

March 25, 2021

Mr. Glenn Clancy, PE
Director of Community Development
Town of Belmont
19 Moore Street
Belmont, Massachusetts 02478

RE: 91 Beatrice Circle
Transportation Peer Review

Dear Mr. Clancy:

As requested, BSC Group, Inc. (BSC) conducted a peer review of the Traffic Impact Memorandum prepared by MDM Transportation Consultants, Inc. (MDM) dated September 23, 2020 for a proposed residential development at 91 Beatrice Circle in Belmont, Massachusetts. A review of the site plans (dated November 4, 2020 and prepared by DeCelle-Burke-Sala & Associates, Inc.) submitted as part of the Comprehensive Permit Application was also conducted.

The purpose of this review is to ensure that the traffic analysis conforms to industry standards, to confirm that the traffic study methods are appropriate for the setting, and to ensure that the recommendations and proposed mitigation adequately address potential project impacts and are consistent with the Town of Belmont's recommended guidelines for transportation improvements. Access to the site will be provided by a single driveway on the south side of the Concord Turnpike/Route 2 Eastbound Frontage Road, which operates as a one-way roadway in the eastbound direction. The driveway will operate as full access allowing right-turns into and out of the site and will be located opposite an existing pedestrian bridge over Route 2. The site currently contains a single-family home that will be removed as part of the Project.

The key findings of our review of the TIAS are presented in the following sections. **BSC's comments and recommendations are presented in bold.**

Scope of Review

The following topics were reviewed in the Traffic Review Letter as part of the peer review:

- Study methodology
- Data collection and existing traffic volumes

Engineers

Environmental
Scientists

Custom Software
Developers

Landscape
Architects

Planners

Surveyors



- Motor vehicle crash analysis
- Trip generation estimates
- Sight distance evaluation
- Traffic operations analysis
- Site access, parking supply and circulation

Study Methodology

The traffic analysis provided in the TIAS presented an evaluation of Design Year conditions (year 2020 with traffic volume adjustments). The study area consists of the intersection of Frontage Road at the site driveway.

Traffic data was collected in June-July 2020 along the Frontage Road with an automatic traffic recorder (ATR). The ATR recorded the traffic volumes and vehicular speeds over the course of two days (June 30 – July 1, 2020). The evaluation included an operations analysis of the Design Year (2020) conditions with the Project. An evaluation of motor vehicle crashes was also conducted to identify any existing safety deficiencies within the study area. Specific recommendations were presented in the memorandum to address off-site impacts.

- 1. The study methodology is generally consistent with the requirements of the Town of Belmont and the Massachusetts Department of Transportation (MassDOT) guidelines for traffic impact assessment with the exception of the evaluation of the Design Year (2020). Traffic impact analyses that follow MassDOT guidelines typically project traffic volumes seven years into the future to evaluate a future “Build” condition scenario that incorporates general traffic growth and any additional traffic volumes from planned projects. BSC requests that the Applicant provide their reasoning for not including a future conditions scenario in the analysis and how this would impact the overall conclusions and findings of memo.**

Data Collection and Existing Traffic Volumes

The Applicant collected traffic data along the Frontage Road in June-July 2020 using an ATR. Due to the historically low traffic volumes during this time period, specific adjustment factors were applied to the traffic volumes to create a baseline condition representative of pre-2020 conditions. The Applicant compared traffic volumes counted in 2019 and 2020 at a continuous count station along Route 2 to determine an appropriate adjustment factor to account for the historically low traffic volumes in 2020. The traffic counts conducted in 2020 along the Frontage Road were adjusted upward by 41 percent for daily volumes, 46 percent for morning peak hour volumes, and 33 percent for evening peak hour volumes. Vehicular speeds were also collected with the ATR and indicated that the 85th percentile speed along the Frontage Road was 38 miles per hour (mph) for the duration of the count period.

The Applicant also noted that a total of 51 pedestrians were counted along the pedestrian bridge and 52 pedestrians were counted along the adjacent sidewalk system over the course of a day, with 6 or fewer during the peak hours. A total of 18 bicycles were observed along Frontage Road on a daily basis, with fewer than 5 during the peak hours.



2. The ATR data was collected during the summer of 2020 during typical weekday commuter peak periods. BSC agrees with the methods of data collection. We also agree that adjustment factors should be applied to the 2020 volumes to represent pre-2020 conditions. However, after reviewing the continuous count station data, the adjustment factors are not high enough to represent the pre-2020 conditions. The following table explains the discrepancy in the adjustment factors:

MassDOT Count Data (Station 4013)				
Time Period	Tuesday June 18, 2019 Traffic Volumes	Tuesday June 23, 2020 Traffic Volumes	Adjustment Factor Used in Analysis	BSC's Calculated Adjustment Factor
Daily	58,987	36,721	1.41	1.61
Morning Peak	9,387	5,030	1.46	1.87
Evening Peak	8,452	5,637	1.33	1.50

The Applicant developed adjustment factors based on a nearby count station that were applied to the 2020 ATR data to represent volumes from 2019. As shown in the above table, the factors the Applicant used were lower than required to adjust the 2020 volumes upward to match the 2019 volumes (e.g. the daily volume of 36,721 needs to be multiplied by 1.61 and not 1.41 to match the 2019 volumes).

The following table shows how the adjustment factors affect the overall traffic volumes that were reported in the memorandum:

Time Period	Frontage Road June 30, 2020 ATR Counts	Adjusted Traffic Volumes used in Analysis	Adjusted Traffic Volumes (based on updated factors)
Daily	2,327	3,280	3,746
Morning Peak	182	266	340
Evening Peak	164	219	246

Based on our independent evaluation, the traffic volumes reported in the memo for Frontage Road that were used in the analysis are expected to be lower than the pre-2020 volumes. BSC requests that the Applicant provide an update on whether this discrepancy will have an impact on the overall conclusions derived from the analyses presented in the memo.

Motor Vehicle Crash Analysis

The Applicant researched motor vehicle crash data for the study area along Frontage Road and concluded that there were no reported crashes in the MassDOT database between 2017 – 2019.

3. BSC verified the information provided in the traffic study. There were no



reported crashes between the years 2017 – 2019. According to MassDOT guidelines, a three-year review period is the minimum and a five-year review period is preferred. We recommend that the Applicant determine if there are any crashes that occurred within a five-year timeframe (add two years to the data).

Trip Generation Estimates

The TIAS estimated the trips generated by the Project based on data provided in the *Institute of Transportation Engineers (ITE) 's Trip Generation, 10th Edition*, using Land Use Code (LUC) 210 – Single-Family Detached Housing and LUC 220 – Multifamily Housing (Low-Rise). The Project is expected to generate 96 trips on an average weekday, 7 trips during the weekday morning peak hour, and 8 trips during the weekday evening peak hour.

- 4. The ITE LUCs that were used are appropriate for the proposed land uses. BSC agrees with the trip generation methodology used in the memo.**

Sight Distance Evaluation

The Applicant provided an evaluation of stopping sight distance (SSD) and intersection sight distance (ISD) at the proposed driveway intersection with Frontage Road. The Applicant noted that the required SSD is 320 feet and the ideal ISD is 365 feet, based on the 85th percentile speed of 38 mph.

- 5. BSC conducted a visit to the Project site to verify sight distances and to observe travel speeds along Frontage Road. Our site visit indicates that available sight distance is approximately 435 feet. BSC also observed vehicles to travel at or above 40 mph. We request that the Applicant determine the required SSD and recommended ISD for speeds of 45 mph.**

BSC has concerns about the safety related to the location of the driveway and crosswalk. We request that the Applicant investigate additional measures to ensure safety at the driveway and crosswalk beyond the proposed crosswalk treatments.

Traffic Operations Analysis

The Applicant conducted a traffic operations analysis for 2020 baseline conditions that include the Project-generated trips. The operations analysis presented an evaluation of vehicular delays, queues, volume-to-capacity ratios, and level-of-service (LOS) at the intersection of Frontage Road and the site driveway.

The operations analysis indicates that the intersection will operate at LOS A (delays under 10 seconds per vehicle).

- 6. The traffic operations analysis was conducted in accordance with traffic engineering standards. BSC agrees with the operations analysis methodology and the reported results.**

As previously mentioned in Comment #1, the analysis did not consider future traffic conditions that incorporate growth and other potential developments in



the area.

Site Access and Circulation

BSC reviewed the “Proposed Site Plan” prepared by DeCelle-Burke-Sala & Associates, Inc., dated November 4, 2020. The site plan shows that the Project will be served by a single driveway 20-feet in width and will intersect Frontage Road in the approximate location of the existing driveway that serves the site. A new crosswalk and wheelchair ramps will be provided across the driveway. A total of 20 parking spaces will be provided on the site. Each residential unit will be assigned a covered garage space and a total of 8 surface spaces will be located on the east side of the site.

The traffic study also included diagrams indicating vehicle paths for a Town of Belmont emergency fire vehicle and for a single-unit moving vehicle (SU-30). The traffic study provided a conceptual plan for a relocated crosswalk across Frontage Road to be located approximately 10 feet to the west of the existing location. The concept plan showed proposed rectangular rapid flashing beacons (RRFB) at the crosswalk.

- 7. The site plan is designed to allow emergency vehicle access to the building and provides a parking ratio of 1.66 spaces per unit. The parking ratio is below the zoning requirements of 2 spaces per unit. We request that the Applicant provide further explanation of the determination of the proposed parking supply.**
- 8. The proposed relocation of the crosswalk will require a new curb ramp on the opposite side of Frontage Road to access the pedestrian bridge. Due to the lack of sidewalk on the opposite side of Frontage Road, the entire roadway will be narrowed to accommodate the width needed for the ramp installation. The crosswalk also does not align with pedestrian desire lines to/from the bridge, especially to access the MBTA bus stop to the east of the driveway.**

The Applicant is also proposing the installation of an RRFB at the crosswalk location. We agree with this treatment and recommend that the Applicant continue to work with the Town on the design of this measure. Appropriate signage should be provided at and in advance of the crosswalk.

We request that the Applicant explore a design of the driveway that retains the existing location of the crosswalk across Frontage Road. This concept should include an ADA accessible ramp at the bridge and the driveway may need to be shifted a few feet to the east.

- 9. The Applicant should ensure that sight lines at the driveway are maintained at all times. Town of Belmont bylaws require driveways to have clear sight triangles set ten feet back from the back of sidewalk, with vegetations and obstructions no higher than three feet in height (Section 4.3.7 of the Zoning Bylaws). The Applicant should confirm that these dimensions will be met and maintained.**

BSC reviewed the traffic impact memorandum for the proposed residential development at 91 Beatrice Circle in Belmont, Massachusetts. We recommend that the Town of Belmont require the Applicant to respond to and address all BSC’s numbered comments in this letter



and submit a response letter for our review.

Please do not hesitate to contact our office with any inquiries you may have.

Very truly yours,

A handwritten signature in black ink, appearing to read "Michael Santos". The signature is fluid and cursive, with the first name "Michael" and last name "Santos" clearly distinguishable.

BSC Group, Inc.

Michael A. Santos, PE, PTOE
Project Manager

cc: Sam Offei-Addo, PE, PTOE