TRANSPORTATION IMPACT STUDY

BRIDLE PATH NORTH SUBDIVISION
ARVA, MUNICIPALITY OF MIDDLESEX CENTRE
MIDDLESEX COUNTY

PREPARED FOR:
YORK DEVELOPMENTS LTD.

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CFCA FILE NO. 2673-7110

CROZIER
CONSULTING ENGINEERS

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Rev.0	January 2025	Issued for Submission

Executive Summary

C.F. Crozier & Associates (Crozier) was retained by York Developments Ltd. to complete a Transportation Impact Study (TIS) for a subdivision located in Arva, Municipality of Middlesex Centre.

Based on the most recent preliminary draft plan of subdivision submitted by MHBC, dated November 15, 2024, the proposed subdivision includes 122 detached residential units, 111 townhouse units, and 3 apartment buildings consisting of 699 residential units with 195 square metres of ground floor commercial space. Four accesses on Medway Road are currently proposed as part of the development.

As discussed in a Traffic Impact Brief submitted by Crozier dated August 20, 2024, an additional access could be implemented on Richmond Street across from St. John's Drive. On October 3, 2024, the Ministry of Transportation Ontario (MTO) conditionally agreed in principle with the Brief's recommendation of a right-in / right-out access. However, the analysis contained herein is based on the current proposal with accesses only to Medway Road. The final access configuration of the development will be based on future discussions with the MTO, Middlesex County, and the Municipality of Middlesex Centre and will be confirmed as part of future submissions.

A turning movement count survey was conducted in July 2024 and was applied for the operational assessment of the study intersections. Intersection operations were modelled using Synchro 11 and SimTraffic software in accordance with relevant provincial guidelines. The results were assessed based on "Highway Capacity Manual" criteria.

Existing Conditions

Under 2024 existing conditions, the study road network operates with a Level of Service 'B' with no observable queuing issues in both the weekday morning and afternoon peak hours. All study intersections are projected to operate with a volume to capacity ratio below the MTO's critical threshold of 0.85.

Future Background Conditions

To account for future growth in background traffic volumes, a 2.0% growth rate was applied for all through movements on Richmond Street. Under 2029, 2034, and 2039 future background conditions, the study road network is still expected to operate acceptably. All study intersections are projected to operate with the same Level of Service as the existing conditions in the weekday morning peak hour. The intersections of Richmond Street and Croydon Drive as well as Richmond Street and St. John's Drive are expected to worsen to a Level of Service 'C' in the weekday afternoon peak hour of the 2039 future background condition. All study intersections are projected to be below the MTO's critical volume to capacity ratio of 0.85 and no queuing issues were identified.

Future Total Conditions

The proposed development is expected to generate 369 two-way (94 inbound and 275 outbound) trips during the weekday morning peak hour and 451 two-way (275 inbound and 176 outbound) trips during the weekday afternoon peak hour.

The site generated traffic was distributed and assigned to the study road network based on existing travel patterns at the study intersections along the Richmond Street corridor.

Under 2029, 2034, and 2039 future total conditions, the north approach of the proposed Medway Road and Proposed Street 'C' / Private Lane intersection is projected to operate at a Level of

Service 'D' and 'F' in the morning and afternoon peak hours, respectively. This can be expected at a minor access onto an arterial road. The intersection is still expected to remain undercapacity with a critical volume-to-capacity ratio of 0.35. The potential site access on Richmond Street would improve delays on the north approach.

All other study intersections are expected to operate at a Level of Service 'C' or better in both peak hours and have a critical volume-to-capacity ratio below the MTO's critical threshold of 0.85.

In the afternoon peak hour of the future total condition, the 95th percentile queue for the northbound left movement at the Medway Road and Richmond Street intersection is expected to exceed existing storage lengths. However, the forecasted average queue length can be accommodated by existing infrastructure. Also, the additional storage required for the projected 95th percentile queue can fit within the taper length of the storage lanes without blocking any through movements. Therefore, no improvements are recommended for the existing turning lanes.

Warrants

Auxiliary left-turn lanes are warranted for the eastbound left and westbound left movements at the proposed Medway Road and Proposed Street 'C' / Private Lane intersection. Left turn lanes at the intersections of Medway Road and Private Lane as well as Medway Road and Proposed Street 'B' are recommended to reduce the risk of collisions and improve traffic operations.

A pedestrian crossover is warranted at the intersection of Medway Road and Proposed Street 'C' / Private Lane to satisfy pedestrian system connectivity and serve expected pedestrian desire lines. Based on the Ontario Traffic Manual Book 15, a Level 2 Type B pedestrian crossover is recommended at the intersection. Additionally, a Level 1 Type A pedestrian crossover is suggested at the intersection of Richmond Street and St. John's Drive. The crossover would satisfy pedestrian desire lines crossing Richmond Street from the development to access amenities such as Weldon Park. The locations for the pedestrian crossovers also complement the active transportation facilities proposed as part of the subdivision.

Site Access Review

The proposed site accesses are expected to meet TAC standards for sight distance and access spacing.

Parking Review

Based on the Municipality of Middlesex Centre Zoning By-Law 2005-005, dated July 2024, the subject site is required to provide 1057 total parking spaces and 29 accessible parking spaces for the apartment buildings included in the development proposal.

Transportation Demand Management

The subdivision proposes several TDM measures to promote alternative modes of transportation including sidewalks, a multi-use path, and short-term bicycle parking. The proposed infrastructure will contribute to a more connective active transportation network in the community of Arva

Conclusion

Overall, the proposed Bridle Path North Subdivision can be supported from a traffic operations perspective.

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1.0 Introduction

C.F. Crozier & Associates (Crozier) was retained by York Developments Ltd. to prepare a Transportation Impact Study (TIS) in support of the development application for the proposed Bridle Path North Subdivision located in Arva, Municipality of Middlesex Centre.

1.1 Development Lands

The existing subject lands are part of Lot 17, Concession 6 and 7, covering an area of approximately 24 hectares. The lands currently consist of agricultural fields with a house, barn, and other outbuildings fronting Richmond Street.

The lands are divided into two parcels: north of Medway Road and south of Medway Road. The north parcel is bound by Medway Creek and farmland to the north and west, Richmond Street and existing residential and commercial developments to the east, and Medway Road to the south. The south parcel is bound by Medway Road to the north, Medway Creek and farmland to the west, Richmond Street and an existing church and cemetery to the east, as well as an existing residential neighbourhood and farmland to the south.

The location of the proposed development is included in **Figure 1.**

1.2 Development Proposal

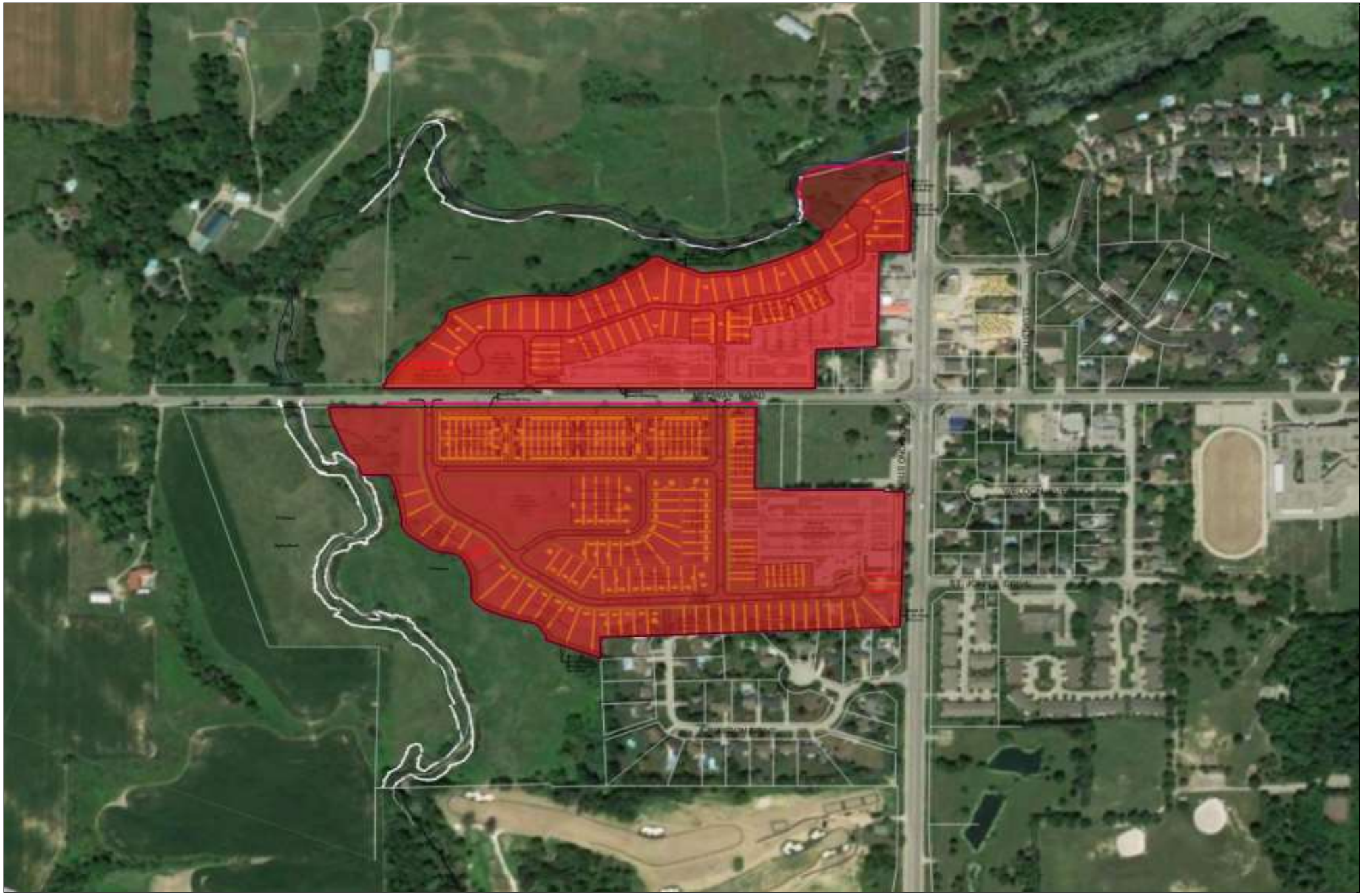
Per the most recent preliminary draft plan of subdivision and preliminary site plans prepared by MHBC, dated November 15, 2024, the development proposal is envisioned to have the following elements:

- 122 low-density detached residential units
- 49 medium-density residential street townhouse units
- 62 medium-density residential cluster townhouse units
- 699 apartment style-units contained in mid-rise or high-rise buildings
- 195 m^2 of commercial space on the ground floor of the high-rise building
- Access to the north parcel provided by two all-moves accesses to Medway Road
- Access to the south parcel provided by two all-moves accesses to Medway Road

The preliminary draft plan of subdivision is attached in **Appendix A**.

While no access to Richmond Street is currently shown on the preliminary draft plans, an additional access could be implemented to serve the south parcel. In this scenario, proposed Street 'B' may be extended through the watermain easement located east of the cul-de-sac on Proposed Street 'B', connecting with Richmond Street opposite of St. John's Drive.

Crozier submitted a Traffic Impact Brief dated August 20, 2024 to assess the traffic operations impacts of several different access configurations for the proposed development, ultimately recommending a right-in / right-out access. The MTO conditionally agreed in principle with the recommendation of the Brief on October 3, 2024, as further outlined in **Section 5.2.** The final access configuration will be based on future discussions with the MTO, the County, and the Municipality.



Legend	Arva Bridle Path North Subdivision		Figure 1
	Site Location	York DEVELOPMENTS / CROZIER CONSULTING ENGINEERS	Project No. 2673-7110 Date: 10/10/2024 Analyst: Anthony De Rango

1.3 Study Purpose and Scope

The purpose of the Transportation Impact Study (TIS) is to evaluate the impacts of the proposed development on the surrounding road network and recommend transportation-related mitigation measures, if required.

The study reviews the following main aspects of the proposed development from a transportation engineering perspective:

- Impacts of development traffic on the study road network through analyzing existing, future background, and future total traffic operations
- Safety requirements of the proposed site accesses

The study has been completed in accordance with procedures set out in the MTO's *General Guidelines for the Preparation of Traffic Impact Studies* dated March 2023.

A Terms of Reference (ToR) encompassing the scope of the Transportation Impact Study was circulated to the MTO on June 11, 2024, and comments were received on June 18, 2024. Correspondence from the MTO is included in **Appendix B.**

As confirmed in the Terms of Reference, this Transportation Impact Study considers the following study intersections:

- Existing Study Intersections:
    - Medway Road and Richmond Street (Signalized)
    - Richmond Street and Croydon Drive (Unsignalized)
    - Richmond Street and St. John's Drive (Unsignalized)
- Future Study Intersections:
    - Medway Road and Proposed Street 'C' / Private Lane (Unsignalized)
    - Medway Road and Private Lane (Unsignalized)
    - Medway Road and Proposed Street 'B' (Unsignalized)

The MTO's *General Guidelines for the Preparation of Traffic Impact Studies* requires analysis of the full build-out horizon, as well as the five- and ten-year horizons from the estimated year of full build-out. Therefore, the 2024, 2029, 2034, and 2039 horizon years were analyzed. These horizon years were confirmed through the Terms of Reference correspondence.

2.0 Existing Conditions

The following section provides a description of the study area from a transportation context, as well as a traffic operations analysis of the existing study road network.

2.1 Study Road Network

Richmond Street, also known as The King's Highway 4, is a north-south Arterial Road with two travel lanes in each direction and a posted speed limit of 60 km/h. Sidewalks are provided on both sides of the street within the community of Arva.

Medway Road, also known as County Road 28, is an east-west Arterial Road with one travel lane in each direction. The roadway has a posted speed limit of 60 km/hour west of Richmond Street and a posted speed limit of 50 km/hour east of The King's Highway 4. It is recognized the speed limit on Medway Road increases to 70 km/hour approximately 150 metres west of Richmond Street. A sidewalk is provided on the south side of Medway Road east of the Richmond Street intersection.

Croydon Drive is an east-west local road. The roadway has an assumed speed limit of 50 km/h.

St. John's Drive is an east-west local road. The roadway has an assumed speed limit of 50 km/h.

2.2 Existing Study Intersections

The lane configurations of the three existing intersections in the study network are as follows:

The intersection of **Medway Road and Richmond Street** is a four-legged signalized intersection. All legs have an auxiliary left-turn lane. In addition, the north and south approaches consist of one through lane and one shared through/right-turn lane. The east and west approaches consist of a shared through/right-turn lane.

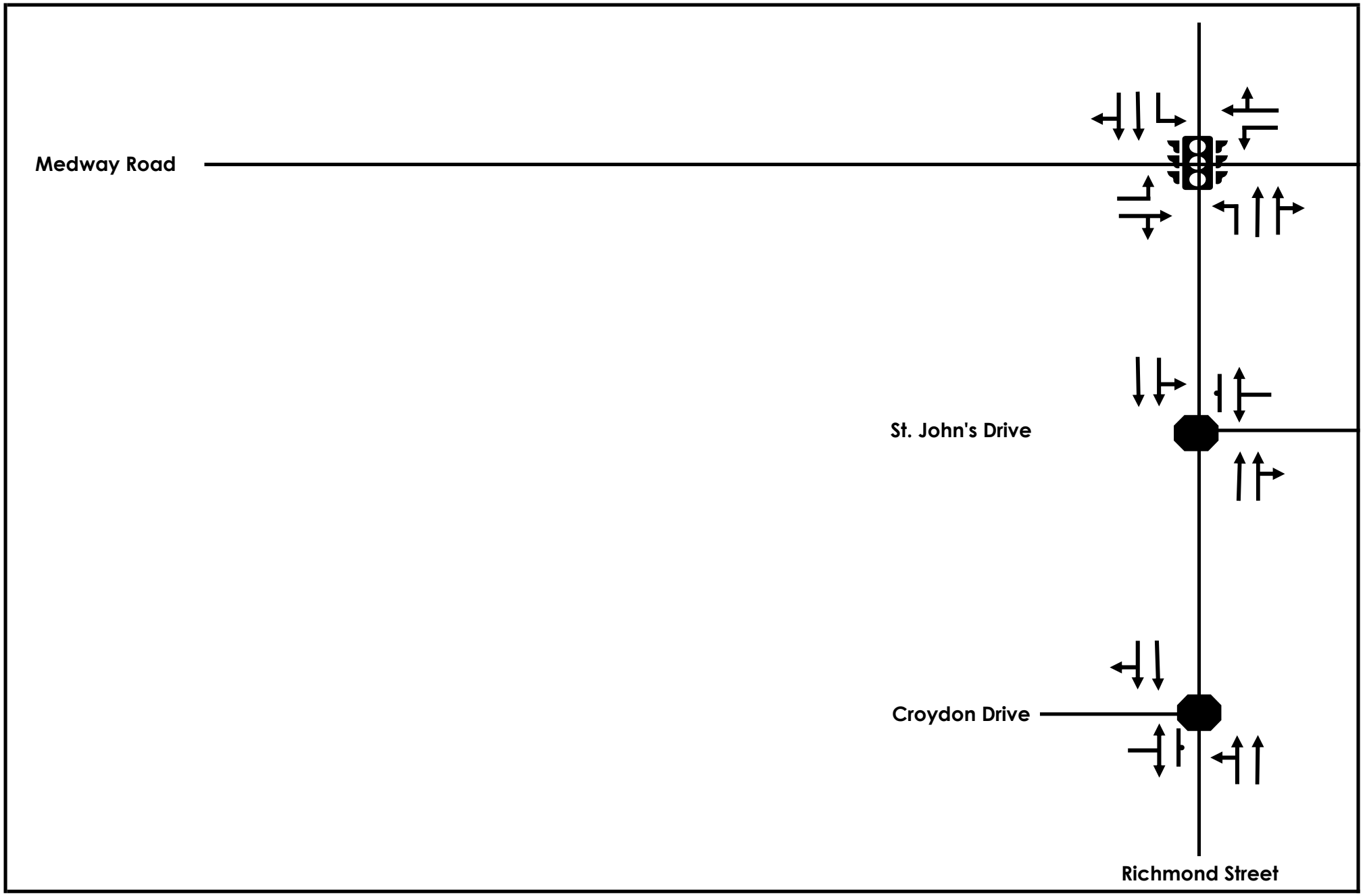
The intersection of **Richmond Street and Croydon Drive** is a three-legged stop-controlled intersection with stop control on the west approach. The north approach consists of one through lane and a shared through/right-turn lane. The south approach consists of one through lane and a shared through/left-turn lane. The west approach consists of a shared left/right-turn lane.

The intersection of **Richmond Street and St. John's Drive** is a three-legged stop-controlled intersection with stop control on the east approach. The north approach consists of one through lane and a shared through/left-turn lane. The south approach consists of one through lane and a shared through/right-turn lane. The east approach consists of a shared left/right-turn lane.

Figure 2 illustrates the existing study roadway.

2.3 Existing Active Transportation Network

No cycling facilities currently exist within the study area. As discussed in **Section 2.1**, sidewalks are provided in the study area on Richmond Street, as well as on the south side of Medway Road east of the Medway Road and Richmond Street intersection.



Legend

Signalized Intersection

Stop Controlled Intersection

Arva Bridle Path North Subdivision

Existing Study Roadway Network

CROZIER CONSULTING ENGINEERS

Figure 2

Project No. 2673-7110

Date: 10/10/2024

Analyst: Anthony De Rango

2.4 Existing Transit Services

Given the rural context of the proposed site location, the study area is not well serviced by transit currently.

The community of Arva is serviced by Route 1 of Middlesex County Connect, an inter-community bus operation. Limited weekday service transports passengers to London, Ilderton, and Lucan with three trips in both the morning and afternoon, respectively. Each bus features 16 seats, including 2 wheelchair-accessible spots. A stop is located at Medway Road and Arva Street, about 240 metres east of the Medway Road and Richmond Street intersection.

The site is located about 1.4 kilometres from the closest London Transit stop located at Richmond Street and Sunningdale Road W. The stop is serviced by City of London Route 34, connecting passengers to key destinations such as Masonville Place.

2.5 Traffic Data

Traffic data was collected by Accu-Traffic Inc., which is a RAQS certified traffic data collector. Turning movement counts were collected at the existing study intersections on Thursday, July 11, 2024, between 6:30 a.m. – 9:30 a.m. and 3:30 p.m. – 6:30 p.m. to determine the weekday morning peak hour and the afternoon peak hour, respectively.

Signal timing plans for the Medway Road and Richmond Street intersection were provided by the MTO.

Appendix C includes the traffic data collected.

2.6 Traffic Modelling

In accordance with the MTO's *General Guidelines for the Preparation of Traffic Impact Studies*, the evaluation of intersections within this report is conducted based on the methodology outlined in the Highway Capacity Manual. Analysis was conducted using Synchro 11 modelling software. Intersections are assessed using a Level of Service (LOS) metric, with ranges of intersection delays assigned a letter from 'A' to 'F'.

Generally, a LOS 'A' or 'B' would typically be measured when lesser traffic volumes are on the roadways and delays are minimal. LOS 'C' through 'F' would typically be observed during commuter peak hours when significant vehicle volumes would cause lengthy travel times.

Appendix D includes the LOS definitions for signalized and two-way stop-controlled intersections.

Queuing analysis was conducted using the microsimulation tool SimTraffic. The 95th percentile queue length metric, representing the 95th percentile queue length of the peak hour traffic simulated in SimTraffic, was compared against the existing available storage lengths.

Peak hour factors used for analysis were calculated based on existing traffic volumes and summarized in **Table 1**. Heavy vehicle percentages and pedestrian movements were also obtained from existing traffic movement counts.

Table 1: Existing Peak Hour Factors

Intersection	Weekday A.M. Peak Hour Factor	Weekday P.M. Peak Hour Factor
Medway Road and Richmond Street	0.95	0.96
Richmond Street and Croydon Drive	0.94	0.94
Richmond Street and St. John's Drive	0.95	0.92

2.7 Existing Intersection Operations

The existing traffic operations at the study intersections were analyzed based on observed traffic volumes during the weekday morning and afternoon peak hours.

Table 2 summarizes the existing traffic operations within the study area.

Table 2: 2024 Existing Levels of Service

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay (s)	Critical V/C Ratio[2]	95th Percentile Queue Length (50th Percentile Queue Length) > Storage Length
Medway Road and Richmond Street	Signalized	A.M.	B	16.0	0.59 (EBT)	N/A
		P.M.	B	19.3	0.71 (EBT)	N/A
Richmond Street and Croydon Drive	Minor Stop	A.M.	B	10.6 (EBLR)	0.19 (SBT)	N/A
		P.M.	B	13.9 (EBLR)	0.22 (NBT)	N/A
Richmond Street and St. John's Drive	Minor Stop	A.M.	B	11.3 (WBLR)	0.19 (SBT)	N/A
		P.M.	B	14.0 (WBLR)	0.21 (NBT)	N/A

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

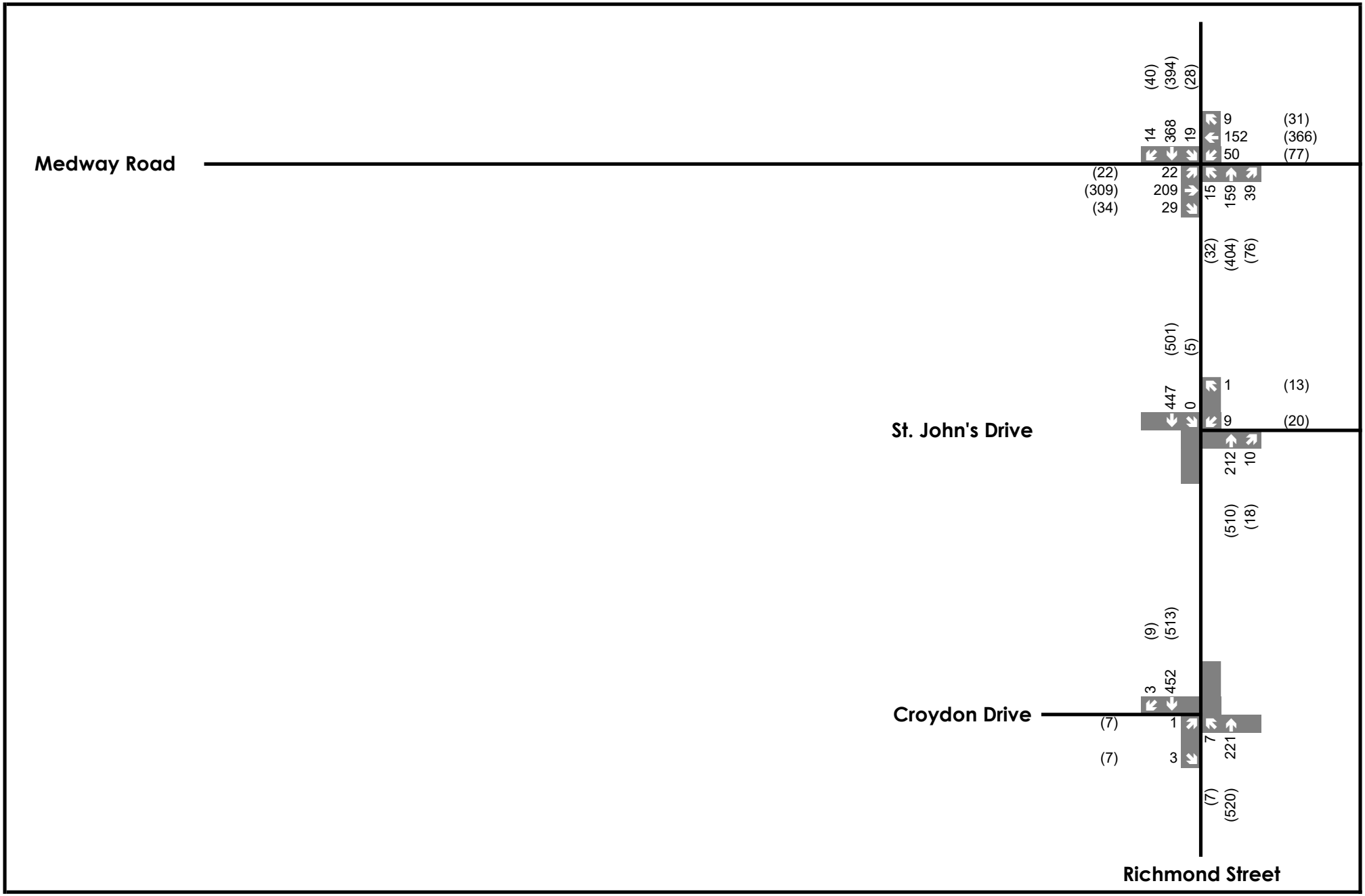
Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Under the 2024 existing conditions, all study intersections operate with a Level of Service of 'B' during the weekday morning and afternoon peak hours.

The MTO's *General Guidelines for the Preparation of Traffic Impact Studies* identifies that movements at signalized intersections with a volume to capacity ratio over 0.85 are deemed critical. No critical movements are noted at the study intersections under existing conditions.

Additionally, the existing storage lengths can accommodate all 95th percentile queues in both peak hours.

Figure 3 shows the existing traffic volumes. **Appendix E** includes detailed capacity analyses.



Legend	Arva Bridle Path North Subdivision	CROZIER CONSULTING ENGINEERS	Figure 3
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	Existing 2024 Volumes		Project No. 2673-7110 Date: 10/10/2024 Analyst: Anthony De Rango

3.0 Future Background Conditions

This section discusses the methodology and assumptions adopted for the development of the future background scenarios, including the growth rates applied, background developments identified, and road network improvements considered.

3.1 Traffic Growth

Per correspondence with MTO staff, a growth rate of 2% per annum was applied for all through movements on Richmond Street.

3.2 Background Development

No background developments that would substantially impact the study intersections were identified. All other development was considered as part of the generic growth of the roadway corridors.

3.3 Future Roadway Improvements

No roadway improvements were identified as planned or under construction within the study area road network.

3.4 Future Background Intersection Operations

Future background traffic operations at the existing study intersections were analyzed following the addition of volumes due to background growth to the existing traffic. **Figure 4**, **Figure 5**, and **Figure 6** illustrate the resulting future background volumes for the 2029, 2034, and 2039 horizon years respectively.

Table 3, **Table 4**, and **Table 5** summarize the Levels of Service for the 2029, 2034, and 2039 future background horizon years respectively. **Appendix F** includes detailed capacity analyses**.**

Table 3: 2029 Future Background Intersection Operations

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay (s)	Critical V/C Ratio[2]	95th Percentile Queue Length (50th Percentile Queue Length) > Storage Length
Medway Road and Richmond Street	Signalized	A.M.	B	16.0	0.59 (EBT)	N/A
		P.M.	B	19.4	0.71 (EBT)	N/A
Richmond Street and Croydon Drive	Minor Stop	A.M.	B	11.0 (EBLR)	0.21 (SBT)	N/A
		P.M.	B	14.6 (EBLR)	0.25 (NBT)	N/A
Richmond Street and St. John's Drive	Minor Stop	A.M.	B	11.5 (WBLR)	0.21 (SBT)	N/A
		P.M.	B	14.9 (WBLR)	0.24 (NBT)	N/A

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Table 4: 2034 Future Background Intersection Operations

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay (s)	Critical V/C Ratio[2]	95th Percentile Queue Length (50th Percentile Queue Length) > Storage Length
Medway Road and Richmond Street	Signalized	A.M.	B	16.0	0.59 (EBT)	N/A
		P.M.	B	19.6	0.71 (EBT)	N/A
Richmond Street and Croydon Drive	Minor Stop	A.M.	B	11.3 (EBLR)	0.23 (SBT)	N/A
		P.M.	C	15.4 (EBLR)	0.27 (NBT)	N/A
Richmond Street and St. John's Drive	Minor Stop	A.M.	B	11.8 (WBLR)	0.23 (SBT)	N/A
		P.M.	C	15.9 (WBLR)	0.26 (NBT)	N/A

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Table 5: 2039 Future Background Intersection Operations

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay (s)	Critical V/C Ratio[2]	95th Percentile Queue Length (50th Percentile Queue Length) > Storage Length
Medway Road and Richmond Street	Signalized	A.M.	B	16.0	0.59 (EBT)	N/A
		P.M.	B	19.8	0.71 (EBT)	N/A
Richmond Street and Croydon Drive	Minor Stop	A.M.	B	11.4 (EBLR)	0.25 (SBT)	N/A
		P.M.	C	16.3 (EBLR)	0.30 (NBT)	N/A
Richmond Street and St. John's Drive	Minor Stop	A.M.	B	12.1 (WBLR)	0.25 (SBT)	N/A
		P.M.	C	17.3 (WBLR)	0.29 (NBT)	N/A

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

The metrics outlined in the future background operations tables demonstrate that the study intersections are expected to continue to operate acceptably in the future, with a Level of Service of 'C' or better in all analysis periods. In the morning peak hour, all study intersections are expected to operate at the same Level of Service as the existing condition with an increase in control delay of no more than 1 second. In the afternoon peak hour, the intersections of Richmond Street and Croydon Drive as well as Richmond Street and St. John's Drive worsen from a Level of Service of 'B' in the existing condition to a Level of Service 'C' in the 2039 future background condition. However, all study intersections are expected to operate with a volume to capacity ratio that remains below the MTO's critical threshold of 0.85. Additionally, all existing storage lengths are expected to accommodate the projected 95th percentile queues in both peak hours in all the study horizons.

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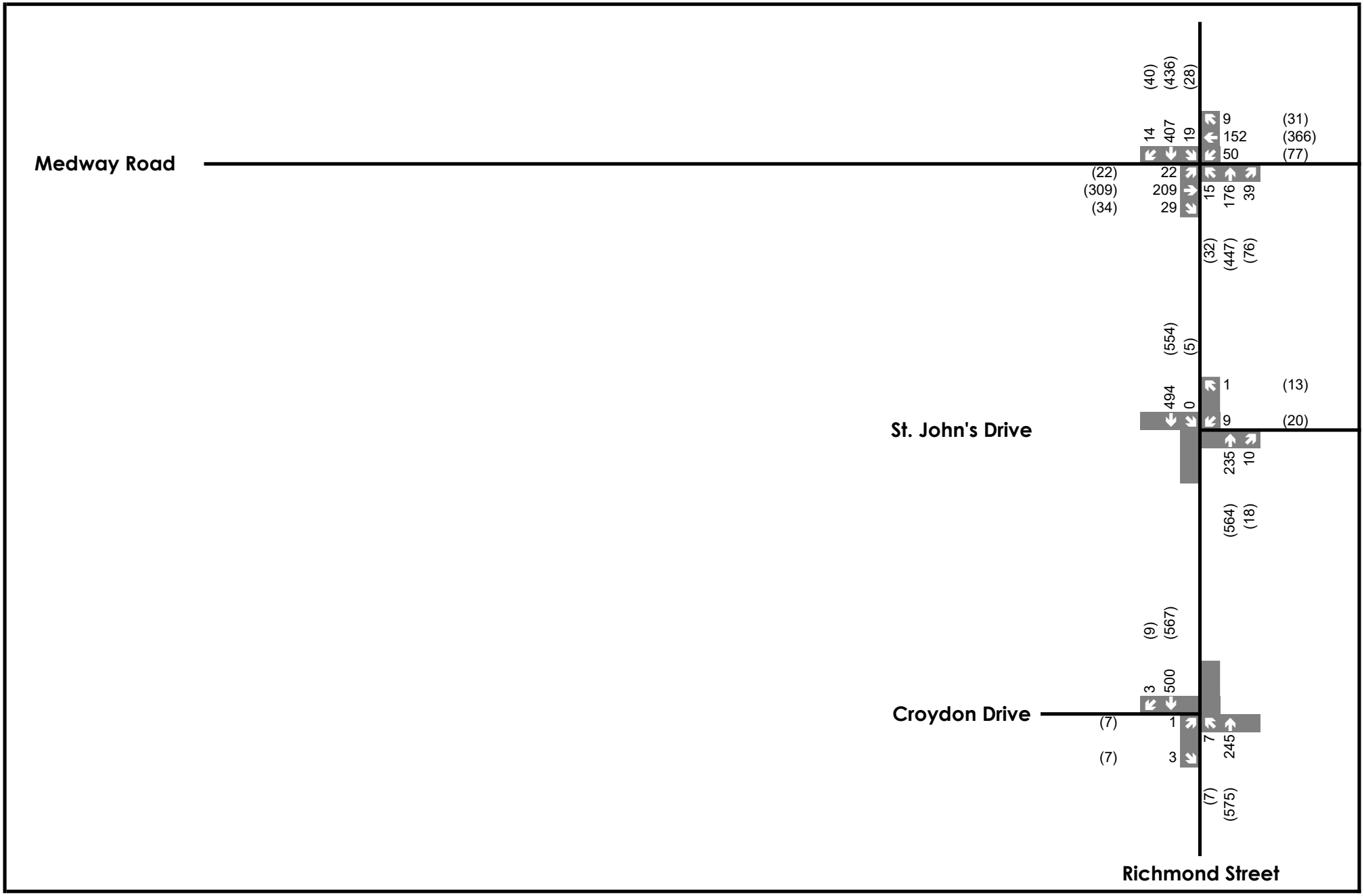

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xx A.M. Peak Hour Traffic Volumes
(xx) P.M. Peak Hour Traffic Volumes

Arva Bridle Path North Subdivision

2029 Future Background Traffic Volumes

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Figure 4

Project No. 2673-7110
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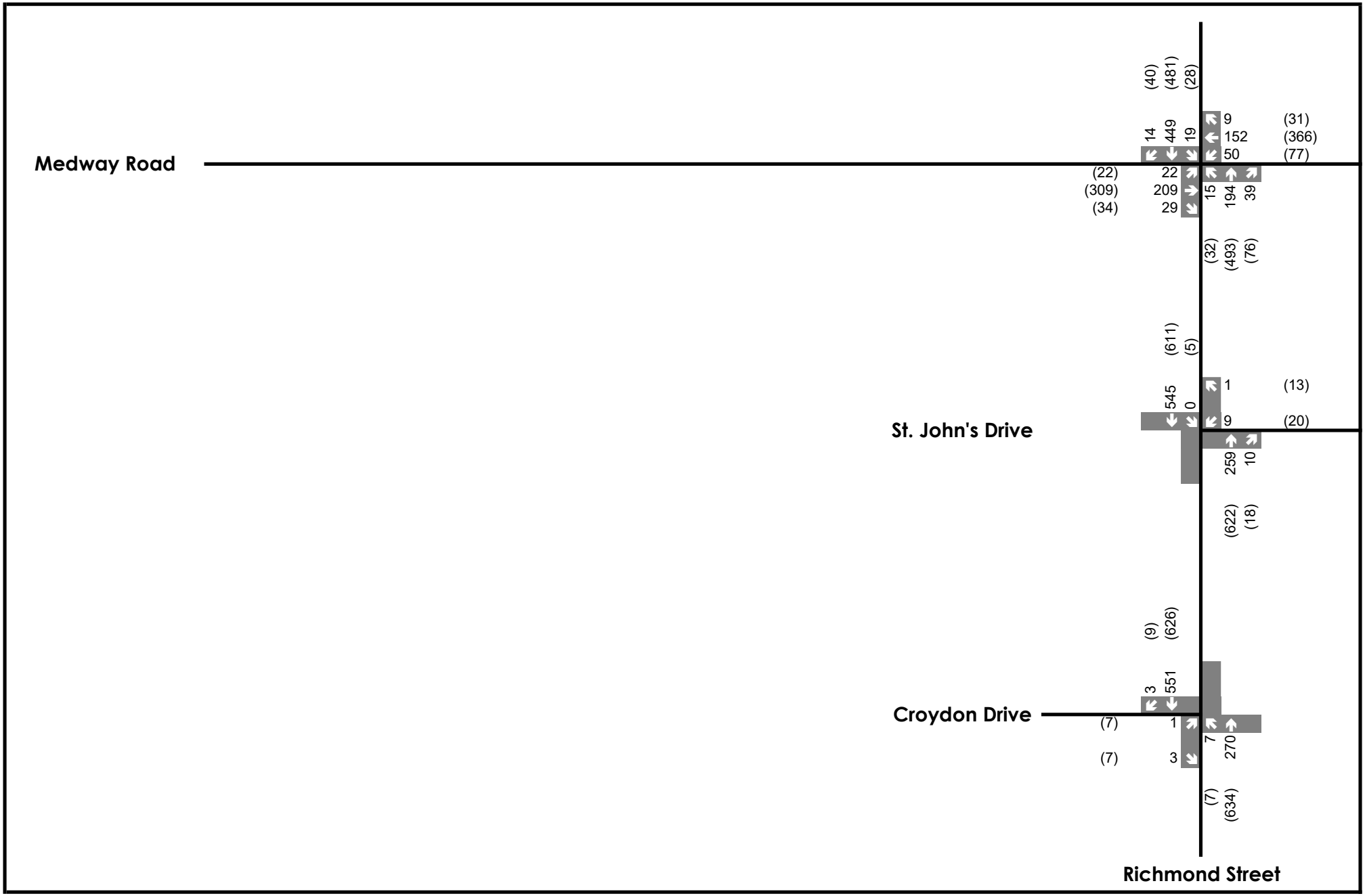
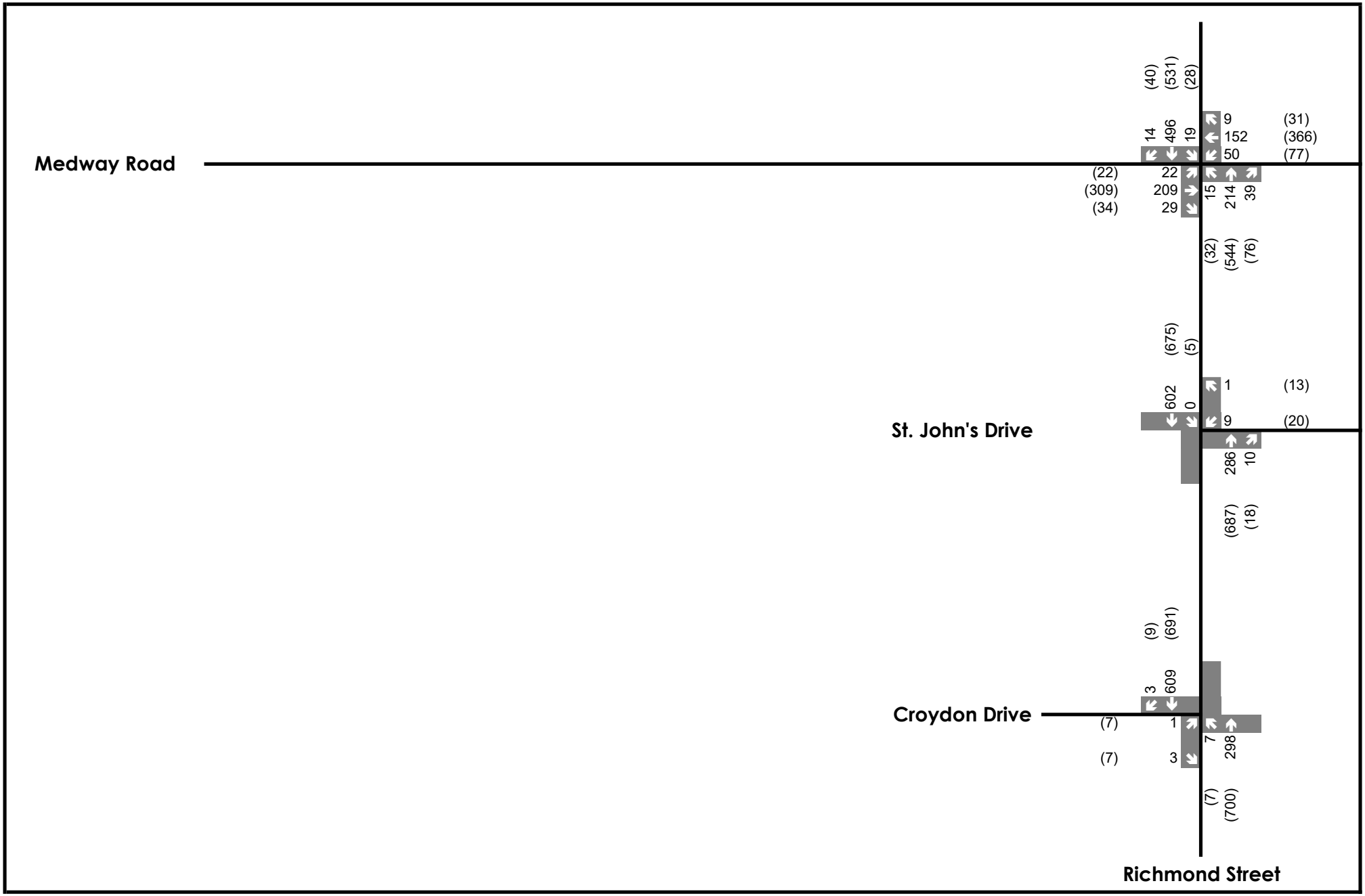
Analyst: Anthony De Rango



Legend	Arva Bridle Path North Subdivision	CROZIER CONSULTING ENGINEERS	Figure 5
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2034 Future Background Traffic Volumes		Project No. 2673-7110 Date: 10/10/2024 Analyst: Anthony De Rango



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xx A.M. Peak Hour Traffic Volumes
(xx) P.M. Peak Hour Traffic Volumes

Arva Bridle Path North Subdivision

2039 Future Background Traffic Volumes

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Figure 6

Project No. 2673-7110
Date: 10/10/2024
Analyst: Anthony De Rango

4.0 Site Generated Traffic

The proposed development will result in additional vehicles on the boundary road network that previously did not exist.

4.1 Trip Generation

The ITE Trip Generation Manual, 11th Edition, was used to forecast the site-generated traffic for the proposed development.

According to the development's preliminary draft plan of subdivision, the proposed land uses consist of the following:

- 122 low-density detached residential units
- 49 medium-density residential street townhouse units
- 62 medium-density residential cluster townhouse units
- 699 medium-density residential apartments
- 195 m^2 of ground floor commercial space

Overall, the proposed development is expected to produce 94 inbound and 275 outbound trips during the weekday morning peak hour, and 275 inbound and 176 outbound trips during the weekday afternoon peak hour.

The trip generation for the north and south parcel of the proposed development is summarized in **Table 6** and **Table 7**, respectively.

Table 6: Site Generated Trips – North Parcel

Unit Type	Land Use (ITE LUC)	Equation	Trip Generation			
			Weekday A.M.		Weekday P.M.	
			Inbound	Outbound	Inbound	Outbound
41 Low-Density Residential Units	LUC 210: Single-Family Detached Housing	A.M. Ln(T) = 0.91 Ln(X) + 0.12 P.M. Ln(T) = 0.94 Ln(X) + 0.27	8	25	27	16
21 Medium-Density Townhouses	LUC 215: Single-Family Attached Housing	A.M. T = 0.52(X) – 5.7 P.M. T = 0.60(X) – 3.93	1	4	5	4
247 Apartment-Style Units in Mid-Rise	LUC 221: Multifamily Housing (Mid-Rise)	A.M. T = 0.44(X) – 11.61 P.M. T = 0.39(X) + 0.34	22	75	59	38
Total			**31**	**104**	**91**	**58**

Table 7: Site Generated Trips – South Parcel

Unit Type	Land Use (ITE LUC)	Equation	Trip Generation			
			Weekday A.M.		Weekday P.M.	
			Inbound	Outbound	Inbound	Outbound
81 Low-Density Residential Units	LUC 210: Single-Family Detached Housing	A.M. Ln(T) = 0.91 Ln(X) + 0.12 P.M. Ln(T) = 0.94 Ln(X) + 0.27	15	46	51	30
90 Medium-Density Townhouses	LUC 215: Single-Family Attached Housing	A.M. T = 0.52(X) – 5.7 P.M. T = 0.60(X) – 3.93	10	31	30	20
452 Apartment-Style Units in High-Rise	LUC 222: Multifamily Housing (High-Rise)	A.M. T = 0.27(X) P.M. T = 0.32(X)	32	90	90	55
Ground Floor Commercial Space (2.1 x 1000 ft^2)	LUC 822 Strip Retail Pizza (<40k)	A.M. Ln(T) = 0.66 Ln(X) + 1.84 P.M. Ln(T) = 0.71 Ln(X) + 2.72	6	4	13	13
Total			**63**	**171**	**184**	**118**

4.2 Trip Distribution and Assignment

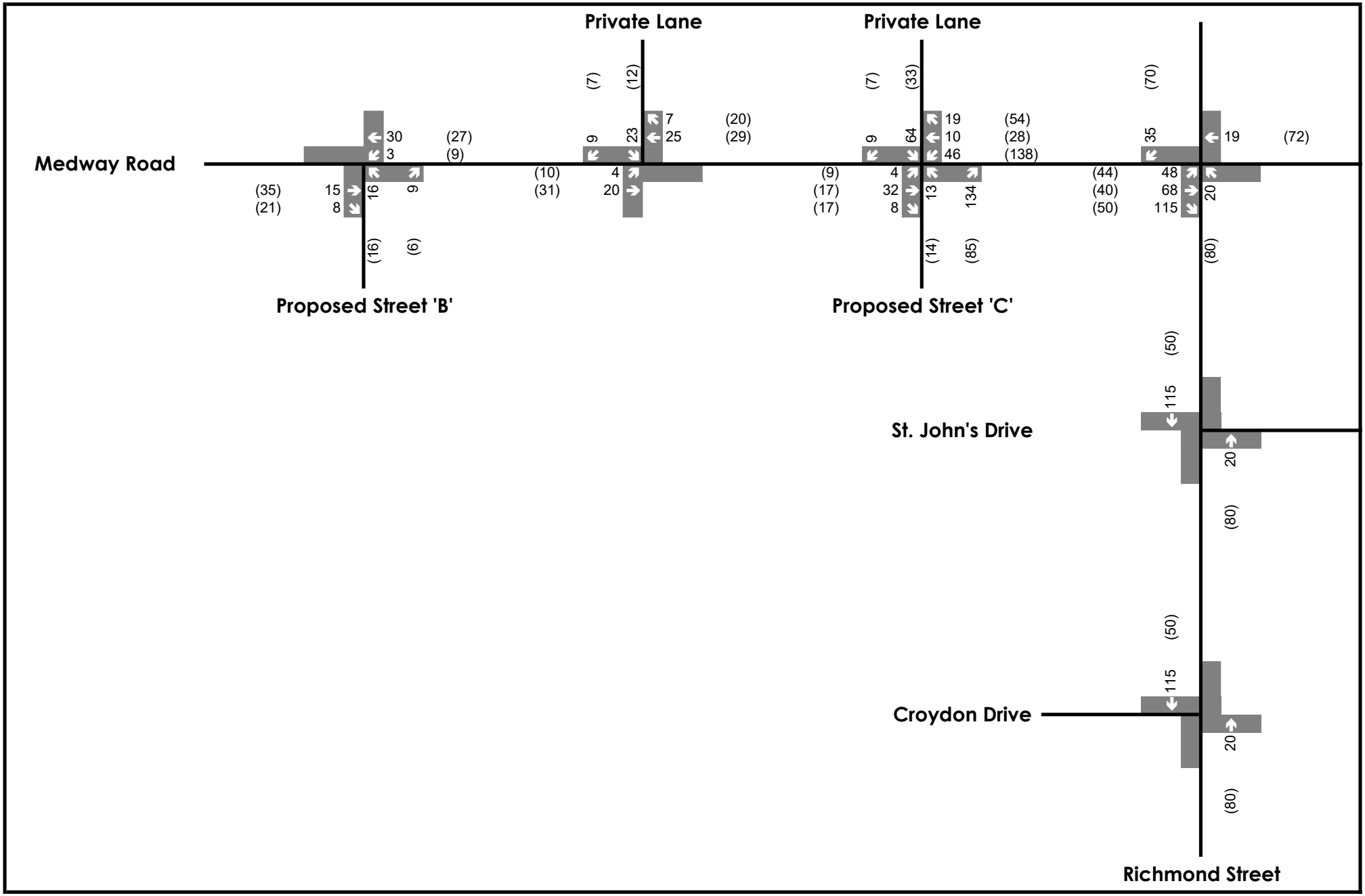
As confirmed with MTO staff, existing travel patterns were analyzed to determine the distribution of site generated trips to the surrounding road network. The primary trips were distributed to the study area road network based on the existing proportions of vehicles entering and exiting the study area road network at the intersections of Medway Road and Richmond Street as well as Richmond Street and Croydon Drive.

Table 8 outlines the resulting trip distribution applied to the site generated trips.

Table 8: Trip Distribution

Direction	A.M. Inbound	A.M. Outbound	P.M. Inbound	P.M. Outbound
North (Richmond Street)	36%	17%	25%	25%
South (Richmond Street)	21%	42%	29%	28%
East (Medway Road)	19%	24%	26%	23%
West (Medway Road)	24%	17%	20%	24%
Total	100%	100%	100%	100%

Based on these distributions, the trips were assigned to the road network as illustrated in **Figure 7**.



Legend	Arva Bridle Path North Subdivision	CROZIER CONSULTING ENGINEERS	Figure 7
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	Site Generated Trips		Project No. 2673-7110 Date: 10/10/2024 Analyst: Anthony De Rango

5.0 Future Total Conditions

This section discusses the projected future total traffic conditions and traffic operations at the study intersections for the horizon years 2029, 2034, and 2039.

5.1 Future Road Network

As illustrated in the preliminary draft plans included in **Appendix A**, it is proposed that the north and south parcels are each served by two full moves accesses on Medway Road.

It is recommended that Medway Road is widened to a three-lane cross-section along the entire frontage of the proposed development. The additional lane will provide the pavement width necessary for the recommended left-turn lanes as discussed in **Section 6.2**.

It is also recommended the speed limit on Medway Road west of Richmond Street be reduced to 50 km/h after construction of the proposed subdivision. This is consistent with the segment of Medway Road east of Richmond Street within the community of Arva. A maximum speed begins sign (Rb-2 in Ontario Traffic Manual Book 5) displaying a limit of 50 km/h is recommended on Medway Road near Medway Creek. This sign location is necessary to slow eastbound vehicles, especially considering these vehicles must descend a hill located approximately 175 metres west of the waterway which can encourage higher travelling speeds. Similarly, it is recommended that the speed limit on Richmond Street is reduced to 50 km/h within the community of Arva to be consistent with the roadways within the study area.

The future study road network including the new site accesses are included in **Figure 8**.

5.2 Potential Richmond Street Access

The future total analysis outlined in this report does not consider the additional access onto Richmond Street. Following the submission of a Traffic Impact Brief dated August 20, 2024, the MTO agreed in principle with Crozier's recommendation for a right-in / right-out access pending the following conditions:

- The access must be designed to MTO standards, including a raised centre median of sufficient length to prevent improper use of the access
- Confirmation that the County and Municipality agree with the recommendation to close connectivity of Croydon Drive at Richmond Street, as well as the MTO's requirement of a raised centre median at the Richmond Street and St. John's Drive / Proposed Street 'B' intersection. The median would effectively restrict the St. John's Drive approach at Richmond Street to a right-in / right-out access.
- Ensure the storage lengths are sufficient at the Medway Road and Richmond Street intersection to accommodate the additional traffic volumes from local traffic diversions caused by the required raised median on Richmond Street

Discussions with the MTO, the County, and the Municipality regarding these conditions are ongoing and a decision on the access will be finalized as part of future submissions.

Another possible access configuration could include a full-moves access at the intersection of Richmond Street and St. John's Drive / Proposed Street 'B'. A raised median would be constructed at the intersection of Richmond Street and Croydon Drive, creating a right-in /right-out access on the eastbound approach. An internal connection would then be provided between the western terminus of Croydon Drive and Proposed Street 'B'.

5.3 Future Pedestrian Network

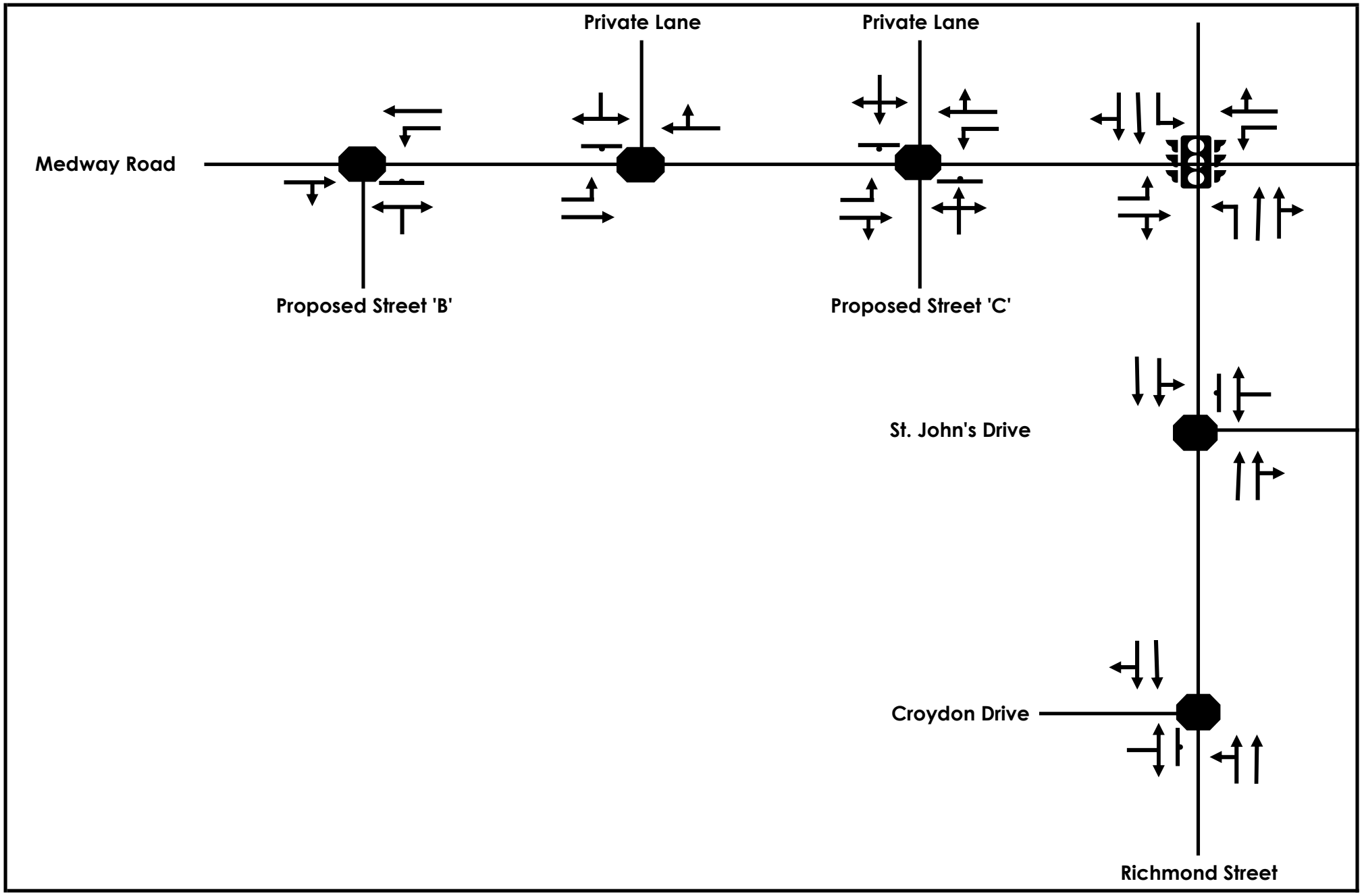
As requested by the Municipality of Middlesex Centre, a multi-purpose path that primarily runs east-west will be included as part of the subject development to increase pedestrian connectivity in the study area. The path would extend between the proposed park in Block 35 and the intersection of Richmond Street and St. John's Drive. The multi-use path would be constructed on the south side of Medway Road, the east side of Proposed Street 'C', the north side of Proposed Street 'B', and through the watermain easement east of the Proposed Street 'B' cul-de-sac. The multi-use path alignment connects with the recommended locations for pedestrian crossovers, as discussed in **Section 6.5**, and also ensures that the three-lane cross-section on Medway Road can be accommodated within the proposed right-of-way.

Additionally, a sidewalk is proposed on the north side of Medway Road between the West Private Lane and Richmond Street.

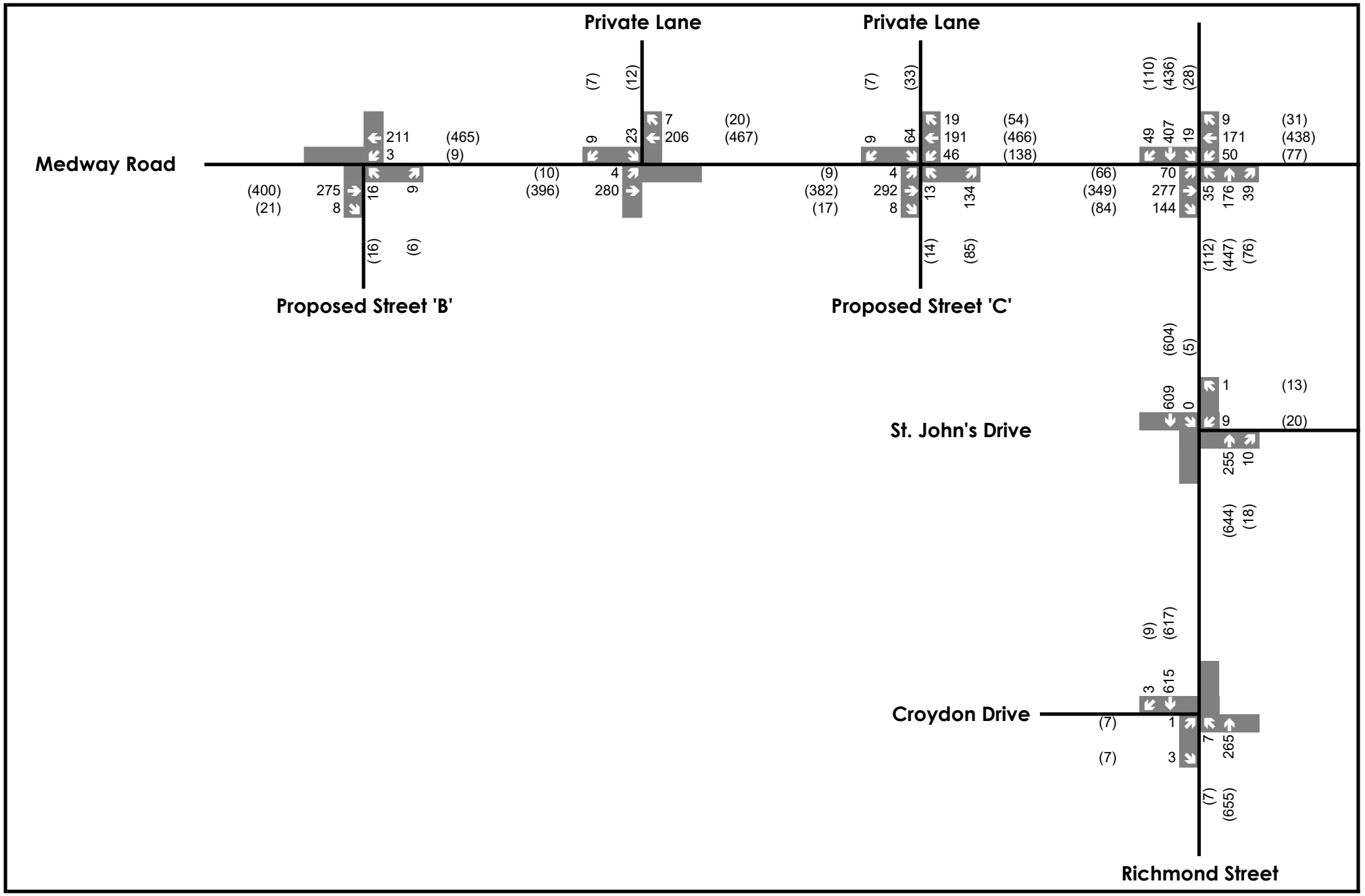
5.4 Future Total Intersection Operations

The future total operations were analyzed by adding the site generated traffic from the proposed development to the future background traffic for each study horizon. **Figure 9**, **Figure 10**, and **Figure 11** illustrate the resulting future total traffic volumes for the 2029, 2034, and 2039 horizon years, respectively.

Table 9, **Table 10**, and **Table 11** summarize the Levels of Service for the 2029, 2034, and 2039 future background horizon years, respectively. **Appendix G** includes detailed capacity analyses.



Legend	Arva Bridle Path North Subdivision	CROZIER CONSULTING ENGINEERS	Figure 8
Signalized Intersection Stop Controlled Intersection	Future Study Roadway Network		Project No. 2673-7110 Date: 10/31/2024 Analyst: Anthony De Rango



Legend

xx A.M. Peak Hour Traffic Volumes
(xx) P.M. Peak Hour Traffic Volumes

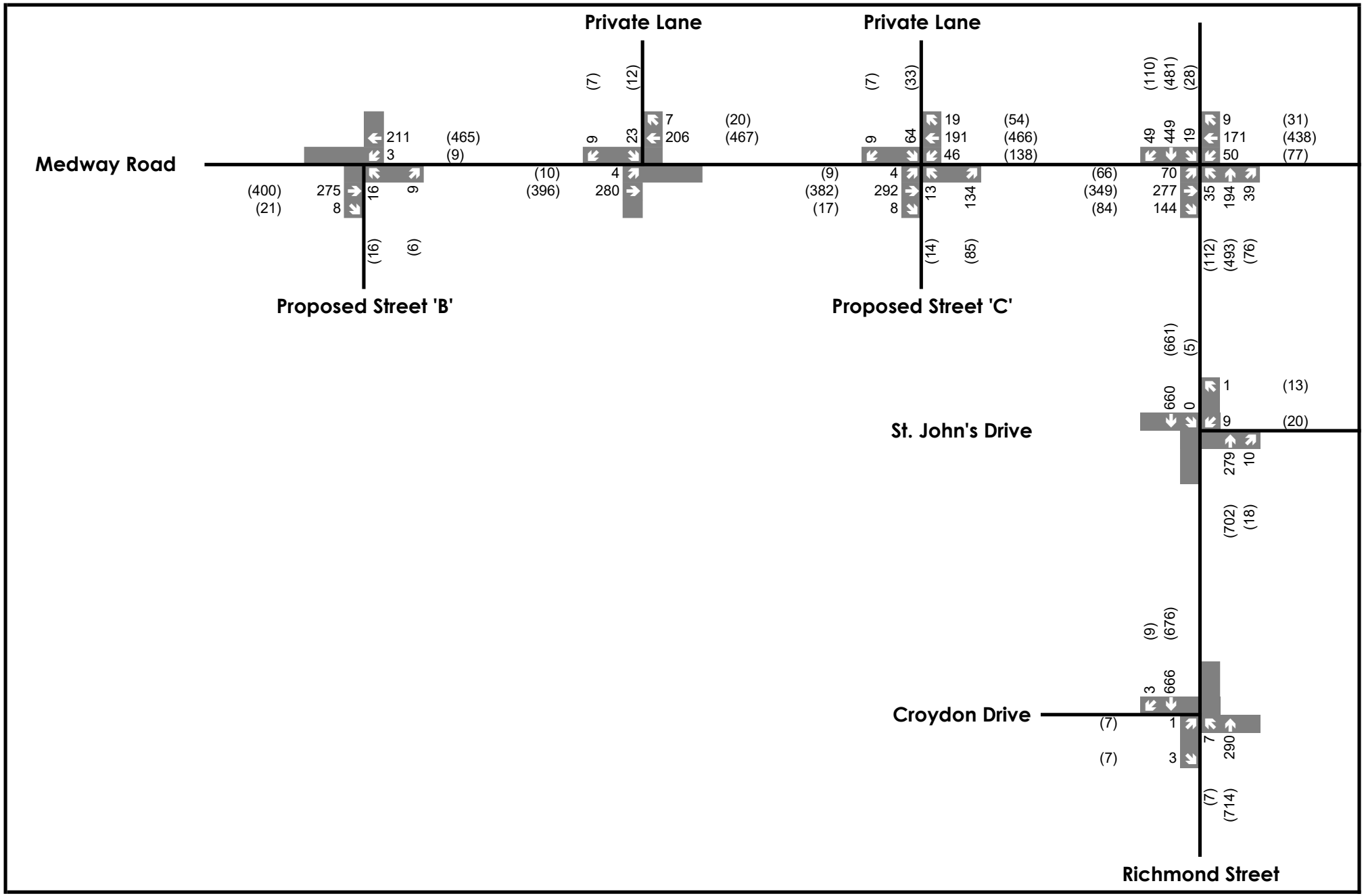
Arva Bridle Path North Subdivision

2029 Future Total Traffic Volumes

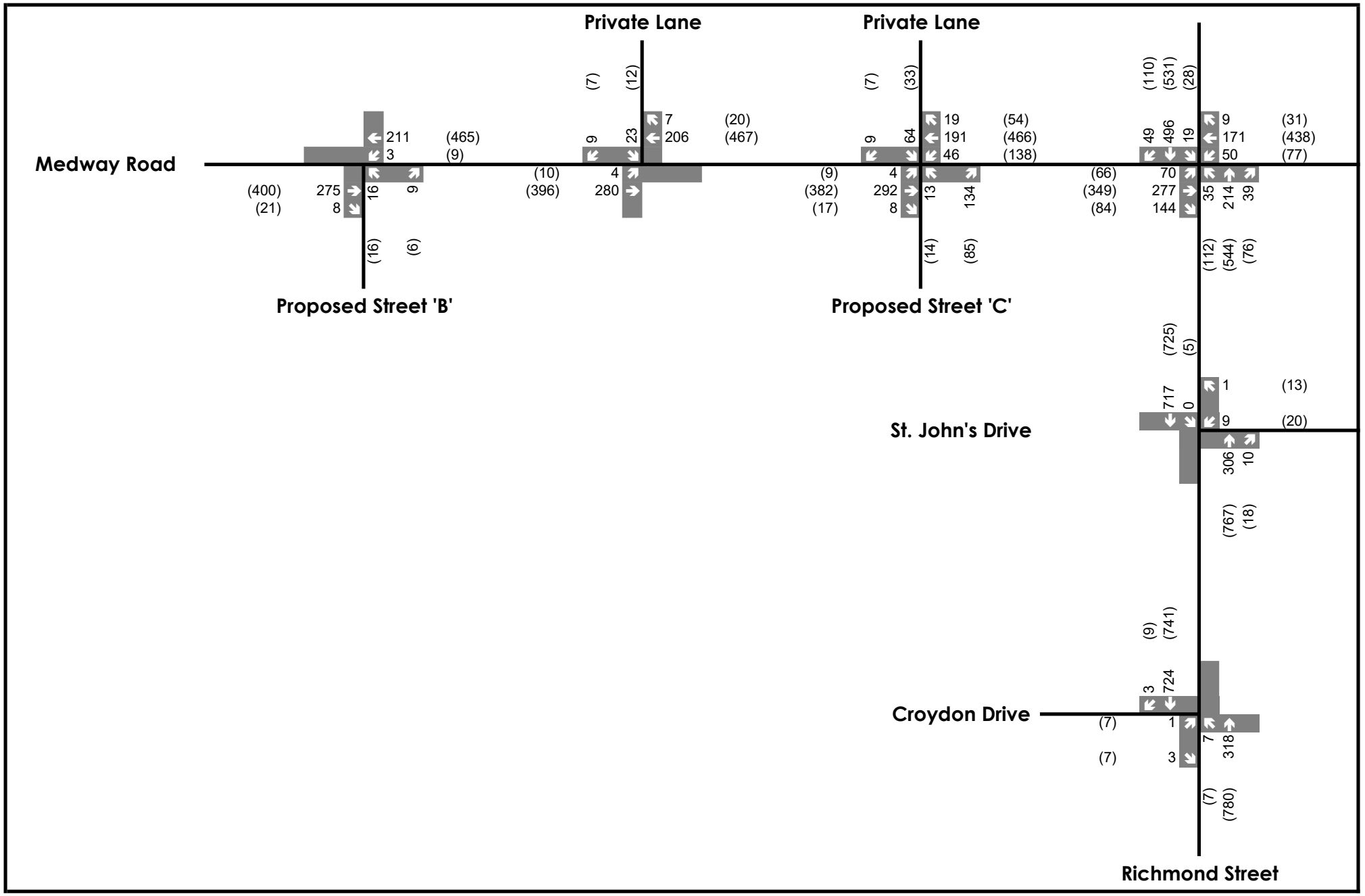
CROZIER CONSULTING ENGINEERS

Figure 9

Project No. 2673-7110
Date: 10/31/2024
Analyst: Anthony De Rango



Legend	Arva Bridle Path North Subdivision	CROZIER CONSULTING ENGINEERS	Figure 10
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2034 Future Total Traffic Volumes		Project No. 2673-7110 Date: 10/31/2024 Analyst: Anthony De Rango



Legend

xx A.M. Peak Hour Traffic Volumes
(xx) P.M. Peak Hour Traffic Volumes

Arva Bridle Path North Subdivision

2039 Future Total Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 11

Project No. 2673-7110
Date: 10/31/2024
Analyst: Anthony De Rango

Table 9: 2029 Future Total Intersection Operations

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay (s)	Critical V/C Ratio[2]	95th Percentile Queue Length (50th Percentile Queue Length) > Storage Length
Medway Road and Richmond Street	Signalized	A.M.	B	19.5	0.73 (EBTR)	N/A
		P.M.	C	21.7	0.76 (EBTR)	**40m** (25m) > 25m (NBL)
Richmond Street and Croydon Drive	Minor Stop	A.M.	B	11.6 (EBLR)	0.25 (SBT)	N/A
		P.M.	C	15.8 (EBLR)	0.28 (NBT)	N/A
Richmond Street and St. John's Drive	Minor Stop	A.M.	B	12.0 (WBLR)	0.25 (SBT)	N/A
		P.M.	C	16.5 (WBLR)	0.27 (NBT)	N/A
Medway Road and Proposed Street 'C' / Private Lane	Minor Stop	A.M.	D	28.1 (SBLTR)	0.35 (SBLTR)	N/A
		P.M.	**F**	**51.1** (SBLTR)	0.35 (SBLTR)	N/A
Medway Road and Private Lane	Minor Stop	A.M.	B	12.1 (SBLR)	0.19 (EBT)	N/A
		P.M.	C	15.4 (SBLR)	0.30 (WBTR)	N/A
Medway Road and Proposed Street 'B'	Minor Stop	A.M.	B	11.9 (NBLR)	0.19 (EBTR)	N/A
		P.M.	C	15.9 (NBLR)	0.28 (WBT)	N/A

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Table 10: 2034 Future Total Intersection Operations

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay (s)	Critical V/C Ratio[2]	95th Percentile Queue Length (50th Percentile Queue Length) > Storage Length
Medway Road and Richmond Street	Signalized	A.M.	B	19.7	0.73 (EBTR)	N/A
		P.M.	C	22.1	0.77 (EBTR)	**35m** (20m) > 25m (NBL)
Richmond Street and Croydon Drive	Minor Stop	A.M.	B	11.7 (EBLR)	0.27 (SBT)	N/A
		P.M.	C	16.6 (EBLR)	0.30 (NBT)	N/A
Richmond Street and St. John's Drive	Minor Stop	A.M.	B	12.2 (WBLR)	0.28 (SBT)	N/A
		P.M.	C	17.8 (WBLR)	0.29 (NBT)	N/A
Medway Road and Proposed Street 'C' / Private Lane	Minor Stop	A.M.	D	28.1 (SBLTR)	0.35 (SBLTR)	N/A
		P.M.	**F**	**51.2** (SBLTR)	0.35 (SBLTR)	N/A

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay (s)	Critical V/C Ratio[2]	95th Percentile Queue Length (50th Percentile Queue Length) > Storage Length
Medway Road and Private Lane	Minor Stop	A.M.	B	12.1 (SBLR)	0.19 (EBT)	N/A
		P.M.	C	15.4 (SBLR)	0.30 (WBTR)	N/A
Medway Road and Proposed Street 'B'	Minor Stop	A.M.	B	11.9 (NBLR)	0.19 (EBTR)	N/A
		P.M.	C	15.9 (NBLR)	0.28 (WBT)	N/A

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Table 11: 2039 Future Total Intersection Operations

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay (s)	Critical V/C Ratio[2]	95th Percentile Queue Length (50th Percentile Queue Length) > Storage Length
Medway Road and Richmond Street	Signalized	A.M.	B	19.8	0.73 (EBTR)	N/A
		P.M.	C	22.8	0.78 (EBTR)	**40m** (25m) > 25m (NBL)
Richmond Street and Croydon Drive	Minor Stop	A.M.	B	11.8 (EBLR)	0.30 (SBT)	N/A
		P.M.	C	17.8 (EBLR)	0.33 (NBT)	N/A
Richmond Street and St. John's Drive	Minor Stop	A.M.	B	12.6 (WBLR)	0.30 (SBT)	N/A
		P.M.	C	19.5 (WBLR)	0.32 (NBT)	N/A
Medway Road and Proposed Street 'C' / Private Lane	Minor Stop	A.M.	D	28.1 (SBLTR)	0.35 (SBLTR)	N/A
		P.M.	**F**	**51.3** (SBLTR)	0.35 (SBLTR)	N/A
Medway Road and Private Lane	Minor Stop	A.M.	B	12.1 (SBLR)	0.19 (EBT)	N/A
		P.M.	C	15.4 (SBLR)	0.30 (WBTR)	N/A
Medway Road and Proposed Street 'B'	Minor Stop	A.M.	B	11.9 (NBLR)	0.19 (EBTR)	N/A
		P.M.	C	15.9 (NBLR)	0.28 (WBT)	N/A

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

The addition of site traffic to the road network slightly worsens the operations at the Medway Road and Richmond Street intersection. The signalized intersection is projected to have control delays of 19.8 and 22.8 seconds in the morning and afternoon peak hours of the 2039 future total condition respectively, compared to delays of 16.0 and 19.8 seconds in the 2039 future background condition.

Additionally, the intersection's critical volume to capacity ratio in the afternoon peak hour is expected to increase from 0.71 in the 2039 future background condition to 0.78 in the 2039 future total condition. Finally, the 95th percentile queues for the northbound left movement at the Medway Road and Richmond Street intersection are expected to exceed the reported storage length in the afternoon peak hour of the future total condition. However, the existing storage length can accommodate the forecasted average queue length for the northbound left movement. Also, the additional storage required to accommodate the projected 95th percentile queues for this movement can be accommodated within the taper length of the existing turning lane without obstructing any through lanes. As a result, no storage lane improvements are recommended for the Medway Road and Richmond Street intersection.

The intersections of Richmond Street and Croydon Drive as well as Richmond Street and St. John's Drive are expected to operate in the 2039 future total condition with the same Level of Service as the 2039 Future Background condition. The control delays at the unsignalized intersections are projected to increase by no more than 2.5 seconds in the morning and afternoon peak hours.

The southbound leg of the proposed Medway Road and Proposed Street 'C' / Private Lane intersection is expected to operate at a Level of Service 'D' and 'F' in the morning and afternoon peak hours respectively in each of the future total horizon years. The Level of Service 'F' in the afternoon peak hour is due to conflicting traffic on Medway Road and Proposed Street 'C' providing infrequent gaps for southbound left turns. These higher delays can be expected at a minor access onto an arterial road. Additionally, all movements at the Medway Road and Proposed Street 'C' / Private Lane intersection are projected to be well under the MTO's critical volume to capacity ratio threshold and no queuing issues were identified. The additional access onto Richmond Street would improve the operations of the Medway Road and Proposed Street 'C' / Private Lane intersection. Vehicles traveling between the south parcel and Richmond Street would use the more convenient access, reducing turning volumes on Medway Road and Proposed Street 'C'. This would ultimately provide more gaps for southbound traffic at the Medway Road and Proposed Street 'C' / Private Lane intersection.

The proposed intersections of Medway Road and Private Lane as well as Medway Road and Proposed Street 'B' are expected to operate acceptably with a Level of Service of 'C' or better in each of the peak hours in all future total horizon years.

All study intersections are expected to operate acceptably with a critical volume to capacity ratio below the MTO's critical threshold of 0.85. Therefore, no recommendations are considered necessary to support the proposed development and its generated traffic.

6.0 Warrants

Warrants for left-turn lanes, right-turn lanes and signals were conducted to assess the future infrastructure needs of the existing intersections as well as the proposed site accesses.

6.1 Storage Length Using Greenshields Method

During consultation with MTO staff, it was requested that the storage lengths for left-turn lanes at signalized intersections be reviewed for future traffic volumes based on the arrival rate method (Greenshields Method) as noted in the MTO's Signal Timing Policy. As a result, the Greenshields Method was applied to the left-turn lanes at the Medway Road and Richmond Street intersection.

The following parameters were used to estimate the queue lengths:

- A Passenger Car Equivalent (PCE) factor of 2.0 was applied to truck volumes
- Cycle length of 100 seconds for both peak hours
- Assumed vehicle length of 7.5 metres.
- LOS A (95%) criteria was applied.

The storage required to accommodate the forecasted 95th percentile queue lengths in the 2039 future total condition was estimated using Greenshields Method for each of the left-turn lanes at the intersection of Medway Road and Richmond Street. **Table 12** summarizes the storage lengths needed to accommodate the 2039 future total traffic 95th percentile queue lengths.

Table 12: Recommended Storage Lengths Using Greenshields Method

Intersection	**Medway Road and Richmond Street**							
Movement	**Northbound Left**		**Southbound Left**		**Eastbound Left**		**Westbound Left**	
Peak Period	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
Volume of Passenger Cars and PCEs	38	**112**	19	**28**	**74**	70	54	**83**
m Value	3.11		0.78		2.06		2.31	
Number of vehicles	6		2		5		5	
Recommended Storage (m)	**45**		15		40		40	
Existing Storage (m)	25		25		55		75	

Based on the analysis following the Greenshields Method, the existing storage lengths can accommodate the projected 95th percentile queues for the southbound, eastbound, and westbound left-turn movements at the Medway Road and Richmond Street intersection. While the existing storage length for the northbound left-turn movement is shorter than the estimated 95th percentile queues, the queue length can be sufficiently accommodated within the taper length of the storage lane without impeding any through traffic. Therefore, no improvements to the storage lanes at the signalized intersection are recommended.

6.2 Left-Turn Lane Warrants

Left-turn lane warrants for unsignalized intersections were completed following the procedure outlined in Appendix 9A of the *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*. The warrants were conducted based on the projected volumes in the 2039 future total condition in the afternoon peak hour, as illustrated previously in **Figure 11**, as it is the most critical scenario for inbound vehicles at the site accesses.

It is assumed the design speed of Medway Road is 10 km/h greater than the posted speed limit. As noted in **Section 5.1**, it is recommended that the posted speed limit of Medway Road will be reduced to 50 km/h at the site accesses. Therefore, a design speed of 60 km/h was assumed for Medway Road.

Table 13 summarizes the results of the left-turn lane warrants for each of the new proposed intersections on Medway Road and the corresponding storage lengths required.

Table 13: Left-Turn Lane Warrants Summary

Intersection	Movement	Left-Turn Lane Warranted	Required Storage Length (m)
Medway Road and Proposed Street 'C' / Private Lane	EBL	Yes	15
	WBL	Yes	30
Medway Road and Private Lane	EBL	No	N/A
Medway Road and Proposed Street 'B'	WBL	No	N/A

Based on the projected 2039 future total traffic volumes, left-turn lanes are required for the eastbound left and westbound left movements at the intersection of Medway Road and Proposed Street 'C' / Private Lane. While left turn lanes are not warranted at the intersections of Medway Road and Private Lane as well as Medway Road and Proposed Street 'B', left-turn lanes are still recommended to improve safety in the study area. Storage lanes would remove left-turning vehicles waiting for gaps in traffic from the busy through lanes on Medway Road, reducing the risk of rear end collisions and increasing traffic throughput. According to TAC GDGCR Section 9.17.2, a minimum storage length of 15 metres is required for left-turn lanes related to collision prevention.

TAC GDGCR Table 9.17.1 specifies a minimum taper ratio of 15:1 for a left-turn lane for a design speed of 60 km/h. Based on an assumed auxiliary lane width of 3.5 metres, all left-turn lane tapers must have a minimum length of 55 metres.

The outlined taper and left-turn auxiliary lane lengths should not pose an issue at the proposed locations of the site accesses from a geometric perspective. Back-to-back left-turn taper lengths for the intersections of Medway Road and Private Lane as well as Medway Road and Proposed Street 'B' will be required.

Appendix H contains the left-turn lane warrant sheets.

6.3 Right-Turn Lane Warrants

According to TAC GDGCR Section 9.14, right-turn lanes are warranted for unsignalized intersections when the volume of decelerating vehicles compared with the through traffic volume causes undue hazard. **Table 14** summarizes the volume of right-turning vehicles on Medway Road as a percentage

of the approach volume anticipated at the site accesses. The afternoon peak hour of the 2039 future total condition was used for this analysis as it is the most critical for inbound vehicle volumes.

Table 14: Percentage of Right-Turn Movements

Intersection	Movement	Right Turn Volume	Approach Volume [1]	% of Right Turn Movements
Medway Road and Proposed Street 'C' / Private Lane	EBR	17	408	4%
	WBR	54	658	8%
Medway Road and Private Lane	WBR	20	487	4%
Medway Road and Proposed Street 'B'	EBR	21	421	5%

Note 1: Approach Volume is the sum of left-turn, right-turn, and through movements.

Table 14 illustrates that the projected volume of right-turning movements into the site accesses represent a relatively small proportion of total movements on Richmond Street and Medway Road. Undue hazard is not expected at the other proposed site accesses because of right-turning vehicles. Therefore, no right-turn lanes are warranted.

6.4 Signal Warrants

Signal warrants were completed following the procedures outlined in Chapter 4 of the Ontario Traffic Manual (OTM) Book 12, March 2012. The warrants were conducted based on the projected volumes in the 2039 future total condition as it is the most critical scenario. As the future total condition is based on future traffic projections, Justification 7 was deemed most appropriate for the signal warrants.

The average hour volume was determined using the following formula from OTM Book 12:

$$AHV = (amPHV + pm\ PHV) / 4$$

Where;

AHV = average hour volume

PHV = peak hour volume

Considering the recommended speed limit reduction to 50 km/h on Medway Road, the signal warrants were conducted using restricted flow conditions. **Table 15** outlines the results from the warrants.

Table 15: Signal Warrants Summary

Intersection	Intersection Details for Warrant Parameters	Percentage Warrant Compliance	Percentage Required for Justification
Medway Road and Proposed Street 'C' / Private Lane	Restricted Flow Conditions New Intersection	53%	150%
Medway Road and Private Lane		12%	
Medway Road and Proposed Street 'B'		11%	

Based on the projected 2039 future total traffic volumes, the installation of traffic signals is not required at the proposed new intersections.

Appendix I contains the signal warrant sheets.

6.5 Pedestrian Crossover Warrant

According to OTM Book 15, a pedestrian crossover is warranted if the infrastructure is needed for pedestrian system connectivity. Additionally, based on Section 4.9 of OTM Book 12, a pedestrian crossover can be installed on roadways with a maximum of four lanes, less than 35,000 average annual daily traffic, and is over 200 metres from other signal-protected pedestrian crossings.

Post-development of the proposed subdivision, it is expected that pedestrians from the north parcel of the site will want to cross Medway Road to access the park proposed as part of the south parcel. The closest existing pedestrian crossing is located at the intersection of Medway Road and Richmond Street, over 200 metres away from the intersection of Medway Road and Proposed Street 'C' / Private Lane. Therefore, a strong pedestrian desire line to cross Medway Road closer to the proposed development is expected. The segment of Medway Road adjacent to the site is proposed to be a three-lane roadway and has an average daily traffic count of 6,403 vehicles, according to 2019 traffic counts publicly provided by Middlesex County. The unsignalized intersection of Medway Road and Proposed Street 'C' / Private Lane is therefore a suitable location for a pedestrian crossover.

As outlined in Table 7 in OTM Book 15, 4-hour two-way vehicular volumes are required to select an appropriate pedestrian crossover design. The vehicle volumes recorded on the west approach of the Medway Road and Richmond Street intersection during the traffic counts taken on July 11, 2024, were used as the existing two-way vehicular traffic at the proposed Medway Road and Proposed Street 'C' / Private Lane intersection. This assumption is reasonable given the close proximity of the two intersections and the minimal number of private driveways located on Medway Road between Richmond Street and Proposed Street 'C'. Based on a peak 4-hour volume of 2,439 vehicles and Medway Road having a three-lane cross section with a posted speed of 50 km/h, Table 7 in the OTM Book 15 recommends a Level 2 Type B pedestrian crossover at the intersection.

The location of the Medway Road pedestrian crossover at Proposed Street 'C' integrates well with the proposed active transportation facilities on Medway Road. Pedestrians on the multi-use path south of Medway Road desiring to continue eastbound to Richmond Street could use the crossover at Proposed Street 'C' to safely access the sidewalk on the north side of the arterial road.

Another major desire line near the proposed development is pedestrians wanting to cross Richmond Street from the south parcel of the subdivision to access amenities such as Weldon Park. Pedestrians were already observed crossing Richmond Street near the Richmond Street and St. John's Drive

intersection during the existing traffic count collection. The nearest signalized pedestrian crossing is at the Medway Road and Richmond Street intersection, nearly 230 metres north of the proposed Richmond Street and St. John's Drive. Richmond Street is a four-lane roadway with an average annual daily traffic count of 9,100 vehicles, as recorded in 2021 by the MTO. Therefore, the proposed Richmond Street and St. John's Drive intersection is also a suitable location for a pedestrian crossover.

The traffic counts taken on July 11, 2024, found a peak 4-Hour two-way vehicular volume of 3,248 vehicles at the existing Richmond Street and St. John's Drive intersection. Considering the recommended speed limit of 50 km/h on Richmond Street within the community of Arva, Table 7 in the OTM Book 15 recommends a Level 1 Type A pedestrian crossover.

The location of the Richmond Street pedestrian crossover at St. John's Drive also integrates well with the proposed active transportation facilities within the subject site. The crossover would safely connect pedestrians at the eastern terminus of the proposed multi-use path to the amenities on the east side of Richmond Street such as Weldon Park.

Appendix J contains excerpts of the average annual daily traffic counts for Medway Road and Richmond Street. **Appendix K** contains relevant excerpts from the OTM Book 15.

7.0 Site Access Review

The following section provides a review of the geometric properties of the proposed site accesses with reference to the TAC GDGCR. This section specifically analyzes the proposed accesses to ensure the intersections provide adequate visibility and sufficient spacing to avoid conflicts.

7.1 Sight Distance Assessment

The available sightlines at the proposed site accesses on Medway Road were measured and compared to the standards set out in the TAC GDGCR. Sight distances were measured from the proposed site accesses using the following assumptions:

- A standard drive eye height of 1.08 metres for a passenger car
- A 4.4 -5.4 metre setback from the approximate extension of the outer curb to represent a vehicle waiting to exit the site

Intersection sight distance (ISD) is calculated using equation 9.9.1 from the TAC GDGCR as outlined below:

$ISD = 0.278 * V_{major} * t_g$

Where;

ISD = Intersection Sight Distance

V_{major} = design speed of roadway (km/h)

t_g = assumed time gap for vehicles to turn from stop onto roadway (s)

It is assumed the design speed of Medway Road is 10 km/h greater than the posted speed limit. Therefore, considering the recommended speed reductions on Medway Road, a design speed of 60 km/h was assumed.

Table 16 outlines the sight distance analysis for the proposed site accesses on Medway Road.

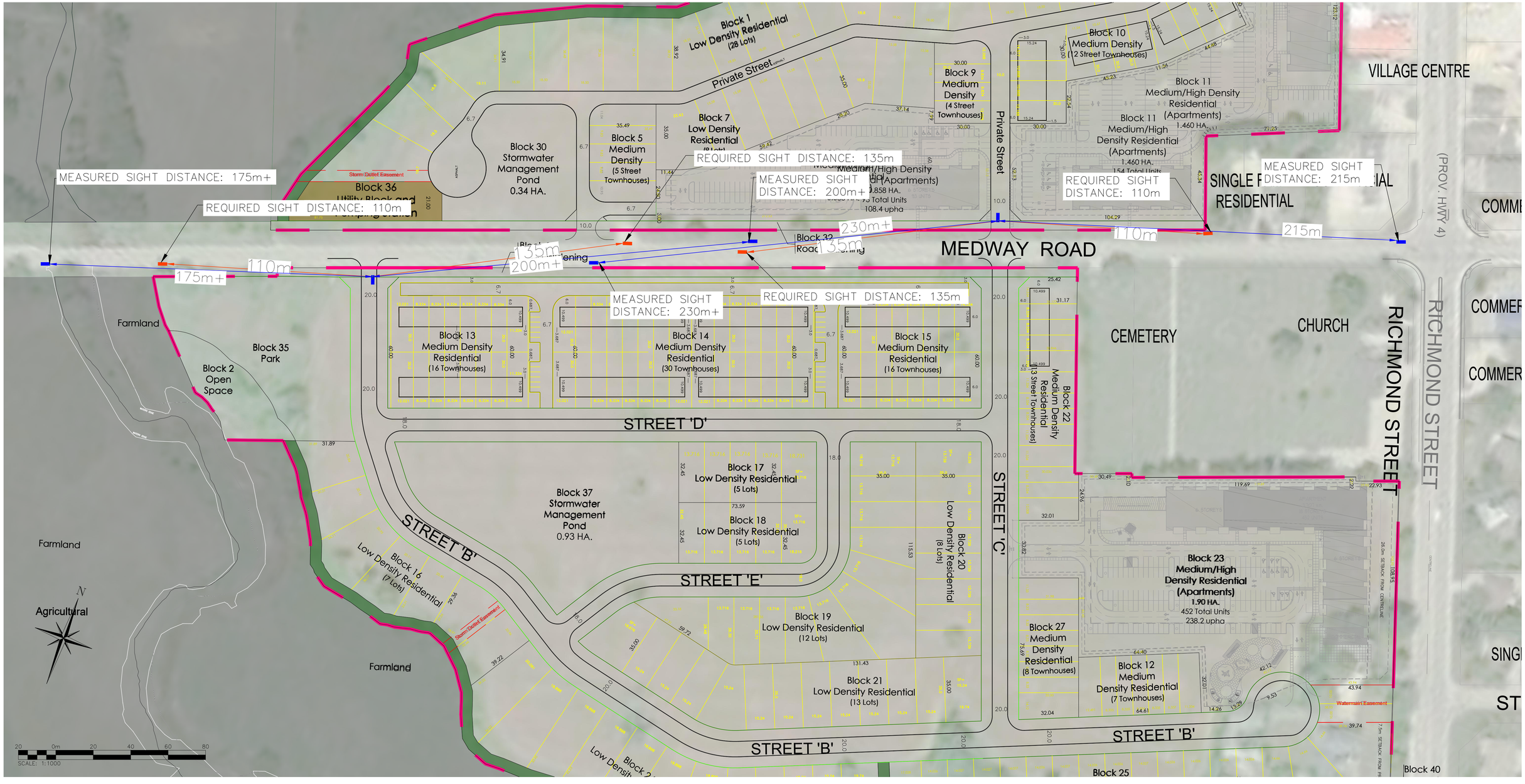
Table 16: Sight Distance Analysis Summary

Parameter	Site Access			
	Proposed Street 'C'	**Private Lane (East)**	**Private Lane (West)**	**Proposed Street 'B'**
Intersection Sight Distance Provided	Left Turn: 200m Right Turn: 240m+	Left Turn: 230m+ Right Turn: 215m	Left Turn: 180m+ Right Turn: 240m+	Left Turn: 200m+ Right Turn: 175m+
Access Type	Full-Moves			
Intersection Control	Stop			
Design Vehicle	Passenger Car			
Recommended Speed Limit	50 km/h			
Assumed Design Speed	60 km/h			
Base Time Gap[1,2]	Left Turn: 8.0s Right Turn: 6.5s			
Grade of Roadway	Less than 3%			
Horizontal Alignment of Roadway	Straight			
Intersection Sight Distance Required	Left Turn: 135m Right Turn: 110m			
Minimum Sight Distance Satisfied	Yes			

Note 1: Time gap for left-turning passenger cars from a stop onto a three-lane highway with no median and with a grade less than 3%. Value from 9.9.5 in the GDGCR.
Note 2: Time gap for right-turning passenger cars from a stop onto a three-lane highway with no median and with a grade less than 3%. Value from 9.9.5 in the GDGCR.
Note 3: Sight distance value calculated from intersection Sight Distance equation 9.9.1 in GDGCR.

The minimum sight distance at all the accesses is satisfied and provides clear sight without any obstruction.

Figure 12 and **Figure 13** show the preliminary sight line analysis. The figures will be updated as part of detailed design of the development accesses.



LEGEND:

AVAILABLE SIGHT DISTANCE

REQUIRED SIGHT DISTANCE

Note: This figure is for illustration purposes only.

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	12/17/2024

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

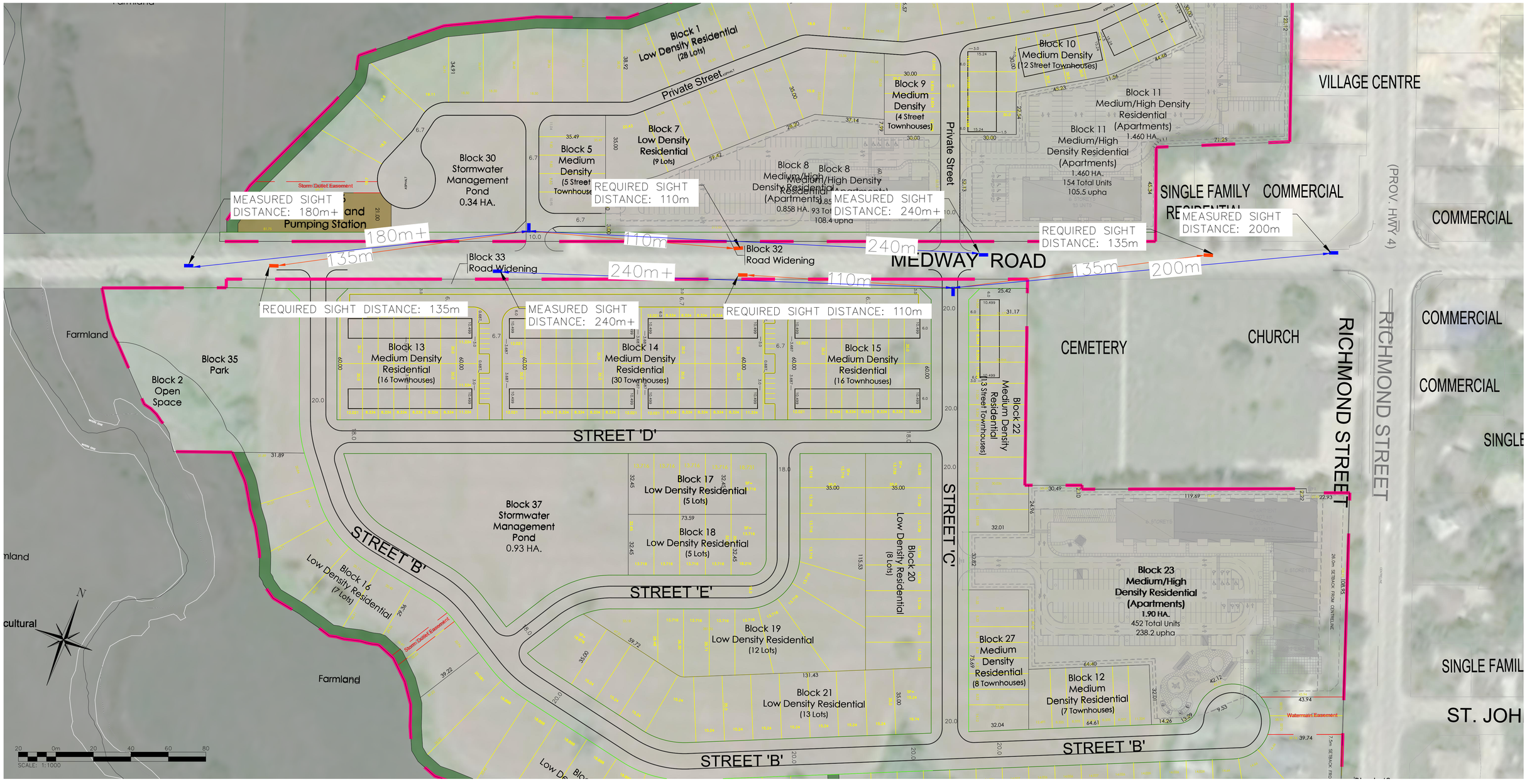
Project
BRIDLE PATH NORTH SUBDIVISION
ARVA, MUNICIPALITY OF MIDDLESEX CENTRE
MIDDLESEX COUNTY

Drawing
SIGHT DISTANCE ASSESSMENT
MEDWAY ROAD AND PRIVATE LANE (EAST) &
MEDWAY ROAD AND PROPOSED STREET 'B'

York DEVELOPMENTS

CROZIER CONSULTING ENGINEERS

Design By	I.A./T.D.S.	Project	2673-7110
Check By	A.D.R.	Scale	1:1000
		Drawing	FIG 12



LEGEND:

AVAILABLE SIGHT DISTANCE

REQUIRED SIGHT DISTANCE

Note: This figure is for illustration purposes only.

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	12/17/2024

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

Project
BRIDLE PATH NORTH SUBDIVISION
ARVA, MUNICIPALITY OF MIDDLESEX CENTRE
MIDDLESEX COUNTY

Drawing
SIGHT DISTANCE ASSESSMENT
MEDWAY ROAD AND PRIVATE LANE (WEST) &
MEDWAY ROAD AND PROPOSED STREET 'C'

York DEVELOPMENTS

CROZIER CONSULTING ENGINEERS

Design By	I.A./T.D.S.	Project	2673-7110
Check By	A.D.R.	Scale	1:1000
		Drawing	FIG 13

7.2 Access Spacing

The TAC GDGCR was used to review the locations of the recommended site accesses along Medway Road. For this analysis, Proposed Street 'B' and Proposed Street 'C' were considered as local cross roads. The Private Lanes north of Medway Road were considered as lane accesses. The access locations on Medway Road were based on the most recent preliminary draft plan of subdivision submitted by MHBC. and dated November 15, 2024.

7.2.1 Access Offsets

The Medway Road and West Private Lane access is proposed to be offset from the Medway Road and Proposed Street 'B' intersection. This allows for a Utility Block and Pumping Station to be constructed on the development lands west of the Private Lane access. According to TAC GDGCR Section 8.9.9, a minimum offset of 100 metres is desirable for opposing driveways on undivided arterials. Proposed Street 'B' and the West Private Lane are offset by about 110 metres between centrelines, meeting the TAC guidelines.

7.2.2 Corner Clearance

The TAC GDGCR defines corner clearance as the distance from an intersection to the nearest access. Corner clearance requirements apply when the access driveway is located on the same side of the study roadway as one of the legs of the intersecting cross road. According to Section 8.8.1 of the TAC GDGCR, the minimum corner clearance between a cross road and the nearest access on an arterial road is 35 metres.

The nearest driveway to the local cross roads on Medway Road is a cemetery access located about 80 metres east of the Medway Road and Proposed Street 'C' / Private Lane intersection. Therefore, the proposed development meets corner clearance requirements.

7.2.3 Intersection Spacing

According to Section 9.4.2 of the TAC GDGCR, the typical minimum intersection spacing for an arterial road is 200 metres.

The Medway Road and Proposed Street 'C' / Private Lane intersection is located over 200 metres west of the Medway Road and Richmond Street intersection and over 300 metres east of the Medway Road and Proposed Street 'B' intersection

Therefore, the proposed accesses meet the spacing requirements set out in the TAC GDGCR. Based on the recommended access configuration, there are no concerns related to maneuverability or safety.

8.0 Parking Review

This section reviews the Municipality of Middlesex Centre Zoning By-Law 2005-005 (July 2024) to determine the parking space requirements for the apartment buildings proposed in the subject development.

Relevant excerpts from the Municipality of Middlesex Centre Zoning By-Law 2005-005 are included in **Appendix L.**

8.1 Total Parking Requirements

Section 4.24 of the Municipality of Middlesex Centre Zoning By-Law 2005-005 was reviewed to determine the parking requirements of the apartment buildings proposed at the subject site**. Table 17** contains a summary of the required parking and preliminary proposed parking supply at each of the residential and mixed-use apartments.

Table 17: Zoning By-Law Total Parking Review

Apartment Block	Units	Zoning By-Law Parking Rate	Required Parking Spaces
Block 8 One 6-Storey Apartment	93	1.5 spaces / unit	140
Block 11 A 6-Storey Apartment and a 4-Storey Apartment	154		231
Block 23 One 18-Storey Apartment	452		678
Block 23 Ground Floor Commercial	195 m^2 GFA	1 space per 25 m^2	8

As outlined in **Table 17** and based on the most recent preliminary draft plan of subdivision submitted by MHBC, residential blocks 8, 11, and 23 are required by Zoning By-Law 2005-005 to provide 140, 231, and 686 total parking spaces. These requirements will be noted in future submissions.

8.2 Accessible Parking Requirements

Section 4.24 of the Municipality of Middlesex Centre Zoning By-Law 2005-005 was reviewed to also determine the accessible parking requirements of the residential blocks with apartment buildings. A summary of the By-Law requirements and the preliminary proposed parking supply is included in **Table 18**.

Table 18: Zoning By-Law Accessible Parking Review

Apartment Block	Required Parking Spaces	Required Accessible Parking Spaces
Block 8 One 6 Storey Apartment	140	5
Block 11 A 6-Storey Apartment and a 4-Storey Apartment	231	7
Block 23 One 18-Storey Apartment	678	16
Block 23 Ground Floor Commercial	8	1

As outlined in **Table 18** and based on the most recent preliminary draft plan of subdivision submitted by MHBC, Blocks 8, 11, and 23 are required by Zoning By-Law 2005-005 to provide 5, 7, and 17 accessible parking spaces. These requirements will be noted in future submissions.

9.0 Transportation Demand Management

Transportation Demand Management (TDM) measures aim to reduce automobile dependence and promote alternate and active modes of transportation to decrease traffic congestion and create a more sustainable transportation system. TDM measures are recommended to promote alternative modes of transportation, such as transit, cycling or walking, and reduce single-occupant vehicle (SOV) trips entering and exiting the proposed development.

9.1 Existing TDM Opportunities

Given the rural context of the study area, the availability of active transportation and transit infrastructure adjacent to the proposed subdivision is limited. However, there are opportunities to enhance the existing active transportation and transit network in the community of Arva by providing additional connections as part of the subject development.

As discussed in **Section 2.3**, sidewalks are provided in the study area on Richmond Street, as well as on the south side of Medway Road east of the Medway Road and Richmond Street intersection.

As discussed in **Section 2.4**, the proposed development would be serviced by Middlesex County Connect. Route 1 of the inter-community bus operation, which runs between London and Lucan, has a stop about 240 metres east of the Medway Road and Richmond Street intersection.

9.2 TDM Opportunities

9.2.1 Active Transportation Infrastructure

As previously mentioned in **Section 5.3**, a multi-use path is proposed to connect the park in Block 35 to Richmond Street through Medway Road, Proposed Street 'C', and Proposed Street 'B'. The proposed path also connects to the recommended locations of the pedestrian crossovers at the intersections of Medway Road and Proposed Street 'C' / Private Lane intersection as well as Richmond Street and St. John's Drive. As a result, the path would allow pedestrians and cyclists from the north parcel as well as the rest of the Arva community to safely access the park within the proposed development. Additionally, the path would connect pedestrians and cyclists within the proposed subdivision to amenities east of Richmond Street.

A1.8-metre sidewalk is proposed on the north side of Medway Road between the West Private Lane and Richmond Street. The sidewalk will tie into the existing sidewalk network and pedestrian crossings at the Medway Road and Richmond Street intersection.

The proposed pedestrian and cycling infrastructure will create a more connective active transportation network in the community of Arva. This will encourage residents to use alternative modes of transportation for trips within the community, for example to Weldon Park, the commercial shops on Richmond Street, or Medway High School.

Additionally, though the Municipality of Middlesex Centre does not require any bicycle infrastructure, the proposed development includes short-term bicycle parking at the apartments in Block 8 and Block 23. This should encourage residents to cycle within the community of Arva and to other nearby destinations of interest within Middlesex County or the City of London. The applicant could consider providing long-term bicycle storage or bicycle repair stations within the apartments of the proposed subdivision to further incentivize cycling.

9.2.2 Transit Infrastructure

The Middlesex County Connect could be utilized by residents within the proposed development who commute to the City of London. However, the existing transit stop located on the eastern side of the community of Arva would be over a 500-metre walk for most residents within the subject site. To incentivize residents within the proposed subdivision to use transit rather than single-occupancy vehicle trips, a second transit stop could be installed at the intersection of Medway Road and Proposed Street 'C' / Private Lane. Alternatively, the existing transit stop could be relocated to the Richmond Street and Medway Road intersection to be more centrally located within the community of Arva, likely leading to increased ridership.

10.0 Conclusions and Recommendations

The conclusions and recommendations of the Transportation Impact Study are summarized below:

- 2024 Existing Conditions
    - All study intersections operate acceptably with a Level of Service 'B' in both the weekday morning and afternoon peak hours. All existing storage lengths can accommodate the 95th percentile queues within the study area
    - The intersection of Medway Road and Richmond Street has the most critical volume to capacity ratio of 0.71 in the afternoon peak hour, which is below the MTO's critical threshold of 0.85
- Future Background Conditions
    - With a 2.0% growth rate applied to all through movements on Richmond Street, all study intersections continue to operate undercapacity without any queuing issues observed in the 2029, 2034, and 2039 future background conditions
    - In the morning peak hour of each of the future background study horizons, all study intersections are expected to operate at the same Level of Service as the existing condition
    - In the afternoon peak hour of the 2039 future background study horizon, the intersections of Richmond Street and Croydon Drive as well as Richmond Street and St. John's Drive worsen to a Level of Service 'C'
- The site is expected to generate 369 two-way (94 inbound and 275 outbound) trips during the weekday morning peak hour and 451 two-way (275 inbound and 176 outbound) trips during the afternoon peak hour
- Future Total Conditions
    - For each of the study horizons, all movements in the study area are expected to be below the MTO's critical volume to capacity ratio threshold of 0.85
    - The Medway Road and Proposed Street 'C' / Private Lane intersection is projected to have the most critical delays, operating at a Level of Service 'D' and 'F' in the morning and afternoon peak hours, respectively. These higher delays can be expected at a minor access onto an arterial road. Additionally, the intersection is expected to remain well undercapacity with a critical volume-to-capacity ratio of 0.35
    - The operations of the Medway Road and Proposed Street 'C' / Private Lane intersection would be improved with the addition of an additional access on Richmond Street. The potential access is currently being discussed with the MTO and will be confirmed as part of future submissions
    - For each of the study horizons, all other study intersections are expected to operate at a Level of Service 'C' or better in both peak hours
    - The reported storage length of the northbound left movement at the Medway Road and Richmond Street intersection will not accommodate the projected 95th

percentile queue in the afternoon peak hour. However, the average queue length can be serviced by the existing infrastructure. Additionally, adequate vehicle storage is provided in the taper length of the turning lane to support the anticipated 95th percentile queue length without impeding any through movements

- Auxiliary left-turn lanes are warranted for the eastbound left and westbound left movements at the Medway Road and Proposed Street 'C' / Private Lane intersection. Auxiliary left-turn lanes are recommended for the westbound left movement at the Medway Road and Proposed Street 'B' intersection as well as the eastbound left movement at the Medway Road and Prive Lane intersection

- To satisfy pedestrian desire lines and system connectivity, a Level 2 Type B pedestrian crossover is recommended at the intersection of Medway Road and Proposed Street 'C' / Private Lane. Additionally, a Level 1 Type A pedestrian crossover is suggested at the intersection of Richmond Street and St. John's Drive

- Sufficient visibility and access spacing is available at each of the proposed site accesses on Medway Road. Future detailed design of these intersections will be further reviewed to confirm conformance with TAC standards

- A Parking Review of the Municipality of Middlesex Centre Zoning By-Law 2005-005 determined 1,057 total parking spaces and 29 accessible parking spaces are required for the three apartment buildings proposed as part of the development

- The subdivision proposes several TDM measures to promote alternative modes of transportation including sidewalks, a multi-use path, and short-term bicycle parking. The proposed infrastructure will contribute to a more connective active transportation network in the community of Arva

Based on the information presented in this report, the proposed development can be supported from a traffic operations perspective. All study intersections are expected to operate with volume to capacity ratios below the MTO's critical threshold and nearly all vehicular movements in the study area are projected to have a Level of Service of 'C' or better in both the morning and afternoon peak hours.

We trust that this study satisfies any traffic operations concerns associated with the proposed development. Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Brandon Bradt, M.Eng.CEM, P. Eng
Manager, Transportation Planning

C.F. CROZIER & ASSOCIATES INC.

Anthony De Rango
Engineering Intern, Transportation

J:\2600\2673 - York Developments\7110 - Arva Subdivision\Reports\Transportation\TIS\2024.01.21_Transportation Impact Study - Bridle Path North Subdivision.docx

Appendix A

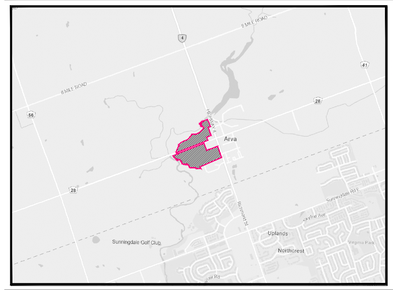
Preliminary Draft Plan of Subdivision

PART OF LOT 17,
CONCESSION 6 & 7
MUNICIPALITY OF MIDDLESEX CENTRE
COUNTY OF MIDDLESEX

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

Surveyor's Certificate

I HEREBY AUTHORIZE CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.



SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR IN OUR LETTER DATED_____,2020
THIS DRAFT PLAN IS APPROVED UNDER SECTION 51 OF THE *PLANNING ACT*
_____ DAY OF _____ ,2020

4	November 15, 2024	Request from Client	PL
3	October 18, 2024	Request from Client	PL
2	October 1, 2024	Revised Apartment blocks, SWM	PL
1	July 26, 2024	Issued	CCF
	Date	**Issued / Revision**	**By**

Additional Information Required Under Section 51(17) of the Planning Act R.S.O. 1990, c.P.13 as Amended

A. As Shown	B. As Shown	C. As Shown
D. Residential	E. As Shown	F. As Shown
G. As Shown	H. Municipal Water Supply Available	I. Silt Loam
J. As Shown	J. All Services As Required	L. As Shown

Description	Lots/Blocks	Units	Area (ha)
Low Density Residential	1, 3, 7, 16 - 21, 24, 25	122	8.031
Medium Density Residential (Street Townhouses)	5, 9, 10, 12, 22, 27	49	1.594
Medium Density Residential (Cluster Townhouses)	13 - 15	62	1.893
Medium Density Residential (Apartments)	8, 11, 23	699	4.216
Park	35		0.603
Walkway	31, 43		0.082
Maintenance Setback	4, 6		0.584
Storm Water Management	30, 37		1.275
Pump Station	36		0.160
Open Space	2, 29		0.753
0.3m Reserves	40, 41		0.009
Road Widening	32, 33		0.457
Roads			3.860
Total	37	932	23.516 ha.

York DEVELOPMENTS

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
540 BINGEMANS CENTRE DRIVE, SUITE 200, KITCHENER, ON, N2B 3X9 | P: 519 576 3650 | WWW.MHBCPLAN.COM

File No.	Drawn By	Date
1094 'BE'	L.M./P.L./C.C.F.	November 15, 2024

PRELIMINARY DRAFT PLAN OF SUBDIVISION

Plan Scale 1:2000
10 20 40 60 80 100

north

Q:\1094 'BE' - ARVA\GRAPHICS\DP\MHBC PRELIM DP_18NOV2024.DWG

Appendix B

Terms of Reference Correspondence

Aarzoo Dhanani

From: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Sent: Thursday, July 25, 2024 3:37 PM
To: Aarzoo Dhanani
Cc: Aaron Wignall; Vallvé, Nina (MTO); Lucente, Jodie (MTO); Brandon Bradt; Anthony De Rango
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hello Aarzoo,

Per MTO TIS guidelines:

Trip Generation

The volume of traffic generated by a proposed development shall be estimated using the procedures described in ITE's Trip Generation Manual. Trip generation parameters shall be selected using the guiding principles included in the ITE's Trip Generation Handbook.

If local data is available, or an alternative methodology for trip generation is proposed, including the use of proxy sites, the use of this data or methodology shall be discussed and approved by MTO in advance of the preparation of the TIS. For trip generators considered by MTO as unique or not adequately estimated by ITE trip generation parameters, an alternative methodology for trip generation shall be discussed and approved by MTO as part of the pre-consultation/ pre-TIS meeting(s) held in advance of the preparation of the TIS.

The TIS shall present trip generation assumptions and results in a tabular form identifying the categories and quantities of land uses, with the corresponding trip generation rates or equations and the resulting number of trips.

Trip Distribution/Assignment

The TIS shall describe methods and assumptions for distribution and route assignment of traffic.

Assumptions for trip distribution shall be supported by one or more of the following:

- Transportation Tomorrow Survey
- Origin-destination Surveys
- Comprehensive Travel Surveys
- Planning models
- Market studies

Assumptions for route assignment shall be supported by:

- Existing travel patterns
- Expected future travel patterns

Assumptions for Origin/Destination and Percent Distribution shall be presented in tabular form and traffic assignment shall be presented as a diagram.

The distribution should be based on the existing travel patterns. This must be demonstrated in the TIS as well as supporting documentation, for the distribution.

Thank you,

Jeremiah Johnston
Corridor Management Planner | Highway Operations Branch
Ministry of Transportation | Ontario Public Service
(226)-980-6407 | jeremiah.johnston@ontario.ca

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---

From: Aarzoo Dhanani <adhanani@cfcrozier.ca>
Sent: Wednesday, July 24, 2024 10:22 AM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Vallvé, Nina (MTO) <nina.vallve@ontario.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>; Brandon Bradt <bbradt@cfcrozier.ca>; Anthony De Rango <aderango@cfcrozier.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hi Jeremiah,

We've obtained new traffic counts through a RAQS-approved consultant and derived a trip distribution based on existing travel patterns which will be applied to the site-generated trips. Could you please review and confirm the trip distribution provided below?

Table 4: Trip Distribution

Direction	A.M. Inbound	A.M. Outbound	P.M. Inbound	P.M. Outbound
North (Richmond Street)	38%	18%	25%	25%
South (Richmond Street)	21%	42%	29%	28%
East (Medway Road)	17%	25%	26%	23%
West (Medway Road)	24%	15%	20%	24%
Total	100%	100%	100%	100%

Kind Regards,
Aarzoo

Aarzoo Dhanani, M.Eng., EIT
Engineering Intern, Transportation
Office: 416.842.0020
Collingwood | Milton | Toronto | Bradford | Guelph

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From: Brandon Bradt <bbradt@cfcrozier.ca>
Sent: Tuesday, July 9, 2024 4:07 PM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Vallvé, Nina (MTO) <nina.vallve@ontario.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>; Peter Ilias <peter@spectrumtraffic.com>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Thanks for confirming Jeremiah

Brandon Bradt, M.Eng. CEM, P.Eng.
Manager (Planning), Transportation
DID: 416.842.0033

From: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Sent: Tuesday, July 9, 2024 3:47 PM
To: Brandon Bradt <bbradt@cfcrozier.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Vallvé, Nina (MTO) <nina.vallve@ontario.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>; Peter Ilias <peter@spectrumtraffic.com>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Good afternoon Brandon,

My section and our Traffic Office are not involved with the up keep of the list itself, I believe Peter would be best to contact qualificationcontrol@ontario.ca .

Confirming new counts will need to be obtained through a RAQS approved consultant.

Best regards,

Jeremiah Johnston
Corridor Management Planner | Highway Operations Branch
Ministry of Transportation | Ontario Public Service
(226)-980-6407 | jeremiah.johnston@ontario.ca

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From: Brandon Bradt <bbradt@cfcrozier.ca>
Sent: Tuesday, July 9, 2024 11:09 AM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Vallvé, Nina (MTO) <nina.vallve@ontario.ca>; Lucente, Jodie (MTO)

<Jodie.Lucente@ontario.ca>; Peter Ilias <peter@spectrumtraffic.com>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hey Jeremiah,

That's unfortunate news, I do think Spectrum is one the premier data collection providers in Ontario with City-wide data collection contracts with the City of Toronto and the City of London to name a couple major cities. They also make some of their collected data available via their exchange platform for a fee with the available intersections shown on an interactive map on their website for those who opt in to have their data shared. Additionally, they provide the video associated with their counts for direct verification/identification of issues with a count (accident, construction, etc.).

Would the MTO team be willing to meet with the president of Spectrum (Peter Ilias) cc'd here so that you can hear more directly from him? This may also be useful for addressing any questions on a RAQS approval in the future for Spectrum.

If so, please let me know the MTO's availability as soon as possible. If not, please confirm as soon as possible so that we can schedule separate counts.

Kind Regards,
Brandon

Brandon Bradt, M.Eng. CEM, P.Eng.
Manager (Planning), Transportation
Office: 416.842.0033
Collingwood | Milton | Toronto | Bradford | Guelph

From: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Sent: Tuesday, July 9, 2024 10:27 AM
To: Aarzoo Dhanani <adhanani@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Brandon Bradt <bbradt@cfcrozier.ca>; Vallvé, Nina (MTO) <nina.vallve@ontario.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hello Aarzoo,

I have discussed this with our Traffic Office,

We appreciate that MTO may not have noted the RAQS requirements for Traffic Data Collection on those four projects.

However, this is a new project and MTO identified the requirement clearly when commenting on the Terms of Reference.

This is not a new category on the RAQS list, it has been on the list for some time, at least four years.

New counts need to be obtained through a RAQS approved consultant.

Spectrum may not be used on MTO projects for data collection until such a time that they are on the Prequalified Engineering Service Providers list for Traffic Data Collection.

Thank you,

Jeremiah Johnston
Corridor Management Planner | Highway Operations Branch
Ministry of Transportation | Ontario Public Service
(226)-980-6407 | jeremiah.johnston@ontario.ca

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---

From: Aarzoo Dhanani <adhanani@cfcrozier.ca>
Sent: Tuesday, July 2, 2024 1:56 PM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Brandon Bradt <bbradt@cfcrozier.ca>; Vallvé, Nina (MTO) <nina.vallve@ontario.ca>; Peter Ilias <peter@spectrumtraffic.com>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hi Jeremiah,

Hope you had a wonder□ul long weekend.

Could you please let us know i□you had a chance to discuss the below with the traffic team?

Kind Regards,
Aarzoo

Aarzoo Dhanani, M.Eng., EIT
Engineering Intern, Transportation
Office: 416.842.0020
Collingwood | Milton | Toronto | Bradford | Guelph

From: Aarzoo Dhanani <adhanani@cfcrozier.ca>
Sent: Wednesday, June 26, 2024 3:22 PM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Brandon Bradt <bbradt@cfcrozier.ca>; Vallvé, Nina (MTO) <nina.vallve@ontario.ca>; Peter Ilias <peter@spectrumtraffic.com>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Good A□ternoon Jeremiah,

Thank you □or the update and we appreciate the team's quick response.

We understand that Spectrum is not on the RAQS list and that MTO requires traffic data collection □rom approved companies. However, please note that Spectrum is a reputable data collection company with extensive experience in Ontario, having conducted over 15,400 turning movement counts to date. Here is a link to their website: https://spectrumtraffic.com/.

Additionally, Spectrum has applied to the MTO, and their application is still under process. I have cc'd Spectrum's current president, Peter Illias, who would be available to discuss any concerns that MTO may have.

We have used Spectrum □or some recent projects that the MTO has been involved in, which are listed below:

West Region

- Aquavil in Town o□the Blue Mountain - 2023.
- Flato Edgewood Greens in Township o□Southgate – 2022.
- Dundalk Southeast in Township o□Southgate – 2024.

Central Region

- Highway 48 & Stouffville Road Ringwood in Town o□Whitchurch-Stouffville – 2023.

I note that we have already collected counts at the study intersections □or the Arva site and have attached the data that was obtained and can also provide the video recordings o□existing conditions, i□desired.

We weren't aware o□this new RAQS category □or data collection and are kindly requesting that the MTO team review this data and consider allowing us to include it in our study. It is my understanding that Spectrum will be gaining this RAQS certification in the near □uture.

Best Regards,
Aarzoo

Aarzoo Dhanani, M.Eng., EIT
Engineering Intern, Transportation
Office: 416.842.0020
Collingwood | Milton | Toronto | Bradford | Guelph

From: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Sent: Tuesday, June 25, 2024 10:34 AM
To: Aarzoo Dhanani <adhanani@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Brandon Bradt <bbradt@cfcrozier.ca>; Vallvé, Nina (MTO) <nina.vallve@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hello Aarzoo,

Please see MTO response in red below.

Thank you,

Jeremiah Johnston
Corridor Management Planner | Highway Operations Branch
Ministry of Transportation | Ontario Public Service
(226)-980-6407 | jeremiah.johnston@ontario.ca

Ontario

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From: Aarzoo Dhanani <adhanani@cfcrozier.ca>
Sent: Wednesday, June 19, 2024 8:43 AM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Brandon Bradt <bbradt@cfcrozier.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hi Jeremiah,

Thank you for confirming the ToR. We will undertake the study in accordance with the comments below, but before we proceed, we would like to confirm a few items:

- We had Spectrum Inc. collect traffic data at the study intersections last week, as we typically work with them. This data will be used for our analysis.

  MTO specified RAQS consultant/company is required when commenting on requirements of the scope/ ToR. Spectrum is not RAQS approved. New counts need to be obtained through a RAQS approved consultant.

- We believe that the Weekday PM peak hour would be the worst-case scenario and that a Saturday peak hour would not be required in the analysis given the minimal commercial/office component. Upon comparing the average rates from ITE Trip Generation Manual 11th edition, we found that the average rate of **6.59** for Weekday PM is slightly higher than the **6.57** for Saturday peak hour. Therefore, the Weekday PM peak hour should suffice to account for any worst-case conditions.

Furthermore, there is no ITE trip generation rate for the office component for Saturday peak hour. So, we propose including only Weekday AM and Weekday PM peak hours in the analysis.

Since the commercial/office is minimal MTO will accept this, if any unique traffic generators (such as a Tim Hortons, McDonalds etc.) are proposed, analysis will need to be updated.

- We'll use Synchro 11 since it's what we currently use, considering Synchro 12 is still relatively new. Is that alright? Yes, however MTO is now using v12, if any discrepancies come up during analysis we will need to discuss.

- The growth rate will be applied to through movements along Richmond Street. Okay.

Please let me know if you have any concerns and if you can confirm this.

Kind Regards,

Aarzoo

Aarzoo Dhanani, M.Eng., EIT
Engineering Intern, Transportation
Office: 416.842.0020
Collingwood | Milton | Toronto | Bradford | Guelph

From: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Sent: Tuesday, June 18, 2024 2:06 PM
To: Aarzoo Dhanani <adhanani@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Brandon Bradt <bbradt@cfcrozier.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hello Aarzoo,

MTO provides the following comments to be addressed / included in the ToR.

- MTO require the submission of a full TIS (following MTO TIS guidelines) to assess the future impact of the proposed development to identify if there are any warranted highway/road improvements.
- Use of Synchro version 12 is required.
- Any traffic counts must completed done by a RAQS qualified consultant under the Traffic Data Collection category. April 2024 MTO Prequalified Engineering Service Providers list is attached for reference.
- As part of the TIS warrants for additional LT and RT lanes shall be analyzed. In accordance queue and storage analysis shall be completed with MTO / TAC guidelines and protocols.

- 2% growth rate should be used for MTO facilities.
- For the Analysis period and scenarios: MTO requires AM, PM and Saturday analysis (due to commercial), as well as existing conditions, the opening date of the development, five years, and 10 years from the opening date. Where applicable, each major phase in a multi-phased development shall be assessed separately for the five and 10-year horizons beyond full build-out of the site.
- The need for geometric improvements shall be reviewed at all locations in the study area and for each proposed development stage. The TIS shall clearly identify transportation impacts by movement, the transportation system improvements that are needed to mitigate these impacts, and the timing of any recommended improvements. A schematic representation of all geometric improvements shall be included as part of the TIS, identifying lane arrangements and intersection improvements for each horizon year.
- Under **Geometric Review**, for MTO operated facilities, MTO standards will govern.

MTO reserves the right to provide additional comments to be included in the TIS (re-visit TIS ToR) based on the results of the TIB, which we can discuss in future as required.

For the summer factor, attached are the seasonal factors to be used. Signal timing for Highway 4 / Medway Road is also attached.

If there are any questions please contact me directly.

Thank you,

Jeremiah Johnston
Corridor Management Planner | Highway Operations Branch
Ministry of Transportation | Ontario Public Service
(226)-980-6407 | jeremiah.johnston@ontario.ca

Ontario

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From: Aarzoo Dhanani <adhanani@cfcrozier.ca>
Sent: Tuesday, June 11, 2024 4:03 PM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Brandon Bradt <bbradt@cfcrozier.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Thanks Jeremiah! I appreciate you circulating the email to the team for review.

Looking forward to hearing back.

Aarzoo Dhanani, M.Eng., EIT
Engineering Intern, Transportation
Office: 416.842.0020
Collingwood | Milton | Toronto | Bradford | Guelph

Medium Employers for 2024. Read more here.

From: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Sent: Tuesday, June 11, 2024 3:03 PM
To: Aarzoo Dhanani <adhanani@cfcrozier.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Brandon Bradt <bbradt@cfcrozier.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hello Aarzoo,

Your email has been circulated to MTO Traffic office for their review.

I will advise of any comments / required revisions or additions once I've heard back.

Thank you,

Jeremiah Johnston
Corridor Management Planner | Highway Operations Branch
Ministry of Transportation | Ontario Public Service
(226)-980-6407 | jeremiah.johnston@ontario.ca

Ontario

Taking pride in strengthening Ontario, its places and its people

From: Aarzoo Dhanani <adhanani@cfcrozier.ca>
Sent: Tuesday, June 11, 2024 1:40 PM
To: Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>; Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Brandon Bradt <bbradt@cfcrozier.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good a□ternoon Jodie and Jeremiah,

Thank you again □or the meeting earlier this week, we really appreciate the opportunity to present both access options open □or the proposed development. Following our discussion, please □nd attached the modi□ed Terms o□ Re□erence □or the Transportation Impact Study.

Also, please pass this along internally as needed to members o□the Tra□□c team.

The proposed development consists o□the □ollowing:

- Low Density Residential – 115 Units
- Medium Density Residential (Street Townhouses) – 59 Units

- Medium Density Residential (Cluster Townhouses) – 75 Units
- Medium Density Residential (Apartments) – 1,111 Units
- Mixed Use (Retail/O□ice/Residential) – 5 residential units & GFA □or o□ice/retail to be determined.
- Four new public internal local roads to serve the development area south o□Medway Road
- Private lanes/roads to serve the development area north o□Medway Road, as well as some o□the medium density development south o□Medway Road

Proposed access connections are as □ollows:

- One local road connection to Highway 4 opposite St. John's Drive (to be determined i□appropriate in Transportation Brie□, this would also close the Croydon Drive access)
- Two local road connections to Medway Road (south o□Medway Road)
- Two private lane connections to Medway Road (north o□Medway Road)

Please see the attached dra□t plan o□subdivision □or your re□erence. It is noted that this plan may change prior to the submission, but we will reach out to con□rm these Terms still apply should the plans change signi□cantly □rom what is currently envisioned.

Transportation Brief – Access Review

Prior to preparing a □ull Transportation Impact Study, we will prepare a Transportation Brie□that will evaluate two potential access scenarios as discussed:

- *Scenario1(Richmond Street Access):* Implementation o□a □our-leg intersection at Street 'B', intersecting with Richmond Street and St Johns Drive. This involves closing Croydon Drive access at Richmond Street and establishing an internal connection □or Croydon Drive at Street 'B' to serve the existing residential uses on Croydon Drive
- *Scenario 2 (Medway Road Access only):* No access to the site via Richmond Street, and the connection o□ Croydon Drive to Richmond Street will remain unchanged (i.e. not connected internally to the proposed site).

The access location will be assessed and determined within the Transportation Brie□prior to commencement o□ the □ull study.

However, please note that the assumptions detailed below will still need con□rmation prior to undertaking the necessary analysis to complete the access review brie□

Transportation Impact Study Terms of Reference

We will be conducting this study using the MTO Transportation Impact Study Guidelines dated March 2023 and scope o□work contained herein is based on applying these guidelines.

Several Transportation Impact Study elements require con□rmation □rom the Township, County, and MTO Sta□.

The □ollowing intersections are proposed to be analyzed within the study:

Medway Road at Richmond Street (Hwy 4)

Richmond Street (Hwy 4) at St. John's Drive

Richmond Street (Hwy 4) at Croydon Drive

Proposed Street 'B' at Richmond Street (Hwy 4)

Proposed Street 'B' at Medway Road

Proposed Street 'B' at Croydon Drive Extension

Proposed Street 'C'/Private Lane at Medway Road

Western Private Lane at Medway Road

We also kindly request the signal timing plans for Medway Road at Richmond Street (Hwy 4).

Please also confirm at your earliest convenience whether the intersections mentioned above are adequate for scheduling new turning movement counts. It is noted that Middlesex Centre Staff have already confirmed they are satisfied with the study area and we would like to get counts scheduled ASAP.

We will consult specialty traffic counting firms we typically work with to obtain turning movements counts as soon as possible. Please also clarify if a Summer Factor is required to modify the traffic volumes for seasonality.

Analysis Periods and Scenarios

The weekday A.M. and P.M. peak hours for the 2024 existing conditions, as well as a 5-year horizon year and a 10-year horizon year from the date of full build-out will be considered for future background and total traffic conditions per MTO's guidelines.

Please confirm if the proposed peak hour periods and the horizon years are sufficient for the analysis.

Future Background Growth Rate

The background growth rate along Richmond Street (Hwy 4) and Medway Road will be determined based on the historical or recent AADT data.

Please provide any data available to calculate a growth rate or provide a growth rate that should be assumed for the roadways.

Please note that the flow of traffic to and from Croydon Avenue might be redirected through the Street 'B' connection in the future horizon years, depending on the findings of the Transportation Brief.

Trip Generation and Distribution

Trip Generation for the proposed development will be based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition using the combination of the land uses proposed at the site.

Site generated traffic to and from the study network will be assigned using existing traffic patterns during the peak hours.

Capacity Analysis Procedures

The peak hour analysis scenarios will be analyzed per the MTO's TIS Guidelines using Synchro 11.0 analysis software and will be reported using Highway Capacity Manual (HCM) 2000 procedures.

Site Access and Internal Roadway Review

The site accesses will be reviewed in accordance with MTO's Highway Corridor Management Manual and the TAC Geometric Design Guide for Canadian Roads (and any applicable MTO supplements).

Geometric Review

The curb radii of local roadway intersections, sightlines, critical dimensions will be reviewed in accordance with the Municipality of Middlesex Centre Infrastructure Design Standards.

Vehicle Maneuvering diagrams will be provided to demonstrate functionality and safety of the proposed development's roadway geometry.

Active Transportation/Transit Review

The existing transportation network, as well as existing transit services in the area will be reviewed and any recommendations for the proposed development to connect to existing active transportation network and transit services will be provided.

Please confirm if the above will suffice for the package. If further details are required for this package to support the application, then please confirm what they would be.

I hope the contents outlined in this email are acceptable. Should you have any questions or require any further information, please feel free to reach out to discuss further.

Kind Regards,

Aarzoo

Aarzoo Dhanani, M.Eng., EIT
Engineering Intern, Transportation
Office: 416.842.0020
Collingwood | Milton | Toronto | Bradford | Guelph

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CROZIER

From: Brandon Bradt <bbradt@cfcrozier.ca>
Sent: Thursday, May 30, 2024 5:36 PM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hey Jeremiah,

That works for us! Can you invite all the members of our team cc'd here as well as the client David Ailles. david.ailles@yorkdev.ca

Kind Regards,
Brandon

Brandon Bradt, M.Eng. CEM, P.Eng.
Manager (Planning), Transportation
DID: 416.842.0033

From: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Sent: Thursday, May 30, 2024 11:08 AM
To: Brandon Bradt <bbradt@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hi Brandon,

Would the 10th 11-noon work for you? As of right now that's the earliest we have open, including our Traffic office.

Thank you,

Jeremiah Johnston
Corridor Management Planner | Highway Operations Branch
Ministry of Transportation | Ontario Public Service
(226)-980-6407 | jeremiah.johnston@ontario.ca

Ontario

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From: Brandon Bradt <bbradt@cfcrozier.ca>
Sent: Thursday, May 30, 2024 10:44 AM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Thanks for the clarifications Jeremiah and I understand/appreciate the MTO's position, I do think the key word below is long-term, but let's discuss this further at a meeting.

I'm free next week pretty much anytime except for Tuesday morning, Wednesday between 10-12 and Friday afternoon.

Kind Regards,
Brandon

Brandon Bradt, M.Eng. CEM, P.Eng.
Manager (Planning), Transportation

Office: 416.842.0033
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CROZIER

From: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Sent: Thursday, May 30, 2024 9:22 AM
To: Brandon Bradt <bbradt@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hello Brandon,

To the best of my knowledge, neither the City of London nor the Municipality of Middlesex Centre have officially requested an extension of their municipal jurisdiction over this section of Highway 4, nor has any interest been expressed by the province to download this asset. As per the Provincial Policy Statement, "new development proposed on adjacent lands to existing corridors and transportation facilities should be compatible with, and supportive of, the long-term purposes of the corridor and should be designed to avoid, mitigate or minimize negative impacts on and from the corridor and transportation facilities."

While the current intersection of St John Street east of Highway 4 may or may not have existing operational issues, it is MTO's mandate and responsibility to protect against identified operational issues. The application of our Highway Access Management policies and the requirements previously identified for this proposal must be implemented to best support the provincial transportation network.

If you would like to meet with MTO staff prior to submitting a scope please provide me with your availability for the weeks of the 3rd and the 10th.

Thank you,

Jeremiah Johnston
Corridor Management Planner | Highway Operations Branch
Ministry of Transportation | Ontario Public Service
(226)-980-6407 | jeremiah.johnston@ontario.ca

Ontario

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From: Brandon Bradt <bbradt@cfcrozier.ca>
Sent: Wednesday, May 29, 2024 1:32 PM
To: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>

Cc: Aaron Wignall <awignall@cfcrozier.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Jeremiah/Jodie,

Thank you both for getting back to me.

Before we submit a formal terms of reference, could we schedule a brief meeting to discuss this? Was there any discussion internally on how this portion of roadway will likely be downloaded to the City in the future and as a result that a more typical urban condition could be considered?

I can understand sticking to the standards for most roadways but we're effectively up against the urban boundary here and I don't see any geometric safety concerns given the 60km/h speed limit to the north and the 80km/h speed limit to the south. Is there a history of collisions at the St John's intersection that is giving you concern?

Kind Regards,
Brandon

Brandon Bradt, M.Eng. CEM, P.Eng.
Manager (Planning), Transportation
Office: 416.842.0033
Collingwood | Milton | Toronto | Bradford | Guelph

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CROZIER

From: Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Sent: Wednesday, May 29, 2024 12:20 PM
To: Brandon Bradt <bbradt@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>; Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Good afternoon Brandon,

Please submit a TIS scope / Terms of Reference for MTO to review and provide input, considering MTO correspondence to date by this email chain.

Thank you,

Jeremiah Johnston
Corridor Management Planner | Highway Operations Branch
Ministry of Transportation | Ontario Public Service
(226)-980-6407 | jeremiah.johnston@ontario.ca

Ontario

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From: Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Sent: Wednesday, May 29, 2024 11:19 AM
To: Brandon Bradt <bbradt@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Good morning, Brandon,

Jeremiah and I met with our Transportation Infrastructure Management Division (Traffic and Project Delivery) and it has been confirmed that due to the existing conditions of Highway 4 at this location (geometry, speed limit, highway classification and designation), in conjunction with the deficient offset(s) to the signalized intersection, MTO is unable to allow the development to have any direct access onto Hwy 4.

A new road connection opposite of John Street, or interconnectivity to the development through Croydon Drive onto Hwy 4 should not be permitted.

Jeremiah will continue to be the MTO lead for your proposal and will be reaching out shortly to discuss next steps.

Regards,

Jodie Lucente
Senior Project Manager – MTO Highway Corridor Management
226-984-7853 | jodie.lucente@ontario.ca

Ontario

From: Brandon Bradt <bbradt@cfcrozier.ca>
Sent: Wednesday, May 29, 2024 9:24 AM
To: Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Hey Jodie,

I just wanted to send a friendly follow-up on the below.

Kind Regards,
Brandon

Brandon Bradt, M.Eng. CEM, P.Eng.
Manager (Planning), Transportation
Office: 416.842.0033
Collingwood | Milton | Toronto | Bradford | Guelph

From: Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Sent: Thursday, May 16, 2024 8:49 AM
To: Brandon Bradt <bbradt@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Good morning, Brandon –

Based on MTO's Highway Access Management policies – the development is not entitled to utilize any direct access onto Hwy 4 – whether it is via a new road connection opposite of John Street, or by interconnectivity through Croydon Drive onto Hwy 4. This was noted in Jeremiah's original comments to the municipality.

We will however review the proposal further with MTO's Transportation Infrastructure Management Division, and will advise of any further comments or concerns.

Regards,

Jodie Lucente
SPM – MTO Highway Corridor Management
226-984-7853 | jodie.lucente@ontario.ca

Ontario

From: Brandon Bradt <bbradt@cfcrozier.ca>
Sent: May 15, 2024 4:52 PM
To: Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>; Aarzoo Dhanani <adhanani@cfcrozier.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Good A□ternoon Jodie,

Thank you □or the quick response, it's very much appreciated.

Would the MTO's position change i□the proposed access across St John's Drive was also supported by the closing o□the Croydon Drive access? We think this would improve sa□ety and reduce turning movement conflicts rather than the development using the existing Croydon Drive access and adding significant traffic volumes there.

In essence, this would be the same amount o□access as currently permitted on Highway 4, just with a single 4-leg intersection rather than two 3-leg intersections.

Please keep me updated with how the discussions go with Transportation Infrastructure Management staff and if it would be possible to set up a meeting to discuss further.

Kind Regards,
Brandon

Brandon Bradt, M.Eng. CEM, P.Eng.
Manager (Planning), Transportation
Office: 416.842.0033
Collingwood | Milton | Toronto | Bradford | Guelph

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CROZIER

From: Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Sent: Wednesday, May 15, 2024 4:09 PM
To: Brandon Bradt <bbradt@cfcrozier.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Johnston, Jeremiah (MTO) <Jeremiah.Johnston@ontario.ca>
Subject: RE: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)

Good afternoon Brandon,

Jeremiah is the Planner for this area, so I have looped him into this email.

MTO would be happy to meet and further discuss the proposal, however, prior to discussion, we will have to consult with our engineering sections from our Transportation Infrastructure Management Division to determine if any deviation from our basic requirements may occur at this location, and this will take some time.

As you may be aware, the number and location of entrances on a provincial highway has a direct impact on the safety and operational functionality for the travelling public. The proposal for direct access onto Highway 4 was considered in accordance with the *Public Transportation and Highway Improvement Act (PTHIA)*, MTO's Highway Access Management Manual (HAMM), as well as current guidelines and policies.

Highway 4 at this location is designated as a 2B Arterial King's Highway, and in accordance with ministry standards, a new or intensified public road connection is required to be located 1600m from the closest intersection or nearest commercial access. Consideration to reduce this spacing below 1600 metres, to any point down to and including 800 metres *may* be considered where it can be demonstrated through a Traffic Impact Study, completed by a RAQS approved traffic engineer, that the new access and any associated highway improvements can be implemented to acceptable MTO standards.

As the proposed access connection is located less than 250 metres from the nearest intersecting road, we hesitate to encourage the proponent spending time and resources evaluating an access scenario that is unlikely to meet minimum MTO standards.

The deficient offset may not allow for the addition of the highway improvements (turning lanes) that would likely be required, without adverse impact to adjacent property owners and the travelling public. A substandard entrance

connection offset, combined with the existing highway geometry may result in hazardous traffic conditions and operations, such as traffic queueing that extends into through lanes, as well as overlaps or conflicts in turning movements.

MTO supports the development of these lands, however, the property does not meet MTO requirements for a safe access directly onto Highway 4, whether it is a new road connection opposite of John Street, or the proposed extension/connectivity to existing Croydon Drive. As such it is recommended that the proponent continue to work towards a design that complies with MTO's minimum, fundamental Highway Access Management requirements.

In the interim I will bring this proposal forward to our Transportation Infrastructure Management Division for further review and comment, after which we can look to set up an additional discussion.

Please contact either Jeremiah or myself with any questions.

Thank you.

Regards,

Jodie Lucente
SPM – MTO Highway Corridor Management
226-984-7853 | jodie.lucente@ontario.ca

Ontario

From: Brandon Bradt <bbradt@cfcrozier.ca>
Sent: May 15, 2024 9:38 AM
To: Lucente, Jodie (MTO) <Jodie.Lucente@ontario.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>
Subject: Arva Subdivision - Access Request King's Highway 4 (Richmond Street)
Importance: High

Hello Jodie,

Nice to e-meet you!

Crozier has been retained as the transportation engineering consultant for a proposed development located on the northwest and southwest corners of the intersection of Medway Road and King's Highway 4 (Richmond Street) in the Country of Middlesex.

As part of the proposed development, we are requesting an access to Richmond Street (opposite the existing St John's Drive access) that we'd like to discuss with the MTO at their earliest opportunity.

I believe there was a previous meeting held between York (the applicant) and the MTO, which we didn't attend. I believe the representative from the MTO at that meeting was Jeremiah Johnston, so please loop him in, as well as any others as needed.

This is an important consideration as our client refines their development application for submission soon so we would be looking to set up a meeting as soon as possible to discuss this.

Kind Regards,

Brandon Bradt, M.Eng.CEM, P.Eng. | Manager, Transportation Planning
211 Yonge Street, Suite 600 | Toronto, ON M5B 1M4
T: 416.842.0033

Crozier Connections:

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Brandon Bradt, M.Eng. CEM, P.Eng.
Manager (Planning), Transportation
Office: 416.842.0033
Collingwood | Milton | Toronto | Bradford | Guelph

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Appendix C
Traffic Data

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Morning Peak Diagram

Specified Period
From: 6:30:00
To: 9:30:00

One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: London
Site #: 2412700001
Intersection: Richmond St & Medway Rd
TFR File #: 1
Count date: 11-Jul-24

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

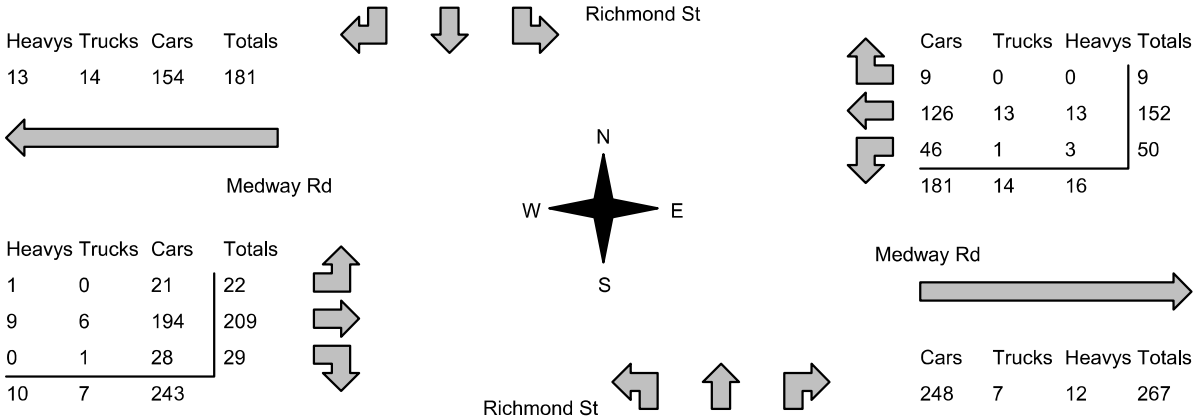
Major Road: Richmond St runs N/S

North Leg Total: 591
North Entering: 401
North Peds: 0
Peds Cross: ⋈

Heavys	0	2	0	2
Trucks	0	0	0	0
Cars	14	366	19	399
Totals	14	368	19	

Heavys	1	
Trucks	3	
Cars	186	
Totals	190	

East Leg Total: 478
East Entering: 211
East Peds: 0
Peds Cross: ⧖



Heavys	Trucks	Cars	Totals
13	14	154	181

Cars	9	0	0	9
	126	13	13	152
	46	1	3	50
	181	14	16	

Heavys	Trucks	Cars	Totals
1	0	21	22
9	6	194	209
0	1	28	29
10	7	243	

Cars	Trucks	Heavys	Totals
248	7	12	267

Peds Cross: ⧖
West Peds: 0
West Entering: 260
West Leg Total: 441

Cars	440			
Trucks	2			
Heavys	5			
Totals	447			

Cars	14	156	35	205
Trucks	1	3	1	5
Heavys	0	0	3	3
Totals	15	159	39	

Peds Cross: ⋈
South Peds: 0
South Entering: 213
South Leg Total: 660

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Afternoon Peak Diagram

Specified Period
From: 15:30:00
To: 18:30:00

One Hour Peak
From: 16:15:00
To: 17:15:00

Municipality: London
Site #: 2412700001
Intersection: Richmond St & Medway Rd
TFR File #: 1
Count date: 11-Jul-24

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Richmond St runs N/S

North Leg Total: 919
North Entering: 462
North Peds: 0
Peds Cross: ⋈

Heavys	1	2	0	3
Trucks	1	0	0	1
Cars	38	392	28	458
Totals	40	394	28	

Heavys	6
Trucks	1
Cars	450
Totals	457

East Leg Total: 891
East Entering: 474
East Peds: 0
Peds Cross: ⧖

Heavys	Trucks	Cars	Totals
9	4	425	438

Richmond St

Cars	Trucks	Heavys	Totals
29	0	2	31
355	3	8	366
72	0	5	77
456	3	15	

Medway Rd

N
W E
S

Heavys	Trucks	Cars	Totals
1	0	21	22
9	14	286	309
0	1	33	34
10	15	340	

Medway Rd

Cars	Trucks	Heavys	Totals
390	14	13	417

Richmond St

Peds Cross: ⧖
West Peds: 1
West Entering: 365
West Leg Total: 803

Cars	497
Trucks	1
Heavys	7
Totals	505

Cars	32	400	76	508
Trucks	0	1	0	1
Heavys	0	3	4	7
Totals	32	404	80	

Peds Cross: ⋈
South Peds: 0
South Entering: 516
South Leg Total: 1021

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Morning Peak Diagram

Specified Period
From: 6:30:00
To: 9:30:00

One Hour Peak
From: 7:30:00
To: 8:30:00

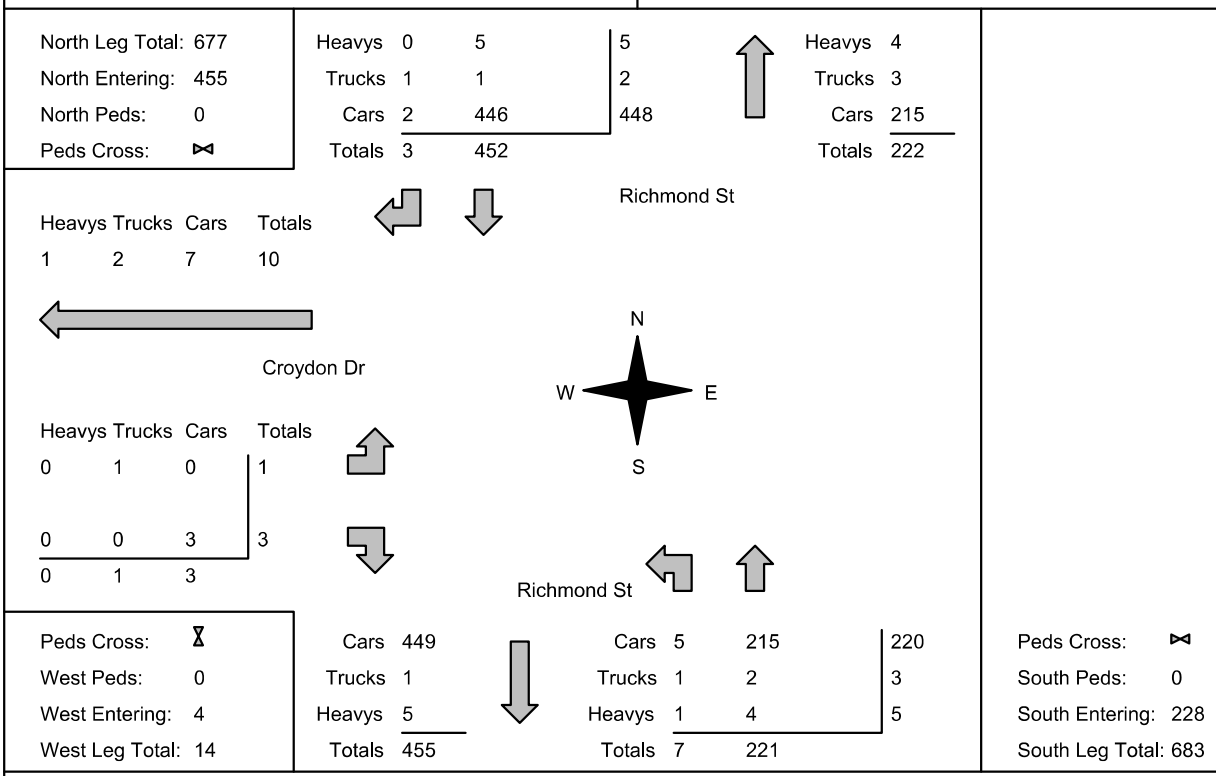
Municipality: London
Site #: 2412700003
Intersection: Richmond St & Croydon Dr
TFR File #: 1
Count date: 11-Jul-24

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Richmond St runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Afternoon Peak Diagram

Specified Period
From: 15:30:00
To: 18:30:00

One Hour Peak
From: 16:15:00
To: 17:15:00

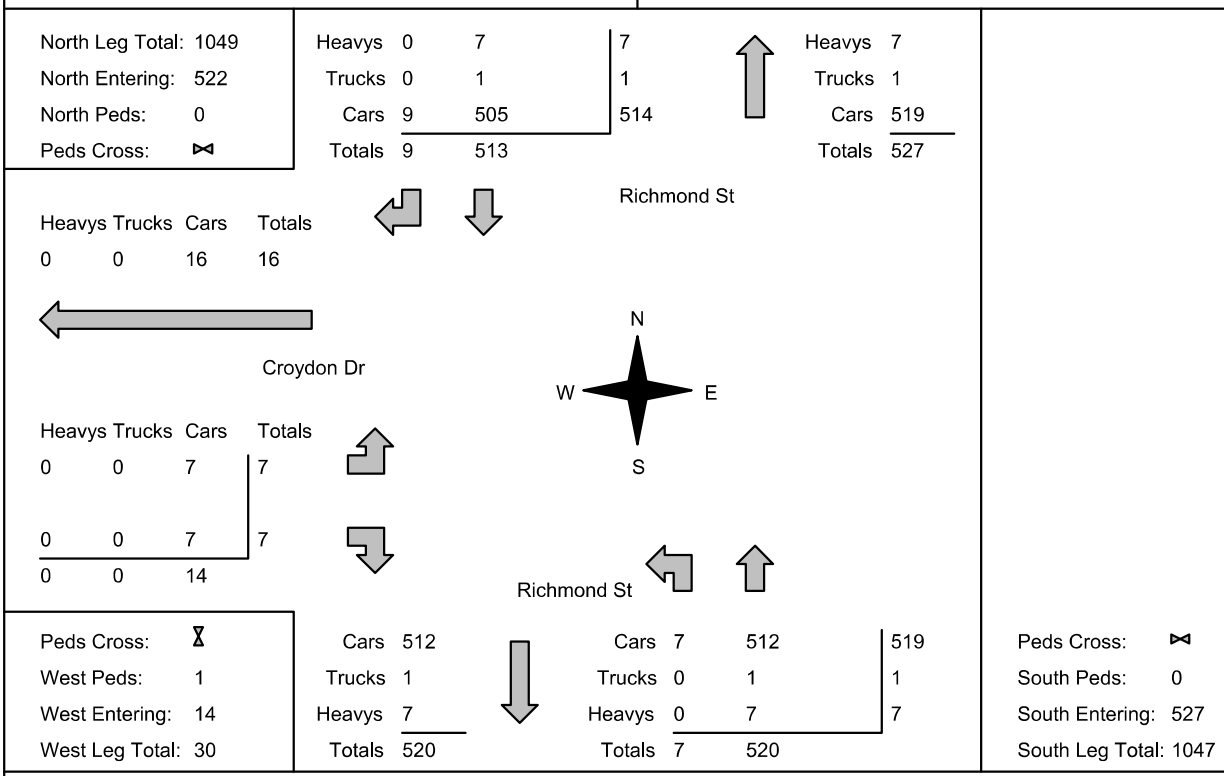
Municipality: London
Site #: 2412700003
Intersection: Richmond St & Croydon Dr
TFR File #: 1
Count date: 11-Jul-24

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Richmond St runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Morning Peak Diagram

Specified Period
From: 6:30:00
To: 9:30:00

One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: London
Site #: 2412700002
Intersection: Richmond St & St Johns Dr
TFR File #: 1
Count date: 11-Jul-24

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Richmond St runs N/S

North Leg Total: 660
North Entering: 447
North Peds: 0
Peds Cross: ⋈

Heavys	4	0	4
Trucks	2	0	2
Cars	441	0	441
Totals	447	0	

Heavys	4
Trucks	5
Cars	204
Totals	213

East Leg Total: 20
East Entering: 10
East Peds: 1
Peds Cross: ⋈

Richmond St

	Cars	Trucks	Heavys	Totals
	1	0	0	1
	9	0	0	9
	10	0	0	

N
W E
S

St Johns Dr

Cars	Trucks	Heavys	Totals
10	0	0	10

Richmond St

Cars	450		
Trucks	2		
Heavys	4		
Totals	456		

Cars	203	10	213
Trucks	5	0	5
Heavys	4	0	4
Totals	212	10	

Peds Cross: ⋈
South Peds: 0
South Entering: 222
South Leg Total: 678

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Afternoon Peak Diagram

Specified Period
From: 15:30:00
To: 18:30:00

One Hour Peak
From: 16:15:00
To: 17:15:00

Municipality: London
Site #: 2412700002
Intersection: Richmond St & St Johns Dr
TFR File #: 1
Count date: 11-Jul-24

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Richmond St runs N/S

North Leg Total: 1029
North Entering: 506
North Peds: 0
Peds Cross: ⋈

Heavys	7	0	7
Trucks	1	0	1
Cars	493	5	498
Totals	501	5	

Heavys	7
Trucks	1
Cars	515
Totals	523

East Leg Total: 56
East Entering: 33
East Peds: 2
Peds Cross: ⋈

Richmond St

Cars	Trucks	Heavys	Totals
13	0	0	13
20	0	0	20
33	0	0	

N
W E
S

St Johns Dr

Cars	Trucks	Heavys	Totals
23	0	0	23

Richmond St

Cars	513		
Trucks	1		
Heavys	7		
Totals	521		

Cars	502	18	520
Trucks	1	0	1
Heavys	7	0	7
Totals	510	18	

Peds Cross: ⋈
South Peds: 0
South Entering: 528
South Leg Total: 1049

Comments

Name	Type	EWStreet	NSStreet	Group	Drop#	Area	AreaAddr	Channel	Sys Ref #	Last Change	FM Name
R1NO Hwy 4	McCain 233	Medway Rd.	Hwy. 4 (Arva	NONE	1	1	72	).151.193.83	145	8/9/2022 3:4	NONE

		Coord Minimums														Bar	
																Hour	Minute
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	0	1
Page 0 <C/5>																	

Notes are in Column A, Rows 32 to 40

INTERSECTION: R1NO Hwy 4 @ Medway Rd (Arva)

Group Assignment: **NONE**
Field Master Assignment: **NONE**
System Reference Number: **145**

N/S Street Name: **Hwy. 4 (Arva)**
E/W Street Name: **Medway Rd. / Middlesex Rd. 28 (Arva)**

Last Database Change: **8/9/2022 3:41:46 PM**

Change Record					
Change	By	Date	Change	By	Date

Notes:

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Drop Number	1	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	1	<C/0+0+2>
Area Address	72	<C/0+0+3>
QuicNet Channel	P:8018:10.151.19	(QuicNet)

Communication Addresses

Manual Plan		<C/0+A+1>
Manual Offset		<C/0+B+1>

Manual Selection

Red Revert	5.0	<F/1+0+F>
All Red Start	5.0	<F/1+C+0>

Start / Revert Times

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Exclusive Ped Phase
(Outputs specified in Assignable Outputs at E/127+A+E & F)

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8
	Phase Names ---->								
0	Ped Walk	0	7	0	7	0	7	0	7
1	Ped FDW	0	18	0	21	0	18	0	21
2	Min Green	0	20	7	10	0	20	0	10
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
5	Veh Extension	0.0	3.6	3.0	3.0	0.0	3.6	0.0	3.0
6	Max Gap	0.0	3.6	3.0	3.0	0.0	3.6	0.0	3.0
7	Min Gap	0.0	3.6	3.0	3.0	0.0	3.6	0.0	3.0
8	Max Limit	0	50	15	35	0	50	0	35
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	Sequence To	0	0	0	0	0	0	0	0
C	Cond Serv Check	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	5.0	3.0	5.0	0.0	5.0	0.0	5.0
F	Red Clear	0.0	2.1	0.0	2.1	0.0	2.1	0.0	2.1

Phase Timing - Bank 1 <C+0+F=1>

	9	A	B	C	D
	- - -	- - -	- - -	- - -	- - -
Phase 1	0	0	0	0	0.0
Phase 2	35	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	0	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	35	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	0	0	0	0	0.0
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing <C+0+F=1>

	E
RR-1 Delay	0
RR-1 Clear	0
EV-A Delay	0
EV-A Clear	0
EV-B Delay	0
EV-B Clear	0
EV-C Delay	0
EV-C Clear	0
EV-D Delay	0
EV-D Clear	0
RR-2 Delay	0
RR-2 Clear	0
View EV Delay	- - -
View EV Clear	- - -
View RR Delay	- - -
View RR Clear	- - -

Preempt Timing

Row		F
0	Permit	_234_6_8
1	Red Lock	_____
2	Yellow Lock	_____
3	Min Recall	_____
4	Ped Recall	_2___6__
5	*View Set Peds*	- - - - -
6	Rest In Walk	_____
7	Red Rest	_____
8	Dual Entry	_2_4_6_8
9	Max Recall	_____
A	Soft Recall	_____
B	Max 2	_____
C	Cond. Service	_____
D	Man Cntrl Calls	_____
E	Yellow Start	_2___6__
F	First Phases	__3____8

Phase Functions <C+0+F=1>

Overlap Assignments <C+0+E=29>

Row	Column Numbers ---->	Overlap 1	2	3	4	5	6	7	8	Row
	Overlap Name ----->									
0	Load Switch Number	0	0	0	0	0	0	0	0	0
1	Veh Set 1 - Phases									1
2	Veh Set 2 - Phases									2
3	Veh Set 3 - Phases									3
4	Neg Veh Phases									4
5	Neg Ped Phases									5
6	Green Omit Phases									6
7	Green Clear Omit Phs.									7
8										8
9										9
A										A
B										B
C										C
D	Green Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	D
E	Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	E
F	Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	F

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = Reserved
5 = Extended Status
6 = International Ped
7 = Flash - Clear Outputs
8 = Split Ring

Extra 2 Flags
1 = AWB During Initial
2 = LMU Installed
3 = Reserved
4 = Reserved
5 = Reserved
6 = Reserved
7 = Reserved
8 = Reserved

Configuration <C+0+E=125>

Row	Column Numbers ---->	E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	3
5	Flash to PE Circuits	
6	Flash Entry Phases	
7	Disable Yellow Range	
8	Disable Ovp Yel Range	
9	Overlap Yellow Flash	
A	EV-A Phases	
B	EV-B Phases	
C	EV-C Phases	
D	EV-D Phases	
E	Extra 1 Config. Bits	1_3_5
F	IC Select (Interconnect)	2

Configuration <C+0+E=125>

	F
Ext. Permit 1 Phases	
Ext. Permit 2 Phases	
Exclusive Ped Assign	
Ped for 2P Output	2
Ped for 6P Output	6
Ped for 4P Output	4
Ped for 8P Output	8
Yellow Flash Phases	
Restricted Phases	
Extra 2 Config. Bits	

Specials <C+0+F=2>

	F
Adv Green Flash Phase	
Green Flash Phases	
Flashing Walk Phases	
Guaranteed Passage	
Simultaneous Gap Term	2_4_6_8
Sequential Timing	
Advance Walk Phases	
Delay Walk Phases	
External Recall	
Max Extension	
Inhibit Ped Reservice	
Semi-Actuated	
Start-up Vehicle Calls	3
Start-up Ped Calls	2_4_6_8

Flash to PE & PE Non-Lock
1 = EV A 5 = RR 1
2 = EV B 6 = RR 2
3 = EV C 7 = SE 1
4 = EV D 8 = SE 2

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Coordination Transition Minimums <C+0+C=5>

	2
Phase 1	10
Phase 2	10
Phase 3	10
Phase 4	10
Phase 5	10
Phase 6	10
Phase 7	10
Phase 8	10

Column Numbers ---->	0	1	2	3	1	3
Row	Detector Name	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0		39	___45___	_2_____	123_____	0.0	0.0
1		40	___45___	_____6__	123_____	0.0	0.0
2		41	___45_7_	___4____	123_____	5.0	0.0
3		42	___45_7_	_______8	123_____	10.0	0.0
4		43	___45___	_2_____	123_____	0.0	0.0
5		44	___45___	_____6__	123_____	0.0	0.0
6		45	___45_7_	___4____	123_____	10.0	0.0
7		46	_____	_____	_____	0.0	0.0
8		47	_____	_____	_____	0.0	0.0
9		48	_____	_____	_____	0.0	0.0
A		49	_____	_____	_____	0.0	0.0
B		50	_____	_____	_____	0.0	0.0
C		55	_____	_____	_____	0.0	0.0
D		56	_____	_____	_____	0.0	0.0
E		57	_____	_____	_____	0.0	0.0
F		58	___45_7_	__3____	123_____	5.0	0.0

	4	5	6	7	2	4
Row	Detector Name	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0		59	_____	_____	_____	0.0	0.0
1		60	_____	_____	_____	0.0	0.0
2		61	_____	_____	_____	0.0	0.0
3		62	_____	_____	_____	0.0	0.0
4		63	_____	_____	_____	0.0	0.0
5		64	_____	_____	_____	0.0	0.0
6		65	_____	_____	_____	0.0	0.0
7		66	_____	_____	_____	0.0	0.0
8		67	_____	_____	_____	0.0	0.0
9		68	_____	_____	_____	0.0	0.0
A		69	_2_____	___4____	123_____	0.0	0.0
B		70	_2_____	_______8	123_____	0.0	0.0
C		76	_____	_____	_____	0.0	0.0
D		77	_____	_____	_____	0.0	0.0
E		78	_____	_____	_____	0.0	0.0
F		79	_____	_____	_____	0.0	0.0

Detector Assignments <C+0+E=126> <C+0+D=0>

Detector Attributes
1 = Full Time Delay
2 = Ped Call
3 =
4 = Count
5 = Extension
6 = Type 3
7 = Calling
8 = Alternate

Det. Assignments
1 = Det. Set 1
2 = Det. Set 2
3 = Det. Set 3
4 =
5 =
6 = Failure - Min Recall
7 = Failure - Max Recall
8 = Report on Failure

Column Numbers ---->	Ped / Phase / Overlap 1	2	3	4	5	6	7	8	Row
Walk	0	0	0	0	0	0	0	0	0
Don't Walk	0	0	0	0	0	0	0	0	1
Phase Green	0	0	0	0	0	0	0	0	2
Phase Yellow	0	0	0	0	0	0	0	0	3
Phase Red	0	0	0	0	0	0	0	0	4
Overlap Green	0	0	0	0	0	0	0	0	5
Overlap Yellow	0	0	0	0	0	0	0	0	6
Overlap Red	0	0	0	0	0	0	0	0	7

Redirect Phase Outputs <C+0+E=127>

Cabinet Type	0	<E/125+D+0>

Enable Redirection
(Enable Redirection = 30)

Max OFF (minutes)	120	<D/0+0+1>
Max ON (minutes)	60	<D/0+0+2>

Detector Failure Monitor

	D	Row
		0
Output Port 1	_____	1
Output Port 2	_____	2
Output Port 3	_____	3
Output Port 4	_____	4
Output Port 5	_____	5
Output Port 6	_____	6
Output Port 7	_____	7

Dimming <C+0+E=125>

	D
Number of Digits	0
1 st Digit	0
2 ed Digit	0
3 ed Digit	0
4 th Digit	0
5 th Digit	0
6 th Digit	0
7 th Digit	0
8 th Digit	0
9 th Digit	0
10 th Digit	0
11 th Digit	0
12 th Digit	0
13 th Digit	0
14 th Digit	0
15 th Digit	0

Dial-Back Telephone Number <C+0+C=5>

Disable Alarms
1 = Stop Time
2 = Flash Sense
3 = Keyboard Entry
4 = Manual Plan
5 = Police Control
6 = External Alarm
7 = Detector Failure
8 =

	B	Row
DELAY-A	0	A
DELAY-B	0	B
DELAY-C	0	C
DELAY-D	0	D
DELAY-E	0	E
DELAY-F	0	F

Delay Logic Times
<C+0+D=0> (seconds)

Omit Alarm	_____	<C/5+F+0>

Disable Alarm Reporting

Time	0	<C/5+C+0>

Redial Time (minutes)

Appendix D
Level of Service Definitions

Signalized Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
B	> 10 and ≤ 20	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
C	> 20 and ≤ 35	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	> 35 and ≤ 55	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	> 55 and ≤ 80	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	> 80	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Level of Service Definitions

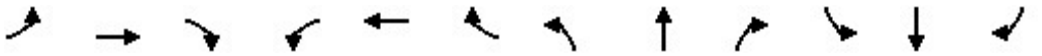
Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Appendix E

2024 Existing Detailed Capacity Analyses

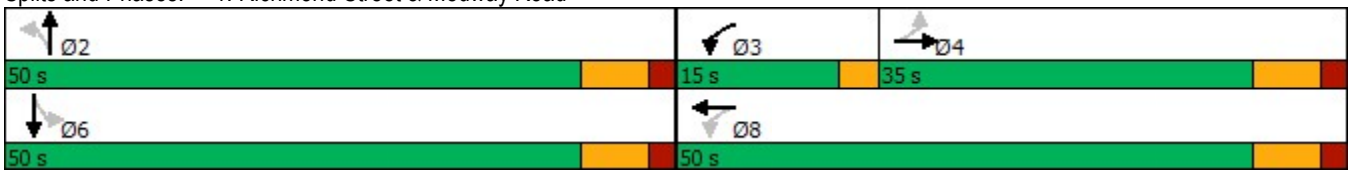


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	209	29	50	152	9	15	159	39	19	368	14
Future Volume (vph)	22	209	29	50	152	9	15	159	39	19	368	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00						1.00			1.00	
Frt		0.981			0.992			0.970			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1783	0	1687	1707	0	1687	3412	0	1805	3551	0
Flt Permitted	0.650			0.480			0.515			0.621		
Satd. Flow (perm)	1176	1783	0	852	1707	0	914	3412	0	1180	3551	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			4			38			5	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		523.5			110.0			243.9			157.5	
Travel Time (s)		31.4			7.9			14.6			9.5	
Confl. Bikes (#/hr)			1						1			1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	0%	7%	11%	0%	7%	2%	3%	0%	1%	0%
Adj. Flow (vph)	23	220	31	53	160	9	16	167	41	20	387	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	251	0	53	169	0	16	208	0	20	402	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	14.0	14.0		23.8	19.6		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.23	0.23		0.40	0.33		0.43	0.43		0.43	0.43	
v/c Ratio	0.08	0.59		0.12	0.30		0.04	0.14		0.04	0.26	
Control Delay	19.9	26.9		10.5	14.8		14.0	10.7		13.8	13.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.9	26.9		10.5	14.8		14.0	10.7		13.8	13.2	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		26.3			13.8			10.9			13.3	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 59.6			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	7	221	452	3
Future Volume (vph)	1	3	7	221	452	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.899				0.999	
Flt Protected	0.988			0.999		
Satd. Flow (prot)	1688	0	0	3523	3536	0
Flt Permitted	0.988			0.999		
Satd. Flow (perm)	1688	0	0	3523	3536	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	15%	2%	2%	0%
Adj. Flow (vph)	1	3	7	233	476	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	0	240	479	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	3	7	221	452	3
Future Volume (Veh/h)	1	3	7	221	452	3
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)	1	3	7	233	476	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked						
vC, conflicting volume	608	240	479			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	608	240	479			
tC, single (s)	6.8	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	429	768	993			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	85	155	317	162
Volume Left	1	7	0	0	0
Volume Right	3	0	0	0	3
cSH	641	993	1700	1700	1700
Volume to Capacity	0.01	0.01	0.09	0.19	0.10
Queue Length 95th (m)	0.2	0.2	0.0	0.0	0.0
Control Delay (s)	10.6	0.8	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.6	0.3		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	22.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	1	212	10	0	447
Future Volume (vph)	9	1	212	10	0	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.988		0.993			
Flt Protected	0.957					
Satd. Flow (prot)	1796	0	3518	0	0	3574
Flt Permitted	0.957					
Satd. Flow (perm)	1796	0	3518	0	0	3574
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)		1		1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	10	1	226	11	0	476
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	237	0	0	476
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	1	212	10	0	447
Future Volume (Veh/h)	9	1	212	10	0	447
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	1	226	11	0	476
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.98					
vC, conflicting volume	470	120			238	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	415	120			238	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	558	915			1340	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	11	151	86	159	317
Volume Left	10	0	0	0	0
Volume Right	1	0	11	0	0
cSH	579	1700	1700	1340	1700
Volume to Capacity	0.02	0.09	0.05	0.00	0.19
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	11.3	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.3	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	14.4	53.4	23.4	47.1	9.8	22.8	21.1	11.6	44.6	29.8
Average Queue (m)	4.4	28.0	8.9	18.1	2.3	10.3	7.4	3.0	22.7	9.5
95th Queue (m)	12.9	46.0	19.1	35.1	8.6	19.6	16.2	9.7	37.8	21.3
Link Distance (m)		509.5		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		0				0			4	
Queuing Penalty (veh)		0				0			1	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	9.0	9.0
Average Queue (m)	1.3	0.8
95th Queue (m)	6.2	5.0
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB
Directions Served	LR
Maximum Queue (m)	9.1
Average Queue (m)	2.5
95th Queue (m)	9.0
Link Distance (m)	144.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

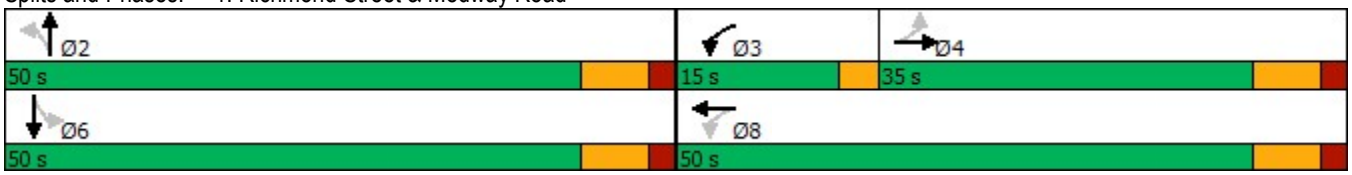
Network wide Queuing Penalty: 1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	309	34	77	366	31	32	404	76	28	394	40
Future Volume (vph)	22	309	34	77	366	31	32	404	76	28	394	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00	1.00			1.00	
Frt		0.985			0.988			0.976			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1822	0	1687	1817	0	1805	3450	0	1805	3510	0
Flt Permitted	0.520			0.343			0.491			0.469		
Satd. Flow (perm)	941	1822	0	609	1817	0	932	3450	0	891	3510	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			5			27			14	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		523.5			110.0			243.9			157.5	
Travel Time (s)		31.4			7.9			14.6			9.5	
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	3%	0%	7%	3%	7%	0%	1%	6%	0%	1%	3%
Adj. Flow (vph)	23	322	35	80	381	32	33	421	79	29	410	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	357	0	80	413	0	33	500	0	29	452	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	18.2	18.2		30.6	26.4		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.27	0.27		0.46	0.40		0.38	0.38		0.38	0.38	
v/c Ratio	0.09	0.71		0.20	0.57		0.09	0.37		0.09	0.33	
Control Delay	19.1	30.3		10.3	17.9		17.4	16.6		17.4	16.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.1	30.3		10.3	17.9		17.4	16.6		17.4	16.7	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		29.6			16.7			16.7			16.7	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 66.4			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 19.3		Intersection LOS: B	
Intersection Capacity Utilization 73.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	7	7	520	513	9
Future Volume (vph)	7	7	7	520	513	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.932				0.997	
Flt Protected	0.976			0.999		
Satd. Flow (prot)	1728	0	0	3537	3530	0
Flt Permitted	0.976			0.999		
Satd. Flow (perm)	1728	0	0	3537	3530	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%
Adj. Flow (vph)	8	8	8	565	558	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	573	568	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	7	7	520	513	9
Future Volume (Veh/h)	7	7	7	520	513	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	8	565	558	10
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked						
vC, conflicting volume	862	285	569			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	862	285	569			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	295	717	1013			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	196	377	372	196
Volume Left	8	8	0	0	0
Volume Right	8	0	0	0	10
cSH	418	1013	1700	1700	1700
Volume to Capacity	0.04	0.01	0.22	0.22	0.12
Queue Length 95th (m)	1.0	0.2	0.0	0.0	0.0
Control Delay (s)	13.9	0.4	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	13.9	0.1		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	13	510	18	5	501
Future Volume (vph)	20	13	510	18	5	501
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.946		0.995			
Flt Protected	0.971					
Satd. Flow (prot)	1745	0	3458	0	0	3540
Flt Permitted	0.971					
Satd. Flow (perm)	1745	0	3458	0	0	3540
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	4%	0%	0%	2%
Adj. Flow (vph)	21	14	543	19	5	533
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	562	0	0	538
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 27.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	20	13	510	18	5	501
Future Volume (Veh/h)	20	13	510	18	5	501
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	14	543	19	5	533
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.96					
vC, conflicting volume	831	283			564	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	733	283			564	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	98			100	
cM capacity (veh/h)	342	719			1016	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	362	200	183	355
Volume Left	21	0	0	5	0
Volume Right	14	0	19	0	0
cSH	433	1700	1700	1016	1700
Volume to Capacity	0.08	0.21	0.12	0.00	0.21
Queue Length 95th (m)	2.1	0.0	0.0	0.1	0.0
Control Delay (s)	14.0	0.0	0.0	0.3	0.0
Lane LOS	B			A	
Approach Delay (s)	14.0	0.0		0.1	
Approach LOS	B				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	19.4	69.6	23.6	74.0	20.6	40.6	39.9	14.2	51.8	33.9
Average Queue (m)	5.2	40.0	11.8	40.6	6.5	22.5	19.7	4.3	27.6	12.2
95th Queue (m)	15.2	63.8	21.5	66.5	16.1	35.9	33.9	12.0	44.7	25.7
Link Distance (m)		509.5		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		2		0	0	4			8	
Queuing Penalty (veh)		1		0	0	1			2	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	13.0	6.3
Average Queue (m)	3.8	0.3
95th Queue (m)	11.3	3.4
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

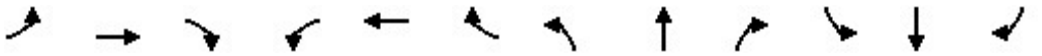
Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	13.0	8.2
Average Queue (m)	6.3	0.5
95th Queue (m)	13.3	4.0
Link Distance (m)	144.6	226.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 4

Appendix F

Future Background Detailed Capacity Analyses

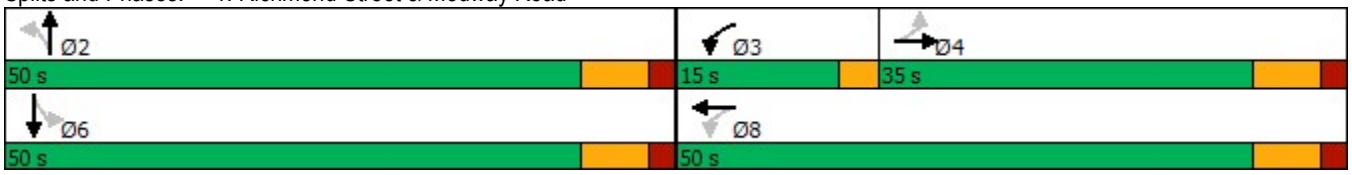


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	209	29	50	152	9	15	176	39	19	407	14
Future Volume (vph)	22	209	29	50	152	9	15	176	39	19	407	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00						1.00			1.00	
Frt		0.981			0.992			0.973			0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1783	0	1687	1707	0	1687	3425	0	1805	3555	0
Flt Permitted	0.650			0.480			0.495			0.611		
Satd. Flow (perm)	1176	1783	0	852	1707	0	879	3425	0	1161	3555	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			4			33			4	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		523.5			110.0			243.9			157.5	
Travel Time (s)		31.4			7.9			14.6			9.5	
Confl. Bikes (#/hr)			1						1			1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	0%	7%	11%	0%	7%	2%	3%	0%	1%	0%
Adj. Flow (vph)	23	220	31	53	160	9	16	185	41	20	428	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	251	0	53	169	0	16	226	0	20	443	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	14.0	14.0		23.8	19.6		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.23	0.23		0.40	0.33		0.43	0.43		0.43	0.43	
v/c Ratio	0.08	0.59		0.12	0.30		0.04	0.15		0.04	0.29	
Control Delay	19.9	26.9		10.5	14.8		14.1	11.1		13.9	13.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.9	26.9		10.5	14.8		14.1	11.1		13.9	13.5	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		26.3			13.8			11.3			13.5	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 59.6			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	7	245	500	3
Future Volume (vph)	1	3	7	245	500	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.899				0.999	
Flt Protected	0.988			0.999		
Satd. Flow (prot)	1688	0	0	3524	3536	0
Flt Permitted	0.988			0.999		
Satd. Flow (perm)	1688	0	0	3524	3536	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	15%	2%	2%	0%
Adj. Flow (vph)	1	3	7	258	526	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	0	265	529	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	23.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	3	7	245	500	3
Future Volume (Veh/h)	1	3	7	245	500	3
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)	1	3	7	258	526	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked						
vC, conflicting volume	670	264	529			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	670	264	529			
tC, single (s)	6.8	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	392	740	949			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	93	172	351	178
Volume Left	1	7	0	0	0
Volume Right	3	0	0	0	3
cSH	605	949	1700	1700	1700
Volume to Capacity	0.01	0.01	0.10	0.21	0.10
Queue Length 95th (m)	0.2	0.2	0.0	0.0	0.0
Control Delay (s)	11.0	0.7	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.0	0.3		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	23.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	1	235	10	0	494
Future Volume (vph)	9	1	235	10	0	494
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.988		0.994			
Flt Protected	0.957					
Satd. Flow (prot)	1796	0	3521	0	0	3574
Flt Permitted	0.957					
Satd. Flow (perm)	1796	0	3521	0	0	3574
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)		1		1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	10	1	250	11	0	526
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	261	0	0	526
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	1	235	10	0	494
Future Volume (Veh/h)	9	1	235	10	0	494
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	1	250	11	0	526
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.96					
vC, conflicting volume	520	132			262	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426	132			262	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	541	899			1313	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	11	167	94	175	351
Volume Left	10	0	0	0	0
Volume Right	1	0	11	0	0
cSH	561	1700	1700	1313	1700
Volume to Capacity	0.02	0.10	0.06	0.00	0.21
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	11.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.5	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	14.3	54.2	23.1	43.6	15.1	24.9	21.2	11.6	45.3	32.8
Average Queue (m)	4.5	26.7	9.8	18.4	3.4	11.0	7.7	3.1	22.7	9.1
95th Queue (m)	12.3	44.5	20.3	34.7	11.2	20.2	17.7	9.9	37.5	21.4
Link Distance (m)		509.5		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		0			0	0			4	
Queuing Penalty (veh)		0			0	0			1	

Intersection: 2: Richmond Street & Croydon Drive

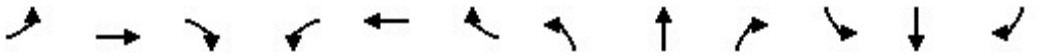
Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.9	10.9
Average Queue (m)	1.2	0.9
95th Queue (m)	5.9	6.1
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB
Directions Served	LR
Maximum Queue (m)	10.4
Average Queue (m)	2.7
95th Queue (m)	9.6
Link Distance (m)	144.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 1

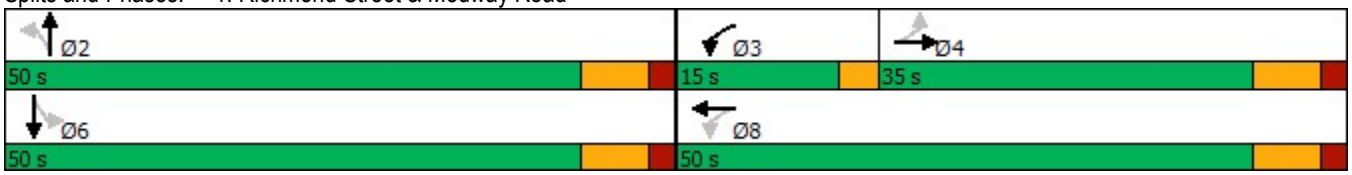


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	309	34	77	366	31	32	447	76	28	436	40
Future Volume (vph)	22	309	34	77	366	31	32	447	76	28	436	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00	1.00			1.00	
Frt		0.985			0.988			0.978			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1822	0	1687	1817	0	1805	3460	0	1805	3515	0
Flt Permitted	0.520			0.343			0.470			0.436		
Satd. Flow (perm)	941	1822	0	609	1817	0	892	3460	0	828	3515	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			5			24			12	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		523.5			110.0			243.9			157.5	
Travel Time (s)		31.4			7.9			14.6			9.5	
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	3%	0%	7%	3%	7%	0%	1%	6%	0%	1%	3%
Adj. Flow (vph)	23	322	35	80	381	32	33	466	79	29	454	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	357	0	80	413	0	33	545	0	29	496	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	18.2	18.2		30.6	26.4		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.27	0.27		0.46	0.40		0.38	0.38		0.38	0.38	
v/c Ratio	0.09	0.71		0.20	0.57		0.10	0.41		0.09	0.37	
Control Delay	19.1	30.3		10.3	17.9		17.5	17.1		17.5	17.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.1	30.3		10.3	17.9		17.5	17.1		17.5	17.1	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		29.6			16.7			17.1			17.1	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 66.4			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 19.4		Intersection LOS: B	
Intersection Capacity Utilization 73.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	7	7	575	567	9
Future Volume (vph)	7	7	7	575	567	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.932				0.998	
Flt Protected	0.976			0.999		
Satd. Flow (prot)	1728	0	0	3537	3533	0
Flt Permitted	0.976			0.999		
Satd. Flow (perm)	1728	0	0	3537	3533	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%
Adj. Flow (vph)	8	8	8	625	616	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	633	626	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	7	7	575	567	9
Future Volume (Veh/h)	7	7	7	575	567	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	8	625	616	10
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	950	314	627			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	918	272	590			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	268	720	979			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	216	417	411	215
Volume Left	8	8	0	0	0
Volume Right	8	0	0	0	10
cSH	390	979	1700	1700	1700
Volume to Capacity	0.04	0.01	0.25	0.24	0.13
Queue Length 95th (m)	1.0	0.2	0.0	0.0	0.0
Control Delay (s)	14.6	0.4	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	14.6	0.1		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	13	564	18	5	554
Future Volume (vph)	20	13	564	18	5	554
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.946		0.995			
Flt Protected	0.971					
Satd. Flow (prot)	1745	0	3458	0	0	3540
Flt Permitted	0.971					
Satd. Flow (perm)	1745	0	3458	0	0	3540
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	4%	0%	0%	2%
Adj. Flow (vph)	21	14	600	19	5	589
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	619	0	0	594
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	20	13	564	18	5	554
Future Volume (Veh/h)	20	13	564	18	5	554
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	14	600	19	5	589
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.94					
vC, conflicting volume	916	312			621	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	785	312			621	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	98			99	
cM capacity (veh/h)	312	689			968	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	400	219	201	393
Volume Left	21	0	0	5	0
Volume Right	14	0	19	0	0
cSH	399	1700	1700	968	1700
Volume to Capacity	0.09	0.24	0.13	0.01	0.23
Queue Length 95th (m)	2.3	0.0	0.0	0.1	0.0
Control Delay (s)	14.9	0.0	0.0	0.3	0.0
Lane LOS	B			A	
Approach Delay (s)	14.9	0.0		0.1	
Approach LOS	B				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	18.0	75.8	30.0	76.6	18.9	43.1	41.3	15.7	59.9	42.6
Average Queue (m)	5.4	38.7	12.6	38.1	6.3	23.2	23.5	5.8	30.3	15.9
95th Queue (m)	14.9	62.8	24.3	63.1	15.5	37.4	39.3	14.3	50.3	32.8
Link Distance (m)		509.5		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		2		0	0	5			11	
Queuing Penalty (veh)		0		0	0	1			3	

Intersection: 2: Richmond Street & Croydon Drive

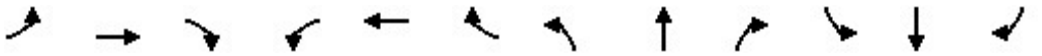
Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	9.0	12.7
Average Queue (m)	3.4	1.1
95th Queue (m)	10.3	6.7
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	18.1	8.2
Average Queue (m)	6.0	0.5
95th Queue (m)	14.6	4.1
Link Distance (m)	144.6	226.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 5

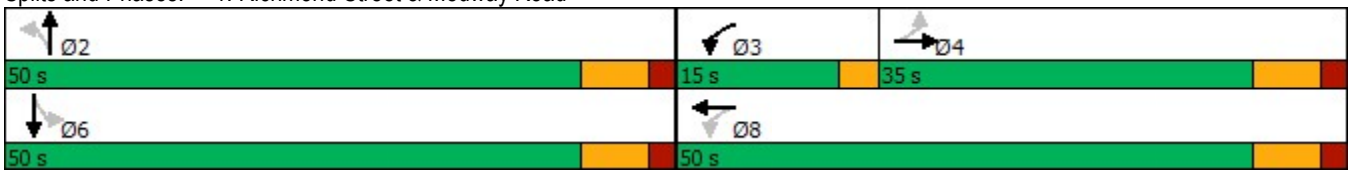


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	209	29	50	152	9	15	194	39	19	449	14
Future Volume (vph)	22	209	29	50	152	9	15	194	39	19	449	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00						1.00			1.00	
Frt		0.981			0.992			0.975			0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1783	0	1687	1707	0	1687	3433	0	1805	3555	0
Flt Permitted	0.650			0.480			0.474			0.600		
Satd. Flow (perm)	1176	1783	0	852	1707	0	842	3433	0	1140	3555	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			4			29			4	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		523.5			110.0			243.9			157.5	
Travel Time (s)		31.4			7.9			14.6			9.5	
Confl. Bikes (#/hr)			1						1			1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	0%	7%	11%	0%	7%	2%	3%	0%	1%	0%
Adj. Flow (vph)	23	220	31	53	160	9	16	204	41	20	473	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	251	0	53	169	0	16	245	0	20	488	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	14.0	14.0		23.8	19.6		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.23	0.23		0.40	0.33		0.43	0.43		0.43	0.43	
v/c Ratio	0.08	0.59		0.12	0.30		0.04	0.17		0.04	0.32	
Control Delay	19.9	26.9		10.5	14.8		14.1	11.5		13.9	13.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.9	26.9		10.5	14.8		14.1	11.5		13.9	13.7	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		26.3			13.8			11.6			13.7	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 59.6			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	7	270	551	3
Future Volume (vph)	1	3	7	270	551	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.899				0.999	
Flt Protected	0.988			0.999		
Satd. Flow (prot)	1688	0	0	3525	3536	0
Flt Permitted	0.988			0.999		
Satd. Flow (perm)	1688	0	0	3525	3536	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	15%	2%	2%	0%
Adj. Flow (vph)	1	3	7	284	580	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	0	291	583	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	3	7	270	551	3
Future Volume (Veh/h)	1	3	7	270	551	3
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)	1	3	7	284	580	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	1.00	1.00	1.00			
vC, conflicting volume	738	292	583			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	734	287	579			
tC, single (s)	6.8	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	356	715	905			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	102	189	387	196
Volume Left	1	7	0	0	0
Volume Right	3	0	0	0	3
cSH	571	905	1700	1700	1700
Volume to Capacity	0.01	0.01	0.11	0.23	0.12
Queue Length 95th (m)	0.2	0.2	0.0	0.0	0.0
Control Delay (s)	11.3	0.7	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.3	0.2		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	1	259	10	0	545
Future Volume (vph)	9	1	259	10	0	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.988		0.994			
Flt Protected	0.957					
Satd. Flow (prot)	1796	0	3521	0	0	3574
Flt Permitted	0.957					
Satd. Flow (perm)	1796	0	3521	0	0	3574
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)		1		1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	10	1	276	11	0	580
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	287	0	0	580
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.1%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	1	259	10	0	545
Future Volume (Veh/h)	9	1	259	10	0	545
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	1	276	11	0	580
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.95					
vC, conflicting volume	572	144			288	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	440	144			288	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	522	882			1284	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	11	184	103	193	387
Volume Left	10	0	0	0	0
Volume Right	1	0	11	0	0
cSH	542	1700	1700	1284	1700
Volume to Capacity	0.02	0.11	0.06	0.00	0.23
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	11.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	25.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	15.4	53.4	25.2	46.4	11.6	21.8	20.9	10.5	51.6	38.0
Average Queue (m)	4.7	28.3	9.3	18.2	2.6	11.7	8.4	3.4	25.6	12.4
95th Queue (m)	13.4	47.1	19.0	34.6	9.4	20.8	17.6	10.3	41.5	26.3
Link Distance (m)		509.5		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		0				0			6	
Queuing Penalty (veh)		0				0			1	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.9	11.2
Average Queue (m)	1.2	0.9
95th Queue (m)	6.2	5.7
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB
Directions Served	LR
Maximum Queue (m)	9.1
Average Queue (m)	2.7
95th Queue (m)	9.3
Link Distance (m)	144.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

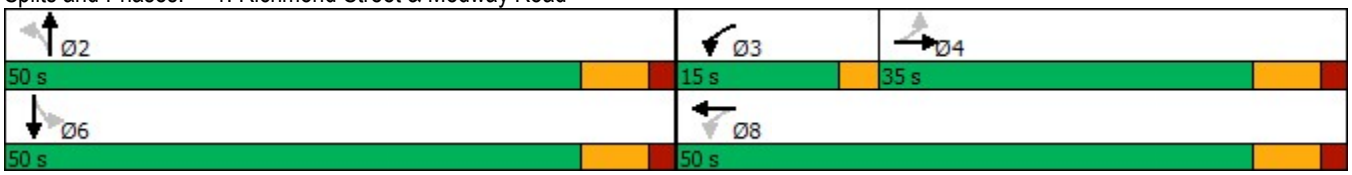
Network wide Queuing Penalty: 1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	309	34	77	366	31	32	493	76	28	481	40
Future Volume (vph)	22	309	34	77	366	31	32	493	76	28	481	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00	1.00			1.00	
Frt		0.985			0.988			0.980			0.988	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1822	0	1687	1817	0	1805	3470	0	1805	3520	0
Flt Permitted	0.520			0.343			0.437			0.402		
Satd. Flow (perm)	941	1822	0	609	1817	0	830	3470	0	764	3520	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			5			21			11	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		523.5			110.0			243.9			157.5	
Travel Time (s)		31.4			7.9			14.6			9.5	
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	3%	0%	7%	3%	7%	0%	1%	6%	0%	1%	3%
Adj. Flow (vph)	23	322	35	80	381	32	33	514	79	29	501	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	357	0	80	413	0	33	593	0	29	543	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	18.2	18.2		30.6	26.4		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.27	0.27		0.46	0.40		0.38	0.38		0.38	0.38	
v/c Ratio	0.09	0.71		0.20	0.57		0.10	0.44		0.10	0.40	
Control Delay	19.1	30.3		10.3	17.9		17.7	17.6		17.8	17.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.1	30.3		10.3	17.9		17.7	17.6		17.8	17.5	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		29.6			16.7			17.6			17.5	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 66.4			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 73.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	7	7	634	626	9
Future Volume (vph)	7	7	7	634	626	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.932				0.998	
Flt Protected	0.976			0.999		
Satd. Flow (prot)	1728	0	0	3536	3533	0
Flt Permitted	0.976			0.999		
Satd. Flow (perm)	1728	0	0	3536	3533	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%
Adj. Flow (vph)	8	8	8	689	680	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	697	690	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	7	7	634	626	9
Future Volume (Veh/h)	7	7	7	634	626	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	8	689	680	10
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	1046	346	691			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	972	245	603			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	242	733	947			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	238	459	453	237
Volume Left	8	8	0	0	0
Volume Right	8	0	0	0	10
cSH	364	947	1700	1700	1700
Volume to Capacity	0.04	0.01	0.27	0.27	0.14
Queue Length 95th (m)	1.1	0.2	0.0	0.0	0.0
Control Delay (s)	15.4	0.4	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	15.4	0.1		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	13	622	18	5	611
Future Volume (vph)	20	13	622	18	5	611
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.946		0.996			
Flt Protected	0.971					
Satd. Flow (prot)	1745	0	3461	0	0	3540
Flt Permitted	0.971					
Satd. Flow (perm)	1745	0	3461	0	0	3540
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	4%	0%	0%	2%
Adj. Flow (vph)	21	14	662	19	5	650
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	681	0	0	655
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	20	13	622	18	5	611
Future Volume (Veh/h)	20	13	622	18	5	611
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	14	662	19	5	650
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.92					
vC, conflicting volume	1008	342			683	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	845	342			683	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	98			99	
cM capacity (veh/h)	281	658			918	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	441	240	222	433
Volume Left	21	0	0	5	0
Volume Right	14	0	19	0	0
cSH	364	1700	1700	918	1700
Volume to Capacity	0.10	0.26	0.14	0.01	0.25
Queue Length 95th (m)	2.5	0.0	0.0	0.1	0.0
Control Delay (s)	15.9	0.0	0.0	0.3	0.0
Lane LOS	C			A	
Approach Delay (s)	15.9	0.0		0.1	
Approach LOS	C				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	30.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	23.0	70.6	28.1	73.6	22.0	44.8	48.4	17.0	58.1	50.8
Average Queue (m)	5.3	40.4	12.7	39.5	8.0	26.7	26.0	6.6	32.5	18.5
95th Queue (m)	15.5	64.3	23.6	64.0	19.0	41.6	42.7	15.6	52.7	39.6
Link Distance (m)		509.5		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)				0						
Queuing Penalty (veh)				0						
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		2		0	0	8		0	12	
Queuing Penalty (veh)		1		0	1	2		0	3	

Intersection: 2: Richmond Street & Croydon Drive

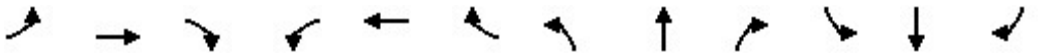
Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	12.7	9.6
Average Queue (m)	3.3	0.8
95th Queue (m)	10.7	5.4
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	15.3	11.5
Average Queue (m)	6.4	0.9
95th Queue (m)	13.7	5.6
Link Distance (m)	144.6	226.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 7

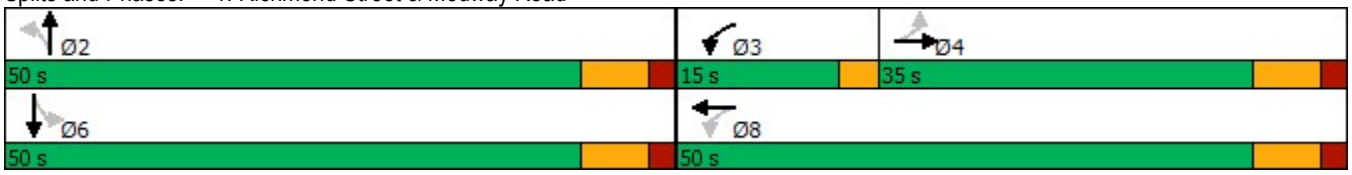


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	209	29	50	152	9	15	214	39	19	496	14
Future Volume (vph)	22	209	29	50	152	9	15	214	39	19	496	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00						1.00			1.00	
Frt		0.981			0.992			0.977			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1783	0	1687	1707	0	1687	3441	0	1805	3559	0
Flt Permitted	0.650			0.480			0.452			0.588		
Satd. Flow (perm)	1176	1783	0	852	1707	0	803	3441	0	1117	3559	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			4			26			4	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		523.5			110.0			243.9			157.5	
Travel Time (s)		31.4			7.9			14.6			9.5	
Confl. Bikes (#/hr)			1						1			1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	0%	7%	11%	0%	7%	2%	3%	0%	1%	0%
Adj. Flow (vph)	23	220	31	53	160	9	16	225	41	20	522	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	251	0	53	169	0	16	266	0	20	537	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	14.0	14.0		23.8	19.6		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.23	0.23		0.40	0.33		0.43	0.43		0.43	0.43	
v/c Ratio	0.08	0.59		0.12	0.30		0.05	0.18		0.04	0.35	
Control Delay	19.9	26.9		10.5	14.8		14.1	11.8		13.9	13.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.9	26.9		10.5	14.8		14.1	11.8		13.9	13.9	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		26.3			13.8			11.9			13.9	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 59.6			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	7	298	609	3
Future Volume (vph)	1	3	7	298	609	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.899				0.999	
Flt Protected	0.988			0.999		
Satd. Flow (prot)	1688	0	0	3526	3536	0
Flt Permitted	0.988			0.999		
Satd. Flow (perm)	1688	0	0	3526	3536	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	15%	2%	2%	0%
Adj. Flow (vph)	1	3	7	314	641	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	0	321	644	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	3	7	298	609	3
Future Volume (Veh/h)	1	3	7	298	609	3
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)	1	3	7	314	641	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	814	322	644			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	761	258	587			
tC, single (s)	6.8	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	335	730	878			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	112	209	427	217
Volume Left	1	7	0	0	0
Volume Right	3	0	0	0	3
cSH	564	878	1700	1700	1700
Volume to Capacity	0.01	0.01	0.12	0.25	0.13
Queue Length 95th (m)	0.2	0.2	0.0	0.0	0.0
Control Delay (s)	11.4	0.6	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.4	0.2		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	1	286	10	0	602
Future Volume (vph)	9	1	286	10	0	602
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.988		0.995			
Flt Protected	0.957					
Satd. Flow (prot)	1796	0	3524	0	0	3574
Flt Permitted	0.957					
Satd. Flow (perm)	1796	0	3524	0	0	3574
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)		1		1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	10	1	304	11	0	640
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	315	0	0	640
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	1	286	10	0	602
Future Volume (Veh/h)	9	1	286	10	0	602
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	1	304	11	0	640
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.93					
vC, conflicting volume	630	158			316	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	457	158			316	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	500	864			1255	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	11	203	112	213	427
Volume Left	10	0	0	0	0
Volume Right	1	0	11	0	0
cSH	520	1700	1700	1255	1700
Volume to Capacity	0.02	0.12	0.07	0.00	0.25
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	12.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.1	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	15.5	57.9	23.8	42.6	16.2	24.3	25.1	13.0	51.4	35.8
Average Queue (m)	4.3	27.5	9.6	19.8	3.8	13.2	9.1	3.5	26.6	12.0
95th Queue (m)	12.2	46.8	21.1	37.3	12.4	21.8	20.4	11.1	44.2	27.0
Link Distance (m)		509.5		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		0			0	0			7	
Queuing Penalty (veh)		0			0	0			1	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.7	8.3
Average Queue (m)	0.9	0.7
95th Queue (m)	5.3	4.9
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB
Directions Served	LR
Maximum Queue (m)	10.2
Average Queue (m)	2.7
95th Queue (m)	9.4
Link Distance (m)	144.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

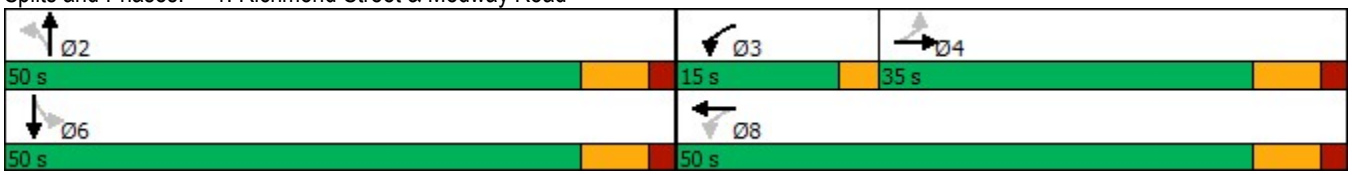
Network wide Queuing Penalty: 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	309	34	77	366	31	32	544	76	28	531	40
Future Volume (vph)	22	309	34	77	366	31	32	544	76	28	531	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00	1.00			1.00	
Frt		0.985			0.988			0.982			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1822	0	1687	1817	0	1805	3480	0	1805	3524	0
Flt Permitted	0.520			0.344			0.400			0.366		
Satd. Flow (perm)	941	1822	0	611	1817	0	759	3480	0	695	3524	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			5			19			10	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		523.5			110.0			243.9			157.5	
Travel Time (s)		31.4			7.9			14.6			9.5	
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	3%	0%	7%	3%	7%	0%	1%	6%	0%	1%	3%
Adj. Flow (vph)	23	322	35	80	381	32	33	567	79	29	553	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	357	0	80	413	0	33	646	0	29	595	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	18.3	18.3		30.6	26.5		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.28	0.28		0.46	0.40		0.38	0.38		0.38	0.38	
v/c Ratio	0.09	0.71		0.20	0.57		0.11	0.48		0.11	0.44	
Control Delay	19.1	30.2		10.3	17.9		18.0	18.2		18.1	18.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.1	30.2		10.3	17.9		18.0	18.2		18.1	18.0	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		29.5			16.6			18.2			18.0	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 66.4			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 73.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	7	7	700	691	9
Future Volume (vph)	7	7	7	700	691	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.932				0.998	
Flt Protected	0.976			0.999		
Satd. Flow (prot)	1728	0	0	3536	3533	0
Flt Permitted	0.976			0.999		
Satd. Flow (perm)	1728	0	0	3536	3533	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%
Adj. Flow (vph)	8	8	8	761	751	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	769	761	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	7	7	700	691	9
Future Volume (Veh/h)	7	7	7	700	691	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	8	761	751	10
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.94	0.94	0.94			
vC, conflicting volume	1154	382	762			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1037	217	621			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	214	746	911			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	262	507	501	260
Volume Left	8	8	0	0	0
Volume Right	8	0	0	0	10
cSH	333	911	1700	1700	1700
Volume to Capacity	0.05	0.01	0.30	0.29	0.15
Queue Length 95th (m)	1.2	0.2	0.0	0.0	0.0
Control Delay (s)	16.3	0.4	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.3	0.1		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	13	687	18	5	675
Future Volume (vph)	20	13	687	18	5	675
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.946		0.996			
Flt Protected	0.971					
Satd. Flow (prot)	1745	0	3461	0	0	3540
Flt Permitted	0.971					
Satd. Flow (perm)	1745	0	3461	0	0	3540
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	4%	0%	0%	2%
Adj. Flow (vph)	21	14	731	19	5	718
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	750	0	0	723
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	20	13	687	18	5	675
Future Volume (Veh/h)	20	13	687	18	5	675
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	14	731	19	5	718
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.91					
vC, conflicting volume	1112	377			752	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	915	377			752	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	98			99	
cM capacity (veh/h)	248	625			865	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	487	263	244	479
Volume Left	21	0	0	5	0
Volume Right	14	0	19	0	0
cSH	327	1700	1700	865	1700
Volume to Capacity	0.11	0.29	0.15	0.01	0.28
Queue Length 95th (m)	2.9	0.0	0.0	0.1	0.0
Control Delay (s)	17.3	0.0	0.0	0.2	0.0
Lane LOS	C			A	
Approach Delay (s)	17.3	0.0		0.1	
Approach LOS	C				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	20.5	73.7	40.5	89.3	15.5	49.1	52.9	14.3	57.2	48.9
Average Queue (m)	4.8	39.8	13.2	42.6	6.6	28.4	28.6	6.0	34.5	20.2
95th Queue (m)	14.3	62.8	28.7	72.7	15.0	44.2	46.1	14.1	52.0	39.2
Link Distance (m)		509.5		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)				0						
Queuing Penalty (veh)				0						
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		2		1		10			15	
Queuing Penalty (veh)		1		0		3			4	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB	NB
Directions Served	LR	LT	T
Maximum Queue (m)	13.9	18.4	2.9
Average Queue (m)	3.6	1.3	0.1
95th Queue (m)	11.5	8.1	2.1
Link Distance (m)	86.4	182.5	182.5
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	16.7	10.6
Average Queue (m)	6.7	0.6
95th Queue (m)	15.0	5.5
Link Distance (m)	144.6	226.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 8

Appendix G

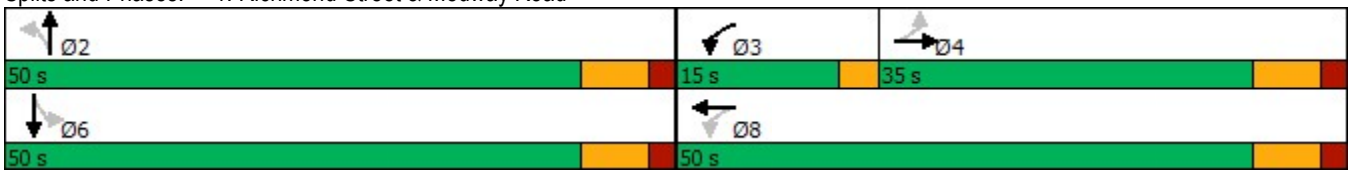
Future Total Detailed Capacity Analyses

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	277	144	50	171	9	35	176	39	19	407	49
Future Volume (vph)	70	277	144	50	171	9	35	176	39	19	407	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor					1.00			1.00			1.00	
Frt		0.949			0.993			0.973			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1746	0	1687	1707	0	1687	3425	0	1805	3513	0
Flt Permitted	0.639			0.290			0.475			0.611		
Satd. Flow (perm)	1156	1746	0	515	1707	0	843	3425	0	1161	3513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			3			33			16	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		232.9			110.0			243.9			157.5	
Travel Time (s)		14.0			7.9			14.6			9.5	
Confl. Bikes (#/hr)						1			1			1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	0%	7%	11%	0%	7%	2%	3%	0%	1%	0%
Adj. Flow (vph)	74	292	152	53	180	9	37	185	41	20	428	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	444	0	53	189	0	37	226	0	20	480	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	23.3	23.3		33.1	28.9		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.34	0.34		0.48	0.42		0.37	0.37		0.37	0.37	
v/c Ratio	0.19	0.73		0.14	0.26		0.12	0.18		0.05	0.37	
Control Delay	18.5	27.5		9.4	12.8		19.4	15.1		18.4	18.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.5	27.5		9.4	12.8		19.4	15.1		18.4	18.2	
LOS	B	C		A	B		B	B		B	B	
Approach Delay		26.2			12.1			15.7			18.2	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 68.9			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 19.5		Intersection LOS: B	
Intersection Capacity Utilization 73.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	7	265	615	3
Future Volume (vph)	1	3	7	265	615	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.899				0.999	
Flt Protected	0.988			0.999		
Satd. Flow (prot)	1688	0	0	3525	3536	0
Flt Permitted	0.988			0.999		
Satd. Flow (perm)	1688	0	0	3525	3536	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	15%	2%	2%	0%
Adj. Flow (vph)	1	3	7	279	647	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	0	286	650	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	3	7	265	615	3
Future Volume (Veh/h)	1	3	7	265	615	3
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)	1	3	7	279	647	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	802	325	650			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	774	291	620			
tC, single (s)	6.8	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	332	702	862			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	100	186	431	219
Volume Left	1	7	0	0	0
Volume Right	3	0	0	0	3
cSH	549	862	1700	1700	1700
Volume to Capacity	0.01	0.01	0.11	0.25	0.13
Queue Length 95th (m)	0.2	0.2	0.0	0.0	0.0
Control Delay (s)	11.6	0.7	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.6	0.3		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

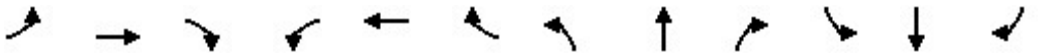
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	1	255	10	0	609
Future Volume (vph)	9	1	255	10	0	609
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.988		0.994			
Flt Protected	0.957					
Satd. Flow (prot)	1796	0	3521	0	0	3574
Flt Permitted	0.957					
Satd. Flow (perm)	1796	0	3521	0	0	3574
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)		1		1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	10	1	271	11	0	648
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	282	0	0	648
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	1	255	10	0	609
Future Volume (Veh/h)	9	1	255	10	0	609
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	1	271	11	0	648
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.94					
vC, conflicting volume	602	142			283	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	458	142			283	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	506	885			1290	

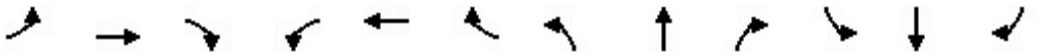
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	11	181	101	216	432
Volume Left	10	0	0	0	0
Volume Right	1	0	11	0	0
cSH	526	1700	1700	1290	1700
Volume to Capacity	0.02	0.11	0.06	0.00	0.25
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.0	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	26.8%	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)	4	292	8	46	191	19	13	0	134	64	0	9
Future Volume (vph)	4	292	8	46	191	19	13	0	134	64	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	55.0			55.0			7.5			7.5		
Lane Util. 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
Frt		0.996			0.986			0.877			0.984	
Flt Protected	0.950			0.950				0.996			0.958	
Satd. Flow (prot)	1805	1821	0	1805	1761	0	0	1660	0	0	1791	0
Flt Permitted	0.950			0.950				0.996			0.958	
Satd. Flow (perm)	1805	1821	0	1805	1761	0	0	1660	0	0	1791	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		221.1			232.9			82.5			105.4	
Travel Time (s)		13.3			14.0			5.9			7.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	4%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	5	336	9	53	220	22	15	0	154	74	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	345	0	53	242	0	0	169	0	0	84	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

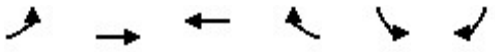
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	292	8	46	191	19	13	0	134	64	0	9
Future Volume (Veh/h)	4	292	8	46	191	19	13	0	134	64	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	5	336	9	53	220	22	15	0	154	74	0	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					233							
pX, platoon unblocked												
vC, conflicting volume	242			345			686	698	340	837	692	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242			345			686	698	340	837	692	231
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			96	100	78	66	100	99
cM capacity (veh/h)	1336			1225			347	349	707	218	352	813

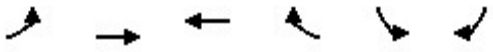
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	345	53	242	169	84
Volume Left	5	0	53	0	15	74
Volume Right	0	9	0	22	154	10
cSH	1336	1700	1225	1700	647	238
Volume to Capacity	0.00	0.20	0.04	0.14	0.26	0.35
Queue Length 95th (m)	0.1	0.0	1.1	0.0	8.3	12.1
Control Delay (s)	7.7	0.0	8.1	0.0	12.5	28.1
Lane LOS	A		A		B	D
Approach Delay (s)	0.1		1.5		12.5	28.1
Approach LOS					B	D

Intersection Summary				
Average Delay	5.5			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	280	206	7	23	9
Future Volume (vph)	4	280	206	7	23	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	55.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.996		0.962	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1805	1827	1772	0	1764	0
Flt Permitted	0.950				0.965	
Satd. Flow (perm)	1805	1827	1772	0	1764	0
Link Speed (k/h)		60	60		50	
Link Distance (m)		115.7	221.1		68.4	
Travel Time (s)		6.9	13.3		4.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	4%	7%	0%	0%	0%
Adj. Flow (vph)	5	322	237	8	26	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	322	245	0	36	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.7%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	280	206	7	23	9
Future Volume (Veh/h)	4	280	206	7	23	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	5	322	237	8	26	10
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	245				573	241
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	245				573	241
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				95	99
cM capacity (veh/h)	1333				483	803

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	322	245	36
Volume Left	5	0	0	26
Volume Right	0	0	8	10
cSH	1333	1700	1700	543
Volume to Capacity	0.00	0.19	0.14	0.07
Queue Length 95th (m)	0.1	0.0	0.0	1.7
Control Delay (s)	7.7	0.0	0.0	12.1
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	12.1
Approach LOS				B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	275	8	3	211	16	9
Future Volume (vph)	275	8	3	211	16	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			55.0		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996				0.952	
Flt Protected			0.950		0.969	
Satd. Flow (prot)	1822	0	1805	1776	1753	0
Flt Permitted			0.950		0.969	
Satd. Flow (perm)	1822	0	1805	1776	1753	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	130.8			115.7	84.2	
Travel Time (s)	7.8			6.9	6.1	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	4%	0%	0%	7%	0%	0%
Adj. Flow (vph)	316	9	3	243	18	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	325	0	3	243	28	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	275	8	3	211	16	9
Future Volume (Veh/h)	275	8	3	211	16	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	316	9	3	243	18	10
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			325		570	320
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			325		570	320
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	99
cM capacity (veh/h)			1246		485	725

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	325	3	243	28
Volume Left	0	3	0	18
Volume Right	9	0	0	10
cSH	1700	1246	1700	550
Volume to Capacity	0.19	0.00	0.14	0.05
Queue Length 95th (m)	0.0	0.1	0.0	1.3
Control Delay (s)	0.0	7.9	0.0	11.9
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		11.9
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	29.4	89.9	24.2	51.5	19.7	27.8	28.8	15.8	51.5	41.3
Average Queue (m)	11.3	43.5	9.4	20.8	7.0	12.3	10.0	3.5	27.5	13.5
95th Queue (m)	22.7	70.4	20.5	40.2	16.9	23.1	20.8	11.6	43.1	29.2
Link Distance (m)		210.6		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		3			0	0		0	8	
Queuing Penalty (veh)		2			0	0		0	2	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.8	7.9
Average Queue (m)	1.0	0.5
95th Queue (m)	5.4	4.2
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB
Directions Served	LR
Maximum Queue (m)	9.1
Average Queue (m)	2.3
95th Queue (m)	8.7
Link Distance (m)	144.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Proposed Street 'C'/Private Lane & Medway Road

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	3.4	13.0	24.6	18.8
Average Queue (m)	0.2	3.4	11.8	9.2
95th Queue (m)	2.0	10.7	19.3	16.6
Link Distance (m)			72.2	95.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	15.0	30.0		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Medway Road & Private Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (m)	1.8	14.4
Average Queue (m)	0.1	6.4
95th Queue (m)	1.7	13.5
Link Distance (m)		58.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Proposed Street 'B' & Medway Road

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	3.4	9.2
Average Queue (m)	0.2	4.4
95th Queue (m)	2.2	11.8
Link Distance (m)		73.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

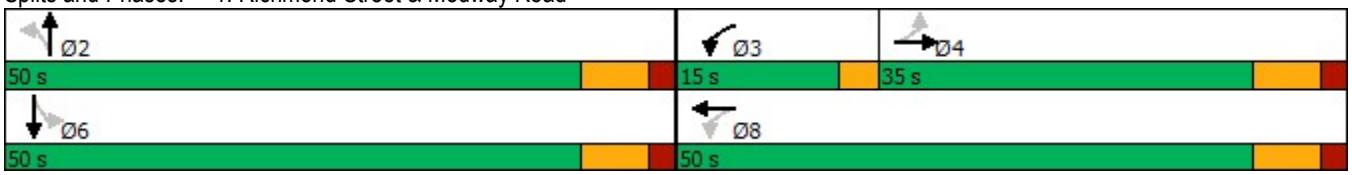
Network wide Queuing Penalty: 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	349	84	77	438	31	112	447	76	28	436	110
Future Volume (vph)	66	349	84	77	438	31	112	447	76	28	436	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00	1.00			1.00	
Frt		0.971			0.990			0.978			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1801	0	1687	1822	0	1805	3460	0	1805	3437	0
Flt Permitted	0.486			0.267			0.401			0.419		
Satd. Flow (perm)	879	1801	0	474	1822	0	761	3460	0	796	3437	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			4			24			39	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		232.9			110.0			243.9			157.5	
Travel Time (s)		14.0			7.9			14.6			9.5	
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	3%	0%	7%	3%	7%	0%	1%	6%	0%	1%	3%
Adj. Flow (vph)	69	364	88	80	456	32	117	466	79	29	454	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	452	0	80	488	0	117	545	0	29	569	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	23.5	23.5		35.9	31.7		26.1	26.1		26.1	26.1	
Actuated g/C Ratio	0.33	0.33		0.50	0.44		0.36	0.36		0.36	0.36	
v/c Ratio	0.24	0.76		0.22	0.61		0.43	0.43		0.10	0.45	
Control Delay	21.4	31.5		10.5	18.5		26.6	19.6		19.6	19.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.4	31.5		10.5	18.5		26.6	19.6		19.6	19.3	
LOS	C	C		B	B		C	B		B	B	
Approach Delay		30.2			17.4			20.8			19.3	
Approach LOS		C			B			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 72.3			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 95.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	7	7	655	617	9
Future Volume (vph)	7	7	7	655	617	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.932				0.998	
Flt Protected	0.976			0.999		
Satd. Flow (prot)	1728	0	0	3536	3533	0
Flt Permitted	0.976			0.999		
Satd. Flow (perm)	1728	0	0	3536	3533	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%
Adj. Flow (vph)	8	8	8	712	671	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	720	681	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	7	7	655	617	9
Future Volume (Veh/h)	7	7	7	655	617	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	8	712	671	10
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	1049	342	682			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1013	293	640			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	232	696	936			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	245	475	447	234
Volume Left	8	8	0	0	0
Volume Right	8	0	0	0	10
cSH	348	936	1700	1700	1700
Volume to Capacity	0.05	0.01	0.28	0.26	0.14
Queue Length 95th (m)	1.2	0.2	0.0	0.0	0.0
Control Delay (s)	15.8	0.4	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	15.8	0.1		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

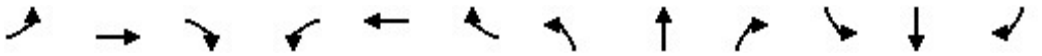
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	13	644	18	5	604
Future Volume (vph)	20	13	644	18	5	604
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.946		0.996			
Flt Protected	0.971					
Satd. Flow (prot)	1745	0	3461	0	0	3540
Flt Permitted	0.971					
Satd. Flow (perm)	1745	0	3461	0	0	3540
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	4%	0%	0%	2%
Adj. Flow (vph)	21	14	685	19	5	643
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	704	0	0	648
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	20	13	644	18	5	604
Future Volume (Veh/h)	20	13	644	18	5	604
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	14	685	19	5	643
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.94					
vC, conflicting volume	1028	354			706	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	891	354			706	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	98			99	
cM capacity (veh/h)	265	647			900	

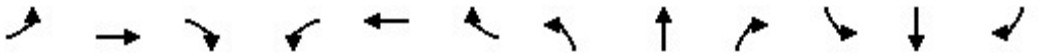
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	457	247	219	429
Volume Left	21	0	0	5	0
Volume Right	14	0	19	0	0
cSH	347	1700	1700	900	1700
Volume to Capacity	0.10	0.27	0.15	0.01	0.25
Queue Length 95th (m)	2.7	0.0	0.0	0.1	0.0
Control Delay (s)	16.5	0.0	0.0	0.3	0.0
Lane LOS	C			A	
Approach Delay (s)	16.5	0.0		0.1	
Approach LOS	C				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	30.2%	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)	9	382	17	138	466	54	14	0	85	33	0	7
Future Volume (vph)	9	382	17	138	466	54	14	0	85	33	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	55.0			55.0			7.5			7.5		
Lane Util. 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
Frt		0.993			0.984			0.884			0.977	
Flt Protected	0.950			0.950				0.993			0.960	
Satd. Flow (prot)	1805	1834	0	1805	1837	0	0	1668	0	0	1782	0
Flt Permitted	0.950			0.950				0.993			0.960	
Satd. Flow (perm)	1805	1834	0	1805	1837	0	0	1668	0	0	1782	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		221.1			232.9			82.5			105.4	
Travel Time (s)		15.9			16.8			5.9			7.6	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	394	18	142	480	56	14	0	88	34	0	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	412	0	142	536	0	0	102	0	0	41	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control		Free			Free			Stop			Stop	

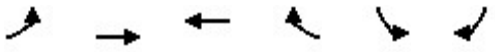
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 50.1%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	382	17	138	466	54	14	0	85	33	0	7
Future Volume (Veh/h)	9	382	17	138	466	54	14	0	85	33	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	9	394	18	142	480	56	14	0	88	34	0	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					233							
pX, platoon unblocked	0.88						0.88	0.88		0.88	0.88	0.88
vC, conflicting volume	536			412			1192	1241	403	1292	1222	508
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	399			412			1148	1204	403	1262	1183	367
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			88			90	100	86	66	100	99
cM capacity (veh/h)	1025			1158			138	141	652	101	146	598

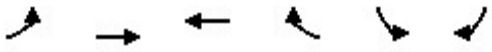
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	412	142	536	102	41
Volume Left	9	0	142	0	14	34
Volume Right	0	18	0	56	88	7
cSH	1025	1700	1158	1700	432	118
Volume to Capacity	0.01	0.24	0.12	0.32	0.24	0.35
Queue Length 95th (m)	0.2	0.0	3.3	0.0	7.3	11.2
Control Delay (s)	8.5	0.0	8.5	0.0	15.9	51.1
Lane LOS	A		A		C	F
Approach Delay (s)	0.2		1.8		15.9	51.1
Approach LOS					C	F

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	50.1%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	396	467	20	12	7
Future Volume (vph)	10	396	467	20	12	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	55.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.994		0.950	
Flt Protected	0.950				0.969	
Satd. Flow (prot)	1805	1845	1853	0	1749	0
Flt Permitted	0.950				0.969	
Satd. Flow (perm)	1805	1845	1853	0	1749	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		115.7	221.1		68.4	
Travel Time (s)		8.3	15.9		4.9	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	3%	2%	0%	0%	0%
Adj. Flow (vph)	10	408	481	21	12	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	408	502	0	19	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	396	467	20	12	7
Future Volume (Veh/h)	10	396	467	20	12	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	408	481	21	12	7
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	502				920	492
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	502				920	492
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				96	99
cM capacity (veh/h)	1073				301	581

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	10	408	502	19
Volume Left	10	0	0	12
Volume Right	0	0	21	7
cSH	1073	1700	1700	366
Volume to Capacity	0.01	0.24	0.30	0.05
Queue Length 95th (m)	0.2	0.0	0.0	1.3
Control Delay (s)	8.4	0.0	0.0	15.4
Lane LOS	A			C
Approach Delay (s)	0.2		0.0	15.4
Approach LOS				C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	400	21	9	465	16	6
Future Volume (vph)	400	21	9	465	16	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			55.0		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.963	
Flt Protected			0.950		0.965	
Satd. Flow (prot)	1834	0	1805	1863	1766	0
Flt Permitted			0.950		0.965	
Satd. Flow (perm)	1834	0	1805	1863	1766	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	130.8			115.7	84.2	
Travel Time (s)	9.4			8.3	6.1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	0%	0%	2%	0%	0%
Adj. Flow (vph)	412	22	9	479	16	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	434	0	9	479	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		100	100		100	100
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	400	21	9	465	16	6
Future Volume (Veh/h)	400	21	9	465	16	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	412	22	9	479	16	6
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			434		920	423
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			434		920	423
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		95	99
cM capacity (veh/h)			1136		301	635

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	434	9	479	22
Volume Left	0	9	0	16
Volume Right	22	0	0	6
cSH	1700	1136	1700	351
Volume to Capacity	0.26	0.01	0.28	0.06
Queue Length 95th (m)	0.0	0.2	0.0	1.6
Control Delay (s)	0.0	8.2	0.0	15.9
Lane LOS		A		C
Approach Delay (s)	0.0	0.2		15.9
Approach LOS				C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	31.2	103.7	73.6	101.0	41.4	48.6	47.9	16.9	56.5	60.1
Average Queue (m)	13.9	53.7	15.9	53.9	19.7	25.4	25.9	5.4	31.9	21.8
95th Queue (m)	27.1	90.4	42.9	87.7	35.6	40.4	44.0	14.2	50.1	43.3
Link Distance (m)		210.6		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)			0	1						
Queuing Penalty (veh)			0	0						
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		10		2	5	7		0	13	
Queuing Penalty (veh)		6		2	12	7		0	4	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	10.3	8.0
Average Queue (m)	3.5	0.4
95th Queue (m)	10.7	3.9
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	15.5	8.7
Average Queue (m)	5.9	0.6
95th Queue (m)	14.0	4.1
Link Distance (m)	144.6	226.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Proposed Street 'C'/Private Lane & Medway Road

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	10.4	18.6	19.9	23.2
Average Queue (m)	1.2	7.4	10.3	8.7
95th Queue (m)	6.5	16.5	16.5	17.8
Link Distance (m)			72.2	95.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	15.0	30.0		
Storage Blk Time (%)	0	0		
Queuing Penalty (veh)	0	0		

Intersection: 5: Medway Road & Private Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (m)	10.4	10.1
Average Queue (m)	1.0	3.7
95th Queue (m)	5.9	10.9
Link Distance (m)		58.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 6: Proposed Street 'B' & Medway Road

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	9.3	13.0
Average Queue (m)	0.9	5.5
95th Queue (m)	5.5	13.2
Link Distance (m)		73.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Network Summary

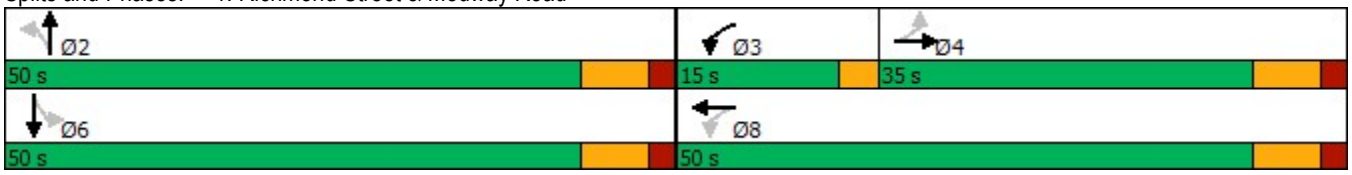
Network wide Queuing Penalty: 31

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	277	144	50	171	9	35	194	39	19	449	49
Future Volume (vph)	70	277	144	50	171	9	35	194	39	19	449	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor					1.00			1.00			1.00	
Frt		0.949			0.993			0.975			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1746	0	1687	1707	0	1687	3433	0	1805	3517	0
Flt Permitted	0.639			0.290			0.440			0.600		
Satd. Flow (perm)	1156	1746	0	515	1707	0	781	3433	0	1140	3517	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			3			29			15	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		232.9			110.0			243.9			157.5	
Travel Time (s)		14.0			7.9			14.6			9.5	
Confl. Bikes (#/hr)						1			1			1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	0%	7%	11%	0%	7%	2%	3%	0%	1%	0%
Adj. Flow (vph)	74	292	152	53	180	9	37	204	41	20	473	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	444	0	53	189	0	37	245	0	20	525	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	23.3	23.3		33.1	28.9		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.34	0.34		0.48	0.42		0.37	0.37		0.37	0.37	
v/c Ratio	0.19	0.73		0.14	0.26		0.13	0.19		0.05	0.40	
Control Delay	18.5	27.5		9.4	12.8		19.7	15.6		18.4	18.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.5	27.5		9.4	12.8		19.7	15.6		18.4	18.6	
LOS	B	C		A	B		B	B		B	B	
Approach Delay		26.2			12.1			16.1			18.6	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 68.9			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 19.7		Intersection LOS: B	
Intersection Capacity Utilization 73.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	7	290	666	3
Future Volume (vph)	1	3	7	290	666	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.899				0.999	
Flt Protected	0.988			0.999		
Satd. Flow (prot)	1688	0	0	3526	3536	0
Flt Permitted	0.988			0.999		
Satd. Flow (perm)	1688	0	0	3526	3536	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	15%	2%	2%	0%
Adj. Flow (vph)	1	3	7	305	701	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	0	312	704	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	3	7	290	666	3
Future Volume (Veh/h)	1	3	7	290	666	3
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)	1	3	7	305	701	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	869	352	704			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796	261	625			
tC, single (s)	6.8	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	315	719	840			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	109	203	467	237
Volume Left	1	7	0	0	0
Volume Right	3	0	0	0	3
cSH	544	840	1700	1700	1700
Volume to Capacity	0.01	0.01	0.12	0.27	0.14
Queue Length 95th (m)	0.2	0.2	0.0	0.0	0.0
Control Delay (s)	11.7	0.7	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.7	0.2		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

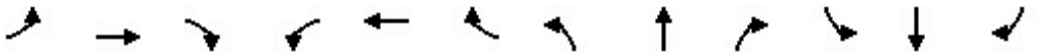
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	1	279	10	0	660
Future Volume (vph)	9	1	279	10	0	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.988		0.995			
Flt Protected	0.957					
Satd. Flow (prot)	1796	0	3524	0	0	3574
Flt Permitted	0.957					
Satd. Flow (perm)	1796	0	3524	0	0	3574
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)		1		1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	10	1	297	11	0	702
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	308	0	0	702
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	1	279	10	0	660
Future Volume (Veh/h)	9	1	279	10	0	660
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	1	297	11	0	702
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.93					
vC, conflicting volume	654	155			309	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	471	155			309	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	488	869			1262	

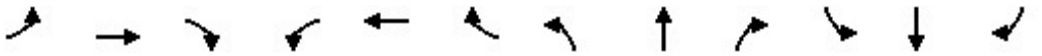
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	11	198	110	234	468
Volume Left	10	0	0	0	0
Volume Right	1	0	11	0	0
cSH	508	1700	1700	1262	1700
Volume to Capacity	0.02	0.12	0.06	0.00	0.28
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	12.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.2	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	28.2%	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)	4	292	8	46	191	19	13	0	134	64	0	9
Future Volume (vph)	4	292	8	46	191	19	13	0	134	64	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	55.0			55.0			7.5			7.5		
Lane Util. 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
Frt		0.996			0.986			0.877			0.984	
Flt Protected	0.950			0.950				0.996			0.958	
Satd. Flow (prot)	1805	1821	0	1805	1761	0	0	1660	0	0	1791	0
Flt Permitted	0.950			0.950				0.996			0.958	
Satd. Flow (perm)	1805	1821	0	1805	1761	0	0	1660	0	0	1791	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		221.1			232.9			82.5			105.4	
Travel Time (s)		13.3			14.0			5.9			7.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	4%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	5	336	9	53	220	22	15	0	154	74	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	345	0	53	242	0	0	169	0	0	84	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

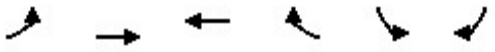
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	292	8	46	191	19	13	0	134	64	0	9
Future Volume (Veh/h)	4	292	8	46	191	19	13	0	134	64	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	5	336	9	53	220	22	15	0	154	74	0	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					233							
pX, platoon unblocked												
vC, conflicting volume	242			345			686	698	340	837	692	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242			345			686	698	340	837	692	231
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			96	100	78	66	100	99
cM capacity (veh/h)	1336			1225			347	349	707	218	352	813

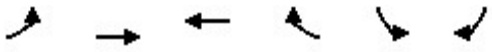
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	345	53	242	169	84
Volume Left	5	0	53	0	15	74
Volume Right	0	9	0	22	154	10
cSH	1336	1700	1225	1700	647	238
Volume to Capacity	0.00	0.20	0.04	0.14	0.26	0.35
Queue Length 95th (m)	0.1	0.0	1.1	0.0	8.3	12.1
Control Delay (s)	7.7	0.0	8.1	0.0	12.5	28.1
Lane LOS	A		A		B	D
Approach Delay (s)	0.1		1.5		12.5	28.1
Approach LOS					B	D

Intersection Summary				
Average Delay	5.5			
Intersection Capacity Utilization	45.6%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	280	206	7	23	9
Future Volume (vph)	4	280	206	7	23	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	55.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.996		0.962	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1805	1827	1772	0	1764	0
Flt Permitted	0.950				0.965	
Satd. Flow (perm)	1805	1827	1772	0	1764	0
Link Speed (k/h)		60	60		50	
Link Distance (m)		115.7	221.1		68.4	
Travel Time (s)		6.9	13.3		4.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	4%	7%	0%	0%	0%
Adj. Flow (vph)	5	322	237	8	26	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	322	245	0	36	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.7%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	280	206	7	23	9
Future Volume (Veh/h)	4	280	206	7	23	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	5	322	237	8	26	10
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	245				573	241
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	245				573	241
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				95	99
cM capacity (veh/h)	1333				483	803

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	322	245	36
Volume Left	5	0	0	26
Volume Right	0	0	8	10
cSH	1333	1700	1700	543
Volume to Capacity	0.00	0.19	0.14	0.07
Queue Length 95th (m)	0.1	0.0	0.0	1.7
Control Delay (s)	7.7	0.0	0.0	12.1
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	12.1
Approach LOS				B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	275	8	3	211	16	9
Future Volume (vph)	275	8	3	211	16	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			55.0		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996				0.952	
Flt Protected			0.950		0.969	
Satd. Flow (prot)	1822	0	1805	1776	1753	0
Flt Permitted			0.950		0.969	
Satd. Flow (perm)	1822	0	1805	1776	1753	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	130.8			115.7	84.2	
Travel Time (s)	7.8			6.9	6.1	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	4%	0%	0%	7%	0%	0%
Adj. Flow (vph)	316	9	3	243	18	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	325	0	3	243	28	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	275	8	3	211	16	9
Future Volume (Veh/h)	275	8	3	211	16	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	316	9	3	243	18	10
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			325		570	320
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			325		570	320
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	99
cM capacity (veh/h)			1246		485	725

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	325	3	243	28
Volume Left	0	3	0	18
Volume Right	9	0	0	10
cSH	1700	1246	1700	550
Volume to Capacity	0.19	0.00	0.14	0.05
Queue Length 95th (m)	0.0	0.1	0.0	1.3
Control Delay (s)	0.0	7.9	0.0	11.9
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		11.9
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	29.3	91.4	26.6	43.5	21.1	27.3	31.4	14.3	50.0	43.1
Average Queue (m)	11.2	45.1	9.9	21.5	7.3	14.3	10.4	4.1	30.4	15.6
95th Queue (m)	22.2	72.5	20.1	38.5	17.8	25.0	22.7	12.1	47.4	32.5
Link Distance (m)		210.6		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		4			0	1		0	12	
Queuing Penalty (veh)		3			0	0		0	2	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.8	6.9
Average Queue (m)	0.8	0.6
95th Queue (m)	5.0	4.0
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB
Directions Served	LR
Maximum Queue (m)	9.1
Average Queue (m)	2.4
95th Queue (m)	8.9
Link Distance (m)	144.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Proposed Street 'C'/Private Lane & Medway Road

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	3.3	15.6	26.7	18.8
Average Queue (m)	0.1	3.4	12.9	9.1
95th Queue (m)	1.7	11.6	21.4	15.7
Link Distance (m)			72.2	95.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	15.0	30.0		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Medway Road & Private Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (m)	5.2	13.0
Average Queue (m)	0.2	6.0
95th Queue (m)	2.2	13.1
Link Distance (m)		58.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Proposed Street 'B' & Medway Road

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	5.4	9.2
Average Queue (m)	0.3	4.8
95th Queue (m)	2.8	12.0
Link Distance (m)		73.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

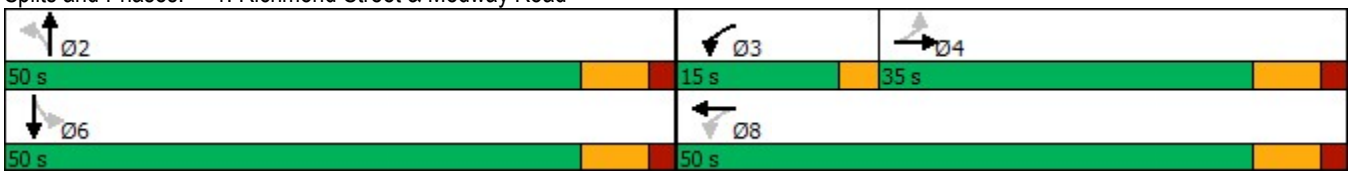
Network wide Queuing Penalty: 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	349	84	77	438	31	112	493	76	28	481	110
Future Volume (vph)	66	349	84	77	438	31	112	493	76	28	481	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00	1.00			1.00	
Frt		0.971			0.990			0.980			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1801	0	1687	1822	0	1805	3470	0	1805	3447	0
Flt Permitted	0.486			0.264			0.369			0.384		
Satd. Flow (perm)	879	1801	0	469	1822	0	701	3470	0	730	3447	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			4			21			35	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		232.9			110.0			243.9			157.5	
Travel Time (s)		14.0			7.9			14.6			9.5	
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	3%	0%	7%	3%	7%	0%	1%	6%	0%	1%	3%
Adj. Flow (vph)	69	364	88	80	456	32	117	514	79	29	501	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	452	0	80	488	0	117	593	0	29	616	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	23.5	23.5		35.9	31.7		26.5	26.5		26.5	26.5	
Actuated g/C Ratio	0.32	0.32		0.49	0.44		0.36	0.36		0.36	0.36	
v/c Ratio	0.24	0.77		0.22	0.61		0.46	0.46		0.11	0.48	
Control Delay	22.0	32.3		10.8	19.0		27.9	20.0		19.6	19.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.0	32.3		10.8	19.0		27.9	20.0		19.6	19.8	
LOS	C	C		B	B		C	C		B	B	
Approach Delay		31.0			17.8			21.3			19.8	
Approach LOS		C			B			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 72.8			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 22.1		Intersection LOS: C	
Intersection Capacity Utilization 95.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	7	7	714	676	9
Future Volume (vph)	7	7	7	714	676	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.932				0.998	
Flt Protected	0.976			0.999		
Satd. Flow (prot)	1728	0	0	3536	3533	0
Flt Permitted	0.976			0.999		
Satd. Flow (perm)	1728	0	0	3536	3533	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%
Adj. Flow (vph)	8	8	8	776	735	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	784	745	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	7	7	714	676	9
Future Volume (Veh/h)	7	7	7	714	676	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	8	776	735	10
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	1145	374	746			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1062	257	646			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	210	716	908			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	267	517	490	255
Volume Left	8	8	0	0	0
Volume Right	8	0	0	0	10
cSH	325	908	1700	1700	1700
Volume to Capacity	0.05	0.01	0.30	0.29	0.15
Queue Length 95th (m)	1.2	0.2	0.0	0.0	0.0
Control Delay (s)	16.6	0.4	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.6	0.1		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	13	702	18	5	661
Future Volume (vph)	20	13	702	18	5	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.946		0.996			
Flt Protected	0.971					
Satd. Flow (prot)	1745	0	3461	0	0	3540
Flt Permitted	0.971					
Satd. Flow (perm)	1745	0	3461	0	0	3540
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	4%	0%	0%	2%
Adj. Flow (vph)	21	14	747	19	5	703
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	766	0	0	708
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.8%		ICU Level of Service A	
Analysis Period (min) 15			

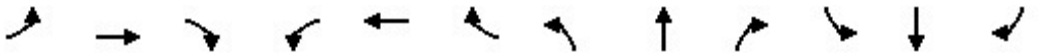
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	20	13	702	18	5	661
Future Volume (Veh/h)	20	13	702	18	5	661
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	14	747	19	5	703
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.92					
vC, conflicting volume	1120	385			768	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	947	385			768	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	98			99	
cM capacity (veh/h)	239	618			854	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	498	268	239	469
Volume Left	21	0	0	5	0
Volume Right	14	0	19	0	0
cSH	317	1700	1700	854	1700
Volume to Capacity	0.11	0.29	0.16	0.01	0.28
Queue Length 95th (m)	3.0	0.0	0.0	0.1	0.0
Control Delay (s)	17.8	0.0	0.0	0.3	0.0
Lane LOS	C			A	
Approach Delay (s)	17.8	0.0		0.1	
Approach LOS	C				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	31.8%	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)	9	382	17	138	466	54	14	0	85	33	0	7
Future Volume (vph)	9	382	17	138	466	54	14	0	85	33	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	55.0			55.0			7.5			7.5		
Lane Util. 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
Frt		0.993			0.984			0.884			0.977	
Flt Protected	0.950			0.950				0.993			0.960	
Satd. Flow (prot)	1805	1834	0	1805	1837	0	0	1668	0	0	1782	0
Flt Permitted	0.950			0.950				0.993			0.960	
Satd. Flow (perm)	1805	1834	0	1805	1837	0	0	1668	0	0	1782	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		221.1			232.9			82.5			105.4	
Travel Time (s)		15.9			16.8			5.9			7.6	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	394	18	142	480	56	14	0	88	34	0	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	412	0	142	536	0	0	102	0	0	41	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control		Free			Free			Stop			Stop	

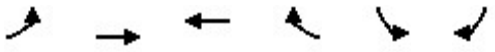
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 50.1%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	382	17	138	466	54	14	0	85	33	0	7
Future Volume (Veh/h)	9	382	17	138	466	54	14	0	85	33	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	9	394	18	142	480	56	14	0	88	34	0	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					233							
pX, platoon unblocked	0.87						0.87	0.87		0.87	0.87	0.87
vC, conflicting volume	536			412			1192	1241	403	1292	1222	508
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	398			412			1148	1204	403	1262	1182	365
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			88			90	100	86	66	100	99
cM capacity (veh/h)	1025			1158			138	141	652	101	145	598

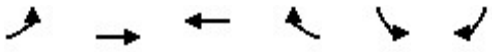
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	412	142	536	102	41
Volume Left	9	0	142	0	14	34
Volume Right	0	18	0	56	88	7
cSH	1025	1700	1158	1700	431	118
Volume to Capacity	0.01	0.24	0.12	0.32	0.24	0.35
Queue Length 95th (m)	0.2	0.0	3.3	0.0	7.3	11.2
Control Delay (s)	8.5	0.0	8.5	0.0	15.9	51.2
Lane LOS	A		A		C	F
Approach Delay (s)	0.2		1.8		15.9	51.2
Approach LOS					C	F

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	50.1%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	396	467	20	12	7
Future Volume (vph)	10	396	467	20	12	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	55.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.994		0.950	
Flt Protected	0.950				0.969	
Satd. Flow (prot)	1805	1845	1853	0	1749	0
Flt Permitted	0.950				0.969	
Satd. Flow (perm)	1805	1845	1853	0	1749	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		115.7	221.1		68.4	
Travel Time (s)		8.3	15.9		4.9	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	3%	2%	0%	0%	0%
Adj. Flow (vph)	10	408	481	21	12	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	408	502	0	19	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	396	467	20	12	7
Future Volume (Veh/h)	10	396	467	20	12	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	408	481	21	12	7
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	502				920	492
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	502				920	492
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				96	99
cM capacity (veh/h)	1073				301	581

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	10	408	502	19
Volume Left	10	0	0	12
Volume Right	0	0	21	7
cSH	1073	1700	1700	366
Volume to Capacity	0.01	0.24	0.30	0.05
Queue Length 95th (m)	0.2	0.0	0.0	1.3
Control Delay (s)	8.4	0.0	0.0	15.4
Lane LOS	A			C
Approach Delay (s)	0.2		0.0	15.4
Approach LOS				C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	400	21	9	465	16	6
Future Volume (vph)	400	21	9	465	16	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			55.0		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.963	
Flt Protected			0.950		0.965	
Satd. Flow (prot)	1834	0	1805	1863	1766	0
Flt Permitted			0.950		0.965	
Satd. Flow (perm)	1834	0	1805	1863	1766	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	130.8			115.7	84.2	
Travel Time (s)	9.4			8.3	6.1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	0%	0%	2%	0%	0%
Adj. Flow (vph)	412	22	9	479	16	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	434	0	9	479	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		100	100		100	100
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	400	21	9	465	16	6
Future Volume (Veh/h)	400	21	9	465	16	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	412	22	9	479	16	6
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			434		920	423
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			434		920	423
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		95	99
cM capacity (veh/h)			1136		301	635

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	434	9	479	22
Volume Left	0	9	0	16
Volume Right	22	0	0	6
cSH	1700	1136	1700	351
Volume to Capacity	0.26	0.01	0.28	0.06
Queue Length 95th (m)	0.0	0.2	0.0	1.6
Control Delay (s)	0.0	8.2	0.0	15.9
Lane LOS		A		C
Approach Delay (s)	0.0	0.2		15.9
Approach LOS				C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	32.5	95.0	53.5	98.9	42.5	48.8	52.8	20.7	55.7	49.3
Average Queue (m)	14.0	53.0	13.9	51.8	17.6	28.5	29.3	6.6	34.5	23.9
95th Queue (m)	28.7	82.1	33.3	86.9	32.9	43.4	48.2	16.8	53.2	43.7
Link Distance (m)		210.6		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)			0	1						
Queuing Penalty (veh)			0	0						
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		8		2	4	10		0	16	
Queuing Penalty (veh)		5		1	11	11		0	5	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	11.9	13.9
Average Queue (m)	3.7	1.1
95th Queue (m)	11.1	6.9
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	15.5	15.2
Average Queue (m)	6.4	1.1
95th Queue (m)	14.3	7.3
Link Distance (m)	144.6	226.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Proposed Street 'C'/Private Lane & Medway Road

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	9.2	17.8	19.9	18.5
Average Queue (m)	1.1	8.0	10.9	8.0
95th Queue (m)	5.9	16.6	17.9	15.6
Link Distance (m)			72.2	95.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	15.0	30.0		
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Intersection: 5: Medway Road & Private Lane

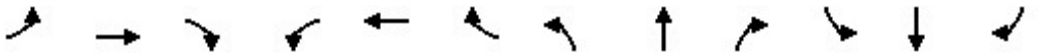
Movement	EB	SB
Directions Served	L	LR
Maximum Queue (m)	9.2	14.6
Average Queue (m)	0.9	4.0
95th Queue (m)	5.3	11.8
Link Distance (m)		58.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 6: Proposed Street 'B' & Medway Road

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	9.2	14.4
Average Queue (m)	0.7	4.7
95th Queue (m)	4.8	12.7
Link Distance (m)		73.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Network Summary

Network wide Queuing Penalty: 33

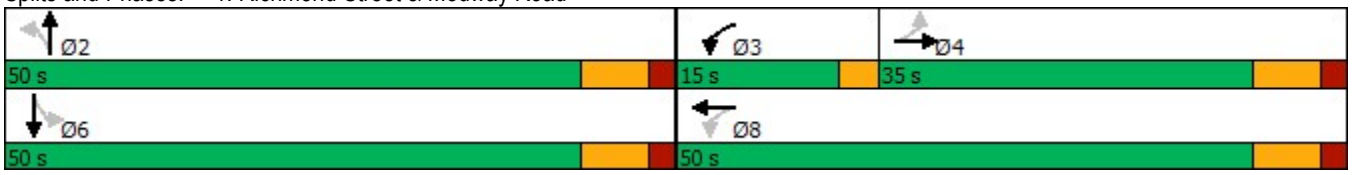


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	277	144	50	171	9	35	214	39	19	496	49
Future Volume (vph)	70	277	144	50	171	9	35	214	39	19	496	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor					1.00			1.00			1.00	
Frt		0.949			0.993			0.977			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1746	0	1687	1707	0	1687	3441	0	1805	3521	0
Flt Permitted	0.639			0.290			0.404			0.588		
Satd. Flow (perm)	1156	1746	0	515	1707	0	717	3441	0	1117	3521	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			3			26			13	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		232.9			110.0			243.9			157.5	
Travel Time (s)		14.0			7.9			14.6			9.5	
Confl. Bikes (#/hr)						1			1			1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	0%	7%	11%	0%	7%	2%	3%	0%	1%	0%
Adj. Flow (vph)	74	292	152	53	180	9	37	225	41	20	522	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	444	0	53	189	0	37	266	0	20	574	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	23.3	23.3		33.1	28.9		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.34	0.34		0.48	0.42		0.37	0.37		0.37	0.37	
v/c Ratio	0.19	0.73		0.14	0.26		0.14	0.21		0.05	0.44	
Control Delay	18.5	27.5		9.4	12.8		20.1	16.0		18.5	19.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.5	27.5		9.4	12.8		20.1	16.0		18.5	19.2	
LOS	B	C		A	B		C	B		B	B	
Approach Delay		26.2			12.1			16.5			19.1	
Approach LOS		C			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 68.9			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 73.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	7	318	724	3
Future Volume (vph)	1	3	7	318	724	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.899				0.999	
Flt Protected	0.988			0.999		
Satd. Flow (prot)	1688	0	0	3526	3536	0
Flt Permitted	0.988			0.999		
Satd. Flow (perm)	1688	0	0	3526	3536	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	15%	2%	2%	0%
Adj. Flow (vph)	1	3	7	335	762	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	0	342	765	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.1%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	3	7	318	724	3
Future Volume (Veh/h)	1	3	7	318	724	3
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)	1	3	7	335	762	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	945	382	765			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	826	231	636			
tC, single (s)	6.8	6.9	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	295	735	813			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	119	223	508	257
Volume Left	1	7	0	0	0
Volume Right	3	0	0	0	3
cSH	535	813	1700	1700	1700
Volume to Capacity	0.01	0.01	0.13	0.30	0.15
Queue Length 95th (m)	0.2	0.2	0.0	0.0	0.0
Control Delay (s)	11.8	0.6	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.8	0.2		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

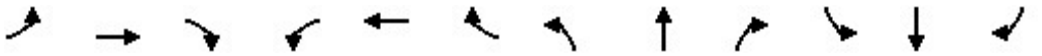
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	1	306	10	0	717
Future Volume (vph)	9	1	306	10	0	717
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.988		0.995			
Flt Protected	0.957					
Satd. Flow (prot)	1796	0	3524	0	0	3574
Flt Permitted	0.957					
Satd. Flow (perm)	1796	0	3524	0	0	3574
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)		1		1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	10	1	326	11	0	763
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	337	0	0	763
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	1	306	10	0	717
Future Volume (Veh/h)	9	1	306	10	0	717
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	1	326	11	0	763
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.91					
vC, conflicting volume	714	170			338	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	488	170			338	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	467	850			1231	

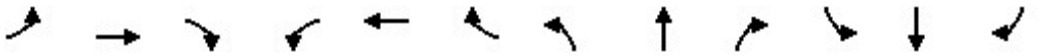
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	11	217	120	254	509
Volume Left	10	0	0	0	0
Volume Right	1	0	11	0	0
cSH	487	1700	1700	1231	1700
Volume to Capacity	0.02	0.13	0.07	0.00	0.30
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0
Control Delay (s)	12.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	29.8%	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)	4	292	8	46	191	19	13	0	134	64	0	9
Future Volume (vph)	4	292	8	46	191	19	13	0	134	64	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	55.0			55.0			7.5			7.5		
Lane Util. 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
Frt		0.996			0.986			0.877			0.984	
Flt Protected	0.950			0.950				0.996			0.958	
Satd. Flow (prot)	1805	1821	0	1805	1761	0	0	1660	0	0	1791	0
Flt Permitted	0.950			0.950				0.996			0.958	
Satd. Flow (perm)	1805	1821	0	1805	1761	0	0	1660	0	0	1791	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		221.1			232.9			82.5			105.4	
Travel Time (s)		13.3			14.0			5.9			7.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	4%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	5	336	9	53	220	22	15	0	154	74	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	345	0	53	242	0	0	169	0	0	84	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

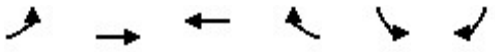
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	292	8	46	191	19	13	0	134	64	0	9
Future Volume (Veh/h)	4	292	8	46	191	19	13	0	134	64	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	5	336	9	53	220	22	15	0	154	74	0	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					233							
pX, platoon unblocked												
vC, conflicting volume	242			345			686	698	340	837	692	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242			345			686	698	340	837	692	231
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			96	100	78	66	100	99
cM capacity (veh/h)	1336			1225			347	349	707	218	352	813

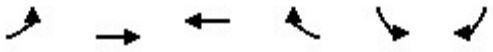
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	345	53	242	169	84
Volume Left	5	0	53	0	15	74
Volume Right	0	9	0	22	154	10
cSH	1336	1700	1225	1700	647	238
Volume to Capacity	0.00	0.20	0.04	0.14	0.26	0.35
Queue Length 95th (m)	0.1	0.0	1.1	0.0	8.3	12.1
Control Delay (s)	7.7	0.0	8.1	0.0	12.5	28.1
Lane LOS	A		A		B	D
Approach Delay (s)	0.1		1.5		12.5	28.1
Approach LOS					B	D

Intersection Summary				
Average Delay	5.5			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	280	206	7	23	9
Future Volume (vph)	4	280	206	7	23	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	55.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.996		0.962	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1805	1827	1772	0	1764	0
Flt Permitted	0.950				0.965	
Satd. Flow (perm)	1805	1827	1772	0	1764	0
Link Speed (k/h)		60	60		50	
Link Distance (m)		115.7	221.1		68.4	
Travel Time (s)		6.9	13.3		4.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	4%	7%	0%	0%	0%
Adj. Flow (vph)	5	322	237	8	26	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	322	245	0	36	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.7%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	280	206	7	23	9
Future Volume (Veh/h)	4	280	206	7	23	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	5	322	237	8	26	10
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	245				573	241
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	245				573	241
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				95	99
cM capacity (veh/h)	1333				483	803

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	322	245	36
Volume Left	5	0	0	26
Volume Right	0	0	8	10
cSH	1333	1700	1700	543
Volume to Capacity	0.00	0.19	0.14	0.07
Queue Length 95th (m)	0.1	0.0	0.0	1.7
Control Delay (s)	7.7	0.0	0.0	12.1
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	12.1
Approach LOS				B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	275	8	3	211	16	9
Future Volume (vph)	275	8	3	211	16	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			55.0		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996				0.952	
Flt Protected			0.950		0.969	
Satd. Flow (prot)	1822	0	1805	1776	1753	0
Flt Permitted			0.950		0.969	
Satd. Flow (perm)	1822	0	1805	1776	1753	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	130.8			115.7	84.2	
Travel Time (s)	7.8			6.9	6.1	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	4%	0%	0%	7%	0%	0%
Adj. Flow (vph)	316	9	3	243	18	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	325	0	3	243	28	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	275	8	3	211	16	9
Future Volume (Veh/h)	275	8	3	211	16	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	316	9	3	243	18	10
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			325		570	320
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			325		570	320
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	99
cM capacity (veh/h)			1246		485	725

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	325	3	243	28
Volume Left	0	3	0	18
Volume Right	9	0	0	10
cSH	1700	1246	1700	550
Volume to Capacity	0.19	0.00	0.14	0.05
Queue Length 95th (m)	0.0	0.1	0.0	1.3
Control Delay (s)	0.0	7.9	0.0	11.9
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		11.9
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	31.6	75.8	20.7	48.6	24.3	31.5	30.6	18.1	52.9	43.2
Average Queue (m)	11.8	46.0	8.7	21.8	8.0	14.2	12.1	4.4	31.4	17.5
95th Queue (m)	25.2	72.0	17.8	39.9	18.8	25.6	24.3	13.5	49.5	37.0
Link Distance (m)		210.6		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		4			0	1		0	12	
Queuing Penalty (veh)		2			0	0		0	2	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.9	13.7
Average Queue (m)	1.3	1.1
95th Queue (m)	6.3	6.7
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB
Directions Served	LR
Maximum Queue (m)	9.0
Average Queue (m)	2.6
95th Queue (m)	9.1
Link Distance (m)	144.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Proposed Street 'C'/Private Lane & Medway Road

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	5.3	12.9	24.2	19.9
Average Queue (m)	0.3	3.5	11.8	10.1
95th Queue (m)	3.1	10.9	19.7	16.1
Link Distance (m)			72.2	95.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	15.0	30.0		
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Intersection: 5: Medway Road & Private Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (m)	1.7	11.7
Average Queue (m)	0.1	6.1
95th Queue (m)	1.6	12.9
Link Distance (m)		58.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Proposed Street 'B' & Medway Road

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	1.6	11.6
Average Queue (m)	0.1	4.8
95th Queue (m)	1.1	12.4
Link Distance (m)		73.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

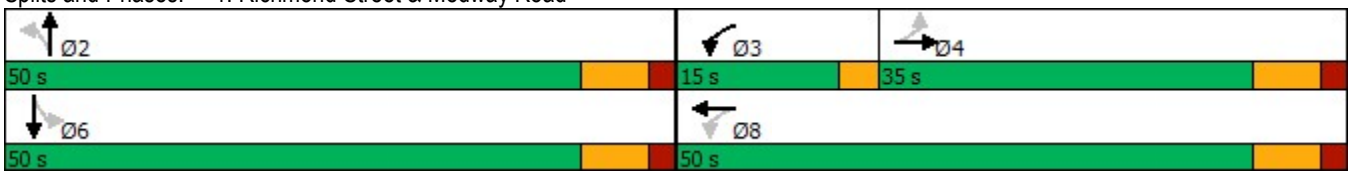
Network wide Queuing Penalty: 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	349	84	77	438	31	112	544	76	28	531	110
Future Volume (vph)	66	349	84	77	438	31	112	544	76	28	531	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	75.0		0.0	25.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	70.0			35.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00	1.00			1.00	
Frt		0.971			0.990			0.982			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1801	0	1687	1822	0	1805	3480	0	1805	3456	0
Flt Permitted	0.486			0.260			0.336			0.350		
Satd. Flow (perm)	879	1801	0	462	1822	0	638	3480	0	665	3456	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			4			19			31	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		232.9			110.0			243.9			157.5	
Travel Time (s)		14.0			7.9			14.6			9.5	
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	3%	0%	7%	3%	7%	0%	1%	6%	0%	1%	3%
Adj. Flow (vph)	69	364	88	80	456	32	117	567	79	29	553	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	452	0	80	488	0	117	646	0	29	668	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	8.5	8.5		8.5	8.5		15.0	20.0		15.0	20.0	
Trailing Detector (m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Position(m)	-1.5	-1.5		-1.5	-1.5		5.0	10.0		5.0	10.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	35.0	35.0		10.0	35.0		32.1	32.1		32.1	32.1	
Total Split (s)	35.0	35.0		15.0	50.0		50.0	50.0		50.0	50.0	
Total Split (%)	35.0%	35.0%		15.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.9	27.9		12.0	42.9		42.9	42.9		42.9	42.9	
Yellow Time (s)	5.0	5.0		3.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.1	2.1		0.0	2.1		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		3.0	7.1		7.1	7.1		7.1	7.1	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0			21.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	23.5	23.5		36.1	31.8		27.3	27.3		27.3	27.3	
Actuated g/C Ratio	0.32	0.32		0.49	0.43		0.37	0.37		0.37	0.37	
v/c Ratio	0.25	0.78		0.22	0.62		0.50	0.50		0.12	0.51	
Control Delay	23.0	33.7		11.5	19.7		29.6	20.3		19.5	20.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.0	33.7		11.5	19.7		29.6	20.3		19.5	20.2	
LOS	C	C		B	B		C	C		B	C	
Approach Delay		32.3			18.6			21.8			20.2	
Approach LOS		C			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 73.7			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 22.8		Intersection LOS: C	
Intersection Capacity Utilization 95.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Richmond Street & Medway Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	7	7	780	741	9
Future Volume (vph)	7	7	7	780	741	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.932				0.998	
Flt Protected	0.976					
Satd. Flow (prot)	1728	0	0	3540	3533	0
Flt Permitted	0.976					
Satd. Flow (perm)	1728	0	0	3540	3533	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	98.8			189.7	128.8	
Travel Time (s)	7.1			11.4	7.7	
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%
Adj. Flow (vph)	8	8	8	848	805	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	856	815	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	7	7	780	741	9
Future Volume (Veh/h)	7	7	7	780	741	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	8	848	805	10
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					373	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	1251	408	816			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1124	221	658			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	187	735	875			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	291	565	537	278
Volume Left	8	8	0	0	0
Volume Right	8	0	0	0	10
cSH	298	875	1700	1700	1700
Volume to Capacity	0.05	0.01	0.33	0.32	0.16
Queue Length 95th (m)	1.4	0.2	0.0	0.0	0.0
Control Delay (s)	17.8	0.3	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	17.8	0.1		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

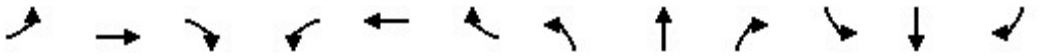
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	13	767	18	5	725
Future Volume (vph)	20	13	767	18	5	725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.946		0.997			
Flt Protected	0.971					
Satd. Flow (prot)	1745	0	3464	0	0	3540
Flt Permitted	0.971					
Satd. Flow (perm)	1745	0	3464	0	0	3540
Link Speed (k/h)	50		60			60
Link Distance (m)	158.8		128.8			243.9
Travel Time (s)	11.4		7.7			14.6
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	4%	0%	0%	2%
Adj. Flow (vph)	21	14	816	19	5	771
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	835	0	0	776
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	20	13	767	18	5	725
Future Volume (Veh/h)	20	13	767	18	5	725
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	14	816	19	5	771
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						244
pX, platoon unblocked	0.90					
vC, conflicting volume	1223	420			837	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1017	420			837	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	98			99	
cM capacity (veh/h)	211	587			804	

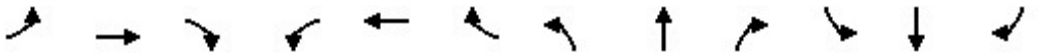
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	544	291	262	514
Volume Left	21	0	0	5	0
Volume Right	14	0	19	0	0
cSH	283	1700	1700	804	1700
Volume to Capacity	0.12	0.32	0.17	0.01	0.30
Queue Length 95th (m)	3.3	0.0	0.0	0.2	0.0
Control Delay (s)	19.5	0.0	0.0	0.2	0.0
Lane LOS	C			A	
Approach Delay (s)	19.5	0.0		0.1	
Approach LOS	C				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	33.5%	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)	9	382	17	138	466	54	14	0	85	33	0	7
Future Volume (vph)	9	382	17	138	466	54	14	0	85	33	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	55.0			55.0			7.5			7.5		
Lane Util. 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
Frt		0.993			0.984			0.884			0.977	
Flt Protected	0.950			0.950				0.993			0.960	
Satd. Flow (prot)	1805	1834	0	1805	1837	0	0	1668	0	0	1782	0
Flt Permitted	0.950			0.950				0.993			0.960	
Satd. Flow (perm)	1805	1834	0	1805	1837	0	0	1668	0	0	1782	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		221.1			232.9			82.5			105.4	
Travel Time (s)		15.9			16.8			5.9			7.6	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	394	18	142	480	56	14	0	88	34	0	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	412	0	142	536	0	0	102	0	0	41	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control		Free			Free			Stop			Stop	

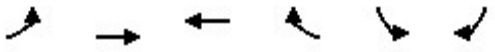
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 50.1%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	382	17	138	466	54	14	0	85	33	0	7
Future Volume (Veh/h)	9	382	17	138	466	54	14	0	85	33	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	9	394	18	142	480	56	14	0	88	34	0	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					233							
pX, platoon unblocked	0.87						0.87	0.87		0.87	0.87	0.87
vC, conflicting volume	536			412			1192	1241	403	1292	1222	508
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	394			412			1147	1203	403	1261	1181	362
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			88			90	100	86	66	100	99
cM capacity (veh/h)	1025			1158			138	141	652	101	145	599

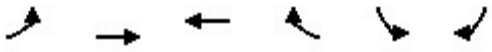
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	412	142	536	102	41
Volume Left	9	0	142	0	14	34
Volume Right	0	18	0	56	88	7
cSH	1025	1700	1158	1700	431	117
Volume to Capacity	0.01	0.24	0.12	0.32	0.24	0.35
Queue Length 95th (m)	0.2	0.0	3.3	0.0	7.3	11.2
Control Delay (s)	8.5	0.0	8.5	0.0	15.9	51.3
Lane LOS	A		A		C	F
Approach Delay (s)	0.2		1.8		15.9	51.3
Approach LOS					C	F

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	50.1%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	396	467	20	12	7
Future Volume (vph)	10	396	467	20	12	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	55.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.994		0.950	
Flt Protected	0.950				0.969	
Satd. Flow (prot)	1805	1845	1853	0	1749	0
Flt Permitted	0.950				0.969	
Satd. Flow (perm)	1805	1845	1853	0	1749	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		115.7	221.1		68.4	
Travel Time (s)		8.3	15.9		4.9	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	3%	2%	0%	0%	0%
Adj. Flow (vph)	10	408	481	21	12	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	408	502	0	19	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	396	467	20	12	7
Future Volume (Veh/h)	10	396	467	20	12	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	408	481	21	12	7
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	502				920	492
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	502				920	492
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				96	99
cM capacity (veh/h)	1073				301	581

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	10	408	502	19
Volume Left	10	0	0	12
Volume Right	0	0	21	7
cSH	1073	1700	1700	366
Volume to Capacity	0.01	0.24	0.30	0.05
Queue Length 95th (m)	0.2	0.0	0.0	1.3
Control Delay (s)	8.4	0.0	0.0	15.4
Lane LOS	A			C
Approach Delay (s)	0.2		0.0	15.4
Approach LOS				C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	400	21	9	465	16	6
Future Volume (vph)	400	21	9	465	16	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			55.0		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.963	
Flt Protected			0.950		0.965	
Satd. Flow (prot)	1834	0	1805	1863	1766	0
Flt Permitted			0.950		0.965	
Satd. Flow (perm)	1834	0	1805	1863	1766	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	130.8			115.7	84.2	
Travel Time (s)	9.4			8.3	6.1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	0%	0%	2%	0%	0%
Adj. Flow (vph)	412	22	9	479	16	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	434	0	9	479	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		100	100		100	100
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	400	21	9	465	16	6
Future Volume (Veh/h)	400	21	9	465	16	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	412	22	9	479	16	6
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			434		920	423
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			434		920	423
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		95	99
cM capacity (veh/h)			1136		301	635

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	434	9	479	22
Volume Left	0	9	0	16
Volume Right	22	0	0	6
cSH	1700	1136	1700	351
Volume to Capacity	0.26	0.01	0.28	0.06
Queue Length 95th (m)	0.0	0.2	0.0	1.6
Control Delay (s)	0.0	8.2	0.0	15.9
Lane LOS		A		C
Approach Delay (s)	0.0	0.2		15.9
Approach LOS				C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Richmond Street & Medway Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	50.7	111.7	46.5	92.9	43.0	54.2	52.1	19.3	67.0	59.4
Average Queue (m)	13.8	58.2	14.2	51.9	19.9	29.9	29.7	6.6	37.8	27.6
95th Queue (m)	34.2	94.8	33.8	84.8	37.6	46.0	47.5	15.5	59.4	50.2
Link Distance (m)		210.6		96.2		226.2	226.2		147.3	147.3
Upstream Blk Time (%)			0	1						
Queuing Penalty (veh)			0	0						
Storage Bay Dist (m)	55.0		75.0		25.0			25.0		
Storage Blk Time (%)		13		2	8	11		0	20	
Queuing Penalty (veh)		9		1	22	12		0	5	

Intersection: 2: Richmond Street & Croydon Drive

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	12.9	18.2
Average Queue (m)	3.5	1.2
95th Queue (m)	11.3	8.0
Link Distance (m)	86.4	182.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Richmond Street & St. John's Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	17.2	9.6
Average Queue (m)	7.0	0.5
95th Queue (m)	14.7	4.5
Link Distance (m)	144.6	226.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Proposed Street 'C'/Private Lane & Medway Road

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	9.2	19.7	24.9	17.2
Average Queue (m)	1.0	7.5	11.3	7.7
95th Queue (m)	5.6	16.4	18.8	15.9
Link Distance (m)			72.2	95.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	15.0	30.0		
Storage Blk Time (%)	0	0		
Queuing Penalty (veh)	0	0		

Intersection: 5: Medway Road & Private Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (m)	9.3	11.3
Average Queue (m)	1.1	4.0
95th Queue (m)	6.0	11.5
Link Distance (m)		58.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 6: Proposed Street 'B' & Medway Road

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	7.4	13.2
Average Queue (m)	1.0	5.0
95th Queue (m)	5.8	12.9
Link Distance (m)		73.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Network Summary

Network wide Queuing Penalty: 50

Appendix H
Left-Turn Lane Warrants

LEFT-TURN LANE WARRANT (Per MTO Design Supplement)

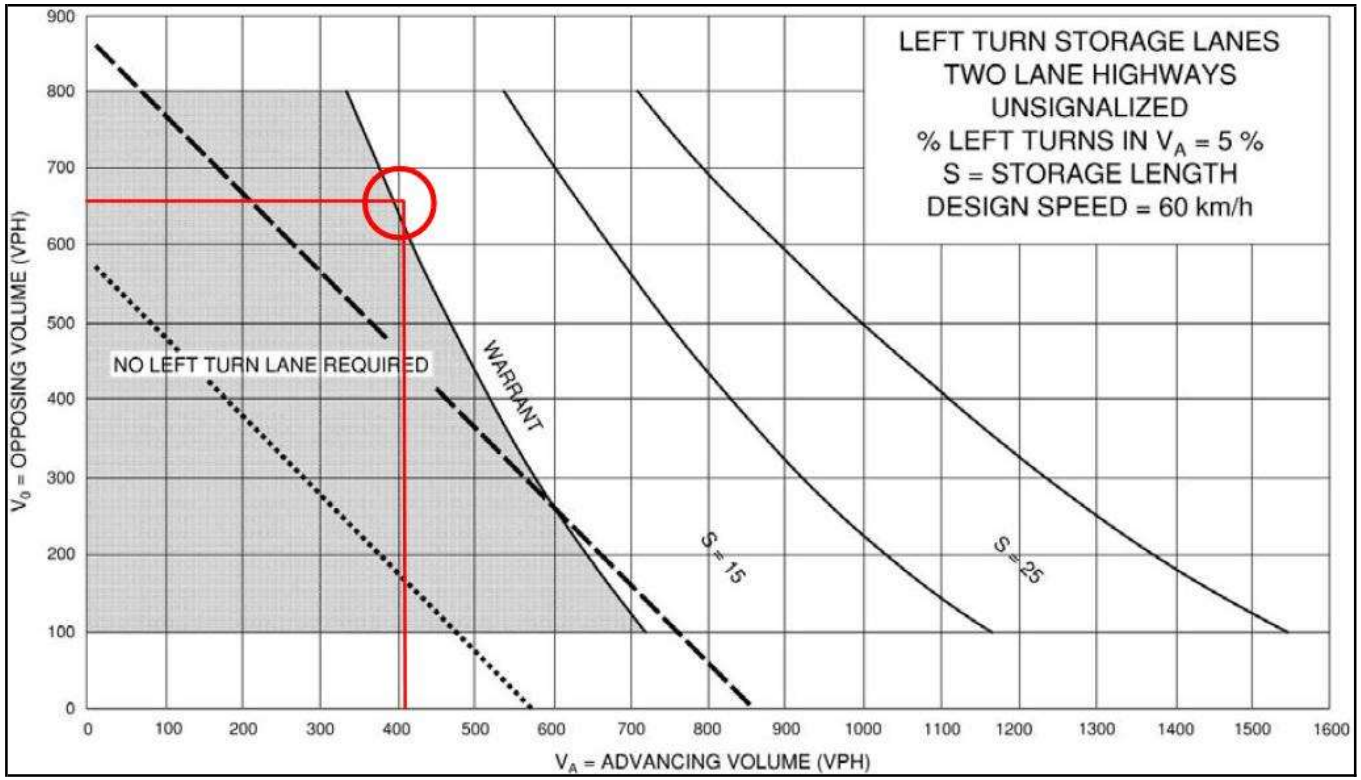
Horizon Year and Analysis Period: 2039 Future Total Afternoon Peak Hour

Project Information

Analyst	Anthony De Rango	**Jurisdiction**	Arva, Township of Middlesex Centre
Company	C.F. Crozier & Associates	**Project Name**	Bridle Path North Subdivision
Date	2024-10-31	**Project No.**	1419-6155

Roadway Information

Intersection	Medway Road and Proposed Street 'C' / Private Lane	**Design Speed**	60 km/h



Conclusion: The results of the calculations show that a left-turn lane is justified at this intersection for the eastbound left movement during the 2039 Future Total Afternoon Peak Hour due to traffic volumes.

LEFT-TURN LANE WARRANT (Per MTO Design Supplement)

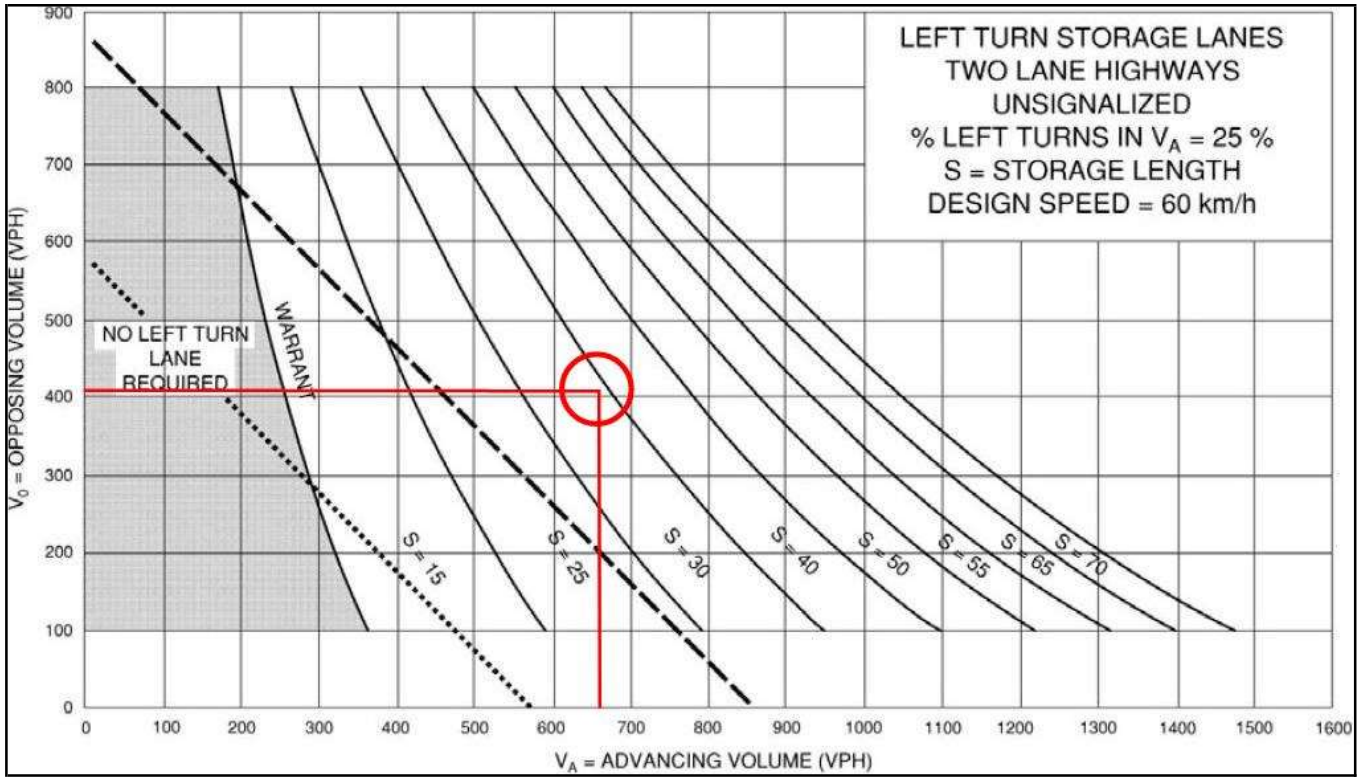
Horizon Year and Analysis Period: 2039 Future Total Afternoon Peak Hour

Project Information

Analyst	Anthony De Rango	**Jurisdiction**	Arva, Township of Middlesex Centre
Company	C.F. Crozier & Associates	**Project Name**	Bridle Path North Subdivision
Date	2024-10-31	**Project No.**	1419-6155

Roadway Information

Intersection	Medway Road and Proposed Street 'C' / Private Lane	**Design Speed**	60 km/h



Conclusion: The results of the calculations show that a left-turn lane is justified at this intersection for the westbound left movement during the 2039 Future Total Afternoon Peak Hour due to traffic volumes.

LEFT-TURN LANE WARRANT (Per MTO Design Supplement)

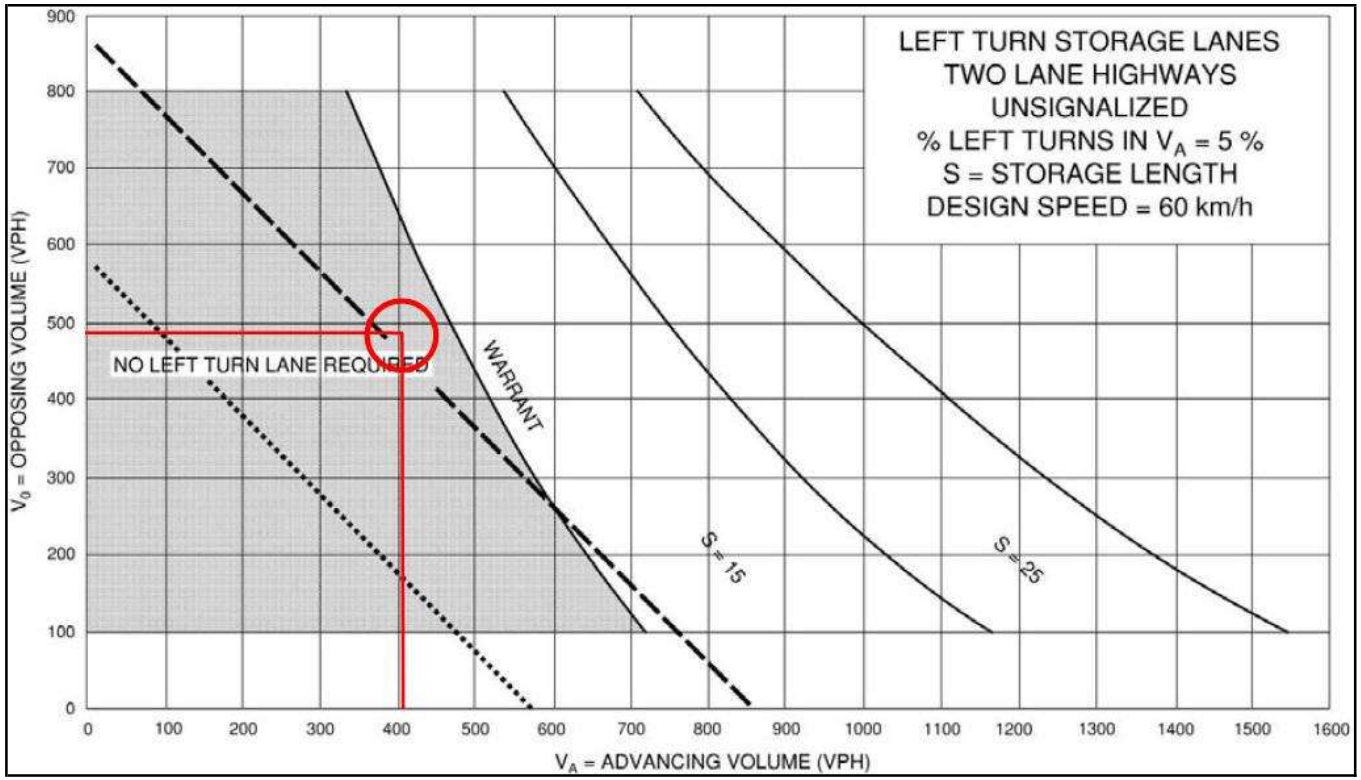
Horizon Year and Analysis Period: 2039 Future Total Afternoon Peak Hour

Project Information

Analyst	Anthony De Rango	**Jurisdiction**	Arva, Township of Middlesex Centre
Company	C.F. Crozier & Associates	**Project Name**	Bridle Path North Subdivision
Date	2024-10-31	**Project No.**	1419-6155

Roadway Information

Intersection	Medway Road and Private Lane	**Design Speed**	60 km/h



Conclusion: The results of the calculations show that a left-turn lane is not justified at this intersection for the eastbound left movement during the 2039 Future Total Afternoon Peak Hour due to traffic volumes.

LEFT-TURN LANE WARRANT (Per MTO Design Supplement)

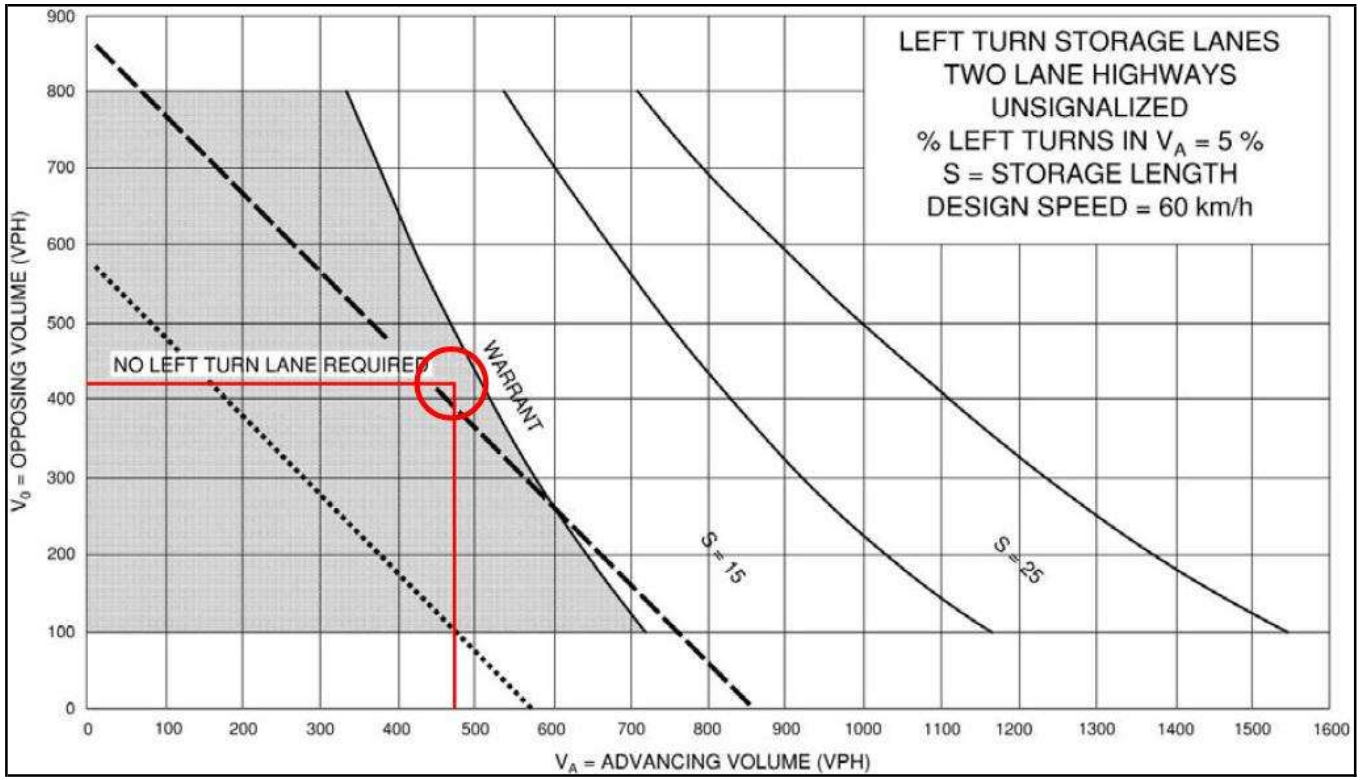
Horizon Year and Analysis Period: 2039 Future Total Afternoon Peak Hour

Project Information

Analyst	Anthony De Rango	**Jurisdiction**	Arva, Township of Middlesex Centre
Company	C.F. Crozier & Associates	**Project Name**	Bridle Path North Subdivision
Date	2024-10-31	**Project No.**	1419-6155

Roadway Information

Intersection	Medway Road and Proposed Street 'B'	**Design Speed**	60 km/h



Conclusion: The results of the calculations show that a left-turn lane is not justified at this intersection for the westbound left movement during the 2039 Future Total Afternoon Peak Hour due to traffic volumes.

Appendix I
Signal Warrants

CROZIER

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)
PER OTM BOOK 12

Project and Scenario Summary

Project	Arva Bridle Path North Subdivision	**Project Number**	2673-7110
		Date	2024-10-31
Horizon	2039 Future Total	**Analyst**	Anthony De Rango

Study Intersection Summary

Major Street	Medway Road	**Direction**	East/West
Minor Street	Proposed Street 'C' / Private Lane	**Direction**	North/South

Intersection Details for Warrant Parameters

Flow Conditions	Restricted Flow (Urban)	**Number of Lanes**	1
T-Intersection?	No	**Intersection Type**	New

Notes: Free Flow (Rural) is used when the operating speed is greater than or equal to 70km/h. Restricted Flow (Urban) is used otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered New if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Medway Road						Minor: Proposed Street 'C' / Private Lane						Pedestrians Crossing Major Street
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	4	292	8	46	191	19	13	0	134	64	0	9	0
PM	9	382	17	138	466	54	14	0	85	33	0	7	0
AHV	3	169	6	46	164	18	7	0	55	24	0	4	0

The AHV is determined by the availability of the peak hour estimates. If both Peak 1 and Peak 2 Peak Hour Volume estimates are available then AHV = (Peak1phv + Peak2phv)/4. In only the case that one estimate is available then AHV = Peak1phv/2 **or** Peak2phv/2.

Justification 7 - OTM Book 12

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		MINIMUM REQUIREMENT 2 OR MORE LANE HIGHWAYS		COMPLIANCE		
						Sectional		Entire Percentage
		Free Flow	Restricted Flow	Free Flow	Restricted Flow	Numerical	Percentage	
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches (Avg. Hour)	480	720	600	900	496	68.9%	52.9%
	B. Vehicle Volume, Along Minor Streets (Avg. Hour)	120	170	120	170	90	52.9%	
2. Delay to Cross Traffic	A. Vehicle Volume, Major Street (Avg. Hour)	480	720	600	900	406	56.4%	41.3%
	B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour)	50	75	50	75	31	41.3%	
Applicable Threshold			X					

Note: For T-intersections the thresholds for 1B have been increased by 50% per OTM Book 12.
Existing Intersections Require 120% Justification
New/Proposed Intersections Require 150% Justification

Percent Compliance: 52.9%
Percentage Required to be Justified: 150%

Signal Justification 7 Met: [ ] **Yes** [X] **No**

CROZIER

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)
PER OTM BOOK 12

Project and Scenario Summary

Project	Arva Bridle Path Subdivision	**Project Number**	2673-7110
		Date	2024-10-31
Horizon	2039 Future Total	**Analyst**	Anthony De Rango

Study Intersection Summary

Major Street	Medway Road	**Direction**	East/West
Minor Street	Private Lane	**Direction**	North/South

Intersection Details for Warrant Parameters

Flow Conditions	Restricted Flow (Urban)	**Number of Lanes**	1
T-Intersection?	Yes	**Intersection Type**	New

Notes: Free Flow (Rural) is used when the operating speed is greater than or equal to 70km/h. Restricted Flow (Urban) is used otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered New if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Medway Road						Minor: Private Lane						Pedestrians Crossing Major Street
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	4	280	0	0	206	7	0	0	0	23	0	9	0
PM	10	396	0	0	467	20	0	0	0	12	0	7	0
AHV	4	169	0	0	168	7	0	0	0	9	0	4	0

The AHV is determined by the availability of the peak hour estimates. If both Peak 1 and Peak 2 Peak Hour Volume estimates are available then AHV = (Peak1phv + Peak2phv)/4. In only the case that one estimate is available then AHV = Peak1phv/2 **or** Peak2phv/2.

Justification 7 - OTM Book 12

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		MINIMUM REQUIREMENT 2 OR MORE LANE HIGHWAYS		COMPLIANCE		
						Sectional		Entire Percentage
		Free Flow	Restricted Flow	Free Flow	Restricted Flow	Numerical	Percentage	
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches (Avg. Hour)	480	720	600	900	361	50.1%	5.1%
	B. Vehicle Volume, Along Minor Streets (Avg. Hour)	180	255	180	255	13	5.1%	
2. Delay to Cross Traffic	A. Vehicle Volume, Major Street (Avg. Hour)	480	720	600	900	348	48.3%	12.0%
	B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour)	50	75	50	75	9	12.0%	
Applicable Threshold			X					

Note: For T-intersections the thresholds for 1B have been increased by 50% per OTM Book 12.
Existing Intersections Require 120% Justification
New/Proposed Intersections Require 150% Justification

Percent Compliance: 12.0%
Percentage Required to be Justified: 150%

Signal Justification 7 Met: [ ] **Yes** [X] **No**

CROZIER

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)
PER OTM BOOK 12

Project and Scenario Summary

Project	Arva Bridle Path Subdivision	**Project Number**	2673-7110
		Date	2024-10-31
Horizon	2039 Future Total	**Analyst**	Anthony De Rango

Study Intersection Summary

Major Street	Medway Road	**Direction**	East/West
Minor Street	Proposed Street 'B'	**Direction**	North/South

Intersection Details for Warrant Parameters

Flow Conditions	Restricted Flow (Urban)	**Number of Lanes**	1
T-Intersection?	Yes	**Intersection Type**	New

Notes: Free Flow (Rural) is used when the operating speed is greater than or equal to 70km/h. Restricted Flow (Urban) is used otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered New if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Medway Road						Minor: Proposed Street 'B'						Pedestrians Crossing Major Street
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	0	275	8	3	211	0	16	0	9	0	0	0	0
PM	0	400	21	9	465	0	16	0	6	0	0	0	0
AHV	0	169	7	3	169	0	8	0	4	0	0	0	0

The AHV is determined by the availability of the peak hour estimates. If both Peak 1 and Peak 2 Peak Hour Volume estimates are available then AHV = (Peak1phv + Peak2phv)/4. In only the case that one estimate is available then AHV = Peak1phv/2 **or** Peak2phv/2.

Justification 7 - OTM Book 12

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		MINIMUM REQUIREMENT 2 OR MORE LANE HIGHWAYS		COMPLIANCE		
						Sectional		Entire Percentage
		Free Flow	Restricted Flow	Free Flow	Restricted Flow	Numerical	Percentage	
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches (Avg. Hour)	480	720	600	900	360	50.0%	4.7%
	B. Vehicle Volume, Along Minor Streets (Avg. Hour)	180	255	180	255	12	4.7%	
2. Delay to Cross Traffic	A. Vehicle Volume, Major Street (Avg. Hour)	480	720	600	900	348	48.3%	10.7%
	B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour)	50	75	50	75	8	10.7%	
Applicable Threshold			X					

Note: For T-intersections the thresholds for 1B have been increased by 50% per OTM Book 12.
Existing Intersections Require 120% Justification
New/Proposed Intersections Require 150% Justification

Percent Compliance: 10.7%
Percentage Required to be Justified: 150%

Signal Justification 7 Met: [ ] **Yes** [X] **No**

Appendix J

Average Annual Daily Traffic Volumes

ROAD NO.	LOCATION	AVERAGE TRAFFIC COUNT	LENGTH (Km)	BOUNDARY LENGTH	EQUIVALENT LENGTH	DAILY VEH-(Km)
NISSOURI RD. 27	CR#28 TO CR#16	*2813*	6.2		6.2	17441
WELLBURN RD. 27	CR#16 TO HIGHWAY #7	*3010*	7		7	21070
THORNDALE RD. 28	OXFORD COUNTY BOUNDARY TO CR#27	*4813*	7.1		7.1	34172
MEDWAY RD. 28	CR#27 TO CR#23	*6829*	8.4		8.4	57364
MEDWAY RD. 28	CR#23 TO HIGHWAY #4	*7477*	5		5	37385
MEDWAY RD. 28	HIGHWAY #4 TO CR#20	*6403*	5		5	32015
HAMILTON RD. 29	LONDON TO CR#74	*8510*	0.8		0.8	6808
HAMILTON RD. 29	CR#74 TO CR#32 DORCHESTER	*6620*	4.9		4.9	32438
HAMILTON RD. 29	CR#32 DORCHESTER TO CR#73	*8472*	3.4		3.4	28805
HAMILTON RD. 29	CR#73 TO OXFORD COUNTY BOUNDARY	*5781*	8		8	46248
PUTNAM RD. 30	OXFORD COUNTY BOUNDARY TO CR#29	*2803*	1.3		1.3	3644
PUTNAM RD. 30	CR#29 PUTNAM TO HIGHWAY #401	*5057*	1.7		1.7	8597
PUTNAM RD. 30	HIGHWAY #401 TO ELGIN COUNTY BOUNDARY AVON	*5125*	7.8		7.8	39975
HERITAGE RD. 31	CR#28 TO CR#16	*778*	6.2		6.2	4824
DORCHESTER RD. 32	CROMARTY DRIVE TO HIGHWAY #401	*2562*	0.7		0.7	1793
DORCHESTER RD. 32	HIGHWAY #401 TO CR#29	*3202*	4		4	12808
DORCHESTER RD. 32	CR#29 TO CR#49	*8042*	0.3		0.3	2413
SHAW RD. 32	CR#49 TO CR#2	*4308*	4.3		4.3	18524
SECOND ST. 33	CR#81 TO CR#39	*6057*	3.3		3.3	19988
LITTLEWOOD DR. 35	ONEIDA TO CR#15	*4216*	1.5		1.5	6324
LITTLEWOOD DR. 35	CR#15 TO LONDON	*3610*	6.8		6.8	24548

Year	Highway	Location Description	Dist (KM)	Pattern Type	AADT	SADT	SWADT	WADT	Truck AADT	Total Collisions	Total CR	Trucks Collisions	Truck CR
2016	4			CTR	13,300	16,200	16,400	11,300	1,500	0	0.0	0	0.0
2017	4			CTR	13,300	17,800	17,700	10,800	1,500	0	0.0	0	0.0
2018	4			CTR	13,300	17,800	17,700	10,800	1,500	0	0.0	0	0.0
2019	4			CTR	13,400	17,900	17,800	10,900	1,450	0	0.0	0	0.0
2021	4			CTR	13,200	17,200	17,100	10,800	1,450	0	0.0	0	0.0
2021	4	HWY 401 IC-180 START OF NA	21.6										
1988	4	LONDON N LTS END OF NA	6.3	C	10,000	11,100	11,100	9,000	600	12	0.5	0	0.0
1989	4			C	11,000	12,200	12,300	9,900	660	13	0.5	1	0.0
1990	4			C	11,500	12,800	12,800	10,400	690	9	0.3	0	0.0
1991	4			C	10,300	11,300	11,400	9,350	620	9	0.4	0	0.0
1992	4			C	9,900	10,700	11,000	9,100	400	7	0.3	0	0.0
1993	4			C	9,550	10,400	10,600	8,800	380	9	0.4	0	0.0
1994	4			C	10,800	11,800	12,000	9,750	430	10	0.4	1	0.0
1995	4			C	11,100	12,100	12,400	10,200	560	6	0.2	0	0.0
1996	4			C	11,300	12,800	12,900	10,200	560	2	0.1	0	0.0
1997	4			C	11,500	13,000	13,100	10,400	580	6	0.2	1	0.0
1998	4			C	11,700	13,200	13,200	10,500	470	4	0.1	0	0.0
1999	4			C	11,900	13,300	13,400	10,700	480	2	0.1	0	0.0
2000	4			C	12,100	13,700	13,700	10,900	480	2	0.1	0	0.0
2001	4			C	12,300	13,900	13,900	11,100	490	1	0.0	0	0.0
2002	4			C	12,500	14,000	14,100	11,200	500	1	0.0	0	0.0
2003	4			C	12,700	14,200	14,300	11,500	510	2	0.1	0	0.0
2004	4			C	12,900	14,500	14,600	11,600	640	1	0.0	0	0.0
2005	4			C	13,100	14,600	14,700	11,800	660	2	0.1	0	0.0
2006	4			C	13,200	14,700	14,800	11,900	660	3	0.1	1	0.0
2007	4			C	13,400	14,900	15,100	12,000	670	1	0.0	0	0.0
2008	4			C	13,500	14,900	14,700	12,100	680	6	0.2	0	0.0
2009	4			C	13,700	15,100	15,200	12,300	680	0	0.0	0	0.0
2010	4			C	13,800	15,200	15,300	12,400	690	4	0.1	0	0.0
2011	4			C	13,000	14,300	14,500	11,700	650	2	0.1	1	0.0
2012	4			C	13,000	14,300	14,000	11,700	650	2	0.1	0	0.0
2013	4			C	13,000	14,300	14,100	11,700	650	5	0.2	1	0.0
2014	4			C	13,000	14,300	13,900	11,700	440	1	0.0	0	0.0
2015	4			C	13,000	14,300	13,900	11,700	440	2	0.1	0	0.0
2016	4			C	13,100	14,400	14,000	11,800	450	3	0.1	1	0.0
2017	4			C	13,800	15,100	15,100	12,500	470	2	0.1	0	0.0
2018	4			C	13,900	15,200	15,100	12,500	470	1	0.0	0	0.0
2019	4			C	13,900	15,200	15,100	12,600	420	1	0.0	0	0.0
2021	4			C	14,200	15,400	15,400	12,900	430	0	0.0	0	0.0
1988	4	MIDDLESEX RD 28 MEDWAY RD (E)	5.6	C	8,900	9,900	9,900	8,000	710	7	0.4	0	0.0
1989	4			C	9,350	10,400	10,500	8,400	750	17	0.9	0	0.0

Year	Highway	Location Description	Dist (KM)	Pattern Type	AADT	SADT	SWADT	WADT	Truck AADT	Total Collisions	Total CR	Trucks Collisions	Truck CR
1990	4			C	9,150	10,200	10,200	8,250	730	7	0.4	0	0.0
1991	4			C	8,900	9,800	9,900	8,100	710	10	0.6	0	0.0
1992	4			C	8,650	9,350	9,600	7,950	260	14	0.8	0	0.0
1993	4			C	8,650	9,450	9,550	7,950	260	16	0.9	0	0.0
1994	4			C	9,100	9,950	10,100	8,250	270	14	0.8	1	0.1
1995	4			C	9,150	10,000	10,300	8,350	370	13	0.7	0	0.0
1996	4			C	9,150	10,400	10,400	8,250	370	12	0.6	0	0.0
1997	4			C	9,200	10,400	10,500	8,300	370	16	0.9	1	0.1
1998	4			C	9,250	10,500	10,500	8,300	560	6	0.3	0	0.0
1999	4			C	9,150	10,200	10,300	8,250	550	5	0.3	1	0.1
2000	4			C	9,150	10,300	10,300	8,250	550	4	0.2	0	0.0
2001	4			C	8,900	10,000	10,000	8,000	440	12	0.7	1	0.1
2002	4			C	9,150	10,200	10,300	8,250	460	7	0.4	0	0.0
2003	4			C	9,200	10,300	10,300	8,300	460	10	0.5	0	0.0
2004	4			C	9,200	10,400	10,400	8,300	460	12	0.6	0	0.0
2005	4			C	9,100	10,100	10,200	8,150	460	6	0.3	3	0.2
2006	4			C	9,100	10,100	10,200	8,200	270	3	0.2	0	0.0
2007	4			C	9,200	10,200	10,400	8,250	280	6	0.3	0	0.0
2008	4			C	9,000	9,950	9,800	8,050	360	3	0.2	0	0.0
2009	4			C	9,100	10,000	10,100	8,200	360	3	0.2	1	0.1
2010	4			C	9,100	10,000	10,100	8,200	360	3	0.2	0	0.0
2011	4			C	9,100	10,000	10,100	8,200	360	4	0.2	0	0.0
2012	4			C	9,100	10,000	9,800	8,200	350	0	0.0	0	0.0
2013	4			C	9,100	10,000	9,900	8,200	350	10	0.5	0	0.0
2014	4			C	9,100	10,000	9,750	8,200	350	6	0.3	0	0.0
2015	4			C	9,100	10,000	9,750	8,200	350	5	0.3	0	0.0
2016	4			C	9,100	10,000	9,750	8,200	350	3	0.2	0	0.0
2017	4			C	9,100	9,950	9,950	8,250	350	9	0.5	2	0.1
2018	4			C	9,100	9,950	9,900	8,200	350	7	0.4	0	0.0
2019	4			C	9,100	9,950	9,900	8,250	360	1	0.1	0	0.0
2021	4			C	9,100	9,900	9,850	8,250	360	7	0.4	1	0.1
1988	4	MIDDLESEX RD 16 ILDERTON RD	8.2	C	7,450	8,250	8,250	6,700	370	13	0.6	0	0.0
1989	4			C	7,900	8,750	8,850	7,100	550	20	0.8	0	0.0
1990	4			C	8,000	8,900	8,900	7,200	560	11	0.5	1	0.0
1991	4			C	7,900	8,700	8,750	7,200	550	7	0.3	1	0.0
1992	4			C	7,800	8,400	8,650	7,200	550	17	0.7	0	0.0
1993	4			C	7,850	8,550	8,700	7,200	550	7	0.3	0	0.0
1994	4			C	8,100	8,850	9,050	7,350	570	14	0.6	1	0.0
1995	4			C	8,150	8,900	9,150	7,450	330	17	0.7	0	0.0
1996	4			C	8,200	9,300	9,350	7,400	330	15	0.6	1	0.0
1997	4			C	8,300	9,400	9,450	7,450	330	10	0.4	2	0.1

Appendix K

Ontario Traffic Manual Book 15 Excerpts

Table 7: Pedestrian Crossover Selection Matrix

Two-way Vehicular Volume			Posted Speed Limit (km/h	Total Number of Lanes for the Roadway Cross Section[1]			
Time Period	Lower Bound	Upper Bound		1 or 2 Lanes	3 lanes	4 lanes w/raised refuge	4 lanes w/o raised refuge
8 Hour	750	2,250	≤50	Level 2 Type D	Level 2 Type C[3]	Level 2 Type D[2]	Level 2 Type B
4 Hour	395	1,185					
8 Hour	750	2,250	60	Level 2 Type C	Level 2 Type B	Level 2 Type C[2]	Level 2 Type B
4 Hour	395	1,185					
8 Hour	2,250	4,500	≤50	Level 2 Type D	Level 2 Type B	Level 2 Type D[2]	Level 2 Type B
4 Hour	1,185	2,370					
8 Hour	2,250	4,500	60	Level 2 Type C	Level 2 Type B	Level 2 Type C[2]	Level 2 Type B
4 Hour	1,185	2,370					
8 Hour	4,500	6,000	≤50	Level 2 Type C	Level 2 Type B	Level 2 Type C[2]	Level 2 Type B
4 Hour	2,370	3,155					
8 Hour	4,500	6,000	60	Level 2 Type B	Level 2 Type B	Level 2 Type C[2]	Level 2 Type B
4 Hour	2,370	3,155					
8 Hour	6,000	7,500	≤50	Level 2 Type B	Level 2 Type B	Level 2 Type C[2]	Level 1 Type A
4 Hour	3,155	3,950					
8 Hour	6,000	7,500	60	Level 2 Type B	Level 2 Type B		
4 Hour	3,155	3,950					
8 Hour	7,500	17,500	≤50	Level 2 Type B	Level 2 Type B		
4 Hour	3,950	9,215					
8 Hour	7,500	17,500	60	Level 2 Type B			
4 Hour	3,950	9,215					

Type A Type B Type C Type D

Approaches to roundabouts should be considered a separate roadways.

[1]The total number of lanes is representative of crossing distance. The width of these lanes is assumed to be between 3.0 m and 3.75 m according to MTO Geometric Design Standards for Ontario Highways (Chapter D.2). A cross sectional feature (e.g. bike lane or on-street parking) may extend the average crossing distance beyond this range of lane widths.

[2]Use of two sets of side mounted signs for each direction (one on the right side and one on the median)

[3] Use Level 2 Type B PXO up to 3 lanes total, cross section one-way.

The hatched cells in this table show that a PXO is not recommended for sites with these traffic and geometric conditions. Generally a traffic signal is warranted for such conditions.

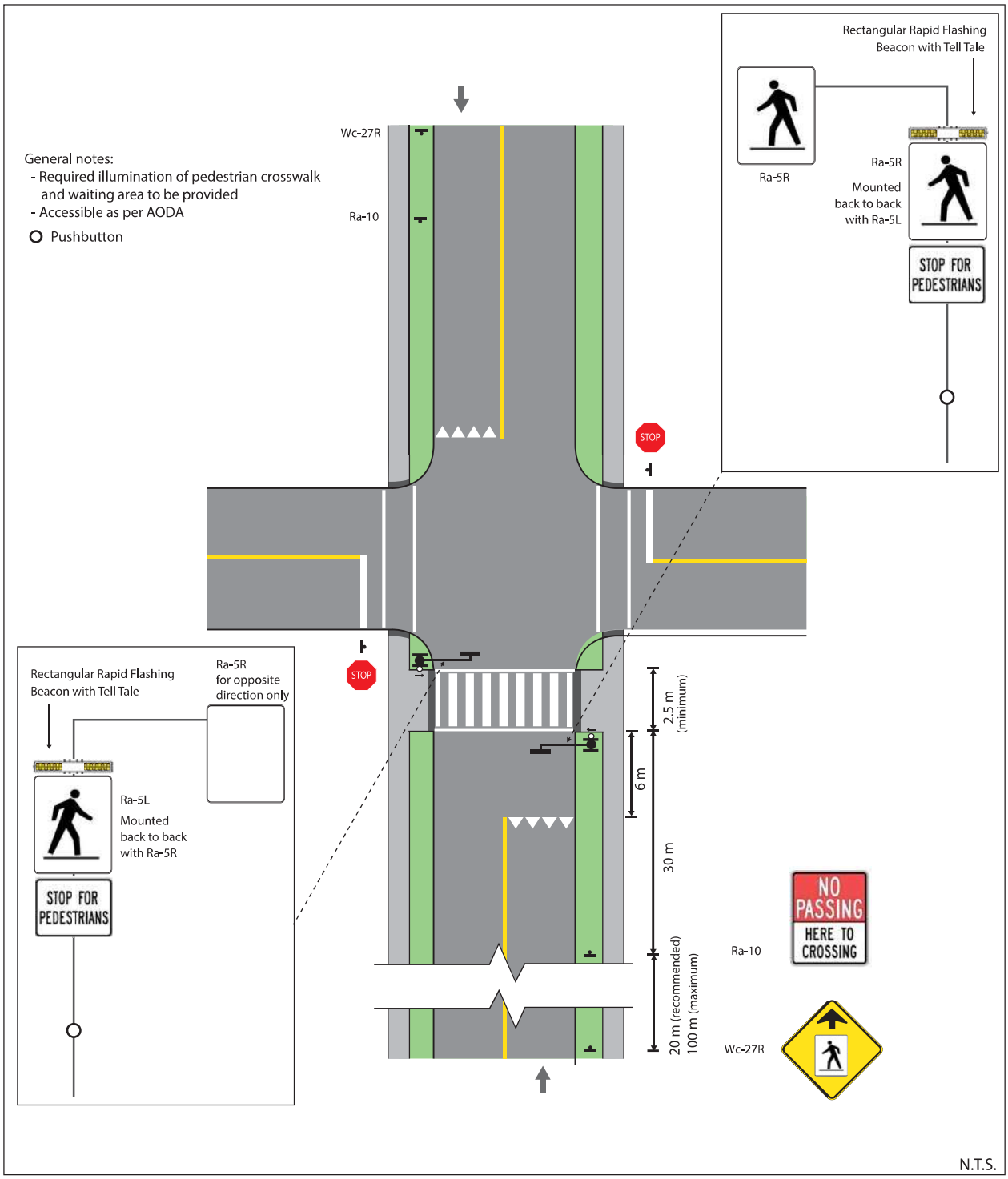


Figure 27: Pedestrian Crossover Level 2 Type B – Intersection (2-way)

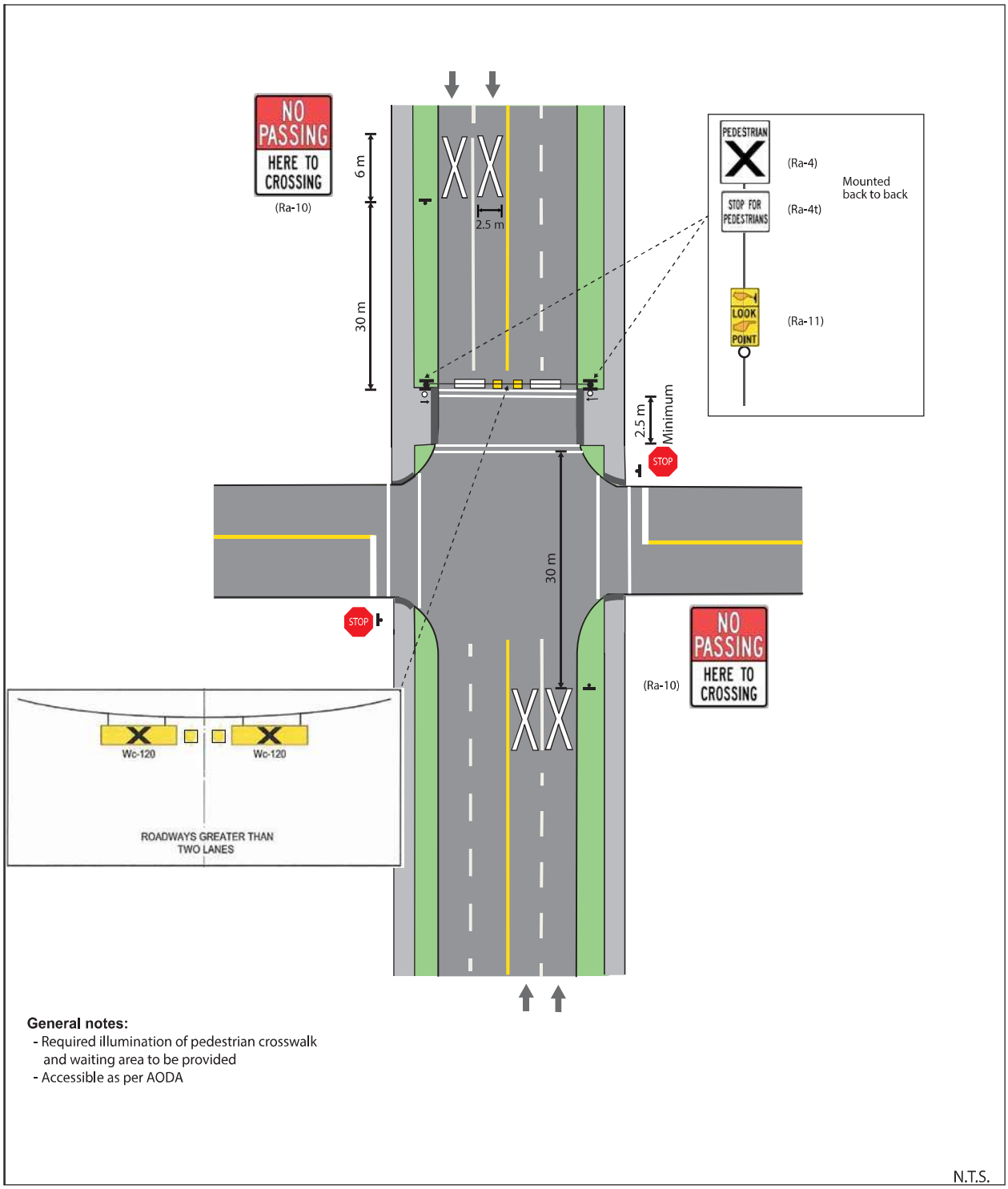


Figure 19: Pedestrian Crossover Level 1 Type A – Intersection (2-way)

Appendix L

Municipality of Middlesex Centre Zoning By-Law Excerpts

4.24 PARKING REGULATIONS

(a) PARKING SPACES REQUIRED

Except as otherwise provided herein, the owner or occupant of a lot, building or structure shall provide and maintain, one or more parking spaces on the said lot in accordance with the provisions of this section.

(b) MINIMUM PARKING SPACE REQUIREMENTS

The following regulations shall apply to all land uses within the Municipality with respect to the minimum parking space requirements:

Note: All area measurements are of gross floor area.

TYPE OF USE	MINIMUM PARKING SPACE REQUIREMENT
RESIDENTIAL	
single detached dwelling semi-detached dwelling	2 spaces per unit
duplex dwelling link dwelling apartment dwelling multiple unit dwelling street townhouse dwelling townhouse dwelling	1.5 spaces per unit
any residential use permitted by this By-law but not specifically mentioned elsewhere in this Clause	1 space per unit
COMMERCIAL	
animal clinic	1 space per 30 m^2
bed and breakfast establishment	1 space per guest room in addition to the required residential spaces
boarding house, rooming house or tourist house	1 space for every 3 rooms offered for rent
building supply establishment	1 space per 30 m^2 of retail space and 1 space per 200 m^2 of warehouse space
car wash	1 space per 10 m^2

club, private	1 space per 7 seats or 1 space per 35 m^2, whichever is greater
day nursery	1 space per 40 m^2
financial institution	1 space per 30 m^2
flea market	1 space per 20 m^2
garage, public	6 spaces per bay
garden centre	1 space per 30 m^2
gas bar	1 space per 10 m^2
hotel or motel	1.25 spaces per guest room
market garden	1 space per 20 m^2
motor vehicle sales establishment	1 space per 30 m^2
motor vehicle service establishment	6 spaces per bay
nursery	1 space per 30 m^2
office, general or professional	1 space per 40 m^2
personal service establishment	1 space per 20 m^2
place of entertainment or recreation	1 space per 7 seats or 1 space per 35 m^2, whichever is greater
restaurant	1 space per 10 m^2
restaurant, drive-thru or take-out	1 space per 10 m^2
service shop	1 space per 30 m^2
store, convenience	1 space per 25 m^2
store, retail	1 space per 25 m^2
tavern	1 space per 10 m^2
any commercial use permitted by this By-law but not specifically mentioned elsewhere in this Clause	1 space per 30 m^2
INDUSTRIAL	
abattoir	1 space per 100 m^2
animal hospital	1 space per 40 m^2
bulk sales establishment	1 space per 30 m^2 of retail space and 1 space per 200 m^2 of warehouse space
contractor's yard or shop	1 space per 100 m^2
industrial use, general industrial use, light	1 space per 100 m^2
machine shop	1 space per 30 m^2
truck terminal	1 space per 100 m^2
warehouse	1 space per 200 m^2
any industrial use permitted by this By-law but not specifically mentioned elsewhere in this Clause	1 space per 30 m^2 of gross floor area

INSTITUTIONAL	
arena	1 space per 7 seats or 1 space per 35 m^2, whichever is greater
cemetery	1 space per 30 m^2 of accessory office space
clinic	1 space per 30 m^2
community centre	1 space per 7 seats or 1 space per 35 m^2, whichever is greater
funeral home	1 space per 20 seats or 1 space per 20 m^2, whichever is greater
institutional use	1 space per 30 m^2
library	1 space per 40 m^2
nursing home	1 space per 2.5 beds
place of worship	1 space per 5 seats or 1 space per 20 m^2, whichever is greater
retirement home	1 space per 2.5 beds
school, elementary (public or private)	3 spaces + 2 space per classroom
school, secondary (public or private)	3 spaces per classroom
any institutional use permitted by this By-law but not specifically mentioned elsewhere in this Clause	1 space per 30 m^2
OTHER	
golf course	8 spaces per tee for a golf course and 1.5 spaces per tee for mini-putt and/or driving range
any other non-residential use permitted by this By-law but not specifically mentioned elsewhere in this Clause	1 space per 30 m^2 of gross floor area

(c) CALCULATION OF PARKING REQUIREMENTS

(i) where a building, structure or lot accommodates more than one type of use as set out in Clause (b) of this Subsection, the total parking space requirement for such building, structure or lot shall be the sum of the requirements for the separate uses thereof;

(ii) parking spaces required in accordance with this By-Law shall not include any parking spaces used or intended to be used primarily for the storage or parking of vehicles for hire or gain, display or sale; and

(iii) where the calculation of the required parking spaces results in a fraction, the required parking spaces shall be rounded to the next highest whole number.

(d) CALCULATION OF BARRIER-FREE PARKING REQUIREMENTS

(i) where parking is required for uses set out in Clause (b) of this Subsection, the total parking requirement for non-residential uses shall include the following number of barrier-free parking spaces:

Total Required Spaces	**Number of Required Barrier-Free Spaces**
1-25	1
26-50	2
51-75	3
76-100	4
101-150	5
151-200	6
201-250	7
251-300	8
Every additional 1 to 50 spaces required beyond the first 300 spaces	1

(e) DIMENSIONS OF PARKING SPACES

(i) a parking space required hereby shall have minimum rectangular dimensions of 2.7 metres (8.9 ft) by 5.5 metres (18 ft); and

(ii) a barrier-free parking space required hereby shall have minimum rectangular dimensions of 3.7 metres (12.1 ft) by 5.5 metres (18 ft).