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GRIFFIN transportation group inc.
[redacted]

October 5, 2023

Att: Connor Wallace, MCIP, LLP
Zwicker Zareski Architecture and Planning
[redacted]

RE: A Traffic Impact Statement for a proposed new office building on Crestfield Drive

1.0 INTRODUCTION

1.1 – Project Overview

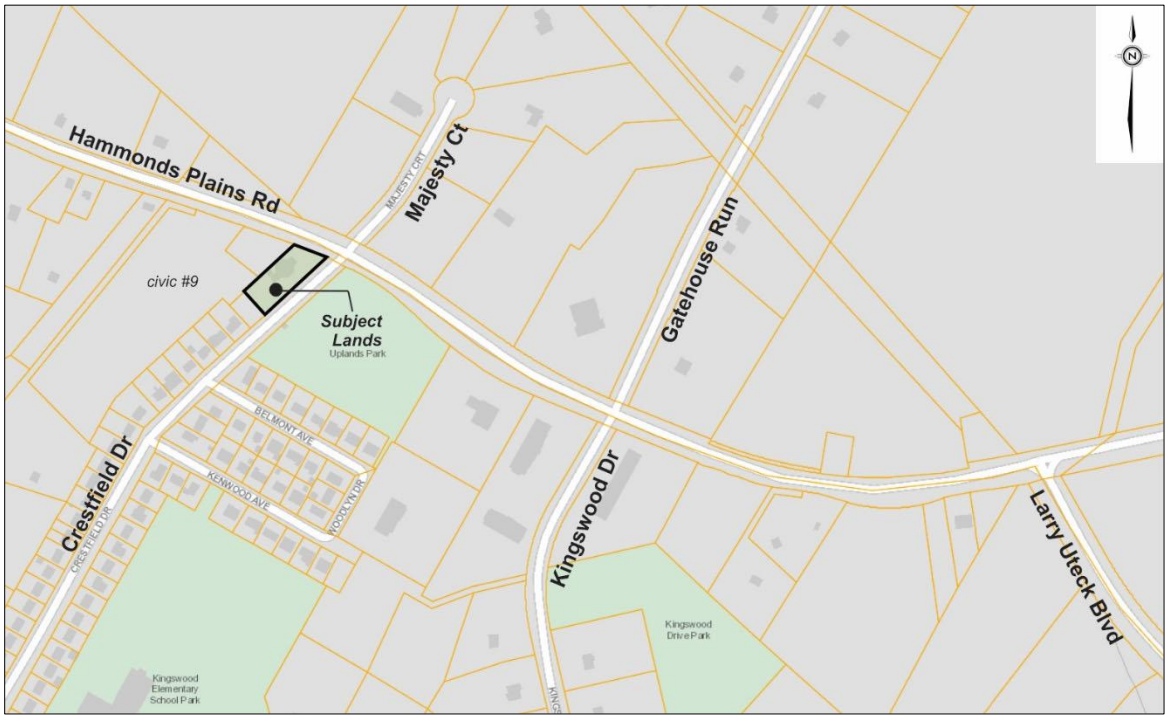
At the request of *Zwicker Zareski Architecture and Planning (ZZAP)*, the GRIFFIN transportation group inc. has carried out a qualitative Stage 1 - Traffic Impact Assessment in support of the planning application process for a new office building proposed on the civic #1274 property located in the southwest quadrant of the Hammonds Plains Road / Crestfield Drive intersection, in the community of Hammonds Plains, Halifax Regional Municipality (HRM). It is understood that the proposed new building will have two floors and a total leasable floor area of 6,600 ft^2. The development is expected to accommodate office space for 1 to 2 small businesses.

The subject property is referred to as civic #1274 Hammonds Plains Road (PID #00422279) and currently contains 1 building – the former St. James Catholic Church. This church facility has been closed for a number of years and the property is currently not in use. These lands have an area of about 0.57 acres and a P-2 (Community Facility) zoning designation in the *Beaver Bank, Hammonds Plains, Upper Sackville Land Use By-law Area*. The location of this property is contained in *Figure 1*.

1.2 – Study Context

Our qualitative Stage 1 traffic impact assessment associated with the proposed development is discussed in the following Sections. The process has followed HRM traffic impact study guidelines as well as Institute of Transportation Engineers (ITE) and Transportation Association of Canada (TAC) best practices.

Figure 1: Location of Subject Lands



Source: Google Maps

2.0 STUDY AREA AND SITE CONTEXT

The two key roadways in the vicinity of the proposed development include:

- *Hammonds Plains Road*: This two-lane, two-way facility has been designated by HRM as an arterial class roadway. It serves as a key east-west commuter travel corridor for this suburban area of HRM. Its predominant function is to move vehicle traffic including commuter vehicles and transit buses. There are no defined/marked active transportation facilities in the vicinity of the study area. HRM has recently lowered the regulatory posted speed limit in this area to 60 km/h.
- *Crestfield Drive*: Appears to function, and has been designated by HRM, as a local residential street. This is an appropriate classification as it terminates as a cul-de-sac and serves less than 100 detached residential units. It has an urban two-lane, two-way cross-section, a pavement width of 8.8 m, and is designated as traffic calmed street with speed humps to manage vehicle operating speeds. The regulatory posted speed limit along this street is 50 km/h; however, the speed humps reduce operating speeds between Hammonds Plains Road and Belmont Avenue.

A neighbourhood park and Canada Post mailbox are located directly opposite the subject lands – on the east side of Crestfield Drive. Based on observations made during our field review, some park patrons travel from outside this neighbourhood and park their vehicles along Crestfield Drive. Of course, use of the park is seasonal and dependent on weather.

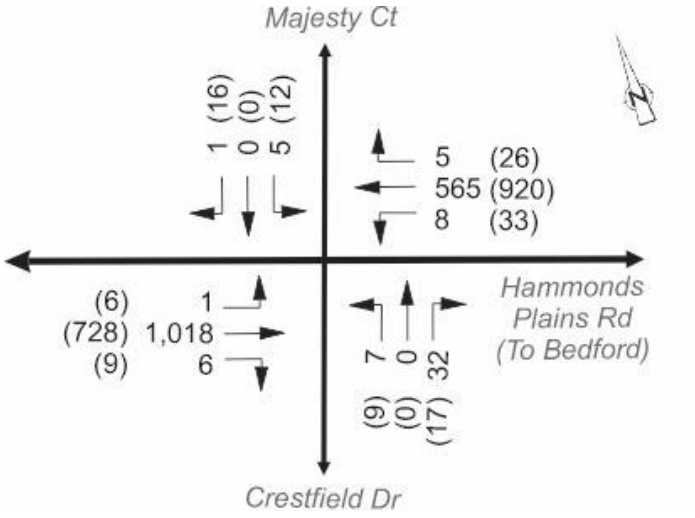
3.0 EXISTING TRAFFIC CONDITIONS

Since the proposed development is in a suburban residential area, weekday mornings and afternoons are expected to experience the highest traffic volumes on the study area streets and intersections. The peak hour volumes on Crestfield Drive are expected to be low since it is a cul-de-sac, functions as a local residential street, and currently serves fewer than 100 residential units.

GRIFFIN has conducted previous assessments on the Hammonds Plains Road / Crestfield Drive intersection in the recent past and are familiar with peak period traffic operations at this location. Despite having obtained traffic volumes at this intersection in the past, GRIFFIN made the decision to obtain current 2023 weekday peak period traffic volumes to ensure the latest travel demand information was applied to our assessment. Using current and up-to-date data also ensured that post-COVID travel/work patterns were understood, and that new traffic generated by the recently opened clothing store on Majesty Court were included in our study.

GRIFFIN completed weekday peak period traffic volume counts at the Hammonds Plains Road / Crestfield Drive intersection on Tuesday September 12th, 2023. Volumes and travel patterns observed during our data collection effort were deemed to be reflective of current post-COVID conditions – capturing work-from-home situations – and schools were open and operational. In some cases, traffic practitioners apply seasonal adjustment factors to traffic counts to ensure typical, and/or average conditions are being used in an assessment; however, GRIFFIN elected not to apply any seasonal adjustment factors as September traffic patterns are typically reflective of periods with average or slightly above average travel demand on HRM roads. A summary of the September 2023 weekday AM and PM peak hour traffic volumes is provided in *Figure 2*.

Figure 2: Existing September 2023 Peak Hour Traffic Volumes



Through this process we also assembled historical peak hour traffic volumes along Crestfield Drive to provide further context for the recent changes in travel demand. This information is contained in *Table 1*.

Table 1: Historical Change in Travel Demand on Crestfield Drive

	AM Peak Hour (two-way volumes)	**PM Peak Hour** (two-way volumes)
2021 (May)	26	57
2023 (September)	53	68

As observed by GRIFFIN, the time of day experiencing the highest vehicle demand occurs during the weekday afternoon peak. Two-way volumes immediately south of Hammonds Plains Road were recorded to be 68 vehicles / hour (vph) which equates to approximately 650 to 700 vehicles/day (vpd). The latest 2023 volume counts also show there has been a slight increase in vehicle demand relative to our May 2021 count. The May 2021 volumes may have been impacted in part by COVID-related travel behaviour.

GRIFFIN reviewed the Transportation Association of Canada (TAC) Geometric Design Guidelines to help put the observed vehicle demand on Crestfield Drive into perspective. Although TAC does not provide guidance with respect to the absolute maximum capacity of roads, they provide typical volumes expected for several roadway classification types. The latest TAC geometric design guidelines suggest that urban local streets typically accommodate up to 1,000 vpd. Again, these are guidelines for typical volumes and the expected maximum capacity values would be higher.

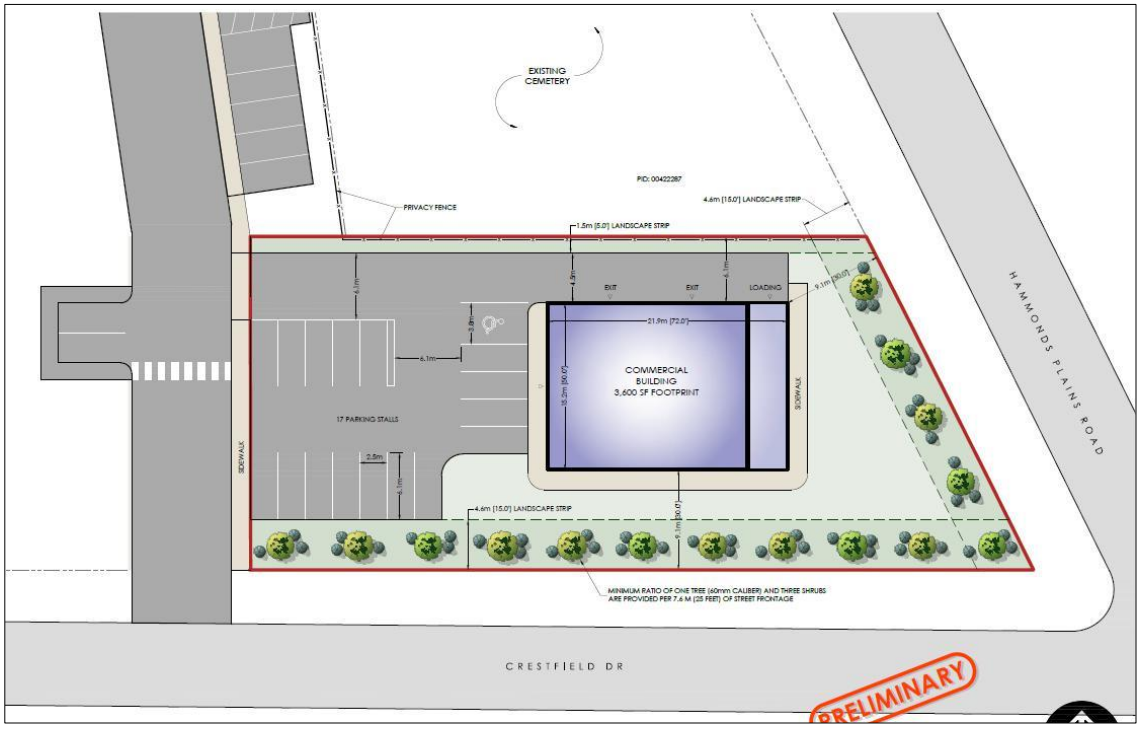
In conclusion, the observed weekday demand of about 700 vpd is below the expected capacity of a local street. This suggests there is some amount of residual capacity in the Crestfield Drive corridor to accommodate future traffic growth.

4.0 NEW VEHICLE TRIP GENERATION

4.1 – The Proposed New Building

The proposed new building is shown in *Figure 3*. It will have frontage along both Hammonds Plains Road and Crestfield Drive; however, the vehicle access will connect to the lower class Crestfield Drive. As noted earlier in this letter, the proponent intends to construct a two-floor office building that will contain about 6,600 ft^2 of leasable floor space. It is expected this new building will be occupied by one or two small businesses.

Figure 3: Proposed Site Layout



Source: Bowers Construction

Building rendering

4.2 – New Vehicle Trips

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. Based on our review of the office space being proposed it was determined that ITE's published trip generation rates for a small office building were appropriate. As such, ITE's *Trip Generation, 11th Edition (Volume 4)* document was used, and we applied ITE's published vehicle trip rates for a commercial office space of less than 10,000 ft^2 – referred to as Land Use Code 712 (Small Office Building).

GRIFFIN applied the ITE regression formulas to estimate the expected number of total vehicle trips moving in/out of the proposed development. A summary of the trip generation calculations are provided in *Table 2*.

Table 2: Site Trip Generation for the Proposed Development

	Size	Trip Rate	New Vehicle Trips / Hour		
			In	Out	Total
AM Peak Hour					
Commercial Building Small Office Building (ITE Code 712)	6,600 ft^2	1.67/1,000ft$^{2\,A}$	9 (82%)	2 (18%)	11
AM Peak Total Trips			**9**	**2**	**11**
PM Peak Hour					
Commercial Building Small Office Building (ITE Code 712)	6,600 ft^2	2.12/1,000ft$^{2\,A}$	5 (82%)	9 (18%)	14
PM Peak Total Trips			**5**	**9**	**14**

A – ITE's average rate was applied to calculate the new vehicle trips.

Based on the results contained in *Table 2*, the proposed development is expected to generate the following peak hour trips:

- *Weekday AM Peak Hour*: 11 new vehicle trips/hour (9 inbound and 2 outbound)
- *Weekday PM Peak Hour*: 14 new vehicle trips/hour (5 inbound and 9 outbound)

This generally equates to adding one new vehicle trip every 4 to 5 minutes to the study area streets and intersections.

5.0 THE PROPOSED SITE ACCESS

5.1 - Overview

It is understood through our discussions with the proponent that vehicles will move in/out of the new office building via a new HRM-approved private laneway connecting to civic #9 Crestfield

Drive. This new driveway will generally be located between the two existing driveway openings that once served the abandoned church. Thus, all new site-generated office traffic will utilize the private laneway access and no additional vehicle driveways are proposed to connect with Hammonds Plains Road or Crestfield Drive.

In 2021, GRIFFIN completed a Stage 1 traffic impact assessment for the adjacent senior living residential complex at civic #9 Crestfield Drive. At that time, GRIFFIN determined the proposed private laneway serving this residential development was an acceptable and suitable location due to the following:

- The driveway location met HRM's By-law S-300 requirements by connecting the access to the lower-class street – Crestfield Drive.
- The number of driveways connecting to Crestfield Drive will be reduced. The two existing driveways serving the former church will be closed and one new private laneway will be constructed – generally between the two existing driveway openings. This improves current conditions and conforms with access management guidelines.
- The driver visibility at the proposed new driveway location meets current Transportation Association of Canada (TAC) geometric design requirements.
- The driveway corner clearance distance separating the Hammonds Plains Road intersection and the new driveway will increase by about 9m, improving upon current conditions.

Expanded discussions relating to the driver visibility and driveway corner clearance are provided in the next sections.

5.2 - Driver Visibility

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 downstream of a new site access. The alignment of Crestfield Drive is flat and straight and offers good visibility to the north and south of the proposed access location. GRIFFIN concluded the following during their field review:

- Visibility to/from the north is clear for 80 m to the Hammonds Plains Road intersection.
- Visibility to/from the south is clear for at least 75 m to the Belmont Avenue intersection.

Vehicle operating speed along Crestfield Drive was not recorded in the vicinity of the proposed access. Operating speeds are expected to be below 50 km/h due to the close proximity of the Hammonds Plains intersection immediately to the north, as well as the two speed humps located on either side of the proposed access – which typically limit operating speeds to about 30-40 km/h.

Based on these site-specific conditions, it was concluded that the available stopping sight distances at the proposed driveway meet or exceed TAC minimum stopping sight distance requirements for a 50 km/h vehicle operating speed.

5.3 - Corner Clearance

A corner clearance review was carried out to ensure the proposed site access was located a sufficient distance away from the Hammonds Plains Road / Crestfield Drive intersection. Providing adequate space separating a driveway and an intersection reduces road safety risks and the likelihood of vehicle-to-vehicle conflicts associated with vehicles turning both at the driveway and intersection.

Both the Transportation Association of Canada (TAC) and the HRM provide guidance with respect to minimum corner clearance guidelines; however, the requirements identified by these two sources vary. Typically, the minimum required distance is based on site-specific conditions and a summary of the existing street characteristics is contained in *Table 3*.

Table 3: Summary of Corner Clearance Characteristics

Site Characteristic	Description
Predominant Land Use Type	Predominantly a residential land use area.
Street Classification	Crestfield appears to function as a local residential street that intersects with an arterial.
Street Width	Crestfield Drive has one travel lane in each direction at the proposed driveway location and measures 8.8 m wide.
Intersection Type	Appears to be a "minor intersection" as defined by TAC (stop-controlled).

Figure 4: Driver View Along Crestfield Drive at Proposed Access

Proposed Access: Looking North to Hammonds Plains Road.

GRIFFIN used these site-specific conditions to identify the minimum required corner clearance distance between the Hammond Plains Road / Crestfield Drive intersection and the proposed driveway. The two key guiding documents suggested the following:

- *HRM Guidelines*: Minimum of 30 m between the street line of the nearest intersecting street and the proposed driveway (Source: *HRM's By-Law Number S-300*).
- *TAC Guidelines*: Minimum of 2 m of tangent distance between the corner radii of the intersection and the corner radii of the proposed driveway (Source: TAC's *GDGCR – Chapter 8 – Access, 2017*).

GRIFFIN then compared these minimum requirements to the available corner clearance associated with the proposed driveway location – determined to be about 70 m of tangent distance (*i.e.* excluding corner radii). Thus, the available corner clearance distance exceeds the minimum requirements identified above. In addition, the proposed driveway is situated further south than the nearest existing driveway – improving the current corner clearance distance that exists today.

5.4 - Proximity to the Speed Humps

As noted earlier in this letter, Crestfield Drive is designated as a traffic calmed corridor and contains two speed humps in the vicinity of the proposed site access to help manage vehicle operating speed. Currently, a speed hump is located immediately north of the existing north driveway serving the abandoned church parking area. The existing corner clearance tangent distance between the existing driveway and the speed hump is only 1.5 m, as shown in *Figure 5*.

Figure 5: Location of the Speed Hump

Speed hump located adjacent to existing driveway

The proposed new site driveway will be located further south of this location and will improve the separation distance between the new site driveway and the speed hump. Thus, the new corner clearance tangent distance to/from the speed hump will be increased to about 10.5 m. There are no other traffic operational concerns with the new driveway location or its proximity to any of the speed humps on Crestfield Drive.

6.0 TRAFFIC IMPACTS ON SURROUNDING STREETS

6.1 – Qualitative Assessment

All site-generated trips will travel along the short 80 m distance between the Hammonds Plains Road and the new site access. No site-generated traffic is expected to travel south of the subject property towards Belmont Avenue and Kenwood Avenue. Therefore, only the north section of Crestfield Drive is expected to experience an increase in traffic volumes associated with the proposed office building once it is built and occupied.

As noted earlier in this letter, Crestfield Drive has sufficient residual capacity to accommodate the expected increase of one trip every 4-5 minutes during peak times of the day. 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 office development, there is not expected to be any measurable change in operations for drivers turning to/from the Hammonds Plains Road intersection. Further evidence of this conclusion is provided in the following Section.

6.2 – Hammonds Plains Road / Crestfield Drive Intersection Commentary

GRIFFIN has carried out two previous traffic impact assessments for the Crestfield Drive area, including:

- *Kenwood Avenue*: This traffic impact work was completed in May 2021 for a senior adult living development being planned at civic #5-#7 Kingswood Drive. This near-by development is proposed to have their main vehicle access connecting to Kenwood Avenue and thus all traffic would enter/exit via the Crestfield Drive / Hammonds Plains Road intersection[1].
- *Civic #9 Crestfield*: Another senior adult living development is proposed at civic #9 Crestfield and this traffic impact statement was completed in August 2021.

At the time, HRM's Traffic Management group requested that GRIFFIN examine the need for traffic signals at the Hammonds Plains Road / Crestfield Drive intersection. GRIFFIN assembled peak hour

[1] May 17th 2021 letter prepared by GRIFFIN summarizing a supplementary traffic operations assessment for a proposed development at civic #5-#7 Kingswood Drive, and access to Kenwood Avenue.

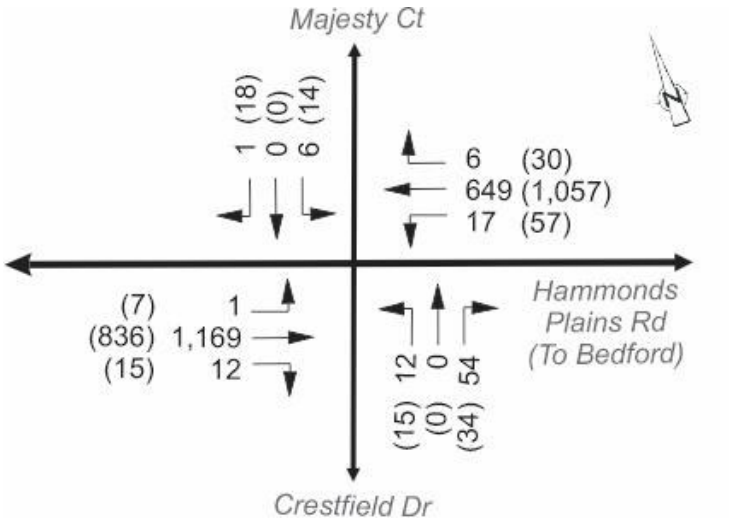
volumes under 2021 conditions along with traffic increases for known future developments – including the then-proposed clothing store on Majesty Court. It was concluded at that time that the warrant for a set of traffic signals was not met.

To ensure GRIFFIN's previous findings are still relevant, GRIFFIN has elected to update our previous traffic signal warrant analysis to include the office-related traffic volumes as well as new and updated September 2023 volumes on Hammonds Plains Road. Thus, GRIFFIN prepared a set of current peak hour traffic volumes to apply to the signal warrant assessment which include the following:

- Current September 2023 volumes including traffic associated with the recently-opened 9,900 ft^2 clothing store on Majesty Court, plus
- A general traffic growth rate of 2% per year out to the 2030 planning horizon to account for population and employment growth in the area, plus
- Expected new traffic associated with both proposed adult senior living developments:
    - *Civic #9 Crestfield Drive*: 53 new senior living units[2]
    - *Civics #5-#7 Kingswood Drive (access via Kenwood)*: 19 new apartment units[3]

The set of future year peak hour volumes are contained in *Figure 6*.

Figure 6: 2030 Peak Hour Volumes – Hammonds Plains / Crestfield Dr Intersection



[2] In August 2021, GRIFFIN completed an impact statement letter for a 53-unit senior living complex at civic #9 Crestfield Drive.

[3] Although the Kingswood Drive / Kenwood Avenue development is being planned for senior active living, GRIFFIN used a typical residential trip rate yielding a higher-than-expected number of new trips for this development – providing a worst-case set of results for the traffic signal warrant assessment.

GRIFFIN applied the TAC traffic signal warrant procedure to the current and forecast traffic demand at the Hammonds Plains Road / Crestfield Drive intersection. This technically consistent methodology is widely used by road agencies across Canada and is a recognized procedure by HRM. The calculation process provides a number of priority points which indicate whether a traffic signal is needed at a particular location. The warrant is met when the minor street peak hour volumes average 75 vehicle/hour or more, and the number of priority points exceed 100. The results of our assessment are provided in *Table 4*.

Table 4: Summary of Traffic Signal Warrant Results

Development Scenario	Hammonds Plains Rd / Crestfield Dr
September 2023	45 points
Future 2030	73 points

The signal warrant results contained in *Table 4* suggest that the Hammonds Plains Road / Crestfield Drive intersection can function adequately with stop-control well beyond the 2030 planning horizon. It also suggests the proposed new office building will only have a marginal impact on traffic operations along both Crestfield Drive and Hammonds Plains Road and this new site-generated traffic is not expected to trigger the need for traffic signals in the short to medium term time frame.

6.3 – Left Turn Auxiliary Lane on Hammonds Plains Road

Although unrelated to the proposed new office building, GRIFFIN identified a potential traffic operational concern with the existing lane markings at the Hammonds Plains Road / Crestfield Drive intersection. Under current conditions, a westbound left turn auxiliary turn lane is provided for drivers making a left turn onto Crestfield Drive. However, no left turn auxiliary turn lane is provided for eastbound drivers turning left onto Majesty Court – only a yellow hatched zone is painted in this area.

Since there is no clearly marked eastbound left turn auxiliary turn lane, left turning drivers make this movement from multiple locations, including stopping in the yellow hatched area or stopping in the eastbound through lane. This mix of driver behaviour can be unpredictable and has the potential to increase road safety risk. This situation is further compounded when a westbound left turning vehicle is occupying the opposing left turn lane and blocks visibility for the eastbound left turning driver – referred to as an off-set left turn situation.

Since there is road width already in place, it is recommended that HRM change the yellow hatch lane markings and provide a clearly marked eastbound left turn lane to overcome the visibility issue that is created by the off-set left turn condition. This simple low-cost change will reduce road safety risk at this intersection.

7.0 CONCLUSIONS AND RECOMMENDATIONS

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

- The proponent has plans to build a new two-floor office building in the southwest quadrant of the Hammonds Plains Road / Crestfield Drive intersection. The civic #1274 property is currently occupied by an abandoned church. The proponent has plans to remove the existing building and replace it with a new office building that will contain a total of 6,600 ft^2 of leasable floor space.
- The forecast new vehicle trips generated by a new office building of this size are estimated to be 11 trips/hour (9 inbound and 2 outbound) during the weekday morning peak period and 14 trips/hour (5 inbound and 9 outbound) during the weekday afternoon peak period - assuming the building is fully occupied.
- Given the fact that the proposed development will only generate a small number of new vehicle trips, it is expected that there will only be a limited and marginal traffic operational impact on the study area streets including Crestfield Drive and Hammonds Plains Road. Based on GRIFFIN's recent assessments associated with other future developments in this area, the proposed two-floor office building is not expected to require the need for a traffic control upgrade at the Hammonds Plains Road / Crestfield Drive intersection.
- A traffic count conducted in September 2023 indicated current demand along Crestfield Drive is about 650-700 vpd, immediately south of Hammonds Plain Road. TAC's typical volume on a local residential street is about 1,000 vpd, and the maximum capacity would be greater than this value. Therefore, there is some residual capacity to accommodate future traffic growth along Crestfield Drive.
- The proposed vehicle access is in a location with good visibility along Crestfield Drive, reduces the number of existing accesses, and increases the corner clearance distance from adjacent intersections and driveways.
- A speed hump is located on Crestfield Drive immediately north of the existing church driveway. The corner clearance distance to/from the new access will increase from 1.5 m to about 10.5 m. Therefore, there are no traffic operational concerns with the proximity of the speed hump to the new driveway location.

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

- That the design of the proposed vehicle access 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).
- That the existing regulatory on-street parking restrictions be extended along the west side of Crestfield Drive to ensure good driver visibility to/from the proposed site driveway. Specifically, the existing "No Parking" zone would be extended south to the civic #11 driveway.
- That HRM review the lane markings at the Hammonds Plains Road / Crestfield Drive intersection and ensure that an eastbound left turn auxiliary lane is provided for drivers entering Majesty Court. This road safety concern should have been identified as part of the planning approval and traffic impact review process for the new commercial business on Majesty Court. Implementing this simple low-cost pavement marking change will reduce safety risks associated with the off-set left turn situation that currently exists for drivers destined for Majesty Court.

8.0 CLOSING

The findings flowing from this qualitative traffic impact statement suggest the new vehicle trips generated by the proposed two-floor office building at civic #1247 Hammonds Plains Road is expected to have a limited and marginal 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 [redacted] or by email at [redacted]

Sincerely,

[redacted]

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

[redacted]