

ATTACHMENT A

**A RESOLUTION AUTHORIZING THE TOWN MANAGER TO EXECUTE
A CONTRACT WITH THE TOWN OF CHAPEL HILL TO INCLUDE DATA
FROM CARRBORO IN THE MOBILITY REPORT CARD**

Resolution No. 24/2003-04

WHEREAS, the Board of Aldermen desire that a Mobility Report Card be prepared for Carrboro;

WHEREAS, the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization has identified the Mobility Report Card as part of the Region's congestion management plan; and

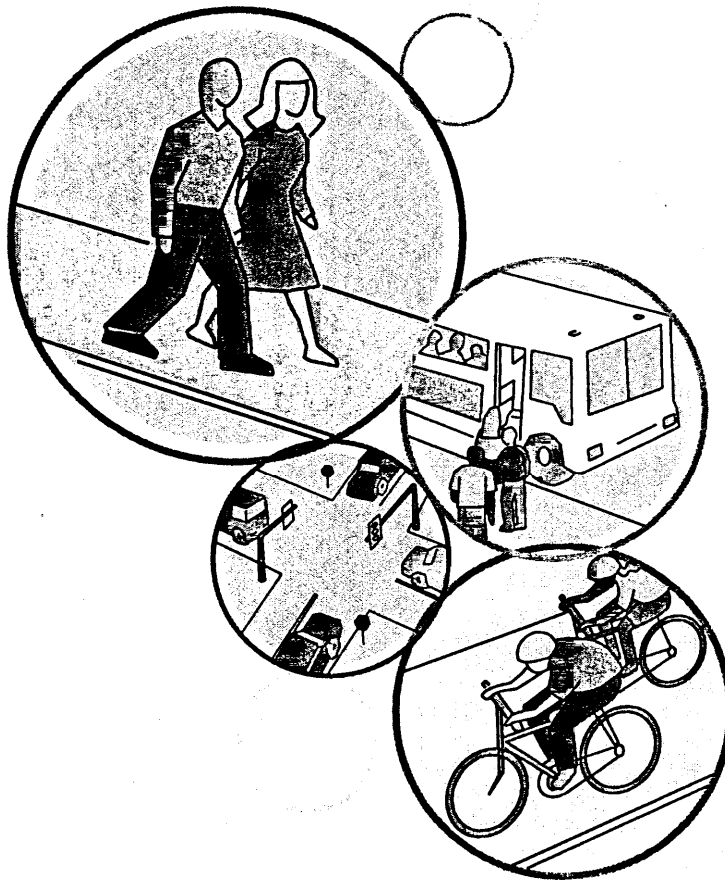
NOW, THEREFORE, BE IT RESOLVED that the Board of Aldermen authorizes the Town Manager to execute a contract with the Town of Chapel Hill to include data from Carrboro in the Mobility Report Card.

This the 16th day of September 2003.

Note: This is an excerpt of the Chapel Hill Mobility Report Card. The full report can be downloaded at: <http://townhall.townofchapelhill.org/planning/docs.html>

Chapel Hill

MOBILITY REPORT CARD



May 2002

LSA

LSA ASSOCIATES, INC.

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Introduction

This report card represents a snapshot of mobility in Chapel Hill during the fall of 2001. The idea for the report card was first described in the 2000 Chapel Hill Comprehensive Plan, where it was recommended as a means to monitor and evaluate the progress towards Town-wide mobility goals. While the 2000 Comprehensive Plan established clear goals and objectives for transportation in Chapel Hill, the progress toward those goals should also be systematically examined. By monitoring and consistently evaluating progress, the Town will be able to more efficiently

- Detect and correct problems,
- Manage, describe, and improve processes, and
- Document accomplishments.

As the first Mobility Report Card, this study represents the baseline for a progress evaluation every two years. The emphasis of this initial mobility report card is descriptive; that is, it should enhance the reader's understanding of the current state of mobility in Chapel Hill. Future mobility report cards will focus less on methodology and indicator description, and emphasize comparative evaluation of progress toward the goals outlined in the 2000 Comprehensive Plan. Accordingly, the tables and figures have been prepared in anticipation of future data, and the report itself is structured for regular updates and future comparative evaluation.

2000 Chapel Hill Comprehensive Plan Action Item – "Mobility Report Card"

In order to assure progress in improved mobility for the citizens of Chapel Hill, the comprehensive plan proposes that periodic transportation mobility surveys be conducted. The survey results become the Town's Mobility Report Card that will be used by Town Council and staff to assist in prioritizing and modifying current transportation programs to address citizen needs. These mobility surveys should be conducted every three to five years, with the first survey becoming the benchmark for subsequent comparisons. Daily and peak hour traffic counts and transit ridership reports are often conducted annually. Survey elements would include the following:

- Daily traffic counts along key arterials (25 to 50 locations).
- AM and PM peak hour intersection turn movement counts and level of service analysis of key intersections (25 to 50 locations).
- AM and PM peak hour travel time and delay runs that determine the average time it takes to travel from one end of Chapel Hill to another along various corridors. This analysis should also identify key congestion points for each corridor (10 to 20 corridors).
- Inventory of miles of sidewalk and bicycle lanes.
- Peak hour and/or daily bicycle and pedestrian counts at key locations (25 to 50 locations).
- Annual and daily transit passenger summaries by total system and route.

Mobility Report Card

Through discussions with Town staff, review of the Chapel Hill 2000 Comprehensive Plan, and input from consultants at LSA Associates, Inc., a series of mobility indicators were selected. It was important that each of these indicators be measurable, meaningful, easy to understand, and cost efficient. Indicators were selected that could be reliably measured over time with a consistent methodology and that would contribute to an overall picture of mobility trends in Chapel Hill. While numerous measures of mobility were considered, and could in the future be analyzed, 10 indicators were chosen to best balance the cost of data collection with the value of the resulting data to describe the current state of mobility within the Town and provide a meaningful baseline for future comparison:

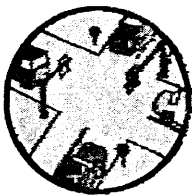
1. Vehicular Activity and Arterial Level of Service
2. Peak Hour Intersection Operations
3. Vehicular Travel Time
4. Pedestrian Facilities
5. Pedestrian Activity
6. Bicycle Facilities
7. Bicycle Activity
8. Transit Service
9. Transit Ridership
10. Office Parking

Discussions of each of the 10 indicators include three descriptions as follows:

2

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

A technical appendix has been provided to Town staff that includes detailed data collection methodologies, much of the supporting data, and electronic data files and analyses. The information collected by LSA has been supplemented with data collected by the University of North Carolina to provide a more complete picture of total Town mobility.



Indicator:

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," where "A" represents excellent level of service and "F" indicates failure. Intersection level of service is based on delay at an intersection. Actual delay by level of service rating is presented in Figure 2.

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 2½- to 3-hour PM peak period from which the respective peak hour is derived as the maximum of four consecutive 15-minute counts.

Because the peak hour intersection level of service analysis evaluates the performance of signalized intersections, the evaluation methodology must obtain data on how the signal system operates. This operational information includes the number of signal phases (i.e., is there just a green ball or are there left turn arrows?), the timing plans as to how much green, yellow, or red are assigned to each phase, and the overall cycle length, which is the time it takes a signal to go through all phases. In addition to the above, it is also necessary to know whether the intersection is a fixed time intersection, where each cycle allocates the same amount of time to each movement or phase, or whether the signal is actuated, which means that the signal automatically adjusts with the ebb and flow of traffic. In order to determine signalized intersection level of service, it is necessary to identify whether the signal is isolated (operates independently of other signals) or whether the signal is part of a system. It should also be noted that there are different timing plans for the morning peaks, evening peaks, midday, and off-peaks.

Understanding the relationship between the peak hour intersection level of service based on actual turn movement counts and the signal timing plans was an issue raised in the development of the 2000 Chapel Hill Comprehensive Plan. Extensive comments were received as part of the development of the plan that the signals in Chapel Hill were not properly timed. Providing a sound intersection turn movement database and a means to analyze and develop a signal timing plan for

the various traffic conditions is an important element not only in assessing current conditions, but in improving them.

Results

Morning, noon, and evening peak hour turn movements counts (TMCs) were collected for 65 intersections throughout Chapel Hill. These peak hour turn movement counts included supplemental counts from the University of North Carolina. These count locations are presented graphically in Figure 1, along with the locations where daily traffic counts were located. These counts are presented in Table B. These counts are expressed in terms such as Northbound Left (NBL), Westbound Right (WBR), Southbound Through (SBT), etc.

As part of this assessment process, a Synchro Database was developed for the Town of Chapel Hill. 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 B and in Figures 5, 6, and 7 for the AM, noon, and PM peak hours, respectively.

Table B – Intersection Level of Service

LOS & Delay Data Reported by Synchro

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Intersections	AM Peak Hour		Noon Peak Hour		PM Peak Hour	
	LOS	Delay(s)	LOS	Delay(s)	LOS	Delay(s)
US 15/501/Elliot Road	C	21.4	B	14.4	B	14.7
US 15/501/Estes	C	21.2	N/A	N/A	D	49.1
US 15/501/Euope Drive/Erwin Road	E	75.8	F	106.1	F	118
US 15/501/Harrison Connors Service Road/Eastowne	F	119.1	F	133.6	F	192.5
US 15/501/I-40 EB On/Off Ramp	E	62	B	17	B	18.8
US 15/501/I-40 WB Off/On Ramp	F	93	B	11	F	110.9
US 15/501/Lakeview Drive/Eastowne	F	81.2	F	141	F	191.1
US 15/501/Main Street	A	8.2	A	8.8	C	20.8
US 15/501/Manning Drive	B	17.4	N/A	N/A	F	93.5
US 15/501/Mt Carmel Church Culbreth	C	23.9	B	19.1	B	18
US 15/501/Scarlett Drive/Sage Road	D	53.4	D	39.3	D	50.9
US 15/501/Willow Drive	A	8.6	B	10.2	B	10.6
Airport Road/Eubanks Road	B	8.1	A	6.2	A	8.7
Airport Road/Hillsborough Street/Umstead Drive	A	8.5	A	7.9	B	14.2
Airport Road/Homestead Road/Church Parking Lot	B	17.4	B	15	B	14.2
Airport Road/I-40 EB On/Off Ramp	A	8.1	A	5.6	A	8.5

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Intersections	AM Peak Hour		Noon Peak Hour		PM Peak Hour	
	LOS	Delay(s)	LOS	Delay(s)	LOS	Delay(s)
Airport Road/I-40 WB On/Off Ramp	B	13.7	A	5.7	C	24
Airport Road/Perkins Drive	A	5.5	A	6.4	A	8.9
Airport Road/Piney Mountain Road/Municipal Drive	B	14.7	B	10.3	C	26.7
Airport Road/Weaver Dairy Road	C	26.6	B	19.4	C	33.3
Airport Road/Westminster Drive	A	6.1	A	5.3	A	6.8
Boundary Street/Franklin Street	A	6	A	6.5	B	10.6
Cameron Avenue/Pittsboro Street	B	17.2	N/A	N/A	B	14.5
Cameron Avenue/Raleigh Street/Country Club Road	C	20.1	N/A	N/A	B	17.9
Cameron Avenue/Ransom Street	A	9.1	B	15.9	D	37.3
Caswell Road/Estes Drive	B	17.8	B	16.4	B	11.5
Church Street/Rosemary Street	A	6.7	A	6.6	A	9.9
Columbia Street/Cameron Avenue	B	16.1	N/A	N/A	C	25.3
Columbia Street/Franklin Street	C	24.4	N/A	N/A	C	32.2
Columbia Street/Manning Drive	B	15	N/A	N/A	B	18.6
Columbia Street/Mason Farm Road/Westwood Drive	B	14	N/A	N/A	D	43.4
Columbia Street/NC 54 AB Ramps	B	13.6	N/A	N/A	C	24.7
Columbia Street/NC 54 CD Ramps	B	19	N/A	N/A	B	14
Columbia Street/Rosemary Street	B	17.1	N/A	N/A	B	18.8
Columbia Street/South Road	B	18.1	N/A	N/A	C	24.5
Columbia Street/Cross Walk	A	0	A	0	A	0
East Chapel Hill High School/Weaver Dairy Road	A	7.1	A	8.3	A	7.8
Erwin Road/Weaver Dairy Road	C	23.8	D	49.5	B	16.2
Fordham Blvd/Old Mason Farm Road	E	60.9	E	67.5	E	75.5
Franklin Street/Eastgate S/C	A	7.1	B	10.5	A	7.5
Franklin Street/Elliott Road	C	21.4	C	27.4	D	44.9
Franklin Street/Estes Drive	C	24.6	E	58.7	B	16.7
Franklin Street/Merritt Mill Road/Brewer Lane	A	5.4	A	6.9	A	7.4
Franklin Street/Raleigh Road	B	18.8	N/A	N/A	B	19.4
Graham Street/Franklin Street	A	7.3	A	6.9	A	6
Henderson Street/Rosemary Street	A	9.2	A	9.3	A	9.3
Hillsborough Street/Rosemary Street	B	10.4	A	6.4	B	10.5
Homestead Road/Seawell School Road	B	11.4	A	8.4	B	14.5
Legion Road/Ephesus Church Road	C	20.4	B	13.1	C	27.7
Manning Drive/Skipper Bowles Drive	B	15.1	N/A	N/A	C	21.9
Manning Drive/West Drive	A	4.5	N/A	N/A	A	7.2
Manning Drive/New East Drive	B	11.1	N/A	N/A	B	15.3
NC 54/Barbee Chapel Road	N/A	N/A	B	10.4	B	13.7
NC 54/Burning Tree Drive	A	8.1	A	6.4	D	38.1
NC 54/Hamilton Road	A	9.2	A	8.4	A	9.4
Parking Lot/Franklin Street/Mallette Street	A	7.2	A	7.2	A	7.8
Robertson Ln (1-Way SB)/Franklin St/Morehead Planetarium Parking	A	0	A	0	A	0
Roberson Lane/Rosemary Street	A	9.2	A	7.2	A	10
Seawell School Road/Estes Drive	A	9.3	B	10.8	E	64.9

Intersections	AM Peak Hour		Noon Peak Hour		PM Peak Hour	
	LOS	Delay(s)	LOS	Delay(s)	LOS	Delay(s)
South Road/Bell Tower Parking Lot	A	8	A	7.8	B	10.3
South Road/Country Club Road	B	13.6	N/A	N/A	C	31.7
South Road/Raleigh Street	A	3.7	N/A	N/A	A	8.6
South Road/McCauley Street/Pittsboro Street	B	14.5	N/A	N/A	A	9.6
Umstead Drive/Umstead Park	A	4.9	A	7.7	A	8.7
Willow Drive/Estes/Camelot Drive	A	5.8	A	6.6	A	10

The Synchro database will provide an important asset to the Town that will allow "what if" signal timing assessments to retune the Town's signal system. The database is also flexible. Even new signals are added or used to evaluate whether locations for future signals could be coordinated with the existing signal progression along a corridor.

Findings and Conclusions

Based on a review of Figures 5, 6, and 7, the majority of signalized intersections operate at the Town's threshold of LOS D or better. The few exceptions are along the US 15/501 corridor approaching I-40. These conditions tend to prevail during all three AM, noon, and PM peak hour time periods.

Unacceptable levels of service were also noted along Fordham Boulevard, south of NC 54. In review of other locations within the Town that exceeded the

minimum threshold, those intersections tended to have isolated problems during only one time period, often resulting from inefficiencies of the existing timing plans.

Based on the current intersection turn movement counts and the development of the Synchro database, the Town should take the opportunity to update the

signal timing plans. These plans tend to be good for two to three years and could be updated with future Mobility Report Card peak hour intersection traffic counts.

Comprehensive Plan Actions and Measures of Progress

- Commit funding to conduct comprehensive intersection turn movement counts and develop multiple signal timing plans (Town Council).
- Secure long-term funding to update traffic counts and timing plans every five years (Town Council).
- Develop and implement a comprehensive signal-timing plan by 2003.
- Conduct before-and-after travel time runs along the key corridors within the Town to demonstrate travel time savings.

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Figure 5 – am Peak Hour Signalized Intersection Level of Service

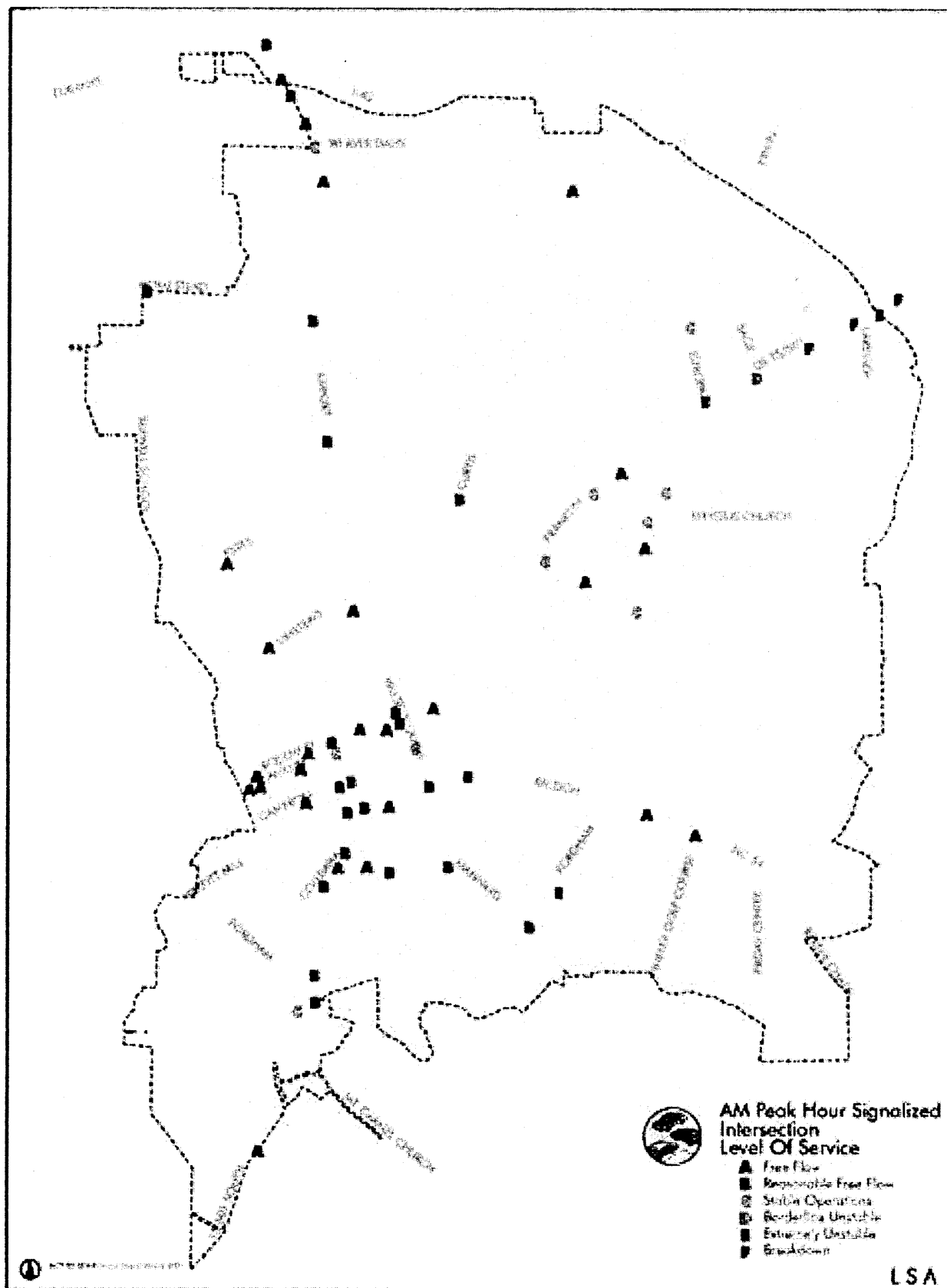


Figure 6 – Noon Peak Hour Signalized Intersection Level of Service

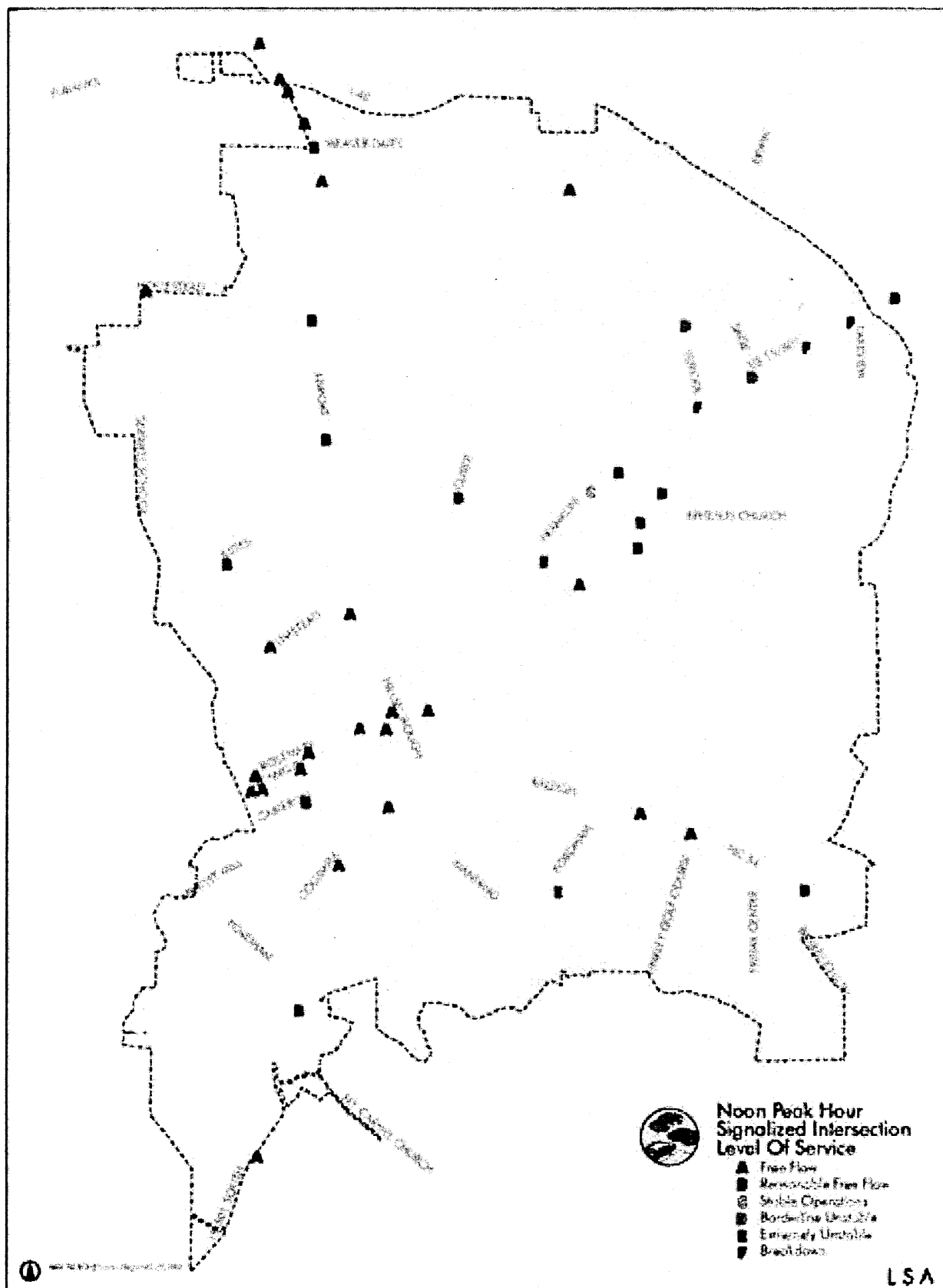
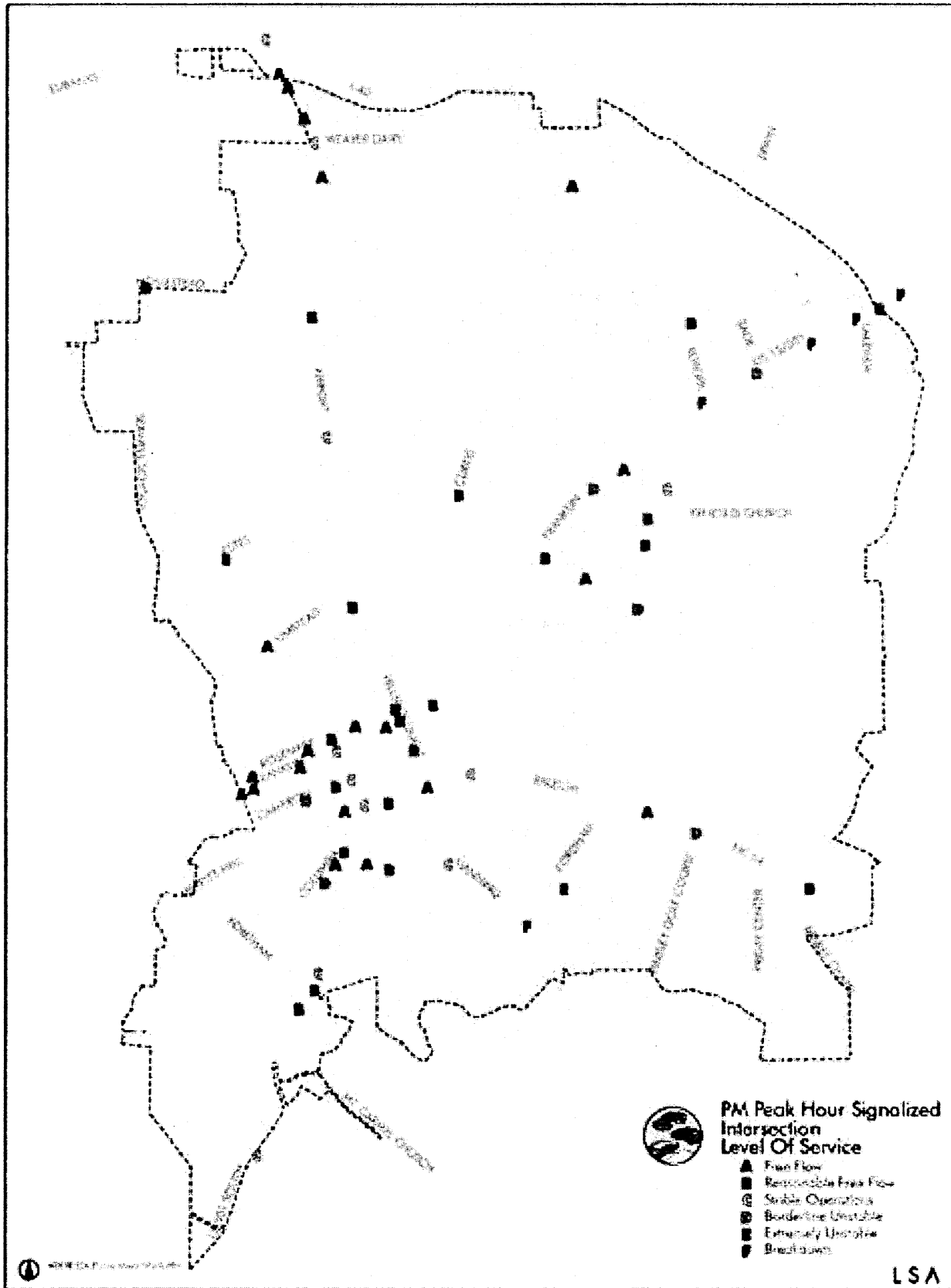
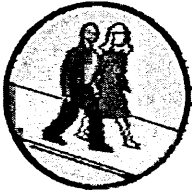


Figure 7 – pm Peak Hour Signalized Intersection Level of Service





Indicator:

PEDESTRIAN ACTIVITY

Measurement: Pedestrian Counts

Data: 12-Hour Directional Counts, Intersection TMCs

Why and How

In order to answer the question, "Does your community have a good pedestrian system?" one must first answer the question, "Are there any pedestrians?" Thus, the Town of Chapel Hill needs to know what level of pedestrian activity is being experienced in order to assess the condition of its pedestrian system. 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.

The first is land use. Are there a mix of uses and activities within proximity to one another, which could be served by walking? The second ingredient is the presence of pedestrian facilities. The third is the design of the facilities, such as the integration of the pedestrian system

2000 Chapel Hill Comprehensive Plan Action Item

- Develop and adopt procedures for evaluating performance of pedestrian facilities.

with development. The Town of Chapel Hill's Comprehensive Plan identified the need to address all three of these ingredients. The plan called for the improvement of the pedestrian network. The plan also called for establishing development review requirements to assure good pedestrian design for new developments. Periodic measurements of pedestrian activity are the indicator as to whether these strategies are working.

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 60 locations throughout the Town. These locations are presented in Figure 12. 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.

Results

The 12-hour pedestrian counts for the 60 count locations ranged from a low of zero to a high of 12,765. These counts are presented graphically in Figure 11 and tabularly in Table D and include supplemental counts from the University of North Carolina. These pedestrian counts are also presented in chart form in Figure 12.

Figure 11 – Pedestrian Count Locations and Volumes

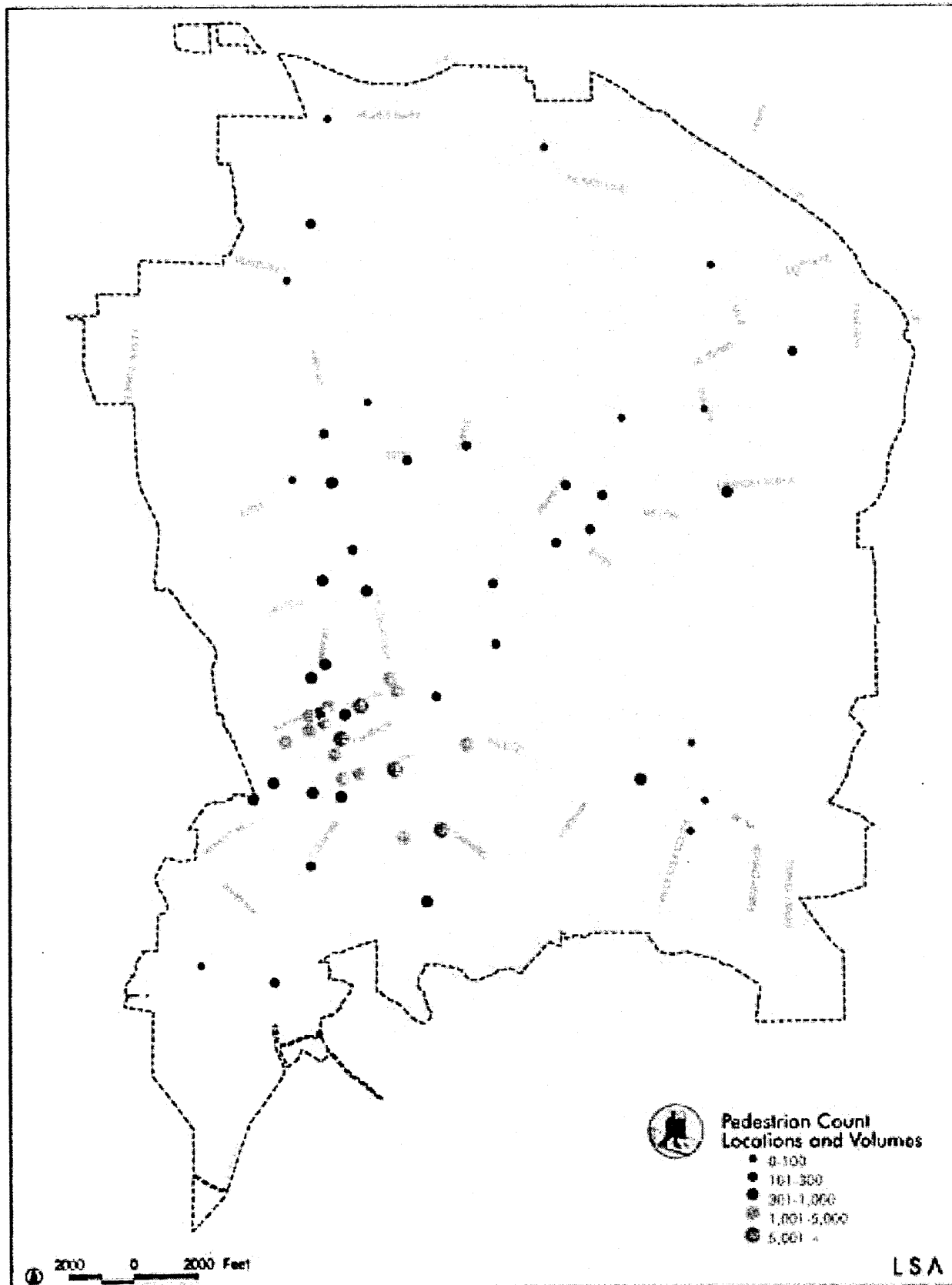


Table D – 12-Hour Pedestrian Counts

Dates Recorded: 11/06/01–11/15/01

Location	12-Hour Count
Airport Road/Shadow Drive	269
Airport Road/Stateside Drive	117
Airport Road/Stephens Street	856
Airport Road/YMCA Driveway	91
Bolin Creek Greenway B/W Airport Road and Bolinwood Drive	180
Bolin Creek Greenway B/W Elizabeth Street and Franklin Street	260
Boundary Street and Forest Theatre	239
Brooker Creek Bike Path	56
Burning Tree Drive North of NC 54	57
Cameron Avenue/Pittsboro Street	3,085
Cameron Avenue/Roberson Street	662
Columbia Street/Old Pittsboro Street	181
Columbia Street/Fraternity Court	7,040
Columbia Street/Town Hall	353
Columbia Street/Rosemary Street	1,139
Culbreth Road west of Adams Way	90
Curtis Road/Elliott Road (Path to School)	144
Elliott Road/Plaza Theatre	290
Ephesus Church Road/Churchill Drive	474
Erwin Road/Sage Road	34
Estes Drive/Horace Williams Airport D/W	24
Estes Drive/Phillips Middle School	142
Estes Drove/Community Center	192
Finley Golf Course Road (south of Prestwick Road)	62
Franklin Street/Caribou Coffee	2,304
Franklin Street/Church Street	2,960
Franklin Street/Coffee Shop	8,890
Franklin Street/Franklin Woods Bus Stop	183
Franklin Street/Henderson Street	6,670
Franklin Street/Hillsborough-Raleigh Street	1,368
Franklin Street/Kenan Street	1,302
Franklin Street/North Columbia Street	9,635
Franklin Street/Roosevelt Street	291
Hillsborough Street/Bolinwood Apts	778
Homestead Road west of Brookstone Apts	26
Legion Road/Europa Drive	33
Manning Drive/Craig Road	1,296
Manning Drive/Ridge Road	6,983
Mason Farm Road/Otey's Road	451
McCauley Street/Ransom Street	710
McCauley Street/Columbia Street	3,095
McCauley Street/Pittsboro Street	2,278

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Table D – 12-Hour Pedestrian Counts

Dates Recorded: 11/06/01–11/15/01

Location	12-Hour Count
Airport Road/Shadow Drive	269
Airport Road/Stateside Drive	117
Airport Road/Stephens Street	856
Airport Road/YMCA Driveway	91
Bolin Creek Greenway B/W Airport Road and Bolinwood Drive	180
Bolin Creek Greenway B/W Elizabeth Street and Franklin Street	260
Boundary Street and Forest Theatre	239
Brooker Creek Bike Path	56
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Manning Drive/Ridge Road	6,983
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McCauley Street/Columbia Street	3,095
McCauley Street/Pittsboro Street	2,278

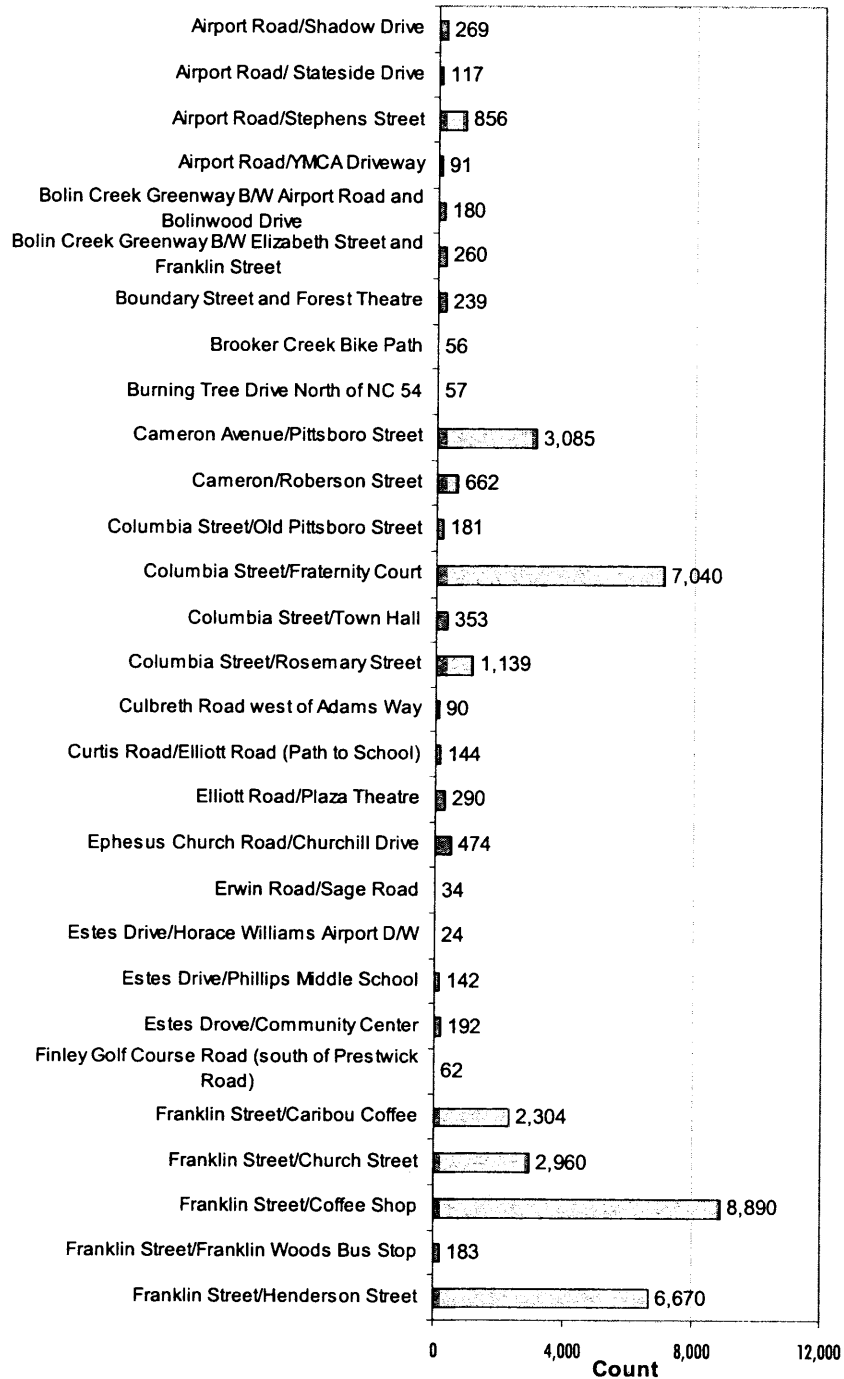
Location	12-Hour Count
Meadowmont Bike Path	30
Merritt Mill Road/Crest Street	427
Mt. Carmel Church Road/Bennett Road	13
NC 54/Hamilton Road	308
Old Durham Road B/W Cooper Street and Standish Drive	152
Piney Mountain Road east of Woodshire Lane	86
Pittsboro Street/Vance Street	782
Rosemary Street west of Columbia Street	692
Rosemary Street/Hillsborough Street	1,071
Rosemary Street/UNC Parking Lots	1,510
South Road/Country Club Road	1,032
South Road/Raleigh Street	5,645
South Road/The Bell Tower	12,765
Southern Village Bike Path	259
Umstead Drive B/W Bradley Road and Green Street	734
Weaver Dairy Road/Perkins Drive and Banks Drive	86
Weaver Dairy Road/Sunrise Lane	34
Willow Drive/Conner Drive	132

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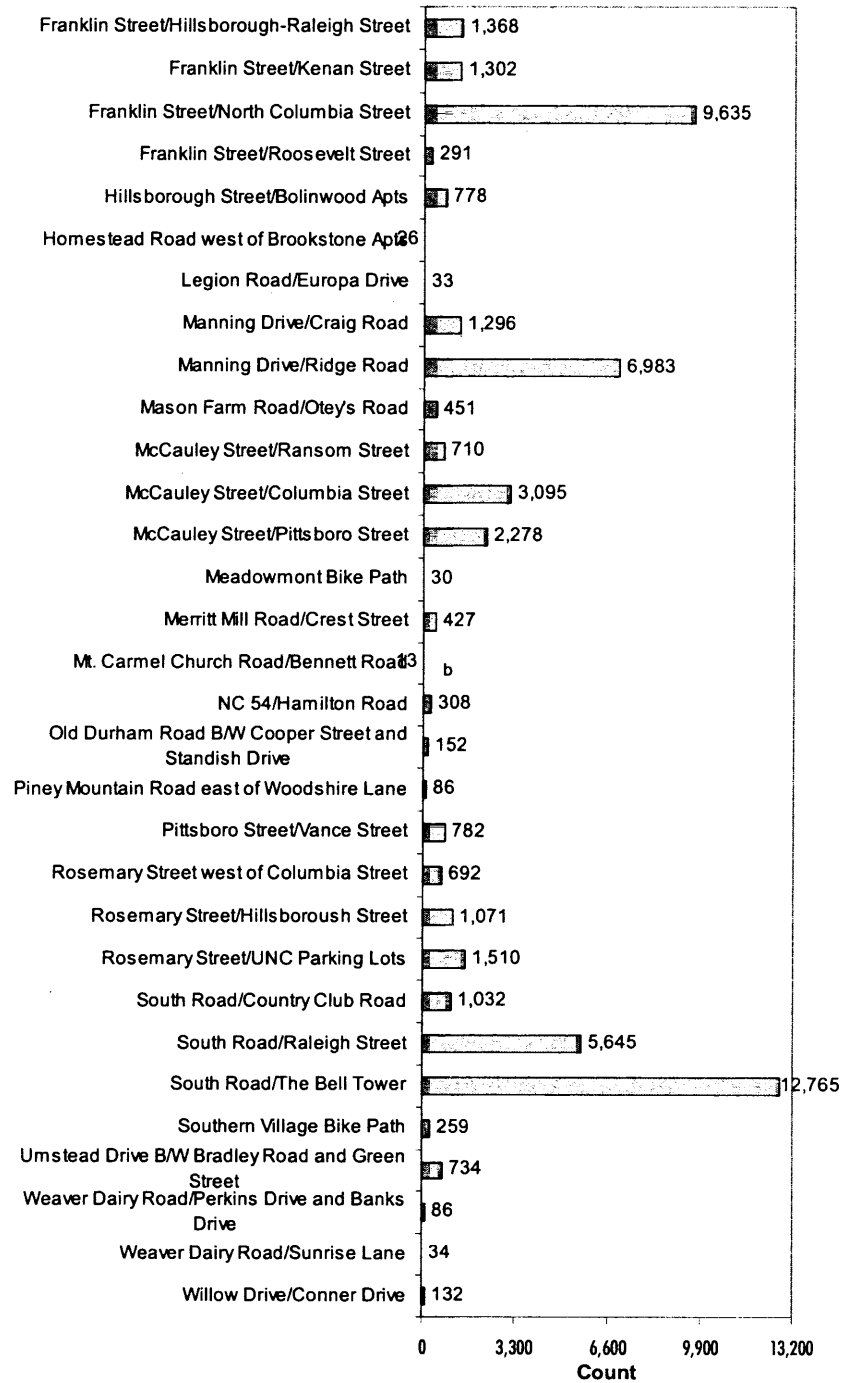
Figure 12 – 12-Hour Pedestrian Activity

Part 1

12-Hour Pedestrian Activity



12-Hour Pedestrian Activity



The range of 12-hour pedestrian counts along key travel corridors include these:

- Columbia Street– 180 to 740
- Franklin Street – 180 to 9,635
- Airport Road – 90 to 850
- Cameron Avenue – 660 to 3080
- South Road – 0 to 12,765

Highest daily volume locations were along South Road and Franklin Street. Six locations in the downtown and UNC area had 12-hour pedestrian volumes over 6,000, including South Road and The Bell Tower (12,765), Franklin Street and North Columbia (9,635), Franklin Street and the Caribou Coffee Shop (8,890), Columbia Street and Fraternity Court (7,040), and Manning Drive and Ridge Road (6,983).

Peak hours of pedestrian travel for campus locations were high at many locations during the 8 AM and 5 PM hours. Franklin Street had very high counts during most of the afternoon, related to pedestrian activity in and around the campus. The Booker Creek Bike Path and Bowlin Creek Greenway both had very high pedestrian use during the 5 PM hour.

Findings and Conclusions

As would be expected, the Town of Chapel Hill experiences the highest pedestrian volumes in the Town Center area and on the University of North Carolina campus. This area has the three ingredients to promote pedestrian activity: mixed use, pedestrian facilities, and good design.

Pedestrian activity outside the downtown and UNC area is generally low, even for areas that have sidewalks. Part of this is because of the lack of mixed-use activities and the design of the development, which does not promote pedestrian activities.

Attachment C

Carrboro Final Cost Estimate Prepared by LSA Associates

WORK EFFORT	SUPPORT LABOR*	#	TOTAL
Project Management			\$1,000
Scope Refinement			\$0
Daily Traffic Counts	$\$105 \times 37 = \$3,885$	37	\$3,885
Peak Hour Turn Movement			
- 1 Man Count Locations	$\$210 \times 8 = \$1,680$	8	\$1,680
- 2 Man Count Locations	$\$290 \times 8 = \$2,320$	8	\$2,320
Level of Service Analysis	$\$100 \times 23 = \$2,300$	23	\$2,300
Travel Time and Delay Runs	2 way, 2 per, a.m., mid-day and p.m. = \$125	5	\$625
Sidewalk Inventory (Mapping)			\$0
Bicycle Inventory (Mapping)			\$0
Bicycle and Pedestrian Counts	$\$16 \times 12 \times 16 = \$3,072$	16	\$3,072
Transit Summary and Mapping			\$0
Analysis and Report Preparation			\$4,000
Expenses – travel, per diem			\$1,500
Total			\$20,382