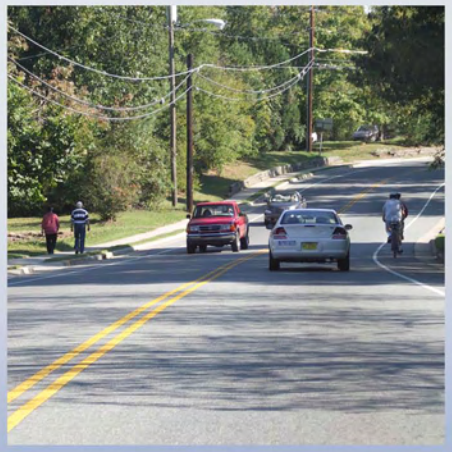
Attachment "A"

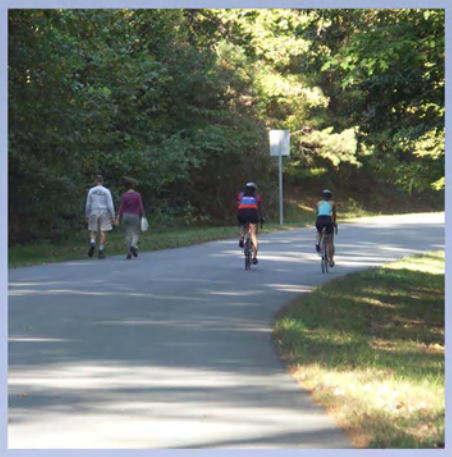
A RESOLUTION RECEIVING A REPORT ON
THE CARRBORO MOBILITY REPORT CARD
Resolution No. 112/2006-07

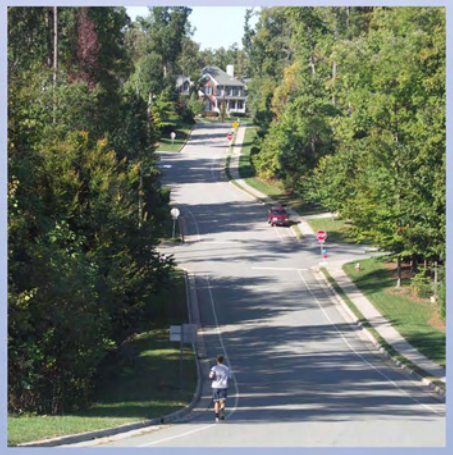
WHEREAS, a Mobility Report Card has been prepared for the Town of Carrboro as a means to monitor and evaluate progress toward town-wide mobility goals.

NOW, THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that the Aldermen has received the report on the 2005 Carrboro Mobility Report Card and releases the report to the Town's advisory boards for review and discussion.

Carrboro
2005 Mobility Report Card







January 16, 2006

TOWN OF CARRBORO
MARCH 3, 1911
NORTH CAROLINA

LSA
LSA ASSOCIATES, INC.

Summary of Findings

VEHICULAR ACTIVITY AND ARTERIAL LEVEL OF SERVICE
Traffic volumes are generally lower in 2005 than in 2003 and congestion along major roadway segments is getting better. Three roadway segments improved their level of congestion and none became substantially more congested.

VEHICLE PEAK HOUR INTERSECTION OPERATIONS
Most of the intersections in the Town of Carrboro operate in an uncongested condition during all time periods. However, several intersections for several time periods declined in level of service. Only two intersections operated in a moderately congested or congested state for all three time periods.

VEHICULAR TRAVEL TIME
Total corridor travel time increased between 2003 and 2005. Many corridors experienced worse travel times and only a few improved. The travel time in several corridors increased substantially.

PEDESTRIAN FACILITIES
Total length of all sidewalks in the Town increased 5% between 2003 and 2005. The total length of sidewalks inside the transit area increased 4%. Approximately half of new sidewalk construction occurred inside the transit service area.

PEDESTRIAN ACTIVITY
Pedestrian activity in 2005 is similar to that experienced in 2003. Some locations improved and some declined in overall activity. The off-street paths saw large increases in pedestrian activity from 2003 to 2005.

BICYCLE FACILITIES
Only one bicycle facility, of approximately ½ mile in length has been added between 2003 and 2005, resulting in a 1% increase in overall length of bicycle facilities.

BICYCLE ACTIVITY
Bicycle activity has increased by about 25% between 2003 and 2005. Ten of 16 locations experienced a greater than 10% increase in bicycle activity. Some of the largest gains in activity were seen in the two off-street facilities.

PEDESTRIAN/BICYCLIST SAFETY
This is the first year of this indicator, but analysis of past accidents involving pedestrians and bicyclists indicate that the number of accidents is staying about the same. However, total pedestrian and bicycle activity has also increased, so the pedestrian/bicyclist accident rate may not be increasing.

TRANSIT SERVICE
Approximately 75% of the Town is within ¼ mile of transit. Fixed route transit service hours increased by over 50% between 2001 and 2005 and total system operating hours increased by 47% over the same time. CHT continues to improve transit service within the Town.

TRANSIT RIDERSHIP
Ridership increased dramatically between 2001 and 2003 due to the conversion to a fare-free system in January 2002. These ridership increases have continued to 2005. System-wide ridership has almost doubled between 2001 and 2005 and has increased by 26% to almost 6 million since 2003. System-wide riders per capita increased by 27% and riders per hour increased by 19%.

MULTIMODAL MOBILITY
This is the first year of the multimodal mobility section, so no comparisons can be made to 2003. Alternative transportation usage is highest in the downtown area, with a high number of pedestrians and bicyclists. Several sections of outlying corridors experienced a high number of transit users.

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Introduction

The first Mobility Report Card for the Town of Chapel Hill was conducted in 2001. In 2003, it was decided to update that report card. At that time, it was also determined to create a mobility report card for the Town of Carrboro in order to present a better picture of the region's mobility as a whole. This is the first update of that document and allows for comparisons of the various indicators over time.

This report card focuses on eleven indicators to best balance the cost of data collection with the value of the resulting data in order to describe the current state of mobility within the Town and provide a meaningful baseline for future comparison. Two indicators have been added to the original nine to provide a more comprehensive picture of the region. The indicators analyzed here are:

1. Vehicular Activity and Arterial Level of Service
2. Peak Hour Intersection Operations
3. Vehicular Travel Time
4. Pedestrian Facilities
5. Pedestrian Activity
6. Bicycle Facilities
7. Bicycle Activity
8. Pedestrian/Bicyclist Safety (new for 2005)
9. Transit Service
10. Transit Ridership
11. Multimodal Mobility (new for 2005)

While the 2003 Carrboro Mobility Report Card provided a baseline for progress evaluation, this update allows, for the first time, for trend comparisons. This update will focus on comparative evaluations between 2003 and 2005. Each of the 11 indicators comprises a separate section of this document. Each indicator discussion includes three descriptions as follows:

- **Why and How:** This section briefly highlights the purpose of the information and what type of data was collected.
- **Results:** This section of the indicator description will present the collected data. This information is presented in simple, easy to understand and read maps, tables and charts.
- **Findings and Conclusions:** For each indicator, key findings and conclusions are highlighted for both current conditions and for future comparisons.

A mobility report focusing on the Town of Chapel Hill is also available. Some of the Chapel Hill data that is essential to understanding mobility issues in the Town of Carrboro are presented here, most notably in the travel time and transit sections. Further data on mobility issues in the Town of Chapel Hill is available in the Town of Chapel Hill Mobility Report Card Update.

Chapter 1 - Vehicular Activity and Arterial Level of Service

MEASUREMENT: Roadway Traffic Volumes and Volume/Capacity Ratio
DATA: 24-Hour Machine Counts

Why and How

Daily 24-hour traffic counts are one of the most common ways of presenting vehicular traffic activity. These counts are obtained through placement of a pneumatic tube or sensor across the whole street. These tubes or sensors send information to the machine counter on the roadside. Counts are only done on weekdays.

For purposes of this study, 38 roadway count locations were analyzed. Thirty-two locations were North Carolina Department of Transportation (NCDOT) count locations and the data was provided by that department. Data for the remaining six count locations was provided by the Town of Carrboro.

The daily traffic counts can also be used to determine level of service. Level of service (LOS) is a measurement system that assesses how well a particular roadway or intersection operates. Level of service uses letter grades similar to grades at school. An LOS of "A" indicates a relatively low volume of traffic in relation to a roadway's capacity meaning vehicles can move freely down the roadway with few other automobiles on the road. The LOS system moves steadily down to an LOS of "F" indicating that traffic volume is above the roadway's capacity. A higher letter grade is not necessarily better than a lower one, as a roadway with high capacity and low volume is not being used efficiently. Figure 1.1 presents general relationships for maneuverability, driver comfort, and average travel speed compared to the speed limit by level of service.

FIGURE 1.1 – LEVEL OF SERVICE CHARACTERISTICS

	A	B	C	D	E	F
Intersection Delay (control delay per vehicle, sec)	< 10	> 10 and < 20	> 20 and < 35	> 35 and < 55	> 55 and < 80	> 80
Arterial Volume/ CapacityRatio	< 0.6	0.6–0.7	0.7–0.8	0.8–0.9	0.9–1.0	> 1.0
Maneuverability	Almost Completely Unimpeded	Only Slightly Restricted	Noticeably Restricted	Severely Limited	Extremely Unstable	Almost None
Driver Comfort	High	High	Some Tension	Poor	Extremely Poor	The Lowest
Average Traveling Speed	Speed Limit	Close to Speed Limit	Close to Speed Limit	Some Slowing	Significantly Slower than Speed Limit	Significantly Slower than Speed Limit

Level of service for roadways is based on a concept referred to as a volume-to-capacity (V/C) ratio, which simply is the daily volume divided by the facility's theoretical capacity. When the estimated or forecast daily traffic volume exceeds the theoretical capacity, then the ratio is greater than one and would experience an "F" level of service. Volume-to-capacity ratios for the other levels of service are depicted in Figure 1.1.

Results

As indicated previously, 38 locations throughout the Town were counted for 24-hour daily volumes. These locations are shown in Figure 1.2. Level of service information is presented in presented in Figure 1.3 and Table 1.1. The map presents two items of information: the first is the traffic volumes, where the higher the volumes, the wider the band and the second item of information are the level of service. This information is color coded in a form similar to a traffic signal: uncongested conditions (LOS A, B and C) are green, moderate congestion (LOS D) is yellow, and congested conditions (LOS E and F) are red.

Included in the table is the resulting level of service for each location for both 2003 and 2005. The count locations in this and future tables are grouped by corridor. Within each corridor section, count locations are listed from the outer edge of Town towards the downtown core.

Figure 1.2 – 24 Hour Auto Count Locations

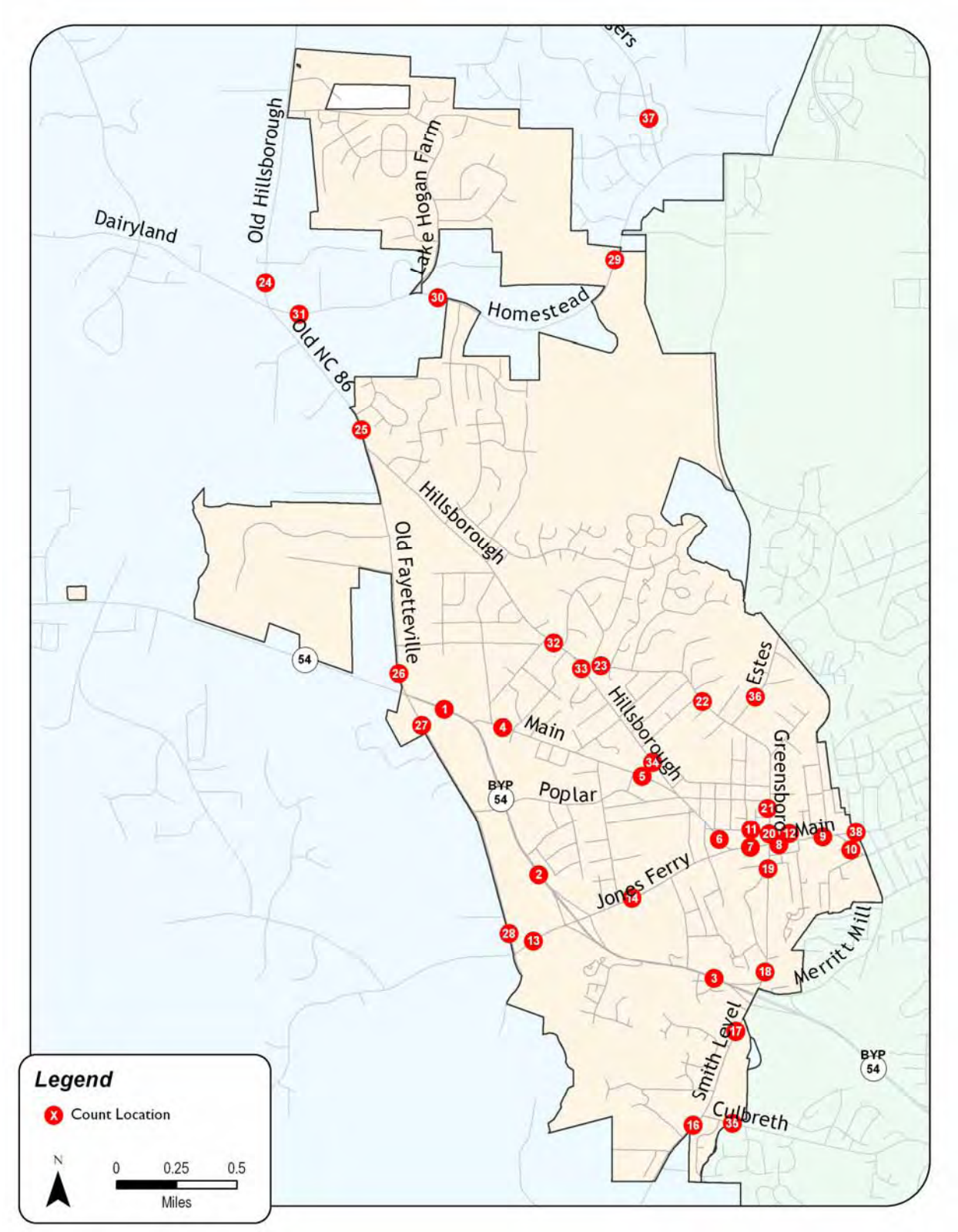
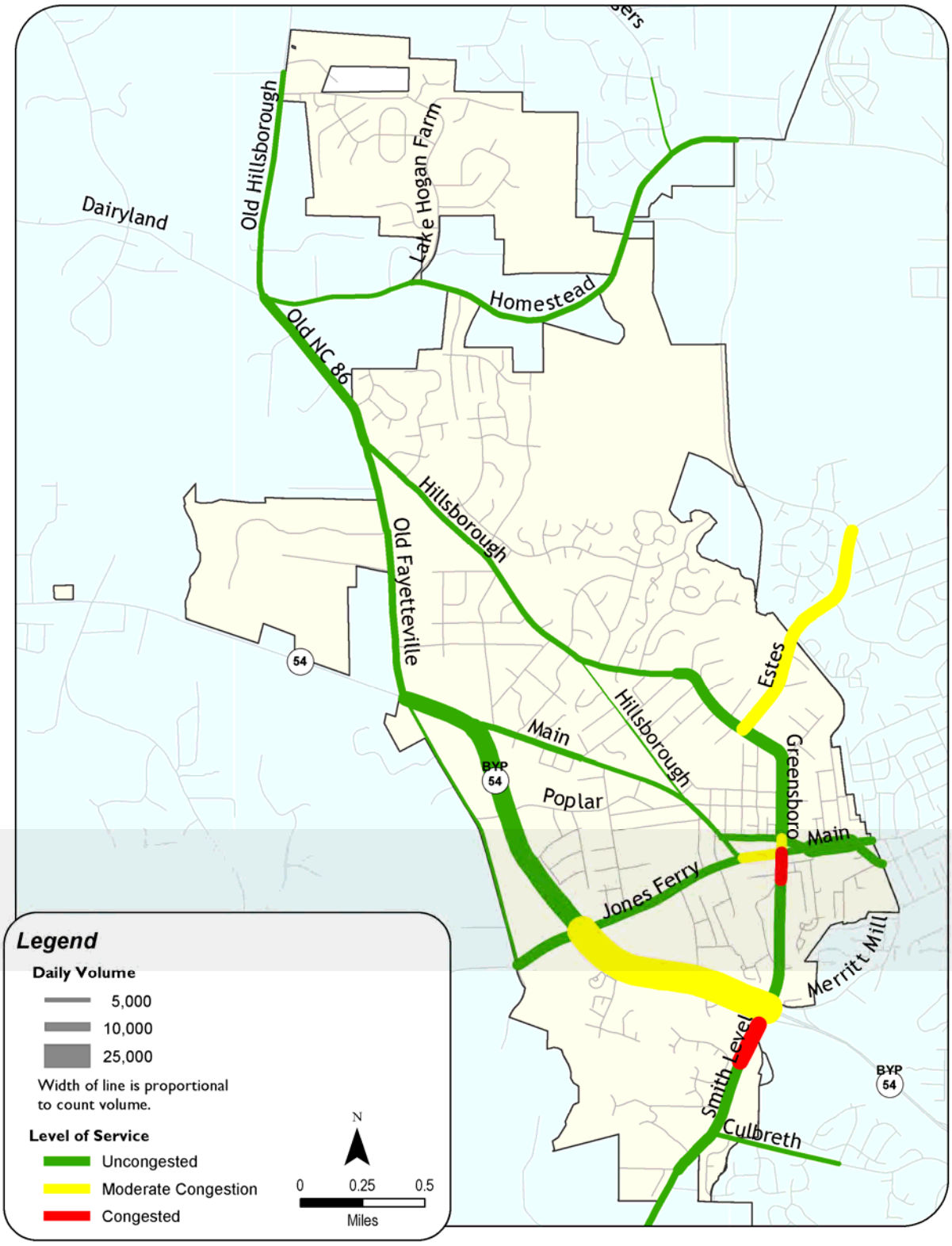


Table 1.1 – Roadway Traffic Volumes and Level of Service 2005

		Count Location	Daily Two Way Capacity	2003 24-Hour Two Way Volume	2003 LOS	2005 24-Hour Two Way Volume	2005 LOS
NC 54	1	NC 54 b/w Main St and Old Fayetteville Rd	37,200	16,000	A	16,000	A
	2	NC 54 Bypass b/w Jones Ferry Rd and Oleander Rd	37,200	21,000	A	19,000	A
	3	NC 54 Bypass b/w Smith Level Rd and Abbey Ct	37,200	33,000	D	31,000	D
Main St/Weaver St	4	Main St b/w James St and Simpson St	12,900	7,200	A	6,900	A
	5	Main St b/w Blackwood Dr and Fidelity St	18,300	4,800	A	4,800	A
	6	Main St b/w Weaver St and Jones Ferry Rd	13,700	5,200	A	4,900	A
	7	Main St b/w Jones Ferry Rd and Greensboro St	13,700	12,000	D	11,000	D
	8	Main St b/w Greensboro St and Weaver St	13,700	-	-	7,800	A
	9	Main St b/w Lloyd St and Rosemary St	27,400	21,000	C	19,000	B
	10	Main St b/w Rosemary and Merritt Mill	18,300	-	-	9,700	A
	11	Weaver St b/w Oak Ave and Greensboro St	13,700	8,700	B	7,800	A
	12	Weaver St b/w Greensboro St and Main St/Roberson St	13,700	12,000	D	10,000	C
Jones Ferry Rd	13	Jones Ferry Rd b/w Old Fayetteville Rd and Willow Creek	17,200	13,000	C	12,000	B
	14	Jones Ferry Rd b/w Barnes St and Davie Rd	17,200	10,000	A	9,300	A
Smith Level Rd/ Greensboro Rd	15	Smith Level Rd b/w Northside Dr and Damascus Church Rd	14,000	8,000	A	7,400	A
	16	Smith Level Rd b/w BPW Club Rd and Culbreth Rd	18,600	-	-	11,600	B
	17	Smith Level Rd b/w Willow Oak Ln and Public Works Dr	18,600	19,000	F	17,000	E
	18	Greensboro St b/w NC 54 Bypass and Rand Rd	17,200	14,000	D	12,000	B
	19	Greensboro St b/w Old Pittsboro Rd (north) and Carr St	13,700	14,000	F	13,000	E
	20	Greensboro St b/w Main St and Weaver St	13,700	12,000	D	11,000	D
	21	Greensboro St b/w Short St and Poplar Ave	18,300	16,000	D	14,000	C
	22	Greensboro St b/w Oak St and Estes Dr	17,200	-	-	12,000	B
	23	Greensboro St b/w Hillsborough Rd and Robert Hunt Dr	17,200	7,000	A	6,400	A
Old NC 86/Old Fayetteville Rd	24	Old NC 86 b/w Homestead Rd and Stony Hill Rd	14,000	5,900	A	6,100	A
	25	Old NC 86 b/w Hillsborough Rd and Farm House Dr	18,600	10,000	A	10,000	A
	26	Old Fayetteville Rd b/w NC 54 and Carol St	14,000	7,900	A	7,600	A
	27	Old Fayetteville Rd b/w Swansea Ln and NC 54	14,000	5,400	A	3,600	A
	28	Old Fayetteville Rd b/w Jones Ferry Rd and Crabtree Dr	14,000	4,200	A	3,800	A
Homestead Rd	29	Homestead Rd south of High School Rd	13,700	7,000	A	6,700	A
	30	Homestead Rd b/w Stratford Rd and Lake Hogan Farm Rd	12,900	-	-	6,000	A
	31	Homestead Rd b/w Old NC 86 and Hardee Ln	12,900	5,800	A	5,100	A
Hillsborough Rd	32	Hillsborough Rd b/w Lorraine St and Blueridge Rd	12,900	-	-	6,100	A
	33	Hillsborough Rd b/w Bel Arbor Ln and Dillard St	12,900	1,700	A	1,700	A
	34	Hillsborough Rd in front of Carrboro Elementary School	12,900	2,400	A	2,600	A
Other	35	Culbreth Rd b/w Rossburn Wy and Cobble Ridge Dr	17,200	5,200	A	5,300	A
	36	Estes Dr b/w Greensboro St and Hillcrest Ave	17,200	15,000	D	14,000	D
	37	Rogers Rd b/w Claymore Rd and Tallyho Tr	13,700	-	-	2,100	A
	38	Rosemary St b/w Main St and Merritt Mill Rd	13,700	-	-	8,900	B

Figure 1.3 – Daily Traffic Volumes and Level of Service



Findings and Conclusions

There are significant variations in daily traffic volumes throughout the Town of Carrboro. Daily volumes range from less than 2,000 to over 30,000. Daily volume ranges along major facilities include the following:

2005 Daily Volume Ranges

NC 54 Bypass – 16,000 to 31,000
Main Street – 4,800 to 19,000
Jones Ferry Road – 9,300 to 12,000
Smith Level Road/Greensboro Street – 6,400 to 17,000
Old NC 86/Old Fayetteville Road – 3,600 to 10,000

2003 Daily Volume Ranges

- NC 54 Bypass – 14,000 to 33,000
- Main Street – 4,800 to 21,000
- Jones Ferry Road –10,000 to 13,000
- Smith Level/Greensboro – 7,000 to 19,000
- Old NC 86/Fayetteville – 4,200 to 10,000

For the most part, traffic volumes throughout the Town are slightly lower or about the same in 2005 than in 2003 along these major corridors. As can be seen in the figures and tables, most of the principal arterials in the Town operate in an uncongested state of LOS C or better. The downtown area, however, has worse daily levels of service, as do two other areas on the east side of town (Estes Drive and NC 54 Bypass). Two locations in the Town of Carrboro, both on the Smith Level Road/Greensboro Street corridor, have LOS F. Estes Drive, NC 54 Bypass between Jones Ferry Road and Smith Level Road/Greensboro Street, and Main Street between Jones Ferry Road and Greensboro Street all experienced a moderately congested state of LOS D. All other daily roadway count locations in Carrboro operated in an uncongested state of LOS C or better. Two lengths of Greensboro Street (between NC 54 Bypass and Pittsboro Road and between Weaver Street and Estes Drive) improved from moderate congestion to uncongested. No segment declined in level of service between 2003 and 2005.

By looking at the 2003 and 2005 data in a slightly different way, it can be seen whether small changes in daily level of service on a roadway segment cause it to "jump categories" in the broader categories of congested, moderate congestion, and uncongested. Figure 1.3 shows a matrix that represents the number of segments that fall into the particular categories. The green areas in the matrix represent segments that are either uncongested or are improving in regards to congestion. Red areas in the matrix represent segments that are becoming significantly more congested and yellow areas represent segments that still have some congestion issues and are neither improving nor declining.

Figure 1.4 – Roadway Segments with Major Changes in Daily Congestion

		2005		
		Uncongested	Moderate Congestion	Congested
2003	Uncongested	21	0	0
	Moderate Congestion	3	4	0
	Congested	0	0	2

Of the 30 segments with both 2003 and 2005 data available, 27 segments remained in the same category of congestion, with the remaining 3 segments improving in overall congestion. Twenty-one of the 27 segments not changing in major congestion levels remained in an uncongested state.

These roadway average daily volume-to-capacity ratios provide general planning level guidelines on a relatively large scale and are only one way to view roadway level of service. To fully understand the operational characteristics of a single roadway, one must also consider intersection level of service. Intersection level of service involves a detailed analysis of one or more intersections using simulation software. This method and its results are presented in the following section.

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Chapter 2 - Vehicle Peak Hour Intersection Operations

MEASUREMENT: Peak Hour Intersection Level of Service (LOS)
DATA: Turn Movement Counts, Signal Timing Plans

Why and How

Whereas daily traffic volumes are often a common measurement used to compare one roadway with another, actual traffic engineering performance of the roadway system is based on how the intersections operate. This process is referred to as intersection level of service. As presented in the previous section, level of service is a universal measurement of operational performance by an intersection or corridor, utilizing a simple grading scale from "A" to "F."

Critical to the evaluation of peak hour intersection level of service is the collection of AM and PM peak hour intersection turn movement counts. These counts are manually recorded for the left turn movement, the through movement, and the right turn movements for each intersection approach direction. In addition, these counts are recorded in 15-minute increments over a 2-hour AM peak period and a 2 to 3-hour PM peak period from which the respective peak hour is derived as the maximum of four consecutive 15-minute counts.

Results

Morning, noon, and evening peak hour turn movements counts (TMCs) were collected for 25 intersections throughout Carrboro which are presented graphically in Figure 2.1. As part of this assessment process, a Synchro Database was developed for the Towns of Carrboro and Chapel Hill together. Synchro is software that is dedicated to evaluate the ebb and flow of traffic throughout a signal system and calculate average intersection delay and corresponding level of service. This database development required input of all signal timing plans by period of the day and required the actual geographic distribution of signalized intersections to calculate the relationships between speed, distance, and progression. These count data, coupled with the timing of the signal phases at the intersection, determine the level of service for each signalized intersection.

The results of this analysis are presented in Table 2.1 and in Figures 2.2, 2.3 and 2.4 for the AM, noon, and PM peak hours, respectively. For comparison purposes, both the 2003 and 2005 data is included in the table and figures. In the table, intersections where the level of service improves from 2003 to 2005 have the 2005 LOS shown in green. The 2005 LOS is shown in red for intersections with a degraded LOS between 2003 and 2005. The outer symbol shows the 2003 level of congestion (uncongested, moderate congestion, or congested). The inner symbol shows the 2005 level of congestion. Circles are used to indicate an uncongested condition (LOS A, B or C), squares are used to indicate a moderate level of congestion (LOS D), and triangles indicate a congested intersection (LOS E or F). Intersections that changed level of congestion are shown with a minus sign (-) next to them if they declined or a positive sign (+) if they improved.

Figure 2.1 – Auto Turning Movement Count Locations

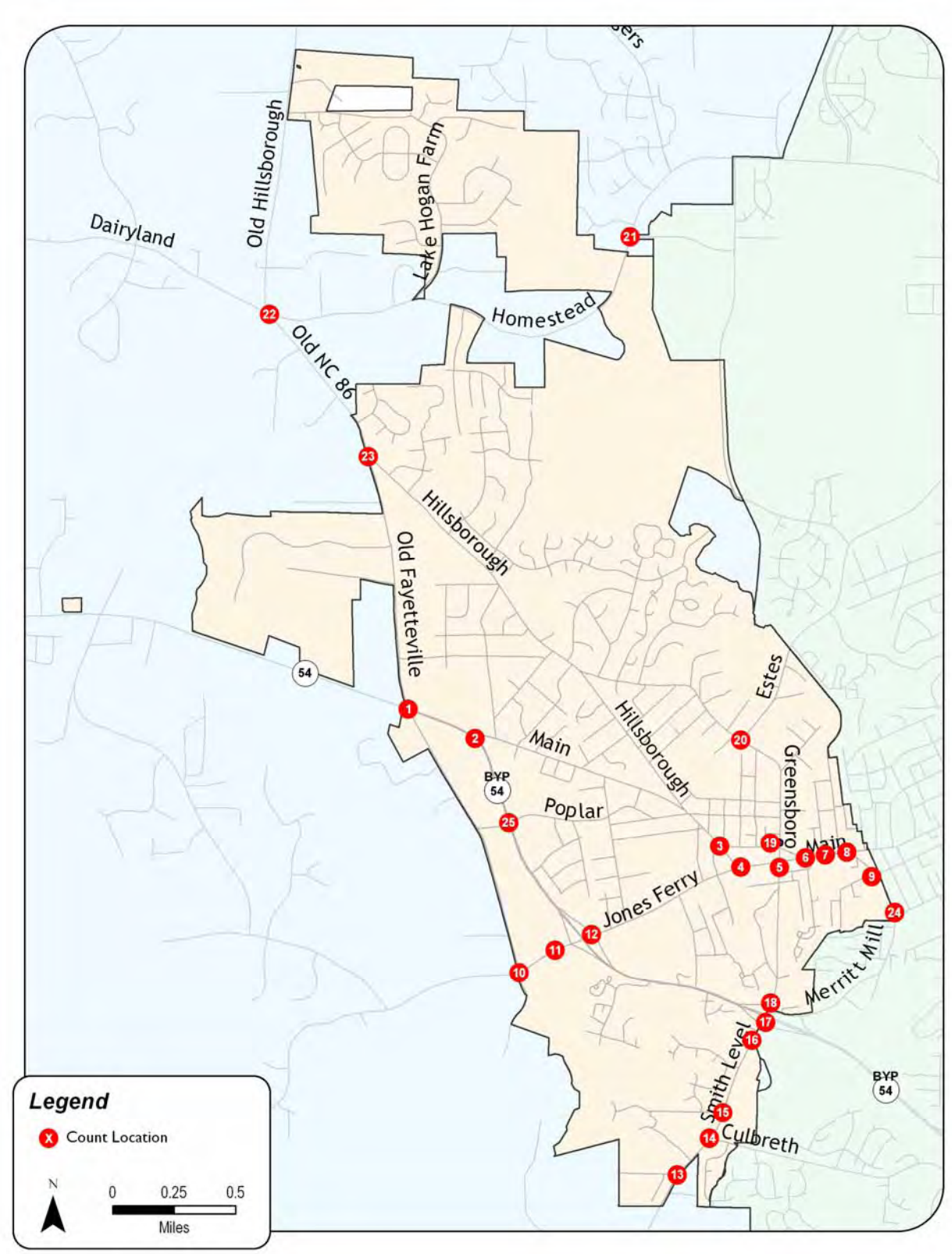


Table 2.1 – Intersection Level of Service 2003 – 2005

			AM Peak		Mid-Day		PM Peak	
		Intersection	2003	2005	2003	2005	2003	2005
Main St	1	NC 54/Old Fayetteville Rd	B	A	A	A	B	B
	2	Main St/NC 54 Bypass	B	A	B	A	B	A
	3	Main St/Weaver St	A	A	A	B	A	C
	4	Main St/Jones Ferry Rd	B	B	A	B	B	B
	5	Main St/Greensboro St	B	B	B	B	C	B
	6	Main St/Weaver St/Roberson St	A	C	A	D	A	D
	7	Main St/Lloyd St	A	A	A	A	A	A
	8	Main St/Rosemary St	B	A	B	A	B	A
	9	Franklin St/Merritt Mill Rd/Brewer Lane	A	C	A	A	A	F
Jones Ferry Rd	10	Jones Ferry Rd/Old Fayetteville Rd	B	A	A	A	A	A
	11	Jones Ferry Rd/Willow Creek Shopping Center	A	A	A	A	A	A
	12	Jones Ferry Rd/NC 54 (east side)	A	A	A	A	B	A
Smith Level Rd/ Greensboro St	13	Smith Level Rd/Rock Haven Rd	-	A	-	A	-	A
	14	Smith Level Rd/Culbreth Rd	D	F	A	D	B	D
	15	Smith Level Rd/BPW Club Rd	B	A	A	A	C	B
	16	Smith Level Rd/Public Works	B	A	A	A	A	A
	17	Smith Level Rd/NC 54 Ramps C/D	C	A	B	A	C	B
	16	Greensboro St/Merritt Mill Rd	A	A	B	A	C	A
	5	Greensboro St/Main St	B	B	B	B	C	B
	19	Greensboro St/Weaver St	C	B	C	B	C	D
	20	Greensboro St/Estes Dr	B	A	B	B	E	B
Home-Stead Rd	21	Homestead Rd/High School Rd	-	D	-	D	-	E
	22	Homestead Rd/Old NC 86	-	C	-	A	-	B
Others	23	Hillsborough Rd/Old Fayetteville Rd/Old NC 86	C	B	A	A	B	B
	24	Merritt Mill Rd/Cameron Ave	-	A	-	A	-	B
	25	Poplar Ave/NC 54	-	A	-	A	-	A

Figure 2.2 – AM Peak Hour Intersection Level of Service 2003 – 2005

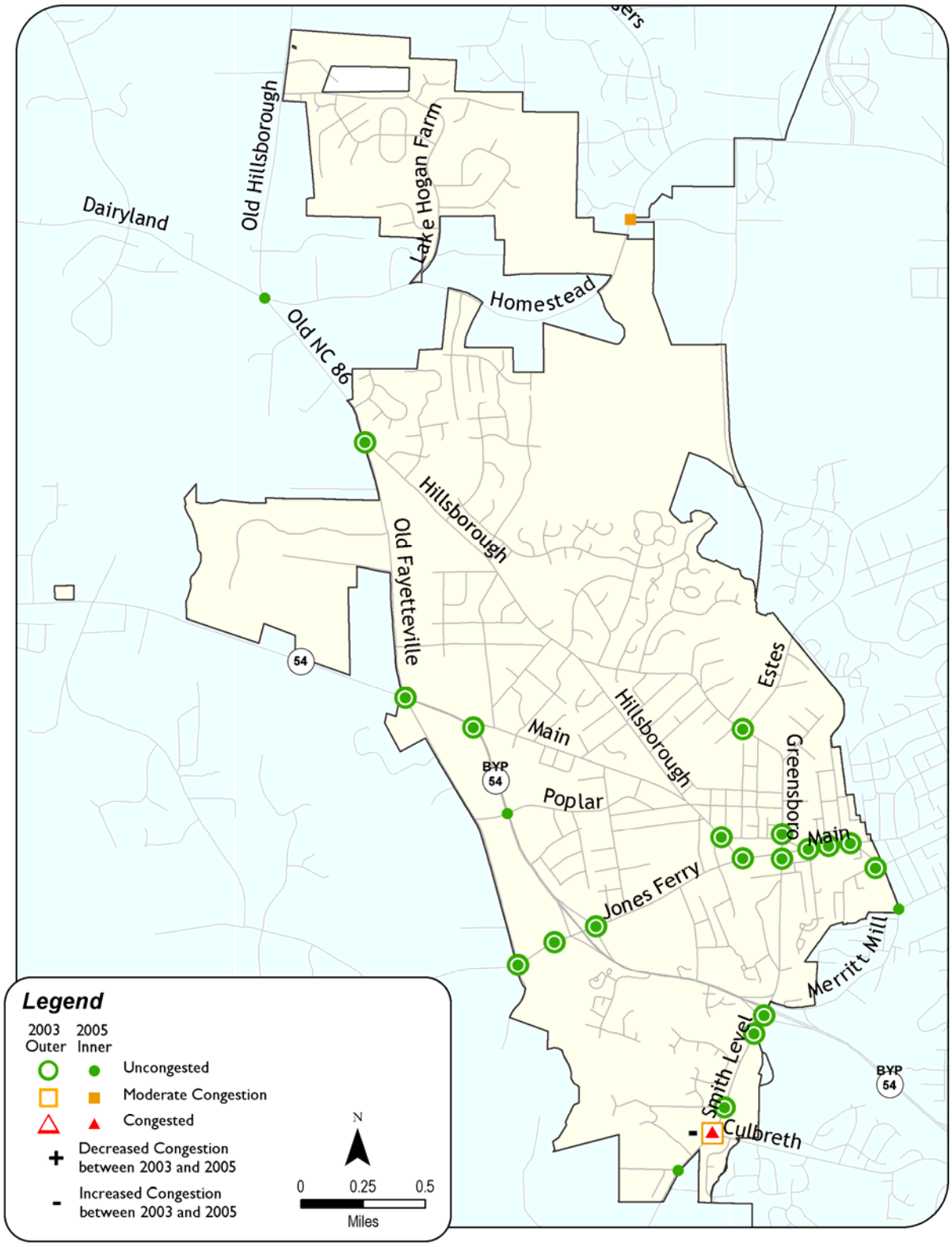


Figure 2.3 – Mid-Day Peak Hour Intersection Level of Service 2003 – 2005

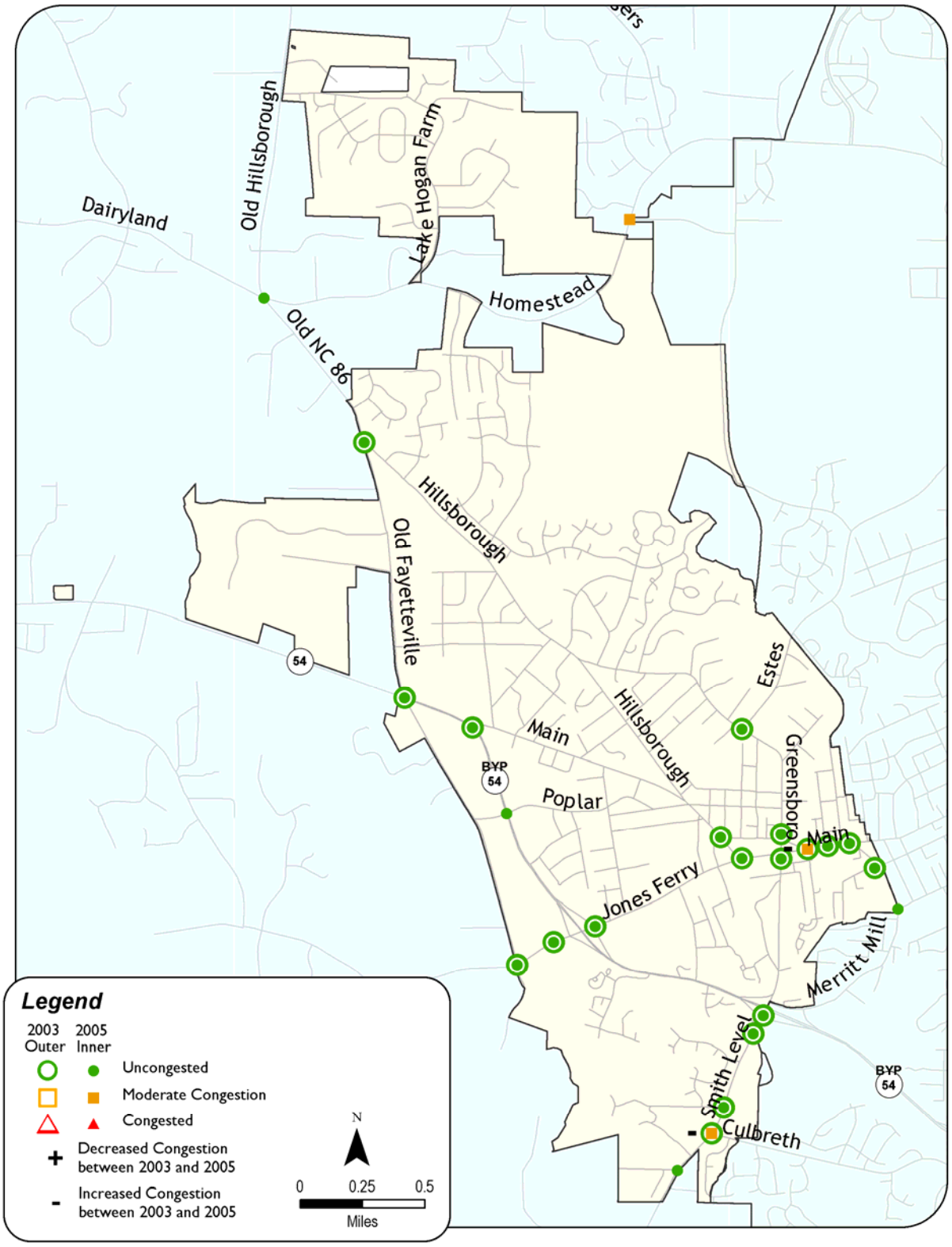
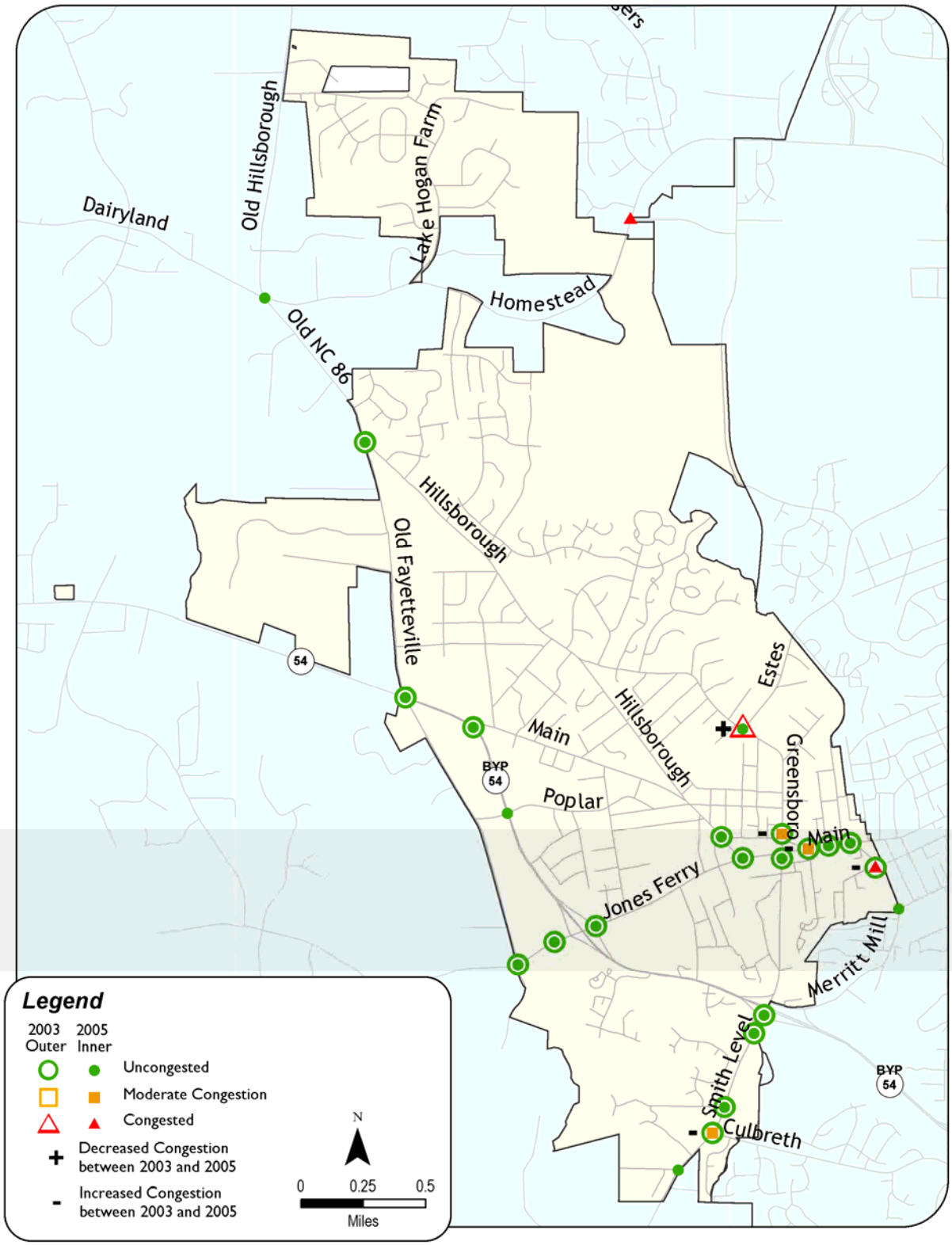


Figure 2.4 – PM Peak Hour Intersection Level of Service 2003 – 2005



Findings and Conclusions

Most of the intersections in the Town of Carrboro operate in an uncongested condition during all time periods. However, several intersections for several time periods declined in level of service.

Only one intersection in the morning peak-hour (Smith Level Road at Culbreth Road) operated in a congested state. No intersections in the mid-day peak operated in a congested state, but several were in the moderately congested category. The afternoon peak hour experienced the worst levels of congestion with two intersections in the congested category and three in the moderately congested category. Only Smith Level Road at Culbreth Road and Homestead Road at High School Road operated in a moderately congested or congested state for all three time periods.

Compared to the 2003 data, most of the intersections are not changing significantly in level of congestion. Figures 2.5, 2.6 and 2.7 depict major changes in intersection congestion for the morning peak hour, mid-day peak hour, and afternoon peak hour, respectively. These figures utilize the traffic signal color coding to indicate intersections that are uncongested or improving (green), intersections that are not changing and have at least moderate congestion (yellow) and intersections that are getting worse (red).

FIGURE 2.5 – INTERSECTIONS WITH MAJOR CHANGES IN AM PEAK CONGESTION

AM		2005		
		Uncongested	Moderate Congestion	Congested
2003	Uncongested	20	0	0
	Moderate Congestion	0	0	1
	Congested	0	0	0

FIGURE 2.6 – INTERSECTIONS WITH MAJOR CHANGES IN MID-DAY PEAK CONGESTION

Mid-Day		2005		
		Uncongested	Moderate Congestion	Congested
2003	Uncongested	19	2	0
	Moderate Congestion	0	0	0
	Congested	0	0	0

Figure 2.7 – Intersections with Major Changes in PM Peak Congestion

PM		2005		
		Uncongested	Moderate Congestion	Congested
2003	Uncongested	16	3	1
	Moderate Congestion	0	0	0
	Congested	1	0	0

In the morning peak hour, of the 21 intersections with both 2003 and 2005 data, 20 stayed at the same level of congestion and one became more congested, moving from uncongested to moderately congested. The mid-day peak hour results show that 19 intersections remained unchanged and two intersections became worse, moving from an uncongested state to moderately congested. Sixteen intersections in the afternoon peak hour stayed at the same level of congestion. One intersection improved and four intersections became worse.

While several intersections appear to get worse for multiple time periods from 2003 to 2005, these differences are likely due to anomalies in the 2003 counts. Both the Franklin Street/Merritt Mil Road/Brewer Lane and Smith Level Road/Culbreth Road intersections showed a more congested state in 2005 than in 2003, however, the 2005 count data and resulting LOS appears to be more in line with the other studies and current conditions. A level of service analysis done in 2003/2004 confirms the 2005 LOS at Franklin Street/Merritt Mill Road/Brewer Lane. The 2005 counts and LOS at Smith Level Road appear to reflect current levels of congestion more reasonably than those in 2003.

Chapter 3 - Vehicular Travel Time

MEASUREMENT: In-Flow Vehicle Travel Time

DATA: Travel Time Surveys on Major Travel Corridors

Why and How

Travel time analysis describes the amount of time it takes to get from one point to the next. Travel time is a measurement that is easy to understand by the typical citizen and is an effective way to assess the overall travel along a corridor. Traffic volumes, traffic control devices, signal timing, and delay are all elements that affect actual travel time. Vehicular travel time is measured by driving a particular route with the regular flow of traffic and timing the duration of the trip.

Results

Travel times were collected for fifteen major travel corridors throughout the Carrboro and Chapel Hill area. The five corridors which are completely or almost completely within Carrboro are Hillsborough Road, Jones Ferry Road, Main Street, Old NC 86/Old Fayetteville Road, and Smith Level Road/Greensboro Street. Large portions of the NC 54 Bypass and Homestead Road are within Carrboro, and a small part of the Estes Drive Corridor is within the Town. The Town is also served by the Eubanks Road corridor between Old NC 86 and Martin Luther King Boulevard.

These routes were driven during the morning, mid-day, and afternoon peak hours. Each route had multiple segments and was driven in each direction to capture inbound and outbound differences in the peak conditions. The corridors in which travel times were collected and the average travel speed by direction for the morning and afternoon peak time periods are presented in Tables 3.1 and 3.2. It should be noted that these travel speeds include delays associated with the signals along the corridor.

Figures 3.1 and 3.2 summarize the travel time for direction and time period for each roadway corridor segment. Time is shown as minutes:seconds (e.g., 4:20 is 4 minutes and 20 seconds). Figure 3.1 shows this information for the Town of Carrboro and Figure 3.2 shows the segments in the Town of Chapel Hill.

Figures 3.3, 3.4 and 3.5 show two pieces of information for each time period in which travel time was measured and for each direction. The width of the line indicates the relative average speed of the corridors as measured in 2003 and the color of the line shows the comparison of the corridor speed with the corridor speed limit. The average speed calculated includes time spent at signals, so the travel speed will be higher than the average speed. Red corridors indicate that the average corridor segment speed is more than 5 mph below that segment's speed limit. Segments with average speeds within 5 mph of the speed limit are shown in green, and segments with average speeds over 5 mph over the speed limit are shown in yellow. Areas both under and over the speed limit can be areas of concern. Where the travel speed is much lower than the speed limit, congestion is likely to be occurring and/or vehicles are getting unnecessarily delayed. Travel speed much higher than the speed limit creates unsafe conditions and can be dangerous for

drivers as well as for pedestrians and bicyclists. For a more complete picture of the region's conditions, travel time for the Town of Carrboro is also included on these maps.

Figures 3.6, 3.7 and 3.8 show the relative change in average travel time from 2003. The line widths are again used to show relative differences in 2005 average corridor segment speed. In these figures, however, the color is used to show the comparison with the average speed of the corridor segment in 2003. Red segments indicate that the 2005 average speed is more than 5 mph slower than the 2003 average speed. Yellow indicates that the 2005 average speed is within 5 mph of the 2003 average speed. Green indicates that the 2005 average speed is more than 5 mph over the 2003 average speed.

Table 3.1 – AM Corridor Travel Speeds 2003 – 2005

Corridor	From	To	Length (miles)	Speed Limit (mph)	Inbound		Outbound	
					2003	2005	2003	2005
Estes Dr	Greensboro St	MLK Blvd	1.71	35	37.3	41.0	29.6	25.0
Eubanks Rd	MLK Blvd	Old NC 86	2.63	45	41.9	40.7	42.1	34.7
Hillsborough Rd	Old NC 86	Main St	1.94	35	33.9	37.8	33.1	31.1
Homestead Rd	MLK Blvd	Old NC 86	3.33	40 - 45	35.1	34.8	40.5	34.7
Jones Ferry Rd	Old Fayetteville Rd	Main St	1.01	35	33.5	26.4	30.4	31.7
Main St	NC 54	Merritt Mill Rd	1.83	20 - 35	17.7	18.1	17.7	14.9
NC 54 Bypass	Old Fayetteville Rd	Smith Level Rd	2.06	45	38.4	34.6	41.6	34.6
Old NC 86/Old Fayetteville Rd	Homestead Rd	Jones Ferry Rd	2.93	35 - 45	32.9	25.1	33.6	17.3
Smith Level Rd/Greensboro St	US 15/501	Hillsborough Rd	4.98	20 - 45	27.9	29.2	33.2	26.3

Table 3.2 – PM Corridor Travel Speeds 2003 – 2005

Corridor	From	To	Length (miles)	Speed Limit (mph)	Inbound		Outbound	
					2003	2005	2003	2005
Estes Dr	Greensboro St	MLK Blvd	1.71	35	34.2	36.2	30.3	25.5
Eubanks Rd	MLK Blvd	Old NC 86	2.63	45	42.5	38.1	40.7	41.7
Hillsborough Rd	Old NC 86	Main St	1.94	35	36.2	38.0	32.5	36.6
Homestead Rd	MLK Blvd	Old NC 86	3.33	40 - 45	38.1	36.0	36.2	57.7
Jones Ferry Rd	Old Fayetteville Rd	Main St	1.01	35	29.9	25.8	31.7	26.4
Main St	NC 54	Merritt Mill Rd	1.83	20 - 35	18.7	16.8	20.2	13.8
NC 54 Bypass	Old Fayetteville Rd	Smith Level Rd	2.06	45	33.8	44.9	43.3	34.5
Old NC 86/Old Fayetteville Rd	Homestead Rd	Jones Ferry Rd	2.93	35 - 45	35.4	32.5	33.9	17.0
Smith Level Rd/Greensboro St	US 15/501	Hillsborough Rd	4.98	20 - 45	28.1	26.9	26.5	25.7

FIGURE 3.1 – CARRBORO AUTO TRAVEL TIME 2005

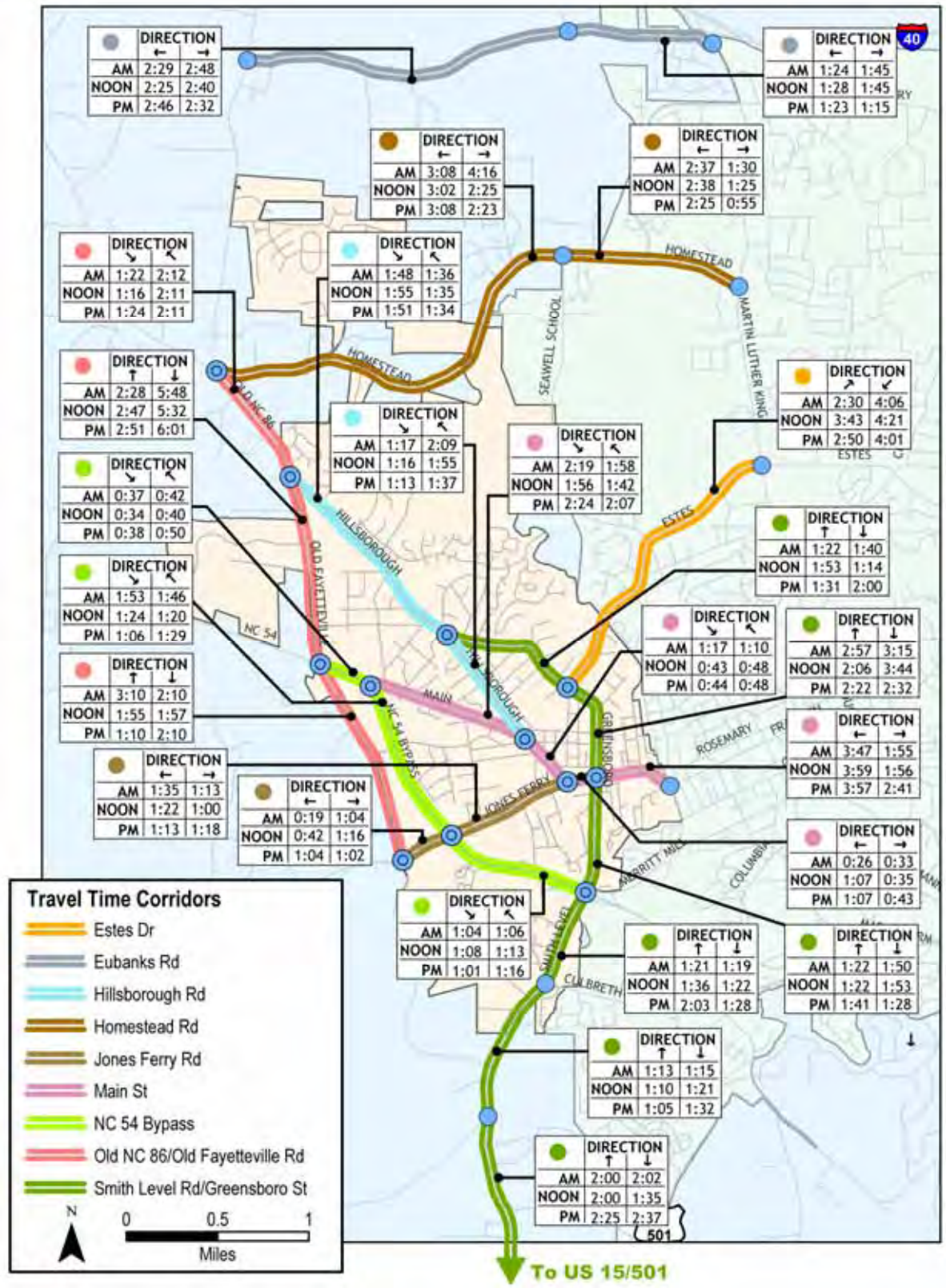


Figure 3.2 – Chapel Hill Auto Travel Time 2005

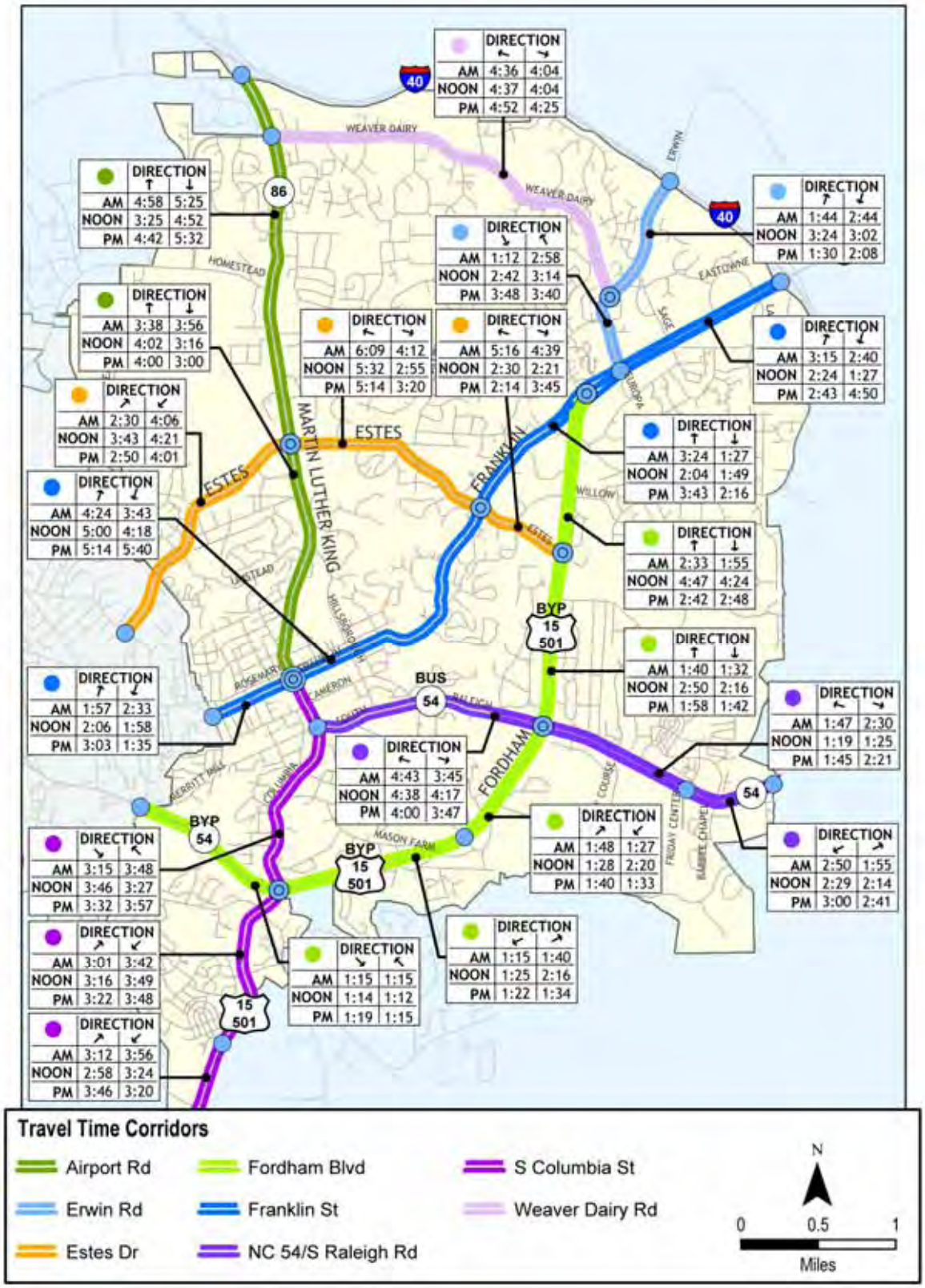


FIGURE 3.3 – AVERAGE AM SPEED COMPARED WITH SPEED LIMIT 2005

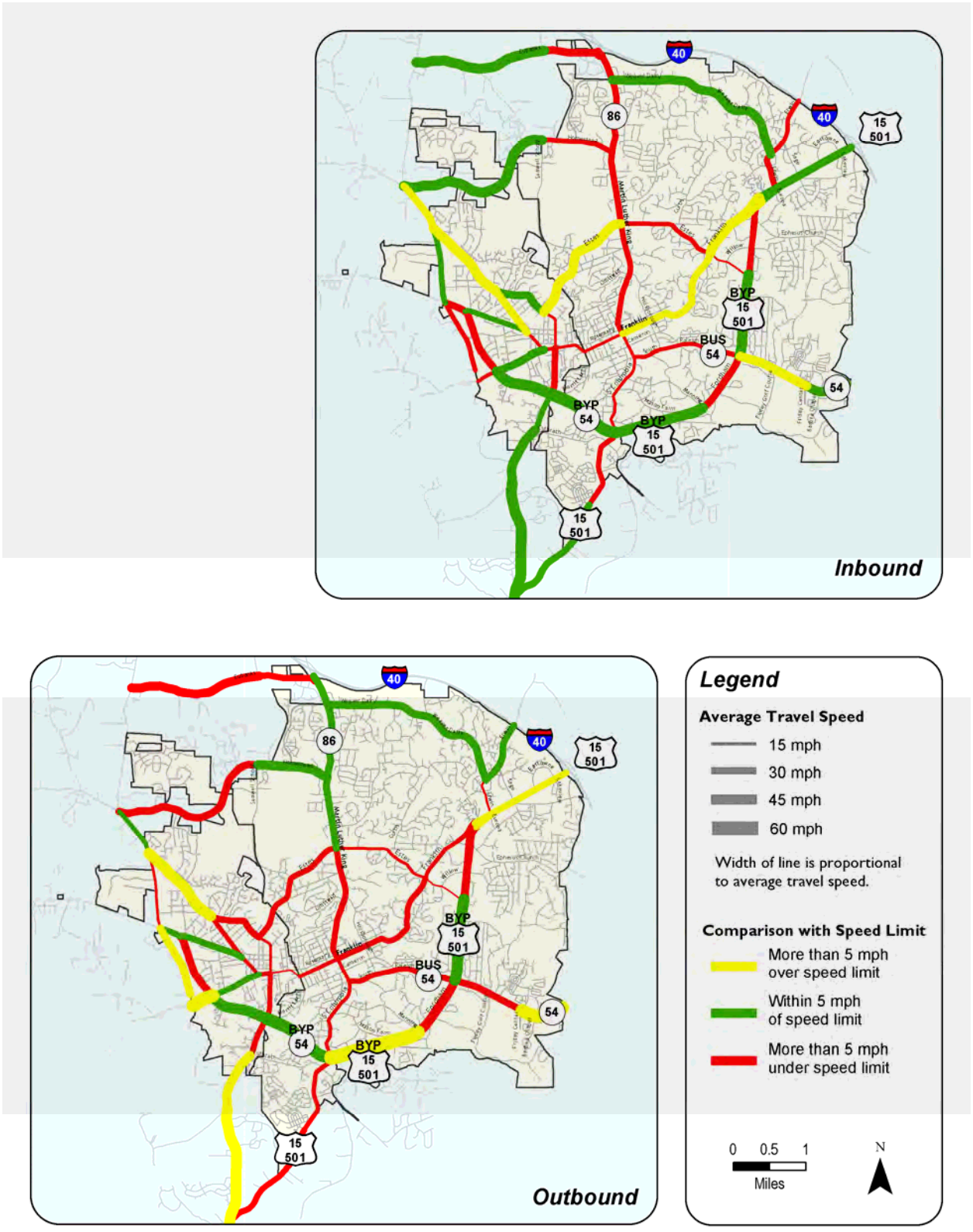


Figure 3.4 – Average Mid-Day Speed Compared with Speed Limit 2005

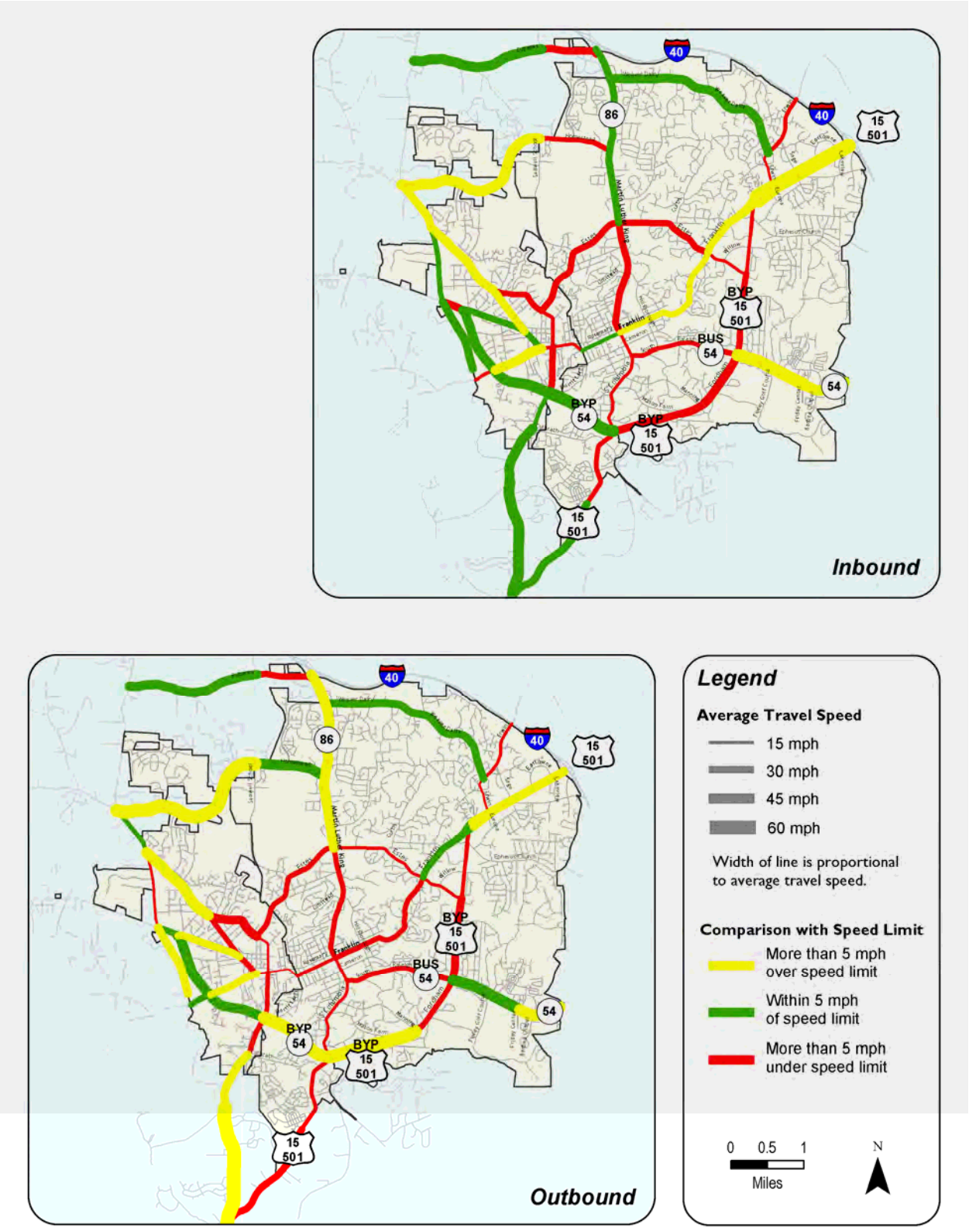


FIGURE 3.5 – AVERAGE PM SPEED COMPARED WITH SPEED LIMIT 2005

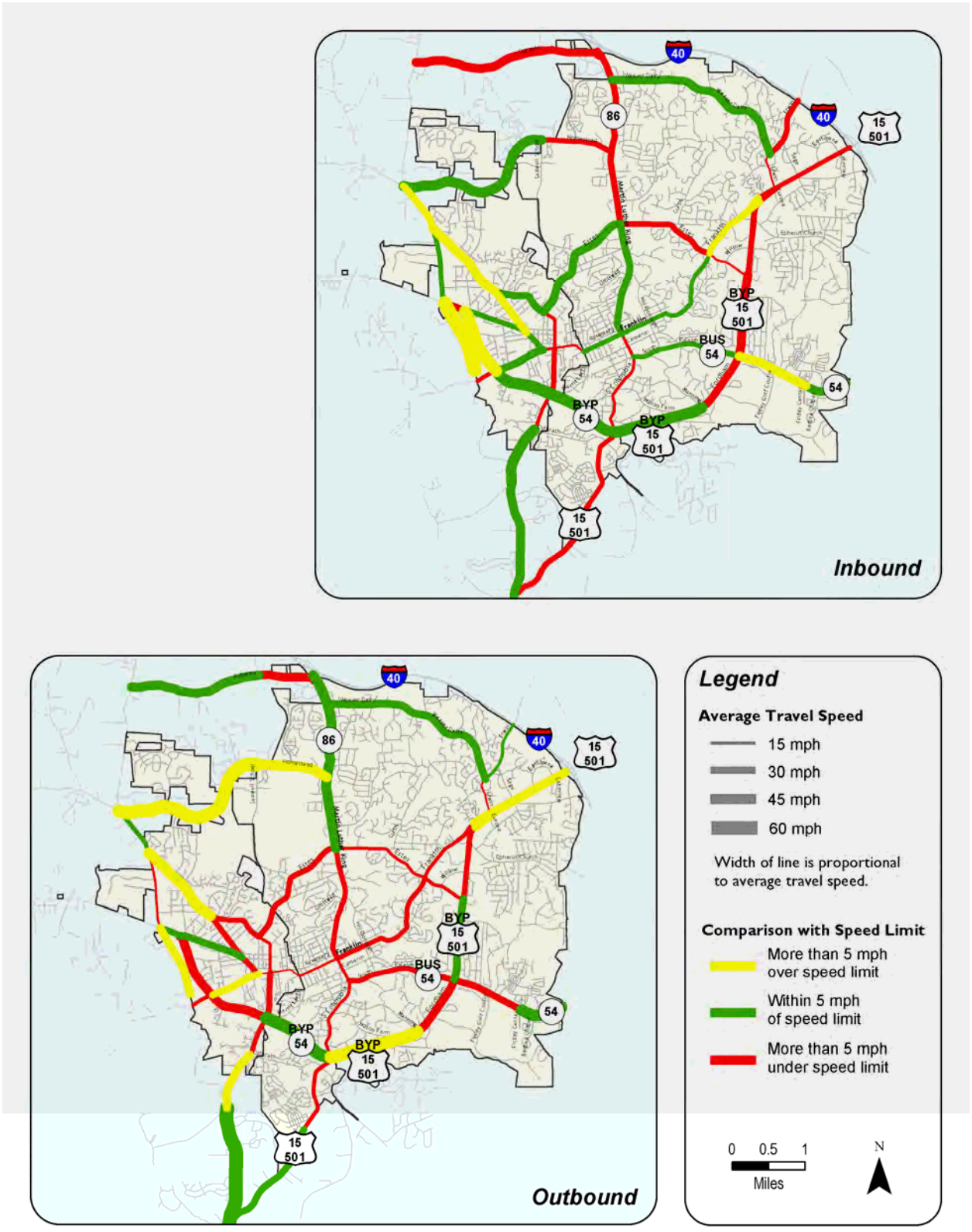


Figure 3.6 – 2005 Average AM Speed Compared with 2003

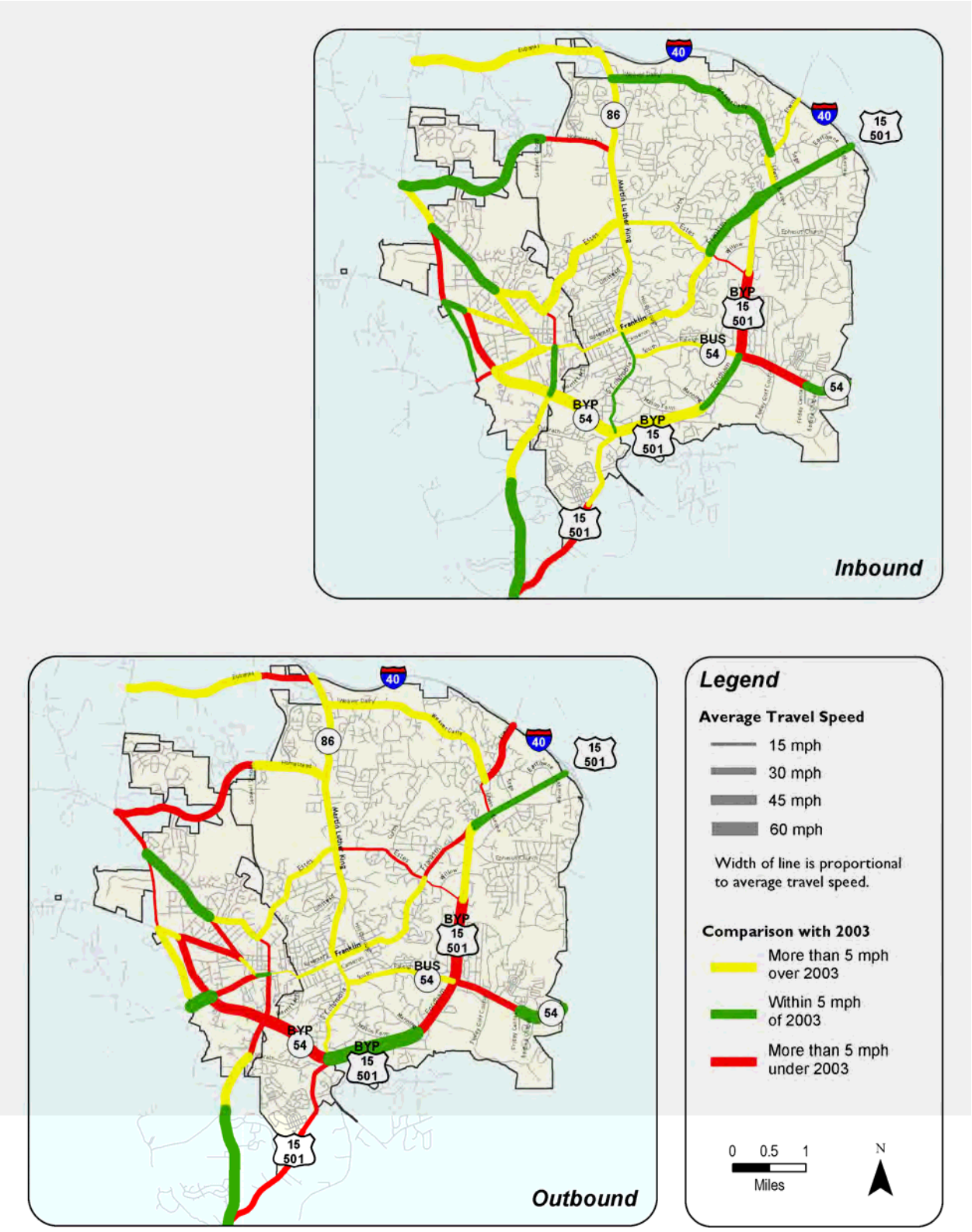


FIGURE 3.7 – 2005 AVERAGE MID-DAY SPEED COMPARED WITH 2003

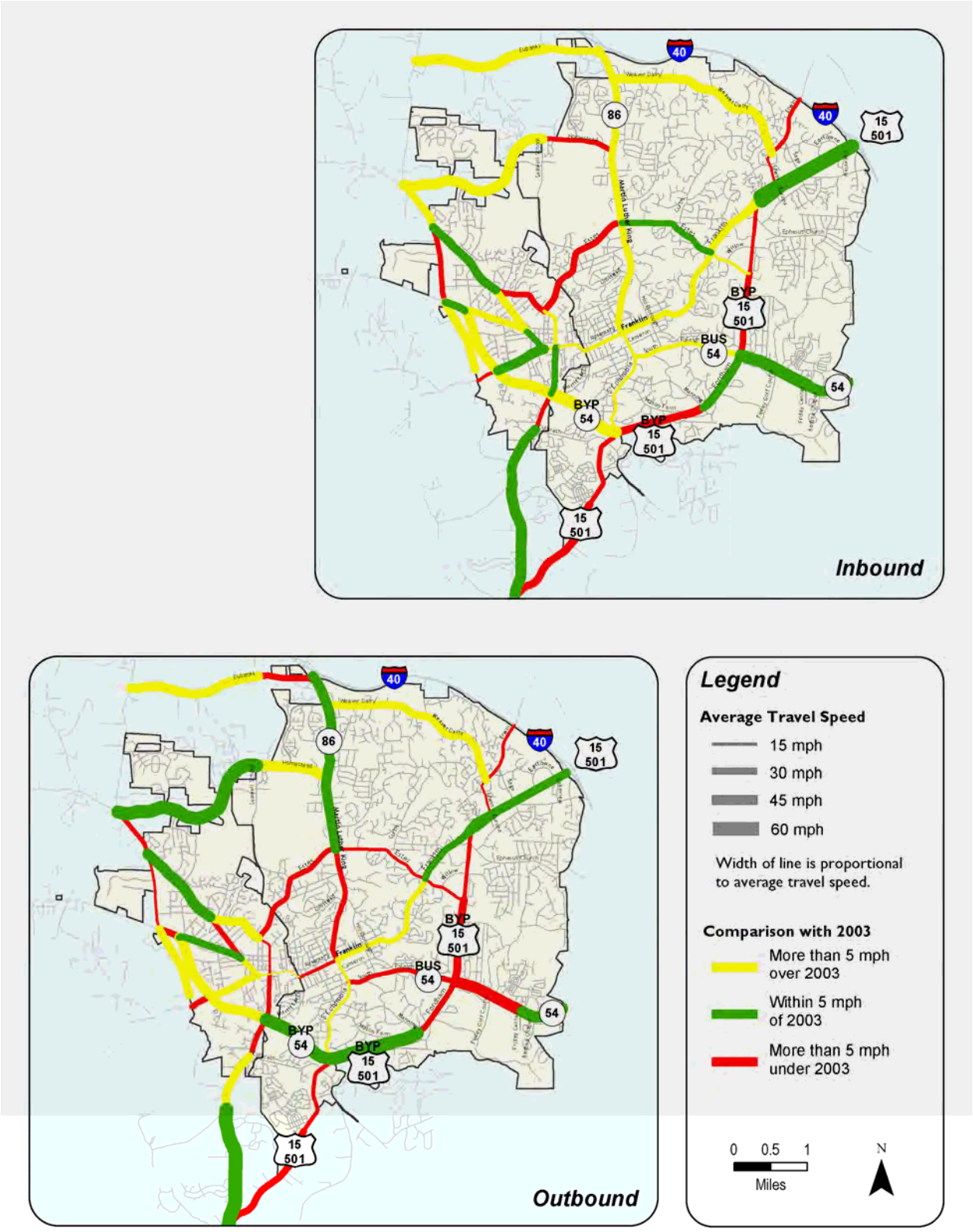
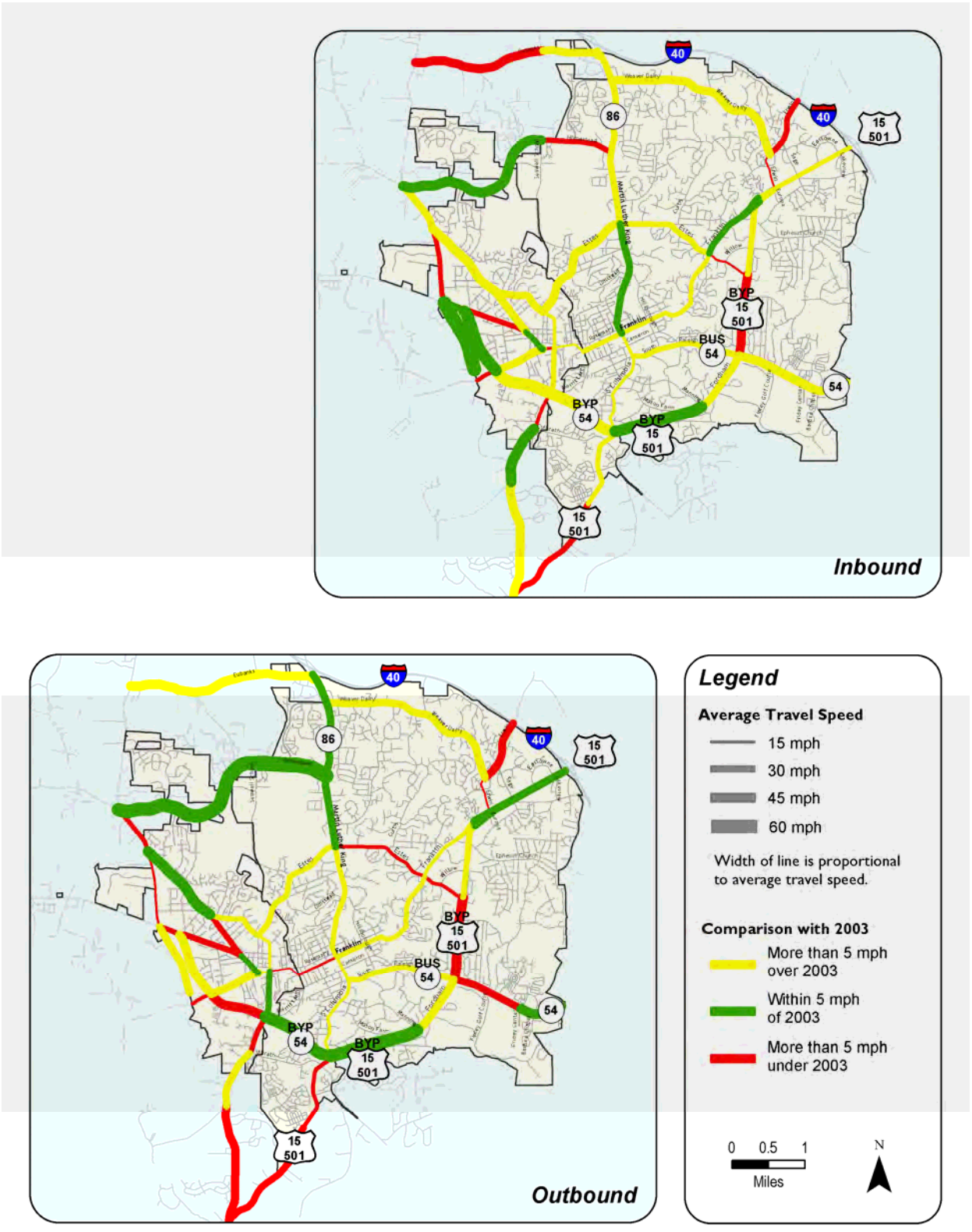


Figure 3.8 – 2005 Average PM Speed Compared with 2003



Findings and Conclusions

The morning peak average speed of the 25 Carrboro roadway segments was 30 mph in the inbound direction and 26 mph in the outbound direction. Average speed along the corridors ranged from 12 mph to 49 mph in the inbound direction and from 7 mph to 58 mph in the outbound direction.

The mid-day peak inbound average speed was 31 mph and the outbound average speed was 27 mph. Average speeds ranged from 14 mph to 49 mph inbound, and from 7 mph to 61 mph outbound.

The afternoon peak had an average speed of 31 mph in the inbound direction and 27 mph in the outbound direction. Average speeds ranged from 10 mph to 60 mph inbound and from 7 mph to 59 mph outbound.

Looking at the sum of travel time in both directions for all segments shows close numbers for both morning and afternoon. The total travel time of all segments in the morning is 1 hour and 37 minutes and in the afternoon the total is 1 hour and 34 minutes. The mid-day period is also very similar, with a total time of 1 hour and 33 minutes.

Overall travel time has increased since 2003 in the surveyed corridors. The total travel time of both directions increased from 1 hour and 26 minutes to 1 hour and 37 minutes in the morning peak hour from 2003 to 2005. Similarly, the total time in the afternoon peak hour increased from 1 hour and 25 minutes in 2003 to 1 hour and 34 minutes in 2005. Average speeds for all corridors surveyed in the Town in 2003 have also decreased. The inbound direction saw a modest average speed increase in the morning, from 30 mph to 28 mph, and a similar decrease in the afternoon from 32 mph to 29 mph. The average speed in the outbound direction fell dramatically in the morning: dropping from 33 mph to 26 mph. The afternoon outbound average speed also decreased, though not as much, dropping from 31 mph in 2003 to 27 mph in 2005.

The Homestead Road corridor experienced average travel speeds almost 15 mph above the speed limit. This is particularly concerning due to the safety implications and the fact that if such high speeds are typical, they will discourage pedestrians and bicyclists from using the road.

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Chapter 4 - Pedestrian Facilities

MEASUREMENT: Miles of Sidewalk
DATA: GIS-Based Sidewalk Inventory

Why and How

Sidewalks have a direct effect on both pedestrian and transit mobility. Obviously, sidewalks make it easy for pedestrians to get around, but since almost every transit trip begins and ends with a walk trip, pedestrian facilities are very important for transit mobility.

The inventory of pedestrian facilities is maintained by Town staff and updated as conditions change with new sidewalk construction or other pedestrian facility improvements. This information was collected, summarized, and mapped to understand the extent and distribution of facilities for pedestrians within the Town limits of Carrboro.

Results

Locations of sidewalks within Carrboro for two different time periods are presented in Figure 4.1. The time periods displayed on the map correspond with previous Mobility Report Cards and include: up to 2003 and 2004 to 2005. The differentiation between years is approximate and may occur at a slightly different time in order to correspond with the data used in previous report cards. Figure 4.2 shows pedestrian facilities along transit corridors. This map also includes a ¼ mile buffer around existing transit stops to show a typical transit walking area.

Figure 4.1 – Pedestrian Facilities 2003 - 2005

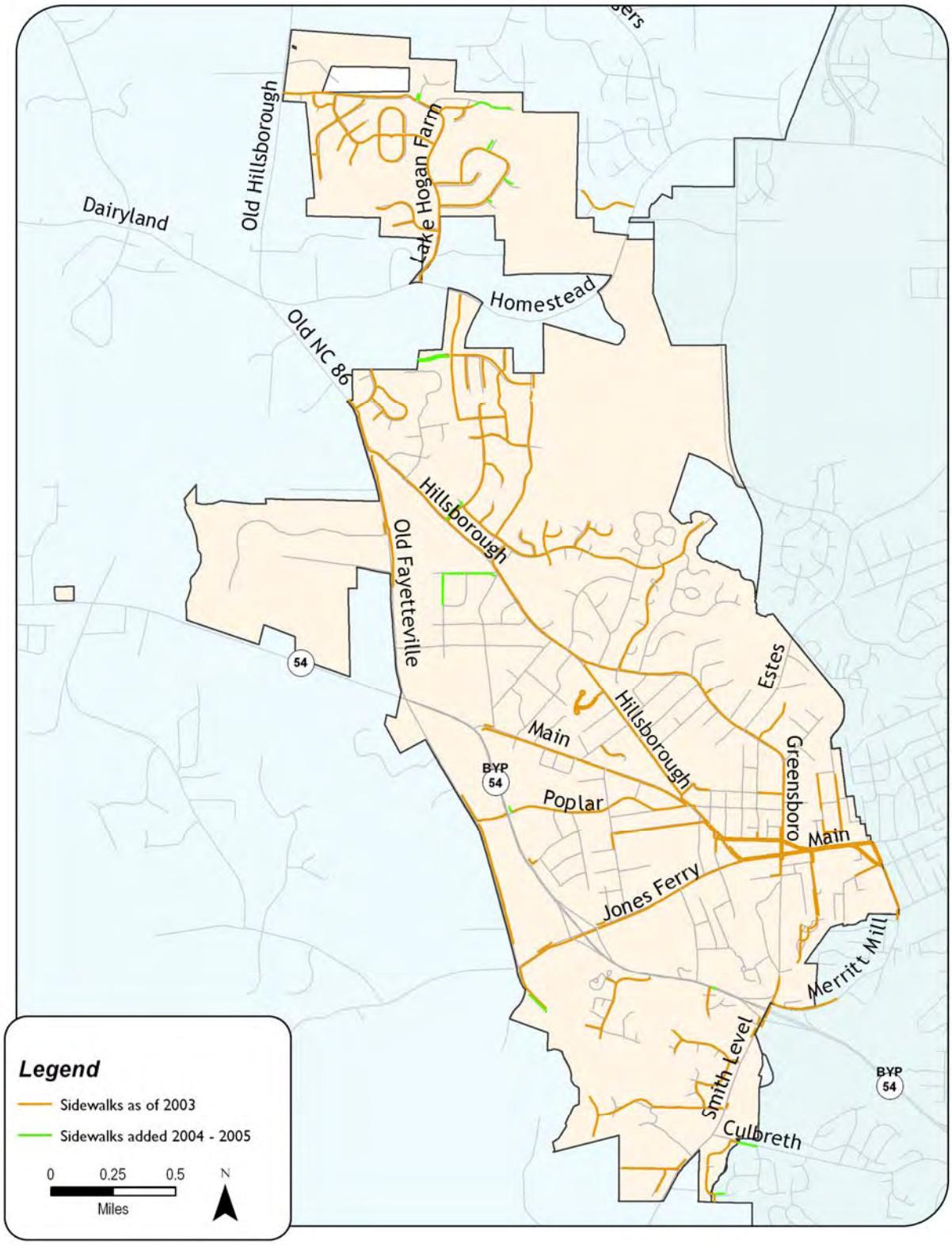
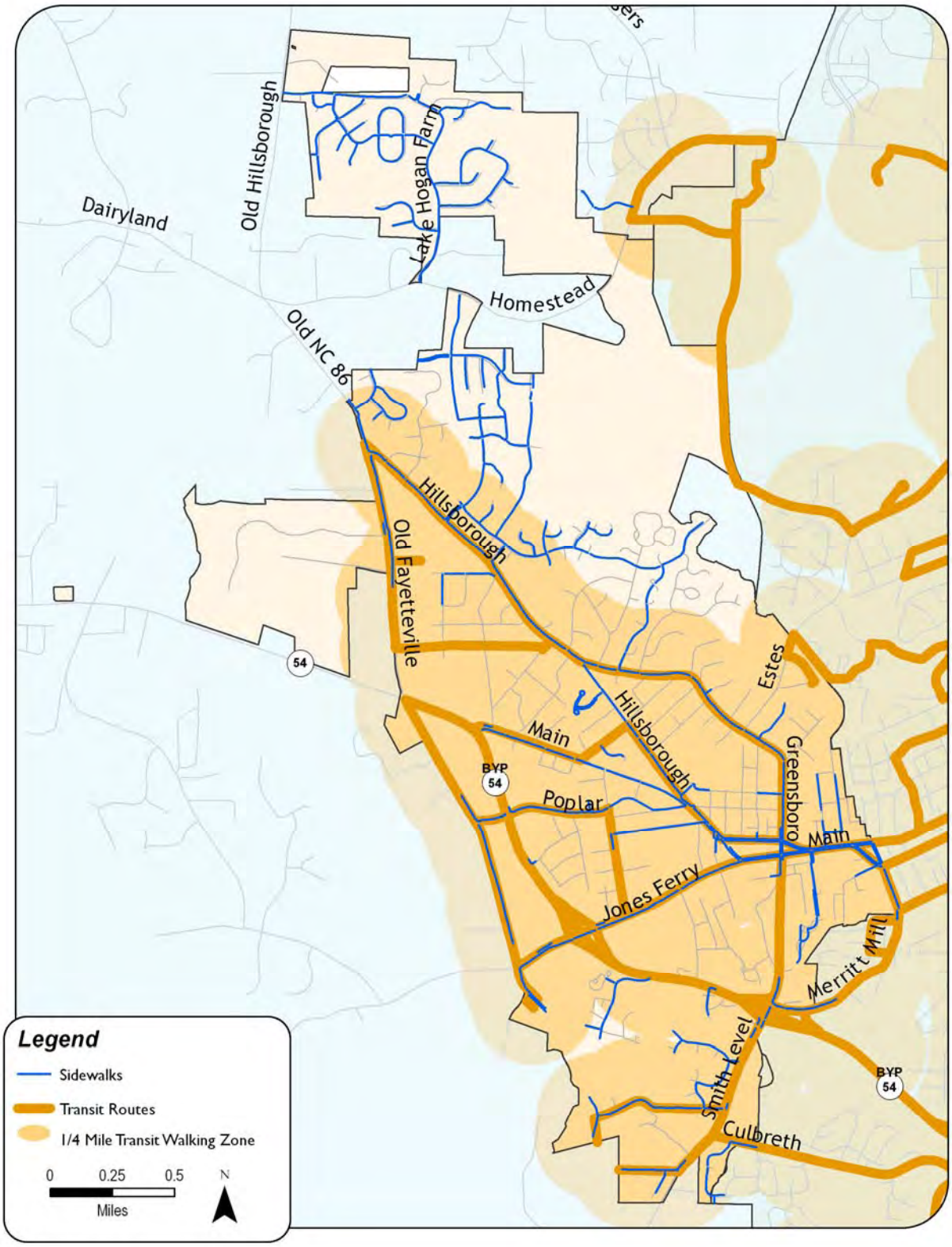


Figure 4.2 – Pedestrian Facilities within ¼ Mile of Transit Service



Findings and Conclusions

Approximately 29 miles of sidewalk exist in the Town. Sidewalk coverage throughout the Town is best in the downtown and the newer outlying areas. Sidewalks in areas between these areas is rather sparse. This is fairly typical in areas across the country as development and transportation priorities have shifted through the last 50 years. For the most part, major streets in the Town's center have sidewalks. Sidewalks are present along Greensboro Street, Hillsborough Road, Jones Ferry Road, Main Street, and Weaver Street in the downtown area. There are also sidewalks along most streets within more recently constructed areas.

Approximately 27 miles of sidewalk existed in the Town in 2003 and 1.3 miles (5%) were added between 2003 and 2005. New sidewalks are scattered throughout town.

FIGURE 4.3 – MILES OF SIDEWALKS

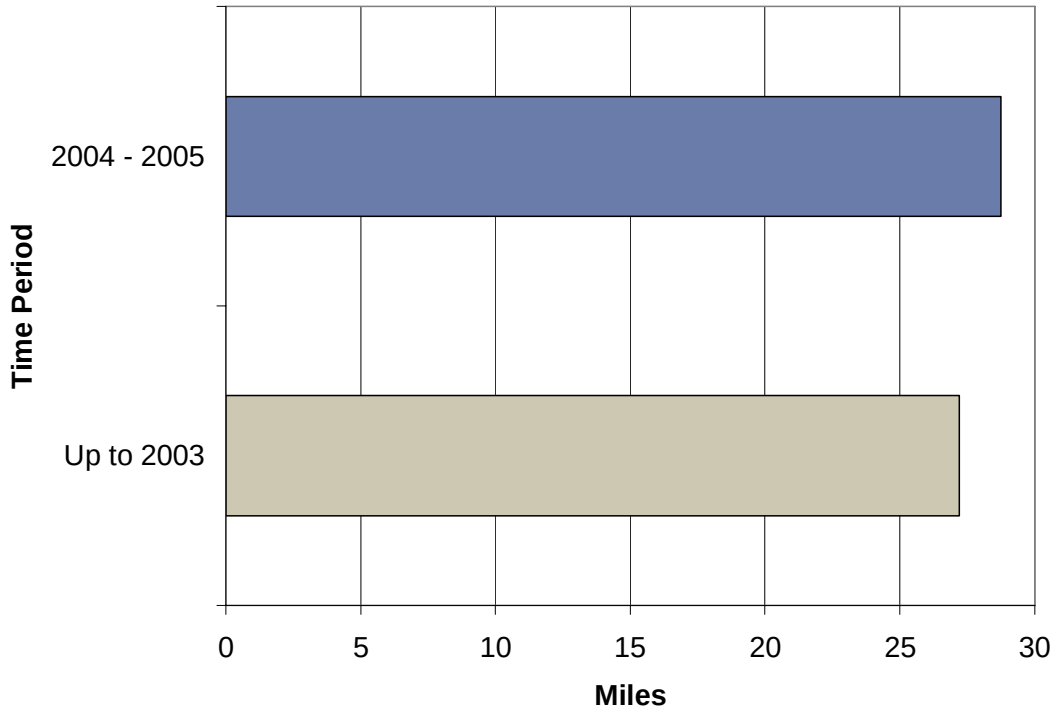


Table 4.1 – Pedestrian Facilities

Time Period	Total Length (miles)	Increase Over Prior Time Period	
		Absolute (miles)	Percent
Up to 2003	27.2		
2004 - 2005	28.5	1.3	4.7%

Pedestrian facilities and transit service go hand in hand. An extensive sidewalk network, especially within close proximity to transit stops, makes access to transit much easier. Sidewalk coverage within transit areas in the Town is improving, but much of the residential areas within typical walking distance from transit stops are not served by sidewalks. Lack of sidewalks within the transit service area can have a negative impact on transit service as well as on transit-dependent residents. Since 2003, the total length of sidewalks within the transit service area has increased at about the same rate as sidewalks overall. Sidewalks within the transit service area have increased by 0.7 miles or about 4%, whereas total sidewalk length throughout the Town has increased by approximately 5%. Table 4.2 shows the sidewalk construction within the transit service area over time. Note that all of these values are based on the transit routes and stops as of October 2005, so some differences will exist when compared to previous Report Cards due to transit system changes over time.

Table 4.2 – New Sidewalk Construction within Transit Service Area

Time Period	Total Length within Transit Service Area (miles)	Cumulative Total within Transit Service Area (miles)	Percent Increase over Prior Time Period
Constructed as of 2003	18.4	18.4	
New Sidewalks 2004 - 2005	0.7	19.1	3.9%

It is important that new sidewalk construction and transit service continue to complement each other. This can be accomplished by focusing sidewalk construction within the transit service area and/or extending transit service to areas with good sidewalk coverage and continuity. This is especially imperative with the continued transit service and ridership increases.

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Chapter 5 - Pedestrian Activity

MEASUREMENT: Pedestrian Counts

DATA: 12-Hour Directional Counts

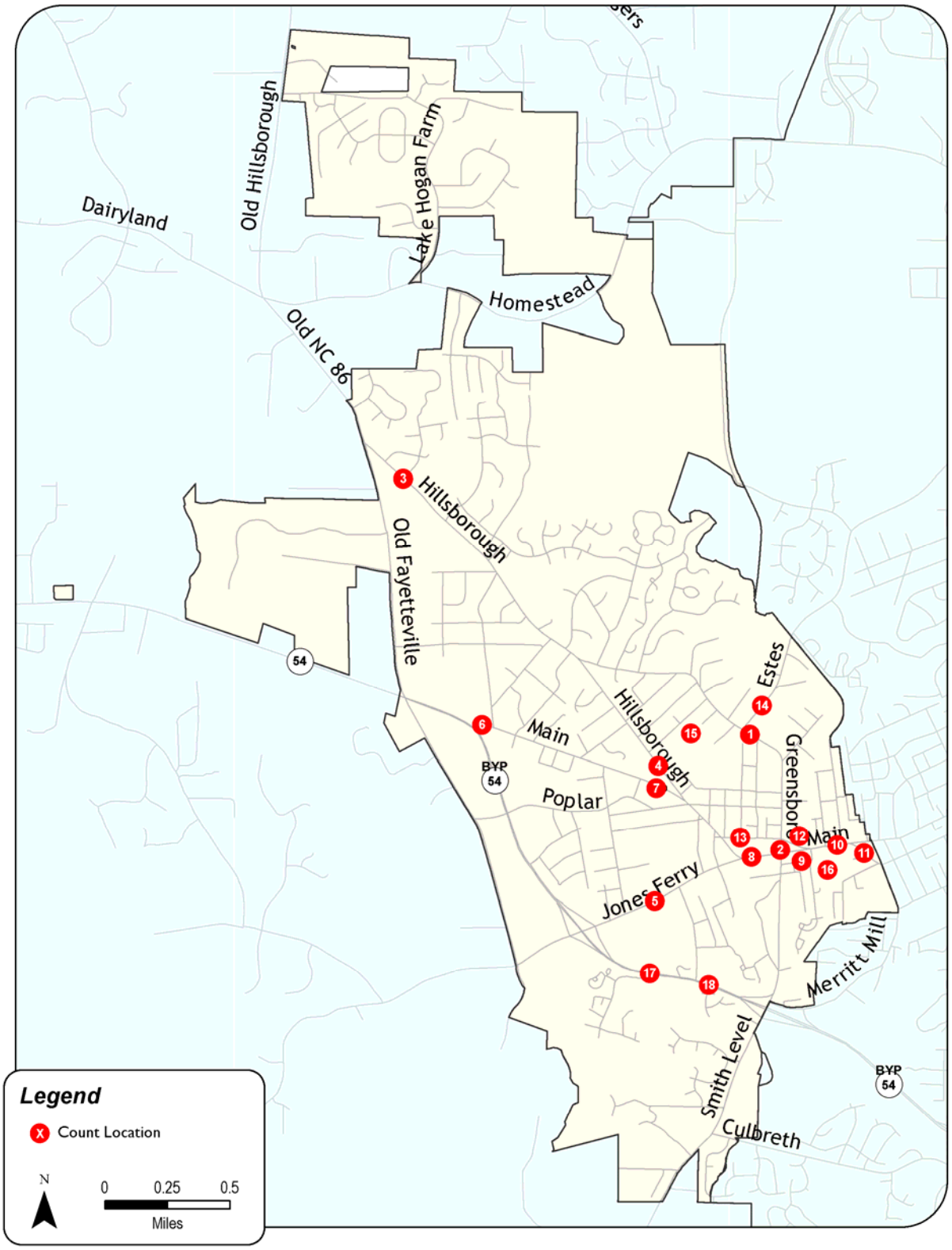
Why and How

In order to assess the condition of its pedestrian system, the Town of Carrboro needs to know what level of pedestrian activity is being experienced. It is also important to know where that pedestrian activity is in order to better understand the reasons why there may or may not be pedestrian activity.

In general, there are three ingredients necessary to promote pedestrian activity: land use, presence of facilities, and design of facilities. A mix of land use types and activities in close proximity to one another encourages walking. For people to walk, there needs to be sidewalk facilities and the design of those facilities can have a great impact on the desirability of walking and allow for the integration of the facilities into developments and other transportation modes.

Pedestrian activity is measured by the number of pedestrians observed at various locations throughout the Town. Wheelchair users, skateboarders, and rollerbladers are all counted as pedestrians. Counts were collected at 18 locations throughout the Town. These locations are presented in Figure 5.1. The counts were collected manually over a 12-hour period from 7:00 AM to 7:00 PM to understand the relative activity throughout the day.

Figure 5.1 – Pedestrian Count Locations



Results

The 12-hour pedestrian counts for the 18 counts ranged from a low of 84 (Estes Drive between Greensboro Street and Hillcrest Drive) to a high of 1,577 (Main Street between Greensboro Street and Weaver Street). These counts are presented graphically in Figure 5.2. The size of the circle is proportional to the 12-hour count volume. The pedestrian counts are also presented in Table 5.1 and in chart form in Figure 5.3.

Table 5.1 – 12 Hour Pedestrian Counts 2003 – 2005

	Location	2003	2005
1	Greensboro St between Oak St and Estes Dr	189	449
2	Greensboro St between Main St and Weaver St	1,936	1,304
3	Hillsborough Rd at McDougle School	265	191
4	Hillsborough Rd at Carrboro Elementary School	566	452
5	Jones Ferry Rd between Barnes and Davie St	1,018	776
6	Main St between James and NC 54	105	109
7	Main St between Blackwood and Fidelity	498	702
8	Main St between Jones Ferry Rd and Greensboro St	1,083	1,164
9	Main St between Greensboro St and Weaver St	1,245	1,577
10	Main St between Lloyd St and Rosemary St	994	618
11	Main St between Rosemary St and Merritt Mill Rd	727	293
12	Weaver St between Greensboro St and East Main St	1,206	833
13	Weaver St between Oak Ave and Lindsay St	622	529
14	Estes Dr between Greensboro St and Hillcrest Dr	24	84
15	Francis Shetley Bikepath between Greensboro St and Shelton St	120	500
16	Libba Cotten Bikepath between Roberson St and Brewer Ln	198	632
17	NC 54 Bypass at Westbrook Dr	-	213
18	NC 54 Bypass at Abbey Lane	-	98

Figure 5.2 – 12 Hour Pedestrian Counts 2005

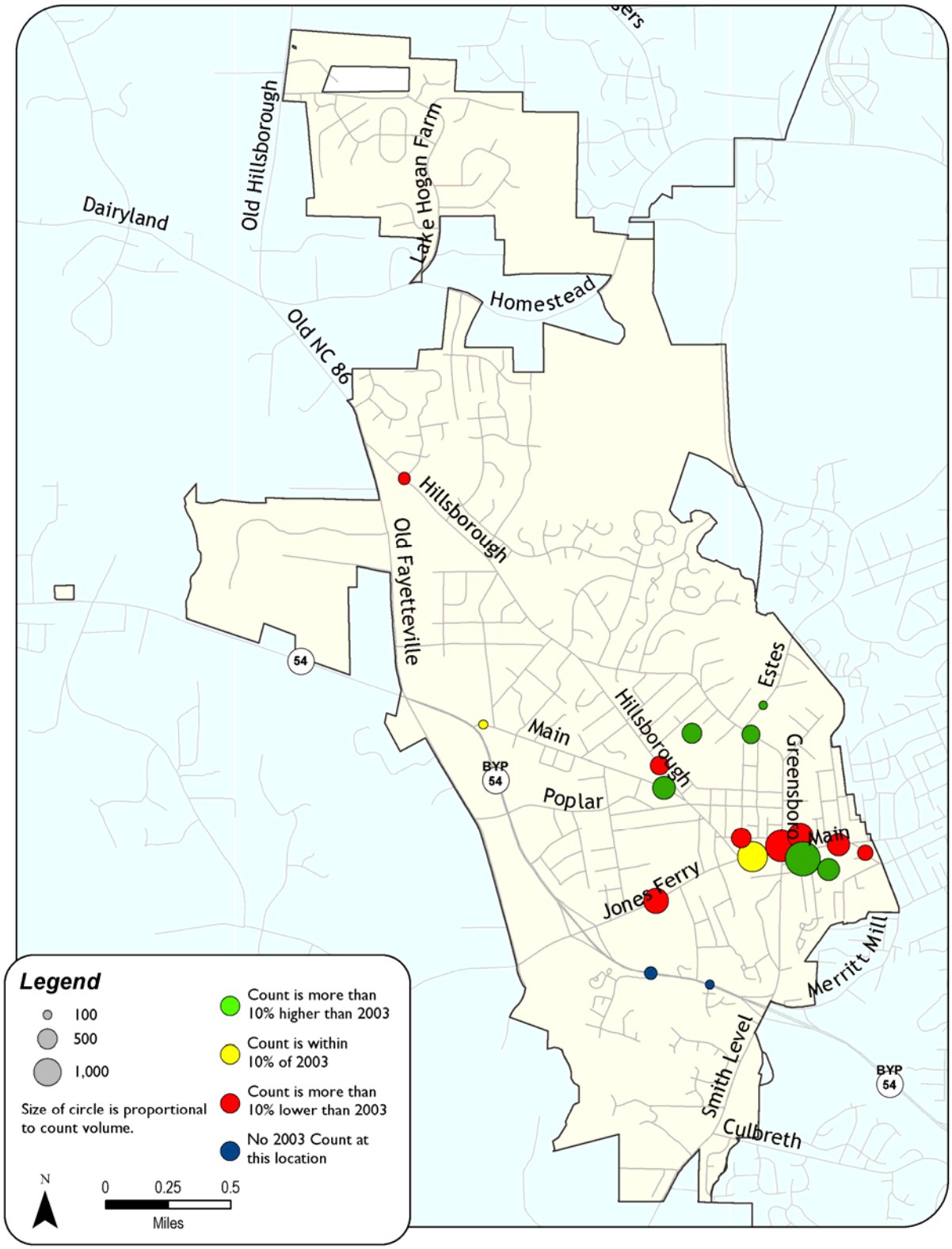
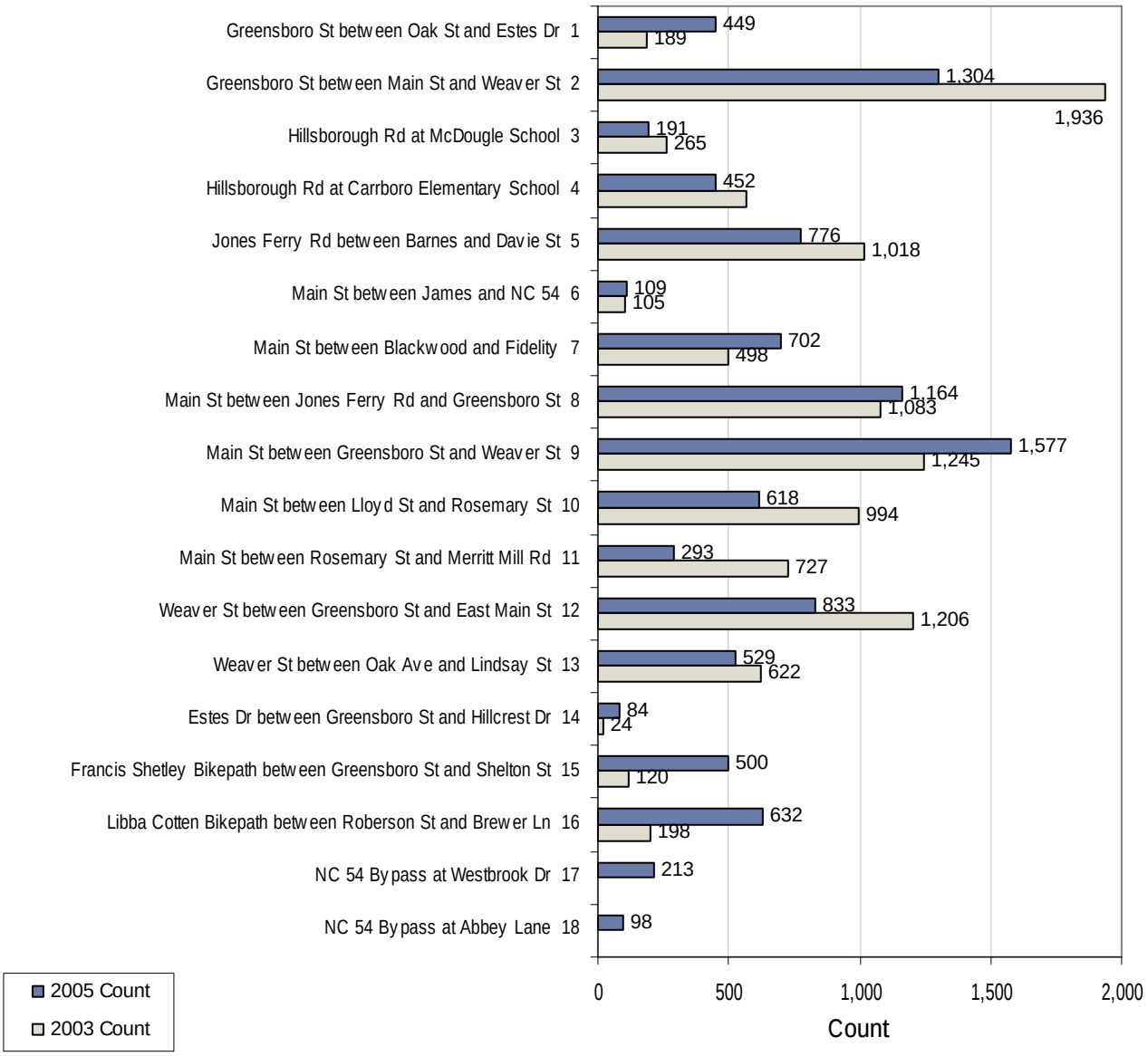


Figure 5.3 – 12-Hour Pedestrian Activity 2003 – 2005



Findings and Conclusions

As would be expected, the downtown core experiences the highest pedestrian volumes in the Town. Pedestrian activity outside the downtown is generally low. Between 2003 and 2005, overall pedestrian activity has dropped in Carrboro. Total pedestrian activity for the 16 locations that were surveyed in 2003 fell from 10,796 to 10,213, or about 5%. Half of those locations surveyed in both 2003 and 2005 saw a greater than 10% decrease in pedestrian activity. Six locations experience a greater than 10% increase in pedestrian activity, and two locations stayed about the same (within 10%) from 2003 to 2005.

The two locations with the largest percent increase were the two bike paths surveyed: the Francis Shetley bike path and the Libba Cotten path. The Francis Shetley path increased from 120 to 500 pedestrians and the Libba Cotten increased from 198 to 632. Several locations in downtown experienced large decreases in pedestrian counts. Greensboro Street between Main Street and Weaver Street (1,936 to 1,304) and Weaver Street between Greebsboro Street and East Main Street (1,206 to 833) were two of the locations with the largest decreases in pedestrian activity.

Chapter 6 - Bicycle Facilities

MEASUREMENT: Miles of Bicycle Routes, Paths, and Lanes
DATA: GIS-Based Bicycle Facility Inventory

Why and How

In a community with a major university nearby and a favorable climate, such as Carrboro, there is a major opportunity to promote bicycle mobility if a comprehensive system of bicycle trails, lanes, and routes exists.

The objective of this inventory is to determine the extent of the bicycle network in Carrboro. The inventory of bicycle facilities is maintained by Town staff and is updated as conditions change with new development or bicycle lane and path improvements. This information was collected, summarized, and mapped to understand the extent and distribution of facilities for bicyclists in the Town limits of Carrboro.

Results

The bicycle facilities for two different time periods for the Town of Carrboro are presented in Figure 6.1. The time periods displayed on the map correspond with previous Mobility Report Cards and include: up to 2003 and 2004 to 2005. The differentiation between years is approximate and may occur at slightly different times in order to correspond with the data used in previous report cards. Table 6.1 shows the length of each type of bicycle facility in the Town of Carrboro. The table shows centerline distance for bicycle paths and one-way distance for bicycle lanes and wide outside lanes. Thus, one mile of bicycle lane on each side of a section of road would show up as two miles of bicycle lanes in the table.

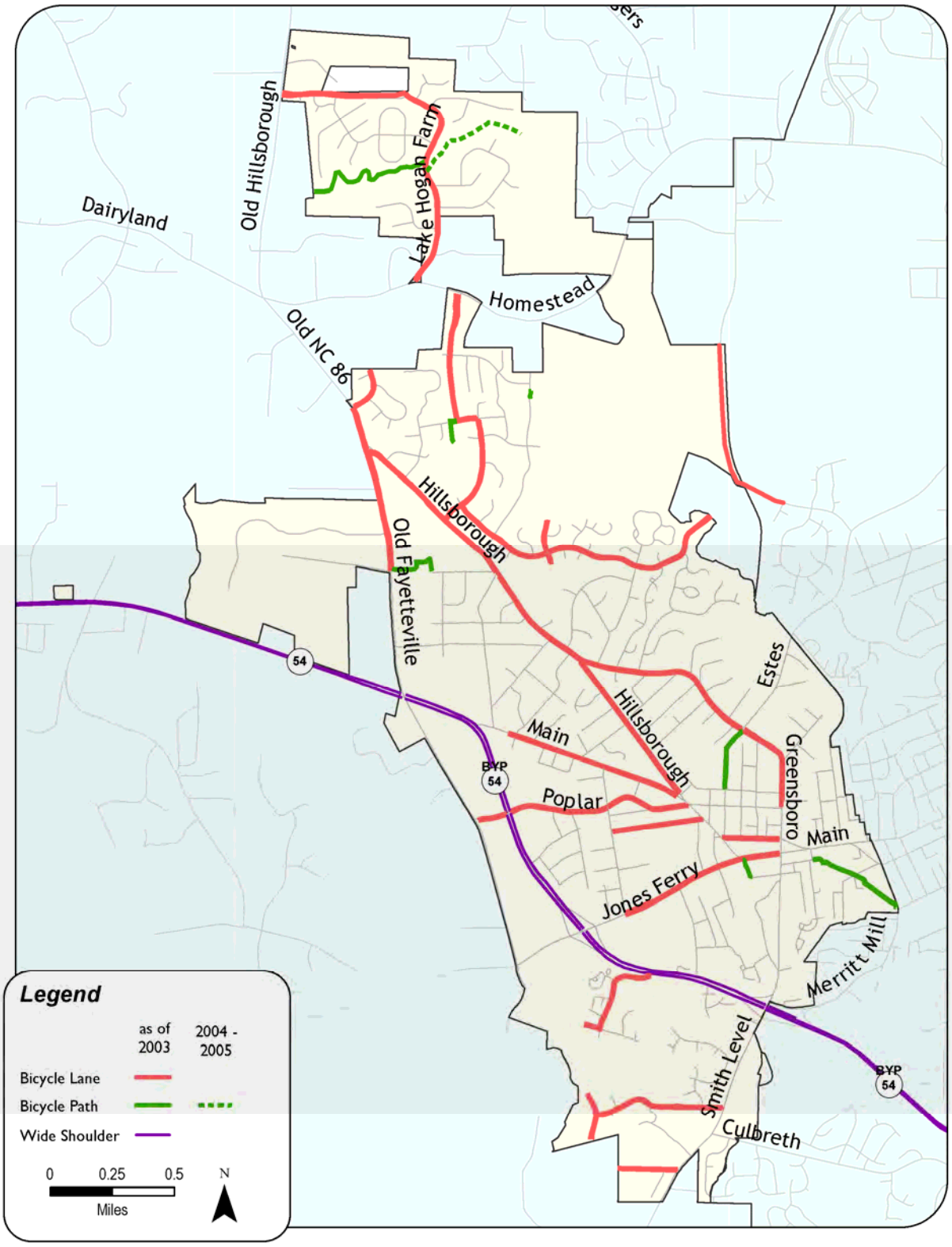
TABLE 6.1 – BICYCLE FACILITIES

	Facility Length		
		Added	Percent
Facility Type	As of 2003	2004- 2005	Increase
Bike Path	2.8	0.5	16.6%
Bike Lane	23.8	0.0	0.0%
Wide Shoulder	8.1	0.0	0.0%
All Facilities	34.7	35.2	1.3%

Findings and Conclusions

As can be seen in Figure 6.1 and Table 6.1, there has not been a large number of new bicycle facilities either constructed or designated. Only ½ mile of new facilities, a bicycle path in the Lake Hogan Farm area, have been added since 2003. This is a little misleading, as there are already a large number of bicycle facilities within the Town. Most all of the arterial streets include some sort of bicycle facility, with most having bicycle lanes. There are still opportunities, however, to fill in missing gaps and further enhance the bicycle system.

Figure 6.1 – Bicycle Facilities 2003 - 2005



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Chapter 7 - Bicycle Activity

MEASUREMENT: Bicycle Counts

DATA: 12-Hour Directional Counts

Why and How

Bicycle activity is measured by the number of cyclists observed at various locations throughout the Town. Counts were collected at 18 locations and were collected over a 12-hour period from 7:00 AM to 7:00 PM. These locations are shown in Figure 7.1

Results

The observed counts are presented graphically in Figure 7.2. This map shows the 2005 bicycle count and the relative change from 2003. The size of the circle is proportional to the 12-hour count volume. The color indicates relative change from 2003. Locations with a greater than 10% increase over 2003 counts are shown in green. Locations with 2005 counts within 10% of 2003 are shown in yellow, and locations with more than 10% decrease from 2003 to 2005 are shown in red. Both the 2003 and 2005 bicycle counts are also presented in tabular form in Table 7.1 and in chart form in Figure 7.3. As can be seen in these figures and the table, bicycle activity is greatest in the downtown area.

Figure 7.1 –Bicycle Count Locations

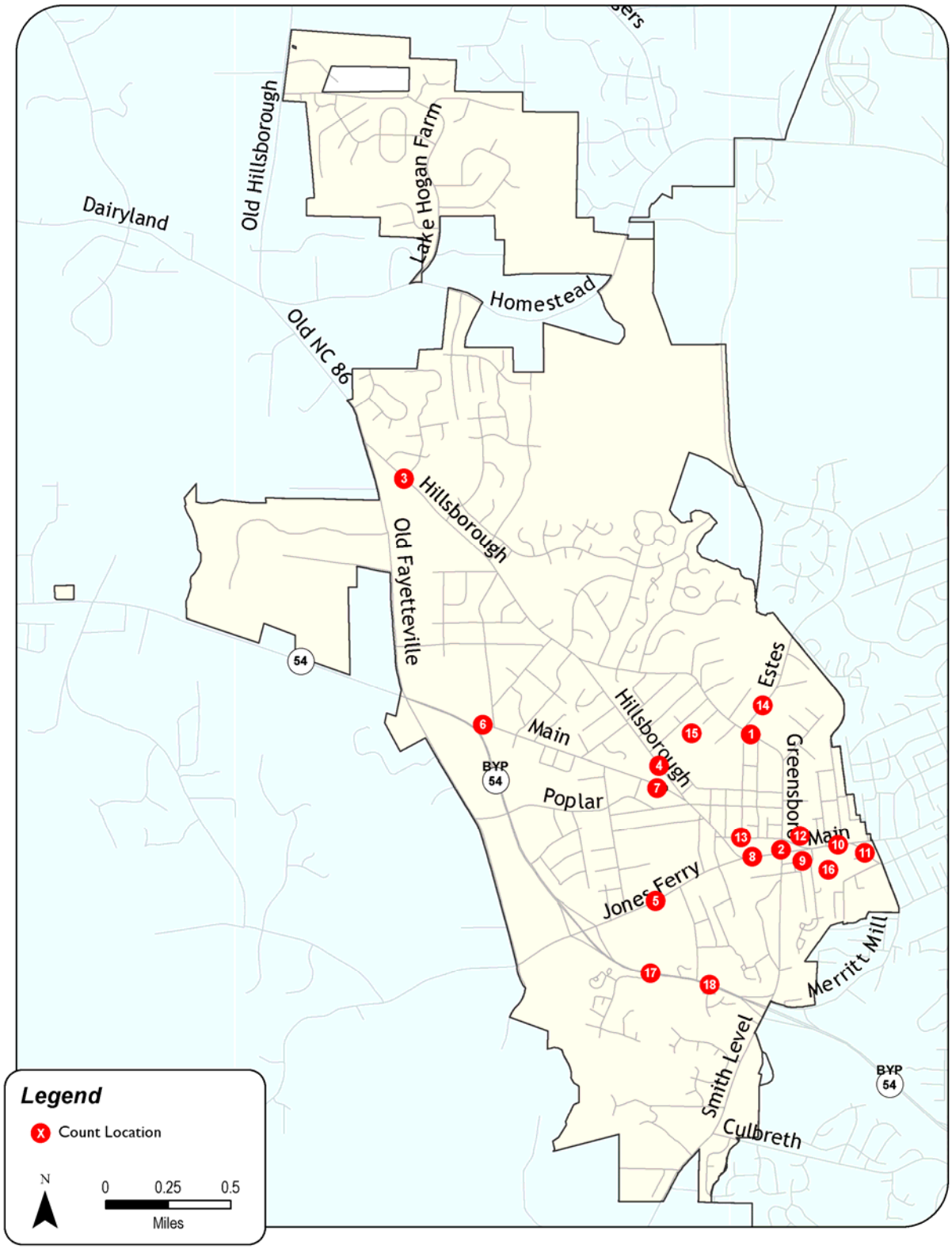


Table 7.1 – 12-Hour Bicycle Counts 2003 – 2005

	Location	2003	2005
1	Greensboro St between Oak St and Estes Dr	156	208
2	Greensboro St between Main St and Weaver St	282	35
3	Hillsborough Rd at McDougle School	59	188
4	Hillsborough Rd at Carrboro Elementary School	301	190
5	Jones Ferry Rd between Barnes and Davie St	59	31
6	Main St between James and NC 54	14	7
7	Main St between Blackwood and Fidelity	138	378
8	Main St between Jones Ferry Rd and Greensboro St	315	416
9	Main St between Greensboro St and Weaver St	122	264
10	Main St between Lloyd St and Rosemary St	281	170
11	Main St between Rosemary St and Merritt Mill Rd	177	58
12	Weaver St between Greensboro St and East Main St	172	241
13	Weaver St between Oak Ave and Lindsay St	161	237
14	Estes Dr between Greensboro St and Hillcrest Dr	13	34
15	Francis Shetley Bikepath between Greensboro St and Shelton St	8	209
16	Libba Cotten Bikepath between Roberson St and Brewer Ln	412	690
17	NC 54 Bypass at Westbrook Dr	-	16
18	NC 54 Bypass at Abbey Lane	-	6

Figure 7.2 – 12-Hour Bicycle Counts 2005

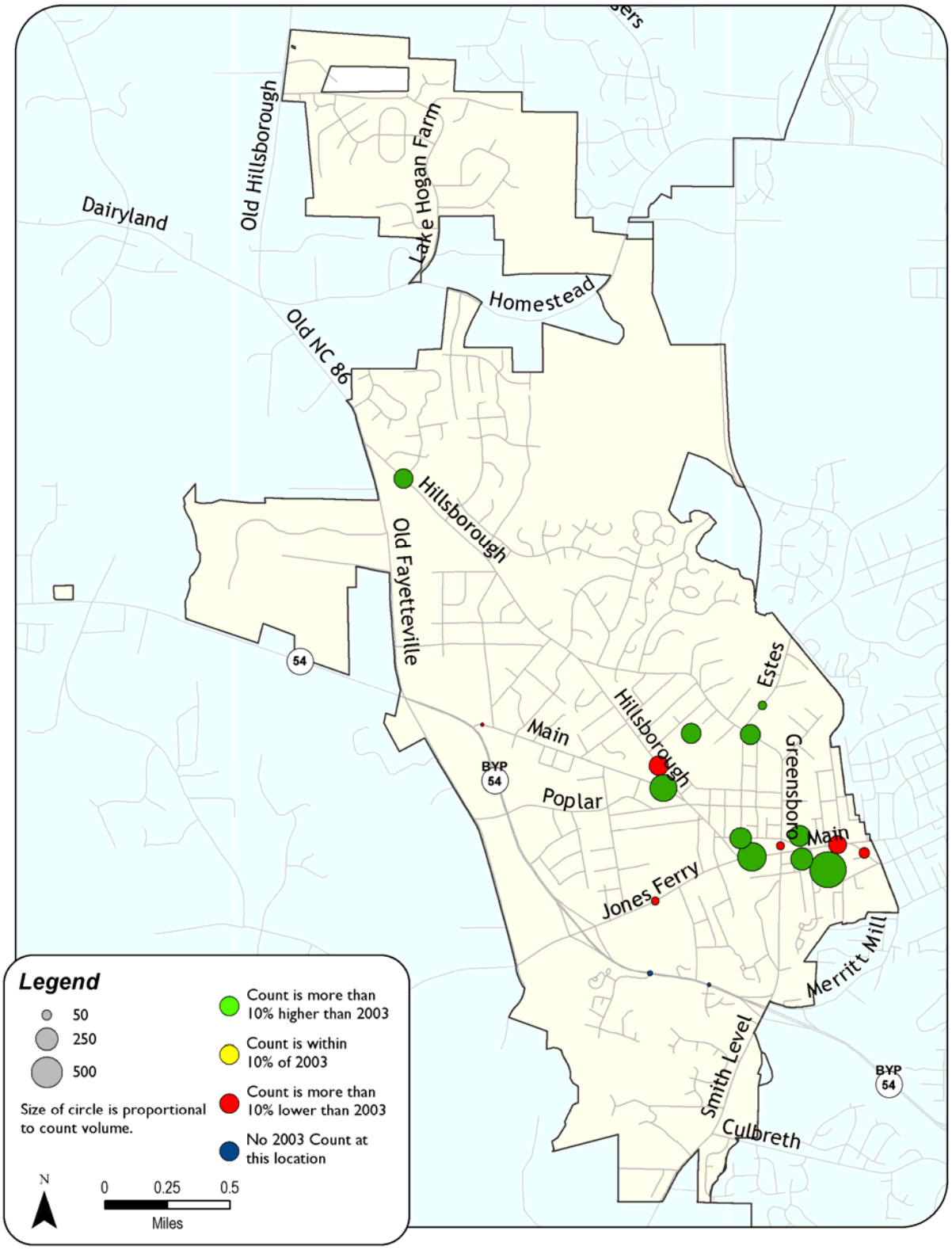
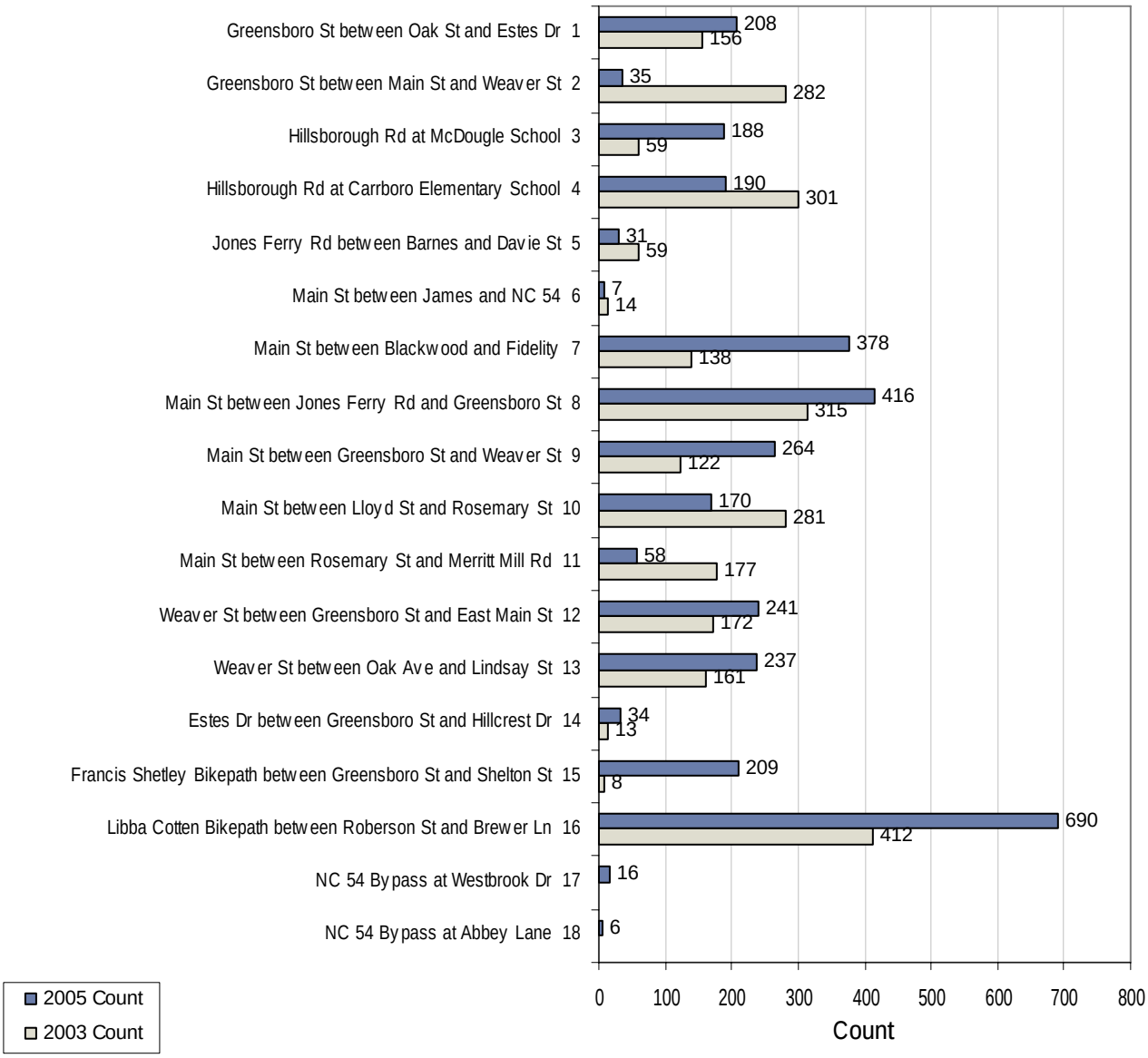


FIGURE 7.3 – 12-HOUR BICYCLE ACTIVITY 2003 – 2005



Findings and Conclusions

The highest bicycle activity in the Town of Carrboro is within the downtown core, where there are also the most complete bicycle facilities in the town. This is a very good sign as it indicates that the bicycle facilities are being used. The Libba Cotten bike path in the downtown area had the highest bicycle count, with almost 700 counted in a 12-hour period. Several counts near Carrboro Elementary School were also fairly high, as was the other bike path counted, the Francis Shetley bike path.

The total bicycle activity for the 16 locations surveyed in both 2003 and 2005 rose by 25% from 2,670 to 3,356. Ten of the locations experienced a greater than 10% increase in bicycle activity between 2003 and 2005 with the remaining six locations experiencing a greater than 10% drop in bicycle activity. As in the pedestrian counts, two of the largest increases came on the two bike paths counted, the Francis Shetley bike path and the Libba Cotten bike path. The bicycle facilities in Carrboro continue to be well utilized.

Chapter 8 – Pedestrian and Bicyclist Safety

MEASUREMENT: Bicycle Counts

DATA: 12-Hour Directional Counts

Why and How

Even an extensive bicycle and pedestrian network will not be used if people aren't safe and/or don't feel safe. Having safe facilities is critical to encouraging and maintaining pedestrian and bicycle activity as well the obvious benefits to the community and the quality of life of its residents.

This valuable indicator is new to the Mobility Report Card for 2005. To measure this indicator, 3 ½ years of accident data (January 1, 2002 to June 30, 2005) from the Traffic Engineering Accident Analysis System (TEAAS) provided by the North Carolina Department of Transportation (NCDOT) was analyzed. The number of motor vehicle accidents involving pedestrians and bicyclists was summed for each travel time corridor segment. The data was disaggregated by bicyclists and pedestrians, as well as by fatal, injury and non-injury accidents.

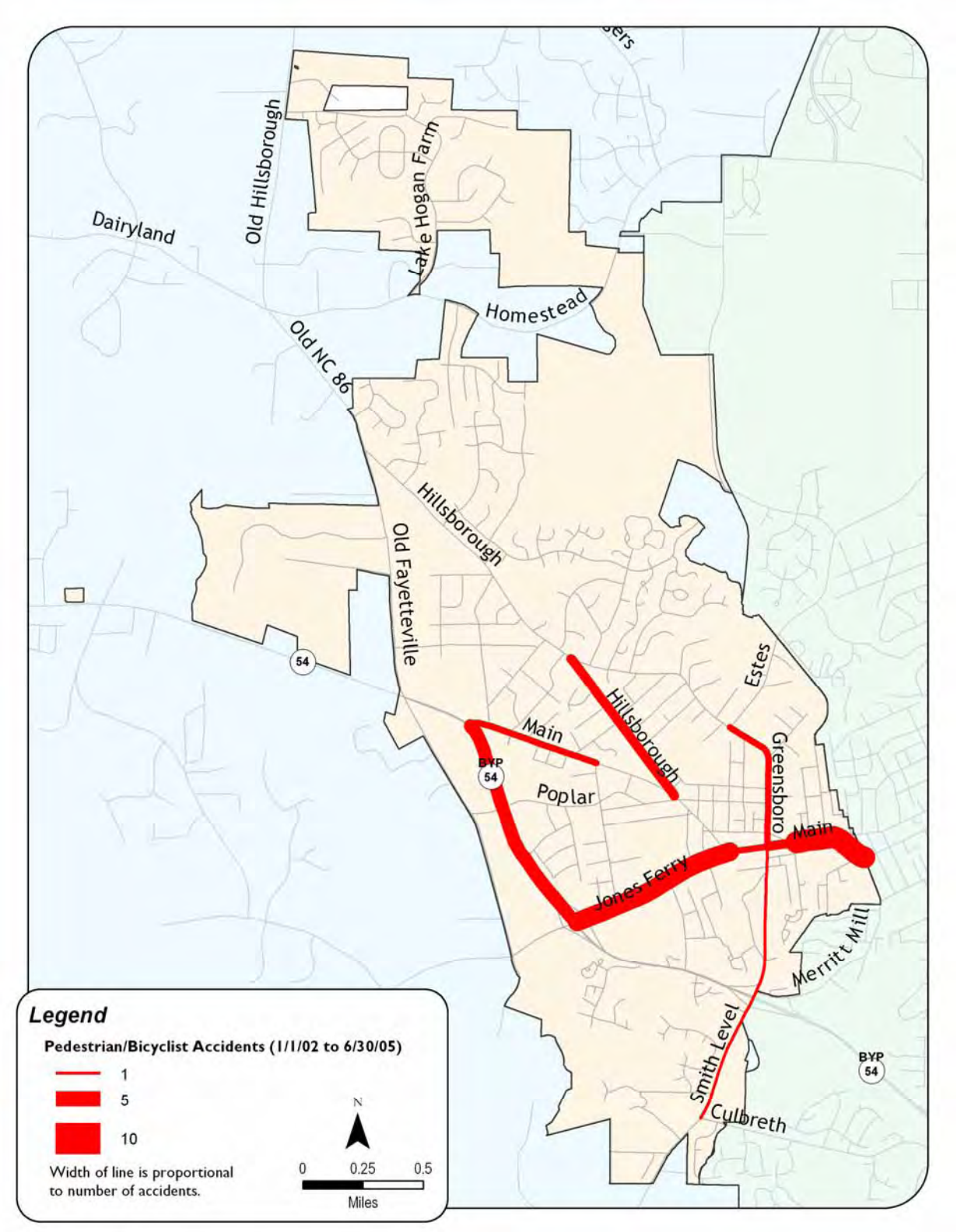
Results

Results of the safety analysis are presented for each corridor in Table 8.1. Figure 8.2 shows the number of pedestrian/bicyclist accidents in the 3 ½ year time period for the major corridors in Carrboro. Along the major corridors in Town, 28 accidents occurred involving pedestrians or bicyclists, or an average of eight per year. Twenty-three of those accidents, or 82%, involve injuries. In the last 3 ½ years, no fatalities occurred in the reported pedestrian/bicyclist accidents in Carrboro.

TABLE 8.1 – ACCIDENTS INVOLVING PEDESTRIANS AND BICYCLISTS JANUARY 1, 2002 TO JUNE 30, 2005

	Involving Pedestrians			Involving Bicyclists			Total		
Corridor	Total	Fatalities	Injuries	Total	Fatalities	Injuries	Total	Fatalities	Injuries
Estes Dr	0	0	0	0	0	0	0	0	0
Eubanks Rd	0	0	0	0	0	0	0	0	0
Hillsborough Rd	0	0	0	0	0	0	0	0	0
Homestead Rd	0	0	0	0	0	0	0	0	0
Jones Ferry Rd	2	0	0	4	0	4	6	0	4
Main St	6	0	5	8	0	7	14	0	12
NC 54 Bypass	3	0	3	1	0	1	4	0	4
Old NC 86	0	0	0	0	0	0	0	0	0
Smith Level Rd	3	0	2	1	0	1	4	0	3
TOTAL	14	0	10	14	0	13	28	0	23

Figure 8.1 – Pedestrian/Bicyclist Accidents
January 1, 2002 to June 30, 2005



Findings and Conclusions

Of the corridors analyzed, Main Street experiences the most number of pedestrian/bicyclist accidents per year by far. The same number of accidents occurred in this corridor as on all other corridors in town combined. More than twice as many pedestrian/bicyclist accidents occurred in this corridor than any other. This is intuitive, as the downtown area has the most number of pedestrians and bicyclists, so it is reasonable that this is where the most accidents will occur. Jones Ferry Road between Main Street and NC 54 Bypass had the second highest number of pedestrian/bicyclist accidents during the time period with four.

Of importance, and also expected, is the fact that almost every accident (82%) involves an injury. Bicyclists appear to be slightly more likely to be injured, with 93% of accidents involving bicyclists resulting in injuries and 71% of accidents with pedestrians resulting in injuries. The number of accidents involving pedestrians and bicyclists is evenly split between the two, with 14 accidents involving each in the study time period. About 58% of accidents involving a pedestrian or bicyclist involve a pedestrian, and 42% involve a bicyclist. Given the numbers observed in the Pedestrian and Bicycle Activity sections, it is much more likely for a bicycle to become involved in an accident with a motor vehicle. This is due, at least in part, to the level of interaction. Pedestrian and vehicle interaction is fairly well divided, while bicycles are much more likely to interact with vehicle traffic by sharing a lane or shoulder. This reinforces the need for dedicated bicycle facilities and/or well designated and signed bicycle lanes and routes.

FIGURE 8.2 – PEDESTRIAN/BICYCLIST ACCIDENTS PER YEAR 2002 – 2005

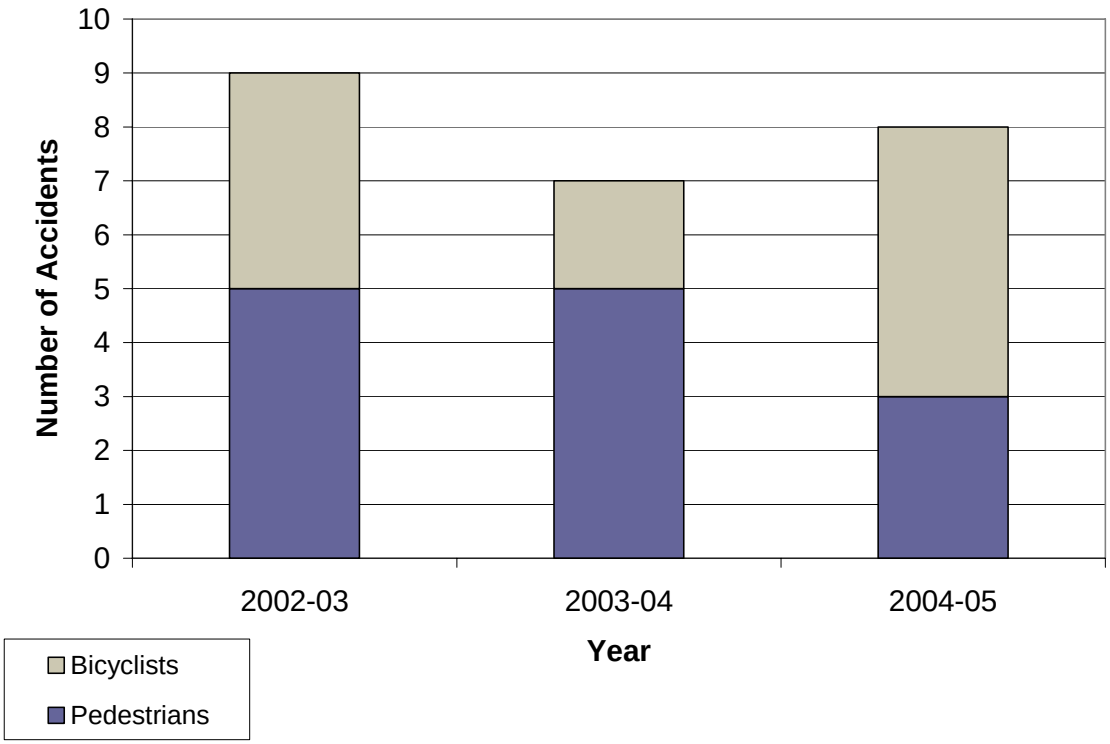
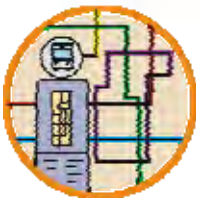


Figure 8.2 shows the number of pedestrian/bicyclist accidents per year (July 1 to June 30). The overall number of accidents has remained fairly constant, dropping from nine accidents in 2002-03 to seven in 2003-04 and rising slightly to eight in 2004-05. However, the split between bicyclists and pedestrian accidents has varied considerably. 2004-05 saw a fairly substantial rise in bicycle accidents and a similar decrease in pedestrian accidents. The rise in bicycle accidents can be attributed, at least in part, to the rise in bicycle activity over the same time period. Future analyses will help in uncovering any trends in the data.



Chapter 9 - Transit Service

MEASUREMENT: Frequency, Coverage, and Capacity

DATA: Route Coverage, Headways, Number and Capacity of Buses

Why and How

Transit service refers to the character and amount of transit service available throughout the Town. Factors that effect this measurement are the geographic extent of the coverage, frequency of the service, and the actual capacities of the buses that are in service. All local transit service provided by Chapel Hill Transit (CHT) is examined for this measure, not just the area of the Town of Carrboro. A typical measurement of transit service is annual service hours of operation.

Results

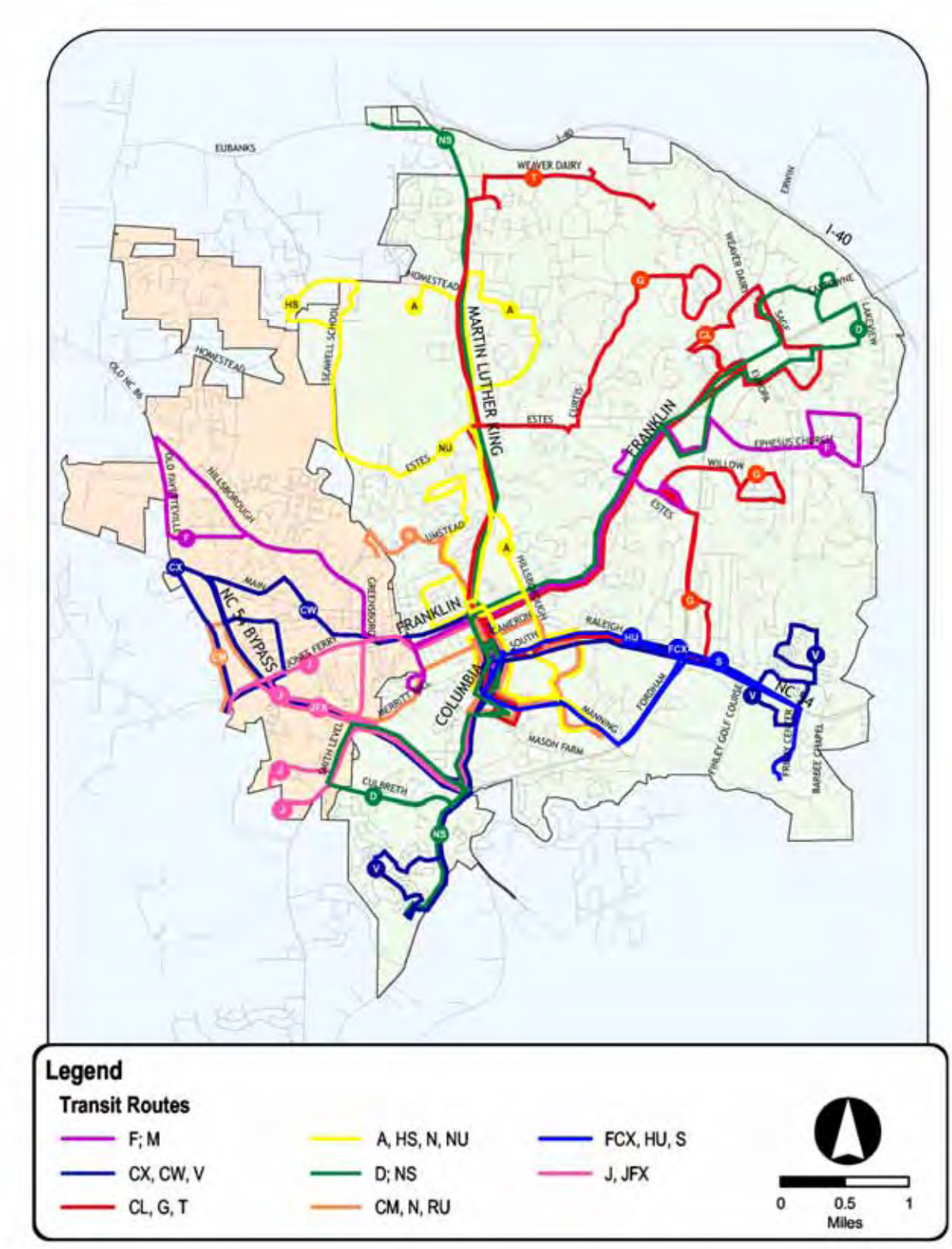
Chapel Hill Transit provides public transit service within the Carrboro, Chapel Hill, and UNC area, serving approximately 25 square miles.

October 2004 service included 22 fixed routes with weekday, evening, and weekend service. CHT also provided an EZ Rider service for mobility-impaired patrons and a demand-responsive Shared Ride service for areas outside of the fixed-route coverage. Weekday fixed-route service is presented graphically in Figure 9.1.

Fixed-route hours of operation are generally from 6:00 AM to 8:00 PM. In addition to the one evening route operating from 7:00 PM to midnight, eleven of the routes operate past 8:00 PM and four routes operate past 10:00 PM. The last regular route completes service at 12:56 AM. Three routes have a “safe ride” service, operating from 11:30 PM to 2:30 AM on most Friday and Saturday nights.

Shared Ride Evening and Sunday services are used on weekday evenings and Sundays when there is not enough demand to warrant a fixed route. This service is available for a fee. Shared Ride feeder service is used for areas that do not receive regular bus service. Patrons are transported to the nearest fixed route. This free service operates from 6:45 AM to 6:15 PM.

Figure 9.1 – Weekday Fixed Route Transit Service

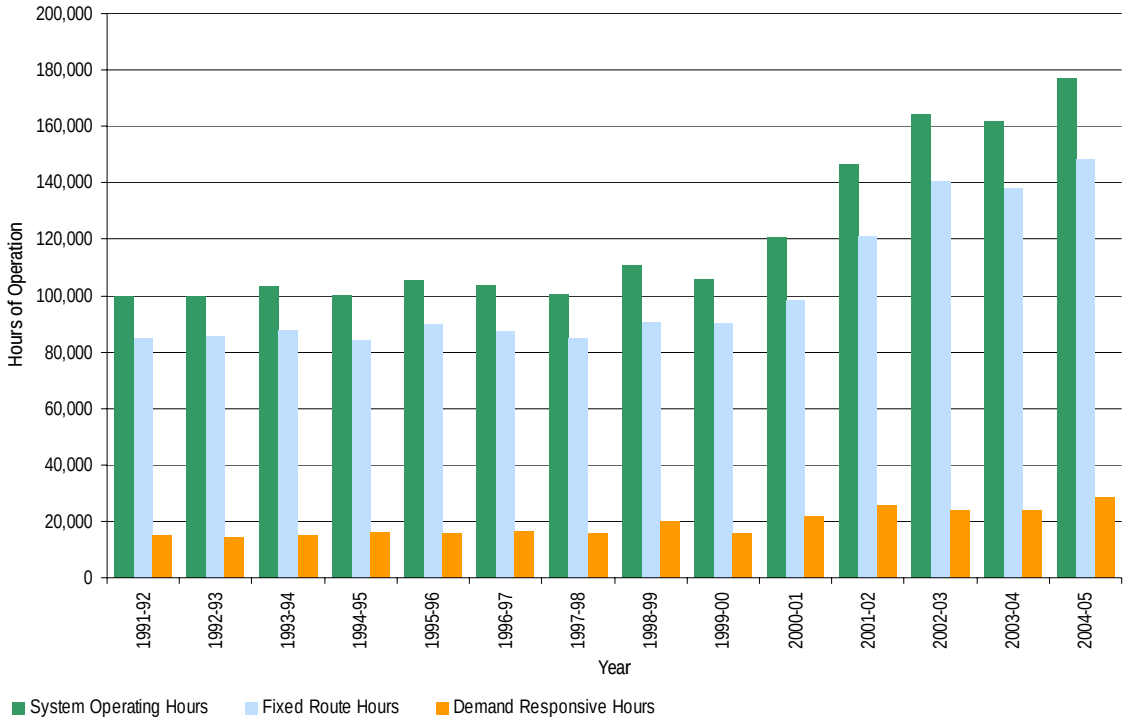


Findings and Conclusions

Approximately 60% of the Town of Carrboro is within one-quarter mile of transit. However, the areas that are not served by transit are primarily the areas on the north side of town such as the Lake Hogan Farm area.

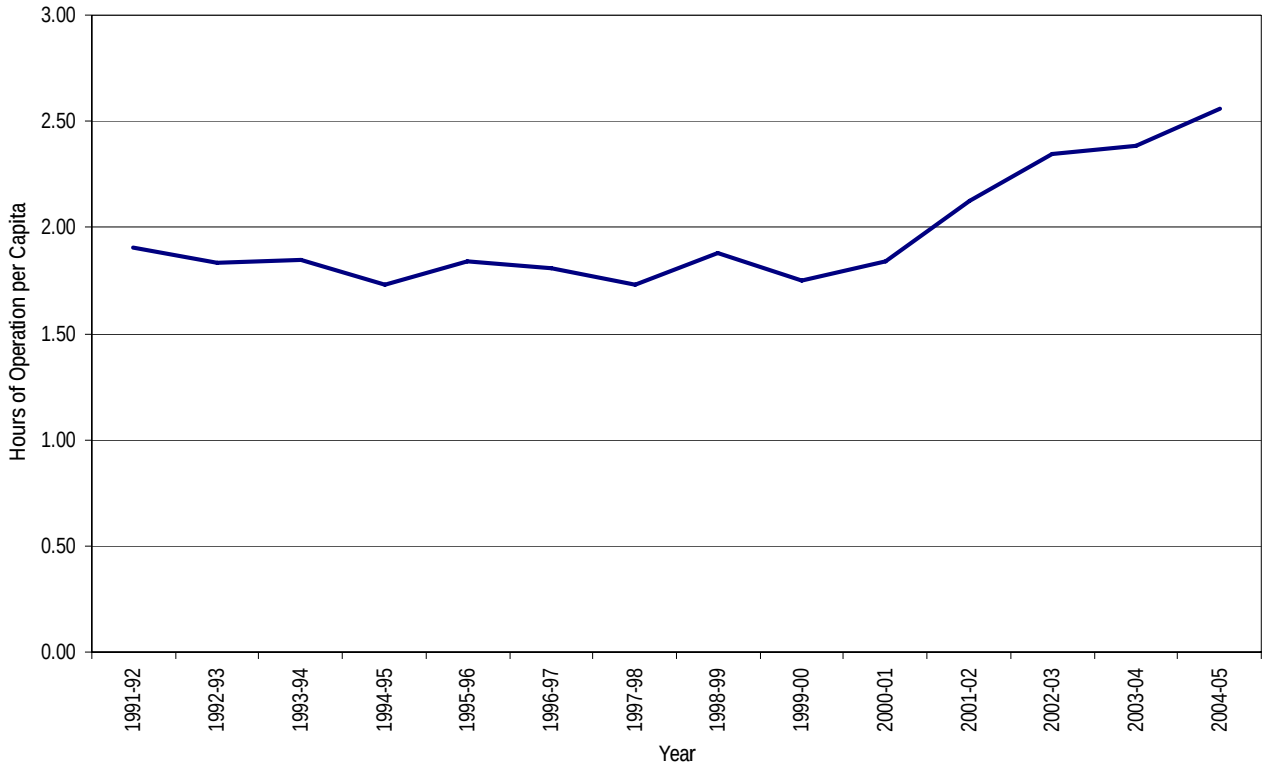
As can be seen in Figure 9.2, the Town of Chapel Hill increased fixed route transit service hours by approximately 16% between 1991 and 2001 and overall service hours increased by 20%. However, in just four years between 2001 and 2005, fixed route transit service hours increased by over 50% and total system operating hours increased by 47%. Much of this increase is due to the conversion of the fixed route system to fare-free service and associated service changes. In anticipation of increased demand, service hours were increased when the system was converted to fare-free. Additional service hours were also added to accommodate further increases in ridership. Both service hours and ridership have continued to increase since the system went fare-free, with the exception of the 2003-2004 year which saw a slight dip in service hours.

FIGURE 9.2 – TRANSIT OPERATING HOURS



Even when the hours of operation are standardized by the population of the service area, an increase is still evident in the fare-free years between 2001 and 2005. As can be seen in Figure 9.3, the hours of operation per capita were relatively stable between 1991 and 2001. A sharp increase occurred in the 2001-2002 year when the system was converted to fare-free. This increase in hours of operation per capita has continued through 2005.

Figure 9.3 – Transit Operating Hours per Capita



Chapter 10 - Transit Ridership

MEASUREMENT: Transit Boardings and Exits

DATA: Transit Boardings and Exits

Why and How

Transit ridership is the direct measurement of how well a transit system is operating. Typically, these measurements are annual in order to average out various daily and weekday variations. Transit ridership is measured by the number of boardings at each stop along each bus route. This information is collected and maintained by Chapel Hill Transit. All local transit service provided by Chapel Hill Transit is examined for this measure, not just the Town of Chapel Hill. In addition to the data provided by Chapel Hill Transit, a boarding and alighting survey was primarily in October 2005. This survey provides the number of people boarding and alighting at each stop for every route.

Ridership information is important when considering the type of service to provide. Because of limited funds, most communities must address whether they want to focus on coverage or productivity. An emphasis on coverage attempts to provide transit service to the majority of the residences and businesses within the community. Often, however, this coverage comes with sacrifices such as longer wait times for a bus. The alternative, productivity, uses the same limited resources, but increases the frequency of service for those routes that have higher ridership. Whereas this method improves statistics such as riders per mile or service hour, the area of Town without transit service increases.

Another important reason for this time series study of ridership is to analyze the effect on ridership of Chapel Hill Transit's conversion of the fixed route system to a fare-free system in January 2002. It is expected that a free system would generate significantly more ridership than a system that charges patrons.

Results

Transit ridership statistics are presented in Table 10.1 and Figure 10.1. Table 10.2 shows average daily ridership and service hours for a typical month for 2001, 2003 and 2005. As can be seen in Figure 10.1, transit ridership per year has steadily increased between 1991 and 2001. Since conversion to a fare-free system, ridership has sharply increased since 2001. As can be seen in Table 10.1, ridership per service hour and ridership per capita has also increased accordingly since 2001, even though it had been relatively stable for the previous decade. Table 10.3 shows the ridership results of the boarding/alighting survey.

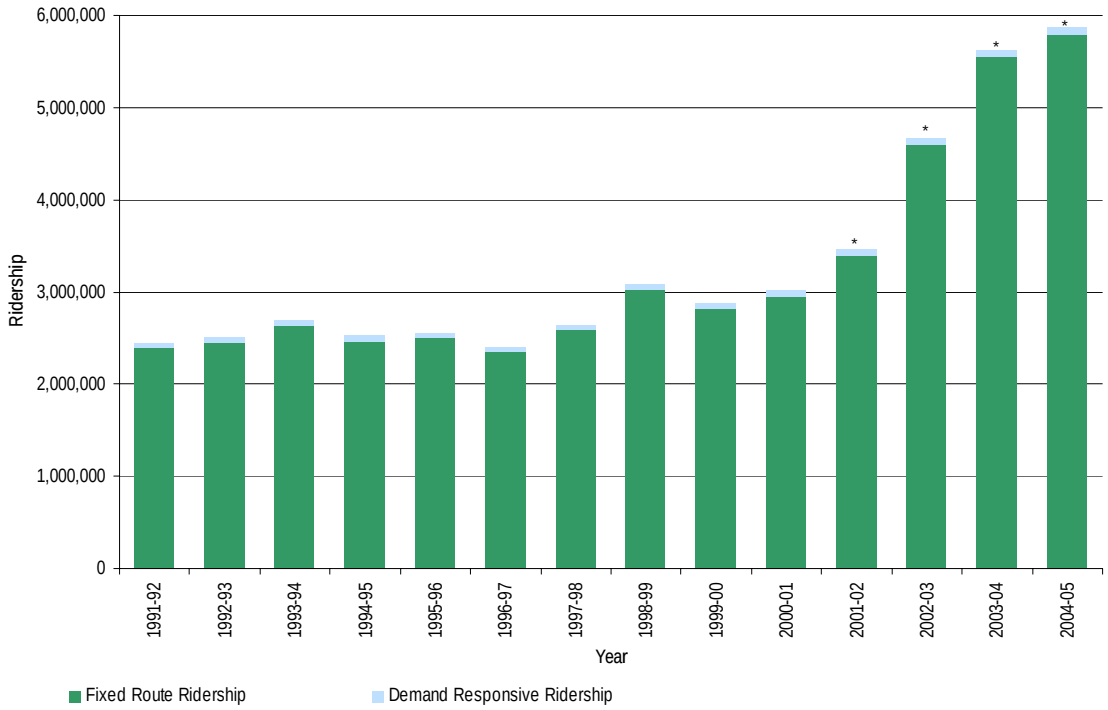
Table 10.1 – Transit Ridership Statistics

	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002*	2002-2003*	2003-2004*	2004-2005*
Population														
Chapel Hill Population	39,765	41,524	42,918	44,470	43,549	43,429	43,977	44,015	44,343	48,715	51,598	52,440	51,519	52,440
Carrboro Population	12,552	12,740	12,931	13,465	13,633	13,784	14,274	14,733	16,012	16,782	17,460	17,585	16,425	16,782
Combined Service Area Population	52,317	54,264	55,849	57,935	57,182	57,213	58,251	58,748	60,355	65,497	69,058	70,025	67,944	69,222
System														
System Ridership (thousands)	2,565	2,644	2,852	2,651	2,670	2,522	2,857	3,243	2,976	3,017	3,459	4,662	5,627	5,872
System Operating Hours	99,805	99,675	103,065	100,110	105,407	103,540	100,735	110,463	105,753	120,486	146,708	164,282	161,968	177,114
System Riders/Hour	25.70	26.53	27.68	26.48	25.34	24.36	28.36	29.36	28.15	25.04	23.58	28.38	34.74	33.15
System Riders/Capita	49.03	48.73	51.07	45.76	46.71	44.09	49.05	55.20	49.32	46.07	50.09	66.58	82.83	84.83
Fixed Route														
Fixed Route Ridership (thousands)	2,391	2,450	2,630	2,463	2,493	2,357	2,592	3,024	2,809	2,957	3,398	4,589	5,558	5,796
Fixed Route Hours	84,836	85,288	87,700	84,142	89,969	87,088	85,091	90,516	90,203	98,649	121,114	140,391	138,115	148,367
Fixed Route Riders/Hour	28.18	28.73	29.99	29.27	27.71	27.08	30.46	33.41	31.15	29.98	28.06	32.69	40.24	39.06
Fixed Route Riders/Capita	45.70	45.16	47.09	42.51	43.60	41.21	44.50	51.48	46.56	45.15	49.22	65.54	81.80	83.73
Demand Responsive														
Demand Responsive Ridership	58,336	58,056	67,496	60,690	51,528	51,861	56,077	57,605	60,314	59,835	60,333	72,559	69,587	76,173
Demand Responsive Hours	14,969	14,387	15,365	15,968	15,438	16,452	15,644	19,947	15,550	21,837	25,594	23,891	23,852	28,747
Demand Responsive Riders/Hour	3.90	4.04	4.39	3.80	3.34	3.15	3.58	2.89	3.88	2.74	2.36	3.04	2.92	2.65
Demand Responsive Riders/Capita	1.12	1.07	1.21	1.05	0.90	0.91	0.96	0.98	1.00	0.91	0.87	1.04	1.02	1.10

* Effective January 2002, all standard CHT routes became fare-free.

Source: Town of Chapel Hill

Figure 10.1 – Transit Ridership



* Effective January 2002, all standard CHT routes became fare-free.

Table 10.2 – October Transit Statistics

	October 2001	October 2003	October 2005	Percent Increase
Average Daily Weekday	14,273	23,001	19,408	36.0%
Average Daily Weekend	535	828	1,237	131.2%
Daily Service Hours Weekday	428.4	540.1	549.5	28.3%
Daily Service Hours Weekend	62.0	82.2	82.8	33.5%

Table 10.3 – Boarding/Alighting Survey Ridership by Route

Weekday

Route	Ridership
A	940
CPX	433
CL	236
CM/CW	1,229
D	1,768
F	1,151
FCX	1,493
G	853
HS	85
HU	1,028
J	3,304
JFX	653
M	136
NS	2,545
NU	1,150
N	648
RU	1,431
S	1,664
T	1,194
TG	68
U	1,528
V	565
Total	24,102

Saturday

Route	Ridership
CM/CW	222
DM	242
FG	220
JN	194
NU	214
U	408
T	191
Total	1,691

Sunday

Route	Ridership
U	283
NU	491
Total	774

Findings and Conclusions

For the 2004–2005 service years, annual service hours totaled over 177,000 hours (148,000 fixed route hours and 29,000 demand response hours). Annual ridership reached almost 5.9 million passengers (5.8 million fixed route passengers and 76,000 demand response passengers). This equates to over 28 passengers per service hour.

For the example month of October, average daily weekday ridership increased by 36% from 2001 to 2005, and was even higher in 2003. This increase is higher than the 28% increase in service hours, so it is safe to assume that other factors are contributing to the ridership increase other than just a service increase. Weekend average daily ridership and service hours increased also, with a large increase in average weekend ridership. Average daily weekend ridership increased by 131% and average daily weekend service hours increasing by 34%.

Chapel Hill Transit's conversion to almost an entirely free system has had a dramatic effect on the transit system. The trends evidenced in the 2003 Mobility Report Card have continued. Between 2001 and 2005:

- System-wide ridership has almost doubled (3.0 to 5.9 million);
- System-wide riders per capita increased by 84% (46.1 to 84.8); and
- System-wide riders per hour increased by 32% (25.0 to 33.2).

Fixed route ridership saw similar increases to the system-wide performance. Between 2001 and 2005:

- Fixed-route ridership almost doubled (3.0 to 5.8 million);
- Fixed-route riders per capita increased by 85% (45.2 to 83.7); and
- Fixed-route riders per hour increased by 30% (30.0 to 39.1).

Since the conversion to a fare-free system took place in January 2002, in the middle of the 2001-2002 reporting year, ridership increased much more between 2002 and 2005 than in the 2001 to 2002 reporting year. The 2001-02 year only included a partial year with free fares, while the free fares were in place for the entire 2002-03 and later reporting years.

The ridership increases seen between 2001 and 2005 resulted in part from the conversion to fare-free, but also from the increase in service hours and other service changes that were made over the same time period. Transit fares and service both impact ridership. A decrease in fares will increase ridership, as will an increase in transit service hours and an increase in duration of service. By combining free fares, more service hours, and longer service, ridership was sure to increase. CHT was able to nearly double ridership between 2001 and 2005 and still maintain productivity (as evidenced by a 30% increase in route riders per hour).

Chapter 11 - Multimodal Mobility

MEASUREMENT: Accessibility, Vitality, and Attractiveness of Various Modes
DATA: Number of Users by Mode

Why and How

While it is very useful to examine each transportation mode individually, it is also important to view the system as a whole and understand the interactions between the different modes. This way the Town can measure a quality of life for all corridor users, not just drivers. For example, a person who is biking will experience the street differently based on street features, safety, and level of bicycle activity versus a person driving an automobile that may only feel the congestion and travel speed indicators. A pedestrian or transit rider will have a very different level of service for the same corridor based on totally different corridor characteristics.

This multimodal mobility assessment is based on the number of users of individual corridor segments using the corridor between 7:00 am and 7:00 pm, including auto occupants, transit riders, bicyclists and pedestrians. The corridor segments analyzed are based on the travel time corridors

For each of the corridor segments, the total daily users of the corridor were estimated to create a complete multimodal picture of the corridor. The users include auto occupants (estimated based on daily traffic counts), transit users (from the boarding/alighting survey) and bicyclists and pedestrians (from the bicycle/pedestrian counts).

The estimated number of auto occupants was calculated by averaging the daily traffic counts that were taken within each corridor segment. A factor based on time of day daily traffic counts was applied to the daily traffic volumes to reflect the 7:00 am to 7:00 pm time period. An auto occupancy rate of 1.1 persons per vehicle (based on Census trip to work data for Chapel Hill and Carrboro) was applied to the resulting traffic volume to arrive at an estimated number of auto occupants using the corridor segment.

Transit use in individual corridor segments was estimated based on the boarding/alighting survey. The number of people who boarded or exited the bus at each stop in one day within a corridor segment was summed to create an estimate of transit activity in the corridor segment.

For the bicycle and pedestrian components, the directional weekday bicycle and pedestrian counts were analyzed and the number of bicyclists and pedestrians moving along (not perpendicular to or crossing) the corridor segment was summed to calculate the number of pedestrian and bicycle users of the corridor segment.

Results

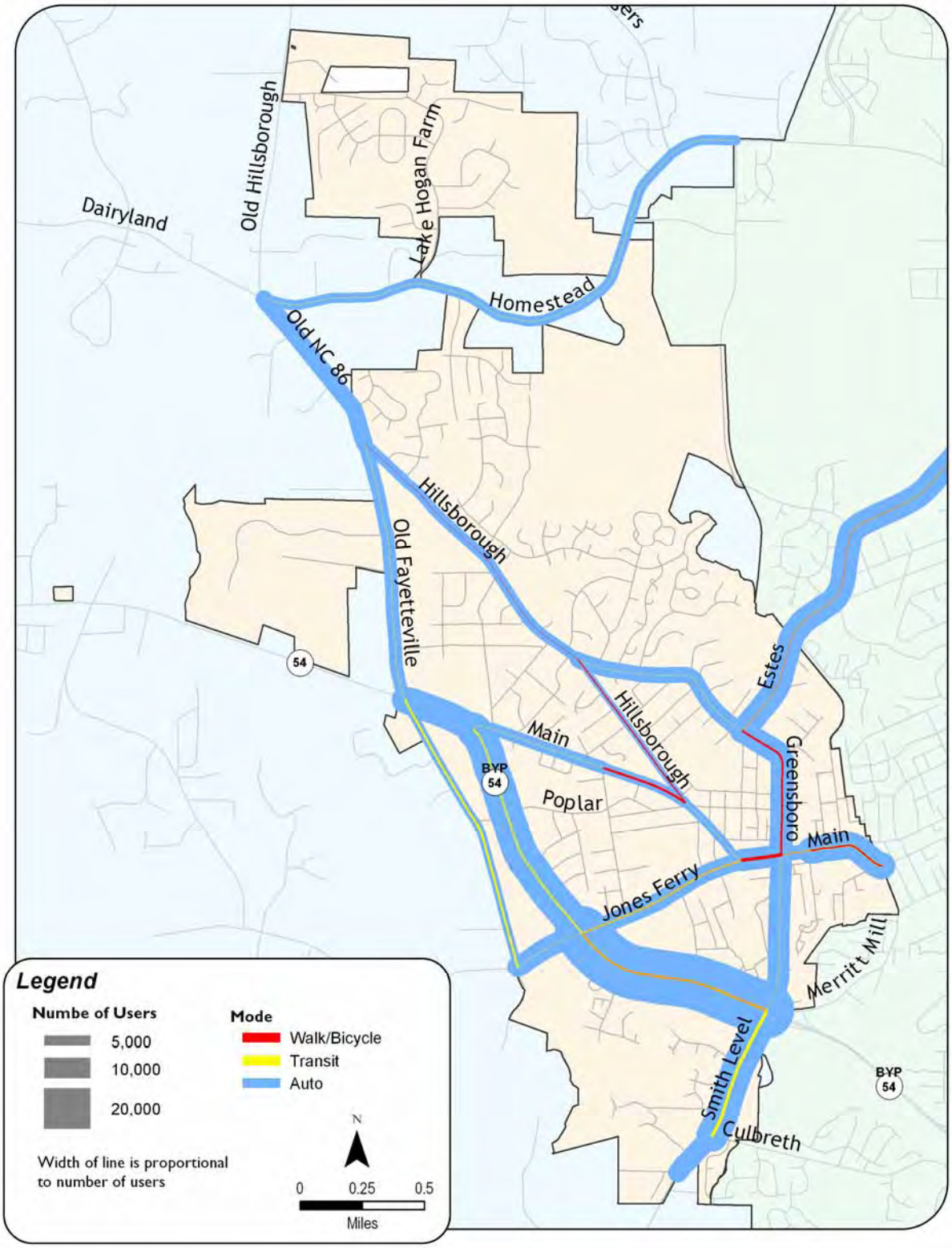
The results of the multimodal mobility assessment by corridor segment are shown in Table 11.1 and graphically in Figure 11.1. Figure 11.1 is a map that shows the number of users of each corridor segment by mode. The width of the various lines shows the relative volumes using that particular corridor segment. The color of the lines shows the mode being represented. Due to their relatively small numbers, pedestrians and bicyclists were combined for clarity purposes.

TABLE 11.1 – ESTIMATED USERS OF CORRIDOR SEGMENTS BY MODE

Corridor	Endpoints	Total Daily Users of Corridor	Auto		Transit		Pedestrian		Bicycle	
			Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
Estes Dr	Greensboro St to MLK Blvd	11,990	11,550	96.3%	340	2.8%	70	0.6%	30	0.3%
Hillsborough Rd	Old Fayetteville Rd to Greensboro St	5,272	5,033	95.5%	41	0.8%	108	2.0%	90	1.7%
Hillsborough Rd	Greensboro St to Main St	2,387	1,774	74.3%	77	3.2%	364	15.2%	172	7.2%
Homestead Rd	Seawell School Rd to Old NC 86	4,951	4,895	98.9%	56	1.1%	*		*	
Jones Ferry Rd	Old Fayetteville Rd to NC 54 Bypass	10,131	9,900	97.7%	231	2.3%	*		*	
Jones Ferry Rd	NC 54 Bypass to Main St	8,441	7,673	90.9%	567	6.7%	175	2.1%	26	0.3%
Main St	NC 54 Bypass to Davie Rd	5,833	5,693	97.6%	140	2.4%	*		*	
Main St	Davie Rd to Hillsborough Rd	5,111	3,960	77.5%	0	0.0%	768	15.0%	383	7.5%
Main St	Hillsborough Rd to Jones Ferry Rd	4,124	4,043	98.0%	81	2.0%	*		*	
Main St	Jones Ferry Rd to Greensboro St	10,815	9,075	83.9%	160	1.5%	1,164	10.8%	416	3.8%
Main St	Greensboro St to Weaver St/Roberson St	7,100	6,435	90.6%	406	5.7%	209	2.9%	50	0.7%
Main St	Weaver St to Merritt Mill Rd	12,924	11,839	91.6%	410	3.2%	526	4.1%	149	1.2%
NC 54	Old Fayetteville Road to Main St	13,200	13,200	100.0%	0	0.0%	*		*	
NC 54 Bypass	Main St to Jones Ferry Rd	16,017	15,675	97.9%	342	2.1%	*		*	
NC 54 Bypass	Jones Ferry Rd to Smith Level Rd	26,196	25,575	97.6%	453	1.7%	154	0.6%	14	0.1%
Old NC 86	Homestead Road to Old Fayetteville Rd	8,250	8,250	100.0%	0	0.0%	*		*	
Old Fayetteville Rd	NC 54 to Hillsborough Rd	6,339	6,270	98.9%	69	1.1%	*		*	
Old Fayetteville Rd	Jones Ferry Rd to NC 54	4,056	3,053	75.3%	1,003	24.7%	*		*	
Smith Level Rd	Rock Haven Rd to Culbreth Rd	9,570	9,570	100.0%	0	0.0%	*		*	
Smith Level Rd	Culbreth Rd to NC 54 Bypass	15,490	14,025	90.5%	1,465	9.5%	*		*	
Greensboro St	NC 54 Bypass to Main St	10,472	10,313	98.5%	159	1.5%	*		*	
Greensboro St	Main St to Estes Dr	11,353	10,313	90.8%	111	1.0%	686	6.0%	243	2.1%
Greensboro St	Estes Drive to Hillsborough St	7,808	7,590	97.2%	218	2.8%	*		*	

* No bicycle/pedestrian count was performed in this corridor segment.

Figure 11.1 – Multimodal Mobility Assessment



Findings and Conclusions

Mobility in Carrboro is highest in the downtown area. Sections of Main Street and Greensboro Street in the downtown and surrounding area have some of the highest alternative mode users in the town.

Bicycle use on the corridors fluctuated greatly. Two corridors (Main Street from Davie Road to Hillsborough Road and Hillsborough Road from Greensboro Street to Main Street) had over 7% use by bicyclists. Main Street from Jones Ferry Road to Greensboro Street had almost 4% use by bicyclists and all other locations had less than 2.5% use by bicyclists.

The percent of pedestrians using the corridor segments also varied greatly, but with a similar distribution as the bicyclists. The three locations with the highest percent of pedestrian users were the same locations as for the bicyclists on Main Street and Hillsborough Road. For the most part, as the distance from the downtown and campus increased, the number of pedestrians decreased dramatically.

Transit use along the corridors appeared opposite that of the bicyclists and pedestrians. The highest percent of transit use occurred in the outlying areas, along Old Fayetteville Road between Jones Ferry Road and NC 54 and along Smith Level Road from Culbreth Road to NC 54 Bypass. These locations had the two highest numbers of transit users, and the Old Fayetteville Road corridor segment also had the second lowest number of auto users of any of the corridor segments. A park and ride lot for Chapel Hill Transit is within the Old Fayetteville corridor segment, so the number of transit users in this corridor is to be expected. The low traffic volumes lead to very high percent transit use in this particular corridor segment.

As expected, auto usage was quite high throughout the Town. The exceptions to this other than Old Fayetteville Road mentioned previously were Hillsborough Road between Greensboro and Main Street and Main Street between Davie Road and Hillsborough Road, all three of which had around 75% auto users. As expected, NC 54 Bypass carried the most number of people, between 16,000 and 26,000, approximately 98% of which are auto users.

Not all corridors need to rank high for multimodal mobility. Some corridors, such as NC 54 Bypass are not well suited for multimodal travel with its high traffic volumes and higher speeds. The Town should continue to concentrate its efforts on enhancing multimodal mobility on corridors that have a high potential for alternative mode usage.