

September 10, 2024

Takashi Tada
Land Use Director/Town Planner
Town of Groton Planning Board
173 Main Street
Groton, MA 01450

RE: Nitsch Project #13346.26
63 Gratuity Road
Traffic Engineering Services
Groton, MA

Dear Takashi Tada:

Nitsch Engineering (Nitsch) has reviewed the Transportation Impact Assessment (TIA) memorandum (the memorandum) dated April 23, 2024, and the Gratuity Brook Farm Estates Definitive Subdivision plans (the plans) as part of the Definitive Plan Submission package for the proposed residential development (the Project) at 63 Gratuity Road in Groton, Massachusetts (the Town). The memorandum was submitted by Vanasse & Associates, Inc. (VAI), dated April 23, 2024, and the plans were submitted by LandTech Consultants, dated August 12, 2024. Nitsch conducted a site visit on Thursday, September 6, 2024, to aid in our review. This letter summarizes our review of the memorandum and the plans for conformance with the Massachusetts Department of Transportation (MassDOT)'s *TIA Guidelines* and current transportation and traffic engineering standards.

VAI previously submitted a TIA associated with a Preliminary Plan Submission, dated June 5, 2023. Nitsch conducted a review on June 30, 2023, and VAI submitted an updated TIA on July 11, 2023. The Definitive Subdivision Plan reflects updates to the Preliminary Plan Submission, which includes a change in the building program from approximately 33 residential units, most of them attached, to 28 age-restricted (55+) attached residential units. The updated TIA also includes new traffic counts, updated site observations, and updated crash history.

Based on our review of the memorandum and plans, the submitted material largely complies with industry practices and current transportation/traffic engineering standards; however, we offer the following comments for consideration:

1. The memorandum references that the Project will be accessed off both Gratuity Road and Jenkins Road, and references the access points as "Project Site Roadway" for each. The plans reference the Project Site Roadway for Gratuity Road as "Gerard Way," and the Project Site Roadway for Jenkins Road as "Therese Lane." We recommend VAI clarify the intended nomenclature for the Project Site Roadways and reference the intended names in future correspondence.
2. The memorandum states that off-street parking will be provided in individual garages and driveways that will accommodate a minimum of two (2) vehicles per dwelling. We recommend VAI clarify parking requirements from the Town of Groton, and present information from the Institute of Transportation Engineers' (ITE's) *Parking Generation* to establish if the Project would provide sufficient parking.
3. Based on our site visit, the Gratuity Road pavement quality is poor in some areas between the future Site driveway and Mill Street with cracking and potholes. We recommend VAI confirm the pavement condition and clarify if pavement resurfacing is proposed as part of the Project.
4. The memorandum indicated that no lighting was present on Gratuity Road near Mill Street. Based on our site visit, we note street lighting is present. We recommend VAI clarify if lighting was recently installed on Gratuity Road, and if there are plans independent of the Project to install additional lighting within the study area.

5. Based on our site visit proximate to the intersection of Main Street at Mill Street, there is an existing sign that indicates a heavy vehicle restriction on Mill Street. We recommend VAI confirm that the truck restriction is present, clarify whether there are additional heavy vehicle restrictions within the study area, and how the restrictions may impact safety and operations within the study area as a result of the Project.
6. Based on our site visit, we observed the following at the intersection of Main Street at Mill Street:
 - a. There are no Americans with Disabilities Act (ADA) and Massachusetts Architectural Access Board (MAAB)-compliant pedestrian ramps or crosswalks present across Mill Street, despite a sidewalk on the west side of Main Street.
 - b. The stop line for the Mill Street eastbound approach is placed beyond the projection of the pedestrian desire line for the sidewalk on the west side of Main Street.
 - c. The available sight distance looking left (southbound) and looking right (northbound) from the Mill Street eastbound approach is impeded by a berm to the south and vegetation to the north. As a result, we observed vehicles inching from the stop line closer to Main Street and into the pedestrian desire line to obtain better observation of approaching vehicles along Main Street.
 - d. The curb radii on both corners of Mill Street are significant given that heavy vehicles are restricted along Mill Street, which can promote high turning speeds for the free southbound right turn and lengthen the crossing distance for pedestrians traveling on the west side of Main Street.

We recommend VAI consider working with the Town to facilitate a proposed improvement plan that may provide better accessibility for vehicles and pedestrians at the intersection of Main Street at Mill Street.

7. Table 1 indicates that the two intersections along Main Street have bicycle accommodations via a combined shoulder and travel lane width equal to or exceeding 14 feet. Though note "b" is not shown for the intersection of Main Street at Arlington Street, we consider that note "b" is applicable for this location in addition to Main Street at Mill Street. Based on our field observations, the travel lanes are not designated as shared lanes by signage or Sharrow pavement markings. We recommend VAI clarify the presence of bicycle accommodations though no signage or Sharrow pavement markings are present and note any recommendations to provide additional bicycle accommodations within the study area.
8. The discussion of seasonal factors on page 5 and presented in the Appendix reviews the factors for Urban Groups 4-7. However, Main Street is classified as an urban principal arterial, which falls under Urban Group 3. We recommend VAI clarify the functional classification of all the roadways included within the study area and establish if seasonal factors should be applied to additional traffic volumes within the study area.
9. The ATR data sheets in the Appendix for the Gratuity Road location indicate the counts were collected east of Mill Street, not west of Mill Street. We recommend VAI clarify the correct ATR collection.
10. The memorandum notes that the peak-hour volumes presented in Table 2 for Gratuity Road and Jenkins Road are obtained from information provided in Figures 2 and 3. We note the following:
 - a. The peak periods and ATR information between Table 2 and Figures 2 and 3 are inconsistent with the information provided in the Appendix.
 - b. The K-factors presented in Table 2 may be unreasonably high given the roadway classifications within study area. The method for how the K-factors were calculated is also unclear.

VAI should clarify the information from Table 2, Figures 2 and 3, and provide revised information, if needed.

11. The ATR counts for Gratuity Road, west of Mill Street, and Jenkins Road, east of Hickory Drive presented within the Appendix do not include vehicle classifications. Particularly, the heavy-vehicle percentages on the two roadways with ATR counts are of importance so we can understand the potential impact of heavy vehicles within the study area. We recommend VAI clarify if heavy vehicle data is available, and if not, consider collecting an additional ATR counts so we may understand the impact of heavy vehicles within the study area.
12. In Table 2, the Average Weekday Traffic (AWT) presented for Gratuity Road and Jenkins Road may be different than the calculated average between the two sets of 24-hour counts. We recommend VAI clarify the calculation methodology, confirm if the numbers presented in Table 2 are correct, and if not, present the correct information.
13. The Pedestrian Facilities discussion on page 9 notes pedestrians were observed crossing at the Main Street/Mill Street and Mill Street/Gratuity Road/Arlington Street intersections during the peak hours, and that pedestrian activity along the study area roadways was found to be generally low. With implementation of the Project, there is potential for additional pedestrian activity within the study area. We recommend VAI clarify when the pedestrian observations were collected, including time of year and time of day, to understand if there is potential for additional pedestrian activity during other times not observed.
14. In the crash rate worksheets presented in the Appendix, we present the following:
 - a. It is unclear whether the AM or PM peak-hour volumes were used to calculate crash rates;
 - b. A K-factor of 0.097 is used at all intersections, which is consistent with the count data from the previous TIA, but is not consistent with the K-factors presented in Table 2;
 - c. The worksheet for the Main Street/Arlington Street intersection indicates one (1) crash occurred; however, Table 4 indicates no crashes at this location.

We recommend VAI present updated crash rate worksheets, and update Table 4, if needed.

15. We coordinated with the Town to confirm the Specific Development by Others presented on page 10. Based on coordination with the Town, construction is underway for the Proposed Residential Development, Hayes Woods Road; however, the Town does not anticipate any occupancy permits being issued in 2024. The Proposed Age-Restricted Multifamily Residential Development at 797 Boston Road was permitted by the Planning Board in June 2024. Based on the memorandum, the traffic volumes associated with this development within the study area are expected to be relatively minor and would be included in the general background traffic growth rate. We obtained the Special Permit Application for the 797 Boston Road project, and the application states that this project is anticipated to generate 78 vehicle trips per day, five (5) vehicle trips during the weekday morning peak hour, and six (6) vehicle trips during the weekday evening peak hour. We recommend VAI clarify if the specific traffic information provided in the Special Permit Application for 797 Boston Road would significantly impact the results presented in the memorandum.
16. In Figure 5 – 2031 No Build Weekday Evening Peak Hour Traffic Volumes, the Mill Street southbound volume at the intersection of Mill Street at Arlington Street and Gratuity Road should be consistent with the 2024 Existing Weekday Evening Peak Hour Traffic Volumes, presented in Figure 3, grown by the background growth rate, and presented in the Synchro analysis in the Appendix. Based on our understanding, the volume should be 57 vehicles instead of 87 vehicles. We recommend VAI clarify if the 57 vehicles should be the correct number of vehicles presented in Figure 5.

17. In Table 5, Column B, based on the information from the Appendix, the number of entering vehicles should be four (4) and the number of exiting vehicles should be three (3). We note that the seven (7) total vehicles presented is consistent with information from the Appendix. We recommend that VAI clarify the numbers presented in Table 5.
18. Based on information from ITE's *Trip Generation*, 11th edition, the TIS used Land Use Code (LUC) 215 – Single Family Attached Housing and LUC 252 – Senior Adult Housing for the Trip Generation Summary presented in Table 5. Based on information available from *Trip Generation*, the Project may fit the description of LUC 251, Single-Family Senior Adult Housing, better than either LUC 215 or LUC 252. According to the ITE description, LUC 251 includes both detached and attached dwelling units, including “traditional single-family detached homes, patio homes, duplexes, and townhouses. Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space.” LUC 252 is used for multifamily units that “share both floors and walls with other units in the residential building.” We recommend VAI evaluate the potential to apply LUC 251 and establish how this may impact the 2031 Build Volumes and Analysis results, Summary, and Recommendations.
19. Gratuity Road is described as 18 feet wide and contains two (2) full traffic lanes. Using the Trip Generation Summary presented in Table 5, the Project estimates 164 added trips per day and approximately 59 trips would use Gratuity Road. The 59 trips would represent an approximately 35% increase in daily trips on Gratuity Road. We recommend VAI recommend additional improvements as part of the Project, including but not limited to: widening Gratuity Road, adding centerline pavement markings, investigate installing speed limit signs, repairing pavement sections that are in poor condition, and/or implement heavy vehicle restrictions.
20. The Traffic Operations Analysis presented on page 13 states that the peak-hour factors (PHFs) and heavy vehicle percentages (%HV) were obtained from the 2024 TMCs for each approach. However, the Synchro output sheets indicate that the heavy vehicle percentages were applied by movement. We recommend VAI clarify which method was intended to ensure consistency between the Synchro inputs and the narrative.
21. For the Synchro model associated with the Traffic Operations Analysis, we note the following:
 - a. Inputs are inconsistent between the traffic volume figures and the traffic counts included in the Appendix for the following movements:
 - Build Weekday Morning volume for the northbound right-turn movement at Mill Street & Gratuity Road/Arlington Street;
 - Weekday Morning heavy vehicle percentage for NBT at Mill Street & Jenkins Road; and
 - Weekday Morning heavy vehicle percentage for NBR at Jenkins Road & Hickory Drive;
 - b. No conflicting pedestrians or approach grades are provided in the inputs, which could impact the overall results. The memorandum indicates that pedestrians are present during the peak hours; therefore, we anticipate the number of conflicting pedestrians to be greater than zero. Based on our site visit, we anticipate several intersection approach grades to be greater than zero; and
 - c. Delay for the Weekday Evening Build condition on the eastbound lane at the Main Street at Arlington Street intersection shown in Table 6 is inconsistent with the Synchro analysis.

We recommend VAI confirm the inputs and results shown above and provide an updated analysis to understand the Project impact.

22. Table 6 indicates that the Mill Street eastbound approach to the intersection of Main Street at Mill Street during the weekday evening peak hour operates at Level of Service (LOS) F with a 95th percentile queue of 138 feet, and a volume to capacity (v/c) ratio of 0.78. Based on our site visit, we

confirmed the operations are consistent with the information presented in the memorandum. We note that during the 2031 No-Build and 2031 Build Conditions, the 95th percentile queue is anticipated to increase to 233 feet, and the v/c ratio is anticipated to increase to 1.09. We recommend VAI outline if there are any plans to implement mitigation at this intersection due to the operations at the Mill Street eastbound approach.

23. In Table 7, several of the measured sight distances are listed as “500+” feet. Based on our site visit, the intersection sight distance looking east from the Project Site Roadway along Gratuity Road is close to 500 feet and constrained by an existing horizontal curve. We recommend VAI provide a more specific measured sight distance to fully understand the available sight distance.
24. Based on our site visit, the sight distances at the intersection of Main Street at Arlington Street are limited due to the crest vertical curve to the south on Main Street and the bridge abutment directly to the south of Arlington Street. Also, there is no marked crosswalk across Arlington Street despite the presence of pedestrian ramps on both sides of Arlington Street on the west side of Main Street. We recommend VAI consider working with the Town to improve intersection sight distance and potential installation of a crosswalk at the Arlington Street eastbound approach to the intersection of Main Street.
25. Based on our site visit at the intersection of Mill Street at Arlington Street and Gratuity Road, we note there are no yield signs, stop signs, or pavement markings to indicate proper traffic control for the northbound channelized right turn lane from Mill Street onto Arlington Street. We recommend VAI consider working with the Town to recommend proper signing and striping for the northbound channelized right turn lane from Mill Street onto Arlington Street.
26. Based on our site visit at the intersection of Mill Street and Jenkins Road, sight distance is limited due to the crest vertical curve to the south on Mill Street, and the Jenkins Road eastbound approach contains a splitter island to separate turns to/from the north and the south. Jenkins Road contains no centerline markings or signage and creates a potential conflict point where two streams of traffic merge at the west end of the island. Based on Figure 6 from the memorandum, Jenkins Road between Project Site Roadway (Therese Lane) and Mill Street is anticipated to service approximately 64% of Project-related traffic. We recommend VAI address how to better serve Project-related traffic along Jenkins Road, including investigating how to limit conflict points at the intersection of Mill Street and Jenkins Road, and how to improve sight distance south on Mill Street.
27. The fourth item under Recommendations in the Project Access section on page 19 discusses conformance of the work with the *Manual on Uniform Traffic Control Devices* (MUTCD), and it references by footnote the 2009 edition of the MUTCD. By the time the Project is approved, the MUTCD 11th Edition may be adopted by MassDOT. Accordingly, we recommend VAI clarify that a reference to “the latest edition” of the MUTCD may be appropriate.
28. The plans indicate a proposed sidewalk on the east side of Project Site Roadway (Gerard Way) to connect to the south side of Gratuity Road, and the east side of Project Site Roadway (Therese Lane) to connect to the north side of Jenkins Road. We note the proposed sidewalks do not connect to existing or proposed sidewalks along either Gratuity Road or Jenkins Road. We recommend VAI consider working with the Town to facilitate how the proposed sidewalks may tie into plans for future pedestrian accommodations within the study area.
29. The Project access along Jenkins Road is adjacent to the Fairgrounds and Hazel Grove Park. Given the potential for seasonal events at Fairground and/or Hazel Grove Park that could potentially result in additional vehicle trips and/or parking for these events along Jenkins Road, VAI should investigate how the Project would impact traffic operations and safety associated with potential events at Fairgrounds and Hazel Grove Park.

30. In our review of the June 5, 2023 TIA, we commented that if Transportation Demand Management (TDM) measures are required for the Project, the memorandum should include a section covering the proposed measures. VAI responded, in part, in their July 11, 2023, response letter that accompanied their updated TIA, "To the extent that there is a homeowners association, the association will make information available to new residents regarding available public transportation options in the area." Page 6 of the memorandum indicates "regularly scheduled public transportation services are not currently provided to or within the Town of Groton or in the immediate vicinity of the Project site." We recommend VAI include a discussion on TDM and additional measures beyond referencing public transportation that may not be immediately available.

We are available to discuss this review as needed and look forward to presenting this information within the public process.

Very truly yours,

Nitsch Engineering, Inc.



Jeffrey T. Bandini, PE, PTOE
Senior Transportation Project Manager

JTB/pfv