

Ref: 7817

January 4, 2018

Ms. Emily Wentworth
Senior Planner: Zoning/Special Projects
Town of Hingham
210 Central Street
Hingham, MA 02043

Re: Traffic Engineering Peer Review
River Stone Condominiums - Ward Street (Map 124, Lots 70-75 and 26)
Hingham, Massachusetts

Dear Emily:

Vanasse & Associates, Inc. (VAI) has completed a review of the materials submitted on behalf of River Stone, LLC (the "Applicant") in support of the proposed River Stone Condominiums to be located off Ward Street and Viking Lane on property shown on Assessors' Map 124, Lots 70-75 and 26, in Hingham, Massachusetts (hereafter referred to as the "Project"). The Project has been submitted to the Town for consideration of the issuance of a Comprehensive Permit under the provisions Massachusetts General Laws, Chapter 40B, Sections 20-23, as amended (Chapter 40B). Our review focused on the following specific areas as they relate to the Project: i) vehicle and pedestrian access and circulation; ii) Massachusetts Department of Transportation (MassDOT) design standards; iii) Town Zoning requirements as they relate to access, parking and circulation; and iv) accepted Traffic Engineering and Transportation Planning practices.

In support the Project, the Applicant submitted the following materials which are the subject of this review:

1. *Comprehensive Permit Application*, River Stone - Hingham, MA, Town of Hingham, Massachusetts; Submitted to the Town of Hingham Zoning Board of Appeals and filed with Town Clerk on March 29, 2016;
2. *Comprehensive Permit Plan*, River Stone (Assessors Map 124, Lots 70-75 & Lot 26), Viking Lane and Ward Street, Hingham, Massachusetts; McKenzie Engineering Group; October 7, 2015, last revised December 20, 2017; and
3. *Traffic Impact and Access Study*, River Stone Condominiums, Hingham, Massachusetts; Ron Müller & Associates; April 11, 2016.

In addition, VAI reviewed the site locus in order to validate the existing conditions context of the Project and the study area that was assessed in the April 11, 2016 *Traffic Impact and Access Study* (the "April 2016 TIAS"), and to observe factors that could impact the design and location of the access to the Project site and potential off-site improvements.

Based on our review of the April 2016 TIAS and the accompanying *Comprehensive Permit Plan*, we have determined that the materials were generally prepared in a professional manner and following the applicable standards of care; however, additional information and revisions to these documents will be required in order to adequately assess the impact of the revised development plan, particularly with regard to impacts on Autumn Circle and the safety of pedestrians within the neighborhood. Specifically, we have requested that the Applicant's engineer: i) expand the study area that was assessed in the April 2016 TIAS to include Autumn Circle and its intersection with High Street; ii) provide a description of pedestrian and bicycle accommodations and public transportation services in the area; iii) provide additional stopping and intersection sight distance measurements; iv) expand the elements of the transportation improvement program; and v) review and revise specific elements of the *Comprehensive Permit Plan* with regard to roadway width, pedestrian accommodations, internal circulation, and plan notations.

The following summarizes our review of the materials submitted in support of the Project. Our comments are indicated in *italicized text*, with those requiring responses or additional information **bolded**.

PROJECT DESCRIPTION

The Project will entail the construction of a 32-unit residential condominium community to be located off Ward Street and Viking Lane on property shown on Assessors' Map 124, Lots 70-75 and 26, in Hingham, Massachusetts. The Project site encompasses 6.67 ± acres of land that is bounded by residential properties to the north; Ward Street and residential properties to the south; residential properties and low-lying wetland areas to the east; and Ward Street and residential properties to the west. At present the Project site consists of areas of open and wooded space that are bisected by Viking Lane, an existing roadway that intersects the east side of Ward Street and will be reconstructed (widened) and extended to intersect the south leg of Autumn Circle in conjunction with the Project. The reconstructed Viking Lane will serve as the access to the Project site.

Parking is proposed by way of individual garages that will be associated with each unit and will accommodate two (2) vehicles per garage, with unit driveways providing parking for an additional two (2) vehicles. In addition, seven (7) parking spaces will be provided for visitors.

APRIL 2016 TRAFFIC IMPACT AND ACCESS STUDY

General

Comment: The April 2016 TIAS was prepared in a professional manner and following the applicable standards of care, and was stamped and signed by the Professional Engineer in responsible charge for the preparation of the document as required pursuant to Massachusetts General Law. ***The study will need to be revised to reflect the current development plan for the Project which now includes a connection to Autumn Circle.***

Existing Conditions

Study Area

The study area that was evaluated for the Project consisted of Ward Street and the following specific intersections:

- High Street at Ward Street and French Street
- Ward Street at Ward Street Extension
- Ward Street at Viking Lane
- Ward Street at Cushing Street

Comment: *This study area is generally sufficient to evaluate the potential impact of the Project on the transportation infrastructure based on the expected trip-distribution pattern for the Project, and encompasses the major intersections located proximate to the Project site where the Project is expected to result in an increase in peak-hour traffic volumes by: i) five (5) percent or more; or ii) by more than 100 vehicles per hour. **That being said, the addition of the connection between Viking Lane and Autumn Circle that is shown on the current version of the Comprehensive Permit Plan necessitates that the study area be expanded to include Autumn Circle and the intersection of High Street at Autumn Circle, with a particular emphasis on pedestrian accommodations and safety for the residents of Autumn Circle.***

Traffic Volumes and Data Collection

Traffic volume data was collected at the study area intersections by means of: i) manual turning movement counts (TMCs) and vehicle classification counts conducted on March 29, 30 and 31, 2016 (Tuesday, Wednesday and Thursday, respectively) and April 7, 2016 (Thursday) during the weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods; and ii) automatic traffic recorder (ATR) counts conducted on April 6th through 7th, 2016 (Wednesday through Thursday, respectively) on Ward Street in the vicinity of the Project site. The ATR counts included the collection of vehicle travel speed data. A review of seasonal adjustment data available from MassDOT indicated that traffic volume conditions during the months of March and April are representative of slightly below average conditions and, as such, the raw traffic count data was adjusted upward accordingly to average-month conditions.

Comment: *The data collection effort (traffic counts and vehicle travel speed measurements) and establishment of the seasonal adjustment (none required) were completed in accordance with standard Traffic Engineering and Transportation Planning practices, and we are in general agreement that the resulting data provides a reasonable basis from which to assess the potential impact of the Project on the transportation infrastructure.*

Additional traffic counts and field measurements are required for Autumn Circle and the intersection of High Street at Autumn Circle.

Pedestrian and Bicycle Facilities

A description of pedestrian and bicycle accommodations within the study area were not included as a part of the April 2016 TIAS.

Comment: *The Applicant's engineer should provide a description (narrative and/or graphic) of existing and planned future pedestrian and bicycle accommodations within the study area in order to ascertain the relationship of such accommodations to the Project site, particularly the accommodations that are available within the Autumn Circle neighborhood and how these accommodations will be impacted by the Project.*

Public Transportation

A description of public transportation services was not included as a part of the April 2016 TIAS.

Comment: *The Applicant's engineer should provide a description of public transportation services within the study area and that serve the Town of Hingham and adjacent communities that may be accessed by residents of the Project.*

Motor Vehicle Crash Summary

Motor vehicle crash information was obtained for the study area intersections and roadway segments from MassDOT for the 3-year period 2011 through 2013, inclusive. Based on a review of this information it was determined that, with the exception of the High Street/Ward Street/French Street intersection, the study area intersections averaged less than one (1) reported motor vehicle crash per year over the 3-year review period and were found to have a motor vehicle crash rate (average number of motor vehicle crashes reported per year per million vehicles traveling through an intersection or per million vehicle miles traveled along a roadway segment) that was below the MassDOT average motor vehicle crash rates for similar intersections.

The High Street/Ward Street/French Street intersection was reported to have experienced 16 crashes over the 3-year review period and was found to have a motor vehicle crash rate that was more than double the MassDOT average crash rate for an unsignalized intersection. The majority of the crashes that occurred at the intersection involved angle (turning) or crossing maneuvers that resulted in property damage only. The Applicant's engineer indicted that a contributing factor to the crashes could be the limited sight distance for vehicles on French Street looking left (east) and for vehicles on Ward Street looking left (west).

Comment: *The motor vehicle crash analysis was completed in accordance with MassDOT standards and following standard Traffic Engineering and Transportation Planning practices, and we are in agreement with the findings of the analysis; however, the following additional information should be provided by the Applicant's engineer:*

- 1. The crash analysis should be updated and expanded to include the most recent crash data that is available from MassDOT for the existing and expanded study area and should include a review of the statewide High Crash Location List;**

2. *Motor vehicle crash data should be obtained from the Town of Hingham Police Department for the most recent 3-year period available; and*
3. *A motor vehicle collision diagram should be prepared for the High Street/Ward Street/French Street intersection in order to ascertain motor vehicle crash patterns at the intersection.*

Future Conditions

No-Build Conditions

Traffic volumes within the study area were projected to 2023, which represents a 7-year planning horizon from the existing conditions base year (2016) that was presented in the April 2016 TIAS. The future condition traffic volume projections were developed by: i) applying a background traffic growth rate to the 2016 Existing traffic volumes; and ii) adding traffic associated with specific development projects by others that may increase traffic volumes within the study area beyond that accounted for by the background traffic growth rate.

The Applicant's engineer reviewed historic traffic growth data available from MassDOT for the Town of Hingham obtained in order to establish the background traffic growth rate. Based on a review of this data, it was determined that traffic volumes have remained relatively stable (little to no growth) over the past 10-years, with traffic volumes increasing by just over 1.6 percent over the past 5-years. In order to provide a conservative (high) analysis scenario, a 2.0 percent per year compounded annual background traffic growth rate was used.

The Applicant's engineer consulted with the Town of Hingham Community Planning Department to determine if there were any planned future development projects by others that would result in an increase in traffic volumes within the study area that would exceed the background traffic growth rate. Based on these discussions, no specific development projects by others were identified for inclusion in the future traffic volume projections.

Comment: *We are in general agreement with the methodology that was used to develop the future No-Build condition traffic volume projections for the Project, including the background traffic growth rate used in the base calculations (2.0 percent per year) and the inclusion of the identified specific development projects by others (none identified).*

The Applicant's engineer should consult with MassDOT and the Town of Hingham Engineering Department in order to determine if there are any planned roadway improvement projects within the study area that would impact traffic volumes, trip patterns or operating conditions.

Build Conditions

Future Build condition (with the Project) traffic volume projections were developed by the Applicant’s engineer using trip-generation statistics published by the Institute of Transportation Engineers (ITE)¹ for similar land uses as those proposed (residential condominiums). The following table summarizes the trip-generation calculations for the Project as presented in the April 2016 TIAS. We note that the number of residential units has been reduced slightly from the 36-units that were assessed in the April 2016 TIAS to 32-units based on the current *Comprehensive Permit Plan*.

**RIVER STONE CONDOMINIUMS
 TRIP-GENERATION SUMMARY**

Time Period/Direction	Vehicle Trips
	Proposed Residential Community (36 Units) ^a
<i>Average Weekday:</i>	210
<i>Weekday Morning Peak Hour:</i>	
Entering	4
<u>Exiting</u>	<u>19</u>
Total	23
<i>Weekday Evening Peak Hour:</i>	
Entering	17
<u>Exiting</u>	<u>9</u>
Total	26

^aBased on ITE LUC 230, *Residential Condominium/Townhouse*.

Traffic volumes associated with the Project were assigned onto the study area roadway network based on a review of 2010 U.S. Census Journey-to-Work data. Based on this approach, the following trip assignments were developed by the Applicant’s engineer for the Project:

¹*Trip Generation*, 9th Edition; Institute of Transportation Engineers; Washington, DC; 2012.



TRIP-DISTRIBUTION SUMMARY

Roadway	Direction To/From	Trip Assignment (Percent)
French Street	North	10
High Street	East	15
High Street	West	50
Cushing Street	South	20
Cushing Street	East	<u>5</u>
TOTAL		100

Comment: *We are in general agreement with the methodology that was used to develop the anticipated traffic characteristics of the Project and the trip distribution pattern. As noted, the Project has been slightly reduced in size from the development program that was assessed in the April 2016 TIAS.*

The Applicant’s engineer should review and revise the trip distribution pattern, trip assignment and Build condition traffic volume networks to reflect the extension of Viking Lane to intersect Autumn Circle.

Traffic Operations Analysis

In order to assess the potential impact of the Project on the transportation infrastructure, a detailed traffic operations analysis was performed for the study intersections under 2016 Existing, 2023 No-Build (without the Project) and 2023 Build (with the Project) conditions. In brief, traffic operations are described by six “levels of service” which are defined by letter grades from “A” through “F”, with a level-of-service (LOS) “A” representing the best operating conditions (average motorist delays of less than 10 seconds and little or no apparent vehicle queuing) and a LOS “F” representing constrained operating conditions (average motorist delays of 50 to 80 seconds or more and often with apparent vehicle queuing). A LOS of “E” is representative of an intersection or traffic movement that is operating at its design capacity, with a LOS of “D” typically representing the limit of acceptable traffic operations.

Based on this analysis, the Applicant’s engineer noted the following conditions at the study intersections:

- *High Street/Ward Street/French Street* – Under 2023 Build conditions, all movements from Ward Street during both the weekday morning and evening peak hours and all movements from French Street during the weekday evening peak-hour are predicted to remain operating over capacity (defined as LOS “F”) with vehicle queues on the Ward Street approach exceeding 600 feet. Project-related impacts were defined as an increase in average motorist delay of up to 50 seconds and in vehicle queuing of between 2 and 3 vehicles.
- *Ward Street/Ward Street Extension* – Under 2023 Build conditions, all movements are predicted to remain operating at LOS C or better during both the weekday morning and evening peak hours (no change over 2023 No-Build conditions). Project-related impacts were defined as an increase



in average motorist delay of less than 1.0 seconds with no material increase in vehicle queuing predicted to occur.

- *Cushing Street/Ward Street* – Under 2023 Build conditions, all movements from the Ward Street approach are predicted to remain operating at LOS C during the weekday morning peak-hour and at LOS E during the weekday evening peak-hour (no change over 2023 No-Build conditions). Project-related impacts were defined as an increase in average motorist delay of up to 1.2 seconds with no material increase in vehicle queuing predicted to occur.
- *Ward Street/Viking Lane* – All movements are predicted to operate at LOS B or better during the peak hours with minimal vehicle queuing (one (1) vehicle).

Comment: *The traffic operations analysis was completed using the appropriate methodologies and we are in general agreement with the reported results and the identified impact of the Project on operating conditions at the study area intersections.*

The Applicant's engineer should provide an assessment of Project-related impacts along Autumn Circle and at the Autumn Circle/High Street intersection. This assessment should include a discussion on how motorist delays at the High Street/Ward Street/French Street intersection may induce cut-through traffic through the Autumn Circle neighborhood.

Sight Distance

The Applicant's engineer provided sight distance measurements for the intersection of Viking Lane with Ward Street. Both stopping sight distance and intersection sight distance measurements were performed following American Association of State Highway and Transportation Officials (AASHTO)² standards and using: i) the regulated travel speed (30 mph)³; and ii) the measured 85th percentile vehicle travel speeds on Ward Street approaching the intersection.⁴ These measurements indicate that the available lines of sight at the Ward Street/Viking Lane intersection exceed the required minimum sight distance for the intersection to function in a safe manner. The Applicant's engineer recommended that proposed landscaping or signs in the vicinity of Viking Lane be kept low to the ground (less than 3-feet above street level) or outside of the intersection sight triangles so as not to impede sight lines.

Comment: *The Applicant's engineer should provide both the measured stopping sight distance and intersection sight distance for the Ward Street/Viking Lane intersection as it is not clear which measurements are presented in Table 4 of the April 2016 TIAS. In addition, sight distance measurements should also be provided for the High Street/Autumn Circle intersection and for the High Street/Ward Street/French Street intersection given that lines of sight at the intersection may be a contributing factor to the motor vehicle crashes that are occurring at the intersection.*

²A *Policy on Geometric Design of Highway and Streets*, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2011.

³The regulated or "prima facie" speed is defined in M.G.L. Chapter 90, Section 17, as the speed which would be deemed reasonable and proper to operate a motor vehicle.

⁴The measured 85th percentile vehicle travel speeds, or the speed at which 85 percent of the observed vehicles travelled at or below, was found to range from 32 to 34 mph.

Recommendations

The following recommendations were presented as a part of the April 2016 TIAS:

- The Town should consider the implementation of all-way stop control at the High Street/Ward Street/French Street intersection in order to improve both traffic operations and safety, to include the installation of warning signs in advance of the intersection and consideration of an overhead flashing beacon (flashing “red” indications for all approaches).
- Proposed landscaping or signs in the vicinity of the Viking Lane intersection with Ward Street should be kept low to the ground or set back sufficiently so as not to impede sight lines.
- A sidewalk should be provided along Viking Lane and extend to the existing sidewalk along Ward Street.
- A crosswalk should be striped across Viking Lane at its intersection with Ward Street and a STOP-sign and stop-line should be installed on the Viking Lane approach to Ward Street.

Comment: *We are in agreement with the infrastructure commitments that were outlined by the Applicant’s engineer; however, given the documented crash history at the High Street/Ward Street/French Street intersection, the Applicant should commit to the following measures:*

- 1. Facilitate (fund) the completion of a Road Safety Audit (RSA) to identify both short and long-term improvements to improve safety at the intersection;***
- 2. Pending completion of the RSA, design and construct the short-term improvements identified as a part of the RSA. Said improvements to be constructed prior to the issuance of any Certificate of Occupancy for the Project subject to receipt of all necessary rights, permits and approvals.***

In addition, the Applicant’s engineer should provide recommendations for traffic control, pedestrian accommodations and safety along Autumn Circle. These recommendations should include measures to reduce the potential for cut-through traffic between High Street and Ward Street, moderate travel speeds through the neighborhood and enhance pedestrian safety.

COMPREHENSIVE PERMIT PLAN

The following comments are offered with respect to our review of the *Comprehensive Permit Plan* prepared by McKenzie Engineering Group and dated October 7, 2015, last revised December 20, 2017 (hereafter referred to as the “Site Plan”).

1. *A truck turning analysis should be provided for the Town of Hingham Fire Department design vehicle and a single-unit (SU) truck (representative of a maintenance vehicle, trash/refuse truck or similar). The turning analysis should demonstrate that the subject vehicles can access and circulate within the Project site in an unimpeded manner, and that the turn-around area at the end of “Road C” complies with the requirements of NFPA® 1.*⁵
2. *Internal to the Project site, circulating roads and drive aisles should be a minimum of 24-feet in width for two-way travel and a minimum of 20-feet in width for one-way travel, or as required to accommodate truck access and fire truck turning maneuvers. The Site Plans currently reflect a 20-foot wide roadway with 1-foot wide Cape Cod berm along both sides, which does not comply with MassDOT standards for residential access to aggregations of residential units of 10 or more dwelling units.*⁶
3. *Where a sidewalk is proposed adjacent to the roadway, vertical curb should be provided or the sidewalk should be set back from the edge of the traveled-way by a minimum of 2-feet.*
4. *Vehicles exiting the Project site to Ward Street should be placed under STOP-sign control with a marked STOP-line provided. These accommodations should be shown on the Site Plans.*
5. *A sidewalk has been provided along one-side of Viking Lane, “Road B” and “Road C” extending to Autumn Circle. The sidewalk should also be extended to Ward Street where a marked crosswalk and Americans with Disabilities Act (ADA) compliant wheelchair ramps and detectable panels should be provided for crossing Viking Lane. In addition, a crossing of “Road B” should also be provided in conjunction with the sidewalk extension to Ward Street.*
6. *Where pedestrian crossings are proposed, marked crosswalks are shown. The Applicant’s engineer should confirm that the crossings will include ADA compliant wheelchair ramps and detectable panels.*
7. *Sight triangle areas should be shown on the Site Plans along with a note to indicate: “Signs, landscaping and other features located within sight triangle areas shall be designed, installed and maintained so as not to exceed 2.5-feet in height. Snow windrows located within sight triangle areas that exceed 3.5-feet in height or that would otherwise inhibit sight lines shall be promptly removed.”*

⁵National Fire Protection Association (NFPA)® 1, *Fire Code*, Seventh Edition; NFPA; Quincy, Massachusetts; 2015; as amended per 527 CMR.

⁶The 2006 *Massachusetts Highway Department Project Development & Design Guide* recommends that a two-lane driveway (24-feet in width) be provided for aggregations of residential use of around ten dwelling units or greater.

8. *A note should be added to the Site Plans stating: “All Signs and pavement markings to be installed within the Project site shall conform to the applicable specifications of the Manual on Uniform Traffic Control Devices (MUTCD).”⁷*
9. *Where provided, double-yellow centerline pavement markings should consist of two parallel yellow lines.*
10. *Driveways to individual units should be a minimum of 21-feet long measured between the garage door and the far edge of the sidewalk (edge closest to the residence) where a sidewalk is provided, and 23-feet measured between the garage door and the edge of the traveled-way in locations without a sidewalk.⁸*
11. *A school bus waiting area should be provided at an appropriate location defined in consultation with the Town of Hingham School Department.*

PARKING

Section V, *Special Regulations*, Subsection V-A, *Off-Street Parking Requirements*, of the Zoning By-Law of the Town of Hingham requires that two (2) parking spaces per unit be provided for a residential use. As proposed, the Project will provide 128 parking spaces by way of parking garages associated with each unit that will accommodate two (2) vehicles per garage, with parking for an additional two (2) vehicles per dwelling unit available in the driveways serving each unit, which exceeds the parking requirements of the Zoning By-Law for the proposed use (64 spaces required). In addition, seven (7) parking spaces will be provided for visitors by way of five (5) perpendicular parking spaces located along the east side of “Road C” and two (2) perpendicular parking spaces located along the east side of “Road B”.

SUMMARY

VAI has completed a review of the materials submitted on behalf of River Stone, LLC in support of the proposed River Stone Condominiums to be located off Ward Street and Viking Lane on property shown on Assessors’ Map 124, Lots 70-75 and 26, in Hingham, Massachusetts. Our review focused on the following areas as they relate to the Project: i) vehicle and pedestrian access and circulation; ii) MassDOT design standards; iii) Town Zoning requirements as they relate to access, parking and circulation; and iv) accepted Traffic Engineering and Transportation Planning practices.

Based on our review of the April 2016 TIAS and the accompanying *Comprehensive Permit Plan*, we have determined that the materials were generally prepared in a professional manner and following the applicable standards of care; however, additional information and revisions to these documents will be required in order to adequately assess the impact of the revised development plan, particularly with regard to impacts on Autumn Circle and the safety of pedestrians within the neighborhood. Specifically, we have requested that the Applicant’s engineer: i) expand the study area that was assessed in the April 2016 TIAS to include Autumn Circle and its intersection with High Street; ii) provide a description of

⁷Manual on Uniform Traffic Control Devices (MUTCD); Federal Highway Administration; Washington, DC; 2009.

⁸NCHRP Report 659, *Guide for the Geometric Design of Driveways*; Transportation Research Board of the National Academies; Washington, D.C.; 2010.

Ms. Emily Wentworth
January 4, 2018
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pedestrian and bicycle accommodations and public transportation services in the area; iii) provide additional stopping and intersection sight distance measurements; iv) expand the elements of the transportation improvement program; and v) review and revise specific elements of the *Comprehensive Permit Plan* with regard to roadway width, pedestrian accommodations, internal circulation, and plan notations. Written responses to our comments should be provided so that we may continue our review of the Project on behalf of the Town.

This concludes our review of the materials that have been submitted to date in support of the Project. If you should have any questions regarding our review, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.



Jeffrey S. Dirk, P.E., PTOE, FITE
Principal

Professional Engineer in CT, MA, ME, NH, RI and VA

JSD/jsd

cc: File