



Ref.: 21009

March 4, 2021

Mr. Frederick Casavant IV, Chairman
Pembroke Zoning Board of Appeals
100 Center Street
Pembroke, MA 02359

Reg.: River March Village - Traffic Review
Proposed 56-Townhouse Units (40B Development)
274 Water Street, Pembroke, Massachusetts

Dear Chairman Casavant and Members of the Board:

Ron Müller & Associates (RMA) has initiated an independent peer review of the traffic assessment and site plans prepared for the proposed residential development to be located at 274 Water Street in Pembroke, Massachusetts. The project proposes to construct 56 townhouse units providing 4 parking spaces per unit plus 34 visitor spaces (258 total parking spaces). Access to the site is proposed via two driveways on Water Street. While full access and egress is proposed at the northern site driveway, the traffic assessment and site plans show conflicting information regarding allowable movements at the southern site driveway.

The submitted traffic assessment and site plans were reviewed with respect to traffic impacts and site access and compared with state guidelines and standard traffic engineering practice. Based on a review of the submitted materials, we have some comments and recommendations that require further action by the applicant. Once these items are addressed, we will be able to finalize the traffic review of the project. The following lists the documents reviewed as part of the independent peer review:

- *Traffic Impact Assessment (including Appendix), Proposed Residential Development, Pembroke, MA; prepared by Vanasse & Associates, Inc.; dated March 2019.*
- *River Marsh Village, Comprehensive Permit Plans (Assessor's Map E-17, Lot 0 & E-17A Lot 274), Water Street, Pembroke, Massachusetts; prepared by McKenzie Engineering Group; dated September 22, 2016 and last revised January 27, 2021.*

The comments below follow the same outline as the submitted traffic assessment for ease of reading.

TRAFFIC ASSESSMENT REVIEW

Existing Conditions

1. The traffic assessment focused on the following intersections:

- Church Street (Route 139) at Water Street
- Schoosett Street (Route 139) at Water Street
- Church Street (Route 139) at Cross Street
- Church Street (Route 139) at North River Plaza Driveway and Lowe's driveway
- Water Street and the proposed northern site driveway (existing residential driveway)
- Water Street and the proposed southern site driveway

Based on the site location, expected use, and area roadway network, **the applicant should include the intersection of Water Street and Cross Street as it is located just north of the site driveways and provides a shorter route for site traffic destined to/from the east on Route 139 than traveling south on Water Street. In fact, the traffic study assumes that 40% of entering site traffic and 20% of exiting site traffic uses Cross Street.** Based on field observations, this intersection lacks traffic control and may have sight distance limitations, particularly between vehicles traveling south on Water Street turning onto Cross Street and vehicles traveling west on Cross Street turning south on Water Street towards the site with full vegetation and foliage.



2. The assessment provides a description of the area roadway network. Manual traffic counts were performed in February and March 2019 during the weekday AM and PM peak periods at the study area intersections, although the study says that all counts were performed in February. RMA concurs with the selected time periods used for analysis. Typically, counts

over 2 years old should be recounted for more current data. Given the current restrictions and limitations in place due to the coronavirus pandemic, it is likely that current volumes are lower now than in 2019 and the existing volumes are acceptable. However, future traffic projections should be made to the year 2028 to reflect a 7-year design horizon as described further below.

3. Available MassDOT permanent count station data at Station 7318 located on Route 3 north of Route 228 was used to estimate seasonal adjustment of the collected traffic data. While this is generally an acceptable approach, **it should be explained why the closest permanent count station to the study area was not used which is Station 36 on Route 3 just north of Route 139.**
4. The assessment provides a description of the study area roadway network as well as the pedestrian, bicycle, and public transportation facilities within the study area.
5. Accident data were reviewed and summarized within the traffic assessment. Calculated crash rates were found not to be significant based on the MassDOT data collected (2012-2016). However, **more recent state data is now available including 2017 and 2018 data and these should also be reviewed to confirm the study findings.**

Future Conditions

6. A 7-year design horizon was described for the No-Build and Build condition analyses consistent with MassDOT's *Transportation Impact Assessment Guidelines*. However, the assessment assumed a 2019 Existing condition. While the growth rate and utilization of area background projects appear appropriate, **the future traffic volumes should represent an additional 2 years of traffic growth representing 2028 future traffic volume conditions. The town should also be contacted to verify the list of background projects and whether any additional developments are now proposed that could affect traffic within the study area.**
7. The anticipated trip generation of the proposed 56-unit townhouse development was estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual* for Multifamily Housing Low-Rise (Land Use Code 220). This land use code is appropriate for the proposed use.
8. The traffic assessment describes that the trip distribution methodology was based on Journey-to-Work data obtained from the U.S. Census for persons residing in the Town of Pembroke and refined based on existing traffic patterns within the study area. **While this approach is appropriate, the Journey-to-Work data utilized for these assumptions should be provided for review. In addition, there is a conflict between allowable site movements at the driveways between the traffic assessment and the provided site plans. The traffic**

assessment states that the southerly site driveway will be restricted to access only while the site plans show two-way traffic on this driveway. Clarification should be made to which is accurate and the assessment or site plans modified as needed.

9. The traffic assessment describes and details the expected traffic impacts of the project along Route 139 leading beyond the study area. However, specific operational and safety concerns are described in the assessment along Water Street, specifically on the approach to Route 139. Accordingly, **Table 5 of the study should be expanded to include increases in traffic (volume and percentage) on Water Street both north and south of the site as well as on Cross Street.**
10. Available sight distances from the northern proposed site driveway were measured and compared with minimum requirements within the traffic assessment. These measurements were described as stopping sight distances and did not describe if intersection sight distances were considered. In addition, the calculations were based on speeds along Water Street up to and equal to an assumed speed limit of 30 mph. While the assessment describes that this was based on roadway observations, actual speed measurements were not provided in the study for review. **It is recommended that the available intersection sight distances be measured for the driveway(s) proposed to allow exiting traffic based on AASHTO standards. It is further recommended that actual vehicle speeds be measured along Water Street adjacent to the site to determine the actual 85th percentile travel speeds and these speeds be used in the calculations of minimum sight distance requirements.** As shown in the pictures below, sight line limitations may currently exist at both driveway locations pending use of the southern site drive and actual speed measurements that will determine the minimum sight distance requirements.



Potential Sight Line Limitation at South Site Driveway



Potential Sight Line Limitation at North Site Driveway

Traffic Operations Analysis

11. The capacity analysis results do not provide volume-to-capacity (V/C) ratios or delay values greater than 50. These values are important to establish project impacts where approaches operate at level of service F. Accordingly, **it is recommended that the capacity analysis table be updated to include the V/C ratios and show vehicle delays greater than 50.0 as well as account for any modifications to the traffic volumes and additional study intersection as detailed previously in this review.**
12. The analysis modeling of the Cross Street intersection with Route 139 utilized two westbound Route 139 through lanes. However, **the two lanes on the Route 139 westbound approach to Cross Street merge prior to the Cross Street intersection and this approach should be modeled as a single lane.**

Recommendations

13. At the northern site driveway, the assessment recommends that 14-foot-wide travel lanes be provided separated by a raised median with a STOP-sign and stop line on the driveway approach to Water Street, yet the site plan shows 13-foot-wide travel lanes. With the raised median proposed, **it is recommended that the travel lanes be a minimum of 16 feet wide to allow traffic to by-pass a vehicle that may be broken down on the side of the road. This is particularly important to maintain emergency access. It is also recommended that No Parking signs be posted along the site driveways.**
14. At the southern site driveway, the assessment recommends that only access into the site be allowed with a travel lane of 16-feet. The one-way traffic flow is not reflected on the site plans nor are signs for this restriction described. **Clarification on the use of this driveway is needed to provide an adequate review. If this driveway is to be one-way only, then it should provide a pavement width of 20 feet, consistent with the National Fire Protection Association (NFPA) fire code regulations.**
15. Off-site improvements are recommended in the assessment at the Church Street and Water Street intersection, but no commitment is made on behalf of the project to implement these improvements. The study suggests that overall safety and operational conditions can be improved by realigning the Water Street approach through pavement markings and clearing of vegetation and roadside fixtures (fence) to improve sight lines for vehicles turning from Water Street onto Route 139. Based on the assessment, 60% of the site's entering traffic and 80% of the site's exiting traffic will travel through this intersection. **The Town should consider this impact and whether these deficiencies should be addressed as part of the 56-unit townhouse development project. The Town should also consider requiring the realignment of the intersection through more than pavement markings. The curb line**

in the northwest corner of the intersection could be relocated to physically square off the intersection.



Water Street looking north on Route 139



Water Street looking south on Route 139

16. Route 139 in close proximity to the site provides a sidewalk for safe pedestrian travel, shoulder widths adequate for bicycle travel, and public transportation that reduces the reliance on private vehicle travel. Neither the study nor the site plans describe improvements to connect the residential development to the existing sidewalk along Route 139. Under current conditions, pedestrians from the site are required to share a 19 to 20-foot wide pavement width for two-way vehicular travel. **The Town should consider requiring construction of a sidewalk along Water Street from the site to the existing sidewalk provided along Route 139.**

SITE PLAN REVIEW (As Related to Traffic and Access)

17. As described in previous comments, there are several recommendations or assumptions made in the traffic assessment that are in conflict with the submitted site plans. **Any conflicts between the site plans and the traffic assessment should be corrected and re-submitted.**
18. All internal roadways are proposed to be 22 feet in width with no accommodations for pedestrians. **While the 22-foot roadway width is acceptable for vehicular travel, a sidewalk along at least one side of each road should be provided to allow safe pedestrian movements within the site. In addition, given this roadway width, on-street parking should be prohibited along all internal roadways.**
19. **All pedestrian accommodations should comply with the Americans with Disabilities Act (ADA).**
20. **All proposed signs and pavement markings should conform with the Manual on Uniform Traffic Control Devices (MUTCD).**

21. The distance between the garage doors of each unit and the edge of roadway should be a minimum of 23 feet to ensure an outside parked vehicle does not interfere with roadway travel. If sidewalks are proposed as recommended, a distance of 21 feet should be provided from the back of sidewalk to the garage door. **It is recommended that these dimensions be reviewed for each of the proposed units and any required changes be made and resubmitted.**
22. Turning radii at the site driveway intersections with Water Street and at the internal site intersections are not labeled. **It is recommended that a turning analysis (using AutoTurn or a similar program) be provided for internal intersections and the two site driveway intersections with Water Street. This analysis should include a Pembroke Fire Department design vehicle as well as a single-unit (SU) truck (inclusive of a delivery, maintenance, trash vehicle, etc.) to assure these turns can safely be made.**
23. Road “C” and the access road to Building-6 are both dead-end streets that would require fire trucks to back out of these streets to exit. **The Pembroke Fire Department should be consulted to determine whether accommodations should be made to allow fire trucks to turn around in these dead-end streets. The Pembroke Fire Department should also be consulted to ensure accessibility to all of the proposed buildings**
24. The proposed southerly site driveway will traverse over a portion of the existing residential driveway to the property at 248 Water Street. **The applicant should explain how this conflict will be resolved.**
25. The Pembroke School Department should be consulted to determine where school children will be picked up and dropped off. **If the school buses will not enter onto the property (which is typically the case), then the applicant should consider an on-site school bus waiting area, potentially at the north site drive intersection with Water Street, including provision of a parking area for parents that drive their children to the bus stop.**
26. The proposed open space/recreational use area is accessed via a 12-foot-wide gravel roadway that also provides access to the proposed wastewater treatment plant. **It is recommended that signs be posted at the beginning of this gravel roadway prohibiting vehicular travel except by authorized vehicles. This will ensure that there are no conflicts with pedestrians accessing the recreational area.**
27. As noted in Comment 10, to achieve the measured sight lines at the site access driveway intersections with Water Street requires the clearing of existing vegetation. **It is recommended that the sight line triangles be shown on the site plans and conditions be included requiring that these areas be maintained free of any vegetation and objects that would impede sight lines within these sight line triangles. If the southern site driveway is to allow egress, measurements and sight triangles should also be provided at this location.**

Once the above comments have been addressed, we will be able to finalize our independent traffic peer review of the proposed residential project. Please feel free to contact me if you have any questions regarding this review.

Sincerely,

Ron Müller & Associates

A handwritten signature in black ink, appearing to read "Ronald Müller", written in a cursive style.

Ronald Müller, P.E.
Principal