

Summary of the June 2018 Traffic Impact Study (TIA) for the UNC Health Care Eastowne Medical Office Building

*Prepared by Town Staff in consultation with HNTB (Traffic Engineering Consultant)
Last updated: August 21, 2018*

What does the revised Eastowne TIA tell us?

The June 2018 Traffic Impact Study (TIA) finds that with some minor improvements, the existing roadway network can accommodate the projected traffic from the proposed UNC Health Care Eastowne Medical Office Building. The applicant is proposing to build these improvements as part of the project.

What specific improvements is the applicant proposing to build?

As highlighted in green and shown in Figure ES-3 within the attached Traffic Impact Study Executive Summary, the applicant has agreed to make the following improvements identified by the Town's TIA consultant in order to mitigate traffic impacts from the proposed project:

- Extend northbound left-turn lane on 15-501 to 400' for added vehicle queuing
- Extend Eastowne Drive left-turn lane onto 15-501 to 300' for added vehicle queuing
- Install crosswalk and pedestrian signals at Eastowne Drive for improved passage across 15-501 and a connection to the future Wegmans
- Construct a new bus shelter along Eastowne Drive adjacent to proposed development
- Install "Do Not Block Intersection" signage in median along Eastowne Drive

Given the project's proximity to the future Wegmans, Figure ES-3 also highlights in red some additional lane extension improvements and traffic signal optimization associated with that project. If these improvements have not been installed before the Eastowne project is completed, then the Eastowne project would be responsible for making them.

What is a TIA and why does the Town require it?

A TIA studies the effects of potential additional travel generated by a proposed development project (the “build” scenario) and compares that potential future travel demand to what would occur otherwise without the proposed project (the “no build” scenario). The difference between the “no build” and “build” scenarios helps the Town identify any needed improvements to the transportation system within the project area.

The Town requires all applicants seeking a Special Use Permit to conduct a Traffic Impact Analysis. This requirement can be waived under limited circumstances when traffic generation is projected to be less than 500 daily trips. The TIA study is performed by a consultant of the Town and is paid for by the applicant.

What is the ‘ITE Manual’ and how does it relate the estimation of vehicle trips?

The *Institute of Transportation Engineers’ Trip Generation Manual (ITE Manual)* provides the industry standard for estimating the number of vehicle trips associated with a variety of different land use types (e.g., office, schools, retail). Trip generation rates provided in the manual are averages derived from case studies. For each land use type within the ITE Manual, vehicle trips can be estimated based on different types of variables (e.g., square footage, number of employees), with transportation engineers selecting the approach that best approximates the conditions under which a given proposed project would function.

How did the consultant incorporate the ITE Manual when making trip generation calculations for the Eastowne project?

The consultant reviewed the available ITE Manual data on land uses related to the proposed UNC Health Care facility (720 – Medical-Dental Office Building, 630 - Medical Clinic), as well as the existing facilities. There are two trip generation options for these land uses – number of employees and square footage. Based on the ITE Manual data available and compared to the applicant-supplied information, the consultant determined that the number of employees was the most appropriate variable to use.

A second consideration is the particular land use type (or “code”) from the manual that best approximates the land use in the proposed project. In this case, no single land use code fully described the proposed land uses, so the consultant averaged the trip generation results of the two land use codes listed above to best approximate the land use in the Eastowne project. For the existing site, the Applicant shared that the existing facilities function as general office buildings (not clinics), so the consultant used the ITE Manual code for General Office Buildings (710) to estimate existing trip generation of the fully utilized existing facilities.

Why were employee counts used instead of square footage?

The consultant noted that the ITE Manual does not have a robust data set to support using square footage for the applicable land use codes (720 – Medical-Dental Office Building, 630 - Medical Clinic). The Manual only provides a limited number of samples, and the maximum square footage studied is less than ¼ of what Eastowne is proposing. In addition, UNC Health Care provided an accurate estimate of the number of employees that are expected to work in these buildings, which was compared to the trip generation derived from the ITE Manual. For these reasons, the consultant chose to use number of employees as the metric for determining trip generation. For existing general office building land uses, the use of square footage is appropriate, as the data sets and rate/equation graphs have ample data points within the range of the existing building size (77,500 square feet).

How was applicant-supplied data used?

The consultant indicates that applicant-supplied data was only used for comparison and validation of the ITE Manual estimates. The temporal variation in patient visits throughout the day indicates that the highest trip generation due to patient visits currently occurs at similar existing UNC facilities (and likely for the proposed Eastowne Medical Office Building) during off peak hours.

How many TIAs has the Consultant done for the Town and how many have they done professionally?

The Consultant has completed 65 TIAs for the Town between 2003 and 2018 and approximately 175 total studies since 1998, almost exclusively under on-call TIA contracts with municipalities in North Carolina.

Does the use of square footage for Medical-Dental Office (720) result in the need for additional recommended improvements?

No. Although the use of square footage for the Medical-Dental Office (720) land use does increase timing delays for some of the study area intersections at certain peak hours (up to 10 seconds in one case), this maximum trip generation scenario would not require additional improvements beyond those identified in the June Traffic Impact Study. For more details, see the attachment *Table 1 - Peak Hour Intersection Capacity Analysis*.

For the reasons explained above under the question *Why were employee counts used instead of square footage?*, the Town's Consultant also advises caution when interpreting results based on square footage for only the Medical-Dental Office (720) land use.

How is the Town working to make TIA reports clearer and easier to follow?

In response to feedback from the Council and a staff interest in providing clearer information about traffic impacts, the staff is working to develop a new framework that will provide clearer information about the inputs, key findings and recommendations provided by TIA consulting firms as part of the development review process.

Attachments

1. Table 1. Peak Hour Intersection Capacity Analysis Summary Max Trip Generation Scenario Comparison
2. Executive Summary -- UNC Health Care Eastowne Medical Office Building Traffic Impact Study

Additional Resources

[Full Report – UNC Health Care Eastowne Medical Office Building Traffic Impact Study](#)

(<http://www.townofchapelhill.org/home/showdocument?id=39826>)

UNC HealthCare Eastowne MOB

**Table 1. Peak Hour Intersection Capacity Analysis Summary
Max Trip Generation Scenario Comparison**

Intersections	Peak Hour	2021 TIS Build		2021 Max Trip Gen Scenario	
		LOS	Delay	LOS	Delay
US 15-501 and Sage Road / Scarlett Drive	AM	D	47.6	D	45.8
	NOON	D	40.7	D	40.3
	PM	D	50.9	D	50.7
US 15-501 and Eastowne Drive (South) / Service Road	AM	B	18.8	C	22.7
	NOON	B	15.8	B	19.5
	PM	B	18.1	C	28.1
US 15-501 and Eastowne Drive (North) / Lakeview Drive	AM	B	18.2	B	18.8
	NOON	B	19.9	C	20.9
	PM	D	35.3	D	39.6
Eastowne Drive and Old Sterling Drive / UNC Health Care Building #5 Driveway#	AM	B	13.7	C	15.3
	NOON	B	13.5	C	15.2
	PM	B	12.9	B	14.8
Eastowne Drive and Future Parking Deck Driveway Access#	AM	B	11.2	B	14.1
	NOON	B	10.7	B	13.1
	PM	B	11.3	C	18.6
Eastowne Drive and Pinegate Circle / UNC Health Care Driveway#	AM	A	9.9	B	10.4
	NOON	B	10.1	B	10.8
	PM	B	10.4	B	12.1
Eastowne Drive and Dobbins Drive#	AM	B	11.8	B	13.3
	NOON	B	10.6	B	11.7
	PM	B	11.3	B	13.9

Key and Explanation of Terms

- Because the intersection does not have a traffic signal, the delay and level of service (LOS) values only relate to the movements controlled by a stop sign.

Delay – means the wait time in seconds for how long the average vehicle will be stopped at an intersection

LOS – means “level of service” and is a qualitative measure of performance based on quantitative transportation data. For intersections, the data comes from average seconds of delay (e.g., LOS C = a 20-35 second delay for the average vehicle at a signalized intersection). Note: Under the Town’s Traffic Impact Analysis Guidelines, LOS letter grade ‘D’ is the level of intersection performance threshold below which additional improvements are required. This is consistent with NC DOT standards.

**UNC HEALTH CARE
EASTOWNE MEDICAL OFFICE BUILDING**

TRAFFIC IMPACT STUDY

EXECUTIVE SUMMARY



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Public Works Department – Traffic Engineering

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June 2018

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UNC HEALTHCARE EASTOWNE MEDICAL OFFICE BUILDING

TRAFFIC IMPACT STUDY

EXECUTIVE SUMMARY



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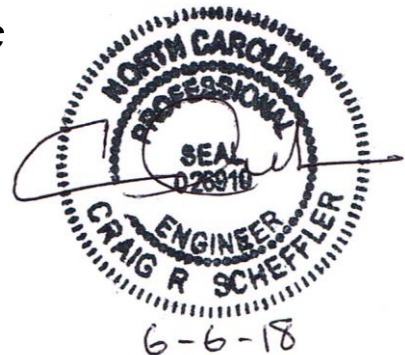
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EXECUTIVE SUMMARY

Project Overview

The redevelopment of the existing UNC Health Care Medical Office Buildings (MOB) complex, located along the US 15-501 (Durham-Chapel Hill Road) and Eastowne Drive, into a larger medical clinic facility with a structured parking deck is being proposed in Chapel Hill. The project proposes to demolish four existing buildings with a total size of 77,484 square feet and construct one new building on the existing parcel with an approximate 150,000 square foot size. **Figure ES-1** shows the general location of the site. The project is anticipated to be fully complete by late 2020. This report analyzes the transportation impacts for the build-out scenario for the year 2021 (one year after anticipated completion), the no-build scenario for the 2021 analysis year, as well as 2018 existing base year traffic conditions.

The proposed site concept plans show several minor transportation network changes from existing conditions, including a new access point along Eastowne Drive to serve the new building and proposed structured parking deck and closure of existing driveways serving existing surface parking lot facilities. **Figure ES-2** displays the preliminary concept plans of the UNC Healthcare Eastowne MOB development, transportation network changes, and nearby land uses and roadways. The project is expected to provide on-site structured parking with a total of approximately 580 spaces in one five story parking deck. This report analyzes and presents the transportation impacts that the UNC Healthcare Eastowne MOB redevelopment will have on the following existing and future intersections in the project study area:

- US 15-501 and Sage Road / Scarlett Drive
- US 15-501 and Eastowne Drive (South) / Service Road
- US 15-501 and Eastowne Drive (North) / Lakeview Drive
- Eastowne Drive and Old Sterling Drive / UNC Health Care Building #5 Driveway
- Eastowne Drive and Future Parking Deck Driveway Access
- Eastowne Drive and Pinegate Circle / UNC Health Care Driveway
- Eastowne Drive and Dobbins Drive

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 along US 15-501 in the Eastowne Business Park. The study area contains three signalized intersections along US 15-501 at Sage Road, Eastowne Drive/Service Road and Eastowne Drive/Lakeview Drive. All future site traffic is expected use a proposed full access site driveway along Eastowne Drive. Internal driveways shown on the preliminary site plan will circulate site traffic to structured and surface parking. US 15-501 is a major arterial facility providing connectivity between Chapel Hill, Durham and the I-40 corridor. Remaining study area network roadways are either minor arterial/collector facilities or local neighborhood 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 10. Trips for the existing UNC Health Care facilities on the site were also generated to establish a “full occupancy” future No-Build Scenario. The redevelopment “net” trips were then calculated by subtracting full occupancy trips from the total estimate site trip generation from the new medical clinic.

Table ES-1. Weekday Vehicle Trip Generation Summary

Description	Daily			AM Peak			Noon Peak			PM Peak		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
BUILD-OUT TOTAL	1,145	1,145	2,290	178	52	230	98	78	175	83	154	237
Existing Site (Full Occupancy)	414	414	828	85	14	99	25	22	47	14	75	89
NET INCREASE OVER EXISTING SITE FULL OCCUPANCY	731	731	1,462	93	38	131	73	56	128	69	79	148

Background Traffic

Background traffic growth for the 2021 analysis year is expected to come from three sources - ambient regional traffic growth, specific development-related traffic growth and the assumption that the existing UNC Health Care buildings are fully occupied in the No-Build Scenario. One Town-approved site (Wegmans Supermarket Redevelopment) in the project study area is expected to contribute to specific background traffic generator growth. All remaining estimated traffic volume increases are assumed to occur due to overall region-wide ambient growth (assumed 1.5 percent per year based on NCDOT/Town provided historic growth data).

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 several intersections along US 15-501 are at capacity during peak travel periods. The projected ambient and background development traffic growth will increase impacts by 2021 but these will be mitigated by proposed mitigation improvements stemming from the Wegmans Supermarket development. Even with the addition of peak hour site-generated “net” trips to the projected 2021 background traffic volumes, no study area intersections are expected to experience deficient traffic operations in any peak hour. 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 Level-of-Service (LOS) is shown in **Table ES-2**.



Table ES-2. Peak Hour Intersection Capacity Analysis Summary

Intersections	Peak Hour	2018 Existing		2021 No-Build		2021 Build		2021 Mitigated	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
US 15-501 and Sage Road / Scarlett Drive	AM	D	46.5	D	47.4	D	47.6	N/A	N/A
	NOON	D	42.5	D	40.8	D	40.7	N/A	N/A
	PM	D	52.2	D	50.6	D	50.9	N/A	N/A
US 15-501 and Eastowne Drive (South) / Service Road	AM	B	10.0	B	14.2	B	18.8	N/A	N/A
	NOON	B	14.6	B	13.2	B	15.8	N/A	N/A
	PM	B	16.8	B	14.9	B	18.1	N/A	N/A
US 15-501 and Eastowne Drive (North) / Lakeview Drive	AM	C	26.3	B	17.7	B	18.2	N/A	N/A
	NOON	B	19.8	B	19.3	B	19.9	N/A	N/A
	PM	D	50.5	C	34.3	D	35.3	N/A	N/A
Eastowne Drive and Old Sterling Drive / UNC Health Care Building #5 Driveway#	AM	B	11.6	B	12.7	B	13.7	N/A	N/A
	NOON	B	12.0	B	12.5	B	13.5	N/A	N/A
	PM	B	11.4	B	12.0	B	12.9	N/A	N/A
Eastowne Drive and Future Parking Deck Driveway Access#	AM	N/A	N/A	N/A	N/A	B	11.2	N/A	N/A
	NOON	N/A	N/A	N/A	N/A	B	10.7	N/A	N/A
	PM	N/A	N/A	N/A	N/A	B	11.3	N/A	N/A
Eastowne Drive and Pinegate Circle / UNC Health Care Driveway#	AM	A	9.5	B	10.5	A	9.9	N/A	N/A
	NOON	A	9.6	A	9.9	B	10.1	N/A	N/A
	PM	A	9.7	B	10.2	B	10.4	N/A	N/A
Eastowne Drive and Dobbins Drive#	AM	B	10.1	B	11.0	B	11.8	N/A	N/A
	NOON	A	9.7	B	10.0	B	10.6	N/A	N/A
	PM	A	9.9	B	10.5	B	11.3	N/A	N/A

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

- Worst-Case LOS/Delay for Unsignalized/Stop-Controlled Critical Movement



Access Analysis

Vehicular site access is to be accommodated by one proposed full movement access driveway connecting to Eastowne Drive for entry/exit to the proposed structured parking and on-site surface drop-off areas. An additional grass paved access for fire truck is shown connecting to US 15-501 southbound on **Figure ES-2**. Design details related to driveway throat lengths are shown on the site plan and provide over 200 feet of driveway throat length, which should be sufficient based on capacity analysis queue estimates for all exiting stop-controlled movements.

Access for pedestrians and bicyclists is limited in the project study area. Sidewalk is present on most study area facilities, but connectivity is impaired due to lack of continuous sidewalk in some areas and adequate crossings of the US 15-501 corridor. Crosswalk and pedestrian signals exist across the US 15-501 intersection with Eastowne Drive (south). Bicycle lanes do exist on Sage Road and Old Sterling Drive, and the cross-section width of Eastowne Drive is does not inhibit bicycling, but there is no bicycling connectivity on or paralleling the US 15-501 corridor.

Signal Warrant Analysis

Based on projected 2021 traffic volumes and proposed access plans, no 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)*.

Crash Analysis

Data from the NCDOT Traffic Safety Unit was provided for the five-year period 3/1/2013 to 2/28/2018 for the US 15-501 and Eastowne Drive road segments in the vicinity of the proposed site. There were 178 crashes reported along the US 15-501 study area corridor between Sage Road and Eastowne Drive/Lakeview Drive over the five year period, with 17 crashes on Eastowne Drive. The primary crash type was rear end crashes and crashes were primarily clustered near the three signalized intersections. Overall, the number and severity of crashes along US 15-501 in the project study area is similar to state-wide averages for similar US highway facilities.

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 Synchro 95 th percentile (max) queue length estimates for the 2021 Build Scenario. No unsignalized intersection 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/Service Road intersection – as this location will have the highest degree of site 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.
Appropriateness of Acceleration/Deceleration Lanes	The site concept plan shows no specifics related to acceleration/deceleration lanes. Due to the low speed limit on Eastowne Drive (25 mph) and the presence of some on-street parking in the vicinity, no acceleration/deceleration lanes are recommended for site access. 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	Existing pedestrian access and connectivity is limited in the project study area, though sidewalk exists along several roadways on at least one side of the road. Bicycle lanes extend along Sage Road and Old Sterling Drive, and will be extended to Old Durham Road, but no bicycle facilities exist along/parallel to the US 15-501 corridor within the project study area. The site plan shows additional sidewalk developed along site frontage. Additional pedestrian upgrades at the US 15-501 and Eastowne Drive/Service Road intersection are needed to connect this sidewalk to the adjacent side of the corridor to connect to Wegmans / SECU area.
Public Transportation Analysis	Public transportation service to the study area, and to the proposed site is adequate, with bus stops and multiple local and regional bus routes on both Eastowne Drive and US 15-501 proximate to the site. Additional amenities for the existing bus stop on Eastowne Drive at the site are recommended.

Mitigation Measures/Recommendations

Planned Improvements

There is one Town of Chapel Hill / North Carolina Department of Transportation improvement project affecting study area roadway facilities within the analysis year time frame of 2018-2021. NCDOT STIP project EB-4707B is currently beginning construction along Old Durham Road/Old Chapel Hill Road east of the project study area and will include 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-5304, but these improvements are not known at this time and were not considered to be complete by the 2021 analysis year.

Background Committed Improvements

The redevelopment of the current Performance Motors campus along US 15-501 into a Wegmans Supermarket has been approved by the Town, and the project will include several geometric and signal timing improvements to intersections along the US 15-501 corridor highlighted in **Figure ES-3**.

Applicant Committed Improvements

Based on the preliminary site plans and supporting development information provided, there are no specific transportation-related improvements proposed external to the UNC Health Care Eastowne MOB site. There are several internal improvements including the following:

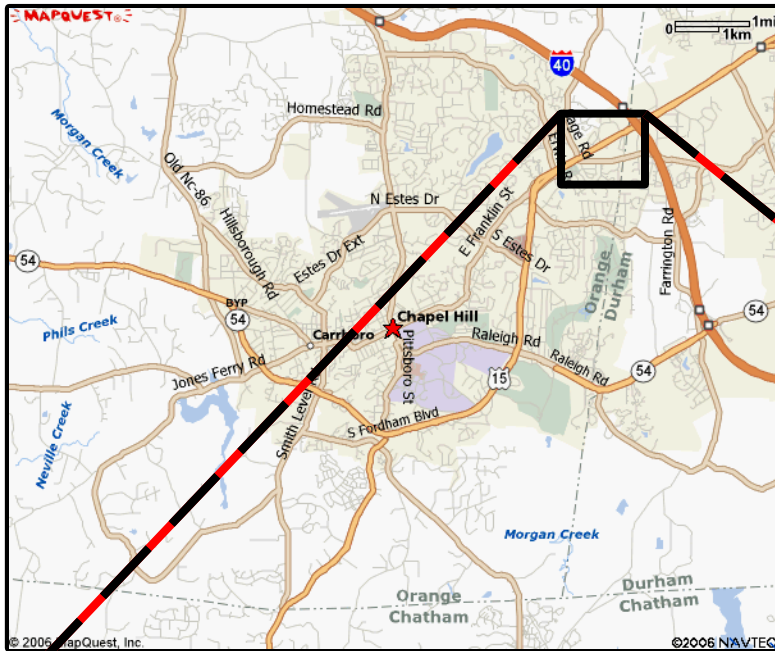


- Provision of internal roadway circulation to/from parking deck and drop-off areas
- Improvements to internal sidewalk and development of sidewalk/side paths along Eastowne Drive and US 15-501 on site frontage
- Closure of two existing surface parking lot driveways and consolidation of driveway access to a single access point for future proposed structured parking.

Necessary Improvements

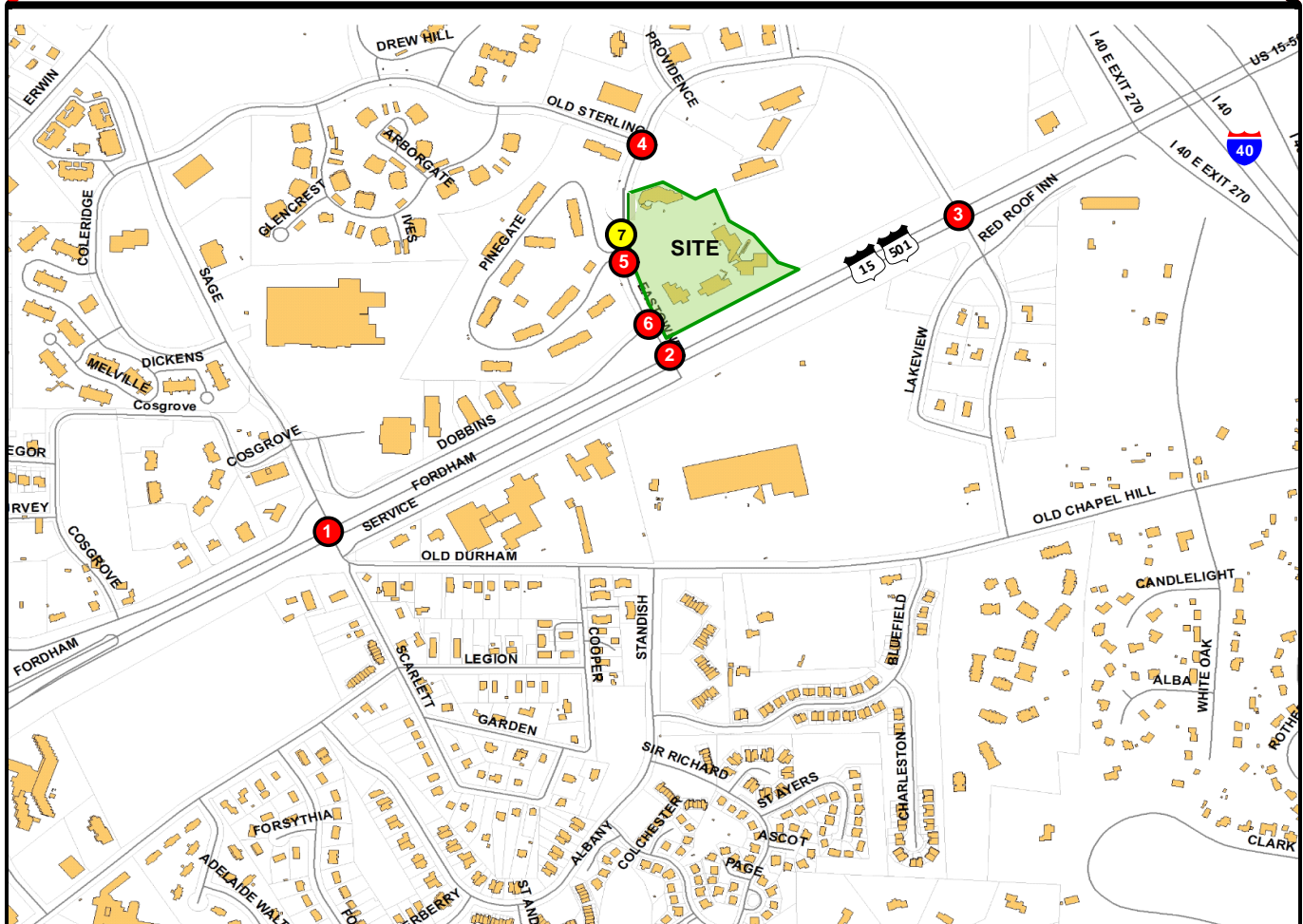
Based on traffic capacity analyses for the 2021 design year, and analyses of existing study area turning bay storage lengths and site access, the following improvements (see **Figure ES-3**) are recommended as being necessary for adequate transportation network operations:

- 1) To manage projected maximum queue lengths on southbound Eastowne Drive at the US 15-501 signalized intersection, it is recommended that the existing left-turn lane be extended to provide 300 feet of vehicle storage (thus creating a three-lane cross-section on Eastowne Drive at least 300 feet upstream of the traffic signal. This will result in two southbound travel lanes crossing the Dobbins Drive intersection.
- 2) To manage access and improve safety at the Dobbins Drive intersection with Eastowne Drive, an additional "Do Not Block Intersection" sign should be installed on southbound Eastowne Drive in the landscaped median.
- 3) A pedestrian crosswalk and pedestrian signal heads should be installed across the southbound approach of the US 15-501 and Eastowne Drive/Service Road signalized intersection. This would provide connectivity between the site and areas across US 15-501, as there is an existing pedestrian signalized crossing in the western quadrant of the intersection.
- 4) Additional bus amenities, such as a bus shelter, should be built at the existing bus stop location along Eastowne Drive directly along site frontage.
- 5) Due to potential peak hour queue spillback issues, the eastbound left-turn lane on US 15-501 at the Eastowne Drive / Service Road intersection should be extended to 400 feet of full storage. Signal timings at this intersection should be reoptimized to prevent left-turn queue spillbacks along US 15-501 and ensure the additional traffic volumes on Eastowne Drive can be cleared in one signal cycle.



LEGEND

- = Existing Building Footprint
- = Existing Study Area Intersection
- = Proposed Site Driveway
- = Proposed Site Parcel



HNTB

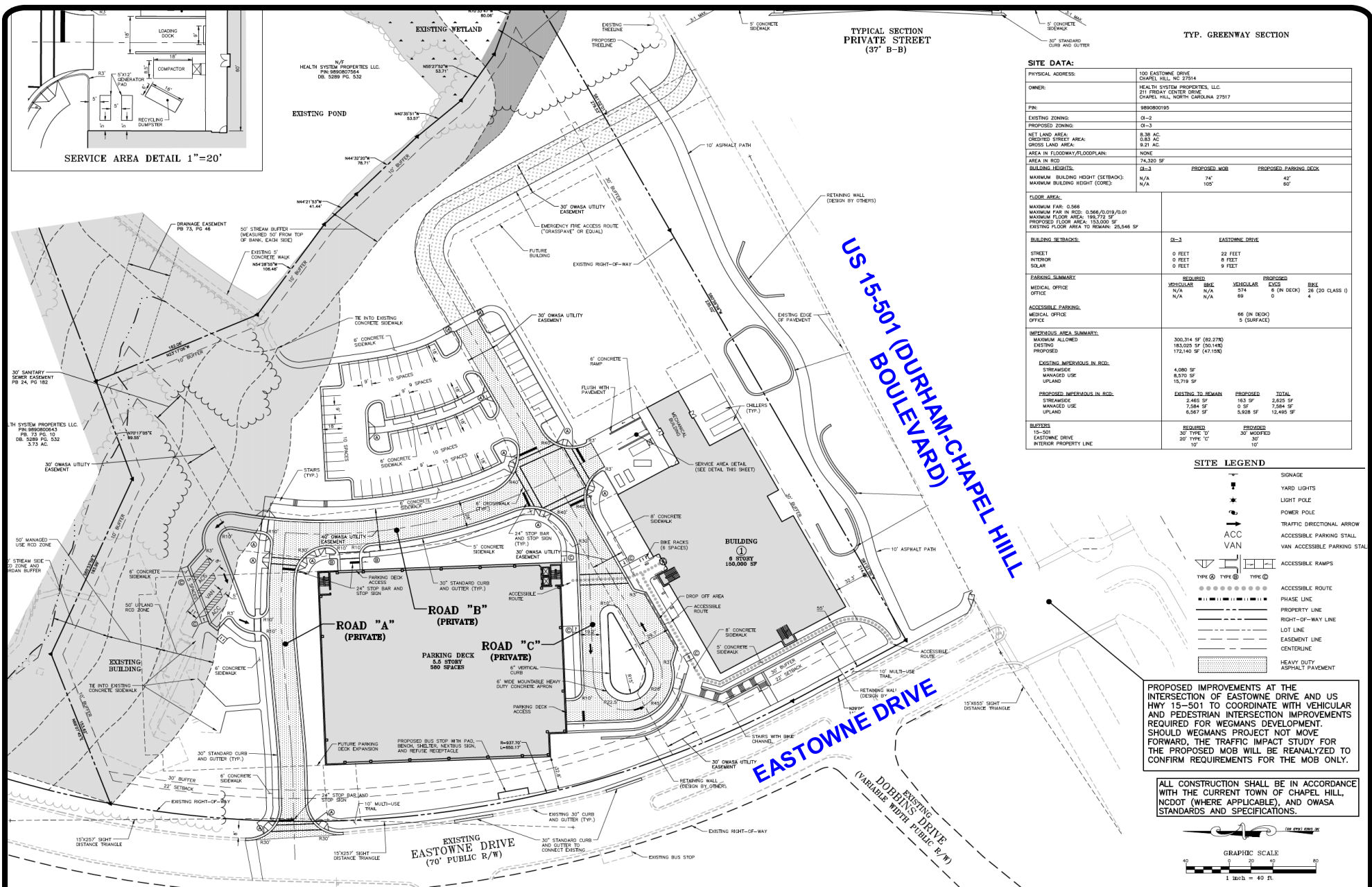


UNC Health Care Eastowne MOB Traffic Impact Study

PROJECT STUDY AREA

DATE: June 2018

FIGURE ES-1



HNTB



NOT TO SCALE

UNC Health Care Eastowne MOB Traffic Impact Study

PRELIMINARY SITE PLAN

DATE: June 2018

FIGURE ES-2

