Alternative 4C Simulation technical Memorandum

I-26 Connector

I-40 to US 19-23-70 North of Asheville
City of Asheville, Buncombe County, North Carolina
State Transportation Improvement Program Project No. I-2513
State Project No. 34165.1.1
Federal Aid project No. MA-NHF-26-1(53)

June 2013

DRAFT

Prepared For:
North Carolina Department of Transportation
Project Development and Environmental Analysis
Prepared By:
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In Association with:
URS Corporation—North Carolina

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1. INTRODUCTION

The North Carolina Department of Transportation (NCDOT) has requested that a simulation analysis be prepared for a potential new alternative for the I-26 Connector project, State Transportation Improvement Program (STIP) project I-2513. STIP Project is broken into three sections, Section C is the southernmost portion of the project and includes the I-26/I-40/I-240 interchange. Section A begins at the north end of Section C and includes the widening and re-design of the existing I-240 corridor as I-26. Section B begins slightly south of Patton Avenue and extends to the northeast on new location eventually connecting to US 19-23-70 and ending at the SR 1477 (Broadway) interchange. The current version of the Draft Environmental Impact Statement includes three alternatives for Section B, Alternative 3, Alternative 4 and Alternative 4B.

In the summer of 2012 a new alternative was conceived that had a goal of providing the benefits of the Alternative 4/4B alignments (addressing the US 19-23-70/I-240 interchange east of the French Broad River) at a lower cost. The alternative came to be known as Alternative 4C. While the Alternative 4C alignment did reduce the cost compared to Alternatives 4 and 4B there was some concerns about the tight weaving sections included in the design.

This report includes an analysis of the traffic operations for the new alternative, especially the weaving segments between the I-26/I-240 split and Patton Avenue. The analysis was completed utilizing TransModeler, a microscopic simulation software developed by Caliper Corporation. TransModeler Version 3.0, Build 3570 was used for this analysis.

2. STUDY OVERVIEW

This section provides an overview of the study area for the evaluation and a description of the planned improvements along the study corridor roadways for this evaluation.

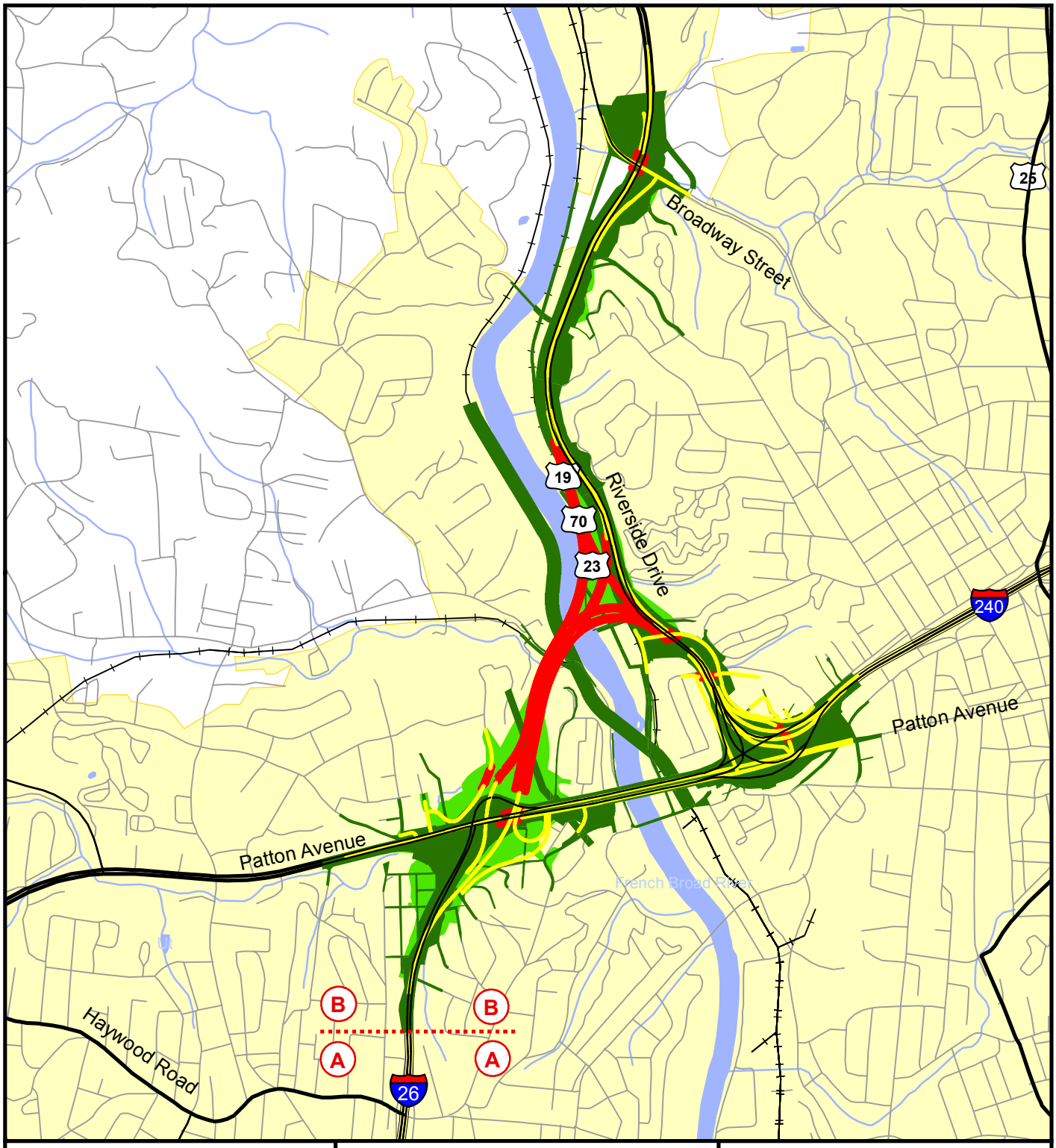
2.1 STUDY AREA

The study area for this evaluation, shown in Figure 2-1, includes the combined I-26/I-240 roadway from slightly north of the US 19-23 Business (Haywood Street) interchange, through the US 19-23-74A (Patton Avenue) interchange, where the I-240 roadway splits to the east and the I-26 corridor continues to the northeast prior to ending slightly south of the SR 1477 (Broadway) interchange. In addition to the I-26 corridor, the analysis includes the merge and diverge segments to/from I-240 and US 19-23-70 on the east side of the French Broad River.

2.2 TRAFFIC FORECAST

The traffic volumes utilized for the simulation analysis are based on the traffic forecast volumes for Alternative 4 that was included in the Traffic Forecasts for NCDOT STIP Project No. I-2513, I-26 Connector, Buncombe County, North Carolina (March 2010). The traffic volumes were then balanced throughout the network for the entire study area.

There was one minor difference between the proposed design for Alternative 4 and Alternative 4C. The design for Alternative 4 included the connection to Resort Drive tying directly into Patton Avenue, while the design for Alternative 4C includes Resort Drive tying into Regent Park Boulevard in order to access Patton Avenue. The trips from Resort Drive were transferred to Regent Park Boulevard and the network was re-balanced to account for the variation. The final AM and PM peak hour volumes for the analysis are included in Figure 2-2 and Figure 2-3.



North Carolina
Department of Transportation

Legend

- Interstate
- US Highways
- NC Highways
- Local Road
- Railroad
- Municipal Boundaries
- Streams
- Existing Right of Way
- Proposed Right of Way
- Existing Roadway
- Proposed Roadway
- Proposed Structures
- Existing structures, island, curb and gutter to be retained
- Water
- Concrete Barrier
- A Section

Date: June 2013

N W E S

0 1,000 2,000 Feet

I-26 Connector
Buncombe County

TIP Project No. I-2513

Figure 2-1

Section B Alternative 4C
Detailed Study Alternative

	1201	2053	4052	5051	5054	5101	5251	5252	5303			
1053	1951		1515	50	506	187		604	52	4865	4865	0
2201		2675	2043	37	280	138		12	1	5186	5186	0
3052	1547	1484		45	475	168		10	1	3730	3730	0
5051					271					271	271	0
5054	418	884	584			129		666	88	2769	2769	0
5101	56	93	112	18	163			101	11	554	554	0
5251	1	64	10	8	62	16				161	161	0
5252	1	549	5	5	498	27	129			1214	1214	0
5303								176		176	176	0
	3974	5749	4269	163	2255	665	129	1569	153	0	18926	
	3974	5749	4269	163	2255	665	129	1569	153	18926	0	
	0	0	0	0	0	0	0	0	0			

VEHICLE/MEDIUM TRUCK MATRIX

	1201	2053	4052	5051	5054	5101	5251	5252	5303
1053	1840		1429	50	495	186		595	52
2201		2523	1927	37	274	137		12	1
3052	1459	1399		45	465	167		10	1
5051					270				
5054	410	866	572			128		657	88
5101	56	93	111	18	162			100	11
5251	1	64	10	8	62	16			
5252	1	538	5	5	492	27	128		
5303								175	

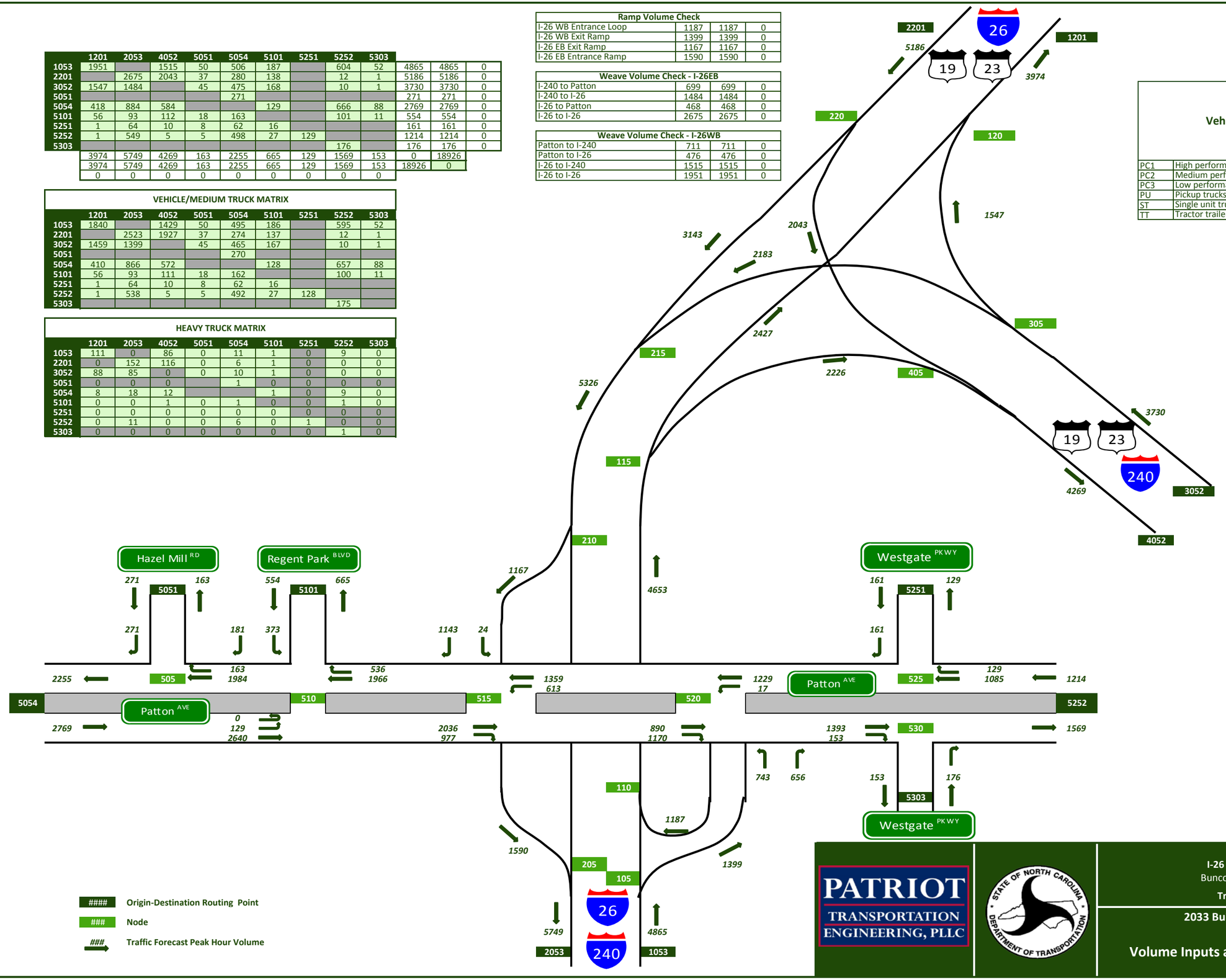
HEAVY TRUCK MATRIX

	1201	2053	4052	5051	5054	5101	5251	5252	5303
1053	111	0	86	0	11	1	0	9	0
2201	0	152	116	0	6	1	0	0	0
3052	88	85	0	0	10	1	0	0	0
5051	0	0	0		1	0	0	0	0
5054	8	18	12			1	0	9	0
5101	0	0	1	0	1	0	0	1	0
5251	0	0	0	0	0	0	0	0	0
5252	0	11	0	0	6	0	1	0	0
5303	0	0	0	0	0	0	0	1	0

Ramp Volume Check			
I-26 WB Entrance Loop	1187	1187	0
I-26 WB Exit Ramp	1399	1399	0
I-26 EB Exit Ramp	1167	1167	0
I-26 EB Entrance Ramp	1590	1590	0

Weave Volume Check - I-26EB			
I-240 to Patton	699	699	0
I-240 to I-26	1484	1484	0
I-26 to Patton	468	468	0
I-26 to I-26	2675	2675	0

Weave Volume Check - I-26WB			
Patton to I-240	711	711	0
Patton to I-26	476	476	0
I-26 to I-240	1515	1515	0
I-26 to I-26	1951	1951	0



Vehicle Fleet		Vehicel/Medium Truck	Heavy Truck
PC1	High performance passenger car	6.0%	0.0%
PC2	Medium performance passenger car	43.0%	0.0%
PC3	Low performance passenger car	6.0%	0.0%
PU	Pickup trucks, vans, SUVs	42.5%	0.0%
ST	Single unit truck	2.5%	0.0%
TT	Tractor trailer truck	0.0%	100.0%

PATRIOT TRANSPORTATION ENGINEERING, PLLC

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STIP No. I-2513
I-26 Connector - Alternative 4C
Buncombe County, North Carolina
Traffic Simulation Analysis

2033 Build - AM Peak

Volume Inputs and Vehicle Routing

FIGURE **2-2**

TOTAL TRIP MATRIX

	1201	2053	4052	5051	5054	5101	5251	5252	5303			
1053	2675		1484	95	730	152		564	49	5749	5749	0
2201		1951	1547	70	284	112		9	1	3974	3974	0
3052	2043	1515		85	482	137		7	0	4269	4269	0
5051					153					153	153	0
5054	401	635	547			99		367	120	2169	2169	0
5101	65	108	130	23	210			116	13	665	665	0
5251	1	54	14	7	45	14				135	135	0
5252	1	602	8	8	752	40	155			1566	1566	0
5303								147		147	147	0
	5186	4865	3730	288	2656	554	155	1210	183	0	18827	
	5186	4865	3730	288	2656	554	155	1210	183	18827	0	
	0	0	0	0	0	0	0	0	0			

VEHICLE/MEDIUM TRUCK MATRIX

	1201	2053	4052	5051	5054	5101	5251	5252	5303
1053	2523		1399	95	715	151		556	49
2201		1840	1459	70	278	111		9	1
3052	1927	1429		85	472	136		7	0
5051					152				
5054	393	622	536			99		362	119
5101	65	107	129	23	209			115	13
5251	1	54	14	7	45	14			
5252	1	590	8	8	742	40	154		
5303								146	

HEAVY TRUCK MATRIX

	1201	2053	4052	5051	5054	5101	5251	5252	5303
1053	152	0	85	0	15	1	0	8	0
2201	0	111	88	0	6	1	0	0	0
3052	116	86	0	0	10	1	0	0	0
5051	0	0	0	0	1	0	0	0	0
5054	8	13	11			0	0	5	1
5101	0	1	1	0	1	0	0	1	0
5251	0	0	0	0	0	0	0	0	0
5252	0	12	0	0	10	0	1	0	0
5303	0	0	0	0	0	0	0	1	0

Ramp Volume Check

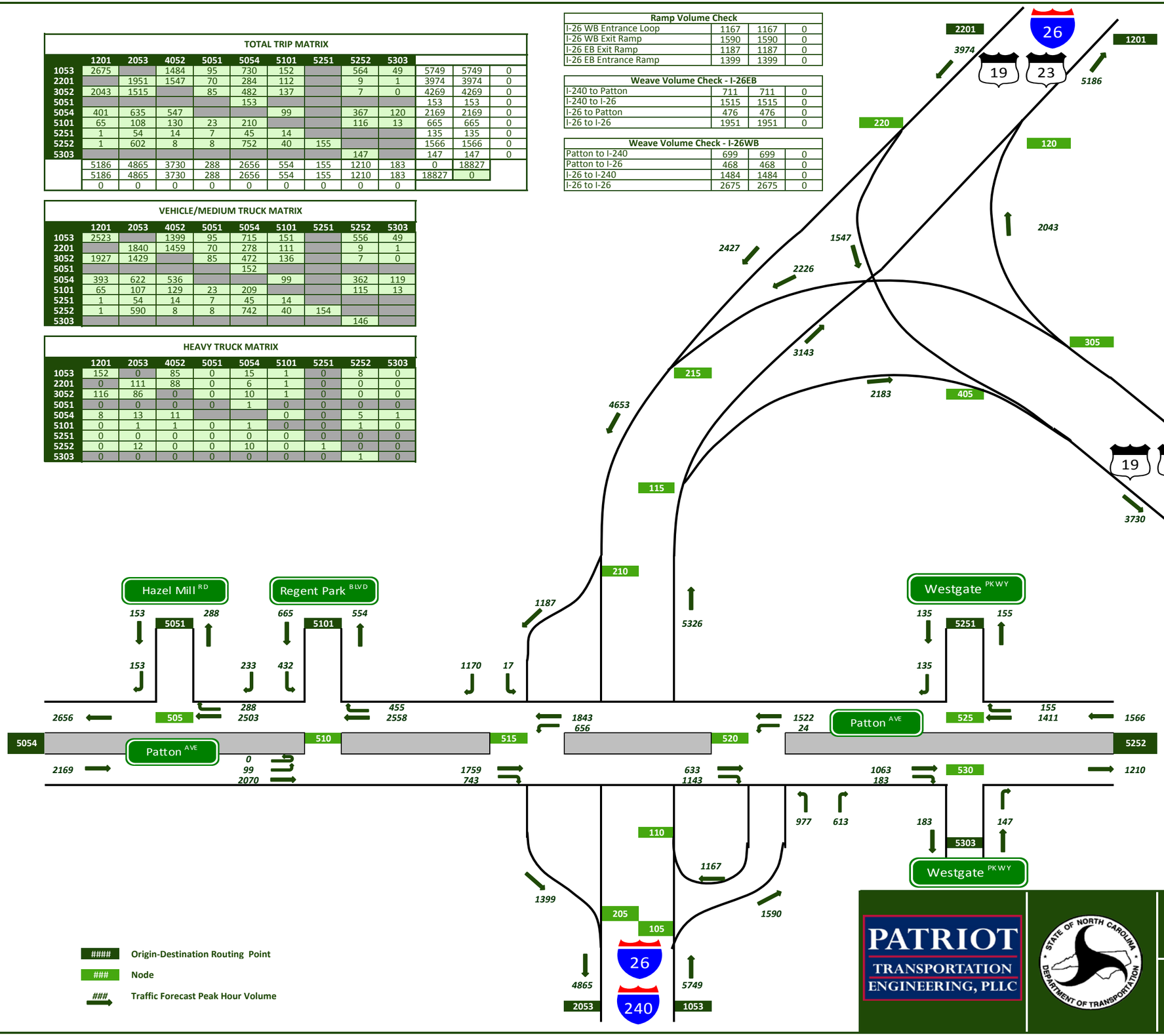
I-26 WB Entrance Loop	1167	1167	0
I-26 WB Exit Ramp	1590	1590	0
I-26 EB Exit Ramp	1187	1187	0
I-26 EB Entrance Ramp	1399	1399	0

Weave Volume Check - I-26EB

I-240 to Patton	711	711	0
I-240 to I-26	1515	1515	0
I-26 to Patton	476	476	0
I-26 to I-26	1951	1951	0

Weave Volume Check - I-26WB

Patton to I-240	699	699	0
Patton to I-26	468	468	0
I-26 to I-240	1484	1484	0
I-26 to I-26	2675	2675	0



Vehicle Fleet		Vehicel/Medium Truck	Heavy Truck
PC1	High performance passenger car	6.0%	0.0%
PC2	Medium performance passenger car	43.0%	0.0%
PC3	Low performance passenger car	6.0%	0.0%
PU	Pickup trucks, vans, SUVs	42.5%	0.0%
ST	Single unit truck	2.5%	0.0%
TT	Tractor trailer truck	0.0%	100.0%

PATRIOT TRANSPORTATION ENGINEERING, PLLC

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

STIP No. I-2513

I-26 Connector - Alternative 4C

Buncombe County, North Carolina

Traffic Simulation Analysis

2033 Build - PM Peak

Volume Inputs and Vehicle Routing

FIGURE

2-3

3. BASE YEAR CALIBRATED MODEL

The proposed facility that is being developed in this analysis does not currently exist; therefore it is difficult to develop a calibrated base year model that would be representative of the future traffic operations due to the magnitude of changes to the study area. However, it is recommended that a larger calibrated base model be developed for the project that would provide insight into the driver behaviors of local drivers. Without locally derived data the findings of this study should be considered preliminary as they have not been calibrated to local operating conditions.

4. 2033 FUTURE YEAR BUILD MODEL

The 2033 future year build model is based on the preliminary design plans developed by URS Corporation and approved in October 2012. The elevations utilized in developing the simulation model are based on the profiles included in the preliminary design plans.

4.1 ORIGIN-DESTINATION MATRIX

The origin-destination matrices, shown on Figure 2-2 and Figure 2-3, were developed based on the traffic forecast volumes and the trips were split based on engineering judgment such that the turn movements matched the forecast volumes. Additionally, a second set of matrices was developed such that the heavy trucks (tractor trailers) would be routed in proportion to the truck percentage shown on the traffic forecast for each facility.

4.2 SPEED LIMITS

The model was coded based on the posted speed limits taken from the project design criteria. The I-26 and I-240 mainlines were modeled with a 55 mph speed limit, the I-240 flyovers were modeled with a 50 mph speed limit, the Patton Avenue ramps were modeled with a 45 mph speed limit, the Patton Avenue loop was modeled with a 25 mph speed limit and Patton Avenue was modeled with a 45 mph speed limit.

4.3 VEHICLE FLEET

The vehicle fleet utilized for the model was based on a vehicle classification derived from video of the I-240 corridor taken in October 2008. The vehicle fleet, shown in Table 4-1, was segregated to include one fleet for passenger cars and medium trucks and a second distribution for heavy trucks.

Table 4-1: Vehicle Fleet Distributions

Vehicle Class	Description	Passenger Car/ Medium Truck Distribution	Heavy Truck Distribution
PC1	High performance passenger car	6.0%	0.0%
PC2	Medium performance passenger car	43.0%	0.0%
PC3	Low performance passenger car	6.0%	0.0%
PU	Pickup trucks, vans, SUVs	42.5%	0.0%
ST	Single unit truck	2.5%	0.0%
TT	Tractor trailer truck	0.0%	100.0%

4.4 DESIRED SPEED DISTRIBUTIONS

The desired speed distributions for the freeway elements of the evaluation were derived based on field collected speed data from October 2008. The desired speed distribution for I-26 and I-240 is based on an average speed distribution taken from three locations along I-240 while the desired speed distribution for the I-240 flyover ramps is based on a speed distribution taken from the I-40/I-240 flyover on the east side of Asheville. The desired speed distributions for the Patton Avenue corridor is derived from a standard speed distribution used for simulation projects in North Carolina. Table 4-2 shows the desired speed distribution utilized in the model.

Table 4-2: Desired Speed Distributions

Deviation from Speed Limit	I-26/I-240 Distribution	Flyover Distribution
-12	0.0%	0.5%
-8	0.5%	4.5%
-5	4.5%	10.0%
-3	5.0%	12.5%
0	12.5%	22.5%
3	18.5%	15.0%
6	20.0%	17.5%
9	16.0%	10.0%
12	12.0%	7.0%
15	7.0%	0.5%
18	3.5%	0.0%
20	0.5%	0.0%

4.5 SIGNAL TIMING

The signal timings for the three signals along Patton Avenue were taken from the Synchro optimized signal output included in the *I-26 Connector Traffic Capacity Analysis Memorandum – Section B Alternative 4C* prepared by URS Corporation, June 2012.

4.6 SIMULATION RUN CONTROL

The simulation was run for both the AM and PM peak periods. The model runs include a one-hour peak with an additional 15-minute warm-up period that included traffic volumes at 75% of the peak hour volume. To account for peaking during the one-hour period a curve based time distribution was utilized such that a peak hour factor of 0.90 (standard for NCDOT projects) would be modeled. The simulation time distribution is shown in Table 4-3.

Table 4-3: Simulation Time Distribution

Time Period – AM Peak	Time Period – PM Peak	Percentage of Demand in Each Interval
8:00 – 8:15	17:00 – 17:15	22.2%
8:15 – 8:30	17:15 – 17:30	25.0%
8:30 – 8:45	17:30 – 17:45	27.8%
8:45 – 9:00	17:45 – 18:00	25.0%

5. SIMULATION RESULTS

The output from the model, or the measure of effectiveness, for the study was selected to be density. Density is the primary measure for determining the Level of Service (LOS) for a freeway facility. The Federal Highway Administration (FHWA) developed the *Traffic Analysis Toolbox, Volume 3* as a guide to help in the development of simulation projects. The Toolbox notes that:

> It is often valuable when explaining microsimulation model results to the general public to report the results in terms of Highway Capacity Manual (HCM) levels of service. However, the analyst should be well aware of the differences between the HCM and the microsimulation analysis when making these comparisons.
>
> If microsimulation model reports of vehicle density are to be reported in terms of their LOS implications, it is important to first translate the densities reported by the software into the densities used by the HCM to report LOS for uninterrupted flow facilities.

The methodology in TransModeler for converting the density results to LOS was reviewed and appears to be a correct conversion to LOS. However to be clear the LOS for the study will be denoted as LOS* with a note that states that the "Level of Service was derived from microscopic simulation and is representative of the traffic operations for the equivalent Level of Service derived from the methodologies included in the 2010 Highway Capacity Manual."

Microsimulation models employ random numbers to represent the uncertainty in driver behavior in any given population of drivers. They will produce slightly different results each time they are run, with a different random number seed giving a different mix of driver behaviors. The simulation was run ten (10) times with different random seeds (5, 10, 15, 20, 25, 30, 35, 40, 45, and 50) for both the AM and PM peak periods.

The analyst needs to determine if the alternatives should be evaluated based on their average predicted performance or their worst case predicted performance. The average or mean performance is easy to compute and interpret statistically. The worst case result for each alternative is slightly more difficult to compute as the analyst has no assurance that if the model were to be run a few more times, the model might not get an even worse result. The solution is to compute the 95th percentile probable worst outcome based on the mean outcome and an assumed normal distribution for the results. The following equation can be used to make this estimate:

$$95\%\text{Worst Result} = m + 1.64 \bullet s$$

where:
m = mean observed result in the model runs
s = standard deviation of the result in the model runs

The simulation results for each of the ten simulations as well as the average and 95th percentile results are shown in Table 5-1 and Table 5-2.

A graphical representation of the analysis is shown on Figure 5-1 and Figure 5-2.

Table 5-1: 2033 Build AM Peak - Simulation Results

ID	TYPE		RS=5	RS=10	RS=15	RS=20	RS=25	RS=30	RS=35	RS=40	RS=45	RS=50	Avg.	95%
I-26 Westbound														
1	Basic	Density	33.9	44.3	33.0	38.1	38.7	29.1	28.0	37.0	24.5	27.4	**33.4**	**43.0**
		LOS*	D	E	D	E	E	D	D	E	C	D	**D**	**E**
2	Diverge	Density	38.5	37.6	41.5	39.4	36.2	39.4	39.6	39.6	36.7	38.3	**38.7**	**41.1**
		LOS*	E	E	E	E	E	E	E	E	E	E	**E**	**E**
3	Basic	Density	20.6	18.4	23.0	18.3	23.6	22.4	15.4	21.2	23.5	18.8	**20.5**	**24.8**
		LOS*	C	C	C	C	C	C	B	C	C	C	**C**	**C**
4	Weave	Density	22.6	21.0	22.5	20.4	21.3	20.2	22.8	20.8	21.1	21.5	**21.4**	**22.8**
		LOS*	C	C	C	C	C	C	C	C	C	C	**C**	**C**
5	Basic	Density	22.8	17.8	15.9	16.0	16.0	16.8	18.8	22.5	19.6	20.1	**18.6**	**22.7**
		LOS*	C	B	B	B	B	B	C	C	C	C	**C**	**C**
6	Merge	Density	22.3	21.7	18.9	16.4	16.8	19.4	15.2	17.7	16.6	18.5	**18.3**	**21.9**
		LOS*	C	C	B	B	B	B	B	B	B	B	**C**	**C**
7	Basic	Density	27.0	22.8	20.1	23.3	25.2	24.5	24.5	21.7	25.2	17.2	**23.1**	**27.6**
		LOS*	D	C	C	C	C	C	C	C	C	B	**C**	**D**
I-26 Eastbound														
8	Basic	Density	29.9	30.0	30.4	29.9	31.8	30.1	31.5	32.5	30.4	30.8	**30.7**	**32.1**
		LOS*	D	D	D	D	D	D	D	D	D	D	**D**	**D**
9	Diverge	Density	32.5	31.5	32.0	32.1	30.0	31.4	31.4	29.5	30.7	34.8	**31.6**	**33.9**
		LOS*	D	D	D	D	D	D	D	D	D	D	**D**	**D**
10	Basic	Density	28.5	22.5	22.2	19.0	21.8	21.7	29.6	26.6	25.1	21.6	**23.9**	**29.2**
		LOS*	D	C	C	C	C	C	D	D	C	C	**C**	**D**
11	Weave	Density	28.1	26.1	25.0	23.3	28.8	26.3	25.4	22.5	29.6	30.9	**26.6**	**30.8**
		LOS*	D	C	C	C	D	C	C	C	D	D	**D**	**D**
12	Basic	Density	27.3	25.0	25.2	24.2	28.0	25.2	22.7	26.3	22.1	27.4	**25.2**	**28.4**
		LOS*	D	C	C	C	D	C	C	D	C	D	**C**	**D**
13	Merge	Density	31.1	23.3	35.8	28.6	31.7	35.4	33.6	34.7	33.5	24.0	**31.2**	**38.2**
		LOS*	D	C	E	D	D	E	D	D	D	C	**D**	**E**
14	Basic	Density	21.8	25.5	24.4	27.2	26.0	30.6	31.0	38.9	25.0	24.6	**27.5**	**35.1**
		LOS*	C	C	C	D	D	D	D	E	C	C	**D**	**E**

LOS* denotes Level of Service that was derived from microscopic simulation and is representative of the traffic operations for the equivalent Level of Service derived from the methodologies included in the 2010 Highway Capacity Manual

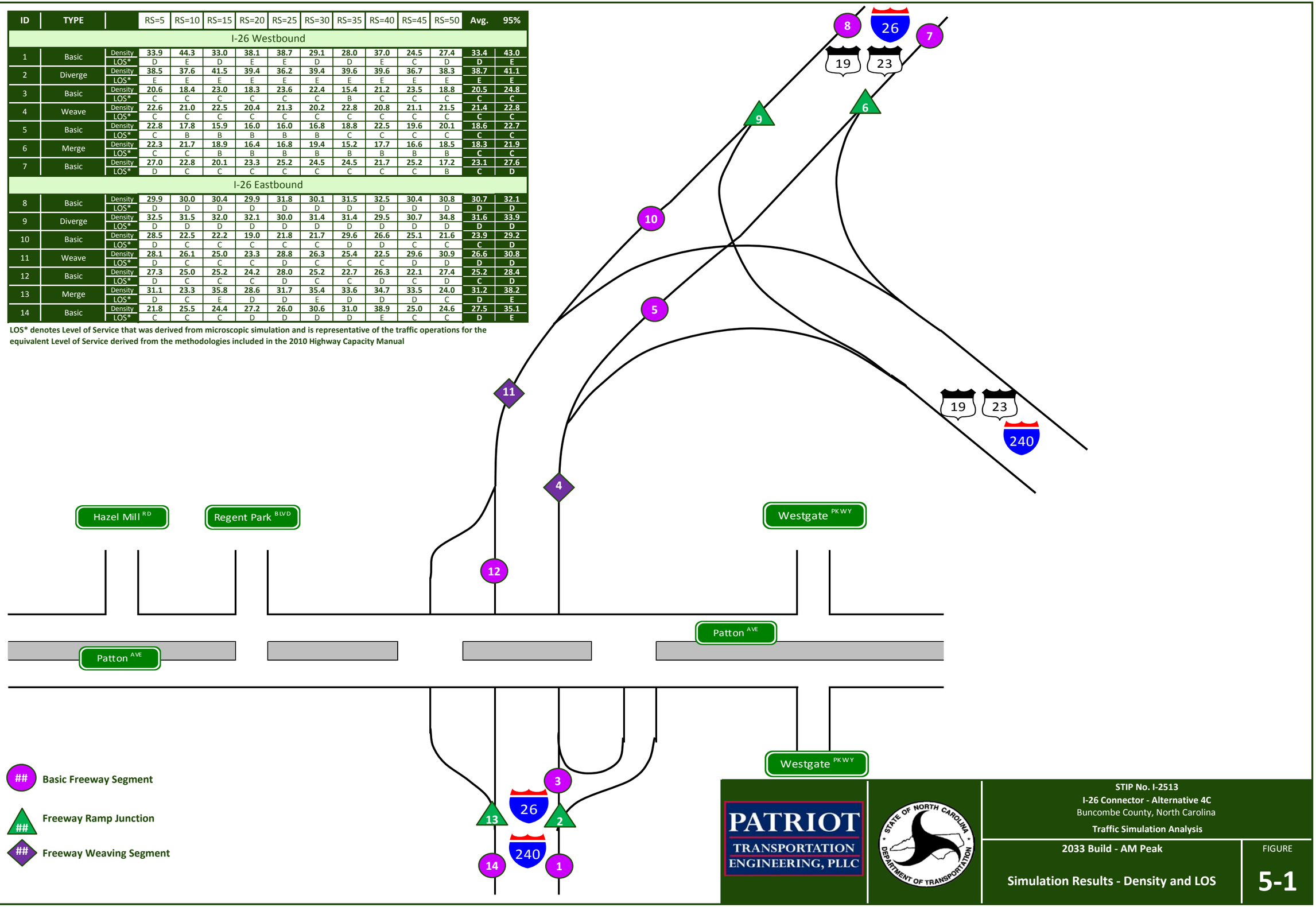
Table 5-2: 2033 Build PM Peak - Simulation Results

ID	TYPE		RS=5	RS=10	RS=15	RS=20	RS=25	RS=30	RS=35	RS=40	RS=45	RS=50	Avg.	95%
I-26 Westbound														
13	Basic	Density	37.6	33.6	41.1	38.8	44.0	49.6	47.7	48.0	43.4	44.0	**42.8**	**50.6**
		LOS*	E	D	E	E	E	F	F	F	E	E	**E**	**F**
59	Diverge	Density	44.6	40.0	46.7	45.2	51.3	52.5	43.0	51.9	45.3	42.2	**46.3**	**53.0**
		LOS*	E	E	E	E	E	E	E	E	E	E	**F**	**F**
60	Basic	Density	29.6	23.2	25.8	22.0	29.9	27.0	23.6	30.5	25.5	22.7	**26.0**	**30.9**
		LOS*	D	C	C	C	D	D	C	D	C	C	**C**	**D**
46	Weave	Density	22.8	25.2	24.2	24.1	22.5	24.3	24.8	22.6	21.9	26.3	**23.9**	**26.1**
		LOS*	C	C	C	C	C	C	C	C	C	C	**C**	**D**
44	Basic	Density	29.5	28.0	24.3	23.3	27.2	22.2	23.3	21.4	23.5	23.1	**24.6**	**28.7**
		LOS*	D	D	C	C	D	C	C	C	C	C	**C**	**D**
55	Merge	Density	27.7	32.3	26.9	24.8	27.4	24.5	21.1	29.4	21.5	26.9	**26.2**	**31.6**
		LOS*	C	D	C	C	C	C	C	D	C	C	**D**	**D**
56	Basic	Density	28.8	31.0	34.3	33.6	29.8	32.9	28.6	28.2	33.8	34.1	**31.5**	**35.4**
		LOS*	D	D	D	D	D	D	D	D	D	D	**D**	**E**
I-26 Eastbound														
64	Basic	Density	21.4	22.5	24.0	22.4	23.5	23.8	23.0	22.5	22.4	22.5	**22.8**	**24.0**
		LOS*	C	C	C	C	C	C	C	C	C	C	**C**	**C**
65	Diverge	Density	23.6	23.9	21.2	26.2	22.8	23.4	22.5	22.0	25.5	21.7	**23.3**	**25.8**
		LOS*	C	C	C	C	C	C	C	C	C	C	**C**	**C**
52	Basic	Density	18.0	14.5	19.6	18.0	21.1	17.3	17.4	21.4	19.1	19.4	**18.6**	**21.7**
		LOS*	B	B	C	C	C	B	B	C	C	C	**C**	**C**
47	Weave	Density	22.9	21.3	24.1	18.6	19.1	21.0	23.4	25.0	25.2	21.9	**22.2**	**25.8**
		LOS*	C	C	C	B	B	C	C	C	C	C	**C**	**C**
48	Basic	Density	18.9	18.6	17.2	22.8	20.6	20.6	19.6	19.5	19.0	20.0	**19.7**	**22.0**
		LOS*	C	C	B	C	C	C	C	C	C	C	**C**	**C**
57	Merge	Density	30.1	24.1	28.2	21.5	23.7	20.7	21.3	25.3	25.3	28.6	**24.9**	**30.0**
		LOS*	D	C	D	C	C	C	C	C	C	D	**C**	**D**
58	Basic	Density	21.2	21.7	18.5	18.0	27.9	20.1	28.2	18.6	28.1	23.5	**22.6**	**29.0**
		LOS*	C	C	C	B	D	C	D	C	D	C	**C**	**D**

LOS* denotes Level of Service that was derived from microscopic simulation and is representative of the traffic operations for the equivalent Level of Service derived from the methodologies included in the 2010 Highway Capacity Manual

ID	TYPE		RS=5	RS=10	RS=15	RS=20	RS=25	RS=30	RS=35	RS=40	RS=45	RS=50	Avg.	95%
I-26 Westbound														
1	Basic	Density	33.9	44.3	33.0	38.1	38.7	29.1	28.0	37.0	24.5	27.4	33.4	43.0
		LOS*	D	E	D	E	E	D	D	E	C	D	D	E
2	Diverge	Density	38.5	37.6	41.5	39.4	36.2	39.4	39.6	39.6	36.7	38.3	38.7	41.1
		LOS*	E	E	E	E	E	E	E	E	E	E	E	E
3	Basic	Density	20.6	18.4	23.0	18.3	23.6	22.4	15.4	21.2	23.5	18.8	20.5	24.8
		LOS*	C	C	C	C	C	C	B	C	C	C	C	C
4	Weave	Density	22.6	21.0	22.5	20.4	21.3	20.2	22.8	20.8	21.1	21.5	21.4	22.8
		LOS*	C	C	C	C	C	C	C	C	C	C	C	C
5	Basic	Density	22.8	17.8	15.9	16.0	16.0	16.8	18.8	22.5	19.6	20.1	18.6	22.7
		LOS*	C	B	B	B	B	B	C	C	C	C	C	C
6	Merge	Density	22.3	21.7	18.9	16.4	16.8	19.4	15.2	17.7	16.6	18.5	18.3	21.9
		LOS*	C	C	B	B	B	B	B	B	B	B	C	C
7	Basic	Density	27.0	22.8	20.1	23.3	25.2	24.5	24.5	21.7	25.2	17.2	23.1	27.6
		LOS*	D	C	C	C	C	C	C	C	C	B	C	D
I-26 Eastbound														
8	Basic	Density	29.9	30.0	30.4	29.9	31.8	30.1	31.5	32.5	30.4	30.8	30.7	32.1
		LOS*	D	D	D	D	D	D	D	D	D	D	D	D
9	Diverge	Density	32.5	31.5	32.0	32.1	30.0	31.4	31.4	29.5	30.7	34.8	31.6	33.9
		LOS*	D	D	D	D	D	D	D	D	D	D	D	D
10	Basic	Density	28.5	22.5	22.2	19.0	21.8	21.7	29.6	26.6	25.1	21.6	23.9	29.2
		LOS*	D	C	C	C	C	C	D	D	C	C	C	D
11	Weave	Density	28.1	26.1	25.0	23.3	28.8	26.3	25.4	22.5	29.6	30.9	26.6	30.8
		LOS*	D	C	C	C	D	C	C	C	D	D	D	D
12	Basic	Density	27.3	25.0	25.2	24.2	28.0	25.2	22.7	26.3	22.1	27.4	25.2	28.4
		LOS*	D	C	C	C	D	C	C	D	C	D	C	D
13	Merge	Density	31.1	23.3	35.8	28.6	31.7	35.4	33.6	34.7	33.5	24.0	31.2	38.2
		LOS*	D	C	E	D	D	E	D	D	D	C	D	E
14	Basic	Density	21.8	25.5	24.4	27.2	26.0	30.6	31.0	38.9	25.0	24.6	27.5	35.1
		LOS*	C	C	C	D	D	D	D	E	C	C	D	E

LOS* denotes Level of Service that was derived from microscopic simulation and is representative of the traffic operations for the equivalent Level of Service derived from the methodologies included in the 2010 Highway Capacity Manual



PATRIOT TRANSPORTATION ENGINEERING, PLLC

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

STIP No. I-2513
I-26 Connector - Alternative 4C
Buncombe County, North Carolina
Traffic Simulation Analysis

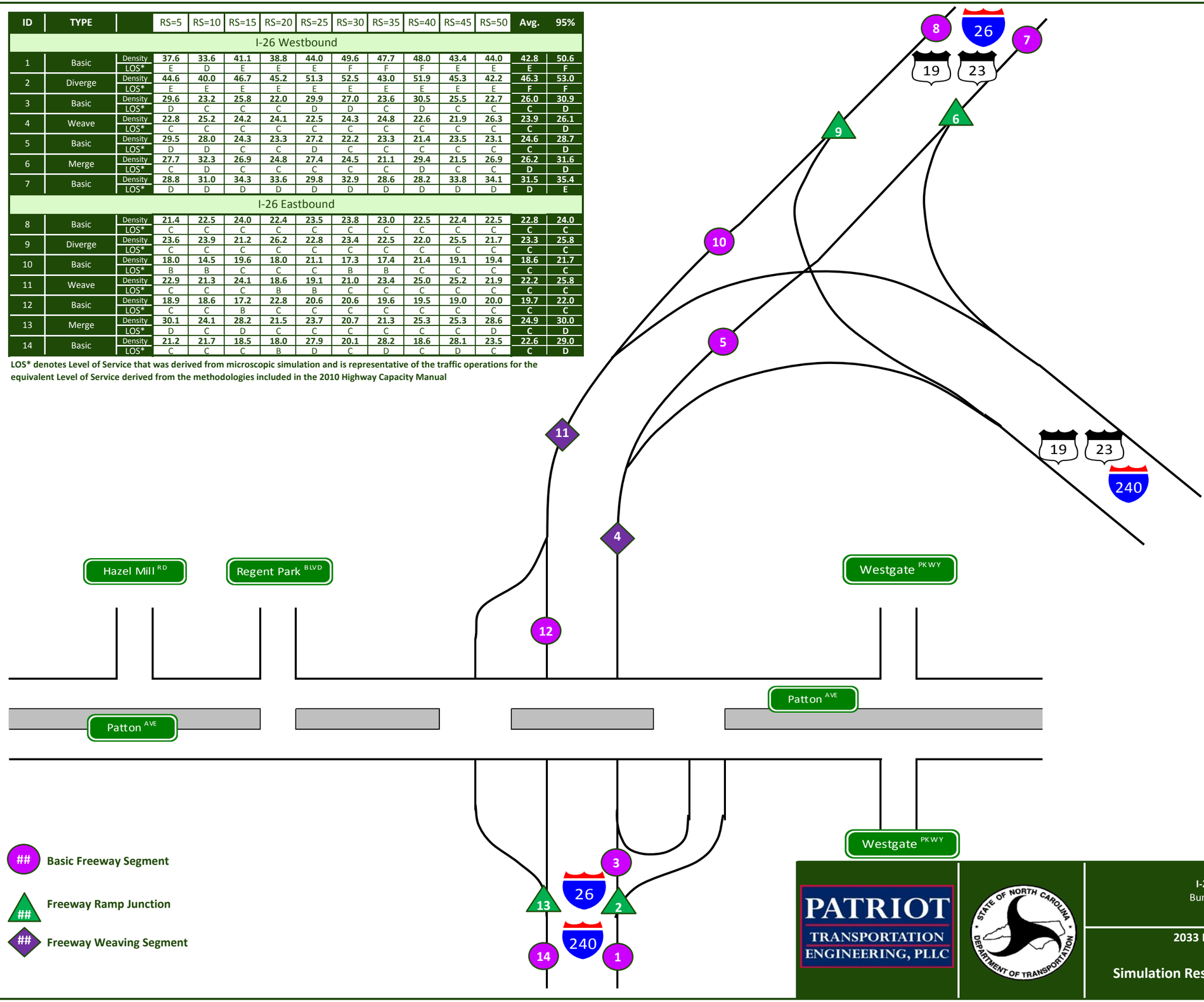
2033 Build - AM Peak

Simulation Results - Density and LOS

FIGURE **5-1**

ID	TYPE		RS=5	RS=10	RS=15	RS=20	RS=25	RS=30	RS=35	RS=40	RS=45	RS=50	Avg.	95%
I-26 Westbound														
1	Basic	Density	37.6	33.6	41.1	38.8	44.0	49.6	47.7	48.0	43.4	44.0	42.8	50.6
		LOS*	E	D	E	E	E	F	F	F	E	E	E	F
2	Diverge	Density	44.6	40.0	46.7	45.2	51.3	52.5	43.0	51.9	45.3	42.2	46.3	53.0
		LOS*	E	E	E	E	E	E	E	E	E	E	F	F
3	Basic	Density	29.6	23.2	25.8	22.0	29.9	27.0	23.6	30.5	25.5	22.7	26.0	30.9
		LOS*	D	C	C	C	D	D	C	D	C	C	C	D
4	Weave	Density	22.8	25.2	24.2	24.1	22.5	24.3	24.8	22.6	21.9	26.3	23.9	26.1
		LOS*	C	C	C	C	C	C	C	C	C	C	C	D
5	Basic	Density	29.5	28.0	24.3	23.3	27.2	22.2	23.3	21.4	23.5	23.1	24.6	28.7
		LOS*	D	D	C	C	D	C	C	C	C	C	C	D
6	Merge	Density	27.7	32.3	26.9	24.8	27.4	24.5	21.1	29.4	21.5	26.9	26.2	31.6
		LOS*	C	D	C	C	C	C	C	D	C	C	D	D
7	Basic	Density	28.8	31.0	34.3	33.6	29.8	32.9	28.6	28.2	33.8	34.1	31.5	35.4
		LOS*	D	D	D	D	D	D	D	D	D	D	D	E
I-26 Eastbound														
8	Basic	Density	21.4	22.5	24.0	22.4	23.5	23.8	23.0	22.5	22.4	22.5	22.8	24.0
		LOS*	C	C	C	C	C	C	C	C	C	C	C	C
9	Diverge	Density	23.6	23.9	21.2	26.2	22.8	23.4	22.5	22.0	25.5	21.7	23.3	25.8
		LOS*	C	C	C	C	C	C	C	C	C	C	C	C
10	Basic	Density	18.0	14.5	19.6	18.0	21.1	17.3	17.4	21.4	19.1	19.4	18.6	21.7
		LOS*	B	B	C	C	C	B	B	C	C	C	C	C
11	Weave	Density	22.9	21.3	24.1	18.6	19.1	21.0	23.4	25.0	25.2	21.9	22.2	25.8
		LOS*	C	C	C	B	B	C	C	C	C	C	C	C
12	Basic	Density	18.9	18.6	17.2	22.8	20.6	20.6	19.6	19.5	19.0	20.0	19.7	22.0
		LOS*	C	C	B	C	C	C	C	C	C	C	C	C
13	Merge	Density	30.1	24.1	28.2	21.5	23.7	20.7	21.3	25.3	25.3	28.6	24.9	30.0
		LOS*	D	C	D	C	C	C	C	C	C	D	C	D
14	Basic	Density	21.2	21.7	18.5	18.0	27.9	20.1	28.2	18.6	28.1	23.5	22.6	29.0
		LOS*	C	C	C	B	D	C	D	C	D	C	C	D

LOS* denotes Level of Service that was derived from microscopic simulation and is representative of the traffic operations for the equivalent Level of Service derived from the methodologies included in the 2010 Highway Capacity Manual



PATRIOT TRANSPORTATION ENGINEERING, PLLC

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STIP No. I-2513
I-26 Connector - Alternative 4C
Buncombe County, North Carolina
Traffic Simulation Analysis

2033 Build - PM Peak

Simulation Results - Density and LOS

FIGURE 5-2

6. CONCLUSIONS

Based on the preliminary evaluation of Alternative 4C using microscopic simulation the following conclusions can be made:

- The weave between US 19-23-74 (Patton Avenue) and the I-26/I-240 split along I-26 Westbound is anticipated to operate at the upper end of the range for LOS C on average and will operate at the very low end of the range for LOS D with a high level of statistical confidence.

- The weave between the I-26/I-240 split and US 19-23-74 (Patton Avenue) along I-26 Eastbound is anticipated to operate at the lower end of the range for LOS D on average and will operate at the middle of the range for LOS D with a high level of statistical confidence.

- The portion of I-26/I-240 south of the US 19-23-74A (Patton Avenue) interchange operates at LOS E for the average condition and at LOS F for the 95th percentile result in the I-26 Westbound direction and at LOS D for the average condition and LOS E for the 95th percentile result. Additionally the merge and diverge to and from US 19-23-74A (Patton Avenue) operated at LOS E or worse. However, it should be noted that the model does not extend to the US 19-23 Business (Haywood Road) interchange so these results may not be truly reflective of the actual operating conditions due them being on the edge of the model.

- From a qualitative standpoint the US 19-23-74A (Patton Avenue) corridor operated relatively well and the only intersection that had any queuing problems was the Patton Avenue/Regent Park Boulevard intersection which had queuing along Regent Park Boulevard but did not affect the through traffic along Patton Avenue.

The results of the analysis show that the weaving segments along I-26 between the US 19-23-74A (Patton Avenue) and the I-26/I-240 interchange will likely operate at LOS D or better in the design year 2033. However, it should be noted that the results included in this analysis are preliminary and are not based on a model that is calibrated to local operating conditions. It is recommended that this analysis should be reviewed and/or updated once a calibrated model is available and the preliminary design plans are completed.

APPENDIX A:

TRANSMODELER OUTPUT REPORTS

Note: The ID numbers shown in the report were modified to be sequential and reduce confusion to the reader. The following table shows the ID number from the report and the corresponding ID number for the TransModeler output reports.

Report ID	TransModeler ID
1	13
2	59
3	60
4	46
5	44
6	55
7	56
8	64
9	65
10	52
11	47
12	48
13	57
14	58

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 14:56:37

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	33.9	D
46	Weaving	22.6	C
55	Merge	22.3	C
56	Partial Basic	27.0	D
59	Diverge	38.5	E
60	Basic	20.6	C
NWB			
44	Basic	22.8	C
49	Diverge	23.7	C
50	Basic	15.6	B
SB			
47	Weaving	28.1	D
57	Merge	31.1	D
58	Partial Basic	21.8	C
64	Partial Basic	29.9	D
65	Diverge	32.5	D
SEB			
53	Basic	23.7	C
54	Merge	20.3	C
SWB			
48	Basic	27.3	D
52	Basic	28.5	D

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 14:57:26

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	44.3	E
46	Weaving	21.0	C
55	Merge	21.7	C
56	Partial Basic	22.8	C
59	Diverge	37.6	E
60	Basic	18.4	C
NWB			
44	Basic	17.8	B
49	Diverge	22.9	C
50	Basic	17.4	B
SB			
47	Weaving	26.1	C
57	Merge	23.3	C
58	Partial Basic	25.5	C
64	Partial Basic	30.0	D
65	Diverge	31.5	D
SEB			
53	Basic	30.0	D
54	Merge	25.2	C
SWB			
48	Basic	25.0	C
52	Basic	22.5	C

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 14:58:13

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	33.0	D
46	Weaving	22.5	C
55	Merge	18.9	B
56	Partial Basic	20.1	C
59	Diverge	41.5	E
60	Basic	23.0	C
NWB			
44	Basic	15.9	B
49	Diverge	23.7	C
50	Basic	15.7	B
SB			
47	Weaving	25.0	C
57	Merge	35.8	E
58	Partial Basic	24.4	C
64	Partial Basic	30.4	D
65	Diverge	32.0	D
SEB			
53	Basic	23.0	C
54	Merge	24.6	C
SWB			
48	Basic	25.2	C
52	Basic	22.2	C

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 15:00:10

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	38.1	E
46	Weaving	20.4	C
55	Merge	16.4	B
56	Partial Basic	23.3	C
59	Diverge	39.4	E
60	Basic	18.3	C
NWB			
44	Basic	16.0	B
49	Diverge	23.0	C
50	Basic	18.3	C
SB			
47	Weaving	23.3	C
57	Merge	28.6	D
58	Partial Basic	27.2	D
64	Partial Basic	29.9	D
65	Diverge	32.1	D
SEB			
53	Basic	24.7	C
54	Merge	29.1	D
SWB			
48	Basic	24.2	C
52	Basic	19.0	C

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 15:00:59

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	38.7	E
46	Weaving	21.3	C
55	Merge	16.8	B
56	Partial Basic	25.2	C
59	Diverge	36.2	E
60	Basic	23.6	C
NWB			
44	Basic	16.0	B
49	Diverge	23.3	C
50	Basic	22.0	C
SB			
47	Weaving	28.8	D
57	Merge	31.7	D
58	Partial Basic	26.0	D
64	Partial Basic	31.8	D
65	Diverge	30.0	D
SEB			
53	Basic	24.4	C
54	Merge	25.1	C
SWB			
48	Basic	28.0	D
52	Basic	21.8	C

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 15:01:45

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	29.1	D
46	Weaving	20.2	C
55	Merge	19.4	B
56	Partial Basic	24.5	C
59	Diverge	39.4	E
60	Basic	22.4	C
NWB			
44	Basic	16.8	B
49	Diverge	24.4	C
50	Basic	18.5	C
SB			
47	Weaving	26.3	C
57	Merge	35.4	E
58	Partial Basic	30.6	D
64	Partial Basic	30.1	D
65	Diverge	31.4	D
SEB			
53	Basic	30.9	D
54	Merge	25.9	C
SWB			
48	Basic	25.2	C
52	Basic	21.7	C

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 15:02:32

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	28.0	D
46	Weaving	22.8	C
55	Merge	15.2	B
56	Partial Basic	24.5	C
59	Diverge	39.6	E
60	Basic	15.4	B
NWB			
44	Basic	18.8	C
49	Diverge	22.2	C
50	Basic	18.5	C
SB			
47	Weaving	25.4	C
57	Merge	33.6	D
58	Partial Basic	31.0	D
64	Partial Basic	31.5	D
65	Diverge	31.4	D
SEB			
53	Basic	21.6	C
54	Merge	29.5	D
SWB			
48	Basic	22.7	C
52	Basic	29.6	D

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 15:03:19

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	37.0	E
46	Weaving	20.8	C
55	Merge	17.7	B
56	Partial Basic	21.7	C
59	Diverge	39.6	E
60	Basic	21.2	C
NWB			
44	Basic	22.5	C
49	Diverge	25.8	C
50	Basic	20.6	C
SB			
47	Weaving	22.5	C
57	Merge	34.7	D
58	Partial Basic	38.9	E
64	Partial Basic	32.5	D
65	Diverge	29.5	D
SEB			
53	Basic	25.4	C
54	Merge	20.3	C
SWB			
48	Basic	26.3	D
52	Basic	26.6	D

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 15:04:06

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	24.5	C
46	Weaving	21.1	C
55	Merge	16.6	B
56	Partial Basic	25.2	C
59	Diverge	36.7	E
60	Basic	23.5	C
NWB			
44	Basic	19.6	C
49	Diverge	30.7	D
50	Basic	18.2	C
SB			
47	Weaving	29.6	D
57	Merge	33.5	D
58	Partial Basic	25.0	C
64	Partial Basic	30.4	D
65	Diverge	30.7	D
SEB			
53	Basic	20.5	C
54	Merge	18.0	B
SWB			
48	Basic	22.1	C
52	Basic	25.1	C

Freeway Segment Level of Service Report

8:00:00AM - 9:00:00AM

Date & Time of Run: 06/18/13 15:04:52

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	27.4	D
46	Weaving	21.5	C
55	Merge	18.5	B
56	Partial Basic	17.2	B
59	Diverge	38.3	E
60	Basic	18.8	C
NWB			
44	Basic	20.1	C
49	Diverge	21.2	C
50	Basic	19.3	C
SB			
47	Weaving	30.9	D
57	Merge	24.0	C
58	Partial Basic	24.6	C
64	Partial Basic	30.8	D
65	Diverge	34.8	D
SEB			
53	Basic	22.5	C
54	Merge	26.8	C
SWB			
48	Basic	27.4	D
52	Basic	21.6	C

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:24:39

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	37.6	E
46	Weaving	22.8	C
55	Merge	27.7	C
56	Partial Basic	28.8	D
59	Diverge	44.6	E
60	Basic	29.6	D
NWB			
44	Basic	29.5	D
49	Diverge	29.9	D
50	Basic	23.5	C
SB			
47	Weaving	22.9	C
57	Merge	30.1	D
58	Partial Basic	21.2	C
64	Partial Basic	21.4	C
65	Diverge	23.6	C
SEB			
53	Basic	18.0	C
54	Merge	23.4	C
SWB			
48	Basic	18.9	C
52	Basic	18.0	B

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:25:28

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	33.6	D
46	Weaving	25.2	C
55	Merge	32.3	D
56	Partial Basic	31.0	D
59	Diverge	40.0	E
60	Basic	23.2	C
NWB			
44	Basic	28.0	D
49	Diverge	33.6	D
50	Basic	20.6	C
SB			
47	Weaving	21.3	C
57	Merge	24.1	C
58	Partial Basic	21.7	C
64	Partial Basic	22.5	C
65	Diverge	23.9	C
SEB			
53	Basic	14.2	B
54	Merge	32.1	D
SWB			
48	Basic	18.6	C
52	Basic	14.5	B

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:26:15

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	41.1	E
46	Weaving	24.2	C
55	Merge	26.9	C
56	Partial Basic	34.3	D
59	Diverge	46.7	E
60	Basic	25.8	C
NWB			
44	Basic	24.3	C
49	Diverge	21.5	C
50	Basic	21.8	C
SB			
47	Weaving	24.1	C
57	Merge	28.2	D
58	Partial Basic	18.5	C
64	Partial Basic	24.0	C
65	Diverge	21.2	C
SEB			
53	Basic	18.5	C
54	Merge	24.6	C
SWB			
48	Basic	17.2	B
52	Basic	19.6	C

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:27:02

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	38.8	E
46	Weaving	24.1	C
55	Merge	24.8	C
56	Partial Basic	33.6	D
59	Diverge	45.2	E
60	Basic	22.0	C
NWB			
44	Basic	23.3	C
49	Diverge	20.6	C
50	Basic	24.8	C
SB			
47	Weaving	18.6	B
57	Merge	21.5	C
58	Partial Basic	18.0	B
64	Partial Basic	22.4	C
65	Diverge	26.2	C
SEB			
53	Basic	18.2	C
54	Merge	27.3	C
SWB			
48	Basic	22.8	C
52	Basic	18.0	C

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:27:49

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	44.0	E
46	Weaving	22.5	C
55	Merge	27.4	C
56	Partial Basic	29.8	D
59	Diverge	51.3	E
60	Basic	29.9	D
NWB			
44	Basic	27.2	D
49	Diverge	21.7	C
50	Basic	24.4	C
SB			
47	Weaving	19.1	B
57	Merge	23.7	C
58	Partial Basic	27.9	D
64	Partial Basic	23.5	C
65	Diverge	22.8	C
SEB			
53	Basic	19.6	C
54	Merge	17.9	B
SWB			
48	Basic	20.6	C
52	Basic	21.1	C

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:28:36

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	49.6	F
46	Weaving	24.3	C
55	Merge	24.5	C
56	Partial Basic	32.9	D
59	Diverge	52.5	E
60	Basic	27.0	D
NWB			
44	Basic	22.2	C
49	Diverge	18.8	B
50	Basic	26.6	D
SB			
47	Weaving	21.0	C
57	Merge	20.7	C
58	Partial Basic	20.1	C
64	Partial Basic	23.8	C
65	Diverge	23.4	C
SEB			
53	Basic	19.3	C
54	Merge	23.5	C
SWB			
48	Basic	20.6	C
52	Basic	17.3	B

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:29:24

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	47.7	F
46	Weaving	24.8	C
55	Merge	21.1	C
56	Partial Basic	28.6	D
59	Diverge	43.0	E
60	Basic	23.6	C
NWB			
44	Basic	23.3	C
49	Diverge	30.2	D
50	Basic	23.0	C
SB			
47	Weaving	23.4	C
57	Merge	21.3	C
58	Partial Basic	28.2	D
64	Partial Basic	23.0	C
65	Diverge	22.5	C
SEB			
53	Basic	17.5	B
54	Merge	28.6	D
SWB			
48	Basic	19.6	C
52	Basic	17.4	B

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:30:12

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	48.0	F
46	Weaving	22.6	C
55	Merge	29.4	D
56	Partial Basic	28.2	D
59	Diverge	51.9	E
60	Basic	30.5	D
NWB			
44	Basic	21.4	C
49	Diverge	21.6	C
50	Basic	23.6	C
SB			
47	Weaving	25.0	C
57	Merge	25.3	C
58	Partial Basic	18.6	C
64	Partial Basic	22.5	C
65	Diverge	22.0	C
SEB			
53	Basic	18.1	C
54	Merge	27.2	C
SWB			
48	Basic	19.5	C
52	Basic	21.4	C

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:30:59

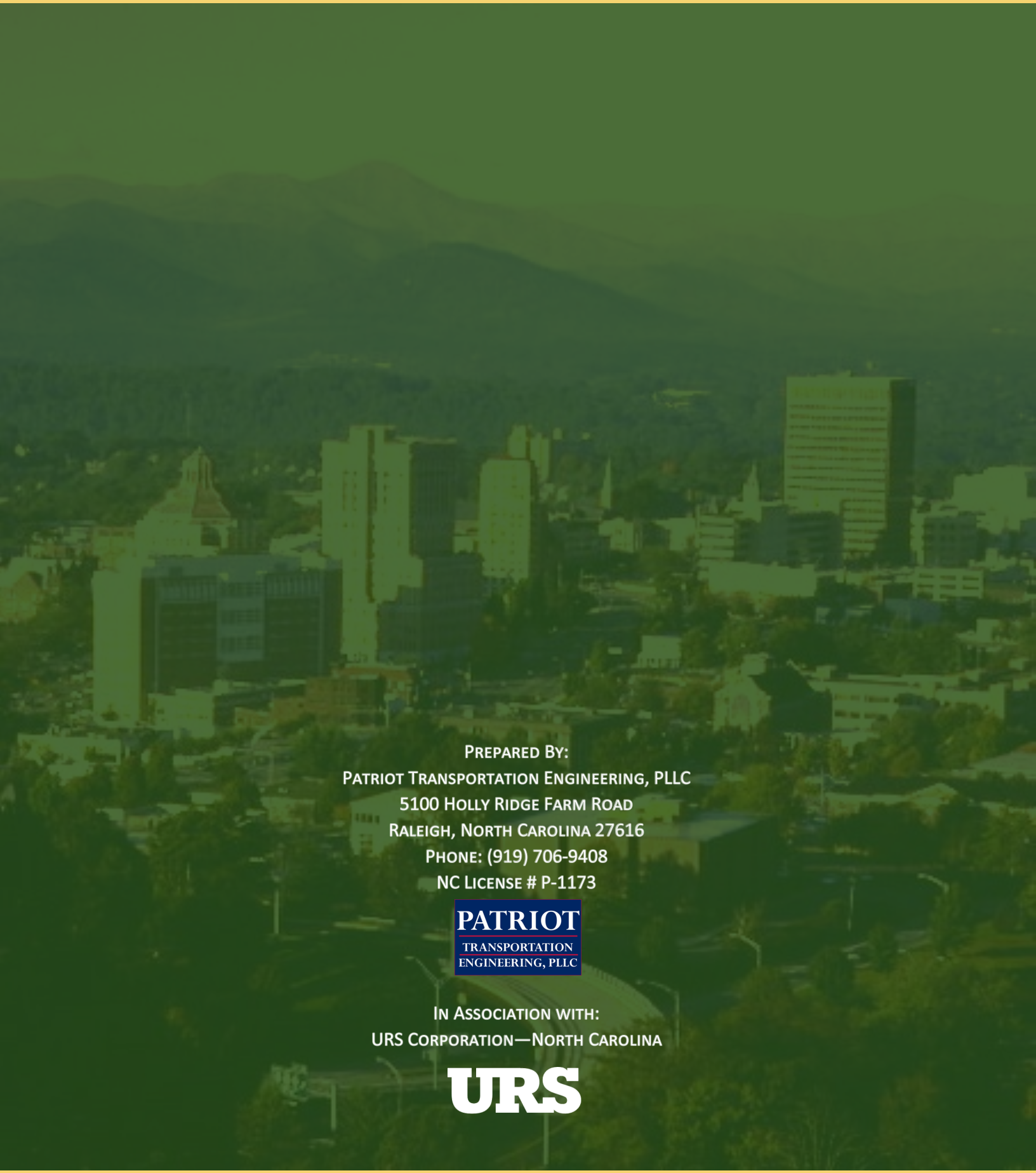
<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	43.4	E
46	Weaving	21.9	C
55	Merge	21.5	C
56	Partial Basic	33.8	D
59	Diverge	45.3	E
60	Basic	25.5	C
NWB			
44	Basic	23.5	C
49	Diverge	30.9	D
50	Basic	19.2	C
SB			
47	Weaving	25.2	C
57	Merge	25.3	C
58	Partial Basic	28.1	D
64	Partial Basic	22.4	C
65	Diverge	25.5	C
SEB			
53	Basic	15.0	B
54	Merge	21.7	C
SWB			
48	Basic	19.0	C
52	Basic	19.1	C

Freeway Segment Level of Service Report

5:00:00PM - 6:00:00PM

Date & Time of Run: 06/18/13 15:31:47

<No Name>			
Segment ID	Analysis Type	Average Density (pc/mi/ln)	Level of Service
NEB			
13	Partial Basic	44.0	E
46	Weaving	26.3	C
55	Merge	26.9	C
56	Partial Basic	34.1	D
59	Diverge	42.2	E
60	Basic	22.7	C
NWB			
44	Basic	23.1	C
49	Diverge	19.5	B
50	Basic	26.7	D
SB			
47	Weaving	21.9	C
57	Merge	28.6	D
58	Partial Basic	23.5	C
64	Partial Basic	22.5	C
65	Diverge	21.7	C
SEB			
53	Basic	17.6	B
54	Merge	20.4	C
SWB			
48	Basic	20.0	C
52	Basic	19.4	C



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