

To: Alison C. Steinfeld, Planning Director
Department of Planning and Community Development
333 Washington Street
Brookline, MA 02445

From: James. D. Fitzgerald, P.E., LEED AP

Date: May 31, 2017

Subject: 455 Harvard Street, Brookline (40B)
Traffic Peer Review

In general, the Traffic Assessment dated May 5, 2017 by Vanasse & Associates, Inc. (VAI) for the proposed development located at 455 Harvard Street has been prepared in a professional manner, consistent with standard engineering practices with the exception of the issues identified below.

The Memorandum provides the number of anticipated trips generated by the proposed apartments and retail development as well as a sight distance evaluation. The following is a summary of Environmental Partners Group's (EPG) traffic review of available documents. A review of proposed parking and mechanical parking systems have been provided under separate cover by Walker Parking Consultants.

Existing Conditions

Harvard Street travels in a northwest/southeast direction and is classified as a minor arterial. In the vicinity of the project site, it provides one vehicle travel lane, a bicycle lane and on-street parking in each direction. The on-street parking is metered with operation Monday to Saturday, 8:00 AM to 8:00 PM with a maximum of two (2) hours; Sunday and holidays are excluded. Land use along Harvard Street consists primarily of commercial properties. No speed limit is posted near the proposed site.

Thorndike Street is a primarily residential roadway that travels in a northeast/southwest direction, intersecting Harvard Street to form a four-legged unsignalized intersection with STOP sign control along both Thorndike Street approaches. Thorndike Street is classified as an urban collector and provides one travel lane in each direction. Free two hour on-street parking is permitted on the southeastern side of the street. "No Parking Any Time" signs and "No Parking This Side" signs exist along the northwestern side of Thorndike Street.

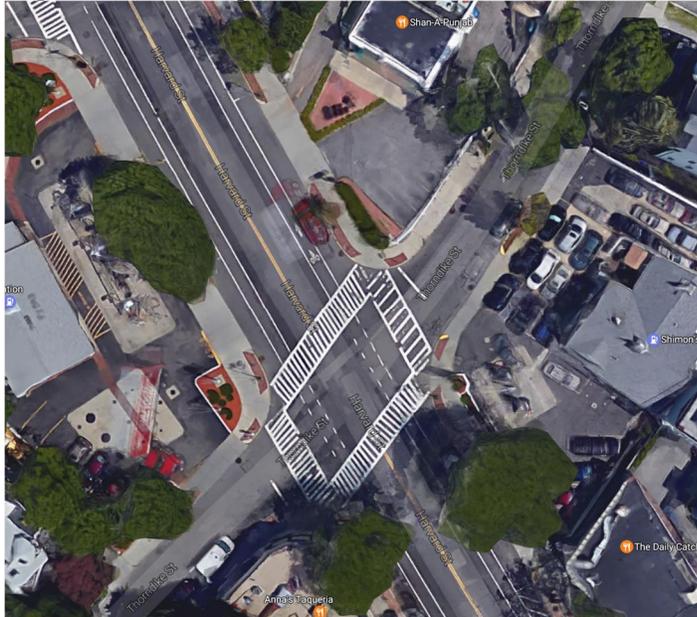
The project site is located at 455 Harvard Street, on the northern corner of the Harvard Street at Thorndike Street intersection. Shan-A-Punjab, an Indian food restaurant, with six (6) parking spaces formerly occupied the parcel. The existing project site is shown in Figure 1.

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Figure 1: Existing Conditions



A Massachusetts Bay Transit Authority (MBTA) Bus Route 66 stops at the intersection of Harvard Street at Coolidge Street, one block southeast of the project site. MBTA Bus route 57/57A stops at the intersection of Brighton Avenue at Commonwealth Avenue approximately 2,200 feet northeast of the project site.

The MBTA Green Line (B Branch) has local stops at Harvard Street - approximately 1,600 feet northwest of the project site, and at Packards Corner - approximately 2,000 feet northeast of the project site. The MBTA Green Line (C Branch) has local stops at Coolidge Corner - approximately 2,500 feet southeast of the project site, and at Summit Avenue - approximately 2,100 feet south of the project site.

Proposed Project

This latest proposed project entails the redevelopment of the former Shan-A-Punjab Restaurant located at 455 Harvard Street into a mixed use development. The development will consist of 17 apartment units which will include 40B affordable housing units, and 1,735 square feet of retail space. The retail space will be located on the ground floor as well as a parking garage that will provide 13 parking spaces (11 mechanical lift parking spaces, one standard space, and one accessible space).

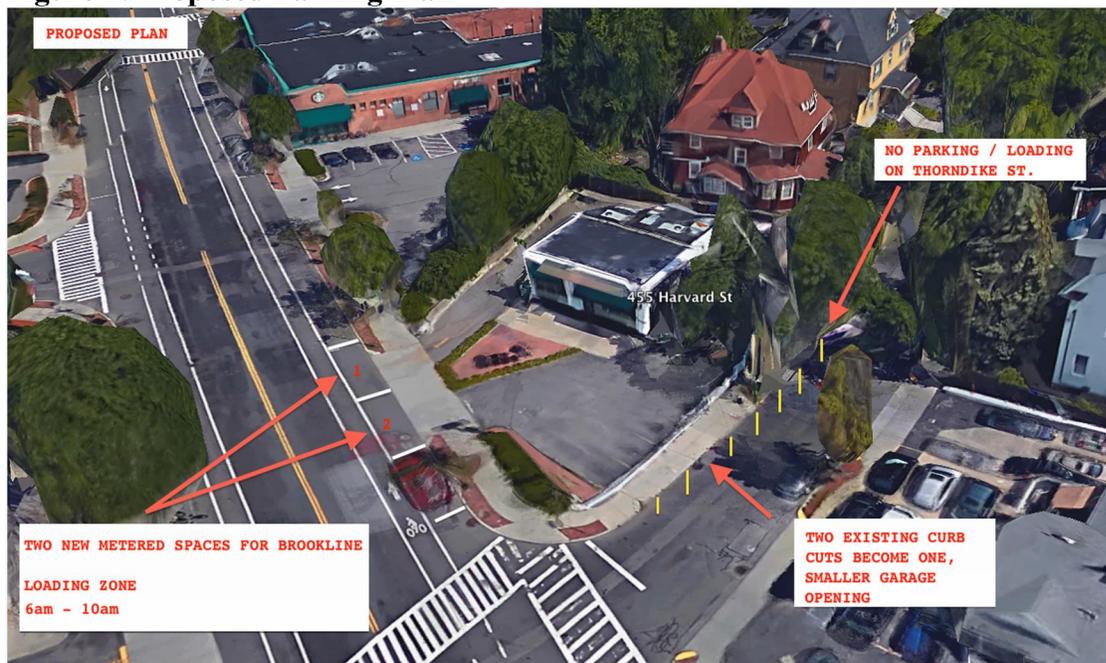
Access to 455 Harvard Street will be provided by way of a new 19 foot wide curb cut on Thorndike Street, replacing the two existing curb cuts on Thorndike Street which will be removed and replaced with sidewalk. (The two existing curb cuts along Thorndike Street are currently blocked by a picket fence.) The existing 42 foot curb cut on Harvard Street will no longer provide access to the site but is proposed to be used as a temporary loading zone and trash pick-up from 5 a.m. to 9 a.m. according to the Loading Zone Narrative. (However the loading zone times conflict with those shown in the proponent's sketch, included as Figure 2.) During non-loading zone hours, 2 metered parking spaces are proposed in this space.

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Figure 2: Proposed Parking Plan



Intersection Safety

The report included a review of crash data at the Harvard Street/Thorndike Street intersection provided by the Town of Brookline Police Department. Only three crashes were reported at the Harvard Street/Thorndike Street intersection for the three-year period of 2014 through 2016, two involving pedestrians and one angle collision related to a pedestrian crossing. No fatalities were recorded. Crash rates were not calculated.

Trip Generation

Anticipated site generated trips were projected using the Institute of Transportation Engineers (ITE) Trip Generation Manual. Land Use Code (LUC) 220 "Apartment" was used to generate trips for the proposed apartment component. According to ITE, "apartments are rental dwelling units located within the same building with at least three other dwelling units." The average rate method was used in generating apartment trips; this method of calculation is suitable and the numbers appear to be accurate.

Trips generated by the proposed 1,735 square feet of retail were projected using ITE's LUC 826 "Specialty Retail Center". According to ITE, "specialty retail centers are generally small strip shopping centers that contain a variety of retail shops and specialize in quality apparel, hard goods and services, such as real estate offices, dance studios, florists and small restaurants." Available data points in ITE for this LUC are very limited, significantly impacting the accuracy of predicted trip generation. For instance, in the case of the evening peak hour, only five data points are provided. According to ITE, for fewer than six data points, "the analyst is encouraged to collect local data and establish a local rate." Further, the data points that are provided cover a range of approximately 15,000 square feet to 215,000 square feet of retail, substantially larger than the proposed 1,735 square foot retail space. Three of the five data points are provided for

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approximately 15,000 square foot retail with a substantial range of 45 to almost 100 trips. Better suited LUCs are not available in the ITE Trip Generation Manual. For instance, LUC 820 "Shopping Center" also covers larger scaled retail and would yield relatively similar hourly trip generation as LUC 826. In order to accurately estimate the retail trips, local data would have to be collected at a similar retail establishment in order to calculate a trip generation rate, likely yielding only a minor difference in trips and a negligible difference in delay. Given the lack of additional available data published for this retail use and the small scale of the proposed retail component, the trips anticipated for the retail component appears to be reasonable.

Given the proximity to the above transit opportunities and general mode splits in the Town of Brookline, a reduction in anticipated site generated traffic was assumed based on census data from 2010-2014 American Community Survey 5-Year Estimates for Brookline. The detailed "Commuting to Work" information was not provided in the proponent's Memorandum, however, EPG has located the information elsewhere. The reductions used in the Memorandum appear to be consistent with the available census data showing a 54.7% reduction (26.7% of commuters using public transportation, 15.8% walk, 5.0% using other means and 7.2% work at home) and therefore appears to be reasonable.

However the same 54.7% reduction was also used on retail trips which are unsupported given the reduction was based on "Commuting to Work" information. Clarification is requested regarding the anticipated type of retail, if the reduction was intended to reflect a local use with primarily foot traffic anticipated and justification for reducing retail trips by 54.7%.

The Memorandum, as submitted, identifies 5 site generated trips during the morning peak hour (2 entering and 3 exiting) and 7 during the evening peak hour (4 entering and 3 exiting).

As a comparison, the study estimated the number of trips that may have been generated by the Indian restaurant when it was operating by using LUC 932 "High-Turnover (Sit Down) Restaurant". Based on this evaluation, the proponent suggests that compared to the previous restaurant use, the proposed development will reduce trips during the morning peak hour (by 2 trips) and only add one trip during the evening peak hour. While the evening peak hour comparison appears reasonable, the morning peak hour evaluation of the Indian restaurant is questionable unless it was open for breakfast.

Traffic generated by the minor retail use is anticipated to peak on Saturdays. Evaluations of site generated traffic were not provided for a Saturday mid-day peak hour.

Sight Distance

Sight distance was reviewed for the intersection of Harvard Street and Thorndike Street since the site traffic is proposed to be diverted to Thorndike Street. While there were no speed limit signs posted for either road, the proponent's Memorandum indicated 85th percentile speeds of 26 mph along northbound Harvard Street and 27 mph along southbound Harvard Street, referencing traffic counts conducted by VAI in April 2017. The traffic data was not provided for verification. The 85th percentile speed is the speed at or below which 85 percent of the vehicles are traveling and is typically the fundamental value in establishing required sight distance.

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Sight distance calculations were performed using the American Association of State Highway and Transportation Officials (AASHTO) guidelines. Intersection Sight Distance (ISD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an oncoming vehicle and safely complete a turning or crossing maneuver. Stopping Sight Distance (SSD) is the distance required for a vehicle traveling at the design speed of a roadway to stop prior to striking an object in its travel path. According to AASHTO, "if the *available sight distance for an entering or crossing vehicle* is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions."

Using an 85th percentile speed of 27 mph, an ISD of 302 feet looking north and 260 feet looking south from Thorndike Street are required; a minimum SSD of 173 feet is required.

Currently, vehicles parked along Harvard Street impact sight distance from Thorndike Street. Based on our site visit, existing sight distance looking north is limited to 80 feet (not the 172 feet reported in the VAI Memorandum) although disrupted visibility is currently available up to 190 feet utilizing the site's existing curb cut along Harvard Street. Under proposed conditions, this gap in on-street parking is proposed to be replaced with a loading zone/parking spaces and a building is proposed along the back edge of sidewalk, restricting visibility further from existing conditions.

Looking southerly from the Thorndike Street approach, there is 125 feet of sight distance available (slightly more than the 113 feet reported in the VAI Memorandum).

Therefore, minimum sight distance requirements are not met at the intersection and the proposed building and reuse of the former driveway opening will create more visual obstructions from the Thorndike Street approach. It is recommended that curb extensions or "bump-outs" be considered at the corners of the Harvard Street at Thorndike Street intersection to extend into the parking shoulder and locate stop lines where visibility can be improved all the while shortening pedestrian crossings.

Sight distance along Thorndike Street was not addressed in the Memorandum but was included on a slide in the applicant's presentation dated May 15, 2017. Given the proximity of the Harvard Street intersection, relatively low travel speeds are anticipated along this segment of Thorndike Street. However, given the corners of the building obscuring sight lines, it appears that the minimum sight distance requirements from the parking garage exit are not being met unless the exiting vehicle protrudes onto the sidewalk. Clarification is requested.

Adequate site distance is provided between pedestrians and vehicles exiting the proposed garage exit.

Site Driveway

The site driveway is proposed at 19 feet wide but zoning requires a 20 feet width for two-way access.

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In order for a passenger vehicle to turn right out of the proposed driveway and remain on their side of the road, the driveway apron needs to be widened.

Pedestrian Accommodations

The site plan shows a flush pedestrian access from the sidewalk to the lobby (including the elevator and stairs) via Harvard Street. Pedestrian access is also provided from the parking garage to the lobby.

Pedestrian crossing signs have been proposed on Harvard Street approaching the Thorndike Street intersection.

Clarification on the existing tree and utility pole that impact pedestrian flow along Thorndike Street should be provided.

Transit

The Memorandum indicates that the project will promote alternative transportation such as ridesharing and car sharing services in order to reduce the use of personal vehicles. A more defined approach to promote such alternative modes of transportation is recommended. Also, it is recommended that transit schedules be posted on site.

Bicycle

Bicycle storage has been shown on the site plan.

Loading Zone/Trash Pickup

A new on-street loading zone/trash pick-up area is proposed in front of the existing curb cut on Harvard Street during four hours each morning. During non-loading hours, two metered parking spaces are proposed for public use in this area.

The plan shows a driveway transition being retained at this location despite it no longer providing driveway access and a building being located along the back of sidewalk. It is recommended that a conventional sidewalk with 6-inch curb reveal be installed for pedestrian protection. Given the sight distance concerns from the Thorndike Street approach (discussed above), consideration should be made when laying out the loading zone, curb location, and adjacent parking (and potential curb extension) in order to provide adequate visibility from the Thorndike Street approach.

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Summary

The following items are requested:

- Clarification is requested regarding the anticipated type of retail included in the proposed development, as well as justification for reducing estimated retail trips by 54.7%.
- Traffic generated by the minor retail use is anticipated to peak on Saturdays. Evaluations of site generated traffic for a Saturday mid-day peak hour are requested.
- Currently, vehicles parked along Harvard Street impact sight distance from Thorndike Street although additional (disrupted) visibility is currently available utilizing the site's current curb cut along Harvard Street. Under proposed conditions, this gap in on-street parking is proposed to be replaced with a loading zone/parking spaces and a building is proposed along the back edge of sidewalk, restricting visibility further from existing conditions. Minimum sight distance requirements are not currently met at the intersection and the proposed building and reuse of the former driveway opening will create more visual obstructions from the Thorndike Street approach. It is recommended that curb extensions or "bump-outs" be considered at the corners of the Harvard Street at Thorndike Street intersection to extend into the parking shoulder and locate stop lines where visibility can be improved all the while shortening pedestrian crossings.
- Sight distance at the proposed site driveway to Thorndike Street was not addressed in the Memorandum. Given the corners of the building obscuring sight lines, it appears that the minimum sight distance requirements from the parking garage exit are not being met unless the exiting vehicle protrudes onto the sidewalk. Clarification is requested.
- The site driveway is proposed at 19 feet wide but zoning requires a 20 foot width for two-way access.
- In order for a passenger vehicle to turn right out of the proposed driveway and remain on their side of the road, the driveway apron needs to be widened.
- The Memorandum indicates that the project will "promote" alternative transportation such as ridesharing and car sharing services in order to reduce the use of personal vehicles. A more defined approach to promote such alternative modes of transportation is recommended. Also, it is recommended that transit schedules be posted on site.
- The plan shows a driveway transition being retained at the former Harvard Street site driveway despite it no longer providing driveway access and a building being located along the back of sidewalk. It is recommended that a conventional sidewalk with 6-inch curb reveal be installed for pedestrian protection. Given the sight distance concerns from the Thorndike Street approach (discussed above), consideration should be made when laying out the loading zone, curb location, and adjacent parking (and potential curb extension) in order to provide adequate visibility from the Thorndike Street approach.

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- The Loading Zone Narrative indicates loading hours from 5 am to 9 am, while the Proposed Parking Circulation Plan shows hours from 6 am to 10 am. Clarification is requested.