

**MEMORANDUM**

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Ref: 1314  
Subject: Traffic Assessment  
Brookhaven at Lexington  
Lexington, Massachusetts  
From: Kim Eric Hazarvartian, Ph.D., P.E., PTOE  
Principal  
Date: December 23, 2015

**INTRODUCTION**

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OHI Engineering, Inc. has retained TEPP LLC to prepare this traffic-assessment memorandum (TAM). This TAM regards the proposed modifications to Brookhaven at Lexington at 1010 Waltham Street in the Town of Lexington, Massachusetts.

In order to prepare this TAM, TEPP LLC conducted the following:

- automatic-traffic-recorder (ATR) traffic counts on the main Brookhaven driveway, from December 10, 2015 through December 12, 2015;
- trip-generation calculations for existing and proposed conditions; and
- review of the *South Lexington Transportation Study, Existing Conditions—Technical Memorandum 1*, prepared for the Town of Lexington Planning and Engineering Departments by FST, with RKG Associates, Inc., dated January 2015.

This TAM concludes that trip-generation associated with the proposed Brookhaven project will have no significant overall traffic impact for the area.

**PROPOSED MODIFICATIONS**

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The existing site includes a total of 309 units comprised of:

- 240 independent-living units
- 20 assisted care-units
- 49 nursing-care units

The modified site will include a total of 351 units comprised of:

- 289 independent-living units
- 50 assisted care-units
- 12 nursing-care units

The existing main driveway along Waltham Street will continue to provide access. A proposed emergency driveway to the north along Waltham Street will be constructed. The TAM assumes that all project-related traffic will use the main Brookhaven driveway.

## **TRIP GENERATION**

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The Institute of Transportation Engineers (ITE) publishes trip-generation information in the authoritative reference *Trip Generation Manual*.<sup>1</sup> This information is based on empirical data for a variety of land uses including:

- senior adult housing—attached, land use 252, based on dwelling units<sup>2</sup>
- assisted living, land use 254, based on beds<sup>3</sup>
- nursing home, land use 620, based on beds<sup>4</sup>

Table 1 shows calculated trip generation for the existing uses and driveway counts. The driveway counts were from an automatic traffic recorder (ATR) from Thursday, December 10, 2015 through Saturday December 12, 2015. Calculated trip generation was comparable to driveway counts for the tabulated peak hours.

Table 2 show calculated trip generation for the proposed uses, with changes from existing as follow:

- weekday daily, 125 (total of in and out)
- weekday AM-street-peak hour, 8 (3 in and 5 out)
- weekday PM-street-peak hour, 11 (6 in and 5 out)
- Saturday daily, 88 (total of in and out)
- Saturday peak hour, 11 (6 in and 5 out)

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<sup>1</sup> ITE, *Trip Generation Manual*, 9<sup>th</sup> edition (Washington DC, 2012).

<sup>2</sup> ITE, *Trip Generation Manual*, pages 488 to 506.

<sup>3</sup> ITE, *Trip Generation Manual*, pages 518 to 543.

<sup>4</sup> ITE, *Trip Generation Manual*, pages 1214 to 1235.

**Table 1. Calculated trip generation for existing uses and driveway counts.**

Time Period and Direction	Vehicle-Trips				Driveway Counts <sup>e</sup>
	Independent Living <sup>a</sup>	Assisted Care <sup>b</sup>	Nursing Care <sup>c</sup>	Total <sup>d</sup>	
Weekday Daily	736	53	134	923	1,213
Weekday AM-Street-Peak Hour					
In	16	2	4	22	45
Out	<u>32</u>	<u>1</u>	<u>4</u>	<u>37</u>	<u>22</u>
Total	48	3	8	59	67
Weekday PM-Street-Peak Hour					
In	32	2	4	38	49
Out	<u>27</u>	<u>2</u>	<u>7</u>	<u>36</u>	<u>58</u>
Total	59	4	11	74	107
Saturday Daily	531	44	109	684	867
Saturday Peak Hour					
In	43	3	10	56	52
Out	<u>32</u>	<u>4</u>	<u>9</u>	<u>45</u>	<u>53</u>
Total	75	7	19	101	104

<sup>a</sup> Based on ITE, *Trip Generation Manual*, 9th edition, senior adult housing—attached, land use 252, 240 units.

<sup>b</sup> Based on ITE, *Trip Generation Manual*, 9th edition, assisted living, land use 254, 20 beds.

<sup>c</sup> Based on ITE, *Trip Generation Manual*, 9th edition, nursing home, land use 620, 49 beds. Estimated directional distribution for weekday AM-street-peak hour and Saturday peak hour.

<sup>d</sup> 309 units.

<sup>e</sup> From ATR conducted from Thursday, December 10, 2015, through Saturday, December 12, 2015.

ITE states, in the authoritative *Trip Generation Handbook: A Recommended Practice*, that “the total generation of vehicle trips entering and exiting the multi-use site may be reduced from simply a sum of the individual, discrete trips generated by each land use.”<sup>5</sup> The three uses constitute a multi-use site. Neither Table 1 nor Table 2 reflects reductions.

<sup>5</sup> Kevin G. Hooper, P.E., Principal Editor, *Trip Generation Handbook: A Recommended Practice*, 2<sup>nd</sup> edition (Washington DC: Institute of Transportation Engineers, June 2004), page 85.

**Table 2. Calculated trip generation for proposed uses.**

Time Period and Direction	Vehicle-Trips				Change from Existing
	Independent Living <sup>a</sup>	Assisted Care <sup>b</sup>	Nursing Care <sup>c</sup>	Total <sup>d</sup>	
Weekday Daily	882	133	33	1,048	125
Weekday AM-Street-Peak Hour					
In	19	5	1	25	3
Out	39	2	1	42	5
Total	58	7	2	67	8
Weekday PM-Street-Peak Hour					
In	38	5	1	44	6
Out	33	6	2	41	5
Total	71	11	3	85	11
Saturday Daily	635	110	27	772	88
Saturday Peak Hour					
In	51	8	3	62	6
Out	39	9	2	50	5
Total	90	17	5	112	11

<sup>a</sup> Based on ITE, *Trip Generation Manual*, 9th edition, senior adult housing—attached, land use 252, 289 units.  
<sup>b</sup> Based on ITE, *Trip Generation Manual*, 9th edition, assisted living, land use 254, 50 beds.  
<sup>c</sup> Based on ITE, *Trip Generation Manual*, 9th edition, nursing home, land use 620, 12 beds. Estimated directional distribution for weekday AM-street-peak hour and Saturday peak hour.  
<sup>d</sup> 351 units.

**POTENTIAL TRAFFIC IMPACTS**

ITE suggests that land developments generating at least 100 peak-hour vehicle-trips, in the busier direction, are candidates for consideration of traffic-impact analysis.<sup>6</sup> The calculations show less than 100 peak-hour vehicle-trips, in the busier direction, due to the proposed modifications.

Calculated increases due to the proposed modification are:

<sup>6</sup> ITE, *Manual of Transportation Engineering Studies* (Prentice Hall: Englewood Cliffs, New Jersey, 2000), page 144.

- for the weekday AM-street-peak hour, 3 additional vehicle-trips entering the site and 5 additional vehicle-trips exiting the site
- for the weekday PM-street-peak hour, 6 additional vehicle-trips entering the site and 5 additional vehicle-trips exiting the site
- for the Saturday peak hour, 6 additional vehicle-trips entering the site and 5 additional vehicle-trips exiting the site

The above trips are further split by orientation to/from the north or south along Waltham Street. This yields average increases of 2 to 4 vehicles per direction on Waltham Street north or south of the site, or one vehicle per 15 to 30 minutes. These increases are well within normal traffic fluctuations on Waltham Street. Therefore, no significant overall traffic impact is anticipated for the area.

## **CONCLUSION**

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This TAM concludes that trip generation associated with the proposed Brookhaven project will have no significant overall traffic impact for the area.

attachment: ATR count

# Accurate Counts

978-664-2565

Location : At 1010 Waltham Street  
 Location : East of Waltham Street  
 City/State: Lexington, MA

Site Code: 13140001

Start Time	07-Dec-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In
12:00 AM	*	*	*	*	*	*	1	0	2	0	5	0	*	*	3	0
01:00	*	*	*	*	*	*	3	2	3	3	1	1	*	*	2	2
02:00	*	*	*	*	*	*	1	1	1	1	0	0	*	*	1	1
03:00	*	*	*	*	*	*	0	0	0	0	1	1	*	*	0	0
04:00	*	*	*	*	*	*	1	0	0	0	0	0	*	*	0	0
05:00	*	*	*	*	*	*	6	6	1	3	1	5	*	*	3	5
06:00	*	*	*	*	*	*	20	31	8	37	5	22	*	*	11	30
07:00	*	*	*	*	*	*	22	42	23	46	15	19	*	*	20	36
08:00	*	*	*	*	*	*	21	44	20	34	14	17	*	*	18	32
09:00	*	*	*	*	*	*	39	33	57	32	17	12	*	*	38	26
10:00	*	*	*	*	*	*	46	38	40	45	23	31	*	*	36	38
11:00	*	*	*	*	*	*	41	55	54	47	26	32	*	*	40	45
12:00 PM	*	*	*	*	*	*	48	41	39	48	42	32	*	*	43	40
01:00	*	*	*	*	*	*	60	40	35	37	33	24	*	*	43	34
02:00	*	*	*	*	*	*	64	50	55	39	53	52	*	*	57	47
03:00	*	*	*	*	*	*	56	48	45	38	47	43	*	*	49	43
04:00	*	*	*	*	*	*	58	47	58	50	40	39	*	*	52	45
05:00	*	*	*	*	*	*	26	35	29	22	22	27	*	*	26	28
06:00	*	*	*	*	*	*	36	53	18	10	21	4	*	*	25	22
07:00	*	*	*	*	*	*	69	21	14	9	23	8	*	*	35	13
08:00	*	*	*	*	*	*	46	21	32	13	26	11	*	*	35	15
09:00	*	*	*	*	*	*	22	7	17	8	26	10	*	*	22	8
10:00	*	*	*	*	*	*	4	7	10	9	11	13	*	*	8	10
11:00	*	*	*	*	*	*	7	2	6	7	8	4	*	*	7	4
Lane	0	0	0	0	0	0	697	624	567	538	460	407	0	0	574	524
Day	0		0		0		1321		1105		867		0		1098	
AM Peak	-	-	-	-	-	-	10:00	11:00	09:00	11:00	11:00	11:00	-	-	11:00	11:00
Vol.	-	-	-	-	-	-	46	55	57	47	26	32	-	-	40	45
PM Peak	-	-	-	-	-	-	19:00	18:00	16:00	16:00	14:00	14:00	-	-	14:00	14:00
Vol.	-	-	-	-	-	-	69	53	58	50	53	52	-	-	57	47

Comb. Total	0	0	0	1321	1105	867	0	1098
ADT	ADT 1,022	AADT 1,022						