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June 24, 2022

Att: Laura Masching
Planner
Armco Capital
168 Hobsons Lake Dr, Suite 300
Halifax, NS B3S 0G4

RE: A Traffic Impact Statement for the Sunset Ridge Residential Development

1.0 INTRODUCTION

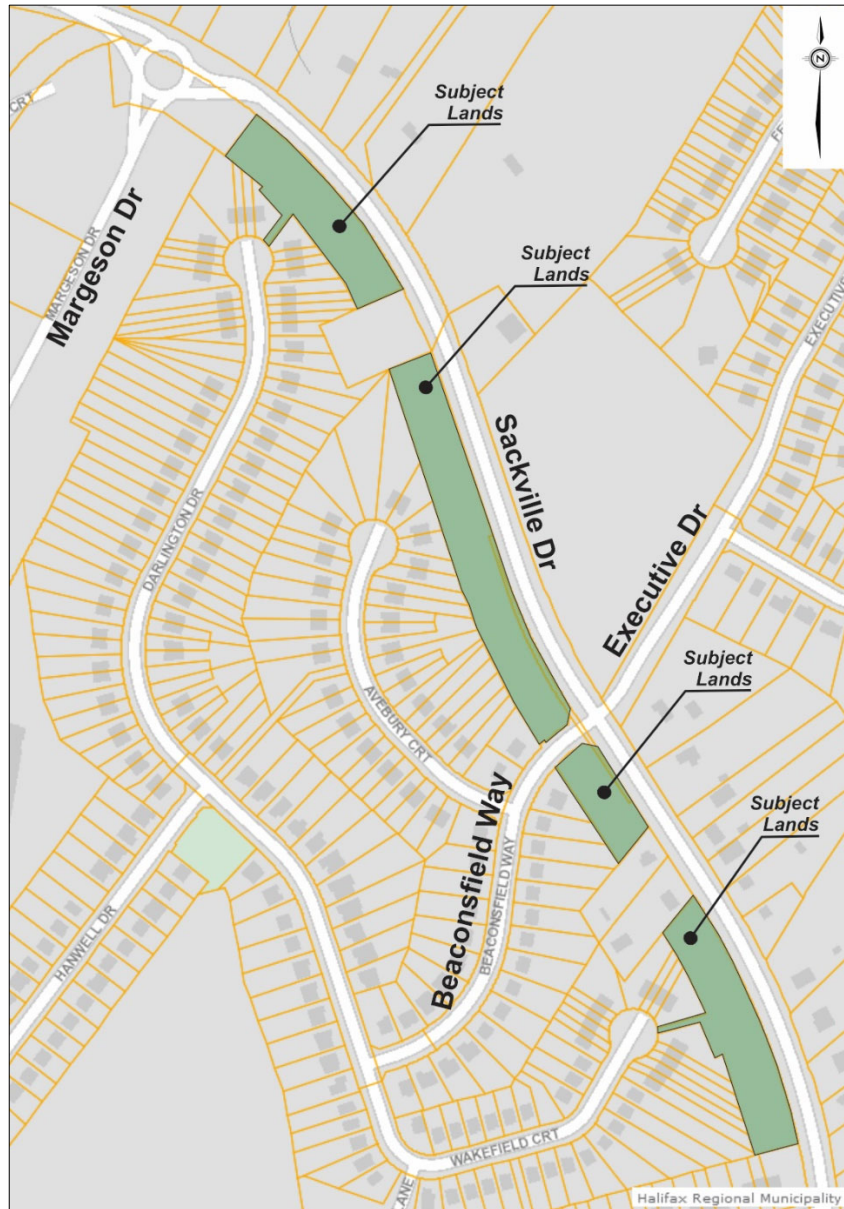
1.1 – Overview

At the request of *Armco Capital (Armco)*, the GRIFFIN transportation group inc. has carried out a qualitative Stage 1 Traffic Impact Assessment in support of the planning application process for a proposed 73-unit medium-density residential development along Sackville Drive, in the community of Middle Sackville, Halifax Regional Municipality (HRM). The new residential units are proposed to be built on vacant lands along the west side of Sackville Drive, between Margeson Drive and Crossfield Ridge. The undeveloped lands include PID's #41292137, 41291758, 41290925 and 41290917. The location of the subject lands are contained in *Figure 1*.

These properties currently have a CDD (Comprehensive Development District) zone designation within the Sackville Land Use By-Law (LUB), which is consistent with the established residential areas of the Sunset Ridge neighbourhood. Therefore, the proposed residential units appear to be consistent with the surrounding residential land uses.

Vehicle access will be provided via five new driveways connecting to Sackville Drive. Three new driveways are proposed to connect between Margeson Drive and Beaconsfield Way, while two new driveways are proposed south of Beaconsfield Way. Although each residential unit will have its own driveway, these individual driveways will be consolidated via an internal lane that will connect to one of the five new accesses to Sackville Drive. The access configurations are shown in *Figures 3 and 4*.

Figure 1: Location of Subject Lands



Source: HRM GIS Maps

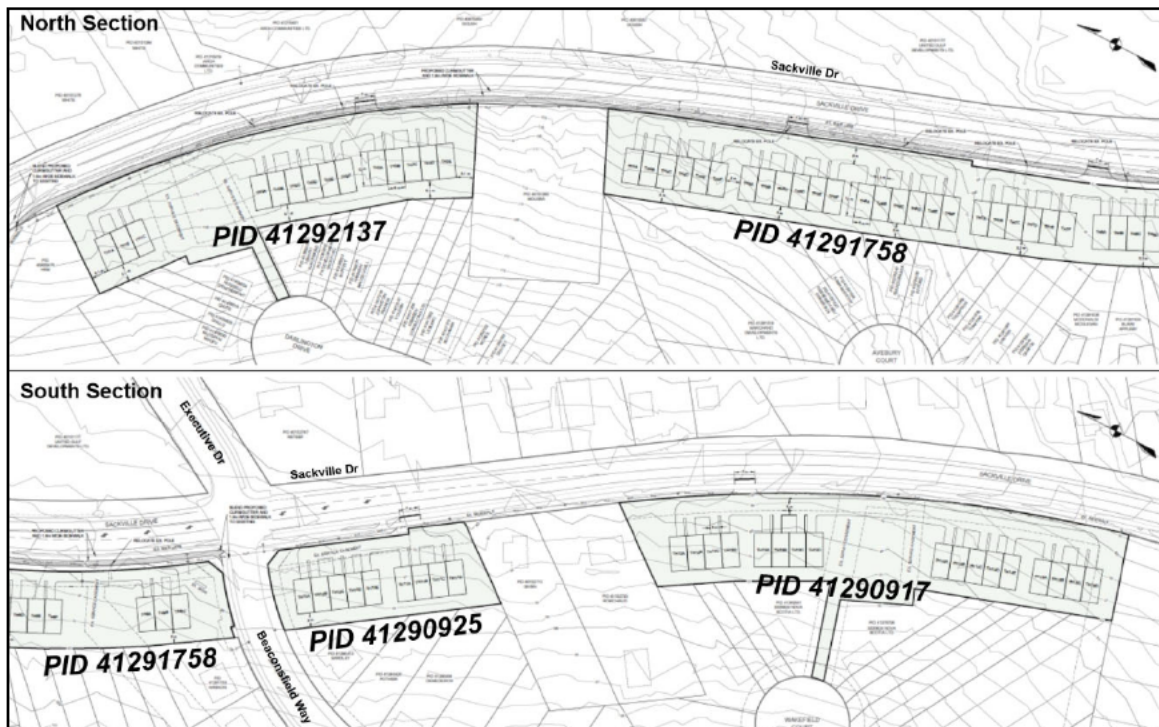
1.2 – The Proposed Development

Currently there are four undeveloped and vacant properties fronting along Sackville Drive that form part of the Sunset Ridge neighbourhood. Two properties are located between Margeson Drive and Beaconsfield Way, while two properties are located south of Beaconsfield Way. A summary of the proposed number of units by property location is provided in *Table 1* and shown spatially in *Figure 2*.

Table 1: Proposed Development by PID

PID	Proposed Units	Location Description
41292137	14 townhomes	- Immediately south of the Sackville Drive / Margeson Drive roundabout
41291758	33 townhomes	- Immediately north of the Sackville Drive / Beaconsfield Way intersection
41290925	9 townhomes	- Immediately south of the Sackville Drive / Beaconsfield Way intersection
41290917	17 townhomes	- Immediately north of the Sackville Drive / Crossfield Ridge intersection

Figure 2: Proposed Site Plan and Unit Layout



Source: DesignPoint (modified by GRIFFIN)

1.3 – Terms of Reference

The qualitative traffic impact assessment associated with the proposed development is discussed in the following Sections. Throughout the completion of this assessment GRIFFIN has followed HRM traffic impact study guidelines for a new residential development located in a suburban area, as well as Institute of Transportation Engineers (ITE), and Transportation Association of Canada (TAC) guiding principles.

2.0 STUDY AREA AND SITE CONTEXT

2.1 – Street Layout and Functionality

Sackville Drive is generally aligned in a north-south direction and this section of the corridor has a two-lane, two-way lane cross-section, with localized widening at the Beaconsfield Way intersection. HRM has designated this street with an arterial classification. According to Transportation Association of Canada (TAC) guidelines the primary purpose of an arterial class street is to move vehicles in an efficient manner and specific features that help ensure good traffic flow is limiting access to individual properties (i.e. minimize access density) and reducing the number of intersections (i.e. minimize intersection density).

However, our review of the existing functionality and road characteristics of this section of the Sackville Drive corridor identified the following:

- *Vehicle Speeds:* A high vehicle operating speed environment (i.e. 70 km/h).
- *Land Access and Access Density:* There appears to be a balance between land access and mobility with 17 existing residential accesses between Margeson Drive and Crossfield Ridge.
- *Bicycle Lanes:* Through the study area there are in-road bicycle lanes provided in both directions. TAC guidelines contained in Chapter 5 of their GDGCR (2017) document suggests that in-road bicycle facility not be provided with vehicle operating speeds between 50–80 km/h due the increased safety risks for cyclists. Bicycle facilities located in this type of speed environment should be physically separated from the vehicle travel lanes.

In Summary, this section of Sackville Drive appears to be functioning as a suburban collector street as it provides a balance between land access and shared mobility for several modes including cars, bicycles, transit, and pedestrians.

2.2 – Existing Traffic Volume Review

GRIFFIN recently obtained historical traffic volumes from HRM for a traffic impact study they completed along the adjacent Margeson Drive corridor. Relevant historical volumes for the Sackville Drive corridor - between Margeson Drive and Melham Drive – were identified and reviewed.

These relevant data were recorded in 2014, 2015 and 2016 by HRM as part of their on-going traffic volume monitoring program. The volumes from 2014 and 2016 were obtained from a location north of Beaconsfield Way while the 2015 volumes were recorded south of Beaconsfield Way. A summary of the historical peak hour volumes traveling in the corridor are provided in *Table 2*.

Table 2: Historical Peak Hour Traffic Volumes along Sackville Drive

	AM Peak Hour			PM Peak Hour		
	Southbound (inbound)	Northbound (outbound)	Two-way Peak Hour Volume	Southbound (inbound)	Northbound (outbound)	Two-way Peak Hour Volume
2014 ^A	147	250	397 vph	415	485	900 vph
2015 ^B	485	227	712 vph	415	467	882 vph
2016 ^A	376	261	637 vph	391	503	894 vph

vph – vehicles per hour

A – volumes recorded north of Beaconsfield Way

B – volumes recorded south of Beaconsfield Way

It should be noted the historical volumes were recorded prior to the Provincial state of emergency imposed in March 2020. Thus, the volumes contained in *Table 2* are representative of typical travel behaviour and vehicle demand along Sackville Drive.

Our detailed assessment of the historical volumes contained in *Table 2* indicates the highest volumes in the corridor occur during the weekday afternoon peak hour. The critical two-way peak hour volumes were very similar from 2014 to 2016 and the highest recorded volume was 900 vph. This equates to an approximate daily demand of about 9,000 vpd.

To help put these current peak hour volumes into perspective, GRIFFIN reviewed the Transportation Association of Canada’s (TAC) guidelines associated with the expected capacity of a two-lane, two-way street. As noted earlier in this letter Sackville Drive appears to be functioning as a collector street. However, HRM has classified this corridor as an arterial. Therefore, GRIFFIN has prepared a demand-capacity summary in *Table 3* for both street classifications.

Table 3: Sackville Drive Demand Versus Capacity

	Recorded Demand Sackville Drive	TAC Typical Volume Range ^A	Estimated Practical Capacity Limit	Volume to Capacity Ratio
Collector	9,000 vpd	<12,000 vpd	12,000	0.75
Minor Arterial	9,000 vpd	<20,000 vpd	20,000	0.45

A – TAC Table 2.6.5, GDGCR (2017)

The daily two-way vehicle demand of 9,000 vpd is less than the estimated capacity of both a collector and a minor arterial street. Therefore, it was concluded there is a considerable amount of residual capacity along this section of Sackville Drive to accommodate future traffic growth.

2.3 – Vehicle Operating Speeds

GRIFFIN also recorded vehicle operating speeds of vehicles traveling on Sackville Drive at two separate locations. These data were recorded during a midday off-peak time period on June 14th, 2022. The calculated two-way 85th percentile vehicle operating speeds for each location are summarized in *Table 4*.

Table 4: Vehicle Speed Survey Results

Sackville Drive Survey Location	85 th Percentile Vehicle Speed			
	Southbound		Northbound	
	Calculated	Rounded ^A	Calculated	Rounded ^A
1. 200m south of Margeson roundabout	54 km/h	50 km/h	58 km/h	60 km/h
2. 200m south of Beaconsfield Way	71 km/h	70 km/h	66 km/h	70 km/h

A – rounded values applied to driver visibility review.

Observed 85th percentile vehicle operating speeds through the corridor were generally around 70 km/h. This is about 10 km/h higher than the 60 km/h speed limit. Southbound operating speeds were slightly higher than northbound speeds and this may be due in part to the constant down grade in the southbound direction.

The exception was near the north end of the study area where the Margeson Drive roundabout appeared to be influencing drivers' speed choice. Southbound vehicles exiting the roundabout (i.e. about 50m south of the roundabout) were traveling at about 50 km/h and speeds increased as drivers traveled downhill in the southbound direction.

3.0 THE PROPOSED SITE ACCESSES

3.1 - Overview

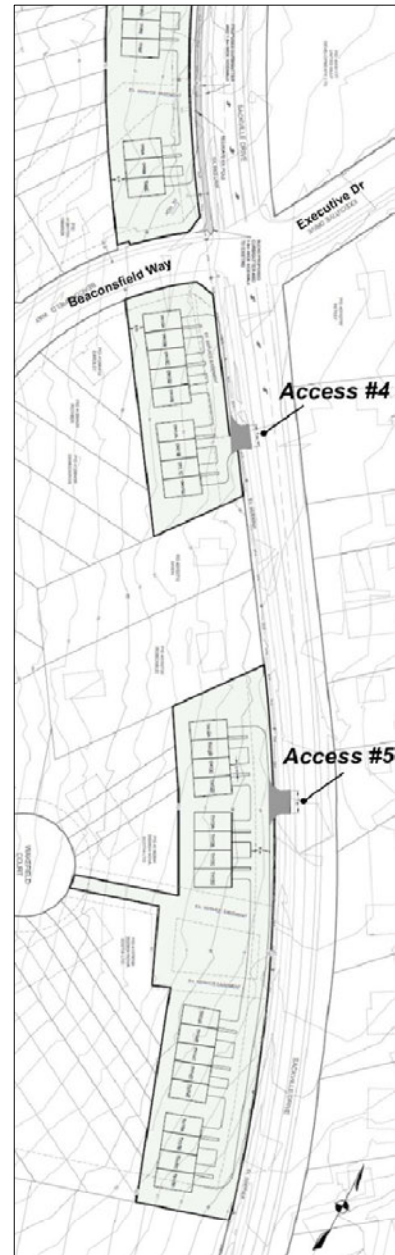
As discussed earlier in this letter the proposed residential units will be constructed in a linear alignment along the west side of the Sackville Drive corridor. However, instead of constructing 73 individual driveway connections to Sackville Drive, the proponent is proposing to follow good access management guidelines and consolidate individual driveways into only five (5) connection points. Therefore, all individual driveways will connect to an internal lane, which will then connect to Sackville Drive via one of 5 new driveways. An example of a similar residential driveway system for a medium-density residential development exists along Beaverbank Road, between the Glendale Drive and Millwood-Stokil Drive intersections. The location of the proposed driveway locations is shown in *Figure 3*.

Figure 3: Proposed Site Plan and Access Locations



North Section

South Section



Source: DesignPoint (modified by GRIFFIN)

A summary of the PID, number of units per PID, and driveways serving each PID is provided in *Table 5*. The driver visibility at all proposed driveway locations was evaluated and is discussed in more detail in the following Section.

Table 5: Proposed Access Location Description

Location	PID No.	Townhome Buildings	No. of Units	Access Reference
North	41292137	Townhome Buildings #1, 2 and 3	14 units	Access #1
<i>Immediately north of Beaconsfield</i>	41291758	Townhome Buildings #4, 5 and 6	18 units	Access #2
		Townhome Buildings #7, 8 and 9	15 units	Access #3
<i>Immediately south of Beaconsfield</i>	41290925	Townhome Buildings #10 and 11	9 units	Access #4
South	41290917	Townhome Buildings #12, 13, 14 and 15	17 units	Access #5
Totals			73 Units	5 new driveways

3.2 - Driver Visibility at the Proposed Accesses

Typically, a driver sight distance review is carried out as part of the traffic impact assessment process to identify any driver sight distance or visibility limitations up and down stream of a new site access. GRIFFIN completed the visibility review process following the latest Transportation Association of Canada’s (TAC) *Geometric Design Guide for Canadian Roads* document (2017) as well as the Nova Scotia Department of Public Works’ field measurement best practices.

At this early planning stage, GRIFFIN only assessed the minimum requirement for vehicles approaching the access on the major roadway – which is referred to as stopping sight distance (SSD). The provision of adequate SSD for vehicles traveling on the major roadway ensures drivers have sufficient forward visibility to identify a hazard in the roadway, and if needed, bring their vehicle to a stop. A summary of the SSD assessment at all proposed access locations is provided in *Table 6*.

GRIFFIN completed the field measurements on June 14th and 15th, 2022 following NSDPW best practices and TAC guidelines. A driver eye height of 1.05m and a hazard object height of 0.6m were used to obtain the field measurements. The available driver sight distances were measured by GRIFFIN at all proposed driveway locations.

Table 6: Summary of Stopping Sight Distance Measurements – At Proposed Accesses

Measurement Location	Travel Direction	Available SSD	TAC Required SSD		Does Available Exceed Required?
			Base ^A	Slope Adjusted	
Access #1 (North) <i>(TH Bldgs 1, 2, and 3)</i>	Southbound (inbound)	98 m	83 m	85 m (-2%) ^B	YES
	Northbound (outbound)	114 m	83 m	79 m (3%) ^B	YES
Access #2 <i>(TH Bldgs 4, 5, and 6)</i>	Southbound (inbound)	124 m	104 m	110 m (-3%) ^B	YES
	Northbound (outbound)	>180 m	104 m	100 m (3%) ^B	YES
Access #3 <i>(TH Bldgs 7, 8, and 9)</i>	Southbound (inbound)	>180 m	104 m	110 m (-3%) ^B	YES
	Northbound (outbound)	>180 m	104 m	100 m (3%) ^B	YES
Access #4 <i>(TH Bldgs 10 and 11)</i>	Southbound (inbound)	>180 m	104 m	110 m (-3%) ^B	YES
	Northbound (outbound)	152 m	104 m	104 m (0%) ^B	YES
Access #5 (South) <i>(TH Bldgs 12 to 15)</i>	Southbound (inbound)	152 m	104 m	104 m (0%) ^B	YES
	Northbound (outbound)	102 m	104 m	100 m (3%) ^B	YES

A – 2017 TAC Chapter 2, Table 2.5.2, based on rounded 85th percentile speeds.

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

Representative driver visibility from two select driveway locations are shown in *Figures 4 and 5*.

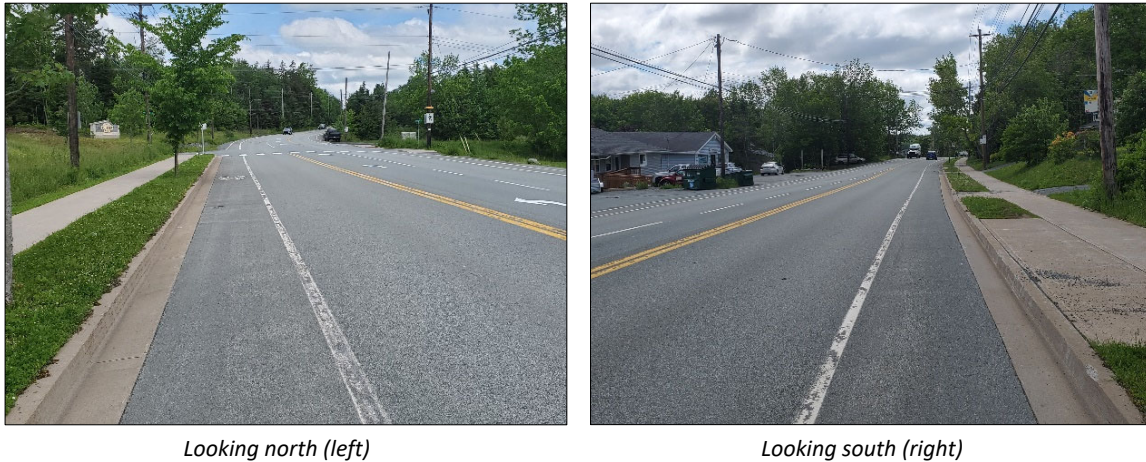
Figure 4: Driver Views Along Sackville Drive from Proposed Access #1



Looking north (left)

Looking south (right)

Figure 5: Driver Views Along Sackville Drive from Proposed Access #4



3.3 – New Driveway Corner Clearance

A corner clearance review was conducted to ensure the proposed new accesses connecting to Sackville Drive were located a sufficient distance away from the nearest intersection. Providing adequate space between an intersection and the nearest driveway reduces road safety risks and reduces the likelihood of overlapping turns occurring simultaneously at the driveway and intersection.

Both the HRM and the Transportation Association of Canada (TAC) provide guidance with respect to minimum corner clearance distances. The minimum required distance is typically based on site-specific conditions and existing street characteristics. Generally, the HRM guidelines are more restrictive and for this review GRIFFIN identified the following guidance:

- *HRM Guidelines:* A minimum of 30m of distance between the nearest intersection “street line” and the proposed driveway corner radii (*Source: HRM By-Law S-300*).

HRM does not clearly define a “street line” in their By-Law document, and so GRIFFIN has used the tangent distance between the corner radii of the intersection and new driveway.

Upon reviewing the proposed five new driveway locations, only two were considered to be near an intersection. They included Access #3 (northwest quadrant) and Access #4 (southwest quadrant) located on either side of the Sackville Drive / Beaconsfield Way intersection. GRIFFIN concluded that the proposed access locations were a sufficient distance away from the Sackville Drive / Beaconsfield Way intersection and exceeded the minimum 30m corner clearance distance.

3.4 – A Discussion on Corner Lot Accesses

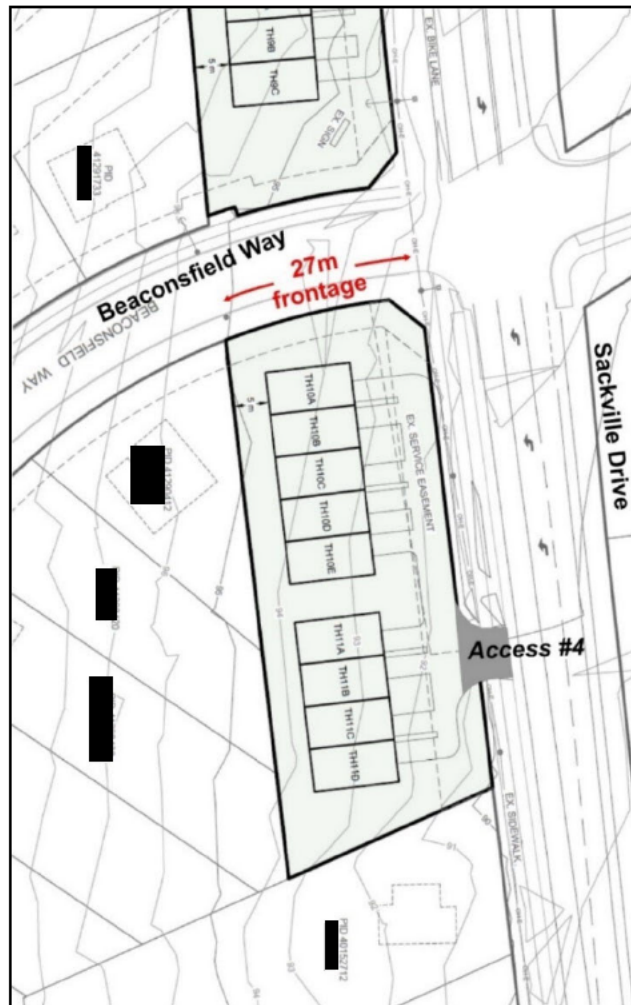
The guidelines contained in HRM’s By-Law S-300, Part V, generally states that properties with frontage on more than one public road (i.e., a corner lot) should connect the new access to the

roadway “...that carries a lesser amount of daily traffic”. As noted in the previous Section, only two of the subject properties are corner lots and they are located in the northwest and southwest quadrants of the Sackville Drive / Beaconsfield Way intersection.

Our review of the two corner lots indicates the property frontage along the minor roadway – Beaconsfield Way – is only about 27m. This is shown in *Figure 6*. Thus, installing a new driveway connection on to Beaconsfield Way with a width of about 7m would result in a corner clearance along Beaconsfield Way of only 20m. Therefore, any attempt to connect a new access to Beaconsfield Way would result in an insufficient corner clearance distance.

GRIFFIN has concluded that the proposed locations of Accesses #3 and #4 exceed both the minimum driver visibility and corner clearance requirements along Sackville Drive. These are two critically important criteria for good driveway operations. Any attempt to relocate these two accesses to Beaconsfield Way will result in a less than desirable driveway location given the close proximity to the Sackville Drive / Beaconsfield Way intersection.

Figure 6: Southwest Corner of Beaconsfield Way



4.0 VEHICLE TRIP GENERATION

To assess the change in traffic volumes on the study area streets under future conditions, there was a need to determine the expected number of new vehicles that would be added to the study area roads and intersections, explicitly associated with the proposed 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) to forecast site-generated volumes for specific land use types, if considered appropriate.

As noted earlier in this letter, the proponent has plans to construct up to 73 townhome units spread across the four subject properties along Sackville Drive. This includes 47 units north of Beaconsfield Drive and 26 units south of Beaconsfield. GRIFFIN reviewed the ITE’s latest *Trip Generation, 11th Edition* document and determined the most applicable land use type was Single-family Attached Housing – Land Use Code 215. ITE describes this type of residential unit as having a shared wall with an adjoining dwelling unit, whether the shared walls are for living space, a vehicle garage or storage space.

GRIFFIN applied the ITE average rate for this land use type to estimate the expected number of vehicle trips moving in/out of the proposed development. The average rate was selected as it provided slightly higher trip estimates relative to the regression formula method. The detailed trip generation calculations are provided in *Table 7*.

Table 7: Site Trip Generation for the Proposed Development

	Size	Trip Rate	New Vehicle Trips / Hour		
			In	Out	Total
AM Peak Hour					
Single-family Attached Housing (ITE Code 215)	73 units	0.48/unit ^A	11 (31%)	24 (69%)	35
AM Peak Total Trips			11	24	35
PM Peak Hour					
Single-family Attached Housing (ITE Code 215)	73 units	0.58/unit ^A	24 (57%)	18 (43%)	42
PM Peak Total Trips			24	18	42

A – ITE’s regression formula was used to determine the per unit trip rate.

Based on the results contained in *Table 7*, the proposed development is expected to generate the following peak hour trips:

- *Weekday AM Peak Hour: 35 new vehicle trips/hour (11 inbound and 24 outbound)*
- *Weekday PM Peak Hour: 42 new vehicle trips/hour (24 inbound and 18 outbound)*

This generally equates to adding one new vehicle trip to the study area streets and intersections every one to two minutes. It was concluded earlier in this letter that Sackville Drive has sufficient residual capacity to accommodate small traffic volume increases such as those expected for the proposed development. During off-peak times the frequency of new trips will be diminished and is expected to have little to no operational impact. Given the relatively low traffic demand generated by the proposed development, there is not expected to be any measurable change in operations on the study area streets and intersections.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 - Conclusions

The following conclusions were gleaned from the qualitative traffic impact assessment of the proposed development:

- *Proposed Development:* The proponent has plans to develop up to 73 townhouse residential units across four properties situated along the west side of Sackville Drive, south of Margeson Drive. The subject properties are currently undeveloped, vacant, and located within the Sunset Ridge neighbourhood, Middle Sackville, HRM.
- *New Vehicle Trips:* The trip generation calculations were carried out using the latest ITE trip generation rates contained in the 11th Edition Trip Generation Manual. A development of this scale is expected to generate up to **35 trips/hour** (11 inbound and 24 outbound) during the weekday morning peak period, and **42 trips/hour** (24 inbound and 18 outbound) during the weekday afternoon peak period.
- *Sackville Drive Corridor:* This section of the Sackville Drive corridor is currently providing a balance between multi-modal mobility and land access. Therefore, this corridor appears to be functioning as a collector street – despite HRM’s designation as an arterial class street. Recent historical volumes recorded in 2014, 2015 and 2016 (i.e., prior to the Provincial state of emergency) indicate that the daily vehicle demand in the corridor is about 9,000 vpd. This is below the estimated practical capacity for this corridor, resulting in residual capacity that can accommodate future traffic growth.
- *Qualitative Impacts:* The proposed 73-unit townhouse development is expected to generate a small amount of new vehicle trips – about one new vehicle trip every one to two minutes. Considering there is residual capacity in the corridor, the traffic flow impacts on Sackville Drive are expected to be minor and negligible.
- *New Driveways:*
 - *Access Management:* Although each individual townhouse unit will have a driveway, these driveways will be consolidated and connected to an internal lane within each PID. As shown in *Figure 3*, only five new driveways are proposed along

an 800 m section of roadway. This approach minimizes the number of new accesses, maintains a low access density in the corridor, and follows good access management guidelines and principles.

- *Driver Visibility:* The available stopping sight distance (SSD) for drivers traveling along Sackville Drive at the five proposed new driveway locations appears to meet TAC minimum requirements. The provision of adequate driver visibility will need to be confirmed by others at the detailed geometric design stage of this project.

In summary, the traffic generated by the proposed 73-unit residential development is expected to have a negligible and acceptable level of impact on the traffic operating conditions along Sackville Drive and adjacent intersections.

5.2 – Recommendations

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

- *Access Design and Design Vehicle:* That an engineering review be carried out to ensure the proposed accesses can accommodate an appropriate design vehicle (i.e. garbage truck or emergency vehicle). The design of the intersection between the new access and Sackville Drive (carried out by others) will need to follow the latest HRM and Transportation Association of Canada (TAC) geometric design guidelines. The design process should also give consideration to the property topography and consider drainage needs to ensure water is not running onto Sackville Drive via the new access connections. Ponding and/or freezing water increase road safety risks.
- *By-Law Requirements:* That municipal By-law/Policy requirements for corner clearance, sight triangles and driver visibility are met to ensure acceptable traffic operations at the proposed driveways. Driver sight distances to/from the proposed accesses should be maintained throughout the design, construction, and final opening phases of the project.
- *Signs and Pavement Markings:* All new or changed signs and/or pavement markings along the study area roads and intersections should follow the latest guidelines contained in TAC's Manual of Uniform Traffic Control Devices for Canada (MUTCDC) document.
- *Vehicle Operating Speeds:* That HRM monitor vehicle operating speeds along the Sackville Drive corridor. The regulatory speed limit is 60 km/h; however, some southbound (downhill) speeds were observed to be more than 70 km/h. This type of speed environment combined with in-road bicycle lanes located adjacent to the vehicle travel lanes with no buffer space raises road safety concerns.

6.0 CLOSING

The findings flowing from this qualitative traffic impact statement suggest the new vehicle trips generated by the proposed 73-unit residential development is expected to have a negligible impact on the traffic operational performance of the study area streets and intersections. 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,



James J. Copeland, P.Eng., RSP1
Managing Principal – Traffic & Road Safety Engineer
GRIFFIN transportation group inc.

