M E M O R A N D U M

To:	**William B. Clark** Planning Director Town of Milton	Date: **January 29, 2010**
From:	**Keri Pyke, P.E., PTOE** **Colin Patterson, E.I.T.**	HSH Project No. **2009186.00**
Subject:	**Temple Shalom of Milton Redevelopment** **Traffic Impact Assessment Peer Review**	

As requested by the Town of Milton, Howard/Stein-Hudson Associates (HSH) has reviewed the *Traffic Impact Assessment* (TIA) and associated site plan for the proposed Temple Shalom Redevelopment project located at 180 Blue Hill Avenue in Milton. The Traffic Impact Assessment was submitted by Vanasse & Associates, Inc. (VAI), on December 17, 2009.

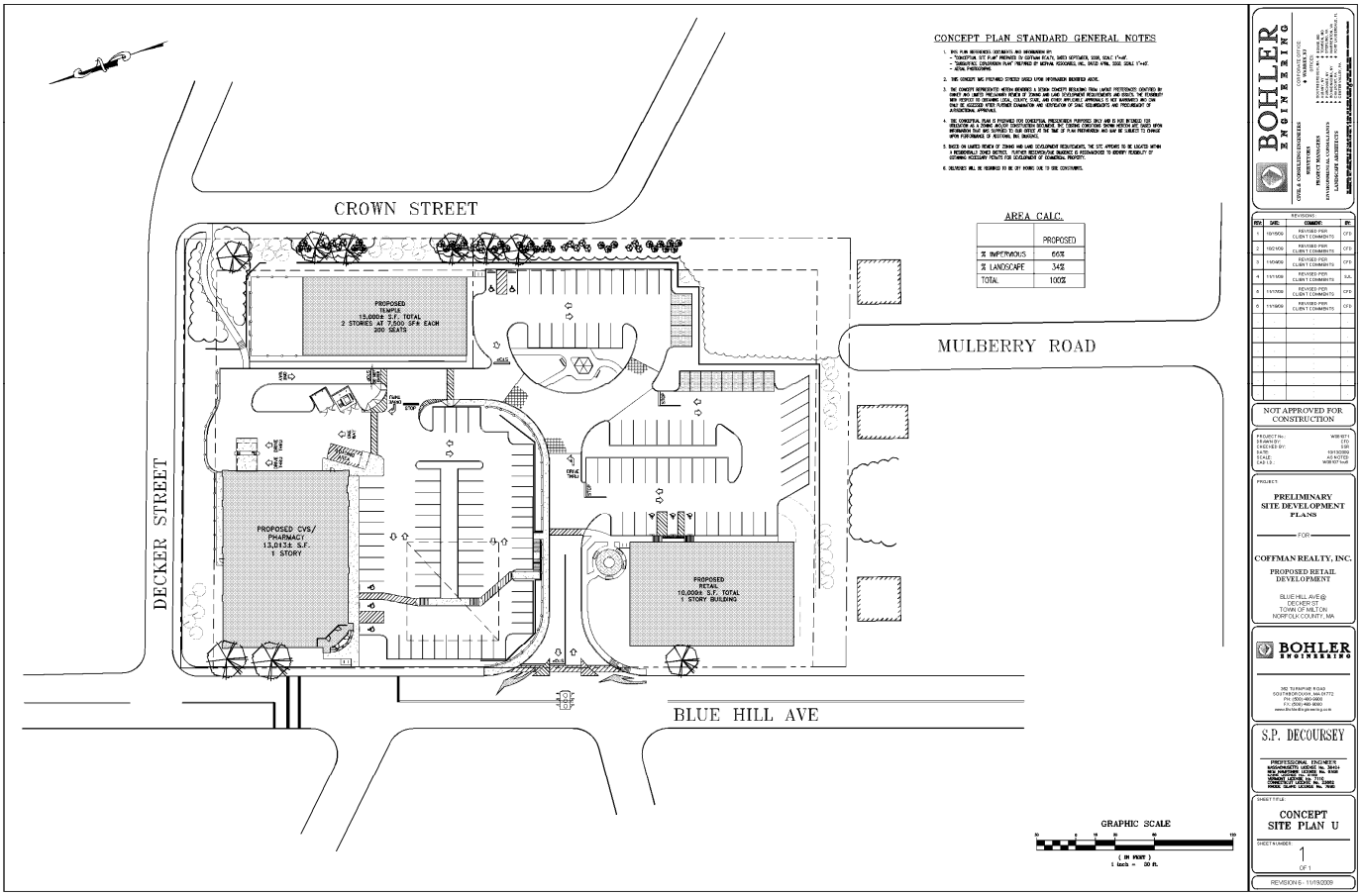
Overall, HSH finds that the TIA was performed according to traffic engineering standards and that the analyses and results adequately describe the traffic impacts of the project, subject to the comments and elaboration set forth below.

Overview of the Project

Located in Milton, this project involves construction of a commercial development on the existing Temple Shalom site. The proposed project will consist of 3 components:

1. Relocation and reconstruction of Temple Shalom in the eastern portion of the site;
2. Construction of a ±13,013 square-foot pharmacy with a drive-through in the northwest corner of the project site; and
3. Construction of a ±10,000 square-foot neighborhood grocery store in the southwest corner of the project site.

The conceptual site plan is shown below.



Access and egress for the project site will occur via the proposed site driveway, which will intersect Blue Hill Avenue opposite Concord Avenue. No other points of access will be provided.

Study Area

The study area includes the following 10 intersections:

- Blue Hill Avenue (Route 138) at Tucker Street and Churchill Street;
- Blue Hill Avenue (Route 138) at Decker Street;
- Blue Hill Avenue (Route 138) at Aberdeen Road;
- Blue Hill Avenue (Route 138) at Concord Avenue and the Temple Shalom driveways;
- Blue Hill Avenue (Route 138) at Blue Hill Terrace Street;
- Blue Hill Avenue (Route 138) at Hudson Street and Amor Road;
- Decker Street at Crown Street;
- Crown Street at the Temple Shalom driveways;
- Blue Hills Parkway at Churchill Street and Kahler Avenue; and
- Blue Hills Parkway at Blue Hill Terrace Street.

Finding:

A study area boundary generally extends to the point where the trip dispersion from a project has become so low that it imposes no significant impact on general traffic. This is generally true for the study area for the project. Intersections at the periphery of the study area receive, on average, less than 10% additional traffic for the weekend peak and less than 5% additional traffic on the weekday peak.

HSH finds that the selection of study area intersections was appropriate and includes the intersections within the adjacent transportation network that will be affected by the project.

Traffic Data Collection

The TIA included traffic data collected from automatic traffic recorders (ATR) and from manual turning movement counts (TMC). The data from the ATRs were collected Friday, September 11; Saturday, September 12; and Saturday, September 19, 2009. The TMCs were collected at study area intersections on Thursday, September 10; Friday, September 11; Saturday, September 12; Saturday, September 19; Thursday, October 1; and Saturday, October 3, 2009. The proponent determined that the weekday evening peak hour occurs between 4:45 and 5:45 p.m., and the Saturday mid-day peak hour between 1:00 and 2:00 p.m. VAI reviewed historical traffic count data at the nearest Massachusetts Department of Transportation (MassDOT) permanent counting station to evaluate the potential for seasonal fluctuation of traffic volumes. Review of these data revealed that traffic volumes in September and October are approximately 5.7% and 5.6% above average, respectively. In order to maintain a conservative analysis, traffic volumes within the study area were not adjusted.

Finding:

HSH finds that the data collection was performed in a satisfactory manner and that the selection of the peak hour and use of the seasonal adjustment are acceptable.

Safety

Crash Rate Analysis

The TIA includes crash rate calculations for study area intersections based on MassDOT crash data from 2005 to 2007. The results indicate that 2 of the intersections have crash rates above the MassDOT district 4 average of 0.58 crashes per million entering vehicles (MEV) for unsignalized intersections:

- The intersection of Decker Street/Crown Street has a crash rate of 4.70 crashes per MEV and is adjacent to the northeast corner of the site.
- The intersection of Blue Hills Parkway/Blue Hill Terrace Street has a crash rate of 0.83 crashes per MEV and represents the southeastern corner of the study area.

The TIA indicates that the lack of existing signage and pavement markings may contribute to the high crash rates at these locations.

Finding:

The proponent should more fully examine the potential causes of the high crash rate at the Decker Street/Crown Street and Blue Hills Parkway/Blue Hill Terrace Street intersections to determine if additional traffic from the project could exacerbate the crash rate.

Sight Distance Analysis

Adequate sight distance allows vehicles to safely exit driveways and allows vehicles already on the road to safely adjust their speed to vehicles entering the roadway or to stop for objects in the roadway. The TIA includes a sight distance analysis at the intersection of Blue Hill Avenue and the proposed site driveway. There are 2 design criteria for sight distance:

- Stopping Sight Distance (SSD), the more critical design value to meet, is composed of reaction time plus braking time and the distance a vehicle travels in both those times. SSD allows vehicles to stop for objects in the roadway.
- Intersection Sight Distance (ISD) allows drivers to perceive conflicts and adjust their speed accordingly. It also allows drivers of stopped vehicles an adequate view of oncoming traffic to decide whether to enter the roadway or not.

The measured sight distance exceeds both the required SSD and the recommended ISD, indicating that sufficient sight distance exists at this proposed intersection.

Findings:

The TIA demonstrates that adequate sight distance exists at the intersection of Blue Hill Avenue and the proposed site driveway.

The proponent should review the remaining study area intersections to identify other locations where sight distance may be a concern.

The proponent should confirm that sufficient sight distance to the signal exists on the Concord Avenue approach of the proposed intersection of Blue Hill Avenue/Concord Avenue/Site Driveway. If adequate sight distance does not exist, a W3-3 (Signal Ahead) sign should be considered for placement on Concord Avenue.

The proponent should examine the sight distance available to vehicles exiting the Amor Road approach of the intersection of Blue Hill Avenue/Hudson Street/Amor Road. The photo below approximately shows the available sight distance for vehicles on the Amor Road eastbound approach looking north.

Looking north on Blue Hill Avenue from the approximate location of Amor Road.

Roadway Improvements

Based on discussions with MassDOT and the Town of Milton, the proponent determined that no roadway improvements, besides routine maintenance, are planned for the study area that would affect traffic operations.

Background Growth and Specific Development

The proponent determined an appropriate background growth rate and compiled a list of area background projects based on discussions with MassDOT, the Town of Milton Planning Department, and, due to the project's proximity to The City of Boston, the Boston Redevelopment Authority (BRA). Historical traffic data compiled by MassDOT from permanent counting stations were used to establish a background growth rate of 1.0% per year for No-Build Conditions. In addition, the traffic generated from 3 planned projects in the area was taken into account for the No-Build network: Curry College Access Improvements, Olmsted Green Mixed-use Development, and Mass Bio Lab Phase II.

Finding:

HSH finds the assessment and application of background traffic growth and specific development acceptable.

Trip Generation

The proponent developed the expected project-related traffic demand using the Institute of Transportation Engineers' *Trip Generation,* 8th edition. ITE Land Use Code (LUC) 881, Pharmacy/Drugstore with Drive-Through, was used to estimate the project-generated trips of the proposed pharmacy; LUC 850, Supermarket, was used to estimate the project-generated trips of the proposed neighborhood grocery store. A 25% pass-by rate and a 10% internal trip rate were used for both land uses at this location.

Findings:

The proponent should provide detailed trip generation calculations in the appendix for LUC 850 (Supermarket).

The trip generation methodology for the Supermarket (LUC 850) appears incorrect for the weekday evening peak hour. The ITE* Trip Generation *handbook recommends the use of the regression equation when 20 or more data points are available; 40 data points are available for LUC 850 during the weekday evening peak hour. The TIA should include discussion regarding the selection of the average rate over the regression equation.

Site Traffic Distribution and Assignment

New project trips were distributed as follows:

To/from the north via Blue Hill Avenue (Route 138)	10%
To/from the east via Route 28	25%
To/from the east via Kahler Street	5%
To/from the east via Warren Avenue	10%
To/from the south via Blue Hills Parkway	10%
To/from the south via Blue Hill Avenue (Route 138)	25%
To/from the west via unspecified neighborhood roadways	5%
To/from the east via unspecified neighborhood roadways	10%

The trip distribution was based on existing traffic volumes and the roadway network.

Finding:

The proponent should provide more detail regarding how the trip distribution percentages were determined.

Traffic Operations Analysis

The capacity analysis follows standard methodology in the presentation of Level of Service (LOS) for Existing, No-Build, and Build Conditions. VAI used the Synchro software package to perform the analysis. This program is based on the *Highway Capacity Manual* and is commonly used and accepted in the field of traffic engineering.

Findings:

The TIA includes a summary of intersection capacity and queue analysis in Tables 7 and 11. The results reported in these tables differ from the results reported in the analysis. The proponent should reconcile these discrepancies.

In the analysis for the Build Mitigated Conditions of the Saturday peak hour, the Blue Hill Avenue northbound through volume at the intersection of Blue Hill Avenue and Decker Street appears to be coded incorrectly. The analysis was performed using a volume of 294 while the build traffic volume figure indicates a volume of 394. The proponent should recode this volume and reanalyze this intersection.

The exclusive pedestrian phases appear to be coded incorrectly in all analyses. The pedestrian phase setting is set to "no," which does not allow the exclusive pedestrian phase to be called. The proponent should recode the exclusive pedestrian phases in each Synchro model and reanalyze the affected intersections.

The Turn on Red condition appears to be coded incorrectly at the intersection of Blue Hill Avenue/Blue Hill Terrace/Cheever Street. This intersection is modeled with right turns on red permitted for each approach. However, existing signage at this location indicates that right turns on red are not permitted for either the Cheever Street eastbound or the Blue Hill Terrace westbound approach. The proponent should correct the Synchro models and reanalyze this intersection.

Site Plan Review

Parking Demand

Based on the Town of Milton's zoning requirements, this project requires 152 parking spaces. The proponent used the methodology outlined in the Urban Land Institute's *Shared Parking,* 2nd edition, to estimate the parking demands of the proposed mixed-use redevelopment. The base parking demand of each land use was modified using 4 adjustment factors: monthly adjustment factor, time-of-day adjustment factor, modal split and vehicle occupancy adjustment factor, and noncaptive adjustment factor.

A 90% automobile/10% pedestrian-bicycle-public transportation mode split was used for the retail components; a 100% automobile mode split was used for the Temple and preschool components. A 90% non-captive factor was applied to the retail components of the site. The proponent determined that the peak parking demand for the proposed project is 121 spaces and occurs at noon on a peak December Saturday. The TIA indicates that 141 spaces will be required, and the site plan indicates that 144 spaces will be

provided, including 8 handicapped-accessible spaces, 105 perpendicular spaces 19 feet in depth, 31 perpendicular spaces 16 feet in depth, and 8 angle parking spaces 21 feet in depth. A comparison of base parking demand by zoning and adjusted parking demand using shared parking methodology by land use is found in **Table 1.**

Table 1. Parking Demand Comparison

Land Use	Base Parking Demand (spaces required by zoning)	Adjusted Parking Demand (spaces required during peak hour of demand)
Place of Worship	50	50
Preschool	10	0
Retail	102	71
Total	**152**	**121**

Findings:

The TIA indicates that a modal adjustment factor of 90% was used in the shared parking analysis for the retail components, while the detailed shared parking analysis contained in the appendix uses a modal adjustment factor of 95%. The proponent should reconcile this difference.

The TIA indicates that 141 parking spaces will be provided, while 144 parking spaces are shown on the site plan. The proponent should reconcile this difference.

Due to the long headway of bus service within the project area, the proponent should evaluate the feasibility of the project without the 10% non-auto mode split.

The proponent should indicate graphically on the site plan how the peak parking demand for the overall site will be accommodated.

Given the small number of parking spaces adjacent to the temple, the proponent should indicate graphically on the site plan how the peak parking demand will be accommodated.

The TIA should provide information regarding the observance of religious holidays at the temple, which may result in increased parking demand and may coincide with the Saturday peak parking demand period.

Of the perpendicular parking spaces, 31 feature a depth of 16 feet. Review of the Town of Milton's Zoning Bylaws indicates that these spaces are likely intended for use by compact cars only. The site plan should indicate which parking spaces are designated for compact cars only. The compact car spaces should be appropriately designated.

The site plan should include all typical dimensions for parking stalls and circulation aisles.

Site Circulation

All land uses within the proposed project site will be accessed via a single site driveway and internal circulation roadways. The site driveway features curve radii of 50 feet at the intersection with Blue Hill Avenue.

Findings:

The proponent should indicate if a handicapped-accessible route exists between the grocery store and the pharmacy, and vice versa.

Review of the MassDOT design standards indicates that the typical curve radius for site driveways is 30 feet. The proponent should demonstrate the need for a 50-foot curve radius at the entrance of the site. Larger radius curves increase crosswalk distances and allow vehicles to enter and exit at high speeds.

It is unclear if the preschool component of the Temple will require pick-up/drop-off operations. The proponent should indicate where the pick-up/drop-off operations will occur.

The proposed circulation plan is unclear at the intersection of 3 internal circulation roadways in the eastern portion of the site. The proponent should clarify the proposed circulation plan at this location.

Service and Loading

The TIA does not describe the service and loading operations of the proposed pharmacy, grocery store, or Temple. The site plan indicates that a loading zone will be located adjacent to the southeast corner of the pharmacy, and 2 dumpsters will be located between the pharmacy and the proposed Temple.

Findings:

The TIA should describe the proposed service and loading operations, including expected delivery schedule and delivery vehicle size.

The proponent should provide AutoTurn analysis that demonstrates site accessibility for the expected delivery vehicles, emergency vehicles, and drive-through operations.

The TIA should identify whether snow removal and storage will impact loading and service operations, parking capacity, or internal circulation.

The site plan does not convey the level of detail required to confirm that the site is likely to operate adequately. As the design progresses further detail on lighting, stormwater management, landscaping, and construction materials and methods, including pavement design should be provided to the Town. It is important that any approvals granted stipulate a requirement of approval of an engineered set of construction plans and specifications, stamped by a registered Professional Engineer.

Pavement Markings and Signage

Crosswalks and traffic flow arrows are proposed within the site's internal circulation roadway and parking lots.

Findings:

The proposed crosswalks and traffic flow arrows should be installed using white thermoplastic.

The proposed intersection of 3 internal circulation roadways in the eastern portion of the site should feature additional pavement markings and/or signage to better communicate the intended circulation pattern to drivers.

The parking lot adjacent to the Temple features a 1-way exit on the north side of the lot. This exit should feature additional pavement marking and signage that make it clear to drivers on the internal circulation roadway that the exit is one-way.

A W11-2a (pedestrian figure) sign and a 16-7p (arrow) sign should be installed at the crosswalk across the Site Driveway at Blue Hill Avenue according to the* Manual on Uniform Traffic Control Devices *(MUTCD).

The proponent should coordinate with MassDOT on the proposed improvements to Blue Hill Avenue.

Construction-period Issues

Finding:

A Construction Management Plan (CMP) should be provided that describes the overall schedule, truck traffic to and from the site, traffic impacts, and other information important to the community.

Mitigation

Based on the TIA, the project will generate 162 weekday evening peak-hour trips and 140 Saturday mid-day peak-hour trips. To mitigate the impact of the expected increase in traffic volume, the TIA specifies a number of transportation improvements to mitigate the project's impact on the adjacent transportation network:

- At the intersection of the proposed ***Site Driveway and Blue Hill Avenue:***
  - Pedestrian and bicycle accommodations should be included on Blue Hill Avenue between Decker Street and Blue Hill Terrace by way of crosswalks, pedestrian pushbuttons, and bicycle detection.
  - The existing signalized pedestrian crossing of Blue Hill Avenue between Aberdeen Road and Decker Street should be removed.
  - The proposed traffic signal located at the proposed site driveway should be interconnected and coordinated with the existing traffic signal at the intersection of Blue Hill Avenue/Cheever Street/Blue Hill Terrace.
  - At the intersection with the proposed Site Driveway, the Blue Hill Avenue southbound approach should be restriped to provide a left-turn lane and a through lane.
  - The proposed Site Driveway should be a minimum of 24 feet in width, accommodating two 12-foot travel lanes.
  - Signs and landscaping adjacent to the proposed project driveway and within the project site should be designed and maintained so as not to restrict lines of sight.

- At the intersection of ***Blue Hill Avenue/Cheever Street/Blue Hill Terrace Street:***
  - Upgrade the existing traffic signal system, including pedestrian and bicycle equipment, and optimize the timing and phasing.
  - Interconnect and coordinate with proposed traffic signal at the proposed site driveway.
  - Install a double yellow centerline along Cheever Street.

- At the intersection of ***Blue Hill Avenue/Decker Street:***
  - Install a stop sign and stop line on the Decker Street approach.

- At the intersection of ***Blue Hill Avenue/Tucker Street/Churchill Street:***
  - Review and upgrade/replace existing signs and pavement markings.
  - Improve sight lines by restricting parking within 20 feet of the intersection.

- At the intersection of ***Amor Road/Hudson Street:***
  - Review and upgrade/replace existing signs and pavement markings.

- At the intersection of ***Decker Street/Crown Street:***
  - Review and upgrade/replace existing signs and pavement markings.
  - Install intersection ahead warning sign on Decker Street approaching Crown Street from the east.

- At the intersection of ***Blue Hills Parkway/Blue Hill Terrace Street:***
  - Review and upgrade/replace existing signs and pavement markings.

In addition to the specific mitigation measures described above, the proponent recommends the implementation of a comprehensive traffic calming plan within the Churchill Street/Decker Street/Blue Hill Terrace Street neighborhood area. The proposed traffic calming plan is designed to manage the traffic volumes, vehicle travel speeds, and cut-through traffic within the neighborhood.

Finding:

The proponent should indicate if the sidewalks along the site's Blue Hill Avenue frontage will be rebuilt as part of this project.

The proponent should indicate the limits of bicycle-related improvements, and coordinate any bicycle-related pavement markings or signage with existing pavement markings and signage.

The stop sign on the Hudson Street approach of the Blue Hill Avenue/Hudson Street/Amor Road intersection is partially hidden by an existing tree and utility pole. The stop sign should be relocated where it will be more visible to motorists.

The proponent should provide more detail on the traffic calming measures proposed as part of the mitigation for the project.

HSH has reviewed the TIA and the accompanying materials for the proposed redevelopment of the Temple Shalom. The TIA was prepared according to accepted traffic engineering standards and practices. At this time, additional information is required to complete the review of the proposed project.