

TECHNICAL MEMORANDUM

HNTB

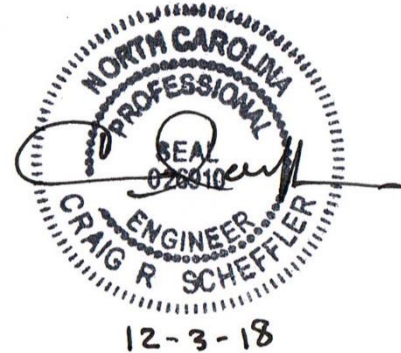
To
Kumar Neppalli
Traffic Engineering Manager
Town of Chapel Hill

From
Craig Scheffler, P.E., PTOE
HNTB North Carolina, P.C.

Cc
HNTB Project File: 71078

Subject
Homestead Road Active Adult
Housing - Traffic Impact Study
Merin Road Community
Background Traffic Analysis

Date
12/3/18



Per Town of Chapel Hill request related to the Homestead Road Active Adult Housing (formerly known as Overture Senior Residences) proposed development, the following information represents an updated analysis of future year 2020 No-Build and Build Scenario conditions to account for the Merin Road Community residential development, which is under construction and located in the traffic impact study (TIS) project study area for the Homestead Road Active Adult Housing development.

This technical memorandum provides intersection capacity analyses and queue length/storage information for estimated weekday AM, noon, and PM peak hour conditions for the 2020 Without Site and 2020 With Site Scenarios, as previously analyzed in the original TIS submitted by HNTB to the Town in December 2017. All previous assumptions regarding existing and future traffic conditions, traffic volume projections, and background traffic growth remain the same from the December 2017 report and analyses, unless noted in the following sections.

Merin Road Community Residential Development Discussion

Town of Chapel Hill staff provided site plans and a previous TIS for the Merin Road Community development, completed by RS&H in June 2015 and titled *Traffic Impact Analysis - Homestead Road Subdivision Development*. This document was used to add and distribute estimated site-generated background trips to the Homestead Road Active Adult Housing study area network. **Table 1**, taken from page 10 of the RS&H TIS, provides a summary of the trip generation. Figure 6 from the TIS was used for trip distribution and assignment purposes. The latest site plan for the development indicates that access for the development will be made at a single access point across from Seawell School Road at its intersection with Homestead Road. The 2015 TIS assumed another access point from Merin Road to Homestead Road. Trip distribution and assignment data was updated for this change in the site plan.

In addition, the development will also feature upgrades to turning lanes and signal operations at the existing Seawell School Road/Homestead Road intersection. Town staff provided an updated traffic signal plan that was utilized in updating 2020 Without Site and With Site analyses for this technical memorandum.

Table 1. Merin Road Community Residential Development Trip Generation

Land Use	Size	Daily		AM Peak Hour		Midday Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Single-Family Detached Housing	75 units	5.37	5.37	0.23	0.64	0.55	0.56	0.71	0.40

Land Use	Size	Daily		AM Peak Hour		Midday Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Single-Family Detached Housing	75 units	403	403	17	48	41	42	53	30

Peak Hour Capacity Analysis Methodology

HNTB updated networks in the Synchro Version 9.1 traffic analysis software for the Homestead Road Active Adult Housing study area by modifying previously submitted 2020 Without Site and 2020 With Site Scenario networks for the additional background traffic produced by the Merin Road Community development and the changes to the intersection and signalization at the Homestead Road/Seawell School Road intersection. No other changes to the networks were made from the original TIS submittal.

Peak Hour Level-of-Service (LOS), vehicular delay, and 95th percentile maximum queue data were extracted from the software outputs and are shown on the following pages in **Table 2** for the 2020 Without Site Scenario and in **Table 3** for the 2020 With Site scenario.

Impact Summary/Recommendations

As shown in **Tables 2 and 3**, and consistent with the analysis results and recommendations provided in the original TIS, all project study area intersections are expected to operate at an acceptable LOS (overall intersection, if signalized and critical stop-controlled movement, if unsignalized) in the 2020 Without Site and With Site scenarios. There are some anticipated operational changes due to the Merin Road Community development access roadway connection at the existing Homestead Road/Seawell School Road intersection, but nothing that results in deficient peak hour LOS or queue spillback issues. There are projected potential queue spillback issues for the southbound right-turn movement during peak hours at the Homestead Road/Weaver Dairy Road Extension intersection for both the 2020 Without Site and With Site Scenarios, but conservative assumptions in the capacity analysis methodology (right-turns on red not permitted) are the source of these results, and no additional mitigation is recommended at this intersection due to site impacts from the Homestead Road Active Adult Housing project. This intersection approach would likely be improved in the development of the adjacent land parcel (Fraley Property) in the future. All other recommendations in the original TIS remain valid for this analysis update, based on the results shown in **Tables 2 and 3**.

**Table 2. Capacity Analysis Results for Study Area Intersections
2020 Traffic Without Site**

Intersections/Movements	AM			Noon			PM			Storage Length (ft)
	LOS	Delay	95 th % Queue	LOS	Delay	95 th % Queue	LOS	Delay	95 th % Queue	
Homestead Road and Seawell School Road	C	30.7		B	11.2		B	19.4		
EB LT	A	5.9	25'	A	4.2	25'	A	7.1	25'	250'
EB TH-RT	C	31.3		B	13.6		C	25.5		
WB LT	C	31.8	225'	A	4.7	25'	B	10.9	75'	650'
WB TH	A	8.1		A	7.9		B	15.7		
WB RT	A	7.4	25'	A	7.3	25'	A	9.7	25'	100'
NB LT	C	29.0	75'	B	17.4	25'	B	19.9	50'	150'
NB TH-RT	D	44.0		B	19.8		C	25.6		
SB LT	C	30.5	50'	B	17.4	25'	B	19.4	50'	100'
SB TH-RT	C	28.3		B	17.2		B	18.6		
Homestead Road and Weaver Dairy Road Extension	B	10.8		B	10.9		B	15.6		
EB LT	A	5.1	75'	A	3.6	50'	A	5.3	50'	100'
EB TH	A	4.3		A	3.2		A	3.4		
WB TH-RT	C	24.7		B	16.7		C	25.3		
SB LT	C	28.5		C	21.9		C	34.7		
SB RT	B	10.0	125'	B	11.1	75'	B	17.5	225'	100'
Homestead Road and NC 86 (Martin Luther King, Jr. Boulevard)	C	29.1		C	32.7		C	34.0		
EB LT	<i>E</i>	<i>78.9</i>	225'	<i>F</i>	<i>84.9</i>	175'	<i>F</i>	<i>96.1</i>	250'	125'
EB LT-TH	<i>E</i>	<i>79.8</i>	225'	<i>F</i>	<i>85.9</i>	175'	<i>F</i>	<i>96.8</i>	250'	CTL
EB RT	<i>E</i>	<i>58.4</i>	325'	<i>F</i>	<i>81.5</i>	300'	<i>E</i>	<i>71.8</i>	350'	550'
WB LT	<i>E</i>	<i>68.3</i>	25'	<i>E</i>	<i>76.9</i>	25'	<i>F</i>	<i>83.3</i>	25'	150'
WB LT-TH	<i>E</i>	<i>68.3</i>		<i>E</i>	<i>76.5</i>		<i>F</i>	<i>83.8</i>		
WB RT	D	45.8	25'	<i>E</i>	<i>55.4</i>	50'	<i>E</i>	<i>56.8</i>	25'	75'
NB LT	<i>E</i>	<i>62.2</i>	125'	<i>E</i>	<i>79.9</i>	175'	<i>F</i>	<i>121.5</i>	350'	350'
NB TH-RT	B	11.0		B	12.3		B	13.3		
SB LT	B	16.1	25'	B	13.2	25'	B	14.4	25'	225'
SB TH	C	22.6		B	14.7		B	17.0		
SB RT	A	6.4	125'	A	5.8	100'	A	5.7	150'	325'

Delay Measured in Seconds Per Vehicle CTL = Continuous Turn Lane **BLUE** = Background Geometric/Signal Timing Improvement
BOLD/ITALICS – Movement or overall intersection is over Town TIS Guidelines threshold capacity **PURPLE** = 95th Percentile Queue May Exceed Storage Length

Table 3. Capacity Analysis Results for Study Area Intersections - 2020 Traffic With Site

Intersections/Movements	AM			Noon			PM			Storage Length (ft)
	LOS	Delay	95 th % Queue	LOS	Delay	95 th % Queue	LOS	Delay	95 th % Queue	
Homestead Road and Seawell School Road	C	30.9		B	11.3		B	19.5		
EB LT	A	5.9	25'	A	4.2	25'	A	7.1	25'	250'
EB TH-RT	C	31.4		B	13.6		C	25.7		
WB LT	C	31.9	225'	A	4.7	25'	B	10.9	75'	650'
WB TH	A	8.1		A	7.9		B	15.7		
WB RT	A	7.4	25'	A	7.4	25'	A	9.7	25'	100'
NB LT	C	29.2	75'	B	17.5	25'	B	19.9	50'	150'
NB TH-RT	D	44.7		B	20.0		C	26.0		
SB LT	C	30.8	50'	B	17.4	25'	B	19.4	25'	100'
SB TH-RT	C	28.4		B	17.1		B	18.6		
Homestead Road and Site Driveway	N/A	N/A		N/A	N/A		N/A	N/A		
WB LT	A	9.8	25'	A	8.2	25'	A	9.0	25'	100'
NB LT-RT	C	19.7	25'	B	12.3	25'	C	16.3	25'	
Homestead Road and Weaver Dairy Road Ext	B	11.0		B	11.1		B	16.0		
EB LT	A	5.2	75'	A	3.6	50'	A	5.8	75'	125'
EB TH	A	4.4		A	3.2		A	3.4		
WB TH-RT	C	24.9		B	17.1		C	25.5		
SB LT	C	28.9		C	22.4		D	35.7		
SB RT	B	10.3	125'	B	11.5	75'	B	18.4	250'	100'
Homestead Road and NC 86 (Martin Luther King, Jr. Boulevard)	C	29.8		C	34.0		D	35.4		
EB LT	<i>E</i>	<i>78.9</i>	225'	<i>F</i>	<i>85.1</i>	175'	<i>F</i>	<i>96.0</i>	250'	125'
EB LT-TH	<i>E</i>	<i>79.6</i>	250'	<i>F</i>	<i>85.8</i>	200'	<i>F</i>	<i>96.7</i>	250'	CTL
EB RT	<i>E</i>	<i>60.8</i>	350'	<i>F</i>	<i>87.2</i>	325'	<i>E</i>	<i>74.1</i>	375'	550'
WB LT	<i>E</i>	<i>68.3</i>	25'	<i>E</i>	<i>76.9</i>	25'	<i>F</i>	<i>83.3</i>	25'	150'
WB LT-TH	<i>E</i>	<i>68.3</i>		<i>E</i>	<i>76.5</i>		<i>F</i>	<i>83.8</i>		
WB RT	D	45.8	25'	<i>E</i>	<i>55.2</i>	50'	<i>E</i>	<i>56.8</i>	25'	75'
NB LT	<i>E</i>	<i>62.5</i>	125'	B	<i>81.6</i>	175'	<i>F</i>	<i>128.8</i>	<i>375'</i>	350'
NB TH-RT	B	11.2		B	12.4		B	13.5		
SB LT	B	16.3	25'	B	13.4	25'	B	14.5	25'	225'
SB TH	C	22.9		B	14.8		B	17.1		
SB RT	A	6.4	125'	A	5.8	100'	A	5.8	175'	325'

N/A => Not Applicable, i.e. movement is non-existent or overall intersection values are not reported for unsignalized intersections
 Delay Measured in Seconds Per Vehicle CTL = Continuous Turn Lane **BOLD/ITALICS** – Movement or overall intersection is over Town TIS Guidelines threshold capacity
RED = Proposed Geometric Mitigation Improvement **PURPLE** = 95th Percentile Queue May Exceed Storage Length