TRANSPORTATION ENGINEERS & PLANNERS

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RE: **Traffic Assessment**
300 Concord Road – Proposed Lab
McMahon Project No. Y21303.11

McMahon Associates has completed a traffic assessment for the proposed lab to be located at 300 Concord Road within the Concord Road Corporate Center in Billerica, MA, as shown in Figure 1 below. The Concord Road Corporate Center currently consists of three office buildings at 296, 298, and 300 Concord Road totaling 353,708 square feet. 1,241 parking spaces are provided within the Concord Road Corporate Center. Under the proposed redevelopment, a two-story lab building totaling 151,700 square feet of lab space would be constructed on a portion of the existing parking lot. Access to the site would continue to be provided via the existing driveway located on Concord Road and via Old Concord Road. The proposed project would provide a total of 778 parking spaces for the proposed lab space and existing office space on the project site. Under current (Spring 2021) conditions, approximately 52 percent (183,928 square feet) of the office space within the Concord Road Corporate Center is occupied, and approximately 48 percent (169,780 square feet) of the office space is vacant. If needed, 186 additional parking spaces could be constructed in a future phase of the project to accommodate future parking demand; however, to avoid unnecessary impervious surface, the area identified for additional parking is proposed to remain landscaped under this phase of the development.

Figure 1: Site Location Map

Existing Conditions
Concord Road is classified as an urban minor arterial under Town of Billerica jurisdiction. Concord Road runs in the north-south direction through the Town of Billerica and generally provides one approximately 12-foot travel lane with an approximately three-foot shoulder in each direction. A speed limit of 35 miles per hour is posted along Concord Road in the vicinity of the site.

Historic Automatic Traffic Recorder (ATR) counts conducted in October and November of 2017 indicate an average daily traffic of approximately 7,400 vehicles per day along Concord Road at a location just north of the Bedford town line. ATR volumes on Concord Road in closer proximity to the site would be expected to be higher than those at the Bedford town line. ATR data taken from the Bedford town line in September of 2020 indicated an 85th percentile vehicle speed of 44 miles per hour in the northbound direction and 43 miles per hour in the southbound direction on Concord Road.

Crash Data Summary
Crash data at the unsignalized intersection of the site driveway at Concord Road, and the signalized intersection of Old Concord Road at Concord Road, was obtained from MassDOT for the most recent five-year period available. This includes crash data from 2014 through 2018 which is presented in the summary attached to this assessment. The unsignalized intersection of the site driveway at Concord Road was shown to experience a total of two crashes during the five-year period analyzed. One of the two crashes resulted in personal injury, and the other resulted in property damage only. The signalized intersection of Old Concord Road at Concord Road experienced eleven crashes in the period from 2014 through 2018. Of the eleven crashes recorded, one was an angle collision, seven were rear-end collision, two were sideswipe collisions, and one was unreported. Two of the crashes resulted in personal injury while nine of the crashes resulted in property damage only. The two analyzed intersections on Concord Road have not been identified as a Highway Safety Improvement Program (HSIP) priority intersection.

Project Site Generated Trips
As part of this assessment, a comparison of proposed project trip generation and the office space proposed to be left vacant was evaluated. The trip generation review focused on the weekday morning and weekday afternoon peak hour periods when the combination of adjacent roadway volumes and potential traffic increases associated with the redevelopment would be greatest. To establish the trip generation of the project, the Institute of Transportation Engineers (ITE) publication, *Trip Generation Manual, 10th Edition* was used as a reference. ITE is a national research organization of transportation professionals and their publication provides traffic generation information for various land uses compiled from studies conducted by members nationwide.

Vehicle trip generation for the proposed lab was calculated based on data published for ITE Land Use Code 760 (Research and Development Center). Vehicle trip rates were established in trips per square foot, and the resulting proposed project site trips are presented in Table 1 below.

Table 1: Proposed Trip Generation Summary

		Weekday AM Peak Hour			Weekday PM Peak Hour		
Description	**Size**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Proposed Lab[1]	151,270 sf	48	16	64	11	63	74

1 ITE Land Use Code 760 (Research and Development Center), based on 151,270 square feet.

As shown in Table 1, the proposed laboratory development is estimated to generate approximately 64 additional vehicle trips (48 entering vehicles and 16 exiting vehicles) during the weekday morning peak hour, and approximately 74 additional vehicle trips (11 entering vehicles and 63 exiting vehicles) during the weekday afternoon peak hour.

The vehicle trip generation for the existing office space was calculated using Land Use Code 710 (General Office Building). As noted above, approximately 48 percent (169,780 square feet) of the office space within the Concord Road Corporate Center is currently vacant, resulting in a total of approximately 183,928 square feet of active office space. Table 2, below, compares the estimated trip generation for the fully occupied existing office space with the estimated trip generation associated with the occupied office space. Table 3 summarizes the net change in total site trips with the addition of the proposed lab, considering approximately 48 percent of the existing office space is vacant.

Table 2: Office Space Trip Generation

		Weekday AM Peak Hour			Weekday PM Peak Hour		
Description	**Size**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Total Office Trips[1]	353,708 sf	309	50	359	60	318	378
- Occupied Office[2]	183,928 sf	172	28	200	32	171	203
Credit for Vacant Office Space		137	22	159	28	147	175

1 ITE Land Use Code 710 (General Office Building), based on 353,708 square feet.
2 ITE Land Use Code 710 (General Office Building), based on 183,928 square feet.

As shown in Table 2, with approximately 48 percent of the existing office space vacant there is a theoretical reduction in the number of vehicles traveling to and from the project site of approximately 159 vehicle trips (137 entering vehicles and 22 exiting vehicles) during the weekday morning peak hour, and a reduction of approximately 175 vehicle trips (28 entering vehicles and 147 exiting vehicles) during the weekday afternoon peak hour.

Table 3: Net Change in Site Trips with Proposed Lab and Vacant Office Space

	Weekday AM Peak Hour			Weekday PM Peak Hour		
Description	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Proposed Lab Trips[1]	48	16	64	11	63	74
- Credit for Vacant Office Space[2]	137	22	159	28	147	175
Net Change in Site Generated Trips	-89	-6	-95	-17	-84	-101

1 From Table 1
2 From Table 2

As shown in Table 3, the total Concord Road Corporate Center site, with the proposed lab development and considering 48 percent of the existing office space is vacant, is estimated to generate approximately 95 fewer vehicle trips (89 fewer entering vehicles and six fewer exiting vehicles) during the weekday morning peak hour, and approximately 101 fewer vehicle trips (17 fewer entering vehicles and 84 fewer exiting vehicles) during the weekday afternoon peak hour compared with the office space being full occupied.

Site-Generated Parking Demand

Under proposed conditions, the final Concord Road Corporate Center configuration would provide 964 parking spaces, including 33 accessible spaces. In order to determine the projected opening day parking demand for the proposed lab and office space, parking generation data from the ITE publication, *Parking Generation Manual, 5th Edition* was referenced. The *Parking Generation Manual* provides parking generation information for various land uses compiled from studies conducted by members nationwide. The parking demand analysis considers that 48 percent (169,780 square feet) of office space is vacant, resulting in a total 183,928 square feet of occupied office space in addition to the proposed 151,270 square foot lab development. Weekday parking demand estimates for the proposed lab and office space were developed based on data presented in this publication for Land Use Codes 110 (General Light Industrial) and 710 (General Office Building), and are presented in Table 4 below.

Table 4: Parking Demand Summary

Description	Size	Weekday Peak Parking Demand
Proposed Lab Development	151,270 sf	98
Office Space	183,928 sf	440
Total Estimated Parking Demand		538

1 ITE Land Use Code 110 (General Light Industrial), based on 151,270 square feet.
2 ITE Land Use Code 710 (General Office Building), based on 183,928 square feet.

As shown in Table 4, the proposed lab and currently occupied office space are projected to generate an average peak parking demand of approximately 538 vehicles. The estimated peak parking utilization for Concord Road Corporate Center with the proposed lab and occupied office space is presented in Table 5 below.

Table 5: Parking Utilization Summary

Estimated Peak Parking Demand	538
Proposed Parking Supply	778
Estimated Peak Parking Utilization	69%

With a total of 778 parking spaces proposed in the Concord Road Corporate Center configuration with the lab project constructed, the estimated weekday peak parking demand would be approximately 69%, as shown in Table 5.

As noted above, 186 additional spaces could be constructed in a future phase of the project to accommodate future parking demand, for a total of 964 parking spaces. As these spaces are not projected to be needed under the currently proposed development, the area identified for additional parking is proposed to remain landscaped under this phase of the development to avoid the unnecessary addition of impervious surface.

Site Access & Circulation

The site would continue to be accessed via the existing driveway on Concord Road as well as via Old Concord Road. Internal circulation roadways within the Concord Road Corporate Center are not anticipated to change significantly from existing conditions, outside of the location of the proposed lab space building.

As a part of the proposed project, new parking spaces would be added to the Concord Road Corporate Center, immediately adjacent to the proposed lab facility as shown on the Site Development Plans prepared by Bohler Engineering. Should the project site need additional parking in the future, 186 additional parking spaces could be constructed in a future phase of the project to accommodate future parking demand. The additional parking spaces would be constructed in a new parking lot adjacent to Concord Road.

Sight Distance

A review of the available sight distance was conducted at the existing driveway on Concord Road. The American Association of State Highway and Transportation Officials (AASHTO) publication, *A Policy on Geometric Design, 2018 Edition,* defines minimum and recommended sight distances at intersections. The minimum sight distance is based on the required Stopping Sight Distance (SSD) for vehicles traveling along the main road. 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 time to anticipate and avoid collisions."

The posted speed limit along Concord Road in the site vicinity is 35 miles per hour. In order to provide a conservative assessment of the required sight distance, the measured 85th percentile speed of 44 miles per hour in the northbound direction and 43 miles per hour in the southbound direction were used which may be different than those at the site driveway. Table 6 below summarizes the AASHTO sight distance standards for the 85th percentile speeds and the measured sight distances available at the site driveway location on Concord Road.

Table 6: Sight Distance Requirements

Location	Looking	Speed Limit (mph)	85th % Speed (mph)	SSD[1] Required	Sight Distance Measured	Meets Required SSD?
Site Driveway at	Left (South)	35	44	335	350	Yes
Concord Road	Right (North)	35	43	340	350	Yes

1 Stopping sight distance (see AASHTO equations 3-2 and 3-3) for the 85th percentile speeds.

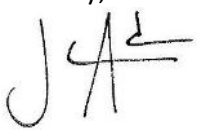
2 Intersection sight distance (see AASHTO equations 9-1 and 9-2) for the 85th percentile speeds.

As shown in Table 6, the available sight distance for a vehicle exiting the site driveway was measured to be approximately 350 feet looking both left (south) and right (north) along Concord Road which exceeds the minimum stopping sight distance for 85th percentile speeds on the roadway. The available stopping sight distance at the existing site driveway along Concord Road is greater than 550 feet approaching the driveway from the south and from the north, which exceeds the AASHTO required stopping sight distances for an 85th percentile speed of 44 miles per hour in the northbound direction and 43 miles per hour in the southbound direction.

Based on the above assessment, it is anticipated that with the proposed lab development and the current vacancy rate of Concord Road Corporate Center, the project site would generate fewer vehicle trips within the surrounding roadway network during the weekday morning and weekday afternoon peak hour periods than when the office space is fully occupied. With the site access locations proposed to remain the same, it is not expected that the proposed project would result in any significant impact on the operations of the surrounding roadway vicinity. The project site is shown to provide enough parking spaces to accommodate the expected demands of the proposed lab and the currently occupied office space.

Please do not hesitate to contact me with any questions you may have.

Sincerely,



Jason Adams, P.E., PTOE
Associate