



Ref.: 21009

June 29, 2021

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

Reg.: River Marsh Village – 2nd 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 reviewed the June 8, 2021 response memorandum prepared by Vanasse & Associates, Inc. (VAI) to our initial peer review comments related to the proposed River Marsh residential development to be located at 274 Water Street in Pembroke, Massachusetts. The memorandum provides responses to Comments 1 through 16 of our original peer review letter that related to the traffic study. Responses to Comments 17 through 27, which related to our review of the site plan, were not provided although an updated site plan prepared by McKenzie Engineering Group, Inc. last revised on June 7, 2021 was submitted that addresses some of our initial comments. Many of our original comments are accordingly reiterated in this review letter. The comments in this letter are numbered to correspond with our original review and are paraphrased below, followed by VAI's response, and any additional comments we have at this time, for ease of reading.

TRAFFIC ASSESSMENT REVIEW

Comment 1: The applicant should evaluate the intersection of Water Street and Cross Street. Based on field observations, this intersection lacks traffic control and may have sight distance limitations.

VAI performed traffic counts, accident research, and capacity analyses of the intersection that revealed that the intersection will continue to operate at acceptable levels with the addition of site traffic. VAI's field observations conducted in May of 2021 did not reveal any existing obstructions to sight lines due to overgrown vegetation. VAI states that the proponent is committed to implementing a number of measures to enhance safety and traffic operations at this location, including installation of new pavement markings and signage in accordance with *Manual on Uniform Traffic Control Devices (MUTCD)* design criteria to enhance traffic operations and safety at this location.

While we concur that pavement markings and signage would be beneficial to enhance the safety of the intersection, no specific description of these improvements is provided, such as where pavement markings would be applied and where and what signage is recommended. A conceptual plan showing the recommended improvements would be beneficial.

Comment 2: Future traffic projections should be made to the year 2028 to reflect a 7-year design horizon.

VAI updated the traffic flow networks and intersection capacity analyses to reflect future-year 2028 traffic conditions.

The updated 2028 design horizon and inclusion of current background development projects is appropriate. **No further comment.**

Comment 3: We questioned why the closest permanent count station to the study area (Station 36 on Route 3 just north of Route 139) was not used to seasonally adjust the counted volumes.

VAI responded that after further review of nearby count station data, the volumes presented in the original traffic study were upwardly adjusted by an additional 9 percent to reflect the higher level of seasonal variation.

The review and inclusion of the additional seasonal adjustment factor is appropriate. **No further comment.**

Comment 4: No response required.

Comment 5: More recent state accident data is now available including 2017 and 2018 data and these should also be reviewed to confirm the study findings.

VAI provided updated crash history at each study area intersection to include the years 2017 and 2018 and concluded that in general, the crash frequency at the majority of locations was relatively consistent with the data presented in the original study, with most collisions resulting in property damage only, and no fatalities reported within the study area. All study area intersections exhibit crash rates that fall below the state average for signalized and unsignalized intersections.

The provided crash history update and crash rate calculations are appropriate. **No further comment.**

Comment 6: The future traffic volumes should include an additional 2 years of traffic growth to represent 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.

VAI updated the future conditions to reflect another two years of traffic growth and confirmed with the Town of Pembroke Planning Department that the development projects included in the original study were appropriate. Two additional small developments were identified on Mattakeesett Street, but given the distance from the study area and the relatively low expected traffic generation, VAI assumed that any minor increase in traffic associated with these uses would be included in the background growth rate.

The updated 2028 design horizon and assumptions on background development projects is appropriate. **No further comment.**

Comment 7: No response required.

Comment 8: The Journey-to-Work data used to develop the trip distribution methodology should be provided for review. In addition, the allowable movements at the site driveways should be clarified.

VAI provided the requested back-up data and responded that the southern site driveway will accommodate two-way traffic flow, but exiting movements will be restricted to right-turns-out only. The traffic flow networks and intersection

capacity analyses were updated accordingly to reflect this change in the access plan.

RMA concurs with the methodology used to estimate traffic distribution and the resulting volumes are consistent with existing traffic patterns observed in the area. VAI recommends that roadway markings and signage be employed to enforce a left-turn-out restriction at the southerly driveway. While in principle this would restrict left turns out of the driveway, it will be difficult to enforce without physical restrictions which may not be feasible given the limited right-of-way. Based on the June 8, 2021 letter submitted to the ZBA by the applicant's attorney, the white picket fence along the 248 Water Street property that currently restricts the sight lines at the southern site driveway is located within the Water Street layout. **We recommend that the Town of Pembroke require the property owner at 248 Water Street to relocate the fence outside of the Water Street layout so that the proposed southerly driveway can function as a full access/egress driveway without any turn restrictions that would otherwise be difficult to enforce.**

Comment 9: We requested that the table summarizing the volume increases due to the project be expanded to include Water Street and Cross Street as these streets will experience the largest increases in traffic.

VAI provided the requested information, which shows that Water Street south of the site will experience volume increases between 20 and 23 peak hour vehicles, while north of the site and on Cross Street, volume increases between 7 and 12 additional peak hour vehicles will be realized. **No further comment.**

Comment 10: We recommended that the available sight lines at the site driveways be compared with the requirements based on the actual speed of traffic on Water Street.

VAI conducted vehicle speed measurements along Water Street which showed that the 85th percentile travel speeds ranged from 33 to 34 mph. Based on these travel speeds, a minimum of 230 feet of sight distance is required to and from the north at both driveway locations, with a minimum requirement of 240 feet looking to and from the south at both locations. VAI concluded that the north site driveway meets these requirements, but that the southern site driveway does not due to the fence along the 248 Water Street property that is located within the Water Street layout. VAI accordingly recommended that the southern driveway be restricted to a right-out-only driveway.

The sight triangles shown on the updated site plan should be revised to reflect the minimum requirements as established by VAI and any trees or other obstructions within these sight triangles should be identified to be trimmed or removed to assure that the minimum required sight lines can be maintained without impacting adjacent properties. See also recommendations in Comment 8 above.

Comment 11: The capacity analysis results should provide volume-to-capacity (V/C) ratios and delay values greater than 50 seconds per vehicle as these values are important to establish project impacts where approaches operate at level of service F.

VAI provided the requested information and the updated level-of-service summary tables indicate that while many of the minor-street movements at the unsignalized study intersections operate at level F with or without the project, the impacts of the additional site traffic are relatively minor and the volume-to-capacity ratios are well below 1.0, indicating that ample capacity remains to accommodate additional traffic. **No further comment.**

Comment 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.

VAI updated the capacity analyses at this intersection to correctly model intersection operations. **No further comment.**

Comment 13: Since the northern site driveway proposes a raised median, we recommended that the travel lanes on either side of the raised median 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. We also recommended that No Parking signs be posted along the site driveways.

VAI responded that the site plan has been updated to reflect 16-foot-wide travel lanes in the vicinity of the raised median at the northern driveway and that No Parking signs will be provided along the site driveways.

The updated site plan now shows 16-foot-wide travel lanes and a 4-foot-wide raised median at the northern driveway and is acceptable. **Keep Right (R4-7) signs should be installed at both ends of the raised median and the**

proposed stop line on the driveway exit to Water Street should extend across the entire approach width to assure that entering traffic does not turn into the driveway on the wrong side of the median. Review of the updated site plan does not show any No Parking signs along the internal site roadways. These should be shown on the plan set.

Comment 14: We questioned the use of the southern site driveway as the traffic study and site plans were in conflict with each other with the traffic study recommending enter-only traffic and the site plan showing two-way traffic.

VAI responded that the southern site driveway will serve two-way traffic, with exiting movements restricted to right turns onto Water Street southbound only. The site plan, traffic distribution, and intersection capacity analyses have been updated accordingly. **See recommendations in Comment 8 regarding the proposed turn restriction at the southern site drive.**

Comment 15: VAI suggested improvements to the Church Street and Water Street intersection including realigning the Water Street approach through pavement markings and clearing of vegetation and roadside fixtures to improve sight lines, but no commitment was made on behalf of the project to implement these improvements. We recommended that the Town consider the impacts of the project at this location 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.

VAI responded that the proponent is committed to working with the Town of Pembroke towards the development of a pavement marking and signage plan to improve intersection geometry and safety, but not through physical improvements such as relocating curb lines. They also note that MassDOT has jurisdiction of Church Street at this location and any proposed modifications would be subject to MassDOT review and approval. Additionally, the proponent has committed to install new pavement markings and signs at the intersection of Water Street with Cross Street, including painted centerlines on the Cross Street approach to delineate inbound and outbound traffic from Church Street, painted stop lines, and installation of a STOP sign.

Based on the above commitments, **we recommend the applicant submit a conceptual plan showing the recommended improvements for review, including how Water Street will be realigned, what signs are proposed, and**

where vegetation and roadside fixtures will be trimmed and/or removed. Without such a plan, the specific actions proposed and limits of work cannot be ascertained. If MassDOT approval for these improvements is required, then the applicant should submit the necessary permit application to MassDOT. MassDOT is not likely to deny a request for improvements to their streets.

Comment 16: We recommended that the Town of Pembroke consider requiring construction of a sidewalk along Water Street from the site to the existing sidewalk provided along Church Street.

VAI responded that at this time, a sidewalk is not proposed along Water Street in conjunction with the project. **Our original comment therefore still stands.**

SITE PLAN REVIEW

While an updated site plan was submitted that addresses some of our concerns with respect to traffic and access, as of the date of this letter, official responses to our site plan comments (Comments 17-27) have not been provided. Therefore, many of these original comments are reiterated below, except where addressed through VAI's responses and changes made to the plans.

Comment 17: Our prior comment regarding conflicts between the traffic study and the site plan with regard to the use of the southern site driveway has been resolved. **See our recommendations in Comment 8 regarding the proposed turn restriction at the southern site drive.**

Comment 18: We recommended that a sidewalk be provided along at least one side of each internal roadway to allow safe pedestrian movements within the site. In addition, given this roadway width, on-street parking should be prohibited along all internal roadways.

The revised site plan now shows a sidewalk along the south side of the northern driveway (Road A), but only up to approximately Building 3. The site plan also does not show any parking prohibition along the internal roadways. **Therefore, our original comment still stands.**

Comment 19: **All pedestrian accommodations should comply with the Americans with Disabilities Act (ADA).**

Comment 20: **All proposed signs and pavement markings should conform with the Manual on Uniform Traffic Control Devices (MUTCD).**

Comment 21: We recommended that a minimum of 23 feet be provided between the garage doors of each unit and the edge of roadway to ensure that an outside parked vehicle does not interfere with roadway travel. The revised site plan now shows a minimum of 23 feet between garage doors and the edge of road. **No further comment.**

Comment 22: We requested that turning radii at the site driveway intersections with Water Street and at the internal site intersections be labeled and that a turning analysis be performed showing how delivery vehicles and Pembroke fire trucks can access and navigate the site.

The corner radii are now labeled on the updated site plan showing 30-foot corner radii at the northern driveway intersection, a 25-foot radius for right-turns-in and a 15-foot radius for right-turns-out at the southern driveway, and 20-foot corner radii at the internal four-way intersection. A turning analysis was performed showing that Pembroke fire trucks can access and egress the site to/from the south via the northern driveway and can access and egress the site to/from the north via the southern driveway.

Since the reverse movements were not modeled, we assume that fire trucks for example, cannot access the site from the south via the southern driveway due to the tight corner radii provided there. This could be problematic for the Pembroke Fire Department if they need to respond to an emergency at the buildings in the southern half of the site. We recommend that the Pembroke Fire Department be consulted to verify that the emergency access/egress plan is acceptable or modifications to the corner radii be made to assure that all movements can be safely made.

Furthermore, site access, egress, and circulation through the site for delivery vehicles was not modeled. The 15-foot corner radius for right turns out of the southern driveway will likely cause delivery vehicles to have to use up all of the Water Street width to make the turn. **We recommend that this movement be modeled and the corner radius adjusted to assure that single-unit trucks can safely make this turn.**

Comment 23: The access road to Building-8 is a dead-end street that would require fire trucks to back out to exit. **The Pembroke Fire Department should be consulted to**

determine whether accommodations should be made to allow fire trucks to turn around in this dead-end street. The Pembroke Fire Department should also be consulted to ensure accessibility to all of the proposed buildings.

Comment 24: The proposed southerly site driveway will traverse over a portion of the existing residential driveway to the property at 248 Water Street. The updated site plan now shows what we presume to be a relocation of this driveway to intersect with the south site drive. **The applicant should confirm with the affected property owner that this driveway relocation is acceptable. The Town of Pembroke may want to consider requiring a written agreement between the two parties.**

Comment 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.**

Comment 26: The prior site plan proposed an open space/recreational use area and we recommended that signs be posted prohibiting vehicular travel along the access road. The updated site plan eliminated the open space/recreational use area. **No further comment.**

Comment 27: We 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 triangles.

While the updated site plan now shows the sight triangles on the plan, **the sight triangles should be revised to reflect the minimum requirements as established by VAI and any trees or other obstructions within these sight triangles should be identified to be trimmed or removed to assure that the minimum required sight lines can be maintained without impacting adjacent properties. See also recommendations in Comment 8 regarding the proposed turn restriction at the southern site drive.**

In summary, a number of outstanding comments and concerns remain including our recommendations to:

- provide conceptual plans showing the recommended improvements to the Water Street and Cross Street intersection and the Water Street and Church Street intersection and a commitment by the applicant to implement these improvements;
- require the property owner at 248 Water Street to relocate the fence outside of the Water Street layout so that the proposed southerly driveway can function as a full access/egress driveway without any turn restrictions;
- revise the sight triangles on the site plan to reflect the minimum requirements established by VAI and identify the vegetation and objects to be trimmed or removed to achieve safe operation of the site driveways;
- increase the corner radii at the southern site driveway to accommodate emergency and delivery vehicles; and
- address our comments on the site plan.

RMA can provide additional review if the outstanding comments are addressed or additional information is provided that was not included in the June 8, 2021 responses prepared by VAI or the updated site plan prepared by McKenzie Engineering Group. Please feel free to contact me if you have any questions regarding this review.

Sincerely,

Ron Müller & Associates



Ronald Müller, P.E.
Principal

cc: Peter Palmieri, Merrill Inc.