I-285/I-20 East Side Interchange Reconstruction

PI# 0013915

TRAFFIC ANALYSIS REPORT

Prepared for
GEORGIA DEPARTMENT OF TRANSPORTATION

In Coordination With
U.S. DEPARTMENT OF TRANSPORTATION
and
FEDERAL HIGHWAY ADMINISTRATION

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PROJECT BACKGROUND

As a part of the Major Mobility Investment Program (MMIP) funded by Georgia Department of Transportation (Georgia DOT) the I-285 @ I-20 East Interchange Reconstruction (PI # 0013915) is being assessed. The project proposes to modify and/or replace:

- Four existing ramps at the I-285 @ I-20 east interchange: the I-20 westbound to I-285 northbound and southbound ramps, and the I-285 southbound to I-20 eastbound and westbound ramps.
- I-20 WB: Addition of one westbound auxiliary lane between Lithonia Industrial Boulevard to Wesley Chapel Road, and new WB Collector Distributor (C/D) lanes between Wesley Chapel Road and the I-20 @ I-285 interchange.
- I-20 EB: Extension of fourth lane on EB existing CD road between I-285/20 interchange to Wesley Chapel Interchange and construction of one eastbound auxiliary lane from Panola Road to Lithonia Industrial Boulevard.
- I-285 NB: Addition of auxiliary lane on I-285 NB between I-20 Westbound on-ramp and off-ramp to Glenwood Road.

PURPOSE AND NEED

The following transportation needs have been identified for the study area:

- Improve I-285/20 interchange capacity
- Improve throughput and traffic operations (relieve congestion)
- Improve safety (reduce crashes)

STUDY AREA

The project study limits along I-20 will extend from Candler Rd (western terminus) to Evans Mill Rd (eastern terminus) which is approximately 9.6 miles; and on I-285 it will extend from Flat Shoals Pkwy (southern terminus) to Glenwood Rd (northern terminus) which is approximately 4.6 miles. The study limits along the corridor extend on each crossroad up to the first signalized intersection beyond the ramp terminus.

SUMMARY OF FINDINGS

Traffic Operational Analysis Findings

I-20 like many other freeways that pass-through Metro Atlanta is heavily congested in existing conditions during peak hours. The AM peak is in the westbound direction where daily commuters travel from residential areas in suburbs to the perimeter area or towards downtown. In the PM peak, the peak is expected to be in the eastbound direction. However, during PM peak although the eastbound traffic is high, westbound I-20 continues to have heavier traffic. This is due to heavy truck traffic and out of state traffic that utilized I-20 to get to different parts of Metro Atlanta. This travel pattern is clearly indicated in existing

traffic data collected, field data and traffic simulation models. It is expected that this pattern will continue in the future conditions as well.

2025 Conditions

I-20 WB operates at an acceptable Level of Service (LOS) with the proposed improvements in build condition. The corridor will be able to process more volume and provide acceptable average stream speeds when compared to the no-build scenario in both AM and PM conditions. I-20 EB in the AM peak operates at a similar LOS in both build and no-build scenarios, since this direction is not the peak travel direction in AM peak.

In the PM peak, I-20 WB along the entire study corridor operates with an acceptable LOS except at the segments between Panola Rd and Wesley Chapel Rd. In the EB direction the build scenario will be able to process more volume compared to the no-build scenario improving overall conditions within the project limits. However, this additional volume creates downstream failures due to the bottleneck created at the end of the project limits. It has to be noted that this section although failing due to high density, will still continue to process more vehicles than the no-build scenario.

2045 Conditions

I-20 WB operates at an acceptable LOS with the proposed improvements in the build condition. The corridor will be able to process more volume with a better average stream speed than the no-build scenario. In the build scenario with more volume being processed in the build condition compared to no-build condition, congestion is shifted to Columbia Drive and the immediate upstream sections. This congestion is not because of additional traffic attracted to the corridor in the build condition, this is latent demand that is released with the proposed improvements. Although the operations are similar in both the build and no-build scenarios, the I-20 EB build condition is able to process higher volume compared to the no-build condition.

In the PM peak along I-20 WB all of the segments of the corridor operate with improved average speed in the build condition compared to the no-build. The number of segments that operate at LOS F are less in the build condition when compared to the no-build, but several segments between the I-20 WB C-D diverge off-ramp to the Evans Mill Rd off-ramp continue to fail due to high diverge volume to the C-D section. This along with the future I-20 express lanes volume entering and exiting via slip ramps in the area causes turbulence further affecting upstream segments in the build conditions. In the EB direction, segments between Candler Road and Columbia Dr fail in both the build and no-build conditions due to the lane change occurring between the Columbia Dr off-ramp and system interchange.

CRASH ANALYSIS FINDINGS

Safety analysis conducted for the project has concluded that the proposed changes will improve the safety of the network during the open year and design year build conditions. In the 2025 Build condition, the total number of crashes will reduce by 90, of which 25 are fatal/injury type and 65 are property damage only (PDO) crashes. In the 2045 Build condition, there will be a reduction of 16 crashes compared to the no-build condition. Less safety benefit is anticipated in 2045 due to the highly congested corridor in the final year of the project's life. Apart from that, I-20 East Express lanes in the median could create conflict points with the through traffic as the vehicles exiting from the express lanes destined to I-285 SB and Wesley Chapel Rd have to cross over four lanes in order to reach the desired

path creating additional weaving movements . The study limits of analysis cover the freeway sections, ramp sections and crossroads (including at least the first major intersection on the either side of the interchange terminus across the freeway).

An economic analysis has been performed for the entire improvement project. The costs, including right-of-way (ROW), utilities, construction, and operations are evaluated against the projected benefits from reduced property damages, injuries, and fatalities. Overall, the total net present value of the direct safety benefits for this project is $186,667,908 and the total cost of the project along the roadways where safety was studied is $347,007,900. A benefit-cost ratio (BCR) of 0.53 indicated that direct safety benefits can compensate for half of the project's cost.

1 INTRODUCTION

1.1 PROJECT DESCRIPTION

The I-285 @ I-20 East Interchange Reconstruction (PI # 0013915) is a part of the Major Mobility Investment Program (MMIP) funded by Georgia Department of Transportation (Georgia DOT). The project proposes to modify and/or replace four existing ramps at the I-285 @ I-20 east interchange: the I-20 westbound to I-285 northbound and southbound ramps, and the I-285 southbound to I-20 eastbound and westbound ramps. In addition to the reconstruction of the interchange, the project would consist of constructing the following: 1) one westbound auxiliary lane between Lithonia Industrial Boulevard and Panola Road, 2) one westbound auxiliary lane from Panola Road to Wesley Chapel Road, and 3) westbound Collector Distributor (C/D) lanes between Wesley Chapel Road and the I-20 @ I-285 interchange. The project would also include improvements to a segment of I-20 eastbound, consisting of the construction of one eastbound auxiliary lane from Panola Road to Lithonia Industrial Boulevard. The construction of the eastbound and/or westbound auxiliary lanes would require the reconstruction of the Miller Road Overpass Bridge, Fairington Road/DeKalb Medical Parkway Overpass Bridge, and the associated intersection at Fairington Road and DeKalb Medical Parkway. The project also consists of one alternative that would add an auxiliary lane from westbound I-20 to northbound I-285 that would extend up to Glenwood Road.

The project study limits along I-20 extend from Candler Road (western terminus) to Evans Mill Road (eastern terminus); along I-285, the limits extend from Flat Shoals Parkway (southern terminus) to Glenwood Road (northern terminus). I-20 is a six-lane east-west limited access facility, with an Interstate functional classification within the study area. I-285 is an eight-lane north-south interstate facility with limited access. The posted speed limit on I-285 is 65 mph, and the posted speed limit on I-20 varies between 55 mph to 70 mph. On I-20 westbound, the speed limit is 70 mph from Klondike underpass to Miller Road, then 65 mph from Miller Road to east of Candler Road and then 55 mph to the west. On I-20 eastbound, the posted speed limit is 65 mph from Candler Road to Lithonia Industrial Boulevard and then 70 mph to the east. The I-285 @ I-20 East Interchange project study includes seven interchanges along I-20 including the system-to-system interchange with I-285 and two interchanges along the I-285 corridor.

1.2 PURPOSE AND NEED STATEMENT

The primary purpose of this project is to improve operational performance and travel time on the I-20 corridor through the addition of an auxiliary lane and the reconstruction of the system to system interchange between I-285 and I-20. The Study Project is one of the initial 11 large-scale Major Mobility Investment Program projects to improve transportation in Georgia's metro areas. DeKalb County is Georgia's fourth most populous county. A continual source of peak period delays, the I-285/I-20 east interchange area is a critical juncture in DeKalb County that requires

operational and geometric improvements. The purpose of the I-285/I-20 East Interchange Reconstruction Project, which includes interchange re-construction and collector-distributor lanes that run parallel to the interstate between Wesley Chapel Road and I-285 interchange along I-20, is to help improve traffic flow, speed and safety (reduce crashes). A secondary purpose of the project is job creation and the promotion of growth in the state's economy in accordance with the goals of Georgia DOT Major Mobility Investment Program.

The need for the proposed project consists of several elements which include: 1) improving regional connectivity, 2) providing traffic capacity to maintain LOS standards, 3) meeting future transportation demand, 4) providing opportunities for economic development, 5) accommodating modal interrelationships, 6) providing congestion relief on parallel facilities and 7) addressing safety needs.

1.3 PROJECT LOCATION /STUDY AREA LIMITS

The proposed project area is on the eastern side of the City of Atlanta in Dekalb County and is shown in **Figure 1-1**. The project is located within the Atlanta Regional Commission's (ARC) Metropolitan Planning Organization (MPO) area limits within metro Atlanta.

The project study limits along I-20 will extend from Candler Rd (western terminus) to Evans Mill Rd (eastern terminus) which is approximately 9.6 miles; and on I-285 it will extend from Flat Shoals Pkwy (southern terminus) to Glenwood Rd (northern terminus) which is approximately 4.6 miles. The study limits along the corridor extend on each crossroad up to the first signalized intersection beyond the ramp terminus. The Table 1-1 listed all the mainline/cross-roads that fall within the Project Analysis Limits. The project area of influence which includes the mainline and the crossroads with the adjacent intersections as shown in the **Figure 1-2**.

Table 1-1. Major Roads within the Project Analysis Limits

Mainline	Crossroads	Local Roads
I-20	Candler Road	Eastwyck Road
		H F Shepherd Drive
	Columbia Drive	Columbia Woods
		Rainbow Drive
	Wesley Chapel Road	Snap Finger Woods Drive
		East side Drive
	Miller Road overpass	Panola Industrial Boulevard
		Minola Drive
	Panola Road	Hillandale Drive
		Fairington Road
	Fairington Road overpass	Chupp Road
		Chupp Way
	Lithonia Industrial Boulevard	The Crossing Way
		C-D Road
	Evans Mill Road	Hillandale Drive
		Evans Mill Road
I-285	Flat Shoals Parkway	Fair Lake Drive
		Glen Hollow Drive
	Glenwood Road	Austin Drive
		Atherton Drive

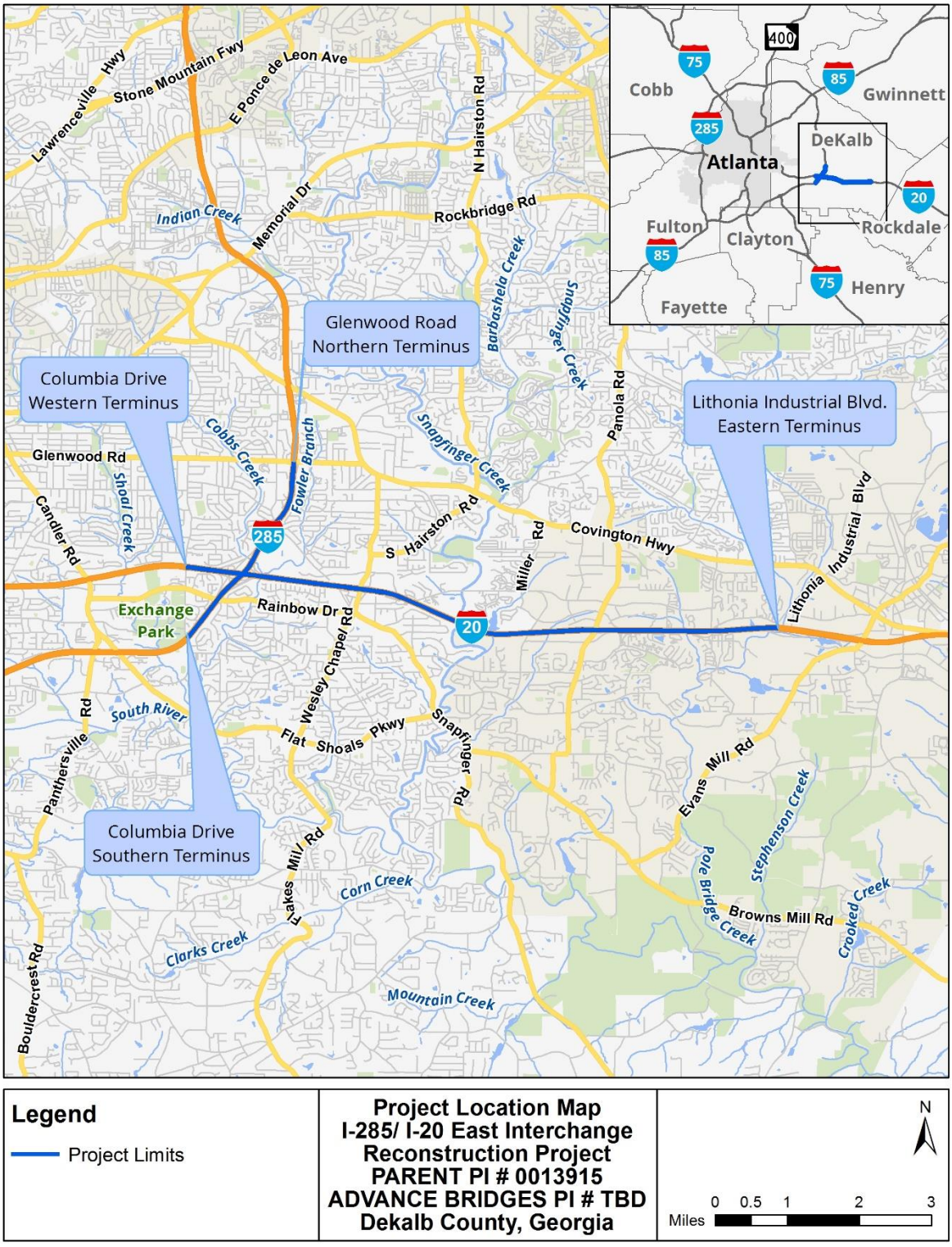


Figure 1-1. Project Location Map

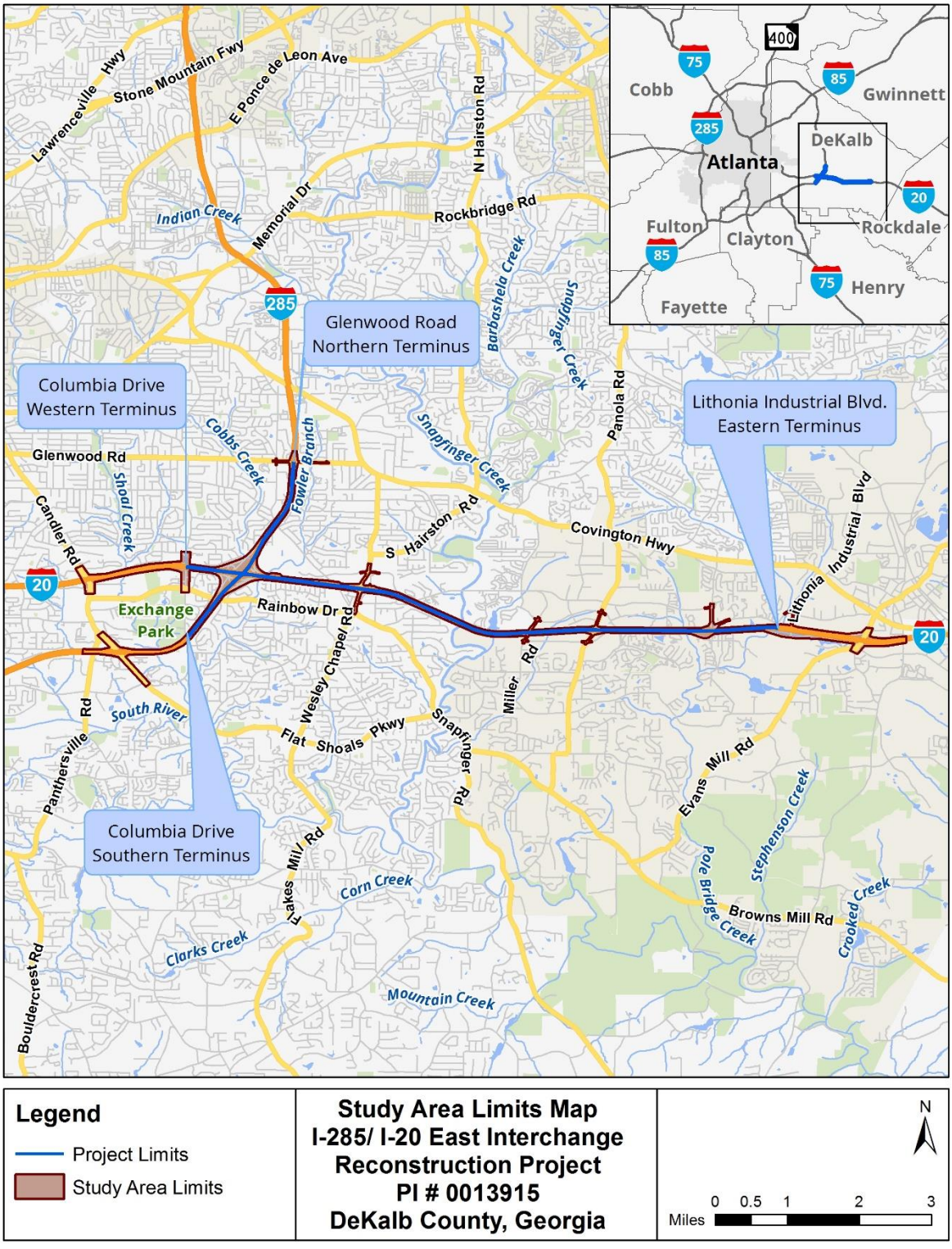


Figure 1-2. Study Area Limits

The approved Methodology Letter of understanding (MLOU) to establish the agreement between Georgia Department of Transportation (Georgia DOT) and Federal Highway Administration (FHWA) detailing the assumptions, procedures and data outputs is included in **Appendix 1-1**.

1.4 ADJACENT PROJECT INFORMATION

The following nearby projects were identified from the GeoPI website:

- P.I. 0013914 – DeKalb County – I-285 Eastside Express Lanes From I-20 To I-85

This project includes building one Express Lane in each direction along I-285 between I-20 and I-85. Existing lanes would be maintained and a new 12 ft outside lane would be constructed. The Express Lanes would be separated from the general-purpose lanes through the use of delineators and pavement striping. Access to the managed lane would be provided with the use of direct access ramps connecting to the surrounding arterial system and slip ramp access to adjacent general-purpose lanes. Traffic data collection is underway for the I-285 Express Lanes, which will include Glenwood Road interchange as an overlapping area with current project. Volume balancing at this location will be matched with the I-285 Express Lanes project to maintain continuity. I-285 Eastside Express Lanes will be open to traffic in 2025.

- P.I. 0013913– DeKalb County – I-20 Express Lanes from I-285 to SR 124

This project includes building one Express Lane in each direction along I-20 between the I-285/20 interchange and SR 124 (Turner Hill Rd) and is expected to open 2038. The existing lanes will be maintained and a new 12 ft outside lane would be constructed and 4ft buffer from the general-purpose lanes. The Express Lanes would be separated from the general-purpose lanes using delineators and pavement striping. Access to the managed lane would be provided with the use of direct access ramps connecting to the surrounding arterial system and slip ramp access to adjacent general-purpose lanes.

- P.I. 0002868 – DeKalb County – Panola Road @ I-20 from Fairington Road to Snapfinger Woods Drive

This project proposes the reconstruction of the Panola Road Interchange and widening the existing corridor from a five-lane flush median to a six-lane raised median section. The mainline will remain an urban section and will vary from two to three 12′ lanes with a 20′ raised concrete median, 4′ bike lanes, and 12′ shoulders that include curb and gutter and 5′ sidewalks. At the I-20 interchange bridge, Panola Road will widen to 4 lanes in each direction and will incorporate a Diverging Diamond design, shifting traffic from one side of the road to the other. The skew angle for both approaches is 45 degrees. Intersection improvements, including turn lane additions, will also be incorporated for several side roads along the project corridor. This project is scheduled to open to traffic in 2027.

2 TRAFFIC FORECASTING

Traffic forecasts for the project were developed in accordance with the Methodology Letter of Understanding (MLOU) for the Project Traffic Study approved in January 2019. The analysis for this study will utilize the latest Atlanta Regional Commission's (ARC) travel demand models (TDM) with the following base, interim, and horizon years:

- Base Year: 2015
- Interim Year: 2030
- Horizon Year: 2040

2.1 DATA COLLECTION

Data collection for the corridor was conducted by the GDOT selected vendor. The approved traffic counts location map (see **Appendix 2-1**) shows the data collection type and locations. The count locations included 48-hour ADT counts at 207 locations (including classification counts) and 6-hour counts at crossroads were taken at 62 locations along the project mainlines. 48-hour classification counts were collected at 31 interstate locations, 33 ramp locations, and 24 arterial locations. Data was collected on April 10-12, April 17-19, May 8-9, May 15-16, and August 14-15 of 2018. Raw counts are attached in electronically-submitted **Appendix 2-2** of this document. The counts were collected at fifteen-minute intervals for both directions of travel at all locations where applicable. TMCs were collected at all ramp termini and significant intersections until the next signalized location along the arterials. Travel time data was collected at five locations along I-20 in the AM peak for westbound direction and in the PM peak in the eastbound direction:

- I-20 from Candler Road overpass to I-285 interchange EB on-ramp
- I-20 from I-285 interchange EB on-ramp to Wesley Chapel Road EB on-ramp
- I-20 from Wesley Chapel Road EB on-ramp to Panola Road EB on-ramp
- I-20 from I-285 Panola Road EB on-ramp to Lithonia Industrial Boulevard EB on-ramp
- I-20 from Lithonia Industrial Boulevard EB on-ramp to East of Klondike Road overpass

2.2 FIELD TRIP SUMMARY

This section discusses the methodology adopted for the field trip of the project study limits. Three members from Parsons visited the site: the first member took video along the corridor, the second member took the travel time readings, and the third member solely concentrated on driving. The field visit was conducted over two days to observe the posted speed limits, congestion along the mainline and record the travel time readings in both the peak and off-peak periods along both directions of the I-20 corridor within the project study limits. The detailed Field Traffic Report is provided in **Appendix 2-3.**

2.3 VOLUME DEVELOPMENT

The methodology outlined in this document for volume development is consistent with the procedures for projecting volumes outlined in the GDOT Design Traffic Forecasting Manual and Existing Conditions Traffic Development Methodology submitted on April 27, 2018, provide in Appendix 2-4. The manual guidelines were employed to calculate traffic factors and to develop volumes for the Existing Year (2018).

2.4 ASSUMPTIONS

Traffic data collection was conducted during months of May, April, and August 2018 on typical weekdays Tuesday, Wednesday and Thursday. Each forty-eight-hour classification count was collected for two days in May, April, and August 2018. In compliance with the GDOT Design Traffic Forecasting Manual, these days are representative of normal conditions in the project area. The raw counts on I-20 were used to find the AM and PM peak hours for each day separately. Peak hours were derived from the data observed within the peak periods (the AM peak period is from 6:00 to 10:00 AM and the PM peak period is from 3:00 to 7:00 PM). A common hour with highest volume for AM and PM was identified for the entire study area. The AM peak hour was defined to be 6:45 AM to 7:45 AM and the PM peak hour was defined to be 4:00 PM to 5:00 PM.

2.5 K AND D FACTORS

K-factors were calculated for each ADT count by dividing the peak hourly volume by the total daily volume. The directional distribution factor, D, is the proportion of the total, two-way design hour traffic traveling in the peak direction. A calculation chart for all count locations is included in Traffic Forecasting Report (**Appendix 2-5)**, which lists the existing K and D factors for the interstate segments, ramps and arterials where ADT counts were taken.

The K and D factors in the future conditions sometimes differ, due to balancing after the growth rates are applied. These factors are compared with the existing factors to confirm they were within an appropriate range. K and D factors along I-20 mainline affected by the proposed project were compared with the existing K and D factors for the same location. The only location along the mainline that will be impacted by the proposed project is I-20 WB, between I-285 and Wesley Chapel Rd where a CD section is being constructed. All the improvements to the system to system interchange only result in a lateral shift of the current roadway sections and do not include substantial roadway configuration changes. A comparison of the K and D factors along this segment in existing and build conditions is summarized in **Table 2-1**.

Table 2-1. Comparison of K and D Factors Along I-20, west of Wesley Chapel Rd

Scenario	K-Factor		D-Factor	
	AM	PM	AM	PM
Existing	0.06	0.06	0.6 (WB)	0.59 (EB)
2025 Build	0.06	0.06	0.61 (WB)	0.58 (EB)
2045 Build	0.06	0.06	0.62 (WB)	0.56 (EB)

2.6 TRAFFIC ADJUSTMENT FACTORS

Traffic counts were adjusted using a monthly factor (MF), a daily factor (DF) and an axle correction factor (ACF) to estimate existing AADT volumes as follows:

$$AADT = ADT * MF * DF * ACF$$

The AADT was calculated for both days of ADT counts and averaged. The axle correction factor was applied only on the non-classification traffic counts. The MF, DF & ACF are provided in **Appendix 2-6.**

2.7 TRUCK PERCENTAGE

The truck percentages for I-20, East of Columbia Drive was calculated by direction, as an example, in **Figure 2-1** and reported as an average in a full calculation chart for each location. The summary of the truck percentages for each location in both the AM and PM peaks and for the daily (24hr) is presented in the **Table 2-2,** they are rounded off to the nearest 0.5%**.** The truck percentage calculation chart for all locations where classification counts were taken is attached in **Appendix 2-5.**

1003, 1004 I-20, east of Columbia Dr

6:45-7:45 am		Total	Light Truck	Heavy Truck	SU T %	COMB T %	Total T %
Day1	EB	2448	77	44	2.8%	1.4%	4.2%
	WB	6072	144	65			
Day2	EB	2330	79	42	2.4%	1.3%	3.7%
	WB	5380	75	47			
				AM DHV T %	**2.6%**	**1.4%**	**4.0%**

4:00-5:00 pm		Total	Light Truck	Heavy Truck	SU T %	COMB T %	Total T %
Day1	EB	6774	123	51	1.7%	1.1%	2.9%
	WB	4082	68	60			
Day2	EB	6391	89	38	1.7%	1.0%	2.7%
	WB	3817	80	51			
				PM DHV T %	**1.7%**	**1.0%**	**2.8%**

24-hr T		Total	Light Truck	Heavy Truck	SU T %	COMB T %	Total T %
Day1	EB	71844	1775	1128	2.5%	1.6%	4.2%
	WB	72807	1905	1215			
Day2	EB	67891	1418	1057	2.1%	1.6%	3.7%
	WB	69221	1502	1144			
				ADT T %	**2.3%**	**1.6%**	**3.9%**

Figure 2-1. Truck Percentage Sample Calculation

Table 2-2. Truck Percentages Table

Road Classification	Location	Traffic Count ID #	AM Peak			PM Peak			24 Hr		
			S.U.	COMB	TOTAL	S.U.	COMB	TOTAL	S.U.	COMB	TOTAL
INTERSTATE	I-20, west of SR 155/ Candler Road	1001, 1002	2.5%	1.5%	4.0%	1.5%	1.0%	2.5%	2.0%	1.5%	3.5%
	I-20, east of Columbia Dr	1003, 1004	2.5%	1.5%	4.0%	1.5%	1.0%	2.5%	2.5%	1.5%	4.0%
	I-20, west of Columbia Dr	1005, 1006	3.0%	1.5%	4.5%	1.5%	1.0%	2.5%	2.0%	1.5%	3.5%
	I-285, north of Glenwood Rd	1007, 1008	3.5%	6.0%	9.5%	2.5%	4.5%	7.0%	3.5%	8.0%	11.5%
	I-285, south of Glenwood Rd	1009, 1010	3.0%	6.0%	9.0%	2.5%	4.5%	7.0%	3.0%	8.0%	11.5%
	I-285, north of SR 155/ Flat Shoals Rd	1011, 1012	4.5%	8.5%	13.0%	3.0%	8.5%	11.5%	4.0%	11.5%	15.5%
	I-285, south of SR 155/ Flat Shoals Rd	1013, 1014	3.5%	7.5%	11.0%	2.5%	7.5%	10.0%	3.5%	11.5%	15.0%
	I-20, west of Wesley Chapel Rd	1015, 1016	3.5%	4.0%	7.5%	2.0%	4.5%	6.5%	3.0%	6.0%	9.0%
	I-20, east of Wesley Chapel Rd	1017, 1018	4.0%	5.0%	9.0%	2.5%	5.5%	8.0%	3.0%	7.0%	10.0%
	I-20, east of Panola Road	1019, 1020	4.5%	6.0%	10.5%	2.0%	4.5%	6.5%	3.5%	7.5%	11.0%
	I-20, east of Lithonia Industrial Blvd	1021, 1022	4.0%	7.5%	11.5%	3.0%	6.0%	9.0%	3.0%	8.0%	11.0%
	I-20, east of Evans Mill Road	1024, 1023	3.5%	5.5%	9.0%	2.0%	5.5%	7.5%	3.0%	7.5%	10.5%
	I-20 EB, east of I-285 SB Off-Ramp	1199	3.5%	1.5%	5.0%	1.5%	0.5%	3.0%	2.5%	2.0%	4.5%
	I-20 WB, east of I-285 SB Off-Ramp	1200	1.5%	1.0%	2.5%	2.0%	2.0%	4.0%	2.0%	2.0%	4.0%
	I-20 WB, between On-ramp from I-285 NB & I-285 SB Off-ramp	1201	2.5%	3.0%	5.5%	2.5%	6.0%	8.5%	2.5%	6.0%	8.5%
	I-20 WB, west of Off-ramp to I-285 NB	1203	2.5%	3.5%	6.0%	2.5%	6.0%	8.5%	3.0%	6.5%	9.5%
	I-20 EB, west of Off-Ramp from I-285 EB to CD	1205	3.5%	2.0%	5.5%	1.5%	1.0%	2.5%	2.5%	2.5%	5.0%

Road Classification	Location	Traffic Count ID #	AM Peak			PM Peak			24 Hr		
			S.U.	COMB	TOTAL	S.U.	COMB	TOTAL	S.U.	COMB	TOTAL
	I-20 EB CD between on-ramps from I-285 and off-ramp to Wesley Chapel Rd	1206	4.5%	6.5%	11.0%	1.5%	5.0%	6.5%	3.0%	8.0%	11.0%
	I-20 EB, east of CD merge after Wesley Chapel Road	1207	4.5%	6.0%	10.5%	1.5%	3.5%	5.0%	3.0%	7.0%	10.0%
Arterials	Columbia Dr, north of Columbia Woods Dr	1060, 1060	3.0%	0.0%	3.0%	3.5%	0.0%	3.5%	2.5%	0.0%	2.5%
	Columbia Dr, south of Rainbow Dr	1061, 1061	3.0%	0.0%	3.0%	5.0%	0.0%	5.0%	4.0%	0.0%	4.0%
	Glenwood Rd, west of Austin Dr	1062, 1062	4.0%	0.0%	4.0%	3.5%	0.0%	3.5%	2.5%	0.0%	3.5%
	Glenwood Rd, east of Atherton Dr	1063, 1063	3.5%	0.5%	4.0%	4.0%	0.5%	4.5%	2.5%	0.5%	3.0%
	Flat Shoals Rd, north of Panthersville Rd	1064, 1064	2.5%	0.0%	2.5%	2.0%	0.5%	2.5%	2.5%	0.5%	3.0%
	Flat Shoals Rd, south of Clifton Springs Rd	1065, 1065	2.0%	0.0%	2.0%	2.5%	0.0%	2.5%	2.5%	0.5%	3.0%
	Wesley Chapel Rd, north of Snapfinger Woods Dr	1066, 1066	2.0%	0.5%	2.5%	1.5%	0.5%	2.0%	1.5%	0.5%	2.0%
	Wesley Chapel Rd, south of Eastside Dr	1067, 1067	2.0%	0.5%	2.5%	2.0%	0.5%	2.5%	1.5%	0.5%	2.0%
	Miller Rd, on the bridge over I-20	1068, 1068	3.0%	0.0%	3.0%	1.5%	0.0%	1.5%	2.0%	0.0%	2.0%
	Panola Rd, south of Fairington Rd/ Minola Dr	1069, 1069	2.5%	0.0%	2.5%	2.5%	0.0%	2.5%	2.0%	0.0%	2.0%
	Panola Rd, north of Hillandale Dr	1070, 1070	3.0%	1.0%	4.0%	2.5%	1.0%	3.5%	2.5%	1.5%	4.0%
	Fairington Rd, on the bridge over I-20	1071, 1071	5.0%	0.0%	5.0%	2.5%	0.0%	2.5%	2.5%	0.0%	2.5%
	Lithonia Industrial Blvd, north of Hillandale Dr/ Chupp Rd	1072, 1072	4.5%	0.0%	4.5%	3.5%	0.0%	3.5%	3.5%	0.0%	3.5%

Road Classification	Location	Traffic Count ID #	AM Peak			PM Peak			24 Hr		
			S.U.	COMB	TOTAL	S.U.	COMB	TOTAL	S.U.	COMB	TOTAL
	Overpass from C/D between Lithonia Ind Blvd and Evans Mill Rd on I-20	1073, 1073	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	0.0%	5.0%
	Evans Mill Rd, South of Mall Pkwy/ Evans Mill Rd	1074, 1074	5.0%	0.5%	5.5%	1.5%	0.0%	1.5%	1.5%	0.5%	2.0%
	Evans Mill Rd, north of Hillandale Dr	1075, 1075	4.0%	0.5%	4.5%	3.0%	0.5%	3.5%	3.5%	0.5%	4.0%
	Candler Rd, south of H F Shepherd Dr	1076, 1076	2.5%	0.0%	2.5%	3.0%	0.0%	3.0%	3.0%	0.5%	3.5%
	Candler Rd, north of Eastwyck Rd	1077, 1077	3.0%	0.5%	3.5%	2.0%	0.5%	2.5%	2.5%	0.5%	3.0%
	Miller Rd, north of Panola Industrial Blvd	1131, 1131	3.0%	0.0%	3.0%	2.0%	0.5%	2.5%	2.5%	0.5%	3.0%
	Miller Rd, south of Minola Dr	1133, 1133	2.0%	0.0%	2.0%	1.5%	0.0%	1.5%	2.0%	0.0%	2.0%
	Klondike Rd underpass, under I-20	1187, 1187	4.5%	1.5%	6.0%	5.0%	3.5%	8.5%	3.5%	2.0%	5.5%
	Rainbow Dr overpass, over I-285	1190, 1190	3.5%	3.5%	7.0%	5.0%	5.0%	10.0%	4.5%	3.5%	8.0%
	Columbia Dr overpass, over I-285	1194, 1194	4.0%	1.5%	5.5%	6.5%	4.0%	10.5%	5.0%	2.0%	7.0%
	Moseri Rd, north of Glenwood Rd	1401, 1401	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Austin Dr underpass West of I-285	1186, 1186	3.5%	0.0%	3.5%	2.5%	0.0%	2.5%	1.5%	0.0%	1.5%
	Panthersville Rd overpass, over I-285	1196, 1196	5.0%	1.0%	6.0%	8.5%	1.0%	9.5%	6.0%	0.5%	6.5%
	Wellington Ct, North of Flat Shoals Pkwy	1111, 1111	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Orchard Walk Apartments Drwy, North of Flat Shoals Pkwy	1112, 1112	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Road Classification	Location	Traffic Count ID #	AM Peak			PM Peak			24 Hr		
			S.U.	COMB	TOTAL	S.U.	COMB	TOTAL	S.U.	COMB	TOTAL
	Flat Shoals Pkwy, West of Orchard Walk Apartments	1113, 1113	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	The Park at Candler Apartments Drwy, West of Candler Rd	1170, 1170	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Danrich Dr, North of Glenwood Dr	1402, 1402	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Flea Mart Drwy (across from Danrich Dr), South of Glenwood Dr	1403, 1403	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Ramps	On-Ramp from Candler Road to I-20 WB	1025	1.0%	0.5%	1.5%	1.5%	0.5%	2.0%	2.0%	0.5%	2.5%
	Off-Ramp from I-20 EB to Candler Road	1026	2.5%	0.5%	3.0%	1.5%	0.0%	1.5%	2.0%	0.5%	2.5%
	On-Ramp from Candler Road to I-20 EB	1027	3.0%	0.5%	3.5%	1.5%	0.0%	1.5%	2.5%	0.5%	3.0%
	Off-Ramp from I-20 WB to Candler Rd	1028	2.0%	0.5%	2.5%	2.5%	0.5%	3.0%	2.5%	0.5%	3.0%
	On-Ramp from Columbia Dr to I-20 WB	1029	1.0%	0.0%	1.0%	2.5%	0.0%	2.5%	1.0%	0.0%	1.0%
	Off-Ramp from I-20 EB to Columbia Dr	1030	3.0%	0.0%	3.0%	1.0%	0.0%	1.0%	1.5%	0.0%	1.5%
	On-Ramp from Glenwood Rd to I-285 NB	1039	2.0%	0.0%	2.0%	2.5%	0.5%	3.0%	2.0%	0.5%	2.5%
	Off-Ramp from I-285 NB to Glenwood Rd	1040	2.0%	1.5%	3.5%	1.5%	1.0%	2.5%	2.0%	1.0%	3.0%
	On-Ramp from Glenwood Rd to I-285 SB	1041	1.5%	0.5%	2.0%	4.0%	0.5%	4.5%	2.0%	1.0%	3.0%
	Off-Ramp from I-285 SB to Glenwood Rd	1042	4.5%	0.5%	5.0%	1.0%	0.0%	1.0%	1.5%	0.5%	2.0%
	On-Ramp from Flat Shoals Rd to I-285 WB	1043	1.5%	1.0%	2.5%	1.5%	1.0%	2.5%	2.5%	2.0%	4.5%

Road Classification	Location	Traffic Count ID #	AM Peak			PM Peak			24 Hr		
			S.U.	COMB	TOTAL	S.U.	COMB	TOTAL	S.U.	COMB	TOTAL
	Off-Ramp from I-285 WB to Flat Shoals Rd	1044	2.0%	1.5%	3.5%	7.5%	1.0%	8.5%	3.5%	1.5%	5.0%
	On-Ramp from Flat Shoals Rd to I-285 EB	1045	3.0%	1.5%	4.5%	2.0%	2.0%	4.0%	4.0%	2.0%	6.0%
	Off-Ramp from I-285 EB to Flat Shoals Rd	1046	1.5%	1.5%	3.0%	1.5%	1.5%	3.0%	2.5%	2.0%	4.5%
	On-Ramp from Panola Rd to I-20 WB	1047	2.5%	1.0%	3.5%	3.5%	1.5%	5.0%	2.5%	1.5%	4.0%
	Off-Ramp from I-20 WB to Panola Rd	1048	11.5%	3.5%	15.0%	3.0%	0.5%	3.5%	3.0%	1.5%	4.5%
	On-Ramp from Panola Rd to I-20 EB	1049	2.0%	1.5%	3.5%	4.0%	0.5%	4.5%	3.0%	1.5%	4.5%
	Off-Ramp from I-20 EB to Panola Rd	1050	4.5%	1.5%	6.0%	3.0%	1.5%	4.0%	3.0%	2.0%	5.0%
	On-Ramp from Lithonia Industrial Blvd to I-20 WB	1051	4.5%	3.0%	7.5%	4.5%	1.5%	6.0%	4.0%	4.0%	8.0%
	Off-Ramp from I-20 EB to Lithonia Industrial Blvd	1052	4.5%	3.0%	7.5%	3.5%	2.5%	6.0%	4.0%	3.5%	7.5%
	On-Ramp from Lithonia Industrial Blvd to I-20 EB C/D	1053	7.0%	1.0%	8.0%	2.0%	0.5%	2.5%	3.0%	1.0%	4.0%
	Old Hillandale Dr to Lithonia Industrial Blvd	1054	2.5%	0.5%	3.0%	4.0%	1.5%	5.5%	2.5%	1.5%	4.0%
	C/D after Evans Mill Rd	1056	8.0%	1.5%	9.5%	1.5%	0.5%	2.0%	3.0%	1.5%	4.5%
	On-Ramp from Evans Mill Rd to Old Hillandale Dr	1057	2.0%	0.5%	2.5%	3.5%	1.5%	5.0%	2.5%	1.0%	3.5%
	Off-Ramp from I-20 WB to Evans Mill Rd	1058	1.5%	0.5%	2.0%	1.5%	1.5%	3.0%	1.5%	1.0%	2.5%
	On-Ramp from Evans Mill Rd to I-20 EB	1059	2.5%	1.5%	4.0%	1.5%	0.5%	2.0%	2.0%	1.5%	3.5%
	On-Ramp from Wesley Chapel Rd to I-20 WB	1182	1.0%	0.5%	1.5%	2.0%	1.0%	3.0%	1.5%	0.5%	2.0%

Road Classification	Location	Traffic Count ID #	AM Peak			PM Peak			24 Hr		
			S.U.	COMB	TOTAL	S.U.	COMB	TOTAL	S.U.	COMB	TOTAL
	Off-Ramp from I-20 WB to Wesley Chapel Rd	1183	5.0%	1.0%	6.0%	2.0%	0.0%	2.0%	2.0%	0.5%	2.5%
	On-Ramp from Wesley Chapel Rd to I-20 EB	1184	3.5%	0.5%	4.0%	2.0%	0.5%	2.5%	2.0%	0.5%	2.5%
	Off-Ramp from I-20 EB to Wesley Chapel Rd	1185	2.5%	1.5%	4.0%	1.0%	0.5%	1.5%	1.5%	1.0%	2.5%
	Merge of I-285 NB & SB Off-ramps to I-20 EB	1202	4.5%	7.5%	12.0%	2.5%	8.5%	11.0%	3.0%	9.5%	12.5%
	Off-Ramp from I-20 EB to CD	1204	4.5%	6.0%	10.5%	2.0%	4.0%	6.0%	3.0%	7.0%	10.0%
	Ramp from I-20 EB to I-285 NB	1031	5.0%	2.0%	7.0%	3.5%	2.5%	6.0%	4.0%	1.5%	5.5%
	Ramp from I-20 EB to I-285 SB	1032	7.0%	2.5%	9.5%	4.5%	1.5%	6.0%	4.5%	3.5%	8.0%
	Ramp from I-20 WB to I-285 NB	1033	5.0%	4.0%	9.0%	5.0%	4.0%	9.0%	5.5%	5.0%	10.5%
	Ramp from I-20 WB to I-285 SB	1034	14.5%	3.5%	18.0%	13.5%	3.5%	17.0%	16.5%	5.0%	21.5%
	Ramp from I-285 SB to I-20 WB	1035	6.0%	0.5%	6.5%	5.0%	1.0%	6.0%	6.0%	0.5%	6.5%
	Ramp from I-285 SB to I-20 EB	1036	6.5%	2.0%	8.5%	5.0%	1.5%	6.5%	8.0%	4.0%	12.0%
	Ramp from I-285 NB to I-20 WB	1037	4.0%	1.5%	5.5%	3.5%	3.5%	7.0%	8.5%	3.5%	12.0%
	Ramp from I-285 NB to I-20 EB	1038	7.5%	6.5%	14.0%	9.5%	11.5%	21.0%	9.0%	12.5%	21.5%
	Off-Ramp from I-20 EB to C/D	1204	15.0%	0.5%	15.5%	7.0%	0.0%	7.0%	8.0%	0.5%	8.5%
	Off-Ramp from I-20 EB C/D to Evans Mill Rd	1055	3.0%	0.0%	3.0%	2.0%	0.5%	2.5%	2.0%	0.5%	2.5%

Since the proposed project does not result in additional truck destinations and the travel demand model does not show increase in truck volume along the corridor in the future years, truck percentages for the future year conditions were assumed to be the same as existing year.

2.8 GROWTH RATES

Growth rates were determined by analyzing AADT volumes from the Atlanta Regional Commission Travel Demand Model (TDM). The base 2015 model was compared to the 2030 No-Build and Build models to calculate a growth rate from 2018-2025. Similarly, the 2030 models were compared to the 2050 models to calculate the 2025-2045 growth rate. The growth rates can be seen in Table 2-**3** and **Table 2-4** for the I-20/I-285 mainlines and crossroads, respectively. **Figure 2-2** shows scenarios and corresponding infrastructure inclusions to the TDM model.

Table 2-3. Growth Rates – I-20/I-285 Mainline

Scenario	Average Growth Rate (2018 – 2025)		Average Growth Rate (2025 – 2045)	
	No-Build	Build	No-Build	Build
I-20	1.3%	1.6%	1.5% *	1.6% *
I-285	1.0% *	1.2% *	0.8%*	0.9%*

*Overall Growth Rate (GP + EL)

Table 2-4. Growth Rates – Crossroads

Scenario	Average Growth Rate (2018 – 2025)		Average Growth Rate (2025 – 2045)	
	No-Build	Build	No-Build	Build
Candler Rd	0.5%	0.5%	0.5%	0.5%
Columbia Dr	1.5%	1.4%	0.9%	0.8%
Wesley Chapel Rd	1.4%	1.2%	1.4%	1.4%
Miller Rd	1.5%	0.5%	4.7%	6.5%
Panola Rd	0.8%	1.1%	0.5%	0.7%
Lithonia Industrial Blvd	0.8%	3.3%	2.2%	0.5%
Evans Mill Rd	0.5%	0.5%	1.5%	2.0%
Flat Shoals Pkwy	0.9%	0.8%	0.6%	0.6%
Glenwood Rd	1.2%	0.9%	0.5%	0.5%

The section explains the method adopted for estimating the ramp growth rate. From 2018 to 2025 ramp volumes were developed using the growth rate for the mainline. Since each section has a different growth rate, some of the volumes are slightly adjusted as a part of volume balancing. From 2025 to 2045, the growth rate of arterials was applied to all the ramps. It is anticipated that ramp volumes will not grow at the same rate as mainline from 2025 to 2045. Most of the arterials have an approximate growth rate of 0.5%, which was applied to the ramps. Our assumption is that until 2025 mainline volume will increase and increase ramp volume at about same rate. However, between 2025 and 2045, with the I-20 express lanes and other MMIP projects, I-20 volume increases at a higher growth rate, but this does not translate to the arterials volume growth which have lower growth percentages between 2025 to 2045. To be able to reflect that the growth on I-20 mainline is mostly through traffic in the study area and not originating from arterials, the ramp growth rate for 2025 to 2045 has been limited to observed arterial growth rate of 0.5%.

Year	Scenario Name	Existing	RTP Without MMIP	I-20 Eastside Interchange	I-285 Express Lanes	I-20 East and West Express Lanes
		Infrastructure				
2018 Existing	Existing Condition	X				
2025 Open Year	No Build		X			
	Build		X	X		
2045 Design Year	No Build		X		X	X
	Build (All MMIP)		X	X	X	X

Figure 2-2. Travel Demand Model (TDM) Scenarios

2.9 FUTURE TRAFFIC VOLUME CALCULATION & BALANCING

The future traffic volumes were calculated by using the following formula: 1+(growth rate/100) raised to the number of years of projection. The growth rates were first applied to the existing AADT volumes for each scenario. The values were then rounded to the nearest 25 and rebalanced to account for any differences between adjacent intersections to finally arrive at the balanced AADTs. Finally, the AADTs were mirrored to have equal volumes along segments and through intersections and interchanges.

The Directional Design Hourly Volumes (DDHV) were then calculated by applying the same growth rates as the AADTs. The volumes were then rounded to the nearest 5 and any remaining differences were then balanced manually.

2.10 VOLUME CAPACITY CONSTRAINTS VERIFICATION

Verification checks were performed along the freeways, ramps, and arterials to ensure that the calculated volumes did not exceed the capacity of each segment. Several single-lane on-ramps were found to have volumes exceed the capacity, including SB I-285 to EB I-20, EB I-20 to NB I-285, Wesley Chapel Road to WB I-20, and Panola Rd to WB I-20. To more accurately represent the volumes on these ramps, the volume was reduced to 2,100 vehicles on each single lane ramp.

2.11 I-20 EXPRESS LANE VOLUME CALCULATION

The I-20 express lanes volumes were calculated by utilizing volumes from the TDM. A proportion – the express lanes volume divided by the total freeway volume – was taken from the 2040 TDM, which was then multiplied by the total volume forecasted from 2018. This resulted in the I-20 express lanes volume for the AADT and peak period scenarios in the 2045 build and no-build conditions. Reasonability checks were then performed to ensure the capacity of the express lanes was not exceeded based on system's goal to have I-20 express lanes operating at a minimum flow rate (70-

75% of the capacity). The volume per lane was also compared to the mainline to ensure that the express lanes volume did not exceed the general-purpose volume per lane. Further adjustments were made to the I-285 express volumes to maintain consistency with the adjacent PI 0013914, as discussed in the next section.

2.12 COORDINATION WITH ADJACENT PROJECT PI 0013914: I-285 EAST EXPRESS LANES

I-285 Eastside Express Lanes project is located adjacent to the I-285/ I-20 East interchange reconstruction project. To ensure that the volume development for both projects maintains continuity the two project teams coordinated with each other throughout existing and future volume development process. All mainline and express lane AADT volumes in the existing and future conditions were compared between the two projects. A difference threshold of 15% between matching segments was established, and the volumes were determined to be within the appropriate range. DHV volumes were also compared, however, they were not held to the same 15% threshold. DHVs between the two projects may not match due to the 45 minutes difference in peak hours between the two projects. PI 0013915 uses I-20 corridor peak period whereas, PI 0013914 used I-285 period.

- **P.I. 0013915:** I-285/ I-20 East Interchange Reconstruction Project:
  - AM Peak: 6:45 am to 7:45 am
  - PM Peak: 4:00pm to 5:00pm
- **P.I. 0013914:** I-20 East Express Lanes Project:
  - AM Peak: 7:30 am – 8:30 am
  - PM Peak: 4:00 pm – 5:00 pm

Based on the project coordination, it was determined that the I-285 express lanes volume if calculated as discussed in the previous section would exceed capacity within the study area of PI 0013914. Therefore, adjustments were made to the I-285 express lanes volume to accommodate the capacity constraint.

2.13 TRAFFIC VOLUME DIAGRAMS

The design traffic diagrams were created with a line diagram to accurately represent the traffic flow and movements along the corridor. The volume diagrams are populated based on unique traffic count IDs that has been assigned to the locations during the data collection process. A macro was used to populate MicroStation files with the balanced traffic volumes from the excel worksheets based on the unique traffic count ID. This reduces human error and provides more accurate volume diagrams. Traffic volume diagrams, including AADTs and DHVs, for the existing condition, open year (2025), and design year (2045), are attached in **Appendix 2-5**.

3 MODEL DEVELOPMENT

3.1 MICROSIMULATION ANALYSIS METHODOLOGY

This section presents the VISSIM simulation model development for existing AM and PM peak hour conditions and calibration results. Calibration is defined as the adjustment of computer-simulated model parameters to accurately reflect local driving behavior and traffic performance characteristics.

The existing base model was developed using the field data which includes existing geometry, demand data, traffic compositions, signal controller data, traffic pattern and traffic control devices. The base model is then reviewed to check coding errors by an independent peer. The calibration is performed by observing the simulation visually to check for inconsistencies and demonstrated accuracy of the base model with the comparison of field and simulation results to be within the acceptable limits recommended by Federal Highway Administration's (FHWA) Traffic Analysis Toolbox Volume III (Updated FHWA).

This report will be complemented later with an Interchange Access Request Report, based on FHWA's guidelines set in the Interstate System Access Informational Guide (FHWA 2010). A calibrated model can analyze proposed future alternatives to address operational and capacity requirements for a project. The microsimulation analysis for the proposed east interchange reconstruction at the intersection of I-20 and I-285 will be conducted using VISSIM 10.00 simulation software (PTV Group) while analyzing the existing and future build alternatives. The study methodology used in the VISSIM simulation follows the FHWA's Traffic Analysis Toolbox Volume III (Guidelines for Applying Traffic Microsimulation Modeling Software -) and is illustrated in **Figure 3-1.** The VISSIM existing conditions model development and calibration report is included in the **Appendix 3-1.**

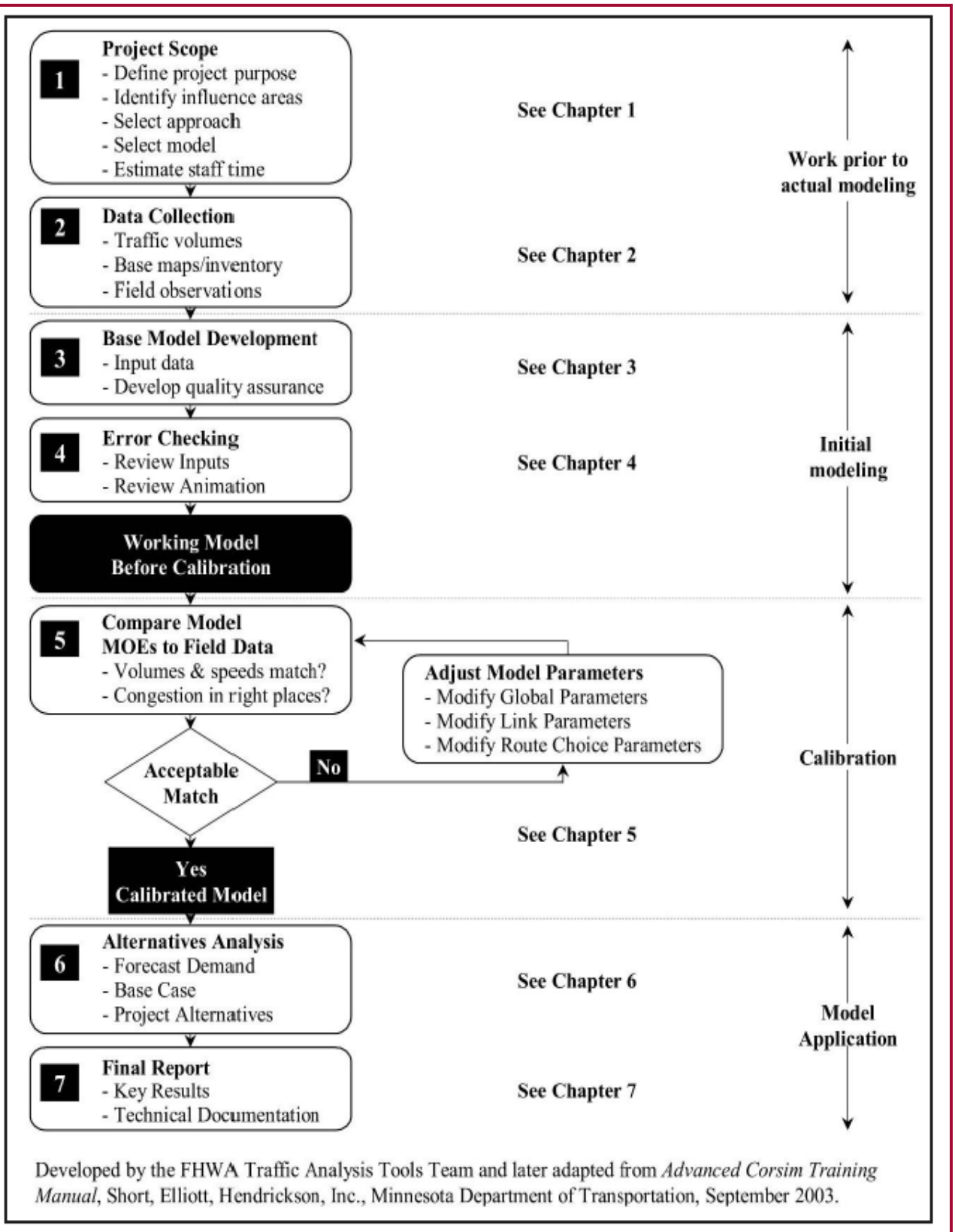


Figure 3-1. FHWA Simulation Studies Methodology

3.2 VISSIM MODEL CALIBRATION

The VISSIM simulation model for this study includes I-20 and I-285 mainline travel lanes, ramp merge/diverge areas, ramp terminal intersections, and adjacent signalized intersections on the arterials. Along with the I-20 and I-285 mainline, the major arterials/collectors considered within the study area limits are Candler Rd, Columbia Dr, Wesley Chapel Rd, Panola Rd, Lithonia Industrial Blvd, Evans Mill Rd, Flat Shoals Pkwy and Glenwood Rd. The details of the crossroads/streets and their start and end locations included for the analysis are listed in **Table 3-1.**

Table 3-1. Calibration Study Area Corridors/Streets

Roadway Name	Start Location	End Location	Directions
I-20	East of Evans Mill Rd	West of Candler Rd	EB/WB
I-285	South of Flat Shoals Rd	North of Glenwood Dr	NB/SB
Candler Rd	Eastwyck Rd	H F Shepherd Rd	NB/SB
Columbia Dr	Columbia Woods Dr	Rainbow Dr	NB/SB
Wesley Chapel Rd	Snap finger Woods Dr	East Side Dr	NB/SB
Panola Rd	Panola Industrial Dr	Fairington Rd	NB/SB
Lithonia Industrial Blvd	I-20	Chupp Rd	NB/SB
Evans Mill Rd	Hillandale Dr	Mall Pkwy	NB/SB
Flat Sholas Pkwy	Panthersville Rd	Columbia Dr	EB/WB
Glenwood Rd	Austin Dr	Atherton Rd	EB/WB

3.2.1 ROAD GEOMETRY

The VISSIM network for the existing conditions analysis was developed using the in-built aerial maps from online map providers and Google Maps. Google Street View was used along with field visits to verify the roadway geometric information from the aerial imagery. A preliminary roadway network composed of links, connectors, and storage bays for turn movements was created. Links are one-directional segments of freeways or surface streets. Links represent the length of the segment and usually contain data on the geometric characteristics of the road or highway between connectors. Ideally, a link represents a roadway segment with uniform geometry and traffic operation conditions. Connectors are usually placed to connect two links. The desired speed decisions were placed where the posted limits were identified in the field; where the driver tends to change lanes to reach his desired direction or decides to accelerate to reach the posted speeds of the corresponding interstates/arterials/collectors and local driveways. Reduced speeds are coded at loops ramps where the drivers are forced to decelerate due to the geometric constraints (curve radius). Field visits were conducted when necessary to validate the roadway geometry coding and record the operational aspects, such as right-turn-on-red, signal phasing (protected/permitted operations), and other features, that are essential for network calibration. The VISSIM network was updated with the update to date information available online and data collected from field visits to reflect existing traffic operations.

3.2.2 SPEED DISTRIBUTION

To control the speeds of vehicles in VISSIM, Desired Speed Decisions or Reduced Speed Areas were added to network links. Desired speed decision points in VISSIM change the speed of crossing vehicles and should be used when the free-flow speeds of an area change significantly due to the road

classification, posted speed limit, geometric change, topography, or other factors. Reduced speed areas are temporary zones with a reduced speed limit and should be used to code small sections where vehicles have a significant change in speed (e.g., ramps, turn movements at intersections).

The Desired Speed Decisions and Reduced Speed Areas were coded in VISSIM based on the type of roadway segment/facility. Regulatory and advisory speed limit data was collected from field observations. The desired speed decisions for the study area were based on the posted speed limits and field observations using GPS. During field data collection activities, the posted speed observed was 65 mph on the I-20 mainline (EB/WB) and I-285 mainline (NB/SB) Rd in the study area, except in the I-20 WB section between Evans Mill Rd and Panola. For arterials, the upper and lower limits for the speed distribution were selected as a linear distribution, with vehicles driving at ± 5mph above/below the posted speed limit. **Table 3-2** provides the free-flow desired speed distributions considered for the base existing VISSIM model, and **Figure 3-2** shows the speed profile on I-20 (WB – section between Evans Mill Rd and Panola Rd) as an example.

Table 3-2. Free Flow Desired Speed Decisions

Roadway Name	Vehicle Type	Posted Speed Limit (mph)	Maximum Speed (mph)	Minimum Speed (mph)
I-20	Cars/Trucks	65/60	70/65	60/55
I-285	Cars/Trucks	Variable Speed -		
Candler Rd	Cars/Trucks	45	50	40
Columbia Dr	Cars/Trucks	40	45	35
Wesley Chapel Rd	Cars/Trucks	45	50	40
Panola Rd	Cars/Trucks	45	50	40
Lithonia Industrial Blvd	Cars/Trucks	35	40	30
Evans Mill Rd	Cars/Trucks	35	40	30
Flat Shoals Pkwy	Cars/Trucks	45	50	40
Glenwood Rd	Cars/Trucks	40	45	35

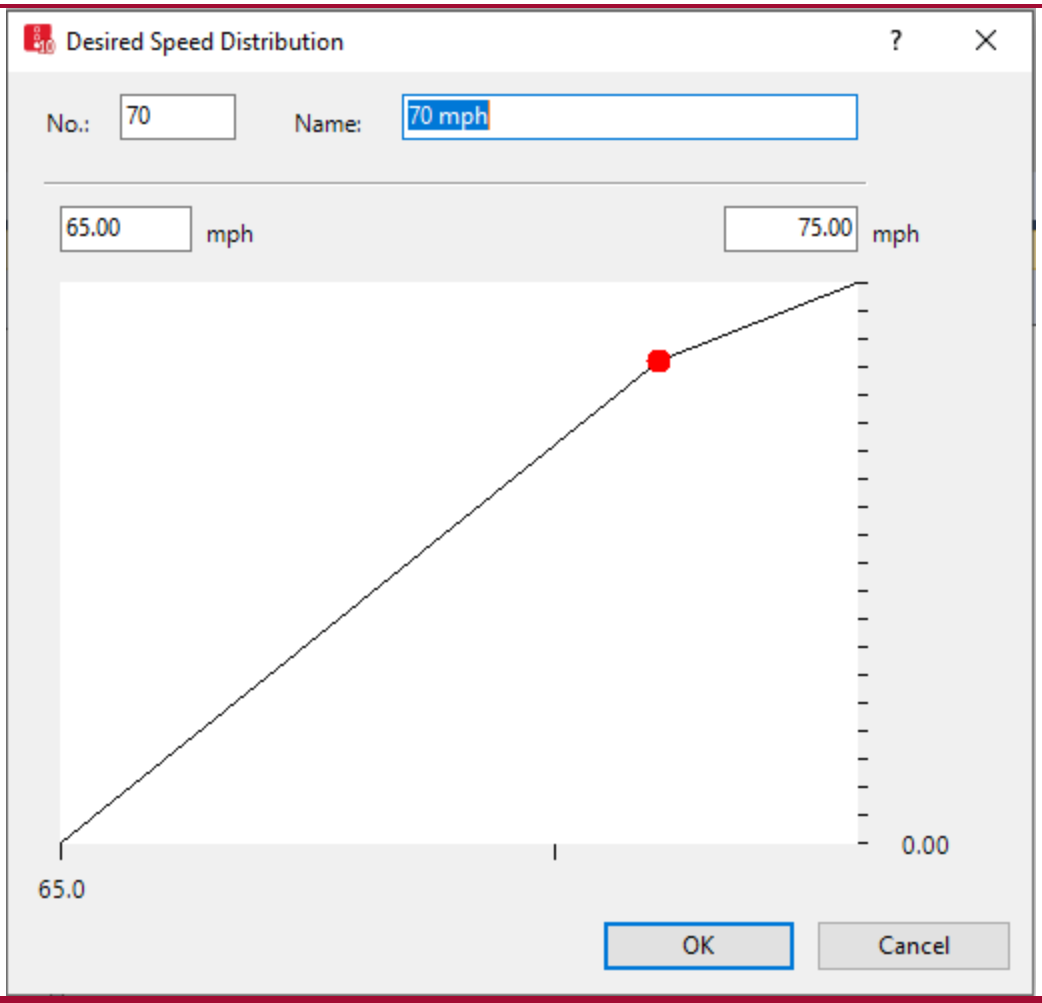


Figure 3-2. I-20 Speed Profile (70 mph Speed Limit)

Desired speeds for the on-ramps to the freeway are coded as 65 mph. Reduced speed areas coded for a temporary change in speed in curves, including ramps, loops, curves, and at intersections for the left-turns and right-turns. **Table 3-3** shows the parameters for right-turn and left-turn reduced speeds considered in the VISSIM models.

Table 3-3. Reduced Speeds within the Study Area

Location	Vehicle Type	Reduced Speed (mph)
Left Turns	Cars/Trucks	15/15
Right Turns	Cars/Trucks	9/9

3.2.3 Vehicular Composition

Vehicular traffic in VISSIM is composed of different vehicle types, including Cars (Vehicle Type – Car - 100) and Single-Unit and Combination-Unit Trucks (Vehicle Type – HGV - Type 200). All the vehicle inputs are coded as per the car/truck composition approved in the turn volume diagrams. In addition, to reflect the exact truck percentages on the system/system interchange ramps and on the

EB CD road, exclusive truck routes were coded along the I-20 and I-285 mainlines through the system to system interchange ramps based on the approved Existing Volumes Turning Volume Diagrams. The peak hour truck percentages considered for the base existing calibration network for the study area are summarized in **Table 3-4**.

Table 3-4. VISSIM Vehicle Composition

Road Name	Ramp Direction	Percentage of HGV (AM)	Percentage of HGV (PM)
I-20 EB	From I-20 EB to I-285 NB	7.0%	6.0%
	From I-20 EB to I-285 SB	9.5%	6.0%
	Towards I-20 EB mainline	7.5%	6.5%
	Towards I-20 EB CD road	15.5%	7.0%
I-20 WB	From I-20 EB to I-285 NB	9.0%	9.0%
	From I-20 EB to I-285 SB	18.0%	17.0%
	Towards WB	2.5%	4.0%
I-285 NB	From I-285 NB to I-20 EB	14.0%	21.0%
	From I-285 NB to I-20 WB	5.0%	7.0%
	Towards I-285 NB	10.8%	6.5%
I-285 SB	From I-285 SB to I-20 EB	8.5%	6.5%
	From I-285 SB to I-20 WB	6.5%	6.0%
	Towards I-285 SB	9.6%	7.0%

Exclusive truck routing was coded for WB Lithonia on-ramp starting from Lithonia Industrial Blvd and Evans Mill Rd. At all of the other vehicle input locations in the study area along arterials, approved truck percentages were derived from the field traffic data collection, and are considered as a part of car route choice. Local roads are provided with the default vehicle models considered in VISSIM typical for North America. PTV, the software developer for VISSIM, has developed a "NorthAmericaDefault.inp" file with vehicle models that provide an accurate representation of vehicles types found in North America.

The default VISSIM software values for the maximum and desired acceleration range (in feet per second squared [ft/sec2]), maximum and desired deceleration range (in ft/sec2), weight (in kilograms [kg]) and power (in kilowatts [KW]) were used for the two vehicles types (Cars and HGV).

3.2.4 Traffic Control Devices

Traffic near signalized intersections within the VISSIM network is controlled by means of signal heads and detectors. Using Google Street View, signal operation features, such as protected/permitted left-turn movements, right-turn-on-red locations and right-turn overlap phasing were identified. A total of 55 intersections were included in the existing conditions AM and PM peak hour VISSIM models, of which 29 are signalized intersections, 4 are ramp-meter signals, and 22 are unsignalized intersections. These signalized intersections, ramp terminus signals and ramp metering signal location details are listed in **Table 3-5**.

Table 3-5. Intersection Traffic Control Information

Roadway Name	Intersection	Control Type
Candler Rd	Eastwyck Rd	Traffic Signal
	The Park of Candler Rd	Unsignalized
	I-20 WB Off-ramp Terminus	Traffic Signal
	I-20 WB On-ramp	Ramp-meter Signal
	I-20 EB Off-ramp Terminus	Traffic Signal
	I-20 EB On-ramp	Ramp-meter Signal
	Ember Dr	Unsignalized
	HF Shepherd Dr	Traffic Signal
Columbia Dr	Columbia Woods Dr	Traffic Signal
	I-20 WB On-ramp	Unsignalized
	I-20 WB On-ramp	Ramp-meter Signal
	I-20 EB Off-ramp Terminus	Traffic Signal
	Forest at Columbia Dr	Unsignalized
	Columbia Crossing	Unsignalized
	Abbeywood Dr	Unsignalized
	Old Rainbow Dr	Unsignalized
	Rainbow Dr	Traffic Signal
Wesley Chapel Rd	Snapfinger Woods	Traffic Signal
	I-20 WB Off-ramp Terminus	Traffic Signal
	I-20 EB Off-ramp Terminus	Traffic Signal
	Wesley Club Dr	Unsignalized
	Eastside Dr	Traffic Signal
Panola Rd	Panola Industrial Blvd	Traffic Signal
	Snapfinger Park Dr	Unsignalized
	Hillandale Park Ct	Unsignalized
	I-20 WB Off-ramp Terminus	Traffic Signal
	I-20 EB Off-ramp Terminus	Traffic Signal
	Panola Rd Park/Ride Dr	Unsignalized
	Minola Dr	Traffic Signal
Lithonia Industrial Blvd	Chupp Rd	Traffic Signal
	Old Hillandale Dr	Traffic Signal
	I-20 EB Off-ramp Terminus	Traffic Signal
Evans Mill Rd	Hillandale Dr	Traffic Signal
	I-20 WB Off-ramp Terminus	Traffic Signal
	I-20 EB Off-ramp Terminus	Traffic Signal
	Milwood Ln	Unsignalized
	Mall Pkwy	Traffic Signal
Glenwood Dr	Austin Dr	Traffic Signal
	Danrich Dr	Unsignalized
	Moseri Rd	Unsignalized

	I-20 SB Off-ramp Terminus	Traffic Signal
	I-20 EB On-ramp	Ramp-meter Signal
	I-20 NB Off-ramp Terminus	Traffic Signal
	Glenfair Rd	Unsignalized
	Glen Acres Ct	Unsignalized
	Meadowglades Dr	Unsignalized
	Arthurs Ct Dr	Unsignalized
	Atherton Dr	Traffic Signal
Flat Shoals Rd	Panthersville Rd	Traffic Signal
	Lumby Dr	Unsignalized
	Wellington Ct	Unsignalized
	Orchid Walk Dr	Unsignalized
	Glen Hollow Dr	Unsignalized
	Barton Morgan Way	Unsignalized
	Clifton Springs Rd	Traffic Signal

Existing signal timings collected from the Dekalb County Public Works received in September 2018 were coded in the VISSIM base model for the AM and PM peak hours. Ramp-meter signals, right-turn-on-red and conflict areas were also coded for signalized intersections. Conflict areas and/or priority rules were also coded to model yielding conditions within the VISSIM network where traffic on a minor street must yield the right-of-way for major street traffic (e.g., channelized right turns and permissive left turns). Signal timings along the side-streets were adjusted for calibration purpose, if required.

3.2.5 Traffic Volume Input

A 30-min seeding period and one hour of pre-peak is used to depict build-up of congestion prior to the peak hour. The peak hour consists of a one-hour analysis period, following the pre-peak. The post-peak hour is also one hour, which follows the peak hour. The seeding time is long enough for vehicles to travel the total length of project corridor which is 20 mins (maximum in AM peak – west bound direction). The simulation durations developed in VISSIM are as follows:

- Seeding Time (Warm-up period): 0 to 1,800 simulation seconds
- Pre-Peak Hour: 1,800 to 5,400 simulation seconds
- Peak Hour: 5,400 to 9,000 simulation seconds (analysis period)
- Post-Peak Hour: 9,000 to 12,600 simulation seconds

The 15-min volume considered for the peak period for of AM and PM peak periods are derived from the traffic raw data from the field counts. These were considered as the input volumes in the VISSIM models for the I-20 and I-285 mainline and are presented in **Table 3-6** and **Table 3-7** for both the AM and PM Peak Hours. Volumes were entered in VISSIM as 15-minute flow rates for all the entry links. The 15-min travel pattern for warm-up and cool-down periods are considered as the similar pattern of the hours on either side of the peak hour derived from raw counts. Similarly, the raw data traffic volume pattern was considered for all the entry points of all the arterial streets within the study area.

Table 3-6. AM Peak Period 15-Minute Distribution Percentages

From	To	I-20 EB	I-20 WB	I-285 NB	I-285 SB
05:45	**06:00**	13.0%	16.5%	15.7%	9.6%
06:00	**06:15**	15.9%	18.8%	18.7%	12.8%
06:15	**06:30**	18.2%	20.1%	23.3%	14.1%
06:30	**06:45**	20.4%	25.6%	25.5%	17.8%
06:45	**07:00**	21.6%	24.7%	21.9%	19.4%
07:00	**07:15**	22.7%	25.7%	24.4%	21.8%
07:15	**07:30**	26.5%	25.8%	24.4%	28.0%
07:30	**07:45**	29.2%	23.8%	29.3%	30.8%
07:45	**08:00**	26.3%	24.1%	28.8%	22.6%
08:00	**08:15**	26.7%	22.1%	26.5%	22.5%
08:15	**08:30**	26.0%	21.8%	24.9%	22.4%
08:30	**08:45**	24.9%	22.0%	28.2%	21.3%

Table 3-7. PM Peak Period 15-Minute Distribution Percentages

From	To	I-20 EB	I-20 WB	I-285 NB	I-285 SB
15:00	**15:15**	16.6%	24.9%	20.6%	22.1%
15:15	**15:30**	17.8%	24.7%	22.6%	24.7%
15:30	**15:45**	19.5%	25.6%	23.5%	25.6%
15:45	**16:00**	24.6%	26.1%	22.7%	26.6%
16:00	**16:15**	23.7%	23.5%	20.9%	25.0%
16:15	**16:30**	25.5%	25.0%	27.3%	24.9%
16:30	**16:45**	24.0%	26.3%	25.0%	25.3%
16:45	**17:00**	26.8%	25.1%	26.8%	24.8%
17:00	**17:15**	23.6%	26.2%	26.6%	25.3%
17:15	**17:30**	24.2%	26.4%	28.0%	26.1%
17:30	**17:45**	24.0%	24.5%	27.3%	24.3%
17:45	**18:00**	26.1%	25.0%	27.5%	25.4%

3.2.6 Traffic Routing

The routing of traffic in VISSIM from the entry links can be assigned in two ways: Static Routing (predetermined paths for traffic to a destination) and Dynamic Routing (pre-defined conditions for traffic to decide the route for a destination).

Dynamic routing of traffic is useful when multiple routes are available for vehicular traffic from one origin to a desired destination within the study area. However, for this study area, there are no alternative routes in the VISSIM network for vehicular traffic to use to reach a desired destination. Therefore, static routing was considered for directing traffic from one entry link to a desired destination exit link for the AM and PM peak period VISSIM models.

Routing decisions were coded in VISSIM using the static routing feature for the AM and PM peak period models. The routing decision feature uses the entry link traffic volumes, on/off-ramp volumes and intersection turning movement volumes and provides longer paths and respective volumes from each entry link to different exit points within the network.

3.2.7 Error Checking

The VISSIM model input parameters were reviewed after the initial coding of the network before proceeding to calibration, the base model is examined for completeness and accuracy. The error checking process was performed by the model developer as well as a peer reviewer who has enough expertise on the simulation modeling approach and who is not associated with the base model development. Both the model developer and the peer review will ensure in emulating existing conditions in the base model network.

After reviewing the model and addressing coding or input errors, the AM and PM peak period VISSIM models were ran to observe the simulation. The models were initially ran for the peak hour and shoulder hours for a total duration of four (4) hours to identify any errors that would hinder the progress of the simulation. The models were then reran, and the animation of the simulations was reviewed closely to observe vehicular routes, look for network gridlock and unusual traffic behavior. Any errors observed in the vehicular routes were corrected. The animation was watched to observe traffic signal operations near signalized intersections, conflict areas near stop signs, and priority rules for yielding right-of-way. The lane change decisions were modified if any turbulence was observed at the diverge areas. Corrections were applied to both the AM and PM peak hour models for consistency. After the input parameters and the VISSIM animation were reviewed thoroughly, the AM and PM peak period models were ready for calibration.

3.3 EXISTING SYNCHRO MODEL DEVELOPMENT

The existing SYNCHRO model was developed using the existing geometry, volumes, signal phasing and timing. Bing Maps background imagery was imported into the SYNCHRO model to create a layout for the geometry. The number of lanes and intersection configurations were coded for all roadways, except the freeway mainlines. The freeways were not coded, because SYNCHRO was not used for any freeway results.

Two versions of the model for the AM and PM peak hours were made after the geometry was verified. The approved turning movement volumes were coded, along with the existing signal phasing and timings. SimTraffic was ran to verify the model was coded properly and any errors were troubleshot and corrected.

4 EXISTING OPERATIONS ANALYSIS

4.1 EXISTING CONDITIONS ANALYSIS

This section presents the existing conditions analysis results from SYNCHRO and VISSIM. The operational analysis was performed based on the calibrated VISSIM model and SYNCHRO network built based on existing field conditions including signal timing obtained from DeKalb County.

4.1.1 SYNCHRO RESULTS

The SYNCHRO analysis results for the 2018 Existing year are shown in the following tables. **Table 4-1** and **Table 4-2** list the summary of the signalized and unsignalized level-of-service (LOS) results, respectively. The SYNCHRO outputs from the software are included in **Appendix 4-1**.

Table 4-1. Signalized Intersection LOS Results (SYNCHRO) – Existing

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at Eastwyck Rd	8.6	A	9.2	A
Candler Rd at I-20 WB Ramps	20	C	24.3	C
Candler Rd at I-20 EB Ramps	31.4	C	41.5	D
Candler Rd at H F Shepherd Dr/ Rainbow Way	7.8	A	9.5	A
Columbia Dr at Columbia Woods Dr	9.8	A	7.5	A
Columbia Dr at I-20 EB Ramps	7.9	A	15.7	B
Columbia Dr at Rainbow Dr	39.1	D	53.8	D
Glenwood Rd at I-285 NB Ramps	50.8	D	23.5	C
Glenwood Rd at I-285 SB Ramps	49.8	D	19.5	B
Glenwood Rd at Austin Dr	29.8	C	18.9	B
Glenwood Rd at Atherton Dr	1.9	A	2.5	A
Flat Shoals Rd at I-285 EB Ramps	22	C	24	C
Flat Shoals Rd at I-285 WB Ramps	12.4	B	20.2	C
Flat Shoals Rd at Panthersville Rd/ Fairlake Dr	34.8	C	30.7	C
Flat Shoals Rd at Clifton Springs Rd/ Columbia Dr	22.9	C	45.4	D
Wesley Chapel Rd at I-20 EB Ramps	37.4	D	35	D
Wesley Chapel Rd at I-20 WB Ramps	25.3	C	29.2	C
Wesley Chapel Rd at Snapfinger Woods Dr	47.6	D	75.5	E
Wesley Chapel Rd at Eastside Dr	26.7	C	5.4	A
Minola Dr/ Shire Dr at Miller Rd	13.4	B	12.3	B
Panola Rd at I-20 EB Ramps	26.3	C	38.3	D
Panola Rd at I-20 WB Ramps	38.5	D	45.5	D
Panola Rd at Panola Industrial Blvd/ Hillandale Dr	44.7	D	61	E

Table 4-1. Signalized Intersection LOS Results (SYNCHRO) – Existing

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Panola Rd at Minola Dr/ Fairington Rd	38.4	D	45.5	D
Hillandale Dr at Fairington Rd	147.2	F	65.8	E
Hillandale Dr at Dekalb Medical Pkwy	41.3	D	48.6	D
Chupp Way at Fairington Rd	13.7	B	15	B
Old Hillandale Dr at Lithonia Industrial Blvd	23.3	C	12.7	B
Lithonia Industrial Blvd at I-20 EB CD Rd	35.7	D	36.2	D
Evans Mill Rd at Old Hillandale Dr/ I-20 WB Ramp	25.1	C	14	B
Evans Mill Rd at I-20 EB CD Rd	16.3	B	18.9	B
Hillandale Dr at Evans Mill Rd	5.9	A	4.1	A
Evans Mill Rd/ Mall Pkwy at Evans Mill Rd/ Woodrow Dr	27	C	24.3	C
Lithonia Industrial Blvd at Hillandale Dr	25.9	C	23.2	C

The above **Table 4-1** 2018 Existing SYNCHRO analysis shows that majority of the signalized intersections operate at LOS D or better, except for a few intersections: Wesley Chapel Rd at Snapfinger Woods Dr (LOS E, PM Peak), Panola Rd at Panola Industrial Blvd (LOS E, PM Peak) and Hillandale Dr at Fairington Rd (LOS F/LOS E, AM Peak/PM Peak).

Table 4-2. Unsignalized Intersection LOS Results (SYNCHRO) – Existing

Intersection	Approach	AM		PM	
		Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at The Park at Candler Entrance	EB	14.7	B	33	D
Candler Rd at Ember Dr	WB	17.1	C	17.4	C
Columbia Dr at I-20 WB Ramps	NBL	4.1	A	1.8	A
Columbia Dr at The Forest Apts	EB	23.9	C	42.6	E
Columbia Dr at Columbia Crossing Dr	WB	16.6	C	20.9	C
Columbia Dr at Abbeywood Dr	EB	22	C	Min*	A
Columbia Dr at Old Rainbow Dr	EB	Min*	A	Min*	A
Glenwood Rd at Moseri Rd	SB	26.6	D	22.2	C
Glenwood Rd at Danrich Dr/ 285 Discount Mall (West Ent.)	NB	10.8	B	11.8	B
	SB	30.8	D	20.9	C
Glenwood Rd at Glenfair Rd	NB	10	B	11.9	B
Glenwood Rd at Glen Acres Ct.	SB	13.1	B	Min*	A
Glenwood Rd at Meadowglades Dr	SB	13.8	B	9.8	A
Glenwood Rd at Arthurs Ct.	NB	18.7	C	26.3	C
Flat Shoals Rd at Lumby Dr.	SB	17.7	C	12.9	B
Flat Shoals Rd at Wellington Ct.	SB	13	B	15.5	C
Flat Shoals Rd at Orchard Walk Apartments	SB	12.1	B	15.7	C
Flat Shoals Rd at Glen Hollow Dr.	NB	15.4	C	14.1	B
Flat Shoals Rd at Barton Morgan Dr.	SB	10	B	17.1	C
Wesley Chapel Rd at Wesley Club Dr	EB	10.8	B	9.5	A
Miller Rd at Panola Industrial Blvd	EB	20	C	19.6	C
	WB	23.3	C	13.8	B
	NB	101.8	F	15.4	C

Table 4-2. Unsignalized Intersection LOS Results (SYNCHRO) – Existing

Intersection	Approach	AM		PM	
		Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
	SB	19.6	C	17.9	C
Miller Rd at Chatooga Dr	WB	17.6	C	10.4	B
Panola Rd at Hillandale Park Ct	WB	73	F	33.5	D
Panola Rd at Snapfinger Park Dr	EB	23.3	C	23.9	C
Fairington Rd at Athena Ln	WB	11.5	B	12.4	B
Evans Mill Rd at Millwood Ln	WB	11.8	B	11.3	B

Min* - minimum delay (Volume is too low to record a delay)

Table 4-2 shows that majority of the minor street approaches at unsignalized intersections operate at LOS D or better, except for a few side street approaches at the following intersections: Columbia Dr at Forest Apts (LOS E, PM Peak), Panola Rd at Hillandale Park Ct (LOS F, AM Peak) and NB approach of the Miller Rd at Panola Industrial Blvd intersection. The approaches/movements that have zero delay are the ones with minimum volumes in existing conditions.

4.1.2 VISSIM Results

The summary of the VISSIM analysis results for the I-20 & I-285 mainlines are shown in the following tables. **Table 4-3** and **Table 4-4** list the volume, speed, density, and LOS for each of the following freeway segment type: basic, merge, diverge and weaving. Table 4-3 shows results for the AM peak period and the PM peak period results are shown in Table 4-4. The 2018 existing freeway segment analysis in schematic formats are provided in **Figures 4-1, 4-2** (AM Peak) and **Figures 4-3, 4-4** (PM peak). Speed heat maps are included in **Appendix 4-2**.

Table 4-3. Freeway Segment Analysis Results (VISSIM) – Existing AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	2,559	64	10	A
	I-20 EB at Candler Rd off-ramp	Diverge	4	2,551	63	10	A
	I-20 EB after Candler Rd off-ramp	BFFS	4	2,182	63	9	A
	I-20 EB at Candler Rd on-ramp	Merge	5	2,649	55	10	A
	I-20 EB at Columbia Dr off-ramp	Diverge	4	2,682	63	11	A
	I-20 EB to I-285 NB & SB Ramps	Diverge	4	2,371	62	10	A
	I-20 EB at the System Interchange	BFFS	3	2,006	63	11	A
	I-20 EB off-ramp to CD Rd	Diverge	4	2,018	63	8	A
	I-20 EB - CD Rd	Diverge	3	2,979	48	21	C
	I-20 EB after off-ramp to CD Rd	BFFS	3	1,593	64	8	A
	I-20 EB on-ramp from CD Rd	Merge	5	3,376	57	12	B
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	3,679	57	11	A
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	3,682	62	15	B
	I-20 EB off-ramp to Panola Rd	Diverge	4	3,669	62	15	B
	I-20 EB after Panola Rd off-ramp	BFFS	3	2,922	62	16	B

Table 4-3. Freeway Segment Analysis Results (VISSIM) – Existing AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 EB on-ramp from Panola Rd	Merge	4	3,284	62	13	B
	I-20 EB after on-ramp from Panola Rd	BFFS	3	3,296	62	18	B
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	3,217	62	13	B
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	2,507	62	13	B
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	2,909	62	12	B
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	4,211	60	18	B
	I-20 WB after Evans Mill Rd off-ramp	BFFS	3	2,884	58	17	B
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	3,799	18	54	F
	I-20 WB after on-ramp from Panola Rd	BFFS	3	3,723	16	77	F
	I-20 WB off-ramp to Panola Rd	Diverge	4	3,492	17	51	F
	I-20 WB after Panola Rd off-ramp	BFFS	3	3,409	12	92	F
	I-20 WB on-ramp from Panola Rd	Merge	4	4,043	11	93	F
	I-20 WB between Wesley Chapel Rd and Panola Rd	BFFS	3	4,327	60	24	C
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	4,182	45	23	C
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	4,174	53	27	D
	I-20 WB after on-ramp from Wesley Chapel Rd	Weaving	4	5,926	38	40	E
	I-20 WB at the System Interchange	BFFS	3	4,929	57	29	D
	I-20 WB between I-285 NB on-ramp and I-285 SB off-ramp	Weaving	4	5,196	55	23	C
	I-20 WB between I-285 SB off-ramp to I-285 SB on-ramp	BFFS	3	4,374	61	24	C
	I-20 WB after I-285 SB on-ramp	Merge	4	5,673	61	23	C
	I-20 WB at Columbia Dr on-ramp	Merge	5	5,674	59	19	C
	I-20 WB at Candler Rd off-ramp	Diverge	4	6,025	60	25	C
	I-20 WB after Candler Road off-ramp	BFFS	4	5,369	62	22	C
	I-20 WB at Candler Road on-ramp	Diverge	5	5,840	60	19	C
I-285 NB	I-285 NB at Flat Shoals Rd off-ramp diverge	Diverge	4	4,948	57	22	C
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	4,390	61	18	C
	I-285 NB at Flat Shoals Rd on-ramp	Merge	5	4,623	52	18	B
	I-285 to I-20 EB off-ramp	Diverge	4	4,741	62	19	C
	I-285 NB after I-20 EB off-ramp	Diverge	3	3,374	62	18	C
	I-285 NB after I-20 WB off-ramp	BFFS	3	3,098	63	16	B
	I-285 NB at I-20 EB and WB ramps merge	Merge	6	4,375	56	13	B
	I-285 after I-20 EB and WB ramps merge	BFFS	5	4,346	55	16	B
	I-285 NB at Glenwood Rd off-ramp	Diverge	4	4,360	52	21	C
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	3,947	53	18	C
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	3,992	53	15	B
I-285 SB	I-285 SB at Glenwood off-ramp	Diverge	4	5,986	51	29	D

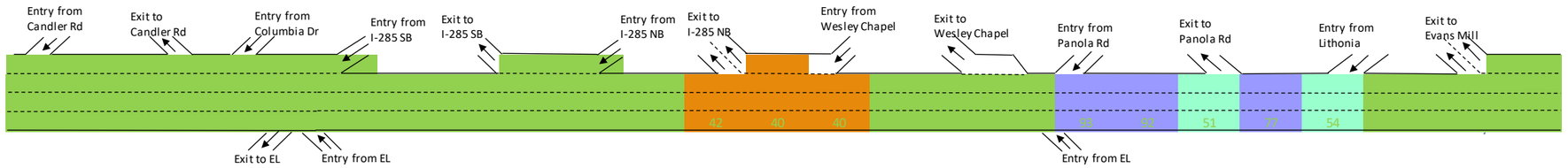
Table 4-3. Freeway Segment Analysis Results (VISSIM) – Existing AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-285 SB after Glenwood off-ramp	BFFS	4	5,538	55	25	C
	I-285 SB at Glenwood Rd on-ramp	Merge	5	6,139	44	28	D
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	6,201	55	28	D
	I-285 SB at I-20 EB and WB ramps diverge	Diverge	5	6,159	60	20	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	3,696	62	20	C
	I-285 at I-20 on-ramp	Merge	4	4,492	61	18	C
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	4,243	61	17	B
	I-285 SB at Flat Shoals Rd on-ramp	Diverge	5	4,681	59	16	B
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	4,725	61	19	C

From **Table 4-3** and the results schematics it is observed that during AM Peak, I-20 in the westbound direction between Lithonia Ind. Blvd and Panola Rd operates at LOS F with an average stream speed below 20 mph. The weaving segment between Wesley Chapel Rd and the system interchange operates at LOS E with an average stream speed below 40 mph. The I-20 mainline and CD section in the eastbound direction within the study corridor operates at an acceptable LOS in the AM condition. I-285 in both SB and NB directions of the entire study corridor operates with an acceptable LOS D or better.

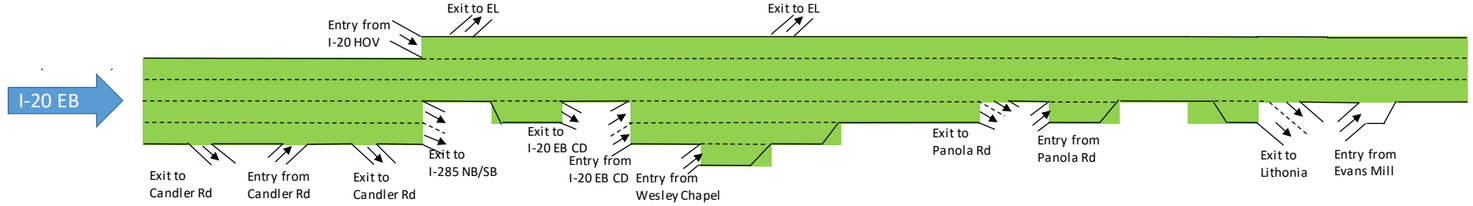
YR 2018 Existing AM Peak - Graphical Results ---- I-20 WB & EB

No of Lanes	5	4	4	5	4	4	3	4	4	4	3	4	4	4	3	4	3	4	3	4	3	4	3	4	3
Distance (ft)	531	2,500	3,174	470	1,767	500	2,023	200	364	200	1,192	1,741	2,713	500	1,759	390	15,245	250	2,129	270	6,513	405	10,692	2,500	4,960
Speed (mph)	60	62	60	59	61	61	61	55	55	55	57	35	38	38	53	45	60	11	12	17	16	18	58	60	62
Level of Service	C	C	C	C	C	C	C	C	C	C	D	E	E	E	D	C	C	F	F	F	F	F	B	B	C
Density (pc/mi/ln))	19	22	25	19	23	23	24	23	23	23	29	42	40	40	27	23	24	93	92	51	77	54	17	18	23
Ramp Demand Volume (vph)	630		690		855		1,410	1,070			270	1,100		2,050		140		1,010		180		675		1,340	



Simulated Volumes (vph)	5,840	5,369	6,025	5,674	5,673	5,673	4,374	5,196	5,196	5,196	4,929	5,848	5,926	5,926	4,174	4,182	4,327	4,043	3,409	3,492	3,723	3,799	2,884	4,211	4,212
Demand Volumes (vph)	6,100	5,470	6,160	6,160	5,305	5,810	4,400	5,470	5,470	5,470	5,200	6,300	6,300	6,300	4,250	4,390	4,390	4,390	3,380	3,560	3,560	3,560	2,885	4,225	4,225

Demand Volumes (vph)		2,570	2,200	2,710	2,405	2,030	2,030	1,605	3,455	3,780	3,780	3,780	3,780	2,965	3,340	3,340	3,340	2,480	2,940	2,940					
Simulated Volumes (vph)		2,551	2,182	2,649	2,371	2,006	2,018	1,593	3,376	3,679	3,682	3,682	3,669	2,922	3,284	3,296	3,217	2,507	2,909	2,909					



Ramp Demand Volume (vph)	370	510		305	475	425	1,850	325				815		375			860	460		
No of Lanes	4	4	4	4	3	4	3	5	6	6	4	4	3	4	3	3	3	4	3	
Distance (ft)	1,500	2,945	3,157	2,617	788	2,137	6,853	1,300	682	1,804	7,891	1,294	2,739	770	5,606	1,270	12,364	2,136	5,427	
Speed (mph)	63	63	55	62	63	63	64	57	57	62	62	62	62	62	62	62	62	62	62	
Level of Service	A	A	B	A	A	A	A	B	A	A	B	B	B	B	B	B	B	B	B	
Density (pc/mi/ln))	10	9	12	10	11	8	8	12	11	10	15	15	16	13	18	17	13	12	16	

LEGEND

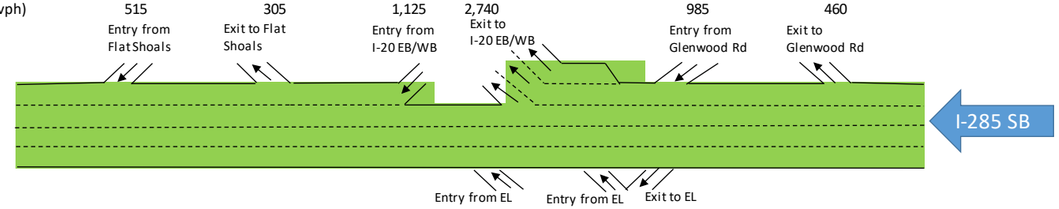
Speed (mph)	Freeway Geometric Coloring density	(veh/mi/ln)		Freeway LOS Coloring Estimated	
20 and below	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D or b	28-35
30-45	Density between	44	55	LOS E	35-43
45 and above	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

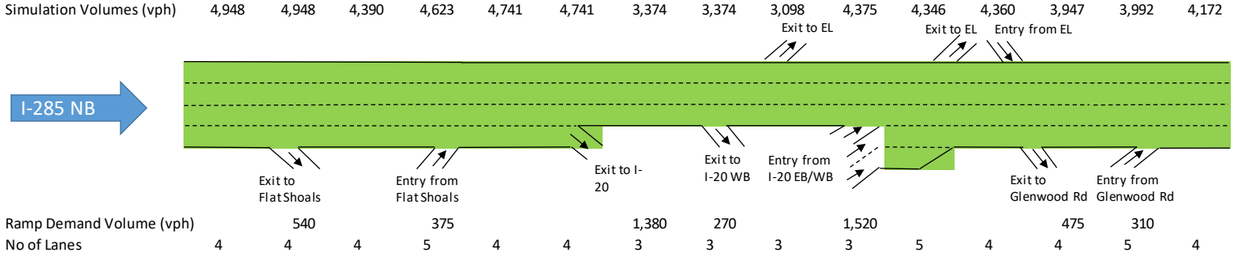
Figure 4-1. Freeway Segment Analysis Schematic Results (VISSIM) – 2018 AM Peak (I-20 WB & EB)

YR 2018 Existing AM Peak - Graphical Results ---- I-285 SB & NB

No of Lanes	4	5	4	4	4	4	3	5	4	5	4	4	4	
Distance (ft)	867	330	2,776	1,500	2,762	1,500	5,996	1,242	2,958	340	2,334	1,500	1,103	
Speed (mph)	61	59	61	61	61	61	63	60	55	44	55	51	51	
Level of Service	C	B	B	C	C	C	C	C	D	D	C	D	D	
Density (pc/mi/ln))	19	16	17	18	18	18	19	20	28	28	25	29	29	
Ramp Demand Volume (vph)		515		305		1,125	2,740			985		460		
Simulated Volumes (vph)	4,725	4,681	4,243	4,492	4,492	4,492	3,612	6,159	6,201	6,139	5,538	5,986	5,986	
Demand Volumes (vph)	5,135	5,135	4,620	4,925	4,925	4,925	3,800	6,510	6,540	6,540	5,555	6,015	6,015	



Demand Volumes (vph)	4,960	4,960	4,355	4,795	4,795	4,795	3,415	3,415	3,145	4,665	4,665	4,665	4,190	4,500	4,500
Simulation Volumes (vph)	4,948	4,948	4,390	4,623	4,741	4,741	3,374	3,374	3,098	4,375	4,346	4,360	3,947	3,992	4,172
Ramp Demand Volume (vph)		540		375			1,380	270		1,520			475	310	
No of Lanes	4	4	4	5	4	4	3	3	3	3	5	4	4	5	4
Distance (ft)	2,017	1,500	4,102	197	4,937	1,500	1,534	500	1,455	1,908	1,158	3,633	1,609	295	730
Speed (mph)	57	57	61	52	62	62	62	62	63	56	55	52	53	53	53
Level of Service	C	C	C	B	C	C	C	C	B	D	B	C	C	B	C
Density (pc/mi/ln))	22	22	18	18	19	19	18	18	16	26	16	21	18	15	20



LEGEND

Speed (mph)	Freeway Geometric Coloring density	(veh/mi/ln)		Freeway LOS Coloring Estimated LOS	
20 and below	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D or b	28-35
30-45	Density between	44	55	LOS E	35-43
45 and above	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000 Demand volume highlighted if simulated falls below 90%
1,000 Demand volume
1,000 Simulated Volume
Density Derived from VISSIM
LOS Letter Grades based on density ranges specified in HCM

Figure 4-2. Freeway Segment Analysis Schematic Results (VISSIM) – 2018 AM peak (I-285 SB & NB)

Table 4-4. Freeway Segment Analysis Results (VISSIM) – Existing PM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	6,179	62	25	C
	I-20 EB at Candler Rd off-ramp	Diverge	4	6,168	59	26	D
	I-20 EB after Candler Rd off-ramp	BFFS	4	5,373	62	22	C
	I-20 EB at Candler Rd on-ramp	Merge	5	5,889	51	23	C
	I-20 EB at Columbia Dr off-ramp	Diverge	4	5,970	55	28	D
	I-20 EB to I-285 NB & SB	Diverge	4	5,037	38	34	D
	I-20 EB at the System Interchange	BFFS	3	3,913	62	21	C
	I-20 EB off-ramp to CD Rd	Diverge	4	3,954	61	16	B
	I-20 EB CD Rd	Diverge	3	3,982	31	41	E
	I-20 EB after off-ramp to CD Rd	BFFS	3	2,836	62	15	B
	I-20 EB on-ramp from CD Rd	Merge	5	5,607	57	20	C
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	5,866	57	17	B
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	5,616	27	51	F
	I-20 EB off-ramp to Panola Rd	Diverge	4	5,358	22	62	F
	I-20 EB after Panola Rd off-ramp	BFFS	3	4,441	52	29	D
	I-20 EB on-ramp from Panola Rd	Merge	4	4,830	61	20	C
	I-20 EB after on-ramp from Panola Rd	BFFS	3	4,863	62	26	D
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	4,767	60	20	C
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	4,042	62	22	C
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	4,672	61	19	C
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	3,971	61	16	B
	I-20 WB after Lithonia Industrial Blvd off-ramp	BFFS	3	3,560	62	19	C
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	4,092	37	28	D
	I-20 WB after on-ramp from Panola Rd	BFFS	3	4,309	58	25	C
	I-20 WB off-ramp to Panola Rd	Diverge	4	4,141	34	30	D
	I-20 WB after Panola Rd off-ramp	BFFS	3	3,993	52	26	C
	I-20 WB on-ramp from Panola Rd	Merge	4	4,424	53	21	C
	I-20 WB between Wesley Chapel and Panola Rd	BFFS	3	4,760	47	34	D
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	4,609	34	34	D
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	4,414	49	30	D
	I-20 WB after on-ramp from Wesley Chapel Rd	Weaving	4	5,229	59	22	C
	I-20 WB at the System Interchange	BFFS	3	3,668	41	33	D
	I-20 WB between I-285 NB on-ramp and I-285 SB off-ramp	Weaving	4	3,736	20	48	F
	I-20 WB between I-285 SB off-ramp to I-285 SB on-ramp	BFFS	3	2,504	58	14	B
	I-20 WB after I-285 SB on-ramp	Merge	4	3,656	61	15	B
	I-20 WB Columbia Dr on-ramp	Merge	5	3,677	60	12	B
	I-20 WB at Candler Rd off-ramp	Diverge	4	3,906	63	16	B

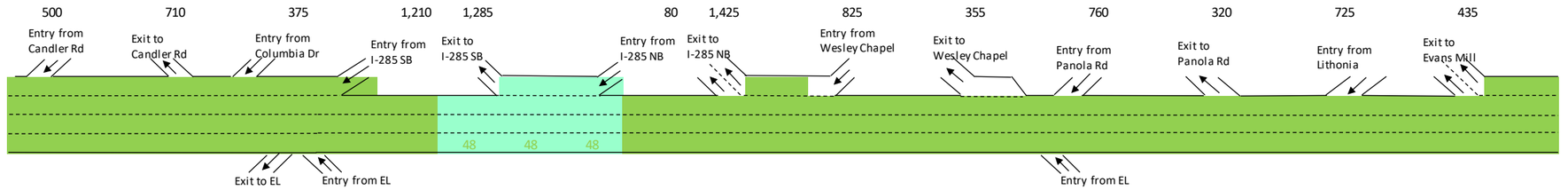
Table 4-4. Freeway Segment Analysis Results (VISSIM) – Existing PM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 WB after Candler Rd off-ramp	BFFS	4	3,231	63	13	B
	I-20 WB at Candler Rd on-ramp	Diverge	5	3,647	59	12	B
I-285 NB	I-285 NB at Flat Shoals Rd diverge	Diverge	4	4,645	62	19	C
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	4,220	62	17	B
	I-285 NB at Flat Shoals Rd on-ramp	Merge	5	4,472	56	16	B
	I-285 to I-20 EB off-ramp	Diverge	4	4,579	40	28	D
	I-285 NB after I-20 EB off-ramp	Diverge	3	3,187	60	18	B
	I-285 NB after I-20 WB off-ramp	BFFS	3	3,116	63	16	B
	I-285 NB at I-20 EB and WB ramps merge	Merge	6	6,446	49	22	C
	I-285 NB after I-20 EB and WB ramps merge	BFFS	5	6,410	45	28	D
	I-285 NB at Glenwood Rd off-ramp	Diverge	4	6,420	44	37	E
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	5,689	45	32	D
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	5,702	42	27	D
I-285 SB	I-285 SB at Glenwood Rd off-ramp	Diverge	4	6,511	53	31	D
	I-285 SB after Glenwood Rd off-ramp	BFFS	4	6,054	55	29	D
	I-285 SB at Glenwood Rd on-ramp	Merge	5	6,404	49	26	D
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	6,470	58	27	D
	I-285 SB at I-20 EB and WB ramps diverge	Diverge	5	6,425	60	21	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	3,696	62	20	C
	I-285 at I-20 on-ramp	Merge	4	4,940	61	20	C
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	4,541	61	18	C
	I-285 SB at Flat Shoals Rd on-ramp	Diverge	5	4,975	60	17	B
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	5,022	62	20	C

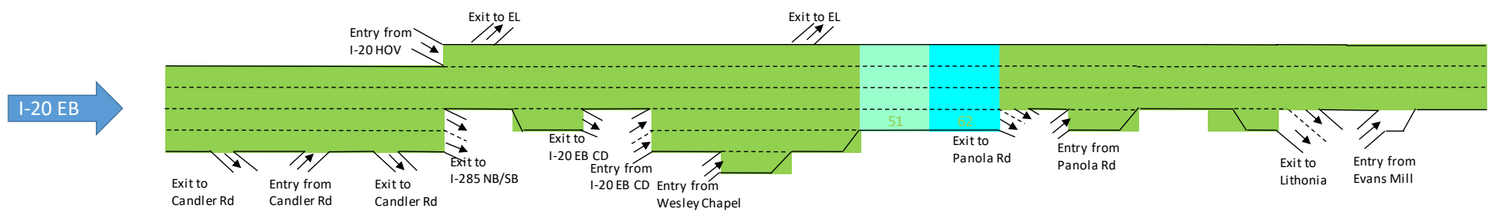
Table 4-4 and the schematic figures show that during PM Peak, the I-20 westbound weaving segment between the Wesley Chapel on-ramp to the system interchange operates at LOS F with an average speed of 20mph. I-20 in the eastbound direction between Wesley Chapel Rd and Panola Rd operates at LOS E or F and the average speed of the section is below 30 mph. I-20 EB CD road segment operates at LOS E in the PM condition. I-285 in the SB direction operates with an acceptable LOS whereas, I-285 in NB direction operates at LOS E or F in the section between the on-ramp from I-20 EB/WB to Glenwood Rd.

YR 2018 Existing PM Peak - Graphical Results ---- I-20 WB & EB

No of Lanes	5	4	4	5	4	4	3	4	4	4	3	4	4	4	3	4	3	4	3	4	3	4	3	4	3	
Distance (ft)	531	2,500	3,174	470	1,767	500	2,023	200	364	200	1,192	1,741	2,713	500	1,759	390	15,245	250	2,129	270	6,513	405	10,692	2,500	4,960	
Speed (mph)	59	63	62	60	61	61	58	21	21	21	40	58	58	58	49	34	47	52	52	35	58	37	62	61	62	
Level of Service	B	B	B	B	B	B	B	F	F	F	D	C	C	C	D	D	D	C	C	D	C	D	C	B	C	
Density (pc/mi/ln))	12	13	16	12	15	15	14	48	48	48	33	22	22	22	30	34	34	21	26	30	25	28	19	16	21	



Simulated Volumes (vph)	3,648	3,235	3,918	3,686	3,661	3,661	2,504	3,733	3,733	3,733	3,662	5,229	5,229	5,229	4,419	4,616	4,755	4,426	3,994	4,140	4,309	4,091	3,560	3,971	3,972	
Demand Volumes (vph)	3,785	3,285	3,995	3,995	3,620	3,775	2,565	3,850	3,850	3,850	3,770	5,195	5,195	5,195	4,370	4,725	4,725	4,725	3,965	4,285	4,285	4,285	3,560	3,995	3,995	



Ramp Demand Volume (vph)	790	615		885	1,930	1,115	2,925	260				1,080		395			970	675		
No of Lanes	4	4	4	4	3	4	3	5	6	6	4	4	3	4	3	3	3	4	3	
Distance (ft)	1,500	2,945	3,157	2,617	788	2,137	6,853	1,300	682	1,804	7,891	1,294	2,739	770	5,606	1,270	12,364	2,136	5,427	
Speed (mph)	59	62	51	37	62	61	62	57	57	28	28	22	52	61	62	60	61	62	61	
Level of Service	D	C	D	D	C	B	B	C	B	D	F	F	D	C	D	D	C	C	C	
Density (pc/mi/ln))	26	22	29	34	21	16	15	20	17	34	51	62	29	20	26	26	22	19	26	

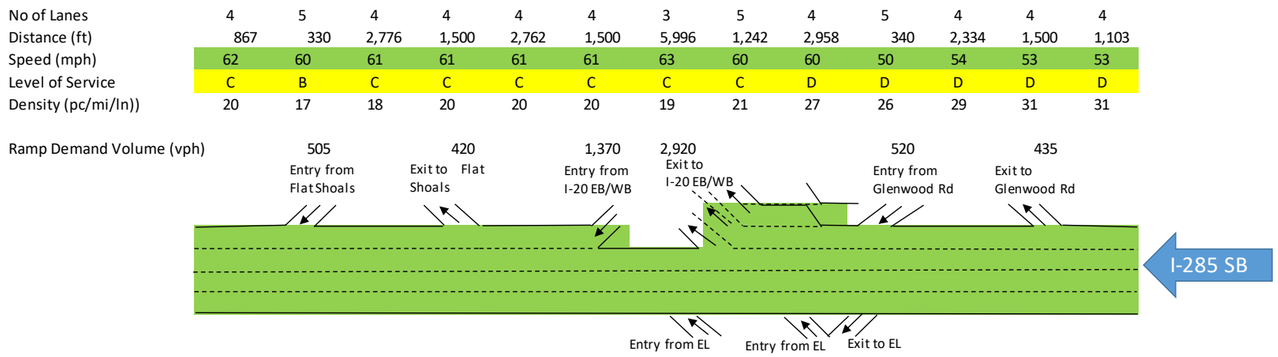
LEGEND

Speed (mph)	Freeway Geometric Coloring density	(veh/mi/ln)		Freeway LOS Coloring Estimated	
20 and below	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D or b	28-35
30-45	Density between	44	55	LOS E	35-43
45 and above	Density between	35	43	LOS F	> 43
	Density between	0	35		

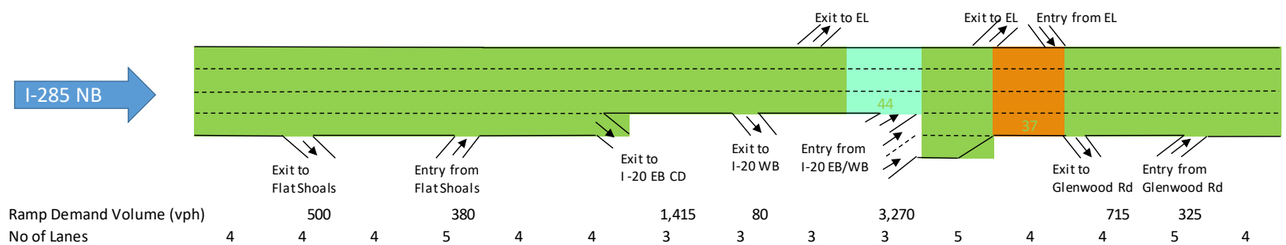
1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 4-3. Freeway Segment Analysis Schematic Results (VISSIM) – 2018 PM Peak (I-20 WB & EB)

YR 2018 Existing PM Peak - Graphical Results ---- I-285 SB & NB



No of Lanes	4	5	4	4	4	4	3	5	4	5	4	4	4	
Distance (ft)	867	330	2,776	1,500	2,762	1,500	5,996	1,242	2,958	340	2,334	1,500	1,103	
Speed (mph)	62	60	61	61	61	61	63	60	60	50	54	53	53	
Level of Service	C	B	C	C	C	C	C	C	D	D	D	D	D	
Density (pc/mi/ln))	20	17	18	20	20	20	19	21	27	26	29	31	31	
Ramp Demand Volume (vph)		505		420		1,370	2,920			520		435		
Simulated Volumes (vph)	5,024	4,977	4,540	4,940	4,940	4,940	3,621	6,438	6,476	6,404	6,054	6,511	6,511	
Demand Volumes (vph)	5,240	4,735	4,735	5,155	5,155	5,155	3,785	6,705	6,705	6,705	5,555	6,620	6,620	
	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	



Ramp Demand Volume (vph)		500		380			1,415	80		3,270			715	325	
No of Lanes	4	4	4	5	4	4	3	3	3	3	5	4	4	5	4
Distance (ft)	2,017	1,500	4,102	197	4,937	1,500	1,534	500	1,455	1,908	1,158	3,633	1,609	295	730
Speed (mph)	62	62	62	56	42	42	60	60	63	49	45	44	45	42	43
Level of Service	C	C	B	B	D	D	B	B	B	E	D	E	D	D	D
Density (pc/mi/ln))	19	19	17	16	28	28	18	18	16	44	28	37	32	27	34

LEGEND

Speed (mph)	Freeway Geometric Coloring density	(veh/mi/ln)	Freeway LOS Coloring Estimated LOS	
20 and below	Density above	75	LOS A to C	< 28
20 - 30	Density above	55	LOS D or b	28-35
30-45	Density above	43	LOS E	35-43
45 and above	Density above	35	LOS F	> 43
	Density below	35		

1,000	Demand volume highlighted if simualted falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 4-4. Freeway Segment Analysis Schematic Results (VISSIM) – 2018 PM peak (I-285 SB & NB)

The signalized intersection results, listed in **Table 4-5,** were obtained from VISSIM by drawing node boundaries around each study intersection.

Table 4-5. Signalized Intersection LOS Results (VISSIM) – Existing

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd / Eastwyck Dr	7.7	A	5.3	A
Candler Rd / I-20 WB Ramps	17.4	B	19.1	B
Candler Rd / I-20 EB Ramps	11.8	B	13.8	B
Candler Rd / H F Shepherd Dr	9.2	A	14.6	B
Columbia Dr / Columbia Woods Dr	12.6	B	7.8	A
Columbia Dr / I-20 EB ramp	7.0	A	9.6	A
Columbia Dr / Rainbow Dr	25.3	C	31.0	C
Wesley Chapel Rd / Snapfinger Woods Dr	42.2	D	59.8	E
Wesley Chapel Rd / I-20 WB ramps	35.5	D	24.5	C
Wesley Chapel Rd / I-20 EB ramps	27.1	C	19.8	B
Wesley Chapel Rd / Eastside Dr	13.3	B	4.2	A
Panola Rd / Panola Industrial Blvd	19.5	B	38.8	D
Panola Rd / I-20 WB ramps	8.4	A	9.0	A
Panola Rd / I-20 EB ramps	14.3	B	15.5	B
Panola Rd / Minola Dr	30.6	C	35.7	D
Lithonia Industrial Blvd / Chupp Rd	47.7	D	8.5	A
Lithonia Industrial Blvd / WB Frontage Rd	26.3	C	10.3	B
Lithonia Industrial Blvd / EB Frontage Rd	28.2	C	27.0	C
Evans Mill Rd / Hillandale Dr	3.5	A	1.2	A
Evans Mill Rd / WB Frontage Rd	18.9	B	10.1	B
Evans Mill Rd / EB Frontage Rd	12.6	B	13.0	B
Evans Mill Rd / Mall Pkwy	18.5	B	26.8	C
Glenwood Dr / Austin Rd	28.2	C	19.3	B
Glenwood Dr / I-285 SB ramps	40.6	D	37.9	D
Glenwood Dr / I-285NB ramps	73.7	E	64.8	E
Glenwood Dr / Atherton Dr	38.1	D	14.0	B
Flat Shoals Rd / Panthersville Rd	28.0	C	22.6	C
Flat Shoals Rd / I-285 SB ramps	8.3	A	11.6	B
Flat Shoals Rd / I-285 NB ramps	12.0	B	9.5	A
Flat Shoals Rd / Clifton Springs Rd	21.2	C	23.9	C

From the above **Table 4-5,** the 2018 Existing VISSIM analysis results show that majority of the signalized intersections operate at LOS D or better, except for a few intersections; Wesley Chapel Rd at Snapfinger Woods Dr (LOS E, PM Peak) and NB Glenwood Off-Ramp terminus signal (LOS E in both the peaks). These results match with the SYNCHRO results shown in previous tables.

Table 4-6 presents the queue lengths for the ramp terminal signals for approaches from the I-20/285 mainline presented by movement. Existing ramp lengths are also presented in the table, and it is observed that the maximum queue is lower than the existing ramp length which confirms that there is no queue spill back from ramp terminus to mainline during existing conditions.

Table 4-6. Ramp Terminal Queue Lengths (VISSIM) – Existing

Ramp Terminal	Movement	Ramp lengths *	AM		PM	
			Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)
Candler Rd / I-20 WB Ramps	WBL	990	48	176	70	262
	WBR		2	67	1	59
Candler Rd / I-20 EB Ramps	EBL	1,130	25	103	34	137
	EBR		11	89	32	167
Columbia Dr / I-20 EB Ramps	EBL	1,200	24	108	41	186
	EBR		0	45	8	212
Wesley Chapel Rd / I-20 WB Ramps	WBL	790	29	112	42	158
	WBR		4	78	7	86
Wesley Chapel Rd / I-20 EB Ramps	EBL	940	107	387	109	398
	EBR		57	258	69	296
Panola Rd / I-20 WB Ramps	WBL	860	4	76	17	133
	WBR		2	92	2	83
Panola Rd / I-20 EB Ramps	EBL	1,200	100	323	94	312
	EBR		4	177	30	403
Lithonia Industrial Blvd / EB Frontage Rd	EBL	3,000	48	205	55	228
	EBT		47	216	47	208
Evans Mill Rd / WB Frontage Rd	WBL	2,360	36	218	27	152
	WBT		83	299	22	101
	WBR		22	333	2	98
Glenwood Dr / I-285 SB Ramps	SBL	800	63	278	64	279
	SBR		2	114	2	96
Glenwood Dr / I-285 NB Ramps	NBL	900	200	620	67	318
	NBR		8	83	23	123
Flat Shoals Rd / I-285 SB Ramps	SBL	1,850	36	190	70	321
	SBR		1	75	1	56
Flat Shoals Rd / I-285 NB Ramps	NBL	2,430	69	378	55	273
	NBR		2	121	2	91

Note: * Ramp length calculated from Google earth (from exit gore point to the stop point of ramp terminus signal)

5 NO BUILD OPERATIONS ANALYSIS

5.1 OPENING YEAR (2025)

This section presents the 2025 No-Build conditions analysis of the study area. Signalized and unsignalized intersections, ramp junctions, and I-20 and I-285 mainline locations that were analyzed for the 2018 Existing Conditions are evaluated with future open year volumes developed (See Chapter 2). The open year no-build operational models include the same geometry as existing models.

5.1.1 SYNCHRO Model Results

The SYNCHRO analysis results for 2025 No-Build are shown in the following tables. **Table 5-1** and **Table 5-2** list the signalized and unsignalized level-of-service (LOS) results, respectively. The SYNCHRO analysis outputs for 2025 No-Build are provided in **Appendix 5-1**.

Table 5-1. Signalized Intersection LOS Results (SYNCHRO) – 2025 No-Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at Eastwyck Rd	14.2	B	11.2	B
Candler Rd at I-20 WB Ramps	27.5	C	31.9	C
Candler Rd at I-20 EB Ramps	37.7	D	45	D
Candler Rd at H F Shepherd Dr/ Rainbow Way	6.7	A	9.7	A
Columbia Dr at Columbia Woods Dr	9.8	A	8.1	A
Columbia Dr at I-20 EB Ramps	8.9	A	18.7	B
Columbia Dr at Rainbow Dr	42.9	D	44.6	D
Glenwood Rd at I-285 NB Ramps	44.8	D	31.7	C
Glenwood Rd at I-285 SB Ramps	62.6	E	70.7	E
Glenwood Rd at Austin Dr	28.9	C	28.4	C
Glenwood Rd at Atherton Dr	2.1	A	2.5	A
Flat Shoals Rd at I-285 EB Ramps	24	C	21.4	C
Flat Shoals Rd at I-285 WB Ramps	13.6	B	28.6	C
Flat Shoals Rd at Panthersville Rd/ Fairlake Dr	38.6	D	33.6	C
Flat Shoals Rd at Clifton Springs Rd/ Columbia Dr	23.1	C	47.2	D
Wesley Chapel Rd at I-20 EB Ramps	38.2	D	36.7	D
Wesley Chapel Rd at I-20 WB Ramps	25.2	C	15.7	B
Wesley Chapel Rd at Snapfinger Woods Dr	46.6	D	61.1	E
Wesley Chapel Rd at Eastside Dr	26.4	C	6.2	A
Minola Dr/ Shire Dr at Miller Rd	12.3	B	14.5	B

Table 5-1. Signalized Intersection LOS Results (SYNCHRO) – 2025 No-Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Panola Rd at I-20 EB Ramps	28.7	C	43	D
Panola Rd at I-20 WB Ramps	38.1	D	50.2	D
Panola Rd at Panola Industrial Blvd/ Hillandale Dr	50.6	D	73.5	E
Panola Rd at Minola Dr/ Fairington Rd	39.4	D	45.5	D
Hillandale Dr at Fairington Rd	60.7	E	66.8	E
Hillandale Dr at Dekalb Medical Pkwy	24.1	C	39.6	D
Chupp Way at Fairington Rd	12.1	B	15.4	B
Old Hillandale Dr at Lithonia Industrial Blvd	27	C	17.2	B
Lithonia Industrial Blvd at I-20 EB C/D	36.2	D	35.2	D
Evans Mill Rd at Old Hillandale Dr/ I-20 WB Ramp	30.8	C	14.2	B
Evans Mill Rd at I-20 EB C/D	16.2	B	20.3	C
Hillandale Dr at Evans Mill Rd	5.7	A	4	A
Evans Mill Rd/ Mall Pkwy at Evans Mill Rd/ Woodrow Dr	47.7	D	29	C
Lithonia Industrial Blvd at Hillandale Dr	26.5	C	16.9	B

Table 5-1 shows that the following intersections operates with LOS E or F in the open year no-build condition: Glenwood Rd at I-285 SB Ramps (LOS E, both AM and PM peak), Wesley Chapel Rd at Snapfinger Woods Dr (LOS E, PM peak), Panola Rd at Panola Industrial Blvd/Hillandale Dr (LOS E, PM peak) and Hillandale Dr at Fairington Rd (LOS E, both peaks).

Table 5-2. Unsignalized Intersection LOS Results (SYNCHRO) – 2025 No-Build

Intersection	Approach	AM		PM	
		Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at The Park at Candler Entrance	EB	15	C	36.3	E
Candler Rd at Ember Dr	WB	18	C	18.8	C
Columbia Dr at I-20 WB Ramps	NBL	4.6	A	2	A
Columbia Dr at The Forest Apts	EB	28.9	D	57.5	F
Columbia Dr at Columbia Crossing Dr	WB	19.3	C	25.6	D
Columbia Dr at Abbeywood Dr	EB	27.5	D	Min*	A
Columbia Dr at Old Rainbow Dr	EB	Min*	A	Min*	A
Glenwood Rd at Moseri Rd	SB	25.4	D	25.2	D
Glenwood Rd at Danrich Dr/ 285 Discount Mall (West Ent.)	NB	13	B	12.4	B
	SB	35.6	E	26.1	D
Glenwood Rd at Glenfair Rd	NB	10.1	B	12.5	B
Glenwood Rd at Glen Acres Ct.	SB	13.5	B	Min*	A
Glenwood Rd at Meadowglades Dr	SB	13.9	B	10.1	B
Glenwood Rd at Arthurs Ct.	NB	20.7	C	29.3	D
Flat Shoals Rd at Lumby Dr.	SB	23.5	C	13.5	B
Flat Shoals Rd at Wellington Ct.	SB	12	B	14.9	B
Flat Shoals Rd at Orchard Walk Apartments	SB	12.1	B	16.2	C
Flat Shoals Rd at Glen Hollow Dr.	NB	15.4	C	14.8	B
Flat Shoals Rd at Barton Morgan Dr.	SB	10	B	18.2	C

Table 5-2. Unsignalized Intersection LOS Results (SYNCHRO) – 2025 No-Build

Intersection	Approach	AM		PM	
		Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Wesley Chapel Rd at Wesley Club Dr	EB	10.2	B	11	B
Miller Rd at Panola Industrial Blvd	EB	19.2	C	34.2	D
	WB	22.4	C	17.2	C
	NB	85.2	F	22	C
	SB	19	C	26.5	D
Miller Rd at Chatooga Dr	WB	16.6	C	10.8	B
Fairington Rd at Athena Ln	WB	11.1	B	12.9	B
Evans Mill Rd at Millwood Ln	EB	26.8	D	27.7	D

Min* - minimum delay (Volume is too low to record a delay)

Table 5-2 shows that the side street/minor leg at the following unsignalized intersections operate at LOS E or F, in at least one peak condition: Columbia Dr at The Park at Candler Entrance (LOS E, PM peak), Columbia Dr at Forest Apts (LOS F, PM peak), southbound approach of Glenwood Rd at Danrich Dr (LOS E, AM peak), and northbound approach of the same intersection (LOS F, AM peak).

5.1.2 VISSIM Model Results

The 2025 No-Build VISSIM analysis results are shown in the **Tables 5-3** and **5-4.** Corresponding segment analysis results in schematic figures are provided in **Figures 5-1, 5-2** (AM Peak) and **Figures 5-3, 5-4** (PM peak). Speed heat maps are included in **Appendix 5-2**.

Table 5-3. Freeway Segment Analysis Results (VISSIM) – 2025 No-Build AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	2,798	64	11	B
	I-20 EB at Candler Rd off-ramp	Diverge	4	2,789	63	11	B
	I-20 EB after Candler Rd off-ramp	BFFS	4	2,383	63	9	A
	I-20 EB at Candler Rd on-ramp	Merge	5	2,906	53	11	B
	I-20 EB at Columbia Dr off-ramp	Diverge	4	2,945	62	12	B
	I-20 EB to I-285 NB & SB Ramps	Diverge	4	2,587	62	10	A
	I-20 EB at the System Interchange	BFFS	3	2,169	63	11	B
	I-20 EB off-ramp to CD Rd	Diverge	4	2,173	63	9	A
	I-20 EB - CD Rd	Diverge	3	3,174	48	22	C
	I-20 EB after off-ramp to CD Rd	BFFS	3	1,716	63	9	A
	I-20 EB on-ramp from CD Rd	Merge	5	3,593	57	13	B
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	3,904	56	12	B
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	3,910	62	16	B
	I-20 EB off-ramp to Panola Rd	Diverge	4	3,909	61	16	B
	I-20 EB after Panola Rd off-ramp	BFFS	3	3,064	62	16	B
	I-20 EB on-ramp from Panola Rd	Merge	4	3,411	62	14	B
	I-20 EB after on-ramp from Panola Rd	BFFS	3	3,426	62	18	C
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	3,350	62	14	B

Table 5-3. Freeway Segment Analysis Results (VISSIM) – 2025 No-Build AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	2,557	62	14	B
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	2,978	62	12	B
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	4,609	58	20	C
	I-20 WB after Evans Mill Rd off-ramp	BFFS	3	3,148	53	20	C
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	3,853	21	46	F
	I-20 WB after on-ramp from Panola Rd	BFFS	3	3,786	18	72	F
	I-20 WB off-ramp to Panola Rd	Diverge	4	3,573	18	49	F
	I-20 WB after Panola Rd off-ramp	BFFS	3	3,457	13	89	F
	I-20 WB on-ramp from Panola Rd	Merge	4	4,251	10	104	F
	I-20 WB between Wesley Chapel Rd and Panola Rd	BFFS	3	4,246	61	23	C
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	4,114	47	23	C
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	4,099	46	30	D
	I-20 WB after on-ramp from Wesley Chapel Rd	Weaving	4	5,794	32	46	F
	I-20 WB at the System Interchange	BFFS	3	4,613	55	28	D
	I-20 WB between I-285 NB on-ramp and I-285 SB off-ramp	Weaving	4	4,952	43	29	D
	I-20 WB between I-285 SB off-ramp to I-285 SB on-ramp	BFFS	3	3,991	60	22	C
	I-20 WB after I-285 SB on-ramp	Merge	4	5,341	61	22	C
	I-20 WB at Columbia Dr on-ramp	Merge	5	5,448	58	19	C
	I-20 WB at Candler Rd off-ramp	Diverge	4	5,793	60	24	C
	I-20 WB after Candler Road off-ramp	BFFS	4	5,146	62	21	C
	I-20 WB at Candler Road on-ramp	Diverge	5	5,693	58	20	C
I-285 NB	I-285 NB at Flat Shoals Rd off-ramp diverge	Diverge	4	5,268	61	22	C
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	4,686	62	19	C
	I-285 NB at Flat Shoals Rd on-ramp	Merge	5	4,952	48	21	C
	I-285 to I-20 EB off-ramp	Diverge	4	5,082	61	21	C
	I-285 NB after I-20 EB off-ramp	Diverge	3	3,579	62	19	C
	I-285 NB after I-20 WB off-ramp	BFFS	3	3,248	63	17	B
	I-285 NB at I-20 EB and WB ramps merge	Merge	6	4,783	55	14	B
	I-285 after I-20 EB and WB ramps merge	BFFS	5	4,756	54	18	B
	I-285 NB at Glenwood Rd off-ramp	Diverge	4	4,752	51	23	C
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	4,277	52	21	C
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	4,355	51	17	B
I-285 SB	I-285 SB at Glenwood off-ramp	Diverge	4	5,979	47	32	D
	I-285 SB after Glenwood off-ramp	BFFS	4	5,495	47	30	D
	I-285 SB at Glenwood Rd on-ramp	Merge	5	6,405	32	40	E
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	6,433	53	30	D

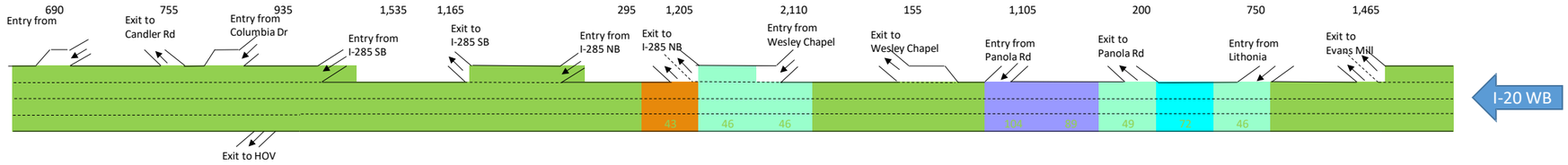
Table 5-3. Freeway Segment Analysis Results (VISSIM) – 2025 No-Build AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-285 SB at I-20 EB and WB ramps diverge	Diverge	5	6,399	60	21	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	3,747	62	20	C
	I-285 at I-20 on-ramp	Merge	4	4,763	61	20	C
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	4,481	61	18	C
	I-285 SB at Flat Shoals Rd on-ramp	Diverge	5	4,963	58	17	B
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	5,012	61	21	C

Table 5-3 and schematic **Figures 5-1** and **5-2** show that during AM peak, two segments fail along the I-20 WB, one, between the Evans Mill Rd off-ramp and Panola Rd and second, the weaving segment between Wesley Chapel Rd and the I-285 NB off-ramp. In the EB direction the main line and the CD segment corridor perform at an acceptable LOS C or better. Along the I-285 corridor in the SB direction, I-285 SB at the Glenwood Rd on-ramp is the only segment operating at LOS E. Along the entire corridor, I-285 NB performs at an acceptable LOS D or better. The open year 2025 No-Build network is able to process 92% of the AM peak demand.

YR 2025 NO BUILD AM Peak - Graphical Results ---- I-20 WB

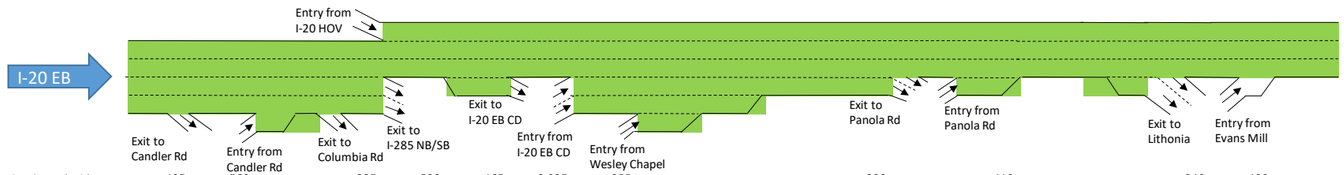
No of Lanes	5	4	4	5	4	4	3	4	4	4	3	4	4	4	3	4	3	4	3	4	3	4	3	4	3	
Distance (ft)	531	2,500	3,174	470	1,767	500	2,023	200	364	200	1,192	1,741	2,713	500	1,759	390	15,245	250	2,129	270	6,513	405	10,692	2,500	4,960	
Speed (mph)	58	62	60	58	61	61	60	43	43	43	55	33	32	32	46	47	61	10	13	18	18	21	53	58	62	
Level of Service	C	C	C	C	C	C	C	D	D	D	D	E	F	F	D	C	C	F	F	F	F	F	C	C	C	
Density (pc/mi/ln))	20	21	24	19	22	22	22	29	29	29	28	43	46	46	30	23	23	104	89	49	72	46	20	20	25	
Ramp Demand Volume (vph)	690		755		935		1,535	1,165			295	1,205		2,110		155		1,105		200		750		1,465		



Simulated Volumes (vph)	5,693	5,146	5,793	5,448	5,341	5,341	3,991	4,952	4,952	4,952	4,613	5,699	5,794	5,794	4,099	4,114	4,246	4,251	3,457	3,573	3,786	3,853	3,148	4,609	4,617	
Demand Volumes (vph)	6,545	5,855	6,610	6,610	6,230	6,230	4,695	5,860	5,860	5,860	5,565	6,770	6,770	6,770	4,660	4,815	4,815	4,815	3,710	3,910	3,910	3,910	3,160	4,625	4,625	

YR 2025 NO BUILD AM Peak - Graphical Results ---- I-20 EB

Demand Volumes (vph)	2,810	2,405	2,965	2,630	2,220	2,220	1,755	3,780	4,135	4,135	4,135	4,135	3,245	3,655	3,655	3,655	2,715	3,205	3,205							
Simulated Volumes (vph)	2,789	2,383	2,906	2,587	2,169	2,173	1,716	3,593	3,904	3,910	3,910	3,909	3,064	3,411	3,426	3,350	2,557	2,978	2,971							



Ramp Demand Volume (vph)	405		560		335	520	465	2,025		355				890			410				940	490				
No of Lanes	4	4	4	4	3	4	3	5	6	6	4	4	3	4	3	3	3	4	3							
Distance (ft)	1,500	2,945	3,157	2,617	788	2,137	6,853	1,300	682	1,804	7,891	1,294	2,739	770	5,606	1,270	12,364	2,136	5,427							
Speed (mph)	63	63	53	62	63	63	63	57	56	62	62	61	62	62	62	62	62	62	62							
Level of Service	B	A	B	A	B	A	A	B	B	A	B	B	B	B	C	C	B	B	B							
Density (pc/mi/ln))	11	9	14	10	11	9	9	13	12	10	16	16	16	14	18	18	14	12	16							

LEGEND

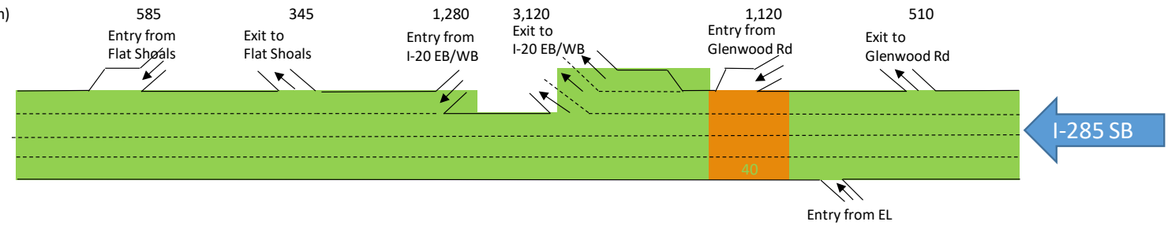
Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000 Demand volume highlighted if simulated falls below 90%
1,000 Demand volume
1,000 Simulated Volume
Density Derived from VISSIM
LOS Letter Grades based on density ranges specified in HCM

Figure 5-1. Freeway Segment Analysis Schematic Results (VISSIM) – 2025 No-Build AM (I-20 WB & EB)

YR 2025 NO BUILD AM Peak - Graphical Results ---- I-285 SB

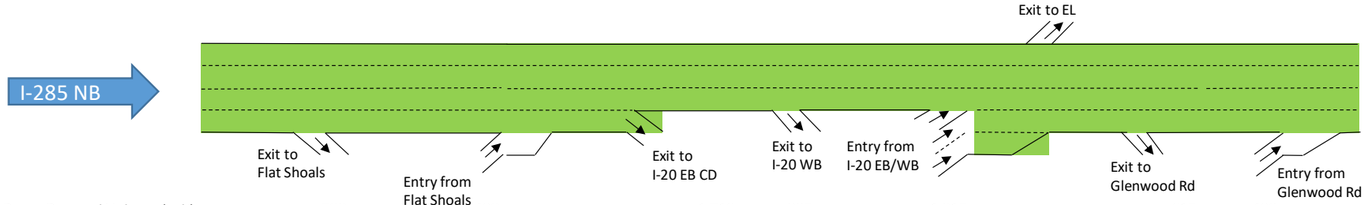
No of Lanes	4	5	4	4	4	4	3	5	4	5	4	4	4
Distance (ft)	867	330	2,776	1,500	2,762	1,500	5,996	1,242	2,958	340	2,334	1,500	1,103
Speed (mph)	61	58	61	61	61	61	62	60	53	32	47	47	47
Level of Service	C	B	C	C	C	C	C	C	D	E	D	D	D
Density (pc/mi/ln))	21	17	18	20	20	20	20	21	30	40	30	32	32
Ramp Demand Volume (vph)		585		345		1,280	3,120			1,120		510	



Simulated Volumes (vph)	5,012	4,963	4,481	4,763	4,763	4,763	3,747	6,399	6,433	6,405	5,495	5,979	5,979
Demand Volumes (vph)	5,555	5,555	4,995	5,330	5,330	5,330	4,105	7,095	7,095	7,095	6,020	6,515	6,515

YR 2025 NO BUILD AM Peak - Graphical Results ---- I-285 NB

Demand Volumes (vph)	5,275	5,275	4,695	5,100	5,100	5,100	3,620	3,620	3,325	4,990	4,990	4,990	4,480	4,820	4,820
Simulated Volumes (vph)	5,268	5,268	4,686	4,952	5,082	5,082	3,579	3,579	3,248	4,783	4,756	4,752	4,277	4,355	4,531



Ramp Demand Volume (vph)		700		490			1,710	335		1,915			615	400	
No of Lanes	4	4	4	5	4	4	3	3	3	3	5	4	4	5	4
Distance (ft)	2,017	1,500	4,102	197	4,937	1,500	1,534	500	1,455	1,908	1,158	3,633	1,609	295	730
Speed (mph)	61	61	62	48	61	61	62	62	63	55	54	51	52	51	52
Level of Service	C	C	C	C	C	C	C	C	B	D	B	C	C	B	C
Density (pc/mi/ln))	22	22	19	21	21	21	19	19	17	29	18	23	21	17	22

LEGEND

Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 5-2. Freeway Segment Analysis Schematic Results (VISSIM) – 2025 No-Build AM (I-285 SB & NB)

Table 5-4. Freeway Segment Analysis Results (VISSIM) – 2025 No-Build PM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	6,776	61	28	D
	I-20 EB at Candler Rd off-ramp	Diverge	4	6,772	53	32	D
	I-20 EB after Candler Rd off-ramp	BFFS	4	5,903	52	29	D
	I-20 EB at Candler Rd on-ramp	Merge	5	6,449	33	41	E
	I-20 EB at Columbia Dr off-ramp	Diverge	4	6,534	43	39	E
	I-20 EB to I-285 NB & SB	Diverge	4	5,510	53	26	C
	I-20 EB at the System Interchange	BFFS	3	4,256	62	23	C
	I-20 EB off-ramp to CD Rd	Diverge	4	4,312	59	18	C
	I-20 EB CD Rd	Diverge	3	4,131	22	62	F
	I-20 EB after off-ramp to CD Rd	BFFS	3	3,093	63	16	B
	I-20 EB on-ramp from CD Rd	Merge	5	5,813	57	20	C
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	6,147	56	18	C
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	6,141	60	25	C
	I-20 EB off-ramp to Panola Rd	Diverge	4	6,148	56	28	D
	I-20 EB after Panola Rd off-ramp	BFFS	3	5,013	61	27	D
	I-20 EB on-ramp from Panola Rd	Merge	4	5,435	59	23	C
	I-20 EB after on-ramp from Panola Rd	BFFS	3	5,463	61	30	D
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	5,317	58	23	C
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	4,483	61	24	C
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	4,823	61	20	C
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	4,360	61	18	B
	I-20 WB after Lithonia Industrial Blvd off-ramp	BFFS	3	3,893	61	21	C
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	4,439	32	35	D
	I-20 WB after on-ramp from Panola Rd	BFFS	3	4,679	58	27	D
	I-20 WB off-ramp to Panola Rd	Diverge	4	4,520	44	27	D
	I-20 WB after Panola Rd off-ramp	BFFS	3	4,310	43	40	E
	I-20 WB on-ramp from Panola Rd	Merge	4	5,016	31	59	F
	I-20 WB between Wesley Chapel and Panola Rd	BFFS	3	4,851	24	69	F
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	4,666	25	47	F
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	4,406	29	51	F
	I-20 WB after on-ramp from Wesley Chapel Rd	Weaving	4	5,319	20	65	F
	I-20 WB at the System Interchange	BFFS	3	3,803	17	73	F
	I-20 WB between I-285 NB on-ramp and I-285 SB off-ramp	Weaving	4	3,895	13	73	F
	I-20 WB between I-285 SB off-ramp to I-285 SB on-ramp	BFFS	3	2,612	56	16	B
	I-20 WB after I-285 SB on-ramp	Merge	4	3,855	61	16	B
	I-20 WB Columbia Dr on-ramp	Merge	5	3,875	60	13	B
	I-20 WB at Candler Rd off-ramp	Diverge	4	4,118	62	17	B

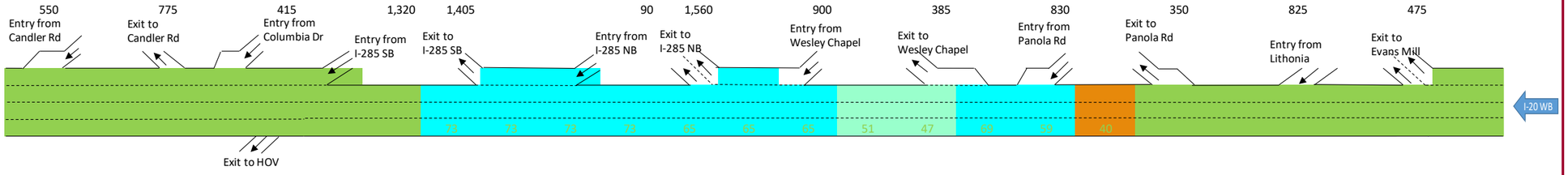
Table 5-4. Freeway Segment Analysis Results (VISSIM) – 2025 No-Build PM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 WB after Candler Rd off-ramp	BFFS	4	3,390	63	13	B
	I-20 WB at Candler Rd on-ramp	Diverge	5	3,851	59	13	B
I-285 NB	I-285 NB at Flat Shoals Rd diverge	Diverge	4	5,202	62	21	C
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	4,682	63	19	C
	I-285 NB at Flat Shoals Rd on-ramp	Merge	5	4,934	48	21	C
	I-285 to I-20 EB off-ramp	Diverge	4	4,960	42	31	D
	I-285 NB after I-20 EB off-ramp	Diverge	3	3,479	62	19	C
	I-285 NB after I-20 WB off-ramp	BFFS	3	3,391	63	18	B
	I-285 NB at I-20 EB and WB ramps merge	Merge	6	6,754	49	23	C
	I-285 NB after I-20 EB and WB ramps merge	BFFS	5	6,582	45	29	D
	I-285 NB at Glenwood Rd off-ramp	Diverge	4	6,745	43	39	E
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	6,040	43	35	E
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	6,071	41	30	D
I-285 SB	I-285 SB at Glenwood Rd off-ramp	Diverge	4	7,005	32	56	F
	I-285 SB after Glenwood Rd off-ramp	BFFS	4	6,463	30	55	F
	I-285 SB at Glenwood Rd on-ramp	Merge	5	6,845	29	49	F
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	6,840	57	30	D
	I-285 SB at I-20 EB and WB ramps diverge	Diverge	5	6,901	59	23	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	6,059	36	57	F
	I-285 at I-20 on-ramp	Merge	4	5,306	59	22	C
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	4,884	61	20	C
	I-285 SB at Flat Shoals Rd on-ramp	Diverge	5	5,385	57	19	C
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	5,441	61	22	C

Table 5-4 and schematic **Figures 5-3** and **5-4** show the I-20 and I-285 performance in the PM peak. Along I-20 WB, the segments between the I-20 WB off-ramp to Panola Rd and the system to system interchange operate at LOS E or F. In the EB direction, the sections operate at LOS E&F include: I-20 EB at Candler Rd off-ramp, I-20 EB at Columbia Dr off-ramp and CD Rd. This is due to the lane change of vehicles at the diverge section between the I-20 EB mainline & the Candler Road off-ramp and the I-285 NB & SB ramp exit. Due to congestion at this location, vehicles are metered and throughput entering the eastbound I-20 EB study corridor is less than the demand volume. Because of this, the study corridor from Columbia Dr to the end at Evans Mill Rd operates at acceptable LOS D or better. The I-20 EB C-D however operates at a failure LOS F due to heavy weaving movement and lack of capacity, this is due to the auxiliary lane drop reducing the C-D section from a four-lane to three-lane before the Wesley Chapel Road exit. Along I-285 in the southbound direction, the section between the Glenwood Rd on-ramp and off-ramp operates at LOS E or F. Whereas, along the NB direction of I-285, the Glenwood Rd off-ramp segment operates at LOS E. The No-Build network is able to process 95% of the 2025 PM peak demand.

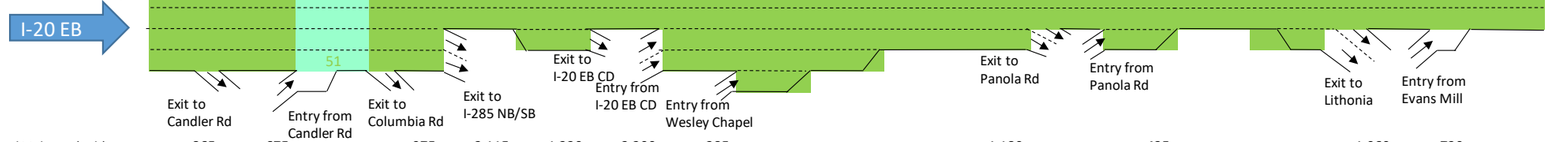
YR 2025 NO BUILD PM Peak - Graphical Results ---- I-20 WB

No of Lanes	5	4	4	5	4	4	3	4	4	4	3	4	4	4	3	4	3	4	3	4	3	4	3	4	3
Distance (ft)	531	2,500	3,174	470	1,767	500	2,023	200	364	200	1,192	1,741	2,713	500	1,759	390	15,245	250	2,129	270	6,513	405	10,692	2,500	4,960
Speed (mph)	59	63	62	60	61	61	56	13	13	13	17	20	20	20	29	25	24	31	43	44	58	32	61	61	62
Level of Service	B	B	B	B	B	B	B	F	F	F	F	F	F	F	F	F	F	F	E	D	D	D	C	B	C
Density (pc/mi/ln))	13	13	17	13	16	16	16	73	73	73	73	65	65	65	51	47	69	59	40	27	27	35	21	18	23
Ramp Demand Volume (vph)	550		775		415		1,320	1,405			90	1,560		900		385		830		350		825		475	
Simulated Volumes (vph)	3,851	3,390	4,118	3,875	3,855	3,855	2,612	3,895	3,895	3,895	3,803	5,319	5,319	5,319	4,406	4,666	4,851	5,016	4,310	4,520	4,679	4,439	3,893	4,360	4,359
Demand Volumes (vph)	4,150	3,600	4,375	4,375	3,960	4,130	2,810	4,215	4,215	4,215	4,125	5,685	5,685	5,685	4,785	5,170	5,170	5,170	4,340	4,690	4,690	4,690	3,895	4,370	4,370



YR 2025 NO BUILD PM Peak - Graphical Results ---- I-20 EB

Demand Volumes (vph)	6,770	5,905	6,580	5,605	4,390	4,390	3,170	6,370	6,655	6,655	6,655	6,655	5,475	5,910	5,910	5,910	4,850	5,580	5,580
Simulated Volumes (vph)	6,772	5,903	6,449	5,510	4,256	4,312	3,093	5,813	6,147	6,141	6,141	6,148	5,013	5,435	5,463	5,317	4,483	5,197	5,203
Ramp Demand Volume (vph)	865	675		975	2,115	1,220	3,200	285					1,180		435			1,060	730
No of Lanes	4	4	4	4	3	4	3	5	6	6	4	4	3	4	3	3	3	4	3
Distance (ft)	1,500	2,945	3,157	2,617	788	2,137	6,853	1,300	682	1,804	7,891	1,294	2,739	770	5,606	1,270	12,364	2,136	5,427
Speed (mph)	53	52	33	53	62	59	63	57	56	60	60	56	61	59	61	58	61	58	60
Level of Service	D	D	F	C	C	C	B	C	C	B	C	D	D	C	D	D	C	C	D
Density (pc/mi/ln))	32	29	51	26	23	18	16	20	18	17	25	28	27	23	30	31	24	22	29



LEGEND

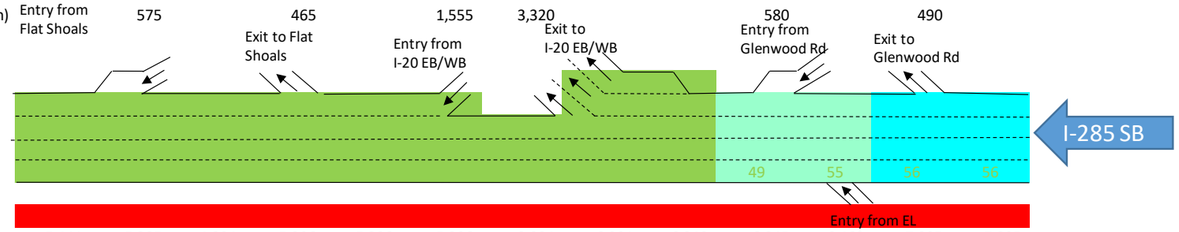
Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 5-3. Freeway Segment Analysis Schematic Results (VISSIM) – 2025 No-Build PM Peak (I-20 WB & EB)

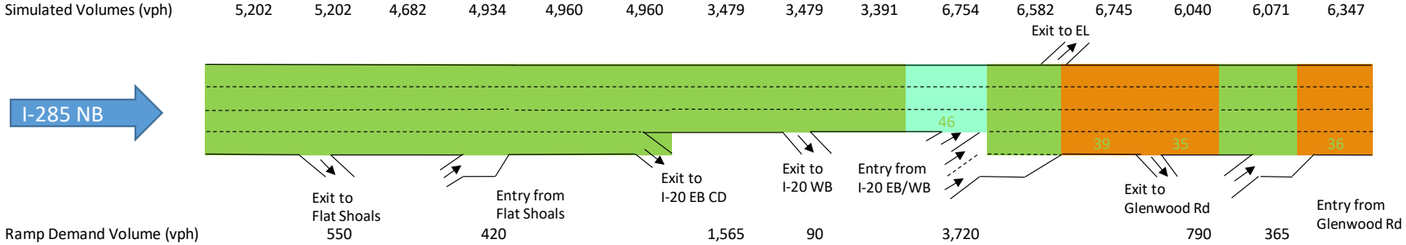
YR 2025 NO BUILD PM Peak - Graphical Results ---- I-285 SB

No of Lanes	4	5	4	4	4	4	3	5	4	5	4	4	4	
Distance (ft)	867	330	2,776	1,500	2,762	1,500	5,996	1,242	2,958	340	2,334	1,500	1,103	
Speed (mph)	61	57	61	59	59	59	59	59	57	29	30	32	32	
Level of Service	C	C	C	C	C	C	C	C	D	F	F	F	F	
Density (pc/mi/ln))	22	19	20	22	22	22	22	23	30	49	55	56	56	
Ramp Demand Volume (vph)	Entry from Flat Shoals	575		465		1,555	3,320			580		490		
Simulated Volumes (vph)	5,441	5,385	4,884	5,306	5,306	5,306	3,894	6,901	6,840	6,845	6,463	7,005	7,005	
Demand Volumes (vph)	5,695	5,695	5,140	5,590	5,590	5,590	4,090	7,280	7,280	7,280	6,720	7,195	7,195	



YR 2025 NO BUILD PM Peak - Graphical Results ---- I-285 NB

Demand Volumes (vph)	5,210	5,210	4,675	5,075	5,075	5,075	3,560	3,560	3,470	7,050	7,050	7,050	6,285	6,635	6,635
Simulated Volumes (vph)	5,202	5,202	4,682	4,934	4,960	4,960	3,479	3,479	3,391	6,754	6,582	6,745	6,040	6,071	6,347
Ramp Demand Volume (vph)		550		420			1,565	90		3,720			790	365	
No of Lanes	4	4	4	5	4	4	3	3	3	3	5	4	4	5	4
Distance (ft)	2,017	1,500	4,102	197	4,937	1,500	1,534	500	1,455	1,908	1,158	3,633	1,609	295	730
Speed (mph)	62	62	63	48	42	42	62	62	63	49	45	43	43	41	44
Level of Service	C	C	C	C	D	D	C	C	B	F	D	E	E	D	E
Density (pc/mi/ln))	21	21	19	21	31	31	19	19	18	46	29	39	35	30	36



LEGEND

Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 5-4. Freeway Segment Analysis Schematic Results (VISSIM) – 2025 No-Build PM Peak (I-285 SB & NB)

The 2025 No-Build signalized intersection results, listed in **Table 5-5,** were obtained from VISSIM by drawing node boundaries around each study intersection.

Table 5-5. Signalized Intersection LOS Results (VISSIM) – 2025 No-Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd / Eastwyck Dr	6.0	A	6.0	A
Candler Rd / I-20 WB Ramps	15.3	B	19.0	B
Candler Rd / I-20 EB Ramps	13.9	B	19.2	B
Candler Rd / H F Shepherd Dr	7.9	A	8.1	A
Columbia Dr / Columbia Woods Dr	5.5	A	6.5	A
Columbia Dr / I-20 EB ramp	7.8	A	9.6	A
Columbia Dr / Rainbow Dr	31.5	C	52.6	D
Wesley Chapel Rd / Snapfinger Woods Dr	41.4	D	56.8	E
Wesley Chapel Rd / I-20 WB ramps	40.0	D	23.5	C
Wesley Chapel Rd / I-20 EB ramps	35.5	D	18.9	B
Wesley Chapel Rd / Eastside Dr	16.2	B	5.8	A
Panola Rd / Panola Industrial Dr	83.7	F	57.2	E
Panola Rd / I-20 WB ramps	58.8	E	37.4	D
Panola Rd / I-20 EB ramps	23.1	C	10.2	B
Panola Rd / Minola Dr	39.8	D	54.2	D
Lithonia Industrial Blvd / Chupp Rd	27.4	C	12.5	B
Lithonia Industrial Blvd / WB Frontage Rd	21.5	C	10.3	B
Lithonia Industrial Blvd / EB Frontage Rd	27.1	C	27.3	C
Evans Mill Rd / Hillandale Dr	8.5	A	1.1	A
Evans Mill Rd / WB Frontage Rd	18.9	B	10.6	B
Evans Mill Rd / EB Frontage Rd	10.5	B	15.7	B
Evans Mill Rd / Mall Pkwy	31.8	C	21.2	C
Glenwood Rd / Austin Rd	24.7	C	22.8	C
Glenwood Rd / I-285 SB ramps	24.8	C	24.2	C
Glenwood Rd / I-285NB ramps	17.9	B	20.5	C
Glenwood Rd / Atherton Dr	0.7	A	1.4	A
Flat Shoals Rd / Panthersville Rd	25.8	C	17.1	B
Flat Shoals Rd / I-285 SB ramps	8.6	A	12.7	B
Flat Shoals Rd / I-285 NB ramps	12.3	B	10.8	B
Flat Shoals Rd / Clifton Springs Rd	19.3	B	24.6	C

From the above **Table 5-5,** VISSIM analysis results show that the following signalized intersections operate at LOS E or F: Wesley Chapel Rd at Snapfinger Woods Dr (LOS E, PM Peak), Panola Rd at Panola Industrial Dr (LOS F, AM Peak; LOS E, PM Peak) and Panola Rd at I-20 WB ramps (LOS E, AM Peak).

Table 5-6. Ramp Terminal Queue Lengths (VISSIM) – 2025 No-Build

Ramp Terminal	Movement	Ramp Lengths	AM		PM	
			Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)
Candler Rd / I-20 WB Ramps	WBL	990	50	174	75	284
	WBR		26	120	24	128
Candler Rd / I-20 EB Ramps	EBL	1,130	25	100	30	136
	EBR		19	88	60	255
Columbia Dr / I-20 EB Ramps	EBL	1,200	27	129	43	193
	EBR		0	47	13	263
Wesley Chapel Rd / I-20 WB Ramps	WBL	790	23	96	48	175
	WBR		26	107	29	126
Wesley Chapel Rd / I-20 EB Ramps	EBL	940	109	377	122	471
	EBR		19	214	26	216
Panola Rd / I-20 WB Ramps	WBL	860	3	61	48	175
	WBR		2	60	29	126
Panola Rd / I-20 EB Ramps	EBL	1,200	109	366	122	471
	EBR		109	366	26	216
Lithonia Industrial Blvd / EB Frontage Rd	EBL	3,000	42	218	57	242
	EBT		0	69	0	86
Evans Mill Rd / WB Frontage Rd	WBL	2,360	37	210	31	188
	WBT		85	345	25	117
	WBR		39	464	2	102
Glenwood Rd / I-285 SB Ramps	SBL	800	87	348	86	375
	SBR		6	132	17	170
Glenwood Rd / I-285 NB Ramps	NBL	900	155	580	86	412
	NBR		15	68	37	229
Flat Shoals Rd / I-285 SB Ramps	SBL	1,850	40	215	80	346
	SBR		1	76	1	76
Flat Shoals Rd / I-285 NB Ramps	NBL	2,430	73	335	70	320
	NBR		3	130	3	136

Table 5-6 presents the queue lengths at ramp terminals by movement. Maximum queues observed in both peaks are lower than the existing ramp length which implies that none of the ramp terminus signals queue will be spilling back on to the mainline in open year no-build condition.

5.2 DESIGN YEAR (2045)

This section presents the 2045 No-Build conditions analysis of the study area. Signalized and unsignalized intersections, ramp junctions, and I-20 and I-285 mainline locations that were analyzed for the 2018 Existing Conditions are evaluated with future design year volumes developed (See Chapter 2).

Design year traffic models include: I-285 East Express lanes project, I-20 at Panola Road interchange improvement project and I-20 East Express lanes project.

5.2.1 SYNCHRO MODEL RESULTS

The SYNCHRO analysis results for 2045 No-Build are shown in the following tables. **Tables 5-7** and **5-8** list the signalized and unsignalized level-of-service (LOS) results, respectively. The SYNCHRO analysis outputs for 2045 No-Build conditions are provided in **Appendix 5-3**.

Table 5-7. Signalized Intersection LOS Results (SYNCHRO) – 2045 No-Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at Eastwyck Rd	14.8	B	11.1	B
Candler Rd at I-20 WB Ramps	32.2	C	35.3	D
Candler Rd at I-20 EB Ramps	38.8	D	46	D
Candler Rd at H F Shepherd Dr/ Rainbow Way	7.3	A	10.3	B
Columbia Dr at Columbia Woods Dr	9.9	A	8.4	A
Columbia Dr at I-20 EB Ramps	10.6	B	24.9	C
Columbia Dr at Rainbow Dr	57.3	E	65.5	E
Glenwood Rd at I-285 NB Ramps	58.3	E	31.7	C
Glenwood Rd at I-285 SB Ramps	87	F	74	E
Glenwood Rd at Austin Dr	34.9	C	30.2	C
Glenwood Rd at Atherton Dr	2.2	A	2.8	A
Flat Shoals Rd at I-285 EB Ramps	24.5	C	22.2	C
Flat Shoals Rd at I-285 WB Ramps	33.6	C	31.4	C
Flat Shoals Rd at Panthersville Rd/ Fairlake Dr	45.7	D	36.1	D
Flat Shoals Rd at Clifton Springs Rd/ Columbia Dr	33.2	C	61	E
Wesley Chapel Rd at I-20 EB Ramps	38.3	D	59.9	E
Wesley Chapel Rd at I-20 WB Ramps	28.5	C	31.4	C
Wesley Chapel Rd at Snapfinger Woods Dr	49.7	D	123	F
Wesley Chapel Rd at Eastside Dr	41.3	D	10.3	B
Minola Dr/ Shire Dr at Miller Rd	1777.6	F	1439.2	F
Panola Rd at I-20 EB Ramps	16.2	B	25.1	C
Panola Rd at I-20 WB Ramps	44.1	D	47.9	D
Panola Rd at Panola Industrial Blvd/ Hillandale Dr	41.5	D	40.3	D
Panola Rd at Minola Dr/ Fairington Rd	40.3	D	42.6	D
Hillandale Dr at Fairington Rd	64	E	76.3	E
Hillandale Dr at Dekalb Medical Pkwy	24.2	C	32	C
Chupp Way at Fairington Rd	12.3	B	17.9	B
Old Hillandale Dr at Lithonida Industrial Blvd	60.7	E	17	B
Lithonia Industrial Blvd at I-20 EB C/D	36.5	D	35.4	D
Evans Mill Rd at Old Hillandale Dr/ I-20 WB Ramp	53.5	D	20.9	C
Evans Mill Rd at I-20 EB C/D	23.5	C	40.5	C

Table 5-7. Signalized Intersection LOS Results (SYNCHRO) – 2045 No-Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Hillandale Dr at Evans Mill Rd	6.3	A	5.7	A
Evans Mill Rd/ Mall Pkwy at Evans Mill Rd/ Woodrow Dr	56.9	E	54.7	D
Lithonia Industrial Blvd at Hillandale Dr	97	F	23.5	C

Table 5-7 results show that the following intersections operate with LOS E or F in 2045 No-Build conditions: Columbia at Rainbow Dr (LOS E, both AM and PM peak), Wesley Chapel Rd at I-20 EB Ramps (LOS E, PM Peak), Wesley Chapel Rd at Snapfinger Woods Dr (LOS F, PM Peak), Minola at Miller Rd (LOS F, AM and PM peak), Hillandale Dr at Fairington Rd (LOS E, AM and PM peak), Old Hillandale Dr at Lithonia Ind. Blvd (LOS E, AM Peak), Evans Mill Rd at Woodrow Dr (LOS E, AM Peak), Lithonia Ind. Blvd at Hillandale Dr (LOS F, AM Peak), Glenwood Rd at I-285 NB Ramps (LOS E , AM Peak), Glenwood Rd at I-285 SB Ramps (LOS F/ LOS E , AM/PM peak), and Flat Shoals Rd at Clifton Springs Rd (LOS E, PM Peak). It can be obsereved that without improvements, the number of intersections failing by design year will increase.

Table 5-8. Unsignalized Intersection LOS Results (SYNCHRO) – 2045 No-Build

Intersection	Approach	AM		PM	
		Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at The Park at Candler Entrance	EB	16.4	C	51	F
Candler Rd at Ember Dr	WB	20.4	C	22.3	C
Columbia Dr at I-20 WB Ramps	NB	5.6	A	2	A
Columbia Dr at The Forest Apts	EB	50.2	F	166	F
Columbia Dr at Columbia Crossing Dr	WB	25.6	D	35.9	E
Columbia Dr at Abbeywood Dr	EB	39	E	Min*	A
Columbia Dr at Old Rainbow Dr	EB	Min*	A	Min*	A
Glenwood Rd at Moseri Rd	SB	5	A	31.3	D
Glenwood Rd at Danrich Dr/ 285 Discount Mall (West Ent.)	NB	14.8	B	13.3	B
	SB	67	F	37.6	E
Glenwood Rd at Glenfair Rd	NB	10.4	B	13.3	B
Glenwood Rd at Glen Acres Ct.	SB	14.3	B	Min*	A
Glenwood Rd at Meadowglades Dr	SB	14.8	B	10.2	B
Glenwood Rd at Arthurs Ct.	NB	22.8	C	40.2	E
Flat Shoals Rd at Lumby Dr.	SB	31.3	D	17.2	C
Flat Shoals Rd at Wellington Ct.	SB	13.3	B	15.1	C
Flat Shoals Rd at Orchard Walk Apartments	SB	13.2	B	17.5	C
Flat Shoals Rd at Glen Hollow Dr.	NB	18.2	C	18.3	C
Flat Shoals Rd at Barton Morgan Dr.	SB	10.3	B	19.1	C
Wesley Chapel Rd at Wesley Club Dr	EB	9.1	A	15.4	C
Miller Rd at Panola Industrial Blvd	EB	297.3	F	766.3	F
	WB	385.9	F	186.7	F
	NB	858.6	F	391.4	F
	SB	409.7	F	549.9	F

Table 5-8. Unsignalized Intersection LOS Results (SYNCHRO) – 2045 No-Build

Intersection	Approach	AM		PM	
		Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Miller Rd at Chatooga Dr	WB	240.9	F	20.1	C
Fairington Rd at Athena Ln	WB	11.4	B	13.6	B
Evans Mill Rd at Millwood Ln	WB	15.5	C	15.9	C

Min* - minimum delay (Volume is too low to record a delay)

Table 5-8 shows that in the the following unsignalized intersections minor legs operate at LOS E or F: Columbia Dr at The Park at Candler Ent. (LOS F, PM Peak), Columbia Dr at Forest Apts (LOS F, AM and PM peak), Columbia Dr at Columbia Crossing Dr (LOS E, PM Peak), Columbia Dr at Abbeywood Dr (LOS F, AM Peak), Miller Rd at Chatooga Dr (LOS F, AM Peak), all the approaches at the intersection of Miller Rd at Panola Ind. Blvd (LOS F, AM and PM peak) and SB direction at Glenwood Rd at Danrich Dr (LOS E/LOS F, AM /PM Peaks).

5.2.2 VISSIM Model Results

No-Build design year 2045 VISSIM analysis results are shown in **Tables 5-9** and **5-10** and the corresponding segment analysis results in schematic format are provided in **Figures 5-5 and 5-6** (AM Peak) and **Figure 5-7 and 5-8** (PM peak). Speed heat maps are included in **Appendix 5-4**.

Table 5-9. Freeway Segment Analysis Results (VISSIM) – 2045 No-Build AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	3,740	63	15	B
	I-20 EB at Candler Rd off-ramp	Diverge	4	3,731	62	15	B
	I-20 EB after Candler Rd off-ramp	BFFS	4	3,281	63	13	B
	I-20 EB at Candler Rd on-ramp	Merge	5	3,807	52	15	B
	I-20 EB at Columbia Dr off-ramp	Diverge	4	3,857	62	16	B
	I-20 EB to I-285 NB & SB Ramps	Diverge	4	3,466	60	14	B
	I-20 EB at the System Interchange	BFFS	3	2,862	63	15	B
	I-20 EB off-ramp to CD Rd	Diverge	4	2,867	63	11	B
	I-20 EB - CD Rd	Diverge	3	3,524	48	25	C
	I-20 EB after off-ramp to CD Rd	BFFS	3	2,378	63	13	B
	I-20 EB on-ramp from CD Rd	Merge	5	4,429	57	15	B
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	4,757	56	14	B
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	4,772	62	19	C
	I-20 EB off-ramp to Panola Rd	Diverge	4	4,579	60	19	C
	I-20 EB after Panola Rd off-ramp	BFFS	3	3,626	62	20	C
	I-20 EB on-ramp from Panola Rd	Merge	4	3,935	61	16	B
	I-20 EB after on-ramp from Panola Rd	BFFS	3	3,948	62	21	C
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	3,863	62	16	B

Table 5-9. Freeway Segment Analysis Results (VISSIM) – 2045 No-Build AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	2,903	62	16	B
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	3,431	62	14	B
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	5,161	32	40	E
	I-20 WB after Evans Mill Rd off-ramp	BFFS	3	3,345	15	76	F
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	3,615	14	66	F
	I-20 WB after on-ramp from Panola Rd	BFFS	3	3,593	12	96	F
	I-20 WB off-ramp to Panola Rd	Diverge	4	3,457	16	55	F
	I-20 WB after Panola Rd off-ramp	BFFS	3	3,401	12	94	F
	I-20 WB on-ramp from Panola Rd	Merge	4	4,166	10	105	F
	I-20 WB between Wesley Chapel Rd and Panola Rd	BFFS	3	4,395	18	81	F
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	4,253	25	42	E
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	4,262	53	27	D
	I-20 WB after on-ramp from Wesley Chapel Rd	Weaving	4	5,953	39	40	E
	I-20 WB at the System Interchange	BFFS	3	4,962	57	29	D
	I-20 WB between I-285 NB on-ramp and I-285 SB off-ramp	Weaving	4	5,321	55	24	C
	I-20 WB between I-285 SB off-ramp to I-285 SB on-ramp	BFFS	3	4,473	61	25	C
	I-20 WB after I-285 SB on-ramp	Merge	4	6,109	61	25	C
	I-20 WB at Columbia Dr on-ramp	Merge	5	6,184	57	22	C
	I-20 WB at Candler Rd off-ramp	Diverge	4	6,573	58	28	D
	I-20 WB after Candler Road off-ramp	BFFS	4	5,938	62	24	C
	I-20 WB at Candler Road on-ramp	Diverge	5	6,523	58	22	C
I-285 NB	I-285 NB at Flat Shoals Rd off-ramp diverge	Diverge	4	6,122	55	28	D
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	5,428	59	23	C
	I-285 NB at Flat Shoals Rd on-ramp	Merge	5	5,725	38	30	D
	I-285 to I-20 EB off-ramp	Diverge	4	5,867	57	26	C
	I-285 NB after I-20 EB off-ramp	Diverge	3	4,163	60	23	C
	I-285 NB after I-20 WB off-ramp	BFFS	3	3,857	62	21	C
	I-285 NB at I-20 EB and WB ramps merge	Merge	6	4,858	56	15	B
	I-285 after I-20 EB and WB ramps merge	BFFS	5	4,835	55	18	B
	I-285 NB at Glenwood Rd off-ramp	Diverge	4	4,833	51	24	C
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	4,306	52	21	C
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	4,303	52	17	B
I-285 SB	I-285 SB at Glenwood off-ramp	Diverge	4	6,564	36	46	F
	I-285 SB after Glenwood off-ramp	BFFS	4	7,006	41	43	E
	I-285 SB at Glenwood Rd on-ramp	Merge	5	6,868	30	46	F
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	6,883	45	39	E

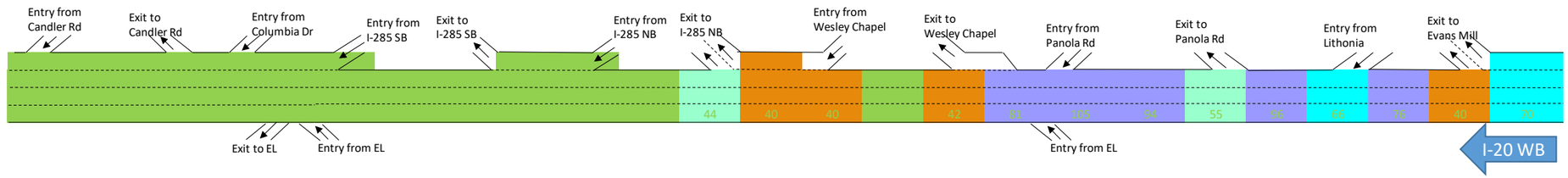
Table 5-9. Freeway Segment Analysis Results (VISSIM) – 2045 No-Build AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-285 SB at I-20 EB and WB ramps diverge	Diverge	5	6,839	60	23	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	4,675	61	26	C
	I-285 at I-20 on-ramp	Merge	4	5,264	60	22	C
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	4,908	61	20	C
	I-285 SB at Flat Shoals Rd on-ramp	Diverge	5	5,451	57	19	C
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	5,507	61	23	C

Table 5-9 and schematic results in **Figures 5-5** and **5-6** illustrate that during the AM Peak, I-20 westbound between Evans Mill Rd and Wesley Chapel Rd operates at LOS F and the stream speed is below 20 mph. In the EB direction, both the mainline and C-D section operate at an acceptable LOS C or better. Along I-285 SB, the section between the Glenwood Rd off-ramp and I-20 off-ramps operates at LOS E and in the NB direction the entire corridor operates at an acceptable LOS D or better. The No-Build network for the design year 2045 is able to process 88% of the demand.

YR 2045 NO BUILD AM Peak - Graphical Results ---- I-20 WB

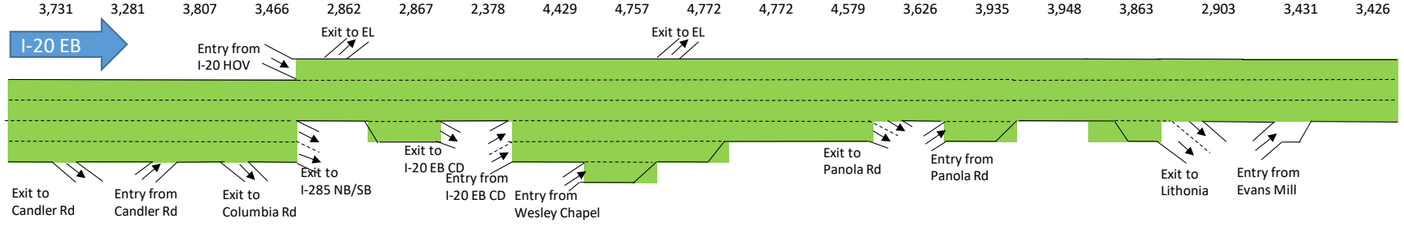
No of Lanes	5	4	4	5	4	4	3	4	4	4	3	4	4	4	3	4	3	4	3	4	3	4	3	4	3
Distance (ft)	531	2,500	3,174	470	1,767	500	2,023	200	364	200	1,192	1,741	2,713	500	1,759	390	15,245	250	2,129	270	6,513	405	10,692	2,500	4,960
Speed (mph)	58	62	58	57	61	61	61	55	55	55	57	34	39	39	53	25	18	10	12	16	12	14	15	32	25
Level of Service	C	C	D	C	C	C	C	C	C	C	D	E	E	E	D	E	F	F	F	F	F	F	F	E	F
Density (pc/mi/ln))	22	24	28	22	25	25	25	24	24	24	29	44	40	40	27	42	81	105	94	55	96	66	76	40	70
Ramp Demand Volume (vph)	760		840		1,035		1,830	1,295			320	1,330		2,100		175		1,230		225		925		1,620	



Simulated Volumes (vph)	6,523	5,938	6,573	6,184	6,109	6,109	4,473	5,321	5,321	5,321	4,962	5,898	5,953	5,953	4,262	4,253	4,395	4,166	3,401	3,457	3,593	3,615	3,345	5,161	5,278
Demand Volumes (vph)	8,235	7,475	8,315	8,315	7,280	7,500	5,670	6,965	6,965	6,965	6,645	7,975	7,975	7,975	5,875	6,040	6,040	6,040	4,810	5,035	5,035	5,035	4,110	5,730	5,730

YR 2045 NO BUILD AM Peak - Graphical Results ---- I-20 EB

Demand Volumes (vph)	3,760	3,315	3,930	3,560	2,940	2,940	2,425	4,665	5,060	4,860	4,860	4,860	3,875	4,330	4,330	4,330	3,190	3,775	3,775	
Simulated Volumes (vph)	3,731	3,281	3,807	3,466	2,862	2,867	2,378	4,429	4,757	4,772	4,772	4,579	3,626	3,935	3,948	3,863	2,903	3,431	3,426	



Ramp Demand Volume (vph)	445	615		370	595	515	2,240	395				985		455			1,140	585		
No of Lanes	4	4	4	4	3	4	3	5	6	6	4	4	3	4	3	3	3	4	3	
Distance (ft)	1,500	2,945	3,157	2,617	788	2,137	6,853	1,300	682	1,804	7,891	1,294	2,739	770	5,606	1,270	12,364	2,136	5,427	
Speed (mph)	62	63	52	60	63	63	63	57	56	62	62	60	62	61	62	62	62	62	62	
Level of Service	B	B	C	B	B	B	B	B	B	B	C	C	C	B	C	C	B	B	C	
Density (pc/mi/ln))	15	13	18	14	15	11	13	15	14	13	19	19	20	16	21	21	16	14	19	

LEGEND

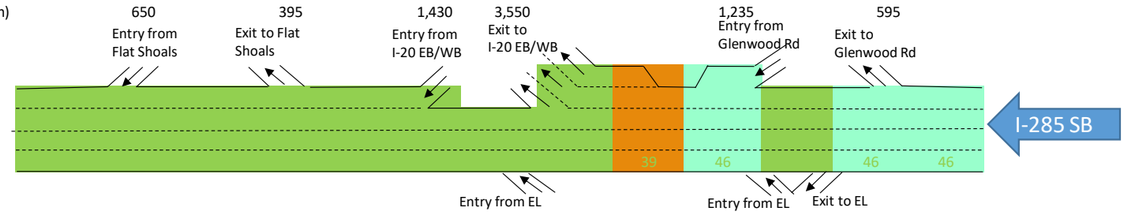
Speed (mph)	Freeway Geometric Coloring density	(veh/mi/ln)		Freeway LOS Coloring Estimated LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 5-5. Freeway Segment Analysis Schematic Results (VISSIM) – 2045 No-Build AM Peak (I-20 WB & EB)

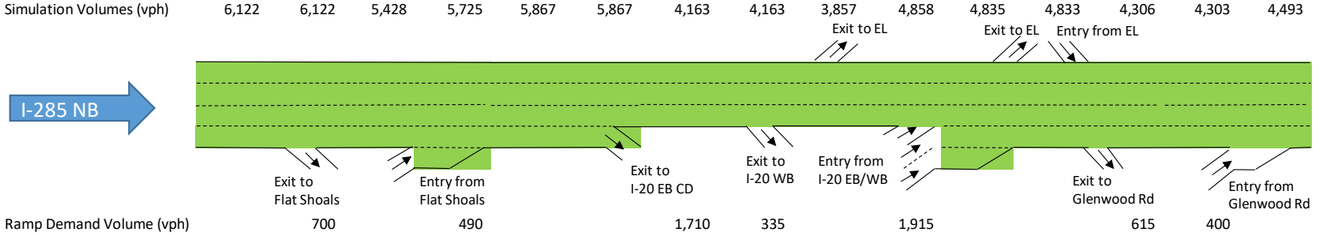
YR 2045 NO BUILD AM Peak - Graphical Results ---- I-285 SB

No of Lanes	4	5	4	4	4	4	3	5	4	5	5	4	4	
Distance (ft)	867	330	2,776	1,500	2,762	1,500	5,996	1,242	2,958	340	2,334	1,500	1,103	
Speed (mph)	61	57	61	60	60	60	61	60	45	30	41	36	36	
Level of Service	C	C	C	C	C	C	C	C	E	F	D	F	F	
Density (pc/mi/ln))	23	19	20	22	22	22	26	23	39	46	35	46	46	
Ramp Demand Volume (vph)		650		395		1,430	3,550			1,235		595		
Simulated Volumes (vph)	5,507	5,451	4,908	5,264	5,264	5,264	4,675	6,839	6,883	6,868	7,006	6,564	6,564	
Demand Volumes (vph)	6380	6380	5750	6135	6135	6135	4195	7640	7,540	7,540	6365	6945	6945	



YR 2045 NO BUILD AM Peak - Graphical Results ---- I-285 NB

Demand Volumes (vph)	6150	6150	5470	5945	5945	5945	4290	4290	3970	5410	5410	5,335	4740	5115	5115
Simulation Volumes (vph)	6,122	6,122	5,428	5,725	5,867	5,867	4,163	4,163	3,857	4,858	4,835	4,833	4,306	4,303	4,493



Ramp Demand Volume (vph)		700		490			1,710	335		1,915			615	400	
No of Lanes	4	4	4	5	4	4	3	3	3	3	5	4	5	5	4
Distance (ft)	2,017	1,500	4,102	197	4,937	1,500	1,534	500	1,455	1,908	1,158	3,633	1,609	295	730
Speed (mph)	55	55	59	38	57	57	60	60	62	56	55	51	52	52	53
Level of Service	D	D	C	D	C	C	C	C	C	D	B	C	B	B	C
Density (pc/mi/ln))	28	28	23	30	26	26	23	23	21	29	18	24	16	17	21

LEGEND

Speed (mph)	Freeway Geometric Coloring density	(veh/mi/ln)		Freeway LOS Coloring Estimated	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 5-6. Freeway Segment Analysis Schematic Results (VISSIM) – 2045 No-Build AM Peak (I-285 SB & NB)

Table 5-10. Freeway Segment Analysis Results (VISSIM) – 2045 No-Build PM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	6,534	21	78	F
	I-20 EB at Candler Rd off-ramp	Diverge	4	6,401	26	61	F
	I-20 EB after Candler Rd off-ramp	BFFS	4	5,654	18	81	F
	I-20 EB at Candler Rd on-ramp	Merge	5	6,290	18	71	F
	I-20 EB at Columbia Dr off-ramp	Diverge	4	6,361	32	50	F
	I-20 EB to I-285 NB & SB	Diverge	4	5,485	44	32	D
	I-20 EB at the System Interchange	BFFS	3	4,206	61	23	C
	I-20 EB off-ramp to CD Rd	Diverge	4	4,264	60	18	B
	I-20 EB CD Rd	Diverge	3	4,094	21	65	F
	I-20 EB after off-ramp to CD Rd	BFFS	3	3,097	62	17	B
	I-20 EB on-ramp from CD Rd	Merge	5	5,809	57	20	C
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	6,135	56	18	C
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	6,129	60	25	C
	I-20 EB off-ramp to Panola Rd	Diverge	4	6,139	56	27	D
	I-20 EB after Panola Rd off-ramp	BFFS	3	5,071	59	29	D
	I-20 EB on-ramp from Panola Rd	Merge	4	5,555	57	25	C
	I-20 EB after on-ramp from Panola Rd	BFFS	3	5,580	60	31	D
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	5,430	57	24	C
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	4,644	61	25	C
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	5,485	60	23	C
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	3,552	11	81	F
	I-20 WB after Lithonia Industrial Blvd off-ramp	BFFS	3	3,244	10	105	F
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	3,848	13	76	F
	I-20 WB after on-ramp from Panola Rd	BFFS	3	4,060	15	92	F
	I-20 WB off-ramp to Panola Rd	Diverge	4	3,916	17	59	F
	I-20 WB after Panola Rd off-ramp	BFFS	3	3,762	14	92	F
	I-20 WB on-ramp from Panola Rd	Merge	4	4,672	13	89	F
	I-20 WB between Wesley Chapel and Panola Rd	BFFS	3	4,839	22	73	F
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	4,671	24	48	F
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	4,558	31	49	F
	I-20 WB after on-ramp from Wesley Chapel Rd	Weaving	4	5,607	22	63	F
	I-20 WB at the System Interchange	BFFS	3	4,177	22	63	F
	I-20 WB between I-285 NB on-ramp and I-285 SB off-ramp	Weaving	4	4,250	17	62	F
	I-20 WB between I-285 SB off-ramp to I-285 SB on-ramp	BFFS	3	2,998	56	18	B
	I-20 WB after I-285 SB on-ramp	Merge	4	4,576	61	19	C
	I-20 WB Columbia Dr on-ramp	Merge	5	4,530	60	15	B
	I-20 WB at Candler Rd off-ramp	Diverge	4	4,817	62	19	C

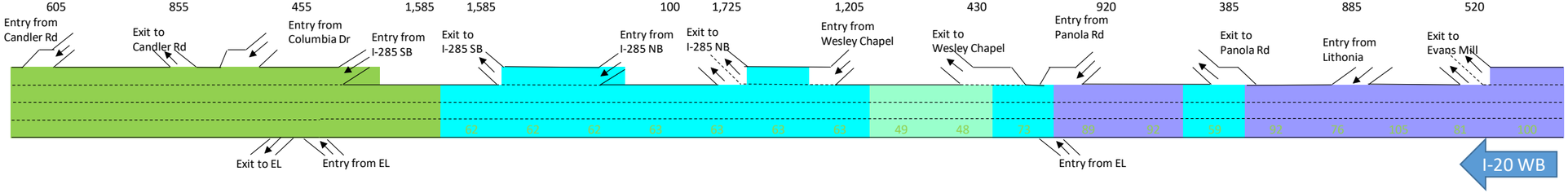
Table 5-10. Freeway Segment Analysis Results (VISSIM) – 2045 No-Build PM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 WB after Candler Rd off-ramp	BFFS	4	4,136	63	16	B
	I-20 WB at Candler Rd on-ramp	Diverge	5	4,654	59	16	B
I-285 NB	I-285 NB at Flat Shoals Rd diverge	Diverge	4	4,018	11	94	F
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	3,414	8	107	F
	I-285 NB at Flat Shoals Rd on-ramp	Merge	5	3,607	8	95	F
	I-285 to I-20 EB off-ramp	Diverge	4	3,653	10	95	F
	I-285 NB after I-20 EB off-ramp	Diverge	3	2,461	61	13	B
	I-285 NB after I-20 WB off-ramp	BFFS	3	2,403	63	13	B
	I-285 NB at I-20 EB and WB ramps merge	Merge	6	5,342	48	19	C
	I-285 NB after I-20 EB and WB ramps merge	BFFS	5	5,214	46	23	C
	I-285 NB at Glenwood Rd off-ramp	Diverge	4	5,360	45	30	D
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	4,795	46	26	D
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	5,001	43	23	C
I-285 SB	I-285 SB at Glenwood Rd off-ramp	Diverge	4	6,384	19	82	F
	I-285 SB after Glenwood Rd off-ramp	BFFS	4	6,762	19	91	F
	I-285 SB at Glenwood Rd on-ramp	Merge	5	6,620	22	60	F
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	6,622	56	30	D
	I-285 SB at I-20 EB and WB ramps diverge	Diverge	5	6,685	60	22	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	3,775	63	20	C
	I-285 at I-20 on-ramp	Merge	4	5,128	60	22	C
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	4,710	61	19	C
	I-285 SB at Flat Shoals Rd on-ramp	Diverge	5	5,278	58	18	C
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	5,332	61	22	C

Table 5-10 and schematic results in **Figures 5-7** and **5-8** illustrate that during the PM Peak, I-20 WB operates at LOS F between Evans Mill Rd and the Wesley Chapel Rd off-ramp (speeds below 20 mph). Along I-20 EB, the section between Candler Rd and Columbia Dr operates at a failure LOS F. At Columbia Dr, the maximum queue exceeds the ramp length. The primary reason for the queue spilling back on to the mainline is due to the congestion along SB Columbia Dr and the lack of desired capacity to process design year volume at the Columbia Dr/Rainbow Dr intersection, which needs capacity improvements to avoid queue spill back from Columbia Dr off-ramp on to the I-20 EB mainline. This queue backup affects the mainline throughput in the post-peak period and the congestion in this section of freeway meters traffic entering into the study segments along I-20 EB. The C-D segment along I-20 EB also deteriorates in performance due to heavy congestion, weaving and lack of capacity in the 2045 No-Build condition. The I-285 SB section between Glenwood Rd and I-20 operates at LOS F. In the NB direction the section between Flat Shoals Rd and I-20 operates at LOS F and the section upstream of the I-20 EB/WB on-ramps operates at LOS E. The No-Build network for the design year 2045 is able to process only 78% of the demand. Most of the volume is metered at the entry points of the study network restricting the vehicular flow through the study corridor.

YR 2045 NO BUILD PM Peak - Graphical Results ---- I-20 WB

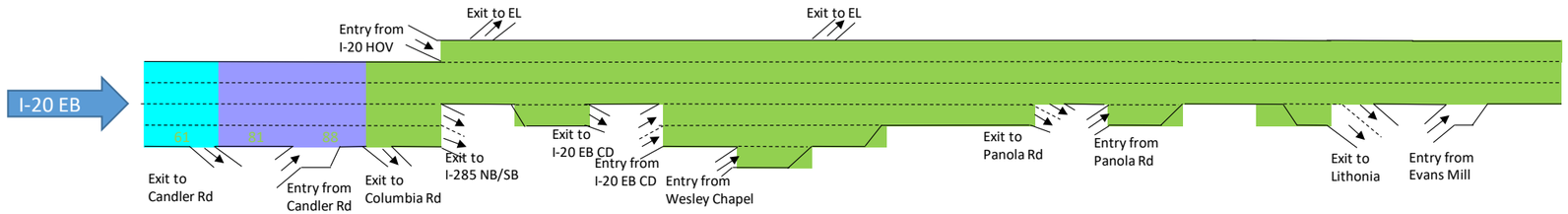
No of Lanes	5	4	4	5	4	4	3	4	4	4	3	4	4	4	3	4	3	4	3	4	3	4	3	4	3
Distance (ft)	531	2,500	3,174	470	1,767	500	2,023	200	364	200	1,192	2,177	2,713	500	1,759	390	15,245	250	2,129	270	6,513	405	10,692	2,500	4,960
Speed (mph)	59	63	62	60	61	61	56	17	17	17	22	22	22	22	31	24	22	13	14	17	15	13	10	11	12
Level of Service	B	B	C	B	C	C	B	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
Density (pc/mi/ln))	16	16	19	15	19	19	18	62	62	62	63	63	63	63	49	48	73	89	92	59	92	76	105	81	100
Ramp Demand Volume (vph)	605		855		455		1,585	1,585			100	1,725		1,205		430		920		385		885		520	



Simulated Volumes (vph)	4,654	4,136	4,817	4,530	4,576	4,576	2,998	4,250	4,250	4,250	4,177	5,607	5,607	5,607	4,558	4,671	4,839	4,672	3,762	3,916	4,060	3,848	3,244	3,552	3,531
Demand Volumes (vph)	5,720	5,115	5,970	5,970	5,515	5,355	3,770	5,355	5,355	5,355	5,255	6,980	6,980	6,980	5,775	6,040	6,040	6,040	5,120	5,505	5,505	5,505	4,620	5,140	5,140

YR 2045 NO BUILD PM Peak - Graphical Results ---- I-20 EB

Demand Volumes (vph)	8,140	7,190	7,935	6,865	5,000	5,000	3,650	7,595	7,910	7,885	7,885	7,885	6,580	7,060	7,060	7,060	5,885	6,755	6,755	
Simulated Volumes (vph)	6,401	5,654	6,290	5,485	4,206	4,264	3,097	5,809	6,135	6,129	6,129	6,139	5,071	5,555	5,580	5,430	4,644	5,485	5,499	



Ramp Demand Volume (vph)	950	745		1,070	2,340	1,350	3,945	315				1,305		480			1,175	870		
No of Lanes	4	4	4	4	3	4	3	5	6	6	4	4	3	4	3	3	3	4	3	
Distance (ft)	1,500	2,945	3,157	2,617	788	2,137	6,853	1,300	682	1,804	7,891	1,294	2,739	770	5,606	1,270	12,364	2,136	5,427	
Speed (mph)	26	18	18	44	61	60	62	57	56	60	60	56	59	57	60	57	61	60	60	
Level of Service	F	F	F	D	C	B	B	C	C	B	C	D	D	C	D	D	C	C	D	
Density (pc/mi/ln))	61	81	88	32	23	18	17	20	18	17	25	27	29	25	31	32	25	23	31	

LEGEND

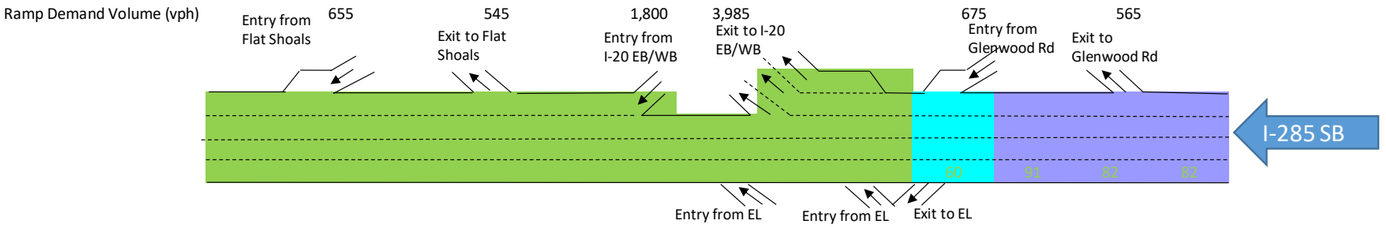
Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS Coloring	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 5-7. Freeway Segment Analysis Schematic Results (VISSIM) – 2045 No-Build PM Peak (I-20 WB & EB)

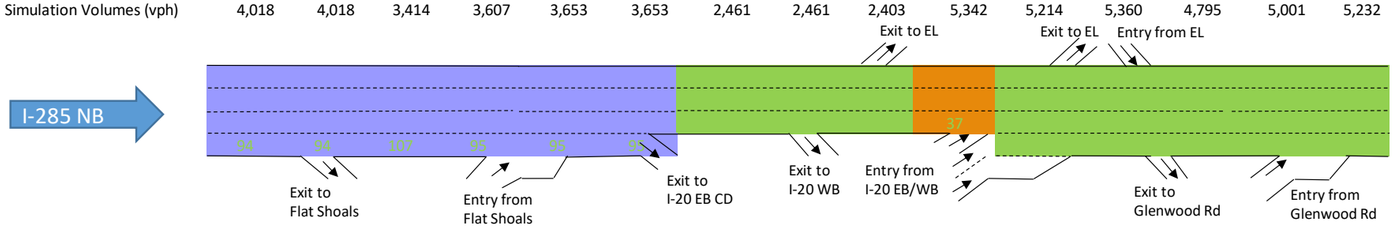
YR 2045 NO BUILD PM Peak - Graphical Results ---- I-285 SB

No of Lanes	4	5	4	4	4	4	3	5	4	5	4	4	4	
Distance (ft)	867	330	2,776	1,500	2,762	1,500	5,996	1,242	2,958	340	2,334	1,500	1,103	
Speed (mph)	61	58	61	60	60	60	61	60	56	22	19	19	19	
Level of Service	C	C	C	C	C	C	C	C	D	F	F	F	F	
Density (pc/mi/ln))	22	18	19	22	22	22	24	22	30	60	91	82	82	
Ramp Demand Volume (vph)		655		545		1,800	3,985			675		565		
Simulated Volumes (vph)	5,332	5,278	4,710	5,128	5,128	5,128	4,390	6,685	6,622	6,620	6,762	6,384	6,384	
Demand Volumes (vph)	6555	6555	5925	6455	6455	6455	4630	8500	7805	7805	7805	8350	8350	



YR 2045 NO BUILD PM Peak - Graphical Results ---- I-285 NB

Demand Volumes (vph)	6140	6140	5515	5995	5995	5995	4085	4085	3985	7645	7645	7,695	6845	7240	7240
Simulation Volumes (vph)	4,018	4,018	3,414	3,607	3,653	3,653	2,461	2,461	2,403	5,342	5,214	5,360	4,795	5,001	5,232



Ramp Demand Volume (vph)		645		495			1,965	95		4,110			875	410	
No of Lanes	4	4	4	5	4	4	3	3	3	3	5	4	4	5	4
Distance (ft)	2,017	1,500	4,102	197	4,937	1,500	1,534	500	1,455	1,908	1,158	3,633	1,609	295	730
Speed (mph)	11	11	8	8	10	10	61	61	63	48	46	45	46	43	45
Level of Service	F	F	F	F	F	F	B	B	B	E	C	D	D	C	D
Density (pc/mi/ln))	94	94	107	95	95	95	13	13	13	37	23	30	26	23	29

LEGEND

Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000 Demand volume highlighted if simulated falls below 90%
1,000 Demand volume
1,000 Simulated Volume
Density Derived from VISSIM
LOS Letter Grades based on density ranges specified in HCM

Figure 5-8. Freeway Segment Analysis Schematic Results (VISSIM) – 2045 No-Build PM Peak (I-285 SB & NB)

The 2045 No-Build signalized intersection results, listed in **Table 5-11,** were obtained from VISSIM by drawing node boundaries around each study intersection.

Table 5-11. Signalized Intersection LOS Results (VISSIM) – 2045 No-Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd / Eastwyck Dr	15.1	B	63.5	E
Candler Rd / I-20 WB Ramps	17.1	B	25.0	C
Candler Rd / I-20 EB Ramps	15.0	B	17.6	B
Candler Rd / H F Shepherd Dr	11.1	B	9.8	A
Columbia Dr / Columbia Woods Dr	6.7	A	63.4	E
Columbia Dr / I-20 EB ramp	8.9	A	58.4	E
Columbia / Rainbow Dr	66.8	E	114.1	F
Wesley Chapel Rd / Snapfinger Woods Dr	68.2	E	128.8	F
Wesley Chapel Rd / I-20 WB ramps	48.4	D	32.5	C
Wesley Chapel Rd / I-20 EB ramps	43.6	D	41.9	D
Wesley Chapel Rd / Eastside Dr	18.0	B	22.1	C
Panola Rd / Panola Industrial Dr	67.0	E	44.0	D
Panola Rd / I-20 WB ramps	90.4	F	35.7	D
Panola Rd / I-20 EB ramps	68.3	E	28.1	C
Panola Rd / Minola Dr	123.6	F	32.5	C
Lithonia Industrial Blvd / Chupp Rd	57.9	E	19.8	B
Lithonia Industrial Blvd / WB Frontage Rd	39.1	D	11.2	B
Lithonia Industrial Blvd / EB Frontage Rd	24.6	C	26.7	C
Evans Mill Rd / Hillandale Dr	14.5	B	1.6	A
Evans Mill Rd / WB Frontage Rd	28.9	C	10.2	B
Evans Mill Rd / EB Frontage Rd	15.2	B	17.6	B
Evans Mill Rd / Mall Pkwy	24.5	C	24.5	C
Glenwood Dr / Austin Rd	28.2	C	28.5	C
Glenwood Dr / I-285 SB ramps	35.1	D	27.1	C
Glenwood Dr / I-285NB ramps	28.0	C	21.6	C
Glenwood Dr / Atherton Dr	57.2	E	1.9	A
Flat Shoals Rd / Panthersville Rd	27.4	C	18.5	B
Flat Shoals Rd / I-285 SB ramps	9.0	A	13.0	B
Flat Shoals Rd / I-285 NB ramps	12.9	B	23.6	C
Flat Shoals Rd / Clifton Springs Rd	20.7	C	29.9	C

Table 5-11 results show that the following signalized intersections operate at LOS E or F: Candler Rd at Eastwyck Dr (LOS E, PM Peak), Columbia Dr at Columbia Woods Dr (LOS E, PM Peak), Columbia Dr at I-20 EB ramps (LOS F, PM Peak), Columbia Dr at Rainbow Dr (LOS E/LOS F, AM Peak, PM Peak), Wesley Chapel Rd at Snapfinger Woods Dr (LOS E/LOS F,AM Peak/ PM Peak) all the intersections along Panola Rd fail with LOS E/F in the AM peak, Lithonia Industrial Blvd at Chupp Rd (LOS E, AM Peak) and Glenwood Dr at Atherton Dr (LOS E , AM Peak).

Table 5-12. Ramp Terminal Queue Lengths (VISSIM) – 2045 No-Build

Ramp Terminal	Movement	Ramp Lengths	AM		PM	
			Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)
Candler Rd / I-20 WB Ramps	WBL	990	47	182	70	244
	WBR		39	152	57	247
Candler Rd / I-20 EB Ramps	EBL	1,130	27	107	27	123
	EBR		30	134	48	205
Columbia Dr / I-20 EB Ramps	EBL	1,200	28	136	18	191
	EBR		0	50	831	1687
Wesley Chapel Rd / I-20 WB Ramps	WBL	790	22	103	31	132
	WBR		15	85	40	145
Wesley Chapel Rd / I-20 EB Ramps	EBL	940	98	439	109	431
	EBR		146	849	133	628
Panola Rd / I-20 WB Ramps	WBL	860	10	86	16	111
	WBR		15	125	22	146
Panola Rd / I-20 EB Ramps	EBL	1,200	71	316	53	223
	EBR		40	212	55	282
Lithonia Industrial Blvd / EB Frontage Rd	EBL	3,000	47	242	68	300
	EBT		1	91	0	72
Evans Mill Rd / WB Frontage Rd	WBL	2,360	46	281	14	115
	WBT		109	542	22	108
	WBR		180	928	3	140
Glenwood Dr / I-285 SB Ramps	SBL	800	167	708	87	371
	SBR		28	269	12	148
Glenwood Dr / I-285 NB Ramps	NBL	900	304	864	53	287
	NBR		19	116	60	237
Flat Shoals Rd / I-285 SB Ramps	SBL	1,850	50	253	78	326
	SBR		1	85	1	60
Flat Shoals Rd / I-285 NB Ramps	NBL	2,430	86	483	47	331
	NBR		6	175	3	149

Table 5-12 presents the queue lengths for the ramp terminal signals by movement. It is observed that the maximum queue length at the eastbound ramps of I-20 at Columbia Dr in PM peak and Glenwood Dr at the I-285 SB ramps in the AM peak exceed existing ramp length. The queue spill back sporadically on to the mainline at these locations will impact the flow of through traffic.

6 BUILD OPERATIONS ANALYSIS

6.1 OPENING YEAR (2025)

This section presents the 2025 Build conditions analysis of the study area. Similar to the 2018 existing conditions: Signalized intersections, unsignalized intersections, ramp termini and freeway segments, that are within the area of influence, were analyzed. Forecasted open year build volumes (see Chapter 2) were used for this analysis.

The open year operational models include geometry for all adjacent projects that are included in the base condition and the I-285/ I-20 East Interchange reconfiguration project improvements.

The preferred alternative for the I-285/20 East Interchange Reconstruction Project proposes to re-align or reconstruct four existing ramps at the I-285 @ I-20 east interchange and improvements to the upstream and downstream sections of the system interchange along I-20 and I-285.

The following system interchange ramps are proposed to be re-aligned or modified:

- I-20 WB to I-285 NB
- I-20 WB to I-20 SB
- I-285 SB to I-20 EB
- I-285 SB to I-20 WB.

The proposed upstream and downstream improvements along I-20 and I-285 are as follows:

- I-20 WB, auxiliary lane between Lithonia Industrial Blvd and Panola Rd
- I-20 WB, auxiliary lane between Panola Road and Wesley Chapel Rd
- I-20 WB, Collector Distributor (C/D) lanes between Wesley Chapel Road and the I-20 @ I-285 system interchange
- I-20 EB, C-D Rd improvement, extending the fourth lane up to the Wesley Chapel Rd off-ramp
- I-20 EB, auxiliary lane between Panola Rd and Lithonia Industrial Blvd
- I-285 NB, auxiliary lane between the I-20 WB on-ramp and Glenwood Rd off-ramp

6.1.1 SYNCHRO Model Results

The SYNCHRO analysis results for 2025 Build are shown in the following tables. **Tables 6-1 and 6-2** list the signalized and unsignalized level-of-service (LOS) results, respectively. The SYNCHRO analysis worksheets for 2025 Build are included in **Appendix 6-1**.

Table 6-1. Signalized Intersection LOS Results (SYNCHRO) – 2025 Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at Eastwyck Rd	14.5	B	11.3	B
Candler Rd at I-20 WB Ramps	27.5	C	31.8	C
Candler Rd at I-20 EB Ramps	38.8	D	44.4	D
Candler Rd at H F Shepherd Dr/ Rainbow Way	6.7	A	9.6	A
Columbia Dr at Columbia Woods Dr	9.8	A	8.1	A
Columbia Dr at I-20 EB Ramps	8.9	A	19.2	B
Columbia Dr at Rainbow Dr	42.7	D	42.6	D
Glenwood Rd at I-285 NB Ramps	43	D	30.6	C
Glenwood Rd at I-285 SB Ramps	72.9	E	65.6	E
Glenwood Rd at Austin Dr	28.5	C	27.9	C
Glenwood Rd at Atherton Dr	2	A	2.6	A
Flat Shoals Rd at I-285 EB Ramps	24.5	C	22.3	C
Flat Shoals Rd at I-285 WB Ramps	14.1	B	29.7	C
Flat Shoals Rd at Panthersville Rd/ Fairlake Dr	38	D	33.2	C
Flat Shoals Rd at Clifton Springs Rd/ Columbia Dr	23.4	C	47.2	D
Wesley Chapel Rd at I-20 EB Ramps	38	D	37.1	D
Wesley Chapel Rd at I-20 WB Ramps	32.1	C	16.2	B
Wesley Chapel Rd at Snapfinger Woods Dr	43	D	60.3	E
Wesley Chapel Rd at Eastside Dr	26.2	C	6.1	A
Minola Dr/ Shire Dr at Miller Rd	11.5	B	12.8	B
Panola Rd at I-20 EB Ramps	29.2	C	45.7	D
Panola Rd at I-20 WB Ramps	39.4	D	47.9	D
Panola Rd at Panola Industrial Blvd/ Hillandale Dr	53.1	D	74.6	E
Panola Rd at Minola Dr/ Fairington Rd	39.8	D	45.3	D
Hillandale Dr at Dekalb Medical Pkwy	27.1	C	31.3	C
Chupp Way at Fairington Rd	14.2	B	15.7	B
Old Hillandale Dr at Lithonida Industrial Blvd	40.7	D	16.9	B
Lithonia Industrial Blvd at I-20 EB C/D	36.3	D	32.5	C
Evans Mill Rd at Old Hillandale Dr/ I-20 WB Ramp	31	C	14.4	B
Evans Mill Rd at I-20 EB C/D	16.8	B	22	C
Hillandale Dr at Evans Mill Rd	7.6	A	3.8	A
Evans Mill Rd/ Mall Pkwy at Evans Mill Rd/ Woodrow Dr	43.6	D	29.5	C
Lithonia Industrial Blvd at Hillandale Dr	36.6	D	16.5	B

From the above **Table 6-1** the 2025 Build SYNCHRO analysis shows that that the following intersections operates at LOS E or F: Wesley Chapel Rd at Snapfinger Woods Dr (LOS E, PM Peak), Glenwood Rd at I-285 SB Ramps (LOS E, both peaks) and Panola Rd at Panola Industrial Blvd/Hillandale Dr (LOS E, PM Peak).

Table 6-2. Unsignalized Intersection LOS Results (SYNCHRO) – 2025 Build

Intersection	Approach	AM		PM	
		Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at The Park at Candler Entrance	EB	15	C	38.4	E
Candler Rd at Ember Dr	WB	18.5	C	19.2	C
Columbia Dr at I-20 WB Ramps	NBL	4.8	A	2.1	A
	SB	Min*	A	Min*	A
Columbia Dr at The Forest Apts	EB	19.1	C	24.6	C
Columbia Dr at Columbia Crossing Dr	WB	27.1	D	5	A
Columbia Dr at Abbeywood Dr	EB	5	A	Min*	A
Columbia Dr at Old Rainbow Dr	EB	Min*	A	23.4	C
Glenwood Rd at Moseri Rd	SB	12.8	B	12.5	B
Glenwood Rd at Danrich Dr/ 285 Discount Mall (West Ent.)	NB	32.7	D	27.9	D
	SB	10.1	B	12.5	B
Glenwood Rd at Glenfair Rd	NB	13.1	B	5	A
Glenwood Rd at Glen Acres Ct.	SB	13.4	B	9.9	A
Glenwood Rd at Meadowglades Dr	SB	20.7	C	28.9	A
Glenwood Rd at Arthurs Ct.	NB	22.9	C	13.1	B
Flat Shoals Rd at Lumby Dr.	SB	11.7	B	14.2	B
Flat Shoals Rd at Wellington Ct.	SB	12	B	16.4	C
Flat Shoals Rd at Orchard Walk Apartments	SB	15.2	C	15.4	C
Flat Shoals Rd at Glen Hollow Dr.	NB	9.9	A	18	C
Flat Shoals Rd at Barton Morgan Dr.	SB	10.5	B	10.5	B
Wesley Chapel Rd at Wesley Club Dr	EB	17.3	C	25.9	D
Miller Rd at Panola Industrial Blvd	EB	19.2	C	15.4	C
	WB	59.6	F	18.4	C
	NB	17	C	22.2	C
	SB	15.6	C	10.6	B
Miller Rd at Chatooga Dr	WB	108.6	F	46.2	E
Fairington Rd at Athena Ln	WB	27.5	D	29.3	D
Evans Mill Rd at Millwood Ln	WB	11.1	B	13	B

Min* - minimum delay (Volume is too low to record a delay)

Table 6-2 results show that the minor leg at the following unsignalized intersections operate at LOS E or F, in at least one peak period: Columbia Dr at The Park at Candler Ent. (LOS E, PM Peak), Columbia Dr at I-20 WB Ramps (LOS F, PM Peak), Miller Rd at Panola Industrial Blvd (Westbound Approach - LOS F, AM Peak) and Miller Rd at Chatooga Dr (LOS F, AM Peak; LOS E, PM Peak).

It must be noted that the project scope does not include providing improvements to arterials or intersections along the arterials. The analysis was conducted to ensure that the proposed project does not further degrade the operations at these arterial intersections. The results in the above tables show that although the proposed project does not provide much relief to the arterials, it does not cause any additional degradation in LOS at the intersecting arterials compared to No-Build.

6.1.2 VISSIM Model Results

The 2025 Build VISSIM analysis results are shown in the following tables. **Table 6-3** and **Table 6-4** and the corresponding segment analysis results in schematic format are provided in **Figure 6-1, Figure 6-2** (AM Peak) and **Figure 6-3, Figure 6-4** (PM peak). Speed heat maps are included in **Appendix 6-2**.

Table 6-3. Freeway Segment Analysis Results (VISSIM) – 2025 Build AM

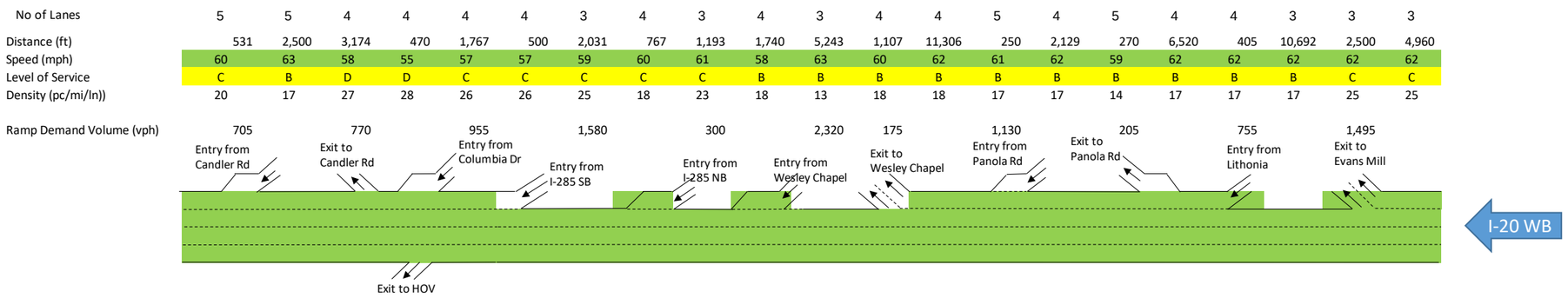
Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	2,857	64	11	B
	I-20 EB at Candler Rd off-ramp	Diverge	4	2,848	63	11	B
	I-20 EB after Candler Rd off-ramp	BFFS	4	2,433	63	10	A
	I-20 EB at Candler Rd on-ramp	Merge	5	2,855	55	10	A
	I-20 EB at Columbia Dr off-ramp	Diverge	4	2,896	62	12	B
	I-20 EB to I-285 NB & SB	Diverge	4	2,552	63	10	A
	I-20 EB at the System Interchange	BFFS	3	2,141	63	11	B
	I-20 EB off-ramp to CD Rd	Diverge	4	2,147	63	9	A
	I-20 EB CD Rd	Diverge	3	3,282	44	25	C
	I-20 EB after off-ramp to CD Rd	BFFS	3	1,696	63	9	A
	I-20 EB on-ramp from CD Rd	Merge	5	3,652	51	14	B
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	3,979	51	13	B
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	3,992	62	16	B
	I-20 EB off-ramp to Panola Rd	Diverge	5	3,957	62	13	B
	I-20 EB after Panola Road off-ramp	BFFS	4	3,148	63	13	B
	I-20 EB on-ramp from Panola Rd	Merge	5	3,524	62	11	B
	I-20 EB after on-ramp from Panola Rd	BFFS	4	3,539	63	14	B
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	3,462	61	14	B
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	2,645	62	14	B
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	2,839	62	11	B
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	4,705	62	19	C
	I-20 WB after Lithonia Industrial Blvd off-ramp	BFFS	3	3,223	62	17	B
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	4,230	62	17	B
	I-20 WB after on-ramp from Panola Rd	BFFS	4	4,348	62	17	B
	I-20 WB off-ramp to Panola Rd	Diverge	5	4,095	59	14	B
	I-20 WB after Panola Road off-ramp	BFFS	4	4,105	62	17	B
	I-20 WB on-ramp from Panola Rd	Merge	4	5,088	61	21	C
	I-20 WB between Wesley Chapel and Panola Rd	BFFS	4	4,389	62	18	B
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	4,252	60	18	B
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	2,396	63	13	B
	I-20 WB at on-ramp from Wesley Chapel Rd	Merge	4	4,117	58	18	B
	I-20 WB between Wesley Chapel on-ramp to I-285 NB on-ramp	BFFS	3	4,098	61	23	C

Table 6-3. Freeway Segment Analysis Results (VISSIM) – 2025 Build AM

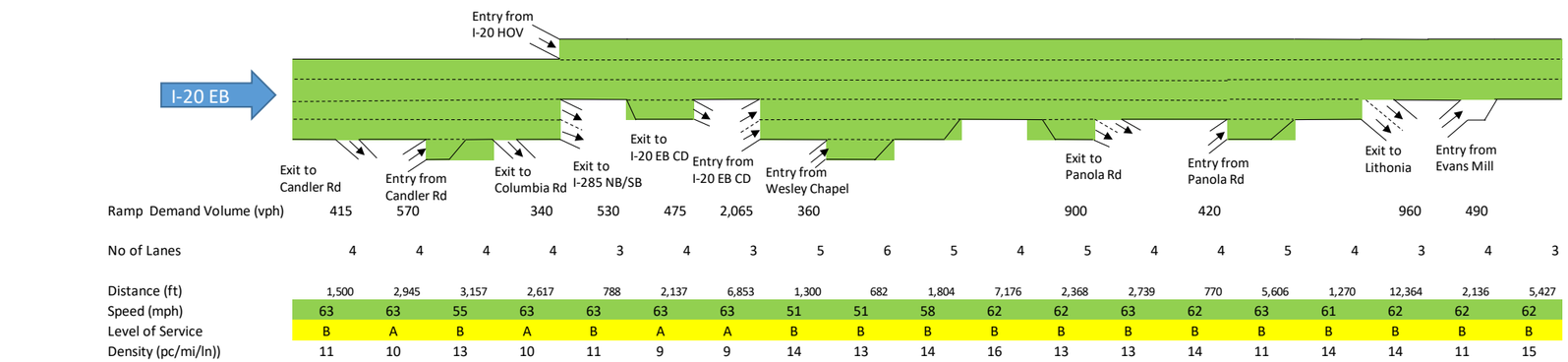
Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 WB at I-285 NB on-ramp	Merge	4	4,351	60	18	C
	I-20 WB between I-285 NB on-ramp to I-285 SB on-ramp	BFFS	3	4,321	59	25	C
	I-20 WB after I-285 SB on-ramp	Merge	4	5,696	57	26	C
	I-20 WB Columbia Dr on-ramp	Merge	5	5,749	55	22	C
	I-20 WB at Candler Rd off-ramp	Diverge	4	6,096	58	27	D
	I-20 WB after Candler Rd off-ramp	BFFS	4	5,406	63	22	C
	I-20 WB at Candler Rd on-ramp	Merge	5	5,868	60	20	C
I-285 NB	I-285 NB Flat Shoals Rd diverge	Diverge	4	5,397	62	22	C
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	4,813	62	19	C
	I-285 NB Flat Shoals Rd on-ramp	Merge	5	5,078	47	22	C
	I-285 to I-20 EB off-ramp	Diverge	4	5,208	61	21	C
	I-285 NB after I-20 EB off-ramp	Diverge	3	3,686	63	20	C
	I-285 NB after I-20 WB off-ramp	BFFS	3	3,373	63	18	B
	I-285 NB and I-20 EB and WB ramps merge	Merge	7	4,825	55	13	B
	I-285 after NB and I-20 EB and WB ramps merge	BFFS	6	4,793	55	15	B
	I-285 NB at Glenwood Rd off-ramp	Diverge	5	4,873	53	18	C
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	4,319	54	20	C
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	4,462	52	17	B
I-285 SB	I-285 SB Glenwood Rd off-ramp	Diverge	4	6,280	35	45	F
	I-285 SB after Glenwood Rd off-ramp	BFFS	4	5,830	39	38	E
	I-285 SB at Glenwood Rd on-ramp	Merge	5	6,733	29	47	F
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	6,768	50	34	D
	I-285 SB at I-20 EB and WB ramps diverge	Diverge	5	6,736	58	23	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	3,909	63	21	C
	I-285 SB at I-20 on-ramp	Merge	4	4,773	59	20	C
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	4,790	62	19	C
	I-285 SB at Flat Shoals Rd on-ramp	Diverge	5	5,284	59	18	B
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	5,338	61	22	C

Table 6-3 and schematic **Figures 6-1** and **6-2** show that during AM peak I-20 in both directions and the corresponding C-D segments perform at an acceptable LOS D or better. The I-285 corridor in the SB direction operates at LOS E and F in the section between Glenwood Rd and the system interchange. In the NB direction all of the sections perform with acceptable LOS. The open year 2025 Build network is able to process 94% of the AM peak demand.

YR 2025 BUILD AM Peak - Graphical Results ---- I-20 WB



YR 2025 BUILD AM Peak - Graphical Results ---- I-20 EB



LEGEND

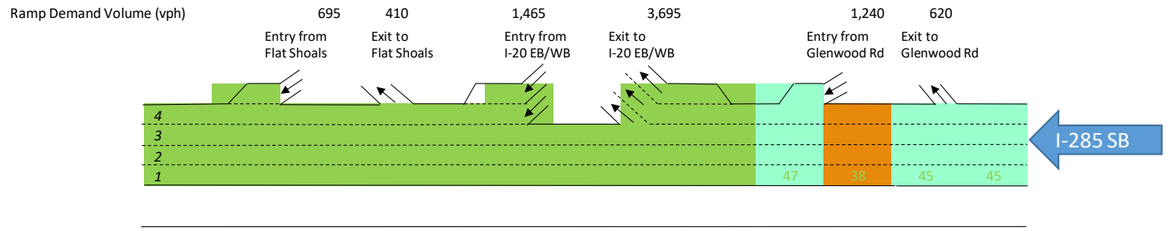
Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000 Demand volume highlighted if simulated falls below 90%
1,000 Demand volume
1,000 Simulated Volume
Density Derived from VISSIM
LOS Letter Grades based on density ranges specified in HCM

Figure 6-1. Freeway Segment Analysis Schematic Results (VISSIM) – 2025 Build AM (I-20 WB & EB)

YR 2025 BUILD AM Peak - Graphical Results ---- I-285 SB

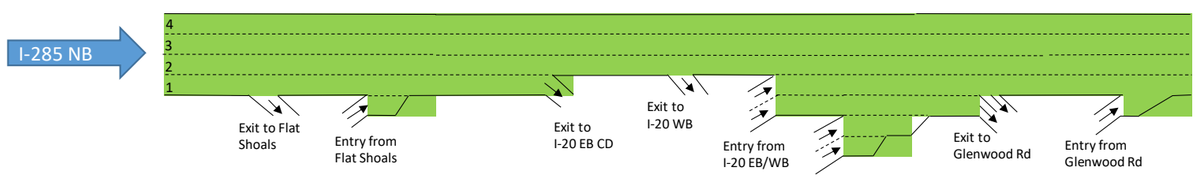
No of Lanes	4	5	4	4	4	4	3	5	4	5	4	4	4	
Distance (ft)	867	330	2,776	1,500	2,762	1,500	5,996	1,242	2,958	340	2,334	1,500	1,103	
Speed (mph)	61	59	62	62	62	62	62	58	50	29	39	35	35	
Level of Service	C	B	C	C	C	C	C	C	D	F	E	F	F	
Density (pc/mi/ln))	22	18	19	21	21	21	21	23	34	47	38	45	45	



Simulated Volumes	5338	5284	4790	5092	5092	5092	3921	6736	6768	6733	5830	6280	6280	
Demand Volumes	5660	5660	5085	5425	5425	5425	4165	7230	7230	7230	6155	6155	6655	

YR 2025 BUILD AM Peak - Graphical Results ---- I-285 NB

	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Demand Volumes	5405	5405	4820	5235	5235	5235	3720	3720	3420	5095	5095	5095	4580	4925	4925	
Simulated Volumes	5397	5397	4813	5078	5208	5208	3686	3686	3373	4825	4793	4873	4319	4462	4662	



No of Lanes	4	4	4	5	4	4	3	3	3	5	7	5	4	4	4	
Distance (ft)	2,017	1,500	4,102	197	4,937	1,500	1,534	500	1,455	1,908	1,158	3,633	1,609	295	730	
Speed (mph)	62	62	62	47	61	61	63	63	63	55	55	53	54	52	53	
Level of Service	C	C	C	C	C	C	C	C	B	B	B	C	C	C	C	
Density (vehicles)	22	22	19	22	21	21	20	20	18	18	13	18	20	21	22	

LEGEND

Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS Coloring	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 6-2. Freeway Segment Analysis Schematic Results (VISSIM) – 2025 Build AM (I-285 SB & NB)

Table 6-4. Freeway Segment Analysis Results (VISSIM) – 2025 Build PM

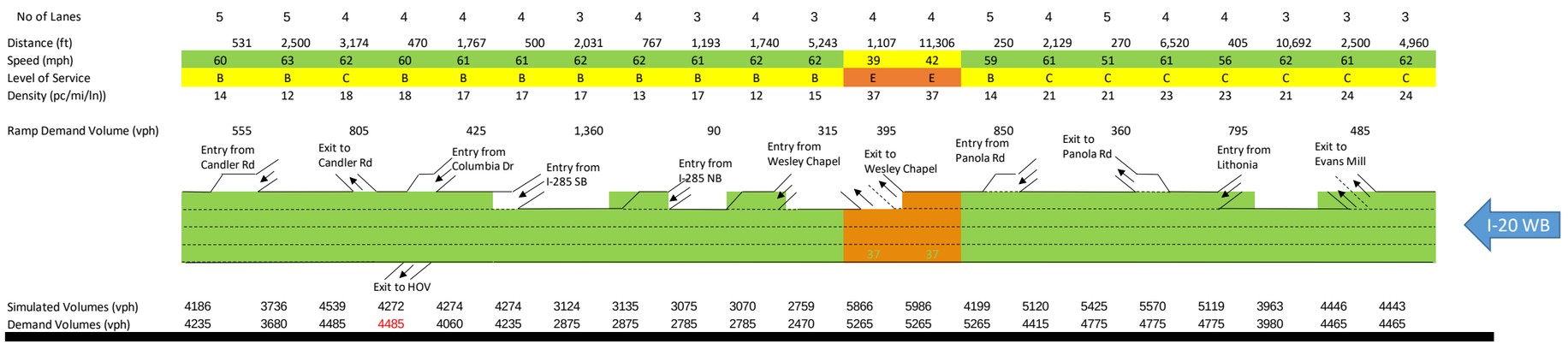
Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	6,896	61	28	D
	I-20 EB at Candler Rd off-ramp	Diverge	4	6,883	53	33	D
	I-20 EB after Candler Rd off-ramp	BFFS	4	5,992	57	27	D
	I-20 EB at Candler Rd on-ramp	Merge	5	6,544	39	34	D
	I-20 EB at Columbia Dr off-ramp	Diverge	4	6,626	53	31	D
	I-20 EB to I-285 NB & SB Ramps	Diverge	4	5,581	57	24	C
	I-20 EB at the System Interchange	BFFS	3	4,309	62	23	C
	I-20 EB off-ramp to CD Rd	Diverge	4	4,367	62	18	B
	I-20 EB CD Rd	Diverge	4	4,331	47	23	C
	I-20 EB after off-ramp to CD Rd	BFFS	3	3,142	63	17	B
	I-20 EB on-ramp from CD Rd	Merge	5	6,003	56	21	C
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	6,348	56	19	C
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	6,303	60	26	D
	I-20 EB off-ramp to Panola Rd	Diverge	5	6,312	61	21	C
	I-20 EB after Panola Rd off-ramp	BFFS	4	5,205	62	21	C
	I-20 EB on-ramp from Panola Rd	Merge	5	5,583	61	18	C
	I-20 EB after on-ramp from Panola Rd	BFFS	4	5,614	62	23	C
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	5,385	58	23	C
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	4,596	61	25	C
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	4,853	61	20	C
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	4,446	61	18	C
	I-20 WB after Lithonia Industrial Blvd off-ramp	BFFS	3	3,963	62	21	C
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	5,119	56	23	C
	I-20 WB after on-ramp from Panola Rd	BFFS	3	5,570	61	30	D
	I-20 WB off-ramp to Panola Rd	Diverge	4	5,425	51	27	D
	I-20 WB after Panola Rd off-ramp	BFFS	3	5,120	61	28	D
	I-20 WB on-ramp from Panola Rd	Merge	4	4,199	59	18	B
	I-20 WB between Wesley Chapel and Panola Rd	BFFS	4	5,986	42	37	E
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	5,866	39	37	E
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	2,759	62	15	B
	I-20 WB at on-ramp from Wesley Chapel Rd	Merge	4	3,070	62	12	B
	I-20 WB between Wesley Chapel on-ramp to I-285 NB on-ramp	BFFS	3	3,075	61	17	B
	I-20 WB at I-285 NB on-ramp	Merge	4	3,135	62	13	B
	I-20 WB between I-285 NB on-ramp to I-285 SB on-ramp	BFFS	3	3,124	62	17	B
	I-20 WB after I-285 SB on-ramp	Merge	4	4,274	61	17	B
	I-20 WB Columbia Dr on-ramp	Merge	5	4,272	60	14	B
	I-20 WB at Candler Rd off-ramp	Diverge	4	4,539	62	18	C

Table 6-4. Freeway Segment Analysis Results (VISSIM) – 2025 Build PM

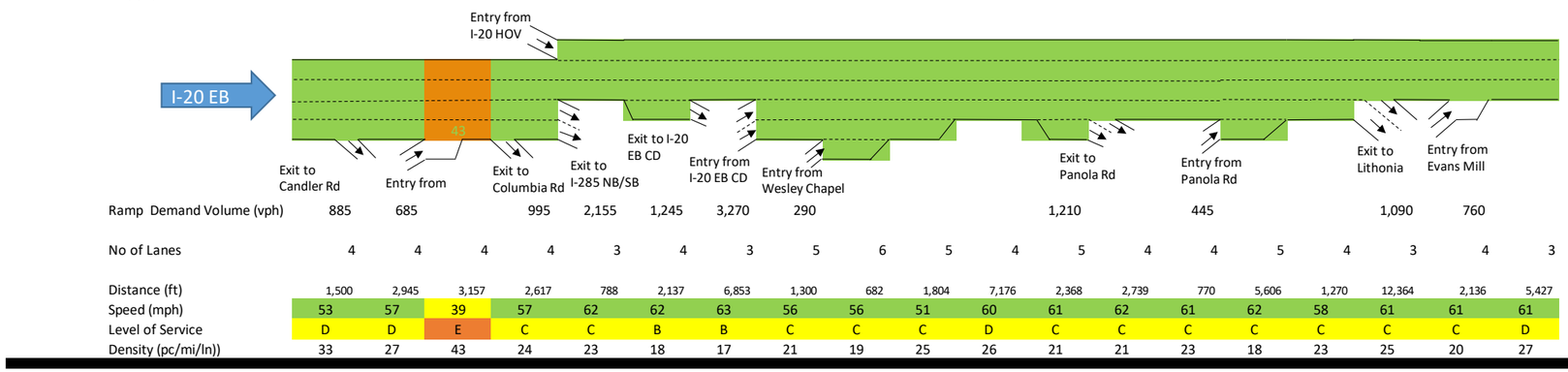
Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 WB after Candler Rd off-ramp	BFFS	4	3,736	63	15	B
	I-20 WB at Candler Rd on-ramp	Merge	5	4,186	60	14	B
I-285 NB	I-285 NB at Flat Shoals Rd diverge	Diverge	4	5,286	61	22	C
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	4,750	62	19	C
	I-285 NB to Flat Shoals Rd on-ramp	Merge	5	5,003	49	20	C
	I-285 to I-20 EB off-ramp	Diverge	4	5,134	58	22	C
	I-285 NB after I-20 EB off-ramp	Diverge	3	3,555	61	19	C
	I-285 NB after I-20 WB off-ramp	BFFS	3	2,050	52	13	B
	I-285 NB and I-20 EB and WB ramps merge	Merge	6	5,459	57	16	B
	I-285 after NB and I-20 EB and WB ramps merge	BFFS	5	7,108	53	27	D
	I-285 NB at Glenwood Rd off-ramp	Diverge	4	7,165	48	39	E
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	6,389	52	31	D
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	6,376	53	24	C
I-285 SB	I-285 SB Glenwood Rd off-ramp	Diverge	4	6,158	52	31	D
	I-285 SB after Glenwood Rd off-ramp	BFFS	4	5,723	58	25	C
	I-285 SB at Glenwood Rd on-ramp	Merge	5	6,178	55	23	C
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	6,182	60	26	C
	I-285 SB and I-20 EB and WB ramps diverge	Diverge	5	6,240	60	21	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	3,507	63	19	C
	I-285 at I-20 on-ramp	Merge	4	5,003	47	27	D
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	4,823	61	20	C
	I-285 SB at Flat shoals Rd on-ramp	Diverge	5	5,331	59	18	B
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	5,386	61	22	C

Table 6-4 and schematic **Figures 6-3** and **6-4** show that in the PM peak I-20 EB operates at an acceptable LOS D or better. In the WB direction the sections between Wesley Chapel Rd and Panola Rd operate at LOS E & F. Both the east and westbound C-D along I-20 operate at an acceptable LOS C. Along I-285, in the northbound direction the Glenwood Rd off-ramp section operates at LOS E. In the southbound direction all of the sections perform with acceptable LOS. The 2025 Build network is able to process 95% of the PM peak demand volume.

YR 2025 BUILD PM Peak - Graphical Results ---- I-20 WB



YR 2025 BUILD PM Peak - Graphical Results ---- I-20 EB



LEGEND

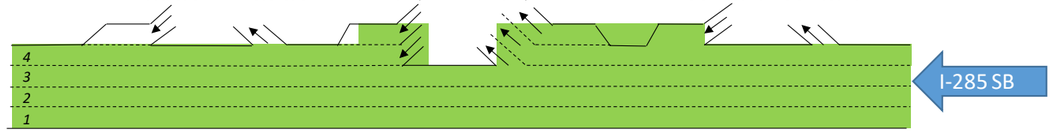
Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 6-3. Freeway Segment Analysis Schematic Results (VISSIM) – 2025 Build PM Peak (I-20 WB & EB)

YR 2025 BUILD PM Peak - Graphical Results ---- I-285 SB

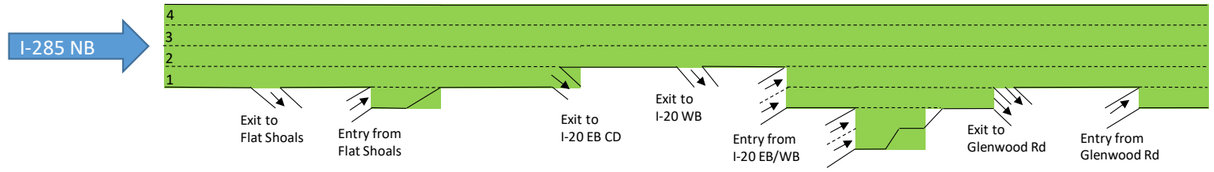
No of Lanes	4	5	4	4	4	4	3	5	4	5	4	4	4	
Distance (ft)	867	330	2,776	1,500	2,762	1,500	5,996	1,242	2,958	340	2,334	1,500	1,103	
Speed (mph)	61	59	61	47	47	47	63	60	60	55	58	52	52	
Level of Service	C	B	C	D	D	D	C	C	C	C	C	D	D	
Density (pc/mi/ln))	22	18	20	27	27	27	18	21	26	23	25	31	31	
Ramp Demand Volume (vph)			560	460		1,530		3,270			570	475		
			Entry from Flat Shoals	Exit to Flat Shoals		Entry from I-20 EB/WB		Exit to I-20 EB/WB			Entry from Glenwood Rd	Exit to Glenwood Rd		



Simulated Volumes	5386	5331	4823	5003	5003	5003	3457	6240	6182	6178	5723	6158	6158
Demand Volumes	5795	5795	5235	5695	5695	5695	4165	7435	7435	7435	6865	7340	7340
	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

YR 2025 BUILD PM Peak - Graphical Results ---- I-285 NB

Demand Volumes	5305	5305	4760	5165	5165	5165	3605	3605	3515	5,575	7160	7160	6385	6740	6740
Simulated Volumes	5286	5286	4750	5003	5134	5134	3555	3555	3445	5459	7108	7165	6389	6376	6666



Ramp Demand Volume (vph)		545	405			1,560		90	2,060	1,585			775	355	
No of Lanes	4	4	4	5	4	4	3	3	3	5	7	5	4	4	4
Distance (ft)	2,017	1,500	4,102	197	4,937	1,500	1,534	500	1,455	1,908	1,158	3,633	1,609	295	730
Speed (mph)	61	61	62	49	58	58	61	61	63	57	53	48	52	53	54
Level of Service	C	C	C	C	C	C	C	C	C	C	C	D	D	D	D
Density (vehicles)	22	22	19	20	22	22	19	19	18	19	19	31	31	30	31

LEGEND

Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000 Demand volume highlighted if simulated falls below 90%
1,000 Demand volume
1,000 Simulated Volume
Density Derived from VISSIM
LOS Letter Grades based on density ranges specified in HCM

Figure 6-4. Freeway Segment Analysis Schematic Results (VISSIM) – 2025 Build PM Peak (I-285 SB & NB)

The 2025 Build signalized intersection results, listed in **Table 6-5,** were obtained from VISSIM by drawing node boundaries around each study intersection.

Table 6-5. Signalized Intersection LOS Results (VISSIM) – 2025 Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd / Eastwyck Dr	7.4	A	11.6	B
Candler Rd / I-20 WB Ramps	16.7	B	22.3	C
Candler Rd / I-20 EB Ramps	12.5	B	19.3	B
Candler Rd / H F Shepherd Dr	9.2	A	7.5	A
Columbia Dr / Columbia Woods Dr	5.5	A	8.6	A
Columbia Dr / I-20 EB ramp	7.0	A	10.1	B
Columbia / Rainbow Dr	37.6	D	45.0	D
Wesley Chapel Rd / Snapfinger Woods Dr	57.2	E	53.7	D
Wesley Chapel Rd / I-20 WB ramps	29.3	C	25.8	C
Wesley Chapel Rd / I-20 EB ramps	30.4	C	20.8	C
Wesley Chapel Rd / Eastside Dr	16.6	B	5.7	A
Panola Rd / Panola Industrial Dr	79.6	E	54.6	D
Panola Rd / I-20 WB ramps	14.1	B	22.9	C
Panola Rd / I-20 EB ramps	22.9	C	19.2	B
Panola Rd / Minola Dr	38.4	D	48.8	D
Lithonia Industrial Blvd / Chupp Rd	40.6	D	148.4	F
Lithonia Industrial Blvd / WB Frontage Rd	27.7	C	103.0	F
Lithonia Industrial Blvd / EB Frontage Rd	26.3	C	31.5	C
Evans Mill Rd / Hillandale Dr	11.2	B	153.2	F
Evans Mill Rd / WB Frontage Rd	20.9	C	35.9	D
Evans Mill Rd / EB Frontage Rd	15.6	B	15.5	B
Evans Mill Rd / Mall Pkwy	23.8	C	23.5	C
Glenwood Dr / Austin Rd	26.3	C	23.4	C
Glenwood Dr / I-285 SB ramps	32.7	C	24.3	C
Glenwood Dr / I-285NB ramps	18.9	B	21.5	C
Glenwood Dr / Atherton Dr	0.7	A	1.4	A
Flat Shoals Rd / Panthersville Rd	25.8	C	16.5	B
Flat Shoals Rd / I-285 SB ramps	8.3	A	12.6	B
Flat Shoals Rd / I-285 NB ramps	12.3	B	11.3	B
Flat Shoals Rd / Clifton Springs Rd	19.2	B	28.8	C

Table 6-5 VISSIM analysis results show that the following signalized intersections operate at LOS E or F: Wesley Chapel Rd at Snapfinger Woods Dr (LOS E, AM peak), Panola Rd at Panola Industrial Dr (LOS E, AM Peak), Lithonia Industrial Blvd at Chupp Rd (LOS F, PM peak), Lithonia Industrial Blvd at WB Frontage Rd (LOS F, PM peak) and Evans Mill Rd at Hillandale Dr (LOS F, PM peak).

Table 6-6. Ramp Terminal Queue Lengths (VISSIM) – 2025 Build

Ramp Terminal	Movement	Ramp Lengths	AM		PM	
			Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)
Candler Rd / I-20 WB Ramps	WBL	990	134	604	82	309
	WBR		34	145	26	141
Candler Rd / I-20 EB Ramps	EBL	1,130	26	107	31	139
	EBR		2	65	63	266
Columbia Dr / I-20 EB Ramps	EBL	1,200	26	109	42	200
	EBR		0	77	35	411
Wesley Chapel Rd / I-20 WB Ramps	WBL	790	24	106	58	208
	WBR		17	70	32	123
Wesley Chapel Rd / I-20 EB Ramps	EBL	940	111	421	117	461
	EBR		19	214	39	199
Panola Rd / I-20 WB Ramps	WBL	860	7	226	70	207
	WBR		5	122	5	142
Panola Rd / I-20 EB Ramps	EBL	1,200	4	161	119	381
	EBR		0	0	43	512
Lithonia Industrial Blvd / EB Frontage Rd	EBL	3,000	47	240	71	293
	EBT		0	96	1	83
Evans Mill Rd / WB Frontage Rd	WBL	2,360	56	277	30	170
	WBT		97	376	26	117
	WBR		29	468	1	94
Glenwood Dr / I-285 SB Ramps	SBL	800	266	1009	125	487
	SBR		16	185	12	141
Glenwood Dr / I-285 NB Ramps	NBL	900	97	433	134	504
	NBR		16	83	45	270
Flat Shoals Rd / I-285 SB Ramps	SBL	1,850	41	218	77	351
	SBR		1	80	1	78
Flat Shoals Rd / I-285 NB Ramps	NBL	2,430	75	373	66	293
	NBR		3	142	2	114

Table 6-6 presents the queue lengths at ramp terminal signals by movement. Maximum queue length at the ramp terminal intersections along I-20 and I-285 are within the existing ramp lengths and queue does not spill back on to the mainline except Glenwood Dr at I-285 SB Ramps (AM peak).

6.2 DESIGN YEAR (2045)

This section presents the 2045 No-Build conditions analysis of the study area. Signalized and unsignalized intersections, ramp junctions, and I-20 and I-285 mainline locations that were analyzed for the 2018 Existing Conditions are evaluated with future design year volumes developed (See Chapter 2).

Design year traffic models will include base year background projects included in open year models, I-285/20 Interchange reconfiguration project improvements, I-20 express lanes project and the I-285 east express lanes.

6.2.1 SYNCHRO MODEL RESULTS

The SYNCHRO analysis results for 2045 Build are shown in the following tables. **Table 6-7** and **Table 6-8** list the signalized and unsignalized level-of-service (LOS) results, respectively. The SYNCHRO analysis worksheets for 2045 Build are included in **Appendix 6-3**.

Table 6-7. Signalized Intersection LOS Results (SYNCHRO) – 2045 Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at Eastwyck Rd	15.4	B	11.5	B
Candler Rd at I-20 WB Ramps	33.3	C	34.7	C
Candler Rd at I-20 EB Ramps	42.1	D	44.9	D
Candler Rd at H F Shepherd Dr/ Rainbow Way	7.5	A	10.4	B
Columbia Dr at Columbia Woods Dr	10.2	B	8.9	A
Columbia Dr at I-20 EB Ramps	11.5	B	24.1	C
Columbia Dr at Rainbow Dr	55.7	E	55.9	E
Glenwood Rd at I-285 NB Ramps	70.8	E	30.7	C
Glenwood Rd at I-285 SB Ramps	85.1	F	85	F
Glenwood Rd at Austin Dr	36.2	D	30.6	C
Glenwood Rd at Atherton Dr	2.2	A	2.8	A
Flat Shoals Rd at I-285 EB Ramps	24.8	C	23.5	C
Flat Shoals Rd at I-285 WB Ramps	14.3	B	31.9	C
Flat Shoals Rd at Panthersville Rd/ Fairlake Dr	43.1	D	35.8	D
Flat Shoals Rd at Clifton Springs Rd/ Columbia Dr	23.1	C	60.7	E
Wesley Chapel Rd at I-20 EB Ramps	47.2	D	57.5	E
Wesley Chapel Rd at I-20 WB Ramps	45.1	D	19.1	B
Wesley Chapel Rd at Snapfinger Woods Dr	51.2	D	106.8	F
Wesley Chapel Rd at Eastside Dr	60.9	E	10.4	B
Minola Dr/ Shire Dr at Miller Rd	2589.2	F	3764.7	F
Panola Rd at I-20 EB Ramps	20.2	C	26	C
Panola Rd at I-20 WB Ramps	43.2	D	37.8	D
Panola Rd at Panola Industrial Blvd/ Hillandale Dr	43.9	D	47.3	D
Panola Rd at Minola Dr/ Fairington Rd	37.8	D	45.1	D
Hillandale Dr at Dekalb Medical Pkwy	27	C	32.5	C
Chupp Way at Fairington Rd	14.7	B	16.4	B
Old Hillandale Dr at Lithonida Industrial Blvd	58.4	E	16.8	B

Table 6-7. Signalized Intersection LOS Results (SYNCHRO) – 2045 Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Lithonia Industrial Blvd at I-20 EB C/D	36.1	D	33.4	C
Evans Mill Rd at Old Hillandale Dr/ I-20 WB Ramp	52.1	D	20.3	C
Evans Mill Rd at I-20 EB C/D	20.9	C	40.1	D
Hillandale Dr at Evans Mill Rd	6.6	A	4.9	A
Evans Mill Rd/ Mall Pkwy at Evans Mill Rd/ Woodrow Dr	49.2	D	55.4	E
Lithonia Industrial Blvd at Hillandale Dr	48	D	18.4	B

Table 6-7 shows that the following intersections operate with LOS E or F in 2045 Build condition: Columbia Dr at Rainbow Dr (LOS E, both peaks), Wesley Chapel Rd at I-20 EB Ramps (LOS E, PM peak), Wesley Chapel Rd at Snapfinger Woods Dr (LOS F, PM peak), Wesley Chapel Rd at Eastside Dr (LOS E, AM peak), Minola Dr at Miller Rd (LOS F, both peaks), Old Hillandale Dr at Lithonia Industrial Blvd (LOSE , AM peak), Evans Mill Rd at Woodrow Dr (LOS E, PM peak), Glenwood Rd at I-285 NB Ramps (LOS E, AM peak), Glenwood Rd at I-285 SB Ramps (LOS F, Both peaks), and Flat Shoals Rd at Clifton Springs Rd (LOS E, PM peak).

Table 6-8. Unsignalized Intersection LOS Results (SYNCHRO) – 2045 Build

Intersection	Approach	AM		PM	
		Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd at The Park at Candler Entrance	EB	16.8	C	52.1	F
Candler Rd at Ember Dr	WB	21.5	C	22.4	C
Columbia Dr at I-20 WB Ramps	NB	5.4	A	2.2	A
Columbia Dr at The Forest Apts	EB	39.7	E	113.8	F
Columbia Dr at Columbia Crossing Dr	WB	25.6	D	31	D
Columbia Dr at Abbeywood Dr	EB	41.9	E	Min*	A
Columbia Dr at Old Rainbow Dr	EB	Min*	A	Min*	A
Glenwood Rd at Moseri Rd	SB	33.8	D	37	E
Glenwood Rd at Danrich Dr/ 285 Discount Mall (West Ent.)	NB	14.7	B	13.3	B
	SB	66.9	F	28	D
Glenwood Rd at Glenfair Rd	NB	10.3	B	13.2	B
Glenwood Rd at Glen Acres Ct.	SB	14.5	B	Min*	A
Glenwood Rd at Meadowglades Dr	SB	15.2	C	10.3	B
Glenwood Rd at Arthurs Ct.	NB	23.6	C	40.2	E
Flat Shoals Rd at Lumby Dr.	SB	26.8	D	14.2	B
Flat Shoals Rd at Wellington Ct.	SB	12.3	B	15.4	C
Flat Shoals Rd at Orchard Walk Apartments	SB	13.5	B	18.6	C
Flat Shoals Rd at Glen Hollow Dr.	NB	18.4	C	16.8	C
Flat Shoals Rd at Barton Morgan Dr.	SB	10.5	B	18.8	C
Wesley Chapel Rd at Wesley Club Dr	EB	9.5	A	13.9	B
Miller Rd at Panola Industrial Blvd	EB	498	F	1134.9	F
	WB	599.4	F	336.1	F
	NB	1387.1	F	537.8	F
	SB	440.2	F	519.6	F

Table 6-8. Unsignalized Intersection LOS Results (SYNCHRO) – 2045 Build

Intersection	Approach	AM		PM	
		Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Miller Rd at Chatooga Dr	WB	1883.8	F	33.5	D
Fairington Rd at Athena Ln	WB	11.4	B	13.5	B
Evans Mill Rd at Millwood Ln	WB	15.7	C	17.1	C

Min* - minimum delay (Volume is too low to record a delay)

Table 6-8 shows that at the following unsignalized intersections the minor leg operates at an LOS E or F; Candler Rd at The Park at Candler Ent. (LOS F, PM peak), Columbia Dr at Forest Apts (LOS E/LOS F, AM peak/PM peak), Columbia Dr at Abbeywood Dr (LOS F, AM peak), Miller Rd at Chatooga Dr (LOS F, AM peak), all the approaches (LOS F/LOS F, AM peak/PM peak) at the intersection of Miller Rd at Panola Ind. Blvd and the SB direction at Glenwood Rd at Danrich Dr (LOS F, AM peak).

As mentioned in the open year section, it must be noted that the project scope does not include providing improvements to arterials or intersections along the arterials. The analysis was conducted to ensure that the proposed project does not further degrade the operations at these arterial intersections. The results in the above tables show that although the proposed project does not provide much relief to the arterials, it does not cause any additional degradation compared to the No-Build condition in LOS at the intersecting arterials.

6.2.2 VISSIM Model Results

The 2045 Build VISSIM analysis AM and PM results are shown in the following tables **Table 6-9** and **Table 6-10** and the corresponding segment analysis results in schematic format are provided in **Figure 6-5, Figure 6-6** (AM peak) and **Figure 6-7, Figure 6-8** (PM peak). Speed heat maps are included in **Appendix 6-4**.

Table 6-9. Freeway Segment Analysis Results (VISSIM) – 2045 Build AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	4,033	63	16	B
	I-20 EB at Candler Rd off-ramp	Diverge	4	4,019	62	16	B
	I-20 EB after Candler Rd off-ramp	BFFS	4	3,560	63	14	B
	I-20 EB at Candler Rd on-ramp	Merge	5	4,114	52	16	B
	I-20 EB at Columbia Dr off-ramp	Diverge	4	4,167	61	17	B
	I-20 EB to I-285 NB & SB	Diverge	4	3,767	61	15	B
	I-20 EB at the System Interchange	BFFS	3	3,203	63	17	B
	I-20 EB off-ramp to CD Rd	Diverge	4	3,209	63	13	B
	I-20 EB CD Rd	Diverge	3	3,634	44	27	D
	I-20 EB after off-ramp to CD Rd	BFFS	3	2,699	63	14	B
	I-20 EB on-ramp from CD Rd	Merge	5	4,781	53	18	C
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	5,096	52	16	B

Table 6-9. Freeway Segment Analysis Results (VISSIM) – 2045 Build AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	5,116	62	21	C
	I-20 EB off-ramp to Panola Rd	Diverge	5	4,914	62	16	B
	I-20 EB after Panola Road off-ramp	BFFS	4	3,996	63	16	B
	I-20 EB on-ramp from Panola Rd	Merge	5	4,437	62	14	B
	I-20 EB after on-ramp from Panola Rd	BFFS	4	4,451	62	18	B
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	4,348	61	18	B
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	3,308	62	18	B
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	3,796	61	15	B
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	5,892	61	24	C
	I-20 WB after Lithonia Industrial Blvd off-ramp	BFFS	3	4,227	62	23	C
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	5,024	57	22	C
	I-20 WB after on-ramp from Panola Rd	BFFS	4	5,163	61	21	C
	I-20 WB off-ramp to Panola Rd	Diverge	5	4,864	43	23	C
	I-20 WB after Panola Road off-ramp	BFFS	4	4,879	59	21	C
	I-20 WB on-ramp from Panola Rd	Merge	5	6,064	56	22	C
	I-20 WB between Wesley Chapel and Panola Rd	BFFS	4	6,017	61	25	C
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	5,836	56	26	C
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	3,648	62	20	C
	I-20 WB at on-ramp from Wesley Chapel Rd	Merge	4	5,245	34	40	E
	I-20 WB between Wesley Chapel on-ramp to I-285 NB on-ramp	BFFS	3	5,181	39	45	F
	I-20 WB at I-285 NB on-ramp	Merge	4	5,423	39	36	E
	I-20 WB between I-285 NB on-ramp to I-285 SB on-ramp	BFFS	3	5,388	37	49	F
	I-20 WB after I-285 SB on-ramp	Merge	4	7,328	35	53	F
	I-20 WB Columbia Dr on-ramp	Merge	5	7,009	31	45	F
	I-20 WB at Candler Rd off-ramp	Diverge	4	7,448	58	32	D
	I-20 WB after Candler Rd off-ramp	BFFS	4	6,703	62	27	D
	I-20 WB at Candler Rd on-ramp	Merge	5	7,347	59	25	C
I-285 NB	I-285 NB Flat Shoals Rd diverge	Diverge	4	6,433	56	29	D
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	5,729	58	25	C
	I-285 NB Flat Shoals Rd on-ramp	Merge	5	5,992	34	36	E
	I-285 to I-20 EB off-ramp	Diverge	4	6,129	59	26	C
	I-285 NB after I-20 EB off-ramp	Diverge	3	4,458	62	24	C
	I-285 NB after I-20 WB off-ramp	BFFS	3	4,123	62	22	C
	I-285 NB and I-20 EB and WB ramps merge	Merge	7	5,438	55	14	B
	I-285 after NB and I-20 EB and WB ramps merge	BFFS	6	5,407	55	16	B
	I-285 NB at Glenwood Rd off-ramp	Diverge	5	4,804	56	17	B

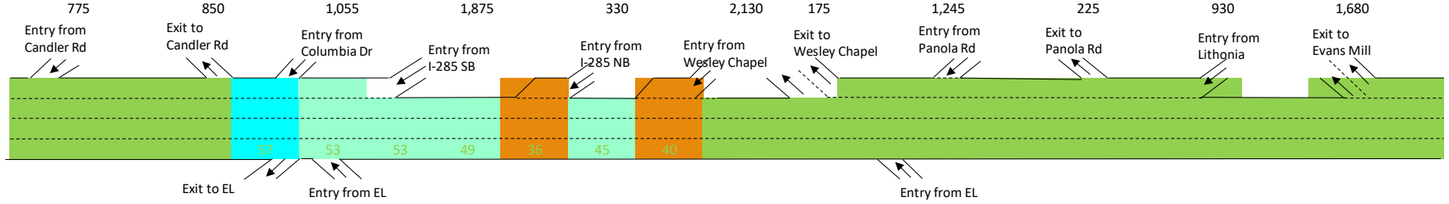
Table 6-9. Freeway Segment Analysis Results (VISSIM) – 2045 Build AM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	4,230	58	18	C
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	4,149	56	15	B
I-285 SB	I-285 SB Glenwood Rd off-ramp	Diverge	4	6,737	36	47	F
	I-285 SB after Glenwood Rd off-ramp	BFFS	4	7,202	44	41	E
	I-285 SB at Glenwood Rd on-ramp	Merge	5	7,104	35	41	E
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	7,129	53	34	D
	I-285 SB at I-20 EB and WB ramps diverge	Diverge	5	7,094	59	24	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	4,444	63	24	C
	I-285 SB at I-20 on-ramp	Merge	4	5,366	57	23	C
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	5,376	62	22	C
	I-285 SB at Flat Shoals Rd on-ramp	Diverge	5	5,956	56	21	C
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	6,016	60	25	C

Table 6-9 and schematic **Figures 6-5** and **6-6** illustrate that during AM Peak, I-20 westbound between Wesley Chapel Rd and Columbia Dr operates at LOS E and F (average speed below 35 mph). In the EB direction the corridor operates with an acceptable LOS D or better. I-20 WB and EB C-D roads operate at an acceptable LOS B and LOS C. I-285 SB between Glenwood Rd and the system interchange operates at LOS E & F and in the NB direction the section at Flat Shoals Rd operates at LOS E. Although some sections appear to be failing in the 2045 build condition, comparing the throughput volume processed in No-Build vs Build it is observed that the Build condition processes 4.8% of additional volume compared to No-Build. The section that performs worse when compared to No-Build is I-20 WB past the I-285 interchange. Due to slightly higher growth rate in the Build condition, and with improved operations in the Build condition, the traffic volumes processed on I-20 WB past the I-285 interchange are slightly higher in Build scenario when compared to the No-Build scenario. In the Build model I-20 WB past the I-285 interchange processed approximately 700 additional vehicles than the No-Build condition due to improved operations, this increases the density of this section and is shown as failing LOS. Further discussion of results is presented in Chapter 7 of this report.

YR 2045 BUILD AM Peak - Graphical Results ---- I-20 WB

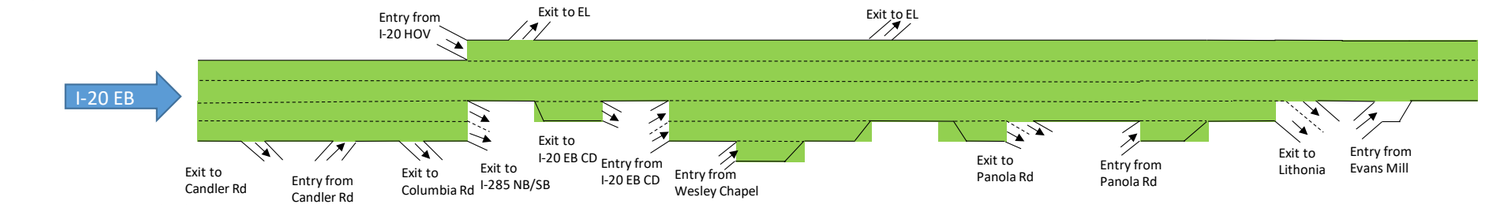
No of Lanes	5	5	4	4	4	4	3	4	3	4	3	4	4	5	4	5	4	4	3	3	3
Distance (ft)	531	2,500	3,174	470	1,767	500	2,031	767	1,193	1,740	5,243	1,107	11,306	250	2,129	270	6,520	405	10,692	2,500	4,960
Speed (mph)	59	62	58	31	35	35	37	39	39	34	62	56	61	56	59	43	61	57	62	61	61
Level of Service	C	C	D	F	F	F	F	E	F	E	C	C	C	C	C	C	C	C	C	D	D
Density (pc/mi/ln))	25	22	32	57	53	53	49	36	45	40	20	26	25	22	21	23	21	22	23	32	32
Ramp Demand Volume (vph)		775		850		1,055		1,875		330		2,130	175		1,245		225		930		1,680



Simulated Volumes (vph)	7347	6703	7448	7009	7328	7328	5388	5423	5181	5245	3648	5836	6017	6064	4879	4864	5163	5024	4227	5892	5899
Demand Volumes (vph)	8640	7865	8715	8715	7660	8120	6245	6245	5915	5915	3785	6185	6175	6175	4930	5155	5155	5155	4225	5905	5905

YR 2045 BUILD AM Peak - Graphical Results ---- I-20 EB

Demand Volumes (vph)	4050	3595	4225	3850	3265	3265	2740	5025	5025	5420	5270	5270	4265	4750	4750	4750	3565	4100	4100
Simulated Volumes (vph)	4019	3560	4114	3767	3203	3209	2699	4781	5096	5106	5116	4914	3996	4437	4451	4348	3308	3796	3792



Ramp Demand Volume (vph)	455	630		375	605	525	2,285	395			1,005		485			1,185	535		
No of Lanes	4	4	4	4	3	4	3	5	6	5	4	5	4	4	5	4	3	4	3
Distance (ft)	1,500	2,945	3,157	2,617	788	2,137	6,853	1,300	682	1,804	7,176	2,368	2,739	770	5,606	1,270	12,364	2,136	5,427
Speed (mph)	62	63	52	61	63	63	63	53	52	57	62	62	63	62	62	61	62	61	62
Level of Service	B	B	C	B	B	B	B	C	B	B	C	B	B	B	B	B	B	B	C
Density (pc/mi/ln))	16	14	20	15	17	13	14	18	16	18	21	16	16	18	14	18	18	15	21

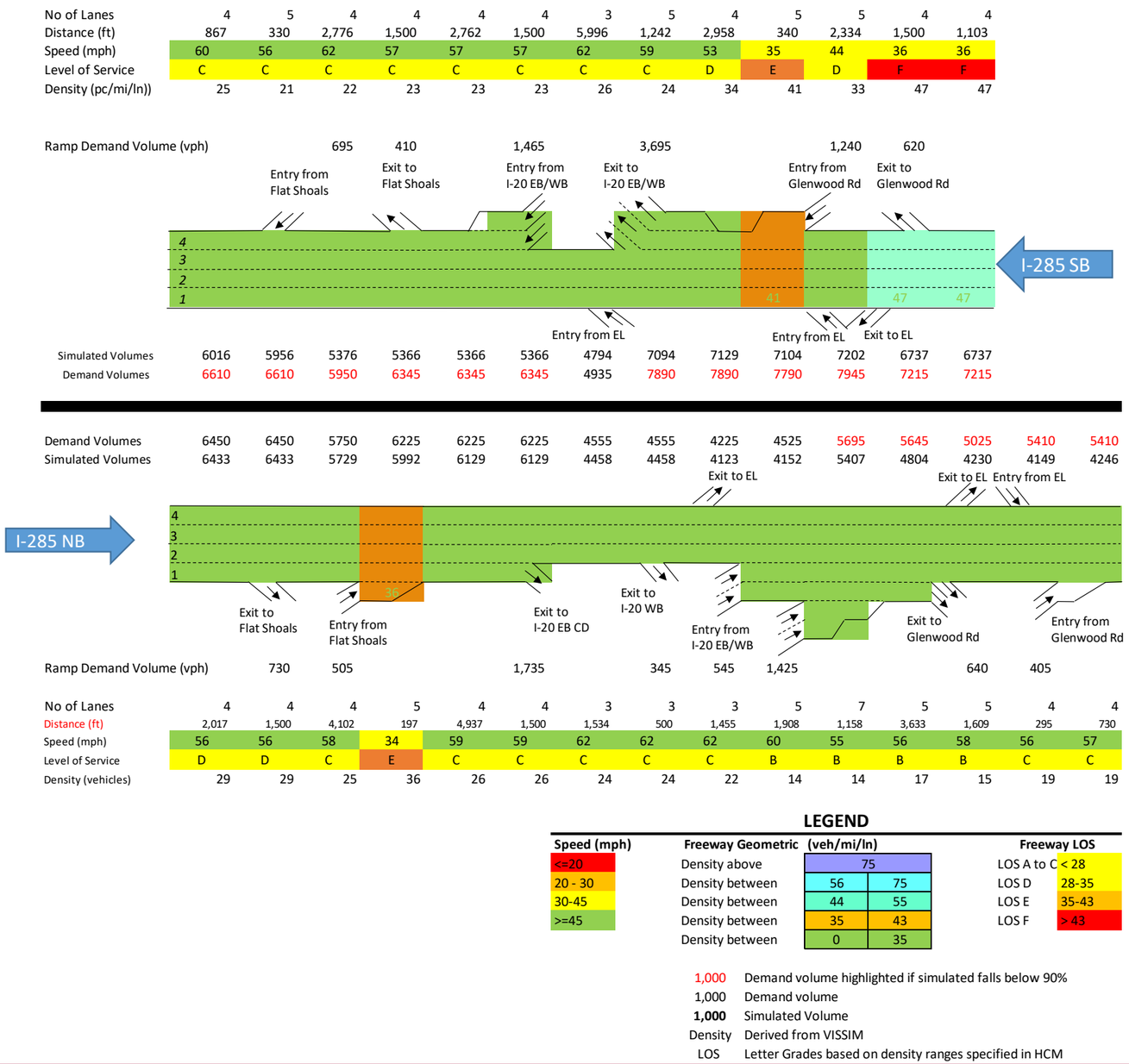
LEGEND

Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000 Demand volume highlighted if simulated falls below 90%
1,000 Demand volume
1,000 Simulated Volume
Density Derived from VISSIM
LOS Letter Grades based on density ranges specified in HCM

Figure 6-5. Freeway Segment Analysis Schematic Results (VISSIM) – 2045 Build AM Peak (I-20 WB & EB)

YR 2045 BUILD AM Peak - Graphical Results ---- I-285 SB & NB



LEGEND

Speed (mph)
<=20
20 - 30
30-45
>=45

Freeway Geometric	(veh/mi/ln)	
Density above	75	
Density between	56	75
Density between	44	55
Density between	35	43
Density between	0	35

Freeway LOS	
LOS A to C	< 28
LOS D	28-35
LOS E	35-43
LOS F	> 43

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 6-6. Freeway Segment Analysis Schematic Results (VISSIM) – 2045 Build AM Peak (I-285 SB & NB)

Table 6-10. Freeway Segment Analysis Results (VISSIM) – 2045 Build PM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
I-20 EB	I-20 EB before Candler Rd off-ramp	BFFS	4	6,147	18	87	F
	I-20 EB at Candler Rd off-ramp	Diverge	4	6,085	26	59	F
	I-20 EB after Candler Rd off-ramp	BFFS	4	5,398	16	85	F
	I-20 EB at Candler Rd on-ramp	Merge	5	6,081	17	71	F
	I-20 EB at Columbia Dr off-ramp	Diverge	4	6,168	34	46	F
	I-20 EB to I-285 NB & SB Ramps	Diverge	4	5,295	49	27	D
	I-20 EB at the System Interchange	BFFS	3	4,068	61	22	C
	I-20 EB off-ramp to CD Rd	Diverge	4	4,125	62	17	B
	I-20 EB CD Rd	Diverge	4	4,521	47	24	C
	I-20 EB after off-ramp to CD Rd	BFFS	3	3,037	63	16	B
	I-20 EB on-ramp from CD Rd	Merge	5	6,272	56	22	C
	I-20 EB on-ramp from Wesley Chapel Rd	Merge	6	6,613	55	20	C
	I-20 EB between Wesley Chapel and Panola Rd	BFFS	4	6,590	59	28	D
	I-20 EB off-ramp to Panola Rd	Diverge	5	6,551	61	21	C
	I-20 EB after Panola Rd off-ramp	BFFS	4	5,488	62	22	C
	I-20 EB on-ramp from Panola Rd	Merge	5	5,916	60	20	C
	I-20 EB after on-ramp from Panola Rd	BFFS	4	6,013	61	25	C
	I-20 EB off-ramp to Lithonia Industrial Blvd	Diverge	4	5,777	51	29	D
	I-20 EB after Lithonia Industrial Blvd off-ramp	BFFS	3	5,042	61	28	D
	I-20 EB on-ramp from Evans Mill Rd	Merge	4	5,867	63	23	C
I-20 WB	I-20 WB off-ramp to Evans Mill Rd	Diverge	4	5,582	29	48	F
	I-20 WB after Lithonia Industrial Blvd off-ramp	BFFS	3	5,029	60	28	D
	I-20 WB on-ramp from Lithonia Industrial Blvd	Merge	4	5,488	57	24	C
	I-20 WB after on-ramp from Panola Rd	BFFS	4	5,887	54	28	D
	I-20 WB off-ramp to Panola Rd	Diverge	5	5,475	43	27	D
	I-20 WB after Panola Rd off-ramp	BFFS	4	5,346	41	39	E
	I-20 WB on-ramp from Panola Rd	Merge	5	4,848	35	35	D
	I-20 WB between Wesley Chapel and Panola Rd	BFFS	4	6,208	25	62	F
	I-20 WB off-ramp to Wesley Chapel Rd	Diverge	4	6,063	39	38	E
	I-20 WB after off-ramp to Wesley Chapel Rd	BFFS	3	3,335	62	18	B
	I-20 WB at on-ramp from Wesley Chapel Rd	Merge	4	3,651	62	15	B
	I-20 WB between Wesley Chapel on-ramp to I-285 NB on-ramp	BFFS	3	3,654	59	21	C
	I-20 WB at I-285 NB on-ramp	Merge	4	3,714	62	15	B
	I-20 WB between I-285 NB on-ramp to I-285 SB on-ramp	BFFS	3	3,707	62	20	C
	I-20 WB after I-285 SB on-ramp	Merge	4	5,306	61	22	C
	I-20 WB Columbia Dr on-ramp	Merge	5	5,297	59	18	B
	I-20 WB at Candler Rd off-ramp	Diverge	4	5,635	61	23	C

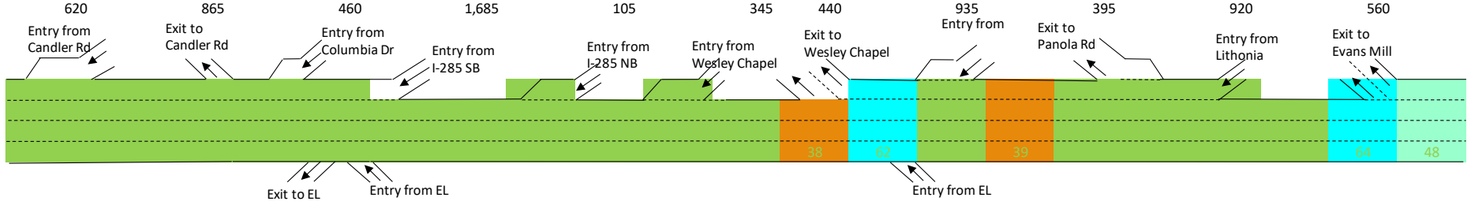
Table 6-10. Freeway Segment Analysis Results (VISSIM) – 2045 Build PM

Mainline	Location	Segment Type	No. Of lanes	Avg Volume	Avg Speed	Avg Density (veh/mi/ln)	LOS
	I-20 WB after Candler Rd off-ramp	BFFS	4	4,883	62	20	C
	I-20 WB at Candler Rd on-ramp	Merge	5	5,390	59	18	C
I-285 NB	I-285 NB at Flat Shoals Rd diverge	Diverge	4	6,320	49	33	D
	I-285 NB after Flat Shoals Rd off-ramp	BFFS	4	5,557	35	41	E
	I-285 NB to Flat Shoals Rd on-ramp	Merge	5	5,757	24	49	F
	I-285 to I-20 EB off-ramp	Diverge	4	5,820	27	54	F
	I-285 NB after I-20 EB off-ramp	Diverge	3	4,035	59	23	C
	I-285 NB after I-20 WB off-ramp	BFFS	3	1,738	52	11	B
	I-285 NB and I-20 EB and WB ramps merge	Merge	6	5,344	59	15	B
	I-285 after NB and I-20 EB and WB ramps merge	BFFS	5	7,155	56	25	C
	I-285 NB at Glenwood Rd off-ramp	Diverge	4	6,099	48	32	D
	I-285 NB after Glenwood Rd off-ramp	BFFS	4	5,458	51	27	D
	I-285 NB after Glenwood Rd on-ramp merge	Merge	5	5,781	52	22	C
I-285 SB	I-285 SB Glenwood Rd off-ramp	Diverge	4	6,312	19	82	F
	I-285 SB after Glenwood Rd off-ramp	BFFS	4	6,696	18	95	F
	I-285 SB at Glenwood Rd on-ramp	Merge	5	6,530	22	60	F
	I-285 SB after Glenwood Rd on-ramp	BFFS	4	6,540	54	31	D
	I-285 SB and I-20 EB and WB ramps diverge	Diverge	5	6,609	59	22	C
	I-285 SB after I-20 EB and WB ramps merge	BFFS	3	3,747	63	20	C
	I-285 at I-20 on-ramp	Merge	4	4,576	54	21	C
	I-285 SB after Flat Shoals Rd off-ramp	BFFS	4	4,659	61	19	C
	I-285 SB at Flat shoals Rd on-ramp	Diverge	5	5,264	57	18	C
	I-285 SB after Flat Shoals Rd on-ramp	BFFS	4	5,320	61	22	C

Table 6-10 and schematic **Figures 6-7** and **6-8** show that during the PM peak I-20 WB between Panola Rd and Wesley Chapel Rd operates at LOS E and F (average speeds below 30 mph). I-20 EB between Candler Rd and Columbia Dr operates at LOS F (average speeds below 20 mph). The congestion in this section of freeway meters traffic entering into the study segments along I-20 EB. The primary reason for congestion in this section is the congestion on SB Columbia Dr and the lack of capacity to process year 2045 volumes at the Columbia Dr/Rainbow Dr intersection. I-20 WB and EB C-D roads operate at an acceptable LOS C. Along I-285 NB the segments between Flat Shoals Rd and I-20 operate at LOS F. I-285 SB sections between Glenwood Rd and the system interchange operate at LOS F. Although it appears that several sections are performing at unacceptable LOS in the Build condition, the Build scenario processed 5.3% more vehicles compared to the No-Build condition in 2045. And the average stream speed along I-20 WB is 52mph in Build scenario compared to 38mph in No-Build. In the EB direction, the Build scenario processed 3% more volume than No-Build. The section that operates worse than the No-Build scenario is I-285 SB at the Flat Shoals Rd interchange as the density in the Build scenario is higher than the No-Build affecting the mainline operations. Further discussion of results is presented in Chapter 7.

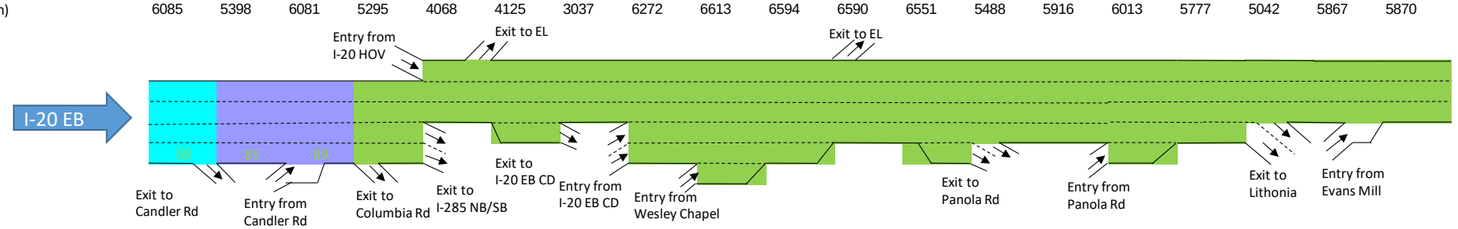
YR 2045 BUILD PM Peak - Graphical Results ---- I-20 WB

No of Lanes	5	5	4	4	4	4	3	4	3	4	3	4	4	5	4	5	4	4	3	3	3
Distance (ft)		531	2,500	3,174	470	1,767	500	2,031	767	1,193	1,740	5,243	1,107	11,306	250	2,129	270	6,520	405	10,692	2,500	4,960
Speed (mph)	59	62	61	59	61	61	62	62	59	62	62	39	25	35	41	43	54	57	60	29	40
Level of Service	C	B	C	C	C	C	C	B	C	B	B	E	F	D	E	D	D	C	D	F	F
Density (pc/mi/ln))	18	16	23	22	22	22	20	15	21	15	18	38	62	35	39	27	28	24	28	64	48
Ramp Demand Volume (vph)	620		865		460		1,685		105		345	440		935		395		920		560	
Simulated Volumes (vph)	5390	4883	5635	5297	5306	5306	3707	3714	3654	3651	3335	6063	6208	4848	5346	5475	5887	5488	5029	5582	5618
Demand Volumes (vph)	6040	5420	6285	6285	5825	5735	4050	4050	3945	3945	3600	6735	6560	6560	5625	6020	6020	6020	5100	5660	5660



YR 2045 BUILD PM Peak - Graphical Results ---- I-20 EB

Demand Volumes (vph)	8370	7395	8150	7055	5200	5200	3825	7835	7835	8150	8125	8125	8125	6790	7305	7305	7305	6105	6930	6930
Simulated Volumes (vph)	6085	5398	6081	5295	4068	4125	3037	6272	6613	6594	6590	6551	5488	5916	6013	5777	5042	5867	5870	
Ramp Demand Volume (vph)	975	755		1,095	2,385	1,375	4,010	315				1,335			515			1,200	825	
No of Lanes	4	4	4	4	3	4	3	5	6	5	4	5	4	4	5	4	3	4	3	
Distance (ft)	1,500	2,945	3,157	2,617	788	2,137	6,853	1,300	682	1,804	7,176	2,368	2,739	770	5,606	1,270	12,364	2,136	5,427	
Speed (mph)	26	16	17	49	61	62	63	56	55	44	59	61	62	60	61	51	61	63	65	
Level of Service	F	F	F	D	C	B	B	C	C	D	D	C	C	C	C	D	D	C	D	
Density (pc/mi/ln))	59	85	89	27	22	17	16	22	20	30	28	21	22	25	20	29	28	23	30	



LEGEND

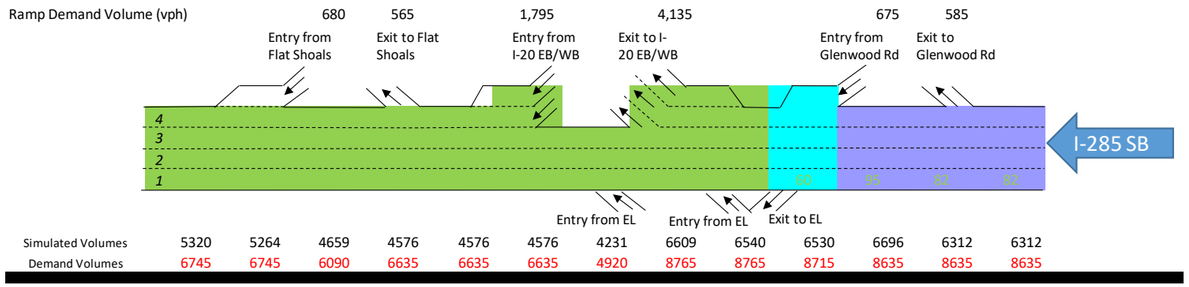
Speed (mph)	Freeway Geometric	(veh/mi/ln)		Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 6-7. Freeway Segment Analysis Schematic Results (VISSIM) – 2045 Build PM Peak (I-20 WB & EB)

YR 2045 BUILD PM Peak - Graphical Results ---- I-285 SB

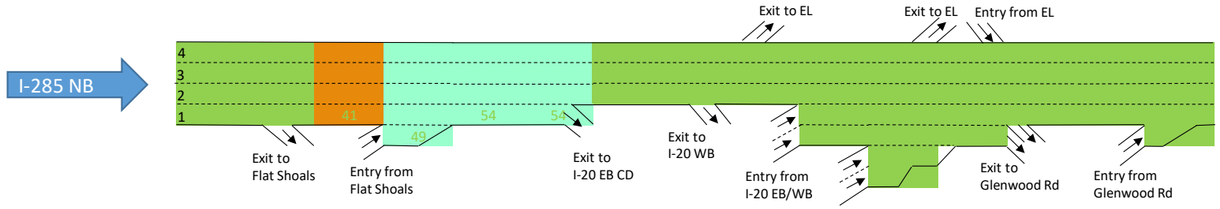
No of Lanes	4	5	4	4	4	4	3	5	4	5	4	4	4
Distance (ft)	867	330	2,776	1,500	2,762	1,500	5,996	1,242	2,958	340	2,334	1,500	1,103
Speed (mph)	61	57	61	54	54	54	60	59	54	22	18	19	19
Level of Service	C	C	C	C	C	C	C	C	D	F	F	F	F
Density (pc/mi/ln))	22	18	19	21	21	21	24	22	31	60	95	82	82



Simulated Volumes	5320	5264	4659	4576	4576	4576	4231	6609	6540	6530	6696	6312	6312
Demand Volumes	6745	6745	6090	6635	6635	6635	4920	8765	8765	8715	8635	8635	8635

YR 2045 BUILD PM Peak - Graphical Results ---- I-285 NB

Demand Volumes	6390	6390	5740	6230	6230	6230	4315	4315	4210	3910	7960	8010	7160	7560	7560
Simulated Volumes	6320	6320	5557	5757	5820	5820	4035	4035	3914	5344	7155	6099	5458	5781	6046



Ramp Demand Volume (vph)		675	510			1,980		100	2,390	1,850			885	425	
No of Lanes	4	4	4	5	4	4	3	3	3	5	7	5	4	4	4
Distance (ft)	2,017	1,500	4,102	197	4,937	1,500	1,534	500	1,455	1,908	1,158	3,633	1,609	295	730
Speed (mph)	49	49	35	24	27	27	59	59	63	59	56	48	51	52	55
Level of Service	D	D	E	F	F	F	C	C	C	C	C	C	D	D	D
Density (vehicles)	33	33	41	49	54	54	23	23	21	18	18	26	27	28	27

LEGEND

Speed (mph)	Freeway Geometric (veh/mi/ln)			Freeway LOS	
<=20	Density above	75		LOS A to C	< 28
20 - 30	Density between	56	75	LOS D	28-35
30-45	Density between	44	55	LOS E	35-43
>=45	Density between	35	43	LOS F	> 43
	Density between	0	35		

1,000	Demand volume highlighted if simulated falls below 90%
1,000	Demand volume
1,000	Simulated Volume
Density	Derived from VISSIM
LOS	Letter Grades based on density ranges specified in HCM

Figure 6-8. Freeway Segment Analysis Schematic Results (VISSIM) – 2045 Build PM Peak (I-285 SB & NB)

The 2045 Build signalized intersection results, listed in **Table 6-11,** were obtained from VISSIM by drawing node boundaries around each study intersection.

Table 6-11. Signalized Intersection LOS Results (VISSIM) – 2045 Build

Intersection	AM		PM	
	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)	LOS
Candler Rd / Eastwyck Dr	6.6	A	18.8	B
Candler Rd / I-20 WB Ramps	15.3	B	21.6	C
Candler Rd / I-20 EB Ramps	12.7	B	18.1	B
Candler Rd / H F Shepherd Dr	8.1	A	8.6	A
Columbia Dr / Columbia Woods Dr	6.7	A	7.2	A
Columbia Dr / I-20 EB ramp	7.9	A	26.5	C
Columbia / Rainbow Dr	66.3	E	106.9	F
Wesley Chapel Rd / Snapfinger Woods Dr	59.4	E	118.5	F
Wesley Chapel Rd / I-20 WB ramps	35.2	D	27.9	C
Wesley Chapel Rd / I-20 EB ramps	39.5	D	22.3	C
Wesley Chapel Rd / Eastside Dr	23.6	C	7.7	A
Panola Rd / Panola Industrial Dr	40.5	D	60.0	E
Panola Rd / I-20 WB ramps	27.9	C	39.7	D
Panola Rd / I-20 EB ramps	29.4	C	30.6	C
Panola Rd / Minola Dr	32.4	C	37.0	D
Lithonia Industrial Blvd / Chupp Rd	26.5	C	12.9	B
Lithonia Industrial Blvd / WB Frontage Rd	29.2	C	12.3	B
Lithonia Industrial Blvd / EB Frontage Rd	24.8	C	26.4	C
Evans Mill Rd / Hillandale Dr	14.0	B	2.6	A
Evans Mill Rd / WB Frontage Rd	39.4	D	12.6	B
Evans Mill Rd / EB Frontage Rd	14.8	B	15.8	B
Evans Mill Rd / Mall Pkwy	32.4	C	37.8	D
Glenwood Dr / Austin Rd	45.2	D	26.1	C
Glenwood Dr / I-285 SB ramps	38.0	D	27.6	C
Glenwood Dr / I-285NB ramps	20.1	C	27.3	C
Glenwood Dr / Atherton Dr	54.5	D	1.7	A
Flat Shoals Rd / Panthersville Rd	27.6	C	18.2	B
Flat Shoals Rd / I-285 SB ramps	9.5	A	12.7	B
Flat Shoals Rd / I-285 NB ramps	13.5	B	13.2	B
Flat Shoals Rd / Clifton Springs Rd	20.9	C	34.1	C

From the above **Table 6-11,** the 2045 Build VISSIM analysis results show that that the following signalized intersections operate at LOS E and F: Columbia Dr at Rainbow Dr (LOS E, LOS F, AM peak/PM peak), Wesley Chapel Rd at Snapfinger Woods Dr (LOS E, LOS F, AM peak/PM peak) and Panola Rd at Panola Industrial Dr (LOS E, PM peak).

Table 6-12. Ramp Terminal Queue Lengths (VISSIM) – 2045 Build

Ramp Terminal	Movement	Ramp Lengths	AM		PM	
			Avg Queue (ft)	Max Queue (ft)	Avg Queue (ft)	Max Queue (ft)
Candler Rd / I-20 WB Ramps	WBL	990	51	195	92	327
	WBR		33	148	22	110
Candler Rd / I-20 EB Ramps	EBL	1,130	27	101	27	122
	EBR		24	99	47	205
Columbia Dr / I-20 EB Ramps	EBL	1,200	29	126	36	201
	EBR		0	51	550	1324
Wesley Chapel Rd / I-20 WB Ramps	WBL	790	29	123	53	185
	WBR		20	93	38	163
Wesley Chapel Rd / I-20 EB Ramps	EBL	940	113	478	124	478
	EBR		57	270	43	232
Panola Rd / I-20 WB Ramps	WBL	860	12	95	23	154
	WBR		3	67	35	181
Panola Rd / I-20 EB Ramps	EBL	1,200	45	216	50	227
	EBR		42	220	59	286
Lithonia Industrial Blvd / EB Frontage Rd	EBL	3,000	43	229	69	301
	EBT		1	96	0	77
Evans Mill Rd / WB Frontage Rd	WBL	2,360	37	259	31	187
	WBT		87	449	28	119
	WBR		400	1290	7	150
Glenwood Dr / I-285 SB Ramps	SBL	800	305	1259	63	277
	SBR		38	460	11	165
Glenwood Dr / I-285 NB Ramps	NBL	900	101	427	123	519
	NBR		16	100	34	192
Flat Shoals Rd / I-285 SB Ramps	SBL	1,850	53	263	75	358
	SBR		2	96	2	71
Flat Shoals Rd / I-285 NB Ramps	NBL	2,430	88	532	83	436
	NBR		6	184	3	168

Table 6-12 presents the queue lengths for the ramp terminal signals by approach. It is observed that the maximum queue exceeds the ramp length at two locations which are Columbia Dr at I-20 EB ramps in the PM peak and Glenwood Dr at I-285 SB Ramps in the AM peak. At I-20 EB at Columbia Dr, the maximum queue crosses the ramp length, and the reason for the queue spilling back on to the mainline is due to the congestion along SB Columbia Dr and the lack of desired capacity to process design year volumes at the Columbia Dr/Rainbow Dr intersection.

In both the AM and PM peak models the location where the ramp terminus queue length in the Build scenario is substantially higher than the No-Build scenario is at the I-20 WB/Evans Mill Rd ramp terminus signal. In the No-Build scenario traffic congestion is observed upstream of the WB Lithonia Industrial Blvd on-ramp due to which the vehicles arriving at the WB Evans Mill Rd frontage road are random. Whereas, in the Build condition as congestion is relieved the volumes arriving at the WB Evans Mill frontage road are in the form of platoons and therefore the ramp terminus queue for the WB right turn movement is higher in the Build scenario and the intersection is able to process 200 more vehicles.

6.2.3 Travel Time Comparison

To evaluate the benefits of the proposed project, travel time data was collected for No-build and Build conditions of open and design year. Travel time segments were selected between every two adjacent interchanges along I-20 mainline and I-285 mainline. Tables **6-13** and **6-14** show the travel time in 2025 and 2045 Build and No-Build conditions. A comparison of the travel time reveals that there will be time savings for vehicles driving on I-20 WB, I-285 SB and I-285 NB in the Build condition. A slight increase in travel time 1% in the AM peak will be observed for I-20 EB due to higher volume in the Build model. This increase is acceptable considering that more vehicle throughput is processed in the Build model compared to the No-Build. In PM peak, a slight decrease in the travel time is observed due to improvements provided.

Table 6-13. Travel Time (VISSIM) – YR 2025

Direction	From	To	Distance (mi)	2025 AM			2025 PM		
				No-Build	Build	Travel Time Saving (%)	No-Build	Build	Travel Time Saving (%)
I-20 Mainline									
Eastbound	Candler Road Off-Ramp	Columbia Dr Off-Ramp	1.14	66	66	0%	84	77	9%
	Columbia Dr Off-Ramp	I-285 NB/SB Off-Ramp	0.48	28	28	1%	32	30	5%
	I-285 NB/SB Off-Ramp	Wesley Chapel Road On-Ramp	2.11	120	125	-4%	122	123	-1%
	Wesley Chapel Road On-Ramp	Panola Rd On-Ramp	2.73	160	161	-1%	167	164	2%
	Panola Rd On-Ramp	Lithonia Ind. Blvd. Off-Ramp	1.49	84	84	0%	86	85	1%
	Lithonia Ind. Blvd. Off-Ramp	Evans Mill Road On-Ramp	2.32	135	135	0%	137	137	0%
	Candler Road Off-Ramp	**Evans Mill Road On-Ramp**	**10.28**	**594**	**600**	**-1%**	**628**	**615**	**2%**
Westbound	Evans Mill Road Off-Ramp	Lithonia Ind. Blvd. On-Ramp	2.03	150	120	20%	124	120	3%
	Lithonia Ind. Blvd. On-Ramp	Panola Road Off-ramp	1.38	247	79	68%	89	81	8%
	Panola Road Off-ramp	Wesley Chapel Road Off-Ramp	2.86	267	162	39%	375	207	45%
	Wesley Chapel Road Off-Ramp	I-285 SB On-Ramp	2.01	169	117	31%	310	120	61%
	I-285 SB On-Ramp	Columbia Dr On-Ramp	0.45	26	27	-5%	26	25	1%
	Columbia Dr On-Ramp	Candler Road On-Ramp	1.19	70	70	0%	68	68	0%
	Evans Mill Road (Overpass)	**Candler Road On-Ramp**	**9.92**	**858**	**505**	**41%**	**923**	**622**	**33%**
I-285 Mainline									
S o	Glenwood Ave On-Ramp	I-20 WB Off-Ramp	1.35	97	108	-11%	123	81	35%

	I-20 WB Off-Ramp	I-20 EB On-Ramp	1.14	65	65	0%	68	65	4%
	I-20 Off-Ramp	Flat Shoals Rd On-Ramp	1.62	96	94	1%	96	97	-1%
	Glenwood Rd Off-Ramp	**Flat Shoals Rd On-Ramp**	**4.11**	**258**	**267**	**-4%**	**287**	**242**	**16%**
Northbound	Flat Shoals Rd Off-Ramp	I-20 EB Off-Ramp	1.71	119	119	0%	145	124	15%
	I-20 EB Off-Ramp	I-20 WB On-Ramp	0.68	38	38	1%	38	38	-1%
	I-20 WB On-Ramp	Glenwood Ave On-Ramp	1.71	116	104	11%	139	112	19%
	Flat Shoals Rd Off-Ramp	**Glenwood Ave On-Ramp**	**4.10**	**274**	**260**	**5%**	**322**	**274**	**15%**

In the year 2025, significant improvement in travel time is observed along I-20 WB. Travel time savings of 41% (AM Peak) and 33% (PM Peak) are observed when comparing Build to No-Build, this improvement is observed as a result of adding a WB auxiliary lane between Lithonia Industrial Blvd and Wesley Chapel Rd and WB C-D system lanes between Wesley Chapel Rd and the system interchange, modifying the single lane loop ramp from I-20 WB to I-285 SB to a two lane directional ramp.

Along I-285 NB, substantial travel time savings of 15% are observed in the PM peak, due to the addition of an auxiliary lane between the system interchange and Glenwood Road and the improvement of I-20 to I-285 NB/SB ramps. For the I-285 SB PM peak, 16% travel time improvement between no build and build is observed. Due to the higher volume in the build condition the upstream of I-285 SB off ramp to Glenwood backs up and reduces the volume entering the section downstream of Glenwood on-ramp, thus improving the travel time. And for I-285 SB AM peak, 4% increase in travel time is observed.

Table 6-14. Travel Time (VISSIM) – YR 2045

Direction	From	To	Distance (mi)	2045 AM			2045 PM		
				No-Build	Build	Travel Time Saving (%)	No-Build	Build	Travel Time Saving (%)
I-20 Mainline									
Eastbound	Candler Road Off-Ramp	Columbia Dr Off-Ramp	1.14	66	67	-1%	184	196	-7%
	Columbia Dr Off-Ramp	I-285 NB/SB Off-Ramp	0.48	29	29	1%	39	38	0%
	I-285 NB/SB Off-Ramp	Wesley Chapel Road On-Ramp	2.11	121	125	-3%	123	122	1%
	Wesley Chapel Road On-Ramp	Panola Rd On-Ramp	2.73	161	162	0%	169	171	-1%
	Panola Rd On-Ramp	Lithonia Ind. Blvd. Off-Ramp	1.49	85	84	1%	88	90	-2%
	Lithonia Ind. Blvd. Off-Ramp	Evans Mill Road On-Ramp	2.32	136	136	0%	138	138	0%
	Candler Road Off-Ramp	**Evans Mill Road On-Ramp**	**10.28**	**598**	**602**	**-1%**	**741**	**756**	**-2%**

Westbound	Evans Mill Road Off-Ramp	Lithonia Ind. Blvd. On-Ramp	2.03	443	120	73%	723	123	83%
	Lithonia Ind. Blvd. On-Ramp	Panola Road Off-ramp	1.38	365	81	78%	324	90	72%
	Panola Road Off-ramp	Wesley Chapel Road Off-Ramp	2.86	603	169	72%	520	380	27%
	Wesley Chapel Road Off-Ramp	I-285 SB On-Ramp	2.01	156	166	-7%	276	121	56%
	I-285 SB On-Ramp	Columbia Dr On-Ramp	0.45	26	46	-79%	26	26	1%
	Columbia Dr On-Ramp	Candler Road On-Ramp	1.19	72	75	-5%	68	69	-1%
	Evans Mill Road (Overpass)	**Candler Road On-Ramp**	**9.92**	**1593**	**659**	**59%**	**1869**	**807**	**57%**
I-285 Mainline									
Southbound	Glenwood Ave On-Ramp	I-20 WB Off-Ramp	1.35	113	102	9%	159	161	-1%
	I-20 WB Off-Ramp	I-20 EB On-Ramp	1.14	65	65	0%	65	65	0%
	I-20 Off-Ramp	Flat Shoals Rd On-Ramp	1.62	95	95	1%	97	100	-4%
	Glenwood Rd Off-Ramp	**Flat Shoals Rd On-Ramp**	**4.11**	**273**	**262**	**4%**	**321**	**326**	-2%
Northbound	Flat Shoals Rd Off-Ramp	I-20 EB Off-Ramp	1.71	126	125	1%	700	233	67%
	I-20 EB Off-Ramp	I-20 WB On-Ramp	0.68	39	38	2%	39	39	0%
	I-20 WB On-Ramp	Glenwood Ave On-Ramp	1.71	115	102	11%	133	113	15%
	Flat Shoals Rd Off-Ramp	**Glenwood Ave On-Ramp**	**4.10**	**280**	**265**	**5%**	**873**	**386**	56%

In the year 2045, significant improvement in travel time is observed along I-20 WB. 59% (AM Peak) and 57% (PM Peak) travel time savings are observed when Build condition is compared to No-Build. This improvement is observed as a result of adding a WB auxiliary lane at Lithonia Industrial Blvd and Wesley Chapel Rd and WB C-D system lanes between Wesley Chapel Rd and the system interchange, modifying the single lane loop ramp from I-20 WB to I-285 SB to a two - lane directional ramp.

Along I-285 NB, substantial travel time savings of 56% are observed in the PM peak. This is due to the addition of an auxiliary lane between the system interchange and Glenwood Road and the improvement of I-20 to I-285 NB/SB ramps. For the rest along I-20 EB no significant difference in travel time is observed.

7 SUMMARY OF OPERATIONS ANALYSIS

7.1 SUMMARY OF VISSIM RESULTS

Chapters 5 and 6 illustrate comparison of No-Build and Build conditions utilizing VISSIM modeling. Reviewing the results, the I-285/ I-20 system to system interchange and corresponding ramps themselves perform at acceptable levels of service. However, several sections upstream and downstream of the interchange seem to be at unacceptable levels of service especially in the 2045 design year. However, it must be noted that the overall improvement to the study area such as improved throughput and improved travel speed through the corridor in Build condition should be considered as a direct benefit of the project.

The improvements in volume processed, speed and density when comparing the Build scenario to the No-Build are listed below:

7.1.1 YR 2025 (NO-BUILD VS BUILD)

AM Peak: In the Build scenario along I-20 WB all of the sections operate with an acceptable LOS with the Build improvements and are able to process more volume (0.7% more volume) and provide an acceptable average speed of 60 mph compared to an average speed of 44 mph along the corridor in the No-Build condition. In the EB direction the operations are similar in both the Build and No-Build scenarios (average speeds above 60mph) with the Build scenario processing 1.2% more volume. It must be noted that I-20 EB is the nonpeak direction during AM.

PM Peak: In the Build scenario along I-20 WB all of the sections operate at an acceptable LOS, except at the Wesley Chapel Rd section, with the Build improvements and can process 5% more volume and provide an acceptable average speed of 58 mph compared to an average speed of 51 mph along the corridor in the No-Build scenario. In the EB direction, the Build scenario is processing 3% more volume compared to the No-Build condition and the failures are observed in both the Build and No-Build scenarios along I-20 between Candler Rd and the system interchange. The congestion in this section of freeway meters traffic entering into the study segments along I-20 EB.

7.1.2 YR 2045 (NO-BUILD VS BUILD)

AM Peak: In the No-Build scenario, the sections between Evans Mill Rd and the system interchange are failing. Whereas, in the Build scenario due to the additional auxiliary lane and new C-D system the corridor even though still performing at unacceptable LOS, is able to process more volume at a better speed compared to the No-Build scenario. In the Build scenario along I-20 WB an additional 850 vehicles are being processed per hour (17% more volume) when compared to the No-Build condition. As a result, more volume is able to reach

I-20 WB near Columbia Drive causing a bottle neck in that area. This is not new traffic that is arriving at the Columbia Dr location, but it is traffic that was being metered upstream at Lithonia Industrial Blvd before the improvements. In the Build scenario the congestion seems to extend from the Columbia Dr on-ramp to the Wesley Chapel Road WB on-ramp. However, it must be noted that even with the congestion shown in this section, I-20 WB processes 800 more vehicles in Build condition compared to the No-Build condition. In the EB direction the operations are similar in both the Build and No-Build scenarios (average speeds above 60mph) and in addition the Build scenario is processing 9% more volume due to improved capacity in Build condition.

PM Peak: In the No-Build scenario almost all segments along I-20 WB within the study area are at failing LOS. In the Build condition the overall LOS of the corridor is also at unacceptable levels. However, in the Build scenario 5.3% more vehicles are processed compared to the No-Build condition and in the Build scenario I-20 WB operates with average stream speed of 53 mph compared to 38 mph in the No-Build condition. In the EB direction, the segments between the Candler Rd off-ramp and Columbia Dr off-ramp operate with a LOS F in both the Build and No-Build conditions. The congestion in this section of freeway meters traffic entering into the study segments along I-20 EB. This interchange location due to close proximity to the Candler Road interchange and I-285 system interchange along with the turbulence from the future I-20 express lane slip ramp creates bottle neck which restrict the amount of traffic that can enter the study area. However, the Build scenario still processes 3% more volume than No-Build.

7.1.3 Travel Time Results Summary

Significant improvement in travel time is observed in both the open year and design year along I-20 WB sections between Evans Mill Rd off-ramp and the system interchange and along I-285 NB from the system interchange to Glenwood Rd on-ramp due to the proposed improvements. Whereas, along I-20 EB travel times remain about the same between No-Build and Build scenarios. Travel time along I-285 SB increases slightly in the Build scenario due to higher volume in Build condition than in the No-Build scenario.

7.2 SUMMARY OF SYNCHRO RESULTS

For signalized and unsignalized intersections, delay and LOS are the measures of effectiveness that are being reviewed utilizing SYNCHRO to compare No-Build and Build conditions. The signalized and unsignalized intersection performance continue to deteriorate when compared to the existing year. Further the number of intersections failing in the open year and design year continue to increase. This deterioration is not a direct result of the proposed project but is because of general growth in the area. The project scope does not include improvements to arterials or adjacent intersections. The performance of the intersections is only documented to ensure that the proposed project does not negatively impact arterials in the area. In the year 2025 the intersection LOS between No-Build vs Build are similar, in the year 2045 PM peak results are similar between No-build and Build whereas in the AM peak results at Minola Rd, Evans Mill Rd & Flat Shoals Rd ramp terminus signals delay is higher in Build scenario when compared to No-Build due to higher turn volumes destined towards I-20 and I-285.

8 EXISTING SAFETY ANALYSIS

8.1 INTRODUCTION

The purpose of this safety analysis section is to evaluate the historical crash data along the study corridors and to identify existing safety deficiencies within the project limits. This study will further be enhanced in later part of the project development to include predictive crash analysis, based on methodologies outlined in the Highway Safety Manual (HSM), published by American Association of State Highway and Transportation Officials (AASHTO) and identify safety improvements that can be included in the project design.

8.2 CRASH ANALYSIS

Historical crash data was obtained from Georgia Electronic Accident Reporting System (GEARS) for the six-year period from 2013 to 2018 along I-285, I-20, crossroads and local street network within the project limits. Crash data was obtained on I-20 from the western terminus, Candler Road to the eastern terminus, Evans Mill Road (approximately 9.6 miles); and on I-285 from the southern terminus, Flat Shoals Parkway to the northern terminus, Glenwood Road (approximately 4.6 miles). Figure **8-1** below shows the safety analysis study limits for this project.

Figure 8-1. Safety Analysis Study Limits

8.2.1 INTERSTATES- 285 AND 20

The crash data for interstate sections within this study includes both I-285 and I-20 corridors. A total of 15,554 crashes occurred during the analysis period on the interstates within the study limits. 10,071 crashes were recorded on I-20 and 5,483 crashes were recorded on I-285. The number of crashes per year increased from 1,156 in the year 2013 to 2,280 by year 2018 on I-20. Similarly, along I-285, crashes per year increased from 658 crashes in year 2013 to 1,048 crashes in year 2018.

The 'Average Crash Rate Method' of crash analysis, based on segment length, AADT and number of crashes occurred, was used for calculating actual crash rate for the roadway segments. Crash rates were calculated using the following equation:

$$Crash\ Rate_i = \frac{C_i * 10^8}{L * 365 * AADT_i}$$

in which; C is the number of crashes along the segment in year *i*, L is the segment length, and AADT is the segment's annual average daily volume for year *i*. Traffic volumes were obtained from TADA (Traffic Analysis and Data Application) for all count stations along the interstates within the study limits. **Tables 8-1 through 8-4** in **Appendix 8-1** show the crash rate calculation for the years 2013-2018 in more detail.

Crash rates are calculated for total crashes, crashes involving injuries, and crashes involving fatalities along the freeway segments and on the ramps. These are then compared to the statewide averages for Interstate (Urbanized) highways and urbanized ramps. The benefit of crash rate analysis is that it provides a more effective comparison of similar locations with safety issues. **Appendix 8-2** provides the GDOT Statewide Crash Rates for years 2013 to 2018.

The overall trend of the crash data for I-20 corridor indicates that the number and rate of the total crashes, as well as the number and rate of the injury crashes has increased during the study period. Crash rate information showed that the overall crash rates for I-20 were significantly higher than the statewide average during the study period. The crash rates involving injuries were substantially higher than the statewide average data in the years 2015 and 2016. The crash rates for 2017 and 2018 were higher than the previous year statewide average rate. The fatal crash rates on half of the segments along I-20 were twice the statewide averages during the study period. **Table 8-2** indicates that every ramp along I-20 experiences high crash rate in one or more of the study years.

Similarly, **Table 8-3** shows that from year 2013 to 2017 there has been an increase in the number and rate of the total crashes as well as the number and rate of the injury crashes occurring along I-285 within the study limits. All segments along I-285 within the study limits have higher crash rates than the statewide averages (by 50-80 percent) during the study period except the segment at I-285/20 Interchange in year 2018. Regarding the ramps on the I-285 corridor, **Table 8-4** indicates that only two ramps, I-285 WB on-ramp at Flat Shoals Rd and I-285 NB on-ramp at Glenwood Rd, had crash rates lower than the statewide average rates.

Crash data was analyzed to determine the type of crashes and frequency of each crash type occurring along the interstates. In Georgia, crash data is categorized by manner of collision or type of crash. Except for the crashes that are "not a collision with a motor vehicle," all other types of crashes focus on the manner in which vehicles collide. A crash categorized as "not a collision with a motor vehicle" occurs when a vehicle leaves the roadway and/or strikes a fixed object (utility pole, guardrail, curb, structure, etc.), a cyclist, or a pedestrian. **Figure 8-2** presents crash frequencies by crash type for Interstates I-20 and I-285.

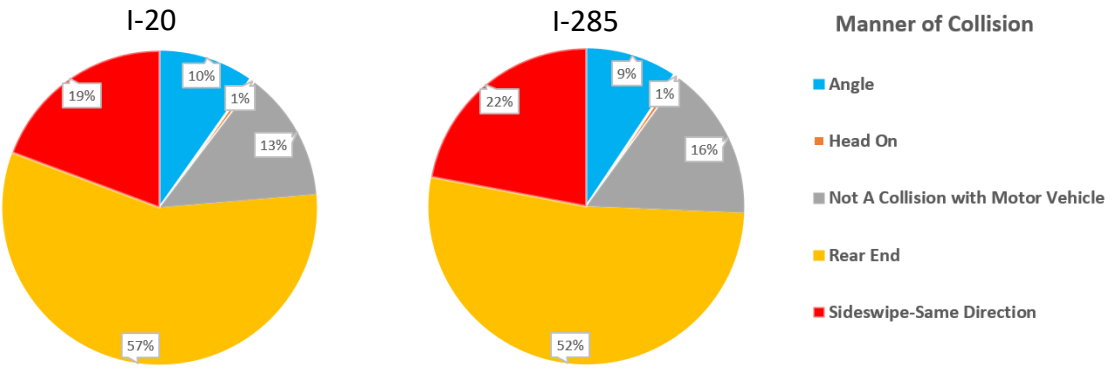


Figure 8-2. Crashes by Type along I-20 and I-285 (2013 to 2018)

On I-20 rear end crashes occurred the most (57 percent of the total crashes), followed by sideswipe in the same direction crashes (19 percent). The next significant crash type is collision with non-motor vehicle (13 percent) and the remaining crash types each accounted for 10 percent or less of the total crashes.

On I-285 rear end crashes occurred the most (52 percent), followed by sideswipe in the same direction (22 percent) and collisions with non-motor vehicle (16 percent). The high percentage of rear end crashes and sideswipe crashes in the same direction is an indication of congestion and improper lane changes.

Figures C.1 through C.12 in **Appendix 8-3** show the location of different crash types analyzed along the interchange of I-285 and I-20 and the interchanges with Flat Shoals Parkway, Columbia Drive, Wesley Chapel Road, Panola Road, and Evans Mill Road. The crash density increases in the vicinity of interchanges and intersections. The most prevalent type of crashes at the interchanges and along the corridors are rear end crashes. The crash density for angle and side swipe opposite direction crashes are higher on crossroads compared to interstates.

Table 8-1 and **Table 8-2** show the number of crashes that occurred by first harmful event and where they occurred on interstates.

Table 8-1. Crashes by First Harmful Event on I-20

First Harmful Event	Entrance/Exit Ramp	Gore	Median	Off Roadway	On Roadway - Non-Intersection	On Roadway - Roadway Intersection	On Shoulder	Other	Total (Percent)
Animal	2	1	0	0	6	6	0	0	**15 (0.1%)**
Curb	4	0	0	2	1	0	0	0	**7 (0.1%)**
Deer	0	0	0	0	4	2	0	0	**6 (0.1%)**
Ditch	1	3	1	12	1	2	3	0	**23 (0.2%)**
Embankment	2	1	0	11	4	0	2	0	**20 (0.2%)**
Guard Rail End	10	7	0	2	3	6	5	0	**33 (0.3%)**
Guard Rail Face	17	3	0	13	7	8	15	0	**63 (0.6%)**
Median Barrier	26	15	82	18	102	82	24	1	**350 (3.5%)**
Motor Vehicle in Motion	682	40	17	60	2987	4044	51	143	**8024 (79.7%)**
Motor Vehicle in Motion - In Other Roadway	2	0	0	0	7	11	1	0	**21 (0.2%)**
Other - Fixed Object	33	4	22	31	48	66	19	1	**224 (2.2%)**
Other Non-Collision	12	4	4	8	46	34	7	2	**117 (1.2%)**
Other Object (Not Fixed)	3	5	2	4	67	85	1	0	**167 (1.7%)**
Other Post/Pole Support	1	0	0	1	0	2	0	0	**4 (0%)**
Overturn	9	0	0	5	3	9	0	0	**26 (0.3%)**
Parked Motor Vehicle	4	1	1	2	8	14	9	1	**40 (0.4%)**
Pedestrian	0	0	0	0	2	1	0	0	**3 (0%)**
Tree	5	1	0	8	6	4	1	0	**25 (0.2%)**
Other	101	5	13	13	69	618	11	66	**896 (8.9%)**
Total	914	93	143	193	3371	4994	149	214	**10071 (100%)**

Out of the 10,071 crashes occurring on I-20 in the six-year analysis period, 8,024 (79.7%) involved motor vehicles in motion, with all other harmful events each accounting for less than 4 percent each. Collision with median barrier (3.5%) and fixed objects (2.2%) were also crash types along I-20.

Table 8-2. Crashes by First Harmful Event on I-285

First Harmful Event	Entrance/Exit Ramp	Gore	Median	Off Roadway	On Roadway - Non-Intersection	On Roadway - Roadway Intersection	On Shoulder	Other	Total (Percent)
Animal	0	0	0	0	1	1	0	0	**2 (0%)**
Curb	8	0	0	0	0	0	0	0	**8 (0.1%)**
Deer	0	0	0	0	0	2	0	0	**2 (0%)**
Ditch	1	1	0	12	2	1	1	0	**18 (0.3%)**
Embankment	4	2	0	7	0	0	1	0	**14 (0.3%)**
Guard Rail End	4	1	0	0	4	1	2	0	**12 (0.2%)**
Guard Rail Face	27	0	1	6	3	4	10	0	**51 (0.9%)**
Median Barrier	146	3	25	9	31	49	11	0	**274 (5%)**
Motor Vehicle in Motion	551	22	9	34	1484	2033	32	27	**4192 (76.5%)**
Motor Vehicle in Motion - In Other Roadway	1	0	0	0	2	4	0	0	**7 (0.1%)**
Other - Fixed Object	75	3	8	10	19	29	9	2	**155 (2.8%)**
Other Non-Collision	22	3	2	8	11	19	2	1	**68 (1.2%)**
Other Object (Not Fixed)	5	0	1	3	15	25	2	0	**51 (0.9%)**
Other Post/Pole Support	0	0	0	0	1	0	0	0	**1 (0%)**
Overturn	8	0	0	10	5	6	0	0	**29 (0.5%)**
Parked Motor Vehicle	4	0	0	1	4	5	3	0	**17 (0.3%)**
Pedestrian	0	0	0	0	0	1	0	0	**1 (0%)**
Tree	5	0	0	7	0	1	0	0	**13 (0.2%)**
Other	91	1	4	10	53	393	4	12	**568 (10.4%)**
Total	952	36	50	117	1635	2574	77	42	**5483 (100%)**

Crash data on I-285 indicates that out of 5,483 crashes that occurred during the six-year analysis period, 4,192 (76.5%) crashes were due to motor vehicles in motion, followed by 274 (5%) collisions with median barrier, and 155 collisions with fixed objects (2.8%).

A total of 1,866 crashes occurred on the ramps of which 1237 crashes were reported at the I-285/20 Interchange. There were seventeen overturn crashes on entrance/exit ramps for the entire study area, of which five occurred on the exit ramp from I-285 SB to I-20 EB, four on I-20 WB to I-285 SB loop ramp, two on I-20 WB to I-285 NB ramp, two on I-285 SB to I-20 WB ramp, two on I-20 EB to I-285 SB ramp, one on I-20 EB to I-285 NB ramp, and one on I-285 NB exit ramp to Flat Shoals Road. Eleven out of 17 crashes occurred during the dark and not-lighted condition. Vehicles of 16 crashes on the I-285/20 Interchange ramps were Tractor/Trailer, negotiating a curve and their speed was reported "Too fast for the condition". **Table 8-3** provides information about the crashes on the I-285/20 Interchange ramps. Results indicate that 285 out of 1237 (23%) crashes occurred during dark and not lighted conditions; 473 crashes (38%) occurred when the ramp surface was wet or covered with ice or snow; and 495 crashes (40%) were single vehicle crashes.

Table 8-3. Crashes on I-285/20 Interchange Ramps Characteristics

Crash Characteristic	Category	Crash count (%)
Lighting Condition	Dark Lighted	227 (18%)
	Dark Not Lighted	285 (23%)
	Dawn	22 (3%)
	Daylight	690 (56%)
	Dusk	13 (1%)
	Total	**1237 (100%)**
Crash Type	Angle	101 (8%)
	Head On	5 (0%)
	Not A Collision with Motor Vehicle	495 (40%)
	Rear End	392 (32%)
	Sideswipe-Opposite Direction	3 (0%)
	Sideswipe-Same Direction	241 (19%)
	Total	**1237 (100%)**
Surface Condition	Dry	752 (61%)
	Ice/Frost	4 (0%)
	Other	5 (0%)
	Snow	3 (0%)
	Wet	473 (38%)
	Total	**1237 (100%)**

Table 8-4 exhibits the number of crashes by severity level on interstates. The majority of crashes are property damage only (PDO) type. Most of the fatal crashes occurred due to driver-related errors. Four fatal crashes occurred on the ramps at the interchange of I-285 and I-20. All four crashes happened during dark conditions.

Twelve fatal crashes were recorded along I-285 corridor, out of which five occurred between the interchange of the Flat Shoals Rd ramps, due to exceeding the speed limit and losing control of the vehicle. Four crashes occurred between the off-ramp and on-ramps at the interchange of Glenwood Road due to vehicles following too close, exceeding the speed limit with improper lane change, improper passing and dark not-lighted conditions. One fatal crash occurred on I-285 SB to I-20 EB ramp when the driver of a tractor/trailer lost control of the vehicle. The last fatal crash occurred on the Columbia Road bridge due to the vehicle exceeding the speed limit.

Twenty-two fatal crashes occurred along the I-20 corridor over the six-year study period. The contributing factors for these crashes were dark-not lighted condition (11 crashes), driver losing control (4 crashes), driving under the influence (3 crashes), exceeding speed limit (one crash), mechanical or vehicle failure (one crash) and striking a pedestrian (2 crashes).

Fatal and injury crash locations within the study limits are shown in **Figure D-1** and **Figure D-2** in **Appendix 8-4.**

Table 8-4. Crashes by Severity

Crash Severity	I-20	I-285
Fatal Crash	21	12
Injury Crash	2,914	1,648
PDO Crash	7,135	3,824
Total	**10,070**	**5,484**

Table 8-5 shows that about 65 percent of all crashes on I-20 and I-285 occurred in daylight conditions. However, the results indicate that lighting conditions play a significant role in fatal crash occurrence. Although, the number of miles driven decreases substantially at night compared with daytime, 85 percent of all traffic deaths (29 out of 34) on interstate corridors occurred after dark (either lighted or not lighted conditions) of which 56 percent (19 out of 34) were related to dark-not lighted conditions and 26 percent were related to dark-lighted conditions.

Table 8-5. Crashes by Lighting Condition

I-20		
Lighting Condition	**All Crashes**	**Fatalities**
Dark Lighted	1746 (17%)	5(24%)
Dark Not Lighted	1619 (16%)	13 (62%)
Dawn	147 (1%)	0 (0%)
Daylight	6463 (64%)	3 (14%)
Dusk	88 (1%)	0 (0%)
Unknown	7 (0%)	0 (0%)
Total	**10,070 (100%)**	**21 (100%)**
I-285		
Lighting Condition	**All Crashes**	**Fatalities**
Dark Lighted	815 (15%)	4 (31%)
Dark Not Lighted	892 (16%)	6 (46%)
Dawn	72 (1%)	1 (8%)
Daylight	3,657 (67%)	2 (215%)
Dusk	45 (1%)	0 (0%)
Unknown	3 (0%)	0 (0%)
Total	**5,484 (100%)**	**13 (100%)**

8.2.2 CROSSROADS

A total of 7,324 crashes occurred during the analysis period (2013-2018) on the crossroads, intersections along the crossroads and local street networks that are impacted by this project. The crossroads and the local street network include the first major intersection on either side of the studied interchanges. GDOT's Functional Classification Application has been used to identify the roadway classification for each crossroad. Table 8-6 shows the crash history for the crossroads in the study area. The crash rates higher than the statewide averages are highlighted in this table.

Table 8-6. Crash History by Rate & Comparison with Statewide Average for Crossroads

Crossroad	Year	No. of Crashes			Total Crashes		Crashes Involving Injuries		Crashes Involving Fatalities	
		Count	Involving Injuries	Involving Fatalities	Rate (100MVM)	Statewide Ave. Rate (100MVM)	Rate (100MVM)	Statewide Ave. Rate (100MVM)	Rate (100MVM)	Statewide Ave. Rate (100MVM)
Candler Rd Urban Minor Arterial	2013	203	51	0	3206	543	805	130	0	1.17
	2014	213	62	0	3363	601	979	145	0	1.21
	2015	205	49	0	3011	637	720	156	0	1.68
	2016	268	66	1	4137	655	1019	156	15	1.53
	2017	322	94	0	4970	623	1451	153	0	1.35
	2018	240	86	0	3613	540	1295	201	0	1.42
Columbia Rd Urban Minor Collector	2013	20	7	0	525	443	184	105	0	1.05
	2014	47	16	0	1234	404	420	99	0	1.23
	2015	68	21	0	1594	568	492	139	0	1.34
	2016	74	19	0	1694	599	435	142	0	1.49
	2017	15	1	0	343	576	23	141	0	1.43
	2018	116	41	0	2383	424	842	156	0	1.16
Evans Mill Rd Urban Minor Collector	2013	21	6	0	859	443	245	105	0	1.05
	2014	20	10	0	818	404	409	99	0	1.23
	2015	18	4	0	708	568	157	139	0	1.34
	2016	20	8	0	769	599	307	142	0	1.49
	2017	29	7	0	1115	576	269	141	0	1.43
	2018	98	26	0	3047	424	808	156	0	1.16
Fairington Rd Urban Minor Collector	2013	18	3	0	1468	443	245	105	0	1.05
	2014	30	8	0	2446	404	652	99	0	1.23
	2015	38	10	0	2992	568	787	139	0	1.34
	2016	38	16	0	2916	599	1228	142	0	1.49
	2017	13	5	0	998	576	384	141	0	1.43
	2018	12	3	0	788	424	197	156	0	1.16
Flat Shoals Rd Urban Minor Arterial	2013	253	66	0	2125	543	554	130	0	1.17
	2014	240	67	0	2016	601	563	145	0	1.21
	2015	313	75	0	2446	637	586	156	0	1.68
	2016	317	77	0	2603	655	632	156	0	1.53
	2017	316	70	0	2594	623	575	153	0	1.35
	2018	265	74	0	2122	540	593	201	0	1.42
Glenwood Rd Urban Minor Arterial	2013	92	24	0	1703	543	444	130	0	1.17
	2014	106	28	0	1962	601	518	145	0	1.21
	2015	146	48	0	2514	637	827	156	0	1.68
	2016	191	56	0	3185	655	934	156	0	1.53
	2017	51	15	1	851	623	250	153	17	1.35
	2018	194	76	0	3800	540	1489	201	0	1.42
Lithonia Blvd Urban Minor Collector	2013	14	5	0	607	443	178	105	0	1.05
	2014	38	11	0	1649	404	391	99	0	1.23
	2015	43	16	0	1796	568	548	139	0	1.34
	2016	59	20	0	2404	599	668	142	0	1.49
	2017	16	5	0	652	576	167	141	0	1.43

Table 8-6. Crash History by Rate & Comparison with Statewide Average for Crossroads

Crossroad	Year	No. of Crashes			Total Crashes		Crashes Involving Injuries		Crashes Involving Fatalities	
		Count	Involving Injuries	Involving Fatalities	Rate (100MVM)	Statewide Ave. Rate (100MVM)	Rate (100MVM)	Statewide Ave. Rate (100MVM)	Rate (100MVM)	Statewide Ave. Rate (100MVM)
	2018	59	22	1	1809	424	553	156	31	1.16
Miller Rd Urban Local Road	2013	3	0	0	148	254	0	48	0	0.53
	2014	10	4	0	493	181	197	34	0	0.40
	2015	8	0	0	379	257	0	50	0	0.48
	2016	19	5	0	876	288	231	56	0	0.44
	2017	8	3	0	369	249	138	49	0	0.54
	2018	9	2	0	411	233	91	64	0	0.39
Old Hillandale Dr Urban Local Road	2013	0	0	0	0	254	0	48	0	0.53
	2014	2	1	0	110	181	55	34	0	0.40
	2015	1	0	0	48	257	0	50	0	0.48
	2016	5	1	0	230	288	46	56	0	0.44
	2017	0	0	0	0	249	0	49	0	0.54
	2018	13	3	0	432	233	100	64	0	0.39
Panola Rd Urban Minor Arterial	2013	94	18	0	1207	543	231	130	0	1.17
	2014	255	61	0	3275	601	784	145	0	1.21
	2015	304	84	0	3630	637	1003	156	0	1.68
	2016	308	74	0	3753	655	902	156	0	1.53
	2017	91	26	0	1109	623	317	153	0	1.35
	2018	436	102	0	5331	540	1247	201	0	1.42
Wesley Chapel Rd Urban Principal Arterial	2013	88	17	0	656	608	127	141	0	1.18
	2014	90	19	0	671	589	142	134	0	1.15
	2015	90	18	0	633	583	127	138	0	1.24
	2016	97	29	0	661	628	198	145	0	1.47
	2017	93	14	0	634	615	95	149	0	1.24
	2018	438	115	0	2878	581	756	211	0	1.55

The crash rates are calculated for total crashes, crashes involving injuries, and crashes involving fatalities along the segments. These are then compared to the statewide averages for minor arterial, minor collector, local urban, and principal arterial (Urbanized). The crash rate information shows that the overall crash rates and crash rates involving injuries for almost all crossroads were substantially higher than the statewide averages during the study period. Only Old Hillandale Dr showed some lower rates than the statewide average rates. Panola Road, Flat Shoals Road, Candler Road, and Glenwood Road had the highest crash rates. Three fatal crashes occurred in six years, one on Candler Road, one on Lithonia Industrial Boulevard and one on Glenwood Road.

Crash data was analyzed to determine the type of crashes and frequency of each crash type occurring along the crossroads. Crash data is categorized by manner of collision (or type of crash). **Figure 8-3** presents the crash counts on each crossroads in the parenthesis and the proportion of crash types using histograms.

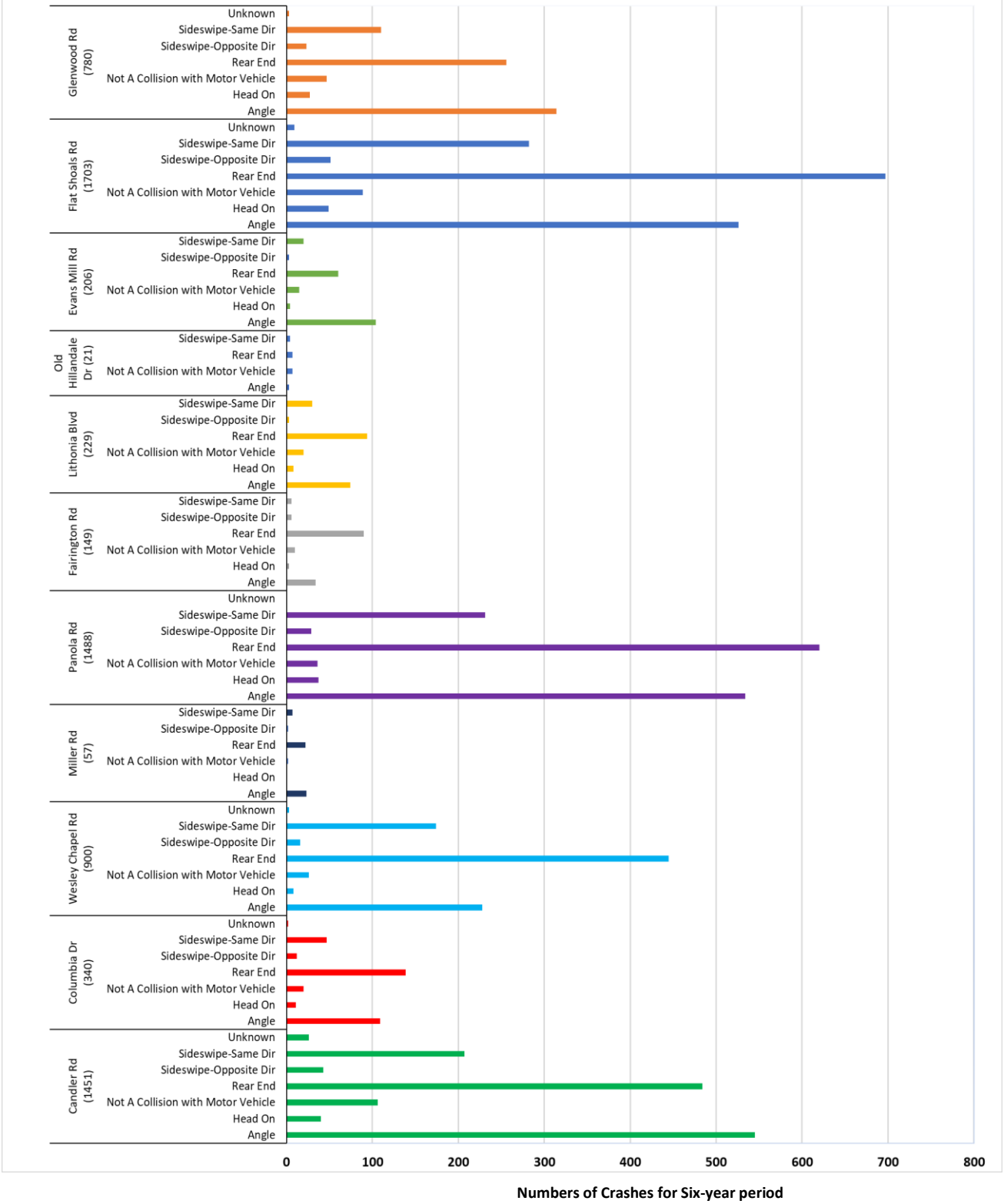


Figure 8-3. Total Crashes in Terms of Crash Type along Crossroads (2013 to 2018)

Overall, rear end crashes on crossroads occurred the most (40% of the total crashes), followed by angle crashes (34%) and sideswipe in the same direction crashes (15%). The remaining crash types each accounted for less than 5 percent of the total crashes. Rear end crashes have been found to be the most predominant manner of collision on Columbia Drive, Fairington Road, Flat Shoals Road, Lithonia Blvd, Panola Road, and Wesley Chapel Road. Angle crashes were the major crash type on Candler Road, Evans Mill Road, Glenwood Road, and Miller Road.

Rear end and side swipe collisions are more likely to happen at mid-blocks; while, it is more likely to have angle crashes at intersections. The high percentage of rear end crashes and sideswipe crashes in the same direction is an indication of congestion and improper lane changing. A large number of angle crashes implies the potential of a sight distance restriction and high intersection volume.

The results presented in **Table 8-7** indicate that vehicles following too close, failing to yield right of way and improper lane changing are the main crash contributing factors.

Table 8-7. Crash Contributing Factors along Crossroads

Contributing Factors	Candler Rd	Columbia Dr	Evans Mill Rd	Fairington Rd	Flat Shoals Rd	Glenwood Rd	Lithonia Blvd	Miller Rd	Old Hillandale Dr	Panola Rd	Wesley Chapel Rd	Total
Following too Close	349	109	56	74	579	211	80	20	5	518	372	**2373**
Failed to Yield	333	65	45	23	310	186	27	14	1	287	103	**1394**
Changed Lanes Improperly	127	28	10	1	168	74	18	2	7	158	117	**710**
Improper Turn	70	18	17	3	77	70	16	4	0	61	23	**359**
Improper Backing	94	14	5	5	92	24	2	4	0	70	44	**354**
Misjudged Clearance	59	4	1	0	55	28	5	0	0	47	20	**219**
Disregard Stop Sign/Signal	25	7	24	2	17	17	21	4	0	34	23	**174**
Inattentive or Other Distraction	21	2	0	0	22	8	5	1	0	16	13	**88**
Driver Lost Control	19	7	2	4	25	7	4	0	2	10	10	**90**
Improper Passing	2	0	0	1	4	2	1	0	0	5	2	**17**
Under the Influence (U.I.)	8	3	3	0	15	6	2	0	1	8	7	**53**
Wrong Side of Road	7	2	0	3	7	3	0	0	0	9	2	**33**
Mechanical or Vehicle Failure	2	0	0	1	5	2	2	0	0	3	3	**18**
Driver Condition	12	5	1	2	42	7	3	0	0	13	8	**93**
Weather Conditions	4	1	1	0	1	1	0	0	0	2	0	**10**
No Contributing Factors	144	37	20	21	133	58	30	6	2	130	65	**646**
Other	175	38	21	9	151	76	13	2	3	117	88	**693**
Total	**1,451**	**340**	**206**	**149**	**1703**	**780**	**229**	**57**	**21**	**1488**	**900**	**7324**

8.3 EXISTING SAFETY ANALYSIS FINDINGS

The study limits of safety analysis cover the freeway sections, ramp sections and crossroads within the study limits of the project. The safety analysis in this report estimated crash rates from the historic crash data and compared them with the statewide averages. The benefit of crash rate analysis is that it provides a more effective comparison of similar locations with safety issues. Crash data was analyzed based on the crash type, the first harmful event and potential contributing factors such as geometric features or roadway condition. Crash data was geocoded which enabled generating crash maps to find the high injury and fatality crash locations within the network.

A total of 15,554 and 7,324 crashes occurred during the analysis period along the interstates and crossroads respectively, within the study limits. 10,070 crashes were recorded on I-20 and 5,484 crashes on I-285. There has been an overall increase in total crash rate and injury crash rate from year 2013 to year 2018 for both interstate corridors. The overall crash rates as well as injury and fatal crash rates for I-20 were significantly higher than the statewide average during the study period. Similarly, the total crash and fatality rates for I-285 were substantially higher than the statewide averages during the study period, except for two ramps, I-285 WB on-ramp at Flat Shoals Rd and I-285 NB on-ramp at Glenwood Rd.

On interstate corridors, rear end crashes occurred the most (over 50%), followed by sideswipe in the same direction crashes (20%). While, on crossroads, rear end crashes were the predominant type of crash (40%) followed by angle crashes (34%) and sideswipe in the same direction crashes (15%). Mainline rear end and sideswipe crashes typically reflect congested traffic flow conditions and generally result from driver aggressiveness and inattention where motorists follow too closely, frequently acceleration and deceleration, and unsafely lanes changes. In addition, existing non-standard and non-conforming geometry such as short weave sections, and non-standard acceleration and deceleration lane lengths also contribute to these types of crashes.

The majority of crashes are PDO type. Most of the fatal crashes occurred due to driver-related errors. Four fatal crashes occurred on the ramps at the interchange of I-285 and I-20, all occurred during the dark conditions. There were five overturn crashes on entrance/exit ramps at the I-285 and I-20 interchange, of which three occurred on the I-20 WB exit loop ramp to I-285 SB. Vehicles of all three crashes on the loop ramp were Tractor/Trailer, negotiating a curve. The leading causes of this type of crashes are failing to adjust speed to curves in the road, the load being carried, condition of the brakes, or road surface. Tractor-trailers are particularly vulnerable because of the trailer's high center of gravity and frequently unstable loads.

Along the crossroads, overall crash rates as well as injury crash rates were substantially higher than the statewide averages. The most common type of crash at intersections is angle crash. Lack of left-turn offset, skew at the intersection, speed limit of the intersecting roadways, and inadequate yellow and all-red clearance intervals contribute to these types of crashes.

Hot spot locations were also identified by calculating the crash density for individual roadways segments. **Figures E.1** and **Figure E.2** in the **Appendix 8-5** show the roadway segments density of crashes within the study limits. The goal was to estimate the crash density by summing the number of events within a search bandwidth of 0.25 miles. **Figure E-2** indicates that the top ten high crash locations are as follows:

(1) Between Wesley Chapel Road on and off-ramps on I-20;

(2) Between Panola Road off and on-ramps on I-20;

(3) On Panola Road, between the intersection of W Fairington Road and I-20 EB on and off-ramp terminal;
(4) On Flat Shoals Road, between the intersection of Fairlake Dr and I-285 SB on and off-ramp terminal;
(5) Between Flat Shoals Road off and on-ramps on I-285;
(6) On Candler Road, between the intersection of Rainbow Drive and I-20 EB on and off-ramp terminal;
(7) On Panola Road, between the intersection of Hillandale Drive and I-20 WB on and off-ramp terminal;
(8) Between Glenwood Road off and on-ramps on I-285;
(9) Between Candler Road off and on-ramps on I-20;
(10) On I-20 between off-ramp to I-285 NB and on-ramp from I-285 NB.

9 FUTURE CRASH ANALYSIS

9.1 PREDICTIVE CRASH ANALYSIS

9.1.1 INTRODUCTION AND BACKGROUND

The purpose of this safety analysis section is to assess the potential safety impact (positive or negative) of the proposed improvements for the I-285 @ I-20 East Interchange Reconstruction Project (PI 0013915). The analysis conducted is based on methodologies outlined in the Highway Safety Manual (HSM), published by American Association of State Highway and Transportation Officials (AASHTO) and identify safety improvements that can be included in the project design.

The study limits of analysis cover the freeway sections, ramp sections and crossroads (including at least the first major intersection on the either side of the interchange terminus across the freeway) within the project limits. **Figure 9-1** shows the roadway and intersections facility types within the study area.

Safety analysis limits on I-20 extends from Candler Rd (western terminus) to Evans Mill Rd (eastern terminus) which is approximately 9.6 miles; and on I-285 it extends from Flat Shoals Pkwy (southern terminus) to Glenwood Rd (northern terminus) which is approximately 4.6 miles

The project proposes to modify and/or replace four existing ramps at the I-285 @ I-20 east interchange: the I-20 westbound to I-285 northbound and southbound ramps, and the I-285 southbound to I-20 eastbound and westbound ramps. In addition to the reconstruction of the interchange, the project would consist of constructing the following: 1) one westbound auxiliary lane between Lithonia Industrial Boulevard and Panola Road, 2) one westbound auxiliary lane from Panola Road to Wesley Chapel Road, and 3) Westbound Collector Distributor (C/D) lanes between Wesley Chapel Road and the I-20/I-285 interchange. The project would also include improvements to a segment of I-20 eastbound consisting of the construction of one eastbound auxiliary lane from Panola Road to Lithonia Industrial Boulevard. The project also consists of an alternate that would add an auxiliary lane from westbound I-20 to northbound I-285 that would extend up to Glenwood Road.

For the purpose of this study, the quantitative analysis is performed for the proposed alternatives between the No-Build and Build scenarios.

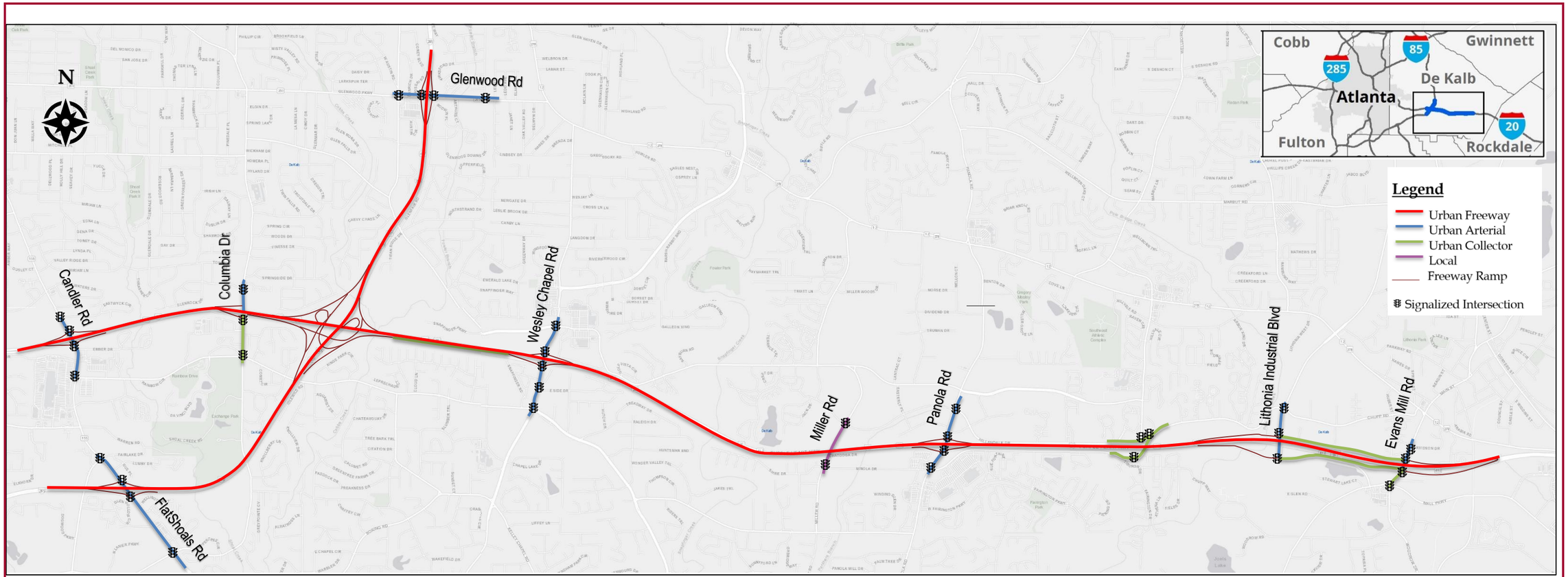


Figure 9-1. Roadway and Intersection Facility Types within the Study Limits

9.1.2 PREDICTIVE CRASH ANALYSIS

Using the American Association of State & Highway Transportation Officials Highway Safety Manual (HSM) Predictive Method, expected crash totals are estimated using the Interactive Highway Safety Design Model (IHSDM) to evaluate safety improvements for the Build and No-Build alternatives. HSM Part C predictive method provides an 18-step procedure to estimate the "expected average crash frequency" of a roadway network, facility, or site as shown in **Figure 9-2**.

9.1.2.1 ANALYSIS TOOL

IHSDM which is a project-level safety analysis tool that supports HSM predictive methods, was developed by the Federal Highway Administration before HSM was published. IHSDM uses the Empirical Bayes (EmB) process and implements the calibration procedures to HSM Part C. IHSDM can be used for evaluating the safety of all facility types covered in HSM Part C. It automatically segments highways for evaluation using HSM Part C segmentation rules. Crash and roadway data outputs can be graphically displayed, allowing users to quickly and easily identify potential safety concerns.

9.1.2.2 EMB METHOD

The EmB method combines the historical crash records of the site and predicted number of crashes obtained from a safety performance function (SPF) for similar sites. This method addresses two problems of safety estimation; (1) it increases the precision of estimates beyond what is possible with the use of a minimum of three-year history crashes, and (2) it corrects for the regression-to-mean bias. However, the EmB procedure is not always applicable. The EmB method is used when an existing highway with available crash history data is being evaluated. For the roadways on new locations, there is no relevant crash history and, therefore, use of the EmB procedure is not an option. In addition, EmB method cannot be applied to the locations where major improvements in the substantial proportion of the roadway length is proposed in the build condition. For instance, due to the recent construction on Flat Shoals road, the crash history between 2013 to 2018 cannot be used in HSM analysis, and therefore no EmB method will be applied for this interchange. It should be noted that if the EmB method cannot be consistently applied to all alternatives (Build and No-Build), then it should not be used for any alternatives.

9.1.2.3 GDOT CALIBRATION FACTORS

In order to predict reflecting levels of crash frequencies in a jurisdiction of interest, the predicted number of crash frequencies are adjusted using calibration factors that are determined for each facility type. Georgia district-based calibration and distribution factors were provided by GDOT for segments and intersections (see the **Appendix 9-1** for Tables A.1 and A.2).

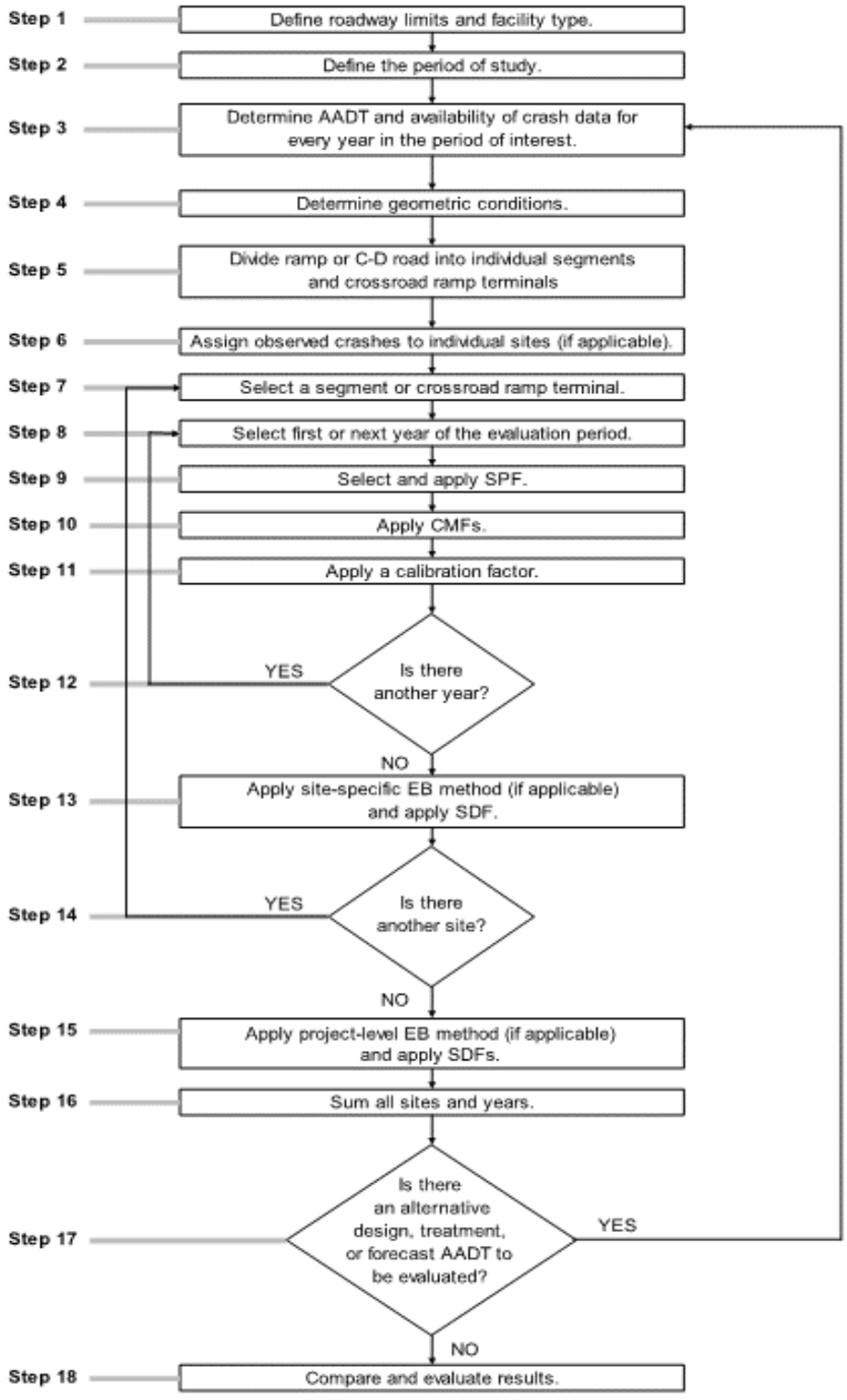


Figure 9-2. The HSM Predictive Method

9.2 DATA COLLECTION

The study area is divided into homogenous analysis sites, called "segmentation," for intersections and roadway segments. Segments are split into distinct sites where any of the following changes: geometry of the roadway, speed limit, area type, Annual Average Daily Traffic (AADT), or median type. Safety-related data for each segment was collected and imported into the IHSDM models.

HSM predictive methods require a substantial amount of roadway geometric design, traffic volume, crashes and traffic control data. AADT volumes are used in the crash analysis calculations. AADT for the existing year and design year are obtained from our predicted traffic volumes presented in the Design Traffic Report. In addition to AADT on each mainline segment, interchange ramp, and arterial segment in the study area, the quantitative crash analysis tool for freeways and interchanges requires the collection and use of detailed design-level factors, such as:

- General: area type, speed limit and functional classification
- Horizontal alignment: Curves and tangent portions of the roadway
- Cross-section: through lane width, auxiliary lanes, shoulders, median and ramps
- Roadside: clear zone
- Intersection: Traffic control information, lane configuration, number of bus stops and schools within 1000 ft radius
- Other: median barrier, outside barrier, shoulder rumble strip, high volume sections and type B weaving sections

Site-specific crash history data is used for the roadways for which the EmB method can be applied. Six years of historical interstate crash data—from January 1, 2013, to December 31, 2018—was obtained from Georgia Electronic Accident Reporting System (GEARS) along I-285 and I-20 within the project limits. In order to enter crash data to the model, each crash was geocoded to determine the station number of the location where the crash occurred.

9.3 CRASH MODIFICATION FACTORS

In Step 10 of the predictive method shown in **Figure 9-2**, crash modification factors are applied to the selected SPF, which was selected in Step 9. Crash modification factors (CMFs) are used to adjust the SPF estimate of predicted average crash frequency for the effect of individual geometric design and traffic control features. The CMF for the SPF base condition of each geometric design or traffic control feature has a value of 1.00. Any feature associated with higher crash frequency than the base condition has a CMF with a value greater than 1.00; any feature associated with lower crash frequency than the base condition has a CMF with a value less than 1.00.

Default CMFs in the IHSDM has been used in this study. A list of CMFs used for the key geometric elements are presented in **Table C-1 through Table C-8** of **Appendix 9-3**. The default CMF factors in HSM are included in **Appendix 9-2**.

The only CMF that was applied manually to the estimated crashes, was the CMF for the conversion of a diamond interchange to a diverging diamond interchange (DDI) at Panola Rd. To estimate the crash frequency at Panola Interchange, several CMFs available in the Clearing House were investigated. Ultimately, a CMF of 0.821 from a recently published study[1], conducted in Georgia State with fair to excellent rating, was selected for this purpose (Nye, T. S., Cunningham, C. M., & Byrom, E. (2019). National-Level Safety Evaluation of Diverging Diamond Interchanges. Transportation Research Record).

9.4 ALTERNATIVES

Four conditions have been modeled in IHSDM and analyzed to estimate the future safety conditions. Future crash frequencies, either predicted or expected, are reported by severity and for each facility type. No analysis is available for local and collector roads shown in **Figure 9-1**.

9.4.1 2025 No Build Condition

The existing alignment of the roadways is used to create the No-Build models. Six years of crash data (from 2013 to 2018) and corresponding AADT is added in this model. **Figure 9-3** shows the No-Build condition, modeled in IHSDM.

Predicted/expected crash frequencies by severity and for each facility type are reported in **Table C-1** to **Table C-2** of **Appendix 9-3.** EmB method cannot be applied to the following locations in 2025 No-Build model: Flat Shoals Rd and its ramps to/from I-285, I-285 SB to I-20 EB ramp, I-20 WB to I-285 SB ramp, I-20 WB exit and entrance ramps at Wesley Chapel Rd Interchange, I-20 EB and WB entrance ramps at Panola Rd Interchange.

9.4.2 2025 Build Condition

To create the 2025 Build model, the 2025 No-Build model was modified to include the new improvement at system-to-system interchange ramps, improvements at the Wesley Chapel Rd interchange, and the addition of I-20 WB C-D, and extension of auxiliary lane along I-20 EB C-D to Wesley Chapel Road.

[1] http://www.cmfclearinghouse.org/detail.cfm?facid=10136

Figure 10-4 shows the Build condition, modeled in IHSDM. Although some ramps do not show to match the proposed design and they are not shown fully connected to the freeways, the connections between ramps and roads are defined in the software. It must be noted that the viewer of the IHSDM is not a perfect tool to show the geometry of the roadways and small gaps or overlaps in the viewer do not affect the analysis results.

Predicted/expected crash frequencies by severity and for each facility type are reported in **Table C-3 and Table C-4** of **Appendix 9-3**. EmB method cannot be applied to the following locations: I-20 WB C-D road and its ramps to/from the freeway, Flat Shoals Rd and its ramps to/from I-285, I-285 SB to I-20 EB ramp, I-20 WB to I-285 SB ramp, I-20 WB exit and entrance ramps at Wesley Chapel Rd Interchange, I-20 EB and WB entrance ramps at Panola Rd Interchange.

9.4.3 2045 No Build Condition

The existing model is used for the 2045 No-Build condition with the new DDI at the Panola Rd Interchange and new Express Lanes on I-20 and I-285. **Figure 9-3** shows the No-Build condition, modeled in IHSDM.

Predicted/expected crash frequencies by severity and for each facility type are reported in **Table C-5 and Table C-6** of **Appendix 9-3**. EmB method cannot be applied to the following locations: Flat Shoals Rd and its ramps to/from I-285, I-285 SB to I-20 EB ramp, I-20 WB to I-285 SB ramp, I-20 WB exit and entrance ramps at Wesley Chapel Rd Interchange, I-20 EB and WB entrance ramps at Panola Rd Interchange.

9.4.4 2045 Build Condition

The 2045 Build condition is shown in **Figure 9-4**. The 2025 Build model is used for the 2045 Build condition with the addition of Express Lanes on I-20.

Predicted/expected crash frequencies by severity and for each facility type are reported in **Table C-7 and Table C-8** of **Appendix 9-3**. EmB method cannot be applied to the new facilities since crash history does not exist at new location roadways. These include: I-20 WB C-D road and its ramps to/from the freeway, Flat Shoals Rd and its ramps to/from I-285, I-285 SB to I-20 EB ramp, I-20 WB to I-285 SB ramp, I-20 WB exit and entrance ramps at the Wesley Chapel Rd Interchange, I-20 EB and WB entrance ramps at the Panola Rd Interchange.

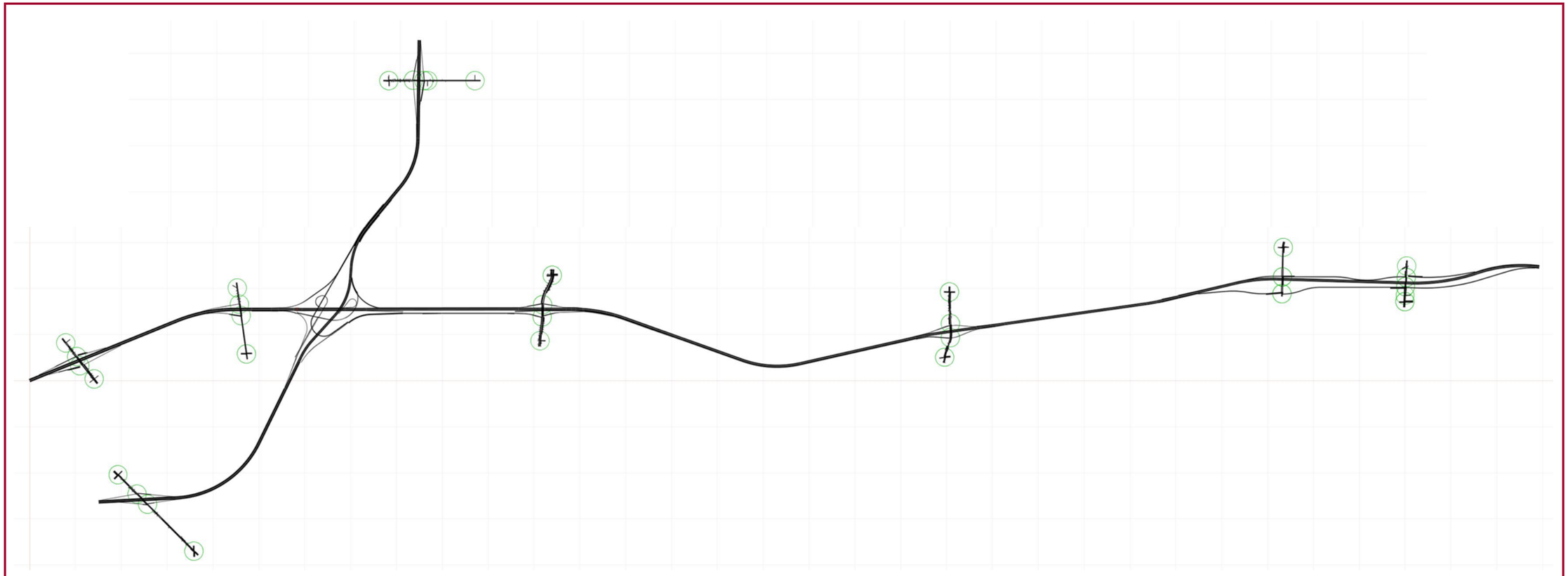


Figure 9-3. No-Build Models in IHSDM

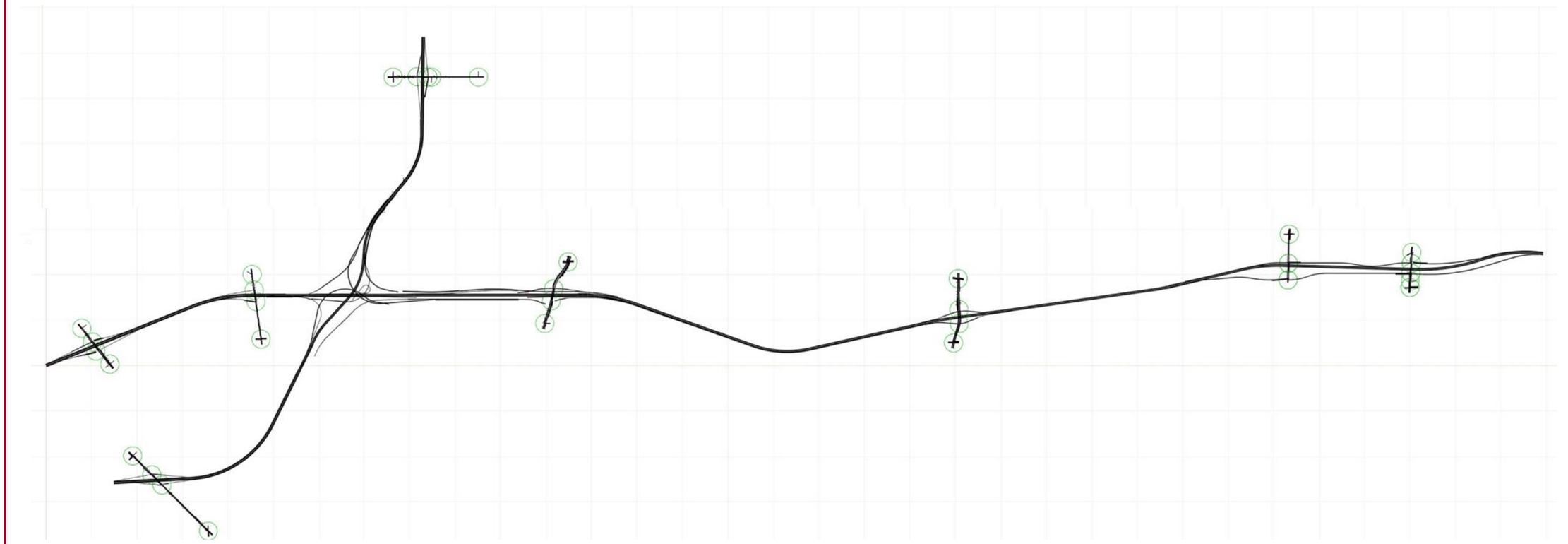


Figure 9-4. Build Models in IHSDM

9.5 RESULTS

The following sections include a comparison of crash numbers between the Build and No-Build conditions in each study year.

9.5.1 SAFETY CONDITION IN YEAR 2025

A comparison of the crash frequencies between 2025 Build and 2025 No-Build alternatives is summarized in **Table 9-1** and **Table 9-2**.

The results indicate that there is a significant crash reduction (196 total crashes) on I-20 mainline if the proposed design will be built in 2025. 56 out of 196 reduced crashes will be fatal or injury type. The geometric improvements on the I-20 EB C-D has also improved the level of safety on this road.

The number of crashes on NB to EB ramp will increase in the Build condition due to (1) AADT increase in build condition and (2) the extension of this ramp. The longer length of a roadway, the higher probability of a crash.

The number of crashes on I-285 will increase from 767 in 2025 No-Build to 827 in 2025 Build condition, which is about an 8 percent increase. This is due to the higher volume on I-285 in the Build condition.

Crash reductions for the I-20 WB C-D and its ramps are negative, since these facilities do not exist in No-Build. Other existing segments on the interstates show zero to some safety improvements in the Build condition.

Table 9-3 shows the crash reduction on crossroads and their ramps to/from the freeways. Number of crashes on the Columbia Rd Interchange and Glenwood Rd Interchange remains about the same in Build condition compared to the No-Build. Slight increase in the crash frequency at other interchanges is due to slightly higher traffic volume on the crossroads and their ramps in the Build condition.

Crashes on Evans Mill Rd and Lithonia Industrial Blvd Interchange will increase from 67 to 94 crashes, mostly due to the volume increase on Lithonia Industrial Blvd.

Overall, the results show safety improvement in the network in 2025 Build condition. The total number of crashes will reduce from 3,925 in No-Build to 3835 in the Build condition in 2025 (90 crash savings).

Table 9-1. 2025 No-Build vs Build – Crash Reduction on Freeway, CD Roads and System to System Ramps by Severity

Facility	Fatal and Injury	Property Damage Only	Total
I-20	56	140	196
I-20 EB CD	6	11	17
I-20 EB onramp from CD	0	0	-1
I-20 EB to CD offramp	0	0	0
I-285	-12	-49	-61
EB to NB ramp	0	0	-1
NB to EB Ramp	-6	-11	-17
SB to EB Ramp	5	13	18
WB to NB ramp	0	0	-1
NB to WB loop	-1	-2	-3
WB to SB Loop	11	20	31
EB to SB Ramp	0	0	0
SB to WB ramp	-1	-1	-1
I-20 WB C-D	-21	-14	-35
I-20 WB CD Entrance to Freeway	-1	-1	-1
I-20 WB CD Entrance to C-D	0	0	-1
Total	**35**	**105**	**140**

Table 9-2. 2025 No Build vs Build- Crash Reduction on Crossroads by Severity

Interchange	Facility	Fatal and Injury	Property Damage Only	Total
Candler Rd	Candler Rd	-1	-3	-4
	I-20 WB Exit	0	0	0
	I-20 WB Entrance	0	0	0
	I-20 EB Exit	0	0	0
	I-20 EB Entrance	0	0	0
	Total	**-1**	**-4**	**-5**
Columbia Dr	Columbia Dr	0	0	0
	I-20 WB Entrance	0	0	0
	I-20 EB Exit	0	0	0
	Total	**0**	**0**	**0**
Wesley Chapel Rd	Wesley Chapel Rd	0	1	1
	I-20 EB Entrance	0	0	0
	I-20 EB Exit	0	-1	-2
	I-20 WB Exit	0	0	0
	I-20 WB Entrance	-1	-9	-11
	Total	**-1**	**-10**	**-12**
Panola Rd	Panola Rd	-1	-2	-3
	I-20 EB Entrance	0	-1	-1
	I-20 EB Exit	0	-1	-1
	I-20 WB Exit	0	-3	-3
	I-20 WB Entrance	0	-1	-2
	Total	**-1**	**-8**	**-9**
Evans Mill Rd and Lithonia Industrial Boulevard	Lithonia Industrial Boulevard	-3	-6	-9
	I-20 EB Exit Ramp	-1	-4	-5
	I-20 WB Entry Ramp	0	0	0
	Evans Mill Rd	-2	-4	-7
	I-20 EB Entry Ramp	-1	-5	-6
	I-20 WB Exit Ramp	0	0	0
	Total	**-8**	**-19**	**-27**
Glenwood Road	Glenwood Road	2	3	6
	I-285 SB Exit Ramp	0	0	0
	I-285 SB Entry Ramp	0	0	0
	I-285 NB Exit Ramp	0	0	0
	I-285 NB Entry Ramp	0	0	0
	Total	**2**	**3**	**5**
Flat Shoals Road	Flat Shoals Road	-1	-2	-3
	I-285 SB Entry Ramp	0	0	0
	I-285 SB Exit Ramp	0	0	0
	I-285 NB Exit Ramp	0	0	0
	I-285 NB Entry Ramp	0	0	0
	Total	**-1**	**-2**	**-3**
Grand Total		**-10**	**-40**	**-50**

9.5.2 Safety Condition in Year 2045

A comparison of the crash frequencies between the two alternatives is summarized in **Table 9-3** and **Table 9-4**.

In 2045 Build condition, safety improvements are expected on I-20, I-20 EB C-D, and WB to SB ramp.

No improvements will be expected for I-20 EB C-D ramps, SB to EB ramp, WB to NB ramp, NB to WB ramp, EB to SB Ramp, SB to WB ramp, and I-20 WB C-D ramps.

The results indicate that the number of crashes on I-285 will increase from 989 in 2045 No-Build to 1,084 in 2045 Build condition, which is about 10 percent increase. This is due to the higher volume on I-285 in the Build condition.

Results shown in **Table 9-4** Table 9-indicate that the crashes on the Wesley Chapel Rd Interchange, Panola Rd Interchange and Evans Mill/ Lithonia Interchange will increase in the 2045 Build condition. Other interchanges with crossroads show safety deterioration.

Overall, the results show safety improvement in the network in 2045 Build condition. The total number of crashes will reduce by 16 in the Build condition compared to the No-Build condition. It is expected that safety on the I-20 corridor, I-20 EB C-D and the proposed ramps at the system-to-system interchange improves, however it will deteriorate on I-285 due to the volume increase in the Build condition.

Table 9-3. 2045 No-Build vs Build – Crash Reduction on Freeway, CD Roads and System to System Ramps by Severity

Facility	Fatal and Injury	Property Damage Only	Total
I-20	23	56	79
I-20 EB CD	6	11	16
I-20 EB onramp from CD	-1	-1	-1
I-20 EB to CD offramp	0	0	0
I-285	-28	-66	-94
EB to NB ramp	-1	-2	-3
NB to EB Ramp	-3	-4	-7
SB to EB Ramp	-18	-14	-33
WB to NB ramp	0	0	0
NB to WB ramp	0	0	0
WB to SB ramp	12	24	36
EB to SB Ramp	1	0	1
SB to WB ramp	-1	-1	-1
I-20 WB CD	-31	-16	-47
I-20 WB CD Entrance to Freeway	-1	-1	-2
I-20 WB Entrance to CD	0	-1	-1
Total	**-42**	**-14**	**-57**

Table 9-4. 2045 No-Build vs Build- Crash Reduction on Crossroads by Severity

Interchange	Facility	Fatal and Injury	Property Damage Only	Total
Candler Rd	Candler Rd	16	42	57
	I-20 WB Exit	0	0	0
	I-20 WB Entrance	0	0	0
	I-20 EB Exit	0	0	0
	I-20 EB Entrance	0	0	0
	Total	**16**	**41**	**57**
Columbia Dr	Columbia Dr	1	1	2
	I-20 WB Entrance	0	0	0
	I-20 EB Exit	0	0	0
	Total	**1**	**1**	**2**
Wesley Chapel Rd	Wesley Chapel Rd	1	3	4
	I-20 EB Entrance	0	0	0
	I-20 EB Exit	0	-2	-3
	I-20 WB Exit	0	0	0
	I-20 WB Entrance	-2	-11	-13
	Total	**-1**	**-10**	**-11**
Panola Rd	Panola Rd	-7	-14	-21
	I-20 EB Entrance	0	-1	-1
	I-20 EB Exit	0	-1	-1
	I-20 WB Exit	0	-4	-4
	I-20 WB Entrance	0	-2	-2
	Total	**-7**	**-21**	**-28**
Evans Mill Rd and Lithonia Industrial Boulevard	Lithonia Industrial Blvd	1	5	6
	I-20 EB Exit Ramp	0	0	0
	I-20 WB Entry Ramp	0	0	0
	Evans Mill Rd	-2	-3	-5
	I-20 EB Entry Ramp	0	0	0
	I-20 WB Exit Ramp	0	0	0
	Total	**-2**	**1**	**-1**
Glenwood Road	Glenwood Road	1	0	1
	I-285 SB Exit Ramp	0	0	0
	I-285 SB Entry Ramp	0	0	0
	I-285 NB Exit Ramp	0	0	0
	I-285 NB Entry Ramp	0	0	0
	Total	**1**	**0**	**1**
Flat Shoals Road	Flat Shoals Road	15	38	53
	I-285 SB Entry Ramp	0	0	0
	I-285 SB Exit Ramp	0	0	0
	I-285 NB Exit Ramp	0	0	0
	I-285 NB Entry Ramp	0	0	0
	Total	**15**	**37**	**53**
Grand Total		**23**	**49**	**73**

9.6 CONCLUSION

Using the IHSDM to complete the HSM Predictive Method, the future effects of the roadway improvements with respect to safety for each alternative are quantified and compared to the No-Build condition.

The results show safety improvement in the network during the open year and design year Build conditions. In the 2025 Build condition, the total number of crashes will reduce by 90, of which 25 are fatal/injury type and 65 are Property Damage Only (PDO) crashes. In the 2045 Build condition, 16 crashes will be reduced compared to the No-Build condition. Less safety benefit is anticipated in 2045 for two reasons: (1) highly congested corridor in the final year of the project's life and (2) the addition of I-20 East Express lanes; which causes more turbulence to the general-purpose lane traffic at the entrance and exit locations.

The results contained within the safety report along with other monetary/non-monetary considerations, and project funding/budget should be used to determine how to proceed and improve the network.

10 BENEFIT COST ANALYSIS

10.1 INTRODUCTION AND BACKGROUND

The purpose of this Benefit-Cost Analysis (BCA) section is to assess the potential safety impact (positive or negative) of the proposed improvements for the I-285 @ I-20 East Interchange Reconstruction Project (PI 0013915).

The safety analysis conducted was based on methodologies outlined in the Highway Safety Manual (HSM), published by American Association of State Highway and Transportation Officials (AASHTO) and identify safety improvements that can be included in the project design.

Safety analysis limits on I-20 extends from Candler Rd (western terminus) to Evans Mill Rd (eastern terminus) which is approximately 9.6 miles; and on I-285 it extends from Flat Shoals Pkwy (southern terminus) to Glenwood Rd (northern terminus) which is approximately 4.6 miles. No analysis is available for local and collector roads.

For the purpose of this study, the economic analysis is performed for the proposed alternative, between the no-build and build conditions. Conducting consistent and reliable BCA will support decision making, optimize the return on investments, and increase the effectiveness of projects and programs.

10.2 ANALYSIS AND RESULTS

The estimated monetary benefits are compared to the estimated cost of an alternative. For each facility, either the "expected" or "predicted" results are used for BCA purpose. Expected crashes are used for the locations where Empirical Bayes method can be applied. The predicted crashes, however, are useful for the locations with new highway/ramps when Empirical Bayes method is not applicable.

10.2.1 BENEFITS

There are two types of safety-related benefits of project alternatives: direct and indirect. Direct safety benefits include the expected change in crash frequency and severity. Indirect benefits include the operational and environmental benefits that result from a reduction in crashes (e.g., reduced delay, fuel use, and emissions)

To estimate the direct safety benefit of a given alternative, the difference in expected/predicted crashes between the no-build condition and alternative condition must be calculated and converted to a dollar amount. This is done for each analysis year and for each facility.

Indirect safety benefits of the improvements, however, are not easy to estimate. Motor vehicle crashes result in significant time delays to other motorists who are inconvenienced by lane closures, police, fire, or emergency services activity, detours, and general traffic slowdowns. This results in a significant time penalty for those affected. It also results in wasted fuel, increased greenhouse gas production, and increased pollution. Assessing congestion costs is difficult because virtually every crash occurs under unique circumstances.

In this study, the direct benefits of the proposed design are estimated. Build and No build conditions were modeled in IHSDM and analyzed to estimate the future crash frequencies in each of the build and no build conditions.

Table 10-1 shows the frequency of predicted/estimated crashes by severity for 2025-2045 analysis period. The 'difference' indicates the reduction in future crash frequencies in the build design compared to the no build.

Table 10-1. Expected Crash Frequencies by Severity

Facility	Title	Fatal (K) Crashes	Incapacitating Injury (A) Crashes	Non-Incapacitating Injury (B) Crashes	Possible Injury (C) Crashes	No Injury (O) Crashes	Total Crashes
I-20	No Build	223.7	596.5	3274.4	6861.4	27578.2	38534.3
	Build	207.0	551.9	3029.5	6348.2	25515.3	35651.8
	Difference	**16.7**	**44.6**	**244.9**	**513.3**	**2062.9**	**2882.5**
I-285	No Build	112.7	305.7	1635.2	3475.1	13528.0	19056.8
	Build	122.5	331.9	1780.1	3769.0	14787.1	20790.6
	Difference	**-9.8**	**-26.2**	**-144.9**	**-293.9**	**-1259.1**	**-1733.9**
Ramps and CD Roads	No Build	52.9	160.3	711.8	1432.4	6353.1	8710.5
	Build	52.2	158.2	748.9	1597.6	5743.0	8299.8
	Difference	**0.7**	**2.1**	**-37.0**	**-165.2**	**610.1**	**410.7**
Candler Rd	No Build	15.7	93.9	389.7	501.5	3636.6	4637.3
	Build	16.0	95.7	397.2	511.3	3734.0	4754.2
	Difference	**-0.3**	**-1.8**	**-7.5**	**-9.8**	**-97.4**	**-116.9**
Columbia Rd	No Build	3.5	22.9	94.5	114.4	517.7	753.0
	Build	3.3	21.1	87.3	106.0	488.8	706.6
	Difference	**0.2**	**1.7**	**7.2**	**8.3**	**28.9**	**46.4**
Wesley Chapel Rd	No Build	12.6	61.5	241.6	535.8	3671.1	4522.6
	Build	13.1	62.4	245.7	568.9	3916.3	4806.3
	Difference	**-0.4**	**-1.0**	**-4.1**	**-33.1**	**-245.1**	**-283.7**
Panola Rd	No Build	8.3	60.4	302.8	956.6	1177.5	2505.6
	Build	9.3	63.4	310.6	983.0	1742.2	3108.5
	Difference	**-1.0**	**-3.0**	**-7.8**	**-26.4**	**-564.6**	**-602.9**
Evans Mill Rd & Lithonia Industrial Blvd	No Build	6.0	38.3	181.3	289.7	1299.9	1815.3
	Build	7.5	46.7	218.8	343.1	1556.2	2172.3
	Difference	**-1.5**	**-8.5**	**-37.4**	**-53.3**	**-256.3**	**-357.0**
Glenwood Road	No Build	13.4	98.8	376.4	480.4	2513.1	3482.1
	Build	13.2	96.6	368.6	470.8	2505.5	3454.8
	Difference	**0.2**	**2.2**	**7.7**	**9.6**	**7.6**	**27.3**
Flat Shoals Road	No Build	25.9	169.2	749.3	960.4	4614.7	6519.4
	Build	25.7	168.5	748.6	959.1	4618.0	6519.9
	Difference	**0.2**	**0.7**	**0.7**	**1.3**	**-3.3**	**-0.4**

The comprehensive crash costs provided by GDOT are used to estimate the direct benefits of the proposed design. These comprehensive costs depend on the severity level of a crash and are applied to the reduction in crashes to estimate, in monetary terms, the safety benefit. GDOT considers $9,100,000 for a fatality crash; $955,000 for an A injury crash and $27,300 for a PDO crash. The default values in IHSDM were used for the costs of B injury ($198,500) and C injury ($125,600) crashes.

IHSDM uses a Crash Cost Index (CCI) of 0.02 to estimate the societal cost per crash (unit cost) for each analysis year and for each severity level and then applies a discount rate[2] (0.03) to calculate the

[2] The rate at which predicted cash expenditures (costs) or inflows (benefits) are reduced in future years to reflect the time cost of money. The purpose of the discount rate is to convert future values to present value.

"present value" of crash costs at "Base" year or present year. In the IHSDM Economic Analysis, the Base year is usually the first year of the evaluations, which in this study it is the open year, 2025.

Table 10-2 shows the crash costs and the net present value of benefits for the Build design. Based on the analysis results, the most benefits will be expected on I-20 mainline. The highest safety cost will be observed on I-285 where there is an increase in the number of crashes due to the higher volume on I-285 in the build condition. Crossroad Interchanges will generally experience more crashes due to higher volume in the build condition. Overall, the total net present value of the direct safety benefits of this project will be $173,682,063.

Table 10-2. Crash Cost Summary

Facility	Title	Present Value of Crash Cost ($)	Net Present Value of Benefits (B) ($)
I-20	No Build	4,949,715,698	
	Build	4,571,267,882	**378,447,817**
I-285	No Build	2,671,709,998	
	Build	2,767,223,014	**-95,513,016**
Ramps and CD Roads	No Build	1,222,293,517	
	Build	1,224,467,706	**-2,174,189**
Candler Rd	No Build	512,008,504	
	Build	522,967,551	**-10,959,047**
Columbia Rd	No Build	109,582,160	
	Build	102,116,996	**7,465,164**
Wesley Chapel Rd	No Build	420,871,079	
	Build	438,718,276	**-17,847,198**
Panola Rd	No Build	374,493,213	
	Build	409,579,877	**-35,086,664**
Evans Mill Rd & Lithonia Industrial Blvd	No Build	214,781,106	
	Build	261,672,189	**-46,891,083**
Glenwood Road	No Build	455,278,861	
	Build	448,168,077	**7,110,784**
Flat Shoals Road	No Build	857,566,727	
	Build	855,451,387	**2,115,340**
Total	**No Build**	**11,788,300,868**	
	Build	**11,601,632,9560**	**186,667,908**

10.2.2 Costs

The costs of the Build design, including right-of-way (ROW), utilities, construction, and operations are evaluated against the projected benefits from reduced property damages, injuries, and fatalities. **Table 10-3** lists estimated probable costs of construction for six segments, inclusive of design, construction, contingencies and Right of Way costs.

Table 10-3. Construction Cost Summary

Description	Cost ($)	Segment Description
Segment 1	131,047,000	I-285/I-20 East Interchange
Segment 2	15,456,300	I-285 Northbound GP Lane Widening
Segment 3	84,265,100	I-20 Collector Distributor Lanes
Segment 4	88,820,700	I-20 Auxiliary Lanes
Segment 5	9,456,000	Miller Road Overpass
Segment 6	17,962,800	Fairington Road Overpass
Sub-Total:	**347,007,900**	

The total cost for BCA will be $347,007,900.

10.2.3 Benefit-Cost Ratio

The benefit-cost ratio (BCR) is the ratio of present value benefits (including negative benefits) to present value costs. In general, a higher BCR is desirable. The BCR for the safety aspect of this project is 0.50.

10.3 CONCLUSION

A BCA is performed for the entire improvement project. The costs, including right-of-way (ROW), utilities, construction, and operations are evaluated against the projected benefits from reduced property damages, injuries, and fatalities. Overall, the total net present value of the direct safety benefits for this project is $186,667,908 and the total cost of the project along the roadways where safety was studied is $347,007,900. A BCR of 0.53 indicates that direct safety benefits can compensate for half of the project's cost.