GREEN INTERNATIONAL AFFILIATES, INC.
239 LITTLETON ROAD, SUITE 3 WESTFORD, MA 01886
T: (978) 923-0400 | F: (978) 399-0033 | WWW.GREENINTL.COM

November 16, 2020

Mr. John Lee
Chairman, Zoning Board of Appeals
Town of Walpole
135 School Street
Walpole, MA 02081

Subject: The Residences at Burns Avenue, Walpole
Proposed Modification - Traffic Review

Dear Mr. Lee:

On behalf of the applicant, Green International Affiliates, Inc. (Green) has completed a limited traffic review of the proposed modification to the currently approved 40B development known as The Residences at Burns Avenue in Walpole, MA. The purpose of this letter is to summarize the potential additional traffic impacts of the proposed modification of adding eight dwelling units to the current project that was previously approved by the Board.

Currently Approved Project

The project that has been approved consists of 32 units of housing with sole access via an extension from Burns Avenue. The proposed access drive would be a dead-end drive with a turnaround for large vehicles including fire apparatus. This project was designed with a 22-foot wide street with 1-foot cape cod berms on each side to serve these homes that included a driveway and garage space for each dwelling. The roadway design was analyzed to ensure adequate access and turning radius for Walpole's fire apparatus and other public safety vehicles, along with other large-scale vehicles. As part of proposed traffic mitigation measures, the proposed actions that the applicant agreed to include were: 1) reconstruct the sidewalk along the north side of Burns Avenue and extend it into the development; 2) improve the pedestrian crossing of Burns Avenue and Pleasant Street; 3) ensuring pedestrian handicap ramp at Burns and Pleasant Street is ADA compliant; and 4) install traffic calming and safety signage/devices along Pleasant Street to provide advance warning to motorists of the location of Burns Avenue and encourage slower traffic speeds along Pleasant Street.

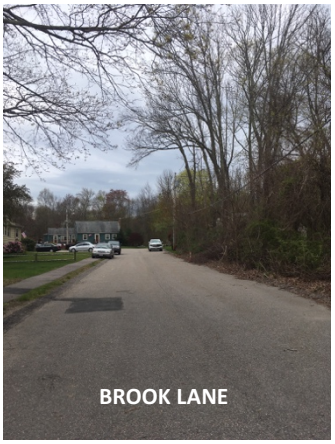
Proposed Modification

The proposed project modification includes the acquisition of the property at 7 Brook Lane which allows for the elimination of the dead-end turnaround previously approved and extend the proposed access drive to connect with existing Brook Lane, exiting out to Union Street. In addition, the number of proposed townhouse homes have been increased from 32 to 40 homes. The additional 8 units of housing will be of similar size and design as the currently approved units.

As previously mentioned, this project modification would eliminate the dead-end configuration of the currently approved project, as well as, providing for two full points of access and egress for the project. The current development street design including its extension to Brook Lane, is to accommodate two-way travel. The existing cul-de-sac on Brook Lane will be eliminated with this proposed modification. The project in total would then have an access point to the neighboring road network via Brook Lane's intersection with Union Street and to the Pleasant Street connection via Burns Avenue.

Union Street in Project Area

Union Street is classified as an "urban collector" roadway and is owned and maintained by the Town of Walpole. Union Street, a two-way, two lane street, generally follows an east-west alignment connecting Washington Street to the west and Route 1 and the Norwood town line to the east. The alignment is straight and level. The sidewalk on the south side connects Brook Lane with Pleasant Street and is separated from the street by approximately 4 feet of grass. The posted speed limit is 35 mph in the vicinity of Brook Lane.


BROOK LANE

Brook Lane

Brook Lane is a local residential street that is 250 feet in length and currently ends with a cul-de-sac. The street is 22 feet in width and a sidewalk exists along the eastern side of the street with a berm and small grass strip separating it from the street. It intersects with Union Street on a level, tangent alignment and its approach operates as a STOP controlled leg of the intersection. Brook Lane is approximately 1,100 feet east of Pleasant Street and 1,500 feet from Route 1 to the east. There are currently four homes directly served by Brook Lane.

Project Related Trip Generation

The proposed modification is to add eight (8) units of housing similar in design as the currently approved project. The modification will also remove the existing single-family home that is located on the 7 Brook Lane property that will accommodate the modification. An estimate of expected trip generation related to the additional project was completed using the models and statistics published by the Institute of Transportation Engineers (ITE) in Trip Generation Manual[1] for similar land uses were examined. Trip forecast models are developed by ITE from actual observations and empirical data collected as part of transportation studies. Land Use Code (LUC) 220-Multi-family was selected for this proposed modification and was also utilized in the approved proposal. The trip forecasts were completed for the resulting 40-unit development and then compared with the approved 32-unit project. The total estimated new trips generated by the project is presented in Table 1 including the calculated difference between the approved and the Modified project. The calculation sheets are attached to this letter.

Table 1 – Summary of Site Trip Generation
Original vs. Modified Multi-Unit Complex

	Original Approved 32 Units			With Added 8 Units (40 Total)			Difference between Original and Modification		
	Enter	Exit	Total	Enter	Exit	Total			
Weekday 24 Hour	101	101	202	131	131	262	30	30	60
Weekday AM Peak Hour	4	12	16	5	15	20	1	3	4
Weekday PM Peak Hour	12	7	19	14	9	23	2	2	4

ITE LUC 220 Multi Unit Land Use, no adjustments, 10th Edition

[1] Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, Washington, D.C., 2017.

As shown in the table, the proposed additional units to The Residences at Burns Avenue development project is expected to generate a small increase in vehicle trips, particularly during the peak hours with 4 vehicle trips projected for the AM peak hour and 4 vehicle trips during the PM peak hour. Similar to discussed in the original study[2], the majority of trips in the morning would be exiting the site while in the evening peak hour, the majority of project trips would be entering the site. The estimated increase in project traffic does not account for the elimination of the existing single-family home on the subject property. Consequently, the net increase in traffic due to the modification will be slightly less than the above estimates indicate.

Based on information contained in the traffic analysis previously completed for the original proposed development and the currently approved project, it was projected that 30% of the peak hour site traffic would be oriented to Union Street and the east, 45% to the north along Pleasant Street and the remaining amount of site traffic oriented to the south and west including towards Route 1A and the center of town. With the ability to use either the Brook Lane or the Burns Avenue access/egress point, those estimated patterns, along with the one's specific dwelling location within the development, will influence which access/egress point is used. For example, someone living closer to Brook Lane and traveling to the north will likely use Brook Lane to Union Street to reach Pleasant Street or Route 1 for the trip, while someone living closer to the Burns Avenue end of the development and making the same trip, is likely to use Burns Avenue to get to Pleasant Street to Union Street to travel north. This new connection may also influence travel patterns of current residents on Burns Avenue and Brook Lane though to a lesser extent due to being closer to the major streets.

With a new through connection from Burns Avenue to Brook Lane, there is the potential for additional traffic from outside the development to use the connection. However, in reviewing and comparing the distances and also the type of roadway to travel in terms of horizontal and vertical alignments, there is virtually little or no advantage for so-called "cut thru" traffic to use the new connection in traveling between Pleasant Street and Union Street. In our view, the level of "cut thru" traffic is expected to be minimal. However, this situation could be monitored and there are several possible actions that could be considered to discourage the "cut thru" or ensure slow, safe movement through the neighborhood. Several of these actions have been included in our recommendations.

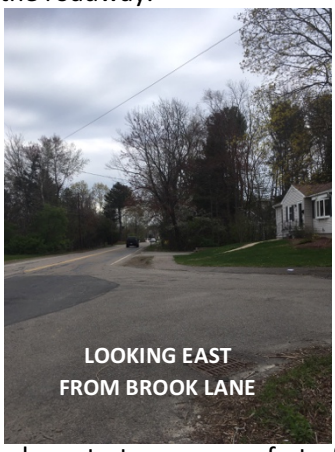
In any event, the effect of the small increase in units, along with the through street extension to Brook Lane, will result in an increase in traffic volumes on Brook Lane. However, in our view the overall volumes of traffic to Brook Lane will remain low. Additionally, as a result of the connection to Brook Lane, there will be a corresponding reduction in volumes on Burns Avenue directly related to the development due to the dual access versus the previously approved single access, dead-end roadway serving the development.

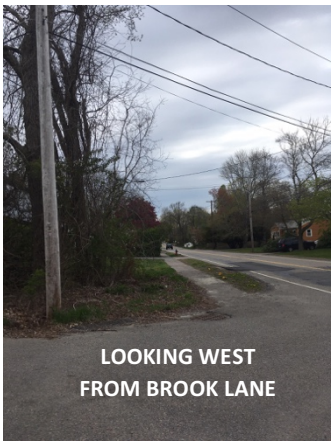
Sight Distance Review

The proposed modification results in a new connection to Brook Lane, an **existing** local street that currently intersects with Union Street and serves 4 homes. While an existing roadway, a field review of visibility conditions at the intersection of Union Street with Brook Lane was completed to review the conditions. The minimum criteria for establishing adequate stopping and intersection sight distances are defined by the American Association of State Highway and Transportation Officials (AASHTO)[3].

[2] Green International Affiliates, Inc., Traffic Impact & Access Study, Village at Burns Avenue, February 2019.
[3] American Association of State Highway Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets (Green Book), Washington, D.C., 2018

Stopping sight distance (SSD) represents the distance required for a driver traveling at a specified speed to come to a complete stop and therefore relates specifically to safety. Intersection sight distance (ISD) relates to a driver's exiting view of approaching traffic and represents the distance an approaching vehicle travels during a specified time gap. As indicated by AASHTO, if the available ISD meets or exceeds the minimum SSD criteria, then there is adequate safe sight distance available for motorists to avoid collisions. Minimum required sight distances are calculated based on operating speeds of approaching drivers and the grade of the roadway.





For 35 mph speeds, the minimum stopping and intersection sight distance required for safe movement would be 250 feet. For 40 mph, which is slightly higher than the observed 85th percentile speed, 305 feet would be required. Field measurements have indicated that there is at least 500 feet in both directions available for visibility. Based on this analysis, it is clear that the proposed site drive location is properly situated with respect to safe sight distances. The available sightlines will be more than adequate to ensure safe traffic operations. Visibility along the sidewalk that runs along the south side of Union Street at Brook Lane will remain clearly visible as well.

Table 2 – Summary of Sight Distance Review

Union Street at Brook Lane	Sight Distance			
	35 MPH			40 MPH
	Measured (ft)	Minimum Required (ft)		Minimum Required (ft)
Union Street Eastbound Approach	500+	250		305
Union Street Westbound Approach	500+	250		305305
Intersection Sight Distance				
Brook Lane, looking east (Union Street WB traffic)	500+	250		305
Brook Lane, looking west (Union Street EB traffic)	500+	250		305

Fire Apparatus/Large Vehicle Movement

The evaluation of fire truck access was completed during the review of the original project that has been approved. That analysis demonstrated that fire apparatus could access, as well as egress, the proposed development. The proposed modification of the development with the extension of the site drive to Brook Lane makes access/egress for the fire apparatus more practical and convenient as they will not need to turnaround within the development to exit once completed with the associated service activity. With the proposed modification, fire apparatus and large vehicles will be able to enter via Burns Avenue and exit through Brook Lane or vice versa depending on their "arriving" direction of travel.

Conclusions

As a result of this traffic review for the proposed modification to add 8 units of housing to the currently approved Residences at Burns Avenue development, it can be concluded that the additional units will result in a small increase in traffic over the original project estimates. The extension of the project's access drive to Brook Lane provides added public safety and convenience to access/egress and result in a more accommodation of the fire apparatus with two points of access/egress.

While the through connection from Burns Avenue to Brook Lane under this proposed modification will increase traffic on Brook Lane, the resulting volumes are expected to remain low and the traffic demands specifically generated by the homes within the development on the current Burns Avenue residents are likely to be much lower.

While this assessment has shown the project can be safely accommodated, several recommendations have been developed. These are as follows:

- Install a STOP sign and markings on the Brook Lane approach to Union Street to formalize a driver's requirement to stop prior to entering Union Street.
- Install STOP sign and markings on development street approach to Burns Avenue.
- Install traffic signs such as "THICKLY SETTLED – USE REDUCED SPEEDS" at both the Burns Avenue and Union Street entrances.
- Install speed hump along the development street section to further encourage slow speeds.
- Install a raised cross-walk at the Brook Lane/Union Street intersection and insure ADA compliance.

All traffic control signage including signs and markings should conform to the MUTCD[4].

If you have any questions, do not hesitate to contact me at 978-923-0400.

Very truly yours,
GREEN INTERNATIONAL AFFILIATES, INC.

William J Scully

William J. Scully, P.E.
Vice President

WJS/-

Attachments

[4] U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD), Washington, D.C., 2009.

PRECISION DATA INDUSTRIES, LLC
46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Union Street
just west of Brook Lane
City, State: Walpole, MA
Client: Green International / J. Gauvin
EB

165334 A Speed
Site Code: 16082

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
10/26/ 16	0	0	0	2	1	5	2	0	0	0	0	0	0	10	40	36
01:00	0	0	0	0	2	4	0	0	0	0	0	0	0	6	37	35
02:00	0	0	0	0	3	2	0	0	0	0	0	0	0	5	37	34
03:00	0	0	0	2	4	3	2	1	0	0	0	0	0	12	41	35
04:00	0	0	0	5	8	7	6	3	1	0	0	0	0	30	43	36
05:00	0	0	1	6	18	27	18	2	0	0	0	0	0	72	41	36
06:00	0	0	4	13	47	46	17	3	0	0	0	0	0	130	39	35
07:00	3	1	12	24	65	53	15	4	0	0	0	0	0	177	38	33
08:00	0	1	2	19	63	91	26	1	0	0	0	0	0	203	38	35
09:00	0	1	1	27	58	64	24	3	0	0	0	0	0	178	39	34
10:00	0	1	4	10	45	66	23	7	0	0	0	0	0	156	40	36
11:00	0	1	4	19	50	58	26	4	0	0	0	0	0	162	40	35
12 PM	0	0	1	19	68	90	23	3	1	0	0	0	0	205	38	35
13:00	0	1	5	12	58	65	17	1	0	0	0	0	0	159	38	34
14:00	1	2	5	16	74	65	24	5	0	0	0	0	0	192	39	34
15:00	2	3	3	18	64	83	20	2	0	0	0	0	0	195	38	34
16:00	0	0	5	19	58	94	35	1	0	0	0	0	0	212	39	35
17:00	0	5	4	10	77	91	23	3	2	0	0	0	1	216	38	35
18:00	0	0	6	11	52	64	14	1	0	1	0	0	0	149	38	35
19:00	0	2	3	9	28	41	15	2	1	1	0	1	0	103	40	35
20:00	0	1	2	6	14	20	9	2	0	0	0	0	0	54	40	35
21:00	1	0	0	3	12	10	6	1	0	1	0	0	0	34	41	35
22:00	1	1	0	0	8	7	2	0	0	0	0	0	0	19	38	33
23:00	0	0	0	2	5	7	0	0	1	0	0	0	0	15	38	35
Total	8	20	62	252	882	1063	347	49	6	3	0	1	1	2694		
%	0.3%	0.7%	2.3%	9.4%	32.7%	39.5%	12.9%	1.8%	0.2%	0.1%	0.0%	0.0%	0.0%			
AM Peak	07:00	07:00	07:00	09:00	07:00	08:00	08:00	10:00	04:00					08:00		
Vol.	3	1	12	27	65	91	26	7	1					203		
PM Peak	15:00	17:00	18:00	12:00	17:00	16:00	16:00	14:00	17:00	18:00		19:00	17:00	17:00		
Vol.	2	5	6	19	77	94	35	5	2	1		1	1	216		

Stats

15th Percentile :	29 MPH
50th Percentile :	34 MPH
85th Percentile :	39 MPH
95th Percentile :	42 MPH
Mean Speed(Average) :	35 MPH
10 MPH Pace Speed :	30-39 MPH
Number in Pace :	1945
Percent in Pace :	72.2%
Number of Vehicles > 35 MPH :	1257
Percent of Vehicles > 35 MPH :	46.7%

PRECISION
D A T A
INDUSTRIES, LLC
46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Union Street
just west of Brook Lane
City, State: Walpole, MA
Client: Green International / J. Gauvin
EB

165334 A Speed
Site Code: 16082

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
10/27/ 16	0	0	3	0	2	1	2	0	0	0	0	0	0	8	41	31
01:00	0	0	0	0	2	2	1	0	0	0	0	0	0	5	40	36
02:00	0	0	0	0	1	2	0	0	0	0	0	0	0	3	37	35
03:00	0	0	0	1	2	2	1	1	0	0	0	0	0	7	43	36
04:00	0	0	0	3	9	10	4	1	2	0	0	0	0	29	42	36
05:00	0	0	0	1	10	31	18	2	0	0	0	0	0	62	41	38
06:00	0	0	1	22	37	32	14	2	0	0	0	0	0	108	38	34
07:00	1	6	9	17	65	68	13	4	0	0	0	0	0	183	38	33
08:00	15	18	10	18	59	69	17	1	0	0	0	0	0	207	38	31
09:00	8	10	25	32	58	34	16	2	0	0	0	0	0	185	37	30
10:00	0	2	9	22	50	44	17	1	0	0	0	0	0	145	38	33
11:00	0	1	3	24	72	69	23	1	0	0	0	0	0	193	38	34
12 PM	1	0	4	21	69	68	17	5	0	0	0	0	0	185	38	34
13:00	0	1	5	18	56	65	17	0	0	0	0	0	0	162	38	34
14:00	3	1	5	13	71	89	17	1	0	0	0	0	0	200	38	34
15:00	2	1	8	23	69	68	23	3	0	0	0	0	0	197	38	34
16:00	0	2	4	12	70	72	16	1	0	0	0	0	0	177	38	34
17:00	0	1	13	24	78	71	9	2	0	0	0	0	0	198	37	33
18:00	0	0	6	28	58	46	1	1	0	0	0	0	0	140	36	32
19:00	1	1	5	11	30	35	7	2	0	0	0	0	0	92	38	33
20:00	1	0	1	10	22	13	5	0	0	0	0	0	0	52	37	33
21:00	0	0	4	5	10	16	5	2	0	0	0	0	0	42	39	34
22:00	2	0	0	2	6	9	3	1	0	0	0	0	0	23	39	33
23:00	0	0	0	2	3	8	2	0	0	0	0	0	0	15	38	35
Total	34	44	115	309	909	924	248	33	2	0	0	0	0	2618		
%	1.3%	1.7%	4.4%	11.8%	34.7%	35.3%	9.5%	1.3%	0.1%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	09:00	09:00	11:00	08:00	11:00	07:00	04:00					08:00		
Vol.	15	18	25	32	72	69	23	4	2					207		
PM Peak	14:00	16:00	17:00	18:00	17:00	14:00	15:00	12:00						14:00		
Vol.	3	2	13	28	78	89	23	5						200		

Stats

15th Percentile :	27 MPH
50th Percentile :	33 MPH
85th Percentile :	38 MPH
95th Percentile :	42 MPH
Mean Speed(Average) :	33 MPH
10 MPH Pace Speed :	30-39 MPH
Number in Pace :	1833
Percent in Pace :	70.0%
Number of Vehicles > 35 MPH :	1022
Percent of Vehicles > 35 MPH :	39.0%

PRECISION
D A T A
INDUSTRIES, LLC
46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Union Street
just west of Brook Lane
City, State: Walpole, MA
Client: Green International / J. Gauvin
WB

165334 A Speed
Site Code: 16082

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
10/26/ 16	0	0	0	0	7	4	1	1	0	0	0	0	0	13	39	35
01:00	0	0	0	0	4	2	0	0	0	0	0	0	0	6	36	34
02:00	0	0	2	1	3	0	0	2	0	0	0	0	0	8	46	33
03:00	0	0	3	3	1	3	2	0	0	0	0	0	0	12	39	31
04:00	0	0	1	4	4	3	4	0	0	0	0	0	0	16	41	34
05:00	0	2	3	13	9	21	4	1	0	0	0	0	0	53	38	33
06:00	0	0	4	34	62	45	6	1	0	0	0	0	0	152	37	33
07:00	0	1	6	43	144	70	11	0	1	0	0	0	0	276	36	33
08:00	0	1	2	40	96	85	16	1	1	0	0	0	0	242	37	34
09:00	1	3	3	39	87	63	8	0	0	0	0	0	0	204	37	32
10:00	0	2	3	20	80	69	13	2	0	0	0	0	0	189	38	34
11:00	0	0	4	20	106	72	10	2	0	0	0	0	0	214	37	34
12 PM	0	1	6	31	123	83	7	0	0	0	0	0	0	251	37	33
13:00	0	0	3	61	128	79	10	0	0	0	0	0	0	281	36	33
14:00	0	1	4	32	99	82	16	0	0	0	0	0	0	234	37	34
15:00	0	2	7	44	108	76	18	4	0	1	0	0	1	261	37	33
16:00	0	0	2	25	114	108	15	5	0	0	0	0	0	269	38	34
17:00	0	0	5	36	174	116	19	1	0	0	0	0	0	351	37	34
18:00	0	2	18	27	117	80	16	1	1	0	0	0	0	262	37	33
19:00	1	2	2	15	83	71	13	1	0	0	0	0	0	188	38	34
20:00	0	1	3	13	46	39	13	4	2	0	0	0	0	121	39	35
21:00	1	0	0	5	47	25	8	1	0	0	0	0	0	87	38	34
22:00	1	1	1	5	17	23	5	0	0	0	0	0	0	53	38	34
23:00	0	0	0	3	5	10	5	0	2	0	0	0	0	25	42	37
Total	4	19	82	514	1664	1229	220	27	7	1	0	0	1	3768		
%	0.1%	0.5%	2.2%	13.6%	44.2%	32.6%	5.8%	0.7%	0.2%	0.0%	0.0%	0.0%	0.0%			
AM Peak	09:00	09:00	07:00	07:00	07:00	08:00	08:00	02:00	07:00					07:00		
Vol.	1	3	6	43	144	85	16	2	1					276		
PM Peak	19:00	15:00	18:00	13:00	17:00	17:00	17:00	16:00	20:00	15:00			15:00	17:00		
Vol.	1	2	18	61	174	116	19	5	2	1			1	351		

Stats

15th Percentile :	28 MPH
50th Percentile :	32 MPH
85th Percentile :	37 MPH
95th Percentile :	40 MPH
Mean Speed(Average) :	33 MPH
10 MPH Pace Speed :	30-39 MPH
Number in Pace :	2893
Percent in Pace :	76.8%
Number of Vehicles > 35 MPH :	1239
Percent of Vehicles > 35 MPH :	32.9%

PRECISION
D A T A
INDUSTRIES, LLC
46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Union Street
just west of Brook Lane
City, State: Walpole, MA
Client: Green International / J. Gauvin
WB

165334 A Speed
Site Code: 16082

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
10/27/ 16	0	0	0	1	3	3	3	1	0	0	0	0	0	11	42	37
01:00	0	0	0	0	3	3	1	0	0	0	0	0	0	7	38	36
02:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	28	27
03:00	0	0	2	0	1	4	1	0	0	0	0	0	0	8	38	33
04:00	0	0	1	2	7	4	0	0	0	0	0	0	0	14	36	32
05:00	0	1	1	10	18	11	5	0	0	0	0	0	0	46	38	33
06:00	0	0	2	29	78	54	8	2	0	0	0	0	0	173	37	33
07:00	0	0	10	42	132	73	16	1	0	0	0	0	0	274	37	33
08:00	4	28	31	50	95	46	9	0	0	0	0	0	0	263	35	29
09:00	1	0	7	56	72	30	9	0	1	0	0	0	0	176	36	31
10:00	3	8	27	38	55	49	8	0	0	0	0	0	0	188	36	30
11:00	3	1	9	34	92	71	12	1	0	1	0	0	0	224	37	33
12 PM	0	3	6	35	132	79	7	0	0	0	0	0	0	262	36	33
13:00	1	1	6	36	108	71	13	0	0	0	0	0	0	236	37	33
14:00	0	1	2	26	125	83	24	2	0	0	0	0	0	263	38	34
15:00	1	1	4	33	90	90	22	1	0	0	0	0	0	242	38	34
16:00	0	0	2	38	119	82	15	2	0	0	0	0	0	258	37	33
17:00	0	1	11	58	156	73	4	1	0	0	0	0	0	304	36	32
18:00	1	1	13	77	120	40	4	2	0	0	0	0	0	258	34	31
19:00	3	0	3	28	79	48	11	1	0	0	0	0	0	173	37	33
20:00	0	1	1	13	71	55	10	0	0	1	0	0	0	152	37	34
21:00	0	0	1	14	36	31	4	1	0	0	0	0	0	87	37	33
22:00	0	0	0	6	19	17	5	1	0	0	0	0	0	48	38	34
23:00	0	0	0	1	5	11	5	0	1	0	0	0	0	23	41	37
Total	17	47	139	628	1616	1028	196	16	2	2	0	0	0	3691		
%	0.5%	1.3%	3.8%	17.0%	43.8%	27.9%	5.3%	0.4%	0.1%	0.1%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	08:00	09:00	07:00	07:00	07:00	06:00	09:00	11:00				07:00		
Vol.	4	28	31	56	132	73	16	2	1	1				274		
PM Peak	19:00	12:00	18:00	18:00	17:00	15:00	14:00	14:00	23:00	20:00				17:00		
Vol.	3	3	13	77	156	90	24	2	1	1				304		

Stats

15th Percentile :	26 MPH
50th Percentile :	32 MPH
85th Percentile :	37 MPH
95th Percentile :	39 MPH
Mean Speed(Average) :	32 MPH
10 MPH Pace Speed :	30-39 MPH
Number in Pace :	2644
Percent in Pace :	71.6%
Number of Vehicles > 35 MPH :	1038
Percent of Vehicles > 35 MPH :	28.1%

TRIP GENERATION WORKSHEET

LAND USE: *Multifamily Housing (Low-Rise)*
LAND USE CODE: 220 Independent Variable---Trips per DU
SETTING/LOCATION: General Urban / Suburban

JOB: Residences at Burns Avenue, East Walpole, MA
JOB NUMBER: 16082 Number of Units: 32

WEEKDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	7.32	4.45	10.97	50%	50%	29
AM PEAK	0.46	0.18	0.74	23%	77%	42
PM PEAK	0.56	0.18	1.25	63%	37%	50
PK GEN AM	0.56	0.34	0.97	28%	72%	36
PK GEN PM	0.67	0.41	1.25	59%	41%	35

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	234	117	117	201	101	101	0.96
AM PEAK	15	3	12	16	4	12	0.9
PM PEAK	18	11	7	19	12	7	0.86
PK GEN AM	18	5	13	19	5	14	0.91
PK GEN PM	21	12	9	40	24	16	0.94

SATURDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	8.14	3.36	11.4	50%	50%	5
PEAK HR	0.7	0.41	0.93			5

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	260	130	130	-73	-37	-37	0.93
PEAK HR	22	0	0	1	0	0	0.87

SUNDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	6.28	2.61	8.22	50%	50%	5
PEAK HR	0.85	0.6	1.45	53%	47%	31

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	201	101	101	-18	-9	-9	0.94
PEAK HR	27	14	13	-5	-3	-2	0.88

SOURCE: Trip Generation, 10th Edition, Institute of Transportation Engineers, 2017.

TRIP GENERATION WORKSHEET

LAND USE: *Multifamily Housing (Low-Rise)*
LAND USE CODE: 220 Independent Variable---Trips per DU
SETTING/LOCATION: General Urban / Suburban

JOB: Residences at Burns Avenue, East Walpole, MA
JOB NUMBER: 16082 Number of Units: 40

WEEKDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	7.32	4.45	10.97	50%	50%	29
AM PEAK	0.46	0.18	0.74	23%	77%	42
PM PEAK	0.56	0.18	1.25	63%	37%	50
PK GEN AM	0.56	0.34	0.97	28%	72%	36
PK GEN PM	0.67	0.41	1.25	59%	41%	35

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	293	147	147	262	131	131	0.96
AM PEAK	18	4	14	20	5	15	0.9
PM PEAK	22	14	8	23	14	9	0.86
PK GEN AM	22	6	16	24	7	17	0.91
PK GEN PM	27	16	11	47	28	19	0.94

SATURDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	8.14	3.36	11.4	50%	50%	5
PEAK HR	0.7	0.41	0.93			5

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	326	163	163	39	20	20	0.93
PEAK HR	28	0	0	10	0	0	0.87

SUNDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	6.28	2.61	8.22	50%	50%	5
PEAK HR	0.85	0.6	1.45	53%	47%	31

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	251	126	126	63	32	32	0.94
PEAK HR	34	18	16	4	2	2	0.88

SOURCE: Trip Generation, 10th Edition, Institute of Transportation Engineers, 2017.