

April 3, 2024

NEX-2400043.00

Ms. Elizabeth Hughes, AICP, Town Planner
Town of Concord
Planning Division
141 Keyes Road
Concord, MA 01742

SUBJECT: 275 Forest Ridge Road, Concord, MA
Peer Review Letter #1 – Traffic Review

Dear Ms. Hughes and Members of the Zoning Board of Appeals:

Greenman-Pedersen, Inc. (GPI) has performed a peer review of the materials submitted to the Concord Zoning Board of Appeals for the Proposed Residences at Thoreau Comprehensive Permit Application at 275 Forest Ridge Road. GPI is in receipt of following documents, which serve as the basis for our review:

- *Comprehensive Permit Application*, prepared for Thoreau Residences LLC by The Pinebrook Group, dated December 21, 2023.
- *Multi-Family Site Development, Residences at Thoreau, 275 Forest Ridge Road, Concord, MA*; prepared by Allen & Major Associates, Inc.; dated December 20, 2023.
- *Traffic Impact and Access Study, Proposed Residential Development, 275 Forest Ridge Road, Concord, Massachusetts*; prepared by MDM Transportation Consultants, Inc. (MDM); dated December 2023.

It should be noted that this review focuses on only the traffic impacts, site circulation and access, and parking elements of the project. Additional comments on the site plans and stormwater analysis will be provided under separate cover. In addition, on March 8, 2024, GPI was notified by the Applicant that the site plans are being modified, which may impact on-site traffic circulation and parking. Therefore, the comments contained in this letter related to *Site Circulation, Access and Egress* consist of only those preliminary comments that had been identified as of March 8, 2024. Additional comments may follow once GPI receives the updated site plans from the Applicant.

As requested, GPI has reviewed the above materials for compliance with the applicable sections of the Town of Concord Zoning Bylaws, Massachusetts Department of Transportation (MassDOT) guidelines for traffic analysis, and general engineering practice. Based on our review, we offer the following comments for the Board's consideration:

Site Circulation, Access, and Egress

1. The proposed site driveway will be located immediately adjacent to the Forest Ridge Road southerly leg of the circle at Black Birch Lane / Forest Ridge Road / Sweet Birch Lane. The proximity of these approaches has the potential to create conflicts between movements entering and exiting these approaches and driver confusion over turning movements. **GPI recommends the Applicant consider either increasing the separation of the driveway from Forest Ridge Road or realigning the driveway to intersect with Forest Ridge Road further south of the circle as a T-type intersection.**
2. The Applicant has designed the site driveway in a boulevard style with a 12-foot travelway in each direction, separated by an 8-foot median island. This layout does not provide enough width for

emergency vehicle bypass in the event a vehicle becomes disabled along the drive aisle. **GPI recommends the Applicant consider one of the following options:**

- a. **Widen the driveway to provide a 16-foot travelway on either side of the median island for emergency vehicle bypass;**
 - b. **Eliminate the median island and provide a single 12-foot entrance and exit lane separated by a centerline; or**
 - c. **Replace the raised median island with a mountable surface, such as textured concrete, to allow for emergency vehicle bypass. This median may also be raised with sloped edges to be mountable.**
3. The Applicant has provided vehicle turning path figures for a fire apparatus circulating the site. However, the Applicant has not provided a vehicle turning path analysis for a trash removal vehicle accessing and egressing the trash receptacle. **The Applicant should provide a vehicle turning path analysis for the trash removal vehicle to ensure that the median island is properly designed to allow access and egress to the trash receptacles without mounting the median.**
 4. The Applicant has designated snow storage areas within the islands at the internal intersections on the site, which may create sight line obstructions for vehicles attempting to exit the parking area between Building A and Buildings B/C. **GPI recommends eliminating the snow storage areas on the inside of the parking loop around the buildings.**
 5. There is an existing sidewalk around the outside of the traffic circle at Forest Ridge Road / Black Birch Lane / Sweet Birch Lane. The Applicant has proposed a sidewalk along the southerly side of the site driveway. **GPI recommends that the Applicant install curb ramps at the site driveway intersection with the traffic circle to allow pedestrians to cross the site driveway to access the sidewalk into Black Birch Lane.**

Traffic Impact and Access Study (TIAS)

6. GPI concurs with the study area utilized to assess the proposed development's impacts on the adjacent roadway network except that GPI notes that the Applicant has not provided an evaluation of the traffic operations and safety at the Forest Ridge Road / Sweet Birch Lane / Black Birch Lane intersection.
7. The TIAS includes a review of the traffic operations during the weekday AM and PM peak commuter periods. For a residential development, it is typical to also evaluate traffic impacts during the Saturday midday peak period. Although none of the MassDOT count stations located near the site provide traffic count data on Saturday, a review of the data for Count Station #403 on Route 2 indicates that two-way traffic volumes during the Saturday midday peak hour are consistent with two-way traffic volumes during the weekday AM and PM peak hours. In addition, the proposed residential development is anticipated to generate similar total vehicle trips during the Saturday midday peak hour as compared to the weekday AM and PM peak periods. Therefore, the proposed residential development is likely to result in similar traffic impacts on the study area intersections during the Saturday midday peak hour as during the weekday AM and PM peak periods.
8. GPI generally concurs with the description of the existing intersection geometries. Although, GPI notes that TIAS states that the Sweet Birch Lane approach to the traffic circle at Forest Ridge Road / Sweet Birch Lane / Black Birch Lane operates under STOP sign control; however, there is currently no STOP sign or STOP line provided on the Sweet Birch Lane approach to the traffic circle. **GPI recommends the Applicant install a STOP sign (R1-1) on the Sweet Birch Lane approach.**
9. The Applicant has reviewed the collision history at the Main Street (Route 62) / Forest Ridge Road intersection based on MassDOT collision data for the years 2018 – 2022. It should be noted that the MassDOT crash data for the years 2021 – 2022 are not yet closed, which indicates that additional

collisions may have occurred in those years. In addition, the crash rate was calculated based on the number of collisions occurring across this five-year period as compared to the current traffic volumes passing through the intersection post- COVID. During 2020 and 2021, in particular, traffic volumes were significantly lower through the study area due to COVID restrictions, which may impact the occurrence of collisions during those years. Therefore, the crash rate per million entering vehicles may be artificially low due to the inclusion of crash data from these years. **GPI recommends that the crash rate be estimated based on a full three-years of crash data pre-COVID conditions (2017 – 2019). Further GPI recommends the Applicant also review the collision history at the traffic circle at Forest Ridge Road / Black Birch Lane / Sweet Birch Lane to identify any potential safety issues at this intersection.**

10. The Applicant has utilized a 0.5 percent annual growth rate to project traffic volumes to 2030 No-Build conditions based on MassDOT permanent count station data from Station #403 located on Route 2 east of the Concord Rotary. GPI concurs that this is the closest permanent count station to the site and is appropriate in considering seasonal variation in the traffic volumes in the area. However, GPI notes that there is also a count station (#4003) located on Main Street (Route 62) just west of Forest Ridge Road that provides traffic count data for the years 2011-2013 and 2015-2019 that may provide a better estimate of the traffic growth within the study area. In addition, upon review of the traffic volumes utilized in the TIAS for Station #403, GPI was unable to reconcile the traffic volumes for the years except 2011 and 2013. Further, MassDOT provides count data for the year 2019 that was not included in the evaluation of the growth rate at this count station. GPI has estimated the growth rate based on the count station data available on MassDOT's Transportation Data Management System for count stations #403 and #4003, and determined that traffic has generally been growing at a rate of 1.0 percent per year from 2010 to 2019. This growth rate is consistent with the rate utilized in recent traffic studies for other development projects in the surrounding area. **Therefore, GPI recommends the Applicant update the analysis using a 1.0 percent per year annual growth rate to project volumes to 2030 No-Build conditions.**
11. The sight distance calculations were based on a travel speed of 20 miles per hour (MPH); however, the Applicant has not provided any evidence to support this travel speed. Although none of the signs are MUTCD compliant, Forest Ridge Road is posted with a speed limit of 25 MPH. **Therefore, the Applicant should provide documentation of speed measurements or utilize a 25 MPH design speed for estimating sight distance requirements.**
12. The sight distance was measured from a decision point 10 feet back from the edge of the roadway. AASHTO Green Book states that intersection sight distances should be measured at 14.5 feet back from the edge of the travel way where applicable. **GPI recommends providing a sight line plan with the decision point being located 14.5 feet back instead of 10 feet.**
13. The trip generation estimate in the TIAS was prepared utilizing Institute of Transportation Engineers (ITE) trip generation rates for Land Use Code (LUC) 221 (Multifamily Housing (mid-rise)). The description provided by ITE of LUC 221 notes that mid-rise facilities typically contain 4 to 10 floors, while low-rise facilities include 2-3 floors of living space. Although the proposed residential buildings will provide only three floors of living space, GPI concurs that the proposed buildings are more consistent with LUC 221 (Multifamily Housing (mid-rise)) due to the provision of common building entrances through a lobby area, with hallways inside the building to access individual units. Housing configurations that fall into the category of "low-rise" consist of walk-up apartments, mansion-style apartments, townhouses and stacked townhouses. Therefore, GPI concurs with the methodology used to estimate site-generated vehicle trips associated with the proposed development.
14. GPI concurs with the distribution of site-generated vehicle trips based on the US Census Journey-to-Work model.

15. Although the Applicant has projected traffic volumes through the Forest Ridge Road / Black Birch Lane / Sweet Birch Lane intersection, no analysis of the traffic operations at this traffic circle was provided in the TIAS.
16. It appears that the Applicant has transposed the heavy vehicle percentages in the capacity and queue analysis on the westbound left and through movements at the Main Street (Route 62) / Forest Ridge Road intersection.
17. The Applicant has applied the existing Peak Hour Factor (PHF) to the 2030 No-Build and Build analysis conditions as part of the Synchro analysis. MassDOT guidelines for traffic impact analysis require that all future year conditions utilize a default PHF of 0.92.
18. The Applicant has provided an assessment of the parking supply that would be required to satisfy zoning requirements, which noted that 2.0 spaces per dwelling unit are required for multi-family developments. However, Table IV in Section 7 of the Concord Zoning Bylaws notes that only 1.5 spaces per dwelling unit are required for subsidized low and moderate incoming housing developments. As this project is a being developed as a Chapter 40B development, the lower parking provision of 1.5 spaces per dwelling unit is applicable for at least the affordable units within the development. Applying the 1.5 spaces per unit parking rate to the entire 216 units would result in a parking requirement of 324 spaces.
19. The Applicant has also provided an assessment of the parking demand anticipated to be generated by the proposed development based on ITE parking generation rates for LUC 221 (Multifamily Housing (mid-rise)) and empirical parking demand data collected at six multifamily residential developments within the I-495 belt of Massachusetts. The results of this analysis indicate that the peak parking demand may range from 266 to 314 parking spaces. ITE recommends that the peak parking demand not exceed the parking supply by more than 90 percent to avoid illegal parking and excessive recirculation of vehicles to find empty spaces. Therefore, based on ITE and the empirical data, a total of 349 parking spaces would be required to meet peak parking demands. GPI concurs with the Applicant's assessment that the 397 parking spaces proposed will be adequate to accommodate the peak parking demand anticipated for the proposed residential development.
20. The Applicant has proposed several Transportation Demand Management (TDM) measures to reduce single-occupant vehicle trips generated by the proposed development. In addition to the measures described in the TIAS, GPI recommends the Applicant consider the following additional TDM strategies:
 - a. An on-site Transportation Coordinator (TC) will be established to distribute information to residents on available transportation options in the area and provide incentives for utilizing alternatives means of travel;
 - b. The TC will provide all new residents with information on registering with NuRIDE upon move-in. Nu-RIDE offers incentives for making green trips (walking, biking, using public transit, carpooling, or ridesharing) and provides assistance to commuters in identifying appropriate ride-share matches in their area. In addition, Nu-RIDE offers a guaranteed ride home for any commuters making green trips that need to leave work in an emergency or inclement weather.
 - c. Consider providing at least one ride-share parking space near the entrances to each building.
 - d. The Applicant should consider transit subsidies or rental reductions for residents utilizing the commuter rail.
21. GPI notes that Applicant has not provided an assessment of the available public transportation services in the surrounding area. However, the site is located approximately two miles from the West Concord MBTA Commuter Rail station and less. **GPI recommends the Applicant review available public transportation near and around the site to assess whether additional transportation demand management (TDM) measures may be included to encourage use of public transportation by residents.**

22. Although there is a sidewalk around the majority of the traffic circle at Forest Ridge Road / Black Birch Lane / Sweet Birch Lane, there is not sidewalk on the northeast quadrant between Black Birch Lane and Forest Ridge Road SB. **GPI recommends that the Applicant install a sidewalk along this portion of the traffic circle to provide a continuous pedestrian path around the circle for improved pedestrian connectivity. In addition, the Applicant should install curb ramps and a crosswalk on the Forest Ridge Road southbound approach to the circle to provide access to the sidewalk along the west side of Forest Ridge Road.**

23. A sidewalk currently exists along the west side of Forest Ridge Road between the Black Birch Lane / Sweet Birch Lane circle and Main Street (Route 62), which is in fair – good condition along its entire length with the exception of a few areas of cracking around utilities and some areas where grass has grown through the pavement joints. However, none of the curb ramps at the crosswalks are ADA-compliant. None have level landing areas and some do not provide tactile warning strips. In addition, the existing crosswalk pavement markings are faded and the crosswalk warning signage is not mounted at the correct height. **The Applicant should consider upgrading these ramps to meet ADA guidelines and restripe the crosswalks consistent with Manual on Uniform Traffic Control Devices (MUTCD) standards.**

24. The Applicant has concluded that the project will have minimal impact on the operations of the study area intersections and that no additional improvements are required to mitigate the impacts of the proposed development. GPI concurs that the proposed development will have limited impact on the traffic operations of the study area intersection. However, GPI notes there are several existing deficiencies that warrant safety enhancements to ensure that the additional traffic generated by the proposed development does not result in increased collisions.
 - a. At the intersection of Main Street (Route 62) / Forest Ridge Road, the existing STOP sign is faded and provides no retro-reflectivity for nighttime visibility. In addition, the existing STOP line is faded and narrow. **GPI recommends the Applicant install a new STOP sign and STOP line on the Forest Ridge Road approach to Main Street (Route 62), compliant with Manual on Uniform Traffic Control Devices (MUTCD) standards.**
 - b. Similarly, the existing STOP sign (R1-1) is faded, is not retro-reflective, and is partially obscured by vegetation along the easterly side of the roadway. **GPI recommends the Applicant replace the existing STOP sign with a new MUTCD-compliant sign and install STOP AHEAD warning signage in advance of the intersection to further alert drivers to the approaching stop condition.**
 - c. Separate left- and right-turn lanes are provided on the Forest Ridge Road approach to Main Street (Route 62). However, the existing pavement markings are faded and partially covered with pavement crack sealant. In addition, the lane markings were paved over during the most recent pavement overlay for the 40 feet closest to Main Street (Route 62). **GPI recommends the Applicant install new lane markings, including lane lines, turn arrows, and a centerline within 100 feet of the STOP line on Forest Ridge Road approaching Main Street (Route 62).**
 - d. GPI also notes that Forest Ridge Road northbound approaches Main Street (Route 62) on a downhill grade. When Main Street (Route 62) was last resurfaced, the first 50 feet of Forest Ridge Road were also resurfaced. However, the roadway was regraded at that time so that the last 50 feet of Forest Ridge Road slopes upward toward Main Street (Route 62) to match the finished elevation of Main Street (Route 62). As a result, a low point has been created on Forest Ridge Road just south of the intersection where water ponds and freezes during the winter months, causing vehicles to slide into the intersection. **GPI recommends the Applicant consider regrading Forest Ridge Road as it approaches Main Street to eliminate the low point and/or properly direct water toward the existing catch basins on Forest Ridge Road.**

Should you have any questions or require additional information, please contact me directly at (603) 766-5223 or by email to rebeccabrown@gpinet.com.

Sincerely,

GREENMAN-PEDERSEN, INC.



Rebecca L. Brown, P.E.
Senior Project Manager

F:\Projects\NEX-2400043 - Concord, MA - 275 Forest Ridge Road Peer Review\Peer Review Letters\2400043_2024-04-03_Initial Traffic Review LTR-FINAL.docx