

James J. Copeland, P.Eng., RSP1
GRIFFIN transportation group inc.
30 Bonny View Drive
Fall River, NS B2T 1R2

July 31, 2023

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

RE: A Stage 1 Traffic Impact Statement for the proposed Morris Lake development

1.0 INTRODUCTION

1.1 – Overview

At the request of *Armco Capital (Armco)*, the GRIFFIN transportation group inc. (GRIFFIN) has carried out a qualitative Stage 1 Traffic Impact Assessment in support of the planning application process for a proposed residential development at PID #41057639 Caldwell Road, in the community of Cole Harbour, Halifax Regional Municipality (HRM). The subject lands measure about 34 acres and they appear to have a Comprehensive Development District (CDD) zone designation, within the *Dartmouth Land Use By-Law* area. The location of the subject lands are contained in *Figure 1*.

It is understood that the proposed residential development will be comprised of up to 150 low-density detached homes (R1's) and up to 40 apartment-style units contained within a multi-unit building. This yields an approximate density of 5.6 units /acre. Vehicle access will be provided via two public street connections to Caldwell Road – the existing Morris Lake Drive, as well as a new street via the road reserve opposite civic #436 Caldwell Road. Both vehicle accesses and their location are conceptually shown in the proposed site layout contained in *Figure 2*.

1.2 – Terms of Reference

The qualitative Stage 1 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 development located in a suburban area, as well as Institute of Transportation Engineers (ITE), and Transportation Association of Canada (TAC) guiding principles.

Figure 1: Location of Subject Lands



Source: HRM GIS Map

In addition, GRIFFIN also applied some of the guiding principles contained in HRM’s draft Mobility Analysis Guidelines document. These new guidelines are expected to supersede HRM’s current TIS guidelines in the near future.

2.0 STUDY AREA AND SITE CONTEXT

2.1 – Street Layout Overview

Caldwell Road is generally aligned in a north-south direction, has a two-lane two-way lane configuration with managed bike lanes and concrete sidewalks along both sides of the street. HRM has designated this section of the corridor as a Major Collector class street. It accommodates multiple travel modes including active transportation users, public transit service, and commuter vehicles. This corridor appears to provide a balance of multi-modal mobility as well as numerous driveways serving individual residences.

2.2 – Existing Traffic Volume Review

GRIFFIN installed an automatic traffic recording (ATR) device on Caldwell Road immediately north of the Morris Lake Drive intersection. The ATR unit captured two-way traffic volumes and vehicle speeds in the vicinity of the two vehicle accesses to the future development. Data was recorded from Monday June 12th to Friday June 16th, 2023. During this time, schools were open and there were no significant weather events that would have changed travel patterns. Thus, the recorded

traffic volume data were considered to be representative of typical conditions. A summary of the recorded peak hour volumes is provided in *Table 1*.

Table 1: Peak Hour Traffic Volumes on Caldwell Road – June 2023

	Northbound (inbound)	Southbound (outbound)	Two-way Peak Hour Volumes
Weekday AM Peak Hour^A	393	280	673 vph
Weekday PM Peak Hour^A	526	420	946 vph

vph – vehicles per hour

The highest two-way volumes occurred during the weekday afternoon peak period and they were observed to be 946 vehicles / hour (vph). Following industry best practices, a weekday afternoon peak hour volume of this magnitude equates to about 9,000-10,000 vehicles / day (vpd).

GRIFFIN reviewed the Transportation Association of Canada (TAC) Geometric Design Guidelines to help put the observed vehicle demand on Caldwell Road 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 guidelines suggest that Collector streets typically accommodate up to 8,000 vpd; however, the expected maximum capacity values would be higher.

In conclusion, the observed weekday demand of about 9,000-10,000 vpd on Caldwell Road is nearing the expected capacity of a Major Collector street. This suggests there is likely a small amount of residual capacity to accommodate future vehicle traffic growth along Caldwell Road. However, we expect the future vehicle demand can be managed in this corridor with continued investment by HRM in improving convenient alternative travel mode options as well as ensuring neighborhoods offer multi-modal facilities that are well connected.

2.3 – Vehicle Operating Speeds

As noted above, GRIFFIN installed an ATR device on Caldwell Road to gather vehicle data in the vicinity of the proposed accesses. The device recorded vehicle operating speeds, including the calculated 85th percentile vehicle operating speed, which was then used to select a design speed for the driveway visibility review.

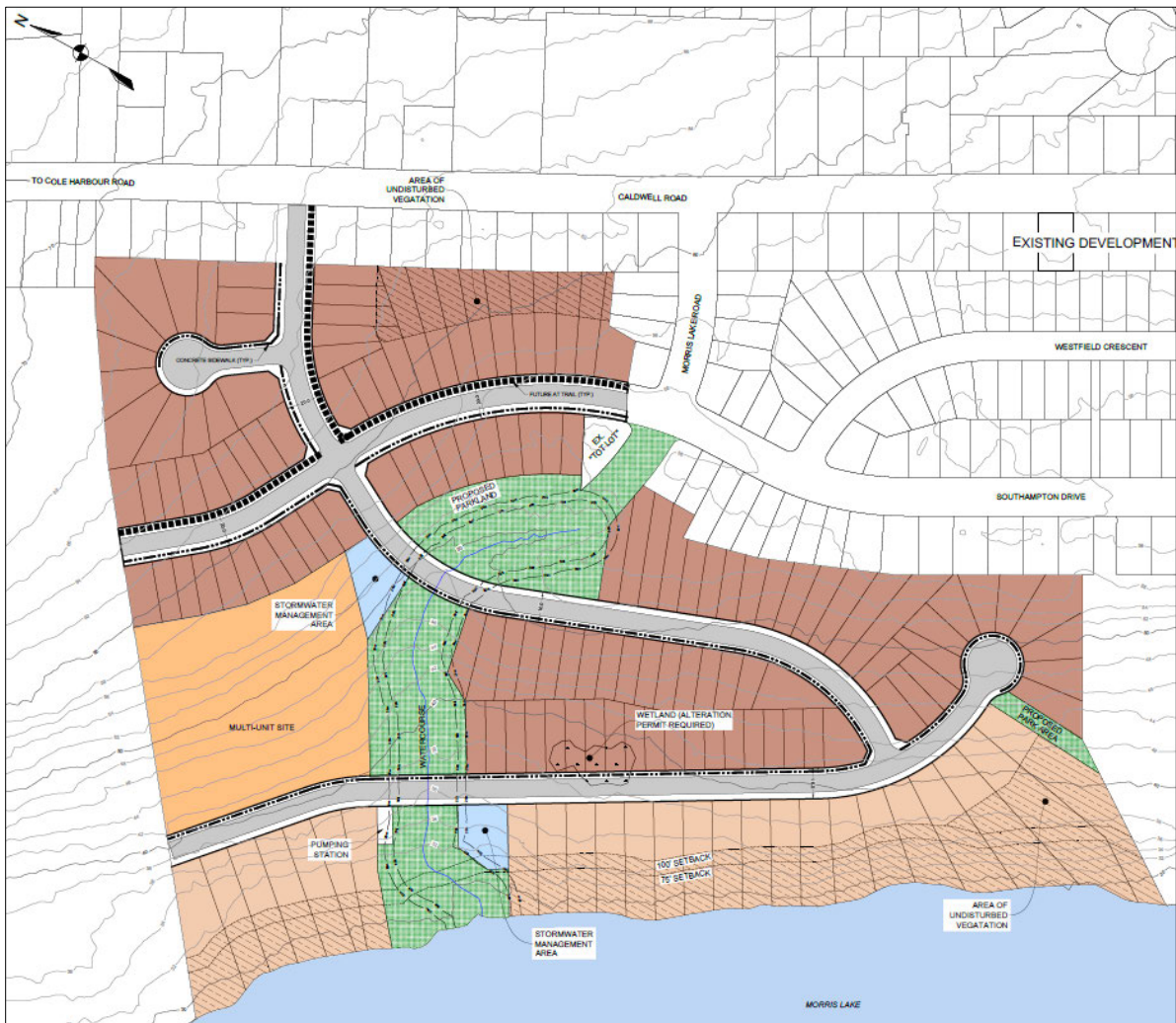
The regulatory speed limit along this section of Caldwell Road is 50 km/h. The observed 85th percentile speed measurements were generally the same in both travel directions, ranging between 62 and 63 km/h. As such, a 60 km/h design speed was selected and applied to our access visibility review discussed later in Section 3.2.

3.0 THE PROPOSED DEVELOPMENT

3.1 - Overview

The proposed residential development will be comprised of 150 new low-density residential units and up to 40 apartment-style units. The internal street layout has been carefully planned to minimize the walking distance to/from public transit service along Caldwell Road, minimize the slopes and steep grades to benefit AT users, as well as provide a secondary active transportation travel corridor that parallels Caldwell Road. This will achieve two connectivity goals – link adjacent neighbourhoods and provide a direct route to the Portland Hills Transit Terminal. A conceptual lot layout is provided in *Figure 2*.

Figure 2: Proposed Site Plan and Access Location



Source: DesignPoint

3.2 – Vehicle Access and Driver Visibility

It is understood the proponent has plans to provide one new vehicle access connecting to Caldwell Road - in addition to the existing access provided via Morris Lake Drive. The new north access will be approximately located opposite civic #436 Caldwell Road and via what appears to be a road reserve. It is expected that the new north access will serve as the primary vehicle access for the majority of new residents given the proposed internal street layout. Thus, the existing Morris Lake Drive intersection is expected to only serve as a secondary access.

Typically, a driver sight distance review is conducted 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. At this early planning stage, GRIFFIN only assessed the minimum requirement for vehicles approaching the new north access along 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. 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 Works’ field measurement best practices.

The field measurements were completed during the morning of Monday June 12th, 2023 following NSDPW best practices and TAC guidelines. A hazard object height of 0.6m and a driver eye height of 1.05 m were used. A summary of the SSD assessment at both locations is provided in *Table 2*.

Table 2: Summary of Stopping Sight Distance Measurements – New North Access (60 km/h)

Measurement Location	Travel Direction	Available SSD	TAC Required SSD		Does Available Exceed Required?
			Base ^A	Slope Adjusted	
New North Access <i>(opposite civic #436)</i>	Northbound (inbound)	210 m	85 m	80m (+3%) ^B	YES
	Southbound (outbound)	152 m	85 m	87 m (-3%) ^B	YES

A – 2017 TAC Chapter 2, Table 2.5.2

B – An estimate of the actual slope along Caldwell Road on the approaches to the new access.

Based on the findings our review, the proposed north access will have good driver visibility in both directions along Caldwell Road and the field measured sight distances exceed TAC minimum SSD requirements.

3.3 – Conforming with HRM Integrated Mobility Plan

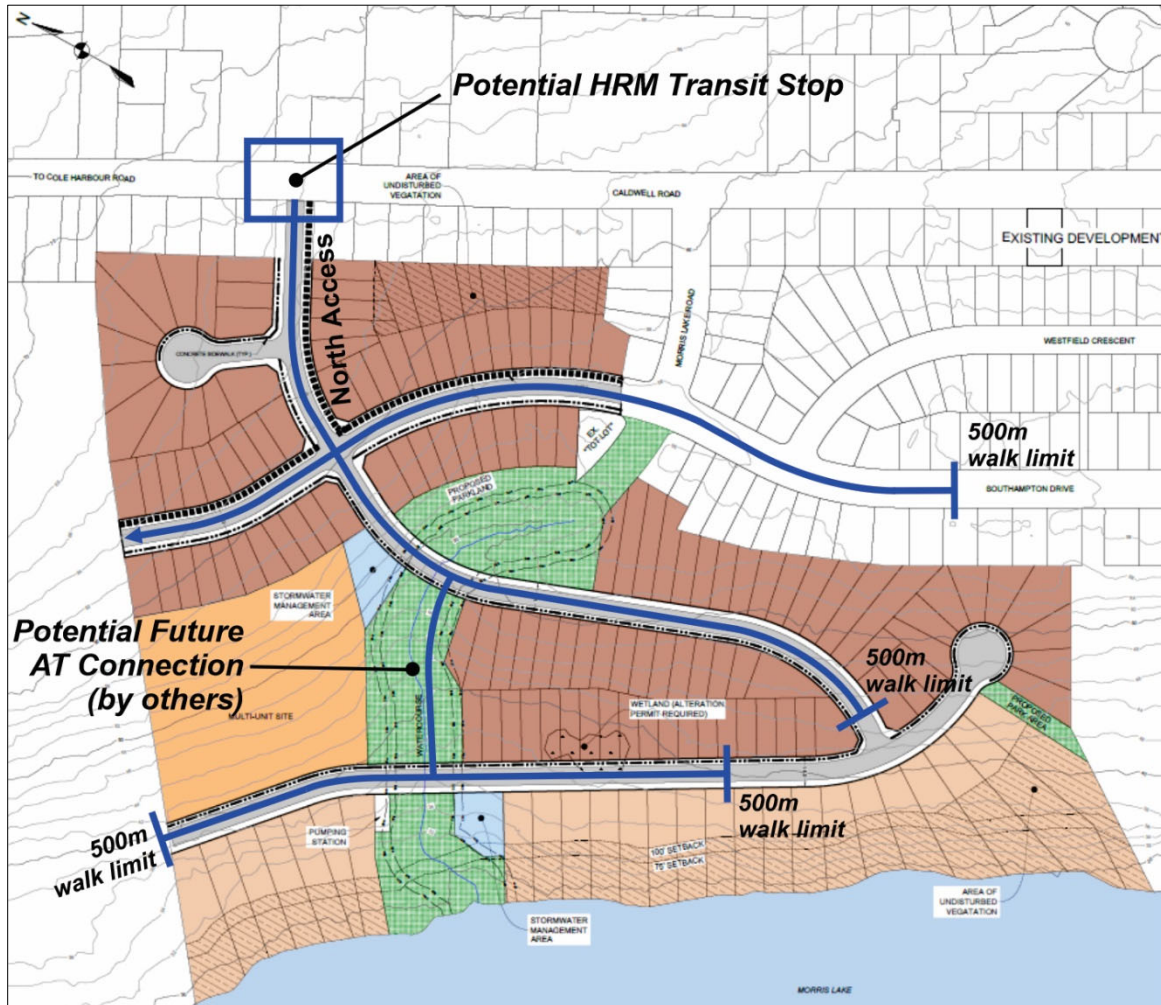
In 2017, HRM Council adopted the Integrated Mobility Plan (IMP) policy providing direction for more cost-effective mobility options to meet the needs of residents across the region. This includes increased use of active transportation and public transit modes, along with the provision of convenient and safe options for travelers.

We have reviewed the mobility options – other than commuter car travel – that are available in the immediate vicinity of the proposed development. These include:

- *Active Transportation – Caldwell Road:* HRM has installed on-road managed bicycle lanes along both sides of Caldwell Road, through the study area. Immediately to the north, HRM has also recently installed a multi-use path (MUP) along the east side of Caldwell Road which provides a good quality AT connection to schools and shopping north of the proposed development. There are opportunities for HRM to extend the existing MUP further south along Caldwell Road to provide AT access for future residents of this proposed development.
- *Active Transportation – Portland Lakes Trail:* HRM has invested in a continually expanding AT trail network in the vicinity of the study area – the Portland Lakes trail system. This AT network provides access for existing residents living in the vicinity of the Portland Hills Estates neighbourhood and allows them to move via non-motorized travel from the Russell Lake area to the Morris Lake area. The proposed development is well suited to accommodate any future expansion of the Portland Lakes trail system by HRM.
- *Public Transit:* HRM currently provides public transit bus service in the study area. A Local bus service is provided along Caldwell Road via Bus Route #65 (Caldwell) – except along the frontage of the proposed development (Astral Drive to Brookfield Drive). In addition, about 2 km north of the proposed development HRM operates the Portland Hills Bus Terminal which provides multiple transit options including express bus service to Dartmouth and Halifax. The proposed development is well suited to provide good AT connections to the Portland Hills Terminal via the Chaswood Drive – Cherrywood Drive street corridors.

In summary, the proposed residential development is strategically located to optimize use of HRM's existing AT facilities and public transit service options with minimal investment by HRM. Further, the proposed street layout is well-suited for future AT facility investments by HRM. Therefore, future residents of the proposed development should have multiple travel options which are expected to significantly reduce the demand for travel via commuter car. We have determined that about 85-90% of new residential lots could be situated within a 500 m walking distance of a public transit stop on Caldwell Road near the north access. This is shown conceptually in *Figure 3*.

Figure 3: Public Transit Stop on Caldwell – 500m Walking Distance



4.0 VEHICLE TRIP GENERATION

4.1 – Overview

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.

Due to the available multi-modal travel options in this area of HRM – as discussed previously in Section 3.3 – our vehicle trip generation assessment was carried out using a two-step process.

The first step identified the expected increase in new vehicle demand using ITE’s traditional trip generation calculation method for a suburban residential development. Our second step utilized ITE’s empirical data to estimate new vehicle travel demand – should HRM’s IMP goals be achieved. The two trip generation calculation procedures are discussed in the following Sections.

4.2 – Traditional Vehicle Trip Generation Method

As noted earlier in this letter, the proponent has plans to construct up to 150 low-density residential units as well as up to 40 apartment-style units. GRIFFIN reviewed the ITE’s latest *Trip Generation Manual, 11th Edition* document to identify the most appropriate trip generation rates to apply to this type of development. The following land use types within a suburban area appeared to best describe the mix of land uses being proposed:

- *Low-density Units:* ITE’s Single-Family Detached Housing – Land Use Code 210, and
- *Apartment-Style Units:* ITE’s Multifamily Housing (Mid-Rise) – Land Use Code 221.

GRIFFIN applied the ITE regression formula method for both land use types. The detailed trip generation calculations are provided in *Table 3*.

Table 3: Vehicle Trip Generation – ITE Traditional Calculation Method

	Size	Trip Rate	New Vehicle Trips / Hour		
			In	Out	Total
AM Peak Hour					
Single-Family Detached Housing (ITE Code 210)	150 units	0.72/unit ^A	27 (25%)	81 (75%)	108
Multifamily Housing (Mid-Rise) (ITE Code 221)	40 units	0.15/unit ^A	1 (23%)	5 (77%)	6
AM Peak Total Trips			28	86	114
PM Peak Hour					
Single-Family Detached Housing (ITE Code 210)	150 units	0.97/unit ^A	91 (63%)	54 (37%)	145
Multifamily Housing (Mid-Rise) (ITE Code 221)	40 units	0.40/unit ^A	10 (61%)	6 (39%)	16
PM Peak Total Trips			101	60	161

A – ITE’s regression formula was used to calculate trip rates.

Following ITE’s traditional vehicle trip generation calculation method for a new suburban neighbourhood, we expect the proposed development to generate the following peak hour trips:

- *Weekday AM Peak Hour:* 114 new vehicle trips/hour (28 inbound and 86 outbound)
- *Weekday PM Peak Hour:* 161 new vehicle trips/hour (101 inbound and 60 outbound)

This generally equates to adding about two to three new vehicle trips to the study area streets and intersections every minute. This is considered to be a small change in traffic volume along a suburban corridor such as Caldwell Road. Thus, there is not expected to be any notable change in

operations on the study area streets and intersections explicitly associated with the proposed development.

Since the traditional method and traditional trip rates are based on empirical survey data for suburban low-density residential areas, it does not account for travel behaviour/travel mode choices that are typically available in more dense residential areas. In areas that offer multiple travel options with good quality connectivity between modes we can expect reductions in vehicle demand and this is supported by ITE empirical survey results.

4.3 – Multi-Modal Trip Generation Method

Should HRM achieve the goals of their IMP for this growing area of the Region, there was a need to understand and quantify the expected reduction in vehicle trips generated by the proposed development. Our assessment was based on the assumption that this suburban area will – in the future – provide multi-modal travel options that are typically found in more dense urban areas of a city.

Therefore, our assessment compared vehicle trip rates, as a percentage of person trips, for both suburban and dense urban areas. These empirical data are contained in ITE’s *Trip Generation Manual, 11th Edition* document. The potential reduction in vehicle travel expected for a suburban residential area relative to an urban residential area was considered to be a good indicator of the potential impacts that HRM’s IMP could potentially achieve in this growing area of HRM. GRIFFIN assembled the relevant empirical data and identified the potential reduction in vehicle trip generation and the results are provided in *Table 4*.

Table 4: Estimate of Vehicle Trip Reductions – ITE Empirical Data

	Weekday Peak Hour Average Vehicle Trips
Low-Density Units^A	
ITE Suburban Residential	79% of person trips ^B
ITE Urban Residential	49% of person trips
Difference - Vehicle Mode	-30% reduction
Medium-Density Units^C	
ITE Suburban Residential	86% of person trips
ITE Urban Residential	48% of person trips
Difference - Vehicle Mode	-38% reduction

A – Empirical data taken from low density LUC 215, no data available for LUC 210.

B – Vehicle trips represent 79% of all person trips being made.

C – Empirical data taken from LUC 221.

Based on the results in *Table 4*, we can conclude from the ITE survey data that there is an expected reduction in the percentage of travel by vehicle – should good quality AT and public transit service, as well as convenient connectivity by provided in and around the new residential neighbourhood.

The expected new vehicle trip demand applied to this study is summarized in *Table 5*. These peak hour volumes are anticipated for the proposed development should HRM achieve the goals of the IMP.

Table 5: Vehicle Trip Generation – Achieving HRM IMP Goals

	New Vehicle Trips / Hour		
	In	Out	Total
AM Peak Hour			
ITE Traditional Method (Table 4)	28	86	114
Reduction due to HRM's IMP Goals	-12	-34	-46
Revised AM Peak Total Trips	16	52	68
PM Peak Hour			
ITE Traditional Method (Table 4)	101	60	161
Reduction due to HRM's IMP Goals	-36	-22	-58
Revised PM Peak Total Trips	65	38	103

A – ITE's regression formula was used to calculate trip rates.

In conclusion, should the HRM achieve the goals as set out in the IMP – including the provision of good quality travel mode options and convenient connectivity between modes – then we can expect a notable reduction in peak hour vehicle trip demand. This could result in the proposed development only generating:

- *Weekday AM Peak Hour:* 68 new vehicle trips/hour (16 inbound and 52 outbound)
- *Weekday PM Peak Hour:* 103 new vehicle trips/hour (65 inbound and 38 outbound)

This generally equates to adding about one new vehicle trip to the study area streets and intersections every minute.

4.4 – Qualitative Vehicle Trip Impacts

GRIFFIN reviewed the existing travel patterns along Caldwell Road to help identify the expected travel directions of new residents. Based on the findings of our review, we expect the majority of drivers (55-60%) will turn to/from the north (inbound) along Caldwell Road as drivers travel to/from the Portland Street corridor. This reflects current commuter travel patterns as drivers move between their place of residence and place of work. The remaining drivers are expected to turn to/from the south (outbound) along Caldwell Road.

Therefore, the splitting of a small number of new site-generated vehicle trips between inbound, outbound, left, and right turns suggests that no auxiliary turn lanes are required at the access street intersections along Caldwell Road.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 - Conclusions

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

- Armco is submitting a Development Agreement application to HRM for a proposed 34-acre residential development on PID #41057639, situated between Caldwell Road and Morris Lake. The proposed development will be comprised of 150 low-density units and up to 40 apartment-style units. Vehicle access will be provided via Morris Lake Drive and a new intersection located about 210m north of Morris Lake Drive.
- The vehicle trip generation calculations were carried out under the assumption that the goals of HRM's IMP could be met in the future through further investments in multi-modal travel options and good connectivity. Our vehicle trip generation calculations were completed using empirical travel mode choice data contained in the ITE's *Trip Generation Manual, 11th Edition*. A development of this scale, with good quality travel options and connectivity between modes could be expected to generate up to **68 trips/hour** (16 inbound and 52 outbound) during the weekday morning peak period, and **103 trips/hour** (65 inbound and 38 outbound) during the weekday afternoon peak period – as documented earlier in *Table 5*. This equates to an average increase of about one new vehicle added to the study area roads every minute.
- GRIFFIN expects there will only be a minor and negligible 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 expected to be about one new vehicle trip per hour split between inbound and outbound travel.
- The available stopping sight distance (SSD) at the proposed new north access appears to meet TAC minimum requirements for the measured vehicle operating speeds. Thus, drivers traveling along Caldwell Road are provided with sufficient forward visibility for the expected operating speed. The provision of adequate driver visibility will need to be confirmed by others during the detailed geometric design stage of this project, once the final access location(s) have been approved.

The proposed development is strategically located near the Portland Hills Transit Terminal, Public Transit Route #65, a new multi-use path (MUP) along Caldwell Road, and the Portland Lakes Trail system. The continued expansion and connectivity of these multi-modal facilities, and integration into the proposed development is expected to result in reduced vehicle trip generation rates for this area.

5.2 – Recommendations

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

1. *Access Design and Design Vehicle:* That an engineering review be carried out to ensure the proposed north access and internal street system can accommodate an appropriate design vehicle (i.e. garbage truck or emergency vehicle). The design of the new north intersection with Caldwell Road (carried out by others) will need to follow the latest HRM and Transportation Association of Canada (TAC) geometric design guidelines. One inbound lane and one outbound lane will provide sufficient capacity to accommodate the future traffic moving in/out of the subject lands. With two access points along Caldwell Road there is not expected to be a need for any auxiliary turn lanes along Caldwell Road.
2. *By-Law Requirements:* That all municipal By-law/Policy requirements for corner clearance, sight triangles and driver visibility are met to ensure driver sight distances to/from the proposed access is maintained throughout the design, construction, and final opening phases of the project.
3. *Signs and Pavement Markings:* That 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.
4. *Active Transportation Facilities:* That the following Active Transportation (AT) facilities and connections be considered:
 - *External:* That HRM consider extending the Caldwell Road MUP. This would include extending the existing MUP south of Astral Drive – towards Brookfield Avenue – to provide improved connectivity to existing and new residential neighbourhoods. A MUP extension along Caldwell Road will provide residents with improved connectivity for the active transportation mode which will help increase AT travel to area schools, the Portland Hills Transit Terminal, and the shopping areas along Portland Street.
 - *Internal:* That a MUP be considered along select internal streets such as the new north connection street – connecting to a future MUP on Caldwell Road – as well as a future north-south AT facility running along local residential streets that could include Southampton Drive, and Cherrywood Drive. HRM has an opportunity to create a local residential AT corridor that parallels Caldwell Road and provides residents with a more direct connection to the Portland Hills Transit Terminal.

Both the internal and external AT facilities are conceptually shown in *Figure 4*.

5. *Caldwell Road Public Transit Stop:* That HRM give consideration to installing a new public transit bus stop in the vicinity of the Caldwell Road / New North Access intersection to better accommodate the future residents of this area as it continues to grow. This may

require route alignment modifications for Transit Route #65, but has the potential to increase the public transit capture area, and reduce commuter vehicle travel demand.

Figure 4: Future Potential AT Facilities



6.0 CLOSING

The findings flowing from this qualitative traffic impact statement suggest the new vehicle trips generated by the proposed residential development are expected to generate about one new vehicle trip every minute. This will result in a very small impact on the traffic operational performance of the study area streets and intersections.

There are opportunities for HRM to improve connectivity between multiple travel modes in this area through the expansion of their existing AT facilities and modifications to public transit routing along Caldwell Road. These changes will help the HRM move towards their IMP goals and potentially reduce the commuter vehicle travel demand in the Caldwell Road corridor. 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.