

## 3 Future Conditions without Proposed Development

---

An evaluation of the transportation impacts associated with the proposed Carolina North project also relies on an understanding of the future transportation system surrounding the site without the proposed development. Since travel in the study area would continue to increase with or without the impacts generated by Carolina North, understanding the future conditions without the proposed development makes it possible to compare the build impacts (Chapter 4) against a baseline condition. The following sections describe the transportation system in the future conditions without Carolina North, for traffic and transit.

### 3.1 Methodology

#### 3.1.1 Travel Demand Forecasting

In order to understand the impact of regional growth on Chapel Hill's transportation system, the Triangle Regional Travel Demand Model (TRM) was used to estimate ambient growth in the area. The following section provides a brief overview of the TRM, describes the model's inputs, and provides the methodology for calculating local ambient growth.

#### 3.1.2 Regional Planning Model

The Triangle Region generally includes the municipalities of Raleigh, Durham, and Chapel Hill, and its travel demand model was developed by the Capitol Area Metropolitan Planning Organization (CAMPO) and the Durham-Chapel Hill-Carrboro (DCHC) MPO. The Region includes several major universities and medical centers including North Carolina State University, Duke University and Medical Center, University of North Carolina at Chapel Hill and UNC Health Care Center. In addition, this region is home to Raleigh, the region's largest municipality and state capital of North Carolina, and Research Triangle Park, one of the fastest growing areas in the nation. These employment centers not only draw employees from residential communities within the Triangle region but from residential areas in adjacent rural areas and communities as well as regions some distance away.

The TRM is managed by the TRM service bureau in cooperation with CAMPO, DCHC MPO, North Carolina Department of Transportation, and the Triangle Transit Authority. The model covers approximately 2,200 square miles of area and consists of 2,265 traffic analysis zones (2188 internal and 77 external).<sup>3</sup> The model currently uses the TransCAD platform and includes over 13,000 roadway links classified into facility type and federal functional class.

---

<sup>3</sup> <http://itre.ncsu.edu/TRM/about/documents/TRMFactSheet.pdf>

## 3.2 Estimation of Background Growth

Two types of background growth were evaluated: ambient growth and site specific growth. Ambient growth is generated by growth throughout the region. Site specific growth is generated by approved developments in the vicinity of Carolina North. It should be noted that the estimation of background growth has not changed from the Spring 2009 TIA.

### 3.2.1 Estimation of Short-Term and Long-Term Ambient Growth

The current TRM baseline year is 2005. The TRM service bureau updates the TRM with anticipated background projects including their location, land use, year of completion and size. Based on these inputs, the TRM distributes trips throughout the model based on the roadway network characteristics, location and size of production and attraction density, and many other inputs. With the inclusion of these background projects, the TRM can be used to estimate traffic volumes on roadway links at future points in time.

To understand short-term and long-term ambient roadway growth, baseline and anticipated (year 2015 and year 2030) roadway volumes were compared to estimated volume growth. The year 2015 and year 2030 TRM included estimates for a previous iteration of the Carolina North development program. In order to isolate the ambient background growth, the Carolina North program coded into the model was removed from the TRM under the 2015 and 2030 model years. Comparisons of vehicle miles travelled (VMT) within the study area showed an annual growth rate of approximately 2.00 percent from years 2005 to 2015 (short-term ambient growth) and an annual growth rate of approximately 1.25 percent from years 2015 to 2030 (long-term ambient growth).<sup>4</sup>

### 3.2.2 Site Specific Growth

In addition to the ambient regional traffic growth, it is important to account for traffic associated with specific future developments in the vicinity of the Carolina North development. The Town of Chapel Hill provided a list of 13 approved developments and their corresponding TIAs. The 13 projects are all located to the east or north of the Carolina North site, with the majority of projects located along or near Martin Luther King Jr. Boulevard (see Figure 3-1 - All figures can be found at the end of the chapter). The TIAs for these projects were used to develop travel forecasts for both phases of the Carolina North development program. The following developments were included in the evaluation of site specific traffic growth:

---

<sup>4</sup> VMT data on I-40 was not included in the calculation of ambient growth. I-40 traffic volumes include interstate travel which does not significantly impact local intersection volumes and does not provide reliable growth estimates.

- University of North Carolina Development Plan (2012)
- Innovation Center (2011) – a component of the Carolina North program
- Residences at Grove (2015)
- Timberlyne Commerce (2007)
- Fraley Property
- Chapel Hill North (2012)
- Chapel Watch Village (2008)
- Orange United Methodist Church Expansion (2018)
- American Board of Pediatrics Development (2013)
- Homestead Twins (2008)
- Bradley Ridge (2013)
- Sawmill Condominiums (2007)
- Purefoy Subdivision (2008)

This study assumes that these developments will be completed before the construction of Phase One. All identified background projects are assumed to be completed by 2019. In total, these projects are anticipated to add 36,170 daily trips (2,255 AM peak hour, 3,360 midday, and 3,617 PM peak hour trips) in the vicinity of Carolina North over the next ten years. It should be noted that inclusion of the Innovation Center as a background development overstates the traffic growth in the immediate study area since this project is also a component of the development program analyzed for the site.

### 3.3 Anticipated Roadway and Intersection Improvements

To mitigate impacts to the transportation network from traffic associated with approved development projects, a series of roadway and intersection improvements are planned in the vicinity of the Carolina North property. These approved improvements are an important consideration in the analysis of future traffic operations and were included in the intersection operations analysis according to their year of implementation. It should be noted that these are the same improvements used in the Spring 2009 TIA. Figure 3-2 shows the location of the following approved transportation improvements:

- Martin Luther King, Jr. (NC 86) Boulevard & I-40 Westbound Ramps
  - Add a northbound thru lane to Martin Luther King, Jr. Boulevard – This improvement is intended to assist traffic traveling northbound away from the Chapel Hill North development (6) and will be implemented by 2012.
- Martin Luther King Jr. (NC 86) & Eubanks Road
  - Add an eastbound left-turn lane to Eubanks Road and a southbound right-turn lane to Martin Luther King Jr. Boulevard – These improvements are associated with the Chapel Hill North Development (6) and will be implemented by 2012. Adding these two lanes will reduce congestion in the eastbound and southbound directions.
  - Lengthen the northbound left-turn lane to 300 feet – This improvement will reduce intersection congestion associated with the Chapel Watch Village residences (7) and was implemented in 2008.
  - Add a paved ‘flare’ area to southbound right-turn lane on Martin Luther King, Jr. Boulevard – This improvement will accommodate tractor-trailers that may go off pavement to turn. It is associated with the Chapel Watch Village development (7) and was implemented in 2008.
- Martin Luther King Jr. (NC 86) & Perkins Drive
  - Add a westbound left-turn lane to Perkins Drive – This turn lane will accommodate vehicles traveling southbound toward the Chapel Hill North development (6) and will be implemented by 2012.
- Martin Luther King Jr. (NC 86) & Weaver Dairy Road
  - Optimize the traffic signal timing – This improvement is associated with the Timberlyne Commerce development (4) and was planned for implementation in 2007.
- Martin Luther King Jr. (NC 86) & Homestead Road
  - Add a northbound right-turn taper – This improvement is scheduled in conjunction with the Orange United Methodist Church Expansion, which will be completed by 2019.
- Martin Luther King Jr. (NC 86) & Hillsborough Street
  - Add an exclusive westbound right-turn lane to Hillsborough Street – This turn lane is intended to reduce congestion at the intersection for vehicles

traveling from the Residences at Grove development (3) and will be implemented by 2013.

- Columbia Street (NC 86) & Rosemary Street
  - Add a dual eastbound left-turn lane to Rosemary Street – This improvement is associated with the Residences at Grove development (3) and will be implemented by 2013.
- Columbia Street (NC 86) & South Road
  - Decrease radius of northbound right turn lane on Columbia Street (leaving a pedestrian refuge island) and provide an eastbound left-turn lane on South Road – These improvements will assist in access to and from the development on the University main campus (1) and were implemented in 2008.
  - Remove one vehicular travel lane and add an exclusive lane for buses and one for bicycles on the northbound approach between Manning Drive and South Road – These improvements will assist in transit, pedestrian, and bicycle access to the development on the University main campus (1) and were implemented in 2008.
- Weaver Dairy Road & Homestead Road
  - Monitor for future signalization; warrants not met for future 2013 – Development of the Fraley Property (5) may contribute to the volume of traffic at this intersection, which would contribute to the need for signalization in 2013.
- Rosemary Street & Hillsborough Street
  - Optimize the traffic signal timing – This adjustment to the signal timing is intended to improve operation of the intersection based on traffic volumes associated with the Residences at Grove (3) and is scheduled for 2013.

In addition to the approved roadway and intersection improvements, there are also three committed improvements from the Town of Chapel Hill. The Town of Chapel Hill has committed to making these transportation improvements and has identified funding sources for their implementation.

- Martin Luther King Jr. Boulevard signal system modernization
  - An upgrade of signal equipment to improve coordination and allow for transit priority along the corridor.
- Martin Luther King Jr. Boulevard (near Shadowood Apartments)
  - Add mid-block pedestrian crosswalk (between Estes Drive and Piney Mountain Road) with a refuge island – installation expected by fall 2009.
- Weaver Dairy Road from Martin Luther King, Jr. Boulevard to Sage Road
  - Add bike lanes and sidewalk on both sides of Weaver Dairy Road and turning lanes where needed – Scheduled for construction by 2010.

### **3.4 No-Build Volumes**

Based on the ambient regional growth in combination with the specific developments in the vicinity of the Carolina North property, future traffic volume forecasts were developed for the 2015 (TIA Phase 1) and 2030 (TIA Phase 2) No-Build scenarios. All traffic associated with specific developments was distributed throughout the study area transportation network based on existing traffic patterns and turning movements. While the methodology for developing future no-build traffic volumes is the same as used in the Spring 2009 TIA, the volumes themselves have changed due to the new existing traffic data obtained for this report.

#### **3.4.1 2015 (TIA Phase 1) Volumes**

Future No-Build traffic volumes for 2015 (TIA Phase 1) consist of existing traffic volumes (2009) grown at a rate of 2.00 percent according to the TRM to the year 2015, plus all traffic associated with the identified specific developments scheduled for completion by 2015. Figure 3-3, Figure 3-4, and Figure 3-5 divide the study area into three quadrants and display the weekday peak hour traffic volumes for the AM, Midday, and PM periods.

#### **3.4.2 2030 (TIA Phase 2) Volumes**

Future No-Build traffic volumes for 2030 (TIA Phase 2) consist of existing traffic volumes (2009) grown at a rate of 2.00 percent to the year 2015 and then at a rate of 1.25 percent to the year 2030 according to the TRM. To these traffic volumes, the traffic volumes associated with all of the identified specific developments are added to determine the 2030 (TIA Phase 2) No-Build traffic volumes. Figure 3-6, Figure 3-7, and Figure 3-8 show the weekday peak hour traffic volumes for the AM, Midday, and PM periods for each of the three study area quadrants.

### **3.5 Intersection Operations Analysis**

Each studied intersection was evaluated with the future No-Build traffic volumes to determine the future LOS without the proposed Carolina North project. An analysis of future No-Build conditions was preformed for the years 2015 (TIA Phase 1) and 2030 (TIA Phase 2).

To accurately reflect future conditions as they are realized, the existing lane geometry and signal timing information obtained from the Town of Chapel Hill was adjusted based on approved and committed roadway and intersection improvements to represent future conditions. Improvements were identified based on their scheduled completion years and incorporated into the transportation network for the appropriate analysis year, either 2015 (TIA Phase 1) or 2030 (TIA Phase 2). The future lane geometry and signal timing information were input into Synchro 7 software along with future No-Build traffic volumes at the study area intersections to conduct future No-Build capacity analysis for both 2015 (TIA Phase 1) and 2030 (TIA Phase 2). The results are shown in Figure 3-9 and Figure 3-10 for 2015 and 2030, respectively.

The capacity analysis results for the intersections within the study area are also summarized in Table 3-1 for the 2015 (TIA Phase 1) No-Build scenario and in Table 3-2 to Table 3-4 for the 2030 (TIA Phase 2) No-Build scenario.

Table 3-1: 2015 (TIA Phase 1) No-Build Intersection Levels-of-Service (#1 to #52)

INT #	INTERSECTION	INTERSECTION CONTROL TYPE	APP	WEEKDAY AM PEAK HOUR			WEEKDAY MIDDAY PEAK HOUR			WEEKDAY PM PEAK HOUR		
				Approach LOS	Overall LOS	Overall Delay (s)	Approach LOS	Overall LOS	Overall Delay (s)	Approach LOS	Overall LOS	Overall Delay (s)
1	MLK Blvd (NC 86) & Whitfield Rd	Traffic Signal	WB	E	B	15.7	E	B	12.0	E	C	21.5
			NB	A			A			B		
			SB	A			A			A		
2	MLK Blvd (NC 86) & I-40 WB Ramps	Traffic Signal	WB	E	D	35.0	E	D	35.7	F	D	42.9
			NB	B			C			B		
			SB	D			C			D		
3	MLK Blvd (NC 86) & I-40 EB Ramps	Traffic Signal	EB	F	E	76.5	E	B	19.8	E	C	29.0
			NB	B			B			C		
			SB	A			A			B		
4	MLK Blvd (NC 86) & Eubanks Rd	Traffic Signal	EB	E	C	30.7	E	A	9.4	E	B	13.9
			NB	A			A			B		
			SB	D			A			A		
6	MLK Blvd (NC 86) & Weaver Dairy Rd	Traffic Signal	EB	E	D	52.4	E	D	42.5	E	F	97.5
			WB	F			E			F		
			NB	D			C			F		
			SB	D			D			C		
10	MLK Blvd (NC 86) & Piney Mountain Rd/ Municipal Dr	Traffic Signal	EB	E	B	10.4	E	A	7.1	E	B	10.9
			WB	E			E			E		
			NB	A			A			A		
			SB	A			A			A		
11	MLK Blvd (NC 86) & Estes Dr	Traffic Signal	EB	F	D	47.6	E	D	42.8	F	E	76.9
			WB	D			E			E		
			NB	C			C			F		
			SB	C			D			E		
12	MLK Blvd (NC 86) & Airport Dr	Stop Sign	EB	C	-	-	C	-	-	F	-	-
			NB	-			-			-		
			SB	-			-			-		
13	MLK Blvd (NC 86) & Hillsborough St/ Umstead Dr	Traffic Signal	EB	E	B	14.8	E	B	16.1	E	C	22.9
			WB	E			E			E		
			NB	B			A			B		
			SB	A			A			A		
14	Columbia St (NC 86) & Rosemary St	Traffic Signal	EB	D	C	32.2	D	C	31.7	E	D	46.9
			WB	C			C			E		
			NB	C			C			D		
			SB	C			C			D		
18	Columbia St (NC 86) & South Rd/ McCauley Street	Traffic Signal	EB	D	C	21.4	D	C	25.7	E	D	44.1
			WB	D			D			D		
			NB	A			A			C		
27	Homestead Rd & Rogers Rd	Stop Sign	EB	E	-	-	B	-	-	D	-	-
			NB	-			-			-		
			SB	-			-			-		
31	Estes Dr Ext & Airport Dr	Stop Sign	EB	-	-	-	-	-	-	-	-	-
			WB	-			-			-		
			NB	E			C			F		
32	Estes Dr Ext & Seawell School Rd	Traffic Signal	EB	A	B	10.6	A	A	9.2	A	B	19.4
			WB	B			B			C		
			SB	B			B			B		
35	NC 54 & Main St	Traffic Signal	EB	B	C	20.1	C	C	31.0	B	C	23.9
			WB	C			C			B		
			NB	C			D			D		
			SB	D			D			D		
37	Greensboro St & Weaver St	Traffic Signal	EB	B	C	24.7	B	D	37.9	B	D	45.3
			WB	C			E			D		
			NB	C			D			E		
			SB	C			C			D		
42	Estes Dr & Caswell Rd	Traffic Signal	EB	A	C	30.6	A	A	8.6	A	E	75.9
			WB	E			B			F		
			NB	B			C			B		
			SB	B			B			B		
43	Estes Dr & Franklin St	Traffic Signal	EB	D	D	38.6	E	D	45.4	F	F	114.4
			WB	D			D			E		
			NB	C			D			F		
			SB	D			C			F		

Table 3-2: 2030 (TIA Phase 2) No-Build Intersection Levels-of-Service (#1 to #18)

INT #	INTERSECTION	INTERSECTION CONTROL TYPE	APP	WEEKDAY AM PEAK HOUR			WEEKDAY MIDDAY PEAK HOUR			WEEKDAY PM PEAK HOUR			
				Approach LOS	Overall LOS	Overall Delay (s)	Approach LOS	Overall LOS	Overall Delay (s)	Approach LOS	Overall LOS	Overall Delay (s)	
1	MLK Blvd (NC 86) & Whitfield Rd	Traffic Signal	WB	E	B	16.2	E	B	12.8	E	C	25.5	
			NB	A			A			B			B
			SB	A			A			A			A
2	MLK Blvd (NC 86) & I-40 WB Ramps	Traffic Signal	WB	E	D	36.8	E	C	35.0	F	E	58.1	
			NB	B			C			C			B
			SB	D			C			C			D
3	MLK Blvd (NC 86) & I-40 EB Ramps	Traffic Signal	EB	F	F	123.8	E	B	19.8	F	D	42.9	
			NB	B			B			B			D
			SB	A			A			A			C
4	MLK Blvd (NC 86) & Eubanks Rd	Traffic Signal	EB	E	D	50.8	E	B	11.0	E	C	20.4	
			NB	B			A			B			B
			SB	E			A			B			B
5	MLK Blvd (NC 86) & Perkins Dr	Traffic Signal	WB	E	B	12.1	E	B	18.7	E	C	26.7	
			NB	A			A			B			B
			SB	B			B			B			C
6	MLK Blvd (NC 86) & Weaver Dairy Rd	Traffic Signal	EB	E	F	103.0	E	D	49.7	E	F	142.8	
			WB	F			F			F			F
			NB	E			C			F			F
			SB	F			D			F			F
7	MLK Blvd (NC 86) & Westminster Dr	Traffic Signal	WB	E	A	9.6	E	B	10.0	F	B	14.6	
			NB	A			A			B			B
			SB	A			A			A			A
8	MLK Blvd (NC 86) & Homestead Rd	Traffic Signal	EB	E	C	29.0	D	D	37.5	D	D	39.2	
			WB	E			E			D			E
			NB	B			C			D			C
			SB	C			D			D			D
9	MLK Blvd (NC 86) & Northfield Dr	Traffic Signal	EB	E	B	10.6	E	A	2.9	E	B	11.5	
			NB	A			A			A			A
			SB	B			A			A			B
10	MLK Blvd (NC 86) & Piney Mountain Rd/ Municipal Dr	Traffic Signal	EB	E	B	12.2	E	A	7.4	E	B	16.4	
			WB	E			E			A			E
			NB	A			A			A			B
			SB	A			A			A			A
11	MLK Blvd (NC 86) & Estes Dr	Traffic Signal	EB	F	F	85.5	F	E	61.4	F	F	128.6	
			WB	E			E			E			F
			NB	C			C			F			F
			SB	D			E			F			F
12	MLK Blvd (NC 86) & Airport Dr	Stop Sign	EB	E	-	-	F	-	-	F	-	-	
			NB	-			-			-			-
			SB	-			-			-			-
13	MLK Blvd (NC 86) & Hillsborough St/ Umstead Dr	Traffic Signal	EB	E	B	17.8	E	B	17.2	D	C	31.0	
			WB	E			E			B			F
			NB	B			A			B			C
			SB	A			A			B			B
14	Columbia St (NC 86) & Rosemary St	Traffic Signal	EB	D	D	41.5	D	D	38.1	F	F	88.4	
			WB	C			D			D			F
			NB	C			D			D			D
			SB	D			D			D			E
15	Columbia St (NC 86) & Franklin St	Traffic Signal	EB	D	D	43.6	E	E	55.4	E	F	97.5	
			WB	D			D			E			D
			NB	D			E			E			F
			SB	D			D			D			F
16	Columbia St (NC 86) & Cameron Ave	Traffic Signal	EB	C	F	108.7	C	F	161.7	C	F	268.8	
			WB	C			C			F			D
			NB	F			F			F			F
			SB	F			F			F			F
18	Columbia St (NC 86) & South Rd/ McCauley Street	Traffic Signal	EB	D	C	22.6	D	C	27.4	E	D	53.6	
			WB	D			D			C			E
			NB	A			B			C			D

Table 3-3: 2030 (TIA Phase 2) No-Build Intersection Levels-of-Service (#19 to #36)

INT #	INTERSECTION	INTERSECTION CONTROL TYPE	APP	WEEKDAY AM PEAK HOUR			WEEKDAY MIDDAY PEAK HOUR			WEEKDAY PM PEAK HOUR		
				Approach LOS	Overall LOS	Overall Delay (s)	Approach LOS	Overall LOS	Overall Delay (s)	Approach LOS	Overall LOS	Overall Delay (s)
19	Pittsboro St (NC 86) & McCauley St	Traffic Signal	EB	C	C	32.5	C	C	22.5	C	D	46.9
			WB	D			D			E		
			SB	C			B			D		
20	Columbia St (NC 86) & Manning Dr/ Pittsboro St	Traffic Signal	EB	D	C	32.0	E	C	28.3	D	C	32.5
			WB	A			C			C		
			NB	C			B			D		
21	Columbia St (NC 86) & Mason Farm Rd/ Westwood Dr	Traffic Signal	EB	C	E	63.2	C	C	26.6	C	F	183.7
			WB	C			C			F		
			NB	F			D			F		
			SB	C			B			F		
22	Columbia St (NC 86) & Fordham Blvd (NC 54) WB Ramps	Traffic Signal	WB	E	C	20.8	D	C	30.9	F	F	100.8
			NB	A			B			D		
			SB	B			B			E		
23	Columbia St (US 15-501) & Fordham Blvd (NC 54) EB Ramps	Traffic Signal	EB	D	C	30.2	D	B	18.5	E	C	29.1
			NB	C			C			C		
			SB	A			A			C		
24	Columbia St (US 15-501) & Mt Carmel Church Rd / Culbreth Rd	Traffic Signal	EB	F	F	143.4	D	C	22.7	D	D	48.7
			WB	F			D			C		
			NB	F			C			E		
			SB	A			B			D		
25	Homestead Rd & Weaver Dairy Rd	Stop Sign	EB	-	-	-	-	-	-	-	-	-
			WB	-			-			-		
			SB	F			C			F		
26	Homestead Rd & Seawell School Rd	Traffic Signal	EB	F	F	152.5	A	A	7.4	C	B	13.4
			WB	C			A			A		
			NB	B			B			B		
27	Homestead Rd & Rogers Rd	Stop Sign	EB	F	-	-	C	-	-	F	-	-
			NB	-			-			-		
			SB	-			-			-		
28	Homestead Rd & High School Rd	Traffic Signal	WB	B	F	148.5	B	A	10.0	B	A	9.2
			NB	F			B			B		
			SB	A			A			A		
29	Homestead Rd/ Dairyland Rd & Old NC 86	Traffic Signal	EB	F	E	69.1	D	C	21.1	C	D	37.8
			WB	B			B			B		
			NB	C			A			B		
			SB	F			B			F		
31	Estes Dr Ext & Airport Dr	Stop Sign	EB	-	-	-	-	-	-	-	-	-
			WB	-			-			-		
			NB	F			C			F		
32	Estes Dr Ext & Seawell School Rd	Traffic Signal	EB	B	B	15.1	A	B	10.4	A	E	74.0
			WB	B			B			F		
			SB	C			B			B		
33	Estes Dr Ext & Greensboro St	Traffic Signal	WB	D	C	32.8	A	B	17.7	B	C	31.6
			NB	B			B			C		
			SB	C			C			D		
35	NC 54 & Main St	Traffic Signal	EB	B	C	25.2	C	C	34.0	B	C	27.9
			WB	C			C			C		
			NB	C			D			D		
			SB	D			E			D		

Table 3-4: 2030 (TIA Phase 2) No-Build Intersection Levels-of-Service (#37 to #52)

INT #	INTERSECTION	INTERSECTION CONTROL TYPE	APP	WEEKDAY AM PEAK HOUR			WEEKDAY MIDDAY PEAK HOUR			WEEKDAY PM PEAK HOUR		
				Approach LOS	Overall LOS	Overall Delay (s)	Approach LOS	Overall LOS	Overall Delay (s)	Approach LOS	Overall LOS	Overall Delay (s)
37	Greensboro St & Weaver St	Traffic Signal	EB	C	C	32.5	B	E	67.0	C	F	84.3
			WB	D			F			E		
			NB	D			E			F		
			SB	C			C			E		
38	Greensboro St & Main St	Traffic Signal	EB	B	E	72.7	B	C	29.8	D	D	52.0
			WB	C			B			C		
			NB	C			C			C		
			SB	F			D			F		
39	Greensboro St & Merritt Mill Rd/ NC 54 WB Ramp	Traffic Signal	WB	D	B	15.6	B	B	11.1	C	D	39.6
			NB	A			A			D		
			SB	A			B			D		
42	Estes Dr & Caswell Rd	Traffic Signal	EB	B	E	60.9	A	B	16.9	A	F	129.8
			WB	F			C			F		
			NB	B			B			B		
			SB	B			B			B		
43	Estes Dr & Franklin St	Traffic Signal	EB	F	E	57.8	F	F	87.9	F	F	196.2
			WB	D			E			F		
			NB	D			F			F		
			SB	D			E			F		
44	Franklin St & Elliott Rd	Traffic Signal	EB	B	C	24.3	E	E	57.2	F	F	115.4
			WB	C			C			D		
			NB	D			F			F		
			SB	D			D			D		
45	Franklin St & Ephesus Church Rd	Traffic Signal	EB	A	B	11.2	B	D	37.2	C	D	41.0
			WB	A			B			B		
			NB	D			F			F		
46	Fordham Blvd (US 15-501) & Erwin Rd/Europa Dr	Traffic Signal (Super Street)	EB	A	B	19.5	A	B	17.2	A	C	22.7
			WB	B			B			B		
			NB	F			F			F		
			SB	E			E			E		
46	US 15-501 & South U-Turn	Traffic Signal (Super Street)	EB	C	C	27.0	F	F	83.7	F	F	263.9
			SB	D			D			D		
46	US 15-501 & North U-Turn	Traffic Signal (Super Street)	WB	B	C	29.3	C	D	37.0	F	F	130.1
			NB	F			F			E		
47	Fordham Blvd (US 15-501) & Sage Rd/Scarlet Dr	Traffic Signal	EB	D	F	84.4	E	E	78.5	F	F	155.5
			WB	F			F			F		
			NB	F			F			F		
			SB	E			E			E		
48	Fordham Blvd (US 15-501) & Eastowne Dr/BSBC Dr	Traffic Signal	EB	C	D	39.7	D	C	33.5	F	F	82.8
			WB	D			B			D		
			NB	E			E			E		
			SB	F			F			F		
49	Fordham Blvd (US 15-501) & Eastowne Dr/ Lakeview Dr	Traffic Signal	EB	E	E	68.3	C	C	32.8	C	F	161.6
			WB	D			C			C		
			NB	E			E			E		
			SB	F			F			F		
50	Fordham Blvd (US 15-501) & I-40 EB Ramps	Traffic Signal	EB	E	D	40.4	C	C	22.5	F	E	70.9
			WB	B			A			D		
			SB	E			E			E		
51	Fordham Blvd (US 15-501) & I-40 WB Ramps	Traffic Signal	EB	C	E	74.8	C	E	67.0	E	F	129.5
			WB	F			F			F		
			NB	E			D			D		
52	Weaver Dairy Rd & Kingston Dr/ McClamroch Cir	Traffic Signal	EB	B	B	11.9	A	A	7.3	B	C	25.6
			WB	A			A			D		
			NB	B			B			B		
			SB	B			B			B		

### 3.5.1 Intersection Operational Analysis Results Summary

As shown in the intersection LOS results tables, a number of intersections are projected to deteriorate in overall LOS between the 2009 Existing condition and the 2015 (TIA Phase 1) and 2030 (TIA Phase 2) No-Build conditions. These deteriorations in LOS are directly caused by either regional traffic growth or site specific growth generated by one of the many background developments assumed in this study. Below is a list of intersections that experience a decrease in overall LOS and that operate at LOS E or F in the 2015 (TIA Phase 1) or 2030 (TIA Phase 2) No-Build scenarios.

#### **2015 (TIA Phase 1) Decreases in LOS**

- Martin Luther King, Jr. Boulevard (NC 86) & I-40 Eastbound Ramps (LOS E)
- Martin Luther King, Jr. Boulevard (NC 86) & Weaver Dairy Road (LOS F)
- Martin Luther King, Jr. Boulevard (NC 86) & Estes Drive (LOS E)
- Homestead Road & Rogers Road (LOS E)
- Estes Drive & Caswell Road (LOS E)
- Estes Drive & Franklin Street (LOS F)

#### **2030 (TIA Phase 2) Decreases in LOS**

- Martin Luther King, Jr. Boulevard (NC 86) & I-40 Westbound Ramps (LOS E)
- Martin Luther King, Jr. Boulevard (NC 86) & I-40 Eastbound Ramps (LOS F)
- Martin Luther King, Jr. Boulevard (NC 86) & Estes Drive (LOS F)
- Columbia Street (NC 86) & Rosemary Street (LOS F)
- Columbia Street (NC 86) & Franklin Street (LOS F)
- Columbia Street (NC 86) & Cameron Avenue (LOS F)
- Columbia Street (NC 86) & Mason Farm Road (LOS F)
- Columbia Street (NC 86) & Fordham Boulevard (NC 54) WB Ramps (LOS F)
- Columbia Street (NC 86) & Mt Carmel Church Road/Culbreth Road (LOS F)
- Homestead Road & Weaver Dairy Road (LOS F)
- Homestead Road & Seawell School Road (LOS F)
- Homestead Road & Rogers Road (LOS F)
- Homestead Road & High School Road (LOS F)
- Homestead Road/Dairyland Road & Old NC 86 (LOS E)
- Estes Drive Extension & Seawell School Road (LOS E)
- Greensboro Street & Weaver Street (LOS F)
- Greensboro Street & Main Street (LOS E)
- Estes Drive & Caswell Road (LOS F)
- Franklin Street & Elliott Road (LOS F)
- Fordham Boulevard (US 15-501) & Superstreet South U-turn (LOS F)
- Fordham Boulevard (US 15-501) & Superstreet North U-turn (LOS F)
- Fordham Boulevard (US 15-501) & Sage Road/Scarlet Drive (LOS F)
- Fordham Boulevard (US 15-501) & Eastowne Drive/BSBC Drive (LOS F)
- Fordham Boulevard (US 15-501) & I-40 Eastbound Ramps (LOS E)
- Fordham Boulevard (US 15-501) & I-40 Westbound Ramps (LOS F)

### 3.6 Roadway Segment Analysis

In addition to intersection analysis, analysis of 21 roadway segments identified by the Town was also performed. The Town's Guidelines for Traffic Impact Analysis require the roadway segments to be analyzed based on a daily volume to capacity ratio where the threshold capacities are established by roadway classification. The results are shown in Table 3-5 for 2015 (TIA Phase 1) and Table 3-6 for 2030 (TIA Phase 2).

The roadway segment analysis has revealed that the following additional roadway segments will exceed the Town of Chapel Hill's pre-established capacity thresholds during in the 2015 (TIA Phase 1) No-Build scenario beyond those in the 2009 Existing scenario:

- Homestead Road between Martin Luther King, Jr. Boulevard and Brookstone Drive
- Martin Luther King, Jr. Boulevard between Dixie Lane and Homestead Road
- Hillsborough Street between Martin Luther King, Jr. Boulevard and Bolinwood Drive
- Martin Luther King, Jr. Boulevard between Piney Mountain Road and Estes Drive

The roadway segment analysis has revealed that the following additional roadway segments will exceed the Town of Chapel Hill's pre-established capacity thresholds during in the 2030 (TIA Phase 2) No-Build scenario beyond those in the 2009 Existing scenario and 2015 (TIA Phase 1) No-Build scenario:

- Martin Luther King, Jr. Boulevard between Perkins Drive and Northwood Drive
- Weaver Dairy Road between Lonebrook Road and Martin Luther King, Jr. Boulevard
- Martin Luther King, Jr. Boulevard between Estes Drive and the YMCA Drive

This signifies that regional growth and background developments between the year 2009 and 2030 (TIA Phase 2) will cause these roadway segments to exceed the Town's pre-established capacity thresholds.

**Table 3-5: 2015 (TIA Phase 1) No-Build Roadway Segments Capacity**

ID	Roadway Section	Town Classification	V/C Ratio*			
			AM	Midday	PM	AADT
1	Martin Luther King, Jr. Blvd (NC 86) between Clyde Rd and Hilltop MHP	Major Arterial	0.30	0.22	0.41	
2	Eubanks Rd between Martin Luther King, Jr. Blvd (NC 86) and Northwood Dr	Collector				1.35
3	Martin Luther King, Jr. Blvd (NC 86) between Perkins Dr and Northwood Dr	Major Arterial	0.84	0.66	0.98	
4	Weaver Dairy Rd between Lonebrook Rd and Martin Luther King, Jr. Blvd (NC 86)	Minor Arterial	0.85	0.37	0.84	
5	Weaver Dairy Rd between Timberlyne Rd and Weatherstone Dr	Minor Arterial	1.25	1.00	1.26	
6	Seawell School Rd between Homestead Rd and Savannah Terrace	Collector				0.71
7	Homestead Rd between Martin Luther King, Jr. Blvd (NC 86) & Brookstone Dr	Minor Arterial	1.13	0.85	1.25	
8	Martin Luther King, Jr. Blvd (NC 86) between Dixie Ln and Homestead Rd	Major Arterial	0.88	0.69	1.01	
9	Seawell School Rd between Hanover Pl and Railroad Crossing	Collector				0.59
10	Estes Dr Ext between Seawell School Rd and Umstead Rd	Minor Arterial	1.57	0.90	1.56	
11	Estes Dr Ext between Martin Luther King, Jr. Blvd (NC 86) and UNC Driveway	Minor Arterial	1.34	0.89	1.38	
12	Martin Luther King, Jr. Blvd (NC 86) between Estes Dr and YMCA Driveway	Major Arterial	0.86	0.64	0.94	
13	Estes Dr between Halifax Rd and Granville Rd	Minor Arterial	1.32	1.21	1.74	
14	Martin Luther King, Jr. Blvd (NC 86) between Bolin Heights Rd and Longview St	Major Arterial	0.64	0.54	0.71	
15	Hillsborough St between North St and Rosemary St	Collector				1.29
16	Hillsborough St between Martin Luther King, Jr. Blvd (NC 86) and Bolinwood Dr	Collector				1.15
17	Martin Luther King, Jr. Blvd (NC 86) between Piney Mountain Rd and Estes Dr	Major Arterial	0.97	0.80	1.25	
18	Piney Mountain Rd between Timber Hollow Ct and Woodshire Ln	Collector				0.50
19	Piney Mountain Rd between Oosting Dr and Lake Ellen Dr	Collector				0.45
20	Kingston Dr between Balsam Ct and Kingston Ct	Collector				0.28
21	Homestead Rd between Hearthstone Ln and Seawell School Rd	Minor Arterial	1.57	0.71	1.31	

\*Based on Town of Chapel Hill's road classification

**Table 3-6: 2030 (TIA Phase 2) No-Build Roadway Segments Capacity**

ID	Roadway Section	Town Classification	V/C Ratio*			
			AM	Midday	PM	AADT
1	Martin Luther King, Jr. Blvd (NC 86) between Clyde Rd and Hilltop MHP	Major Arterial	0.35	0.26	0.49	
2	Eubanks Rd between Martin Luther King, Jr. Blvd (NC 86) and Northwood Dr	Collector				1.59
3	Martin Luther King, Jr. Blvd (NC 86) between Perkins Dr and Northwood Dr	Major Arterial	0.97	0.78	1.15	
4	Weaver Dairy Rd between Lonebrook Rd and Martin Luther King, Jr. Blvd (NC 86)	Minor Arterial	1.01	0.43	0.98	
5	Weaver Dairy Rd between Timberlyne Rd and Weatherstone Dr	Minor Arterial	1.48	1.15	1.47	
6	Seawell School Rd between Homestead Rd and Savannah Terrace	Collector				0.84
7	Homestead Rd between Martin Luther King, Jr. Blvd (NC 86) & Brookstone Dr	Minor Arterial	1.33	0.99	1.46	
8	Martin Luther King, Jr. Blvd (NC 86) between Dixie Ln and Homestead Rd	Major Arterial	1.04	0.80	1.18	
9	Seawell School Rd between Hanover Pl and Railroad Crossing	Collector				0.70
10	Estes Dr Ext between Seawell School Rd and Umstead Rd	Minor Arterial	1.89	1.08	1.87	
11	Estes Dr Ext between Martin Luther King, Jr. Blvd (NC 86) and UNC Driveway	Minor Arterial	1.61	1.07	1.66	
12	Martin Luther King, Jr. Blvd (NC 86) between Estes Dr and YMCA Driveway	Major Arterial	1.02	0.75	1.11	
13	Estes Dr between Halifax Rd and Granville Rd	Minor Arterial	1.58	1.43	2.07	
14	Martin Luther King, Jr. Blvd (NC 86) between Bolin Heights Rd and Longview St	Major Arterial	0.76	0.63	0.84	
15	Hillsborough St between North St and Rosemary St	Collector				1.55
16	Hillsborough St between Martin Luther King, Jr. Blvd (NC 86) and Bolinwood Dr	Collector				1.37
17	Martin Luther King, Jr. Blvd (NC 86) between Piney Mountain Rd and Estes Dr	Major Arterial	1.15	0.93	1.47	
18	Piney Mountain Rd between Timber Hollow Ct and Woodshire Ln	Collector				0.59
19	Piney Mountain Rd between Oosting Dr and Lake Ellen Dr	Collector				0.53
20	Kingston Dr between Balsam Ct and Kingston Ct	Collector				0.31
21	Homestead Rd between Hearthstone Ln and Seawell School Rd	Minor Arterial	1.87	0.82	1.53	

\*Based on Town of Chapel Hill's road classification

## 3.7 Transit

Transit is a key element of the Chapel Hill transportation system and there are plans to continue to enhance and expand the transit system regardless of the Carolina North project. Ridership is expected to increase, both for local routes and for park-and-ride services. This section presents a summary of the planned transit improvements and a detailed analysis of future ridership on existing transit routes.

The analysis of future transit conditions without the proposed development shows that ridership on local transit routes will increase and that capacity will remain even without consideration of service enhancements or service expansions. However, the park-and-ride system is expected to be at capacity in the future, even without any park-and-ride activity generated by the proposed Carolina North development.

It should be noted that transit service was evaluated based on existing service patterns. Service patterns in 2015 (TIA Phase 1) and 2030 (TIA Phase 2) will likely be modified based on strategy in the *Chapel Hill and Carrboro 2035 Long Range Transit Plan*. For example, if additional park-and-ride capacity is provided at Gateway 1, it is likely that an express bus service would be initiated to provide direct trips from the park-and-ride lots to Carolina North, much like the FCX currently provides express service from the Friday Center park-and-ride lot to the University main campus.

The only modification to the existing Chapel Hill Transit bus routes that was considered was a diversion into Carolina North for the six routes that operate within the vicinity of the site (A, G, HS, NS, NU, and T). This route modification will add approximately five to 10 minutes to the travel time of each route, and will require additional trips to maintain the existing headways. In addition, for the purposes of this analysis, passengers boarding from areas other than those served by the six Carolina North routes were assumed to make a transfer in downtown Chapel Hill. In the future, the local bus route structure may be adjusted to provide additional direct service to Carolina North. However, since each route has its own ridership patterns, ridership is not interchangeable between routes.

### 3.7.1 Future Transit Ridership, Without Proposed Development

Because plans for future transit improvements are not yet finalized, the analysis of future transit ridership does not take into account any new routes, nor does it include enhancements (such as shorter headways) to existing routes that are envisioned in the *2035 Chapel Hill-Carrboro Long Range Transit Plan*. Thus, the analysis should be viewed as conservative with regard to its findings of future ridership and available transit capacity as it is likely that services provided by Chapel Hill Transit will be expanded and enhanced in the future with or without the development. In addition, all transit analysis is based on ridership and housing choices as projected in the regional model and the potential transit mitigation measures may need to be adjusted if these choices change over time.

The key assumptions for the future transit ridership are for the anticipated annual growth rates for the local transit service and for the routes serving park-and-ride locations.

- The annual growth rate for local transit service routes is 2.5 percent per year for each year through 2030. This 2.5 percent growth rate is calculated from the most aggressive annualized “local transit” increase presented in the initial draft of the *2035 Long Range Transit Plan*. The 2.5 percent annual growth rate reflects the “high investment” scenario of 53,310 passengers in 2035, which includes transit ridership related to parking deficits at the University main campus. The growth rate is calculated using 2009 daily passenger counts of 28,800, obtained from the bus stop on/off count database provided by Chapel Hill Transit.
- The annual growth rate for transit ridership related to park-and-ride locations is 4.5 percent through 2015, and 1.25 percent between 2015 and 2030. The initial 4.5 percent growth rate reflects conditions where all existing park-and-ride lots would be at capacity by 2015 (TIA Phase 1). The 1.25 percent annual growth rate is consistent with the assumptions for overall increases in vehicle traffic used in the Triangle Regional Travel Demand Model and for the traffic analyses in this study.

### **2015 (TIA Phase 1) No-Build Condition for Transit**

Table 3-7 and Table 3-8 show the available capacity to and from the Carolina North site for 2015 (TIA Phase 1) conditions without the proposed development. The 2015 (TIA Phase 1) No-Build Condition for transit shows that there remains significant excess capacity to and from the Carolina North site. Inbound available capacity exceeds 1,000 passengers during the morning peak hour and outbound available capacity exceeds 650 passengers in the evening peak hour.

Please note, in both tables the peak direction approaching and departing Carolina North is shaded. The peak direction for travel to Carolina North is opposite of the peak direction traveling to downtown Chapel Hill and the UNC Main Campus, except for the NS Route.

- During the morning peak hour (7:30 am to 8:30 am) there is currently available capacity for 818 passengers to arrive at the Carolina North site, and capacity for 666 passengers to depart from the Carolina North site, in the peak direction.
- During the midday peak hour (12:30 pm to 1:30 pm) there is currently available capacity for 825 passengers to arrive at the Carolina North site, and capacity for 783 passengers to depart from the Carolina North site.
- During the evening peak hour (4:00 pm to 5:00 pm) there is currently available capacity for 502 passengers to arrive at the Carolina North site, and capacity for 695 passengers to depart from the Carolina North site, in the peak direction.

There is sufficient capacity on all individual routes during the morning, midday, and evening peak hours.

**Table 3-7: 2015 (TIA Phase 1) No-Build Available Capacity APPROACHING Carolina North**

Route	Direction	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
		Vehicle Capacity	Available Capacity	Vehicle Capacity	Available Capacity	Vehicle Capacity	Available Capacity
Route A	NB	120	118	60	46	120	68
	SB	120	84	120	109	60	59
Route G	NB	120	117	120	108	60	32
	SB	120	94	120	116	60	57
Route HS	NB	120	104	60	52	120	104
	SB	120	97	60	49	120	108
Route NS	NB	462	435	75	23	438	125
	SB	462	209	150	103	438	399
Route NU	NB	180	170	120	83	120	80
	SB	n/a	n/a	n/a	n/a	n/a	n/a
Route T	NB	120	101	60	46	60	22
	SB	120	24	120	90	120	72
Total	NB	1,122	1,044	495	358	918	430
	SB	942	508	570	467	798	695
	Peak Direction	1,122	818	1,065	825	918	502
	Total	2,064	1,552	1,065	825	1,716	1,125

Note: Shaded area indicates peak direction APPROACHING Carolina North  
 Source: Chapel Hill Transit on/off data, as compiled by VHB.

**Table 3-8: 2015 (TIA Phase 1) No-Build Available Capacity DEPARTING Carolina North**

Route	Direction	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
		Vehicle Capacity	Available Capacity	Vehicle Capacity	Available Capacity	Vehicle Capacity	Available Capacity
Route A	NB	120	116	60	55	120	102
	SB	120	52	120	92	60	57
Route G	NB	120	117	120	116	60	32
	SB	120	93	120	107	60	57
Route HS	NB	120	102	60	52	120	105
	SB	120	104	60	49	120	107
Route NS	NB	462	441	75	38	438	234
	SB	462	109	150	87	438	385
Route NU	NB	n/a	n/a	n/a	n/a	n/a	n/a
	SB	180	140	60	54	180	167
Route T	NB	120	81	60	49	60	31
	SB	120	22	120	85	120	73
Total	NB	942	858	375	309	798	503
	SB	1,122	521	630	474	978	847
	Peak Direction	1,122	666	1,005	783	978	695
	Total	2,064	1,378	1,005	783	1,776	1,350

Note: Shaded area indicates peak direction DEPARTING Carolina North  
 Source: Chapel Hill Transit on/off data, as compiled by VHB.

**2030 (TIA Phase 2) No-Build Condition for Transit**

Table 3-9 and Table 3-10 show available capacity to and from the Carolina North site for 2030 (TIA Phase 2) conditions without the proposed development. The 2030 (TIA Phase 2) No-Build Condition for transit shows that overall there remains excess capacity to and from the Carolina North site. Inbound available capacity exceeds 1,000 passengers during the morning peak hour and outbound available capacity is almost 600 passengers in the evening peak hour.

Please note, in both tables the peak direction approaching and departing Carolina North is shaded. The peak direction for travel to Carolina North is opposite of the peak direction traveling to downtown Chapel Hill and the UNC Main Campus, except for the NS Route.

- During the morning peak hour (7:30 am to 8:30 am) there is currently available capacity for 745 passengers to arrive at the Carolina North site, and capacity for 551 passengers to depart from the Carolina North site, in the peak direction.
- During the midday peak hour (12:30 pm to 1:30 pm) there is currently available capacity for 747 passengers to arrive at the Carolina North site, and capacity for 713 passengers to depart from the Carolina North site.
- During the evening peak hour (4:00 pm to 5:00 pm) there is currently available capacity for 396 passengers to arrive at the Carolina North site, and capacity for 621 passengers to depart from the Carolina North site, in the peak direction.

There is sufficient capacity on all individual routes during the morning, midday, and evening peak hours, except Route T approaching and departing Carolina North in the morning in the southbound direction.

**Table 3-9: 2030 (TIA Phase 2) No-Build Available Capacity APPROACHING Carolina North**

Route	Direction	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
		Vehicle Capacity	Available Capacity	Vehicle Capacity	Available Capacity	Vehicle Capacity	Available Capacity
Route A	NB	120	116	60	41	120	47
	SB	120	69	120	104	60	58
Route G	NB	120	116	120	103	60	20
	SB	120	84	120	114	60	56
Route HS	NB	120	97	60	49	120	97
	SB	120	87	60	45	120	103
Route NS	NB	462	430	75	13	438	61
	SB	462	157	150	94	438	390
Route NU	NB	180	165	120	67	120	64
	SB	n/a	n/a	n/a	n/a	n/a	n/a
Route T	NB	120	93	60	40	60	6
	SB	120	-15	120	78	120	53
Total	NB	1,122	1,018	495	313	918	295
	SB	942	382	570	435	798	661
	Peak Direction	1,122	745	1,065	747	918	396
	Total	2,064	1,400	1,065	747	1,716	956

Note: Shaded area indicates peak direction APPROACHING Carolina North  
 Source: Chapel Hill Transit on/off data, as compiled by VHB.

**Table 3-10: 2030 (TIA Phase 2) No-Build Available Capacity DEPARTING Carolina North**

Route	Direction	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
		Vehicle Capacity	Available Capacity	Vehicle Capacity	Available Capacity	Vehicle Capacity	Available Capacity
Route A	NB	120	115	60	53	120	94
	SB	120	24	120	81	60	55
Route G	NB	120	115	120	114	60	20
	SB	120	82	120	101	60	56
Route HS	NB	120	95	60	49	120	99
	SB	120	97	60	44	120	102
Route NS	NB	462	437	75	30	438	192
	SB	462	37	150	73	438	375
Route NU	NB	n/a	n/a	n/a	n/a	n/a	n/a
	SB	180	124	60	52	180	162
Route T	NB	120	65	60	44	60	19
	SB	120	-17	120	71	120	54
Total	NB	942	827	375	290	798	424
	SB	1,122	347	630	423	978	804
	Peak Direction	1,122	551	1,005	713	978	621
	Total	2,064	1,174	1,005	713	1,776	1,228

Note: Shaded area indicates peak direction DEPARTING Carolina North  
 Source: Chapel Hill Transit on/off data, as compiled by VHB.

### 3.7.2 Future Park-and-Ride Activity, without Proposed Development

Currently only three of the nine park-and-ride lots have any significant available capacity. There are approximately 700 spaces available among the three lots. Due to continued efforts to move drive-alone commuters to park-and-ride lots and further development in the Town and by the University, it is assumed that all of the currently available capacity in the park-and-ride lots will be used by 2015 (TIA Phase 1). This increase represents an approximate annualized growth rate of 4.5 percent and the 4.5 percent growth rate is used in ridership assumptions for transit route boardings and alightings at park-and-ride locations.

For years between 2015 (TIA Phase 1) and 2030 (TIA Phase 2) the background growth rate for park-and-ride passengers is assumed to be 1.25 percent annually, the same as the overall growth in vehicle traffic. Given that all of the 3,400 park-and-ride spaces are expected to be full by 2015 (TIA Phase 1), there will be a shortage of park-and-ride spaces in 2030 (TIA Phase 2) even without any development at the Carolina North site.

It should be noted that the completion of the Main Campus Development Plan includes additional parking structures that will free up park-and-ride spaces that are now occupied by Main Campus employees. The availability of additional park-and-ride spaces could potentially offset the future demand for more spaces. Moreover, the potential need for additional buses, many of which are specifically to serve the increased park-and-ride use, could also be correspondingly reduced. Given the uncertainty of the timing of future projects on the Main Campus, the availability and need for more park-and-ride spaces should be continually monitored before additional facilities are built or buses to serve them are purchased.

### 3.7.3 Potential Transit Service Improvements

Potential transit service improvements are defined in the *Durham-Chapel Hill-Carrboro Metropolitan Planning Organization 2030 Long Range Transportation Plan (2030 Transportation Plan)* and the draft *Chapel Hill and Carrboro 2035 Long Range Transit Plan (2035 Transit Plan)*. The *2030 Transportation Plan* was finalized in 2005 and work is currently underway on a 2035 plan update. The MPO plan covers area-wide transportation planning, including transit. It should be noted that the *2035 Transit Plan* is not an adopted plan but serves as a strategy to pursue future improvements on the local transit network.

#### **DCHC MPO Long Range Transportation Plan**

The *2030 Transportation Plan* is the result of a public planning process and technical analysis by the MPO. It identifies recommended major transportation investments for the MPO area. The plan covers highway projects, fixed guideway and high capacity projects, bus transit projects, bicycle projects, and pedestrian projects. The area transportation plan is updated every five years, with interim adjustments to the specific transportation improvement program projects as scheduling and funding opportunities evolve.

The *2030 Transportation Plan* includes enhanced local bus service, new express bus routes, and a regional light-rail connection. The proposed enhancements to existing transit service in Chapel Hill improve the existing 20-60 minute bus headways to 10-minute headways. The *2030 Transportation Plan* includes high-capacity transit service between Eubanks Road and Southern Village. This mirrors the current NS Route that serves the Carolina North site. The plan also includes a fixed guideway (light-rail) system between the Duke Medical Center in Durham and the downtown Chapel Hill.

### **2035 Chapel Hill/Carrboro Long Range Transit Plan**

The *2035 Transit Plan* is focused on transit options for Chapel Hill and Carrboro. The stated goal of the *2035 Transit Plan* is to “develop a comprehensive transit network serving the Chapel Hill/Carrboro area that would provide a viable transportation alternative for those who live and work in the community.” Transit services outside of the boundaries of the community are specifically not addressed in the *2035 Transit Plan* as these services “were considered the responsibility of other providers such as Triangle Transit”.

Despite the differences between the objectives and study area of the *2030 Transportation Plan* and the *2035 Transit Plan*, most of the proposed transit programs affecting Chapel Hill are consistent between the two plans. The draft of the *2035 Transit Plan* includes improving headways on local bus routes to 10 minutes. Strategies for new bus routes and high-capacity transit services are similar, although some operational assumptions are modified.

#### **3.7.4 Transit Improvements included in the Evaluation of Future Transit Operations**

Although the findings of this analysis are consistent with the needs identified in the other plans, none of the transit improvements proposed in the *2030 Transportation Plan* or the draft *2035 Transit Plan* are included in the evaluation of future transit conditions – with or without the proposed Carolina North development.

### 3.8 Pedestrian and Bicycle Analysis

The pedestrian and bicycle facilities were reevaluated based on the projected increase in traffic volumes throughout the study area using the Pedestrian LOS and Bicycle LOS calculations as outline in Section 2.3.3 and Section 2.4.3, respectively. For purposes of this analysis, it was assumed that the existing roadway and sidewalk conditions would remain unchanged. The analysis found that many segments will worsen and several additional segments will now fail as a result of the additional background (non-development) traffic on the surrounding roadways. The Pedestrian LOS results under the 2015 No-Build conditions are shown in Figure 3-11 while the 2030 No-Build conditions are shown in Figure 3-12. The Bicycle LOS results under the 2015 No-Build conditions are shown in Figure 3-13 while the 2030 No-Build Conditions are shown in Figure 3-14.

As previously stated, these are recently developed methodologies that have not been adopted by the Town of Chapel, but are methodologies that are being applied in other localities. They are used in this study solely to identify locations that may require improvements to provide a high pedestrian and bicycle level of service. These potential improvements are not specifically necessary to mitigate impacts generated by Carolina North, and the methodology is not intended to identify improvements that will be required as part of the development. Rather, the potential improvements represent a set of measures to address a lack of widely available and high quality pedestrian and bicycle facilities near the project site and to inform the design of improvements included in the Development Agreement. Further definition of the specific characteristics and phased implementation for these facilities will be a component of the future design effort for these facilities.

In addition to the segments identified under the 2009 Existing conditions, the Pedestrian LOS analysis has revealed that the following roadway segments are anticipated to deteriorate from LOS D or better to operate at LOS E or LOS F under the 2015 No-Build conditions:

- East side of Martin Luther King, Jr. Boulevard north and south of Airport Drive, from north of Estes Drive to north of Piney Mountain Road, and north and south of Homestead Drive
- East side of Seawell School Road south of Homestead Road

In addition to the segments identified under the 2009 Existing and 2015 No-Build conditions, the Pedestrian LOS analysis has revealed that the following roadway segments are anticipated to deteriorate from LOS D or better to operate at LOS E or LOS F under the 2030 No-Build conditions:

- West side of Martin Luther King, Jr. Boulevard north and south of Homestead Road
- South side of Estes Drive Extension east of Martin Luther King, Jr. Boulevard

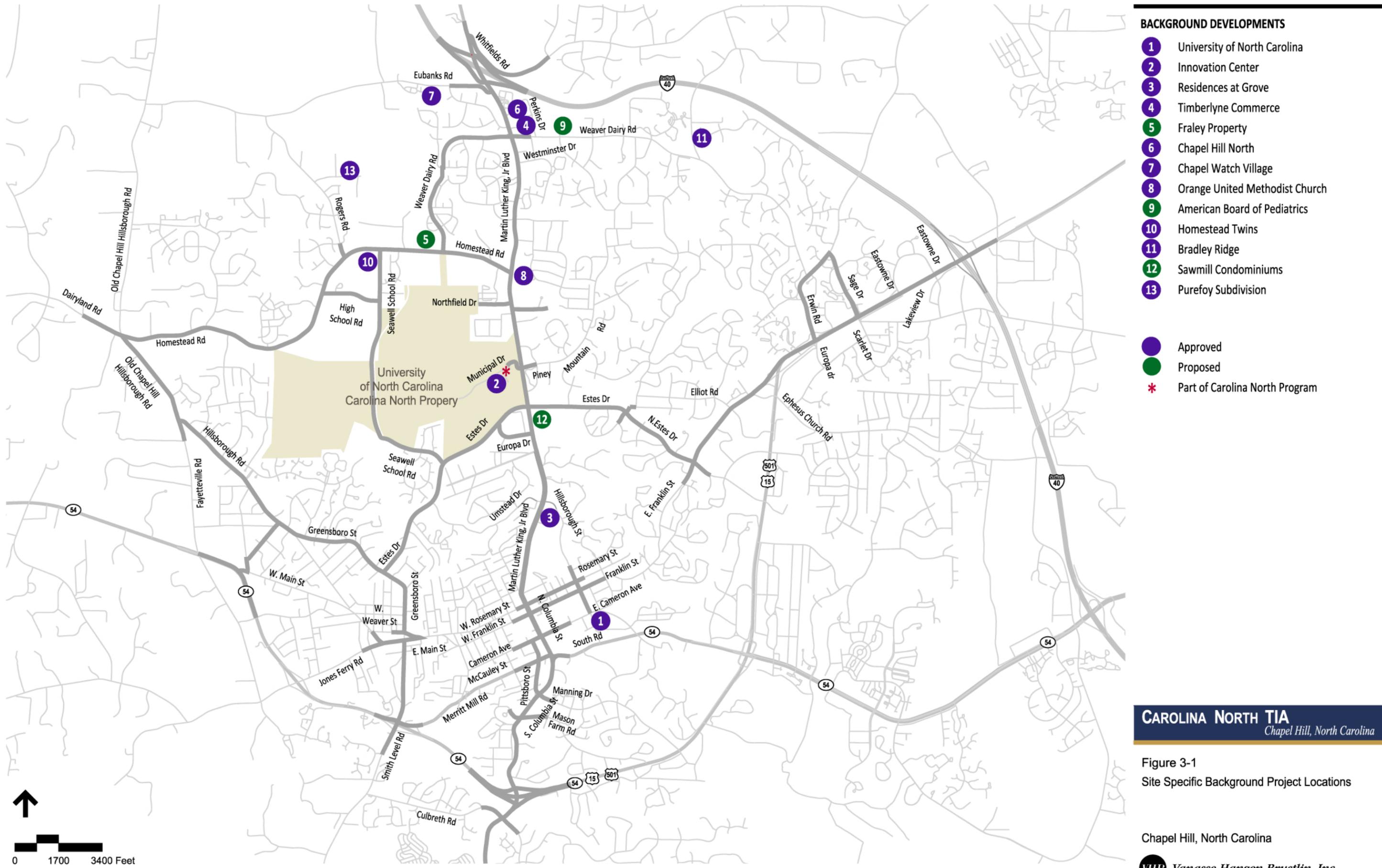
In addition to the segments identified under the 2009 Existing conditions, the Bicycle LOS analysis has revealed that the following roadway segments are anticipated to deteriorate from LOS D or better to operate at LOS E or LOS F under the 2015 No-Build conditions:

- East side of Columbia Street north of Franklin Street and north of Rosemary Street
- West side of Martin Luther King, Jr. Boulevard south of Estes Drive and south of Hillsborough Street
- West side of Columbia Street to the north and south of Franklin Street
- South side of Franklin Street east of Columbia Street
- North side of Hillsborough Street east of Martin Luther King, Jr. Boulevard

In addition to the segments identified under the 2009 Existing and 2015 No-Build conditions, the Bicycle LOS analysis has revealed that the following roadway segments are anticipated to deteriorate from LOS D or better to operate at LOS E or LOS F under the 2030 No-Build conditions:

- West side of Martin Luther King, Jr. Boulevard from south of Homestead Road to north of Northfield Road and south of Piney Mountain Road
- North side of Franklin Street east of Columbia Street
- South side of Estes Drive east of Martin Luther King, Jr. Boulevard
- South side of Homestead Road from west of Weaver Dairy Road to east of Seawell School Road
- West side of Seawell School Road south of Homestead Road and from north of Estes Drive to south of High School Road

As stated earlier in the report, a poor LOS under this methodology does not imply that pedestrians or bicyclists will be unable to travel along these particular segments. This analysis merely identifies locations where these users will feel less comfortable during peak vehicular traffic periods and that upgrades to pedestrian and bicycle accommodations at these points would be warranted and provide a measurable benefit.



## TRANSPORTATION NETWORK IMPROVEMENTS

### Approved Development Improvements

- 2 Martin Luther King Jr/I-40 WB Ramps**
  - Add exclusive NBT lane to MLK (BG 6, 2012)
- 4 Martin Luther King Jr/Eubanks Road**
  - Add EBL turn lane to Eubanks Road (BG 6, 2012)
  - Add SBR turn lane to MLK Blvd. (BG 6, 2012)
  - Lengthen NBL turn lane to 300 ft. (BG 7, 2008 Implemented)
  - Add paved 'flare' area to SBR turn lane on MLK Blvd. to accommodate tractor-trailers that may go off pavement to turn (BG 7, 2008, Implemented)
- 5 Martin Luther King Jr/Perkins Drive**
  - Add WBL turn lane to Perkins Drive (BG 6, 2012)
- 6 Martin Luther King Jr/Weaver Dairy Road**
  - Adjust signal timing plans and optimize (BG 4, 2007)
- 8 Martin Luther King Jr/Homestead Road**
  - Add NBR taper (BG8, 2019)
- 13 Martin Luther King Jr/Hillsborough Road**
  - Add exclusive WBR turn lane to Hillsborough Drive (BG 3, 2013)
- 14 Columbia Street/Rosemary Street**
  - Add dual EBL turn lane to Rosemary Street (BG 3, 2013)
- 18 Columbia Street/South Street**
  - Decrease radius of NBR turn lane on Columbia Street (leaving a pedestrian refuge island) and provide eastbound exclusive left-turn lane street (BG 1, 2008, Implemented)
  - Remove one vehicular travel lane, add an exclusive lane for buses and one for bicycles on the NB approach, between Manning Drive and South Road (BG 1, 2008, Implemented)
- 25 Weaver Dairy Road/Homestead Road**
  - Monitor for future signalization; warrants not met for future 2013 (BG 5, 2013)
- 40 Rosemary Street/Hillsborough Road**
  - Adjust signal timing plans and optimize (BG 3, 2013)

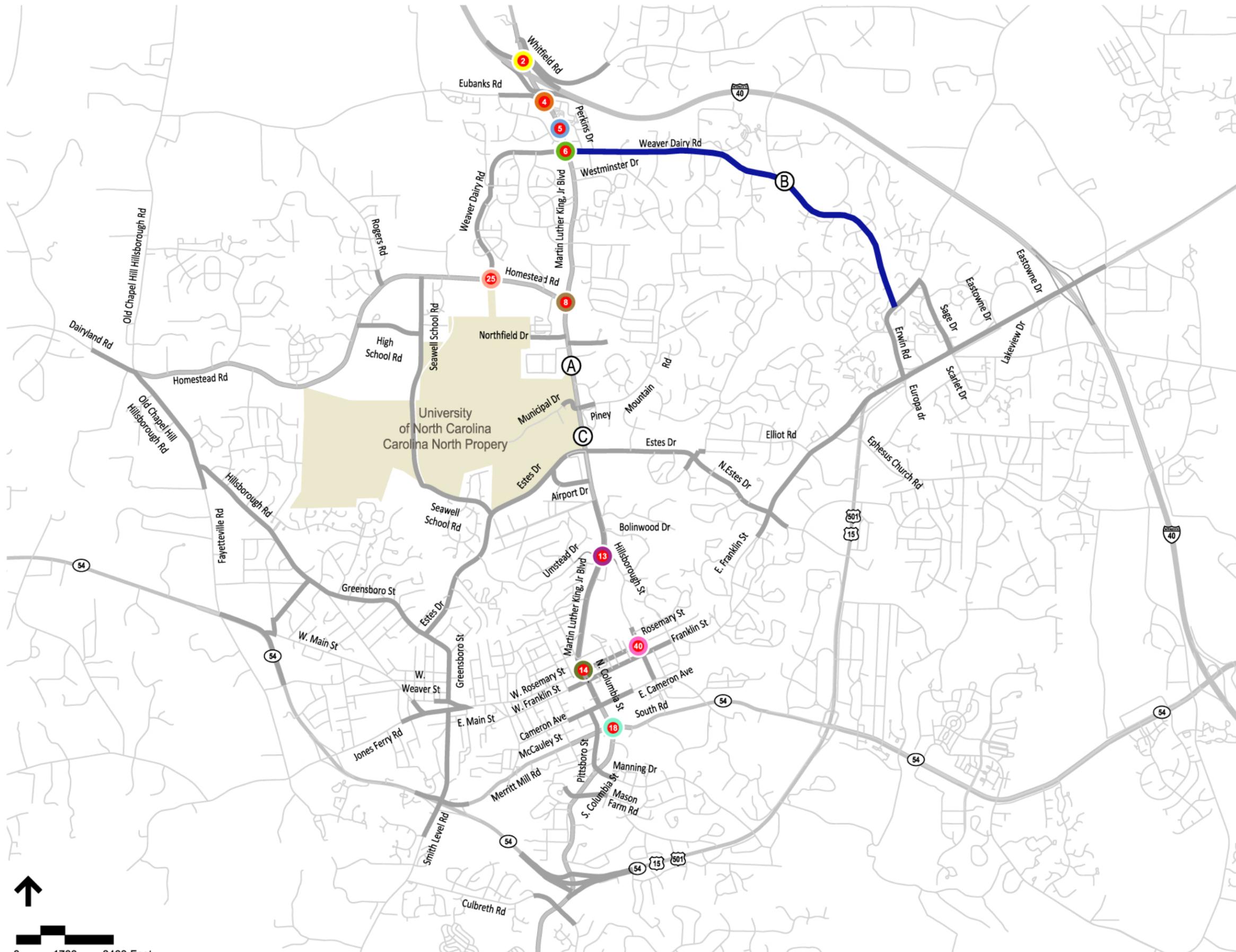
### Committed Improvements

- A Mid-Block Pedestrian Crosswalk with Refuge Island on MLK Blvd near Shadowood Apartments**
  - Located between Estes Dr and Piney Mountain Rd and expected to be installed by fall 2009.
- B Weaver Dairy Road from NC 86 to Sage Rd**
  - Bike Lanes and sidewalk on both sides and turning lanes where needed. Scheduled for construction by 2010.
- C MLK Blvd Signal System Improvement Project**

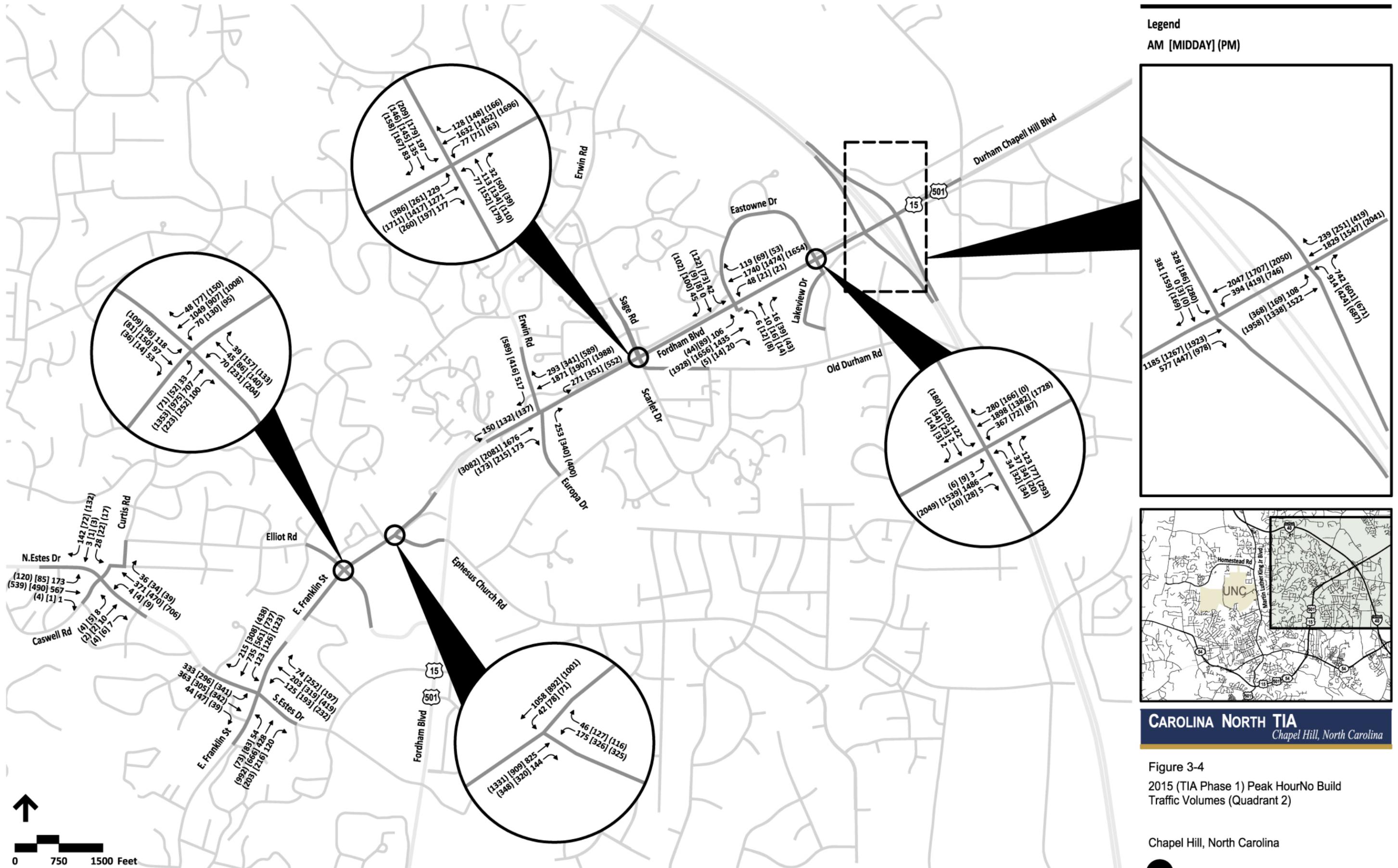
## CAROLINA NORTH TIA Chapel Hill, North Carolina

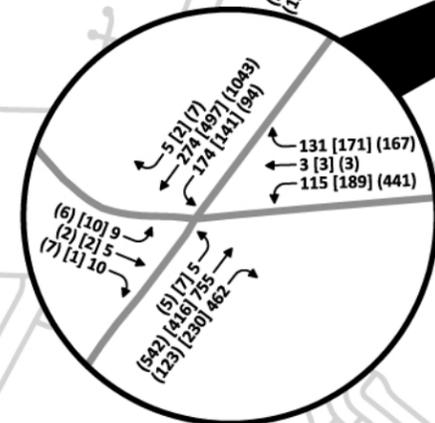
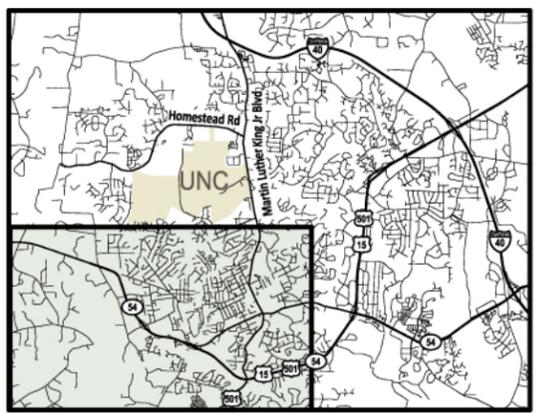
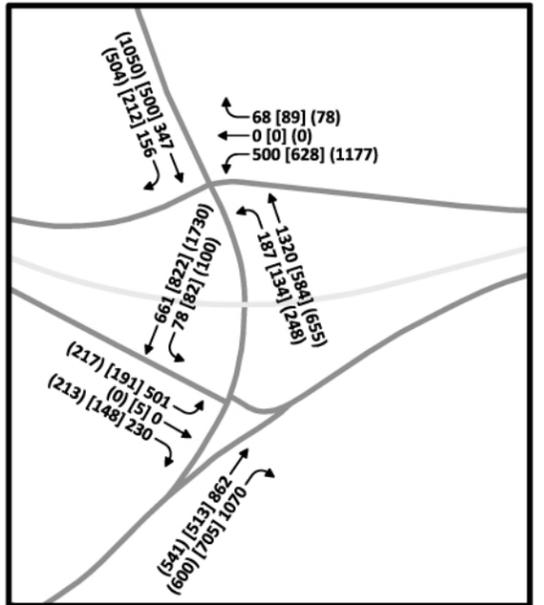
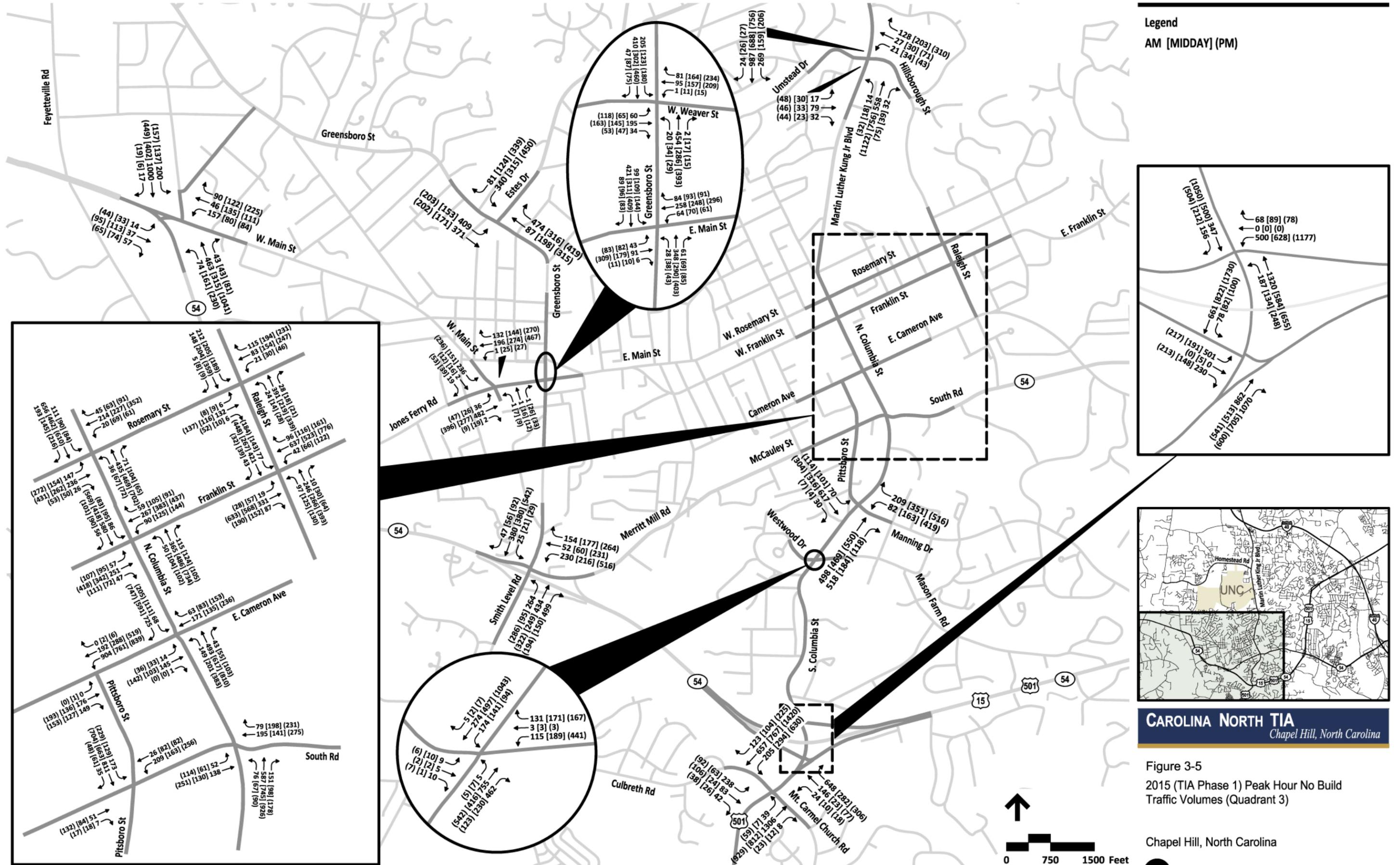
Figure 3-2  
Anticipated and Committed Transportation Improvements

Chapel Hill, North Carolina

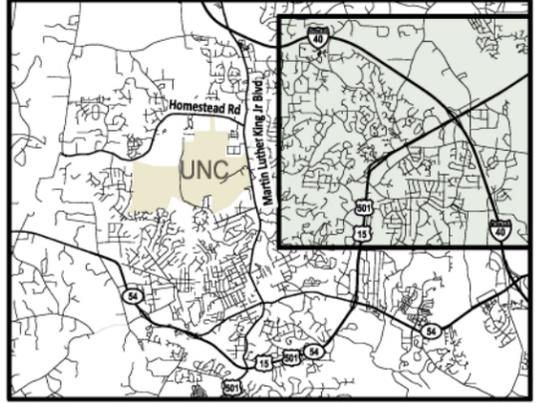
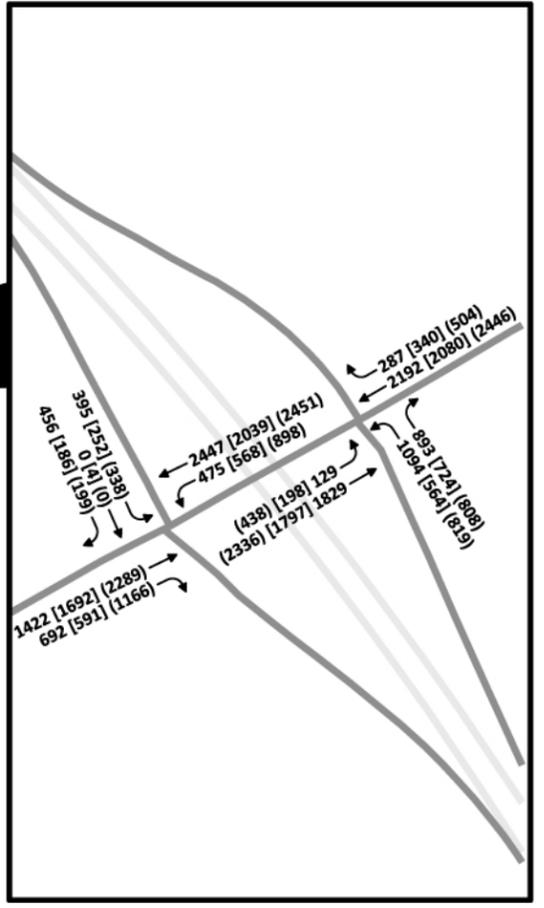
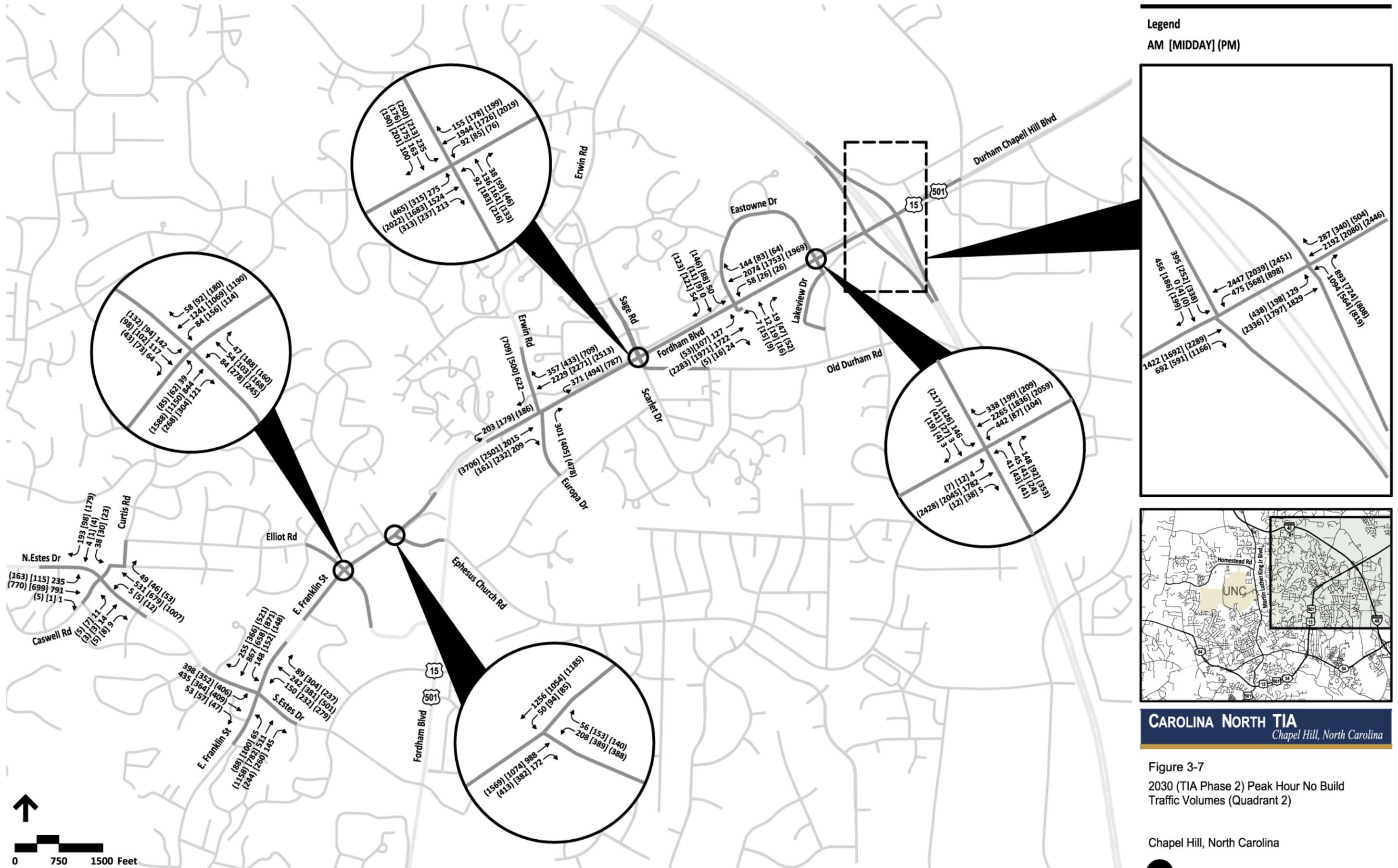








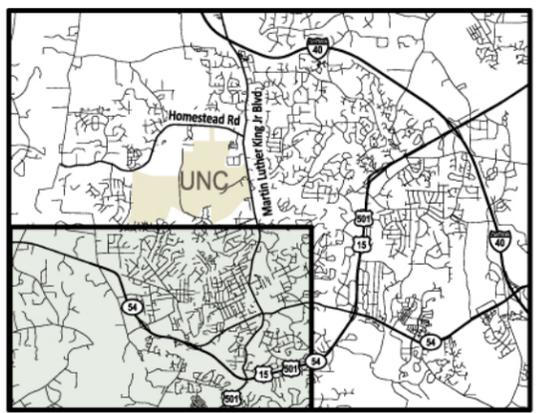
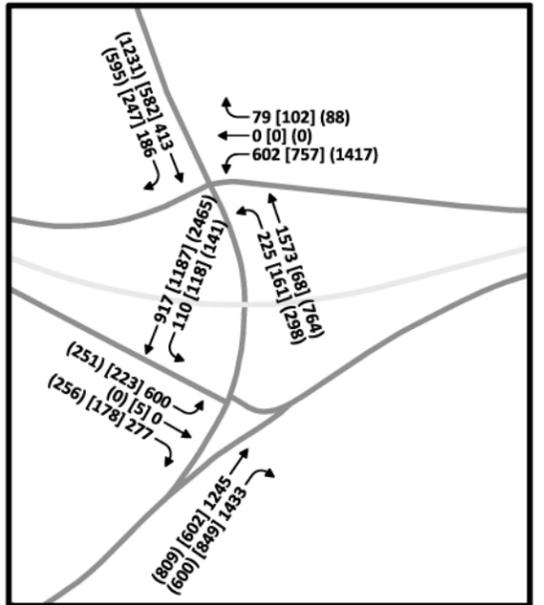
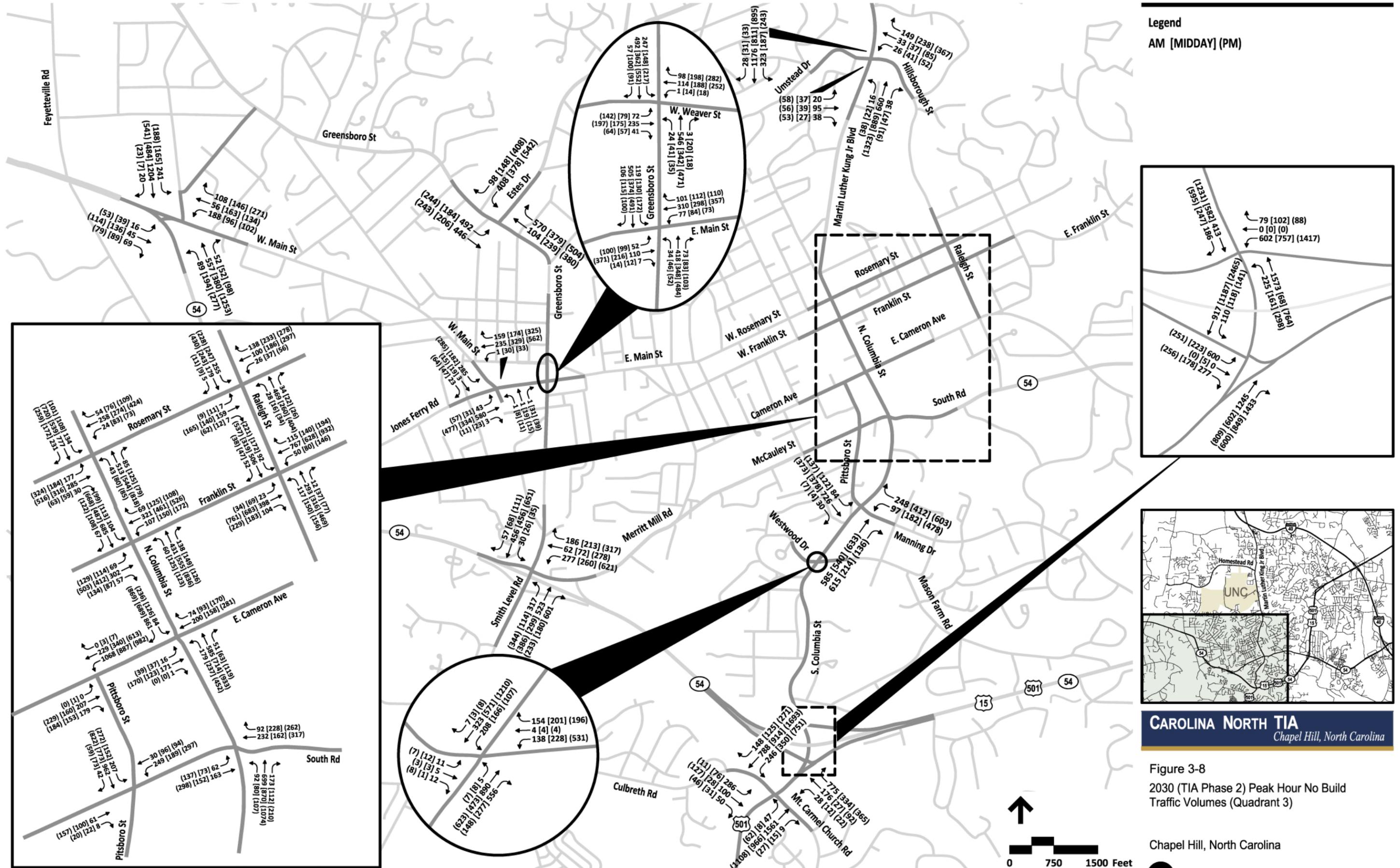




**CAROLINA NORTH TIA**  
Chapel Hill, North Carolina

Figure 3-7  
2030 (TIA Phase 2) Peak Hour No Build Traffic Volumes (Quadrant 2)

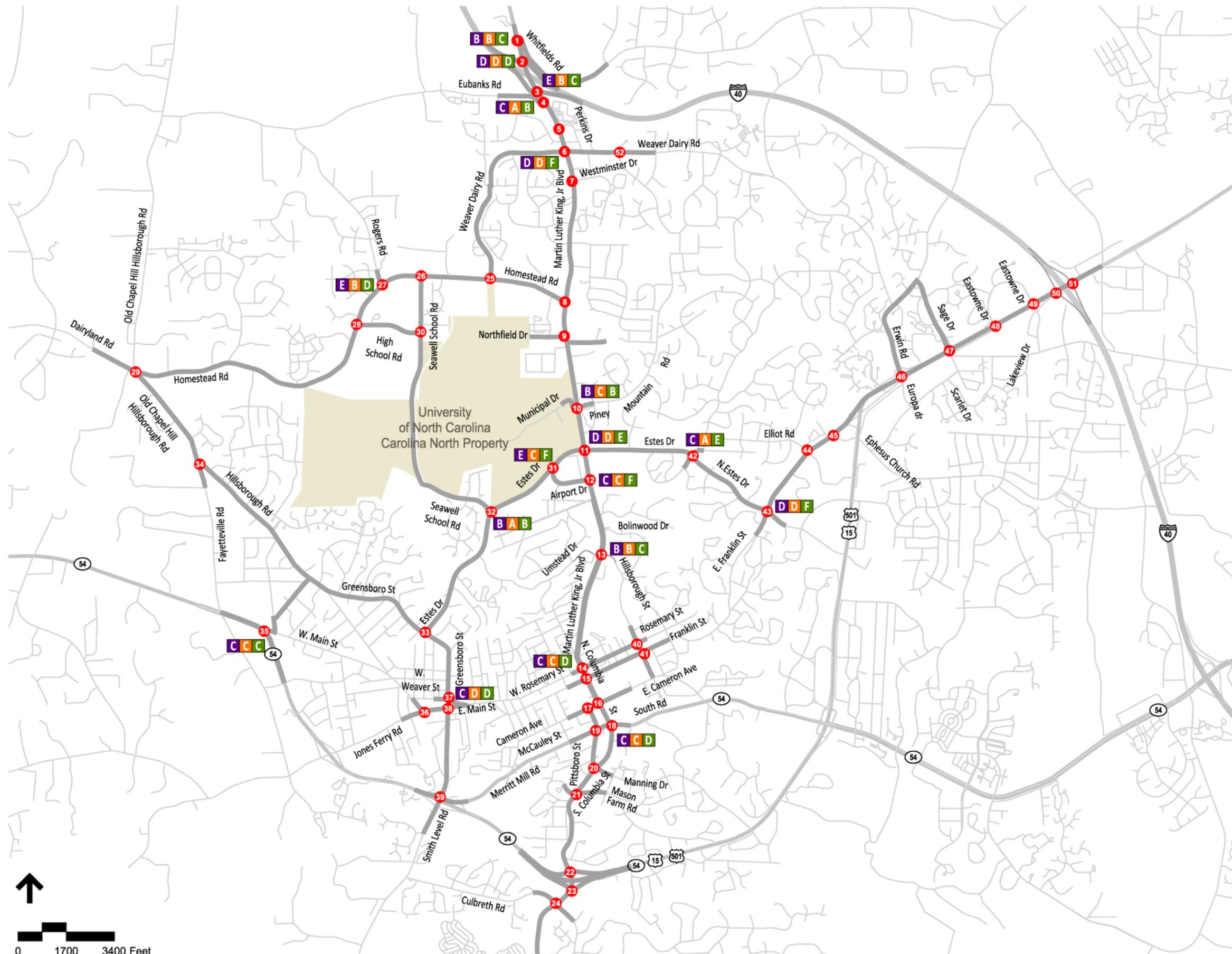
Chapel Hill, North Carolina



**CAROLINA NORTH TIA**  
Chapel Hill, North Carolina

Figure 3-8  
2030 (TIA Phase 2) Peak Hour No Build Traffic Volumes (Quadrant 3)

Chapel Hill, North Carolina



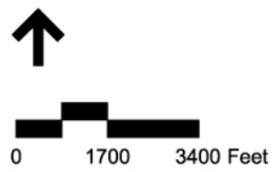
**Legend**

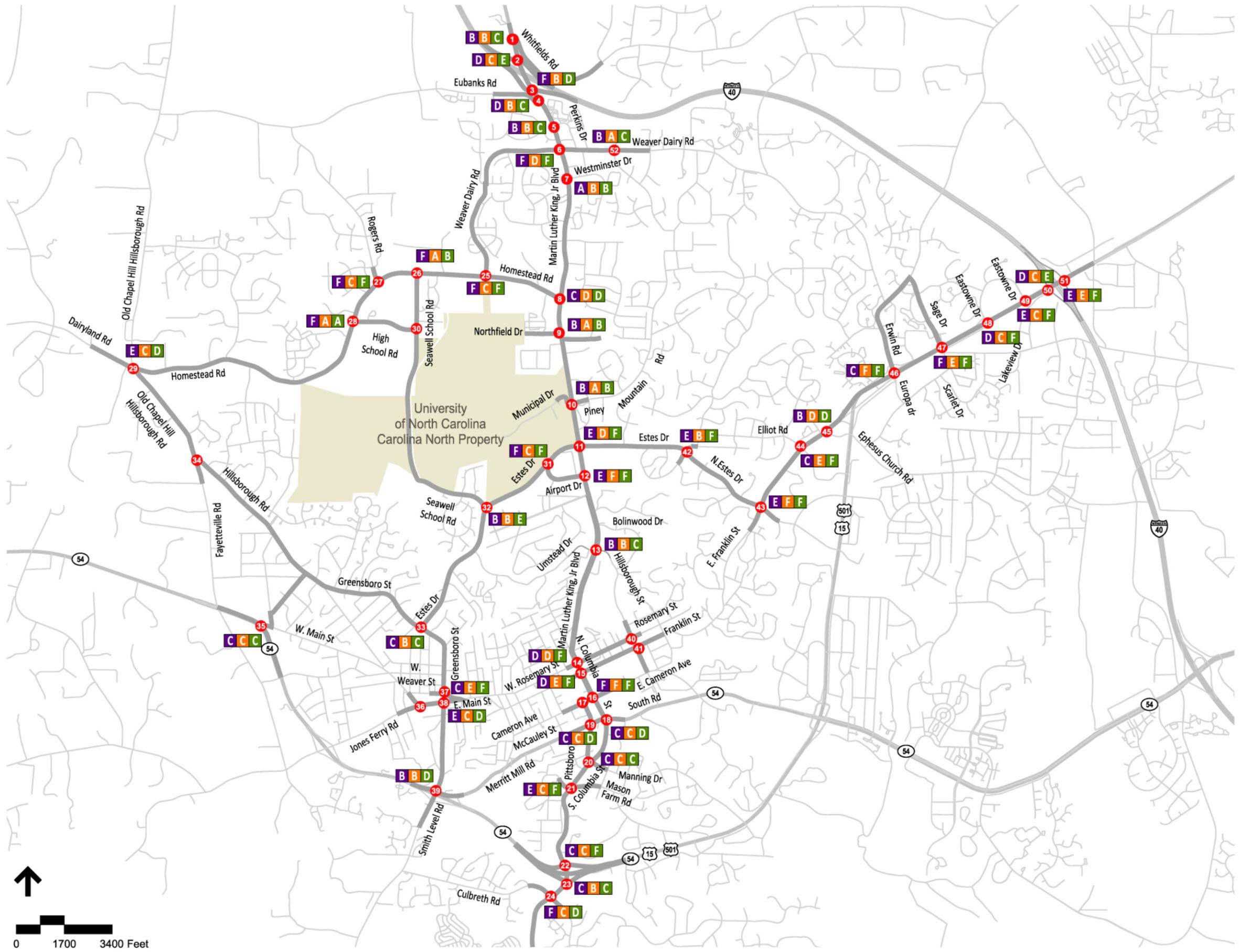
- # Study Area Intersections
- A B C Overall Peak Hour LOS
  - PM
  - Midday
  - AM

**CAROLINA NORTH TIA**  
Chapel Hill, North Carolina

Figure 3-9  
2015 (TIA Phase 1) No Build Levels-of-Service

Chapel Hill, North Carolina





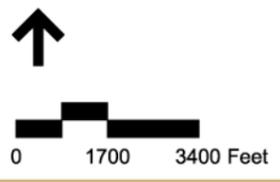
**Legend**

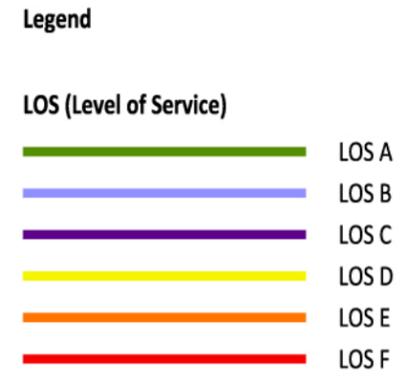
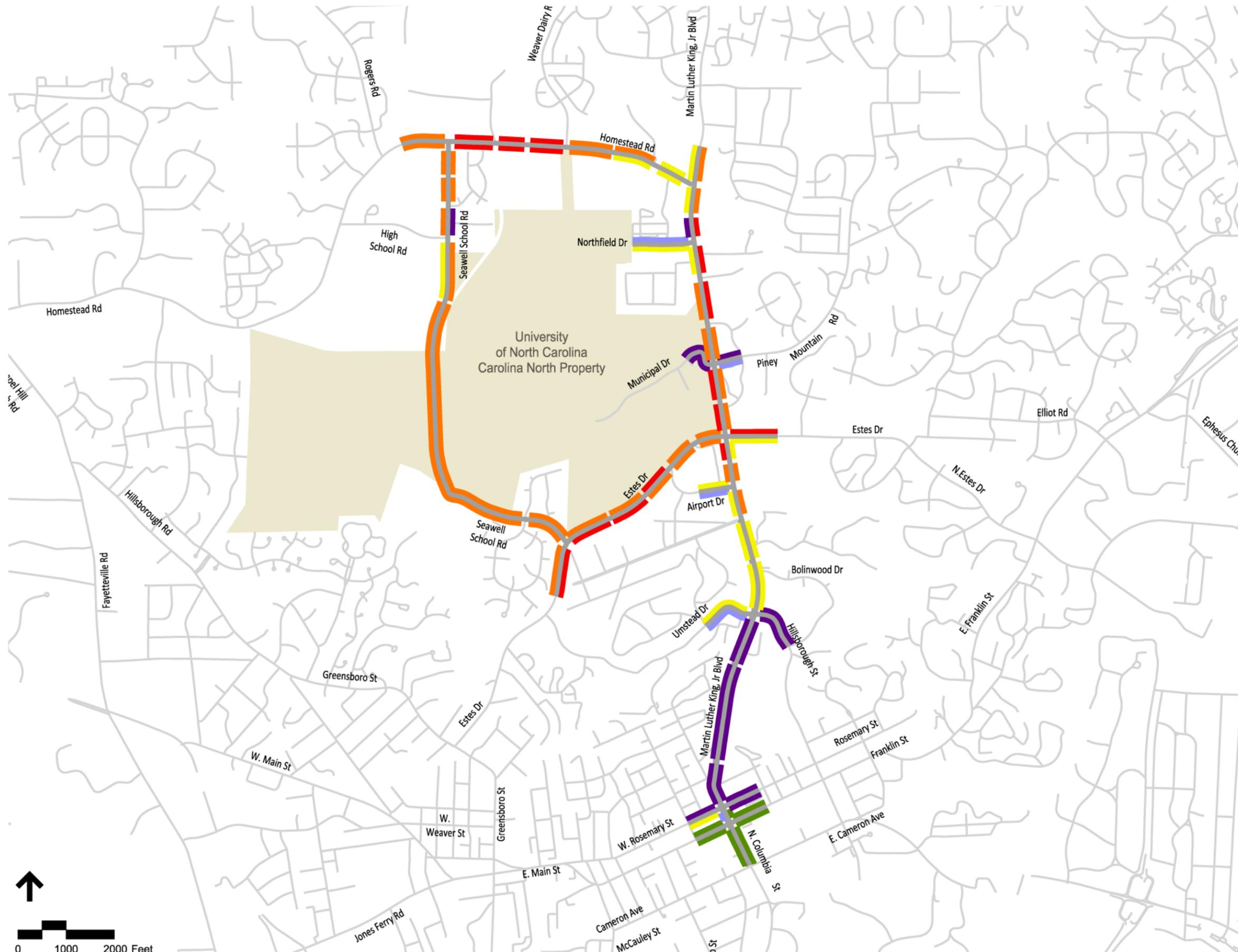
- # Study Area Intersections
- A B C Overall Peak Hour LOS
  - PM
  - Midday
  - AM

**CAROLINA NORTH TIA**  
Chapel Hill, North Carolina

Figure 3-10  
2030 (TIA Phase 2) No Build Levels-of-Service

Chapel Hill, North Carolina

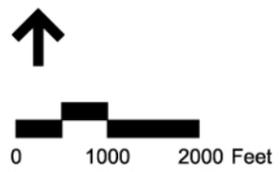
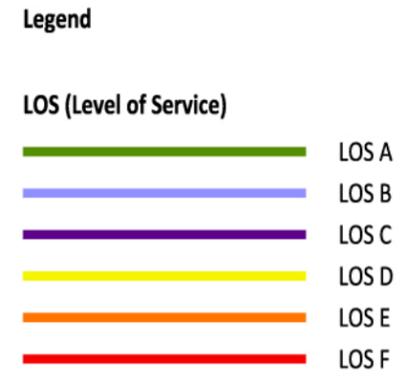
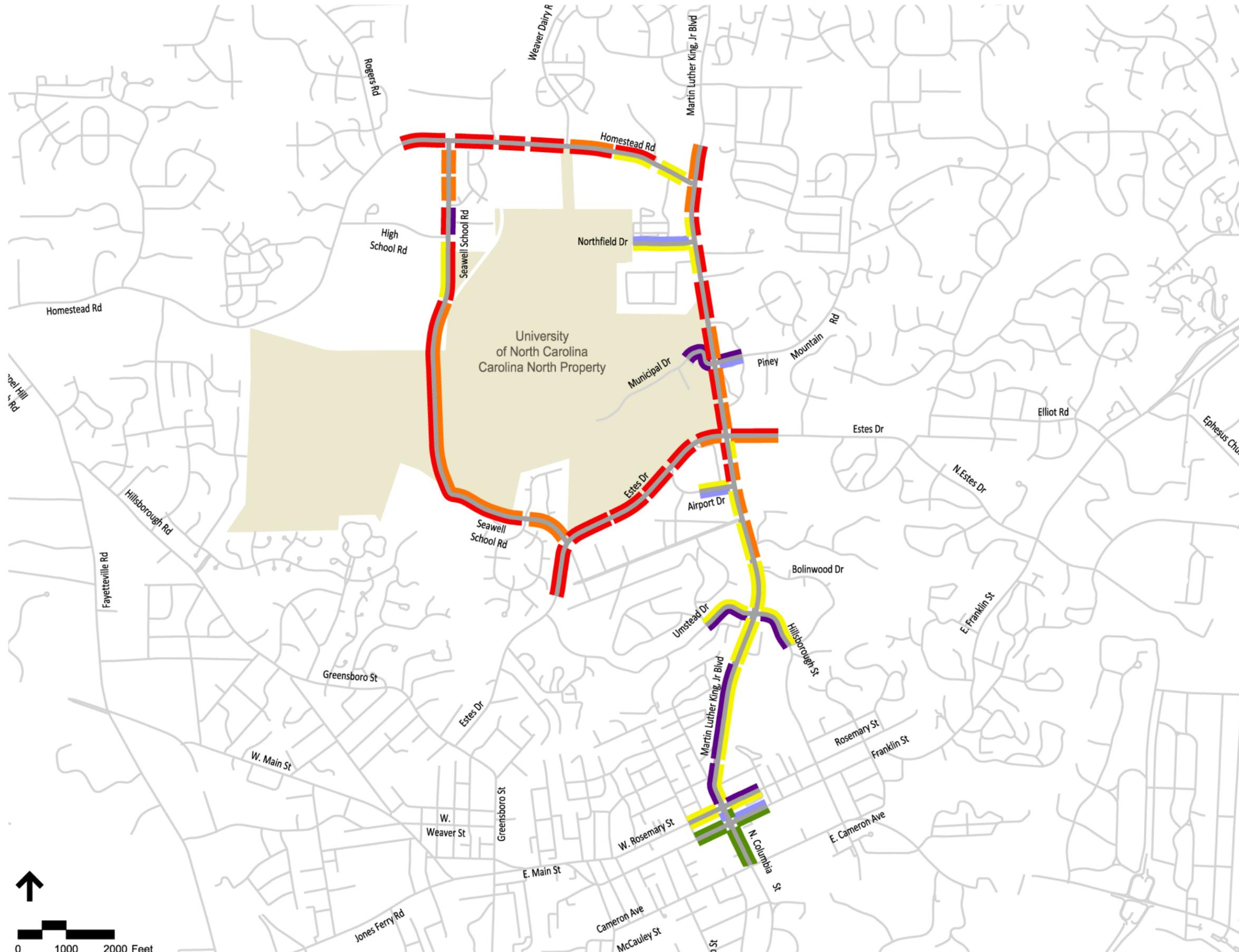




**CAROLINA NORTH TIA**  
Chapel Hill, North Carolina

Figure 3-11  
2015 No-Build Pedestrian Levels-of-Service

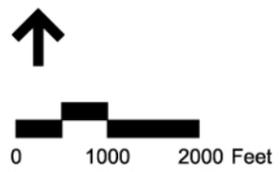
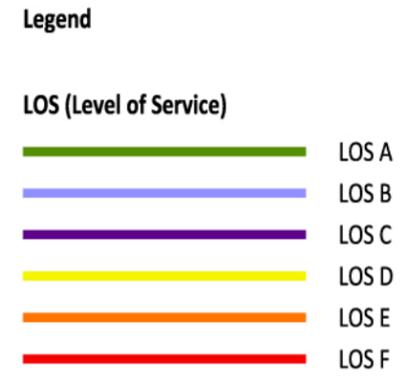
Chapel Hill, North Carolina



**CAROLINA NORTH TIA**  
Chapel Hill, North Carolina

Figure 3-12  
2030 No-Build Pedestrian Levels-of-Service

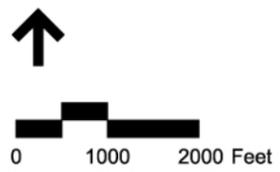
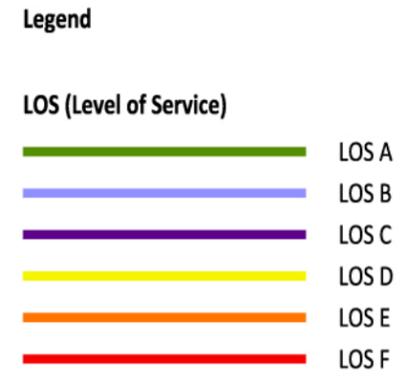
Chapel Hill, North Carolina



**CAROLINA NORTH TIA**  
Chapel Hill, North Carolina

Figure 3-13  
2015 No-Build Bicycle Levels-of-Service

Chapel Hill, North Carolina



**CAROLINA NORTH TIA**  
Chapel Hill, North Carolina

Figure 3-14  
2030 No-Build Bicycle Levels-of-Service

Chapel Hill, North Carolina