May 18, 2017

Blythe Robinson, Executive Director
Town of Wellesley
525 Washington Street
Wellesley, MA 02482

Attn.: Meghan Jop
Assistant Executive Director

Re: 900 Worcester Street (Route 9) – Wellesley Sports Traffic Peer Review

Dear Ms. Robinson:

As requested, BETA Group, Inc. (BETA) has reviewed the Traffic Impact and Access Study (TIAS) for the proposed Wellesley Sports Complex, located at 900 Worcester Street (Route 9) adjacent to Dale Street and opposite Lexington Road. The TIAS was prepared by MDM Transportation Consultants, Inc (MDM), dated April 2017, for ESG Associates, Inc. (The Applicant).

The proposed site is located on a 7.8 Acre property previously owned by the Roman Catholic Archbishop of Boston and occupied by the Saint James Church. In November 2014, the Town of Wellesley purchased the property. The buildings within the site were demolished in November 2015.

PROPOSED BUILDING PLAN

The Applicant has proposed the construction of a 130,000 square foot (indoor) sport complex that includes two regulation size ice rink surfaces, a synthetic turf field, and a 35,000 square foot Health Club that includes an Aquatics Center and an Olympic size swimming pool. The building is also expected to include other amenities such as locker rooms, strength and conditioning rooms, a snack bar/food station, and conference space. Based on the site plan, it is expected the building will provide approximately 1,050 spectator seats.

1. Discuss where the spectator seats will be located, e.g. how many will be provided for each use and will they all be occupied at one time.

The building will be located on the southeast side of the property, with primary parking on the northwest side of the site. Additional parking is provided between the east side of the building and the property line of the adjacent office property. A travel path is provided around ¾ of the proposed building.

2. BETA recommends the Applicant coordinate with the Town of Wellesley Fire Department to ensure the proposed site plan, particularly the travel path, provides adequate fire access.

Vehicular access to the existing property is provided via two curb cuts along Route 9 and one curb cut along Dale Street. As part of the building plan, the Applicant has proposed to close the curb cut along Dale Street, while retaining two curb cuts along Route 9. The two curb cuts along Route 9 will be shifted slightly west of their existing locations, with the western most access aligning with Lexington Road. The preferred design

alternative, pending MassDOT approval, is the installation of a traffic signal at the intersection of the western drive and Lexington Road. The signal would allow vehicles to enter and exit the property via Route 9 Westbound and Lexington Road. Left turns or U-Turns from Route 9 Eastbound will NOT be permitted at this intersection. An "old" pedestrian crossing, previously located east of the site, will be relocated to the newly proposed signal at the western driveway. The signal is expected to provide safer pedestrian crossing conditions and reduce the number of site generate trips at the Weston Road interchange.

The eastern drive will be shifted west of an existing tree line that separates 900 Worcester Street from the adjacent office property at 888-892 Worcester Street. The Applicant has proposed a parking lot connection between the two properties at the location of the eastern drive. It is expected that this will allow vehicles from both properties to exit via the proposed signal should they be destined to Route 9 Westbound. The eastern drive is proposed to provide right-out access only. No vehicles will be permitted to enter the site via this curb cut.

3. Consider providing Stop Signs and Stop Lines for approaches connecting the two parking lots at the intersection of the eastern driveway.

STUDY AREA

Five primary intersections were examined as part of the TIAS:

- Route 9 at Overbrook Drive/CVS Driveway – Signalized
- Route 9 Eastbound Ramp at Weston Road – Unsignalized
- Route 9 Westbound Ramp at Weston Road/Cleveland Road – Unsignalized
- Route 9 at Proposed Driveway/Lexington Road – Unsignalized
- Route 9 at Secondary Site Driveway – Unsignalized

The study did not include the neighborhoods north or south of the site. It is known that these neighborhoods are used as a cut-through to avoid the heavily congested Route 9 corridor and Route 9/Weston Road Interchange.

4. In addition to the above intersections, the study should include the Beechwood Road, Manor Avenue, Overbrook Drive, Russell Road, and Fells Road neighborhoods. It is recommended this study include traffic volumes, speeds, and vehicle classification for a minimum of 72 hours for each neighborhood.

SIDEWALK STUDY

Area pedestrian facilities were briefly discussed as part of the Study Area section of the TIAS. As part of the Special Permit for Projects of Significant Impact (PSI) requirements, a pedestrian and bicycle safety study should be completed for the study area "within a walking distance of 600 feet from the development area."

5. BETA recommends the Applicant complete the Pedestrian and Bicycle Safety Study as noted in the Wellesley PSI Requirements. This should include a discussion regarding the Cochituate Aqueduct Trail.

TRAFFIC VOLUMES

Existing traffic volume data was collected in March 2017. The traffic data collection effort included the use of Automatic Traffic Recorders (ATR) on Route 9 and Turning Movement Counts (TMC) at the five intersections.

DAILY TRAFFIC

The ATR unit recorded traffic volume data for 24 hours on Thursday, March 23rd, 2017 and for 24 hours on Saturday, March 25th, 2017. The ATR unit did not collect vehicle classification or vehicle speeds. The data revealed an average daily traffic (ADT) volume of 54,400 vehicles per day (vpd) for Thursday and 46,428 vpd for Saturday. The weekday morning peak hour (8:00-9:00AM) volume was found to be 4,243 vehicles per hour (vph) and the Saturday mid-day peak hour (12:00-1:00PM) volume was found to be 3,644 vph.

6. The weekday afternoon peak hour traffic volume provided in Table 1 of the TIAS does not appear to match data provided in the Appendix. Please clarify.

PEAK HOUR TRAFFIC

Turning movement counts (TMC) were collected at the side driveway/Lexington Road on Thursday, March 23rd, 2017 and Saturday, March 25th, 2017 for one hour during the morning (8:00-9:00AM), evening (4:45-5:45PM), and Saturday mid-day (11:45AM-12:45PM) peak periods. The one hour of data, provided in the appendix, does not include heavy vehicle counts.

7. Explain how the one hour of traffic data was determined to be the peak hour. Typically TMC are collected from 7:00-9:00AM, 4:00-6:00PM, and 11:00AM-1:00PM.
8. Since the TMC sheets did not include heavy vehicles, explain how the heavy vehicle percentages were determined for analysis purposes.

The intersections of Route 9 at Overbrook Drive/CVS, Route 9 Eastbound Ramp at Weston Road, and Route 9 Westbound Ramp/Cleveland Road at Weston Road were counted on Thursday, March 30th, 2017 during the morning commuting peak period (7:00-9:00AM) and evening commuting peak period (4:00-6:00PM); and Saturday, April 1st, 2017 during the mid-day peak period (11:00AM – 1:00PM). BETA finds these counts to be acceptable.

Given the existing vacancy of the site, the secondary (eastern) site driveway was not counted. BETA finds this methodology to be acceptable.

SEASONAL ADJUSTMENT

Massachusetts Department of Transportation (MassDOT) continuous Count Stations "307 – Westborough, Route 9 East of Northborough T.L." and "4165 – Newton, I-95/Route 128 South of I-90" were examined to determine if the TMC data should be adjusted due to seasonal traffic patterns. Based on the Count Station data, it was determined that March traffic is generally lower than an average month. As a result, the TMC data were increased by 2.0% to reflect average traffic conditions. BETA finds this methodology to be acceptable.

TRAVEL SPEEDS

Travel speeds on Route 9 in the vicinity of the Site Driveway were collected via a Spot Speed Study on Monday, March 27th, 2017. It was noted that this study was performed by tracking vehicles across two

locations and converting the travel time and distance to determine travel speed. Typically this data is obtained via speed radar gun, similar to those utilized by local and state police. Speed data values for a sample of 100 vehicles eastbound and 100 vehicles westbound were provided in the Appendix.

9. Please clarify the means of data collection. Was a speed radar gun utilized, or were other detection methods utilized?

The Spot Speed Study revealed an average eastbound speed of 45 miles per hour (mph) and an average westbound speed of 47 mph. The 85th percentile speeds were found to be 51 mph (eastbound) and 52 mph (westbound). Data in the appendix revealed approximately 20% of vehicles (both directions) were traveling faster than the posted 50 mph speed limit.

10. The TIAS did not discuss the time period of the spot speed study. Clarify if these speeds were collected during commuting peak periods where congestion may impact speed readings.

SAFETY EVALUATION

The most recent three years (2012-2014) of MassDOT crash data were examined for the study area intersections. The MassDOT revealed approximately 37 crashes at the intersection of Route 9 and Overbrook Drive/CVS Drive, 10 crashes at the intersection of Route 9 and Lexington Road/Site Drive, 9 crashes at the Intersection of Route 9 Westbound Ramps at Weston Road, and 13 crashes at the intersection of Route 9 Eastbound Ramps at Weston Road. All of the intersections were found to have crash rates lower than the district average crash rates. Most of the crashes reported on Route 9 were revealed to be rear-end crashes. BETA finds the crash summary to be acceptable.

In addition to historical crash data, MassDOT Highway Safety Improvement Program (HSIP) high crash location clusters were examined for the study area. Areas within significant crash clusters may be eligible for HSIP funding to improve safety. According to MassDOT, intersections/roadways impacted by projects subject to MEPA review require a Road Safety Audit (RSA). The RSA will explore short term, mid-term and long term safety improvements for the intersection/roadway. It was determined that the intersection of Route 9 at Overbrook Drive/CVS Drive falls within the 2012-2014 HSIP cluster. As noted in the *Wellesley Sports Center Project of Significant Impact*, dated April 13, 2017 by Allen & Major Associates, Inc., this project may require MEPA review due to increased traffic volume on Route 9 as a result of the project. The Applicant has is seeking an "advisory opinion" regarding the project's status regarding MEPA thresholds.

11. Upon completion, the advisory opinion regarding MEPA thresholds should be provided for review. Should the Project satisfy MEPA thresholds the Applicant is expected to complete the RSA for the intersection of Route 9 at Overbrook Drive/CVS Driveway in accordance with MassDOT.

PUBLIC TRANSPORTATION

The project is located along the Metro-West Regional Transit Authority (MWRTA) bus Route 1 which travels along Worcester Street (Route 9) between Framingham and the Woodland MBTA Station. The traffic volume data used in the TIAS was not adjusted due to the presence of the existing bus route. BETA finds this methodology to be conservative and acceptable.

SIGHT LINE ANALYSIS

Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD) were examined for both site driveways along Route 9.

STOPPING SIGHT DISTANCE

The required SSD as discussed in the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets* (*Green Book*) represents the distance at which an oncoming vehicle must see an obstruction in order to stop safely. This includes distance traveled during perception-reaction time, and distance traveled while physically braking.

Two distances were examined in the TIAS, including the recommended SSD based on posted speed (50 mph) and the recommended SSD based on the measured 85th percentile speed (51 mph and 52 mph) discussed previously. It was determined that the recommended SSD would be 425 feet based on posted speed and 450 feet based on 85th percentile speed. The available SSD was measured in the field to be greater than 950 feet in each direction. Given the straight alignment of Route 9 in this area, BETA finds this analysis to be acceptable.

INTERSECTION SIGHT DISTANCE

The recommended ISD as discussed in the *Green Book* represents the desirable distance at which a vehicle entering the roadway can see an oncoming vehicle to safely complete the movement without collision. Generally, an ISD consistent with the required SSD is sufficient as it provides enough distance for an oncoming vehicle to stop before collision. However, recommended ISD values are typically larger than the required SSD in order to provide greater driver comfort and fewer operational delays.

The ISD was examined for right turns and left turns out of the site driveway. The recommended ISD based on Stopping Distance was calculated to be approximately 450 feet, consistent with SSD discussed previously. The calculated ISD desirable for right turns was noted to be 478 feet and the calculated ISD desirable for left turns was noted to be 551 feet. The available ISD measured in the field was found to be greater than 800 feet.

12. The methodology discussed in the TIAS represents ISD for a two-lane highway. Since Route 9 is a four-lane highway with median, vehicles may require more time to make the left turning maneuver. Based on the AASHTO *Green* Book this increases the recommended sight distance to approximately 588 feet for left turns. Despite the increased distance, the measured available sight distance of greater than 800 feet is acceptable.
13. The calculated sight distances discussed in this section were based on passenger cars. Trucks typically take longer to accelerate and therefore require longer sight distances. According to AASHTO, the recommended ISD for a single unit truck (or a bus) is approximately 735 feet. Based on the field measurements discussed in the TIAS, the available sight distance of greater than 800 feet is acceptable.

PLANNED ROADWAY IMPROVEMENTS

The TIAS discussed nearby roadway improvement projects, primarily by MassDOT, that may impact traffic within the study area. This included the resurfacing of Route 9 (Project 608180) in the project area, and a larger projected expected to improve sidewalks, pavement markings, and roadway reflectors (Project 607340).

14. BETA recommends the Applicant coordinate with MassDOT and provide an estimated project schedule for these improvements. Particularly those related to proposed roadway and sidewalk changes that may coincide with the potential installation of a traffic signal at the Site Driveway.

NO-BUILD TRAFFIC VOLUMES

The 2024 No-Build traffic volumes were obtained by inflating the 2017 seasonally adjusted existing volumes based on examination of historical traffic growth patterns and adding traffic generated by nearby proposed developments.

HISTORICAL AREA GROWTH

MassDOT continuous Count Stations "307 – Westborough, Route 9 East of Northborough T.L." and "4165 – Newton, I-95/Route 128 South of I-90" were examined to determine overall traffic growth patterns over recent years. Based on the Count Station data, it was determined that traffic has been relatively stable over recent years. To estimate future traffic growth, the TIAS utilized a compounded annual growth rate of 0.5% per year for seven years.

15. To be consistent with all the TIAS completed in the Town of Wellesley, BETA recommends a 1.0% per year compounded growth rate.

BACKGROUND DEVELOPMENTS

One nearby project; *MathWorks Lakeside Campus* located at 1 Lakeside Campus Drive in Natick, MA; was found to potentially increase traffic in the study area. This re-development includes approximately 510,000 square feet of general office space. To estimate the amount of added traffic related to this development, Institute of Transportation Engineers (ITE) *Trip Generation* rates were examined for Land Use Code (LUC) 710 – General Office Building for the 510,000 square foot building. These trips were then added to the network using Census Journey to Work data for the Town of Natick. Based on the Journey to Work data, approximately 10% of the generated office trips would travel along Route 9 within the study area. This represents approximately 71 vehicles during the morning peak hour, 65 vehicles during the evening peak hour, and 22 vehicles during the Saturday mid-day peak hour.

BETA finds the discussed methodology and 2024 No-Build traffic volumes to be acceptable.

TRIP GENERATION

Site generated trips for the proposed sports center were estimated based on ITE's *Trip Generation*. Since this type of facility is not specifically defined as a Land Use Code, trips were estimated as a combination of different land uses added together.

ATHLETIC FIELD

The TIAS examined LUC 488 – Soccer Complex for one soccer field. The one soccer field is expected to generate one trip in the morning peak hour, 18 trips in the evening peak hour, and 30 trips during the Saturday mid-day peak hour. The ITE *Trip* Generation provides daily trip rate information, however the projected daily trips were calculated by multiplying the most conservative peak hour (18 for weekday, and 30 for Saturday) by the number of operating hours for each day. This yielded 300 trips per weekday, and 420 trips per Saturday. BETA finds this methodology to be acceptable, though notes the following:

16. The morning trip generation (1 trip) for the athletic field may be higher depending on the operating program/schedule.

Health and Fitness – Swimming Pool

The TIAS examined LUC 492 – Health/Fitness Club for 35,000 square feet. Based on the trip rates, the health club/swimming pool is expected to generate approximately 50 trips in the morning peak hour, 142 trips in the evening peak hour, and 97 trips during the Saturday mid-day peak hour. The pool was estimated to generate approximately 1152 trips per weekday and 730 trips per Saturday, based on ITE trip rates.

17. Discuss consideration for using LUC 493 – Athletic Club, which generates more trips by square footage than LUC 492 – Health/Fitness Club.

Ice Hockey Rinks

Ice Hockey Rinks (LUC 465) are discussed in ITE's *Trip Generation*, though the trip generation rates are based on only one data point. Since this data is unreliable, empirical data was examined at two similar sports complexes, including the Essex Sports Complex in Middleton, MA and the New England Sports Center in Marlborough, MA. The Essex Sports Complex was observed on Thursday, March 23, 2017 and Saturday, March 27, 2017. The New England Sports Center was observed on Saturday, October 17, 2015 and Tuesday, October 20, 2015. Based on the empirical data, the two ice rinks were estimated to generate approximately 150 trips in the morning peak hour, 123 trips in the evening peak hour, and 122 trips during the Saturday mid-day peak hour. Similar to the soccer field methodology, the daily number of trips was obtained by multiplying the most conservative peak hour trip generation by the number of operating hours each day. This revealed approximately 1476 trips per weekday and 1464 trips per Saturday. BETA finds the empirical data to be acceptable.

Total Site

Based on data provided in the TIAS, the site is expected to generate approximately 201 trips in the morning peak hour, 283 trips in the evening peak hour, and 249 trips during the Saturday mid-day peak hour. Daily trips represent 2928 trips per weekday and 2614 trips per Saturday.

18. Given the use of operating hours to determine daily trip generation, discuss overall operating hours/programming and how this might impact traffic. Are all site features expected to be in full use at the same time, or will there be staggered programs?
19. It was noted that the site is expected to generate approximately 10-15 special events per year (swim meets, hockey tournaments, etc.) that may draw additional trips. Trip generation for special events should be discussed and analyzed.

Pass-By Trips

Given the specialty nature of the site, pass-by trips were not examined for this project. BETA finds this methodology to be conservative and acceptable.

Trip Distribution and Assignment

The population of surrounding towns and cities were examined within a 20 minute driving radius to the site. Trip distribution percentages were applied to Route 9 Westbound, Route 9 Eastbound, Weston Road Northbound, and Weston Road Southbound based on the percentage of towns within the 20 minute drive.

The resulting distribution exercise; provided in the Appendix; revealed approximately 40% traveling to/from the west via Route 9, approximately 45% traveling to/from the east via Route 9, approximately 5% traveling to/from the north via Weston Road, and approximately 10% traveling to/from the south via Weston Road. BETA finds the trip distribution methodology to be acceptable for general use, but offers the following comments:

20. Figure 9 in the TIAS shows approximately 60% of trips traveling to/from the east via Route 9 which is inconsistent with the exercise provided in the Appendix and subsequent turning movement volume diagrams.
21. Discuss how trip distribution will be affected for special events.

The Trip Assignment was developed by applying the trip generation numbers to the estimated trip distribution percentages. BETA finds the trip assignment methodology to be acceptable.

Adjacent Office Re-Distribution

Given the installation of the proposed traffic signal at the site driveway and Lexington Road, it is anticipated that the proposed parking lot may be connected with the adjacent office space (888-892 Worcester Street) parking. This connection would allow vehicles from the office to exit via the traffic signal, headed westbound on Route 9, rather than utilizing the Weston Road interchange to reverse direction. To determine the number of trips that might be redistributed to the new traffic signal, the overall trip generation for the office space (74,790 square feet) was estimated via ITE *Trip Generation* LUC 710 – General Office. It was assumed that 40% of these trips would be destined to/from the west via Route 9. The applied 40% of the examined peak hour trip generation was then removed from the Weston Road interchange and applied to the proposed site driveway. Based on this exercise, it is expected that approximately eight vehicles will be redistributed in the morning peak hour, 55 vehicles in the evening peak hour, and 9 vehicles in the Saturday mid-day peak hour.

22. BETA recommends the Applicant collect traffic volumes at the 888-892 Worcester Street driveways to validate the number of existing trips generated by the adjacent office property.
23. On-site traffic circulation impacts associated with the cross-over traffic from the 888-892 Worcester Street offices should be addressed.

Build Traffic Volumes

The Build traffic volumes were obtained by applying the trip assignment, from the proposed project and the redistricted office trips, to the no-build traffic volume. This methodology is in accordance with industry standards.

Traffic Signal Warrant

To validate the applicability of a proposed signal at the site driveway and Lexington Road, MDM conducted a traffic signal warrant analysis. The Manual on Uniform Traffic Control Devices (MUTCD) explains several traffic signal warrants that must be satisfied to justify the installation or continued operation of a traffic signal. In this TIAS, Warrant 1 – Eight Hour Traffic Volume was examined as it is the most conservative vehicle based warrant. This warrant compares the main road volume (per hour in both directions) with the site driveway volume (per hour). The main road, Route 9, volume was obtained via the ATR unit discussed in previous sections. Since the existing site driveway is unused, the projected site driveway volumes were

estimated. It was noted in the Appendix that these site driveway volumes were estimated based on empirical data, though the process is unclear.

24. Clarify how empirical data was used to determine hourly driveway volumes used for the signal warrant analysis. Please provide the empirical data for ease of review and understanding.

Based on the data provided in the TIAS, this site driveway satisfies Warrant 1 for nine hours, and therefore the installation of a signal is applicable. Using the data provided in the TIAS, BETA examined Warrant 2 – Four Hour Volume and Warrant 3 – Peak Hour Volume. It was found that the intersection also satisfies both Warrant 2 and Warrant 3 for their 70% cases; assuming the site driveway volume estimation is accurate.

It is understood that this signal warrant analysis and signal design are awaiting approval from MassDOT.

25. Request that the Town and BETA be included in future meetings with MassDOT.

Traffic Operations Analysis

Traffic analysis was completed at the four study intersections for the 2017 Existing, 2024 No-Build, and 2024 Build scenarios during the morning commuting peak hour, evening commuting peak hour, and Saturday mid-day peak hour. Traffic analysis was completed with Synchro software. The TIAS summarized analysis results by means of Level of Service (LOS), delay, volume to capacity ratio (v/c), and queues.

26. Upon examination of Synchro output sheets provided in the Appendix, it appears that the traffic volume analyzed at the intersection of Weston Road and the Route 9 Westbound ramps does not match volumes shown in the turning movement diagrams. Clarify traffic volumes and update the analysis accordingly.
27. Similarly, traffic volumes at the intersection of Route 9 at Overbrook Drive/CVS Drive were found to be slightly different than those shown in the turning movement diagrams. Please clarify and update accordingly.
28. The intersection of Route 9 at Overbrook Drive/CVS Drive was analyzed as coordinated during existing and no-build conditions. How will the existing coordination be impacted by future coordination with the proposed site driveway signal?
29. The build analysis does not propose any signal timing alterations at the intersection of Route 9 at Overbrook Drive/CVS Drive, despite the recommended coordination with the proposed site drive. Discuss whether signal timing adjustments may improve overall traffic operations on Route 9.
30. Analysis output sheets in the Appendix suggest that pedestrian phases are not included for the Route 9 at Overbrook Drive and Route 9 at Site Driveway traffic signals. Discuss how the presence of pedestrian phases may impact overall operations on Route 9.

Level of Service Results

The morning peak hour results were provided in Table 8, evening results were provided in Table 9, and Saturday results were provided in Table 10 of the TIAS. These tables show a summary for each analysis case (existing, no-build, and build) for all intersections.

31. Traffic analysis results in Table 8, Table 9, and Table 10 of the TIAS show analysis summaries for each intersection by approach, rather than by lane use.

In the morning peak hour, approaches with failing level of service included the Overbrook Drive southbound approach, the Route 9 Westbound Left Turn Lane at the site driveway, and the Route 9 Eastbound Ramp at

Weston Road. All of these approaches operate with delays greater than 80 seconds (for signals) or 50 seconds (for unsignalized locations) during all three analysis cases.

32. It is unclear, based on the tables, how much these approaches with LOS F degrade or improve as there is little comparison shown in the Table. For example, the Route 9 Eastbound Ramp at Weston Road is noted to "operate with long delays" and that the ramp will experience a "net reduction of up to 100 vehicles during the peak hour with associated net reduction in travel delay," however the Synchro analysis worksheets reveal an increase in delay for this approach during the morning peak hour as a result of the project.

In the evening peak hour, approaches with failing operations include the Route 9 Westbound Left Turn Lane at the site driveway, the Route 9 Eastbound Ramp at Weston Road, and the Route 9 Westbound Ramp/Cleveland Road at Weston Road. The table shows a slight improvement in delays at the Route 9 Westbound Left Turn Lane as a result of the signal (LOS F to LOS E) though the delay actually increases. This is because the Level of Service Delay thresholds are higher for signals.

During the Saturday peak hour, the Route 9 Westbound Left Turn Lane at the site driveway was found to operate with failing LOS for the No-Build condition. This case improved as a result of the added traffic signal.

QUEUE ANALYSIS

Queues were examined and tabulated for the signalized intersections of Route 9 at Overbrook Drive/CVS Drive (Table 11) and Route 9 at Site Drive/Lexington Road (Table 12) only.

33. The queue lengths provided in Table 11 and Table 12 were found to be inconsistent with those provided in the Appendix. Please clarify and update accordingly.
34. Table 12 shows an eastbound left turn lane on Route 9 at the Site Driveway. This left turn movement was noted in the TIAS as being prohibited. Clarify if the signal will allow left turns and if the left turn lane will be provided.

The Appendix shows Route 9 Westbound queues at the Overbrook Drive in the evening peak hour extend approximately 540 feet under existing conditions, and will improve to approximately 428 feet in the build condition.

35. Field observation revealed longer westbound queues in the evening, typically extending back Weston Road and beyond. The long queues will easily block the left turn lane entering the site. Similarly, during the morning commuting period, the queue on Route 9 Eastbound typically extends from the Kingsbury Street signal to Weston Road and beyond. The traffic analysis does not reflect or take into consideration these existing operational issues.
36. The Kingsbury Street signal is scheduled to be reconstructed this year by MassDOT (Project 608180). The MassDOT project will replace two existing unsignalized U-Turn lanes with traffic signals. Since 45% of the site traffic will be arrive and depart from Route 9 east of the site, the proposed Kingsbury Street signals should be included in the study.

Queueing summaries were not provided for unsignalized intersections, namely the Route 9 Ramps at Weston Road, which are known to operate with significant queues.

37. Provide a table that summarizes queueing conditions at the Route 9 Ramps.
38. Based on the Appendix sheets, the Route 9 Eastbound Ramp at Weston Road was found to queue approximately 665 feet, which would extend well onto Route 9. Explain how added queueing at the Route 9 Ramps may impact the already congested Route 9 during peak periods.

PARKING

The proposed site plan provides approximately 355 parking spaces on-site, based on the Town of Wellesley parking by-law for "any building used for physical education or physical recreation purpose." This requires one parking space per three permanent spectator seats. According to the site plan, the proposed site will provide approximately 1,050 spectator seats which represent 350 parking spaces.

The TIAS examined typical parking generation rates from ITE's *Parking Generation* for LUC 492 – Health/Fitness Club and LUC 488 – Soccer Complex were examined. Similar to the Trip Generation exercise, LUC 465 – Ice Skating Rink provided data based on one site. As a result, the two ice rinks were added into the parking generation by assuming two additional soccer fields.

According to ITE, for the 35,000 square foot health and fitness center (swimming pool) and three soccer fields, the proposed site would generate an average weekday parking demand of 300 parking spaces and an average Saturday parking demand of 279 spaces.

Empirical data used for parking analysis was collected at two YMCA locations in January 2007. Empirical data was also collected at Winchester Soccer Club in June 2012. According to the TIAS, the empirical data shows a parking demand of 308 spaces on a weekday and 322 spaces on a Saturday.

39. These data are more than five years old. New data should be collected for this study.

The Applicant is currently in discussion with the owner of the adjacent office buildings at 888-892 Worcester Street regarding the usage of their parking lot for overflow parking. This would be used in cases of large parking demand, such as hockey tournaments, soccer tournaments, or swim meets. The Applicant expects approximately 10-15 events per year that may require overflow parking.

40. The parking demand estimates for special events were not provided. For parking and traffic management purposes, this information should be provided.
41. Given the office nature of the adjacent parcel, it is expected that overflow parking would be utilized after business closing hours. Should the adjacent property be used as overflow parking, ensure that all tournaments or heavy traffic events occur outside of business hours.
42. A traffic management plan for special events should be developed for this project.

The site plan proposes a mix of standard parking spaces, handicap spaces, and compact parking spaces. As noted in the Town of Wellesley Parking by-law, a maximum of 30% of the required parking spaces may be used as Compact Parking spaces. All parking along the Route 9 side of the property is proposed as Compact parking spaces with dimensions of 7.5' wide by 15' deep. A total of 64 (18%) Compact spaces are proposed in this area.

43. Though these compact spaces are covered under the parking by-law, compact spaces are discouraged per the ITE *Traffic Engineering Handbook, 7th Edition.* Since vehicle sizes have been increasing as larger SUVs have become popular, standard "compact" cars no longer fit within the 7.5' x 15' space. As a result, drivers can become confused as to whether their vehicle is actually a "compact" or "small" vehicle. This can increase the number of larger vehicles attempting to park in these areas. The ITE *Traffic Engineering Handbook* recommends no more than 10% of parking stalls be labeled Small-Car-Only.

UNSIGNALIZED ACCESS ALTERNATIVE

The TIAS also examined the unsignalized access alternative, which represents proposed conditions with no traffic signal at the site driveway. This would include a reconfigured main site driveway that allows left and right turns in, and right turns out only (similar to existing conditions). All site related trips would depart the site to the east, via Route 9 Eastbound. Those destined to the west would utilize the Weston Road interchange to reverse direction. No change, beyond existing conditions, is expected for the adjacent office building traffic as a result of this alternative.

The TIAS provided updated trip distribution and build traffic volumes. BETA finds the attached volumes to be acceptable.

LEVEL OF SERVICE ANALYSIS

The TIAS indicated that there will be no major changes in operations, when compared to the signal alternative, would be expected at the intersection of Route 9 at Overbrook Drive/CVS drive as a result of this the unsignalized alternative, given that the trip distribution and traffic volumes will be similar.

In the morning peak hour, the Route 9 westbound left turn into the site driveway was found to increase dramatically (over 400 minutes) as a result of the project traffic. The Route 9 eastbound ramp was also found to dramatically increase in delays by approximately 7 minutes. These are significant delays.

In the evening peak hour, the Route 9 westbound left turn into the site driveway was found to increase in delays by approximately 70 seconds as a result of the added site traffic. The Route 9 eastbound ramp was also found to increase in delays, approximately 4 minutes, in the evening peak hour.

Under the Saturday mid-day conditions, only the Route 9 eastbound ramp was found to increase dramatically (80 seconds) in delay, though the Route 9 westbound left turn into the site driveway degraded to LOS F as a result of the project traffic.

44. Given the large delays at the Route 9 eastbound ramp, discuss whether a traffic signal at this location will alleviate some delay on the Route 9 ramp and Weston Road. A traffic signal warrant should be performed.

QUEUE ANALYSIS

A detailed queue analysis was not provided or discussed for the unsignalized access alternative. Based on the analysis sheets in the appendix, the Route 9 eastbound ramp at Weston Road is expected to queue approximately 950 feet after site traffic is added to the interchange. This would result in significant spill-back onto Route 9.

45. Given the projected spill-back onto Route 9 as a result of the 950 foot long queue, discuss any impacts to the Russell Road and Fells Road neighborhoods generated by cut-through vehicles avoiding the Route 9 interchange.
46. Long westbound queues generated from the Overbrook Drive intersection in the evening peak hour will block the left turn lane into the site.

RECOMMENDATIONS

Four primary improvement measures were discussed to address any traffic related impacts generated by the project. These included: access-related improvements, off-site improvements, special event parking management protocol, and a TDM program.

ACCESS/EGRESS IMPROVEMENTS

The proposed signalized intersection at the site driveway will provided a signalized pedestrian crossing that connects neighborhoods north of Route 9 with the Cochituate Aquifer Trail system. Other site related improvements were discussed regarding the "right-out only" nature of the secondary site driveway, and limiting plantings/vegetation to two foot heights in order to increase sight distances.

The TIAS further discussed the proposed traffic signal at the site driveway, noting the coordination of the proposed signal with the existing signals at Overbrook Drive and at Oak Street. It was noted that the proposed intersection would provide a westbound left turn lane into the site driveway but will not allow left turns towards Lexington Road. This signal will replace the existing median break (previously used for U-Turns during church services) east of the site driveway.

47. Given the existing queueing problems on Route 9, evaluate any impacts to the Lexington Road and Beechwood Road neighborhoods generated by potential cut-through traffic.

SPECIAL EVENT PARKING MANAGEMENT

The proposed site plan is expected to provide approximately 355 parking spaces. Special programming, such as hockey tournaments, soccer tournaments, and swim meets are expected to potentially require additional parking. The Applicant expects this to occur 10-15 times per year, and is in discussion with the owner of the adjacent office buildings located at 888-892 Worcester Street as one location to potentially accommodate overflow parking.

48. A traffic management plan for special events should be developed for this project.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

The TIAS discussed several TDM measures that the Applicant has committed to implementing in order to reduce employee, athlete, and spectator based auto trips. These included:

- On-Site Transportation Coordinator – this employee will disseminate and promote TDM information to employees.
- MassRides – this program provides free assistance to commuters, employees, students, and other travelers and promotes carpooling, vanpooling, and ridesharing. The Applicant will promote commuter assistance programs through MassRides.
- MWRTA Transit Stop – The Applicant will work with the MWRTA to provide a dedicated bus stop on-site or along Route 9 adjacent to the site.
- Bus Drop-Off/Parking Area – The Applicant will provide a dedicated bus drop-off/parking area on-site that is adjacent to the main driveway to promote bus use by regional sports teams.
- Public Transportation Information – The Applicant will post transit schedules on-site as well as sell transit passes to promote public transportation.
- Employee Transit Pass Subsidy – The Applicant will consider providing a transit pass subsidy for full time employees.

- Pedestrian Infrastructure – The proposed site plan will provide pedestrian connections to existing sidewalks along Route 9.
- Tenant Manual for Employee Services – The proposed manual will offer employees: direct deposit, transit pass subsidies, and a guaranteed ride home program for carpool/vanpool employees.
- On-Site Amenities – The project will include services such as food (snack bar), pro-shop, equipment sales and services, and on-site showers.
- Electric Vehicle Charging Stations and Preferential Parking for Low-Emission Vehicles – These parking locations will be detailed during site plan review.
- Preferential Parking for Carpool/Vanpool – These parking locations will be detailed during site plan review.
- No Idling Signage – This signage will be provided in parking areas for buses/commercial vehicles in attempt to reduce greenhouse gas emissions.

BETA finds the provided TDM measures to be acceptable, but offers the following comments.

49. The bus stop location provided on the site plan is located adjacent to the north side of the building. This location requires busses to exit via the secondary (right-out) driveway which would require westbound destined buses to utilize the Weston Road interchange to reverse direction. The TDM notes that this location would be adjacent to the Main Driveway. Please discuss.
50. Discuss whether preferential parking may or may not reduce the overall number of "useable" parking spaces. How will these spaces be enforced?

General Comments

51. A post-construction traffic monitoring program should be established for this project, similar to the nearby CVS project.
52. Traffic impacts related to the project construction should be discussed.

If we can be of any further assistance regarding this matter, please contact us at our office.

Very truly yours,
BETA Group, Inc.

Kien Ho, P.E., PTOE
Vice President

cc: Tyler de Ruiter, P.E.

Job No: 5475-05