

January 30, 2024

Zoning Board of Appeals
Town of Groton
173 Main Street
Groton, MA 01450

Attn: Bruce Easom, Chair

Subject: Transportation Consulting Services
Heritage Landing 40B Development, Cow Pond Brook Road
Groton, MA

Dear Chair and Board Members:

MDM Transportation Consultants, Inc. (MDM) is pleased to provide you with the following transportation review comments for the above-referenced project. These comments have been prepared based on review of the documents identified below. To facilitate response by Applicant, review items requiring response are noted in ***Bold Italic***.

In summary, MDM finds that the Traffic Impact and Access Study (TIAS) for Heritage Landing 40B Application has been prepared in general conformance with industry standards and reasonably quantifies existing/baseline traffic conditions for study locations along primary roads serving the Site, traffic generation characteristics for the Site, and traffic impacts/operations at the Site driveway and nearby study intersections. Areas of expanded or updated analysis are identified requiring Applicant response that include site access and circulation swept path analysis. Proposed mitigative actions including refreshed pavement markings, regulatory and advance warning/advisory signs should be definitively identified on plans to ensure compliance with applicable MUTCD guidance. Driver speed feedback signs in the site driveway vicinity are also recommended to reinforce lower speeds which are documented to be well above regulatory speed limits in the site area.

Documents Reviewed

MDM has reviewed the following documents to gain an understanding of the project and determine if industry standards have been applied in determining the potential impacts of the project. The following relevant documents were reviewed:

- *Traffic Impact and Access Study, Heritage Landing, Groton Massachusetts, prepared by TEPP LLC, dated January 12, 2024.*
- *Proposed Comprehensive Permit Plan Set, Heritage Landing, Cow Pond Brook Road, prepared by Meisner Brem Corporation, dated January 3, 2024*

Proposed Development

The proposed site development, as presented in the TIAS and associated Comprehensive Permit Plan Set, consists of 28 residential units comprised of 16 single family units and 12 duplex units. Access to the Site is to be provided by a single unsignalized driveway located along Cow Pond Brook Road approximately one-quarter mile north of Hoyt's Wharf Road. Parking includes a total of approximately 56 garage parking spaces representing a per-unit parking ratio of 2 spaces per residential unit excluding driveway/surface spaces.

Traffic Impact and Access Study Comments

Existing Conditions

1. *Study Area:* The study area includes the subject property driveway, Lowell Street at Cow Pond Brook Road and Cow Pond Brook Road at Hoyt's Wharf Road.

The selection of these study locations is consistent with guidelines for study area selection published by MassDOT (locations sustaining 100 vehicle-trip increases or that may experience more than a 5% change in volume); MDM concurs that these study locations are appropriate and in context with the likely traffic impacts for the Project.

2. *Traffic Volumes:* Traffic volumes for study locations were conducted in September and October 2023 for the weekday AM peak period (7:00 AM to 9:00 AM) and weekday PM peak period (4:00 PM to 6:00 PM); expanded daily and hourly counts were also conducted along Cow Pond Brook Road from September 9-17 and October 5-8, 2023. These expanded counts are meant to capture normal hourly fluctuation in traffic resulting from use of recreational field use, Groton transfer station operations and the Groton highway department. Consideration of seasonal factors derived from MassDOT seasonal correction factor data is also noted.

MDM has reviewed baseline traffic volume data and confirms that September and October represent above-average traffic months based on MassDOT permanent count station data; hence no seasonal

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correction factors are required. We also acknowledge that the TIAS analysis reflects a "high-side" traffic volume condition along Cow Pond Brook Road from September 2023 during which soccer fields were in active/full use. Baseline traffic volumes presented in the TIAS therefore are representative of peak traffic volume conditions for the area, exceeding normal industry practice of adjusting baseline volumes for average conditions.

3. *Accidents/Crash Data:* The TIAS presents relevant crash data for the study intersections for the period 2016-2020; these data indicate crash rates that are below MassDOT district average for all locations and none of the study locations are listed on the MassDOT high crash location database.

MDM acknowledges that crash data for the 2015-2019 period presents crash rates that below MassDOT averages, no fatalities are noted for the period evaluated and that study locations are not listed in the MassDOT HSIP list of high crash locations. However, MDM recommends that the crash database review be expanded to include the period 2021-2023 as these data are presently in the MassDOT crash portal and reflect several years additional data including the Pandemic period when crash severity in particular were generally at higher levels throughout the Commonwealth. These additional data may be used to confirm TIAS findings and to validate that safety countermeasures in the study area are not warranted, particularly for pedestrians and bicyclists.

4. *Vehicle Speeds:* Vehicle speeds presented in the TIAS are derived from multi-day automatic traffic recorder (ATR) counts conducted by an independent third-party vendor along Cow Pond Brook Road at multiple locations. The TIAS relies on these data to calculate average and 85th percentile travel speeds along Cow Pond Brook Road as the basis for calculating applicable driveway sight line requirements.

Resulting 85th percentile travel speeds (the speed at which regulatory speed limits are typically established and that serve as the basis for determining driveway sight line requirements) is 44 miles per hour (mph) southbound and 34 mph northbound in the site vicinity. This is well above the 25 mph regulatory speed limits for this segment of Cow Pond Brook Road, suggesting the need for countermeasures that reinforce the speed limit. Potential countermeasures are described under Mitigation which should be considered for implementation by Proponent to reinforce lower speeds and to enhance travel safety along Cow Pond Brook Road.

5. *Driveway Sight Distance:* Measured sight lines For both SSD and ISD exceed 500 feet in both view/travel directions of the driveway and hence meet or exceed applicable AASHTO sight line criteria. Calculated minimum stopping sight distance (SSD) requirement for the proposed

driveway is 347 feet (minimum) southbound and 236 feet (minimum) northbound based on measured 85th percentile travel speeds following AASHTO and MassDOT guidance based on cited design speeds (85th percentile) of 44 mph southbound and 34 mph northbound. Ideal sight distance (ISD) is calculated at up to 420 feet from the driveway.

MDM observed sight lines at the driveway that are in excess of 500 feet in both travel/approach directions for the site driveway location; MDM concurs applicable sight line criteria are met or exceeded.

MDM recommends that the applicable sight line triangles be shown on the Site Layout Plan along with measured sight lines indicating that minimum sight line criteria are met. The Site Layout Plan should also include a note citing that "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 above driveway grade or that would otherwise inhibit sight lines shall be promptly removed."

6. *Sight Lines – Lowell Road at Cow Pond Brook Road:* Measured sight lines for both SSD and ISD exceed 450 feet looking east and 600 feet looking west of Cow Pond Brook Road and hence meet or exceed applicable AASHTO sight line criteria. Available stopping sight distance (SSD) for Cow Pond Brook Road meets travel speeds of up to 40 to 45 mph on Lowell Road.

Measured sight lines are based on vehicle in stopped position beyond the existing painted stop bar/marking on Cow Pond Brook Road; sight lines may also be impaired by roadside vegetation at the intersection during growth seasons. Accordingly, MDM recommends as cited under Mitigation that (a) stop bar pavement markings and STOP sign be relocated for the Cow Pond Brook Road approach to an appropriate vehicle stopped position; (b) a STOP AHEAD sign be placed along Cow Pond Brook Road to reinforce driver awareness of the STOP condition; and (c) maintenance/clearing of roadside vegetation on the north side of Lowell Road within sight line triangles to ensure ample sight lines are provided.

7. *Public Transportation:* The TIAS indicates that public transportation is not available within the study area/project vicinity; the nearest public transportation station is the MBTA commuter rail station at Ayer.

MDM notes that the Groton Council on Aging operates a van service serving qualified senior residents of the town which may also service the site upon request. Door-to-door transportation services provided through these vans pick up qualified residents at home and take them anywhere in town, to surrounding towns, and even to Boston area hospitals. Rides

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are provided for medical appointments, social engagements, shopping, errands and more. Applicant should acknowledge and promote this service in its marketing materials for the project.

Future Conditions

8. *Traffic Growth:* Future traffic volumes are projected to a 7-year horizon using a 1.0 percent annualized growth; no other site-specific background projects are included in the TIAS volume projections.

The applied growth rate of 1.0 percent annual exceeds regional growth trends derived from Central Transportation Planning Staff (CTPS) data of 0.02 percent for the Town of Groton. While there are other known area development projects in Groton, trips associated with these projects are well within the general growth factor applied in this case. The resulting 7-year horizon traffic volumes in the TIAS present a reasonable (and likely conservative) basis for analysis of future-year conditions.

9. *Planned Area Improvements:* The TIAS indicates no planned area roadway improvements within the study area.

MDM concurs on the basis of review of MassDOT project database; however, Proponent should confirm with Groton Public Works whether any planned maintenance or improvements are planned for Lowell Road or Cow Pond Brook Road (both local jurisdiction roadways).

10. *Trip Generation:* Trip estimates for the Project are appropriately based on characteristics published by the Institute of Transportation Engineers (ITE) in Trip Generation 11th Edition for Single Family Detached Housing Land Use Code (LUC) 210 and Single-Family Attached Housing LUC 215. Resulting peak-hour trip estimates are modest and range from 20 to 25 vehicle-trips during AM and PM peak hours, respectively and 30 vehicle-trips during Saturday Midday peak hours using this methodology. Daily trip estimates range from 228 two-way trips on weekdays to 267 two-way trips on Saturdays.

MDM concurs that appropriate methodology was employed in the TIAS to estimate project-related trips for weekday peak hour and daily conditions.

11. *Trip Distribution:* Regional trip patterns for Site traffic presented in the TIAS are based on existing area travel patterns. MDM finds that the resulting trip distribution is generally consistent with observed patterns including the intersection travel patterns

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observed/documented in the TIAS for peak hours. The majority (70 percent) of trips to/from the site are oriented to/from the east where major employment centers exist.

MDM finds that basis for site trip distribution to be consistent with observed/documented trip patterns for area roadways which exhibit highly directional orientation, consistent with commuter travel to/from employment centers located east of the project site.

12. *Operations Analysis:* Operational analyses are presented in the TIAS follow generally accepted traffic engineering practices and protocols, indicating ample capacity at study intersections to accommodate project trip increases. While longer delays are reported for turns from side-street approaches to Lowell Road (particularly left-turns), modest trip increases due to the Project are not expected to materially change operations, delays or LOS designation relative to “No Build” conditions with overall LOS D or better operation.

MDM concurs with analysis results and finds that relative impact of the project is not expected to materially change operating levels or vehicle queuing at study locations. We note that a “sensitivity analysis” is also provided for Saturday conditions (representing an additional 10 percent increase in baseline Saturday peak hour volumes); this analysis also indicates that ample capacity will be available at study locations to accommodate the project traffic, albeit with slightly longer delays for turns from Cow Pond Brook Road.

Site Parking, Access and Circulation Comments

13. *Site Parking:* The proposed parking supply for the project in the aggregate represents a parking ratio of 2 spaces per residential unit, excluding additional parking capacity within unit driveways.

MDM finds the proposed parking supply adequate to accommodate anticipated peak parking demands per ITE Parking Generation (5th Edition) standards.

14. *Site Access Design:* MDM notes the following aspects of driveway design should be considered by the Applicant:

- (a) *MDM recommends that the applicable sight line triangles be shown on the Site Layout Plan;*
- (b) *The Site Layout Plan should also include a note citing that “Signs, landscaping and other features located within sight triangle areas shall be designed, installed and*

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maintained so as not to exceed 2.5-feet in height. Snow windrows located within sight triangle areas that exceed 3.5-feet height above driveway grade or that would otherwise inhibit sight lines shall be promptly removed."

- (c) *Relocation or additional "No Parking" signs should be identified along the Site Frontage to ensure roadside parking associated with recreational field use/parking overflow does not impact driveway sight lines.*

15. *Site Circulation:*

(a) *Applicant should confirm that the Site Layout Plan provides sufficient maneuvering area to accommodate the Town's largest responding fire apparatus (ladder truck) and service vehicles (SU-30 type design vehicles or equivalent) by conducting AutoTurn® vehicle turn analysis/exhibits.*

16. *General Site Plan Comments:*

(a) *The potential for school bus access to the site with centralized pick-up/drop-off area should be considered and discussed with the school department to facilitate student bus loading and buses reversing direction to return to Lowell Road. Alternatively, a school bus waiting area/shelter should be considered at an appropriate location near the Site driveway.*

(d) *MUTCD-compliant signs and markings should be identified on the site development plans for the site driveway.*

Offsite Mitigation Commitments

17. The TIAS generically cites potential offsite improvements to include sign and/or marking improvements at study locations that include Lowell Road at Cow Pond Road and Cow Pond Road at Hoyt's Wharf Road.

Specific recommendations are noted for potential funding or implementation by Proponent as follows:

(a) *Lowell Road at Cow Pond Brook Road Signs and Markings. MDM recommends the STOP line pavement markings and STOP sign be relocated for the Cow Pond Brook Road approach to*

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Lowell Road to allow an appropriate vehicle stopped position that maximizes driver sight lines. A STOP AHEAD sign is also recommended along Cow Pond Brook Road to reinforce driver awareness of the STOP condition. All signs and marking should conform to the latest guidance published in the Manual on Uniform Traffic Control Devices (MUTCD).

(b) Lowell Road Sight Line Enhancements. Field review indicates that sight lines looking east and west from the Cow Pond Road stop position may be impacted by roadside vegetation, substantially reducing driver visibility to oncoming vehicles. MDM advises that regular clearing/maintenance of roadside vegetation be conducted to ensure sight lines are maximized at this location.

(c) Cow Pond Brook Road at Hoyt's Wharf Road Signs and Markings. All signs and markings at this intersection should be updated to conform to the latest guidance published in the MUTCD including All-Way Stop plaques at STOP signs.

(d) Cow Pond Road Speed Advisory/Driver Feedback Signs. Placement of radar-based driver speed feedback signs should be considered by Proponent to reinforce lower speeds and to enhance travel safety along Cow Pond Brook Road for both travel directions in the vicinity of the proposed site driveway. Studies based on research published by the FHWA as summarized in the publication Engineering Countermeasures for Reducing Speeds: A Desktop Reference of Potential Effectiveness, May 2009. Reduction in 85th percentile speeds using speed feedback signs is estimated at an 11 percent reduction.

(e) Cow Pond Brook Road Centerline Markings and "fog line" markings. Centerline markings and edgeline/shoulder markings (also referred to as "fog line" markings) along Cow Pond Brook Road would better define travel lane and roadway edges – a safety enhancement that would benefit both residents of the proposed development and the general public.

MDM appreciates the opportunity to provide Transportation Planning & Engineering Services to the Town of Groton and look forward to discussing our findings at the upcoming Zoning Board hearing. If you have any questions or concerns, please feel free to contact this office.

Sincerely,



Robert J. Michaud, P.E.
Managing Principal

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