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RE: Traffic Impact and Access Study Review
Cold Brook Crossing Residential Development
North Road
Sudbury, MA

McMahon Associates has completed a Peer Review of the Traffic Impact and Access Study (TIAS) prepared for the proposed Cold Brook Crossing residential development, to be located on North Road (Route 117) in Sudbury, MA, approximately 0.2 miles west of the Concord Town Line.

The Peer Review is based on the TIAS developed by MDM Transportation Consultants, Inc. (herein referred to as "the Applicant") dated February, 2020. McMahon's review of the TIAS was based on the Overall Context Plan prepared by Civil Design Group, LLC dated March 11, 2020 as well as the Environmental Notification Form (ENF) for the project dated December 11, 2019. According to these documents, the proposed site is located on approximately 38 acres of land, which currently consists of a vacant residential property and a gravel pit. The proposed project consists of razing the vacant residential property and constructing 274 residential units. The residential units are proposed to include 151 mid-rise multifamily units and 123 townhome style units. Out of the 274 total units, 81 units are proposed to be age-restricted (31 townhomes and 50 multifamily). The site is proposed to be accessed through one full access driveway on the north side North Road (Route 117), with an additional emergency access driveway located approximately 650 feet west of the main driveway. A total of 766 parking spaces are proposed for the site; including 392 surface parking spaces and 374 garage spaces.

The purpose of this letter is to present our comments on the TIAS and Overall Context Plan. Overall, the methodologies applied conform to standard engineering practices; however, we have identified the following comments listed below.

Existing Conditions/Study Area
A field visit was conducted by McMahon on Monday, April 20, 2020 during clear conditions to confirm site characteristics as reported in the TIAS. The existing conditions documented in the report correspond to the existing field conditions. The site consists of one vacant residential home, with a U-shaped driveway providing access to North Road (Route 117). An additional driveway is located just east of the residential driveway, which provides access to the existing gravel pit. The following study area intersections were included as part of the study:

- North Road (Route 117) at Dakin Road/Pantry Road
- North Road (Route 117) at Powder Mill Road/Mossman Road
- North Road (Route 117) at Main Site Driveway

We agree that these intersections reflect key intersections within the vicinity of the site. However, as a majority of the site traffic is expected to come from the east via North Road (Route 117), we suggest that the Applicant consider including the intersection of Fitchburg Turnpike (Route 117) at Sudbury Road in the study area. This signalized intersection is located less than a mile east of the proposed site driveway, just over the Town Line in Concord, MA.

In addition, the ENF identified the following additional study area intersections within the Towns of Sudbury and Concord where transportation improvements may be implemented:

- **North Road (Route 117) at Cummings Office Park (142-150 North Road), Sudbury**
- **Fitchburg Turnpike (Route 117) at Plainfield Road, Concord**

Comments from the Town of Concord also note that the following intersections should be considered when implementing traffic signal synchronization;

- **Fitchburg Turnpike (Route 117) at Sudbury Road, Concord**
- **South Great Road (Route 117) at Concord Road (Route 126), Lincoln**

Traffic Data
Automatic Traffic Recorder (ATR) data was collected as part of a previous project on North Road (Route 117) adjacent to the project site to evaluate daily traffic volumes and vehicle speeds. ATR data was collected for a 24-hour period on Thursday, September 27, 2018. Based on the data collected, the weekday average daily traffic (ADT) on North Road (Route 117) is approximately 12,400 vehicles per day (vpd). The ATR data indicates that the 85th percentile speeds on North Road (Route 117) in the vicinity of the site are 41 mph and 45 mph for eastbound and westbound traffic, respectively.

Turning movement counts (TMCs) conducted as part of a traffic impact study completed for a previous potential development on the site were used for the traffic analysis. The TMC's were conducted at the study area intersections during the weekday morning (7:00 AM to 9:00 AM) and weekday afternoon

(4:00 PM to 6:00 PM) peak periods on Thursday, September 20, 2018 and Thursday, September 27, 2018. The network peak hour for the study area, which was used as a basis of the traffic analysis, consists of the four highest consecutive 15-minute intervals during each count period. **Based on a review of the ATR data, daily traffic patterns on North Road (Route 117) coincide with the TMC time periods. We agree that the weekday morning peak hour occurs between 7:30 AM and 8:30 AM and the weekday afternoon peak hour occurs between 5:00 PM and 6:00 PM, as presented in the TIAS.**

In order to adjust the 2018 traffic volumes to 2020 baseline volumes, the Applicant reviewed historical traffic data from a count station on Elm Street (Route 2) in Concord, MA (Station ID #403). Based on the data provided, traffic volumes in this area have increased by an average of approximately 0.4% per year between 2010 and 2018. Based on this calculation traffic volumes were adjusted by 0.5% per year to grow the 2018 volumes to 2020 baseline volumes. **We agree that the 0.5% annual growth rate is appropriate to apply to the 2018 data to generate 2020 baseline volumes.**

Historical traffic data from a MassDOT continuous count station located on Elm Street (Route 2) approximately 4.5 miles northeast of the project site in Concord, MA (Station ID #403) was reviewed to determine a seasonal factor for the collected traffic volumes. Elm Street (Route 2) is classified as an urban principal arterial. Based on traffic volumes collected at this location, traffic volumes collected in the month of September represent an average month. Therefore, no seasonal adjustment was applied to the 2020 baseline traffic volumes. **We agree that traffic volumes collected in this area in the month of September generally reflect an average month, and no seasonally adjustment is necessary.**

Safety

A crash summary was completed for the intersections of North Road (Route 117) at Dakin Road/Pantry Road and North Road (Route 117) at Powder Mill Road/Mossman Road. The summary was based on three years of data from 2017 to 2019, collected from MassDOT. Crash rates were calculated for each intersection and compared to the District 3 average crash rates of 0.61 and 0.89 crashes per million entering vehicles (MEV) for unsignalized and signalized intersections, respectively. The most recent crash data available through the MassDOT Crash Portal includes crash data through the year 2017, as data from 2018 and 2019 are noted to be subject to change. The MassDOT Transportation Impact Assessment Guidelines state that a review of the most recent five years of available data is preferred. **We suggest that the Applicant review the most recent five years of competed crash data available through MassDOT, which would include data for 2013 to 2017. We also suggest that crash data along North Road (Route 117) in the vicinity of the proposed site driveway is reviewed. Crash rates should be compared to both the District and Statewide averages to assess potential safety concerns.**

Sight Distance

During the field visit, McMahon reviewed the sight distance measurements outlined in the study. The TIAS indicated that with the proposed clearing and regrading, the sight lines looking both left (east) and right (west) from the site driveway satisfy the American Society of State Highway and Transportation Officials' (AASHTO) minimum requirements for both stopping and intersection sight

distance based on the measured 85th percentile speeds. **Based on sight distance measurements taken in the field, we agree that the proposed driveway location meets the AASHTO minimum sight distance requirements. It is recommended that all proposed landscaping and signage remain under a height of two-feet, and are placed as to not obstruct sight lines.**

Background Growth
The Applicant reviewed historical traffic data from a count station on Elm Street (Route 2) in Concord, MA (Station ID #403) to calculate a background growth rate of approximately 0.4% per year between 2010 and 2018. A conservative growth rate of 1% was applied to the existing traffic volumes to project the 2020 baseline volumes to the 2027 No Build traffic conditions. This growth rate was assumed to account for general population growth and small development projects. **We agree that the 1% annual growth rate applied is expected to present a conservative analysis based on the historical traffic data available.**

The Applicant noted that the Town of Sudbury identified one proposed development which was to be included in the 2027 future traffic projections. Maynard Crossing, a proposed mixed-use development is to be located off of Parker Street, less than four miles southwest of the project site. The TIAS states that trip generation estimates provided in the traffic study prepared for the development were applied to the study area. **We agree that the trip generation estimates and distributions for the Maynard Crossing development are applied to the study area appropriately. Due to the Cold Brook Crossing site's close proximity to the Town of Concord, we suggest that the Applicant contact the Town of Concord Planning Department to confirm that there are no additional developments that should be included in the traffic volume projections.**

Trip Generation
The trip generation estimates for the proposed project use were developed based on data available from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*. ITE Land Use Code (LUC) 220 – Low Rise Multifamily was used for the 123 proposed townhomes, and 221-Mid-Rise Multifamily was used for the proposed 151 apartment style units. The trip generation calculations were provided, indicating the results of the average trip for each land use. **Although LUC 251 (Senior Adult Housing—Detached) and LUC 252 (Senior Adult Housing—Attached) would also be applicable to the proposed age-restricted units, we agree with the trip generation calculations provided as they present a conservative analysis.**

Based on a review of the Overall Context Plan prepared by Civil Design Group, LLC dated March 11, 2020, there is remaining developable land within the property line that is over the Sudbury Town line in Concord, MA, located on the northeastern portion of the site. Although the plan does not indicate any proposed housing units in this portion of the site, the proposed Cold Brook Crossing Drive site plan is shown to have the potential to extend to this remaining developable land. **We recommend that the Applicant confirm what the intent is with the remaining developable land. If there is a**

possibility of additional development being proposed, we suggest that the TIAS be revised to include a scenario which represents a full build out of the site to include these units.

Trip Distribution
The vehicle trips expected to be generated by the proposed project were distributed based on U.S. Census Journey-to-Work data. **We agree that this methodology is appropriate for the respective land uses.**

Based on the Trip Distribution graphic (Figure 6) provided in the TIAS, 5% of trips were assumed to access the site via local roadways outside of the study area intersections. **Although it is not expected to have a notable impact on the capacity analysis results, it is suggested that the capacity analysis be revised to show all new trips accessing the site through the study area intersections.**

Parking Generation
The Overall Context Plan indicates that the site is proposed to include a total of 766 parking spaces, including 392 surface parking spaces and 374 garage spaces. Based on the Town of Sudbury zoning map, the site was previously zoned as Research (RD), but was recently designated a Smart-Growth Overlay District and North Road Residential Overlay District (NRROD) in order to allow for the proposed project. The Zoning Bylaws for the NRROD state that "The NRROD shall comply with the parking standards of Section 3100" of the Town's Zoning Bylaws. Section §3100 -3120 "Number of Parking Spaces" of the Town's Zoning Bylaws indicates that the proposed site would require a minimum of two parking spaces per dwelling unit, which equates to a total of 548 parking spaces. **The proposed 766 parking spaces are expected to be adequate for the proposed site based on the Town's Zoning Bylaw.**

Traffic Analysis
During the field visit, we observed the existing signal phases and timings at the intersection of North Road (Route 117) at Dakin Road/Pantry Road and found minor inconsistencies with what was presented in the TIAS. The yellow and red clearance times were measured to be four and one seconds, respectively, which is inconsistent with what is presented in the TIAS. **We recommend that the Applicant confirm the signal timings with the latest traffic signal plan for North Road (Route 117) at Dakin Road/Pantry Road and update the capacity analysis appropriately**.

A capacity analysis was completed by the Applicant using Synchro 10 software for the study area intersections for the weekday morning and weekday afternoon peak hours under the 2020 Existing, 2027 No Build, and 2027 Build conditions. **The capacity analysis indicates that the proposed development is not expected to have a significant impact on the traffic operations at the existing study area intersections. We suggest that additional mitigation measures be considered for potential impacts to additional study area intersections and the proposed site driveway based on recommendations from this review.**

Conclusions and Recommendations

The study outlines Traffic Demand Management (TDM) measures in which the Proponent is committed to implementing in efforts to minimize vehicular traffic to and from the site. Additional mitigation at the site driveway, as shown on the Conceptual Roadway Improvement plan provided in the TIAS, includes widening North Road (Route 117) to include an eastbound left turn lane into the site, with a storage length of approximately 150 feet. This would minimize impacts to eastbound through traffic on North Road (Route 117). Based on the capacity analysis results provided in the TIAS, a scenario with this mitigation in place was not analyzed. **We suggest that the Applicant include any proposed mitigation in their capacity analysis. Analyzing the proposed mitigation alternative should also confirm the storage length requirements for the eastbound left-turn lane. Additional mitigation alternatives that we suggest the Applicant consider include:**

- **Providing a two-lane exit at the site driveway to include separate left-turn and right-turn lanes.**
- **Completing a signal warrant analysis at the site driveway to verify the appropriate traffic control. If a traffic signal is warranted, the project team should explore the feasibility of constructing a new traffic signal.**

If you should have any further questions or require further information, please feel free to contact us.

Very truly yours,

Jeffrey T. Bandini, P.E., PTOE
Project Manager