Gillon Associates
Traffic & Parking Specialists

111 River Street
N. Weymouth, MA 02191-2104
Telephone: (781) 589-7339
e-mail: jt.gillon@comcast.net

June 28, 2018

Jesse Geller, Chairman
Zoning Board of Appeals
Town of Brookline
566 Washington Street
Brookline, MA 02445-6899

Reference: Traffic Study Peer Review **MEMO #1**
Chapter 40B, 1299 Beacon Street
Zoning District G-1.75, Precinct 10

Dear Chairman Geller and Board Members:

At the request of my clients, Roberta Sydney and Kyle Spellman, on behalf of KS Company Trust at 1309-1319 Beacon Street, I have reviewed the traffic and parking characteristics of the subject project. In particular I have reviewed documents and plans on the Town's website including the "Transportation Impact Assessment" prepared by Vanasse & Associates, Inc. of Andover, Massachusetts. I also visited the site and made personal notes.

Existing Conditions

The proponent has accurately presented the roadway circulation and lane-widths on their Figure 2 of the traffic study. The weekday morning and evening traffic volumes were observed and recorded on Tuesday, September 13, 2016 and the Saturday traffic counts were recorded on January 13, 2018. Although not specifically mentioned, it appears the 2016 volumes were slightly adjusted upward by two percent to arrive at the 2018 Baseline peak hour network volumes. The normal growth factor of one percent per year was suggested by the proponent after reviewing MassDOT count Stations and this seems reasonable but the location and reason for using those stations was not disclosed. On Wednesday, June 13th 2018, the day of the Brookline ZBA meeting, the traffic volume on the Mass Pike just one mile away from the site, was 173,844 vehicles. On Wednesday, January 18, 2012 this continuous counting station recorded 129,715 vehicles. The Wednesday January 17, 2018 Mass Pike volume just four days after the proponent's Saturday count, was 138,410, seemingly suggesting the January count was 26 percent lower than the same year June count.

The Saturday counts obtained by the proponent over the Martin Luther King three-day holiday weekend may not have been typical since a lot of Brookline residents travel out of town to either ski areas or head to warmer climate that time of year. Moreover, both Boston University and Boston College had not returned to class although some students typically return on Sunday or the Monday holiday itself, after the Saturday count, for classes starting the following week. It is my understanding based on reviewing a recent photograph, that Sewall Avenue was closed on that Saturday as well.

If you design intersections at capacity for the average yearly volume, the intersections will work efficiently only half of the time since it was an average. If you design for one of the lowest months of the year, the intersection will only work for one or two months of the year and will be under performing the rest of the time. Therefore, the proponent should re-investigate whether there may be a larger seasonable difference, as seemingly indicated in the MassDOT #H13144 Count Station data.

Although most residents in the area cite parking supply as more of a concern than the terrible normal peak hour traffic gridlock, no parking occupancy survey was presented for either the petitioner's site or on-street

parking spaces in the area. It may be advantageous to document either an excess capacity in available parking spaces or an existing deficit noticed by illegal and double parking.

Technical References Utilized

The Institute of Transportation Engineers (ITE) provides vehicle trip generation data on a variety of land uses and project sizes. The proponent had used the ITE Trip Generation report 9th Edition in estimating both Apartment and Specialty Retail Center trips. Since the ITE Trip Generation report 10th Edition has been out since September of 2017, perhaps it would be beneficial to see if there is any projected difference if this updated reference were utilized.

The capacity calculation analysis is based on the "Highway Capacity Manual" for both signalized and non-signalized intersections. This manual has been published by the Transportation Board of the National Research Council and approved by the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine. Trafficware's Synchro Software Version 8 was utilized in the proponent's assessment. Since Trafficware's Synchro Analysis Software Version 10 has been out since April of 2017, perhaps it would be beneficial to see if there is any projected difference if this updated reference were utilized.

Trip Generation Evaluation

The proponent has projected the 12,285 square feet of retail area and 74 dwelling units will generate only 33 vehicle trips during a critical evening peak hour. We have taken a close look at the variables considered in this projection.

Using the ITE 9th Edition of the ITE report, the proponent had estimated a rough volume of 58 trips for the housing component before applying a 65% reduction for adjacent transit use as evidenced in the trip to work data for Census Tract 4002. After taking the 65% reduction the proponent had estimated only 20 vehicle trips for the evening peak hour housing component. The new ITE report has a new category for housing in a densely populated built-up urban area with only one study with a (R^2) value of 0.70, which yields only 14 evening peak hour passenger vehicle trips. The General/Urban/Suburban category based on seven studies yielded 26 passenger vehicle trips in the evening peak hour. This second category has an associated coefficient of determination (R^2) value of 0.82 for the evening peak hour, indicating there is a good fit for this plotted data, thus, suggesting a higher level of confidence is the projection. An average of the two categories equates to 20 vehicle trips which is identical to the proponent's projection for the evening peak hour housing component (Figure 1).

The proponent had used the "Specialty Retail Center" Land Use Category 826 in their trip projections for the 12,285 square feet of retail use projecting a rough volume of 51 trips for the retail component before applying a 75% reduction for adjacent transit use. The 9th Edition suggest this category is intended for small centers specializing in quality apparel, and other goods as well as real estate offices, florists, and small restaurants. The new ITE report does not recognize this particular Land Use Code stating this LUC was removed and that data was reclassified to existing land uses.

Since it is unclear what the new 12,285 square feet of retail space will be used for, it would be prudent to assume general retail since once the project is approved, any retailer may show a different interest even a few years down the line.

Although the "Specialty Retail Center" category had been removed, a new category for retail use within a dense Multi-Use Urban setting has been added. This category recognizes the internal capture rate within the building as well as the close walking distance as well as the transit mode share. As can be seen on the following page, this new category would suggest 60 vehicle trips for the weekday evening peak hour component which is close to the 51 vehicle trips projected by the proponent prior to their 75% reduction.

Source of Data
ITE Report (10th Edition)
ITE Land Use Code: 221
Multifamily Housing (Mid Rise)
Dense Multi-Use Urban
Volume 2, Pages 100-103

	AM			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Trips per Unit	T = 0.20(x)			T = 0.18(x)		
Directional Split	12%	88%		72%	28%	
Trips Projected	**2**	**13**	**15**	**10**	**4**	**14**

(Based on 74 Units)

Trips per Weekday
Multifamily Housing
T= 2.59 (x)
Trips Based on 74 Units = 192 Enter = 96 & Exit = 96

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Source of Data
ITE Report (10th Edition)
ITE Land Use Code: 221
Multifamily Housing (Mid Rise)
General Urban/Suburban
Volume 2, Pages 82-84

	AM			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Trips per Unit	T = 0.44(x)-4.16			T = 0.46(x)-8.22		
Directional Split	26%	74%		64%	36%	
Trips Projected	**7**	**21**	**28**	**17**	**9**	**26**

(Based on 74 Units)

Trips per Weekday
Multifamily Housing
T= 5.57 (x) - 143.95
Trips Based on 74 Units = 268 Enter = 134 & Exit = 134

Source of Data
ITE Report (10th Edition)
ITE Land Use Code: 820
Shopping Center (Dense Multi-Use Urban)
Volume 2, Pages 152—153

	AM			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Trips per Unit	T = 2.41(x)			T = 4.92(x)		
Directional Split	54%	46%		48%	52%	
Trips Projected	**16**	**14**	**30**	**29**	**31**	**60**

(Based on 12.285 KGSF)

Trips per Weekday
Shopping Center (General Urban/Suburban)
Volume 2, Page 138
Ln(T) = 0.68 Ln(x) +5.57
Trips Based 12.285 KGSF = 1,444 Enter = 722 & Exit = 722

Perhaps the proponent could review their projected retail peak hour trip projections in light of a new ITE land-use category replacing an older one.

Correlation Between Observed and Calculated Delay

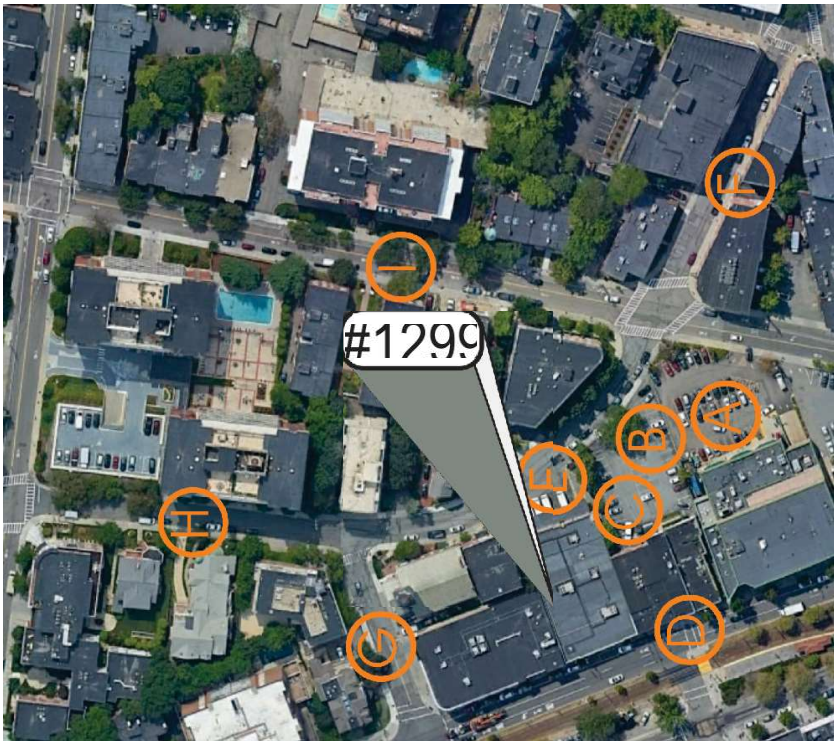
The scientific methodology of comparing existing delay and levels of service with projected or project related Build conditions is most often identified by the capacity software output. This unadjusted output is hypothesized as assuming that any unmeasurable influence such as a police officer at an un-signalized intersection or busy mid-block curb cut, would be duplicated in assessment comparisons, thus, yielding a measureable impact even if not completely accurate due to the unaccounted influence. However, in this particular case it may be beneficial to utilize a stop watch to measure existing delay since the consequence of not documenting both delay and queuing or stacking back from intersections could have disastrous consequences by blocking major curb-cuts and roadways.

The projected build queue on Longwood Avenue back from Harvard Street is calculated as 263 feet during the weekday evening peak hour with over two minutes of delay. The actual single westbound travel lane on Longwood Avenue is only 213 feet long between Harvard Street and Sewall Avenue. In essence the traffic queued during the evening peak hour is expected to block the Trader Joe's parking lot, the Bank of America parking lot and extend into the Longwood Avenue / Sewall Avenue intersection. Perhaps a police detail at the Harvard Street / Longwood Avenue intersection is mitigating this unsafe condition.

Parking Concerns

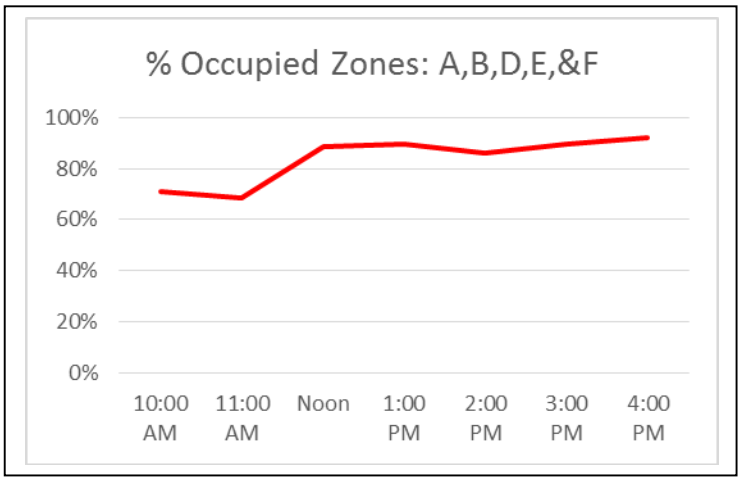
Although the applicant is proposing 99 parking spaces which seems reasonable, do you really have that parking capacity if motorists cannot utilize them? According to the Institute of Transportation Engineer's Parking Report, the retail element of the proposed project would require approximately 46 parking spaces. Neena's of Brookline advertises all over eastern Massachusetts their wonderful lighting design services and unique lighting fixtures. Customers do not always arrive by walking or by trolley. An existing survey was undertaken to document the existing parking demand in this area.

On Tuesday, June 26, 2018, a short parking survey was conducted mid-day for nine parking zones or areas in close proximity to #1299 Beacon Street to document the availability of both on and off-street parking availability.



Once an hour between 10:00 am and 4:00 pm the number of vehicles parked within each zone was observed and recorded. Below is the findings of each zone as well as the collective total of all zones. While the area of parking within the #1299 parking lot set aside for Trader Joe's (Zone "B") is only 50 percent occupied for most of the day, the existing retail parking set aside for Neena's, the dental office and real estate office (Zone "C") is occupied approximately 80 percent for a good part of the day. Moreover, the immediate parking zones not reserved for #1299 has a very large parking demand as shown below:

ZONES			
A, B, D, E, & F	Occupied	Percent	Open
86	Spaces	Occupied	Spaces
10:00 AM	61	71%	25
11:00 AM	59	69%	27
Noon	76	88%	10
1:00 PM	77	90%	9
2:00 PM	74	86%	12
3:00 PM	77	90%	9
4:00 PM	79	92%	7



Clearly, there is insufficient parking supply to accommodate additional retail development. Once recorded demand is approaching 90%, the actual demand is often more as some motorist had just left a parking space and others may be circling the lot searching for a space. If no retail parking spaces are provided, the proponent should clearly show where a customer would park if he or she choose to drive to the 12,285 square-foot retail site. The proponent should document how all residents could have valet parking personnel take possession of their vehicle, enter the lift or elevator, un-park their vehicle and park it at some other floor level and return the lift for another vehicle without causing excess delay to others entering the site or queuing back to Sewall Avenue.

	ZONE A Cap. =		32
	Trader Joe's Lot		
A	Occupied	Percent	Open
32	Spaces	Occupied	Spaces
10:00 AM	17	53.1%	15
11:00 AM	23	71.9%	9
Noon	31	96.9%	1
1:00 PM	30	93.8%	2
2:00 PM	28	87.5%	4
3:00 PM	32	100.0%	0
4:00 PM	31	96.9%	1

	ZONE B Cap. =		20
	#1299 -Trader Joes's Section		
B	Occupied	Percent	Open
20	Spaces	Occupied	Spaces
10:00 AM	6	30.0%	14
11:00 AM	4	20.0%	16
Noon	8	40.0%	12
1:00 PM	9	45.0%	11
2:00 PM	10	50.0%	10
3:00 PM	11	55.0%	9
4:00 PM	11	55.0%	9

	ZONE C Cap. =		11
	#1299 (Other Section)		
C	Occupied	Percent	Open
11	Spaces	Occupied	Spaces
10:00 AM	2	18.2%	9
11:00 AM	5	45.5%	6
Noon	8	72.7%	3
1:00 PM	9	81.8%	2
2:00 PM	5	45.5%	6
3:00 PM	8	72.7%	3
4:00 PM	9	81.8%	2

	ZONE D Cap. =		13
	Beacon St (Harvard - Charles)		
D	Occupied	Percent	Open
13	Spaces	Occupied	Spaces
10:00 AM	15	115.4%	-2
11:00 AM	8	61.5%	5
Noon	17	130.8%	-4
1:00 PM	19	146.2%	-6
2:00 PM	16	123.1%	-3
3:00 PM	15	115.4%	-2
4:00 PM	18	138.5%	-5

	ZONE E Cap. =		11
	Sewall Ave (Longwood - Charles)		
E	Occupied	Percent	Open
11	Spaces	Occupied	Spaces
10:00 AM	13	118.2%	-2
11:00 AM	15	136.4%	-4
Noon	10	90.9%	1
1:00 PM	9	81.8%	2
2:00 PM	11	100.0%	0
3:00 PM	11	100.0%	0
4:00 PM	10	90.9%	1

	ZONE F Cap. =		10
	Sewall Ave (Longwood - Harvard)		
F	Occupied	Percent	Open
10	Spaces	Occupied	Spaces
10:00 AM	10	100.0%	0
11:00 AM	9	90.0%	1
Noon	10	100.0%	0
1:00 PM	10	100.0%	0
2:00 PM	9	90.0%	1
3:00 PM	8	80.0%	2
4:00 PM	9	90.0%	1

	ZONE G Cap. =		2 HP
	Charles St (2 HP Spaces)		
G	Occupied	Percent	Open
2	Spaces	Occupied	Spaces
10:00 AM	1	50.0%	1
11:00 AM	2	100.0%	0
Noon	1	50.0%	1
1:00 PM	1	50.0%	1
2:00 PM	2	100.0%	0
3:00 PM	1	50.0%	1
4:00 PM	2	100.0%	0

	ZONE H Cap. =		12
	Sewall Ave (Charles - St Paul)		
H	Occupied	Percent	Open
12	Spaces	Occupied	Spaces
10:00 AM	10	83.3%	2
11:00 AM	6	50.0%	6
Noon	8	66.7%	4
1:00 PM	12	100.0%	0
2:00 PM	8	66.7%	4
3:00 PM	9	75.0%	3
4:00 PM	10	83.3%	2

	ZONE I Cap. =		25
	Longwood Ave (Sewall - St Paul)		
I	Occupied	Percent	Open
25	Spaces	Occupied	Spaces
10:00 AM	14	56.0%	11
11:00 AM	22	88.0%	3
Noon	17	68.0%	8
1:00 PM	22	88.0%	3
2:00 PM	22	88.0%	3
3:00 PM	15	60.0%	10
4:00 PM	18	72.0%	7

	ALL ZONES Cap.=		136
ALL	Occupied	Percent	Open
136	Spaces	Occupied	Spaces
10:00 AM	88	65%	48
11:00 AM	94	69%	42
Noon	110	81%	26
1:00 PM	121	89%	15
2:00 PM	111	82%	25
3:00 PM	110	81%	26
4:00 PM	118	87%	18

Loading and Circulation

While good circulation is necessary in any residential project and rubbish removal as well as moving trucks and snow removal are essential components, the problem of large truck deliveries to large retail stores is sometimes problematic. If large retail truck deliveries are not made, a goods delivery plan should be identified, established, and adopted into any Order of Conditions. Emergency fire apparatus such as a single-unit 30-foot axle length vehicle (SU-30) should be able to maneuver within and around the site without backing into Sewall Avenue. Turning movement templates should be used to document this ability. Of particular concern is the overhead canopy height and whether a truck would have sufficient room to maneuver without obstructions. The required number of loading docks to service 12,285 square feet of retail space and 74 apartment dwelling units should be quantified.

Presently Longwood Avenue operates quite well with a designated southeast bound left-turn lane into both Trader Joe's site and Sewall Avenue and no parking on the southerly side. This practice ensures optimum passage of emergency vehicle runs between Brookline and the Longwood Medical Area. It appears to me, the retail component will have loading, trash, and employee parking demands not clearly addressed thus far. Moreover, when the on-site demand spills back onto Sewall Avenue, the queuing or stacking will block the through traffic on Sewall Avenue and capacity availability at minor intersections will be inconsequential if a motorist cannot get to those intersections.

Incremental Increases in Delay and Parking

After reviewing the possibly revised trip generation and Synchro 10 output, I will review the incremental impact to define the quantifiable consequences of providing over twelve thousand square feet of retail use.

Mitigation Assessment

I continue to believe it is premature to define mitigation at this time prior to developing a complete understanding of the actual traffic and parking demands, roadway improvement and site driveway configuration.

Sincerely,
GILLON ASSOCIATES

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John T. Gillon, P.E.