

June 8, 2021

Mr. Bernard Cahill
Town Planner
Town of Shrewsbury
100 Maple Avenue
Shrewsbury, MA 01545

RE: **Transportation Engineering Peer Review Services
Campus Master Plan Special Permit
Centech Park
384-386 South Street
Shrewsbury, MA**

Dear Mr. Cahill,

McMahon Associates (McMahon) has completed a comprehensive peer review of the proposed Centech Park Campus Master Plan (herein referred to as the "Project") located at 384-386 South Street in the Town of Shrewsbury, Massachusetts. The peer review is based on the Traffic Impact and Access Study (TIAS) prepared by Greenman-Pedersen, Inc. (herein referred to as the "Applicant") dated April 2021, and the most recent site plans prepared by Beals Associates, Inc., dated April 14, 2021.

It should be noted that a TIAS for the Project was initially conducted by MDM Transportation Consultants, Inc. in April 2019, titled *Proposed Centech Park North, Sub-District A*. The original build program analyzed by MDM consisted of 110,000 square feet of office space and 165,000 square feet of industrial space between four on-site buildings. The most recent build program analyzed by the applicant in the April 2021 TIAS has been reduced considerably.

The purpose of this letter is to present our comments on the April 2021 TIAS and Site Plans, specifically focused on internal vehicular circulation, pedestrian circulation and safety, site parking, delivery and operations, and lighting. Overall, the project conforms to standard engineering practice. However, issues that we have identified are explained in further detail below.

Project Description

The Project proposes the clearing of existing vegetation on site and construction two warehouses and an office building. Based on a review of the most recent site plan, the proposed warehouses would have a combined gross floor area of approximately 280,000 square feet. A campus building is proposed in the southeast corner of the site as part of the Project, and would have a gross floor area of approximately 10,400 square feet. To accommodate parking demand, the Project proposes a total of 271 spaces for passenger vehicles, 62 truck loading bays and 52 trailer parking spaces, with separate parking lots being provided for each building. The TIAS states that the gross floor area of the proposed campus building would be approximately 16,800 square feet, which is not consistent with the 10,400 square feet shown in the most recent site plan. **We request that the Applicant confirm the total square footage of the campus building to be consistent for the TIAS and the site plans.**

Study Area Roadways and Intersections

McMahon conducted a site visit on Monday, June 7, 2021 under clear conditions to verify existing roadway and intersection characteristics reported in the TIAS. Based on this field review, the existing conditions documented in the TIAS, including No Turn on Red (NTOR) restrictions, signal phasing and geometric characteristics of the study area roadways, are consistent with the observed field conditions. The following study area intersections were included as part of the TIAS;

- Boston-Worcester Turnpike (Route 9) at South Street;
- South Street at Charles River Laboratories Driveway/University of Massachusetts (UMass) Driveway;
- Hartford Turnpike (US Route 20) at South Street/Green Street;
- Hartford Turnpike (US Route 20) at Cherry Street/Centech Boulevard;
- Grafton Circle (Route 140) at Route 9 Eastbound Connector;
- Grafton Circle/Memorial Drive (Route 140) at Route 9 Eastbound Connector;
- Boston-Worcester Turnpike (Route 9) Westbound at Route 9 Westbound Connector;
- Boston-Worcester Turnpike (Route 9) Eastbound at Grafton Street;
- South Street at Proposed Site Driveway;
- Hartford Turnpike (US Route 20) at Proposed Site Driveway.

Based on a review of the Project trip distribution from the TIAS, traffic volumes on Route 140 coming from/going to the south are shown to increase under future conditions as a result of additional developments by others and Project-generated traffic. This would result in higher northbound and southbound through volumes at the Route 140/US Route 20 interchange to the south of the study area. Furthermore, the TIAS indicates that trucks entering and exiting the site will only be permitted to use the US Route 20 Site Driveway, increasing the likelihood that truck volumes at the Route 140/US Route 20 interchange would increase. These increased volumes may result in higher delays and longer queues for vehicles on stop-controlled approaches. **This interchange, however, was not included as part of the analysis in the TIAS. We request that the Applicant provide clarification as to why the Route 140/US Route 20 interchange was not included in the study area.**

Traffic Volumes

At the time of the TIAS, traffic volumes in the study area were below average due to the ongoing COVID-19 pandemic. As such, historic traffic count data obtained in 2018 and 2019 as part of the original TIAS for the Centech North Development conducted by MDM were utilized for this TIAS. This is consistent with the Massachusetts Department of Transportation (MassDOT) *Guidance on Traffic Count Data*, revised April 2020, which states that historic count data should be used wherever possible. Turning movement counts (TMCs) were conducted at the study area intersections in October 2018 and October 2019 during the weekday morning peak period (7:00 AM to 9:00 AM) and the weekday afternoon peak period (4:00 PM to 6:00 PM). Additionally, Automatic Traffic Recorder (ATR) counts were conducted on US Route 20 and South Street on Thursday, December 10, 2020 to obtain vehicle travel speeds in the vicinity of the site. **We generally concur with the counted peak periods and the use of historic TMC data for the TIAS. However, we request that the Applicant verify class times and schedules at the UMass campus, if possible, to ensure that peak traffic volumes at the campus align with the network peak hours and that there are no unusual midday peak hours.**

The Applicant reviewed the MassDOT U1-Worcester Statewide Seasonal Adjustment Factors in order to determine the appropriate seasonal adjustment applicable to the collected traffic volumes. The U1-Worcester factors are calculated using data from interstate highways in Worcester County. Based on information presented in the TIAS, traffic counts collected in the month of October are typically shown to be approximately 5.0 percent higher than those collected in the average month. Conversely, traffic counts collected in the month of December are shown to be approximately 6.5 percent lower than those collected in the average month. **We recommend that the Applicant confirm that the county-wide seasonal factor applied is appropriate for the study area by reviewing available count data from MassDOT at a continuous count station in the vicinity of the site.**

Safety

A crash summary was completed for the study area intersections for the most recent five-year period, including January 1, 2014 through December 31, 2018, consistent with MassDOT Traffic Impact Study guidelines. The TIAS indicates that crash data were obtained from MassDOT, and yearly crash summaries were provided in the TIAS Appendices. The crash rate was calculated at each intersection, and is expressed in crashes per million entering vehicles (MEV). These crash rates were compared with MassDOT District 3 and statewide average crash rates. For signalized intersections, the District 3 and statewide average crash rates are 0.89 and 0.78 crashes per MEV, respectively. For unsignalized intersections, the District 3 and statewide average crash rates are 0.61 and 0.57 crashes per MEV, respectively. Based on the crash data review provided as part of this TIAS, the following intersections were found to have crash rates exceeding the District 3 and statewide averages:

- Route 9 at South Street – signalized (1.59 crashes per MEV, higher than District 3 and statewide);
- US Route 20 at Centech Boulevard – signalized (0.87 crashes per MEV, higher than statewide);
- Route 9 Westbound at Route 9 Westbound Connector – unsignalized (0.64 crashes per MEV, higher than District 3).

The TIAS indicates that a Road Safety Audit (RSA) was conducted for the intersection of Route 9 and South Street, whereby a multi-disciplinary team visited the intersection to evaluate existing safety deficiencies and propose applicable countermeasures. Several low-cost countermeasures recommended as part of the RSA have already been implemented, and were considered as part of the 2021 Existing Conditions traffic analysis in the TIAS. These include:

- Installation of a supplemental *No Turn on Red* sign on the far side of the intersection for the South Street southbound approach;
- Installation of a *No Turn on Red* sign for the Route 9 Eastbound approach;
- Modification of yellow and red signal clearance times to better align with observed travel speeds through the intersection.

During the June 7 field visit, it was confirmed that these countermeasures have been implemented.

We acknowledge that the crash rate at the Route 9/South Street intersection is significantly above average, which is indicative of safety deficiencies. However, the countermeasures proposed as part of the RSA for this intersection are expected to adequately address these existing deficiencies and reduce the observed intersection crash rate over time. Some additional low-cost/medium safety payoff countermeasures identified in the RSA have not yet been implemented, such as painting of southbound double left-turn lane extension lines and relocation of the “Advance Traffic Signal” sign on the Route 9 westbound approach. These countermeasures, along with other medium and high safety payoff countermeasures, should be implemented in a timely manner to ensure that safety deficiencies at this intersection are not exacerbated by the addition of Project-related traffic under future conditions.

We request that the Applicant evaluate the potential for low-cost countermeasures to address safety concerns at the signalized US Route 20/Centech Boulevard intersection, as well as the unsignalized Route 9 Westbound/Route 9 Westbound Connector intersection. While the crashes at these locations were generally low-severity, both intersections experienced crash rates that are slightly above average.

Vehicle Speeds

As mentioned previously, ATR counts were obtained in December 2020 on South Street and US Route 20 to determine travel speeds in the vicinity of the Project site. The TIAS indicates that the northbound and southbound 85th percentile speeds on South Street are 37 miles per hour (mph) and 38 mph, respectively. The eastbound and westbound 85th percentile speeds on US Route 20 are 51 mph and 54 mph, respectively. The study area speed data were used to modify signal clearance times at the intersection of Route 9 and South Street, and were applied in the calculation of sight distance at the site driveways.

We reviewed the December 2020 ATR speed data on US Route 20 and South Street provided in the TIAS Appendices and concur with the 85th percentile speeds in the study area.

Sight Distance

The TIAS reports the minimum required stopping sight distance (SSD) and recommended intersection sight distance (ISD) based on guidance provided by the American Association of State Highway and Transportation Officials (AASHTO). The AASHTO publication, *A Policy on Geometric Design, 2011 Edition*, states that minimum sight distances at intersections is based on the required SSD for vehicles traveling along the main roadway. AASHTO describes ISD as the desirable sight distance which allows vehicles to enter the main street traffic flow without requiring the mainline traffic to slow to less than 70 percent of their speed.

Actual field measurements of the SSD and ISD are not provided in the TIAS. However, the Applicant provided sight triangle plans in the TIAS Appendices that illustrate the SSD and ISD standards for drivers exiting the site driveways. The TIAS states that minor clearing of vegetation adjacent to the site driveways will ensure that sight lines remain unobstructed. To verify the sight distance measurements provided in the TIAS, McMahon calculated the minimum required SSD and recommended ISD given the measure 85th percentile speeds on South Street and US Route 20, and found that the SSD and ISD provided in the TIAS utilize a passenger car as the design vehicle for the calculations. **The TIAS notes that trucks to and from the Project site will be directed to the US Route 20 Driveway and will not be permitted to use the South Street Driveway. Combination trucks have more conservative gap acceptance parameters and will change the sight distance requirements considerably. As such, we request that the Applicant revise the sight distance calculations for the US Route 20 Driveway to reflect a combination truck as the design vehicle.**

McMahon conducted field measurements of the available sight distance at the locations of the full-access site driveways on South Street and US Route 20 during the June 7 field review. These sight distance measurements are provided in Table 1 below.

Table 1 – Sight Distance Measurements

| Site Driveway | Looking | Sight Distance Measured (ft) |
|----------------------------|----------------|-------------------------------------|
| South Street Site Driveway | Left (North) | 510 |
| | Right (South) | 440 |
| US Route 20 Site Driveway | Left (East) | >700 |
| | Right (West) | 550 |

Based on our field measurements, we concur that adequate sight distance will be provided at the South Street and US Route 20 Driveways for passenger vehicles. As mentioned previously, we request that the sight distance requirements at the US Route 20 Driveway be revised to reflect a combination truck as the design vehicle. We are in agreement that the vegetation should be cleared along the frontage of the site to ensure unobstructed sight lines and meet the AASHTO minimum required SSD and recommended ISD.

Background Growth

The Traffic Study indicates that a 0.5-percent background growth rate, compounded annually, was applied to the existing traffic volumes to project the 2021 Existing volumes to the 2028 No Build traffic conditions. It is stated that this rate is consistent with the TIAS previously completed by MDM. Upon further review of the original MDM TIAS for the Centech North development, it was found that the 0.5-percent growth rate was derived using traffic data collected between 2007 and 2013, which may not be representative of existing traffic conditions. Additionally, the Applicant provides no indication that this growth rate was confirmed with local traffic authorities. **We request that the Applicant review more recent traffic data collected after 2013, if available, to calculate the annual background growth rate. Furthermore, it is recommended that the calculated background growth rate be confirmed with the Town of Shrewsbury and with the Central Massachusetts Regional Planning Commission (CMRPC).**

Based on information presented in the TIAS, the Applicant confirmed five planned developments with the Town of Shrewsbury that would be expected to impact future traffic volumes or patterns in the vicinity of the Project site. These developments include a mix of retail, residential and office land uses. The traffic volumes associated with these developments are based on their respective traffic studies, where applicable. A traffic study for the one of the additional mixed-use developments, namely *The Village at Grafton Woods*, has not been submitted to the Town.

As such, traffic volumes associated with this development were based on available trip generation data from the Institute of Transportation Engineers' (ITE) publication, *Trip Generation Manual, 10th Edition*. **We are in agreement with the methodology used to distribute traffic expected to be generated by the known developments in the Town of Shrewsbury, and concur with the application of ITE trip generation data for *The Village at Grafton Woods*.**

The Applicant also indicates that UPS is negotiating with the Town of Grafton to develop a 900,000-square-foot facility in the existing Centech Park on Centennial Drive, approximately one mile to the south of the US Route 20/Cherry Street/Centech Boulevard intersection. At the time of the original MDM TIAS, there were no formal filings submitted, nor were any site plans or build programs developed. The Applicant confirmed with the Town of Grafton on February 16, 2021 that no further steps have been taken. As such, traffic volumes associated with this development were not included in the TIAS. We generally concur that trips associated with the UPS Grafton Facility cannot be accounted for in the TIAS, as the scope of this development is unknown at this time. However, if this development were to be realized, it would be expected to add a substantial amount of traffic to several of the study area roadways and intersections under future conditions and have a noticeable impact on intersection operations. **We request the Applicant provide a status update of the UPS Grafton Facility project and consider what impacts, if any, that project will have on the study area intersections included in this project's TIAS.**

Planned Roadway Improvements

The Applicant identified a substantial MassDOT roadway improvement project on US Route 20. According to the TIAS, this project would include roadway widening, signal and geometric improvements, and implementation of pedestrian and bicycle accommodations. The project corridor runs from the Northborough Town Line to the Worcester City Line for a total length of approximately 4.6 miles. The following intersection improvements are proposed at the following locations as part of this project:

- US Route 20 at South Street/Green Street;
 - Exclusive left turn lane and two through lanes in the eastbound and westbound directions.
 - Exclusive right turn lane in the westbound direction.
 - Exclusive left turn lane and shared through/right turn lanes in the northbound and southbound directions.
 - Crosswalks and pedestrian phasing across all four approaches.
 - Signal timing modifications.
- US Route 20 at Centech Boulevard/Cherry Street;
 - Exclusive left turn lane, two through lanes and an exclusive right turn lane in the eastbound direction.
 - Two exclusive left turn lanes, a through lane and a shared through/right turn lane in the westbound direction.
 - Two exclusive left turn lanes, a through lane and an exclusive right turn lane in the northbound direction.
 - Crosswalks and pedestrian phasing across all four approaches.
 - Signal timing modifications.

The TIAS did not apply these proposed modifications under future conditions to provide a conservative analysis. The TIAS states that these improvements would be expected to significantly reduce delay and queuing at the intersections, while also improving safety and mobility. McMahon reviewed the MassDOT Route 20 Corridor

Plan, available publicly online, to verify the aforementioned improvements. **We generally concur that the proposed intersection improvements as part of MassDOT's US Route 20 Corridor Widening Project would be expected to reduce delays and queues at the South Street/Green Street and Centech Boulevard/Cherry Street intersections. We also acknowledge that the results of the analysis presented in this TIAS do not include these improvements, and are therefore conservative. However, modeling of the proposed improvements may be considered at intersections where signal operations are shown to be poor.**

Trip Generation

The weekday morning and weekday afternoon peak hour trip generation presented in the TIAS was calculated based on available trip generation data from the ITE Trip Generation Manual, 10th Edition. The trip generation for the proposed warehouses on site was developed using the combined square footage of the buildings in conjunction with data for ITE Land Use Code (LUC) 150 (Warehouse). The trip generation for the proposed campus building was based on the square footage of the campus building and ITE LUC 710 (General Office Building). The total number of trips that would be expected to be generated by Project, as presented in Table 5 of the TIAS, are 93 total vehicle trips (74 entering, 19 exiting) during the weekday morning peak hour and 95 total vehicle trips (21 entering, 74 exiting) during the weekday afternoon peak hour. These trip generation estimates were verified as part of McMahon's review. Based on a review of the trip generation estimates provided in Table 5 of the TIAS, the Applicant used the average trip generation rate to estimate trips to and from the campus building (LUC 710 – General Office Building). However, ITE recommends the application of the fitted curve to estimate trips for LUC 710, which would provide a more conservative estimate. **We request that the Applicant discuss why the trip generation estimates for the campus building using the fitted curve was not utilized or clarify why the average trip generation rate was used instead.**

As mentioned previously, the square footage of the campus building noted in the TIAS does not match that square footage indicated on the most recent site plan. Depending on the revision to the TIAS or the site plans for the actual size of the building, the trip generation estimates may need to be revised to reflect the most recent site plan. McMahon acknowledges, however, that the trip generation estimates for the campus building as shown provide a conservative estimate.

The specific weekday morning and weekday afternoon peak hours that were used as a basis of the analysis were not provided in the TIAS. **It is requested that the Applicant identify the peak hours used as a basis for the analysis.**

The Applicant reviewed truck trip generation data presented in the ITE publication, *Trip Generation Handbook, 3rd Edition*. Appendix I of this publication provides truck trip generation data for various industrial land uses. As part of this study, the Applicant reviewed truck trip generation data for LUC 130 (Industrial Park), LUC 150 (Warehouse) and LUC 152 (High-Cube Warehouse/Distribution Center). In order to provide a conservative analysis, the TIAS considered 30 percent of all warehouse trips to be truck trips and applied these trips to the weekday morning and weekday afternoon peak hours. This truck trip percentage is consistent with the upper thresholds for the aforementioned LUCs. **McMahon concurs with the truck trip methodology applied in the TIAS.**

McMahon concurs that a Notice of Project Change (NPC) does not need to be filed with the Massachusetts Environmental Protection Agency (MEPA) due to the anticipated reduction in site trips compared to the original build program.

Trip Distribution

The vehicle trips expected to be generated by the proposed project were distributed throughout the study area intersections based on US Census Journey-to-Work data from the years 2011-2015. McMahon concurs with the trip distribution percentages applied in the TIAS. However, Journey-to-Work data generally are only applicable to employee commuter flows, and are not representative of truck trips. **We request that the Applicant consider providing separate distributions for Project employees and Project truck trips, as Journey-to-Work data may not be applicable to the latter. We also recommend that the truck trip distribution be based on the populations of the surrounding municipalities that are to be serviced by the Project.**

The TIAS assumes that 60 percent of trips traveling between US Route 20 West and Warehouse Building A will utilize the US Route 20 Driveway. Similarly, it is assumed that 25 percent of trips between South Street North and Warehouse Building B will utilize the South Street Driveway. **We concur with the distribution of site traffic at the proposed US Route 20 and South Street Driveways.**

Traffic Analysis

A capacity analysis was completed by the Applicant using *Synchro 10* software for the study area intersections for the weekday morning and weekday afternoon peak hours. The TIAS indicates that capacity analyses were completed for the 2021 Existing, 2028 No Build and 2028 Build scenarios. Analysis results are provided in the Appendix of the report. The Applicant utilized Highway Capacity Manual (HCM) 2000 methodology for signalized and unsignalized intersections. **We request that the Applicant use the Synchro 10 methodology for the analysis of the signalized intersections, as HCM 2000 methodology is fairly outdated and has been superseded by more up-to-date methodologies. Furthermore, it is our opinion that the HCM 2000 methodology is not appropriate for use at unsignalized intersections for the same reason. As such, it is requested that the Applicant utilize HCM 6th Edition methodology at all unsignalized intersections in the study area. Consistency should be achieved between intersections with similar types of traffic control.**

Based on a review of the capacity analysis reports provided in the Appendix of the TIAS, Synchro's default values for the peak hour factor (PHF) were used for each study area intersection under 2021 Existing, 2028 No Build and 2028 Build conditions. (The MassDOT TIA guidelines state that the PHF should be calculated by approach, and not by intersection and therefore, **we request that the Applicant calculate the approach PHFs and revise the capacity analysis as needed. Furthermore, MassDOT TIA guidelines state that the PHF under future conditions should be set to a default value of 0.92, unless professional engineering judgment dictates otherwise. We request that the applicant revise the 2028 No Build and 2028 Build capacity analyses to reflect a PHF of 0.92.**

For the intersection of Route 140 at the Route 9 Westbound Connector, we request that eastbound right turns be set to "free" in Synchro for the 2021 Existing, 2028 No Build and 2028 Build capacity analyses, as this movement is under yield control and channelized under existing conditions as it is currently set to "permissive."

For the intersection of Route 140 at the Route 9 Westbound Connector, we request that a southbound right-turn overlap be coded on Phase 4 (eastbound left turns), consistent with existing conditions observed during McMahon's field review. This change should be applied to the 2021 Existing, 2028 No Build and 2028 Build conditions.

For the intersection of South Street at the Charles River Laboratories Driveway/UMass Driveway, the eastbound left turn volume should be 40 vehicles under 2021 Existing conditions. It is currently shown as four vehicles.

For the intersection of Route 9 at South Street, the weekday morning and weekday afternoon peak hour volumes in the 2028 Build Conditions capacity analysis do not match the volumes shown in Figure 8. Similarly, the 2028 Build weekday morning peak hour volumes at the intersection of South Street at the Charles River Laboratories Driveway/UMass Driveway do not match the volumes in Figure 8. We request that the applicant revise the capacity analysis accordingly.

The intersection of Route 9 at South Street is shown to decrease from level-of-service (LOS) E under 2028 No Build conditions to LOS F under 2028 Build conditions. Furthermore, the LOS some movements at other signalized intersections are shown to experience significant delay under future conditions, including the intersections of US Route 20 at South Street/Green Street and Centech Boulevard/Cherry Street. We suggest that the Applicant consider reviewing and proposing additional mitigation measures to reduce delay, such as signal timing optimization. Alternatively, the Applicant could consider modeling the proposed intersection improvements for the US Route 20 corridor project to mitigate delays and queueing.

Stop-controlled movements at several unsignalized intersections are shown to experience high delays under 2021 Existing, 2028 No Build and 2028 Build conditions. In particular, stop-controlled eastbound movements at the intersection of Route 140 at the Route 9 Eastbound Connector is shown to exceed 600 seconds of delay. We request that the Applicant consider conducting a gap acceptance study at this intersection as a means of calibrating the Synchro model and providing more realistic delays.

Mitigation

McMahon conducted a review of the proposed delay mitigation strategies in the TIAS. A traffic signal warrant analysis was conducted for the US Route 20 Driveway in accordance with guidelines in the *Manual on Uniform Traffic Control Devices, 2009 Edition* (MUTCD). The following signal warrants were evaluated as part of this analysis:

- Warrant 1 – Eight-Hour Vehicular Volume;
 - Condition A – Minimum Vehicular Volume.
 - Condition B – Interruption of Continuous Traffic.
 - Combination of Conditions A and B.
- Warrant 2 – Four-Hour Vehicular Volume;
- Warrant 3 – One-Hour Vehicular Volume.

The MUTCD guidelines require that at least one of the aforementioned warrants be met in order for installation of a traffic signal to be warranted. MassDOT guidelines, however, require that Warrant 1 (Eight-Hour Vehicular Volume) be met, at a minimum, to warrant installation of a traffic signal. The TIAS states that the US Route 20 Driveway is not expected to meet any of the aforementioned warrants under 2028 Build conditions. **McMahon has reviewed the traffic signal warrant analysis provided in the TIAS, and we concur that the US Route 20 Driveway does not meet the MUTCD signal warrants.**

The Applicant has agreed to implement a number of Transportation Demand Management (TDM) strategies to reduce single-occupancy vehicle trips to the site and mitigate traffic impacts. These strategies include pedestrian and bicycle accommodations, electric vehicle charging spaces, and incentivizing alternate transportation modes to and from the Project site (rideshare programs, improved access to public transit, etc.). Furthermore, the Applicant has committed to conducting a post-occupancy monitoring study to ensure that traffic volumes to and from the site do not significantly exceed the estimates in the TIAS. **We generally concur with the proposed TDM strategies. Coordination with local transit agencies and rideshare programs will be necessary early on, such that site employees and visitors will have access to these programs and incentives on day one.**

Parking

The provided Site Plan indicates that the site is proposed to include a total of 271 passenger vehicle parking spaces, 62 truck loading bays and 52 trailer parking spaces. The Town of Shrewsbury Zoning Bylaws, Section VII, Subsection D lists the following parking requirements relevant to the Project site:

- Offices – One (1) parking space for each four hundred (400) square feet of gross floor area, plus space for all company vehicles, space for visitors and loading space for all deliveries and shipping.
- Warehouses – One (1) parking space for each fifteen hundred (1500) square feet of gross floor area.

Based on these requirements, the 232,500 s.f. facility would require a minimum of 229 passenger vehicle parking spaces (187 for the warehouses, 42 for the campus building). As shown in the most recent site plan, the warehouses would provide a total of 224 parking spaces, and the office would provide a total of 47 parking spaces. As such, the proposed parking meets the requirements in the Town of Shrewsbury Zoning Bylaws.

The parking demand characteristics of the Project site were reviewed based on the ITE *Parking Generation Manual, 5th Edition*. Parking demand data were reviewed for LUC 150 (Warehouse) and LUC 710 (General Office Building) to estimate the average peak period parking demand for the Project. The ITE average parking generation rates for these land uses are as follows:

- LUC 150 (Warehouse) – 0.39 spaces per 1,000 square feet of building space;
- LUC 710 (General Office Building) – 2.39 spaces per 1,000 square feet of building space.

Based on these parking generation estimates, Warehouse Building A would be expected to require a minimum of 75 parking spaces, and Warehouse Building B would be expected to require a minimum of 40 parking spaces. As proposed, Building A would provide 146 parking spaces, and Building B would provide 78 parking spaces. The campus building, as proposed in the most recent site plan, would be expected to require a minimum of 25 spaces. The proposed building would provide 47 parking spaces. **Based on a review of the ITE parking generation estimates for the Project, the proposed warehouses and campus building are expected to provide adequate parking to meet site demand.**

For the proposed campus building, the Americans with Disabilities Act (ADA) requires that parking facilities of 26 to 50 spaces, at least two spaces should be accessible to persons with disabilities, including one van-accessible space. The site plan shows a total of four van-accessible spaces. For Warehouse A, ADA requirements state that parking facilities with 76 to 100 parking spaces should provide at least four accessible spaces, with one of which accessible for vans. Warehouse A proposes six van-accessible spaces.

For parking facilities with 101 to 150 spaces, ADA requirements state that at least five spaces should be accessible, with at least one van-accessible space. Warehouse B proposes six van-accessible spaces. **The site plan shows a total of 16 accessible spaces between all three land uses, all of which appear to be van-accessible, meeting the ADA requirements for each use.**

Vehicular Site Circulation

Based on the Site Plan, access to the site is proposed to be provided via two full-access site driveways: one on South Street and one on US Route 20. Two-way circulation would be provided throughout the site on all internal roadways and parking lots. The TIAS indicates that the South Street Driveway is intended for employee use only, and all truck traffic accessing the site would use the US Route 20 Driveway. However, the Site Materials Plan does not indicate proposed signage to enforce these access restrictions. **It is requested that signage for the employee only and truck only entrances be provided on the site plans.**

Pedestrian Circulation/Safety

As shown in the site plans, a concrete sidewalk is currently proposed along the internal roadways. Marked crosswalks and appropriate signage would be provided at all crossings, and the sidewalk would connect all land uses on site. **The proposed sidewalk on site is expected to provide safe and efficient access for pedestrians.**

Deliveries and Operations

A delivery truck should be able to safely navigate the site between the delivery bays and parking spaces but turning templates are not provided in the submission. In addition, the provided site plans do not address emergency vehicle access, including whether a fire truck can adequately access the site. **We request that the Applicant provide a turning movement diagram to show a delivery truck and emergency vehicle safely navigating and exiting the proposed site without blocking proposed spaces and confirm specified loading areas.**

In addition, the location of the dumpster is not indicated in the Site Plan. **We request that the dumpster locations be designated on the plans.**

Site Lighting

The Applicant has not provided a lighting plan as part of the drawing submission. **We request that the Applicant provide a lighting plan stamped by a professional engineer licensed in the Commonwealth of Massachusetts, with photometric light levels, showing the location and style of proposed outdoor light fixtures for the site.**

If you should have any further questions or require further information, please feel free to contact me.

Very truly yours,



Steven C. Findlen
Senior Project Manager