HILLMONT

RESIDENTIAL DEVELOPMENT

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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NCBELS License #: C-1554

June 2023

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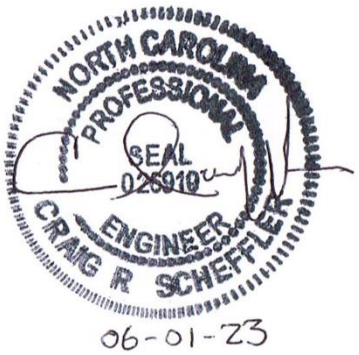

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EXECUTIVE SUMMARY

Project Overview

A new residential community, known as Hillmont, is being proposed in eastern Chapel Hill near Barbee Chapel Road and Stancell Drive/NC 54. **Figure ES-1** shows the general location of the site. The project proposes to construct approximately 500 residential townhome/condominium units and is anticipated to be fully complete and occupied by 2025. This report analyzes the full build-out scenario for Hillmont for the year 2026 (one year after anticipated completion), the no-build scenario for 2026, as well as 2022 existing year traffic conditions.

The current proposed site plan shows a provision for a full movement access driveway serving the site that connects to Barbee Chapel Road and a two minor full access driveway connections along Stancell Drive. No other external roadway vehicular access connections are proposed. **Figure ES-2** displays the overall site plan and nearby land uses and roadways. The Hillmont site is expected to provide individual vehicle parking spaces located as part of each condominium lot or garage parking for larger individual buildings – with potential on-street parking allowed in areas where curb space permits. Several internal driveways connecting parking locations/buildings within the site property are also proposed. This report analyzes and presents the transportation impacts that Hillmont will have on the following intersections in the project study area:

- NC 54 (Raleigh Road) & Meadowmont Lane / Friday Center Drive
- NC 54 (Raleigh Road) & Barbee Chapel Road / East Barbee Chapel Road
- NC 54 (Raleigh Road) & Little John Road
- Barbee Chapel Road & Stancell Drive
- Little John Road & Stancell Drive
- Barbee Chapel Road & Finley Forest Drive / Proposed Site Driveway #1
- Stancell Drive & Proposed Site Driveway #2
- Stancell Drive & Proposed Site Driveway #3

Existing Conditions

Study Area

The site is located in eastern Chapel Hill in Durham County east of Barbee Chapel Road and south of NC 54. The study area contains two signalized intersections along NC 54 at Meadowmont Lane/Friday Center Drive and Barbee Chapel Road. NC 54 is a major east-west arterial providing connectivity between downtown Chapel Hill and south Durham. Barbee Chapel Road is a collector facility providing connectivity for primarily residential development east of Chapel Hill. Remaining study area network roadways are either minor collector or local access streets.

Site Traffic Generation

With the addition of new trips during the weekday AM, noon, and PM peak hours, there are potential site traffic impacts to study area intersections. **Table ES-1** shows the site trip generation details, with rates taken from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, Version 10*.

Background Traffic

Background traffic growth for the 2026 analysis years is expected to come from two sources - ambient regional traffic growth and specific development-related traffic growth. Two development sites near the project study area were considered for specific development related growth. All remaining estimated traffic volume increases are assumed to occur due to overall region-wide ambient growth (assumed 4.0

percent per year) based on NCDOT/Town historic growth data and taking into consideration the on-going rebound to pre-COVID traffic levels caused by the pandemic.

Table ES-1. Weekday Vehicle Trip Generation Summary

Description	Density	Daily			AM Peak			Noon Peak*			PM Peak		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Low-Rise Multi-family (ITE LUC 220)	500 Units	1,870	1,870	3,740	53	177	230	86	105	191	176	104	280

* - No Noon Peak ITE Data Available – Used Average of AM and PM Peak Data X 0.75

Impact Analysis

Peak Hour Intersection Level of Service

Existing traffic operations at all study area intersections are acceptable during all three peak hours analyzed, except for the stop-controlled movement at the NC 54 / Little John Road intersection. The projected ambient and background development traffic growth will increase impacts by 2026, worsening delays in the vicinity of this intersection and queuing along Barbee Chapel Road at its intersection with NC 54. The addition of peak hour site-generated trips to the projected 2026 background traffic volumes, further worsens these deficient traffic operations at these two locations. Additional mitigation improvements were tested at the two locations to increase capacity and queue storage. 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 simulation Level-of-Service (LOS_S) is shown in **Table ES-2**.

Vehicular Access Analysis

Vehicular site access to the project is to be accommodated at a proposed full movement local street access connecting to Barbee Chapel Road about 1,200 feet to the south of Barbee Chapel Road's intersection with NC 54. The proposed driveway has a single inbound and two outbound lanes, as shown on the concept plan. Two additional local street access connections are also proposed to link with Stancell Drive. These connections would provide access between Hillmont and Barbee Chapel Road, along with the NC 54 corridor via Little John Road's full access intersection to the east of the site. All driveway connections to Barbee Chapel Road and Stancell Drive would have acceptable design distances for driveway throat lengths, driveway separations from intersections, and driveway separation from other access driveways based on standards found in the 2017 *Town of Chapel Hill Public Works Design Manual* and the 2003 *NCDOT Policy on Street and Driveway Access to North Carolina Highways*.

Signal Warrant Analysis

Based on projected 2026 traffic volumes and proposed access plans, no unsignalized study area intersection would warrant the installation of a traffic signal, based on the Peak Hour warrant 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 2/1/2017 to 1/31/2022 for the segments of Barbee Chapel Road and Stancell Drive in the vicinity of the proposed site. There were 18 crashes reported along Barbee Chapel Road study area corridor between Finley Forest Drive and NC 54 over the five year period and 0 crashes along Stancell Drive between Barbee Chapel Road and Little John Road.. The primary crash types was left-turn and angle crashes and crashes clustered near the NC 54/Barbee Chapel Road intersection. Overall, the number of crashes along Barbee Chapel Road in the project study area is higher than state-wide averages for similar facilities, but the overall severity is lower.

Table ES-2. Peak Hour Intersection Capacity Analysis Summary

Intersections	Peak Hour	2022 Existing		2026 No-Build		2026 Build		2026 Mitigated	
		LOS$_S$	Delay	LOS$_S$	Delay	LOS$_S$	Delay	LOS$_S$	Delay
NC 54 (Raleigh Road) & Meadowmont Lane / Friday Center Drive	AM	B	16.6	B	17.6	B	17.7	N/A	N/A
	NOON	B	16.0	B	14.7	B	16.6	N/A	N/A
	PM	C	24.1	C	21.6	C	22.1	N/A	N/A
NC 54 (Raleigh Road) & Barbee Chapel Road / East Barbee Chapel Road	AM	C	23.9	C	27.7	C	33.2	C	28.5
	NOON	B	16.0	B	16.4	B	17.2	B	16.5
	PM	C	22.0	C	24.8	C	27.4	C	29.6
NC 54 (Raleigh Road) & Little John Road#	AM	C	24.0	E	47.2	***F***	***79.4***	***F***	***52.6****
	NOON	D	26.7	E	36.4	E	47.8	D	33.9**
	PM	***F***	***103.5***	***F***	***478***	***F***	***731***	***F***	***124****
Barbee Chapel Road & Stancell Drive#	AM	B	10.6	B	11.2	B	12.1	N/A	N/A
	NOON	A	9.4	A	9.6	B	10.0	N/A	N/A
	PM	A	9.7	B	10.0	B	10.4	N/A	N/A
Little John Road & Stancell Drive#	AM	A	6.7	B	11.3	***F***	***251***	C	18.3
	NOON	A	8.6	A	8.0	E	45.7	A	8.7
	PM	E	40.1	***F***	***330***	***F***	***1004***	***F***	***156***
Barbee Chapel Road & Finley Forest Drive / Proposed Site Driveway #1#	AM	B	10.1	B	13.6	B	14.7	B	13.2
	NOON	A	7.6	A	8.9	A	9.2	B	10.5
	PM	C	16.8	C	21.1	D	26.5	C	23.6
Stancell Drive & Proposed Site Driveway #2#	AM	N/A	N/A	N/A	N/A	A	5.7	N/A	N/A
	NOON	N/A	N/A	N/A	N/A	A	4.8	N/A	N/A
	PM	N/A	N/A	N/A	N/A	A	5.6	N/A	N/A
Stancell Drive & Proposed Site Driveway #3#	AM	N/A	N/A	N/A	N/A	***F***	***107***	A	4.9
	NOON	N/A	N/A	N/A	N/A	A	5.5	A	5.0
	PM	N/A	N/A	N/A	N/A	***F***	***350***	B	13.7

N/A – Not Applicable or No Improvements Necessary
BOLD/ITALICS – Critical Movement or Overall Intersection Requires Mitigation Per Town TIA Guidelines
- Worst-Case LOS/Delay for Unsignalized/Stop-Controlled Critical Movement
** - Delay Calculated as Weighted Average of Left and Right-Turn Movements for Northbound Approach

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
Long Range Planning Level Daily V/C Analysis	The projected 3,700 daily trips generated by the Hillmont site were analyzed in comparison to daily demand estimates for the 2045 horizon year of the Triangle Regional Travel Demand Model. Results indicate that regardless of site development and long-term projects to improve capacity along the NC 54 corridor, future demands along the facility may result in congested conditions throughout the day. Daily site traffic impacts are most pronounced along the Barbee Chapel Road corridor between the site driveway and NC 54.
Turn Lane Storage Requirements	Based on simulation modeling analysis, the intersection of Barbee Chapel Road and NC 54, the northbound approach queues may exceed existing storage due to site traffic impacts. Lengthening the northbound queue storage to the vicinity of Pearl Lane and adjustments to signal timing may be necessary to mitigate this issue. Additional lengthening of the westbound left-turn bay at the NC 54 and Little John Road is necessary to accommodate additional site traffic. Separation of the Little John Road northbound approach to left and right-turn lanes improves operational efficiency in this vicinity. No other intersection maximum queue results indicate potential queue spillback.
Appropriateness of Acceleration/ Deceleration Lanes	Generally, existing roadway facilities have appropriate auxiliary turn lanes to facilitate traffic flow. Additional southbound and northbound turn lanes at the Barbee Chapel Road intersection with Finley Forest Drive / Site Driveway #1 would provide a safety and operational benefit by removing these traffic movements from the high volume through traffic streams along Barbee Chapel Road.
Pedestrian and Bicycle Analysis	Existing pedestrian access and connectivity is lacking along the Barbee Chapel Road corridor but is provided near the site via the paved off-road path along Stancell Drive. No bicycle facilities exist along Barbee Chapel Road within the project study area. The paved off-road path along Stancell Drive provides connectivity to other paved paths along the NC 54 corridor and sidewalk/bicycle lanes in the Meadowmont and Friday Center areas.
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 servicing the Friday Center and Meadowmont development. No bus service extends directly to serve the site, however.

Mitigation Measures/Recommendations

Planned Improvements

There are no North Carolina Department of Transportation or Town of Chapel Hill improvement projects for study area roadway facilities within the analysis year time frame of 2022-2026.

Background Committed Improvements

Several previous traffic impact studies for development projects in and near the study area recommended signal timing reoptimization for signalized intersections along the NC 54 (Raleigh Road) corridor by their respective build-out years. It is assumed that signal timing reoptimization will occur for the NC 54 corridor and for the Barbee Chapel Road/Weaver Dairy Road intersection by the year 2026, whether or not specifically needed by any of the proposed background traffic generating developments included in this study. No other geometric improvements or changes to study area transportation network facilities constructed by private development projects are expected by the 2026 Build-Out Year+1.

Applicant Committed Improvements

Based on the preliminary site plans and supporting development information provided, there are several specific transportation-related improvements proposed for the Hillmont project. Internal and external improvements (shown schematically in **Figure ES-3**) include:

- Provision of a primary full movement access driveway connecting to Finley Forest Drive with a proposed left-turn lane and through/right-turn lane.
- Provision of two full movement access driveways along Stancell Drive.

Necessary Improvements

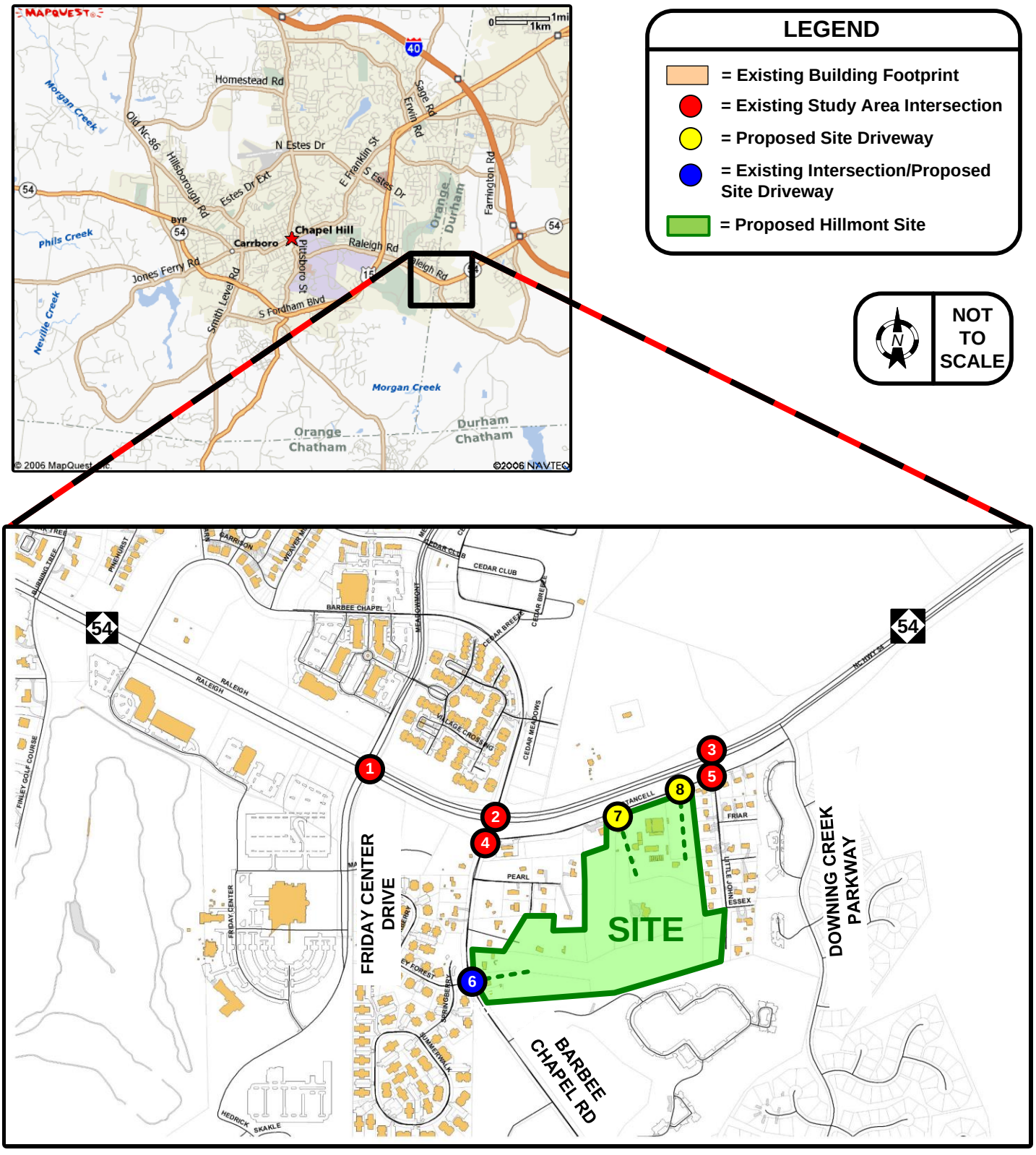
Based on traffic capacity analyses for the 2026 design year for the Hillmont development and analyses of existing study area turning bay storage lengths and site access, the following improvements are recommended as being necessary for adequate transportation network operations and safety (see **Figure ES-3**).

- Lengthen the northbound left-turn lane at the NC 54 / Barbee Chapel Road intersection to approximately 450 feet and appropriate taper, using the existing pavement section in the vicinity of Pearl Lane.
- Construct a right-turn lane at this approach with 125 feet of storage utilizing existing pavement and widening along frontage of the existing gas station up to its existing access driveway along Barbee Chapel Road.
- Upgrade NC 54 / Barbee Chapel Road signal for northbound right-turn overlap signal phase and retime signal.
- Construct a 150 foot southbound left-turn lane and appropriate taper at the Barbee Chapel Road and Finley Forest Drive / Site Driveway #1 intersection. The intersection design and adjustment in alignment for through travel lanes along Barbee Chapel Road should allow for the creation of a northbound left-turn lane with 100 feet of minimum storage and appropriate taper.
- Stripe separate left-turn and through/right-turn lanes at the Finley Forest Drive approach.
- Provide a pedestrian crosswalk across the south leg of the Barbee Chapel Road / Finley Forest Drive approach.
- Restripe the current northbound approach at the NC 54 / Little John Road intersection for separate left-turn and right-turn lanes, with small amount of roadway widening, as needed.
- Extend the existing westbound left-turn bay at the NC 54 / Little John Road intersection to 250 feet of vehicle storage and appropriate taper.
- Extend the existing paved off-road multi-use path on the south side of Stancell Drive across the proposed Hillmont site frontage.

<u>These improvements are recommended due to site transportation needs due to the Hillmont development.</u>

- Per Town Mobility Plan recommendations, a sidewalk from Finley Forest Drive to NC 54 along Barbee Chapel Road should be constructed.

<u>This improvement is recommended regardless of whether or not the Hillmont development is constructed.</u>



Source: Town of Chapel Hill GIS Files

HNTB / Town of Chapel Hill	**Hillmont Residential** **Transportation Impact Analysis**	**DATE:** June 2023
	PROJECT STUDY AREA	**FIGURE ES-1**

HNTB

TOWN OF CHAPEL HILL

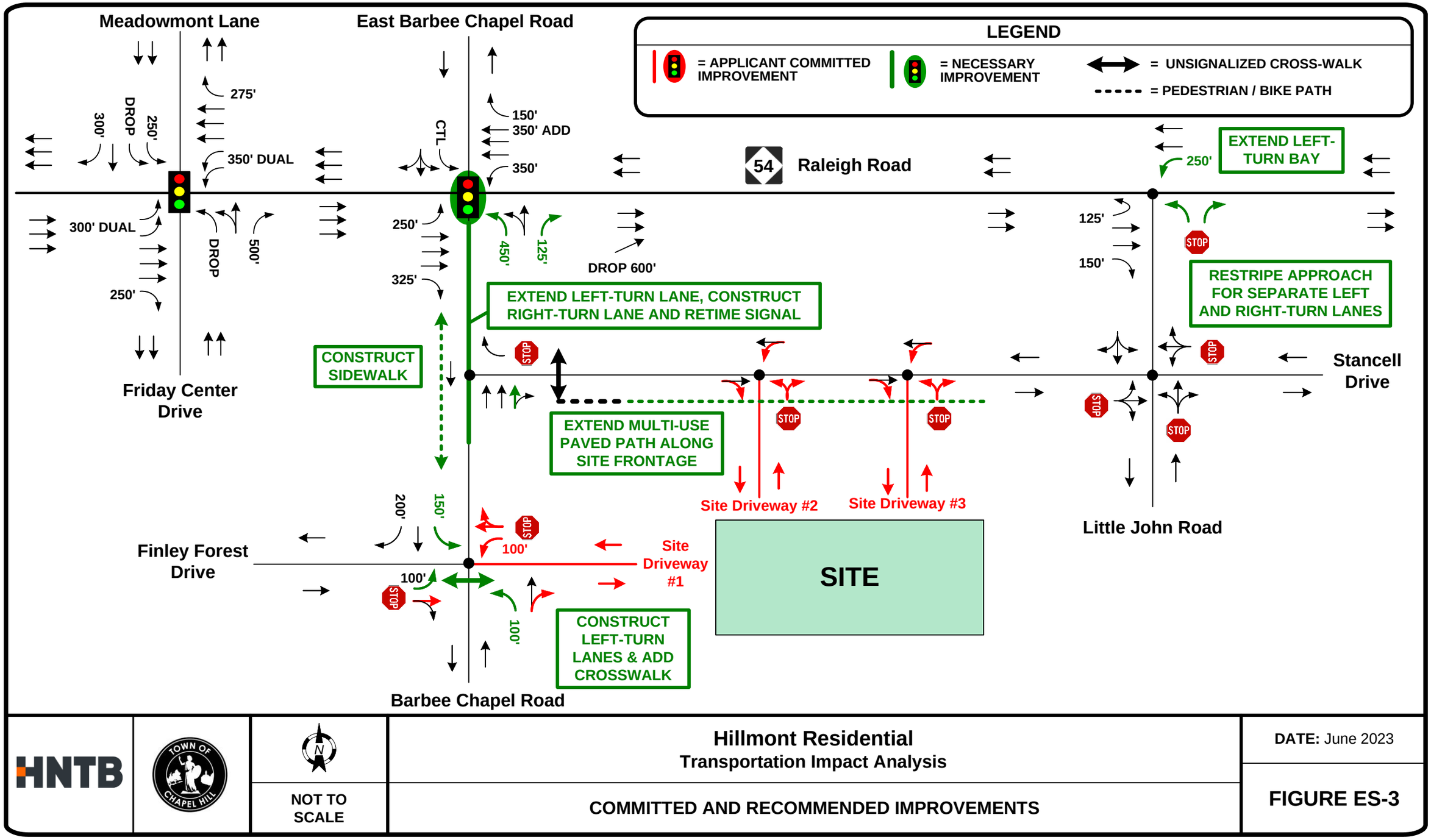
NOT TO SCALE

Hillmont Residential
Transportation Impact Analysis

DATE: June 2023

PRELIMINARY SITE PLAN

FIGURE ES-2



HNTB

NOT TO SCALE

Hillmont Residential
Transportation Impact Analysis

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COMMITTED AND RECOMMENDED IMPROVEMENTS

FIGURE ES-3