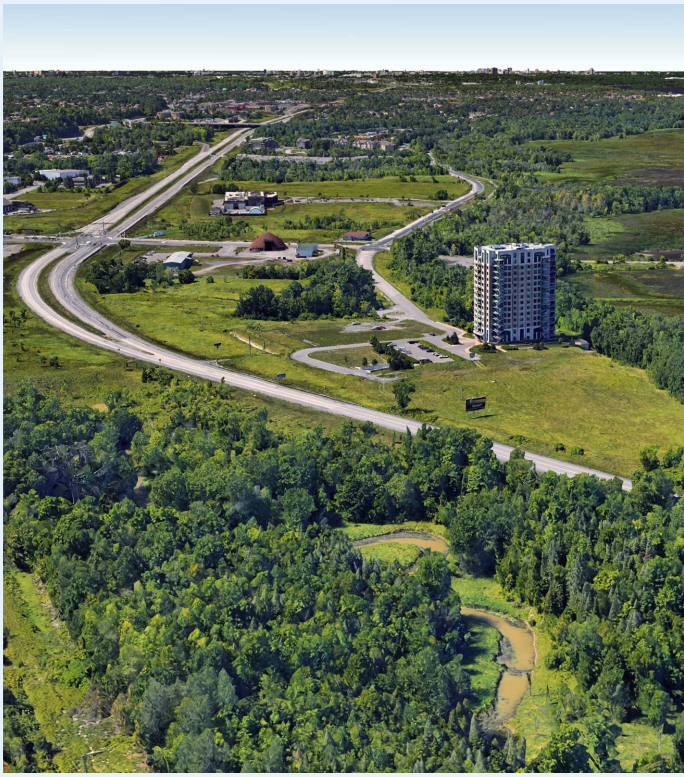
July 2019

BRIGIL

"Proud to build a better quality of life"

Petrie's Landing I - Towers 3 to 5

Transportation Impact Assessment



PARSONS

Petrie's Landing I - Towers 3 to 5

8900 Jeanne d'Arc Boulevard

Transportation Impact Assessment
TIA Report

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Document Control Page

CLIENT:	Brigil Construction
PROJECT NAME:	8900 Jeanne D'Arc Boulevard
REPORT TITLE:	Petrie's Landing I TIA Report
PARSONS PROJECT NO:	476705-01000
VERSION:	Final
DIGITAL MASTER:	\\XCCAN57FS01\Data\ISO\476705\1000\DOCS\2019-03-08 - Step 4 Resubmission\TIA_Report-PtrLdgI-2019-07-19.docx
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HISTORY:	TIA Step 4 Original Submission – August 20, 2019 TIA Step 4 Resubmission – May 9, 2019 TIA Step 4 Resubmission – July 22, 2019

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

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

[1,2] **License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**

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

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Transportation Impact Assessment Report

The following Transportation Impact Assessment (TIA) Report has been prepared in support of a Zoning By-Law Amendment and a Site Plan Control application for a proposed residential development located at 8900 Jeanne d'Arc Boulevard (formerly 8911 North Service Road). This document incorporated all comments from all previous steps in the TIA process, as outlined in the City Transportation Impact Assessment (TIA) Guidelines (2017). City comments from the previous submission have been provided in Appendix A.

1. SCREENING FORM

The screening form confirmed the need for a TIA based on the Trip Generation, Location and Safety triggers, given that the proposed development consists of three towers with a total of 842 additional condominium units, located at a lot bounded to the south by OR-174 (speed limit of 90 km/h) and partially within the Trim TOD zone. The screening form has also been provided in Appendix A.

2. SCOPING REPORT

2.1. EXISTING AND PLANNED CONDITIONS

2.1.1. PROPOSED DEVELOPMENT1

The subject site is located in Ward 1, Orléans. The current land use designation is R5 - Residential Fifth Density Zone according to the Zoning By-Law No. 2008-250, Part 6, sec. 163-164. The site is bound by OR-174 to the south, the Otawa River to the north and undeveloped lands to the east and west. The site's local context is illustrated in **Figure 1.**

Figure 1: Local Context

The subject site contains a fully occupied 15-storey tower (Tower 1) with 89 units and a second tower (Tower 2) currently under construction that will include 145 units. Brigil is proposing four additional buildings, Towers 3 to 5. The unit breakdown of each tower has been provided in **Table 1**. Buildout is expected in two phases: Interim buildout by 2022, which includes Tower 3 and 4, and full build-out by 2024.

Table 1: Unit Breakdown

Building	# of Storeys	# of Units	Size of Retail (sq.m)
Tower 3	18	162	-
Tower 4	22	198	-
Tower 5a	32	286	400
Tower 5b	22	196	1,100

Access to site will be provided via Inlet Private, which provides access between the existing buildings to Jeanne D'Arc Boulevard. The site plan is illustrated in **Figure 2**.

2.1.2. EXISTING CONDITIONS

Area Road Network

Ottawa Regional Road 174 (OR-174) is an east-west City-owned freeway, which extends from HWY 417 in the west to Trim Road and continues east. Within the study area, OR-174 has a four-lane cross section and auxiliary turn lanes are provided at its intersection with Trim Road. The posted speed limit within the study area is 90 km/h.

Trim Road is classified as an arterial roadway south of OR-174 and as a major collector roadway between OR-174 and Jeanne D'Arc Boulevard (formerly known as North Service Road). North of Jeanne D'Arc Boulevard, Trim Road is classified as a local roadway. Within the study area, Trim Road has a two-lane cross section, a concrete sidewalk on the west side, a multi-use pathway on the east side and one curb cycle lane on each direction. The posted speed limit is 50 km/h.

Jeanne D'Arc Boulevard is a major collector roadway west of Trim Road. East of Trim Road, Jeanne D'Arc Boulevard (formerly known as North Service Road) is classified as a local roadway. Within the study area, Jeanne D'Arc Boulevard has a two-lane cross section. The posted speed limit is 60 km/h.

Dairy Drive Is a local roadway which extends from Old Montreal Road to the east and finishes at the Trim Road Roundabout. Directly across from Dairy Road at the roundabout is the beginning of Taylor Creek Drive. The unposted speed limit is assumed to be 50km/h.

Pedestrian and Cycling Network

Trim Road, north of OR-174, has concrete sidewalk on the west side and a multi-use path on the east side. A multi-use pathway also exists along the north side of Jeanne D'Arc Boulevard, west of Trim Road. According to the City's 2013 Official Cycling Plan, Trim Road and Jeanne D'Arc Boulevard (west of Trim Road) are classified as spine routes, as shown in **Figure 3**. Currently, paved shoulders and an off-road multi-use pathway exist along Jeanne D'Arc Boulevard, west of Trim Road. Onstreet cycling lanes are provided on Trim Road, south of Jeanne D'Arc Boulevard.

Figure 2: Site Plan

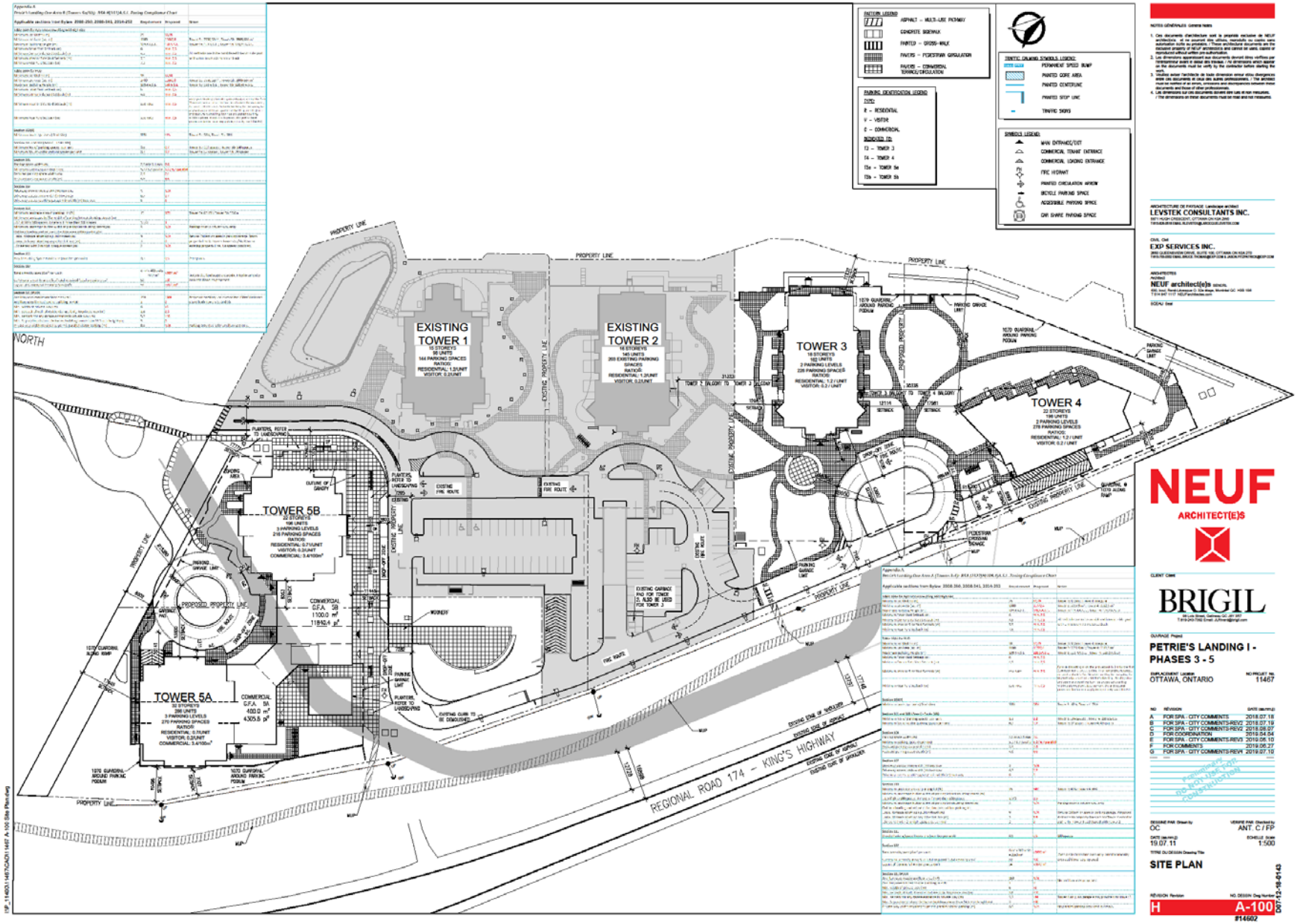
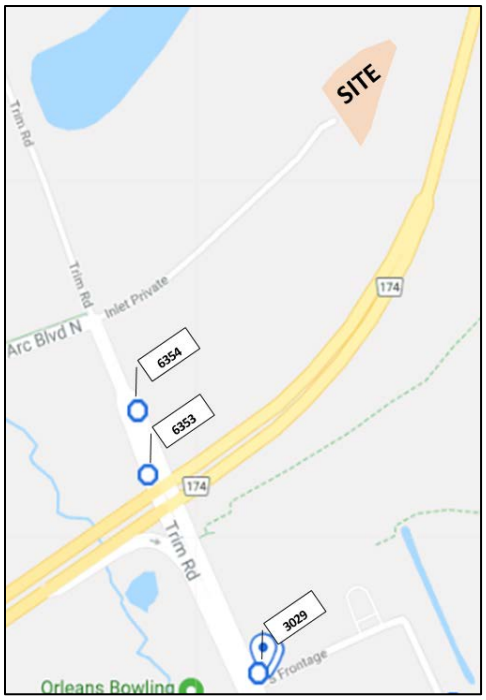


Figure 3: Area Cycling network

Transit Network

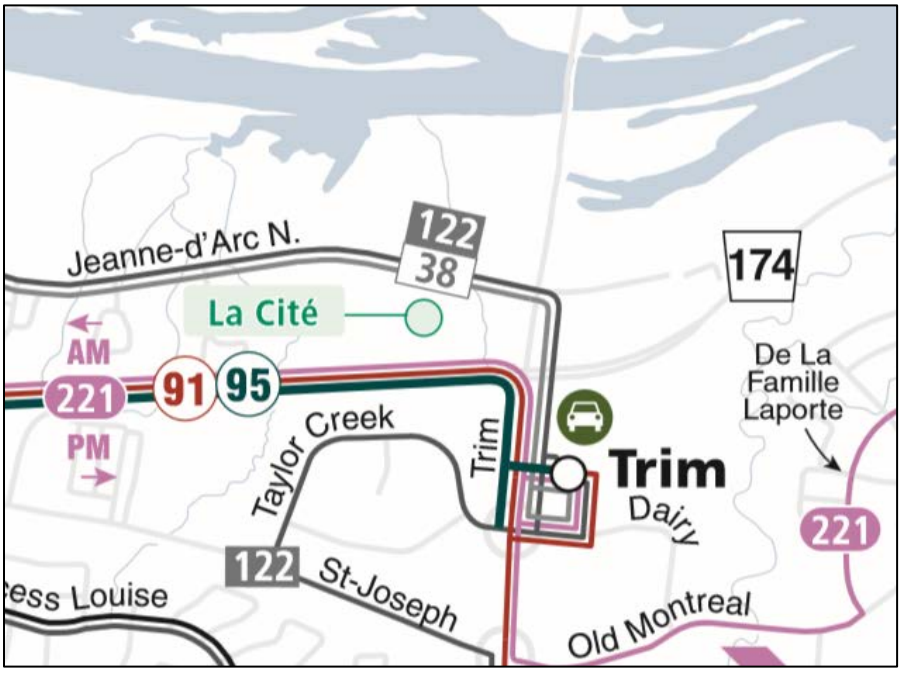
OC Transpo transit service within the study area is provided by Routes #22, #38, #91, #95, #122 and #221. All routes stop at the existing OC Transpo 'Park and Ride' lot, approximately 250m south of the Trim/OR-174 intersection. Bus stops for Routes #38 and #122 are provided along Jeanne D'Arc Boulevard, approximately 350m west of the Trim/Jeanne D'Arc intersection. Additional stops are provided for Route #122 on Trim Road, approximately 100m south of the Trim/Jeanne D'Arc intersection as depicted in **Figure 4**.

Figure 4: OC Transpo Existing Bus Stops



Regular Routes #91, #95 and #122 provide frequent all-day service. Routes #22, #38 and #221 provide weekday morning and afternoon peak hour service only. Frequency of transit service near the site is approximately three to four buses pear hour, with higher frequency at the OC Transpo 'Park and Ride' lot.

Figure 5: Area Transit Network

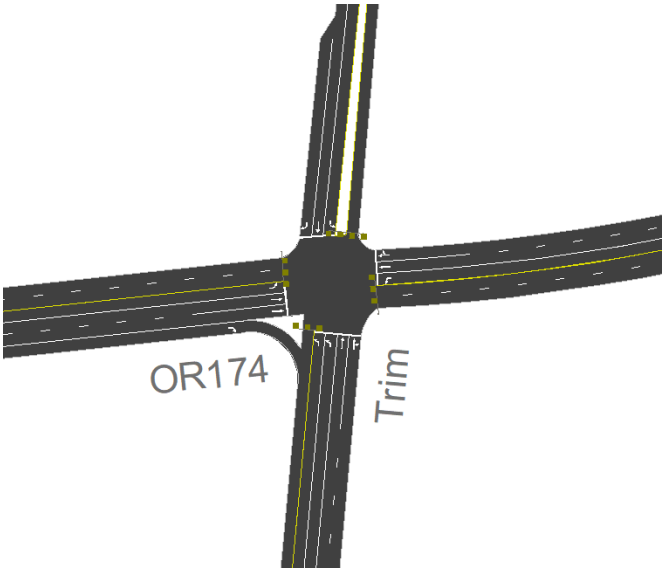


www.octranspo.ca, accessed March 8th, 2019.

Existing Study Area Intersection

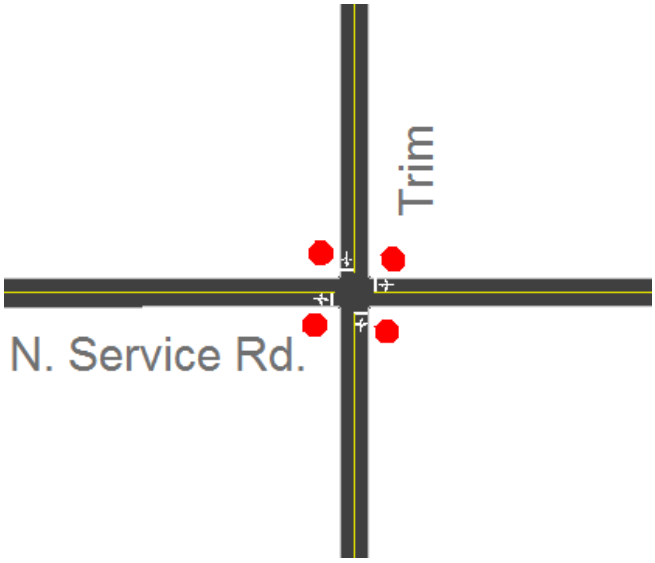
Trim/OR-174

The Trim/OR-174 intersection is a signalized four-legged intersection. The eastbound approach consists of a single left-turn lane, two through lanes and a single channelized right-turn lane. The westbound approach consists of a single left-turn lane, a through lane and a shared through/right-turn lane. The northbound approach consists of two left-turn lanes, a single through lane and a shared through/right-turn lane. The southbound approach consists of a single left-turn lane, a single through lane and a left-turn lane.



Trim/Jeanne D'Arc

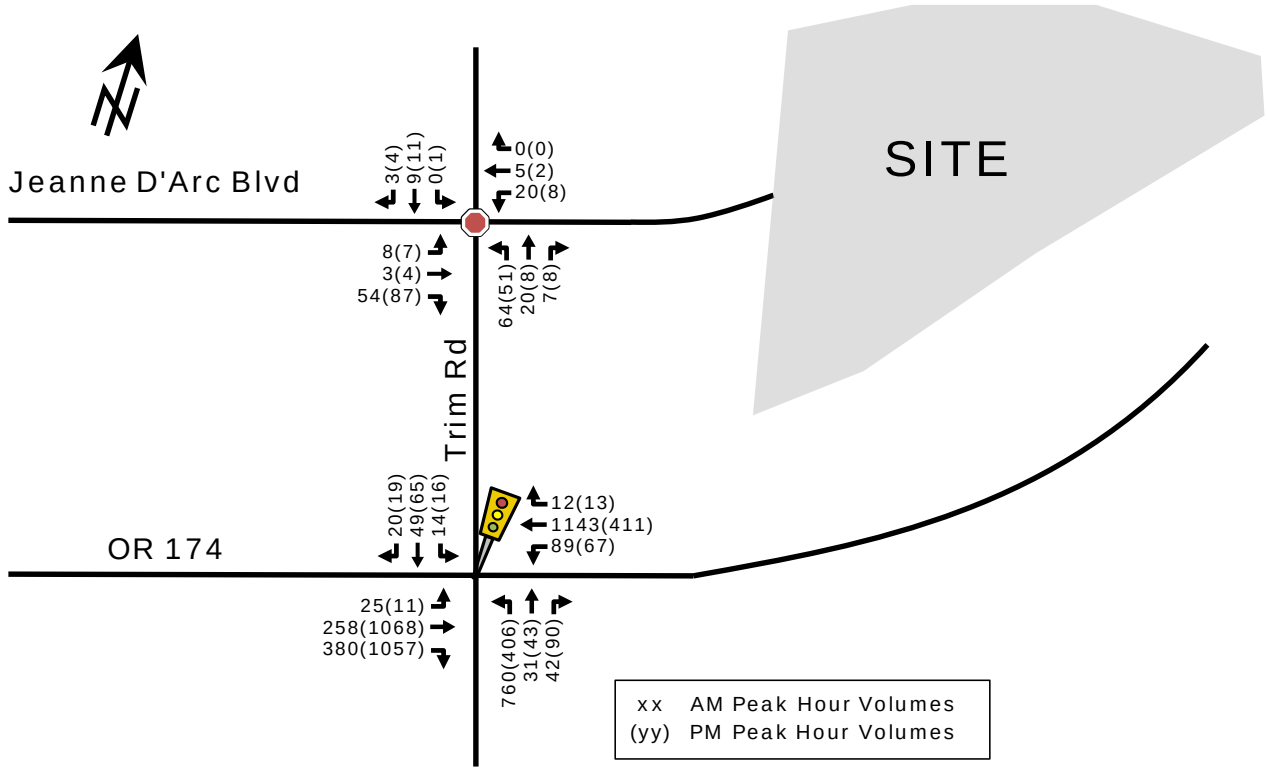
The Trim/Jeanne D'Arc intersection is a four-legged intersection with all-way STOP control. All approaches consist of a single full-movement lane. The northbound approach includes a bike lane.



Existing Intersection Volumes

The existing peak hour traffic volumes (illustrated in **Figure 6** below) were obtained from the City of Ottawa and from counts performed by Parsons in 2018. The full traffic volume counts are provided in Appendix B.

Figure 6: Existing Peak Hour Traffic Volumes



Existing Road Safety Conditions

Collision history for study area (2012 to 2016, inclusive) was obtained from the City of Ottawa. All collisions were registered at the Trim Road/OR-174 intersection. The majority (79%, or 55) of collisions involved property damage, 20% or 14

collisions involved non-fatal injuries, and 1 resulted in a fatal injury. The collision that resulted in a fatal injury involved a vehicle that ran off road while heading in the east direction on February 2014. The road conditions were dry and the environment was clear.

Regarding the type of collision, rear ends accounted for 74% (or 51 collisions) of collisions, turning movements and sideswipe accounted for 9% (or 6 collisions) each, and angled, single vehicle other and other accounted for 3% (or 2 collisions) each. Majority of the rear end collisions took place on OR-174 in the westbound direction and in the eastbound direction involving vehicles slowing down and going ahead. Nine (9) rear end collisions were registered on Trim Road in the northbound direction. Turning movement collisions mainly involved EB vehicles turning left and WB vehicles going ahead during dark conditions. Given the geometry of OR-174, high-speeds may be the cause of the collisions at this intersection. Currently, there are "Prepare to Stop when Flashing" signals on OR-174 approximately 600 meters to the west of Trim Road and 600 meters to the east of Trim Road.

Regarding Trim Road at Jeanne D'Arc Boulevard, no collisions were registered between 2012 and 2016. A standard unit of measure for assessing collisions at an intersection is based on the number collisions per million entering vehicles (MEV). The reported collision rate for Trim Road at OR-174 was 1.11 MEV. No additional collision mitigation measures are recommended at this time. The stop ahead warning sign and flashers have been provided on either side of the intersection on OR-174, and the intersection has recently been reconstructed. The effects of these improvements should be documented prior to any additional changes by the City. It is anticipated that the grade separation of this intersection in the future will address the collisions along OR-174.

The collision data and related analysis is included in Appendix C.

Existing Area Traffic Management Measures

Within the area of study, the following traffic management measures are identified:

- Two "Prepare to Stop when Flashing" signals on OR-174, each approximately 600 meters to the west of Trim Road and 600 meters to the east of Trim Road; and,
- One High Deer Collision Corridor signal on OR-174 westbound approximately 300 meters to the west of Trim Road.

2.1.3. PLANNED CONDITIONS

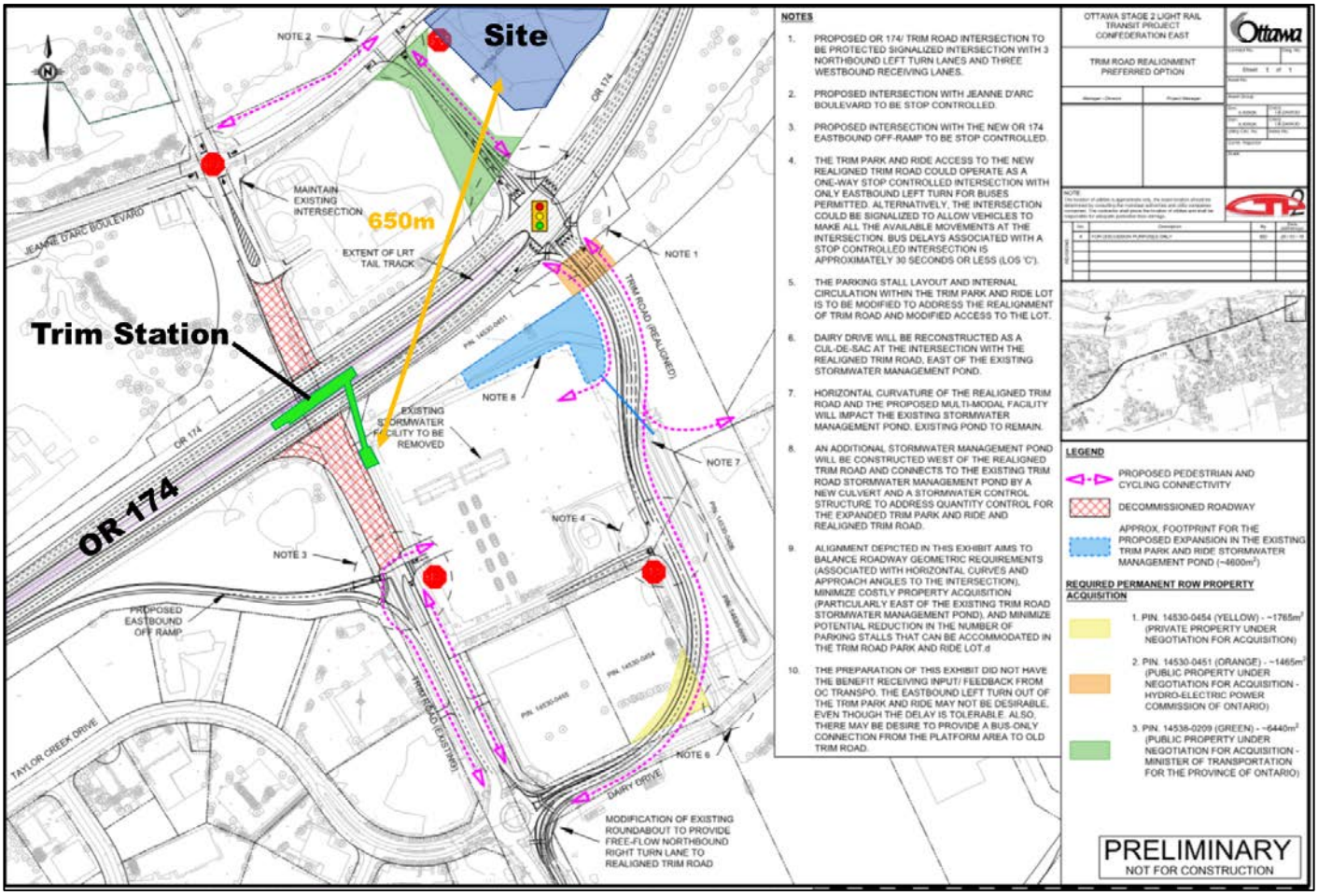
Planned Study Area Transportation Network Changes

OR-174 Light-Rail

Schedule D of the Official Plan – Rapid Transit and Transit Priority Network identifies the light rail Confederation Line east extension to Trim Road. According to the Confederation Line East Functional Design Report, the Stage 2 LRT east extension proposes a new signalized intersection on OR-174, approximately 300m east of the existing Trim Road intersection. **Figure 7** illustrates the planned LRT station and interchange at Trim Road. This new intersection location accommodates the LRT tail tracks. Trim Road will be truncated both north and south of OR-174 to accommodate the new station. Trim Road, to the south, will be realigned at the Dairy Road roundabout, to connect to the new intersection.

The relocated at-grade intersection will include pedestrian crosswalks and bi-directional cycling cross-ride facilities on both the east and south legs. The Trim Road Park and Ride Facility will be modified to include a new bus loop, bus lay-bys, and bus station platforms. It is noteworthy that the subject site is located approximately 650m from the future Trim Road LRT Station and is therefore considered to be within the Trim TOD area.

Figure 7: Confederation Line East Extension Interchange at Trim Road



https://www.stage2lrt.ca/wp-content/uploads/2019/02/7.-Traffic_Mobility-and-Detours.pdf, accessed March 11th, 2019.

OR-174 Widening

An Environmental Assessment for the potential widening of OR-174 was conducted by the Townships of Prescott-Russell/City of Ottawa. The widening of OR-174 to six-lanes from Hwy 417 to Trim Road and to four-lanes from Trim Road to the City boundary is identified as a road project in the current 2013 City of Ottawa Transportation Master Plan. However, the widening of OR-174 is not identified as part of the Affordable Network Plan within the TMP. Therefore, the road widening of OR-174 east of Trim Road is unlikely within the foreseeable future.

Cycling Network

Within the Ottawa 2013 Cycling Plan, both Trim Road north of Jeanne D'Arc Boulevard and Jeanne D'Arc Boulevard east of Tim Road are identified as major cycling pathways. To the north, the planned pathway will extend along Trim Road to Petrie Island Beach and to the east, the planned MUP will extend along Jeanne D'Arc Boulevard to Cardinal Creek, bordering the subject site along the southern edge. Trim Road is classified as a Spine route south of Jeanne D'Arc Boulevard.

Jeanne D'Arc Culvert Renewal

According to Ward 1 Construction Map, culvert renewal is planned along Jeanne D'Arc Boulevard, west and east of Trim Road for the period 2018 - 2021.

Petrie's Landing Traffic Calming Concept

Within the TIS for Tower 2 of the Petrie's Landing I Development (prepared by Parsons), an addendum traffic calming plan was prepared. The traffic-calming plan has been developed with the intention to be implemented during the construction

of Tower 2, and subsequently as each additional Tower is completed. It is noted that the subject site plan is generally consistent with the traffic calming plan. The aforementioned traffic calming plan is included in Appendix D.

2.1.4. OTHER AREA DEVELOPMENTS

The following section outlines adjacent developments in the general area that were considered in the TIA. Vehicle volumes generated by these developments at study area intersections have been included in Appendix E.

Petrie's Landing I - 2013 TIS

Delcan (now Parsons) prepared a Transportation Impact Study on December 2013 to support the Site Plan Application for Towers I, II, III, IV and a retirement residence within the subject site, for a total of 845 high-rise residential condominium units. The horizon years included in the assessment were 2018 (representing full occupancy of Tower 2) and 2024 (representing full occupancy of Towers III and IV). The proposed towers were projected to generate 297 and 285 veh/h during the weekday morning and afternoon peak hours. A traffic calming plan was prepared as addendum to the TIS and is included as Appendix D. Currently, Tower 1 has been built and Tower 2 is under construction.

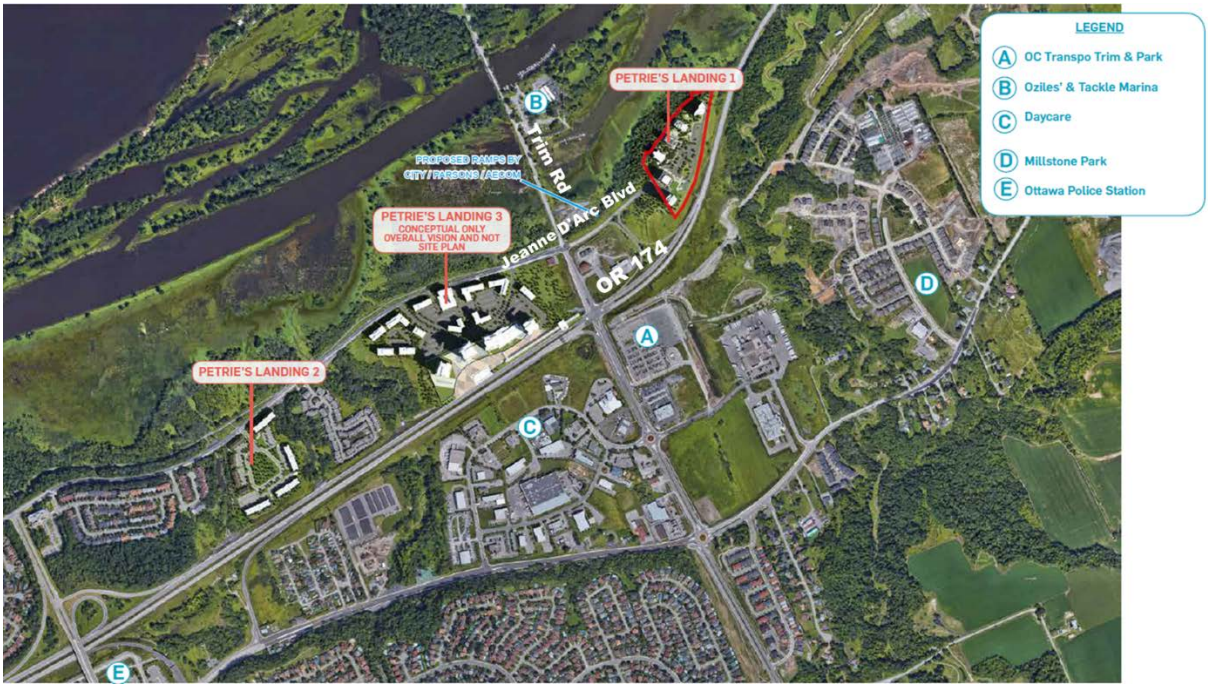
Petrie's Landing II

Brigil is proposing the construction of a residential development consisting of approximately 300 to 430 residential units. The proposed Petrie's Landing II is located south of Jeanne D'Arc Boulevard, approximately 1.5 km west of the subject site, as illustrated in **Figure 8**. Currently, over 60% of the development is completed (Phases 1 and 2). The projected two-way vehicle trips for this proposed residential development are approximately 150 veh/h during both peak hours.

Petrie's Landing III

Brigil is proposing the construction of a mixed-use development consisting of approximately 370,000 ft² of office, 23,000 ft² of retail and up to 790 residential units. The proposed Petrie's Landing III is located south of Jeanne D'Arc Boulevard, approximately 1 km west of the subject site, as illustrated in **Figure 8**. The projected two-way vehicle trips for this proposed mixed-use development is approximately 660 and 685 veh/h during the morning and afternoon peak hours, respectively.

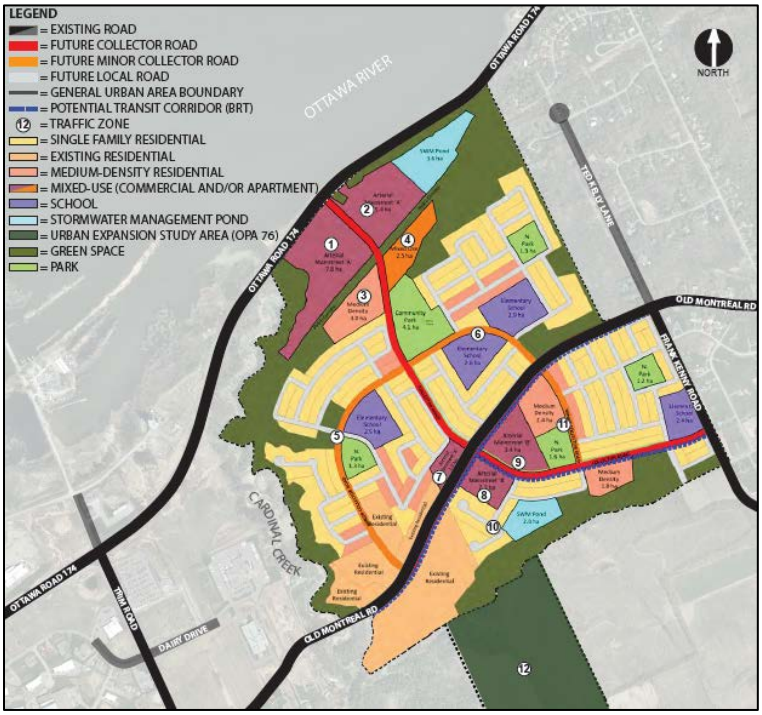
Figure 8: Petrie's Landing I, II and III Concept Plan



Cardinal Creek Village

Tamarack Homes is currently constructing a 1,446-unit subdivision and a 430,000 ft^2 shopping centre, south of OR-174 and east of Cardinal Creek, as illustrated in **Figure 9**. The Transportation Impact Study (prepared by IBI Group) projected approximately 1,460 veh/h and 2,619 veh/h by horizon year 2031 (full build-out) during the morning and afternoon peak hours, respectively.

Figure 9: Cardinal Creek Village



2.1.5. TRANSIT

As mentioned previously, transit is served within the area with bus stops for routes #38 and #122 on Trim Road approximately 500 meters from the site; and bus stops for routes #22, 91, 95 and 221 on Trim Road at the existing OC Transpo 'Park and Ride' lot, approximately 800m from the site.

2.1.6. NETWORK CONCEPT

The Bilberry Creek Screenline, SL-45, is in close proximity to the proposed development, capturing east-west traffic on OR-174 and Bilberry Creek. The Frank Kenny Screenline, SL-46, is also in close proximity to the proposed development, capturing east-west traffic on OR-174 and the projection of Ted Kelly Lane. With close proximity to the future Trim LRT Station, this development was not expected to significant impacts on these Screenlines.

2.1.7. INTERSECTION DESIGN

The proposed site will access the adjacent road network via the existing Inlet Private, which connects to Jeanne D'Arc Boulevard and Trim Road. The strategy analysis will review and document the any access requirements.

2.2. STUDY AREA AND TIME PERIODS

2.2.1. STUDY AREA

The proposed study area is outlined below and highlighted in **Figure 10**.

- Jeanne D'Arc/Trim intersection;
- Trim/OR-174 intersection;
- Jeanne D'Arc/Inlet/Dairy intersection;
- Trim/OR-174 intersection;
- Inlet Private – adjacent to the site.

Figure 10: Study Area

2.2.2. TIME PERIODS

The subject site proposes typical high-density residential uses. The standard weekday morning and afternoon peak hour periods were analyzed.

2.2.3. HORIZON YEARS

For the purposes of this analysis the site full-occupancy date was assumed to be year 2024, based on current market demand forecasts. The buildout plus five-year horizon would be year 2029. An interim 2022 horizon was analyzed to

account for transportation demand projections for Towers 3 and 4, prior to the completion of the LRT extension and station at Trim Road. Year 2024 and 2029 will analyze an ultimate design at Petrie's Landing I with all towers built and LRT to the future Trim Station operational.

Considering construction trends of the past years, the following phasing is assumed for other area developments:

Year 2022

- Trim LRT Station under construction
- Petrie's Landing I – Towers 3 and 4 built;
- Petrie's Landing II – 100% built;
- Petrie's Landing III – 30% built; and,
- Cardinal Creek – 40% built.

Year 2024

- Trim LRT Station in Operation
  Petrie's Landing I – 100% built;
- Petrie's Landing II – 100% built;
- Petrie's Landing III – 50% built; and,
- Cardinal Creek – 60% built.

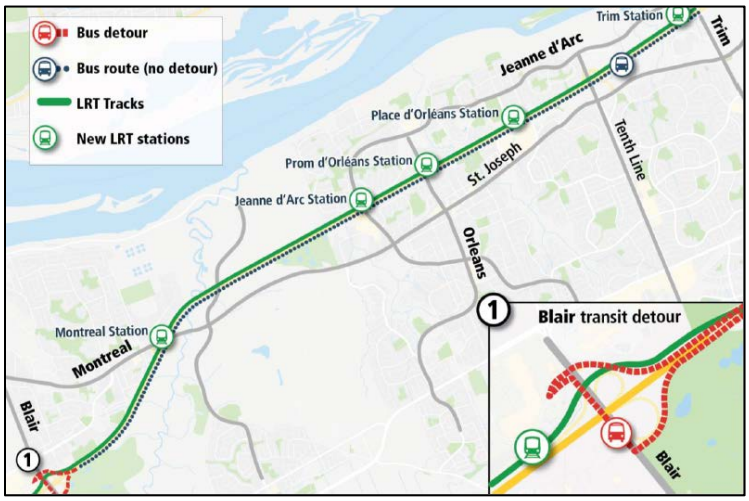
Year 2029

- Trim LRT Station in Operation
- Petrie's Landing II – 100% built;
- Petrie's Landing III – 100% built; and,
- Cardinal Creek – 90% built.

2.2.4. INTERIM CONDITION DETOURS

The existing Trim/OR-174 intersection shall remain operational until year 2022, when the Trim LRT Station and realigned Trim/OR-174 intersection have been built. Before closing the existing intersection, a new eastbound off ramp will be built and commissioned to serve the traffic demand destined for southbound Trim Road. Transit routes for the Confederation East Line Extension will only be affected near Blair Station, maintaining and providing current transit routes to Trim Station as shown in **Figure 11**.

Figure 11: Bus Route Detours During LRT Construction



2.3. EXEMPTIONS REVIEW

Based on the foregoing analysis and review of the existing conditions, it is recommended that any future work within the context of this TIA excludes the following modules and elements summarized in **Table 2**.

Table 2: Exemptions Review Summary

Module	Element	Exemption Consideration
4.2 Parking	4.2.2 Parking Spillover	Some towers are located within 800 meters walk and others exceeding 800 meters walk of the planned Trim Road LRT transit station, as depicted in **Figure 18**. Considering Sections 101(5)(d), 101(5)(e), 102(5), 103(1) and 103(2) of the Zoning By-Law 2008-250-Consolidation-Part 4, the subject development is required to provide 673 parking spaces for residents, 112 parking spaces for visitors and 54 parking spaces for commercial uses, for a total of 839 parking spaces. With a proposed total of 927 underground parking spaces, the subject development is meeting City requirements.

In addition to the above recommendations of the Exemptions Review, the following exemptions are also proposed for both Step 3 – Forecasting and Step 4 – Analysis and are summarized in **Table 3.**

Table 3: Additional Recommended Exemptions Summary

Module	Element	Exemption Consideration
4.4 Access Intersection Design	4.4.2 Intersection Control	Site access will operate at Jeanne D'Arc Boulevard Dead-End and will not require an intersection screening for a signal or roundabout.
	4.4.3 Intersection Design	Site access will operate at Jeanne D'Arc Boulevard Dead-End and will not require an intersection screening for a signal or roundabout.
4.6 Neighbourhood Traffic Management	All Elements	Given the site's location relative to the existing road network, no cut through traffic is expected.

Next sections will review the trips generated by the subject development and assess future network operations.

3. FORECASTING REPORT

3.1. DEVELOPMENT GENERATED TRAVEL DEMAND

3.1.1. TRIP GENERATION AND MODE SHARES

Trip generation rates for the proposed development were based on the City's TRANS Trip Generation – Residential Trip Rates (Table 6.3 of the TRANS Trip Generation Study) for suburban high-rise condominiums and have been summarized in **Table 4**.

Table 4: TRANS Recommended Vehicle Trip Generation Rates for Residential Land Uses with Transit Bonus

Land Use	Data Source	Trip Rate	
		AM Peak	PM Peak
Tower 3	TRANS (ITE 232)	0.46	0.46
Tower 4			
Tower 5a			
Tower 5b			

Using the TRANS Trip Generation rates, the total amount of vehicle trips generated by the proposed interim phase development (consisting of 360 units from Towers 3 and 4) and full buildout development (consisting of an additional 482 units from Towers 5a and 5b) was calculated. The results are summarized in **Table 5**. From the information provided, it is our understanding that retail uses to be accommodated within Towers 5a and 5b, will be small scale and oriented to the

local development only. Therefore, vehicle trips generated by these uses were not expected to impact the adjacent transportation network.

Table 5: TRANS Vehicle Trip Generation

Land Use	Units	AM Peak (veh/h)			PM Peak (veh/h)		
		In	Out	Total	In	Out	Total
Tower 3	162 du	21	54	75	43	32	75
Tower 4	198 du	25	66	91	52	39	91
Tower 5a	286 du	36	96	132	76	56	132
Tower 5b	196 du	25	65	90	52	38	90
Total		**107**	**281**	**388**	**223**	**165**	**388**

Using the TRANS guidelines and table 3.13, the person trips were calculated and shown in **Table 6** and **Table 8** for interim Towers 3 and 4, and addition of Towers 5a and 5b respectively. The person trips were then used to calculate the vehicle trips generated based on mode shares for Orléans extracted from the OD-Survey conducted in 2011 as seen in **Table 7**, and **Table 9** for interim Towers 3 and 4 and for addition of Towers 5a and 5b respectively. The total vehicle trip generated for full buildout is summarized in **Table 10**.

Table 6: Site 'Person Trips' Generated – Interim Towers 3 & 4

Travel Mode	AM Mode Share	AM Peak (persons/h)			PM Mode Share	PM Peak (persons/h)		
		In	Out	Total		In	Out	Total
Auto Driver	44%	46	120	166	44%	96	70	166
Auto Passenger	9%	9	24	33	14%	31	22	53
Transit	34%	35	93	128	33%	71	53	124
Non-motorized	13%	14	36	50	9%	20	14	34
Total People Trips	**100%**	**104**	**273**	**377**	**100%**	**218**	**159**	**377**

Table 7: Site 'Vehicle Trips' Generated – Interim Towers 3 & 4

Travel Mode	AM Mode Share	AM Peak (veh/h)			PM Mode Share	PM Peak (veh/h)		
		In	Out	Total		In	Out	Total
Auto Driver	40%	42	109	151	55%	120	87	207
Auto Passenger	20%	21	54	75	20%	43	32	75
Transit	25%	26	69	95	15%	33	24	57
Non-motorized	15%	15	41	56	10%	22	16	38
Total People Trips	**100%**	**104**	**273**	**377**	**100%**	**218**	**159**	**377**
Total 'New' Vehicle Trips		**42**	**109**	**151**	-	**120**	**87**	**207**

Table 8: Site 'Person Trips' Generated – Towers 5a & 5b

Travel Mode	AM Mode Share	AM Peak (persons/h)			PM Mode Share	PM Peak (persons/h)		
		In	Out	Total		In	Out	Total
Auto Driver	44%	62	160	222	44%	128	94	222
Auto Passenger	9%	12	33	45	14%	42	29	71
Transit	34%	48	124	172	33%	96	71	167
Non-motorized	13%	18	48	66	9%	27	18	45
Total People Trips	**100%**	**140**	**365**	**505**	**100%**	**293**	**212**	**505**

Mode Shares – TOD Targets for Towers 5a and 5b

Considering the location of Towers 5a and 5b within Trim TOD area and the planned Light Rail East extension discussed in Section 2.1.3., modal share percentages were adjusted for Towers 5a and 5b to reflect the City of Ottawa transit share targets for TOD areas and is shown in **Table 9**.

Table 9: Site 'Vehicle Trips' Generated using TOD Targets – Towers 5a & 5b

Travel Mode	AM Mode Share	AM Peak (veh/h)			PM Mode Share	PM Peak (veh/h)		
		In	Out	Total		In	Out	Total
Auto Driver	30%	42	110	152	30%	87	64	151
Auto Passenger	10%	14	36	50	10%	29	22	51
Transit	60%	84	219	303	60%	175	128	303
Non-motorized	0%	0	0	0	0%	0	0	0
Total People Trips	**100%**	**140**	**365**	**505**	**100%**	**291**	**214**	**505**
Total 'New' Vehicle Trips		**42**	**110**	**152**		**87**	**64**	**151**

Table 10: Site 'Vehicle Trips' Generated –Full Buildout

Travel Mode	AM Mode Share	AM Peak (veh/h)			PM Mode Share	PM Peak (veh/h)		
		In	Out	Total		In	Out	Total
Auto Driver	30%	84	219	303	30%	207	151	358
Auto Passenger	10%	35	90	125	10%	72	54	126
Transit	60%	110	288	398	60%	208	152	360
Non-motorized	0%	15	41	56	0%	22	16	38
Total People Trips	**100%**	**244**	**638**	**882**	**100%**	**509**	**373**	**882**
Total 'New' Vehicle Trips		**84**	**219**	**303**		**207**	**151**	**358**

As shown in **Table 10**, the proposed development was projected to generate approximately 400 and 360 two-way transit trips per hour, and 305 and 360 two-way auto trips, during the weekday morning and afternoon peak hours respectively. No active mode trips were assumed during the peak periods due to the site being bounded by OR-174 to the south and The Ottawa River to the north.

3.1.2. TRIP DISTRIBUTION

The trip distribution applied in all horizons for the proposed development was assumed as follows:

- (From/To) the East: 5%;
- (From/To) the South: 20%; and,
- (From/To) the West: 75%.

3.1.3. TRIP ASSIGNMENT

Based on this assumed distribution, site-generated traffic at interim build-out (2022) was assigned to the existing adjacent network, as shown in **Figure 12**. Site-generated traffic at full build-out (2024) was assigned to the planned adjacent network as shown in **Figure 13**.

Figure 12: Interim Site-Generated Traffic (Towers 3 & 4)

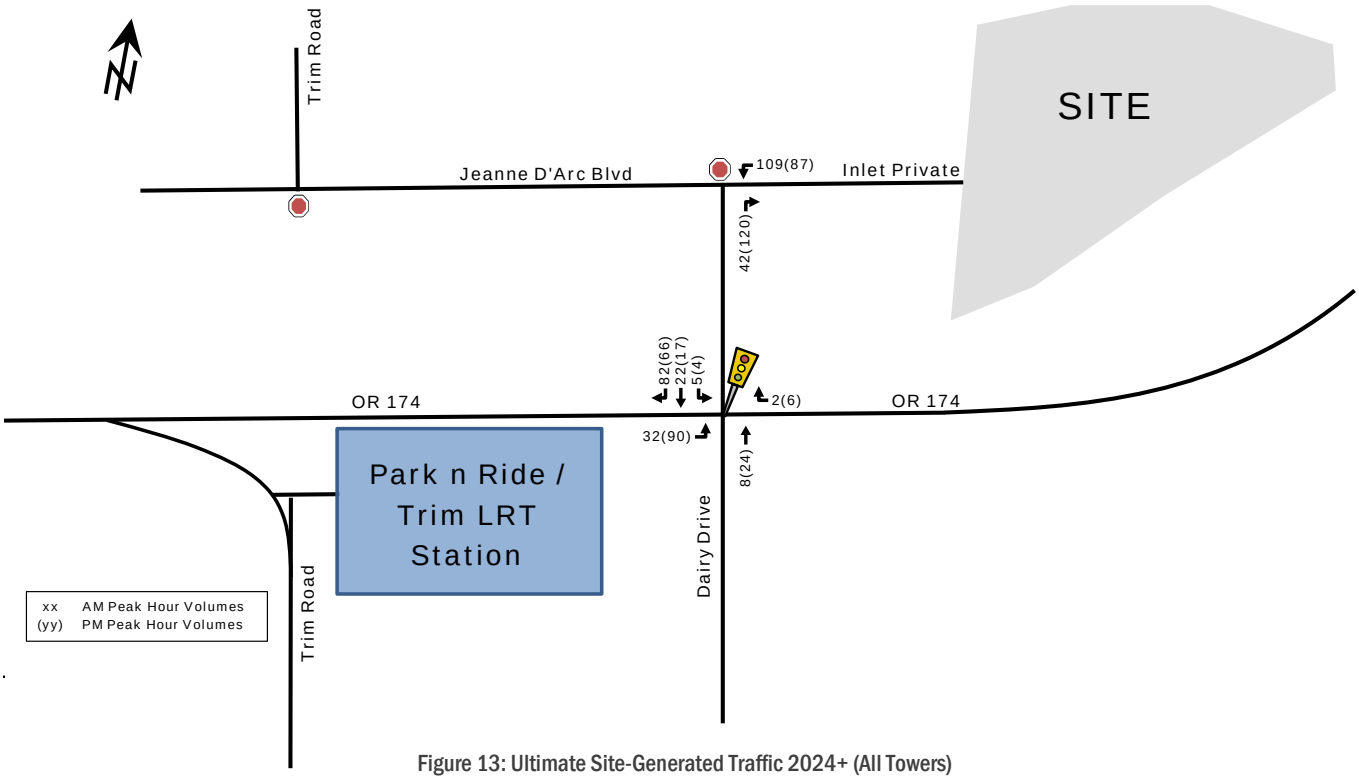
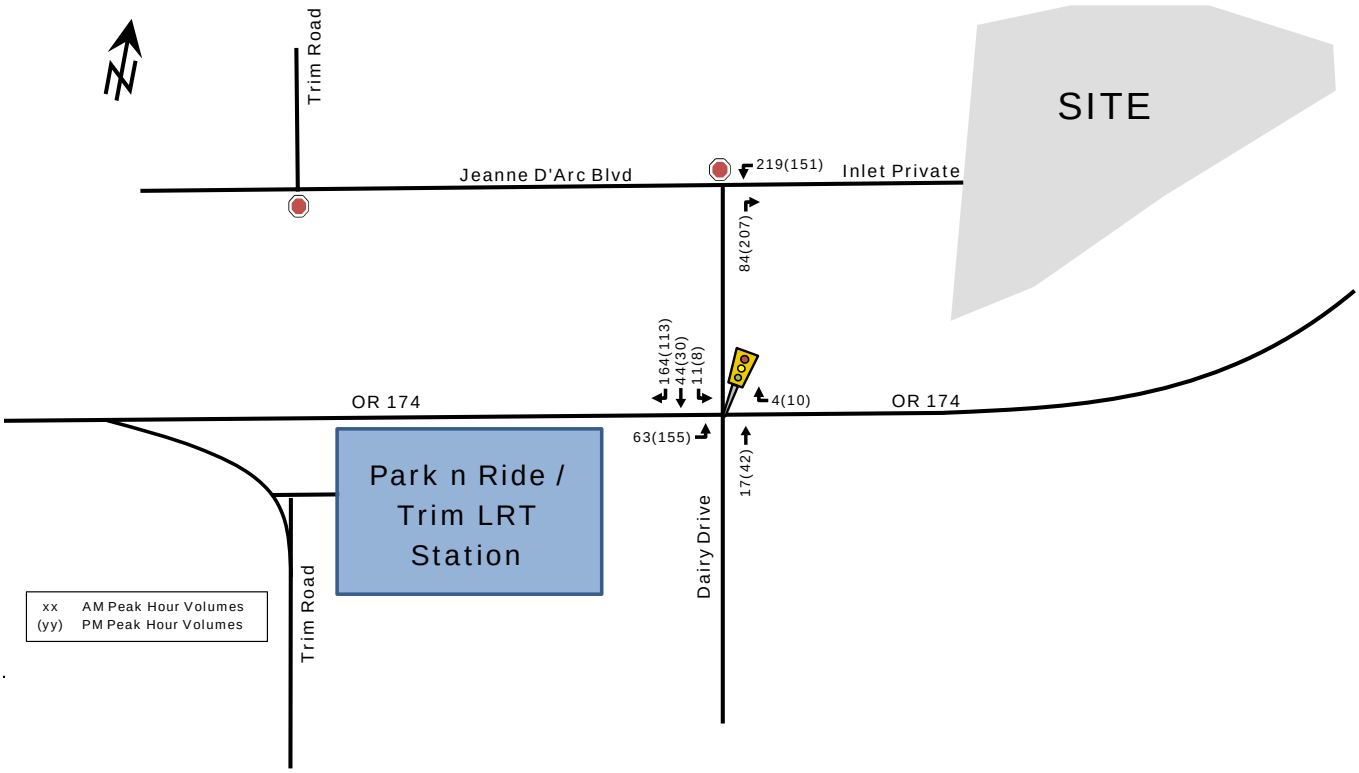


Figure 13: Ultimate Site-Generated Traffic 2024+ (All Towers)



3.2. BACKGROUND NETWORK TRAVEL DEMAND

3.2.1. TRANSPORTATION NETWORK PLANS

The transportation network changes have been discussed within Section 2.1.3., and none were anticipated to impact the transportation analysis for this development.

3.2.2. BACKGROUND GROWTH

The background traffic growth through the immediate study area (summarized in **Table 11**) was calculated based on historical traffic count data (years 2007, 2008, 2010, 2012, and 2017) provided by the City of Ottawa at the Trim/OR-174 intersection. Detailed analysis of the background growth is included in Appendix F.

Table 11: Trim/OR-174 Historical Background Growth (2007 – 2017)

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	2.64%	1.03%	-0.66%	-0.05%	**0.13%**
AM Peak	4.40%	2.49%	0.26%	0.84%	**1.13%**
PM Peak	-3.09%	0.12%	-0.16%	-0.37%	**-0.24%**

As shown in **Table 11**, in past years OR-174 and Trim Road have experienced varied annual growth, ranging from -0.37% to 0.84% and -3.09% to 4.40%, respectively. Overall, growth was observed north of OR-174, which coincides with recent development (Petrie Landing I – III), whereas OR-174 traffic growth remained fairly stagnant. For the subsequent analysis of future conditions, a conservative 1% annual growth rate along OR-174 and Trim Road, in addition to other area developments-generated traffic.

3.2.3. OTHER AREA DEVELOPMENTS

Other area developments were outlined in **Section 2.1.4**. Trips generated by these development have been summarized in **Table 12**.

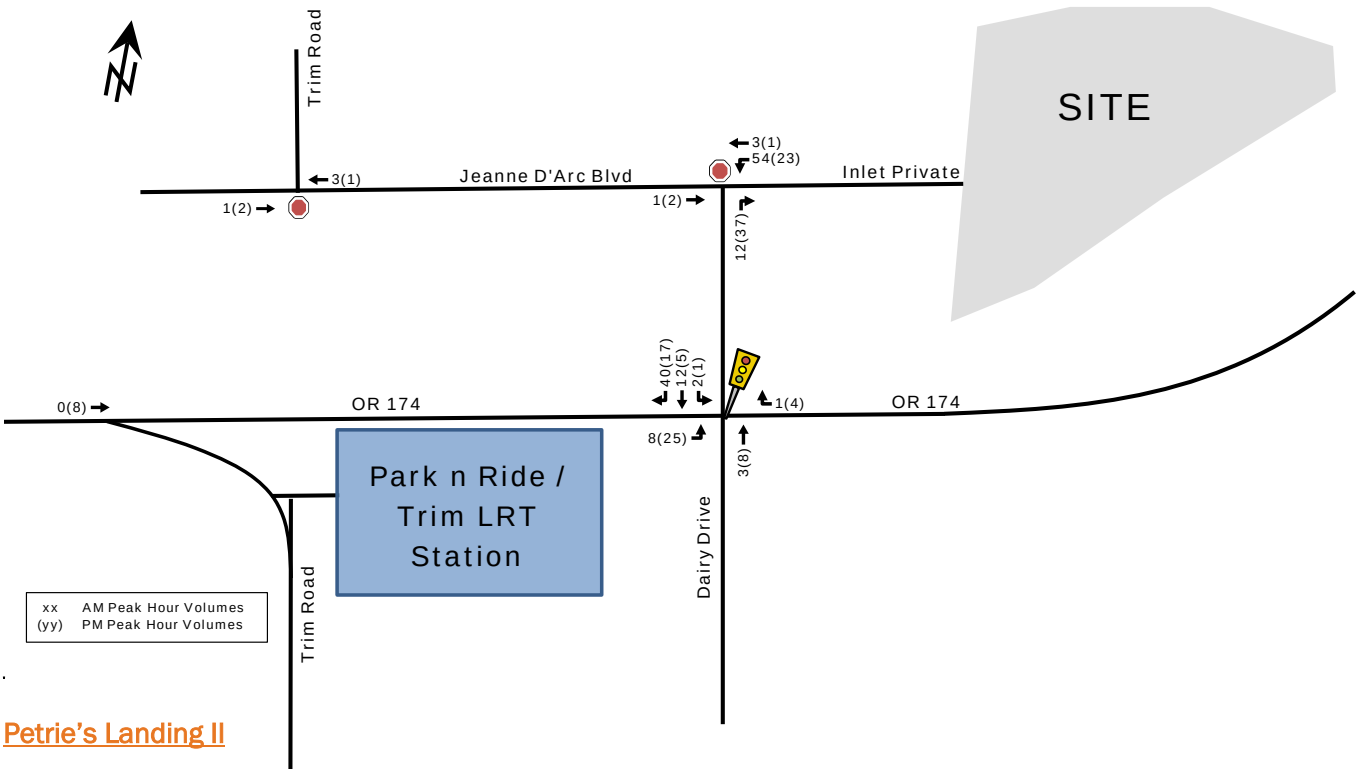
Table 12: Other Area Developments Vehicle Trip Generation

	AM Peak (persons/h)			PM Peak (persons/h)		
	In	Out	Total	In	Out	Total
Petrie's Landing I - Tower 2	13	57	70	39	24	63
Petrie's Landing II	22	108	130	104	52	156
Petrie's Landing III	422	237	659	254	430	584
Cardinal Creek (External Only)	412	940	1,352	1,246	980	2,226
Total	**869**	**1,342**	**2,211**	**1,643**	**1,486**	**3,029**

Petrie's Landing I - Tower 2

Petrie's Landing I - Tower 2 was expected to be fully occupied by 2022. The projected traffic volumes are illustrated in **Figure 14**.

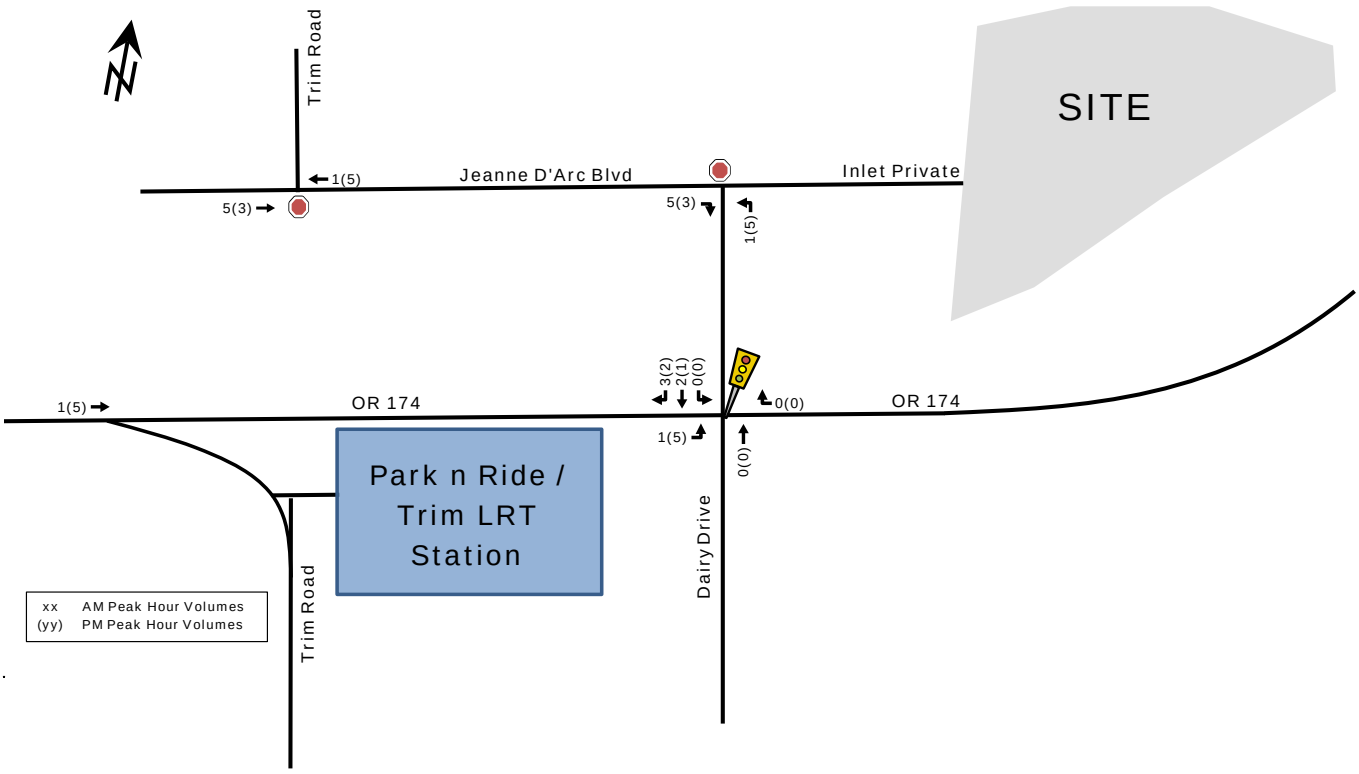
Figure 14: Petrie's Landing I Tower 2 Projected Traffic Volumes



Petrie's Landing II

Figure 15 illustrates the projected traffic volumes for Petrie's Landing II at full build-out, obtained from the 2013 Petrie's Landing I TIS. Considering assumed time horizons, 65% of build-out volumes will be applied in year 2022, 100% in year 2024 and 100% in year 2029.

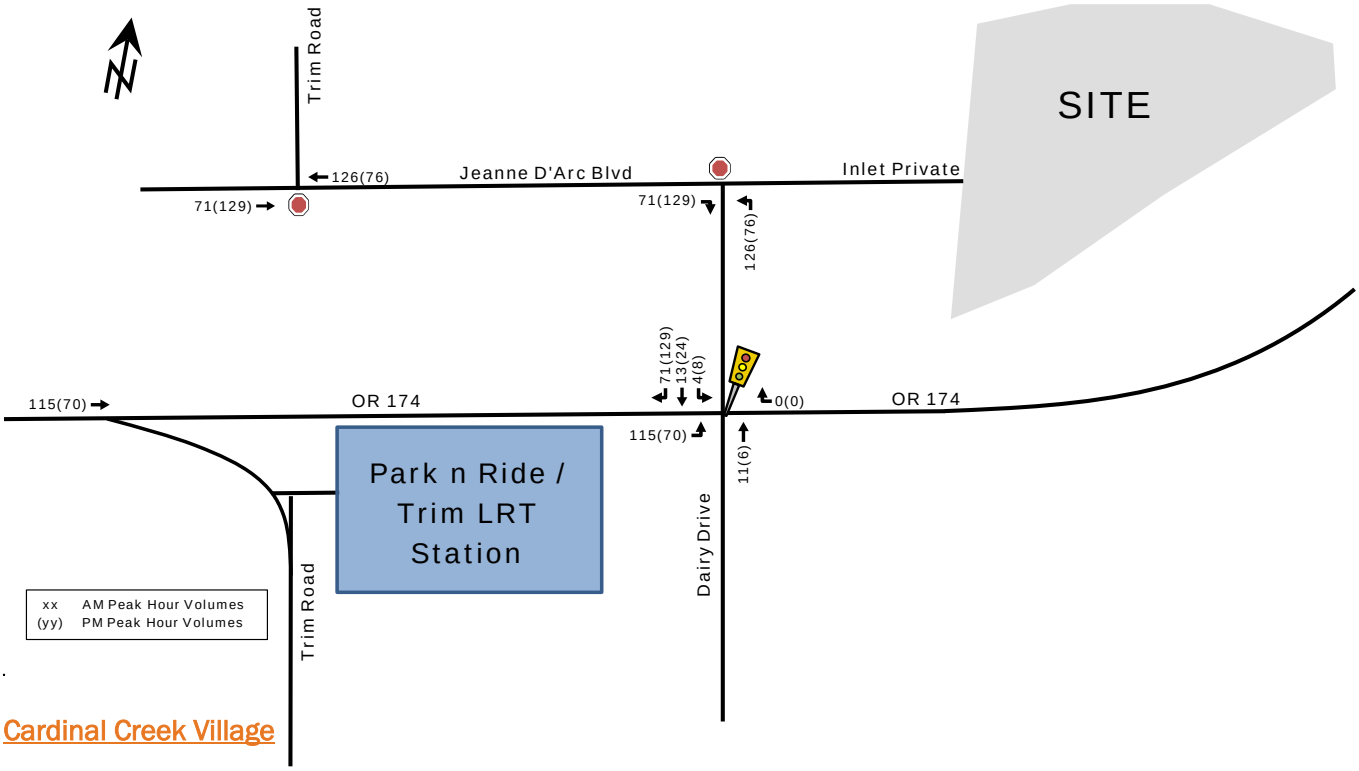
Figure 15: Petrie's Landing II Projected Traffic Volumes – Full Build Out



Petrie's Landing III

Figure 16 illustrates the projected traffic volumes for Petrie's Landing III at full build-out, obtained from the 2013 Petrie's Landing I TIS. Considering assumed time horizons, 30% of build-out volumes will be applied in year 2022, 50% in year 2024 and 100% in year 2029.

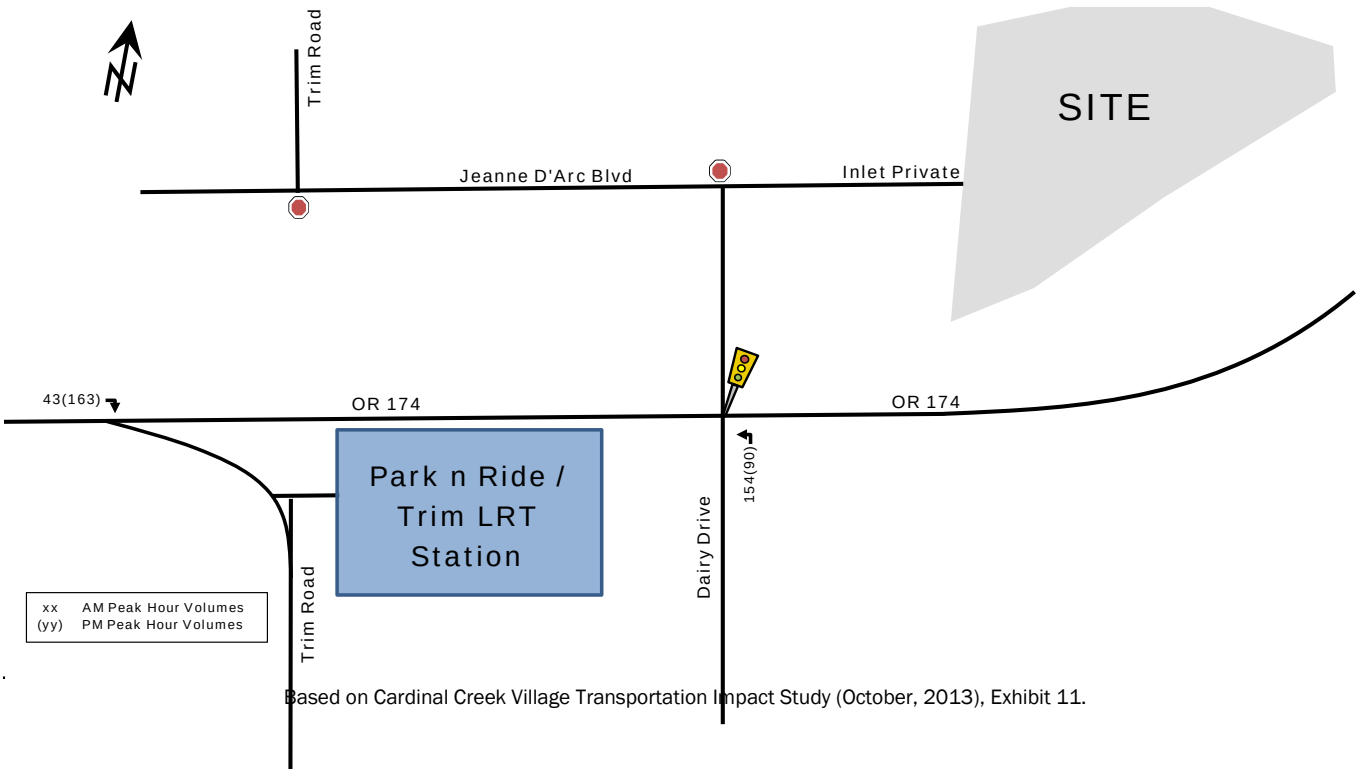
Figure 16: Petrie's Landing III Projected Traffic Volumes – Full Build-Out



Cardinal Creek Village

Figure 17 illustrates the projected traffic volumes for Cardinal Creek Village at horizon year 2029 at study area intersections (obtained from the 2013 Cardinal Creek Village CTS). Considering assumed time horizons, 40% of full build-out volumes will be applied in year 2022, 60 % in year 2024 and 90% in year 2029.

Figure 17: Cardinal Creek 2029 Projected Traffic Volumes at Study Area Intersections



Based on Cardinal Creek Village Transportation Impact Study (October, 2013), Exhibit 11.

3.3. DEMAND RATIONALIZATION

The forecasted background volumes do not identify any lane constraints due to capacity for site entry and egress and no changes to the trip generation or distribution analysis is required.

4. STRATEGY REPORT

4.1. DEVELOPMENT DESIGN

The proposed development includes a network of paved interlocked sidewalks 2.0m wide that connect Towers 1 to 4, garbage collection pads and the planned off-site MUP. East-west MUPs are proposed to the north and south of the property. These pathways are envisioned to connect to adjacent City active travel facilities a Jeanne D'Arc Blvd and Trim Rd. As such, the proposed site plan is considered supportive of pedestrian and cycling connectivity towards the future rail station. Further discussion on on-site active travel facilities, treatments, landscaping features and onsite accessibility can be found in the Planning Rationale supporting this application.

Considering Towers 5a and 5b will be located within 600 meters walk of the future LRT Trim Road Station, further improvement to pedestrian access would be to provide a walking connection to the concrete sidewalk on Inlet Private cul-de-sac from Tower 5a and 5b. This connection could be planned in conjunction with the opening of the Trim Road LRT station.

A large portion of the internal road network has already been constructed as part of Phases 1 and 2, which consists of two-way roadways 7.0-meter-wide (3.5 meters lanes) and curve radii of 8 to 12 meters. No issues were noted for access of municipal and emergency services HSU vehicles to support Buildings 3 to 5.

The proposed layout of the road network is consistent with traffic calming principles, incorporates feedback/direction from the local community and City staff, and is considered appropriate for safe sharing of the road. The proposed site plan is consistent with the 2016 traffic calming concept prepared by Parsons as addendum # 3 to the Petrie's Landing I 2013 TIS. Additionally, the 2016 traffic calming concept was augmented through discussions with City staff and public feed, by converting the temporary speed humps into permanent speed humps. **Table 13** summarizes updated traffic calming measures to be incorporated for Towers 5a & 5b.

Table 13: Traffic Calming Measures

Phase	Measure	Location	Notes
Towers 5a & 5b	Signage – Yield Signs	Inlet Private cul-de-sac: (i) On Towers 5a & 5b underground parking ramp and on circle at Tower 5a underground parking ramp. (ii) On Tower 5b surface parking aisle at circle.	(i) Regulates conflicts between exiting and entering vehicles from/to Towers 5a & 5b (ii) Regulates conflicts between exiting and entering vehicles from/to Towers 5a & 5b surface parking
	Signage – Stop Sign	On Private Approach, for exiting vehicles	Controls conflict of exiting vehicles from the visitor surface parking with vehicles from/to the underground parking
	Permanent Speed Humps	Locations outlined in the 2016 traffic calming concept	Convert to permanent facilities to reduce travel speeds and improve safety onsite

One 7.0-meter-wide two-way ramp is proposed for access to Tower 5a underground parking off the roundabout. To access the underground parking of Towers 1 to 4, two 7.0-meter-wide two-way ramps located in front of Tower 2 and Tower 4 are proposed. The ramps providing access to the lower level parking should be within a percent grade safe for the movement of vehicles and pedestrians.

The City's Private Approach By-Law states that a private approach may be greater than 6% but shall not exceed 12% provided that a subsurface melting device sufficient to keep the private approach free of ice at all times is installed and properly maintained. In addition, our review of the available industry literature indicates that ramp grades should ideally not exceed 12%. However, a ramp grade up to 15% is acceptable if pedestrians are specifically excluded from using the ramp and transition grades are provided. Therefore, the proposed ramp grades should function acceptably provided appropriate pedestrian signage is installed, a subsurface melting device is installed for ramps exposed to ice/snow, and the appropriate transition grades are provided.

Regarding site access during construction, easements will have to be provided to avoid conflicts between construction access routes and existing towers access routes, fire routes, sidewalks, parking spaces and City's existing or future MUPs.

4.2. PARKING SUPPLY

Over half the subject site is located within 600m radius of the future Trim LRT Station, including Towers 1, 2, 5a and 5b. Towers 3 and 4 are within 700 meters distance of the planned Trim Road LRT transit station, as depicted in **Figure 18**. The vehicle and bicycle parking requirements have been summarized in **Table 14** and

Figure 18: Site Distance to the Planned Trim Road LRT Station

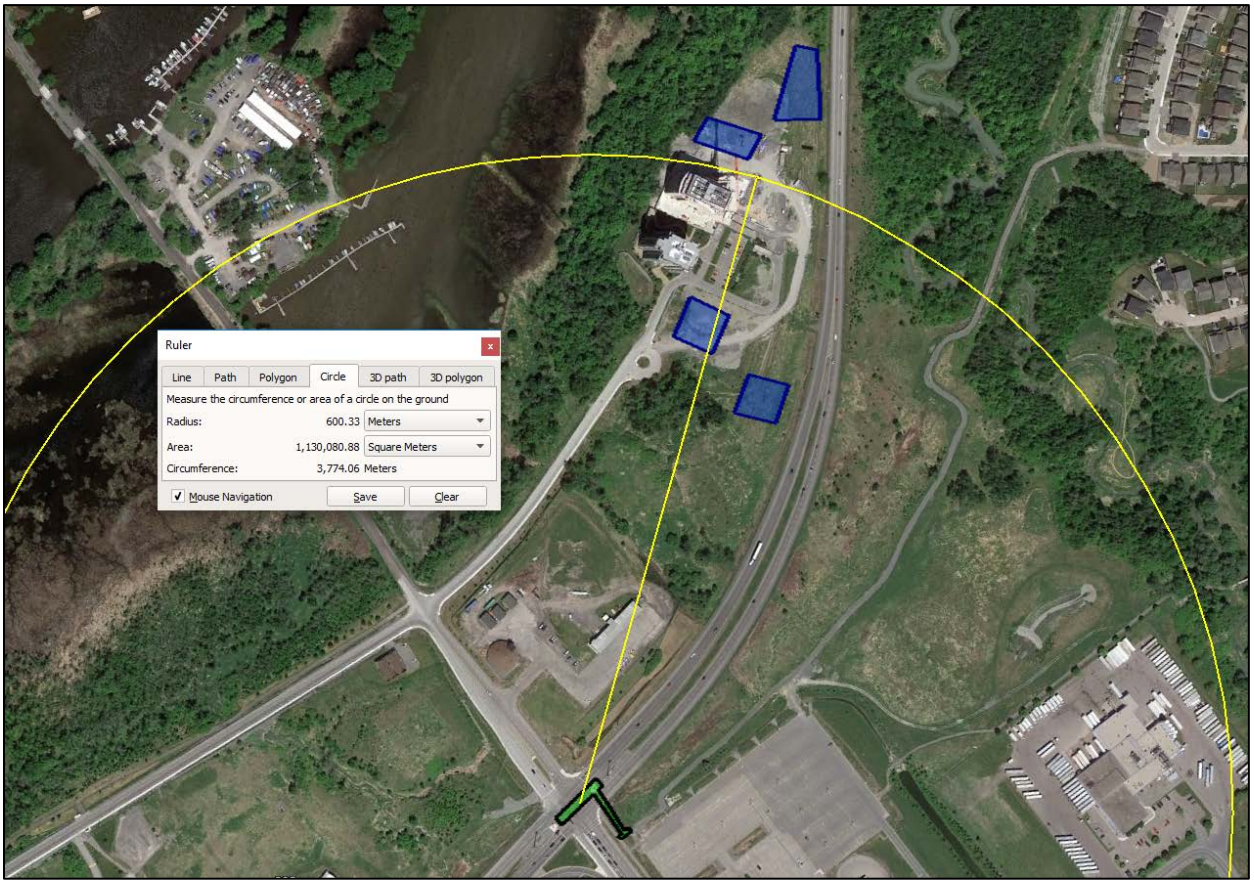


Table 14: Vehicle Parking Spaces Requirements

Building / Units		Residential Rate (spaces/unit)	Required # of Parking Spaces				Proposed # of Parking Spaces
			Comm	Res	Visitor	Total	
Tower 3	162 du	1.2	-	194	30	226	250
Tower 4	198 du	1.2	-	238	37	278	261
Tower 5a	286 du	0.5	14	143	27	186	237
Tower 5b	196 du	0.5	37	98	18	155	179
Total			**54**	**673**	**112**	**839**	**927**

According to **Table 14**, the subject development is required to provide 673 parking spaces for residents, 112 parking spaces for visitors and 54 parking spaces for commercial uses, for a total of 839 parking spaces. With a total of 927 proposed underground parking spaces, the subject development is meeting City requirements. Note that access to underground visitor parking spaces will be provided for all towers. The visitor parking spaces for Tower 4 will be provided in adjacent Tower 3 with an underground pedestrian pathway.

Table 15 summarizes bicycle parking requirements as per City of Ottawa Zoning By-Law-Part 4, sections 100-114.

Table 15: Bicycle Parking Requirements

Land Use	Units	# of Bicycle Spaces	
		Required	Proposed
Tower 3	162	81	81
Tower 4	198	99	99
Tower 5a	286	143	143
Tower 5b	196	98	98
Total	**842**	**421**	**421**

4.3. BOUNDARY STREET DESIGN

4.3.1. EXISTING CONDITIONS

Given the development's location within the general urban area and on a major pathway, the target levels of service for pedestrians and cyclists are PLoS 'C' and BLoS 'D' for Private Inlet near the site, respectively. For the Trim Road segment between Inlet Private to OR-174, the targets are PLoS 'A' and BLoS 'A' as this segment is within 600m of a rapid transit station. There are currently no MMLoS targets for transit or trucks on within the study area. The multi-modal level of service analysis for the existing road segments adjacent to the site is summarized in **Table 16,** with detailed analysis provided in Appendix G.

Table 16: MMLOS – Jeanne D'Arc Boulevard Adjacent to the Site – South Side of Existing Road

Road Segment	Level of Service			
	Pedestrian (PLoS)		Bicycle (BLoS)	
	PLoS	Target	BLoS	Target
Existing Conditions (before LRT opening)				
Inlet Private (site to Trim Road)	B	C	B	D
Trim Road (Inlet Private to OR-174)	B	A	B	B

The MMLOS road segment analysis shows that existing conditions on the south side of Inlet Private meets MMLOS area targets for pedestrians and cyclists, however do not meet the MMLOS targets for the Trim Road segment.

4.3.2. FUTURE CONDITIONS

Once the new Trim/OR-174 at-grade intersection is constructed (anticipated 2022) and after the LRT opening date (anticipated 2024), the site context will involve a high-speed road (OR-174) connecting to a local, low-speed road (Jeanne D'Arc Boulevard) that will function as a connector from the site to the rail station causing an anticipated significant increase in pedestrians and cyclists volumes. As such, speed management measures will be required to achieve necessary speed transitions and minimize speed differentials on Jeanne D'Arc Boulevard. To protect vulnerable users, a reduction of conflict zones should be sought while encouraging rail connectivity.

The development will be located within 600 m radius of a transit station, the target levels of service for pedestrians and cyclists will be PLoS 'A' and BLoS 'B', respectively. It is assumed that access to the future Trim Road LRT station will be provided via pedestrian crosswalks and bi-directional cycling crossride facilities on both the east and south legs of the relocated former Trim/OR-174 intersection to Trim/OR-174 intersection.

The pedestrian and cycling crosswalks/crossrides will connect to the Trim Road Park & Ride. The multi-modal level of service analysis for the road segment along Jeanne D'Arc Boulevard adjacent to the site, considering planned network (**Figure 19**), is summarized in **Table 17**, with detailed analyses provided in Appendix H.

Figure 19: Planned Network MMLOS Analysis - Segments and Intersections

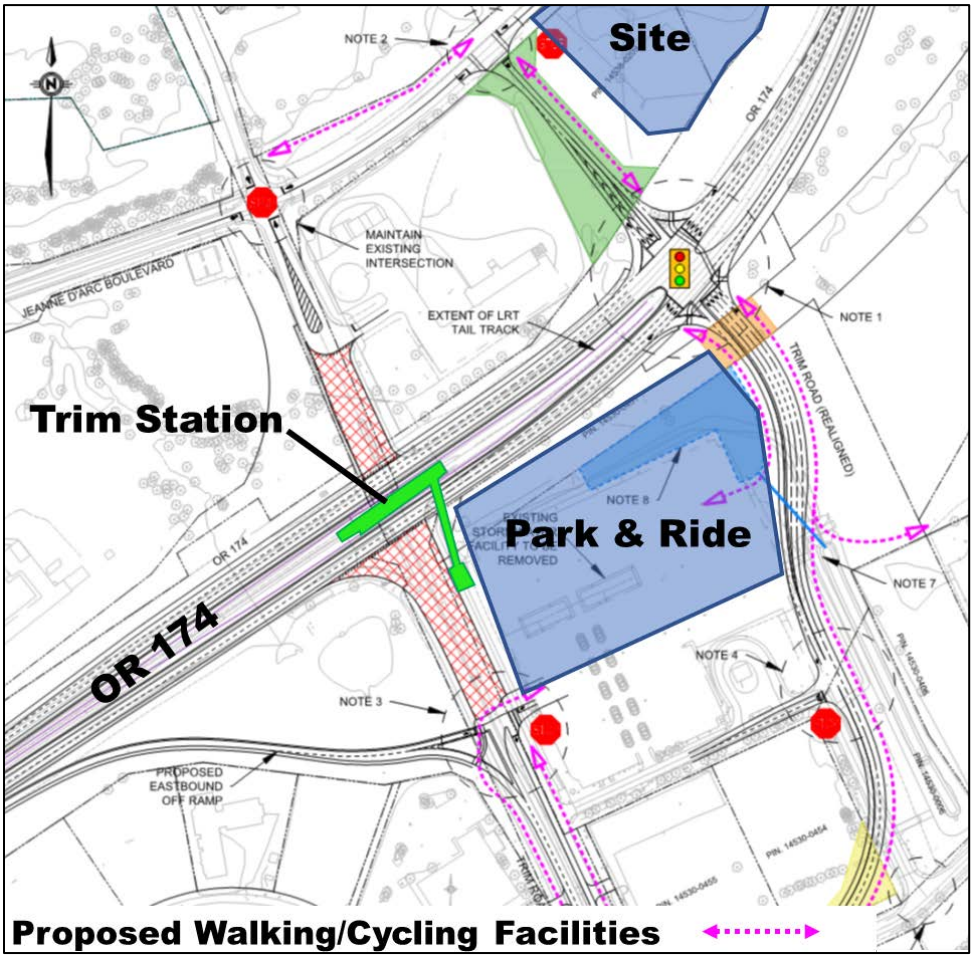


Table 17: MMLOS – Jeanne D'Arc Boulevard adjacent to the Site – South Side of Road-2024

Road Segment	Level of Service			
	Pedestrian (PLoS)		Bicycle (BLoS)	
	PLoS	Target	BLoS	Target
2024 Planned Transportation Network				
Inlet Private (site to Dairy Drive)	B	A	B	B
Dairy Drive (Inlet Private to OR-174)	B	A	B	B

Both Inlet Private and the realigned Trim Road will be key active travel connections to the new Trim LRT Station, meaning both have more aggressive pedestrian and cycling level of service goals. The MMLOS analysis shows that planned conditions on the south side of Inlet Private, would not meet MMLOS area targets for both pedestrians and cyclists. Assuming a 2.0m sidewalk with less than 0.5m curb and given expected traffic volumes on this segment (approximately 1,000 vehicles during the peak hour), would result in a PLoS 'B'. Providing a 2.0m sidewalk with a minimum boulevard width of 2.0m and reducing vehicle speeds to 30 km/h or less would result in PLoS 'A'.

If a new pedestrian bridge were provided to the north from the LRT Station along with supporting active travel facilities between it and the subject site, the PLoS and BLoS would improve to 'A' and provide more direct access to the station from the lands north of the OR-174 (e.g. La Cite campus, Petrie Landing II etc.)

4.4. ACCESS INTERSECTION DESIGN

4.4.1. LOCATION AND DESIGN OF ACCESS

The proposed development is located at the end of Inlet Private, which is approximately 300m east of the Jeanne D'Arc/Trim intersection. The main access road from the property limit will provide 50 m throat length, which meets the City of Ottawa requirements. Further into the site there is a 90-degree bend, where a 1.5-meter-wide median will be introduced with 4.5m travel lanes. The median prevents left-turns into the "exit only" laneway, with line paintings to prevent parking/stopping along the entry lane and reinforce travel lanes. The median can be constructed with mountable curb to allow emergency vehicles to enter and exit the site if there is an obstruction in the travel lane. This also means the median must be clear of obstructions; only minimal landscaping. This is the only access road for residents in Towers 1 to 4.

The main entrance to Towers 5a and 5b will be accessible from a separate road off Inlet Private that leads to a cul-de-sac and parking ramp. This configuration reduces traffic loading on the internal road network, which was a concern of existing residents. Therefore, no access issues are anticipated at either access.

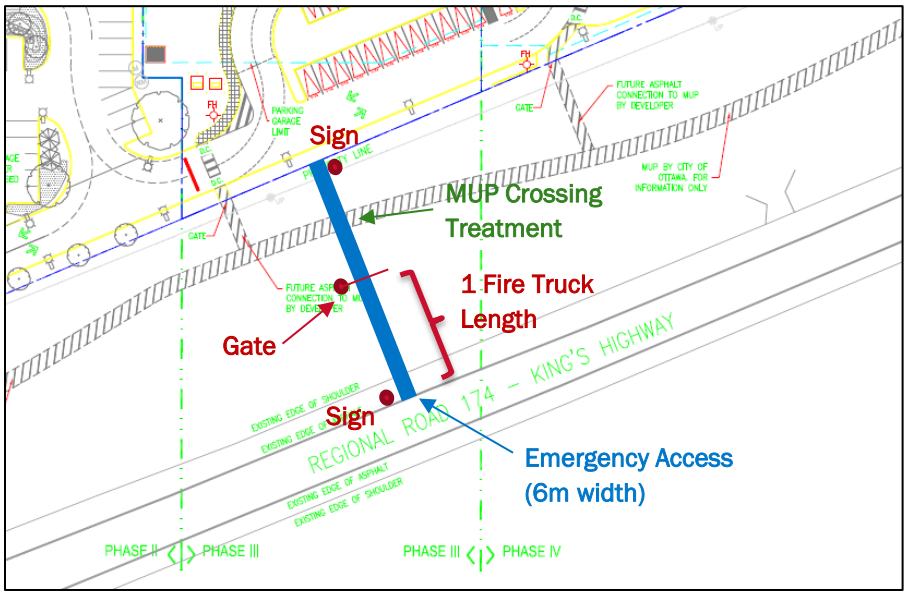
Interlocked paved sidewalk is proposed on the north side of the main access road, connecting to Towers 1 to 4. Given the existing concrete sidewalk on the south side of Jeanne D'Arc Boulevard, a texturized pedestrian crossing is proposed at the site access to connect both sidewalks. Towers 5a and 5b are located within 600 meters radius and 800 meters walk of the future LRT Trim Road Station, a further improvement to pedestrian access would be to provide a walking connection between Towers 5a and 5b and the Inlet Private cul-de-sac south sidewalk.

4.4.2. EMERGENCY ACCESS

Vehicular access to and from the site is only provided via Inlet Private. City staff raised concerns with the lack of secondary emergency access, if Inlet Private were to be obstructed between Trim Road and the proposed development property line.

One option to address this concern would be to construct an emergency access to the OR-174 from within the proposed development, as shown in **Figure 20**. This road would be constructed to standard City specifications; to accommodate all emergency vehicles (6m), gated and signed to restrict access to emergency vehicles only. There is sufficient space between the property line and the OR-174 to easily fit a fire truck, to limit impacts to OR-174 traffic operations.

Figure 20: Potential Emergency Access



4.5. TRANSPORTATION DEMAND MANAGEMENT

The development generated travel demand has been estimated in Section 3.1.1 using modal shares from the 2011 TRANS O-D survey for Orleans. These modal shares reflect conditions for a wide variety of transportation services supply within Orleans. Given site location at Orleans' north-eastern edge, they might not reflect site's current conditions. However, considering development phasing (full occupancy by 2024) and the LRT East Extension to Trim Road at OR-174 by 2024, it is anticipated that transit shares will increase, and auto shares will decrease for the subject site within the horizon analysis.

Once the envisioned LRT East Extension is completed, and to support the anticipated rise in transit ridership, post-occupancy TDM measures are recommended and attached as Appendix I.

4.6. ROUTE CAPACITY

Considering project phasing and Delcan 2013 Petrie's Landing I Transportation Impact Study estimations for Tower 2, site-generated transit trips in 2024 were estimated to be 445 and 385 'new' two-way transit passengers during the weekday morning and afternoon peak hour respectively, as summarized in **Table 18**.

Table 18: Site-Generated Transit Trips Post-LRT

Land Use	Horizon	AM Peak (persons/h)			PM Peak (persons/h)		
		In	Out	Total	In	Out	Total
Tower 2	Existing*	4	18	22	13	8	21
Towers 3 & 4	2022*	49	131	181	88	68	155
Towers 5a & 5b	2024	68	175	242	121	87	209
	Total	**121**	**324**	**445**	**222**	**163**	**385**
**note: Towers 2, 3 & 4 assumed at transit mode shares estimated for LRT usage, anticipated to be operational 2024*							

According to **Table 18**, the required bus fleet to serve the site-generated transit demand would be:

Year 2022

- Morning - inbound passengers: 1 single bus;
- Morning - outbound passengers: 1 articulated bus;
- Afternoon - inbound passengers: 1 single bus; and,
- Afternoon - outbound passengers: 1 single bus.

Year 2024

- Considering the envisioned LRT East extension line is projected to begin operation in 2024 and assuming a similar capacity to that of the Confederation Line (600 passengers per train and 12 trains per hour during peak), it is anticipated that the future transit network will have sufficient capacity to accommodate the subject development transit demand.

4.7. TRANSIT PRIORITY

No transit priority measures are anticipated on Trim Road within the area of study. Although there will be more generated trips in 2024 as compared to 2022 (addition of Towers 5a and 5b on already built Towers 2 to 4 by 2022), the vehicle trips will not grow by much as it is anticipated that less people will drive from towers 2 to 4 by 2024 in response to the opening of the LRT. Projected operation level of service between 2022 and 2024 is expected to stay almost constant with the addition of towers 5a and 5b and also the opening of LRT to Trim Road.

4.8. REVIEW OF NETWORK CONCEPT

The subject site is designated as R5A [2327] H(109.4) and R5A [2327] H(101), according to the Part 6, sec. 163-164 of the Zoning By-Law No. 2008-250. The planned transportation network includes expanded transit and traffic capacity through the extension of LRT services to Trim Road and the provision of a new at grade intersection at OR-174/Dairy Drive, approximately 200m east of the existing OR-174/Trim Road intersection with added northbound left turn lane and westbound through lane. The realigned Trim/OR-174 intersection will replace the existing OR-174/Trim intersection; however, it will maintain the eastbound right turn off-ramp to Trim. No changes to network concepts were anticipated to serve the subject development.

4.9. INTERSECTION DESIGN

4.9.1. EXISTING CONDITIONS

Table 19 provides a summary of the existing traffic operations at study area intersections based on the SYNCHRO (V9) traffic analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio for signalized intersections, delay (s) for stop-controlled and roundabout intersections, and the corresponding Level of Service (LoS) for the critical movement(s). The subject intersections 'as a whole' were assessed based on a weighted v/c ratio or delay, and the SYNCHRO model output of existing conditions is provided within Appendix J.

Table 19: Existing Performance at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Jeanne D'Arc/Trim (unsignalized)	A(A)	7.8(7.7)	NB(NB)	8(7)	A(A)	-
Trim/OR-174	E(D)	0.96(0.84)	NBL(EBT)	46(28)	E(C)	0.91(0.79)
Note: Analysis of signalized intersections assumes a PHF of 0.90 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 19**, study area intersections 'as a whole' are currently approaching capacity during the weekday AM peak hours and operating at acceptable LoS 'C' in the PM peak. With regard to the 'critical movements' at study area intersections, they are nearing capacity with LoS 'E' in the AM and operating at an acceptable LoS 'D' or better in the PM

Multi-Modal Level of Service

As previously stated in the MMLoS Guidelines, only signalized or roundabout intersections were considered for the intersection level of service measures. The Trim/OR-174 intersection is within 600 meters of high-frequency transit. The applicable target levels of service for pedestrians and cyclists is PLoS 'A' and BLoS 'B', respectively. The MMLOS analysis for the existing signalized intersection Trim/OR-174 within the study area, are summarized in **Table 20**, with detailed analyses provided in Appendix G.

Table 20: Existing MMLOS – Trim/OR-174

Intersection	Level of Service			
	Pedestrian (PLoS)		Bicycle (BLoS)	
	PLoS	Target	BLoS	Target
Trim/OR-174	E	A	D	B

As shown in **Table 20**, the pedestrian and bicycle target levels of service were not met at the Trim/OR-174 intersection. A summary of the results is as follows:

- Pedestrians have to cross up to six lanes of traffic at Trim/OR-174. There are few feasible options to improve the PLoS to minimum standards without adversely operations along the highway. Furthermore, such improvements would severely decrease both transit and vehicle levels of service.

- Bike lanes are provided along east and west legs of Trim/OR-174 intersection. Trim/OR-174 features north and south bike lanes that are a part of the Spine Route of Ottawa, spine pocket bike lane on the north leg and major bike path lane on the south leg. The failure in BLoS at the intersection can be attributed to operating speed of vehicles. As such, there are no options that can help improve the BLoS significantly enough to meet the target BLoS.

- Direct north access to the Trim LRT Station would reduce walking distances to site and would provide increased pedestrian safety by eliminating the at-grade crossing point at Trim/OR-174 intersection.

4.9.2. PROJECTED BACKGROUND 2022 OPERATIONS

Figure 21 illustrates the future background traffic volumes for the year 2022. It was assumed that the realigned Trim/OR-174 intersection will be operational by 2022, to allow time to build the future Trim LRT Station. **Table 21** summarizes the future background operations for the 2022 future background traffic volumes.

Figure 21: Projected Background 2022 Traffic Volumes

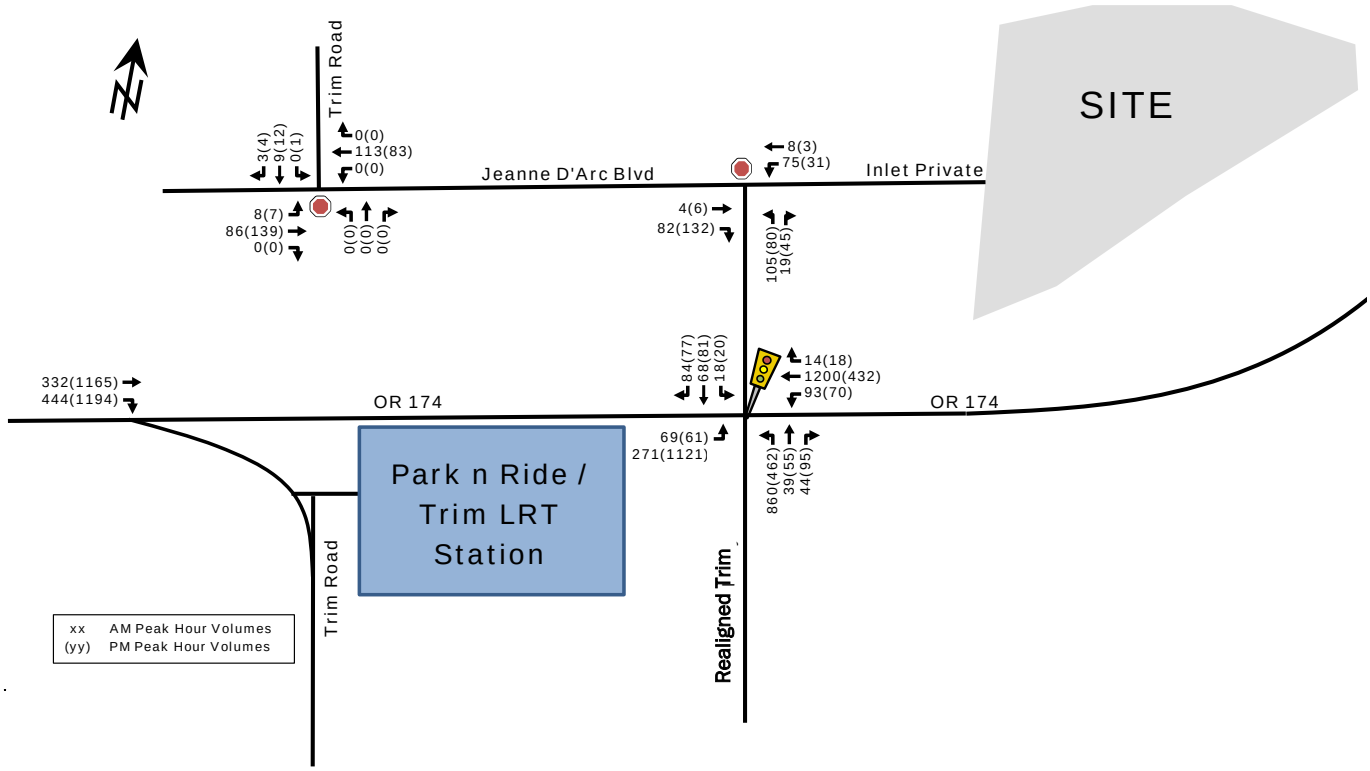


Table 21: Projected Background 2022 Performance at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Signalized						
Trim/OR-174	C(C)	0.80(0.71)	NBL(NBL)	37(31)	B(B)	0.65(0.64)
Unsignalized						
Jeanne D'Arc/Dairy/Inlet	A(A)	8.1(7.9)	NB(NB)	7.8(7.6)	A(A)	-
Jeanne D'Arc/Trim	A(A)	7.6(7.9)	EB(EB)	7.6(7.7)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 21**, the unsignalized Jeanne D'Arc/Trim and Jeanne D'Arc/Dairy/Inlet intersections 'as a whole' are projected to continue operating at an excellent LoS 'A' during the weekday peak hours. With regard to the 'critical movements', they are also operating at a LoS 'A'.

The realigned Trim/OR-174 intersection is expected to experience better levels of performance due to additional northbound left lane and westbound through lane. As such, the OR-174/Dairy intersection 'as a whole' is projected to operate at a LoS 'B' during peak hours (as compared to existing LoS 'E') with critical movements operating at LoS 'C' (as compared to existing LoS 'E'). Mitigative measures were not required. The SYNCHRO model output of 2022 background conditions have been provided in Appendix K.

Multi-Modal Level of Service

The future realigned Trim/OR-174 intersection will also be within 600 meters of high-frequency transit. The applicable target levels of service for pedestrians and cyclists is PLoS 'A' and BLoS 'B', respectively. The MMLOS analysis has been summarized in **Table 22**, with detailed output provided in Appendix H.

Table 22: Projected Background 2022 MMLOS – Trim/OR-174

Intersection	Level of Service			
	Pedestrian (PLoS)		Bicycle (BLoS)	
	PLoS	Target	BLoS	Target
Trim/OR-174	F	A	D	B

As shown in **Table 22**, the pedestrian and bicycle target levels of service were not met at the realigned Trim/OR-174 intersection. A summary of the results is as follows:

- Pedestrians have to cross up to eight lanes of traffic at Trim/OR-174. There are no options that can help improve the PLoS significantly enough to meet the target PLoS.
- Bike lanes are provided along east and west legs of the realigned Trim/OR-174 intersection. This intersection also features north and south bike lanes that are a part of the Spine Route of Ottawa, spine pocket bike lane on the north leg and major bike path lane on the south leg. The failure in BLoS at the intersection can be attributed to operating speed of vehicles. As such, there are no options that can help improve the BLoS significantly enough to meet the target BLoS.
- Direct north access to the Trim LRT Station would reduce walking distances to site and would provide increased pedestrian safety by eliminating the at-grade crossing point at Trim/OR-174 intersection.

4.9.3. PROJECTED BACKGROUND 2024 OPERATIONS

Figure 22 illustrates the future background traffic volumes for the year 2024, considering planned transportation network changes and including both background growth and other area developments generated traffic. **Table 23** summarizes the future background operations for the year 2024 future background traffic volumes.

Figure 22: Projected Background 2024 Traffic Volumes

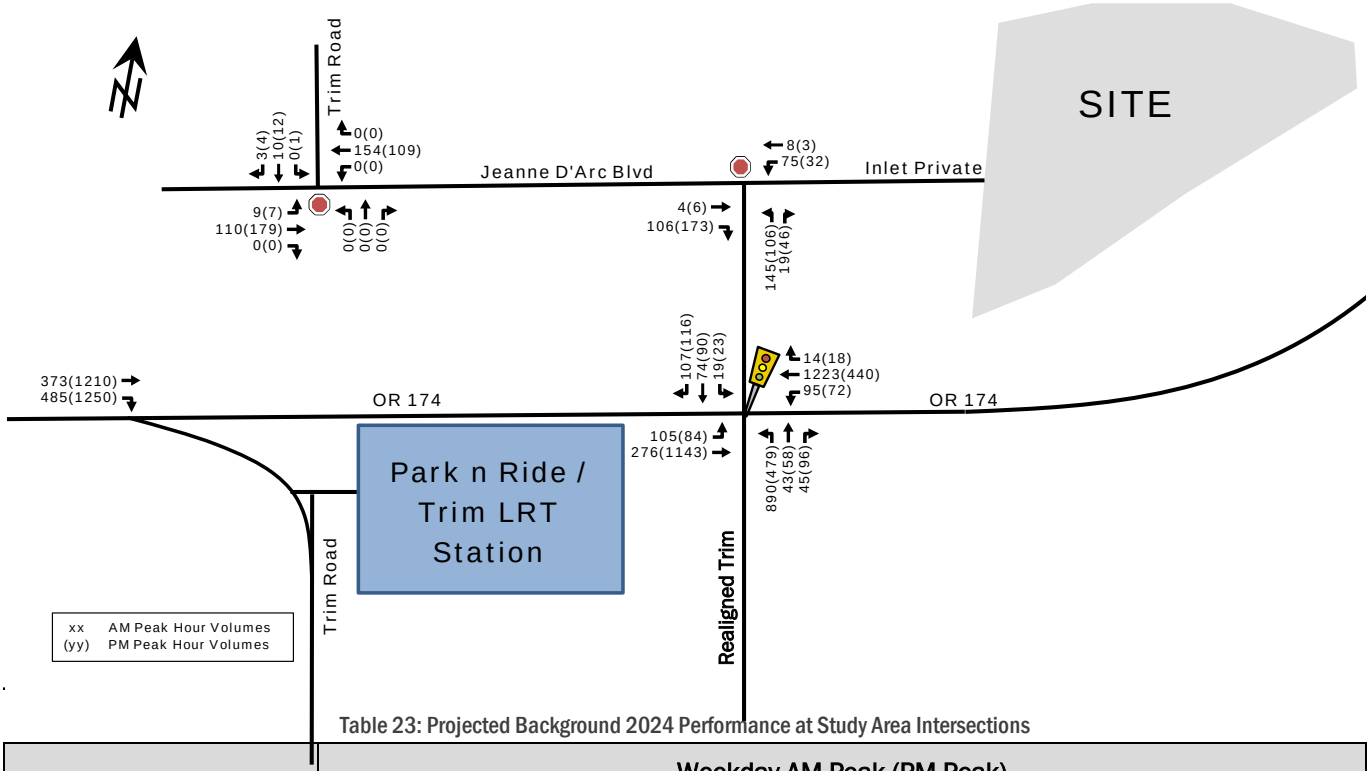


Table 23: Projected Background 2024 Performance at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Signalized						
Trim/OR-174	C(C)	0.80(0.72)	NBL(NBL)	38(31)	B(B)	0.70(0.66)
Unsignalized						
Jeanne D'Arc/Dairy/Inlet	A(A)	8.6(8.3)	NB(NB)	8.1(7.9)	A(A)	-
Jeanne D'Arc/Trim	A(A)	7.9(8.2)	EB(EB)	7.8(8.0)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 23**, the unsignalized Jeanne D'Arc/Trim and Jeanne D'Arc/Dairy/Inlet intersections 'as a whole' were projected to continue operating at an excellent LoS 'A' during the weekday peak hours. With regard to the 'critical movements', they were also operating at a LoS 'A'.

The realigned Trim/OR-174 intersection was shown to experience better levels of performance due to additional northbound left lane and westbound through lane. As such, the realigned Trim/OR-174 intersection 'as a whole' was projected to operate at LoS 'B' during peak hours (as compared to existing LoS 'E') with critical movements operating at LoS 'C' (as compared to existing LoS 'E'). Mitigative measures are not required. The SYNCHRO model output of 2024 background conditions have been provided in Appendix K.

Multi-Modal Level of Service

There were no significant changes to MMLOS results or recommendations as demonstrated in the 2022 Background Condition (refer to Section 4.9.2.).

4.9.4. PROJECTED BACKGROUND 2029 OPERATIONS

Figure 23 illustrates the future background traffic volumes for the year 2029, considering planned transportation network changes and including both background growth and other area developments generated traffic. **Table 24** summarizes the future background operations for the year 2029 future background traffic volumes.

Figure 23: Projected Background 2029 Traffic Volumes

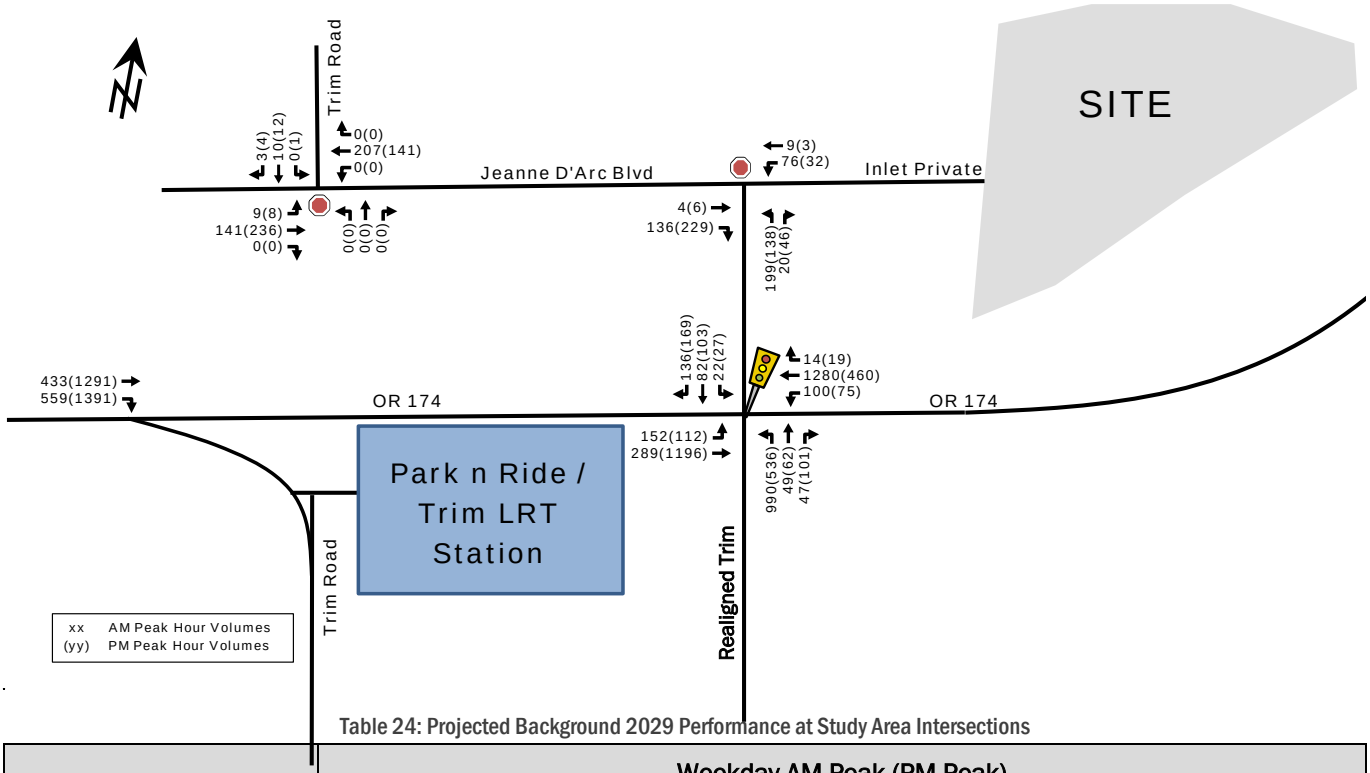


Table 24: Projected Background 2029 Performance at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Signalized						
Trim/OR-174	D(C)	0.85(0.75)	NBL(NBL)	42(33)	C(C)	0.77(0.71)
Unsignalized						
Jeanne D'Arc/Dairy/Inlet	A(A)	9.3(8.8)	NB(NB)	8.6(8.4)	A(A)	-
Jeanne D'Arc/Trim	A(A)	8.4(8.7)	EB(EB)	8.2(8.4)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 24**, the unsignalized Jeanne D'Arc/Trim and Jeanne D'Arc/Dairy/Inlet intersections 'as a whole' were projected to continue operating at an excellent LoS 'A' during the weekday peak hours. With regard to the 'critical movements', they were also operating at a LoS 'A'.

The realigned Trim/OR-174 intersection was expected to experience better levels of performance due to additional northbound left lane and westbound through lane. As such, the realigned Trim/OR-174 intersection 'as a whole' was projected to operate at a LoS 'C' or better during peak hours (as compared to existing LoS 'E') with critical movements operating at LoS 'D' or better (as compared to existing LoS 'E'). Mitigative measures were not required.

It is important to note that a very conservative annual growth rate was used. It is anticipated that the actual level of service will perform better than shown in **Table 27**, since traffic patterns will have had time to adjust with years of LRT Phase 2 adoption. The SYNCHRO model output of 2029 background conditions have been provided in Appendix K.

Multi-Modal Level of Service

There were no significant changes to MMLOS results or recommendations as demonstrated in the 2022 Background Condition (refer to Section 4.9.2.).

4.9.5. TOTAL PROJECTED 2022 CONDITIONS – INTERIM BUILDOUT

The total projected 2022 volumes were derived by superimposing 2022 site-generated volumes (**Figure 12**) onto 2022 background traffic volumes (**Figure 21**) and are illustrated as **Figure 24**. **Table 25** provides a performance summary of study area intersections, based on total projected 2022 traffic volumes and existing adjacent road network.

Figure 24: Total Projected 2022 Peak Hour Traffic Volumes

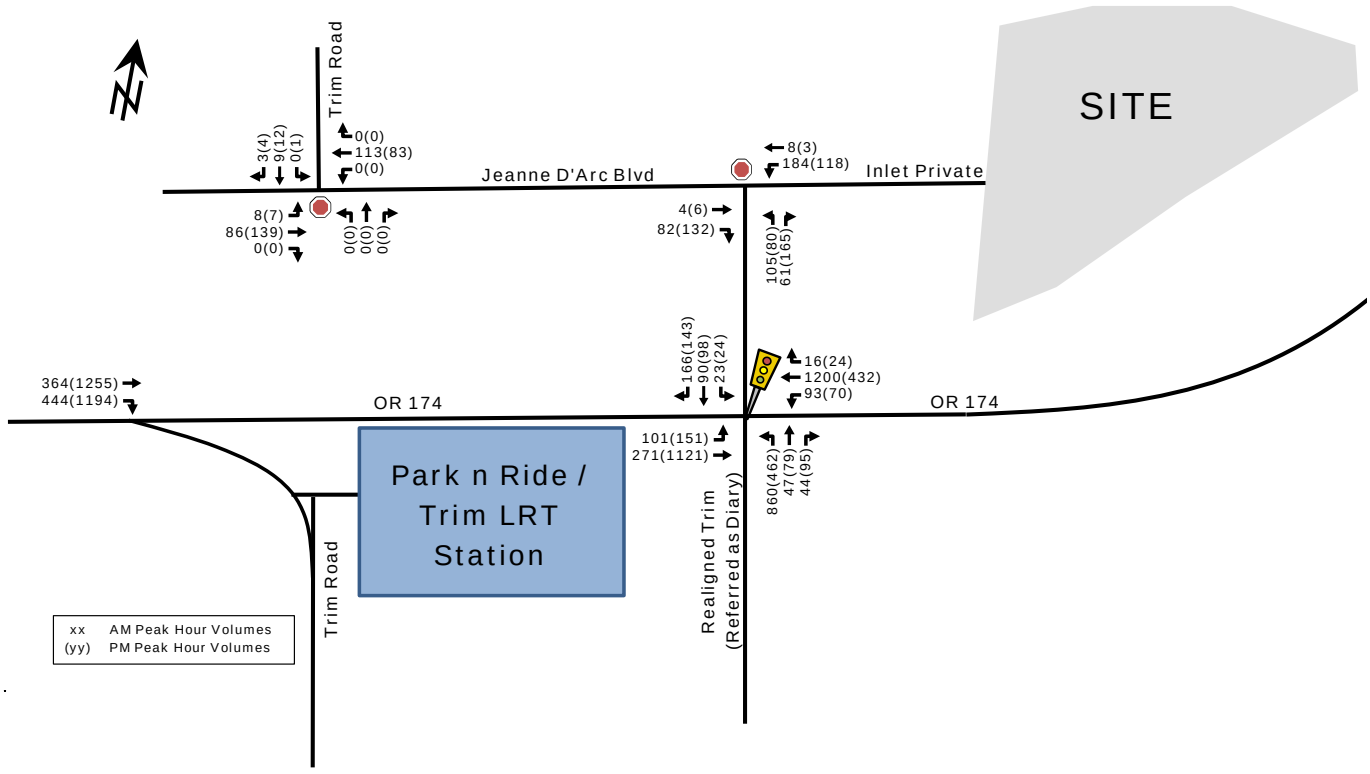


Table 25: Total Projected 2022 Performance of Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Signalized						
Trim/OR-174	C(C)	0.80(0.72)	NBL(NBL)	37(31)	B(B)	0.68(0.65)
Unsignalized						
Jeanne D'Arc/Dairy/Inlet	A(A)	9(9)	WB(NB)	9(9)	A(A)	-
Jeanne D'Arc/Trim	A(A)	8(8)	EB(EB)	8(8)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 25**, the unsignalized Jeanne D'Arc/Trim and Jeanne D'Arc/Dairy/Inlet intersections 'as a whole' were projected to continue operating at an excellent LoS 'A' during the weekday peak hours. With regard to the 'critical movements', they were also operating at a LoS 'A'.

The realigned Trim/OR-174 intersection was expected to experience better levels of performance due to additional northbound left lane, westbound through lane and channelized right turn lanes. As such, the realigned Trim/OR-174 intersection 'as a whole' was projected to operate at a LoS 'B' during peak hours (as compared to existing LoS 'E') with critical movements operating at LoS 'C' (as compared to existing LoS 'E'). Mitigative measures were not required. The SYNCHRO model output of 2022 projected conditions have been provided within Appendix L.

Multi-Modal Level of Service

No significant changes to MMLOS as demonstrated in background 2022. Refer to section 4.9.2.

4.9.6. TOTAL PROJECTED 2024 CONDITIONS – FULL BUILDOUT

The total projected 2024 volumes were derived by superimposing full build-out site-generated volumes (**Figure 13**) onto 2024 background traffic volumes (**Figure 22**) and are illustrated as **Figure 25**. **Table 26** provides a performance summary of study area intersections, based on total projected 2024 traffic volumes and widened (i.e. six lanes) OR-174.

Figure 25: Total Projected 2024 Peak Hour Traffic Volumes

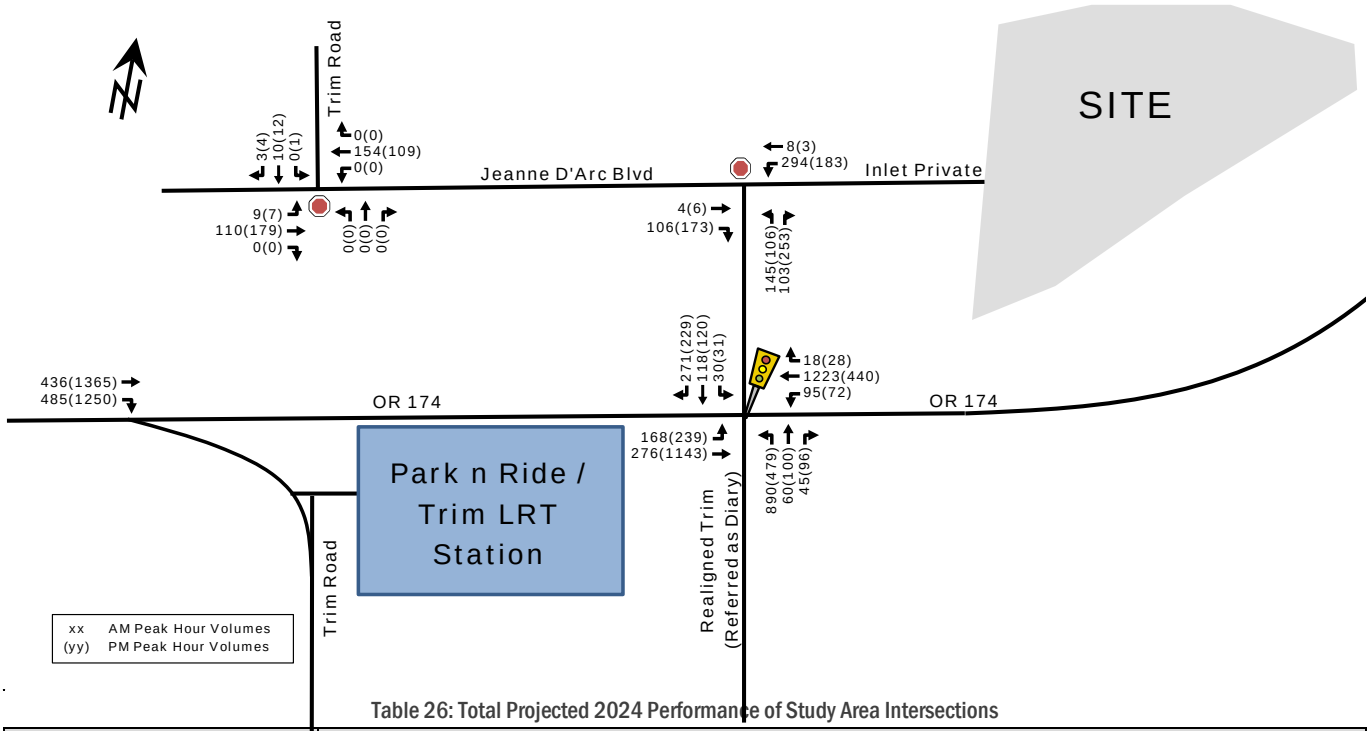


Table 26: Total Projected 2024 Performance of Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Signalized						
OR-174/Dairy	D(C)	0.82(0.73)	NBL(NBL)	40(31)	C(B)	0.75(0.68)
Unsignalized						
Jeanne D'Arc/Dairy/Inlet	B(B)	11(11)	WB(NB)	10(10)	B(B)	-
Jeanne D'Arc/Trim	A(A)	8(8)	EB(EB)	8(8)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 26**, the unsignalized Jeanne D'Arc/Trim and Jeanne D'Arc/Dairy/Inlet intersections 'as a whole' were projected to continue operating at an excellent LoS 'B' or better during the weekday peak hours. With regard to the 'critical movements', they were shown to operate at a LoS 'B' or better.

The realigned Trim/OR-174 intersection was expected to experience better levels of performance due to additional northbound left lane, westbound through lane and channelized right turn lanes. As such, the realigned Trim/OR-174 intersection 'as a whole' was projected to operate at a LoS 'C' or better during peak hours (as compared to existing LoS 'E') with critical movements operating at LoS 'D' or better (as compared to existing LoS 'E'). Mitigative measures were not required. The SYNCHRO model output of 2024 projected conditions have been provided in Appendix L.

Multi-Modal Level of Service

There were no significant changes to MMLOS results or recommendations as demonstrated in the 2022 Background Condition (refer to Section 4.9.2.).

4.9.7. TOTAL PROJECTED 2029 CONDITIONS – FULL BUILDOUT PLUS 5 YEARS

The total projected 2029 volumes were derived by superimposing full build-out site-generated volumes (**Figure 13**) onto projected 2029 background traffic volumes (**Figure 23**), and are illustrated as **Figure 26**. **Table 27** provides a performance summary of study area intersections, based on total projected 2029 traffic volumes, widened (i.e. six lanes) OR-174 and the above-mentioned background 2029 mitigative measures (e.g. dual eastbound left-turn lane and triple northbound left-turn lanes at the Trim/OR-174 intersection).

Figure 26: Total Projected 2029 Peak Hour Traffic Volumes

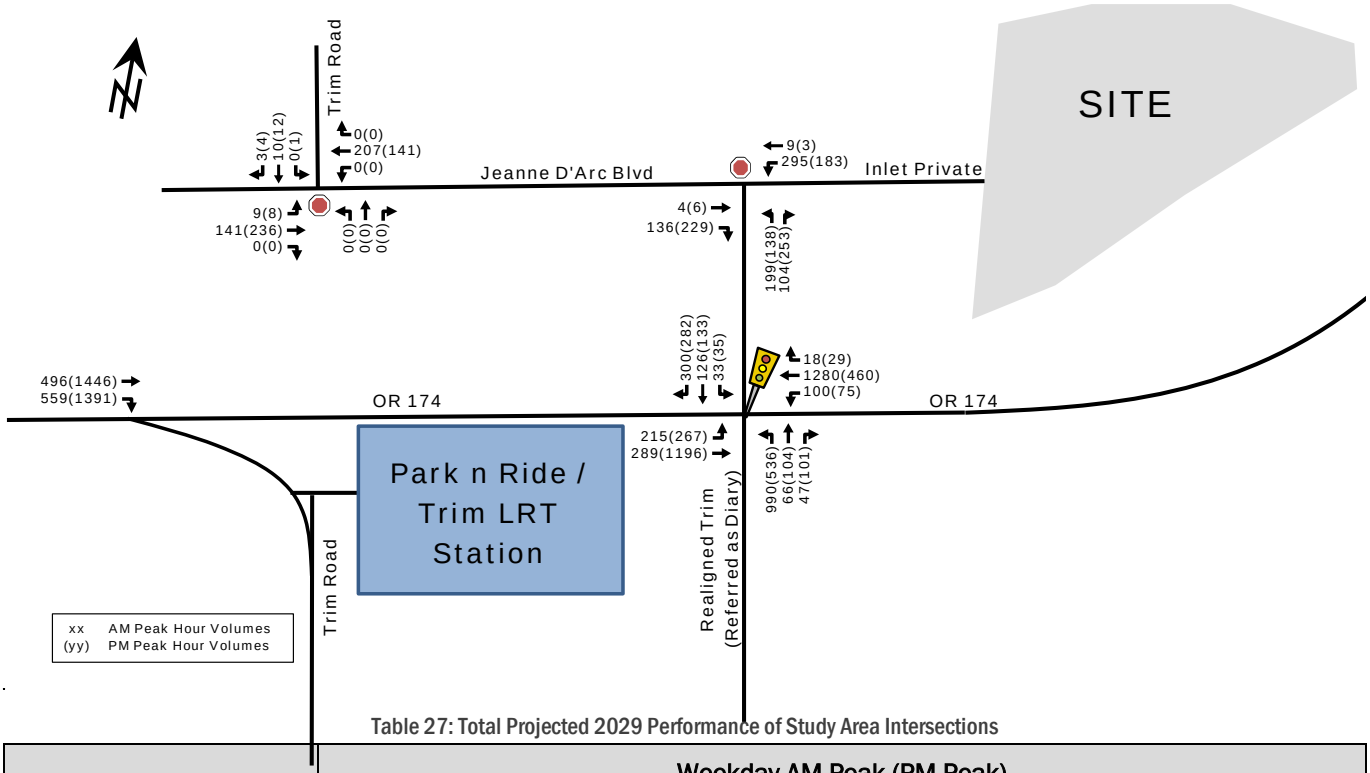


Table 27: Total Projected 2029 Performance of Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Signalized						
OR-174/Dairy	D(C)	0.89(0.75)	NBL(NBL)	44(33)	D(C)	0.84(0.73)
Unsignalized						
Jeanne D'Arc/Dairy/Inlet	B(B)	12(12)	WB(NB)	11(11)	B(B)	-
Jeanne D'Arc/Trim	A(A)	8(9)	EB(EB)	8(8)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 27**, the unsignalized Jeanne D'Arc/Trim and Jeanne D'Arc/Dairy/Inlet intersections 'as a whole' were projected to continue operating at a good LoS 'B' or better during the weekday peak hours. With regard to the 'critical movements', they were shown to operate at a LoS 'B' or better.

The realigned Trim/OR-174 intersection was expected to operate at acceptable LoS 'D' or better for peak hours. The northbound left was anticipated to operate at LoS 'D' in the morning peak hour. It is important to note that the proposed development does not add any vehicles to the northbound left movement.

It is important to note that a very conservative annual growth rate was used. It is anticipated that the actual level of service will perform better than shown in **Table 27**, since traffic patterns will have had time to adjust with years of LRT Phase 2 adoption. The SYNCHRO model output of 2029 background conditions have been provided in Appendix L.

Multi-Modal Level of Service

There were no significant changes to MMLOS results or recommendations as demonstrated in the 2022 Background Condition (refer to Section 4.9.2.).

4.9.8. TOTAL PROJECTED 2029 CONDITIONS IF TOD TARGETS NOT MET

The impacts to the study area network were analyzed in the event that TOD targets were not met. The most critical scenario, 2029 full buildout was used assuming all towers to have a mode share as extracted from the existing OD Survey Study for Orleans. The Synchro results are provided in Appendix M and summarized in **Table 28**.

Table 28: Total Projected 2029 Performance of Study Area Intersections if TOD Target not Met

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Signalized						
OR-174/Dairy	D(C)	0.90(0.77)	NBL(NBL)	45(33)	D(C)	0.84(0.73)
Unsignalized						
Jeanne D'Arc/Dairy/Inlet	B(B)	14(12)	WB(NB)	12(11)	B(B)	-
Jeanne D'Arc/Trim	A(A)	8(9)	EB(EB)	8(8)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As seen in **Table 28**, there are no significant performance changes if TOD targets are not met for Towers 5a and 5b when compared to assumed modal splits for the most critical scenario.

5. SUMMARY OF IMPROVEMENTS AND RECOMMENDATIONS

Proposed Development

- The proposed development is located at 8900 Jeanne D'Arc Boulevard (formerly 8911 North Service Road)
- The site contains an existing 15-storey tower containing 89 condominium units (Tower 1) and a second tower nearing completion this year that will consist of 145 units (Tower 2)
- The proposed development will continue with the residential Towers 3 to 5 within the planned Petrie's Landing I; Towers 3 and 4 are expected to have full occupancy by 2022, and Towers 5a and 5b by 2024
- In total, the proposed development will consist of the following:
  - Tower 3: 18-storey building with 162 units
  - Tower 4: 22-storeys building with 198 units
  - Tower 5a: 32-storeys building with 286 units and 400 sq. m of commercial
  - Tower 5b: 22-storeys building with 196 units and 1,100 sq. m of commercial

Existing Conditions

- The Trim/OR-174 intersection 'as a whole' is currently operating at an LoS 'E' in the AM peak hour and 'C' in the PM peak hour, with critical movements of LoS 'E' and 'D' respectively
- The Jeanne D'arc/Trim intersection was shown to operate at a LoS 'A' in both peak periods

- The MMLOS intersection analysis confirmed the Trim/OR-174 intersection does not meet MMLOS area targets for pedestrians or cyclist, due to the operating speed and number of lanes on the OR-174. No mitigation was possible to meet targets without severely impacting OR-174 operations

Background Conditions

- A 1% annual growth rate was applied to the OR-174 and Trim Road, despite historical traffic count data showing near 0% growth along OR-174 and all adjacent developments north of the OR-174 have been accounted for separately
- Other area developments considered in the analysis included:
  - Petries Landing II residential development (300 to 430 units);
  - Petries Landing III mixed use development (approximately 370,000 ft^2 of office, 23,000 ft^2 of retail and up to 790 residential units); and,
  - Cardinal Creek Village (1,446-unit subdivision and a 430,000 ft2 shopping centre)
- The interim (2022) condition does not include the opening of LRT, but does account for early construction of new realigned Trim/OR-174 intersection located approximately 200m east of existing intersection
- The realigned Trim/OR-174 intersection will improve the level of service for vehicles compared to existing conditions but will worsen pedestrian and cyclist level of service. The new Trim/OR-174 intersection 'as a whole' is projected to operate at a LoS 'C' during peak hours (as compared to existing LoS 'E' and 'C') with critical movements operating at a LoS 'D' (as compared to existing critical movements of LoS 'E' and 'D')
- In both 2024 and 2029 background conditions, the Trim LRT station will be operational, and study area intersections were shown to operate similarly to the 2022 background conditions (within City standards) with slight increases in v/c ratio due the increase in background traffic
- The MMLOS road segment analysis shows that future conditions on the realigned Trim and Inlet Private within the study area do not meet MMLOS area targets for pedestrians. To meet the target PLoS 'A', the City can consider creating a fully separated MUP connecting the new realigned Trim/OR-174 intersection to the site's proposed MUP
- The City should also consider extending the proposed pedestrian bridge from the new Trim LRT Station, over the OR-174 to the north. This connection would eliminate the risk of pedestrians crossing OR-174 and improve active mode usage for all future developments north of the OR-174

Trip Generation and Parking

- At interim buildout (2022), the proposed development was expected to generate approximately 150 to 210 vehicle trips in the weekday morning and afternoon peak hours respectively based on existing mode shares derived from the 2011 OD Survey for Orleans. The new Trim LRT Station was assumed to not be operational
- At full buildout (2024), the modal share percentages were maintained the same as existing from the OD Survey for Orleans for Towers 3 and 4 but was adjusted to reflect the City of Ottawa transit share targets for TOD areas for Towers 5a and 5b which are located within 600 meters of a rapid transit station (based on the new Trim LRT Station). The proposed development was expected to generate approximately 305 and 360 vehicle trips during the weekday morning and afternoon periods respectively
- The subject development will provide a total of 927 underground vehicle parking spaces, and 421 bicycle parking spaces, which meet City requirements

Projected Conditions

- The projected 2022 interim traffic conditions anticipate better levels of performance at Trim/OR-174 due to an additional northbound left lane, westbound through lane and channelized right turn lanes. Trim/OR-174 'as a whole' is projected to operate at good LoS 'B' for peak hours with critical movements of LoS 'C' for the northbound left. Note that this development will not add vehicles to the northbound left movement. The minor all-way stop-controlled intersections are all anticipated to operate at excellent LoS 'A'
- The projected 2024 traffic condition are anticipated to operate similar to the projected 2022 traffic conditions, considering the opening of Stage 2 LRT likely changing commuting habits

- The projected 2029 traffic conditions will operate similar to 2029 background conditions, indicating that a big influencer of worsening traffic conditions is due to background growth. The minor all-way stop-controlled intersections are anticipated to operate at LoS 'B' or better. Trim/OR-174 is anticipated to operate at acceptable LoS 'D' or better during peaks with critical movements of 'D' or better. The critical movement for projected 2029 is still the northbound left, indicating that the majority of the congestion is coming from the south of this development
- A test was conducted to determine if unmet TOD targets would overload the network. Using the most critical scenario and updating the mode shares to existing, non-TOD mode shares, it was determined that no significant changes to the network were seen
- The MMLOS road segment analysis shows that future conditions on the realigned Trim and Inlet Private would not meet minimum targets. To meet the target PLoS 'A', the City can consider creating a fully separated MUP connecting the new Trim/OR-174 to the site's proposed MUP
- Similar to existing conditions, the MMLOS intersection analysis confirmed realigned Trim/OR-174 intersection would not meet MMLOS area targets for pedestrians or cyclists. No mitigation was possible to meet targets without severely impacting OR-174 operations
- The City should consider extending the proposed pedestrian bridge from the new Trim LRT Station, over the OR-174 to the north. This connection would eliminate the risk of pedestrians crossing OR-174 and improve active mode usage for all future developments north of the OR-174

Transit

- Site-generated transit trips at interim (2022) buildout was approximately 95 and 60 during the weekday morning and afternoon peak hour, respectively
- The estimated transit trips could be accommodated by one articulated bus during the AM and PM peak hour periods
- Site-generated transit trips at full buildout (2024) were approximately 400 and 360 during the weekday morning and afternoon peak hour, respectively
- Stage 2 LRT will be operational by 2024, which was expected to have sufficient capacity to accommodate anticipated development transit demand

Site Access, Circulation and Connectivity

- The proposed development is located at the end of Inlet Private, which is approximately 300m east of the Jeanne D'Arc/Trim intersection
- The internal road network consists of two-way roadways 7.0-meter-wide (3.5 meters lanes) and curve radii of 8 to 12 meters. No issues are noted for access of municipal and emergency services HSU vehicles;
- The main access road approach will have a median and mountable curb up to the first internal street, to facilitate emergency access
- The proposed site plan is considered supportive of pedestrian connectivity towards the future rail station by providing a network of paved interlocked sidewalks 2.0 meters wide that connect Towers 1 to 4 to Jeanne D'Arc Boulevard south sidewalk. Paved interlocked paths connecting to garbage collection pads and the planned MUP are also proposed
- The proposed site plan is considered supportive of cycling connectivity towards the future rail station by providing a road network layout that is consistent with traffic calming principles and safe sharing of the road with bike users. Previous temporary speed humps will be made permanent, additional signs will be provided, and connections to the City planned MUP to the south of the site are also included
- A secondary emergency access may be provided to the OR-174 from within the site, near Towers 3 and 4. This road would be constructed to standard City specifications; to accommodate all emergency vehicles (6m), gated and signed to restrict access to emergency vehicles only. The gate should be located between the property line and the OR-174 to fit one fire truck, to limit impacts to OR-174 traffic operations. The details of this access can be provided during detailed design

Based on the foregoing, the proposed Site Plan for Petrie's Landing I Towers 3 to 5, is recommended from a transportation perspective.

Prepared By:

Juan Lavin, E.I.T.

Reviewed By:

Austin Shih, P.Eng.
Senior Transportation Engineer

Appendix A

Screening Form and City Comments

PARSONS

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City of Ottawa 2017 TIA Guidelines

TIA Screening Form

Date	13-Jun-18
Project	Petrie's Landing I Towers 3 to 5
Project Number	476705

Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	Yes
Development Satisfies the Safety Trigger	Yes

Module 1.1 - Description of Proposed Development	
Municipal Address	8900 Jeanne D'Arc Boulevard, Orleans, ON, K4A 0S9
Description of location	Existing tower with 89 residential units and a second tower consisting of 145 residential units currently under construction. Access to tower 1 provided at the end of Jeanne D'Arc Boulevard. Construction access to tower 2 provided through Jeanne D'Arc former Cul-De-Sac.
Land Use	Residential
Development Size	806 Apartment Units (high-rise) distributed in Towers 3, 4, 5A and 5B.
Number of Accesses and Locations	1 vehicular access from the West via Jeanne D'Arc Blvd to towers 3, 4 and 5. 1 additional vehicular access from Jeanne D'Arc Blvd to tower 5 via Inlet Private former Cul-De-Sac.
Development Phasing	Two Phases: Towers 3 to 4 by 2022. Tower 5 by 2024.
Buildout Year	Year 2024 (Towers 3 to 5)
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger		
Land Use Type	Townhomes or Apartments	
Development Size	806	Units
Trip Generation Trigger Met?	Yes	

Module 1.3 - Location Triggers		
Development Proposes a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks (See Sheet 3)	No	
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	Yes	Development is partially within Trim TOD Zone
Location Trigger Met?	Yes	

Module 1.4 - Safety Triggers		
Posted Speed Limit on any boundary road	>80	km/h
Horizontal / Vertical Curvature on a boundary street limits sight lines at a proposed driveway	No	
A proposed driveway is within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions) or within auxiliary lanes of an intersection;	No	
A proposed driveway makes use of an existing median break that serves an existing site	No	
There is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development	No	
The development includes a drive-thru facility	No	
Safety Trigger Met?	Yes	

C. Transportation Review Comments: (received June 25 2019)

A) Transportation Engineering Services

1. The appendices were not included in the report. Ensure that they are attached with resubmission.
   Response: Noted

2. Given the location, number of parking spaces, lack of TDM measures and timing of LRT, both current and future mode share conditions require consideration following build out.
   Response: Noted, Section 4.9.8 was added to reflect intersection performance under current mode shares if TOD targets are not met.

3. As previously requested, review the proposed parking spaces for reduction and enhance the TDM strategies to support the reduction. If no strategies are considered for reducing vehicle dependency, indicate the impact of 55% vehicle mode share at full build out on the road network.
   Response: Noted, Section 4.9.8 was added to reflect intersection performance under current mode shares if TOD targets are not met. Parking figures have been updated in the latest proposal. A detailed rationale has been provided in a previous comment (4. Zoning By-Law Amendment Review). A summary was included in Section 4.2 of the TIA.

B) Traffic Signal Operations

1. No vehicle volumes are included at the stop control intersection for the EB off ramp, roundabout, or the proposed signal at the Park and Ride. This should be revised in the synchro modelling and resubmitted.
   Response: The previous Stage 2 LRT plan for Hwy 417/Trim was grade separation, and vehicles heading north on Trim were required to use the EB off ramp to cross the highway. The recent Stage 2 LRT contract shows Hwy 417/Trim will remain at-grade, and vehicles will be able to turn left (north) directly from Hwy417. This change eliminates any development trips from using the EB off-ramp, making future analysis of the RB ramp roundabout unecessary.

   The signalized Park and Ride intersection was not included given the very low trip generation to/from the south. The predominant site generated movement will be to/from Hwy417 west. The proportion of site generated trips in any other direction will be insignificant compared to background traffic volumes, and should not be required in the future analysis.

2. In the event that the TOD mode share is not achieved, demonstrate that the EBL at the new Trim Road and 174 intersection will be adequate to service the development.
   Response: Noted, as previously noted, Section 4.9.8 was added to reflect intersection performance under current mode shares if TOD targets are not met.

April 30, 2019

City of Ottawa
Planning and Infrastructure
110 Laurier Avenue West
Ottawa, Ontario
K1P 1J1

Attention: Ms. Shoma Murshid
Development Services Department

Re: Zoning By-law Amendment and Site Plan Applications
Brigil's Petries Landing 1 Towers 3-5
Transportation Comments

Dear Ms. Murshid:

The following letter outlines the response to City comments received November 30, 2018. Our response have been provide in red.

14. <u>Traffic Review Comments:</u>

a. Does the traffic report include assessment of the proposed commercial uses and vehicles?

Response: It is our understanding that retail uses to be accommodated within Towers 5a and 5b, will be small scale and oriented to the local development only. They are not expected to impact the adjacent transportation network as trips generated for commercial purposes are expected to come from within the site, internal trips only. Furthermore, the location of this site is not a favorable pass-by location for trips destined outside the site due to it being at a dead-end road that is not directly accessible via the 174.

a. Development Design section broaches traffic calming measures. Please have the removable speed humps replaced with permanent speed humps. Transfer traffic calming measures to site plan, with details.

Response: Noted, TIA and site plan amended accordingly.

b. Traffic Signals: No comments to this circulation. Traffic Signal Design and Specification reserves the right to make future comments based on subsequent submissions.

Response: Noted.

Future considerations:

If there are any future proposed changes in the existing roadway geometry for the purpose of construction of a new traffic control signal (TCS) or modifications to existing TCS including roundabouts, the City of Ottawa Traffic Signal Design and Specification Unit is required to complete a review for traffic signal plant design or re-design and provide the actual design or re-design.

If the proposed traffic signals or roundabout are warranted/approved for installation, or modifications to existing TCS are approved (RMA approved), please forward approved geometry detail design drawings (dwg digital format in NAD 83 coordinates). Drawings must include base mapping, existing and new underground utilities/sewers, new/existing catch basins, Turn-Radius Modeling and approved pavement markings drawings in separate files for detail traffic plant design lay out.

Please send all digital (CADD) design files to Peter.Grajcar@ottawa.ca 613-580-2424 ext. 23035.

Response: Noted.

c. Street Lighting No comments with this circulation. Street Lighting reserves the right to make future comments based on subsequent submissions.

Response: Noted.

Future considerations may include but are not limited to as follows:

If there are any proposed changes to the existing roadway geometry, additional traffic requirements, roundabouts, etc., the City of Ottawa Street Light Asset Management Group is required to provide a full street light design. Upon completion of proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed street light design and coordination with the Street Light maintenance provider and all necessary parties. Be advised that the applicant will be 100% responsible for all costs associated with any Street Light design as a result of the roadway geometry change.

Alterations and/or repairs are required where the existing street light plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction process. All street light plant alterations and/or repairs must be performed by the City of Ottawa's Street Light maintenance provider.

Be advised that the applicant will be 100% responsible for all costs associated with any relocations/modifications to the existing street light plant.

Response: Noted.

e. Traffic Engineering

Section 3.4 - The diagram geometry does not match description nor the actual geometry.

Response: Noted, TIA amended accordingly.

Peak hour factors used are not in conformance with 2017 TIA Guidelines. Revise.

Response: Noted, TIA amended accordingly.

Section 18.3 - Report mentions mitigated measures from 2029 background analysis. No mitigated measures were mentioned previously in report. Furthermore, the intersection of Trim Road and 174 will be an interchange, so not sure where the suggested mitigated measure to provide dual eastbound left lanes and triple northbound left lanes comes from.

Response: Noted, the appropriate section was updated to reflect latest designs for Trim/174 as per Stage 2 LRT Design Briefing.

The summary suggests that in 2029 the City should consider traffic signals at the Jeanne D'Arc Boulevard and 174 WB ramp terminals. This is not examined in the report body. A review of signal warrant and LOS is required. In addition, the NB movement is projected to have a LOS C in the AM with only background traffic, but will experience LOS E with total traffic; implying that the subject development causes the movement to fail.

Response: Noted, the updated TIA reflects latest Stage 2 LRT plans, which no longer triggers significant traffic delays to Jeanne D'Arc and thus, no signal warrant was required.

Year 2024 and 2029 analyses do not show the impact south of OR174 on Trim Road where the future 174 EB ramps tie into Trim Road (at Dairy Road, as well

as ramp terminals at Dairy Road). The subject development will add traffic to these intersections and should be included in the analyses.

Response: Noted, the updated TIA reflects latest Stage 2 LRT designs, which no longer includes an interchange.

Synchro models should show the southbound left turn at Trim Road and 174 as protected, not permissive protected. There are also no recalls for north-south.

A revised Synchro analysis is required.

Response: Noted, the synchro analysis was updated to reflect the latest Stage 2 LRT designs.

f. Transportation Engineering Services

Review the proposed parking spaces for reduction and enhance the TDM strategies to support the reduction.

Response: Noted, parking figures have been updated in the latest proposal. A detailed rationale has been provided in a previous comment (4. Zoning By-Law Amendment Review). A summary was included in Section 4.2 of the TIA.

Underground ramps should be limited to a 12% grade and must contain a subsurface melting device when exceeding 6%.

Response: Noted

a. Traffic Report is missing MUP discussion and details. Include.

Response: Noted, TIA amended accordingly.

Appendix B

City of Ottawa Traffic Data

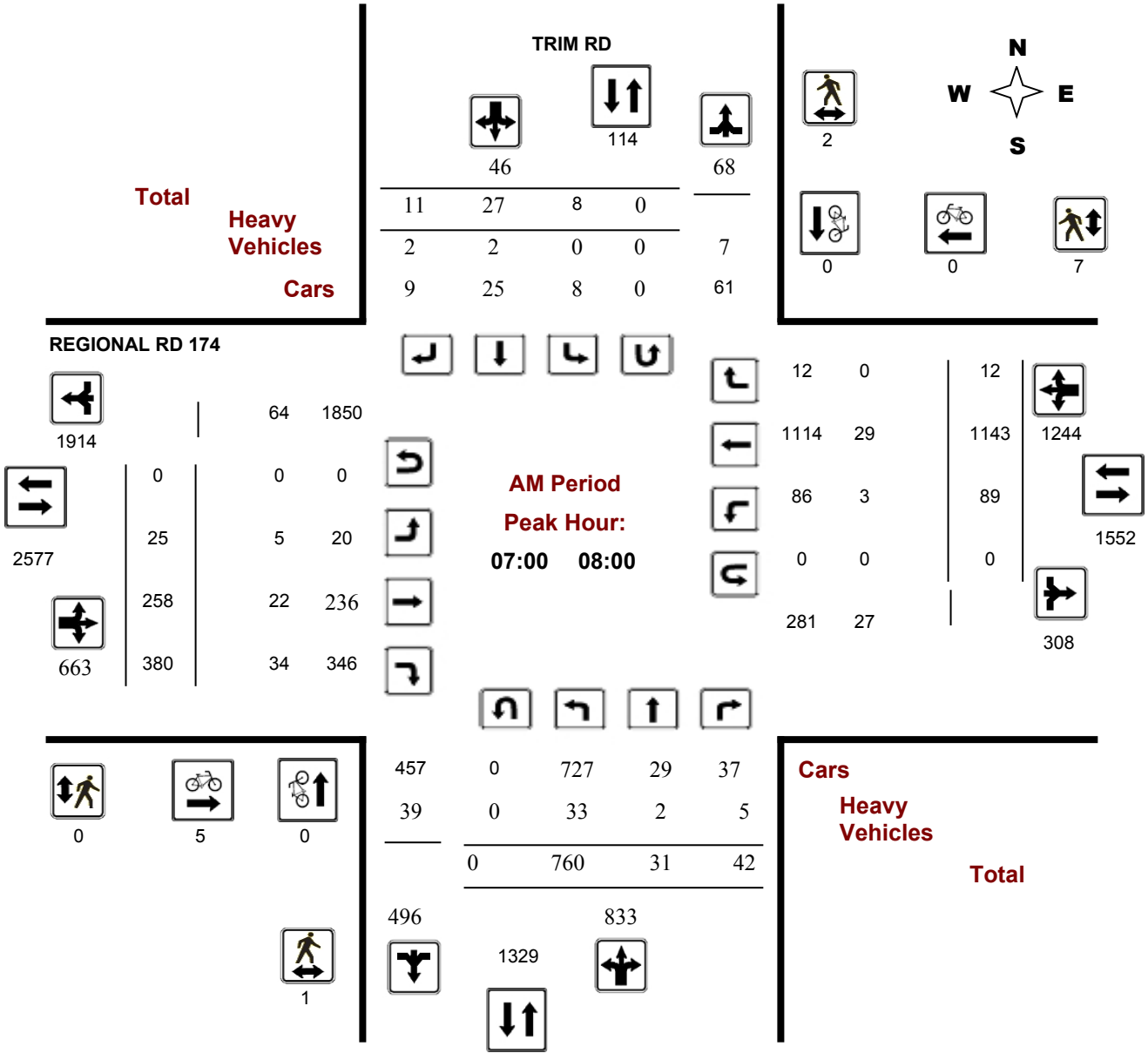
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

REGIONAL RD 174 @ TRIM RD

Survey Date: Wednesday, April 19, 2017
Start Time: 07:00

WO No: 36942
Device: Miovision



Comments

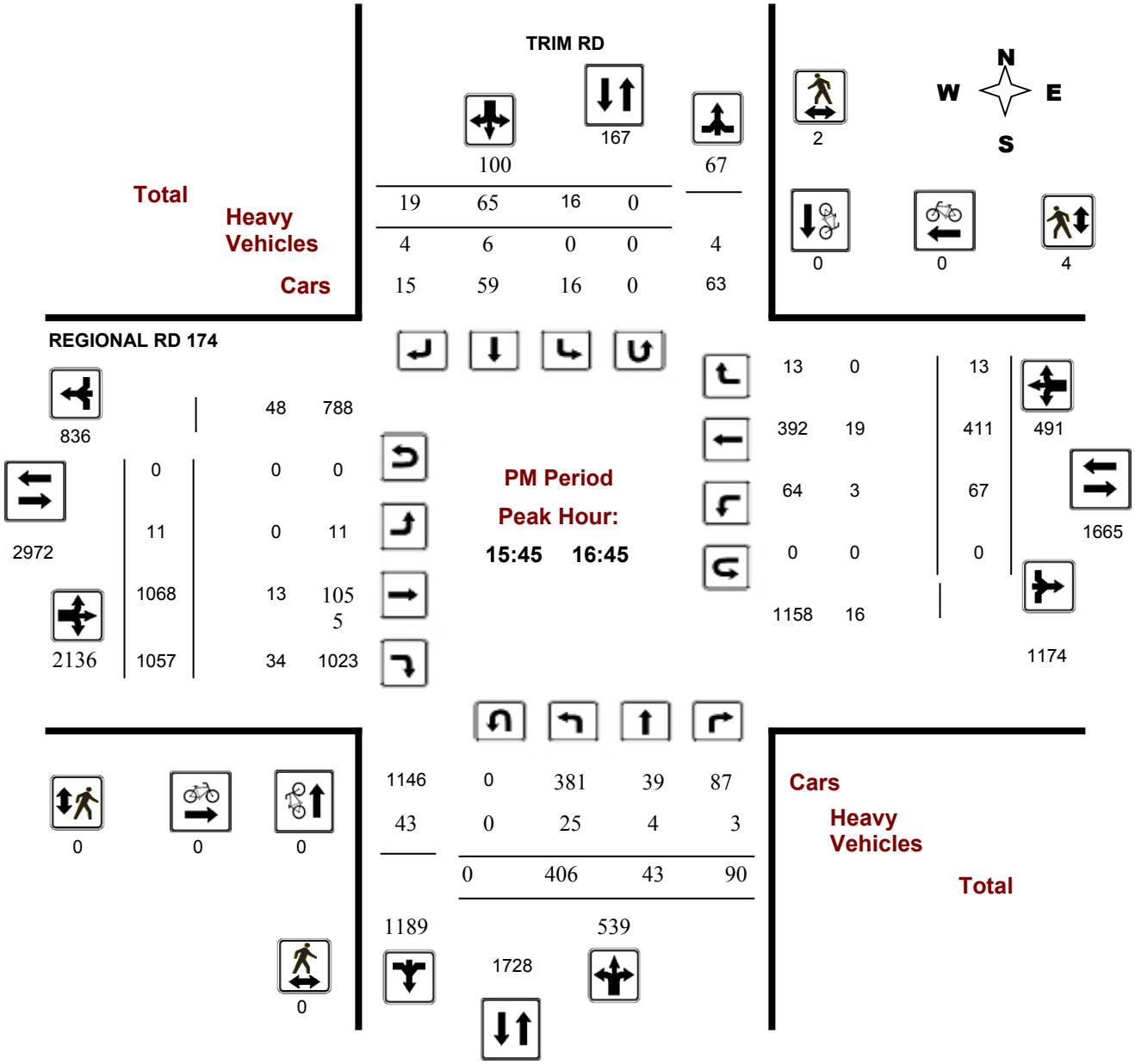
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

REGIONAL RD 174 @ TRIM RD

Survey Date: Wednesday, April 19, 2017
Start Time: 07:00

WO No: 36942
Device: Miovision



Comments

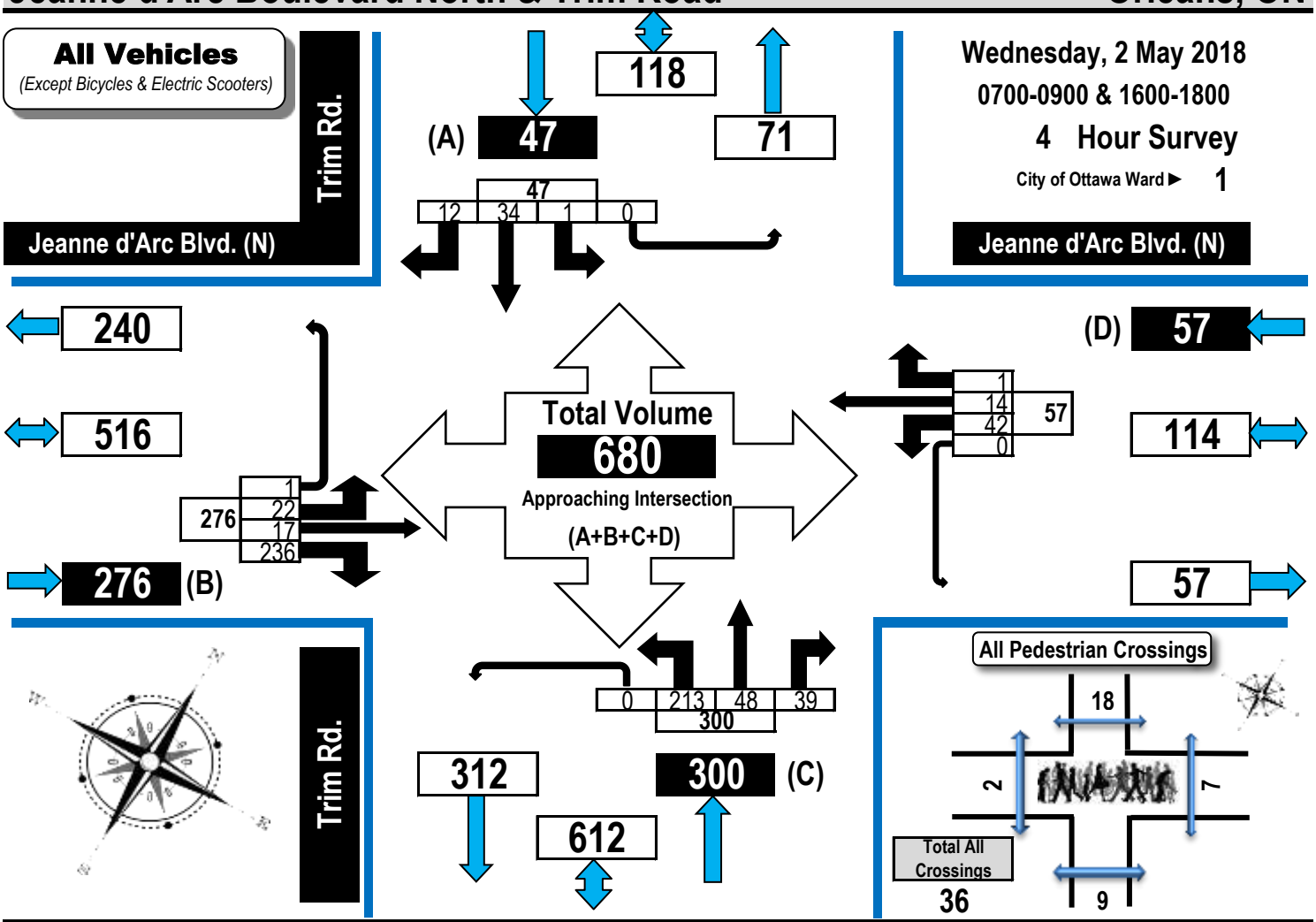
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

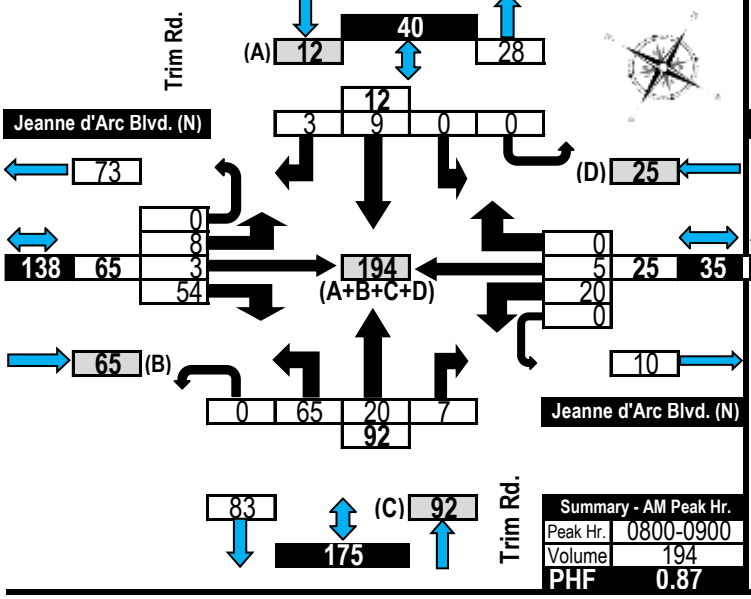
Jeanne d'Arc Boulevard North & Trim Road — Orléans, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Wednesday, 2 May 2018
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ▶ 1

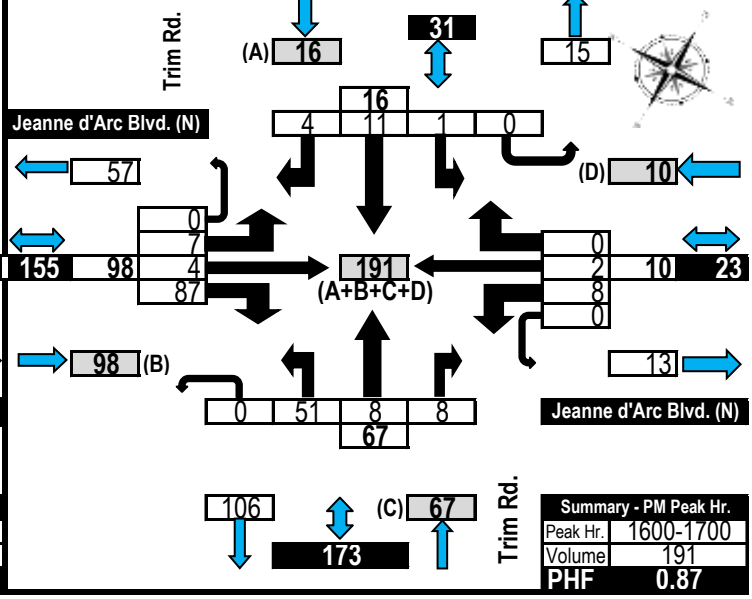


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0800-0900
Volume	194
PHF	0.87

PM Peak Hour Flow Diagram



Summary - PM Peak Hr.	
Peak Hr.	1600-1700
Volume	191
PHF	0.87

Appendix C

Collision Data and Analysis

Total Area

Classification of Accident	*Rear End*	*Turning Movement*	*Sideswipe*	*Angle*	*Approaching*	*Single Vehicle (other)*	*Single vehicle (Unattended vehicle)*	*Other*	*Total*	
P.D. only	39	5	6	1	0	2	0	2	55	80%
Non-fatal injury	12	1	0	1	0	0	0	0	14	20%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	**51**	**6**	**6**	**2**	**0**	**2**	**0**	**2**	**69**	100%
	#1 or 74%	#2 or 9%	#2 or 9%	#4 or 3%	#7 or 0%	#4 or 3%	#7 or 0%	#4 or 3%		

REGIONAL RD 174/TRIM RD

Years	*Total # Collisions*	*24 Hr AADT Veh Volume*	*Days*	*Collisions/MEV*
2012-2016	69	34,176	1825	**1.11**

Classification of Accident	*Rear End*	*Turning Movement*	*Sideswipe*	*Angle*	*Approaching*	*Single Vehicle (other)*	*Single vehicle (Unattended vehicle)*	*Other*	*Total*	
P.D. only	39	5	6	1	0	2	0	2	55	80%
Non-fatal injury	12	1	0	1	0	0	0	0	14	20%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	**51**	**6**	**6**	**2**	**0**	**2**	**0**	**2**	**69**	100%
	74%	9%	9%	3%	0%	3%	0%	3%		

JEANNE D'ARC BOULEVARD/TRIM RD

Years	*Total # Collisions*	*24 Hr AADT Veh Volume*	*Days*	*Collisions/MEV*
2012-2016	0	2,391	1825	**0.00**

Classification of Accident	*Rear End*	*Turning Movement*	*Sideswipe*	*Angle*	*Approaching*	*Single Vehicle (other)*	*Single vehicle (Unattended vehicle)*	*Other*	*Total*	
P.D. only	0	0	0	0	0	0	0	0	0	
Non-fatal injury	0	0	0	0	0	0	0	0	0	
Non reportable	0	0	0	0	0	0	0	0	0	
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0%

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2012-01-01 TO: 2013-01-01

REGIONAL RD 174 & TRIM RD

Former Municipality: **Cumberland** Traffic Control: **Traffic signal** Number of Collisions: **11**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
1	2012-03-21	We	08:45	Fog,	Daylight	Angle	Non-fatal	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Turning left	Automobile, station	Other motor vehicle	
								V3 N	Dry	Turning left	Automobile, station	Other motor vehicle	
2	2012-04-13	Fri	21:21	Clear	Dark	Turning	Non-fatal	V1 E	Dry	Turning right	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Going ahead	Passenger van	Other motor vehicle	
								V3 E	Dry	Going ahead	Automobile, station	Other motor vehicle	
3	2012-05-11	Fri	08:00	Clear	Daylight	Rear end	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Going ahead	Pick-up truck	Other motor vehicle	
4	2012-06-15	Fri	18:05	Clear	Daylight	Rear end	Non-fatal	V1 E	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Stopped	Pick-up truck	Other motor vehicle	
5	2012-06-16	Sat	12:05	Clear	Daylight	Rear end	Non-fatal	V1 E	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Slowing or	Automobile, station	Other motor vehicle	
6	2012-06-28	Thu	08:55	Clear	Daylight	Rear end	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Stopped	Automobile, station	Other motor vehicle	
								V3 E	Dry	Stopped	Automobile, station	Other motor vehicle	
7	2012-07-17	Tue	16:22	Clear	Daylight	Rear end	Non-fatal	V1 E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2 E	Dry	Slowing or	Automobile, station	Other motor vehicle	
8	2012-08-22	We	11:57	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2 S	Dry	Stopped	Truck and trailer	Other motor vehicle	
9	2012-10-11	Thu	17:35	Rain	Daylight	Rear end	P.D. only	V1 E	Wet	Turning right	Automobile, station	Other motor vehicle	0
								V2 E	Wet	Turning right	Automobile, station	Other motor vehicle	
10	2012-10-13	Sat	11:07	Clear	Daylight	Rear end	P.D. only	V1 N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Going ahead	Pick-up truck	Other motor vehicle	
11	2012-11-26	Mo	17:58	Clear	Dark	Rear end	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Slowing or	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2013 **To:** December 31, 2016

Location: REGIONAL RD 174 @ TRIM RD

Traffic Control: Traffic signal

Total Collisions: 59

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Dec-09, Fri,17:22	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Slowing or stopping	Pick-up truck	Other motor vehicle	
2016-Oct-27, Thu,07:05	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2016-Jun-28, Tue,10:14	Clear	Rear end	Non-fatal injury	Dry	West	Slowing or stopping	Passenger van	Other motor vehicle	
					West	Slowing or stopping	Pick-up truck	Other motor vehicle	
2016-Jun-21, Tue,07:20	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Slowing or stopping	Pick-up truck	Other motor vehicle	
2016-May-14, Sat,20:00	Rain	Rear end	Non-fatal injury	Wet	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Feb-22, Mon,16:20	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	

					West	Stopped	Automobile, station wagon	Other motor vehicle
2016-Feb-21, Sun,12:56	Clear	Rear end	Non-fatal injury	Dry	West	Slowing or stopping	Pick-up truck	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle
2016-Feb-08, Mon,16:15	Clear	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Pick-up truck	Other motor vehicle
2016-Feb-05, Fri,15:15	Clear	Rear end	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Unknown	Unknown	Other motor vehicle
2016-Jan-20, Wed,15:15	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Passenger van	Other motor vehicle
2016-Jan-04, Mon,14:50	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2015-Oct-25, Sun,20:17	Clear	Turning movement	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Turning left	Pick-up truck	Other motor vehicle
2015-Oct-07, Wed,12:59	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Truck - dump	Other motor vehicle

					West	Stopped	Automobile, station wagon	Other motor vehicle
2015-Sep-29, Tue,13:06	Rain	Sideswipe	P.D. only	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Turning left	Truck - dump	Other motor vehicle
2015-Sep-14, Mon,18:51	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2015-Sep-08, Tue,12:37	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2015-Jul-24, Fri,17:00	Clear	Rear end	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-Jul-03, Fri,19:00	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2015-Jun-29, Mon,14:30	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle

2015-Jun-12, Fri,11:11	Rain	Rear end	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Pick-up truck	Other motor vehicle
2015-May-23, Sat,12:20	Clear	Sideswipe	P.D. only	Dry	South	Overtaking	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Mar-10, Tue,19:34	Clear	Sideswipe	P.D. only	Wet	West	Turning left	Pick-up truck	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2015-Jan-21, Wed,08:30	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Pick-up truck	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2015-Jan-21, Wed,07:43	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-Jan-13, Tue,16:59	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle
2015-Jan-13, Tue,16:15	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle

2014-Dec-21, Sun,11:03	Clear	Rear end	P.D. only	Wet	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2014-Dec-07, Sun,03:06	Clear	SMV other	P.D. only	Dry	East	Turning right	Automobile, station wagon	Ran off road
2014-Nov-29, Sat,12:35	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Stopped	Passenger van	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2014-Nov-25, Tue,06:06	Clear	Turning movement	P.D. only	Dry	West	Turning left	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Nov-16, Sun,07:45	Snow	Angle	P.D. only	Packed snow	East	Turning right	Pick-up truck	Other motor vehicle
					North	Turning left	Unknown	Other motor vehicle
2014-Oct-29, Wed,12:20	Clear	Rear end	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2014-Sep-02, Tue,10:17	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Passenger van	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle

2014-Jun-27, Fri,07:15	Clear	Rear end	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2014-Jul-14, Mon,13:40	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Passenger van	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2014-Jul-02, Wed,06:10	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2014-Jun-17, Tue,16:11	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Pick-up truck	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2014-May-04, Sun,13:08	Rain	Sideswipe	P.D. only	Wet	West	Pulling away from shoulder or curb	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2014-Apr-15, Tue,12:07	Rain	Rear end	P.D. only	Wet	West	Going ahead	Pick-up truck	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2014-Mar-14, Fri,14:18	Clear	Rear end	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle

2014-Feb-17, Mon,08:40	Clear	Other	P.D. only	Wet	North	Reversing	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2014-Feb-17, Mon,00:53	Clear	SMV other	Fatal injury	Dry	East	Going ahead	Automobile, station wagon	Ran off road
2014-Feb-07, Fri,09:25	Clear	Rear end	P.D. only	Dry	East	Merging	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2014-Feb-05, Wed,02:30	Clear	SMV other	P.D. only	Wet	South	Turning left	Municipal transit bus	Skidding/sliding
2013-Nov-29, Fri,20:26	Clear	Turning movement	P.D. only	Wet	North	Turning left	Pick-up truck	Other motor vehicle
					North	Turning left	Pick-up truck	Other motor vehicle
2013-Nov-10, Sun,21:35	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Truck - closed	Other motor vehicle
2013-Nov-07, Thu,18:45	Clear	Rear end	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					North	Turning left	Pick-up truck	Other motor vehicle
2013-Nov-01, Fri,09:15	Clear	Rear end	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					North	Turning left	Passenger van	Other motor vehicle

2013-Oct-21, Mon,13:00	Clear	Rear end	P.D. only	Dry	East	Going ahead	Passenger van	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2013-Sep-11, Wed,08:25	Clear	Other	P.D. only	Dry	West	Unknown	Pick-up truck	Other motor vehicle
					West	Unknown	Truck - closed	Other motor vehicle
2013-Sep-09, Mon,13:34	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2013-Apr-14, Sun,11:22	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Pick-up truck	Other motor vehicle
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2013-Apr-12, Fri,08:30	Freezing Rain	Rear end	P.D. only	Ice	West	Turning left	Automobile, station wagon	Other motor vehicle
					West	Turning left	Pick-up truck	Other motor vehicle
2013-Feb-24, Sun,20:30	Clear	Rear end	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2013-Feb-14, Thu,15:40	Clear	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle

2013-Feb-04, Mon,07:31	Clear	Sideswipe	P.D. only	Wet	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Truck and trailer	Other motor vehicle
2013-Jan-25, Fri,08:38	Clear	Rear end	P.D. only	Ice	North	Turning left	Automobile, station wagon	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2013-Jan-25, Fri,07:00	Clear	Rear end	P.D. only	Dry	North	Turning left	Passenger van	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2013-Jan-19, Sat,07:45	Snow	Rear end	P.D. only	Loose snow	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	School bus	Other motor vehicle

Appendix D

Petrie's Landing | Traffic Calming Concept

PARSONS

1223 Michael Street, Suite 100 | Ottawa, Ontario K1J7T2
P: +1 613.738.4160 | www.parsons.com

30 August 2016

OUR REF: 982847-02311

Brigil
98 rue Lois
Gatineau (Hull), QC J8Y 3R7

Attention: Jean-Luc Rivard, Director – Land Development

Dear Jean-Luc:

Re: Petrie's Landing I TIS Towers II, III and IV – Addendum #3

This Addendum #3 has been prepared in response to the City of Ottawa's comments regarding potential traffic calming concerns within the Petrie's Landing development. The concerns raised to date include potential sight line issues at underground parking entrances, vehicle conflict zones with multiple accesses or bends on Inlet Private, and speeding along Inlet Private along the south limits of the site. To address these, a conceptual traffic-calming plan was developed and provided to the City for comment on June 30, 2016. Subsequent to this conceptual submission, additional comments were provided by the City and the plan was revised to focus solely on Tower II.

The traffic-calming plan has been developed with the intention of the Tower II recommendations to be implemented during construction. The Tower I recommendations are conceptual in nature and can be implemented during Tower II construction. Table 1 summarizes the traffic calming measures proposed for Petrie's Landing and Figure 1 illustrates the location of each of the proposed/conceptual features.

Table 1 Petrie's Landing Proposed Traffic Calming Measures

Phase	Measure	Location	Notes
Tower II	Removable Speed Hump	Along one-way access between Tower I and II site limits	• Introduces vertical deflection along the one-way access road to limit cut through vehicles and speed in front of Towers I and II
	Removable Speed Hump	Along Inlet Private, between Tower II and III site limits	• Introduces vertical deflection along Inlet Private between Towers II and III to limit speed along the road
	Signage – Stop Signs	Introduce all-way stop control at the Tower II underground parking exit to Inlet Private	• Controls access to Inlet Private
Tower I (conceptual)	Pavement Markings – Gore Area	Exit from Tower I drop off area onto Inlet Private	• Delineates approach angle and lane width for exiting vehicles from the Tower I drop-off area to reduce vehicle conflicts on Inlet Private
	Pavement Markings - Centerline	Along Inlet Private at the 90 bend in the southwest corner of the site	• Delineates the lane widths (3.5m) and improve adherence to driving line on the curve
	Signage – Stop Sign	At one-way access from Towers I and II to Inlet Private, south of Tower I	• Controls access to Inlet Private
	Signage – Warning Curve Sign	On Inlet Private on both sides of the 90 degree bend in the southwest corner of the site	• Warning for vehicles approaching the curve to reduce speed, in conjunction with the centerline pavement marking

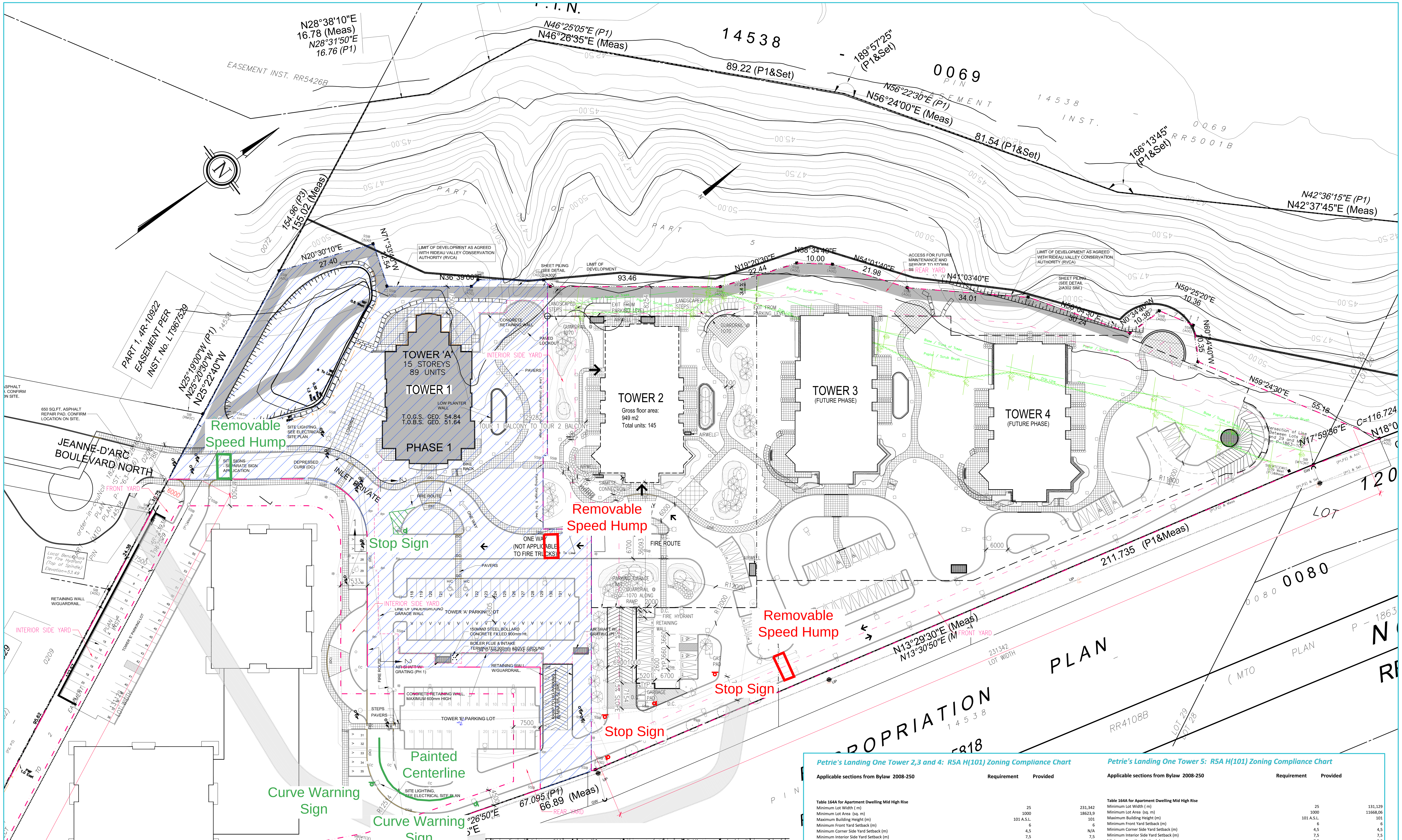
In conclusion, the proposed traffic calming measures are anticipated to address the City's comments and aggregated public feedback regarding the existing and future site operations. Should the conceptual plans be agreed upon, they can be implemented into the existing Tower II Site Plan Control submission and further implemented as the Petrie's Landing site develops.

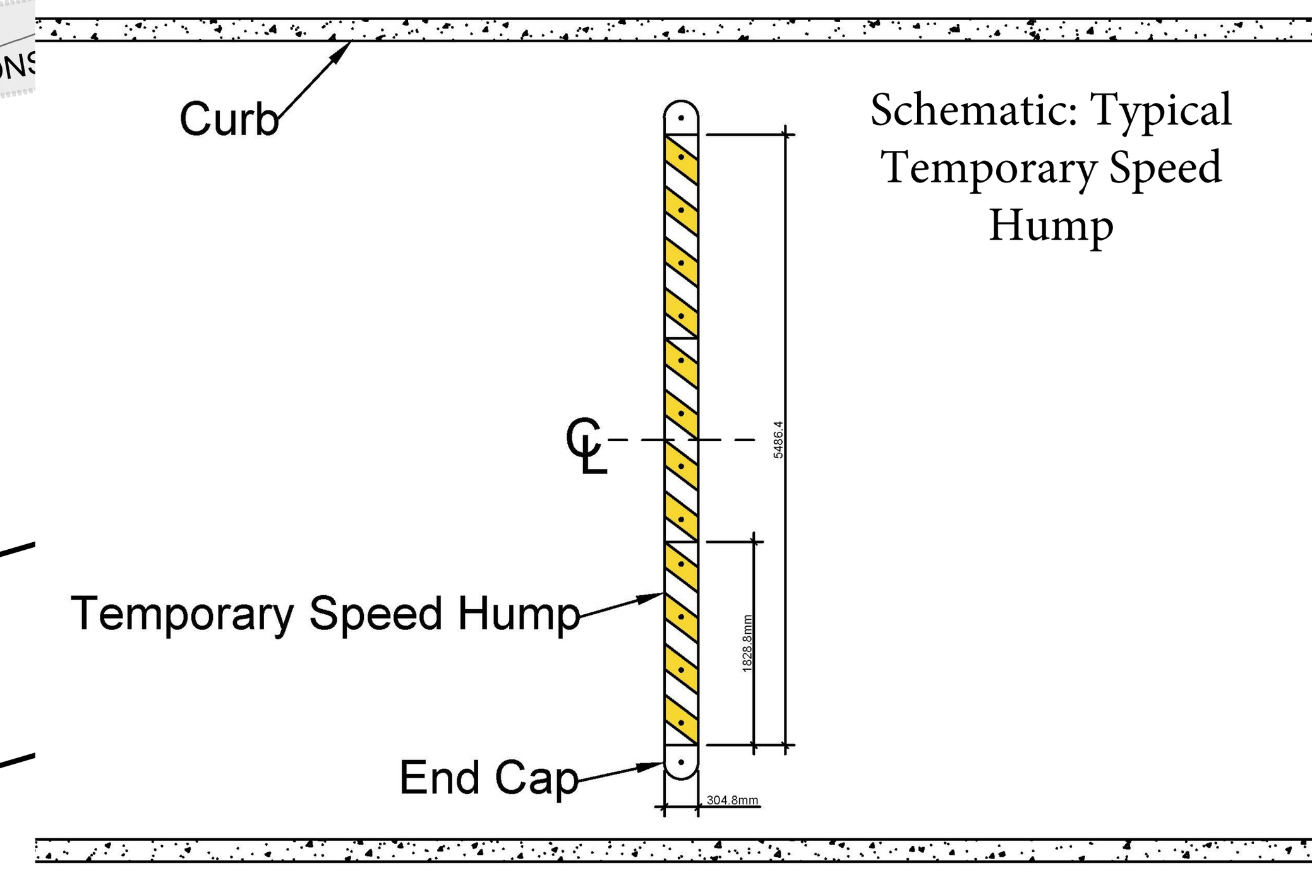
Prepared By:

Andrew Harte, P.Eng.
Transportation Engineer

Reviewed by:

Christopher Gordon, P, Eng.
Senior Project Manager





Legend:

Tower I Conceptual Measures

Tower II Proposed Measures

Petrie's Landing One Tower 2,3 and 4: R5A H(101) Zoning Compliance Chart

Applicable sections from Bylaw 2008-250	Requirement	Provided
Table 164A for Apartment Dwelling Mid High Rise		
Minimum Lot Width (m)	25	231,342
Minimum Lot Area (sq. m)	1000	18623,9
Maximum Building Height (m)	101 A.S.L.	101
Minimum Front Yard Setback (m)	6	6
Minimum Corner Side Yard Setback (m)	4,5	N/A
Minimum Interior Side Yard Setback (m)	7,5	7,5
Minimum Rear Yard Setback (m)	7,5	7,5
Section 163(9)		
Minimum landscape area (% of site)	30	48%
Section 101 and 102		
Minimum No. of parking spaces per unit	1,2	1,3
Minimum No. of visitor parking spaces per unit	0,2	0,2
Section 106		
Parking space width (m)	2.6 min 2.75 max	2,6
Minimum parking space depth (m)	5,2	5,2
Section 107		
Driveway access : min width (m) one way	3	N/A
Driveway access : min width (m) two way	6,7	6,7
Section 109		
No parking space in required front yard or corner yard		no parking units in required yards
Section 110		
Minimum landcape area of parking lot (%)	15	57%
Minimum landscape buffer width of parking lot not abutting street (m)		
...1.5 if fewer than 100 spaces; 3 meters if more than 100 spaces	1.5/3	1,5
Minimum landscape buffer width of parking lot abutting street (m)	3	N/A
Section 111		
Bicycle Parking Space Provisions (number per unit)	0,5	0,5
Section 137		
Total amenity area (sq. m per unit)	6	6,0
Communal amenity area: % of total required 'total amenity area'	50	50%

Petrie's Landing One Tower 5: R5A H(101) Zoning Compliance Chart

Applicable sections from Bylaw 2008-250	Requirement	Provided
Table 164A for Apartment Dwelling Mid High Rise		
Minimum Lot Width (m)	25	131,129
Minimum Lot Area (sq. m)	1000	11668,06
Maximum Building Height (m)	101 A.S.L.	101
Minimum Front Yard Setback (m)	6	6
Minimum Corner Side Yard Setback (m)	4,5	4,5
Minimum Interior Side Yard Setback (m)	7,5	7,5
Minimum Rear Yard Setback (m)	7,5	7,5
Section 163(9)		
Minimum landscape area (% of site)	30%	40%
Section 101		
Minimum No. of parking spaces per unit	0,25 per unit plus 1/100m2 of GFA used for medical, health or personnal services	80 exterior parking
Section 106		
Parking space width (m)	2.6 min 2.75 max	2,6
Minimum parking space depth (m)	5,2	5,2
Section 107		
Driveway access : min width (m) one way	3	N/A
Driveway access : min width (m) two way	6,7	6,7
Section 109		
No parking space in required front yard or corner yard		some parking units in interior side yard only
Section 110		
Minimum landcape area of parking lot (%)	15%	33%
Minimum landscape buffer width of parking lot not abutting street (m)		
...1.5 if fewer than 100 spaces; 3 meters if more than 100 spaces	1.5/3	1,5
Minimum landscape buffer width of parking lot abutting street (m)	3	N/A
Section 111		
Bicycle Parking Space Provisions (number per unit)	0,25	0,25
Section 137		
Total amenity area (sq. m per unit)	6	6,0
Communal amenity area: % of total required 'total amenity area'	50	50%

I:\P_10500\10557\CAD\10557 A100 Site Plan.dwg

NOTES GÉNÉRALES General Notes

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ARCHITECTURE DE PAYSAGE Landscape architect

CIVIL Civil

ARCHITECTES Architect
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SCEAU Seal

DCYSA devient / becomes
NEUF
ARCHITECT(E)S

CLIENT Client

OUVRAGE Project
Petrie's Landing I, Phase 2

EMPLACEMENT Location: OTTAWA
NO PROJET No.: 10557

NO	RÉVISION	DATE (aa.mm.jj)
A	SITE APPROVAL	2013-12-20
B	FOR COORDINATION	2016.01.18
C	SITE PLAN APPROVAL 4TH	2016.06.03

Preliminary DO NOT USE FOR CONSTRUCTION

DESSINÉ PAR Drawn by: A.B.
VÉRIFIÉ PAR Checked by: ANT.C.
DATE (aa.mm.jj): 13.06.05
ÉCHELLE Scale: 1:500

TITRE DU DESSIN Drawing Title
Site plan

RÉVISION Revision: C
NO. DESSIN Dwg Number: A100

D07-12-13-0248
#14602

Appendix E

Adjacent Developments Trip Generation and Distribution

PARSONS

1223 Michael Street, Suite 100 • Ottawa, Ontario K1J 7T2 • (613) 738-4160 • Fax: (613) 739-7105 • www.parsons.com

24 February 2015 OUR REF: TO3131TOY

Brigil
98 rue Lois
Gatineau (Hull), QC J8Y 3R7

Attention: Jean-Luc Rivard

Dear Jean-Luc:

Re: Petrie's Landing I TIS
Towers II, III and IV - Addendum #2

This Addendum #2 has been prepared in response to a City of Ottawa comment regarding the number of assumed residential units identified in the original TIS prepared December 2013 by Delcan (now known as Parsons). It has come to the City's attention that number of proposed residential units identified in the original TIS is less than the number of residential units identified in the Zoning By-Law Amendment/Official Plan Amendment for Towers I to IV.

Based on information provided at the time, the number of residential units identified in the original TIS are as follows:

Petrie's Landing I *- original TIS*

- **Phase I** consists of a 89 unit residential tower (Tower I);
- **Phase II** consists of a 336 unit retirement building; and
- **Phase III** consists of Towers II, III and IV, each comprised of 140 residential condo units for a total of 420 residential condo units.

The number of residential units identified in the Zoning By-Law Amendment/Official Plan Amendment is as follows:

Petrie's Landing I *- Zoning By-Law Amendment/Official Plan Amendment*

- **Phase I** consists of a 89 unit residential tower (Tower I);
- **Phase II** consists of a 314 unit retirement building; and
- **Phase III** consists of Towers II, III and IV, each comprised of 145, 175 and 145 residential condo units, respectively, for a total of 465 residential condo units.

The net difference between the original TIS and the Zoning By-Law Amendment/Official Plan Amendment equates to 23 fewer residential units assumed in the original TIS. As such, the following Tables 1 and 2 summarize the projected site-generated traffic from the original TIS report and the revised projected site-generated traffic, respectively. The revised projected site-generated traffic summarized in Table 2 is based on the number of residential units identified in the Zoning By-Law Amendment/Official Plan Amendment and the same appropriate trip generation rates/modal shares identified in the original TIS.

Table 1: Original Projected Site-Generated Traffic

Land Use	Dwelling Units	AM Peak (veh/hr)			PM Peak (veh/hr)		
		In	Out	Total	In	Out	Total
Retirement Residence	336	17	33	50	39	24	63
Tower I	89	8	35	43	22	14	36
Tower II	140	13	55	68	38	24	62
Tower III	140	13	55	68	38	24	62
Tower IV	140	13	55	68	38	24	62
Total 'New' Auto Trips		**64**	**233**	**297**	**175**	**110**	**285**

As shown in Table 1, the total projected two-way site-generated traffic for Petrie's Landing I is approximately 300 and 285 veh/h during the weekday morning and afternoon peak hours, respectively.

The following Table 2 summarizes the projected two-way site-generated traffic for Petrie's Landing I based on the number of residential units identified in the Zoning By-Law Amendment/Official Plan Amendment.

Table 2: Revised Project Site-Generated Traffic

Land Use	Dwelling Units	AM Peak (veh/hr)			PM Peak (veh/hr)		
		In	Out	Total	In	Out	Total
Retirement Residence	314	16	30	46	35	24	59
Tower I	89	8	35	43	22	14	36
Tower II	145	13	57	70	39	24	63
Tower III	175	15	63	78	45	28	73
Tower IV	145	13	57	70	39	24	63
Total 'New' Auto Trips		**65**	**242**	**307**	**180**	**114**	**294**

As shown in Table 2, the total projected two-way site-generated traffic for Petrie's Landing I, based on the number of residential units identified in the Zoning By-Law Amendment/Official Plan Amendment, is approximately 310 and 295 veh/h during the weekday morning and afternoon peak hours, respectively.

The approximate net difference in the total projected two-way site-generated traffic equates to an additional 10 veh/h (or approximately 1 additional vehicle every 6 minutes) during both weekday morning and afternoon peak hours. This amount of additional site-generated is considered negligible and will have *no* effect on the results, findings or conclusions included in the original TIS or the subsequent Addendum #1.

Therefore, based on the foregoing, the results, findings and conclusions include in the original TIS and the subsequent Addendum #1 remain valid and no further analysis is required from a transportation perspective. If there any questions, please call.

Prepared By:

Gordon R. Scobie, P.Eng.
Transportation Engineer
Ottawa Operations

Trip Generation - Petrie's Landing II

ITE Vehicle Trip Generation Rates

Land Use	Data Source	Trip Rate	
		AM Peak	PM Peak
Residential Condominiums/Townhouses	ITE 230	0.44	0.52

Modified Person Trip Generation Rates

Land Use	Data Source	Person Trip Rate	
		AM Peak	PM Peak
Residential Condominiums/Townhouses	ITE 230	0.57	0.68

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

ITE Fitted Curve Equations

Land Use	Data Source	Fitted Curve Equation					
		AM Peak			PM Peak		
Residential Condominiums/Townhouses	ITE 230	Ln(T)=	0.80Ln(x)	+ 0.26	Ln(T)=	0.82Ln(x)	+ 0.32

Modified Person Trip Generation

Land Use	Data Source	Area	AM Peak (Persons/hr)			PM Peak (Persons/hr)		
			In	Out	Total	In	Out	Total
		Units	17%	83%		67%	33%	
Residential Condominiums/Townhouses	ITE 230	430 du	36	180	216	172	86	258
		Total	36	180	216	172	86	258

Total Site Trip Generation

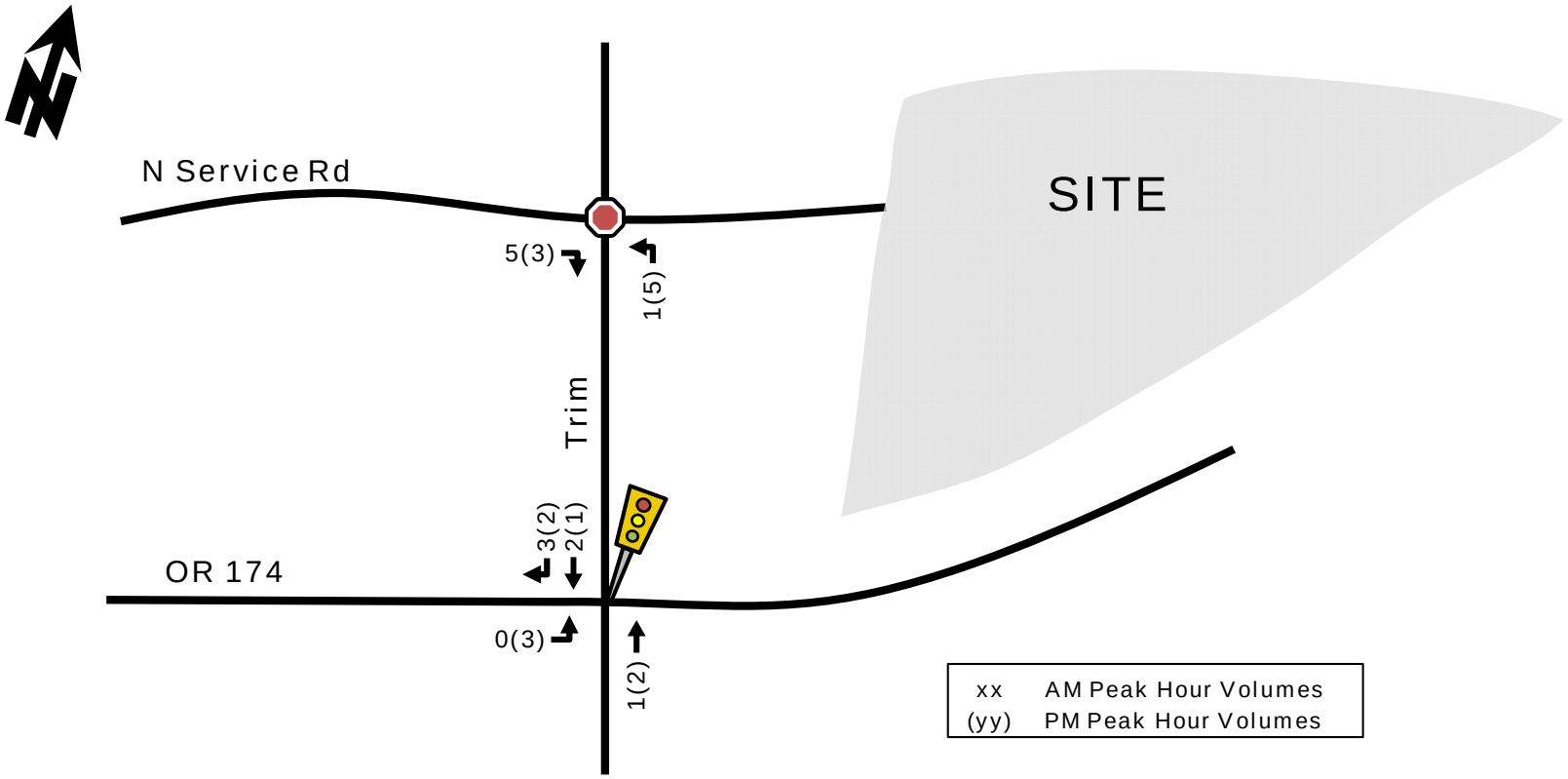
Travel Mode	Mode Share	AM Peak (Persons/hr)			PM Peak (Persons/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	60%	22	108	130	104	52	156
Auto Passenger	10%	4	18	22	17	9	26
Transit	25%	9	45	54	43	21	64
Non-motorized	5%	1	9	10	8	4	12
Total Person Trips	100%	36	180	216	172	86	258
Total 'New' Auto Trips		**22**	**108**	**130**	**104**	**52**	**156**

Total Site Vehicle Trip Generation

Travel Mode	AM Peak (veh/hr)			PM Peak (veh/hr)		
	In	Out	Total	In	Out	Total
Total Site Trip Generation	22	108	130	104	52	156
Total 'New' Auto Trips	**22**	**108**	**130**	**104**	**52**	**156**

Petrie's Landing II

New Trips



Trip Generation - Petrie's Landing III

ITE Vehicle Trip Generation Rates

Land Use	Data Source	Trip Rate	
		AM Peak	PM Peak
Residential Condominiums/Townhouses	ITE 230	0.44	0.52
General Office	ITE 710	1.56	1.49
Specialty Retail	ITE 826	1.36	2.71

Modified Person Trip Generation Rates

Land Use	Data Source	Person Trip Rate	
		AM Peak	PM Peak
Residential Condominiums/Townhouses	ITE 230	0.57	0.68
General Office	ITE 710	2.03	1.94
Specialty Retail	ITE 826	1.76	3.52

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

ITE Fitted Curve Equations

Land Use	Data Source	Fitted Curve Equation					
		AM Peak			PM Peak		
Residential Condominiums/Townhouses	ITE 230	Ln(T)=	0.80Ln(x)	+ 0.26	Ln(T)=	0.82Ln(x)	+ 0.32
General Office	ITE 710	Ln(T)=	0.80Ln(x)	+ 1.57	T=	1.12(x)	+ 78.45
Specialty Retail	ITE 826	T=	1.20(x)	+ 10.74	T=	2.40(x)	+ 21.48

Modified Person Trip Generation

Land Use	Data Source	Area	AM Peak (Persons/hr)			PM Peak (Persons/hr)		
			In	Out	Total	In	Out	Total
		Units	17%	83%		67%	33%	
Residential Condominiums/Townhouses	ITE 230	790 du	59	292	351	285	141	426
		ft²	88%	12%		17%	83%	
General Office	ITE 710	370,000 ft²	623	86	709	108	533	641
		ft²	56%	44%		44%	56%	
Specialty Retail	ITE 826	23,000 ft²	28	22	50	44	56	100
		Total	710	400	1,110	437	730	1,167

Residential Condominiums/Townhouses Trip Generation

Travel Mode	Mode Share	AM Peak (Persons/hr)			PM Peak (Persons/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	60%	36	176	212	171	85	256
Auto Passenger	10%	6	29	35	29	14	43
Transit	25%	15	73	88	71	35	106
Non-motorized	5%	2	14	16	14	7	21
Total Person Trips	100%	59	292	351	285	141	426
Total 'New' Residential Condominiums/Townhouses Auto Trips		**36**	**176**	**212**	**171**	**85**	**256**

General Office Trip Generation

Travel Mode	Mode Share	AM Peak (Persons/hr)			PM Peak (Persons/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	60%	374	52	426	65	320	385
Auto Passenger	10%	63	9	72	11	54	65
Transit	25%	155	21	176	27	133	160
Non-motorized	5%	31	4	35	5	26	31
Total Person Trips	100%	623	86	709	108	533	641
Total 'New' General Office Auto Trips		**374**	**52**	**426**	**65**	**320**	**385**

Specialty Retail Trip Generation

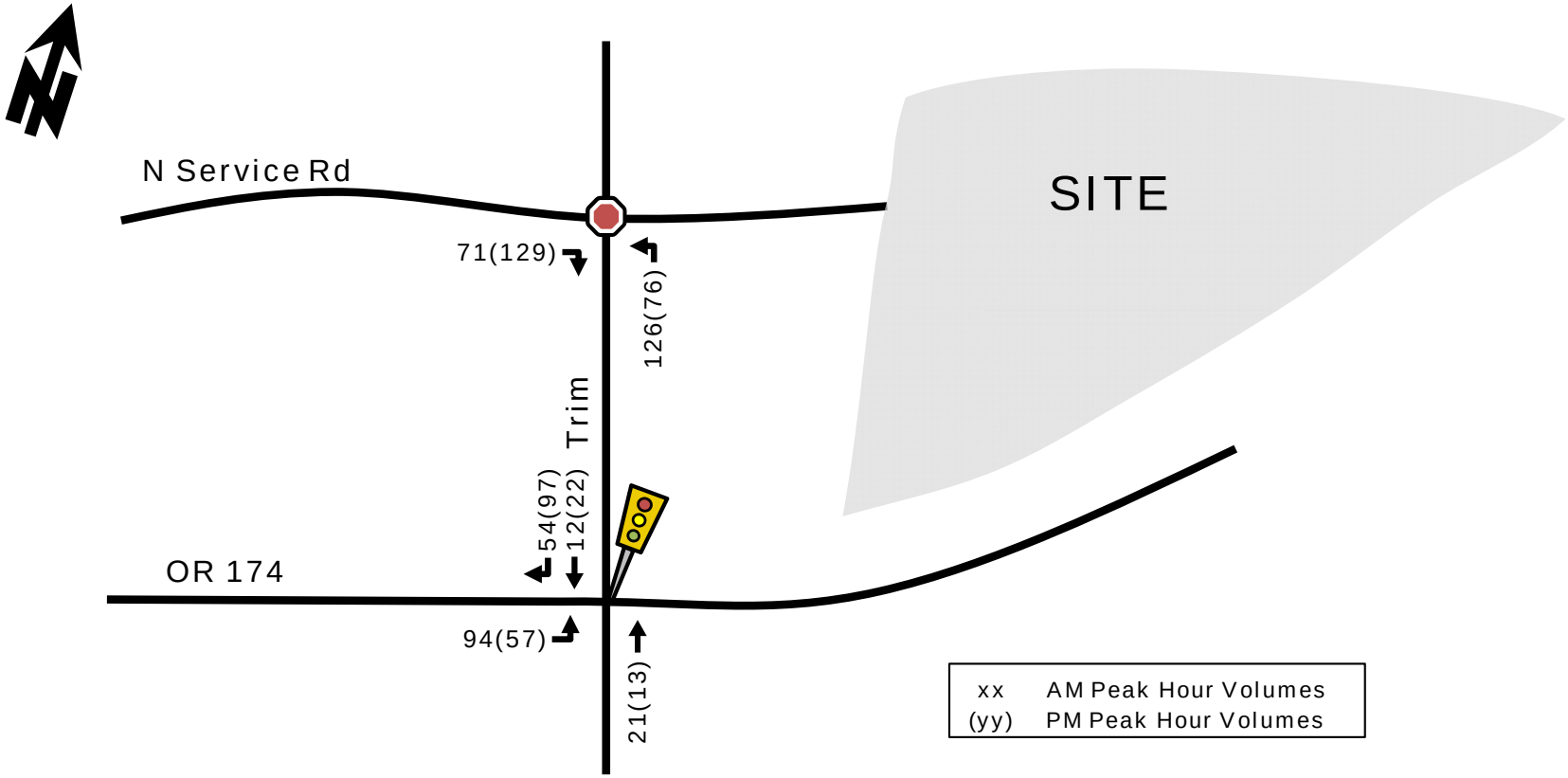
Travel Mode	Mode Share	AM Peak (Persons/hr)			PM Peak (Persons/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	60%	17	14	31	27	34	61
Auto Passenger	10%	3	2	5	4	6	10
Transit	25%	7	5	12	11	14	25
Non-motorized	5%	1	1	2	2	2	4
Total Person Trips	100%	28	22	50	44	56	100
Less Pass-by (30%)		-5	-5	-10	-9	-9	-18
Total 'New' Specialty Retail Auto Trips		**12**	**9**	**21**	**18**	**25**	**43**

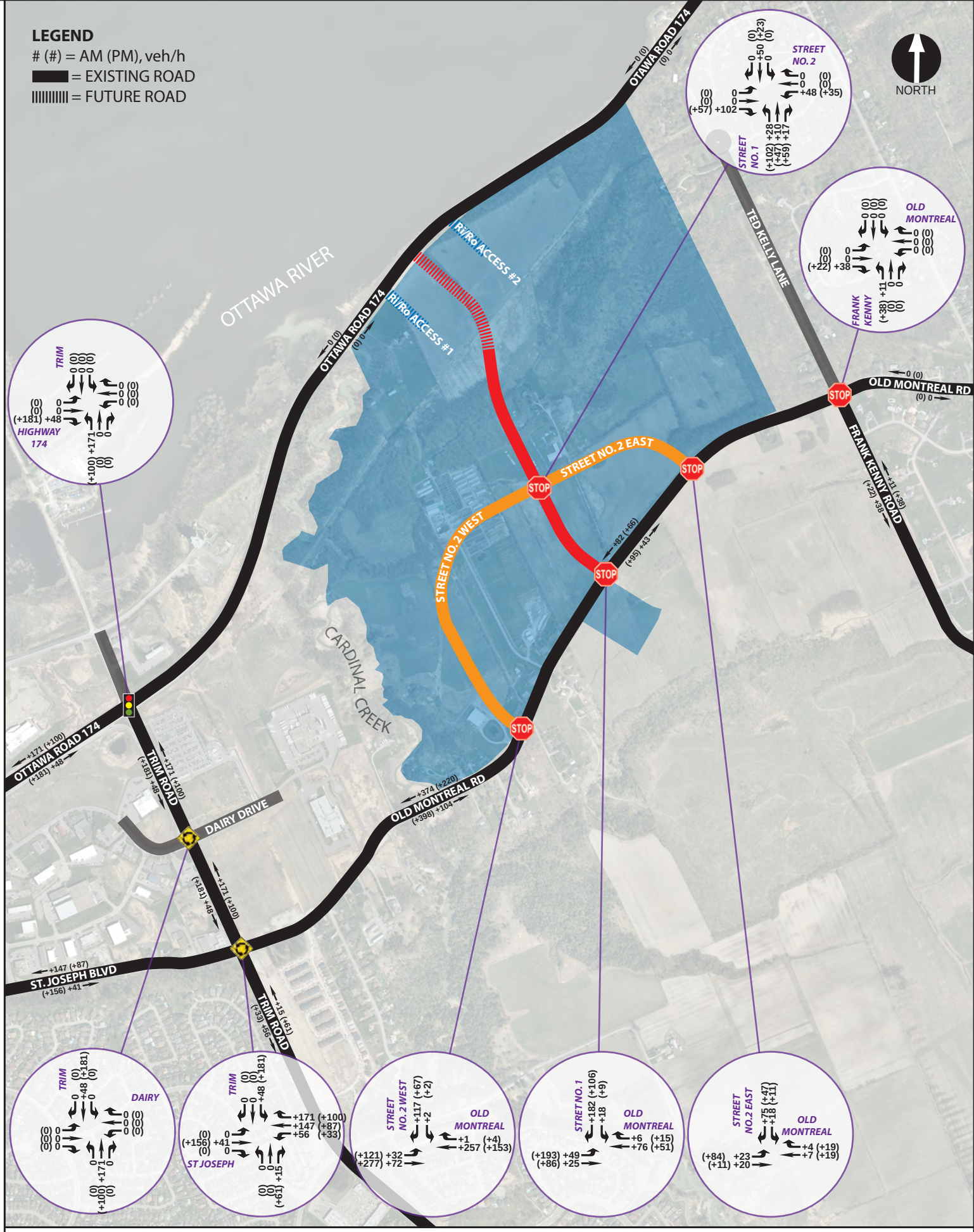
Total Site Vehicle Trip Generation

Travel Mode	AM Peak (veh/hr)			PM Peak (veh/hr)		
	In	Out	Total	In	Out	Total
ondominiums/Townhouses Trip Generation	36	176	212	171	85	256
General Office Trip Generation	374	52	426	65	320	385
Specialty Retail Trip Generation	17	14	31	27	34	61
Less Specialty Retail Pass-by (30%)	-5	-5	-10	-9	-9	-18
Total 'New' Auto Trips	**422**	**237**	**659**	**254**	**430**	**684**

Petrie's Landing III

New Trips





IBI GROUP

Cardinal Creek Village
Transportation Impact Study
(Phases 1 to 7)

EXHIBIT 11
Site Generated Traffic
(Phases 1 to 7)

PROJECT No. 31539
DATE: October 2013
SCALE:
0m 200m 400m

Appendix F

Background Growth Analysis

Trim/OR 174
8 hrs

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2007	Wednesday 31 January	322	242	4191	4602	5927	5317	8831	9110	38542
2008	Friday 20 June	618	391	4770	5319	6281	6058	10034	9935	43406
2010	Friday 9 July	744	722	5389	4539	6433	6484	9542	10363	44216
2012	Friday 8 June	329	441	4696	4430	5833	5818	8875	9044	39466
2017	Wednesday 19 April	590	518	4739	5742	5522	5570	10003	9024	41708

North Leg

Year	Counts				% Change			
	NB	***SB***	***NB+SB***	***INT***	***NB***	***SB***	***NB+SB***	***INT***
2007	242	322	564	38542				
2008	391	618	1009	43406	61.6%	91.9%	78.9%	12.6%
2010	722	744	1466	44216	84.7%	20.4%	45.3%	1.9%
2012	441	329	770	39466	-38.9%	-55.8%	-47.5%	-10.7%
2017	518	590	1108	41708	17.5%	79.3%	43.9%	5.7%

Regression Estimate	2007	393	490	883	41312
Regression Estimate	2017	576	570	1147	41722
Average Annual Change		**3.89%**	**1.53%**	**2.64%**	**0.10%**

West Leg

Year	Counts				% Change			
	EB	***WB***	***EB+WB***	***INT***	***EB***	***WB***	***EB+WB***	***INT***
2007	8831	9110	17941	38542				
2008	10034	9935	19969	43406	13.6%	9.1%	11.3%	12.6%
2010	9542	10363	19905	44216	-4.9%	4.3%	-0.3%	1.9%
2012	8875	9044	17919	39466	-7.0%	-12.7%	-10.0%	-10.7%
2017	10003	9024	19027	41708	12.7%	-0.2%	6.2%	5.7%

Regression Estimate	2007	9252	9733	18985
Regression Estimate	2017	9791	9108	18899
Average Annual Change		**0.57%**	**-0.66%**	**-0.05%**

East Leg

Year	Counts				% Change			
	EB	***WB***	***EB+WB***	***INT***	***EB***	***WB***	***EB+WB***	***INT***
2007	5317	5927	11244	38542				
2008	6058	6281	12339	43406	13.9%	6.0%	9.7%	12.6%
2010	6484	6433	12917	44216	7.0%	2.4%	4.7%	1.9%
2012	5818	5833	11651	39466	-10.3%	-9.3%	-9.8%	-10.7%
2017	5570	5522	11092	41708	-4.3%	-5.3%	-4.8%	5.7%

Regression Estimate	2007	5900	6242	12143
Regression Estimate	2017	5767	5602	11369
Average Annual Change		**-0.23%**	**-1.08%**	**-0.66%**

South Leg

Year	Counts				% Change			
	NB	***SB***	***NB+SB***	***INT***	***NB***	***SB***	***NB+SB***	***INT***
2007	4191	4602	8793	38542				
2008	4770	5319	10089	43406	13.8%	15.6%	14.7%	12.6%
2010	5389	4539	9928	44216	13.0%	-14.7%	-1.6%	1.9%
2012	4696	4430	9126	39466	-12.9%	-2.4%	-8.1%	-10.7%
2017	4739	5742	10481	41708	0.9%	29.6%	14.8%	5.7%

Regression Estimate	2007	4671	4630	9300
Regression Estimate	2017	4898	5411	10308
Average Annual Change		**0.48%**	**1.57%**	**1.03%**

Trim/OR 174
AM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2007	Wednesday 31 January	50	32	626	402	1346	395	658	1651	5160
2008	Friday 20 June	34	14	649	439	1326	294	674	1836	5266
2010	Friday 9 July	42	46	819	454	1309	387	720	2003	5780
2012	Friday 8 June	62	64	875	414	1292	313	578	2016	5614
2017	Wednesday 19 April	48	51	807	537	1324	428	727	1890	5812

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	32	50	82	5160				
2008	14	34	48	5266	-56.3%	-32.0%	-41.5%	2.1%
2010	46	42	88	5780	228.6%	23.5%	83.3%	9.8%
2012	64	62	126	5614	39.1%	47.6%	43.2%	-2.9%
2017	51	48	99	5812	-20.3%	-22.6%	-21.4%	3.5%

Regression Estimate	2007	30	44	74	5297
Regression Estimate	2017	61	52	113	5901
Average Annual Change		**7.45%**	**1.78%**	**4.40%**	**1.09%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	658	1651	2309	5160				
2008	674	1836	2510	5266	2.4%	11.2%	8.7%	2.1%
2010	720	2003	2723	5780	6.8%	9.1%	8.5%	9.8%
2012	578	2016	2594	5614	-19.7%	0.6%	-4.7%	-2.9%
2017	727	1890	2617	5812	25.8%	-6.3%	0.9%	3.5%

Regression Estimate	2007	657	1811	2468	
Regression Estimate	2017	695	1990	2685	
Average Annual Change		**0.56%**	**0.94%**	**0.84%**	

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	395	1346	1741	5160				
2008	294	1326	1620	5266	-25.6%	-1.5%	-7.0%	2.1%
2010	387	1309	1696	5780	31.6%	-1.3%	4.7%	9.8%
2012	313	1292	1605	5614	-19.1%	-1.3%	-5.4%	-2.9%
2017	428	1324	1752	5812	36.7%	2.5%	9.2%	3.5%

Regression Estimate	2007	339	1326	1666	
Regression Estimate	2017	402	1308	1710	
Average Annual Change		**1.72%**	**-0.14%**	**0.26%**	

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	626	402	1028	5160				
2008	649	439	1088	5266	3.7%	9.2%	5.8%	2.1%
2010	819	454	1273	5780	26.2%	3.4%	17.0%	9.8%
2012	875	414	1289	5614	6.8%	-8.8%	1.3%	-2.9%
2017	807	537	1344	5812	-7.8%	29.7%	4.3%	3.5%

Regression Estimate	2007	682	406	1089	
Regression Estimate	2017	874	519	1393	
Average Annual Change		**2.50%**	**2.47%**	**2.49%**	

Trim/OR 174
PM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2007	Wednesday 31 January	144	50	455	788	672	1440	2018	911	6478
2008	Friday 20 June	64	60	494	1051	424	1354	2206	723	6376
2010	Friday 9 July	107	40	603	1007	664	1334	2131	1124	7010
2012	Friday 8 June	94	69	634	905	624	1353	2024	1049	6752
2017	Wednesday 19 April	56	61	587	801	657	1284	1839	993	6278

North Leg

Year	Counts				% Change			
	NB	***SB***	***NB+SB***	***INT***	***NB***	***SB***	***NB+SB***	***INT***
2007	50	144	194	6478				
2008	60	64	124	6376	20.0%	-55.6%	-36.1%	-1.6%
2010	40	107	147	7010	-33.3%	67.2%	18.5%	9.9%
2012	69	94	163	6752	72.5%	-12.1%	10.9%	-3.7%
2017	61	56	117	6278	-11.6%	-40.4%	-28.2%	-7.0%

Regression Estimate	2007	52	114	166	6642
Regression Estimate	2017	63	58	121	6475
Average Annual Change		**2.00%**	**-6.52%**	**-3.09%**	**-0.25%**

West Leg

Year	Counts				% Change			
	EB	***WB***	***EB+WB***	***INT***	***EB***	***WB***	***EB+WB***	***INT***
2007	2018	911	2929	6478				
2008	2206	723	2929	6376	9.3%	-20.6%	0.0%	-1.6%
2010	2131	1124	3255	7010	-3.4%	55.5%	11.1%	9.9%
2012	2024	1049	3073	6752	-5.0%	-6.7%	-5.6%	-3.7%
2017	1839	993	2832	6278	-9.1%	-5.3%	-7.8%	-7.0%

Regression Estimate	2007	2148	898	3045
Regression Estimate	2017	1874	1062	2936
Average Annual Change		**-1.35%**	**1.69%**	**-0.37%**

East Leg

Year	Counts				% Change			
	EB	***WB***	***EB+WB***	***INT***	***EB***	***WB***	***EB+WB***	***INT***
2007	1440	672	2112	6478				
2008	1354	424	1778	6376	-6.0%	-36.9%	-15.8%	-1.6%
2010	1334	664	1998	7010	-1.5%	56.6%	12.4%	9.9%
2012	1353	624	1977	6752	1.4%	-6.0%	-1.1%	-3.7%
2017	1284	657	1941	6278	-5.1%	5.3%	-1.8%	-7.0%

Regression Estimate	2007	1398	575	1973
Regression Estimate	2017	1279	663	1942
Average Annual Change		**-0.88%**	**1.43%**	**-0.16%**

South Leg

Year	Counts				% Change			
	NB	***SB***	***NB+SB***	***INT***	***NB***	***SB***	***NB+SB***	***INT***
2007	455	788	1243	6478				
2008	494	1051	1545	6376	8.6%	33.4%	24.3%	-1.6%
2010	603	1007	1610	7010	22.1%	-4.2%	4.2%	9.9%
2012	634	905	1539	6752	5.1%	-10.1%	-4.4%	-3.7%
2017	587	801	1388	6278	-7.4%	-11.5%	-9.8%	-7.0%

Regression Estimate	2007	506	952	1458
Regression Estimate	2017	634	842	1476
Average Annual Change		**2.29%**	**-1.22%**	**0.12%**

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	2.64%	1.03%	-0.66%	-0.05%	**0.13%**
AM Peak	4.40%	2.49%	0.26%	0.84%	**1.13%**
PM Peak	-3.09%	0.12%	-0.16%	-0.37%	**-0.24%**

Appendix G

Multimodal Level of Service Analysis: Existing Conditions

Multi-Modal Level of Service - Segments Form

Consultant	**PARSONS**	**Project**	**Petrie's Landing I**
Scenario	**Jeanne D'Arc East of Trim**	**Date**	**5/18/2018**
Comments	**Existing Conditions and Possible**		
	Improvements		

SEGMENTS		**Street A**	Section Site Access	Section Former Cul-de-Sac	Section Mid-block
Pedestrian	Sidewalk Width Boulevard Width	-	≥ 2 m < 0.5	≥ 2 m < 0.5	≥ 2 m < 0.5
	Avg Daily Curb Lane Traffic Volume		≤ 3000	≤ 3000	≤ 3000
	Operating Speed On-Street Parking		> 30 to 50 km/h no	> 30 to 50 km/h no	> 50 to 60 km/h no
	Exposure to Traffic PLoS		**B**	**B**	**C**
	Effective Sidewalk Width		2.0 m	2.0 m	2.0 m
	Pedestrian Volume				
	Crowding PLoS		-	-	-
	Level of Service		**-**	**-**	**-**
Bicycle	Type of Cycling Facility	A	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Number of Travel Lanes		2-3 lanes total	2-3 lanes total	2-3 lanes total
	Operating Speed		≤ 40 km/h	>40 to <50 km/h	≥ 50 to 60 km/h
	# of Lanes & Operating Speed LoS		**B**	**D**	**E**
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS		-	-	-
	Bike Lane Blockages				
	Blockage LoS		-	-	-
	Median Refuge Width (no median = < 1.8 m)				
	No. of Lanes at Unsignalized Crossing				
	Sidestreet Operating Speed				
	Unsignalized Crossing - Lowest LoS		-	-	-
	Level of Service		**-**	**-**	**-**

Multi-Modal Level of Service - Intersections Form

Consultant	**PARSONS**	**Project**	**Petries Landing I**
Scenario	**Jeanne D'Arc @ Trim**	**Date**	**7/12/2018**
Comments	**Year 2022 Before LRT Conditions**		

INTERSECTIONS		Existing Conditions			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	0 - 2	0 - 2	0 - 2	0 - 2
	Median	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	Permissive
	Conflicting Right Turns	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
	Ped Signal Leading Interval?	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	**85**	**85**	**85**	**85**
	Ped. Exposure to Traffic LoS	**B**	**B**	**B**	**B**
	Cycle Length				
	Effective Walk Time				
	Average Pedestrian Delay				
	Pedestrian Delay LoS	-	-	-	-
	Level of Service	**B**	**B**	**B**	**B**
		B			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	≤ 50 m	Not Applicable	≤ 50 m	Not Applicable
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**D**	**Not Applicable**	**D**	**Not Applicable**
	Separated or Mixed Traffic	**Mixed Traffic**	**Separated**	**Mixed Traffic**	**Separated**
	Left Turn Approach	No lane crossed	1 lane crossed	No lane crossed	1 lane crossed
	Operating Speed	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	≥ 60 km/h
	Left Turning Cyclist	**C**	**D**	**C**	**E**
	Level of Service	**D**	**D**	**D**	**E**
		E			

Appendix H

Multimodal Level of Service: Planned Network

Multi-Modal Level of Service - Segments Form

Consultant	Parsons	**Project**	Petrie's Landing 1
Scenario	Towers 3-5	**Date**	4/17/2019
Comments			

SEGMENTS		Street A	Section Private Inlet	Section Trim Rd	Section Dairy	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
Pedestrian	Sidewalk Width Boulevard Width	B	≥ 2 m < 0.5	≥ 2 m < 0.5	≥ 2 m < 0.5						
	Avg Daily Curb Lane Traffic Volume		≤ 3000	≤ 3000	≤ 3000						
	Operating Speed On-Street Parking		> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no						
	Exposure to Traffic PLoS		**B**	**B**	**B**	-	-	-	-	-	-
	Effective Sidewalk Width		2.0 m	2.0 m	2.0 m						
	Pedestrian Volume		500 ped /hr	1000 ped/hr	1000 ped/hr						
	Crowding PLoS		**B**	**B**	**B**	-	-	-	-	-	-
	Level of Service		**B**	**B**	**B**	-	-	-	-	-	-
Bicycle	Type of Cycling Facility	A	Mixed Traffic	Curbside Bike Lane	Physically Separated						
	Number of Travel Lanes		≤ 2 (no centreline)	2 ea. dir. (no median)							
	Operating Speed		>40 to <50 km/h	≤ 50 km/h							
	# of Lanes & Operating Speed LoS		**B**	**B**	**-**	-	-	-	-	-	-
	Bike Lane (+ Parking Lane) Width			≥ 1.8 m							
	Bike Lane Width LoS		-	**A**	-	-	-	-	-	-	-
	Bike Lane Blockages			Rare							
	Blockage LoS		-	**A**	-	-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)										
	No. of Lanes at Unsignalized Crossing										
	Sidestreet Operating Speed										
	Unsignalized Crossing - Lowest LoS		-	-	**A**	-	-	-	-	-	-
	Level of Service		**-**	**-**	**A**	-	-	-	-	-	-
Transit	Facility Type	-									
	Friction or Ratio Transit:Posted Speed										
	Level of Service		**-**	**-**	**-**	-	-	-	-	-	-
Truck	Truck Lane Width	-									
	Travel Lanes per Direction										
	Level of Service		**-**	**-**	**-**	-	-	-	-	-	-

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons**	**Project**	**Petrie's Landing 1**
Scenario	**Towers 3-5**	**Date**	**17-Apr-19**
Comments			

Unlocked Rows for Replicating

	INTERSECTIONS	Trim/OR174 (existing)				Dairy/Or174 (future int)				Intersection C			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	5	5	5		5	6	8					
	Median	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	No Median - 2.4 m					
	Conflicting Left Turns	Protected	Protected	Protected		Protected	Protected	Protected					
	Conflicting Right Turns	Permissive or yield control	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					
	Ped Signal Leading Interval?	No	No	No		No	No	No					
	Right Turn Channel	No Channel	No Channel	No Channel		Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane					
	Corner Radius	5-10m	10-15m	10-15m		10-15m	10-15m	10-15m					
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Textured/coloured pavement	Textured/coloured pavement					
	PETSI Score	**46**	**45**	**45**		**49**	**35**	**3**					
	Ped. Exposure to Traffic LoS	**D**	**D**	**D**	**-**	**D**	**E**	**F**	**-**	**-**	**-**	**-**	**-**
	Cycle Length	120	120	120									
	Effective Walk Time	5	8	8									
	Average Pedestrian Delay	**55**	**52**	**52**									
	Pedestrian Delay LoS	**E**	**E**	**E**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Level of Service	**E**	**E**	**E**	**-**	**D**	**E**	**F**	**-**	**-**	**-**	**-**	**-**
		E				**F**				**-**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Curb Bike Lane, Cycletrack or MUP			Pocket Bike Lane	Curb Bike Lane, Cycletrack or MUP						
	Right Turn Lane Configuration	> 50 m Introduced right turn lane	Not Applicable			Bike lane shifts to the left of right turn	Not Applicable						
	Right Turning Speed	≤ 25 km/h	Not Applicable			≤ 25 km/h	Not Applicable						
	Cyclist relative to RT motorists	**D**	**Not Applicable**	**-**	**-**	**D**	**Not Applicable**	**-**	**-**	**-**	**-**	**-**	**-**
	Separated or Mixed Traffic	**Separated**	**Separated**	**-**	**-**	**Separated**	**Separated**	**-**	**-**	**-**	**-**	**-**	**-**
	Left Turn Approach	No lane crossed	No lane crossed			No lane crossed	No lane crossed						
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h			> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h						
	Left Turning Cyclist	**B**	**B**	**-**	**-**	**B**	**B**	**-**	**-**	**-**	**-**	**-**	**-**
	Level of Service	**D**	**B**	**-**	**-**	**D**	**B**	**-**	**-**	**-**	**-**	**-**	**-**
		D				**D**				**-**			
Transit	Average Signal Delay												
	Level of Service	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		-				**-**				**-**			
Truck	Effective Corner Radius												
	Number of Receiving Lanes on Departure from Intersection												
	Level of Service	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		-				**-**				**-**			
Auto	Volume to Capacity Ratio												
	Level of Service	**-**				**-**				**-**			

Appendix I

Transportation Demand Management Checklist

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)*	☑ After LRT openning
		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	☑ During first 6 months after LRT openning
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)	☑ For phase 5 - Retirement Units
		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	☐

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)*	☑ Phase V: a further improvement would be to provide a walking connection between Tower V west entrance and Inlet Private sidewalk
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)*	☑

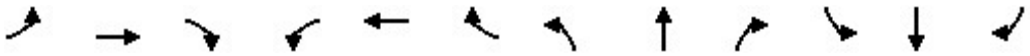
		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas 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	☑ See 1.2.1
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)*	☑ Bicycle parking spaces will be required for Phase V should independent living seniors reside in Tower 5
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)	☑ One bike repair station to serve all residents and users of City planned MUP
	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 J

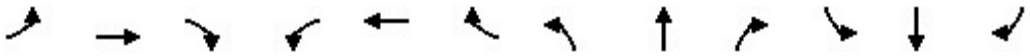
SYNCHRO Capacity Analysis: Existing Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	8	3	54	20	5	0	64	20	7	0	9	3
Future Volume (vph)	8	3	54	20	5	0	64	20	7	0	9	3
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)	9	3	60	22	6	0	71	22	8	0	10	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	72	28	101	13
Volume Left (vph)	9	22	71	0
Volume Right (vph)	60	0	8	3
Hadj (s)	-0.44	0.19	0.13	-0.10
Departure Headway (s)	3.7	4.4	4.2	4.1
Degree Utilization, x	0.07	0.03	0.12	0.01
Capacity (veh/h)	928	789	820	847
Control Delay (s)	7.0	7.6	7.8	7.2
Approach Delay (s)	7.0	7.6	7.8	7.2
Approach LOS	A	A	A	A

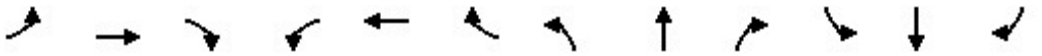
Intersection Summary				
Delay	7.5			
Level of Service	A			
Intersection Capacity Utilization	24.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	4	87	8	2	0	51	8	8	1	11	4
Future Volume (vph)	7	4	87	8	2	0	51	8	8	1	11	4
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)	8	4	97	9	2	0	57	9	9	1	12	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	109	11	75	17
Volume Left (vph)	8	9	57	1
Volume Right (vph)	97	0	9	4
Hadj (s)	-0.49	0.20	0.11	-0.10
Departure Headway (s)	3.6	4.4	4.3	4.1
Degree Utilization, x	0.11	0.01	0.09	0.02
Capacity (veh/h)	963	793	813	842
Control Delay (s)	7.1	7.5	7.7	7.2
Approach Delay (s)	7.1	7.5	7.7	7.2
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.3			
Level of Service	A			
Intersection Capacity Utilization	23.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	258	380	89	1143	12	760	31	42	14	49	20
Future Volume (vph)	25	258	380	89	1143	12	760	31	42	14	49	20
Satd. Flow (prot)	1695	3390	1517	1695	3383	0	3288	3095	0	1695	1784	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1695	3390	1517	1695	3383	0	3288	3095	0	1695	1784	1517
Satd. Flow (RTOR)			422		1			47				217
Lane Group Flow (vph)	28	287	422	99	1283	0	844	81	0	16	54	22
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.1	41.2		17.5	41.2		12.2	42.4		11.9	17.4	17.4
Total Split (s)	15.0	50.0		20.0	55.0		42.0	43.0		17.0	18.0	18.0
Total Split (%)	11.5%	38.5%		15.4%	42.3%		32.3%	33.1%		13.1%	13.8%	13.8%
Yellow Time (s)	3.3	5.1		3.3	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.8	2.1		4.2	2.1		3.9	4.1		3.6	4.1	4.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.1	7.2		7.5	7.2		7.2	7.4		6.9	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Act Effct Green (s)	7.0	43.8	130.0	11.7	54.1		34.6	45.6		7.6	10.6	10.6
Actuated g/C Ratio	0.05	0.34	1.00	0.09	0.42		0.27	0.35		0.06	0.08	0.08
v/c Ratio	0.31	0.25	0.28	0.65	0.91		0.96	0.07		0.16	0.37	0.07
Control Delay	67.6	32.2	0.5	77.3	47.5		70.0	16.0		60.6	64.4	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.6	32.2	0.5	77.3	47.5		70.0	16.0		60.6	64.4	0.4
LOS	E	C	A	E	D		E	B		E	E	A
Approach Delay		15.4			49.6			65.3			48.5	
Approach LOS		B			D			E			D	
Queue Length 50th (m)	7.0	28.3	0.0	24.8	~183.6		110.2	2.7		4.0	13.3	0.0
Queue Length 95th (m)	17.1	39.8	0.0	#45.5	#228.1		#149.7	9.7		11.4	27.0	0.0
Internal Link Dist (m)		353.5			594.5			361.2			134.5	
Turn Bay Length (m)	155.0		255.0	130.0			190.0			125.0		50.0
Base Capacity (vph)	103	1142	1517	162	1407		880	1116		131	145	323
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	0.27	0.25	0.28	0.61	0.91		0.96	0.07		0.12	0.37	0.07

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 24 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

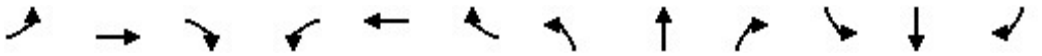
Maximum v/c Ratio: 0.96

Intersection Signal Delay: 46.1	Intersection LOS: D
Intersection Capacity Utilization 85.6%	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: 3: Trim /Trim & OR 174



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1068	1057	67	411	13	406	43	90	16	65	19
Future Volume (vph)	11	1068	1057	67	411	13	406	43	90	16	65	19
Satd. Flow (prot)	1695	3390	1517	1695	3377	0	3288	3048	0	1695	1784	1517
Flt Permitted	0.463			0.076			0.950			0.950		
Satd. Flow (perm)	826	3390	1517	136	3377	0	3288	3048	0	1695	1784	1517
Satd. Flow (RTOR)			888		3			100				217
Lane Group Flow (vph)	12	1187	1174	74	471	0	451	148	0	18	72	21
Turn Type	pm+pt	NA	Free	pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6								4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.1	41.2		11.0	41.2		12.2	42.4		11.9	17.4	17.4
Total Split (s)	16.0	54.0		16.0	54.0		33.0	43.0		17.0	27.0	27.0
Total Split (%)	12.3%	41.5%		12.3%	41.5%		25.4%	33.1%		13.1%	20.8%	20.8%
Yellow Time (s)	3.3	5.1		4.0	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.8	2.1		2.0	2.1		3.9	4.1		3.6	4.1	4.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.1	7.2		6.0	7.2		7.2	7.4		6.9	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	Max
Act Effct Green (s)	59.4	54.4	130.0	65.8	60.7		22.4	42.5		7.6	19.6	19.6
Actuated g/C Ratio	0.46	0.42	1.00	0.51	0.47		0.17	0.33		0.06	0.15	0.15
v/c Ratio	0.03	0.84	0.77	0.44	0.30		0.80	0.14		0.18	0.27	0.05
Control Delay	17.6	41.8	3.9	26.2	23.7		62.4	12.6		61.5	51.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	17.6	41.8	3.9	26.2	23.7		62.4	12.6		61.5	51.9	0.2
LOS	B	D	A	C	C		E	B		E	D	A
Approach Delay		22.9			24.0			50.1			43.7	
Approach LOS		C			C			D			D	
Queue Length 50th (m)	1.5	147.6	0.0	9.3	35.2		57.5	4.0		4.5	16.5	0.0
Queue Length 95th (m)	5.0	#203.5	0.0	19.1	59.7		74.0	13.1		12.4	31.2	0.0
Internal Link Dist (m)		353.5			594.5			361.2			134.5	
Turn Bay Length (m)	155.0		255.0	130.0			190.0			125.0		50.0
Base Capacity (vph)	450	1417	1517	188	1578		652	1064		131	268	413
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	0.03	0.84	0.77	0.39	0.30		0.69	0.14		0.14	0.27	0.05

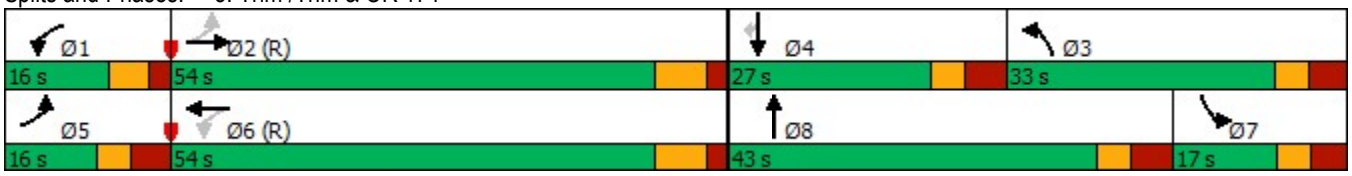
Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 125 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 28.2	Intersection LOS: C
Intersection Capacity Utilization 71.4%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 3: Trim /Trim & OR 174



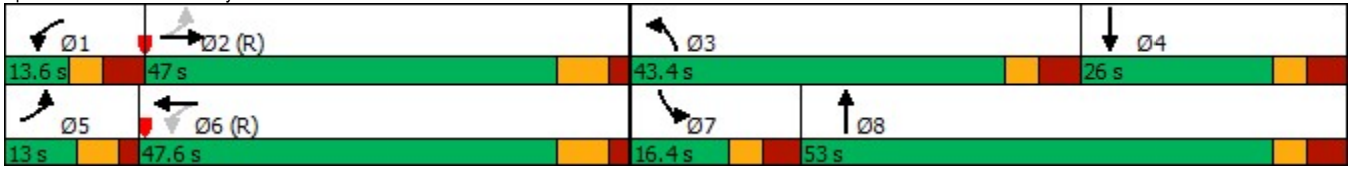
Appendix K

SYNCHRO Capacity Analysis: Background Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	271	10	94	1200	14	860	39	44	18	68	84
Future Volume (vph)	69	271	10	94	1200	14	860	39	44	18	68	84
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.153			0.542			0.950			0.950		
Satd. Flow (perm)	273	3390	1517	967	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			266			266			266			266
Lane Group Flow (vph)	69	271	10	94	1200	14	860	39	44	18	68	84
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	13.0	47.0		13.6	47.6		43.4	53.0		16.4	26.0	
Total Split (%)	10.0%	36.2%		10.5%	36.6%		33.4%	40.8%		12.6%	20.0%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	60.5	51.1	130.0	63.6	56.0	130.0	29.1	41.5	130.0	7.0	11.3	130.0
Actuated g/C Ratio	0.47	0.39	1.00	0.49	0.43	1.00	0.22	0.32	1.00	0.05	0.09	1.00
v/c Ratio	0.32	0.20	0.01	0.18	0.57	0.01	0.80	0.07	0.03	0.20	0.44	0.06
Control Delay	21.0	28.2	0.0	18.4	31.3	0.0	53.9	32.0	0.0	63.3	65.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	28.2	0.0	18.4	31.3	0.0	53.9	32.0	0.0	63.3	65.0	0.1
LOS	C	C	A	B	C	A	D	C	A	E	E	A
Approach Delay		26.0			30.0			50.5			32.8	
Approach LOS		C			C			D			C	
Queue Length 50th (m)	8.3	23.6	0.0	11.8	85.7	0.0	74.2	6.5	0.0	4.5	17.0	0.0
Queue Length 95th (m)	18.4	39.2	0.0	24.2	117.8	0.0	85.0	15.6	0.0	12.5	31.2	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	219	1333	1517	524	2098	1517	1331	629	1517	123	255	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.20	0.01	0.18	0.57	0.01	0.65	0.06	0.03	0.15	0.27	0.06

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 36.6	Intersection LOS: D
Intersection Capacity Utilization 69.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174



Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	82	75	8	105	19
Future Vol, veh/h	4	82	75	8	105	19
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	82	75	8	105	19
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.1	8	8.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	85%	0%	90%
Vol Thru, %	0%	5%	10%
Vol Right, %	15%	95%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	124	86	83
LT Vol	105	0	75
Through Vol	0	4	8
RT Vol	19	82	0
Lane Flow Rate	124	86	83
Geometry Grp	1	1	1
Degree of Util (X)	0.148	0.089	0.101
Departure Headway (Hd)	4.301	3.742	4.399
Convergence, Y/N	Yes	Yes	Yes
Cap	825	963	803
Service Time	2.377	1.742	2.487
HCM Lane V/C Ratio	0.15	0.089	0.103
HCM Control Delay	8.1	7.1	8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.5	0.3	0.3

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	86	0	0	114	0	0	0	0	0	9	3
Future Vol, veh/h	8	86	0	0	114	0	0	0	0	0	9	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	86	0	0	114	0	0	0	0	0	9	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	7.6	0	7.3
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	9%	0%	0%
Vol Thru, %	100%	91%	100%	75%
Vol Right, %	0%	0%	0%	25%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	94	114	12
LT Vol	0	8	0	0
Through Vol	0	86	114	9
RT Vol	0	0	0	3
Lane Flow Rate	0	94	114	12
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.106	0.127	0.014
Departure Headway (Hd)	4.301	4.057	4.026	4.139
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	883	890	851
Service Time	2.395	2.085	2.051	2.229
HCM Lane V/C Ratio	0	0.106	0.128	0.014
HCM Control Delay	7.4	7.6	7.6	7.3
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.4	0.4	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	1121	10	70	432	18	462	55	95	20	81	77
Future Volume (vph)	61	1121	10	70	432	18	462	55	95	20	81	77
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.491			0.137			0.950			0.950		
Satd. Flow (perm)	876	3390	1517	244	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			266			266			266			266
Lane Group Flow (vph)	61	1121	10	70	432	18	462	55	95	20	81	77
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	11.0	62.0		14.4	65.4		28.2	38.4		15.2	25.4	
Total Split (%)	8.5%	47.7%		11.1%	50.3%		21.7%	29.5%		11.7%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	73.2	66.1	130.0	74.1	67.9	130.0	17.6	30.8	130.0	6.9	12.0	130.0
Actuated g/C Ratio	0.56	0.51	1.00	0.57	0.52	1.00	0.14	0.24	1.00	0.05	0.09	1.00
v/c Ratio	0.11	0.65	0.01	0.31	0.17	0.01	0.71	0.13	0.06	0.22	0.49	0.05
Control Delay	12.1	27.7	0.0	15.8	17.9	0.0	60.1	41.1	0.1	64.5	66.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	27.7	0.0	15.8	17.9	0.0	60.1	41.1	0.1	64.5	66.1	0.1
LOS	B	C	A	B	B	A	E	D	A	E	E	A
Approach Delay		26.6			17.0			49.0			37.4	
Approach LOS		C			B			D			D	
Queue Length 50th (m)	5.8	111.7	0.0	7.0	21.3	0.0	40.7	10.5	0.0	5.0	20.2	0.0
Queue Length 95th (m)	13.5	156.1	0.0	15.4	31.6	0.0	51.2	22.9	0.0	13.4	35.6	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	537	1724	1517	226	2544	1517	772	446	1517	108	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.65	0.01	0.31	0.17	0.01	0.60	0.12	0.06	0.19	0.33	0.05

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 39 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 30.9	Intersection LOS: C
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	6	132	31	3	80	45
Future Vol, veh/h	6	132	31	3	80	45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	132	31	3	80	45
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.3	7.7	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	64%	0%	91%
Vol Thru, %	0%	4%	9%
Vol Right, %	36%	96%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	125	138	34
LT Vol	80	0	31
Through Vol	0	6	3
RT Vol	45	132	0
Lane Flow Rate	125	138	34
Geometry Grp	1	1	1
Degree of Util (X)	0.144	0.138	0.042
Departure Headway (Hd)	4.142	3.604	4.444
Convergence, Y/N	Yes	Yes	Yes
Cap	860	980	796
Service Time	2.193	1.68	2.525
HCM Lane V/C Ratio	0.145	0.141	0.043
HCM Control Delay	7.9	7.3	7.7
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.5	0.5	0.1

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	139	0	0	83	0	0	0	0	1	12	4
Future Vol, veh/h	7	139	0	0	83	0	0	0	0	1	12	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	139	0	0	83	0	0	0	0	1	12	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

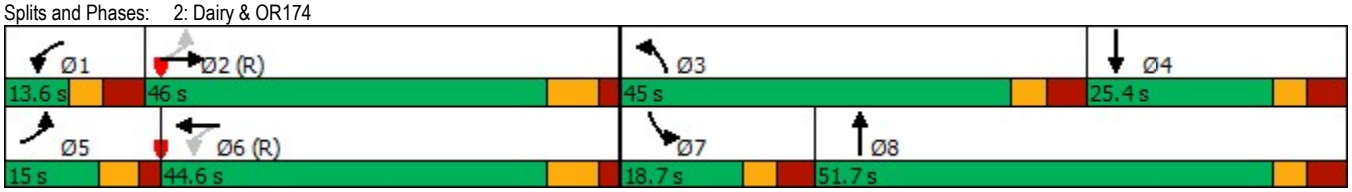
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	7.5	0	7.4
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	5%	0%	6%
Vol Thru, %	100%	95%	100%	71%
Vol Right, %	0%	0%	0%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	146	83	17
LT Vol	0	7	0	1
Through Vol	0	139	83	12
RT Vol	0	0	0	4
Lane Flow Rate	0	146	83	17
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.164	0.094	0.02
Departure Headway (Hd)	4.448	4.035	4.073	4.298
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	889	877	838
Service Time	2.448	2.062	2.111	2.298
HCM Lane V/C Ratio	0	0.164	0.095	0.02
HCM Control Delay	7.4	7.9	7.5	7.4
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.6	0.3	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	276	10	95	1223	14	890	43	45	19	74	107
Future Volume (vph)	105	276	10	95	1223	14	890	43	45	19	74	107
Lane Group Flow (vph)	105	276	10	95	1223	14	890	43	45	19	74	107
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	15.0	46.0		13.6	44.6		45.0	51.7		18.7	25.4	
Total Split (%)	11.5%	35.4%		10.5%	34.3%		34.6%	39.8%		14.4%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	60.9	49.8	130.0	59.4	50.6	130.0	30.1	42.8	130.0	7.0	11.6	130.0
Actuated g/C Ratio	0.47	0.38	1.00	0.46	0.39	1.00	0.23	0.33	1.00	0.05	0.09	1.00
v/c Ratio	0.49	0.21	0.01	0.19	0.65	0.01	0.80	0.07	0.03	0.21	0.47	0.07
Control Delay	25.8	29.2	0.0	19.4	35.8	0.0	53.1	31.1	0.0	63.5	65.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.8	29.2	0.0	19.4	35.8	0.0	53.1	31.1	0.0	63.5	65.6	0.1
LOS	C	C	A	B	D	A	D	C	A	E	E	A
Approach Delay		27.5			34.3			49.7			30.3	
Approach LOS		C			C			D			C	
Queue Length 50th (m)	13.1	24.5	0.0	12.1	91.3	0.0	76.7	7.1	0.0	4.8	18.5	0.0
Queue Length 95th (m)	26.7	40.3	0.0	24.9	127.4	0.0	87.4	16.5	0.0	12.8	33.1	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	223	1299	1517	511	1894	1517	1389	621	1517	153	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.21	0.01	0.19	0.65	0.01	0.64	0.07	0.03	0.12	0.30	0.07

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 38.3	Intersection LOS: D
Intersection Capacity Utilization 72.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174



Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	106	75	8	145	19
Future Vol, veh/h	4	106	75	8	145	19
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	106	75	8	145	19
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	8.2	8.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	88%	0%	90%
Vol Thru, %	0%	4%	10%
Vol Right, %	12%	96%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	164	110	83
LT Vol	145	0	75
Through Vol	0	4	8
RT Vol	19	106	0
Lane Flow Rate	164	110	83
Geometry Grp	1	1	1
Degree of Util (X)	0.199	0.117	0.106
Departure Headway (Hd)	4.373	3.841	4.612
Convergence, Y/N	Yes	Yes	Yes
Cap	809	938	781
Service Time	2.469	1.843	2.616
HCM Lane V/C Ratio	0.203	0.117	0.106
HCM Control Delay	8.6	7.4	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	0.4	0.4

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	110	0	0	154	0	0	0	0	0	10	3
Future Vol, veh/h	9	110	0	0	154	0	0	0	0	0	10	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	110	0	0	154	0	0	0	0	0	10	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

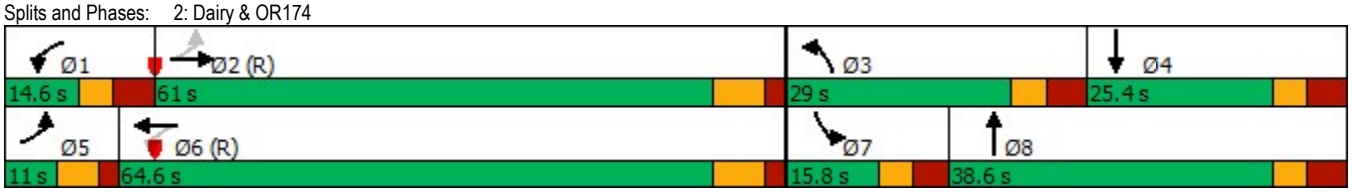
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.9	0	7.5
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	8%	0%	0%
Vol Thru, %	100%	92%	100%	77%
Vol Right, %	0%	0%	0%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	119	154	13
LT Vol	0	9	0	0
Through Vol	0	110	154	10
RT Vol	0	0	0	3
Lane Flow Rate	0	119	154	13
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.135	0.173	0.016
Departure Headway (Hd)	4.537	4.088	4.046	4.381
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	875	886	822
Service Time	2.538	2.126	2.079	2.381
HCM Lane V/C Ratio	0	0.136	0.174	0.016
HCM Control Delay	7.5	7.8	7.9	7.5
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.5	0.6	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	1143	10	72	440	18	479	58	96	23	90	116
Future Volume (vph)	84	1143	10	72	440	18	479	58	96	23	90	116
Lane Group Flow (vph)	84	1143	10	72	440	18	479	58	96	23	90	116
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	11.0	61.0		14.6	64.6		29.0	38.6		15.8	25.4	
Total Split (%)	8.5%	46.9%		11.2%	49.7%		22.3%	29.7%		12.2%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	72.6	65.2	130.0	71.6	64.2	130.0	18.1	28.8	130.0	7.2	12.4	130.0
Actuated g/C Ratio	0.56	0.50	1.00	0.55	0.49	1.00	0.14	0.22	1.00	0.06	0.10	1.00
v/c Ratio	0.16	0.67	0.01	0.33	0.18	0.01	0.72	0.15	0.06	0.25	0.53	0.08
Control Delay	12.8	28.9	0.0	16.8	19.4	0.0	59.8	42.8	0.1	64.7	66.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	28.9	0.0	16.8	19.4	0.0	59.8	42.8	0.1	64.7	66.9	0.1
LOS	B	C	A	B	B	A	E	D	A	E	E	A
Approach Delay		27.6			18.4			49.2			32.9	
Approach LOS		C			B			D			C	
Queue Length 50th (m)	8.4	117.3	0.0	7.4	22.4	0.0	42.1	12.8	0.0	5.8	22.4	0.0
Queue Length 95th (m)	17.9	162.8	0.0	16.3	32.6	0.0	52.5	23.8	0.0	14.9	38.6	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	533	1700	1517	222	2407	1517	801	436	1517	116	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.67	0.01	0.32	0.18	0.01	0.60	0.13	0.06	0.20	0.36	0.08

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 39 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 31.4	Intersection LOS: C
Intersection Capacity Utilization 72.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174



Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	6	173	32	3	106	46
Future Vol, veh/h	6	173	32	3	106	46
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	173	32	3	106	46
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	7.9	8.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	70%	0%	91%
Vol Thru, %	0%	3%	9%
Vol Right, %	30%	97%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	152	179	35
LT Vol	106	0	32
Through Vol	0	6	3
RT Vol	46	173	0
Lane Flow Rate	152	179	35
Geometry Grp	1	1	1
Degree of Util (X)	0.18	0.186	0.045
Departure Headway (Hd)	4.26	3.747	4.638
Convergence, Y/N	Yes	Yes	Yes
Cap	833	963	776
Service Time	2.337	1.748	2.642
HCM Lane V/C Ratio	0.182	0.186	0.045
HCM Control Delay	8.3	7.6	7.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	0.7	0.1

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	179	0	0	109	0	0	0	0	1	12	4
Future Vol, veh/h	7	179	0	0	109	0	0	0	0	1	12	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	179	0	0	109	0	0	0	0	1	12	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

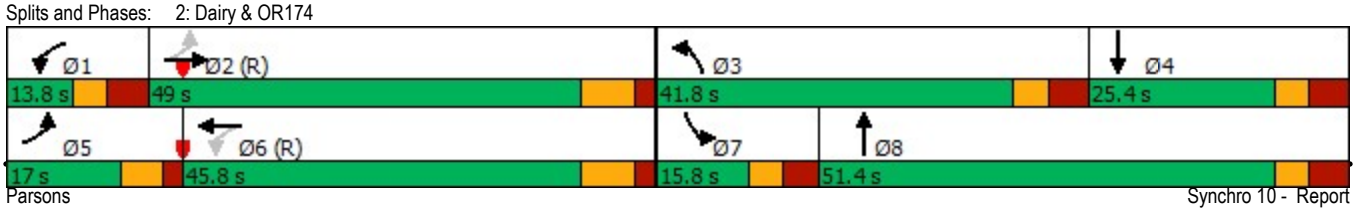
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	7.7	0	7.5
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	4%	0%	6%
Vol Thru, %	100%	96%	100%	71%
Vol Right, %	0%	0%	0%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	186	109	17
LT Vol	0	7	0	1
Through Vol	0	179	109	12
RT Vol	0	0	0	4
Lane Flow Rate	0	186	109	17
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.209	0.124	0.021
Departure Headway (Hd)	4.589	4.053	4.102	4.437
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	884	869	812
Service Time	2.59	2.087	2.151	2.437
HCM Lane V/C Ratio	0	0.21	0.125	0.021
HCM Control Delay	7.6	8.2	7.7	7.5
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.8	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	289	10	100	1280	14	990	49	47	22	82	136
Future Volume (vph)	152	289	10	100	1280	14	990	49	47	22	82	136
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.091			0.575			0.950			0.950		
Satd. Flow (perm)	162	3390	1517	1026	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			279			279			279			279
Lane Group Flow (vph)	152	289	10	100	1280	14	990	49	47	22	82	136
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	17.0	49.0		13.8	45.8		41.8	51.4		15.8	25.4	
Total Split (%)	13.1%	37.7%		10.6%	35.2%		32.2%	39.5%		12.2%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	61.5	48.1	130.0	54.8	46.2	130.0	31.8	42.0	130.0	7.1	12.0	130.0
Actuated g/C Ratio	0.47	0.37	1.00	0.42	0.36	1.00	0.24	0.32	1.00	0.05	0.09	1.00
v/c Ratio	0.69	0.23	0.01	0.21	0.74	0.01	0.85	0.09	0.03	0.24	0.50	0.09
Control Delay	41.6	30.2	0.0	20.8	41.0	0.0	54.4	32.0	0.0	64.4	66.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	30.2	0.0	20.8	41.0	0.0	54.4	32.0	0.0	64.4	66.2	0.1
LOS	D	C	A	C	D	A	D	C	A	E	E	A
Approach Delay		33.4			39.1			51.0			28.6	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	21.1	27.0	0.0	13.5	105.2	0.0	85.4	9.2	0.0	5.5	20.5	0.0
Queue Length 95th (m)	#48.9	40.4	0.0	26.1	133.8	0.0	99.7	18.2	0.0	14.3	35.8	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	227	1254	1517	477	1731	1517	1272	613	1517	116	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.23	0.01	0.21	0.74	0.01	0.78	0.08	0.03	0.19	0.33	0.09

Intersection Summary		
Cycle Length: 130		
Actuated Cycle Length: 130		
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 90		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.85		
Intersection Signal Delay: 41.6	Intersection LOS: D	
Intersection Capacity Utilization 78.7%	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: 2: Dairy & OR174



Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	136	76	9	199	20
Future Vol, veh/h	4	136	76	9	199	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	136	76	9	199	20
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.7	8.4	9.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	91%	0%	89%
Vol Thru, %	0%	3%	11%
Vol Right, %	9%	97%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	219	140	85
LT Vol	199	0	76
Through Vol	0	4	9
RT Vol	20	136	0
Lane Flow Rate	219	140	85
Geometry Grp	1	1	1
Degree of Util (X)	0.277	0.155	0.113
Departure Headway (Hd)	4.553	3.983	4.787
Convergence, Y/N	Yes	Yes	Yes
Cap	791	902	750
Service Time	2.573	2.001	2.808
HCM Lane V/C Ratio	0.277	0.155	0.113
HCM Control Delay	9.3	7.7	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.1	0.5	0.4

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	141	0	0	207	0	0	0	0	0	10	3
Future Vol, veh/h	9	141	0	0	207	0	0	0	0	0	10	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	141	0	0	207	0	0	0	0	0	10	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	8.4	0	7.6
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	6%	0%	0%
Vol Thru, %	100%	94%	100%	77%
Vol Right, %	0%	0%	0%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	150	207	13
LT Vol	0	9	0	0
Through Vol	0	141	207	10
RT Vol	0	0	0	3
Lane Flow Rate	0	150	207	13
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.172	0.234	0.016
Departure Headway (Hd)	4.719	4.124	4.069	4.56
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	864	880	790
Service Time	2.719	2.174	2.11	2.56
HCM Lane V/C Ratio	0	0.174	0.235	0.016
HCM Control Delay	7.7	8	8.4	7.6
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.6	0.9	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	1196	10	75	460	19	536	62	101	27	103	169
Future Volume (vph)	112	1196	10	75	460	19	536	62	101	27	103	169
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.477			0.112			0.950			0.950		
Satd. Flow (perm)	851	3390	1517	200	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			266			266			266			266
Lane Group Flow (vph)	112	1196	10	75	460	19	536	62	101	27	103	169
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	11.0	61.0		14.0	64.0		29.6	39.1		15.9	25.4	
Total Split (%)	8.5%	46.9%		10.8%	49.2%		22.8%	30.1%		12.2%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	70.9	63.4	130.0	69.0	61.9	130.0	19.4	30.7	130.0	7.4	13.2	130.0
Actuated g/C Ratio	0.55	0.49	1.00	0.53	0.48	1.00	0.15	0.24	1.00	0.06	0.10	1.00
v/c Ratio	0.22	0.72	0.01	0.39	0.20	0.01	0.75	0.15	0.07	0.28	0.57	0.11
Control Delay	14.7	31.6	0.0	19.8	20.8	0.0	59.9	41.2	0.1	65.7	67.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	31.6	0.0	19.8	20.8	0.0	59.9	41.2	0.1	65.7	67.6	0.1
LOS	B	C	A	B	C	A	E	D	A	E	E	A
Approach Delay		30.0			19.9			49.6			29.3	
Approach LOS		C			B			D			C	
Queue Length 50th (m)	11.9	131.1	0.0	8.1	24.9	0.0	47.1	13.4	0.0	6.8	25.7	0.0
Queue Length 95th (m)	23.8	174.1	0.0	17.4	34.2	0.0	58.4	24.5	0.0	16.4	42.8	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	514	1652	1517	192	2319	1517	823	450	1517	117	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.72	0.01	0.39	0.20	0.01	0.65	0.14	0.07	0.23	0.42	0.11

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 39 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 32.7	Intersection LOS: C
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	6	229	32	3	138	46
Future Vol, veh/h	6	229	32	3	138	46
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	229	32	3	138	46
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.1	8	8.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	75%	0%	91%
Vol Thru, %	0%	3%	9%
Vol Right, %	25%	97%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	184	235	35
LT Vol	138	0	32
Through Vol	0	6	3
RT Vol	46	229	0
Lane Flow Rate	184	235	35
Geometry Grp	1	1	1
Degree of Util (X)	0.23	0.25	0.047
Departure Headway (Hd)	4.506	3.832	4.786
Convergence, Y/N	Yes	Yes	Yes
Cap	802	940	750
Service Time	2.506	1.844	2.805
HCM Lane V/C Ratio	0.229	0.25	0.047
HCM Control Delay	8.8	8.1	8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	1	0.1

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	236	0	0	141	0	0	0	0	1	12	4
Future Vol, veh/h	8	236	0	0	141	0	0	0	0	1	12	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	236	0	0	141	0	0	0	0	1	12	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	8	0	7.7
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	3%	0%	6%
Vol Thru, %	100%	97%	100%	71%
Vol Right, %	0%	0%	0%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	244	141	17
LT Vol	0	8	0	1
Through Vol	0	236	141	12
RT Vol	0	0	0	4
Lane Flow Rate	0	244	141	17
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.276	0.162	0.022
Departure Headway (Hd)	4.784	4.075	4.146	4.629
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	878	857	778
Service Time	2.785	2.12	2.21	2.629
HCM Lane V/C Ratio	0	0.278	0.165	0.022
HCM Control Delay	7.8	8.7	8	7.7
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	1.1	0.6	0.1

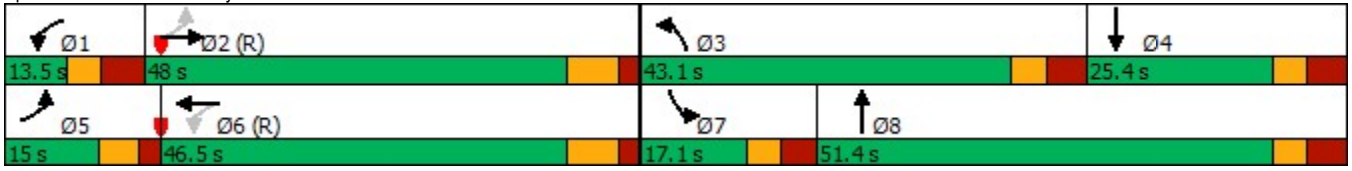
Appendix L

SYNCHRO Capacity Analysis: Total Projected Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	271	10	93	1200	16	860	47	44	23	90	166
Future Volume (vph)	101	271	10	93	1200	16	860	47	44	23	90	166
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.137			0.576			0.950			0.950		
Satd. Flow (perm)	244	3390	1517	1028	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			279			279			279			279
Lane Group Flow (vph)	101	271	10	93	1200	16	860	47	44	23	90	166
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	15.0	48.0		13.5	46.5		43.1	51.4		17.1	25.4	
Total Split (%)	11.5%	36.9%		10.4%	35.8%		33.2%	39.5%		13.2%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	61.2	50.6	130.0	59.6	51.4	130.0	29.1	39.6	130.0	7.3	12.4	130.0
Actuated g/C Ratio	0.47	0.39	1.00	0.46	0.40	1.00	0.22	0.30	1.00	0.06	0.10	1.00
v/c Ratio	0.46	0.21	0.01	0.18	0.62	0.01	0.80	0.09	0.03	0.24	0.53	0.11
Control Delay	24.9	28.5	0.0	19.5	34.8	0.0	53.9	33.3	0.0	64.1	66.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.9	28.5	0.0	19.5	34.8	0.0	53.9	33.3	0.0	64.1	66.9	0.1
LOS	C	C	A	B	C	A	D	C	A	E	E	A
Approach Delay		26.8			33.3			50.4			27.0	
Approach LOS		C			C			D			C	
Queue Length 50th (m)	12.7	24.1	0.0	11.9	89.4	0.0	74.2	9.1	0.0	5.8	22.4	0.0
Queue Length 95th (m)	26.0	38.7	0.0	24.7	122.3	0.0	85.0	17.5	0.0	14.8	38.6	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	228	1320	1517	515	1924	1517	1320	603	1517	132	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.21	0.01	0.18	0.62	0.01	0.65	0.08	0.03	0.17	0.36	0.11

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 37.4	Intersection LOS: D
Intersection Capacity Utilization 71.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174



Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	82	184	8	105	61
Future Vol, veh/h	4	82	184	8	105	61
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	82	184	8	105	61
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	9.1	8.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	63%	0%	96%
Vol Thru, %	0%	5%	4%
Vol Right, %	37%	95%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	166	86	192
LT Vol	105	0	184
Through Vol	0	4	8
RT Vol	61	82	0
Lane Flow Rate	166	86	192
Geometry Grp	1	1	1
Degree of Util (X)	0.206	0.095	0.245
Departure Headway (Hd)	4.469	3.97	4.603
Convergence, Y/N	Yes	Yes	Yes
Cap	805	904	781
Service Time	2.488	1.99	2.62
HCM Lane V/C Ratio	0.206	0.095	0.246
HCM Control Delay	8.6	7.4	9.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	0.3	1

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	86	0	0	113	0	0	0	0	0	9	3
Future Vol, veh/h	8	86	0	0	113	0	0	0	0	0	9	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	86	0	0	113	0	0	0	0	0	9	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	7.6	0	7.3
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	9%	0%	0%
Vol Thru, %	100%	91%	100%	75%
Vol Right, %	0%	0%	0%	25%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	94	113	12
LT Vol	0	8	0	0
Through Vol	0	86	113	9
RT Vol	0	0	0	3
Lane Flow Rate	0	94	113	12
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.106	0.126	0.014
Departure Headway (Hd)	4.299	4.056	4.026	4.137
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	883	890	852
Service Time	2.393	2.084	2.051	2.228
HCM Lane V/C Ratio	0	0.106	0.127	0.014
HCM Control Delay	7.4	7.6	7.6	7.3
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.4	0.4	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	151	1121	10	70	432	24	462	79	95	24	98	143
Future Volume (vph)	151	1121	10	70	432	24	462	79	95	24	98	143
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.483			0.148			0.950			0.950		
Satd. Flow (perm)	862	3390	1517	264	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			266			266			266			266
Lane Group Flow (vph)	151	1121	10	70	432	24	462	79	95	24	98	143
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	12.0	63.0		14.4	65.4		27.2	38.3		14.3	25.4	
Total Split (%)	9.2%	48.5%		11.1%	50.3%		20.9%	29.5%		11.0%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	74.2	65.7	130.0	70.1	63.1	130.0	17.4	29.0	130.0	6.7	12.9	130.0
Actuated g/C Ratio	0.57	0.51	1.00	0.54	0.49	1.00	0.13	0.22	1.00	0.05	0.10	1.00
v/c Ratio	0.28	0.65	0.01	0.31	0.18	0.02	0.72	0.20	0.06	0.28	0.55	0.09
Control Delay	14.0	28.0	0.0	16.3	19.9	0.0	60.6	43.3	0.1	67.0	67.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	28.0	0.0	16.3	19.9	0.0	60.6	43.3	0.1	67.0	67.3	0.1
LOS	B	C	A	B	B	A	E	D	A	E	E	A
Approach Delay		26.1			18.5			49.4			31.0	
Approach LOS		C			B			D			C	
Queue Length 50th (m)	15.7	114.0	0.0	7.1	22.8	0.0	40.7	17.6	0.0	6.0	24.4	0.0
Queue Length 95th (m)	29.3	153.8	0.0	15.6	31.6	0.0	51.7	30.1	0.0	15.1	41.3	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	547	1712	1517	226	2364	1517	735	433	1517	96	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.65	0.01	0.31	0.18	0.02	0.63	0.18	0.06	0.25	0.40	0.09

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 39 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 30.6	Intersection LOS: C
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	6	132	118	3	80	165
Future Vol, veh/h	6	132	118	3	80	165
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	132	118	3	80	165
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.8	8.8	8.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	33%	0%	98%
Vol Thru, %	0%	4%	2%
Vol Right, %	67%	96%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	245	138	121
LT Vol	80	0	118
Through Vol	0	6	3
RT Vol	165	132	0
Lane Flow Rate	245	138	121
Geometry Grp	1	1	1
Degree of Util (X)	0.284	0.155	0.162
Departure Headway (Hd)	4.175	4.048	4.814
Convergence, Y/N	Yes	Yes	Yes
Cap	862	886	745
Service Time	2.196	2.071	2.839
HCM Lane V/C Ratio	0.284	0.156	0.162
HCM Control Delay	8.9	7.8	8.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.2	0.5	0.6

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	139	0	0	83	0	0	0	0	1	12	4
Future Vol, veh/h	7	139	0	0	83	0	0	0	0	1	12	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	139	0	0	83	0	0	0	0	1	12	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

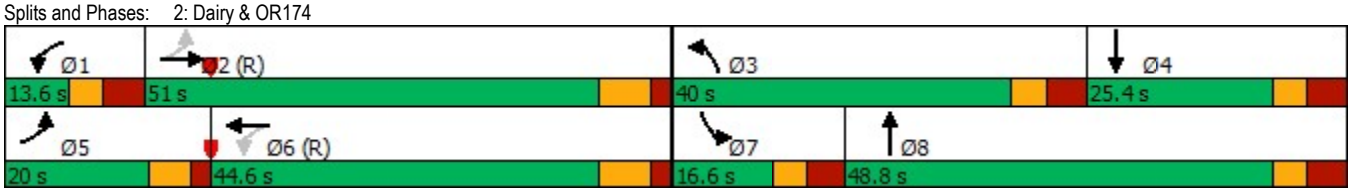
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	7.5	0	7.4
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	5%	0%	6%
Vol Thru, %	100%	95%	100%	71%
Vol Right, %	0%	0%	0%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	146	83	17
LT Vol	0	7	0	1
Through Vol	0	139	83	12
RT Vol	0	0	0	4
Lane Flow Rate	0	146	83	17
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.164	0.094	0.02
Departure Headway (Hd)	4.448	4.035	4.073	4.298
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	889	877	838
Service Time	2.448	2.062	2.111	2.298
HCM Lane V/C Ratio	0	0.164	0.095	0.02
HCM Control Delay	7.4	7.9	7.5	7.4
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.6	0.3	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	276	10	95	1223	18	890	60	45	30	118	271
Future Volume (vph)	168	276	10	95	1223	18	890	60	45	30	118	271
Lane Group Flow (vph)	168	276	10	95	1223	18	890	60	45	30	118	271
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	20.0	51.0		13.6	44.6		40.0	48.8		16.6	25.4	
Total Split (%)	15.4%	39.2%		10.5%	34.3%		30.8%	37.5%		12.8%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	63.4	49.6	130.0	53.6	46.1	130.0	29.4	41.1	130.0	7.7	13.9	130.0
Actuated g/C Ratio	0.49	0.38	1.00	0.41	0.35	1.00	0.23	0.32	1.00	0.06	0.11	1.00
v/c Ratio	0.71	0.21	0.01	0.20	0.71	0.01	0.82	0.11	0.03	0.30	0.62	0.18
Control Delay	39.9	28.9	0.0	21.7	40.4	0.0	54.8	32.6	0.0	65.8	69.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	28.9	0.0	21.7	40.4	0.0	54.8	32.6	0.0	65.8	69.2	0.3
LOS	D	C	A	C	D	A	D	C	A	E	E	A
Approach Delay		32.4			38.5			50.9			24.4	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	23.1	25.6	0.0	12.8	100.2	0.0	76.8	11.5	0.0	7.5	29.4	0.0
Queue Length 95th (m)	#51.9	37.8	0.0	25.1	128.0	0.0	90.0	21.2	0.0	17.4	47.9	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	260	1294	1517	466	1728	1517	1206	583	1517	126	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.21	0.01	0.20	0.71	0.01	0.74	0.10	0.03	0.24	0.48	0.18

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 39.7	Intersection LOS: D
Intersection Capacity Utilization 76.5%	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: Dairy & OR174



Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	106	294	8	145	103
Future Vol, veh/h	4	106	294	8	145	103
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	106	294	8	145	103
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.1	11.3	10.2
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	58%	0%	97%
Vol Thru, %	0%	4%	3%
Vol Right, %	42%	96%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	248	110	302
LT Vol	145	0	294
Through Vol	0	4	8
RT Vol	103	106	0
Lane Flow Rate	248	110	302
Geometry Grp	1	1	1
Degree of Util (X)	0.329	0.133	0.408
Departure Headway (Hd)	4.772	4.339	4.86
Convergence, Y/N	Yes	Yes	Yes
Cap	751	821	737
Service Time	2.82	2.396	2.909
HCM Lane V/C Ratio	0.33	0.134	0.41
HCM Control Delay	10.2	8.1	11.3
HCM Lane LOS	B	A	B
HCM 95th-tile Q	1.4	0.5	2

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	110	0	0	154	0	0	0	0	0	10	3
Future Vol, veh/h	9	110	0	0	154	0	0	0	0	0	10	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	110	0	0	154	0	0	0	0	0	10	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.9	0	7.5
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	8%	0%	0%
Vol Thru, %	100%	92%	100%	77%
Vol Right, %	0%	0%	0%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	119	154	13
LT Vol	0	9	0	0
Through Vol	0	110	154	10
RT Vol	0	0	0	3
Lane Flow Rate	0	119	154	13
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.135	0.173	0.016
Departure Headway (Hd)	4.537	4.088	4.046	4.381
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	875	886	822
Service Time	2.538	2.126	2.079	2.381
HCM Lane V/C Ratio	0	0.136	0.174	0.016
HCM Control Delay	7.5	7.8	7.9	7.5
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.5	0.6	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	1143	10	72	440	28	479	100	96	31	120	229
Future Volume (vph)	239	1143	10	72	440	28	479	100	96	31	120	229
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.448			0.143			0.950			0.950		
Satd. Flow (perm)	799	3390	1517	255	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			279			279			279			279
Lane Group Flow (vph)	239	1143	10	72	440	28	479	100	96	31	120	229
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	18.0	62.0		14.6	58.6		28.0	37.9		15.5	25.4	
Total Split (%)	13.8%	47.7%		11.2%	45.1%		21.5%	29.2%		11.9%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	75.9	64.1	130.0	64.9	57.8	130.0	17.9	30.0	130.0	7.4	14.0	130.0
Actuated g/C Ratio	0.58	0.49	1.00	0.50	0.44	1.00	0.14	0.23	1.00	0.06	0.11	1.00
v/c Ratio	0.43	0.68	0.01	0.35	0.20	0.02	0.73	0.24	0.06	0.32	0.62	0.15
Control Delay	16.2	29.9	0.0	18.6	23.4	0.0	60.3	43.2	0.1	67.3	69.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	29.9	0.0	18.6	23.4	0.0	60.3	43.2	0.1	67.3	69.5	0.2
LOS	B	C	A	B	C	A	E	D	A	E	E	A
Approach Delay		27.3			21.6			49.2			27.6	
Approach LOS		C			C			D			C	
Queue Length 50th (m)	27.5	121.6	0.0	7.7	25.4	0.0	42.1	22.2	0.0	7.8	29.9	0.0
Queue Length 95th (m)	47.3	160.5	0.0	16.5	35.5	0.0	53.1	36.6	0.0	18.1	48.7	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	555	1671	1517	212	2166	1517	764	435	1517	112	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.68	0.01	0.34	0.20	0.02	0.63	0.23	0.06	0.28	0.49	0.15

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 39 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 72.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	6	173	183	3	106	253
Future Vol, veh/h	6	173	183	3	106	253
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	173	183	3	106	253
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.8	10.1	11
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	30%	0%	98%
Vol Thru, %	0%	3%	2%
Vol Right, %	70%	97%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	359	179	186
LT Vol	106	0	183
Through Vol	0	6	3
RT Vol	253	173	0
Lane Flow Rate	359	179	186
Geometry Grp	1	1	1
Degree of Util (X)	0.442	0.22	0.267
Departure Headway (Hd)	4.43	4.427	5.164
Convergence, Y/N	Yes	Yes	Yes
Cap	808	804	692
Service Time	2.479	2.492	3.23
HCM Lane V/C Ratio	0.444	0.223	0.269
HCM Control Delay	11	8.8	10.1
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.3	0.8	1.1

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	179	0	0	109	0	0	0	0	1	12	4
Future Vol, veh/h	7	179	0	0	109	0	0	0	0	1	12	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	179	0	0	109	0	0	0	0	1	12	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	7.7	0	7.5
HCM LOS	A	A	-	A

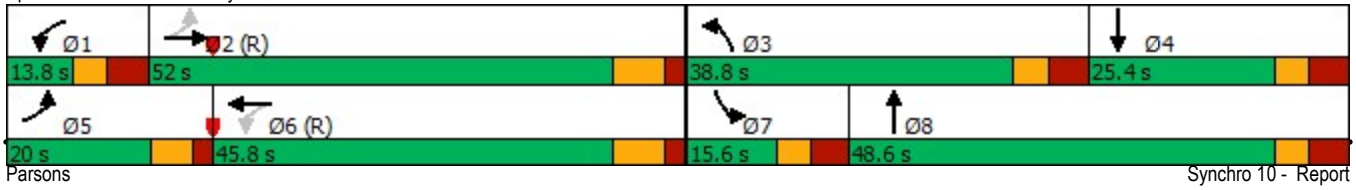
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	4%	0%	6%
Vol Thru, %	100%	96%	100%	71%
Vol Right, %	0%	0%	0%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	186	109	17
LT Vol	0	7	0	1
Through Vol	0	179	109	12
RT Vol	0	0	0	4
Lane Flow Rate	0	186	109	17
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.209	0.124	0.021
Departure Headway (Hd)	4.589	4.053	4.102	4.437
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	884	869	812
Service Time	2.59	2.087	2.151	2.437
HCM Lane V/C Ratio	0	0.21	0.125	0.021
HCM Control Delay	7.6	8.2	7.7	7.5
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.8	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	289	10	100	1280	18	990	66	47	33	126	300
Future Volume (vph)	215	289	10	100	1280	18	990	66	47	33	126	300
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.088			0.575			0.950			0.950		
Satd. Flow (perm)	157	3390	1517	1026	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			329			329			329			329
Lane Group Flow (vph)	215	289	10	100	1280	18	990	66	47	33	126	300
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	20.0	52.0		13.8	45.8		38.8	48.6		15.6	25.4	
Total Split (%)	15.4%	40.0%		10.6%	35.2%		29.8%	37.4%		12.0%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	64.4	48.3	130.0	49.8	42.4	130.0	30.4	42.6	130.0	7.5	14.2	130.0
Actuated g/C Ratio	0.50	0.37	1.00	0.38	0.33	1.00	0.23	0.33	1.00	0.06	0.11	1.00
v/c Ratio	0.84	0.23	0.01	0.23	0.81	0.01	0.89	0.11	0.03	0.34	0.65	0.20
Control Delay	57.8	29.6	0.0	22.4	45.6	0.0	58.6	32.1	0.0	67.9	70.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.8	29.6	0.0	22.4	45.6	0.0	58.6	32.1	0.0	67.9	70.4	0.3
LOS	E	C	A	C	D	A	E	C	A	E	E	A
Approach Delay		40.8			43.3			54.5			24.4	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	37.9	27.7	0.0	13.9	114.6	0.0	86.4	12.4	0.0	8.3	31.4	0.0
Queue Length 95th (m)	#86.0	39.0	0.0	25.9	133.8	0.0	103.1	22.9	0.0	19.1	50.7	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	260	1260	1517	432	1589	1517	1161	596	1517	113	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.23	0.01	0.23	0.81	0.01	0.85	0.11	0.03	0.29	0.51	0.20

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 44.0 Intersection LOS: D
Intersection Capacity Utilization 90.1% 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: Dairy & OR174



Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	136	295	9	199	104
Future Vol, veh/h	4	136	295	9	199	104
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	136	295	9	199	104
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.6	11.9	11.5
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	66%	0%	97%
Vol Thru, %	0%	3%	3%
Vol Right, %	34%	97%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	303	140	304
LT Vol	199	0	295
Through Vol	0	4	9
RT Vol	104	136	0
Lane Flow Rate	303	140	304
Geometry Grp	1	1	1
Degree of Util (X)	0.414	0.175	0.427
Departure Headway (Hd)	4.916	4.512	5.056
Convergence, Y/N	Yes	Yes	Yes
Cap	727	785	708
Service Time	2.984	2.592	3.123
HCM Lane V/C Ratio	0.417	0.178	0.429
HCM Control Delay	11.5	8.6	11.9
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2	0.6	2.1

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	141	0	0	207	0	0	0	0	0	10	3
Future Vol, veh/h	9	141	0	0	207	0	0	0	0	0	10	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	141	0	0	207	0	0	0	0	0	10	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	8.4	0	7.6
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	6%	0%	0%
Vol Thru, %	100%	94%	100%	77%
Vol Right, %	0%	0%	0%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	150	207	13
LT Vol	0	9	0	0
Through Vol	0	141	207	10
RT Vol	0	0	0	3
Lane Flow Rate	0	150	207	13
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.172	0.234	0.016
Departure Headway (Hd)	4.719	4.124	4.069	4.56
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	864	880	790
Service Time	2.719	2.174	2.11	2.56
HCM Lane V/C Ratio	0	0.174	0.235	0.016
HCM Control Delay	7.7	8	8.4	7.6
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.6	0.9	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	267	1196	10	75	460	29	536	104	101	35	133	282
Future Volume (vph)	267	1196	10	75	460	29	536	104	101	35	133	282
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.419			0.123			0.950			0.950		
Satd. Flow (perm)	748	3390	1517	219	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			329			329			329			329
Lane Group Flow (vph)	267	1196	10	75	460	29	536	104	101	35	133	282
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	22.0	61.0		14.0	53.0		29.6	38.4		16.6	25.4	
Total Split (%)	16.9%	46.9%		10.8%	40.8%		22.8%	29.5%		12.8%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	75.1	62.2	130.0	60.5	53.6	130.0	19.4	31.6	130.0	7.9	14.6	130.0
Actuated g/C Ratio	0.58	0.48	1.00	0.47	0.41	1.00	0.15	0.24	1.00	0.06	0.11	1.00
v/c Ratio	0.50	0.74	0.01	0.41	0.23	0.02	0.75	0.24	0.07	0.34	0.67	0.19
Control Delay	18.1	32.8	0.0	22.5	26.6	0.0	59.9	42.0	0.1	67.0	71.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	32.8	0.0	22.5	26.6	0.0	59.9	42.0	0.1	67.0	71.2	0.3
LOS	B	C	A	C	C	A	E	D	A	E	E	A
Approach Delay		30.0			24.7			49.2			26.4	
Approach LOS		C			C			D			C	
Queue Length 50th (m)	33.0	135.6	0.0	8.4	28.3	0.0	47.1	22.6	0.0	8.7	33.1	0.0
Queue Length 95th (m)	54.4	174.1	0.0	17.5	39.9	0.0	58.4	37.6	0.0	19.5	53.3	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	553	1622	1517	185	2009	1517	823	449	1517	126	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.74	0.01	0.41	0.23	0.02	0.65	0.23	0.07	0.28	0.54	0.19

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 39 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 33.0	Intersection LOS: C
Intersection Capacity Utilization 82.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	6	229	183	3	138	253
Future Vol, veh/h	6	229	183	3	138	253
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	229	183	3	138	253
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.5	10.5	12.3
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	35%	0%	98%
Vol Thru, %	0%	3%	2%
Vol Right, %	65%	97%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	391	235	186
LT Vol	138	0	183
Through Vol	0	6	3
RT Vol	253	229	0
Lane Flow Rate	391	235	186
Geometry Grp	1	1	1
Degree of Util (X)	0.5	0.296	0.276
Departure Headway (Hd)	4.608	4.536	5.341
Convergence, Y/N	Yes	Yes	Yes
Cap	774	783	666
Service Time	2.675	2.617	3.429
HCM Lane V/C Ratio	0.505	0.3	0.279
HCM Control Delay	12.3	9.5	10.5
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.8	1.2	1.1

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	236	0	0	141	0	0	0	0	1	12	4
Future Vol, veh/h	8	236	0	0	141	0	0	0	0	1	12	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	236	0	0	141	0	0	0	0	1	12	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	8	0	7.7
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	3%	0%	6%
Vol Thru, %	100%	97%	100%	71%
Vol Right, %	0%	0%	0%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	244	141	17
LT Vol	0	8	0	1
Through Vol	0	236	141	12
RT Vol	0	0	0	4
Lane Flow Rate	0	244	141	17
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.276	0.162	0.022
Departure Headway (Hd)	4.784	4.075	4.146	4.629
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	878	857	778
Service Time	2.785	2.12	2.21	2.629
HCM Lane V/C Ratio	0	0.278	0.165	0.022
HCM Control Delay	7.8	8.7	8	7.7
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	1.1	0.6	0.1

Appendix M

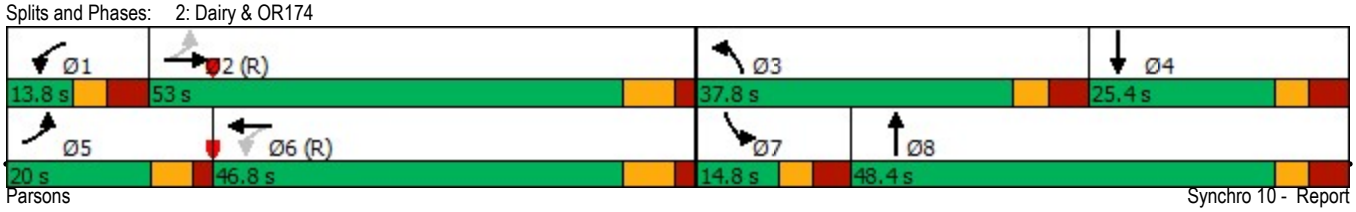
SYNCHRO Capacity Analysis: Total Projected Conditions if TOD Targets not Met

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	289	10	100	1280	19	990	69	47	35	133	327
Future Volume (vph)	226	289	10	100	1280	19	990	69	47	35	133	327
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.088			0.575			0.950			0.950		
Satd. Flow (perm)	157	3390	1517	1026	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			329			329			329			329
Lane Group Flow (vph)	226	289	10	100	1280	19	990	69	47	35	133	327
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	20.0	53.0		13.8	46.8		37.8	48.4		14.8	25.4	
Total Split (%)	15.4%	40.8%		10.6%	36.0%		29.1%	37.2%		11.4%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	65.0	48.7	130.0	49.3	42.0	130.0	29.8	42.7	130.0	7.2	14.6	130.0
Actuated g/C Ratio	0.50	0.37	1.00	0.38	0.32	1.00	0.23	0.33	1.00	0.06	0.11	1.00
v/c Ratio	0.86	0.23	0.01	0.23	0.81	0.01	0.90	0.12	0.03	0.37	0.67	0.22
Control Delay	60.0	29.2	0.0	22.1	46.0	0.0	60.6	32.2	0.0	70.3	71.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	29.2	0.0	22.1	46.0	0.0	60.6	32.2	0.0	70.3	71.2	0.3
LOS	E	C	A	C	D	A	E	C	A	E	E	A
Approach Delay		41.9			43.6			56.3			24.3	
Approach LOS		D			D			E			C	
Queue Length 50th (m)	41.0	27.4	0.0	13.8	113.3	0.0	87.3	13.1	0.0	8.8	33.1	0.0
Queue Length 95th (m)	#91.9	38.5	0.0	25.5	132.3	0.0	#105.5	24.0	0.0	19.8	53.3	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	264	1271	1517	427	1575	1517	1125	596	1517	103	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.23	0.01	0.23	0.81	0.01	0.88	0.12	0.03	0.34	0.54	0.22

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 44.6 Intersection LOS: D
Intersection Capacity Utilization 90.7% 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: Dairy & OR174



Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	136	330	9	199	118
Future Vol, veh/h	4	136	330	9	199	118
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	136	330	9	199	118
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.7	12.9	12
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	63%	0%	97%
Vol Thru, %	0%	3%	3%
Vol Right, %	37%	97%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	317	140	339
LT Vol	199	0	330
Through Vol	0	4	9
RT Vol	118	136	0
Lane Flow Rate	317	140	339
Geometry Grp	1	1	1
Degree of Util (X)	0.439	0.179	0.48
Departure Headway (Hd)	4.986	4.606	5.102
Convergence, Y/N	Yes	Yes	Yes
Cap	716	769	702
Service Time	3.064	2.699	3.179
HCM Lane V/C Ratio	0.443	0.182	0.483
HCM Control Delay	12	8.7	12.9
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.2	0.6	2.6

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	141	0	0	207	0	0	0	0	0	10	3
Future Vol, veh/h	9	141	0	0	207	0	0	0	0	0	10	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	141	0	0	207	0	0	0	0	0	10	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	8.4	0	7.6
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	6%	0%	0%
Vol Thru, %	100%	94%	100%	77%
Vol Right, %	0%	0%	0%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	150	207	13
LT Vol	0	9	0	0
Through Vol	0	141	207	10
RT Vol	0	0	0	3
Lane Flow Rate	0	150	207	13
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.172	0.234	0.016
Departure Headway (Hd)	4.719	4.124	4.069	4.56
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	864	880	790
Service Time	2.719	2.174	2.11	2.56
HCM Lane V/C Ratio	0	0.174	0.235	0.016
HCM Control Delay	7.7	8	8.4	7.6
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	0.6	0.9	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	322	1196	10	75	460	33	536	118	101	37	144	322
Future Volume (vph)	322	1196	10	75	460	33	536	118	101	37	144	322
Satd. Flow (prot)	1695	3390	1517	1695	4871	1517	4780	1784	1517	1695	1784	1517
Flt Permitted	0.414			0.133			0.950			0.950		
Satd. Flow (perm)	739	3390	1517	237	4871	1517	4780	1784	1517	1695	1784	1517
Satd. Flow (RTOR)			329			329			329			329
Lane Group Flow (vph)	322	1196	10	75	460	33	536	118	101	37	144	322
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	25.2		12.5	25.2		12.2	25.4		11.9	25.4	
Total Split (s)	27.0	63.0		14.0	50.0		27.6	38.3		14.7	25.4	
Total Split (%)	20.8%	48.5%		10.8%	38.5%		21.2%	29.5%		11.3%	19.5%	
Yellow Time (s)	4.0	5.1		3.3	5.1		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.1		4.2	2.1		3.9	4.1		3.6	4.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	7.2		7.5	7.2		7.2	7.4		6.9	7.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min		None	Min	
Act Effct Green (s)	75.6	62.7	130.0	57.3	50.8	130.0	18.8	32.2	130.0	7.2	15.0	130.0
Actuated g/C Ratio	0.58	0.48	1.00	0.44	0.39	1.00	0.14	0.25	1.00	0.06	0.12	1.00
v/c Ratio	0.58	0.73	0.01	0.41	0.24	0.02	0.77	0.27	0.07	0.40	0.70	0.21
Control Delay	19.5	32.1	0.0	23.4	28.6	0.0	61.8	42.0	0.1	71.9	72.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	32.1	0.0	23.4	28.6	0.0	61.8	42.0	0.1	71.9	72.9	0.3
LOS	B	C	A	C	C	A	E	D	A	E	E	A
Approach Delay		29.2			26.2			50.4			26.4	
Approach LOS		C			C			D			C	
Queue Length 50th (m)	42.0	137.2	0.0	8.5	29.7	0.0	47.1	25.7	0.0	9.3	35.8	0.0
Queue Length 95th (m)	64.3	169.2	0.0	16.9	41.4	0.0	59.6	42.0	0.0	20.9	57.1	0.0
Internal Link Dist (m)		572.1			692.6			218.7			259.5	
Turn Bay Length (m)	150.0		30.0	150.0		30.0	200.0		30.0	150.0		30.0
Base Capacity (vph)	584	1635	1517	182	1904	1517	750	450	1517	101	247	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.73	0.01	0.41	0.24	0.02	0.71	0.26	0.07	0.37	0.58	0.21

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 39 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 33.1	Intersection LOS: C
Intersection Capacity Utilization 82.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Dairy & OR174

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	6	229	236	3	138	326
Future Vol, veh/h	6	229	236	3	138	326
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	229	236	3	138	326
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.3	12.1	15.6
HCM LOS	B	B	C

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	30%	0%	99%
Vol Thru, %	0%	3%	1%
Vol Right, %	70%	97%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	464	235	239
LT Vol	138	0	236
Through Vol	0	6	3
RT Vol	326	229	0
Lane Flow Rate	464	235	239
Geometry Grp	1	1	1
Degree of Util (X)	0.625	0.323	0.377
Departure Headway (Hd)	4.852	4.944	5.679
Convergence, Y/N	Yes	Yes	Yes
Cap	747	726	633
Service Time	2.852	2.987	3.723
HCM Lane V/C Ratio	0.621	0.324	0.378
HCM Control Delay	15.6	10.3	12.1
HCM Lane LOS	C	B	B
HCM 95th-tile Q	4.4	1.4	1.8

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	236	0	0	141	0	0	0	0	1	12	4
Future Vol, veh/h	8	236	0	0	141	0	0	0	0	1	12	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	236	0	0	141	0	0	0	0	1	12	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	8	0	7.7
HCM LOS	A	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	3%	0%	6%
Vol Thru, %	100%	97%	100%	71%
Vol Right, %	0%	0%	0%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	244	141	17
LT Vol	0	8	0	1
Through Vol	0	236	141	12
RT Vol	0	0	0	4
Lane Flow Rate	0	244	141	17
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.276	0.162	0.022
Departure Headway (Hd)	4.784	4.075	4.146	4.629
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	878	857	778
Service Time	2.785	2.12	2.21	2.629
HCM Lane V/C Ratio	0	0.278	0.165	0.022
HCM Control Delay	7.8	8.7	8	7.7
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	1.1	0.6	0.1