Professional Services Corporation, PC

Memorandum

Date	January 9, 2007
To	Canton Planning Board
From	Thomas C. Houston
Project	Plymouth Rubber Reuse Project (Napleton)
Subject	Peer Review of Traffic Impact Study for Canton Development Properties Revere Street Site Redevelopment

On behalf of the Canton Planning Board, Professional Services Corporation, PC (PSC) conducted a peer review of the *Traffic Impact Study* for redevelopment of the former Plymouth Rubber site on Revere Street. The proponent is Canton Development Properties commonly referred to as Napleton.

In general, we find that the *Traffic Impact Study for Canton Development Properties Revere Street Site Redevelopment* was prepared in accord with standard engineering practice and properly identifies and evaluates the overall traffic impacts of the project. However; based upon our peer review, we request that information be provided clarifying and documenting certain aspects of the traffic analysis and we recommend that portions of the *Traffic Impact Study* be revised and supplemented as set forth herein.

BASIS

Our peer review is based upon evaluation of the following:

- *Traffic Impact Study for Canton Development Properties Revere Street Site Redevelopment* prepared by Vanasse Hangen Brustlin, Inc. dated November 2007.

LIMITATION

The *Traffic Impact Study* provides a valuable tool to assist the Town in understanding the traffic impacts of the proposed *Zoning By-Law* amendment for mixed use development of the former Plymouth Rubber

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site. However, the *Traffic Impact Study* addresses only one of many potential development options for the property.

Currently there are competing warrant articles submitted by the Planning Board and by citizens petition. Various scenarios could result from the Town Meeting process and all warrant articles could be amended at Town Meeting. Each warrant article in turn would permit a wide range of land uses including offices and research/development facilities. The wide range of development options that are enabled by the proposed *Zoning By-Law* amendments would result in a correspondingly wide range of potential traffic impacts. Under each of the proposed amendments, the mix of residential and non-residential uses could vary measurably and the actual future development could include primarily non residential development alternatives each with its own trip generation characteristics, directional distribution, and trip distribution/traffic assignment characteristics. Although a valuable decision making tool, the *Traffic Impact Study* addresses the traffic impacts of only one potential development option.

DEVELOPMENT ALTERNATIVE ANALYSED

The *Traffic Impact Study* evaluates the traffic impacts of redeveloping the Plymouth Rubber property as a primarily residential mixed use development containing 650 residential units and 20,000 sq. ft. of retail space. The trips generated by permitted accessory uses such as the farmers market are not addressed.

The current Planning Board draft zoning proposal requires the proponent to "choose" between the proposed mixed use overlay zoning and the underlying industrial zoning. Consistently, mixed industrial use is not addressed in the *Traffic Impact Study*.

TRAFFIC STUDY AREA

The Traffic Study Area includes the Washington and Neponset Streets intersection, the Washington and Church Streets intersection, the Washington and Wall/Mechanic Streets intersection, the Washington and Bolivar Streets intersection, the Washington and Revere Streets intersection, and the Washington and Sherman Streets intersection. The Traffic Study Area also includes the Neponset Street and Cape Cod Lane/Plymouth Street intersection, the Neponset and Walpole Streets intersection, the Chapman and Fuller /Jackson Streets intersection, and the Revere and Sherman Streets intersection.

We consider the Traffic Study Area to be appropriate for identification and evaluation of traffic impacts at a programmatic level. However, if the proposed zoning amendment is adopted and the project proceeds with implementation, we recommend in future more detailed studies that the Traffic Study Area be extended further north on Washington Street as part of more detailed traffic analyses to be provided in conjunction with any required Special Permit process. The Washington Street and Chapman Street intersection and the Washington Street and Dedham Street intersection will be directly impacted by projected generated trips and these intersections are already known to experience capacity constraints.

TRAFFIC VOLUMES

Existing traffic volumes were developed based upon manual turning movement counts taken in October 2006 and Automatic Traffic Recorder counts taken in 2006 and 2007. We consider the counting program to be adequate to establish existing traffic volumes.

The traffic counts were taken in October and available MassHighway traffic volume data indicates that the month of October experiences traffic volumes higher than the yearly average. Accordingly, no seasonal adjustment was applied with is conservative and appropriate.

Existing traffic volumes were used to develop the Build Plus Five Year traffic volumes using a growth factor and including traffic volumes form pipeline projects.

An assumed growth factor of 0.5 percent per year was used in the analysis. The assumed growth factor is reasonably representative although it is slightly lower than available count data representative of conditions in Canton. Examination of MassHighway traffic count data for Station for station 6097 on Route I-93 (formerly Route 128) between Routes I-95 and 138 indicates a decline in average daily traffic in 2003 and 2005 with a rebound to more normal increases in 2006.[1] The average increase in AADT at Station 6097 over this four year period averaged 0.7 percent. Similarly, examination of continuous count station data for District 4 indicates an average increase from 2005 to 2006 of 0.8 percent for the District as a whole and 0.7 percent for urban locations. Based upon the above, a 0.5 percent per year growth factor is considered acceptable.

Trips from identified pipeline projects were calibrated including trips to be generated by the Village on the River, Reebok Phase II, and Blue Hill Commons. Trips from the latter two projects primarily affect Washington Street.

Network volumes were not balanced which is acceptable given typical intersection separation.

TRIP GENERATION

The *Traffic Impact Study* forecasts trip generation for 650 residential units and 20,000 sq. ft. of retail space which is consistent with the maximum residential density being considered for the site under current alternative zoning proposals.

The *Traffic Impact Study* forecasts trip generation for the 20,000 sq. ft of retail space using the Institute of Transportation Engineers (ITE) trip generation data for Land Use Code (LUC) 820 Shopping Center. Although the site will not accommodate stores typically found in shopping centers and may be more oriented to on-site customers than a traditional shopping center, we concur that use of LUC 820 is

[1] AADT For station 6097 is 163,600 (2003), 151,100 (2004), 152,200 (2005), and 167,300 (2006).

appropriate due to the extensive database available for this land use and the data limitations for other land use codes such as LUC 814 Specialty Retail Center.

The *Traffic Impact Study* forecasts trip generation for the 650 residential units using LUC 230 Residential Condominium/Townhouse. However; the proponent has articulated the necessity of including substantial numbers of rental apartments in the housing mix. Regardless of the form of ownership, the proposed dwelling units are not likely to be comparable to typical suburban townhouse units due to floor area limitations proposed for the dwelling units. Review of ITE data for LUC 220 Apartment indicates that apartment units use generates more trips per dwelling unit than townhouse units (LUC 230 Residential Condominium/Townhouse.) Based upon the above, we recommend that the trip generation forecast be revised to utilize ITE LUC 220 Apartment in lieu of LUC 230 Residential Condominium/Townhouse in order to provide a more accurate and conservative forecast of future trip generation for the proposed apartments. Alternatively, the proponent is invited to submit supplemental information that justifies use of LUC 230 Residential Condominium/Townhouse.

Plymouth Rubber Reuse Project
Comparative Trip Generation for 650 Dwelling Units
Residential Condominium/Townhouse [ITE LUC 230]
Versus Apartment [ITE LUC 220]

	Residential Condominium/ Townhouse	Apartment	Difference
Weekday 24 Hour			
Enter	1576	2029	28.7%
Exit	1576	2029	28.7%
Total	3152	4058	28.7%
Weekday AM Peak Hour (1 Hour 7:00-9:00 AM)			
Enter	39	64	64.1%
Exit	192	258	34.4%
Total	231	322	39.4%
Weekday PM Peak Hour (1 Hour 4:00-6:00 PM)			
Enter	187	244	30.5%
Exit	92	131	42.4%

Total	279	375	34.4%
Saturday 24 Hour			
Enter	1391	2424	74.3%
Exit	1391	2424	74.3%
	2782	4848	74.3%
Saturday Peak Hour			
Enter	125	143	14.4%
Exit	106	143	34.9%
Total	231	286	23.8%

The *Traffic Impact Study* reduces the total trips on the roadways within the Traffic Study Area by several factors including:

- Internal capture rate adjustment
- Transit credit adjustment
- Retail pass-by adjustment

The internal capture rate analysis provided in the *Traffic Impact Study* is computed using factors provided in *Trip Generation Handbook, Second Edition, An ITE Recommended Practice*, June 2004. However, the data used as the basis for the capture rate is limited to a single data source for projects in the state of Florida. We recommend that additional data sources be provided to establish an internal capture rate applicable to this site.

Further, the ITE *Trip Generation Handbook* states "These internal trips can be made either by walking or by vehicles using internal roadways without using external streets." In the absence of a site plan, it is unclear if the site will accommodate vehicular access to on-site retail facilities which will diminish the likelihood that retail trips will be confined to the site. Additionally, a portion of the residential units will be located on the northerly side of Revere Street making it less likely the residents would walk to retail stores. Any vehicle based trips from the north side of Revere Street would involve use of the public roads. In light of these limitations, consideration should be given to reducing the internal capture rate used in the analysis.

The trips generated by the project are reduced by 20 percent based upon anticipated commuter rail use during peak hours. We concur that mode split will be a significant factor in reducing trips added to roadways within the Traffic Study Area; however, there is reason to believe that the actual reduction will be less than 20 percent utilized in the analysis. US Census data indicates that in the Town of Canton 13.3

percent of workers take public transportation or walk to work.[2] One could reasonably argue that transit usage should be higher for the project site given the proximity of commuter rail stations. However, published data for Census Tract 4151.02 which includes the Plymouth Rubber site indicates that 16.1 percent of workers take public transportation or walk to work. Based upon the above, it is recommended that the transit credit be set at 16 percent to reflect existing commuter rail use in the downtown.[3] Alternatively, the proponent is invited to submit additional information justifying use of the 20 percent transit credit.

Retail trips are reduced by both an internal capture rate adjustment and by a pass-by trip adjustment. The 25 percent reduction for pass-by trips is consistent with EOEA/EOT Guidelines and practice in Massachusetts; however, the 25 percent pass-by reduction is not consistent with the low daily traffic volume on Revere Street.

Revere Street has an existing daily traffic volume of only 2,430. The retail trip generation summary utilizes a pass-by trip credit of 540. For this adjustment to be valid, more than 1 out of 5 vehicles passing the site on Revere Street would have to turn into the site and patronize an on-site retail store. Rather than categorizing these trips as pass-by trips, these trips are more properly categorized as diverted link trips. It is recommended that the *Traffic Impact Study* be revised to include a diverted link adjustment with diversions computed from major streets in the Traffic Study Area rather than from Revere Street.

TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

The *Traffic Impact Study* distributes trips using place of work data from the US Census and assigns trips based upon the characteristics of the area wide roadway network which provides an appropriate quantitative basis for trip distribution and traffic assignment.

INTERSECTION OPERATIONS

Two signalized intersections in the Traffic Study Area will operate at unacceptable levels-of-service for the 2012 Build Condition. The intersection of Neponset Street and Chapman Street will operate at

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[2] US Bureau of the Census, Census 2000, Table DP-3 Profile of Selected Economic Characteristics 2000. Commuting to work by workers 16 years and over, 12.3 percent of trips are made by public transportation and 1.0 percent are made by walking.

[3] US Bureau of the Census, Census 2000, Table DP-3 Profile of Selected Economic Characteristics 2000, Data Set: Census 2000 Summary File 3 (SF-3) Sample Date, Geographic Area: Census Tract 4151.02. Commuting to work by workers 16 years and over, 15.0 percent of trips are made by public transportation and 1.1 percent are made by walking

capacity during the morning peak hour. This intersection will be impacted by the proposed project with approximately 39 percent of project generated trips forecast to pass though this intersection. Control delay per vehicle will increase from 66.5 to 66.8 seconds.

The intersection of Washington Street and Church Street will be signalized under the Washington Street Revitalization project. Although traffic signal control will be provided, the intersection will operate at Level-of-Service F following completion of the improvements. The proposed project will increase traffic on this segment of Washington Street with approximately 11 percent of project generated trips forecast to pass though this intersection.

Three unsignalized intersections will operate at unacceptable levels-of-service for both the morning peak hour and the evening peak hour. The Neponset and Walpole Streets intersection will operate at level-of-service F; however, project generated trips will not measurably impact this intersection. The intersection of Washington Street and Wall/Mechanic Streets will also operate at level-of-service F; with approximately 14 percent of project generated traffic utilizing this intersection. The Chapman Street and Everett/Spaulding Streets intersection will operate at level-of-service F with approximately 48 percent of project generated trips forecast to pass through this intersection.

TRAFFIC MITIGATION

The *Traffic Impact Study* proposes both pedestrian and vehicular related improvements as mitigation for the traffic impacts caused by reuse of the Plymouth Rubber site. The proposed mitigation would be effective in mitigating some project impacts; however, given the magnitude of the project we recommend that consideration be given to providing additional mitigation as set forth herein. Should traffic volumes increase as a result of revisions recommended in this memorandum, mitigation requirements should be revised and refined as appropriate.

Pedestrian Related Mitigation

The *Traffic Impact Study* proposes to construct a pedestrian path through the site in order to provide project residents with direct access to the Canton Junction commuter rail. The *Traffic Impact Study* also proposes to provide crosswalks connecting the portion of the site on the north side of Revere Street with the remainder of the project site. These measures are appropriate and will help to mitigate the traffic impacts of the project by encouraging pedestrian trips.

In addition, we recommend that consideration be given to additional pedestrian related mitigation measures. The feasibility and details of these mitigating measures can be refined during follow-on detailed traffic studies to be provided during later stages of project approval. Recommended mitigating measures are as follows:

1. Allow full public access to all on-site walkways and to any on-site connection to Canton Junction station.
2. Install curbing and a sidewalk along the entire length of Revere Street. This would provide upgraded access to Canton Junction station for residents of both the project and the existing neighborhood. A sidewalk would also reinforce the link between the site and the existing downtown and enhance access options for retail stores in the downtown and on-site. A field reconnaissance of the Traffic Study Area indicates that a sidewalk runs along segments of Revere Street but is intermittent and generally lacks proper curbing.
3. Provide points of connection between the new sidewalk along Revere Street with the proposed on-site pedestrian access way to Canton Junction station.
4. Replace the existing railroad bridge over Revere Street in order to provide a separate sidewalk for pedestrians and improved sight distance for drivers. Assessor's maps indicate that the right-of-way of Revere Street is approximately 50 feet wide in this location. The proponent is encouraged to seek the assistance of the Town in obtaining any temporary construction easements if required.
5. Provide a pedestrian crossing of the Neponset River linking the project to Neponset Street and providing additional circulation options for existing residents.

Vehicle Related Mitigation

The signalized Neponset and Chapman Streets intersection is impacted by approximately 39 percent of the trips generated by the proposed project. The signalized intersection will operate at capacity (level-of-service E) during the morning peak hour for the 2012 No-Build Case and the 2012 Build Case. During the morning peak hour for the 2012 Build Case, the westbound queue for through traffic headed towards I-95 on Neponset Street is approximately 760 feet and the eastbound queue on Neponset Street for left turning vehicles is approximately 680 feet. The *Traffic Impact Study* recommends that the Town modify the westbound approaches of the Jackson and Neponset Street intersection and the westbound approach of the Chapman and Neponset Street intersection to provide a "through and through-right" lane configuration in accordance with original design plans. The *Traffic Impact Study* states that the eastbound Neponset Street approach is marked as a single lane but notes use of the shoulder as a by-pass. VHB proposes to provide technical assistance to the Canton DPW to upgrade the coordinated signal timing. These proposed measures are appropriate and will help to mitigate traffic impacts caused by the project.

The unsignalized Chapman Street and Everett/Spaulding Street intersection will be impacted by approximately 48 percent of the trips generated by the proposed project. The unsignalized intersection will operate at level-of-service F during morning peak hour conditions and during evening peak hour conditions for the 2012 No-Build Case and the 2012 Build Case.

We recommend that consideration be given to additional vehicular related mitigation measures as follows:

1. Provide further upgrades for the Neponset and Chapman Streets intersection including restriping, minor approach widening and similar measures as required to ensure that the Chapman and Neponset Street intersection and the coordinated intersection of Neponset and Jackson Streets operate at a minimum level-of-service D during peak hour conditions. As part of follow-on detailed traffic analyses to be required under any Special Permit process for this project, a Functional Design Report should be prepared and if feasible the proponent should commit to design and construction of these intersection improvements.
2. Provide traffic signal control and related geometric improvements at the Chapman Street and Everett/Spaulding Street intersection. As part of follow-on detailed traffic analyses to be required under any Special Permit process for this project, a warrants analysis and a Functional Design Report should be provided for this location. If feasible, the proponent should commit to design and construction of these intersection improvements.
3. Provide an actuated pedestrian signal on Revere Street to facilitate access to the Canton Junction station from the portion of the project on the north side of Revere Street and for existing neighborhood residents.