

(79)

**Overview of the Revised Traffic Impact Analysis
Residence at Chapel Hill North
January 3, 2007**

A Traffic Impact Analysis (TIA) was prepared by the Town Consultant in accordance with the Town's TIA guidelines. The purpose of this study is to determine the impact to the surrounding transportation system caused by the additional traffic generated by the proposed development. The project is expected to be completed and fully occupied in two phases by 2012.

A copy of the Recent Transportation Impact Analysis Executive Summary is appended to this report.

TIA Findings: The findings of the TIA indicate that the additional traffic generated by the proposed Residences at Chapel Hill North is expected to impact the surrounding roadway network. The Town Consultant has recommended signal timing and geometric improvements at some intersections to mitigate the projected traffic impacts, including adding another exclusive left-turn lane on Perkins Drive at the intersection of Martin Luther King Jr Boulevard.

Mitigation Measures: The State Transportation Improvement Program (TIP Project) Project (Weaver Dairy Road roadway improvements) in this area includes a center island on Weaver Dairy Road between Martin Luther King Jr Boulevard and University Station Road. The island will restrict vehicular traffic to right in/right out movements at Perkins Drive and Old University Station Road. This improvement is scheduled for construction between FY 2009 and FY 2013.

We discussed the existing and future analyses of traffic operations at the intersection of Weaver Dairy Road and Perkins Drive with NCDOT. They do not support a traffic signal at this intersection because of the proposed island on Weaver Dairy Road as part of the TIP Project and the close proximity of Martin Luther King Jr Boulevard and Banks Drive intersections. They recommend that the Chapel Hill North project construct a median on Weaver Dairy Road at Perkins Drive such that left turns are prohibited. We therefore included the following stipulation in Resolution A:

Perkins Drive Right In/Right Out Movement: That the applicant shall provide a median on Weaver Dairy Road to restrict traffic movements to right-in/right-out access to Perkins Drive, design subject to NCDOT and the Town Manager approval, prior to issuance of a Zoning Compliance Permit.

The TIA findings also indicated that under the 2012 build conditions, an additional left-turn lane needs to be added on Perkins Drive at Martin Luther King Jr Boulevard. We recommended the following stipulation:

Repaint Right Lane Arrows on Perkins Drive: That the applicant shall repaint the right-lane turn arrows on Perkins Drive at the intersection of NC-86 to provide a dual-motion



right/left turn lane design, subject to NCDOT and the Town Manager approval, prior to issuance of a Zoning Compliance Permit.

We also included the following stipulations related to traffic signal timing on Martin Luther King Jr Blvd Corridor and pedestrian/bicycle improvements at the intersection of Martin Luther King Jr Boulevard and Perkins Drive:

Signal Retiming: That the applicant shall provide an \$8,000 payment to the Town for traffic signal retiming on the Martin Luther King Jr Blvd. and Weaver Dairy Road corridors, prior to the issuance of a Zoning Compliance Permit.

Pedestrian Crosswalk and Bicycle Safety Improvements at Martin Luther King Jr. Boulevard and Perkins Drive: Subject to NCDOT and Town Manager approval, the applicant shall upgrade the existing traffic signal to provide a crosswalk, with pedestrian signals, on Martin Luther King, Jr. Boulevard and bicycle activated loops on Perkins Drive prior to issuance of a Zoning Compliance Permit.

**TRAFFIC IMPACT ANALYSIS
CHAPEL HILL NORTH
MASTER PLAN
PROPOSED MODIFICATION - 2006**

**Chapel Hill, North Carolina
Executive Summary**



prepared for:
Chapel Hill, NC

prepared by:
RS&H
IMPROVING YOUR WORLD
RS&H Architects-Engineers-Planners, Inc.

October 2006

The Chapel Hill North Master Plan that was approved by the Town Council in 1990 proposed a mixed-use development at the intersection of Martin Luther King, Jr. Boulevard (NC 86) and Weaver Dairy Road. The plan authorized a total of 633,400 square feet of floor area on the 40-acre site including a minimum of 374,200 square feet of office development (60%); and a maximum of 259,200 square feet of retail use (40%). Phase 1 of the Master Plan was developed in 1991 with 102,713 square feet of office use and 147,807 square feet of retail use built and occupied. There is an additional 382,880 square feet of approved development that has not yet been built.

This proposed modification of the Chapel Hill North Master Plan maintains the total development size of 633,400 square feet but reallocates the space among retail, office and residential uses. The proposed modification of the Chapel Hill North Master plan proposes 132,000 square feet of office development, 50,000 square feet of retail development and 200,880 square feet of residential development in two phases. A summary of the proposed modification of the Chapel Hill North Master Plan is presented in Table 1 and illustrated in Figure 1.

**Table 1:
 Proposed Modification of the Chapel Hill North Master Plan**

Land Use	Approved in 1990	Constructed and Occupied	2009- Phase II Development	2012- Phase III Development	Proposed 2006 Master Plan
	(sq ft)	(sq ft)	(sq ft)	(sq ft)	(sq ft)
Office	374,200	102,713		132,000	234,713
Retail	259,200	147,807		50,000	197,807
Residential			200,880		200,880
Total	633,400	250,520	200,880	182,000	633,400

1) Project Overview

The undeveloped portion of the proposed modification of the Chapel Hill North Master Plan consists of 200,880 square feet of multi-family residential development, 132,000 square feet of office development and 50,000 square feet of retail development. The project is expected to be completed and fully occupied in two phases by 2012.

The site is located in the MU-01-1, 'Mixed-use office/institutional' zoning district as indicated in the Town of Chapel Hill zoning map (see Figure 2). This district includes special land use intensity standards, specific permitted land use regulations and development thresholds. As proposed, the modification of the Chapel Hill North Master Plan would decrease the office ratio threshold below the zoning's specified minimum of 60% of the total project floor area. The size of the retail portion of the site would continue to meet zoning requirements and the proposed residential use is permitted under the MU-01-1 zoning.

The undeveloped portion of the proposed mixed-use development is located on Perkins Road in the vicinity of the intersection of Martin Luther King, Jr. Boulevard with Weaver Dairy Road.

**Table 2:
 Site Trip Generation
 Chapel Hill North**

TRIP GENERATION RATES									
Land Use	Size	Weekday (veh. per 1000 sf per day)		AM Peak Hour (veh. per 1000 sf per hour)		Mid day Peak Hour (veh. Per 1000 sf per hour)		PM Peak Hour (veh. per 1000 sf per hour)	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
<u>1990 Approved Master Plan</u>	374,000 sf	5.00	5.00	1.30	0.20	0.70	0.70	0.20	1.10
Office	259,200 sf	24.30	24.30	0.70	0.40	1.80	1.80	2.20	2.40
Retail									
<u>Proposed 2006 Modification of the Master Plan</u>									
Office	234,713 sf	5.50	5.50	1.40	0.20	0.70	0.70	0.20	1.20
Retail	197,807 sf	26.90	26.90	0.70	0.50	2.00	2.00	2.40	2.60
Residential	123 dus	4.10	4.10	0.10	0.40	0.30	0.30	0.40	0.20

TRIP GENERATION VOLUME									
Land Use	Size	Weekday (veh. per day)		AM Peak Hour (veh. per hour)		Mid day Peak Hour (veh. per hour)		PM Peak Hour (veh. per hour)	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
<u>Approved Master Plan</u>									
Office	374,000 sf	1,842	1,842	474	64	248	249	85	413
Retail	259,200 sf	6,306	6,306	169	108	469	469	564	610
TOTAL		8,148	8,148	643	172	717	717	649	1,023
<u>Proposed 2006 Modification of the Master Plan</u>									
Office	234,713 sf	1,287	1,287	326	44	170	170	58	283
Retail	197,807 sf	5,290	5,290	143	91	392	392	471	510
Residential	123 dus	508	508	13	51	40	40	52	28
TOTAL		7,085	7,085	482	186	602	602	581	821

**Table 3:
 New Site Trip Generation
 Chapel Hill North**

TRIP GENERATION RATES									
Land Use	Size	Weekday (veh. per 1000 sf per day)		AM Peak Hour (veh. per 1000 sf per hour)		Mid day Peak Hour (veh. Per 1000 sf per hour)		PM Peak Hour (veh. per 1000 sf per hour)	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
<u>Currently Proposed for Construction</u>									
Office	132,000 sf	6.30	6.30	1.20	0.20	0.60	0.60	0.20	0.90
Retail	50,000 sf	43.30	43.30	0.50	0.30	1.40	1.40	1.70	1.80
Residential	123 dus	4.10	4.10	0.11	0.40	0.33	0.33	0.42	1.04

TRIP GENERATION VOLUME									
Land Use	Size	Weekday (veh. per day)		AM Peak Hour (veh. per hour)		Mid day Peak Hour (veh. per hour)		PM Peak Hour (veh. per hour)	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
<u>Currently Proposed for Construction</u>									
Office	132,000 sf	826	826	158	22	74	74	26	123
Retail	50,000 sf	2,164	2,164	23	14	68	68	83	89
Residential	123 dus	508	508	13	51	40	40	52	28
TOTAL		3,498	3,498	194	187	182	182	161	240

Table 4.
Summary of the Proposed Project's Impacts

Analyses	Impacts
Site Access	The two driveways shown in the proposed site plan should be sufficient to accommodate the site traffic as estimated for the proposed development.
New Signal Location	A signal warrant analysis was performed at the unsignalized intersections of Weaver Dairy Road at Banks Drive and Weaver Dairy Road at Perkins Drive to determine the need for a traffic signal. Travel conditions at both these intersections met the Warrant 3 - Peak Hour Vehicular Volume. NCDOT proposes improvements to these two intersections under the T. I. P. U-3306. If this project is not built, a traffic signal may be needed at these locations. A detailed description of the proposed mitigation measures is included in Section 7.
Traffic Signal Phasing	The intersections analyzed for this study have multi-phase signal controllers that can accommodate variations in traffic flow. According to this analysis, traffic demand at several locations would exceed the intersection capacity limits. In order to improve the traffic flow, this study recommends improvements to the signal phasing at all the study intersections under the 2009 and 2012 Build Conditions.
High Crash Locations	Crash data were obtained from the North Carolina Department of Transportation (NCDOT) for 36-month period for locations most likely to be impacted by the proposed development. This crash data indicated that the travel conditions in the study area are relatively safe today except at the intersection of Martin Luther King, Jr. Boulevard with Weaver Dairy Road.
Traffic Signal Progression	The signalized intersections in the study area were analyzed as isolated intersections, therefore no progression analysis was conducted part of this study.
Peak Hour Intersection Capacity	The peak hour intersection capacity analysis indicated that traffic demand in the study area flows at acceptable Levels of Service under the 2006 Existing Conditions, 2009 No Build and Build Conditions with some minor changes in the signal timing plan. Under the 2012 No Build and Build Conditions, traffic demand at several locations would exceed the intersection capacity limits. This study recommends mitigation measures for several locations in the year 2012. A detailed description of the proposed mitigation measures for this intersection is provided in Section 7.
Turn Lane Storage Requirements	The capacity analysis indicates that no separate left-turn lanes or additional storage lengths will be necessary at any of the intersections analyzed for this study.
Intersection Sight Distance	There is no sight distance problem at the intersections of Perkins Drive and Old University Station Road with the proposed site driveways.
Appropriateness of Acceleration/Deceleration Lanes	The speed limit on Perkins Drive and Old University Station Road, the roadways to which the proposed development will have direct access is low (25 miles per hour) indicating that there is no need for acceleration/ deceleration lanes at the proposed site driveway.
Pedestrian and Bicycle Facilities	<p>There is a continuous sidewalk on the eastern side of Martin Luther King, Jr. Boulevard from I-40 to downtown Chapel Hill. Weaver Dairy Road has a sidewalk along the south side of the street. Banks Drive has sidewalks along both sides of the street. Perkins Drive has sidewalks along southern side of the street near its intersection with Martin Luther King, Jr. Boulevard and on western side of the street near its intersections with Weaver Dairy Road. Shopping Center Drive has sidewalks along the northern side of the street. On the other area streets, there are no other sidewalks.</p> <p>Martin Luther King, Jr. Boulevard has bicycle lanes in both directions in the vicinity of the study area. There are no other bicycle facilities on other nearby roads.</p> <p>This study does not recommend any additional facilities for pedestrians and/or bicycle riders.</p>
Public Transportation Facilities	The study area is well served by the Chapel Hill Transit with several mid-block bus stops in the study area. No additional bus stop will be added as part of this project.

7) Mitigation Measures Recommendations

Roadway improvements are divided into four categories: improvements already planned by the Town or the North Carolina Department of Transportation; those required regardless of development at the proposed site; improvements proposed as part of the site development; and any additional improvements required as a result of site development.

a) Planned Improvements

The North Carolina Department of Transportation (NCDOT) under the 2007-13 Transportation Improvement Program Number U-3306 (T. I. P.) proposes to upgrade and/or widen the Weaver Dairy Road between Martin Luther King, Jr. Boulevard and Erwin Road. This project is scheduled to begin construction in 2009 and complete by 2011. Therefore, the 2012 No Build and Build Conditions were analyzed including the improvements of this proposed project. These improvements were discussed in detail under the 2012 No Build Conditions Section.

b) Background Committed Improvements

No other roadway improvements that directly impact this analysis are committed by other development projects in the area.

c) Applicant Committed Improvements

The proposed site would have access via two new site drives, one on Perkins Drive and one on Old University Station Road. At these two new site drives, improvements required to accommodate site traffic are limited to one approach lane and one exit lane on site driveways.

d) Recommended Improvements

The 2009 capacity analysis indicated that the traffic demand would flow at acceptable Levels of Service at all the study intersections with the exception of the intersection of Martin Luther King, Jr. Boulevard at Weaver Dairy Road. At this intersection, additional left-right-turning lanes would be required to improve the traffic flow in 2009 No Build/Build Conditions. However, NCDOT proposes to add additional lanes to this intersection under the T.I.P U-3306: Weaver Dairy Road widening project, which is scheduled to begin construction in 2009 and complete by 2011. Therefore, no mitigation measures were recommended at this intersection for the year 2009.

The 2012 capacity analysis indicated that the traffic demand would flow at acceptable Levels of Service at all the study intersections with the exception of the following three intersections:

- Martin Luther King, Jr. Boulevard at I-40 Westbound Ramps
- Martin Luther King, Jr. Boulevard at Eubanks Road
- Martin Luther King, Jr. Boulevard at Perkins Drive

Regardless of whether the proposed project is built, improvements are required at these three intersections. The following provides a brief description of the mitigation measures recommended at these three intersections for the year 2012.

Martin Luther King, Jr. Boulevard at I-40 Westbound Ramps: Under the 2012 Build Conditions with Improvements, an additional exclusive through-lane needs to be added on the northbound Martin Luther King, Jr. Boulevard. With these improvements, the following would be the lane configuration at this intersection in the year 2012:

- Two through lanes and an exclusive right-turn lane on the southbound Martin Luther King, Jr. Boulevard approach
- Two exclusive left-turn lanes and two through lanes on the northbound Martin Luther King, Jr. Boulevard approach
- Two exclusive left-turn lanes and an exclusive right-turn lane on the westbound 1-40 westbound Ramp approach

Under the 2012 Build Conditions with Improvements, an analysis of the signalized intersection of Martin Luther King, Jr. Boulevard with 1-40 westbound ramps indicates that the intersection as a whole would function at Level of Service D or better during the AM, mid-day, and PM peak hours of the day, an acceptable rate of traffic flow. However, the northbound left-turning traffic demand on the MLK, Jr. Blvd. would function at Level of Service F during the PM peak hour. This study did not recommend any improvements to improve the northbound left-turning movements, because the existing bridge would have to be re-designed to accommodate any improvements. Therefore, this location should be further studied in a separate report.

Martin Luther King, Jr. Boulevard at Eubanks Road: Under the 2012 Build Conditions with Improvements, an additional left-turn lane needs to be added on the eastbound Eubanks Road and an additional right-turn lane on southbound Martin Luther King, Jr. Boulevard. With these improvements, the following would be the lane configuration at this intersection in the year 2012:

- Two through lanes and an exclusive right-turn lane on the southbound Martin Luther King, Jr. Boulevard approach.
- One exclusive left-turn lane, three through lanes on the northbound Martin Luther King, Jr. Boulevard approach.
- Two exclusive left-turn lanes and an exclusive right-turn lane on the eastbound Eubanks Road approach.

Under the 2012 Build Conditions with Improvements, an analysis of the signalized intersection of Martin Luther King, Jr. Boulevard with Eubanks Road indicates that the intersection as a whole would function at Level of Service C or better during the AM, mid-day, and PM peak hours.

Martin Luther King, Jr. Boulevard at Perkins Drive: Under the 2012 Build Conditions with Improvements, an additional left-turn lane needs to be added on the westbound Perkins Drive approach. With these improvements, the following would be the lane configuration at this intersection in the year 2012:

- One exclusive left-turn lane and two through lanes on the southbound Martin Luther King, Jr. Boulevard approach.
- Three through lanes with a shared right-turn lane on northbound Martin Luther King, Jr. Boulevard approach.
- Two exclusive left-turn lanes, one through lane and an exclusive right-turn lane on the westbound Perkins Drive approach.

Under the 2012 Build Conditions with Improvements, overall traffic demand at the intersection of Martin Luther King, Jr. Boulevard at Perkins Drive would operate at Level of Service C or better throughout the day.

As proposed under the T.I.P. U-3306, the North Carolina Department of Transportation recommends to eliminate the southbound Perkins Drive left-turning movements and the eastbound Weaver Dairy Road left-turning movements and thereby restrict the Perkins Drive to right-in/right-out only. With these improvements, the intersection of Weaver Dairy Road at Perkins Drive would operate with a Level of Service C throughout the day. However, if the Weaver Dairy Road project is not built, traffic demand at this intersection would continue to exceed the intersection capacity limits. Therefore, if this project is not built the following two alternatives should be considered to improve the traffic flow at this intersection:

Install a traffic signal at the intersection of Weaver Dairy Road at Perkins Drive, which would improve the traffic flow conditions for the traffic on the southbound Perkins Drive. A signal warrant analysis summarized in Section G-Project Impacts indicates that warrant 3: Peak Hour warrant would be met. However, the proposed traffic signal at this intersection may adversely affect the flow conditions along Weaver Dairy Road because the distance between the Martin Luther King, Jr. Boulevard/Weaver Dairy Road intersection and the Weaver Dairy Road/Perkins Drive intersection is only 500 feet.

The second alternative is to re-align Perkins Drive to the intersection of Weaver Dairy Road at Banks Drive and install a traffic signal at this intersection. This alternative would better facilitate the traffic flow along Weaver Dairy Road, as the distance between the proposed signal at the intersection of Weaver Dairy Road/Banks Drive and the existing signal at the intersection of Martin Luther King, Jr. Boulevard/Weaver Dairy Road is approximately 750 feet. However, it is unclear how the right-of-way would be acquired on the north side of Weaver Dairy Road and who would be responsible for the roadway improvements.

Table 5 compares the intersection capacity analysis results for all the scenarios analyzed in this study.

Table 5:
 Intersection Capacity Analysis Summary

Location	2006 Existing Conditions		2009 No Build Conditions		2009 Build Conditions		2012 No Build Conditions		2012 Build Conditions		2012 Mitigation Measures		
	AM	Mid-day	PM	AM	Mid-day	PM	AM	Mid-day	PM	AM	Mid-day	PM	
Martin Luther King, Jr. Boulevard at I-40 Westbound Ramps	Overall	C	C	D	C	D	C	D	C	D	C	D	C
		L	E	E	E	E	E	E	E	E	E	E	E
	Westbound	R	B	A	C	B	A	B	B	B	B	B	B
		L	D	C	C	D	D	D	D	D	D	D	C
	Northbound	T	B	A	B	D	A	B	D	C	D	C	A
		T	C	C	C	D	C	B	D	B	E	B	B
	Southbound	R	A	A	A	B	A	A	B	A	B	A	A
		B	A	B	A	A	B	B	A	B	A	C	B
	Overall	L	E	E	E	E	E	E	E	E	E	E	E
	Eastbound	R	B	E	C	B	E	B	B	E	B	E	B
		T	B	A	C	A	A	C	C	A	C	C	A
	Northbound	R	A	A	A	A	A	A	A	A	A	A	A
	L	E	A	E	B	E	B	E	E	B	E	B	
Southbound	T	A	A	A	A	A	A	A	A	A	A	A	
	B	A	B	B	C	B	B	C	B	D	C	B	
Overall	L	E	E	E	E	E	E	E	E	F	D	E	
Eastbound	R	A	C	C	D	C	C	C	D	C	C	C	
	L	A	A	C	C	B	E	D	C	F	C	B	
Northbound	T	A	A	A	A	A	A	B	A	A	A	A	
	T	A	A	A	B	A	D	B	A	D	B	A	
Southbound	R	A	A	A	A	A	A	A	A	A	A	A	
	A	A	A	A	A	A	A	A	A	A	A	A	
Overall	L	E	E	E	E	E	E	E	E	E	E	E	
Westbound	R	B	C	B	A	D	B	C	A	B	C	A	
	TR	A	A	A	A	A	A	A	A	A	A	B	
Northbound	L	A	A	C	A	A	A	A	D	B	C	D	
	T	A	A	A	A	A	A	A	A	A	A	A	
Southbound													

8

Table 5 Continued

Location	Overall	2006 Existing Conditions			2009 No Build Conditions			2009 Build Conditions			2012 No Build Conditions			2012 Build Conditions			2012 Mitigation Measures						
		AM	Mid-day	PM	AM	Mid-day	PM	AM	Mid-day	PM	AM	Mid-day	PM	AM	Mid-day	PM	AM	Mid-day	PM				
Martin Luther King, Jr. Boulevard at Weaver Dairy Road	Eastbound	L	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E			
		T	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
		R	B	C	B	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	
	Westbound	L	D	E	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
		T	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
		R	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
	Northbound	L	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
		T	C	B	D	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B
		R	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
	Southbound	L	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
TR		B	A	C	C	A	D	C	B	D	B	A	C	C	B	D	B	A	C	C	B	D	
R		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
Martin Luther King, Jr. Boulevard at Shopping Center Drive*	Westbound	R	B	B	C	B	C	B	D	B	B	D	B	B	D	B	B	D	B	B	D	B	
		L	A	A	B	A	A	B	A	A	B	A	A	B	A	A	B	A	A	B	A	A	
		LR	D	E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	
	Eastbound	L	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
		LR	D	E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F
		R	B	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C
	Southbound	L	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
		LR	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
		R	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

* - Unsignalized Intersections