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[redacted]
Grace Lutheran Church
40 Caldwell Road
Dartmouth, NS B2V 2S2

RE: A Traffic Impact Statement for a proposed residential development on Hampton Green

1.0 INTRODUCTION

1.1 – Overview

At the request of *Grace Lutheran Church*, the GRIFFIN transportation group inc. has carried out a qualitative Stage 1 - Traffic Impact Assessment in support of a Development Agreement application for the proposed subdivision of PID #40337347. The subject property is located at civic #40 Caldwell Road, in the northeast quadrant of the Caldwell Road / Hampton Green intersection, in the community of Cole Harbour, Halifax Regional Municipality (HRM). The location of these lands is contained in *Figure 1*.

The existing property currently accommodates the Grace Lutheran Church building and parking area. The majority of the 2.1-acre parcel is undeveloped. Currently, these lands have a CDD (Comprehensive Development District) land use zone designation within the *Cole Harbour / Westphal Land Use By-Law* area.

It is understood the proponent is submitting a planning application to HRM for approval to divide the existing civic #40 property into two separate land parcels. One parcel would continue to accommodate the existing *Grace Lutheran Church* and allow this facility to continue its operations into the future. The vacant lands in the eastern portion of the property would form a new land parcel that could accommodate medium density residential units. Representatives of the Church have indicated they have plans to sell the new land parcel and do not intend to build new residential units. Therefore, no proposed site plan layout or concept plan has been prepared for the new parcel. As such, GRIFFIN has assumed that a total of 10 new residential units could be built on the new land parcel, which appears to be the maximum permitted under the current zoning.

Figure 1: Location of Subject Lands

Source: HRM GIS Maps

1.2 – Terms of Reference

The qualitative traffic impact assessment associated with the proposed development is discussed in the following Sections. Throughout the completion of this study GRIFFIN has followed HRM traffic impact study guidelines for a new 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 Overview

Hampton Green is a suburban residential street that is generally aligned in an east-west direction. Although, it appears to function as an urban local residential street that provides access to individual residents and has speed humps to manage vehicle speeds – it also serves as one of several accesses in/out of this neighbourhood. As such, HRM currently classifies Hampton Green as a Minor Collector street.

Hampton Green measures about 810 m in length. To the west it connects to Caldwell Road (Major Collector) and the Portland Street arterial corridor. To the east it connects to Cumberland Drive (Minor Collector) and the Forest Hills Parkway arterial corridor. Thus, both Caldwell Road and Cumberland Drive provide important vehicle connections to the surrounding arterial streets.

HRM has installed speed hump traffic calming devices along Hampton Green likely in response to vehicle speed and/or traffic short-cutting concerns. Currently, the nearest speed hump is installed about 35-40m east of the subject property east boundary, near the Hampton Green / Heathland Way intersection and will not create any traffic operational concerns associated with a new driveway connection to the civic #40 Caldwell Road property.

2.2 – Existing Traffic Volume Review

GRIFFIN installed an automatic traffic recording (ATR) device on Hampton Green to record the existing vehicle demand and operating speeds traveling in both directions. The ATR unit was placed adjacent to the existing Grace Lutheran Church driveway in order to gather relevant data in the vicinity of the proposed new land parcel. The ATR unit recorded weekday vehicle information for more than 24 hours on February 15th and 16th, 2023. A summary of the observed February 2023 weekday peak hour volumes is contained in *Table 1*.

Table 1: Peak Hour Traffic Volumes on Hampton Green – February 2023

	Eastbound (toward Cumberland)	**Westbound** (toward Caldwell)	**Two-way Peak Hour Volumes**
Weekday AM Peak Hour	66	118	184 vph
Weekday PM Peak Hour	241	107	348 vph

vph – vehicles per hour

The highest hour of traffic flow occurred during the weekday afternoon commuter peak. At this time of day, the two-way peak hour volumes traveling along Hampton Green in the vicinity of the subject lands was observed to be about 348 vehicles/hour (vph) which equates to approximately 3,400-3,500 vehicles/day (vpd).

The observed peak hour vehicle demand appears to be typical for a Minor Collector street classification. This is likely due in part to the fact that Hampton Green is a key corridor for drivers moving in/out of the neighborhood as they travel to/from the Portland Street arterial corridor and the large employment areas in Dartmouth and Halifax, to the west.

GRIFFIN reviewed the Transportation Association of Canada (TAC) Geometric Design Guidelines to help put the observed vehicle demand on Hampton Green into perspective. Although TAC does not provide guidance with respect to the absolute maximum capacity of streets, they provide typical volumes expected for several roadway classification types. The latest TAC geometric design guidelines suggest that collector streets typically accommodate up to 8,000 vpd. Again, these are guidelines for typical volumes and the expected maximum capacity values would be higher.

In conclusion, the observed weekday demand of about 3,500 vpd is well below the expected capacity of a collector street. This suggests there is a substantial amount of residual capacity in the Hampton Green corridor to accommodate future traffic growth.

2.3 – Vehicle Operating Speeds

As noted above, the installed ATR unit also gathered vehicle operating speeds on Hampton Green in the vicinity of the property frontage. The 85th percentile vehicle operating speed recorded by the ATR unit was calculated to be 44 km/h in the westbound direction, and 47 km/h in the eastbound direction. As such, 50 km/h was chosen as the design speed for the sight distance assessment discussed later in this letter.

The 85th percentile operating speed is less than the regulatory 50 km/h speed limit. This is likely due in part to the relatively narrow street width, presence of on-street parking, and the speed hump traffic calming devices along the corridor. The research literature indicates these specific street characteristics have a speed-reducing impact on driver speed choices and operating speeds.

3.0 THE PROPOSED DEVELOPMENT

3.1 - Overview

Representatives of the Church indicated the new land parcel would be comprised of the vacant area of the civic #40 property, east of the existing church parking lot. However, once the new land parcel is created, the Church does not have plans to develop this new property. Their desire is to sell the new land parcel and allow the purchaser to construct new residential units within the limitations of the Land Use By-Law. Thus, the Church has not prepared a future site concept plan for the new land parcel.

Under these conditions, and to help facilitate the planning approval process for these circumstances, GRIFFIN has approached the traffic impact assessment using a worst-case scenario and assumed the maximum allowable number of residential units within the current zone designation. Through our discussions with representatives of the Church, it is understood that the zone designation assigned to the new land parcel would only allow up to 10 townhouse-style residential units. This formed the basis of our traffic impact assessment.

3.2 – New Driveway Driver Visibility

Typically, a driver sight distance review is completed as part of the traffic impact assessment process to identify any driver sight distance or visibility limitations up and downstream of a new site access. GRIFFIN carried out 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 Work's field measurement best practices.

At this early planning stage, GRIFFIN only assessed the minimum requirement for vehicles approaching the new access which is referred to as stopping sight distance (SSD). The provision of adequate SSD for vehicles traveling on the main roadway ensures drivers have sufficient forward visibility to identify a hazard in the roadway, and if needed, bring their vehicle to a stop.

GRIFFIN completed the field measurements using a hazard object height of 0.6m and a driver eye height of 1.05m. The available sight distance measurements were recorded in several places along the property frontage to identify any potential visibility constraints. This approach helped to determine suitable and appropriate driveway locations for the future land owner. A summary of the SSD assessment is provided in *Table 2* which only shows the results for an assumed driveway location at about the mid-point of the new property frontage.

Table 2: Summary of Stopping Sight Distance Measurements – At Proposed Access (50 km/h)

Measurement Location	Travel Direction	Available SSD	TAC Required SSD		**Does Available Exceed Required?**
			Base[A]	Slope Adjusted	
1. New Street Connection *(centre of new frontage)*	Eastbound (toward Cumberland)	80 m[C]	65 m	70 m (-6%)[B]	YES
	Westbound (toward Caldwell)	>112 m	65 m	45 m (0%)[B]	YES

A – 2017 TAC Chapter 2, Table 2.5.2

B – An estimate of the actual slope along Hampton Green on the approaches to the new access.

C – Clear sight lines to/from the Caldwell Road intersection.

GRIFFIN concluded that the available driver visibility along Hampton Green – to any point along the new property frontage – exceeds minimum TAC requirements for a 50 km/h operating speed. The driver visibility observed during the field review is provided in *Figures 2 and 3*.

3.3 – Active Transportation and Public Transit

A pedestrian sidewalk is provided along the south side of Hampton Green and connects Caldwell Road through to Cumberland Drive. Marked and signed pedestrian crosswalks across Hampton Green have been installed at the Caldwell Road intersection about 60-70 m to the west, as well as at the Heathland Way intersection about 100 m to the east.

Public Transit service is provided along Caldwell Road, with transit stops provided immediately south of the Caldwell Road / Hampton Green intersection (i.e. stops #6353 and 6344). These transit stops are conveniently located less than 100 m from the proposed new residential units. In addition, The existing Portland Hills Transit Terminal is only about 650 m walking distance to the northwest.

In summary, the future residents of the proposed new units will have good pedestrian connectivity and good access to public transit service.

Figure 2: Driver Views Along Hampton Green Near Proposed Access – Looking East (Left)

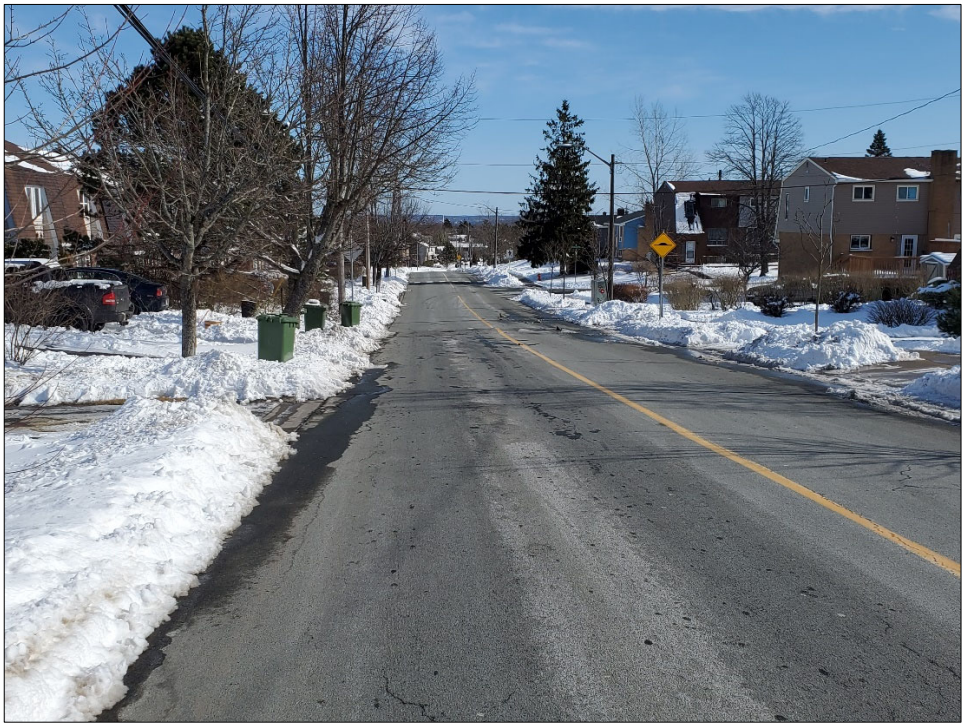
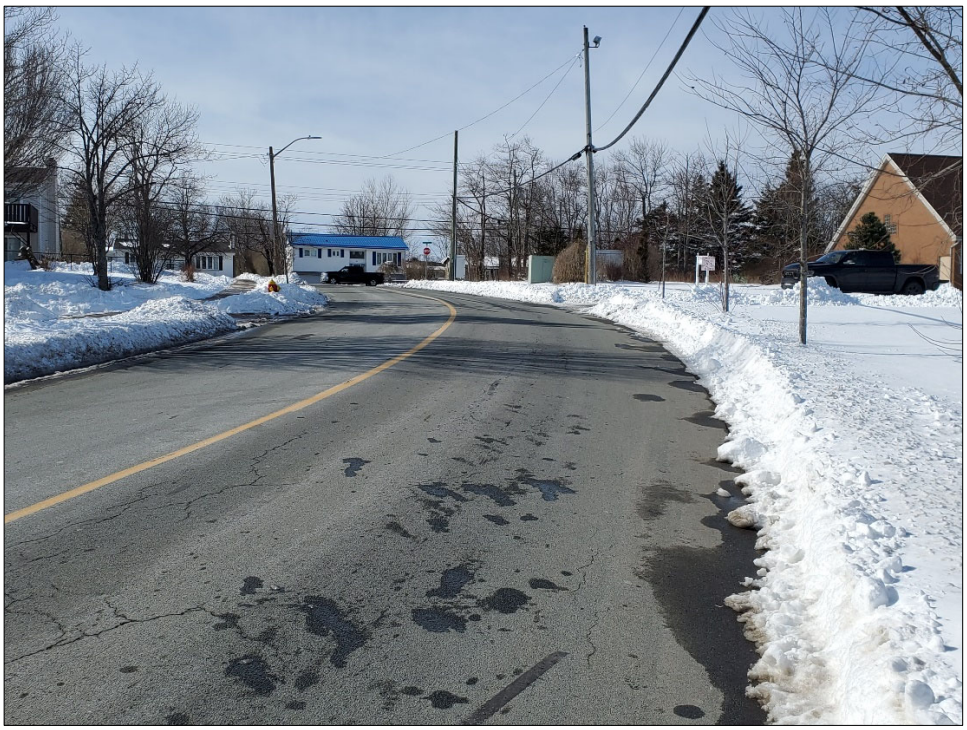


Figure 3: Driver Views Along Hampton Green Near Proposed Access – Looking West (Right)



4.0 VEHICLE TRIP GENERATION

4.1 – New Vehicle Trips

In order 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 deemed appropriate.

As noted earlier in this letter, the proponent has plans to subdivide the existing civic #40 Caldwell Road property to create a new parcel that will accommodate new residential units. It is understood that the land use zone designation for the new parcel will allow medium density residential development, up to a maximum of 10 units.

GRIFFIN reviewed the ITE's latest *Trip Generation Manual, 11th Edition* document to identify the most applicable land use type for the proposed future conditions. Two land use types were examined:

- *Townhome Units*: Multifamily Housing (Low-Rise), Not close to Rail Transit - ITE LUC 220.
- *Semi-Detached Units*: Single-family Attached Housing – ITE LUC 215.

Our review and comparison of the vehicle trip generation rates for these two ITE land use codes suggests there is only a slight difference in results for a small 10-unit development. Therefore, GRIFFIN has applied the higher rate which is associated with ITE's land use code 215 – a rate that is consistent with an R-2 semi-detached unit.

GRIFFIN applied the ITE average rate formula to estimate the expected number of new vehicle trips moving in/out of the proposed development. This method was preferred as the regression formula method yielded unreasonable results – likely due to the small number of units being proposed. The detailed trip generation calculations are provided in *Table 3*.

Based on the results contained in *Table 3*, the proposed development is expected to generate the following peak hour trips:

- *Weekday AM Peak Hour*: 5 new vehicle trips/hour (1 inbound and 4 outbound)
- *Weekday PM Peak Hour*: 6 new vehicle trips/hour (4 inbound and 2 outbound)

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Table 3: Vehicle 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)	10 units	0.48/unit[A]	1 (25%)	4 (75%)	5
AM Peak Total Trips			**1**	**4**	**5**
PM Peak Hour					
Single-family Attached Housing (ITE Code 215)	10 units	0.57/unit[A]	4 (59%)	2 (41%)	6
PM Peak Total Trips			**4**	**2**	**6**

A – ITE's average formula used to determine the per unit trip rate.

This generally equates to adding one new vehicle trip every 10-12 minutes to the study area streets and intersections. We previously concluded Hampton Green has a considerable amount of residual capacity that can accommodate an expected increase of one trip every 10-12 minutes during peak times of the day. During off-peak times the frequency of new trips will be diminished and is expected to have 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.

4.2 – Expected Distribution of New Trips

The highest concentration of new vehicle trips generated by the proposed development will occur on Hampton Green – in the vicinity of the new access. However, as stated above, the addition of one new vehicle trip every 10-12 minutes is expected to have little to no impact. As drivers move further away from the proposed development they are offered multiple route choices – which will further diminish the expected traffic impact.

GRIFFIN also carried out a qualitative assessment of where the expected new vehicle trips will travel, and conclude the following:

- *To/From the East*: Drivers can move in/out of the neighbourhood via Cumberland Drive. We expect about 30-40% of new trips will utilize this route to gain access to the Forest Hills Parkway corridor. This equates to one new vehicle every 15-20 minutes – resulting in no measurable impact on the Cumberland Drive and Forest Hills Parkway corridors.
- *To/from the West*: Drivers move in/out of the neighbourhood via Caldwell Road. We expect about 60-70% of new trips will utilize this route to gain access to the Portland Street corridor. This equates to adding one new vehicle every 12-15 minutes – resulting in no operational impact on the Caldwell Road or Portland Street corridors.

In summary, the distribution of new site-generated vehicle trips to the two main neighbourhood access points is expected to have no traffic impact relative to current conditions. This is simply based on the fact there is expected to be a very small number of new trips per hour generated by the proposed development.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 - Conclusions

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

- *Proposed Land Use Changes*: The proponent has plans to subdivide the existing civic #40 Caldwell Road property into two land parcels. One land parcel would continue to accommodate the existing *Grace Lutheran Church* and allow this facility to continue its operations into the future. The vacant lands in the eastern portion of civic #40 would form a new land parcel that could accommodate new medium density residential units. It is understood that the zone designation for the new land parcel would allow up to 10 new residential units, similar to a townhouse-style unit. From a traffic impact perspective, GRIFFIN has assumed a worst-case scenario that includes a total of 10 new R-2 residential units and one new driveway connecting to Hampton Green.
- *New Vehicle Traffic*: The trip generation calculations were carried out using the latest ITE trip generation rates contained in the 11th Edition of the Trip Generation Manual. A 10-unit development is expected to generate up to 5 trips/hour (1 inbound and 4 outbound) during the weekday morning peak period, and 6 trips/hour (4 inbound and 2 outbound) during the weekday afternoon peak period.
- *Traffic Operational Impacts*: GRIFFIN expects there will be no traffic operational impact on the study area streets and intersections associated with the completion of the proposed development. This conclusion is based on the fact there is a considerable amount of residual capacity in the Hampton Green corridor, and the proposed development will only generate a very small number of new vehicle trips during peak travel periods. Traffic impacts will diminish as new vehicle trips disperse along the multiple travel routes available to move in/out of the neighbourhood. These routes include Cumberland Drive to the east and Caldwell Road to the west.
- *Visibility at the Driveway*: The available stopping sight distance (SSD) measured along Hampton Green appears to exceed TAC minimum requirements for the measured 85th percentile operating speed. This suggests that a proposed new driveway can connect to Hampton Green in any location between the existing church driveway and the existing east property boundary – and meet TAC minimum SSD requirements.

In summary, the traffic generated by a new 10-unit residential development containing either semi-detached (R-2) or townhome (R-3) style units is expected to have an acceptable level of impact on the traffic operations along Hampton Green, Caldwell Road and Cumberland Drive.

5.2 – Recommendations

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

- *Access Design:* That the geometric design of the proposed vehicle access serving the new subdivided land parcel follows the latest Transportation Association of Canada (TAC) and HRM design guidelines contained in the most recent edition of their Municipal Design Guidelines document. This includes the accommodation of an appropriate truck design vehicle (i.e. garbage truck or emergency vehicle). One inbound and one outbound lane will provide sufficient capacity to accommodate up to 10 new residential units and no auxiliary turn lanes will be required on Hampton Green.
- *By-Law Requirements*: That the municipal By-laws/Policy requirements for corner clearance, sight triangles, and driver visibility are met to ensure acceptable traffic operations are maintained throughout the planning, design, and construction phases of the project.
- *Signs and Pavement Markings*: Should any new or changed signs and/or pavement markings be installed, that they follow the latest guidelines contained in TAC's Manual of Uniform Traffic Control Devices for Canada (MUTCDC) document.

6.0 CLOSING

The findings flowing from this qualitative traffic impact statement suggest the new vehicle trips generated by a new 10-unit residential development on Hampton Green 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,

[redacted]

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