JLR No.: 29899-000

August 30, 2021

Transportation Impact Assessment

2983, 3053 and 3079 Navan Road

J.L.Richards
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Introduction

With respect to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines, a total of five separate submissions are required for City review/approval. Each submission is a component/section of a formal TIA, which includes:

- *Step 1 – Screening*
- *Step 2 – Scoping*
- *Step 3 – Forecasting*
- *Step 4 – Analysis*
- *Step 5 – TIA Submission* (i.e. Findings and Recommendations)

This report has been structured with these above noted *Steps 1-5* as numbered sections accordingly, as outlined in the City's TIA Guidelines.

1.0 Screening

In regards to *Step 1 – Screening*, this is a form that contains a list of triggers to determine if the proposed size, type and location of a proposed development will require a formal TIA, as part of the City's development application approval process (e.g. not all new developments require a TIA).

With respect to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines, the proposed development (described below in Section 2.1) triggered the trip generation, location and the safety criteria outlined in the City's TIA *Step 1 – Screening* form. Given these triggers were met, a formal TIA (i.e. completed Steps 1-5) must accompany the subject development application.

2.0 Scoping

2.1 Existing and Planned Conditions

Description of Proposed Development

Based on the information provided, it is our understanding that the proponent is seeking City approval for the development of approximately 5.44 acres of vacant land municipally known as 2983 Navan Road, 3053 Navan Road and 3079 Navan Road, within Ottawa's Orleans community. The subject site is located within the east quadrant of the Navan/Brian Coburn Blvd intersection.

The latest Site Plan illustrates that the proposed development will include approximately 333 townhomes/low-rise apartments, a gas station/convenience store with drive-thru car wash, and fast food restaurant with a drive-thru and approximately 20,000 ft^2 of commercial/retail space.

The proposed development will include a total of four vehicle driveway connections to/from the subject site. Two of the proposed driveway connections will be for access/egress to the residential portion of the subject site (i.e. one driveway connection will be to Navan Road approximately 150 m west of Pagé Road and the other will be on Brian Coburn Blvd at the Park and Ride intersection). The other two proposed site driveways will be for access/egress for the gas station/convenience store portion of the site (i.e. one of the driveways will be located on Navan Road approximately 75 m southeast of the Navan/Brian Coburn roundabout and the other driveway connection will be on Brian Coburn Blvd approximately 100 m northeast of the Navan/Brian Coburn roundabout). Pedestrians will have direct access to an existing multi-use

pathway along Brian Coburn, which supports active mobility between on-site facilities and the developed surrounding pedestrian/cycling network.

The subject development will be constructed in a single phase, with an estimated build-out year of 2026.

The local context surrounding the subject development site is depicted in the following **Figure 1**, and the proposed Site Plan is depicted in the subsequent **Figure 2**.

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Figure 1: Local Context

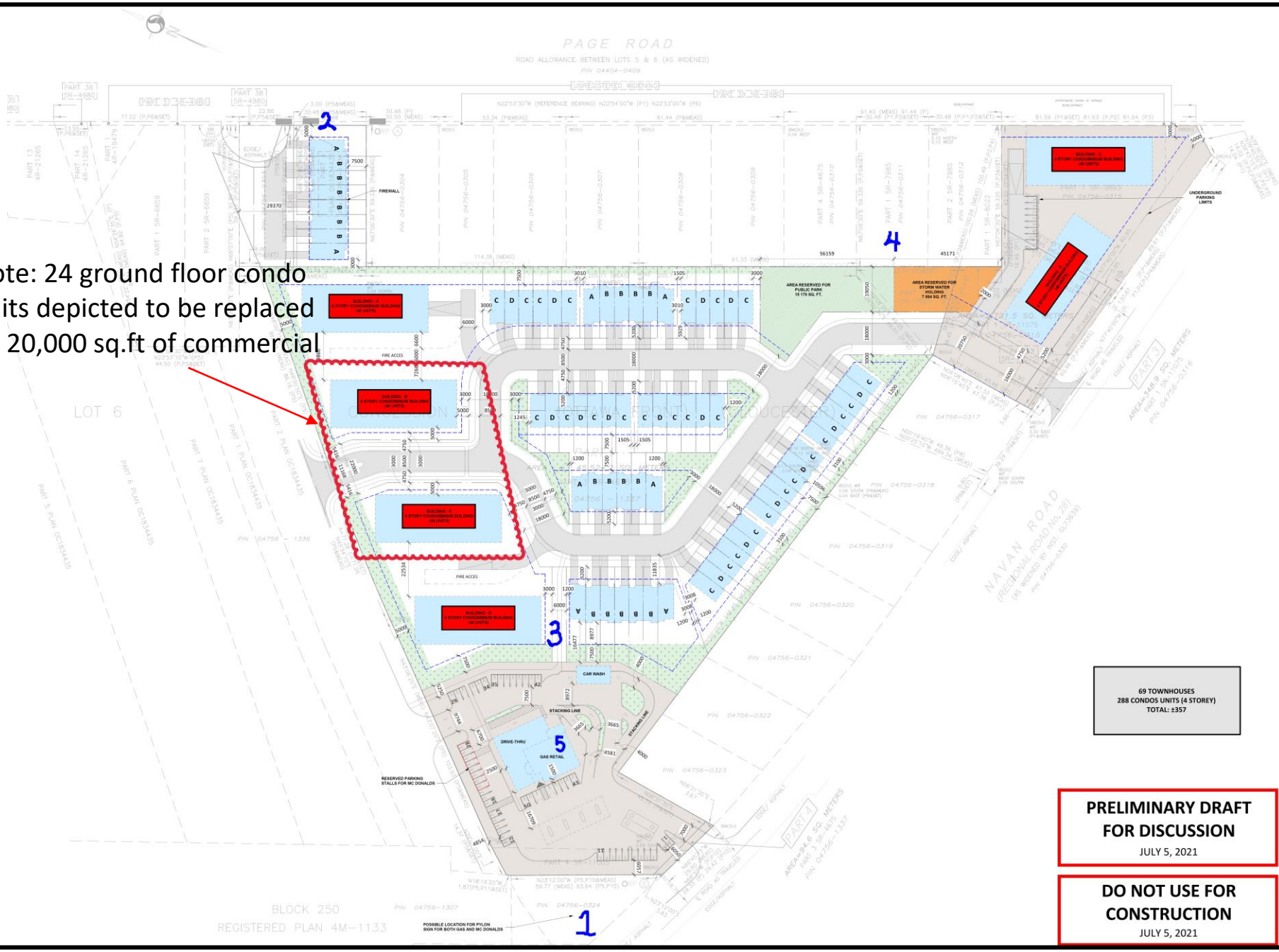

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Figure 2: Proposed Site Plan

Existing Conditions

Area Road Network

Navan Road is a two-lane arterial roadway (i.e. one travel lane per direction) along the subject site's frontage. It extends between Blackburn Hamlet Bypass in the north-west and Trim Road in the south-east. Within the vicinity of the subject development site, the posted speed limit is 60 km/h and on-street parking regulations are unposted. With respect to City By-Law, on-street parking is permitted for a maximum of 3 hrs along both sides of the roadway, where possible (e.g. you may only park on-street, if you can be completely clear of the adjacent travel lane).

Brian Coburn Boulevard is a two-lane arterial roadway (i.e. one travel lane per direction), it extends between Navan Road in the west and Trim Road in the east. Within the vicinity of the subject development site, the posted speed limit is 70 km/h and on-street parking regulations are unposted. With respect to City By-Law, on-street parking is permitted for a maximum of 3 hrs along both sides of the roadway, where possible. However, given Brian Coburn is curbed with no shoulder, and does not have vehicle travel lanes sufficiently wide enough to accommodate unimpeded traffic flow and on-street parking, on-street parking within the vicinity of the subject site is not permitted.

Pagé Road is a two-lane collector roadway (i.e. one travel lane per direction), which extends between Meadowglen Drive in the north and Renaud Road in the south; however, it should be noted that it has recently been made discontinuous via cul-de-sacs at Brian Coburn Blvd. Within the vicinity of the subject site, the posted speed limit is 40 km/h and on-street parking regulations are unposted.

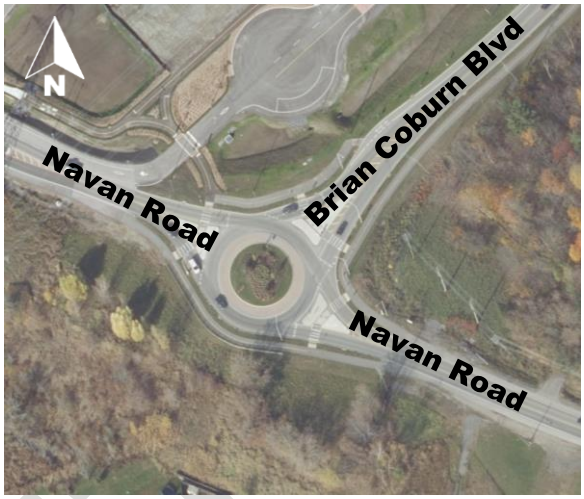
Renaud Road is a two-lane collector road (i.e. one travel lane per direction), which extends between Anderson Road in the west and Mer-Bleue Road in the east. Within the vicinity of the subject site, the posted speed limit is 50 km/h and parking regulations are unposted, with the exception of on-street parking is not permitted on either side of the roadway for a distance of approximately 900 m, west of Navan Road.

Orléans Boulevard is a two-lane arterial roadway (i.e. one travel lane per direction), which extends from Navan Road in the south and terminates just past St. Andre Drive in the north. Within the vicinity of the subject site, the posted speed limit is 50 km/h and on-street parking is not permitted on either side of the roadway within the vicinity of the site.

Study Area Intersections

Navan/Brian Coburn

The Navan/Brian Coburn intersection is a YEILD controlled three-legged roundabout. All approaches consist of a single lane that accommodates all possible movements.



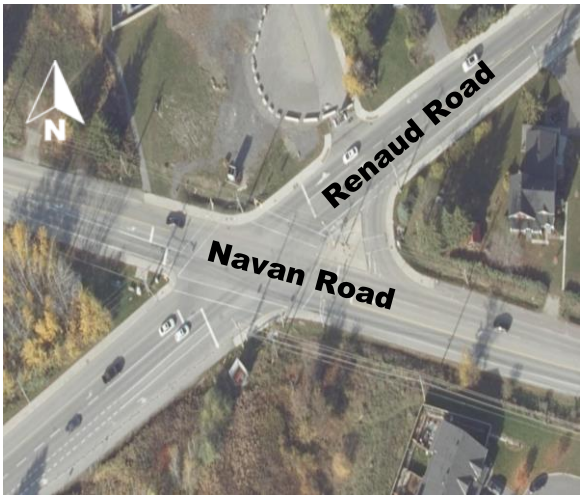
Navan/Pagé

The Navan/Pagé intersection is an unsignalized, four-legged intersection, with STOP control on the southbound approach and YEILD control on the northbound approach. The northbound approach (Pagé Road) consists of a single channelized right-turn lane. The southbound approach (Pagé Road) consists of a single shared lane that accommodates all possible movements. The east and westbound approaches (Navan Road) consist of a single shared lane that accommodates all possible movements.

Heavy trucks are prohibited on Pagé Road and northbound vehicles are prohibited to turn left or proceed straight. All other movements are permitted.

Navan/Renaud

The Navan/Renaud intersection is a signalized, four-legged intersection. The southwest approach (northbound Renaud Road) consists of one left-turn lane, one through lane, and one right-turn lane. The northeast approach (southbound Renaud Road) consists of one shared through/right-turn lane, and one left-turn lane. The east and westbound approaches (Navan Road) each consist of one left-turn lane, and one shared through/right-turn lane (note, the westbound right-turn is channelized).



Heavy trucks are prohibited on Renaud Road; however, all other movements are permitted.

Brian Coburn/Park and Ride

The Brian Coburn/Park and Ride intersection is a signalized, three-legged intersection. The northeast approach (southbound Brian Coburn Blvd) consists of one through lane, and one right-turn lane. The southwest approach (northbound Brian Coburn Blvd) consists of one left-turn lane, and one through lane. The northwest approach (Park and Ride driveway) consists of a single shared lane that accommodates all possible movements.

Pedestrian and cycling movements are permitted by way of a crosswalk and a cross-ride on the west leg of the intersection. Eastbound left-turns are prohibited, with the exception for transit vehicles. All other movements are permitted at this location.

Brian Coburn/Pedestrian Crossing

The Brian Coburn Blvd signalized pedestrian crosswalk connects the pedestrian sidewalks and the Multi-use Pathway (MUP) along Pagé Road. The north and southbound approaches (Brian Coburn) consist of one through lane.

All movements are permitted at this location and the signal is pedestrian push button activated.

Navan/Orléans
The Navan/Orléans intersection is a signalized, three-legged intersection. The southbound approach (Orléans Blvd) consists of one left-turn lane, and one right-turn lane. The eastbound approach (Navan Road) consists of one left-turn lane, and one through lane. The westbound approach (Navan Road) consists of one through lane, and one right-turn lane.

Heavy trucks are prohibited on Orléans Blvd; however, all other movements are permitted.

Navan/Park and Ride
The Navan/Park and Ride intersection is a signalized, three-legged intersection. The northeast approach (Park and Ride driveway) consists of a single shared lane that accommodates all possible movements. The southeast approach (northbound Navan Road) consists of one through lane, and one right-turn lane. The northwest approach (southbound Navan Road) consists of one left-turn lane and one through lane.

All movements are permitted at this location.

Existing Driveways to Adjacent Development

As depicted in the following **Figure 3**, there are approximately 104 driveway connections within a 200 m boundary of all site driveway connections. Approximately 88% of the driveways adjacent to the subject development, provide access/egress for private low-rise residential land uses, such as single-family homes, townhomes and apartments. The remainder of the driveways (within approximately 200 m of the subject development) provide access/egress to commercial facilities, vacant land, mixed-use land or stormwater management.

Pedestrian/Cycling Network

The pedestrian network within the vicinity of the subject site is currently comprised of bi-directional asphalt multi-use pathways (MUP) that run along both sides of Brian Coburn Blvd, between Navan Road and Pagé Road. The MUP that runs along the north side of Brian Coburn Blvd connects pedestrians and cyclists to the existing Chapel Hill South subdivisions via the mid-block Brian Coburn Blvd/Pagé pedestrian crossing, and via a bi-directional MUP that runs along the north side of Navan Road for approximately 310 m, west of the Brian Coburn/Navan roundabout. The MUP that runs along the south side of Brian Coburn Blvd extends from the Brian Coburn/Navan roundabout in the west to the Brian Coburn/Mer Bleue roundabout in the east.

Additionally, concrete sidewalks are provided along both sides of Renaud Road and Orléans Blvd, within the vicinity of the subject development site. It should be noted that there are currently no sidewalks provided on Navan Road or Pagé Road.

With respect to cyclists, current cycling facilities are fairly well established. As previously mentioned, there are a series of MUPs provided within the vicinity of the subject development site. As depicted in the City's Transportation Master Plan (TMP) – *Cycling Network*, paved shoulders are provided along both sides of Navan Road between Blackburn Hamlet Bypass and Spring Valley Drive, which are classified as 'Spine Routes'. Within the vicinity of the subject site along Renaud Road, paved shoulders are also provided on both sides of the road for cyclists, between Saddleridge Drive and Rue Fern Casey Street, and east-west pocket bike lanes are provided at the Navan/Renaud intersection, along Renaud Road.

Detailed maps of the existing study area pedestrian/cycling network, and how it connects to the greater network is depicted in the following **Figure 4** and **Figure 5**, as sourced from the City's online open data source tool. It should be noted that the pedestrian network has not been updated on the City's data sources, since a number of new facilities have been implemented; however, the description of all area facilities has been provided above.

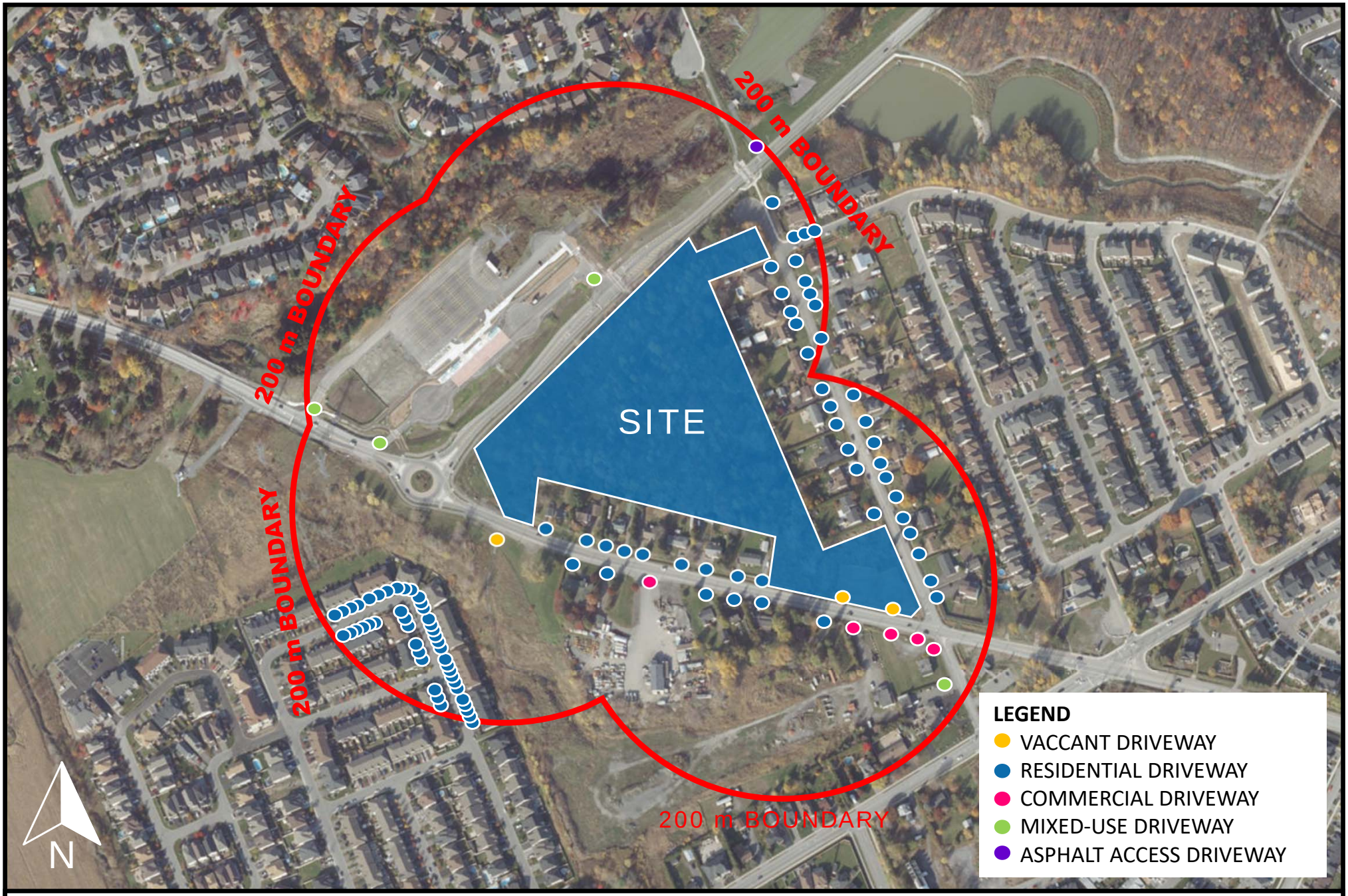


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Figure 3: Adjacent Driveways

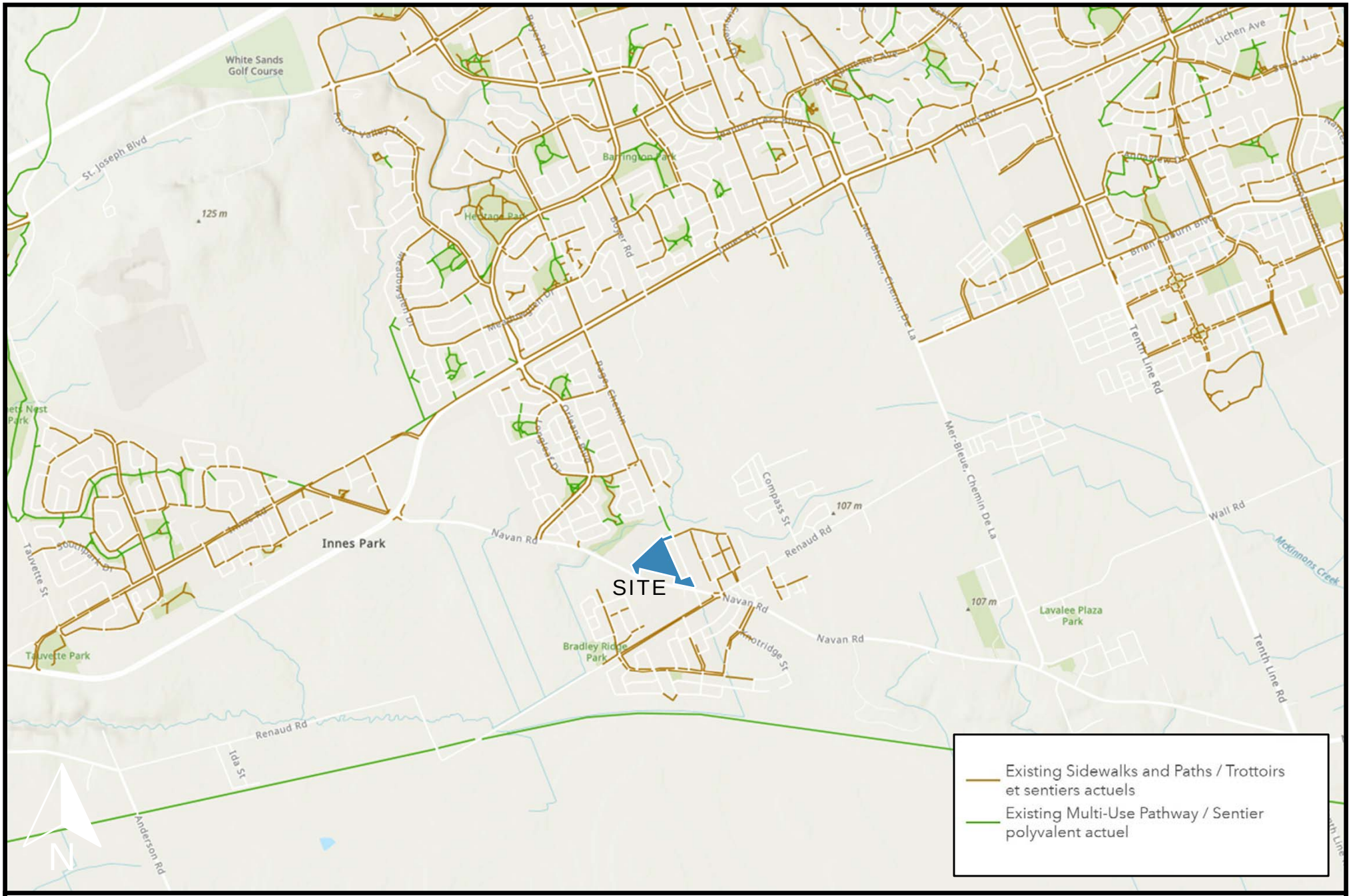

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Figure 4: Pedestrian Network

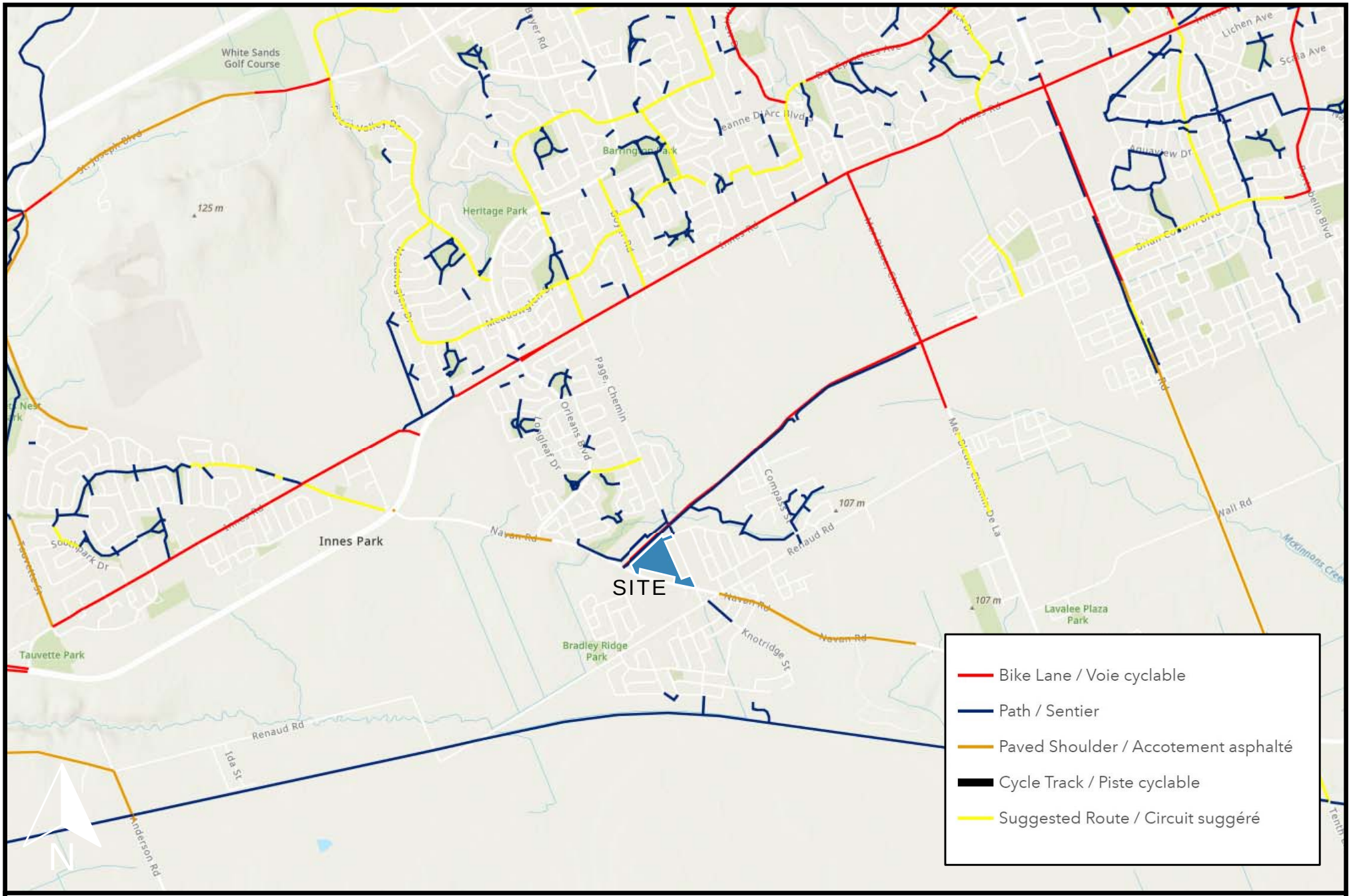

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Figure 5: Cycling Network

Transit Network

There are ten (10) OC Transpo bus stops that are located within walking distance to/from the subject development site. The following **Table 1** summarizes existing bus stops, and their associated routes and direction of travel.

Table 1: OC Transpo Stop Information

Stop #	Location	Route Identifier	Direction
3074	Chapel Hill B	225, 34	Inbound
3074	Chapel Hill A	225, 34	Outbound
9058	Renaud/Pagé	225, 228, 634, 641	Inbound/Northbound/ Eastbound/Inbound
9059	Renaud/Navan	228, 612, 622, 634, 641	Southbound/Northbound/ Westbound/Outbound/ Eastbound
5936	Pagé/Navan	34, 225, 612, 622, 634, 641	Outbound/Southbound/ westbound/Eastbound
2653	Navan/Topsoil	34, 225, 612, 622, 634, 641	Inbound/Northbound/ Eastbound/Westbound
1983	Navan/Pagé	34, 225, 612, 622, 634, 641	Inbound/Northbound/ Eastbound/Westbound
2655	Navan/Topsoil	34, 225, 612, 622, 634, 641	Outbound/Southbound/ Westbound/Eastbound
3617	Orléans/Navan	34, 225, 612, 622, 634, 641	Inbound/Northbound/ Eastbound/Westbound
3307	Orléans/Des Grand Champs	34, 225, 612, 622, 634, 641	Outbound/Southbound/ Westbound/Eastbound

Note: Routes numbered in the 600's are designated school routes and OC Transpo does not consider these routes as part of regular service.

The following **Figure 6** depicts the OC Transpo routes within the vicinity of the subject development, and **Table 2** provides additional information with respect to OC Transpo services identified in **Table 1**.

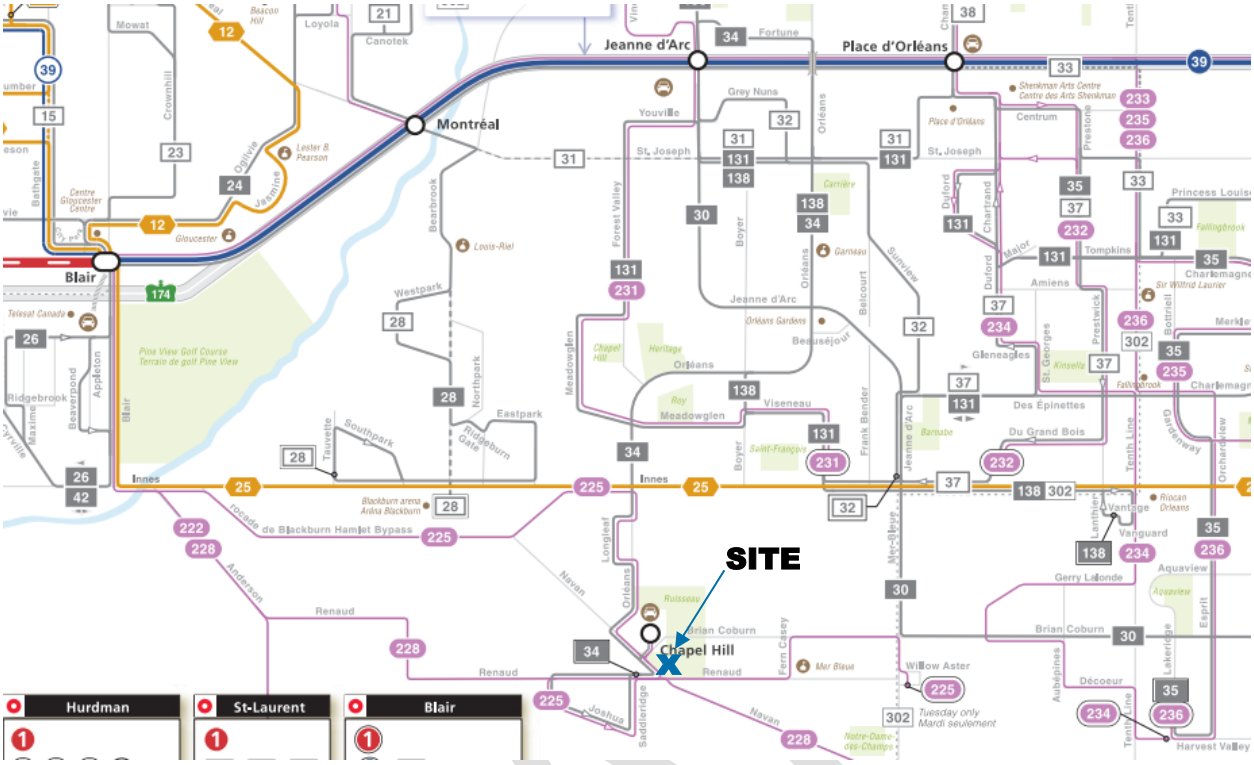

Figure 6: Transit Routes Within Study Area (Source: OC Transpo System Map)

Table 2: OC Transpo Route Information

Route	Origin/Destination	Service Type	Peak Hour Headway
34	Renaud ↔ Blair	Local	15(30) mins
225	Blair ↔ Renaud	Connexion	Mon – Fri Peak Periods Only
228	Navan Sarsfield ↔ Blair	Connexion	Mon – Fri Peak Periods Only

The following **Figure 7** depicts transit stop locations within the vicinity of the subject development site.

Figure 7: Transit Stops Within Study Area

Area Traffic Management

Traffic calming within the vicinity of the subject site is fairly abundant and include measures such as:

- Information signage (e.g. “traffic-calmed neighbourhood” and caution children crossing)
- Speed display devices
- Pavement markings (e.g. speed limit, stop approaching, school crossing, full lane transverse bars)
- Vertical line treatments to give drivers a lane-narrowing effect (e.g. centreline and curb line flex stakes)
- Speed humps
- Vehicular directional closures (e.g. “No Trucks”)
- Intersection channelization (e.g. northbound through and left-turn traffic is prohibited by channelization at the Page/Navan intersection)
- Vehicle access closures (e.g. Page Road has been deadened for vehicular traffic at Brian Coburn Blvd; however, pedestrian and cycling traffic is permitted/facilitated)

The following **Figure 8** depicts the approximate location and type of traffic calming measures provided within the study area. In addition to the traffic calming measures identified in **Figure 8**, roundabouts are also considered to be an effective tool to mitigate vehicle speed (e.g. the Brian Coburn/Navan roundabout).

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Figure 8: Area Traffic Management

Peak Hour Travel Demands

For the purpose of this assessment and based on discussions with the City staff, the following study area intersections have been identified for intersection capacity analysis:

- Navan/Pagé
- Navan/Brian Coburn
- Navan/Renaud
- Brian Coburn/Pedestrian Crossing
- Brian Coburn/Park and Ride
- Navan/Park and Ride
- Navan/Orleans

The following **Figure 9** depicts the observed (pre-pandemic) weekday morning and afternoon peak hour vehicular volumes at study area intersections, and **Figure 12** depicts pedestrian and cyclist movements over the same peak hours. Detailed traffic volume data provided by the City of Ottawa is provided as **Appendix A**.

Given historical traffic volume data related to the Chapel Hill Park and Ride is not available, and collecting traffic count data at this time (i.e. during the COVID-19 pandemic) will not yield an accurate sample of typical conditions, the volumes depicted in the following **Figure 10** were used for analysis purposes. These projected volumes were obtained from the July 2017 *Chapel Hill PnR Traffic Analysis Technical Memo*, and the related excerpt from this memo report is included as **Appendix B**.

Superimposing the projected Park and Ride volumes (i.e. **Figure 10**) onto existing volumes (i.e. **Figure 9**), the result is **Figure 11**. For analysis purposes, the volumes depicted in **Figure 11** have been assumed as the baseline condition, to be compared against future traffic volume projections.

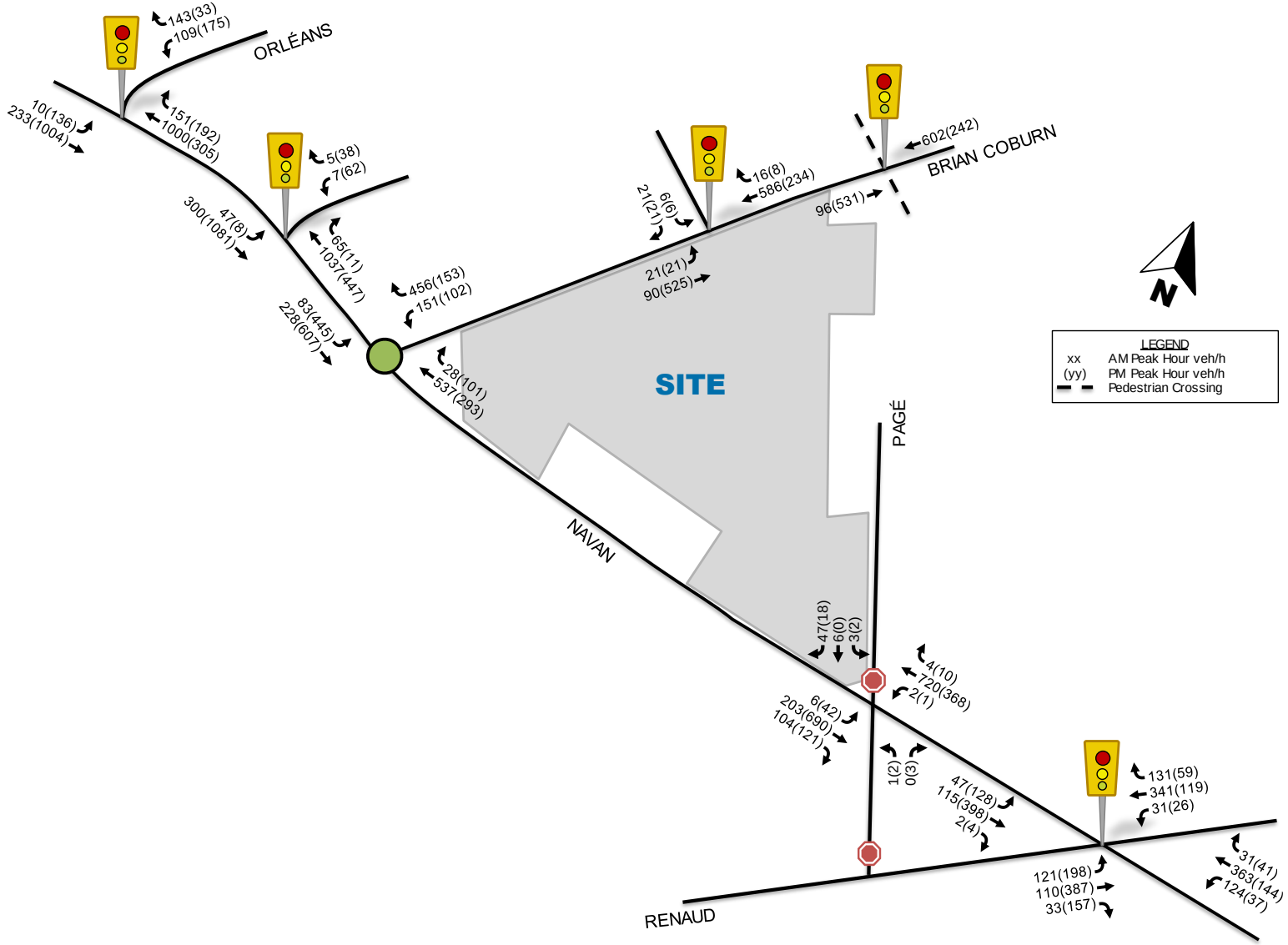

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Figure 9: Existing Vehicular Volumes AM(PM)

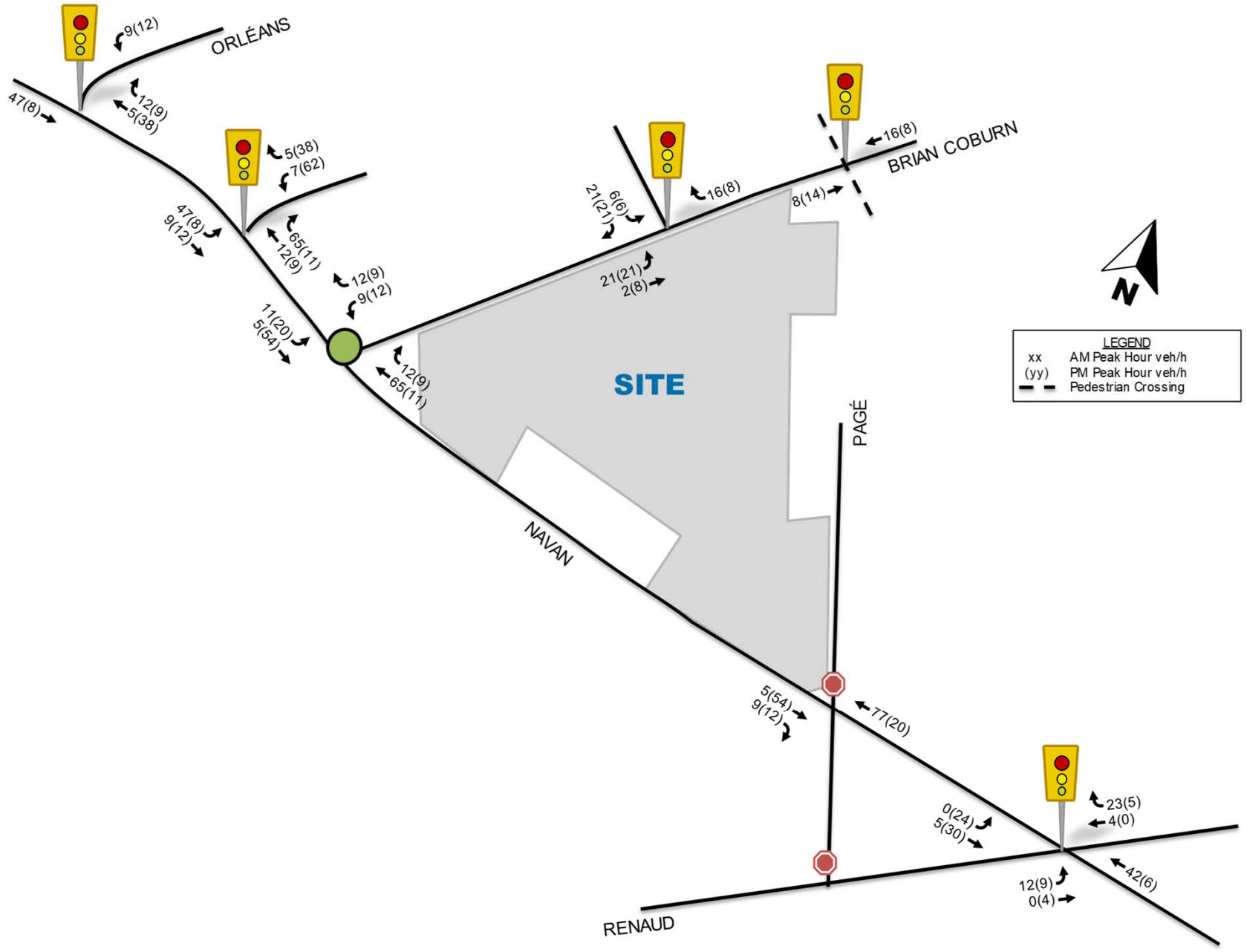

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Figure 10: Park and Ride Vehicular Volumes AM(PM)

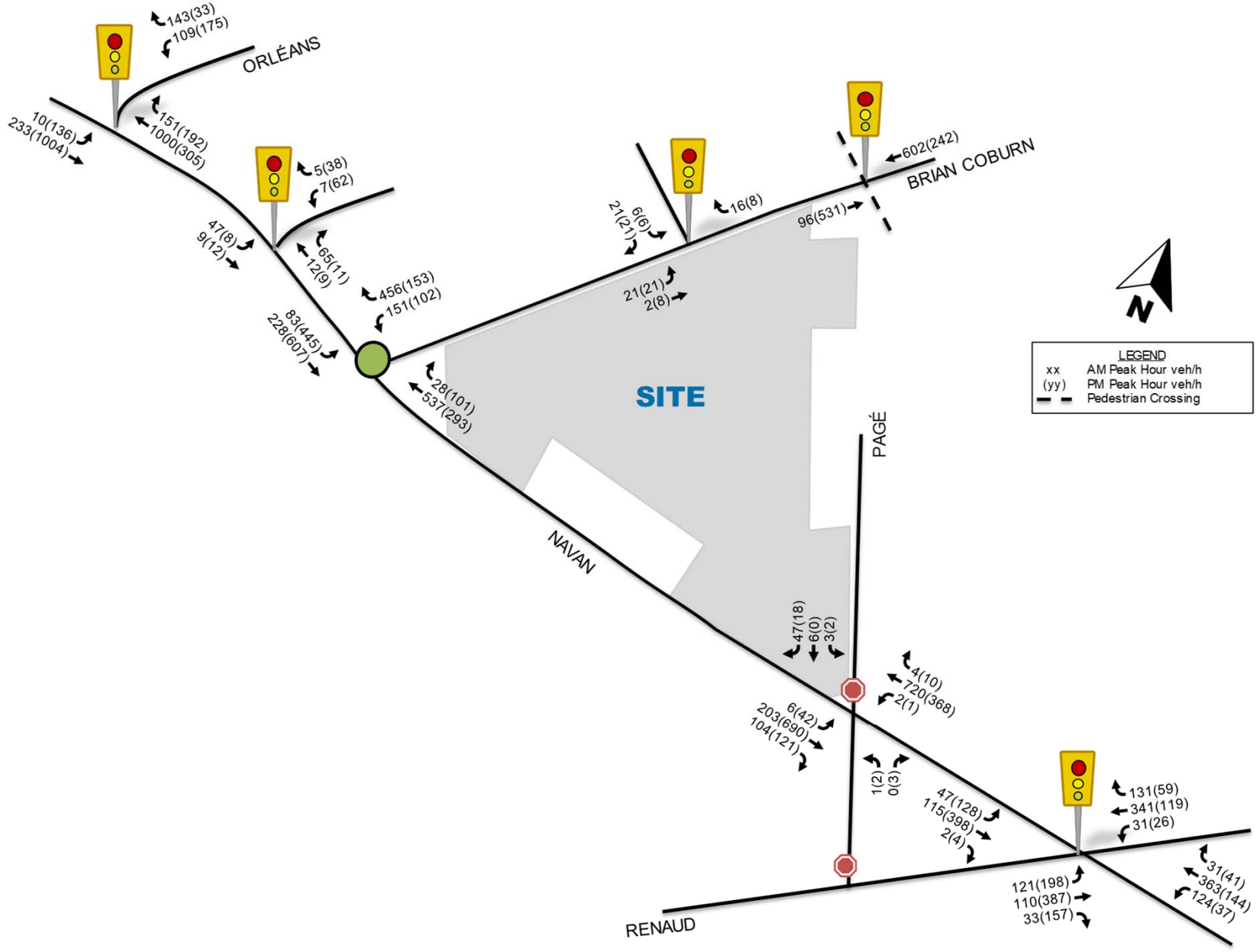

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Figure 11: Baseline Existing Vehicular Volumes AM(PM)

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Figure 12: Existing Volumes AM(PM) – Non-motorists

Existing Road Safety Conditions

The most recent collision history for the past five (5) years was obtained from the city (i.e. available collision data for the years of 2015 – 2019, inclusive). The collision data includes all collisions occurring at intersections and roadway segments within the study area surrounding the subject development site.

Based on the most recent available historical collision data, the five-year total number of recorded collisions within the study area is 64. Most of the collisions within the study area resulted in property damage only (a total of 53 collisions, or 83%), and the remaining collisions resulted in non-fatal injuries (a total of 11 collisions, or 17%). The most frequent types of collisions, as cited by police, were rear-end (33%), angle (33%) and SMV (1%) type collisions.

The following **Figure 13** is a map that depicts the location and year of collisions within the study area.

Figure 13: Collison Frequency

The source collision data is provided in **Appendix C**, and a more detail collision analysis is included in the subsequent *Step 4 – Analysis* section of the report.

Planned Conditions

Study Area Transportation Network Changes

Transit Projects

According to the City of Ottawa Transportation Master Plan (TMP), peak period bus lanes are to be made available through new road projects and relocation of lanes between Innes Road (west) and Tenth Line. This network change is identified as part of the City's planned *2031 Affordable Network Projects – Transit Priority*.

Road Projects

Referencing the City's Construction and Infrastructure Projects website, new road construction projects have not yet been scheduled to start within the horizon years. However, as identified in the City's TMP planned 2031 affordable road network Phase 2 is anticipated to start anytime between 2020 and 2025. The following is a list of road projects that are within the vicinity of the subject development:

- Brian Coburn Boulevard
  - Road widening from two lanes to four lanes;
  - Extension of Brian Coburn Blvd west of Navan Road and then north towards Blackburn Hamlet Bypass. As a result of this extension modifications to Brian Coburn the Brian Coburn/Navan roundabout would be modified to terminate the north leg of Navan Road. The roundabout would then still stay a three-legged intersection except Brian Coburn would run east west and Navan would be the south leg.

Outlined in the TMP's *2031 Network Concept* (i.e. not on the *Affordable Network Plan*) is the road widening of Blackburn Hamlet Bypass from four to six lanes between Innes Road (west) and Navan Road in the east, and the widening of Navan Road from two to four lanes from Brian Coburn Blvd to Mer Bleue Road.

The City has also recently completed a functional design (attached as **Appendix D**) of a new roundabout to be located at the Renaud/Navan intersection. This will result in dead-ending Page Road at Navan Road and a realignment of Renaud Road, eliminating the ability for eastbound traffic approaching Navan Road to continue eastbound on Renaud Road. Given there is no official timeline for the construction of this roundabout, it has not been included in the subsequent analysis.

Other Area Development

Planned developments within the vicinity of the subject development were identified using the City's online Development Application Tool. The following **Table 3** below summarizes the registered developments within the vicinity of the subject site.

Table 3: Area Development

Location	Anticipated Build-Out Year	Size	Land Use
3252 Navan Road	2023	11 Single detached homes 262 townhomes 48 condominium units	Residential
6101 Renaud Road	2024	156 townhouse units, 23 detached house units, and a four to six story condo blocks containing 150 condominium dwelling units	Residential
6173 Renaud Road	2022	Back-to-back stacked town building, 32 dwelling units	Residential

6321 Renaud Road and 506 Compass Street	2023	4 detached homes and 6 townhomes	Residential
6429 Renaud Road	2024	186 residential dwellings	Residential

It should be noted that the projected impact of the development summarized in **Table 3** has been included in the subsequent *Step 3 – Forecasting* section of this report.

2.2 Study Area and Time Periods

Study Area

As discussed previously, City staff confirmed the following study area intersections for the purpose of this assessment:

- Navan/Pagé
- Navan/Brian Coburn
- Navan/Renaud
- Brian Coburn/Pedestrian Crossing
- Brian Coburn/Park and Ride
- Navan/Park and Ride
- Navan/Orleans

Time Periods

Given the surrounding road network (Navan Road and Brian Coburn Blvd) typically experience the heaviest volumes during the weekday morning and afternoon peak hours, this assessment considered weekday morning and afternoon peak hours for analysis purposes only.

Horizon Years

For the purpose of this assessment, the following development timeline was assumed:

- **2026** – Estimated full build-out of the subject development
- **2031** – 5-years beyond full build-out, required under the City's TIA Guidelines

2.3 Exemptions Review

Given the size and nature of the proposed subject development site, **Table 4** outlines which elements identified in the 2017 Transportation Impact Assessment Guidelines that can be exempt from this analysis.

Table 4: Module Exemption Review

Module	Element	Exemption Criteria	Exemption Status
Design Review			
4.1 Development Design	4.1.2 Circulation and Access	Required for Site Plans	***Not Exempt***
	4.1.3 New Street Network	Required for Plans of Subdivisions	***Not Exempt***
4.2 Parking	4.2.1 Parking Supply	Required for Site Plans	***Not Exempt***
	4.2.2 Spillover Parking	Required for Site Plans where parking supply will be 15% below unconstrained demand	Exempt
Network Impact			
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	Exempt
4.6 Neighborhood Traffic Management	4.6.1 Adjacent Neighborhoods	Required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt
4.8 Network Concept	All Elements	Required when development is projected to generate more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	Exempt

3.0 Forecasting

3.1 Development-Generated Travel Demand

Trip Generation

As previously described, the latest Site Plan illustrates that the proposed development will consist of approximately 333 townhomes/low-rise apartments, a gas station/convenience store with drive-thru car wash, a fast food restaurant with a drive-thru and approximately 20,000 ft^2 of commercial/retail space. It has been assumed that the proposed development will be constructed in a single phase, with an anticipated buildout year of 2026.

Consistent with the City's TIA guidelines, projected site-generated traffic was estimated using appropriate trip generation rates from the 10th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual and from the latest TRANS Trip Generation Manual Summary Report, dated October 21, 2020. Based on the location and type of development envisioned, the following **Table 5** summarizes the appropriate trip generation rates for estimating projected site-generated traffic.

Table 5: ITE and TRANS Peak Hour Trip Generation Rates

Land Use	ITE Land Use Code	AM Peak Hour	PM Peak Hour
Gasoline/Service Station with Convenience Market	ITE 945 General Urban/Suburban Vehicle Trips	T_A = 75.99(X); T_F = n/a	T_A = 88.35(X); T_F = n/a
Fast Food Restaurant with Drive-Through Window	ITE 934 General Urban/Suburban Vehicle Trips	T_A = 40.19(X); T_F = n/a	T_A = 32.67(X); T_F = n/a
Shopping Center	ITE 820 General Urban/Suburban Vehicle Trips	T_A = 0.94(X); T = 0.50(X) + 151.78	T_A = 3.81(X); Ln(T) = 0.74 Ln(X) + 2.89
Multifamily Housing (Low-Rise)	ITE 220 TRANS Study Table 3 & 4 Person Trips	T_P = 1.35(U) x 0.50	T_P = 1.58(U) x 0.44
Multifamily Housing (Mid-Rise)	ITE 221 TRANS Study Table 3 & 4 Person Trips	T_P = 0.80(U) x 0.50	T_P = 0.90 (U) x 0.44

Notes: *T_A = Average Vehicle Trips*
T_F = Vehicle Trips by Fitted Curve
X = 1,000 ft^2 of Gross Floor Area (GFA)
T_P = Average Person Trips
U = Per Unit

With respect to ITE trip generation rates, the data used to develop these rates only include vehicle trips (i.e. walking, cycling and transit trips are not captured in this data). To properly consider the multi-modal trips generated by the proposed development, projected site-generated traffic

(estimated using the ITE trip generation rates) are converted to projected site-generated person trips, which can then be subdivided into different transportation modes based on area travel patterns and available facilities/network connections (e.g. the availability of transit, walking and cycling facilities).

To convert projected ITE vehicle trips to person trips, an auto occupancy factor and non-auto trip factor is applied to the ITE trip generation rates. With respect to the City's TIA Guidelines, and based on available American Census data, the typical modal share of non-auto person trips is approximately 10% and the typical auto occupancy is 1.15. Therefore, when combined, a factor of 1.28 is used to convert vehicle trips to person trips.

It should also be noted that given trip generation rates are predominantly developed using standalone land uses, it can be expected that a mixed-use development will generate multi-purpose trips. For example, someone going to a gas station for fuel, may also go to the fast food restaurant on the same site (i.e. a single trip with multiple purposes). Given multi-purpose trips often do not require individuals to leave and return to a site (to visit two different land uses on the same site), a multi-purpose trip is observed as a single trip. In order to account for multi-purpose trips for mixed-use developments, a percent reduction is applied to the total projected site-generated trips. This approach mitigates "double counting" when using trip generation rates that are predominantly developed using standalone land uses. This is considered a standard industry practice.

Based on the foregoing, the projected weekday morning and afternoon peak hour person trip generation for the proposed development is summarized in **Table 6**.

Table 6: Modified Peak Period Person Trips

Land Use	Area	AM Peak Hour (Person Trips/h)			PM Peak Hour (Person Trips/h)		
		In	Out	Total	In	Out	Total
Gasoline/Service Station with Convenience Market	3,398 ft^2	168	163	331	195	189	384
Fast Food Restaurant with Drive-Through Window	4,010 ft^2	105	101	206	87	81	168
Shopping Center	20,000 ft^2	128	79	207	101	110	211
Multifamily Housing (Low-Rise)	69 Units	14	33	47	26	22	48
Multifamily Housing (Mid-Rise)	264 Units	32	74	106	60	45	105
Total Person Trips		447	450	897	469	447	916
10% Multi-Purpose Trip Reduction		-45	-45	-90	-47	-45	-92
Total 'New' Person Trips		**402**	**405**	**807**	**422**	**402**	**824**

As summarized in **Table 6**, the proposed development is projected to generate an approximate two-way total of 807 and 824 person trips/h during weekday morning and afternoon peak hours, respectively. Directional splits (i.e. inbound vs outbound trips) were obtained from the ITE Trip

Generation Manual and the TRANS Trip Generation Manual Summary Report. Additionally, given the proposed development is considered mixed-use, a 'multi-purpose' trip reduction of 10% was assumed to account for the internal trips between residential and commercial land uses.

To determine the number of person trips arriving/departing by travel mode, total projected person trips were subdivided by percent mode shares. With respect to the TRANS Trip Generation Manual Summary Report, mode shares have been developed for select land uses, specific to City of Ottawa districts (e.g. Kanata-Stittsville, Orleans, Hunt Club, Ottawa Centre, etc.). Using mode share values from the TRANS Trip Generation Manual Summary Report as a baseline, other key factors were also taken into consideration, including; employment, proximity and quality of transit, pedestrian and cycling facilities, purpose of trips, etc. The following **Table 7**, **Table 8**, **Table 9, Table 10** and **Table 11** summarize the appropriate mode share values that were used for analysis purposes, based on the proposed land uses.

Given the nature of the proposed land uses, it should be noted that a percentage of the projected site-generated trips can be attributed to 'pass-by' traffic (i.e. a quick diversion to/from the subject development on someone's otherwise, normal daily commute). This additional 'pass-by' traffic does not impact overall network capacity, as this traffic already exists and is using the adjacent transportation network; however, 'pass-by' trips do impact the performance of turning movements at intersections within close proximity to the proposed development, typically where development site access/egress is provided. As such, and for analysis purposes, it was assumed approximately 80% and 50% of projected site-generated traffic will be comprised of 'pass-by' trips for the proposed gas station/convenience store and the fast food restaurant land uses, respectively.

Travel Mode Shares

With respect to the TRANS Summary Report, the proposed development is located in the Orleans district and the AM/PM peak period modal splits within this district, reveal person trips are generally compromised of 47-77% auto drivers, 6-20% auto passengers, 2-29% transit and 5-11% non-motorized modes of travel.

Based on TRANS mode share values for specific land uses and other key factors that can affect mode choice, the projected site-generated person trips were subdivided into separate travel modes and summarized in the **Table 7**, **Table 8**, **Table 9**,**Table 10** and **Table 11** below.

Table 7: Projected Modal Site Generated Trips – Gasoline Service Station

Travel Mode	Mode Share	AM Peak Hour (Person Trips/h)			PM Peak Hour (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	70%	106	103	209	124	119	243
Auto Passenger	15%	23	23	46	27	26	53
Transit	5%	7	7	14	8	8	16
Non-motorized	10%	15	14	29	17	17	34
Total Person Trips	100%	151	147	298	176	170	346
Less Pass-by 80%		-84	-84	-168	-97	-97	-194
Total 'New' Vehicle Trips		**22**	**19**	**41**	**27**	**22**	**49**

Given the nature of this land use, the local context and the number of designated OC Transpo school routes/its close proximity to an OC Transpo Park and Ride, it has been assumed that 5% of the total person trips for the gasoline service station will be by transit. Despite a gas station land use primarily offering services that cater to auto drivers, the potential for individuals to visit a gas station land use, without a car, still exists. For example, given the number of OC Transpo school routes within the vicinity of the subject site, the potential for students visiting the proposed gas station convivence market is considered to be relatively high (e.g. a group of students purchasing food, beverages, cellphone accessories, etc. before/after school). Other examples could simply be OC Transpo riders and/or drivers (on break) visiting the proposed convenience market. Therefore, as summarized in **Table 7**, the proposed development is projected to generate approximate two-way transit trips of 14 and 16 person trips/h during weekday morning and afternoon peak hours, respectively.

Table 8: Projected Modal Site Generated Trips – Fast Food Restaurant

Travel Mode	Mode Share	AM Peak Hour (Person Trips/h)			PM Peak Hour (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	60%	57	55	112	47	44	91
Auto Passenger	10%	10	9	19	8	8	16
Transit	20%	19	18	37	16	14	30
Non-motorized	10%	9	9	18	7	7	14
Total Person Trips	100%	95	91	186	78	73	151
Less Pass-by 50%		-28	-28	-28	-56	-23	-23
Total 'New' Vehicle Trips		**29**	**29**	**27**	**56**	**24**	**21**

Table 9: Projected Modal Site Generated Trips – Shopping Center

Travel Mode	Mode Share	AM Peak Hour (Person Trips/h)			PM Peak Hour (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	60%	69	43	112	55	60	115
Auto Passenger	10%	12	7	19	9	10	19
Transit	20%	23	14	37	18	20	38
Non-motorized	10%	11	7	18	9	9	18
Total Person Trips	100%	115	71	186	91	99	190
Less Pass-by 30%		-17	-17	-34	-17	-17	-34
Total 'New' Vehicle Trips		**6**	**52**	**26**	**78**	**38**	**43**

Table 10: Projected Modal Site Generated Trips – Multifamily Housing (Low-Rise)

Travel Mode	Mode Share	AM Peak Hour (Person Trips/h)			PM Peak Hour (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	50%	7	15	22	12	10	22
Auto Passenger	10%	2	3	5	3	2	5
Transit	30%	3	9	12	6	6	12
Non-motorized	10%	1	3	4	2	2	4
Total Person Trips	100%	13	30	43	23	20	43
Total 'New' Vehicle Trips		**7**	**15**	**22**	**12**	**10**	**22**

Table 11: Projected Modal Site Generated Trips – Multifamily Housing (Mid-Rise)

Travel Mode	Mode Share	AM Peak Hour (Person Trips/h)			PM Peak Hour (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	50%	15	34	49	27	21	48
Auto Passenger	10%	3	7	10	6	4	10
Transit	30%	9	20	29	16	12	28
Non-motorized	10%	2	6	8	5	4	9
Total Person Trips	100%	29	67	96	54	41	95
Total 'New' Vehicle Trips		**15**	**34**	**49**	**27**	**21**	**48**

Summing together the total projected 'new' vehicle trips summarized in **Table 7**, **Table 8**, **Table 9**, **Table 10** and **Table 11**, the proposed development is projected to generate approximate two-way vehicle volumes of 246 veh/h and 245 veh/h during weekday morning and afternoon peak hours, respectively.

With regard to active modes, the proposed development is projected to generate approximate two-way person trips of 77 trips/h and 76 trips/h, during weekday morning and afternoon peak hours, respectively, and site-generated transit trips are projected to be in the order of 129 trips/h and 124 trips/h, during weekday morning and afternoon peak hours, respectively.

Trip Distribution

The projected distribution of site-generated traffic was derived based on existing travel patterns, the site's connections to/from the surrounding road network, our local area knowledge (e.g. the location and proximity of employment, other area shopping, communities, recreational opportunities, etc.). For analysis purposes and to be consistent with other area studies, the following approximate distribution of projected site-generated traffic was assumed:

10%	to/from the northeast via Brian Coburn Boulevard;
5%	to/from the north via Orleans Boulevard;
55%	to/from the west via Navan Road;
5%	to/from the northeast via Renaud Road;
5%	to/from the southeast via Navan Road; and
+ 20%	to/from the southwest via Renaud Road.
100%	

Trip Assignment

Based on the above assumed distribution, projected 'new' site-generated traffic was assigned to the study area network and is depicted in the following **Figure 14**. Similarly, projected 'pass-by' site-generated traffic, which represents existing traffic temporarily diverted to/from the subject site, is depicted in the following **Figure 15**.

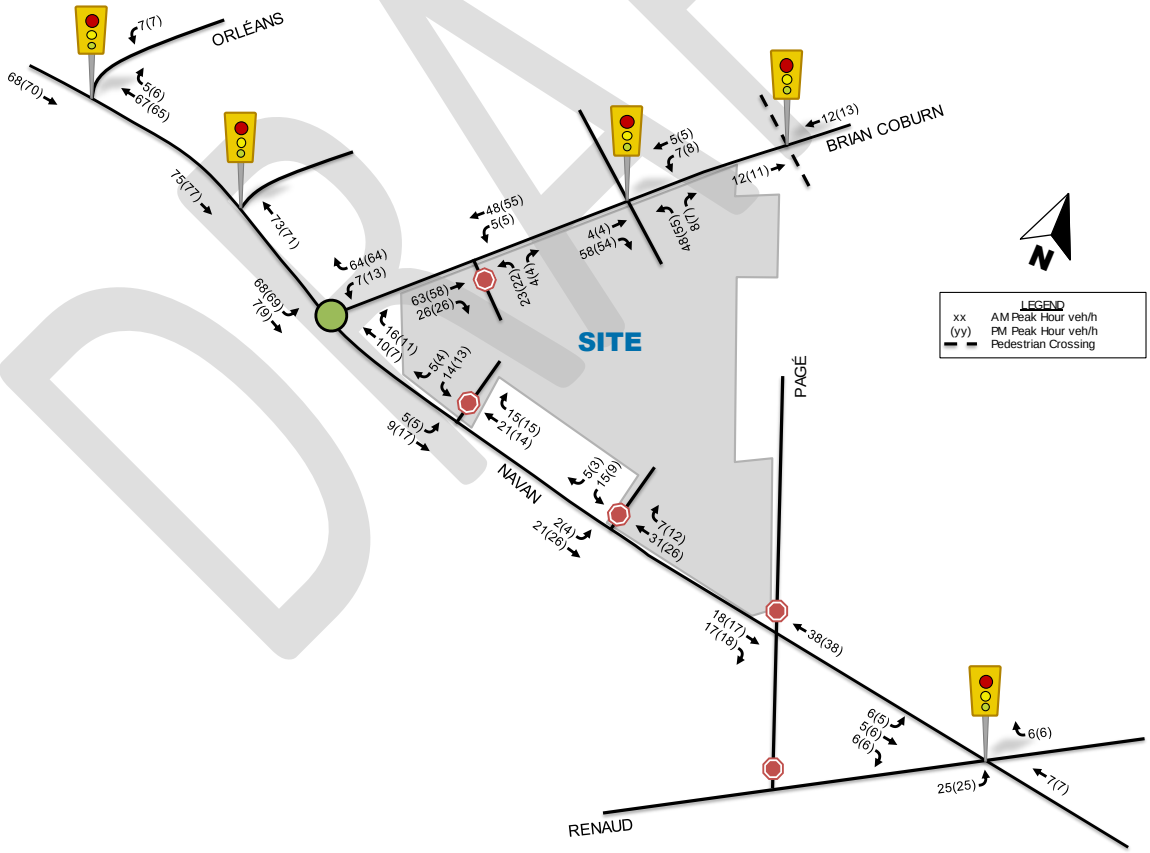

Figure 14: 'New' Projected Site-Generated Traffic

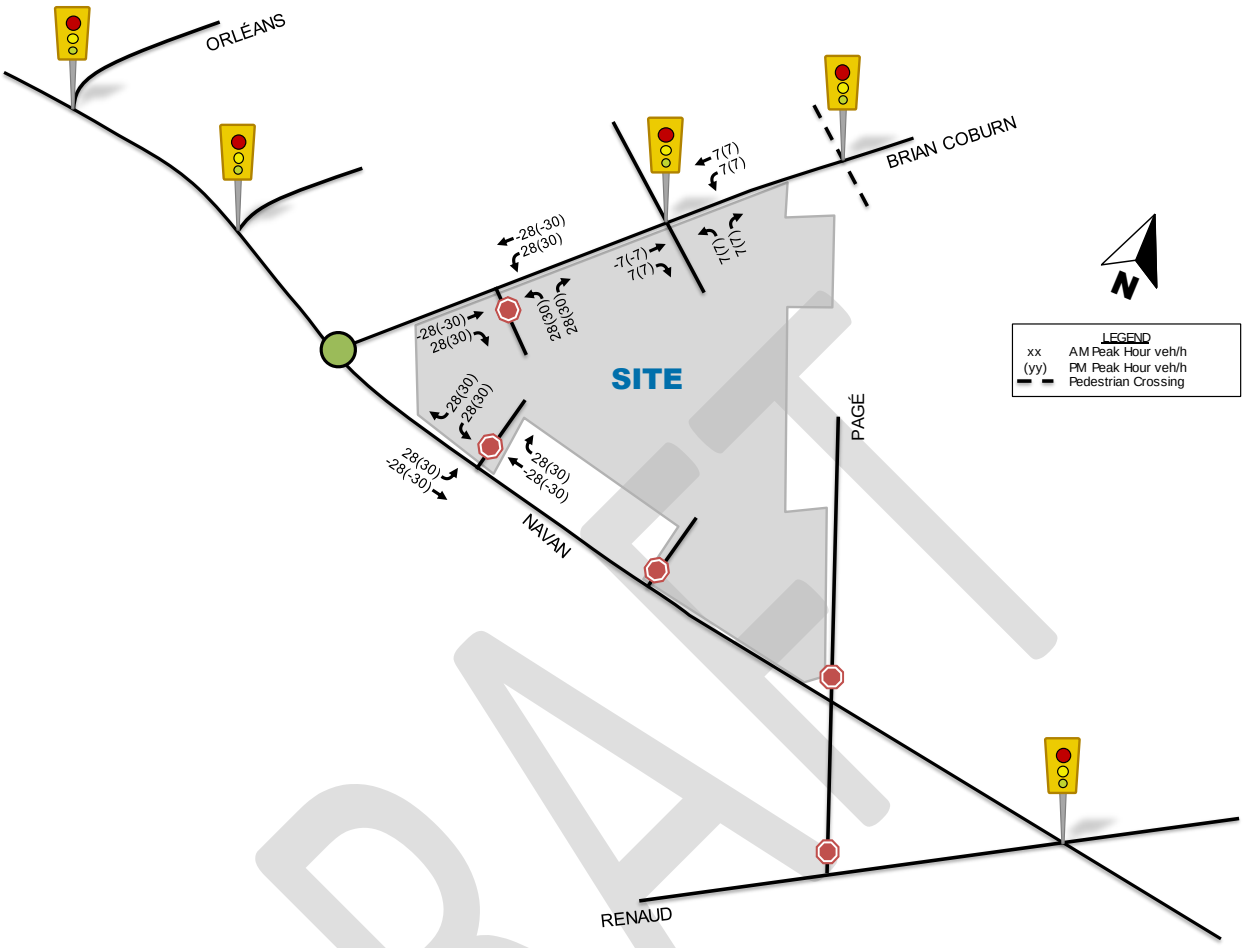

Figure 15: 'Pass-By' Projected Site-Generated Traffic

3.2 Background Network Travel Demands

Transportation Network Plans

According to Ottawa's current Transportation Master Plan (TMP), and identified in the *2031 Affordable Network* plan, Brian Coburn Boulevard will be extended further as a Phase 2 project (i.e. expected between the years 2020 and 2025. Identified in the *2031 Affordable Rapid Transit and Transit Priority* plan, dedicated transit lanes will be provided between Brian Coburn Boulevard and the Blackburn Hamlet Bypass, and isolated transit priority measures are planned along Brian Coburn Boulevard, between Navan Road and Tenth Line.

The alignment of the Brian Coburn Boulevard extension (with dedicated transit priority lanes) is currently being studied as part of the City lead environmental assessment (EA), titled *Brian Coburn Extension / Cumberland Transitway Westerly Alternate Corridor EA Study*. The latest update on this study was posted June 28, 2021 on the City's website, which included a functional design of the preferred alignment of the Brian Coburn Boulevard extension and a two-lane roundabout at the Brian Coburn/Navan intersection. Attached as **Appendix D** is the recommended ultimate design that was presented at the final public consultation meeting.

With respect the City's current ultimate network plan in their TMP, the Blackburn Hamlet Bypass is planned to be widened to a six-lane facility (i.e. three-lanes per direction) between Innes Road (west) and Navan Road in the east. Navan Road is also planned to be widened from two lanes to four-lanes (i.e. two-lanes per direction) between Brian Coburn Blvd and Mer Bleue Road. Given these road widenings are not identified on the City's affordable plan, they are not considered a priority.

Other Area Developments

Using the City's online Development Application Tool, five proposed developments were identified as having potential impacts on the study area network, namely;

- 3252 Navan Road;
- 6101 Renaud Road;
- 6173 Renaud Road;
- 6321 Renaud Road, 506 Compass Street; and
- 6429 Renaud Road

The site-generated traffic from the above mentioned future area developments were accounted for in the subsequent analysis using an assumed background traffic growth rate, which is further described below.

Background Growth

Upon review of the available TIA studies prepared for the previously mentioned future area developments, a 2% per annum background traffic growth rate was consistently assumed for each TIA study. As such, and to be consistent with previously complete studies within proximity of the subject development, a 2% per annum background traffic growth rate was assumed for the subsequent analysis.

Based on a 2% per annum background traffic growth rate, and in the absence of the site development, the following **Figure 16** and **Figure 17** depict total projected 'background' traffic volumes for the 2026 and 2031 horizon years, respectively.

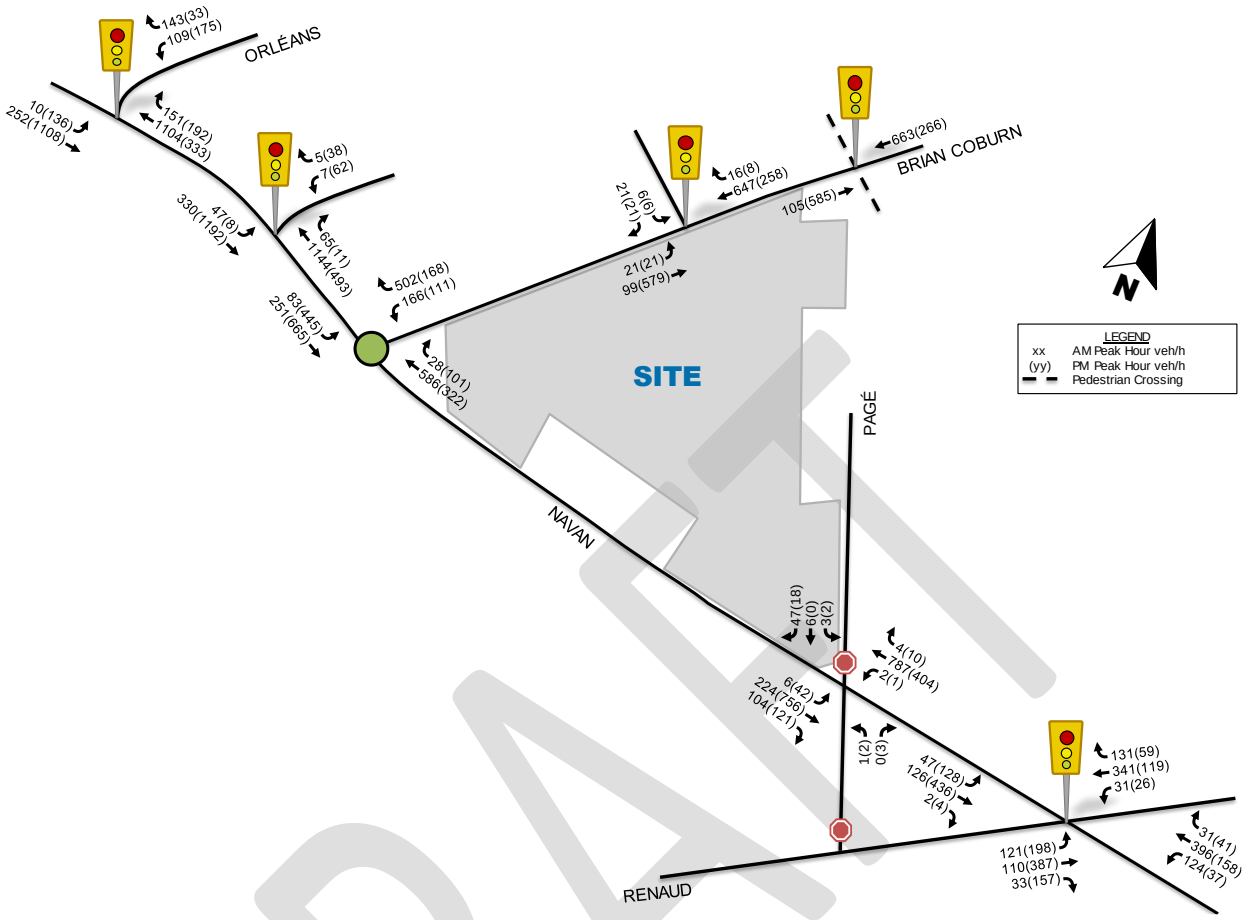

Figure 16: Background Traffic Volumes (2026)

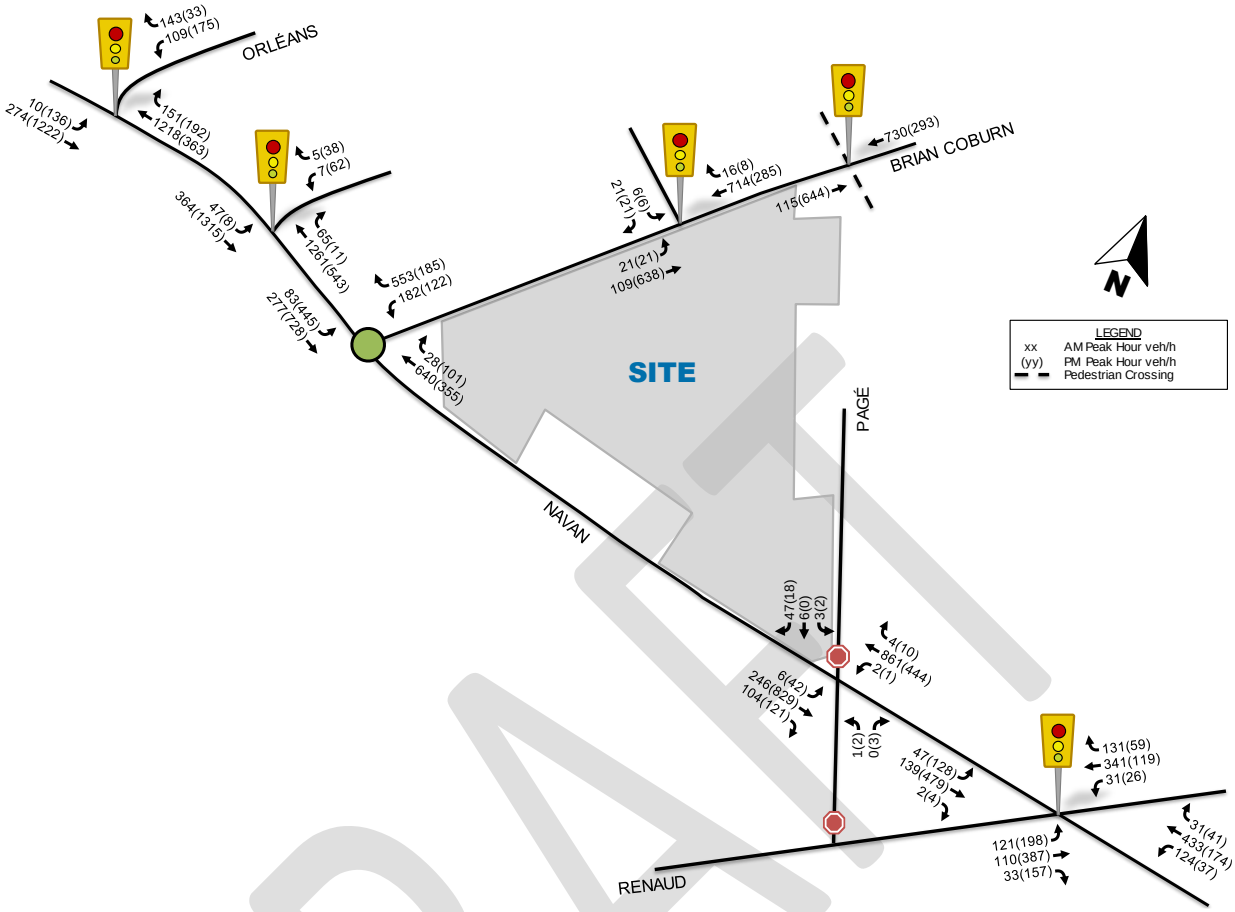

Figure 17: Background Traffic Volumes (2031)

3.3 Demand Rationalization

The following section summarizes the vehicular intersection capacity analysis of existing, future background and future total volume scenarios.

Using the intersection capacity analysis software Synchro (v10), study area intersections were assessed in terms of vehicle delay (seconds), 95th percentile queues (meters), a volume-to-capacity ratio (V/C ratio) and a corresponding Auto Level of Service (LOS or Auto-LOS). It should be noted that the overall performance of a signalized intersection is calculated as a weighted V/C ratio and assigned a corresponding Auto-LOS, and individual vehicular movements are assigned a LOS based on their respective V/C ratio. The overall performance of an unsignalized intersection is an Auto-LOS output from Synchro, which is based on an Intersection Capacity Utilization (ICU) method, and each movement is assigned a LOS based on their respective V/C ratio.

Existing and Background Conditions

The following **Table 12**, **Table 13** and **Table 14** summarize existing and projected background conditions at study area intersections, in the absence of the proposed development. The objective of this analysis is to determine if network improvements are, or will be required to support background traffic, or if projected future demand should be adjusted (e.g. once an auto network becomes saturated, a modal shift can be expected). Detailed Synchro output data for existing and future background conditions are provided in **Appendix E**.

Table 12: Study Area Intersection Operations – Existing Conditions

Dir	Lanes	AM Peak Hour				PM Peak Hour			
		v/c	Delay (s)	LOS	Queue (m)	v/c	Delay (s)	LOS	Queue (m)
Navan/Orleans - Semi Act-Uncoord Signal									
EBL	1 L	0.09	6.8	A	3	0.23	7.2	A	20
EBT	1 T	0.22	5.2	A	23	0.96	33.7	E	#268.0
WBT	1 T	0.92	26.0	E	#240.5	0.29	6.9	A	38
WBR	1 R	0.16	1.9	A	8	0.20	1.5	A	8
SBL	1 L	0.46	33.1	A	30	0.63	37.0	B	45
SBR	1 R	0.52	19.3	A	25	0.12	9.4	A	7
Overall		**0.86**	**20.6**	**D**	-	**0.78**	**23.8**	**C**	-
Navan/Park n' Ride - Semi Act-Uncoord Signal									
WB	1 L/R	0.06	25.1	A	7	0.48	33.2	A	28
NBT	1 T	0.69	5.9	B	#256.0	0.35	4.6	A	45
NBR	1 R	0.05	0.9	A	4	0.01	1.9	A	1
SBL	1 L	0.16	2.8	A	6	0.01	3.5	A	2
SBT	1 T	0.20	1.3	A	22	0.86	17.3	D	#286.6
Overall		**0.66**	**4.8**	**B**	-	**0.70**	**14.7**	**C**	-
Navan/Brian Coburn - Roundabout									
WB	1 L/R	1.12	98.9	F	147	0.37	8.8	A	14
NB	1 T/R	0.62	12.4	B	35	0.66	18.3	C	35
SB	1 L/T	0.37	7.9	A	14	1.18	109.9	F	#245
Overall		**0.98**	**46.9**	**E**	-	**1.8**	**73.5**	**F**	-
Page/Navan - Unsignalized									
EB	1 L/T/R	0.01	0.3	A	0	0.04	1.1	A	1
WB	1 L/T/R	0.00	0.0	A	0	0.00	0.0	A	0
NBR	1 R	0.00	0.0	A	0	0.01	14.9	A	0
SB	1 L/T/R	0.19	18.8	A	6	0.05	13.2	A	1
Overall		**0.52**	**1.1**	**A**	-	**0.83**	**1.0**	**D**	-
Navan/Renaud - Actuated-Uncoordinated Signal									
EBL	1 L	0.50	20.4	A	24	0.54	21.5	A	39
EBT	1 T	0.15	14.8	A	23	0.65	25.3	B	83
EBR	1 R	0.05	4.9	A	5	0.29	8.3	A	19
WBL	1 L	0.10	24.4	A	12	0.18	29.2	A	11
WB	1 T/R	1.07	93.4	F	#166.3	0.63	35.7	B	46
NBL	1 L	0.29	20.3	A	31	0.13	14.7	A	11
NBT	1 T	0.57	24.7	A	85	0.20	14.2	A	29
NBR	1 R	0.05	0.2	A	0	0.06	1.4	A	2
SBL	1 L	0.19	19.6	A	14	0.27	15.7	A	29
SB	1 T/R	0.19	18.1	A	27	0.56	19.3	A	85
Overall		**0.78**	**43.9**	**C**	-	**0.57**	**20.5**	**A**	-
Brian Coburn/Park n' Ride - Semi Act-Uncoord Signal									
EBL	1 L	0.04	2.5	A	3	0.02	2.0	A	2
EBT	1 T	0.06	2.1	A	7	0.36	2.7	A	46
WBT	1 T	0.41	3.3	A	56	0.16	1.9	A	17
WBR	1 R	0.01	1.6	A	2	0.01	1.4	A	1
SBL	1 L	0.03	33.7	A	5	0.04	38.7	A	6
SBR	1 R	0.11	16.0	A	7	0.12	17.6	A	8
Overall		**0.39**	**3.8**	**A**	-	**0.29**	**3.1**	**A**	-

Page MUP/Brian Coburn - Semi Act-Uncoord Signal									
EBT	1 T	0.06	0.1	A	0	0.33	0.5	A	0
WBT	1 T	0.38	0.6	A	0	0.15	0.2	A	0
Overall		**0.34**	**0.5**	**A**	**-**	**0.27**	**0.4**	**A**	**-**

Notes: *# - denotes 95th percentile volume exceeding capacity*
Ideal saturation flow rate assumed to be 1,800 veh/h/lane
PHF assumed to be 0.90

As shown in **Table 12**, study area intersections are currently operating with an acceptable overall Auto-LOS 'D' or better during weekday morning and afternoon peak hours, with the exception of the Navan/Brian Coburn roundabout, which is currently operating near or at capacity with an overall Auto-LOS of 'E' during the weekday morning peak hour and an Auto-LOS of 'F' during the afternoon peak hour. With regard to 'critical' movements, they are operating with an Auto-LOS of 'D' or better during both peak hours, with the exception of the westbound movements at Navan/Brian Coburn and Navan/Renaud intersections operating with an Auto-LOS 'F' during the AM peak hour, and during the PM peak hour, the southbound approach at the Navan/Brian Coburn roundabout is also exceeding available capacity.

In terms of 95th percentile queues, sufficient vehicle storage is provided, such that vehicle queues do not spill or block adjacent lanes or intersections. However, it should be noted that there are a number of critical movements that operate with long 95th percentile queues and delays.

Based on our local area knowledge, the above quantitative study area intersection operations summary is consistent with actual operations.

Potential measures to improve individual movements that are operating near or over capacity during peak hours include:

- Implement an auxiliary westbound right-turn lane at the Navan/Renaud intersection; and
- Increase the number of circulation lanes from 1 to 2 at the Navan/Brian Coburn roundabout.

These suggested improvement measures mentioned above are only provided for information/decision making purposes and will not be assumed subsequent analysis. If any of these possible measures are desirable by the City, further investigation of their feasibility may be required to support their justification.

As previously mentioned, the City is currently leading an EA to further improve transit and extend Brian Coburn Boulevard, west of Navan Road, which will include a multi-lane roundabout at the Navan/Brian Coburn intersection. These improvements will not only improve area vehicular capacity, the additional transit improvements will greatly increase person trip capacity, which should reduce the need for additional road widenings (e.g. an auxiliary westbound right-turn lane at the Navan/Renaud intersection).

The following **Table 13** summarizes intersection operations for the 2026 horizon year with the addition of background traffic volumes only. This future background scenario assumes no intersection or network improvements for comparison purposes (e.g. comparing apples to apples).

Table 13: Study Area Intersection Operations – 2026 Background Conditions

Dir	Lanes	AM Peak Hour				PM Peak Hour			
		v/c	Delay (s)	LOS	Queue (m)	v/c	Delay (s)	LOS	Queue (m)
Navan/Orleans - Semi Act-Uncoord Signal									
EBL	1 L	0.11	8.3	A	3	0.24	7.4	A	20
EBT	1 T	0.23	5.4	A	26	1.06	60.1	F	#308.1
WBT	1 T	1.02	46.9	F	#282.9	0.32	7.1	A	42
WBR	1 R	0.16	2.1	A	9	0.20	1.5	A	8
SBL	1 L	0.46	32.8	A	30	0.63	37.0	B	45
SBR	1 R	0.54	23.2	A	29	0.12	9.4	A	7
Overall		**0.96**	**34.2**	**E**	-	**0.86**	**39.0**	**D**	-
Navan/Park n' Ride - Semi Act-Uncoord Signal									
WB	1 L/R	0.06	25.1	A	7	0.48	33.2	A	28
NBT	1 T	0.76	7.8	C	#301.2	0.39	4.9	A	52
NBR	1 R	0.05	0.9	A	4	0.01	1.9	A	1
SBL	1 L	0.22	4.3	A	8	0.01	3.5	A	2
SBT	1 T	0.22	1.4	A	25	0.94	26.6	E	#332.4
Overall		**0.73**	**6.2**	**C**	-	**0.77**	**20.8**	**C**	-
Navan/Brian Coburn - Roundabout									
WB	1 L/R	1.30	170.2	F	217	0.40	9.8	A	14
NB	1 T/R	0.68	14.1	B	42	0.70	20.5	C	42
SB	1 L/T	0.41	8.6	A	14	1.26	142.1	F	#301
Overall		**1.05**	**77.5**	**F**	-	**1.15**	**93.3**	**F**	-
Page/Navan - Unsignalized									
EB	1 L/T/R	0.01	0.3	A	0	0.04	1.2	A	1
WB	1 L/T/R	0.00	0.0	A	0	0.00	0.0	A	0
NBR	1 R	0.00	0.0	A	0	0.01	15.9	A	0
SB	1 L/T/R	0.22	21.5	A	6.6	0.05	14.2	A	1
Overall		**0.55**	**1.1**	**A**	-	**0.89**	**1.1**	**D**	-
Navan/Renaud - Actuated-Uncoordinated Signal									
EBL	1 L	0.50	20.4	A	24	0.54	22.2	A	42
EBT	1 T	0.15	14.8	A	23	0.66	26.0	B	90
EBR	1 R	0.05	4.9	A	5	0.29	8.6	A	21
WBL	1 L	0.10	24.4	A	12	0.18	29.9	A	11
WB	1 T/R	1.07	93.4	F	#166.3	0.63	36.3	B	48
NBL	1 L	0.30	20.3	A	31	0.14	14.9	A	11
NBT	1 T	0.63	26.1	B	94	0.22	14.3	A	32
NBR	1 R	0.05	0.2	A	0	0.06	1.3	A	2
SBL	1 L	0.21	20.3	A	15	0.27	15.6	A	29
SB	1 T/R	0.20	18.3	A	29	0.60	20.2	A	96
Overall		**0.80**	**43.7**	**C**	-	**0.59**	**21.0**	**A**	-
Brian Coburn/Park n' Ride - Semi Act-Uncoord Signal									
EBL	1 L	0.04	2.5	A	3	0.02	2.1	A	2
EBT	1 T	0.07	2.1	A	8	0.40	3.0	A	53
WBT	1 T	0.45	3.7	A	66	0.18	2.0	A	19
WBR	1 R	0.01	1.7	A	2	0.01	1.4	A	1
SBL	1 L	0.03	33.7	A	5	0.04	38.7	A	6
SBR	1 R	0.11	16.0	A	7	0.12	17.6	A	8
Overall		**0.43**	**4.0**	**A**	-	**0.33**	**3.2**	**A**	-

Page MUP/Brian Coburn - Semi Act-Uncoord Signal									
EBT	1 T	0.07	0.1	A	0	0.37	0.6	A	0
WBT	1 T	0.42	0.7	A	0	0.17	0.2	A	0
Overall		**0.37**	**0.6**	**A**	**-**	**0.31**	**0.5**	**A**	**-**

Notes: *# - denotes 95th percentile volume exceeding capacity*
Ideal saturation flow rate assumed to be 1,800 veh/h/lane
PHF assumed to be 0.90

As shown in **Table 13**, study area intersections are projected to continue operating with an acceptable overall Auto-LOS 'D' or better during weekday morning and afternoon peak hours, with the exception of the Navan/Brian Coburn roundabout, which is expected to continue operating over capacity with an overall Auto-LOS of 'F' during both AM and PM peak hours. The Navan/Orleans intersection is also projected to operate near capacity with an overall Auto-LOS of 'E' during the AM peak hour.

With regard to 'critical' movements, the majority are projected to operate with an Auto-LOS of 'C' or better during both peak hours; however, there are a number of 'critical' movements that are projected to operate near or over capacity, including:

- Westbound movements at the Navan/Orleans, Navan/Brian Coburn and Navan/Renaud intersections, projected to operate with an Auto-LOS 'F' during the AM peak hour;
- Eastbound through movement at the Navan/Orleans intersection, projected to operate with an Auto-LOS 'F' during the PM peak hour;
- Southbound movement at Navan/Brian Coburn roundabout, projected to operate with an Auto-LOS 'F' during the PM peak hour; and the
- Southbound movement at Navan/Park and Ride intersection, projected to operate near capacity with an Auto-LOS 'E' during the PM peak hour.

In terms of 95th percentile queues, some individual movements are projected to approach/exceed available storage, similar to existing conditions.

As previously mentioned, potential measures to improve individual movements that are operating near or over capacity during peak hours include:

- Implement an auxiliary westbound right-turn lane at the Navan/Renaud intersection; and
- Increase the number of circulation lanes from 1 to 2 at the Navan/Brian Coburn roundabout.

These suggested improvement measures mentioned above are only provided for information/decision making purposes and will not be assumed subsequent analysis. If any of these possible measures are desirable by the City, further investigation of their feasibility may be required to support their justification (e.g. the *Brian Coburn Extension / Cumberland Transitway Westerly Alternate Corridor EA Study*)

The following **Table 14** summarizes intersection operations for the 2031 horizon year with the addition of background traffic volumes only. This future background scenario assumes no intersection improvements or network improvements.

Table 14: Study Area Intersection Operations – 2031 Background Conditions

Dir	Lanes	AM Peak Hour				PM Peak Hour			
		v/c	Delay (s)	LOS	Queue (m)	v/c	Delay (s)	LOS	Queue (m)
Navan/Orleans - Semi Act-Uncoord Signal									
EBL	1 L	0.12	8.6	A	3	0.25	7.6	A	21
EBT	1 T	0.25	5.7	A	30	1.17	102.4	F	#351.7
WBT	1 T	1.13	87.3	F	#329.7	0.35	7.4	A	47
WBR	1 R	0.16	2.5	A	10	0.20	1.5	A	8
SBL	1 L	0.45	32.1	A	30	0.63	37.0	B	45
SBR	1 R	0.56	26.6	A	31	0.12	9.4	A	7
Overall		**1.06**	**60.7**	**F**	-	**0.95**	**64.1**	**E**	-
Navan/Park n' Ride - Semi Act-Uncoord Signal									
WB	1 L/R	0.06	25.1	A	7	0.48	33.2	A	28
NBT	1 T	0.84	10.4	D	#350.3	0.43	5.3	A	60
NBR	1 R	0.05	1.0	A	4	0.01	1.9	A	1
SBL	1 L	0.40	15.4	A	#23.8	0.02	3.5	A	2
SBT	1 T	0.24	1.5	A	28	1.04	50.3	F	#383.3
Overall		**0.82**	**8.5**	**D**	-	**0.85**	**36.6**	**D**	-
Navan/Brian Coburn - Roundabout									
WB	1 T/L	1.52	264.0	F	#294	0.46	11.3	B	14
NB	1 T/R	0.74	16.5	C	49	0.76	23.8	C	49
SB	1 L/T	0.44	9.4	A	14	1.35	180.0	F	#364
Overall		**1.04**	**118.2**	**F**	-	**1.22**	**116.5**	**F**	-
Page/Navan - Unsignalized									
EB	1 L/T/R	0.01	0.3	A	0	0.04	1.3	A	1
WB	1 L/T/R	0.00	0.0	A	0	0.00	0.0	A	0
NBR	1 R	0.00	0.0	A	0	0.01	17.2	C	0
SB	1 L/T/R	0.26	25.6	A	8	0.06	15.7	C	2
Overall		**0.59**	**1.2**	**A**	-	**0.95**	**1.2**	**E**	-
Navan/Renaud - Actuated-Uncoordinated Signal									
EBL	1 L	0.51	21.0	A	26	0.55	23.2	A	46
EBT	1 T	0.15	15.3	A	24	0.66	26.9	B	97
EBR	1 R	0.05	5.2	A	6	0.29	9.0	A	22
WBL	1 L	0.10	25.1	A	12	0.18	30.8	A	12
WB	1 T/R	1.08	96.0	F	#174.4	0.64	37.1	B	51
NBL	1 L	0.30	20.1	A	31	0.16	15.2	A	11
NBT	1 T	0.68	27.5	B	105	0.24	14.3	A	35
NBR	1 R	0.05	0.2	A	0	0.06	1.2	A	2
SBL	1 L	0.23	20.9	A	15	0.27	15.5	A	29
SB	1 T/R	0.22	18.3	A	31	0.66	21.5	B	110
Overall		**0.82**	**44.4**	**D**	-	**0.63**	**21.7**	**B**	-
Brian Coburn/Park n' Ride - Semi Act-Uncoord Signal									
EBL	1 L	0.04	2.6	A	3	0.03	2.1	A	3
EBT	1 T	0.08	2.0	A	9	0.44	3.3	A	62
WBT	1 T	0.50	4.1	A	79	0.20	2.0	A	21
WBR	1 R	0.01	1.8	A	2	0.01	1.4	A	1
SBL	1 L	0.03	33.7	A	5	0.04	38.7	A	6
SBR	1 R	0.11	16.0	A	7	0.12	17.6	A	8
Overall		**0.48**	**4.3**	**A**	-	**0.36**	**3.4**	**A**	-

Page MUP/Brian Coburn - Semi Act-Uncoord Signal									
EBT	1 T	0.07	0.1	A	0	0.41	0.7	A	0
WBT	1 T	0.46	0.9	A	0	0.18	0.2	A	0
Overall		**0.41**	**0.8**	**A**	**-**	**0.34**	**0.5**	**A**	**-**
Notes:	*# - denotes 95th percentile volume exceeding capacity* *Ideal saturation flow rate assumed to be 1,800 veh/h/lane* *PHF assumed to be 0.90*								

As shown in **Table 14**, assuming no signal timing or network modifications for the 2031 horizon year, study area intersections are projected to continue operating similar to the 2026 horizon year, only with relatively minor increases in volumes and delays due to projected increases in background traffic (i.e. in the absence of traffic generated by the subject development site).

Similar to existing and background 2026 conditions, there are some individual movements that are operating near or over capacity during peak hours, which can be improved with the measures mentioned previously.

Adjustments to Background Network Demand

Given study area intersections are planned to undergo significant capacity improvements in the near future (e.g. the extension of Brian Coburn Boulevard, dedicated transit lanes, etc.), adjustments to background network demand was not considered for the purposes of this assessment. With the extension of Brian Coburn Boulevard and the addition of dedicated transit lanes, there will certainly be a redistribution of area travel patterns and mode choices. This shift in travel behaviour will be studied as part of the *Brian Coburn Extension / Cumberland Transitway Westerly Alternate Corridor EA Study* and is considered beyond the scope of a typical TIA. The main objective of this TIA study will be to identify any additional mitigation measures that may be necessary to support the subject development site (e.g. evaluate the need for auxiliary turn lanes, modifications to intersection traffic control, transportation demand management strategies, traffic calming, etc.), which will be discussed in the subsequent *Step 4 – Analysis* section of this report.

It should be noted that with the implementation of area transit priority measures, an increase in transit users was accounted for in the previous *Development-Generated Travel Demand* section of this report, where a 20% to 30% transit modal share was assumed for site-generated traffic/analysis purposes.

Total Projected Conditions

The following **Figure 18** depicts 'total' projected volumes for the horizon year of 2026, which were derived by superimposing site-generated traffic volumes (i.e. 'new' and 'pass-by' trips) onto projected background traffic volumes (e.g. summing together volumes depicted in **Figure 14**, **Figure 15** and **Figure 16**, resulting in **Figure 18**).

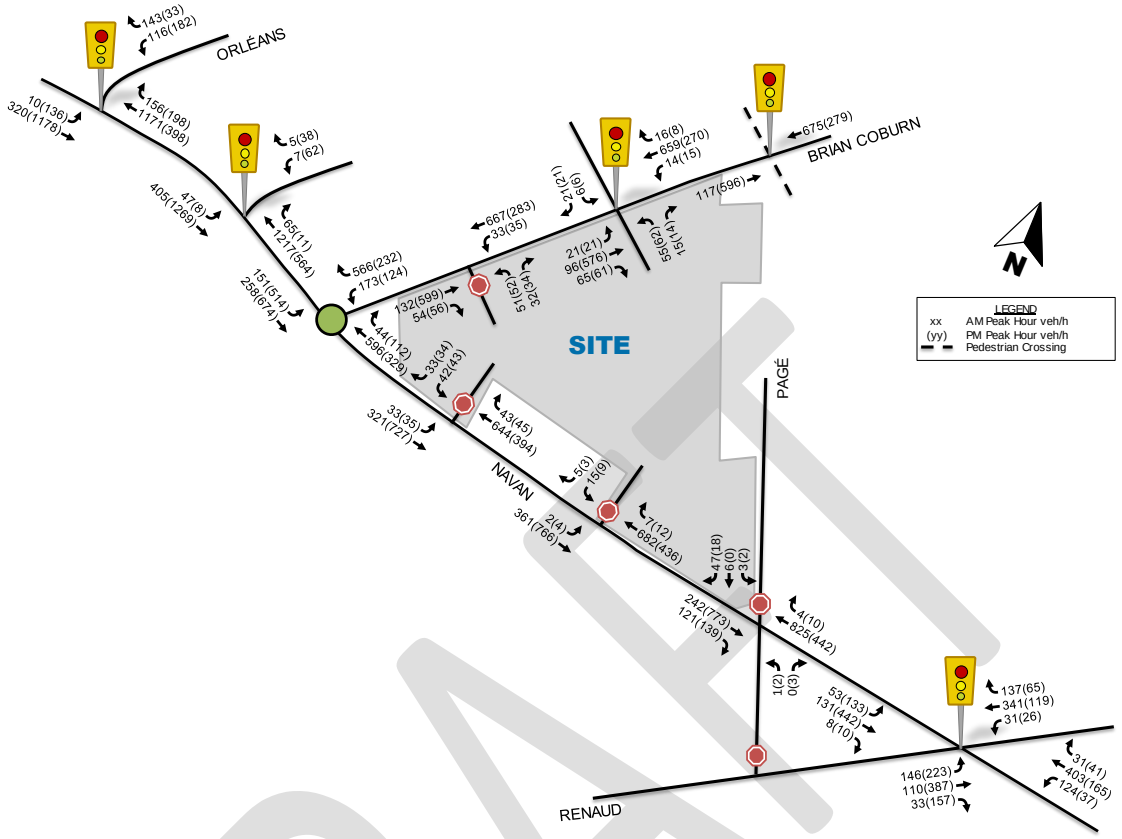

Figure 18: Total Projected Traffic Volumes (2026)

Similar to existing and future background conditions, total projected conditions were assessed using the intersection capacity analysis software Synchro (v10). Metrics such as Auto-LOS, V/C ratio, 95th percentile queue (metres) and vehicular delay (seconds) were analyzed. Assuming no intersection improvements, the following **Table 15** summarizes the intersection operational analysis of the study area intersections for the total projected 2026 horizon year.

Detailed Synchro output data for future total projected conditions is provided in **Appendix F**.

Table 15: Study Area Intersection Operations – Total Projected Conditions (2026)

Dir	Lanes	AM Peak Hour				PM Peak Hour			
		v/c	Delay (s)	LOS	Queue (m)	v/c	Delay (s)	LOS	Queue (m)
Navan/Orleans - Semi Act-Uncoord Signal									
EBL	1 L	0.12	8.5	A	3	0.27	8.0	A	22
EBT	1 T	0.30	6.0	A	35	1.13	87.6	F	#337.9
WBT	1 T	1.09	69.5	F	#310.3	0.38	7.9	A	53
WBR	1 R	0.16	2.4	A	10	0.21	1.5	A	8
SBL	1 L	0.48	33.2	A	32	0.64	37.3	B	47
SBR	1 R	0.55	25.1	A	30	0.12	9.4	A	7
Overall		**1.02**	**47.6**	**F**	-	**0.91**	**54.0**	**E**	-

Navan/Park n' Ride - Semi Act-Uncoord Signal									
WB	1 L/R	0.06	25.1	A	7	0.48	33.2	A	28
NBT	1 T	0.81	9.3	D	#332.0	0.45	5.5	A	63
NBR	1 R	0.05	0.9	A	4	0.01	1.9	A	1
SBL	1 L	0.30	7.5	A	11	0.02	3.5	A	2
SBT	1 T	0.27	1.5	A	32	1.00	39.6	F	#364.6
Overall		**0.79**	**7.3**	**C**	-	**0.82**	**29.0**	**D**	-
Navan/Brian Coburn - Roundabout									
WB	1 L/R	1.46	235.5	F	#280	0.52	12.3	B	21
NB	1 T/R	0.76	18.8	C	56	0.79	28.1	D	56
SB	1 L/T	0.50	10.3	B	21	1.37	189	F	#378
Overall		**1.16**	**106.4**	**F**	-	**1.25**	**121.4**	**F**	-
Navan/Site Driveway N - Unsignalized									
WB	1 L/R	0.32	25.0	A	11	0.36	28.6	A	13
NB	1 T/R	0.45	0.0	A	0	0.29	0.0	A	0
SB	1 L/T	0.04	1.4	A	1	0.04	0.9	A	1
Overall		**0.58**	**2.1**	**A**	-	**0.82**	**2.3**	**D**	-
Navan/Site Driveway S - Unsignalized									
WB	1 L/R	0.10	22.6	A	3	0.07	25.3	A	2
NB	1 T/R	0.45	0.0	A	0	0.29	0.0	A	0
SB	1 L/T	0.00	0.1	A	0	0.00	0.1	A	0
Overall		**0.48**	**0.5**	**A**	-	**0.56**	**0.3**	**A**	-
Page/Navan - Unsignalized									
EB	1 L/T/R	0.01	0.3	A	0	0.04	1.3	A	1
WB	1 L/T/R	0.00	0.0	A	0	0.00	0.0	A	0
NBR	1 R	0.00	0.0	A	0	0.01	16.3	A	0
SB	1 L/T/R	0.25	23.9	C	7	0.06	15.2	A	2
Overall		**0.57**	**1.2**	**A**	-	**0.92**	**1.1**		-
Navan/Renaud - Actuated-Uncoordinated Signal									
EBL	1 L	0.60	24.3	A	31	0.62	24.8	B	49
EBT	1 T	0.15	14.9	A	23	0.66	26.1	B	91
EBR	1 R	0.05	5.0	A	5	0.29	8.7	A	21
WBL	1 L	0.10	24.5	A	12	0.18	30.0	A	12
WB	1 T/R	1.09	99.6	F	#169.7	0.65	36.7	B	51
NBL	1 L	0.30	20.5	A	31	0.14	15.1	A	11
NBT	1 T	0.64	26.6	B	96	0.23	14.4	A	33
NBR	1 R	0.05	0.2	A	0	0.06	1.2	A	2
SBL	1 L	0.24	21.2	A	17	0.29	15.9	A	30
SB	1 T/R	0.22	18.2	A	31	0.62	20.8	B	101
Overall		**0.81**	**45.6**	**D**	-	**0.60**	**21.6**	**B**	-
Site Driveway/Brian Coburn - Unsignalized									
EB	1 T/R	0.12	0.0	A	0	0.43	0.0	A	0
WB	1 T/L	0.03	0.7	A	1	0.04	1.5	A	1
NB	1 L/R	0.27	19.1	A	9	0.34	24.4	A	12
Overall		**0.65**	**2.2**	**B**	-	**0.59**	**2.4**	**A**	-
Site Driveway/Park n' Ride/Brian Coburn - Semi Act-Uncoord Signal									
EBL	1 L	0.05	3.8	A	3	0.03	3.2	A	3
EB	1 T/R	0.14	2.7	A	10	0.51	5.9	A	72
WB	1 L/T	0.55	7.0	A	77	0.24	3.8	A	25
WBR	1 R	0.02	0.6	A	1	0.01	0.1	A	0
NB	1 L/T/R	0.27	19.9	A	17	0.38	28.7	A	22
SBL	1 L	0.04	28.3	A	4	0.04	33.0	A	5

SBR	1 R	0.10	7.8	A	5	0.11	10.3	A	5
Overall		**0.51**	**7.5**	**A**	-	**0.42**	**7.2**	**A**	-
Page MUP/Brian Coburn - Semi Act-Uncoord Signal									
EBT	1 T	0.07	0.1	A	0	0.38	0.6	A	0
WBT	1 T	0.42	0.8	A	0	0.18	0.2	A	0
Overall		**0.37**	**0.7**	**A**	-	**0.32**	**0.5**	**A**	-

Notes: *# - denotes 95th percentile volume exceeding capacity*
Ideal saturation flow rate assumed to be 1,800 veh/h/lane
PHF assumed to be 0.90

As shown in **Table 15**, assuming no intersection improvements, study area intersections are projected to continue operating similar to background 2026 conditions, only with relatively minor increases in volumes and delays due to added site-generated traffic.

Similar to existing and background conditions, there are some individual movements that are operating near or over capacity during peak hours, which can be improved with the measures mentioned previously.

Five years beyond full site build-out, the following **Figure 19** depicts the future 'total' volumes for the horizon year of 2031, which were derived by superimposing site-generated traffic (i.e. 'new' and 'pass-by' trips) volumes onto projected background traffic volumes (e.g. summing volumes together from **Figure 14**, **Figure 15** and **Figure 17**, resulting in **Figure 19**).

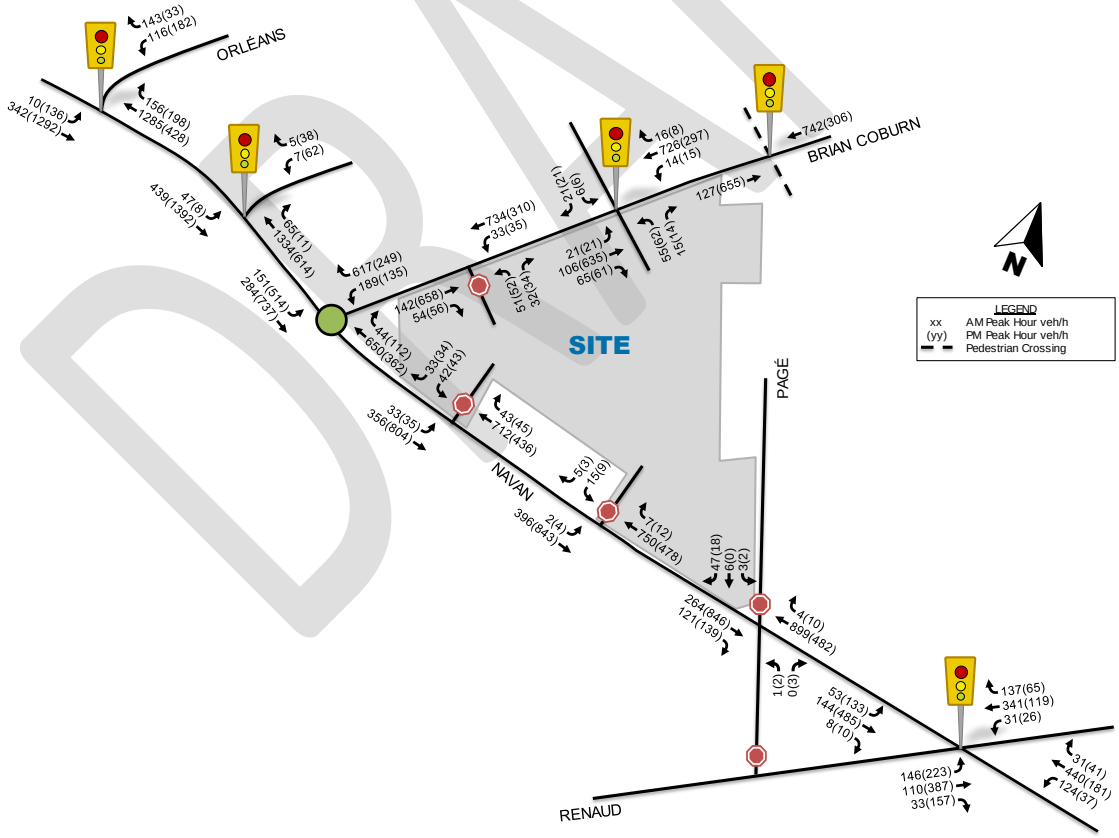

Figure 19: Total Projected Traffic Volumes (2031)

The following **Table 16** summarizes the intersection operational analysis of the study area intersections for the total projected 2031 horizon year and detailed Synchro output data for future total projected conditions is provided in **Appendix F**.

Table 16: Study Area Intersection Operations – Total Projected Conditions (2031)

Dir	Lanes	AM Peak Hour				PM Peak Hour			
		v/c	Delay (s)	LOS	Queue (m)	v/c	Delay (s)	LOS	Queue (m)
Navan/Orleans - Semi Act-Uncoord Signal									
EBL	1 L	0.12	8.7	A	3	0.29	8.3	A	22
EBT	1 T	0.32	6.3	A	39	1.24	133.8	F	#381.5
WBT	1 T	1.20	115.5	F	#356.7	0.41	8.2	A	59
WBR	1 R	0.17	2.7	A	11	0.21	1.5	A	8
SBL	1 L	0.47	32.6	A	32	0.64	37.3	B	47
SBR	1 R	0.57	28.2	A	33	0.12	9.4	A	7
Overall		**1.13**	**77.4**	**F**	-	**1.00**	**81.5**	**E**	-
Navan/Park n' Ride - Semi Act-Uncoord Signal									
WB	1 L/R	0.06	25.1	A	7	0.48	33.2	A	28
NBT	1 T	0.88	13.0	D	#381.2	0.49	5.9	A	73
NBR	1 R	0.05	1.0	A	4	0.01	2.0	A	2
SBL	1 L	0.50	26.9	A	#13.3	0.02	3.5	A	2
SBT	1 T	0.29	1.6	A	36	1.10	72.8	F	#415.1
Overall		**0.86**	**10.3**	**D**	-	**0.90**	**51.0**	**E**	-
Navan/Brian Coburn - Roundabout									
WB	1 L/R	1.69	337.5	F	#364	0.58	14.4	B	28
NB	1 T/R	0.83	23.2	C	70	0.85	34.2	D	63
SB	1 L/T	0.54	11.4	B	21	1.46	227.8	F	#441
Overall		**1.25**	**151.5**	**F**	-	**1.32**	**145.4**	**F**	-
Navan/Site Driveway N - Unsignalized									
WB	1 L/R	0.37	29.8	A	13	0.43	35.7	A	16
NB	1 T/R	0.49	0.0	A	0	0.31	0.0	A	0
SB	1 L/T	0.05	1.4	A	1	0.04	1.0	A	1
Overall		**0.60**	**2.3**	**A**	-	**0.86**	**2.6**	**D**	-
Navan/Site Driveway S - Unsignalized									
WB	1 L/R	0.12	26.9	A	3	0.08	30.1	A	2
NB	1 T/R	0.49	0.0	A	0	0.32	0.0	A	0
SBL	1 L/T	0.00	0.1	A	0	0.00	0.1	A	0
Overall		**0.52**	**0.5**	**A**	-	**0.60**	**0.3**	**B**	-
Page/Navan - Unsignalized									
EB	1 L/T/R	0.01	0.3	A	0	0.05	1.4	A	1
WB	1 L/T/R	0.00	0.1	A	0	0.00	0.0	A	0
NBR	1 R	0.00	0.0	A	0	0.01	17.5	A	0
SB	1 L/T/R	0.29	29.0	A	9	0.07	16.6	A	2
Overall		**0.62**	**1.3**	**B**	-	**0.98**	**1.2**	**E**	-
Navan/Renaud - Actuated-Uncoordinated Signal									
EBL	1 L	0.60	25.0	A	#33.8	0.62	26.1	B	54
EBT	1 T	0.15	15.4	A	25	0.66	27.1	B	101
EBR	1 R	0.05	5.3	A	6	0.29	9.1	A	23
WBL	1 L	0.10	25.3	A	12	0.18	31.2	A	12
WB	1 T/R	1.10	102.7	F	#178.6	0.65	37.6	B	54
NBL	1 L	0.30	20.2	A	31	0.16	15.5	A	11

NBT	1 T	0.69	28.0	B	107	0.25	14.5	A	37
NBR	1 R	0.05	0.2	A	0	0.06	1.1	A	2
SBL	1 L	0.27	22.0	A	17	0.29	15.8	A	31
SB	1 T/R	0.24	18.2	A	33	0.67	22.2	B	115
Overall		**0.83**	**46.4**	**D**	**-**	**0.63**	**22.4**	**B**	**-**
Site Driveway/Brian Coburn - Unsignalized									
EB	1 T/R	0.13	0.0	A	0	0.47	0.0	A	0
WB	1 L/T	0.03	0.7	A	1	0.05	1.5	A	1
NBL	1 L/R	0.31	22.1	A	10	0.39	28.7	A	14
Overall		**0.69**	**2.3**	**B**	**-**	**0.60**	**2.6**	**A**	**-**
Site Driveway/Park n' Ride/Brian Coburn - Semi Act-Uncoord Signal									
EBL	1 L	0.06	3.9	A	3	0.03	3.3	A	3
EB	1 T/R	0.15	2.9	A	11	0.56	6.6	A	84
WB	1 T/L	0.61	7.9	B	93	0.26	3.9	A	27
WBR	1 R	0.02	0.6	A	1	0.01	0.1	A	0
NB	1 L/T/R	0.27	19.9	A	17	0.38	28.7	A	22
SBL	1 L	0.04	28.3	A	4	0.04	33.0	A	5
SBR	1 R	0.10	7.8	A	5	0.11	10.3	A	5
Overall		**0.56**	**8.2**	**A**	**-**	**0.46**	**7.5**	**A**	**-**
Page MUP/Brian Coburn - Semi Act-Uncoord Signal									
EBT	1 T	0.08	0.1	A	0	0.41	0.7	A	0
WBT	1 T	0.47	0.9	A	0	0.19	0.2	A	0
Overall		**0.41**	**0.8**	**A**	**-**	**0.34**	**0.6**	**A**	**-**

Notes: *# - denotes 95th percentile volume exceeding capacity*
Ideal saturation flow rate assumed to be 1,800 veh/h/lane
PHF assumed to be 0.90

As shown in **Table 16**, assuming no intersection improvements, study area intersections are projected to continue operating similar to background 2031 conditions, only with relatively minor increases in volumes and delays due to added site-generated traffic.

Similar to existing and background conditions, there are some individual movements that are operating near or over capacity during peak hours, which can be improved with the measures mentioned previously.

Adjustments to Site-Generated Demand

With respect to projected site-generated traffic for the subject development lands and other area developments, adjusting modal splits away from projected auto trips further, is difficult to justify, as certain individuals will ultimately be required to drive for one reason or another (e.g. distance between origin/destination is too great, travel is a requirement for employment, physical disabilities limit travel options to personal vehicle, etc.). Additionally, adjusting the auto modal share for site-generated traffic much lower will have a negligible affect on the performance of study area network (*note: study area intersections are projected to continue operating similar to background conditions, only with minor increases in volumes and delays).*

As mentioned previously, the *Brian Coburn Extension / Cumberland Transitway Westerly Alternate Corridor EA Study* will assess the impacts associated with the extension of Brian Coburn Boulevard and the addition of dedicated travel lanes. The main objective of this TIA study, from a broader network perspective, will be to identify any additional mitigation measures that may be necessary to support the subject development site (e.g. evaluate the need for auxiliary turn lanes, modifications to intersection traffic control, transportation demand management strategies, traffic calming, etc.), which will be discussed in the subsequent *Step 4 – Analysis* section of this report.

4.0 Analysis

With respect to the City of Ottawa TIA Guidelines, this module reviews the proposed transportation network elements within the development study area to ensure that they provide effective access for all users, while creating an environment that encourages walking, cycling, and transit use and prioritizes safety.

4.1 Development Design

Design for Sustainable Modes

Pedestrian Facilities: The pedestrian network within the vicinity of the subject site is currently comprised of bi-directional asphalt multi-use pathways (MUP) that run along both sides of Brian Coburn Blvd. Fully integrating pedestrians with the existing pedestrian network, sidewalks will be provided throughout the subject development site.

Cycle Facilities: As mentioned in the *Step 2 – Scoping* section, the surrounding cycling network is fairly well established. A MUP is provided along both sides of Brian Coburn Blvd, which connects cyclists to Mer-Bleue Road in the east. Paved shoulders are provided along both sides of Navan Road between Blackburn Hamlet Bypass and Spring Valley Drive, which are classified as 'Spine Routes'. Within the vicinity of the subject site along Renaud Road, paved shoulders are also provided on both sides of the road for cyclists, between Saddleridge Drive and Rue Fern Casey Street, and east-west pocket bike lanes are provided at the Navan/Renaud intersection, along Renaud Road.

Transit Facilities: As mentioned in the *Step 2 – Scoping* section, there are ten transit stops located within the vicinity of the subject development site. There are six transit stops that are located within the OC Transpo service design guidelines of 400 m walking distance to/from the subject site. The other four transit stops previously listed in **Table 1** are located approximately 700 m to/from the subject development site.

With respect to the City's TIA Guidelines, a Transportation Demand Management checklist, provided by the City and titled *TDM – Supportive Development Design and Infrastructure*, has been completed and is included as **Appendix G**. Given the proposed development is currently in the early stages of planning/approvals, not all TDM measures identified as 'required' in the TDM checklist can be committed to at this time. Further refinements to the proposed development design are anticipated during subsequent phases of the City's development application approval process.

Circulation and Access

As depicted in **Figure 2**, 8.5 m wide roadways will be provided throughout the residential portion of the site, and a width of at least 6.7 m will be maintained throughout the commercial parking lot, which satisfies the City's Zoning By-Law provisions for *"Aisles and Driveways".* In addition, this also complies with Building Code requirements for emergency vehicle access that requires a clear 6 m wide fire route, which is provided for both the residential and commercial portions of the site.

With regard to on-site circulation and access, an AutoTurn truck turning analysis should be conducted to ensure sufficient turning radii will be provided.

In terms of vehicle queue storage for the proposed fast food restaurant and carwash land uses, approximately 7 vehicles will be able to queue before the restaurant's drive-thru order board and at least 6 spaces will be provided prior to the restaurant service window, and approximately 10

spaces for vehicle storage will be provided for the carwash. With respect to the City's Zoning By-law "Provisions for Drive-Through Operations", Section 112 Table 112, sufficient queue storage will be provided for both the restaurant and carwash land uses.

New Street Networks

For the residential component of the site, the proposed internal roadway network will be a series of curvilinear two-way local streets that provide access/egress to individual driveway and below grade parking. As depicted in **Figure 2**, the internal roads are proposed to have a pavement width of 8.5 m, which can accommodate on-street parking. Based on the layout of the internal road network, in combination with on-street parking, the proposed should operate with low speeds and cut-through traffic is not anticipated. If speeding and cut-through traffic prove to be problematic, additional traffic calming measures can be implemented (e.g. speed humps, centerline flex-stakes, bulb-outs/chicanes/lane narrowings, etc.).

4.2 Parking

Parking Supply

The proposed development is located in Area C (Suburban), as identified in Schedule 1A of the City's Zoning By-law provisions for *"Parking, Queuing and Loading Provisions"*. The following **Table 17** and **Table 18** summarize the minimum parking and bicycle parking space requirements for the proposed land uses, in accordance with the City's Zoning By-law, *Section 101 - Minimum Parking Space Rates*, *Section 102 - Minimum Visitor Parking Space Rates* and *Section 111 - Bicycle Parking Space Rates and Provisions*.

Vehicular Parking

Given the proposed development is within 600 m for residential and 300 m for non-residential of a rapid-transit station, the minimum parking requirements are to be calculated using the rates for Area X, as outlined under Section 101 of the City's Zoning By-Law (i.e. Column II of Table 101 in Section 101 of the Zoning By-Law). As outlined under Section 102 of the City's Zoning By-Law, visitor parking is to be calculated using the rates for Area C (i.e. Column III of Table 102 in Section 102 of the Zoning By-Law).

The following **Table 17** summarizes appropriate vehicle parking rates and minimum parking requirements for the subject development.

Table 17: Vehicular Parking Supply

Land Use	Zoning Requirement	Dwelling Units/GFA	Minimum Parking Requirement
Townhouse	0.75 per dwelling unit	69 DU	52
Mid-high-Rise Apartments	0.50 per dwelling unit	192 DU	96
	0.20 per dwelling unit (Visitor)	192 DU	38
Dwellings in a Mixed-use building	0.50 per dwelling unit	72 DU	36
	0.20 per dwelling unit (Visitor)	72 DU	14
Retail Store	1.25 per 100 m^2 of gross floor area	1,858 m^2	23

Restaurant Fast Food	5.0 per 100 m^2 of gross floor area	373 m^2	19
Convenience Store	1.25 per 100 m^2 of gross floor area	291 m^2	4
		Total Required	**282**

As summarized in **Table 17**, the minimum vehicle parking space requirement for the subject development is 282 parking spots. It should be noted that due to the proximity of the rapid-transit station, the minimum parking required is significantly lower than if the development was located further from rapid-transit. This is to encourage residents to consider alternative travel modes for their daily commute, by limiting the amount of available vehicle parking.

Bike Parking

As outlined under Section 111 of the City's Zoning By-Law, bike parking is to be calculated using the rates found in Table 111A (i.e. Column II of Table 111A in Section 111 of the Zoning By-Law).

Table 18: Bicycle Parking Supply

Land Use	Zoning Requirement	Dwelling Units/GFA	Minimum Parking Requirement
Mid-high-Rise Apartments	0.50 per dwelling unit	192 DU	96
Dwellings in a Mixed-use building	0.50 per dwelling unit	72 DU	36
Retail Store	1.00 per 250 m^2 of gross floor area	1858 m^2	7
Restaurant Fast Food	1.00 per 250 m^2 of gross floor area	373 m^2	2
Convenience Store	1.00 per 250 m^2 of gross floor area	291 m^2	1
		Total Required	**142**

As summarized in **Table 18**, the subject development is required to have a minimum of 142 bike parking spaces, provided in well-lit areas and close to the main entrances of buildings. Incorporating bike parking on-site will help encourage cycling as a viable travel mode.

Spillover Parking

With respect to the City's TIA Guidelines and given the proponent will not be seeking a reduction in the minimum supply of parking for the subject development, this module is exempt.

4.3 Boundary Street Design

With respect to the City's TIA Guidelines, this module determines design elements of boundary streets required to accommodate the proposed development, consistent with the City's complete

streets philosophy and its urban design objectives for the development area. The identified boundary streets for the subject site are Brian Coburn Boulevard and Navan Road, which are all owned and maintained by the City of Ottawa.

Mobility

A Multi-Modal Level of Service (MMLOS) analysis was conducted for the subject site's boundary streets, which is a measure of risk, comfort and stress for active modes and a measure of impedance, delay and reliability for trucks/buses. With respect to the City of Ottawa's MMLOS guidelines, target MMLOS values were obtained from Exhibit 22 of the MMLOS guidelines and are identified in brackets in the following **Table 19**. The detailed MMLOS assessment is included as **Appendix H**.

Segment MMLOS Summary

The following **Figure 20** depicts the road classifications from the City's GeoOttawa website. It should be noted that Brian Coburn Boulevard and Navan Road are designated truck routes.

Figure 20: Road Classification

The following **Table 19** is a MMLOS analysis summary of existing conditions for non-auto modes (i.e. pedestrian, cycling, transit and trucks) along the road segments described above. Any LOS results highlighted in red indicate that the target MMLOS was not met for that segment. It should be noted that a MMLOS segment analysis focuses on local transit provided along boundary streets only (i.e. MMLOS worksheets are not sensitive to dedicated rapid transit facilities).

Table 19: Segment MMLOS – Existing LOS(Target LOS)

No.	Road Name	Segment Between	PLOS	BLOS	TLOS	TkLOS
1	Navan Road	Orleans – Park n' Ride	n/a(A)	A(C)	D(D)	C(D)
2	Navan Road	Park n' Ride – Brian Coburn	n/a(A)	AC)	D(D)	C(D)
3	Navan Road	Brian Coburn – Site Driveway N	n/a(A)	C(C)	D(D)	C(D)
4	Navan Road	Site Driveway N – Site Driveway S	n/a(A)	C(C)	D(D)	C(D)
5	Navan Road	Site Driveway S – Page	n/a(A)	C(C)	D(D)	C(D)
6	Navan Road	Page – Renaud	n/a(A)	C(C)	D(D)	C(D)
7	Brian Coburn	Navan – Site Driveway	n/a(A)	A(B)	D(D)	C(D)
8	Brian Coburn	Site Driveway – Park n' Ride	n/a(A)	A(B)	D(D)	C(D)
9	Brian Coburn	Park n' Ride – Pedestrian Crossing	n/a(A)	A(B)	D(D)	C(D)
Notes: *'n/a' denotes insufficient input data*						

Based on the results summarized in **Table 19**, the following should be noted/considered:

Pedestrian LOS

- Road segments along Navan Road and Brian Coburn Boulevard do not meet PLOS targets due to lack of provided sidewalks.
- It should be noted that PLOS targets are not met on Brian Coburn Boulevard because the MMLOS summary tool does not take into account multi-use pathways (MUP), despite all design guidelines being met and a large buffer provided between a MUP and active travel lanes.

Bike LOS

- All road segments meet or exceed BLOS targets.

Transit LOS

- All road segments meet TLOS targets.
- It should be noted that the only way to improve the TLOS, is to implement dedicated transit lanes. As outlined in the City's *"2031 Affordable Network Plan"*, Brian Coburn Boulevard is planned to be widened to four lanes and extended west past Navan Road. The implementation of these measures will provide improved transit service/reliability.

Truck LOS

- All road segments exceed TkLOS targets.

Given the Brian Coburn extension and the Navan/Renaud roundabout are in preliminary planning/design phases, conducting a future MMLOS analysis will require broad assumptions. As such, and given these network improvements are not scheduled to occur prior to full build-out of the subject development, a detailed future segment MMLOS analysis has not been included as part of this assessment. However, it is anticipated that the planned network improvements such as the Brian Coburn extension and the Navan/Renaud roundabout, will improve the LOS for all modes, within the vicinity of the subject development.

Road Safety

For the purpose of a road safety review, collision records for boundary streets were examined to determine if locations exhibit any collision trends that might be mitigated by engineering intervention. If there is a collision trend that is outside the norm of what is expected, then the potential exists to reduce the collision experience by addressing the over-represented collision trend. Whenever changes are being made to the road environment, it is an opportunity to examine whether a safety intervention could result in meaningful safety benefits. Where there are identifiable safety trends, it is worthwhile to mitigate those, such that the added traffic from a new development does not increase the risk of new collisions.

Based on a review of the most recent five (5) years of historical collision data (collected from January 1st, 2015 to December 31st, 2019), the following **Table 20** summarizes the number and rate of collisions within the vicinity of the subject development site, along study area road segments (i.e. collisions and collisions per million vehicle kilometers).

Table 20: Historical Collision Data Summary by Road Segment

Segment	Between	Total Collisions (5-year Total)	Rate (C/MVK)	Classification		
				Property Damage	Non-fatal Injury	Fatal Injury
Brian Coburn	Navan & Fern Casey	1	0.06	1	0	0
Navan	Orleans & Page	10	0.44	9	1	0
Navan	Page & Renaud	1	0.50	1	0	0
Total		12	-	11	1	0

Notes: *C/MVK = Collisions per Million Vehicle Kilometers*

As summarized in **Table 20**, the number of collisions for all road segments adjacent to the subject development site are considered to be low, and the severity of collisions along all road segments are also low, based on the available data.

Based on the same most recent five (5) years of historical collision data, the following **Table 21** summarizes the number and rate of collisions within the vicinity of the subject development site, at study area intersections (i.e. collisions and collisions per million entering vehicles).

Table 21: Historical Collision Data Summary by Intersection

Intersection	Total Collisions (5-year Total)	Rate (C/MEV)	Classification		
			Property Damage	Non-fatal Injury	Fatal Injury
Brian Coburn/Navan	10	0.36	9	1	0
Navan/Page	8	0.50	7	1	0
Navan/Renaud	14	0.52	9	5	0
Navan/Orleans	12	0.34	9	3	0
Total	44	-	34	10	0

Notes: *C/MEV = Collisions per Million Entering Vehicles*

As summarized in **Table 21**, the number and rate of collisions at study area intersections are considered to be low, and the severity of collisions at study area intersections are also low, based on the available data.

A more detailed collision analysis for study area road segments and intersections is included as **Appendix I**. As previously mentioned, source collision data is included as **Appendix C**.

Neighbourhood Traffic Management (NTM)

This section reviews the development location to determine if the proposed development will exacerbate existing operational concerns on boundary streets, if the subject development will rely on collector or local roads.

Given the subject development will only provide connections to arterial roadways (e.g. Brian Coburn Boulevard and Navan Road), a review of potential NTM strategies is not required, with respect to the City's TIA Guidelines.

4.4 Access Intersection Design

With respect to the City's TIA Guidelines, this module determines design elements of the points of access to/from the subject development site, consistent with the City's Complete Streets philosophy, MMLOS guidelines, and its urban design objectives for the development area.

Location and Design of Access

There are four site driveway connections to/from the subject development being proposed. Two of the proposed driveway connections will be for access/egress to the residential portion of the subject site (i.e. one driveway connection will be to Navan Road approximately 150 m west of Page Road and the other will be on Brian Coburn Blvd at the existing Park and Ride intersection and forming the fourth leg). The other two proposed site driveways will be for access/egress for the commercial portion of the site (i.e. one of the driveways will be located on Navan Road approximately 75 m southeast of the Navan/Brian Coburn roundabout and the other driveway connection will be on Brian Coburn Blvd approximately 100 m northeast of the Navan/Brian Coburn roundabout). All four site driveways are proposed to be within the maximum width of 9 m for a private approach driveway (or divided by a median into two smaller driveways), are within a 60 m distance from adjacent intersecting roadways and are at least 9 m from adjacent driveways.

Therefore, with respect to the City's Private Approach By-Law No. 2003-447, the new proposed driveway connections will satisfy By-Law requirements.

The length of driveways is described as a "clear throat length", which is the area provided as part of a driveway to store vehicles that may require a space to queue before they enter the site or adjacent road network. A sufficiently long clear throat length is most critical to avoid queue spillback onto the adjacent road network.

With respect to TAC's 2017 *Geometric Design Guide for Canadian Roads*, the minimum clear throat lengths for driveways are based on the proposed land use, development size and abutting road classification (collector or arterial). As depicted in **Figure 20**, Brian Coburn Boulevard and Navan Road are both classified as arterial roadways. Therefore, based on Table 8.9.3 found in the TAC Geometric Design Guide, a clear throat length of 40 m is recommended for all proposed driveways. Based on the foregoing, the proposed throat lengths for the fast food restaurant will not satisfy the TAC Design Guide. However, based on the layout of the proposed site and anticipated on-site operations (e.g. interactions between vehicle parking and entering vehicles should be low and queue stacking related to the proposed drive-thru and car wash land uses will be located as far away as possible from driveway connections), the proposed driveway throat lengths should be sufficient.

As depicted in **Figure 2**, all proposed driveway connections will operate as full movement.

Intersection Control

With the exception of the site driveway connection proposed as the fourth leg of the existing signalized Brian Coburn/Park n' Ride intersection, new site driveway connections are proposed to be YEILD or STOP controlled on the minor approach only. All proposed driveway connections are projected to operate acceptably.

Intersection Design

The following is a MMLOS analysis for signalized study area intersections. As previously mentioned, MMLOS is a measure of risk, comfort and stress for active modes and a measure of impedance, delay and reliability for trucks/buses. With respect to the City of Ottawa's MMLOS guidelines, target MMLOS values were obtained from Exhibit 22 of the MMLOS guidelines and are identified in brackets in the following **Table 22** and **Table 23**.

Intersection MMLOS Summary

Similar to the MMLOS analysis conducted for the *4.2 – Boundary Street Design* section of this report, the following **Table 22** summarizes existing MMLOS conditions and **Table 23** summarizes projected 2031 MMLOS conditions for all modes, at signalized study area intersections. The detailed intersection MMLOS analysis for both existing and projected conditions are provided in **Appendix J**.

Table 22: Intersection MMLOS – Existing LOS(Target LOS)

No.	Intersection	PLOS	BLOS	TLOS	TkLOS	AutoLOS
1	Navan/Orleans	C(A)	E(C)	D(D)	E(D)	D(E)
2	Navan/Park n' Ride	B(A)	D(C)	C(D)	E(D)	B(E)
3	Navan/Renaud	D(A)	F(C)	F(D)	F(D)	C(E)
4	Brian Coburn/ Park n' Ride	D(A)	D(B)	B(D)	E(D)	A(E)
5	Brian Coburn/ Ped Crossing	A(A)	B(B)	A(D)	n/a(D)	A(E)
Notes: *'n/a' denotes insufficient input data*						

Based on the results summarized in **Table 22**, the following should be noted/considered:

Pedestrian LOS

- All study area intersections do not meet PLOS targets, with the exception of the Brian Coburn pedestrian signal.
- It should be noted that failing PLOS targets is because the MMLOS summary tool does not take into account multi-use pathways (MUP), despite all design guidelines being met and a large buffer provided between the MUP and active travel lanes.

Bike LOS

- All study area intersections do not meet BLOS targets, with the exception of the Brian Coburn pedestrian signal.
- Failing BLOS targets is primarily due to either cyclists having to share the road with mixed traffic to connect to the extensive MUP network, or the number of vehicle travel lanes that are required to cross to perform a left-turn (without a 2-stage left turn or bike box).

Transit LOS

- All study area intersections meet TLOS targets, with the exception of the Navan/Renaud intersection.
- Failing TLOS targets is due to the average signal delay.
- As previously mentioned, the only way to improve the TLOS, is to implement dedicated transit lanes. As outlined in the City's "2031 Affordable Network Plan", Brian Coburn Boulevard is planned to be widened to four lanes and extended west past Navan Road. The implementation of these measures will provide improved transit service/reliability.

Truck LOS

- All study area intersections do not meet TkLOS targets.
- Despite Navan and Brian Coburn being dedicated truck routes, failing TkLOS targets are due to the combination of small corner radii and the limited number of receiving lanes (only single receiving lanes are provided).

Auto LOS

- All study area intersections meet AutoLOS targets.

As previously mentioned as part of the segment MMLOS analysis, planned network improvements, such as the Brian Coburn extension and the Navan/Renaud roundabout project, have not been included as part of this assessment. As such, the following projected MMLOS (summarized in **Table 23**) was completed assuming existing network geometry, but considers projected study area intersection performance.

Table 23: Intersection MMLOS Projected LOS(Target LOS)

No.	Intersection	PLOS	BLOS	TLOS	TkLOS	AutoLOS
1	Navan/Orleans	C(A)	E(C)	F(D)	E(D)	F(E)
2	Navan/Park n' Ride	B(A)	D(C)	F(D)	E(D)	E(E)
3	Navan/Renaud	D(A)	F(C)	F(D)	F(D)	D(E)
4	Brian Coburn/ Park n' Ride	D(A)	D(B)	B(D)	E(D)	A(E)
5	Brian Coburn/ Ped Crossing	A(A)	B(B)	A(D)	n/a(D)	A(E)

Notes: *'n/a' denotes insufficient input data*
Highlighted cells indicate changes between existing and projected LOS

Based on the results summarized in **Table 23**, the following changes to LOS targets should be noted/considered:

Transit LOS

- Navan/Orleans and Navan/Park n' Rider intersections do not meet TLOS targets.
- Failing TLOS targets are due to increased average signal delay.

AutoLOS

- Navan/Orleans intersection does not meet AutoLOS targets.
- Failing AutoLOS targets are due to volume-to-capacity ratios greater than 1.0.

4.5 Transportation Design Management

With respect to the City's TIA Guidelines, a review of Transportation Demand Management (TDM) strategies is a requirement for the subject development. Determining, which TDM strategies maybe appropriate for implementation, a formal TDM checklist is provided by the City for review by the proponent.

As mentioned previously in the *4.3 – Development Design/Design for Sustainable Modes* section of this report, the proposed development is currently in the early stages of planning/approvals, and not all TDM measures identified as 'required' in the TDM checklist can be committed to at this time. Further refinements to the proposed development design are anticipated during subsequent phases of the City's development application approval process.

A TDM checklist is attached as **Appendix K**, which can be used by the proponent to identify possible TDM strategies that can be committed to for implementation.

4.6 Neighborhood Traffic Management

With respect to the City's TIA Guidelines, this module reviews significant access routes to/from the development and identifies any required neighborhood traffic management (NTM) measures to mitigate impacts on collector and local roads.

As mentioned previously in the *4.3 – Boundary Street Design* section of this report, the proposed development does not rely on local or collector streets for access and therefore, a review of potential NTM strategies is not required, with respect to the City's TIA Guidelines.

4.7 Transit

Transit stops that serve the development site were previously mentioned in the *Step 2 – Scoping* section of this report, which included stop number, location, route identifier and directional information (summarized in **Table 1**). Additionally, transit route information, including frequency and service type, were previously summarized in **Table 2**. All transit stops are located within the OC Transpo service design guidelines (i.e. within 400 m walking distance to/from the site) with the exception of the two transit stops located at the Navan/Orleans intersection. It should be noted that these stops are located within approximately 800 m walking distance to/from the subject development site. Detailed transit maps are included in **Appendix L**.

Route Capacity

Current transit ridership data for the bus stops listed in **Table 1** was provided by the City and is included as **Appendix M**. Based on the projected modal split of site-generated traffic, it was estimated that approximately 20% of the retail/fast food and 30% of residential trips generated will be accommodated by transit, which equates to approximately 129 and 124 additional transit person trips for weekday morning and afternoon peak hours, respectively.

With respect to local transit, the study area is serviced by 40 ft buses on approximate 15-30 min headways, which have a person capacity of approximately 50 passengers per bus. According to passenger on/off data provided by the City, there are approximately 1 to 27 passengers per bus that arrive/depart at the bus stops within the vicinity of the subject development site during peak hours.

Assuming projected site-generated transit trips to/from the subject development will be spread between the handful of local bus stops and the Chapel Hill Park n' Ride station within the vicinity of the site, it is projected that future transit users can be easily accommodated by the existing area transit service.

Transit Priority

Given the relatively low volume of projected site-generated traffic, transit travel times should not be impacted. However, as mentioned previously in the *Step 3 – Forecasting* section, study area intersections are currently operating near or at capacity during weekday morning and afternoon peak hours. With relatively soon to be implemented future network modifications such as dedicated transit lanes planned along Brian Coburn Boulevard (as outlined in the City's *"2031 Affordable Network Plan"*), transit service and reliability will be significantly improved.

4.8 Review of Network Concept

With respect to the City's TIA Guidelines, this module is exempt.

4.9 Intersection Design

With respect to the City's TIA Guidelines, this module determines the design elements of the study area intersections required to accommodate the proposed development, consistent with the City's Complete Streets philosophy and MMLOS practices.

Intersection Control

All site driveways are currently proposed to be STOP or YEILD control on the minor approach, with the exception of the northern site entrance to Brian Coburn Boulevard, which is proposed to be the fourth leg of the existing signalized Brian Coburn/Park n' Ride intersection. Based on the intersection capacity analysis included in the *Step 3 – Forecasting* section of this report, and consistent with the City's policies, goals and objectives, additional signal or intersection control will not be warranted.

Intersection Design

Based on the intersection capacity analysis in the *Step 3 – Forecasting* section of this report, and consistent with the City's policies, goals and objectives, some network modifications are required to improve study area intersections. However, as previously mentioned, the City has already planned for a number of future study area network modifications, with a number of studies and functional designs currently underway, which will take into account the impacts of the subject development.

5.0 Findings and Recommendations

As with any infill development, the introduction of a new land use will have impacts on the surrounding transportation network. J.L. Richards and Associates Limited has completed a review of these impacts and summarized the findings within this transportation assessment, which follows the format of a Transportation Impact Assessment (TIA) Study, as requested by the City of Ottawa. At this stage, and with respect to the City's TIA Guidelines, the following findings and conclusions are offered:

- Study area intersections are currently operating near or at capacity and are projected to continue operating near or at capacity with the additional traffic generated by the proposed development.
- Based on historical collision data, there are also no prevailing safety concerns.
- Given the local context, the private auto is projected to be the primary mode choice for travel for all proposed land uses.
- The proposed development is projected to generate 'new' two-way vehicles volumes of 246 veh/h and 245 veh/h during weekday morning and afternoon peak hours, respectively.
- With regard to active modes, the proposed development is projected to generate approximate two-way person trips of 77 trips/h and 76 trips/h during weekday morning and afternoon peak hours.
- With regard to transit trips during weekday morning and afternoon peak hours, the proposed development is projected to generate approximately two-way person trips of 129 trips/h and 124 trips/h, respectively.
- The proposed parking supply for the subject development is proposed to meet minimum By-Law requirements.

- Current and projected intersection MMLOS targets are not met for pedestrian and cycling modes for the majority of study area intersections; however, this is because the City's MMLOS summary tool does not take into consideration MUP facilities, despite all design guidelines being met and a large buffer provided between the MUP and active travel lanes.
- Current and projected intersection MMLOS targets are not met for trucks modes for the majority of study area intersections due to the combination of small corner radii and the limited number of receiving lanes.
- Based on the projected volumes and intersection capacity analysis, additional network modifications are warranted. It is anticipated that the planned network improvements such as the Brian Coburn extension and the Navan/Renaud roundabout, will improve the LOS for all modes, within the vicinity of the subject development.
- The overall layout of the site is laid out effectively and should operate acceptably, and satisfies applicable By-Laws. AutoTurn truck turning analysis should be conducted to ensure efficient turning radii will be provided for larger vehicles (e.g. fire and garbage truck, etc.).

The proposed development fits well into the context of the surrounding area and it is projected to have minimal impact on the surrounding transportation network. The design and location of the proposed development serves the City of Ottawa's policies, goals and objectives.

Based on the foregoing, the proposed development located at 2983 Navan Road, 3053 Navan Road and 3079 Navan Road is recommended from a transportation perspective.

J.L. RICHARDS & ASSOCIATES LIMITED

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Appendix A

Existing Traffic Counts

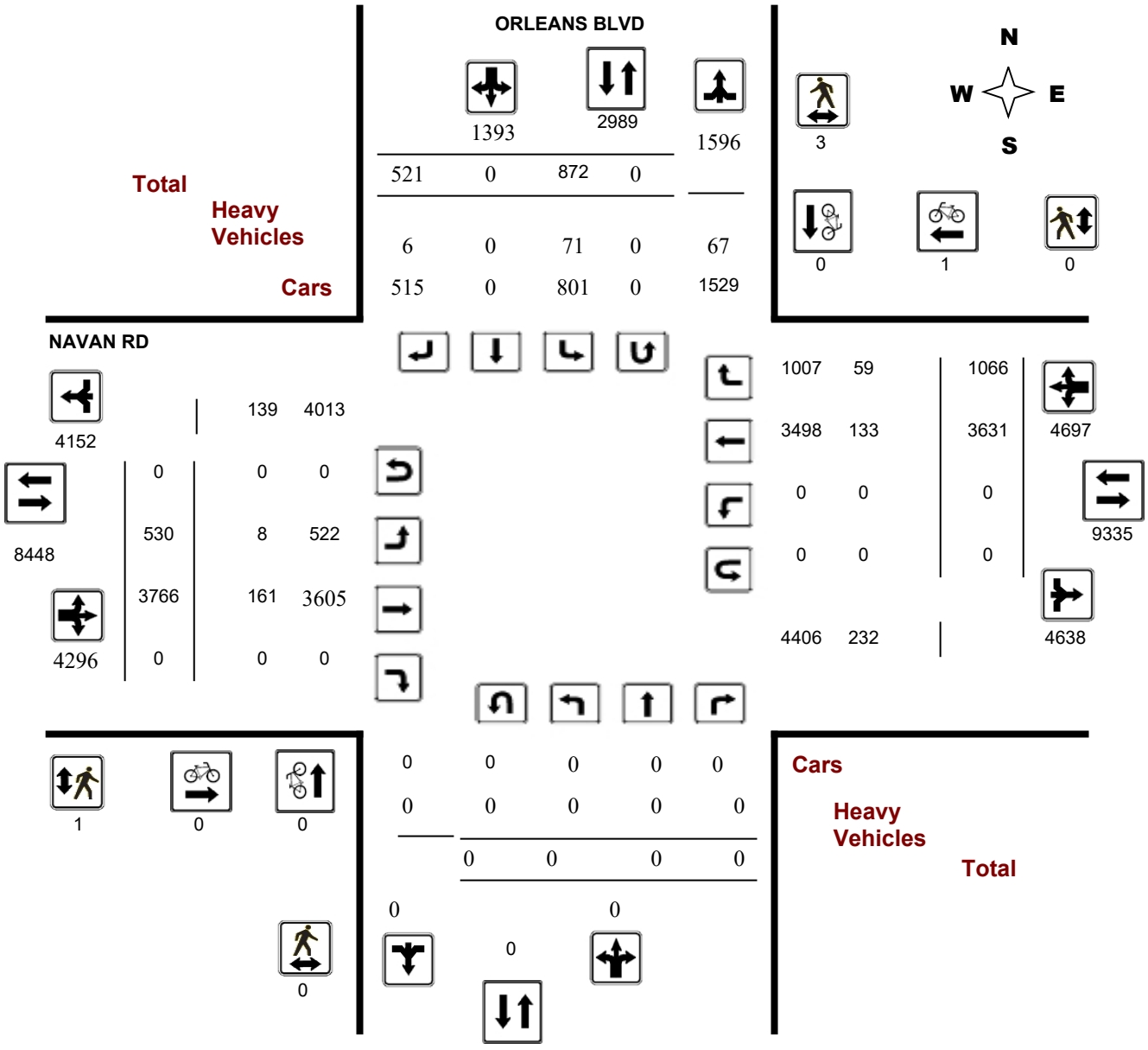
Transportation Services - Traffic Services

Turning Movement Count - Study Results

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020
Start Time: 07:00
WO No: 39251
Device: Miovision

Full Study Diagram



5469192 - TUE JAN 07, 2020 - 8HRS - LORETTA

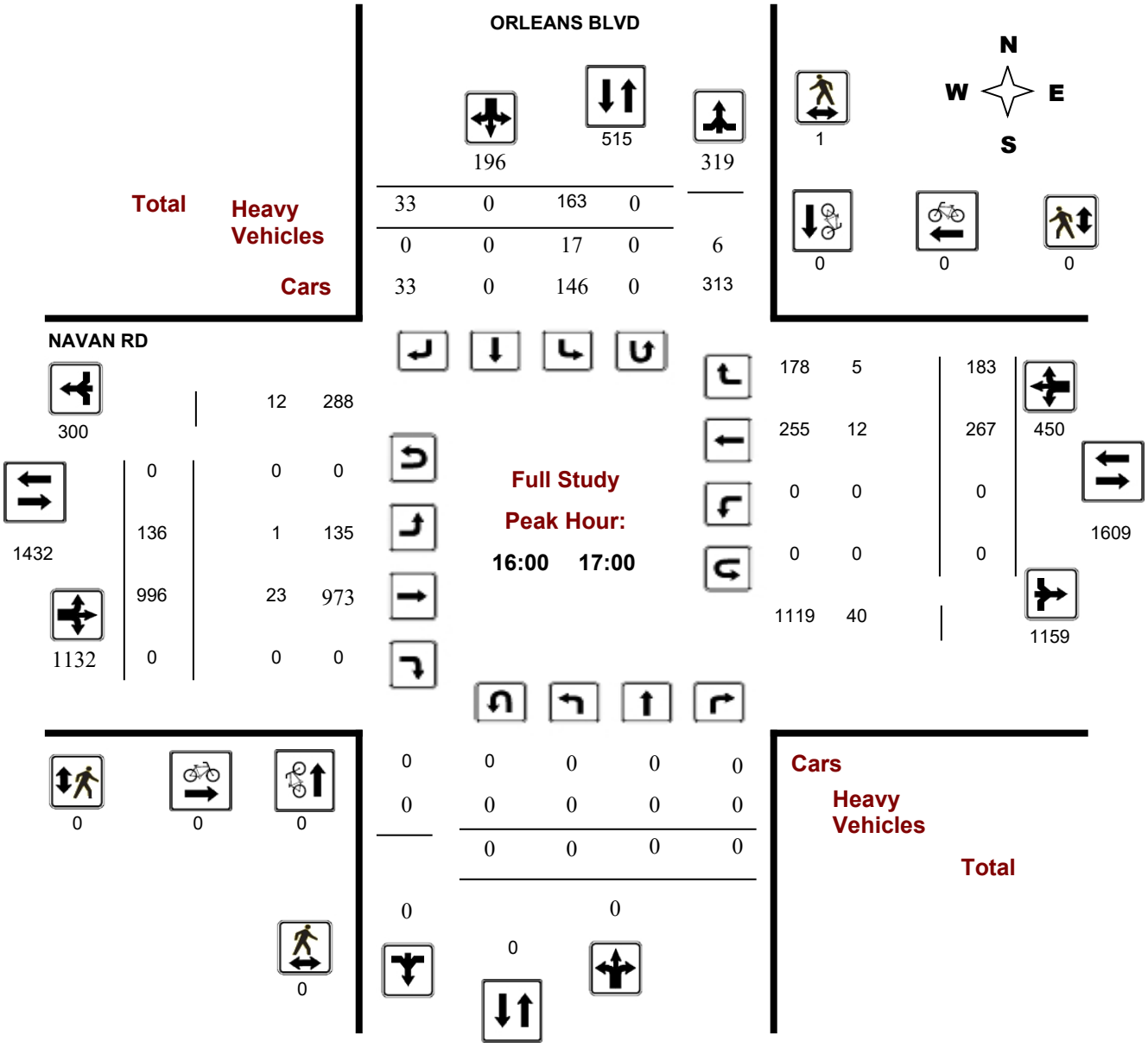
Transportation Services - Traffic Services

Turning Movement Count - Study Results

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020
Start Time: 07:00
WO No: 39251
Device: Miovision

Full Study Peak Hour Diagram



5469192 - TUE JAN 07, 2020 - 8HRS - LORETTA

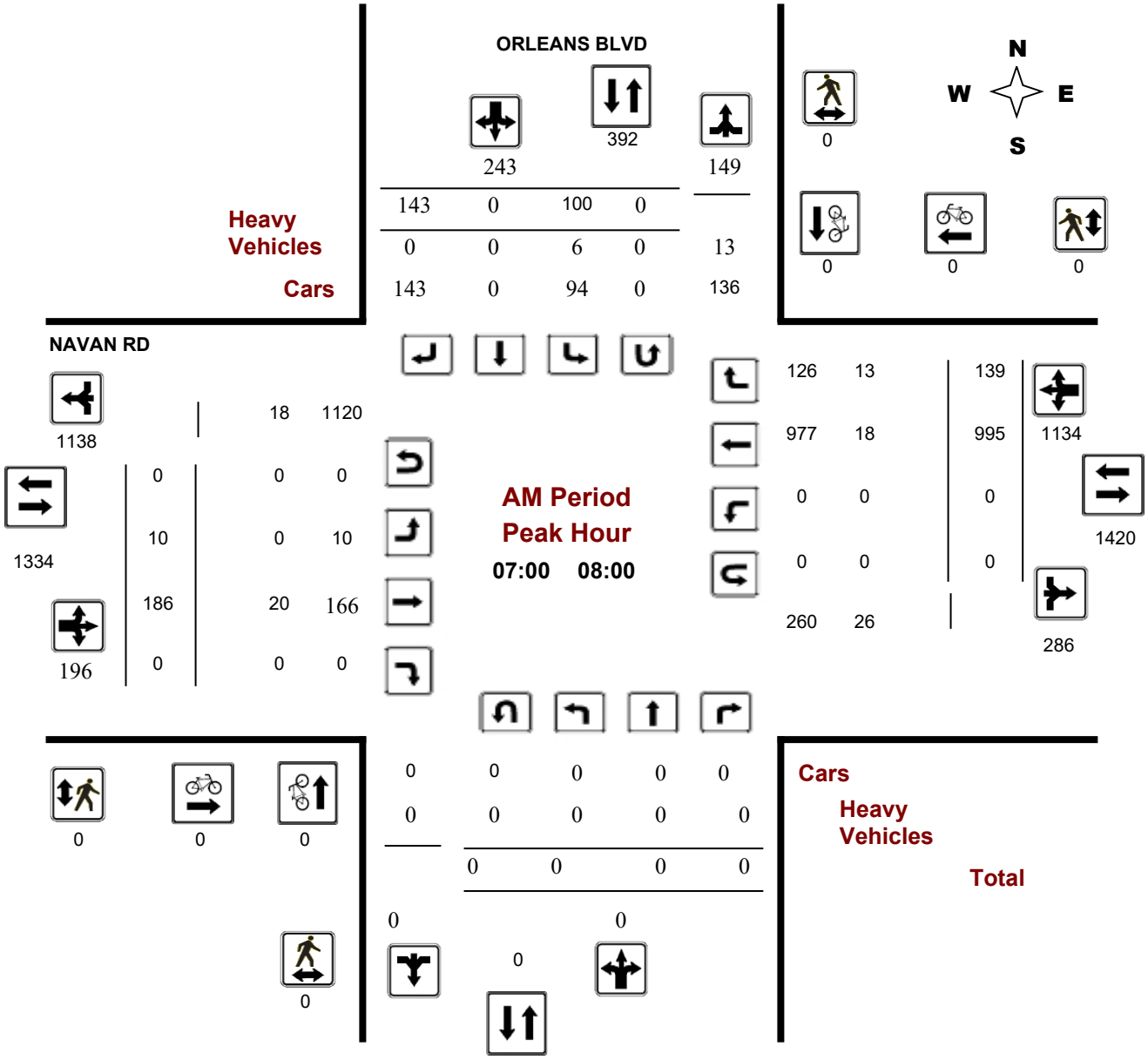
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020 **WO No:** 39251

Start Time: 07:00 **Device:** Miovision



Comments 5469192 - TUE JAN 07, 2020 - 8HRS - LORETTA

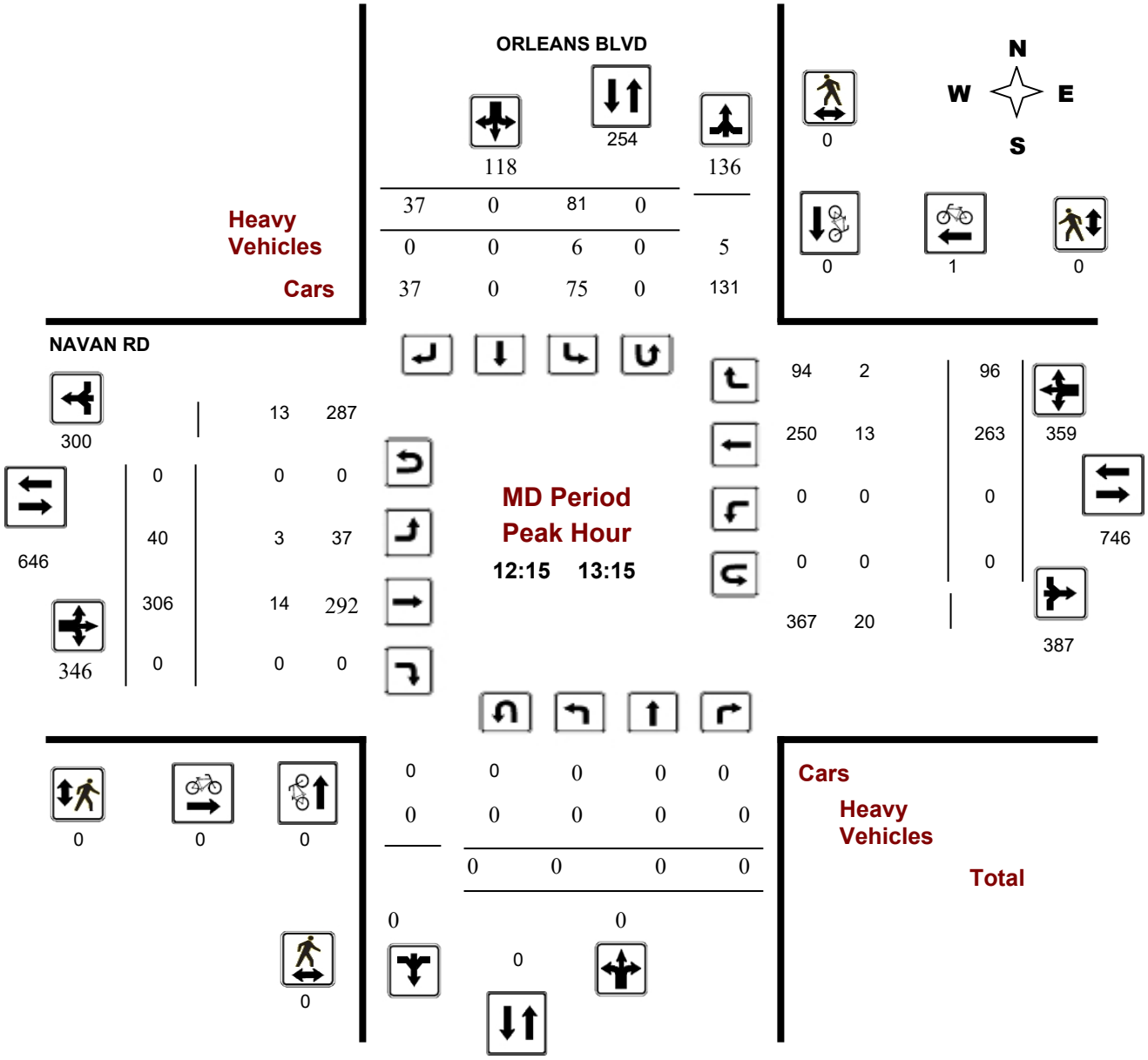
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020 **WO No:** 39251

Start Time: 07:00 **Device:** Miovision



Comments 5469192 - TUE JAN 07, 2020 - 8HRS - LORETTA

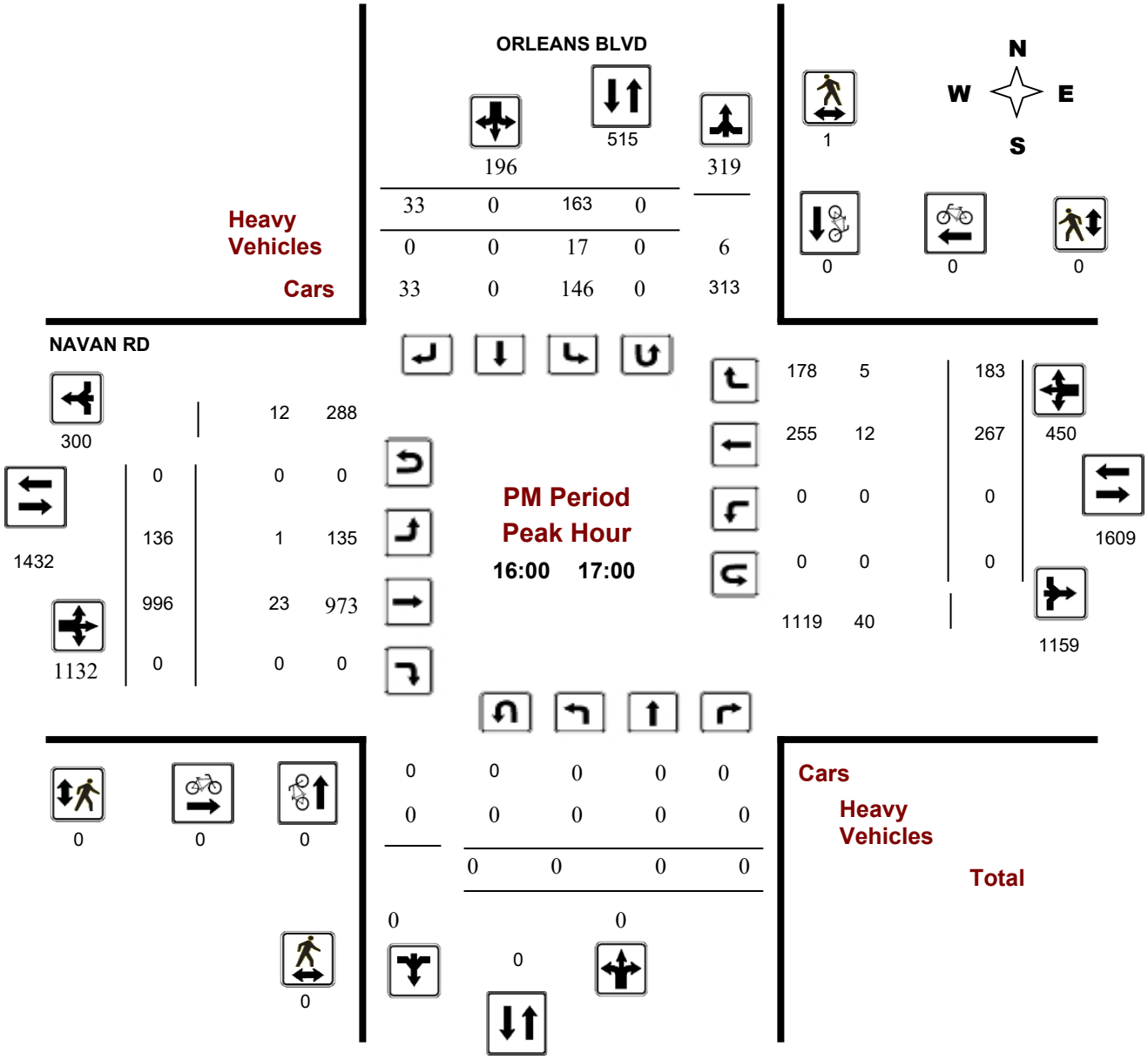
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020 **WO No:** 39251

Start Time: 07:00 **Device:** Miovision



Comments 5469192 - TUE JAN 07, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020 **WO No:** 39251

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, January 07, 2020

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor

1.10

	ORLEANS BLVD									NAVAN RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	0	0	0	**0**	100	0	143	**243**	**243**	10	186	0	**196**	0	995	139	**1134**	**1330**	**1573**
08:00 09:00	0	0	0	**0**	121	0	118	**239**	**239**	21	163	0	**184**	0	743	174	**917**	**1101**	**1340**
09:00 10:00	0	0	0	**0**	74	0	79	**153**	**153**	26	215	0	**241**	0	478	92	**570**	**811**	**964**
11:30 12:30	0	0	0	**0**	73	0	41	**114**	**114**	35	243	0	**278**	0	324	69	**393**	**671**	**785**
12:30 13:30	0	0	0	**0**	74	0	40	**114**	**114**	36	280	0	**316**	0	253	99	**352**	**668**	**782**
15:00 16:00	0	0	0	**0**	124	0	35	**159**	**159**	114	787	0	**901**	0	302	155	**457**	**1358**	**1517**
16:00 17:00	0	0	0	**0**	163	0	33	**196**	**196**	136	996	0	**1132**	0	267	183	**450**	**1582**	**1778**
17:00 18:00	0	0	0	**0**	143	0	32	**175**	**175**	152	896	0	**1048**	0	269	155	**424**	**1472**	**1647**
Sub Total	0	0	0	**0**	872	0	521	**1393**	**1393**	530	3766	0	**4296**	0	3631	1066	**4697**	**8993**	**10386**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	0	0	0	**0**	872	0	521	**1393**	**1393**	530	3766	0	**4296**	0	3631	1066	**4697**	**8993**	**10386**
EQ 12Hr	0	0	0	**0**	1212	0	724	**1936**	**1936**	737	5235	0	**5971**	0	5047	1482	**6529**	**12500**	**14437**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	0	0	0	**0**	1257	0	751	**2007**	**2130**	764	5427	0	**6191**	0	5232	1536	**6768**	**13750**	**15881**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**1.1**						
AVG 24Hr	0	0	0	**0**	1646	0	983	**2630**	**2630**	1000	7109	0	**8110**	0	6854	2012	**8867**	**16977**	**19607**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020 **WO No:** 39251

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		ORLEANS BLVD									NAVAN RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	0	19	0	43	62	1	1	38	0	39	0	254	28	282	1	383
07:15	07:30	0	0	0	0	27	0	34	61	2	3	44	0	47	0	272	27	299	2	407
07:30	07:45	0	0	0	0	33	0	39	72	1	1	48	0	49	0	250	34	284	1	405
07:45	08:00	0	0	0	0	21	0	27	48	2	5	56	0	61	0	219	50	269	2	378
08:00	08:15	0	0	0	0	40	0	39	79	1	2	40	0	42	0	186	53	239	1	360
08:15	08:30	0	0	0	0	37	0	29	66	2	7	42	0	49	0	200	30	230	2	345
08:30	08:45	0	0	0	0	21	0	20	41	2	7	42	0	49	0	183	36	219	2	309
08:45	09:00	0	0	0	0	23	0	30	53	4	5	39	0	44	0	174	55	229	4	326
09:00	09:15	0	0	0	0	25	0	39	64	4	9	42	0	51	0	129	35	164	4	279
09:15	09:30	0	0	0	0	19	0	16	35	2	5	68	0	73	0	138	25	163	2	271
09:30	09:45	0	0	0	0	18	0	15	33	1	8	49	0	57	0	125	13	138	1	228
09:45	10:00	0	0	0	0	12	0	9	21	1	4	56	0	60	0	86	19	105	1	186
11:30	11:45	0	0	0	0	13	0	16	29	1	4	57	0	61	0	98	24	122	1	212
11:45	12:00	0	0	0	0	20	0	6	26	1	13	55	0	68	0	66	14	80	1	174
12:00	12:15	0	0	0	0	16	0	8	24	0	7	49	0	56	0	96	17	113	0	193
12:15	12:30	0	0	0	0	24	0	11	35	1	11	82	0	93	0	64	14	78	1	206
12:30	12:45	0	0	0	0	19	0	7	26	2	12	70	0	82	0	75	26	101	2	209
12:45	13:00	0	0	0	0	20	0	7	27	1	10	74	0	84	0	65	36	101	1	212
13:00	13:15	0	0	0	0	18	0	12	30	2	7	80	0	87	0	59	20	79	2	196
13:15	13:30	0	0	0	0	17	0	14	31	2	7	56	0	63	0	54	17	71	2	165
15:00	15:15	0	0	0	0	27	0	5	32	0	29	163	0	192	0	69	33	102	0	326
15:15	15:30	0	0	0	0	24	0	4	28	5	23	187	0	210	0	78	34	112	5	350
15:30	15:45	0	0	0	0	30	0	8	38	3	36	219	0	255	0	88	46	134	3	427
15:45	16:00	0	0	0	0	43	0	18	61	11	26	218	0	244	0	67	42	109	11	414
16:00	16:15	0	0	0	0	42	0	9	51	6	23	247	0	270	0	77	43	120	6	441
16:15	16:30	0	0	0	0	55	0	8	63	8	34	248	0	282	0	67	51	118	8	463
16:30	16:45	0	0	0	0	33	0	7	40	1	42	245	0	287	0	64	43	107	1	434
16:45	17:00	0	0	0	0	33	0	9	42	2	37	256	0	293	0	59	46	105	2	440
17:00	17:15	0	0	0	0	35	0	9	44	1	29	220	0	249	0	54	51	105	1	398
17:15	17:30	0	0	0	0	38	0	4	42	2	37	243	0	280	0	66	37	103	2	425
17:30	17:45	0	0	0	0	37	0	14	51	2	44	217	0	261	0	81	34	115	2	427
17:45	18:00	0	0	0	0	33	0	5	38	3	42	216	0	258	0	68	33	101	3	397
Total:		0	0	0	0	872	0	521	1393	77	530	3766	0	4296	0	3631	1066	4697	77	10,386

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020 **WO No:** 39251

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		ORLEANS BLVD			NAVAN RD			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	1	1	1
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		0	0	**0**	0	1	1	1

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020 **WO No:** 39251

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

	ORLEANS BLVD			NAVAN RD			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	**Total**	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	**Total**	**Grand Total**
07:00 07:15	0	0	**0**	0	0	**0**	**0**
07:15 07:30	0	0	**0**	0	0	**0**	**0**
07:30 07:45	0	0	**0**	0	0	**0**	**0**
07:45 08:00	0	0	**0**	0	0	**0**	**0**
08:00 08:15	0	0	**0**	0	0	**0**	**0**
08:15 08:30	0	0	**0**	0	0	**0**	**0**
08:30 08:45	0	0	**0**	0	0	**0**	**0**
08:45 09:00	0	0	**0**	0	0	**0**	**0**
09:00 09:15	0	0	**0**	0	0	**0**	**0**
09:15 09:30	0	0	**0**	1	0	**1**	**1**
09:30 09:45	0	0	**0**	0	0	**0**	**0**
09:45 10:00	0	0	**0**	0	0	**0**	**0**
11:30 11:45	0	0	**0**	0	0	**0**	**0**
11:45 12:00	0	0	**0**	0	0	**0**	**0**
12:00 12:15	0	0	**0**	0	0	**0**	**0**
12:15 12:30	0	0	**0**	0	0	**0**	**0**
12:30 12:45	0	0	**0**	0	0	**0**	**0**
12:45 13:00	0	0	**0**	0	0	**0**	**0**
13:00 13:15	0	0	**0**	0	0	**0**	**0**
13:15 13:30	0	0	**0**	0	0	**0**	**0**
15:00 15:15	0	0	**0**	0	0	**0**	**0**
15:15 15:30	0	0	**0**	0	0	**0**	**0**
15:30 15:45	0	2	**2**	0	0	**0**	**2**
15:45 16:00	0	0	**0**	0	0	**0**	**0**
16:00 16:15	0	0	**0**	0	0	**0**	**0**
16:15 16:30	0	0	**0**	0	0	**0**	**0**
16:30 16:45	0	1	**1**	0	0	**0**	**1**
16:45 17:00	0	0	**0**	0	0	**0**	**0**
17:00 17:15	0	0	**0**	0	0	**0**	**0**
17:15 17:30	0	0	**0**	0	0	**0**	**0**
17:30 17:45	0	0	**0**	0	0	**0**	**0**
17:45 18:00	0	0	**0**	0	0	**0**	**0**
Total	0	3	**3**	1	0	**1**	**4**

5469192 - TUE JAN 07, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020 **WO No:** 39251

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		ORLEANS BLVD									NAVAN RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	**0**	1	0	0	**1**	**1**	0	1	0	**1**	0	5	4	**9**	**10**	**11**
07:15	07:30	0	0	0	**0**	2	0	0	**2**	**2**	0	7	0	**7**	0	2	3	**5**	**12**	**14**
07:30	07:45	0	0	0	**0**	1	0	0	**1**	**1**	0	2	0	**2**	0	7	2	**9**	**11**	**12**
07:45	08:00	0	0	0	**0**	2	0	0	**2**	**2**	0	10	0	**10**	0	4	4	**8**	**18**	**20**
08:00	08:15	0	0	0	**0**	1	0	0	**1**	**1**	0	7	0	**7**	0	1	4	**5**	**12**	**13**
08:15	08:30	0	0	0	**0**	2	0	0	**2**	**2**	1	7	0	**8**	0	5	2	**7**	**15**	**17**
08:30	08:45	0	0	0	**0**	2	0	0	**2**	**2**	0	6	0	**6**	0	6	7	**13**	**19**	**21**
08:45	09:00	0	0	0	**0**	3	0	1	**4**	**4**	0	4	0	**4**	0	5	3	**8**	**12**	**16**
09:00	09:15	0	0	0	**0**	3	0	1	**4**	**4**	2	9	0	**11**	0	6	6	**12**	**23**	**27**
09:15	09:30	0	0	0	**0**	2	0	0	**2**	**2**	0	15	0	**15**	0	7	1	**8**	**23**	**25**
09:30	09:45	0	0	0	**0**	1	0	0	**1**	**1**	0	7	0	**7**	0	8	1	**9**	**16**	**17**
09:45	10:00	0	0	0	**0**	1	0	0	**1**	**1**	0	10	0	**10**	0	8	0	**8**	**18**	**19**
11:30	11:45	0	0	0	**0**	1	0	0	**1**	**1**	0	8	0	**8**	0	2	1	**3**	**11**	**12**
11:45	12:00	0	0	0	**0**	1	0	0	**1**	**1**	0	4	0	**4**	0	2	0	**2**	**6**	**7**
12:00	12:15	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	8	1	**9**	**11**	**11**
12:15	12:30	0	0	0	**0**	1	0	0	**1**	**1**	0	2	0	**2**	0	2	0	**2**	**4**	**5**
12:30	12:45	0	0	0	**0**	2	0	0	**2**	**2**	0	2	0	**2**	0	5	1	**6**	**8**	**10**
12:45	13:00	0	0	0	**0**	1	0	0	**1**	**1**	3	3	0	**6**	0	1	0	**1**	**7**	**8**
13:00	13:15	0	0	0	**0**	2	0	0	**2**	**2**	0	7	0	**7**	0	5	1	**6**	**13**	**15**
13:15	13:30	0	0	0	**0**	1	0	1	**2**	**2**	0	2	0	**2**	0	4	2	**6**	**8**	**10**
15:00	15:15	0	0	0	**0**	0	0	0	**0**	**0**	0	6	0	**6**	0	4	3	**7**	**13**	**13**
15:15	15:30	0	0	0	**0**	5	0	0	**5**	**5**	0	3	0	**3**	0	8	2	**10**	**13**	**18**
15:30	15:45	0	0	0	**0**	2	0	1	**3**	**3**	0	3	0	**3**	0	7	2	**9**	**12**	**15**
15:45	16:00	0	0	0	**0**	9	0	2	**11**	**11**	1	5	0	**6**	0	2	1	**3**	**9**	**20**
16:00	16:15	0	0	0	**0**	6	0	0	**6**	**6**	1	4	0	**5**	0	6	1	**7**	**12**	**18**
16:15	16:30	0	0	0	**0**	8	0	0	**8**	**8**	0	6	0	**6**	0	3	3	**6**	**12**	**20**
16:30	16:45	0	0	0	**0**	1	0	0	**1**	**1**	0	8	0	**8**	0	2	1	**3**	**11**	**12**
16:45	17:00	0	0	0	**0**	2	0	0	**2**	**2**	0	5	0	**5**	0	1	0	**1**	**6**	**8**
17:00	17:15	0	0	0	**0**	1	0	0	**1**	**1**	0	3	0	**3**	0	0	1	**1**	**4**	**5**
17:15	17:30	0	0	0	**0**	2	0	0	**2**	**2**	0	1	0	**1**	0	2	0	**2**	**3**	**5**
17:30	17:45	0	0	0	**0**	2	0	0	**2**	**2**	0	1	0	**1**	0	2	2	**4**	**5**	**7**
17:45	18:00	0	0	0	**0**	3	0	0	**3**	**3**	0	1	0	**1**	0	3	0	**3**	**4**	**7**
Total:	None	0	0	0	**0**	71	0	6	**77**	**77**	8	161	0	**169**	0	133	59	**192**	**361**	**438**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ORLEANS BLVD @ NAVAN RD

Survey Date: Tuesday, January 07, 2020 **WO No:** 39251

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		ORLEANS BLVD		NAVAN RD		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

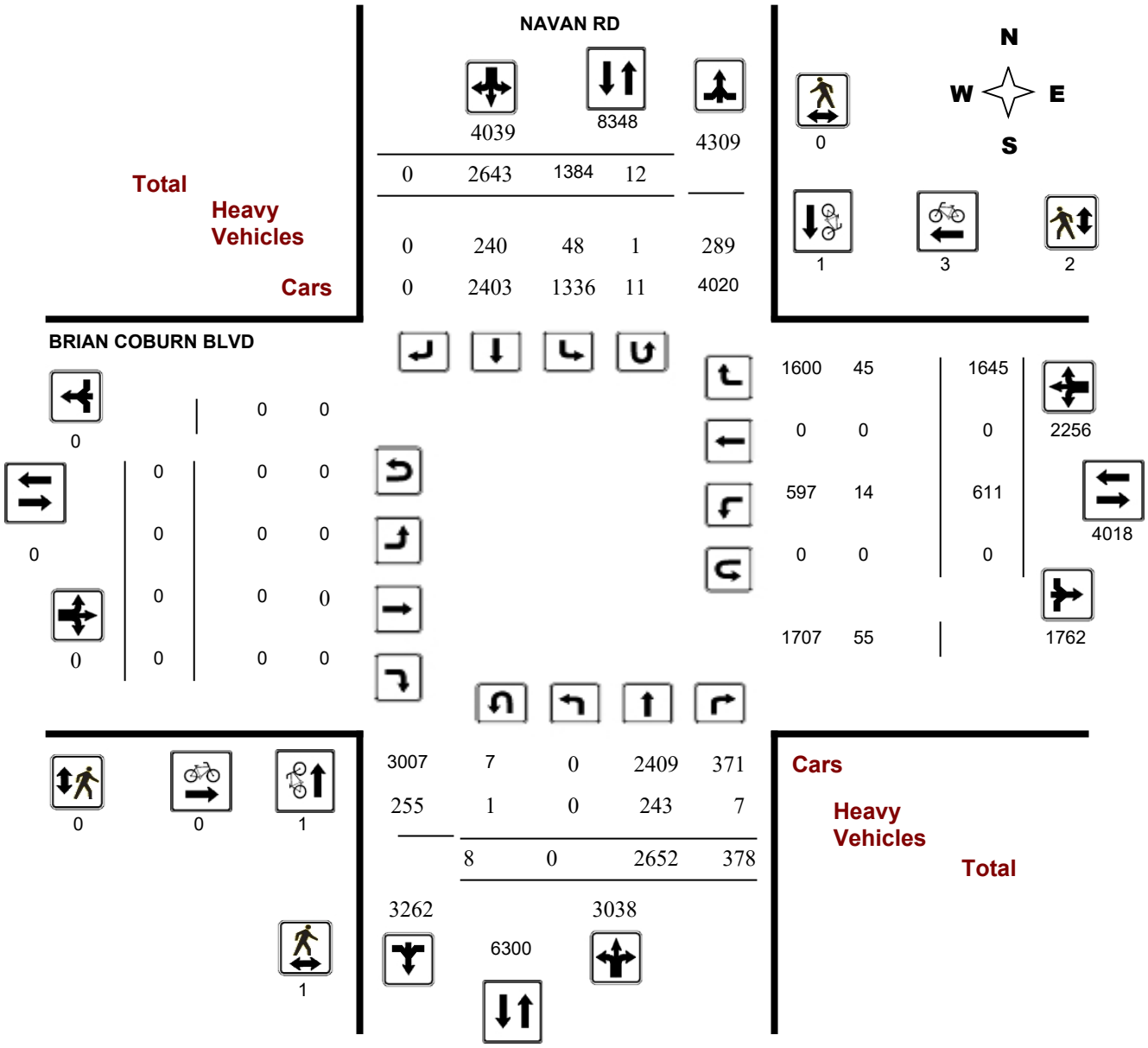
Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018
Start Time: 07:00
WO No: 38030
Device: Miovision

Full Study Diagram



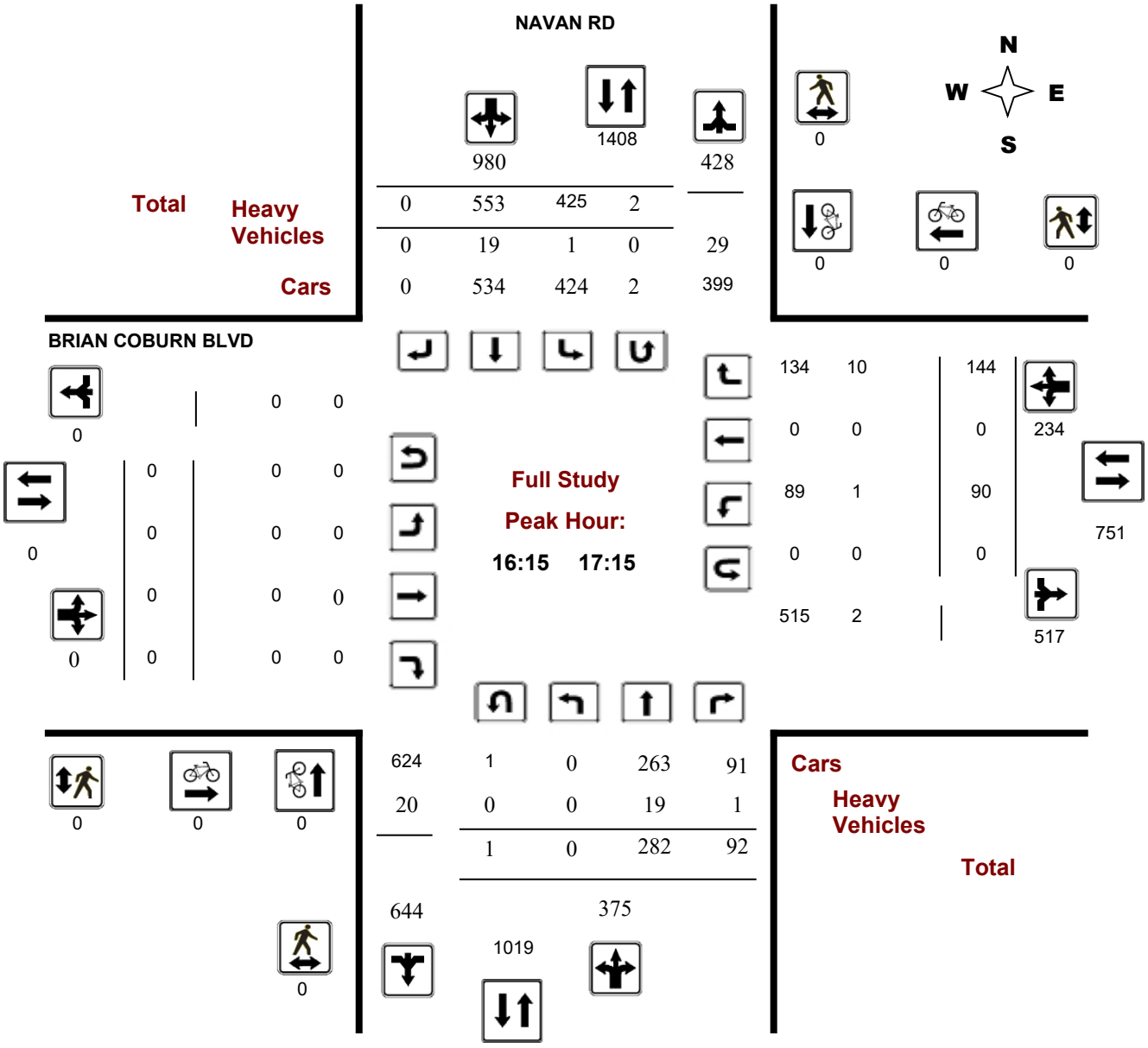
Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018
Start Time: 07:00
WO No: 38030
Device: Miovision

Full Study Peak Hour Diagram



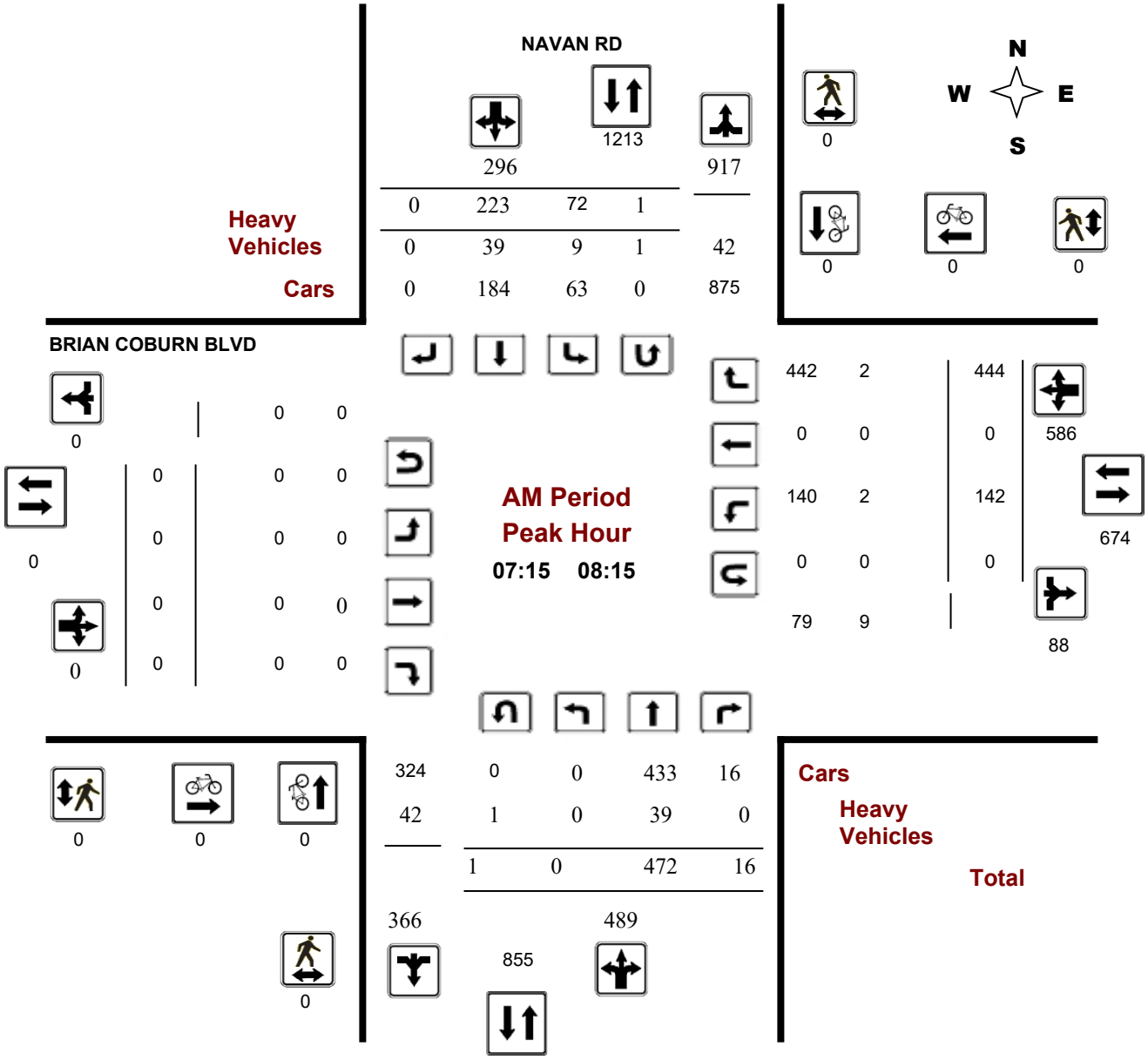
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018 **WO No:** 38030

Start Time: 07:00 **Device:** Miovision



Comments

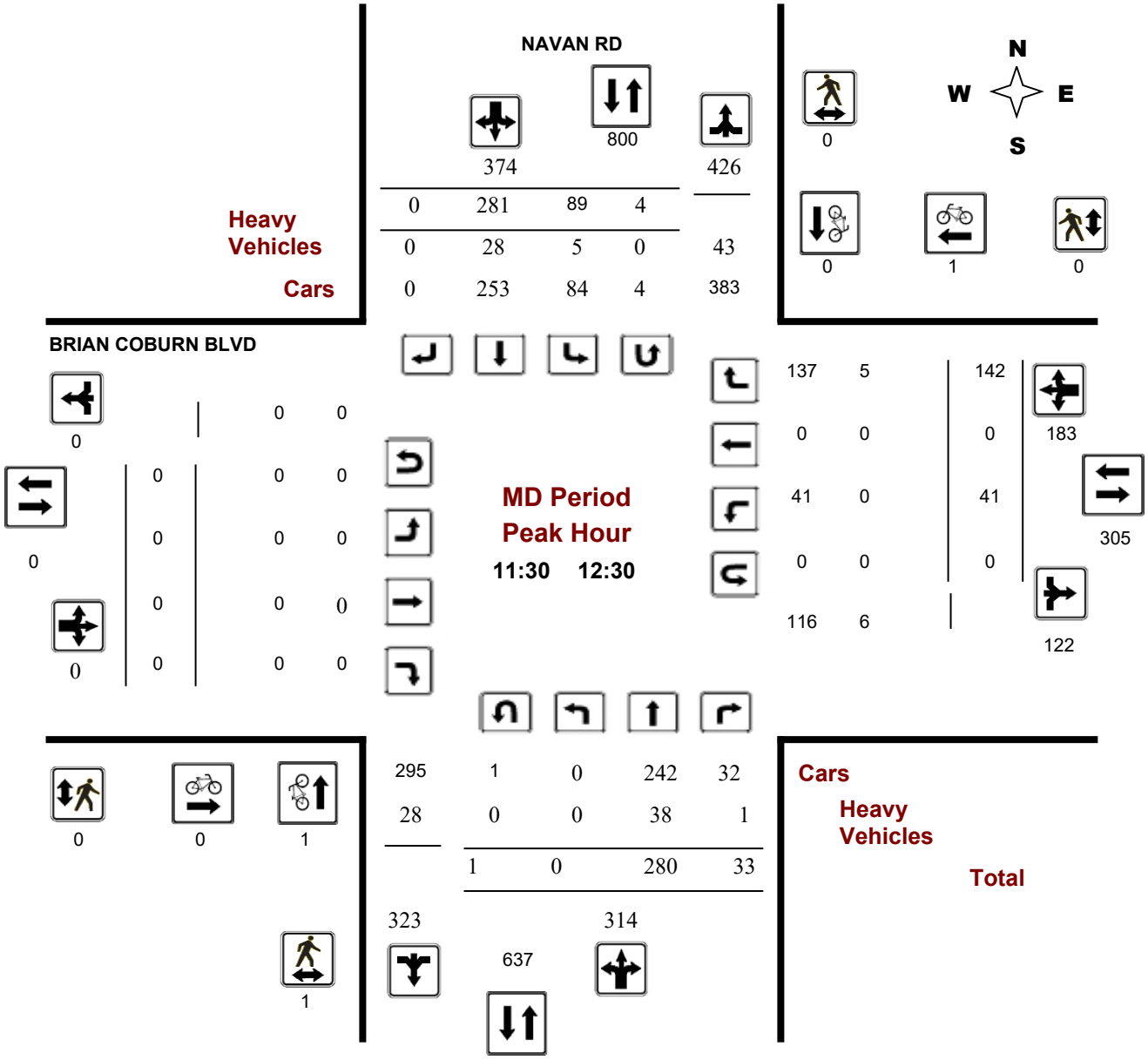
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018 **WO No:** 38030

Start Time: 07:00 **Device:** Miovision



Comments

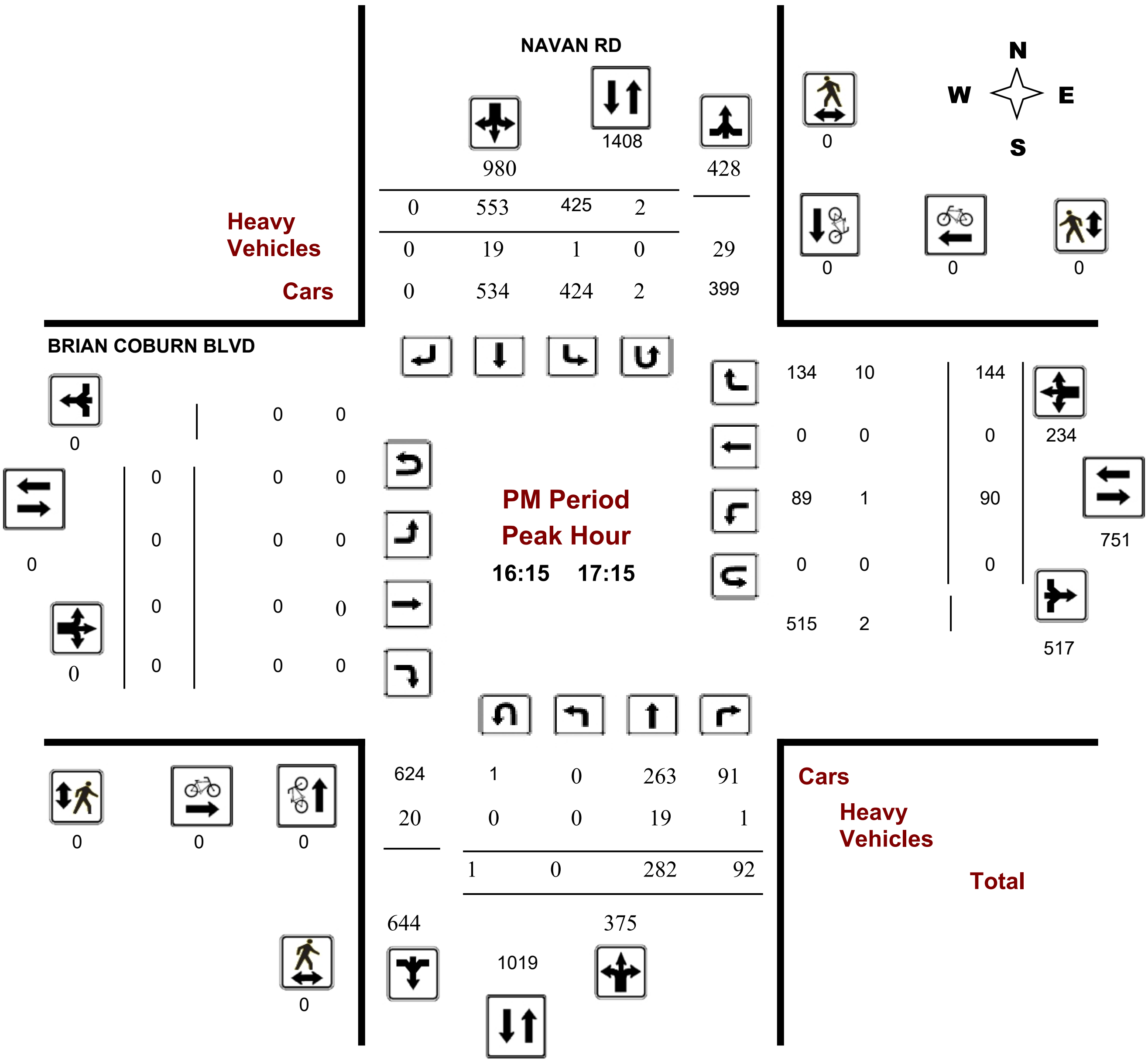
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018 **WO No:** 38030

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018 **WO No:** 38030

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, July 19, 2018

Total Observed U-Turns

Northbound: 8 Southbound: 12

Eastbound: 0 Westbound: 0

AADT Factor

.90

	NAVAN RD									BRIAN COBURN BLVD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	0	487	13	**500**	72	203	0	**275**	**775**	0	0	0	**0**	142	0	449	**591**	**591**	**1366**
08:00 09:00	0	423	35	**458**	70	221	0	**291**	**749**	0	0	0	**0**	107	0	381	**488**	**488**	**1237**
09:00 10:00	0	327	30	**357**	55	230	0	**285**	**642**	0	0	0	**0**	46	0	162	**208**	**208**	**850**
11:30 12:30	0	280	33	**313**	89	281	0	**370**	**683**	0	0	0	**0**	41	0	142	**183**	**183**	**866**
12:30 13:30	0	246	34	**280**	92	252	0	**344**	**624**	0	0	0	**0**	51	0	108	**159**	**159**	**783**
15:00 16:00	0	281	61	**342**	253	415	0	**668**	**1010**	0	0	0	**0**	69	0	124	**193**	**193**	**1203**
16:00 17:00	0	301	82	**383**	397	540	0	**937**	**1320**	0	0	0	**0**	95	0	136	**231**	**231**	**1551**
17:00 18:00	0	307	90	**397**	356	501	0	**857**	**1254**	0	0	0	**0**	60	0	143	**203**	**203**	**1457**
Sub Total	0	2652	378	**3030**	1384	2643	0	**4027**	**7057**	0	0	0	**0**	611	0	1645	**2256**	**2256**	**9313**
U Turns	8			**8**	12			**12**	**20**	**0**			**0**	0			**0**	**0**	**20**
Total	8	2652	378	**3038**	1396	2643	0	**4039**	**7077**	0	0	0	**0**	611	0	1645	**2256**	**2256**	**9333**
EQ 12Hr	11	3686	525	**4222**	1940	3674	0	**5614**	**9836**	0	0	0	**0**	849	0	2287	**3136**	**3136**	**12972**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	10	3317	472	**3799**	1746	3307	0	**5053**	**8852**	0	0	0	**0**	764	0	2058	**2822**	**2822**	**11674**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**.90**					
AVG 24Hr	13	4345	618	**4976**	2287	4332	0	**6619**	**11595**	0	0	0	**0**	1001	0	2696	**3697**	**3697**	**15292**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018 **WO No:** 38030

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		NAVAN RD									BRIAN COBURN BLVD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	117	4	121	17	45	0	62	**183**	0	0	0	0	30	0	117	147	**147**	**330**
07:15	07:30	0	130	2	132	16	49	0	65	**197**	0	0	0	0	43	0	140	183	**183**	**380**
07:30	07:45	1	118	2	121	25	41	0	66	**187**	0	0	0	0	37	0	110	147	**147**	**334**
07:45	08:00	0	122	5	127	14	68	0	82	**209**	0	0	0	0	32	0	82	114	**114**	**323**
08:00	08:15	0	102	7	109	18	65	0	83	**192**	0	0	0	0	30	0	112	142	**142**	**334**
08:15	08:30	0	104	11	115	18	55	0	73	**188**	0	0	0	0	31	0	101	132	**132**	**320**
08:30	08:45	0	108	7	115	25	51	0	76	**191**	0	0	0	0	26	0	96	122	**122**	**313**
08:45	09:00	3	109	10	122	10	50	0	60	**182**	0	0	0	0	20	0	72	92	**92**	**274**
09:00	09:15	0	78	6	84	13	70	0	83	**167**	0	0	0	0	20	0	58	78	**78**	**245**
09:15	09:30	0	85	6	91	12	46	0	58	**149**	0	0	0	0	8	0	42	50	**50**	**199**
09:30	09:45	0	86	9	95	13	59	0	72	**167**	0	0	0	0	6	0	27	33	**33**	**200**
09:45	10:00	0	78	9	87	18	55	0	73	**160**	0	0	0	0	12	0	35	47	**47**	**207**
11:30	11:45	0	77	9	86	25	56	0	81	**167**	0	0	0	0	12	0	38	50	**50**	**217**
11:45	12:00	1	70	6	77	14	70	0	84	**161**	0	0	0	0	8	0	39	47	**47**	**208**
12:00	12:15	0	65	12	77	29	76	0	105	**182**	0	0	0	0	17	0	31	48	**48**	**230**
12:15	12:30	0	68	6	74	25	79	0	104	**178**	0	0	0	0	4	0	34	38	**38**	**216**
12:30	12:45	0	59	6	65	20	51	0	71	**136**	0	0	0	0	14	0	24	38	**38**	**174**
12:45	13:00	1	72	10	83	24	59	0	83	**166**	0	0	0	0	12	0	25	37	**37**	**203**
13:00	13:15	0	48	11	59	34	73	0	107	**166**	0	0	0	0	11	0	34	45	**45**	**211**
13:15	13:30	0	67	7	74	16	69	0	85	**159**	0	0	0	0	14	0	25	39	**39**	**198**
15:00	15:15	1	68	11	80	44	91	0	135	**215**	0	0	0	0	16	0	32	48	**48**	**263**
15:15	15:30	0	70	18	88	60	94	0	154	**242**	0	0	0	0	13	0	36	49	**49**	**291**
15:30	15:45	0	70	13	83	63	102	0	165	**248**	0	0	0	0	17	0	27	44	**44**	**292**
15:45	16:00	0	73	19	92	87	128	0	215	**307**	0	0	0	0	23	0	29	52	**52**	**359**
16:00	16:15	0	80	15	95	83	129	0	212	**307**	0	0	0	0	21	0	28	49	**49**	**356**
16:15	16:30	0	87	25	112	91	140	0	231	**343**	0	0	0	0	24	0	37	61	**61**	**404**
16:30	16:45	1	64	22	87	114	138	0	252	**339**	0	0	0	0	25	0	43	68	**68**	**407**
16:45	17:00	0	70	20	90	111	133	0	244	**334**	0	0	0	0	25	0	28	53	**53**	**387**
17:00	17:15	0	61	25	86	111	142	0	253	**339**	0	0	0	0	16	0	36	52	**52**	**391**
17:15	17:30	0	74	33	107	93	113	0	206	**313**	0	0	0	0	21	0	27	48	**48**	**361**
17:30	17:45	0	82	21	103	90	139	0	229	**332**	0	0	0	0	12	0	46	58	**58**	**390**
17:45	18:00	0	90	11	101	63	107	0	170	**271**	0	0	0	0	11	0	34	45	**45**	**316**
Total:		8	2652	378	3038	1396	2643	0	4039	**7077**	0	0	0	0	611	0	1645	2256	**7077**	**9,333**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018 **WO No:** 38030

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		NAVAN RD			BRIAN COBURN BLVD			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	**0**	0	0	**0**	**0**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	0	0	**0**	0	0	**0**	**0**
08:30	08:45	0	1	**1**	0	0	**0**	**1**
08:45	09:00	0	0	**0**	0	0	**0**	**0**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	0	**0**	0	1	**1**	**1**
12:00	12:15	1	0	**1**	0	0	**0**	**1**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	2	**2**	**2**
13:15	13:30	0	0	**0**	0	0	**0**	**0**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	0	**0**	0	0	**0**	**0**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	0	**0**	0	0	**0**	**0**
16:15	16:30	0	0	**0**	0	0	**0**	**0**
16:30	16:45	0	0	**0**	0	0	**0**	**0**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	0	**0**	0	0	**0**	**0**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
Total		1	1	**2**	0	3	**3**	**5**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018 **WO No:** 38030

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

	NAVAN RD			BRIAN COBURN BLVD			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	**Total**	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	**Total**	**Grand Total**
07:00 07:15	0	0	**0**	0	0	**0**	**0**
07:15 07:30	0	0	**0**	0	0	**0**	**0**
07:30 07:45	0	0	**0**	0	0	**0**	**0**
07:45 08:00	0	0	**0**	0	0	**0**	**0**
08:00 08:15	0	0	**0**	0	0	**0**	**0**
08:15 08:30	0	0	**0**	0	0	**0**	**0**
08:30 08:45	0	0	**0**	0	0	**0**	**0**
08:45 09:00	0	0	**0**	0	0	**0**	**0**
09:00 09:15	0	0	**0**	0	0	**0**	**0**
09:15 09:30	0	0	**0**	0	0	**0**	**0**
09:30 09:45	0	0	**0**	0	0	**0**	**0**
09:45 10:00	0	0	**0**	0	0	**0**	**0**
11:30 11:45	0	0	**0**	0	0	**0**	**0**
11:45 12:00	1	0	**1**	0	0	**0**	**1**
12:00 12:15	0	0	**0**	0	0	**0**	**0**
12:15 12:30	0	0	**0**	0	0	**0**	**0**
12:30 12:45	0	0	**0**	0	0	**0**	**0**
12:45 13:00	0	0	**0**	0	0	**0**	**0**
13:00 13:15	0	0	**0**	0	0	**0**	**0**
13:15 13:30	0	0	**0**	0	0	**0**	**0**
15:00 15:15	0	0	**0**	0	0	**0**	**0**
15:15 15:30	0	0	**0**	0	0	**0**	**0**
15:30 15:45	0	0	**0**	0	0	**0**	**0**
15:45 16:00	0	0	**0**	0	0	**0**	**0**
16:00 16:15	0	0	**0**	0	2	**2**	**2**
16:15 16:30	0	0	**0**	0	0	**0**	**0**
16:30 16:45	0	0	**0**	0	0	**0**	**0**
16:45 17:00	0	0	**0**	0	0	**0**	**0**
17:00 17:15	0	0	**0**	0	0	**0**	**0**
17:15 17:30	0	0	**0**	0	0	**0**	**0**
17:30 17:45	0	0	**0**	0	0	**0**	**0**
17:45 18:00	0	0	**0**	0	0	**0**	**0**
Total	1	0	**1**	0	2	**2**	**3**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018 **WO No:** 38030

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		NAVAN RD									BRIAN COBURN BLVD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	7	0	**7**	6	8	0	**14**	**21**	0	0	0	**0**	0	0	1	**1**	**1**	**22**
07:15	07:30	0	8	0	**8**	3	8	0	**11**	**19**	0	0	0	**0**	0	0	0	**0**	**0**	**19**
07:30	07:45	0	9	0	**9**	4	10	0	**14**	**23**	0	0	0	**0**	2	0	0	**2**	**2**	**26**
07:45	08:00	0	10	0	**10**	2	8	0	**10**	**20**	0	0	0	**0**	0	0	0	**0**	**0**	**20**
08:00	08:15	0	12	0	**12**	0	13	0	**13**	**25**	0	0	0	**0**	0	0	2	**2**	**2**	**28**
08:15	08:30	0	12	0	**12**	3	11	0	**14**	**26**	0	0	0	**0**	1	0	0	**1**	**1**	**27**
08:30	08:45	0	7	0	**7**	2	5	0	**7**	**14**	0	0	0	**0**	0	0	0	**0**	**0**	**14**
08:45	09:00	0	11	0	**11**	0	11	0	**11**	**22**	0	0	0	**0**	0	0	0	**0**	**0**	**22**
09:00	09:15	0	7	1	**8**	1	11	0	**12**	**20**	0	0	0	**0**	1	0	0	**1**	**1**	**21**
09:15	09:30	0	16	1	**17**	4	12	0	**16**	**33**	0	0	0	**0**	0	0	4	**4**	**4**	**37**
09:30	09:45	0	6	0	**6**	1	15	0	**16**	**22**	0	0	0	**0**	1	0	0	**1**	**1**	**23**
09:45	10:00	0	13	0	**13**	1	7	0	**8**	**21**	0	0	0	**0**	3	0	5	**8**	**8**	**29**
11:30	11:45	0	15	0	**15**	0	6	0	**6**	**21**	0	0	0	**0**	0	0	0	**0**	**0**	**21**
11:45	12:00	0	5	0	**5**	1	5	0	**6**	**11**	0	0	0	**0**	0	0	2	**2**	**2**	**13**
12:00	12:15	0	6	0	**6**	2	6	0	**8**	**14**	0	0	0	**0**	0	0	2	**2**	**2**	**16**
12:15	12:30	0	12	1	**13**	2	11	0	**13**	**26**	0	0	0	**0**	0	0	1	**1**	**1**	**27**
12:30	12:45	0	5	0	**5**	2	7	0	**9**	**14**	0	0	0	**0**	0	0	0	**0**	**0**	**14**
12:45	13:00	0	5	0	**5**	4	6	0	**10**	**15**	0	0	0	**0**	0	0	1	**1**	**1**	**16**
13:00	13:15	0	7	1	**8**	2	6	0	**8**	**16**	0	0	0	**0**	0	0	0	**0**	**0**	**16**
13:15	13:30	0	11	0	**11**	0	7	0	**7**	**18**	0	0	0	**0**	0	0	2	**2**	**2**	**20**
15:00	15:15	0	3	2	**5**	3	6	0	**9**	**14**	0	0	0	**0**	0	0	2	**2**	**2**	**16**
15:15	15:30	0	10	0	**10**	0	3	0	**3**	**13**	0	0	0	**0**	1	0	4	**5**	**5**	**18**
15:30	15:45	0	6	0	**6**	0	6	0	**6**	**12**	0	0	0	**0**	1	0	1	**2**	**2**	**14**
15:45	16:00	0	4	0	**4**	1	6	0	**7**	**11**	0	0	0	**0**	0	0	1	**1**	**1**	**12**
16:00	16:15	0	4	0	**4**	2	11	0	**13**	**17**	0	0	0	**0**	1	0	4	**5**	**5**	**22**
16:15	16:30	0	8	0	**8**	0	4	0	**4**	**12**	0	0	0	**0**	1	0	5	**6**	**6**	**18**
16:30	16:45	0	2	0	**2**	1	7	0	**8**	**10**	0	0	0	**0**	0	0	2	**2**	**2**	**12**
16:45	17:00	0	4	0	**4**	0	4	0	**4**	**8**	0	0	0	**0**	0	0	0	**0**	**0**	**8**
17:00	17:15	0	5	1	**6**	0	4	0	**4**	**10**	0	0	0	**0**	0	0	3	**3**	**3**	**13**
17:15	17:30	0	4	0	**4**	0	2	0	**2**	**6**	0	0	0	**0**	2	0	1	**3**	**3**	**9**
17:30	17:45	0	5	0	**5**	0	8	0	**8**	**13**	0	0	0	**0**	0	0	2	**2**	**2**	**15**
17:45	18:00	0	4	0	**4**	1	6	0	**7**	**11**	0	0	0	**0**	0	0	0	**0**	**0**	**11**
Total:	None	0	243	7	**250**	48	240	0	**288**	**538**	0	0	0	**0**	14	0	45	**59**	**59**	**599**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRIAN COBURN BLVD @ NAVAN RD

Survey Date: Thursday, July 19, 2018 **WO No:** 38030

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

Time Period		NAVAN RD Northbound U-Turn Total	NAVAN RD Southbound U-Turn Total	BRIAN COBURN BLVD Eastbound U-Turn Total	BRIAN COBURN BLVD Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	**0**
07:15	07:30	0	0	0	0	**0**
07:30	07:45	1	0	0	0	**1**
07:45	08:00	0	0	0	0	**0**
08:00	08:15	0	1	0	0	**1**
08:15	08:30	0	0	0	0	**0**
08:30	08:45	0	0	0	0	**0**
08:45	09:00	3	0	0	0	**3**
09:00	09:15	0	1	0	0	**1**
09:15	09:30	0	0	0	0	**0**
09:30	09:45	0	0	0	0	**0**
09:45	10:00	0	0	0	0	**0**
11:30	11:45	0	1	0	0	**1**
11:45	12:00	1	0	0	0	**1**
12:00	12:15	0	2	0	0	**2**
12:15	12:30	0	1	0	0	**1**
12:30	12:45	0	0	0	0	**0**
12:45	13:00	1	1	0	0	**2**
13:00	13:15	0	1	0	0	**1**
13:15	13:30	0	0	0	0	**0**
15:00	15:15	1	0	0	0	**1**
15:15	15:30	0	0	0	0	**0**
15:30	15:45	0	1	0	0	**1**
15:45	16:00	0	0	0	0	**0**
16:00	16:15	0	1	0	0	**1**
16:15	16:30	0	0	0	0	**0**
16:30	16:45	1	1	0	0	**2**
16:45	17:00	0	0	0	0	**0**
17:00	17:15	0	1	0	0	**1**
17:15	17:30	0	0	0	0	**0**
17:30	17:45	0	0	0	0	**0**
17:45	18:00	0	0	0	0	**0**
Total		8	12	0	0	**20**

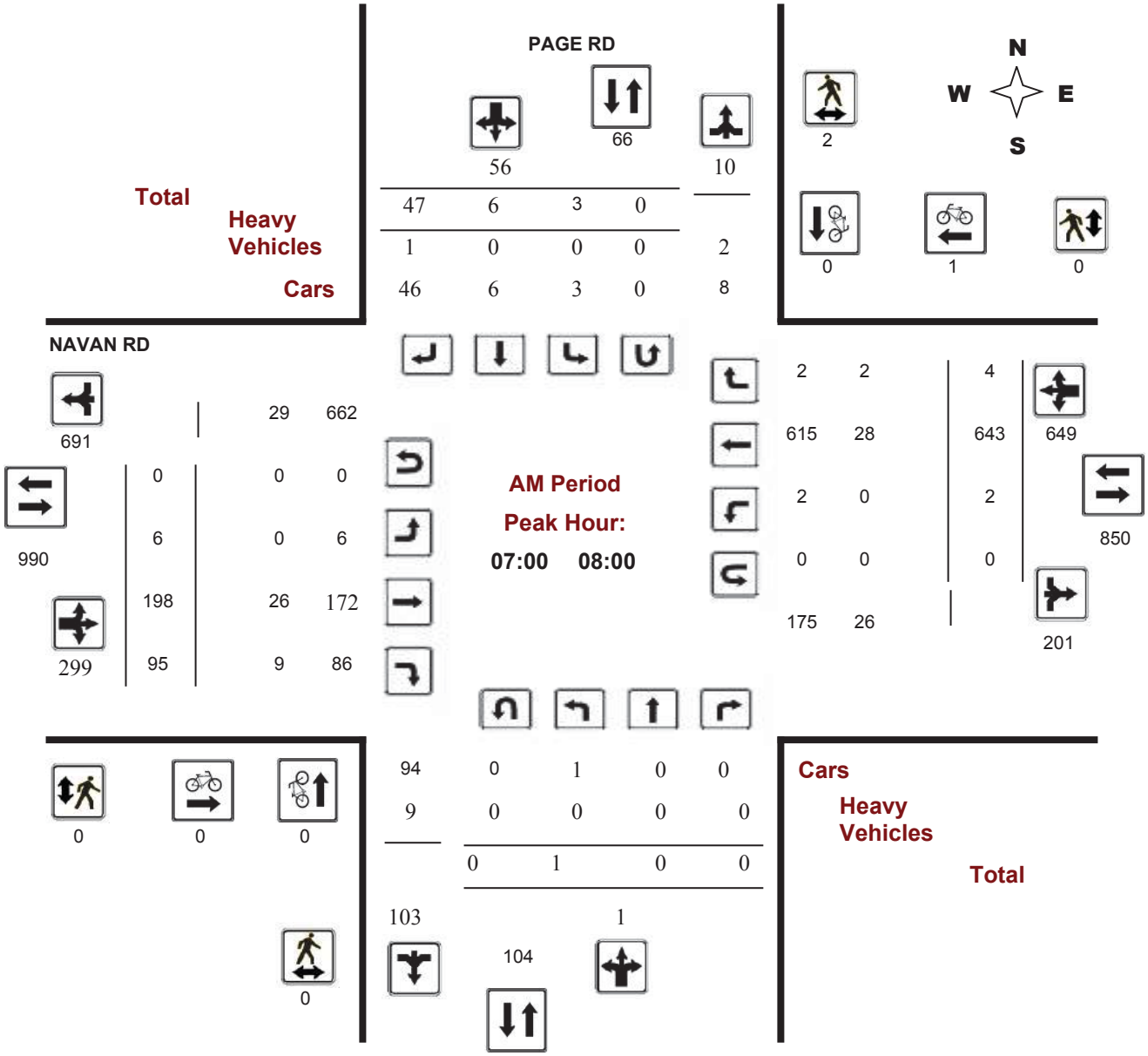
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

NAVAN RD @ PAGE RD

Survey Date: Thursday, May 25, 2017
Start Time: 07:00

WO No: 37064
Device: Miovision



Comments

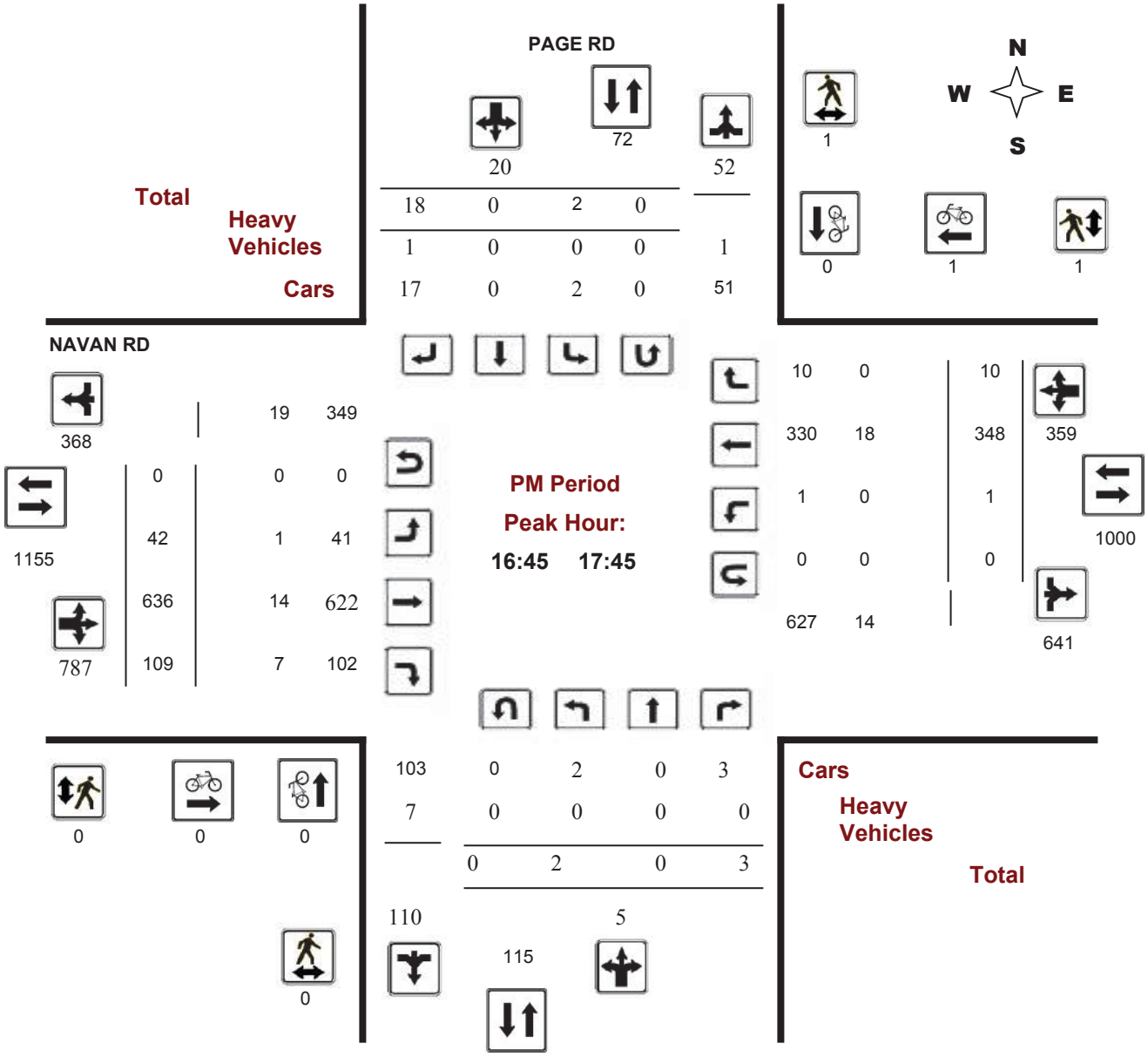
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

NAVAN RD @ PAGE RD

Survey Date: Thursday, May 25, 2017 **WO No:** 37064

Start Time: 07:00 **Device:** Miovision



Comments

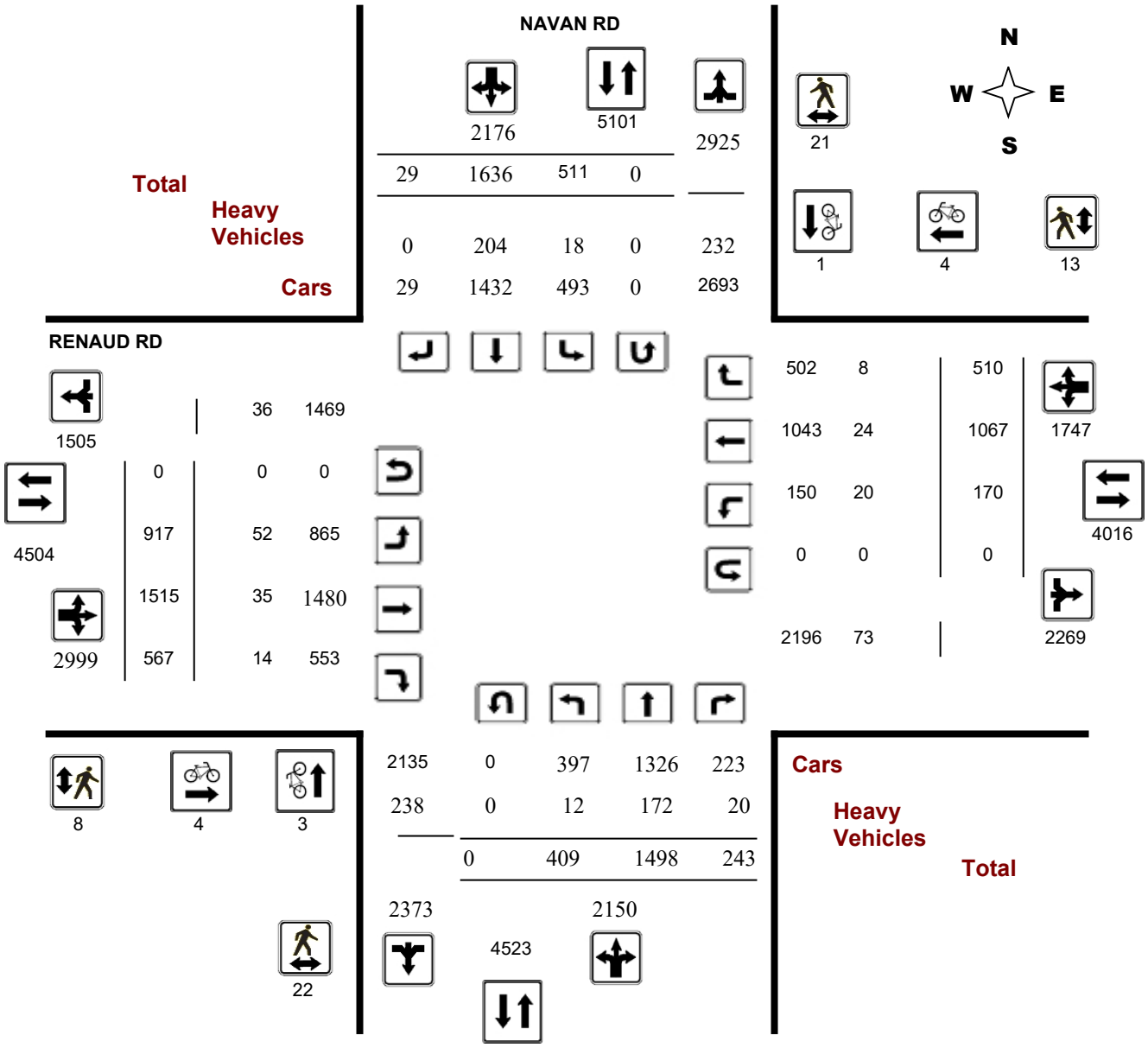
Transportation Services - Traffic Services

Turning Movement Count - Study Results

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019
Start Time: 07:00
WO No: 38897
Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

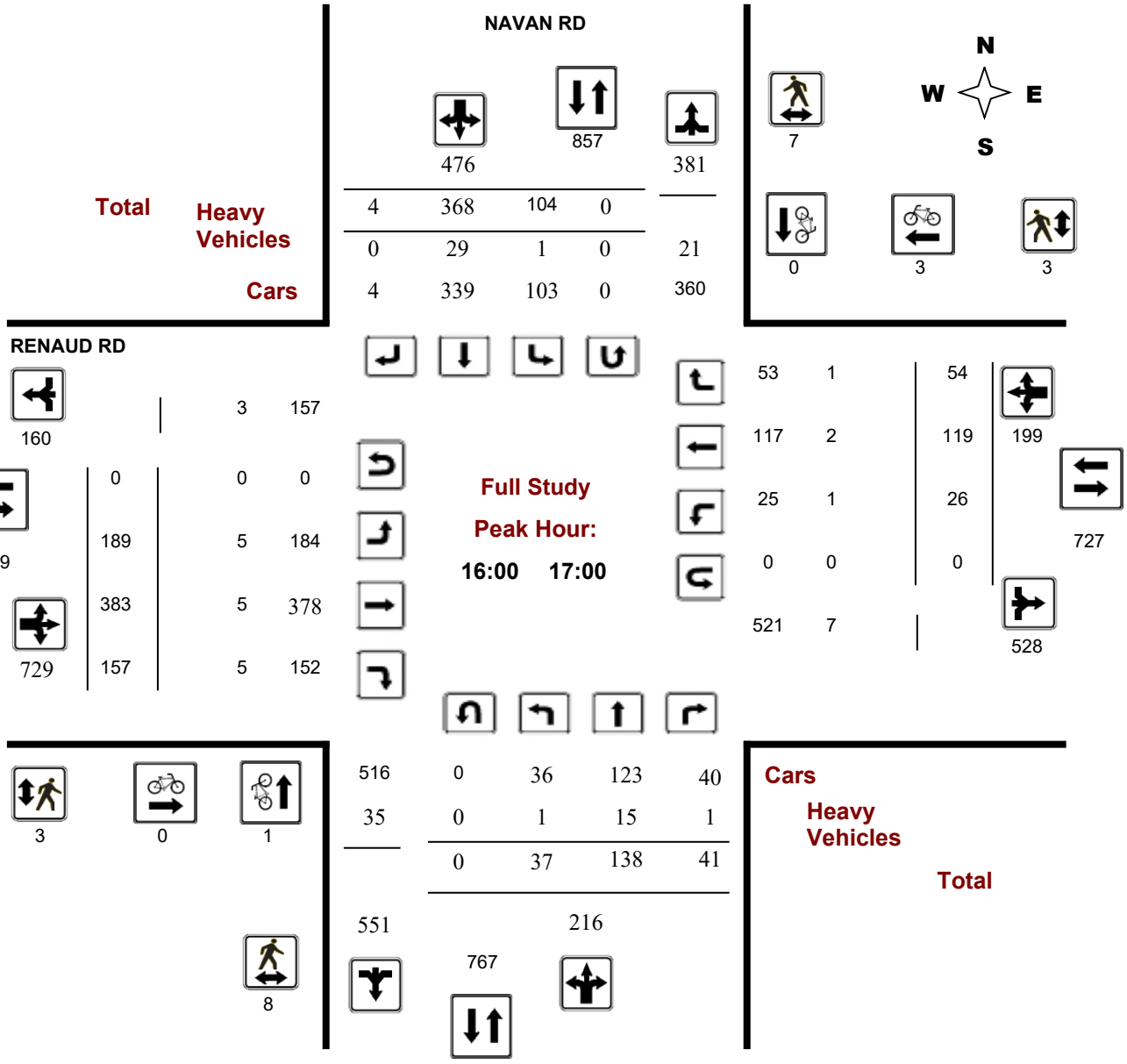
Turning Movement Count - Study Results

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



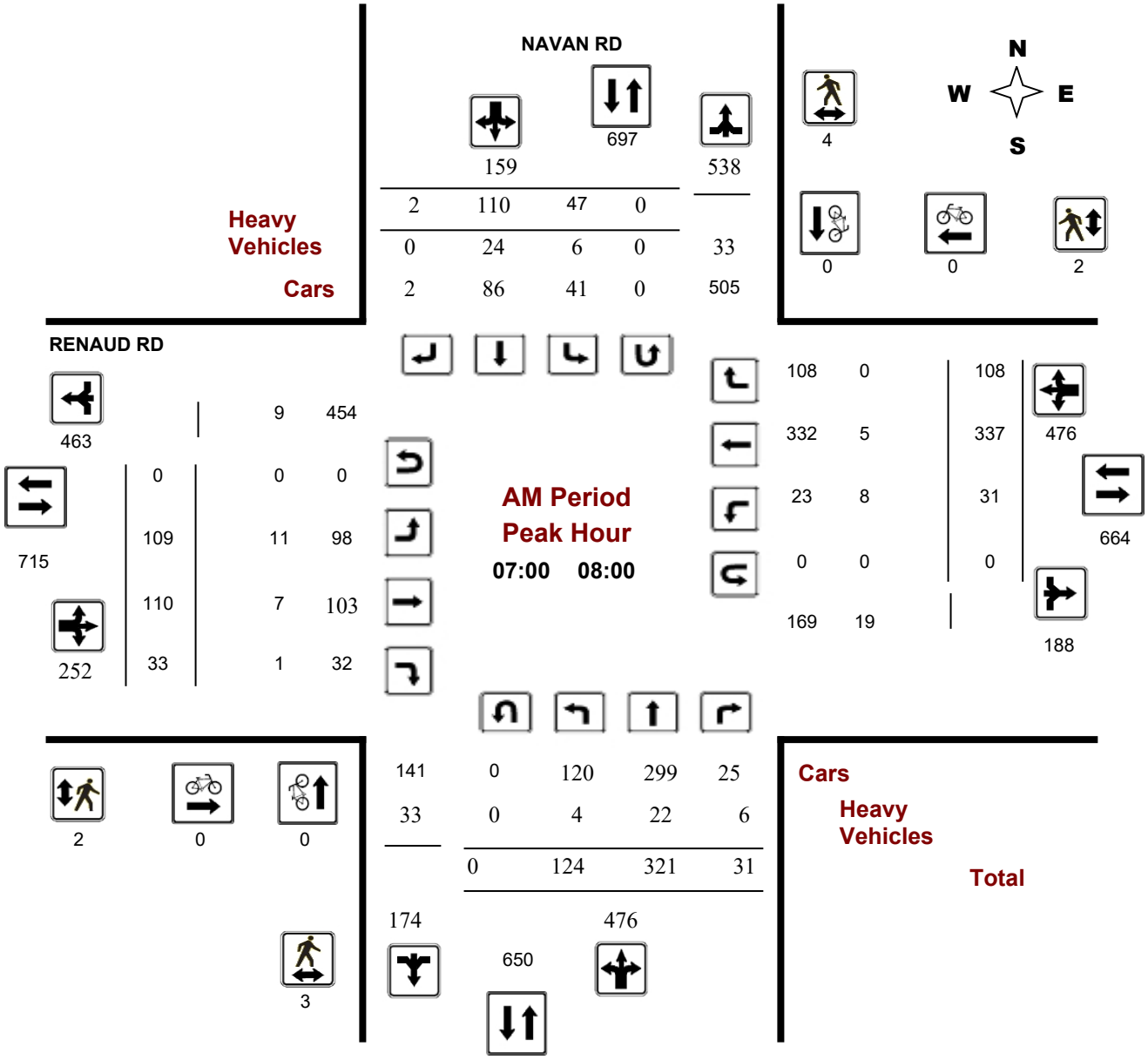
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

Start Time: 07:00 **Device:** Miovision



Comments

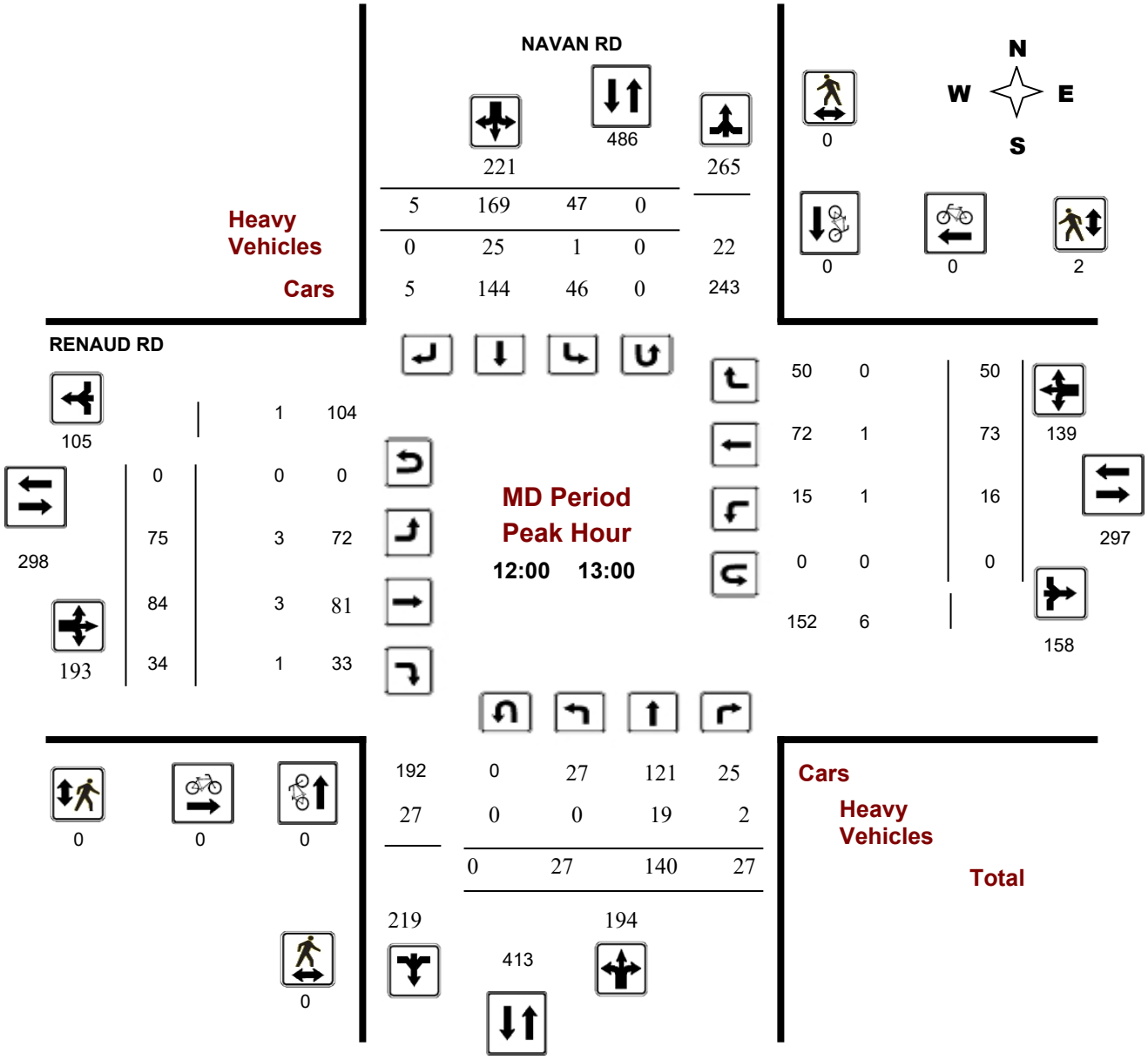
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

Start Time: 07:00 **Device:** Miovision



Comments

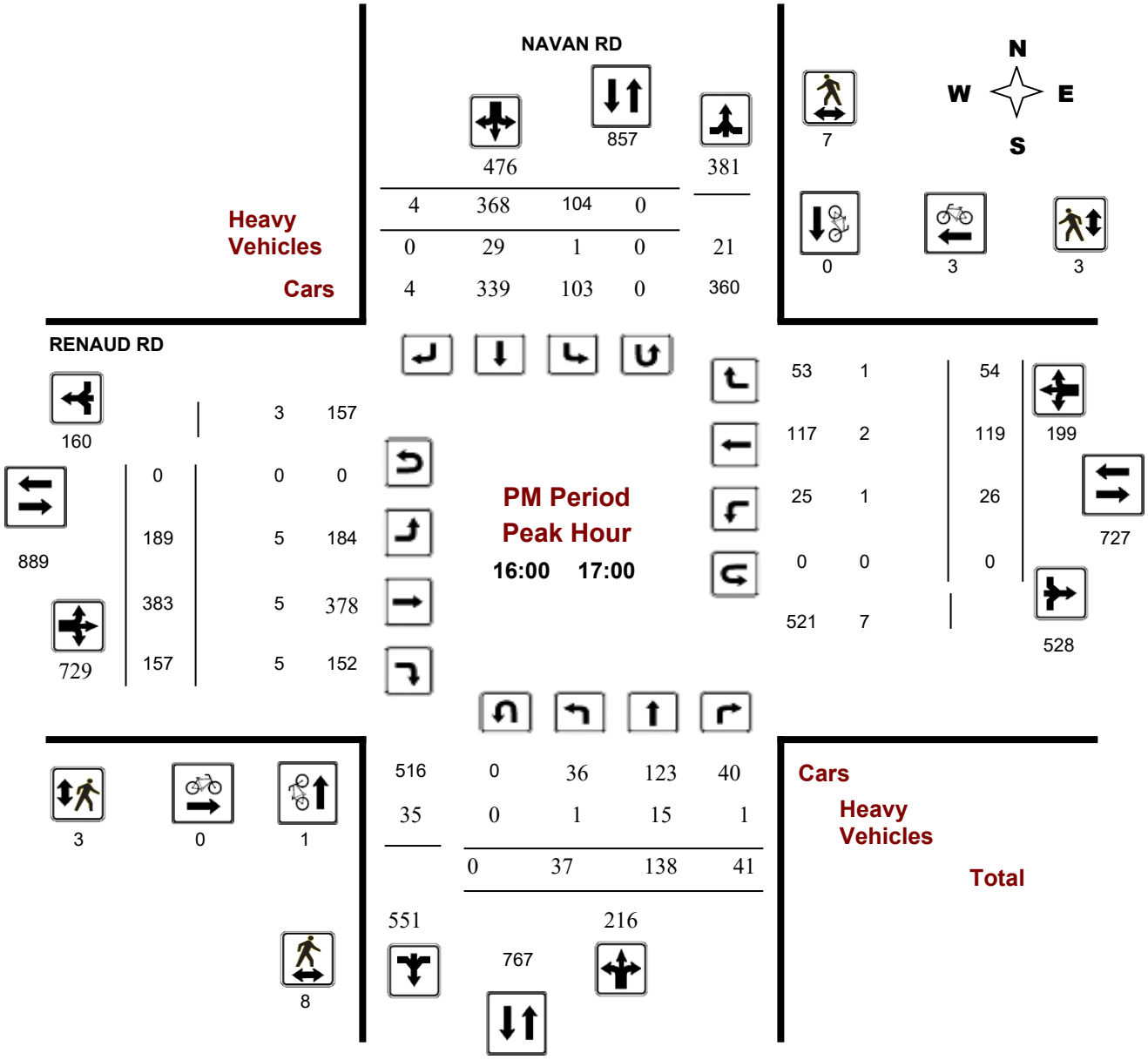
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, October 29, 2019

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor

1.25

	NAVAN RD									RENAUD RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	124	321	31	**476**	47	110	2	**159**	**635**	109	110	33	**252**	31	337	108	**476**	**728**	**1363**
08:00 09:00	94	241	36	**371**	41	119	2	**162**	**533**	115	135	26	**276**	18	195	91	**304**	**580**	**1113**
09:00 10:00	32	182	26	**240**	30	145	6	**181**	**421**	68	88	21	**177**	12	73	67	**152**	**329**	**750**
11:30 12:30	28	153	23	**204**	46	141	3	**190**	**394**	72	73	27	**172**	15	61	42	**118**	**290**	**684**
12:30 13:30	21	153	26	**200**	43	164	5	**212**	**412**	67	96	39	**202**	16	69	44	**129**	**331**	**743**
15:00 16:00	40	176	35	**251**	68	284	5	**357**	**608**	142	266	127	**535**	32	106	50	**188**	**723**	**1331**
16:00 17:00	37	138	41	**216**	104	368	4	**476**	**692**	189	383	157	**729**	26	119	54	**199**	**928**	**1620**
17:00 18:00	33	134	25	**192**	132	305	2	**439**	**631**	155	364	137	**656**	20	107	54	**181**	**837**	**1468**
Sub Total	409	1498	243	**2150**	511	1636	29	**2176**	**4326**	917	1515	567	**2999**	170	1067	510	**1747**	**4746**	**9072**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	409	1498	243	**2150**	511	1636	29	**2176**	**4326**	917	1515	567	**2999**	170	1067	510	**1747**	**4746**	**9072**
EQ 12Hr	569	2082	338	**2988**	710	2274	40	**3025**	**6013**	1275	2106	788	**4169**	236	1483	709	**2428**	**6597**	**12610**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	512	1874	304	**2690**	639	2047	36	**2722**	**5412**	1147	1895	709	**3752**	213	1335	638	**2185**	**5937**	**11349**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**0.9**					
AVG 24Hr	670	2455	398	**3523**	837	2681	48	**3566**	**7089**	1503	2483	929	**4915**	279	1749	836	**2863**	**7778**	**14867**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		NAVAN RD									RENAUD RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	36	77	10	123	6	22	0	28	308	19	18	6	43	3	92	30	125	308	319
07:15	07:30	36	84	11	131	6	36	0	42	371	26	12	11	49	13	98	28	139	371	361
07:30	07:45	26	79	4	109	13	26	1	40	326	35	47	7	89	9	78	21	108	326	346
07:45	08:00	26	81	6	113	22	26	1	49	342	29	33	9	71	6	69	29	104	342	337
08:00	08:15	25	64	12	101	14	32	1	47	296	24	29	4	57	3	45	21	69	296	274
08:15	08:30	27	67	8	102	9	31	0	40	298	26	38	4	68	4	58	24	86	298	296
08:30	08:45	20	54	9	83	9	29	0	38	274	32	41	9	82	5	49	24	78	274	281
08:45	09:00	22	56	7	85	9	27	1	37	275	33	27	9	69	6	43	22	71	275	262
09:00	09:15	20	50	7	77	8	33	0	41	257	23	27	5	55	6	24	22	52	257	225
09:15	09:30	3	50	2	55	9	43	2	54	235	15	18	3	36	2	23	13	38	235	183
09:30	09:45	6	46	10	62	6	34	1	41	221	17	18	4	39	1	13	16	30	221	172
09:45	10:00	3	36	7	46	7	35	3	45	203	13	25	9	47	3	13	16	32	203	170
11:30	11:45	7	44	1	52	8	41	2	51	218	11	16	8	35	5	9	6	20	218	158
11:45	12:00	4	39	7	50	12	28	0	40	193	17	16	6	39	1	18	12	31	193	160
12:00	12:15	8	36	5	49	10	36	1	47	212	25	19	6	50	3	23	10	36	212	182
12:15	12:30	9	34	10	53	16	36	0	52	221	19	22	7	48	6	11	14	31	221	184
12:30	12:45	4	40	6	50	8	49	3	60	243	16	17	8	41	3	25	17	45	243	196
12:45	13:00	6	30	6	42	13	48	1	62	223	15	26	13	54	4	14	9	27	223	185
13:00	13:15	5	42	8	55	12	27	1	40	206	19	28	10	57	3	12	10	25	206	177
13:15	13:30	6	41	6	53	10	40	0	50	223	17	25	8	50	6	18	8	32	223	185
15:00	15:15	9	44	10	63	10	62	2	74	315	30	39	27	96	4	15	11	30	315	263
15:15	15:30	10	50	11	71	25	61	0	86	367	37	76	33	146	10	36	19	65	367	368
15:30	15:45	12	40	7	59	13	77	2	92	347	28	73	27	128	11	30	13	54	347	333
15:45	16:00	9	42	7	58	20	84	1	105	390	47	78	40	165	7	25	7	39	390	367
16:00	16:15	10	38	8	56	21	96	2	119	403	42	106	37	185	4	30	11	45	403	405
16:15	16:30	11	46	12	69	27	106	1	134	458	38	75	45	158	8	31	12	51	458	412
16:30	16:45	8	24	10	42	24	86	0	110	370	48	101	41	190	5	29	14	48	370	390
16:45	17:00	8	30	11	49	32	80	1	113	393	61	101	34	196	9	29	17	55	393	413
17:00	17:15	10	37	5	52	29	90	0	119	383	37	95	34	166	7	28	7	42	383	379
17:15	17:30	4	33	2	39	22	85	0	107	366	45	106	39	190	3	25	15	43	366	379
17:30	17:45	8	34	6	48	42	74	1	117	380	44	85	40	169	6	32	17	55	380	389
17:45	18:00	11	30	12	53	39	56	1	96	307	29	78	24	131	4	22	15	41	307	321
Total:		409	1498	243	2150	511	1636	29	2176	9624	917	1515	567	2999	170	1067	510	1747	9624	9,072

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		NAVAN RD			RENAUD RD			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	1	0	1	1
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	1	0	1	1
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	1	1	0	0	0	1
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	1	1	1
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	1	0	1	1
16:00	16:15	1	0	1	0	2	2	3
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	1	1	1
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	1	0	1	0	0	0	1
17:15	17:30	0	0	0	1	0	1	1
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	1	0	1	0	0	0	1
Total		3	1	**4**	4	4	8	12

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

	NAVAN RD			RENAUD RD			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	**Total**	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	**Total**	**Grand Total**
07:00 07:15	0	0	**0**	0	1	**1**	**1**
07:15 07:30	3	2	**5**	2	1	**3**	**8**
07:30 07:45	0	1	**1**	0	0	**0**	**1**
07:45 08:00	0	1	**1**	0	0	**0**	**1**
08:00 08:15	0	0	**0**	0	0	**0**	**0**
08:15 08:30	0	0	**0**	0	0	**0**	**0**
08:30 08:45	0	0	**0**	0	0	**0**	**0**
08:45 09:00	0	2	**2**	0	0	**0**	**2**
09:00 09:15	0	0	**0**	0	0	**0**	**0**
09:15 09:30	0	0	**0**	0	0	**0**	**0**
09:30 09:45	1	0	**1**	0	0	**0**	**1**
09:45 10:00	0	1	**1**	0	0	**0**	**1**
11:30 11:45	0	1	**1**	0	0	**0**	**1**
11:45 12:00	0	0	**0**	0	0	**0**	**0**
12:00 12:15	0	0	**0**	0	1	**1**	**1**
12:15 12:30	0	0	**0**	0	0	**0**	**0**
12:30 12:45	0	0	**0**	0	0	**0**	**0**
12:45 13:00	0	0	**0**	0	1	**1**	**1**
13:00 13:15	1	0	**1**	0	0	**0**	**1**
13:15 13:30	0	0	**0**	0	0	**0**	**0**
15:00 15:15	0	0	**0**	0	0	**0**	**0**
15:15 15:30	1	1	**2**	1	1	**2**	**4**
15:30 15:45	2	1	**3**	1	0	**1**	**4**
15:45 16:00	0	1	**1**	0	0	**0**	**1**
16:00 16:15	0	5	**5**	1	1	**2**	**7**
16:15 16:30	1	0	**1**	0	2	**2**	**3**
16:30 16:45	4	2	**6**	0	0	**0**	**6**
16:45 17:00	3	0	**3**	2	0	**2**	**5**
17:00 17:15	4	0	**4**	0	2	**2**	**6**
17:15 17:30	0	1	**1**	1	0	**1**	**2**
17:30 17:45	0	2	**2**	0	0	**0**	**2**
17:45 18:00	2	0	**2**	0	3	**3**	**5**
Total	22	21	**43**	8	13	**21**	**64**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		NAVAN RD									RENAUD RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	1	5	2	**10**	2	2	0	**11**	**21**	2	1	0	**5**	0	1	0	**6**	**11**	**16**
07:15	07:30	0	6	2	**19**	0	6	0	**15**	**34**	3	0	1	**4**	4	0	0	**6**	**10**	**22**
07:30	07:45	2	4	1	**18**	2	9	0	**17**	**35**	2	6	0	**12**	2	2	0	**13**	**25**	**30**
07:45	08:00	1	7	1	**18**	2	7	0	**20**	**38**	4	0	0	**7**	2	2	0	**7**	**14**	**26**
08:00	08:15	1	8	0	**17**	0	8	0	**21**	**38**	4	4	0	**10**	0	1	1	**6**	**16**	**27**
08:15	08:30	0	12	1	**25**	2	9	0	**27**	**52**	4	2	0	**8**	3	2	0	**10**	**18**	**35**
08:30	08:45	0	10	0	**21**	1	8	0	**24**	**45**	5	1	0	**8**	3	2	0	**7**	**15**	**30**
08:45	09:00	2	10	1	**18**	1	5	0	**19**	**37**	3	2	0	**9**	0	2	0	**6**	**15**	**26**
09:00	09:15	0	10	0	**18**	0	7	0	**20**	**38**	3	0	1	**4**	0	0	0	**0**	**4**	**21**
09:15	09:30	0	5	1	**17**	1	10	0	**17**	**34**	1	0	0	**1**	1	0	0	**3**	**4**	**19**
09:30	09:45	0	2	3	**14**	3	9	0	**16**	**30**	0	1	0	**1**	0	0	2	**9**	**10**	**20**
09:45	10:00	0	8	0	**19**	0	11	0	**21**	**40**	1	0	0	**1**	0	0	1	**1**	**2**	**21**
11:30	11:45	1	7	0	**15**	0	7	0	**14**	**29**	0	0	0	**1**	0	0	0	**0**	**1**	**15**
11:45	12:00	0	7	0	**10**	0	3	0	**11**	**21**	1	0	0	**1**	0	0	0	**0**	**1**	**11**
12:00	12:15	0	8	0	**15**	0	6	0	**15**	**30**	1	0	0	**2**	1	1	0	**2**	**4**	**17**
12:15	12:30	0	3	1	**11**	1	7	0	**12**	**23**	1	1	0	**2**	0	0	0	**3**	**5**	**14**
12:30	12:45	0	3	1	**13**	0	8	0	**11**	**24**	0	1	1	**2**	0	0	0	**2**	**4**	**14**
12:45	13:00	0	5	0	**9**	0	4	0	**10**	**19**	1	1	0	**2**	0	0	0	**1**	**3**	**11**
13:00	13:15	1	8	1	**15**	0	5	0	**14**	**29**	0	0	0	**1**	0	0	1	**2**	**3**	**16**
13:15	13:30	0	5	2	**14**	1	5	0	**12**	**26**	1	1	1	**3**	1	0	0	**5**	**8**	**17**
15:00	15:15	1	4	1	**14**	1	8	0	**15**	**29**	1	0	0	**3**	0	1	1	**4**	**7**	**18**
15:15	15:30	1	7	1	**16**	0	6	0	**15**	**31**	2	0	0	**7**	1	4	0	**6**	**13**	**22**
15:30	15:45	0	7	0	**15**	0	7	0	**17**	**32**	2	1	1	**7**	0	3	1	**5**	**12**	**22**
15:45	16:00	0	4	0	**11**	0	6	0	**12**	**23**	2	2	1	**5**	0	0	0	**2**	**7**	**15**
16:00	16:15	0	4	0	**13**	0	9	0	**15**	**28**	2	1	0	**3**	0	0	0	**1**	**4**	**16**
16:15	16:30	0	6	1	**19**	1	8	0	**18**	**37**	2	3	4	**10**	0	1	1	**7**	**17**	**27**
16:30	16:45	0	3	0	**13**	0	8	0	**11**	**24**	0	0	1	**1**	1	0	0	**1**	**2**	**13**
16:45	17:00	1	2	0	**7**	0	4	0	**7**	**14**	1	1	0	**4**	0	1	0	**2**	**6**	**10**
17:00	17:15	0	1	0	**4**	0	2	0	**4**	**8**	1	3	1	**6**	0	1	0	**4**	**10**	**9**
17:15	17:30	0	0	0	**1**	0	1	0	**3**	**4**	2	1	0	**3**	0	0	0	**1**	**4**	**4**
17:30	17:45	0	1	0	**6**	0	4	0	**5**	**11**	0	0	1	**1**	0	0	0	**0**	**1**	**6**
17:45	18:00	0	0	0	**7**	0	5	0	**5**	**12**	0	2	1	**3**	1	0	0	**3**	**6**	**9**
Total:	None	12	172	20	**442**	18	204	0	**454**	**896**	52	35	14	**137**	20	24	8	**125**	**262**	**579**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RENAUD RD @ NAVAN RD

Survey Date: Tuesday, October 29, 2019 **WO No:** 38897

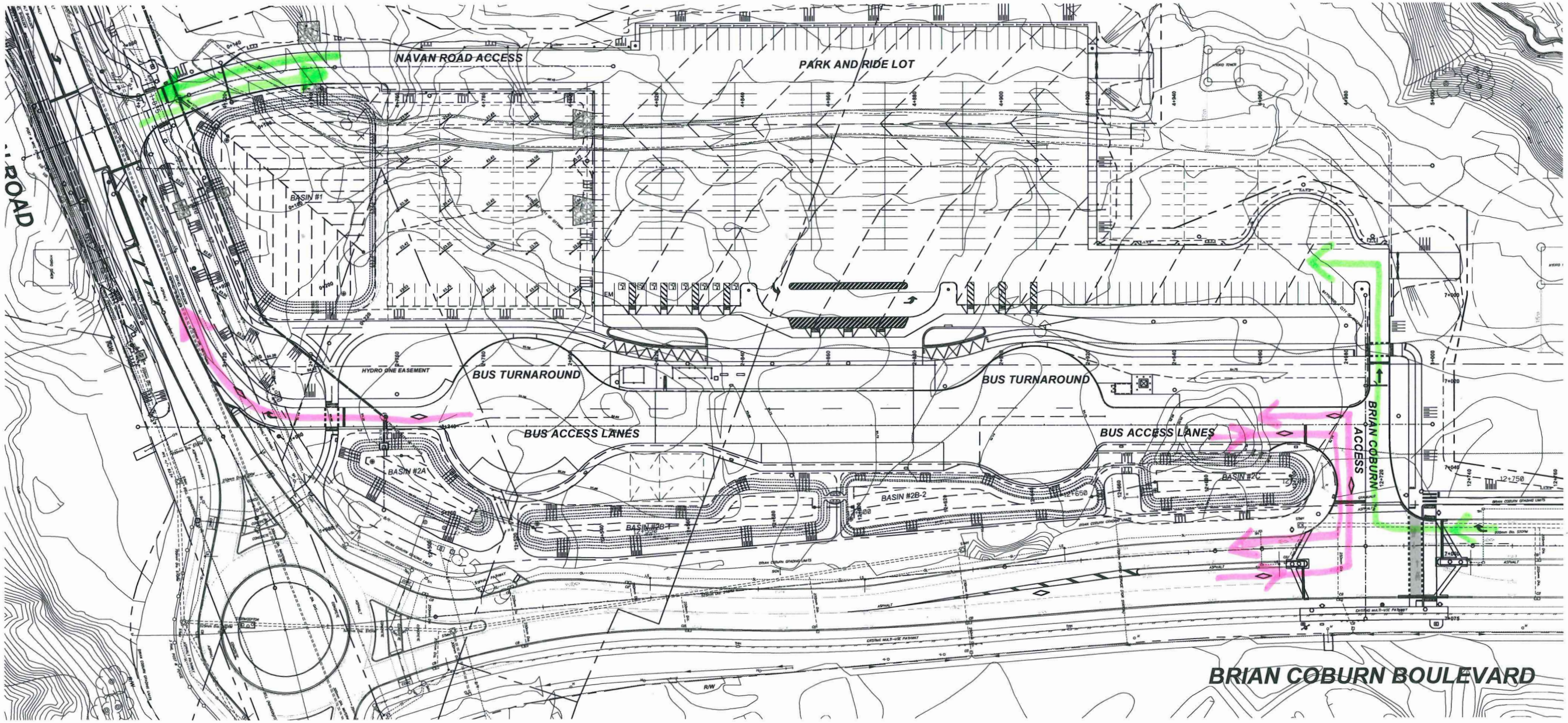
Start Time: 07:00 **Device:** Miovision

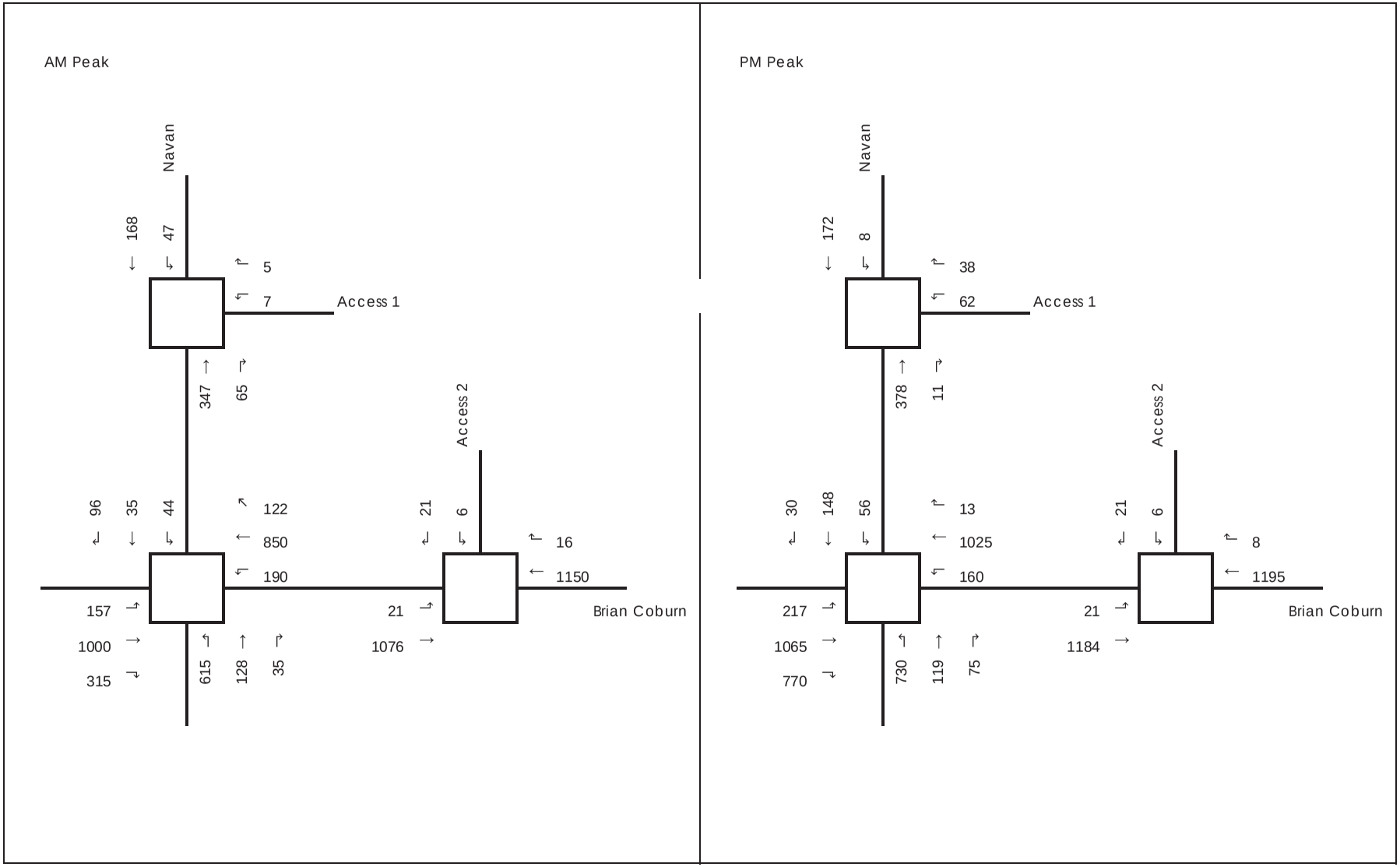
Full Study 15 Minute U-Turn Total

		NAVAN RD		RENAUD RD		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

Appendix B

Chapel Hill Park and Ride Excerpt


NAVAN ROAD ACCESS
PARK AND RIDE LOT
BASIN #1
HYDRO ONE EASEMENT
BUS TURNAROUND
BUS TURNAROUND
BUS ACCESS LANES
BUS ACCESS LANES
BRIAN COBURN ACCESS
BASIN #2A
BASIN #2B-1
BASIN #2B-2
BASIN #2C
BRIAN COBURN BOULEVARD
General Traffic
Buses



Stantec Consulting Ltd.
1331 Clyde Avenue, Suite 400
Ottawa, ON, Canada K2C 3G4
Tel: (613) 722-4420

City of Ottawa
Chapel Hill Park & Ride Environmental Assessment
Figure 1-2
2031 AM and PM Total Peak Hour Volumes

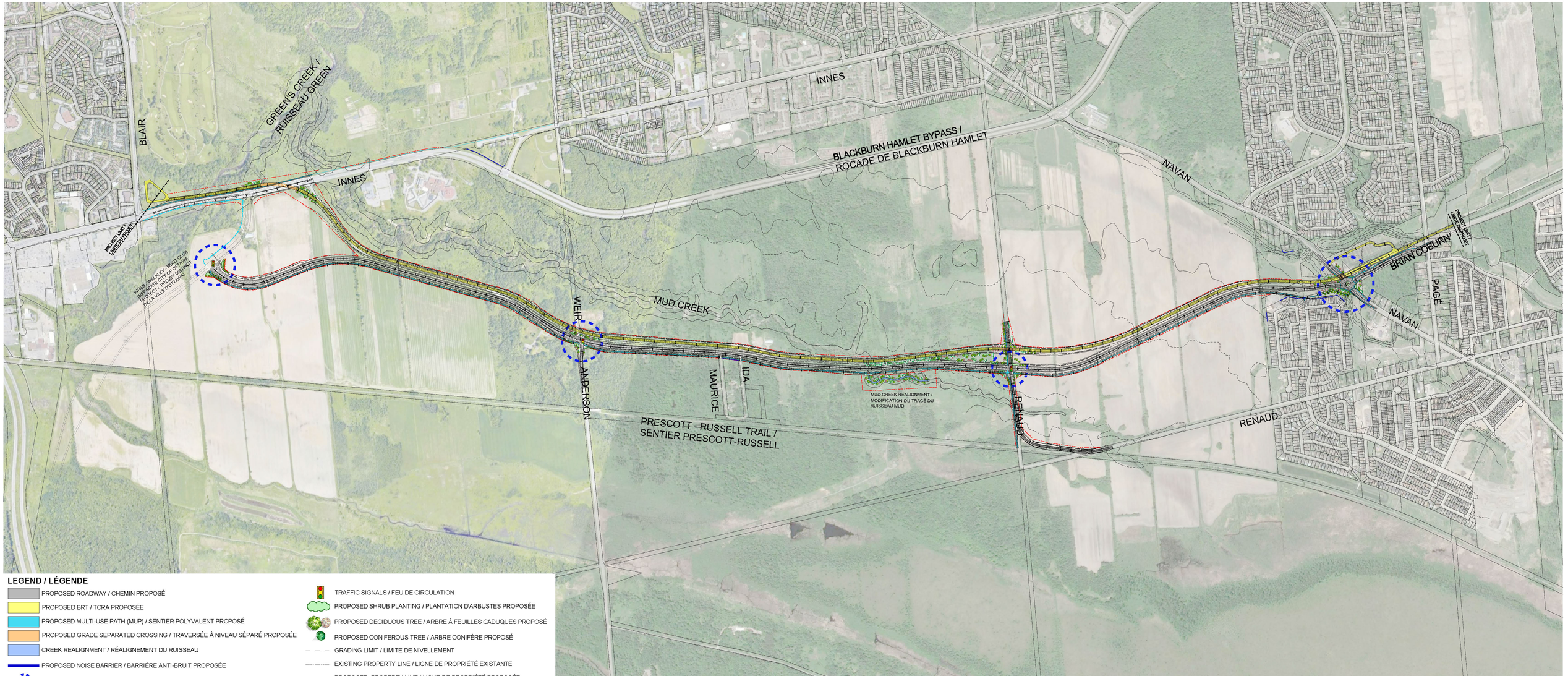
Appendix C

Collision Data

OBJECTID	DATE	ANOM_ID	YEAR	TIME	LOCATION	GEO_ID	ACCIDENT_LO	CLASS_OF_AC	IMPACT_TYPE	ENVIRONMENT	LIGHT	ROAD_SURFAC	TRAFFIC_CON	TRAFFIC_CONTROL_CONDITION
1674	2018/02/13 00:00:0	18-1947	2018	9:04:00 PM	BRIAN COBURI	e___2IA8	01 - Non interse	03 - P.D. only	07 - SMV other	01 - Clear	07 - Dark	05 - Packed snc	10 - No control	
2562	2018/02/25 00:00:0	18-2315	2018	8:30:00 AM	BRIAN COBURI	17228	03 - At intersect	03 - P.D. only	07 - SMV other	04 - Freezing R	01 - Daylight	06 - Ice	11 - Roundabou	01 - Functioning
7772	2018/08/09 00:00:0	18-7234	2018	1:04:00 PM	BRIAN COBURI	17228	02 - Intersection	03 - P.D. only	01 - Approachin	01 - Clear	01 - Daylight	01 - Dry	11 - Roundabou	01 - Functioning
3583	2018/04/05 00:00:0	18-3449	2018	7:25:00 AM	BRIAN COBURI	17228	03 - At intersect	03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	11 - Roundabou	01 - Functioning
10367	2018/11/16 00:00:0	18-10696	2018	10:47:00 AM	BRIAN COBURI	17228	02 - Intersection	02 - Non-fatal in	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	11 - Roundabou	01 - Functioning
85579	11/29/2019	19-12976	2019	17:00:00+00	BRIAN COBURI	17228	02 - Intersection	03 - P.D. only	03 - Rear end	01 - Clear	05 - Dusk	01 - Dry	11 - Roundabou	01 - Functioning
80507	7/4/2019	19-7262	2019	22:00:00+00	BRIAN COBURI	17228	03 - At intersect	03 - P.D. only	02 - Angle	01 - Clear	07 - Dark	01 - Dry	11 - Roundabou	01 - Functioning
78331	5/24/2019	19-5773	2019	18:55:00+00	BRIAN COBURI	17228	02 - Intersection	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	11 - Roundabou	01 - Functioning
84969	11/24/2019	19-12706	2019	14:30:00+00	BRIAN COBURI	17228	03 - At intersect	03 - P.D. only	07 - SMV other	01 - Clear	01 - Daylight	01 - Dry	11 - Roundabou	01 - Functioning
81909	9/7/2019	19-9480	2019	01:11:00+00	BRIAN COBURI	17228	03 - At intersect	03 - P.D. only	07 - SMV other	02 - Rain	07 - Dark	02 - Wet	11 - Roundabou	01 - Functioning
75348	2/23/2019	19-2774	2019	09:30:00+00	BRIAN COBURI	17228	02 - Intersection	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	02 - Wet	11 - Roundabou	01 - Functioning
2829	2018/03/19 00:00:0	18-2988	2018	6:38:00 AM	NAVAN RD btw	__3ZA3J1	04 - At/near priv	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	10 - No control	
74373	2/2/2019	19-1826	2019	19:34:00+00	NAVAN RD btw	__3ZA3J1	01 - Non interse	03 - P.D. only	01 - Approachin	01 - Clear	07 - Dark	03 - Loose snow	10 - No control	
9121	2018/10/09 00:00:0	18-9203	2018	10:52:00 PM	NAVAN RD btw	__3ZA3J1	01 - Non interse	03 - P.D. only	03 - Rear end	01 - Clear	07 - Dark	01 - Dry	10 - No control	
5780	2018/06/06 00:00:0	18-5255	2018	5:18:00 PM	NAVAN RD btw	__3ZA3J1	01 - Non interse	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	10 - No control	
68811	5/31/2017 4:00	10815	2017	12/31/1899 2:29	NAVAN RD btwn	ORLEANS BL\	01 - Non interse	03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	08 - Loose sand	10 - No control	
2956	2018/03/10 00:00:0	18-2756	2018	6:50:00 PM	NAVAN RD btw	__3ZA3J1	01 - Non interse	02 - Non-fatal in	07 - SMV other	01 - Clear	07 - Dark	01 - Dry	10 - No control	
55971	2016/12/05 05:00:0	16-11351	2016	1899/12/31 23:4	NAVAN RD btwn	ORLEANS BLVD & PAGE RD		03 - P.D. only	03 - Rear end	03 - Snow	07 - Dark	05 - Packed snc	10 - No control	
4331	2018/05/09 00:00:0	18-4379	2018	4:24:00 PM	BRIAN COBURI	17232	02 - Intersection	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic sign	01 - Functioning
61193	10/29/2017 4:00	2228	2017	1/1/1900 4:43	BRIAN COBURN	BLVD @ PAGI	02 - Intersection	03 - P.D. only	07 - SMV other	02 - Rain	07 - Dark	02 - Wet	01 - Traffic signal	
46105	2016/02/17 05:00:0	16-1896	2016	1899/12/31 23:4	NAVAN RD btwn	ORLEANS BLVD & PAGE RD		03 - P.D. only	03 - Rear end	03 - Snow	07 - Dark	06 - Ice	10 - No control	
74600	2/4/2019	19-1881	2019	07:44:00+00	NAVAN RD btw	__3ZA3J1	01 - Non interse	03 - P.D. only	01 - Approachin	01 - Clear	01 - Daylight	02 - Wet	10 - No control	
55375	2016/11/02 04:00:0	16-10079	2016	1899/12/31 21:0	NAVAN RD @ PAGE RD			02 - Non-fatal in	05 - Turning mo	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	01 - Functioning
68575	9/18/2017 4:00	10805	2017	12/31/1899 10:0	NAVAN RD @ PAGE RD		03 - At intersect	03 - P.D. only	07 - SMV other	01 - Clear	07 - Dark	01 - Dry	02 - Stop sign	
45557	2016/01/25 05:00:0	16-1032	2016	1899/12/31 21:4	NAVAN RD @ PAGE RD			03 - P.D. only	02 - Angle	01 - Clear	05 - Dusk	01 - Dry	02 - Stop sign	01 - Functioning
81099	8/9/2019	19-8463	2019	11:28:00+00	NAVAN RD @ F	4199	03 - At intersect	03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	01 - Functioning
33565	2015/03/25 04:00:0	15-4117	2015	1899/12/31 17:0	NAVAN RD @ PAGE RD			03 - P.D. only	07 - SMV other	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	01 - Functioning
50310	2016/06/16 04:00:0	16-5795	2016	1900/01/01 01:0	NAVAN RD @ PAGE RD			03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	01 - Functioning
68578	3/2/2017 5:00	10806	2017	12/31/1899 12:0	NAVAN RD @ PAGE RD		03 - At intersect	03 - P.D. only	02 - Angle	04 - Freezing R	03 - Dawn	06 - Ice	02 - Stop sign	
34101	2015/03/23 04:00:0	15-4044	2015	1899/12/31 20:0	NAVAN RD @ PAGE RD			03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	01 - Functioning
73444	1/11/2019	19-449	2019	18:30:00+00	NAVAN RD btw	__3ZBOGN	01 - Non interse	03 - P.D. only	01 - Approachin	01 - Clear	07 - Dark	01 - Dry	10 - No control	
46618	2016/02/19 05:00:0	16-2103	2016	1899/12/31 23:5	RENAUD RD @ PAGE RD			03 - P.D. only	02 - Angle	03 - Snow	07 - Dark	03 - Loose snow	02 - Stop sign	01 - Functioning
75901	3/15/2019	19-3570	2019	17:38:00+00	RENAUD RD @	4535	02 - Intersection	03 - P.D. only	05 - Turning mo	02 - Rain	01 - Daylight	02 - Wet	02 - Stop sign	00 - Unknown
12233	2018/12/19 00:00:0	18-12206	2018	7:55:00 AM	NAVAN RD btw	__3ZA3J1	01 - Non interse	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	10 - No control	
39824	2015/10/05 04:00:0	15-10376	2015	1899/12/31 22:2	RENAUD RD @ NAVAN RD			02 - Non-fatal in	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic sign	01 - Functioning
70422	9/5/2017 4:00	11087	2017	12/31/1899 1:5(	ORLEANS BLVD @ NAVAN RD		02 - Intersection	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	
70424	2/7/2017 5:00	11089	2017	12/31/1899 12:1	ORLEANS BLVD @ NAVAN RD		03 - At intersect	03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	04 - Slush	02 - Stop sign	
80090	7/24/2019	19-7924	2019	01:56:00+00	ORLEANS BLVI	12474	02 - Intersection	03 - P.D. only	07 - SMV other	01 - Clear	07 - Dark	01 - Dry	01 - Traffic sign	01 - Functioning
51678	2016/08/10 04:00:0	16-7434	2016	1899/12/31 16:1	ORLEANS BLVD @ NAVAN RD			02 - Non-fatal in	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	01 - Functioning
1444	2018/02/10 00:00:0	18-1826	2018	5:38:00 PM	ORLEANS BLVI	12474	03 - At intersect	02 - Non-fatal in	01 - Approachin	03 - Snow	07 - Dark	05 - Packed snc	01 - Traffic sign	01 - Functioning
1680	2018/02/14 00:00:0	18-1953	2018	7:14:00 AM	ORLEANS BLVI	12474	03 - At intersect	03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	01 - Functioning
898	2018/01/15 00:00:0	18-698	2018	5:56:00 PM	ORLEANS BLVI	12474	02 - Intersection	02 - Non-fatal in	03 - Rear end	01 - Clear	07 - Dark	06 - Ice	01 - Traffic sign	01 - Functioning
12104	2018/12/19 00:00:0	18-12199	2018	6:52:00 AM	ORLEANS BLVI	12474	02 - Intersection	03 - P.D. only	03 - Rear end	01 - Clear	03 - Dawn	01 - Dry	01 - Traffic sign	01 - Functioning
70421	7/11/2017 4:00	11086	2017	12/31/1899 9:34	ORLEANS BLVD @ NAVAN RD		02 - Intersection	03 - P.D. only	01 - Approachin	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	
54395	2016/10/06 04:00:0	16-9199	2016	1899/12/31 12:2	ORLEANS BLVD @ NAVAN RD			03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	01 - Functioning
49124	2016/05/02 04:00:0	16-4347	2016	1899/12/31 19:5	ORLEANS BLVD @ NAVAN RD			03 - P.D. only	99 - Other	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	01 - Functioning
70238	10/19/2017 4:00	11946	2017	12/31/1899 6:0	RENAUD RD @ NAVAN RD		02 - Intersection	03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic signal	
34306	2015/04/14 04:00:0	15-4681	2015	1899/12/31 17:3	RENAUD RD @ NAVAN RD			03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic sign	01 - Functioning
31025	2015/02/04 05:00:0	15-1963	2015	1899/12/31 15:3	RENAUD RD @ NAVAN RD			03 - P.D. only	07 - SMV other	03 - Snow	01 - Daylight	03 - Loose snow	01 - Traffic sign	01 - Functioning
11602	2018/12/10 00:00:0	18-11745	2018	10:05:00 AM	RENAUD RD @	3685	02 - Intersection	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic sign	01 - Functioning
77254	4/15/2019	19-4476	2019	08:48:00+00	RENAUD RD @	3685	03 - At intersect	02 - Non-fatal in	02 - Angle	02 - Rain	01 - Daylight	02 - Wet	01 - Traffic sign	01 - Functioning
80920	8/15/2019	19-8659	2019	07:12:00+00	RENAUD RD @	3685	02 - Intersection	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic sign	01 - Functioning
6011	2018/07/17 00:00:0	18-6608	2018	9:43:00 PM	RENAUD RD @	3685	03 - At intersect	03 - P.D. only	02 - Angle	01 - Clear	07 - Dark	01 - Dry	01 - Traffic sign	01 - Functioning
7479	2018/08/31 00:00:0	18-7822	2018	9:20:00 AM	RENAUD RD @	3685	03 - At intersect	02 - Non-fatal in	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic sign	01 - Functioning
78070	5/21/2019	19-5622	2019	12:53:00+00	RENAUD RD @	3685	03 - At intersect	02 - Non-fatal in	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic sign	01 - Functioning
80074	7/23/2019	19-7909	2019	16:55:00+00	RENAUD RD @	3685	02 - Intersection	03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic sign	01 - Functioning
70423	11/12/2017 5:00	11088	2017	12/31/1899 8:16	ORLEANS BLVD @ NAVAN RD		03 - At intersect	03 - P.D. only	02 - Angle	01 - Clear	01 - Daylight	01 - Dry	02 - Stop sign	
70239	10/24/2017 4:00	11947	2017	12/31/1899 12:2	RENAUD RD @ NAVAN RD		03 - At intersect	02 - Non-fatal in	07 - SMV other	02 - Rain	03 - Dawn	02 - Wet	01 - Traffic signal	
45364	2016/01/05 05:00:0	16-157	2016	1899/12/31 23:4	RENAUD RD @ NAVAN RD			03 - P.D. only	02 - Angle	01 - Clear	07 - Dark	01 - Dry	01 - Traffic sign	01 - Functioning
45152	2016/01/07 05:00:0	16-245	2016	1899/12/31 21:1	RENAUD RD @ NAVAN RD			03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	01 - Traffic sign	01 - Functioning
2665	2018/03/14 00:00:0	18-2828	2018	6:25:00 AM	RENAUD RD bt	__3ZBN8V	04 - At/near priv	03 - P.D. only	02 - Angle	03 - Snow	03 - Dawn	04 - Slush	10 - No control	
41171	2015/11/03 05:00:0	15-11388	2015	1899/12/31 14:1	NAVAN RD btwn	INNES RD & ORLEANS BLVD		03 - P.D. only	07 - SMV other	01 - Clear	01 - Daylight	01 - Dry	10 - No control	
34275	2015/04/13 04:00:0	15-4650	2015	1899/12/31 15:0	NAVAN RD btwn	RENAUD RD & MER BLEUE R		03 - P.D. only	99 - Other	01 - Clear	01 - Daylight	01 - Dry	10 - No control	
49896	2016/06/14 04:00:0	16-5719	2016	1899/12/31 23:5	RENAUD RD btwn	NAVAN RD & WHITE ST		03 - P.D. only	03 - Rear end	01 - Clear	01 - Daylight	01 - Dry	10 - No control	

Appendix D

Brian Coburn/Navan Intersection Ultimate Design and Navan/Renaud Intersection Functional Design



LEGEND / LÉGENDE

- PROPOSED ROADWAY / CHEMIN PROPOSÉ
- PROPOSED BRT / TCRA PROPOSÉE
- PROPOSED MULTI-USE PATH (MUP) / SENTIER POLYVALENT PROPOSÉ
- PROPOSED GRADE SEPARATED CROSSING / TRAVERSÉE À NIVEAU SÉPARÉ PROPOSÉE
- CREEK REALIGNMENT / RÉALIGNEMENT DU RUISSEAU
- PROPOSED NOISE BARRIER / BARRIÈRE ANTI-BRUIT PROPOSÉE
- GATEWAYS / POINT D'ACCÈS
- TRAFFIC SIGNALS / FEU DE CIRCULATION
- PROPOSED SHRUB PLANTING / PLANTATION D'ARBUSTES PROPOSÉE
- PROPOSED DECIDUOUS TREE / ARBRE À FEUILLES CADUQUES PROPOSÉ
- PROPOSED CONIFEROUS TREE / ARBRE CONIFÈRE PROPOSÉ
- GRADING LIMIT / LIMITE DE NIVELLEMENT
- EXISTING PROPERTY LINE / LIGNE DE PROPRIÉTÉ EXISTANTE
- PROPOSED PROPERTY LINE / LIGNE DE PROPRIÉTÉ PROPOSÉE

Ottawa MORRISON HERSHFIELD

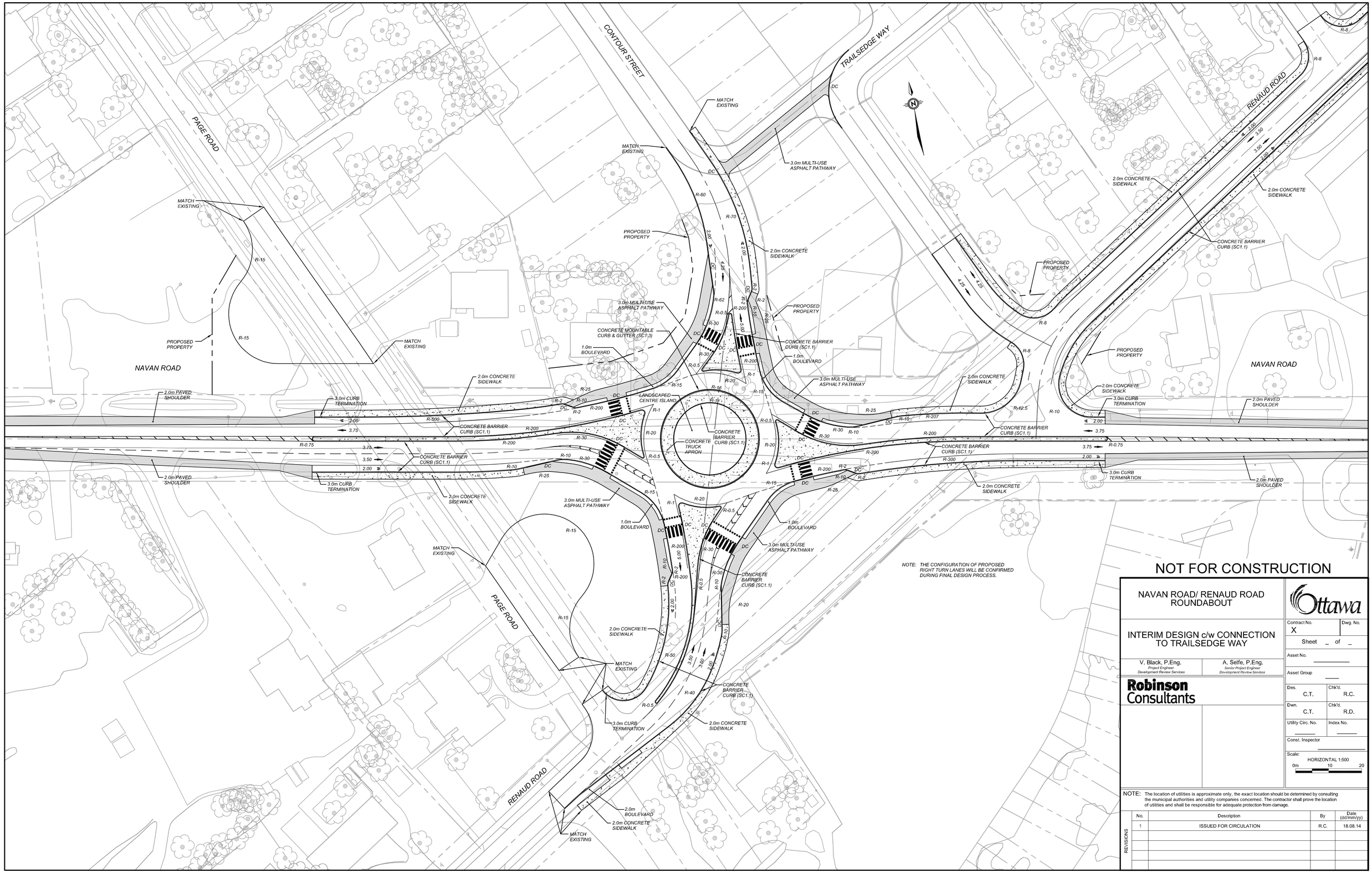
BRIAN COBURN / CUMBERLAND TRANSITWAY EA STUDY
ÉTUDE D'ÉE DU PROLONGEMENT DU BOULEVARD BRIAN-COBURN / TRANSITWAY DE CUMBERLAND
ULTIMATE DESIGN / CONCEPTION ULTIME

SOURCES:
1. Ottawa Pedestrian Plan (2013) / Plan de la circulation piétonnière d'Ottawa (2013)
2. Transportation Master Plan, City of Ottawa (2013) / Plan directeur des transports, Ville d'Ottawa (2013)
3. Transit-oriented development guidelines, City of Ottawa (2007) / Lignes directrices sur l'utilisation du sol et la conception des aménagements axés sur le transport en commun, Ville d'Ottawa (2007)
4. geoOttawa, City of Ottawa / GeoOttawa, Ville d'Ottawa

2021.05.25

0 100 200
SCALE / ÉCHELLE 1:4000

CSW



NOT FOR CONSTRUCTION

NAVAN ROAD/ RENAUD ROAD ROUNDABOUT

INTERIM DESIGN c/w CONNECTION TO TRAILSEDGE WAY

Ottawa

Contract No. X | Dwg. No.

Sheet _ of _

Asset No. _____

Asset Group _____

V. Black, P.Eng.
Project Engineer
Development Review Services

A. Selfe, P.Eng.
Senior Project Engineer
Development Review Services

Robinson Consultants

Des. C.T. | Chk'd. R.C.

Dwn. C.T. | Chk'd. R.D.

Utility Circ. No. _____ | Index No. _____

Const. Inspector _____

Scale: HORIZONTAL 1:500

0m 10 20

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR CIRCULATION	R.C.	18.08.14

Appendix E

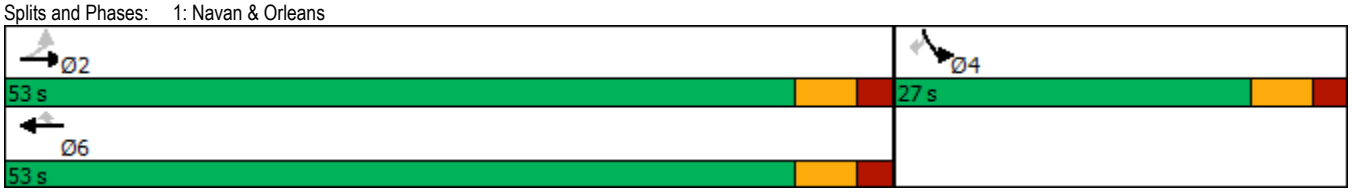
Existing and Background Conditions Output Data (2026, 2031)

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	233	1000	151	109	143
Future Volume (vph)	10	233	1000	151	109	143
Lane Group Flow (vph)	11	259	1111	168	121	159
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	49.9	49.9	49.9	49.9	11.4	11.4
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.16	0.16
v/c Ratio	0.09	0.22	0.92	0.16	0.46	0.52
Control Delay	6.8	5.2	26.0	1.9	33.1	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	5.2	26.0	1.9	33.1	19.3
LOS	A	A	C	A	C	B
Approach Delay		5.2	22.8		25.3	
Approach LOS		A	C		C	
Queue Length 50th (m)	0.4	10.8	106.8	1.4	15.3	8.8
Queue Length 95th (m)	2.7	23.4	#240.5	7.8	30.2	25.3
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	120	1203	1203	1064	488	499
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.22	0.92	0.16	0.25	0.32

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 73.1	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 20.6	Intersection LOS: C
Intersection Capacity Utilization 74.7%	ICU Level of Service D
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Navan & Orleans

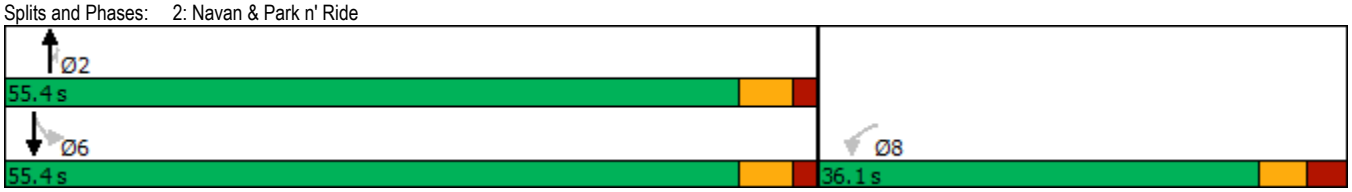


Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	7	1037	65	47	300
Future Volume (vph)	7	1037	65	47	300
Lane Group Flow (vph)	14	1152	72	52	333
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	55.4	55.4	55.4	55.4
Total Split (%)	39.5%	60.5%	60.5%	60.5%	60.5%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	10.1	69.9	69.9	69.9	69.9
Actuated g/C Ratio	0.14	0.95	0.95	0.95	0.95
v/c Ratio	0.06	0.69	0.05	0.16	0.20
Control Delay	25.1	5.9	0.9	2.8	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	5.9	0.9	2.8	1.3
LOS	C	A	A	A	A
Approach Delay	25.1	5.6			1.5
Approach LOS	C	A			A
Queue Length 50th (m)	1.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	6.9	#256.0	4.0	6.2	22.3
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	666	1677	1427	317	1677
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.69	0.05	0.16	0.20

Intersection Summary	
Cycle Length: 91.5	
Actuated Cycle Length: 73.6	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 4.8	Intersection LOS: A
Intersection Capacity Utilization 75.5%	ICU Level of Service D
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

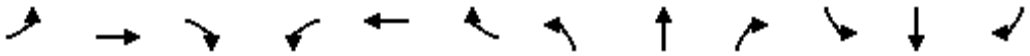
Splits and Phases: 2: Navan & Park n' Ride



Intersection	
Intersection Delay, s/veh	46.9
Intersection LOS	E

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	675	628	345
Demand Flow Rate, veh/h	688	641	352
Vehicles Circulating, veh/h	609	94	171
Vehicles Exiting, veh/h	126	429	1126
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	98.9	12.4	7.9
Approach LOS	F	B	A

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	688	641	352
Cap Entry Lane, veh/h	615	1029	952
Entry HV Adj Factor	0.981	0.980	0.980
Flow Entry, veh/h	675	628	345
Cap Entry, veh/h	603	1008	933
V/C Ratio	1.119	0.623	0.370
Control Delay, s/veh	98.9	12.4	7.9
LOS	F	B	A
95th %tile Queue, veh	21	5	2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	203	104	2	720	4	0	0	0	3	6	47
Future Volume (Veh/h)	6	203	104	2	720	4	0	0	0	3	6	47
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	226	116	2	800	4	0	0	0	3	7	52
Pedestrians											1	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.80						0.80	0.80		0.80	0.80	0.80
vC, conflicting volume	805			342			1160	1107	284	1105	1163	803
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	631			342			1074	1009	284	1006	1079	629
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			100			100	100	100	98	96	87
cM capacity (veh/h)	760			1217			131	190	755	174	173	386

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	349	806	0	62
Volume Left	7	2	0	3
Volume Right	116	4	0	52
cSH	760	1217	1700	322
Volume to Capacity	0.01	0.00	0.00	0.19
Queue Length 95th (m)	0.2	0.0	0.0	5.6
Control Delay (s)	0.3	0.0	0.0	18.8
Lane LOS	A	A	A	C
Approach Delay (s)	0.3	0.0	0.0	18.8
Approach LOS			A	C

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	51.6%	ICU Level of Service	A	
Analysis Period (min)	15			

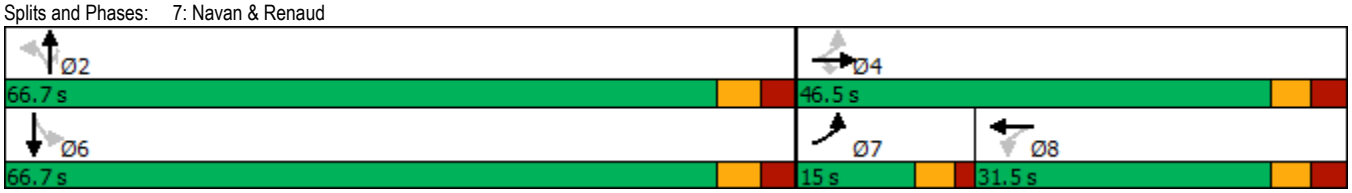
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	121	110	33	31	341	124	363	31	47	115
Future Volume (vph)	121	110	33	31	341	124	363	31	47	115
Lane Group Flow (vph)	134	122	37	34	525	138	403	34	52	130
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	41.1	39.6	39.6	25.0	25.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.47	0.45	0.45	0.28	0.28	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.50	0.15	0.05	0.10	1.07	0.29	0.57	0.05	0.19	0.19
Control Delay	20.4	14.8	4.9	24.4	93.4	20.3	24.7	0.2	19.6	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	14.8	4.9	24.4	93.4	20.3	24.7	0.2	19.6	18.1
LOS	C	B	A	C	F	C	C	A	B	B
Approach Delay		16.1			89.2		22.2			18.5
Approach LOS		B			F		C			B
Queue Length 50th (m)	13.2	12.3	0.0	4.5	~103.5	16.4	54.8	0.0	5.9	14.6
Queue Length 95th (m)	24.2	22.9	5.3	11.8	#166.3	30.7	84.5	0.4	14.4	26.9
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	273	804	687	339	489	812	1206	1028	478	1204
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.15	0.05	0.10	1.07	0.17	0.33	0.03	0.11	0.11

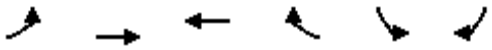
Intersection Summary	
Cycle Length: 113.2	
Actuated Cycle Length: 87.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 43.9	Intersection LOS: D
Intersection Capacity Utilization 90.9%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Navan & Renaud

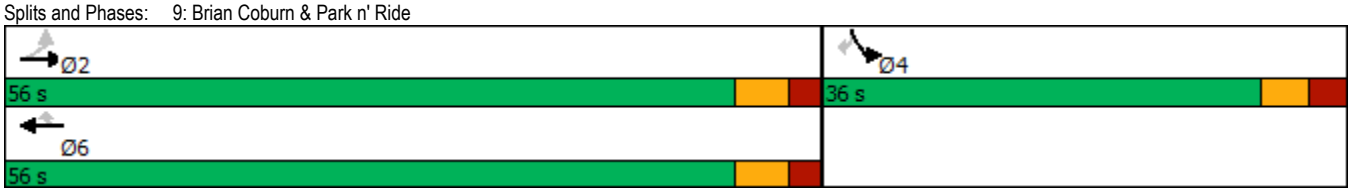




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	90	586	16	6	21
Future Volume (vph)	21	90	586	16	6	21
Lane Group Flow (vph)	23	100	651	18	7	23
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	25.0	25.0
Total Split (s)	56.0	56.0	56.0	56.0	36.0	36.0
Total Split (%)	60.9%	60.9%	60.9%	60.9%	39.1%	39.1%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	69.5	69.5	69.5	69.5	10.1	10.1
Actuated g/C Ratio	0.90	0.90	0.90	0.90	0.13	0.13
v/c Ratio	0.04	0.06	0.41	0.01	0.03	0.11
Control Delay	2.5	2.1	3.3	1.6	33.7	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.5	2.1	3.4	1.6	33.7	16.0
LOS	A	A	A	A	C	B
Approach Delay		2.1	3.3		20.1	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0	0.0	0.9	0.0
Queue Length 95th (m)	2.7	7.3	55.7	1.6	5.1	7.1
Internal Link Dist (m)		239.9	144.7		38.2	
Turn Bay Length (m)	40.0			35.0		
Base Capacity (vph)	632	1586	1586	1349	656	601
Starvation Cap Reductn	0	0	97	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.06	0.44	0.01	0.01	0.04

Intersection Summary	
Cycle Length: 92	
Actuated Cycle Length: 77.3	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 3.8	Intersection LOS: A
Intersection Capacity Utilization 50.9%	ICU Level of Service A
Analysis Period (min) 15	

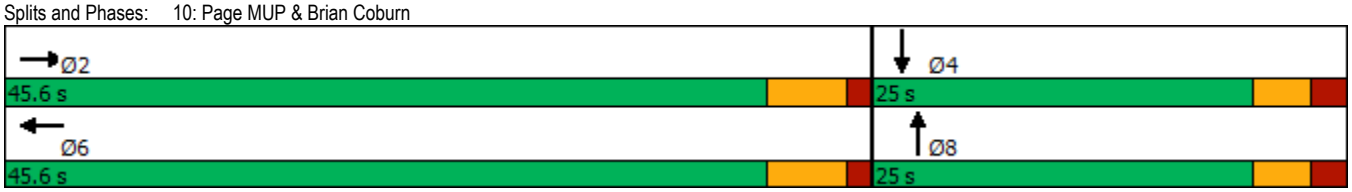
Splits and Phases: 9: Brian Coburn & Park n' Ride



Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	96	602		
Future Volume (vph)	96	602		
Lane Group Flow (vph)	107	669		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.06	0.38		
Control Delay	0.1	0.6		
Queue Delay	0.0	0.0		
Total Delay	0.1	0.6		
LOS	A	A		
Approach Delay	0.1	0.6		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.06	0.38		

Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.38	
Intersection Signal Delay: 0.5	Intersection LOS: A
Intersection Capacity Utilization 53.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn

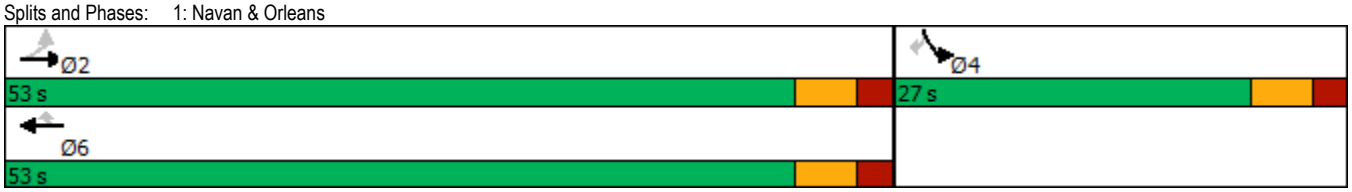


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	136	1004	305	192	175	33
Future Volume (vph)	136	1004	305	192	175	33
Lane Group Flow (vph)	151	1116	339	213	194	37
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	50.4	50.4	50.4	50.4	14.1	14.1
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.18	0.18
v/c Ratio	0.23	0.96	0.29	0.20	0.63	0.12
Control Delay	7.2	33.7	6.9	1.5	37.0	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	33.7	6.9	1.5	37.0	9.4
LOS	A	C	A	A	D	A
Approach Delay		30.5	4.8		32.6	
Approach LOS		C	A		C	
Queue Length 50th (m)	7.6	130.6	18.0	0.0	25.7	0.0
Queue Length 95th (m)	19.9	#268.0	38.3	7.7	45.3	7.1
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	647	1164	1164	1062	466	444
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.96	0.29	0.20	0.42	0.08

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.4	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 23.8	Intersection LOS: C
Intersection Capacity Utilization 75.8%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Navan & Orleans

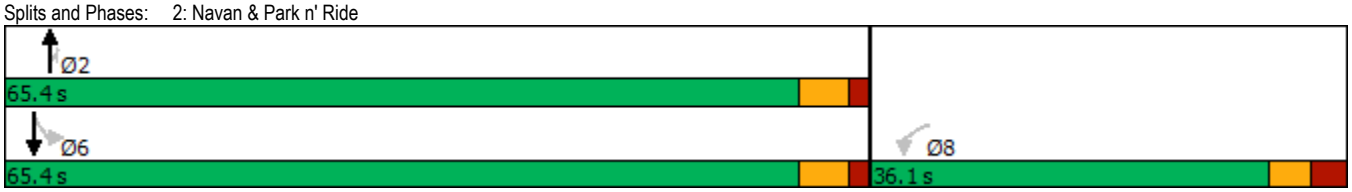


Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	62	447	11	8	1081
Future Volume (vph)	62	447	11	8	1081
Lane Group Flow (vph)	111	497	12	9	1201
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	65.4	65.4	65.4	65.4
Total Split (%)	35.6%	64.4%	64.4%	64.4%	64.4%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	11.1	70.0	70.0	70.0	70.0
Actuated g/C Ratio	0.13	0.80	0.80	0.80	0.80
v/c Ratio	0.48	0.35	0.01	0.01	0.86
Control Delay	33.2	4.6	1.9	3.5	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	4.6	1.9	3.5	17.3
LOS	C	A	A	A	B
Approach Delay	33.2	4.6			17.2
Approach LOS	C	A			B
Queue Length 50th (m)	13.9	23.9	0.0	0.3	129.9
Queue Length 95th (m)	28.0	45.2	1.4	1.6	#286.6
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	576	1404	1196	653	1404
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.35	0.01	0.01	0.86

Intersection Summary

Cycle Length: 101.5
Actuated Cycle Length: 87.9
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 14.7 Intersection LOS: B
Intersection Capacity Utilization 78.0% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

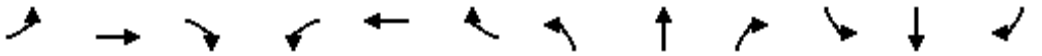
Splits and Phases: 2: Navan & Park n' Ride



Intersection	
Intersection Delay, s/veh	73.5
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	283	438	1168
Demand Flow Rate, veh/h	288	447	1191
Vehicles Circulating, veh/h	333	504	115
Vehicles Exiting, veh/h	618	802	506
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	8.8	18.3	109.9
Approach LOS	A	C	F

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	288	447	1191
Cap Entry Lane, veh/h	810	683	1007
Entry HV Adj Factor	0.983	0.981	0.980
Flow Entry, veh/h	283	438	1168
Cap Entry, veh/h	796	670	987
V/C Ratio	0.356	0.655	1.182
Control Delay, s/veh	8.8	18.3	109.9
LOS	A	C	F
95th %tile Queue, veh	2	5	35



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	690	121	1	368	10	0	0	3	2	0	18
Future Volume (Veh/h)	42	690	121	1	368	10	0	0	3	2	0	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	767	134	1	409	11	0	0	3	2	0	20
Pedestrians					1						1	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.0						1.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	421			901			1364	1351	835	1346	1412	416
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	306			901			1350	1335	835	1330	1403	300
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 %	96			100			100	100	99	98	100	97
cM capacity (veh/h)	1133			754			108	133	367	114	121	668

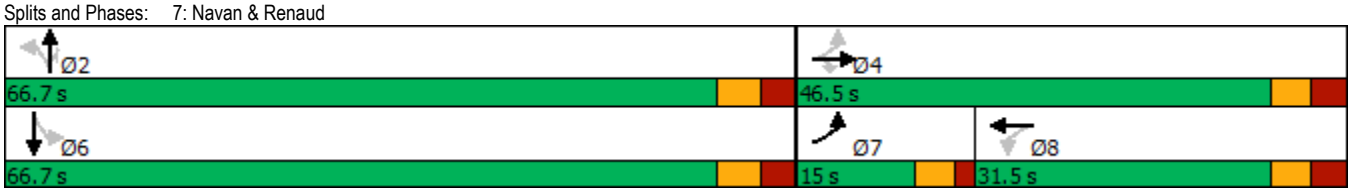
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	948	421	3	22
Volume Left	47	1	0	2
Volume Right	134	11	3	20
cSH	1133	754	367	463
Volume to Capacity	0.04	0.00	0.01	0.05
Queue Length 95th (m)	1.0	0.0	0.2	1.2
Control Delay (s)	1.1	0.0	14.9	13.2
Lane LOS	A	A	B	B
Approach Delay (s)	1.1	0.0	14.9	13.2
Approach LOS			B	B

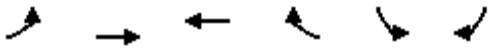
Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	83.0%	ICU Level of Service	E	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	198	387	157	26	119	37	144	41	128	398
Future Volume (vph)	198	387	157	26	119	37	144	41	128	398
Lane Group Flow (vph)	220	430	174	29	198	41	160	46	142	446
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	30.2	28.7	28.7	13.8	13.8	35.1	35.1	35.1	35.1	35.1
Actuated g/C Ratio	0.39	0.37	0.37	0.18	0.18	0.46	0.46	0.46	0.46	0.46
v/c Ratio	0.54	0.65	0.29	0.18	0.63	0.13	0.20	0.06	0.27	0.56
Control Delay	21.5	25.3	8.3	29.2	35.7	14.7	14.2	1.4	15.7	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	25.3	8.3	29.2	35.7	14.7	14.2	1.4	15.7	19.3
LOS	C	C	A	C	D	B	B	A	B	B
Approach Delay		20.7			34.9		11.9			18.4
Approach LOS		C			C		B			B
Queue Length 50th (m)	22.9	53.4	6.6	3.8	25.4	3.4	14.0	0.0	12.9	47.2
Queue Length 95th (m)	39.2	83.3	19.2	11.0	46.2	10.7	28.9	2.4	28.5	85.0
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	411	918	805	291	552	553	1377	1161	902	1375
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.47	0.22	0.10	0.36	0.07	0.12	0.04	0.16	0.32

Intersection Summary	
Cycle Length: 113.2	
Actuated Cycle Length: 77	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 20.5	Intersection LOS: C
Intersection Capacity Utilization 110.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Navan & Renaud

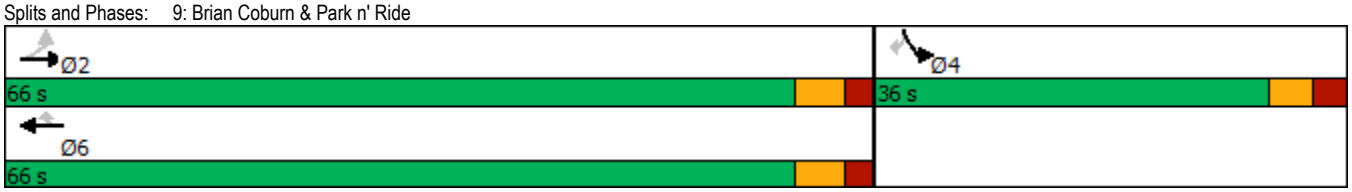




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	525	234	8	6	21
Future Volume (vph)	21	525	234	8	6	21
Lane Group Flow (vph)	23	583	260	9	7	23
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	25.0	25.0
Total Split (s)	66.0	66.0	66.0	66.0	36.0	36.0
Total Split (%)	64.7%	64.7%	64.7%	64.7%	35.3%	35.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	79.5	79.5	79.5	79.5	10.1	10.1
Actuated g/C Ratio	0.91	0.91	0.91	0.91	0.12	0.12
v/c Ratio	0.02	0.36	0.16	0.01	0.04	0.12
Control Delay	2.0	2.7	1.9	1.4	38.7	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.0	2.7	1.9	1.4	38.7	17.6
LOS	A	A	A	A	D	B
Approach Delay		2.7	1.9		22.5	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0	0.0	1.0	0.0
Queue Length 95th (m)	2.4	45.7	17.3	1.0	5.7	7.6
Internal Link Dist (m)		239.9	144.7		38.2	
Turn Bay Length (m)	40.0			35.0		
Base Capacity (vph)	961	1605	1605	1364	579	534
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.36	0.16	0.01	0.01	0.04

Intersection Summary	
Cycle Length: 102	
Actuated Cycle Length: 87.4	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 3.1	Intersection LOS: A
Intersection Capacity Utilization 47.5%	ICU Level of Service A
Analysis Period (min) 15	

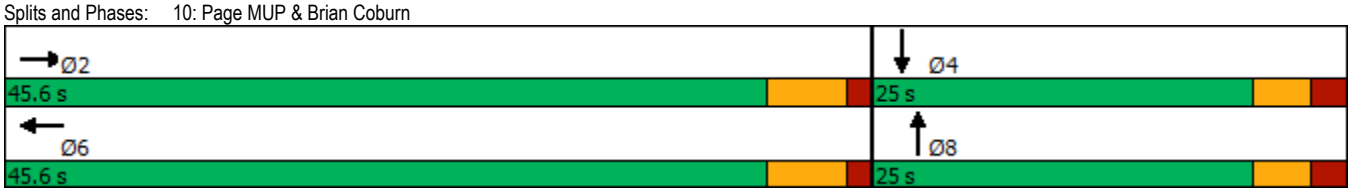
Splits and Phases: 9: Brian Coburn & Park n' Ride



Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	531	242		
Future Volume (vph)	531	242		
Lane Group Flow (vph)	590	269		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.33	0.15		
Control Delay	0.5	0.2		
Queue Delay	0.0	0.0		
Total Delay	0.5	0.2		
LOS	A	A		
Approach Delay	0.5	0.2		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.33	0.15		

Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.33	
Intersection Signal Delay: 0.4	Intersection LOS: A
Intersection Capacity Utilization 49.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	252	1104	151	109	143
Future Volume (vph)	10	252	1104	151	109	143
Lane Group Flow (vph)	11	280	1227	168	121	159
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	49.9	49.9	49.9	49.9	11.6	11.6
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.16	0.16
v/c Ratio	0.11	0.23	1.02	0.16	0.46	0.54
Control Delay	8.3	5.4	46.9	2.1	32.8	23.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	5.4	46.9	2.1	32.8	23.2
LOS	A	A	D	A	C	C
Approach Delay		5.5	41.5		27.4	
Approach LOS		A	D		C	
Queue Length 50th (m)	0.4	11.9	~153.7	1.9	15.3	11.5
Queue Length 95th (m)	3.0	26.4	#282.9	8.9	30.0	28.5
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	96	1200	1200	1058	487	483
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.23	1.02	0.16	0.25	0.33

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 73.3	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 34.2	Intersection LOS: C
Intersection Capacity Utilization 80.5%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

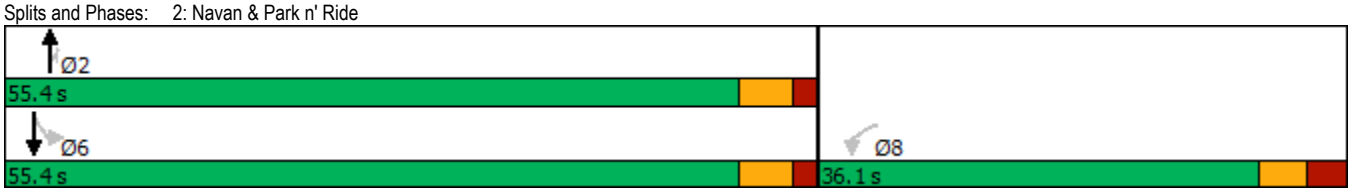
Splits and Phases: 1: Navan & Orleans

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	7	1144	65	47	330
Future Volume (vph)	7	1144	65	47	330
Lane Group Flow (vph)	14	1271	72	52	367
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	55.4	55.4	55.4	55.4
Total Split (%)	39.5%	60.5%	60.5%	60.5%	60.5%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	10.1	69.9	69.9	69.9	69.9
Actuated g/C Ratio	0.14	0.95	0.95	0.95	0.95
v/c Ratio	0.06	0.76	0.05	0.22	0.22
Control Delay	25.1	7.8	0.9	4.3	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	7.8	0.9	4.3	1.4
LOS	C	A	A	A	A
Approach Delay	25.1	7.4			1.8
Approach LOS	C	A			A
Queue Length 50th (m)	1.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	6.9	#301.2	4.1	7.6	25.0
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	666	1677	1427	233	1677
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.76	0.05	0.22	0.22

Intersection Summary

Cycle Length: 91.5
Actuated Cycle Length: 73.6
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 6.2 Intersection LOS: A
Intersection Capacity Utilization 81.5% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

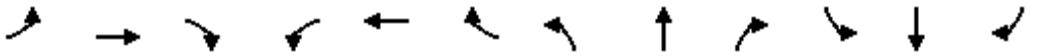
Splits and Phases: 2: Navan & Park n' Ride



Intersection	
Intersection Delay, s/veh	77.5
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	742	682	371
Demand Flow Rate, veh/h	757	696	379
Vehicles Circulating, veh/h	664	94	188
Vehicles Exiting, veh/h	126	473	1233
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	170.2	14.1	8.6
Approach LOS	F	B	A

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	757	696	379
Cap Entry Lane, veh/h	582	1029	936
Entry HV Adj Factor	0.980	0.980	0.980
Flow Entry, veh/h	742	682	371
Cap Entry, veh/h	570	1008	918
V/C Ratio	1.301	0.677	0.405
Control Delay, s/veh	170.2	14.1	8.6
LOS	F	B	A
95th %tile Queue, veh	31	6	2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	224	104	2	787	4	0	0	0	3	6	47
Future Volume (Veh/h)	6	224	104	2	787	4	0	0	0	3	6	47
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	249	116	2	874	4	0	0	0	3	7	52
Pedestrians											1	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.78						0.78	0.78		0.78	0.78	0.78
vC, conflicting volume	879			365			1256	1204	307	1202	1260	877
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	701			365			1187	1119	307	1116	1191	698
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			100			100	100	100	98	95	85
cM capacity (veh/h)	696			1194			104	159	733	142	144	342

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	372	880	0	62
Volume Left	7	2	0	3
Volume Right	116	4	0	52
cSH	696	1194	1700	279
Volume to Capacity	0.01	0.00	0.00	0.22
Queue Length 95th (m)	0.2	0.0	0.0	6.6
Control Delay (s)	0.3	0.0	0.0	21.5
Lane LOS	A	A	A	C
Approach Delay (s)	0.3	0.0	0.0	21.5
Approach LOS			A	C

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	55.3%	ICU Level of Service	B	
Analysis Period (min)	15			

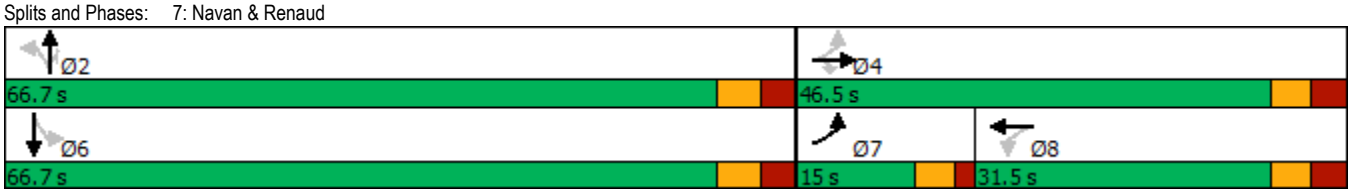
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	121	110	33	31	341	124	396	31	47	126
Future Volume (vph)	121	110	33	31	341	124	396	31	47	126
Lane Group Flow (vph)	134	122	37	34	525	138	440	34	52	142
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	41.1	39.6	39.6	25.0	25.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.47	0.45	0.45	0.28	0.28	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.50	0.15	0.05	0.10	1.07	0.30	0.63	0.05	0.21	0.20
Control Delay	20.4	14.8	4.9	24.4	93.4	20.3	26.1	0.2	20.3	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	14.8	4.9	24.4	93.4	20.3	26.1	0.2	20.3	18.3
LOS	C	B	A	C	F	C	C	A	C	B
Approach Delay		16.1			89.2		23.4			18.8
Approach LOS		B			F		C			B
Queue Length 50th (m)	13.2	12.3	0.0	4.5	~103.5	16.4	61.5	0.0	6.0	16.1
Queue Length 95th (m)	24.2	22.9	5.3	11.8	#166.3	30.8	93.9	0.4	14.8	29.0
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	273	804	687	339	489	802	1206	1028	430	1204
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.15	0.05	0.10	1.07	0.17	0.36	0.03	0.12	0.12

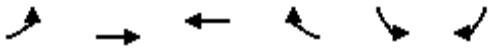
Intersection Summary	
Cycle Length: 113.2	
Actuated Cycle Length: 87.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 43.7	Intersection LOS: D
Intersection Capacity Utilization 113.6%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Navan & Renaud

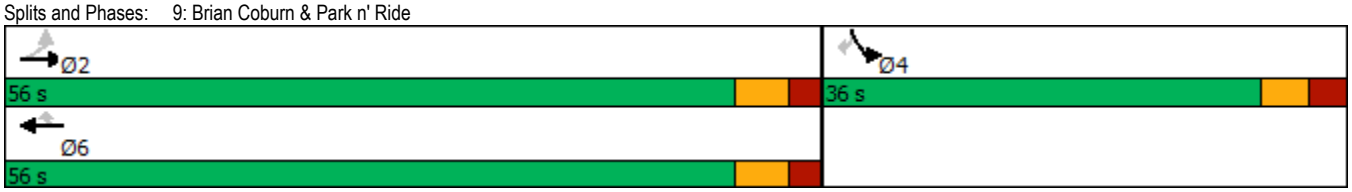




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	99	647	16	6	21
Future Volume (vph)	21	99	647	16	6	21
Lane Group Flow (vph)	23	110	719	18	7	23
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	25.0	25.0
Total Split (s)	56.0	56.0	56.0	56.0	36.0	36.0
Total Split (%)	60.9%	60.9%	60.9%	60.9%	39.1%	39.1%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	69.5	69.5	69.5	69.5	10.1	10.1
Actuated g/C Ratio	0.90	0.90	0.90	0.90	0.13	0.13
v/c Ratio	0.04	0.07	0.45	0.01	0.03	0.11
Control Delay	2.5	2.1	3.7	1.7	33.7	16.0
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	2.5	2.1	3.7	1.7	33.7	16.0
LOS	A	A	A	A	C	B
Approach Delay		2.1	3.7		20.1	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0	0.0	0.9	0.0
Queue Length 95th (m)	2.7	8.0	65.9	1.7	5.1	7.1
Internal Link Dist (m)		239.9	144.7		38.2	
Turn Bay Length (m)	40.0			35.0		
Base Capacity (vph)	580	1586	1586	1349	656	601
Starvation Cap Reductn	0	0	89	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.07	0.48	0.01	0.01	0.04

Intersection Summary	
Cycle Length: 92	
Actuated Cycle Length: 77.3	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 4.0	Intersection LOS: A
Intersection Capacity Utilization 54.3%	ICU Level of Service A
Analysis Period (min) 15	

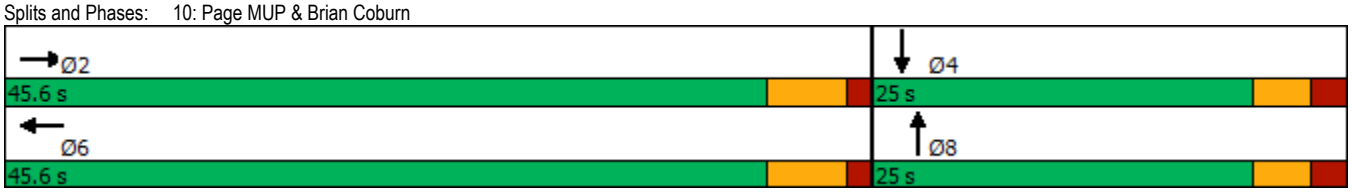
Splits and Phases: 9: Brian Coburn & Park n' Ride



Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	105	663		
Future Volume (vph)	105	663		
Lane Group Flow (vph)	117	737		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.07	0.42		
Control Delay	0.1	0.7		
Queue Delay	0.0	0.0		
Total Delay	0.1	0.7		
LOS	A	A		
Approach Delay	0.1	0.7		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.07	0.42		

Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.42	
Intersection Signal Delay: 0.6	Intersection LOS: A
Intersection Capacity Utilization 56.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	136	1108	333	192	175	33
Future Volume (vph)	136	1108	333	192	175	33
Lane Group Flow (vph)	151	1231	370	213	194	37
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	50.4	50.4	50.4	50.4	14.1	14.1
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.18	0.18
v/c Ratio	0.24	1.06	0.32	0.20	0.63	0.12
Control Delay	7.4	60.1	7.1	1.5	37.0	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	60.1	7.1	1.5	37.0	9.4
LOS	A	E	A	A	D	A
Approach Delay		54.3	5.1		32.6	
Approach LOS		D	A		C	
Queue Length 50th (m)	7.7	~199.7	20.1	0.0	25.7	0.0
Queue Length 95th (m)	20.2	#308.1	42.4	7.7	45.3	7.1
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	620	1164	1164	1062	466	444
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	1.06	0.32	0.20	0.42	0.08

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.4	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 39.0	Intersection LOS: D
Intersection Capacity Utilization 81.6%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

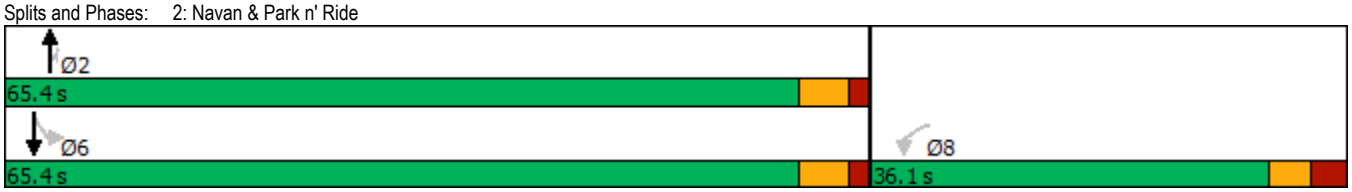
Splits and Phases: 1: Navan & Orleans

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	62	493	11	8	1192
Future Volume (vph)	62	493	11	8	1192
Lane Group Flow (vph)	111	548	12	9	1324
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	65.4	65.4	65.4	65.4
Total Split (%)	35.6%	64.4%	64.4%	64.4%	64.4%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	11.1	70.0	70.0	70.0	70.0
Actuated g/C Ratio	0.13	0.80	0.80	0.80	0.80
v/c Ratio	0.48	0.39	0.01	0.01	0.94
Control Delay	33.2	4.9	1.9	3.5	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	4.9	1.9	3.5	26.6
LOS	C	A	A	A	C
Approach Delay	33.2	4.9			26.5
Approach LOS	C	A			C
Queue Length 50th (m)	13.9	27.5	0.0	0.3	183.2
Queue Length 95th (m)	28.0	51.6	1.4	1.7	#332.4
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	576	1404	1196	612	1404
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.39	0.01	0.01	0.94

Intersection Summary	
Cycle Length: 101.5	
Actuated Cycle Length: 87.9	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 20.8	Intersection LOS: C
Intersection Capacity Utilization 84.1%	ICU Level of Service E
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

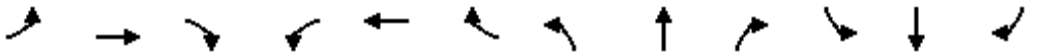
Splits and Phases: 2: Navan & Park n' Ride



Intersection	
Intersection Delay, s/veh	93.3
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	310	470	1233
Demand Flow Rate, veh/h	316	479	1258
Vehicles Circulating, veh/h	365	504	125
Vehicles Exiting, veh/h	618	879	556
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	9.8	20.5	142.1
Approach LOS	A	C	F

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	316	479	1258
Cap Entry Lane, veh/h	784	683	997
Entry HV Adj Factor	0.981	0.981	0.980
Flow Entry, veh/h	310	470	1233
Cap Entry, veh/h	770	670	978
V/C Ratio	0.403	0.702	1.262
Control Delay, s/veh	9.8	20.5	142.1
LOS	A	C	F
95th %tile Queue, veh	2	6	43



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	756	121	1	404	10	0	0	3	2	0	18
Future Volume (Veh/h)	42	756	121	1	404	10	0	0	3	2	0	18
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	840	134	1	449	11	0	0	3	2	0	20
Pedestrians					1						1	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.0						1.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.88						0.88	0.88		0.88	0.88	0.88
vC, conflicting volume	461			974			1478	1464	908	1460	1526	456
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	322			974			1474	1459	908	1454	1529	316
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 %	96			100			100	100	99	98	100	97
cM capacity (veh/h)	1091			708			86	109	333	91	99	638

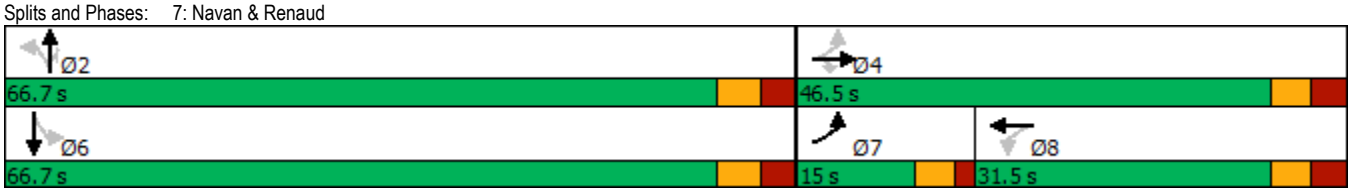
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1021	461	3	22
Volume Left	47	1	0	2
Volume Right	134	11	3	20
cSH	1091	708	333	413
Volume to Capacity	0.04	0.00	0.01	0.05
Queue Length 95th (m)	1.1	0.0	0.2	1.3
Control Delay (s)	1.2	0.0	15.9	14.2
Lane LOS	A	A	C	B
Approach Delay (s)	1.2	0.0	15.9	14.2
Approach LOS			C	B

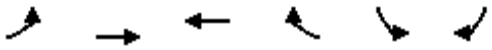
Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	198	387	157	26	119	37	158	41	128	436
Future Volume (vph)	198	387	157	26	119	37	158	41	128	436
Lane Group Flow (vph)	220	430	174	29	198	41	176	46	142	488
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	30.4	28.9	28.9	13.9	13.9	35.8	35.8	35.8	35.8	35.8
Actuated g/C Ratio	0.39	0.37	0.37	0.18	0.18	0.46	0.46	0.46	0.46	0.46
v/c Ratio	0.54	0.66	0.29	0.18	0.63	0.14	0.22	0.06	0.27	0.60
Control Delay	22.2	26.0	8.6	29.9	36.3	14.9	14.3	1.3	15.6	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	26.0	8.6	29.9	36.3	14.9	14.3	1.3	15.6	20.2
LOS	C	C	A	C	D	B	B	A	B	C
Approach Delay		21.3			35.5		12.1			19.2
Approach LOS		C			D		B			B
Queue Length 50th (m)	22.9	53.4	6.6	3.8	25.4	3.5	15.5	0.0	12.9	53.4
Queue Length 95th (m)	42.1	89.5	20.6	11.4	48.4	10.8	31.8	2.3	28.5	95.9
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	408	909	798	288	546	495	1363	1150	880	1362
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.47	0.22	0.10	0.36	0.08	0.13	0.04	0.16	0.36

Intersection Summary	
Cycle Length: 113.2	
Actuated Cycle Length: 77.9	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 21.0	Intersection LOS: C
Intersection Capacity Utilization 110.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Navan & Renaud

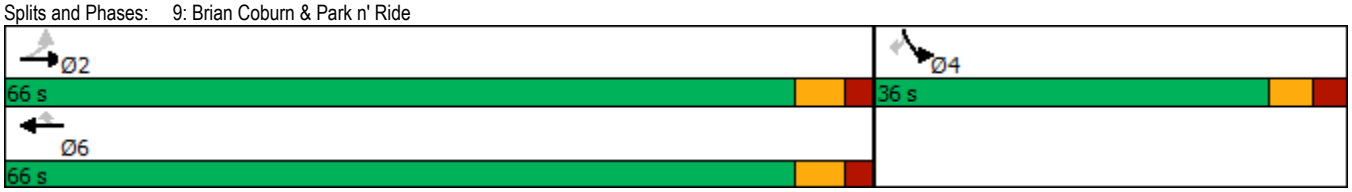




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	579	258	8	6	21
Future Volume (vph)	21	579	258	8	6	21
Lane Group Flow (vph)	23	643	287	9	7	23
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	25.0	25.0
Total Split (s)	66.0	66.0	66.0	66.0	36.0	36.0
Total Split (%)	64.7%	64.7%	64.7%	64.7%	35.3%	35.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	79.5	79.5	79.5	79.5	10.1	10.1
Actuated g/C Ratio	0.91	0.91	0.91	0.91	0.12	0.12
v/c Ratio	0.02	0.40	0.18	0.01	0.04	0.12
Control Delay	2.1	3.0	2.0	1.4	38.7	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.1	3.0	2.0	1.4	38.7	17.6
LOS	A	A	A	A	D	B
Approach Delay		2.9	1.9		22.5	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0	0.0	1.0	0.0
Queue Length 95th (m)	2.4	53.0	19.1	1.0	5.7	7.6
Internal Link Dist (m)		239.9	144.7		38.2	
Turn Bay Length (m)	40.0			35.0		
Base Capacity (vph)	937	1605	1605	1364	579	534
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.40	0.18	0.01	0.01	0.04

Intersection Summary	
Cycle Length: 102	
Actuated Cycle Length: 87.4	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 3.2	Intersection LOS: A
Intersection Capacity Utilization 50.5%	ICU Level of Service A
Analysis Period (min) 15	

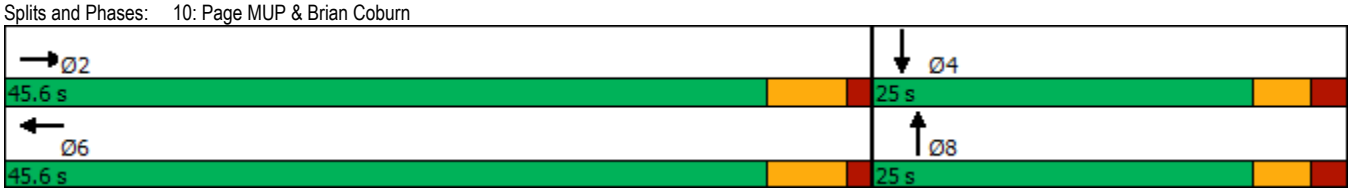
Splits and Phases: 9: Brian Coburn & Park n' Ride



Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	585	266		
Future Volume (vph)	585	266		
Lane Group Flow (vph)	650	296		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.37	0.17		
Control Delay	0.6	0.2		
Queue Delay	0.0	0.0		
Total Delay	0.6	0.2		
LOS	A	A		
Approach Delay	0.6	0.2		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.37	0.17		

Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 0.5	Intersection LOS: A
Intersection Capacity Utilization 52.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	274	1218	151	109	143
Future Volume (vph)	10	274	1218	151	109	143
Lane Group Flow (vph)	11	304	1353	168	121	159
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	49.9	49.9	49.9	49.9	12.0	12.0
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.16	0.16
v/c Ratio	0.12	0.25	1.13	0.16	0.45	0.56
Control Delay	8.6	5.7	87.3	2.5	32.1	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	5.7	87.3	2.5	32.1	26.6
LOS	A	A	F	A	C	C
Approach Delay		5.8	77.9		29.0	
Approach LOS		A	E		C	
Queue Length 50th (m)	0.4	13.3	~219.1	2.3	15.3	14.0
Queue Length 95th (m)	3.1	30.1	#329.7	9.9	29.9	31.4
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	95	1194	1194	1049	484	468
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.25	1.13	0.16	0.25	0.34

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 73.7	
Natural Cycle: 130	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 60.7	Intersection LOS: E
Intersection Capacity Utilization 86.8%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

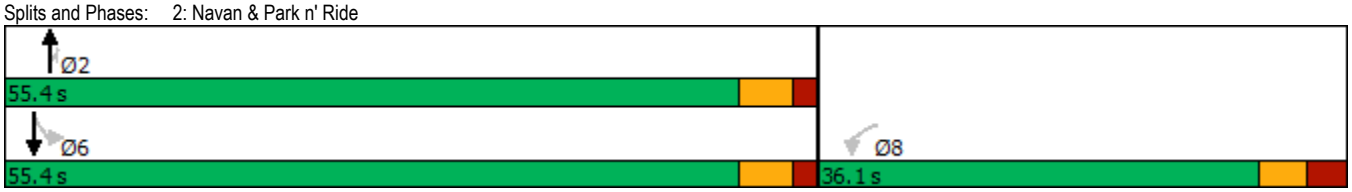
Splits and Phases: 1: Navan & Orleans

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	7	1261	65	47	364
Future Volume (vph)	7	1261	65	47	364
Lane Group Flow (vph)	14	1401	72	52	404
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	55.4	55.4	55.4	55.4
Total Split (%)	39.5%	60.5%	60.5%	60.5%	60.5%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	10.1	69.9	69.9	69.9	69.9
Actuated g/C Ratio	0.14	0.95	0.95	0.95	0.95
v/c Ratio	0.06	0.84	0.05	0.40	0.24
Control Delay	25.1	10.4	1.0	15.4	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	10.4	1.0	15.4	1.5
LOS	C	B	A	B	A
Approach Delay	25.1	10.0			3.0
Approach LOS	C	A			A
Queue Length 50th (m)	1.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	6.9	#350.3	4.3	#23.8	27.9
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	666	1677	1427	129	1677
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.84	0.05	0.40	0.24

Intersection Summary	
Cycle Length: 91.5	
Actuated Cycle Length: 73.6	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 88.0%	ICU Level of Service E
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

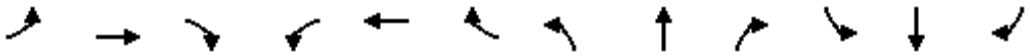
Splits and Phases: 2: Navan & Park n' Ride



Intersection	
Intersection Delay, s/veh	118.2
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	816	742	400
Demand Flow Rate, veh/h	832	757	408
Vehicles Circulating, veh/h	725	94	206
Vehicles Exiting, veh/h	126	520	1351
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	264.0	16.5	9.4
Approach LOS	F	C	A

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	832	757	408
Cap Entry Lane, veh/h	547	1029	920
Entry HV Adj Factor	0.981	0.980	0.980
Flow Entry, veh/h	816	742	400
Cap Entry, veh/h	537	1008	901
V/C Ratio	1.520	0.736	0.444
Control Delay, s/veh	264.0	16.5	9.4
LOS	F	C	A
95th %tile Queue, veh	42	7	2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	246	104	2	861	4	0	0	0	3	6	47
Future Volume (Veh/h)	6	246	104	2	861	4	0	0	0	3	6	47
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	273	116	2	957	4	0	0	0	3	7	52
Pedestrians											1	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.75						0.75	0.75		0.75	0.75	0.75
vC, conflicting volume	962			389			1364	1311	331	1309	1367	960
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	783			389			1318	1248	331	1245	1323	780
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			100			100	100	100	97	94	82
cM capacity (veh/h)	626			1170			78	128	711	112	116	296

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	396	963	0	62
Volume Left	7	2	0	3
Volume Right	116	4	0	52
cSH	626	1170	1700	236
Volume to Capacity	0.01	0.00	0.00	0.26
Queue Length 95th (m)	0.3	0.0	0.0	8.2
Control Delay (s)	0.3	0.0	0.0	25.6
Lane LOS	A	A	A	D
Approach Delay (s)	0.3	0.0	0.0	25.6
Approach LOS			A	D

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	59.4%	ICU Level of Service	B	
Analysis Period (min)	15			

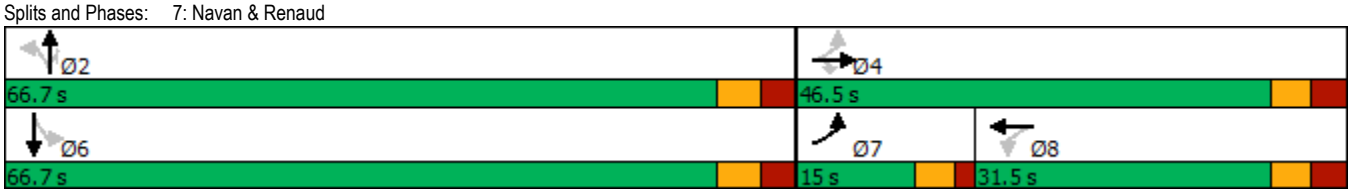
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	121	110	33	31	341	124	433	31	47	139
Future Volume (vph)	121	110	33	31	341	124	433	31	47	139
Lane Group Flow (vph)	134	122	37	34	525	138	481	34	52	156
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	41.1	39.6	39.6	25.0	25.0	35.6	35.6	35.6	35.6	35.6
Actuated g/C Ratio	0.46	0.45	0.45	0.28	0.28	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.51	0.15	0.05	0.10	1.08	0.30	0.68	0.05	0.23	0.22
Control Delay	21.0	15.3	5.2	25.1	96.0	20.1	27.5	0.2	20.9	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	15.3	5.2	25.1	96.0	20.1	27.5	0.2	20.9	18.3
LOS	C	B	A	C	F	C	C	A	C	B
Approach Delay		16.6			91.7		24.6			18.9
Approach LOS		B			F		C			B
Queue Length 50th (m)	13.2	12.3	0.0	4.5	~103.5	16.4	69.4	0.0	6.0	17.8
Queue Length 95th (m)	25.8	24.3	5.5	12.3	#174.4	30.6	104.7	0.3	14.9	31.4
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	271	798	683	336	486	787	1197	1022	377	1195
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.15	0.05	0.10	1.08	0.18	0.40	0.03	0.14	0.13

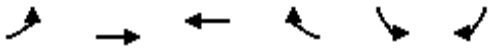
Intersection Summary	
Cycle Length: 113.2	
Actuated Cycle Length: 88.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 44.4	Intersection LOS: D
Intersection Capacity Utilization 113.6%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Navan & Renaud

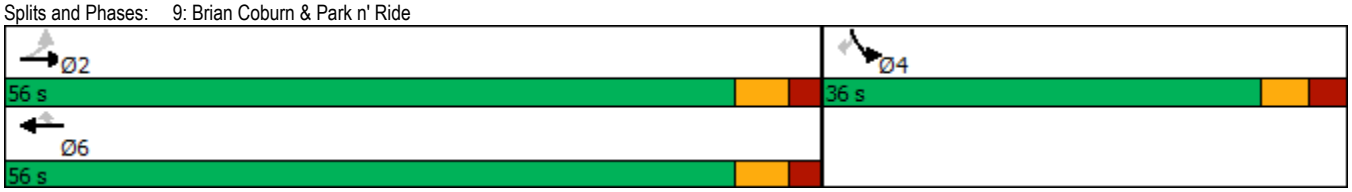




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	109	714	16	6	21
Future Volume (vph)	21	109	714	16	6	21
Lane Group Flow (vph)	23	121	793	18	7	23
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	25.0	25.0
Total Split (s)	56.0	56.0	56.0	56.0	36.0	36.0
Total Split (%)	60.9%	60.9%	60.9%	60.9%	39.1%	39.1%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	69.5	69.5	69.5	69.5	10.1	10.1
Actuated g/C Ratio	0.90	0.90	0.90	0.90	0.13	0.13
v/c Ratio	0.04	0.08	0.50	0.01	0.03	0.11
Control Delay	2.6	2.0	4.1	1.8	33.7	16.0
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	2.6	2.0	4.2	1.8	33.7	16.0
LOS	A	A	A	A	C	B
Approach Delay		2.1	4.1		20.1	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0	0.0	0.9	0.0
Queue Length 95th (m)	2.7	8.7	78.7	1.7	5.1	7.1
Internal Link Dist (m)		239.9	144.7		38.2	
Turn Bay Length (m)	40.0			35.0		
Base Capacity (vph)	525	1586	1586	1349	656	601
Starvation Cap Reductn	0	0	79	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.08	0.53	0.01	0.01	0.04

Intersection Summary	
Cycle Length: 92	
Actuated Cycle Length: 77.3	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 4.3	Intersection LOS: A
Intersection Capacity Utilization 58.0%	ICU Level of Service B
Analysis Period (min) 15	

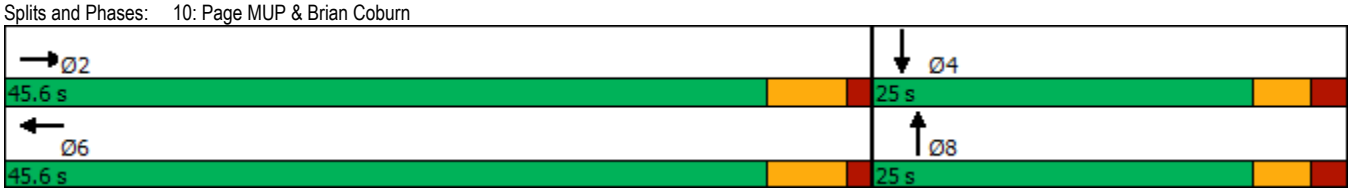
Splits and Phases: 9: Brian Coburn & Park n' Ride



Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	115	730		
Future Volume (vph)	115	730		
Lane Group Flow (vph)	128	811		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.07	0.46		
Control Delay	0.1	0.9		
Queue Delay	0.0	0.0		
Total Delay	0.1	0.9		
LOS	A	A		
Approach Delay	0.1	0.9		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.07	0.46		

Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 0.8	Intersection LOS: A
Intersection Capacity Utilization 60.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	136	1222	363	192	175	33
Future Volume (vph)	136	1222	363	192	175	33
Lane Group Flow (vph)	151	1358	403	213	194	37
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	50.4	50.4	50.4	50.4	14.1	14.1
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.18	0.18
v/c Ratio	0.25	1.17	0.35	0.20	0.63	0.12
Control Delay	7.6	102.4	7.4	1.5	37.0	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	102.4	7.4	1.5	37.0	9.4
LOS	A	F	A	A	D	A
Approach Delay		92.9	5.4		32.6	
Approach LOS		F	A		C	
Queue Length 50th (m)	7.8	~238.3	22.4	0.0	25.7	0.0
Queue Length 95th (m)	20.6	#351.7	46.8	7.7	45.3	7.1
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	593	1164	1164	1062	466	444
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	1.17	0.35	0.20	0.42	0.08

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.4	
Natural Cycle: 140	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 64.1	Intersection LOS: E
Intersection Capacity Utilization 88.0%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Navan & Orleans

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	62	543	11	8	1315
Future Volume (vph)	62	543	11	8	1315
Lane Group Flow (vph)	111	603	12	9	1461
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	65.4	65.4	65.4	65.4
Total Split (%)	35.6%	64.4%	64.4%	64.4%	64.4%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	11.1	70.0	70.0	70.0	70.0
Actuated g/C Ratio	0.13	0.80	0.80	0.80	0.80
v/c Ratio	0.48	0.43	0.01	0.02	1.04
Control Delay	33.2	5.3	1.9	3.5	50.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	5.3	1.9	3.5	50.3
LOS	C	A	A	A	D
Approach Delay	33.2	5.2			50.0
Approach LOS	C	A			D
Queue Length 50th (m)	13.9	31.7	0.0	0.3	~303.2
Queue Length 95th (m)	28.0	59.6	1.4	1.7	#383.3
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	576	1404	1196	570	1404
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.43	0.01	0.02	1.04

Intersection Summary	
Cycle Length: 101.5	
Actuated Cycle Length: 87.9	
Natural Cycle: 130	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 36.6	Intersection LOS: D
Intersection Capacity Utilization 91.0%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

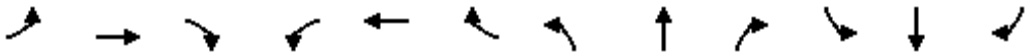
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Navan & Park n' Ride

Intersection	
Intersection Delay, s/veh	116.5
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	342	506	1303
Demand Flow Rate, veh/h	349	516	1329
Vehicles Circulating, veh/h	402	504	139
Vehicles Exiting, veh/h	618	964	612
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	11.3	23.8	180.2
Approach LOS	B	C	F

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	349	516	1329
Cap Entry Lane, veh/h	756	683	983
Entry HV Adj Factor	0.980	0.981	0.980
Flow Entry, veh/h	342	506	1303
Cap Entry, veh/h	741	670	964
V/C Ratio	0.462	0.756	1.352
Control Delay, s/veh	11.3	23.8	180.2
LOS	B	C	F
95th %tile Queue, veh	2	7	52



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	829	121	1	444	10	0	0	3	2	0	18
Future Volume (Veh/h)	42	829	121	1	444	10	0	0	3	2	0	18
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	921	134	1	493	11	0	0	3	2	0	20
Pedestrians					1						1	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.0						1.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.87						0.87	0.87		0.87	0.87	0.87
vC, conflicting volume	505			1055			1602	1589	989	1584	1650	500
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	359			1055			1617	1602	989	1597	1673	353
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 %	96			100			100	100	99	97	100	97
cM capacity (veh/h)	1045			660			68	88	299	71	80	602

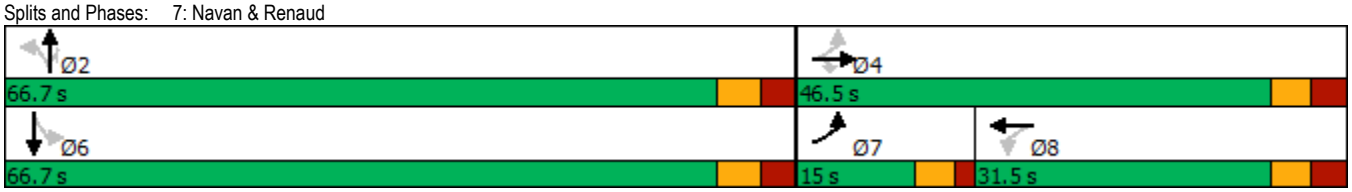
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1102	505	3	22
Volume Left	47	1	0	2
Volume Right	134	11	3	20
cSH	1045	660	299	359
Volume to Capacity	0.04	0.00	0.01	0.06
Queue Length 95th (m)	1.1	0.0	0.2	1.6
Control Delay (s)	1.3	0.0	17.2	15.7
Lane LOS	A	A	C	C
Approach Delay (s)	1.3	0.0	17.2	15.7
Approach LOS			C	C

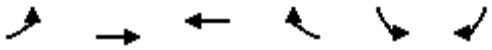
Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	95.0%	ICU Level of Service	F	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	198	387	157	26	119	37	174	41	128	479
Future Volume (vph)	198	387	157	26	119	37	174	41	128	479
Lane Group Flow (vph)	220	430	174	29	198	41	193	46	142	536
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	30.6	29.1	29.1	14.1	14.1	36.7	36.7	36.7	36.7	36.7
Actuated g/C Ratio	0.39	0.37	0.37	0.18	0.18	0.46	0.46	0.46	0.46	0.46
v/c Ratio	0.55	0.66	0.29	0.18	0.64	0.16	0.24	0.06	0.27	0.66
Control Delay	23.2	26.9	9.0	30.8	37.1	15.2	14.3	1.2	15.5	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	26.9	9.0	30.8	37.1	15.2	14.3	1.2	15.5	21.5
LOS	C	C	A	C	D	B	B	A	B	C
Approach Delay		22.1			36.3		12.3			20.3
Approach LOS		C			D		B			C
Queue Length 50th (m)	22.9	53.4	6.6	3.8	25.4	3.5	17.2	0.0	12.9	61.0
Queue Length 95th (m)	45.6	96.7	22.2	12.1	51.4	11.0	34.7	2.1	28.8	109.8
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	402	899	791	285	541	434	1349	1139	857	1348
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.48	0.22	0.10	0.37	0.09	0.14	0.04	0.17	0.40

Intersection Summary	
Cycle Length: 113.2	
Actuated Cycle Length: 79	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 110.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Navan & Renaud

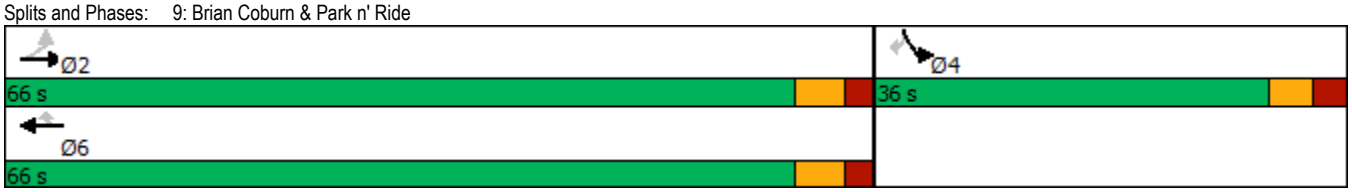




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	638	285	8	6	21
Future Volume (vph)	21	638	285	8	6	21
Lane Group Flow (vph)	23	709	317	9	7	23
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	25.0	25.0
Total Split (s)	66.0	66.0	66.0	66.0	36.0	36.0
Total Split (%)	64.7%	64.7%	64.7%	64.7%	35.3%	35.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	79.5	79.5	79.5	79.5	10.1	10.1
Actuated g/C Ratio	0.91	0.91	0.91	0.91	0.12	0.12
v/c Ratio	0.03	0.44	0.20	0.01	0.04	0.12
Control Delay	2.1	3.3	2.0	1.4	38.7	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.1	3.3	2.0	1.4	38.7	17.6
LOS	A	A	A	A	D	B
Approach Delay		3.2	2.0		22.5	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0	0.0	1.0	0.0
Queue Length 95th (m)	2.5	62.2	21.3	1.0	5.7	7.6
Internal Link Dist (m)		239.9	144.7		38.2	
Turn Bay Length (m)	40.0			35.0		
Base Capacity (vph)	911	1605	1605	1364	579	534
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.44	0.20	0.01	0.01	0.04

Intersection Summary	
Cycle Length: 102	
Actuated Cycle Length: 87.4	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 3.4	Intersection LOS: A
Intersection Capacity Utilization 53.8%	ICU Level of Service A
Analysis Period (min) 15	

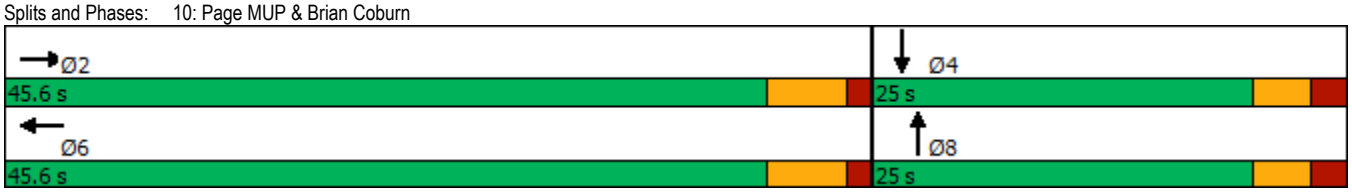
Splits and Phases: 9: Brian Coburn & Park n' Ride



Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	644	293		
Future Volume (vph)	644	293		
Lane Group Flow (vph)	716	326		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.41	0.18		
Control Delay	0.7	0.2		
Queue Delay	0.0	0.0		
Total Delay	0.7	0.2		
LOS	A	A		
Approach Delay	0.7	0.2		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.41	0.18		

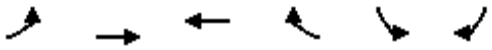
Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 0.5	Intersection LOS: A
Intersection Capacity Utilization 55.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn



Appendix F

Total Projected Conditions Output Data (2026, 2031)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	320	1171	156	116	143
Future Volume (vph)	10	320	1171	156	116	143
Lane Group Flow (vph)	11	356	1301	173	129	159
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	49.9	49.9	49.9	49.9	11.8	11.8
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.16	0.16
v/c Ratio	0.12	0.30	1.09	0.16	0.48	0.55
Control Delay	8.5	6.0	69.5	2.4	33.2	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	6.0	69.5	2.4	33.2	25.1
LOS	A	A	E	A	C	C
Approach Delay		6.0	61.6		28.7	
Approach LOS		A	E		C	
Queue Length 50th (m)	0.4	16.3	~204.6	2.2	16.4	13.0
Queue Length 95th (m)	3.1	35.0	#310.3	9.7	31.8	30.2
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	95	1196	1196	1053	485	474
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.30	1.09	0.16	0.27	0.34

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 73.6	
Natural Cycle: 120	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 47.6	Intersection LOS: D
Intersection Capacity Utilization 84.2%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

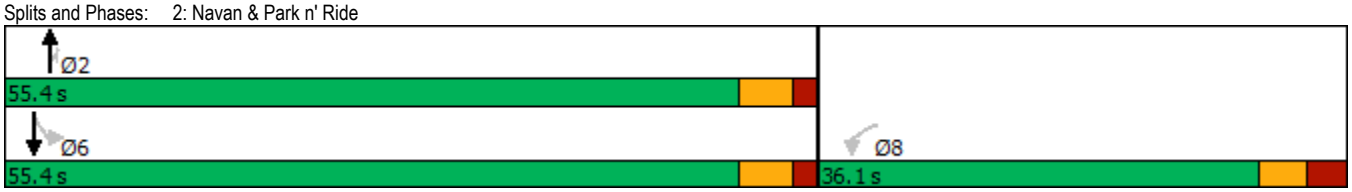
Splits and Phases: 1: Navan & Orleans

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	7	1217	65	47	405
Future Volume (vph)	7	1217	65	47	405
Lane Group Flow (vph)	14	1352	72	52	450
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	55.4	55.4	55.4	55.4
Total Split (%)	39.5%	60.5%	60.5%	60.5%	60.5%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	10.1	69.9	69.9	69.9	69.9
Actuated g/C Ratio	0.14	0.95	0.95	0.95	0.95
v/c Ratio	0.06	0.81	0.05	0.30	0.27
Control Delay	25.1	9.3	0.9	7.5	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	9.3	0.9	7.5	1.5
LOS	C	A	A	A	A
Approach Delay	25.1	8.9			2.2
Approach LOS	C	A			A
Queue Length 50th (m)	1.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	6.9	#332.0	4.2	11.3	32.0
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	666	1677	1427	171	1677
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.81	0.05	0.30	0.27

Intersection Summary	
Cycle Length: 91.5	
Actuated Cycle Length: 73.6	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Navan & Park n' Ride



Intersection	
Intersection Delay, s/veh	106.4
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	821	711	455
Demand Flow Rate, veh/h	838	725	464
Vehicles Circulating, veh/h	675	171	196
Vehicles Exiting, veh/h	221	489	1317
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	235.5	18.8	10.3
Approach LOS	F	C	B

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	838	725	464
Cap Entry Lane, veh/h	575	952	929
Entry HV Adj Factor	0.980	0.980	0.981
Flow Entry, veh/h	821	711	455
Cap Entry, veh/h	564	934	911
V/C Ratio	1.457	0.761	0.500
Control Delay, s/veh	235.5	18.8	10.3
LOS	F	C	B
95th %tile Queue, veh	40	8	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	33	644	43	33	321
Future Volume (Veh/h)	42	33	644	43	33	321
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	37	716	48	37	357
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	1171	740			764	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1171	740			764	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	91			96	
cM capacity (veh/h)	204	417			849	

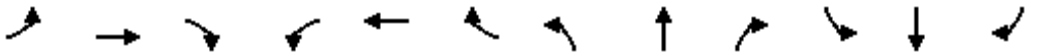
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	84	764	394
Volume Left	47	0	37
Volume Right	37	48	0
cSH	263	1700	849
Volume to Capacity	0.32	0.45	0.04
Queue Length 95th (m)	10.6	0.0	1.1
Control Delay (s)	25.0	0.0	1.4
Lane LOS	D		A
Approach Delay (s)	25.0	0.0	1.4
Approach LOS	D		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	5	682	7	2	361
Future Volume (Veh/h)	15	5	682	7	2	361
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	6	758	8	2	401
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			313			
pX, platoon unblocked	0.85	0.85			0.85	
vC, conflicting volume	1167	762			766	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1110	635			640	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	99			100	
cM capacity (veh/h)	197	408			806	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	23	766	403
Volume Left	17	0	2
Volume Right	6	8	0
cSH	228	1700	806
Volume to Capacity	0.10	0.45	0.00
Queue Length 95th (m)	2.7	0.0	0.1
Control Delay (s)	22.6	0.0	0.1
Lane LOS	C		A
Approach Delay (s)	22.6	0.0	0.1
Approach LOS	C		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	48.3%	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)	6	242	121	2	825	4	0	0	0	3	6	47
Future Volume (Veh/h)	6	242	121	2	825	4	0	0	0	3	6	47
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	269	134	2	917	4	0	0	0	3	7	52
Pedestrians											1	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.76						0.76	0.76		0.76	0.76	0.76
vC, conflicting volume	922			403			1328	1276	336	1274	1341	920
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	736			403			1273	1204	336	1201	1290	733
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			100			100	100	100	98	94	84
cM capacity (veh/h)	657			1156			86	137	706	121	122	318

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	410	923	0	62
Volume Left	7	2	0	3
Volume Right	134	4	0	52
cSH	657	1156	1700	252
Volume to Capacity	0.01	0.00	0.00	0.25
Queue Length 95th (m)	0.3	0.0	0.0	7.5
Control Delay (s)	0.3	0.0	0.0	23.9
Lane LOS	A	A	A	C
Approach Delay (s)	0.3	0.0	0.0	23.9
Approach LOS			A	C

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	57.5%	ICU Level of Service	B	
Analysis Period (min)	15			

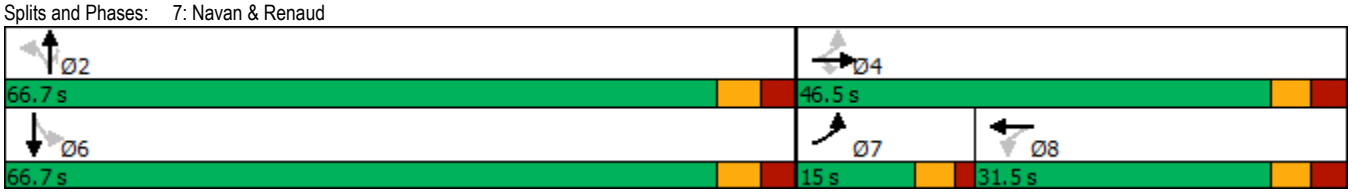
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	146	110	33	31	341	124	403	31	53	131
Future Volume (vph)	146	110	33	31	341	124	403	31	53	131
Lane Group Flow (vph)	162	122	37	34	531	138	448	34	59	155
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	41.4	39.9	39.9	25.0	25.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.47	0.45	0.45	0.28	0.28	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.60	0.15	0.05	0.10	1.09	0.30	0.64	0.05	0.24	0.22
Control Delay	24.3	14.9	5.0	24.5	99.6	20.5	26.6	0.2	21.2	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	14.9	5.0	24.5	99.6	20.5	26.6	0.2	21.2	18.2
LOS	C	B	A	C	F	C	C	A	C	B
Approach Delay		18.5			95.1		23.8			19.0
Approach LOS		B			F		C			B
Queue Length 50th (m)	16.2	12.3	0.0	4.5	~105.9	16.4	63.0	0.0	6.9	17.4
Queue Length 95th (m)	31.4	23.0	5.3	11.8	#169.7	30.9	96.2	0.4	16.7	31.1
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	273	800	684	337	486	789	1200	1024	416	1189
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.15	0.05	0.10	1.09	0.17	0.37	0.03	0.14	0.13

Intersection Summary	
Cycle Length: 113.2	
Actuated Cycle Length: 88.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 45.6	Intersection LOS: D
Intersection Capacity Utilization 115.4%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

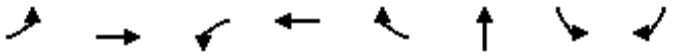
Splits and Phases: 7: Navan & Renaud



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	132	54	33	667	51	32
Future Volume (Veh/h)	132	54	33	667	51	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	147	60	37	741	57	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				159		
pX, platoon unblocked					0.80	
vC, conflicting volume			207		992	177
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			207		869	177
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		77	96
cM capacity (veh/h)			1364		253	866

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	207	778	93
Volume Left	0	37	57
Volume Right	60	0	36
cSH	1700	1364	348
Volume to Capacity	0.12	0.03	0.27
Queue Length 95th (m)	0.0	0.7	8.5
Control Delay (s)	0.0	0.7	19.1
Lane LOS		A	C
Approach Delay (s)	0.0	0.7	19.1
Approach LOS			C

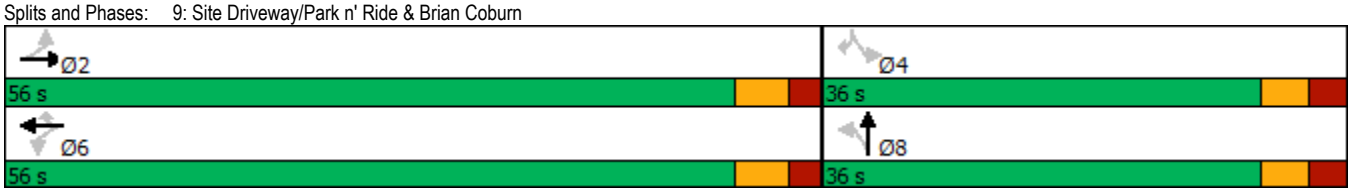
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBR
Lane Configurations								
Traffic Volume (vph)	21	96	14	659	16	0	6	21
Future Volume (vph)	21	96	14	659	16	0	6	21
Lane Group Flow (vph)	23	179	0	748	18	78	7	23
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases		2		6		8		
Permitted Phases	2		6		6		4	4
Detector Phase	2	2	6	6	6	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	23.0	24.0	25.0	25.0
Total Split (s)	56.0	56.0	56.0	56.0	56.0	36.0	36.0	36.0
Total Split (%)	60.9%	60.9%	60.9%	60.9%	60.9%	39.1%	39.1%	39.1%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	-2.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	4.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	None	None	None
Act Effct Green (s)	59.7	59.7		59.7	59.7	12.1	10.1	10.1
Actuated g/C Ratio	0.77	0.77		0.77	0.77	0.16	0.13	0.13
v/c Ratio	0.05	0.14		0.55	0.02	0.27	0.04	0.10
Control Delay	3.8	2.7		7.0	0.6	19.9	28.3	7.8
Queue Delay	0.0	0.0		0.5	0.0	0.0	0.0	0.0
Total Delay	3.8	2.7		7.4	0.6	19.9	28.3	7.8
LOS	A	A		A	A	B	C	A
Approach Delay		2.8		7.3		19.9		
Approach LOS		A		A		B		
Queue Length 50th (m)	0.9	4.7		46.5	0.0	6.1	1.0	0.0
Queue Length 95th (m)	3.0	10.3		76.6	0.9	16.5	4.4	4.5
Internal Link Dist (m)		135.4		144.7		29.7		
Turn Bay Length (m)	40.0				35.0			
Base Capacity (vph)	448	1297		1358	1169	708	534	608
Starvation Cap Reductn	0	0		231	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0
Reduced v/c Ratio	0.05	0.14		0.66	0.02	0.11	0.01	0.04

Intersection Summary	
Cycle Length: 92	
Actuated Cycle Length: 77.1	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 7.5	Intersection LOS: A
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

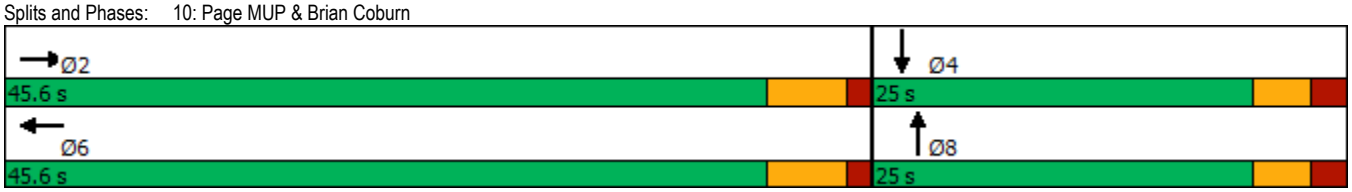
Splits and Phases: 9: Site Driveway/Park n' Ride & Brian Coburn

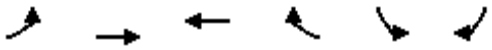


Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	117	675		
Future Volume (vph)	117	675		
Lane Group Flow (vph)	130	750		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.07	0.42		
Control Delay	0.1	0.8		
Queue Delay	0.0	0.0		
Total Delay	0.1	0.8		
LOS	A	A		
Approach Delay	0.1	0.8		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.07	0.42		

Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.42	
Intersection Signal Delay: 0.7	Intersection LOS: A
Intersection Capacity Utilization 57.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	136	1178	398	198	182	33
Future Volume (vph)	136	1178	398	198	182	33
Lane Group Flow (vph)	151	1309	442	220	202	37
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	50.3	50.3	50.3	50.3	14.5	14.5
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.19	0.19
v/c Ratio	0.27	1.13	0.38	0.21	0.64	0.12
Control Delay	8.0	87.6	7.9	1.5	37.3	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	87.6	7.9	1.5	37.3	9.4
LOS	A	F	A	A	D	A
Approach Delay		79.3	5.8		33.0	
Approach LOS		E	A		C	
Queue Length 50th (m)	8.0	~225.7	25.8	0.0	27.0	0.0
Queue Length 95th (m)	21.5	#337.9	53.4	8.0	47.1	7.1
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	556	1158	1158	1060	465	443
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	1.13	0.38	0.21	0.43	0.08

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.6	
Natural Cycle: 120	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 54.0	Intersection LOS: D
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Navan & Orleans

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	62	564	11	8	1269
Future Volume (vph)	62	564	11	8	1269
Lane Group Flow (vph)	111	627	12	9	1410
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	65.4	65.4	65.4	65.4
Total Split (%)	35.6%	64.4%	64.4%	64.4%	64.4%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	11.1	70.0	70.0	70.0	70.0
Actuated g/C Ratio	0.13	0.80	0.80	0.80	0.80
v/c Ratio	0.48	0.45	0.01	0.02	1.00
Control Delay	33.2	5.5	1.9	3.5	39.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	5.5	1.9	3.5	39.6
LOS	C	A	A	A	D
Approach Delay	33.2	5.4			39.4
Approach LOS	C	A			D
Queue Length 50th (m)	13.9	33.7	0.0	0.3	~283.6
Queue Length 95th (m)	28.0	63.3	1.4	1.7	#364.6
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	576	1404	1196	552	1404
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.45	0.01	0.02	1.00

Intersection Summary	
Cycle Length: 101.5	
Actuated Cycle Length: 87.9	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 29.0	Intersection LOS: C
Intersection Capacity Utilization 88.4%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Navan & Park n' Ride

Intersection	
Intersection Delay, s/veh	121.4
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	396	490	1320
Demand Flow Rate, veh/h	404	499	1346
Vehicles Circulating, veh/h	373	582	141
Vehicles Exiting, veh/h	708	905	636
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	12.3	28.1	188.8
Approach LOS	B	D	F

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	404	499	1346
Cap Entry Lane, veh/h	778	631	981
Entry HV Adj Factor	0.980	0.981	0.981
Flow Entry, veh/h	396	490	1320
Cap Entry, veh/h	763	620	962
V/C Ratio	0.519	0.790	1.372
Control Delay, s/veh	12.3	28.1	188.8
LOS	B	D	F
95th %tile Queue, veh	3	8	54

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	34	394	45	35	727
Future Volume (Veh/h)	43	34	394	45	35	727
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	48	38	438	50	39	808
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	1349	463			488	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1349	463			488	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	94			96	
cM capacity (veh/h)	160	599			1075	

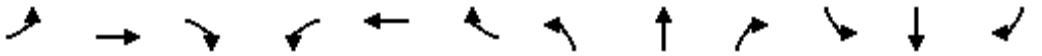
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	86	488	847
Volume Left	48	0	39
Volume Right	38	50	0
cSH	237	1700	1075
Volume to Capacity	0.36	0.29	0.04
Queue Length 95th (m)	12.6	0.0	0.9
Control Delay (s)	28.6	0.0	0.9
Lane LOS	D		A
Approach Delay (s)	28.6	0.0	0.9
Approach LOS	D		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	3	436	12	4	766
Future Volume (Veh/h)	9	3	436	12	4	766
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	10	3	484	13	4	851
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			311			
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	1350	490			497	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1341	432			439	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	99			100	
cM capacity (veh/h)	158	589			1060	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	497	855
Volume Left	10	0	4
Volume Right	3	13	0
cSH	190	1700	1060
Volume to Capacity	0.07	0.29	0.00
Queue Length 95th (m)	1.7	0.0	0.1
Control Delay (s)	25.3	0.0	0.1
Lane LOS	D		A
Approach Delay (s)	25.3	0.0	0.1
Approach LOS	D		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	773	139	1	442	10	0	0	3	2	0	18
Future Volume (Veh/h)	42	773	139	1	442	10	0	0	3	2	0	18
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	859	154	1	491	11	0	0	3	2	0	20
Pedestrians					1						1	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.0						1.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	503			1013			1548	1535	937	1530	1606	498
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	343			1013			1556	1541	937	1535	1624	336
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 %	96			100			100	100	99	97	100	97
cM capacity (veh/h)	1047			684			74	95	321	78	84	607

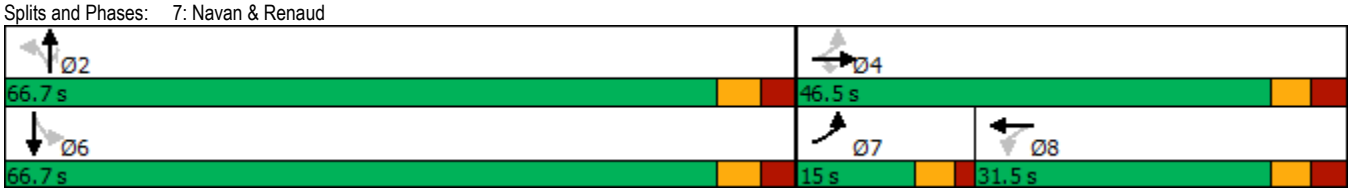
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1060	503	3	22
Volume Left	47	1	0	2
Volume Right	154	11	3	20
cSH	1047	684	321	375
Volume to Capacity	0.04	0.00	0.01	0.06
Queue Length 95th (m)	1.1	0.0	0.2	1.5
Control Delay (s)	1.3	0.0	16.3	15.2
Lane LOS	A	A	C	C
Approach Delay (s)	1.3	0.0	16.3	15.2
Approach LOS			C	C

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	92.9%	ICU Level of Service	F	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	223	387	157	26	119	37	165	41	133	442
Future Volume (vph)	223	387	157	26	119	37	165	41	133	442
Lane Group Flow (vph)	248	430	174	29	204	41	183	46	148	502
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	30.8	29.3	29.3	14.2	14.2	36.1	36.1	36.1	36.1	36.1
Actuated g/C Ratio	0.39	0.37	0.37	0.18	0.18	0.46	0.46	0.46	0.46	0.46
v/c Ratio	0.62	0.66	0.29	0.18	0.65	0.14	0.23	0.06	0.29	0.62
Control Delay	24.8	26.1	8.7	30.0	36.7	15.1	14.4	1.2	15.9	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	26.1	8.7	30.0	36.7	15.1	14.4	1.2	15.9	20.8
LOS	C	C	A	C	D	B	B	A	B	C
Approach Delay		22.1			35.9		12.3			19.7
Approach LOS		C			D		B			B
Queue Length 50th (m)	26.4	53.4	6.6	3.8	26.1	3.5	16.3	0.0	13.6	55.8
Queue Length 95th (m)	48.7	91.4	21.0	11.7	50.7	10.9	33.3	2.2	30.1	100.6
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	403	902	793	286	542	474	1354	1143	868	1350
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.48	0.22	0.10	0.38	0.09	0.14	0.04	0.17	0.37

Intersection Summary	
Cycle Length: 113.2	
Actuated Cycle Length: 78.6	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 21.6	Intersection LOS: C
Intersection Capacity Utilization 110.2%	ICU Level of Service H
Analysis Period (min) 15	

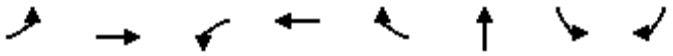
Splits and Phases: 7: Navan & Renaud



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	599	56	35	283	52	34
Future Volume (Veh/h)	599	56	35	283	52	34
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	666	62	39	314	58	38
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				164		
pX, platoon unblocked					0.98	
vC, conflicting volume			728		1089	697
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			728		1080	697
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		74	91
cM capacity (veh/h)			876		226	441

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	728	353	96
Volume Left	0	39	58
Volume Right	62	0	38
cSH	1700	876	280
Volume to Capacity	0.43	0.04	0.34
Queue Length 95th (m)	0.0	1.1	11.8
Control Delay (s)	0.0	1.5	24.4
Lane LOS		A	C
Approach Delay (s)	0.0	1.5	24.4
Approach LOS			C

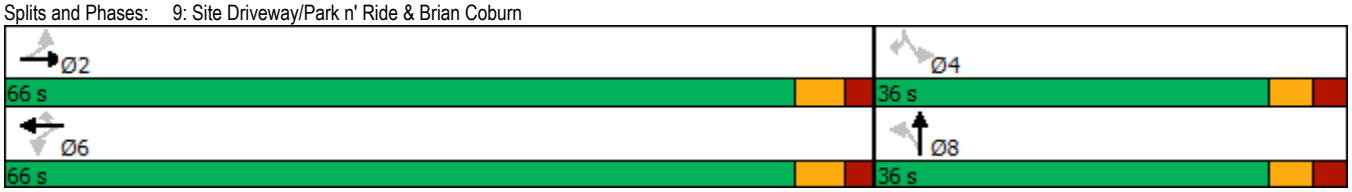
Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBR
Lane Configurations								
Traffic Volume (vph)	21	576	15	270	8	0	6	21
Future Volume (vph)	21	576	15	270	8	0	6	21
Lane Group Flow (vph)	23	708	0	317	9	85	7	23
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases		2		6		8		
Permitted Phases	2		6		6		4	4
Detector Phase	2	2	6	6	6	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	23.0	24.0	25.0	25.0
Total Split (s)	66.0	66.0	66.0	66.0	66.0	36.0	36.0	36.0
Total Split (%)	64.7%	64.7%	64.7%	64.7%	64.7%	35.3%	35.3%	35.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	-2.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	4.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	None	None	None
Act Effct Green (s)	69.3	69.3		69.3	69.3	12.4	10.4	10.4
Actuated g/C Ratio	0.80	0.80		0.80	0.80	0.14	0.12	0.12
v/c Ratio	0.03	0.51		0.24	0.01	0.32	0.04	0.11
Control Delay	3.2	5.9		3.8	0.1	25.9	33.0	10.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	5.9		3.8	0.1	25.9	33.0	10.3
LOS	A	A		A	A	C	C	B
Approach Delay		5.9		3.7		25.9		
Approach LOS		A		A		C		
Queue Length 50th (m)	0.9	41.8		13.9	0.0	8.8	1.2	0.0
Queue Length 95th (m)	2.9	71.5		24.6	0.3	20.9	4.8	5.4
Internal Link Dist (m)		139.8		144.7		27.8		
Turn Bay Length (m)	40.0				35.0			
Base Capacity (vph)	798	1388		1345	1201	630	469	540
Starvation Cap Reductn	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0
Reduced v/c Ratio	0.03	0.51		0.24	0.01	0.13	0.01	0.04

Intersection Summary	
Cycle Length: 102	
Actuated Cycle Length: 87	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 7.0	Intersection LOS: A
Intersection Capacity Utilization 65.9%	ICU Level of Service C
Analysis Period (min) 15	

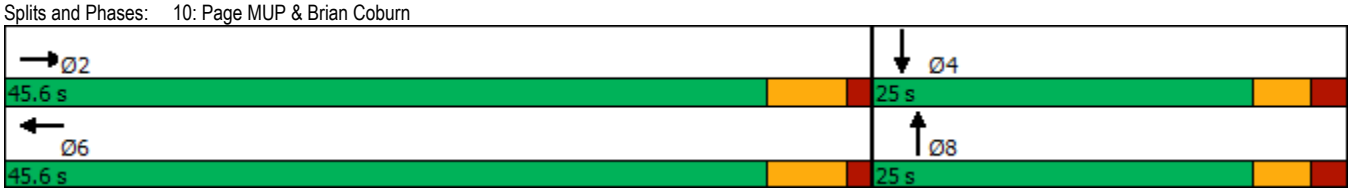
Splits and Phases: 9: Site Driveway/Park n' Ride & Brian Coburn

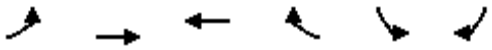


Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	596	279		
Future Volume (vph)	596	279		
Lane Group Flow (vph)	662	310		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.38	0.18		
Control Delay	0.6	0.2		
Queue Delay	0.0	0.0		
Total Delay	0.6	0.2		
LOS	A	A		
Approach Delay	0.6	0.2		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.38	0.18		

Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.38	
Intersection Signal Delay: 0.5	Intersection LOS: A
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	342	1285	156	116	143
Future Volume (vph)	10	342	1285	156	116	143
Lane Group Flow (vph)	11	380	1428	173	129	159
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	49.9	49.9	49.9	49.9	12.2	12.2
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.17	0.17
v/c Ratio	0.12	0.32	1.20	0.17	0.47	0.57
Control Delay	8.7	6.3	115.5	2.7	32.6	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	6.3	115.5	2.7	32.6	28.2
LOS	A	A	F	A	C	C
Approach Delay		6.4	103.3		30.2	
Approach LOS		A	F		C	
Queue Length 50th (m)	0.4	18.0	~242.8	2.7	16.4	15.0
Queue Length 95th (m)	3.2	39.0	#356.7	10.6	31.6	32.5
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	95	1190	1190	1046	483	461
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.32	1.20	0.17	0.27	0.34

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 73.9	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 77.4	Intersection LOS: E
Intersection Capacity Utilization 90.6%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

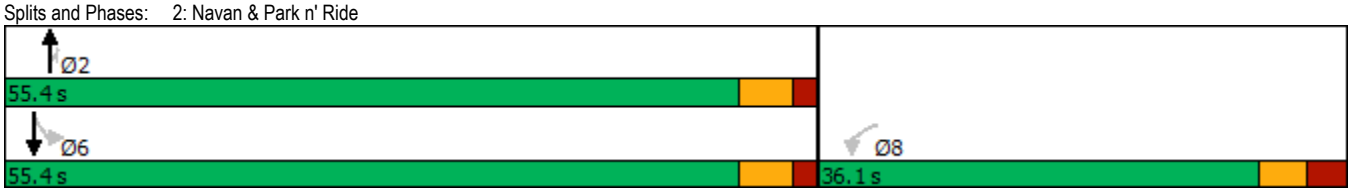
Splits and Phases: 1: Navan & Orleans

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	7	1334	65	47	439
Future Volume (vph)	7	1334	65	47	439
Lane Group Flow (vph)	14	1482	72	52	488
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	55.4	55.4	55.4	55.4
Total Split (%)	39.5%	60.5%	60.5%	60.5%	60.5%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	10.1	69.9	69.9	69.9	69.9
Actuated g/C Ratio	0.14	0.95	0.95	0.95	0.95
v/c Ratio	0.06	0.88	0.05	0.50	0.29
Control Delay	25.1	13.0	1.0	26.9	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	13.0	1.0	26.9	1.6
LOS	C	B	A	C	A
Approach Delay	25.1	12.4			4.1
Approach LOS	C	B			A
Queue Length 50th (m)	1.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	6.9	#381.2	4.3	#13.3	35.5
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	666	1677	1427	103	1677
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.88	0.05	0.50	0.29

Intersection Summary	
Cycle Length: 91.5	
Actuated Cycle Length: 73.6	
Natural Cycle: 140	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 10.3	Intersection LOS: B
Intersection Capacity Utilization 92.0%	ICU Level of Service F
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Navan & Park n' Ride



Intersection	
Intersection Delay, s/veh	151.5
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	896	771	484
Demand Flow Rate, veh/h	914	786	493
Vehicles Circulating, veh/h	736	171	214
Vehicles Exiting, veh/h	221	536	1436
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	337.5	23.2	11.4
Approach LOS	F	C	B

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	914	786	493
Cap Entry Lane, veh/h	541	952	912
Entry HV Adj Factor	0.980	0.980	0.981
Flow Entry, veh/h	896	771	484
Cap Entry, veh/h	531	934	895
V/C Ratio	1.689	0.825	0.540
Control Delay, s/veh	337.5	23.2	11.4
LOS	F	C	B
95th %tile Queue, veh	52	10	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	33	712	43	33	356
Future Volume (Veh/h)	42	33	712	43	33	356
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	37	791	48	37	396
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	1285	815			839	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1285	815			839	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	73	90			95	
cM capacity (veh/h)	173	377			796	

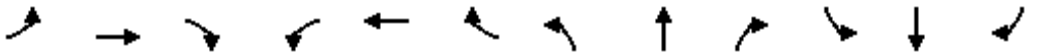
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	84	839	433
Volume Left	47	0	37
Volume Right	37	48	0
cSH	227	1700	796
Volume to Capacity	0.37	0.49	0.05
Queue Length 95th (m)	12.9	0.0	1.2
Control Delay (s)	29.8	0.0	1.4
Lane LOS	D		A
Approach Delay (s)	29.8	0.0	1.4
Approach LOS	D		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	5	750	7	2	396
Future Volume (Veh/h)	15	5	750	7	2	396
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	6	833	8	2	440
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			313			
pX, platoon unblocked	0.82	0.82			0.82	
vC, conflicting volume	1281	837			841	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1234	694			698	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	98			100	
cM capacity (veh/h)	160	364			738	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	23	841	442
Volume Left	17	0	2
Volume Right	6	8	0
cSH	187	1700	738
Volume to Capacity	0.12	0.49	0.00
Queue Length 95th (m)	3.3	0.0	0.1
Control Delay (s)	26.9	0.0	0.1
Lane LOS	D		A
Approach Delay (s)	26.9	0.0	0.1
Approach LOS	D		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	52.1%	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)	6	264	121	2	899	4	0	0	0	3	6	47
Future Volume (Veh/h)	6	264	121	2	899	4	0	0	0	3	6	47
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	293	134	2	999	4	0	0	0	3	7	52
Pedestrians											1	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.73						0.73	0.73		0.73	0.73	0.73
vC, conflicting volume	1004			427			1434	1382	360	1380	1447	1002
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	820			427			1410	1338	360	1335	1427	817
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			100			100	100	100	97	93	81
cM capacity (veh/h)	589			1132			64	110	684	94	97	274

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	434	1005	0	62
Volume Left	7	2	0	3
Volume Right	134	4	0	52
cSH	589	1132	1700	211
Volume to Capacity	0.01	0.00	0.00	0.29
Queue Length 95th (m)	0.3	0.0	0.0	9.4
Control Delay (s)	0.4	0.1	0.0	29.0
Lane LOS	A	A	A	D
Approach Delay (s)	0.4	0.1	0.0	29.0
Approach LOS			A	D

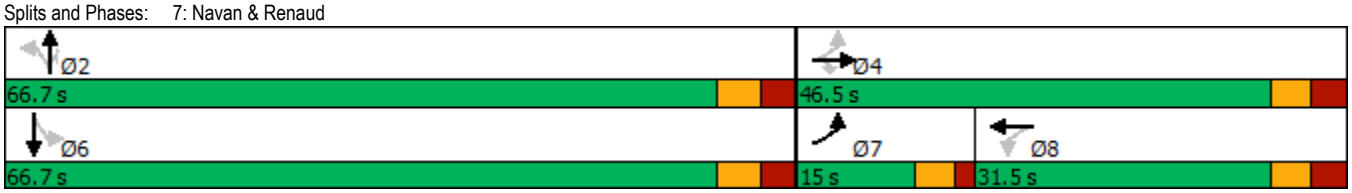
Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	61.6%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	146	110	33	31	341	124	440	31	53	144
Future Volume (vph)	146	110	33	31	341	124	440	31	53	144
Lane Group Flow (vph)	162	122	37	34	531	138	489	34	59	169
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	41.5	40.0	40.0	25.0	25.0	35.7	35.7	35.7	35.7	35.7
Actuated g/C Ratio	0.47	0.45	0.45	0.28	0.28	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.60	0.15	0.05	0.10	1.10	0.30	0.69	0.05	0.27	0.24
Control Delay	25.0	15.4	5.3	25.3	102.7	20.2	28.0	0.2	22.0	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	15.4	5.3	25.3	102.7	20.2	28.0	0.2	22.0	18.2
LOS	C	B	A	C	F	C	C	A	C	B
Approach Delay		19.1			98.1		25.0			19.2
Approach LOS		B			F		C			B
Queue Length 50th (m)	16.2	12.3	0.0	4.5	~105.9	16.5	70.9	0.0	7.0	19.1
Queue Length 95th (m)	#33.8	24.6	5.6	12.4	#178.6	30.7	106.7	0.3	16.9	33.4
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	271	794	679	334	483	773	1191	1017	364	1182
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.15	0.05	0.10	1.10	0.18	0.41	0.03	0.16	0.14

Intersection Summary

Cycle Length: 113.2
Actuated Cycle Length: 88.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 46.4 Intersection LOS: D
Intersection Capacity Utilization 115.4% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

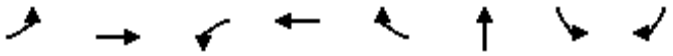
Splits and Phases: 7: Navan & Renaud



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	142	54	33	734	51	32
Future Volume (Veh/h)	142	54	33	734	51	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	158	60	37	816	57	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				159		
pX, platoon unblocked					0.76	
vC, conflicting volume			218		1078	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			218		946	188
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		73	96
cM capacity (veh/h)			1352		215	854

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	218	853	93
Volume Left	0	37	57
Volume Right	60	0	36
cSH	1700	1352	303
Volume to Capacity	0.13	0.03	0.31
Queue Length 95th (m)	0.0	0.7	10.2
Control Delay (s)	0.0	0.7	22.1
Lane LOS		A	C
Approach Delay (s)	0.0	0.7	22.1
Approach LOS			C

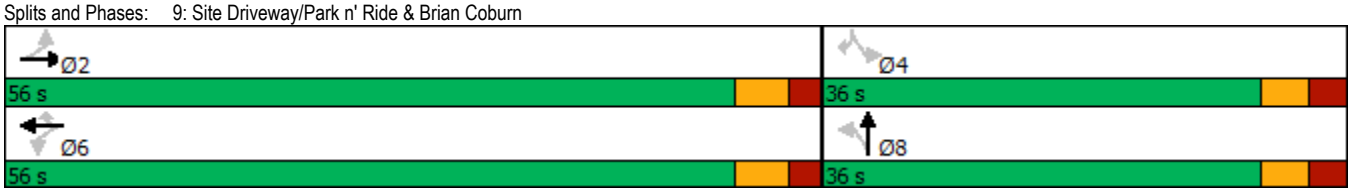
Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBR
Lane Configurations								
Traffic Volume (vph)	21	106	14	726	16	0	6	21
Future Volume (vph)	21	106	14	726	16	0	6	21
Lane Group Flow (vph)	23	190	0	823	18	78	7	23
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases		2		6		8		
Permitted Phases	2		6		6		4	4
Detector Phase	2	2	6	6	6	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	23.0	24.0	25.0	25.0
Total Split (s)	56.0	56.0	56.0	56.0	56.0	36.0	36.0	36.0
Total Split (%)	60.9%	60.9%	60.9%	60.9%	60.9%	39.1%	39.1%	39.1%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	-2.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	4.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	None	None	None
Act Effct Green (s)	59.7	59.7		59.7	59.7	12.1	10.1	10.1
Actuated g/C Ratio	0.77	0.77		0.77	0.77	0.16	0.13	0.13
v/c Ratio	0.06	0.15		0.61	0.02	0.27	0.04	0.10
Control Delay	3.9	2.9		7.9	0.6	19.9	28.3	7.8
Queue Delay	0.0	0.0		0.6	0.0	0.0	0.0	0.0
Total Delay	3.9	2.9		8.5	0.6	19.9	28.3	7.8
LOS	A	A		A	A	B	C	A
Approach Delay		3.0		8.3		19.9		
Approach LOS		A		A		B		
Queue Length 50th (m)	0.9	5.4		55.3	0.0	6.1	1.0	0.0
Queue Length 95th (m)	3.0	11.3		92.6	0.9	16.5	4.4	4.5
Internal Link Dist (m)		135.4		144.7		29.7		
Turn Bay Length (m)	40.0				35.0			
Base Capacity (vph)	396	1299		1358	1169	708	534	608
Starvation Cap Reductn	0	0		212	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0
Reduced v/c Ratio	0.06	0.15		0.72	0.02	0.11	0.01	0.04

Intersection Summary	
Cycle Length: 92	
Actuated Cycle Length: 77.1	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 8.2	Intersection LOS: A
Intersection Capacity Utilization 71.4%	ICU Level of Service C
Analysis Period (min) 15	

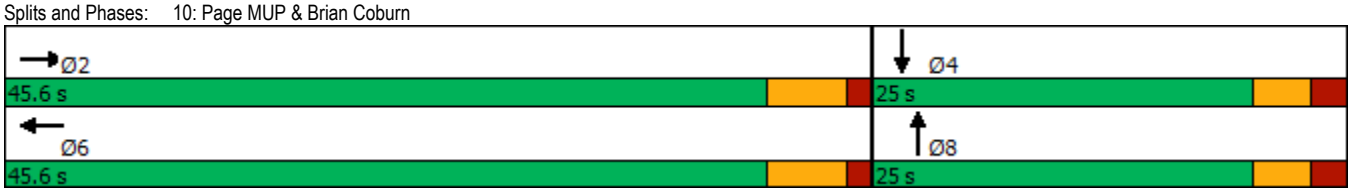
Splits and Phases: 9: Site Driveway/Park n' Ride & Brian Coburn

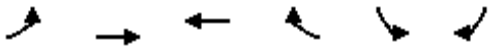


Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	127	742		
Future Volume (vph)	127	742		
Lane Group Flow (vph)	141	824		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.08	0.47		
Control Delay	0.1	0.9		
Queue Delay	0.0	0.0		
Total Delay	0.1	0.9		
LOS	A	A		
Approach Delay	0.1	0.9		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.08	0.47		

Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 0.8	Intersection LOS: A
Intersection Capacity Utilization 61.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	136	1292	428	198	182	33
Future Volume (vph)	136	1292	428	198	182	33
Lane Group Flow (vph)	151	1436	476	220	202	37
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	25.0	25.0	26.8	26.8
Total Split (s)	53.0	53.0	53.0	53.0	27.0	27.0
Total Split (%)	66.3%	66.3%	66.3%	66.3%	33.8%	33.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.3	2.3	2.3	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	None	None
Act Effct Green (s)	50.3	50.3	50.3	50.3	14.5	14.5
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.19	0.19
v/c Ratio	0.29	1.24	0.41	0.21	0.64	0.12
Control Delay	8.3	133.8	8.2	1.5	37.3	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	133.8	8.2	1.5	37.3	9.4
LOS	A	F	A	A	D	A
Approach Delay		121.9	6.1		33.0	
Approach LOS		F	A		C	
Queue Length 50th (m)	8.2	~264.5	28.5	0.0	27.0	0.0
Queue Length 95th (m)	22.0	#381.5	58.8	8.0	47.1	7.1
Internal Link Dist (m)		129.3	474.0		151.1	
Turn Bay Length (m)	85.0			55.0	30.0	
Base Capacity (vph)	529	1158	1158	1060	465	443
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	1.24	0.41	0.21	0.43	0.08

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.6	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 81.5	Intersection LOS: F
Intersection Capacity Utilization 92.3%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Navan & Orleans

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	62	614	11	8	1392
Future Volume (vph)	62	614	11	8	1392
Lane Group Flow (vph)	111	682	12	9	1547
Turn Type	Perm	NA	Perm	Perm	NA
Protected Phases		2			6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	17.4	17.4	15.4	15.4
Total Split (s)	36.1	65.4	65.4	65.4	65.4
Total Split (%)	35.6%	64.4%	64.4%	64.4%	64.4%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	5.4	5.4	5.4	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
Act Effct Green (s)	11.1	70.0	70.0	70.0	70.0
Actuated g/C Ratio	0.13	0.80	0.80	0.80	0.80
v/c Ratio	0.48	0.49	0.01	0.02	1.10
Control Delay	33.2	5.9	2.0	3.5	72.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	5.9	2.0	3.5	72.8
LOS	C	A	A	A	E
Approach Delay	33.2	5.8			72.4
Approach LOS	C	A			E
Queue Length 50th (m)	13.9	38.4	0.0	0.3	~336.3
Queue Length 95th (m)	28.0	72.6	1.5	1.7	#415.1
Internal Link Dist (m)	83.0	100.0			474.0
Turn Bay Length (m)			50.0	45.0	
Base Capacity (vph)	576	1404	1196	511	1404
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.49	0.01	0.02	1.10

Intersection Summary	
Cycle Length: 101.5	
Actuated Cycle Length: 87.9	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 51.0	Intersection LOS: D
Intersection Capacity Utilization 95.3%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Navan & Park n' Ride

Intersection	
Intersection Delay, s/veh	73.8
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	427	526	1390
Demand Flow Rate, veh/h	436	536	1417
Vehicles Circulating, veh/h	410	582	153
Vehicles Exiting, veh/h	708	988	693
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	10.1	18.9	114.1
Approach LOS	B	C	F

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	436	536	1417
Cap Entry Lane, veh/h	908	762	1180
Entry HV Adj Factor	0.979	0.981	0.981
Flow Entry, veh/h	427	526	1390
Cap Entry, veh/h	890	748	1158
V/C Ratio	0.480	0.703	1.200
Control Delay, s/veh	10.1	18.9	114.1
LOS	B	C	F
95th %tile Queue, veh	3	6	42

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	34	436	45	35	804
Future Volume (Veh/h)	43	34	436	45	35	804
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	48	38	484	50	39	893
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	1480	509			534	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1480	509			534	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	64	93			96	
cM capacity (veh/h)	133	564			1034	

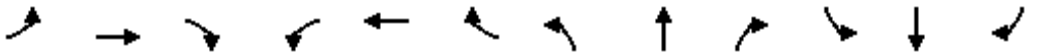
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	86	534	932
Volume Left	48	0	39
Volume Right	38	50	0
cSH	201	1700	1034
Volume to Capacity	0.43	0.31	0.04
Queue Length 95th (m)	15.8	0.0	0.9
Control Delay (s)	35.7	0.0	1.0
Lane LOS	E		A
Approach Delay (s)	35.7	0.0	1.0
Approach LOS	E		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	3	478	12	4	843
Future Volume (Veh/h)	9	3	478	12	4	843
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	10	3	531	13	4	937
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			311			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	1482	538			544	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1481	471			478	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	99			100	
cM capacity (veh/h)	129	554			1014	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	544	941
Volume Left	10	0	4
Volume Right	3	13	0
cSH	156	1700	1014
Volume to Capacity	0.08	0.32	0.00
Queue Length 95th (m)	2.1	0.0	0.1
Control Delay (s)	30.1	0.0	0.1
Lane LOS	D		A
Approach Delay (s)	30.1	0.0	0.1
Approach LOS	D		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	846	139	1	482	10	0	0	3	2	0	18
Future Volume (Veh/h)	42	846	139	1	482	10	0	0	3	2	0	18
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	940	154	1	536	11	0	0	3	2	0	20
Pedestrians					1						1	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.0						1.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					160							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	548			1094			1674	1661	1018	1656	1732	542
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	382			1094			1705	1689	1018	1684	1773	376
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 %	95			100			100	100	99	97	100	96
cM capacity (veh/h)	1001			638			57	76	288	60	67	571

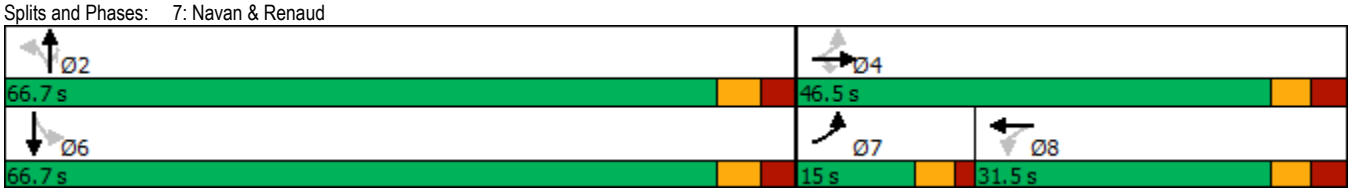
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1141	548	3	22
Volume Left	47	1	0	2
Volume Right	154	11	3	20
cSH	1001	638	288	323
Volume to Capacity	0.05	0.00	0.01	0.07
Queue Length 95th (m)	1.2	0.0	0.3	1.7
Control Delay (s)	1.5	0.0	17.6	17.0
Lane LOS	A	A	C	C
Approach Delay (s)	1.5	0.0	17.6	17.0
Approach LOS			C	C

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	99.2%	ICU Level of Service	F	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	223	387	157	26	119	37	181	41	133	485
Future Volume (vph)	223	387	157	26	119	37	181	41	133	485
Lane Group Flow (vph)	248	430	174	29	204	41	201	46	148	550
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4			8		2			6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	8	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	35.0	35.0	35.0	35.0	35.0
Minimum Split (s)	10.0	22.5	22.5	22.5	22.5	41.7	41.7	41.7	41.7	41.7
Total Split (s)	15.0	46.5	46.5	31.5	31.5	66.7	66.7	66.7	66.7	66.7
Total Split (%)	13.3%	41.1%	41.1%	27.8%	27.8%	58.9%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.7	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.5	6.5	6.5	6.5	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead			Lag	Lag					
Lead-Lag Optimize?	Yes			Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	31.0	29.5	29.5	14.4	14.4	37.1	37.1	37.1	37.1	37.1
Actuated g/C Ratio	0.39	0.37	0.37	0.18	0.18	0.46	0.46	0.46	0.46	0.46
v/c Ratio	0.62	0.66	0.29	0.18	0.65	0.16	0.25	0.06	0.29	0.67
Control Delay	26.1	27.1	9.1	31.2	37.6	15.5	14.5	1.1	15.8	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	27.1	9.1	31.2	37.6	15.5	14.5	1.1	15.8	22.2
LOS	C	C	A	C	D	B	B	A	B	C
Approach Delay		23.1			36.8		12.5			20.9
Approach LOS		C			D		B			C
Queue Length 50th (m)	26.4	53.4	6.6	3.8	26.1	3.5	18.1	0.0	13.6	63.8
Queue Length 95th (m)	53.9	100.9	23.0	12.4	54.1	11.3	36.7	2.1	30.5	115.1
Internal Link Dist (m)		178.9			138.6		146.2			136.1
Turn Bay Length (m)	100.0		35.0	30.0		60.0		30.0	25.0	
Base Capacity (vph)	398	890	784	282	535	412	1335	1128	842	1331
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.48	0.22	0.10	0.38	0.10	0.15	0.04	0.18	0.41

Intersection Summary	
Cycle Length: 113.2	
Actuated Cycle Length: 80	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 22.4	Intersection LOS: C
Intersection Capacity Utilization 110.2%	ICU Level of Service H
Analysis Period (min) 15	

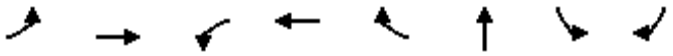
Splits and Phases: 7: Navan & Renaud



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	658	56	35	310	52	34
Future Volume (Veh/h)	658	56	35	310	52	34
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	731	62	39	344	58	38
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				164		
pX, platoon unblocked					0.97	
vC, conflicting volume			793		1184	762
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			793		1174	762
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		70	91
cM capacity (veh/h)			828		196	405

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	793	383	96
Volume Left	0	39	58
Volume Right	62	0	38
cSH	1700	828	246
Volume to Capacity	0.47	0.05	0.39
Queue Length 95th (m)	0.0	1.2	14.0
Control Delay (s)	0.0	1.5	28.7
Lane LOS		A	D
Approach Delay (s)	0.0	1.5	28.7
Approach LOS			D

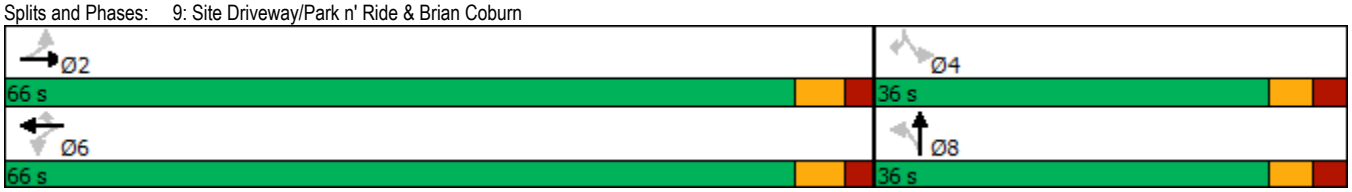
Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBR
Lane Configurations								
Traffic Volume (vph)	21	635	15	297	8	0	6	21
Future Volume (vph)	21	635	15	297	8	0	6	21
Lane Group Flow (vph)	23	774	0	347	9	85	7	23
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases		2		6		8		
Permitted Phases	2		6		6		4	4
Detector Phase	2	2	6	6	6	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.0	16.0	23.0	23.0	23.0	24.0	25.0	25.0
Total Split (s)	66.0	66.0	66.0	66.0	66.0	36.0	36.0	36.0
Total Split (%)	64.7%	64.7%	64.7%	64.7%	64.7%	35.3%	35.3%	35.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	None	None	None
Act Effct Green (s)	69.3	69.3		69.3	69.3	10.4	10.4	10.4
Actuated g/C Ratio	0.80	0.80		0.80	0.80	0.12	0.12	0.12
v/c Ratio	0.03	0.56		0.26	0.01	0.38	0.04	0.11
Control Delay	3.3	6.6		3.9	0.1	28.7	33.0	10.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	6.6		3.9	0.1	28.7	33.0	10.3
LOS	A	A		A	A	C	C	B
Approach Delay		6.5		3.8		28.7		
Approach LOS		A		A		C		
Queue Length 50th (m)	0.9	49.1		15.5	0.0	9.0	1.2	0.0
Queue Length 95th (m)	2.9	84.2		27.2	0.3	21.6	4.8	5.4
Internal Link Dist (m)		139.8		144.7		27.8		
Turn Bay Length (m)	40.0				35.0			
Base Capacity (vph)	777	1389		1345	1201	593	474	540
Starvation Cap Reductn	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0
Reduced v/c Ratio	0.03	0.56		0.26	0.01	0.14	0.01	0.04

Intersection Summary	
Cycle Length: 102	
Actuated Cycle Length: 87	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 7.5	Intersection LOS: A
Intersection Capacity Utilization 70.8%	ICU Level of Service C
Analysis Period (min) 15	

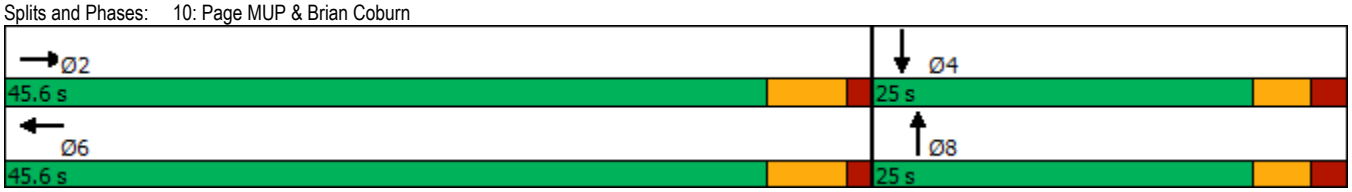
Splits and Phases: 9: Site Driveway/Park n' Ride & Brian Coburn



Lane Group	EBT	WBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	655	306		
Future Volume (vph)	655	306		
Lane Group Flow (vph)	728	340		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.6	15.6	23.0	23.0
Total Split (s)	45.6	45.6	25.0	25.0
Total Split (%)	64.6%	64.6%	35%	35%
Yellow Time (s)	4.2	4.2	3.0	3.0
All-Red Time (s)	1.4	1.4	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.6	5.6		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	None	None
Act Effct Green (s)	60.6	60.6		
Actuated g/C Ratio	1.00	1.00		
v/c Ratio	0.41	0.19		
Control Delay	0.7	0.2		
Queue Delay	0.0	0.0		
Total Delay	0.7	0.2		
LOS	A	A		
Approach Delay	0.7	0.2		
Approach LOS	A	A		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	144.7	123.4		
Turn Bay Length (m)				
Base Capacity (vph)	1765	1765		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.41	0.19		

Intersection Summary	
Cycle Length: 70.6	
Actuated Cycle Length: 60.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 0.6	Intersection LOS: A
Intersection Capacity Utilization 56.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Page MUP & Brian Coburn



Appendix G

Transportation Demand Management (TDM) Strategies

Introduction

The City of Ottawa's *Transportation Impact Assessment (TIA) Guidelines* (specifically Module 4.1—Development Design) requires proponents of qualifying developments to use the City's **TDM-Supportive Development Design and Infrastructure Checklist** to assess the opportunity to implement design elements that are supportive of sustainable modes. The goal of this assessment is to ensure that the development provides safe and efficient access for all users, while creating an environment that encourages walking, cycling and transit use.

The remaining sections of this document are:

- Using the Checklist
- Glossary
- TDM-Supportive Development Design and Infrastructure Checklist: Non-Residential Developments
- TDM-Supportive Development Design and Infrastructure Checklist: Residential Developments

Readers are encouraged to contact the City of Ottawa's TDM Officer for any guidance and assistance they require to complete this checklist.

Using the Checklist

This **TDM-Supportive Development Design and Infrastructure Checklist** document includes two actual checklists, one for non-residential developments (office, institutional, retail or industrial) and one for residential developments (multi-family or condominium only; subdivisions are exempt). Readers may download the applicable checklist in electronic format and complete it electronically, or print it out and complete it by hand. As an alternative, they may create a freestanding document that lists the design and infrastructure measures being proposed and provides additional detail on them.

Each measure in the checklist is numbered for easy reference. Each measure is also flagged as:

- 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.

Glossary

This glossary defines and describes the following measures that are identified in the **TDM-Supportive Development Design and Infrastructure Checklist**:

Walking & cycling: Routes
- Building location & access points
- Facilities for walking & cycling
- Amenities for walking & cycling

Walking & cycling: End-of-trip facilities
- Bicycle parking
- Secure bicycle parking
- Shower & change facilities
- Bicycle repair station

Transit
- Walking routes to transit
- Customer amenities

Ridesharing
- Pick-up & drop-off facilities
- Carpool parking

Carsharing & bikesharing
- Carshare parking spaces
- Bikeshare station location

Parking
- Number of parking spaces
- Separate long-term & short-term parking areas

Other
- On-site amenities to minimize off-site trips

In addition to specific references made in this glossary, readers should consult the City of Ottawa's design and planning guidelines for a variety of different land uses and contexts, available on the City's website at www.ottawa.ca. Readers may also find the following resources to be helpful:

- *Promoting Sustainable Transportation through Site Design*, Institute of Transportation Engineers, 2004 (www.cite7.org/wpdm-package/iterp-promoting-sustainable-transportation)
- *Bicycle End-of-Trip Facilities: A Guide for Canadian Municipalities and Employers*, Transport Canada, 2010 (www.fcm.ca/Documents/tools/GMF/Transport_Canada/BikeEndofTrip_EN.pdf)

▶ *Walking & cycling: Routes*

Building location & access points. Correctly positioning buildings and their entrances can help make walking convenient, comfortable and safe. Minimizing travel distances and maximizing visibility are key.

Facilities for walking & cycling. The Official Plan gives clear direction on the provision and design of walking and cycling facilities for both access and circulation. On larger, busier sites (e.g. multi-building campuses) the inclusion of sidewalks, pathways, marked crossings, stop signs and traffic calming features can create a safer and more supportive environment for active transportation.

Amenities for walking & cycling. Lighting, landscaping, benches and wayfinding can make walking and cycling safer and more secure, comfortable and accessible.

▶ *Walking & cycling: End-of-trip facilities*

Bicycle parking. The Official Plan and Zoning By-law both address the need for adequate bicycle parking at developments. Weather protection and theft prevention are major concerns for commuters who spend hundreds or thousands of dollars on a quality bicycle. Bicycle racks should have a design that enables secure locking while preventing damage to wheels. They should be located within sight of busy areas such as main building entrances or staffed parking kiosks.

Secure bicycle parking. Ottawa's Zoning By-law requires a secure area for bicycles at office or residential developments having more than 50 bicycle parking spaces. Lockable outdoor bike cages or indoor storage rooms that limit access to registered users are ideal.

Shower & change facilities. Longer-distance cyclists, joggers and even pedestrians can need a place to shower and change at work; the lack of such facilities is a major barrier to active commuting. Lockers and drying racks provide a place to store gear away from workspaces, and showers and grooming stations allow commuters to make themselves presentable for the office.

Bicycle repair station. Cycling commuters can experience maintenance issues that make the homeward trip difficult or impossible. A small supply of tools (e.g. air pump, Allen keys, wrenches) and supplies (e.g. inner tube patches, chain lubricant) in the workplace can help.

▶ *Transit*

Customer amenities. Larger developments that feature an on-site transit stop can make transit use more attractive by providing shelters, lighting and benches. Even better, they could integrate the passenger waiting area into a building entrance.

▶ *Ridesharing*

Pick-up & drop-off facilities. Having a safe place to load or unload passengers (for carpools as well as taxis and ride-hailing services) without obstructing pedestrians, cyclists or other vehicles can help make carpooling work.

Carpool parking. At destinations with large parking lots (or lots that regularly fill to capacity), signed priority carpool parking spaces can be an effective ridesharing incentive. Priority spaces are frequently abused by non-carpoolers, so a system to provide registered users with vehicle identification tags is recommended.

▶ *Carsharing & bikesharing*

Carshare parking spaces. For developments where carsharing could be an attractive option for employees, visitors or residents, ensuring an attractive location for future carshare parking spaces can avoid challenges associated with future retrofits.

Bikeshare station location. For developments where bikesharing could be an attractive option for employees, visitor or residents, ensuring an attractive location for a future bikeshare station can avoid challenges associated with future retrofits.

▶ *Parking*

Number of parking spaces. Parking capacity is an important variable in development design, as it can either support or subvert the mode share targets set during the transportation impact analysis (TIA). While the Zoning By-law establishes any minimum and/or maximum requirements for parking capacity, it also allows a reduction in any minimum to reflect the existence of on-site shower, change and locker rooms provided for cyclists.

Separate long-term & short-term parking areas. Because access to unused parking spaces can be a powerful incentive to drive, developments can better manage their parking supply and travel behaviours by separating long-term from short-term parking through the use of landscaping, gated controls or signs. Doing so makes it difficult for long-term parkers (e.g. commuters) to park in short-term areas (e.g. for visitors) as long as enforcement occurs; it also protects long-term parking capacity for its intended users.

▶ *Other*

On-site amenities to minimize off-site trips. Developments that offer facilities to limit employees' need for a car during their commute (e.g. to drop off children at daycare) or during their workday (e.g. to hit the gym) can free employees to make the commuting decision that otherwise works best for them.

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	☐
	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	☐
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)	☐

		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)*	☐
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)*	☐
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)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐
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)	☐

	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	☐
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	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐
	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	☐
	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	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	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)*	☐
	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	☐

		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	☑
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	☐
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)*	☐
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)*	☐
	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)	☐
	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	☐

TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)

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: *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: *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	☐
	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	☐
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)	☐

		TDM-supportive design & infrastructure measures: *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)*	☐
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 resident-owned bicycles, plus the expected peak number of visitor cyclists	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential 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)*	☐
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
	2.3	**Bicycle repair station**	
BETTER	2.3.1	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)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
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	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

	TDM-supportive design & infrastructure measures: *Residential developments*		Check if completed & add descriptions, explanations or plan/drawing references
	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	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	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	☐
	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	☐
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	☐
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)*	☐
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)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐

Appendix H

Segment MMLOS

Multi-Modal Level of Service - Segments Form

Scenario **Existing Conditions**

SEGMENTS		Street A	Navan	Navan	Navan	Navan	Navan	Navan	Brian Coburn	Brian Coburn	Brian Coburn
			Orleans/Park n' Ride	Park n' Ride/Brian Coburn	Brian Coburn/Site Drwy N	Site Drwy N/Site Drwy S	Site Drwy S/Page	Page/Renaud	Navan/Site Drwy	Site Drwy/Park n' Ride	Park n' Ride/Ped Cross
Pedestrian	Sidewalk Width Boulevard Width	-	no sidewalk n/a	no sidewalk n/a	no sidewalk n/a	no sidewalk n/a	no sidewalk n/a	no sidewalk n/a	no sidewalk n/a	no sidewalk n/a	no sidewalk n/a
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 50 to 60 km/h no	> 50 to 60 km/h no	> 50 to 60 km/h no	> 50 to 60 km/h no	> 50 to 60 km/h no	> 60 km/h no	> 60 km/h no	> 60 km/h no
	Exposure to Traffic PLoS		**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
	Effective Sidewalk Width										
	Pedestrian Volume										
	Crowding PLoS		-	-	-	-	-	-	-	-	-
	Level of Service		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Bicycle	Type of Cycling Facility	C	Physically Separated	Physically Separated	Curbside Bike Lane	Curbside Bike Lane	Curbside Bike Lane	Curbside Bike Lane	Physically Separated	Physically Separated	Physically Separated
	Number of Travel Lanes				≤ 1 each direction	≤ 1 each direction	≤ 1 each direction	≤ 1 each direction			
	Operating Speed				>50 to 70 km/h	>50 to 70 km/h	>50 to 70 km/h	>50 to 70 km/h			
	# of Lanes & Operating Speed LoS		-	-	**C**	**C**	**C**	**C**	-	-	-
	Bike Lane (+ Parking Lane) Width				≥1.5 to <1.8 m	≥1.5 to <1.8 m	≥1.5 to <1.8 m	≥1.5 to <1.8 m			
	Bike Lane Width LoS		-	-	**B**	**B**	**B**	**B**	-	-	-
	Bike Lane Blockages				Rare	Rare	Rare	Rare			
	Blockage LoS		-	-	**A**	**A**	**A**	**A**	-	-	-
	Median Refuge Width (no median = < 1.8 m)				< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge			
	No. of Lanes at Unsignalized Crossing				≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes			
	Sidestreet Operating Speed				≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	>50 to 60 km/h			
	Unsignalized Crossing - Lowest LoS		**A**	**A**	**A**	**A**	**A**	**C**	**A**	**A**	**A**
	Level of Service		**A**	**A**	**C**	**C**	**C**	**C**	**A**	**A**	**A**
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
	Level of Service		**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**
Truck	Truck Lane Width	C	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m
	Travel Lanes per Direction		1	1	1	1	1	1	1	1	1
	Level of Service		**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**

Appendix I

Collision Analysis

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	5	17	18	0	1	0	10	2	53	83%
02 - Non-fatal injury	1	4	3	0	1	0	2	0	11	17%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**6**	**21**	**21**	**0**	**2**	**0**	**12**	**2**	**64**	100%
	#4 or 9%	#1 or 33%	#1 or 33%	#7 or 0%	#5 or 3%	#7 or 0%	#3 or 19%	#5 or 3%		

BRIAN COBURN BLVD btwn FERN CASEY ST & NAVAN RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MVK
2015-2019	1	5,700	1825	**0.06**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	0	0	0	0	0	0	1	0	1	100%
02 - Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	100%
	0%	0%	0%	0%	0%	0%	100%	0%		

BRIAN COBURN BLVD @ NAVAN RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	10	15,292	1825	**0.36**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	1	2	3	0	0	0	3	0	9	90%
02 - Non-fatal injury	0	0	1	0	0	0	0	0	1	10%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**1**	**2**	**4**	**0**	**0**	**0**	**3**	**0**	**10**	100%
	10%	20%	40%	0%	0%	0%	30%	0%		

NAVAN RD btwn ORLEANS BLVD & PAGE RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MVK
2015-2019	10	11,292	1825	**0.44**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	2	1	6	0	0	0	0	0	9	90%
02 - Non-fatal injury	0	0	0	0	0	0	1	0	1	10%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**2**	**1**	**6**	**0**	**0**	**0**	**1**	**0**	**10**	100%
	20%	10%	60%	0%	0%	0%	10%	0%		

BRIAN COBURN BLVD @ PAGE RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	2	n/a	1825	**n/a**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	0	0	1	0	0	0	1	0	2	100%
02 - Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	100%
	0%	0%	50%	0%	0%	0%	50%	0%		

NAVAN RD @ PAGE RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	8	8,704	1825	**0.50**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	0	5	0	0	0	0	2	0	7	88%
02 - Non-fatal injury	0	0	0	0	1	0	0	0	1	13%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**5**	**0**	**0**	**1**	**0**	**2**	**0**	**8**	100%
	0%	63%	0%	0%	13%	0%	25%	0%		

NAVAN RD btwn PAGE RD & RENAUD RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MVK
2015-2019	1	6,572	1825	**0.50**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	1	0	0	0	0	0	0	0	1	100%
02 - Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	100%
	100%	0%	0%	0%	0%	0%	0%	0%		

RENAUD RD @ PAGE RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	2	n/a	1825	**n/a**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	0	1	0	0	1	0	0	0	2	100%
02 - Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	100%
	0%	50%	0%	0%	50%	0%	0%	0%		

RENAUD RD @ NAVAN RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	14	14,867	1825	**0.52**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	0	4	4	0	0	0	1	0	9	64%
02 - Non-fatal injury	0	3	1	0	0	0	1	0	5	36%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**7**	**5**	**0**	**0**	**0**	**2**	**0**	**14**	100%
	0%	50%	36%	0%	0%	0%	14%	0%		

ORLEANS BLVD @ NAVAN RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	12	19,607	1825	**0.34**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	1	3	3	0	0	0	1	1	9	75%
02 - Non-fatal injury	1	1	1	0	0	0	0	0	3	25%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**2**	**4**	**4**	**0**	**0**	**0**	**1**	**1**	**12**	100%
	17%	33%	33%	0%	0%	0%	8%	8%		

RENAUD RD btwn NAVAN RD & WHITE ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MVK
2015-2019	2	n/a	1825	**n/a**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	0	1	1	0	0	0	0	0	2	100%
02 - Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	100%
	0%	50%	50%	0%	0%	0%	0%	0%		

NAVAN RD btwn INNES RD & ORLEANS BLVD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MVK
2015-2019	1	n/a	1825	**n/a**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	0	0	0	0	0	0	1	0	1	100%
02 - Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	100%
	0%	0%	0%	0%	0%	0%	100%	0%		

NAVAN RD btwn RENAUD RD & MER BLEUE RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MVK
2015-2019	1	n/a	1825	**n/a**

Classification of Accident	01 - Approaching	02 - Angle	03 - Rear end	04 - Sideswipe	05 - Turning movement	06 - SMV unattended vehicle	07 - SMV other	99 - Other	Total	
03 - P.D. only	0	0	0	0	0	0	0	1	1	100%
02 - Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
01 - Fatal injury	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	100%
	0%	0%	0%	0%	0%	0%	0%	100%		

Appendix J

Intersection MMLOS

Multi-Modal Level of Service - Intersections Form

Scenario **Existing Conditions**

INTERSECTIONS		Navan/Orleans Intersection				Navan/Park n'Ride Intersection				Navan/Renaud Intersection			
Crossing Side		NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG
Pedestrian	Lanes	3		3	3	3	3	0 - 2		3	3	3	4
	Median	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	Median > 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive		Permissive	Permissive	No left turn / Prohib.	Permissive	Permissive		Protected/ Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control		No right turn	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed		RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No		No	No	No	No	No		No	No	No	No
	Right Turn Channel	No Channel		No Channel	No Channel	No Right Turn	No Channel	No Channel		No Channel	Smart Channel	No Channel	No Channel
	Corner Radius	10-15m		10-15m	10-15m	No Right Turn	5-10m	10-15m		5-10m	>25m	5-10m	10-15m
	Crosswalk Type	Std transverse markings		Std transverse markings	Std transverse markings			Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	**70**		**75**	**70**			**85**		**71**	**73**	**71**	**53**
	Ped. Exposure to Traffic LoS	**C**	**-**	**B**	**C**	**-**	**-**	**B**	**-**	**C**	**C**	**C**	**D**
	Cycle Length	27		53	53	55	55	36		67	67	46	61
	Effective Walk Time	21		19	19		12			35	35	16	16
	Average Pedestrian Delay	**1**		**11**	**11**		**17**			**8**	**8**	**10**	**17**
	Pedestrian Delay LoS	**A**	**-**	**B**	**B**	**-**	**B**	**-**	**-**	**A**	**A**	**B**	**B**
	Level of Service	**C**	**-**	**B**	**C**	**-**	**B**	**B**	**-**	**C**	**C**	**C**	**D**
		C				**B**				**D**			
Approach From		NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic		Pocket Bike Lane	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Pocket Bike Lane
	Right Turn Lane Configuration	≤ 50 m		Bike lane shifts to the left of right turn	Not Applicable	Not Applicable	Not Applicable	≤ 50 m		≤ 50 m	≤ 50 m	≤ 50 m	Bike lane shifts to the left of right turn
	Right Turning Speed	≤ 25 km/h		≤ 25 km/h	Not Applicable	Not Applicable	Not Applicable	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**D**	**-**	**D**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**D**	**-**	**D**	**D**	**D**	**D**
	Separated or Mixed Traffic	**Mixed Traffic**	**-**	**Separated**	**Separated**	**Separated**	**Separated**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Separated**
	Left Turn Approach	One lane crossed			1 lane crossed	No lane crossed	No lane crossed	No lane crossed		One lane crossed	One lane crossed	One lane crossed	≥ 2 lanes crossed
	Operating Speed	> 50 to < 60 km/h			≥ 60 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**E**	**-**	**-**	**E**	**B**	**B**	**B**	**-**	**F**	**F**	**E**	**F**
	Level of Service	**E**	**-**	**-**	**E**	**B**	**B**	**D**	**-**	**F**	**F**	**E**	**F**
		E				**D**				**F**			
Transit	Average Signal Delay	≤ 30 sec		≤ 30 sec	≤ 30 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec		> 40 sec	> 40 sec	> 40 sec	> 40 sec
	Level of Service	**D**	**-**	**D**	**D**	**C**	**C**	**C**	**-**	**F**	**F**	**F**	**F**
		D				**C**				**F**			
Truck	Effective Corner Radius	10 - 15 m		10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m		< 10 m	> 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1		1		1	1	1		1	1	1	1
	Level of Service	**E**	**-**	**E**	**-**	**E**	**E**	**E**	**-**	**F**	**C**	**E**	**E**
		E				**E**				**F**			
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.61 - 0.70				0.71 - 0.80			
	Level of Service	**D**				**B**				**C**			

Multi-Modal Level of Service - Intersections Form

Scenario **Existing Conditions**

INTERSECTIONS		Brian Coburn/Park n' Ride				Brian Coburn/Ped Crossing			
Crossing Side		NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG
Pedestrian	Lanes		0 - 2	4	3			0 - 2	0 - 2
	Median		Median > 2.4 m	Median > 2.4 m	Median > 2.4 m			No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns		Permissive	Permissive	No left turn / Prohib.			No left turn / Prohib.	No left turn / Prohib.
	Conflicting Right Turns		Permissive or yield control	No right turn	Permissive or yield control			No right turn	No right turn
	Right Turns on Red (RTOR) ?		RTOR allowed	RTOR allowed	RTOR allowed			RTOR prohibited	RTOR allowed
	Ped Signal Leading Interval?		No	No	No			No	No
	Right Turn Channel		No Channel	No Channel	No Channel			No Right Turn	No Right Turn
	Corner Radius		10-15m	10-15m	10-15m			No Right Turn	No Right Turn
	Crosswalk Type		Std transverse markings	Std transverse markings				Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score		**85**	**60**				**114**	**111**
	Ped. Exposure to Traffic LoS	**-**	**B**	**C**	**-**	**-**	**-**	**A**	**A**
	Cycle Length		36	56	56	25	25	46	46
	Effective Walk Time		19	17		18	18		
	Average Pedestrian Delay		**4**	**14**		**1**	**1**		
	Pedestrian Delay LoS	**-**	**A**	**B**	**-**	**A**	**A**	**-**	**-**
	Level of Service	**-**	**B**	**C**	**-**	**A**	**A**	**A**	**A**
		C				**A**			
Approach From		NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG
Bicycle	Bicycle Lane Arrangement on Approach		Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration		≤ 50 m	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Right Turning Speed		≤ 25 km/h	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Cyclist relative to RT motorists	**-**	**D**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**-**	**Mixed Traffic**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**
	Left Turn Approach		No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed		≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h
	Left Turning Cyclist	**-**	**B**	**B**	**B**	**B**	**B**	**B**	**B**
	Level of Service	**-**	**D**	**B**	**B**	**B**	**B**	**B**	**B**
		D				**B**			
Transit	Average Signal Delay		≤ 10 sec	≤ 10 sec	≤ 10 sec	0 sec	0 sec	0 sec	0 sec
	Level of Service	**-**	**B**	**B**	**B**	**A**	**A**	**A**	**A**
		B				**A**			
Truck	Effective Corner Radius		10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection		1	1	1				
	Level of Service	**-**	**E**	**E**	**E**	**-**	**-**	**-**	**-**
		E				**-**			
Auto	Volume to Capacity Ratio	0.0 - 0.60				0.0 - 0.60			
	Level of Service	**A**				**A**			

Multi-Modal Level of Service - Intersections Form

Scenario **Projected Conditions**

	INTERSECTIONS	Navan/Orleans Intersection				Navan/Park n'Ride Intersection				Navan/Renaud Intersection			
	Crossing Side	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG
Pedestrian	Lanes	3		3	3	3	3	0 - 2		3	3	3	4
	Median	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	Median > 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive		Permissive	Permissive	No left turn / Prohib.	Permissive	Permissive		Protected/ Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control		No right turn	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed		RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No		No	No	No	No	No		No	No	No	No
	Right Turn Channel	No Channel		No Channel	No Channel	No Right Turn	No Channel	No Channel		No Channel	Smart Channel	No Channel	No Channel
	Corner Radius	10-15m		10-15m	10-15m	No Right Turn	5-10m	10-15m		5-10m	>25m	5-10m	10-15m
	Crosswalk Type	Std transverse markings		Std transverse markings	Std transverse markings			Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	**70**		**75**	**70**			**85**		**71**	**73**	**71**	**53**
	Ped. Exposure to Traffic LoS	**C**	**-**	**B**	**C**	**-**	**-**	**B**	**-**	**C**	**C**	**C**	**D**
	Cycle Length	27		53	53	55	55	36		67	67	46	61
	Effective Walk Time	21		19	19		12			35	35	16	16
	Average Pedestrian Delay	**1**		**11**	**11**		**17**			**8**	**8**	**10**	**17**
	Pedestrian Delay LoS	**A**	**-**	**B**	**B**	**-**	**B**	**-**	**-**	**A**	**A**	**B**	**B**
	Level of Service	**C**	**-**	**B**	**C**	**-**	**B**	**B**	**-**	**C**	**C**	**C**	**D**
		C				**B**				**D**			
	Approach From	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic		Pocket Bike Lane	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Pocket Bike Lane
	Right Turn Lane Configuration	≤ 50 m		Bike lane shifts to the left of right turn	Not Applicable	Not Applicable	Not Applicable	≤ 50 m		≤ 50 m	≤ 50 m	≤ 50 m	Bike lane shifts to the left of right turn
	Right Turning Speed	≤ 25 km/h		≤ 25 km/h	Not Applicable	Not Applicable	Not Applicable	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**D**	**-**	**D**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**D**	**-**	**D**	**D**	**D**	**D**
	Separated or Mixed Traffic	**Mixed Traffic**	**-**	**Separated**	**Separated**	**Separated**	**Separated**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Separated**
	Left Turn Approach	One lane crossed			1 lane crossed	No lane crossed	No lane crossed	No lane crossed		One lane crossed	One lane crossed	One lane crossed	≥ 2 lanes crossed
	Operating Speed	> 50 to < 60 km/h			≥ 60 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**E**	**-**	**-**	**E**	**B**	**B**	**B**	**-**	**F**	**F**	**E**	**F**
	Level of Service	**E**	**-**	**-**	**E**	**B**	**B**	**D**	**-**	**F**	**F**	**E**	**F**
		E				**D**				**F**			
Transit	Average Signal Delay	> 40 sec		> 40 sec	> 40 sec	> 40 sec	> 40 sec	> 40 sec		> 40 sec	> 40 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**-**	**F**	**F**	**F**	**F**	**F**	**-**	**F**	**F**	**F**	**F**
		F				**F**				**F**			
Truck	Effective Corner Radius	10 - 15 m		10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m		< 10 m	> 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1		1		1	1	1		1	1	1	1
	Level of Service	**E**	**-**	**E**	**-**	**E**	**E**	**E**	**-**	**F**	**C**	**E**	**E**
		E				**E**				**F**			
Auto	Volume to Capacity Ratio	> 1.00				0.91 - 1.00				0.81 - 0.90			
	Level of Service	**F**				**E**				**D**			

Multi-Modal Level of Service - Intersections Form

Scenario **Projected Conditions**

	INTERSECTIONS	Brian Coburn/Park n' Ride				Brian Coburn/Ped Crossing			
	Crossing Side	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG
Pedestrian	Lanes	0 - 2	0 - 2	4	3			0 - 2	0 - 2
	Median	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m	Median > 2.4 m			No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive			No left turn / Prohib.	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control			No right turn	No right turn
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed			RTOR prohibited	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No			No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel			No Right Turn	No Right Turn
	Corner Radius	5-10m	10-15m	10-15m	10-15m			No Right Turn	No Right Turn
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings				Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**86**	**85**	**55**				**114**	**111**
	Ped. Exposure to Traffic LoS	**B**	**B**	**D**	**-**	**-**	**-**	**A**	**A**
	Cycle Length	36	36	56	56	25	25	46	46
	Effective Walk Time	19	19	17		18	18		
	Average Pedestrian Delay	**4**	**4**	**14**		**1**	**1**		
	Pedestrian Delay LoS	**A**	**A**	**B**	**-**	**A**	**A**	**-**	**-**
	Level of Service	**B**	**B**	**D**	**-**	**A**	**A**	**A**	**A**
		D				**A**			
	Approach From	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG
Bicycle	Bicycle Lane Arrangement on Approach	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	Not Applicable	≤ 50 m	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Right Turning Speed	Not Applicable	≤ 25 km/h	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Cyclist relative to RT motorists	**Not Applicable**	**D**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**Separated**	**Mixed Traffic**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h
	Left Turning Cyclist	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**
	Level of Service	**B**	**D**	**B**	**B**	**B**	**B**	**B**	**B**
		D				**B**			
Transit	Average Signal Delay	≤ 10 sec	≤ 10 sec	≤ 10 sec	≤ 10 sec	0 sec	0 sec	0 sec	0 sec
	Level of Service	**B**	**B**	**B**	**B**	**A**	**A**	**A**	**A**
		B				**A**			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	1	1	1				
	Level of Service	**E**	**E**	**E**	**E**	**-**	**-**	**-**	**-**
		E				**-**			
Auto	Volume to Capacity Ratio	0.0 - 0.60				0.0 - 0.60			
	Level of Service	**A**				**A**			

Appendix K

Collision Analysis

Introduction

The City of Ottawa's *Transportation Impact Assessment (TIA) Guidelines* (specifically Module 4.3—Transportation Demand Management) requires proponents of qualifying developments to assess the context, need and opportunity for transportation demand management (TDM) measures at their development. The guidelines require that proponents complete the City's **TDM Measures Checklist**, at a minimum, to identify any TDM measures being proposed.

The remaining sections of this document are:

- Using the Checklist
- Glossary
- TDM Measures Checklist: Non-Residential Developments
- TDM Measures Checklist: Residential developments

Readers are encouraged to contact the City of Ottawa's TDM Officer for any guidance and assistance they require to complete this checklist.

Using the Checklist

The City's *TIA Guidelines* are designed so that *Module 3.1—Development-Generated Travel Demand*, *Module 4.1—Development Design*, and *Module 4.2—Parking* are complete before a proponent begins *Module 4.3—Transportation Demand Management*.

Within Module 4.3, *Element 4.3.1—Context for TDM* and *Element 4.3.2—Need and Opportunity* are intended to create an understanding of the need for any TDM measures, and of the results they are expected to achieve or support. Once those two elements are complete, proponents begin *Element 4.3.3—TDM Program* that requires proponents to identify proposed TDM measures using the **TDM Measures Checklist**, at a minimum. The *TIA Guidelines* note that the City may require additional analysis for large or complex development proposals, or those that represent a higher degree of performance risk; as well, proponents proposing TDM measures for a new development must also propose an implementation plan that addresses planning and coordination, funding and human resources, timelines for action, performance targets and monitoring requirements.

This **TDM Measures Checklist** document includes two actual checklists, one for non-residential developments (office, institutional, retail or industrial) and one for residential developments (multi-family, condominium or subdivision). Readers may download the applicable checklist in electronic format and complete it electronically, or print it out and complete it by hand. As an alternative, they may create a freestanding document that lists the TDM measures being proposed and provides additional detail on them, including an implementation plan as required by the City's *TIA Guidelines*.

Each measure in the checklist is numbered for easy reference. Each measure is also flagged as:

- 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.

Glossary

This glossary defines and describes the following measures that are identified in the **TDM Measures Checklist**:

TDM program management
- Program coordinator
- Travel surveys

Parking
- Priced parking

Walking & cycling
- Information on walking/cycling routes & destinations
- Bicycle skills training
- Valet bike parking

Transit
- Transit information
- Transit fare incentives
- Enhanced public transit service
- Private transit service

Ridesharing
- Ridematching service
- Carpool parking price incentives
- Vanpool service

Carsharing & bikesharing
- Bikeshare stations & memberships
- Carshare vehicles & memberships

TDM marketing & communications
- Multimodal travel information
- Personalized trip planning
- Promotions

Other incentives & amenities
- Emergency ride home
- Alternative work arrangements
- Local business travel options
- Commuter incentives
- On-site amenities

For further information on selecting and implementing TDM measures (particularly as they apply to non-residential developments, with a focus on workplaces), readers may find it helpful to consult Transport Canada's *Workplace Travel Plans: Guidance for Canadian Employers*, which can be downloaded in English and French from the ACT Canada website at www.actcanada.com/resources/act-resources.

▶ *TDM program management*

While some TDM measures can be implemented with a minimum of effort through routine channels (e.g. parking or human resources), more complex measures or a larger development site may warrant assigning responsibility for TDM program coordination to a designated person either inside or outside the implementing organization. Similarly, some TDM measures are more effective if they are targeted or customized for specific audiences, and would benefit from the collection of related information.

Program coordinator. This person is charged with day-to-day TDM program development and implementation. Only in very large employers with thousands of workers is this likely to be a full-time, dedicated position. Usually, it is added to an existing role in parking, real estate, human resources or environmental management. In practice, this role may be called TDM coordinator, commute trip reduction coordinator or employee transportation coordinator. The City of Ottawa can identify external resources (e.g. non-profit organizations or consultants) that could provide these services.

Travel surveys. Travel surveys are most commonly conducted at workplaces, but can be helpful in other settings. They identify how and why people travel the way they do, and what barriers and opportunities exist for different behaviours. They usually capture the following information:

- *Personal data* including home address or postal code, destination, job type or function, employment status (full-time, part-time and/or teleworker), gender, age and hours of work
- *Commute information* including distance or time for the trip between home and work, usual methods of commuting, and reasons for choosing them
- *Barriers and opportunities* including why other commuting methods are unattractive, willingness to consider other options, and what improvements to other options could make them more attractive

▶ *Parking*

Priced parking. Charging for parking is typically among the most effective ways of getting drivers to consider other travel options. While drivers may not support parking fees, they can be more accepting if the revenues are used to improve other travel options (e.g. new showers and change rooms, improved bicycle parking or subsidized transit passes). At workplaces or daytime destinations, parking discounts (e.g. early bird specials, daily passes that cost significantly less than the equivalent hourly charge, monthly passes that cost significantly less than the equivalent daily charge) encourage long-term parking and discourage the use of other travel options. For residential uses, unbundling parking costs from dwelling purchase, lease or rental costs provides an incentive for residents to own fewer cars, and can reduce car use and the costs of parking provision.

▶ *Walking & cycling*

Active transportation options like cycling and walking are particularly attractive for short trips (typically up to 5 km and 2 km, respectively). Other supportive factors include an active, health-conscious audience, and development proximity to high-quality walking and cycling networks. Common challenges to active transportation include rain, darkness, snowy or icy conditions, personal safety concerns, the potential for bicycle theft, and a lack of shower and change facilities for those making longer trips.

Information on walking/cycling routes & destinations. Ottawa, Gatineau and the National Capital Commission all publish maps to help people identify the most convenient and comfortable walking or cycling routes.

Bicycle skills training. Potential cyclists can be intimidated by the need to ride on roads shared with motor vehicles. This barrier can be reduced or eliminated by offering cycling skills training to interested cyclists (e.g. CAN-BIKE certification courses).

Valet bike parking. For large events, temporary “valet parking” areas can be easily set up to maximize convenience and security for cyclists. Experienced local non-profit groups can help.

▶ *Transit*

Transit information. Difficulty in finding or understanding basic information on transit fares, routes and schedules can prevent people from trying transit. Employers can help by providing online links to OC Transpo and STO websites. Transit users also appreciate visible maps and schedules of transit routes that serve the site; even better, a screen that shows real-time transit arrival information is particularly useful at sites with many transit users and an adjacent transit stop or station.

Transit fare incentives. Free or subsidized transit fares are an attractive incentive for non-transit riders to try transit. Many non-users are unsure of how to pay a fare, and providing tickets or a preloaded PRESTO card (or, for special events, pre-arranging with OC Transpo that transit fares are included with event tickets) overcome that barrier.

Enhanced public transit service. OC Transpo may adjust transit routes, stop locations, service hours or frequencies for an agreed fee under contract, or at no cost where warranted by the potential ridership increase. Information provided by a survey of people who travel to a given development can support these decisions.

Private transit service. At remote suburban or rural workplaces, a poor transit connection to the nearest rapid transit station can be an obstacle for potential transit users, and an employer in this situation could initiate a private shuttle service to make transit use more feasible or attractive. Other circumstances where a shuttle makes sense include large special events, or a residential development for people with limited independent mobility who still require regular access to shops and services.

▶ *Ridesharing*

Ridesharing's potential is greatest in situations where transit ridership is low, where parking costs are high, and/or where large numbers of car commuters (e.g. employees or full-time students) live reasonably far from the workplace.

Ridematching service. Potential carpoolers in Ottawa are served by www.OttawaRideMatch.com, an online service to help people find carpool partners. Employers can arrange for a dedicated portal where their employees can search for potential carpool partners only among their colleagues, if they desire. Some very large employers may establish internal ridematching services, to maximize employee uptake and corporate control. Ridematching service providers typically include a waiver to relieve employers of liability when their employees start carpooling through a ridematching service. Ridesharing with co-workers also tends to eliminate security concerns.

Carpool parking price incentives. Discounted parking fees for carpools can be an extra incentive to rideshare.

Vanpool service. Vanpools operate in the Toronto and Vancouver metropolitan areas, where vans that carry up to about ten occupants are driven by one of the vanpool members. Vanpools tend to operate on a cost-recovery basis, and are most practical for long-distance commutes where transit is not an option. Current legislation in Ontario does not permit third-party (i.e. private or non-profit) vanpool services, but does permit employers to operate internal vanpools.

▶ *Carsharing & bikesharing*

Bikeshare station & memberships. VeloGO Bike Share and Right Bike both operate bikesharing services in Ottawa. Developments that would benefit from having a bikeshare station installed at or near their development may negotiate directly with either service provider.

Carshare vehicles & memberships. VRTUCAR and Zipcar both operate carsharing services in Ottawa, for use by the general public or by businesses as an alternative to corporate fleets. Carsharing services offer 24-hour access, self-serve reservation systems, itemized monthly billings, and outsourcing of all financing, insurance, maintenance and administrative responsibilities.

▶ *TDM marketing & communications*

Multimodal travel information. Aside from mode-specific information discussed elsewhere in this document, multimodal information that identifies and explains the full range of travel options available to people can be very influential—especially when provided at times and locations where individuals are actively choosing among those options. Examples include: employees when their employer is relocating, or when they are joining a new employer; students when they are starting a program at a new institution; visitors or customers travelling to an unfamiliar destination, or when faced with new options (e.g. shuttle services or parking restrictions); and residents when they purchase or occupy a residence that is new to them.

Personalized trip planning. As an extension to the simple provision of information, this technique (also known as *individualized marketing*) is effective in helping people make more sustainable travel choices. The approach involves identifying who is most likely to change their travel choices (notably relocating employees, students or residents) giving them customized information, training and incentives to support them in making that change. It may be conducted with assistance from an external service provider with the necessary skills, and delivered in a variety of settings including workplaces and homes.

Promotions. Special events and incentives can raise awareness and encourage individuals to examine and try new travel options.

- *Special events* can help attract attention, build participation and celebrate successes. Events that have been held in Ottawa include Earth Day (in April) Bike to Work Month (in May), Environment Week (early June), International Car Free Day (September 22), and Canadian Ridesharing Week (October). At workplaces or educational institutions, similarly effective internal events could include workshops, lunch-and-learns, inter-departmental challenges, pancake breakfasts, and so on.
- *Incentives* can encourage trial of sustainable modes, and might include loyalty rewards for duration or consistency of activity (e.g. 1,000 km commuted by bicycle), participation prizes (e.g. for completing a survey or joining a special event), or personal recognition that highlights individual accomplishments.

▶ *Other incentives & amenities*

Emergency ride home. This measure assures non-driving commuters that they will be able to get home quickly and conveniently in case of family emergency (or in some workplaces, in case of unexpected overtime, severe weather conditions, or the early departure of a carpool driver) by offering a chit or reimbursement for taxi, carshare or rental car usage. Limits on annual usage or cost per employee may be set, although across North America the actual rates of usage are typically very low.

Alternative work arrangements. A number of alternatives to the standard 9-to-5, Monday-to-Friday workweek can support sustainable commuting (and work-life balance) at workplaces:

- *Flexible working hours* allow transit commuters to take advantage of the fastest and most convenient transit services, and allow potential carpoolers to include people who work slightly different schedules in their search for carpool partners. They also allow active commuters to travel at least one direction in daylight, either in the morning or the afternoon, during the winter.
- *Compressed workweeks* allow employees to work their required hours over fewer days (e.g. five days in four, or ten days in nine), eliminating the need to commute on certain days. For employees, this can promote work-life balance and gives flexibility for appointments. For employers, this can permit extended service hours as well as reduced parking demands if employees stagger their days off.
- *Telework* is a normal part of many workplaces. It helps reduce commuting activity, and can lead to significant cost savings through workspace sharing. Telework initiatives involve many stakeholders, and may face as much resistance as support within an organization. Consultation, education and training are helpful.

Local business travel options. A common obstacle for people who might prefer to not drive to work is that their employer requires them to bring a car to work so they can make business trips during the day. Giving employees convenient alternatives to private cars for local business travel during the workday makes walking, cycling, transit or carpooling in someone else's car more practical.

- *Walking and cycling*—Active transportation can be a convenient and enjoyable way to make short business trips. They can also reduce employer expenses, although they may require extra travel time. Providing a fleet of shared bikes, or reimbursing cyclists for the kilometres they ride, are inexpensive ways to validate their choice.
- *Public transit*—Transit can be convenient and inexpensive compared to driving. OC Transpo's PRESTO cards are transferable among employees and automatically reloadable, making them the perfect tool for enabling transit use during the day.
- *Ridesharin*g—When multiple employees attend the same off-site meeting or event, they can be reminded to carpool whenever possible.
- *Taxis or ride-hailing*—Taxis and ride-hailing can eliminate parking costs, save time and eliminate collision liability concerns. Taxi chits eliminate cash transactions and minimize paperwork.
    - *Fleet vehicles or carsharing*—Fleet vehicles can be cost-effective for high travel volumes, while carsharing is a great option for less frequent trips.
    - *Interoffice shuttles*—Employers with multiple worksites in the region could use a shuttle service to move people as well as mail or supplies.
    - *Videoconferencing*—New technologies mean that staying in the office to hold meetings electronically is more viable, affordable and productive than ever.

Commuter incentives. Financial incentives can help create a level playing field and support commuting by sustainable modes. A "commuting allowance" given to all employees as a taxable benefit is one such incentive; employees who choose to drive could then be charged for parking, while other employees could use the allowance for transit fares or cycling equipment, or for spending or saving. (Note that in the United States this practice is known as "parking cash-out," and is popular because commuting allowances are not taxable up to a certain limit). Alternatively, a monthly commuting allowance for non-driving employees would give drivers an incentive to choose a different commuting mode. Another practical incentive for active commuters or transit users is to offer them discounted "rainy day" parking passes for a small number of days each month.

On-site amenities. Developments that offer services to limit employees' need for a car during their commute (e.g. to drop off clothing at the dry cleaners) or during their workday (e.g. to buy lunch) can free employees to make the commuting decision that otherwise works best for them.

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	☐
		1.2 Travel surveys	
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
		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	☐
		2.2 Bicycle skills training	
		Commuter travel	
BETTER	★	2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses	☐
		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)	☐

			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	☐
BASIC		3.1.2	Provide online links to OC Transpo and STO information	☐
BETTER		3.1.3	Provide real-time arrival information display at entrances	☐
		3.2	**Transit fare incentives**	
			Commuter travel	
BETTER		3.2.1	Offer preloaded PRESTO cards to encourage commuters to use transit	☐
BETTER	★	3.2.2	Subsidize or reimburse monthly transit pass purchases by employees	☐
			Visitor travel	
BETTER		3.2.3	Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	☐
		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)	☐
			Visitor travel	
BETTER		3.3.2	Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	☐
		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)	☐
			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)	☐

		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	☐
		4.2 Carpool parking price incentives	
		Commuter travel	
BETTER		4.2.1 Provide discounts on parking costs for registered carpools	☐
		4.3 Vanpool service	
		Commuter travel	
BETTER		4.3.1 Provide a vanpooling service for long-distance commuters	☐
		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	☐
		Commuter travel	
BETTER		5.1.2 Provide employees with bikeshare memberships for local business travel	☐
		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	☐
BETTER		5.2.2 Provide employees with carshare memberships for local business travel	☐
		6. PARKING	
		6.1 Priced parking	
		Commuter travel	
BASIC	★	6.1.1 Charge for long-term parking (daily, weekly, monthly)	☐
BASIC		6.1.2 Unbundle parking cost from lease rates at multi-tenant sites	☐
		Visitor travel	
BETTER		6.1.3 Charge for short-term parking (hourly)	☐

		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	☐
		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)	☐
		7.2 Personalized trip planning	
		Commuter travel	
BETTER	★	7.2.1 Offer personalized trip planning to new/relocating employees	☐
		7.3 Promotions	
		Commuter travel	
BETTER		7.3.1 Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	☐
		8. OTHER INCENTIVES & AMENITIES	
		8.1 Emergency ride home	
		Commuter travel	
BETTER	★	8.1.1 Provide emergency ride home service to non-driving commuters	☐
		8.2 Alternative work arrangements	
		Commuter travel	
BASIC	★	8.2.1 Encourage flexible work hours	☐
BETTER		8.2.2 Encourage compressed workweeks	☐
BETTER	★	8.2.3 Encourage telework	☐
		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	☐
		8.4 Commuter incentives	
		Commuter travel	
BETTER		8.4.1 Offer employees a taxable, mode-neutral commuting allowance	☐
		8.5 On-site amenities	
		Commuter travel	
BETTER		8.5.1 Provide on-site amenities/services to minimize mid-day or mid-commute errands	☐

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

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: *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	☐
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	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 *(multi-family, condominium)*	☐
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

			TDM measures: *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 *(multi-family, condominium)*	☐
BETTER		3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
		3.2	**Transit fare incentives**	
BASIC	★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐
BETTER		3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
		3.3	**Enhanced public transit service**	
BETTER	★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐
		3.4	**Private transit service**	
BETTER		3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
		4.	**CARSHARING & BIKESHARING**	
		4.1	**Bikeshare stations & memberships**	
BETTER		4.1.1	Contract with provider to install on-site bikeshare station (*multi-family)*	☐
BETTER		4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
		4.2	**Carshare vehicles & memberships**	
BETTER		4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER		4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
		5.	**PARKING**	
		5.1	**Priced parking**	
BASIC	★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐
BASIC	★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☐

TDM measures: *Residential developments*				Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☐
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

Appendix L

Transit Route Maps

Winter 2020 (5 Jan 2020 - 7 Mar 2020)

Stop No.	Location	Route	Direction	AM (6:00-9:00)			PM (15:00-18:00)			24-HR		
				Boardings	*Alightings*	*Avg Load at Departure*	*Boardings*	*Alightings*	*Avg Load at Departure*	*Boardings*	*Alightings*	*Avg Load at Departure*
#3074	CHAPEL HILL B	225	IB	21	0	16	-	-	-	21	0	16
		34	IB	8	2	4	0	0	3	11	2	3
#3074	CHAPEL HILL A	225	OB	-	-	-	0	21	12	0	25	10
		34	OB	0	0	2	0	1	2	0	12	2
#9058	RENAUD / PAGÉ	225	IB	1	2	7	-	-	-	2	2	6
		634	NB	-	-	-	-	-	-	0	0	27
		641	EB	0	0	4	-	-	-	0	0	4
		228	IB	11	0	15	-	-	-	11	0	15
#9059	RENAUD / NAVAN	634	SB	0	0	11	-	-	-	0	0	11
		634	NB	-	-	-	0	0	27	0	0	27
		641	WB	-	-	-	0	0	3	0	0	3
		228	OB	-	-	-	0	6	16	0	6	16
		612	EB	0	0	2	-	-	-	0	0	2
		622	WB	0	0	5	-	-	-	0	0	5
#5936	PAGÉ / NAVAN	225	OB	-	-	-	0	12	9	0	19	9
		634	SB	0	0	12	-	-	-	0	0	12
		641	WB	-	-	-	0	3	8	0	3	8
		612	WB	-	-	-	0	5	6	0	6	4
		622	EB	-	-	-	0	0	3	0	0	3
		34	OB	0	9	0	0	7	1	2	46	0
#2653	NAVAN / TOPSOIL	225	IB	0	0	14	-	-	-	0	0	13
		634	NB	-	-	-	0	0	27	0	0	27
		641	EB	0	0	10	-	-	-	0	0	10
		612	EB	0	0	3	-	-	-	0	0	3
		622	WB	0	0	5	-	-	-	0	0	5
		34	IB	1	0	4	0	0	3	1	0	3
#1983	NAVAN / PAGÉ	225	IB	5	0	14	-	-	-	5	0	13
		634	NB	-	-	-	1	0	27	1	0	27
		641	EB	1	0	10	-	-	-	1	0	10
		612	EB	5	0	3	-	-	-	5	0	3
		622	WB	1	0	5	-	-	-	1	0	5
		34	IB	5	0	3	2	0	3	17	2	3
#2655	NAVAN / TOPSOIL	225	OB	-	-	-	0	0	11	0	0	10
		634	SB	0	0	12	-	-	-	0	0	12
		641	WB	-	-	-	0	0	11	0	0	11
		612	WB	-	-	-	0	0	9	0	0	6
		622	EB	-	-	-	0	0	4	0	0	4
		34	OB	0	0	2	0	0	2	0	1	2
#3617	ORLÉANS / NAVAN	225	IB	3	0	16	-	-	-	3	0	16
		634	NB	-	-	-	0	1	26	0	1	26
		641	EB	0	0	10	-	-	-	0	0	10
		612	EB	0	0	3	-	-	-	0	0	3
		622	WB	0	0	6	-	-	-	0	0	6
		34	IB	0	1	4	2	0	3	2	1	4
#3307	ORLÉANS / DES GRAND CHAMPS	225	OB	-	-	-	0	3	13	0	4	12
		634	SB	0	0	12	-	-	-	0	0	12
		641	WB	-	-	-	0	0	11	0	0	11
		612	WB	-	-	-	0	1	9	0	1	6
		622	EB	-	-	-	0	0	4	0	0	4
		34	OB	0	0	2	0	0	2	0	2	2

Appendix M

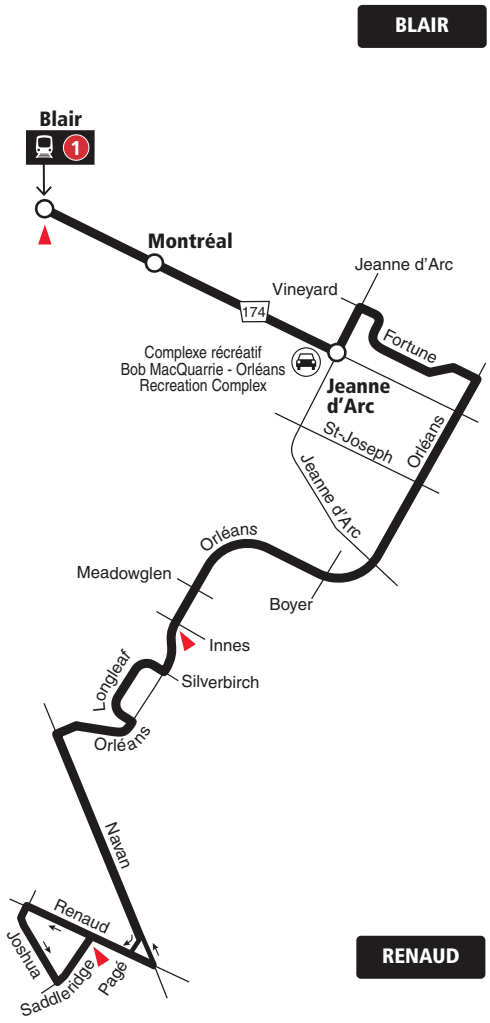
Transit Ridership Data

34 RENAUD / BLAIR

Local

7 days a week / 7 jours par semaine

All day service
Service toute la journée



2019.07

Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... **613-563-4011**
Security / Sécurité..... **613-741-2478**

OC Transpo
INFO 613-741-4390
octranspo.com

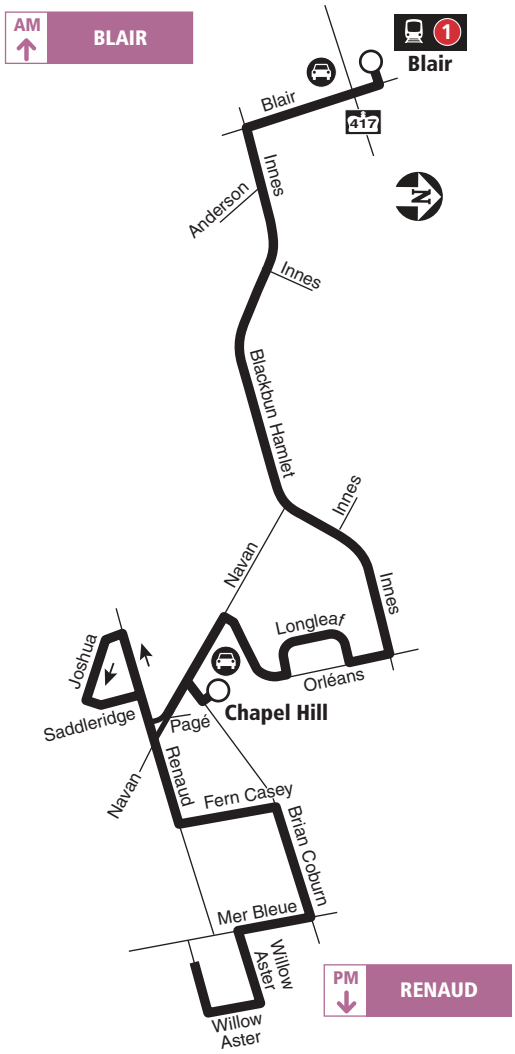
225 Connexion

BLAIR
RENAUD

Monday to Friday / Lundi au vendredi

Peak periods only

Périodes de pointe seulement



Transitway Station / Station du Transitway

Park & Ride / Parc-o-bus

2019.09

Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité..... **613-741-2478**

OC Transpo

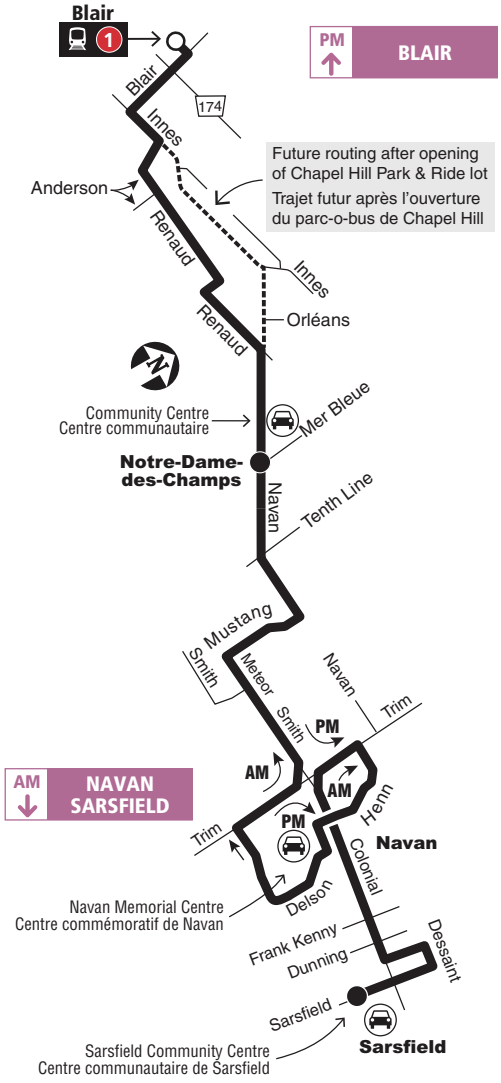
INFO 613-741-4390
octranspo.com

228 Connexion

NAVAN SARSFIELD
BLAIR

Monday to Friday / Lundi au vendredi

Peak periods only
Périodes de pointe seulement



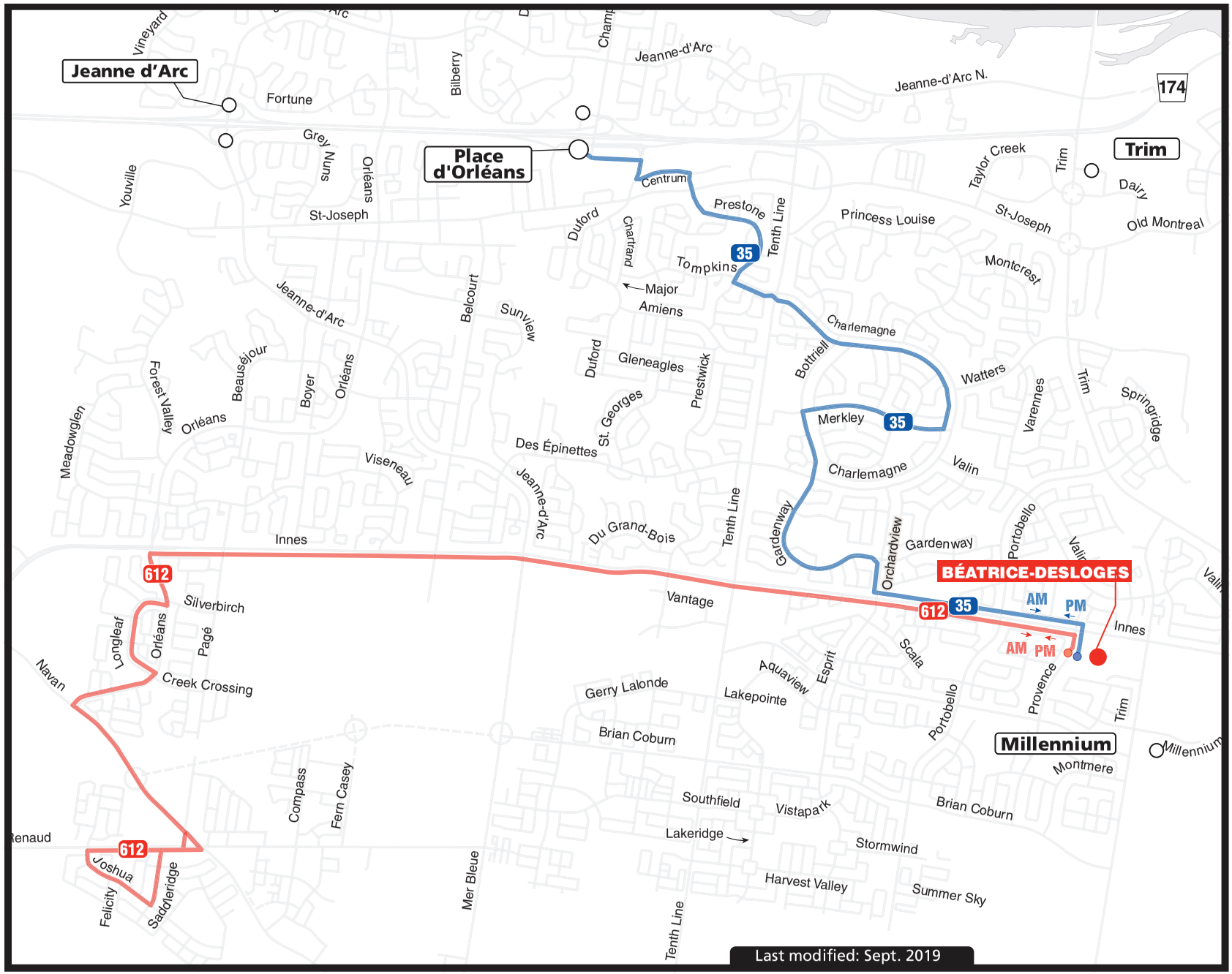
2019.07

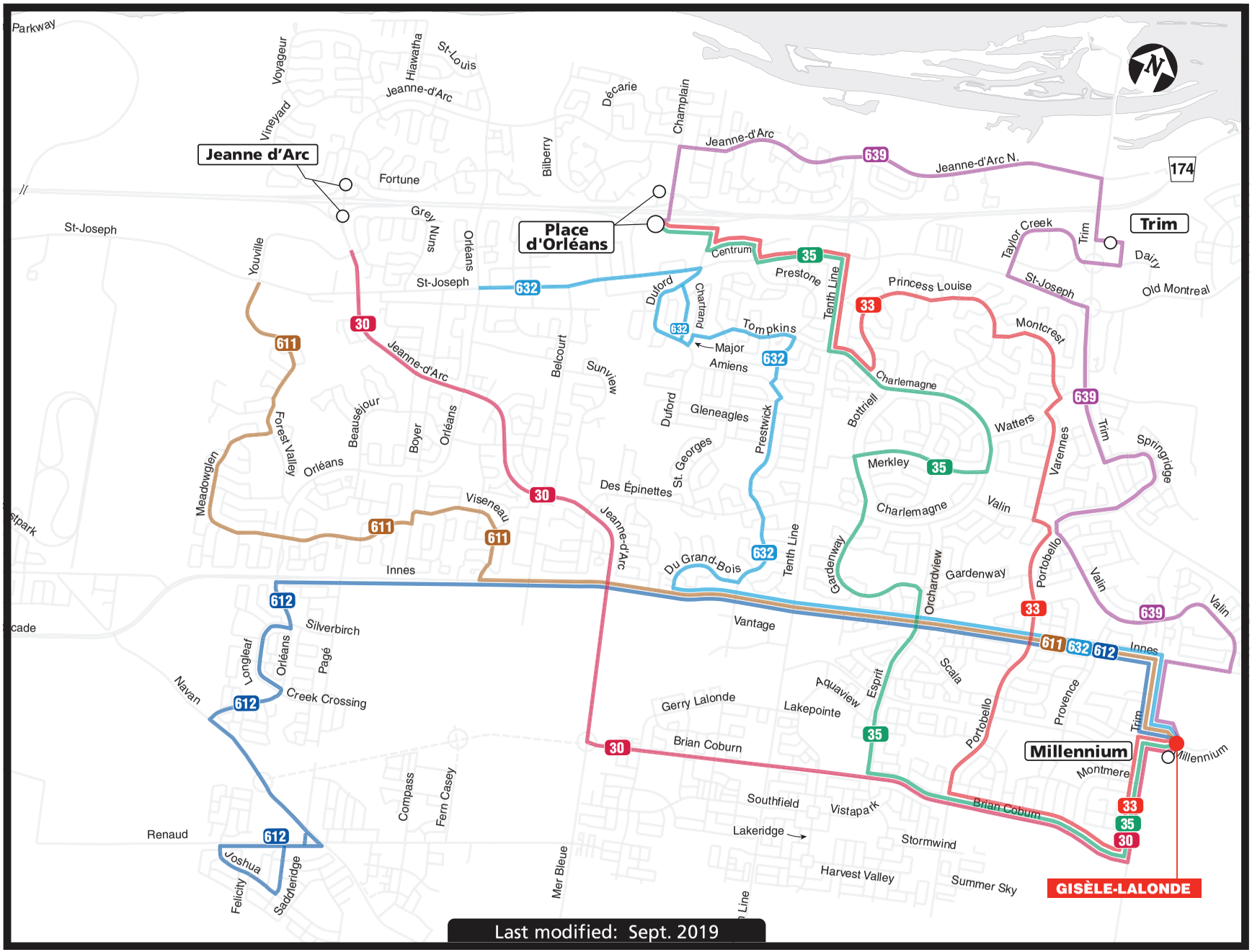
1

Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... **613-563-4011**
Security / Sécurité..... **613-741-2478**

OC Transpo
INFO 613-741-4390
octranspo.com


Jeanne d'Arc
Vineyard
Fortune
Bilberry
Jeanne-d'Arc
Jeanne-d'Arc N.
174
Grey Nuns
Orléans
St-Joseph
Youville
Place d'Orléans
Centrum
Prestone
Tenth Line
Princess Louise
Taylor Creek
Trim
Trim
Dairy
St-Joseph
Old Montreal
Duford
Chartrand
35
Tompkins
Montcrest
Major
Amiens
Belcourt
Sunview
Jeanne-d'Arc
Charlemagne
Bottrell
Watters
Varennes
Trim
Springridge
Forest Valley
Beauséjour
Boyer
Orléans
Orléans
Duford
Gleneagles
Prestwick
St. Georges
Merkley
35
Meadowglen
Des Épinettes
Viseneau
Jeanne-d'Arc
Charlemagne
Valin
Tenth Line
Gardenway
Du Grand-Bois
Innes
Orchardview
Gardenway
Portobello
Valin
BÉATRICE-DESLOGES
612
Silverbirch
Vantage
612
35
AM
PM
Innes
AM
PM
Longleaf
Orléans
Pagé
Navan
Creek Crossing
Gerry Lalonde
Lakepointe
Aquaview
Esprit
Scala
Provence
Portobello
Trim
Millennium
Millennium
Montmere
Brian Coburn
Compass
Fern Casey
Southfield
Vistapark
Brian Coburn
Renaud
612
Lakeridge
Stormwind
Joshua
Felicity
Saddleridge
Mer Bleue
Harvest Valley
Summer Sky
Tenth Line
Last modified: Sept. 2019


Jeanne d'Arc
Place d'Orléans
Trim
Millennium
GISÈLE-LALONDE
Parkway
Voyageur
Vineyard
Hiawatha
St-Louis
Jeanne-d'Arc
Décarie
Champlain
Bilberry
Fortune
Grey Nuns
Orléans
St-Joseph
Youville
Jeanne-d'Arc N.
174
Taylor Creek
Trim
Dairy
Old Montreal
Centrum
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Tenth Line
Princess Louise
Montcrest
Duford
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Tompkins
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Sunview
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Beausejour
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Innes
Du Grand-Bois
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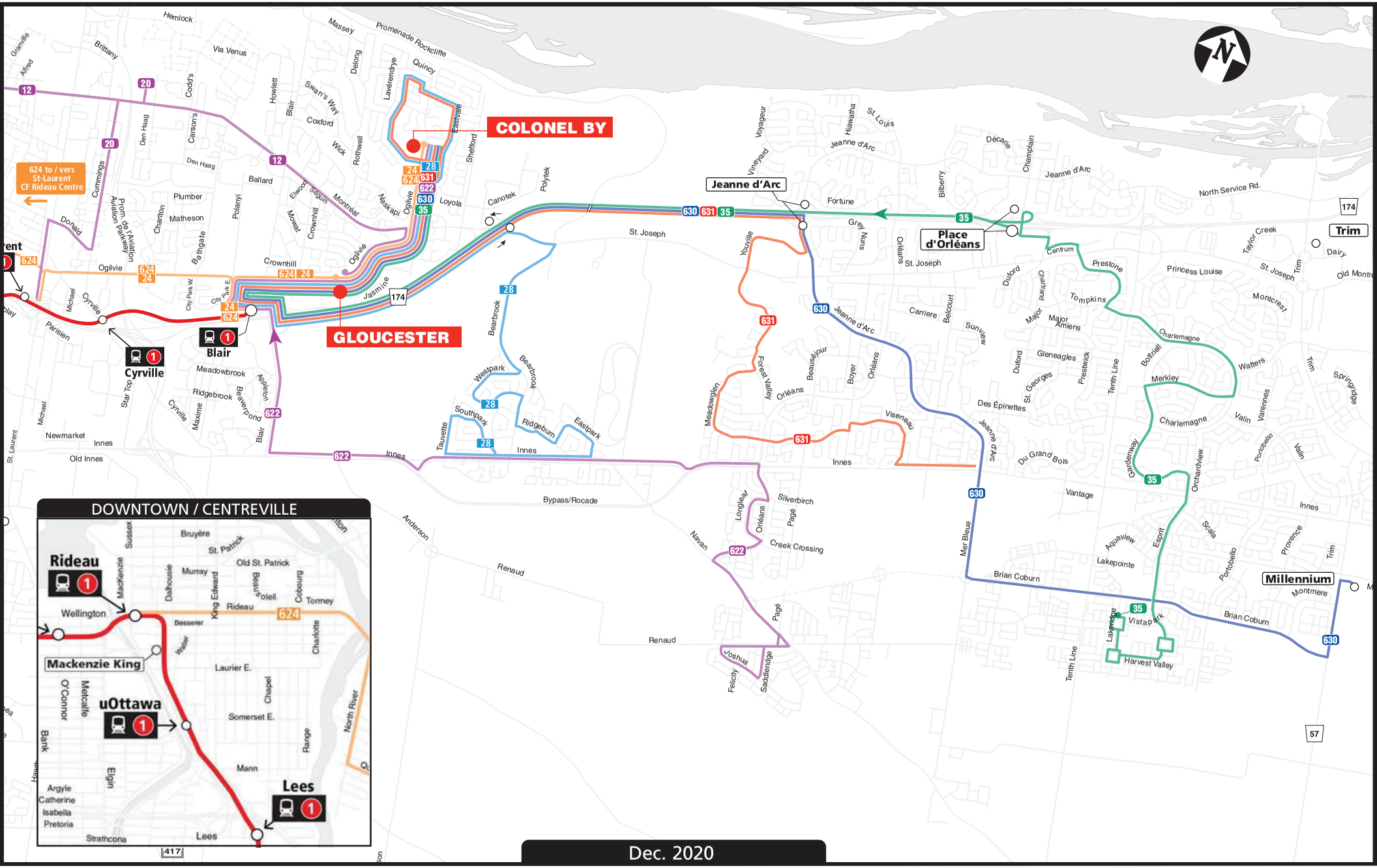
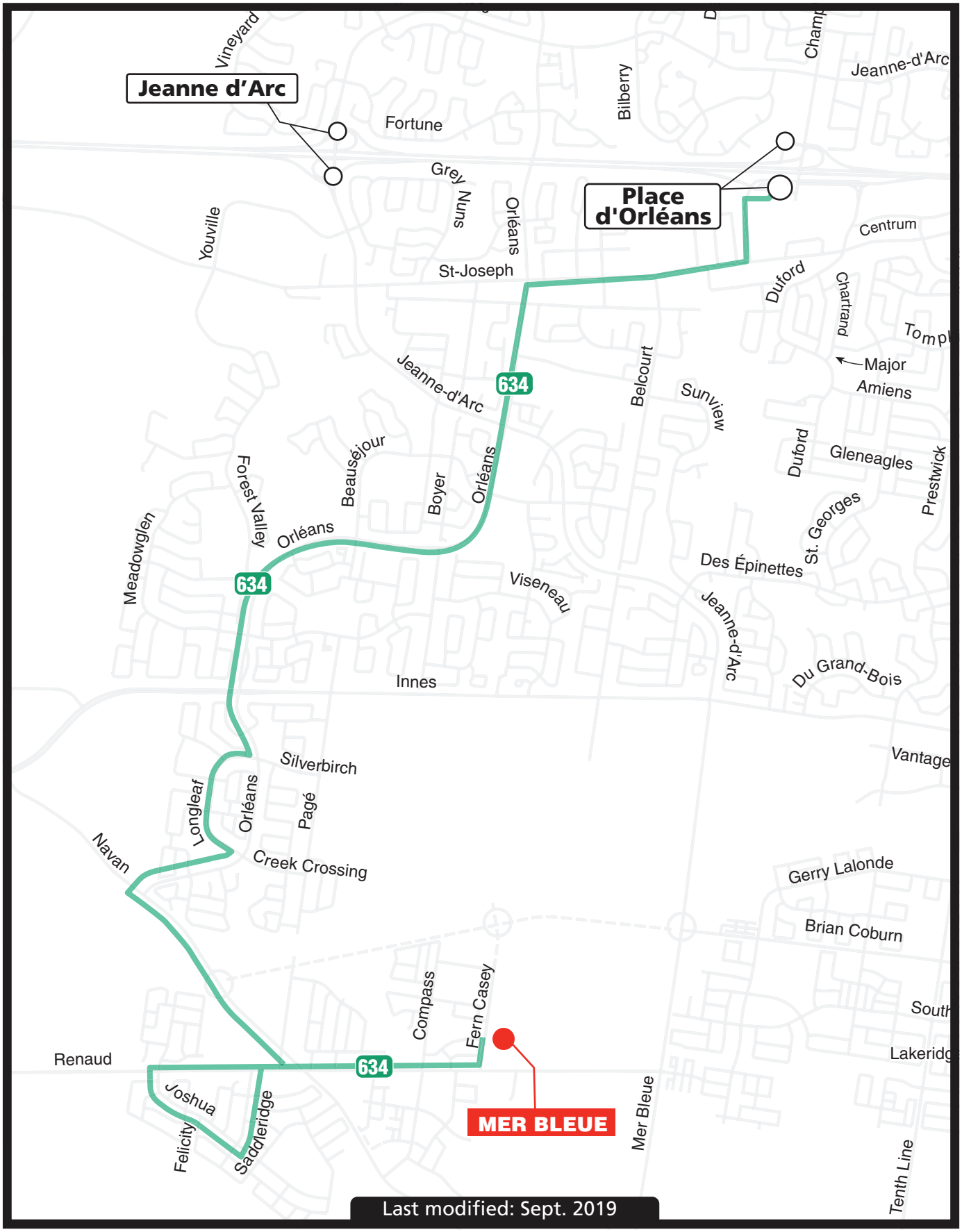
Felicity
Saddleridge
Mer Bleue
Last modified: Sept. 2019


COLONEL BY
GLOUCESTER
Jeanne d'Arc
Place d'Orléans
Trim
Millennium
Blair
Cyrville
Rideau
Mackenzie King
uOttawa
Lees
Wellington
624 to / vers St-Laurent CF Rideau Centre
DOWNTOWN / CENTREVILLE
Dec. 2020


Jeanne d'Arc
Place d'Orléans
Vineyard
Fortune
Grey Nuns
Orléans
Youville
St-Joseph
Bilberry
Jeanne-d'Arc
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Duford
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Des Épinettes
Viseneau
Du Grand-Bois
Innes
Vantage
Gerry Lalonde
Brian Coburn
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Tenth Line
634
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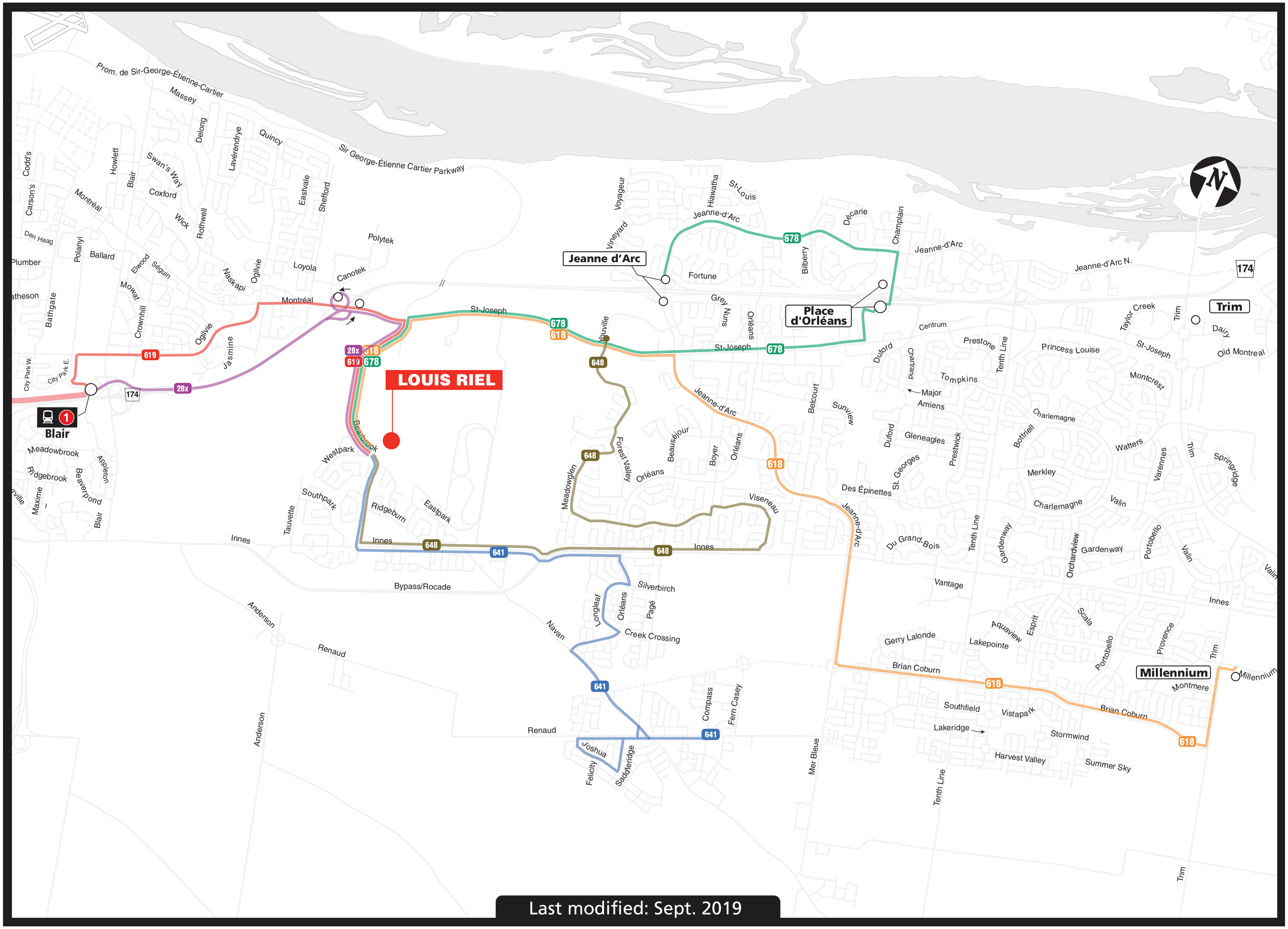
Pagé
Navan
Creek Crossing
Compass
Fern Casey
Renaud
Joshua
Felicity
Saddleridge
MER BLEUE
Last modified: Sept. 2019



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