(14-1)

ATTACHMENT 14

UNIVERSITY VILLAGE

TRAFFIC IMPACT STUDY

EXECUTIVE SUMMARY

Prepared for:

The Town of Chapel Hill
Engineering Department

Prepared by:

HNTB North Carolina, PC

343 East Six Forks Road
Suite 200
Raleigh, NC 27609

June, 2006

NORTH CAROLINA PROFESSIONAL SEAL 026910 ENGINEER CRAIG R SCHEFFLER

6-1-06

EXECUTIVE SUMMARY

Project Overview

A new mixed-use development called University Village, located on N.C. Route 54 (Raleigh Road) between Hamilton Road and Finley Golf Course Road, is being proposed for construction in Chapel Hill. The development will consist of a mix of residential, office, and retail development with structured and surface lot parking. The development is to replace an existing 84 unit Best Western motel and also occupy undeveloped land along N.C. 54 frontage. **Figure ES-1** shows the general location of the site. The project is anticipated to be complete by 2011. This report analyzes the full build-out scenario for the year 2012 (one year after full buildout), the no-build scenario for 2012, as well as 2006 existing year traffic conditions.

The proposed development plans show direct, full movement access to Hamilton Road, Finley Golf Course Road, and Prestwick Road. An additional full movement access connection to N.C. 54 is desired immediately across from Rogerson Drive. Most site-related traffic will use N.C. 54 for access to locations external to the study area. **Figure ES-2** displays the preliminary site plans for the proposed University Village development and nearby roadways.

The land uses proposed for the site include 115,500 square feet of office space, 64,185 square feet of retail space, 228,215 square feet of residential space (189 condominiums/townhomes) and a 70,000 square foot (138 room) hotel. An estimated 922 parking spaces will be provided in surface lots, and above ground and underground decks.

Existing Conditions

Study Area

The study area contains sections of N.C. 54 and U.S. 15-501 and their interchange to the west of the proposed site. N.C. 54 from the U.S. 15-501 interchange to Barbee Chapel Road is studied the major intersections (Hamilton Road, Burning Tree Lane/Finley Golf Course Road, W. Barbee Chapel Road, Meadowmont Lane/Friday Center Drive, Barbee Chapel Road). Some minor intersections directly adjacent to the University Village site are also studied. Site traffic is expected to use entrance and exit driveways along N.C. 54, Finley Golf Course Road, and Prestwick Road. U.S. 15-501 is a major arterial running north-south through the study area, connecting areas of south Chapel Hill/UNC Hospitals to University Mall/Eastgate and the I-40 corridor. N.C. 54 is a major arterial connecting the UNC Campus area with the eastern Chapel Hill and out to I-40 and Durham. The remaining study area streets are either minor arterials, collector streets or local roadways providing access to residential and commercial developments in the study area.

This report analyzes and presents the transportation impacts that the University Village site will have on the following intersections along U.S. Route 15-501 (Fordham

Boulevard) in the project study area, south to north:

- U.S. 15-501 and Old Mason Farm Road
- U.S. 15-501 Northbound Off Ramp and N.C. 54 (Raleigh Road)
- U.S. 15-501 Northbound On Ramp and U.S. 15-501 Northbound
- U.S. 15-501 Southbound On Ramp and U.S. 15-501 Southbound
- U.S. 15-501 Southbound Off Ramp and Raleigh Road

This report also presents transportation impacts for the following intersections in the project study area along N.C. 54 (Raleigh Road), west to east:

- N.C. 54 and S. Hamilton Road
- N.C. 54 and Site Driveway #1 (Right-In/Right-Out Only)
- N.C. 54 and Site Driveway #2 (Full Access)/Rogerson Drive
- N.C. 54 and Burning Tree Drive/Finley Golf Course Road
- N.C. 54 and W. Barbee Chapel Road/Commercial Driveway
- N.C. 54 and Meadowmont Lane/Friday Center Driveway
- N.C. 54 and Barbee Chapel Road

Finally, the study area also includes the following intersections located adjacent to the proposed University Village site:

- S. Hamilton Road and Prestwick Road
- Finley Golf Course Road and Prestwick Road
- Finley Golf Course Road and UNC Medical Building Site Driveway (Full Access)

Site Traffic Generation

With the addition of new peak hour trips during the AM, noon, and PM peak hours, there are potential site traffic impacts to the study area intersections. **Table ES-1** shows the site trip generation details, with generation rates taken from the *ITE Trip Generation Manual, Volume 7*. Trip reductions for "pass-by" type tripmaking were conducted for this study, due to the fact that the retail component of the mixed use development may generate pass-by type trips. In addition, internal capture factors were applied, since the mixed-use nature of the proposed development would likely generate some trips (office/residential/retail) that would not leave the development. A trip reduction of 5% for transit was also accounted for, due to the proximity of the proposed sites to transit routes and bus stops. No noon peak generation data currently exists in the ITE methodologies, so an average of the projected AM and PM peak generated trips was used to evaluate noon peak impacts.

Table ES-1
Vehicle Trip Generation Summary - University Village

Daily Weekday Vehicle Trip Generation Summary

230	Residential Condominium/Townhouse	189	dwelling units	552	551	1103
710	General Office Building	115,500	sq. ft.	746	745	1491
820	Shopping Center	64,185	sq. ft.	2546	2545	5091
310	Hotel	138	rooms	564	563	1127
				4408	4404	8812
	Internal Capture	14%		-441	-440	-881
				3967	3964	7931
	Pass-by Trips (Shopping Center)	34%		-752	-772	-1524
				3215	3192	6407
	Transit Trips	5%		-161	-160	-321
				3054	3032	6086
320	Existing Motel (Reduction)	84	rooms	-243	-243	-486
			Total (New Trips)	**2811**	**2789**	**5600**

AM Peak Weekday Vehicle Trip Generation Summary

230	Residential Condominium/Townhouse	189	dwelling units	15	71	86
710	General Office Building	115,500	sq. ft.	185	25	210
820	Shopping Center	64,185	sq. ft.	73	47	120
310	Hotel	138	rooms	47	30	77
				320	173	493
	Transit Trips	5%		-16	-9	25
				304	164	468
320	Existing Motel (Reduction)	84	rooms	-14	-24	38
			Total (New Trips)	**290**	**140**	**430**

Noon Peak Weekday Vehicle Trip Generation Summary

230	Residential Condominium/Townhouse	189	dwelling units	42	52	94
710	General Office Building	115,500	sq. ft.	110	99	209
820	Shopping Center	64,185	sq. ft.	149	145	294
310	Hotel	138	rooms	45	35	80
				346	331	677
	Internal Capture	10%		-35	-33	68
				311	298	609
	Pass-by Trips (Shopping Center)	34%		-45	-43	88
				266	255	521
	Transit Trips	5%		-13	-13	-26
				253	242	495
320	Existing Motel (Reduction)	84	rooms	-21	-24	-45
			Total (New Trips)	**232**	**218**	**450**

PM Peak Weekday Vehicle Trip Generation Summary

230	Residential Condominium/Townhouse	189	dwelling units	68	33	101
710	General Office Building	115,500	sq. ft.	35	173	208
820	Shopping Center	64,185	sq. ft.	224	243	467
310	Hotel	138	rooms	43	39	82
				370	488	858
	Internal Capture	13%		-48	-63	-111
				322	425	747
	Pass-by Trips (Shopping Center)	34%		-68	-72	-140
				254	353	607
	Transit Trips	5%		-13	-18	-31
				241	335	576
320	Existing Motel (Reduction)	84	rooms	28	24	52
			Total (New Trips)	**213**	**311**	**524**

Background Traffic

There is one adjacent future development – the UNC Hospitals Clinical Facility - that Town of Chapel Hill staff desired to include as an approved background traffic generator. This project is located immediately to the east of the University Village site. There is a concurrent traffic impact study ongoing for UNC Hospitals that data was taken from. It was assumed based on information from the UNC Hospitals study that the clinical facility site would be complete and fully operational by the 2012 analysis year. An ambient area-wide traffic growth percentage of two percent per year was applied to existing traffic volumes based on information from the NCDOT Traffic Surveys Unit and the Town of Chapel Hill Planning Department.

Impact Analysis

Peak Hour Intersection Level of Service

The 2006 Existing Conditions analysis shows that only one intersection – U.S. 15-501 and Old Mason Farm Road – operates over capacity during the AM and PM peak hours. The northbound stop-controlled exiting traffic from the existing motel is over capacity for all three peak periods along N.C. 54. Existing operational deficiencies occur for individual turning movements at the N.C. 54 and Burning Tree Lane/Finley Golf Course Road intersection. All of these intersections will continue to experience these problems in the 2012 analyses, with or without site traffic impacts. Even with the addition of AM, noon, and PM peak hour site-generated trips to the projected 2012 background traffic volumes, no other existing study area intersections will experience overall deficient traffic operations. A summary of the traffic operations for each intersection, related to vehicular delays (intersection average as a whole if signalized, critical movement if stop-controlled) and the corresponding Level-of-Service (LOS) is shown in **Table ES-2** below.

Table ES-2 also shows that increases to vehicular delay at most intersections due to site-related traffic are not excessive. Signal timing will need to be adjusted at the intersections of N.C. 54 at Hamilton Road and at Burning Tree Lane/Finley Golf Course Road to ensure that vehicular queues from left-turn storage bays do not spill back into the eastbound and westbound N.C. 54 through travel lanes. The mitigation analysis provides summary data for improvements construct appropriate turning lane improvements along N.C. 54, as well as improving capacity along Finley Golf Course Road.

Table ES-2. LOS and Delay Summary

Intersections	Time Period	2006 Existing		2012 No-Build		2012 Build		2012 Mitigated	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Old Mason Farm Road and U.S. 15-501/NC 54	AM	82.0	***F***	***119.2***	***F***	***129.1***	***F***	N/A	N/A
	NOON	28.5	C	51.5	D	62.1	E	N/A	N/A
	PM	80.6	***F***	***129.6***	***F***	***141.1***	***F***	N/A	N/A
N.C. 54 and Hamilton Road	AM	8.0	A	9.1	A	9.5	A	11.2	B
	NOON	8.4	A	7.8	A	8.1	A	10.3	B
	PM	9.6	A	12.0	B	11.2	B	14.6	B
N.C. 54 and Burning Tree Lane/Finley GC Road	AM	18.1	B	17.1	B	19.1	B	24.4	C
	NOON	11.8	B	15.7	B	17.1	B	18.8	B
	PM	16.6	B	25.1	C	22.8	C	24.1	C
N.C. 54 and W. Barbee Chapel Road	AM	9.4	A	15.2	B	15.8	B	N/A	N/A
	NOON	6.2	A	6.2	A	6.7	A	N/A	N/A
	PM	8.5	A	7.7	A	8.0	A	N/A	N/A
N.C. 54 and Meadowmont Lane/Friday Center Drive	AM	32.1	C	32.7	C	33.6	C	N/A	N/A
	NOON	15.6	B	14.4	B	14.0	B	N/A	N/A
	PM	18.9	B	23.3	C	20.7	C	N/A	N/A
N.C. 54 and Barbee Chapel Road	AM	12.0	B	16.6	B	16.6	B	N/A	N/A
	NOON	12.5	B	12.9	B	13.7	B	N/A	N/A
	PM	15.4	B	17.0	B	16.8	B	N/A	N/A
U.S. 15-501 SB On-Rmp and U.S. 15-501 SB	AM	12.6	B	13.7	B	14.2	B	N/A	N/A
	NOON	12.8	B	16.0	B	18.5	B	N/A	N/A
	PM	14.7	B	20.2	C	25.2	C	N/A	N/A
Prestwick Road and Hamilton Road	AM	9.1	A	9.5	A	9.6	A	9.7	A
	NOON	7.3	A	7.3	A	7.4	A	7.4	A
	PM	7.6	A	7.7	A	7.7	A	7.8	A
Prestwick Road and Finley Golf Course Road	AM	9.3	A	9.4	A	10.3	B	10.8	B
	NOON	8.9	A	9.0	A	9.8	A	10.4	B
	PM	9.6	A	9.8	A	10.7	B	12.0	C

N/A => Not Applicable, i.e. movement is non-existent or no improvements made

Table ES-2. LOS and Delay Summary (Continued)

Intersections	Time Period	2006 Existing		2012 No-Build		2012 Build		2012 Mitigated	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Finley Golf Course Rd and UNC Hospitals Site Driveway	AM	N/A	N/A	11.4	B	11.9	B	12.1	B
	NOON	N/A	N/A	11.6	B	12.2	B	12.8	B
	PM	N/A	N/A	12.9	B	13.9	B	15.2	C
N.C. 54 and Site Driveway #2 /Rogerson Lane	AM	***1294***	***F***	***3877***	***F***	***27492***	***F***	2.1	A
	NOON	***174.7***	***F***	***367.0***	***F***	***7042***	***F***	2.4	A
	PM	***1096***	***F***	***2339***	***F***	--	***F***	3.0	A
N.C. 54 WB and US 15-501 NB Off-Ramp	AM	17.0*	C*	19.7*	C*	20.4*	C*	N/A	N/A
	NOON	11.6*	B*	12.4*	B*	12.8*	B*	N/A	N/A
	PM	12.5*	B*	13.6*	B*	14.3*	B*	N/A	N/A
N.C. 54 EB and U.S. 15-501 SB Off-Rmp	AM	10.4*	B*	11.1*	B*	12.0*	B*	N/A	N/A
	NOON	11.8*	B*	12.9*	B*	14.2*	B*	N/A	N/A
	PM	14.1*	B*	16.5*	C*	18.9*	C*	N/A	N/A
U.S. 15-501 NB and N.C. 54 EB Off-Ramp	AM	15.3*	C*	17.2*	C*	17.2*	C*	N/A	N/A
	NOON	15.7*	C*	18.1*	C*	18.1*	C*	N/A	N/A
	PM	21.0*	C*	28.2*	D*	28.2*	D*	N/A	N/A
U.S. 15-501 SB and N.C. 54 EB Off-Ramp	AM	13.9*	B*	15.3*	C*	15.6*	C*	N/A	N/A
	NOON	16.4*	C*	18.8*	C*	19.5*	C*	N/A	N/A
	PM	17.1*	C*	19.8*	C*	20.8*	C*	N/A	N/A
N.C. 54 and Site Driveway #1	AM	N/A	N/A	N/A	N/A	36.8	E	15.9	C
	NOON	N/A	N/A	N/A	N/A	26.2	D	13.6	B
	PM	N/A	N/A	N/A	N/A	***210.6***	***F***	21.2	C

N/A => Not Applicable, i.e. movement is non-existent or no improvements made
* => Simtraffic microsimulation Results

Access Analysis

Vehicular site access is to be accommodated via several driveway connections to N.C. 54, Finley Golf Course Road and Prestwick Road. The variety of connections provides options for site-related traffic to enter/exit via the most convenient route and will serve to disperse site-related trips to some extent. There are two driveways proposed along N.C. 54 – a right-turn in/right-turn out only driveway located about 300 feet east of the N.C. 54/Hamilton Road intersection that would primarily serve the proposed hotel, and a Left-Over driveway (left-turn in, no left-turn out) located at the existing University Inn motel driveway. A shared driveway is proposed to be constructed along Finley Golf Course Road about 400 feet to the south of its intersection with N.C. 54. This driveway will be the primary access point for the adjacent UNC Hospitals Clinical Facility.

Additional driveway access points are located along Prestwick Road on the southern frontage of the site property. These driveways would connect traffic to Prestwick Road and then to either Hamilton Road to the west or Finley Golf Course Road to the east.

Driveway throat lengths as shown on the proposed site development plans are adequate for the driveway access to N.C. 54, Prestwick Road, and Finley Golf Course Road for projected 2012 with site traffic conditions. On-site vehicle queuing will be able to be stored in the driveway throats. One potential issue is the presence of a number of parking spaces right at the driveway throat for Site Driveways #1 and #2. Queuing for exiting vehicles will take place in the driveway throats and should not block any internal circulation roadways or parking deck ramps.

Driveway distances from the signalized intersections at N.C. 54 and Hamilton Road and N.C. 54 and Burning Tree Lane/Finley Golf Course Road are acceptable, based on recommendations of 100 foot minimum corner clearance as set forth in the 2003 *NCDOT Policy on Street and Driveway Access to North Carolina Highways* and the 2003 *Town of Chapel Hill Design Manual*. The Town Design Manual recommends 250 foot minimum spacing between an intersection and driveway along an arterial, which is adhered to in the proposed site plan.

The key access consideration for the proposed University Village site is whether to allow full access at the existing median break along N.C. 54 that would serve as the primary site driveway. Operations analyses indicate that traffic attempting to exit the site and turning left would face lengthy delays, cause large queues back into the site, and would present a safety hazard in attempting to find gaps in traffic to cross three eastbound lanes, find median refuge and find acceptable westbound gaps. Currently, this is not as much of an issue due to the fact that the existing property generates far less trips than what is projected for University Village. If the median is closed, there would be significant impacts in the amount of u-turning traffic at Hamilton Road and Burning Tree Lane. It would also add high amounts of site traffic to both Hamilton Road and Finley Golf Course Road seeking to access N.C. 54. Neither of these existing roadway approaches is particularly well designed to accommodate significant increases of site-related traffic. The solutions tested for this study were to signalize the N.C. 54 and Site Driveway #2 intersection and let it remain full access or allow the westbound left-turn into the site by developing a storage bay in the existing median.

Internal circulation for site-related traffic is well designed on the site plan. There is an east-west driveway circulation pattern for surface parking lot traffic that connects to structured parking at the rear of the site (away from N.C. 54). There is a logical internal connection to the UNC Hospitals site to the east. There is also an internal traffic circle to facilitate traffic movement around the site. The layout of roadways connecting to the circle would not cause queues from the circle to back up to the N.C. 54 roadway (150 feet upstream).

Access for pedestrians and bicyclists is currently acceptable. As previously discussed, there is good sidewalk connectivity, at least in the local study area, and a pedestrian signal is located at the Hamilton Road/N.C. 54 intersection. Bicycle access is possible

to and from the site, although no specific bicycle amenities exist directly on N.C. 54 adjacent to the site

Sight Distance Analysis

In general, sight distance issues entering and exiting the proposed driveways would be minimal. Sight distance along N.C. 54, Finley Golf Course Road, Prestwick Road, and Hamilton Road is adequate, with only slight horizontal and/or vertical curvature present on these roadways in the study area. The location of the existing motel site driveway (Site Driveway #2) is just to the east of the crest of a vertical curve on N.C. 54 that limits westbound left-turning traffic from observing on-coming vehicle on eastbound N.C. 54. Traffic exiting the site and making right-turns will need to be cognizant of traffic queues on N.C. 54 at the signalized intersections at Hamilton Road, Site Driveway #2, and Finley Golf Course Road. No additional limitations or problems due to the site developments or site traffic impacts are expected at these intersections.

Intersection Crash Analysis

Data from the Town of Chapel Hill Police Department was provided for the period 3/1/2003 to 2/28/2006 for the study area intersections. Summary results are shown in **Table ES-3** below.

Table ES-3. Study Area Crash Data

Northbound U.S. 15-501 Exit Ramp and N.C. 54 Eastbound	124
U.S. 15-501 and All other N.C. 54 Interchange Ramps	99
N.C. 54 and Hamilton Road	61
N.C. 54 and Burning Tree Lane/Finley Golf Course Road	22
N.C. 54 and W. Barbee Chapel Road	29
N.C. 54 and Meadowmont Lane/Friday Center Drive	38
N.C. 54 and Barbee Chapel Road	45

The number of crashes at the U.S. 15-501 interchange with N.C. 54 is much higher than similar interchanges/intersections in Chapel Hill. The Northbound Exit Ramp intersection with N.C. 54 eastbound has the highest crash rate in Chapel Hill over the last three years. Overall, the number and severity of crashes at other study area intersections are average compared to other similar intersections in the Town of Chapel Hill. Most of the study area crashes are rear-end, sideswipe, and angle collisions due to the high volume of traffic in the area, and the delays and congested conditions that result from the traffic.

Other Transportation-Related Analyses

Other transportation-related analyses relevant to the 2001 Town of Chapel Hill Guidelines for the preparation of Traffic Impact Studies were completed as appropriate. The following topics listed in **Table ES-4** below are germane to the scope of this study.

Table ES-4. Other Transportation-Related Analyses

Long Range Planning-Level Capacity Analysis	Long Range Daily Capacity and Level of Service analyses were conducted for N.C. 54 and U.S. 15-501. Using 2030 Triangle Regional Model results, many segments of these roadways are projected to be over daily capacity in 2030.
Signal Phasing Analysis	Signal phasing for existing and future conditions produces adequate traffic operations at the signalized intersections under study.
Progression Analysis	Signals in the study area are part of the Town's signal system and coordination of these signals provides orderly traffic flow upstream and downstream of the proposed site. Signal timing plans were adjusted for each peak period under study. Signal timing for a new signal at N.C. 54 and Site Driveway #2 was optimized for progressed traffic flow along N.C. 54.
Turn Lane Storage Requirements	Storage lengths for existing turning bays on N.C. 54 are currently adequate. However, increases in turning traffic due to the University Village and UNC Hospitals projects may necessitate lengthening signal green time for these movements to prevent queue spillback into the through travel lanes. The Site Driveway #2 intersection with N.C. 54 will require a westbound left-turn lane with at least 200 feet of vehicular storage for recommended access control and a right-turn deceleration lane with at least 100 feet of full storage.
Appropriateness of Acceleration/ Deceleration Lanes	Given the lane geometrics and posted speeds on N.C. 54, it would be possible to create an eastbound exclusive right-turn lane at Site Driveway #2. No other special acceleration or deceleration lanes are required due to the proposed University Village development.
Pedestrian and Bicycle Analysis	Existing pedestrian access and connectivity is excellent through the study area. Exclusive ped/bike paths exist just to the east of the site location.
Public Transportation Analysis	Public transportation service to the site is excellent, with on-street bus stops within walking distance to the sites and multiple routes serving the study area.

Special Analysis/Issues Related to Project

Based on discussions with Town of Chapel Hill staff, no special analyses or issues related to the proposed University Village project were investigated for this report.

Mitigation Measures / Recommendations

Planned Improvements

The Town of Chapel Hill and the North Carolina Department of Transportation are not expected to make any significant transportation improvements to the project study area within the design year time frame of 2006-2012.

Background Committed Improvements

The UNC Hospitals Clinical Facility project recommendations are to address the lack of existing sidewalk connectivity at the existing site by providing sidewalk along the N.C. 54 and Finley Golf Course Road site frontage. Sidewalk width and design should meet Town of Chapel Hill Engineering design standards.

No other background improvements are committed by other project area developments.

Applicant Committed Improvements

Based on the concept plan provided, there is one transportation-related improvement to be made external to the site property. The concept plan provided shows that Prestwick Road will be widened and paved and will include on-street parallel parking spaces. Overall, driveway entrances/exits shown on the plan do not have any prescribed laneage. It will be assumed that these driveways are to be two-lane roadways with 24 foot pavement width. The main access driveway along N.C. 54 (Site Driveway #2) is also shown as a two-lane roadway. No specific delineation of left-turning vehicles out of the proposed site is shown for this driveway on the concept plan.

Necessary Improvements

Potentially, the Site Driveway #2/N.C. 54 intersection could be signalized to allow full access at the existing median break, or a left-over could be constructed in the existing median on N.C. 54 and left-turns out of the existing driveway could be restricted. Both options were analyzed for this study and it is recommended that a left-over into Site Driveway #2 be constructed, with signalized operations to safely control access into and out of the site, due to limited sight distances and heavy traffic volumes on N.C 54. This improvement requires a number of related improvements to ensure efficient and safe traffic operations along N.C. 54.

- Design the existing median break for eastbound left-turn operations into the site driveway only – prohibit any westbound u-turns.
- Construct an exclusive right-turn deceleration lane for eastbound N.C. 54 site traffic with at least 100 feet of full storage.
- Construct an exclusive left-turn lane with at least 200 feet of queue storage in the existing median on N.C. 54.
- Add right-turn arrow signal head for Rogerson Lane approach that remains red at all times. Add signage at this southbound approach indicating westbound N.C. 54 traffic does not stop. Keep the same current access restrictions for Rogerson Lane.

The resulting limitation of left-turn access out of the site at Site Driveway #2 may cause a shift in anticipated trip distribution patterns in the area of the proposed site. Site

traffic volumes were adjusted to account for this and impacts to certain study area intersections were highlighted in **Table ES-2** in the 2012 Mitigation column. Results indicate that no major operational impacts are expected at these other nearby intersections.

The operational results of this improvement are shown in **Table ES-5**, below.

Table ES-5. 2012 Capacity Analysis at N.C. 54 & Site Driveway #2/Rogerson Lane

Unsignalized Full Movement	N/A	N/A	N/A	N/A	N/A	N/A
EB LT	D	C	D	33.0	16.6	32.0
WB LT	E	C	***F***	36.4	18.5	***57.8***
NB LT	***F***	***F***	***F***	***27492.0***	***7042.0***	--
NB RT	D	C	E	31.5	19.6	48.7
SB RT	D	C	C	28.4	16.8	23.4
Signalized "Left-Over"	A	A	A	2.1	2.4	3.0
WB LT	***E***	***E***	***E***	***67.7***	***58.9***	***68.9***
WB TH	A	A	A	0.0	0.0	0.0
EB TH	A	A	A	1.4	0.6	1.8
EB RT	A	A	A	0.4	0.7	0.6
NB RT	D	D	D	54.4	45.3	53.6
SB RT*	C*	B*	C*	17.5*	13.2*	16.2*

* - HCS Results for unsignalized operations
-- => No movement capacity predicted by HCM Methodology, Delay Theoretically Infinite

The primary problem with signal installation for full access at this driveway access point is that the spacing between upstream and downstream signals (900 feet to Hamilton Road and 750 feet to Burning Tree Lane/Finley Golf Course Road) is closer than recommended for the optimal traffic progression on N.C. 54 given anticipated traffic volumes if this driveway were allowed to be full movement and keeping the current N.C. 54 speed limit (35 mph). Signal spacings of ¼ mile (1320 feet) for a 35 mph facility are recommended by the *Transportation Research Board – 2003 Access Management Manual.* By limiting access out of the site at this location and simplifying the traffic signal phasing, disruption to the N.C. 54 traffic stream is minimized.

In addition, in conjunction with the UNC Hospitals Clinical Facility project, pedestrian crosswalks and pedestrian signal heads should be added at all four approaches of the N.C. 54 and Burning Tree Lane/Finley Golf Course Road intersection. This improvement will provide a key link between the paved ped/bike paths in Meadowmont and existing sidewalk (with bus stop access) along the south side of N.C. 54, as well as across N.C. 54.

Additional improvements to accommodate additional traffic volume on Finley Golf Course Road and at its intersection with N.C. 54 are also recommended. Left-turn storage bays along N.C. 54 should be lengthened to 250 feet of full storage to accommodate additional left-turn movements onto Finley Golf Course Road and for additional u-turns on N.C. 54 eastbound. Existing protected-only left-turn phasing should remain in operation. Finley Golf Course Road should be widened to a three-

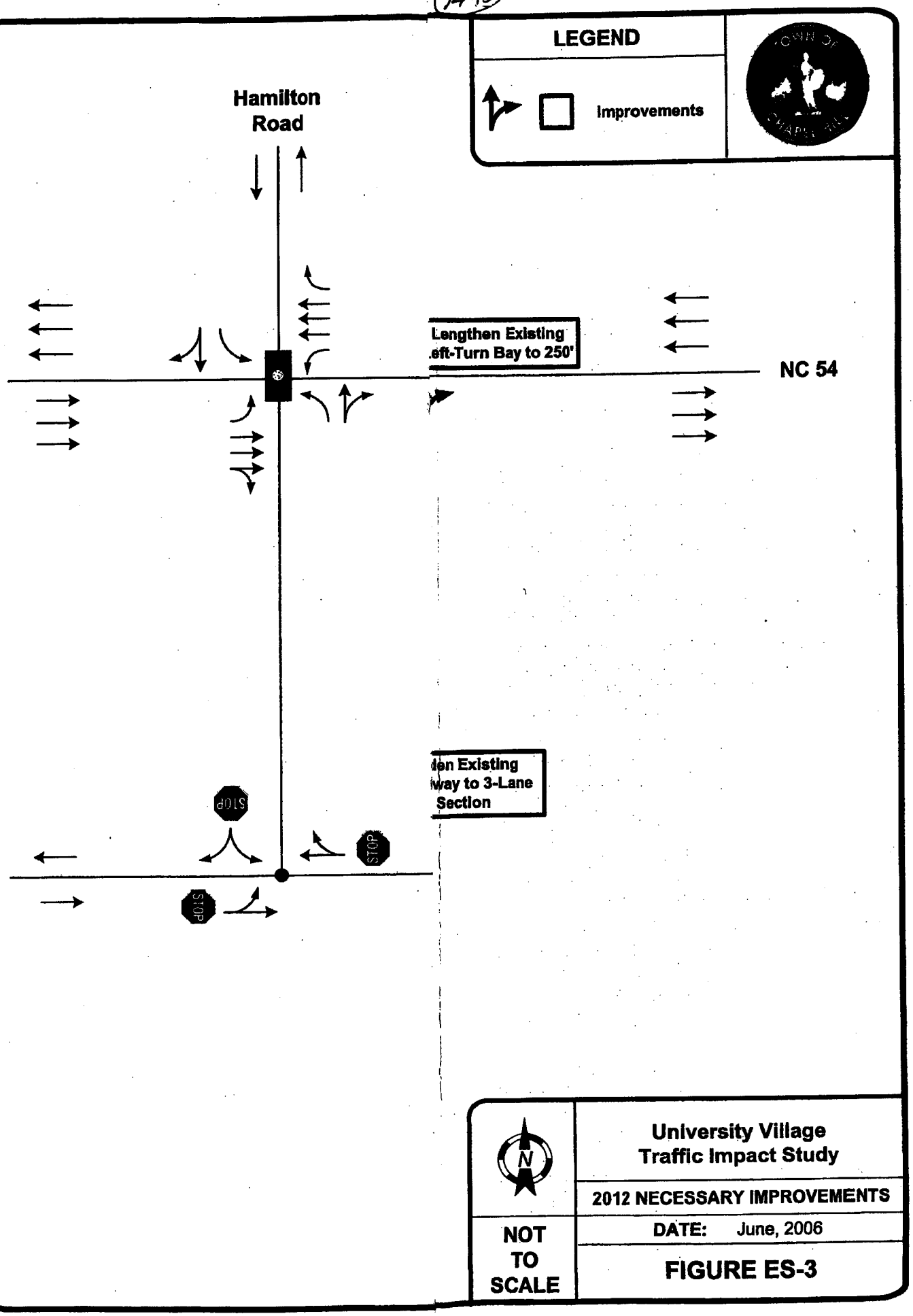
lane section from Prestwick Road to N.C. 54 to provide additional capacity for left-turn movements onto Prestwick Road and the UNC Hospitals Clinical Facility access driveway. This results in two approach lanes northbound at the N.C. 54 intersection.

Figure ES-3 shows a schematic of the proposed necessary improvements to the study area. No improvements at the N.C. 54/Hamilton Road intersection are necessary due to projected site traffic impact. No additional external roadway improvements are necessary to due to the addition of ambient growth and/or site traffic impacts.

The intersection of Old Mason Farm Road and U.S. 15-501 is currently over capacity and will operate worse in the 2012 analysis year. No improvements due to site-related traffic impact are recommended, as the intersection, and entire U.S. 15-501 corridor in this area, needs a major system capacity improvement. This would also affect and improve operations for many of the current ramps at the N.C. 54 interchange.

The intersection of the northbound US 15-501 Exit Ramp and N.C. 54 eastbound currently can be considered to be unsafe, using recent crash data. Though impacts of site-related traffic should not contribute to additional safety problems at this intersection, improvements to reduce the number of vehicle crashes need to be implemented. The merging of exit ramp traffic into the N.C. 54 eastbound traffic stream is near capacity during existing peak travel hours. In addition, traffic attempting to access the shopping center and gas station to the east of this intersection weave across the lane that is used by the exit ramp traffic to accelerate into the traffic stream. Recent improvements at this intersection consisting of raised lane delineators need to be evaluated for effectiveness in reducing vehicle crashes and potentially more permanent solutions of raised concrete curbing or the extension of concrete median to separate the yield-controlled approach with through traffic lanes may need to be considered.

14-15



N	University Village Traffic Impact Study
	2012 NECESSARY IMPROVEMENTS
NOT TO SCALE	DATE: June, 2006
	FIGURE ES-3