



May 12, 2020

Ms. Sheila Paige
Assistant Planning Director
1625 Massachusetts Avenue
Lexington, MA 02420

Reference: Proposed Development – (91 Hartwell Avenue) - Peer Review of Traffic Impact Assessment and Supplementary Materials

Dear Ms. Paige:

On behalf of the Town of Lexington, we have reviewed the Impact Assessment and application for Special Permit and Site Plan Review for the proposed office/laboratory space at 91 Hartwell Avenue.

The documents reviewed include the following;

- *Application for Special Permit and Major Site Plan Review for 91 Hartwell Avenue,*
- *Appendix B Transportation Impact Analysis (TIA),*
- *Updated Parking and Transportation Demand Management Plan,*
- *91 Hartwell Avenue Staff Memo,*
- *Section 4 Site Plans,*
- *Hartwell Avenue Area TMO-1 Transportation Management Plan*
- *Lexington Zoning Regulations*

Our review focused on the adequacy of the study with regard industry best practices for analyzing traffic operations, estimating project generated trips and related traffic impacts including TDM treatments and a parking demand analysis. In addition, the off-site mitigation measures were reviewed in detail to ensure their effectiveness in accommodating projected future traffic volumes with the development in place.

Introduction

As indicated in the TIA, the proposed development consists of the construction of 93,250 square feet of office/laboratory space and a four-story parking garage consisting of 499 parking spaces. The existing site contains an existing three-story office building, which will remain, and parking for 388 vehicles. The proposed laboratory office building will be constructed in the existing surface parking lot necessitating developing parking for both the existing and proposed buildings in the new garage. The redevelopment of the site will result in the elimination of the existing surface parking.

The site is located within the Hartwell Avenue office park, with primary access from Hartwell Avenue via a driveway to the main parking area and secondary access from Hartwell Place, just south of the site.

The site access is proposed to be modified to use Hartwell Place as the primary access point to site and the existing driveway modified for emergency use only.

Subsequent to the TIA, an Updated Parking and Transportation Demand Management Plan (PTDMP) was prepared to supplement the TIA. The primary purpose of the Updated PTDM was to identify a plan that would significantly reduce the number of single occupancy vehicle (SOV) trips to the site and ultimately reduce demand for parking spaces to be supplied by the project proponent. A goal of a maximum of 85% SOV trips to the site, for both existing and proposed building uses, has been identified in the PTDMP. The aggressive TDM program described in the PTDMP was not factored into the trip generation numbers for site trips forecast for the proposed development in the TIA. The PTDMP identified the amount of the Transportation Mitigation Fee to be paid by the project proponent.

Study Area

The study area in the TIA includes the following intersections:

1. Bedford Street at Hartwell Avenue
2. Hartwell Avenue at Maguire Road
3. Hartwell Avenue at 91 Hartwell Avenue Driveway
4. Hartwell Avenue at Hartwell Place
5. Hartwell Avenue at Wood Street

The study area is generally sufficient to evaluate the potential impact of the project on the transportation infrastructure based on the expected trip-distribution pattern for the Project.

Traffic Volumes and Data Collection

Traffic volume data was collected at the study area intersections by means of manual turning movement counts and automatic traffic recorder counts in August of 2018. Existing pedestrian and bicycle facilities were described but no count data was collected.

Travel speeds were not collected on Hartwell Avenue although the existing posted speed limits were noted. Spot speeds should be measured in the vicinity of the Hartwell Place intersection to determine appropriate sight distance requirements.

Seasonal Adjustment

Traffic counts for passenger cars and trucks were taken in August, a period when traffic volumes are generally higher than average conditions. Based on Seasonal Adjustment Factors provided by MassDOT, for urban arterials, August traffic volumes are 7% higher than average

conditions. The parking survey indicated that 93% of the existing office was occupied during the August survey period supporting the assumption that use of unadjusted August traffic counts results in a conservative estimate of traffic volumes used for this TIA.

Crash Data

Motor vehicle crash data was obtained for the study area intersections from MassDOT for the 5-year period of 2014-2018. The intersection of Bedford Street and Hartwell Avenue averaged over 16 crashes per year over the 5-year period. The motor vehicle crash rate for this intersection exceeds MassDOT's average crash rate for signalized intersections. All remaining study area intersections were found to have crash rates that fall below the MassDOT average crash rate for unsignalized intersections.

The intersection of Hartwell Avenue at Maguire Road has an average of only 4+ crashes per year, but a crash rate that is approaching the district wide average for the 5-year period examined. A very large volume of turning traffic, right from Maguire Road in the morning and lefts from Hartwell Avenue northbound to Maguire Road in the afternoon, may account for number of angle and rear-end crashes. As reported, the Town is pursuing potential transportation improvements for the Hartwell Avenue corridor which, if implemented, should improve the safety record of these two study area intersections.

Sight Distance

The site plans call for the site access to be changed from the existing driveway location to a location utilizing the intersection with Hartwell Place. Proposed landscaping plans should be provided showing the necessary clearing to make sure adequate sight distance can be maintained.

General Background Growth

A background growth rate of 0.5% was assumed based on a review of historical MassDOT traffic counts in the area. Based on continuous count station data, on Route 128 in the immediate area, dating back to 1990, and the uncertainty of the future travel in the short term, 0.5% is a reasonable assumption.

Specific Development by Others

The other development projects were identified in the report. No additional work required.

Project-Generated Traffic

The assumptions used to estimate weekday daily and peak hour traffic volumes was based on Institute of Transportation Engineers Trip General Manual, using Land Use Code 760 for Research and Development Centers. No reduction was applied for transit or bicycle trips.

The calculations for project generated trips were based on a proposed development size of 93,250 sf to be added to the existing traffic volumes counted at the site driveway and Hartwell Place. Based on the calculated volumes, the project is expected to generate approximately 1,050 new trips (525 in/525 out) per day, 39 trips (29 in/10 out) during the morning peak hour and 46 trips (7 in/39 out) during the evening peak hour.

Existing traffic volumes, counted in August, totaled 114 trips entering and 6 exiting the site from the existing office space in the morning peak hour; similarly, 84 vehicles were counted leaving the site and 14 entering in the afternoon peak hour.

Based on the ITE rates, peak hour trip generation rates for Research and Development Centers are significantly lower than general office space, as there are likely less employees per square foot.

It should be noted that there is a slight difference in the proposed building uses between the TIA and the site plans submitted for the special permit. The TIA utilizes 93,250 square feet of laboratory space, while the site plans call for a mix of office and laboratory space. The mix (30% office/70% laboratory) of office and laboratory space would result in higher peak hour trip generation values than pure laboratory space. WorldTech estimates that a site with 30% Office would generate approximately 1010 new trips (505 in/505 out) per day, 60 trips (48 in/11 out) during the morning peak hour and 64 trips (10 in/54 out) during the evening peak hour.

Based on this calculation, the TIA might overestimate the daily trip generation and underestimate the peak hour trip generation. The proposed use of the site should be clarified.

No adjustment was applied to the proposed ITE laboratory rates to account for the aggressive TDM program, so the differences in trip generation values are less impactful than the estimate above.

Trip Distribution and Assignment

Traffic volumes associated with the project were assigned to the study area roadways based on a review of existing travel patterns and other traffic impact studies performed in the area. The trip distribution provided in the TIA is generally consistent with existing travel patterns and likely routes to and from the project site.

Future Traffic Volumes-Build Conditions

Table 5 in the study provided a summary of peak hour traffic volume increases on area roadways. The results showed low percentage increases on Bedford Street and Hartwell Avenue.

Traffic Operations Analysis

Bedford Street at Hartwell Avenue

Under 2019 Existing Conditions the intersection of Bedford Street with Hartwell Avenue currently operates at an overall LOS E and C during weekday morning and weekday evening peak hours, respectively. The Bedford Street eastbound approach is over capacity ($V/C = 1.12$) in the morning peak hour. With the addition of No Build traffic and ultimately Build traffic added to the intersection, conditions will worsen. The Town of Lexington prepared a Transportation Improvement Plan (TMO-1) for the Hartwell Avenue corridor in 2010, which the project proponent has agreed to contribute funds. The plan calls for the intersection of Bedford Street and Hartwell Avenue to be reconstructed and the signalized intersection replaced by a roundabout design. The schedule for these improvements has not provided. Additional capacity analyses should be performed for the morning Build Conditions to see if an optimized timing plan, that improves the LOS for the eastbound Bedford Street approach, can be developed.

Hartwell Avenue at Maguire Road

Under 2019 Existing conditions the intersection of Hartwell Avenue with Maguire Road currently operates at a LOS F during both the weekday morning and weekday evening peak hours, for eastbound traffic on McGuire Road. The Maguire Road eastbound approach is over capacity ($V/C > 1.20$) in both peak hours. The summary tables do not provide details on the level of increased delay that would result in the No-build and Build cases compared to Existing conditions. The Transportation Improvement Plan (TMO-1) for the Hartwell Avenue corridor details traffic operations improvements consisting of a new roundabout design that should address the capacity and safety issues at the intersection. The Town is also considering a traffic signal design alternative to the roundabout. The project proponent is contributing mitigation fees that could be used to implement either traffic operations improvement.

Hartwell Avenue at Hartwell Place

Under 2019 Existing conditions the stop-controlled intersection of Hartwell Avenue with Hartwell Place currently operates at a LOS D during weekday morning and a LOS F during the weekday evening peak hours, respectively for eastbound traffic on the Hartwell Place approach. Although the V/C ratios do not indicate a capacity problem for traffic on the Hartwell Place approach, under Existing and No Build conditions, delays are predicted to increase under Build conditions compared with No-Build. New capacity analyses should be performed on the intersection for Build conditions with separate right and left turn lanes on Hartwell Place as a potential mitigation measure to reduce delays at the intersection.

Hartwell Avenue at Wood Street

Under 2019 existing conditions the intersection of Hartwell Avenue with Wood Street currently operates at a LOS F during both the morning and afternoon peak hours for the westbound traffic on Wood Street. The TMO-1 described a plan to add an additional lane to the Wood Street

approach to the intersection and should improve the LOS at this location. The small number of site generated trips at this intersection would not trigger any further analysis or mitigation.

Transportation Demand Management

There were no Transportation Demand Management (TDM) measures identified in the TIA, but the PTDMP identified a significant program offered by the project's proponent to reduce SOV trips to the site. These incentives consisted of bicycle improvements, such as bicycle parking, shower and changing facilities and the use of on-site bicycles and helmets for use during business hours. Due to the proximity of the Minuteman Bike Trail, the measures have the potential to be very effective.

Public transportation services were proposed including subsidized bus passes and continued support in the 128 Business Council, including assigning a Transportation Coordinator for the site. The last component of the TDM measures was a constrained parking supply to discourage the use of single occupancy vehicles (SOV) trips. With these TDM measures in place, and a marketing plan employed for the site, the project proponent has established a goal of no more than 85% SOV trips. Since the project was analyzed without taking advantage of these TDM measures, the traffic operations analyses prepared for the project would be characterized as conservative.

Transportation Mitigation Fee

A commitment was provided in the PTDMP for a payment of \$373,000 as a transportation mitigation fee based on a value of \$5 per square foot of the net floor area. The net floor area was determined by applying an 80% reduction in size according to the Zoning Bylaws

Parking Demand Analysis

A parking demand analysis was prepared consisting of two elements: first a survey of the parking demand of the existing office use was undertaken. According to the parking survey taken in August 2018, less than 40% of the available parking spaces were occupied during the peak parking demand period on a typical Wednesday. During the survey period, the existing office building was reported to be at 93% utilization. The total number of cars parked totaled 148, with 18 additional cars parked on Hartwell Place at 10 AM. This time period represents the peak parking demand for office uses.

The second component of the parking analysis was an estimate of parking demand that could be expected from construction of new laboratory office space. Based on data derived from ITE's latest parking generation report, the expected 85th percentile parking demand, for the proposed laboratory/office space, would be 293 spaces. The combined demand for parking based on observed parking usage for the existing office space plus a projected demand for new laboratory space would yield 441 vehicles.

The survey data from the August count seems to indicate a lower parking demand than published sources like ITE would expect. Using the ITE data for office uses would yield a calculated average

demand of 289 parkers and an 85% demand of 410 parkers compared to the observed 148 cars parked in August.

According to the Special Permit Application, a total of 589 parking spaces would be required for the combined office/laboratory use, based on Table 5-1-4 of the zoning requirements. The updated PTDMP reported that 502 off-street parking spaces would be supplied and an additional 18 on-street spaces designated on Hartwell Avenue. Considering the Town's desire to discourage SOV trips for new developments on Hartwell Avenue, the 502 off-street spaces are a reasonable number of off-street spaces to encourage drivers to reduce SOV trips.

If the demand for off-site parking were to exceed the available spaces provided in the new garage during a period of high demand, vehicles may spend time circulating in the garage or would likely try to find a parking space on Hartwell Place.

Site Access and Circulation

World Tech reviewed the site plan for overall site circulation issues. Below are our findings.

- A plan for the restriping of Hartwell Avenue should be provided, showing the elimination of the left turn lane into the existing site drive and new pavement markings for the Hartwell Place approach to the intersection. New regulatory signing, supplementing the proposed pavement marking plan, should be provided.
- The on-street parking for Hartwell Place should be reviewed in terms of the potential to prohibit parking adjacent to the intersection with Hartwell Avenue to provide additional turn lanes on the Hartwell Place approach. Consideration should be given to designing the parking on Hartwell Place as "short term" parking for visitors to the site.
- The parking demand analysis supports a conclusion that 502 off-street parking spaces would be sufficient to support the proposed office/laboratory development.

Traffic Monitoring and Reporting

The project applicant, LPC Northeast, (or subsequent owner) should conduct a post development traffic monitoring and employee survey program in order to evaluate the success and to refine the elements of the TDM program, and to validate the trip generation projections for the project. The monitoring program will include:

- Obtaining traffic volume information over a continuous seven-day period, weeklong period at the driveway(s) serving the site;
- Perform manual turning movement count and vehicle classification counts at the intersection of Hartwell Avenue and Bedford Street and Hartwell Avenue and Maguire Road and Hartwell Avenue during the weekday morning (7:00 to 9:00 AM), weekday evening (4:00 to 6:00 PM) peak hours; conducting an employee survey of commuting modes.

The monitoring program will commence six months after issuance of the permanent Certificate of Occupancy for the new Parking garage and will continue on an annual basis for a duration to be mutually agreed between LPC Northeast and the Town of Lexington, Planning Board. The results of the monitoring program will be summarized in a report to be provided to the Town within 2-months after completion of the data collection effort. The report will document the traffic volumes associated with the proposed laboratory as occupied at the time that the traffic counts are completed.

If the monitoring program indicates that the SOV employee mode split exceeds 85%, LPC Northeast will identify and undertake corrective measures in conjunction with the Town of Lexington Planning Department to implement additional TDM measures. The corrective measures, if any, will be documented in the transportation monitoring and reporting program report and will identify the appropriate parties responsible for implementation and timelines for approvals.

Summary

Based on the calculated volumes, for Research and Development Center, the project is expected to generate approximately 1,050 new trips (525 in/525 out) per day, 39 trips (29 in/10 out) during the morning peak hour and 46 trips (7 in/39 out) during the evening peak hour. An aggressive TDM program is proposed and a goal of 85% SOV usage is anticipated. Traffic volumes on Study Area will increase by less than 2% over No Build conditions. As noted in the discussion of the project generated traffic above, there is a difference in the proposed mix of laboratory/office space between the site plans submitted and the TIA. Those differences would result in a difference in the trip generation but are not expected to change our recommended mitigation

The project team should provide the following analysis/documentation

- Provide a recommendation to optimize the timing of the Bedford Street at Hartwell Avenue intersection to eliminate the poor operations (LOS F) for the Bedford Street eastbound approach.
- Provide an analysis of the Hartwell Avenue at Hartwell Place intersection with both left and right turn lanes.
- Review the parking plan for Hartwell Place depending on the outcome of the recommendation for additional turn lanes on Hartwell Place.
- Provide a revised pavement marking and signage plan for Hartwell Avenue illustrating the changes in access proposed for the site.
- Verify the stopping sight distance requirements can be met for the Hartwell Place intersection with Hartwell Avenue.
- Provide a Traffic Monitoring and Reporting plan as described above.

Ms. Sheila Page.
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If you have any questions or require additional information, please feel free to contact me directly at any time.

Sincerely,

WORLDTECH ENGINEERING, LLC



Rodney C. Emery, P.E., PTOE