Kanata Highlands: Phase 1
Kanata, Ontario

• TRAFFIC IMPACT STUDY •

August 27, 2013

Delcan 60th ANNIVERSARY

Address Terry Fox Drive TIS

File # TO1170TON00

Date 27 August 2013

Check List

- ❑ Municipal address; N/A
- ☑ Location relative to major elements of the existing transportation system (e.g., the site is located in the southwest quadrant of the intersection of Main Street/ First Street, 600 metres from the Maple Street Rapid Transit Station);
- ❑ Existing land uses or permitted use provisions in the Official Plan, Zoning By-law, etc.; N/A
- ☑ Proposed land uses and relevant planning regulations to be used in the analysis;
- ☑ Proposed development size (building size, number of residential units, etc.) and location on site;
- ☑ Estimated date of occupancy;
- ☑ Planned phasing of development;
- ❑ Proposed number of parking spaces (not relevant for Draft Plans of Subdivision); and N/A
- ☑ Proposed access points and type of access (full turns, right-in/ right-out, turning restrictions, etc.
- ☑ Study area;
- ☑ Time periods and phasing; and
- ☑ Horizon years (include reference to phased development).

Existing Conditions

- ☑ Existing roads and ramps in the study area, including jurisdiction, classification, number of lanes, and posted speed limit;
- ☑ Existing intersections, indicating type of control, lane configurations, turning restrictions, and any other relevant data (e.g., extraordinary lane widths, grades, etc.);
- ☑ Existing access points to adjacent developments (both sides of all roads bordering the site);
- ☑ Existing transit system, including stations and stops;
- ☑ Existing on- and off-road bicycle facilities and pedestrian sidewalks and pathway networks;
- ☑ Existing system operations (V/C, LOS); and

❑ Major trip generators/ attractors within the Study Area should be indicated. N/A

Demand Forecasting

☑ General background growth;

☑ Other study area developments;

☑ Changes to the study area road network;

☑ Future background system operations (V/C, LOS, queue lengths):

☑ Trip generation rates;

☑ Trip distribution and assignment:

Impact Analysis

☑ Total future system operations (V/C, LOS, queue lengths);

☑ Signal and auxiliary lane (device) warrants;

❑ Operational/ safety assessment (e.g., sight line assessment where grades are an issue); N/A

☑ Storage analysis for closely spaced intersections;

☑ Pedestrian and bicycle network connections and continuity;

☑ On-site circulation and design;

❑ Potential for neighbourhood impacts; and N/A

❑ TDM. N/A

☑ Synchro Files

CTS

Impact Analysis

❑ Network Capacity Analysis;

❑ Non-auto network connections and continuity;

❑ Potential for community impacts, and

❑ TDM.

❑ Synchro Files

❑ Screenline Analysis

Kanata Highlands: Phase 1

Traffic Impact Study

prepared for:

Richcraft
2280 St. Laurent Boulevard
Suite 201
Ottawa, ON K1G 4K1

prepared by:

1223 Michael Street
Suite 100
Ottawa, ON K1J 7T2

August 27, 2013

TO1170TON00

Table of Contents

List of Figures

List of Tables

Appendices

1. INTRODUCTION

Richcraft is proposing a 457 unit residential subdivision on the lands in Kanata located adjacent to the south of Terry Fox Drive between Richardson Side Road and Second Line Road approximately midway. The site's context is shown in Figure 1 and the Site Plan is shown on Figure 2. As shown on the Site Plan, Phase 1 two roadway connections are proposed to Terry Fox Drive and one is shown connecting to the residential subdivision adjacent to the south.

Figure 1: Local Context

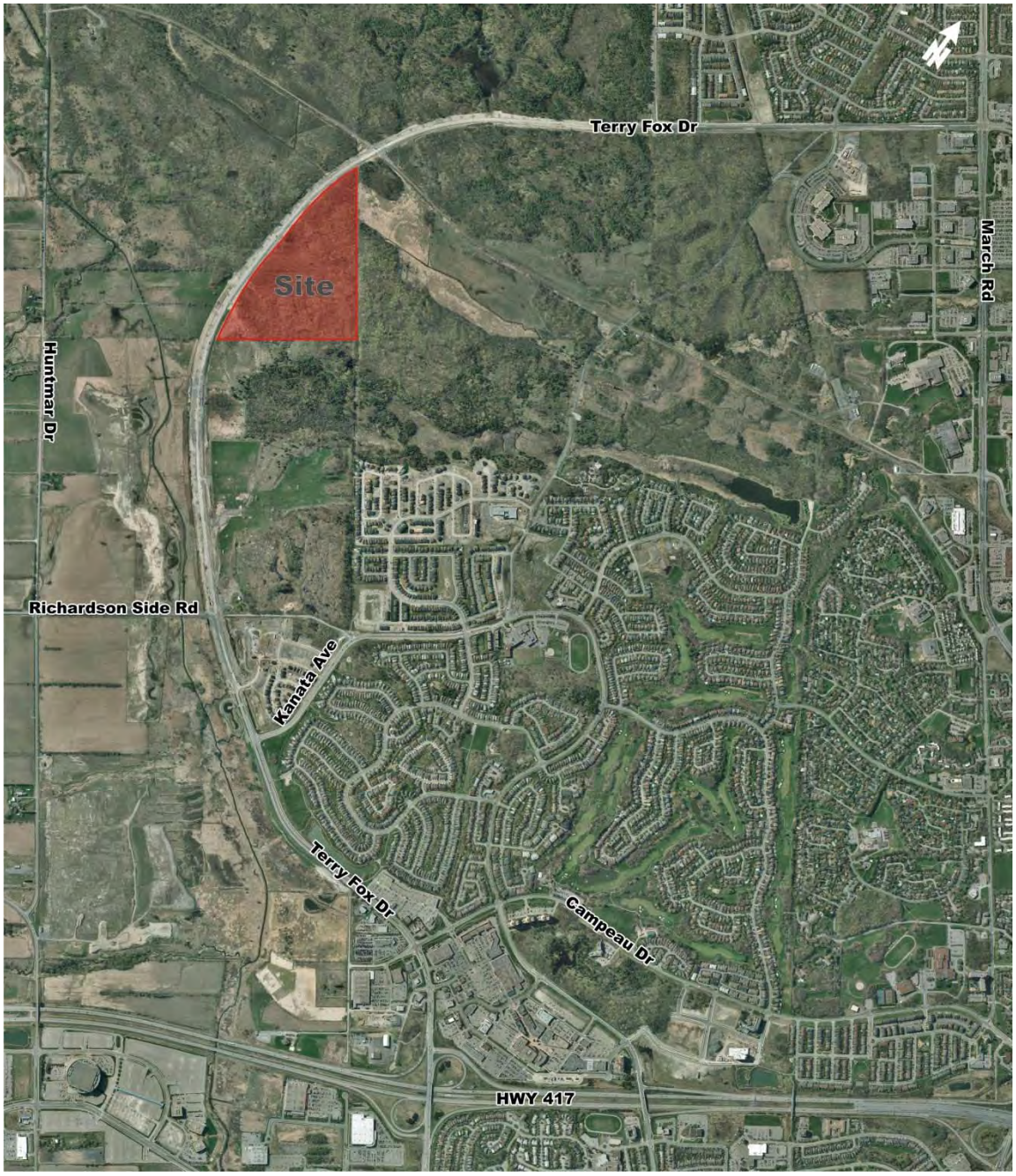
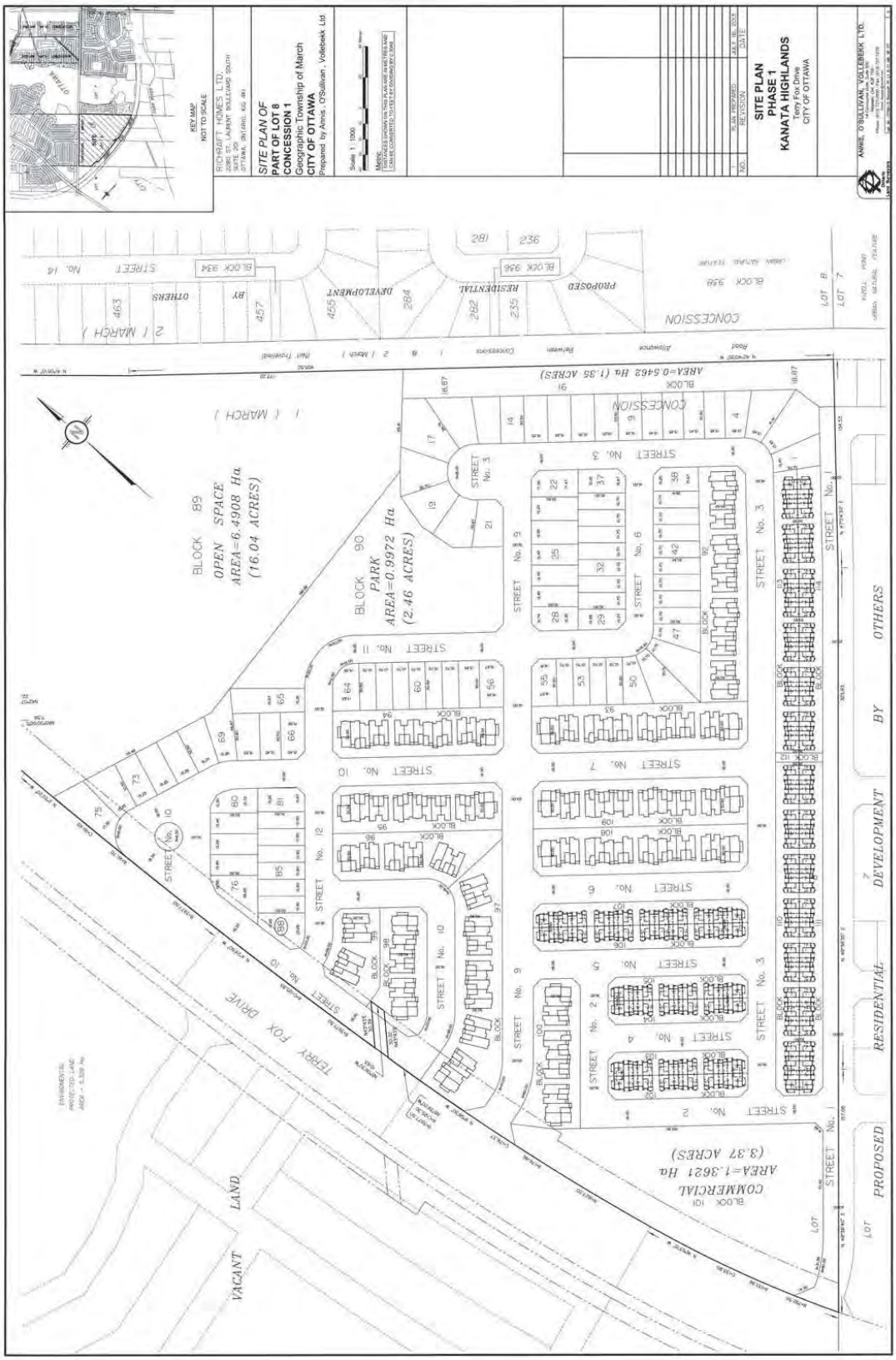


Figure 2: Preliminary Site Plan



2. SCOPE OF WORK

The scope of work for the required transportation study was discussed with the City's Ed Blaszynski, Program Manager, Infrastructure Approvals. As the proposed subdivision is at the current edge of urban development, and as Terry Fox Drive has significant spare capacity at its existing two lanes (planned for four lanes ultimately), the following was agreed to:

- A Traffic Impact Study is required but a screenline analysis and study area collision analysis is not required; and
- The primary focus should be on local issues including; current Terry Fox Drive peak hour volumes, site intersection spacing and requirements, internal street layout and pedestrian and bicycle network connectivity.

The following TIS addresses these topics.

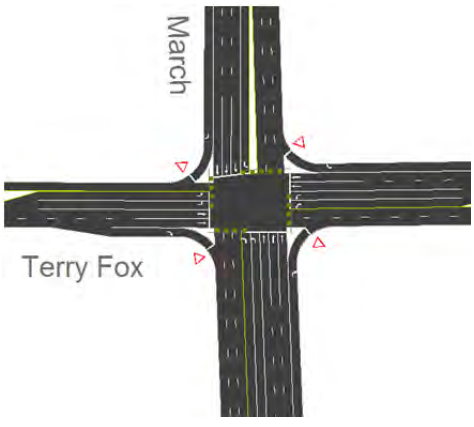
3. EXISTING TRANSPORTATION CONDITIONS

This section focuses on Terry Fox Drive, which now extends from March Road in the east to Highway 417 and beyond in the west/southwest. Over much of its length, and adjacent to the site, it exists as the first two lanes of an ultimate four-lane divided arterial. Currently, the south two lanes are built, with its south edge being urban and its north edge being rural. Proceeding from south to north the existing road cross-section is comprised of an asphalt multi-use pathway, street lighting, a boulevard, curbing, a bike lane, two paved lanes (one each direction), a wide paved shoulder and a ditch.

The key intersections on either side of the subject site are Terry Fox/Kanata Avenue to the southwest and Terry Fox/March Road to the east.

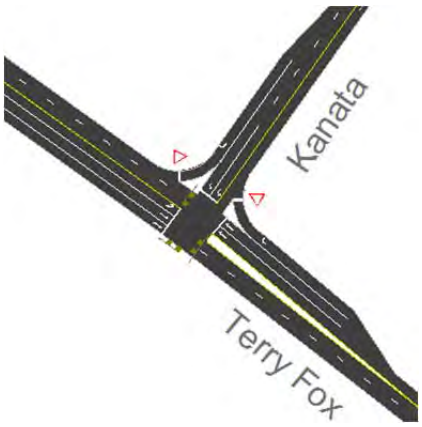
Terry Fox / March

The Terry Fox/March intersection is a signalized four-legged intersection. The east and westbound approaches consist of double left-turn lanes, two through lanes and single channelized right-turn lanes. The northbound approach consists of two left-turn lanes, three through lane and a single channelized right-turn lane. The southbound approach consists of a single left-turn lane, three through lanes and a single channelized right-turn lane. All movements are permitted at this location. Terry Fox Drive at this location has a sidewalk on the south side and bicycle lanes in both directions.



Terry Fox / Kanata

The Terry Fox/Kanata intersection is a signalized three-legged intersection. The northbound approach consists of two through lanes and a channelized right-turn lane. The southbound approach consists of a single left-turn lane and two through lanes. The westbound approach consists of two left-turn lanes and a channelized right-turn lane. All movements are permitted at this location. Terry Fox Drive at this location also has a sidewalk on the east side and bicycle lanes in both directions.



In the vicinity of Huntsville Drive located to the north of Kanata Avenue, the road's cross-section transitions down to a two-lane road, which extends to the subject site and beyond with the above-noted two-lane cross-section.

With regard to traffic volumes, the City's most current peak hour intersection counts at the Terry Fox/Kanata and Terry Fox/March intersections are included in Appendix A and summarized as follows in Figure 3. As noted, two-way peak our volumes adjacent to the site are approximately 1000 vph during the morning peak hour and 1200 vph during the afternoon peak hour, with peak directional volumes ranging from approximately 500 vph to 725 vph. At these volumes, there remains significant available capacity within the existing two-lane road, and even more if/when Terry Fox is widened to a four-lane divided road.

Figure 3: Current Study Area Traffic Volumes

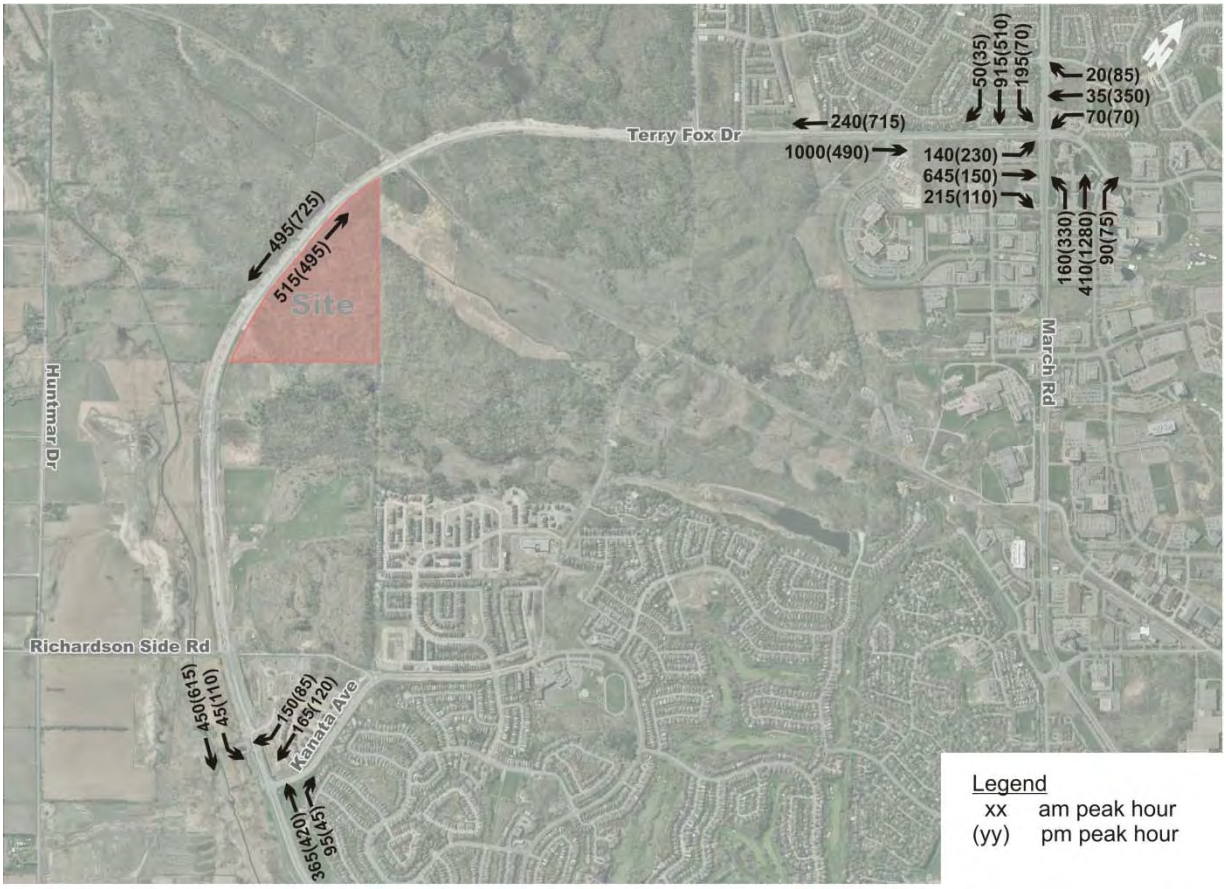


Table 1 provides a summary of existing traffic operations at study area intersections based on the SYNCHRO (V8) traffic analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the critical movement(s). The subject intersections "as a whole" were assessed based on a weighted v/c ratio and the Synchro model output of existing conditions is provided within Appendix B.

As shown in Table 1, the two key study area signalized intersections "as a whole" operate at an excellent Level of Service 'A' during both peak periods. With regard to the "critical movement", it is an excellent LoS 'A' for the Kanata/Terry Fox intersection and at capacity (LoS 'E') for the eastbound left-turn movement during the afternoon peak hour at the March/Terry Fox intersection. During the morning peak hour, it is at an acceptable Los 'C' for the southbound left-turn movement.

With regard to existing transit service, there is currently none adjacent to the site. Further to the east, Route 60 runs on Terry Fox Drive between March Road and Flamborough Way. Once the subject subdivision is developed, transit routing adjustments will be required.

Table 1: Existing Intersection Operation

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection as a Whole		
	LoS	Max. v/c or avg. delay(s)	Movement	Delay(s)	LoS	v/c
March/Terry Fox	C(E)	0.79(0.94)	SBL(EBL)	38.3(37.1)	A(A)	0.59(0.57)
Kanata/Terry Fox	A(A)	0.43(0.26)	SBR(SBR)	8.7(6.9)	A(A)	0.26(0.25)
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.						

4. PLANNED TRANSPORTATION NETWORK MODIFICATIONS

Within the general study area, the three major road projects are; the widening (8 lanes) of Highway 417 west to Carp Road, the extension of Campeau Drive west to Huntmar Drive and the four-laning of the balance of Terry Fox Drive from Kanata Avenue to March Road. Current schedules are as follows, however, as the City is currently finalizing its Updated TMP, these dates could change.

- Highway 417 widening to Carp Road 2013/2014
- Campeau Drive extension to Huntmar Drive 2014/2015
- Terry Fox Widening to four lanes 2023-2031

With regard to transit, the Environmental Assessment Study for the Transitway Extension west and south to Fernbank Road, and north along March Road to Terry Fox Drive, has been completed. Current timing for its implementation is:

- Transitway: Eagleson to Canadian Tire Centre – Phase 1, Increment 3; and
- Transitway: March Road, Eagleson to Klondike – Phase 2.

5. SITE PLAN TRAFFIC GENERATION, DISTRIBUTION AND ASSIGNMENT

5.1 Traffic Generation

Richcraft's proposed subdivision will consist of approximately 117 single family homes and 340 townhomes. The appropriate trip generation rate for the proposed land use was obtained from the 8th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual and is summarized in Table 2.

Table 2: ITE Vehicle Trip Generation Rates

Land Use	Data Source	Trip Rate	
		AM Peak	PM Peak
Single Family Grove	ITE 210	0.75	1.01
Residential TownGroves	ITE 231	0.44	0.52

As ITE trip generation surveys only record vehicle trips and typically reflect highly suburban locations (with little to no access by travel modes other than private automobiles), adjustment factors appropriate to areas where quality transit service will be available.

To convert ITE vehicle trip rates to person trips, an auto occupancy factor and a non-auto trip factor were applied to the ITE vehicle trip rates. Our review of the available literature suggests that a combined factor of approximately 1.3 is considered reasonable to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%. The modified person trip generation rates for the prosed subdivision are summarized in Table 3 with the resultant person trip generation shown in Table 4.

Table 3: ITE Vehicle Trip Generation Rates

Land Use	Data Source	Trip Rate		
		AM Peak	PM Peak	SAT Peak
Single Family Homes	ITE 210	0.75	1.00	0.00
Townhouses	ITE 230	0.44	0.52	0.00

Modified Person Trip Generation Rates

Land Use	Data Source	Person Trip Rate		
		AM Peak	PM Peak	SAT Peak
Single Family Homes	ITE 210	0.98	1.30	0.00
Townhouses	ITE 230	0.57	0.68	0.00
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
Single Family Homes	ITE 210	T= 0.70(x) + 9.74	Ln(T)= 0.90(x) + 0.51
Townhouses	ITE 230	Ln(T)= 0.80(x) + 0.26	Ln(T)= 0.82(x) + 0.32

Table 4: Modified Person Trip Generation

Land Use	Data Source	Area	AM Peak (Persons/hr)			PM Peak (Persons/hr)		
			In	Out	Total	In	Out	Total
		Units	25%	75%		63%	37%	
Single Family Homes	ITE 210	117 ft²	29	90	119	98	59	157
		Units	17%	83%		67%	33%	
Townhouses	ITE 230	340 ft²	30	149	179	142	71	213
		Total	**59**	**239**	**298**	**240**	**130**	**370**

As shown in Table 5, the resulting number of potential "new" two-way vehicle trips generated by the proposed subdivision and approximately 180 veh/h and 223 veh/h during the morning and afternoon peak hours, respectively. It is these volumes that will be assigned to the proposed site intersections and the study area's signalized intersections to determine impacts and requirements.

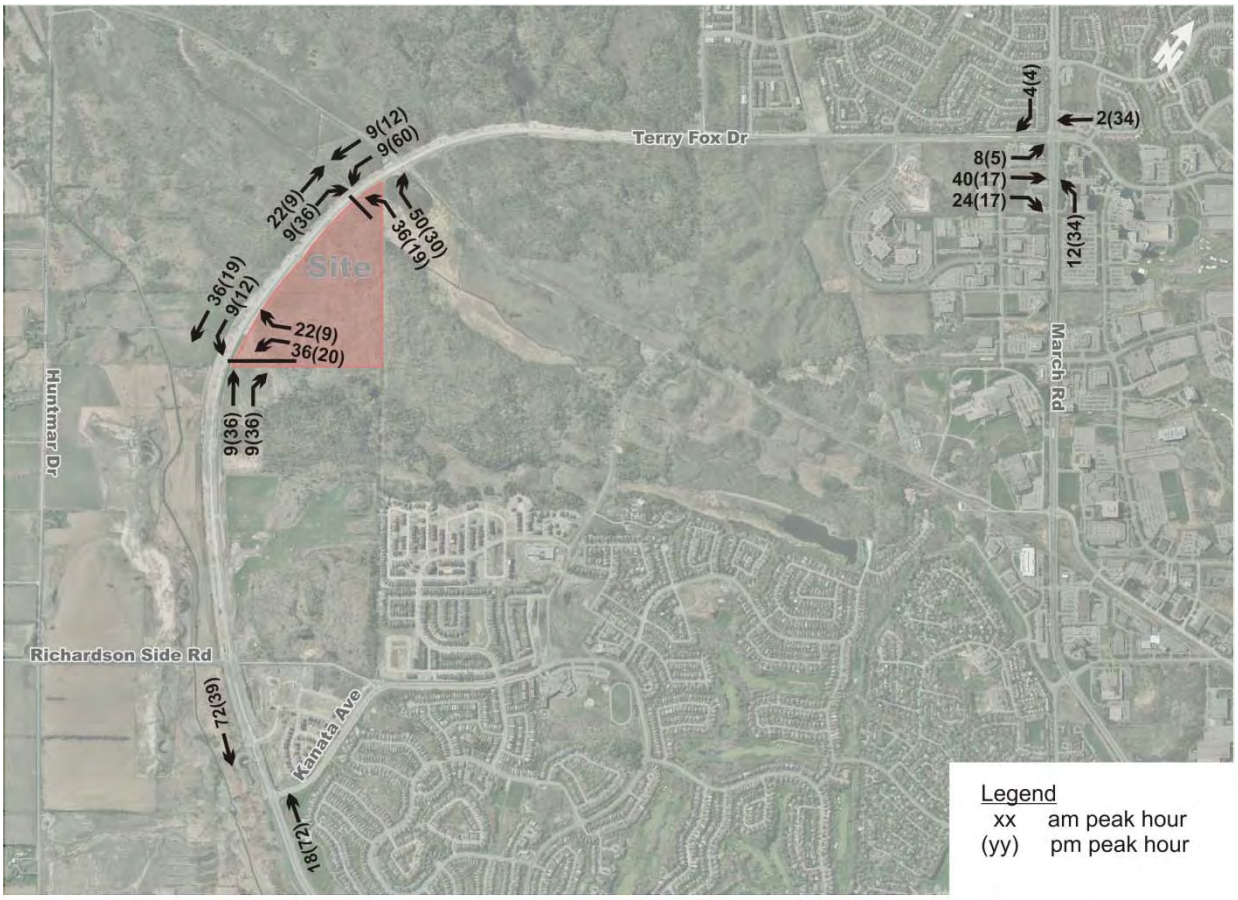
Table 5: Total Site Trip Generation

Travel Mode	Mode Share	AM Peak (Persons/hr)			PM Peak (Persons/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	60%	36	144	180	144	78	222
Auto Passenger	15%	8	35	43	36	19	55
Transit	20%	12	48	60	48	26	74
Non-motorized	5%	3	12	15	12	7	19
Total Person Trips	100%	59	239	298	240	130	370
Total 'New' Auto Trips		**36**	**144**	**180**	**144**	**78**	**222**

5.2 Traffic Distribution and Assignment

Traffic distribution is impacted by a number of factors when considering a residential site plan. Included are locations of employment and retail, subdivision driveway connections to adjacent arterial roads and connectivity to the area's main commuter/highway routes. In this particular instance, another excellent indicator of traffic distribution is the existing turning movements at the Kanata Avenue/Terry Fox Drive intersection. Although this intersection is located closer to the Highway 417 interchange than it is to March Road, it is a good reference. At this intersection, the distribution is approximately 60% to the south towards the Highway 417 interchange and 40% to the northeast to the March Road intersection. As the Richcraft subdivision is approximately 0.5 km to 1 km closer to March Road than is the Kanata/Terry Fox intersection, it would be reasonable to assume that the directional split for its traffic generation is 50% to/from the south via Terry Fox to Highway 417 and 50% to/from the east via Terry Fox Drive to March Road. Applying this distribution to the Table 5 projected peak hour traffic generation and assigning it to the subdivision's two proposed roadway connections to Terry Fox Drive results in the traffic assignment depicted in Figure 4. It is noteworthy that the percentage distribution at the Terry Fox/March intersection is approximately the same as existing conditions.

Figure 4: Site-Generated Peak Hour Traffic Assignment

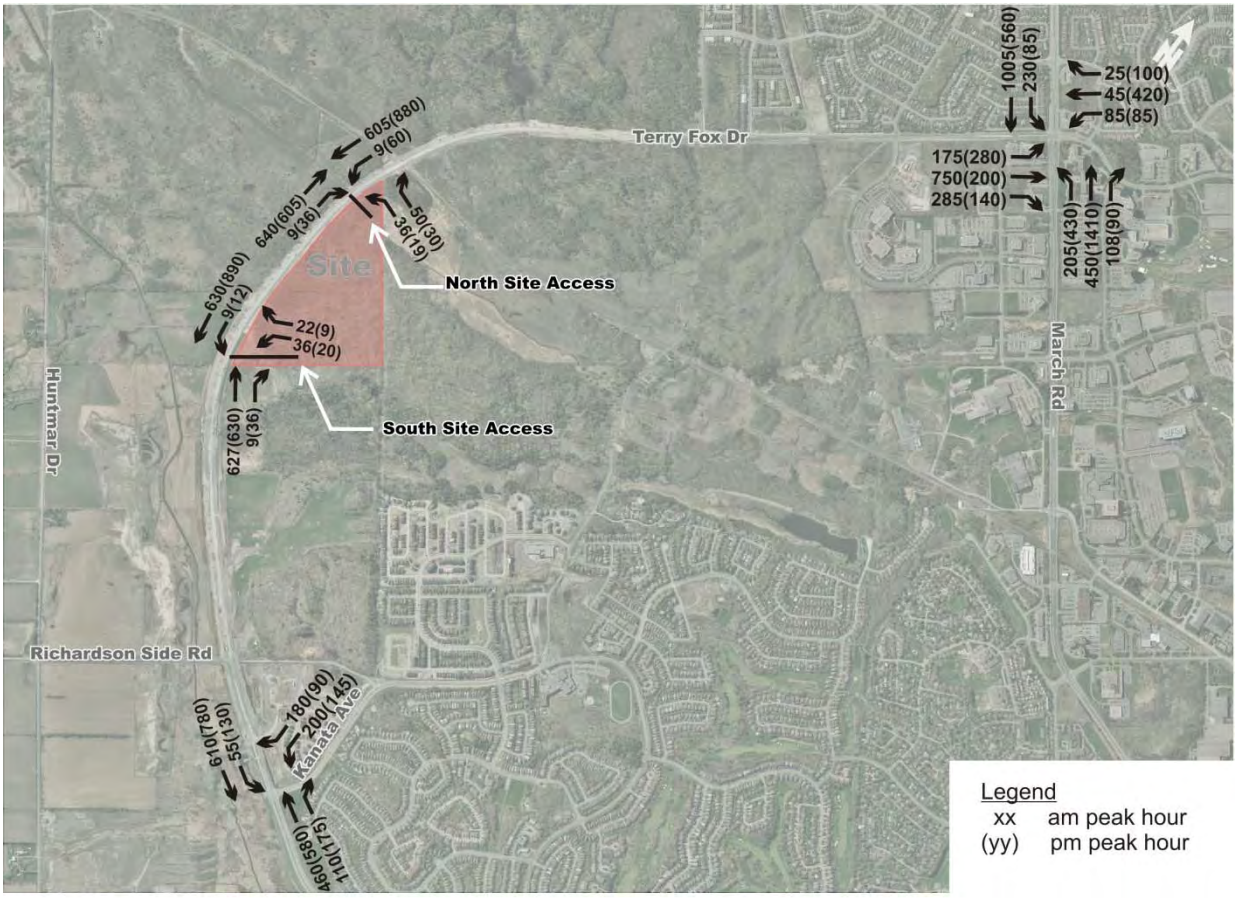


6. TOTAL PROJECTED TRAFFIC CONDITIONS

Total projected traffic conditions typically are for a "horizon year" which is 5 years beyond full build-out. As an approximate 457 unit subdivision typically takes 3 to 4 years to be built and occupied, and as the project will not start construction for a year or two, it is realistic to assume a build-out of 4 to 5 years from now. This would be approximately 2017, with a resultant horizon year of 2022.

As Terry Fox Drive has only recently been open for its full length in Kanata North, meaningful background traffic growth data is not available. Therefore, as a default, we are assuming an approximate 2% annual background traffic growth rate for applicable volumes, which translates to an approximate 20% growth in current volumes by the horizon year. The combination of 20% growth in existing applicable volumes plus projected site-generated traffic (Figure 4) are depicted in Figure 5. It is noteworthy that the significant north-south movements on March Road through the Terry Fox Drive intersection were only increased by 10% due to their currently high absolute value compared to the other movements at this location.

Figure 5: Total Projected Horizon Year Traffic Volumes



The projected intersection operation and requirements for the total projected horizon year traffic conditions (background traffic growth + site-generated traffic as per Figure 5) were determined using the SYNCHRO (V8) traffic analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio 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 and the Synchro model output of horizon year conditions ask provided within Appendix C. Projected intersection performance is summarized in Table 6.

Table 6: Projected Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection as a Whole		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
March/Terry Fox	D(F)	0.85(1.16)	SBL(EBL)	42.0(46.7)	B(C)	0.66(0.71)
Kanata/Terry Fox	A(A)	0.47(0.35)	SBR(EBT)	8.9(7.6)	A(A)	0.32(0.34)
Terry Fox/Site North	D(D)	25.5(32.3)	NBL(NBL)	1.8(2.1)	-	-
Terry/Fox/Site South	D(E)	27.8(37.3)	WBL(WBL)	1.3(0.9)	-	-
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.						

As noted in Table 6, both the March/Terry Fox and Kanata/Terry Fox "intersections as a whole" are continuing to operate at very good levels of service in the Los 'A' to 'C' range. With regard to the "critical movements", there are none (LoS 'A') at the Kanata/Terry Fox intersection. At the March/Terry Fox intersection, the growth in background traffic during the afternoon peak hour reduces the "critical" eastbound left-turn from LoS 'E' to LoS 'F'. As double eastbound left-turn lanes already exist, possible mitigative measures to improve the Level of Service for the eastbound left-turn movement from LoS 'F' to LoS 'D' at the March/Terry Fox intersection include optimizing signal timing phasing (Appendix D).

With regard to the two proposed site driveways, based on high volumes along Terry Fox Drive, auxiliary left turn lanes are warranted at both site driveways. The left-turn warrant analysis is included as Appendix E. All-way STOP control and signal control warrant analysis was also performed at the site driveway connections. Based on the low projected peak volume entering the proposed development, neither all-way STOP or signal control are initially warranted at either location (Appendix F) for these initial conditions.

With regard to turn lane requirements at the site's North and South Accesses, they are as follows for the volumes shown in Figure 5.
North Site Access:

- WB left-turn lane = 21 m
- EB right-turn lane = 12 m
- NB left-turn lane = 18 m

South Site Access:

- NB right-turn lane = 12 m
- SB left-turn lane = 7 m
- WB left-turn lane = 12 m

It is noteworthy in reviewing the Figure 2 Site Plan that there is a Commercial Block located in the northwest corner of the Terry Fox/South Site Access intersection that is not part of the Site Plan Application. Regardless, its traffic generation will affect the turn lane requirements at this intersection.

Preliminary indications are that an approximate 34,500 ft^2 plaza could be accommodated. A plaza of this size would generate an approximate two-way total of approximately 40 vph and 80 vph during the weekday morning and afternoon peak hours (Appendix G). When assigned into the adjacent subdivision and onto Terry Fox Drive via the South Site Access, it could add the following traffic to the Figure 5 Horizon year volumes.

- NB right-turn: + 5 vph and 15 vph during a.m. and p.m. peak hours respectively
- SB left-turn: +5 vph and 15 vph during a.m. and p.m. peak hours respectively
- WB left-turn: + 10 vph and 15 vph during a.m. and p.m. peak hours respectively

When these retail-generated volumes are accounted for, the requirements for turn lanes at the South Site Access/Terry Fox intersection are:

- NB right-turn lane = 18 m + taper
- SB left-turn lane = 10 m + taper
- WB left-turn lane = 16 m + taper

Signal warrant analysis for these combined conditions, which include volumes from the retail site, indicate that traffic signal control is still not warranted.

In review of the foregoing, as all the identified turn-lane requirements vary in length from 10 m to 21 m, it is recommended that all be provided at 25 m plus the appropriate length of taper.

7. SITE PLAN REVIEW

During the development of the Site Plan, Delcan reviewed a number of iterations and provided comments regarding internal intersection location, uninterrupted throat lengths on the site connections to Terry Fox Drive, street rights-of-way and intersection spacing along Terry Fox Drive.

In review of the Site Plan, all of our comments have been taken into account except for the spacing of intersections along Terry Fox Drive.

With regard to rights-of-way, the two streets that connect to Terry Fox Drive have the following characteristics:

- 20 m right-of-way;
- up to 100 m of throat length uninterrupted by residential driveways; and
- the potential for 11 m to 12 m of pavement width to accommodate one inbound lane and two outbound lanes at their future signalized intersections with Terry Fox Drive.

All other internal local streets have an 18 m rights-of-way with appropriate intersection spacings and design so as to have safe and efficient traffic circulation and to minimize the noise attenuation requirements along Terry Fox Drive.

With regard to intersection spacing along Terry Fox Drive, key considerations are the future four-laning of Terry Fox Drive and the location of site connections to planned development on the west side of Terry Fox Drive. As shown on the Figure 2: Site Plan, the two proposed site driveway connections to the subject Richcraft Site Plan are both located towards the south end of the site and located only 260 m from each other. Further to the north and accessing lands on the west side of Terry Fox Drive, is a proposed intersection only 180 m north of the subject site's North Site Driveway intersection. Ultimately where volumes increase and Terry Fox is widened to four lanes, each of these intersections would want to be traffic signalled controlled. It is our opinion that this series of three intersections are located too close together to signalize and have efficient traffic flow progression along Terry Fox Drive. Ideally, the spacing of signalized intersections along a major arterial road should be in the 350 m to 450 m range. Spacings of 260 m and 180 m

adjacent to each other are considered much too close. Ideally, the subject site's North Driveway connection to Terry Fox Drive should be relocated north to align opposite the proposed driveway connection on the north side of Terry Fox Drive. This would then result in an approximate 440 m spacing between signalized (ultimately) and consolidated intersections, which would be ideal.

With regard to sidewalks, the locations have not yet been shown, but it is assumed that they will be provided on both sides of the 20 m wide roads and on at least one side of the 18 m roads.

Pathway connections to the adjacent subdivisions are shown on the Figure 2: Site Plan. On the south boundary of the Site Plan, Block 112 will be a pathway connection that provides a good north-south connection. On the east boundary is an open space system that abuts Block 934. This will result in a good east-west pathway connection.

With regard to transit service, it will ultimately be provided along Terry Fox Drive and bus pads/shelters will be required. OC Transpo will determine the location of bus stop locations along Terry Fox Drive and these will be well connected to the Richcraft subdivision via both the sidewalk system on Terry Fox Drive and the planned sidewalk system internal to the community. As noted in Table 5, the Richcraft subdivision is projected to generate between 60 and 75 transit riders during peak hours.

8. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The findings, conclusions and recommendations of the foregoing analysis are as follows.

- Richcraft's proposed 457 unit residential development is projected to generate a two-way total of 180 vph and 222 vph during the morning and afternoon peak hours respectively.

- The two proposed site connections to Terry Fox Drive are sufficient to accommodate projected site-generated traffic.

- The current Site Plan has the two site connections to Terry Fox Drive spaced only 260 m apart with the next planned intersection to the north only being 180 m away. This intersection spacing is not sufficient when Terry Fox Drive is widened to four lanes and all intersections are signalized. It is recommended that the site's North Driveway connection with Terry Fox Drive be shifted north to align with the proposed road connection to the planned subdivision on the north side of Terry Fox Drive. With this occurrence, the intersection spacing would then be approximately 440 m, which would be ideal spacing for signalized intersections along a major four-lane divided arterial road.

- Internal to the subdivision, the combination of road rights-of-way, throat lengths on the Terry Fox Drive connections, intersection locations and pathway connections are all considered acceptable.

- The projected transit ridership of 60 to 75 transit riders per hour can be adequately accommodated by planned transit service on Terry Fox Drive.

- For the horizon year of this analysis, traffic signal control is not warranted at the site's road connections to Terry Fox Drive. Regardless, the proponent may want to signalize these intersections prior to warrants being met to maximize safe access/egress to/from their subdivision.

- Turn lane requirements at the site connections to Terry Fox Drive are initially as follows.

  North Site Driveway/Terry Fox
  - northbound left-turn lane = 18 m + taper
  - eastbound right-turn lane = 12 m + taper
  - westbound left-turn lane = 21 m + taper

  South Site Driveway/Terry Fox
  - northbound right-turn lane = 12 m + taper
  - southbound left-turn lane = 7 m + taper
  - westbound left-turn lane = 12 m + taper

  - For the South Site Driveway, once the adjacent proposed retail plaza is developed, it will add traffic that will require the length of turn-lanes to be increased as follows:
    - northbound right-turn lane = 12 m + 6 m = 18 m + taper
    - southbound left-turn lane = 7 m + 3 m = 10 m + taper
    - westbound left-turn lane = 12 m + 4 m = 16 m + taper

    As all the foregoing turn-lane requirements are in the 10 m to 21 m range plus tapers, it is recommended that all be provided initially at 25 m plus the appropriate length of taper.

Accounting for the foregoing recommendations, the proposed Site Plan is recommended form a transportation perspective.

Sincerely.

Ronald M. Jack, P.Eng
Vice President Transportation
Manager Ottawa Operations

Appendix A – Study Area Intersection Counts

- Terry Fox/Kanata
- Terry Fox/March

Public Works and Services Department

Count ID 2948

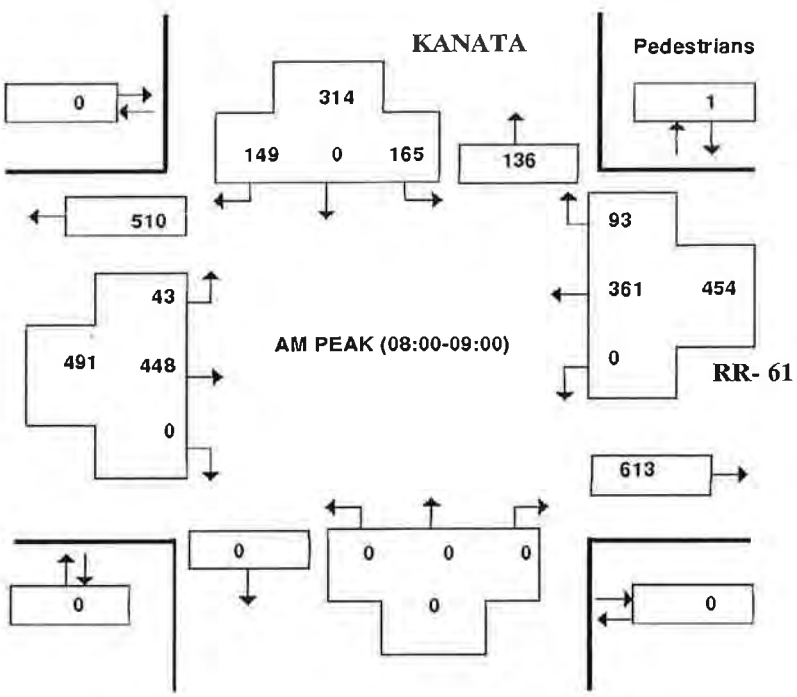
KANATA AVE and TERRY FOX RD

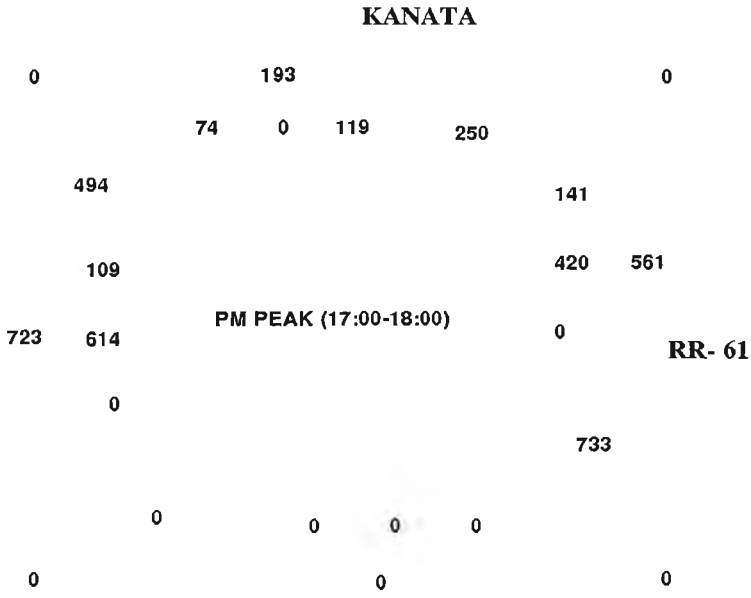
(ULRS Listing KANATA & RR- 61)

Survey Date: Wednesday 24 August 2011
Conditions: dry
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Wednesday in August
9





Approved by : KC

Printed on : 08/11/2011

Ottawa — *Public Works and Services Department*

Count ID 3101

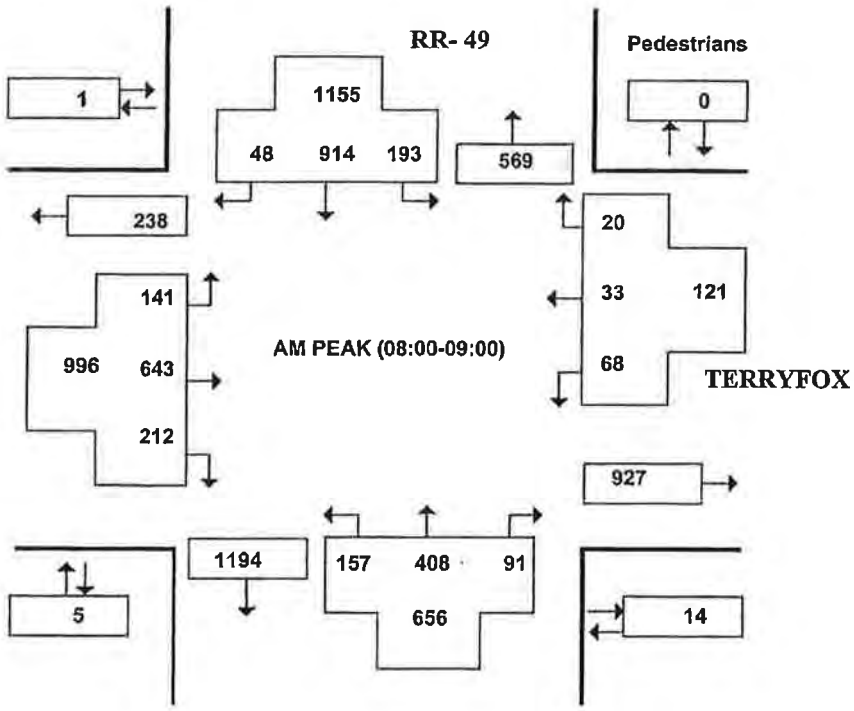
MARCH RD and TERRY FOX DR

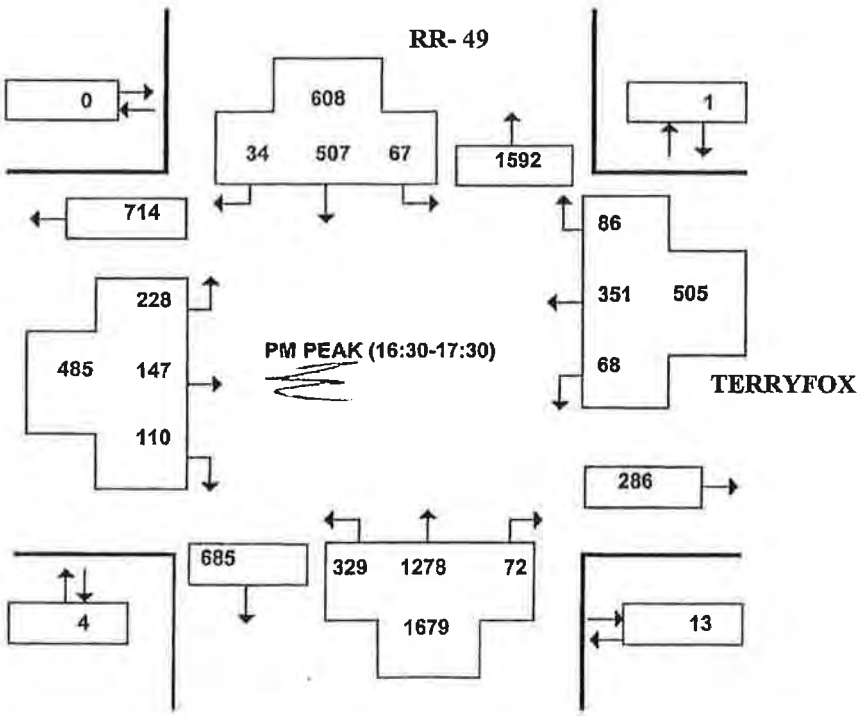
(ULRS Listing RR- 49 & TERRYFOX)

Survey Date: Wednesday 20 June 2012
Conditions: dry
Start Time: 0700

Total Observed U-Turns
Northbound: 214 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Wednesday in June i:
0.9





Approved by : JM

Printed on : 05/07/2012

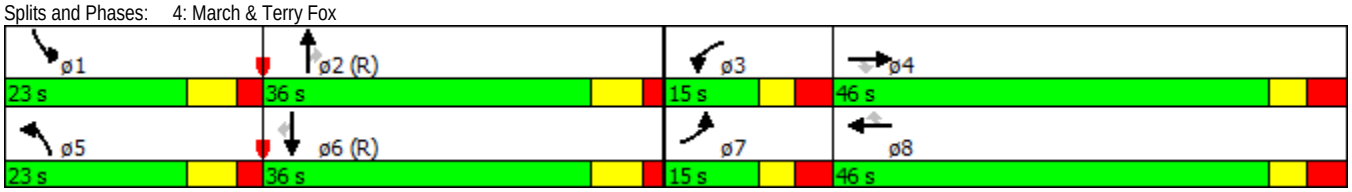
Appendix B – SYNCHRO Model of Existing Conditions

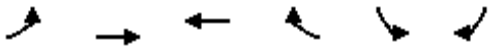
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	643	212	68	33	20	157	408	91	193	914	48
Lane Group Flow (vph)	148	677	223	72	35	21	165	429	96	203	962	51
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.7	36.1	36.1	11.7	36.1	36.1	11.8	28.6	28.6	11.8	28.6	28.6
Total Split (s)	15.0	46.0	46.0	15.0	46.0	46.0	23.0	36.0	36.0	23.0	36.0	36.0
Total Split (%)	12.5%	38.3%	38.3%	12.5%	38.3%	38.3%	19.2%	30.0%	30.0%	19.2%	30.0%	30.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.4	3.8	3.8	3.4	3.8	3.8	2.2	2.0	2.0	2.2	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	7.1	7.1	6.7	7.1	7.1	6.8	6.6	6.6	6.8	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	11.5	31.5	31.5	7.5	28.5	28.5	11.3	37.9	37.9	18.3	44.9	44.9
Actuated g/C Ratio	0.10	0.26	0.26	0.06	0.24	0.24	0.09	0.32	0.32	0.15	0.37	0.37
v/c Ratio	0.47	0.76	0.43	0.35	0.04	0.04	0.53	0.28	0.16	0.79	0.53	0.08
Control Delay	58.6	46.3	11.3	58.4	30.6	0.2	57.8	33.9	1.0	70.4	33.1	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	58.6	46.3	11.3	58.4	30.6	0.2	57.8	33.9	1.0	70.4	33.1	0.2
LOS	E	D	B	E	C	A	E	C	A	E	C	A
Approach Delay		40.6			41.3			35.0			37.9	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	17.8	77.3	8.8	8.5	3.2	0.0	19.4	29.9	0.0	45.1	66.9	0.0
Queue Length 95th (m)	#29.8	90.2	27.2	15.9	6.7	0.0	29.6	40.9	1.1	#90.0	92.8	0.0
Internal Link Dist (m)		1862.6			280.2			873.2			461.7	
Turn Bay Length (m)	70.0		40.0	70.0		75.0	150.0		75.0	100.0		100.0
Base Capacity (vph)	314	1098	595	227	1098	590	443	1538	588	262	1823	648
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	0.62	0.37	0.32	0.03	0.04	0.37	0.28	0.16	0.77	0.53	0.08

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 8 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 38.3 Intersection LOS: D
Intersection Capacity Utilization 71.0% 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: 4: March & Terry Fox

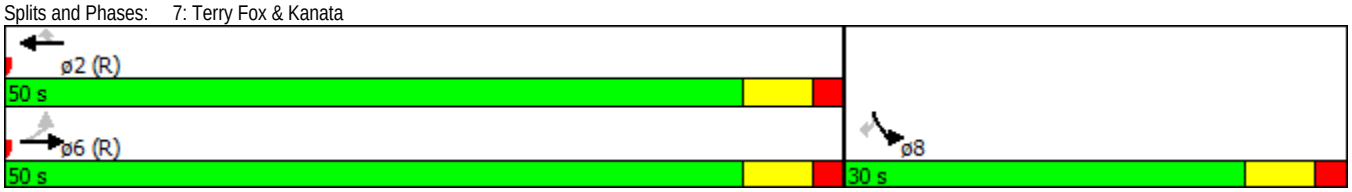




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	43	448	361	93	165	149
Lane Group Flow (vph)	45	472	380	98	174	157
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Detector Phase	6	6	2	2	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	16.1	35.1	35.1	27.2	27.2
Total Split (s)	50.0	50.0	50.0	50.0	30.0	30.0
Total Split (%)	62.5%	62.5%	62.5%	62.5%	37.5%	37.5%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	1.9	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	55.4	55.4	55.4	55.4	12.3	12.3
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.15	0.15
v/c Ratio	0.07	0.20	0.16	0.09	0.34	0.43
Control Delay	5.5	5.2	5.0	1.7	31.2	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	5.2	5.0	1.7	31.2	8.6
LOS	A	A	A	A	C	A
Approach Delay		5.2	4.4		20.5	
Approach LOS		A	A		C	
Queue Length 50th (m)	1.6	9.9	7.7	0.0	12.8	0.0
Queue Length 95th (m)	6.9	23.9	19.3	5.4	18.1	13.2
Internal Link Dist (m)		2013.6	365.3		660.0	
Turn Bay Length (m)	90.0			55.0		55.0
Base Capacity (vph)	650	2346	2346	1080	978	561
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.20	0.16	0.09	0.18	0.28

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 42.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Terry Fox & Kanata

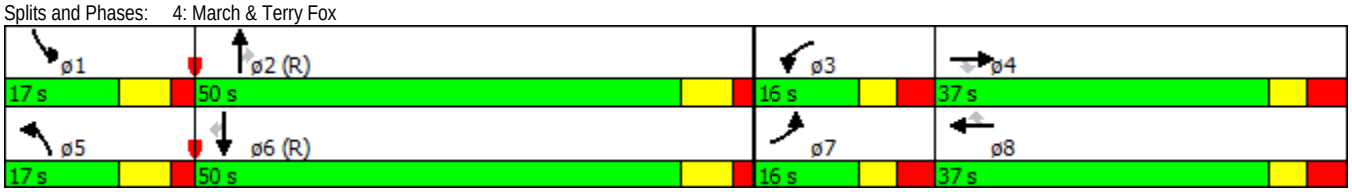


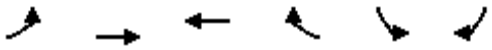
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	228	147	110	68	351	86	329	1278	72	67	507	34
Lane Group Flow (vph)	240	155	116	72	369	91	346	1345	76	71	534	36
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.7	36.1	36.1	11.7	36.1	36.1	11.8	28.6	28.6	11.8	28.6	28.6
Total Split (s)	16.0	37.0	37.0	16.0	37.0	37.0	17.0	50.0	50.0	17.0	50.0	50.0
Total Split (%)	13.3%	30.8%	30.8%	13.3%	30.8%	30.8%	14.2%	41.7%	41.7%	14.2%	41.7%	41.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.4	3.8	3.8	3.4	3.8	3.8	2.2	2.0	2.0	2.2	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	7.1	7.1	6.7	7.1	7.1	6.8	6.6	6.6	6.8	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	9.3	23.7	23.7	7.9	19.7	19.7	20.2	56.7	56.7	9.7	43.6	43.6
Actuated g/C Ratio	0.08	0.20	0.20	0.07	0.16	0.16	0.17	0.47	0.47	0.08	0.36	0.36
v/c Ratio	0.94	0.23	0.28	0.33	0.66	0.24	0.63	0.58	0.09	0.52	0.30	0.06
Control Delay	99.2	41.6	3.9	57.5	52.4	1.8	53.2	26.4	0.2	66.2	27.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	99.2	41.6	3.9	57.5	52.4	1.8	53.2	26.4	0.2	66.2	27.9	0.2
LOS	F	D	A	E	D	A	D	C	A	E	C	A
Approach Delay		60.1			44.4			30.5			30.6	
Approach LOS		E			D			C			C	
Queue Length 50th (m)	29.4	17.0	0.0	8.5	44.0	0.0	38.9	85.2	0.0	16.2	32.6	0.0
Queue Length 95th (m)	#54.2	24.4	6.8	15.8	53.8	0.7	#78.5	119.2	0.0	31.1	42.2	0.0
Internal Link Dist (m)		1862.6			280.2			873.2			461.7	
Turn Bay Length (m)	70.0		40.0	70.0		75.0	150.0		75.0	100.0		100.0
Base Capacity (vph)	254	844	483	254	844	489	553	2302	801	152	1770	634
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	0.94	0.18	0.24	0.28	0.44	0.19	0.63	0.58	0.09	0.47	0.30	0.06

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 54 (45%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 37.1 Intersection LOS: D
Intersection Capacity Utilization 71.3% 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: 4: March & Terry Fox

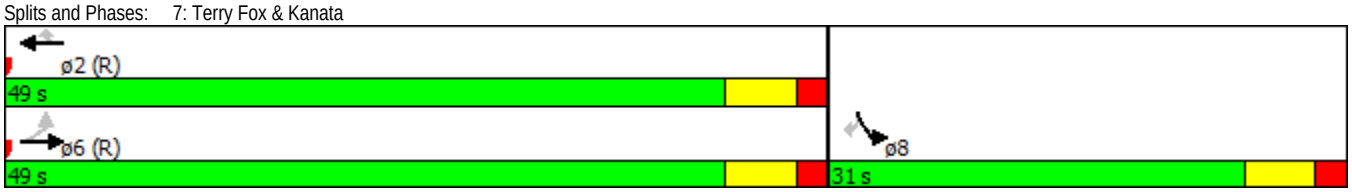




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	109	614	420	141	119	74
Lane Group Flow (vph)	115	646	442	148	125	78
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Detector Phase	6	6	2	2	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	16.1	35.1	35.1	27.2	27.2
Total Split (s)	49.0	49.0	49.0	49.0	31.0	31.0
Total Split (%)	61.3%	61.3%	61.3%	61.3%	38.8%	38.8%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	1.9	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	60.0	60.0	60.0	60.0	12.2	12.2
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.15	0.15
v/c Ratio	0.17	0.25	0.17	0.13	0.25	0.26
Control Delay	6.0	5.0	4.7	1.5	30.0	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	5.0	4.7	1.5	30.0	9.1
LOS	A	A	A	A	C	A
Approach Delay		5.2	3.9		22.0	
Approach LOS		A	A		C	
Queue Length 50th (m)	4.6	14.4	9.2	0.0	9.0	0.0
Queue Length 95th (m)	15.9	33.5	22.4	6.6	13.8	9.5
Internal Link Dist (m)		2013.6	365.3		660.0	
Turn Bay Length (m)	90.0			55.0		55.0
Base Capacity (vph)	663	2541	2541	1174	1019	524
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.25	0.17	0.13	0.12	0.15

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.26	
Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 44.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Terry Fox & Kanata



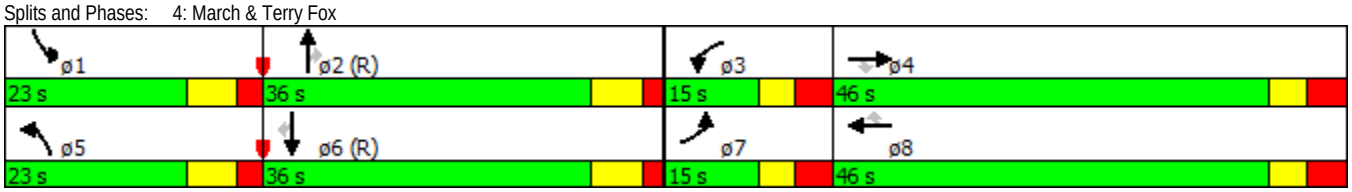
Appendix C – SYNCHRO Model of Horizon Year Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	750	285	85	45	25	205	450	108	230	1005	48
Lane Group Flow (vph)	184	789	300	89	47	26	216	474	114	242	1058	51
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.7	36.1	36.1	11.7	36.1	36.1	11.8	28.6	28.6	11.8	28.6	28.6
Total Split (s)	15.0	46.0	46.0	15.0	46.0	46.0	23.0	36.0	36.0	23.0	36.0	36.0
Total Split (%)	12.5%	38.3%	38.3%	12.5%	38.3%	38.3%	19.2%	30.0%	30.0%	19.2%	30.0%	30.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.4	3.8	3.8	3.4	3.8	3.8	2.2	2.0	2.0	2.2	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	7.1	7.1	6.7	7.1	7.1	6.8	6.6	6.6	6.8	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	14.9	34.9	34.9	7.8	31.2	31.2	13.0	30.0	30.0	20.1	37.0	37.0
Actuated g/C Ratio	0.12	0.29	0.29	0.06	0.26	0.26	0.11	0.25	0.25	0.17	0.31	0.31
v/c Ratio	0.45	0.80	0.53	0.42	0.05	0.05	0.61	0.39	0.23	0.85	0.70	0.09
Control Delay	56.4	45.8	14.6	59.9	29.0	0.2	58.1	38.7	2.8	76.4	41.0	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	56.4	45.8	14.6	59.9	29.0	0.2	58.1	38.7	2.8	76.4	41.0	0.3
LOS	E	D	B	E	C	A	E	D	A	E	D	A
Approach Delay		40.0			41.4			38.8			45.8	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	22.4	89.0	17.5	10.5	4.1	0.0	25.3	34.3	0.0	56.6	82.4	0.0
Queue Length 95th (m)	#40.7	108.2	42.4	18.9	8.4	0.0	36.8	45.0	5.3	#112.5	#111.1	0.0
Internal Link Dist (m)		1862.6			280.2			873.2			461.7	
Turn Bay Length (m)	70.0		40.0	70.0		75.0	150.0		75.0	100.0		100.0
Base Capacity (vph)	409	1098	613	227	1098	590	443	1216	498	284	1503	563
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	0.45	0.72	0.49	0.39	0.04	0.04	0.49	0.39	0.23	0.85	0.70	0.09

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 8 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 42.0 Intersection LOS: D
Intersection Capacity Utilization 76.2% 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: 4: March & Terry Fox

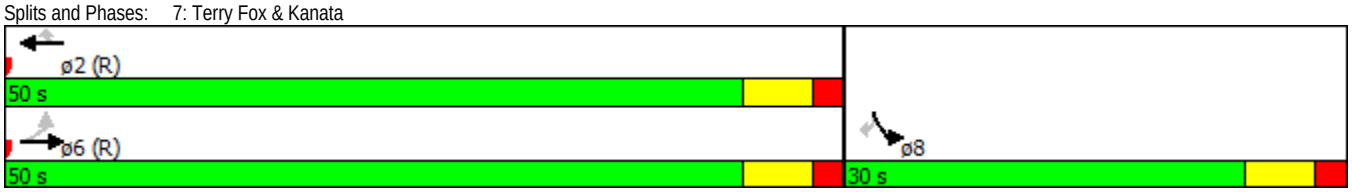


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	55	610	460	110	200	180
Lane Group Flow (vph)	58	642	484	116	211	189
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Detector Phase	6	6	2	2	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	16.1	35.1	35.1	27.2	27.2
Total Split (s)	50.0	50.0	50.0	50.0	30.0	30.0
Total Split (%)	62.5%	62.5%	62.5%	62.5%	37.5%	37.5%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	1.9	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	55.1	55.1	55.1	55.1	12.6	12.6
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.16	0.16
v/c Ratio	0.10	0.28	0.21	0.11	0.41	0.47
Control Delay	5.8	5.7	5.4	1.6	31.8	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	5.7	5.4	1.6	31.8	8.5
LOS	A	A	A	A	C	A
Approach Delay		5.7	4.6		20.8	
Approach LOS		A	A		C	
Queue Length 50th (m)	2.2	14.7	10.4	0.0	15.6	0.0
Queue Length 95th (m)	8.7	33.3	24.5	5.9	21.4	14.3
Internal Link Dist (m)		630.3	365.3		660.0	
Turn Bay Length (m)	90.0			55.0		55.0
Base Capacity (vph)	584	2334	2334	1080	978	584
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.28	0.21	0.11	0.22	0.32

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 8.9 — Intersection LOS: A
Intersection Capacity Utilization 45.4% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 7: Terry Fox & Kanata



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	640	9	9	605	36	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	674	9	9	637	38	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			683		1334	678
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			683		1334	678
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		77	88
cM capacity (veh/h)			910		168	452

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	683	646	91
Volume Left	0	9	38
Volume Right	9	0	53
cSH	1700	910	265
Volume to Capacity	0.40	0.01	0.34
Queue Length 95th (m)	0.0	0.2	11.1
Control Delay (s)	0.0	0.3	25.5
Lane LOS		A	D
Approach Delay (s)	0.0	0.3	25.5
Approach LOS			D

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	36	22	627	9	9	630
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	38	23	660	9	9	663
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1347	665			669	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1347	665			669	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	95			99	
cM capacity (veh/h)	165	460			921	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	61	669	673
Volume Left	38	0	9
Volume Right	23	9	0
cSH	218	1700	921
Volume to Capacity	0.28	0.39	0.01
Queue Length 95th (m)	8.4	0.0	0.2
Control Delay (s)	27.8	0.0	0.3
Lane LOS	D		A
Approach Delay (s)	27.8	0.0	0.3
Approach LOS	D		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

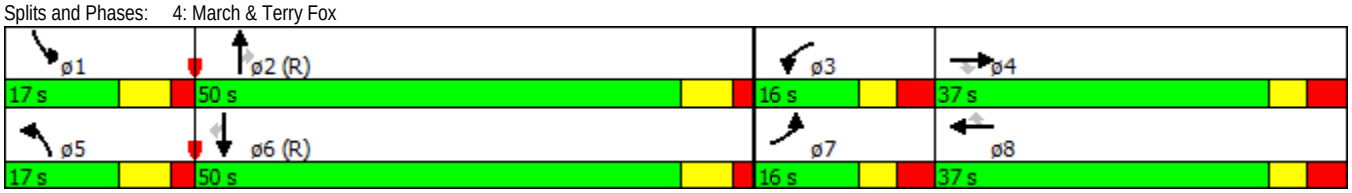
Projected PM
4: March & Terry Fox

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	200	140	85	420	100	430	1410	90	85	560	34
Lane Group Flow (vph)	295	211	147	89	442	105	453	1484	95	89	589	36
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.7	36.1	36.1	11.7	36.1	36.1	11.8	28.6	28.6	11.8	28.6	28.6
Total Split (s)	16.0	37.0	37.0	16.0	37.0	37.0	17.0	50.0	50.0	17.0	50.0	50.0
Total Split (%)	13.3%	30.8%	30.8%	13.3%	30.8%	30.8%	14.2%	41.7%	41.7%	14.2%	41.7%	41.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.4	3.8	3.8	3.4	3.8	3.8	2.2	2.0	2.0	2.2	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	7.1	7.1	6.7	7.1	7.1	6.8	6.6	6.6	6.8	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	9.3	22.9	22.9	8.2	21.8	21.8	18.3	51.0	51.0	10.7	43.4	43.4
Actuated g/C Ratio	0.08	0.19	0.19	0.07	0.18	0.18	0.15	0.42	0.42	0.09	0.36	0.36
v/c Ratio	1.16	0.33	0.36	0.40	0.72	0.26	0.91	0.72	0.13	0.59	0.33	0.06
Control Delay	155.4	42.6	7.8	58.5	52.6	3.1	73.3	32.1	0.5	68.3	28.5	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	155.4	42.6	7.8	58.5	52.6	3.1	73.3	32.1	0.5	68.3	28.5	0.2
LOS	F	D	A	E	D	A	E	C	A	E	C	A
Approach Delay		85.7			45.2			39.8			32.0	
Approach LOS		F			D			D			C	
Queue Length 50th (m)	~42.3	22.8	0.0	10.5	52.1	0.0	54.7	105.8	0.0	20.3	36.5	0.0
Queue Length 95th (m)	#70.1	32.0	14.2	18.7	64.4	4.0	#108.3	136.0	0.8	#37.7	46.7	0.0
Internal Link Dist (m)		667.9			280.2			873.2			461.7	
Turn Bay Length (m)	70.0		40.0	70.0		75.0	150.0		75.0	100.0		100.0
Base Capacity (vph)	254	844	483	254	844	489	500	2068	736	160	1761	632
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	1.16	0.25	0.30	0.35	0.52	0.21	0.91	0.72	0.13	0.56	0.33	0.06

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 54 (45%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 46.7 Intersection LOS: D
Intersection Capacity Utilization 77.5% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

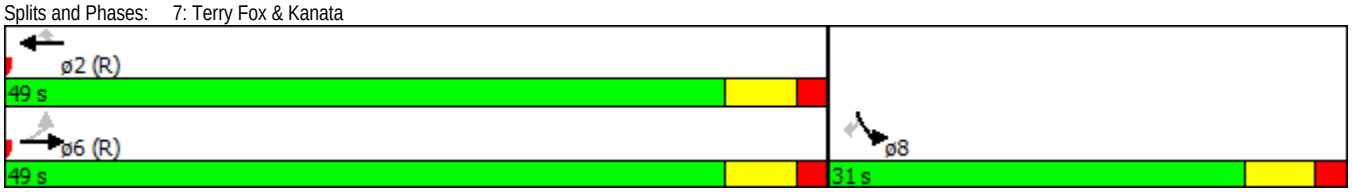
Splits and Phases: 4: March & Terry Fox



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	130	780	576	175	145	90
Lane Group Flow (vph)	137	821	606	184	153	95
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Detector Phase	6	6	2	2	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	16.1	16.1	35.1	35.1	27.2	27.2
Total Split (s)	49.0	49.0	49.0	49.0	31.0	31.0
Total Split (%)	61.3%	61.3%	61.3%	61.3%	38.8%	38.8%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	1.9	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	55.5	55.5	55.5	55.5	12.2	12.2
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.15	0.15
v/c Ratio	0.26	0.35	0.26	0.17	0.30	0.30
Control Delay	7.2	6.0	5.5	1.5	30.8	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	6.0	5.5	1.5	30.8	8.8
LOS	A	A	A	A	C	A
Approach Delay		6.2	4.5		22.4	
Approach LOS		A	A		C	
Queue Length 50th (m)	5.8	19.6	13.3	0.0	11.1	0.0
Queue Length 95th (m)	20.2	44.5	31.3	7.3	16.2	10.5
Internal Link Dist (m)		1447.1	365.3		660.0	
Turn Bay Length (m)	90.0			55.0		55.0
Base Capacity (vph)	523	2351	2351	1108	1019	535
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.35	0.26	0.17	0.15	0.18

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.35	
Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 48.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Terry Fox & Kanata



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	605	36	60	880	19	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	637	38	63	926	20	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			675		1708	656
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			675		1708	656
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		79	93
cM capacity (veh/h)			916		93	466

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	675	989	52
Volume Left	0	63	20
Volume Right	38	0	32
cSH	1700	916	183
Volume to Capacity	0.40	0.07	0.28
Queue Length 95th (m)	0.0	1.7	8.4
Control Delay (s)	0.0	1.9	32.3
Lane LOS		A	D
Approach Delay (s)	0.0	1.9	32.3
Approach LOS			D

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	20	9	630	36	12	890
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	9	663	38	13	937
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1644	682			701	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1644	682			701	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	81	98			99	
cM capacity (veh/h)	108	450			896	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	31	701	949
Volume Left	21	0	13
Volume Right	9	38	0
cSH	141	1700	896
Volume to Capacity	0.22	0.41	0.01
Queue Length 95th (m)	5.9	0.0	0.3
Control Delay (s)	37.3	0.0	0.4
Lane LOS	E		A
Approach Delay (s)	37.3	0.0	0.4
Approach LOS	E		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

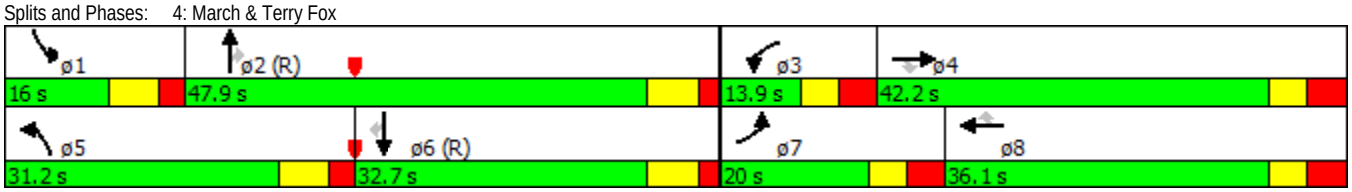
Appendix D – Signal Timing Plan Modifications

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	200	140	85	420	100	430	1410	90	85	560	34
Lane Group Flow (vph)	295	211	147	89	442	105	453	1484	95	89	589	36
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.7	36.1	36.1	11.7	36.1	36.1	11.8	28.6	28.6	11.8	28.6	28.6
Total Split (s)	20.0	42.2	42.2	13.9	36.1	36.1	31.2	47.9	47.9	16.0	32.7	32.7
Total Split (%)	16.7%	35.2%	35.2%	11.6%	30.1%	30.1%	26.0%	39.9%	39.9%	13.3%	27.3%	27.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.4	3.8	3.8	3.4	3.8	3.8	2.2	2.0	2.0	2.2	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	7.1	7.1	6.7	7.1	7.1	6.8	6.6	6.6	6.8	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	13.1	27.8	27.8	7.0	21.8	21.8	21.2	47.4	47.4	10.6	36.8	36.8
Actuated g/C Ratio	0.11	0.23	0.23	0.06	0.18	0.18	0.18	0.40	0.40	0.09	0.31	0.31
v/c Ratio	0.83	0.27	0.29	0.46	0.72	0.23	0.78	0.77	0.14	0.60	0.39	0.06
Control Delay	71.8	37.6	2.1	62.8	52.6	1.2	57.1	36.0	0.6	69.5	35.4	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	71.8	37.6	2.1	62.8	52.6	1.2	57.1	36.0	0.6	69.5	35.4	0.2
LOS	E	D	A	E	D	A	E	D	A	E	D	A
Approach Delay		45.0			45.6			39.1			37.9	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	35.5	21.5	0.0	10.6	52.1	0.0	52.8	112.6	0.0	20.2	40.3	0.0
Queue Length 95th (m)	#56.2	29.6	2.2	19.1	64.4	0.0	68.8	140.1	0.8	#45.1	58.0	0.0
Internal Link Dist (m)		667.9			280.2			873.2			461.7	
Turn Bay Length (m)	70.0		40.0	70.0		75.0	150.0		75.0	100.0		100.0
Base Capacity (vph)	364	991	584	197	819	526	668	1923	695	153	1492	603
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	0.81	0.21	0.25	0.45	0.54	0.20	0.68	0.77	0.14	0.58	0.39	0.06

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 54 (45%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 40.9 Intersection LOS: D
Intersection Capacity Utilization 77.5% 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.

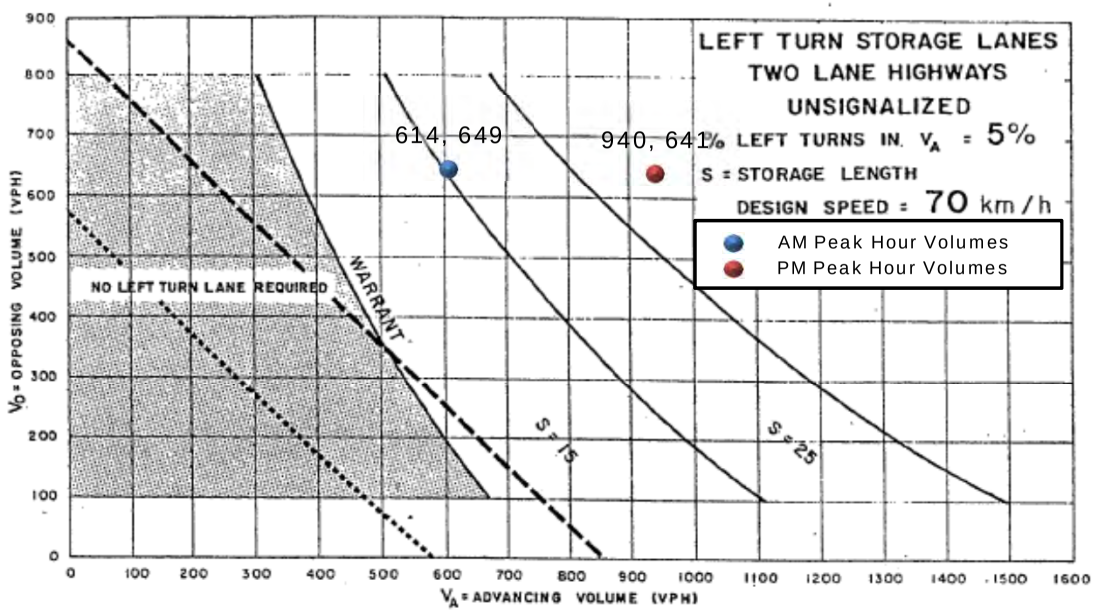
Splits and Phases: 4: March & Terry Fox



Appendix E – Left-Turn Warrant Analysis

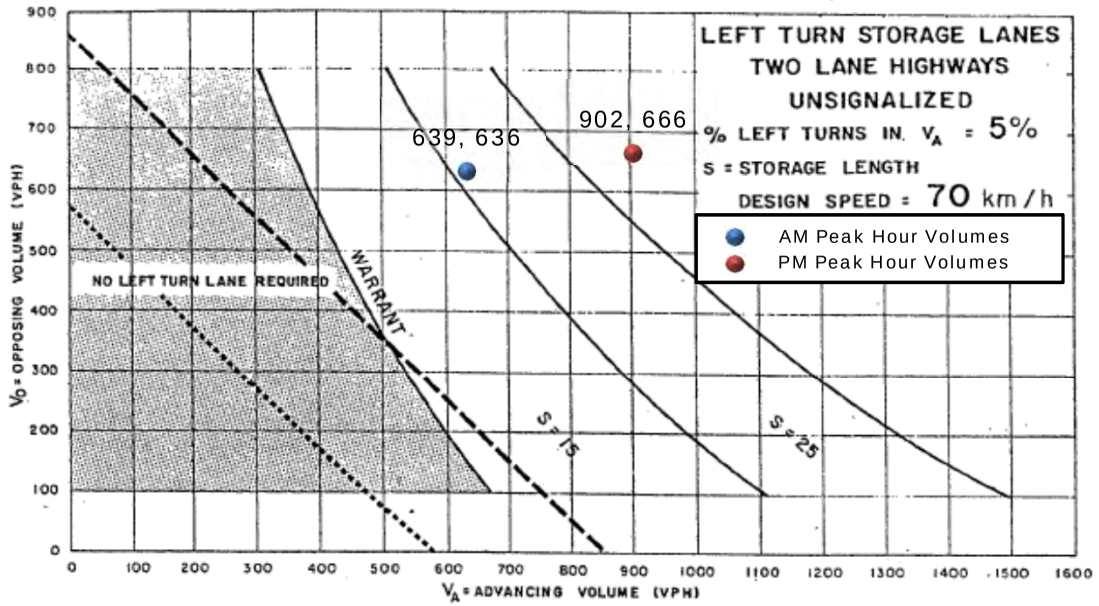
	Design Speed	Advancing Traffic Volume (V_A)		Opposing Traffic Volume (V_O)		Left Turn Traffic Volume (V_L)		% of Left Turning Traffic		Warrant Left Turn Lane
		AM	PM	AM	PM	AM	PM	AM	PM	
Existing										
Terry Fox/Site North	70	614	940	649	641	9	60	1%	6%	Yes

Peak	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
										Warrant?		
AM	36		50					640	9	9	605	
PM	19		30					605	36	60	880	



	Design Speed	Advancing Traffic Volume (V_A)		Opposing Traffic Volume (V_O)		Left Turn Traffic Volume (V_L)		% of Left Turning Traffic		Warrant Left Turn Lane
		AM	PM	AM	PM	AM	PM	AM	PM	
Existing										
Terry Fox/Site South	70	639	902	636	666	9	12	1%	1%	Yes

Peak	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
				Warrant?								
AM		627	9	9	630					36		22
PM		630	36	12	890					20		9



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

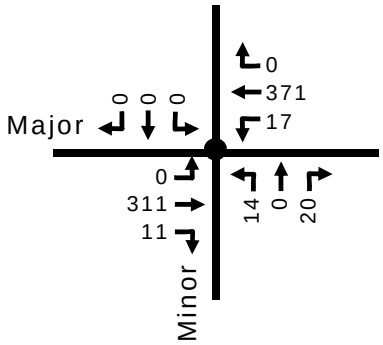
Appendix F – Traffic Control Warrant Analysis

Terry Fox/Site North - Projected

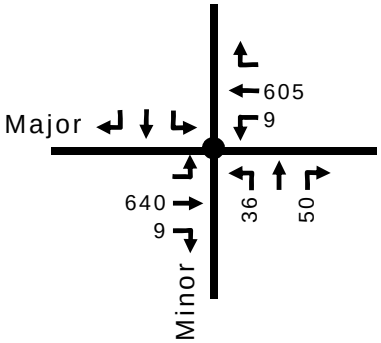
AWSC Warrant		Description		Minimum Requirement for a 'T' intersection	Compliance		
					Sectional %	Entire %	Warrant
Intersection	1. Minimum Volume Criterion	A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, or	200	372%	14%	**No**
		B	Vehicle Volume, All Approaches for the Heaviest Peak Hour, and	350	466%		
		C	Vehicle and pedestrian Volume, Along Minor Streets for Each of the Same 8 Hours, and	80	43%		
		D	The volume split between the major and minor streets	75/25	14%		
	2. Minimum Collision Criterion	A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	3	0%	0%	

Note: ***0*** *preventable by AWSC collisions (i.e. right angle and turning movement collisions) were reported during a 3 year time period*

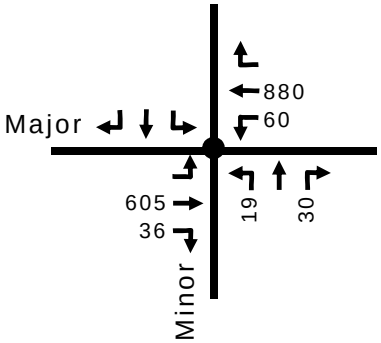
Average 8 Hour Volumes



AM Peak Hour Volumes



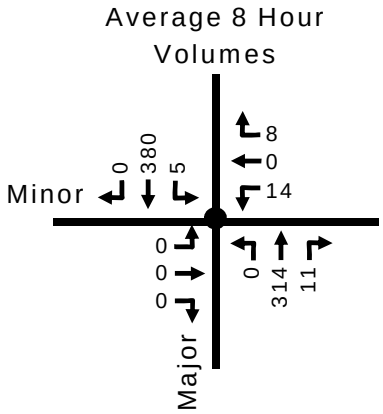
PM Peak Hour Volumes

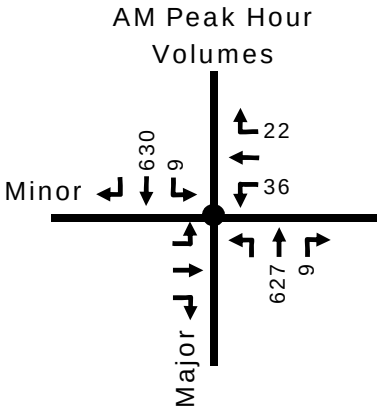


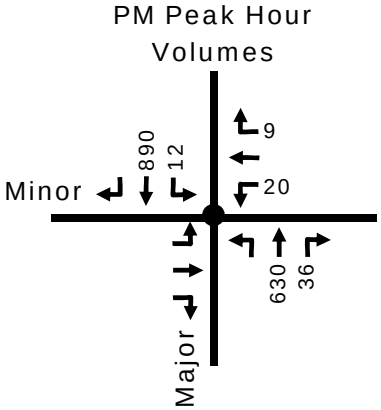
Terry Fox/Site South - Projected

AWSC Warrant		Description		Minimum Requirement for a 'T' intersection	Compliance		
					Sectional %	Entire %	Warrant
Intersection	1. Minimum Volume Criterion	A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, or	200	366%	9%	**No**
		B	Vehicle Volume, All Approaches for the Heaviest Peak Hour, and	350	456%		
		C	Vehicle and pedestrian Volume, Along Minor Streets for Each of the Same 8 Hours, and	80	28%		
		D	The volume split between the major and minor streets	75/25	9%		
	2. Minimum Collision Criterion	A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	3	0%	0%	

Note: ***0*** *preventable by AWSC collisions (i.e. right angle and turning movement collisions) were reported during a 3 year time period*







Terry Fox / Site North - Projected

Signal Warrant		Description		Minimum Requirement for Two-Lane Roadways	Compliance		
				Restricted Flow - Operating Speed Less Than 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	720	103%	13%	**19%** **No**
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	255	13%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	720	99%	19%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	75	19%		

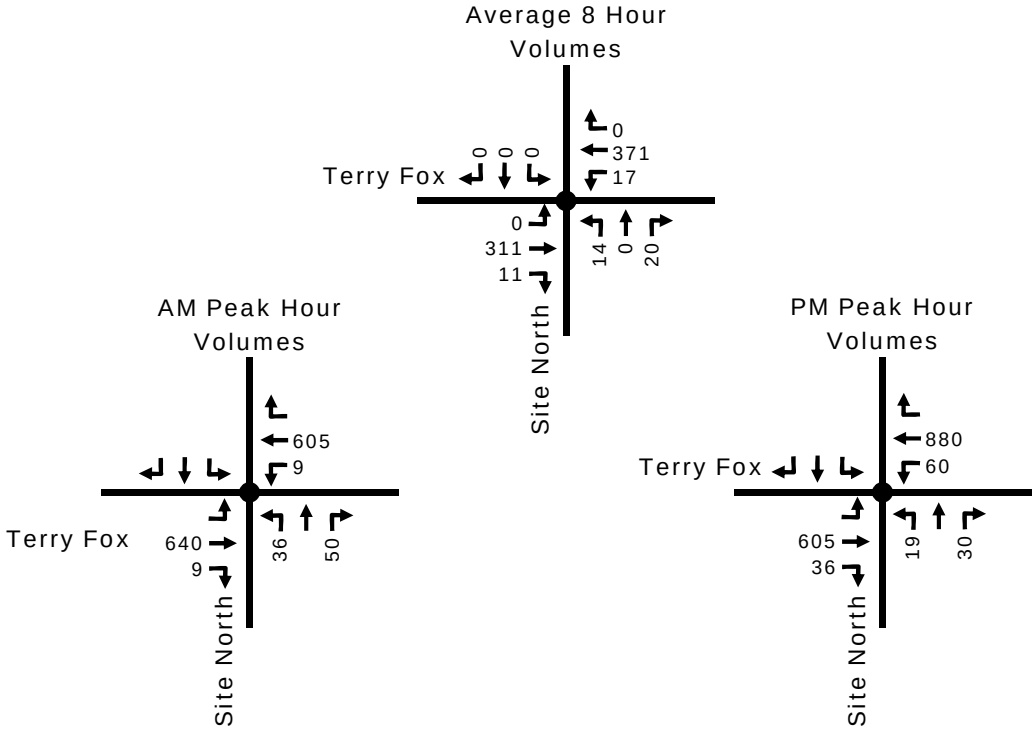
Notes

1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* **No**

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* **Yes**



Terry Fox / Site South - Projected

Signal Warrant		Description		Minimum Requirement for Two-Lane Roadways	Compliance		
				Restricted Flow - Operating Speed Less Than 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	720	102%	9%	**19% No**
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	255	9%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	720	99%	19%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	75	19%		

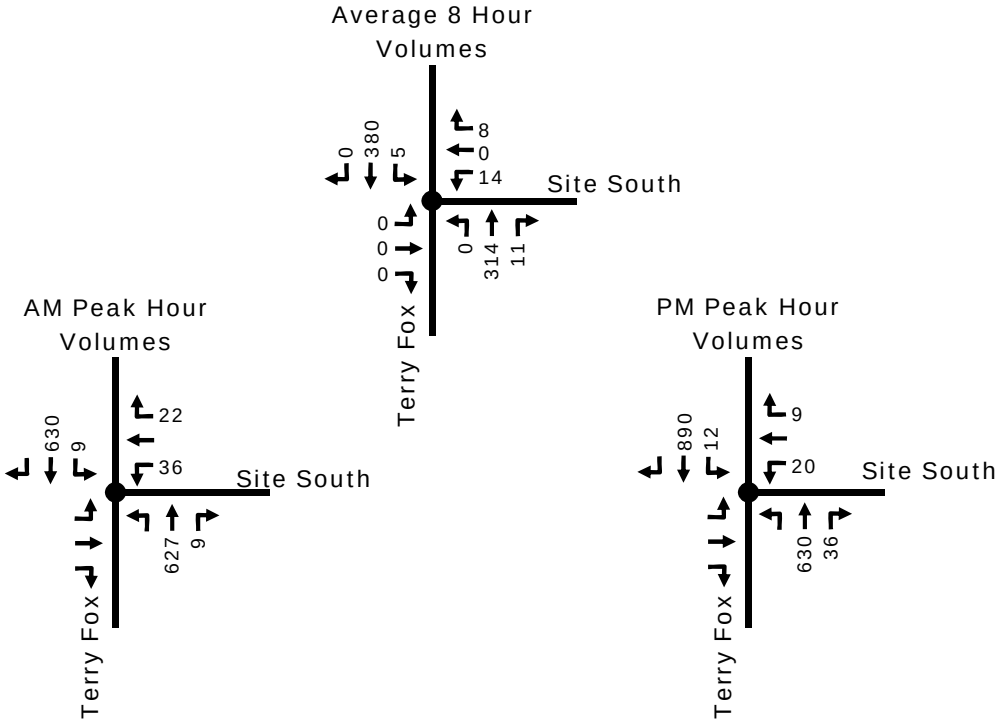
Notes

1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — **No**

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — **Yes**



Appendix G – 34,500 ft^2 Retail Plaza: Trip Generation

Trip Generation - Retail Plaza

ITE Vehicle Trip Generation Rates

Land Use	Data Source	Trip Rate	
		AM Peak	PM Peak
Retail	ITE 826	1.36	2.71

Modified Person Trip Generation Rates

Land Use	Data Source	Person Trip Rate	
		AM Peak	PM Peak
Retail	ITE 826	1.77	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		
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
		ft²	56%	44%		44%	56%	
Retail	ITE 826	34,500 ft²	38	30	68	59	77	136
		Total	38	30	68	59	77	136

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%	23	18	41	36	47	83
Auto Passenger	15%	6	5	11	9	12	21
Transit	5%	2	1	3	3	3	6
Non-motorized	20%	7	6	13	11	15	26
Total Person Trips	100%	38	30	68	59	77	136
	Total 'New' Auto Trips	**23**	**18**	**41**	**36**	**47**	**83**

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	23	18	41	36	47	83
Total 'New' Auto Trips	**23**	**18**	**41**	**36**	**47**	**83**