
TRAFFIC IMPACT ANALYSIS LIBRARY EXPANSION

Chapel Hill, North Carolina

Executive Summary



Prepared for:
The Town of Chapel Hill, NC



prepared by:
Architects-Engineers-Planners, Inc.

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E.0 EXECUTIVE SUMMARY

E.1 Project Overview

The objective of this study is to analyze the impacts of the proposed Chapel Hill Public Library expansion on the area roads. The proposed project plans to expand the existing Chapel Hill Public Library located off of Estes Drive near its intersection with Franklin Street. Under this plan, the Chapel Hill Public Library will be adding 47,000 square feet to the existing 28,000 square feet. This expansion is expected to be completed by 2009. The existing Public Library is bounded by other private residential developments to the north and west, commercial development to the east and Estes Drive to the south. Figures E-1 and E-2 show the proposed site plan study area and zoning respectively.

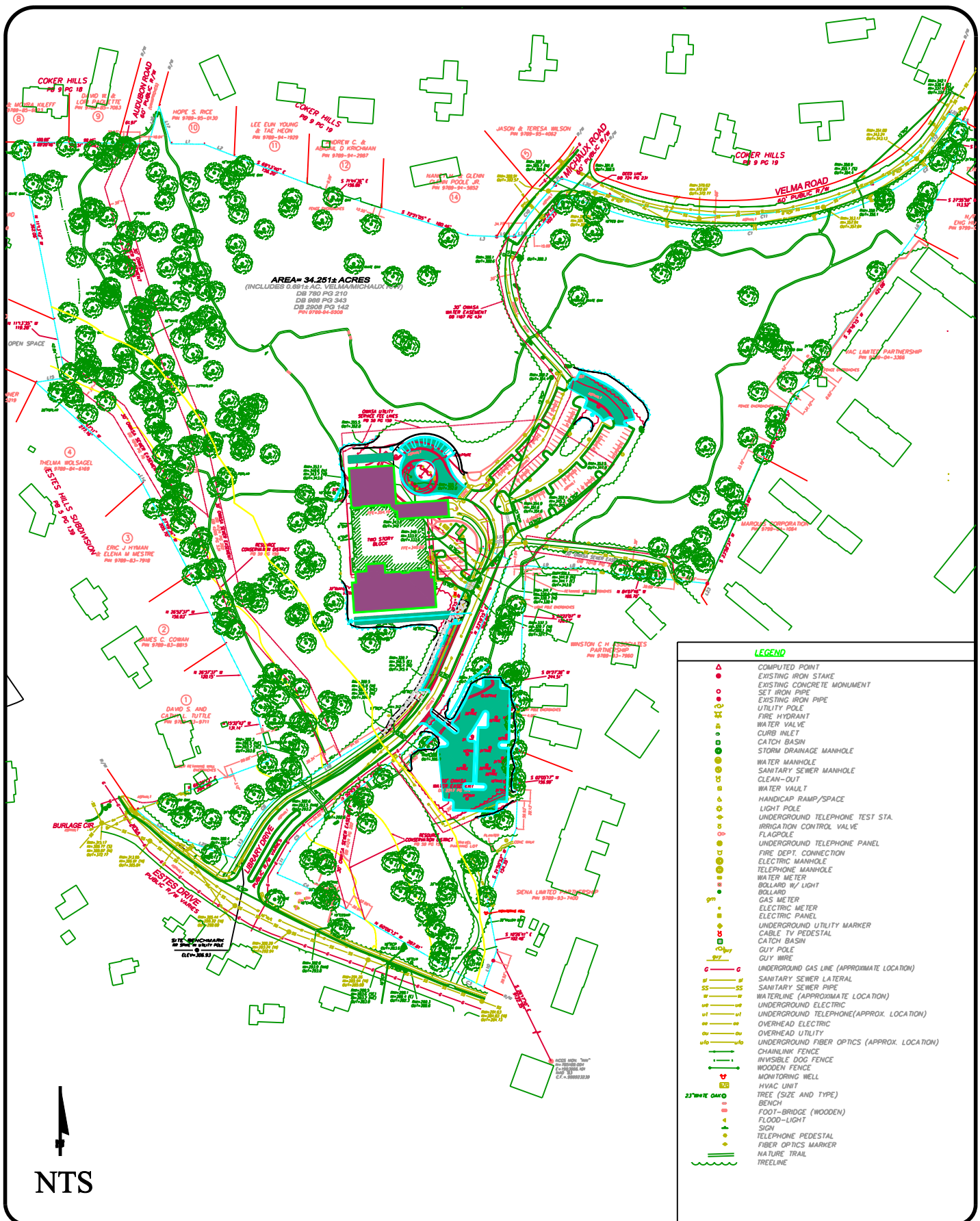
E.2 Proposed Project Traffic

The proposed Chapel Hill Public Library Expansion generates 2,118 daily vehicle trips. Of these, 57 vehicles trip will occur during the Am peak hour, 276 vehicle trips during the Mid-day and PM peak hours.

Table E-1 summarizes the number of trips generated by the proposed development during the AM, mid-day and PM peak periods of the day.

**Table E-1
Site Trip Generation Volumes**

Traffic Volumes										
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	
Public Library	47,000 sf	1,059	1,059	41	16	138	138	132	143	



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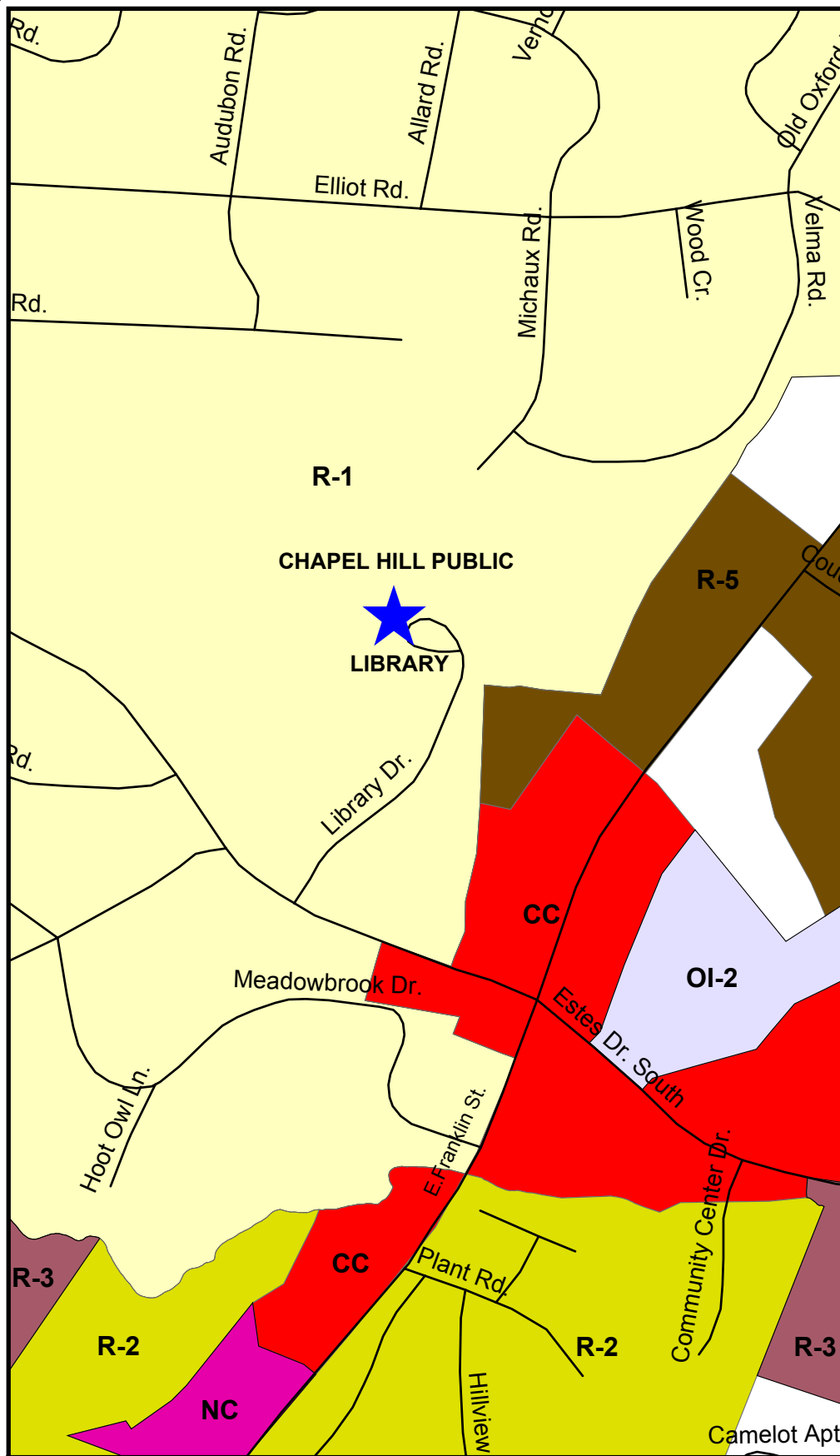


LIBRARY EXPANSION TRAFFIC IMPACT ANALYSIS



PROJECT SITE PLAN

FIGURE E-1



LEGEND

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Streets

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Interstates

Zoning

R-1

R-1A

R-2

R-3

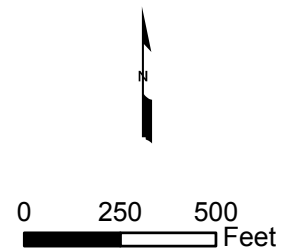
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LIBRARY EXPANSION
TRAFFIC IMPACT STUDY



PROJECT LOCATION

FIGURE E-2

E.3 Project Impacts

To determine the traffic impacts of the proposed site development on nearby roadways, traffic flow conditions were analyzed at the following two arterial segments and three intersections for the 2007 Existing Conditions, 2010 No Build Conditions, and 2010 Build Conditions:

Arterial Segments:

- Estes Drive between Caswell Road and Franklin Street
- Franklin Street in the vicinity of Estes Drive

Intersections

- Estes Drive at Caswell Road
- Estes Drive at Library Drive
- Franklin Street at Estes Drive

Tables E-2 and E-3 compare the arterial and intersection capacity analysis results for all of the conditions analyzed in this study. Table E-4 summarizes the overall impacts of the proposed project for the year 2010 (one-year after it is built and fully occupied).

Table E-4
Summary of the Proposed Project's Impacts

Analyses	Impacts
Peak Hour Arterial Capacity	Traffic demand on Library Drive would either approach or exceed the roadway capacity limits at its intersection with Estes Drive during the 2007 Existing Conditions, the 2010 No Build Conditions and 2010 Build Conditions Mid-day and PM peak hours.
Site Access	The existing driveway off of Estes Drive would be sufficient to accommodate the site traffic as estimated for the proposed expansion.
New Signal Location	A signal warrant analysis for the intersection of Estes Drive and Library Drive indicated that this intersection does not meet the signal warrant requirements for warrants 2 under the 2007 Existing Conditions. However, a more detailed study might be needed to determine if this intersection warrants a traffic signal in the future.
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, the traffic demand on one or more approaches at two of the three intersections analyzed in this study exceeds the intersection capacity limits. In order to improve the traffic flow, this study recommends improvements to the intersection of Franklin Street and Estes Drive.
Crash Analysis	Crash data was obtained from the North Carolina Department of Transportation (NCDOT) for a 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.
Traffic Signal Progression	The signalized intersections in the study area were analyzed as isolated intersections; therefore no Progression Analysis was conducted as part of this study.
Peak Hour Intersection Capacity	The peak hour intersection capacity analysis indicates that traffic demand on one or more approaches at the intersections of Estes Drive and Library Drive along with Franklin Street and Estes Drive approach or exceed the intersection capacity limits under the 2007 Existing Conditions, 2010 No Build Conditions and Build Conditions. A detailed description of the proposed mitigation measures for these intersections is provided in Section E-4.
Turn Lane Storage Requirements	The capacity analysis indicates that regardless of whether the proposed project is built, improvements are required at the intersections of Franklin Street/Estes Drive and Estes Drive/Library Drive. A detailed description of the proposed mitigation measures for these intersections is provided in Section E-4.
Intersection Sight Distance	At the intersection of Estes Drive with Library Drive, improvements such as removal of vegetation are recommended to provide a safe sight distance as recommended by AASHTO Green Book.
Appropriateness of Acceleration/Deceleration Lanes	The speed limit on Estes Drive is 35 miles per hour. Since the speed limits for the roadways are low, acceleration/ deceleration lanes are not needed at the proposed site driveway.
Pedestrian and Bicycle Facilities	<p>Sidewalks are present along Estes Drive and Library Drive in the site vicinity. Library Drive has a marked bike lane from Estes Drive to the Public Library facility. On Estes Drive between Caswell Road and Fordham Boulevard, the width of the outside lane is wider than the standard twelve foot lane; therefore bicycle use is possible on this roadway.</p> <p>The proposed development does not add any new sidewalks or bicycle lanes in the project vicinity.</p>
Public Transportation Facilities	<p>In the vicinity of the proposed development, multiple bus routes are present on Estes Drive, Library Drive, and Franklin Street.</p> <p>No additional bus stop will be added as part of this project.</p>

E.4 Mitigation Measures/Recommendations

Roadway improvements are divided into four categories: improvements already planned by the Town or NCDOT; 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.

Planned Improvements

There are no planned improvements to study area roads.

Background Committed Improvements

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

Applicant Committed Improvements

The proposed development would expand an existing Public Library facility, which has access/egress to/from Estes Drive via one approach lane and one exit lane. No improvements are required at this location.

Recommended Improvements

The capacity analysis indicates that regardless of whether the proposed project is built, improvements are required at the intersections of Franklin Street and Estes Drive and Estes Drive at Library Drive.

Franklin Street and Estes Drive: Under the 2007 Existing Conditions, the 2010 No Build Conditions and 2010 Build Conditions, overall traffic demand at this intersection would either approach or exceed the intersections capacity limits during at least one peak hour of the day (Level of Service E or F). This analysis clearly indicates that roadway improvements are needed at this location whether the proposed project is built or not.

The Mitigation Measures capacity analysis included additional turn lanes for all the four approaches. With these improvements, the following would be the lane configuration for this intersection:

- On eastbound Estes Drive, two exclusive left-turn lanes, one exclusive through lane and an exclusive right-turn lane
- On westbound Estes Drive, two exclusive left-turn lanes, one exclusive through lane and an additional through lane shared with right-turning movements.
- On northbound Franklin Street, an exclusive left-turn lane, two exclusive through lanes and an exclusive right-turn lane
- On southbound Franklin Street, an exclusive left-turn lane, two exclusive through lanes and an exclusive right-turn lane

With the proposed changes, all the through and right-turning traffic demand at this intersection would function at Level of Service D or better through out the day, an acceptable rate of traffic flow. The left-turning movements would flow at Level of Service E or better through out the day, an acceptable rate of traffic flow for turning movements during the peak hour conditions.

Estes Drive at Library Drive: Under the 2007 Existing Conditions, the 2010 No Build Conditions and 2010 Build Conditions, traffic demand on southbound Library Drive experiences long delays (Level of Service E or F) during at least one peak hour of the day. This intersection should be monitored to determine whether traffic demand on Library Drive could warrant a traffic signal in the future.



However, to predict the impacts of installing a traffic signal at this location, a signalized intersection capacity analysis was performed. In this analysis, traffic signals at the intersection of Estes Drive/Library Drive/Franklin Street were assumed as coordinated. The signalized intersection capacity analysis indicates that the intersection as a whole and all the movements at this intersection would function at Level of Service C or better through out the day, a good rate of traffic flow.

The intersection capacity analyses results for the 2010 Build Conditions Mitigation Measures are summarized in Table E-3.





8008 Corporate Center Drive, Suite 410
Charlotte, North Carolina 28226-4489
(704) 752-0610 (704) 541-3081 Fax