

GATEWAY RESIDENTIAL

TRANSPORTATION IMPACT ANALYSIS

EXECUTIVE SUMMARY



Prepared for:

The Town of Chapel Hill
Public Works Department - Engineering

Prepared by:

HNTB North Carolina, PC

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June 2023



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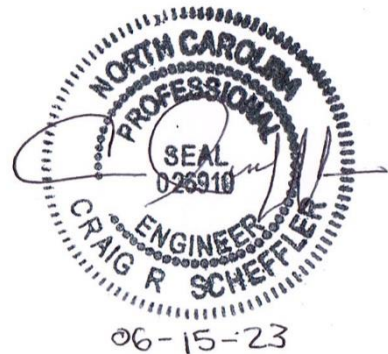
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Project Overview

This study analyzes the transportation impacts from Gateway Residential, a proposed development located along Lakeview Drive and White Oak Drive in Chapel Hill. The project proposes to construct several multi-family residential buildings with a total of 392 residential units. **Figure ES-1** shows the general location of the site. The entire project is anticipated to be fully complete by 2027. This report analyzes the transportation impacts for the build-out scenario for the year 2028 (one year after anticipated completion), the no-build scenario for the 2028 analysis year, as well as 2022 base year traffic conditions. The analysis also includes two future background traffic scenarios, one with assumed background traffic generating developments complete by 2028 and one with two potential additional adjacent residential developments included.

The preliminary site plans show internal transportation network connections and external access points. Internal site streets are proposed to connect to Lakeview Drive and White Oak Drive for a connection to Old Chapel Hill Road. Parking on the site will include surface lots and private lots/garages. **Figure ES-2** displays the preliminary site concept plan for the Gateway Residential development, transportation network changes, and nearby land uses and roadways. This report analyzes and presents the transportation impacts that the Gateway Residential development is expected to have on the following existing and future intersections in the project study area:

- US 15-501 and Sage Road / Old Durham Road
- US 15-501 and Eastowne Drive (South) / Service Road
- US 15-501 and Eastowne Drive (North) / Lakeview Drive
- US 15-501 and I-40 Eastbound Ramps
- US 15-501 and I-40 Westbound Ramps
- Lakeview Drive / Nova Apartments Driveway & Old Durham Road
- Old Chapel Hill Road and White Oak Drive
- Old Chapel Hill Road and Pope Road
- Old Chapel Hill Road and Mount Moriah Road
- Lakeview Drive and W. Lakeview Drive / Red Roof Inn Driveway
- Lakeview Drive and Proposed Site Access Street Connection

The impacts of the proposed site at the study area intersections were evaluated during the AM, noon, and PM peak hours of an average weekday.

Existing Conditions

Study Area

The site is located in northeast Chapel Hill near the US 15-501 interchange with I-40 and along Lakeview Drive. The study area contains four unsignalized intersections along Old Chapel Hill Road, two of which are roundabouts at Pope Road and Mt. Moriah Road, and the signalized intersections along US 15-501 between Sage Road/Old Durham Road and the I-40 interchange. US 15-501 is a major arterial facility providing connectivity between Chapel Hill, Durham and the I-40 corridor. Old Chapel Hill Road is a minor arterial facility providing connectivity between the US 15-501 corridor and southwest Durham. Remaining study area network roadways are minor collector or local access streets.

Site Traffic Generation

With the addition of new peak hour trips during the weekday 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 Institute of Transportation Engineers (ITE) *Trip Generation Manual, Version 11*.

Table ES-1. Weekday Vehicle Trip Generation Summary

Land Use Description	Density	Daily			AM Peak Hour			Noon Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Multi-Family Mid-Rise Apartments	320 units	740	740	1,480	30	99	129	40	56	96	76	49	125
Senior Adult Housing - Multifamily	72 Units	117	117	234	5	10	15	6	7	13	10	8	18
Multi-Modal Trip Reduction (Transit/Ped/Bike) - 10%		-86	-86	-171	-4	-11	-14	-5	-6	-11	-9	-6	-14
Total Vehicular Trips Generated		771	771	1,543	31	98	130	41	57	98	77	51	129

* - Noon Peak Estimated as Average of AM/PM Enter/Exit * 0.75

Background Traffic

Background traffic growth for the 2028 analysis year is expected to come from two sources - ambient regional traffic growth and specific development-related traffic growth. Three developments in the project study area that are currently in the Town planning review process were included to contribute to specific background traffic generator growth, with two background scenarios studied. One scenario included the UNC Health Care Medical Office Building #2 development and the other included Chapel Hill Crossing and White Oak Apartments in addition to the UNC Health Care development. All remaining estimated traffic volume increases are assumed to occur due to overall region-wide ambient growth (assumed 1.75 percent per year based on NCDOT/Town provided historic growth data and data related to peak hour traffic conditions rebounding from the effects of COVID-19).

Impact Analysis

Peak Hour Intersection Level of Service

Existing traffic operations at all study area intersections are acceptable during all three peak hours analyzed, though the intersection of US 15-501 and Sage Road/Old Durham Road is congested and nearing capacity during peak travel periods. No unsignalized intersection along Old Durham/Old Chapel Hill Road has existing operational issues. The projected ambient and background development traffic growth will increase intersection delay and queue impacts by 2028. With the addition of peak hour site-generated trips to the projected 2028 background traffic volumes, several study area intersections are expected to experience near capacity traffic operations in the PM peak hour, particularly for the scenario where the additional two background adjacent developments are constructed. Proposed geometric and signal timing improvements are expected to mitigate anticipated deficient LOS conditions throughout the study area and improve queue storage and safety, as well.

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 traffic microsimulation Level-of-Service (LOS_s) is shown in **Table ES-2**.



Table ES-2. Peak Hour Intersection Capacity Analysis Summary

Intersections	Peak Hour	2022 Existing		Assumed Background Traffic						Potential Additional Background Traffic from Two Adjacent Developments					
				2028 No-Build		2028 Build		2028 Mitigated		2028 No-Build		2028 Build		2028 Mitigated	
		LOS _s	Delay	LOS _s	Delay	LOS _s	Delay	LOS _s	Delay	LOS _s	Delay	LOS _s	Delay	LOS _s	Delay
US 15-501 and Sage Road / Old Durham Road	AM	C	34.8	D	41.4	D	43.2	D	38.9	D	43.6	D	43.8	D	42.4
	PM	C	34.2	D	37.6	D	36.9	D	40.1	D	37.3	D	38.4	D	41.1
US 15-501 and Eastowne Drive (South) / Service Road	AM	B	14.6	C	19.8	C	20.2	C	22.1	C	20.0	B	19.9	C	22.5
	PM	B	12.8	B	17.0	B	17.0	B	18.9	B	16.9	B	18.1	C	22.2
US 15-501 and Eastowne Drive (North) / Lakeview Drive	AM	B	10.1	B	16.3	B	18.0	B	14.1	B	19.3	C	21.2	C	21.0
	PM	B	11.6	B	19.3	B	21.3	B	18.1	C	32.1	D	41.2	D	42.1
US 15-501 and I-40 Eastbound Ramps	AM	C	23.1	C	29.2	C	29.4	C	27.9	C	29.0	C	29.7	C	32.9
	PM	C	27.5	C	33.2	C	33.3	C	29.8	C	32.6	D	46.3	C	30.3
US 15-501 and I-40 Westbound Ramps	AM	C	32.5	D	37.6	D	36.5	D	35.8	D	35.9	D	35.8	D	37.7
	PM	C	28.1	C	34.4	C	29.7	C	29.3	C	29.9	D	44.9	D	40.9
Old Durham Road and Lakeview Drive#	AM	A	7.9	A	9.8	A	8.7	n/a	n/a	B	14.4	B	13.0	n/a	n/a
	PM	B	12.3	B	14.9	C	16.3	n/a	n/a	D	31.7	C	23.8	n/a	n/a
Old Chapel Hill Road and White Oak Drive#	AM	A	4.8	A	5.3	A	7.6	n/a	n/a	A	7.4	A	9.2	A	7.6
	PM	A	8.2	A	8.4	B	10.3	n/a	n/a	B	11.8	C	16.7	B	13.7
Old Chapel Hill Road and Pope Road	AM	B	10.9	B	11.1	B	12.0	n/a	n/a	B	12.3	B	12.4	n/a	n/a
	PM	B	11.9	B	12.5	B	13.9	n/a	n/a	B	13.6	B	14.4	n/a	n/a
Old Chapel Hill Road and Mount Moriah Road	AM	A	9.9	B	10.2	B	10.4	n/a	n/a	B	10.8	B	10.8	n/a	n/a
	PM	B	10.9	B	11.3	B	11.6	n/a	n/a	B	11.5	B	12.1	n/a	n/a
Lakeview Drive and W. Lakeview Drive / Red Roof Inn Driveway#	AM	A	4.1	A	5.2	A	5.1	n/a	n/a	B	10.5	C	22.0	n/a	n/a
	PM	A	4.7	A	4.9	A	5.9	n/a	n/a	A	7.7	B	10.5	n/a	n/a
Lakeview Drive and Gateway Access Street#	AM	n/a	n/a	n/a	n/a	A	5.2	A	5.3	n/a	n/a	A	7.3	A	9.8
	PM	n/a	n/a	n/a	n/a	A	5.1	A	5.0	n/a	n/a	A	5.9	A	8.6

BOLD/ITALICS – Critical Movement or Overall Intersection Requires Mitigation Per Town TIA Guidelines

- Worst-Case LOS/Delay for Unsignalized Critical Movement



Access Analysis

Vehicular site access is to be accommodated by two proposed access local street connections at Lakeview Drive to the west and then an extension of White Oak Drive to the south, as shown on **Figure ES-2**. The two roadways will intersect within the site. Design details related to driveway throat lengths shown on the site plan and driveway spacing from existing intersections and adjacent driveways adhere to NCDOT *Policy on Street and Driveway Access to North Carolina Highways* and the Town of Chapel Hill Design Manual, with the exception of intersection separation along Lakeview Drive. Access for pedestrians and bicyclists in the immediate project study area along Old Chapel Hill Road is excellent, as marked bicycle lanes and sidewalk facilities on both sides of the road provided by the recent NCDOT STIP project. The proposed site concept features internal sidewalk connectivity that should be extended down White Oak Drive to connect to new pedestrian and bicycle facilities along Old Chapel Hill Road.

Signal Warrant Analysis

Based on projected 2028 traffic volumes and proposed access plans, one unsignalized intersection in the project study area would warrant the installation of a traffic signal, based on the methodology found in the *2009 Manual on Uniform Traffic Control Devices (MUTCD)*. The intersection of Lakeview Drive and Old Durham Road meets the Peak Hour Warrant for weekday PM peak traffic if all adjacent background developments and the proposed site are built-out and continues the need to be monitored for a full Warrant Analysis, as it is projected to experience PM peak queuing issues with additional background and site-related traffic growth.

Crash Analysis

Data from the NCDOT Traffic Safety Unit was extracted for the five-year period 12/1/2017 to 11/30/2022 for the Old Durham Road/Old Chapel Hill Road and Lakeview Drive segments in the vicinity of the proposed site. There were 32 crashes reported along the Old Durham Road/Old Chapel Hill Road study area corridor between Lakeview Drive and Mount Moriah Road over the five year period, with 25 crashes on Lakeview Drive in the vicinity of the site. The primary crash types were rear-end and angle crashes and crashes were primarily clustered near the higher volume intersections. Overall, the number and severity of crashes along both facilities in the project study area are higher than state-wide averages for similar urban North Carolina secondary roadway facilities. This may, in part, be due to on-going construction on Old Chapel Hill Road over several years during the crash data collection period that is now complete, with the finished project along the corridor expected to provide some multi-modal safety benefits. Crash issues on Lakeview Drive are exclusively located at the two termini intersections at US 15-501 and Old Chapel Hill Road.

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-3** are germane to the scope of this study.

Table ES-3. Other Transportation-Related Analyses

Analysis	Comment
Turn Lane Storage Requirements	Storage bay lengths at study area intersections were analyzed using maximum queue length estimates for the 2028 Build Scenarios. One unsignalized intersection (Old Durham Road/Lakeview Drive) is expected to have excessive peak hour queues or conditions that exceed existing turn lane storage. Recommendations to improve turn lane storage were made for the US 15-501 and Eastowne Drive/Lakeview Drive intersection – as this location will have a high degree of site traffic and background development traffic impact. Storage issues not due to site-related traffic impacts are not easily correctable at other upstream/



	downstream intersections, given the high traffic volumes along the US 15-501 corridor, but signal timing adjustments are shown to reduce side street queues at critical locations.
Appropriateness of Acceleration/Deceleration Lanes	The site concept plan shows no specifics related to acceleration/deceleration lanes. Due to the relatively close W. Lakeview Drive and US 15-501 intersections and the potential blockages and safety issues caused by left-turn traffic entering Gateway Residential, a southbound left-turn lane is recommended for site access at the proposed Lakeview Drive site access street intersection until the time when the intersection could be converted to a roundabout. With the build-out of adjacent developments in the area, the Old Chapel Hill Road / White Oak Drive is also recommended for left-turn lanes along Old Chapel Hill Road. Existing intersections along US 15-501 currently have left-turn and right-turn auxiliary deceleration lanes. No other specific acceleration/ deceleration lane issues were analyzed in the project study area.
Pedestrian and Bicycle Analysis	Pedestrian access exists in the project study area, with excellent connectivity along the Old Chapel Hill Road corridor and is limited directly along the US 15-501 corridor. Bicycle lanes extend along Sage Road, Old Durham Road / Old Chapel Hill Road, and a short section of Eastowne Drive. Very limited bicycle facilities exist along/parallel to the US 15-501 corridor within the study area. The site plan shows additional sidewalk along all roadways internal to the site. To aid connectivity, the White Oak Drive cross-section between the site and Old Chapel Hill Road should be upgraded to Town local street standards.
Public Transportation Analysis	Public transportation service to the study area, and to the proposed site, is excellent, with bus stops and multiple local and regional bus routes on both Old Chapel Hill Road and US 15-501 proximate to the site.

Mitigation Measures/Recommendations

Planned Improvements

There are no Town of Chapel Hill / North Carolina Department of Transportation improvement projects affecting study area roadway facilities within the analysis year time frame of 2022-2028. NCDOT STIP project EB-4707B has completed construction along Old Durham Road/Old Chapel Hill Road east of the project study area and included pedestrian and bicycle improvements connecting to the US 15-501 corridor at the Sage Road/Scarlett Drive intersection. The US 15-501 corridor is currently being studied for capacity improvements as part of NCDOT STIP U-5304F, but these improvements are not known at this time and were not considered to be complete by the 2028 analysis year.

Background Committed Improvements

The UNC Health Care Eastowne Medical Office Building #2 project is currently under review by the Town of Chapel Hill and for the purposes of this study, was considered to be complete in all analysis scenarios by the 2028 Build-Out+1 year. As part of recommended mitigation in the TIA for that project, the southbound left-turn lane for the Eastowne Drive / US 15-501 intersection was recommended to be lengthened and the three traffic signals along US 15-501 (Sage Road/Eastowne Drive – Service Road/Eastowne Drive – Lakeview Drive) were recommended for reoptimization.

The intersection of Old Chapel Hill Road and Lakeview Drive, as part of the Wegman's permitting process, will be monitored for the need to make traffic control (signalization/roundabout) improvements, depending on the meeting signal warrant thresholds, or exhibiting excessive observed delay/queuing from field data. The study results for this TIA indicate that the 2028 projected future peak hour traffic volumes will not meet MUTCD peak hour signal warrants and do not cause excessive delays. Data indicates that PM peak southbound queues on Lakeview Drive may exceed the right-turn storage bay space.



Applicant Committed Improvements

Based on the preliminary site plans and supporting development information provided, there are several specific transportation-related improvements proposed internal to the site or related to site access. These improvements include the following:

- 1) Construct new two-lane local street access connection with sidewalk to Lakeview Drive and extend to intersect White Oak Drive with future potential extension to the east of the site.
- 2) Upgrade existing unpaved section of White Oak Drive within site parcel to local two-lane street with sidewalk.
- 3) Construct a southbound left-turn lane with 100 feet of vehicle storage on Lakeview Drive at the proposed local street access connection intersection.
- 4) White Oak Drive to be upgraded to local street standards as defined in the Town of Chapel Hill Design Manual from the site parcel to the intersection with Old Chapel Hill Road
- 5) Signal timings at all five study area intersections to be reoptimized after the site is complete to account for the effects of site-related traffic in the AM, noon, and PM peak hours. Particular attention needs to be made to the US 15-501 intersection with Lakeview Drive / Eastowne Drive, where site traffic impact along the corridor is expected to be the greatest.
- 6) Extend the current 300 foot eastbound outer shared through/right-turn lane on US 15-501 at the Lakeview Drive/Eastowne Drive intersection to provide 450 feet of storage to help accommodate site traffic increases and a high volume of traffic using the downstream outer lane to turn right onto I-40.

Necessary Improvements

Based on traffic capacity analyses for the 2028 design year, and analyses of existing study area turning bay storage lengths, site access and multi-modal mobility, the following improvements (see **Figure ES-3A**) are recommended as being necessary for adequate transportation network operations for the Condition 4 Build Scenario with assumed background traffic:

- 1) Based on NCDOT required stipulations after review of the draft TIA, to reduce blockages caused by left-turns and improve safety for through traffic movements on Old Chapel Hill Road at the White Oak Drive intersection, it is recommended that a left-turn lane in the eastbound direction with 100 feet of vehicular storage be constructed. This recommendation was originally made in the Condition 7 Build Scenario improvements listed below. It is now a requirement for the Gateway Development regardless of whether or not the adjacent developments are constructed. NCDOT also stipulates a right-turn lane with 100 feet of storage be constructed at this intersection in the westbound direction.

Based on traffic capacity analyses for the 2028 design year that includes the effects of the potential future background Chapel Hill Crossing and White Oak apartment developments, the following improvements (see **Figure ES-3B**) are recommended as being necessary for adequate transportation network operations for the Condition 7 Build Scenario with assumed background traffic. This is in addition to the improvements previously identified above for Condition 4.

- 1) To reduce congestion and traffic conflicts and better manage access in the vicinity of the US 15-501/Lakeview Drive intersection, it is recommended to install a concrete median from the intersection northbound approach back to the proposed Gateway Residential access street connection to Lakeview Drive, restricting both side streets to RIRO operation.



- 2) In addition, to provide adequate vehicle storage for the northbound approach on Lakeview Drive to US 15-501, the left-turn lane should be extended to provide 300 feet of storage.
- 3) To allow traffic to/from W. Lakeview Drive and the Red Roof Inn Driveway to make u-turn movements to access these roadway facilities, it is recommended that a single-lane roundabout be designed for the future access street intersection with Lakeview Drive.
- 4) To improve operations for the eastbound direction of US 15-501, particularly at the Lakeview Drive/Eastowne Drive intersection, it is recommended to extend the eastbound outer shared through/right-turn lane to provide 600 feet of storage to help accommodate increased site-related traffic from all three proposed developments and a high volume of traffic using the downstream outer lane to turn right onto I-40.
- 5) In Condition 7, with all potential background traffic generating sites complete, the US 15-501 corridor traffic signals in the project study area should be reoptimized for all peak periods.
- 6) To reduce blockages caused by left-turns and improve safety for through traffic movements on Old Chapel Hill Road at the White Oak Drive intersection, it is recommended that a left-turn lane in the westbound direction with 100 feet of vehicular storage be constructed.

