

CHAPEL HILL NORTH – HARRIS TEETER EXPANSION

TRAFFIC IMPACT STUDY

EXECUTIVE SUMMARY



Prepared for:

The Town of Chapel Hill
Public Works Department - Engineering

Prepared by:

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March 2018

HNTB

CHAPEL HILL NORTH – HARRIS TEETER SUPERMARKET

COMMERCIAL REDEVELOPMENT

TRAFFIC IMPACT STUDY

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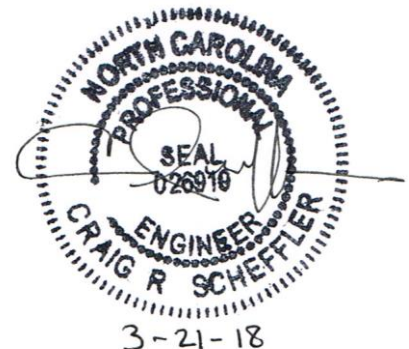
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Project Overview

A redevelopment of the Chapel Hill North Shopping Center Harris Teeter supermarket, located along N.C. 86 (Martin Luther King, Jr. Boulevard) near Perkins Drive, is being proposed in Chapel Hill. The project will entail adding space to the existing supermarket building and constructing a fuel station with 14 gas pumps and additional on-site parking at the rear of the existing Harris Teeter parking lot. **Figure ES-1** shows the general location of the site. The project is anticipated to be fully complete by 2020. This report analyzes the full build-out scenario for the year 2021 (one year after anticipated completion), the no-build scenario for 2021, as well as 2017 existing year traffic conditions.

The proposed site concept plan shows no changes to existing access driveways to the site. There are two existing external access connections – internal driveways to Perkins Drive and the NC 86 corridor or via an existing right-turn in/right-turn out only (RIRO) driveway along NC 86 adjacent to the site. **Figure ES-2** displays the preliminary concept plan of Harris Teeter Expansion and nearby land uses and roadways.

Existing Conditions

Study Area

The existing Harris Teeter supermarket is part of the Chapel Hill North Shopping Center and has its own surface parking lot and shares two primary access points to Perkins Drive to the south and NC 86 (Martin Luther King, Jr. Boulevard) to the west. The site borders residential neighborhoods to the west and commercial development to the south, The I-40 corridor is located directly to the north. The proposed site plan, shown in **Figure ES-2**, shows the location of the local access streets, internal driveway network and adjacent transportation facilities.



Existing Harris Teeter Site

The study area contains all signalized intersections along NC 86 (Martin Luther King, Jr. Boulevard) from Weaver Dairy Road to the I-40 interchange. It also includes site access unsignalized intersections at Perkins Drive and an existing stop-controlled right-turn in/right-turn out only intersection with NC 86. Site traffic will use one of these two existing access points. NC 86 (Martin Luther King, Jr. Boulevard) is a major arterial providing connectivity throughout Chapel Hill. The remaining study area network roadways are either minor arterial or collector street facilities providing connectivity throughout northern Chapel Hill or local neighborhood/commercial access streets.

Site Traffic Generation

With the addition of new peak hour trips due to site expansion during the weekday AM, noon, and PM peak hours, there are potential site traffic impacts to the study area intersections. Appropriate modifications for “pass-by” type trips, “diverted-linked” trips from the I-40 corridor, and internal “chained” trips (that utilize both the supermarket and fuel station in one external trip) were assumed to occur, given the nature of the proposed land uses, and are summarized in **Table ES-1**. **Table ES-1** shows site trip generation details, with rates taken from the *ITE Trip Generation Manual, Volume 9* and adjusted for the appropriate trip reductions stated above. Trip chain reductions were conservatively only applied to new fuel station/supermarket expansion trips and not existing trips to the supermarket.



Table ES-1
Weekday Vehicle Trip Generation Summary
Harris Teeter Supermarket Redevelopment

Trip Generation Type	Land Use	ITE LUC	Density	Daily			AM Peak Hour			Noon Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
1. Total Trips	Supermarket Addition	850	11,908 SF	609	609	1,218	25	15	40	46	43	89	58	55	113
	Fuel Station	944	14 Fueling Positions	1,180	1,180	2,360	87	83	170	92	90	182	97	97	194
	Raw ITE Total Trips			1,789	1,789	3,578	112	98	210	138	133	271	155	152	307
2. Adjusted Total Trips for Trip Chaining	Supermarket Addition			457	457	914	18	11	28	30	28	58	35	34	69
	Fuel Station			885	885	1,770	61	58	119	60	59	119	59	59	118
	Total Adjusted Trips			1,342	1,342	2,684	78	69	147	90	87	177	95	93	187
3. Primary (New) Trips	Supermarket Addition			91	91	183	4	2	6	6	6	12	7	7	14
	Fuel Station			177	177	354	12	12	24	12	12	24	12	12	24
	Total Primary (New) Trips			268	268	537	16	14	29	18	17	35	19	19	37
4. Pass-By Trips	Supermarket Addition			228	228	457	9	5	14	15	14	29	18	17	34
	Fuel Station			443	443	885	30	29	60	30	29	60	30	30	59
	Total Pass-By Trips			671	671	1,342	39	34	74	45	44	89	47	46	94
	Total Pass-By Trips (Balanced)			671	671	1,342	37	37	74	44	44	89	47	47	94
5. Diverted-Linked Trips	Supermarket Addition			137	137	274	5	3	8	9	8	17	11	10	21
	Fuel Station			266	266	531	18	17	36	18	18	36	18	18	36
	Total Diverted Linked Trips			403	403	805	24	21	44	27	26	53	28	28	56
	Total Diverted Linked Trips (Balanced)			403	403	805	22	22	44	27	27	53	28	28	56

LUC = Land Use Code Number



Background Traffic

Background traffic growth for the future 2021 analysis years is expected to come ambient regional traffic growth and specific development-related traffic growth. Based on information on average daily traffic collected by the Town of Chapel Hill and the North Carolina Department of Transportation (NCDOT), an ambient traffic growth rate of 0.5 percent per year was estimated for the short-term 2021 design year capacity analyses. This rate is based on previous and anticipated growth trends for this area from Town and NCDOT average annual daily traffic (AADT) information from the period 1990-2015. In some cases, AADT's on study area roadways have actually declined over the last 10 years. However, to conservatively account for any background development projects and potential traffic increases in the future, a positive growth rate was selected.

Four background development projects in or adjacent to the project study area were specifically included as background traffic generators. Their site traffic impacts were added to the ambient growth estimates to produce total 2021 background traffic volumes.

Impact Analysis

Peak Hour Intersection Level of Service (LOS)

Existing 2017 traffic operations at most study area intersections are acceptable during all three peak hours analyzed, with only one unsignalized intersection exceeding capacity in one peak hour. The projected ambient and background development traffic growth will marginally increase impacts for the 2021 analysis time period – with the assumption that background development transportation network improvements are complete by 2021. With the addition of Harris Teeter redevelopment site traffic on the network, no intersections drop to deficient levels of service, although several mitigation improvements to improve site traffic mobility and safety were tested in the 2021 mitigation scenario. These improvements cause slight increases in vehicular delay.

A summary of the traffic operations for each intersection, related to vehicular delays (overall intersection average if signalized, critical movement if stop-controlled) and the corresponding Level-of-Service (LOS) is shown in **Table ES-2**.

Access Analysis

Vehicular site access is to be accommodated via two existing internal Chapel Hill North shopping center driveways connecting to external study area roadways. An existing right-turn in/right-turn out only driveway connects directly to the existing Harris Teeter surface parking lot and store frontage. A second internal driveway provides access throughout the Chapel Hill North shopping center and connects to Perkins Drive, with connectivity to the existing signalized intersection with NC 86 (Martin Luther King, Jr Boulevard). No additional driveways are proposed. Additional modifications to driveway aisles and additional surface parking are proposed in the existing surface parking lot for Harris Teeter (see **Figure ES-2**).

Access for pedestrians and bicyclists is adequate in the project study area. Sidewalks are present on both sides of N.C. 86 (Martin Luther King, Jr. Boulevard) throughout the study area and connectivity is available on at least one side of the street along many facilities in the project study area that connect to the Martin Luther King, Jr. Boulevard and to the Harris Teeter site. Crosswalk and pedestrian signals exist across the NC 86 intersections with Weaver Dairy Road and Perkins Drive near the site. Striped bicycle lanes along NC 86, Weaver Dairy Road and the Weaver Dairy Road Extension currently exist in the project study area.



**Table ES-2. Chapel Hill North - Harris Teeter Redevelopment
 Peak Hour LOS and Vehicular Delay Summary**

Intersections	Peak Hour	2017 Existing		2021 No-Build		2021 Build		2021 Mitigated	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
NC 86 (Martin Luther King Jr. Boulevard) and I-40 Westbound Ramps	AM	C	25.2	C	28.7	C	28.8	N/A	N/A
	Noon	C	27.3	C	30.5	C	30.8	N/A	N/A
	PM	D	37.2	C	34.9	D	35.7	N/A	N/A
NC 86 (Martin Luther King Jr. Boulevard) and I-40 Eastbound Ramps	AM	C	24.9	C	25.5	C	27.0	N/A	N/A
	Noon	B	14.2	B	12.5	B	12.8	N/A	N/A
	PM	B	17.7	B	13.8	B	14.2	N/A	N/A
NC 86 (Martin Luther King Jr. Boulevard) and Eubanks Road	AM	C	26.7	C	20.0	C	21.0	C	25.9
	Noon	B	13.6	B	16.3	B	16.3	B	19.6
	PM	B	16.8	B	17.6	B	18.0	C	21.6
NC 86 (Martin Luther King Jr. Boulevard) and Chapel Hill North RIRO Driveway [@]	AM	C	16.7	C	19.0	C	24.5	N/A	N/A
	Noon	C	16.1	C	18.8	D	25.6	N/A	N/A
	PM	F	56.2	F	103.2	F	261.5	E**	37.6**
NC 86 (Martin Luther King Jr. Boulevard) and Perkins Drive	AM	A	7.1	A	6.8	A	8.3	A	9.7
	Noon	B	12.6	A	8.9	B	10.1	B	11.0
	PM	B	10.7	B	11.7	B	13.2	B	15.7
NC 86 (Martin Luther King Jr. Boulevard) and Weaver Dairy Road / Weaver Dairy Road Extension	AM	C	34.3	D	36.1	D	36.2	N/A	N/A
	Noon	C	26.3	C	28.3	C	28.3	N/A	N/A
	PM	D	40.9	D	38.9	D	39.1	N/A	N/A
Perkins Drive and Chapel Hill North Main Access Driveway [@]	AM	A	9.5	A	9.6	A	9.7	N/A	N/A
	Noon	B	11.2	B	11.3	B	11.8	N/A	N/A
	PM	B	11.5	B	11.6	B	12.0	N/A	N/A
Internal Chapel Hill North Driveway Intersection near Harris Teeter [@]	AM	A	9.2	A	9.2	B	10.8	N/A	N/A
	Noon	B	10.1	B	10.7	B	13.6	N/A	N/A
	PM	B	12.4	B	12.5	C	18.7	N/A	N/A

BOLD/ITALICS – Movement or Overall Intersection is over capacity as defined by Chapel Hill TIS Standards
[@] - Unsignalized Intersection, LOS/Delay Values Correspond to Worst-Case Critical Movement
 N/A – Not Applicable, i.e. no improvements made ** - Operations results from SimTraffic Microsimulation Software

Signal Warrant Analysis

Based on projected 2021 traffic volumes and current/proposed access plans, no unsignalized intersection in the project study area would potentially warrant the installation of a traffic signal, based on the methodology found in the *2009 Manual on Uniform Traffic Control Devices (MUTCD)* and the current access spacing and center concrete median island provisions currently in place along both NC 86 and Weaver Dairy Road. Though the projected LOS for the NC 86 / Chapel Hill North RIRO stop-controlled driveway intersection is LOS F in the 2021 PM peak hour, a traffic signal installation at this location is not recommended. Actual operations analyzed in Condition 4 indicate that this intersection will receive enough adequate gaps due to the presence of the existing traffic signal at Perkins Drive.



Crash Analysis

Data from the NCDOT Traffic Safety Unit was provided for the five-year period 5/1/2012 to 4/30/2017 for segment of NC 86 (Martin Luther King, Jr. Boulevard) in the vicinity of the proposed site. 60 crashes were reported along NC 86 between Eubanks Road and Weaver Dairy Road. Primary crash types included rear end crashes and left-turn crashes. Overall, the number and severity of crashes along the Weaver Dairy Road corridor in the project study area is slightly higher than state-wide averages for similar facilities.

Mitigation Measures/Recommendations

Planned Improvements

There are no Town of Chapel Hill or NCDOT improvement projects for study area facilities within the analysis year time frame of 2017-2021. NCDOT will begin construction on STIP I-3306A (I-40 Widening) in 2023. The Town is continuing planning activities on bus rapid transit (BRT) improvements for the NC 86 corridor, but the implementation of those was assumed to be after the 2021 analysis year.

Background Committed Improvements

There is one specific private development project (Carraway Village – formerly The Edge) that has been approved and is expected to be complete by the 2021 analysis year that would impact project study area transportation facilities. Transportation improvements required by the Carraway Village development include a widening of Eubanks Road to a four-lane divided cross-section and intersection laneage and signal timing improvements at the NC 86 / Eubanks Road signalized intersection. In addition, recommendations from the original The Edge Traffic Impact Study included signal retiming along the NC 86 corridor to mitigate the impacts of site traffic increases from this development.

All of the proposed recommended improvements listed above were included in the 2021 No-Build and Build analyses for the Harris Teeter Expansion project.

Applicant Committed Improvements

Based on the preliminary site plan and supporting development information provided, no external transportation improvements are proposed. Internal improvements for traffic circulation and additional parking spaces in the existing Harris Teeter parking lot are shown on **Figure ES-2**.

Necessary Improvements

Based on traffic capacity analyses for the 2021 design year, and analyses of existing study area turning bay storage lengths and site access, the following improvements are recommended as being necessary for adequate transportation network operations (see **Figure ES-3**).



- 1) Monitor and retime the NC 86 (Martin Luther King, Jr. Boulevard) traffic signal at Eubanks Road to allow adequate green time for the northbound left-turn movement – which would be impacted by u-turning site traffic from Harris Teeter. In addition, if u-turning traffic is conflicting with eastbound right-turn traffic and blocking the higher volume of left-turn vehicles seeking to access Eubanks Road, remove the eastbound right-turn overlap signal phase and add signage to alert right-turn drivers to yield to u-turns. This improvement is recommended if the Harris Teeter Expansion site is developed.
- 2) Monitor and retime the NC 86 (Martin Luther King, Jr. Boulevard) traffic signal at Perkins Drive to allow adequate green time for the southbound left-turn movement – which would be impacted by u-turning site traffic from Harris Teeter. Extend existing southbound left-turn/u-turn storage bay to 300 feet of full storage. Similar to the recommendation above, if u-turning traffic is conflicting



with westbound right-turn traffic, remove the eastbound right-turn overlap signal phase and add signage to alert right-turn drivers to yield to u-turns. This improvement is recommended if the Harris Teeter Expansion site is developed.

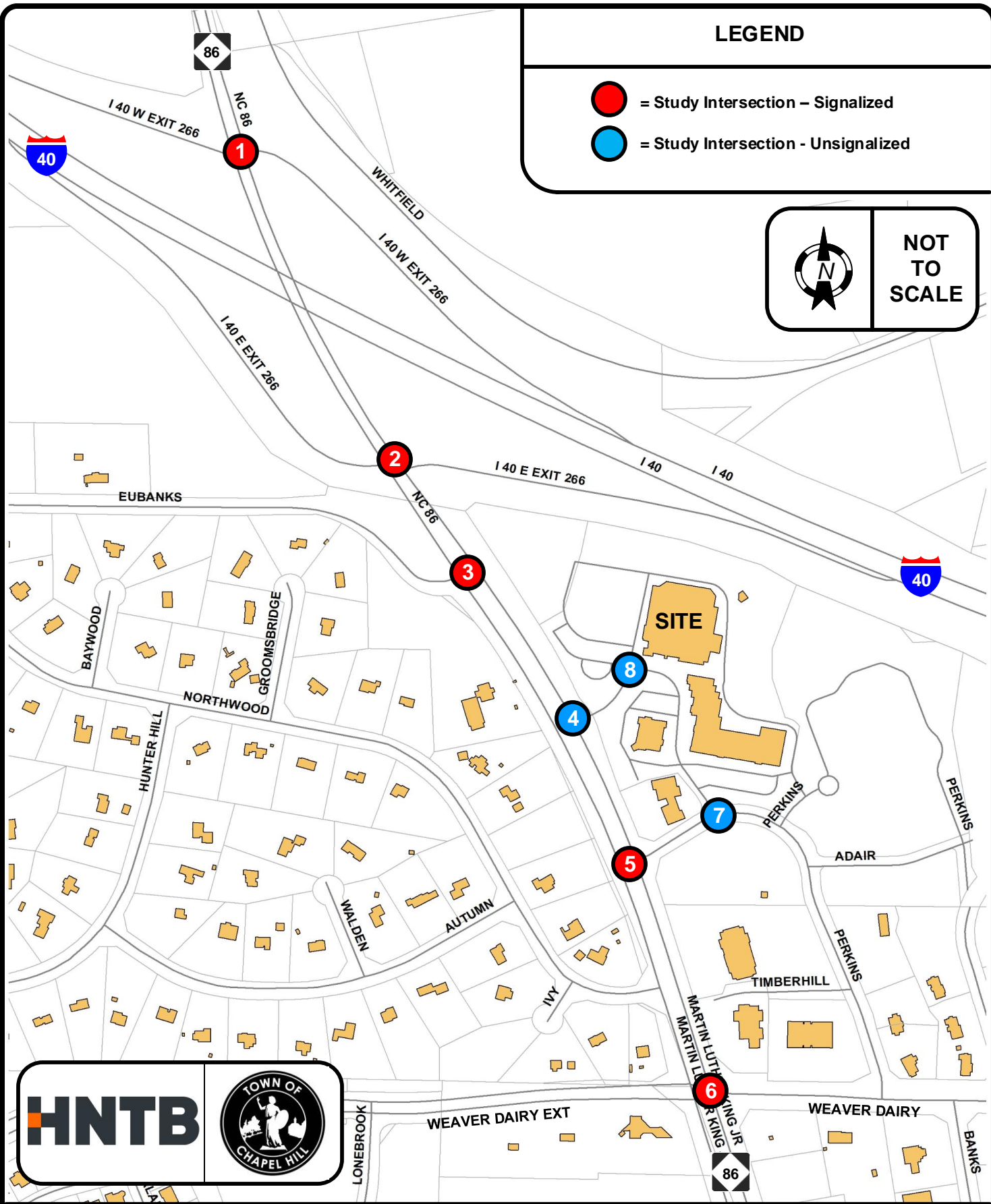
- 3) If not already committed to by the Town or other development plans, extend the existing sidewalk along the Harris Teeter NC 86 northbound frontage to connect to the proposed crosswalk improvement at Eubanks Road.

LEGEND

-  = Study Intersection – Signalized
-  = Study Intersection - Unsignalized



NOT TO SCALE

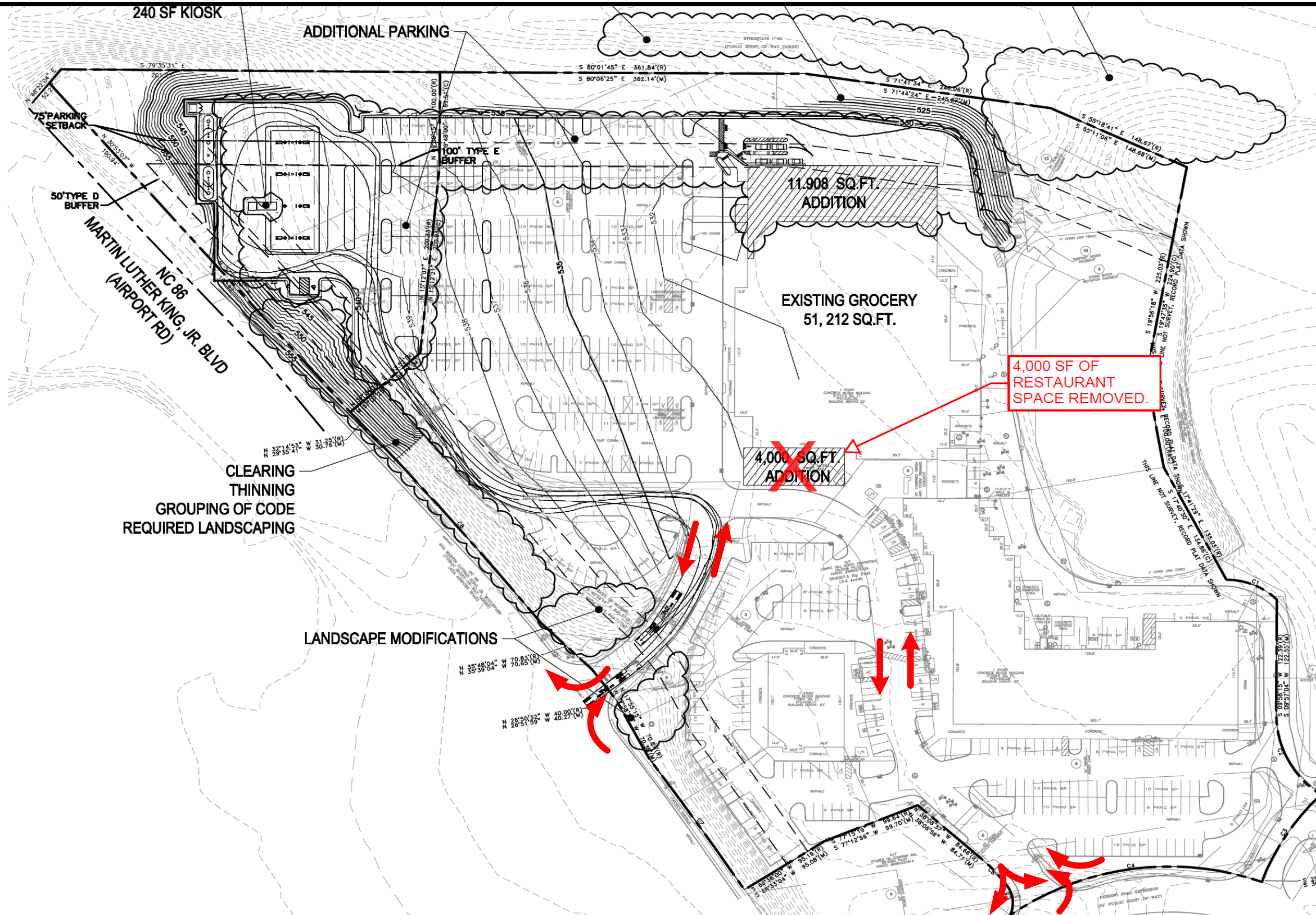



Chapel Hill North – Harris Teeter Expansion
Traffic Impact Study

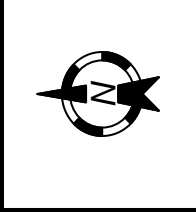
PROJECT STUDY AREA

DATE: March 2018

FIGURE ES-1



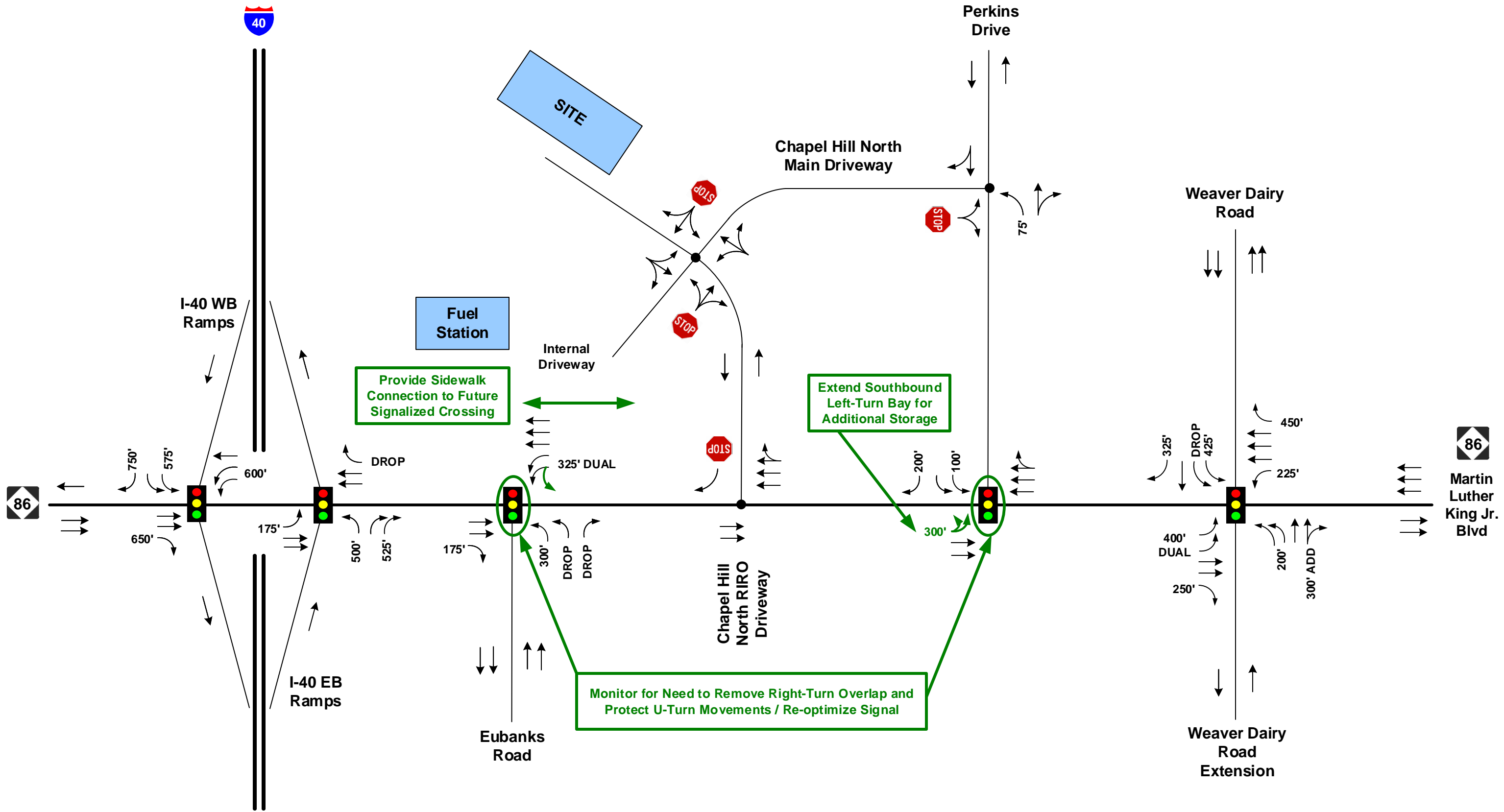
LEGEND	
	= PROPOSED EXTERNAL ACCESS POINTS



NOT TO SCALE

Chapel Hill North - Harris Teeter Expansion
Traffic Impact Study
PROPOSED REVISED SITE PLAN

DATE: March 2018
FIGURE ES-2



LEGEND

- = Necessary Geometric Improvement
- = Signal Timing Re-optimization/Improvement



NOT TO SCALE

Chapel Hill North - Harris Teeter Expansion
Traffic Impact Study

RECOMMENDED IMPROVEMENTS

DATE: March 2018

FIGURE ES-3