analysis needs of the law enforcement, traffic engineering, transportation planning agencies, and research institutions in the state of Florida." The main intent for this supplemental review was to identify any additional crashes along the study corridor. Crashes that were pulled from Signal Four Analytics were compared with crashes from CAR and duplicates were removed. In addition, a review of the crash data from Signal Four Analytics was also conducted from January 2019 to September 15, 2021 (latest data available at the time of query), to determine whether the type of crashes identified during the 2014 to 2018 study period are prevalent in the later years and if there have been any crashes resulting in severe injury.

A summary of the overall crash statistics and main findings is presented below.

FDOT CAR (2014 to 2018)

Based on the crash data reviewed, a total of 390 crashes were documented along the study corridor during the referenced five-year period with 58 crashes in 2014, 67 crashes in 2015, 80 crashes in 2016, 88 crashes in 2017 and 97 crashes in 2018, as presented in ***Table 2-13***.

Table 2-13 FDOT Crash Summary (2014 to 2018)

Segment/Spot with No Expected Values Available		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		Year							
		2014	2015	2016	2017	2018			
CRASH TYPE	Rear End	27	33	38	48	41	187	37.40	47.9%
	Head On	1	1	1	0	2	5	1.00	1.3%
	Angle	10	9	21	22	15	77	15.40	19.7%
	Left Turn	8	7	9	6	10	40	8.00	10.3%
	Right Turn	3	1	1	3	4	12	2.40	3.1%
	Sideswipe	6	8	7	5	17	43	8.60	11.0%
	Backed Into	0	0	0	0	0	0	0.00	0.0%
	Pedestrian	0	0	0	0	1	1	0.20	0.3%
	Bicycle	0	0	0	1	0	1	0.20	0.3%
	Fixed Object	1	6	3	3	5	18	3.60	4.6%
	Other Non-Collisions	1	1	0	0	0	2	0.40	0.5%
	Overturn/Rollover	0	0	0	0	0	0	0.00	0.0%
	Others	1	1	0	0	2	4	0.80	1.0%
	Total Crashes	**58**	**67**	**80**	**88**	**97**	**390**	**78.00**	**100.0%**
SEVERITY	PDO Crashes	35	48	55	54	62	254	50.80	65.1%
	Fatal Crashes	0	0	1	0	0	1	0.20	0.3%
	Injury Crashes	23	19	24	34	35	135	27.00	34.6%
LIGHTING CONDITIONS	Daylight	36	51	65	58	70	280	56.00	71.8%
	Dusk	0	1	0	4	3	8	1.60	2.1%
	Dawn	0	0	1	1	0	2	0.40	0.5%
	Dark	21	15	14	25	23	98	19.60	25.1%
	Unknown	1	0	0	0	1	2	0.40	0.5%
SURFACE CONDITIONS	Dry	44	52	67	78	80	321	64.20	82.3%
	Wet	13	15	13	10	16	67	13.40	17.2%
	Others	1	0	0	0	1	2	0.40	0.5%

- **Leading Crash Types**: The top four leading crash types along the study corridor were Rear-End with 187 crashes (48%), Angle with 77 crashes (20%), Sideswipe with 43 crashes (11%), and Left-Turn with 40 crashes (10%).
- **Pedestrian & Bicycle Crashes**: There was one crash involving a pedestrian and one crash involving a bicyclist documented during the study period. No crash pattern was identified for these crashes.
- **Nighttime and Wet Pavement**: Nighttime and wet/slippery pavement crashes are above the 2014-2018 Districtwide averages: 108 nighttime crashes (28%) reported, which is just below the FDOT District Six's average of 29%; 67 (17%) of the total crashes reported occurred under wet/slippery pavement conditions, which is above the FDOT District Six's average of 12%.
- **Crash Severity**: Based on crash severity, 65% (254 crashes) of all crashes resulted in property damage only crashes, 35% (135 crashes) in injury crashes, and <1% (1 crash) in a fatal crash. The fatal collision was a westbound left-turn crash that occurred at SW 132nd Avenue on Sunday, March 20, 2016, at 8:40 PM during wet pavement conditions. The crash resulted from the westbound left-turning vehicle failing to yield the right-of-way

to oncoming eastbound traffic.

- **Peak Crash Period**: Most crashes, 102 of the 390 crashes (26%), occurred between 6 PM and midnight. This is followed by the peak crash periods of 3:00 PM to 6:00 PM with 91 (23%) crashes and 6:00 AM to 9:00 AM with 85 (22%) crashes which coincide with the traffic s of the study corridor.
- **High Crash Location(s)**: A confidence level analysis was performed for the study corridor that indicates that the frequency of crashes was not abnormally high for the study period. According to the Highway Safety Improvement Program (HSIP), urban locations with a confidence level of 99.95% or higher can be considered to have an abnormally high number of crashes. The study corridor's confidence levels were calculated at 80% or less for each year of analysis. In addition, the Department's high crash lists for segments and intersections were reviewed for the crash period. The following intersections and segments are considered high crash locations:

    - Intersection SW 137th Avenue: MP 4.06 to MP 4.10,
    - Intersection SW 134th Avenue: MP 4.30 to MP 4.36,
    - Intersection SW 132nd Avenue: MP 4.58 to MP 4.59,
    - Intersection SW 127th Avenue: MP 5.05 to MP 5.10,
    - Segment from SW 137th Avenue to east of SW 129th Avenue: MP 4.075 to 4.961.

Signal Four Analytics (2014 to 2021)

Signal Four Analytics identified 97 additional crashes for the study corridor from 2014 to 2018, which corresponds to the same crash period used for FDOT CAR. These 97 crashes were not reported by FDOT CAR. The leading crash type of rear-end collisions presented by Signal Four for 2014-2018 coincides with the FDOT CAR findings. For the period from 2019 to 2021 (up to September 15), Signal Four documented 99 crashes in 2019, 71 crashes in 2020 and 55 crashes in 2021 as presented in ***Table 2-14***. The main findings as discussed below also mostly coincide with the FDOT CAR crash data findings from 2014 to 2018.

Table 2-14 Signal Four Crash Summary (2014 to Sep 15, 2021)

Segment/Spot with No Expected Values Available		Number of Crashes							
		Year							
		2014	2015	2016	2017	2018	2019	2020	2021
CRASH TYPE	Rear End	3	7	11	4	9	43	27	21
	Head On	0	1	0	0	0	1	1	1
	Angle	0	0	1	0	2	7	7	5
	Left Turn	1	1	5	4	7	22	15	13
	Right Turn	0	0	1	1	2	2	1	3
	Sideswipe	1	3	3	2	3	12	8	2
	Backed Into	0	0	0	0	0	0	0	0
	Pedestrian	0	1	0	0	0	0	0	0
	Bicycle	0	0	0	0	0	1	0	0
	Fixed Object	0	0	0	0	0	0	0	0
	Others	3	8	4	6	3	11	12	10
	Total Crashes	**8**	**21**	**25**	**17**	**26**	**99**	**71**	**55**
SEVERITY	PDO Crashes	6	18	25	17	25	73	50	44
	Fatal Crashes	0	0	0	0	0	1	0	0
	Injury Crashes	2	3	0	0	1	25	21	11
LIGHTING	Daylight	4	19	17	12	24	80	48	41
	Dark	4	2	8	5	2	19	23	14
	Unknown	0	0	0	0	0	0	0	0
SURFACE CONDITIONS	Dry	7	16	18	15	23	89	62	47
	Wet	0	4	7	2	3	10	9	8
	Others	1	1	0	0	0	0	0	0

Notes: Crashes presented by Signal Four from 2014 to 2018 correspond to additional crashes not reported by FDOT CAR data for the same study period. These are not total crashes documented by Signal Four for those years. However, crashes presented by Signal Four from 2019 to 2021 (up to September 15) are total crashes for those years.

- **Leading Crash Types**: The top four leading crash types along the study corridor based on Signal Four (2019 to September 15, 2021) were Rear-End with 91 crashes (40%), Left-Turn with 50 crashes (22%), Sideswipe with 22 crashes (10%) and Other with 33 crashes (28%).
- **Pedestrian & Bicycle Crashes**: There was one crash involving a bicyclist documented during the three-year study period.
- **Nighttime and Wet Pavement**: There were 56 (25%) night/dusk/dawn crashes reported during the three-year study period and 27 (12%) crashes reported to have occurred under wet/slippery pavement conditions. Nighttime crashes are lower that the FDOT District Six's average of 28%, however wet pavement crashes do meet the FDOT District Six's average of 12%.
- **Crash Severity**: Based on crash severity, 74% (167 crashes) of all crashes resulted in property damage only crashes, 25% (57 crashes) in injury crashes, and <1% (1 crash) in a fatal crash.
- **Peak Crash Period:** Most crashes occurred between 3:00 PM and midnight.

Main Findings:

Based on the crash data and collision diagrams analyses, the following is stated:

- Most of the crashes along the study corridor occurred within the influence area of SW 127th Avenue with 142 crashes (36%), followed by SW 134th Avenue with 74 crashes (19%), and SW 137th Avenue with 62 crashes (16%).
- Except for SW 134th Avenue (where angle crashes are predominant), rear-end crashes are the leading crash type for all the study intersections along the study corridor. This pattern is primarily attributed to congestion/lack of capacity and lack of turning lanes. These crashes are mainly documented along SR 994, except at SW 127th Avenue where they are also present along the northbound and southbound intersection approaches.
- Based on the Expected Values Analysis (EVA) conducted for the intersection of SR 994 at SW 127 Avenue, the following crash types and conditions were considered abnormally high:

  At 90th Percentile
  - Daylight lighting condition
  - Dry and wet surface conditions

  At 95th Percentile
  - Left-turn crashes
  - Sideswipe crashes
  - Injury crashes
  - Dark lighting conditions
  - Time periods of 6:00 AM to 9:00 AM and 6:00 PM to midnight

  Note: *No EVA analysis was conducted for the other main intersections of SW 137th Avenue and SW 134th Avenue since these values are not available for these types of intersections.*

- The following crash patterns were identified at the main and minor study intersections:
  - SW 137th Avenue: Rear-End crashes at the eastbound approach with 29 crashes (59% resulting in property damage only). Main probable cause is the lack of an eastbound left-turn lane.
  - SW 134th Avenue: Rear-End crashes at the eastbound, westbound, and northbound approaches with 7, 12, and 6 crashes, respectively (60% resulting in property damage only). Angle crashes between the northbound approach and the eastbound and westbound approaches with 16 and 10 crashes, respectively (65% resulting in property damage only). Main probable causes are lack of left-turn lanes on SR 994 and lack of available gaps for northbound traffic to proceed through the intersection.
  - SW 132 Avenue: Rear-End crashes at the westbound approach with 27 crashes (34% resulting in property damage only). Main probable cause is the lack of a westbound left-turn lane.
  - SW 130 Avenue: Rear-End crashes at the eastbound approach with 10 crashes

(60% resulting in property damage only). Main probable cause is the lack of an eastbound left-turn lane.

- SW 127 Avenue: Rear-End crashes at the northbound and eastbound approaches with 12 and 9 crashes, respectively (81% resulting in property damage only). Sideswipe crashes at the northbound approach with 11 crashes (82% resulting in property damage only). Left-Turn crashes at the westbound approach with 11 crashes (46% resulting in property damage only). Main probable causes are saturated traffic conditions and lack of a northbound right-turn lane.

2.16 DRAINAGE

The existing drainage infrastructure within the project limits is self-contained and consists mainly of roadside swales with inlets connected to isolated short segments of French drains providing runoff disposal. The project includes a bridge crossing over the C-1W Black Creek Canal approximately at the mid-section of the project. The C-1W Canal is a primary canal owned, operated, and maintained by the South Florida Water Management District (SFWMD). However, the project does not have any existing outfall connections into this canal. The existing drainage system east of SW 127th Avenue consists of a positive gravity storm sewer system which has an outfall connection into the SW 122nd Avenue Canal. The SW 122nd Avenue Canal is a secondary canal owned, operated, and maintained by Miami-Dade County Department of Regulatory and Economic Resources (DRER). This canal is located outside the project limits.

According to Flood Insurance Rate Map number 12086C0583L Panels 583 and 584 of 1031, most of the project area is located within Zone X which translates to a low-risk flood zone. The X zone (also known as “low-risk flood zone”) is an area outside of the Special Flood Hazard Area. It shall be noted that because an area is designated as X zone does not mean that the area will never flood but there is low incidence of flooding. FEMA maps also show that a small project area in the immediate proximity to the C-1 Canal bridge crossing lies within Zone AH with 100-year floodplain elevation of 6.5’-NAVD (8.0’-NGVD). The existing bridge and roadway approaches pavement elevation ranges from 8.5’ to 9.0’-NAVD so these are located above the 100-year flood. Also, the existing bridge low member elevation is 7.0’-NAVD (8.5’-NGVD) which is also above the 100-year flood and translates into no overtopping flow incidence.

Additional details about the drainage features are documented in the Conceptual Drainage Report (***Appendix C***), a companion document to this PD&E Study.

2.17 SOILS AND GEOTECHNICAL DATA

A summary of soils and geotechnical data is provided below. Please refer to the Preliminary Geotechnical Reports for Roadway and Bridge improvements included in ***Appendix F*** and ***Appendix G*** for details.

2.17.1 Roadway Improvements

In general, for the purposes of the geotechnical analysis, roadway improvements were anticipated to consist mainly of widening of SR 994 from two lanes to four lanes with additional turning lanes at select intersections and providing an asphalt walkway along the Black Creek Canal in the vicinity of SR 994.

2.17.1.1 Miami-Dade County Soil Survey

The Soil Survey of Miami-Dade County Area, Florida, published by the United States Department of Agriculture (USDA), was reviewed for general near-surface soil information within the general project vicinity. This information indicates that there are four (4) primary mapping units for this project. The map soil units encountered are as follows:

- Perine marl, drained (6)
- Krome very gravelly loam (7)
- Biscayne marl, drained (16)
- Water (99)

A reproduction of the USDA map for the project area is included in ***Appendix F.***

2.17.1.2 Site Subsurface Conditions

The subsurface conditions disclosed by the borings are generally consistent with the regional geology. The stratification is based on visual examination of the recovered soil/rock samples, laboratory testing, and interpretation of the field boring logs by a Geotechnical Engineer. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our preliminary engineering evaluation may have been abbreviated for clarity. The borings present the subsurface conditions at the particular boring location and slight variations do occur among the borings. Boring location information and Roadway Soil Profiles are included in ***Appendix F.***

A detailed description of the subsurface materials encountered at the project site is presented below. Specifically, the following six (6) strata have been identified in the subsoils (besides the existing roadway pavement) along the limits of the project.

Stratum	Soil Description	AASHTO Group
0	Asphalt Pavement	N/A
1	Dark Brown Organic Silty Fine SAND with Grass (TOPSOIL)	A-8
2	Brown Silty Fine to Coarse SAND with Little to Mostly Limerock Fragments (FILL)	A-1-b
3	Brown Clean to Slightly Silty Fine to Medium SAND with Little Limestone Fragments	A-3
4	Brown Silty Fine to Medium SAND with Little to Some Limerock Fragments (FILL)	A-2-4
5	Brown Sandy SILT	A-4
6	Brown Sandy LIMESTONE	N/A

Specific details concerning the subsurface materials and conditions encountered at each test location may be obtained from the Roadway Soil Profiles presented in ***F***.

2.17.1.3 Groundwater Conditions

The groundwater table was measured during the wet season at each boring location while performing the test borings and confirmed immediately following completion of drilling operations. The groundwater table depths within the roadway borings were measured after a short stabilization period. The groundwater depths ranged from approximately 6.1 to 8.9 feet, with an average of about 7.9 feet, below existing grades. Fluctuation in the observed groundwater levels should be expected due to rainfall variation, construction activity and other factors, and it should be taken into consideration during the Design phase.

2.17.1.4 Estimated Seasonal High-Water Table

The estimated seasonal high-water table each year is the level in the August-September period at the end of the rainy season during a year of average (normal) rainfall. The water table elevations associated with a flood would be much higher than the seasonal high-water table elevations. The normal high-water levels would more approximate the seasonal high-water table elevations. The seasonal high-water table is affected by a number of factors. The drainage characteristic of the soils, the land surface elevation, relief points such as lakes, canals, swamp areas, etc., and distance to relief points are some of the more important factors influencing the seasonal high-water table elevation.

The borings performed for this project were generally done during the wet season and the Seasonal High Ground Water Table (SHGWT) is expected to be slightly above the levels measured at the borings performed for this study. Based on the site conditions and results of test boring data, it is estimated that the normal seasonal high-water table is about 6 to 12 inches above the water levels measured in the boring locations. Also, based on site conditions, test boring data, Miami-Dade County historical groundwater maps, and United States Geological Survey (USGS) historical groundwater data, it is estimated that the normal seasonal high-water table should range from about +4 to +5 feet (NGVD,1929). With these estimates, the roadway base clearance exceeds three (3) feet, which is satisfactory for the performance of the anticipated roadway improvements. The range in SHGWT is due to the limited groundwater data that was collected during the PD&E study. The recommendation for SHGWT should be refined and revisited during the final design phase.

2.17.1.5 Preliminary Recommendations for Roadway Design

Results of the soil survey indicate that the project alignment is generally suitable for the proposed roadway improvements when viewed from a geotechnical engineering perspective. However, planning for the roadway improvement should carefully consider the impact of the existing low strength and highly compressible sandy silt (A-4/Stratum 5) to the performance of the proposed roadway improvements. Sandy silt (A-4/Stratum 5) materials were encountered in two (2) test locations (A-6 and A-15) at depths ranging from 2.0 to 7.3 feet below existing grades, with thickness ranging from 1.9 to 3.8 feet and an average thickness of about 2.9 feet.

The following ground improvement options should be considered during final design for the proposed roadway improvements and the most practical should be selected:

(a) Complete removal of unsuitable soils (A-4) and replacement with select fill material.

(b) No removal of unsuitable soils (A-4) with geogrid reinforcement and geotextile separator. This involves leaving unsuitable soils (A-4) in place and utilizing a geotextile to serve as a separator between the shallow in-situ silt soils and the stabilized subgrade materials as well as a geogrid to serve as reinforcement for the base materials.

(c) Surcharging of silty (A-4) soils without removal (with biaxial geogrid reinforcement).

Each option has its advantages and disadvantages. Final evaluations will be made during final design. The milling and resurfacing recommendation provided by the Pavement Section of the FDOT Districts 4 and 6 Materials Office is as follows:

"Base and subgrade consist of slightly silty fine to medium sand with some limerock fragments (A-1-b) cores 1,2, and 4 have 5-in, 5-in, 6-in of asphalt base course (ABC), respectively. Milling recommendation: mill 1.5 inches and repave with 1.5 inches FC-12.5." This recommendation is preliminary and subject to change. See ***Appendix F*** for details.

2.17.2 Bridge Improvements

In general, for the purposes of the geotechnical analysis, bridge improvements were anticipated to consist of the widening or replacement of the SR 994 bridge over Black Creek Canal (Canal C-1W) from a two-lane section to a four-lane section. The objective of the geotechnical analysis during the PD&E phase is to aid FDOT in reaching a decision on the feasibility, location, and conceptual design that will improve mobility and accessibility. Deep foundations (driven piles, drilled shafts, and ACIP piles), as well as shallow foundations were considered in the analysis.

2.17.2.1 Miami-Dade County Soil Survey

The Soil Survey of Miami-Dade County Area, Florida, published by the United States Department of Agriculture (USDA), was reviewed for general near-surface soil information within the general project bridge area. This information indicates that there are three (3) primary mapping units for the project bridge area. The map soil units encountered are as follows:

- Perine marl, drained (6)
- Biscayne marl, drained (16)
- Water (99)

A reproduction of the USDA map for the project area is included in ***Appendix G.***

2.17.2.2 Groundwater Conditions

The groundwater table was measured during the wet season at each boring location while performing the test borings and confirmed immediately following completion of drilling operations. The groundwater table depths within the roadway borings were measured after a short stabilization period. The groundwater depths ranged from approximately 6.2 to 6.9 feet, with an average of about 6.6 feet, below existing grades. Fluctuation in the observed groundwater levels should be expected due to rainfall variation, construction activity and other factors, and it should be taken into consideration during the Design phase. See ***Appendix G*** for details.

2.17.2.3 Estimated Seasonal High-Water Table

Estimated as described in Section **2.17.1.4** above.

2.17.2.4 Preliminary Recommendations for Bridge Design

The following foundation alternatives were considered in the analysis. Recommendations for each alternative are provided in ***Appendix G***.

- Shallow Foundations
- Straight Sided Drilled Shafts
- Steel Piles, Including Pipe and H-Sections
- Precast Prestressed Concrete Piles
- Auger Cast-in-Place (ACIP) Piles

If required, temporary excavations of the existing subsurface materials may be accomplished as follows:

- Granular Soils: Temporary excavation maximum side slopes of 1V:2H in the granular subsurface materials are stable and have a minimum factor of safety of 1.3.
- Sandy Silt: Temporary excavation maximum side slopes of 1V:3H in the sandy silt are stable and have a minimum factor of safety of 1.3.
- Limestone Formations: Temporary excavation maximum side slopes of 1V:1H in the natural limestone formations are stable and also have a minimum factor of safety of 1.3.

If steeper side slopes are required, the designer should evaluate the need for temporary ground support systems such as temporary sheet piles during excavation. The temporary ground support systems may be designed using the preliminary soil/rock parameters presented in ***Table 2-15*** below.

Table 2-15 Summary of Preliminary Geotechnical Design Parameters

GENERAL MATERIAL DESCRIPTION	UNIT WEIGHT, γ (PCF)		FRICTION ANGLE, ϕ (Degrees)	DESIGN UNIT SKIN FRICTION, f_{su} (TSF)	COHESION (C) (TSF)	EARTH PRESSURE COEFFICIENTS		
	TOTAL	EFFECTIVE				ACTIVE (Ka)	PASSIVE (Kp)	AT-REST (Ko)
Granular Fill (SP/SP-SM/SM)	115	53	34	-	-	0.26	5.15	0.44
Sandy Silt (ML)	90	28	23	-	-	0.44	2.28	0.61
Natural Upper Limestone	120	58	35	-	-	0.25	5.63	0.43
Natural Sand (SP)	110	48	31	-	-	0.29	4.28	0.48
Natural Lower Limestone	120	58	-	3.5	7.0	-	-	-

A limited number of test borings were performed for this PD&E study to support the bridge foundation design. A final design-level geotechnical investigation program will be required for the selected bridge structure. The final design-level geotechnical investigation program should be performed in accordance with the latest version of the FDOT Soils and Foundations Handbook.

If drilled shafts, ACIP piles, or spread footings are chosen as a foundation for support of the proposed bridges, rock coring and laboratory testing on rock core specimens will be required for final design of the foundations in accordance with the latest version of the FDOT Soils and Foundations Handbook.

2.18 UTILITIES

Utility Agency Owners (UAOs) located in the vicinity of SR 994/Quail Roost Drive were contacted and requested to provide information regarding their utility facilities within the project area. A list of UAOs was obtained through Sunshine 811 on December 15, 2020. Utilities include electric, water, sewer, cable, and telephone. Existing UAOs and contact information are provided in ***Table 2-16***. Plans showing approximate location of the utility facilities are provided in ***Appendix H***.

Table 2-16 Utility Agency Owners

Utility Agency Owner	Facility	Contact Information	
AT&T DISTRIBUTION	TELEPHONE	Henry Urena 600 NW 79th Ave Room 360 Miami, FL Steve Low (future POC)	(954) 260-0615 (305) 913-1408 Henry.urena@att.com hu083j@att.com sl4504@att.com 305-607-8201
COMCAST	CATV, FIBER	Ricardo Davidson 6565 Nova Drive Davie, FL 33317	(754) 221-1254 ricardoa_davidson@comcast.com
CROWN CASTLE	FIBER	Danny Haskett 1601 NW 136th Avenue Suite A-200 Sunrise, FL 33323	(786) 610-7073 (786) 246-7827 Danny.Haskett@crowncastle.com
DCPWT	TRAFFIC SIGNALS	Octavio Vidal (No Response)	(305) 412-0891 Ext. 102
FPL (Distribution)	ELECTRIC	Emma McAskill 4200 W. Flagler St. (LFO) Miami, FL 33134	(305) 442-5129 (305) 298-2147 emma.mcaskill@fpl.com
MCI (Verizon)	FIBER, COMMUNICATION	Jason Matthews 16563 NW 15th Avenue Miami, FL 33169	(786) 224-8576 (954) 298-5606 Jason.matthews@verizon.com
MDC ITD	FIBER	Frank Dopico 5680 SW 87th Ave Suite 213 Miami, FL 33173	frank.dopico@miamidade.gov (305) 275-7813
MD-WASD	SEWER, WATER	Patrick Chong 3575 South LeJeune Rd Miami, FL 33146	(786) 552-4416 Patrick.Chong@miamidade.gov

The above contact list was developed based on letters sent to each UAO and/or via responses received from the UAO for the Quail Roost Drive corridor.

The following is a summary of existing utility facilities within the study limits. The crossing roadways and distances described below are approximate locations. See ***Appendix H*** for details.

AT&T DISTRIBUTION FLORIDA

AT&T operates the following facilities placed within the public right of way: overhead telephone/fiber, buried telephone, buried fiber, placed out of service facilities, pole, cabinets and handholes within the study limits. The following are approximate locations based on markups provided by the UAO.

- **SR-994/Quail Roost Drive**
  - BT 1-1100 Pr. Cable, placed out of service on North side of corridor from Sta 312 to Sta 338.
  - BT 1-200 Pr. Cable from Sta 328 to Sta 333. BT 2-200 Pr Cable.
  - BT 1-Fiber Optic Cable from Sta 333 to Sta 338 converging into a cabinet and handhole on the north side of the corridor.
  - BT 1-4" PVC initiating from cabinet on north side of corridor crossing travel lanes onto south side of road where it joins a BT 1-Fiber Optic on south side of roadway and rises up onto overhead pole line.
  - OT 1-Fiber Optic Cable on overhead pole line starting on south side of roadway starting at Sta 338 with another aerial facility OT 2-100 Pr cable introduced at Sta 340 to Sta 358 where it crosses travel lanes at Sta 358 and comes off pole line into a buried facility.
  - AT&T Pole on SW Corner of SR-994/Quail Roost Drive and SW 129th Avenue transitioning from overhead to buried telephone at pole in southbound trajectory.
  - OT 2-Fiber Optic Cables north side of roadway starting at Sta 353 to Sta 355 where comes off pole at SW 129th Avenue converting into a BT 1- Fiber Optic Cable.
  - BT 1-200 Pr Cable and BT 5-Fiber Optic Cable ductbank north side of roadway starting at Sta 358 terminating at SW 127 Avenue/Burr Road.
  - OT 1-Fiber Optic Cable and OT 1-300 Pr. Cable on north side of roadway located aerially starting at Sta 368 crossing SE 127th Avenue/Burr Road in eastbond trajectory to end of project limits.

- **SW 137th Avenue**, Overhead Telephone 1-500 Pr. Cable.
- **SW 134th Avenue/Talbot Road**, Overhead Telephone 1-500 Pr. Cable crossing aerially North/South.
- **SW 133 Court**, BT 1-Fiber Optic Cable on east side of roadway starting at Sta 333 in NB direction.
- **SW 133 Avenue**, BT 1-Fiber Optic Cable crossing from north side of SR-994/Quail Roost Drive fiber optic southbound trajectory transitioning to BT 2-Fiber Optic Cables.
- **SW 132nd Court**, BT 1-Fiber Optic Cable
- **SW 130th Avenue**, BT 1-Fiber Optic Cable

- **SW 129th Court**, BT 1-Fiber Optic Cable
- **SW 127th Avenue/Burr Road**, west side of roadway
    - OT 2-Fiber Optic Cables, OT 1-200 Pr. Cables located aerially on pole line
    - BT 1-600 Pr. Cable and BT 1-4" PVC ductbank
- **SW 127th Avenue/Burr Road**, east side of roadway
    - OT 2-Fiber Optic Cables, OT 1-300 Pr.Cables located aerially on pole line

COMCAST

Existing aerial and buried facilities were provided by Comcast within the study corridor highlighted by solid and dashed orange lines on markups. The east/west trajectory along north and south side of Quail Roost Drive as attached to the existing FPL poles. Comcast utility information was provided via base map markups during the coordination phase.

- **SR-994/Quail Roost Drive**
    - Aerial facilities located as joint user on pole line on north side of SR-994/Quail Roost Drive from start of project Sta 312 to Sta 326
    - Aerial facilities on north side of roadway, starting at Sta 329 in eastbound direction to Sta 334 with aerial service crossings at Sta 329 and Sta 334
    - Aerial facilities crossing diagonally onto south side of roadway at Sta 334 to Sta 338 with an aerial service crossing onto north side of SR-994/Quail Roost Drive at Sta 336
    - Aerial service crossing onto north side of SR-994/Quail Roost Drive at Sta 336
    - Aerial facilities crossing diagonally onto south side of roadway at Sta 334 in eastbound direction with aerial crossing onto north side of travel lanes at Sta 351, crossing back onto south side until Sta 358 where aerial facilities stay on north side until Sta 369 end of project limits

- **SW 137th Avenue/Lindgren Road**
    - Underground facilities with cabinet/riser transitioning to overhead in north/south trajectory

- **SW 134th Avenue/Talbot Road**
    - Aerial facilities crossing SR-994/Quail Roost continuing in northbound trajectory on east side of SW 134th Avenue/Talbot Road
- **SW 132nd Place**
    - Aerial facilities crossing SR-994/Quail Roost to west side of SW 132 Place

- **SW 129th Avenue**
    - Aerial facilities crossing SR-994/Quail Roost to west side of SW 129 Place
- **SW 127th Avenue/Burr Road**
    - Aerial facilities crossing SR-994/Quail Roost drive on west side of travel lanes in southbound direction
    - Aerial facilities on west side of roadway in northbound direction

- **Underground facilities**
  - Transfering off pole line at Sta 326 to 328/SW 134th Avenue/Talbot Road
  - Transfering off pole line approximately 200' west of SW 135th Avenue/Sta 323
  - Sta 338 to Sta 339 crossing roadway in northbound trajectory at SW 132nd Court
  - Underground facilities on south side of SR-994/Quail Roost Drive transfering off pole at Sta 349 in westbound direction to SW 130th Avenue where buried fiber/television heads southbound on SW 130th Avenue

CROWN CASTLE

Four (4) 1.5" HDPE conduits, aerial fiber, riser pole and hand holes within the study coridor were provided by the UAO. The following are the locations indicated by the UAO along Quail Roost Drive, both on the north and south side as attached to the exisitng FPL poles.

- **Aerial fiber**
  - SR-994/Quail Roost Drive west of Sta 312 beginning of project to Sta 315 crossing over SW 137th Avenue transfering off pole line into underground trajectory
  - South side of SR-994/Quail Roost Drive from Sta 344 to Sta 358, crossing roadway onto northside of corridor until Sta 364 where transitions off pole to buried facilities.
- **Undergound/buried (4) 1.5" HDPE Conduits**
  - East side of SW 137th Avenue in northbound direction
  - Crossing SR-994/Quail Roost Drive in southbound direction at Sta 315, continuing eastbound to Sta 344 where going up riser onto overhead pole line.
  - Sta 364 coming off pole line in eastbound direction to Sta 368/SW 127th Avenue/Burr Road to Sta 369 end of proejct limits
  - At NW corner of SW 127th Avenue/Burr Road and SR-994/Quail Roost Drive conduits cross underground in southbound direction to termination node on SW corner of intersections

Nine (9) hand hole locations throughout marked plans located at the following locations:

- Hand hole – NE & SE corner of intersection of SW 137th Avenue and Quail Roost Drive
- Hand hole – south side of the intersection of SW 135th Avenue and Quail Roost Drive
- Hand hole – south side of intersection of SW 133rd Court and Quail Roost Drive
- Hand hole – SE corner of intersection of SW 132nd Avenue and Quail Roost Drive
- Hand hole – approximately 40' west of Canal C-1 on the south side of Quail Roost Drive
- Hand hole – NE & SE corner of intersection of SW 127th Avenue and Quail Roost Drive
- Hand hole – approximately 200' east of intersection of SW 127th Avenue and Quail Roost Drive

Additionally, it was noted in correspondence with UAO that the Crown Castle organization has appropriated Fibernet Direct and Sunesys facilities within study corridor.

FPL DISTRIBUTION

The UAO provided mark ups, record drawings, as-built prints, check prints and referenced primary maps. documentation of the location of exisitng electric distribution facilities, consisting of 13kV and 120/240V overhead electric pole line along with underground buried electric street light circuit lines within the study limits. Listed below are the locations of FPL distribution lines:

- **Aerial Facilities**
  - SR-994/Quail Roost Drive,overhead 13KV power line on the north and south side of roadway from the beginning of the project lmits to the end
  - North and South along SW 137th Avenue – overhead 13KV powerline and 120/240OV powerline
  - North and South along SW 134th Avenue / Talbot Road – overhead 13KV powerline
  - North along SW 132nd Court – overhead 13KV powerline
  - North and South along SW 127th Avenue / Burr Road – overhead 13KV powerline
- **Underground Facilities**
  - SR-994/Quail Roost Drive, 13kV buried electric east of SW 132nd Place to Black Creek / Canal C-1
  - SW 135th Avenue, 120V buried electric streetlight circuits
  - SW 134th Court, 120V buried electric street light circuits
  - SW 130th Avenue – 13KV BE
  - SW 129th Court – 13KV BE

MCI/VERIZON

According to the review conducted by MCI/Verizon, the UAO does not have facilities within the proposed project limits. MCI/Verizon noted their facilities are within general area and should be contacted if project limits are extended to analyze potential impacts.

MDC ITD

The UAO indicated no conflict within the PD&E study limits.

MIAMI-DADE PUBLIC WORKS AND TRAFFIC

The location of the facilities was not provided by Miami-Dade Public Works at this phase. Potential impacts to street lighting and traffic signals (if any) are to be coordinated with Miami-Dade County Public Works and Traffic in future phases of the project.

MD-WASD

The UAO provided water and sewer as-builts and atlas for facilities within the project limits. ***Water Distribution System*** includes: 48" Concrete Water Main, 16" DIP Water Main, 12" DIP and 8" DIP Water Mains at intersecting streets 48" PCCP Water Main, along with tie-in to fire hydrants and residential/commercial water service lines, water valves, tapping valves. ***Sanitary Sewer System*** includes: 4" and 8" Force Main, sludge line, manholes, cleanouts, fire hydrants and water valves at the locations indicated below.

MD-WASD may consider entering into a Joint Participation Agreement (JPA) for relocation work, if needed, when project reaches 60% phase development.

As-Builts depict 5' Right of Way Easement at NW Corner of SW 127th Avenue and SR-994/Quail Roost Drive.

- **Water**
  - 16" DIP Water Main, SR-994/Quail Roost Drive**,** from west of 135th Avenue/Sta 319
    to east of SW 129th Avenue/Sta,357 crossing aerially over the Black Creek Canal
  - 16" DIP Water Main, SW 137th Avenue, west side of roadway in northbound direction
  - 16" DIP Water Main, SR-994/Quail Roost Drive/Sta 385 to Sta 369
  - 8" DIP tie-in/connections from existing 16" DIP to intersecting streets;
    SW 135th Avenue, SW 134th Court, SW 134th Avenue/Talbot Road, SW 133rd Court,
    SW 132nd Place, SW 13nd Court, SW 130th Avenue, SW 129th Court, SW 129th
  - 48" PCCP Water Main, SW 127th Ave, west side of roadway in north/southn direction
- **Sanitary**
  - 8" DIP sanitary sewer, SR-994/Quail Roost Drive north side of roadway from west side of
    SW 127th Court/Sta 365 westbound trajectory to SW 130th Avenue/ Sta 348
  - Connections to existing 8"DIP sanitary sewer system at
    - SW 130th Avenue
    - SW 129th Court
    - SW 127th Court

2.19 LIGHTING

The existing roadway lighting system along SR 994/Quail Roost Drive from SW 137th Avenue and SW 127th Avenue is inconsistently scattered, and it consists of conventional light emitting diode (LED) cobra-head luminaires mounted on conventional aluminum light poles and roadway FP&L light poles. Most of the corridor has no lighting. Lighting is present at the following locations:

- From SW 137th Avenue to SW 133rd Avenue - luminaires mounted on three mixed concrete and wood poles
- From SW 135 Avenue to SW 134th Court - three decorative top mount pedestrian light poles
- From SW 133rd Avenue to SW 132nd Court - two FP&L concrete light poles
- Intersection of SW 127th Avenue

The intersection of SR 994 and SW 127th Avenue has been recently upgraded to conventional aluminum light poles with LED luminaires. The maintaining agency for roadway lighting along the SR 994 corridor is Miami-Dade County.

2.20 SIGNS

Signs along the corridor include standard regulatory, warning, guide and information, and marker signs. Signs are in good condition overall. The following signs are posted along the SR 994 corridor.

Regulatory Signs

- Speed Limit (R2-1)
- Stop Here For Peds (R1-5c)
- No Left Turn (R3-2)
- Turning Vehicles Yield To Pedestrians (R10-15)

Warning Signs

- Bicycle (W11-1)
- Warning Bicycle & Pedestrian (W11-15)
- Trail X-ing Plaque (W11-15P)
- Cross Road Intersection (W2-1)
- Side Road Intersection [W2-2(L&R)]
- Pedestrian (W11-2)

Guide and Information Signs

- Street Name (D3-1)
- Advance Street Name (D3-2)

Marker Signs

- State Highway Route (M1-5)
- Bicycle Route (M1-8)
- East (Auxiliary) (M3-2)

2.21 AESTHETICS FEATURES

The following community features associated with aesthetics were identified within a buffer of one-quarter mile from the study limits:

- One park and recreational facility (Charles Burr Park)
- One existing recreational trail (Black Creek Trail Corridor)
- Three significant historic resources (1307 Quail Roost Drive, 20000 SW 137th Avenue, and 13390 SW 200 Street).

Nearly the entire corridor lacks shrubs and groundcovers. The trees on site are largely used to make entry features to the surrounding communities stand out.

The conditions along SR 994 / Quail Roost Drive provide ample opportunities for landscaping, however the site is constrained by other existing features. There are multiple species of trees and shrubs within the right of way including, but not limited to: Live Oaks, Royal Palms, Cat Palms, Australian Pine, Pigeon Plum, Royal Poinciana, Mango Tree, Christmas Palm, and Black Olives. Shrubs are rare within the right of way; however individual properties have shrubs and groundcovers along the property line. Upon initial analysis, there are currently no sight line issues at intersections within the corridor. Miami-Dade County Department of Regulatory and Economic Resources - Division of Environmental Resources Management (DERM) has identified the project area as subject to the preservation of specimen tree resources (trees with a trunk diameter equal to or greater than 18 inches) per Miami-Dade County Code. Any impacts to trees on arterial roadways and rights-of-ways that are located outside of the State Highway System or its appurtenances, will require a Miami-Dade County Tree Removal Permit prior to the removal and/or relocation of any tree that is subject to the tree preservation and protection provisions within Miami-Dade County Code.

2.22 BRIDGES AND STRUCTURES

There is one bridge within the study limits (Bridge No. 870633 – SR 994 over Black Creek Canal). The Black Creek Canal is not considered navigable; therefore, no provisions need to be made for boat traffic.

2.22.1 Existing Bridge Conditions

SR 994 over Black Creek Canal (Bridge No. 870633) is a 3-span structure constructed in 1962. The Department performs biannual inspections and evaluations of all fixed bridges under its jurisdiction as part of the "National Bridge Inventory (NBI) and Structural Inventory and Appraisal Program" required by the Federal Highway Administration (FHWA). According to the Bridge Inspection Report dated April 21, 2021, the bridge is functionally obsolete with a Health Index of 99.91 and Sufficiency Rating of 75.2. Based on the current load rating analysis dated July 6, 2011, posting is not required. The structure is currently not posted. On September 3, 2015, the structure was hit by a vehicle traveling westbound on SR 994, which caused significant damage to several elements of the structure. For additional details on the existing bridge conditions, please refer to the Bridge Analysis Report, a companion document to this study (***Appendix I***).

Table 2-17 Existing Bridge Characteristics

Structure ID	870633
Inspection Date	4/21/2021
Structure Owner	FDOT
Maintaining Agency	FDOT
Year Built	1962
Structure Name	SW 200 St over Black Creek Canal
Section No.	87091000

Table 2-17 Existing Bridge Characteristics

Milepost	4.645
Facility Carried	SR 994/Quail Roost Dr/SW 200 St
Feature Intersected	Black Creek Canal C-1-W
Structure Type	Prestressed Concrete Slab (sonovoid)
Number of Lanes	2
Number of Spans	3
Length of Max. Span	29.33 ft
Structure Length	87.99 ft
Deck Width	37.99 ft
Sufficiency Rating (%)	75.2
Health Index (%)	99.91
Significant Deficiencies	Functionally Obsolete

Figure 2-12 Existing Bridge Elevation Looking North

Figure 2-13 Existing Bridge Aerial

2.22.2 Structure Typical Section

The existing bridge is 38'-0" wide and has three equal span lengths of 29'-4" resulting in a total bridge length of 88'-0". The superstructure consists of eight 15-inch thick, 4-foot wide prestressed concrete sonovoid slab units with a 1-inch-thick asphalt overlay. Transverse post-tensioning tendons are used at the 1/3 point along each span to connect the individual slab units. 12" square prestressed concrete piles are used at each end bent and 14" square prestressed concrete piles are used at the two intermediate bents.

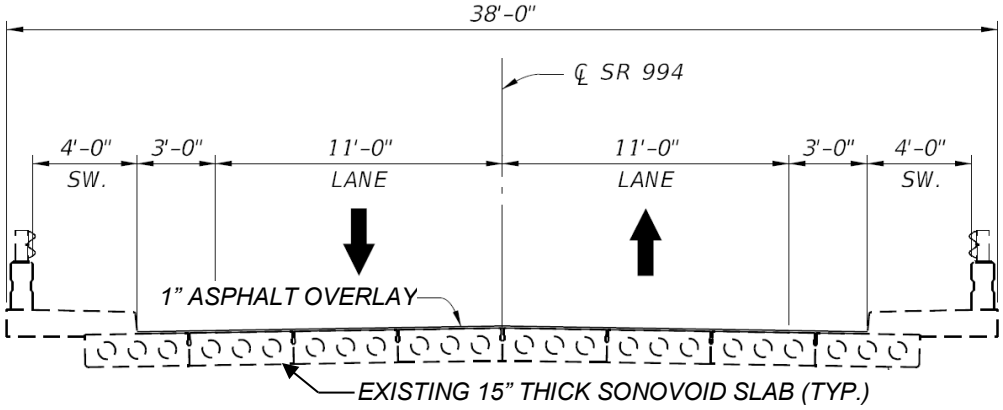


Figure 2-14 Existing Bridge Typical Section

3.0 PROJECT DESIGN CONTROLS AND CRITERIA

3.1 ROADWAY CONTEXT CLASSIFICATION

Design standards and criteria provide the framework for evaluating the current geometry, existing deficiencies and future design to meet the mobility needs of the corridor. Specifically, they help establish the roadway typical section, cross-sections, and acceptable intersection configurations.

The proposed condition of this segment of SR 994/Quail Roost Drive maintains the original context classification as presented in ***Table 2-3***. On the other hand, the access management classification for this corridor shall change from Class 4 to Class 5 to most closely match FDOT's Access Management Guidebook.

3.2 DESIGN CONTROL AND CRITERIA

Design standards are well defined for Florida's roadways. Design standards and criteria provide the framework for evaluating the current geometry, existing deficiencies, and future design to meet the mobility needs of the corridor. Specifically, they help establish the roadway typical section and cross-sections.

3.2.1 Roadway Design Criteria

Roadway design elements and applicable design standards considered in the design of the typical sections for the corridor are summarized in ***Table 3-1***.

Table 3-1 Roadway Design Criteria

Design Element	FDOT Criteria					
	FDM				FDOT Greenbook (2022 Draft)	
	SR 994 /Quail Roost Dr (East of SW 137)	SR 994 /Quail Roost Dr (at SW 137 Ave)	SR 994 /Quail Roost Dr (West of SW 137 Ave)	Reference	Arterials & Local Roads	Reference
Context Classification	C3R-Suburban Residential		C2-Rural	PLCC	N/A	N/A
Design Speed	35–55 mph		55-70 mph	Table 201.5.1	30-60 mph Arterials/Collectors 20-30 mph Local	Table 3-1
	40 mph	45 mph	50 mph (based on existing)		30 mph / 40 mph	
Travel Lane Widths	11 ft		12 ft	Table 210.2.1	9 ft Local Rural 10 ft Local Urban / Collector Rural 11 ft Collector Urban (10 ft if constrained)	Table 3-20, Page 3-47 / Section D.6, Page 11-15
Bike Lane Width	7 ft buffered		5-ft unmarked shoulder	Section 223.2.1.1	4 ft	Section D.6, Page 11-15
Two-Way Left-turn	12 ft	N/A		Table 210.2.1	10 ft	Table 3-20, Page 3-47

Design Element	FDOT Criteria					
	FDM				FDOT Greenbook (2022 Draft)	
	SR 994 /Quail Roost Dr (East of SW 137)	SR 994 /Quail Roost Dr (at SW 137 Ave)	SR 994 /Quail Roost Dr (West of SW 137 Ave)	Reference	Arterials & Local Roads	Reference
Sidewalk Width	6 ft		5 ft	Table 222.2.1	5 ft (with 2 ft buffer from BOC) 6 ft (without a buffer)	Section B.1, Page 8-2 / Section D.6, Page 11-15
Sidewalk Grade and Cross Slope	5% max grade, 2% max cross slope			Section 222.2.1.3	5% max grade, 2% max cross slope	Section B.1, Page 8-2
Outside Shoulder Width (Paved/Unpaved)	5 ft / 10 ft			Table 210.4.1	8 ft	Table 3-21, Page 3-50
Median or Left Shoulder Width (Paved/Unpaved)	4 ft / 8 ft				4 ft	
Median Width	22 ft (15.5 ft if severely constrained)	22 ft (19.5 ft if severely constrained)	40 ft	Table 210.3.1	22 ft (15.5 ft if severely constrained)	Table 3-23, Page 3-56
Border Width	12 ft (10 ft with Bike Lanes)	14 ft (12 ft with Bike Lanes)	40 ft	Table 210.7.1	N/A	
Clear Zone Width New Construction	18 ft Travel Lanes 10 ft Auxiliary Lanes	24 ft Travel Lanes 14 Ft Auxiliary Lanes		Table 215.2.1	14 ft	Table 4-1. Page 4-5
Minimum Stopping Sight Distance – Under 2% Longitudinal Slope	305 ft	360 ft	425 ft	Table 210.11.1	200 ft	305 ft	Table 3-4, Page 3-13
Max Deflection without curve	2° 00' 00"	1° 00' 00" (Curbed) 0° 45' 00" (Flush shoulder)	0° 45' 00"	Section 210.8.1	2° 00' 00"		Section C.4.b
Length of Horizontal Curve	600 ft (Desirable)	675 ft (Desirable)	750 ft (Desirable)	Table 210.8.1	450 ft	600 ft	Table 3-8, Page 3-21
	400 ft (Minimum)				400 ft (Minimum)		
Maximum Curvature	10° 45' 00"	8°15'00"	8°15'00"	Table 210.9.1 Table 210.9.2	20° 00' 00"	10° 45' 00"	Table 3-11, Page 3-25
Minimum Radius SHS/RRR	533 ft / 468 ft	694 ft / 637 ft	694 ft / 674 ft	Table 210.8.2	240 ft	510 ft	Table 3-12, Page 3-26
Minimum Radius NC/RC	1,528 ft / 716 ft	2,083 ft / 955 ft	8,337 ft / 6,171 ft	Table 210.9.2	819 ft / 409 ft	1,528 ft / 716 ft	Table 3-11, Page 3-25
Maximum Superelevation	5%		10%	Section 210.9	5%		Section C.4.c.2
Maximum change in grade without vertical curve	0.80%	0.70%	0.60%	Table 210.10.2	1%	0.80%	Table 3-17, Page 3-40

Design Element	FDOT Criteria					
	FDM				FDOT Greenbook (2022 Draft)	
	SR 994 /Quail Roost Dr (East of SW 137)	SR 994 /Quail Roost Dr (at SW 137 Ave)	SR 994 /Quail Roost Dr (West of SW 137 Ave)	Reference	Arterials & Local Roads	Reference
Base Clearance above Base Clearance Water Elevation	3 ft	3 ft	3 ft 2 ft for two lane roadways on CC C2)	Section 210.10.3	2 ft	Section C.3.b, Page 17-3
Crest Curve K	70 New Construction 44 RRR	98 New Construction 61 RRR	136 New Construction 84 RRR	Table 210.10.3	19 / 44	Table 3-18, Page 3-41
Sag Curve K	64	79	96		37 / 64	
Minimum Vertical Curve Length	120 ft	135 ft	300 ft	Table 210.10.4	N/A (< 50 mph)	
Vertical Clearance for New Bridge Structures / RRR	16.5 ft / 16 ft			Table 260.6.1	16.5 ft Arterials and Collectors	Section C.7.j.4.(b), Page 3-83 / Table 7-2, Page 7-15
Vertical Clearance for Overhead Sign Structures (New / Existing)	17.5 ft / 17 ft			Section 210.10.3	16 f t	
Vertical Clearance DMS Structures (New / Existing)	19.5 ft / 19 ft					
Vertical Clearance for signals, span wires, mast arms (New / Existing)	17.5 ft / 17 ft					
Vertical Clearance for Bridges over Waterways	Design Flood Stage (7.49 NAVD) + 2 ft Low Member Elevation = 9.49			Section 260.8.1	Design Flood Stage (7.49 NAVD) + 2 ft Low Member Elevation = 9.49	Section C.3.b Page 17-3
Maximum Grade	7%	6%	4%	Table 210.10.1	7% Collector and Local Rural 9% Collector Urban	Table 3-16, Page 3-38

3.2.2 Shared-Use Path and Sidewalk Level Bicycle Lane Design Criteria

Design criteria for Share Use Paths and Sidewalk Level Bicycle lanes is being consolidated for the purpose of this section, as the two types of facilities share many criteria elements including: Horizontal Clearance, Vertical Clearance, Design Speed, Horizontal Alignment, Separation from Roadway, Longitudinal Grades and Cross Slopes. Design elements and applicable design standards considered in the design of the aforementioned facilities are summarized in ***Table 3-2***.

Table 3-2 Shared-Use Path and Sidewalk Level Separated Bicycle Lanes Design Criteria

Design Element	FDOT Criteria		
	FDM		
	SR 994 /Quail Roost Dr./Black Creek Trail		Reference
Design Speed	18 mph	30 mph	-
Shared Use Path Widths	12 ft Standard 10 ft Constrained R/W 8 ft Short Constricted Sections		Section 224.4
Sidewalk Level Bicycle Lane Width	5 ft One-Way facility, adjacent to one Type F or D curb		Table 223.2.1
Minimum Grade Transition Distance (2% to -2% and vice-versa)	75 ft		Section 224.5
Maximum Cross Slope	2%		
Maximum Longitudinal Grades and Distances	4%	5% Throughout Desired 6% (≤ 800 ft) 7% (≤ 400 ft) 8% (≤ 300 ft) 9% (≤ 200 ft) 10% (≤ 100 ft) 11% + (≤ 50 ft)	Table 224.6.1 and Section 224.9
Horizontal Clearance	4 ft Desired 2 ft Minimum (1:6 max adjacent slope)		Section 224.7
Vertical Clearance	**RETROFIT** 8 ft **NEW CONSTRUCTION** 8 ft Overhead Objects 10 ft Desired 12 ft Emergency Vehicles/Tunnels/SUN Trail		Section 224.8
Minimum Horizontal Curve Radius	74 ft (+2% max) 86 ft (-2% max)	261 ft (+2% max) 236 ft (-2% max)	Table 224.10.1
Minimum Stopping Sight Distance	134 ft (Flat) 149 ft (-3%) / 123 ft (+3%) 156 ft (-4 %) / 120 ft (+4%)	Same as 18mph + 383 ft (-5%) / 118 ft (+5%) 410 ft (-6%) / 115 ft (+6%) 444 ft (-7%) / 113 ft (+7%) 485 ft (-8%) / 111 ft (+8%) 539 ft (-9%) / 109 ft (+9%)	Table 224.10.2

Design Element	FDOT Criteria	
	FDM	
	SR 994 /Quail Roost Dr./Black Creek Trail	Reference
Minimum Vertical Curve Length	When S > L : L = 2S - (900 / A) When S < L : L = AS^2 / 900	Section 224.11
Minimum Separation from Roadway	**FLUSH SHOULDER ROADWAY** 5 ft ≤ 45 mph (from edge of paved shoulder) 5 ft ≥ 50 mph (from edge of shoulder break) **CURBED ROADWAY** 5 ft (from face of curb) 2 ft Minimum (from back of Curb) (Side path)	Section 224.12
SBL buffer from sidewalk	2-ft detectable buffer (1-ft in constrained conditions)	Section 223.2.4.2

3.2.3 Drainage Design Criteria

3.2.3.1 Base Clearance

Per FDOT Pavement Design Manual a minimum 3-feet base clearance is required to provide for pavement structural integrity protection. When the clearance is less than 3-feet the pavement designer must reduce the Design Resilient Modulus as follows:

- For 2-feet base clearance, a 25% modulus reduction
- For 1-foot base clearance, a 50% modulus reduction.

A minimum roadway edge of pavement elevation of 7.0'-NAVD is required to provide a 3-feet base clearance from SHGWT (3.0'-NAVD) to the bottom of base.

3.2.3.2 Conveyance Systems

The design of both, storm sewer systems and conveyance ditches are based on FDOT drainage design criteria. These criteria are summarized as follows:

1. For major interstates a 10-year recurrence interval shall be used in the design of storm sewer systems;
2. For interstates within a sag vertical curve with no outlet other than the storm sewer, a 50-year recurrence shall be used in the design of the storm sewer system. Also, for a depressed expressway with drainage provided by a pumping station a 50-year recurrence shall be used for the design of the storm sewer system;
3. Design of storm sewer system shall maintain hydraulic grade line HGL a minimum of 1-foot below gutter line when minor losses are not computed in the design. When minor losses are considered, HGL may be maintained at the gutter line;
4. Design of storm sewer system shall maintain a minimum and maximum velocities of 2.5 and 15 feet per second respectively;

5. Roadway and median ditches are designed to convey the 10-year frequency storm. Outfall ditches are designed to convey the 25-year frequency storm;
6. The maximum allowed velocity in grassed ditches is 5.5 feet per second. For velocities higher than 5.5 feet per second lining other than grass shall be used such as paved concrete, flexible, rip-rap, geo-grid and interlocking concrete blocks.

In addition, for widening or new construction areas with flush shoulders, a minimum of 10-ft wide swale areas should be provided behind the paved shoulders for drainage purposes.

3.2.3.3 French Drains

French drains are allowed when in-situ soil hydraulic conductivity is sufficient to promote exfiltration of the required stormwater quality volumes. French drains must be designed in accordance with current FDOT District 6 Drainage Design Guidelines and the Exfiltration Trench Reference Manual (ETRM) dated February, 2020 and must address the following design criteria and parameters:

1. Exfiltrate to the groundwater the greater of the SFWMD or DERM stormwater quality volume, prior to discharge over control weir;
2. Percolate runoff into areas of aquifer that do not contain contaminated soil;
3. Exfiltration pipe shall be a minimum of 24 inches in diameter with an invert elevation set at or above DERM average October groundwater elevation, to be accounted for water quality treatment;
4. Provide baffles, skimmers and sumps in inlets to minimize entrance of oils and sediments into drainage pipes;
5. Bottom of skimmers shall be set at a minimum of 18 inches below the average yearly lowest groundwater elevation, as outlined in the Metropolitan Dade County Public Works Department Design Standards.
6. Trench width shall be a minimum of 4.5 feet;
7. Rock in trench must be enclosed in filter material, at least on the top and sides;
8. In-situ soil exfiltration capacity must be determined by the FDOT percolation test method. Percolation test hole must be advanced to a depth that will yield a minimum of 6 gpm per foot of head of exfiltration capacity; and
9. Depth of French drain trench must be at or below the percolation test hole depth to a maximum of 20 feet as outlined in the FDOT-VI Drainage Section Pamphlet “Subsurface Drainage with French Drains: June 20, 1991”.

3.2.3.4 Spread

The minimum longitudinal gutter grade shall be kept at 0.3% to properly drain the pavement and reduce the width of the spread, thus decreasing the likelihood of hydroplaning. The careful spacing of the inlets is required to limit the spread resulting from a constant 4.0 inches per hour storm. Utilize curb inlets types 1 thru 4 to the maximum extent practicable to facilitate maintenance. Curb inlets type 5 and 6 shall be used when inlets type 1 thru 4 cannot be accommodated. Inlets type 5, 6, 9 and 10 are not permitted in concrete pavement sections. The spread criteria are summarized as follows:

Table 3-3 Spread Criteria

Typical Section Condition	Design Speed (mph)	Spread Criteria
Parking Lane of Full Width Shoulder	All	No encroachment
Left Turn Lanes	Design Speed > 45	Keep 8' of lane clear
Right Turn Lanes	All	Keep ½ lane clear
All Other	Design Speed ≤ 45	Keep ½ lane clear
	45 ≤ Design Speed ≤ 55	Keep 8' of lane clear
	Design Speed > 55	No encroachment

3.2.3.5 FDOT D6 Drainage Guidelines

FDOT D6 has developed drainage design guidelines tailored to address the unique drainage conditions found within Miami Dade and Monroe County. These unique conditions include lowlying areas, flat terrain and highly transmissive limestone formation that allows for French drains to be the bulk of stormwater management systems used in District 6. These guidelines include the Exfiltration Trench Reference Manual, the ICPR Application Manual and the ICPR Technical Design Guide.

3.2.3.6 FDOT D6 Drainage System Design Flood Protection Level of Service (FPLOS)

FDOT stormwater systems shall be designed to meet the 10-year storm FPLOS and shall be checked for performance for the 100-yr storm. Typically, analysis and design of system components including storm drains, French drains, swales, ponds, weirs, pollution control structures and pump station are conducted using ICPR flood routing analysis. The 10-yr, 1-hr, 8-hr and 24-hr storm events simulations are evaluated for system design while the 100-yr, 1-hr, 8-hr and 24-hr storm events simulation are evaluated for system performance.

3.2.3.7 Miami-Dade Flood Criteria

Chapter 28 of the Miami-Dade County Ordinance Code requires roadway facilities to meet flood criteria elevation to establish required roadway crown minimum elevation. As per Miami-Dade County Flood Criteria Map the project flood criteria elevation is 6.0'-NAVD (7.5'-NGVD).

3.2.3.8 Sea Level Rise Resiliency Planning

The project is located relatively further inland, west of the salinity control line. C-1 Canal is a flood-controlled waterway and is not tidally influenced by Biscayne Bay tidal fluctuations. Also, project topography is relatively high (8' to 13'-NAVD) while SHGWT is relatively low (3.0'-NAVD). These conditions promotes favorable conditions in terms of drainage and does not present an immediate risk in terms of SLR flooding impacts to the project.

3.2.4 Permit Criteria

This section describes the Federal, State, and local stormwater quality and quantity criteria applicable to the project. This section also outlines the Federal, State, and local permitting

requirements. The criteria and parameters outlined in this section are from the pertinent published regulations, permit design manuals, and design standards.

3.2.4.1 Stormwater Quality

The South Florida Water Management District (SFWMD) and the Miami-Dade County Department of Regulatory and Economic Resources (DRER) have jurisdiction over the stormwater quality criteria for the project. The following subsections details the applicable criteria.

3.2.4.1.1 SFWMD Stormwater Quality Criteria

The SFWMD requires that all projects meet State water quality standards, as set forth in Chapter 17-302, Florida Administrative Code (FAC). To assure that these criteria are met, the proposed drainage improvements must meet the following volumetric retention/detention requirements, as described in the SFWMD Permit Volume IV:

1. For wet detention systems, the first one inch of runoff from the project or the total runoff from 2.5 inches times the percent of imperviousness, whichever is greater, must be detained on site. A wet detention system is a system, which maintains the bottom elevation below one foot from the seasonal high groundwater elevation and does not bleed-down more than one-half inch of detention volume in 24 hours.
2. Dry detention systems must only provide 75 percent of the required wet detention volume. Dry detention systems maintain the bottom elevation at least one foot above the seasonal high groundwater elevation.
3. Retention systems must only provide 50 percent of the wet detention volume.
4. For projects with more than 50 percent of imperviousness, discharge to the receiving water bodies must be made through baffles, skimmers, or other mechanisms suitable of preventing oil and grease from discharging to/or from the retention/detention areas.

3.2.4.1.2 DRER Stormwater Quality Criteria

The Miami-Dade Department of Regulatory and Economic Resources (DRER) also requires that all projects meet the State water quality standards. To assure that this criterion is met, 100 percent of the first inch of runoff must be retained on site. This volume is equivalent to retaining one inch of runoff from the furthest hydrologic point in the project. The methodology for estimating this volume is outlined in DERM's Policy for Design of Drainage Structures, dated December 1980 as follows:

$V = 60CiAT_t$

Where:

V = Required stormwater quality volume, cubic feet

C = Runoff Coefficient; 0.2 for pervious areas and 0.95 for Impervious areas

A = Total tributary area, acre

T_t= Duration of storm whose runoff is polluted and contaminated, minutes

$= T_{1"} + T_c$

Where:

$T_{1"}$ = Time to generate one inch of runoff, minutes

$$= \frac{2940F^{-0.11}}{308.5\ C - 60.5(0.5895 + F^{-0.67})}$$

Where:

F = Storm frequency, years

C = previously defined

T_c = Time of concentration, minutes

i = Storm intensity, inches per hour

$$= \frac{308.5}{48.6F^{-0.11} + T_t\ (0.5895 + F^{-0.67})}$$

All variables previously defined.

For highway systems, DERM requires that the first inch of runoff must be retained for a rainfall event with a 10-year frequency. DERM also requires that the retained volume is infiltrated into the groundwater in a period of 24 hours and does not allow bleeder mechanisms.

3.2.4.2 Stormwater Quantity

The SFWMD and DERM both have jurisdiction over the stormwater quantity criteria for the Project. The following subsections outline these requirements.

3.2.4.2.1 SFWMD Stormwater Quantity Criteria

The SFWMD requires that off-site discharge rate be limited to rates not causing adverse impacts to existing off-site properties, and:

1. Historic discharge rates; or
2. Rates determined in previous SFWMD permit actions; or
3. Basin allowable discharge rates.

The receiving water bodies within the project are the Miami River and its tributaries including the Lawrence Canal, the Wagner Creek and the Seybold Canal. These receiving water bodies do not have historic or allowable discharge criteria. Nevertheless, the SFWMD requires that pre-

development peak discharge during a 25-year, 72-hour rainfall event does not increase for post-development conditions. The SFWMD also requires flood protection within the project as follows:

1. Building finish floor elevation must be set at or above the 100-year flood elevation, as determined from the Federal Flood Insurance Rate Maps (FIRM) or 100-year, 72-hour rainfall event peak stages;
2. Centerline of roadways must be set at or above the 5-year, 24-hour rainfall event peak stages or 2 feet above the seasonal high groundwater elevation, whichever is greater;
3. Parking lots served by French drains must be set at or above the 5-year, 1-hour rainfall event peak stages.

The SFWMD also requires that provisions be made to replace or otherwise mitigate the loss of historical basin storage provided by the project.

3.2.4.2.2 Variable Tailwater Conditions

Historically, the SFWMD has allowed French drain exfiltration in hydrologic/hydraulic modeling for only one-hour of rainfall duration or its equivalent of 3.28-inch precipitation deduction credit for a SFWMD 25-year, 72-hour storm event. This volume of runoff typically is the stormwater quality volume required to be retained onsite with French drains. However, because of the relatively excellent draining soils in Miami-Dade County, this criterion is overly conservative and stormwater management systems are over designed. Based on local design experience, French drains tend to exfiltrate throughout the duration of long-term rainfall events such as 24 and 72 hours and provide quick drawdown of retained stormwater runoff after the end of the rainfall event.

In the recent years, based on previous roadway projects and meetings between FDOT VI, SFWMD and DRER, the use of French drain exfiltration in flood routing modeling during the entire storm duration has been accepted for SFWMD 25-year, 72-hour pre-development versus post-development peak discharge analysis. However, this acceptance is subject to include in the model a boundary condition with groundwater and/or surface water levels representative of SFWMD 25-year, 72-hour storm event. Variable tailwater conditions were also used for all other design storms included in this report.

Tailwater boundary conditions for canal water levels and groundwater levels can be established based on two (2) FDOT D6 common design practice approach. The first approach is to set the initial and peak water level boundaries to DERM Average October Groundwater Level and Yearly Highest Groundwater Level respectively. The second approach is to use any recent DRER and/or SFWMD canal masterplan documentation, canal stormwater model and/or groundwater study. DRER has recently completed the Black Creek Cana C-1 master plan which includes the C-1 XPSWMM hydrologic and hydraulic model. Either approach is typically accepted by the Department.

3.2.4.2.3 DRER Stormwater Quantity Criteria

Sample Protection from flooding has long been the primary objective of Miami-Dade County. The sizing of a drainage system is determined by the design storm and the land use type. The design storm is based on the County Intensity Duration Frequency (IDF) curves as shown in W.C. 1.1 and W.C. 1.2. The table below summarizes this agency's requirements.

In addition, DRER states that a safety factor of 4, exfiltration trenches with 24 inches perforated pipes 100 feet long, and 18 inches pipes shall be used for section line and half section line roadways, and exfiltration trenches with 36 inches perforated pipes on arterial roads.

3.2.4.3 SFWMD Right of Way Occupancy Permit

South Florida Water Management District (SFWMD) currently has four maintenance access points to Black Creek Canal, one on every corner of the bridge. As part of the coordination process that took place during the PD&E Phase, SFWMD requested access is maintained at all four corners, uninterrupted (no median), and provided specific criteria for the driveways and canal work, as listed below:

Canal Design Information

Canal Section:

Bottom Elevation: (-)12.0' NGVD

Bottom Width: 40'

Side Slopes: 1V:1H

Hydraulic Information:

Design Water Surface Elevation: 4.3' NGVD

Optimum Water Control Elevation: 5.0' NGVD

Required Vertical Clearance:

The required minimum vertical clearance acceptable at this location is two (2) feet of clearance above the design water surface elevation or 4.5 feet above the optimum water surface elevation, whichever produces the higher elevation.

Required Horizontal Clearances:

The center span must be centered on the centerline of the canal. The center span must have a minimum clear opening of 25 feet as measured from the faces of the pile bents. Approach spans must have a minimum spacing of 20 feet as measured on centers.

Bridge Hydraulic Report

A bridge hydraulic report (BHR) is required for any bridge crossing a District canal and must be submitted with the application for a Right of Way Occupancy Permit. The BHR must demonstrate that the proposed bridge does not result in head loss greater than 0.1 feet.

Cross-Sections:

For the District to determine if clean-out or excavation of the canal is necessary at the point of a proposed crossing, the applicant must provide certified cross-sections of the canal prepared by a surveyor licensed in the State of Florida.

For bridge crossings, the applicant is required to provide a minimum of five (5) cross- sections: one at the centerline of the crossing, one at each of the proposed upstream and downstream faces of the bridge and one on each side taken at 25 feet upstream and 25 feet downstream of the proposed faces of the bridge (unless otherwise directed by District staff).

The cross-sections must be taken perpendicular to the centerline of the canal. Soundings for cross sections are to be taken at a maximum of 10-foot intervals from top of bank to top of bank and tied into the canal right of way lines. The cross-sections must also include the canal design section superimposed on each section.

Excavation:

If excavation is required to achieve the required canal design section, the limits of excavation shall extend outwardly a distance of 25 feet upstream and downstream from the faces of the proposed crossing with adequate transitions back to the existing canal section at both ends. The limits of the excavated area and transitions into the existing section must be shown on both the plan and profile view of the application drawings.

Bank Stabilization

If bank stabilization is required, acceptable erosion control materials include either rubble rip-rap or articulating concrete block mat. Materials specifications and installation must comply with District standards.

Slopes greater than 1:3 need to be stabilized. A hardened slope will be required with 1:1 slope as follows:

- 1:1 Articulated Block (Not riprap) from top of bank to toe of slope. Top of bank landward can be riprap (stabilization needs to be 25' from bridge face in each direction and can be articulated block)
- 1.5:1 and shallower – riprap is allowed
- 1.5:1 and steeper – a slope stability analysis would be required by USACE

Access:

In designing bridge approaches, consideration must be given to ensure that the District's access along the canal is not be severed or impeded. Guardrails, curbs, sidewalks and medians must be designed so that they do not interfere with the movement of District equipment along the canal or the District's need for vehicular access. Additional requirements are listed below:

- Provide a minimum 50 foot turning radius for turning movements
- The openings at each quadrant must each be 20 feet.
- Driveway at each quadrant needs to be paved, 14-ft wide and 75-ft long, at a minimum

Please refer to ***Appendix J*** for details on coordination and correspondence with SFWMD.

3.2.5 Structures Design Criteria

Design criteria for the replacement of the SR 994 bridge over Black Creek Canal is summarized below.

3.2.5.1 Design Method

The Load and Resistance Factor Design (LRFD) methodology and English Units will be used for the structures design for this project.

3.2.5.2 Specifications

The structure shall be designed in accordance with the latest edition of the following:

- FDOT Structures Manual (includes the Structures Design Guidelines referred to herein as SDG and the Structures Detailing Manual referred to herein as SDM)
- AASHTO LRFD Bridge Design Specifications, (referred to herein as LRFD)
- FDOT Standard Specifications for Road and Bridge Construction
- FDOT Design Manual (referred to herein as FDM)
- FDOT Standard Plans
- FDOT Load Rating Manual

3.2.5.3 Concrete Materials

For all classes of concrete, the calculation for Modulus of Elasticity, E_c, (in accordance with LRFD 5.4.2.4) uses a 0.145 kcf unit weight (un-reinforced concrete), and the 1.0 aggregate source correction factor, K_1, for the assumed use of Florida limerock coarse aggregate, in accordance with SDG 1.4.1. Normal weight concrete is assumed for the design. The following concrete classifications and strengths as specified in SDG Section 1.4.3 will be used for the project.

Concrete Element	Concrete Class	28-day Strength	Modulus of Elasticity
Superstructure			
- Approach Slabs	II (Bridge Deck)	4,500 psi	4,145 ksi
- Bridge Deck	II (Bridge Deck)	4,500 psi	4,145 ksi
- Traffic Barriers/Raised Sidewalk	II	3,400 psi	3,778 ksi
- Prestressed Concrete Beams	VI	8,500 psi	5,112 ksi
Substructure			
- CIP Substructure	IV	5,500 psi	4,428 ksi
- Prestressed Concrete Piling	V	6,500 psi	4,679 ksi

The concrete cover for each component is in accordance with SDG Table 1.4.2-1.

3.2.5.4 Steel Materials

The steel materials to be used in the project are:

Reinforcing Steel (SDG 1.4.1B)

- ASTM A615, Grade 60 deformed carbon-steel bar
- ASTM A1064, Grade 75 deformed welded wire reinforcement (WWR)

Prestressing Strands (SDG 4.3.1)

- ASTM A416, Grade 270, low-relaxation strands

3.2.5.5 Design Loads

The following loads are used in the project design:

Dead Loads (SDG 2.2 and LRFD 3.5.1)

- Compacted Soil 115 lb/ft³
- Reinforced Concrete (Structural) 150 lb/ft³
- Traffic Railing Barrier (32" Vertical Shape) 385 lb/ft (Index 521-423)
- Future Wearing Surface 0 lb/ft² (SDG Table 2.2-1 – Long Bridges)
- Bullet Railing 10 lb/ft (Index 521-820, 515-021 & 515-022)

Live Loads (LRFD 3.6)

- Design vehicular live load shall be the HL-93 designation (LRFD 3.6.1.2.1)
- Design pedestrian load shall be 75 psf (LRFD 3.6.1.6).
- The multiple presence of live loads that occupy the lanes of a bridge shall be considered and the corresponding multiple presence factor shall be applied in accordance with LRFD Table 3.6.1.1.2-1.
- Dynamic load allowance shall be applied in accordance with LRFD 3.6.2.
- Bridge shall be load rated for the FL120 permit loading.

Wind Loads (SDG 2.4 and LRFD 3.8)

- Design wind speed on completed structure shall be 170 mph (Miami-Dade County).

Seismic Effects (SDG 2.3 and LRFD 3.10)

- The project structure is exempt from seismic requirements in accordance with SDG 2.3.
  - Elastomeric bearings will be used.
- Substructures shall satisfy minimum support length criteria in accordance with LRFD 4.7.4.4.

Thermal Loads (SDG 2.7.1)

- Movement of bridge structures shall be calculated assuming the following uniform temperature range:

Superstructure Material	Temperature Range (Degrees Fahrenheit)			
	Mean	High	Low	Range
Concrete Only	70	105	35	70

3.2.5.6 Vertical Clearance

There are several criteria that are contemplated as part of the vertical clearance requirements over the Black Creek Canal. These include the following:

- South Florida Water Management District
  - 2 feet above the design water surface elevation of EL. 5.0 (NGVD).
  - 4.5 feet above the optimum water control elevation of EL. 4.3 (NGVD).
- FDM
  - Section 260.8.1

        - "The minimum vertical clearance between the design flood stage and the low member of a bridge is 2 feet. This clearance is necessary to allow the majority of debris to pass without causing damage to the structure."
    - Section 222.2.1.2
        - "Provide a minimum 7-foot vertical clearance over the entire walking surface."
    - Figure 266.2.1 Note 2
        - "…provided an 8-foot minimum headroom is maintained."
    - Section 224.8
        - "Provide a 10-foot vertical clearance from the lowest edge of an overhead obstruction to any portion of the path under the obstruction. An 8-foot clearance is allowed for overhead signs and for other overhead obstructions under constrained conditions."

Due to proximity of SW 130th Avenue to the bridge, the conditions are considered constrained; therefore, the controlling criteria is FDM Section 224.8. The proposed roadway profile will be set to allow for a minimum vertical clearance of 8-foot over the proposed trail located underneath Span 3.

3.2.5.7 Horizontal Clearance

There are several criteria that are considered related to horizontal clearance. These include the following:

- South Florida Water Management District
    - The center span must be centered on the centerline of the canal.
    - The center span must have a minimum clear opening of 25 feet as measured from the faces of the pile bents.
    - Approach spans must have a minimum spacing of 20 feet as measured on centers.
- FDM
    - Section 224.7
        - "For Urban Side Paths, the following criteria reflect the lower design speed. Provide a minimum 2-foot buffer area adjacent to both sides of the path, including placement of signs. Signs, plantings or other items must be located outside of the 2-foot buffer. Maintain a graded area with a maximum 1:6 slope adjacent to both sides of the path within the 2-foot minimum buffer area."
    - Section 262.1
        - "For retaining walls greater than 5 feet in height, provide a 10-foot maintenance area (1:10 or flatter) in front of the wall face with suitable access for maintenance vehicles." Per the Standard Plans Instructions for Index 548-020, the flat area at the base of the retaining wall can be reduced to a minimum of 4-foot where the 10-foot cannot be provided.

For the MSE wall located in front of End Bent 4, the FDM Section 224.7 criteria will be used to place the proposed MSE wall. For the MSE wall located in front of End Bent 1, the exposed wall height measured from the proposed groundline to the bottom of the coping is expected to be less than 5 feet; therefore, the FDM 262.1 criteria is not applicable.

The spans lengths for the proposed bridge will be set to ensure compliance with these requirements.

4.0 ALTERNATIVES ANALYSIS

A range of alternatives were considered for the study corridor including the No-Build option, Transportation System Management & Operations (TSM&O) improvements and three Build scenarios as described below. All alternatives were evaluated in terms of engineering, environmental, and socioeconomic aspects.

4.1 PREVIOUS STUDIES

In November 1988, an *Environmental Analysis Report (EAR)* was finalized for widening SR 994 from SW 177th Avenue (SR 997/Krome Avenue) to US 1 (SR 5) under Work Program Number 6113760. The Federal Highway Administration (FHWA) concurred that the Class of Action (COA) for the EAR was a Categorical Exclusion as part of the signed Environmental Determination in October 1988. Within the Scoping Report study limits from west of SW 137th Avenue to east of SW 127th Avenue, the EAR Preferred Alternative included reconstruction of SR 994 from two lanes to a four-lane divided rural section from west of SW 127th Avenue to SR 997/Krome Avenue and to a four-lane divided urban typical section from SW 127th Avenue to the Homestead Extension of Florida's Turnpike (HEFT) interchange.

A *Value Engineering Study Summary* was prepared in April 1988 and recommended to defer the reconstruction of the segment of SR 994 from SW 177th Avenue to SW 127th Avenue until traffic projections demonstrated the need for widening more clearly. Since 1988, the existing conditions (including surrounding land uses and traffic patterns) have changed substantially. As such, the proposed action will result in environmental effects that were not evaluated in the original PD&E Study. Therefore, the 1988 EAR will not provide a basis for existing conditions or environmental clearance. Right-of-way (ROW) for future widening to four lanes was not previously acquired for the segment of SR 994 within the study limits that remains two lanes.

In June 2019, a *Resurfacing, Restoration, and Rehabilitation (RRR) Safety Review* for SR 994 was completed from west of SW 137th Avenue to west of SW 127th Avenue under Financial Management Number (FM No.) 250650-4 to evaluate safety and operational improvements recommended during the potential milling and resurfacing of SR 994. Based on the operations analysis and safety review, the RRR study recommended consideration of widening SR 994 to four lanes from SW 137th Avenue to west of SW 127th Avenue. As a result of the RRR Safety Review, FDOT removed the RRR milling and resurfacing project from FDOT's Five Year Work Program and programmed a PD&E phase for SR 994 from west of SW 137th Avenue to east of SW 127th Avenue (MP 4.000–5.162) to further evaluate the potential SR 994 widening. The *PD&E Scoping Report* was completed in January 2021.

Within the study limits, the SR 994/Quail Roost Drive intersection at SW 134th Avenue was previously evaluated for a signal warrant analysis (FM No. 249726-4-32-01). The evaluation is documented in the *Intersection Qualitative Assessment and Signal Warrant Analysis* (June 2017) report. The study evaluated operational and safety improvements for the SW 134th Avenue intersection. Based on the field observations and qualitative assessment documented in the report, a signal was recommended for installation at SW 134th Avenue to improve the operation and safety of the intersection.

A *Shared-Use Path (SUP) Evaluation* was conducted by the Department in February 2024, to analyze the options of providing one bi-directional SUP on one side of the SR 994/Quail Roost Drive corridor versus two directional SUPs on either side. The recommended option was to provide the SUP on both sides of the corridor. After further analysis and coordination with the District 6 Design Office, the SUPs were replaced by sidewalks with sidewalk level Separated Bicycle Lanes (SBLs). Refer to ***Section 4.5.1*** for details.

Previous studies by the Department are available upon request.

4.2 NO-BUILD (NO-ACTION) ALTERNATIVE

The No-Build (No-Action) Alternative proposes to keep the existing configuration throughout the corridor without further improvements. No operational, safety, or traffic capacity improvements would be implemented throughout the project limits. The No-Build Alternative has a number of positive aspects since it would not require the expenditure of public funds for design, construction, right of way, and/or utility relocation. Traffic would not be temporarily disrupted due to construction, avoiding disruptions to local residents and businesses. Also, there would be no direct or secondary impacts to the environment, the socio-economic characteristics, community cohesion, or system linkage of the area. However, this alternative does not address existing and future congested traffic conditions or existing safety deficiencies. Travel demand and truck traffic will increase significantly over time, given the continued growth expected in this area of Miami-Dade County and future adjacent projects further connecting the corridor with high-volume roadways nearby. An example of a recently completed project nearby is the widening of SW 137 Avenue, a direct connection to SR 994. Furthermore, this alternative does not address safety concerns and multimodal deficiencies along the corridor.

The No-Build alternative is considered a viable alternative through the public hearing and final selection phase to serve as a comparison to the study proposed alternatives. However, the No-Build Alternative fails to fulfill the purpose and need of the project.

The No-Build alternative is not a viable alternative as it fails to fulfill the purpose and need of the project. However, it is included throughout the evaluation for comparison purposes.

The No-Build roadway typical section within the study limits, is the same as the existing typical section. SR 994, between SW 137 Avenue and SW 127 Avenue, consists of two 11.5-ft wide general use lanes (one lane in the westbound direction and one lane in the eastbound direction). Sidewalk sections are scattered throughout project limits and are mostly present near residential areas adjacent to the corridor. See ***Figure 1-2*** for details.

4.3 TSM&O ALTERNATIVE

This alternative is a strategy aimed at improving the overall performance of the transportation network without resorting to large-scale, capital improvements. This alternative maintains one lane of traffic in both directions and proposes the following improvements:

- Signal optimization and one additional eastbound left-turn lane at the intersection of SW 137th Avenue and SR 994

- New signal and one additional left-turn lane on all approaches of the intersection of SW 134th Avenue and SR 994
- One additional westbound left-turn lane at the intersection of SW 132nd Ave and SR 994.
- New sidewalk on missing segments
- 5-ft outside paved shoulder along the study limits

This alternative presents substantial impacts to the right of way and historic resources within the study limits, and it also requires the widening/replacement of the bridge over the Black Creek Canal. All of this while still not addressing the purpose and need of the project. The alternative was therefore considered non-viable as a TSM&O option (low cost and low impacts), and it evolved into Build Alternative 1.

4.4 FUTURE CONDITIONS

This project is not expected to affect the current or future land use of the area, other than the localized effects of potential relocations for the build alternatives.

Miami-Dade County is the most populous county in Florida with over 2.6 million residents in 2022. By 2045, the county's population is expected to grow by over 33% to over 3.5 million residents. Employment growth in the county is expected to increase from 960,000 workers in 2021 to more than 1.8 million workers by 2045.

Between SW 137th Avenue and SW 127th Avenue, the corridor has experienced a 7% increase in Annual Average Daily Traffic (AADT) from 2015 to 2019 with traffic volumes growing from 17,900 to 19,200 vehicles per day. Traffic is anticipated to continue to increase due to population growth and residential development in the area.

A Traffic Analysis and Safety Methodology Memorandum was completed for this study and is included in ***Appendix K***. The Southeast Florida Regional Planning Model (SERPM) version 8.511 was used to develop the travel demand forecasting for this project. The SERPM is a travel demand model based on the Coordinated Travel Regional Activity Based Modeling Platform (CT-RAMP). This is an activity-based, time-of-day model that is capable of forecasting traffic for future years based on various highway, transit, and socioeconomic scenarios. The 2045 horizon year scenario in this model is based on the Transportation Planning Organization (TPO) approved 2045 Cost Feasible LRTP networks, population, and employment forecasts.

For this study, a one-mile radius buffer was applied to the project section of SR 994 from west of SW 137th Avenue to east of SW 127th Avenue. The following steps were performed to develop the 2015 (Base Year), 2025 (Opening Year), and 2045 (Design Year) AADTs for this study:

- Within the one-mile radius of the study, the SERPM data inputs for the years 2015 and 2045 were reviewed, including both the socioeconomic data and the highway network. The zonal structure and the centroid connector loading points were also reviewed to ensure a reasonable distribution of the trips for the study area.
- The Base Year 2015 roadway volumes within the one-mile radius of the study limits were then estimated using the SERPM. The model volumes generated were compared to traffic counts where available to evaluate the reasonableness of the model validation.

- The Design Year 2045 roadway volumes within the one-mile radius of the study were then estimated using the SERPM and were adjusted based on the comparison between base year model volumes and counts.
- The Opening Year 2025 volumes for the roadways within the one-mile radius of the study were developed by interpolating between the year 2015 AADT volumes and the adjusted 2045 AADT volumes.
- The same 2045 "Build" network was used for two runs; one with 2015 and one with 2045 input data, so that the interpolation of their results represents the Opening Year 2025 Build traffic with the project built.

Lastly, the 2015 and 2045 SERPM model output volumes were adjusted for reasonableness following the guidelines presented by the NCHRP Report 765 – Analytical Travel Forecasting Approaches for Project-Level Planning and Design (2014). This report is an update to NCHRP Report 255 – Highway Traffic Data for Urbanized Area Project Planning and Design and describes methods, data sources, and procedures for producing travel forecasts for highway project-level analyses. For additional details on the travel demand forecasting, please refer to section ***4.5.9*** and the PTAR included in ***Appendix B***.

The following projects by Miami-Dade County are planned within the vicinity of the study corridor.

- Project No. PW000950 -The project proposes widening along SW 127th Avenue, south of SR 994 to accommodate a two-way left turn lane and an exclusive right turn lane in the NB direction. The proposed layout provides single left turn lanes on the NB, SB and EB approaches and dual left turn lanes on the WB approach. Exclusive right turn lanes are proposed at all approaches.
- Project No. PW168 - SW 137th Avenue from US-1 to SW 184th Street, widening the road from two to four lanes with a median and on-street bicycle lanes.
- Project No. PW0001115 - SW 200th Street from Quail Roost Drive to US-1, widening the road from two to four lanes with a new shared-use path along the west side.

4.5 BUILD ALTERNATIVE(S)

The objective of this PD&E Study is to evaluate alternatives that meet the purpose and need of the project. To address the growing traffic demand within the study area as well as other multimodal deficiencies, multiple preliminary concepts were analyzed including the following typical sections.

- Two-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and on-street bicycle lanes

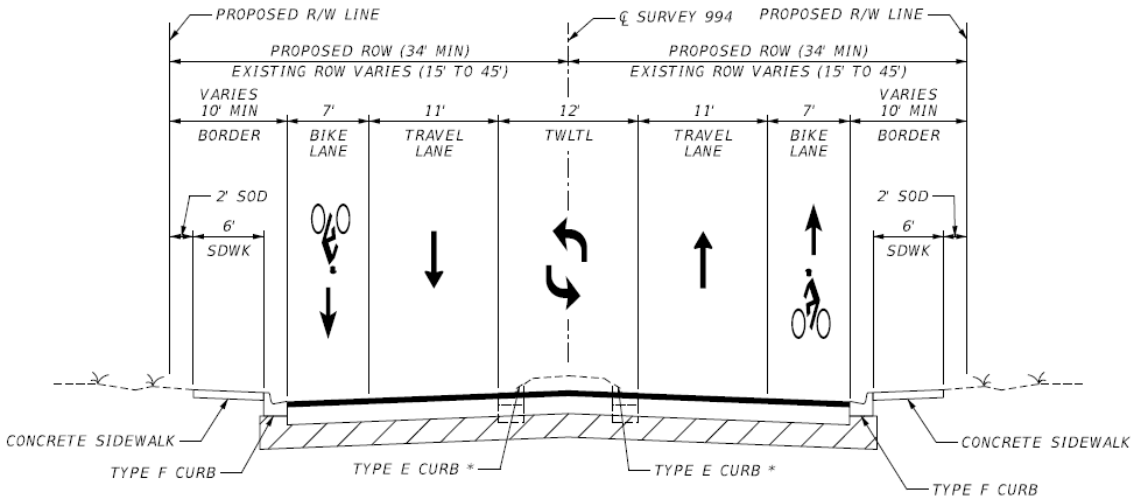


Figure 4-1 Two-Lane Road with TWLTL and On-Street Bicycle Lane

- Two-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and paved shoulders

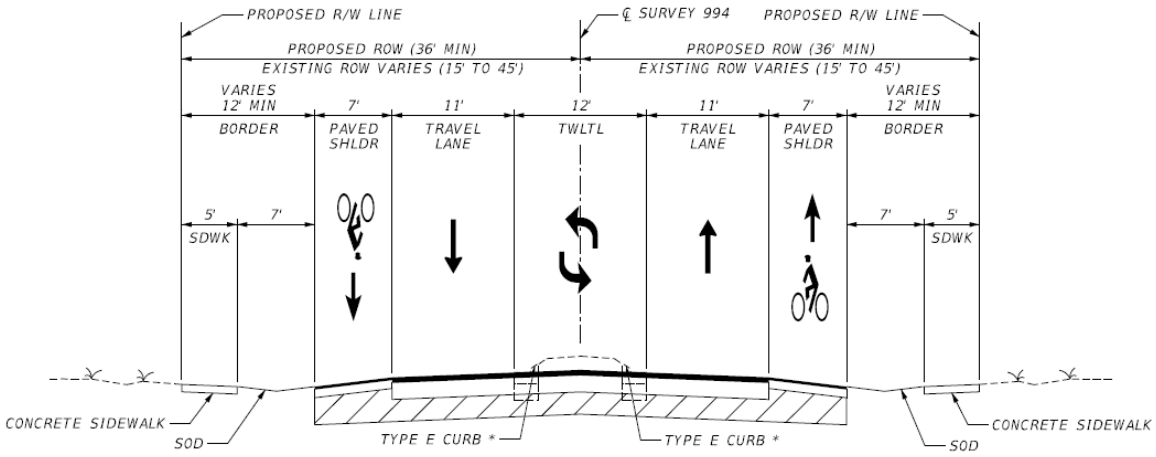


Figure 4-2 Two-Lane Road with TWLTL and Paved Shoulders

- Two-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and Shared Use Path (SUP) on both sides of the corridor

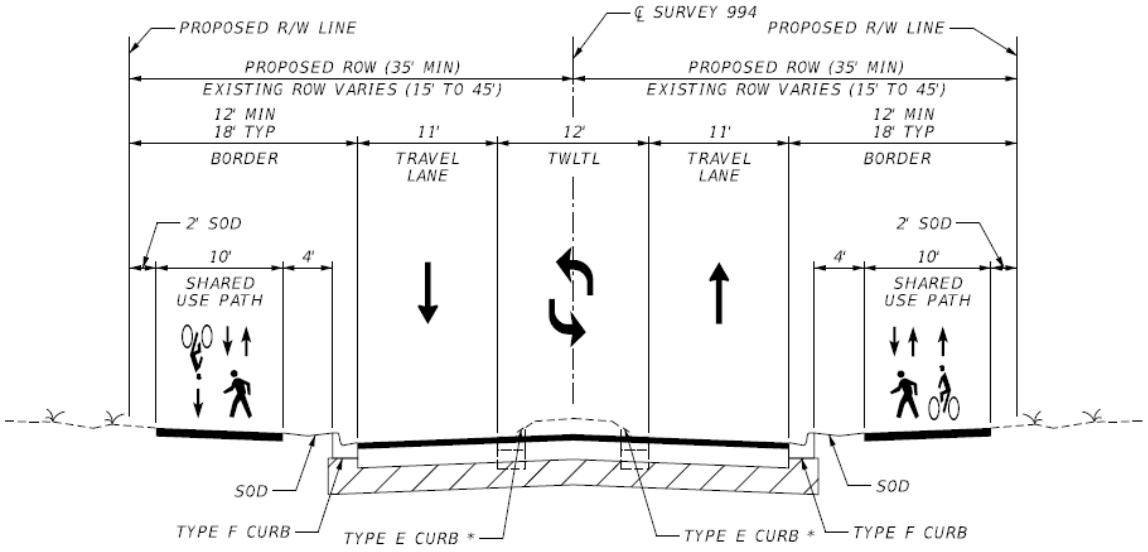


Figure 4-3 Two-Lane Road with TWLTL and Shared-Use Path

- Four-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and on-street bicycle lanes

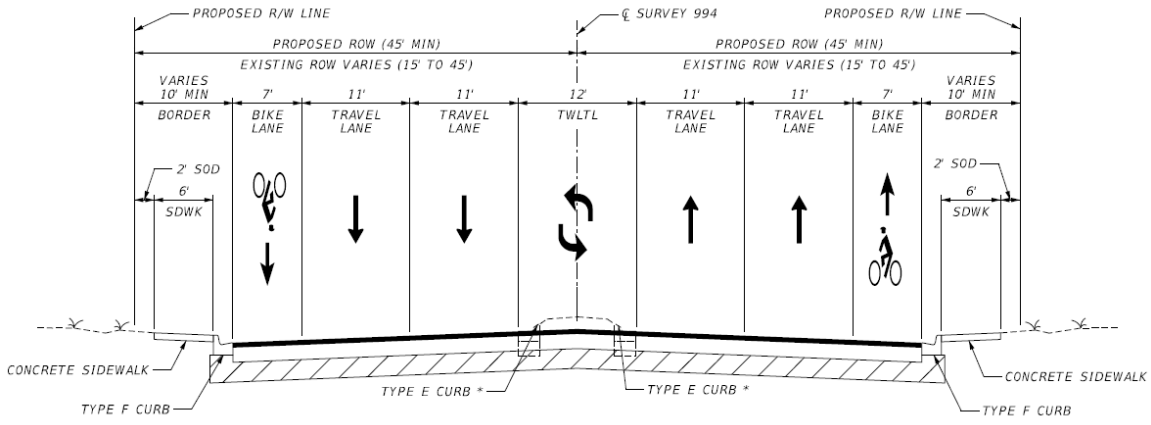


Figure 4-4 Four-Lane Road with TWLTL and On-Street Bicycle Lane

- Four-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and SUP on both sides of the corridor

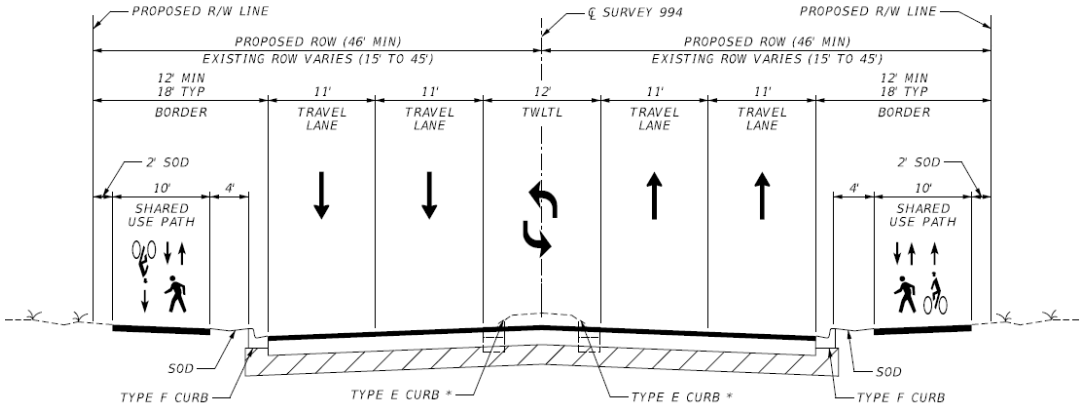


Figure 4-5 Four-Lane Road with TWLTL and Shared-Use Path

- Four-lane Road with raised median and on-street bicycle lanes

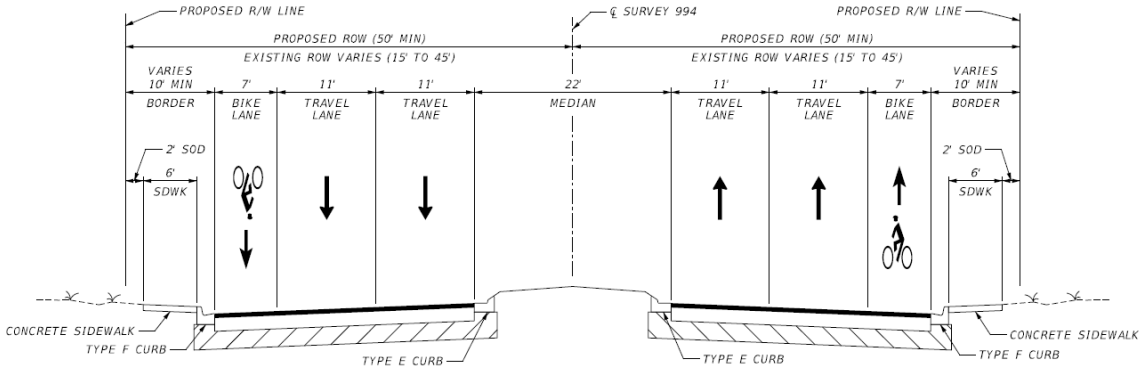


Figure 4-6 Four-Lane Road with Full-Width Median and On-Street Bicycle Lane

- Two-lane Road with 16.5-ft raised median and SUP on both sides of the corridor

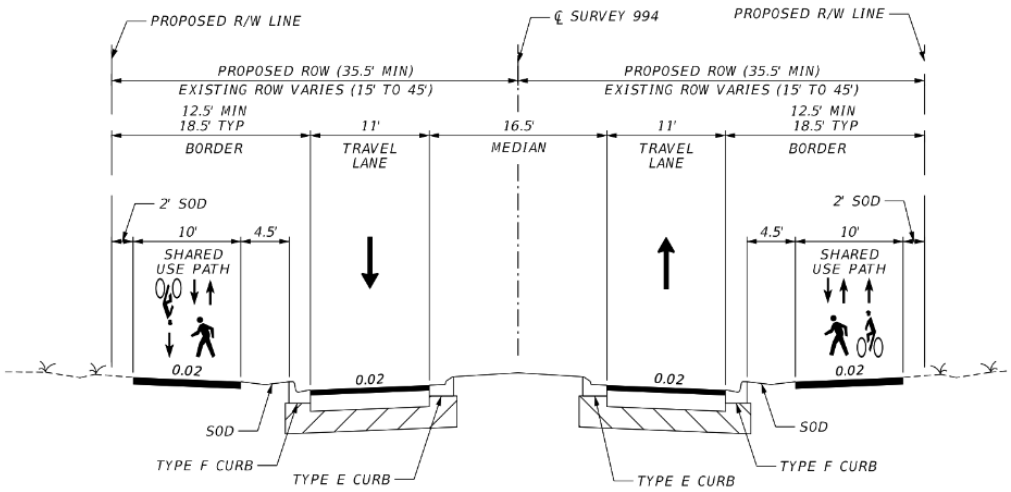


Figure 4-7 Two-Lane Road with 16.5-ft Median and Shared-Use Path

- Four-lane Road with 16.5-ft raised median and SUP on both sides of the corridor

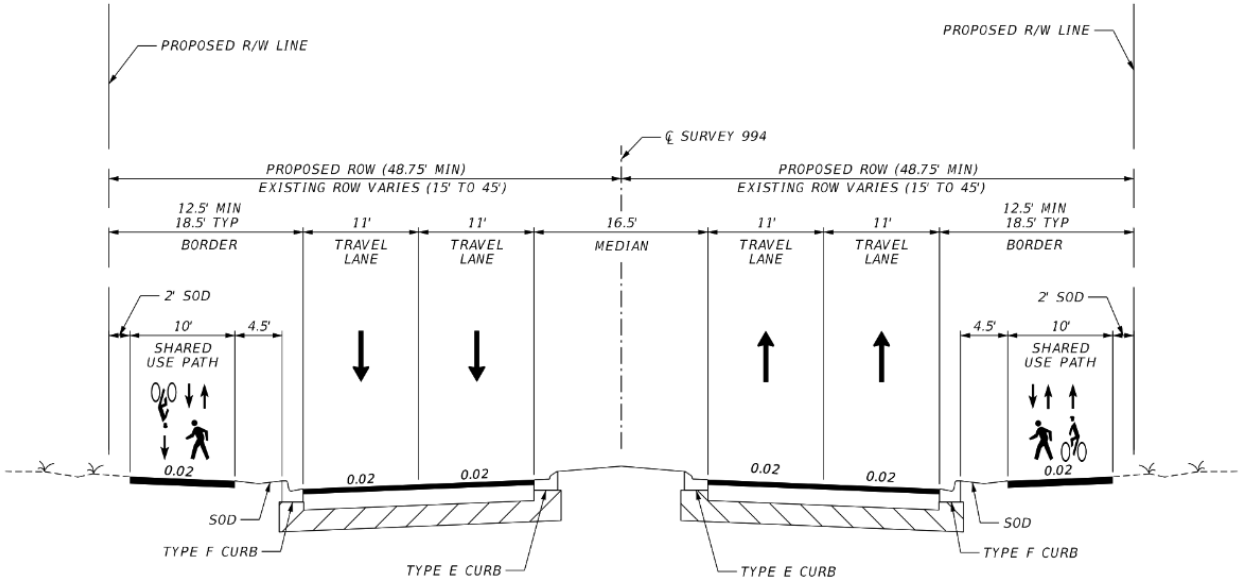


Figure 4-8 Four-Lane Road with 16.5-ft Median and Shared-Use Path

- Four-lane Road with 22-ft raised median and SUP on both sides of the corridor

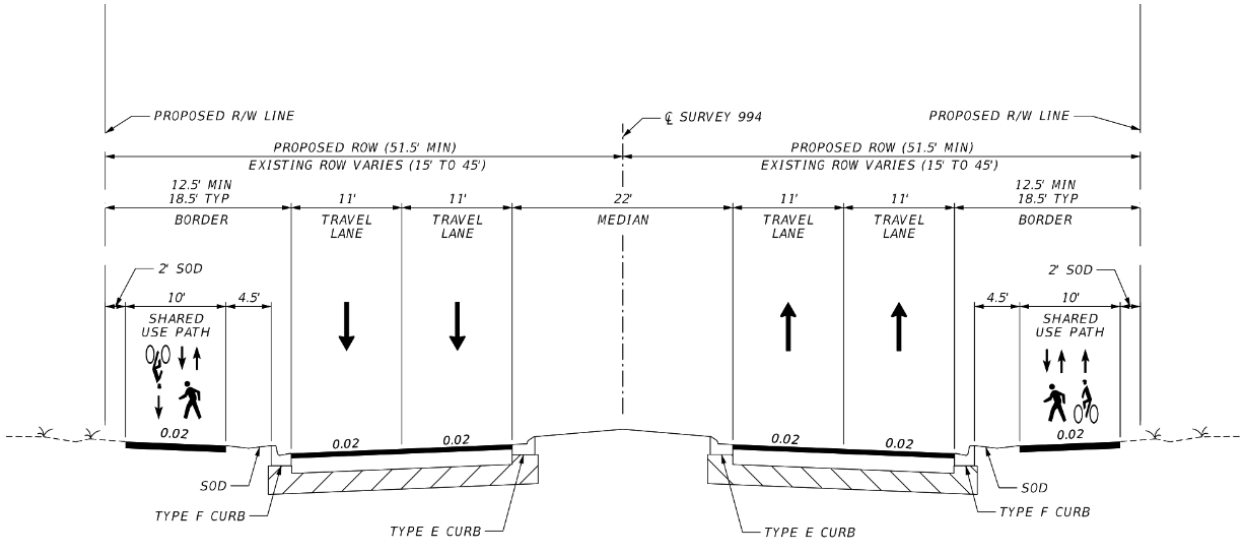


Figure 4-9 Four-Lane Road with Full-Width Median and Shared-Use Path

For the intersection of SR 994 with the Black Creek Trail, located just west of SW 130 Avenue, two options were considered: 1) maintaining the at-grade crossing and 2) relocating the trail under the proposed new bridge over the Black Creek Canal.

Black Creek Trail At-grade Crossing: This option allows for a lower roadway profile and minimizes impacts to SFWMD access, adjacent properties, traffic control plan and water main crossing. However, the at-grade crossing presents conflicts between motor vehicles and bicyclists/pedestrians, which is a safety concern. In addition, traffic delays are expected to increase due to vehicles stopping for pedestrians and bicyclists that will be crossing a longer distance. In the existing condition, pedestrians and bicyclists cross a two-lane undivided section. In the future condition, depending on the alternative selected, pedestrians and bicyclists would need to cross either a two-lane divided section or a four-lane divided section.

Figure 4-10 Black Creek Trail At-Grade Crossing

Black Creek Trail Underpass Crossing: This option relocates the trail under the proposed new bridge over Black Creek Canal. The advantages of this option include improved safety and traffic operations due to the elimination of conflicts between motor vehicles and bicyclists/pedestrians. In addition, this option provides improved overall bridge vertical clearance. Disadvantages of this option include higher roadway profile, impacts to adjacent properties, utilities and SFWMD access driveway, as well as a more complex traffic control plan since a higher bridge results in a greater difference in elevation between the existing and proposed roadway profile, creating the need for temporary retaining walls and temporary connections to side streets.

Figure 4-11 Black Creek Trail Underpass Crossing

The at-grade option was selected over the underpass option in coordination with the District Design, Maintenance and Right of Way offices due to impacts to adjacent properties created by the required MSE walls along the approaches to the bridge. The MSE walls would require additional right of way for maintenance purposes.

4.5.1 Alternatives Eliminated

The preliminary concepts described above were presented to the Traffic Operations and Planning and Environmental Management Offices of FDOT District 6 on January 13th, 2022. The Traffic Operations Office indicated that Two-Way Left Turn Lanes (TWLTL) were a safety concern because vehicles and pedestrians compete for space. Alternating Left-Turn and Right-Turn lanes is a preferred option for the District. In addition, TWLTLs create additional conflicts along a corridor, with safety implications.

The Bicycle and Pedestrian Coordinator from PLEMO indicated that the SUP option was preferred over the on-street bicycle lanes due to safety reasons as well. FDM 224.1 states that a shared use path may substitute *"Bicycle lanes on roads with a design speed of 35 mph or greater"*. Furthermore, FDM 223.2.1. states that *"Bicycle lanes can be used on curbed roadways with a design speed ≤ 45 mph. However, it is best practice to consider other types of facilities for design speeds greater than 30 mph."* While the difference in typical section footprint between the 2

options (on-street vs off-street) is 3 ft (1.5ft on each side), the separated facility option is more aligned with the project purpose and need of improving safety for all modes of transportation.

Based on the feedback received from both offices, the following preliminary concepts were eliminated from further evaluation.

- Two-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and on-street bicycle lanes
- Two-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and paved shoulders
- Two-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and Shared Use Path (SUP) on both sides of the corridor
- Four-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and on-street bicycle lanes
- Four-lane Road with Two-Way Left Turn Lanes (TWLTL) and raised islands when possible, and SUP on both sides of the corridor
- Four-lane Road with raised median and on-street bicycle lanes

The following alternatives remained under consideration for further development and analysis.

- Two-Lane Road with 16.5-ft Median and SUP
- Four-Lane Road with 16.5-ft Median and SUP
- Four-Lane Road with Full-Width (22-ft) Median and SUP

As previously mentioned in ***Section 4.1***, an SUP Evaluation was conducted by the Department in February 2024 to determine whether the SUP should be provided on one or both sides of SR 994/SW 200th Street within the study limits. The evaluation included two SUP alternatives: 1) 10-ft directional SUPs on either side of the road and 2) A 6-ft sidewalk on the north side of the road with a 12-ft bi-directional SUP on the south side of the road. The following is a summary of the different criteria used to compare both SUP alternatives.

- **Conflict Points:** Since SUP Alternative 2 provides one bi-directional SUP, the number of conflict points (between bicyclists/pedestrians and vehicular movements) for this alternative is twice the number of conflict points of SUP Alternative 1. Based on the number of conflict points, bicyclists along a bidirectional SUP are at a higher risk than along a directional SUP, with a higher potential for conflict with right turning vehicles and overall traffic patterns at commercial driveways and signalized intersections.
- **Safety:** Based on the NCHRP predictive safety analysis, the number of predicted bicycle crashes is greater for SUP Alternative 2 than for SUP Alternative 1. SUP Alternative 2 is expected to experience 20% more bicycle crashes than SUP Alternative 1 along the study corridor and at signalized intersections.
- **Bicycle Level of Traffic Stress (BLTS):** The BLTS is a performance measure that quantifies the amount of discomfort that people feel when they bicycle close to traffic. BLTS designates the quality of service into four categories (1 through 4). BLTS 1 represents the level that most children can use confidently, while BLTS 4 represents the

level tolerated only by those with limited route or mode choice or cycling enthusiasts that choose to ride under stressful conditions. Based on the analysis, SUP Alternative 1 (two directional SUPs) has a score of BLTS 1, while SUP Alternative 2 (one bi-directional SUP) has a score of BLTS 4. Therefore, SUP Alternative 1 is preferred over SUP Alternative 2.

- **Operations:** Based on the HCM predictive operational analysis, both SUP alternatives are expected to operate at a LOS A for bicyclists.

The SUP evaluation concluded that SUP Alternative 1 (two SUPs) was preferred over SUP Alternative 2 (one bi-directional SUP). Therefore, SUP Alternative 2 was eliminated from further analysis.

The SUP Alternative 1 (two SUPs) continued to be analyzed in coordination with the District 6 Design Office. Some of the concerns identified with this option included the following:

- Usage of the SUP as a one-way facility while FHWA states that one-way facilities should be treated as two-way facilities unless properly enforced.
- Separation of pedestrians from bicyclists/ high-speed wheeled users needed for efficiency of the path.

To address the above issues from the SUP Alternative 1, an alternate design was considered. The SUP Alternative 1 was replaced by sidewalks with sidewalk level SBLs, also known as raised bicycle lanes. These are exclusive bicycle facilities located at sidewalk level directly adjacent to the roadway. See Section 223.2.4.2 of the 2024 FDOT Design Manual for details. In addition to pavement markings and signage, the design may be supplemented with enforcement measures to maintain the directional usage of the SBLs.

Based on the above evaluation, the SUP Alternative 1 was also eliminated from further consideration, and it was replaced by the sidewalks with sidewalk level SBLs. See ***Sections 4.5.2*** through ***4.5.4*** for additional details.

4.5.2 Build Alternative 1

This alternative maintains one lane of traffic in each direction, while adding a 16.5-ft median with exclusive left turn lanes along SR 994. Curb and Gutter Type F is being proposed on the outside of the travel lanes while Type E curb is the typical condition on the median. Type B curb could also be used to maximize the available landscaping area within the raised islands. This alternative proposes sidewalks with sidewalk level SBLs along both sides of the corridor, that are intended to be utilized by pedestrians as well as bicyclists. A minimum 4.5-ft buffer is proposed from the back of curb to the front of the sidewalk level SBLs and a 2-ft buffer is proposed between the sidewalk and the bicycle lane. A traffic signal is proposed at the intersection of SR 994/Quail Roost Drive and SW 134th Avenue. See ***Figure 4-12***. for typical section details.

Figure 4-12 Build Alternative 1 Typical Section

Build Alternative 1 provides limited capacity improvements (additional turning lanes) at the signalized intersections but not throughout the entire project limits. These improvements, however, are not enough to achieve acceptable traffic operations in the future condition as detailed in ***Section 4.5.9***. In addition, right turn maneuvers from the side streets can't be completed by trucks due to the limited pavement width of the receiving lane (one-lane in each direction with a raised median). U-turn movements would also need to be restricted for all vehicles for the same reason.

In summary, Build Alternative 1 does not address the capacity/transportation demand goal of the project while it still impacts multiple properties along the corridor, including three historic resources. For these reasons, Build Alternative 1 does not meet the Purpose and Need of the project.

4.5.3 Build Alternative 2

This alternative proposes one additional travel lane in each direction, for a total of two 11-ft lanes on each bound, and a 16.5-ft median with exclusive left turn lanes along SR 994. Curb and Gutter Type F is being proposed on the outside of the travel lanes while Type E curb is the typical condition on the median. This alternative also proposes sidewalks with sidewalk level SBLs along both sides of the corridor, that are intended to be utilized by pedestrians as well as bicyclists. A minimum 4.5-ft buffer is proposed from the back of curb to the front of the sidewalk level SBLs and a 2-ft buffer is proposed between the sidewalk and the bicycle lane. A traffic signal is proposed at the intersection of SR 994/Quail Roost Drive and SW 134th Avenue. See ***Figure 4-13*** for typical section details.

Figure 4-13 Build Alternative 2 Typical Section

4.5.4 Build Alternative 3

Similar to Build Alternative 2, this alternative proposes adding one travel lane in each direction along SR 994 for a total of two 11-ft lanes on each bound. A 22-ft-wide raised median with exclusive left turn lanes is provided along the corridor, restricting access to the minor roads and driveways connecting to SR 994. At the intersections, a striped buffer is proposed between the left turn lanes and the through traffic. Curb and Gutter Type F is being proposed on the outside of the travel lanes while Type E curb is the typical condition on the median. This alternative also proposes sidewalks with sidewalk level SBLs along both sides of the corridor, that are intended to be utilized by pedestrians as well as bicyclists. A minimum 4.5-ft buffer is proposed from the back of curb to the front of the sidewalk level SBLs and a 2-ft buffer is proposed between the sidewalk and the bicycle lane. A traffic signal is proposed at the intersection of SR 994/Quail Roost Drive and SW 134th Avenue. This alternative has the greatest impact to the existing right-of-way and also the most access management restrictions. See ***Figure 4-14*** for typical section details.

Figure 4-14 Build Alternative 3 Typical Section

4.5.5 Horizontal Alignment

All three build alternatives propose to accommodate the typical section to impact the least number of residential, church, businesses, and historic parcels ROW possible. An initial analysis of widening North, South or center of the existing baseline survey was performed to determine the proposed alignment. These alignments are mainly composed of tangents with deflection angles smaller than 2° 00' 00" per FDM criteria from ***Table 3-1***. Ultimately, a best-fit alignment was found to be the least impactful to adjacent properties.

Build Alternative 1

This alternative is composed mainly of tangents with small deflection angles and a horizontal curve that connects to existing at the East portion of the project. The curve corresponds to a design speed of 40 mph. The alignment begins West of SW 137th Avenue where it connects to the centerline of the existing two-lane road. In general, the horizontal geometry is between 2-3 ft offset South from the Baseline Survey. ***Table 4-1*** shows a detailed description of all tangents and curves in this alternative and Concept Plans are shown in ***Appendix L***.

Table 4-1 Build Alternative 1 Tangent and Curve Information

TANGENT SECTION				CURVE SECTION				
Begin STA.	End STA.	Distance (ft)	Bearing	PC STA.	PT STA.	Length (ft)	Radius (ft)	Superelevation
1294+00.00	1303+84.88	984.78	N89°11'25"E	-	-	-	-	-
1303+84.88	1308+60.23	475.36	N89°39'50"W	-	-	-	-	-
1308+60.23	1314+49.53	589.319	N89°20'10"E	-	-	-	-	-
1314+49.55	1318+90.67	441.12	N88°22'33"E	-	-	-	-	-
1318+90.67	1323+85.80	495.13	N87°37'55"E	-	-	-	-	-
1323+85.80	1324+68.84	83.04	N88°54'18"E	-	-	-	-	-
1324+68.84	1328+00.07	331.23	N87°55'38"E	-	-	-	-	-
1328+00.07	1333+06.47	506.41	N88°55'38"E	-	-	-	-	-

TANGENT SECTION				CURVE SECTION				
Begin STA.	End STA.	Distance (ft)	Bearing	PC STA.	PT STA.	Length (ft)	Radius (ft)	Superelevation
1333+06.47	1335+37.92	231.44	N89º45'55"E	-	-	-	-	-
1335+37.92	1341+53.31	615.40	N88º48'47"E	-	-	-	-	-
1341+53.31	1345+60.09	406.77	N89º48'47"E	-	-	-	-	-
1345+60.09	1348+17.93	257.84	N88º48'47"E	-	-	-	-	-
1348+17.93	1368+20.25	2002.32	N89º48'47"E	-	-	-	-	-
1368+20.25	1373+07.60	487.35	N89º14'10"E	-	-	-	-	-
-	-	-	-	1373+07.60	1385+87.47	1279.87	1920	0.04
1385+87.47	1389+96.60	409.13	N51º02'34"E	-	-	-	-	-

Build Alternative 2

This alternative is composed mainly of tangents with small deflection angles with a flat reverse horizontal curve at approximately the middle of the project length, and a horizontal curve that connects to existing at the East portion of the project. The curves correspond to a design speed of 40 mph. The alignment begins West of 137th Avenue and follows the East bound inside edge of pavement until 137th Avenue. At 137th Avenue it transitions to follow the centerline of the proposed design until 127th Avenue. West of 127th avenue it transitions back to follow the East bound inside edge of pavement. ***Table 4-2*** shows the description of all tangents and curves in this alternative and Concept Plans are shown in ***Appendix L***.

Table 4-2 Build Alternative 2 Tangent and Curve Information

TANGENT SECTION				CURVE SECTION				
Begin STA.	End STA.	Distance (ft)	Bearing	PC STA.	PT STA.	Length (ft)	Radius (ft)	Superelevation
2294+00.00	2303+84.93	984.93	N89º11'25"E	-	-	-	-	-
2303+84.93	2309+85.05	600.12	S89°39'50"E	-	-	-	-	-
2309+85.05	2314+49.82	464.77	N89º11'25"E	-	-	-	-	-
2314+49.82	2319+17.90	468.08	N89º43'55"E	-	-	-	-	-
2319+17.90	2321+94.96	277.06	N88º45'58"E	-	-	-	-	-
2321+94.96	2325+38.75	343.79	N89º45'58"E	-	-	-	-	-
2325+38.75	2328+00.06	261.31	N88º45'58"E	-	-	-	-	-
-	-	-	-	2328+00.06	2332+08.85	408.79	14000	NC
-	-	-	-	2332+08.85	2336+29.38	420.53	14000	NC
2336+29.38	2340+21.54	392.16	N88º48'47"E	-	-	-	-	-
2340+21.54	2346+01.39	579.85	N89º48'47"E	-	-	-	-	-
2346+01.39	2347+76.42	175.03	N89º22'31"E	-	-	-	-	-
2347+76.42	2360+19.76	1243.34	N89º48'47"E	-	-	-	-	-
2360+19.76	2362+62.64	242.88	N87º48'47"E	-	-	-	-	-
2362+62.64	2368+20.40	557.76	N89º48'47"E	-	-	-	-	-
-	-	-	-	2373+05.74	2385+89.31	1283.59	1925	0.04
2385+89.31	2386+20.95	31.65	N51º02'34"E	-	-	-	-	-

Build Alternative 3

This alternative is composed mainly of tangents with small deflection angles and a horizontal curve that connects to existing at the East portion of the project. The curve corresponds to a design speed of 40 mph. The alignment begins West of SW 137th Avenue and follows the Eastbound inside edge of pavement until SW 137th Avenue. At SW 137th Avenue it transitions to follow the centerline of the proposed design until SW 127th Avenue. West of SW 127th Avenue it transitions back to follow the Eastbound inside edge of pavement. ***Table 4-3*** shows the description of all tangents and curves in this alternative and Concept Plans are shown in ***Appendix L***.

Table 4-3 Build Alternative 3 Tangent and Curve Information

TANGENT SECTION				CURVE SECTION				
Begin STA.	End STA.	Distance (ft)	Bearing	PC STA.	PT STA.	Length (ft)	Radius (ft)	Superelevation
3294+00.00	3303+84.88	984.88	N89º11'25"E	-	-	-	-	-
3303+84.88	3309+84.99	600.12	N89º39'50"W	-	-	-	-	-
3309+84.99	3314+49.57	464.57	N89º11'25"E	-	-	-	-	-
3314+49.57	3319+90.37	540.8	N89º45'55"E	-	-	-	-	-
3319+90.37	3327+99.85	809.47	N88º45'55"E	-	-	-	-	-
-	-	-	-	3327+99.85	3332+15.22	415.38	10500	NC
-	-	-	-	3332+15.22	3336+39.35	424.13	10500	NC
3336+39.35	3341+50.71	511.35	N88º48'47"E	-	-	-	-	-
3341+50.71	3368+20.25	2669.54	N89º48'47"E	-	-	-	-	-
3368+20.25	3372+91.71	471.46	N89º14'51"E	-	-	-	-	-
-	-	-	-	3372+91.71	3385+91.96	1300.26	1950	0.04
3385+91.96	3386+21.42	29.46	N51º02'34"E	-	-	-	-	-

4.5.6 Vertical Alignment

All three build alternatives propose to modify the vertical alignment of the road to comply with minimum longitudinal grading criteria for a curb and gutter section. All three alternative profiles contain longitudinal grades ranging from -0.5% to +0.5% with a maximum change in grade of 1% in local roads, 0.8% on the suburban residential area and 0.6% towards the West rural area of the project per the criteria in ***Table 3-1***. The conceptual profile elevations range from 8.17-ft to 12.83-ft (NAVD). Two different profile designs were analyzed toward the stationing approaching the bridge to comply with the vertical clearance required. The details are explained below:

Bridge elevated with underpass for grade separated crossing of the Black Creek Trail:

- Grade line elevation set at 16.9' to allow for an 8' minimum clearance underpass. This was achieved with a crest curve with a length of 470' and a K value of 70 followed by sag curves at both extremes to connect to the other proposed tangents.

Table 4-4 Conceptual Profile Geometry with Trail Underpass

TANGENT SECTION						CURVE SECTION	
Begin STA.	Begin ELE.	End STA.	End ELE.	Length (ft)	Grade	Type	K value
2298+23.53	11.570	2302+55.35	11.92	431.82	0.08%		
2302+55.35	11.915	2306+03.30	12.65	347.95	0.21%		
2306+03.30	12.650	2310+78.30	11.23	475.00	-0.30%		
2310+78.30	11.225	2313+28.30	11.97	250	0.30%		
2313+28.30	11.97	2314+60.38	12.46	139.85	0.35%		
2314+60.38	12.46	2315+68.23	12.09	107.85	-0.35%		
2315+68.23	12.079	2318+18.23	12.83	250.00	0.30%		
2318+18.23	12.829	2322+18.23	11.63	400.00	-0.30%		
2322+18.23	11.629	2324+68.23	12.38	250.00	0.30%		
2324+68.23	12.379	2328+64.48	10.98	396.25	-0.35%		
2328+64.48	10.979	2331+14.48	11.73	250.00	0.30%		
2331+14.48	11.729	2333+64.48	10.98	250.00	-0.30%		
2333+64.48	10.979	2336+14.48	11.73	250.00	0.30%		
2336+14.48	11.729	2340+31.55	9.64	417.08	-0.50%		
2340+31.76	9.650	2342+81.76	13.12	250.00		Sag	66
2342+81.76	13.118	2347+52.30	12.73	470.54		Crest	70
2347+52.30	12.731	2350+02.30	8.80	250		Sag	66
2350+02.30	8.800	2352+07.55	9.41	205.25	0.30%		
2352+07.55	9.41	2362+37.55	11.09	724.16	-0.40%		
2362+37.55	11.09	2368+17.55	9.35	580.00	-0.30%		

Bridge with no underpass:

- Grade line elevation set at a minimum of 11.73’ to allow for an 2’ minimum clearance from the flood elevation (50 year storm). This was achieved with a crest curve with a length of 342 and a K value of 70 followed by sag curves at both extremes to connect to the other proposed tangents.

Table 4-5 Conceptual Profile Geometry without Trail Underpass

TANGENT SECTION						CURVE SECTION	
Begin STA.	Begin ELE.	End STA.	End ELE.	Length (ft)	Grade	Type	K value
2336+14.48	11.73	2341+59.60	9.003	417.08	-0.50%		
2341+59.60	9.003	2343+43.03	10.71	183		Sag	64
2343+43.03	10.71	2346+86.10	10.43	343		Crest	70
2346+86.10	10.43	2348+67.51	8.4	181		Sag	64
2348+67.51	8.4	2352+07.55	9.417	340	0.30%		

4.5.7 Right of Way

All three build alternatives require Right of Way acquisition to implement the proposed improvements. Build Alternative 2 was refined as part of the Section 4(f) evaluation process to minimize impacts to the identified historic resources. Refinements consisted of reducing the footprint of the improvements around the SW 137 Ave and SW 134 Ave intersections, thereby reducing the relocation impacts. There are no residential relocations with the refined Build Alternative 2. Since Build Alternative 1 was determined to not meet the Purpose and Need, it was not further analyzed for minimization under the Section 4(f) process. For additional details, please refer to the Individual Section 4(f) Evaluation, a companion document to this PD&E study, found in the SWEPT project file. Right of Way impacts and associated costs were calculated and summarized in ***Table 4-6***. The impacts and estimated costs were developed based on the conceptual design plans. For details on the impacted parcels and costs, please refer to ***Appendix M***.

Table 4-6 Right of Way Impacts and Cost

Type of Parcel	Parcel Impact		
	Build Alternative 1	Build Alternative 2	Build Alternative 3
Commercial	8	9	9
Agricultural	12	12	12
Residential	20	41	46
Total Parcels Impacted	40	62	67
Partial Impacts	39	62	64
Potential Relocation	6 (1-Res + 5 PP)	8 (8 PP)	10 (3-Res + 7 PP)
Total Area Impact (S.F.)	212,046	282,644	396,213
Total Area Impact (Acre)	4.87	6.49	9.10
Estimated Right of Way Cost	**$4,729,126**	**$7,211,238**	**$10,387,863**
Estimated Relocation Cost	**$105,100**	**$6,400**	**$344,750**

4.5.8 Access Management

Access management is the coordinated planning, regulation, and design of access between roadways and land development. It promotes the efficient and safe movement of people and goods by reducing conflicts on the roadway system and at its interface with other modes of travel.

The existing access management classification for SR 994 within the study limits is Class 4 as described in ***Section 2.5***. Roadways designated with Access Class 4 are characterized by non-restrictive medians. All build alternatives propose the construction of restrictive medians throughout the study limits. This improvement would require the reclassification of the study

corridor to an Access Class 5 to more closely represent the proposed roadway conditions as well as the existing Context Classification of C3R-Suburban Residential. Access Class 5 roadways are controlled access facilities where adjacent land has been extensively developed and where the probability of major land use change is not high. These roadways are distinguished by existing or planned restrictive medians. ***Table 4-7*** includes access management standards for Access Access Class 4 (existing) and Access Class 5 (proposed).

Table 4-7 Access Management Standards

Roadway Access Class	FDOT Context Classification	Movement Type	Multimodal Mix	Network Density	Median Type	Connection/Driveway Spacing (feet)		Median Opening Spacing (feet)		Minimum Signal Spacing (feet)***
						≤45mph Posted	>45mph Posted	Directional	Full	
4	C3R Suburban Residential, C3C Suburban Commercial	Regional	Moderate	Low	Non-Restrictive**	440	660	N/A	N/A	2,640
5	C3R Suburban Residential, C3C Suburban Commercial, C4 Urban General	Regional	High	High	Restrictive	245	440	660/330*	2,640/ 1,320*/ 660*	2,640/ 1,320*

**Full Median Opening Spacing 1,320 and 660 feet when roadway speed limit is 40-45 mph and 35 mph or below respectively.*
**Directional Median Opening Spacing 330 feet when roadway speed limit is 35 mph or below.*

***It is recommended that additional safety/operational analysis is completed for non-restrictive medians*

****Traffic signals, proposed at intervals closer than the access management standard for the designated access class, will only be approved where the need for such signal(s) is clearly demonstrated for the safety and operation of the roadway through the signal warrant process. (F.A.C. Rule Chapter: 14-97.003) Applicants requesting or requiring the addition, removal, or modification of a traffic signal for Category E, F, and G connections, must submit an Intersection Control Evaluation Form, Form 750-010-30 (F.A.C. Rule Chapter: 14-96.003). This language is in the draft version of rule 14-96.*

All build alternatives propose the installation of a traffic signal at the intersection of SR 994 and SW 134th Avenue. This improvement would result in a signal spacing of approximately 1,340-ft and would meet the minimum requirement of 1,320-ft for the proposed Access Class 5. The need for the traffic signal has been demonstrated through the signal warrant process and details are provided in ***Appendix B***. A median opening evaluation was conducted for all three build alternatives. None of the alternatives meet the minimum opening spacing of 660-ft (directional) and 1,320-ft (full) for Access Class 5 on multiple instances. See ***Figure 4-15*** for details. Minimum connection spacing is not met in the existing condition and will continue to be substandard in the future condition.

Proposed changes to the current Access Management Classification will be implemented in accordance with Section 335.199 of the Florida Statutes.

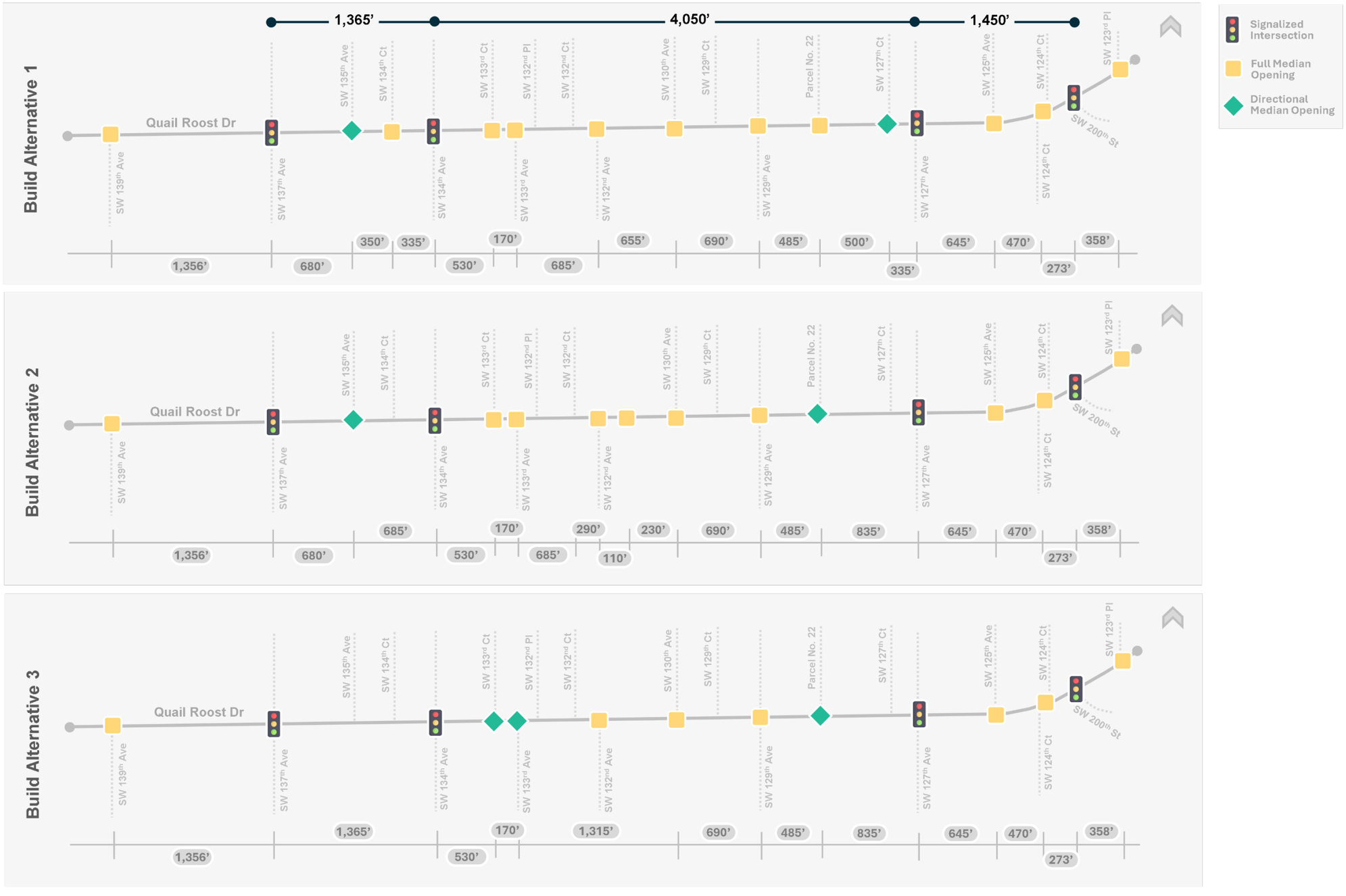


Figure 4-15 Access Management – Proposed Conditions

4.5.9 Traffic Volumes and Operational Conditions

A PTAR was prepared for this PD&E study and is included in ***Appendix B.*** The PTAR includes details on traffic projection methodology, travel demand forecast and traffic operational analysis. A summary of the future traffic conditions is provided below.

4.5.9.1 Traffic Scenarios

The following future scenarios were considered in the traffic analysis:

- No-Build Alternative: Years 2025 and 2045 for AM and PM Periods
- Build Alternatives: Years 2025 and 2045 for AM and PM Periods
    - Build Alternative 1: Includes widening SR 994 to provide a raised median with left-turning opportunities from and onto the side streets, while implementing access management enhancements. Additionally, implement several capacity improvements at the signalized intersections of SW 137th Avenue and SW 127th Avenue, and upgrade the stop-controlled intersection of SW 134th Avenue to signal control.
    - Build Alternative 2: In addition to the improvements in Build Alternative 1, this alternative widens SR 994 from two lanes to four lanes.
    - Build Alternative 3: In addition to the improvements in Build Alternative 2, this alternative implements additional access management enhancements.

The analysis periods include the AM and PM peak hours for the project proposed opening year (2025) and the design year (2045). The following are descriptions of the future conditions assumed for each alternative considered.

No-Build Alternative

The No-Build Alternative assumes no proposed improvements and serves as the baseline for comparison against the other alternatives. This alternative, however, includes any on-going construction projects and all funded and programmed improvements specified in approved development orders. These improvements were outlined in the FDOT Five-Year Work Program, Miami-Dade Transportation Planning Organization (TPO) cost feasible LRTP, Transportation Improvements Plan (TIP), the transportation element of Local Government Comprehensive Plans (LGCP), or developer-funded transportation improvements specified in approved development orders. The SERPM Cost Feasible 2045 scenario network was used without the widening of SR 994 from SW 137th Avenue to SW 127th Avenue as the No-Build network. The following main projects were included in this alternative:

- Project No. PW20040343 along SW 137th Avenue, which provided two lanes from US-1 to SR 994/Quail Roost Drive with on-street bicycle lanes on both sides of SW 137th Avenue. This project was completed in June 2022 and introduced the south leg of the signalized intersection of SW 137th Avenue and SR 994, which was under construction at the beginning of this study.
- Project No. PW000950 - SW 127 Avenue and SW 200 Street Intersection Improvement. The project proposes widening along SW 127th Avenue, south of SR 994 to accommodate a two-way left turn lane and an exclusive right turn lane in the NB direction. This project is currently under construction.

- Project No. PW168 along SW 137th Avenue from US-1 to SW 184th Street, to widen the road from two to four lanes with a median and on-street bicycle lanes. This project is anticipated to be completed by 2045.

Build Alternatives

Build Alternative 1 considers improvements such as signal coordination and optimization, adding a raised median, adding auxiliary lanes, adding turning lanes or extending storage bays at intersections, improving turning radii, and providing acceleration/deceleration lanes. Build Alternative 2 includes the Build Alternative 1 improvements plus widening SR 994 from two lanes to four lanes. The Build Alternative 3 includes the Build Alternative 2 improvements plus further limits possible vehicle conflicts by extending raised medians and eliminating left-turn from the side streets onto SR 994. The median design options follow the requirements presented by Florida Statute 335.199 – Transportation Projects Modifying Access to Adjacent Property. During the design development of the build alternatives, improvements to pedestrian and bicycle users were considered, such as:

- Improving the continuity and connectivity of sidewalks.
- Providing sidewalks with sidewalk level SBLs on both sides of SR 994.
- Providing special emphasis pedestrian markings and pedestrian signals at all signalized intersections. Additionally, closing the box at the intersection of SR 994 and SW 137th Ave.
- Providing grade-separated crossing for the Black Creek Trail under the bridge over Black Creek Canal.

4.5.9.2 Traffic Factors

The traffic factors used to develop peak hour volumes consist of the Standard K factors in addition to Directional (D) and Truck (T) factors obtained from the Florida Traffic Online website, nearby traffic count stations, as well as new classification counts from the data collection effort. Standard K and D factors were used to develop future directional design hour volumes (DDHVs), as obtained from the FDOT's Project Traffic Forecasting Handbook (2019). A K-factor of 9% and a D-factor of 56% were selected for this study which fall between the allowable ranges for an urban arterial such as SR 994. For additional details on the travel demand forecasting, please refer to ***Section 4.4*** and ***Appendix B***.

4.5.9.3 Future Corridor AADTs

The forecasted adjusted volumes for the SR 994 corridor and the crossing streets are shown in ***Figure 4-16***. ***Table 4-8*** presents the AADTs and growth rates for the study corridor. On average, the growth rates for the study corridor are 1.2% for the No-Build Alternative and 1.6% for the Build Alternatives in 2045. Only one set of projected AADTs were developed for the Build Alternatives. When analyzing the Build Alternatives with raised median, the future turning movement volumes were adjusted according to the median opening modifications. Details are provided in ***Appendix B.***

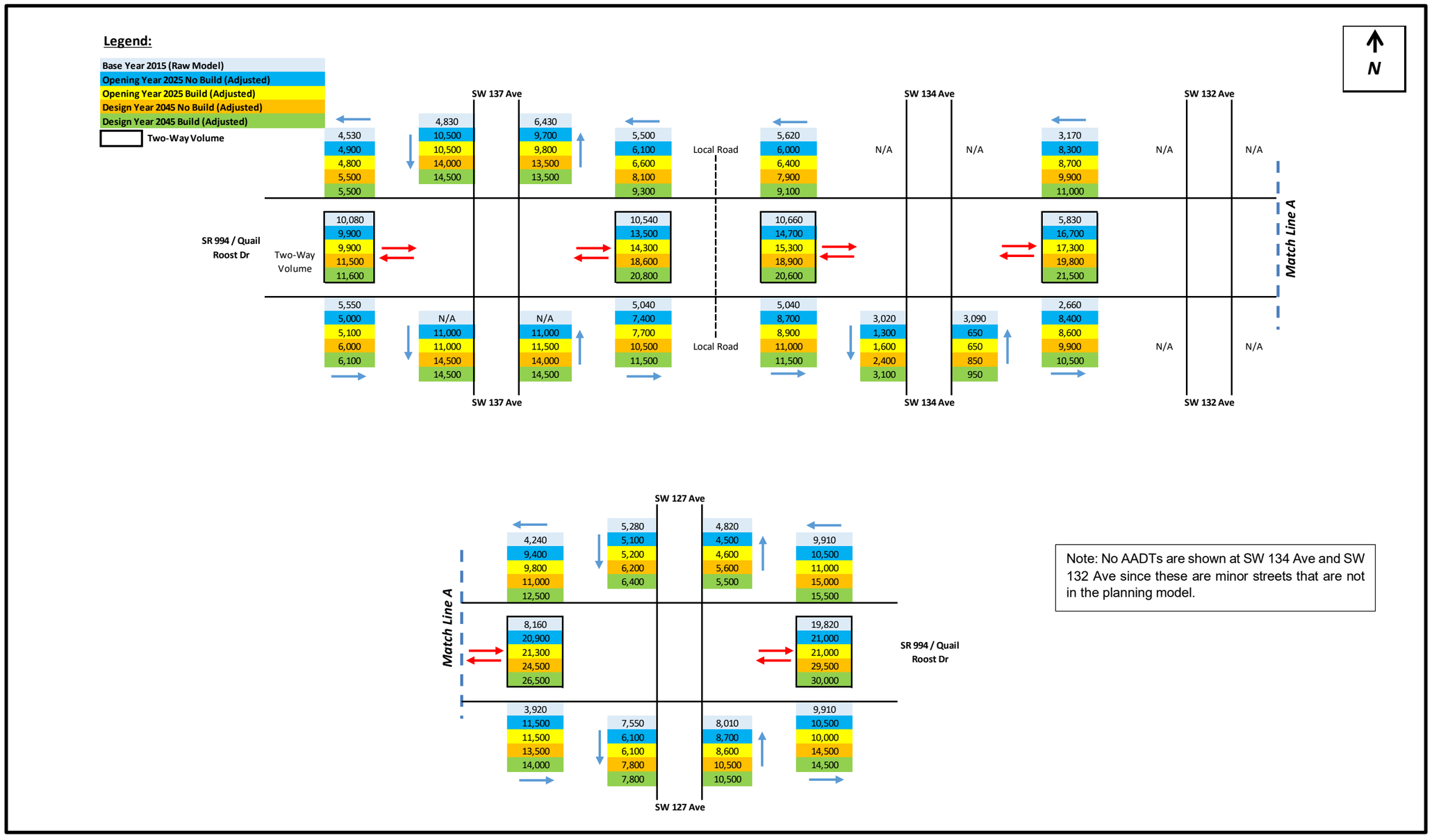


Figure 4-16 Future AADTs

Table 4-8 AADTs and Estimated Growth Rates

Location	Direction	Project Traffic Volumes				Annual Growth Rates	
		2025 No-Build	2025 Build	2045 No-Build	2045 Build	2045 No-Build	2045 Build
West of SW 137 Ave	EB	5,000	5,100	6,000	6,100	1.0%	1.0%
	WB	4,900	4,800	5,500	5,500	0.6%	0.7%
East of SW 137 Ave	EB	7,400	7,700	10,500	11,500	2.1%	2.5%
	WB	6,100	6,600	8,100	9,300	1.6%	2.0%
West of SW 134 Ave	EB	8,700	8,900	11,000	11,500	1.3%	1.5%
	WB	6,000	6,400	7,900	9,100	1.6%	2.1%
East of SW 134 Ave	EB	8,400	8,600	9,900	10,500	0.9%	1.1%
	WB	8,300	8,700	9,900	11,000	1.0%	1.3%
West of SW 127 Ave	EB	11,500	11,500	13,500	14,000	0.9%	1.1%
	WB	9,400	9,800	11,000	12,500	0.9%	1.4%
East of SW 127 Ave	EB	10,500	10,000	14,500	14,500	1.9%	2.3%
	WB	10,500	11,000	15,000	15,500	2.1%	2.0%
SW 127 Ave, North of SR 994	NB	4,500	4,600	5,600	5,500	1.2%	1.0%
	SB	5,100	5,200	6,200	6,400	1.1%	1.2%
SW 127 Ave, South of SR 994	NB	8,700	8,600	10,500	10,500	1.0%	1.1%
	SB	6,100	6,100	7,800	7,800	1.4%	1.4%
SW 137 Ave, North of SR 994	NB	9,700	9,800	13,500	13,500	2.0%	1.9%
	SB	10,500	10,500	14,000	14,500	1.7%	1.9%
SW 137 Ave, South of SR 994	NB	11,000	11,500	14,000	14,500	1.4%	1.3%
	SB	11,000	11,000	14,500	14,500	1.6%	1.6%

4.5.9.4 Future Intersection Volumes

The future intersection volumes were developed in accordance with the procedures outlined in the FDOT Project Traffic Forecasting Handbook (2019). For the three main intersections within the study corridor—SW 137th Avenue, SW 134th Avenue, and SW 127th Avenue—turning movement volumes were generated using TMTOOL. TMTOOL is an Excel-based tool that establishes turning movements by combining base year and projected future year AADT volumes with existing year turning movement counts and growth factors.

The AADTs input into TMTOOL included any available historical AADTs, the 2021 AADTs derived from traffic counts, and the AADTs output from the SERPM model. However, no historical AADTs were available for SW 137th Avenue and SW 134th Avenue, and no SERPM AADT was available for the north leg at SW 134th Avenue since it is a minor road not identified in the SERPM model. Historical AADTs for SW 127th Avenue were available due to the FDOT Count Station on SR 994 west of the intersection.

Three growth rates were input into TMTOOL for each intersection: the historical growth rate, the historical plus model growth rate, and the base year to future year model growth rate. A historical growth rate of 1% was determined from a trend analysis using the AADTs from the FDOT Count Station. This 1% historical growth rate was deemed reasonable and therefore applied to all legs at the three main intersections. The historical plus model and base year to future year model growth rates were unique to each intersection leg and applied accordingly. The most appropriate growth rate for each intersection was selected to align better with the forecasted SERPM model AADTs, based on linear growth.

During the PD&E study, additional traffic counts were performed in 2023 at SW 137th Avenue, SW 134th Avenue, SW 132nd Avenue, and SW 127th Avenue due to the opening of the south leg at SW 137th Avenue in 2022. These counts revealed a decrease in traffic flow from southbound SW 137th Avenue to eastbound SR 994, followed by an eastbound right turn onto SW 134th Avenue. Similarly, the westbound right turn at SW 137th Avenue, primarily from SR 994 westbound, and the northbound left-turn movement from SW 134th Avenue also decreased. Traffic conditions for the rest of the study corridor remained very similar to the 2021 conditions.

Given these changes, a 1% annual growth rate was applied to the 2023 traffic counts to determine 2025 turning movement volumes for the intersections at SW 137th Avenue and SW 134th Avenue. This approach was deemed more appropriate than using the 2021 counts, as the 2023 data reflected the opening of the south leg, which led to changes in traffic patterns. These 2025 volumes were then used as the base for determining future turning movement volumes in TMTOOL for these intersections. The 2045 No-Build turning movement volumes for the AM peak hour from TMTOOL for SW 137th Avenue, SW 134th Avenue, and SW 127th Avenue were then input into Excel with the volumes for the other intersections. Since the turning movement volumes for the other intersections were from 2021 counts, an annual 1% growth rate was applied to project these volumes to 2045. This growth rate balanced the volumes throughout the study corridor reasonably. Lastly, the balanced 2025 and 2045 turning movement volumes were compared to the existing 2021 and 2023 counts to ensure any discrepancies in the forecasted volumes were addressed, including justifications for volumes that were decreasing instead of increasing.

The same process was repeated for the 2045 No-Build PM peak hour, No-Build 2025 AM and PM peak hours, and Build 2025 and 2045 AM and PM peak hours. The Project Traffic Analysis Report is included in ***Appendix B***. The 2025 and 2045 AM and PM turning movement volumes for the No-Build and Build Alternatives are presented in ***Table 4-9*** through ***Table 4-12*** and ***Figure 4-17*** through ***Figure 4-24***.

Table 4-9 No-Build AM and PM Peak-Hour Traffic Volumes

Intersection Approach	Movement	2025 No Build - AM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	70	1	2	14	4	---	20	---	113	---	2	126
	Thru	401	663	672	626	773	767	847	896	1015	1035	1028	897
	Right	93	---	---	38	---	13	---	15	3	---	5	106
	Appr. Total	***564***	***663***	***673***	***678***	***777***	***780***	***867***	***911***	***1131***	***1035***	***1035***	***1129***
Westbound	Left	201	---	---	74	---	13	---	66	1	---	16	266
	Thru	390	832	834	765	883	802	805	788	771	786	776	498
	Right	245	4	3	50	10	---	17	---	24	21	2	161
	Appr. Total	***836***	***836***	***837***	***889***	***893***	***815***	***822***	***854***	***795***	***808***	***795***	***925***
Northbound	Left	145	---	---	44	---	91	---	34	5	---	29	201
	Thru	417	---	---	18	---	---	---	---	1	---	2	219
	Right	127	---	---	105	---	100	---	235	4	---	56	356
	Appr. Total	***689***	***---***	***---***	***167***	***---***	***191***	***---***	***269***	***10***	***---***	***86***	***776***
Southbound	Left	137	11	6	46	7	---	64	---	16	---	6	104
	Thru	283	---	---	42	---	---	---	---	1	---	1	241
	Right	146	4	2	28	6	---	11	---	78	9	2	50
	Appr. Total	***566***	***15***	***9***	***116***	***13***	***---***	***74***	***---***	***95***	***9***	***9***	***395***
	Int. Total	***2655***	***1514***	***1519***	***1850***	***1683***	***1786***	***1764***	***2033***	***2032***	***1852***	***1926***	***3225***

Intersection Approach	Movement	2025 No Build - PM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	43	2	1	20	6	---	1	---	40	---	1	62
	Thru	418	744	750	685	800	802	835	817	880	898	843	725
	Right	87	---	---	51	---	8	---	47	4	---	54	128
	Appr. Total	***548***	***745***	***751***	***756***	***806***	***810***	***836***	***864***	***924***	***898***	***898***	***915***
Westbound	Left	162	---	---	54	---	29	---	155	1	---	19	346
	Thru	338	678	679	623	721	716	740	729	829	840	835	570
	Right	181	5	5	46	12	---	10	---	28	5	5	125
	Appr. Total	***681***	***683***	***684***	***723***	***733***	***745***	***750***	***884***	***858***	***845***	***859***	***1041***
Northbound	Left	138	---	---	35	---	17	---	21	2	---	7	164
	Thru	256	---	---	37	---	---	---	---	1	---	1	208
	Right	148	---	---	90	---	34	---	107	2	---	27	212
	Appr. Total	***542***	***---***	***---***	***162***	***---***	***51***	***---***	***129***	***4***	***---***	***35***	***584***
Southbound	Left	178	7	6	30	10	---	28	---	16	---	6	146
	Thru	501	---	---	23	---	---	---	---	3	---	1	308
	Right	139	5	1	26	2	---	5	---	53	17	2	73
	Appr. Total	***818***	***12***	***6***	***79***	***12***	***---***	***33***	***---***	***73***	***17***	***10***	***527***
	Int. Total	***2589***	***1441***	***1442***	***1720***	***1551***	***1607***	***1619***	***1876***	***1859***	***1761***	***1802***	***3067***

Table 4-10 2045 No-Build AM and PM Peak-Hour Traffic Volumes

Intersection Approach	Movement	2045 No Build - AM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	83	1	2	18	5	---	26	---	141	---	3	157
	Thru	450	828	840	774	956	950	1050	1111	1259	1285	1275	1112
	Right	116	---	---	56	---	16	---	18	4	---	7	132
	Appr. Total	***649***	***829***	***842***	***848***	***961***	***966***	***1076***	***1129***	***1404***	***1285***	***1285***	***1401***
Westbound	Left	377	---	---	74	---	16	---	82	1	---	21	333
	Thru	434	1062	1064	974	1104	1003	1006	985	964	983	971	622
	Right	256	5	4	63	12	---	22	---	30	27	3	201
	Appr. Total	***1067***	***1067***	***1068***	***1111***	***1116***	***1019***	***1028***	***1067***	***994***	***1010***	***994***	***1156***
Northbound	Left	181	---	---	66	---	113	---	42	6	---	36	251
	Thru	521	---	---	22	---	---	---	---	1	---	2	274
	Right	165	---	---	131	---	125	---	294	5	---	70	445
	Appr. Total	***867***	***---***	***---***	***219***	***---***	***239***	***---***	***336***	***12***	***---***	***108***	***970***
Southbound	Left	215	13	8	57	9	---	80	---	20	---	7	130
	Thru	353	---	---	42	---	---	---	---	1	---	1	301
	Right	182	5	3	28	7	---	13	---	98	11	3	62
	Appr. Total	***750***	***18***	***11***	***127***	***16***	***---***	***93***	***---***	***119***	***11***	***11***	***493***
	Int. Total	***3333***	***1915***	***1921***	***2305***	***2094***	***2224***	***2196***	***2533***	***2530***	***2306***	***2398***	***4020***

Intersection Approach	Movement	2045 No Build - PM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	51	2	1	25	7	---	1	---	50	---	2	77
	Thru	466	930	938	850	994	996	1037	1014	1093	1115	1047	900
	Right	109	---	---	70	---	10	---	59	5	---	66	160
	Appr. Total	***626***	***932***	***939***	***945***	***1001***	***1006***	***1038***	***1073***	***1148***	***1115***	***1115***	***1137***
Westbound	Left	218	---	---	68	---	37	---	194	1	---	24	433
	Thru	361	859	864	779	901	895	925	911	1036	1050	1044	712
	Right	286	6	6	57	15	---	12	---	35	6	6	156
	Appr. Total	***865***	***865***	***870***	***904***	***916***	***931***	***938***	***1105***	***1072***	***1057***	***1074***	***1301***
Northbound	Left	173	---	---	58	---	22	---	27	2	---	9	205
	Thru	319	---	---	46	---	---	---	---	1	---	1	260
	Right	186	---	---	113	---	43	---	134	2	---	33	265
	Appr. Total	***678***	***---***	***---***	***217***	***---***	***64***	***---***	***161***	***5***	***---***	***44***	***730***
Southbound	Left	278	9	7	38	12	---	36	---	20	---	8	183
	Thru	626	---	---	29	---	---	---	---	4	---	1	385
	Right	174	6	1	33	3	---	6	---	67	22	3	91
	Appr. Total	***1078***	***15***	***8***	***100***	***15***	***---***	***42***	***---***	***91***	***22***	***12***	***659***
	Int. Total	***3247***	***1812***	***1817***	***2166***	***1933***	***2002***	***2017***	***2338***	***2317***	***2193***	***2245***	***3827***

Table 4-11 2025 Build AM and PM Peak-Hour Traffic Volumes

Intersection Approach	Movement	2025 Build - AM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	71	---	---	20	31	---	---	---	130	---	3	143
	Thru	519	877	885	823	968	1003	1103	1085	1186	1206	1196	1043
	Right	79	---	---	42	---	17	---	18	5	---	7	120
	Appr. Total	***669***	***877***	***885***	***885***	***999***	***1020***	***1103***	***1103***	***1321***	***1206***	***1206***	***1306***
Westbound	Left	219	---	---	79	---	14	---	70	2	---	18	217
	Thru	379	837	840	765	891	811	814	800	787	805	797	560
	Right	244	5	4	53	11	---	19	---	25	23	3	131
	Appr. Total	***842***	***842***	***844***	***897***	***902***	***825***	***833***	***870***	***814***	***828***	***817***	***908***
Northbound	Left	105	---	---	51	---	91	---	34	5	---	29	168
	Thru	417	---	---	19	---	---	---	---	1	---	2	144
	Right	180	---	---	111	---	100	---	235	4	---	60	235
	Appr. Total	***702***	***---***	***---***	***181***	***---***	***191***	***---***	***269***	***10***	***---***	***91***	***547***
Southbound	Left	178	---	---	65	52	---	---	---	16	---	6	67
	Thru	283	---	---	42	---	---	---	---	1	---	1	156
	Right	97	4	2	28	6	---	11	---	78	9	2	38
	Appr. Total	***558***	***4***	***2***	***135***	***58***	***---***	***11***	***---***	***95***	***9***	***9***	***261***
	Int. Total	***2771***	***1723***	***1732***	***2098***	***1958***	***2036***	***1947***	***2241***	***2240***	***2043***	***2124***	***3022***

Intersection Approach	Movement	2025 Build - PM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	43	---	---	26	10	---	---	---	48	---	2	74
	Thru	535	986	990	909	1033	1052	1086	1028	1080	1098	1036	892
	Right	71	---	---	55	---	11	---	59	6	---	60	155
	Appr. Total	***649***	***986***	***990***	***990***	***1043***	***1063***	***1086***	***1087***	***1135***	***1098***	***1098***	***1121***
Westbound	Left	178	---	---	58	---	32	---	167	2	---	21	286
	Thru	327	681	686	625	729	725	752	742	854	868	864	641
	Right	180	6	6	49	13	---	11	---	29	6	5	104
	Appr. Total	***685***	***687***	***692***	***732***	***742***	***757***	***763***	***909***	***885***	***873***	***890***	***1031***
Northbound	Left	87	---	---	41	---	17	---	21	2	---	7	134
	Thru	256	---	---	39	---	---	---	---	1	---	1	138
	Right	214	---	---	96	---	34	---	107	2	---	29	140
	Appr. Total	***557***	***---***	***---***	***176***	***---***	***51***	***---***	***129***	***4***	***---***	***37***	***412***
Southbound	Left	237	---	---	38	30	---	---	---	16	---	7	94
	Thru	501	---	---	23	---	---	---	---	3	---	1	198
	Right	98	5	1	26	2	---	5	---	53	17	2	57
	Appr. Total	***836***	***5***	***1***	***87***	***32***	***---***	***5***	***---***	***73***	***17***	***10***	***349***
	Int. Total	***2727***	***1678***	***1683***	***1985***	***1818***	***1871***	***1854***	***2124***	***2096***	***1989***	***2035***	***2913***

Table 4-12 2045 Build AM and PM Peak-Hour Traffic Volumes

Intersection Approach	Movement	2045 Build - AM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	84	---	---	25	39	---	---	---	162	---	4	179
	Thru	561	1096	1107	1007	1188	1232	1360	1338	1463	1489	1477	1285
	Right	98	---	---	75	---	21	---	22	6	---	8	150
	Appr. Total	***743***	***1096***	***1107***	***1107***	***1227***	***1253***	***1360***	***1360***	***1631***	***1489***	***1489***	***1614***
Westbound	Left	278	---	---	98	---	17	---	88	2	---	22	271
	Thru	413	1069	1072	957	1114	1014	1018	999	984	1006	996	701
	Right	383	6	5	66	13	---	24	---	32	29	3	164
	Appr. Total	***1074***	***1075***	***1077***	***1121***	***1127***	***1031***	***1042***	***1087***	***1017***	***1035***	***1022***	***1135***
Northbound	Left	131	---	---	85	---	113	---	42	6	---	36	210
	Thru	521	---	---	23	---	---	---	---	1	---	0	180
	Right	243	---	---	139	---	125	---	294	5	---	75	294
	Appr. Total	***895***	***---***	***---***	***247***	***---***	***239***	***---***	***336***	***12***	***---***	***111***	***684***
Southbound	Left	292	---	---	81	65	---	---	---	20	---	8	84
	Thru	353	---	---	52	---	---	---	---	1	---	1	195
	Right	121	5	3	35	7	---	13	---	98	11	3	47
	Appr. Total	***766***	***5***	***3***	***168***	***72***	***---***	***13***	***---***	***119***	***11***	***12***	***326***
	Int. Total	***3478***	***2176***	***2187***	***2643***	***2426***	***2523***	***2415***	***2784***	***2780***	***2535***	***2634***	***3759***

Intersection Approach	Movement	2045 Build - PM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	51	---	---	33	13	---	---	---	60	---	2	92
	Thru	529	1232	1238	1112	1268	1292	1334	1260	1326	1348	1270	1091
	Right	88	---	---	93	---	13	---	74	8	---	76	193
	Appr. Total	***668***	***1232***	***1238***	***1238***	***1281***	***1305***	***1334***	***1334***	***1394***	***1348***	***1348***	***1376***
Westbound	Left	241	---	---	73	---	40	---	209	2	---	26	357
	Thru	347	877	883	781	912	907	940	927	1067	1084	1080	801
	Right	295	7	7	62	16	---	13	---	37	7	7	130
	Appr. Total	***883***	***884***	***890***	***916***	***928***	***947***	***954***	***1136***	***1106***	***1092***	***1112***	***1289***
Northbound	Left	109	---	---	76	---	22	---	27	2	---	9	168
	Thru	319	---	---	49	---	---	---	---	1	---	1	172
	Right	274	---	---	120	---	43	---	134	2	---	36	175
	Appr. Total	***702***	***---***	***---***	***245***	***---***	***65***	***---***	***161***	***5***	***---***	***46***	***515***
Southbound	Left	379	---	---	49	37	---	---	---	20	---	9	117
	Thru	626	---	---	29	---	---	---	---	4	---	1	247
	Right	123	6	1	33	3	---	6	---	67	22	3	71
	Appr. Total	***1128***	***6***	***1***	***111***	***40***	***---***	***6***	***---***	***91***	***22***	***13***	***436***
	Int. Total	***3381***	***2122***	***2129***	***2510***	***2249***	***2317***	***2294***	***2630***	***2597***	***2461***	***2520***	***3615***

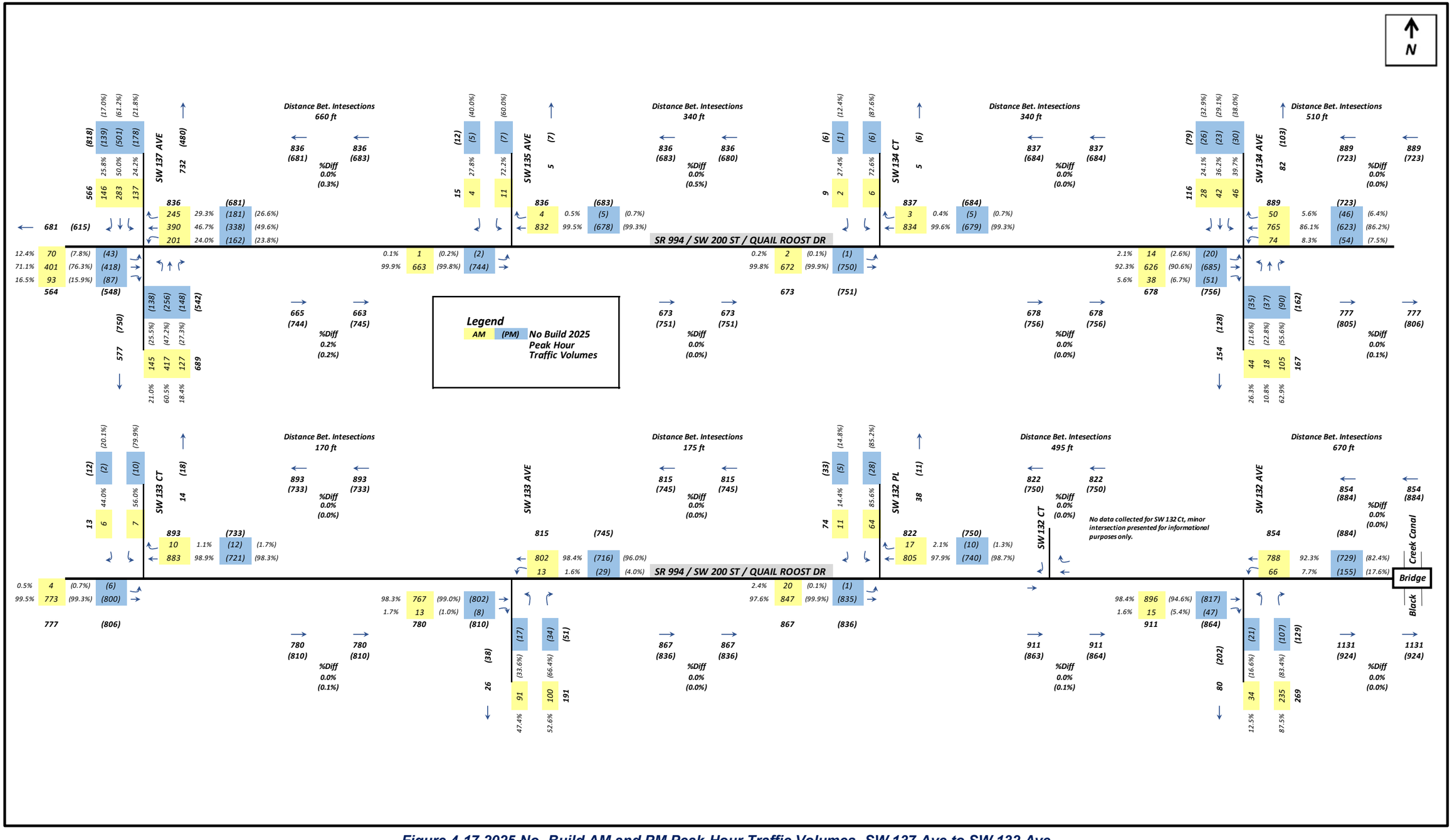


Figure 4-17 2025 No- Build AM and PM Peak-Hour Traffic Volumes- SW 137 Ave to SW 132 Ave

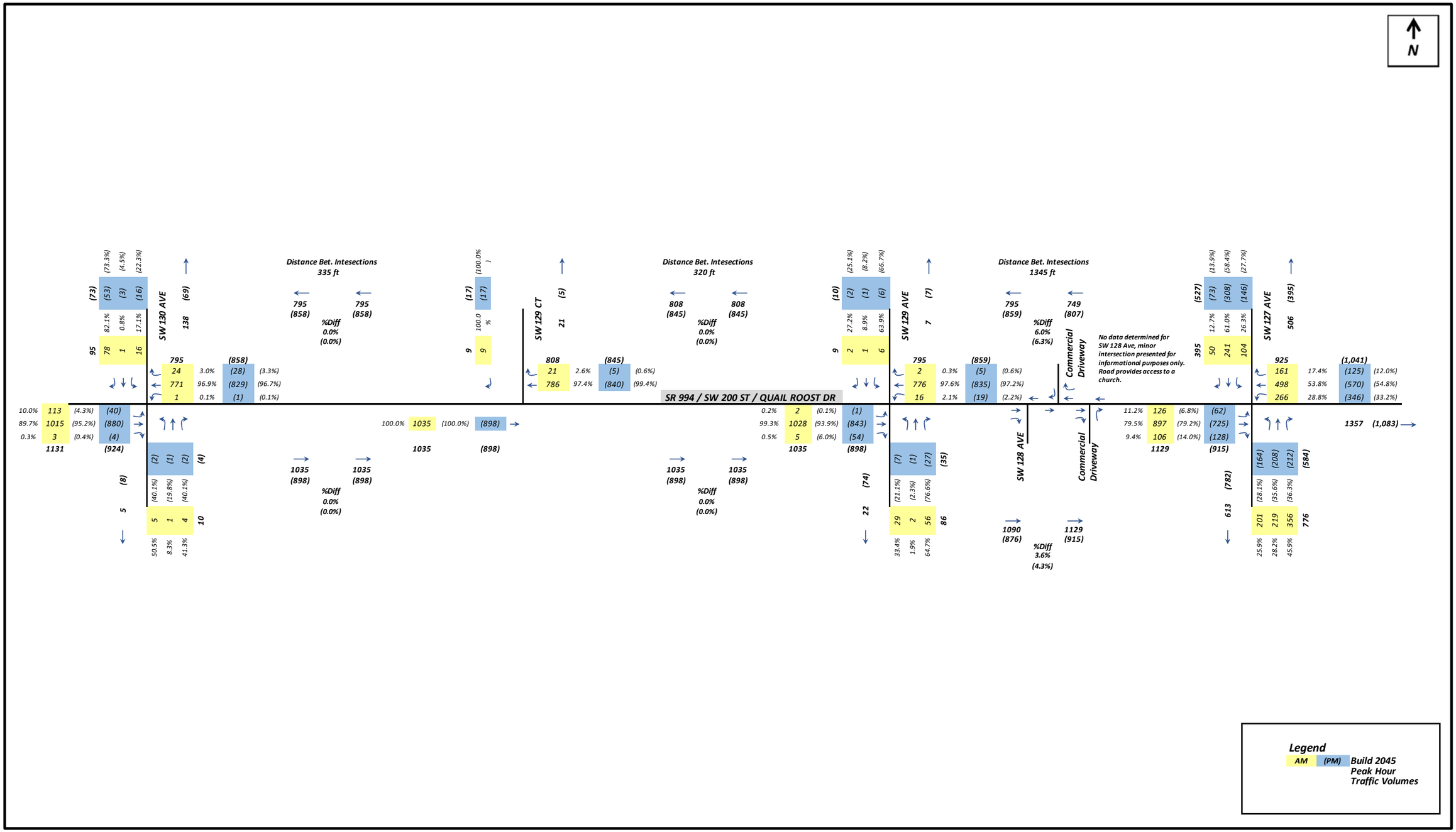


Figure 4-18 2025 No-Build AM and PM Peak-Hour Traffic Volumes – SW 130 Ave to SW 127 Ave

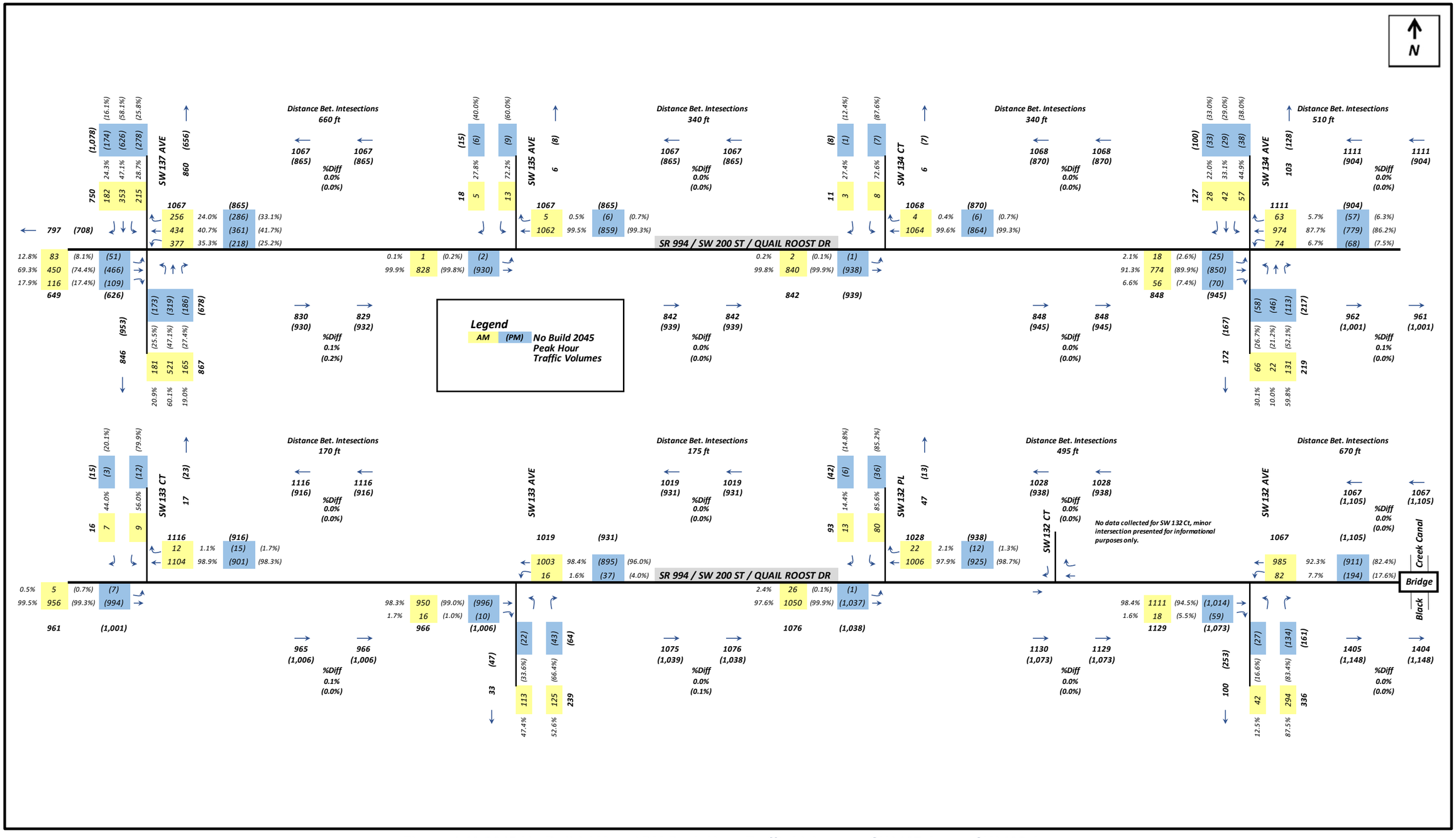


Figure 4-19 2045 No-Build AM and PM Peak-Hour Traffic Volumes – SW 137 Ave to SW 132 Ave

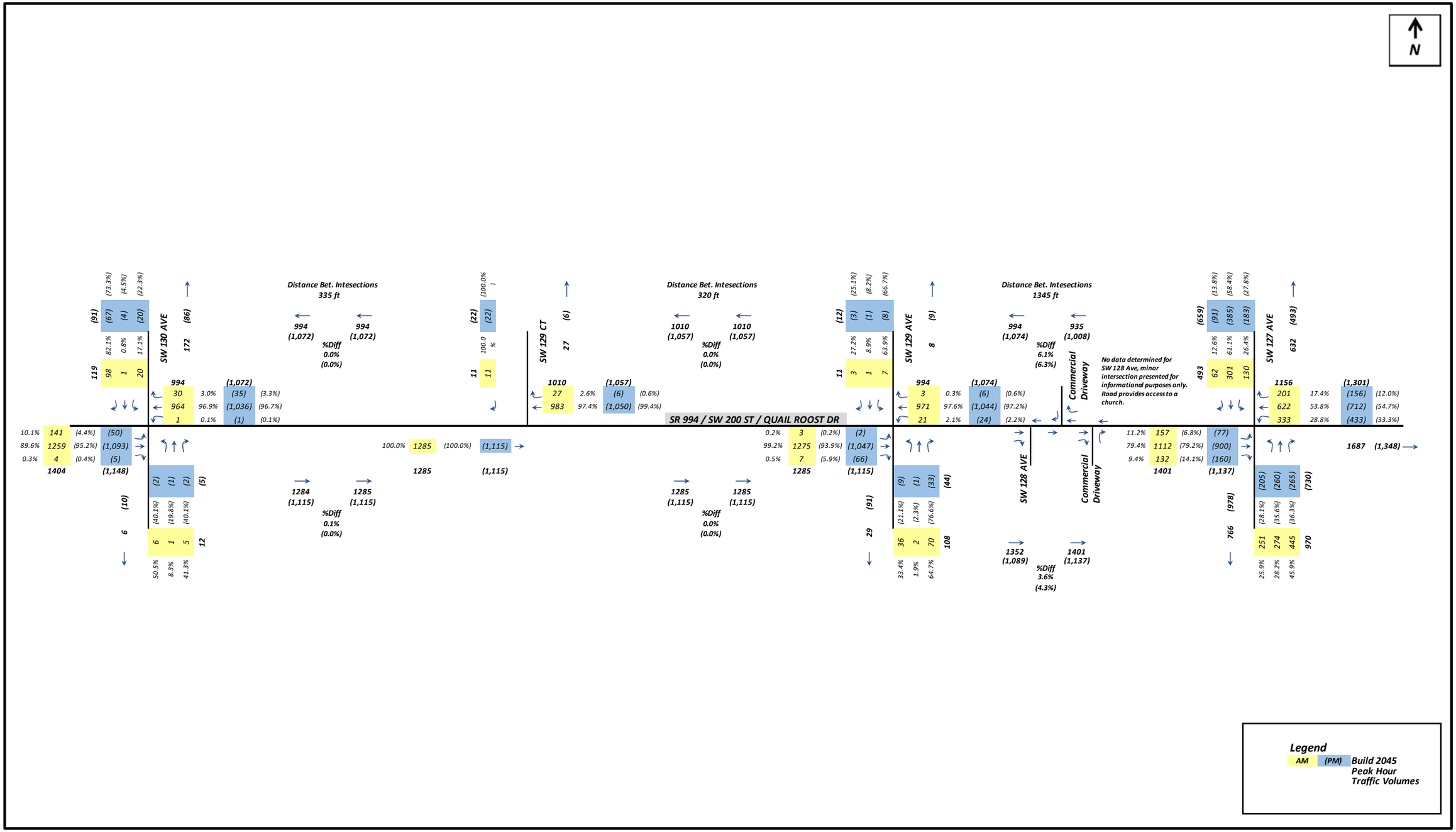


Figure 4-20 2045 No-Build AM and PM Peak-Hour Traffic Volumes – SW 130 Ave to SW 127 Ave

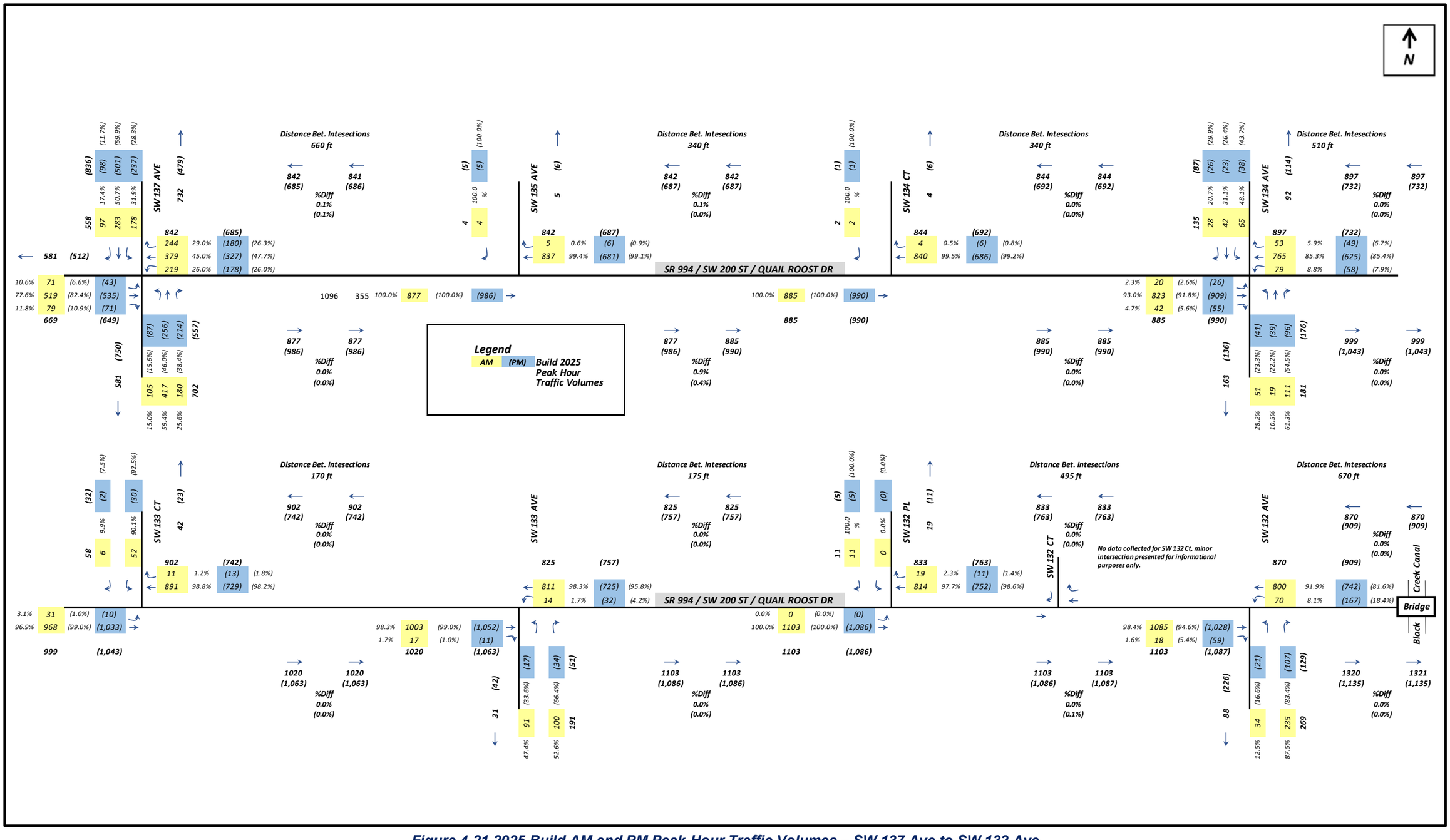


Figure 4-21 2025 Build AM and PM Peak-Hour Traffic Volumes – SW 137 Ave to SW 132 Ave

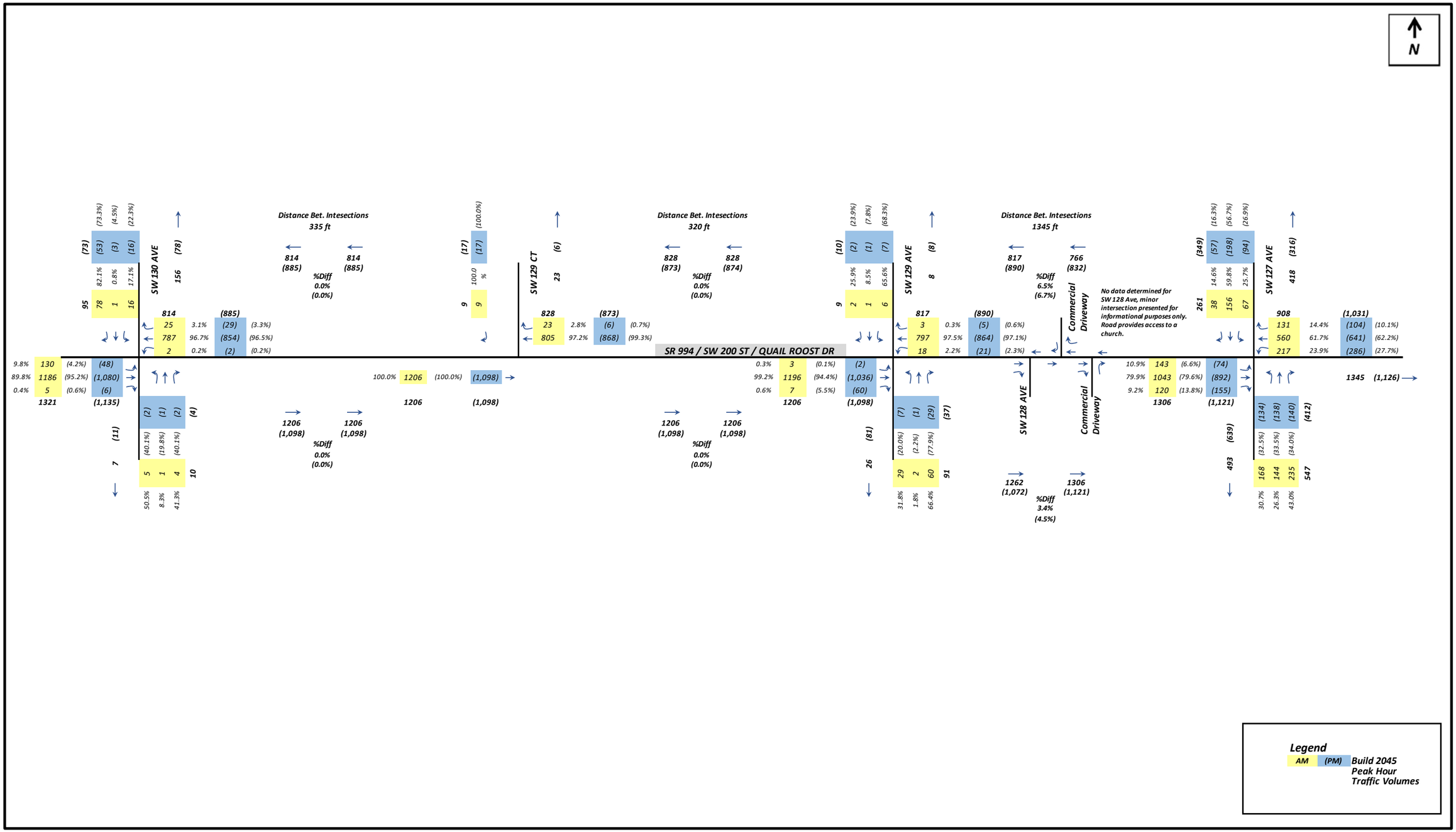


Figure 4-22 2025 Build AM and PM Peak-Hour Traffic Volumes – SW 130 Ave to SW 127 Ave

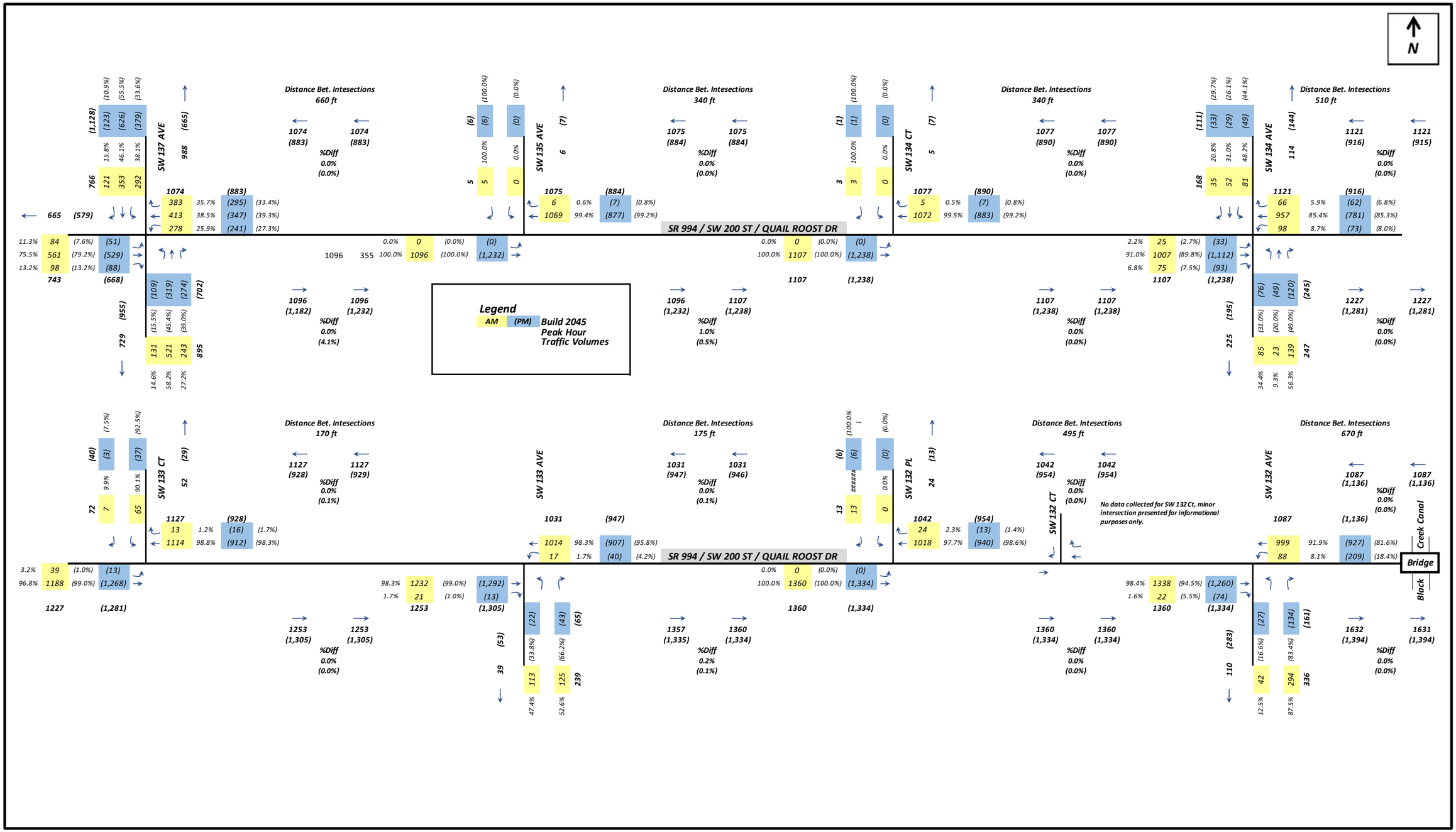


Figure 4-23 2045 Build AM and PM Peak-Hour Traffic Volumes – SW 137 Ave to SW 132 Ave

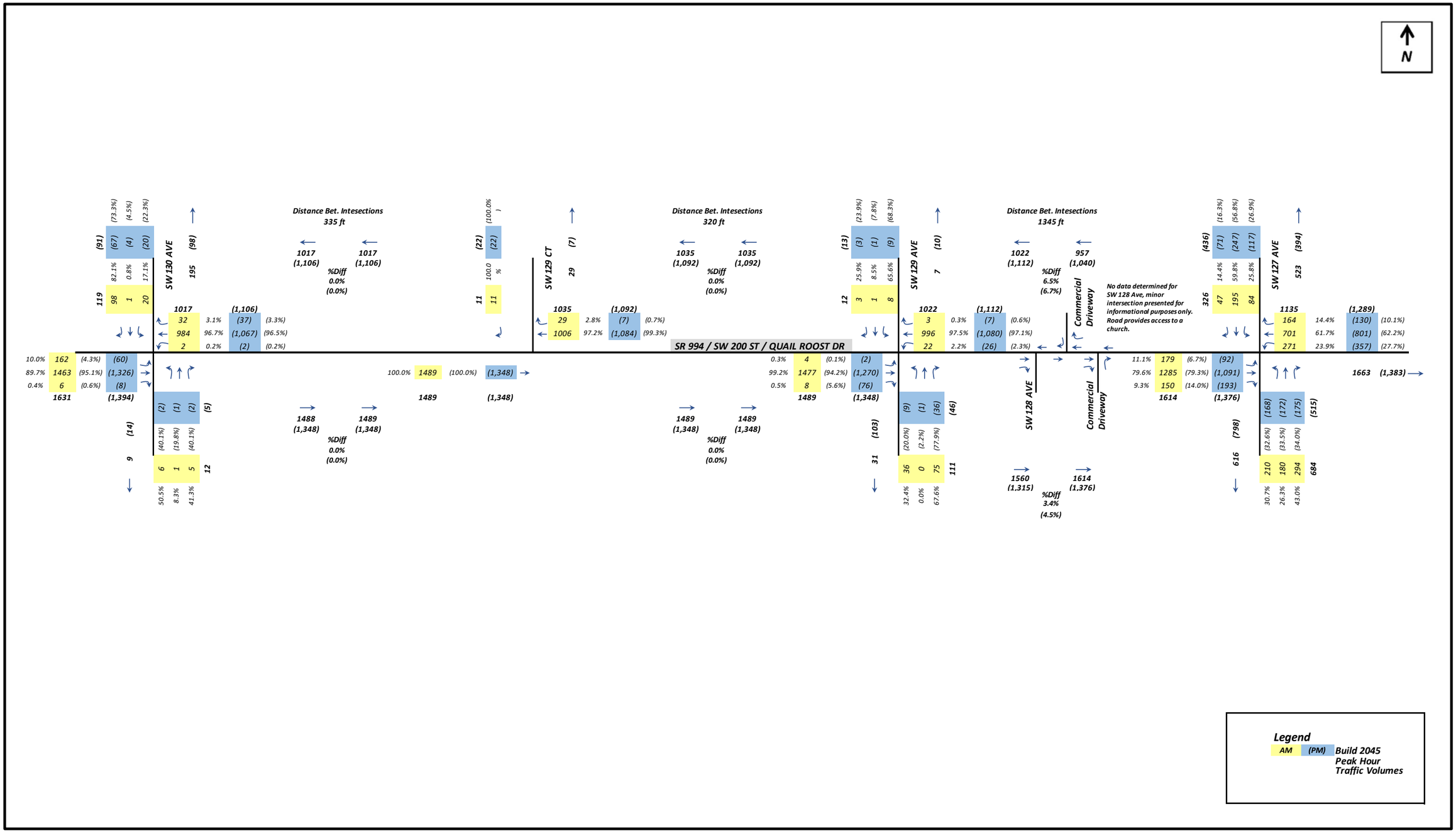


Figure 4-24 2045 Build AM and PM Peak-Hour Traffic Volumes – SW 130 Ave to SW 127 Ave

4.5.9.5 Future Operational Analysis

An operational analysis of the study corridor was performed utilizing Synchro, Version 11, to assess and compare the future traffic conditions for the Build Alternatives with the No-Build Alternative for the weekday AM and PM hours. As done for existing traffic conditions, the operational assessment was performed in accordance with the FDOT's Traffic Analysis Handbook (2021) and consistent with HCM. The operational analysis included intersection and arterial evaluations. The results are based on the HCM 6th Edition, except the arterial analysis which is based on Synchro. In addition, the results for the signalized intersection of SW 137th Avenue are based on the HCM 2000 since the latest versions (HCM 6th and 2010) do not support the current signal operation of a leading left-turning arrow for the eastbound direction without an exclusive left-turn bay. For consistency, the results for SW 137th Avenue for future conditions are also based on the HCM 2000. The following future scenarios were analyzed for the project proposed opening year (2025) and the design year (2045). Per the agreed traffic methodology for this study, no interim year was analyzed.

- No-Build Alternative (2025 & 2045 for AM & PM), includes maintaining the existing lane configuration at the study intersections, except for the following improvements at SW 137th Avenue and SW 127th Avenue:
    - The south leg at the signalized intersection of SW 137th Avenue opens to traffic under Miami-Dade County Project No. 20040343. It opened approximately in June 2022. At the beginning of this current study effort, the south leg was closed to traffic and under construction. The northbound lane configuration includes 1 exclusive left-turn bay and 1 shared through/right-turn lane. The County project also changes the southbound approach lane configuration from one exclusive right-turn bay, one shared through/left-turn lane to 1 exclusive left-turn bay+1 shared through/right-turn lane. In addition, SW 137th Avenue will be widened from US 1 to SW 184th Street to a four-lane roadway by 2045, under Miami-Dade County Project PW168 (no FM number available yet).
    - An exclusive northbound right-turn bay will be constructed at the intersection of SW 127th Avenue under Miami-Dade County Project No. 20180004.

- Build Alternative 1 (2025 & 2045 for AM & PM): includes the same improvements under No-Build scenario plus the following:
    - Add a raised median along SR 994 with left-turning opportunities from and onto the side streets, except the following:
        - Restrict the eastbound left-turn movement at SW 135th Avenue. The current volume for this movement is low and is expected to continue to be minimal. This movement will be diverted 100% to SW 134th Court.
        - Restrict the eastbound and southbound left-turn movements at SW 132nd Place. The current volume for this movement is low-to-moderate and is expected to continue the same. This eastbound left-turn movement will be diverted 100% to SW 133rd Court. Based on the adjacent ample roadway grid network, 70% of the southbound left-turn movement will be diverted to the southbound left-turn at SW 133 Court and the remaining 30% to the

southbound left-turn at SW 134th Avenue, which is now signal-controlled. Refer to ***Figure 4-25*** and ***Figure 4-26*** for details.

- For SW 137th Avenue:
  - Dual left-turn bays for the southbound, eastbound, and westbound intersection approaches.
  - Exclusive right-turn bays for the northbound and southbound intersection approaches.
  - An additional right-turn bay for the westbound approach for a total of two right-turns.
- For SW 134th Avenue:
  - The north/south stop-controlled 4-legged intersection of SW 134th Avenue is upgraded to signal control. A signal warrant analysis completed by the FDOT in 2017 recommended upgrading this intersection to signal control. The signal warrant analysis completed under this current study effort (refer to ***Appendix B***) confirmed that a traffic signal control is warranted at SW 134th Avenue.
  - The proposed lane configuration includes providing exclusive left-turns at all intersection approaches and an exclusive right-turn at the westbound intersection approach.
- Widen SW 132nd Avenue to convert the northbound shared left-turn/right-turn lane to one exclusive left-turn lane and one exclusive right-turn lane.
- For SW 127 Avenue:
  - Additional exclusive left-turn bay for the northbound and westbound intersection approaches for a total of two left-turns.
  - Exclusive southbound right-turn bay.
- Confirmed and modified storage lengths for turn bays, as necessary based on queue build-ups.

- Build Alternative 2 (2025 & 2045 for AM & PM): includes the same improvements under Build 1 plus the following:
  - Widening SR 994 from two-lanes to four-lanes.
    - For the westbound direction, the additional through lane connects to the existing two-lane section just past SW 127th Avenue and continues across the SW 137th Avenue intersection to be merged further downstream.
    - For the eastbound direction, the additional through lane on SR 994 begins at SW 137th Avenue and connects to the existing two-lane section approaching SW 127th Avenue. Refer to ***Figure 4-25*** and ***Figure 4-26*** for details.
  - For SW 137 Avenue,
    - Additional lanes on SW 137th Avenue near SR 994, merging downstream past SR 994.
    - Additional exclusive left-turn bay for the northbound intersection approaches for a total of two left-turns.

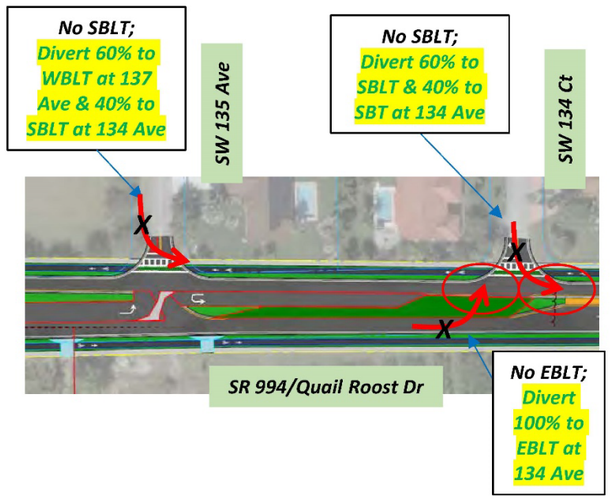
- For SW 127 Avenue:
  - Provide an exclusive right-turn bay for the eastbound intersection approach.
  - Although dual northbound left-turns were necessary under Build1, a single exclusive northbound left-turn is necessary for Build 2.
- Confirmed and modified storage lengths for turn bays, as necessary based on queue build-ups.

- Build Alternative 3 (2025 & 2045 for AM & PM): includes the same improvements under Build 2 plus the following:
  - Restrict the eastbound left-turn movement at SW 134th Court and the southbound left-turn movements at SW 135th Avenue and SW 134th Court. The current volumes for these movements are low and are expected to continue the same. This eastbound left-turn movement will be diverted 100% to SW 134th Avenue. Based on the adjacent ample roadway grid network, 60% of the southbound left-turn movement from SW 134th Court will be diverted to the southbound left-turn at SW 134th Avenue and the remaining 40% to the southbound through at SW 134th Avenue, which are now under signal controlled. 60% of the southbound left-turn movement from SW 135th Avenue will be diverted to the westbound left-turn at SW 137th Avenue and the remaining 40% to the southbound left-turn at SW 134th Avenue. Refer to ***Figure 4-25*** and ***Figure 4-26*** for details.
  - Restrict the southbound left-turn movement at SW 133rd Court and the northbound left-turn movement at SW 133rd Avenue. The current volumes for these movements are low and are expected to continue the same, except the northbound left-turn at SW 133rd Avenue during the AM peak hour. Nevertheless, the ample roadway grid network also allows the adequate diversion of the northbound left-turn at SW 133rd Avenue. The southbound left-turn movement will be diverted 100% to the right-turn at SW 133rd Court and then to the westbound left-turn at SW 134th Avenue, which is now under signal control. Based on the adjacent ample roadway grid network, 40% of the northbound left-turn at SW 133rd Avenue will be diverted to the northbound left-turn at SW 132nd Avenue and then to the westbound right-turn at SW 134th Avenue, 30% will be diverted to the northbound through at SW 134th Avenue, and the remaining 30% to the northbound left-turn at SW 134th Avenue and then to the westbound right-turn at SW 137th Avenue. Refer to ***Figure 4-25*** and ***Figure 4-26*** for details.

Table 4-13 and ***Table 4-14*** summarize the build volumes for the main three intersections within the study corridor under each alternative, including diverted traffic volume. All future scenarios included optimizing the intersection splits with some cycle length changes, updating the PHFs to 0.95, and maintaining the same truck percentages as existing traffic conditions.

N

Build Alternative 1



EB Approach: Single thru lane. At SW 135 Ave, an exclusive left-turn bay.

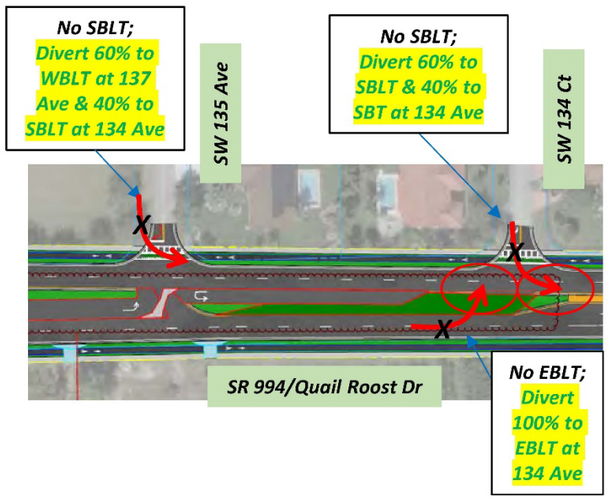
WB Approach: Single shared thru/right-turn lane.

NB Approach: N/A.

SB Approach: Exclusive right-turn lane.

Build Alternative 2

Note: Lane geometry differences with previous alternative are indicated in red. Alternatives are cumulative.



EB Approach: Dual thru lanes. At SW 135 Ave, an exclusive left-turn bay.

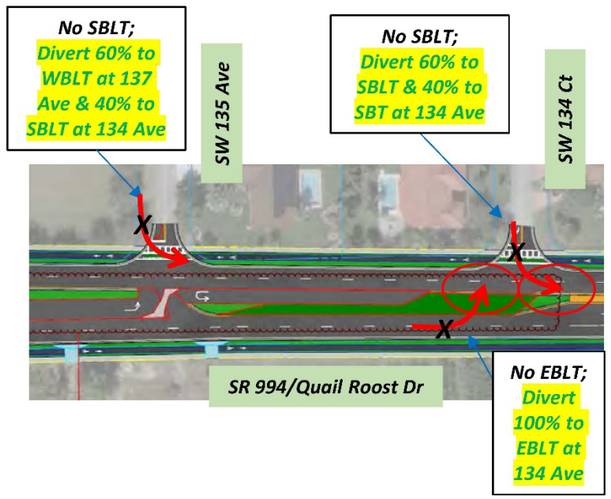
WB Approach: Exclusive thru lane and single shared thru/right-turn lane.

NB Approach: N/A.

SB Approach: Exclusive right-turn lane.

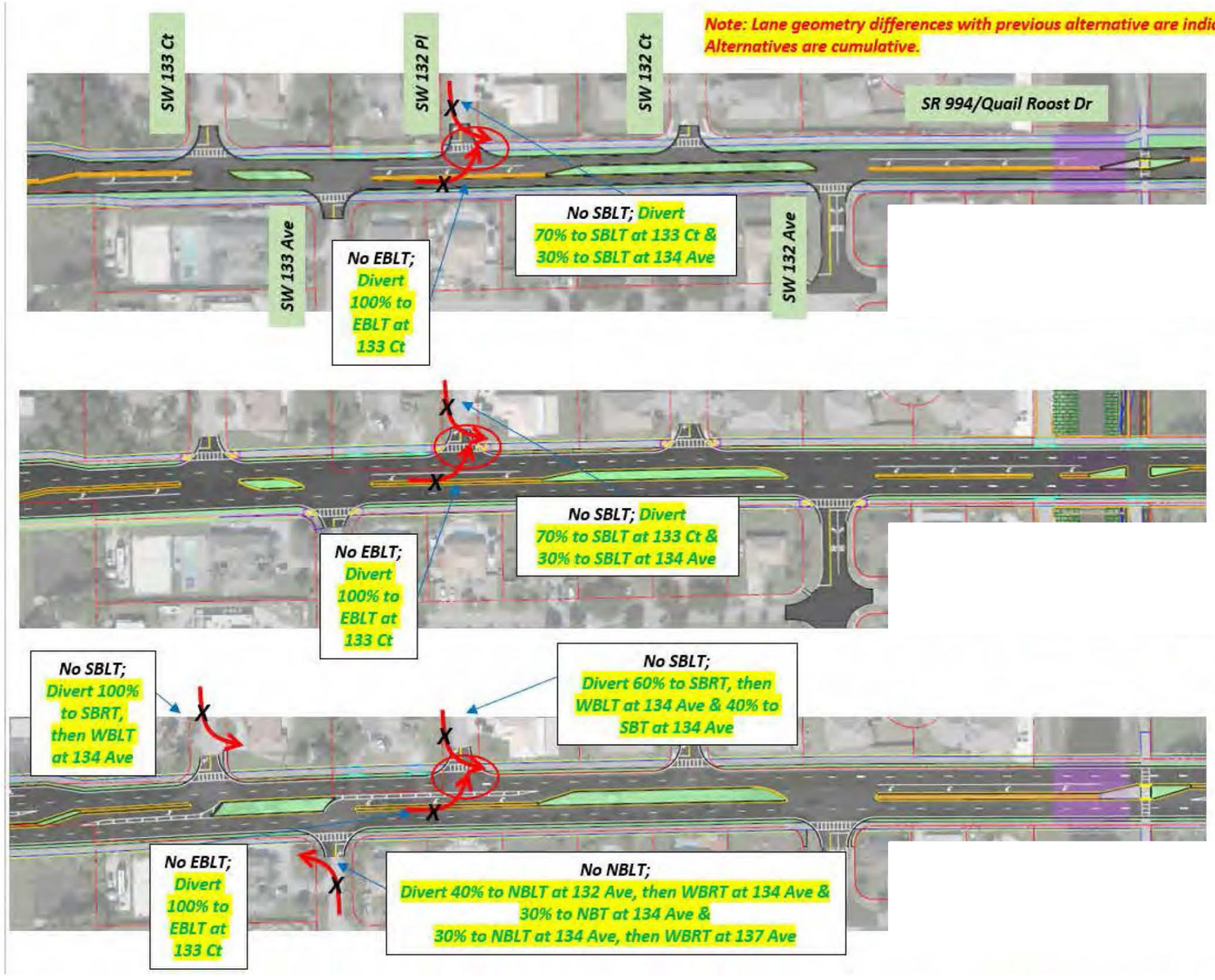
Note: Build 2 adds an additional thru lane in each direction.

Build Alternative 3



Same as Build 2.

Figure 4-25 Traffic Diversion for SW 135 Ave and SW 134 Ct



Build Alternative 1

EB Approach: Single shared thru/right-turn lane. At SW 133 Ct, an exclusive left-turn bay.

WB Approach: Single shared thru/right-turn lane. At SW 132 Ave and SW 133 Ave, an exclusive left-turn bay.

NB Approach: At SW 132 Ave, single right-turn lane and single left-turn lane. At SW 133 Ave, shared right/left-turn lane.

SB Approach: At SW 132 Ct and SW 132 Pl, exclusive right-turn lanes. At SW 133 Ct, shared right/left-turn lane.

Build Alternative 2

Same as Build 1.

Build Alternative 3

Same as Builds 1 and 2 but SBLT at SW 133 Ct and NBLT at SW 133 Ave are eliminated.

Figure 4-26 Traffic Diversion for SW 133 Ct, SW 133 Ave, and SW 132 Pl

Table 4-13 Build Alternatives 1 & 2 Traffic Volumes Year 2045

Intersection Approach	Movement	2045 Builds 1 & 2 - AM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	84	---	---	25	39	---	---	---	162	---	4	179
	Thru	561	1096	1107	1007	1188	1232	1360	1338	1463	1489	1477	1285
	Right	98	---	---	75	---	21	---	22	6	---	8	150
	Appr. Total	***743***	***1096***	***1107***	***1107***	***1227***	***1253***	***1360***	***1360***	***1631***	***1489***	***1489***	***1614***
Westbound	Left	278	---	--	98	---	17	---	88	2	---	22	271
	Thru	413	1069	1072	957	1114	1014	1018	999	984	1006	996	701
	Right	383	6	5	66	13	---	24	---	32	29	3	164
	Appr. Total	***1074***	***1075***	***1077***	***1121***	***1127***	***1031***	***1042***	***1087***	***1017***	***1035***	***1022***	***1136***
Northbound	Left	131	---	---	85	---	113	---	42	6	---	36	210
	Thru	521	---	---	23	---	---	---	---	1	---	---	180
	Right	243	---	---	139	---	125	---	294	5	---	75	294
	Appr. Total	***895***	***---***	***---***	***247***	***---***	***239***	***---***	***336***	***12***	***---***	***111***	***684***
Southbound	Left	292	--	--	81	65	---	---	---	20	---	8	84
	Thru	353	---	---	52	---	---	---	---	1	---	1	195
	Right	121	5	3	35	7	---	13	---	98	11	3	47
	Appr. Total	***766***	***5***	***3***	***168***	***72***	***---***	***13***	***---***	***119***	***11***	***12***	***326***
	Int. Total	***3478***	***2176***	***2187***	***2643***	***2426***	***2523***	***2415***	***2784***	***2780***	***2535***	***2634***	***3760***

Intersection Approach	Movement	2045 Builds 1 & 2 - PM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	51	---	---	33	13	---	---	---	60	---	2	92
	Thru	529	1232	1238	1112	1268	1292	1334	1260	1326	1348	1270	1091
	Right	88	---	---	93	---	13	---	74	8	---	76	193
	Appr. Total	***718***	***1232***	***1238***	***1238***	***1281***	***1305***	***1334***	***1334***	***1394***	***1348***	***1348***	***1376***
Westbound	Left	241	---	---	73	---	40	---	209	2	---	26	357
	Thru	347	877	883	781	912	907	940	927	1067	1084	1080	801
	Right	295	7	7	62	16	---	13	---	37	7	7	130
	Appr. Total	***883***	***884***	***890***	***916***	***928***	***946***	***954***	***1136***	***1106***	***1092***	***1112***	***1288***
Northbound	Left	109	---	---	76	---	22	---	27	2	---	9	168
	Thru	319	---	---	49	---	---	---	---	1	---	1	172
	Right	274	---	---	120	---	43	---	134	2	---	36	175
	Appr. Total	***702***	***---***	***---***	***245***	***---***	***64***	***---***	***161***	***5***	***---***	***46***	***515***
Southbound	Left	379	---	---	49	37	---	---	---	20	---	9	117
	Thru	626	---	---	29	---	---	---	---	4	---	1	247
	Right	123	6	1	33	3	---	6	---	67	22	3	71
	Appr. Total	***1128***	***6***	***1***	***111***	***40***	***---***	***6***	***---***	***91***	***22***	***13***	***435***
	Int. Total	***3431***	***2122***	***2129***	***2510***	***2249***	***2316***	***2294***	***2630***	***2597***	***2461***	***2520***	***3614***

Table 4-14 Build Alternative 3 Traffic Volumes Year 2045

Intersection Approach	Movement	2045 Build 3 - AM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	84	---	---	27	39	---	---	---	162	---	4	179
	Thru	560	1093	1096	994	1161	1140	1266	1243	1368	1393	1381	1189
	Right	98	---	---	75	---	21	---	22	6	---	8	150
	Appr. Total	***742***	***1093***	***1096***	***1096***	***1200***	***1161***	***1266***	***1265***	***1536***	***1393***	***1393***	***1518***
Westbound	Left	265	---	---	155	---	17	---	98	2	---	22	271
	Thru	393	1009	1004	889	1094	1107	1063	1000	994	1017	1007	701
	Right	365	6	5	66	13	---	24	---	32	29	3	164
	Appr. Total	***1023***	***1015***	***1009***	***1110***	***1107***	***1124***	***1087***	***1098***	***1028***	***1046***	***1032***	***1136***
Northbound	Left	131	---	---	85	---	---	---	87	6	---	36	210
	Thru	521	---	---	57	---	---	---	---	1	---	2	180
	Right	241	---	---	139	---	125	---	294	5	---	75	294
	Appr. Total	***893***	***---***	***---***	***281***	***---***	***125***	***---***	***381***	***12***	***---***	***113***	***684***
Southbound	Left	292	---	---	67	---	---	---	---	20	---	8	84
	Thru	377	---	---	87	---	---	---	---	1	---	1	195
	Right	121	13	11	35	16	---	61	---	98	11	3	47
	Appr. Total	***790***	***13***	***11***	***189***	***16***	***---***	***61***	***---***	***119***	***11***	***12***	***326***
	Int. Total	***3448***	***2121***	***2116***	***2676***	***2323***	***2410***	***2414***	***2744***	***2695***	***2450***	***2550***	***3664***

Intersection Approach	Movement	2045 Build 3 - PM Peak Hour Traffic Volumes											
		SW 137 AVE	SW 135 AVE	SW 134 CT	SW 134 AVE	SW 133 CT	SW 133 AVE	SW 132 PL	SW 132 AVE	SW 130 AVE	SW 129 CT	SW 129 AVE	SW 127 AVE
Eastbound	Left	51	---	---	34	13	---	---	---	60	---	2	92
	Thru	577	1229	1230	1103	1256	1243	1285	1211	1277	1299	1221	1042
	Right	88	---	---	93	---	13	---	74	8	---	76	193
	Appr. Total	***716***	***1229***	***1230***	***1230***	***1269***	***1256***	***1285***	***1285***	***1345***	***1299***	***1299***	***1327***
Westbound	Left	242	---	---	107	---	40	---	222	2	---	26	357
	Thru	346	870	870	768	921	938	949	928	1081	1098	1093	801
	Right	293	7	7	62	16	---	13	---	37	7	7	130
	Appr. Total	***881***	***877***	***877***	***937***	***937***	***978***	***962***	***1150***	***1120***	***1105***	***1126***	***1288***
Northbound	Left	109	---	---	76	---	---	---	36	2	---	9	168
	Thru	319	---	---	56	---	---	---	---	1	---	1	172
	Right	274	---	---	120	---	43	---	134	2	---	36	175
	Appr. Total	***702***	***---***	***---***	***252***	***---***	***43***	***---***	***170***	***5***	***---***	***46***	***515***
Southbound	Left	378	---	---	46	---	---	---	---	20	---	9	117
	Thru	640	---	---	46	---	---	---	---	4	---	1	247
	Right	123	11	8	33	15	---	28	---	67	22	3	71
	Appr. Total	***1141***	***11***	***8***	***125***	***15***	***---***	***28***	***---***	***91***	***22***	***13***	***435***
	Int. Total	***3440***	***2117***	***2115***	***2544***	***2221***	***2277***	***2275***	***2605***	***2561***	***2426***	***2484***	***3565***

The following Measures of Effectiveness (MOEs) were generated based on the HCM 6th Edition (except for SW 137th Avenue, HCM 2000 was used) and the Synchro outputs and summarized for the traffic models:

- Intersection:
  - Level of Service
  - Average Vehicle Delay (seconds/vehicle)
- Vehicle Movement:
  - Level of Service
  - Average Vehicle Delay (seconds/vehicle)
  - Volume/Capacity (v/c) Ratio (for signalized intersections only)
  - 95th Percentile Queue (feet)
- Arterial:
  - Level of Service
  - Average Vehicle Speed (miles/hour)
  - Travel Time (seconds)
  - Delay (hours)

The HCM utilizes LOS as the quantitative measure to represent the level of service at an intersection or arterial. The LOS grading criteria ranges from LOS A to LOS F, where LOS A is under-saturated/free-flow conditions and LOS F is over-saturated conditions. The Synchro output sheets are included ***Appendix B***. It is noted that the intersections of SW 137 Avenue and SW 134 Avenue are coordinated in the east/west direction, while SW 127 Avenue is coordinated in the north/south direction.

4.5.9.5.1 Arterial Analysis Results

The study arterial for the existing conditions of SR 994 is operating at LOS C or better for both eastbound and westbound directions during the AM and PM hours as presented in ***Table 4-15*** and ***Table 4-16***. The average vehicle speed for eastbound SR 994 during the AM and PM hours is 21-27 MPH, whereas in the westbound direction also for both s is slightly higher at 28-33 MPH. These speeds are lower than the 40 MPH posted speed limit for SR 994. If no improvements are implemented, the arterial operations of the study corridor for the westbound direction would degrade to LOS E for No-Build conditions 2025 PM, LOS F for eastbound 2045 AM and LOS E or worse for westbound 2045 AM and PM, as presented in ***Table 4-15*** and ***Table 4-16***. The travel speeds decrease to 14 MPH or less with increased travel times. The total arterial travel time for westbound traffic under No-Build conditions in 2025 PM increases from 1.6 minutes to 4.3 minutes. For eastbound traffic under No-Build conditions in 2045 AM, the total arterial travel time increases from 2.6 minutes to 10.6 minutes. In 2045, for westbound traffic, the No-Build conditions show an increase in total arterial travel time from 1.9 minutes to 8.5 minutes in the AM and from 1.6 minutes to 4 minutes in the PM.

With the implementation of the recommended improvements under the Build conditions, the arterial operations of the study corridor would improve to LOS D or better with increased speeds and lower travel times, as presented in***Table 4-15*** and ***Table 4-16***. Although all three Build alternatives are expected to significantly improve travel speeds during both the AM and PM peak

hours in future years, Build Alternatives 2 and 3 are anticipated to provide approximately 3-5 MPH higher speeds when compared to Build Alternative 1.

With regards to arterial operations, Build Alternatives 2 and 3 have similar potential benefits while both being better than Build Alternative 1.

Table 4-15 Existing and 2025 Arterial Operational Results

	Dir.	Peak Hour	MOE	EXISTING	NO BUILD 2025	BUILD 1 2025	BUILD 2 2025	BUILD 3 2025
2025	Eastbound	AM	LOS	C	C	C	C	C
			Speed (mph)	21	20	22	20	20
			Travel Time (min)	2.6	2.7	2.8	3.1	3.1
		PM	LOS	C	C	C	C	C
			Speed (mph)	27	19	20	21	21
			Travel Time (min)	2.0	2.8	3.1	2.9	2.9
	Westbound	AM	LOS	B	D	C	C	C
			Speed (mph)	28	16	21	23	23
			Travel Time (min)	1.9	3.2	3.0	2.6	2.7
		PM	LOS	B	E	C	C	C
			Speed (mph)	33	12	20	23	22
			Travel Time (min)	1.6	4.3	3.1	2.7	2.8
		Total Arterial Travel Time (min)		8.1	13.0	12.0	11.3	11.4

Notes: Summarized results are based on Synchro.

Table 4-16 Existing and 2045 Arterial Operational Results

	Dir.	Peak Hour	MOE	EXISTING	NO BUILD 2045	BUILD 1 2045	BUILD 2 2045	BUILD 3 2045
2045	Eastbound	AM	LOS	C	F	D	C	C
			Speed (mph)	21	6	15	18	18
			Travel Time (min)	2.6	10.6	4.0	3.3	3.3
		PM	LOS	C	D	D	C	C
			Speed (mph)	27	16	14	19	19
			Travel Time (min)	2.0	3.4	4.2	3.2	3.2
	Westbound	AM	LOS	B	F	C	C	C
			Speed (mph)	28	8	21	24	24
			Travel Time (min)	1.9	8.5	2.8	2.6	2.6
		PM	LOS	B	E	C	C	C
			Speed (mph)	33	14	22	22	22
			Travel Time (min)	1.6	4.0	2.8	2.7	2.7
		Total Arterial Travel Time (min)		8.1	26.5	13.9	11.8	11.8

Notes: Summarized results are based on Synchro.

4.5.9.5.2 Intersection Analysis Results

It is essential to consider the timing and type of improvements under each Build alternative to understand the operational results and the changes to traffic patterns that these actions will bring. In other words, the benefits or decay in operations due to the implementation of the Build Alternatives are not linearly related but influenced by the modifications taking place at such time.

Build 1 includes capacity improvements at SW 137th Avenue and the opening of the south leg to traffic by the 2025 analysis year (the intersection leg actually opened in June 2022). Introduction of the south leg at SW 137th Avenue altered traffic patterns at SW 137th Avenue and SW 134th Avenue. Additionally, a County project to widen SW 137th Avenue from 2 lanes to 4 lanes is expected to be completed by 2030. While this project will improve traffic conditions by 2045, it will not affect conditions in the analysis year 2025. Starting with Build 1, the traffic control at the intersection of SW 134th Avenue will be upgraded to signal control. Additionally, capacity improvements will be implemented at the intersection of SW 127th Avenue. Under Build 2 and 3 alternatives, SR 994 is to be widened from 2 lanes to 4 lanes by FDOT. The primary difference between Build 2 and Build 3 is that Build 3 includes additional access management enhancements, which will divert traffic within the study corridor.

Due to the opening of the south leg at SW 137th Avenue and signal control upgrade at SW 134th Avenue, an Intersection Control Evaluation (ICE) was performed for the intersections of SR 994

at SW 137th Avenue and at SW 134th Avenue per the guidelines presented by FDOT's Manual on Intersection Control Evaluation (January 2021). The purpose of ICE is to consider multiple context-sensitive control strategies when planning a new or modified intersection. This was applicable for the intersection of SW 137th Avenue since the south leg was recently opened to traffic and introduced new vehicle movements to the intersection. It was also applicable for the intersection of SW 134th Avenue since a previous study by the Department (2017) recommended upgrading the stop-control condition to signal control. A Signal Warrant Analysis conducted for this PD&E Study also confirmed the need to install a traffic signal at SW 134th Avenue. No changes in intersection control were proposed for the SW 137th Avenue intersection based on the ICE results. Details of the ICE and Signal Warrant Analysis are included in ***Appendix B***.

Signalized Intersection of SW 137th Avenue:

As previously presented in ***Table 2-11***, this intersection is currently operating at LOS C or better with an overall average intersection delay of 33 seconds per vehicle or less during the AM and PM peak hours. At the beginning of this current study effort, the south leg at the intersection was under construction and closed to traffic. The south leg opened to traffic approximately in June 2022. Per the 2021 traffic data collected, all intersection movements are operating at LOS D or better, except the southbound left-turn movement at LOS F during the PM peak hour. The southbound left-turn movement is experiencing long vehicle queues and taking a few signal cycles for vehicles to complete the left-turn onto SR 994 eastbound during both peak hours. Additionally, the eastbound approach is experiencing long queues during the AM peak hour.

As presented in ***Table 4-17***, with the increase in traffic expected in 2025, the level of service at this intersection under No-Build conditions is expected to degrade to LOS F. Most intersection movements will operate at LOS F and experience long vehicular queues. The operations at the intersection will worsen by 2045. Signal timing improvements alone are not sufficient to mitigate the expected increase in traffic at the study intersection.

For the opening year 2025, operations at SW 137th Avenue are expected to show some improvement under Build 1. The overall average intersection delay per vehicle is projected to decrease from 119 to 65 seconds during the AM peak hour and from 159 to 121 seconds during the PM peak hour. Despite these improvements, the intersection level of service remains similar to No-Build conditions at LOS E or worse. By 2045, further improvements in intersection operations are anticipated due to the widening of SW 137th Avenue. The overall average intersection delay per vehicle is expected to decrease from 217 to 61 seconds during the AM peak hour and from 135 to 79 seconds during the PM peak hour. However, the intersection level of service remains at E for both peak hours.

Although significant operational improvements are anticipated with both Build Alternatives 2 and 3, Build 2 is expected to experience lower vehicular delay. For the opening year 2025, the level of services for both alternatives are projected to be LOS D for the AM peak hour and LOS E for the PM peak hour. The overall average intersection delay per vehicle is 38 seconds for Build 2 and 41 seconds for Build 3 during the AM peak hour. For the PM peak hour, the overall average intersection delay per vehicle is 55 seconds for Build 2 and 65 seconds for Build 3. By year 2045,

the intersection level of service improves to LOS D due to the widening of SW 137 Avenue. The overall average intersection delay per vehicle is 38 seconds for Build 2 and 40 seconds for Build 3 during the AM peak hour. For the PM peak hour, the overall average intersection delay per vehicle is 39 seconds for Build 2 and 43 seconds for Build 3.

To highlight the difference in total vehicular delays between Build 2 and Build 3, the total cumulative intersection vehicular delay for 2045 was calculated. For Build 2, the total delay is 36 hours during the AM and PM peak hours each, compared to 38 to 41 hours for Build 3 during the same periods, making Build 2 the better option at the intersection of SW 137 Avenue.

Table 4-17 No-Build and Build Alternative 1 Operational Results (2025 and 2045) for SW 137th Avenue

	NO BUILD - 2025							NO BUILD - 2045							BUILD 1 - 2025							BUILD 1 - 2045						
	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
AM Peak Hour	EBLT	70	*	*	*	*	*	EBLT	83	*	*	*	*	*	EBLT	71	56.1	1.1	53	0.44	E	EBLT	84	54.4	1.3	60	0.42	D
	EBT	401	68.3	10.7	707	1.01	E	EBT	450	398.4	71.8	736	1.80	F	EBT	519	146.5	24.3	917	1.19	F	EBT	561	151.3	27.7	1044	1.21	F
	EBRT	93	*	*	*	*	*	EBRT	116	*	*	*	*	*	EBRT	79	*	*	*	*	*	EBRT	98	*	*	*	*	*
	WBLT	201	*	*	*	*	*	WBLT	377	*	*	*	*	*	WBLT	219	53.4	3.2	127	0.60	D	WBLT	278	54.0	4.2	155	0.67	D
	WBT	390	93.5	15.3	770	1.09	F	WBT	434	345.7	77.9	830	1.69	F	WBT	379	37.8	4.0	442	0.65	D	WBT	413	35.3	4.0	515	0.66	D
	WBRT	245	15.6	1.1	93	0.24	B	WBRT	256	13.8	1.0	80	0.23	B	WBRT	244	18.5	1.3	24	0.10	B	WBRT	383	14.6	1.6	26	0.15	B
	NBLT	145	99.5	4.0	197	0.96	F	NBLT	181	71.3	3.6	222	0.88	E	NBLT	105	28.6	0.8	80	0.30	C	NBLT	131	37.8	1.4	97	0.48	D
	NBT	417	127.9	19.3	735	1.14	F	NBT	521	129.3	24.6	457	1.14	F	NBT	417	48.3	5.6	440	0.81	D	NBT	521	48.9	7.1	259	0.75	D
	NBRT	127	*	*	*	*	*	NBRT	165	*	*	*	*	*	NBRT	180	31.4	1.6	96	0.13	C	NBRT	243	39.3	2.7	65	0.16	D
	SBLT	137	137.7	5.2	207	1.07	F	SBLT	215	71.3	4.3	274	0.93	E	SBLT	178	53.6	2.7	107	0.57	D	SBLT	292	52.3	4.2	158	0.67	D
	SBT	283	271.6	32.4	677	1.47	F	SBT	353	117.2	11.5	352	1.10	F	SBT	283	61.0	4.8	358	0.89	E	SBT	353	39.5	3.9	165	0.67	D
	SBRT	146	*	*	*	*	*	SBRT	182	*	*	*	*	*	SBRT	97	26.2	0.7	30	0.07	C	SBRT	121	29.9	1.0	39	0.09	C
	Int	**2655**	**119.4**	**88.1**			F	**Int**	**3333**	**216.6**	**194.7**			F	**Int**	**2771**	**65.0**	**50.1**			E	**Int**	**3478**	**61.0**	**59.0**			E
PM Peak Hour	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
	EBLT	43	*	*	*	*	*	EBLT	51	*	*	*	*	*	EBLT	43	56.2	0.7	37	0.31	E	EBLT	51	56.1	0.8	42	0.35	E
	EBT	418	93.6	14.2	717	1.04	F	EBT	466	54.6	9.5	743	0.97	D	EBT	488	347.1	53.9	996	1.78	F	EBT	529	244.1	41.8	1049	1.53	F
	EBRT	87	*	*	*	*	*	EBRT	109	*	*	*	*	*	EBRT	71	*	*	*	*	*	EBRT	88	*	*	*	*	*
	WBLT	162	*	*	*	*	*	WBLT	218	*	*	*	*	*	WBLT	178	54.3	2.7	109	0.57	D	WBLT	241	54.8	3.7	140	0.65	D
	WBT	338	163.1	22.7	724	1.25	F	WBT	361	138.4	22.3	798	1.21	F	WBT	327	56.7	5.2	427	0.80	E	WBT	347	40.9	3.9	376	0.66	D
	WBRT	181	21.0	1.1	55	0.15	C	WBRT	286	16.4	1.3	108	0.28	B	WBRT	180	24.4	1.2	23	0.07	C	WBRT	295	16.6	1.4	22	0.12	B
	NBLT	138	133.4	5.1	204	1.07	F	NBLT	173	161.4	7.8	253	1.16	F	NBLT	87	21.3	0.5	57	0.27	C	NBLT	109	31.5	1.0	80	0.41	C
	NBT	256	37.7	4.2	389	0.69	D	NBT	319	45.2	6.3	230	0.65	D	NBT	256	26.7	1.9	233	0.37	C	NBT	319	36.1	3.2	159	0.36	D
	NBRT	148	*	*	*	*	*	NBRT	186	*	*	*	*	*	NBRT	214	23.9	1.4	53	0.14	C	NBRT	274	34.3	2.6	69	0.18	C
	SBLT	178	26.1	1.3	133	0.61	C	SBLT	278	97.3	7.5	333	1.04	F	SBLT	237	53.6	3.5	135	0.64	D	SBLT	379	52.9	5.6	199	0.74	D
	SBT	501	369.2	65.6	1000	1.71	F	SBT	626	302.5	67.2	606	1.55	F	SBT	501	134.8	18.8	705	1.18	F	SBT	626	54.4	9.5	364	0.93	D
	SBRT	139	*	*	*	*	*	SBRT	174	*	*	*	*	*	SBRT	98	18.0	0.5	26	0.07	B	SBRT	123	23.5	0.8	235	0.09	C
	Int	**2589**	**158.8**	**114.2**			F	**Int**	**3247**	**135.1**	**121.9**			F	**Int**	**2680**	**121.3**	**90.2**			F	**Int**	**3381**	**79.0**	**74.2**			E

Notes: “v/c” indicates volume over capacity; values greater than 1 indicates over capacity. “*” indicates movement is shared. “N/A” indicates movement does not exist or results are not calculated by Synchro. LOS E and F are highlighted in orange and red, respectively.

Table 4-18 Build Alternatives 2 and 3 Operational Results (2025 and 2045) for SW 137th Avenue

	BUILD 2 - 2025							BUILD 2 - 2045							BUILD 3 - 2025							BUILD 3 - 2045						
	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
AM Peak Hour	EBLT	71	56.1	1.1	53	0.44	E	EBLT	84	54.6	1.3	61	0.42	D	EBLT	71	56.1	1.1	53	0.44	E	EBLT	84	54.4	1.3	60	0.42	D
	EBT	519	44.1	7.3	457	0.71	D	EBT	562	36.5	6.7	405	0.64	D	EBT	518	43.3	7.2	449	0.70	D	EBT	560	36.5	6.7	423	0.64	D
	EBRT	79	*	*	*	*	*	EBRT	98	*	*	*	*	*	EBRT	79	*	*	*	*	*	EBRT	98	*	*	*	*	*
	WBLT	219	46.2	2.8	129	0.60	D	WBLT	278	44.1	3.4	135	0.67	D	WBLT	206	53.4	3.1	121	0.59	D	WBLT	265	53.5	3.9	147	0.65	D
	WBT	379	28.8	3.0	209	0.38	C	WBT	413	21.8	2.5	204	0.35	C	WBT	357	32.5	3.2	195	0.36	C	WBT	393	27.1	3.0	193	0.33	C
	WBRT	243	1.6	0.1	5	0.10	A	WBRT	383	10.6	1.1	107	0.18	B	WBRT	230	21.0	1.3	28	0.09	C	WBRT	365	14.9	1.5	27	0.14	B
	NBLT	105	54.8	1.6	73	0.45	D	NBLT	131	54.5	2.0	87	0.51	D	NBLT	105	54.8	1.6	73	0.45	D	NBLT	131	54.5	2.0	87	0.51	D
	NBT	417	39.4	4.6	370	0.72	D	NBT	521	47.9	6.9	254	0.73	D	NBT	417	39.4	4.6	370	0.72	D	NBT	521	47.4	6.9	252	0.72	D
	NBRT	181	28.2	1.4	36	0.12	C	NBRT	242	39.7	2.7	90	0.24	D	NBRT	181	28.2	1.4	45	0.12	C	NBRT	241	38.6	2.6	63	0.16	D
	SBLT	177	53.5	2.6	106	0.57	D	SBLT	292	52.8	4.3	158	0.67	D	SBLT	177	53.5	2.6	106	0.57	D	SBLT	292	52.8	4.3	158	0.67	D
	SBT	283	54.5	4.3	293	0.86	D	SBT	353	45.7	4.5	173	0.74	D	SBT	283	54.5	4.3	293	0.86	D	SBT	377	48.1	5.0	185	0.78	D
	SBRT	97	25.3	0.7	3	0.07	C	SBRT	121	32.6	1.1	20	0.09	C	SBRT	97	25.3	0.7	21	0.07	C	SBRT	121	32.3	1.1	41	0.09	C
	Int	**2770**	**38.4**	**29.6**			**D**	**Int**	**3478**	**37.7**	**36.4**			**D**	**Int**	**2721**	**41.1**	**31.1**			**D**	**Int**	**3448**	**39.9**	**38.2**			**D**
	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
PM Peak Hour	EBLT	43	56.2	0.7	53	0.31	E	EBLT	51	56.1	0.8	42	0.60	E	EBLT	43	56.2	0.7	37	0.31	E	EBLT	51	56.1	0.8	42	0.35	E
	EBT	488	70.1	10.9	457	0.94	E	EBT	529	54.8	9.4	445	0.36	D	EBT	487	94.2	14.6	407	1.03	F	EBT	527	61.2	10.5	409	0.89	E
	EBRT	71	*	*	*	*	*	EBRT	88	*	*	*	*	*	EBRT	71	*	*	*	*	*	EBRT	88	*	*	*	*	*
	WBLT	178	53.4	2.6	129	0.55	D	WBLT	242	50.7	3.4	145	0.74	D	WBLT	177	53.5	2.6	107	0.55	D	WBLT	242	54.2	3.6	139	0.64	D
	WBT	327	39.4	3.6	209	0.42	D	WBT	347	33.5	3.2	192	0.37	C	WBT	325	43.5	3.9	176	0.48	D	WBT	346	36.6	3.5	176	0.40	D
	WBRT	180	20.5	1.0	5	0.07	C	WBRT	294	1.3	0.1	3	0.18	A	WBRT	179	22.9	1.1	25	0.07	C	WBRT	293	2.5	0.2	6	0.12	A
	NBLT	87	19.6	0.5	73	0.14	B	NBLT	109	26.8	0.8	30	0.22	C	NBLT	87	54.5	1.3	62	0.39	D	NBLT	109	53.8	1.6	73	0.43	D
	NBT	256	26.8	1.9	370	0.37	C	NBT	319	32.8	2.9	141	0.37	C	NBT	256	23.8	1.7	220	0.34	C	NBT	319	31.3	2.8	146	0.30	C
	NBRT	214	24.0	1.4	36	0.14	C	NBRT	274	31.4	2.4	61	0.73	C	NBRT	214	21.5	1.3	50	0.14	C	NBRT	274	30.1	2.3	63	0.18	C
	SBLT	237	53.4	3.5	106	0.63	D	SBLT	379	51.9	5.5	195	0.80	D	SBLT	236	53.5	3.5	134	0.64	D	SBLT	378	54.2	5.7	203	0.76	D
	SBT	501	155.1	21.6	293	1.23	F	SBT	626	39.8	6.9	283	0.85	D	SBT	501	123.9	17.2	705	1.16	F	SBT	640	51.3	9.1	387	0.92	D
	SBRT	98	19.1	0.5	3	0.07	B	SBRT	123	20.8	0.7	16	0.09	C	SBRT	98	17.3	0.5	21	0.07	B	SBRT	123	22.5	0.8	39	0.09	C
	Int	**2680**	**54.9**	**48.2**			**E**	**Int**	**3381**	**38.5**	**36.1**			**D**	**Int**	**2674**	**65.3**	**48.5**			**E**	**Int**	**3390**	**43.4**	**40.9**			**D**

Notes: “v/c” indicates volume over capacity; values greater than 1 indicates over capacity. “*” indicates movement is shared. “N/A” indicates movement does not exist or results are not calculated by Synchro. LOS E and F are highlighted in orange and red, respectively.

Stopped-Control Intersection (to be upgraded to signal control) of SW 134th Avenue:

As previously presented in ***Table 2-11***, the through movements on SR 994 are currently free and not under traffic control. Although the eastbound and westbound left-turn volumes are low, vehicles would block the single through lanes on SR 994 when turning left due to the lack of exclusive left-turn lanes. Based on the HCM methodology, the eastbound and westbound left-turns are serviced at LOS B or better. The critical movements are the northbound and southbound single lane approaches operating under stop control at LOS F with excessive delay, except the southbound approach during the PM peak hour operating at LOS D.

As presented in ***Table 4-19***, with the increase in traffic expected in 2025, the level of service at this intersection under No-Build conditions is expected to further degrade. The service level might be rated as F due to poor traffic flow on side streets, as the HCM 6th methodology does not account for this due to east and west directions being in free flow conditions. The operations at the intersection will worsen by 2045.

With the implementation of any of the Build alternatives, the overall intersection operation during the AM and PM peak hours is improved to LOS C or better in 2025 and 2045 (from estimated LOS F). The intersection is upgraded to signal control under the Build alternatives. The overall average intersection delay per vehicle is expected to be 10 to 33 seconds with any of the alternatives. Build 2 and 3 seem to provide better operational benefits when compared to Build 1 with an average vehicular delay of 15 seconds vs. 25 seconds during each peak hour.

Table 4-19 No-Build and Build Alternative 1 Operational Results (2025 and 2045) for SW 134th Avenue

	NO BUILD 2025 (STOP CONTROL)							NO BUILD 2045 (STOP CONTROL)							BUILD 1 2025							BUILD 1 2045						
	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
AM Peak Hour	EBLT	14	10.3	0.0	0	0.02	B	EBLT	18	11.7	0.1	0	0.03	B	EBLT	20	12.3	0.1	22	0.06	B	EBLT	25	24.9	0.2	15	0.12	C
	EBT	626	0.0	0.0	N/A	N/A	N/A	EBT	774	0.0	0.0	N/A	N/A	N/A	EBT	823	15.9	3.6	641	0.72	B	EBT	1007	35.4	9.9	931	0.95	D
	EBRT	38	N/A	N/A	N/A	N/A	N/A	EBRT	56	N/A	N/A	N/A	N/A	N/A	EBRT	42	5.0	0.1	0	0.04	A	EBRT	75	6.8	0.1	18	0.07	A
	WBLT	74	9.2	0.2	0	0.08	A	WBLT	74	10.1	0.2	0	0.10	B	WBLT	79	12.5	0.3	37	0.24	B	WBLT	98	32.3	0.9	88	0.61	D
	WBT	765	0.0	0.0	N/A	N/A	N/A	WBT	815	0.0	0.0	N/A	N/A	N/A	WBT	765	8.2	1.7	456	0.58	A	WBT	957	14.2	3.8	735	0.76	B
	WBRT	50	N/A	N/A	N/A	N/A	N/A	WBRT	63	N/A	N/A	N/A	N/A	N/A	WBRT	53	3.9	0.1	9	0.05	A	WBRT	66	5.0	0.1	14	0.06	A
	NBLT	44	*	*	*	*	*	NBLT	66	*	*	*	*	*	NBLT	51	48.7	0.7	69	0.34	D	NBLT	85	48.4	1.1	103	0.44	D
	NBT	18	47.1	2.2	103	0.70	E	NBT	22	468.7	28.5	396	1.84	F	NBT	19	49.0	1.8	65	0.57	D	NBT	23	46.4	2.1	74	0.57	D
	NBRT	105	*	*	*	*	*	NBRT	131	*	*	*	*	*	NBRT	111	*	*	*	*	*	NBRT	139	*	*	*	*	*
	SBLT	46	*	*	*	*	*	SBLT	57	*	*	*	*	*	SBLT	65	56.6	1.0	96	0.45	E	SBLT	81	56.1	1.3	114	0.50	E
	SBT	42	77.0	2.5	106	0.76	F	SBT	42	481.3	17.0	255	1.76	F	SBT	42	59.5	1.2	82	0.63	E	SBT	52	53.8	1.3	101	0.65	D
	SBRT	28	*	*	*	*	*	SBRT	28	*	*	*	*	*	SBRT	28	*	*	*	*	*	SBRT	35	*	*	*	*	*
	Int	**1850**	**9.5**	**4.9**			**E	**Int**	**2146**	**71.5**	**45.8**			**F	**Int**	**2098**	**18.0**	**10.5**			**B**	**Int**	**2643**	**28.3**	**20.8**			**C**
PM Peak Hour	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
	EBLT	20	9.7	0.1	0	0.03	B	EBLT	25	10.5	0.1	0	0.04	B	EBLT	26	8.0	0.1	26	0.06	A	EBLT	33	14.5	0.1	33	0.11	B
	EBT	685	0.0	0.0	N/A	N/A	N/A	EBT	850	0.0	0.0	N/A	N/A	N/A	EBT	909	17.5	4.4	1036	0.78	B	EBT	959	49.0	13.1	1027	1.01	D
	EBRT	51	N/A	N/A	N/A	N/A	N/A	EBRT	70	N/A	N/A	N/A	N/A	N/A	EBRT	55	4.9	0.1	9	0.05	A	EBRT	253	5.8	0.4	31	0.09	A
	WBLT	54	9.3	0.1	0	0.06	A	WBLT	68	10.6	0.2	0	0.10	A	WBLT	58	14.1	0.2	31	0.20	B	WBLT	73	37.9	0.8	60	0.59	D
	WBT	623	0.0	0.0	N/A	N/A	N/A	WBT	779	0.0	0.0	N/A	N/A	N/A	WBT	625	5.8	1.0	344	0.46	A	WBT	781	9.1	2.0	447	0.60	A
	WBRT	46	N/A	N/A	N/A	N/A	N/A	WBRT	57	N/A	N/A	N/A	N/A	N/A	WBRT	49	3.3	0.0	8	0.04	A	WBRT	62	4.3	0.1	11	0.06	A
	NBLT	35	*	*	*	*	*	NBLT	58	*	*	*	*	*	NBLT	41	50.8	0.6	57	0.29	D	NBLT	234	48.7	3.2	97	0.44	D
	NBT	37	36.5	1.6	81	0.61	E	NBT	46	289.9	17.5	323	1.46	F	NBT	39	53.3	2.0	81	0.67	D	NBT	49	50.0	2.3	123	0.68	D
	NBRT	90	*	*	*	*	*	NBRT	113	*	*	*	*	*	NBRT	96	*	*	*	*	*	NBRT	120	*	*	*	*	*
	SBLT	30	*	*	*	*	*	SBLT	38	*	*	*	*	*	SBLT	38	58.0	0.6	66	0.33	E	SBLT	49	57.1	0.8	79	0.39	E
	SBT	23	36.5	0.8	44	0.43	E	SBT	29	227.6	6.3	158	1.16	F	SBT	23	60.8	0.8	58	0.56	E	SBT	29	57.7	1.0	67	0.56	E
	SBRT	26	*	*	*	*	*	SBRT	33	*	*	*	*	*	SBRT	26	*	*	*	*	*	SBRT	33	*	*	*	*	*
	Int	**1720**	**5.5**	**2.6**			**E	**Int**	**2166**	**40.0**	**24.1**			**F	**Int**	**1985**	**17.8**	**9.8**			**B**	**Int**	**2675**	**33.5**	**23.7**			**C**

Notes: “v/c” indicates volume over capacity; values greater than 1 indicates over capacity. “*” indicates movement is shared. “**” LOS estimated per intersection delay obtained from analysis since it is not determined by software. For No-Build, SW 134th Avenue is under stopped control. “N/A” indicates movement does not exist or results are not calculated by Synchro. LOS E and F are highlighted in orange and red, respectively.

Table 4-20 Build Alternatives 2 and 3 Operational Results (2025 and 2045) for SW 134th Avenue

	BUILD 2 2025							BUILD 2 2045							BUILD 3 2025							BUILD 3 2045						
	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
AM Peak Hour	EBLT	20	8.7	0.0	29	0.05	A	EBLT	25	9.2	0.1	35	0.08	A	EBLT	22	7.7	0.0	31	0.05	A	EBLT	27	9.4	0.1	38	0.08	A
	EBT	665	11.4	2.1	418	0.41	B	EBT	1009	11.0	3.1	518	0.48	B	EBT	812	10.1	2.3	420	0.39	B	EBT	994	12.0	3.3	514	0.49	B
	EBRT	207	6.8	0.4	15	0.04	A	EBRT	73	5.1	0.1	49	0.07	A	EBRT	42	5.9	0.1	22	0.04	A	EBRT	75	5.8	0.1	59	0.07	A
	WBLT	79	7.7	0.2	39	0.19	A	WBLT	98	7.8	0.2	58	0.27	A	WBLT	124	7.0	0.2	69	0.28	A	WBLT	155	9.3	0.4	90	0.42	A
	WBT	765	6.5	1.4	164	0.32	A	WBT	957	6.3	1.7	274	0.39	A	WBT	710	5.3	1.0	182	0.29	A	WBT	889	6.6	1.6	258	0.37	A
	WBRT	53	5.0	0.1	12	0.05	A	WBRT	66	4.5	0.1	19	0.06	A	WBRT	53	4.2	0.1	11	0.05	A	WBRT	66	4.8	0.1	20	0.06	A
	NBLT	170	46.2	2.2	68	0.26	D	NBLT	85	45.5	1.1	89	0.43	D	NBLT	51	48.0	0.7	62	0.36	D	NBLT	85	45.0	1.1	87	0.46	D
	NBT	19	62.3	2.2	75	0.83	E	NBT	23	46.3	2.1	62	0.58	D	NBT	47	48.2	2.1	89	0.63	D	NBT	57	46.5	2.5	113	0.65	D
	NBRT	111	*	*	*	*	*	NBRT	139	*	*	*	*	*	NBRT	111	*	*	*	*	*	NBRT	139	*	*	*	*	*
	SBLT	65	46.9	0.8	80	0.41	D	SBLT	81	55.9	1.3	113	0.50	E	SBLT	54	56.4	0.8	82	0.40	E	SBLT	67	56.2	1.0	95	0.46	E
	SBT	42	51.8	1.0	84	0.43	D	SBT	52	56.9	1.4	100	0.63	E	SBT	70	62.5	1.7	121	0.76	E	SBT	87	59.6	2.0	145	0.77	E
	SBRT	28	*	*	*	*	*	SBRT	35	*	*	*	*	*	SBRT	28	*	*	*	*	*	SBRT	35	*	*	*	*	*
	Int	**2224**	**15.6**	**10.5**			**B**	**Int**	**2643**	**15.0**	**11.0**			**B**	**Int**	**2124**	**15.5**	**9.1**			**B**	**Int**	**2676**	**16.5**	**12.3**			**B**
PM Peak Hour	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
	EBLT	26	6.2	0.0	23	0.06	A	EBLT	33	6.9	0.1	14	0.09	A	EBLT	27	6.5	0.0	24	0.06	A	EBLT	34	7.1	0.1	32	0.09	A
	EBT	767	8.5	1.8	428	0.41	A	EBT	1112	10.1	3.1	553	0.51	B	EBT	902	8.8	2.2	405	0.41	A	EBT	1103	10.3	3.2	552	0.51	B
	EBRT	202	4.9	0.3	24	0.05	A	EBRT	93	4.6	0.1	36	0.09	A	EBRT	55	5.1	0.1	22	0.05	A	EBRT	93	4.7	0.1	35	0.09	A
	WBLT	58	5.5	0.1	31	0.14	A	WBLT	73	7.1	0.1	40	0.22	A	WBLT	85	5.8	0.1	43	0.20	A	WBLT	107	7.7	0.2	56	0.31	A
	WBT	625	4.0	0.7	133	0.24	A	WBT	781	4.9	1.1	185	0.31	A	WBT	615	4.1	0.7	133	0.24	A	WBT	768	4.9	1.0	186	0.30	A
	WBRT	49	3.3	0.0	8	0.04	A	WBRT	62	3.7	0.1	16	0.05	A	WBRT	49	3.3	0.0	8	0.04	A	WBRT	62	3.8	0.1	16	0.05	A
	NBLT	187	50.4	2.6	57	0.29	D	NBLT	76	47.4	1.0	87	0.40	D	NBLT	41	50.3	0.6	56	0.31	D	NBLT	76	47.6	1.0	86	0.43	D
	NBT	39	52.9	2.0	80	0.67	D	NBT	49	50.0	2.3	98	0.68	D	NBT	44	52.8	2.1	83	0.67	D	NBT	56	50.2	2.5	114	0.69	D
	NBRT	96	*	*	*	*	*	NBRT	120	*	*	*	*	*	NBRT	96	*	*	*	*	*	NBRT	120	*	*	*	*	*
	SBLT	38	57.5	0.6	66	0.33	E	SBLT	49	57.1	0.8	79	0.39	E	SBLT	37	57.4	0.6	64	0.32	E	SBLT	46	57.1	0.7	73	0.37	E
	SBT	23	60.5	0.8	58	0.56	E	SBT	29	58.0	1.0	67	0.57	E	SBT	36	63.3	1.1	75	0.68	E	SBT	46	60.8	1.3	93	0.69	E
	SBRT	26	*	*	*	*	*	SBRT	33	*	*	*	*	*	SBRT	26	*	*	*	*	*	SBRT	33	*	*	*	*	*
	Int	**2136**	**12.8**	**9.0**			**B**	**Int**	**2510**	**13.9**	**9.7**			**B**	**Int**	**2013**	**13.4**	**7.5**			**B**	**Int**	**2544**	**14.4**	**10.2**			**B**

Notes: Notes: “v/c” indicates volume over capacity; values greater than 1 indicates over capacity. “*” indicates movement is shared. “N/A” indicates movement does not exist or results are not calculated by Synchro. LOS E and F are highlighted in orange and red, respectively.

Signalized Intersection of SW 127th Avenue:

As previously presented in ***Table 2-11***, this intersection is currently operating at LOS D with an overall average intersection delay of approximately 44 to 51 seconds per vehicle during the AM and PM peak hours, respectively. The northbound approach is serviced at LOS F and experiences significant queues, due to the high volume (315 vehicles) of right turns during the AM peak hour. Although the right-turn volume decreases during the PM peak hour, the northbound through movement is being serviced at LOS E due to the single lane operation and signal progression priority of SR 994 over SW 127th Avenue. The southbound movement experiences an increase in delay due to the slightly higher volume during the PM peak hour when compared to the earlier period.

As presented in ***Table 4-21***, with the increase in traffic expected in 2025, the level of service at this intersection under No-Build conditions is expected to be maintained at LOS D. This is possible due to the northbound right-turn to be constructed by the County and optimization of the intersection timing splits. However, the operations at the intersection will worsen by 2045 to LOS F. Further signal timing improvements alone are not sufficient to mitigate the expected increase in traffic at the study intersection.

With the implementation of any of the Build alternatives, the overall intersection operation during the AM and PM peak hours is improved to LOS C or better in 2025 and 2045 (from LOS F). The overall average intersection delay per vehicle is expected to be approximately 35 to 50 seconds with any of the alternatives. Although some intersection movements are expected to operate at LOS E, the vehicular queues are moderate. The overall benefits at this intersection are similar under any of the Build alternatives since the improvements are very similar.

Table 4-21 No-Build and Build Alternative 1 Operational Results (2025 and 2045) for SW 127th Avenue

	NO BUILD 2025							NO BUILD 2045							BUILD 1 2025							BUILD 1 2045						
	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
AM Peak Hour	EBLT	126	22.8	0.8	111	0.31	C	EBLT	157	29.9	1.3	126	0.44	C	EBLT	143	14.5	0.6	97	0.32	B	EBLT	179	18.9	0.9	126	0.48	B
	EBT	897	42.2	10.5	740	0.71	D	EBT	1112	113.3	35.0	974	1.08	F	EBT	1043	29.5	8.5	694	0.69	C	EBT	1285	58.7	21.0	1033	0.95	E
	EBRT	106	42.1	1.2	*	0.71	D	EBRT	132	114.7	4.2	*	1.09	F	EBRT	120	29.5	1.0	*	0.69	C	EBRT	150	60.7	2.5	*	0.96	E
	WBLT	266	42.5	3.1	353	0.87	D	WBLT	333	120.2	11.1	559	1.06	F	WBLT	217	67.2	4.1	145	0.80	E	WBLT	271	70.8	5.3	177	0.84	E
	WBT	498	25.6	3.5	252	0.31	C	WBT	622	31.4	5.4	304	0.42	C	WBT	560	17.7	2.8	240	0.31	B	WBT	701	23.9	4.7	318	0.43	C
	WBRT	161	21.3	1.0	42	0.20	C	WBRT	201	24.3	1.4	41	0.27	C	WBRT	131	13.1	0.5	33	0.15	B	WBRT	164	17.0	0.8	37	0.20	B
	NBLT	201	58.4	3.3	222	0.80	E	NBLT	251	101.5	7.1	430	0.99	F	NBLT	168	68.2	3.2	118	0.77	E	NBLT	210	67.2	3.9	142	0.80	E
	NBT	219	50.0	3.0	272	0.48	D	NBT	274	55.3	4.2	367	0.58	E	NBT	144	54.0	2.2	185	0.49	D	NBT	180	50.8	2.5	221	0.51	D
	NBRT	356	79.4	7.9	134	0.93	E	NBRT	445	145.7	18.0	328	1.14	F	NBRT	235	49.1	3.2	169	0.65	D	NBRT	294	46.0	3.8	230	0.68	D
	SBLT	104	53.7	1.6	119	0.46	D	SBLT	130	53.4	1.9	154	0.58	D	SBLT	67	48.4	0.9	83	0.32	D	SBLT	84	44.9	1.0	95	0.36	D
	SBT	241	79.6	6.4	411	0.88	E	SBT	301	130.3	13.1	648	1.07	F	SBT	156	58.9	2.6	214	0.60	E	SBT	195	57.6	3.1	262	0.63	E
	SBRT	50	*	*	*	*	*	SBRT	62	*	*	*	*	*	SBRT	38	52.6	0.6	0	0.17	D	SBRT	47	49.5	0.6	0	0.17	D
	Int	**3225**	**47.2**	**42.3**			**D**	**Int**	**4020**	**92.2**	**102.8**			**F**	**Int**	**3022**	**35.7**	**29.9**			D	**Int**	**3760**	**48.4**	**50.2**			D
PM Peak Hour	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
	EBLT	62	28.8	0.5	59	0.17	C	EBLT	77	32.4	0.7	72	0.26	C	EBLT	74	14.3	0.3	57	0.17	B	EBLT	92	18.5	0.5	75	0.27	B
	EBT	725	48.2	9.7	641	0.70	D	EBT	900	82.3	20.6	811	0.97	F	EBT	848	25.7	6.1	583	0.59	C	EBT	1091	44.5	13.5	997	0.85	D
	EBRT	128	48.2	1.7	*	0.70	D	EBRT	160	82.6	3.7	*	0.97	F	EBRT	155	25.7	1.1	*	0.59	C	EBRT	193	45.2	2.4	*	0.86	D
	WBLT	346	51.4	4.9	460	0.94	D	WBLT	433	224.7	27.0	809	1.34	F	WBLT	286	65.9	5.2	182	0.83	E	WBLT	357	60.1	6.0	219	0.86	E
	WBT	570	26.2	4.1	269	0.35	C	WBT	712	30.7	6.1	371	0.46	C	WBT	641	14.5	2.6	274	0.32	B	WBT	801	18.7	4.2	373	0.44	B
	WBRT	125	17.1	0.6	29	0.15	B	WBRT	156	23.4	1.0	41	0.21	C	WBRT	104	9.0	0.3	25	0.10	A	WBRT	130	11.0	0.4	30	0.14	B
	NBLT	164	62.8	2.9	234	0.81	E	NBLT	205	77.7	4.4	313	0.91	E	NBLT	134	69.2	2.6	99	0.74	E	NBLT	168	64.2	3.0	120	0.78	E
	NBT	208	52.9	3.1	288	0.49	D	NBT	260	46.4	3.4	324	0.50	D	NBT	138	61.7	2.4	184	0.64	E	NBT	172	55.6	2.7	216	0.65	E
	NBRT	212	56.5	3.3	71	0.60	E	NBRT	265	49.7	3.7	69	0.61	D	NBRT	140	47.1	1.8	43	0.42	D	NBRT	175	41.4	2.0	66	0.44	D
	SBLT	146	43.0	1.7	164	0.48	D	SBLT	183	66.0	3.4	201	0.74	E	SBLT	94	50.6	1.3	107	0.46	D	SBLT	117	45.7	1.5	121	0.51	D
	SBT	308	88.1	9.3	576	0.95	F	SBT	385	177.3	23.4	861	1.21	F	SBT	198	69.5	3.8	257	0.86	E	SBT	247	57.6	4.0	309	0.88	E
	SBRT	73	*	*	*	*	*	SBRT	91	*	*	*	*	*	SBRT	57	55.9	0.9	*	0.29	E	SBRT	71	52.0	1.0	0	0.29	E
	Int	**3067**	**49.2**	**41.9**			**D**	**Int**	**3827**	**91.6**	**97.3**			**F**	**Int**	**2869**	**35.6**	**28.3**			D	**Int**	**3614**	**43.3**	**41.0**			D

Notes: “v/c” indicates volume over capacity; values greater than 1 indicates over capacity. “*” indicates movement is shared. “N/A” indicates movement does not exist or results are not calculated by Synchro. LOS E and F are highlighted in orange and red, respectively.

Table 4-22 Build Alternatives 2 and 3 Operational Results (2025 and 2045) for SW 127th Avenue

	BUILD 2 2025							BUILD 2 2045						
	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
AM Peak Hour	EBLT	143	14.5	0.6	100	0.32	B	EBLT	179	18.8	0.9	117	0.48	B
	EBT	1043	25.5	7.4	562	0.62	C	EBT	1284	39.9	14.2	801	0.86	D
	EBRT	120	18.2	0.6	12	0.17	B	EBRT	150	23.6	1.0	34	0.24	C
	WBLT	217	68.2	4.1	146	0.81	E	WBLT	271	72.4	5.5	179	0.84	E
	WBT	560	17.7	2.8	240	0.31	B	WBT	701	23.7	4.6	301	0.43	C
	WBRT	131	13.0	0.5	31	0.15	B	WBRT	164	16.7	0.8	34	0.20	B
	NBLT	168	51.0	2.4	183	0.68	D	NBLT	210	55.0	3.2	249	0.76	D
	NBT	144	54.2	2.2	188	0.50	D	NBT	180	51.2	2.6	230	0.52	D
	NBRT	235	49.8	3.3	149	0.65	D	NBRT	294	47.2	3.9	246	0.69	D
	SBLT	67	52.2	1.0	82	0.31	D	SBLT	84	48.9	1.1	100	0.36	D
	SBT	156	69.5	3.0	217	0.78	E	SBT	195	71.4	3.9	268	0.80	E
	SBRT	38	57.3	0.6	0	0.22	E	SBRT	47	54.4	0.7	0	0.23	D
	Int	**3022**	**33.7**	**28.3**			**C**	**Int**	**3759**	**40.5**	**42.3**			**D**
PM Peak Hour	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
	EBLT	74	16.1	0.3	60	0.18	B	EBLT	92	20.8	0.5	77	0.29	C
	EBT	892	25.5	6.3	497	0.55	C	EBT	1091	37.7	11.4	751	0.78	D
	EBRT	155	20.6	0.9	69	0.23	C	EBRT	193	27.4	1.5	111	0.33	C
	WBLT	286	71.9	5.7	182	0.85	E	WBLT	357	77.2	7.7	228	0.88	E
	WBT	641	16.6	3.0	284	0.34	B	WBT	801	22.5	5.0	400	0.46	C
	WBRT	104	10.5	0.3	26	0.11	B	WBRT	130	13.4	0.5	32	0.15	B
	NBLT	134	50.4	1.9	142	0.64	D	NBLT	168	51.4	2.4	166	0.72	D
	NBT	138	56.4	2.2	181	0.52	E	NBT	172	53.1	2.5	215	0.54	D
	NBRT	140	43.8	1.7	42	0.38	D	NBRT	175	38.8	1.9	49	0.40	D
	SBLT	94	49.4	1.3	104	0.40	D	SBLT	117	45.7	1.5	118	0.44	D
	SBT	198	69.5	3.8	257	0.86	E	SBT	247	70.2	4.8	309	0.88	E
	SBRT	57	55.9	0.9	0	0.29	E	SBRT	71	52.8	1.0	4	0.29	D
	Int	**2913**	**34.9**	**28.2**			**C**	**Int**	**3614**	**40.6**	**40.7**			**D**

	BUILD 3 2025							BUILD 3 2045						
	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
AM Peak Hour	EBLT	143	14.5	0.6	100	0.32	B	EBLT	179	18.9	0.9	122	0.48	B
	EBT	969	24.4	6.6	507	0.58	C	EBT	1189	36.3	12.0	724	0.80	D
	EBRT	120	18.2	0.6	12	0.17	B	EBRT	150	23.6	1.0	35	0.24	C
	WBLT	217	68.2	4.1	146	0.81	E	WBLT	271	72.4	5.5	179	0.84	E
	WBT	560	17.7	2.8	240	0.31	B	WBT	701	23.8	4.6	310	0.43	C
	WBRT	131	13.0	0.5	31	0.15	B	WBRT	164	16.8	0.8	34	0.20	B
	NBLT	168	51.0	2.4	183	0.68	D	NBLT	210	53.1	3.1	228	0.76	D
	NBT	144	54.2	2.2	188	0.50	D	NBT	180	51.2	2.6	230	0.52	D
	NBRT	235	49.8	3.3	144	0.65	D	NBRT	294	47.2	3.9	229	0.69	D
	SBLT	67	52.2	1.0	82	0.31	D	SBLT	84	49.2	1.1	98	0.36	D
	SBT	156	69.5	3.0	217	0.78	E	SBT	195	73.3	4.0	268	0.82	E
	SBRT	38	57.3	0.6	0	0.22	E	SBRT	47	54.8	0.7	0	0.23	D
	Int	**2948**	**33.6**	**27.5**			**C**	**Int**	**3664**	**39.4**	**40.1**			**D**
PM Peak Hour	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
	EBLT	74	16.1	0.3	60	0.18	B	EBLT	92	20.8	0.5	77	0.29	C
	EBT	854	25.0	5.9	470	0.53	C	EBT	1042	36.2	10.5	699	0.74	D
	EBRT	155	20.6	0.9	64	0.23	C	EBRT	193	27.4	1.5	106	0.33	C
	WBLT	286	71.9	5.7	182	0.85	E	WBLT	357	77.2	7.7	228	0.88	E
	WBT	641	16.6	3.0	284	0.34	B	WBT	801	22.5	5.0	400	0.46	C
	WBRT	104	10.5	0.3	26	0.11	B	WBRT	130	13.4	0.5	32	0.15	B
	NBLT	134	50.4	1.9	142	0.64	D	NBLT	168	51.4	2.4	166	0.72	D
	NBT	138	56.4	2.2	181	0.52	E	NBT	172	53.1	2.5	215	0.54	D
	NBRT	140	43.8	1.7	42	0.38	D	NBRT	175	38.8	1.9	48	0.40	D
	SBLT	94	49.4	1.3	104	0.40	D	SBLT	117	45.7	1.5	118	0.44	D
	SBT	198	69.5	3.8	257	0.86	E	SBT	247	70.2	4.8	309	0.88	E
	SBRT	57	55.9	0.9	0	0.29	E	SBRT	71	52.8	1.0	4	0.29	D
	Int	**2875**	**34.9**	**27.9**			**C**	**Int**	**3565**	**40.2**	**39.8**			**D**

Notes: “v/c” indicates volume over capacity; values greater than 1 indicates over capacity. “*” indicates movement is shared. “N/A” indicates movement does not exist or results are not calculated by Synchro. LOS E and F are highlighted in orange and red, respectively.

Stop-Controlled Intersections:

The critical movements at the stop-controlled intersections within the study limits include making a left-turn from the side streets or mainline SR 994. This is due to the lack of left-turning lanes and gaps on SR 994 given only one travel lane in each direction. ***Table 4-23*** and ***Table 4-24*** present a summary of the average vehicular delay, 95th percentile queue length, and level of service for all left-turn movements at each intersection for the No-Build and Build alternatives.

Although there are several left-turning movements expected to operate at LOS F for No-Build conditions 2025 and 2045 during the AM and PM peak hours, most of these movements experience short queues. However, the southbound left-turn at SW 130 Avenue and the northbound left-turns at SW 132 Avenue and SW 133 Avenue are expected to experience significant queuing by 2045 during the AM peak hour. For No-Build 2045, the 95th percentile queue for these movements at SW 130 Avenue, SW 132 Avenue, and SW 133 Avenue are 363, 752, and 506 feet, respectively. These traffic deficiencies do not improve under Build 1, as presented in the traffic simulation screen captured from SimTraffic and summarized in ***Table 4-23***.

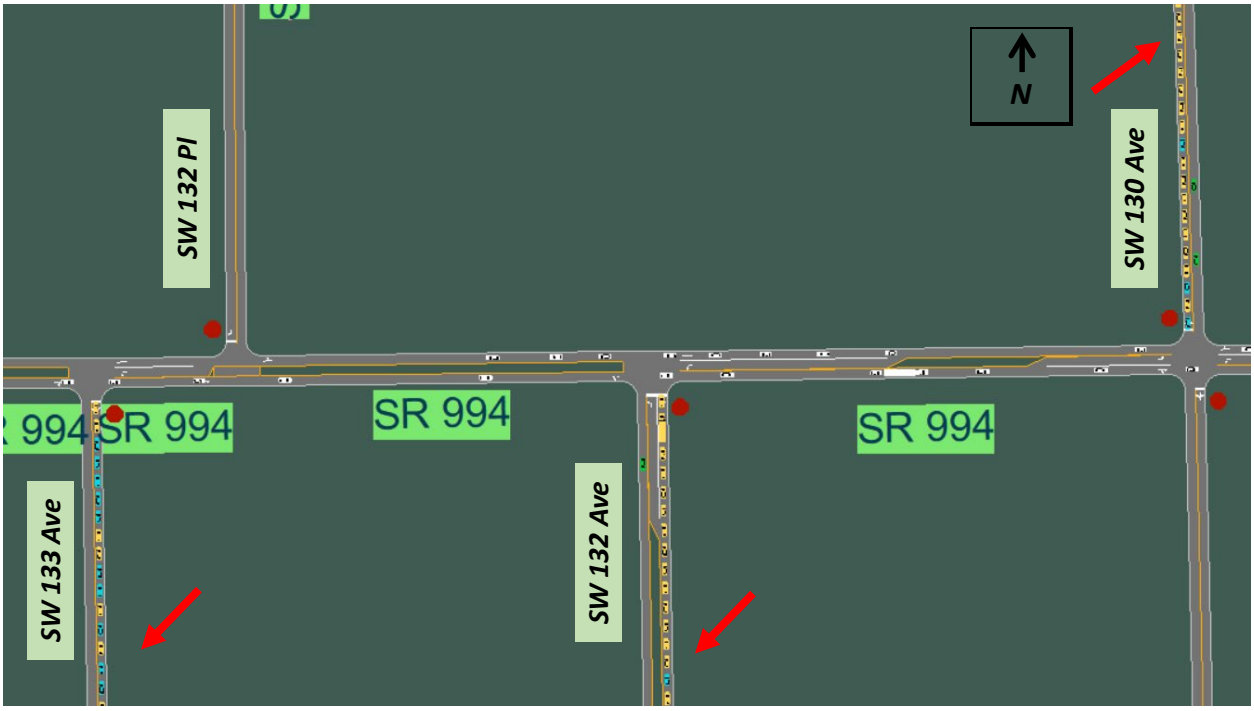


Figure 4-27 SimTraffic Vehicular Queues at Stop-Controlled Intersections

The additional roadway widening for SR 994 under Build 2 and 3 is expected to facilitate turning left from these side streets experiencing significant queuing. As presented in ***Table 4-24***, the vehicular queues for all critical intersection movements are low-to-moderate for Build Alternatives 2 and 3 under all scenarios. Build Alternatives 2 and 3 are expected to reduce left-turn delay by approximately 50% or more when compared to Build Alternative 1. The total vehicular delay for Build 1 is projected to be 131.8 vehicular hours in 2045 for both the AM and PM peak hours, compared to 45.3 vehicular hours for Build 2 and 44.4 vehicular hours for Build 3, as summarized in ***Table 4-24***. Build 3 has a slightly lower delay due to additional access management enhancements compared to Build 2.

Table 4-23 No-Build and Build Alternative 1 Operational Results (2025 and 2045) for Critical Movements at Unsignalized Intersections

		NO BUILD 2025						NO BUILD 2045						BUILD 1 2025						BUILD 1 2045					
	Intersection	Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS	Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS	Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS	Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS
AM Peak Hour		(1) SBLT	11	32.2	0.10	~25 ft	D	(1) SBLT	13	59.9	0.22	~25 ft	F	(1) SBLT	N/A	N/A	N/A	N/A	N/A	(1) SBLT	N/A	N/A	N/A	N/A	N/A
	SW 135 Ave	(2) EBLT	1	9.6	0.00	~25 ft	A	(2) EBLT	1	10.7	0.00	~25 ft	B	(2) EBLT	N/A	N/A	N/A	N/A	N/A	(2) EBLT	N/A	N/A	N/A	N/A	N/A
		(3) SBLT	6	32.6	0.05	~25 ft	D	(3) SBLT	8	56.7	0.13	~25 ft	F	(3) SBLT	N/A	N/A	N/A	N/A	N/A	(3) SBLT	N/A	N/A	N/A	N/A	N/A
	SW 134 Ct	(4) EBLT	2	9.7	0.01	~25 ft	A	(4) EBLT	2	10.7	0.01	~25 ft	B	(4) EBLT	N/A	N/A	N/A	N/A	N/A	(4) EBLT	N/A	N/A	N/A	N/A	N/A
		(5) SBLT	7	37.6	0.07	~25 ft	E	(5) SBLT	9	77.3	0.19	~25 ft	F	(5) SBLT	52	250.8	3.62	110	F	(5) SBLT	65	1180.0	21.31	205	F
	SW 133 Ct	(6) EBLT	4	9.9	0.01	~25 ft	A	(6) EBLT	5	11.0	0.02	~25 ft	B	(6) EBLT	31	10.2	0.09	~25 ft	B	(6) EBLT	39	11.5	0.12	~25 ft	B
		(7) NBLT	91	208.6	5.27	253	F	(7) NBLT	113	863.0	27.09	506	F	(7) NBLT	91	449.3	11.36	348	F	(7) NBLT	113	1505.0	47.24	594	F
	SW 133 Ave	(8) WBLT	13	9.7	0.04	~25 ft	A	(8) WBLT	16	10.6	0.05	~25 ft	B	(8) WBLT	14	10.8	0.04	~25 ft	B	(8) WBLT	17	12.3	0.06	~25 ft	B
		(9) SBLT	64	129.8	2.31	99	F	(9) SBLT	80	665.4	14.79	218	F	(9) SBLT	N/A	N/A	N/A	N/A	N/A	(9) SBLT	N/A	N/A	N/A	N/A	N/A
	SW 132 Pl	(10) EBLT	20	9.7	0.05	~25 ft	A	(10) EBLT	26	10.8	0.08	~25 ft	B	(10) EBLT	N/A	N/A	N/A	N/A	N/A	(10) EBLT	N/A	N/A	N/A	N/A	N/A
		(11) NBLT	34	246.5	2.33	361	F	(11) NBLT	42	1066.5	12.44	752	F	(11) NBLT	34	206.2	1.95	224	F	(11) NBLT	42	960.0	11.20	506	F
	SW 132 Ave	(12) WBLT	66	10.7	0.20	~25 ft	B	(12) WBLT	82	12.4	0.28	~25 ft	B	(12) WBLT	70	12.0	0.23	~25 ft	B	(12) WBLT	88	14.7	0.36	~25 ft	B
		(13) NBLT	5	172.1	0.24	~25 ft	F	(13) NBLT	6	2621.0	4.37	62	F	(13) NBLT	5	217.3	0.30	26	F	(13) NBLT	6	1371.0	2.29	57	F
		(14) SBLT	16	164.5	0.73	134	F	(14) SBLT	20	3542.0	19.68	363	F	(14) SBLT	16	230.1	1.02	154	F	(14) SBLT	20	1629.0	9.05	328	F
		(15) EBLT	113	10.4	0.33	~25 ft	B	(15) EBLT	141	12.1	0.47	~25 ft	B	(15) EBLT	130	10.6	0.38	~25 ft	B	(15) EBLT	162	12.6	0.57	~25 ft	B
	SW 130 Ave	(16) WBLT	1	10.5	0.00	~25 ft	B	(16) WBLT	1	11.9	0.00	~25 ft	B	(16) WBLT	2	11.4	0.01	~25 ft	B	(16) WBLT	2	13.3	0.01	~25 ft	B
		(17) NBLT	29	171.9	1.38	55	F	(17) NBLT	36	826.8	8.27	112	F	(17) NBLT	29	311.0	2.51	70	F	(17) NBLT	36	1325.0	13.25	121	F
		(18) SBLT	6	105.2	0.18	~25 ft	F	(18) SBLT	7	445.6	0.87	40	F	(18) SBLT	6	172.9	0.29	~25 ft	F	(18) SBLT	8	1006.0	2.24	53	F
		(19) EBLT	2	9.4	0.01	~25 ft	A	(19) EBLT	3	10.3	0.01	~25 ft	B	(19) EBLT	3	9.5	0.01	~25 ft	A	(19) EBLT	4	10.4	0.01	~25 ft	B
	SW 129 Ave	(20) WBLT	16	11.1	0.05	~25 ft	B	(20) WBLT	21	12.8	0.07	~25 ft	B	(20) WBLT	18	12.2	0.06	~25 ft	B	(20) WBLT	22	14.6	0.09	~25 ft	B
		Total	**507**	**94.8**	**13.4**	**N/A**	**N/A**	***Total***	**632**	**507.1**	**89.0**	**N/A**	**N/A**	***Total***	**501**	**157.1**	**21.9**	**N/A**	**N/A**	***Total***	**624**	**621.8**	**107.8**	**N/A**	**N/A**
PM Peak Hour		(1) SBLT	7	25.4	0.05	~25 ft	D	(1) SBLT	9	42.0	0.11	~25 ft	E	(1) SBLT	N/A	N/A	N/A	N/A	N/A	(1) SBLT	N/A	N/A	N/A	N/A	N/A
	SW 135 Ave	(2) EBLT	2	9.0	0.01	~25 ft	A	(2) EBLT	2	9.8	0.01	~25 ft	A	(2) EBLT	N/A	N/A	N/A	N/A	N/A	(2) EBLT	N/A	N/A	N/A	N/A	N/A
		(3) SBLT	6	30.8	0.05	~25 ft	D	(3) SBLT	7	52.0	0.10	~25 ft	F	(3) SBLT	N/A	N/A	N/A	N/A	N/A	(3) SBLT	N/A	N/A	N/A	N/A	N/A
	SW 134 Ct	(4) EBLT	1	9.0	0.00	~25 ft	A	(4) EBLT	1	9.8	0.00	~25 ft	A	(4) EBLT	N/A	N/A	N/A	N/A	N/A	(4) EBLT	N/A	N/A	N/A	N/A	N/A
		(5) SBLT	10	40.5	0.11	~25 ft	E	(5) SBLT	12	75.9	0.25	~25 ft	F	(5) SBLT	30	95.0	0.79	42	F	(5) SBLT	37	375.7	3.86	97	F
	SW 133 Ct	(6) EBLT	6	9.3	0.02	~25 ft	A	(6) EBLT	7	10.0	0.02	~25 ft	B	(6) EBLT	10	9.3	0.03	~25 ft	A	(6) EBLT	13	10.1	0.04	~25 ft	B
		(7) NBLT	17	30.7	0.14	~25 ft	D	(7) NBLT	22	79.4	0.49	68	F	(7) NBLT	17	49.8	0.24	37	E	(7) NBLT	22	190.5	1.16	106	F
	SW 133 Ave	(8) WBLT	29	9.9	0.08	~25 ft	A	(8) WBLT	37	11.0	0.11	~25 ft	B	(8) WBLT	34	11.3	0.11	~25 ft	B	(8) WBLT	40	13.1	0.15	~25 ft	B
		(9) SBLT	28	47.3	0.37	~25 ft	E	(9) SBLT	36	129.9	1.30	64	E	(9) SBLT	N/A	N/A	N/A	N/A	N/A	(9) SBLT	N/A	N/A	N/A	N/A	N/A
	SW 132 Pl	(10) EBLT	1	9.3	0.00	~25 ft	A	(10) EBLT	1	10.1	0.00	~25 ft	B	(10) EBLT	N/A	N/A	N/A	N/A	N/A	(10) EBLT	N/A	N/A	N/A	N/A	N/A
		(11) NBLT	21	98.6	0.58	132	F	(11) NBLT	27	1390.0	10.43	414	F	(11) NBLT	21	247.5	1.44	51	F	(11) NBLT	27	1401.0	10.51	117	F
	SW 132 Ave	(12) WBLT	155	11.3	0.49	~25 ft	B	(12) WBLT	194	14.0	0.75	33	B	(12) WBLT	167	13.5	0.63	~25 ft	B	(12) WBLT	209	19.0	1.10	53	C
		(13) NBLT	2	65.2	0.04	~25 ft	F	(13) NBLT	2	203.0	0.11	~25 ft	F	(13) NBLT	2	97.6	0.05	~25 ft	F	(13) NBLT	2	315.9	0.18	~25 ft	F
		(14) SBLT	16	66.6	0.30	66	F	(14) SBLT	20	446.4	2.48	189	F	(14) SBLT	16	122.6	0.54	95	F	(14) SBLT	20	792.0	4.40	224	F
		(15) EBLT	40	10.1	0.11	~25 ft	B	(15) EBLT	50	11.4	0.16	~25 ft	B	(15) EBLT	48	10.3	0.14	~25 ft	B	(15) EBLT	60	11.8	0.20	~25 ft	B
	SW 130 Ave	(16) WBLT	1	9.8	0.00	~25 ft	A	(16) WBLT	1	10.9	0.00	~25 ft	B	(16) WBLT	2	10.8	0.01	~25 ft	B	(16) WBLT	2	12.3	0.01	~25 ft	B
		(17) NBLT	7	80.3	0.16	~25 ft	F	(17) NBLT	9	231.4	0.58	~25 ft	F	(17) NBLT	7	125.1	0.24	~25 ft	F	(17) NBLT	9	436.0	1.09	35	F
		(18) SBLT	6	72.0	0.12	~25 ft	F	(18) SBLT	8	213.4	0.47	31	F	(18) SBLT	7	120.8	0.23	~25 ft	F	(18) SBLT	9	493.0	1.23	46	F
		(19) EBLT	1	9.7	0.00	~25 ft	A	(19) EBLT	2	10.7	0.01	~25 ft	B	(19) EBLT	2	9.8	0.01	~25 ft	A	(19) EBLT	2	10.8	0.01	~25 ft	B
	SW 129 Ave	(20) WBLT	19	10.4	0.05	~25 ft	B	(20) WBLT	24	11.7	0.08	~25 ft	B	(20) WBLT	21	11.5	0.07	~25 ft	B	(20) WBLT	26	13.4	0.10	~25 ft	B
		Total	**375**	**25.7**	**2.7**	**N/A**	**N/A**	***Total***	**471**	**133.4**	**17.5**	**N/A**	**N/A**	***Total***	**384**	**42.4**	**4.5**	**N/A**	**N/A**	***Total***	**478**	**180.9**	**24.0**	**N/A**	**N/A**

Notes: LOS E and F are highlighted in orange and red, respectively.

Table 4-24 Build Alternatives 2 and 3 Operational Results (2025 and 2045) for Critical Movements at Unsignalized Intersections

AM Peak Hour

BUILD 2 2025						
Intersection	Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS
	(1) SBLT	N/A	N/A	N/A	N/A	N/A
SW 135 Ave	(2) EBLT	N/A	N/A	N/A	N/A	N/A
	(3) SBLT	N/A	N/A	N/A	N/A	N/A
SW 134 Ct	(4) EBLT	N/A	N/A	N/A	N/A	N/A
	(5) SBLT	52	98.4	1.42	25	F
SW 133 Ct	(6) EBLT	31	10.2	0.09	~25 ft	B
	(7) NBLT	91	155.0	3.92	222	F
SW 133 Ave	(8) WBLT	14	11.0	0.04	~25 ft	B
	(9) SBLT	N/A	N/A	N/A	N/A	N/A
SW 132 Pl	(10) EBLT	N/A	N/A	N/A	N/A	N/A
	(11) NBLT	34	106.0	1.00	48	F
SW 132 Ave	(12) WBLT	70	12.2	0.24	~25 ft	B
	(13) NBLT	5	105.1	0.15	~25 ft	F
	(14) SBLT	16	51.5	0.23	68	F
	(15) EBLT	130	10.7	0.39	~25 ft	B
SW 130 Ave	(16) WBLT	2	11.4	0.01	~25 ft	B
	(17) NBLT	29	132.7	1.07	48	F
	(18) SBLT	6	56.7	0.09	~25 ft	F
	(19) EBLT	3	9.5	0.01	~25 ft	A
SW 129 Ave	(20) WBLT	18	12.5	0.06	~25 ft	B
	Total	**501**	**62.6**	**8.7**	**N/A**	**N/A**

BUILD 2 2045						
Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS	
(1) SBLT	N/A	N/A	N/A	N/A	N/A	
(2) EBLT	N/A	N/A	N/A	N/A	N/A	
(3) SBLT	N/A	N/A	N/A	N/A	N/A	
(4) EBLT	N/A	N/A	N/A	N/A	N/A	
(5) SBLT	65	458.9	8.29	161	F	
(6) EBLT	39	11.5	0.12	~25 ft	B	
(7) NBLT	113	419.5	13.17	264	F	
(8) WBLT	17	11.4	0.05	~25 ft	B	
(9) SBLT	N/A	N/A	N/A	N/A	N/A	
(10) EBLT	N/A	N/A	N/A	N/A	N/A	
(11) NBLT	42	458.1	5.34	169	F	
(12) WBLT	88	15.0	0.37	~25 ft	C	
(13) NBLT	6	431.3	0.72	42	F	
(14) SBLT	20	387.0	2.15	224	F	
(15) EBLT	162	12.7	0.57	~25 ft	B	
(16) WBLT	2	13.3	0.01	~25 ft	B	
(17) NBLT	36	564.8	5.65	66	F	
(18) SBLT	8	127.9	0.28	~25 ft	F	
(19) EBLT	4	10.4	0.01	~25 ft	B	
(20) WBLT	22	15.1	0.09	~25 ft	C	
Total	**624**	**212.5**	**36.8**	**N/A**	**N/A**	

BUILD 3 2025						
Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS	
(1) SBLT	N/A	N/A	N/A	N/A	N/A	
(2) EBLT	N/A	N/A	N/A	N/A	N/A	
(3) SBLT	N/A	N/A	N/A	N/A	N/A	
(4) EBLT	N/A	N/A	N/A	N/A	N/A	
(5) SBLT	N/A	N/A	N/A	N/A	N/A	
(6) EBLT	31	11.7	0.10	~25 ft	B	
(7) NBLT	N/A	N/A	N/A	N/A	N/A	
(8) WBLT	14	10.6	0.04	~25 ft	B	
(9) SBLT	N/A	N/A	N/A	N/A	N/A	
(10) EBLT	N/A	N/A	N/A	N/A	N/A	
(11) NBLT	70	184.3	3.58	112	F	
(12) WBLT	70	11.6	0.23	~25 ft	B	
(13) NBLT	5	91.0	0.13	~25 ft	F	
(14) SBLT	16	45.3	0.20	62	E	
(15) EBLT	130	10.7	0.39	~25 ft	B	
(16) WBLT	2	11.0	0.01	~25 ft	B	
(17) NBLT	29	104.6	0.84	42	F	
(18) SBLT	6	52.6	0.09	~25 ft	F	
(19) EBLT	3	9.5	0.01	~25 ft	A	
(20) WBLT	18	12.0	0.06	~25 ft	B	
Total	**394**	**51.8**	**5.7**	**N/A**	**N/A**	

BUILD 3 2045					
Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS
(1) SBLT	N/A	N/A	N/A	N/A	N/A
(2) EBLT	N/A	N/A	N/A	N/A	N/A
(3) SBLT	N/A	N/A	N/A	N/A	N/A
(4) EBLT	N/A	N/A	N/A	N/A	N/A
(5) SBLT	N/A	N/A	N/A	N/A	N/A
(6) EBLT	39	11.4	0.12	~25 ft	B
(7) NBLT	N/A	N/A	N/A	N/A	N/A
(8) WBLT	17	11.9	0.06	~25 ft	B
(9) SBLT	N/A	N/A	N/A	N/A	N/A
(10) EBLT	N/A	N/A	N/A	N/A	N/A
(11) NBLT	87	937.3	22.65	227	F
(12) WBLT	98	14.2	0.39	~25 ft	B
(13) NBLT	6	343.0	0.57	40	F
(14) SBLT	20	321.6	1.79	209	F
(15) EBLT	162	12.8	0.58	~25 ft	B
(16) WBLT	2	12.6	0.01	~25 ft	B
(17) NBLT	36	428.8	4.29	92	F
(18) SBLT	8	127.9	0.28	~25 ft	F
(19) EBLT	4	10.5	0.01	~25 ft	B
(20) WBLT	22	14.2	0.09	~25 ft	B
Total	**501**	**221.5**	**30.8**	**N/A**	**N/A**

PM Peak Hour

BUILD 2 2025						
Intersection	Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS
	(1) SBLT	N/A	N/A	N/A	N/A	N/A
SW 135 Ave	(2) EBLT	N/A	N/A	N/A	N/A	N/A
	(3) SBLT	N/A	N/A	N/A	N/A	N/A
SW 134 Ct	(4) EBLT	N/A	N/A	N/A	N/A	N/A
	(5) SBLT	30	45.0	0.38	~25 ft	E
SW 133 Ct	(6) EBLT	10	9.3	0.03	~25 ft	A
	(7) NBLT	17	28.7	0.14	~25 ft	D
SW 133 Ave	(8) WBLT	32	11.4	0.10	~25 ft	B
	(9) SBLT	N/A	N/A	N/A	N/A	N/A
SW 132 Pl	(10) EBLT	N/A	N/A	N/A	N/A	N/A
	(11) NBLT	21	151.0	0.88	40	F
SW 132 Ave	(12) WBLT	167	13.8	0.64	29	B
	(13) NBLT	2	57.3	0.03	~25 ft	F
	(14) SBLT	16	42.2	0.19	46	E
	(15) EBLT	48	10.4	0.14	~25 ft	B
SW 130 Ave	(16) WBLT	2	10.8	0.01	~25 ft	B
	(17) NBLT	7	67.3	0.13	~25 ft	F
	(18) SBLT	7	52.6	0.10	~25 ft	F
	(19) EBLT	2	9.8	0.01	~25 ft	A
SW 129 Ave	(20) WBLT	21	11.8	0.07	~25 ft	B
	Total	**382**	**26.7**	**2.8**	**N/A**	**N/A**

BUILD 2 2045					
Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS
(1) SBLT	N/A	N/A	N/A	N/A	N/A
(2) EBLT	N/A	N/A	N/A	N/A	N/A
(3) SBLT	N/A	N/A	N/A	N/A	N/A
(4) EBLT	N/A	N/A	N/A	N/A	N/A
(5) SBLT	37	104.5	1.07	55	F
(6) EBLT	13	10.1	0.04	~25 ft	B
(7) NBLT	22	65.0	0.40	59	F
(8) WBLT	40	13.4	0.15	~25 ft	B
(9) SBLT	N/A	N/A	N/A	N/A	N/A
(10) EBLT	N/A	N/A	N/A	N/A	N/A
(11) NBLT	27	482.2	3.62	90	F
(12) WBLT	209	16.4	0.95	44	C
(13) NBLT	3	138.5	0.12	~25 ft	F
(14) SBLT	20	198.6	1.10	141	F
(15) EBLT	60	11.9	0.20	~25 ft	B
(16) WBLT	2	12.3	0.01	~25 ft	B
(17) NBLT	9	153.2	0.38	~25 ft	F
(18) SBLT	9	116.7	0.29	~25 ft	F
(19) EBLT	2	10.8	0.01	~25 ft	B
(20) WBLT	26	13.9	0.10	~25 ft	B
Total	**479**	**63.4**	**8.4**	**N/A**	**N/A**

BUILD 3 2025					
Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS
(1) SBLT	N/A	N/A	N/A	N/A	N/A
(2) EBLT	N/A	N/A	N/A	N/A	N/A
(3) SBLT	N/A	N/A	N/A	N/A	N/A
(4) EBLT	N/A	N/A	N/A	N/A	N/A
(5) SBLT	N/A	N/A	N/A	N/A	N/A
(6) EBLT	10	9.3	0.03	~25 ft	A
(7) NBLT	N/A	N/A	N/A	N/A	N/A
(8) WBLT	32	13.0	0.12	~25 ft	B
(9) SBLT	N/A	N/A	N/A	N/A	N/A
(10) EBLT	N/A	N/A	N/A	N/A	N/A
(11) NBLT	28	102.3	0.80	53	F
(12) WBLT	167	11.9	0.55	~25 ft	B
(13) NBLT	2	53.8	0.03	~25 ft	F
(14) SBLT	16	39.8	0.18	42	E
(15) EBLT	48	10.4	0.14	~25 ft	B
(16) WBLT	2	10.6	0.01	~25 ft	B
(17) NBLT	7	62.4	0.12	~25 ft	F
(18) SBLT	7	50.2	0.10	~25 ft	F
(19) EBLT	2	9.8	0.01	~25 ft	A
(20) WBLT	21	11.5	0.07	~25 ft	B
Total	**342**	**22.4**	**2.1**	**N/A**	**N/A**

BUILD 3 2045					
Critical Movement	Volume (vph)	Avg Delay (sec/veh)	Avg Delay (veh-hr)	95th % Q (ft)	LOS
(1) SBLT	N/A	N/A	N/A	N/A	N/A
(2) EBLT	N/A	N/A	N/A	N/A	N/A
(3) SBLT	N/A	N/A	N/A	N/A	N/A
(4) EBLT	N/A	N/A	N/A	N/A	N/A
(5) SBLT	N/A	N/A	N/A	N/A	N/A
(6) EBLT	13	10.2	0.04	~25 ft	B
(7) NBLT	N/A	N/A	N/A	N/A	N/A
(8) WBLT	40	13.0	0.14	~25 ft	B
(9) SBLT	N/A	N/A	N/A	N/A	N/A
(10) EBLT	N/A	N/A	N/A	N/A	N/A
(11) NBLT	36	1030.0	10.30	117	F
(12) WBLT	222	19.2	1.18	57	C
(13) NBLT	3	91.0	0.08	~25 ft	F
(14) SBLT	24	139.8	0.93	119	F
(15) EBLT	60	12.0	0.20	~25 ft	B
(16) WBLT	2	11.1	0.01	~25 ft	B
(17) NBLT	9	137.5	0.34	~25 ft	F
(18) SBLT	9	113.5	0.28	~25 ft	F
(19) EBLT	2	10.9	0.01	~25 ft	B
(20) WBLT	26	13.4	0.10	~25 ft	B
Total	**446**	**109.9**	**13.6**	**N/A**	**N/A**

Notes: LOS E and F are highlighted in orange and red, respectively.

4.5.10 Safety

The future safety analysis for the study corridor was completed using the predictive method exemplified in the Highway Safety Manual (HSM). The predictive method for urban and suburban arterials in the HSM can be used to estimate the expected average crash frequency for a series of contiguous sites (an entire urban or suburban arterial facility), or a single individual site. Each predictive model consists of a safety performance function (SPF), crash modification factors (CMFs), a calibration factor, and pedestrian and bicyclist factors. The analysis worksheets are provided in ***Appendix B***.

In the predictive method, a facility consists of a contiguous set of individual intersections and roadway segments referred to as "sites." For the study segment, it was determined that there would be 8 intersections and 8 segments. This segmentation has been discussed with FDOT's prime reviewer for this study effort. These segments were determined based on the crashes associated to the intersection and crashes associated to the main roadway of SR 994. The intersections/segments were as follows:

- Signalized Intersections:
  - SW 137th Avenue
  - SW 134th Avenue
  - SW 127th Avenue
- Unsignalized Intersections:
  - SW 133rd Avenue
  - SW 132nd Place
  - SW 132nd Avenue
  - SW 130th Avenue
  - SW 129th Avenue
- Segments:
  - SW 137th Avenue to SW 134th Avenue
  - SW 134th Avenue to SW 133rd Avenue
  - SW 133rd Avenue to SW 132nd Avenue
  - SW 132nd Avenue to SW 130th Avenue
  - SW 130th Avenue to SW 129th Avenue
  - SW 129th Avenue to SW 128th Avenue
  - SW 128th Avenue to SW 127th Avenue
  - SW 127th Avenue to SW 125th Avenue

The predictive model was developed for all alternatives (i.e., No-Build, Build 1, Build 2, and Build 3) for design year 2045 to estimate the predicted average crash frequency of the individual intersections and the homogenous roadway segments, as presented in ***Table 4-25*** and ***Table 4-26***. Based on the analysis, the number of crashes for existing conditions for the study corridor are 13.6 segment crashes and 64.4 intersection crashes on a yearly average, resulting in a total average of 78.0 crashes per year. For the 2045 No-Build Alternative, the expected average crash frequency is 9.7 segment crashes and 44.0 intersection crashes per year with a total of 53.7 crashes. The decrease observed in crash frequency could be attributed to the scheduled

improvements at the intersections of SW 137th Avenue, where the south leg has been already opened to traffic, and SW 127th Avenue where an exclusive northbound right-turn bay will be added to the intersection. Nevertheless, the crashes documented for existing conditions cannot be directly compared to the number of crashes expected under the 2045 No-Build Alternative, as one represents actual historical crashes and the other is based on crash expectancy calculations given the future roadway conditions of the study corridor.

The Build 1 Alternative improvements result in an expected average crash frequency of 9.7 segment crashes and 44.0 intersection crashes per year, resulting in a total of 53.7 crashes. The crash reduction of 5.6 crashes for the Build 1 Alternative when compared to No-Build is attributed to the additional roadway capacity and access management improvements, such as the addition of a raised median and turning lanes, recommended throughout the study corridor.

Under the Build 2 Alternative, the expected average crash frequency is 8.4 segment crashes and 43.6 intersection crashes per year, resulting in a total of 52.0 crashes. The crash decrease of 1.7 crashes for the Build 2 Alternative when compared to the Build 1 improvements is attributed to the additional capacity improvements due to widening SR 994 from two lanes to four and additional access management enhancements.

The Build 3 Alternative is expected to have the same average crash frequencies as the Build 2 Alternative. Although there are some differing improvements between the Build 2 and Build 3 Alternatives, these differences are minor and are not identified or measured by the HSM analysis.

It is noted that the HSM Predictive Method for Urban and Suburban Arterials Analysis Spreadsheet has limitations which may have affected the results observed. The limitations applicable to this analysis are as follows:

- Does not identify whether the lanes allow for passing. For example, in the existing conditions, and thus the No-Build alternative, the two lanes along SR 994 are divided by yellow broken line pavement markings which indicate that passing is allowed.
- Does not include a 2-lane divided roadway as a roadway type. This condition is present in the Build 1 Alternative. As a result, the 2-lane undivided arterial type was selected for this analysis.
- Does not consider prohibited movements. In the proposed alternatives, raised medians are installed which at certain locations restrict the left turns from and onto the minor road.

In addition to the HSM analysis, a cursory review was performed using Crash Modification Factors (CMFs) from the Federal Highway Administration's Crash Modification Factors Clearinghouse to better differentiate the potential safety benefits of the Build Alternatives. A CMF of 29% (i.e., CRF of 71%) with ID 2219, rated with four stars (3 or higher is preferred) from FHWA's source, was selected to estimate the potential crash reduction association with installing a raised median along the study corridor. This CMF is applicable for all crashes along an urban roadway. Additionally, a CMF of 37% (i.e., CRF of 63%) with ID 7568, rated with four stars (3 or higher is preferred) from FHWA's source, was also selected to estimate the potential crash reduction association with

widening the study corridor from 2 lanes to 4 lanes. This CMF is applicable for all crashes along an urban roadway. Based on the application of these CMFs to the Build Alternatives, he following is stated:

- For the Build 1 Alternative, installing a raised median along SR 994 has an expected crash reduction of 71% for all crashes (CMF ID: 2219). During the five-year study period, there were 390 documented crashes along the study corridor, averaging 78 crashes per year. The crash reduction percentage will be applied to 60% these crashes (78 crashes reduced by 40% to account for crashes occurring at intersections where the raised median may not be present). After applying the reduction, the estimated potential crash reduction under the Build 1 Alternative is 33.4 crashes per year.

- For the Build 2 and 3 Alternatives, the study corridor will be widened from two lanes to four lanes in addition to installing a raised median as in the Build 1 Alternative. The same CMF ID 2219 for installing a raised median will be applied for these alternatives. Additionally, a CMF of 0.63 (37% crash reduction) for widening the road (CMF: 7568) will be applied to the total 78 crashes, after accounting for the already reduced crash expectancy of 33.4 crashes per year. After applying this additional reduction, the estimated potential crash reduction under the Build 2 and 3 Alternatives is 16.5 crashes per year, for a total crash reduction of 49.9 crashes annually.

In conclusion, based on the HSM and CMF methodologies crashes are expected to decrease for No-Build due to the improvements at SW 137th Avenue, SW 134th Avenue, and SW 127th Avenue per other FDOT and County projects that are being completed by 2045. With the implementation of the Build Alternatives, crashes are expected to further decrease. Based on the HSM methodology, the safety benefits between the Build Alternatives are minimal (a difference of 1.7 crashes per year). The CMF application methodology presents greater safety benefits for the Build 2 and 3 Alternatives when compared to the Build 1 Alternative. Based on the CMF methodology, the four-lane roadway with a raised median option is slightly better than the two-lane roadway with a raised median alternative (with a reduction of 16.5 more crashes per year).

Installing a raised median along an undivided arterial, such as the study roadway, can bring several safety benefits, including:

- **Reduction in Head-On Collisions:** A raised median creates a physical barrier between opposing lanes of traffic, reducing the risk of head-on collisions.
- **Prevention of Left-Turn Crashes:** Raised medians can provide designated areas for left-turning vehicles, reducing the likelihood of conflicts with through traffic and decreasing left-turn crashes.
- **Improved Pedestrian Safety:** Raised medians provide pedestrians with a refuge area when crossing the street. They can cross one direction of traffic at a time, reducing exposure to moving vehicles.
- **Channelization of Traffic:** Raised medians help to guide traffic flow and discourage unsafe maneuvers such as sudden lane changes.

- **Reduced Conflict Points:** By limiting the number of conflict points where vehicles can cross paths, raised medians decrease the likelihood of crashes.
- **Speed Reduction:** Medians can be designed to visually narrow the roadway, which can encourage drivers to reduce speed, enhancing overall safety.

Additionally, safety benefits that can be achieved by widening the road from two lanes to four lanes under Build Alternatives 2 or 3, include the following:

- **Reduced Rear-End Collisions:** Additional lanes can ease congestion and reduce the likelihood of rear-end collisions caused by sudden stops or traffic slowdowns.
- **Decreased Congestion-Related Crashes:** By increasing roadway capacity, widening can help alleviate congestion, reducing the likelihood of crashes caused by congestion-related factors such as sudden lane changes or merging conflicts.
- **Reduced Sideswipe Collisions:** Additional lanes provide more space for vehicles, reducing the chance of sideswipe collisions, especially during lane changes or overtaking maneuvers.
- **Enhanced Passing Opportunities:** With more lanes available, drivers have increased opportunities to pass slower-moving vehicles safely, potentially reducing aggressive passing maneuvers and associated crashes.
- **Decreased Lane Departure Crashes:** Additional lanes provide more space for vehicles, potentially reducing the likelihood of lane departure crashes caused by drifting out of lanes due to narrow roadways.
- **Improved Traffic Flow:** Widening can smooth traffic flow, reducing stop-and-go conditions and the likelihood of crashes associated with abrupt changes in speed.

During the five-year study period, the crash analysis documented a total of 390 crashes. These crashes consisted of 48% (187) rear-end collisions, 30% (117) angle/left-turn collisions, 11% (43) sideswipe collisions, and 5% (18) lane departure collisions. Furthermore, approximately 35% of all crashes resulted in injury, while the majority (65%) resulted in property-damage only crashes. This high percentage of property-damage only crashes indicate incidents related to saturated traffic conditions along the study corridor, attributed to the presence of only one lane in each direction amidst growing traffic.

The improvements proposed under Build Alternatives 2 and 3 will specifically target these crash types to enhance the safety of the study corridor compared to Build Alternative 1.

Overall, widening a two-lane roadway to four lanes can lead to a safer and more efficient transportation corridor by reducing congestion, improving traffic flow, and providing additional space for vehicles to maneuver safely. Similarly, installing a raised median along an undivided arterial can significantly enhance safety for both motorists and pedestrians by reducing conflict points and providing physical separation between opposing traffic flows. These potential benefits are specifically associated with Build Alternatives 2 and 3, rather than Build 1.

Table 4-25 2045 Safety Analysis for No-Build and Build Alternatives – Segments

Location	Existing Avg Crashes	NO BUILD 2045		BUILD 1 2045		BUILD 2 2045		BUILD 3 2045	
		Expected Avg Crash Frequency	Improvements	Expected Avg Crash Frequency	Improvements (In Addition to No Build)	Expected Avg Crash Frequency	Improvements (In Addition to Build 1)	Expected Avg Crash Frequency	Improvements (In Addition to Build 2)
ROADWAY SEGMENTS				ROADWAY SEGMENTS		ROADWAY SEGMENTS		ROADWAY SEGMENTS	
SW 137 Ave to SW 134 Ave	3.600	2.222	-	2.313	Adding a raised median. Inclusion of directional medians.	2.085	From 1 lane in each direction to 2 lanes in each direction.	2.085	Extension of raised median resulting in median closures.
SW 134 Ave to SW 133 Ave	2.200	1.006	-	1.040	Adding a raised median.	0.866	From 1 lane in each direction to 2 lanes in each direction.	0.866	Extension of raised median resulting in directional medians.
SW 133 Ave to SW 132 Ave	0.800	0.629	-	0.704	Adding a raised median. Inclusion of directional medians.	0.504	From 1 lane in each direction to 2 lanes in each direction.	0.504	-
SW 132 Ave to SW 130 Ave	1.400	1.077	-	1.162	Adding a raised median.	0.961	From 1 lane in each direction to 2 lanes in each direction.	0.961	-
SW 130 Ave to SW 129 Ave	0.800	0.870	-	0.892	Adding a raised median.	0.655	From 1 lane in each direction to 2 lanes in each direction.	0.655	-
SW 129 Ave to SW 128 Ave	0.200	0.694	-	0.711	Adding a raised median.	0.477	From 1 lane in each direction to 2 lanes in each direction.	0.477	-
SW 128 Ave to SW 127 Ave	2.200	1.293	-	1.369	Adding a raised median.	1.369	From 1 lane in each direction to 2 lanes in each direction.	1.369	-
SW 127 Ave to SW 125 Ave	2.400	1.493	-	1.503	Adding a raised median.	1.503	-	1.503	-
Total Roadway Segment Crashes	*13.600*	*9.284*	-	*9.694*	-	*8.420*	-	*8.420*	-

Note: The crashes documented for existing conditions cannot be directly compared to the number of crashes expected under the 2045 No-Build Alternative, as one represents actual historical crashes and the other is based on crash expectancy calculations given the future roadway conditions of the study corridor.

Table 4-26 Safety Analysis for No-Build and Build Alternatives – Intersections

Location	Existing Avg Crashes	NO BUILD 2045		BUILD 1 2045		BUILD 2 2045		BUILD 3 2045	
		Expected Avg Crash Frequency	Improvements	Expected Avg Crash Frequency	Improvements (In Addition to No Build)	Expected Avg Crash Frequency	Improvements (In Addition to Build 1)	Expected Avg Crash Frequency	Improvements (In Addition to Build 2)
INTERSECTIONS					**INTERSECTIONS**		**INTERSECTIONS**		**INTERSECTIONS**
SW 137 Ave	11.400	8.535	The south leg will open with one left-turn lane and a shared through/right-turn lane.	6.788	Adding one additional southbound, eastbound, and westbound left-turn lane. Converting the southbound and northbound shared through/right turn lane to one through lane and one right-turn bay. Adding one additional southbound and northbound through lane. Converting the eastbound shared left-turn/through/right-turn lane to one left-turn lane and one shared through/right-turn lane. Converting the westbound through/left-turn lane to one through lane and one left-turn bay. Adding one additional westbound right-turn lane.	6.603	Additional exclusive through lane in both major approaches. Adding one additional northbound left-turn lane.	6.603	-
SW 134 Ave	13.800	8.730	-	8.032	Converting the southbound shared left-turn/through/right-turn lane to one left-turn lane and one shared through/right-turn lane. Converting the westbound shared through/right-turn lane to one through lane and one right-turn lane.	8.032	Additional exclusive through lane in both major approaches.	8.032	-
SW 133 Ave	1.600	2.094	-	1.877	Adding left-turn on westbound approach.	1.877	Additional exclusive through lane in both major approaches.	1.877	Eliminating northbound left-turn movement.
SW 132 Pl	0.600	1.269	-	0.844	Eliminating the eastbound left-turn movement.	0.844	Additional exclusive through lane in both major approaches.	0.844	-
SW 132 Ave	6.600	5.568	-	5.025	Converting the northbound approach to one left-turn lane and one right-turn lane. Adding left-turn on westbound approach.	5.025	Additional exclusive through lane in both major approaches.	5.025	-
SW 130 Ave	3.000	3.364	-	2.711	Adding left-turn bays along the major road.	2.390	Additional exclusive through lane in both major approaches.	2.390	-
SW 129 Ave	3.400	3.484	-	2.473	Adding left-turn bays along the major road.	2.473	Additional exclusive through lane in both major approaches.	2.473	-
SW 127 Ave	24.000	16.977	An exclusive right-turn bay will be added to the northbound approach.	16.260	Adding one additional westbound and northbound left-turn lane. Converting the southbound shared through/right-turn lane to one through lane and one right-turn lane.	16.330	Additional exclusive through lane in the eastbound approach. Converting the eastbound shared through/right-turn lane to one through lane and one right-turn lane. Eliminating one northbound left-turn lane.	16.330	-
Total Intersection Crashes	*64.400*	*50.020*	-	*44.009*	-	*43.574*	-	*43.574*	-
TOTAL CRASHES (Segments + Intersections)	**78.000**	**59.305**	**-**	**53.703**	**-**	**51.994**	**-**	**51.994**	**-**

Note: The crashes documented for existing conditions cannot be directly compared to the number of crashes expected under the 2045 No-Build Alternative, as one represents actual historical crashes and the other is based on crash expectancy calculations given the future roadway conditions of the study corridor.

4.6 COMPARATIVE ALTERNATIVES EVALUATION

4.6.1 Evaluation Matrix

The No-Build and Build Alternatives were evaluated with the goal of providing a balance between the environmental impacts, the engineering considerations, and the project costs, along with public input. The various criteria used in the evaluation are listed below. The evaluation methodology used in this study involves a combination of both comparative qualitative and quantitative analyses to select the preferred alternative. The evaluation matrix is presented in ***Table 4-27***.

Evaluation Criteria

- Purpose and Need
- Community Support
- Engineering
    - Traffic Operations
    - Safety
    - Utility Impacts
    - Access Management
    - Multimodal Accommodations
    - Maintenance of Traffic (MOT)
    - Drainage
    - Right of Way Impacts
- Environment
    - Socio-Cultural Effects/Relocation Potential
    - Historic Resources
    - Recreational Resources
    - Wetlands
    - Wildlife and Habitat
    - Noise
    - Air Quality
    - Contamination
- Cost
    - Construction Cost
    - Relocation Cost
    - Right of Way Acquisition

Table 4-27 Alternatives Evaluation Matrix

Evaluation Criteria		Alternatives							
		No-Build (2-Lane Undivided)	Score	**Build Alternative 1 (2-Lane with 16.5-ft median)**	Score	**Build Alternative 2 (4-Lane with 16.5-ft median)**	Score	**Build Alternative 3 (4-Lane with 22-ft median)**	Score
Meets Purpose & Need		No	-	No	+	Yes	++	Yes	++
Community Support		Not supported by the public based on input received at the Alternatives workshop.	-	Moderate support from the public based on input received at the Alternatives workshop.	+	Greatest support from the public based on input received at the Alternatives workshop.	++	No evidence of public support (or opposition) received at the Alternatives Workshop.	0
ENGINEERING		**Additional Capacity Throughout Project Limits**							
		No	-	No	-	Yes (Two additional lanes)	+	Yes (Two additional lanes)	+
		Corridor-Wide Delay and Travel Times							
	Traffic Operations	Traffic Operations significantly deteriorate from existing conditions. 310 hours of delay by Opening Year VS. 138 hours today If no action (both AM&PM for signalized/critical movements at unsignalized intersections; mostly due to lack of turning lanes); Delay is expected to double by Design Year 2045 to 693 hours Travel Time increases by 5 mins by Opening Year from 8 mins for the total of both AM&PM + EB/WB; By 2045, travel time increases from 8 mins to 27 mins	--	Delay is significantly reduced by -42% to 401 hours VS. 693 hours in No-Build for 2045 (both AM+PM) Travel Time improved to 7 mins back/forth (from 19 mins) for the AM peak hour and to 7 mins back/forth (from 7.5 mins) for the PM peak hour when compared to No-Build	+	Delay is significantly reduced by -68% to 222 hours VS. 693 hours in No-Build for 2045 (both AM+PM) Build 2 reduces delay by an additional -26% when compared to Build 1 Travel Time improved to 6 mins back/forth (from 7 mins) per peak period when compared to Build 1	++	Delay is significantly reduced by -67% to 226 hours VS. 693 hours in No-Build for 2045 (both AM+PM) Build 3 increases delay by +2% when compared to Build 2 Travel Time remains at 6 mins back/forth per peak period	+
		Main Intersections Level of Service							
		LOS at SW 137 Ave fails (from C or better) due to lack of turning lanes Already failing LOS at SW 134 Ave worsens by 2045 where 2 fatal crashes occurred LOS at SW 127 Ave fails by 2045 (from D)	--	LOS at SW 137 Ave improved to E (from F, if No Action); it cannot be improved to LOS D due to the single eastbound approach through lane at SW 137 Ave LOS at SW 134 Ave improved to C (from F, if No Action) LOS at SW 127 Ave improved to D (from F, if No Action)	+	Delay at SW 137 Ave further reduced by -45% (-61 hours) at an improved LOS D Delay at SW 134 Ave further reduced by -53% (-24 hours) at an improved LOS B Although at LOS D, SW 127 Ave delay further reduced by -9% (-8 hours)	++	Although at LOS D, SW 137 Ave delay increased by +9% (+7 hours) Although at LOS B, SW 134 Ave delay increased by +9% (+2 hours) Although at LOS D, SW 134 Ave delay further reduced by -4% (-3 hours)	+

Table 4-27 Alternatives Evaluation Matrix

Evaluation Criteria		Alternatives							
		No-Build (2-Lane Undivided)	**Score**	**Build Alternative 1 (2-Lane with 16.5-ft median)**	**Score**	**Build Alternative 2 (4-Lane with 16.5-ft median)**	**Score**	**Build Alternative 3 (4-Lane with 22-ft median)**	**Score**
		Stop-Controlled Intersections Delay							
		Turning Traffic Delay from/onto side streets worsens to 106 hours by 2045 from 16 hours for both AM & PM peak periods	--	Turning Traffic Delay from/onto side streets worsens by +24% to 132 hours from 106 hours for both AM & PM peak periods	--	Turning Traffic Delay from/onto side streets improves by -66% to 45 hours from 132 hours for both AM & PM peak periods when compared to Build 1	++	Turning Traffic Delay from/onto side streets improves by -2% to 44 hours from 45 hours for both AM & PM peak periods when compared to Build 2	++
	Safety	Number of crashes expected to increase compared to existing conditions due to projected increase in traffic volumes	--	Safety Improvements include: • Turn Lanes (left and right) • Protected Left-Turn Phasing • Multimodal Facilities (SUPs) • Special Emphasis Ped/Bike Crossings • Enhancements to Existing Trail Crossing • Corridor Lighting • Traffic Control Upgrade at SW 134 Ave to Signal Control • Some Access Management Improvements • Raised Median Islands/Traffic Separators Per CMF Methodology, expected to reduce 33 crashes per year In addition, this alternative addresses severity of crashes – 2 out of 3 fatal accidents in the past 5 years were related to turning movements at the SW 134 Avenue intersection	+	Safety Improvements include the same as Build Alternative 1 plus the addition of: • One additional thru lane in each direction Per CMF Methodology, expected to reduce 50 crashes per year; this is approximately 16 more crashes than Build 1 Same as Build 1, this alternative addresses severity of crashes; however, Build 1 does not address crashes related to traffic congestion such as rear-end collisions	++	Safety Improvements include the same as Build alternative 2 plus the addition of: • Wider Raised Median, 22 ft • Additional Access Management Improvements Per CMF Methodology, expected to reduce 50 crashes per year; this is approximately 16 more crashes than Build 1* *Similar safety benefits as Build 2, since the locations where Build 3 implemented additional access management improvements did not have significant crashes for mitigation Same as Builds 1 and 2, this alternative addresses severity of crashes. however, Build 1 does not address crashes related to traffic congestion such as rear-end collisions	++

Table 4-27 Alternatives Evaluation Matrix

Evaluation Criteria		Alternatives							
		No-Build (2-Lane Undivided)	Score	**Build Alternative 1 (2-Lane with 16.5-ft median)**	Score	**Build Alternative 2 (4-Lane with 16.5-ft median)**	Score	**Build Alternative 3 (4-Lane with 22-ft median)**	Score
	Utility Impacts	No Impacts	0	Moderate to significant impacts to the following five Utility Agency/Owners (not reimbursable). •AT&T (overhead telephone and communication pole) •Comcast (overhead facilities, underground facilities, and hand holes) •Crown Castle (aerial fiber, HDPE BFO, and hand holes) •FPL (overhead electric pole line and street light circuit) •MD-WASD (Water Main, WM Tie-in Connections, water valves, sanitary sewer, and manholes)	-	Significant impacts to same five Utility Agency/Owners (not reimbursable) as Build Alternative 1.	-	Significant impacts to same five Utility Agency/Owners (not reimbursable) as Build Alternatives 1 and 2.	-
	Access Management	No changes to current access	0	Divided typical with reduced width raised median and one lane in each direction. No refuge for two-stage left turns. • Restricting turn movements at: – SW 135th Ave (partial) – SW 132nd PL – Eight driveways •U-turn movements restricted (due to one thru lane) •Restrictive left and right turn movements for trucks	--	Divided typical with reduced width raised median and two lanes in each direction. No refuge for two-stage left turns. • Restricting turn movements at: – SW 135th Ave (partial) – SW 132nd PL – Eight driveways •Facilitates u-turn movements (due to wider pavement width -two lanes)	-	Divided typical with raised median. Refuge for two-stage left turns. • Restricting turn movements at: – SW 135th Ave (full) – SW 134th Ct (full) – SW 133rd Ct (partial) – SW 133 Ave (partial) – SW 132nd PL – Nine driveways •Further facilitates u-turn movements (due to wider median)	--
	Multimodal Accommodations	Non-continuous 5-ft sidewalks generally located at residential subdivisions along the study corridor. No bicycle facilities within the project limits.	--	Continuous sidewalks with sidewalk level Separated Bicycle Lanes (SBLs) on both sides of Quail Roost Drive. Additional separation between vehicular travel lanes and the SBLs. Shorter crossing distance along Quail Roost Dr compared to Alternatives 2 & 3.	++	Continuous sidewalks with sidewalk level Separated Bicycle Lanes (SBLs) on both sides of Quail Roost Drive. Minimum required separation between vehicular travel lanes and the SBLs. Refuge areas for crossings at major intersections. Longer crossing distance along Quail Roost Dr.	++	Same as Alternative 2	++

Table 4-27 Alternatives Evaluation Matrix

Evaluation Criteria		Alternatives							
		No-Build (2-Lane Undivided)	Score	**Build Alternative 1 (2-Lane with 16.5-ft median)**	Score	**Build Alternative 2 (4-Lane with 16.5-ft median)**	Score	**Build Alternative 3 (4-Lane with 22-ft median)**	Score
	Transit	No current bus routes within the project limits. Any future bus routes would need to use the single lane in each direction, creating further delays for vehicular traffic.	-	No current bus routes within the project limits. Any future bus routes would need to use the single lane in each direction, creating further delays for vehicular traffic.	-	An additional through lane in each direction provides opportunities for future bus routes to stop on the outside lane while maintaining the flow of vehicular traffic on the inside lane.	+	An additional through lane in each direction provides opportunities for future bus routes to stop on the outside lane while maintaining the flow of vehicular traffic on the inside lane.	+
	Maintenance of Traffic	No Impacts	+	Various phase shifts and potential temporary pavement for overbuild/shifts during construction. Less construction time. Bridge replacement requires detours.	--	Moderate phase shifts. Less temporary pavement due to wider proposed pavement available. Additional construction time. Bridge construction can be phased.	-	Minimal phase shifts. New pavement can be constructed outside of existing traffic. Additional construction time. Bridge construction can be phased.	-
	Drainage	No Impacts	0	• Improved drainage system along the corridor • Reduction in grassed areas when compared to the No-Build Alternative requires French drain construction	-	• Wider corridor roadway section promoting larger contributing total onsite drainage area, which will require more French drain construction. • Least pervious area (grassed area) which requires more French drain construction.	-	• Widest corridor roadway section promoting largest contributing total onsite drainage area, which will require most French drain construction. • Less pervious area (grassed area) which requires more French drain construction.	-
	Right of Way Impacts	No Impacts	0	Potential impacts to 40 parcels (8 commercial, 12 agricultural, 20 residential) Impact Area: 216,224 SF	-	Potential impacts to 61 parcels (9 commercial, 12 agricultural, 40 residential) Impact Area: 233,475 SF	--	Potential impacts to 67 parcels (9 commercial, 12 agricultural, 46 residential) Impact Area: 389,939 SF	**--**

Table 4-27 Alternatives Evaluation Matrix

Evaluation Criteria		Alternatives							
		No-Build (2-Lane Undivided)	**Score**	**Build Alternative 1 (2-Lane with 16.5-ft median)**	**Score**	**Build Alternative 2 (4-Lane with 16.5-ft median)**	**Score**	**Build Alternative 3 (4-Lane with 22-ft median)**	**Score**
ENVIRONMENT	**Socio-Cultural Effects/ Relocation Potential**	No relocations	0	6 potential relocations (1 residential + 5 personal property)	-	8 potential relocations (0 residential + 8 personal property) *Note: This alternative was refined as part of the Section 4(f) evaluation process. Residential relocations were eliminated with the minimization strategies. See section 4.5.7 for details.*	-	10 potential relocations (3 residential + 7 personal property)	-
	Historic Resources	No Impacts	0	Adverse effects (impacts) to three significant properties: 1307 Quail Roost Drive, 20000 SW 137th Avenue, 13390 SW 200 Street. This alternative presents the least physical impact and encroachment of the historic buildings, walls, and properties. Talbott Estate (8DA2789) (SE corner of SW 134 Ave intersection) •Parcel impact area = 21,775 SF •Distance from Resource to Proposed ROW = 42’ on the north and 56’ on the west side of the parcel MacDonell House (8DA20712) (NW corner of SW 137 Ave intersection) •Parcel impact area = 17,223 SF •Distance from Resource to Proposed ROW = 60’ on the south and 14.5’ on the east side of the parcel 20000 SW 137th Avenue (8DA20713) (SW corner of SW 137 Ave intersection) •Parcel impact area = 2,957 SF •Distance from Resource to Proposed ROW = 22’ on the north side of the parcel LEAST SEVERE	-	Adverse effects (impacts) to three significant properties: 1307 Quail Roost Drive, 20000 SW 137th Avenue, 13390 SW 200 Street. This alternative presents more physical impact than Build Alternative 1 in terms of the encroachment of the historic buildings, walls, and properties. Talbott Estate (8DA2789) (SE corner of SW 134 Ave intersection) •Parcel impact area = 23,359 SF •Distance from Resource to Proposed ROW = 28’ on the north and 58’ on the west side of the parcel MacDonell House (8DA20712) (NW corner of SW 137 Ave intersection) •Parcel impact area = 17,165 SF •Distance from Resource to Proposed ROW = 46.3’ on the south and 30.8’ on the east side of the parcel 20000 SW 137th Avenue (8DA20713) (SW corner of SW 137 Ave intersection) •Parcel impact area = 3,375 SF •Distance from Resource to Proposed ROW = 20.4’ on the north side of the parcel MORE SEVERE	-	Adverse effects (impacts) to three significant properties: 1307 Quail Roost Drive, 20000 SW 137th Avenue, 13390 SW 200 Street. For the three Build alternatives, this alternative presents the most physical impact and encroachment of the historic buildings, walls, and properties. Talbott Estate (8DA2789) (SE corner of SW 134 Ave intersection) •Parcel impact area = 31,186 SF •Distance from Resource to Proposed ROW = 14’ on the north and 57’ on the west sides of the parcel MacDonell House (8DA20712) (NW corner of SW 137 Ave intersection) •Parcel impact area = 23,103 SF •Distance from Resource to Proposed ROW = 46’ on the south and 14’ on the east sides of the parcel 20000 SW 137th Avenue (8DA20713) (SW corner of SW 137 Ave intersection) •Parcel impact area = 6,778 SF •Distance from Resource to Proposed ROW = 8’ on the north side of the parcel MOST SEVERE	-

Table 4-27 Alternatives Evaluation Matrix

Evaluation Criteria		Alternatives							
		No-Build (2-Lane Undivided)	Score	**Build Alternative 1 (2-Lane with 16.5-ft median)**	Score	**Build Alternative 2 (4-Lane with 16.5-ft median)**	Score	**Build Alternative 3 (4-Lane with 22-ft median)**	Score
	Recreational Resources	No Impact	0	• Grade-separation of the Black Creek Trail under the proposed new bridge over the Black Creek Canal. • Improved safety and traffic operations due to the elimination of conflicts between motor vehicles and bicyclists/pedestrians. • Improved overall bridge vertical clearance. • Impacts to adjacent properties, utilities, and SFWMD access driveway due to higher roadway profile. • Temporary impacts for access to the Black Creek Trail during construction.	+	Same as Build Alternative 1	+	Same as Build Alternative 1	+
	Wetlands	No Impact	0	Surface water impacts are 0.271 acres and are limited to the bridge reconstruction.	0	Same as Build Alternative 1	0	Same as Build Alternative 1	0
	Wildlife and Habitat	No Impact	0	Six (6) federally listed animal species, seven (7) federally listed plant species, six (6) state listed animal species and one (1) state listed plant species were evaluated in the study area. The project would have *No Effect* for the FBB, American crocodile, Wood stork, and Bartram's hairstreak butterfly. The project would result in a *MANLAA* for the West Indian manatee and the Eastern indigo snake. The project would have *No Effect* on all seven (7) federally listed plant species and *No effect anticipated* for all six (6) state listed animal species and one (1) state listed plant species. No impacts are anticipated for the Bald eagle, Osprey, Tricolored bat, and the Monarch butterfly.	0	Same as Build Alternative 1	0	Same as Build Alternative 1	0

Table 4-27 Alternatives Evaluation Matrix

Evaluation Criteria		Alternatives							
		No-Build (2-Lane Undivided)	**Score**	**Build Alternative 1 (2-Lane with 16.5-ft median)**	**Score**	**Build Alternative 2 (4-Lane with 16.5-ft median)**	**Score**	**Build Alternative 3 (4-Lane with 22-ft median)**	**Score**
	Noise	The roadway traffic speed will be reduced due to the congestion caused by higher traffic volumes, which results in a slight decrease in sound levels.	0	As the overall performance of the network improves, the traffic speed will increase compared to the No-Build, which results in a slight increase in sound levels. In addition, the traffic lane is 12 ft closer to the residences, when compared to the No-Build Alternative	-	As the traffic speed improves to a free flow condition there will be an increase in sound levels. In addition, the new lane in each direction will move the noise source (roadway traffic volume) 11 ft closer to the residences, when compared to the Build Alternative 1. This may result in an increase in sound levels.	-	The same condition as Alternative 2 except the outside lane is shifted 3 ft closer to the residences than Alternative 2	-
	Air Quality	Project is located within an attainment area. Minimal potential impacts may occur from increased congestion.	0	Project is located within an attainment area. No significant air quality impacts are anticipated. Project is anticipated to decrease congestion.	+	Project is located within an attainment area. No significant air quality impacts are anticipated. Project is anticipated to decrease congestion.	+	Project is located within an attainment area. No significant air quality impacts are anticipated. Project is anticipated to decrease congestion.	+
	Contamination	No Impact	0	One High Risk Site One Medium Risk Site	0	Same as Build Alternative 1	0	Same as Build Alternative 1	0
COST	**Construction (LRE)**	No Cost	+	$34,976,168	-	$37,919,009	-	$39,247,535	-
	Relocation Cost	No Cost		**$105,100 Total** $4,000 (Personal Property) $101,100 (Residential)		**$6,400 Total** $6,400 (Personal Property)		**$344,750 Total** $5,600 (Personal Property) $339,150 (Residential)	
	Right of Way Acquisition	No Cost		**$4,679,232 Total** $1,795,595 Residential $1,365,754 Business $1,517,883 Agricultural		**$5,358,213 Total** $2,516,451Residential $1,258,247 Business $1,583,515 Agricultural		**$10,066,595 Total** $6,676,585 Residential $1,368,737 Business $2,021,274 Agricultural	
TOTAL SCORE		**-12**		**-6**		**8**		**3**	

Score	Description
+	Alternative meets or has a positive response to the Evaluation Criteria
0	Alternative has no effect or provides some benefit to the Evaluation Criteria
-	Alternative has a poor or negative response to the Evaluation Criteria

Note: ++ or ++ denote greater impact positively or negatively

4.6.2 Value Engineering

A Value Engineering (VE) Study was conducted during the week of June 12, 2023 through June 16, 2023. The VE Team generated 51 ideas, which were further developed and resulted in 16 recommendations. Most of the recommendations were preliminarily accepted for further evaluation or for consideration during the Design and ROW phases. Some of the recommendations had been previously analyzed and discarded per coordination with the Department. These recommendations were therefore not accepted for implementation. A summary of the VE recommendations and preliminary responses is presented in ***Table 4-28*** below. Responses are currently under review by the Department and a final approval disposition will be included in the Final Preliminary Engineering Report. For additional details, refer to the Value Engineering Study Report included in ***Appendix N***.

Table 4-28 Value Engineering Study Recommendations

VE Study Recommendation		PD&E Team Preliminary Response
1	Develop Alternative Drainage Solution	Recommendation will be considered during the design phase, based on approved typical section package.
2	Identify County & FDOT Property for Staging and Drainage Purposes	Recommendation will be coordinated with Miami-Dade County after 60% design.
3	Modify Median Design	A 12-ft median was previously considered but it was not accepted by the DDE.
4	Use Preemption Technology	Recommendation will be considered during design phase, as part of the signalization design.
5	Modify Median Access	Storage area as proposed for SW 132nd Ave would require a design variation due to insufficient acceleration length. The island at SW 134 CT has been reconfigured to restrict the SBL movement as recommended.
6	Modify SFWMD Canal Access	As part of the coordination with SFWMD during the PD&E phase, the proposed concept reflects the design requested by SFWMD. Recommendation can be further evaluated during design as part of the SFWMD ROW Occupancy Permit coordination process.
7	Remove Buffer along Bridge	Per FDM, the bridge typical section needs to match the typical section of the roadway approaches. Removing buffer would require design variation.
8	Modify Pedestrian & Bicyclist Accommodations	The PD&E concept with one SUP on either side of the road was previously coordinated with the PLEMO and Safety offices and it was determined to be the preferred option. After further analysis and coordination with the District 6 Design Office, the SUPs were replaced by sidewalks with sidewalk level SBLs.

VE Study Recommendation		PD&E Team Preliminary Response
9	Advance Safety Improvements at Critical Locations	The improvements at SW 134th Ave and SW 132nd Ave were previously evaluated by the Safety Office and it was determined that improvements would be included in this project. Also, at some of the critical locations like SW 134th Avenue, even an interim improvement will require ROW.
10	Eliminate Trail Underpass	After further analysis and coordination with the District 6 Design, Maintenance and ROW Offices, an at-grade crossing is being proposed as the preferred option for the trail crossing.
11	Implement TSMO Strategies	ITS improvements were coordinated with the TSM&O Office. The study corridor has not been identified by the FDOT District 6 as a priority corridor for implementation of TSM&O strategies such as Adaptive Signal Control Technologies (ASCT) or Traffic Signal Priority (TSP). Please refer to ***Section 6.1.9*** for additional information.
12	Reduce Limits of Projects along SW 127th Ave, SW 134th Ave & SW 137th Ave	The proposed improvements at the intersections with County roads are controlled by traffic operations needs to achieve an acceptable Level of Service (LOS). The proposed work along the County roads is limited to the minimum acceleration length required, taking into account not only the FDOT standard plans but also the queue length to avoid spillover into the intersection (prior to the merge). Also, note the design speed for SW 137 Ave was assumed to be 45 mph per as-built plans.
13	Reduce Bridge Width	The buffer reduction was discussed under VE Recommendation No. 7. Providing two separate bridges would restrict the length of the left turn lane to SW 132 Ave and it would impact SFWMD's maintenance access. Also, the overall footprint of the two bridges would be similar to the one-bridge alternative due to pair bridges needing inside shoulders and railings per FDM.
14	Install ITS Infrastructure Prior to Construction	Please refer to response to VE Response No. 11. No ITS improvements proposed.
15	Remove 196th St Connector Improvements	SW 196 Street connector has been removed from the project.
16	Seek ROW Cost Reimbursement of County Encroachments to Private Owners	Recommendation will be coordinated during the ROW Acquisition phase.

4.7 SELECTION OF THE PREFERRED ALTERNATIVE

The preferred alternative for the SR 994/Quail Roost Drive corridor is Build Alternative 2. This alternative was selected based on the alternative alignment analysis and the evaluation results summarized in the evaluation matrix. Build Alternative 2 will add the capacity improvements necessary to improve traffic operations, multimodal safety, and transit. Alternative 2 is the most prudent when compared with the other build alternatives for the following reasons:

Safety

Build Alternative 2 is expected to improve safety and reduce the amount and severity of crashes along the segment. The addition of a median will reduce the number of conflicts at stop-controlled intersections by restricting or eliminating some of the existing turn movements. Traffic separators at signalized intersections will channelize traffic and provide refuge for pedestrians. Sidewalks with sidewalk-level SBLs on both sides of the road will enhance bicycle and pedestrian safety and reduce the potential for bicycles crossing at undesignated mid-block locations to reach the other side, compared to only providing bicycle lanes on one side of the road. The new signalized intersection at SW 134th Avenue will provide an additional crossing location between SW 137th Avenue and SW 127th Avenue.

An additional through lane in each direction will allow for vehicles to safely pass slower traffic or stranded vehicles. It will also improve emergency evacuation and response times. Additional safety benefits that can be achieved by widening the road from two lanes to four lanes include the following:

- **Reduced Rear-End Collisions:** Additional lanes can ease congestion and reduce the likelihood of rear-end collisions caused by sudden stops or traffic slowdowns.
- **Decreased Congestion-Related Crashes**: By increasing roadway capacity, widening can help alleviate congestion, reducing the likelihood of crashes caused by congestion-related factors such as sudden lane changes or merging conflicts.
- **Reduced Sideswipe Collisions:** Additional lanes provide more space for vehicles, reducing the chance of sideswipe collisions, especially during lane changes or overtaking maneuvers.
- **Enhanced Passing Opportunities:** With more lanes available, drivers have increased opportunities to pass slower-moving vehicles safely, potentially reducing aggressive passing maneuvers and associated crashes.
- **Decreased Lane Departure Crashes:** Additional lanes provide more space for vehicles, potentially reducing the likelihood of lane departure crashes caused by drifting out of lanes due to narrow roadways.
- **Improved Traffic Flow:** Widening can smooth traffic flow, reducing stop-and-go conditions and the likelihood of crashes associated with abrupt changes in speed.

During the five-year study period, the crash analysis documented a total of 390 crashes. These crashes consisted of 48% (187) rear-end collisions, 30% (117) angle/left-turn collisions, 11% (43) sideswipe collisions, and 5% (18) lane departure collisions. Furthermore, approximately 35% of all crashes resulted in injury, while the majority (65%) resulted in property-damage-only crashes. This high percentage of property-damage-only crashes indicates incidents related to saturated traffic conditions along the study corridor, attributed to the presence of only one lane in each

direction amidst growing traffic. The improvements proposed under Build Alternative 2 will specifically target these crash types to enhance the safety of the study corridor.

Traffic Operations

Build Alternative 2 provides one additional through lane in each direction between SW 137th Avenue and SW 127th Avenue, which will provide faster travel times, especially during peak hours. Additional auxiliary turn lanes at signalized intersections will improve capacity and reduce queue lengths with higher levels of service. SW 132nd Avenue will be improved with an exclusive westbound left turn lane and separate left and right turn lanes in the northbound direction. Access management restrictions that are currently enforced with raised directional islands or pavement markings will now be controlled with the raised median.

An additional through lane in each direction will facilitate u-turn movements, allowing access to side streets where left turns are restricted from Quail Roost Drive due to the median. This prevents unnecessary traffic diversion into local residential streets to reach the intended destination. The additional through lane also allows for turning maneuvers of trucks and other large vehicles, otherwise restricted if there is one single through lane.

Capacity

Build Alternative 2 adds corridor capacity between SW 137th Avenue and SW 127th Avenue. The additional through lane will improve travel time. The addition of auxiliary lanes at signalized and unsignalized intersections will also reduce vehicular traffic delays.

Transit

Transit routes are currently not servicing the project area. However, an additional through lane provides opportunities for future bus routes to stop on the outside lane while maintaining the flow of vehicular traffic on the inside lane. Continuous sidewalks with sidewalk-level SBLs also provide bike/ped connectivity to any future bus stops and remove potential conflicts created by buses stopping on a bicycle lane.

Multimodal

Alternative 2 will enhance pedestrian and bicycle connectivity throughout the corridor. By providing continuous sidewalks with sidewalk-level SBLs on both sides of the road, this segment of SR 994 will allow pedestrians and bicyclists to move freely and securely throughout this section of the corridor and connect to existing side streets within the study limits. Additionally, the sidewalks with SBLs will extend to connect to Charles Burr Park, an existing park south of the intersection of SR 994 and SW 127th Avenue, further improving mobility of peds and bikes. Sidewalks with sidewalk-level SBLs accessible from both sides of the road will reduce the potential for undesignated/illegal crossings along Quail Roost Dr. The proposed Black Creek Trail crossing is proposed to be upgraded from the current RRFB to a signalized pedestrian crossing.

Project Cost

Alternative 2, when compared against Alternative 3, will cost significantly less due to the reduced typical section width and the reduction of right-of-way impacts. Even though Alternative 1 has the

lowest cost, it does not provide the capacity, safety and operational benefits of the additional through lane proposed by Alternative 2.

4.8 PREFERRED ALTERNATIVE REFINEMENT

During the development of the PTAR, the PD&E team considered a recent system linkage/capacity improvement project led by Miami-Dade County, which was completed in June 2022 at the intersection of Quail Roost Drive and SW 137th Avenue. At the start of the PD&E study, the south leg of the SW 137th Avenue intersection was under construction, extending south along SW 137th Avenue to connect to US-1.

Initially, traffic patterns for the PD&E alternative development were estimated based on historical data, traffic counts from 2021, and planning model outputs. Roadway capacity improvements for the build alternatives were developed accordingly. However, once the new SW 137th Avenue connection opened to traffic, additional traffic data was collected in early 2023 to reassess future turning movement volumes for the No-Build and Build Alternatives for the years 2025 and 2045, as discussed in ***Section 4.5.9.4***.

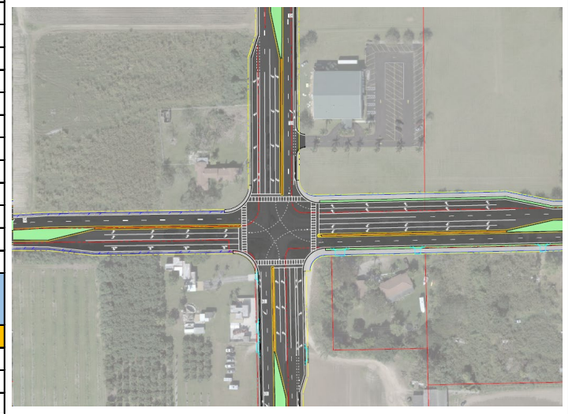
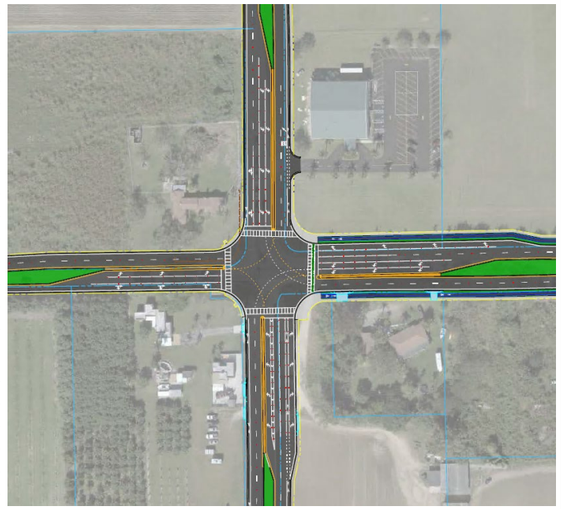
The new data revealed a decrease in traffic patterns from southbound SW 137th Avenue to eastbound Quail Roost Drive and then to southbound SW 134th Avenue, as well as from westbound Quail Roost Drive to northbound SW 137th Avenue. Consequently, future turning movement volumes were revised during this current submittal based on the changes and analyzed according to the previously developed roadway capacity improvements for the intersections of SW 137th Avenue and SW 134th Avenue. A separate sensitivity analysis was conducted to refine the Build Alternative 2 and determine if turning lanes could be reconsidered. The refinements to intersection capacities resulted in positive operational benefits, as detailed in ***Table 4-29*** and ***Table 4-30***:

At SW 137th Avenue:
- Eastbound Approach: Reduce from 2 left-turn lanes to 1 left-turn lane
- Westbound Approach: Reduce from 2 right-turn lanes to 1 right-turn lane
- Northbound Approach: Reduce from 2 left-turn lanes to 1 left-turn lane
- Southbound Approach: Remove right-turn lane to share with through lane

At SW 134th Avenue:
- Eastbound Approach: Remove right-turn lane to share with through lane
- Westbound Approach: Remove right-turn lane to share with through lane
- Northbound Approach: No changes
- Southbound Approach: No changes

The Synchro analysis worksheets are included in the Project Traffic Analysis Report in ***Appendix B***.

Table 4-29 Refined Build Alternative 2 Operational Results 2045 AM & PM for SW 137th Avenue

	BUILD 2 - 2045							BUILD 2 - 2045	*Refined* BUILD 2 - 2045							*Refined* BUILD 2 - 2045
	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Intersection Geometry	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	Intersection Geometry
AM Peak Hour	EBLT	84	54.6	1.3	61	0.42	D		EBLT	84	22.7	0.5	69	0.24	C	
	EBT	562	36.5	6.7	405	0.64	D		EBT	562	34.9	6.4	332	0.62	C	
	EBRT	98	*	*	*	*	*		EBRT	98	*	*	*	*	*	
	WBLT	278	44.1	3.4	135	0.67	D		WBLT	278	47.1	3.6	156	0.66	D	
	WBT	413	21.8	2.5	204	0.35	C		WBT	413	34.3	3.9	222	0.32	C	
	WBRT	383	10.6	1.1	107	0.18	B		WBRT	383	1.5	0.2	6	0.27	A	
	NBLT	131	54.5	2.0	87	0.51	D		NBLT	131	36.5	1.3	107	0.48	D	
	NBT	521	47.9	6.9	254	0.73	D		NBT	521	50.4	7.3	270	0.77	D	
	NBRT	242	39.7	2.7	90	0.24	D		NBRT	242	39.8	2.7	68	0.16	D	
	SBLT	292	52.8	4.3	158	0.67	D		SBLT	292	54.1	4.4	162	0.70	D	
	SBT	353	45.7	4.5	173	0.74	D		SBT	353	55.0	7.2	237	0.86	D	
	SBRT	121	32.6	1.1	20	0.09	C		SBRT	121	*	*	*	*	*	
	Int	**3478**	**37.7**	**36.4**			**D**		**Int**	**3478**	**38.9**	**37.6**			**D**	
PM Peak Hour	Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS		Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS	
	EBLT	51	56.1	0.8	42	0.60	E		EBLT	51	31.4	0.4	61	0.19	C	
	EBT	529	54.8	9.4	445	0.36	D		EBT	529	48.7	8.3	#351	0.78	D	
	EBRT	88	*	*	*	*	*		EBRT	88	*	*	*	*	*	
	WBLT	242	50.7	3.4	145	0.74	D		WBLT	242	51.8	3.5	128	0.70	D	
	WBT	347	33.5	3.2	192	0.37	C		WBT	347	30.0	2.9	160	0.35	C	
	WBRT	294	1.3	0.1	3	0.18	A		WBRT	294	4.5	0.4	142	0.20	A	
	NBLT	109	26.8	0.8	30	0.22	C		NBLT	109	32.0	1.0	61	0.48	C	
	NBT	319	32.8	2.9	141	0.37	C		NBT	319	33.9	3.0	263	0.33	C	
	NBRT	274	31.4	2.4	61	0.73	C		NBRT	274	33.9	2.6	105	0.31	C	
								EB: 2 LEFTS + 1 THRU + 1 SHARED THRU/RIGHT									EB: 1 LEFT + 1 THRU + 1 SHARED THRU/RIGHT
	SBLT	379	51.9	5.5	195	0.80	D	WB: 2 LEFTS + 2 THRUS + 2 RIGHTS	SBLT	379	52.9	5.6	186	0.74	D	WB: 2 LEFTS + 2 THRUS + 1 RIGHT
	SBT	626	39.8	6.9	283	0.85	D	NB: 2 LEFTS + 2 THRUS + 1 RIGHT	SBT	626	53.4	11.1	#507	0.95	D	NB: 1 LEFT + 2 THRUS + 1 RIGHT
	SBRT	123	20.8	0.7	16	0.09	C	SB: 2 LEFTS + 2 THRUS + 1 RIGHT	SBRT	123	*	*	*	*	*	SB: 2 LEFTS + 1 THRU + 1 SHARED THRU/RIGHT
	Int	**3381**	**38.5**	**36.1**			**D**		**Int**	**3381**	**41.3**	**38.8**			**D**	

Notes: “v/c” indicates volume over capacity; values greater than 1 indicates over capacity. “*” indicates movement is shared. LOS E is highlighted in orange.

Table 4-30 Refined Build Alternative 2 Operational Results 2045 AM & PM for SW 134th Avenue

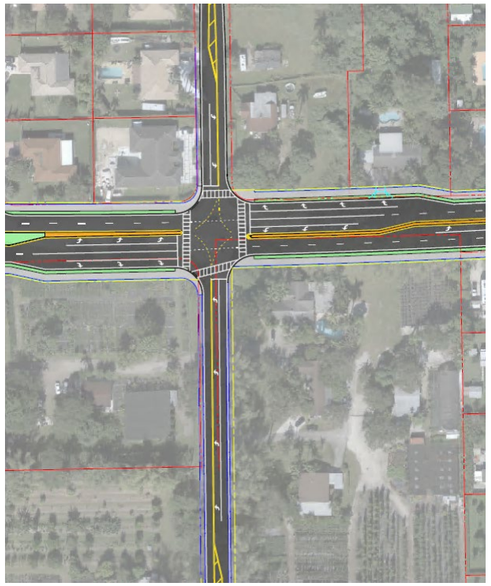
AM Peak Hour

BUILD 2 - 2045						
Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
EBLT	25	9.2	0.1	35	0.08	A
EBT	1009	11.0	3.1	518	0.48	B
EBRT	73	5.1	0.1	49	0.07	A
WBLT	98	7.8	0.2	58	0.27	A
WBT	957	6.3	1.7	274	0.39	A
WBRT	66	4.5	0.1	19	0.06	A
NBLT	85	45.5	1.1	89	0.43	D
NBT	23	46.3	2.1	62	0.58	D
NBRT	139	*	*	*	*	*
SBLT	81	55.9	1.3	113	0.50	E
SBT	52	56.9	1.4	100	0.63	E
SBRT	35	*	*	*	*	*
Int	**2643**	**15.0**	**11.0**			**B**

PM Peak Hour

BUILD 2 - 2045						
Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
EBLT	33	6.9	0.1	14	0.09	A
EBT	1112	10.1	3.1	553	0.51	B
EBRT	93	4.6	0.1	36	0.09	A
WBLT	73	7.1	0.1	40	0.22	A
WBT	781	4.9	1.1	185	0.31	A
WBRT	62	3.7	0.1	16	0.05	A
NBLT	76	47.4	1.0	87	0.40	D
NBT	49	50.0	2.3	98	0.68	D
NBRT	120	*	*	*	*	*
SBLT	49	57.1	0.8	79	0.39	E
SBT	29	58.0	1.0	67	0.57	E
SBRT	33	*	*	*	*	*
Int	**2510**	**13.9**	**9.7**			**B**

BUILD 2 - 2045 Intersection Geometry



EB: 1 LEFT + 2 THRUS + 1 RIGHT
WB: 1 LEFT + 2 THRUS + 1 RIGHT
NB: 1 LEFT + 1 SHARED THRU/RIGHT
SB: 1 LEFT + 1 SHARED THRU/RIGHT

Refined BUILD 2 - 2045

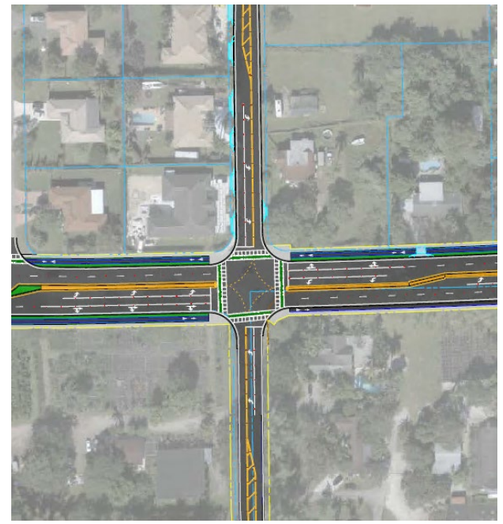
AM Peak Hour

Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
EBLT	25	7.2	0.1	1	0.08	A
EBT	1009	12.1	3.6	338	0.51	B
EBRT	73	*	*	*	*	*
WBLT	98	8.3	0.2	35	0.27	A
WBT	957	10.2	2.9	261	0.44	B
WBRT	66	*	*	*	*	*
NBLT	85	49.0	1.2	114	0.38	D
NBT	23	46.5	2.1	79	0.59	**D**
NBRT	139	*	*	*	*	*
SBLT	81	56.2	1.3	129	0.51	E
SBT	52	42.6	1.0	95	0.31	D
SBRT	35	*	*	*	*	*
Int	**2643**	**16.8**	**12.4**			**B**

PM Peak Hour

Movement	Vol (vph)	Delay (sec/veh)	Delay (veh-hr)	95th % Q (ft)	v/c	LOS
EBLT	33	5.7	0.1	18	0.09	A
EBT	1112	11.5	3.8	588	0.55	B
EBRT	93	*	*	*	*	*
WBLT	73	7.8	0.2	25	0.22	A
WBT	781	8.3	1.9	188	0.36	A
WBRT	62	*	*	*	*	*
NBLT	76	49.4	1.0	106	0.35	D
NBT	49	50.8	2.4	134	0.68	D
NBRT	120	*	*	*	*	*
SBLT	49	57.2	0.8	90	0.39	E
SBT	29	44.1	0.8	63	0.25	D
SBRT	33	*	*	*	*	*
Int	**2510**	**15.7**	**11.0**			**B**

Refined BUILD 2 - 2045 Intersection Geometry



EB: 1 LEFT + 1 THRU + 1 SHARED THRU/RIGHT
WB: 1 LEFT + 1 THRU + 1 SHARED THRU/RIGHT
NB: 1 LEFT + 1 SHARED THRU/RIGHT
SB: 1 LEFT + 1 SHARED THRU/RIGHT

Notes: “v/c” indicates volume over capacity; values greater than 1 indicates over capacity. “*” indicates movement is shared. LOS E is highlighted in orange.

5.0 PROJECT COORDINATION & PUBLIC INVOLVEMENT

5.1 AGENCY COORDINATION

Agency coordination was conducted via the Efficient Transportation Decision Making (ETDM) tool. The Advance Notification (AN) package was sent to the State Clearinghouse Coordinator on June 4, 2020. See ***Appendix O*** for details on the AN Package and the official transmittal list.

ETDM comments provided preliminary insight to the perceived environmental concerns along the corridor. Each comment was addressed through the analysis of the respective environmental impact topic and the results of the analysis were used to develop the alternatives while minimizing the potential for significant environmental impacts. In addition, if impacts were determined to be unavoidable, the ETDM comments assisted the PD&E team with analyzing potential mitigation options for any unavoidable impacts.

Agency coordination was maintained during project development through various public and agency meetings as described in Section ***5.2*** below.

The project is scheduled to be presented to the Bicycle Pedestrian Advisory Committee (BPAC) and Citizens Transportation Advisory Committee (CTAC) of the Miami-Dade Transportation Planning Organization (TPO) in June 2023.

5.2 PUBLIC INVOLVEMENT

A public involvement program was developed and implemented for this PD&E Study. The program is documented in the Public Involvement Plan (PIP) (***Appendix P***), a companion document to this PER. The PIP is a working document that is updated and amended throughout the project development process to incorporate the latest public involvement policies and techniques as they evolve during the life of the project. The PIP outlines the public involvement approach and activities required to be undertaken with the project, including lists of the contact persons, such as citizens, private groups (residential/business), officials, agencies, stakeholders, and media, and the means used to involve them in the process.

The purpose of the PIP is to assist in providing information to and obtaining input from concerned citizens, agencies, private groups (residential/business), and governmental entities. The overall goal of the plan is to help ensure that the study reflects the values and needs of the communities it is designed to benefit.

Public information meetings began in January 2022 and have continued throughout the study process. Exhibits and project information have been provided for public review and comment at each meeting. Exhibits and project information are also available on the project website (https://www.fdotmiamidade.com/QuailRoostPDE.html). Florida Department of Transportation (FDOT) representatives have been available at each meeting to discuss the project and answer questions, as well as members of the consultant team.

The following public/agency meetings have taken place to date:

Elected Official/Agency and Public Kick-Off Meetings

A hybrid kick-off meeting (virtual and in-person) for elected officials and agencies was held on Thursday, January 27, 2022. The in-person meeting was held at the South Dade Regional Library located at 10750 SW 211 Street, Cutler Bay, Florida. The purpose of this meeting was to present the study along the corridor. The meeting provided Elected Officials and agencies with an opportunity to learn about PD&E planning and development stage and purpose and need of the study. They were also able to provide comments and questions about the existing corridor conditions. See ***Appendix Q*** for details including sign-in sheets, questions received, invitation letters, advertisement, and presentation.

A hybrid Public Kick-off meeting was held on Thursday, January 27, 2022. The purpose of this meeting was to present the study along the corridor. The meeting provided the public with an opportunity to learn about PD&E planning and development stage and purpose and need of the study. See ***Appendix Q*** for details including sign-in sheets, questions received, invitation letters, advertisement, and presentation.

Affected Parties Consultation Meeting #1

A hybrid Affected Parties Consultation meeting was held on October 12, 2022 to discuss the State Road (SR) 994/Quail Roost Drive PD&E Study from West of SW 137 Avenue to East of SW 127 Avenue. The in-person meeting was held at the South Dade Regional Library located at 10750 SW 211 Street, Cutler Bay, Florida. The purpose of this workshop was to present the upcoming project. The meeting provided directly affected property owners with an overview of alternatives and opportunity to provide comments and questions about the anticipated impacts to the historic properties located at: 13390 SW 200 Street, 20000 SW 137 Avenue, and 13701 Quail Roost Drive. See ***Appendix R*** for details including sign-in sheets, questions received, invitation letters, and presentation.

Alternatives Public Workshop

A hybrid Alternatives Public Workshop was held on October 18, 2022. The in-person meeting was held at the South Dade Regional Library located at 10750 SW 211 Street, Cutler Bay, Florida. Project alternatives were presented and feedback about the concepts was received. Polling questions were conducted throughout the presentation. See ***Appendix S*** for details including sign-in sheets, questions received, invitation letters, advertisement, and presentation.

Affected Parties Consultation Meeting #2

A hybrid Affected Parties Consultation workshop was held on May 15, 2023 to discuss the State Road (SR) 994/Quail Roost Drive PD&E Study from West of SW 137 Avenue to East of SW 127 Avenue. The in-person meeting was held at the South Dade Regional Library located at 10750 SW 211 Street, Cutler Bay, Florida. The purpose of this workshop was to update plans and progress on the project from the last meeting. The meeting provided directly affected property owners with an overview of alternatives and opportunity to provide comment and questions about the anticipated impacts to these historic properties located at: 13390 SW 200 Street, 20000 SW

137 Avenue, and 13701 SW 200 Street. See ***Appendix R*** for details including meeting notes and presentation.

Affected Parties Consultation Meeting #3

An Affected Parties Consultation meeting was held on September 11, 2023 to discuss the State Road (SR) 994/Quail Roost Drive PD&E Study from West of SW 137 Avenue to East of SW 127 Avenue. The purpose of this meeting was to follow-up with the property owner located at 20000 SW 137 Avenue after the Affected Parties Consultation workshop which took place on May 15, 2023. The meeting took place at the property site and it allowed for the project team to exemplify the proposed ROW acquisition on the property and to consult with the owner regarding potential impacts to their historic property, as well as to receive input from the property owner regarding potential mitigation strategies. See ***Appendix R*** for meeting notes.

Affected Parties Consultation Meeting #4

An Affected Parties Consultation meeting was held on September 12, 2023 to discuss the State Road (SR) 994/Quail Roost Drive PD&E Study from West of SW 137 Avenue to East of SW 127 Avenue. The purpose of this meeting was to follow-up with the property owner located at 13390 SW 200 Street (Talbot Estate) after the Affected Parties Consultation workshop which took place on May 15, 2023. The meeting took place at the property site and it allowed for the project team to exemplify the proposed ROW acquisition on the property and to consult with the owner regarding potential impacts to their historic property, as well as to receive input from the property owner regarding potential mitigation strategies. See ***Appendix R*** for meeting notes.

Public Hearing

A Public Hearing is currently scheduled for July 15, 2024. This section will be updated after the Public Hearing.

6.0 DESIGN FEATURES OF THE PREFERRED ALTERNATIVE

6.1 ENGINEERING DETAILS OF THE PREFERRED ALTERNATIVE

Conceptual Design Plans of the Preferred Alternative are included in ***Appendix T***. Engineering details are presented below.

6.1.1 Roadway Typical Section

The preferred alternative proposes one additional travel lane in each direction, for a total of two 11-ft lanes on each bound, and a 16.5-ft median with exclusive left turn lanes along SR 994. Curb and Gutter Type F is proposed on the outside of the travel lanes while Type B curb is the typical condition on the inside to maximize the available landscaping area within the raised islands. This alternative also proposes sidewalk with sidewalk level SBLs along both sides of the corridor, that are intended to be utilized by pedestrians as well as bicyclists. A minimum 4.5-ft buffer is proposed from the back of curb to the front of the sidewalk level SBLs and a 2-ft buffer is proposed between the sidewalk and the bicycle lane. A traffic signal is proposed at the intersection of SR 994/Quail Roost Drive and SW 134th Avenue. See ***Figure 6-1*** for details. The typical section package is currently under review by the Department. See ***Appendix U*** for details.

Figure 6-1 Preferred Alternative Typical Section

6.1.2 Bridges and Structures

The preferred alternative proposes the construction of a new bridge carrying SR 994 over Black Creek Canal. The recommended bridge is a three-span structure having an overall length of 100'-0". The bridge superstructure will consist of prestressed concrete 12" Florida Slab Beams with a 6" cast-in-place concrete topping. Square prestressed concrete piling will be used for all foundations and the substructure will consist of pile bents. The bridge will be phase constructed on the existing alignment. For additional details, please refer to the *Bridge Analysis Report*, a companion document to this study (***Appendix I***).

6.1.2.1 Bridge Typical Section

The bridge typical section consists of two 11-foot eastbound travel lanes, two 11-foot westbound travel lanes, one 11-foot westbound left turn lane and a variable width raised median. There are 1'-4" shoulders between the thru travel lanes and the adjacent raised sidewalk and median as required by FDM Figure 260.1.3. The raised sidewalk on each side has a width of 18'-2" to match the approaching roadway section. 32" vertical shape traffic railings with bullet rail are used adjacent to the sidewalk. The overall bridge width is 101'-8". See ***Figure 6-2*** for details.

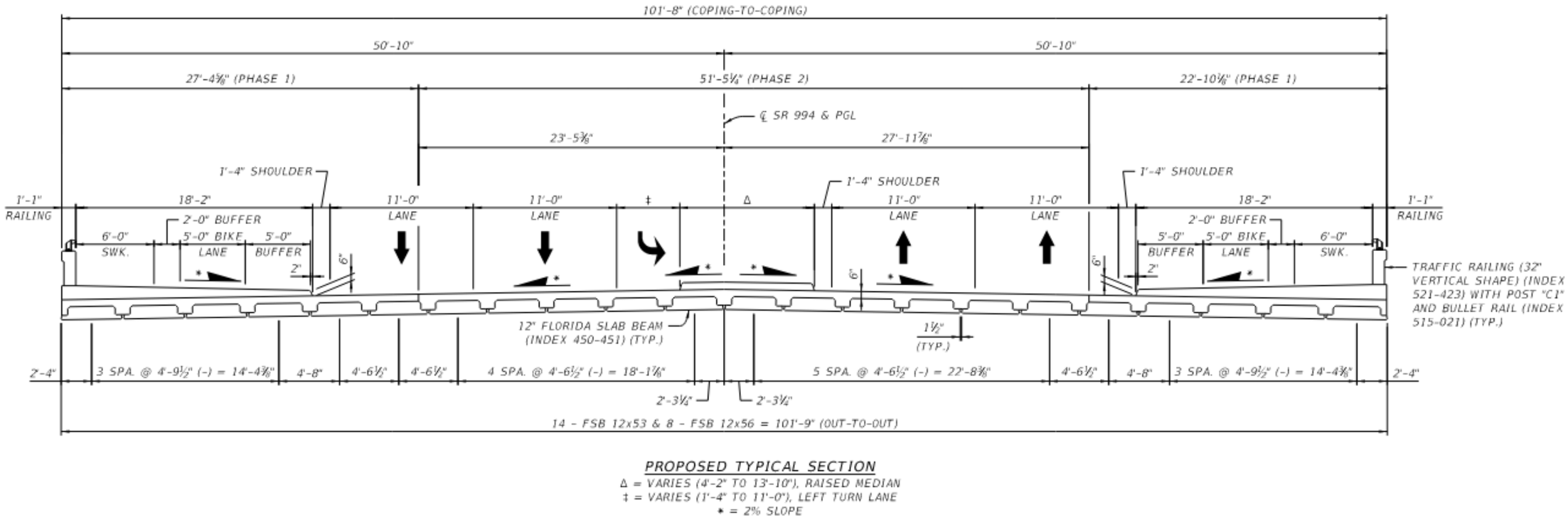
6.1.2.2 Construction Phasing

Construction phasing of the proposed bridge will be required. Details related to the phasing will be determined during final design; however, the current plan is to utilize a simple two-phased approach. In Phase 1 existing vehicular and pedestrian traffic is maintained in its current configuration while construction of the northern and southern portions of the proposed bridge are built. Phase 2 moves westbound traffic onto the northern portion built during Phase 1 and eastbound traffic onto the southern portion built during Phase 1 while the existing bridge is removed, and the middle portion of the proposed bridge is constructed.

6.1.2.3 Span Arrangement

Selecting an appropriate span arrangement is a key design issue for a new bridge. The location of the begin bridge, end bridge, centerline of the existing canal and location of the existing pile bents drive many of the decisions related to span arrangement while ensuring the items noted in the Design Criteria section are satisfied.

The existing bridge is centered on the Black Creek Canal with three equal spans of 29'-4". To avoid conflicts with existing pile foundations, the proposed span arrangement will be set to ensure the proposed pile bents are offset longitudinally from the existing pile bents. Span 2 will be centered on the Black Creek Canal with a span length of 40'-6". See ***Appendix I*** for details on the proposed span arrangement.



PROPOSED TYPICAL SECTION
Δ = VARIES (4'-2" TO 13'-10"), RAISED MEDIAN
‡ = VARIES (1'-4" TO 11'-0"), LEFT TURN LANE
* = 2% SLOPE

Figure 6-2 Proposed Bridge Typical Section

6.1.2.4 Foundation Alternatives

Several foundation alternatives, including shallow foundations, drilled shafts, steel piles (pipe & H-sections), precast prestressed concrete piles and auger cast-in-place piles are considered viable foundation options. The preliminary geotechnical report included in ***Appendix G*** discusses each of these alternatives.

Precast prestressed concrete (PPC) piles are a widely used and proven foundation system in Florida. PPC piles are readily available and generally have a lower cost per ton of capacity than other pile types. The minimum PPC pile size for the bridge foundations is 18 inches as required by FDOT Structures Design Guidelines (SDG) Table 3.5.1-1; however, 24-inch piles may be required based upon structural requirements that will be determined during final design. PPC piles are the recommended foundation type for this bridge.

6.1.2.5 Superstructure Alternative

To keep the proposed profile as low as possible, only shallow superstructure options were considered viable. The longest span length is 40'-6". See ***Appendix I*** for details.

Florida Slab Beams (FSBs) are the recommended superstructure type for the proposed bridge. ***Table 6-1*** provides guidance from the Instructions for Standard Plans (Index 450-450) related to maximum recommended span lengths.

Table 6-1 Florida Slab Beam Maximum Span Length Recommendations

Recommended Maximum Span Lengths (CL Bearing to CL Bearing) [Long Bridges]		
Beam Type	**Beam Width**	
	4'-0"	5'-0"
12" FSB	41'-2"	44'-5"
15" FSB	53'-3"	56'-9"

Based upon the maximum span length, 12" FSBs with a 6" cast-in-place topping can provide the necessary structural capacity with a superstructure depth of 18 inches. No temporary shoring is needed to erect these beams. SDG Section 9.2.3 indicates the cost for pretensioned slab beams with a cast-in-place topping, excluding premiums associated with phased construction, is from $180/SF to $300/SF.

6.1.2.6 Substructure Alternative

Pile bents are the recommended substructure type for the proposed bridge. This is the most common type of substructure used for short span bridges crossing small waterways. The existing bridge utilizes pile bents.

6.1.3 Right of Way and Relocations

Right of Way impacts and associated costs of the preferred alternative were calculated and summarized in ***Table 6-2***. The impacts and estimated costs were developed based on the conceptual design plans. Details are provided in ***Appendix M***.

Table 6-2 Preferred Alternative Right of Way Impacts and Cost

Type of Parcel	Parcel Impact
Commercial	9
Agricultural	12
Residential	41
Total Parcels Impacted	62
Partial Impacts	62
Potential Relocation	8 (8 PP)
Total Area Impact (S.F.)	282,644
Total Area Impact (Acre)	6.49
Estimated Right of Way Cost	**$7,211,238**
Estimated Relocation Cost	**$6,400.00**

PP = Personal Property

6.1.4 Horizontal and Vertical Geometry

6.1.4.1 Horizontal Alignment

This horizontal alignment of the Preferred Alternative is composed mainly of tangents with small deflection angles with a flat reverse horizontal curve at approximately the middle of the project length, and a horizontal curve that connects to existing at the east portion of the project. The curves correspond to a design speed of 40 mph. The alignment begins west of SW 137th Avenue and follows the eastbound inside edge of pavement until 137th Avenue. At SW 137th Avenue it transitions to follow the centerline of the proposed design until SW 127th Avenue. West of SW 127th Avenue it transitions back to follow the eastbound inside edge of pavement. ***Table 6-3*** shows the description of all tangents and curves of this alternative.

Table 6-3 Preferred Alternative Tangent and Curve Information

TANGENT SECTION				CURVE SECTION				
Begin STA.	End STA.	Distance (ft)	Bearing	PC STA.	PT STA.	Length (ft)	Radius (ft)	Superelevation
2294+00.00	2303+84.93	984.93	N89º11'25"E	-	-	-	-	-
2303+84.93	2309+85.05	600.12	S89°39'50"E	-	-	-	-	-
2309+85.05	2314+49.82	464.77	N89º11'25"E	-	-	-	-	-
2314+49.82	2319+17.90	468.08	N89º43'55"E	-	-	-	-	-
2319+17.90	2321+94.96	277.06	N88º45'58"E	-	-	-	-	-
2321+94.96	2325+38.75	343.79	N89º45'58"E	-	-	-	-	-
2325+38.75	2328+00.06	261.31	N88º45'58"E	-	-	-	-	-
-	-	-	-	2328+00.06	2332+08.85	408.79	14000	NC
-	-	-	-	2332+08.85	2336+29.38	420.53	14000	NC
2336+29.38	2340+21.54	392.16	N88º48'47"E	-	-	-	-	-
2340+21.54	2346+01.39	579.85	N89º48'47"E	-	-	-	-	-

TANGENT SECTION				CURVE SECTION				
Begin STA.	End STA.	Distance (ft)	Bearing	PC STA.	PT STA.	Length (ft)	Radius (ft)	Superelevation
2346+01.39	2347+76.42	175.03	N89º22'31"E	-	-	-	-	-
2347+76.42	2360+19.76	1243.34	N89º48'47"E	-	-	-	-	-
2360+19.76	2362+62.64	242.88	N87º48'47"E	-	-	-	-	-
2362+62.64	2368+20.40	557.76	N89º48'47"E	-	-	-	-	-
-	-	-	-	2373+05.74	2385+89.31	1283.59	1925	0.04
2385+89.31	2386+20.95	31.65	N51º02'34"E	-	-	-	-	-

6.1.4.2 Vertical Alignment

The preferred alternative proposes to modify the vertical alignment of the road to comply with minimum longitudinal grading criteria for a curb and gutter section. The profile contains longitudinal grades ranging from -0.5% to +0.5% with a maximum change in grade of 1% in local roads, 0.8% on the suburban residential area and 0.6% towards the west rural area of the project per the criteria in ***Table 3-1***. The conceptual profile elevations range from 8.17-ft to 12.83-ft (NAVD). A profile design was analyzed toward the stationing approaching the bridge to comply with the vertical clearance required. Due to the impacts created by a higher profile, the Black Creek Trail underpass alternative was deemed impractical. An at-grade crossing alternative was selected as the preferred.The details are explained below:

Bridge elevated without underpass for grade separated crossing of the Black Creek Trail:

- Grade line elevation set at a minimum of 11.73' to allow for an 2' minimum clearance from the flood elevation (50 year storm). This was achieved with a crest curve with a length of 342 and a K value of 70 followed by sag curves at both extremes to connect to the other proposed tangents. See details in ***Table 6-4***.

Table 6-4 Preferred Alternative Conceptual Profile Geometry

LONGITUDINAL GRADE						VERTICAL CURVE	
Begin STA.	Begin ELE.	End STA.	End ELE.	Length (ft)	Grade	Type	K Value
2298+23.53	11.58	2302+55.35	11.92	431.82	0.08%		
2302+55.35	11.92	2306+03.30	12.65	347.95	0.21%		
2306+03.30	12.65	2310+78.30	11.23	475	-0.30%		
2310+78.30	11.23	2313+78.23	12.13	299.93	0.30%		
2313+78.23	12.13	2314+63.95	12.6	85.72	0.55%		
2314+63.95	12.6	2315+68.23	12.08	104.28	-0.50%		
2315+68.23	12.08	2318+18.23	12.83	250	0.30%		
2318+18.23	12.83	2322+18.23	11.63	400	-0.30%		
2322+18.23	11.63	2324+68.23	12.38	250	0.30%		
2324+68.23	12.38	2328+64.48	10.98	396.25	-0.35%		
2328+64.48	10.98	2331+14.48	11.73	250	0.30%		

LONGITUDINAL GRADE						VERTICAL CURVE	
Begin STA.	Begin ELE.	End STA.	End ELE.	Length (ft)	Grade	Type	K Value
2331+14.48	11.73	2333+64.48	10.98	250	-0.30%		
2333+64.48	10.98	2336+14.48	11.73	250	0.30%		
2336+14.48	11.73	2341+59.60	9.003	417.08	-0.50%		
2341+59.60	9.003	2343+43.03	10.71	183		Sag	64
2343+43.03	10.71	2346+86.10	10.43	343		Crest	70
2346+86.10	10.43	2348+67.51	8.4	181		Sag	64
2348+67.51	8.4	2352+07.55	9.417	340	0.30%		
2352+07.55	9.417	2355+13.43	8.19	305.88	-0.40%		
2355+13.43	8.19	2362+37.55	11.09	724.13	0.40%		
2362+37.55	11.09	2368+17.55	9.35	580	-0.30%		

6.1.5 Bicycle and Pedestrian Accommodations

The preferred alternative includes continuous sidewalks with sidewalk level SBLs along both sides of the corridor. The proposed sidewalk level SBLs will serve as an east-west connector between the Krome Path, Black Creek Trail and South Dade Trail. The eastern limit of the project is just under two miles from the SW 200th Street Transit Station, which is expected to be improved as part of the SMART Plan Transitway Design-Build project. This distance is the desired biking distance from an accessibility/connectivity standpoint thus providing a connection for multimodal system linkage. Additionally, there is an existing SUP (Roberta Hunter Park Path) just one mile east of the eastern limit of the project. Miami Dade County DTPW recently completed a project along SW 137th Avenue, from US-1 to north of SR 994/Quail Roost Drive (MDC Project 20040343) that introduced on-street bicycle lanes on both sides of SW 137th Avenue. Similarly, DTPW is planning two roadway projects in the area that will provide bicycle facilities connectivity to Quail Roost Drive: MDC Project PW168 (SW 137th Avenue from US-1 to SW 184th Street, widening to 4-lane divided roadway with on-street bicycle lanes) and MDC Project 20200285 (SW 200th Street from US-1 to Quail Roost Drive, widening to 4 lanes with a new SUP along the west side).

Figure 6-3 Sidewalk Level Separated Bicycle Lane

6.1.6 Multi-Modal Accommodations

There are no transit, railroad, or truck routes within the project limits. The project is anticipated to improve mobility in the area as well as provide connectivity to the SW 200th Street Transit Station located approximately two miles to the east of the project.

6.1.7 Access Management

The preferred alternative proposes the construction of restrictive medians throughout the study limits. This improvement would require the reclassification of the study corridor from an Access Class 4 to an Access Class 5 to more closely represent the proposed roadway conditions as well as the existing Context Classification of C3R-Suburban Residential. Access Class 5 roadways are controlled access facilities where adjacent land has been extensively developed and where the probability of major land use change is not high. These roadways are distinguished by existing or planned restrictive medians. ***Table 4-7*** includes access management standards for Access Access Class 4 (existing) and Access Class 5 (proposed).

The preferred alternative proposes the installation of a traffic signal at the intersection of SR 994 and SW 134th Avenue. This improvement would result in a signal spacing of approximately 1,340-ft and would meet the minimum requirement of 1,320-ft for the proposed Access Class 5. The need for the traffic signal has been demonstrated through the signal warrant process and details are provided in ***Appendix B***. A median opening evaluation confirmed the preferred alternative does not meet the minimum opening spacing of 660-ft (directional) and 1,320-ft (full) for Access Class 5 on multiple instances. See ***Figure 6-4*** for details. The minimum connection spacing is also not met in the existing condition and will continue to be substandard in the future condition.

Proposed changes to the current Access Management Classification will be implemented in accordance with Section 335.199 of the Florida Statutes.

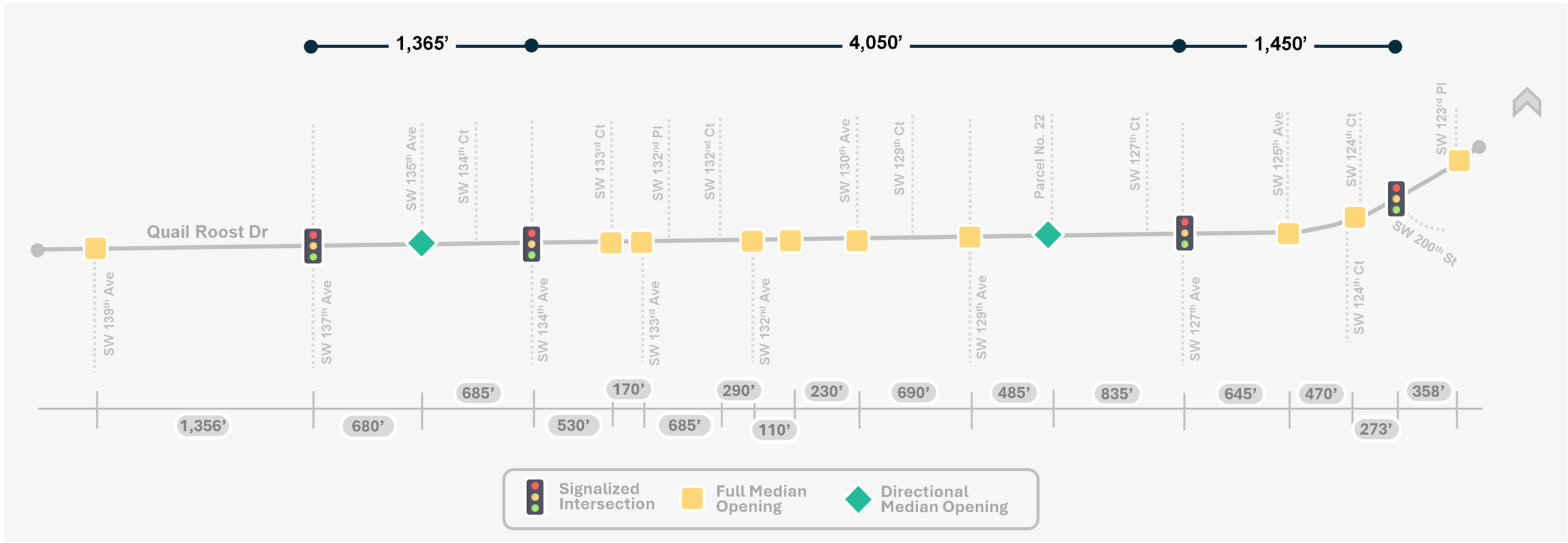


Figure 6-4 Preferred Alternative Median Opening Spacing

6.1.8 Intersection Concepts

SW 137 Avenue

The intersection layout considers the future typical section of SW 137 Ave, per Miami-Dade County DTPW Study, which shows two lanes in each direction and a raised median. The intent is to minize future impacts to the intersection when DTPW implements the proposed typical section. Along SR 994, the two thru lanes in each direction are maintained to the west of SW 137 Avenue to provide more capacity. The typical section transitions back to a two-lane undivided section to the west of the untersection functional area. Westbound and southbound approaches feature dual left turn lanes while eastbound and northbound approaches have a single left turn lane. The NB and WB approaches feature an exclusive right turn lane, while the EB and SB approaches feature a shared right-thru lane on the outside. All approaches include 4-ft traffic separators. The SBLs end on the east side of the intersection, where connectivity will be provided to the sidewalk that runs on the east side of SW 137 Ave, north of SR 994. Bicycle traffic will have connectivity to 4-ft bicycle lanes running on each bound of SW 137 Ave. No sidewalk or bicycle facility exists along SR 994, west of SW 137 Ave., therefore this intersection was selected as the logical termini for biycle and pedestrian facilities in the east-west direction.

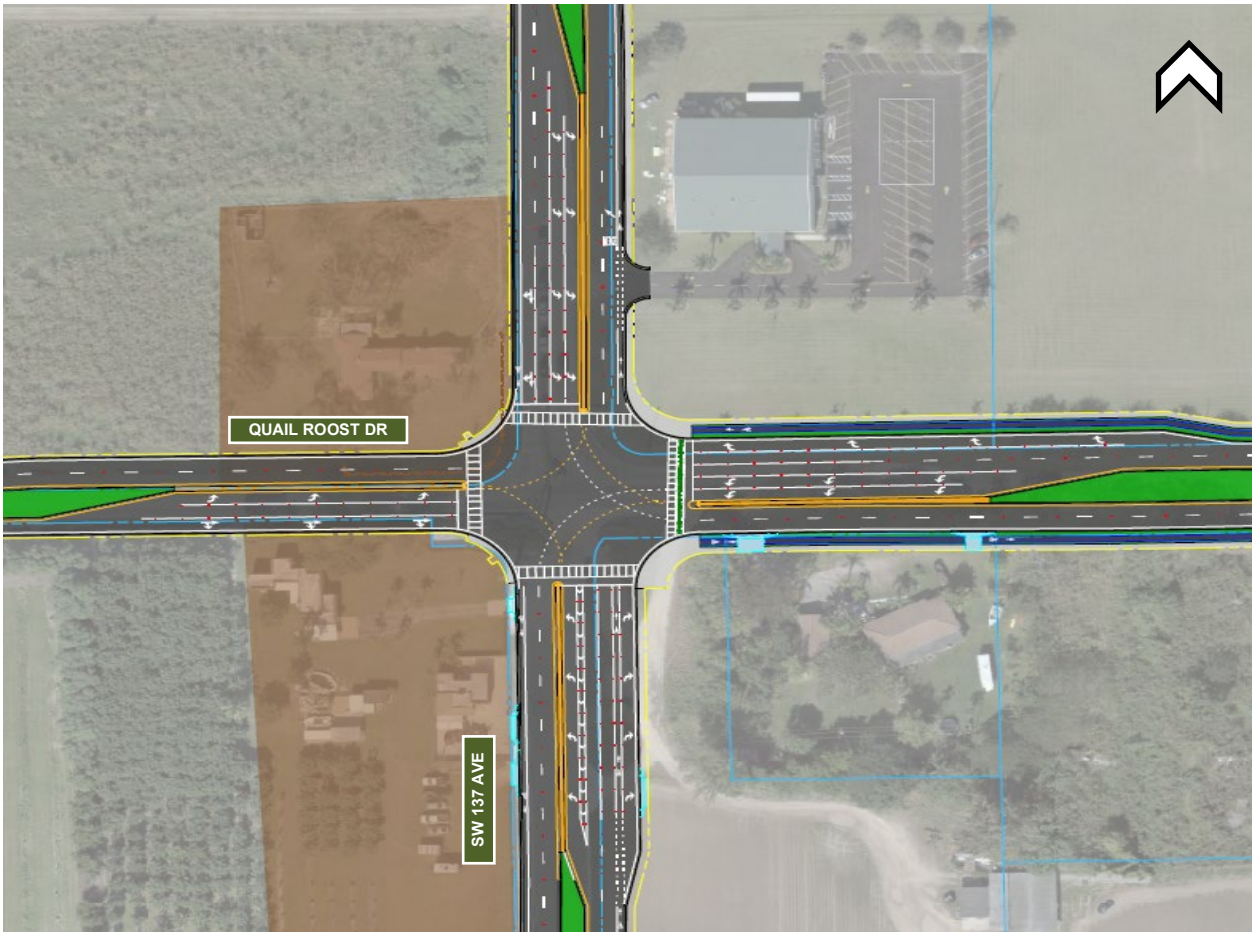


Figure 6-5 SR 994/Quail Roost Dr and SW 137th Avenue Intersection

SW 134 Avenue

The intersection layout considers the proposed signal being proposed. Exclusive left turn lanes are being proposed and shared right-thru lanes are being proposed on all approaches. Raised sidewalks and SBL are continuous across the intersection in the East-West direction, with the south side footpint being reduced in front of Talbott Estate (SE Corner) by removing utility strip and SBL to sidewalk buffer to reduce impacts to the historic property. All approaches include 4-ft traffic separators.

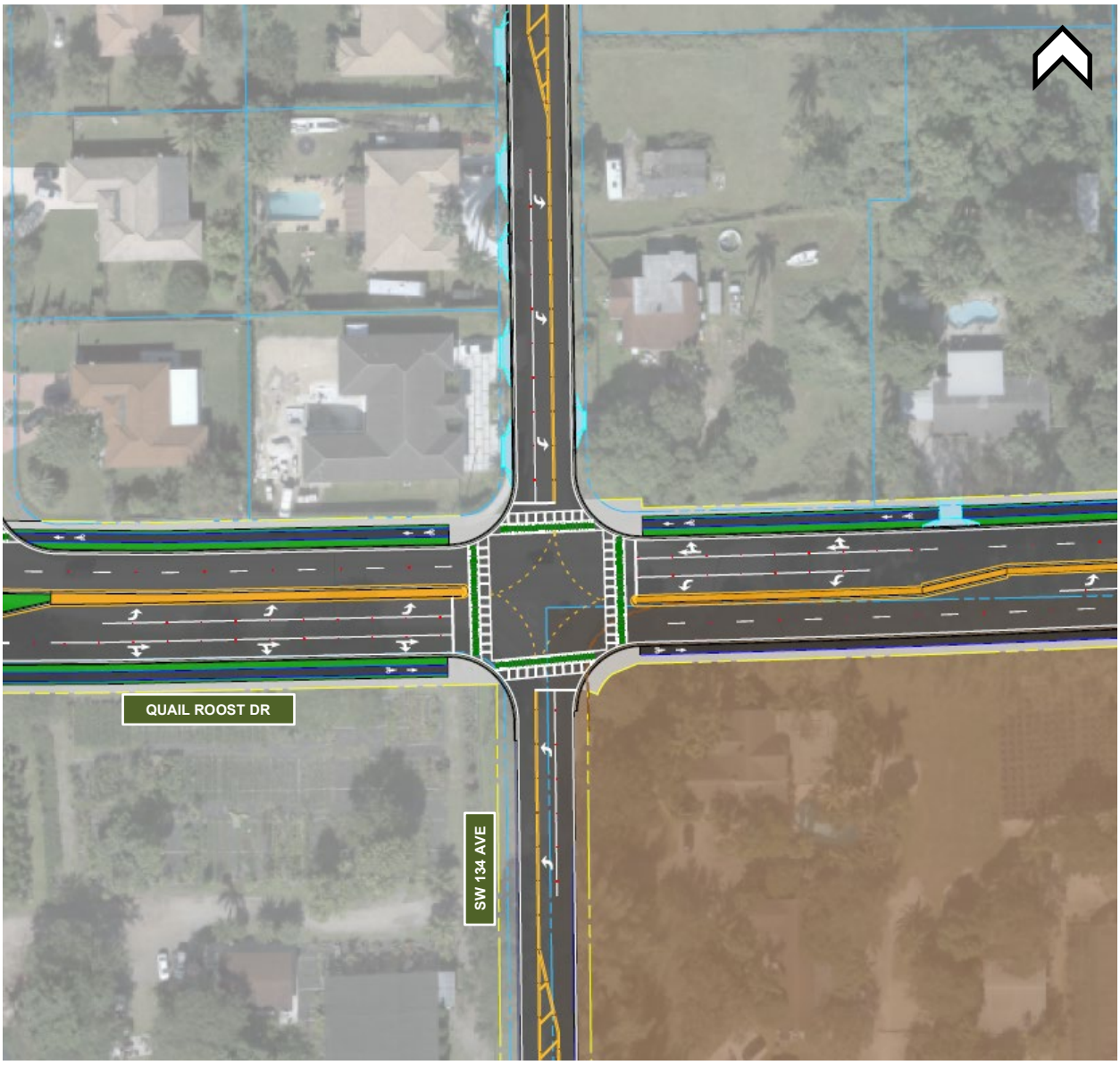


Figure 6-6 SR 994/Quail Roost Dr and SW 134th Avenue Intersection

SW 132 Avenue

The intersection remians unsignalized, as recommended by a previously completed Signal Warrant Study. The proposed configuration will feature an exclusive WB left turn lane as well as exclusive NB right and left turn lanes. This improvement requires milling and resurfacing along SW 132 Avenue that will extend to the south to also cover the SW 200 Terrace intersection.

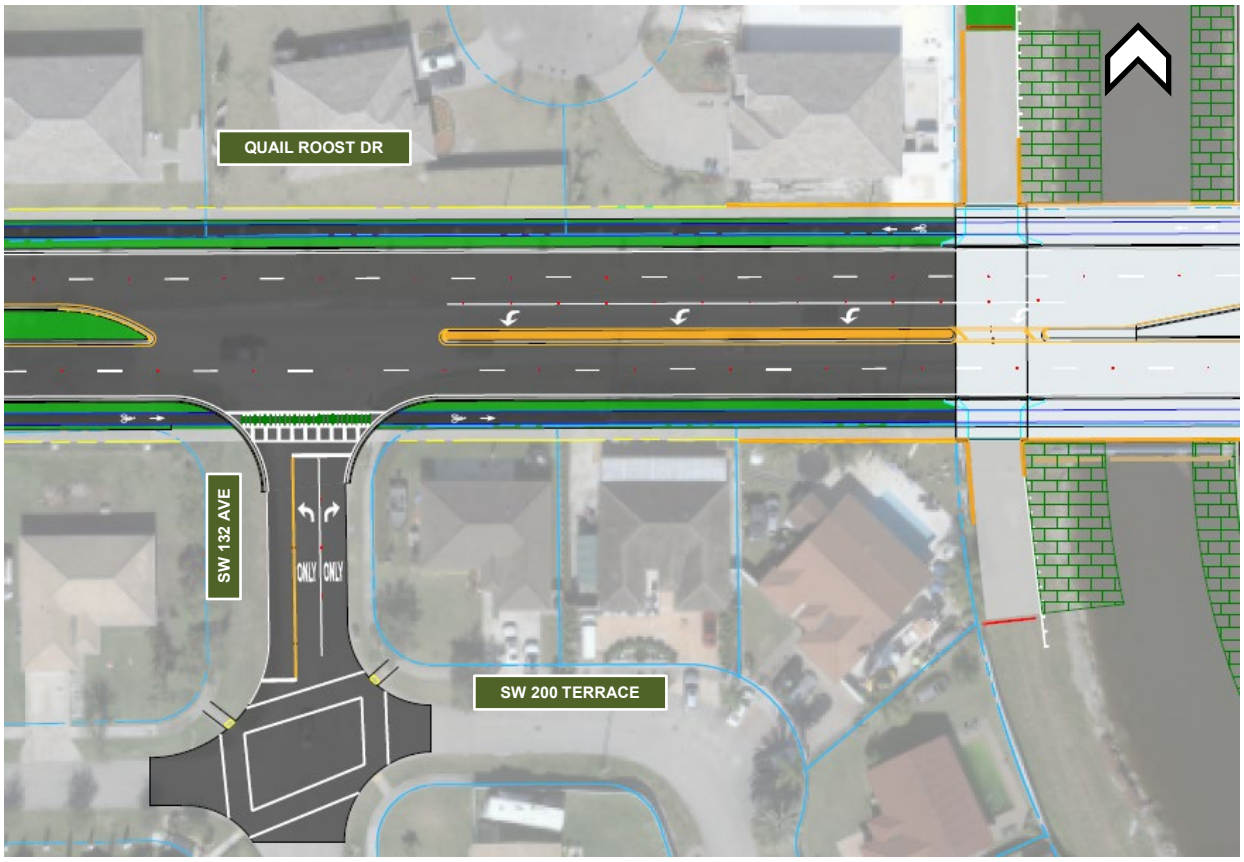


Figure 6-7 SR 994/Quail Roost Dr and SW 132nd Avenue Intersection

SW 127 Ave

The intersection layout considers the future typical section of SW 127 Ave, per Miami-Dade County DTPW Project 20180004, which has completed design and is awaiting construction. The project proposed widening along SW 127 Ave, south of SR 994 to accommodate a two-way left turn lane and an exclusive right turn lane in the NB direction. The proposed layout features one single left turn lane on the NB, SB and EB approaches and a dual left turn lane on the WB approach. Also, exclusive right turn lanes at all approaches. All approaches include 4-ft traffic separators.

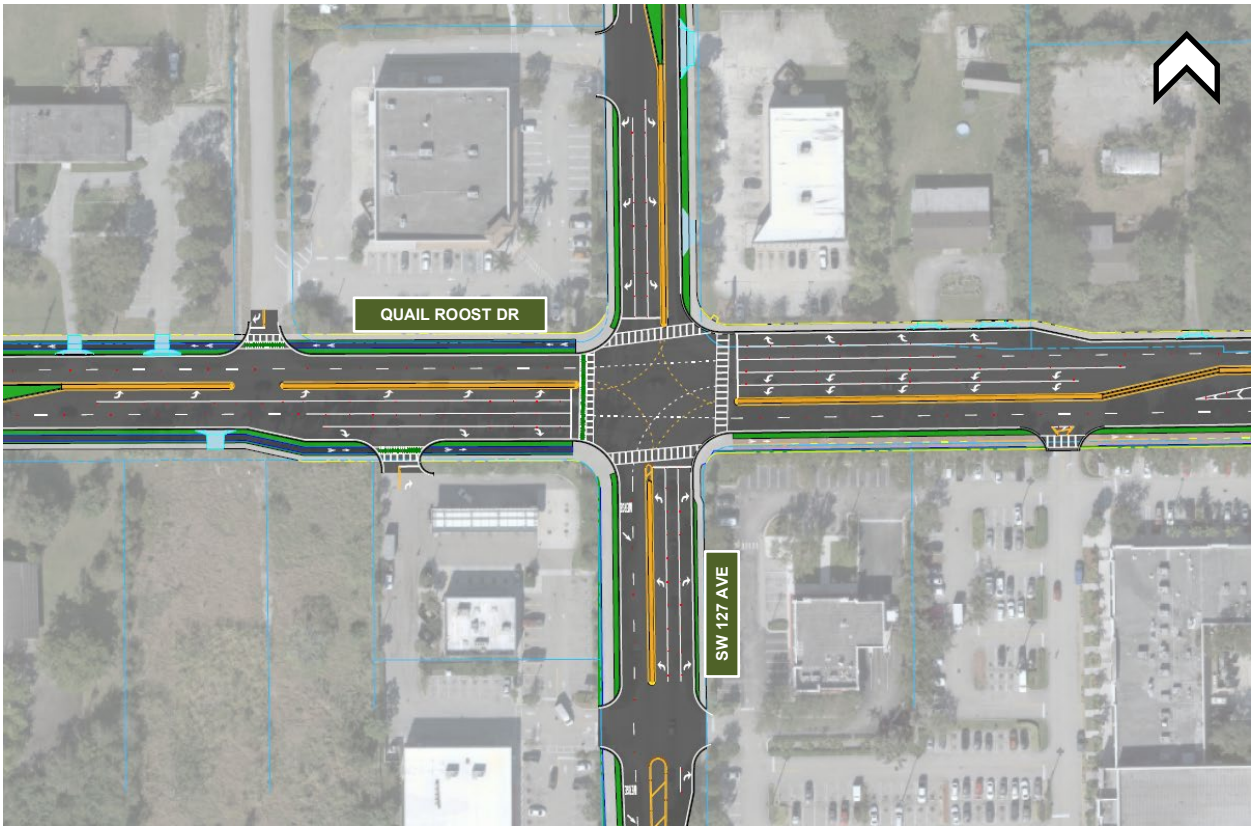


Figure 6-8 SR 994/Quail Roost Dr and SW 127th Avenue Intersection

6.1.9 Intelligent Transportation Systems (ITS) and TSM&O Strategies

There are no existing or planned ITS facilities within the study limits. The closest ITS devices consist of Closed-Circuit Television (CCTV) Cameras and Dynamic Messaging Signs (DMS), located on US-1 in the vicinity the Florida's Turnpike. The study corridor has not been identified by the FDOT District 6 as a priority corridor for implementation of TSM&O strategies such as Adaptive Signal Control Technologies (ASCT) or Traffic Signal Priority (TSP).

The Traffic Signals & Signs (TSS) Division of the Miami-Dade County Department of Transportation and Public Works (DTPW) is installing a new Advanced Traffic Management System (ATMS) that will enhance mobility for commuters, transit users, pedestrians, and bicyclists throughout Miami-Dade County. The project includes the upgrade of the County's ATMS Central Software, replacement of approximately 3,000 controllers and installation of additional detection systems at signalized intersections. The upgraded system will provide the platform to be able to implement strategies to enhance mobility for motorized and transit vehicles, pedestrians, and bicyclists to optimize mobility for all transportation system users. Controllers for the following signals within the project limits are scheduled to be installed in December 2023.

- Quail Roost Drive/SW 200th Street and SW 137th Avenue (Asset ID 6507)
- Quail Roost Drive/SW 200th Street and SW 127th Avenue (Asset ID 5751)

6.1.10 Signing and Pavement Markings

New signage and Pavement Markings is proposed for vehicular and non-vehicular traffic within the limits of the project. Single post ground mounted signage is to be installed within the sidewalk area to avoid obstructing the separated bicycle lanes and meeting minimum offset from the road.

Crosswalks along side streets are proposed with Bicycle Green conflict markings for SBL adjacent to high emphasis markings for sidewalk areas. Hardenend centerlines can be accommodated at most signalized intersections, with the exception of locations with vehicle turning movement restrictions. Constrained locations include SW 134 Ave (north and south leg), SW 127 Ave (north and south leg), SW 200 St. (south leg).

6.1.11 Signalization

Four signalized intersections and one signalized pedestrian crossing are proposed as follows:

- Quail Roost Dr. and SW 137 Ave.: The intersection is currently signalized and proposed to be reconstructed with new signalization equipment to match the proposed roadway layout.
- Quail Roost Dr. and SW 134 Ave.:The intersection is currently a two-way stop controlled intersection to be upgraded to sigbal controlled with new signalization equipment to match the proposed roadway layout.
- Quail Roost Dr. and SW 127 Ave.: The intersection is currently signalized and proposed to be reconstructed with new signalization equipment to match the proposed roadway layout.
- Quail Roost Dr. and SW 200 St.: The intersection is currently signalized and proposed to be adjusted to accommodate minor widening proposed in this area. Anticipated

adjustments include shifting signal heads, adjusting detection zones, reconstruction pedestrian signals and adjustments to impacted conduit or pull boxes.

- Quail Roost Dr. and Black Creek Trail: The existing trail crossing is currently controlled by gouund mounted Rapid Rectangular Flashing Beacons (RRFB). The proposed condition included a four-lane signalized crossing with a refuge area in the median.

6.1.12 Lighting

New corridor lighting is proposed to be located at the back of sidewalk using. The proposed lighting system is to provide compliant levels of horizontal illumination for travel lanes, intersections, bicycle lanes and sidewalks.

At signalized corsswalks, minimum levels of vertical illumination are to be provided to comply with FDM 231.

6.1.13 Utilities

Utility Agency Owners (UAOs) with known facilities within the study limits were contacted at the beginning of the PD&E Study and requested to provide the location of their existing and planned facilities. ***Table 2-16*** lists the contact information of each UAO. A preliminary evaluation for potential utility impacts associated with the recommended alternative was performed along SR 994 within the study limits. A summary of the impacts to each UAO is presented below. ***Appendix H*** documents the plans with the approximate location of the potential utility impacts.

AT&T DISTRIBUTION

Potential impacts to buried telephone, placed out of service buried telephone, communication cabinet, pole and hand hole at the following locations.

- **SR 994/Quail Roost Drive**
  - Sta 312 – 338, placed out of service buried telephone
  - Sta 328 – 338, active buried telephone
  - Sta 328/SW 134th Avenue /Talbot Road, overhead telephone on pole line
  - Sta 333/SW 133rd Court, active buried fiber optic
  - Sta 338, AT&T Cabinet and Hand Hole
  - Sta 338 – 358, south side of SR 994/Quail Roost Drive, one (1) overhead fiber optic cable and two (2) overhead telephone cables as joint user on electric pole line
  - Sta 353 – 358, north side of SR 994/Quail Roost Drive, two (2) overhead fiber optic cables as joint user on electric pole line
  - Sta 355, AT&T pole on SW corner of SR 994/Quail Roost Drive and SW 129th Avenue
  - Sta 358 – 368, AT&T duct bank consisting of one (1) buired telephone and five (5) fiber optic cables
  - Sta 368, NW/SW corner of SR-994/Quail Roost Drive and SW 127th Avenue/Burr Road overhead facilities consist of two (2) fiber optic cables, one (1) overhead telephone and buried telephone consisting of one (1) buried telephone and one (1) 4” PVC.

COMCAST

Potential impacts to overhead facilities, risers and underground facilities where these transition off overhead pole line.

- **SR 994/Quail Roost Drive**
  - Sta 312 – 326, overhead facilities on north side of roadway
  - Sta 323, underground facilties coming on/off pole
  - Sta 326 – 328, underground facilities
  - Sta 328 – 334, overhead facilities on north side of roadway
  - Sta 334, overhead facilities crossing diagonally to south side of corridor at Sta 336, crossing back to north side at 336 continuing eastbound
  - Sta 336 overhead facilities on south side of roadway to Sta 352 where crosses to north side of SR 994/Quail Roost Drive to end of proejct limits/Sta 369
  - Sta 354, aerial crossing
  - Sta 368/SW 127th Avenue/Burr Road in northbound direction on east side of roadway
  - Sta 368/SW 127th Avenue/Burr Road in southbound direction on west side of roadway
- **SW 137th Avenue**
  - Overhead facilities running north and south of roadway crossing from west to east at SR 994/Quail Roost Drive in northbound trajectory on east side of SW 137th Avenue
- **SW 134th Avenue/Talbot Road**
  - Overhead facilities on north and south side of roadway crossing SR 994/Quail Roost Drive.
- **Underground Faciliites**
  - Sta 338 – Sta 339, overhead facilities comes off pole and crossing SR 994/Quail Roost Drive onto north side of SW 132nd Court
  - Sta 349, overhed facilities transitioning off pole travel southbound on SW 130th Avenue

CROWN CASTLE

Potential impacts to overhead facilities, risers and underground facilities where these transition off overhead pole line.

- **SR-994/Quail Roost Drive**
  - Aerail fiber west of Sta 312 on north side of SR-994/Quail Roost to Sta 315
  - (4) 1.5” HDPE buried fiber crossing SR-994/Quail Roost Drive in southbound directon at Sta 315, continues eastbound in swale to Sta 344 where buried fiber comes up riser onto overhead pole line.
  - Aerial fiber on south side of SR-994/Quail Roost Drive from Sta 344/crossing Black Creek Canal C-1 in eastbound direction to Sta 358. At Sta 358 aerial fiber crosses

SR-994/Quail Roost Drive onto northside of corridor until Sta 364 where transitions off pole to buried facilities.

- (4) 1.5" HDPE buried fiber located on north side of SR-994/Quail Roost Drive in eastbound direction, crossing SW 127th Avenue/Burr Road

- **SW 137th Avenue**
  - Aerial facilities crossing onto east side of SW 137th Avenue transfering off pole line to (4) 1.5" HDPE underground faciliteis in NB trajectory

- **SW 127th Avenue/Burr Road**
  - Sta 364 coming off pole line in eastbound direction to Sta 368/SW 127th Avenue/Burr Road to Sta 369 end of proejct limits
  - At NE/SE corner of SW 127th Avenue/Burr Road and SR-994/Quail Roost Drive (2) 1.5" HDPE buried fiber conduits to two (2) termination nodes on NE/SE corner of intersections
- Adjustments Handholes/Acess Points

  Nine (9) hand hole/nodes as depicted by marked plans located at the following locations:
  - Hand hole – NE & SE corner of intersection of SW 137th Avenue and Quail Roost Drive
  - Hand hole – south side of the intersection of SW 135th Avenue and Quail Roost Drive
  - Hand hole – south side of intersection of SW 133rd Court and Quail Roost Drive
  - Hand hole – SE corner of intersection of SW 132nd Avenue and Quail Roost Drive
  - Hand hole – approximately 40' west of Canal C-1 on the south side of Quail Roost Drive
  - Hand hole – NE corner of intersection of SW 127th Avenue and Quail Roost Drive
  - Node – SE corner of intersection of SW 127th Avenue and Quail Roost Drive
  - Hand hole – approximately 200' east of intersection of SW 127th Avenue and Quail Roost Drive

FPL DISTRIBUTION

Impacts anticipated to 13kV and 120/240V overhead electric pole line, risers, span guy, appurtenances and street light underground buried electric circuit lines at the following locations:

- **Aerial Facilities**
  - SR 994/Quail Roost Drive,overhead 13KV power line on north side of roadway from the beginning of project limits/Sta 312 in eastbound to Sta 334 where overhead electric crosses roadway onto south side of SR 994/Quail Roost Drive to end of project limits/Sta 369

- North and South along SW 137th Avenue – overhead 13KV powerline and 120/240OV powerline
- North and South along SW 134th Avenue / Talbot Road, overhead 13KV powerline
- North along SW 132nd Court – overhead 13KV powerline
- North and South along SW 127th Avenue / Burr Road, overhead 13KV powerline

- **Underground Facilities**
  - SR-994/Quail Roost Drive, 13kV buried electric east of SW 132nd Place to Black Creek / Canal C-1
  - SR-994/Quail Roost Drive, 120V street light circuit/ buried electric
  - SW 135th Avenue, 120V street light circuit/ buried electric
  - SW 134th Court, 120V street light circuit/ buried electric
  - SW 130th Avenue – 13KV BE
  - SW 129th Court – 13KV BE

MIAMI-DADE PUBLIC WORKS AND TRAFFIC

The location of the facilities was not provided by Miami-Dade Public Works at this phase. Potential impacts to street lighting and traffic signals (if any) are to be coordinated with Miami-Dade County Public Works and Traffic in future phases of the project.

MD-WASD

Potential impacts to water distribution system and sanitary sewer facilites along with manholes and water valves, identified at following locations:

- **Water**
  - 16” DIP Water Main, SR-994/Quail Roost Drive**,** from west of 135th Avenue/Sta 319 to east of SW 129th Avenue/Sta,357 crossing aerially over the Black Creek Canal
  - 16” DIP Water Main, SW 137th Avenue, west side of roadway in northbound direction
  - 16” DIP Water Main, SR-994/Quail Roost Drive/Sta 385 to Sta 369
  - 8” DIP tie-in/connections from existing 16” DIP to intersecting streets; SW 135th Avenue, SW 134th Court, SW 134th Avenue/Talbot Road, SW 133rd Court, SW 132nd Place, SW 132nd Court, SW 130th Avenue, SW 129th Court, SW 129th Avenue
  - 48” PCCP Water Main, SW 127th Ave, west side of roadway in north/south direction
- **Sanitary**
  - 8” DIP sanitary sewer, SR 994/Quail Roost Drive north side of roadway from west side of SW 127th Court/Sta 365 westbound trajectory to SW 130th Avenue/ Sta 348

- Connections to existing 8"DIP sanitary sewer system at SW 130th Avenue, SW 129th Court and SW 127th Court

All the identified UAOs are within the public right of way and have not reported a compensable interests.

The proposed build alternatives will impact all the utilities within the corridor thereby requiring relocation to accommodate the final right-of-way requirement.

Overhead electric facilites may have to extend relocation beyond the project limits as well due to sudden change in alignment of impact to an existing pole that is relied on for structural support. If pad mounted transformers are installed at ground level, this may require an easement granted to FPL. Joint tenants on the overhead pole line will need to transfer from existing pole line to newly placed pole line once final right-of-way requirement is determined.

Underground utilities/facilties may need to relocate to accomdate widening; also access points such as manholes, handholes, pedestals, cabinets will need to be relocated depending on the final right-of-way requirement.

Miami-Dade Water and Sewer will determine if they intend to pursue a Joint Participation Agreement/Utility Work by Highway Contractor when the project phase is at 60% phase development.

6.1.14 Drainage and Stormwater Management Facilities

The SR 994 corridor presents favorable field conditions for drainage. The corridor is located within high terrain (elevation range 8' to 14'-NAVD), with a relatively low groundwater table (elevation 3.0'-NAVD) and excellent limestone percolation ($3x10^{-3}$ cfs/ft^2-ft). Given these conditions, self-contained French drain system is found to be typically the most effective and economic stormwater management system for the project. The approach will include maintaining existing corridor drainage flow patterns which does not include existing outfall connections to the C-1W Canal. The proposed system will not be provided with outfall connections. A description of the pre- and post-development conditions at each system is summarized below. Additional details about the drainage features are documented in the Conceptual Drainage Report (***Appendix C***), a companion document to this PD&E Study.

6.1.14.1 Pre-Development Drainage Conditions

Basin 1 – SR 994 from Begin Project to SW 137th Avenue

This basin includes is located within the rural section of the corridor. There is no drainage infrastructure located within this basin. The roadway directly sheet-flows into the adjacent agricultural lands.

Basin 2 – SR 994 from SW 137th Avenue to C-1 Canal Bridge Crossing

This basin includes a mixed rural and urban residential setup. The existing drainage infrastructure consists of roadside swales which provide runoff collection with ditch bottom inlets connected to isolated short segments of French drains which provide runoff disposal.

Basin 3 – SR 994 from C-1 Canal Bridge Crossing to just West of SW 127th Avenue
This basin includes an urban residential setup. As the previous segment the existing drainage infrastructure consists of roadside swales which provide runoff collection with ditch bottom inlets connected to isolated short segments of French drains which provide runoff disposal.

Basin 4 – SR 994 from just West of SW 127th Avenue to End of Project
This basin includes a mixed urban residential and commercial setup. The existing drainage infrastructure consists of a combined storm sewers and French drain trunk-line system which overflows into the SW 122nd Avenue Canal.

6.1.14.2 Post-Development Drainage Conditions

Basin 1 – SR 994 from Begin Project to SW 137th Avenue
Basin 1 has a total drainage area of 2.87-acres. This basin includes two different roadway typical sections, one with curb and gutter at the intersection approach with SW 137th Avenue and the other one at the western end of the project which includes open shoulder with swale. The proposed drainage system within the curb and gutter section will consist of P-2 and P-4 inlets connected though lateral drains into a closed French drain trunk-line. The proposed drainage system within the open shoulder segment consists of swales, inlets and isolated French drain segments for runoff collection and disposal. Inlet tops of type P-2 and P-4 are preferred by FDOT Maintenance because of their ease of access. A total length of new 625' of 24" self-contained French drain is provided within Basin 1 for runoff disposal. This length of French drain exceeds SFWMD stormwater quality and quantity control as well as FDOT flood protection criteria requirements.

Basin 1 bisects SW 137th Avenue into a north and south section referred to as B-137 AVE-N. and B-137 AVE-S. Basin 1 covers an area of 2.87 acres, while B-137 AVE-N and B-137 AVE-S cover an area of 2.85 acres, and 2.84 acres respectively.

Basin 2 – SR 994 from SW 137th Avenue to C-1W Canal Bridge Crossing
Basin 2 has a total drainage area of 7.47-acres. Basin 2 starts at the intersection of SW 137th Avenue and ends at the C-1W canal bridge. The roadway typical section is urban and consists of curb and gutter type F, four (4) 11' wide lanes, a 16.5' median and 5' Separated Bicycle Lane (SBL) with a 2' buffer to sidewalk at both sides. The proposed drainage system within the curb and gutter section will consist of P-2 and P-4 inlets connected though lateral drains into a closed French drain trunk-line. A total length of new 1910' of 24" self-contained French drain is provided within Basin 2 for runoff disposal. This length of French drain exceeds SFWMD stormwater quality and quantity control as well as FDOT flood protection criteria requirements.

Basin 2 covers an area of 7.47 acres. Minor improvement will be performed at the intersection of SR 994 with SW 134th Avenue. North of SR 994 the improvement will impact 0.52 acre and this drainage basin is referred to as B1-134 AVE-N. South of SR 994 the improvement will impact 0.78 acre and this drainage basin is referred to as B1-134 AVE-S.

Basin 3– SR 994 from C-1W Canal Bridge Crossing to SW 127th Avenue

Basin 3 has a total drainage area of 5.51-acres. Basin 3 starts at the C-1W canal bridge and ends at the intersection of SW 127th Avenue. The roadway typical section is urban and consists of curb and gutter type F, four (4) 11' wide lanes, a 16.5' median and 5' Separated Bicycle Lane (SBL) with a 2' buffer to sidewalk at both sides. The proposed drainage system within the curb and gutter section will consist of P-2 and P-4 inlets connected though lateral drains into a closed French drain trunk-line. A total length of new 1210' of 24" self-contained French drain is provided within Basin 3 for runoff disposal. This length of French drain exceeds SFWMD stormwater quality and quantity control as well as FDOT flood protection criteria requirements.

Basin 3 bisects SW 127th Avenue into a north and south section referred to as B-127 AVE-N. and B-127 AVE-S. Basin 3 covers an area of 5.51 acres, while B-127 AVE-N and B-127 AVE-S cover an area of 0.73 acres, and 1.61 acres respectively.

Basin 4 - SR 994 from SW 127th Avenue to End of Project

Basin 4 has a total drainage area of 4.04-acres. Basin 4 starts at the intersection of SW 127th Avenue and ends at SW 123rd Place which is the end of the project. The project scope includes widening improvements within this segment of the corridor. The roadway typical section is urban and consists of curb and gutter type F, four (4) 11' wide lanes, a 16.5' median and 5' Separated Bicycle Lane (SBL) with a 2' buffer to sidewalk at both sides. The proposed drainage system within the curb and gutter section will consist of P-2 and P-4 inlets as well as P-5 and P-6 inlets (where right of way is limited) connected though lateral drains into a new French drain trunk-line system. A total length of new 1159' of 24" self-contained French drain is provided within Basin 4 for runoff disposal. This length of French drain exceeds SFWMD stormwater quality and quantity control as well as FDOT flood protection criteria requirements.

6.1.15 Floodplain Analysis

According to Flood Insurance Rate Map number 12086C0583L Panels 583 and 584 of 1031, most of the project area is located within Zone X which translates to a low-risk flood zone. The X zone (also known as "low-risk flood zone") is an area outside of the Special Flood Hazard Area. It shall be noted that because an area is designated as X zone does not mean that the area will never flood but there is low incidence of flooding. FEMA maps also show that a small project area in the immediate proximity to the C-1 Canal bridge crossing lies within Zone AH with 100-year floodplain elevation of 6.5'-NAVD (8.0'-NGVD). The existing bridge and roadway approaches pavement elevation ranges from 8.5' to 9.0'-NAVD so these are located above the 100-year flood. Also, the existing bridge low member elevation (LME) is 7.0'-NAVD (8.5'-NGVD) which is also above the 100-year flood and translates into no overtopping flow incidence. Finally, the proposed bridge replacement and roadway approaches will be set at a higher elevation than the existing bridge with a proposed LME of 9.5'-NAVD.

6.1.16 Landscape Opportunities

The openness of the current project limits and areas surrounding the project present large opportunities to improve landscape design. Nearly the entire corridor lacks shrubs and groundcovers. The design can add visual interest and provide a sense of safety by creating a planted buffer between the roadway and the proposed SUP. The trees on site are largely used

to make entry features to the surrounding communities stand out. Lastly, the proposed design includes medians throughout the corridor which can be planted to further provide visual interest while still maintaining sight line and other FDOT safety criteria.

6.1.17 Transportation Management Plan

Maintenance of Traffic will be a critical component as the sequence of construction plans are necessary in order to demonstrate the ability to properly and safely implement the proposed improvements while maintaining the facility open to traffic. Therefore, as part of this PD&E Study, a conceptual Transportation Management Plan was developed to determine the constructability and the ability to maintain traffic for the preferred alternative. Many of the components required to develop a plan will be developed in accordance with the FDOT standards during the subsequent phases of the project. The plan proposes to keep the same amount of existing travel lanes open at all times during construction. Short lane closures may be necessary during off-peaks to change construction phases. Advance notice of any lane closure will be given to minimize disruption to roadway users. The SR 994 mainline roadway typical sections general maintenance of traffic were divided into two segments, between the beginning of project and SW 137 Avenue as well as SW 132 Pl to SW 127 Ave, and between SW 137 Avenue and SW 132 Place. The SR 994 roadway mainline will consist of four maintenance of traffic phases (see ***Figure 6-9*** through ***Figure 6-16***).

Scheme 1: Beginning of Project to SW 137 Avenue & SW 132 Place to SW 127 Avenue

Phase 1

The intent of this phase is to construct the temporary pavement necessary for traffic to be redirected to in the subsequent phase of construction (Phase 2). This will be accomplished by reducing travel lanes to a 11ft width to make space for the buffer necessary between the channelizing device and edge of travel lane.

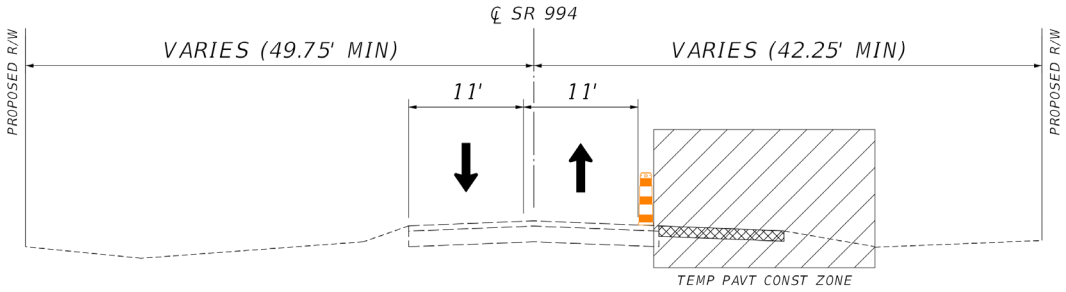


Figure 6-9 MOT Scheme 1 – Phase 1

Phase 2

In this phase, traffic is to be shifted south to utilize the temporary pavement constructed during Phase 1. Lane widths are to be set to 11ft. Low profile barriers are then to be installed to separate westbound traffic from the work zone constructing the proposed westbound widening. Construction area extends to the edge of the proposed right of way.

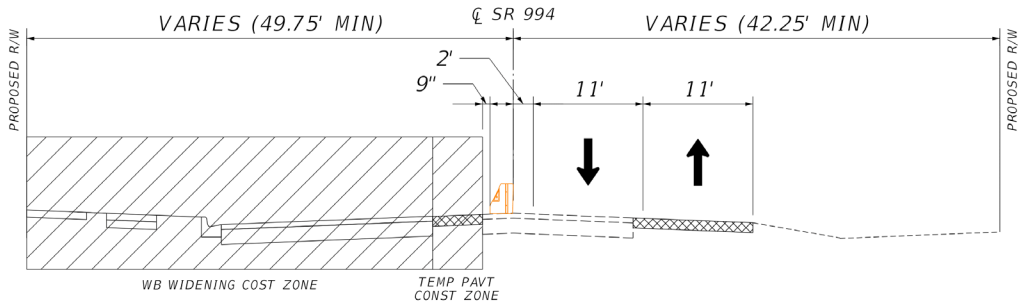


Figure 6-10 MOT Scheme 1 – Phase 2

Phase 3

During this phase, traffic shifts to utilize the westbound lanes built during Phase 2. The final configuration of the two westbound lanes is not yet functional. Instead, two-way traffic is to be established for the duration of this phase. Lane widths are still set to 11ft width. Low profile barrier is to be installed separating eastbound traffic from the work zone constructing the proposed eastbound widening. Construction area extends to the edge of the proposed right of way.

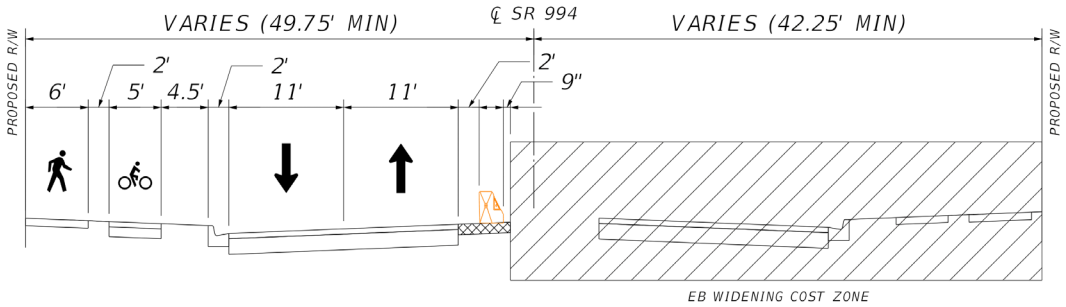


Figure 6-11 MOT Scheme 1 – Phase 3

Phase 4

For the final phase, all four lanes of traffic have been constructed. Both, EB and WB traffic will utilize the outside lane while the inside lane will be closed to provide a buffer to the work zone. The proposed work includes completing the median and left turn lanes.

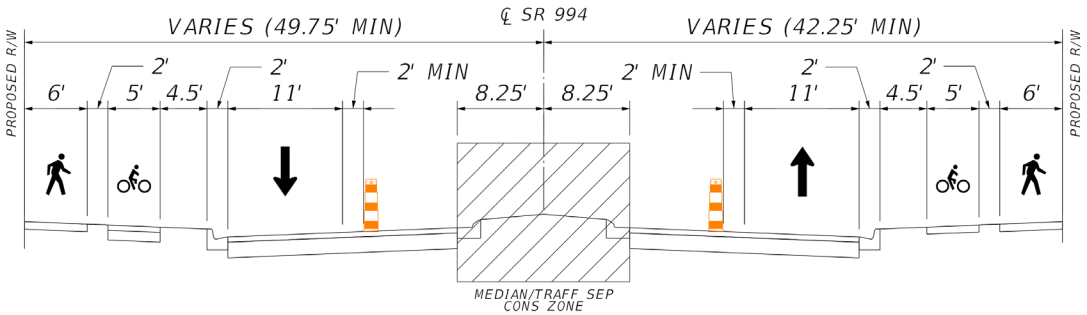


Figure 6-12 MOT Scheme 1 – Phase 4

Scheme 2: SW 137 Avenue to SW 132 Place

Phase 1

The intent of this phase is to construct the temporary pavement necessary for traffic to be redirected to in the subsequent phase of construction (Phase 2). This will be accomplished by reducing travel lanes to a 11ft width to make space for the buffer necessary between the channelizing device and edge of travel lane.

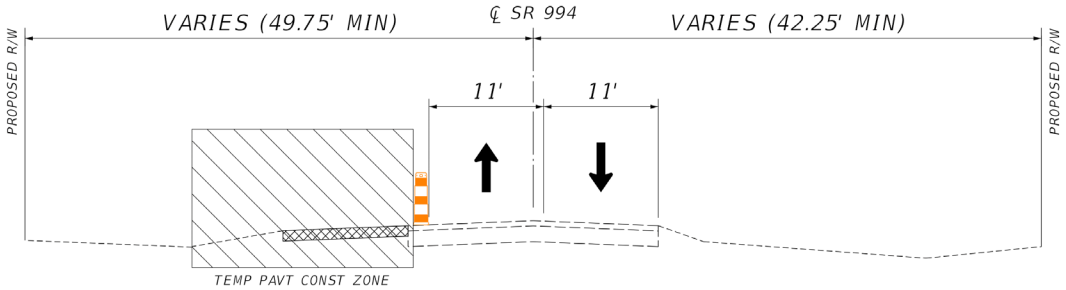


Figure 6-13 MOT Scheme 2 – Phase 1

Phase 2

In this phase, traffic is to be shifted north to utilize the temporary pavement constructed during Phase 1. Lane widths are to be set to 11ft. Low profile barriers are then to be installed to separate eastbound traffic from the work zone constructing the proposed eastbound widening. Construction area extends to the edge of the proposed right of way.

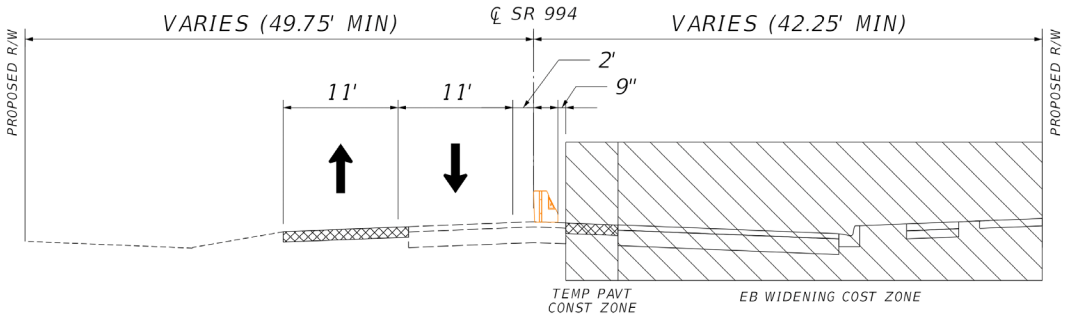


Figure 6-14 MOT Scheme 2 – Phase 2

Phase 3

During this phase, traffic shifts to utilize the eastbound lanes built during Phase 2. The final configuration of the two eastbound lanes is not yet functional. Instead, two-way traffic is to be established for the duration of this phase. Lane widths are still set to 11ft width. Low profile barrier is to be installed separating westbound traffic from the work zone constructing the proposed westbound widening. Construction area extends to the edge of the proposed right of way.

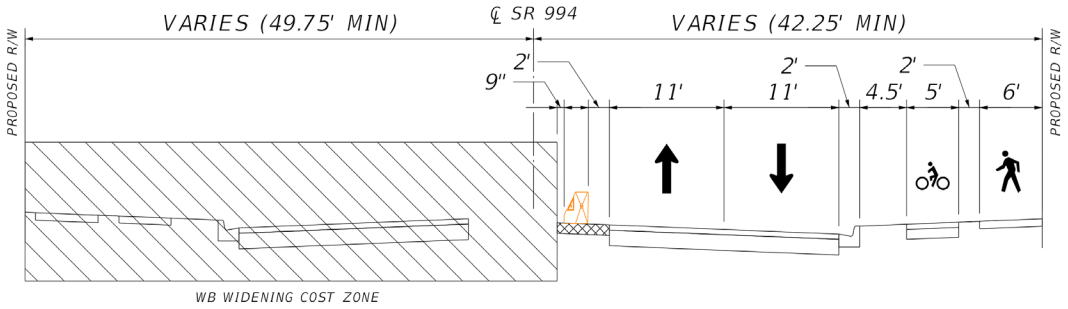


Figure 6-15 MOT Scheme 2 – Phase 3

Phase 4

For the final phase, all four lanes of traffic have been constructed. Both, EB and WB traffic will utilize the outside lane while the inside lane will be closed to provide a buffer to the work zone. The proposed work includes completing the median and left turn lanes.

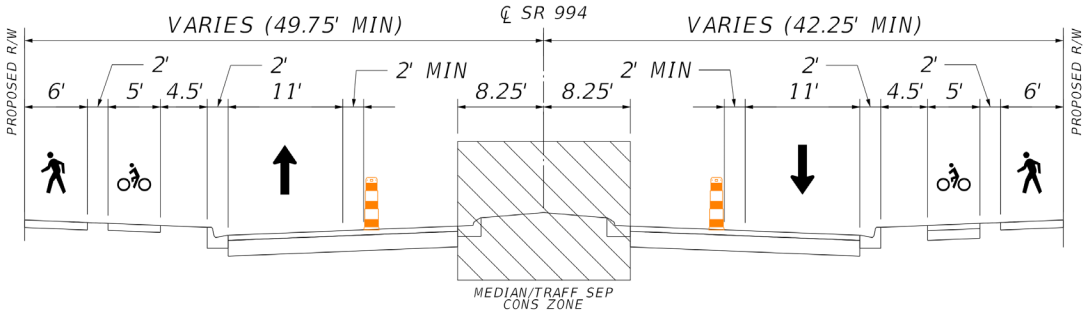


Figure 6-16 MOT Scheme 2 – Phase 4

6.1.18 Special Features

Two noise barrier systems are recommended for further consideration during the project's design phase. Details are provided in ***Section 6.2.8.***

6.1.19 Design Variations and Design Exceptions

Design controls and criteria that will need a Design Variation are summarized in ***Table 6-5***. See ***Appendix V*** for details. Design Exceptions were not identified for the proposed improvements.

Table 6-5 Design Variations

Design Element	Location	Approx Length (ft)	Proposed (ft)	Criteria	Comment
Median width	From East of SW 137 Ave To East of SW 127 Ave	7,000	16.5	FDM: 22 ft (min) for C3 AASHTO 10ft (min) - not a controlling element	Necessary to avoid excessive impacts and relocations beyond the right of way.
SBL Horizontal Clearance EB SR 994	From East of SW 134 Ave To SW 133 Ave	650	0.5 (curb width)	FDM: 5ft separation from face of curb	Necessary to minimize impacts to historic parcel on SE corner of the intersection.
Border Width	From West of SW 137 Ave To SW 137 Ave	1,700	4 min	FDM: 29 ft (min) C&G and 40 ft (min) flush shoulders AASHTO: 8ft (min) - not a controlling element	Necessary to minimize impacts to historic parcels on NW and SW corners of the intersection, and to minimize relocation impacts for adjacent parcels.
Bicycle Facility	From 400-ft West of SW 137 Ave to SW 137 Ave & East of SW 200 St.	800-ft	0	FDM: 4 ft (min.)	Necessary to minimize impacts to historic parcels on NW and SW corners of the intersection, and to minimize relocation impacts for adjacent parcels.
Lane Width	From SW 200 St to SW 123 Pl	400-ft	10 (TWLTL)	FDM: 11-ft for 40 mph AASHTO: 11-ft	Necessary to avoid impacts to six (6) additional parcels and to match the adjacent typical section at the end of the project

Design Element	Location	Approx Length (ft)	Proposed (ft)	Criteria	Comment
Clear Zone	From MP 3.740 to MP 3.901	850-ft	15	FDM: 24 ft for 50 mph	Necessary for the open shoulder section at the west end of the project to avoid further R/W acquisition.

6.1.20 Cost Estimates

The PD&E Study developed a project cost estimate for the preferred alternative. The estimated construction cost was generated using the FDOT Long Range Estimate (LRE) cost estimating system. The project cost estimate includes the major cost components typically associated with highway construction and right of way acquisition. The total cost estimate for the preferred alternative is approximately **$51,557,377.76**. ***Table 6-6*** summarizes the construction cost estimate and total cost estimate. These costs are preliminary in nature and will be refined as the project enters subsequent phases. See ***Appendix W*** for details.

Table 6-6 Cost Estimate

Category	Cost
Construction *(includes MOT and Mobilization)*	$37,919,008.50
Utilities (non-reimbursable)	$0.00
Design (7%)	$2,643,830.60
Right of Way	$7,211,237.81
Relocation Cost	$6,400.00
Construction Engineering and Inspection (10%)	$3,776,900.85
Total Cost Estimate	**$51,557,377.76**

6.2 SUMMARY OF ENVIRONMENTAL IMPACTS OF THE PREFERRED ALTERNATIVE

6.2.1 Future Land Use

Miami-Dade County has an adopted comprehensive plan to establish goals, objectives and policies for future growth pursuant to Chapter 163, Florida Statutes. These plans include Future Land Use Elements as well as Transportation Elements.

Future land use for the project area, according to Miami-Dade County, continues to be mostly residential with agriculture and a minor addition of commercial use.

The future land use is similar to the existing land use. While the project may result in the redevelopment of parcels, this redevelopment would occur over previously developed land. Therefore, based on the above, adverse effects (direct/indirect) to land use are not anticipated as a result of this project.

Additionally, the Miami-Dade Urban Development Boundary (UBD) is located along Quail Roost Drive from SW 134th Avenue to SW 137th Avenue (see ***Figure 2-4***). The UDB is proposed to be expanded in 2030, however, it is not expanding in the location of the Quail Roost Drive project.

6.2.2 Section 4(f)

In compliance with the US Department of Transportation (DOT) Act of 1966 (FHWA 2018), codified at 23 U.S.C. § 138 and 49 U.S.C. § 303, and in accordance with the FDOT PD&E Manual, Part 2, Chapter 7 – Section 4(f) Evaluations (dated July 1, 2023), the study corridor was evaluated for potential Section 4(f) involvement. The provisions of Section 4(f) apply to any significant publicly-owned parks, recreation areas, or wildlife and waterfowl refuges; historic and archeological sites; and properties which represent public multiple-use land holdings.

The following Section 4(f) **recreational** resource was identified within the project limits.

Black Creek Trail- Segment of Route 7

The Black Creek Trail Segment of Route 7 is a publicly owned park located adjacent to the project corridor, along the east side of the South Florida Water Management District (SFWMD) Black Creek Canal (C-1W). The trail qualifies for an exception to the requirement for Section 4(f) in compliance with 23 CFR 774.13(f)(3). Exceptions identified by FHWA include, but are not limited to "Trails, paths, bikeways, and sidewalks that occupy a transportation facility right-of-way without limitation to any specific location within that right-of-way, so long as the continuity of the trail, path, bikeway, or sidewalk is maintained." This project maintains continuity of the trail as described below.

Black Creek Trail- Segment of Route 7 is an 8.7-mile-long greenway corridor that begins at Black Point Park and Marina located at 24775 SW 87th Ave. in South Miami-Dade County and ends at Larry and Penny Thompson Park located at 12451 SW 184th St. in South Miami-Dade County. The Black Creek Trail is a moderately trafficked point-to-point trail that features a canal and is good for all skill levels. The trail is primarily used for walking, running, bird watching, and road biking and is accessible year-round. Dogs are also able to use this trail but must be kept on leash.

The scope of work consists of widening the road from two lanes to four lanes, including removal and replacement of the bridge over the Black Creek Canal (C-1W). Black Creek Trail- Segment of Route 7 is within the limits of this project and two alternatives were evaluated for improvements to the Black Creek Trail- Segment of Route 7.

- At-grade Crossing: This option allows for a lower roadway profile and minimizes impacts to SFWMD access, adjacent properties, traffic control plan and water main crossing. However, the at-grade crossing presents conflicts between motor vehicles and bicyclists/pedestrians, which is a safety concern. In addition, traffic delays are expected to increase due to vehicles stopping for pedestrians and bicyclists that will be crossing a longer distance. In the existing condition, pedestrians and bicyclists cross a two-lane undivided section.

- Underpass Crossing: This option relocates the trail under the proposed new bridge over Black Creek Canal. The advantages of this option include improved safety and traffic operations due to the elimination of conflicts between motor vehicles and bicyclists/pedestrians. In addition, this option provides improved overall bridge vertical clearance.

Both options (at-grade and underpass crossing) maintain the continuity of the trail across SR 994/Quail Roost Drive. The proposed alternatives to the trail are intended to enhance trail accessibility while improving safety for pedestrians and bicyclists using the trail and preserving existing trail functions. As previously mentioned, the trail qualifies for an exception to the requirement for Section 4(f) in compliance with 23 CFR 774.13(f)(3).

The following **historic properties** were identified during the Cultural Resources Assessment Survey (CRAS).

- Talbott Estate;13390 SW 200th Street
  - Eligible and Locally Designated
- MacDonell Residence; 13701 SW 200th Street
  - Eligible and Locally Designated
- Building located at 20000 SW 137th Avenue
  - Eligible

Impacts to Section 4(f) resources were documented in an Individual Section 4(f) Evaluation, a companion document to this PD&E Study, currently under review by the Office of Environmental Management. Out of the alternatives that meet the project's Purpose and Need, Build Alternative 2 was found to cause the least overall harm to Section 4(f) resources.

For additional information regarding recreational and historic resources, please refer to the CRAS report and Draft Individual Section 4(f) Evaluation completed for this PD&E study, located in the SWEPT project file.

6.2.3 Cultural Resources

A CRAS was conducted for this PD&E Study. The purpose of the CRAS was to locate and evaluate archaeological and historic resources within the Area of Potential Effect (APE) and to assess their eligibility for inclusion in the National Register of Historic Places (National Register) according to the criteria set forth in 36 CFR Section 60.4. A summary of the CRAS findings is presented below.

The 2022 CRAS resulted in the identification of three National Register-eligible resources: The Talbott Estate (8DA2789); the MacDonell Residence (8DA20712); and the building at 20000 SW 137th Avenue (8DA20713). The State Historic Preservation Officer (SHPO) concurred with the 2022 CRAS in a letter dated January 30, 2023. For additional information regarding cultural and

historical resources, please refer to the CRAS report completed for this project located in the SWEPT project file.

The Section 106 process identified historic properties within the project APE. Refer to the Section 106 Case Study for more details of the potential effects that the proposed project activities may have on the three NRHP-eligible resources. Build Alternative 2 is the recommended alternative, and this alternative will have an adverse effect on the Talbott Estate (8DA2789), the MacDonell Residence (8DA20712), and 20000 SW 137th Avenue (8DA20713). This alternative will require property acquisition from each of the parcels, and the widened facility will encroach onto the historic properties, affecting the historic buildings, historic walls of the Talbott Estate and MacDonell Residence, and overall setting and other aspects of their historic integrity.

Several coordination meetings and public meetings have occurred regarding the Section 106 process. On August 23, 2022, FDOT, the FDOT Office of Environmental Management (OEM), and the consultant project team attended a meeting coordinating Section 106 Affected Parties Consultation. To address the overall Section 106 and 4(f) processes and potential adverse effects to the significant properties, Affected Parties Consultation meetings were held on the following dates:

- October 12, 2022
- May 15, 2023
- September 11, 2023
- September 12, 2023

Participants in the consultation process included the property owners of the three significant properties, SHPO, FDOT District 6, FDOT OEM, and the Dade Heritage Trust. Throughout the coordination, discussions focused on the effects and developing mitigation through consultation with all parties, in particular, the immediately affected property owners. Measures to mitigate the adverse effects to the three National Register-eligible historic properties were documented in a draft MOA to be signed by the FDOT District 6, FDOT OEM, and SHPO. Additional details, including minutes for these meetings, are provided in the Section 4(f) Evaluation Report, a companion document to this PD&E Study, available in the SWEPT project file.

The archaeological desktop analysis identified no previously recorded archaeological sites or locally designated archaeological zones within one mile of the project limits. The archaeological field review determined that many areas of the archaeological APE have already been disturbed by the construction of the roadway and its associated curbs, gutters, sidewalks, and drainage systems; the installation of underground and aerial utilities; as well as the development of the surrounding areas.

6.2.4 Wetlands

In accordance with Presidential Executive Order (EO) 11990 entitled “Protection of Wetlands”, United States Department of Transportation Order 5660.1A, “Preservation of the Nation’s Wetlands” and the Wetlands and Other Surface Waters chapter of the FDOT PD&E Manual, the Preferred Alternative was assessed for the presence of wetlands that may be impacted by proposed project activities. There are no jurisdictional wetlands in the project area. Surface water

features that occur within the Preferred Alternative consist of one man-made canal. Desktop reviews and field investigations identified one South Florida Water Management District (SFWMD) owned canal, the Black Creek Canal (C-1W). ***Table 6-7*** lists the individual surface water present within the project study area, with the Florida Land Cover Classification System (FLUCFCS) code, Florida Fish and Wildlife Conservation Commission (FWC) classification, and acreage.

Table 6-7 Summary of Individual Water Features

ID	Type	FLUCFCS Description	FLUCFCS Code	FWC Classification*	Acres in Study Area
Black Creek Canal (C-1W)	Surface Water Feature	Canal	816	R2UBHx	0.606

***FWC Wetland Description:**
R2UBHx: Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Excavated

Impacts to this other surface water feature does not require mitigation. However, a Section 408 review and authorization will be necessary for any proposed improvements in or over this federal Central and Southern Florida (C&SF) Federal Flood Control Project canal. Future phases of the project will require coordination with the US Army Corps of Engineers and the SFWMD during the Environmental Resource Permitting process. Additional information can be found in the Natural Resources Evaluation (NRE) Report, a companion document to this PD&E Study, found in the SWEPT project file.

6.2.4.1 Wetland and Surface Water Impacts

No vegetated wetland resources exist within the project study area. The existing surface water feature within the project study area provides low quality habitat due to the location within a densely developed urban area and the proximity to the existing roadway corridor. The Preferred Alternative will result in impacts to the existing surface water feature, due to the proposed bridge replacement over the Black Creek Canal (C-1W), which includes canal slope protection and bridge piles. The approach will include maintaining existing corridor drainage flow patterns which does not include existing outfall connections to the Black Creek Canal (C-1W). The proposed system does not include any new outfall connections. Refer to ***Table 6-8*** for a summary of surface water impacts for the preferred alternative.

Table 6-8 Drainage/Surface Water Feature Impacts

Drainage/Surface Water Feature	Preferred Alternative	
	Sq.Ft.	Acres
Black Creek Canal (C-1W)	11,823	0.271
Total Impacts	**11,823**	**0.271**

6.2.5 Protected Species and Habitat

The project study area was evaluated for the presence of federal and state protected species and their suitable habitats in accordance with Section 7 of the ESA, the Protected Species and Habitat

chapter and the Essential Fish Habitat chapter of the FDOT PD&E Manual. Due to a lack of suitable habitat, the Preferred Alternative will not result in unavoidable impacts to habitats potentially used by federally and state listed species. ***Table 6-9*** below presents the respective effect determinations assigned to each federally and state listed species based on their probability ranking. It was determined that Black Creek Canal (C-1W) contains potential suitable habitat for the West Indian manatee (*Trichechus manatus latirostris*), however no manatees were observed during field visits. The Preferred Alternative will not result in destruction or adverse modification of federally-designated Critical Habitat.

Additional information can be found in the Natural Resources Evaluation (NRE) Report, a companion document to this PD&E Study, found in the SWEPT project file.

Table 6-9 Summary of Listed Species and Effect Determinations

Protected Species		Jurisdictional Agency		Potential of Occurrence	Effect Determination
Common Name	Scientific Name	USFWS/ NMFS	FWC/ FDACS		
MAMMALS					
Florida bonneted bat	*Eumops floridanus*	E	E	Low	*No Effect*
West Indian manatee	*Trichechus manatus latirostris*	T	T	Low	*May Affect, Not Likely to Adversely Affect*
Tricolored bat***	*Perimyotis subflavus*	C	NL	Low	*Candidate Species*
Florida black bear**	*Ursus americanus floridanus*	NL	68A-4.009 FAC	Low	*N/A*
REPTILES					
American crocodile	*Crocodylus acutus*	T	T	Low	*No Effect*
Eastern indigo snake	*Drymarchon couperi*	T	T	Low	*May Affect, Not Likely to Adversely Affect*
Florida pine snake	*Pituophis melanoleucus mugitus*	NL	T	Low	*No effect anticipated*
Gopher tortoise	*Gopherus polyphemus*	NL	T	Low	*No effect anticipated*
BIRDS					
Bald eagle*	*Haliateetus leucocephalus*	BGEPA/ MBTA	68A-16.002 FAC	Low	*N/A*
Osprey*	*Pandion haliaetus*	MBTA	NA	Low	*N/A*
Wood stork	*Mycteria americana*	T	T	Low	*No Effect*
Little blue heron	*Egretta caerulea*	NL	T	Low	*No effect anticipated*
Reddish egret	*Egretta rufescens*	NL	T	Low	*No effect anticipated*
Tricolored Heron	*Egretta tricolor*	NL	T	Low	*No effect anticipated*
Florida burrowing owl	*Athene cunicularia floridana*	NL	T	Low	*No effect anticipated*
INSECTS					
Bartram's Hairstreak Butterfly	*Strymon acis bartrami*	E	E	Moderate	*No Effect*
Monarch Butterfly	*Danaus plexippus*	C	NL	Moderate	*Candidate Species*
PLANTS					
Blodgett's Silverbush	*Argythamnia blodgettii*	T	T	Low	*No Effect*

Protected Species		Jurisdictional Agency		Potential of Occurrence	Effect Determination
Common Name	Scientific Name	USFWS/ NMFS	FWC/ FDACS		
Florida Brickell-bush	*Brickellia mosieri*	E	E	Low	*No Effect*
Florida Prairie-clover	*Dalea carthagenensis floridana*	E	E	Low	*No Effect*
Garber's Spurge	*Chamaesyce garberi*	E	E	Low	*No Effect*
Sand Flax	*Linum arenicola*	E	E	Low	*No Effect*
Small's Milkpea	*Galactia smallii*	E	E	Low	*No Effect*
Tiny Polygala	*Polygala smallii*	E	E	Low	*No Effect*
Florida royal palm	*Roystonea elata*	NL	E	High	*Potential for Adverse Effect*

Definitions:
E = Endangered, **T** = Threatened, , **C**= Candidate Species, **NL**= Not Listed
Low = Minimal suitable habitat present and no documented occurrences within or near the project study area.
Moderate = Potentially suitable habitat present and/or documented occurrences near the project study area.
High = Suitable habitat present and documented occurrences within the project study area.
** Removed from Florida's Endangered and Threatened Species List in 2008 but is still protected under the Bald and Golden Eagle Protection Act (BGEPA), Migratory Bird Treaty Act (MBTA), and Florida Administrative Code (FAC).*
*** Removed from Florida's Endangered and Threatened Species List in 2012, but is still protected under the Florida Black Bear Conservation FAC.*
**** USFWS has proposed to list the tricolored bat as an endangered species under the ESA.*

6.2.6 Essential Fish Habitat

The NMFS is the regulatory agency responsible for the nation's living marine resources and their habitats, including EFH. This authority is designated by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended. The MSFCMA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. § 1802(10)]. Based on the ETDM coordination, the NMFS concluded that the project study area will not directly or indirectly impact EFH and provided a no involvement determination. Based on the Essential Fish Habitat chapter of the PD&E Manual, location of the project, comments received from NMFS and field reviews, the project will have no involvement with EFH. Further coordination or consultation with NMFS is not necessary unless future modifications on the project are proposed that may result in adverse impacts to EFH.

NMFS reported that no EFH would be impacted by the project and stated that it is not aware of any threatened or endangered species or critical habitat under the purview of NMFS within the project area. Further coordination or consultation with NMFS is not necessary unless future modifications on the project are proposed that may result in adverse impacts to EFH.

6.2.7 Strategic Habitat Conservation Areas

Strategic Habitat Conservation Areas (SHCA) are defined as regions not in public ownership, which are recommended for protection in order to maintain biological diversity. These SHCA designations are intended to indicate that the existing land use should be maintained in order to conserve state-wide biodiversity. There are no Strategic Habitat Conservation Areas within proximity to the project study area. As such, no impacts are anticipated as a result of the proposed project.

6.2.8 Highway Traffic Noise

The information presented in this section is a summary of the SR 994/Quail Roost Drive Noise Study Report (NSR), companion document to this study, found in the SWEPT project file. The traffic noise study was performed in accordance with the Federal Highway Administration's (FHWA) noise policy, Title 23 of the Code of Federal Regulations, Part 772 (23 CFR 772) "Procedures for Abatement of Highway Traffic Noise and Construction Noise" (July 13, 2010), the FDOT's PD&E Manual, Part 2, Chapter 18, Highway Traffic Noise (July 1, 2020), and FDOT's Traffic Noise Modeling and Analysis Practitioners Handbook (December 31, 2018). The primary objectives of this noise study were to describe the existing site conditions including noise sensitive land uses within the project limits, document the methodology used to conduct the noise assessment, assess the significance of traffic noise levels on noise sensitive land uses for the No-Build and recommended Build Alternative, and evaluate abatement measures for those noise sensitive sites that, under the recommended Build Alternative, approach, meet, or exceed the Noise Abatement Criteria (NAC) set forth by the FDOT and FHWA or where a substantial increase in traffic noise occurs.

The existing noise levels and future design year (2045) noise levels for the No-Build and the recommended Build Alternative were predicted using the latest approved version of FHWA's Traffic Noise Model (TNM), Version 2.5. These predicted noise levels represent the hourly equivalent sound level [Leq(h)]. Leq(h) is the steady-state sound level, which contains the same amount of acoustic energy as the actual time-varying sound level over a 1-hour period. Leq(h) is measured in A-weighted decibels [dB(A)], which closely approximate the human frequency response.

Two hundred thirty-five noise sensitive land uses were identified along the project corridor that can potentially be impacted by traffic noise associated with the project. One hundred fourteen noise sensitive land uses are located north of Quail Roost Drive, and one hundred twenty-one noise sensitive land uses are located south of Quail Roost Drive. These noise sensitive land uses are comprised of two hundred twenty-nine single family residences, three of which are of historic significance, four places of worship, a public park and a shared use trail system.

Of all identified noise sensitive land uses analyzed within the project corridor, an average traffic related noise level of 58.2 dB(A), an increase of 0.4 dB(A) over existing, is predicted for the 2045 No-Build Alternative. An average traffic related noise level of 60.8 dB(A), an increase of 3.0 dB(A) over existing, is predicted for the preferred 2045 Build Alternative 2. Traffic noise levels are predicted to approach, meet, or exceed the NAC (noise impact) at sixty residences (NAC B) and two recreational outdoor uses (NAC C) along the project corridor with the Build Alternative 2. Of these project related impacts, thirty-two impacts are located north of Quail Roost Drive and thirty impacts are located south of Quail Roost Drive. All impacts are project-adjacent, first row land uses. Impacted land uses are predicted to experience an average traffic noise level of 69 dB(A) with the Build Alternative 2, an average increase over existing of 3 dB(A). In accordance with FHWA and FDOT policies, noise barriers were considered for all noise sensitive land uses where design year (2045) noise levels approach, meet, or exceed the NAC. It was determined that conceptual noise barriers are feasible and reasonable in both Noise Sensitive Area 1 (NSA 1): Common Noise Environment 1A (CNE 1A), and Noise Sensitive Area 4: Common Noise

Environment 4A and are both recommended for further consideration in the design phase. See ***Figure 6-17***.

The CNE 1A optimal conceptual noise barrier system is ten feet high and five hundred forty feet in total length, located at the project right-of-way and behind the proposed shared use path, north of Quail Roost Drive between SW 135th Avenue and SW 134th Avenue. The CNE 1A optimal conceptual noise barriers benefit all four traffic noise impacted receptor sites with an average noise level attenuation of 8.6 dB(A), at a total estimated cost of $162,000 or $40,500 per benefited receptor. The CNE 1A optimal conceptual noise barriers are recommended for further consideration in the design phase.

The CNE 4A optimal conceptual noise barrier system is twelve feet high and one thousand two hundred sixty feet in total length, located at the project right-of-way and behind the proposed shared use path, south of Quail Roost Drive between SW 130th Avenue and SW 128th Avenue. The CNE 4A optimal conceptual noise barriers benefit fifteen of the sixteen traffic noise impacted receptor sites in CNE 4A with an average noise level attenuation of 9.3 dB(A), at a total estimated cost of $453,600 or $30,240 per benefited receptor. The CNE 4A optimal conceptual noise barriers are recommended for further consideration in the design phase.

Noise barriers were considered but determined to be not feasible for construction within NSA 1 (CNE 1C), NSA 2, NSA 3, and NSA 6. Noise barriers were considered but determined to be feasible but not cost reasonable within NSA 4 (CNE 4B and CNE 4C). Traffic noise impacted residential land uses not benefiting from noise abatement features are predicted to experience an average noise level of 69 dB(A) with the Build Alternative 2, an overall average increase over existing of 3.0 dB(A).

Statement of Likelihood

FDOT is committed to the construction of feasible noise abatement measures (i.e., recommended noise barriers) at the noise impacted locations identified in ***Table 6-10*** and ***Figure 6-18*** upon the following conditions:

- Final recommendations on the construction of abatement measures are determined during the project's design and through the public involvement process;
- Detailed noise analyses during the final design process support the need, feasibility, and reasonableness of providing abatement;
- Cost analysis indicates that the cost of the noise barrier(s) will not exceed the cost reasonable criterion;
- Community input supporting types, heights, and locations of the noise barrier(s) is provided to the District Office; and
- Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved.

It is likely that the noise abatement measures for the identified locations will be constructed if found feasible based on the contingencies listed above. If, during the project's design phase, any of the contingency conditions listed above cause abatement to no longer be considered

reasonable or feasible for a given location(s), such determination(s) will be made prior to requesting approval for construction advertisement. Commitments regarding the exact abatement measure locations, heights, and type (or approved alternatives) will be made during project reevaluation and at a time before the construction advertisement is approved.

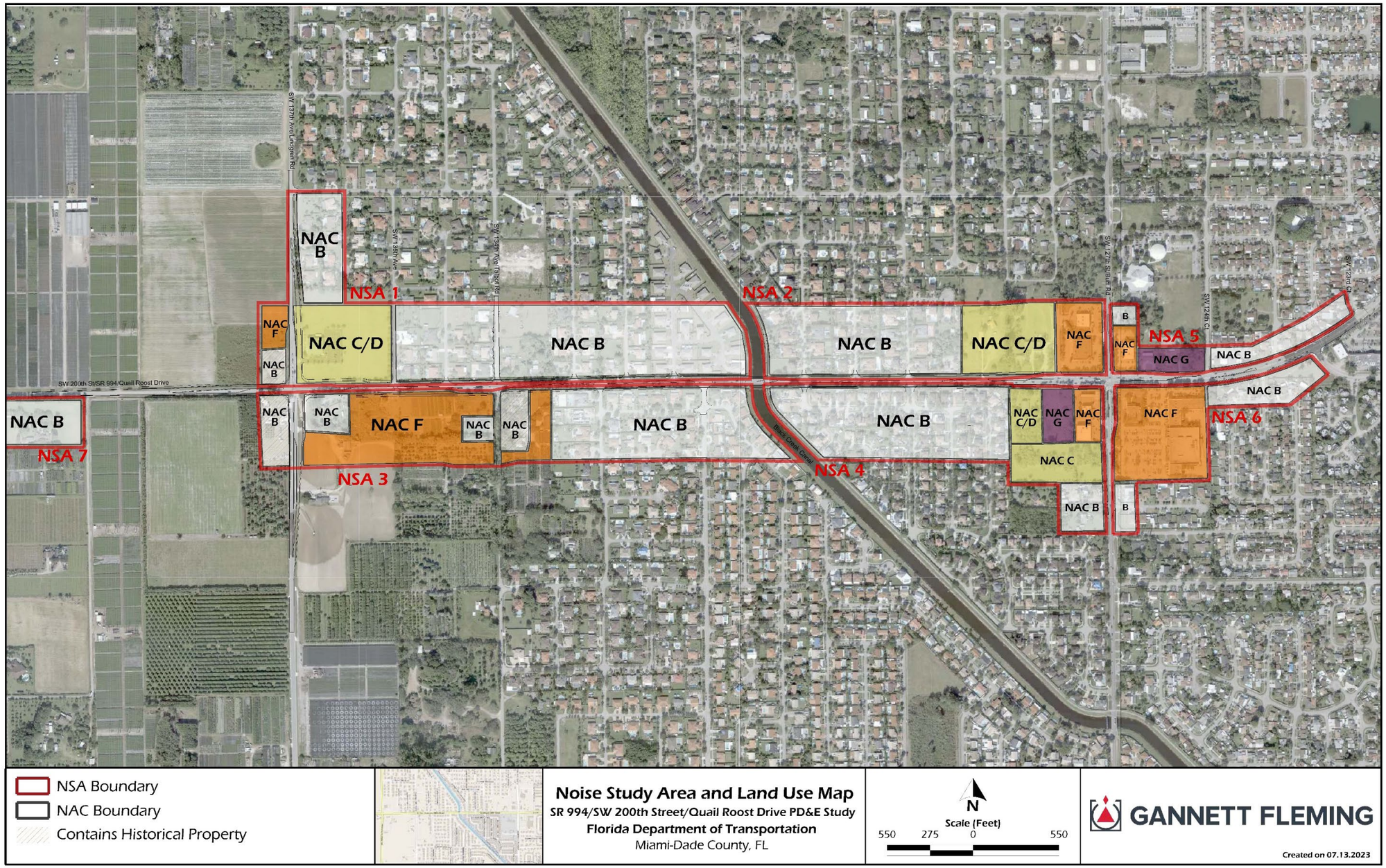


Figure 6-17 Noise Study Area and Land Use Map

Table 6-10 Noise Barrier Recommendation

Noise Sensitive Area Name/ Number	Conceptual Noise Barrier Design Number	Noise Barrier Type	Noise Barrier Location	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Number of Impacted/ Benefited Receptor Sites	Number of Benefited Receptor Sites/ Not Impacted	Total Number of Benefited Receptor Sites	Average Noise Reduction for all Benefited Receptor Sites dB(A)	Maximum Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Does Optimal Barrier Design Meet FDOT's Reasonable and Feasible Noise Abatement Criteria of $42,000 per Benefited Receptor Site and 7.0 dB(A) Noise Reduction Design Goal, and recommended for further consideration and public input?
NSA 1	CNE 1A-B	Ground Mounted	North of SW 200th between SW 135th Ave and SW 134th Ct, behind the proposed SUP but within the project right-of-way.	10	280	321+60	324+40	4	4	0	4	8.6	10.1	$162,000	$40,500	Yes
	CNE 1A-C	Ground Mounted	North of SW 200th between SW 134th Ct and SW 134th Ave/Talbot Rd, behind the proposed SUP but within the project right-of-way.		260	325+00	327+60									
NSA 4	CNE 4A-B	Ground Mounted	South of SW 200th St between SW 130th Ave and SW 129th Ave, behind the proposed SUP but within the project right-of-way.	12	620	348+50	354+65	16	15	0	15	9.3	10.9	$453,600	$30,240	Yes
	CNE 4A-C	Ground Mounted	South of SW 200th St between SW 129th Ave and SW 128th Ave, behind the proposed SUP but within the project right-of-way.		640	355+50	361+90									

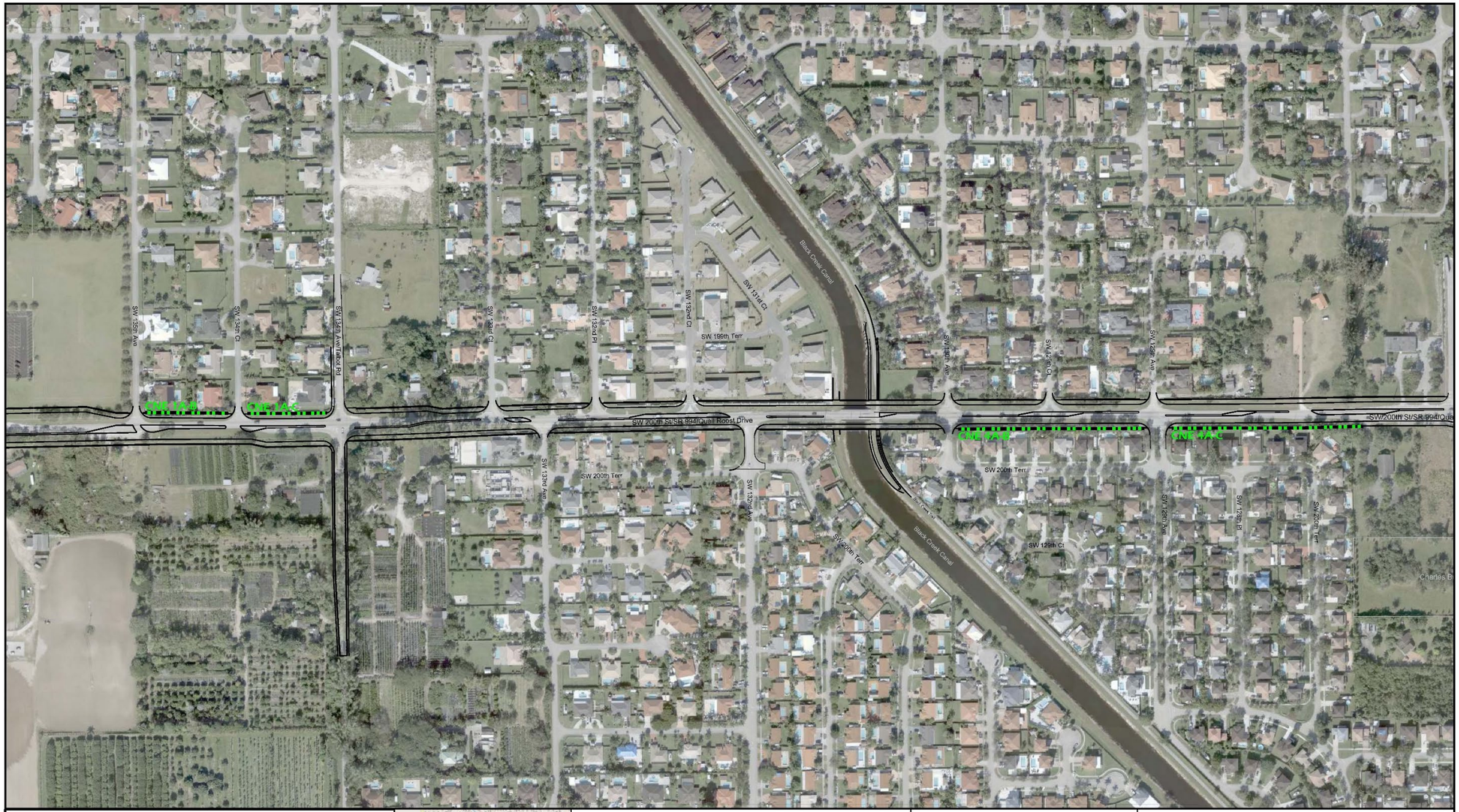


Figure 6-18 Noise Barrier Recommendation Map

6.2.9 Contamination

In accordance with Part 2, Chapter 20 (dated July 1, 2020) of the FDOT PD&E Manual, potential contamination impacts in the area surrounding the project corridor were assessed for all viable Build Alternatives as well as the No-Build Alternative. For the viable Build Alternatives, the degree of potential contamination concerns is equivalent due to the location and distance of the potential contaminated sites with reference to the proposed project layout. After a review of all available data, such as agency file reviews at FDEP, aerial photography, and confirmed by site reconnaissance, contamination of groundwater has been documented in the vicinity of the project corridor. A total of two sites of potential environmental concern were identified for the project corridor; of these, one site is rated as High risk, one site is rated as Medium risk, and three sites are rated as Low Risk. The review did not identify any No Risk sites. The status of the sites will be updated accordingly at each future design phase. Remaining sites identified in the above-referenced sources are not considered to pose potential contamination concerns because of the current regulatory status of the site and/or the distance from the project corridor.

The FDOT District VI Planning and Environmental Management Office will utilize the information contained in this report to determine the need for additional investigation during the design phase of the Project. The Level II Contamination Assessment investigation may be conducted prior to any right-of-way acquisition and/or during the design phase, should any become necessary. Based on the findings of updated future review and Level II investigation, the design engineers may be instructed to avoid the areas of concern or to include special provisions with the plans to require that the construction activities performed in the areas of concern be performed or supervised by a contamination assessment and remediation contractor specified by the FDOT.

Appendix A – Project-Level Context Classification and Target Speed Memo

Appendix B – Project Traffic Analysis Report

Appendix C – Conceptual Drainage Report

Appendix D – Location Hydraulic Report

Appendix E – Bridge Hydraulic Report

Appendix F – Preliminary Geotechnical Report for Roadways

Appendix G – Preliminary Geotechnical Report for Bridge Widening/Replacement

Appendix H – Utility Assessment Package

Appendix I – Bridge Analysis Report

Appendix J – SFWMD Coordination

Appendix K – Traffic Analysis and Safety Methodology Memorandum

Appendix L – Preliminary Conceptual Design Plans

Appendix M – Right of Way Impacts

Appendix N – Value Engineering Study Report

Appendix O – Advance Notification Package

Appendix P – Public Involvement Plan

Appendix Q – Elected Official/Agency and Public Kick-Off Meeting Reports

Appendix R – Affected Parties Consultation Meetings

Appendix S – Alternatives Public Workshop Report

Appendix T – Preferred Alternative Preliminary Conceptual Design Plans

Appendix U – Typical Section Package

Appendix V – Design Variation Memorandum

Appendix W – Long Range Estimates