October 10, 2017

Michael Kulesza, Chairman
Town of Norfolk – Zoning Board of Appeals
One Liberty Lane
Norfolk, MA 02056

Re: Norfolk, MA – Abbyville Commons and Preserve at Abbyville
Traffic Peer Review – Second Comment Letter

Dear Mr. Kulesza:

BETA Group, Inc. (BETA) has conducted a review of the April 2017 Traffic Impact and Access Study prepared for 48 apartment units with access on Lawrence Street in Norfolk, Massachusetts (Abbyville Commons). As part of a separate project, 148 single family homes would be constructed as part of a full build-out of the site (Preserve at Abbyville). Our original traffic peer review comments and recommendations were summarized in July 21, 2017 letters prepared for each project. In response to our traffic peer review letters, the Applicant's traffic engineer (Green International Affiliates, Inc.) developed separate August 28, 2017 letters for the Abbyville Commons and Preserve at Abbyville projects. Subsequent to the August 2017 letters and during the Town of Norfolk permitting process, discussions have been held with the Applicant's traffic engineer and supplemental information has been provided for review.

Since many of our initial comments and the associated responses were similar for both of the proposed developments, we have prepared this second comment letter to outline our outstanding concerns that are applicable to both projects.

FINDINGS, COMMENTS AND RECOMMENDATIONS

Original T2 (Commons and Preserve) Comment:

Based on ITE methodologies, standard traffic engineering practice is to evaluate the impacts of a development during the time periods that would result in the highest cumulative directional demands (i.e., the combination of adjacent street traffic and site trips).[1] This approach is consistent with MassDOT standard operating procedures in that the peak periods for analysis should be based on the site trip generation and existing conditions.[2] Since the traffic study states that MassDOT and ITE guidelines were used in preparing the assessment, it is recommended that the Applicant confirm that the Saturday Midday peak hour is not a critical time period for the proposed development based on the combination of site trips and adjacent street traffic volumes. This effort could be accomplished by either collecting traffic counts within the study area during the Saturday Midday peak period (11 AM-1 PM) or researching available traffic counts on a Saturday from the records of the Town of Norfolk, Metropolitan Area Planning Council (MAPC), and MassDOT.

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1 *Transportation Impact Analyses for Site Development: An ITE Proposed Recommended Practice*. Washington, DC: Institute of Transportation Engineers, 2010.

2 Massachusetts Department of Transportation. "Transportation Impact Assessment (TIA) Guidelines." *MassDOT Development Review – Planning Process*. Commonwealth of Massachusetts, 13 Mar. 2014.

Response:

Weekday peak hour analysis is considered sufficient for residential projects, per Section II.D of the March 13, 2014, Transportation Impact Assessment Guidelines ("while most office/ industrial/residential studies include the weekday a.m. and p.m. peak hours", as opposed to just "weekday evening…peak hour analysis"). This is also consistent with ITE guidelines, which we have attached a relevant excerpt from the ITE Recommended Practice that indicates the typical study periods for residential based developments. The predominant land use in the vicinity of the proposed development is residential. All of the roadways intersecting Lawrence Street and Park Street have only residential or some farm land uses. In conclusion, this is not a retail area or a unique (i.e. resort area) environment in which Saturday conditions could be substantively higher than the weekday periods. Consequently, it can be reasonably concluded that the study periods used for this assessment are adequate to understand its impacts and access requirements.

Supplemental Comment:

As supported by MassDOT and ITE, standard traffic engineering practice is to assess the traffic impacts of a development (regardless of land use type) during the time periods that would provide the highest traffic volumes based on a combination of site traffic and adjacent street traffic and at locations considered to be critical. Based on ITE Land Use Code 210 (Single-Family Detached Housing), residential developments generate more vehicular trips during the Saturday Midday peak hour as compared with the Weekday AM peak hour. In addition, the roadways in the vicinity of the site are residential in nature. Therefore, the Saturday Midday peak hour may be a critical time period in the area of the subject site.

We have recommended that the Applicant confirm that the Saturday Midday peak hour is not a critical time period for the proposed development by either collecting a spot traffic count within the study area during the Saturday Midday peak period (11 AM-1 PM) or researching available traffic counts on a Saturday from the records of the Town of Norfolk, MAPC, and MassDOT. If the Saturday Midday peak period is found to be a critical time period in the area (i.e., higher traffic volumes than the traffic counts originally collected during the Weekday AM and Weekday PM peak hour), then a full analysis should be conducted at all of the study area intersections during the Saturday Midday peak period.

The Applicant's traffic engineer has subsequently conducted traffic counts along Lawrence Street, Park Street, and Main Street on a Saturday. Based on those findings, the Saturday Midday peak-hour traffic volumes are lower than traffic volumes during the Weekday AM and Weekday PM peak hours. Therefore, the Applicant's traffic engineer has concluded that the Saturday Midday peak hour is not a critical time period for the proposed development. Once the Saturday Midday peak-hour traffic counts are provided, we will review and comment accordingly.

Original T12 (Commons) and T5 (Preserve) Comment:

Based on MassDOT guidelines, the proponent may need to commit to a mitigation program if the development is anticipated to add vehicle trips to an intersection that is already performing with poor operations (e.g., LOS D or below in rural areas and LOS E or below in urban areas). In addition, state guidelines suggest that a development might have a significant impact at an intersection that should be mitigated if the addition of site trips results in an increase of 10 seconds of delay (Weekday AM = +17.5 seconds, Weekday PM = +38.2 seconds). Since the traffic study states that MassDOT guidelines were used in preparing the assessment, it is recommended that the Applicant coordinate with the Norfolk Planner

and Director of Public Works to develop and implement mitigation measures to improve operations and offset the project's impacts at this intersection.

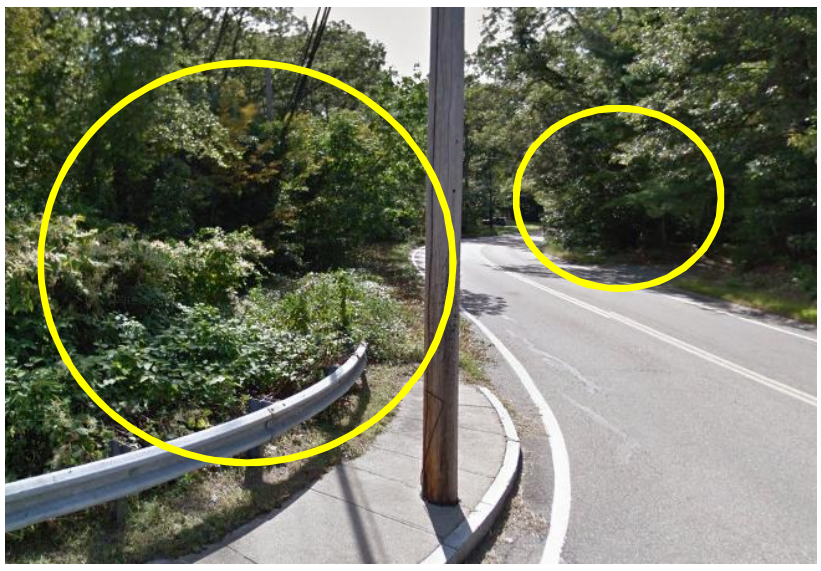
Response:

A proposed mitigation program has been outlined by the Applicant and is summarized later in the response as well as described in the April 2017 study. The intersection of Main Street at Park Street experiences long estimated delays during the peak hours under current conditions, however, there are no feasible alternatives to alleviate the delays due to the location and design of the MBTA bridge on Park Street. Safety related actions at this intersection, however, have been included in the proposed mitigation plan.

Supplemental Comment:

Sight Lines

The Applicant's traffic engineer has proposed to post an advance warning sign along the Main Street eastbound approach west of Park Street. We concur with this improvement to help provide Main Street eastbound vehicles an indication that there is an intersection downstream (ahead) and motorists should be prepared to react accordingly. Based on our field visits, we noted that sight lines to and from the west of Park Street are limited due to the horizontal curvature of Main Street, as well as vegetation located along the southwest corner of the intersection and along the north side of Lawrence Street (see picture below). As requested at the August 22, 2017 Zoning Board of Appeals meeting, we recommended that the Applicant evaluate sight lines at this intersection and research the right-of-way boundaries along Main Street to develop safety improvement measures to improve sight lines.



The Applicant's traffic engineer has subsequently researched the existing rights-of-way in these areas and has accordingly committed to assist the Norfolk Department of Public Works (DPW) in trimming/ clearing vegetation near the intersection. The Applicant's traffic engineer has proposed to conduct these efforts at the time the construction-related Traffic Management Plan (TMP) is being implemented. We have requested that the Applicant's traffic engineer provide an aerial image to depict the areas of vegetation trimming/clearing. Once the plan is provided, we will review and comment accordingly.

Traffic Signal Warrant Analysis

Due to the long delays along the Park Street approach to the Main Street intersection documented by the Applicant's traffic engineer, it was previously recommended that a traffic signal warrant analysis be conducted in accordance with Manual on Uniform Traffic Control Devices (MUTCD) guidelines. If a traffic signal was found to be warranted, then the Applicant should work with the Town of Norfolk in the design and installation a traffic signal at this location.

The Applicant's traffic engineer has subsequently conducted a traffic signal warrant analysis at the Park Street and Main Street intersection. According to the Applicant's traffic engineer, Warrant 1 (Eight Hour

Vehicular Volume) and Warrant 2 (Four-Hour Vehicular Warrant) are not satisfied. Typically, Warrant 1 should be met before traffic signal control is considered. Therefore, the Applicant's traffic engineer has determined that a traffic signal should not be installed at this location. We have requested that the Applicant's traffic engineer provide the traffic signal warrant analysis. Once the analysis is provided, we will review and comment accordingly.

Original T13 (Commons) Comment:

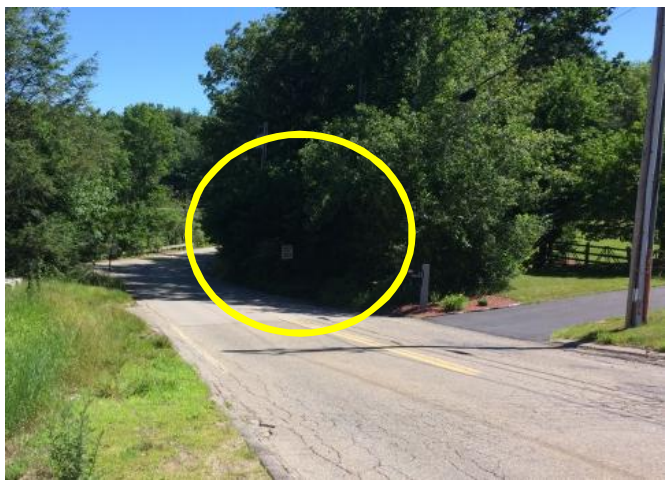
The traffic study identified that the horizontal curvature of Lawrence Street hinders sight lines. In addition, our field reconnaissance revealed that Lawrence Street adjacent to the site has a vertical curve that could contribute to limited sight lines at the proposed site driveways. It is recommended that Sight Line Profile Plans be prepared to demonstrate that sight lines would be available to meet minimum AASHTO [American Association of State Highway and Transportation Officials] requirements to provide safety for the future residents of the development as well as for the traveling public along this section of Lawrence Street.

Response:

Analysis of sight lines has been completed and we have worked closely with the site engineer in developing the site access drive intersections. As indicated in the traffic report, there will be clearing and re-grading in the vicinity of the proposed site drives to ensure adequate visibility. The sight line triangle necessary to meet minimum criteria was demonstrated in the traffic report. A more detailed sight line profile plan will be prepared and submitted separately.

Supplemental Comment:

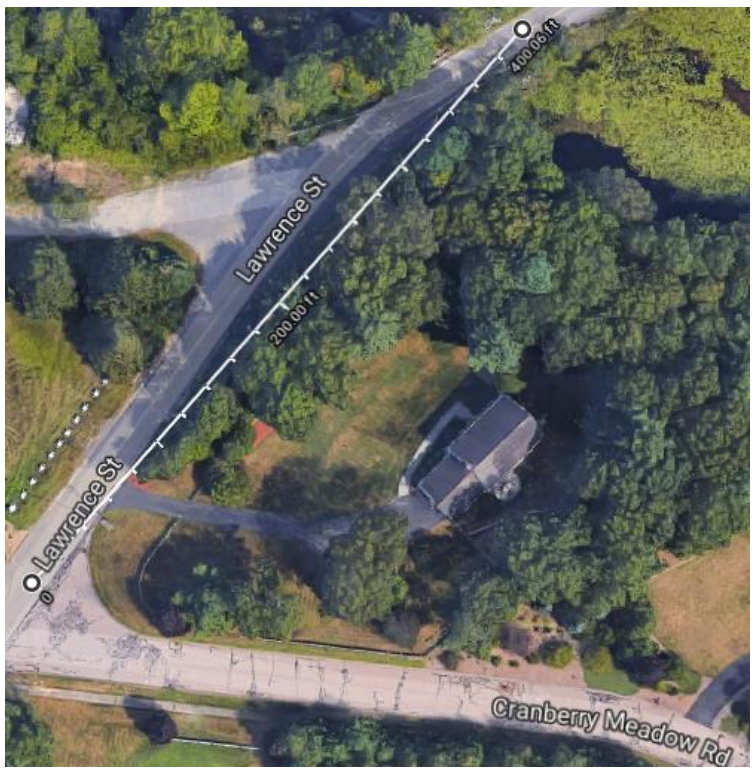
Based on a review of the Sight Line and Profile plans submitted by the Applicant's traffic engineer on September 21, 2017, the available sight lines are shown to exceed minimum AASHTO requirements within the existing rights of way or through portions of the Applicant's property. In order to achieve these sight distances, the areas of vegetation and trees that will be required to be cleared or trimmed have been identified on the plans.



Based on field reconnaissance, however, sight lines may be limited for Lawrence Street eastbound vehicles turning left into the proposed east site driveway (Elliot Boulevard) due to the horizontal alignment of Lawrence Street and the vegetation located along the south side of Lawrence Street. The concern is that vehicles turning left into the site from Lawrence Street eastbound may not be able to appropriately judge the gaps in the Lawrence Street westbound traffic stream and that Lawrence Street westbound approaching vehicles may not have adequate time to react to a downstream turning vehicle into the site. For reference, the picture to the right was taken from the approximate location of the proposed east site driveway with the area of concern circled. Therefore, we requested that the Applicant's traffic engineer research the existing right-of-way along the south side of Lawrence Street in this area for potential vegetation clearing/trimming to improve safety.

As documented in a subsequent October 6, 2017 letter, the Applicant's traffic engineer stated that the horizontal curvature in Lawrence Street located approximately 200 feet from Cranberry Meadow Road and the associated vegetation located along the southern side of Lawrence Street would not limit sight lines to and from the proposed east site driveway (Elliot Boulevard). Further, the Applicant's traffic engineer states that sight distance measurements of over 400 feet can be achieved (that exceeds the minimum requirement for the 85th percentile speeds) even if vegetation extends to the edge of the roadway. Therefore, the Applicant's traffic engineer has determined that no vegetation clearing along the south side of Lawrence is necessary, but the Applicant is willing to work with the Norfolk DPW and Conservation Commission staff in relation to any additional vegetative trimming within the Lawrence Street right-of-way east of the proposed east site driveway.

Based on information provided by the Applicant's traffic engineer and our research, however, it appears that sight lines would be significantly less than 400 feet for vehicles turning left from Lawrence Street eastbound into the proposed site driveway opposite Cranberry Meadow Road attempting to see Lawrence Street westbound approaching vehicles. The line drawn on the aerial image to the right is approximately 400 feet from Cranberry Meadow Road (i.e., the location of where Lawrence Street eastbound left turns would turn to the driveway).



In accordance with AASHTO guidelines (Case F – Left Turns from the Major Road), roadways that allow vehicles on a major roadway to turn left across opposing traffic (i.e., at intersections and driveways) should have sufficient sight lines to accommodate this left-turn movement. At three-legged intersections, these types of sight distances should be evaluated especially when located near a horizontal cure or crest vertical curve along the major roadway.

While we agree that the Applicant should coordinate with the Norfolk DPW and Conservation Commission staff regarding any vegetation clearing/trimming, we also recommend that the Applicant's traffic engineer prepare a sight line plan for Lawrence Street vehicles turning left into the proposed east site driveway in accordance with AASHTO guidelines.

Original T14 (Commons) Comment:

On the sight line plan for the west site driveway (Figure 10), site lines from the site driveway to the east are shown [to] cross onto an abutting property. If this abutting property is not part of the subject site, it is recommended that the Applicant pursue a sight line easement to prevent the use of the land identified.

Response:

Sight lines based on desirable distances and minimum required (per Federal Highway Administration "Green Book") distances are both shown in Figures 9 and 10. The sight line triangle crossing onto an abutting property in Figure 10 is a desirable sight distance line [Intersection Sight Distance]. The critical sight line

triangles [Stopping Sight Distance], for meeting minimum requirements, that are proposed to be kept clear all lie entirely within the right-of-way.

Supplemental Comment:

Sight distance is an important factor in providing safety for vehicles entering and exiting the major roadway stream as well as the traveling public continuing along the major roadway. The Stopping Sight Distance (SSD) is the minimum distance required for a vehicle traveling at a certain speed to safely stop before reaching a stationary object in its path (i.e., looking from an approaching vehicle toward the site driveway). The Intersection Sight Distance (ISD) is provided on minor street approaches to allow motorists of stopped vehicles a sufficient view of the major roadway to decide when to enter the mainline traffic stream (i.e., looking from the site driveway toward approaching vehicles).

The SSD has generally been found to be more important as it represents the minimum distance required for safe stopping, while the ISD is based on acceptable speed reductions to the approaching traffic stream. In accordance with AASHTO guidelines, however, the length of the ISD must be equal to or greater than the minimum required SSD in order to provide safe operations at an intersection. *"If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road."* Accordingly, the ISD is important for vehicular safety and should be at least equal to the distance required to allow a driver approaching the major road to safely stop (i.e., the SSD).

Within the April 2017 Traffic Impact and Access Study and the April 28, 2017 response to comments letter, the Applicant's traffic engineer has documented that motorists exiting the proposed west site driveway (Buckley Boulevard) would not be able to meet the ISD requirements along Lawrence Street to the east within the existing right of way. Therefore, vehicles exiting the proposed driveway would be required to view Lawrence Street westbound approaching vehicles by looking through an abutting property to the east. Our concern was that the land owner of this abutting property could construct a structure or plant vegetation on his/her property that would limit sight lines at the proposed west site driveway.

Based on a review of the Sight Line and Profile plans submitted by the Applicant's traffic engineer on September 21, 2017, the available sight lines at the west site driveway are shown to exceed minimum AASHTO requirements within the existing rights of way or through portions of the Applicant's property. In order to achieve these sight distances, the areas of vegetation that will need to be cleared/trimmed have been identified on the plans. These sight line measurements, however, are shown to be different than originally presented within the Traffic Impact and Access Study and the August 28, 2017 letter prepared by the Applicant's traffic engineer. As depicted on the newer plans, the ISD no longer crosses into the abutting property to the east. Therefore, we requested that an explanation be provided for the difference in the sight line plans.

As described in the October 6, 2017 letter prepared by the Applicant's traffic engineer, the difference between the sight distance plans provided in the April 2017 Traffic Impact and Access Study and in the September 2017 letter are attributed to the former plans developed as sketches and the latter based on field survey to more accurately depict field conditions. No further comment required.

Original T15 (Commons) and T6 (Preserve) Comment:

As recommended in the Traffic Impact and Access Study, any proposed landscaping and signage would be low and/or set back from the proposed site driveways to allow for adequate sight lines. To further improve sight lines, vegetation along the site frontage would be trimmed and selectively cleared, and land would be regraded as needed. After the proposed water main is installed, Lawrence Street would be repaved to provide a consistent roadway width. Advance intersection warning signs (W2-2) would be posted at the Lawrence Street and Park Street intersection.

In addition, the Applicant should develop and propose measures to alleviate safety issues and improve vehicular operations at the Park Street and Main Street intersection (see Comments T3 and T12); reduce vehicle speeds along the Lawrence Street and Park Street corridors (see Comments T4 and T5); and ensure available sight lines would be provided at the site driveways in accordance with AASHTO requirements (see Comments T13 and T14).

Response:

The Applicant has been working with the town on a comprehensive package of improvements that would enhance conditions along Lawrence Street and the study intersections. At this point, the proposed mitigation plan is summarized in Table A attached to this response. The actions are intended to enhance safety for both motorists and non-motorists and assist the town in addressing the bridge condition and improve pedestrian/ bicycle travel in the project area.

Supplemental Comment:

Below, we have summarized the proposed mitigation measures that were listed in the response letter prepared by the Applicant's traffic engineer:

- Site Driveways:
  - Clear vegetation within the sight triangles on property under the Applicant's control.
  - Install STOP signs and stripe pavement markings on the site driveways.
- Lawrence Street adjacent to the site:
  - Regrade Lawrence Street.
- Lawrence Street Bridge (east of the site):
  - Assist the Town of Norfolk with the design and MassWorks grant application.
- Lawrence Street between Park Street and Lawrence Street Bridge:
  - Assist the Town of Norfolk with the design of a 24-foot wide roadway section with a sidewalk.
- Lawrence Street Boardwalk:
  - As part of the MassWorks grant, assist the Town of Norfolk with the design and permitting services to construct a pedestrian connection along Lawrence Street between the Lawrence Bridge and the Cranberry Village/proposed site driveway intersection.

- Post advance warning signs:
  - Main Street and Park Street intersection: along the Main Street eastbound approach.
  - Park Street and Lawrence Street intersection: along the Park Street northbound and southbound approaches and along the Lawrence Street approach.

The Applicant's traffic engineer has states that these improvements have been discussed during the permitting process with the Norfolk Zoning Board of Appeals. In addition, the project team has been coordinating with the Norfolk Town Administrator, Police Chief, Fire Chief, Conservation Agent, and DPW Director regarding off-site improvements. Although we have not been involved with the comprehensive package of improvements being discussed between the Applicant and the Town of Norfolk, we can be available to assist the Town with the development and review of the improvements. As the project proceeds, we will review the improvements in further detail when more specific improvement details are submitted by the Applicant. No further comment required.

If we can be of any further assistance regarding this matter, please contact me.

Very truly yours,
BETA Group, Inc.

Jason R. Plourde, P.E., PTP
Project Manager

cc: Amy Brady – Norfolk Zoning Clerk

Job No: 4980