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F. A. Hesketh
& Associates, Inc.

July 25, 2022

Ms. Suzanne Choate, P.E.
Design Professionals, Inc.
P.O. Box 1167
21 Jeffrey Drive
South Windsor, CT 06074

**RE: Marlborough Multi-Family**
**South Main Street and Johnson Road**
**Marlborough, Connecticut**
**Our File # 21105**

Dear Mrs. Choate:

Pursuant to your request our office has prepared this report to document our findings related to the potential traffic impact of a proposed residential development located on the northwest corner of South Main Street and Johnson Road in the Town of Marlborough, Connecticut. The site location is presented in Figure 1 with respect to the surrounding roadway network. This report presents our findings.

**Site Plan**

The site proposed for development is currently a wooded site. The property has frontage to South Main Street and Johnson Road. The proposed site plan, prepared by your office, shows two proposed apartment buildings located in the northwest corner of the site. A parking lot with a total of 144 parking spaces is proposed. Access to the site is proposed by way of a full access driveway to South Main Street, located approximately 200 feet west of Johnson Road and 60 feet east of School Street. The proposed driveway will provide 24 feet of pavement with a single lane for both entering and exiting traffic. The driveway approach will operate under stop sign control.

**Description of Area**

The site proposed for development is located on the northwest corner of the intersection of South Main Street and Johnson Road. South Main Street is a town-maintained

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roadway that originates at a signalized intersection with Route 66 and extends in an easterly direction past the subject site through an unsignalized intersection with Johnson Road and continues east to an interchange with Route 2. Across the site frontage the roadway provides approximately 32 feet of pavement with a single 12-foot lane and painted shoulder in each direction. West of the site the roadway widens to provide a dedicated left turn lane for the Big Y Plaza and Route 66. The roadway is posted at 25 miles per hour west of Johnson Road and 35 miles per hour east of that roadway. Land use immediately east of Route 66 is a mix of commercial and residential, and residential east of Johnson Road. A concrete sidewalk is provided on the east side of the roadway from Johnson Road to Route 66.

Johnson Road is a town-maintained roadway that originates at a unsignalized intersection with South Main Street and extends in a northerly direction over Route 2 to its terminus at an unsignalized four-way intersection with Hebron Road and Parker Road. Johnson Road provides 24-28 feet of pavement separated by a double yellow centerline with no painted shoulders. The posted speed limit is 25 miles per hour. Land use along Johnson road is residential.

School Drive originates at an unsignalized intersection with South Main Street and extends in a southwesterly direction to its terminus at Route 66. School Drive provides 24 to 26 feet of pavement with a single travel lane in each direction separated by a painted double yellow centerline. The roadway is a dead-end roadway, with only school buses and emergency vehicles allowed to utilize the Route 66 access. The roadway is posted at 25 mph and speed bumps are located along the roadway. The roadway serves mainly as an access to the Elmer Thienes-Mary Hall Elementary School, the Richmond Memorial Library and the Marlborough Senior Center. A sidewalk is provided from South Main Street to the School.

**Current Traffic Volumes**

The Connecticut DOT maintains a traffic volume count program on all state highways and some local roadways. Included within the DOT database are counts conducted during March 2021, during the Covid pandemic, on Route 66 southwest of North Main Street, on South Main Street southwest of Route 66, and on South Main Street southeast of South Road. These counts are lower than the previous counts conducted pre-pandemic. We therefore have utilized these pre-pandemic volumes in this study. The count on Route 66, taken during December 2018, indicates an Average Daily Traffic volume (ADT) of 13,000 vehicles with peak hour volumes of 1,146 vehicles during the a.m. peak hour (7:00 a.m.) and 1,243 vehicles during the p.m. peak hour (4:00 p.m.). The South Main Street count, south of Route 66, taken during April 2006, indicates an Average Daily Traffic volume (ADT) of 10,700 vehicles with peak hour volumes of 894 vehicles during the a.m. peak hour (7:00 a.m.) and 982 vehicles during the p.m. peak hour (5:00 p.m.). The South Main Street count, south of South Road, conducted during 2018, indicates an Average Daily Traffic volume (ADT) of 2,100 vehicles with peak hour volumes of 146 vehicles during the a.m. peak hour (8:00 a.m.) and 183 vehicles during the p.m. peak hour (4:00 p.m.). The ConnDOT counts are presented in Tables 1, 2 and 3.

Copies of a traffic impact report prepared by our office for the recently approved Big Y Convenience Store, located at the intersection of Route 166 and North Main Street were obtained. These volumes were based on the traffic impact report for the Marlborough Tavern Green, ConnDOT volumes and manual turning movement counts conducted by our office. The combined volumes from that report were used as the existing traffic volumes for that intersection.

Additional manual turning movement counts were conducted for the intersection of South Main Street and Johnson Road during January 2021 and for the intersection of South Main Street with School Drive during June 2022. These counts, together with the ConnDOT counts and the Marlborough Tavern Green report were utilized to develop

turning movements for that intersection. A growth rate of 1% per year was applied to the observed volumes. The resultant background traffic volumes represent the 2024 background traffic volumes for the morning, and afternoon peak hours for the study area. These volumes are presented in Figure 3.

In addition to the ConnDOT counts described above, our office has reviewed the files of OSTA and the Town of Marlborough to determine if there have been any recent approvals or submissions that may have an impact on traffic volumes in the vicinity. None have been identified other than the Big Y Convenience Store which is included in the figures already.

**Site Generated Traffic**

To determine the trip generation for the proposed site, the Institute of Transportation Engineers (ITE) *Trip Generation* Report was consulted. *Trip Generation* presents trip generation estimates for many land uses based on counts conducted at existing facilities throughout the country. Included within the ITE database is Land Use Code 221: Multi Family (Mid Rise). A mid-rise multi-family use is defined as having between four and ten stories. The report presents data based on the number of units. Based on the ITE data, the proposed 98 unit apartment development is projected to generate a total of 445 trips on a daily basis, with peak hour volumes of 36 trips, made up of 8 entering and 28 exiting movements, during the morning peak hour, and 39 trips, made up of 23 entering and 15 exiting movements during the afternoon peak hour. The trip generation summary is presented in Table 4.

The site generated traffic was then applied to the existing roadway network with a directional distribution of 65% to and from Route 66 to the northeast, 15% to and from Route 66 to the southwest, 5% to and from North Main Street and 15% to and from South Main Street southeast of the site. The directional distribution is shown in Figure 4. Based on this distribution, Figure 5 represents the distributed site generated traffic. By adding

these volumes to the 2024 background traffic volumes from Figure 3, the combined traffic volumes, upon completion of the development, can be represented. These volumes present the 2024 combined traffic volumes as presented in Figure 6, for the morning, and afternoon peak hours, respectively.

**Intersection Capacity**

To determine the impact of the site generated traffic on the existing roadway network, capacity analyses were conducted for the background and combined traffic volume conditions for the morning, afternoon, and Saturday peak hours. The computer program *SYNCHRO,* which is based on the methodology in the Highway Capacity Manual, was utilized for this purpose. The general method determines how much of the capacity available for each movement is being utilized. This is converted into a delay for each movement, and the delay is rated on a level of service (LOS) scale from A to F, with A being the best level of service with low delays and F being the poorest level of service with high delays. An analysis was completed for the signalized intersection of Route 66/ East Hampton Road, with North and South Main Streets, as well as for the proposed site driveways. The capacity analysis worksheets are included in the appendix. The level of service results are summarized in Table 5.

**Route 66 (East Hampton Road) at North/South Main Street -** This is an existing signalized intersection, with Route 66 oriented in the north/south direction. North Main Street approaches from the west and South Main Street approaches from the east. All four approaches provide a dedicated left turn lane and a shared through\right turn lane. The signal operates with advanced protected left turns followed by the through movements with permitted left turns in the north/south direction, followed by the same phasing for the east/west direction. An analysis indicates that the intersection operates at an overall LOS C during the morning peak hour, and at a LOS E during the afternoon peak hour under background conditions. With the introduction of the site generated traffic,

the intersection will continue to operate at the same levels of service as in the background conditions.

**South Main Street at School Drive -** This is an existing unsignalized intersection with South Main Street oriented in an east/west direction. School Drive approaches from the south and operates under stop sign control. All approaches provide a single lane approach. An analysis indicates that the Route 66 approaches operate at a LOS A during peak hours, and the School Drive approach operates at a LOS C during the morning peak hour and at a LOS B during the afternoon peak hour. With the introduction of the sit generated traffic, the Route 66 approaches will continue to operate at a LOS A during peak hours. The School Drive approach will operate at a LOS D during the morning peak hour and at a LOS B during the afternoon peak hour.

**South Main Street at Johnson Road -** This is an existing unsignalized intersection with South Main Street oriented in an east/west direction. Johnson Road approaches from the north and operates under stop sign control. All approaches provide a single lane approach. An analysis indicates that the Route 66 approaches operate at a LOS A during peak hours, and the site driveway approach operates at a LOS B during the morning and afternoon peak hours under both background and combined conditions.

**South Main Street at Site Driveway -** This is a proposed un-signalized intersection with South Main Street oriented in the east/west direction. The site driveway approaches from the north and operates under stop sign control. All approaches provide a single lane. An analysis indicates that the South Main Street approaches will operate at a LOS A during peak hours and the site driveway approach will operate at a LOS B during the morning peak hour and at a LOS A during the afternoon peak hour.

**Left Turn Warrant**

A review was completed to determine if a widening is required for a left turn lane at the proposed site access driveway. The analysis reflects the methodology contained in the ConnDOT Highway Design Manual and is based on the volume of through traffic, volume of left turns and volume of opposing traffic at the intersection. The analysis indicates that a left turn lane is not warranted. There are no left turns or by-pass areas provided at other locations along South Main Street. Based on the projected level of service for the mainline traffic and the low volume of left turns at the intersection and the lack of by-pass areas along the roadway, it is my profession opinion that a bypass capability is not warranted either. The analysis worksheets are included in the appendix.

**Alternate Site Access**

At the request of Town Staff, we have reviewed an alternate site access to Johnson Road. Figure 6 presents the background, site generated and combined traffic volumes for the alternate Johnson Road access drive and for the intersection of Johnson Road and South Main Street. Table 6 presents the LOS results for the two intersections based on the volumes presented in Figure 6. The analysis indicates that all approaches at the two intersections will operate at a LOS A or B during peak hours under the combined traffic volumes.

**Site Driveway Location and Design**

The proposed site driveway to South Main Street is located approximately 200 feet west of Johnson Road and 60 feet east of and opposite School Drive. The proposed site driveway is located opposite of and 60 feet east of School Drive. This location was chosen as it is the only location where the site has frontage, that does not require an extensive wetlands crossing. Although it is preferable to locate two intersecting roadways or streets directly opposite from each other, the location of the driveway should not present any operational issues. Because the site driveway is located east of School

Street, the offset allows for simultaneous left turns without conflict.

Observations of the operations at School Street indicate that, although the driveway is quite busy at times, there were no significant back-ups along South Main Street that would interfere with operations of the site driveway. The capacity analysis indicates that the operations of the site driveway will not impact the existing operations at School Drive. During the morning peak hour, the heaviest flow of traffic from the site is exiting traffic, with few entering vehicles. The afternoon peak hour of the site will occur after the peak hour of the school.

The available intersection sight distance at this location is in excess of 400 feet in each direction. The available sight distance meets the current ConnDOT criteria for an approach speed of 35 miles per hour. South Main Street in this area is posted at 25 mph.

**Accident Experience**

The University of Connecticut gathers and compiles traffic accident data for all state highways and some major local roadways. A list of accidents occurring in the area from April 1st, 2019 through March 31st, 2022 includes the most recent 3 years of available data. In the appendix are the UConn tables relating the accidents to various conditions including date, time, roadway and weather conditions, collision types, and other variables as well as a short description of each accident.

Accident records were obtained for the full length of South Main Street from Route 66 to the Hebron Town line. The 3 year accident history indicates a total of 10 accidents, involving 18 vehicles. Of the 10 accidents on South Main Street, four occurred at the intersection of Route 66, one at Johnson Road, one at Wilhenger Drive, one at South Road, one at the Route 2 ramps and two near Jerry Daniels Road. There were four rear end accidents, 1 angle accident, four fixed object accidents and one backing up accident. All ten accidents were property damage only. There were no fatalities reported.

**State Approval**

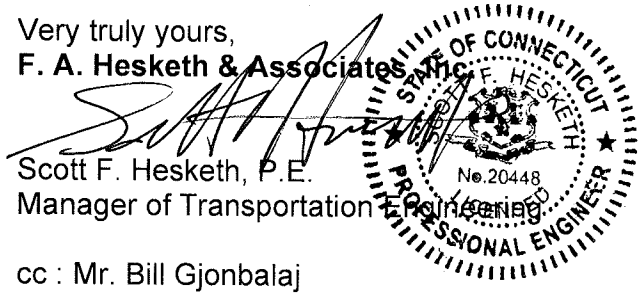
Since the development does not propose access to a State highway it will not be necessary to obtain an encroachment permit from the ConnDOT District II Administration Office. Since the development includes less than 100,000 s.f. of floor area and fewer than 100 residential units and fewer than 200 parking spaces, a review by OSTA of the project as a major traffic generator will not be required.

**Conclusion**

Based on our analysis, it is our professional opinion that the traffic volumes associated with the proposed housing development can readily be accommodated by the existing roadway network. The proposed site driveway is properly located with respect to adjacent intersections and with respect to available sight distances and are properly designed to accommodate the anticipated driveway volumes. A secondary access to Johnson Road could be added for convenience or for emergency access, but a second access is not required from a capacity standpoint.

We appreciate the opportunity to provide this analysis to you. We will be available to offer testimony in support of your application before local planning agencies upon your request. If you require additional information regarding this application, please do not hesitate to contact our office.

Very truly yours,
**F. A. Hesketh & Associates, Inc.**




Scott F. Hesketh, P.E.
Manager of Transportation Engineering

cc : Mr. Bill Gjonbalaj

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