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Mr. Kent V. Morash, P.Eng.
KVM Consultants Ltd.
Suite 202, 51 Cobequid Road
Lower Sackville, NS B4C 2N1

RE: A Traffic Impact Statement for a proposed development on Sackville Drive

Dear Mr. Morash:

1.0 INTRODUCTION

At the request of *KVM Consultants Ltd. (KVM)*, the GRIFFIN transportation group inc. has completed a qualitative Stage 1 - Traffic Impact Assessment in support of the planning application requested by the Halifax Regional Municipality's Planning and Development Department for a proposed residential development located in the southeast quadrant of the Sackville Drive / Millwood Drive intersection, in the community of Middle Sackville, Halifax Regional Municipality (HRM).

The subject property (PID #40109308) located on the south side of Sackville Drive is currently undeveloped and has an area of about 3.3 acres. These lands are located in the Sackville Land Use By-Law area and currently has an R-6 (Rural Residential) zone designation. The site location is generally illustrated in *Figure 1*.

It is understood that the proposed development will be comprised of two individual buildings that will have a height of four floors and will each contain 53 apartment-style units. When complete, there will be a total of 106 residential units on the property.

Vehicle access to this development will be provided via two new driveways connecting directly to the south side of Sackville Drive, east of Millwood Drive. The west access will be located about 95m east of Millwood Drive (centreline distance), while the east access will be located near the east property boundary, about 200 m from Millwood Drive. The driveway locations are shown in *Figure 2*.

Figure 1: Study Area and Site Context



Source: HRM GIS Mapping

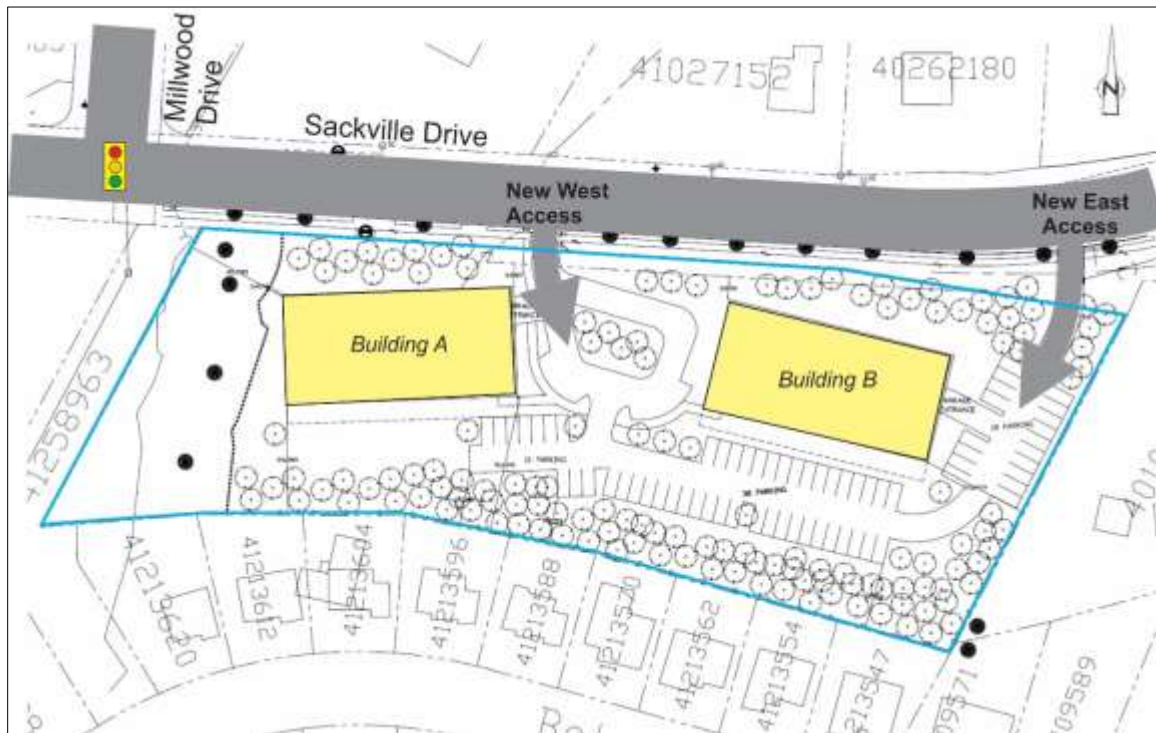
2.0 STUDY AREA AND SITE CONEXT

2.1 Overview

Sackville Drive is generally aligned in an east-west direction through the study area. It has a three-lane asphalt travel way that includes one lane in each direction and a centre two-way left-turn lane (TWLTL). The pavement measures 10.4 m wide and the street has an urban curb-and-gutter cross-section. Pedestrian sidewalks are provided along both sides of the street, which includes the entire frontage of the subject property.

Sackville Drive is under the jurisdiction of the Halifax Regional Municipality (HRM), and in the vicinity of the subject property, appears to function as major collector street. This corridor serves multiple modes of travel including commuter cars, public transit, walking and cycling. A signaled pedestrian crosswalk is provided at the adjacent Millwood Drive intersection, about 95 m away from the nearest site driveway.

Figure 2: Proposed Internal Site Layout



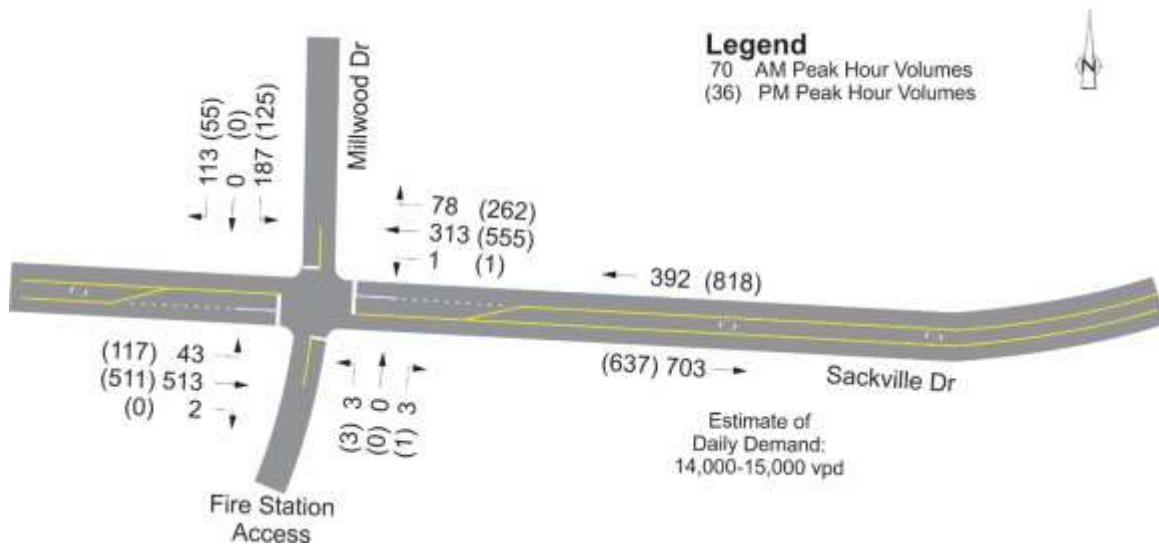
Source: KVM Consultants Ltd.

2.2 Existing Traffic Volume Review

Due to a provincial state of emergency GRIFFIN was not able to gather current and representative traffic volumes that would be representative of typical peak period conditions along Sackville Drive. As such, HRM's Traffic Management department were contacted to obtain recent peak hour traffic volumes in the vicinity of the site. Several sets of traffic data from 2015 to 2017 were provided including a peak hour turning movement count at the adjacent Sackville Drive / Millwood Drive signalized intersection recorded in August 2017. The weekday morning and afternoon peak hour traffic volumes from this count are shown graphically in *Figure 3*. It was concluded the two-way afternoon peak hour demand traveling along Sackville Drive in the vicinity of the future site accesses is about 1,455 vph.

Another set of data recorded by HRM included hourly profiles on Sackville Drive during a one-week time frame in October 2016. These data suggested that the Average Annual Weekday Traffic (AAWT) volume was about 9,000 – although current 2020 volumes are likely slightly higher and in the range of 10,000-12,000. Higher class roadways with a three-lane cross-section (i.e. with a centre TWLTL) typically have daily capacities that range between 20,000 and 25,000 vpd. This suggests there is residual capacity in the corridor and some ability to accommodate future traffic growth.

Figure 3: Observed Peak Hour Volumes – August 2017 (HRM)



In addition to the fact that Sackville Drive is currently operating below capacity, there is a traffic signal located in close proximity. Based on field observations, the red phase of the traffic signal interrupts the east-west traffic flow along Sackville Drive which creates gaps in the traffic stream – particularly in the vicinity of the proposed access locations. This suggests that there will be adequate gaps for site-generated traffic entering and exiting the proposed development.

2.3 Vehicle Operating Speed Data

Using a hand-held radar unit, GRIFFIN gathered vehicle operating speed data along Sackville Drive, east of Millwood Drive on May 6th, 2020. These data only included free-flow vehicle speeds not influenced by slowing/turning vehicles at adjacent intersections or driveways. Although not a statistically rigorous survey, all of the speed recordings were assembled and an 85th percentile vehicle speed was calculated. This value has been identified as a reasonable “design” speed that is used by many road agencies across North America to set regulatory speed limits on roadways. In the case of this assessment, the 85th percentile vehicle operating speed was used for the stopping sight distance review.

The calculated 85th percentile vehicle operating speed on Sackville Drive was determined to be 68 km/h and included vehicles traveling in both directions. In order to remain conservative, a 70 km/h was chosen as the design speed for the sight distance assessment discussed below.

3.0 NEW VEHICLE ACCESSES

3.1 Overview

Vehicle access to/from the proposed development will be provided via two separate driveway connections to Sackville Drive. They include the following:

1. *West Access* – located approximately 95 m east of Millwood Drive (centreline distance).
2. *East Access* – located approximately 200 m east of Millwood Drive (centreline distance).

The location of both proposed accesses are shown in *Figure 2*. It should be noted that the existing lane configuration along Sackville Drive includes a centre two-way left turn lane (TWLTL), and thus, provides an auxiliary left turn lane at each of these new access locations.

3.2 Corner Clearance Review

Providing a sufficient distance between accesses and intersections helps to ensure no new traffic operational issues are created when new accesses are built. As such, a corner clearance review was undertaken at the most critical location – between the existing Sackville Drive / Millwood Drive intersection and the proposed new west access.

At the west access location, GRIFFIN was only able to provide an estimate of the corner clearance distance at this time since the detailed design step has not yet been completed. To start, GRIFFIN assumed that each corner radii (i.e. at the Millwood intersection and the proposed west access locations) comprise of about 15 m in longitudinal distance each. Based on this assumption, a total of 30m was removed from the 95 m centreline distance, which yielded a “tangent” distance along Sackville Drive of about 65 m. Therefore, it was concluded that the corner clearance at this location exceeds the HRM minimum requirement of 30 m for this classification of road.

3.3 Driver Stopping Sight Distance Review

The sight distance review was based on the guidelines contained in the latest Transportation Association of Canada’s (TAC) Geometric Design Guide for Canadian Roads document (2017). At this early stage of the planning process only the minimum requirement for vehicles approaching the new access was assessed. This is referred to as stopping sight distance (SSD). The provision of adequate SSD for vehicles traveling on the main roadway – in this case Sackville Drive – ensures that drivers have sufficient forward visibility to identify a hazard in the roadway, and if needed, bring their vehicle to a stop.

The field measurements were carried out by GRIFFIN and followed HRM/NSTIR best practices and TAC guidelines including a driver eye height of 1.05 m and an object/hazard height of 0.60 m. The 0.60 m object was placed at the approximate centre of the proposed new access, on the edge of the eastbound (inbound) travel lane.

A summary of the field measured sight distances relative to the minimum requirements for a 70 km/h operating speed is provided in *Table 1*.

Table 1: Summary of Stopping Sight Distance Measurements (70 km/h)

Measurement Location	Travel Direction	Available SSD	TAC Required SSD		Does Available Exceed Required?
			Base ^A	Slope Adjusted	
West Access (95m east of Millwood Dr)	Westbound	108 m	105 m (70 km/h)	100 m (+3%) ^B	Yes
	Eastbound	186 m		110 m (-3%) ^B	Yes
East Access (200m east of Millwood Dr)	Westbound	203 m		110 m (-3%) ^B	Yes
	Eastbound	143 m		110 m (-3%) ^B	Yes

A – 2017 TAC Chapter 2, Table 2.5.2

B – An estimate of the actual slope along Sackville Drive on the approaches to the site accesses.

Based on the site conditions, the available stopping sight distances along Sackville Drive appears to meet or exceed TAC minimum requirements for a 70 km/h vehicle operating speed and the proposed accesses thus meet minimum design guidelines. Following the planning approval process associated with the proposed development, the geometric design team will need to confirm the final location of the site accesses and ensure that minimum driver sight distances, intersection corner clearances and sight triangles are provided.

Figure 4: Driver Views Along Sackville Drive


West Access – Looking west (left)



West Access – Looking east (right)



East Access – Looking west (left)



East Access – Looking east (right)

4.0 SITE TRIP GENERATION

In order to assess the change in traffic volumes on the study area streets under future conditions, there was a need to determine the number of new vehicles that would be entering and exiting the proposed residential development. This is referred to as the trip generation calculation process. Typically, traffic engineers use trip generation rates published by the Institute of Transportation Engineers (ITE), in the most recent *Trip Generation, 10th Edition* document. Based on information provided by the client, a total of 106 residential units will be constructed within two buildings. Each building will be designed to have four floors. Therefore, the most applicable ITE land use code for this type of development was determined to be the Multifamily Housing (Mid-Rise) – ITE Land Use Code 221.

A review of the ITE survey data graphs was carried in order to select the most appropriate trip rate for this specific land use. Upon reviewing the graphs for Land Use Code 221, it was determined that the regression formula method yielded a slightly higher number of new trips compared to using the average rate method. As such, the formula method was applied in order to use a slightly worse-than-typical scenario.

The trip generation calculations using land use code 221 are summarized in *Table 2*.

Table 2: Site Trip Generation for the Proposed Residential Development

	Size	Trip Rate	New Vehicle Trips / Hour		
			In	Out	Total
AM Peak Hour					
Multifamily Housing (Mid-Rise) (Code 221)	106 Units	0.34/unit ^A	9 (26%)	27 (74%)	36
AM Peak Total Trips ^B			9	27	36
PM Peak Hour					
Multifamily Housing (Mid-Rise) (Code 221)	106 Units	0.44/unit ^A	29 (61%)	18 (39%)	47
PM Peak Total Trips ^B			29	18	47

A – ITE's formula rate used.

B – New trips equal total site trips, no discounts for pass-by traffic applied.

Based on the results contained in *Table 2*, the proposed 106-unit development is expected to generate up to 36 trips/hour (9 inbound and 27 outbound) during the weekday morning peak period and 47 trips/hour (29 inbound and 18 outbound) during the weekday afternoon peak period. This generally equates to one additional vehicle trip added to the Sackville Drive corridor every 1 to 2 minutes during peak times of the day. This is considered to be a small and manageable increase that will only have a marginal impact on traffic operations.

It should be noted that the site—generated trip forecasts contained in *Table 2* are specific to the vehicle mode of travel. There have been no mode choice reduction factors applied to the above-noted forecasts that would account for the effects of public transit or active modes. The effects these alternative travel mode choices can have on the number of vehicle trips are already inherently considered in the ITE trip rates since they are based on empirical survey data. However, the existence of a public transit stop on the opposite side of the street would suggest that there is an added incentive to utilize this mode of travel and could possibly reduce the peak hour vehicle trip forecasts contained in *Table 2*.

5.0 FINDINGS & CONCLUSIONS

The following conclusions were gleaned from the qualitative traffic impact assessment of the proposed 106-unit residential development:

- The proposed residential development will be comprised of 106 apartment-style residential units, contained within two buildings, each having four floors. This size of development is expected to generate up to 36 trips/hour (9 inbound and 27 outbound) during the weekday morning peak period and 47 trips/hour (29 inbound and 18 outbound) during the weekday afternoon peak period.
- There is public transit service along Sackville Drive and an existing transit stop located on the opposite side of the street from the proposed development. In addition, there are good provisions for pedestrians including concrete sidewalks on both sides of Sackville Drive and a signalized crossing about 100 m away. As such, the proposed development is well situated for residents to utilize alternative travel modes.
- There are two new vehicle accesses proposed to connect to Sackville Drive. The large majority of site-generated trips are expected to travel to/from the east along Sackville Drive. Thus, the majority of turns at the site accesses are expected to be right out and left in movements.
- The new west and east accesses were assumed to be located 95 m and 200 m east of Millwood Drive, respectively. Both new accesses have acceptable corner clearance distances to adjacent intersections. In addition, both accesses meet TAC's minimum driver stopping sight distance requirements for a 70 km/h operating speed.
- The qualitative traffic operational assessment suggests the new peak hour site-generated trips will have a marginal impact on the Sackville Drive traffic operations. Given the relatively low peak hour volumes using the site driveways, they are expected to operate with acceptable performance measures with one inbound and one outbound lane. In addition, there is expected to be sufficient residual capacity in the Sackville Drive corridor during peak times to accommodate the new site-generated trips. The adjacent traffic signals at the Millwood Drive intersection will also create gaps in the Sackville Drive traffic flow as the traffic signal cycles through the green, amber and red phases.

Based on the findings of this qualitative review the following steps are recommended:

1. That the design of the new site driveways and their intersection with Sackville Drive follow the latest HRM and Transportation Association of Canada (TAC) geometric design guidelines. This includes the accommodation of an appropriate design vehicle (i.e. garbage truck or fire truck).
2. That all municipal By-law/Policy requirements for corner clearance, sight triangles and driver visibility are met to ensure driver sight distances are maintained throughout the planning, design and construction phases of this project.
3. That any new or changed signs and/or pavement markings be installed following the latest guidelines contained in TAC's Manual of Uniform Traffic Control Devices for Canada (MUTCDC) document.

7.0 CLOSING

The findings flowing from this qualitative traffic impact statement suggest the new trips generated by the proposed 106-unit mid-rise residential development are expected to have a minimal impact on the existing traffic operations in the Sackville Drive corridor. The relatively low volume of site-generated vehicle trips will be distributed across two site accesses. Both site accesses are expected to operate with acceptable operational performance measures with one inbound lane and one outbound lane.

I would be happy to provide you with additional information or clarification regarding these matters and can be reached anytime by phone at (902) 266-9436 or by email at jcopeland@griffininc.ca.

Sincerely,

Original Signed

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Managing Principal – Traffic & Road Safety Engineer
GRIFFIN transportation group inc.

