DILLON CONSULTING

OTTAWA CATHOLIC SCHOOL BOARD

Transportation Impact Assessment

Proposed Catholic Elementary School and Childcare Facility, Riverside South

October 2022– 22-4621

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Certification

1. I have reviewed and have a sound understanding of the objectives, needs, and requirements of the City of Ottawa's Official Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the presentation of transportation impact assessment reports, including multimodal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering, or traffic operations; and,
4. I am either a licensed or registered professional in good standing, whose field of expertise is either transportation engineering or transportation planning.

Signature of individual certifier that s/he meets the above four criteria.

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1.0 Screening

1.1 Summary of Development

Municipal Address	836 Solarium Avenue
Description of Location	The site is located within the Claridge Homes Riverside South Phase 2 development area, north of the Urbandale Phase 15 South Parcel development. The site is located on the north side Solarium Avenue on the west side of Brian Good Avenue, approximately 650 metres west of Spratt Road.
Land Use Classification	Institutional
Development Size	1 storey elementary school and childcare centre. The single storey school is 4,630 m^2 (49,837 sq. ft.) and provides a 276 m^2 (2,970 sq. ft.) childcare facility. The school provides 22 classrooms capable of accommodating 524 students. The site plan includes future expansion to 18 portable classrooms. The school will be capable of accommodating approximately 921 students with the expansion to 18 portables. The childcare facility will accommodate up to 40 students.
Number of accesses and locations	The staff parking lot and parent drop-off/pick-up layby would be accessed from Solarium Avenue, and the school bus layby would be located on Brian Good Avenue. The childcare drop-off is located within the staff parking lot.
Phases of development	1
Build-out year	September 2024

1.2 Trip Generation Trigger

The proposed elementary school is anticipated to generate over 60 person trips during the peak hour, therefore the trip generation trigger has been satisfied and a transportation impact assessment is required.

Land Use Type	Minimum Development Size	Yes	No
Single-family homes	40 units		x
Townhomes or apartments	90 units		x
Office	3,500 sq.m.		x
Industrial	5,000 sq.m.		x
Fast-food restaurant or coffee shop	100 sq.m.		x
Destination retail	1,000 sq.m.		x
Gas station or convenience market	75 sq.m.		x
Other	60 person trips or more during weekday peak hours	x	

Since the development satisfies the Trip Generation Trigger, both the Design Review and Network Impact Components will be addressed in the TIA study.

2.0 Scoping

2.1 Existing and Planned Conditions

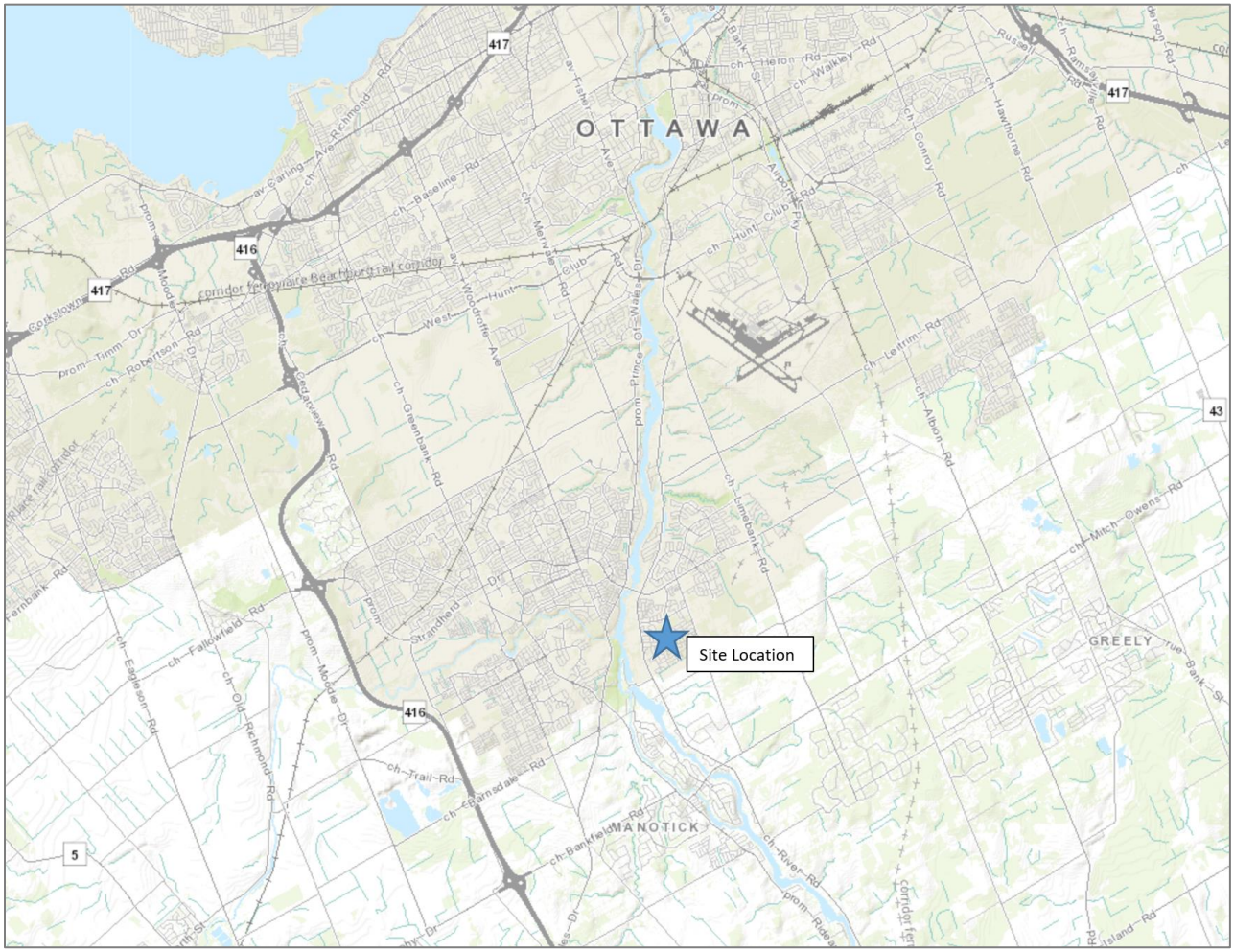
2.1.1 Proposed Development

The proposed school development is located within the Claridge Homes, Riverside South Phase 2 development, and north of the Urbandale Phase 15 South Parcel development. A transportation impact study was completed in 2017 for the Riverside South Phase 2 development, municipally known as 4720 Spratt Road and 807 River Road. The proposed school site is located on the northwest corner of Solarium Avenue and Brian Good Avenue, approximately 650 metres west of Spratt Road. **Figure 1** illustrates the location of the proposed development and **Figure 2** illustrates the proposed study area intersections to be considered within this TIA. **Figure 3** illustrates the proposed site plan.

The site is currently zoned as I1A / R4Z Minor Institutional Zone which permits a school and daycare among other types of developments. The school and daycare facility is anticipated to open in September 2024.

The proposed site plan provides a parking lot for staff and childcare drop-off/pick-ups. Access to the parking lot would be via an entrance from Solarium Avenue. The site plan also proposes on-street lay-bys, one dedicated for school buses on Brian Good Avenue, and a layby for student drop-offs and pick-ups on Solarium Avenue. The Brian Good Avenue school bus lay-by area provides space for nine school buses (approximately 140 metres). The site plan proposes a 100 metre drop-off lay-by area on Solarium Avenue.

Figure 1: Site Location

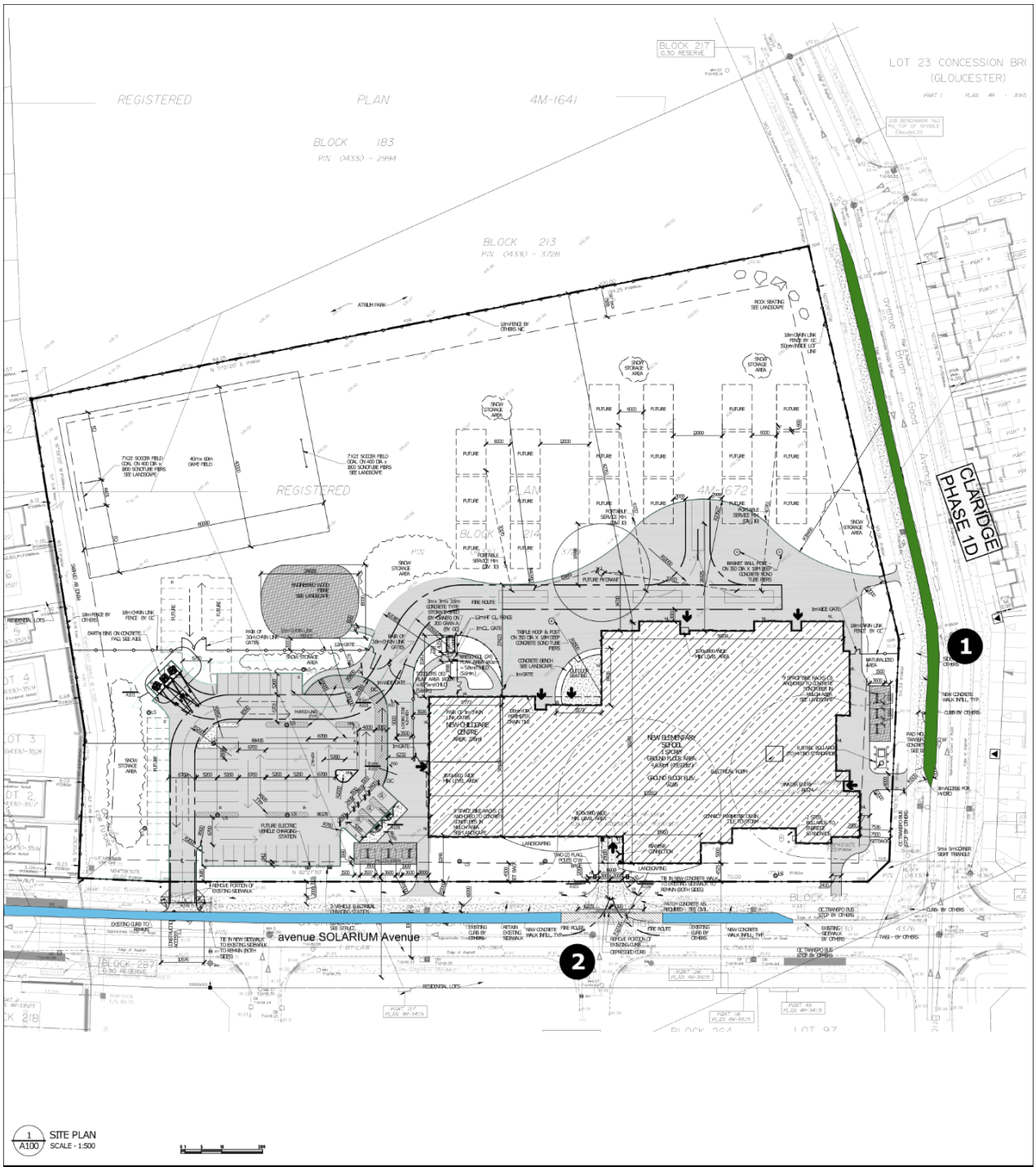


Background map source: geoOttawa, accessed August 2022

Figure 2: Study Area Intersection

Background map Source: geoOttawa, accessed August 2022

Figure 3: Proposed Site Plan



Source: Site plan provided by PRTY Architect, dated August 8, 2022

2.1.2 Existing Conditions

The subdivision is currently under construction with hundreds of houses in various stages of completion. While there are some houses that have been occupied within Riverside South Phase 2, there is a large portion of the units that are either under construction or have yet to break ground. The southern parcel of the Urbandale Phase 15 development has just recently begun construction. **Figure 4** is a photo (taken in July 2022) on Brian Good Avenue adjacent the school site looking south towards Solarium Drive.

Figure 4: Brian Good Avenue Looking South towards Solarium Drive (July 2022)

2.1.2.1 Roads and Traffic Control

The roadways under consideration in the study area are described as follows:

Brian Good Avenue	Brian Good Avenue is a proposed municipally-owned, two-lane collector road running north-south from Earl Armstrong Road in the north to Chorus Drive in the south within the Riverside South community. The right-of-way (ROW) is 26 metres. The residential development adjacent to the school site is under construction and the roadway curbs have not been constructed. The roadway has not yet been assumed by the City in the area adjacent the site.
Solarium Avenue	Solarium Avenue is a proposed major collector road in the Official Plan, running east-west, connecting to River Road in the west and Spratt Road in the east (to be extended to Limebank Road in the future. The ROW of Solarium Avenue is 26 metres.
Andromeda Road	Andromeda Road is a proposed local street running north of Solarium Avenue and is located on the west side of the proposed school site opposite Hydrangea Avenue. The roadway has a length of 275 metres.
Hydrangea Avenue	Hydrangea Avenue is a proposed local street running south of Solarium Avenue to Chorus Drive and is located on the west side of the proposed school site opposite Andromeda Road. The roadway has a length of 340 metres.

Atrium Ridge	Atrium Ridge is a proposed local street running east/west of Brian Good Avenue, and is located approximately 340 metres north of Solarium Avenue. The roadway connects to River Road in the west and to Canvasback Ridge (local street) to the east for a length of approximately 1 km.
River Road	River Road is a municipally-owned, two-lane urban arterial roadway running north-south along Rideau River from Riverside Drive / Limebank Road south to beyond the City limits. River Road has a four-lane urban cross-section at the intersection with Earl Armstrong Road.
Spratt Road	Spratt Road is a municipally-owned, two-lane major collector road running north-south from Limebank Road to Mitch Owens Road. The ROW of Spratt Road is 26 metres. North of Earl Armstrong Road, Spratt Road has an urban cross-section and a 60 km/h posted speed limit, but transitions to a rural cross-section south of Earl Armstrong Road with a posted speed limit of 80 km/h.

2.1.2.2 Walking and Cycling

Brian Good Avenue and Solarium Avenue in proximity to the school site have not yet been assumed by the City. The roadways are currently paved with base asphalt however there are no curbs or sidewalks at this time near the school site. To the north of the school and park site, Brian Good Avenue provides sidewalks on both sides of the roadway. On Solarium Avenue, there are portions of sidewalk to the west of the Andromeda Road/Hydrangea Avenue intersection however the sidewalks are not complete to River Road.

2.1.2.3 Transit

There are no existing transit operations in the immediate area of the school site.

2.1.2.4 Traffic Management Measures

There are no existing traffic management measures in the study area.

2.1.2.5 Traffic Volumes

As the streets adjacent to the proposed school site are not yet in place, traffic volumes in the area represent construction workers and visitors to the site, therefore existing traffic volumes are not relevant and were not collected.

2.1.2.6 Collision History

As the streets adjacent to the development are not yet in place, there is no existing collision history.

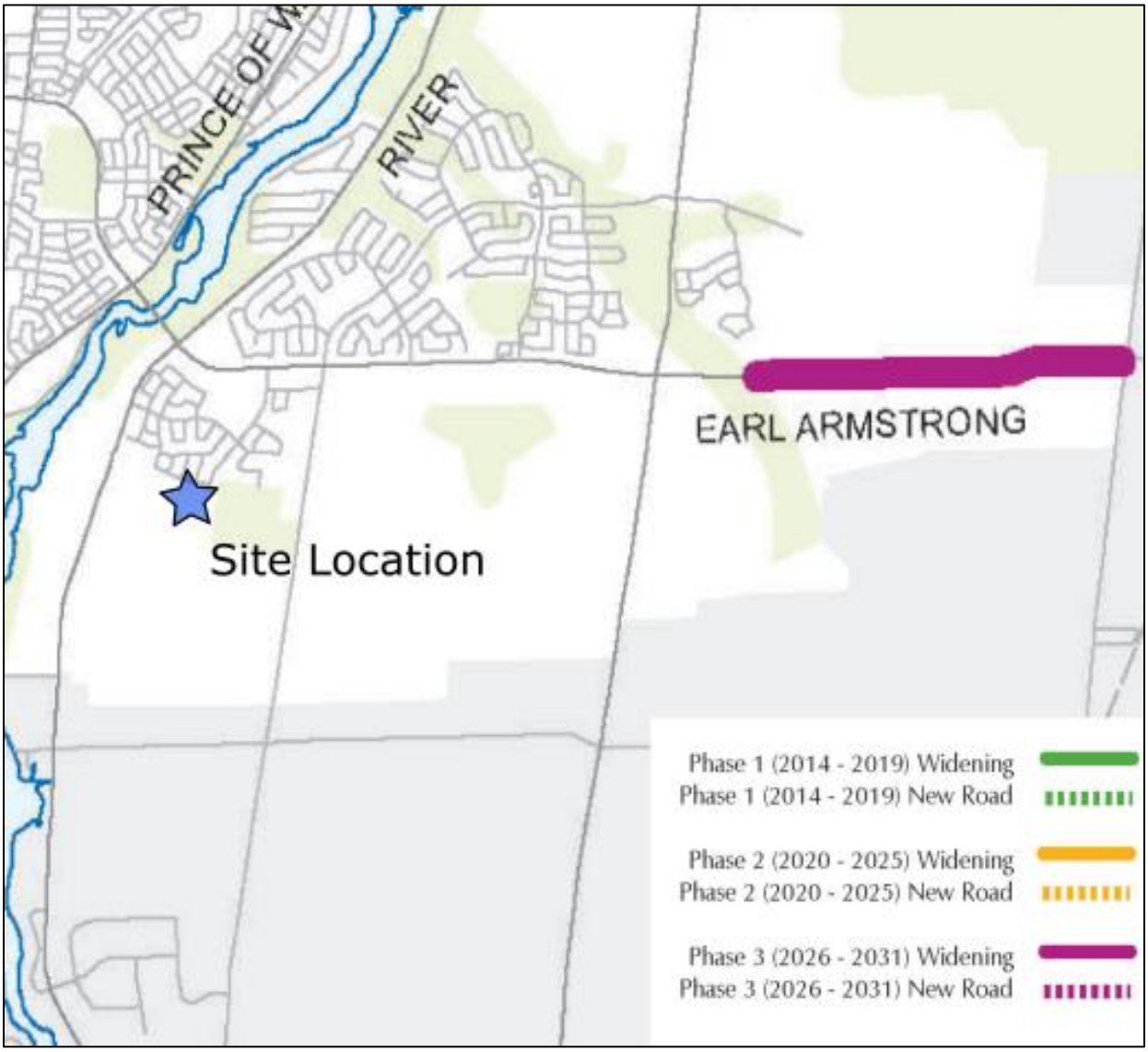
2.1.3 Planned Conditions

2.1.3.1 Road Network Improvements

Figure 5 shows the 2031 'Affordable' Road Network as proposed in the 2013 Transportation Master Plan (TMP) for the Riverside South area. Notable proposed road network changes include a road widening along Earl Armstrong Road to the east of Limebank Road. The widening was scheduled to occur between 2026 and 2031.

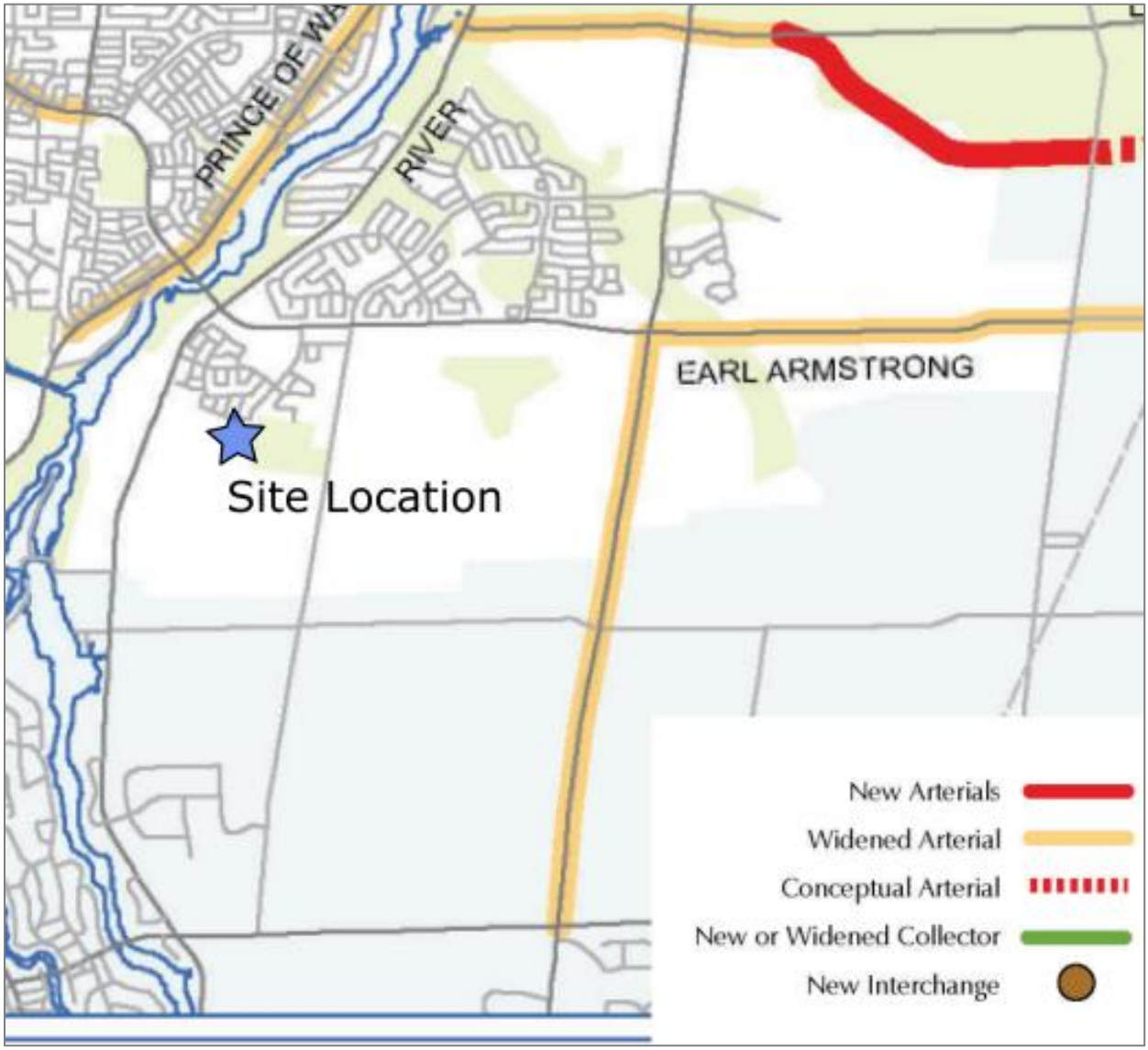
Figure 6 shows the 2031 Road Network Concept that indicates a widening a Limebank Road, Earl Armstrong Road, Prince of Wales Drive and a realignment of Leitrim Road. The timing for these projects is currently unknown.

Figure 5: 2031 Affordable Road Network



Source: City of Ottawa 2013 TMP, 2031 Affordable Road Network

Figure 6: 2031 Road Network Concept



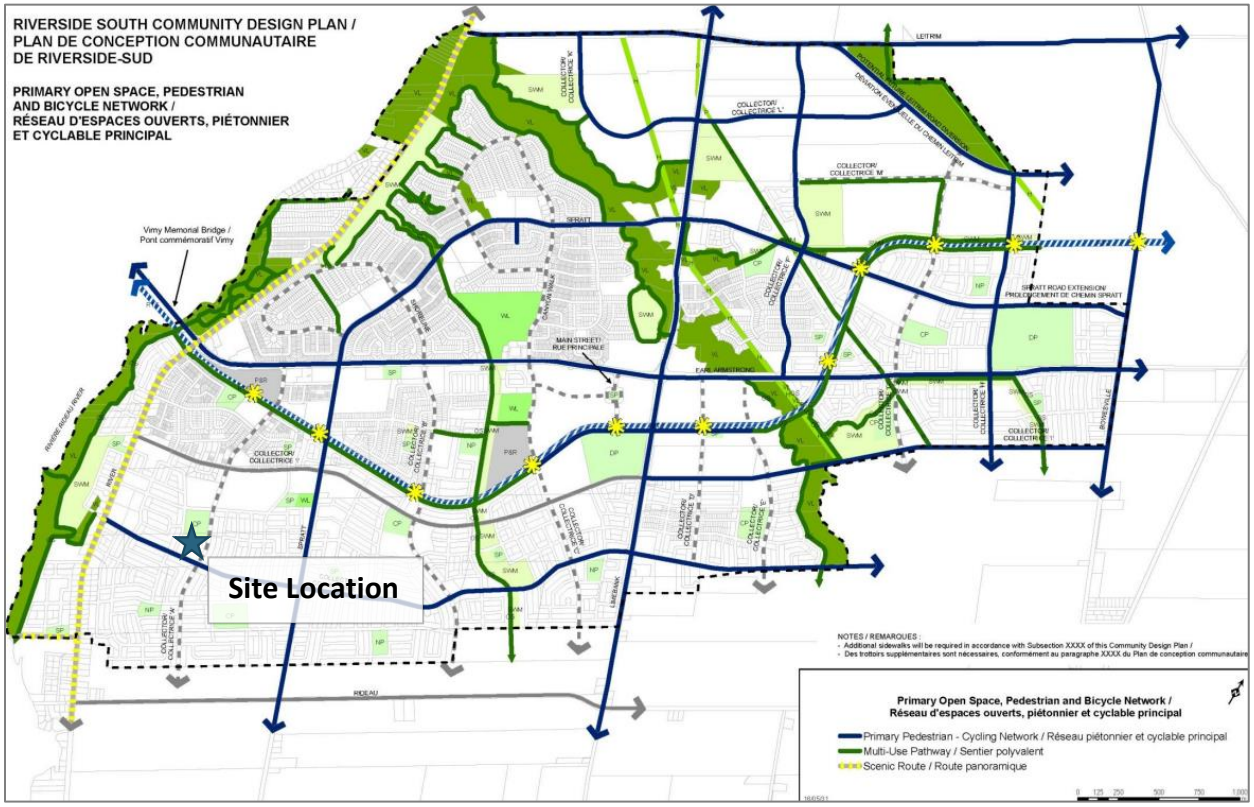
Source: City of Ottawa 2013 TMP, 2031 Road Network Concept

2.1.3.2 Walking and Cycling

Figure 7 illustrates the planned walking and cycling facilities from the Riverside South Community Design Plan (CDP), 2016. The CDP shows a major pedestrian and cycling network along Brian Good Avenue and Solarium Avenue.

As collector roadways, Brian Good Avenue and Solarium Avenue will be constructed with sidewalks on both sides of the roadways.

Figure 7: Planned Walking and Cycling Facilities (Riverside South Community Design Plan, 2016)



Source: Riverside South Community Design Plan, Sept 2016

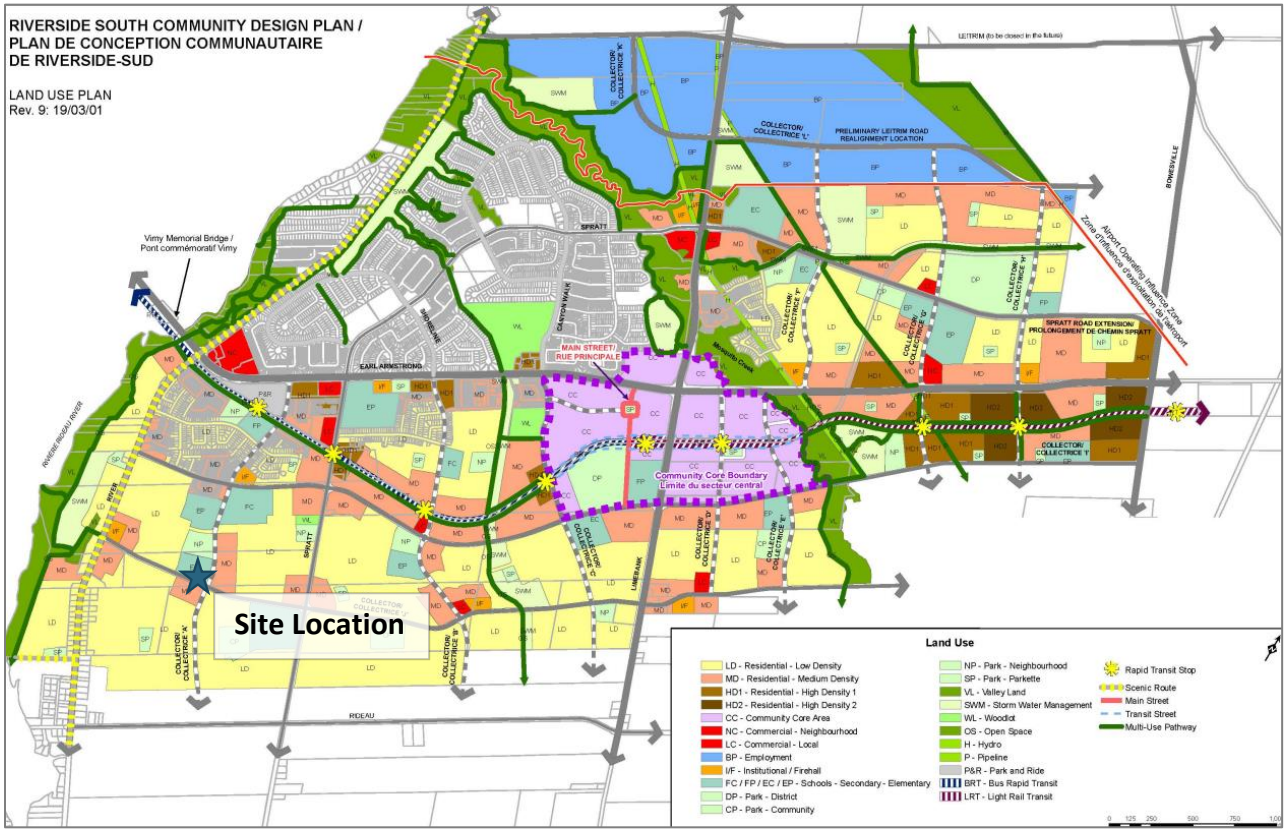
2.1.3.3 Transit

The Riverside South Community Design Plan (CDP) was updated in 2019 to reflect and accommodate:

- A change in the location of the future Leitrim Road by-pass (to accommodate a planned westerly extension to a future runway for the Macdonald Cartier airport); and
- A change in the location of the Rapid Transit Corridor from its current planned location through the north-easterly part of the community and connecting to the future Core Area (town centre), to a new location south of Earl Armstrong Road between Bowesville Road and the future Core Area.

Figure 8 illustrates the 2019 CDP and the proposed extension of the LRT line from Bowesville Road to the Riverside South Community Core, where Bus Rapid Transit will carry on from the Riverside South Community Core west beyond the Vimy Memorial Bridge.

Figure 8: 2019 Community Plan Update – New LRT and Transit Stop Locations



2.1.3.4 Future Background Developments

A Community Design Plan (CDP) was prepared for the Riverside South Community. The CDP was approved in 2004 and updated in 2010, 2014, 2015 and 2018. A Community Transportation Study was also prepared as supporting information for the original CDP. The document identified and accounted for various background developments. The Community Transportation Study (CTS) for Phase 2 of the Claridge Homes Riverside South development (4720 Spratt Road, May 2017) identified and accounted for various background developments. However, the report did not include the subject elementary school site, as the size and specifics of the school facility was not known at the time of the study.

There are four known significant developments in the vicinity of the study area, which are summarized in **Table 1** and illustrated in **Figure 9.** These developments are either in the development application approval process, have already been approved and are in pre-construction, or are currently under construction. The number of dwelling units and assumed build-out dates for each development were obtained from previous traffic studies.

Table 1: Background Developments

Development	Location	Development Size	Assumed Build-Out
Urbandale Phase 15	4650 Spratt Road 750 River Road	452 single family homes 740 townhomes	2018 (still under construction)
RSDC Phase 17	East of 4775 - 4875 Spratt Road	1,240 residential units	2036
Riverside South Phase 2	4720 Spratt Road 807 River Road	346 single family homes 409 townhomes	2026
Ironwood (Cardel Homes)	673 River Road	225 single family homes 244 townhomes	2029

Figure 9: Background Developments

Source: Aerial Image from Google Maps (October 2019)

2.2 Study Area and Time Periods

The study area for this report is limited to the intersection of Brian Good Avenue at Solarium Avenue, Brian Good Avenue at Atrium Ridge, Solarium Avenue at Andromeda Road/Hydrangea Avenue, the site driveway on Solarium Avenue, and to sections of roadway between the school and the noted study area intersections.

The selected time periods for analysis are the weekday AM and PM peak hours of adjacent street traffic (i.e., the AM and PM rush hours), since these are often the time periods that govern roadway design. Notably, many elementary school days end before the PM rush hour and therefore the impact of the school is typically governed by the AM peak hour, as it is in this case.

The proposed development is anticipated to be open for the 2024 school year. Therefore, this analysis will examine the build-out (2024) and build-out plus five year (2029) future horizon years.

2.3 Exemptions Review

Table 2 summarizes the exemptions review table from the City of Ottawa's 2017 *Transportation Impact Assessment Guidelines*. **Module 4.2.2** is not included since the parking supply meets the zoning bylaw requirement. The site plan proposes 59 parking spaces for the initial 22 classrooms and the child care facility. In the future when the 18 portables are added, an additional 28 parking spaces will be provided within the parking lot. The future total parking supply is 87 parking spaces. The zoning bylaw requires an ultimate parking supply of 66 parking spaces, therefore the site exceeds the parking requirement.

Table 2: Exemptions Review

Module	Element	Exemption Consideration	Status
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Included
	4.1.3 New Street Networks	Only required for plans of subdivision	Not included
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Included
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Not included
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Included
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on Local or Collector streets for access and total volumes exceed ATM capacity thresholds	Included
4.8 Network Concept		Only required when proposed development generates more than 200 person trips during the peak hour in excess of the equivalent volume permitted by established zoning	Not included
4.9 Intersection Design	All Elements	Not required if site generation trigger is not met	Included

3.0 Forecasting

3.1 Development-Generated Travel Demand

Traffic volumes within the study area will consist of trips generated by the school and trips generated by background land uses. The background land uses are generally residential in nature, and are known as Urbandale Phase 15, Riverside South Phase 2 and the Ironwood subdivision.

3.1.1 School Trips

The school and childcare facility trip generation can be calculated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th edition methodology or by using a first principles approach. In this case, trips were calculated using both approaches, for comparison purposes. The first principles approach has used the TRANS Trip Mode Shares, which have been adjusted as deemed appropriate for the location and school attendance boundary.

The trip generation and mode share for the proposed school was calculated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th edition.* **Table 3** summarizes the vehicle trip generation for the proposed elementary school based on ITE trip rates.

Table 3: ITE Trip Generation – Vehicle Trips

Land Use (ITE Land Use Code)	Size	AM Peak Hour of Adjacent Street Traffic (i.e. 7-9 AM)			PM Peak Hour of Adjacent Street Traffic (i.e. 4-6 PM)		
		Inbound	Outbound	Total	Inbound	Outbound	Total
Elementary school (520)	921 Students	368	314	682	67	80	147
Daycare (565)	2,960 sq. ft.	17	16	33	15	18	33
Total Auto Trips		**367**	**314**	**681**	**79**	**94**	**173**

A first principles approach was also undertaken to forecast the number of vehicle and person trips that will be generated by the site. When operating at maximum capacity (not anticipated in the 3-5 year horizon), the school is anticipated to have 40 staff members and 18 portables. The school board anticipates that the maximum 18 portables may be required for a relatively short period of time (a few years) in advance of another school opening in the Riverside South development area. It is anticipated that when the school first opens in 2024, two to three school buses will be used initially, increasing to 7 buses in the future when all of the portables are in operation. The childcare facility is anticipated to accommodate 39 childcare spaces. The following outlines our first principles approach to identifying the trip generation of the school.

1. The Trans Trip Generation Manual, 2020, indicates the typical student travel mode share as observed within the city of Ottawa, as indicated in **Table 4**. The TRANS manual notes that each site exhibits its own unique characteristics, and may differ from site to site. Given that the school is embedded directly within the subdivision with planned high quality sidewalks and

many students living within easy walking distance, it's assumed that a slightly higher walking and cycling mode share, with a corresponding reduction in auto passenger share, as indicated in **Table 5.**

Table 4: Elementary School Transportation Mode Share - TRANS Trip Generation Manual, 2020

School Type	Mode Share					
	Auto Passenger	School Bus	Transit	Walk	Bike	Other
Elementary	22%	48%	6%	20%	2%	2%

Table 5: Elementary School Transportation Mode Share - Modified Mode Share

School Type	Mode Share					
	Auto Passenger	School Bus	Transit	Walk	Bike	Other
Elementary	15%	48%	6%	24%	5%	2%

2. During maximum loading, the school will be capable of supporting up to 921 students with 40 staff members, for a total of 961 person trips to the school.
3. Assume that on any given day, five percent (5%) of students will be absent. Assume that 100% of all staff members are present. Therefore, 875 students and 40 staff will attend the school on a daily basis.

AM Trip Generation

4. The student auto trips are calculated using the modified TRANS rates for Auto Passenger, the site will generate 131 student auto passenger trips. Canada census data indicates 44% of households have one child, while 56% of households have 2 or more children. It's assumed 1.3 students per automobile, therefore approximately 101 automobiles will arrive carrying 131 students.
5. The elementary school will be serviced by 7 school buses. Assuming the TRANS bus rate is 54%, the school is expected to generate 473 student trips by bus, for an average of 67 students per bus. A typical full length school bus can carry up to 72 elementary students, assuming three students per seat.
6. Assuming the walking and cycling modes maintain the TRANS rates, active modes will account for the following:
    a. Walking (24%) – 210 trips
    b. Cycling (5%) – 44 trips (cycling trips will likely be higher during fair weather)
7. During the AM peak period, 40 elementary school staff are anticipated to be at the school. Of the proposed 40 staff members, it is assumed that 30 will arrive during the peak hour and the other 10 will arrive before or after the peak hour. The proposed school is located in a developing suburban area in proximity to the future rapid transit corridor, therefore we have assumed 20% of the staff members will be arriving by transit or other active modes (six trips), resulting in 24 peak hour automobile trips on any given weekday.

PM Trip Generation

8. During the PM peak hour of the school, it was assumed that of the 875 students at the school, 122 students (14%) remained for after school programs. This assumption was confirmed by the school board and is based on ITE methodology. Therefore 752 students leave the school after the bell. Assuming a similar automobile rate of 15%, it can be expected that 86 automobiles will pick up 112 students (assuming 1.3 students per vehicle) at the end of school bell. It is assumed that 60% of the remaining students would be picked up during the PM peak commuter hour. Thus, 67 students will be picked up by 52 automobiles. The remaining students would be picked up within the PM peak period, but outside of the peak hour.

Child Care Facility Operations

9. During the AM and PM peak hours, approximately 50% (17/39) of childcare drop-offs or pick-ups are anticipated to occur by vehicle during the peak hour. Childcare drop-offs and pick-ups are likely to occur over a two-hour window as arrival and departure patterns are based on parent schedules. The childcare facility staff members will arrive before the peak hour of the school and depart following the afternoon bell times.

Table 6 summarizes the trip generation of the school in terms of person trips based on the first principles approach and TRANS mode shares identified above. The trip generation first principles approach during the AM peak hour has been carried forward within this report as it more accurately reflects the anticipated operation of the site as compared to the ITE trip generation methodology.

Table 6: Trip Generation – Persons Trips

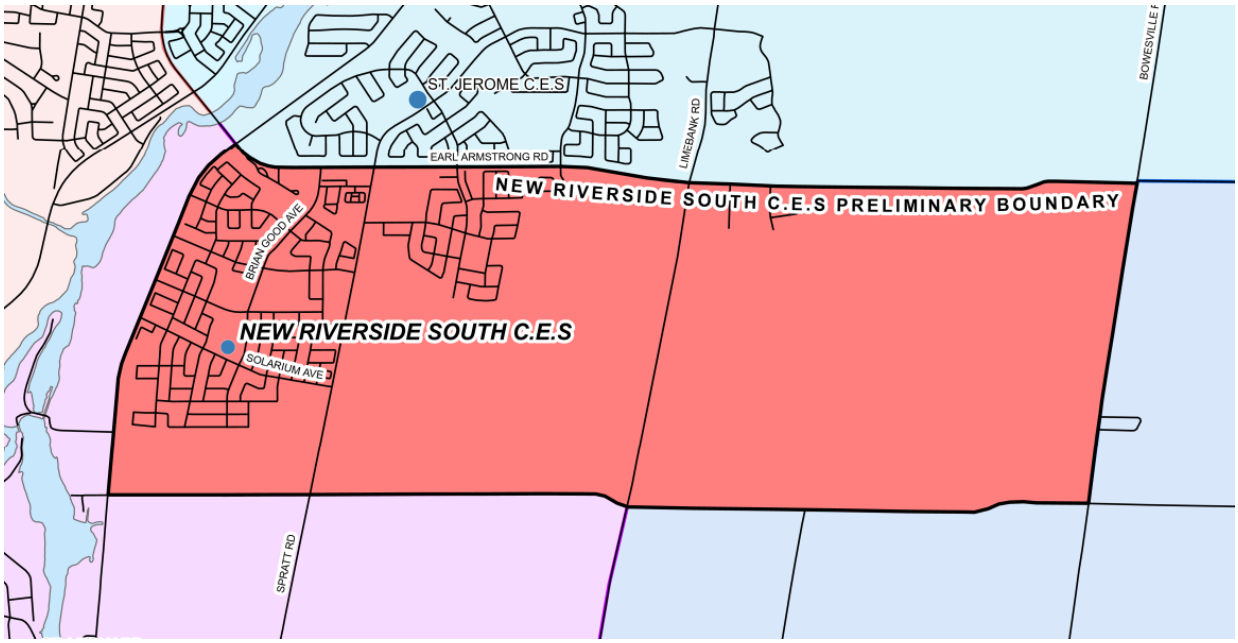
Location / Activity	AM Peak Hour of Roadway Traffic			PM Peak Hour of Roadway Traffic		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Staff Parking Lot						
Staff parking (vehicles)	24	0	24	0	13	13
Childcare drop-off / pick-up (vehicles)	17	16	33	15	18	33
On-Street Laybys						
School bus trips (students) (48% of students)	473	0	420	0	0	0
School bus trips (vehicles)	7	7	14	0	0	0
Student pick-up/drop-off trips (15% of students)	131	131	262	0	67	67
Student pick-up/drop-offs (vehicles)	101	101	202	52	52	104
Active Transportation[1]						
Walking (assume 24% of students)	210	0	210	0	0	0
Cycling (assume 5% of students)	44	0	44	0	0	0
Total Person Trips	852	154	995	98	113	173

[1] Walking & cycling are anticipated to very low or negligible during the PM peak hour (of adjacent roadway traffic) since the school day is over by the afternoon peak hour of the adjacent street. Students participating in the after-school program were assumed to be picked-up.

3.1.1.1 Trip Distribution for Vehicle Trips

The distribution of staff and student pick-up/drop-off trips have been treated separately. School staff typically live across the city and regionally, whereas students will live within the attendance boundary as indicated by the red area in **Figure 10.**

Figure 10: Riverside South School Preliminary Attendance Boundary



The proposed school is located in southern Ottawa and therefore the majority of staff are anticipated to live west and north of the site. Based on the review of the background TIA reports, it has been assumed that staff trip distribution would follow the South Nepean District travel patterns. As such, it was assumed that staff would travel as follows:

- 35% - West on Earl Armstrong Road over the Vimy Memorial Bridge
- 25% - East on Earl Armstrong Road at Spratt Road
- 35% - North on River Road or Spratt Road at Earl Armstrong Road
- 5% - South on River Road

Childcare pick-up and drop-off trips were assumed to originate from within the area south of Earl Armstrong Road within the Riverside South community, similar to the school attendance boundary.

Table 7 summarizes the assumed distribution for vehicle trips based on the above assumptions. **Appendix A** contains the Trans Trip Distribution data for the Leitrim/South Gloucester area.

Table 7: Assumed Trip Distribution – Vehicle Trips

Direction Relative to Site	Staff (Regional Trips)	Student & Childcare drop-off / pick-up (Attendance Boundary Trips)
North	35%	50%
East	25%	20%
South	5%	20%
West	35%	10%
Total	**100%**	**100%**

3.1.1.2 Trip Assignment

Vehicle trips were assigned to the road network in accordance with Table 7.

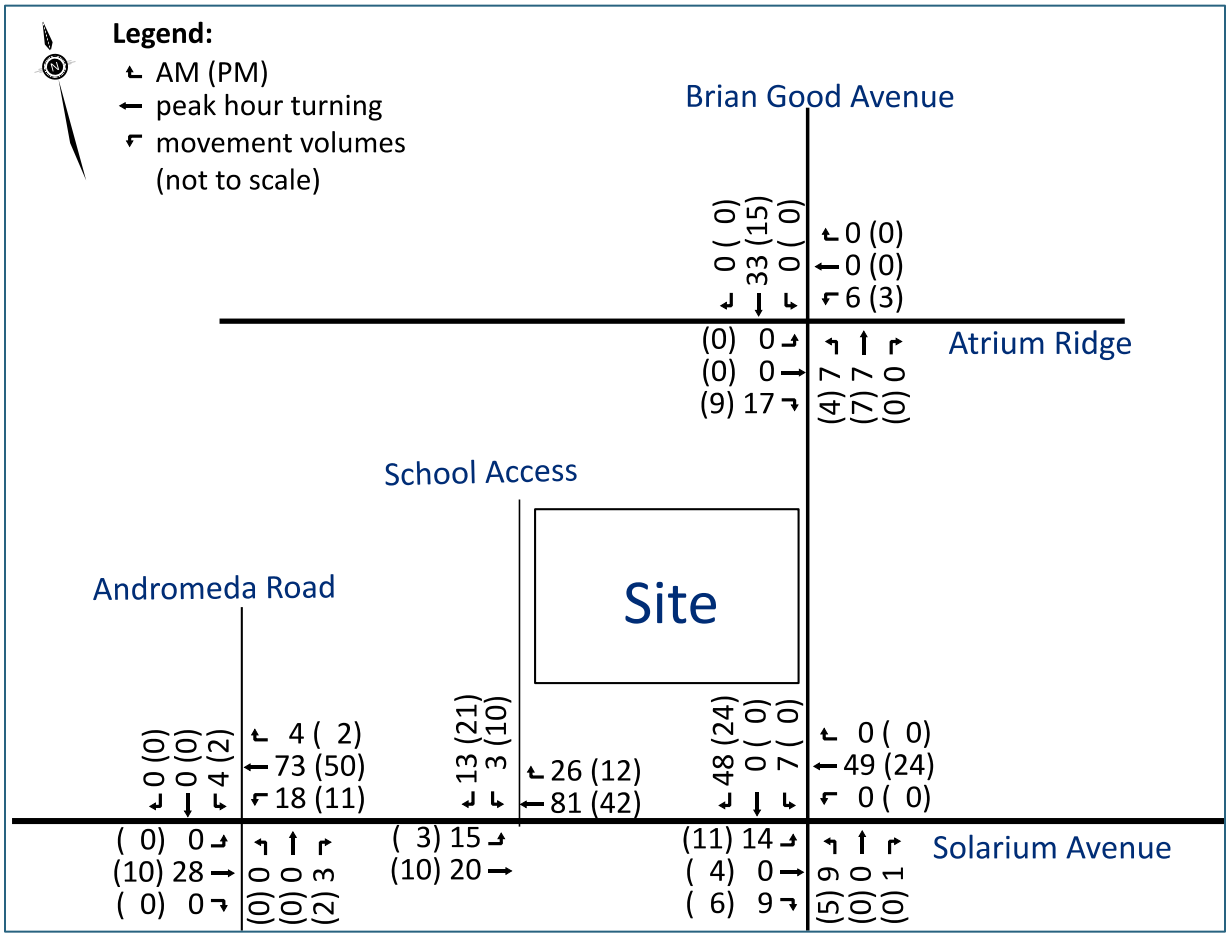
School bus trips were assigned to the bus bay along Brian Good Avenue. The bus bay is approximately 140 metres in length and has the capacity to store nine school buses, although only seven buses are anticipated.

Student drop-off and pickup is expected to occur on Solarium Avenue. The site plan proposes dedicated parking bays which provide approximately 125 metres of short term parking area corresponding to space for approximately 18 vehicles.

The childcare drop-offs are expected to occur within the staff parking lot, accessing from Solarium Avenue.

Figure 11 illustrates the school site generated trips for the weekday AM and PM peak hours based on the above assumptions.

Figure 11: Site Generated Trips



3.1.2 Background Network Travel Demand

3.1.2.1 Transportation Network Plans

As indicated in Figure 8, the LRT/BRT is to be extended south into Riverside South, with a transit stop located at the existing Park and Ride Lot located just west of Brian Good Avenue on the south side of Earl Armstrong Road.

Local intersection modifications may also be required in the surrounding area to support future Ironwood developments.

3.1.2.2 Background Growth

All traffic generated along Solarium Avenue and Brian Good Avenue will be directly attributed to future and ongoing developments within the Riverside South subdivisions. As such, background traffic growth is not expected on these roadways.

3.1.2.3 Other Developments

As noted in **Section 2.1.3.4**, there are several background developments in the study area. Riverside South Phase 2, Urbandale Phase 15 and the Ironwood subdivision are expected to generate traffic volumes on Solarium Avenue and Brian Good Avenue near the proposed school site. The traffic studies for these background developments forecast traffic to/from the arterial road networks but did not include localized internal subdivision traffic volume forecasts.

Internal subdivision traffic volumes were forecast by Dillon based on the current lot pattern as indicated within the geoOttawa online map. Where the lot pattern was not yet included within the online mapping, the background traffic study and associated subdivision plan was used to estimate development levels. The area south of Borbridge Avenue was divided into 13 independent local zones and trips were forecast based the number of units within each zone using the Trans Trip Manual, October 2020 methodology. Refer to **Appendix B** for further information.

Ironwood (Cardel Homes) Developments

The Ironwood Subdivision is planned to develop with 225 single dwelling units and 244 townhomes, refer to **Appendix C** for further information. **Table 8** indicates the number of trips anticipated to be generated by the Ironwood Subdivision.

The Ironwood development trips were assigned to the local road network in accordance with the supporting traffic study, as indicated in **Table 9**.

Table 8: Ironwood Developments Vehicle Trip Generation

	AM Vehicle Trips			PM Vehicle Trips		
Land Use	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Single Family	54	163	217	178	105	283
Townhomes	23	114	137	108	54	162
Total Trips	**77**	**277**	**354**	**286**	**159**	**445**

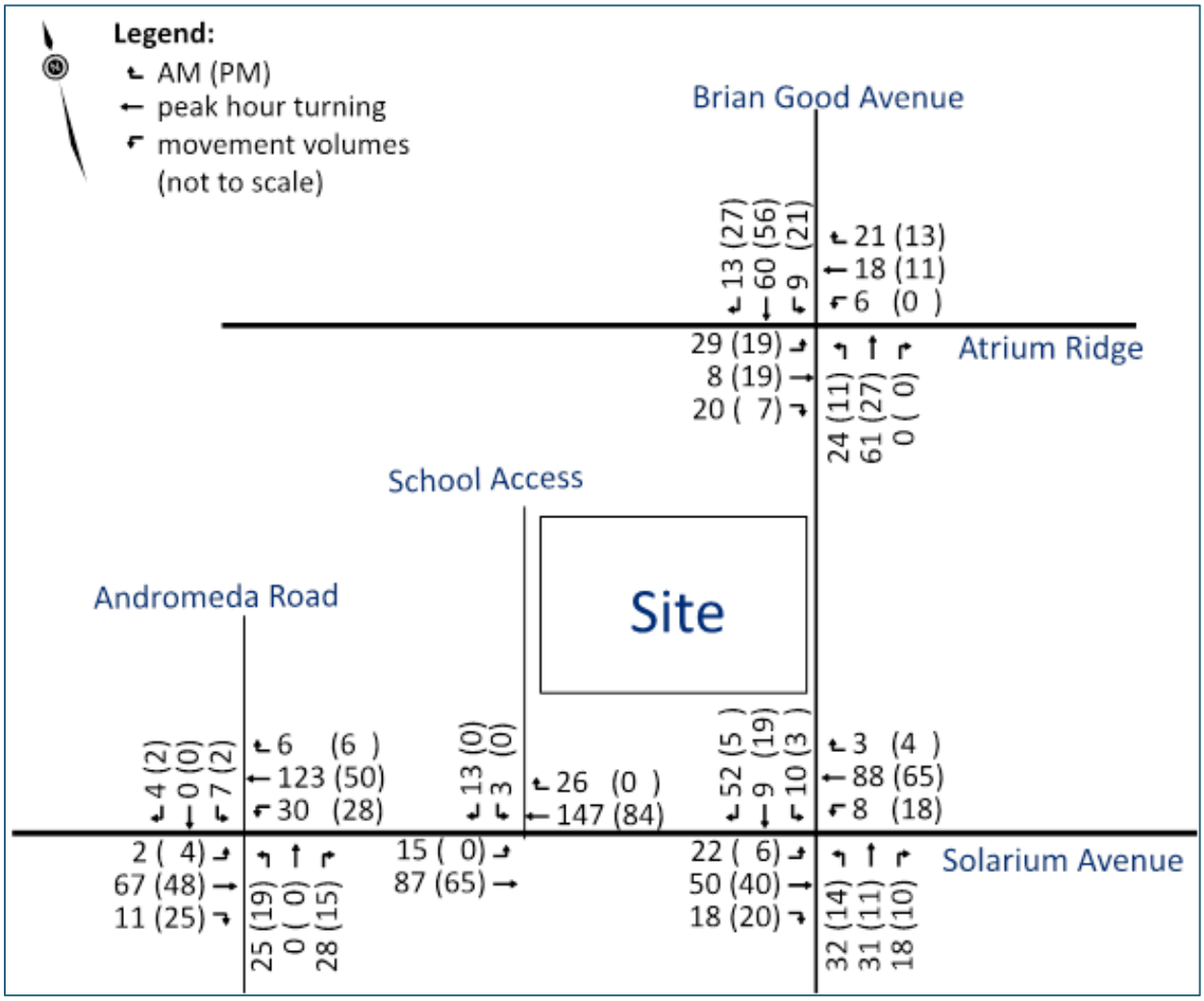
Table 9: Ironwood Development Trip Assignment

Cardinal Direction (relative to School)	Percentage
To/from the north via River Road and Earl Armstrong Road	10%
To/from the north via Spratt Road and Limebank Road	50%
To/from the north via Earl Armstrong Road and Limebank Road	20%
To/ from the north via Brian Good Avenue and Earl Armstrong Road	10%
To/from the south via Spratt Road	5%
To/from the south via Rideau Road and Spratt Road	5%
Total	**100%**

3.1.3 Background Traffic Volumes

Figure 12 illustrates the 2029 background traffic volumes on Solarium Avenue and Brian Good Avenue.

Figure 12: 2029 Background Traffic Volumes



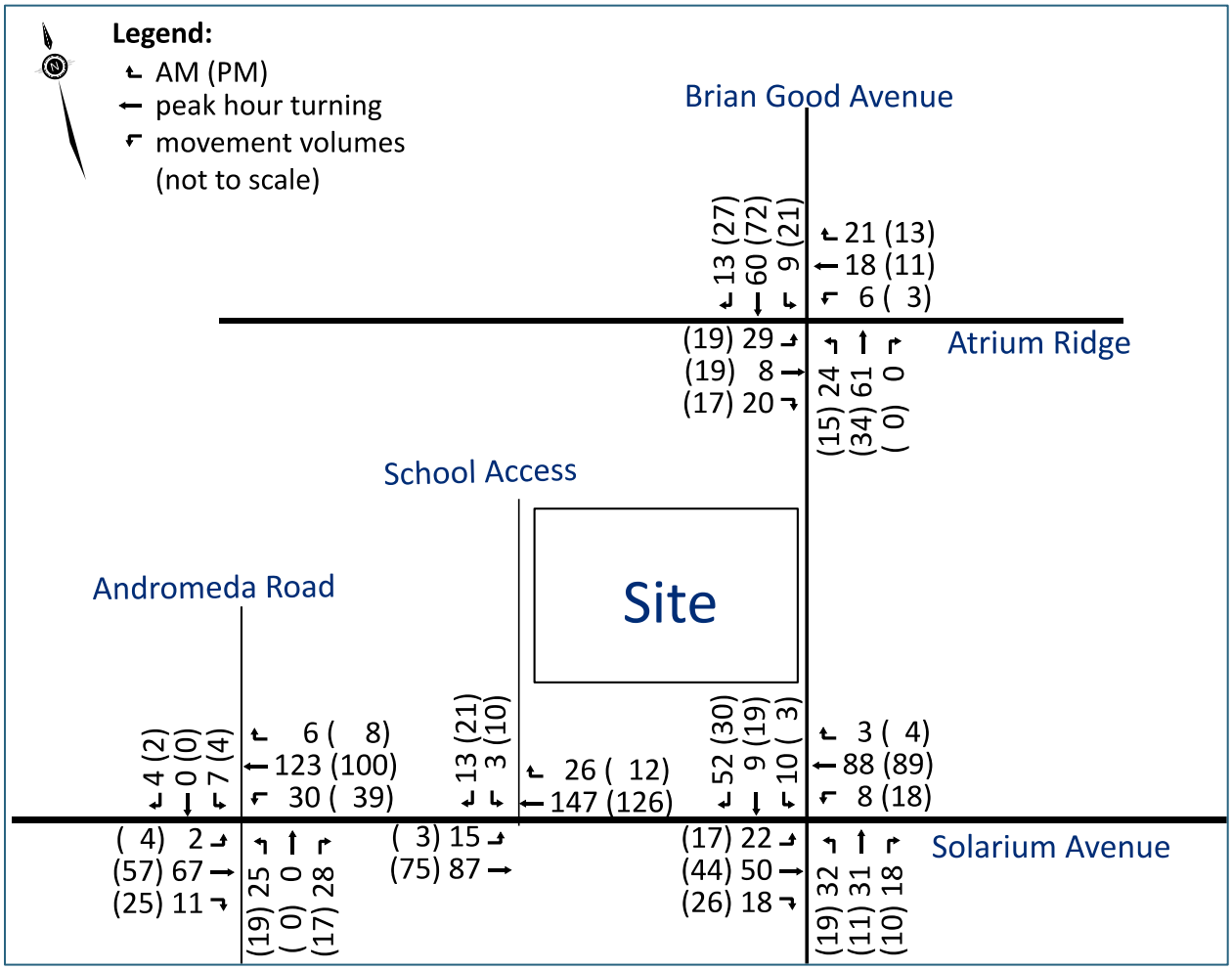
3.2 Demand Rationalization

The proposed development is not anticipated to increase traffic volumes significantly. Traffic volumes along Solarium Avenue and Brian Good Avenue are not anticipated to exceed capacity. For these reasons demand rationalization was not completed.

3.3 Total Traffic Forecasts

Figure 13 illustrates the forecasted 2029 total traffic volumes, which include the school site traffic, Riverside South Phase 2, Urbandale Phase 15 and the Ironwood subdivision traffic volumes. A 2024 buildout horizon was not forecast as many of the background developments will be continuing to build out. Beyond the 2029 horizon year, Solarium Drive traffic volumes will ultimately be higher when the anticipated commercial and residential development plans on the east side of the Riverside South community are established.

Figure 13: 2029 Total Traffic Volumes



4.0 Analysis

4.1 Development Design

4.1.1 Design for Sustainable Modes

Bicycle facilities: A total of six bike racks with eight rings each are proposed, providing a minimum of 48 bicycle parking spaces on the east and south sides of the school. Direct and convenient paved surfaces are provided to access the school from the bike parking areas.

Pedestrian access and circulation: The sidewalk and paved surfaces around the school provide direct access from the school bus layby to the main school entrance. Paved surfaces around the school also provide direct and convenient access from the staff parking lot, bicycle parking areas, childcare centre, and drop-off / pick-up layby area to the school and childcare entrances.

Transit facilities: OC Tranpo stops are provided on Solarium Avenue immediately east of the site and are connected by sidewalks on both the north and south sides of the roadway to the school site. A school bus lay-by lane is provided adjacent the school on Brian Good Avenue. The bus layby is connected to the school through pedestrian walkways.

4.1.2 Circulation and Access

An on-street school bus lay-by on Brian Good Avenue and an on-street lay-by on Solarium Avenue is provided for parents dropping off and picking up students. The school will have one driveway to Solarium Avenue on the west side of the school, which is intended for staff parking and child care drop-off / pick-up. The staff parking lot also contains the waste bins.

School bus layby: the school bus layby will provide approximately 140 metres of storage space, capable of queuing nine (9) full size school buses at one time. The school board indicated there will be up to seven (7) school buses in the future when the school is operating at capacity. Given that all buses are full sized and present at one time, the proposed layby will adequately service the future school bus lay-by demands. Two of the bus lay-by spaces could be reallocated to parent pickup/drop-off activity.

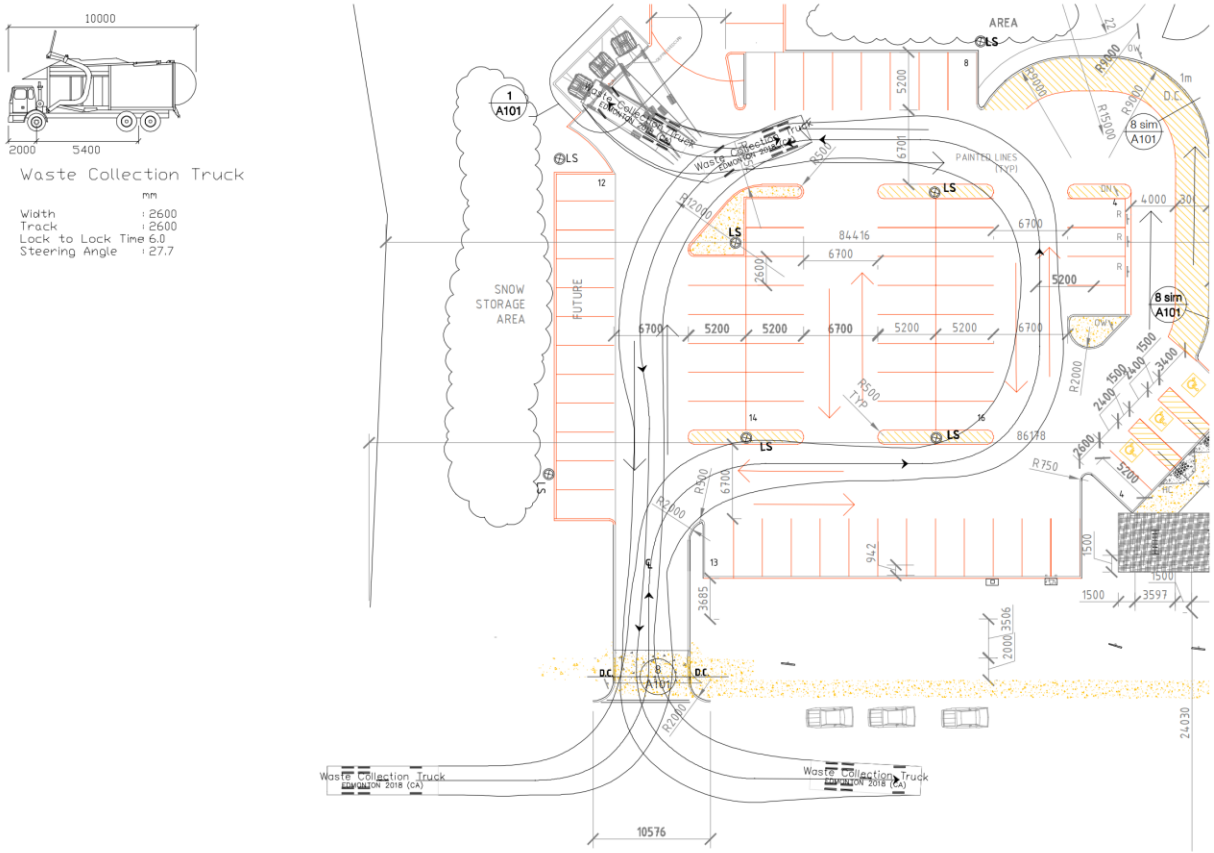
Parent drop-off / pick-up layby: the parent drop-off / pick-up lay-by on the north side of Solarium Avenue starts approximately 23 metres west of the Brian Good Avenue intersection. The Solarium Avenue on-street layby extends across the school frontage. The subdivision design incorporates the Neighbourhood Collector Streets design philosophy. The lay-by parking bay provides storage space for approximately 18 vehicles. During the morning drop-off period it is forecast to generate up to 101 vehicles over a 20-minute period, requiring each drop-off space to process (turnover) 5.6 vehicles (101/18) in the 20-minute period in advance of the bell time. Therefore, an average drop-off duration of less than four (4) minutes (20/5.6) per vehicle is required, which is achievable. Parents should be encouraged to drop their students at the curb and continue their trip as opposed to entering the school.

During the PM peak hour of the street, pick-ups are forecast to occur over a period of an hour. The after school pickup demand is 52 vehicles, requiring each lay-by space to process (turnover) 2.9 vehicles (52/18) in an hour. The average pickup duration should not exceed approximately 20 minutes. During the PM peak hour, parents picking up may also access the school parking lot for additional short-term parking needs.

Waste collection: the staff parking lot will be marked using painted lines. Parking end isles will be painted, therefore waste collection vehicles will be able to easily maneuver through the parking lot on weekends or after the school day has finished.

Figure 14 illustrates the waste collection truck movements into and out of the site.

Figure 14: Waste Collection Truck Turning Templates



Childcare drop-off / pick-up area: the childcare drop-off / pick-up area is located within the staff parking lot and has approximately 30 metres designated for a drop-off/pick-up area, which can accommodate approximately five (5) vehicles at a time. There are up to 17 drop-offs/pick-ups that may need to occur within an hour, which would require that each drop-off/pick-up parking space to process three (3) vehicles per hour (17/5). The drop-offs and pick-ups would therefore need to be less than 18 minutes (60/3.4). There is adequate short-term parking space for the childcare drop-off and pick-up activity.

4.2 Parking

4.2.1 Parking Supply

Automobile Parking – As per City of Ottawa Zoning By-law 2008-250 (Sections 101 and 102), the minimum parking space rate is 1.5 parking spaces per classroom and one parking spaces per 50 m^2 of childcare space. The school will have 22 classrooms with a maximum of 18 portables in the future. Therefore, 39 parking spaces[2] are required for the school without portables and 66 parking spaces[3] may be required if the school reaches its maximum capacity. The site plan shows that 59 parking spaces will be provided at build-out and 87 parking spaces could be provided if the school reaches its maximum capacity. The proposed site plan shows parking supply exceeds the zoning bylaw requirement.

Bicycle Parking – As per City of Ottawa Zoning By-law 2016-249 (Section 111), the minimum bicycle parking rate is 1 bicycle parking space per 100 m^2 of gross floor area. Therefore, 47 bicycle parking spaces[4] are required, the site plan provides 48 spaces with six (6) bicycle parking racks. Therefore, the site plan meets the zoning bylaw requirements.

4.3 Boundary Street Design

The design of Brian Good Avenue and Solarium Avenue are the responsibility of Claridge Homes (Riverside South Phase 2 Subdivision) and the Riverside South Development Corporation (Riverside South Phase 15 Subdivision).

4.3.1 Mobility

The Multi-Modal Level of Service (MMLOS) was evaluated for Solarium Avenue and Brian Good Avenue to assist with developing a concept that maximizes the achievement of the MMLOS objectives. Since the development is within 300 metres of a school (the site itself), it is subject to MMLOS targets of the school policy area. Note that there are no targets for trucks on a Collector roadway within the school policy area, and there are no targets for auto traffic between intersections (there are targets for auto traffic at signalized intersections only, there are no signalized intersections within the study area).

Table 10 presents the MMLOS conditions for roadway segments meeting the City's 26-metre right-of-way Collector Road design standard on Solarium Avenue and Brian Good Avenue. This MMLOS analysis is based on assumed when built conditions, which includes a shared travel lane adjacent the parking lay-by and sidewalks on both sides of Solarium Avenue and Brian Good Avenue. It was assumed that Solarium Avenue and Brian Good Avenue within the school area would have a posted speed limit of 40 km/h.

The analysis shows that all MMLOS targets are met for cycling and transit modes if Solarium Avenue and Brian Good Avenue are designed in accordance with the Designing Neighbourhood Collector Streets

[2] 22 classrooms x 1.5 spaces/classroom + 275 sq.m. daycare x 1 parking space / 50 sq.m daycare = 39 spaces

[3] (22 classrooms + 18 portables) x 1.5 spaces/classroom + 275 sq.m. daycare x 1 parking space / 50 sq.m daycare = 66 spaces

[4] 4,639 sq.m gross school floor area x 1 bicycle parking space / 100 sq.m + 275 sq.m. daycare x 1 bicycle parking space / 250 sq.m. daycare = 47 bicycle parking spaces

policy. The MMLOS targets for pedestrians are not met and could only be met if the effective sidewalk width were increased to 3.0 metres.

Table 10: MMLOS Conditions - Segments

Travel Mode	Criteria	Target	Solarium Avenue Collector Road (24 B)	Brian Good Avenue Collector Road (26 B)
Pedestrian LOS	Sidewalk width Boulevard width AADT < 3000	A	2 metres 0.5 – 2 metres Yes (assume 12x multiplier for PM peak hour volumes)	2 metres 0.5 – 2 metres Yes (assume 12x multiplier for PM peak hour volumes)
	On-Street Parking Operating Speed **Level of Service**		Yes > 30 or <50 km/h **B**	Yes > 30 or <50 km/h **B**
Cycling LOS	Type of facility Number of travel lanes/direction Bike lane width	B	Parkingside Bike Lane 1 4.5 m with Parking	Parkingside Bike Lane 1 4.5 m with Parking
	Operating speed Bike lane blockage frequency		< 40 km/h Low	< 40 km/h Low
	Level of Service		**A**	**A**
Transit LOS	Type of facility Parking/driveway friction **Level of Service**	D	Mixed traffic Limited / Low **D**	Mixed traffic Limited / Low **D**

4.3.2 Road Safety

The proposed design of Solarium Avenue and Brian Good Avenue should promote acceptable operating speeds within the subdivision. Over time, the City should monitor the area roadways to ensure the roadways are operating safely.

4.4 Access Intersection Design

4.4.1 Location and Design of Driveway

The site driveway is located on Solarium Avenue providing a single lane into and out of the site. The site driveway is 6.5 metres wide and provides a clear throat distance of greater than 16 metres from the property line. This meets the requirements of the City of Ottawa Private Approach Bylaw (#2003-447). The driveway is located with clear sightlines.

4.4.2 Intersection Control

The site driveway will be located on a relatively low-volume Collector roadway (<3,000 AADT); therefore, Two-Way Stop-Control (TWSC) facing traffic exiting the site is appropriate.

4.4.3 Access Intersection Design

Table 11 summarizes the traffic operational results for the intersection of Solarium Avenue and the site driveway for the 2029 full buildout weekday AM and PM peak hours. **Appendix D** contains the

intersection performance worksheets. Assuming single lane approaches and a Stop sign facing traffic exiting the school, the driveway intersection will operate at a LOS A.

Table 11: Site Driveway and Solarium Avenue Intersection Operations

Approach/ Movement	Volume	Delay (s)	LOS	V/C	Q95th (m)
EB LT	111 (85)	1.2 (0.3)	A (A)	0.1 (0.3)	0.3 (0.1)
WB TR	188 (150)	0.0 (0.0)	- (-)	0.11 (0.09)	0.0 (0.0)
SB LR	17 (34)	9.4 (9.4)	A (A)	0.02 (0.04)	0.5 (1.0)

Note: Results are presented in the format AM (PM) peak hour; Q95th (m) indicates the 95th percentile queues, LOS is an abbreviation for Level-of-Service, EB = eastbound, WB = westbound, SB = southbound; LTR = left, through, right movements for single lane

4.5 Transportation Demand Management

The proposed school will have 40 staff and up to 921 students at maximum capacity if all 18 portables are in operation; 24% of students are anticipated walk to school, approximately 5% of students are anticipated to bike to school (likely will be higher during fair weather). The large portion of students will take the school bus. The majority of students are expected to arrive between 8:30 AM and 9:00 AM and leave at 3:30 PM. Approximately 14% of the students will stay behind for after-school care or other programs.

The majority of staff (80%) are expected to drive to school. Staff are expected to arrive at least half an hour before school starts and leave shortly after school ends. It is likely that approximately 20% of staff may arrive by transit, walking or cycling modes.

Appendix E contains the TDM checklists. From the TDM checklists, some recommendations are as follows: display relevant transit schedules and route maps at entrances, provide links to OC Transpo and STO information on the school board website, and provide shower and lockers for staff use (these measures are provided). The school board should also consider offering preloaded PRESTO cards to encourage commuters to use transit, or provide reimbursement of monthly transit passes for employees.

4.6 Neighbourhood Traffic Management

Solarium Avenue is a major collector and Brian Good Avenue is a collector street. The forecast weekday AM peak hour total traffic volumes on Solarium Avenue to the west of the school is 210 vehicles per hour (vph), or approximately 2,500 vehicles per day (vpd). On Brian Good Avenue just north of the school site, the forecast AM peak hour traffic volume is 173 vph, or approximately 2,100 vpd. The forecast future traffic volumes are within the design thresholds for collector roadways.

Given that the traffic volumes are within the threshold for a collector roadway and that the school activity is concentrated over short durations, neighbourhood traffic management is not deemed necessary.

4.7 Transit

The proposed school is anticipated to generate a small number of transit trips and therefore transit service will not be impacted.

Transit service and stop locations will be addressed through the overall plan of the subdivision, by others.

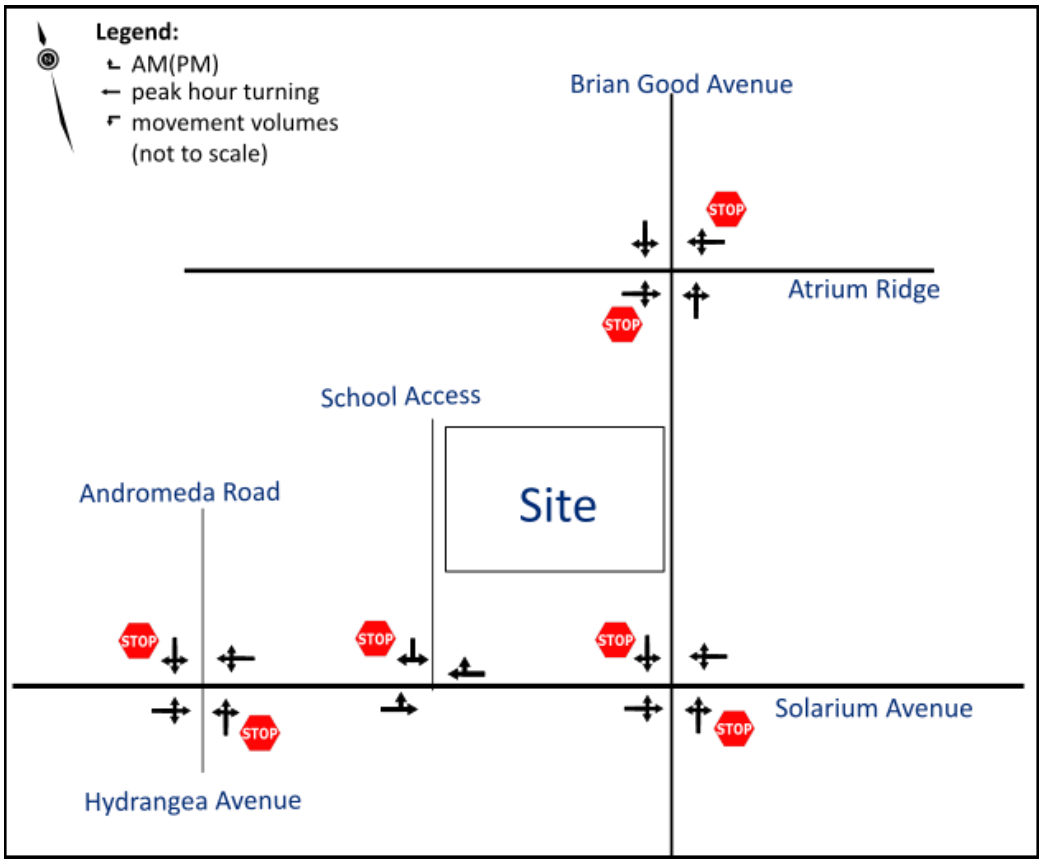
4.8 Review of Network Concept

A review of the network concept is not included within this study. The network concept review is only required when a proposed development generates more than 200 person trips during the peak hour in excess of the equivalent volume permitted by established zoning. The proposed school is in keeping with the zoning of the lands.

4.9 Intersection Design

The following subsections provide a review of the study area intersection traffic operations. The future forecast 2029 total future traffic conditions have been analysed using Synchro 11 software. The analysis includes the anticipated lane geometry and traffic control, as shown in **Figure 15**. The level-of-service (LOS) of definition is provided in **Appendix D**Error! Reference source not found.

Figure 15: Anticipated Lane Geometry and Traffic Control



4.9.1 Solarium Avenue and Andromeda Road

The intersection is forecast to operate at a very good LOS based on single lane approaches and free flow traffic on Solarium Avenue, with and Stop sign control facing Andromeda Road, as indicated in **Table 12**.

Table 12: Solarium Avenue at Andromeda Road Intersection Operations

Approach / Movement	Volume	Delay (s)	LOS	V/C	Q95th (m)
EB LTR	87 (93)	0.2 (0.3)	A (A)	0.0 (0.0)	0.0 (0.1)
WB LTR	174 (160)	1.6 (2.1)	A (A)	0.02 (0.03)	0.5 (0.7)
NB LTR	57 (39)	9.9 (9.9)	A (A)	0.07 (0.05)	1.9 (1.3)
SB LTR	12 (6)	10.4 (10.2)	B (B)	0.02 (0.01)	0.4 (0.2)

Note: Results are presented in the format AM (PM) peak hour; Q95th (m) indicates the 95th percentile queues, LOS is an abbreviation for Level-of-Service, * EB = eastbound, WB = westbound, SB = southbound; LTR = left, through, right movements for single lane.

4.9.2 Brian Good Avenue and Atrium Ridge

The intersection is forecast to operate at a very good LOS based on single lane approaches and free flow traffic on Brian Good Avenue, with and Stop sign control facing Atrium Ridge, as indicated in **Table 13**.

Table 13: Brian Good Avenue at Atrium Ridge Intersection Operations

Approach / Movement	Volume	Delay (s)	LOS	V/C	Q95th (m)
EB LTR	63 (60)	10.2 (10.2)	B (B)	0.08 (0.08)	2.2 (2.1)
WB LTR	50 (29)	9.9 (9.7)	A (A)	0.06 (0.04)	1.6 (0.9)
NB LTR	92 (53)	2.2 (2.3)	A (A)	0.02 (0.01)	0.4 (0.3)
SB LTR	89 (130)	0.9 (1.4)	A (A)	0.01 (0.01)	0.2 (0.4)

Note: Results are presented in the format AM (PM) peak hour; Q95th (m) indicates the 95th percentile queues, LOS is an abbreviation for Level-of-Service, * EB = eastbound, WB = westbound, SB = southbound; LTR = left, through, right movements for single lane.

4.9.3 Solarium Avenue and Brian Good Avenue

The intersection is forecast to operate at a very good LOS based on single lane approaches and free flow traffic on Solarium Avenue and Stop sign control facing Brian Good Avenue, as indicated in **Table 14**.

Table 14: Solarium Avenue at Brian Good Avenue Intersection Operations

Approach / Movement	Volume	Delay (s)	LOS	V/C	Q95th (m)
EB LTR	98 (94)	1.9 (1.5)	A (A)	0.02 (0.01)	0.4 (0.3)
WB LTR	108 (121)	0.7 (1.3)	A (A)	0.01 (0.01)	0.1 (0.3)
NB LTR	89 (44)	11.0 (10.5)	B (B)	0.13 (0.06)	3.6 (1.6)
SB LTR	78 (57)	9.7 (9.9)	A (A)	0.09 (0.07)	2.4 (1.9)

Note: Results are presented in the format AM (PM) peak hour; Q95th (m) indicates the 95th percentile queues, LOS is an abbreviation for Level-of-Service, * EB = eastbound, WB = westbound, SB = southbound; LTR = left, through, right movements for single lane.

4.9.4 Pedestrian Crossings

The school is forecast to generate 210 AM students walking trips. Some of the walking trips will travel north/south of the school, crossing Solarium Avenue. A number of other students will need to cross Brian Good Avenue to/from the east of the school.

Based on the 2029 forecast pedestrian activity related to the school and the forecast traffic volumes on the adjacent roadways, a pedestrian crossover (PXO) is not warranted on Solarium Avenue or Brian Good Avenue. It is recommended that the City evaluate the need for a formal school crossing guard and related school crossing signage (Wc-2 and Wc-2A) and appropriate crossing protection, as warranted.

5.0 Summary/Conclusions

The Ottawa Catholic School Board is proposing to construct a new elementary school and childcare facility in the Riverside South Phase 2 development area, between the Urbandale Phase 15 and Ironwood development lands. The site is located on the northwest corner of Solarium Avenue and Brian Good Avenue, approximately 650 metres west of Spratt Road. The proposed single storey elementary school is 4,639 m^2 (49,934 sq. ft.) and will provide a 275 m^2 (2,960 sq. ft.) childcare facility. The site plan includes a maximum of 18 future portable classrooms. The school is planned to be open in September 2024. The zoning of the lands permits a school and childcare facility.

The site plan includes bicycle parking facilities, a total of six bike racks are proposed, each capable of supporting 8 bikes, for a total of 48 bicycle parking spaces. Pedestrian access from the public sidewalks are well defined and lead to the school doors. Adequate parking is provided to address the school parking demands and the short-term parking needs of the childcare centre.

The design and construction of the boundary streets, Solarium Avenue and Brian Good Avenue, are the responsibility of the others. The proposed site plan includes a defined parking layby area on Brian Good Avenue to accommodate up to 9 school buses. Solarium Avenue and Brian Good Avenue are proposed collector roadways. City policy is to design collector roadways in accordance with the *Designing Neighbourhood Collector Streets* policy which requires in boulevard cycling facilities, parking bays, and other features to calm traffic. The site plan proposes an automobile drop-off/pickup parking layby lane on Solarium Avenue adjacent the school frontage, which is in keeping with these policies. A school bus lay-by lane is planned for Brian Good Avenue.

Assuming that the boundary roadways are designed according to City policy, it is forecast that Solarium Avenue and Brian Good Avenue will meet the MMLOS targets for cycling and transit, however will only achieve a pedestrian LOS B.

The site driveway to Solarium Avenue is forecast to operate at LOS A with very little delay during the weekday AM and PM peak hours. The school driveway should be controlled by Stop sign. Solarium Avenue should be operate under free flow conditions.

The intersection of Solarium Avenue and Brian Good Avenue is forecast to operate at a very good LOS, with the eastbound and westbound shared movement lanes operating with free flow conditions, at LOS A. The northbound shared lane approach is to be controlled by a Stop sign and is forecast to operate at LOS B during the AM and PM peak hours, while the southbound shared lane approach with Stop sign control is forecast to operate at LOS A during the AM and PM peak hours. It is recommended that the intersection of Solarium Avenue and Brian Good Avenue include lane narrowing's (bulb-outs) to reduce the pedestrian crossing distances and to act as a traffic calming measure.

It is recommended that the City of Ottawa (or appropriate agency) evaluate the need for a formal school crossing guard and related school crossing signage (Wc-2 and Wc-2A) regularly as the subdivision continues to build out and implement crossing protection, as warranted.

The following TDM measures are to be provided:

- Display relevant transit schedules and route maps at school entrances;
- Provide links to OC Transpo and STO information on the school board website;
- Provide shower and lockers for staff use (these measures are provided); and,
- Consider offering preloaded PRESTO cards to encourage commuters to use transit, or provide reimbursement of monthly transit passes for employees.

Appendix A

Trans Trip Distribution Data

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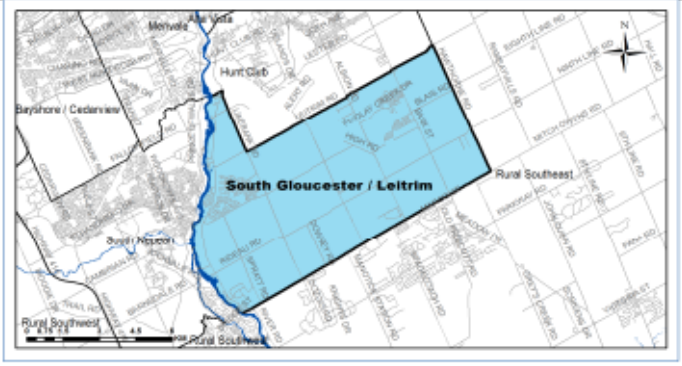
South Gloucester / Leitrim

Demographic Characteristics

Population	17,600	Actively Travelled	14,190
Employed Population	8,910	Number of Vehicles	11,080
Households	6,240	Area (km²)	78.9

Occupation Status (age 5+)	Male	Female	Total
Full Time Employed	4,550	3,630	8,180
Part Time Employed	130	590	730
Student	2,160	2,130	4,290
Retiree	720	770	1,490
Unemployed	90	220	320
Homemaker	20	540	560
Other	80	120	200
Total:	7,750	8,010	15,760

Traveller Characteristics	Male	Female	Total
Transit Pass Holders	790	1,070	1,850
Licensed Drivers	5,790	5,940	11,730
Telecommuters	60	10	70
Trips made by residents	20,810	24,430	45,240

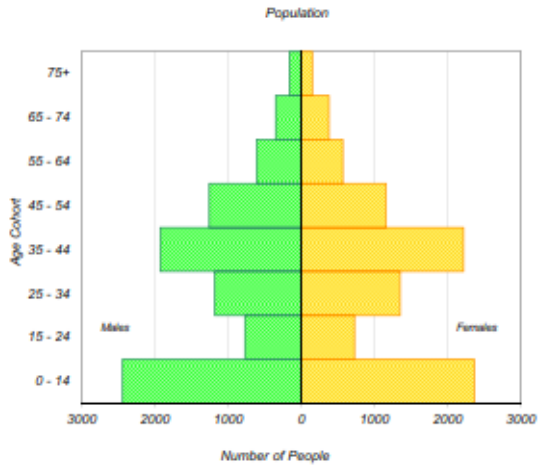


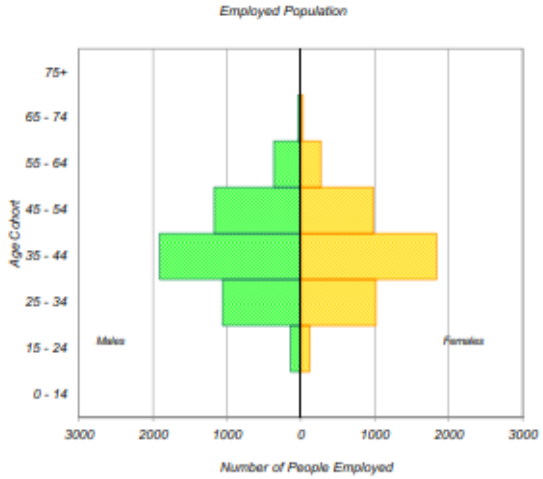
Household Size		
1 person	880	14%
2 persons	1,870	30%
3 persons	1,170	19%
4 persons	1,630	26%
5+ persons	690	11%
Total:	6,240	100%

Households by Vehicle Availability		
0 vehicles	40	1%
1 vehicle	2,080	33%
2 vehicles	3,510	56%
3 vehicles	510	8%
4+ vehicles	100	2%
Total:	6,240	100%

Selected Indicators	
Daily Trips per Person (age 5+)	2.87
Vehicles per Person	0.63
Number of Persons per Household	2.82
Daily Trips per Household	7.25
Vehicles per Household	1.78
Workers per Household	1.43
Population Density (Pop/km2)	220

Households by Dwelling Type		
Single-detached	3,300	53%
Semi-detached	770	12%
Townhouse	2,010	32%
Apartment/Condo	150	2%
Total:	6,240	100%



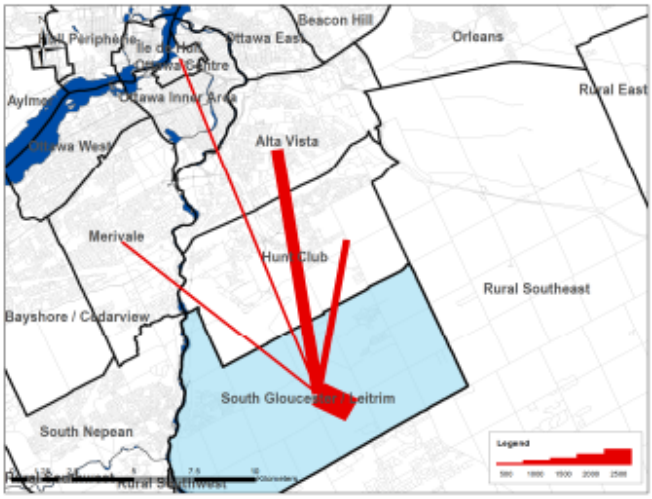


* In 2005 data was only collected for household members aged 11+ therefore these results cannot be compared to the 2011 data.

Travel Patterns

Top Five Destinations of Trips from South Gloucester / Leitrim

AM Peak Period



Summary of Trips to and from South Gloucester / Leitrim

AM Peak Period (6:30 - 8:59)	Destinations of Trips From District	% Total	Origins of Trips To District	% Total
Districts				
Ottawa Centre	930	9%	0	0%
Ottawa Inner Area	530	5%	250	4%
Ottawa East	240	2%	40	1%
Beacon Hill	240	2%	30	0%
Alta Vista	1,970	18%	160	2%
Hunt Club	1,100	10%	870	13%
Merivale	770	7%	340	5%
Ottawa West	290	3%	0	0%
Bayshore / Cedarview	170	2%	70	1%
Orléans	50	0%	170	3%
Rural East	0	0%	10	0%
Rural Southeast	210	2%	570	8%
South Gloucester / Leitrim	3,680	34%	3,680	55%
South Nepean	310	3%	100	1%
Rural Southwest	120	1%	220	3%
Kanata / Stittsville	140	1%	60	1%
Rural West	40	0%	60	1%
Île de Hull	90	1%	0	0%
Hull Périphérie	10	0%	20	0%
Plateau	0	0%	20	0%
Aylmer	0	0%	0	0%
Rural Northwest	20	0%	10	0%
Pointe Gatineau	10	0%	30	0%
Gatineau Est	0	0%	0	0%
Rural Northeast	20	0%	0	0%
Buckingham / Masson-Angers	0	0%	20	0%
Ontario Sub-Total:	10,790	99%	6,630	99%
Québec Sub-Total:	150	1%	100	1%
Total:	10,940	100%	6,730	100%

Trips by Trip Purpose

24 Hours	From District		To District		Within District	
Work or related	6,300	29%	3,270	15%	700	6%
School	1,640	8%	840	4%	1,930	16%
Shopping	1,830	8%	720	3%	700	6%
Leisure	2,730	13%	1,990	9%	660	6%
Medical	440	2%	120	1%	120	1%
Pick-up / drive passenger	1,610	7%	970	4%	1,720	14%
Return Home	6,020	28%	13,110	60%	5,320	44%
Other	1,160	5%	680	3%	850	7%
Total:	21,730	100%	21,700	100%	12,000	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Work or related	4,650	64%	1,740	57%	420	11%
School	1,310	18%	810	27%	1,580	43%
Shopping	60	1%	40	1%	10	0%
Leisure	140	2%	50	2%	0	0%
Medical	80	1%	0	0%	0	0%
Pick-up / drive passenger	780	11%	180	6%	900	25%
Return Home	100	1%	120	4%	330	9%
Other	150	2%	110	4%	430	12%
Total:	7,270	100%	3,050	100%	3,670	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Work or related	140	3%	150	2%	40	1%
School	30	1%	0	0%	80	2%
Shopping	270	6%	170	2%	210	6%
Leisure	840	19%	420	6%	140	4%
Medical	50	1%	0	0%	30	1%
Pick-up / drive passenger	310	7%	360	5%	400	12%
Return Home	2,400	54%	5,990	82%	2,350	69%
Other	400	9%	200	3%	150	4%
Total:	4,440	100%	7,290	100%	3,400	100%

Peak Period (%)	Total:	% of 24 Hours	Within District (%)
24 Hours	55,430		22%
AM Peak Period	13,990	25%	26%
PM Peak Period	15,130	27%	22%

Trips by Primary Travel Mode

24 Hours	From District		To District		Within District	
Auto Driver	14,990	69%	14,970	69%	5,210	43%
Auto Passenger	3,870	18%	3,650	17%	3,120	26%
Transit	1,630	8%	1,740	8%	200	2%
Bicycle	90	0%	100	0%	20	0%
Walk	40	0%	40	0%	2,680	22%
Other	1,110	5%	1,200	6%	770	6%
Total:	21,730	100%	21,700	100%	12,000	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Auto Driver	4,640	64%	2,070	68%	1,540	42%
Auto Passenger	1,260	17%	210	7%	1,140	31%
Transit	860	12%	100	3%	60	2%
Bicycle	70	1%	20	1%	10	0%
Walk	20	0%	0	0%	620	17%
Other	420	6%	640	21%	300	8%
Total:	7,270	100%	3,040	100%	3,670	100%

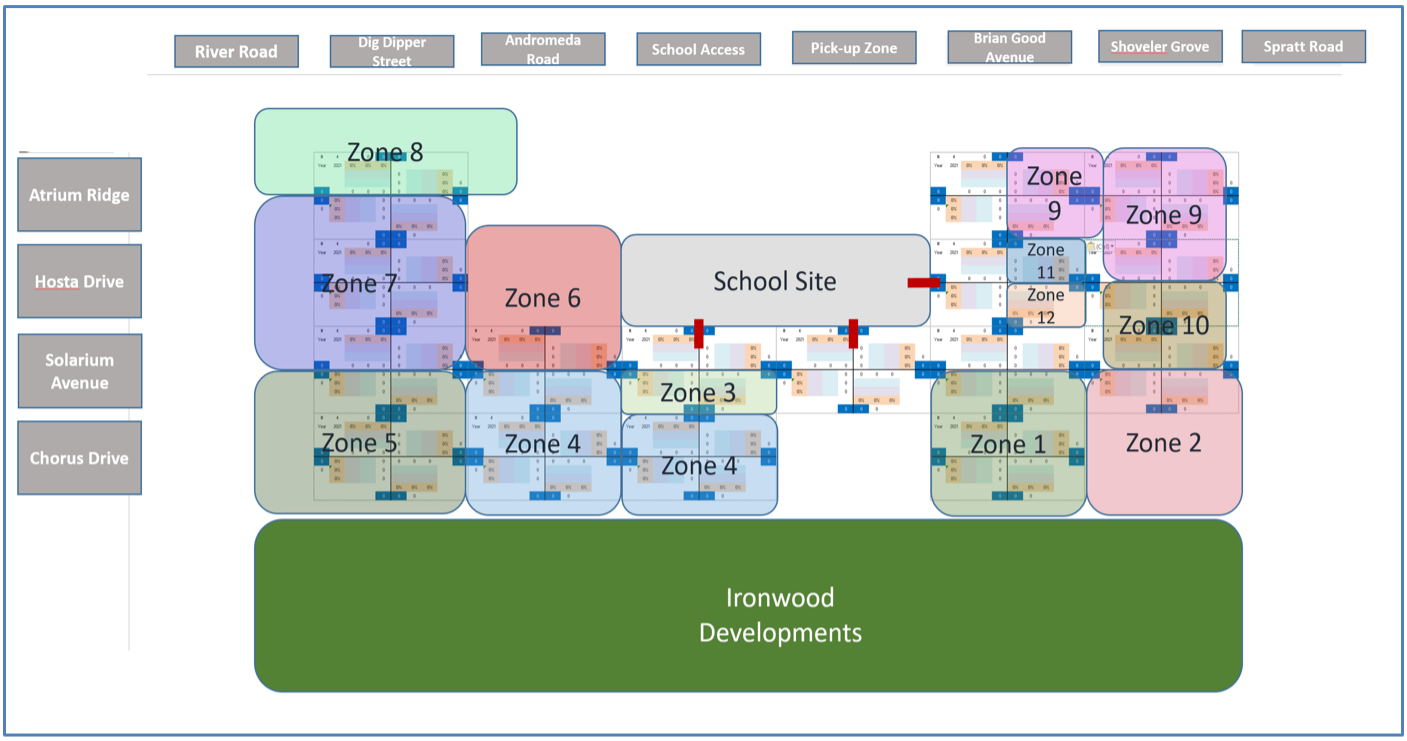
PM Peak (15:30 - 17:59)	From District		To District		Within District	
Auto Driver	3,100	70%	4,920	67%	1,510	44%
Auto Passenger	1,020	23%	1,120	15%	860	25%
Transit	150	3%	790	11%	50	1%
Bicycle	20	0%	80	1%	0	0%
Walk	10	0%	0	0%	850	25%
Other	130	3%	390	5%	130	4%
Total:	4,430	100%	7,300	100%	3,400	100%

Avg Vehicle Occupancy	From District	To District	Within District
24 Hours	1.26	1.24	1.60
AM Peak Period	1.27	1.10	1.74
PM Peak Period	1.33	1.23	1.57

Transit Modal Split	From District	To District	Within District
24 Hours	8%	9%	2%
AM Peak Period	13%	4%	2%
PM Peak Period	4%	12%	2%

Appendix B

Background Development Trip Generation



Zone	Single Family House Units	Trans Person Trips (Peak Period)		Peak Period Trips	
		AM	PM	AM	PM
1	119	2.05	2.48	244	295
2	54			111	134
3	56			115	139
4	72			148	179
5	203			416	503
6	27			55	67
7	73			150	181
8	66			135	164
9	137			281	340
10	63			129	156
11	3			6	7
12	0			0	0

Zone	Town Home Units	Trans Person Trips (Peak Period)		Peak Period Trips	
		AM	PM	AM	PM
1	0	1.35	1.58	0	0
2	0			0	0
3	0			0	0
4	33			45	52
5	123			166	194
6	0			0	0
7	162			219	256
8	113			153	179
9	13			18	21
10	336			454	531
11	13			18	21
12	23			31	36

Single Family House Trips		Time Period		Peak Period Person Trips Generated		Peak Hour Adjustment		Peak Hour Trips		Directional Split		Trips Generated (In/Out)					
Zone	Mode of Transport	AM	PM	AM	PM	AM	PM	AM	PM	AM In	PM In	AM In	AM Out	AM Total	PM IN	PM Out	PM Total
1	Auto Mode Share	0.54	0.55	132	162	0.48	0.44	63	71	0.3	0.62	19	44	63	44	27	71
	Auto Passanger	0.24	0.25	59	74	0.48	0.44	28	33	0.3	0.62	8	20	28	20	13	33
	Transit	0.12	0.09	29	27	0.55	0.47	16	13	0.3	0.62	5	11	16	8	5	13
	Cycling	0.01	0.01	2	3	0.58	0.48	1	1	0.3	0.62	0	1	1	1	0	1
	Walking	0.09	0.1	22	30	0.58	0.52	13	16	0.3	0.62	4	9	13	10	6	16
2	Auto Mode Share	0.54	0.55	60	74	0.48	0.44	29	33	0.3	0.62	9	20	29	20	13	33
	Auto Passanger	0.24	0.25	27	34	0.48	0.44	13	15	0.3	0.62	4	9	13	9	6	15
	Transit	0.12	0.09	13	12	0.55	0.47	7	6	0.3	0.62	2	5	7	4	2	6
	Cycling	0.01	0.01	1	1	0.58	0.48	1	0	0.3	0.62	0	1	1	0	0	0
	Walking	0.09	0.1	10	13	0.58	0.52	6	7	0.3	0.62	2	4	6	4	3	7
3	Auto Mode Share	0.54	0.55	62	76	0.48	0.44	30	33	0.3	0.62	9	21	30	20	13	33
	Auto Passanger	0.24	0.25	28	35	0.48	0.44	13	15	0.3	0.62	4	9	13	9	6	15
	Transit	0.12	0.09	14	13	0.55	0.47	8	6	0.3	0.62	2	6	8	4	2	6
	Cycling	0.01	0.01	1	1	0.58	0.48	1	0	0.3	0.62	0	1	1	0	0	0
	Walking	0.09	0.1	10	14	0.58	0.52	6	7	0.3	0.62	2	4	6	4	3	7
4	Auto Mode Share	0.54	0.55	80	98	0.48	0.44	38	43	0.3	0.62	11	27	38	27	16	43
	Auto Passanger	0.24	0.25	36	45	0.48	0.44	17	20	0.3	0.62	5	12	17	12	8	20
	Transit	0.12	0.09	18	16	0.55	0.47	10	8	0.3	0.62	3	7	10	5	3	8
	Cycling	0.01	0.01	1	2	0.58	0.48	1	1	0.3	0.62	0	1	1	1	0	1
	Walking	0.09	0.1	13	18	0.58	0.52	8	9	0.3	0.62	2	6	8	6	3	9
5	Auto Mode Share	0.54	0.55	225	277	0.48	0.44	108	122	0.3	0.62	32	76	108	76	46	122
	Auto Passanger	0.24	0.25	100	126	0.48	0.44	48	55	0.3	0.62	14	34	48	34	21	55
	Transit	0.12	0.09	50	45	0.55	0.47	28	21	0.3	0.62	8	20	28	13	8	21
	Cycling	0.01	0.01	4	5	0.58	0.48	2	2	0.3	0.62	1	1	2	1	1	2
	Walking	0.09	0.1	37	50	0.58	0.52	21	26	0.3	0.62	6	15	21	16	10	26
6	Auto Mode Share	0.54	0.55	30	37	0.48	0.44	14	16	0.3	0.62	4	10	14	10	6	16
	Auto Passanger	0.24	0.25	13	17	0.48	0.44	6	7	0.3	0.62	2	4	6	4	3	7
	Transit	0.12	0.09	7	6	0.55	0.47	4	3	0.3	0.62	1	3	4	2	1	3
	Cycling	0.01	0.01	1	1	0.58	0.48	1	0	0.3	0.62	0	1	1	0	0	0
	Walking	0.09	0.1	5	7	0.58	0.52	3	4	0.3	0.62	1	2	3	2	2	4
7	Auto Mode Share	0.54	0.55	81	100	0.48	0.44	39	44	0.3	0.62	12	27	39	27	17	44
	Auto Passanger	0.24	0.25	36	45	0.48	0.44	17	20	0.3	0.62	5	12	17	12	8	20
	Transit	0.12	0.09	18	16	0.55	0.47	10	8	0.3	0.62	3	7	10	5	3	8
	Cycling	0.01	0.01	2	2	0.58	0.48	1	1	0.3	0.62	0	1	1	1	0	1
	Walking	0.09	0.1	14	18	0.58	0.52	8	9	0.3	0.62	2	6	8	6	3	9
8	Auto Mode Share	0.54	0.55	73	90	0.48	0.44	35	40	0.3	0.62	11	25	36	25	15	40
	Auto Passanger	0.24	0.25	32	41	0.48	0.44	15	18	0.3	0.62	5	11	16	11	7	18
	Transit	0.12	0.09	16	15	0.55	0.47	9	7	0.3	0.62	3	6	9	4	3	7
	Cycling	0.01	0.01	1	2	0.58	0.48	1	1	0.3	0.62	0	1	1	1	0	1
	Walking	0.09	0.1	12	16	0.58	0.52	7	8	0.3	0.62	2	5	7	5	3	8
9	Auto Mode Share	0.54	0.55	152	187	0.48	0.44	73	82	0.3	0.62	22	51	73	51	31	82
	Auto Passanger	0.24	0.25	67	85	0.48	0.44	32	37	0.3	0.62	10	22	32	23	14	37
	Transit	0.12	0.09	34	31	0.55	0.47	19	15	0.3	0.62	6	13	19	9	6	15
	Cycling	0.01	0.01	3	3	0.58	0.48	2	1	0.3	0.62	1	1	2	1	0	1
	Walking	0.09	0.1	25	34	0.58	0.52	15	18	0.3	0.62	5	11	16	11	7	18
10	Auto Mode Share	0.54	0.55	70	86	0.48	0.44	34	38	0.3	0.62	10	24	34	24	14	38
	Auto Passanger	0.24	0.25	31	39	0.48	0.44	15	17	0.3	0.62	5	11	16	11	6	17
	Transit	0.12	0.09	15	14	0.55	0.47	8	7	0.3	0.62	2	6	8	4	3	7
	Cycling	0.01	0.01	1	2	0.58	0.48	1	1	0.3	0.62	0	1	1	1	0	1
	Walking	0.09	0.1	12	16	0.58	0.52	7	8	0.3	0.62	2	5	7	5	3	8
11	Auto Mode Share	0.54	0.55	3	4	0.48	0.44	1	2	0.3	0.62	0	1	1	1	1	2
	Auto Passanger	0.24	0.25	1	2	0.48	0.44	0	1	0.3	0.62	0	0	0	1	0	1
	Transit	0.12	0.09	1	1	0.55	0.47	1	0	0.3	0.62	0	1	1	0	0	0
	Cycling	0.01	0.01	0	0	0.58	0.48	0	0	0.3	0.62	0	0	0	0	0	0
	Walking	0.09	0.1	1	1	0.58	0.52	1	1	0.3	0.62	0	1	1	1	0	1
12	Auto Mode Share	0.54	0.55	0	0	0.48	0.44	0	0	0.3	0.62	0	0	0	0	0	0
	Auto Passanger	0.24	0.25	0	0	0.48	0.44	0	0	0.3	0.62	0	0	0	0	0	0
	Transit	0.12	0.09	0	0	0.55	0.47	0	0	0.3	0.62	0	0	0	0	0	0
	Cycling	0.01	0.01	0	0	0.58	0.48	0	0	0.3	0.62	0	0	0	0	0	0
	Walking	0.09	0.1	0	0	0.58	0.52	0	0	0.3	0.62	0	0	0	0	0	0

Town Home Trips		Time Period		Peak Period Person Trips Generated		Peak Hour Adjustment		Peak Hour Trips		Directional Split		Trips Generated (In/Out)					
Zone	Mode of Transport	AM	PM	AM	PM	AM	PM	AM	PM	AM In	PM In	AM In	AM Out	AM Total	PM IN	PM Out	PM Total
1	Auto Mode Share	0.59	0.62	0	0	0.48	0.44	0	0	0.3	0.56	0	0	0	0	0	0
	Auto Passanger	0.2	0.18	0	0	0.48	0.44	0	0	0.3	0.56	0	0	0	0	0	0
	Transit	0.16	0.17	0	0	0.55	0.47	0	0	0.3	0.56	0	0	0	0	0	0
	Cycling	0.01	0.01	0	0	0.58	0.48	0	0	0.3	0.56	0	0	0	0	0	0
	Walking	0.04	0.03	0	0	0.58	0.52	0	0	0.3	0.56	0	0	0	0	0	0
2	Auto Mode Share	0.59	0.62	0	0	0.48	0.44	0	0	0.3	0.56	0	0	0	0	0	0
	Auto Passanger	0.2	0.18	0	0	0.48	0.44	0	0	0.3	0.56	0	0	0	0	0	0
	Transit	0.16	0.17	0	0	0.55	0.47	0	0	0.3	0.56	0	0	0	0	0	0
	Cycling	0.01	0.01	0	0	0.58	0.48	0	0	0.3	0.56	0	0	0	0	0	0
	Walking	0.04	0.03	0	0	0.58	0.52	0	0	0.3	0.56	0	0	0	0	0	0
3	Auto Mode Share	0.59	0.62	0	0	0.48	0.44	0	0	0.3	0.56	0	0	0	0	0	0
	Auto Passanger	0.2	0.18	0	0	0.48	0.44	0	0	0.3	0.56	0	0	0	0	0	0
	Transit	0.16	0.17	0	0	0.55	0.47	0	0	0.3	0.56	0	0	0	0	0	0
	Cycling	0.01	0.01	0	0	0.58	0.48	0	0	0.3	0.56	0	0	0	0	0	0
	Walking	0.04	0.03	0	0	0.58	0.52	0	0	0.3	0.56	0	0	0	0	0	0
4	Auto Mode Share	0.59	0.62	27	32	0.48	0.44	13	14	0.3	0.56	4	9	13	8	6	14
	Auto Passanger	0.2	0.18	9	9	0.48	0.44	4	4	0.3	0.56	1	3	4	2	2	4
	Transit	0.16	0.17	7	9	0.55	0.47	4	4	0.3	0.56	1	3	4	2	2	4
	Cycling	0.01	0.01	0	1	0.58	0.48	0	0	0.3	0.56	0	0	0	0	0	0
	Walking	0.04	0.03	2	2	0.58	0.52	1	1	0.3	0.56	0	1	1	1	0	1
5	Auto Mode Share	0.59	0.62	98	120	0.48	0.44	47	53	0.3	0.56	14	33	47	30	23	53
	Auto Passanger	0.2	0.18	33	35	0.48	0.44	16	15	0.3	0.56	5	11	16	8	7	15
	Transit	0.16	0.17	27	33	0.55	0.47	15	16	0.3	0.56	5	11	16	9	7	16
	Cycling	0.01	0.01	2	2	0.58	0.48	1	1	0.3	0.56	0	1	1	1	0	1
	Walking	0.04	0.03	7	6	0.58	0.52	4	3	0.3	0.56	1	3	4	2	1	3
6	Auto Mode Share	0.59	0.62	0	0	0.48	0.44	0	0	0.3	0.56	0	0	0	0	0	0
	Auto Passanger	0.2	0.18	0	0	0.48	0.44	0	0	0.3	0.56	0	0	0	0	0	0
	Transit	0.16	0.17	0	0	0.55	0.47	0	0	0.3	0.56	0	0	0	0	0	0
	Cycling	0.01	0.01	0	0	0.58	0.48	0	0	0.3	0.56	0	0	0	0	0	0
	Walking	0.04	0.03	0	0	0.58	0.52	0	0	0.3	0.56	0	0	0	0	0	0
7	Auto Mode Share	0.59	0.62	129	159	0.48	0.44	62	70	0.3	0.56	19	43	62	39	31	70
	Auto Passanger	0.2	0.18	44	46	0.48	0.44	21	20	0.3	0.56	6	15	21	11	9	20
	Transit	0.16	0.17	35	44	0.55	0.47	19	21	0.3	0.56	6	13	19	12	9	21
	Cycling	0.01	0.01	2	3	0.58	0.48	1	1	0.3	0.56	0	1	1	1	0	1
	Walking	0.04	0.03	9	8	0.58	0.52	5	4	0.3	0.56	2	4	6	2	2	4
8	Auto Mode Share	0.59	0.62	90	111	0.48	0.44	43	49	0.3	0.56	13	30	43	27	22	49
	Auto Passanger	0.2	0.18	31	32	0.48	0.44	15	14	0.3	0.56	5	11	16	8	6	14
	Transit	0.16	0.17	24	30	0.55	0.47	13	14	0.3	0.56	4	9	13	8	6	14
	Cycling	0.01	0.01	2	2	0.58	0.48	1	1	0.3	0.56	0	1	1	1	0	1
	Walking	0.04	0.03	6	5	0.58	0.52	3	3	0.3	0.56	1	2	3	2	1	3
9	Auto Mode Share	0.59	0.62	11	13	0.48	0.44	5	6	0.3	0.56	2	4	6	3	3	6
	Auto Passanger	0.2	0.18	4	4	0.48	0.44	2	2	0.3	0.56	1	1	2	1	1	2
	Transit	0.16	0.17	3	4	0.55	0.47	2	2	0.3	0.56	1	1	2	1	1	2
	Cycling	0.01	0.01	0	0	0.58	0.48	0	0	0.3	0.56	0	0	0	0	0	0
	Walking	0.04	0.03	1	1	0.58	0.52	1	1	0.3	0.56	0	1	1	1	0	1
10	Auto Mode Share	0.59	0.62	268	329	0.48	0.44	129	145	0.3	0.56	39	90	129	81	64	145
	Auto Passanger	0.2	0.18	91	96	0.48	0.44	44	42	0.3	0.56	13	31	44	24	18	42
	Transit	0.16	0.17	73	90	0.55	0.47	40	42	0.3	0.56	12	28	40	24	18	42
	Cycling	0.01	0.01	5	5	0.58	0.48	3	2	0.3	0.56	1	2	3	1	1	2
	Walking	0.04	0.03	18	16	0.58	0.52	10	8	0.3	0.56	3	7	10	4	4	8
11	Auto Mode Share	0.59	0.62	11	13	0.48	0.44	5	6	0.3	0.56	2	4	6	3	3	6
	Auto Passanger	0.2	0.18	4	4	0.48	0.44	2	2	0.3	0.56	1	1	2	1	1	2
	Transit	0.16	0.17	3	4	0.55	0.47	2	2	0.3	0.56	1	1	2	1	1	2
	Cycling	0.01	0.01	0	0	0.58	0.48	0	0	0.3	0.56	0	0	0	0	0	0
	Walking	0.04	0.03	1	1	0.58	0.52	1	1	0.3	0.56	0	1	1	1	0	1
12	Auto Mode Share	0.59	0.62	18	22	0.48	0.44	9	10	0.3	0.56	3	6	9	6	4	10
	Auto Passanger	0.2	0.18	6	6	0.48	0.44	3	3	0.3	0.56	1	2	3	2	1	3
	Transit	0.16	0.17	5	6	0.55	0.47	3	3	0.3	0.56	1	2	3	2	1	3
	Cycling	0.01	0.01	0	0	0.58	0.48	0	0	0.3	0.56	0	0	0	0	0	0
	Walking	0.04	0.03	1	1	0.58	0.52	1	1	0.3	0.56	0	1	1	1	0	1

Appendix C

Ironwood (Cardel Homes) Developments

3.9. SITE TRIP GENERATION

Appropriate trip generation rates for the proposed development of approximately 225 single family homes and 244 residential townhome units were obtained from the 9th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual, which are summarized in Table 3.

As ITE trip generation surveys only record vehicle trips and typically reflect highly suburban locations (with little to no access by travel modes other than private automobiles), adjustment factors appropriate to the more connected suburban study area context were applied to attain estimates of person trips for the proposed development. This approach is considered appropriate within the industry for more urban developments.

Table 3: ITE Trip Generation Rates

Land Use	Data Source	Trip Rates	
		AM Peak	PM Peak
Single Family Homes	ITE 210	T = 0.70(x) + 9.74	Ln(T) = 0.90(x) + 0.51
Townhomes	ITE 230	Ln(T) = 0.80(x) + 0.26	Ln(T) = 0.82(x) + 0.32

Notes: *T = Average Vehicle Trip Ends*
X = 1000 ft² Gross Floor Area

To convert ITE vehicle trip rates to person trips, an auto occupancy factor and a non-auto trip factor were applied to the ITE vehicle trip rates. Our review of available literature suggests that a combined factor of approximately 1.3 is considered reasonable to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%. As such, the person trip generation for the proposed site is summarized in Table 4.

Table 4: Modified Person Trip Generation

Land Use	Units	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Single Family Homes	225	54	163	217	178	105	283
Townhomes	244	23	114	137	108	54	162
Total Person Trips		**77**	**277**	**354**	**286**	**159**	**445**

Note: 1.3 factor to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%

The person trips shown in Table 4 for the proposed site were then reduced by modal share values, with the total site-generated vehicle traffic summarized in Table 5.

Table 5: Total Site Vehicle Trip Generation

Land Use	Mode Share	AM Peak (veh/h)			PM Peak (veh/h)		
		In	Out	Total	In	Out	Total
Auto Driver	65%	51	181	232	187	105	292
Auto Passenger	20%	16	56	72	58	32	90
Transit	10%	7	27	34	28	15	43
Non-motorized	5%	3	13	16	13	7	20
Total 'New' Auto Trips		**51**	**181**	**232**	**187**	**105**	**292**

As shown in Table 5, the resulting number of potential 'new' two-way vehicle trips for the proposed development is approximately 232 and 292 veh/h during the weekday morning and afternoon peak hours, respectively.

3.10. VEHICLES DISTRIBUTION AND ASSIGNMENT

Traffic distribution was based on the different types of land uses, existing volume splits at study area intersections and our knowledge of the surrounding area. The resultant distribution is outlined as follows.

Residential (Background) from PARSONS

- 10% to/from the north via River Road and Earl Armstrong Road
- 50% to/from the north via Spratt Road and Limebank Road
- 30% to/from the north via Earl Armstrong Road and Limebank Road
- 5% to/from the south via Spratt Road
- 5% to/from the south via Rideau Road and Spratt Road

100%

Dillon's Revised Vehicle Distribution for Riverside South School TIA
Residential

- 10% to/from the north via River Road and Earl Armstrong Road
- 50% to/from the north via Spratt Road and Limebank Road
- 20% to/from the north via Earl Armstrong Road and Limebank Road
- 5% to/from the south via Spratt Road
- 5% to/from the south via Rideau Road and Spratt Road
- 10% to/from the north via Brian Good Avenue and Earl Armstrong Road

100%

Appendix D

Intersection Performance Worksheets

LEVEL OF SERVICE ANALYSIS AT UNSIGNALIZED INTERSECTIONS[1]

The term "level of service" implies a qualitative measure of traffic flow at an intersection. It is dependent upon the vehicle delay and vehicle queue lengths at approaches. The level of service at unsignalized intersections is often related to the delay accumulated by flows on the minor streets, caused by all other conflicting movements. The following table describes the characteristics of each level.

Level of Service	Features
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.
E	Very long traffic delays occur. Operations approach the capacity of the intersection.
F	Saturation occurs, with vehicle demand exceeding the available capacity. Very long traffic delays occur.

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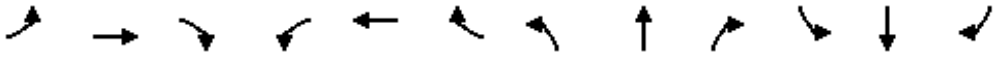
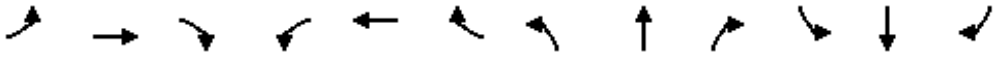
(1) Highway Capacity Manual - Special Report No. 209, Transportation Research Board, 1985.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	8	20	6	18	21	24	61	0	9	60	13
Future Volume (Veh/h)	29	8	20	6	18	21	24	61	0	9	60	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	9	22	7	20	23	26	66	0	10	65	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	243	210	72	236	217	66	79			66		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	243	210	72	236	217	66	79			66		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	99	98	99	97	98	98			99		
cM capacity (veh/h)	666	671	990	682	665	998	1519			1536		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	63	50	92	89
Volume Left	32	7	26	10
Volume Right	22	23	0	14
cSH	753	789	1519	1536
Volume to Capacity	0.08	0.06	0.02	0.01
Queue Length 95th (m)	2.2	1.6	0.4	0.2
Control Delay (s)	10.2	9.9	2.2	0.9
Lane LOS	B	A	A	A
Approach Delay (s)	10.2	9.9	2.2	0.9
Approach LOS	B	A		

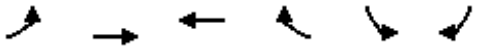
Intersection Summary				
Average Delay	4.8			
Intersection Capacity Utilization	24.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	67	11	30	123	6	25	0	28	7	0	4
Future Volume (Veh/h)	2	67	11	30	123	6	25	0	28	7	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	73	12	33	134	7	27	0	30	8	0	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	141			85			290	290	79	316	292	138
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	141			85			290	290	79	316	292	138
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			96	100	97	99	100	100
cM capacity (veh/h)	1442			1512			647	606	981	606	604	911

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	87	174	57	12
Volume Left	2	33	27	8
Volume Right	12	7	30	4
cSH	1442	1512	789	682
Volume to Capacity	0.00	0.02	0.07	0.02
Queue Length 95th (m)	0.0	0.5	1.9	0.4
Control Delay (s)	0.2	1.6	9.9	10.4
Lane LOS	A	A	A	B
Approach Delay (s)	0.2	1.6	9.9	10.4
Approach LOS			A	B

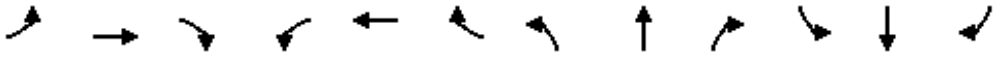
Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	25.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	87	147	26	3	13
Future Volume (Veh/h)	15	87	147	26	3	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	95	160	28	3	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	188				301	174
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188				301	174
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	98
cM capacity (veh/h)	1386				683	869

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	111	188	17
Volume Left	16	0	3
Volume Right	0	28	14
cSH	1386	1700	829
Volume to Capacity	0.01	0.11	0.02
Queue Length 95th (m)	0.3	0.0	0.5
Control Delay (s)	1.2	0.0	9.4
Lane LOS	A		A
Approach Delay (s)	1.2	0.0	9.4
Approach LOS			A

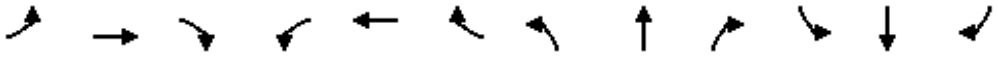
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	50	18	8	88	3	32	31	18	10	9	52
Future Volume (Veh/h)	22	50	18	8	88	3	32	31	18	10	9	52
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	54	20	9	96	3	35	34	20	11	10	57
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	99			74			290	229	64	264	238	98
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	99			74			290	229	64	264	238	98
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			94	95	98	98	98	94
cM capacity (veh/h)	1494			1526			606	656	1000	637	649	959

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	108	89	78
Volume Left	24	9	35	11
Volume Right	20	3	20	57
cSH	1494	1526	687	847
Volume to Capacity	0.02	0.01	0.13	0.09
Queue Length 95th (m)	0.4	0.1	3.6	2.4
Control Delay (s)	1.9	0.7	11.0	9.7
Lane LOS	A	A	B	A
Approach Delay (s)	1.9	0.7	11.0	9.7
Approach LOS			B	A

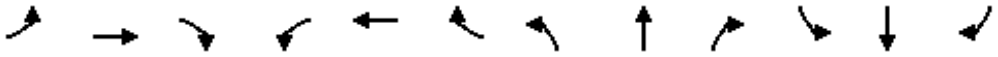
Intersection Summary				
Average Delay	5.3			
Intersection Capacity Utilization	27.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	19	17	3	11	13	15	34	0	21	72	27
Future Volume (Veh/h)	19	19	17	3	11	13	15	34	0	21	72	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	21	18	3	12	14	16	37	0	23	78	29
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	228	208	92	236	222	37	107			37		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	228	208	92	236	222	37	107			37		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	97	98	100	98	99	99			99		
cM capacity (veh/h)	694	672	965	675	660	1035	1484			1574		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	60	29	53	130
Volume Left	21	3	16	23
Volume Right	18	14	0	29
cSH	749	802	1484	1574
Volume to Capacity	0.08	0.04	0.01	0.01
Queue Length 95th (m)	2.1	0.9	0.3	0.4
Control Delay (s)	10.2	9.7	2.3	1.4
Lane LOS	B	A	A	A
Approach Delay (s)	10.2	9.7	2.3	1.4
Approach LOS	B	A		

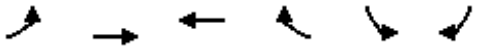
Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	21.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	57	25	39	100	8	19	0	17	4	0	2
Future Volume (Veh/h)	4	57	25	39	100	8	19	0	17	4	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	62	27	42	109	9	21	0	18	4	0	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	118			89			283	286	76	299	294	114
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	118			89			283	286	76	299	294	114
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			97	100	98	99	100	100
cM capacity (veh/h)	1470			1506			652	605	986	626	598	939

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	93	160	39	6
Volume Left	4	42	21	4
Volume Right	27	9	18	2
cSH	1470	1506	773	705
Volume to Capacity	0.00	0.03	0.05	0.01
Queue Length 95th (m)	0.1	0.7	1.3	0.2
Control Delay (s)	0.3	2.1	9.9	10.2
Lane LOS	A	A	A	B
Approach Delay (s)	0.3	2.1	9.9	10.2
Approach LOS			A	B

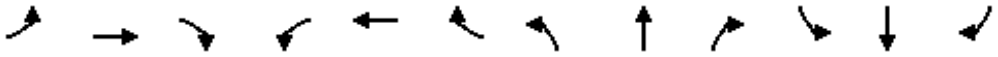
Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	24.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	75	126	12	10	21
Future Volume (Veh/h)	3	75	126	12	10	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	82	137	13	11	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	150				232	144
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	150				232	144
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	97
cM capacity (veh/h)	1431				755	904

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	85	150	34
Volume Left	3	0	11
Volume Right	0	13	23
cSH	1431	1700	850
Volume to Capacity	0.00	0.09	0.04
Queue Length 95th (m)	0.1	0.0	1.0
Control Delay (s)	0.3	0.0	9.4
Lane LOS	A		A
Approach Delay (s)	0.3	0.0	9.4
Approach LOS			A

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	17.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	44	26	18	89	4	19	11	10	3	19	30
Future Volume (Veh/h)	17	44	26	18	89	4	19	11	10	3	19	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	48	28	20	97	4	21	12	11	3	21	33
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	101			76			280	239	62	254	251	99
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	101			76			280	239	62	254	251	99
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			97	98	99	100	97	97
cM capacity (veh/h)	1491			1523			620	646	1003	669	636	957

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	94	121	44	57
Volume Left	18	20	21	3
Volume Right	28	4	11	33
cSH	1491	1523	694	792
Volume to Capacity	0.01	0.01	0.06	0.07
Queue Length 95th (m)	0.3	0.3	1.6	1.9
Control Delay (s)	1.5	1.3	10.5	9.9
Lane LOS	A	A	B	A
Approach Delay (s)	1.5	1.3	10.5	9.9
Approach LOS			B	A

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	23.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Appendix E

TDM Checklists

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☒
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☒
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☒
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☒
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☒

	TDM-supportive design & infrastructure measures: *Non-residential developments*		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☒
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☒
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☒
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☒
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☒
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐ N/A for site plan application.
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☐ N/A site is located near street
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐ N/A school site

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☒ Bicycle parking is located at north and south ends of school.
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☒
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☒
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☒
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☐ N/A for school
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐ N/A for school
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☒ Shower provided for staff.
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☒
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐ N/A for school

	TDM-supportive design & infrastructure measures: *Non-residential developments*		Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ N/A, shelter already provided
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐ N/A, shelter already provided
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ N/A for school
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐ N/A for school
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐ N/A for school
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐ N/A for school
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐ N/A for school
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐ N/A for school

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☐ N/A parking meets zoning requirements
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐ N/A for school
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐ N/A for school
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐ N/A for school
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐ N/A for school
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐ N/A for school

TDM Measures Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☐ N/A for school
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐ N/A for school
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances	☐ N/A for school
	2.2	**Bicycle skills training**	
		Commuter travel	
BETTER ★	2.2.1	Offer on-site cycling courses for commuters, or subsidize off-site courses	☐ N/A for school
	2.3	**Valet bike parking**	
		Visitor travel	
BETTER	2.3.1	Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	☐ N/A for school

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances	☒ Recommended
BASIC	3.1.2	Provide online links to OC Transpo and STO information	☒ Recommended
BETTER	3.1.3	Provide real-time arrival information display at entrances	☐ N/A for school
		3.2 Transit fare incentives	
		Commuter travel	
BETTER	3.2.1	Offer preloaded PRESTO cards to encourage commuters to use transit	☒ Recommended
BETTER ★	3.2.2	Subsidize or reimburse monthly transit pass purchases by employees	☒ Recommended
		Visitor travel	
BETTER	3.2.3	Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	☐ N/A for school
		3.3 Enhanced public transit service	
		Commuter travel	
BETTER	3.3.1	Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	☐ N/A for school
		Visitor travel	
BETTER	3.3.2	Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	☐ N/A for school
		3.4 Private transit service	
		Commuter travel	
BETTER	3.4.1	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	☐ N/A for school
		Visitor travel	
BETTER	3.4.2	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	☐ N/A for school

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
	4.	**RIDESHARING**	
	4.1	**Ridematching service**	
		Commuter travel	
BASIC ★	4.1.1	Provide a dedicated ridematching portal at OttawaRideMatch.com	☐ N/A for school
	4.2	**Carpool parking price incentives**	
		Commuter travel	
BETTER	4.2.1	Provide discounts on parking costs for registered carpools	☐ N/A for school
	4.3	**Vanpool service**	
		Commuter travel	
BETTER	4.3.1	Provide a vanpooling service for long-distance commuters	☐ N/A for school
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Bikeshare stations & memberships**	
BETTER	5.1.1	Contract with provider to install on-site bikeshare station for use by commuters and visitors	☐ N/A for school
		Commuter travel	
BETTER	5.1.2	Provide employees with bikeshare memberships for local business travel	☐ N/A for school
	5.2	**Carshare vehicles & memberships**	
		Commuter travel	
BETTER	5.2.1	Contract with provider to install on-site carshare vehicles and promote their use by tenants	☐ N/A for school
BETTER	5.2.2	Provide employees with carshare memberships for local business travel	☐ N/A for school
	6.	**PARKING**	
	6.1	**Priced parking**	
		Commuter travel	
BASIC ★	6.1.1	Charge for long-term parking (daily, weekly, monthly)	☐ N/A for school
BASIC	6.1.2	Unbundle parking cost from lease rates at multi-tenant sites	☐ N/A for school
		Visitor travel	
BETTER	6.1.3	Charge for short-term parking (hourly)	☐ N/A for school

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
	7.	**TDM MARKETING & COMMUNICATIONS**	
	7.1	**Multimodal travel information**	
		Commuter travel	
BASIC ★	7.1.1	Provide a multimodal travel option information package to new/relocating employees and students	☐ N/A for school
		Visitor travel	
BETTER ★	7.1.2	Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	☐ N/A for school
	7.2	**Personalized trip planning**	
		Commuter travel	
BETTER ★	7.2.1	Offer personalized trip planning to new/relocating employees	☐ N/A for school
	7.3	**Promotions**	
		Commuter travel	
BETTER	7.3.1	Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	☐ N/A for school
	8.	**OTHER INCENTIVES & AMENITIES**	
	8.1	**Emergency ride home**	
		Commuter travel	
BETTER ★	8.1.1	Provide emergency ride home service to non-driving commuters	☐ N/A for school
	8.2	**Alternative work arrangements**	
		Commuter travel	
BASIC ★	8.2.1	Encourage flexible work hours	☐ N/A for school
BETTER	8.2.2	Encourage compressed workweeks	☐ N/A for school
BETTER ★	8.2.3	Encourage telework	☐ N/A for school
	8.3	**Local business travel options**	
		Commuter travel	
BASIC ★	8.3.1	Provide local business travel options that minimize the need for employees to bring a personal car to work	☐ N/A for school
	8.4	**Commuter incentives**	
		Commuter travel	
BETTER	8.4.1	Offer employees a taxable, mode-neutral commuting allowance	☐ N/A for school
	8.5	**On-site amenities**	
		Commuter travel	
BETTER	8.5.1	Provide on-site amenities/services to minimize mid-day or mid-commute errands	☐ N/A for school