



153 Union Street East, Waterloo, ON Transportation Impact Study

Paradigm Transportation Solutions Limited

2026-04
250792

Project Summary

**Project Number:**

250792

Date and Version:

2026-04

0.0.1

Client:**Southside Group**

75 Blackfriars Street
London, ON N6H 1K8

Michael Frijia
Vice President

Consultant Project Team

Erica Bayley, P.Eng.
Andrew Orr, EIT
Jim Mallett, P.Eng., PTOE

Paradigm Transportation Solutions Limited

5A-150 Pinebush Road
Cambridge ON N1R 8J8
p: 519.896.3163
905.381.2229
416.479.9684

www.ptsl.com

153 Union Street East, Waterloo, ON Transportation Impact Study



Erica Bayley, P.Eng.

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Executive Summary

Content

Southside Group retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study for a proposed mixed-use development located at 153 Union Street East in Waterloo, Ontario.

This Transportation Impact Study (TIS) includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for a five-year horizon from the date of the full build-out, and any recommendations required to manage future traffic conditions.

Development Concept

The subject site is proposed to be developed into two residential apartment buildings (each 11 to 12 storeys) with a combined total of 244 units plus 321 m² of commercial space.

Vehicle access is proposed via driveway connections to Union Street East and Roger Street.

The full build-out is assumed to be completed by 2028.

Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** The study area intersections are currently operating at acceptable levels of service with the following critical movements during the AM and PM peak hours:

Weber Street South at Union Street East:

- The northbound through/right-turn movement is modelled to have its 95th percentile queue length block the northbound left-turn lane during the AM and PM peak hours; and
- The southbound through/right-turn movement is modelled to have its 95th percentile queue length block the southbound left-turn lane during the AM and PM peak hours.

Union Street East at Moore Avenue South:

- The eastbound through/right-turn movement is modelled to have its 95th percentile queue length block the eastbound left-turn lane during the AM and PM peak hours;



- The westbound through movement is modelled to have its 95th percentile queue length block the westbound left-turn lane during the AM and PM peak hours;
 - The northbound through/right-turn movement is modelled to have its 95th percentile queue length block the northbound left-turn lane during the AM and PM peak hours; and
 - The southbound through/right-turn movement is modelled to have its 95th percentile queue length block the eastbound left-turn lane during the PM peak hour.
- ▶ **Development Trip Generation:** The development is forecast to generate approximately 68 and 54 net external trips during the AM and PM peak hours, respectively.
- ▶ **Background Traffic Conditions:** The study area intersections are forecast to operate at acceptable levels of service similar to existing traffic conditions with the following additional critical movements noted at the intersection of Weber Street South and Roger Street:
- The eastbound approach is forecast to operate with a delay exceeding 100 seconds during the PM peak hour; and
 - The westbound approach is forecast to operate with a delay exceeding 55 seconds during the AM peak hour.
- ▶ **Total Traffic Conditions:** The study area intersections are forecast to operate at acceptable levels of service similar to background traffic conditions with no additional critical movements noted.
- ▶ **Left-Turn Lane-Warrant:** Eastbound and westbound left-turn lanes are not warranted at the intersection of Roger Street and the Southern Site Access. However, at the intersection of Union Street East and Dover Street/Northern Site Access, a 15 m westbound left-turn lane is warranted under total traffic conditions and a 15 m eastbound left-turn lane is warranted under background traffic conditions. It is noted that the existing four-lane cross-section along Union Street East enables eastbound and westbound through vehicles to use the adjacent curb lane to travel around a left-turning vehicle at Dover Street/Northern Site Access. It is also noted that there are no forecast critical movements noted at the intersection of Union Street East and Dover Street/Northern Site Access. Therefore, left-turn lanes along Union Street East at Dover Street/Northern Site Access are not recommended.



- ▶ **Traffic Control Signal Warrant:** A traffic control signal is not justified at the intersection of Weber Street South at Roger Street under future total traffic conditions.
- ▶ **Pedestrian Crossover (PXO) Warrant:** Pedestrian crossovers are not warranted at the Spur Line Trail crossings along Moore Avenue South and Roger Street.
- ▶ **Transportation Demand Management:** Given the active transportation-friendly environment and location within the Allen Station Major Transit Station Area, future residents will have opportunities to conveniently access:
 - the existing sidewalk network and the Spur Line Trail;
 - public transit (bus and light rail service); and
 - car share spaces.

Recommendations

Based on the findings of this study, it is recommended that the development be considered for approval with no conditions related to geometric improvements along the existing study area roadways. It is also recommended that:

- ▶ the City continue to monitor the need for a Pedestrian Crossover (PXO) at the Spur Line Trail crossing along Roger Street; and
- ▶ the developer and/or building owner (as applicable) further promote transportation demand management, and the multi-modal transportation network near the site, by considering the following:
 - unbundling parking;
 - providing transit and active transportation information in a welcome package to new residents and tenants, including the posting of this information in a central location; and
 - providing 74 Type A residential, 74 Type B residential, and three non-residential bicycle parking spaces.



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1 Introduction

1.1 Overview

Southside Group retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study for a proposed mixed-use development located at 153 Union Street East in Waterloo, Ontario. **Figure 1.1** illustrates the site location.

The study scope includes:

- ▶ assessing current traffic and site conditions within the study area;
- ▶ forecasting future non-development (background) traffic growth;
- ▶ forecasting site-generated traffic;
- ▶ analysing future traffic impacts on the surrounding road network for five years after the full build-out; and
- ▶ recommending any necessary mitigation to manage future traffic conditions.

Appendix A contains the pre-study consultation material and responses from the Region and City.

1.2 Study Area

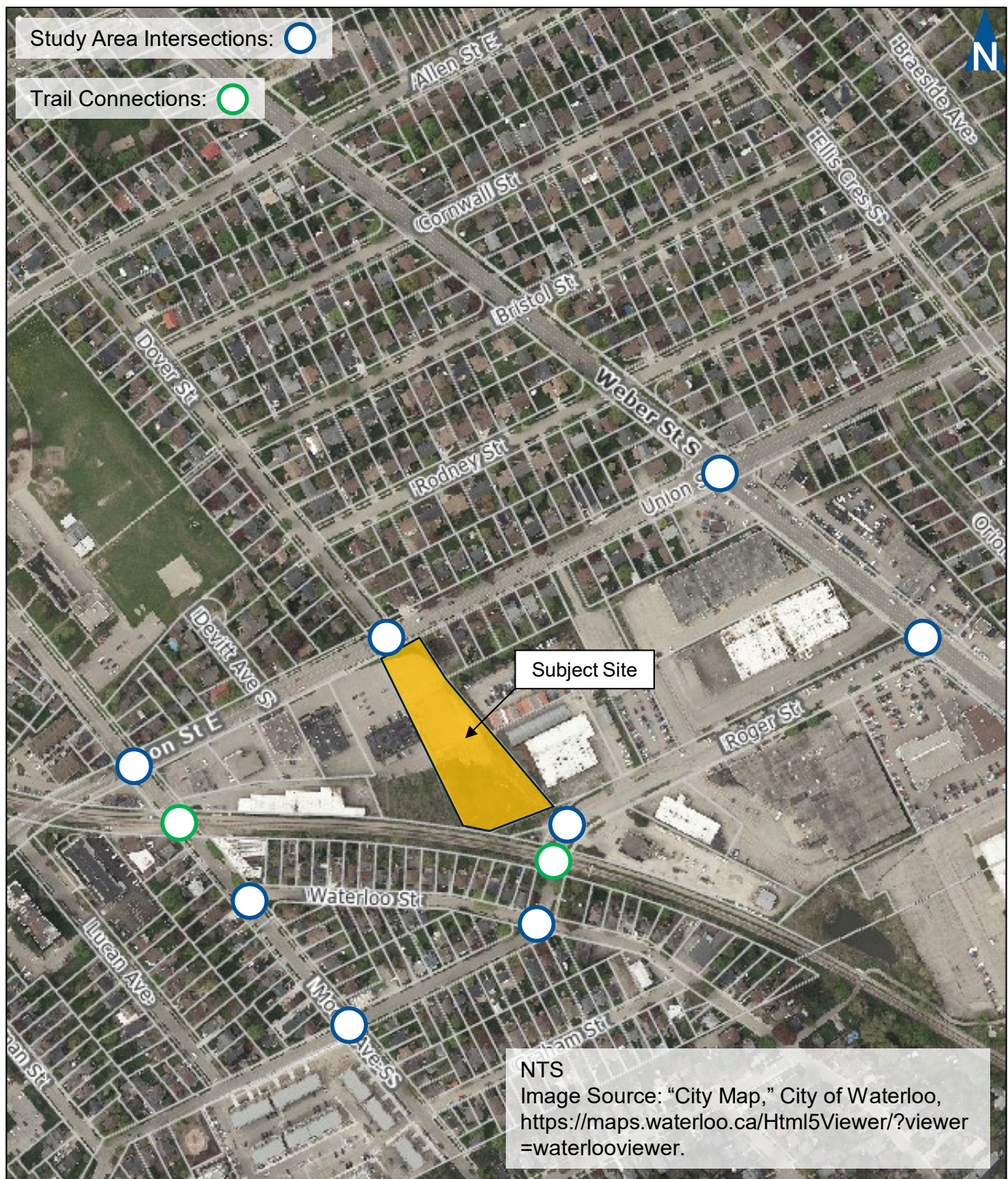
The intersections assessed in this study include:

- ▶ Roger Street at Weber Street South (unsignalized);
- ▶ Union Street East at Moore Avenue South (signalized);
- ▶ Union Street East at Weber Street South (signalized);
- ▶ Roger Street at Moore Avenue South (unsignalized).
- ▶ Moore Avenue South at Waterloo Street (unsignalized);
- ▶ Roger Street at Waterloo Street (unsignalized);
- ▶ Dover Street/proposed driveway connection to Union Street East (unsignalized); and
- ▶ the proposed driveway connection to Roger Street (unsignalized).

The active transportation connections assessed in this study include:

- ▶ Moore Avenue South at the Spur Line Trail; and
- ▶ Roger Street at Spur Line Trail.





2 Existing Conditions

2.1 Road Characteristics

The roadways of interest within the study area include Weber Street South (Region of Waterloo governed) and Union Street East, Moore Avenue South, Dover Street, Waterloo Street, and Roger Street (all City of Waterloo governed). These roadways are generally described as follows¹:

- ▶ **Weber Street South** is a four-lane, 50 km/h regional arterial road within the study area. Sidewalks are provided along both sides of the roadway;
- ▶ **Union Street East** is a 50 km/h major collector road within the study area and with sidewalks provided along both sides of the roadway. East of Moore Avenue South, the roadway has a four-lane cross-section. West of Moore Avenue South, the roadway has a two-lane cross-section;
- ▶ **Moore Avenue South** is a minor collector road within the study area. The speed limit along the roadway is 40 km/h however, between Allen Street East and Union Street East, the speed limit is 30 km/h. North of Graham Street, sidewalks are provided along both sides of the roadway. South of Graham Street, a sidewalk is only provided along the east side of the roadway;
- ▶ **Dover Street** is a two-lane, 30 km/h local road within the study area. Sidewalks are provided along both sides of the roadway;
- ▶ **Waterloo Street** is a two-lane, local road within the study area and sidewalks are provided along both sides of the roadway. North of Graham Street, the speed limit is 30 km/h. South of Graham Street, the speed limit is 40 km/h; and
- ▶ **Roger Street** is a two-lane, 30 km/h local road within the study area. Between Weber Street East and Bowman Street, a sidewalk is provided along the south side of the roadway. Although, in addition to the sidewalk along the south side of roadway, a sidewalk is provided along the north side of the roadway between Waterloo Street and Lucan Avenue.

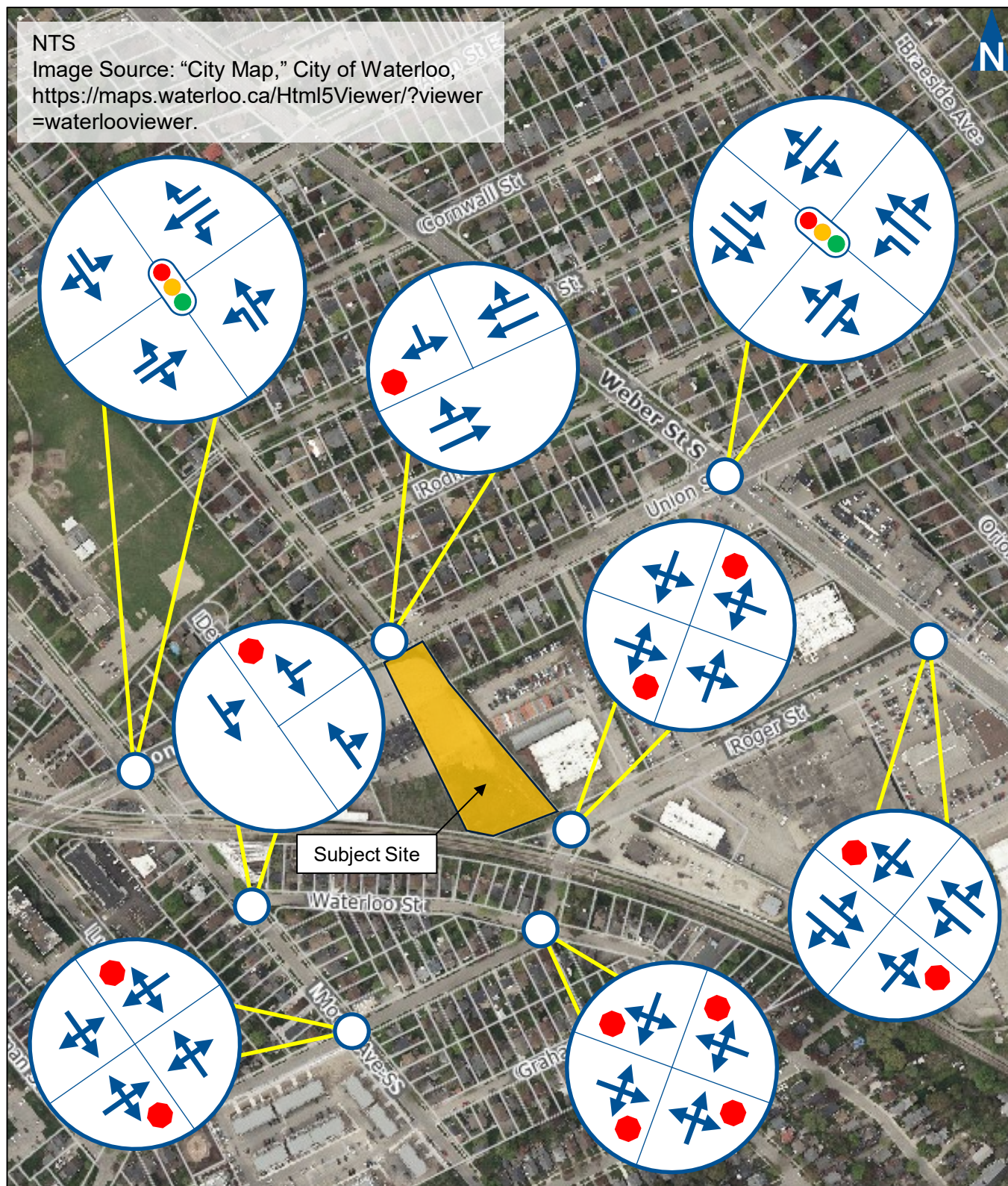
Figure 2.1 details the existing traffic control and lane configurations at the study area intersections.

¹ City of Waterloo, *Official Plan Road Classification System Schedule E*, (Waterloo: City of Waterloo, 2018).



NTS

Image Source: "City Map," City of Waterloo,
<https://maps.waterloo.ca/Html5Viewer/?viewer=waterlooviewer>.



Existing Lane Configurations and Traffic Control

153 Union Street East, Waterloo TIS
250792

Figure 2.1

2.2 Active Transportation

2.2.1 Walking

Sidewalks are provided on at least one side of all surrounding roadways.

The subject site earns a Walk Score² of 75 and is considered “Very Walkable” which means that most errands can be accomplished on foot. Walk Score is an online tool that assigns a score between 0 and 100 based on how many businesses, parks, theatres, schools, and other common destinations are within walking distance of the site.

2.2.2 Cycling

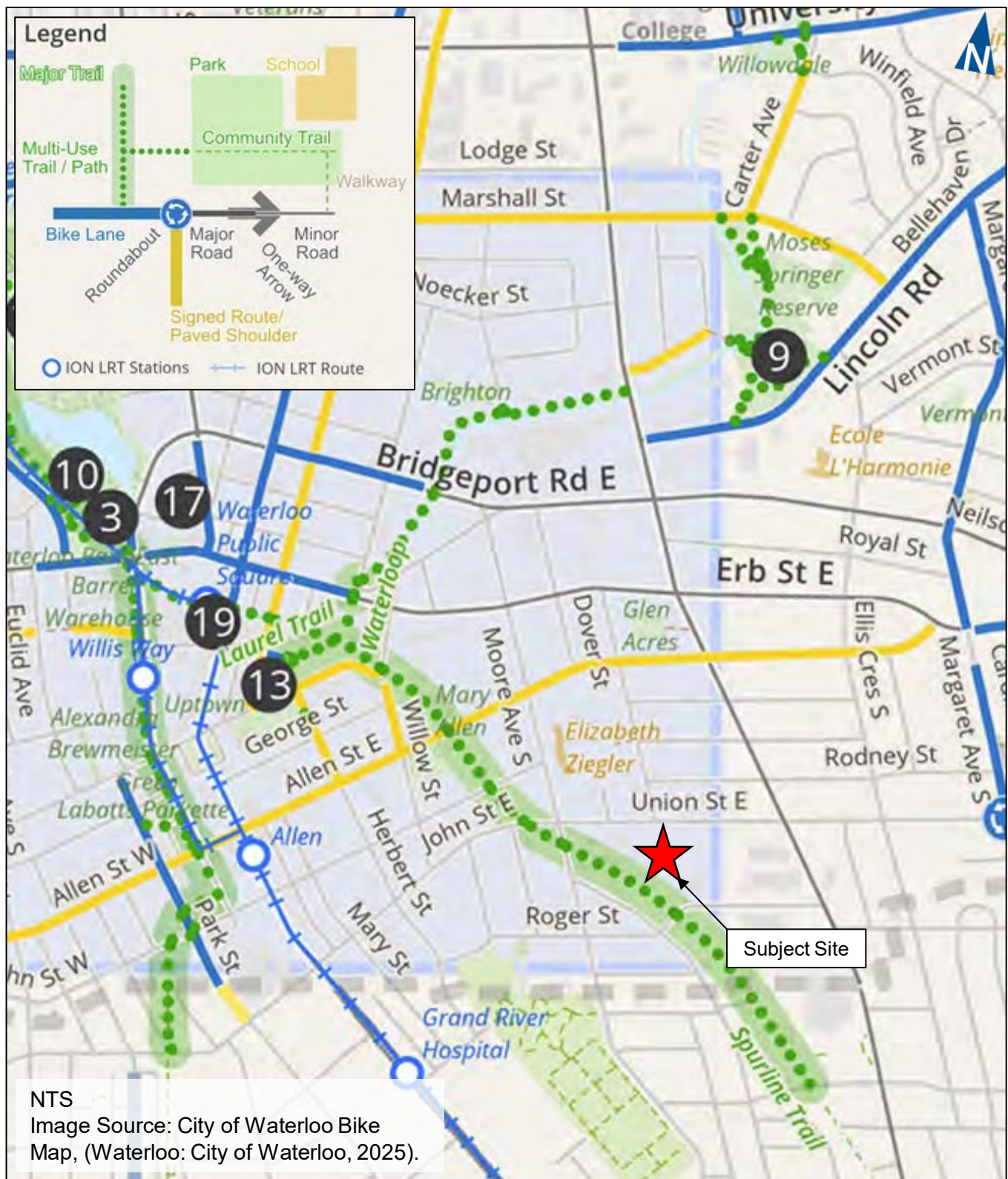
The Spur Line Trail is immediately adjacent to the subject site and nearby connections to the trail include exist on:

- ▶ Moore Avenue South between Union Street East and Waterloo Street;
- ▶ Roger Street to the east of Waterloo Street; and
- ▶ Union Street East between Moore Avenue South and Lucan Avenue.

Additionally, a cycling route is provided along Allen Street East. It is also noted that the Spur Line Trail is an active transportation route that connects the site to the University of Waterloo, Wilfred Laurier University, Uptown Waterloo, and Downtown Kitchener. Therefore, future residents of the site will have opportunities to access commercial, employment, and institutional areas within the Region of Waterloo via walking and/or cycling.

² “Walk Score,” 2025, <https://www.walkscore.com/score/153-union-st-e-waterloo-on-canada>.





2.3 Transit Service

Figure 2.3 illustrates the existing transit network. Grand River Transit³ operates seven routes (six bus and one light rail) near the study area:

- ▶ **Route 4 (Glasgow-Margaret)** travels between the Boardwalk shopping center and Downtown Kitchener. This route operates Monday to Friday from 5:50 AM to 12:20 AM with headways between 20 to 45 minutes. On Saturday, this route operates from 6:20 AM to 11:20 PM with headways between 30 to 60 minutes. On Sunday, this route operates from 8:30 AM to 11:25 PM with headways between 30 to 60 minutes;
- ▶ **Route 5 (Erb)** travels between the Boardwalk shopping center and the Bridgeport area of Kitchener Monday to Saturday). On Sunday, the route travels between the Boardwalk shopping center and Uptown Waterloo. This route operates Monday to Friday from 5:30 AM to 12:20 AM with headways between 20 to 40 minutes. On Saturday, this route operates from 6:05 AM to 12:00 AM with headways between 25 to 60 minutes. On Sunday, this route operates from 9:45 AM to 6:20 PM with 45 minute headways;
- ▶ **Route 7 (King)** travels between Fairview Park Mall in Kitchener and Conestoga Mall in Waterloo. This route operates Monday to Friday from 5:25 AM to 12:40 AM with headways between 10 to 30 minutes. On Saturday, the route operates from 5:40 AM to 12:40 AM with headways between 10 to 30 minutes. On Sunday, the route operates from 8:00 AM to 12:40 AM with headways between 10 to 30 minutes;
- ▶ **Route 8 (Weber)** travels between the intersection of King Street North and University Avenue East/West in Waterloo and Fairview Park Mall in Kitchener. This route operates Monday to Friday from 5:35 AM to 1:05 AM with headways generally between 5 to 30 minutes. On Saturday, the route operates from 6:15 AM to 12:35 AM with headways between 25 to 35 minutes. On Sunday, the route operates from 7:25 AM to 12:35 AM with headways between 25 to 35 minutes;
- ▶ **Route 16 (Strasburg-Belmont)** travels between the Doon Campus for Conestoga College in Kitchener and Uptown Waterloo. This route operates Monday to Friday from 5:20 AM to 11:45 PM with headways between 10 to 30 minutes. On Saturday, the route operates from 6:25 AM to 12:20 AM with headways between 30 to 35 minutes. On Sunday, the route

³ "Grand River Transit Map," Region of Waterloo, 2025, <https://www.grt.ca/en/schedules-maps/system-map.aspx>.



operates from 7:45 AM to 12:20 AM with headways between 25 to 35 minutes;

- ▶ **Route 91 (Late Night Loop)** travels between Downtown Kitchener and the University of Waterloo. This route operates Thursday to Saturday from 12:00 AM to 2:35 AM with 30-minute headways; and
- ▶ **Route 301 (ION Light Rail)** travels between Conestoga Mall in Waterloo and Fairview Park Mall in Kitchener. This route operates Monday to Friday from 4:45 AM to 12:25 AM with headways between 10 to 35 minutes. On Saturday, the route operates from 5:25 AM to 12:25 AM with headways between 15 to 30 minutes. On Sunday, the route operates from 6:15 AM to 12:25 AM with headways between 15 to 30 minutes.

The bus stops immediately adjacent to the subject site include:

- ▶ Stop 1083: Located on the south side of Union Street East directly opposite to the Devitt Avenue South intersection with Union Street East; and
- ▶ Stop 1005: Located on the north side of Union Street East between Dover Street and Devitt Avenue South.

The subject site is located within the Major Transit Station Area (MTSA) for the Allen ION Station. Therefore, the ION light rail service is reasonably accessible (1.1 km from the subject site or a 16-minute walk).

It is noted that the Grand River Hospital ION Station can also provide future residents with another location to access the ION light rail service (1.3 km from the subject site or an 18-minute walk).





2.4 Traffic Data

Paradigm undertook Turning Movement Counts (TMCs) at the study area intersections and active transportation counts (pedestrians and cyclists) at trail connections adjacent to the site in January 2026.

During the time of TMC collection, it is acknowledged that Elizabeth Ziegler Public School (adjacent to the study area) was closed as indicated by City staff at the study pre-consultation. Therefore, the January 2026 TMC data are not reflective of typical weekday AM and weekday PM peak hour traffic conditions.

To forecast base year traffic conditions at the study area intersections that reflect conditions where Elizabeth Ziegler Public School is open, historical traffic data provided by both the City and Region were used to calculate an adjustment factor (approximately 1.13) to apply to the observed January 2026 TMC data.

It is noted that the active transportation counts at the adjacent trail connections and the conflicting pedestrian counts at the study area intersections collected in January 2026 were not adjusted. Although, at the intersection of Union Street East and Moore Avenue South (the closest study area intersection to Elizabeth Ziegler Public School), the conflicting pedestrian counts from TMC data collected in September 2023 by the Region was used in lieu of the conflicting pedestrian counts from the January 2026 TMC data collected by Paradigm.

At the intersection of Union Street East and Moore Avenue South, the number of pedestrians crossing each leg during the weekday AM and weekday PM peak hours was higher in the September 2023 data.

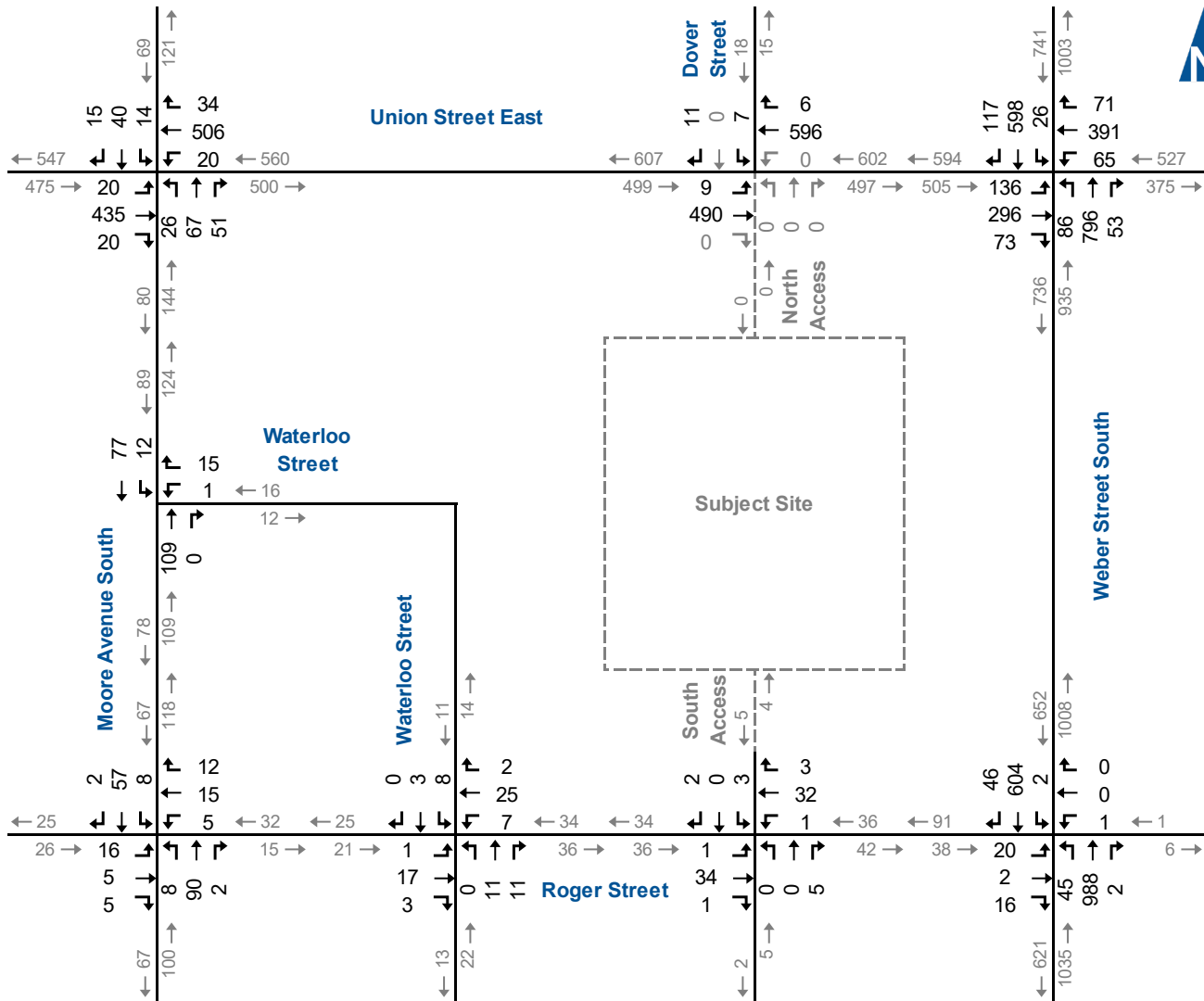
The proposed south access for the site connecting to Roger Street extends the existing driveway for Cafe Pyrus Outpost (150 Roger Street) and aligns with the western driveway for Boucher & Jones Fuels Petro-Canada Distributor (155 Roger Street).

AM and PM peak hour observations from the January 2026 video data at the adjacent Spur Line Trail crossing along Roger Street were used to determine the existing trip generation activity for the two connections to the proposed southern site access to Roger Street.

Appendix B contains the observed and historical traffic counts for the study area intersections along with the existing signal timings. **Figure 2.4** and **Figure 2.5** illustrate the adjusted base year weekday AM and PM peak hour traffic volumes.



AM Peak Hour



2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

The operations of the study intersections were evaluated using the existing lane configurations, traffic controls, and the base year traffic peak hour volumes.

The level of service conditions on the existing road network have been assessed using Synchro 12. As noted in the Region of Waterloo TIS guidelines⁴, movements are considered critical when the:

- ▶ estimated 95th percentile queue length for an exclusive movement exceeds the available storage space;
- ▶ exclusive turning lanes are inaccessible because of queue lengths in adjacent through lanes;
- ▶ estimated 95th percentile queue length for an individual movement will block an existing access; and
- ▶ average control delay for individual movements is greater than 55 seconds.

Intersections are considered critical when:

- ▶ an unsignalized intersection has an average control delay larger than 35 seconds (LOS E or F); and when
- ▶ a signalized intersection has an average control delay larger than 55 seconds (LOS E or F).

⁴ Region of Waterloo, *Transportation Impact Study Guidelines*, (Kitchener: Region of Waterloo, 2014).



Table 2.1 and **Table 2.2** summarize the existing intersection operations. The entries in the table indicating the AM and PM peak hour level of service (LOS), volume to capacity ratios (V/C), and 95th percentile queues experienced.

All study area intersections currently operate at overall acceptable levels of service during the weekday AM and PM peak hours with critical movements at:

- ▶ Weber Street South at Union Street East where:
 - the northbound through/right-turn movement is modelled to have 95th percentile queue length that blocks the northbound left-turn lane during the AM and PM peak hours; and
 - the southbound through/right-turn movement is modelled to have 95th percentile queue length that blocks the southbound left-turn lane during the AM and PM peak hours.
- ▶ Union Street East at Moore Avenue South where:
 - the eastbound through/right-turn movement is modelled to have a 95th percentile queue length that blocks the eastbound left-turn lane during the AM and PM peak hours;
 - the westbound through movement is modelled to have a 95th percentile queue length that blocks the westbound left-turn lane during the AM and PM peak hours;
 - the northbound through/right-turn movement is modelled to have a 95th percentile queue length that blocks the northbound left-turn lane during the AM and PM peak hours; and
 - the southbound through/right-turn movement is modelled to have a 95th percentile queue length that blocks the eastbound left-turn lane during the PM peak hour.

Appendix C contains the supporting detailed Synchro reports.



TABLE 2.1: BASE YEAR OPERATIONS (AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																	
				Eastbound				Westbound				Northbound				Southbound				Overall	
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	Weber Street South & Union Street East	TCS	LOS Delay V/C Q Stor. Avail.	< < < < <	B 13 0.54 42 - -	> > > > >	B 13	< < < < <	C 26 0.64 50 - -	> > > > >	C 26	B 17 0.35 15 30 15	B 18 0.59 66 - -	> > > > >	B 18	C 22 0.14 9 25 16	C 25 0.64 67 - -	> > > > >	C 25	C 21	
	Moore Avenue South & Union Street East	TCS	LOS Delay V/C Q Stor. Avail.	A 7 0.05 4 25 21	B 11 0.49 57 - -	> > > > >	B 11	A 5 0.04 2 25 23	A 8 0.46 39 - -	A 1 0.04 0 - -	A 7	C 21 0.07 8 15 7	B 15 0.26 20 - -	> > > > >	B 16	C 20 0.04 6 15 9	B 17 0.12 12 - -	> > > > >	B 18	B 10	
	Weber Street South & Roger Street	TWSC	LOS Delay V/C Q	< < < <	D 33 0.23 7	> > > >	D 33	< < < <	E 45 0.01 0	> > > >	E 45	A 9 0.05 2	A 1 0.00 0	A 0 0.00 0	> > > >	A 1	B 10 0.00 0	A 0 0.00 0	> > > >	A 0	
	Moore Avenue South & Roger Street	TWSC	LOS Delay V/C Q	< < < <	B 10 0.04 1	> > > >	B 10	< < < <	A 10 0.04 1	> > > >	B 10	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	> > > >	A 1	A 7 0.01 0	A 0 0.00 0	> > > >	A 1	
	Moore Avenue South & Waterloo Street	TWSC	LOS Delay V/C Q					A 9 0.02 1		> > > >	A 9		A 0 0.00 0	A 0 0.00 0	> > > >	A 0	A 7 0.01 0	A 0 0.00 0		A 1	
	Waterloo Street & Roger Street	AWSC	LOS Delay V/C Q	< < < <	A 7 0.02 1	> > > >	A 7	< < < <	A 7 0.04 1	> > > >	A 7	< < < <	A 7 0.03 1	> > > >	A 7	< < < <	A 7 0.01 0	> > > >	A 7		
	Union Street East & Dover Street	TWSC	LOS Delay V/C Q	A 9 0.01 0	A 0 0.00 0		A 0		A 0 0.00 0	A 0 0.00 0		A 0					B 14 0.04 1		> > > >	B 14	
	Roger Street & South Access	TWSC	LOS Delay V/C Q	A 7 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0	< < < <	A 10 0.01 0	> > > >	A 10	< < < <	A 9 0.01 0	> > > >	A 9	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

</> - Shared Movement



TABLE 2.2: BASE YEAR OPERATIONS (PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																		
				Eastbound				Westbound				Northbound				Southbound				Overall		
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach			
PM Peak Hour	Weber Street South & Union Street East	TCS	LOS Delay V/C Q Stor. Avail.	< < < < <	C 25 0.74 63 - -	> > > > >	C 25 - - -	< < < < <	C 26 0.50 40 - -	> > > > >	C 26 - - -	B 20 0.43 17 30 13	B 18 0.54 66 - -	> > > > >	B 18 - - -	C 25 0.25 16 25 9	C 30 0.76 99 - -	> > > > >	C 30 - - -	C 24		
	Moore Avenue South & Union Street East	TCS	LOS Delay V/C Q Stor. Avail.	A 8 0.10 7 25 18	B 14 0.62 84 - -	> > > > >	B 13 - - -	A 7 0.06 4 25 21	A 10 0.41 51 - -	A 1 0.03 2 - -	A 9 - - -	C 22 0.15 13 15 2	B 16 0.26 22 - -	> > > > >	B 18 - - -	C 21 0.10 10 15 5	B 19 0.31 28 - -	> > > > >	B 20 - - -	B 13		
	Weber Street South & Roger Street	TWSC	LOS Delay V/C Q	< < < <	F 52 0.58 23	> > > >	F 52 - - -	< < < <	D 28 0.01 0	> > > >	D 28 - - -	B 10 0.03 1	A 0 0.00 0	A 0 0.00 0	> > > >	A 1 - - -	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0		
	Moore Avenue South & Roger Street	TWSC	LOS Delay V/C Q	< < < <	B 10 0.04 1	> > > >	B 10 - - -	< < < <	B 10 0.04 1	> > > >	B 10 - - -	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	> > > >	A 1 - - -	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	
	Moore Avenue South & Waterloo Street	TWSC	LOS Delay V/C Q					A 9 0.04 1			> > > >	A 9 - - -	A 0 0.00 0	A 0 0.00 0	> > > >	A 0 - - -	A 8 0.01 0	A 0 0.00 0		A 1 - - -		
	Waterloo Street & Roger Street	AWSC	LOS Delay V/C Q	< < < <	A 7 0.03 1	> > > >	A 7 - - -	< < < <	A 7 0.07 2	> > > >	A 7 - - -	< < < <	A 7 0.03 1	> > > >	A 7 - - -	< < < <	A 8 0.02 1	> > > >	A 8 - - -	A 8		
	Union Street East & Dover Street	TWSC	LOS Delay V/C Q	A 9 0.01 0	A 0 0.00 0		A 0 - - -		A 0 0.00 0	A 0 0.00 0		A 0 - - -					B 13 0.04 1		> > > >	B 13 - - -		
	Roger Street & South Access	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 - - -		A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 - - -	< < < <	A 9 0.00 0	> > > >	A 9 - - -	< < < <	A 9 0.00 0	> > > >	A 9 - - -	A 9	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

</> - Shared Movement



3 Development Concept

3.1 Development Description

The subject site is located at 153 Union Street East in Waterloo, Ontario.

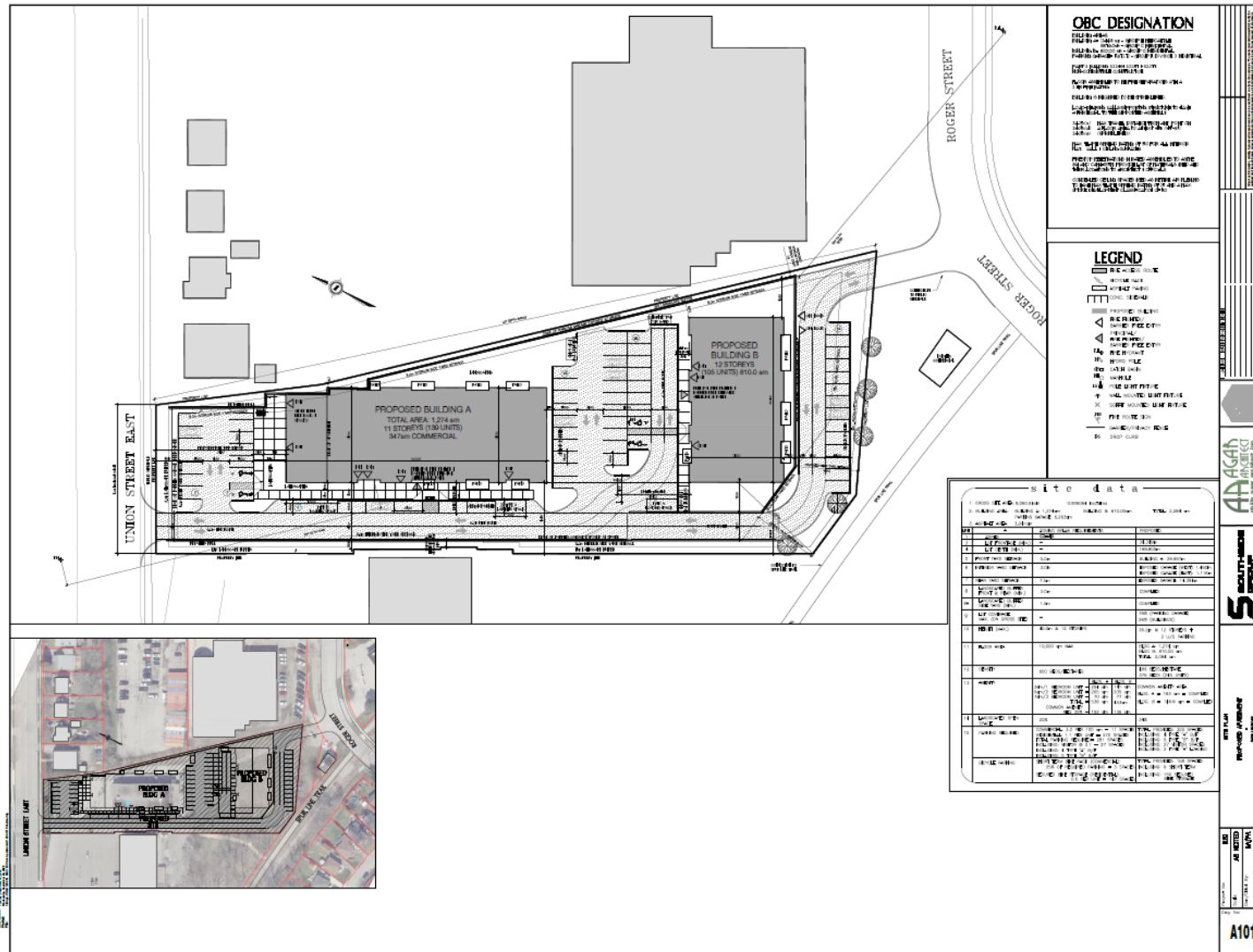
The subject site is proposed to be developed into two residential apartment buildings (each 11 to 12 storeys) with a combined total of 244 units plus 321 m² of commercial space.

Vehicle access is proposed via driveway connections to Union Street East and Roger Street.

The full build-out is assumed to be completed by 2028.

Figure 3.1 shows the proposed concept plan.





3.2 Site Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual⁵ methods forecast site-generated trips. Land Use Code (LUC) 222 – Multifamily Housing (High-Rise) – Close to Rail Transit and Dense, Multi-Use Urban plus LUC 822 – Strip Retail Plaza (<40k) were used to estimate the site trip generation.

Table 3.1 summarizes the forecast site-generated trips indicating 68 AM peak hour and 54 PM peak hour net external trips.

The estimated site trip generation is based on the average trip rates for both land uses during the AM and PM peak hours. For LUC 822 during the AM peak hour, the equation rate is not available. For LUC 822 during the PM peak hour and LUC 222 (both peak hours), the regression equations have coefficients of determination (R^2 values) with an undesirable fit.

ITE internal capture calculations were used to determine the internal capture rates between the residential and commercial/retail uses.

Appendix D contains the internal capture calculations.

An ITE pass-by trip reduction of 40% was applied during the PM peak hour for LUC 822 per LUC 821.

TABLE 3.1: FORECAST SITE-GENERATED TRIPS

LUC	Size	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
222	244 Units	6	48	54	32	14	46
822	3.46 ft ² /1000	7	7	14	11	11	22
Total Trip Generation		13	55	68	43	25	68
<i>Internal Capture</i>		<i>0</i>	<i>0</i>	<i>0</i>	<i>4</i>	<i>4</i>	<i>8</i>
<i>Pass-by Trips</i>		<i>0</i>	<i>0</i>	<i>0</i>	<i>3</i>	<i>3</i>	<i>8</i>
<i>Net Trip Generation</i>		<i>14</i>	<i>55</i>	<i>68</i>	<i>36</i>	<i>18</i>	<i>54</i>

LUC 222: AM - Average Rate = 0.22 | PM - Average Rate = 0.19

LUC 822: AM - Average Rate = 3.93 | PM - Average Rate = 6.29

The trip distribution used for this study was based on the existing distribution and the 2022 Transportation Tomorrow Survey (TTS) data⁶. The trip distribution for this study is appropriate for this study

⁵ Institute of Transportation Engineers, *Trip Generation Manual*, 12th ed., (Washington DC: ITE, 2025).

⁶ Data Management Group, *Transportation Tomorrow Survey 2022*, University of Toronto, 2025, <http://www.transportationtomorrow.on.ca/>



because all site trips enter and exit the study area via arterial and collector roads and all travel directions provide connections to employment areas. **Table 3.2** summarizes the estimated trip distribution.

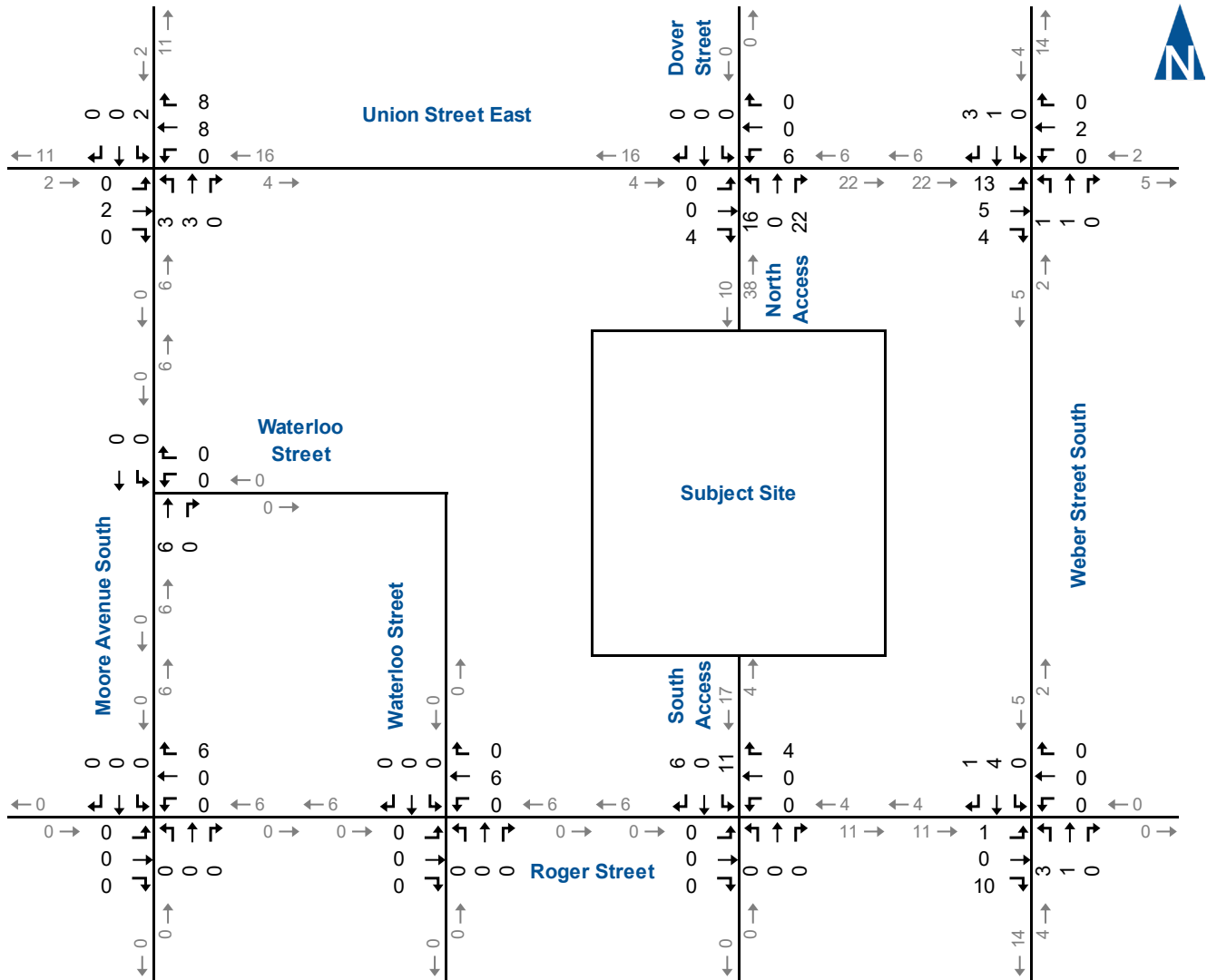
Figure 3.2 and **Figure 3.3** illustrate the site-generated traffic for the AM and PM peak hours.

TABLE 3.2: TRIP DISTRIBUTION

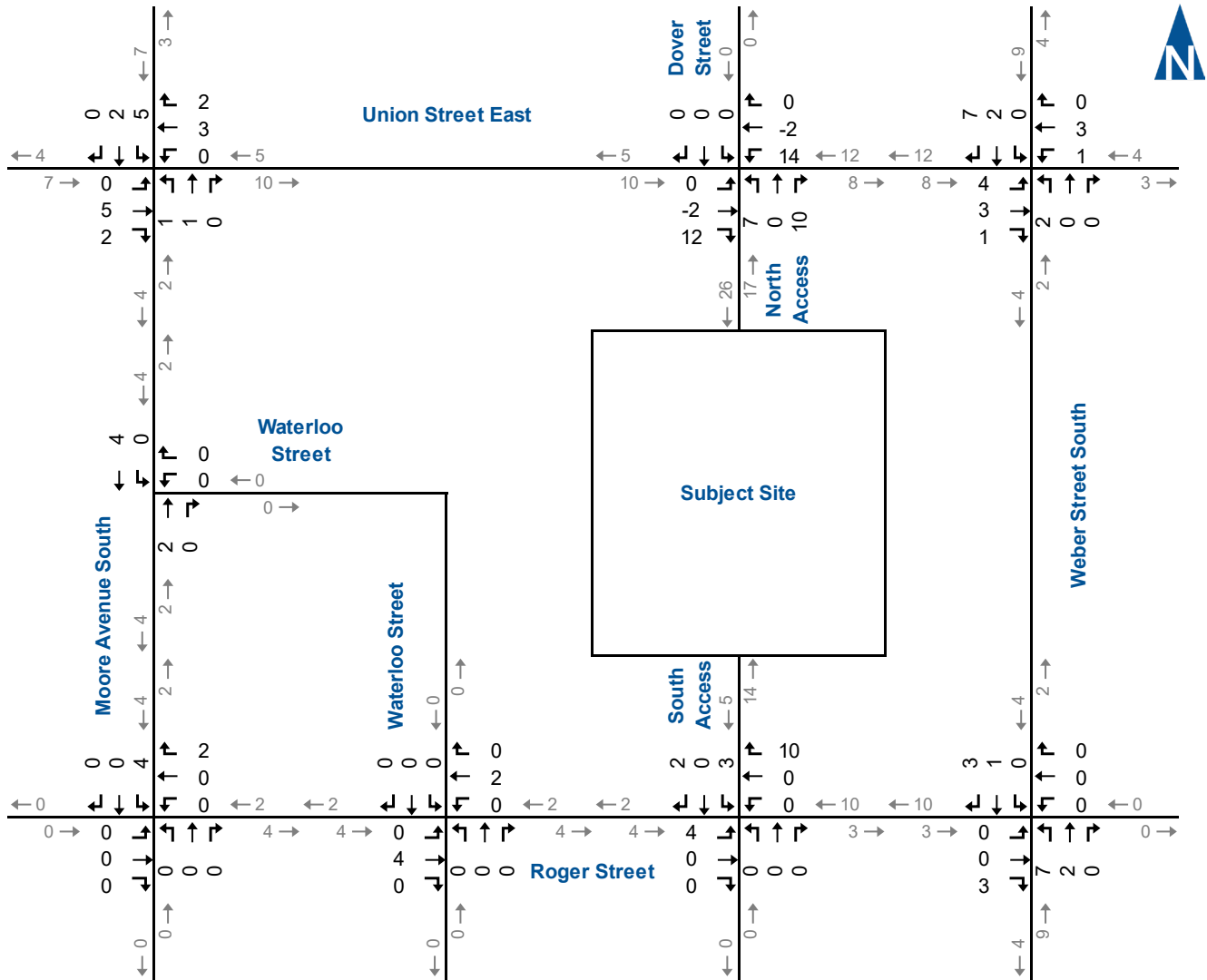
Origin/Destination	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
North via Weber Street South	25%	25%	25%	25%
North via Moore Avenue South	15%	20%	20%	15%
South via Weber Street South	30%	25%	25%	25%
East via Union Street East	15%	10%	10%	15%
West via Union Street East	15%	20%	20%	20%
Total	100%	100%	100%	100%



AM Peak Hour



PM Peak Hour



4 Future Conditions

This section contains an assessment of the future traffic conditions using future traffic forecasts as input to the intersection operational analyses. A five-year horizon (2033) from the anticipated full build-out of the site (2028) has been assessed to determine the impact of the subject site.

To the west of Moore Avenue South, it is acknowledged that the cross-section along Union Street East⁷ will be modified to better accommodate active transportation users. However, the illustrations of the proposed improvements to the cross-section along Union Street East indicate that the existing lane configuration at the intersection of Moore Avenue South and Union Street East will remain.

4.1 Forecast Traffic

Future background traffic volumes reflect an annual growth rate of 2.0% applied to the adjusted base year volumes as indicated by the City and Region at the pre-study consultation.

Additionally, the future background traffic volumes in this study also includes traffic generated from the following proposed developments as requested by the City:

- ▶ 924-944 King Street West⁸: Located west of the subject site at the intersection of King Street West and Mount Hope Street. The development proposes 341 high-rise residential units and a 659 m² commercial space and is forecast to generate 87 and 90 new vehicle trips during the AM and PM peak hours, respectively; and
- ▶ 864-872 King Street West⁹: Located west of the subject site at the intersection of King Street West and Pine Street. The development proposes 455 high-rise residential units and is forecast to generate 100 and 86 new vehicle trips during the AM and PM peak hours, respectively.

Appendix E contains the background development traffic volumes.

⁷ Walterfedy, *Union Street East Reconstruction (King Street South to Moore Avenue South)*, (Waterloo: City of Waterloo, n.d.).

⁸ Paradigm Transportation Solutions Limited, *924-944 King Street West, Kitchener, ON Transportation Impact Study*, (Cambridge: PTSL, 2024).

⁹ Paradigm Transportation Solutions Limited, *864 King Street West, Kitchener, ON Transportation Impact Study*, (Cambridge: PTSL, 2024).

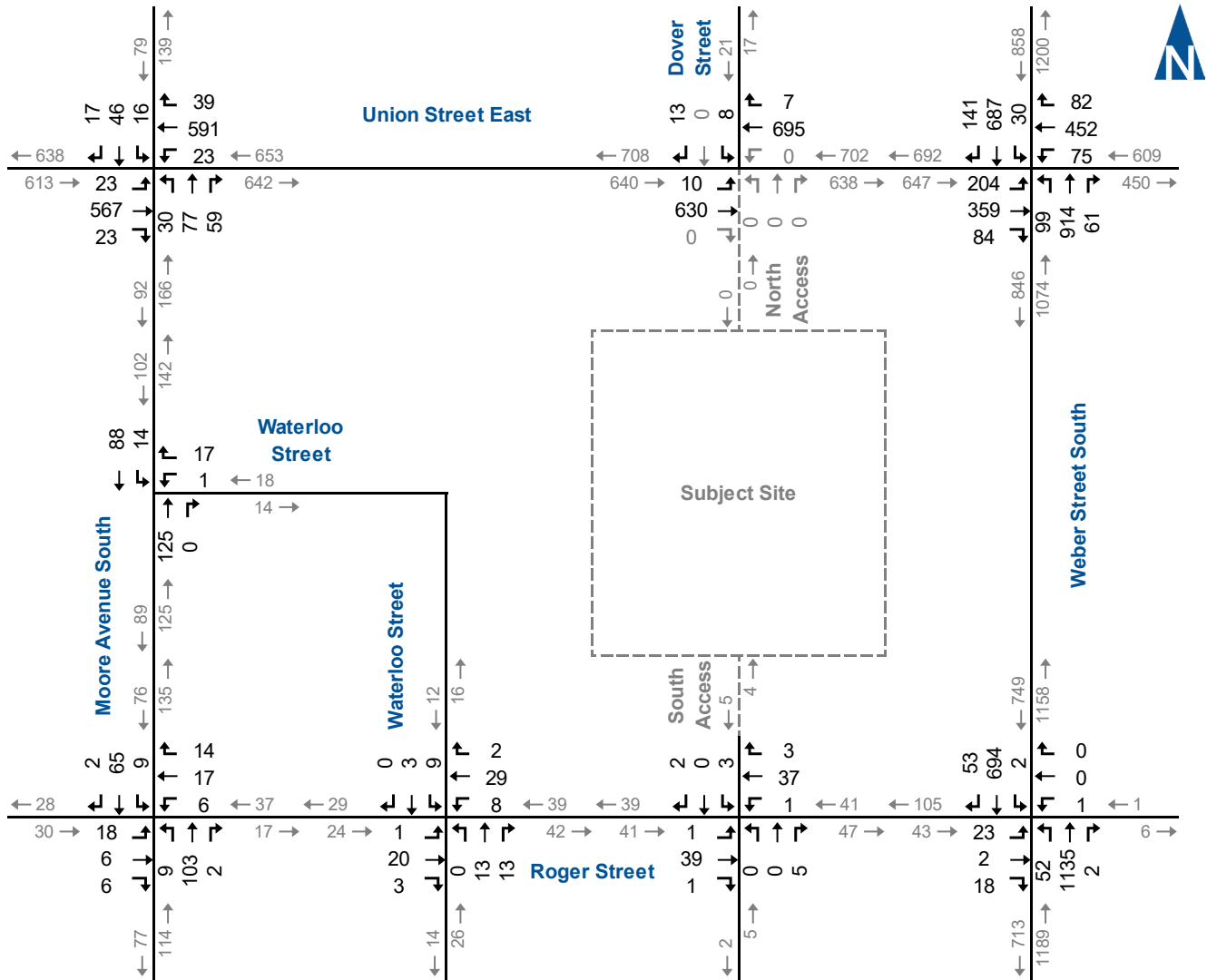


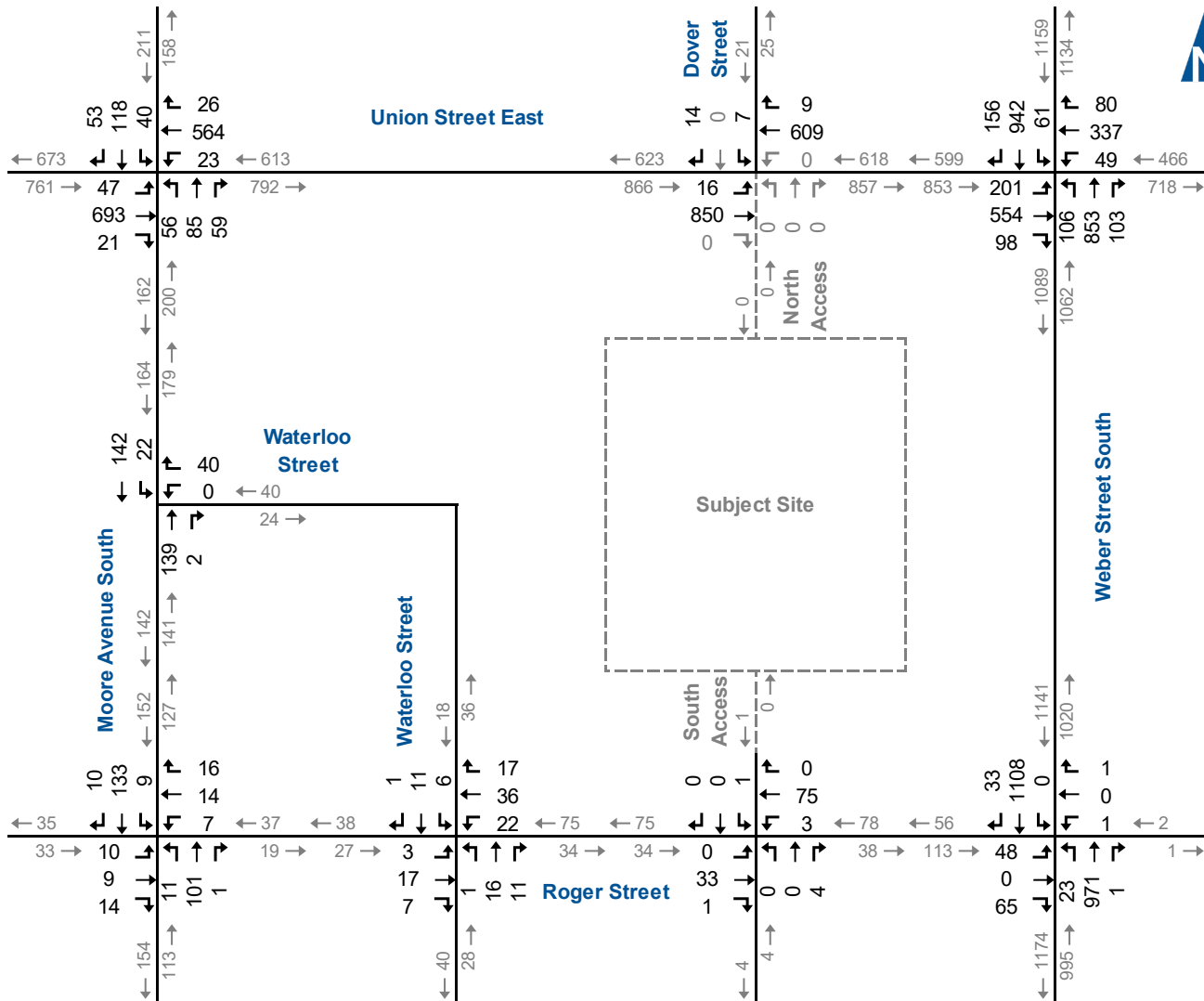
Figure 4.1 and **Figure 4.2** illustrate the forecast background traffic volumes for the weekday AM and weekday PM peak hours.

Figure 4.3 and **Figure 4.4** illustrate the forecast total (background + site traffic) traffic volumes for the weekday AM and weekday PM peak hours.



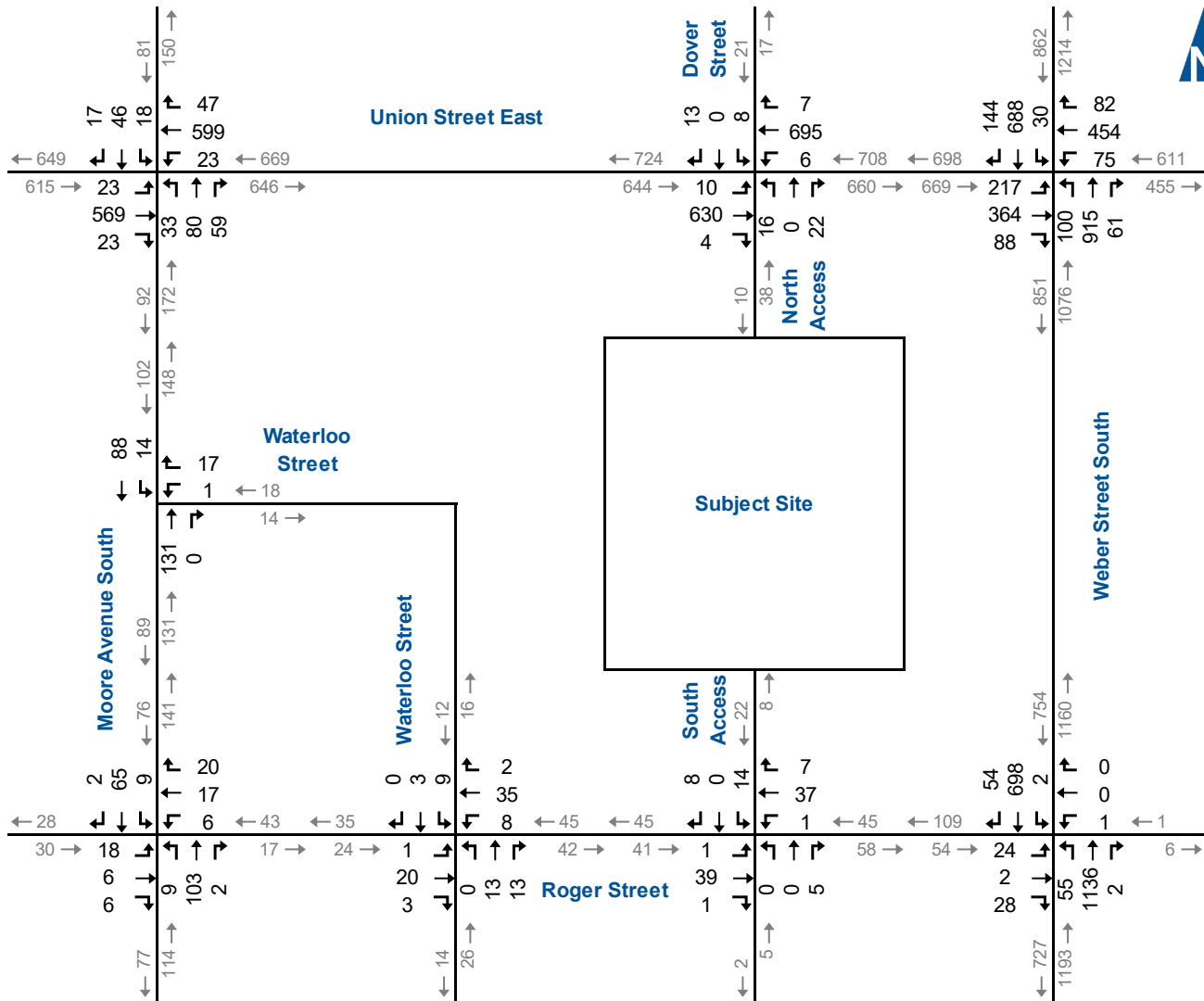
AM Peak Hour

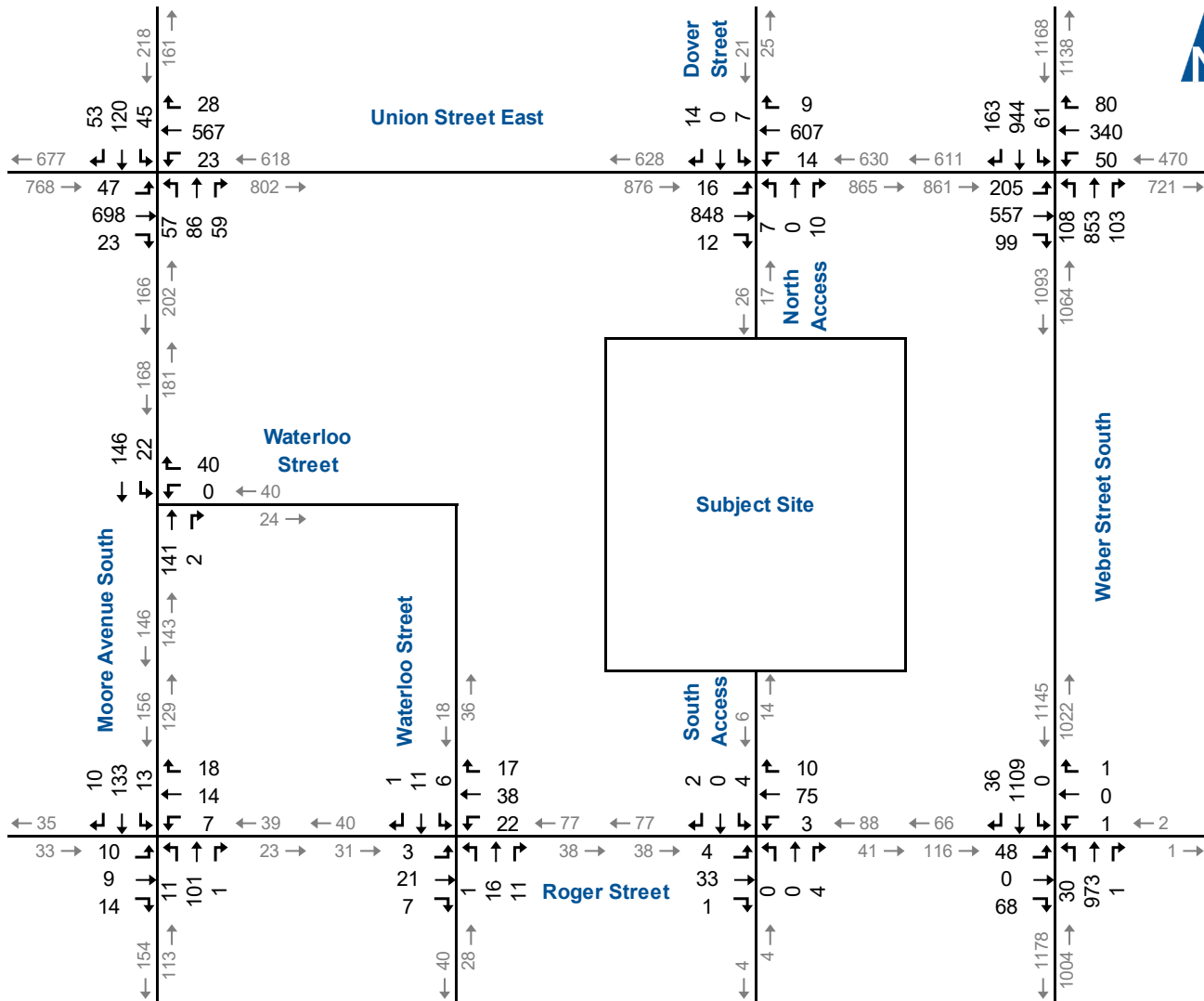




Background Traffic Volumes (PM Peak Hour)

AM Peak Hour





Total Traffic Volumes (PM Peak Hour)

4.2 Background Traffic Operations

Table 4.1 and **Table 4.2** summarize the five-year background traffic level of service conditions.

The study intersections are forecast to operate at acceptable levels of service similar to existing traffic conditions during the weekday AM peak hour and weekday PM peak hours. The following critical movements are noted:

- ▶ Weber Street South at Union Street East (all critical movements at this intersection are a result of existing traffic conditions):
 - The northbound through/right-turn movement is modelled to have 95th percentile queue length that blocks the northbound left-turn lane during the AM and PM peak hours; and
 - The southbound through/right-turn movement is modelled to have 95th percentile queue length that blocks the southbound left-turn lane during the AM and PM peak hours.
- ▶ Union Street East at Moore Avenue South (all critical movements at this intersection are a result of existing traffic conditions):
 - The eastbound through/right-turn movement is modelled to have a 95th percentile queue length that blocks the eastbound left-turn lane during the AM and PM peak hours;
 - The westbound through movement is modelled to have a 95th percentile queue length that blocks the westbound left-turn lane during the AM and PM peak hours;
 - The northbound through/right-turn movement is modelled to have a 95th percentile queue length that blocks the northbound left-turn lane during the AM and PM peak hours; and
 - The southbound through/right-turn movement is modelled to have a 95th percentile queue length that blocks the eastbound left-turn lane during the PM peak hour.
- ▶ Weber Street South at Roger Street (new critical movements):
 - The eastbound approach is forecast to operate with a delay exceeding 100 seconds during the PM peak hour; and
 - The westbound approach is forecast to operate with a delay exceeding 55 seconds during the AM peak hour.

Appendix F contains the supporting detailed Synchro reports.



TABLE 4.1: BACKGROUND OPERATIONS (AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Weber Street South & Union Street East	TCS	LOS Delay V/C Q Stor. Avail.	< < < < <	B 19 0.77 51 -	> > > > >	B 19	< < < < <	C 31 0.77 62 -	> > > > >	C 31	C 21 0.49 17 30 13	B 19 0.66 78 -	> > > > >	B 20	C 23 0.20 10 25 15	C 25 0.70 77 -	> > > > >	C 25	C 23
	Moore Avenue South & Union Street East	TCS	LOS Delay V/C Q Stor. Avail.	A 8 0.07 5 25 20	B 14 0.63 85 -	> > > > >	B 14	A 5 0.07 1 25 24	A 8 0.53 43 -	A 1 0.05 0 -	A 7	C 21 0.08 9 15 6	B 16 0.30 24 -	> > > > >	B 17	C 21 0.05 6 15 9	B 17 0.14 14 -	> > > > >	B 18	B 12
	Weber Street South & Roger Street	TWSC	LOS Delay V/C Q	< < < <	F 51 0.36 11	> > > >	F 51	< < < <	F 66 0.02 1	> > > >	F 66	A 10 0.06 2	A 1 0.00 0	A 0 0.00 0	A 1	B 11 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	
	Moore Avenue South & Roger Street	TWSC	LOS Delay V/C Q	< < < <	B 11 0.04 1	> > > >	B 11	< < < <	B 10 0.05 2	> > > >	B 10	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1	
	Moore Avenue South & Waterloo Street	TWSC	LOS Delay V/C Q					A 9 0.02 1			A 9		A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.01 0	A 0 0.00 0		A 1	
	Waterloo Street & Roger Street	AWSC	LOS Delay V/C Q	< < < <	A 7 0.03 1	> > > >	A 7	< < < <	A 7 0.04 1	> > > >	A 7	< < < <	A 7 0.03 1	> > > >	A 7	< < < <	A 7 0.01 0	> > > >	A 7	
	Union Street East & Dover Street	TWSC	LOS Delay V/C Q	A 9 0.01 0	A 0 0.00 0		A 0		A 0 0.00 0	A 0 0.00 0	A 0					C 15 0.06 2		> > > >	C 15	
	Roger Street & South Access	TWSC	LOS Delay V/C Q	A 7 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	< < < <	A 10 0.01 0	> > > >	A 10	< < < <	A 9 0.01 0	> > > >	A 9	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

</> - Shared Movement



TABLE 4.2: BACKGROUND OPERATIONS (PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																		
				Eastbound				Westbound				Northbound				Southbound				Overall		
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach			
PM Peak Hour	Weber Street South & Union Street East	TCS	LOS Delay V/C Stor. Avail.	< < < < <	D 46 0.95 102 - -	> > > > >	D 46	< < < < <	C 28 0.60 49 - -	> > > > >	C 28	C 30 0.62 23 30 7	B 18 0.60 77 - -	> > > > >	B 19	C 26 0.34 18 25 7	C 30 0.82 120 - -	> > > > >	C 30	C 30		
	Moore Avenue South & Union Street East	TCS	LOS Delay V/C Stor. Avail.	A 8 0.13 8 25 17	B 17 0.74 114 - -	> > > > >	B 17	A 8 0.09 4 25 21	B 11 0.51 68 - -	A 2 0.03 2 - -	> > > > >	B 11	C 23 0.18 15 15 0	B 17 0.30 25 - -	> > > > >	B 18	C 22 0.12 11 15 4	C 21 0.36 32 - -	> > > > >	C 21	B 15	
	Weber Street South & Roger Street	TWSC	LOS Delay V/C Stor. Avail.	< < < < <	F 131 0.93 45	> > > > >	F 131	< < < < <	E 38 0.02 1	> > > > >	E 38	B 11 0.04 1	A 0 0 0	A 0 0 0	> > > > >	A 1	A 0 0 0	A 0 0 0	> > > > >	A 0		
	Moore Avenue South & Roger Street	TWSC	LOS Delay V/C Stor. Avail.	< < < < <	B 10 0.05 1	> > > > >	B 10	< < < < <	B 10 0.05 2	> > > > >	B 10	A 8 0.01 0	A 0 0 0	A 0 0 0	> > > > >	A 1	A 8 0.01 0	A 0 0 0	> > > > >	A 0		
	Moore Avenue South & Waterloo Street	TWSC	LOS Delay V/C Stor. Avail.						A 9 0.04 1		> > > > >	A 9		A 0 0.00 0	A 0 0 0	> > > > >	A 0	A 8 0.02 0	A 0 0 0	> > > > >	A 1	
	Waterloo Street & Roger Street	AWSC	LOS Delay V/C Stor. Avail.	< < < < <	A 7 0.03 1	> > > > >	A 7	< < < < <	A 7 0.08 2	> > > > >	A 7	< < < < <	A 7 0.03 1	> > > > >	A 7	< < < < <	A 8 0.02 1	> > > > >	A 8			
	Union Street East & Dover Street	TWSC	LOS Delay V/C Stor. Avail.	A 9 0.02 1	A 0 0.00 0		A 0		A 0 0.00 0	A 0 0.00 0	> > > > >	A 0					B 15 0.05 2		> > > > >	B 15		
	Roger Street & South Access	TWSC	LOS Delay V/C Stor. Avail.	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0		A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	< < < < <	A 9 0.00 0	> > > > >	A 9	< < < < <	A 9 0.00 0	> > > > >	A 9		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

</> - Shared Movement



4.3 Total Traffic Operations

Table 4.3 and **Table 4.4** summarize the five-year total traffic level of service conditions.

The study intersections are forecast to operate at acceptable levels of service similar to background traffic conditions during the weekday AM and PM peak hours with no additional critical movements triggered by the site.

With the addition of the site generated traffic volumes, the existing approach delays at the study area intersections increase by three seconds or less during the AM and PM peak hours. Although, the eastbound approach delay at the intersection of Weber Street South and Roger street increases by 14 seconds during the PM peak hour.

Appendix G contains the supporting detailed Synchro reports.



TABLE 4.3: TOTAL OPERATIONS (AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Weber Street South & Union Street East	TCS	LOS Delay V/C Q Stor. Avail.	< < < < <	C 21 0.81 59 -	> > > > >	C 21 - - -	< < < < <	C 32 0.78 63 -	> > > > >	C 32 - - -	C 21 0.49 17 30 13	B 19 0.66 79 -	> > > > >	B 20 - - -	C 23 0.20 10 25 15	C 25 0.71 77 -	> > > > >	C 25 - - -	C 24
	Moore Avenue South & Union Street East	TCS	LOS Delay V/C Q Stor. Avail.	A 8 0.07 5 25 20	B 14 0.63 86 -	> > > > >	B 14 - - -	A 5 0.07 1 25 24	A 8 0.54 45 -	A 1 0.06 0 -	A 7 - -	C 21 0.09 10 15 5	B 16 0.30 25 -	> > > > >	B 17 - -	C 21 0.06 6 15 9	B 17 0.14 14 -	> > > > >	B 18 - -	B 12
	Weber Street South & Roger Street	TWSC	LOS Delay V/C Q	< < < <	E 48 0.40 13	> > > >	E 48 - -	< < < <	F 68 0.02 1	> > > >	F 68 - -	A 10 0.07 2	A 1 0.00 0	A 0 0.00 0	A 1 - -	B 11 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 - -	A 0
	Moore Avenue South & Roger Street	TWSC	LOS Delay V/C Q	< < < <	B 11 0.04 1	> > > >	B 11 - -	< < < <	B 10 0.06 2	> > > >	B 10 - -	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1 - -	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1 - -	A 1
	Moore Avenue South & Waterloo Street	TWSC	LOS Delay V/C Q					A 9 0.02 1			A 9 - -		A 0 0.00 0	A 0 0.00 0	A 0 - -	A 8 0.01 0	A 0 0.00 0		A 1 - -	A 1
	Waterloo Street & Roger Street	AWSC	LOS Delay V/C Q	< < < <	A 7 0.03 1	> > > >	A 7 - -	< < < <	A 7 0.05 2	> > > >	A 7 - -	< < < <	A 7 0.03 1	> > > >	A 7 - -	< < < <	A 7 0.01 0	> > > >	A 7 - -	A 7
	North Access/Dover Street & Union Street East	TWSC	LOS Delay V/C Q	A 9 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0 - -	A 9 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0 - -	< < < <	C 18 0.12 3	> > > >	C 18 - -	< < < <	C 17 0.07 2	> > > >	C 17 - -	A 17
	Roger Street & South Access	TWSC	LOS Delay V/C Q	A 7 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 - -	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 - -	< < < <	A 10 0.01 0	> > > >	A 10 - -	< < < <	A 9 0.02 1	> > > >	A 9 - -	A 9

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LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

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Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

</> - Shared Movement



TABLE 4.4: TOTAL OPERATIONS (PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																	
				Eastbound				Westbound				Northbound				Southbound				Overall	
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
PM Peak Hour	Weber Street South & Union Street East	TCS	LOS Delay V/C Stor. Avail.	< < < < <	D 49 0.97 105 - -	> > > > >	D 49	< < < < <	C 28 0.60 49 - -	> > > > >	C 28	C 31 0.63 24 30 6	B 18 0.60 77 - -	> > > > >	B 20	C 26 0.34 18 25 7	C 31 0.83 127 - -	> > > > >	C 30	C 31	
	Moore Avenue South & Union Street East	TCS	LOS Delay V/C Stor. Avail.	A 8 0.14 8 25 17	B 18 0.75 116 - -	> > > > >	B 17	A 8 0.09 4 25 21	B 11 0.51 68 - -	A 2 0.03	B 11	C 23 0.19 15 15 0	B 17 0.30 26 - -	> > > > >	B 19	C 22 0.14 12 15 3	C 21 0.36 33 - -	> > > > >	C 21	B 16	
	Weber Street South & Roger Street	TWSC	LOS Delay V/C Stor. Avail.	< < < < <	F 145 0.97 48	> > > > >	F 145	< < < < <	E 40 0.02 1	> > > > >	E 40	B 11 0.05 2	A 1 0 0	A 1	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	> > > > >	A 0		
	Moore Avenue South & Roger Street	TWSC	LOS Delay V/C Stor. Avail.	< < < < <	B 10 0.05 1	> > > > >	B 10	< < < < <	B 10 0.06 2	> > > > >	B 10	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	> > > > >	A 1	
	Moore Avenue South & Waterloo Street	TWSC	LOS Delay V/C Stor. Avail.						A 9 0.05 1		> > >	A 9		A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.02 0	A 0 0.00 0		A 1	
	Waterloo Street & Roger Street	AWSC	LOS Delay V/C Stor. Avail.	< < < < <	A 7 0.03 1	> > > > >	A 7	< < < < <	A 7 0.09 2	> > > > >	A 7	< < < < <	A 7 0.03 1	> > > > >	A 7	< < < < <	A 8 0.02 1	> > > > >	A 8		
	North Access/Dover Street & Union Street East	TWSC	LOS Delay V/C Stor. Avail.	A 9 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0	A 10 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0	< < < < <	C 22 0.07 2	> > >	C 21	< < < < <	C 17 0.06 2	> > >	C 17		
	Roger Street & South Access	TWSC	LOS Delay V/C Stor. Avail.	A 7 0.00 0	A 0 0.00 0	A 0 0.00 0	A 1	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	< < < < <	A 9 0.00 0	> > >	A 9	< < < < <	A 9 0.01 0	> > >	A 9		

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LOS - Level of Service

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</> - Shared Movement



5 Remedial Measures

5.1 Left-Turn Lane Warrant

The intersections of Union Street East and Dover Street/Northern Site Access, and Roger Street and the Southern Site Access were assessed to determine if the projected traffic volumes warrant installation of left-turn lanes. The warrants for left-turn lanes follow the requirements in the Ministry of Transportation's (MTO) Geometric Design Standards ¹⁰.

For the two-lane cross-section warrant, a design speed of 50 km/h (20 km/h over the posted speed limit) was used for Roger Street.

The percentages of left-turning vehicles in the approaching volume for a two-lane cross-section were rounded to the nearest 5%, as nomographs are only provided for 5% increments. This requirement follows the MTO warrant procedure that assumes a minimum of 5% of left turning vehicles in the advancing volume. Therefore, left-turn lanes are not warranted for any left turning volume less than 5%.

Table 5.1 summarizes the left-turn lane warrant for the intersection of Roger Street at the Southern Site Access. The warrant analysis suggests that both eastbound and westbound left-turn lanes are not warranted.

TABLE 5.1: LEFT-TURN LANE WARRANT SUMMARY – ROGER STREET

Roadway	Roger Street			
Intersection	South Access		South Access	
Approach Direction	Eastbound		Westbound	
Design Speed	50 km/h		50 km/h	
Horizon	Total 2033		Total 2033	
Peak Hour	AM	PM	AM	PM
Advancing Volume	41	38	45	88
Opposing Volume	45	88	41	38
Left Turning Traffic	1	4	1	3
% of Left Turning Traffic	2%	11%	2%	3%
Figure Used*	NA	9A-3	NA	9A-3
Warranted	No	No	No	No
Storage Length Required	-	-	-	-

*Ontario Ministry of Transportation, *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*, (Toronto: Kings Printer for Ontario, 2023).

Table 5.2 summarizes the left-turn lane warrant for the intersection of Union Street East and Dover Street/Northern Site Access. The warrant analysis suggests that a 15 m westbound left-turn lane is warranted under total traffic conditions (to access the site) and a 15 m eastbound

¹⁰ Ontario Ministry of Transportation, *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*, (Toronto: King's Printer for Ontario, 2023).



left-turn lane is warranted under background traffic conditions (to access Dover Street).

It is noted that the existing four-lane cross-section along Union Street East enables eastbound and westbound through vehicles to use the adjacent curb lane to travel around a left-turning vehicle at Dover Street/Northern Site Access. It is also noted that there are no forecast critical movements noted at the intersection of Union Street East and Dover Street/Northern Site Access. Therefore, left-turn lanes along Union Street East at Dover Street/Northern Site Access are not recommended.

TABLE 5.2: LEFT-TURN LANE WARRANT SUMMARY –UNION STREET EAST

Roadway	Union Street East							
	Dover Street/North Access Westbound		Dover Street/North Access Eastbound		Dover Street/North Access Eastbound		Dover Street/North Access Eastbound	
Approach Direction	Westbound		Eastbound		Eastbound		Eastbound	
Horizon	Total 2033		Total 2033		Background 2033		Base Year 2026	
Peak Hour	AM	PM	AM	PM	AM	PM	AM	PM
Opposing Volume	644	876	708	630	702	618	602	502
Left Turning Traffic	6	14	10	16	10	16	9	14
Figure Used*	9A-31	9A-31	9A-31	9A-31	9A-31	9A-31	9A-31	9A-31
Warranted	No	Yes	No	Yes	No	Yes	No	No
Storage Length Required	--	15 m	--	15 m	--	15 m	--	-

*Ontario Ministry of Transportation, *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*, (Toronto: Kings Printer for Ontario, 2023).

Appendix H contains the left-turn lane warrant nomographs.

5.2 Auxiliary Turn Lane Extensions

Under existing and future conditions, there are multiple through movements at the intersections of Weber Street South at Union Street East and Moore Avenue South at Union Street East that have 95th percentile queue lengths that block access to adjacent auxiliary turn lanes. To prevent left-turning traffic from being blocked by adjacent through movements, the storage length for the left-turn lanes should be extended. However, an extension of the storage length for left-turn lanes is not recommended at the intersections of Weber Street South at Union Street East and Moore Avenue South at Union Street East for one or more of the following reasons:

- ▶ individual movement delays do not surpass critical movement thresholds (55 seconds);
- ▶ the 95th percentile queue lengths for the left-turn movements can be contained by the existing left-turn storage lane lengths;
- ▶ an extended left-turn lane may conflict with a Spur Line Trail crossing; and
- ▶ an extended left-turn lane may not fit within the existing roadway cross-section. If the roadway cross-section is extended, this



could conflict with existing active transportation facilities and/or prevent the installation of any future active transportation infrastructure (if any is planned).

5.3 Traffic Control Signal Warrant

Under future traffic conditions, the intersection of Weber Street South at Roger Street has poor side street operations. Therefore, the intersection of Weber Street South at Roger Street was assessed using the Ontario Traffic Manual (OTM) Book 12 – Justification 7¹¹ procedures.

Based on the warrant analysis, a traffic control signal is not justified at the intersection of Weber Street South at Roger Street under total traffic conditions.

Appendix I contains the warrant analysis.

5.4 Pedestrian Crossover (PXO) Warrant

The Spur Line Trail Crossings along Roger Street and Moore Avenue South were assessed using the Ontario Traffic Manual (OTM Book 15 – Pedestrian Crossing Treatments)¹².

According to OTM Book 15, the following should be considered if a pedestrian crosswalk is to be installed:

- ▶ when 8 hours of vehicular traffic is equal to or exceeds 750 vehicles and 8 hours of pedestrian traffic crossing the major street is equal to or exceeds 100 pedestrians, or when 4 hours of vehicular traffic is equal to, or exceeds 395 vehicles and 4 hours of pedestrian traffic crossing the major street is equal to or surpasses 65 pedestrians;
- ▶ the proposed location for the pedestrian crossover fits within walking desire lines; and
- ▶ the proposed location for the pedestrian crossover is or is not within 200 m of a traffic control device.

At the Spur Line Trail crossing on Roger Street, the existing 8-hour (338) and 4-hour (198) pedestrian counts (inclusive of cyclists) exceed the OTM Book 15 thresholds. However, the forecast 2033 total 8-hour (643) and 4-hour (389) roadway/vehicular counts do not exceed the OTM Book 15 thresholds. Additionally, the adjacent all-way stop

¹¹ Ontario Ministry of Transportation, *Ontario Traffic Manual Book 12: Traffic Signals*, (Toronto: King's Printer for Ontario, 2024).

¹² Ontario Ministry of Transportation, *Ontario Traffic Manual Book 15: Pedestrian Crossing Treatments*, (Toronto: Queen's Printer for Ontario, 2016).



controlled intersection of Roger and Waterloo Street is too close to the crossing (approximately 55 m of separation). Therefore, a PXO would not be warranted at the Spur Line Trail crossing along Roger Street. Although, the pedestrian desire lines for the Spur Line trail likely do not include the all-way stop intersection of Roger Street at Waterloo Street. Given the posted speed limit (30 km/h) along Roger Street and the vehicular count requirement close to being satisfied, the City should monitor the need for a PXO at the Spur Line Trail crossing along Roger Street.

At the Spur Line Trail crossing along Moore Avenue South, the existing 8-hour (335) and 4-hour (197) pedestrian counts (inclusive of cyclists) exceeds the OTM Book 15 thresholds. Additionally, the forecast 2033 total 8-hour (2,121) and 4-hour (1,261) roadway/vehicular counts also exceed the OTM Book 15 thresholds. However, the adjacent signalized intersection of Union Street East at Moore Avenue South is too close to the crossing (approximately 60 m of separation). It is also noted that the signalized intersection of Moore Avenue South at Union Street East fits within the pedestrian desire lines for the Spur Line Trail and could provide assistance to pedestrians uncomfortable with crossing Moore Avenue South without a traffic control device. Therefore, a PXO would not be warranted at the Spur Line Trail crossing along Moore Avenue South.

5.5 Transportation Demand Management

Transportation Demand Management (TDM) refers to policies, programs, and initiatives that improve the efficiency of the road network and encourage the use of alternative modes of transportation. TDM programs consider how people's choices of travel mode are affected by land use patterns and composition, development design, parking availability, parking cost, and the relative cost, convenience, and availability of alternative modes of travel.

TDM strategies at a development can be divided into two basic categories: pre-occupancy and post-occupancy. Pre-occupancy strategies and initiatives are critical because they are most likely to determine how attractive, convenient, and safe alternative travel modes will be once the site is occupied. These can include such measures as secure bike parking, a lower vehicle parking supply, or safe pedestrian routes between the development and the municipal sidewalk network. In some cases, these measures affect the built form of a development and are difficult to modify after building completion.

After a development is built, incentives can be offered to encourage the use of alternative modes of transportation, but these incentives are only effective if the development and surrounding area are designed to



facilitate the incentives. Post-occupancy programs and initiatives can include subsidies to use transit, the provision of rideshare programs, or disseminating information about alternative travel modes proximate to the site.

5.5.1 Walking

The pedestrian accessibility of a development is essential to ensure that those that choose to walk, have access to safe, comfortable, and well-lit pedestrian connections.

The landscaping plan should consider additional amenities such as lighting and soft landscaping to enhance the pedestrian realm and to prioritize pedestrians.

All on-site sidewalks should be well-lit and should conform to the Accessibility for Ontarians with Disabilities Act (AODA) design standards.

5.5.2 Cycling

The City of Waterloo Zoning By-law 2018-050¹³ requires:

- ▶ Residential Type A (locker or indoor bicycle parking spot): at 0.3 bicycle parking spaces per unit (74 spaces);
- ▶ Residential Type B (non-locker or non-indoor bicycle parking spot): at 0.3 bicycle parking spaces per unit (74 spaces); and
- ▶ Non-Residential: at 25% of the provided non-residential vehicle parking spaces (3 spaces).

The proposed supply of 159 bicycle parking spaces (both short-term and long-term), results in a surplus of 8 spaces.

5.5.3 Transit

The subject site is located within the MTSA for the Allen ION Station. **(Route 4 Glasgow-Margaret)** is immediately adjacent to the site along Union Street East. **Route 4 Glasgow-Margaret** is accessible via the existing sidewalk network along Union Street East and the signalized intersection of Moore Avenue South at Union Street East. Additionally, **Route 4 Glasgow-Margaret** can be used by future residents of the site to connect with **Route 301 ION Light Rail**. The pedestrian facilities provided on both sides of Union Street East also provide an

¹³ City of Waterloo Zoning By-law 2018-050, Section 6.6.2



opportunity for future residents to access the nearby ION stations (Allen and Grand River Hospital) on foot (16 to 18-minute walk).

It is also noted that **Route 4 (Glasgow-Margaret)** can also provide connections to other bus routes within and near the study area such as:

- ▶ **Route 5 (Erb);**
- ▶ **Route 7 (King);**
- ▶ **Route 8 (Weber); and**
- ▶ **Route 16 (Strasburg-Belmont).**

All GRT transit routes (bus and light rail) easily accessible from the site provide connectivity to the broader GRT network and key destinations within the region including shopping centres, Uptown Waterloo, and universities/colleges.

5.5.4 Parking Management

Parking management refers to “*various policies and programs that result in more efficient use of parking resources.*”¹⁴ They include but are not limited to unbundled parking, shared parking, and parking pricing.

Unbundled parking policies separate the cost of a parking space from the lease or ownership cost of a dwelling unit. This enables those who want or need a parking space to purchase or rent the spaces they need. For residents who do not need (or do not want a parking space) unbundled parking allows them to purchase or rent a unit without the need to pay for a parking space they do not need.

The purchase or rental cost of each parking space remains unknown, however, charging for parking can help manage parking demands. By removing the provision of free parking on-site, residents can compare the cost and convenience of owning or renting a parking space(s) to that of alternative modes of transportation. Providing a “right-size” parking supply for a development can reduce the potential for unused parking spaces and the oversupply of parking spaces.

The development plan proposes 320 parking spaces.

5.5.5 Car Share Program

Car sharing refers to automobile rental services intended to substitute for private vehicle ownership. It makes occasional use of a vehicle

¹⁴ Victoria Transport Policy Institute, *Parking Management: Strategies, Evaluation, and Planning*, 2021.



affordable while providing an incentive to minimize the use of a personal vehicle for every trip. When complemented by robust alternative transportation systems (for example, higher-order rapid transit, and safe and accessible cycling networks) car sharing programs provide travel options to households. Where car sharing services are available, some households may reduce their vehicle ownership, either shifting from two to one vehicle, or from one to zero vehicles.

By providing this type of mode share on site, lower automobile ownership rates and parking requirements can be further obtained. Residents of the building could choose to use walking, transit or cycling as their primary mode of travel and use car share as a secondary mode of travel.

Communauto¹⁵ is offered in the Region of Waterloo. Vehicles are provided at 57 Union Street East – Station 098 (700 m from the subject site, a 10-minute walk away)

The provision of car share spaces closer to the site or on-site would allow residents of the development and surrounding community who normally would not need a vehicle for their daily activities to be comfortable with the decision to reduce their overall vehicle ownership rate or forgo owning a vehicle altogether.

5.5.6 Travel Planning/Education/Promotion

Increasing awareness of sustainable transportation opportunities for residents and visitors of the subject site can increase the use of these alternate modes. This awareness can also be in combination with public agencies such as Grand River Transit.

Providing a welcome package to new residents and tenants can help support the use of alternate modes of transportation. This can include information about local transit services, car share programs, or bike parking locations.

General education of all modes of transportation, including their benefits and how to make the best use of them, are a key component to TDM success. The strategies require cooperation and coordination with several partners, including transit providers, building owners, area municipalities as well as residents.

By educating residents about sustainable modes of travel as well as providing travel demand management tools and incentives, TDM can

¹⁵ "How It Works," Communauto, 2026, <https://ontario.communauto.com/how-it-works/>.



be further integrated within the development to promote all modes of transportation.

5.5.7 TDM Summary

Given the active transportation friendly environment and location within the Allen Station MTSA, future residents will have opportunities to conveniently access the following:

- ▶ the existing sidewalk network and the Spur Line Trail;
- ▶ public transit (bus and light rail service); and
- ▶ car share spaces.

To further promote TDM, and the multi-modal transportation network near the site, it is recommended that the developer and/or building owner (as applicable):

- ▶ unbundle parking;
- ▶ provide transit and active transportation information in a welcome package to new residents and tenants, including the posting of this information in a central location; and
- ▶ provide 74 Type A residential, 74 Type B residential, and 3 non-residential bicycle parking spaces.



6 Conclusions and Recommendations

6.1 Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** The study area intersections are currently operating at acceptable levels of service with the following critical movements during the AM and PM peak hours:

Weber Street South at Union Street East:

- The northbound through/right-turn movement is modelled to have its 95th percentile queue length block the northbound left-turn lane during the AM and PM peak hours; and
- The southbound through/right-turn movement is modelled to have its 95th percentile queue length block the southbound left-turn lane during the AM and PM peak hours.

Union Street East at Moore Avenue South:

- The eastbound through/right-turn movement is modelled to have its 95th percentile queue length block the eastbound left-turn lane during the AM and PM peak hours;
- The westbound through movement is modelled to have its 95th percentile queue length block the westbound left-turn lane during the AM and PM peak hours;
- The northbound through/right-turn movement is modelled to have its 95th percentile queue length block the northbound left-turn lane during the AM and PM peak hours; and
- The southbound through/right-turn movement is modelled to have its 95th percentile queue length block the eastbound left-turn lane during the PM peak hour.
- ▶ **Development Trip Generation:** The development is forecast to generate approximately 68 and 54 net external trips during the AM and PM peak hours, respectively.
- ▶ **Background Traffic Conditions:** The study area intersections are forecast to operate at acceptable levels of service similar to existing traffic conditions with the following additional critical movements noted at the intersection of Weber Street South and Roger Street:
 - The eastbound approach is forecast to operate with a delay exceeding 100 seconds during the PM peak hour; and



- The westbound approach is forecast to operate with a delay exceeding 55 seconds during the AM peak hour.
- ▶ **Total Traffic Conditions:** The study area intersections are forecast to operate at acceptable levels of service similar to background traffic conditions with no additional critical movements noted.
- ▶ **Left-Turn Lane-Warrant:** Eastbound and westbound left-turn lanes are not warranted at the intersection of Roger Street and the Southern Site Access. However, at the intersection of Union Street East and Dover Street/Northern Site Access, a 15 m westbound left-turn lane is warranted under total traffic conditions and a 15 m eastbound left-turn lane is warranted under background traffic conditions. It is noted that the existing four-lane cross-section along Union Street East enables eastbound and westbound through vehicles to use the adjacent curb lane to travel around a left-turning vehicle at Dover Street/Northern Site Access. It is also noted that there are no forecast critical movements noted at the intersection of Union Street East and Dover Street/Northern Site Access. Therefore, left-turn lanes along Union Street East at Dover Street/Northern Site Access are not recommended.
- ▶ **Traffic Control Signal Warrant:** A traffic control signal is not justified at the intersection of Weber Street South at Roger Street under future total traffic conditions.
- ▶ **Pedestrian Crossover (PXO) Warrant:** Pedestrian crossovers are not warranted at the Spur Line Trail crossings along Moore Avenue South and Roger Street.
- ▶ **Transportation Demand Management:** Given the active transportation-friendly environment and location within the Allen Station Major Transit Station Area, future residents will have opportunities to conveniently access:
 - the existing sidewalk network and the Spur Line Trail;
 - public transit (bus and light rail service); and
 - car share spaces.

6.2 Recommendations

Based on the findings of this study, it is recommended that the development be considered for approval with no conditions related to geometric improvements along the existing study area roadways. It is also recommended that:



- ▶ the City continue to monitor the need for a Pedestrian Crossover (PXO) at the Spur Line Trail crossing along Roger Street; and
- ▶ the developer and/or building owner (as applicable) further promote transportation demand management, and the multi-modal transportation network near the site, by considering the following:
 - unbundling parking;
 - providing transit and active transportation information in a welcome package to new residents and tenants, including the posting of this information in a central location; and
 - providing 74 Type A residential, 74 Type B residential, and three non-residential bicycle parking spaces.



Appendix A

Pre-Study



From: Tanikia Kinear <TKinear@regionofwaterloo.ca>
Sent: December 16, 2025 3:56 PM
To: Ainsley Rego; Erica Bayley; Andrew Orr
Subject: Re: 250792 (153 Union Street East, Waterloo) TIS
Attachments: Union at Moore_Typified_20251216150115.csv; Union @ Moore TMC_13September2023_GeolD10641.pdf

Good afternoon,

Please see attached files :

- The first attachment, an Excel file, has output data from our Miovision cameras for AADT data at the Union / Moore signalized intersection.
 - The data range is from January 1 – February 28, 2025 - As cameras were only recently put up at this location, no count data is available from Miovision in 2024 or earlier.
- The second, a PDF file, shows the output from our typical in-the-field turning movement counts (TMC) rather than our daily Miovision counts.
 - Since the data range the City provided is from June 2023, this indicated the TMC at this location from September 2023 for comparison.

I hope this helps!

Thanks,

Tanikia Kinear, C.E.T.

Senior Transportation Planner (Corridor Development)
Region of Waterloo
150 Frederick Street, 8th Floor, Kitchener ON N2G 4J3
519-897-5691
www.regionofwaterloo.ca

From: Ainsley Rego <Ainsley.Rego@waterloo.ca>
Sent: Friday, December 12, 2025 9:30 AM
To: Erica Bayley <ebayley@ptsl.com>; Andrew Orr <aorr@ptsl.com>

Cc: Tanikia Kinear <TKinear@regionofwaterloo.ca>
Subject: RE: 250792 (153 Union Street East, Waterloo) TIS

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Were you expecting this email? TAKE A CLOSER LOOK. Is the sender legitimate?
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Hi Erica and Andrew,

Please see attached with available traffic data for the following locations:

1. Union Street between Devitt Avenue and Moore Avenue
2. Moore Avenue between Union Street to John Street

Tanikia – can the Region provide data for the Union Street at Moore Avenue signalized intersection? If possible, prior to March 2025 when Elizabeth Ziegler was closed.

Erica and Andrew – let me know if you need the data in another format.

Thanks,

Ainsley Rego, BES, RSP1

Engineering Technologist, Transportation Engineering, IPPW

Transportation Services Division

City of Waterloo

Service Centre

265 Lexington Court

Waterloo, Ontario, N2J 4A8

P: 519-886-2310 x30336

E: ainsley.rego@waterloo.ca

W: www.waterloo.ca

Connect with us: @cityofwaterloo on [Instagram](#), [Facebook](#), [Youtube](#) and [X](#)



From: Erica Bayley <ebayley@ptsl.com>

Sent: December 4, 2025 8:30 AM

To: Ainsley Rego <Ainsley.Rego@waterloo.ca>; Andrew Orr <aorr@ptsl.com>; Tanikia Kinear <tkinear@regionofwaterloo.ca>

Subject: [EXTERNAL] RE: 250792 (153 Union Street East, Waterloo) TIS

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Thx Ainsley – we pushed our data collection to January given equipment availability. Our coordinator is always good about watching weather.

Please send what you have for historical data around EZ.

Thz,

Erica Bayley, P.Eng.

Senior Project Manager, Associate
(She/Her)

Vacation Notice: Dec 22, 2025 through Jan 2, 2026

Offices Closed: Dec 25, 2025 through Jan 2, 2026

Paradigm Transportation Solutions Limited

5A-150 Pinebush Road Cambridge ON N1R 8J8

m: 519-635-5349

e: ebayley@ptsl.com

From: Ainsley Rego <Ainsley.Rego@waterloo.ca>

Sent: December 4, 2025 8:02 AM

To: Erica Bayley <ebayley@ptsl.com>; Andrew Orr <aorr@ptsl.com>; Tanikia Kinear <tkinear@regionofwaterloo.ca>

Subject: RE: 250792 (153 Union Street East, Waterloo) TIS

Hi Andrew,

As a follow up to the below, please also include the following sites in background traffic:

1. 864 – 872 King Street West
2. 924 – 944 King Street West

Best Regards,


Ainsley Rego, BES, RSP1 (she/her)

Engineering Technologist – Traffic

Transportation Engineering, Integrated Planning & Public Works, City of Waterloo

265 Lexington Court PO Box 337 Station Waterloo Waterloo, ON N2J 4A8

P: 1.519.886.2310 ext. 30336 **F:** 1.519.886.5788 **TTY:** 1.866.786.3941 **E:** ainsley.rego@waterloo.ca

From: Ainsley Rego

Sent: December 4, 2025 7:48 AM

To: Erica Bayley <ebayley@ptsl.com>; Andrew Orr <aorr@ptsl.com>; Tanikia Kinear <tkinear@regionofwaterloo.ca>

Subject: RE: 250792 (153 Union Street East, Waterloo) TIS

Good morning Erica and Andrew,

Thank you for reaching out regarding the below TIS scope of work. My comments below in red.

Can you push out data collection to the following week? Looking ahead at the forecast, it appears we may be getting some snow during the week.

One other item to note is that Elizabeth Ziegler Public School (90 Moore Avenue South) is currently closed with plans to re-open in 2027. The City can provide traffic data from when school was in session. There must be consideration of this traffic within the study.

Let me know if you have any questions or concerns.

Best,
Ainsley



Ainsley Rego, BES, RSP1 (she/her)

Engineering Technologist – Traffic

Transportation Engineering, Integrated Planning & Public Works, City of Waterloo

265 Lexington Court PO Box 337 Station Waterloo Waterloo, ON N2J 4A8

P: 1.519.886.2310 **ext.** 30336 **F:** 1.519.886.5788 **TTY:** 1.866.786.3941 **E:** ainsley.rego@waterloo.ca

From: Erica Bayley <ebayley@ptsl.com>

Sent: December 2, 2025 10:34 AM

To: Andrew Orr <aorr@ptsl.com>; Ainsley Rego <Ainsley.Rego@waterloo.ca>; Tanikia Kinear <tkinear@regionofwaterloo.ca>

Subject: [EXTERNAL] RE: 250792 (153 Union Street East, Waterloo) TIS

CAUTION:

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Hi all – in addition to the below details, we'd like to collect data next week (Dec 8th) and want to confirm this is acceptable.

Please advise ASAP on this item as it's time sensitive.

Thx,

Erica Bayley, P.Eng.

Senior Project Manager, Associate

(She/Her)

Vacation Notice: Dec 22, 2025 through Jan 2, 2026

Offices Closed: Dec 25, 2025 through Jan 2, 2026

Paradigm Transportation Solutions Limited

5A-150 Pinebush Road Cambridge ON N1R 8J8

m: 519-635-5349

e: ebayley@ptsl.com

From: Andrew Orr <aorr@ptsl.com>

Sent: December 1, 2025 9:06 AM

To: Ainsley Rego <ainsley.rego@waterloo.ca>; Tanikia Kinear <tkinear@regionofwaterloo.ca>

Cc: Erica Bayley <ebayley@ptsl.com>

Subject: 250792 (153 Union Street East, Waterloo) TIS

Hi Ainsley and Tanikia,

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) for a proposed mixed-use development located at 153 Union Street East in Waterloo, ON. The subject site is proposed to be developed into two residential apartment buildings (11 to 12 storeys) with a combined total of 244 units plus 347 square metres of commercial space. Vehicle access is proposed via driveway connections to Union Street East and Roger Street (concept plan attached). If the Region is interested in this study, a PSC form will be sent.

We'd like to prepare our report based on the following scope, subject to your comments:

PROPOSED TERMS OF REFERENCE

Study Area Intersections:

- Roger Street at Weber Street South (unsignalized);
- Union Street East at Moore Avenue South (signalized);
- Union Street East at Weber Street South (signalized);
- Roger Street at Moore Avenue South (unsignalized).
- Driveway connection to Union Street East; and
- Driveway connection to Roger Street.
- **Moore Avenue South at Waterloo Street**
- **Waterloo Street at Roger Street**

Active Transportation Connections:

- Moore Avenue South at Spur Line Trail; and
- Roger Street at Spur Line Trail.

Analysis Periods:

- Weekday AM peak hour; and
- Weekday PM peak hour.

Existing Data:

- Traffic data to be collected in December 2025/January 2026.

Horizon Year:

- Five years from the date of the full build-out (Year – TBD).

Analysis:

- Synchro 12, HCM 7 analysis.

Background Traffic:

- Background traffic annual growth rate **Please Confirm** – 2% growth rate on City streets.
- Any future background developments to include?

Future Road Improvements:

- **Please confirm** – **Union Street is up for reconstruction in 2026. For more information visit the [City's website.](#)**

Trip Generation:

- ITE Trip Generation Data 12th Edition.

Trip Distribution:

- Existing Distribution and 2022 Transportation Tomorrow Survey (TTS) Data.

Best Regards,

Andrew Orr, M.A.Sc., EIT

Transportation Consultant, Associate
(He/Him)



5A-150 Pinebush Road, Cambridge ON, N1R 8J8
p: 519.896.3163 x210
m: 289-808-8997
e: aorr@ptsl.com
w: www.ptsl.com

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From: Tanikia Kinear <TKinear@regionofwaterloo.ca>
Sent: December 9, 2025 4:26 PM
To: Andrew Orr; Ainsley Rego
Cc: Erica Bayley
Subject: Re: 250792 (153 Union Street East, Waterloo) TIS

Good afternoon all,

The Region requests a 2% AGR. There are no future Regional transportation network projects planned in the area.

Thanks,

Tanikia Kinear, C.E.T.

Senior Transportation Planner (Corridor Development)
Region of Waterloo
150 Frederick Street, 8th Floor, Kitchener ON N2G 4J3
519-897-5691
www.regionofwaterloo.ca

From: Andrew Orr <aorr@ptsl.com>
Sent: Monday, December 1, 2025 9:05 AM
To: Ainsley Rego <ainsley.rego@waterloo.ca>; Tanikia Kinear <TKinear@regionofwaterloo.ca>
Cc: Erica Bayley <ebayley@ptsl.com>
Subject: 250792 (153 Union Street East, Waterloo) TIS

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Hi Ainsley and Tanikia,

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) for a proposed mixed-use development located at 153 Union Street East in Waterloo, ON. The subject site is proposed to be developed into two residential apartment buildings (11 to 12 storeys) with a combined total of 244 units plus 347 square metres of commercial space. Vehicle access is proposed via driveway connections to Union Street East and Roger Street (concept plan attached). If the Region is interested in this study, a PSC form will be sent.

We'd like to prepare our report based on the following scope, subject to your comments:

PROPOSED TERMS OF REFERENCE

Study Area Intersections:

- Roger Street at Weber Street South (unsignalized);
- Union Street East at Moore Avenue South (signalized);
- Union Street East at Weber Street South (signalized);
- Roger Street at Moore Avenue South (unsignalized).
- Driveway connection to Union Street East; and
- Driveway connection to Roger Street.

Active Transportation Connections:

- Moore Avenue South at Spur Line Trail; and
- Roger Street at Spur Line Trail.

Analysis Periods:

- Weekday AM peak hour; and
- Weekday PM peak hour.

Existing Data:

- Traffic data to be collected in December 2025/January 2026.

Horizon Year:

- Five years from the date of the full build-out (Year – TBD).

Analysis:

- Synchro 12, HCM 7 analysis.

Background Traffic:

- Background traffic annual growth rate **Please Confirm**
- Any future background developments to include?

Future Road Improvements:

- **Please confirm**

Trip Generation:

- ITE Trip Generation Data 12th Edition.

Trip Distribution:

- Existing Distribution and 2022 Transportation Tomorrow Survey (TTS) Data.

Best Regards,

Andrew Orr, M.A.Sc., EIT

Transportation Consultant, Associate
(He/Him)



5A-150 Pinebush Road, Cambridge ON, N1R 8J8

p: 519.896.3163 x210

m: 289-808-8997

e: aorr@ptsl.com

w: www.ptsl.com

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Appendix B

Traffic Data





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Moore Avenue Trail Crossing
Site Code: 250792
Start Date: 01/08/2026
Page No: 1

Moore Avenue Trail Crossing (Westbound)

Start Time	Pedestrians	Bicycles	Total
7:00 AM	2	2	4
7:15 AM	1	1	2
7:30 AM	5	0	5
7:45 AM	6	4	10
8:00 AM	6	0	6
8:15 AM	6	3	9
8:30 AM	5	2	7
8:45 AM	3	1	4
9:00 AM	6	1	7
9:15 AM	5	3	8
9:30 AM	2	2	4
9:45 AM	1	1	2
11:30 AM	4	2	6
11:45 AM	5	0	5
12:00 PM	6	0	6
12:15 PM	5	1	6
12:30 PM	6	3	9
12:45 PM	6	0	6
1:00 PM	4	0	4
1:15 PM	1	0	1
3:00 PM	5	3	8
3:15 PM	4	0	4
3:30 PM	9	0	9
3:45 PM	3	1	4
4:00 PM	6	1	7
4:15 PM	3	0	3
4:30 PM	4	0	4
4:45 PM	2	0	2
5:00 PM	5	1	6
5:15 PM	6	1	7
5:30 PM	4	1	5
5:45 PM	13	0	13
Total	149	34	183
Total %	81.4	18.6	100.0
AM Times	7:30 AM	7:45 AM	7:45 AM
AM Peaks	23	9	32
PM Times	12:15 PM	4:45 PM	5:00 PM
PM Peaks	21	3	31



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Count Name: Moore Avenue Trail Crossing
Site Code: 250792
Start Date: 01/08/2026
Page No: 2

Moore Avenue Trail Crossing (Eastbound)

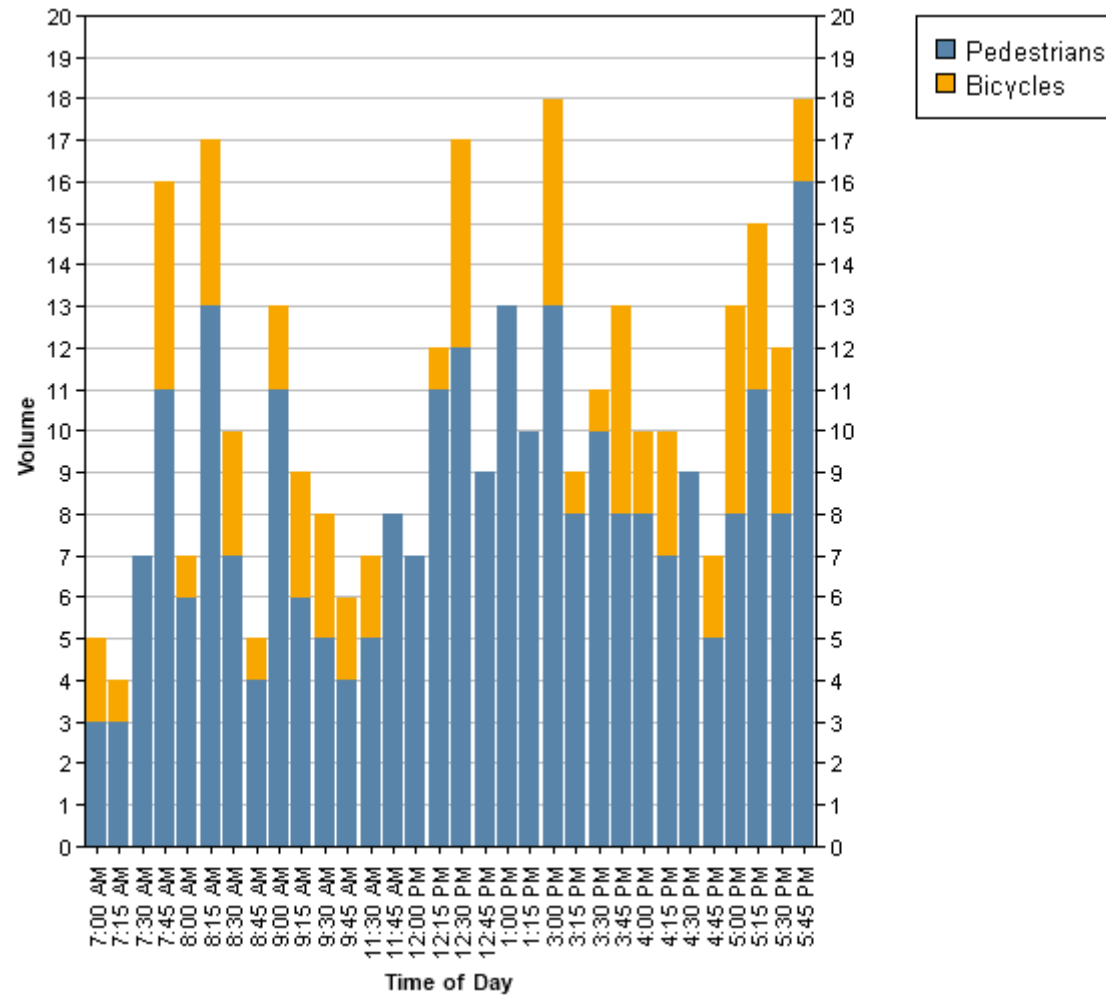
Start Time	Pedestrians	Bicycles	Total
7:00 AM	1	0	1
7:15 AM	2	0	2
7:30 AM	2	0	2
7:45 AM	5	1	6
8:00 AM	0	1	1
8:15 AM	7	1	8
8:30 AM	2	1	3
8:45 AM	1	0	1
9:00 AM	5	1	6
9:15 AM	1	0	1
9:30 AM	3	1	4
9:45 AM	3	1	4
11:30 AM	1	0	1
11:45 AM	3	0	3
12:00 PM	1	0	1
12:15 PM	6	0	6
12:30 PM	6	2	8
12:45 PM	3	0	3
1:00 PM	9	0	9
1:15 PM	9	0	9
3:00 PM	8	2	10
3:15 PM	4	1	5
3:30 PM	1	1	2
3:45 PM	5	4	9
4:00 PM	2	1	3
4:15 PM	4	3	7
4:30 PM	5	0	5
4:45 PM	3	2	5
5:00 PM	3	4	7
5:15 PM	5	3	8
5:30 PM	4	3	7
5:45 PM	3	2	5
Total	117	35	152
Total %	77.0	23.0	100.0
AM Times	7:30 AM	7:45 AM	7:45 AM
AM Peaks	14	4	18
PM Times	12:15 PM	4:45 PM	5:00 PM
PM Peaks	24	12	27



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Moore Avenue Trail Crossing
Site Code: 250792
Start Date: 01/08/2026
Page No: 3





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Roger Street Trail Crossing
Site Code: 250792
Start Date: 01/08/2026
Page No: 1

Roger Street Trail Crossing (Westbound)

Start Time	Pedestrians	Bicycles	Total
7:00 AM	2	0	2
7:15 AM	1	0	1
7:30 AM	2	0	2
7:45 AM	1	1	2
8:00 AM	4	1	5
8:15 AM	7	1	8
8:30 AM	3	1	4
8:45 AM	1	0	1
9:00 AM	5	1	6
9:15 AM	1	0	1
9:30 AM	2	0	2
9:45 AM	6	1	7
11:30 AM	0	1	1
11:45 AM	1	0	1
12:00 PM	1	1	2
12:15 PM	6	1	7
12:30 PM	11	0	11
12:45 PM	5	2	7
1:00 PM	3	0	3
1:15 PM	12	0	12
3:00 PM	7	1	8
3:15 PM	2	1	3
3:30 PM	3	2	5
3:45 PM	4	1	5
4:00 PM	2	1	3
4:15 PM	4	3	7
4:30 PM	5	1	6
4:45 PM	2	2	4
5:00 PM	6	4	10
5:15 PM	5	2	7
5:30 PM	6	0	6
5:45 PM	2	0	2
Total	122	29	151
Total %	80.8	19.2	100.0
AM Times	7:45 AM	7:45 AM	7:45 AM
AM Peaks	15	4	19
PM Times	12:30 PM	4:15 PM	12:30 PM
PM Peaks	31	10	33



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Start Date: 01/08/2026
Page No: 2

Roger Street Trail Crossing (Eastbound)

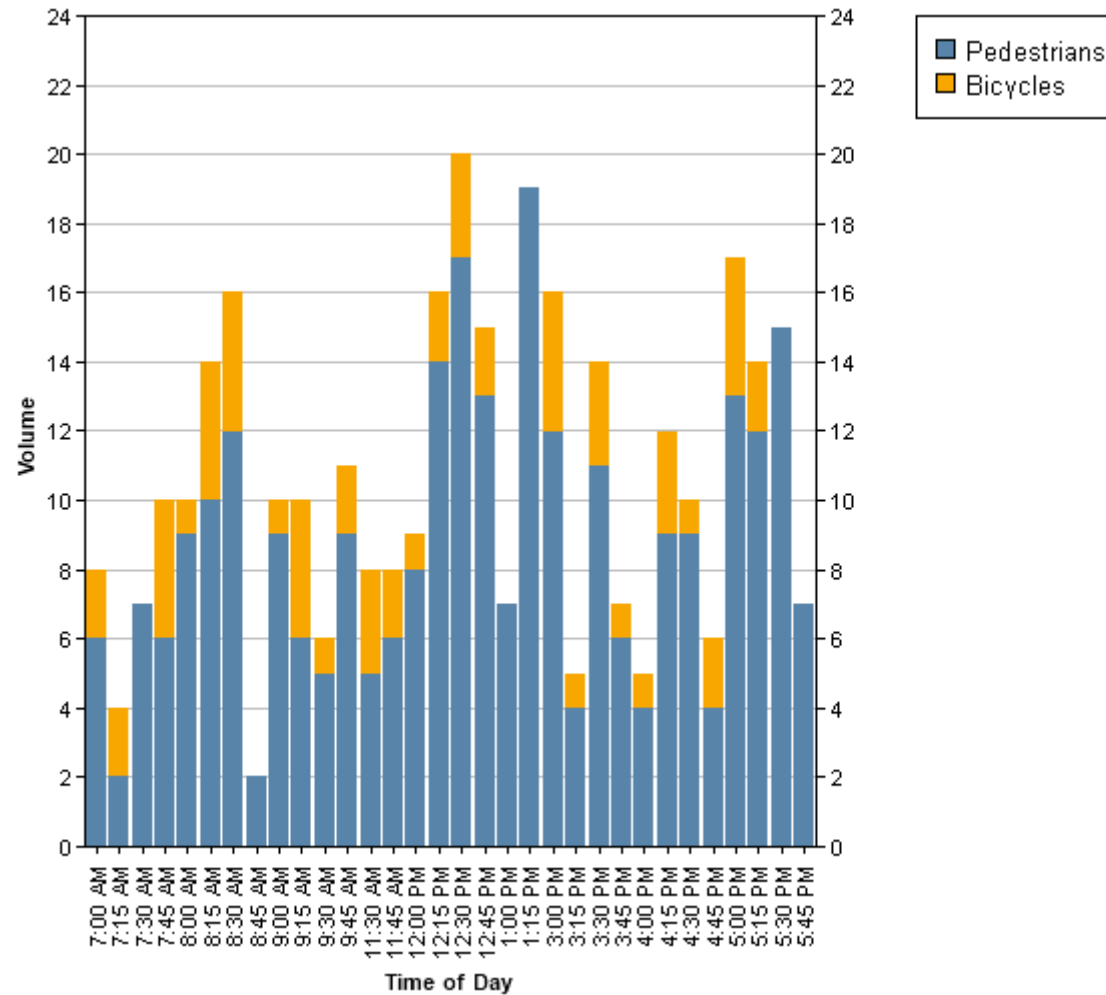
Start Time	Pedestrians	Bicycles	Total
7:00 AM	4	2	6
7:15 AM	1	2	3
7:30 AM	5	0	5
7:45 AM	5	3	8
8:00 AM	5	0	5
8:15 AM	3	3	6
8:30 AM	9	3	12
8:45 AM	1	0	1
9:00 AM	4	0	4
9:15 AM	5	4	9
9:30 AM	3	1	4
9:45 AM	3	1	4
11:30 AM	5	2	7
11:45 AM	5	2	7
12:00 PM	7	0	7
12:15 PM	8	1	9
12:30 PM	6	3	9
12:45 PM	8	0	8
1:00 PM	4	0	4
1:15 PM	7	0	7
3:00 PM	5	3	8
3:15 PM	2	0	2
3:30 PM	8	1	9
3:45 PM	2	0	2
4:00 PM	2	0	2
4:15 PM	5	0	5
4:30 PM	4	0	4
4:45 PM	2	0	2
5:00 PM	7	0	7
5:15 PM	7	0	7
5:30 PM	9	0	9
5:45 PM	5	0	5
Total	156	31	187
Total %	83.4	16.6	100.0
AM Times	7:45 AM	7:45 AM	7:45 AM
AM Peaks	22	9	31
PM Times	12:30 PM	4:15 PM	12:30 PM
PM Peaks	25	0	28



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsll.com

Count Name: Roger Street Trail Crossing
Site Code: 250792
Start Date: 01/08/2026
Page No: 3





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Roger Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 1

Turning Movement Data

Start Time	Roger Street Eastbound						Roger Street Westbound						Moore Avenue Northbound						Moore Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	0	2	0	0	2	2	0	1	0	0	3	0	7	0	0	0	7	0	2	3	0	0	5	17
7:15 AM	1	2	1	0	3	4	0	1	0	0	0	1	2	5	1	0	0	8	1	4	0	0	2	5	18
7:30 AM	3	1	2	0	2	6	2	2	1	0	0	5	1	11	0	0	0	12	2	10	2	0	0	14	37
7:45 AM	1	1	3	0	1	5	1	1	3	0	2	5	0	21	0	0	1	21	1	6	1	0	0	8	39
Hourly Total	5	4	8	0	6	17	5	4	5	0	2	14	3	44	1	0	1	48	4	22	6	0	2	32	111
8:00 AM	3	1	1	0	6	5	0	4	4	0	3	8	3	15	0	0	0	18	2	14	0	0	0	16	47
8:15 AM	4	0	3	0	3	7	2	2	2	0	1	6	1	20	1	0	2	22	1	9	0	0	1	10	45
8:30 AM	4	1	0	0	3	5	1	3	4	0	1	8	0	15	0	0	3	15	1	13	2	0	1	16	44
8:45 AM	3	2	0	0	6	5	1	4	1	0	6	6	3	29	1	0	0	33	3	14	0	0	14	17	61
Hourly Total	14	4	4	0	18	22	4	13	11	0	11	28	7	79	2	0	5	88	7	50	2	0	16	59	197
9:00 AM	1	4	2	0	2	7	0	5	1	0	2	6	1	12	2	0	2	15	4	11	1	1	2	17	45
9:15 AM	2	0	1	0	1	3	1	2	2	0	2	5	1	18	0	0	0	19	3	15	0	0	1	18	45
9:30 AM	1	3	1	0	0	5	0	2	0	0	0	2	1	10	1	0	3	12	1	8	0	0	1	9	28
9:45 AM	2	1	1	0	0	4	0	1	2	0	0	3	0	13	0	0	3	13	1	16	2	0	0	19	39
Hourly Total	6	8	5	0	3	19	1	10	5	0	4	16	3	53	3	0	8	59	9	50	3	1	4	63	157
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	3	3	2	0	0	8	0	0	2	0	2	2	1	8	0	0	1	9	2	13	0	0	0	15	34
11:45 AM	2	1	2	0	5	5	0	0	5	0	0	5	0	15	1	0	0	16	2	15	2	0	0	19	45
Hourly Total	5	4	4	0	5	13	0	0	7	0	2	7	1	23	1	0	1	25	4	28	2	0	0	34	79
12:00 PM	3	0	1	0	0	4	1	1	1	0	3	3	1	6	0	0	1	7	2	16	2	0	1	20	34
12:15 PM	1	0	3	0	1	4	0	0	2	0	4	2	0	5	0	0	4	5	3	15	5	0	1	23	34
12:30 PM	2	2	2	0	1	6	0	1	5	0	4	6	1	9	0	0	4	10	1	16	1	0	1	18	40
12:45 PM	4	2	0	0	2	6	3	3	6	0	0	12	3	9	0	0	0	12	1	16	1	0	2	18	48
Hourly Total	10	4	6	0	4	20	4	5	14	0	11	23	5	29	0	0	9	34	7	63	9	0	5	79	156
1:00 PM	1	3	1	0	0	5	0	2	4	0	2	6	0	11	0	0	0	11	3	13	0	0	0	16	38
1:15 PM	2	4	1	0	0	7	1	1	2	0	2	4	1	14	1	0	2	16	2	18	0	0	2	20	47
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	3	7	2	0	0	12	1	3	6	0	4	10	1	25	1	0	2	27	5	31	0	0	2	36	85
3:00 PM	1	2	0	0	2	3	1	3	5	0	1	9	1	14	0	0	4	15	1	11	5	0	3	17	44
3:15 PM	2	1	0	0	2	3	1	5	1	0	2	7	1	20	1	0	1	22	1	18	4	0	1	23	55
3:30 PM	3	1	2	0	3	6	0	3	1	0	5	4	0	15	1	0	1	16	3	9	0	0	3	12	38
3:45 PM	2	6	3	0	7	11	0	3	6	0	3	9	1	13	0	0	1	14	2	15	2	0	2	19	53
Hourly Total	8	10	5	0	14	23	2	14	13	0	11	29	3	62	2	0	7	67	7	53	11	0	9	71	190
4:00 PM	1	0	4	0	1	5	2	6	5	0	5	13	2	24	1	0	9	27	1	20	4	0	7	25	70
4:15 PM	4	6	3	0	5	13	0	2	0	0	2	2	1	23	0	0	2	24	2	14	2	0	3	18	57

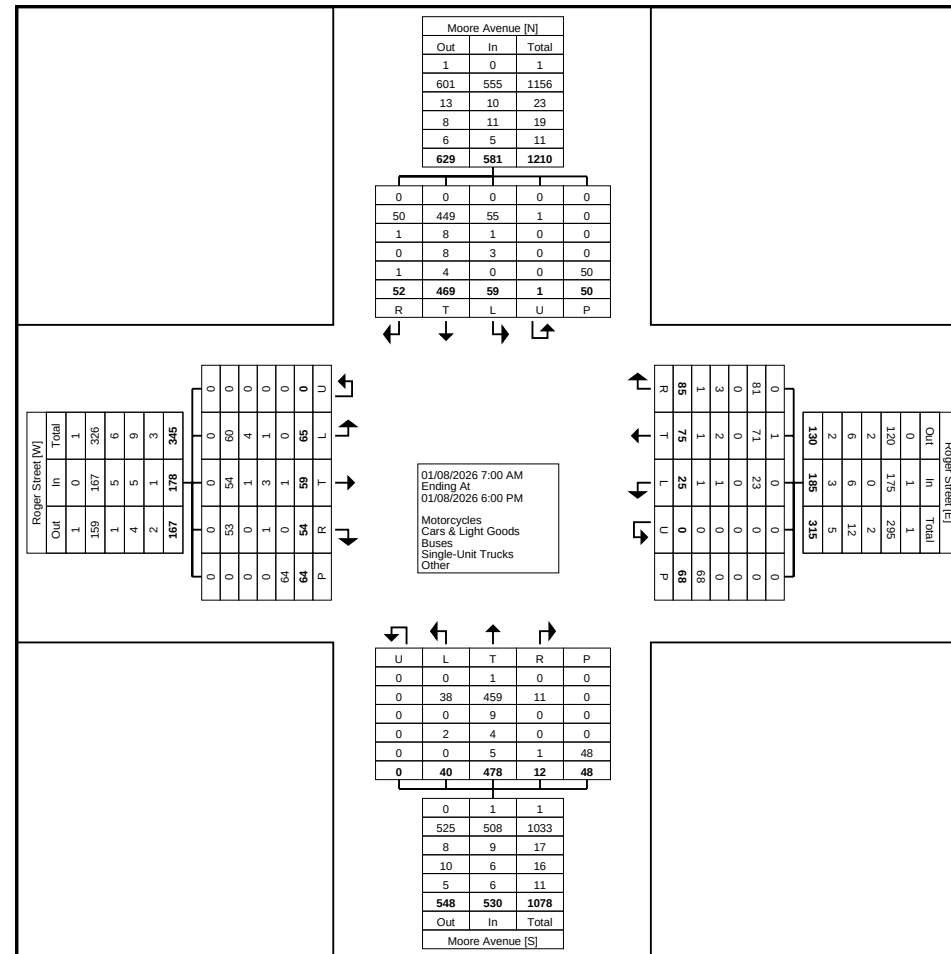
4:30 PM	1	2	2	0	1	5	1	2	7	0	1	10	2	20	0	0	1	22	2	18	1	0	0	21	58
4:45 PM	1	2	3	0	2	6	0	2	2	0	3	4	1	17	0	0	1	18	2	27	0	0	1	29	57
Hourly Total	7	10	12	0	9	29	3	12	14	0	11	29	6	84	1	0	13	91	7	79	7	0	11	93	242
5:00 PM	3	2	3	0	2	8	4	1	6	0	2	11	1	29	0	0	1	30	1	24	6	0	1	31	80
5:15 PM	2	2	4	0	2	8	1	4	3	0	6	8	3	17	0	0	0	20	3	21	0	0	0	24	60
5:30 PM	2	1	1	0	0	4	0	4	1	0	2	5	4	15	1	0	1	20	1	30	2	0	0	33	62
5:45 PM	0	3	0	0	1	3	0	5	0	0	2	5	3	18	0	0	0	21	4	18	4	0	0	26	55
Hourly Total	7	8	8	0	5	23	5	14	10	0	12	29	11	79	1	0	2	91	9	93	12	0	1	114	257
Grand Total	65	59	54	0	64	178	25	75	85	0	68	185	40	478	12	0	48	530	59	469	52	1	50	581	1474
Approach %	36.5	33.1	30.3	0.0	-	-	13.5	40.5	45.9	0.0	-	-	7.5	90.2	2.3	0.0	-	-	10.2	80.7	9.0	0.2	-	-	-
Total %	4.4	4.0	3.7	0.0	-	12.1	1.7	5.1	5.8	0.0	-	12.6	2.7	32.4	0.8	0.0	-	36.0	4.0	31.8	3.5	0.1	-	39.4	-
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	2
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	1.3	0.0	-	-	0.5	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	0.0	-	0.0	0.1
Cars & Light Goods	60	54	53	0	-	167	23	71	81	0	-	175	38	459	11	0	-	508	55	449	50	1	-	555	1405
% Cars & Light Goods	92.3	91.5	98.1	-	-	93.8	92.0	94.7	95.3	-	-	94.6	95.0	96.0	91.7	-	-	95.8	93.2	95.7	96.2	100.0	-	95.5	95.3
Buses	4	1	0	0	-	5	0	0	0	0	-	0	0	9	0	0	-	9	1	8	1	0	-	10	24
% Buses	6.2	1.7	0.0	-	-	2.8	0.0	0.0	0.0	-	-	0.0	0.0	1.9	0.0	-	-	1.7	1.7	1.7	1.9	0.0	-	1.7	1.6
Single-Unit Trucks	1	3	1	0	-	5	1	2	3	0	-	6	2	4	0	0	-	6	3	8	0	0	-	11	28
% Single-Unit Trucks	1.5	5.1	1.9	-	-	2.8	4.0	2.7	3.5	-	-	3.2	5.0	0.8	0.0	-	-	1.1	5.1	1.7	0.0	0.0	-	1.9	1.9
Articulated Trucks	0	0	0	0	-	0	1	0	1	0	-	2	0	0	1	0	-	1	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	4.0	0.0	1.2	-	-	1.1	0.0	0.0	8.3	-	-	0.2	0.0	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Road	0	1	0	0	-	1	0	1	0	0	-	1	0	5	0	0	-	5	0	4	1	0	-	5	12
% Bicycles on Road	0.0	1.7	0.0	-	-	0.6	0.0	1.3	0.0	-	-	0.5	0.0	1.0	0.0	-	-	0.9	0.0	0.9	1.9	0.0	-	0.9	0.8
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	3.1	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	62	-	-	-	-	-	68	-	-	-	-	-	48	-	-	-	-	-	50	-	-
% Pedestrians	-	-	-	-	96.9	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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519-896-3163 cbowness@pts1.com

Count Name: Roger Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Roger Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

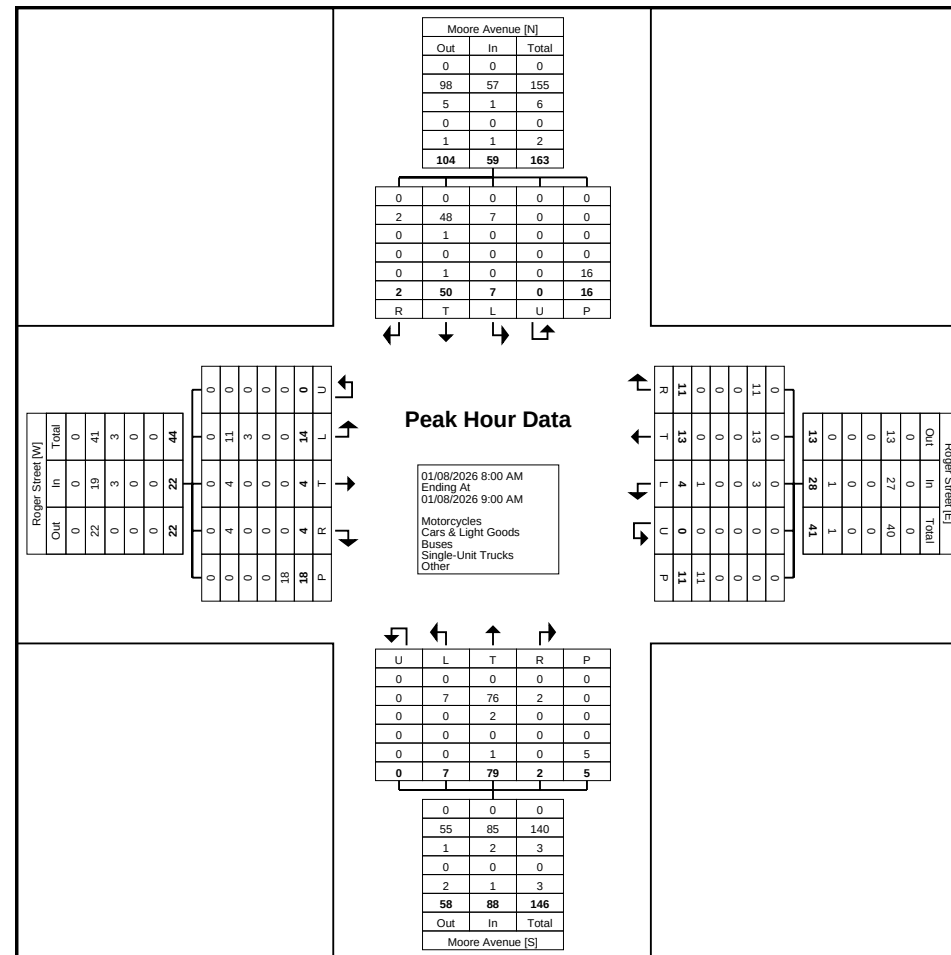
Start Time	Roger Street Eastbound						Roger Street Westbound						Moore Avenue Northbound						Moore Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	3	1	1	0	6	5	0	4	4	0	3	8	3	15	0	0	0	18	2	14	0	0	0	16	47
8:15 AM	4	0	3	0	3	7	2	2	2	0	1	6	1	20	1	0	2	22	1	9	0	0	1	10	45
8:30 AM	4	1	0	0	3	5	1	3	4	0	1	8	0	15	0	0	3	15	1	13	2	0	1	16	44
8:45 AM	3	2	0	0	6	5	1	4	1	0	6	6	3	29	1	0	0	33	3	14	0	0	14	17	61
Total	14	4	4	0	18	22	4	13	11	0	11	28	7	79	2	0	5	88	7	50	2	0	16	59	197
Approach %	63.6	18.2	18.2	0.0	-	-	14.3	46.4	39.3	0.0	-	-	8.0	89.8	2.3	0.0	-	-	11.9	84.7	3.4	0.0	-	-	-
Total %	7.1	2.0	2.0	0.0	-	11.2	2.0	6.6	5.6	0.0	-	14.2	3.6	40.1	1.0	0.0	-	44.7	3.6	25.4	1.0	0.0	-	29.9	-
PHF	0.875	0.500	0.333	0.000	-	0.786	0.500	0.813	0.688	0.000	-	0.875	0.583	0.681	0.500	0.000	-	0.667	0.583	0.893	0.250	0.000	-	0.868	0.807
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	11	4	4	0	-	19	3	13	11	0	-	27	7	76	2	0	-	85	7	48	2	0	-	57	188
% Cars & Light Goods	78.6	100.0	100.0	-	-	86.4	75.0	100.0	100.0	-	-	96.4	100.0	96.2	100.0	-	-	96.6	100.0	96.0	100.0	-	-	96.6	95.4
Buses	3	0	0	0	-	3	0	0	0	0	-	0	0	2	0	0	-	2	0	1	0	0	-	1	6
% Buses	21.4	0.0	0.0	-	-	13.6	0.0	0.0	0.0	-	-	0.0	0.0	2.5	0.0	-	-	2.3	0.0	2.0	0.0	-	-	1.7	3.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	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
Articulated Trucks	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	25.0	0.0	0.0	-	-	3.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.3	0.0	-	-	1.1	0.0	2.0	0.0	-	-	1.7	1.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	18	-	-	-	-	-	11	-	-	-	-	-	5	-	-	-	-	-	16	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Roger Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Roger Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 6

Turning Movement Peak Hour Data (12:30 PM)

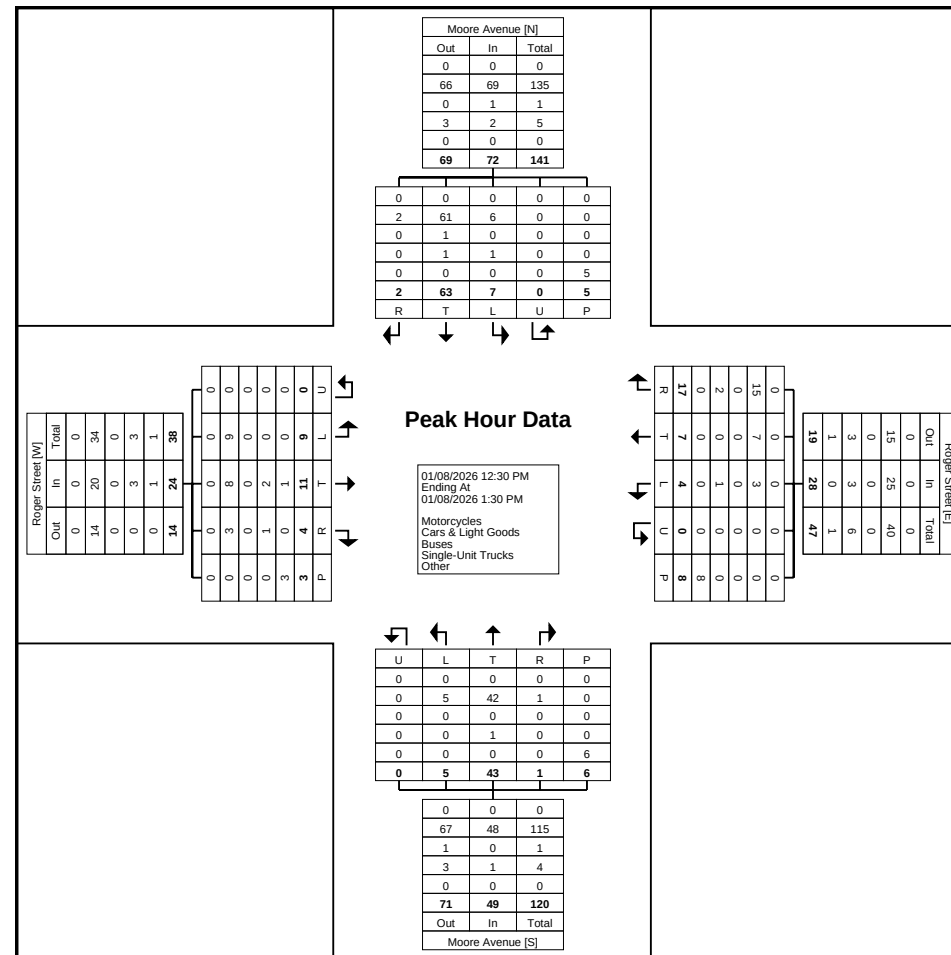
Start Time	Roger Street Eastbound						Roger Street Westbound						Moore Avenue Northbound						Moore Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:30 PM	2	2	2	0	1	6	0	1	5	0	4	6	1	9	0	0	4	10	1	16	1	0	1	18	40
12:45 PM	4	2	0	0	2	6	3	3	6	0	0	12	3	9	0	0	0	12	1	16	1	0	2	18	48
1:00 PM	1	3	1	0	0	5	0	2	4	0	2	6	0	11	0	0	0	11	3	13	0	0	0	16	38
1:15 PM	2	4	1	0	0	7	1	1	2	0	2	4	1	14	1	0	2	16	2	18	0	0	2	20	47
Total	9	11	4	0	3	24	4	7	17	0	8	28	5	43	1	0	6	49	7	63	2	0	5	72	173
Approach %	37.5	45.8	16.7	0.0	-	-	14.3	25.0	60.7	0.0	-	-	10.2	87.8	2.0	0.0	-	-	9.7	87.5	2.8	0.0	-	-	-
Total %	5.2	6.4	2.3	0.0	-	13.9	2.3	4.0	9.8	0.0	-	16.2	2.9	24.9	0.6	0.0	-	28.3	4.0	36.4	1.2	0.0	-	41.6	-
PHF	0.563	0.688	0.500	0.000	-	0.857	0.333	0.583	0.708	0.000	-	0.583	0.417	0.768	0.250	0.000	-	0.766	0.583	0.875	0.500	0.000	-	0.900	0.901
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	9	8	3	0	-	20	3	7	15	0	-	25	5	42	1	0	-	48	6	61	2	0	-	69	162
% Cars & Light Goods	100.0	72.7	75.0	-	-	83.3	75.0	100.0	88.2	-	-	89.3	100.0	97.7	100.0	-	-	98.0	85.7	96.8	100.0	-	-	95.8	93.6
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Buses	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	1.6	0.0	-	-	1.4	0.6
Single-Unit Trucks	0	2	1	0	-	3	1	0	2	0	-	3	0	1	0	0	-	1	1	1	0	0	-	2	9
% Single-Unit Trucks	0.0	18.2	25.0	-	-	12.5	25.0	0.0	11.8	-	-	10.7	0.0	2.3	0.0	-	-	2.0	14.3	1.6	0.0	-	-	2.8	5.2
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	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
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	9.1	0.0	-	-	4.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	8	-	-	-	-	-	6	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Roger Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 7



Turning Movement Peak Hour Data Plot (12:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Roger Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 8

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Roger Street Eastbound						Roger Street Westbound						Moore Avenue Northbound						Moore Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	1	2	3	0	2	6	0	2	2	0	3	4	1	17	0	0	1	18	2	27	0	0	1	29	57
5:00 PM	3	2	3	0	2	8	4	1	6	0	2	11	1	29	0	0	1	30	1	24	6	0	1	31	80
5:15 PM	2	2	4	0	2	8	1	4	3	0	6	8	3	17	0	0	0	20	3	21	0	0	0	24	60
5:30 PM	2	1	1	0	0	4	0	4	1	0	2	5	4	15	1	0	1	20	1	30	2	0	0	33	62
Total	8	7	11	0	6	26	5	11	12	0	13	28	9	78	1	0	3	88	7	102	8	0	2	117	259
Approach %	30.8	26.9	42.3	0.0	-	-	17.9	39.3	42.9	0.0	-	-	10.2	88.6	1.1	0.0	-	-	6.0	87.2	6.8	0.0	-	-	-
Total %	3.1	2.7	4.2	0.0	-	10.0	1.9	4.2	4.6	0.0	-	10.8	3.5	30.1	0.4	0.0	-	34.0	2.7	39.4	3.1	0.0	-	45.2	-
PHF	0.667	0.875	0.688	0.000	-	0.813	0.313	0.688	0.500	0.000	-	0.636	0.563	0.672	0.250	0.000	-	0.733	0.583	0.850	0.333	0.000	-	0.886	0.809
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.3	0.0	-	-	1.1	0.0	0.0	0.0	-	-	0.0	0.4
Cars & Light Goods	8	7	11	0	-	26	5	11	12	0	-	28	9	77	1	0	-	87	7	101	8	0	-	116	257
% Cars & Light Goods	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	98.7	100.0	-	-	98.9	100.0	99.0	100.0	-	-	99.1	99.2
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	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
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	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
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	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
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Bicycles on Road	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	1.0	0.0	-	-	0.9	0.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	13	-	-	-	-	-	3	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (4:45 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Rogers Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 1

Turning Movement Data

Start Time	Roger Street Eastbound						Driveway Westbound						Weber Street Northbound						Weber Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	3	0	0	0	0	3	0	0	0	0	0	0	9	85	0	0	0	94	0	49	3	0	0	52	149
7:15 AM	2	0	2	0	0	4	0	0	0	0	0	0	13	79	0	0	0	92	0	77	4	0	2	81	177
7:30 AM	4	0	5	0	0	9	0	0	0	0	0	0	9	109	0	0	0	118	2	78	4	0	0	84	211
7:45 AM	3	0	3	0	0	6	0	0	1	0	1	1	13	152	0	0	0	165	1	122	7	0	3	130	302
Hourly Total	12	0	10	0	0	22	0	0	1	0	1	1	44	425	0	0	0	469	3	326	18	0	5	347	839
8:00 AM	7	0	1	0	3	8	1	0	0	0	0	1	6	214	0	0	0	220	2	119	9	0	0	130	359
8:15 AM	5	0	3	0	1	8	0	0	0	0	1	0	11	238	0	0	0	249	0	134	8	0	0	142	399
8:30 AM	5	2	5	0	0	12	0	0	0	0	0	0	16	224	2	0	0	242	0	151	11	0	0	162	416
8:45 AM	1	0	5	0	1	6	0	0	0	0	0	0	7	195	0	0	0	202	0	129	13	0	0	142	350
Hourly Total	18	2	14	0	5	34	1	0	0	0	1	1	40	871	2	0	0	913	2	533	41	0	0	576	1524
9:00 AM	4	0	13	0	0	17	0	0	0	0	0	0	9	182	0	0	0	191	1	136	6	0	0	143	351
9:15 AM	1	0	4	0	0	5	0	0	0	0	0	0	5	185	1	0	0	191	0	132	4	0	0	136	332
9:30 AM	7	0	4	0	0	11	0	0	0	0	2	0	6	157	0	0	0	163	1	112	3	0	0	116	290
9:45 AM	3	0	5	0	1	8	0	0	0	0	0	0	6	144	0	0	0	150	0	128	3	0	0	131	289
Hourly Total	15	0	26	0	1	41	0	0	0	0	2	0	26	668	1	0	0	695	2	508	16	0	0	526	1262
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	6	0	5	0	1	11	0	0	1	0	0	1	5	149	0	0	0	154	0	117	2	0	0	119	285
11:45 AM	3	0	5	0	2	8	0	0	0	0	2	0	0	135	0	0	2	135	0	103	7	0	0	110	253
Hourly Total	9	0	10	0	3	19	0	0	1	0	2	1	5	284	0	0	2	289	0	220	9	0	0	229	538
12:00 PM	11	0	9	0	7	20	1	0	1	0	2	2	5	152	0	0	0	157	0	146	10	0	0	156	335
12:15 PM	6	0	3	0	7	9	2	0	1	0	1	3	2	166	0	0	0	168	1	144	7	0	0	152	332
12:30 PM	12	0	7	0	9	19	0	0	0	0	1	0	2	170	1	0	0	173	0	104	10	0	0	114	306
12:45 PM	4	0	5	0	7	9	0	0	0	0	2	0	14	157	0	0	0	171	0	137	9	0	1	146	326
Hourly Total	33	0	24	0	30	57	3	0	2	0	6	5	23	645	1	0	0	669	1	531	36	0	1	568	1299
1:00 PM	8	0	4	0	6	12	0	0	1	0	1	1	7	142	1	0	0	150	2	124	10	0	0	136	299
1:15 PM	2	0	5	0	8	7	0	0	1	0	2	1	5	159	1	0	0	165	0	153	9	0	0	162	335
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	10	0	9	0	14	19	0	0	2	0	3	2	12	301	2	0	0	315	2	277	19	0	0	298	634
3:00 PM	9	0	4	0	3	13	1	0	2	0	3	3	5	148	1	0	0	154	3	150	6	0	0	159	329
3:15 PM	7	0	5	0	2	12	0	0	0	0	0	0	4	162	1	0	0	167	0	140	7	0	0	147	326
3:30 PM	6	0	4	0	3	10	0	0	2	0	2	2	2	163	1	0	0	166	2	163	3	0	0	168	346
3:45 PM	6	0	10	0	1	16	0	0	0	0	1	0	6	166	0	0	0	172	0	167	2	0	0	169	357
Hourly Total	28	0	23	0	9	51	1	0	4	0	6	5	17	639	3	0	0	659	5	620	18	0	0	643	1358
4:00 PM	5	0	6	0	0	11	0	0	0	0	0	0	11	165	0	0	0	176	0	200	4	0	0	204	391
4:15 PM	6	0	8	0	2	14	0	0	0	0	0	0	2	162	1	0	0	165	1	206	7	0	0	214	393

4:30 PM	7	0	7	0	2	14	0	0	0	0	1	0	8	175	0	0	0	183	0	227	8	0	1	235	432
4:45 PM	7	0	7	0	1	14	1	0	1	0	1	2	3	162	1	0	1	166	0	228	7	0	1	235	417
Hourly Total	25	0	28	0	5	53	1	0	1	0	2	2	24	664	2	0	1	690	1	861	26	0	2	888	1633
5:00 PM	15	0	16	0	2	31	0	0	0	0	0	0	7	200	0	0	0	207	0	198	6	0	0	204	442
5:15 PM	8	0	20	0	1	28	0	0	0	0	0	0	0	208	0	0	0	208	0	198	5	0	0	203	439
5:30 PM	2	0	8	0	4	10	0	0	0	0	3	0	6	197	0	0	1	203	0	192	2	0	0	194	407
5:45 PM	9	0	9	0	0	18	0	0	0	0	0	0	6	159	0	0	0	165	0	188	2	0	0	190	373
Hourly Total	34	0	53	0	7	87	0	0	0	0	3	0	19	764	0	0	1	783	0	776	15	0	0	791	1661
Grand Total	184	2	197	0	74	383	6	0	11	0	26	17	210	5261	11	0	4	5482	16	4652	198	0	8	4866	10748
Approach %	48.0	0.5	51.4	0.0	-	-	35.3	0.0	64.7	0.0	-	-	3.8	96.0	0.2	0.0	-	-	0.3	95.6	4.1	0.0	-	-	-
Total %	1.7	0.0	1.8	0.0	-	3.6	0.1	0.0	0.1	0.0	-	0.2	2.0	48.9	0.1	0.0	-	51.0	0.1	43.3	1.8	0.0	-	45.3	-
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	175	1	177	0	-	353	6	0	11	0	-	17	197	5149	11	0	-	5357	16	4547	189	0	-	4752	10479
% Cars & Light Goods	95.1	50.0	89.8	-	-	92.2	100.0	-	100.0	-	-	100.0	93.8	97.9	100.0	-	-	97.7	100.0	97.7	95.5	-	-	97.7	97.5
Buses	2	0	2	0	-	4	0	0	0	0	-	0	1	58	0	0	-	59	0	60	1	0	-	61	124
% Buses	1.1	0.0	1.0	-	-	1.0	0.0	-	0.0	-	-	0.0	0.5	1.1	0.0	-	-	1.1	0.0	1.3	0.5	-	-	1.3	1.2
Single-Unit Trucks	4	1	11	0	-	16	0	0	0	0	-	0	7	49	0	0	-	56	0	43	5	0	-	48	120
% Single-Unit Trucks	2.2	50.0	5.6	-	-	4.2	0.0	-	0.0	-	-	0.0	3.3	0.9	0.0	-	-	1.0	0.0	0.9	2.5	-	-	1.0	1.1
Articulated Trucks	3	0	6	0	-	9	0	0	0	0	-	0	5	4	0	0	-	9	0	2	3	0	-	5	23
% Articulated Trucks	1.6	0.0	3.0	-	-	2.3	0.0	-	0.0	-	-	0.0	2.4	0.1	0.0	-	-	0.2	0.0	0.0	1.5	-	-	0.1	0.2
Bicycles on Road	0	0	1	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.0	0.5	-	-	0.3	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	74	-	-	-	-	-	26	-	-	-	-	-	4	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Data Plot

Start Time	Roger Street Eastbound						Driveway Westbound						Weber Street Northbound						Weber Street Southbound						Int. Total	
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total		
8:00 AM	7	0	1	0	3	8	1	0	0	0	0	1	6	214	0	0	0	220	2	119	9	0	0	130	359	
8:15 AM	5	0	3	0	1	8	0	0	0	0	1	0	11	238	0	0	0	249	0	134	8	0	0	142	399	
8:30 AM	5	2	5	0	0	12	0	0	0	0	0	0	16	224	2	0	0	242	0	151	11	0	0	162	416	
8:45 AM	1	0	5	0	1	6	0	0	0	0	0	0	7	195	0	0	0	202	0	129	13	0	0	142	350	
Total	18	2	14	0	5	34	1	0	0	0	1	1	40	871	2	0	0	913	2	533	41	0	0	576	1524	
Approach %	52.9	5.9	41.2	0.0	-	-	100.0	0.0	0.0	0.0	0.0	-	-	4.4	95.4	0.2	0.0	-	-	0.3	92.5	7.1	0.0	-	-	-
Total %	1.2	0.1	0.9	0.0	-	2.2	0.1	0.0	0.0	0.0	-	0.1	2.6	57.2	0.1	0.0	-	59.9	0.1	35.0	2.7	0.0	-	37.8	-	
PHF	0.643	0.250	0.700	0.000	-	0.708	0.250	0.000	0.000	0.000	-	0.250	0.625	0.915	0.250	0.000	-	0.917	0.250	0.882	0.788	0.000	-	0.889	0.916	
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Motorcycles	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	
Cars & Light Goods	17	1	12	0	-	30	1	0	0	0	-	1	37	849	2	0	-	888	2	519	38	0	-	559	1478	
% Cars & Light Goods	94.4	50.0	85.7	-	-	88.2	100.0	-	-	-	-	100.0	92.5	97.5	100.0	-	-	97.3	100.0	97.4	92.7	-	-	97.0	97.0	
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	11	0	0	-	11	0	10	0	0	-	10	21	
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	1.3	0.0	-	-	1.2	0.0	1.9	0.0	-	-	1.7	1.4	
Single-Unit Trucks	0	1	1	0	-	2	0	0	0	0	-	0	0	11	0	0	-	11	0	4	1	0	-	5	18	
% Single-Unit Trucks	0.0	50.0	7.1	-	-	5.9	0.0	-	-	-	-	0.0	0.0	1.3	0.0	-	-	1.2	0.0	0.8	2.4	-	-	0.9	1.2	
Articulated Trucks	1	0	1	0	-	2	0	0	0	0	-	0	3	0	0	0	-	3	0	0	2	0	-	2	7	
% Articulated Trucks	5.6	0.0	7.1	-	-	5.9	0.0	-	-	-	-	0.0	7.5	0.0	0.0	-	-	0.3	0.0	0.0	4.9	-	-	0.3	0.5	
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Bicycles on Road	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	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-	
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pedestrians	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	0	-	-	-	
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Rogers Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

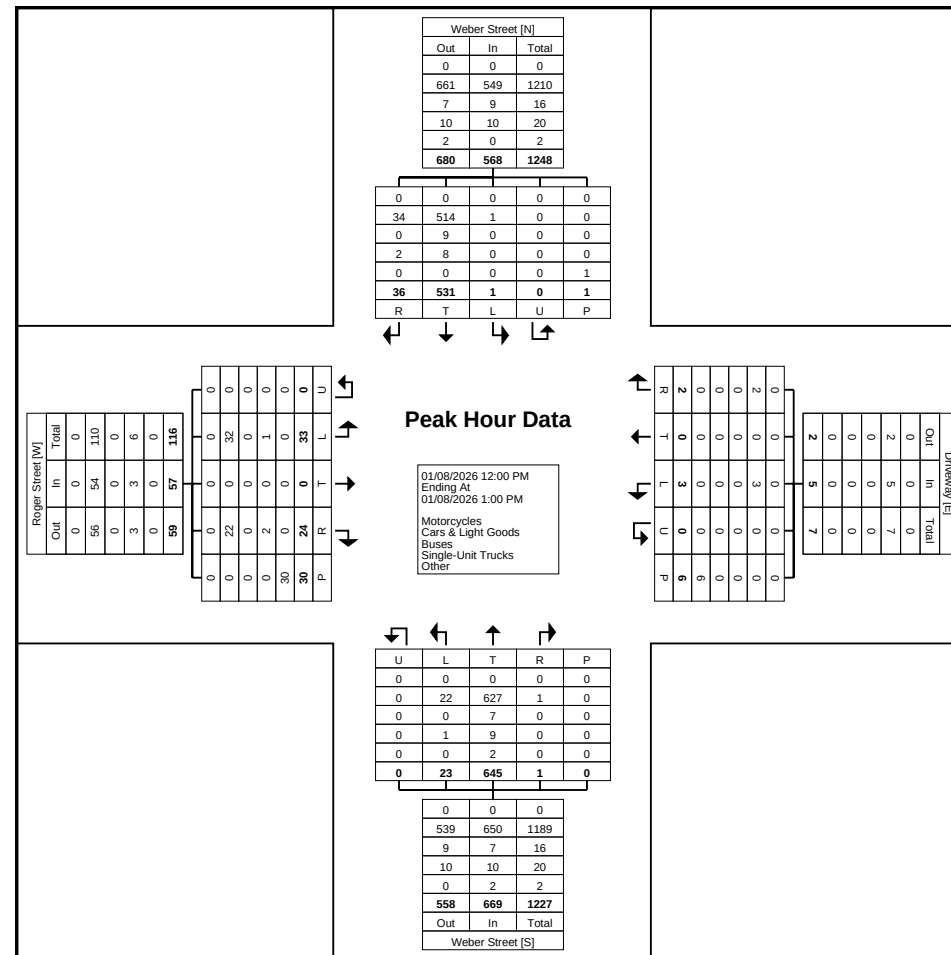
Start Time	Roger Street Eastbound						Driveway Westbound						Weber Street Northbound						Weber Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	11	0	9	0	7	20	1	0	1	0	2	2	5	152	0	0	0	157	0	146	10	0	0	156	335
12:15 PM	6	0	3	0	7	9	2	0	1	0	1	3	2	166	0	0	0	168	1	144	7	0	0	152	332
12:30 PM	12	0	7	0	9	19	0	0	0	0	1	0	2	170	1	0	0	173	0	104	10	0	0	114	306
12:45 PM	4	0	5	0	7	9	0	0	0	0	2	0	14	157	0	0	0	171	0	137	9	0	1	146	326
Total	33	0	24	0	30	57	3	0	2	0	6	5	23	645	1	0	0	669	1	531	36	0	1	568	1299
Approach %	57.9	0.0	42.1	0.0	-	-	60.0	0.0	40.0	0.0	-	-	3.4	96.4	0.1	0.0	-	-	0.2	93.5	6.3	0.0	-	-	-
Total %	2.5	0.0	1.8	0.0	-	4.4	0.2	0.0	0.2	0.0	-	0.4	1.8	49.7	0.1	0.0	-	51.5	0.1	40.9	2.8	0.0	-	43.7	-
PHF	0.688	0.000	0.667	0.000	-	0.713	0.375	0.000	0.500	0.000	-	0.417	0.411	0.949	0.250	0.000	-	0.967	0.250	0.909	0.900	0.000	-	0.910	0.969
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	32	0	22	0	-	54	3	0	2	0	-	5	22	627	1	0	-	650	1	514	34	0	-	549	1258
% Cars & Light Goods	97.0	-	91.7	-	-	94.7	100.0	-	100.0	-	-	100.0	95.7	97.2	100.0	-	-	97.2	100.0	96.8	94.4	-	-	96.7	96.8
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	7	0	0	-	7	0	9	0	0	-	9	16
% Buses	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	1.1	0.0	-	-	1.0	0.0	1.7	0.0	-	-	1.6	1.2
Single-Unit Trucks	1	0	2	0	-	3	0	0	0	0	-	0	1	9	0	0	-	10	0	8	2	0	-	10	23
% Single-Unit Trucks	3.0	-	8.3	-	-	5.3	0.0	-	0.0	-	-	0.0	4.3	1.4	0.0	-	-	1.5	0.0	1.5	5.6	-	-	1.8	1.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	2
% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	30	-	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Rogers Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Rogers Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 8

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Roger Street Eastbound						Driveway Westbound						Weber Street Northbound						Weber Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	7	0	7	0	2	14	0	0	0	0	1	0	8	175	0	0	0	183	0	227	8	0	1	235	432
4:45 PM	7	0	7	0	1	14	1	0	1	0	1	2	3	162	1	0	1	166	0	228	7	0	1	235	417
5:00 PM	15	0	16	0	2	31	0	0	0	0	0	0	7	200	0	0	0	207	0	198	6	0	0	204	442
5:15 PM	8	0	20	0	1	28	0	0	0	0	0	0	0	208	0	0	0	208	0	198	5	0	0	203	439
Total	37	0	50	0	6	87	1	0	1	0	2	2	18	745	1	0	1	764	0	851	26	0	2	877	1730
Approach %	42.5	0.0	57.5	0.0	-	-	50.0	0.0	50.0	0.0	-	-	2.4	97.5	0.1	0.0	-	-	0.0	97.0	3.0	0.0	-	-	-
Total %	2.1	0.0	2.9	0.0	-	5.0	0.1	0.0	0.1	0.0	-	0.1	1.0	43.1	0.1	0.0	-	44.2	0.0	49.2	1.5	0.0	-	50.7	-
PHF	0.617	0.000	0.625	0.000	-	0.702	0.250	0.000	0.250	0.000	-	0.250	0.563	0.895	0.250	0.000	-	0.918	0.000	0.933	0.813	0.000	-	0.933	0.979
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	37	0	48	0	-	85	1	0	1	0	-	2	18	736	1	0	-	755	0	842	26	0	-	868	1710
% Cars & Light Goods	100.0	-	96.0	-	-	97.7	100.0	-	100.0	-	-	100.0	100.0	98.8	100.0	-	-	98.8	-	98.9	100.0	-	-	99.0	98.8
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	7	0	0	-	7	0	8	0	0	-	8	15
% Buses	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.9	0.0	-	-	0.9	-	0.9	0.0	-	-	0.9	0.9
Single-Unit Trucks	0	0	1	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	3
% Single-Unit Trucks	0.0	-	2.0	-	-	1.1	0.0	-	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	-	0.1	0.0	-	-	0.1	0.2
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	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
Bicycles on Road	0	0	1	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	2
% Bicycles on Road	0.0	-	2.0	-	-	1.1	0.0	-	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	-	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

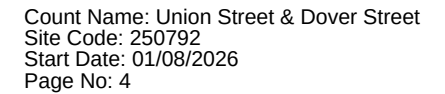
Count Name: Union Street & Dover Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 1

Turning Movement Data

Start Time	Union Street Eastbound					Union Street Westbound					Dover Street Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:00 AM	0	64	0	0	64	48	0	0	0	48	0	3	0	0	3	115
7:15 AM	4	77	0	0	81	82	0	0	0	82	0	1	0	0	1	164
7:30 AM	0	70	0	0	70	89	0	0	0	89	0	1	0	1	1	160
7:45 AM	3	79	0	0	82	107	0	0	0	107	2	1	0	2	3	192
Hourly Total	7	290	0	0	297	326	0	0	0	326	2	6	0	3	8	631
8:00 AM	2	102	0	0	104	146	1	0	0	147	2	4	0	0	6	257
8:15 AM	1	124	0	0	125	123	3	0	0	126	1	2	0	0	3	254
8:30 AM	2	108	0	0	110	124	0	0	0	124	1	0	0	0	1	235
8:45 AM	3	98	0	0	101	133	1	0	0	134	2	4	0	0	6	241
Hourly Total	8	432	0	0	440	526	5	0	0	531	6	10	0	0	16	987
9:00 AM	0	92	0	0	92	119	0	0	0	119	0	2	0	0	2	213
9:15 AM	2	91	0	0	93	134	1	0	0	135	1	1	0	0	2	230
9:30 AM	0	87	0	0	87	97	2	0	0	99	0	0	0	1	0	186
9:45 AM	0	88	0	0	88	106	1	0	0	107	2	2	0	0	4	199
Hourly Total	2	358	0	0	360	456	4	0	0	460	3	5	0	1	8	828
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	3	101	0	0	104	76	1	0	0	77	0	2	0	2	2	183
11:45 AM	0	102	1	0	103	100	1	0	0	101	1	2	0	0	3	207
Hourly Total	3	203	1	0	207	176	2	0	0	178	1	4	0	2	5	390
12:00 PM	1	120	0	0	121	95	0	0	0	95	1	0	0	2	1	217
12:15 PM	3	93	0	0	96	87	4	0	0	91	0	0	0	0	0	187
12:30 PM	0	107	0	0	107	96	2	0	0	98	0	2	0	1	2	207
12:45 PM	1	95	0	0	96	110	2	0	0	112	2	0	0	1	2	210
Hourly Total	5	415	0	0	420	388	8	0	0	396	3	2	0	4	5	821
1:00 PM	0	80	0	0	80	87	1	0	0	88	0	1	0	0	1	169
1:15 PM	1	85	0	0	86	88	0	0	0	88	1	0	0	0	1	175
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	165	0	0	166	175	1	0	0	176	1	1	0	0	2	344
3:00 PM	2	132	0	0	134	95	1	0	0	96	2	1	0	0	3	233
3:15 PM	3	114	0	0	117	117	1	0	0	118	2	7	0	5	9	244
3:30 PM	5	149	0	0	154	104	3	0	0	107	1	2	0	2	3	264
3:45 PM	0	140	0	0	140	96	1	0	0	97	0	1	0	0	1	238
Hourly Total	10	535	0	0	545	412	6	0	0	418	5	11	0	7	16	979
4:00 PM	2	161	0	0	163	104	1	0	0	105	0	3	0	1	3	271
4:15 PM	4	169	0	0	173	117	3	0	0	120	3	3	0	0	6	299
4:30 PM	2	168	0	0	170	114	1	0	0	115	1	3	0	0	4	289

4:45 PM	4	139	0	0	143	101	2	0	0	103	1	2	0	1	3	249
Hourly Total	12	637	0	0	649	436	7	0	0	443	5	11	0	2	16	1108
5:00 PM	4	148	0	0	152	110	0	0	0	110	1	0	0	0	1	263
5:15 PM	3	124	0	0	127	99	1	0	0	100	0	1	0	0	1	228
5:30 PM	3	110	0	0	113	90	1	0	0	91	0	1	0	0	1	205
5:45 PM	0	102	0	0	102	83	1	0	0	84	2	1	0	0	3	189
Hourly Total	10	484	0	0	494	382	3	0	0	385	3	3	0	0	6	885
Grand Total	58	3519	1	0	3578	3277	36	0	0	3313	29	53	0	19	82	6973
Approach %	1.6	98.4	0.0	-	-	98.9	1.1	0.0	-	-	35.4	64.6	0.0	-	-	-
Total %	0.8	50.5	0.0	-	51.3	47.0	0.5	0.0	-	47.5	0.4	0.8	0.0	-	1.2	-
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	56	3434	1	-	3491	3220	33	0	-	3253	28	48	0	-	76	6820
% Cars & Light Goods	96.6	97.6	100.0	-	97.6	98.3	91.7	-	-	98.2	96.6	90.6	-	-	92.7	97.8
Buses	2	35	0	-	37	32	1	0	-	33	0	2	0	-	2	72
% Buses	3.4	1.0	0.0	-	1.0	1.0	2.8	-	-	1.0	0.0	3.8	-	-	2.4	1.0
Single-Unit Trucks	0	47	0	-	47	21	1	0	-	22	0	2	0	-	2	71
% Single-Unit Trucks	0.0	1.3	0.0	-	1.3	0.6	2.8	-	-	0.7	0.0	3.8	-	-	2.4	1.0
Articulated Trucks	0	3	0	-	3	4	0	0	-	4	0	0	0	-	0	7
% Articulated Trucks	0.0	0.1	0.0	-	0.1	0.1	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	1	1	0	-	2	3
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	2.8	-	-	0.0	3.4	1.9	-	-	2.4	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	19	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Turning Movement Data Plot



Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Union Street & Dover Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

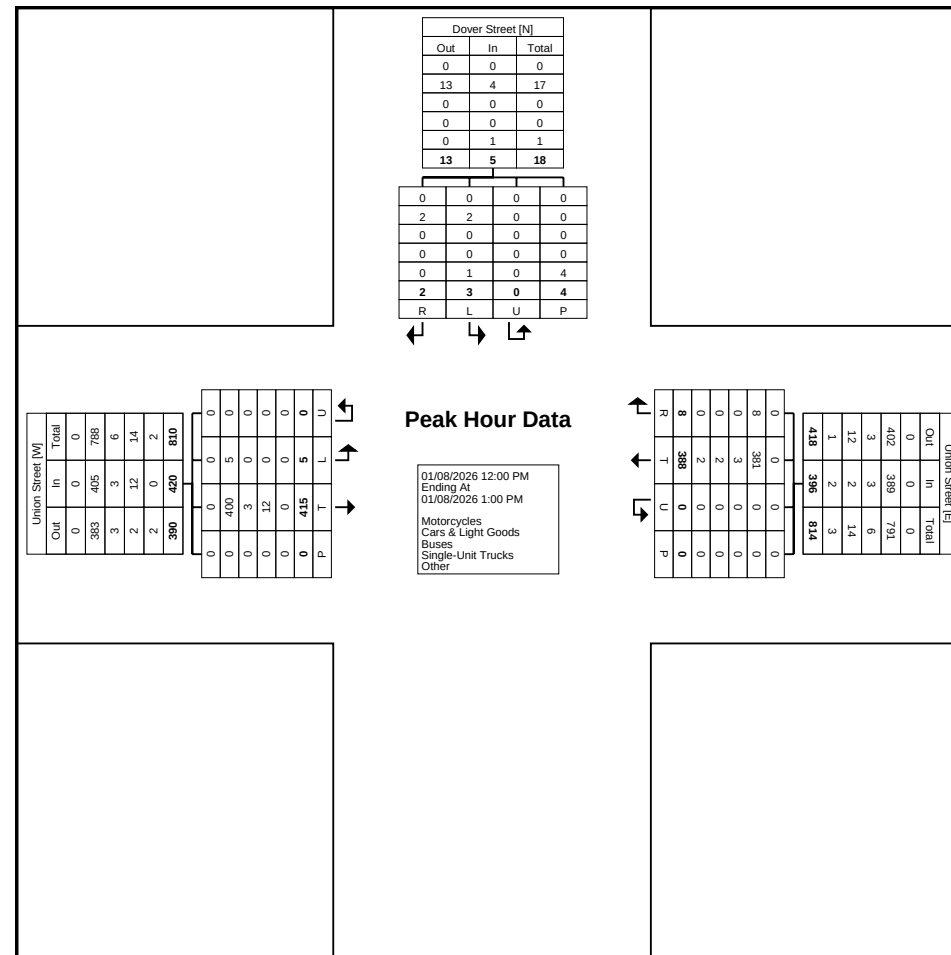
Start Time	Union Street Eastbound					Union Street Westbound					Dover Street Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
12:00 PM	1	120	0	0	121	95	0	0	0	95	1	0	0	2	1	217
12:15 PM	3	93	0	0	96	87	4	0	0	91	0	0	0	0	0	187
12:30 PM	0	107	0	0	107	96	2	0	0	98	0	2	0	1	2	207
12:45 PM	1	95	0	0	96	110	2	0	0	112	2	0	0	1	2	210
Total	5	415	0	0	420	388	8	0	0	396	3	2	0	4	5	821
Approach %	1.2	98.8	0.0	-	-	98.0	2.0	0.0	-	-	60.0	40.0	0.0	-	-	-
Total %	0.6	50.5	0.0	-	51.2	47.3	1.0	0.0	-	48.2	0.4	0.2	0.0	-	0.6	-
PHF	0.417	0.865	0.000	-	0.868	0.882	0.500	0.000	-	0.884	0.375	0.250	0.000	-	0.625	0.946
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	5	400	0	-	405	381	8	0	-	389	2	2	0	-	4	798
% Cars & Light Goods	100.0	96.4	-	-	96.4	98.2	100.0	-	-	98.2	66.7	100.0	-	-	80.0	97.2
Buses	0	3	0	-	3	3	0	0	-	3	0	0	0	-	0	6
% Buses	0.0	0.7	-	-	0.7	0.8	0.0	-	-	0.8	0.0	0.0	-	-	0.0	0.7
Single-Unit Trucks	0	12	0	-	12	2	0	0	-	2	0	0	0	-	0	14
% Single-Unit Trucks	0.0	2.9	-	-	2.9	0.5	0.0	-	-	0.5	0.0	0.0	-	-	0.0	1.7
Articulated Trucks	0	0	0	-	0	2	0	0	-	2	0	0	0	-	0	2
% Articulated Trucks	0.0	0.0	-	-	0.0	0.5	0.0	-	-	0.5	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	33.3	0.0	-	-	20.0	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Dover Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Dover Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 8

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Union Street Eastbound					Union Street Westbound					Dover Street Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
4:00 PM	2	161	0	0	163	104	1	0	0	105	0	3	0	1	3	271
4:15 PM	4	169	0	0	173	117	3	0	0	120	3	3	0	0	6	299
4:30 PM	2	168	0	0	170	114	1	0	0	115	1	3	0	0	4	289
4:45 PM	4	139	0	0	143	101	2	0	0	103	1	2	0	1	3	249
Total	12	637	0	0	649	436	7	0	0	443	5	11	0	2	16	1108
Approach %	1.8	98.2	0.0	-	-	98.4	1.6	0.0	-	-	31.3	68.8	0.0	-	-	-
Total %	1.1	57.5	0.0	-	58.6	39.4	0.6	0.0	-	40.0	0.5	1.0	0.0	-	1.4	-
PHF	0.750	0.942	0.000	-	0.938	0.932	0.583	0.000	-	0.923	0.417	0.917	0.000	-	0.667	0.926
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	11	632	0	-	643	432	7	0	-	439	5	11	0	-	16	1098
% Cars & Light Goods	91.7	99.2	-	-	99.1	99.1	100.0	-	-	99.1	100.0	100.0	-	-	100.0	99.1
Buses	1	3	0	-	4	4	0	0	-	4	0	0	0	-	0	8
% Buses	8.3	0.5	-	-	0.6	0.9	0.0	-	-	0.9	0.0	0.0	-	-	0.0	0.7
Single-Unit Trucks	0	2	0	-	2	0	0	0	-	0	0	0	0	-	0	2
% Single-Unit Trucks	0.0	0.3	-	-	0.3	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (4:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 1

Turning Movement Data

Start Time	Union Street Eastbound						Union Street Westbound						Moore Avenue Northbound						Moore Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	2	60	4	0	0	66	0	46	3	0	0	49	3	5	4	0	0	12	1	4	2	0	0	7	134
7:15 AM	2	75	1	0	0	78	1	71	3	0	1	75	0	1	6	0	0	7	2	3	2	0	0	7	167
7:30 AM	4	55	5	0	0	64	5	80	2	0	0	87	3	3	11	0	0	17	2	7	5	0	1	14	182
7:45 AM	4	75	2	0	3	81	6	89	3	0	2	98	4	14	9	0	6	27	1	2	1	0	1	4	210
Hourly Total	12	265	12	0	3	289	12	286	11	0	3	309	10	23	30	0	6	63	6	16	10	0	2	32	693
8:00 AM	6	92	5	0	0	103	7	127	9	0	6	143	3	11	11	0	2	25	6	5	1	0	4	12	283
8:15 AM	6	105	7	0	1	118	4	105	6	0	2	115	8	17	12	0	1	37	2	8	6	0	1	16	286
8:30 AM	3	98	4	0	3	105	3	107	7	0	1	117	5	10	8	0	0	23	3	10	1	0	3	14	259
8:45 AM	3	89	2	0	2	94	4	107	8	0	5	119	7	21	14	0	2	42	1	12	5	0	2	18	273
Hourly Total	18	384	18	0	6	420	18	446	30	0	14	494	23	59	45	0	5	127	12	35	13	0	10	60	1101
9:00 AM	3	75	7	0	1	85	6	115	4	0	2	125	5	10	7	0	1	22	5	11	9	0	1	25	257
9:15 AM	4	73	9	0	1	86	9	109	2	0	3	120	5	9	12	0	0	26	4	11	7	0	1	22	254
9:30 AM	9	78	5	0	0	92	2	87	3	0	1	92	3	8	6	0	0	17	3	8	5	0	0	16	217
9:45 AM	2	75	4	0	0	81	5	96	6	0	0	107	5	8	5	0	1	18	5	11	4	0	0	20	226
Hourly Total	18	301	25	0	2	344	22	407	15	0	6	444	18	35	30	0	2	83	17	41	25	0	2	83	954
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	7	89	4	0	4	100	4	69	1	0	1	74	9	9	4	0	1	22	2	9	7	0	0	18	214
11:45 AM	10	92	4	0	2	106	8	86	8	0	0	102	7	8	10	0	0	25	4	12	8	0	1	24	257
Hourly Total	17	181	8	0	6	206	12	155	9	0	1	176	16	17	14	0	1	47	6	21	15	0	1	42	471
12:00 PM	4	98	4	0	3	106	4	85	4	0	0	93	7	4	6	0	2	17	8	12	5	0	1	25	241
12:15 PM	9	78	8	0	1	95	7	68	7	0	4	82	1	6	6	0	0	13	7	17	4	0	4	28	218
12:30 PM	6	86	7	0	2	99	8	80	4	0	4	92	4	9	7	0	0	20	6	16	5	0	2	27	238
12:45 PM	4	85	5	0	1	94	7	91	5	0	3	103	7	11	8	0	5	26	3	10	8	0	1	21	244
Hourly Total	23	347	24	0	7	394	26	324	20	0	11	370	19	30	27	0	7	76	24	55	22	0	8	101	941
1:00 PM	4	68	7	0	4	79	4	79	5	0	2	88	8	10	8	0	1	26	9	19	3	0	0	31	224
1:15 PM	4	79	4	0	1	87	5	60	5	0	1	70	6	10	9	0	1	25	3	14	8	0	0	25	207
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	8	147	11	0	5	166	9	139	10	0	3	158	14	20	17	0	2	51	12	33	11	0	0	56	431
3:00 PM	5	112	5	0	2	122	5	85	3	0	2	93	6	16	8	0	1	30	7	15	6	0	1	28	273
3:15 PM	9	94	2	0	0	105	8	102	8	0	0	118	12	14	9	0	1	35	7	18	10	0	5	35	293
3:30 PM	6	117	4	0	6	127	5	88	3	0	1	96	8	11	7	0	3	26	9	9	8	0	3	26	275
3:45 PM	1	126	5	0	7	132	10	92	7	0	3	109	6	8	7	0	3	21	6	16	11	0	3	33	295
Hourly Total	21	449	16	0	15	486	28	367	21	0	6	416	32	49	31	0	8	112	29	58	35	0	12	122	1136
4:00 PM	3	133	3	0	0	139	2	91	10	0	4	103	9	15	12	0	7	36	7	23	3	0	0	33	311
4:15 PM	12	131	3	0	4	146	1	100	7	0	4	108	4	18	13	0	6	35	10	23	9	0	2	42	331

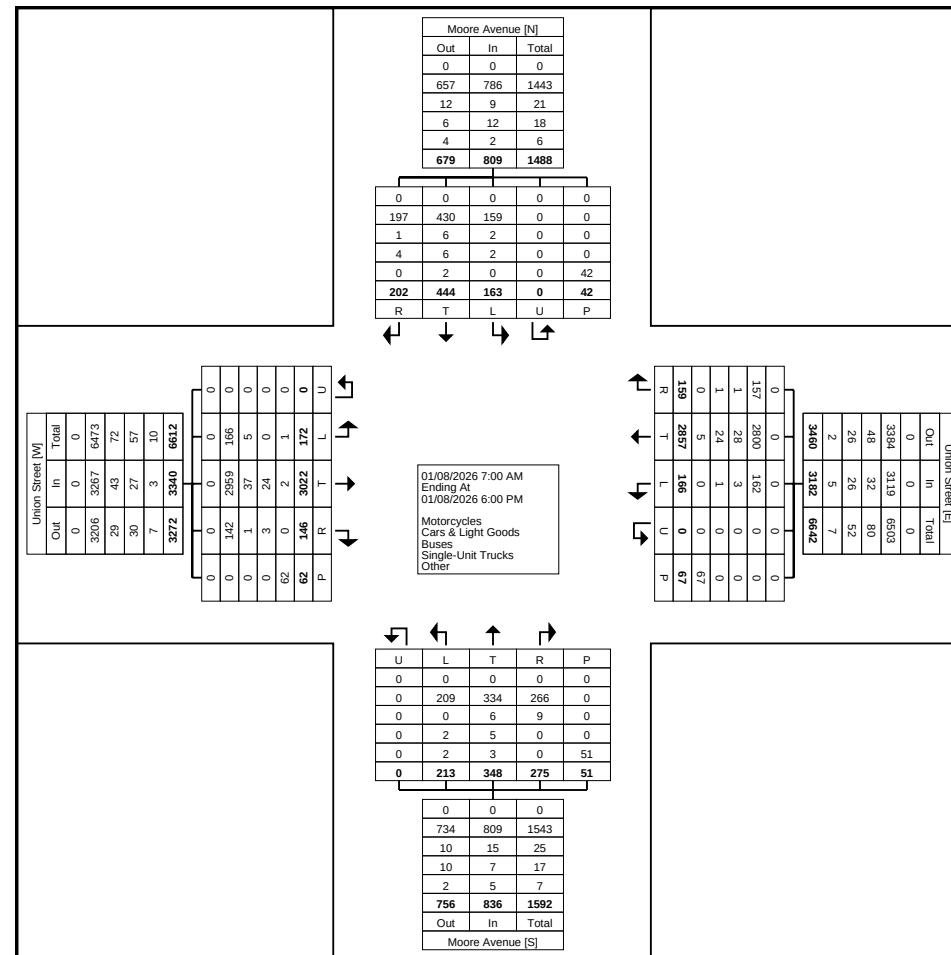
4:30 PM	8	149	4	0	2	161	7	113	3	0	6	123	13	14	14	0	0	41	3	19	11	0	1	33	358
4:45 PM	9	114	4	0	6	127	4	90	2	0	3	96	14	9	5	0	5	28	8	21	7	0	0	36	287
Hourly Total	32	527	14	0	12	573	14	394	22	0	17	430	40	56	44	0	18	140	28	86	30	0	3	144	1287
5:00 PM	7	122	5	0	0	134	6	97	8	0	0	111	12	24	13	0	0	49	10	28	14	0	0	52	346
5:15 PM	10	106	6	0	2	122	3	83	5	0	3	91	6	14	9	0	1	29	10	24	9	0	3	43	285
5:30 PM	5	110	3	0	0	118	10	77	4	0	3	91	15	11	5	0	0	31	6	26	8	0	1	40	280
5:45 PM	1	83	4	0	4	88	6	82	4	0	0	92	8	10	10	0	1	28	3	21	10	0	0	34	242
Hourly Total	23	421	18	0	6	462	25	339	21	0	6	385	41	59	37	0	2	137	29	99	41	0	4	169	1153
Grand Total	172	3022	146	0	62	3340	166	2857	159	0	67	3182	213	348	275	0	51	836	163	444	202	0	42	809	8167
Approach %	5.1	90.5	4.4	0.0	-	-	5.2	89.8	5.0	0.0	-	-	25.5	41.6	32.9	0.0	-	-	20.1	54.9	25.0	0.0	-	-	-
Total %	2.1	37.0	1.8	0.0	-	40.9	2.0	35.0	1.9	0.0	-	39.0	2.6	4.3	3.4	0.0	-	10.2	2.0	5.4	2.5	0.0	-	9.9	-
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	166	2959	142	0	-	3267	162	2800	157	0	-	3119	209	334	266	0	-	809	159	430	197	0	-	786	7981
% Cars & Light Goods	96.5	97.9	97.3	-	-	97.8	97.6	98.0	98.7	-	-	98.0	98.1	96.0	96.7	-	-	96.8	97.5	96.8	97.5	-	-	97.2	97.7
Buses	5	37	1	0	-	43	3	28	1	0	-	32	0	6	9	0	-	15	2	6	1	0	-	9	99
% Buses	2.9	1.2	0.7	-	-	1.3	1.8	1.0	0.6	-	-	1.0	0.0	1.7	3.3	-	-	1.8	1.2	1.4	0.5	-	-	1.1	1.2
Single-Unit Trucks	0	24	3	0	-	27	1	24	1	0	-	26	2	5	0	0	-	7	2	6	4	0	-	12	72
% Single-Unit Trucks	0.0	0.8	2.1	-	-	0.8	0.6	0.8	0.6	-	-	0.8	0.9	1.4	0.0	-	-	0.8	1.2	1.4	2.0	-	-	1.5	0.9
Articulated Trucks	1	2	0	0	-	3	0	5	0	0	-	5	0	1	0	0	-	1	0	0	0	0	-	0	9
% Articulated Trucks	0.6	0.1	0.0	-	-	0.1	0.0	0.2	0.0	-	-	0.2	0.0	0.3	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	2	2	0	0	-	4	0	2	0	0	-	2	6
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.9	0.6	0.0	-	-	0.5	0.0	0.5	0.0	-	-	0.2	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	2.0	-	-	-	-	-	2.4	-	-
Pedestrians	-	-	-	-	62	-	-	-	-	-	67	-	-	-	-	-	50	-	-	-	-	-	41	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	98.0	-	-	-	-	-	97.6	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Union Street Eastbound						Union Street Westbound						Moore Avenue Northbound						Moore Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	6	92	5	0	0	103	7	127	9	0	6	143	3	11	11	0	2	25	6	5	1	0	4	12	283
8:15 AM	6	105	7	0	1	118	4	105	6	0	2	115	8	17	12	0	1	37	2	8	6	0	1	16	286
8:30 AM	3	98	4	0	3	105	3	107	7	0	1	117	5	10	8	0	0	23	3	10	1	0	3	14	259
8:45 AM	3	89	2	0	2	94	4	107	8	0	5	119	7	21	14	0	2	42	1	12	5	0	2	18	273
Total	18	384	18	0	6	420	18	446	30	0	14	494	23	59	45	0	5	127	12	35	13	0	10	60	1101
Approach %	4.3	91.4	4.3	0.0	-	-	3.6	90.3	6.1	0.0	-	-	18.1	46.5	35.4	0.0	-	-	20.0	58.3	21.7	0.0	-	-	-
Total %	1.6	34.9	1.6	0.0	-	38.1	1.6	40.5	2.7	0.0	-	44.9	2.1	5.4	4.1	0.0	-	11.5	1.1	3.2	1.2	0.0	-	5.4	-
PHF	0.750	0.914	0.643	0.000	-	0.890	0.643	0.878	0.833	0.000	-	0.864	0.719	0.702	0.804	0.000	-	0.756	0.500	0.729	0.542	0.000	-	0.833	0.962
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	16	369	18	0	-	403	18	437	29	0	-	484	23	56	44	0	-	123	12	34	12	0	-	58	1068
% Cars & Light Goods	88.9	96.1	100.0	-	-	96.0	100.0	98.0	96.7	-	-	98.0	100.0	94.9	97.8	-	-	96.9	100.0	97.1	92.3	-	-	96.7	97.0
Buses	2	10	0	0	-	12	0	4	1	0	-	5	0	3	1	0	-	4	0	1	1	0	-	2	23
% Buses	11.1	2.6	0.0	-	-	2.9	0.0	0.9	3.3	-	-	1.0	0.0	5.1	2.2	-	-	3.1	0.0	2.9	7.7	-	-	3.3	2.1
Single-Unit Trucks	0	4	0	0	-	4	0	5	0	0	-	5	0	0	0	0	-	0	0	0	0	0	-	0	9
% Single-Unit Trucks	0.0	1.0	0.0	-	-	1.0	0.0	1.1	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.8
Articulated Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.3	0.0	-	-	0.2	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
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	10.0	-	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	14	-	-	-	-	-	5	-	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	90.0	-	-

Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 6

Turning Movement Peak Hour Data (11:45 AM)

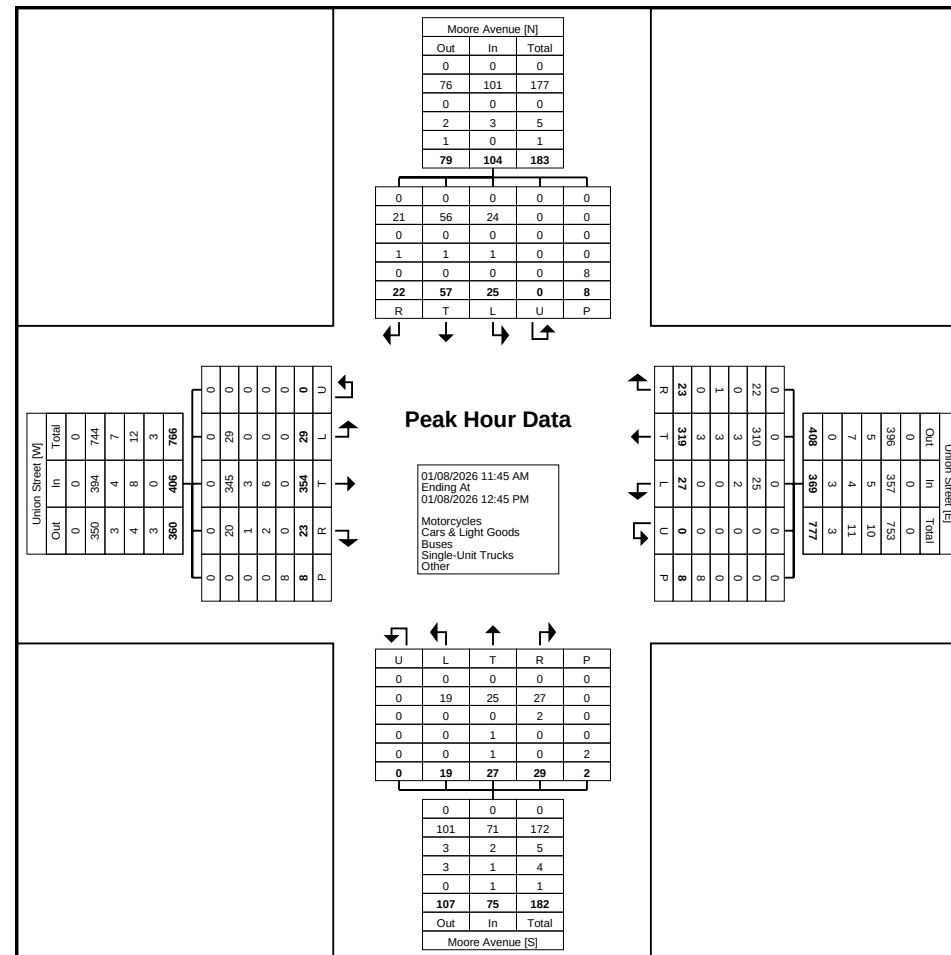
Start Time	Union Street Eastbound						Union Street Westbound						Moore Avenue Northbound						Moore Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:45 AM	10	92	4	0	2	106	8	86	8	0	0	102	7	8	10	0	0	25	4	12	8	0	1	24	257
12:00 PM	4	98	4	0	3	106	4	85	4	0	0	93	7	4	6	0	2	17	8	12	5	0	1	25	241
12:15 PM	9	78	8	0	1	95	7	68	7	0	4	82	1	6	6	0	0	13	7	17	4	0	4	28	218
12:30 PM	6	86	7	0	2	99	8	80	4	0	4	92	4	9	7	0	0	20	6	16	5	0	2	27	238
Total	29	354	23	0	8	406	27	319	23	0	8	369	19	27	29	0	2	75	25	57	22	0	8	104	954
Approach %	7.1	87.2	5.7	0.0	-	-	7.3	86.4	6.2	0.0	-	-	25.3	36.0	38.7	0.0	-	-	24.0	54.8	21.2	0.0	-	-	-
Total %	3.0	37.1	2.4	0.0	-	42.6	2.8	33.4	2.4	0.0	-	38.7	2.0	2.8	3.0	0.0	-	7.9	2.6	6.0	2.3	0.0	-	10.9	-
PHF	0.725	0.903	0.719	0.000	-	0.958	0.844	0.927	0.719	0.000	-	0.904	0.679	0.750	0.725	0.000	-	0.750	0.781	0.838	0.688	0.000	-	0.929	0.928
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	29	345	20	0	-	394	25	310	22	0	-	357	19	25	27	0	-	71	24	56	21	0	-	101	923
% Cars & Light Goods	100.0	97.5	87.0	-	-	97.0	92.6	97.2	95.7	-	-	96.7	100.0	92.6	93.1	-	-	94.7	96.0	98.2	95.5	-	-	97.1	96.8
Buses	0	3	1	0	-	4	2	3	0	0	-	5	0	0	2	0	-	2	0	0	0	0	-	0	11
% Buses	0.0	0.8	4.3	-	-	1.0	7.4	0.9	0.0	-	-	1.4	0.0	0.0	6.9	-	-	2.7	0.0	0.0	0.0	-	-	0.0	1.2
Single-Unit Trucks	0	6	2	0	-	8	0	3	1	0	-	4	0	1	0	0	-	1	1	1	1	0	-	3	16
% Single-Unit Trucks	0.0	1.7	8.7	-	-	2.0	0.0	0.9	4.3	-	-	1.1	0.0	3.7	0.0	-	-	1.3	4.0	1.8	4.5	-	-	2.9	1.7
Articulated Trucks	0	0	0	0	-	0	0	3	0	0	-	3	0	1	0	0	-	1	0	0	0	0	-	0	4
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.9	0.0	-	-	0.8	0.0	3.7	0.0	-	-	1.3	0.0	0.0	0.0	-	-	0.0	0.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	8	-	-	-	-	-	2	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
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Turning Movement Peak Hour Data Plot (11:45 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Union Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

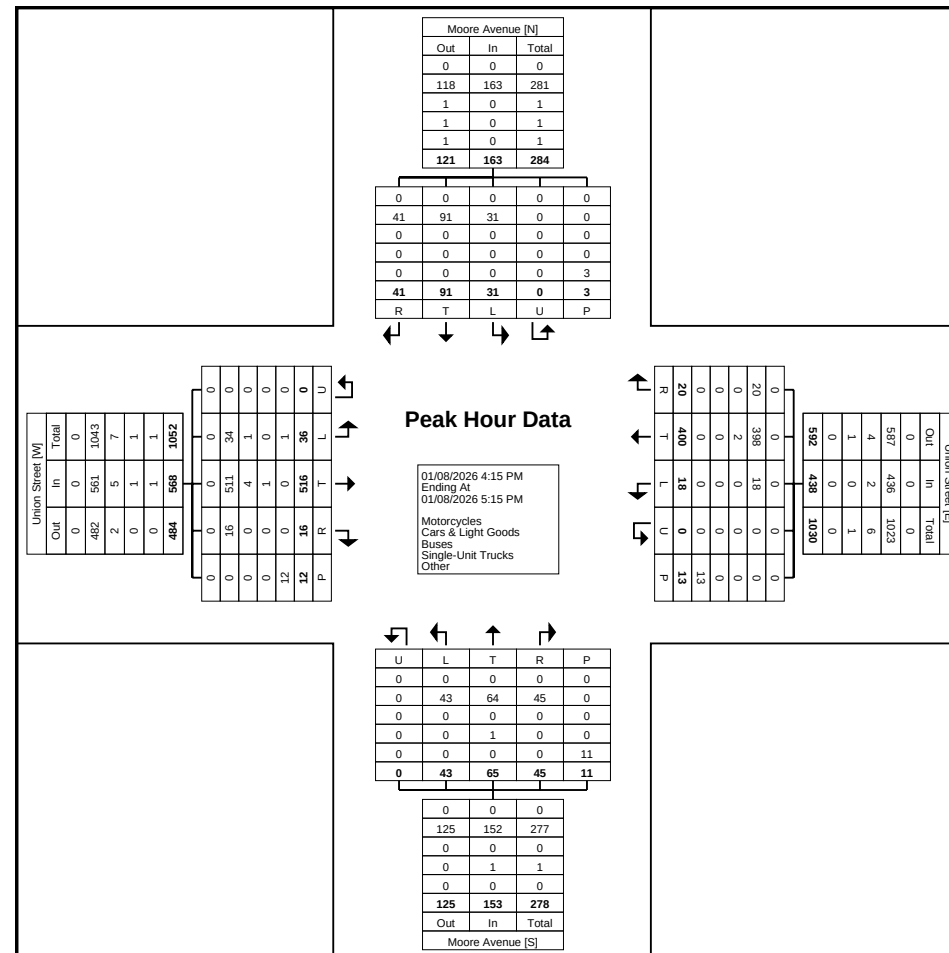
Start Time	Union Street Eastbound						Union Street Westbound						Moore Avenue Northbound						Moore Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	12	131	3	0	4	146	1	100	7	0	4	108	4	18	13	0	6	35	10	23	9	0	2	42	331
4:30 PM	8	149	4	0	2	161	7	113	3	0	6	123	13	14	14	0	0	41	3	19	11	0	1	33	358
4:45 PM	9	114	4	0	6	127	4	90	2	0	3	96	14	9	5	0	5	28	8	21	7	0	0	36	287
5:00 PM	7	122	5	0	0	134	6	97	8	0	0	111	12	24	13	0	0	49	10	28	14	0	0	52	346
Total	36	516	16	0	12	568	18	400	20	0	13	438	43	65	45	0	11	153	31	91	41	0	3	163	1322
Approach %	6.3	90.8	2.8	0.0	-	-	4.1	91.3	4.6	0.0	-	-	28.1	42.5	29.4	0.0	-	-	19.0	55.8	25.2	0.0	-	-	-
Total %	2.7	39.0	1.2	0.0	-	43.0	1.4	30.3	1.5	0.0	-	33.1	3.3	4.9	3.4	0.0	-	11.6	2.3	6.9	3.1	0.0	-	12.3	-
PHF	0.750	0.866	0.800	0.000	-	0.882	0.643	0.885	0.625	0.000	-	0.890	0.768	0.677	0.804	0.000	-	0.781	0.775	0.813	0.732	0.000	-	0.784	0.923
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	34	511	16	0	-	561	18	398	20	0	-	436	43	64	45	0	-	152	31	91	41	0	-	163	1312
% Cars & Light Goods	94.4	99.0	100.0	-	-	98.8	100.0	99.5	100.0	-	-	99.5	100.0	98.5	100.0	-	-	99.3	100.0	100.0	100.0	-	-	100.0	99.2
Buses	1	4	0	0	-	5	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	7
% Buses	2.8	0.8	0.0	-	-	0.9	0.0	0.5	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.5
Single-Unit Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	2
% Single-Unit Trucks	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	1.5	0.0	-	-	0.7	0.0	0.0	0.0	-	-	0.0	0.2
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	2.8	0.0	0.0	-	-	0.2	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
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	12	-	-	-	-	-	13	-	-	-	-	-	11	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Union Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 1

Turning Movement Data

Start Time	Union Street Eastbound						Union Street Westbound						Weber Street Northbound						Weber Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	6	53	2	0	0	61	4	30	5	0	0	39	9	71	5	0	0	85	2	49	10	0	0	61	246
7:15 AM	22	45	8	0	0	75	4	43	5	0	0	52	8	61	5	0	0	74	1	75	20	0	0	96	297
7:30 AM	17	48	14	0	2	79	5	58	16	0	0	79	8	84	9	0	0	101	5	74	24	0	1	103	362
7:45 AM	17	50	13	0	2	80	9	65	14	0	1	88	11	117	11	0	0	139	3	117	17	0	1	137	444
Hourly Total	62	196	37	0	4	295	22	196	40	0	1	258	36	333	30	0	0	399	11	315	71	0	2	397	1349
8:00 AM	27	63	16	0	1	106	8	88	14	0	4	110	22	172	16	0	3	210	2	126	31	0	0	159	585
8:15 AM	41	68	16	0	0	125	19	86	12	0	3	117	18	182	12	0	2	212	3	129	20	0	1	152	606
8:30 AM	23	69	19	0	2	111	16	89	17	0	1	122	19	177	12	0	2	208	9	147	19	0	2	175	616
8:45 AM	29	61	13	0	0	103	14	82	20	0	2	116	17	171	7	0	0	195	9	125	33	0	0	167	581
Hourly Total	120	261	64	0	3	445	57	345	63	0	10	465	76	702	47	0	7	825	23	527	103	0	3	653	2388
9:00 AM	28	45	20	0	3	93	14	71	17	0	1	102	14	142	14	0	1	170	11	124	25	0	0	160	525
9:15 AM	22	56	17	0	4	95	9	79	15	0	1	103	24	140	11	0	1	175	6	96	28	0	4	130	503
9:30 AM	22	49	17	0	4	88	6	61	14	0	1	81	19	132	8	0	1	159	12	97	24	0	2	133	461
9:45 AM	40	36	10	0	1	86	9	45	14	0	0	68	20	103	9	0	0	132	11	117	30	0	0	158	444
Hourly Total	112	186	64	0	12	362	38	256	60	0	3	354	77	517	42	0	3	636	40	434	107	0	6	581	1933
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	28	61	15	0	2	104	2	48	17	0	2	67	9	110	13	0	2	132	9	103	21	0	2	133	436
11:45 AM	27	66	10	0	0	103	6	58	17	0	1	81	14	147	8	0	0	169	8	100	26	0	0	134	487
Hourly Total	55	127	25	0	2	207	8	106	34	0	3	148	23	257	21	0	2	301	17	203	47	0	2	267	923
12:00 PM	41	66	18	0	3	125	8	46	10	0	1	64	21	148	8	0	4	177	11	129	22	0	1	162	528
12:15 PM	23	56	14	0	5	93	6	44	10	0	1	60	17	140	12	0	2	169	7	125	29	0	2	161	483
12:30 PM	34	63	14	0	2	111	2	43	18	0	4	63	14	151	11	0	11	176	10	110	40	0	0	160	510
12:45 PM	30	57	12	0	4	99	3	54	15	0	7	72	21	138	12	0	0	171	7	142	35	0	4	184	526
Hourly Total	128	242	58	0	14	428	19	187	53	0	13	259	73	577	43	0	17	693	35	506	126	0	7	667	2047
1:00 PM	24	44	12	1	7	81	8	35	11	0	1	54	24	113	18	0	2	155	8	124	28	0	1	160	450
1:15 PM	38	49	17	0	1	104	8	49	12	0	0	69	13	134	8	0	1	155	16	136	26	0	1	178	506
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	62	93	29	1	8	185	16	84	23	0	1	123	37	247	26	0	3	310	24	260	54	0	2	338	956
3:00 PM	33	83	17	0	0	133	1	53	8	0	3	62	15	131	15	0	0	161	13	132	26	0	1	171	527
3:15 PM	31	77	12	0	0	120	5	58	15	0	2	78	23	142	14	0	4	179	16	129	37	0	2	182	559
3:30 PM	37	91	16	0	4	144	5	59	16	0	2	80	16	142	21	0	2	179	16	152	26	0	4	194	597
3:45 PM	36	98	7	0	2	141	5	62	20	0	2	87	14	152	13	0	1	179	12	155	23	0	2	190	597
Hourly Total	137	349	52	0	6	538	16	232	59	0	9	307	68	567	63	0	7	698	57	568	112	0	9	737	2280
4:00 PM	36	97	25	0	1	158	7	48	17	0	0	72	25	168	25	0	0	218	11	164	30	0	1	205	653
4:15 PM	39	121	22	0	0	182	7	68	13	0	2	88	20	165	21	0	0	206	13	178	24	0	1	215	691

4:30 PM	49	108	16	0	0	173	9	53	11	0	3	73	25	154	26	0	0	205	15	179	30	0	1	224	675
4:45 PM	25	90	20	0	0	135	8	63	21	0	1	92	16	149	14	0	0	179	11	207	16	0	1	234	640
Hourly Total	149	416	83	0	1	648	31	232	62	0	6	325	86	636	86	0	0	808	50	728	100	0	4	878	2659
5:00 PM	32	100	17	0	2	149	14	66	17	0	0	97	20	187	18	0	1	225	8	159	27	0	0	194	665
5:15 PM	29	93	14	0	0	136	9	59	14	0	3	82	16	171	22	0	1	209	23	185	28	0	2	236	663
5:30 PM	26	85	11	0	1	122	6	50	22	0	1	78	15	176	12	0	0	203	12	152	27	0	0	191	594
5:45 PM	30	65	14	0	0	109	8	46	14	0	1	68	13	134	9	0	3	156	11	129	21	0	0	161	494
Hourly Total	117	343	56	0	3	516	37	221	67	0	5	325	64	668	61	0	5	793	54	625	103	0	2	782	2416
Grand Total	942	2213	468	1	53	3624	244	1859	461	0	51	2564	540	4504	419	0	44	5463	311	4166	823	0	37	5300	16951
Approach %	26.0	61.1	12.9	0.0	-	-	9.5	72.5	18.0	0.0	-	-	9.9	82.4	7.7	0.0	-	-	5.9	78.6	15.5	0.0	-	-	-
Total %	5.6	13.1	2.8	0.0	-	21.4	1.4	11.0	2.7	0.0	-	15.1	3.2	26.6	2.5	0.0	-	32.2	1.8	24.6	4.9	0.0	-	31.3	-
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	920	2177	454	1	-	3552	236	1826	453	0	-	2515	526	4397	413	0	-	5336	305	4069	812	0	-	5186	16589
% Cars & Light Goods	97.7	98.4	97.0	100.0	-	98.0	96.7	98.2	98.3	-	-	98.1	97.4	97.6	98.6	-	-	97.7	98.1	97.7	98.7	-	-	97.8	97.9
Buses	9	30	2	0	-	41	4	26	3	0	-	33	1	58	3	0	-	62	3	60	4	0	-	67	203
% Buses	1.0	1.4	0.4	0.0	-	1.1	1.6	1.4	0.7	-	-	1.3	0.2	1.3	0.7	-	-	1.1	1.0	1.4	0.5	-	-	1.3	1.2
Single-Unit Trucks	11	6	11	0	-	28	4	7	5	0	-	16	12	46	3	0	-	61	3	32	5	0	-	40	145
% Single-Unit Trucks	1.2	0.3	2.4	0.0	-	0.8	1.6	0.4	1.1	-	-	0.6	2.2	1.0	0.7	-	-	1.1	1.0	0.8	0.6	-	-	0.8	0.9
Articulated Trucks	2	0	1	0	-	3	0	0	0	0	-	0	1	3	0	0	-	4	0	5	2	0	-	7	14
% Articulated Trucks	0.2	0.0	0.2	0.0	-	0.1	0.0	0.0	0.0	-	-	0.0	0.2	0.1	0.0	-	-	0.1	0.0	0.1	0.2	-	-	0.1	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	3.9	-	-	-	-	-	2.3	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	53	-	-	-	-	-	49	-	-	-	-	-	43	-	-	-	-	-	37	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	96.1	-	-	-	-	-	97.7	-	-	-	-	-	100.0	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Union Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Union Street Eastbound						Union Street Westbound						Weber Street Northbound						Weber Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	27	63	16	0	1	106	8	88	14	0	4	110	22	172	16	0	3	210	2	126	31	0	0	159	585
8:15 AM	41	68	16	0	0	125	19	86	12	0	3	117	18	182	12	0	2	212	3	129	20	0	1	152	606
8:30 AM	23	69	19	0	2	111	16	89	17	0	1	122	19	177	12	0	2	208	9	147	19	0	2	175	616
8:45 AM	29	61	13	0	0	103	14	82	20	0	2	116	17	171	7	0	0	195	9	125	33	0	0	167	581
Total	120	261	64	0	3	445	57	345	63	0	10	465	76	702	47	0	7	825	23	527	103	0	3	653	2388
Approach %	27.0	58.7	14.4	0.0	-	-	12.3	74.2	13.5	0.0	-	-	9.2	85.1	5.7	0.0	-	-	3.5	80.7	15.8	0.0	-	-	-
Total %	5.0	10.9	2.7	0.0	-	18.6	2.4	14.4	2.6	0.0	-	19.5	3.2	29.4	2.0	0.0	-	34.5	1.0	22.1	4.3	0.0	-	27.3	-
PHF	0.732	0.946	0.842	0.000	-	0.890	0.750	0.969	0.788	0.000	-	0.953	0.864	0.964	0.734	0.000	-	0.973	0.639	0.896	0.780	0.000	-	0.933	0.969
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	115	255	60	0	-	430	55	340	62	0	-	457	73	682	46	0	-	801	22	514	101	0	-	637	2325
% Cars & Light Goods	95.8	97.7	93.8	-	-	96.6	96.5	98.6	98.4	-	-	98.3	96.1	97.2	97.9	-	-	97.1	95.7	97.5	98.1	-	-	97.5	97.4
Buses	0	5	0	0	-	5	2	4	0	0	-	6	0	10	1	0	-	11	0	8	1	0	-	9	31
% Buses	0.0	1.9	0.0	-	-	1.1	3.5	1.2	0.0	-	-	1.3	0.0	1.4	2.1	-	-	1.3	0.0	1.5	1.0	-	-	1.4	1.3
Single-Unit Trucks	4	1	4	0	-	9	0	1	1	0	-	2	3	10	0	0	-	13	1	3	1	0	-	5	29
% Single-Unit Trucks	3.3	0.4	6.3	-	-	2.0	0.0	0.3	1.6	-	-	0.4	3.9	1.4	0.0	-	-	1.6	4.3	0.6	1.0	-	-	0.8	1.2
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	3
% Articulated Trucks	0.8	0.0	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.3	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	10	-	-	-	-	-	7	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

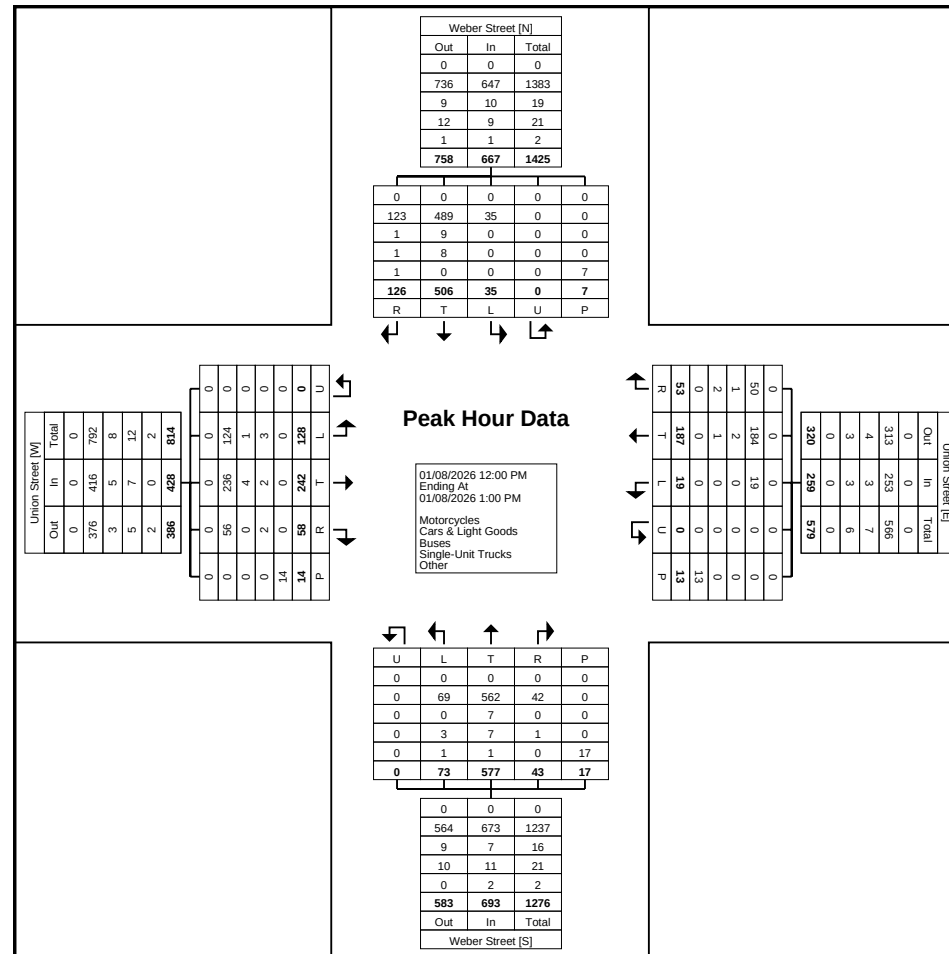
Start Time	Union Street Eastbound						Union Street Westbound						Weber Street Northbound						Weber Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	41	66	18	0	3	125	8	46	10	0	1	64	21	148	8	0	4	177	11	129	22	0	1	162	528
12:15 PM	23	56	14	0	5	93	6	44	10	0	1	60	17	140	12	0	2	169	7	125	29	0	2	161	483
12:30 PM	34	63	14	0	2	111	2	43	18	0	4	63	14	151	11	0	11	176	10	110	40	0	0	160	510
12:45 PM	30	57	12	0	4	99	3	54	15	0	7	72	21	138	12	0	0	171	7	142	35	0	4	184	526
Total	128	242	58	0	14	428	19	187	53	0	13	259	73	577	43	0	17	693	35	506	126	0	7	667	2047
Approach %	29.9	56.5	13.6	0.0	-	-	7.3	72.2	20.5	0.0	-	-	10.5	83.3	6.2	0.0	-	-	5.2	75.9	18.9	0.0	-	-	-
Total %	6.3	11.8	2.8	0.0	-	20.9	0.9	9.1	2.6	0.0	-	12.7	3.6	28.2	2.1	0.0	-	33.9	1.7	24.7	6.2	0.0	-	32.6	-
PHF	0.780	0.917	0.806	0.000	-	0.856	0.594	0.866	0.736	0.000	-	0.899	0.869	0.955	0.896	0.000	-	0.979	0.795	0.891	0.788	0.000	-	0.906	0.969
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	124	236	56	0	-	416	19	184	50	0	-	253	69	562	42	0	-	673	35	489	123	0	-	647	1989
% Cars & Light Goods	96.9	97.5	96.6	-	-	97.2	100.0	98.4	94.3	-	-	97.7	94.5	97.4	97.7	-	-	97.1	100.0	96.6	97.6	-	-	97.0	97.2
Buses	1	4	0	0	-	5	0	2	1	0	-	3	0	7	0	0	-	7	0	9	1	0	-	10	25
% Buses	0.8	1.7	0.0	-	-	1.2	0.0	1.1	1.9	-	-	1.2	0.0	1.2	0.0	-	-	1.0	0.0	1.8	0.8	-	-	1.5	1.2
Single-Unit Trucks	3	2	2	0	-	7	0	1	2	0	-	3	3	7	1	0	-	11	0	8	1	0	-	9	30
% Single-Unit Trucks	2.3	0.8	3.4	-	-	1.6	0.0	0.5	3.8	-	-	1.2	4.1	1.2	2.3	-	-	1.6	0.0	1.6	0.8	-	-	1.3	1.5
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	1	1	0	0	-	2	0	0	1	0	-	1	3
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	1.4	0.2	0.0	-	-	0.3	0.0	0.0	0.8	-	-	0.1	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	15.4	-	-	-	-	-	5.9	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	14	-	-	-	-	-	11	-	-	-	-	-	16	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	84.6	-	-	-	-	-	94.1	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
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Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

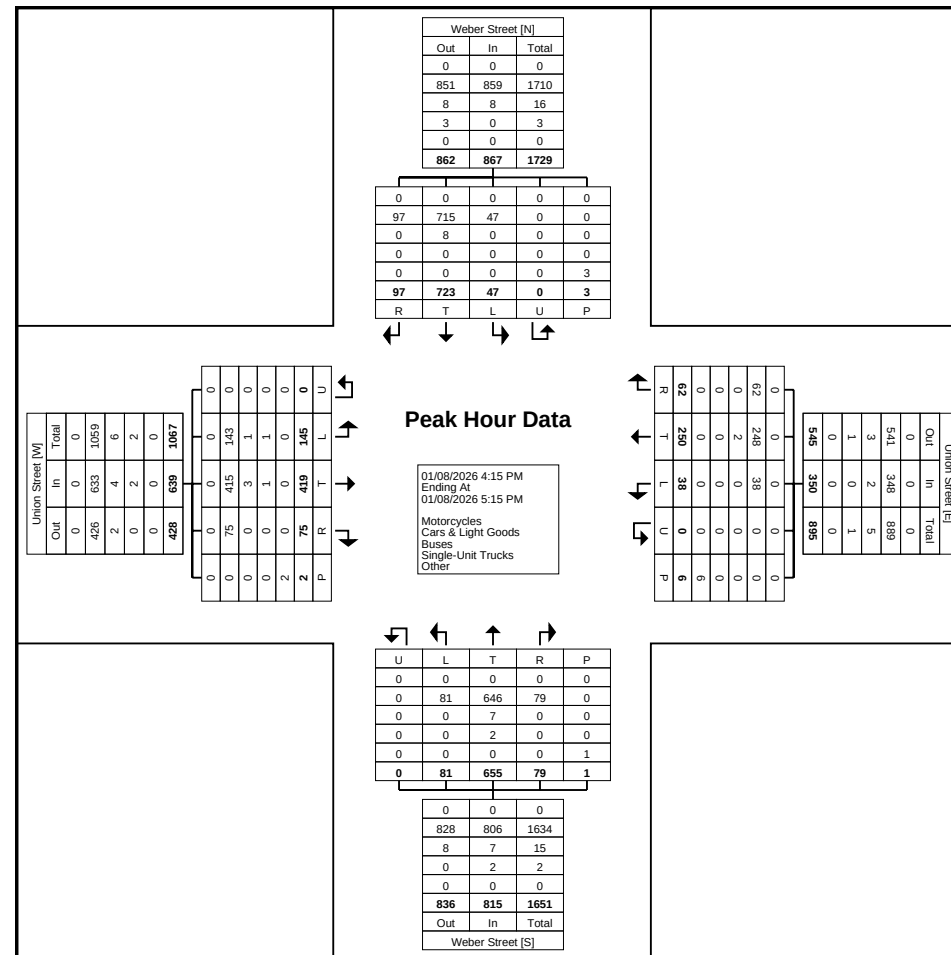
Start Time	Union Street Eastbound						Union Street Westbound						Weber Street Northbound						Weber Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	39	121	22	0	0	182	7	68	13	0	2	88	20	165	21	0	0	206	13	178	24	0	1	215	691
4:30 PM	49	108	16	0	0	173	9	53	11	0	3	73	25	154	26	0	0	205	15	179	30	0	1	224	675
4:45 PM	25	90	20	0	0	135	8	63	21	0	1	92	16	149	14	0	0	179	11	207	16	0	1	234	640
5:00 PM	32	100	17	0	2	149	14	66	17	0	0	97	20	187	18	0	1	225	8	159	27	0	0	194	665
Total	145	419	75	0	2	639	38	250	62	0	6	350	81	655	79	0	1	815	47	723	97	0	3	867	2671
Approach %	22.7	65.6	11.7	0.0	-	-	10.9	71.4	17.7	0.0	-	-	9.9	80.4	9.7	0.0	-	-	5.4	83.4	11.2	0.0	-	-	-
Total %	5.4	15.7	2.8	0.0	-	23.9	1.4	9.4	2.3	0.0	-	13.1	3.0	24.5	3.0	0.0	-	30.5	1.8	27.1	3.6	0.0	-	32.5	-
PHF	0.740	0.866	0.852	0.000	-	0.878	0.679	0.919	0.738	0.000	-	0.902	0.810	0.876	0.760	0.000	-	0.906	0.783	0.873	0.808	0.000	-	0.926	0.966
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	143	415	75	0	-	633	38	248	62	0	-	348	81	646	79	0	-	806	47	715	97	0	-	859	2646
% Cars & Light Goods	98.6	99.0	100.0	-	-	99.1	100.0	99.2	100.0	-	-	99.4	100.0	98.6	100.0	-	-	98.9	100.0	98.9	100.0	-	-	99.1	99.1
Buses	1	3	0	0	-	4	0	2	0	0	-	2	0	7	0	0	-	7	0	8	0	0	-	8	21
% Buses	0.7	0.7	0.0	-	-	0.6	0.0	0.8	0.0	-	-	0.6	0.0	1.1	0.0	-	-	0.9	0.0	1.1	0.0	-	-	0.9	0.8
Single-Unit Trucks	1	1	0	0	-	2	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	4
% Single-Unit Trucks	0.7	0.2	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	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
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	6	-	-	-	-	-	1	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Union Street & Weber Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 1

Turning Movement Data

Start Time	Waterloo Street Westbound					Moore Avenue Northbound					Moore Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:00 AM	0	2	0	0	2	8	0	0	0	8	1	5	0	0	6	16
7:15 AM	0	0	0	0	0	7	0	0	0	7	0	4	0	0	4	11
7:30 AM	0	1	0	1	1	15	0	0	0	15	2	14	0	0	16	32
7:45 AM	0	6	0	1	6	25	1	0	0	26	0	8	0	0	8	40
Hourly Total	0	9	0	2	9	55	1	0	0	56	3	31	0	0	34	99
8:00 AM	1	2	0	6	3	22	0	0	0	22	2	15	0	1	17	42
8:15 AM	0	5	0	0	5	29	0	0	0	29	2	10	0	0	12	46
8:30 AM	0	2	0	0	2	21	0	0	0	21	3	16	0	0	19	42
8:45 AM	1	4	0	2	5	34	0	0	0	34	2	15	0	2	17	56
Hourly Total	2	13	0	8	15	106	0	0	0	106	9	56	0	3	65	186
9:00 AM	0	5	0	1	5	17	0	0	0	17	2	18	0	0	20	42
9:15 AM	0	2	0	2	2	24	0	0	0	24	4	19	0	0	23	49
9:30 AM	0	4	0	0	4	11	0	0	0	11	2	14	1	0	17	32
9:45 AM	0	1	0	1	1	17	0	0	0	17	3	19	0	0	22	40
Hourly Total	0	12	0	4	12	69	0	0	0	69	11	70	1	0	82	163
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	0	3	0	1	3	13	1	0	0	14	1	16	0	0	17	34
11:45 AM	1	0	0	0	1	24	1	0	0	25	0	19	0	0	19	45
Hourly Total	1	3	0	1	4	37	2	0	0	39	1	35	0	0	36	79
12:00 PM	0	1	0	1	1	9	0	0	0	9	2	19	0	0	21	31
12:15 PM	0	3	0	7	3	7	0	0	0	7	3	25	0	0	28	38
12:30 PM	0	5	0	0	5	15	1	0	0	16	3	19	0	0	22	43
12:45 PM	0	1	0	2	1	19	0	0	0	19	0	21	1	0	22	42
Hourly Total	0	10	0	10	10	50	1	0	0	51	8	84	1	0	93	154
1:00 PM	0	3	0	1	3	15	1	0	0	16	6	16	0	0	22	41
1:15 PM	0	5	0	1	5	19	0	0	0	19	0	21	0	0	21	45
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	8	0	2	8	34	1	0	0	35	6	37	0	0	43	86
3:00 PM	0	7	0	2	7	23	0	0	0	23	3	17	0	0	20	50
3:15 PM	0	5	0	2	5	22	0	0	0	22	3	23	0	0	26	53
3:30 PM	0	2	0	3	2	18	1	0	0	19	1	10	0	0	11	32
3:45 PM	0	3	0	4	3	20	0	0	0	20	8	19	0	0	27	50
Hourly Total	0	17	0	11	17	83	1	0	0	84	15	69	0	0	84	185
4:00 PM	0	2	0	0	2	33	0	0	0	33	1	26	0	0	27	62
4:15 PM	0	5	0	3	5	27	1	0	0	28	5	19	0	1	24	57
4:30 PM	0	12	0	2	12	26	1	0	0	27	6	21	0	0	27	66

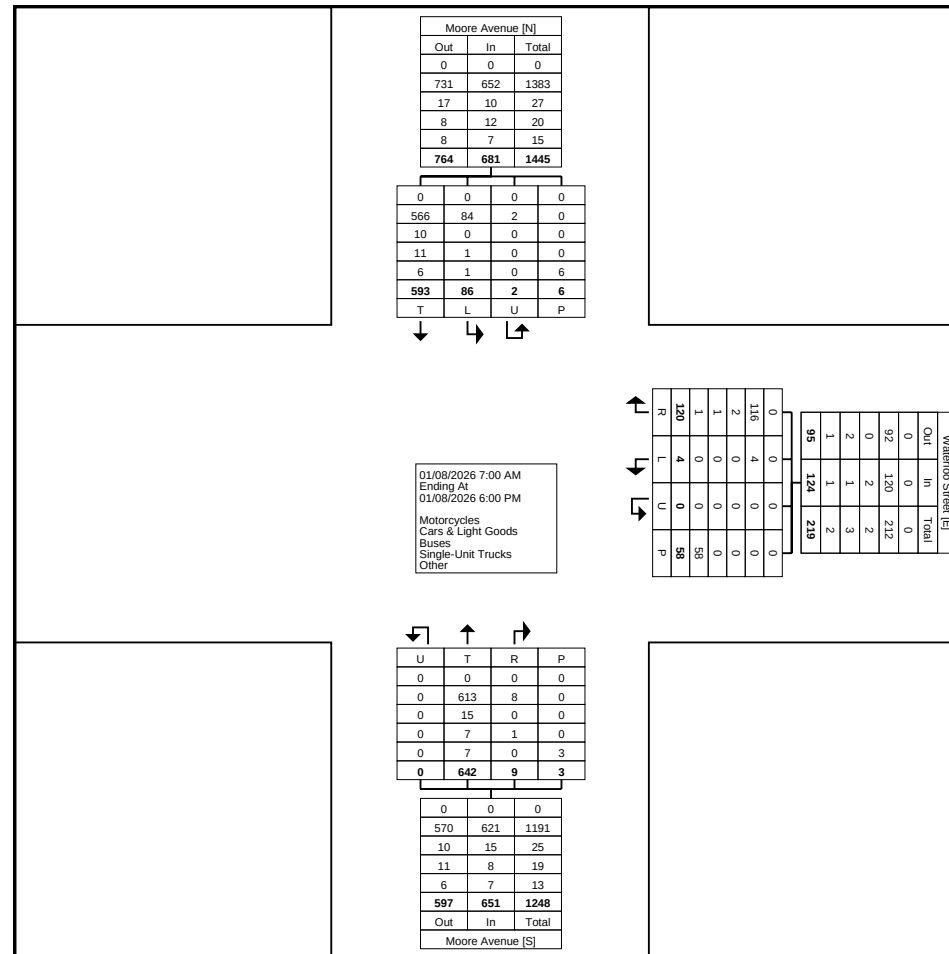
4:45 PM	0	8	0	3	8	20	0	0	0	20	0	30	0	0	30	58
Hourly Total	0	27	0	8	27	106	2	0	0	108	12	96	0	1	108	243
5:00 PM	0	6	0	5	6	38	1	0	3	39	5	30	0	1	35	80
5:15 PM	0	5	0	5	5	23	0	0	0	23	6	28	0	1	34	62
5:30 PM	0	8	0	1	8	21	0	0	0	21	6	31	0	0	37	66
5:45 PM	1	2	0	1	3	20	0	0	0	20	4	26	0	0	30	53
Hourly Total	1	21	0	12	22	102	1	0	3	103	21	115	0	2	136	261
Grand Total	4	120	0	58	124	642	9	0	3	651	86	593	2	6	681	1456
Approach %	3.2	96.8	0.0	-	-	98.6	1.4	0.0	-	-	12.6	87.1	0.3	-	-	-
Total %	0.3	8.2	0.0	-	8.5	44.1	0.6	0.0	-	44.7	5.9	40.7	0.1	-	46.8	-
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	4	116	0	-	120	613	8	0	-	621	84	566	2	-	652	1393
% Cars & Light Goods	100.0	96.7	-	-	96.8	95.5	88.9	-	-	95.4	97.7	95.4	100.0	-	95.7	95.7
Buses	0	2	0	-	2	15	0	0	-	15	0	10	0	-	10	27
% Buses	0.0	1.7	-	-	1.6	2.3	0.0	-	-	2.3	0.0	1.7	0.0	-	1.5	1.9
Single-Unit Trucks	0	1	0	-	1	7	1	0	-	8	1	11	0	-	12	21
% Single-Unit Trucks	0.0	0.8	-	-	0.8	1.1	11.1	-	-	1.2	1.2	1.9	0.0	-	1.8	1.4
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	0.0	0.1
Bicycles on Road	0	1	0	-	1	6	0	0	-	6	1	6	0	-	7	14
% Bicycles on Road	0.0	0.8	-	-	0.8	0.9	0.0	-	-	0.9	1.2	1.0	0.0	-	1.0	1.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	16.7	-	-
Pedestrians	-	-	-	58	-	-	-	-	3	-	-	-	-	5	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	83.3	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 4

Turning Movement Peak Hour Data (8:30 AM)

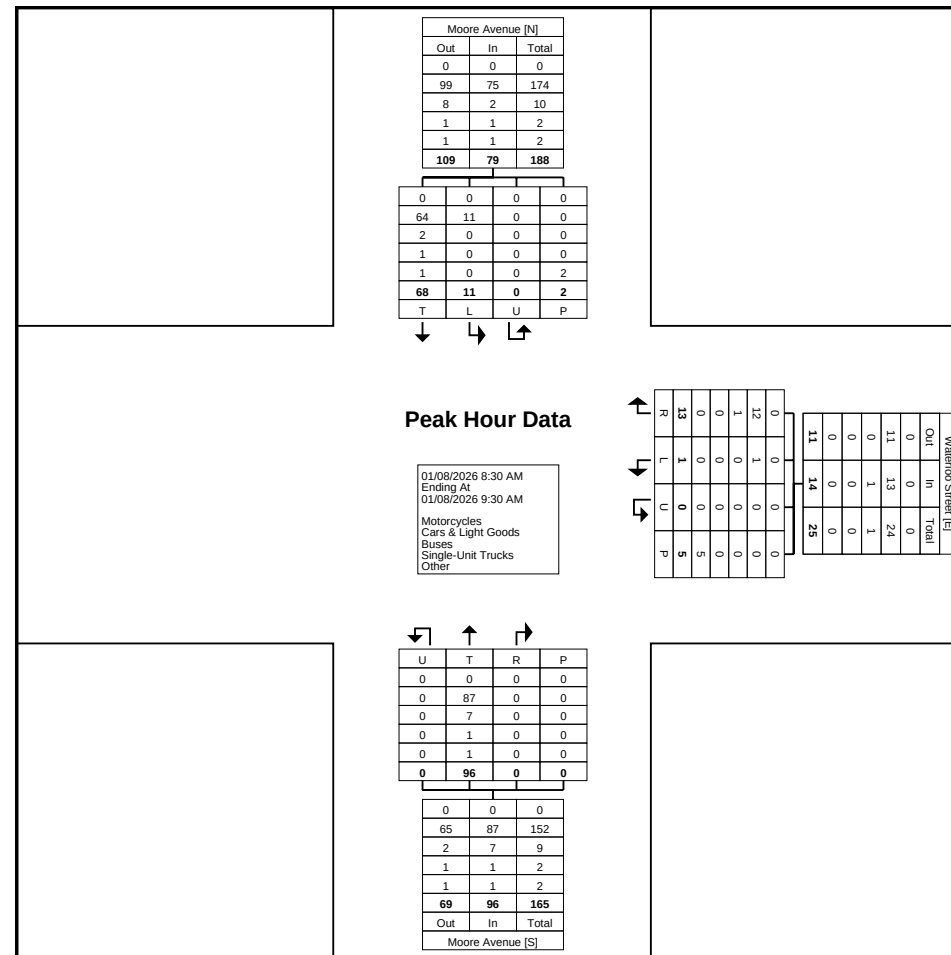
Start Time	Waterloo Street Westbound					Moore Avenue Northbound					Moore Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
8:30 AM	0	2	0	0	2	21	0	0	0	21	3	16	0	0	19	42
8:45 AM	1	4	0	2	5	34	0	0	0	34	2	15	0	2	17	56
9:00 AM	0	5	0	1	5	17	0	0	0	17	2	18	0	0	20	42
9:15 AM	0	2	0	2	2	24	0	0	0	24	4	19	0	0	23	49
Total	1	13	0	5	14	96	0	0	0	96	11	68	0	2	79	189
Approach %	7.1	92.9	0.0	-	-	100.0	0.0	0.0	-	-	13.9	86.1	0.0	-	-	-
Total %	0.5	6.9	0.0	-	7.4	50.8	0.0	0.0	-	50.8	5.8	36.0	0.0	-	41.8	-
PHF	0.250	0.650	0.000	-	0.700	0.706	0.000	0.000	-	0.706	0.688	0.895	0.000	-	0.859	0.844
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	1	12	0	-	13	87	0	0	-	87	11	64	0	-	75	175
% Cars & Light Goods	100.0	92.3	-	-	92.9	90.6	-	-	-	90.6	100.0	94.1	-	-	94.9	92.6
Buses	0	1	0	-	1	7	0	0	-	7	0	2	0	-	2	10
% Buses	0.0	7.7	-	-	7.1	7.3	-	-	-	7.3	0.0	2.9	-	-	2.5	5.3
Single-Unit Trucks	0	0	0	-	0	1	0	0	-	1	0	1	0	-	1	2
% Single-Unit Trucks	0.0	0.0	-	-	0.0	1.0	-	-	-	1.0	0.0	1.5	-	-	1.3	1.1
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	0	1	0	-	1	2
% Bicycles on Road	0.0	0.0	-	-	0.0	1.0	-	-	-	1.0	0.0	1.5	-	-	1.3	1.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	5	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 5



Turning Movement Peak Hour Data Plot (8:30 AM)

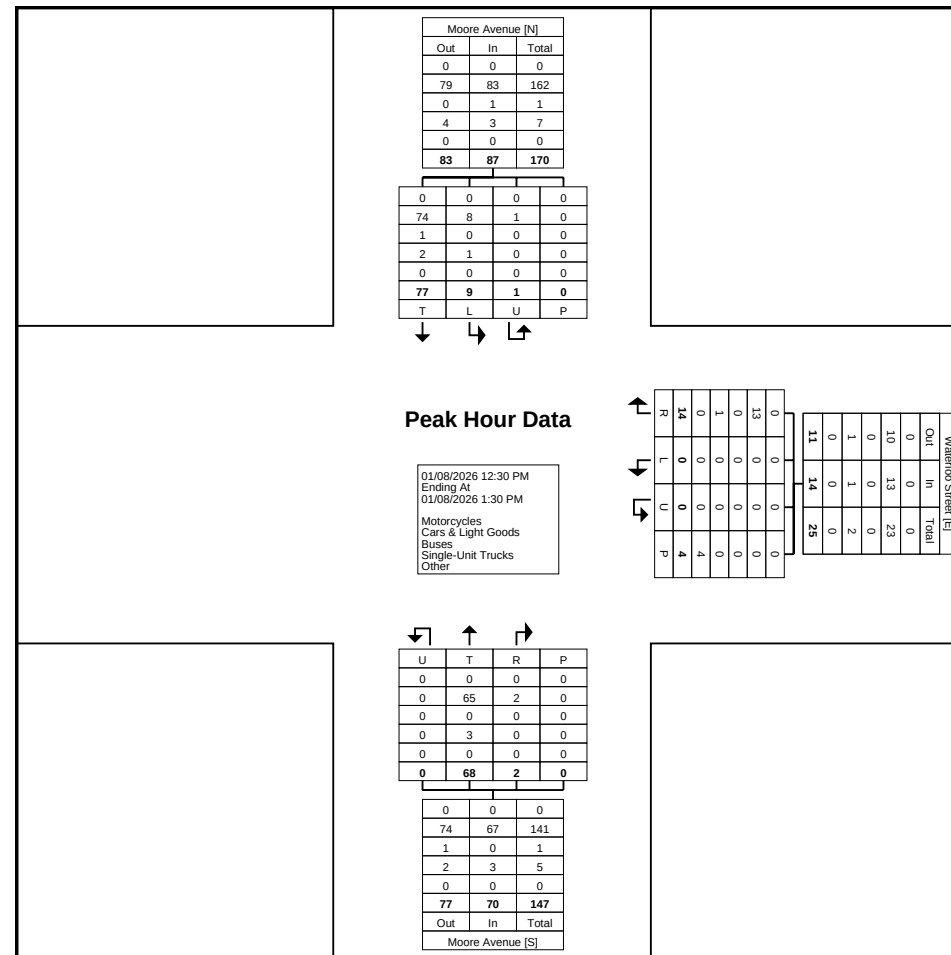
[illegible]



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 7



Turning Movement Peak Hour Data Plot (12:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Moore Avenue
Site Code: 250792
Start Date: 01/08/2026
Page No: 8

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Waterloo Street Westbound					Moore Avenue Northbound					Moore Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
4:30 PM	0	12	0	2	12	26	1	0	0	27	6	21	0	0	27	66
4:45 PM	0	8	0	3	8	20	0	0	0	20	0	30	0	0	30	58
5:00 PM	0	6	0	5	6	38	1	0	3	39	5	30	0	1	35	80
5:15 PM	0	5	0	5	5	23	0	0	0	23	6	28	0	1	34	62
Total	0	31	0	15	31	107	2	0	3	109	17	109	0	2	126	266
Approach %	0.0	100.0	0.0	-	-	98.2	1.8	0.0	-	-	13.5	86.5	0.0	-	-	-
Total %	0.0	11.7	0.0	-	11.7	40.2	0.8	0.0	-	41.0	6.4	41.0	0.0	-	47.4	-
PHF	0.000	0.646	0.000	-	0.646	0.704	0.500	0.000	-	0.699	0.708	0.908	0.000	-	0.900	0.831
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	0	30	0	-	30	105	1	0	-	106	17	108	0	-	125	261
% Cars & Light Goods	-	96.8	-	-	96.8	98.1	50.0	-	-	97.2	100.0	99.1	-	-	99.2	98.1
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	1	1	0	-	2	0	0	0	-	0	2
% Single-Unit Trucks	-	0.0	-	-	0.0	0.9	50.0	-	-	1.8	0.0	0.0	-	-	0.0	0.8
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	1	0	-	1	1	0	0	-	1	0	1	0	-	1	3
% Bicycles on Road	-	3.2	-	-	3.2	0.9	0.0	-	-	0.9	0.0	0.9	-	-	0.8	1.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	50.0	-	-
Pedestrians	-	-	-	15	-	-	-	-	3	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	50.0	-	-

Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Roger Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 1

Turning Movement Data

Start Time	Roger Street Eastbound						Roger Street Westbound						Waterloo Street Northbound						Waterloo Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	0	0	0	0	0	0	1	0	0	1	1	0	0	2	0	0	2	0	0	0	0	0	0	3
7:15 AM	0	4	0	0	0	4	0	1	0	0	0	1	0	0	2	0	0	2	1	0	0	0	0	1	8
7:30 AM	0	3	0	0	0	3	1	3	0	0	0	4	2	0	3	0	0	5	1	0	0	0	0	1	13
7:45 AM	1	1	0	0	0	2	0	5	0	0	1	5	0	6	3	0	1	9	0	0	0	0	0	0	16
Hourly Total	1	8	0	0	0	9	1	10	0	0	2	11	2	6	10	0	1	18	2	0	0	0	0	2	40
8:00 AM	0	3	0	0	0	3	0	6	0	0	0	6	1	1	2	0	0	4	1	0	0	0	0	1	14
8:15 AM	0	2	0	0	0	2	3	5	0	0	0	8	0	3	4	0	0	7	3	0	0	0	1	3	20
8:30 AM	0	2	0	0	2	2	0	4	1	0	0	5	0	1	5	0	4	6	3	1	0	0	1	4	17
8:45 AM	0	4	2	0	0	6	3	6	0	0	0	9	0	4	1	0	0	5	1	1	0	0	0	2	22
Hourly Total	0	11	2	0	2	13	6	21	1	0	0	28	1	9	12	0	4	22	8	2	0	0	2	10	73
9:00 AM	1	7	1	0	1	9	0	7	1	0	1	8	0	2	0	0	0	2	0	1	0	0	0	1	20
9:15 AM	0	2	1	0	0	3	0	3	0	0	0	3	0	0	3	0	2	3	2	1	0	0	0	3	12
9:30 AM	1	4	0	0	0	5	0	2	0	0	0	2	0	2	2	0	2	4	0	2	0	0	0	2	13
9:45 AM	0	2	0	0	0	2	1	3	1	0	2	5	0	0	1	0	2	1	2	2	0	0	2	4	12
Hourly Total	2	15	2	0	1	19	1	15	2	0	3	18	0	4	6	0	6	10	4	6	0	0	2	10	57
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	0	7	0	0	0	7	1	2	0	0	0	3	0	3	6	0	0	9	1	1	0	0	1	2	21
11:45 AM	1	2	1	0	0	4	2	2	0	0	0	4	2	0	3	0	0	5	0	2	0	0	0	2	15
Hourly Total	1	9	1	0	0	11	3	4	0	0	0	7	2	3	9	0	0	14	1	3	0	0	1	4	36
12:00 PM	0	1	1	0	0	2	4	4	0	0	0	8	1	2	3	0	4	6	0	2	0	0	0	2	18
12:15 PM	1	3	0	0	0	4	0	1	0	0	0	1	0	1	1	0	6	2	1	1	0	0	0	2	9
12:30 PM	0	2	0	0	3	2	3	4	0	0	0	7	1	4	4	0	5	9	2	2	0	0	0	4	22
12:45 PM	1	1	1	0	0	3	3	9	0	0	2	12	1	0	3	0	2	4	0	0	1	0	1	1	20
Hourly Total	2	7	2	0	3	11	10	18	0	0	2	28	3	7	11	0	17	21	3	5	1	0	1	9	69
1:00 PM	1	3	1	0	0	5	5	3	1	0	3	9	4	0	1	0	0	5	3	2	1	0	0	6	25
1:15 PM	0	8	0	0	0	8	2	3	0	0	0	5	1	4	5	0	1	10	0	0	1	0	1	1	24
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	11	1	0	0	13	7	6	1	0	3	14	5	4	6	0	1	15	3	2	2	0	1	7	49
3:00 PM	0	3	0	0	2	3	5	9	3	0	2	17	0	3	5	0	2	8	0	2	0	0	0	2	30
3:15 PM	0	1	2	0	0	3	3	7	1	0	0	11	0	3	1	0	0	4	1	2	0	0	0	3	21
3:30 PM	0	2	1	0	1	3	1	6	2	0	3	9	0	2	1	0	1	3	0	2	0	0	1	2	17
3:45 PM	1	5	3	0	0	9	2	7	1	0	0	10	1	2	1	0	0	4	2	2	1	0	0	5	28
Hourly Total	1	11	6	0	3	18	11	29	7	0	5	47	1	10	8	0	3	19	3	8	1	0	1	12	96
4:00 PM	0	1	2	0	0	3	1	13	1	0	0	15	0	2	1	0	2	3	0	1	0	0	0	1	22
4:15 PM	0	6	2	0	0	8	2	3	1	0	1	6	0	3	2	0	0	5	1	3	0	0	0	4	23

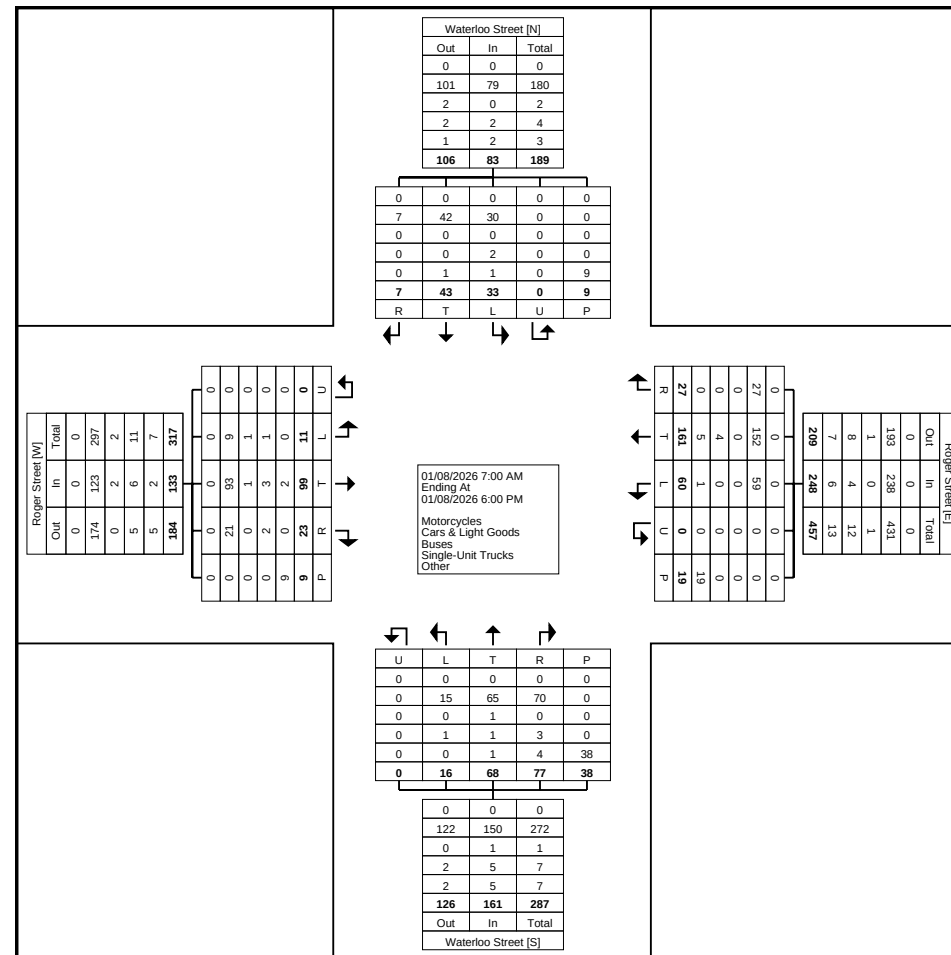
4:30 PM	2	2	0	0	0	4	5	7	6	0	1	18	1	4	3	0	0	8	2	2	0	0	0	4	34
4:45 PM	1	3	1	0	0	5	2	6	4	0	0	12	0	3	3	0	3	6	0	0	0	0	1	0	23
Hourly Total	3	12	5	0	0	20	10	29	12	0	2	51	1	12	9	0	5	22	3	6	0	0	1	9	102
5:00 PM	0	2	2	0	0	4	8	11	2	0	1	21	0	2	1	0	0	3	1	4	1	0	0	6	34
5:15 PM	0	5	0	0	0	5	2	7	0	0	0	9	0	4	1	0	0	5	1	2	0	0	0	3	22
5:30 PM	0	3	0	0	0	3	0	4	1	0	1	5	1	6	0	0	1	7	3	4	1	0	0	8	23
5:45 PM	0	5	2	0	0	7	1	7	1	0	0	9	0	1	4	0	0	5	1	1	1	0	0	3	24
Hourly Total	0	15	4	0	0	19	11	29	4	0	2	44	1	13	6	0	1	20	6	11	3	0	0	20	103
Grand Total	11	99	23	0	9	133	60	161	27	0	19	248	16	68	77	0	38	161	33	43	7	0	9	83	625
Approach %	8.3	74.4	17.3	0.0	-	-	24.2	64.9	10.9	0.0	-	-	9.9	42.2	47.8	0.0	-	-	39.8	51.8	8.4	0.0	-	-	-
Total %	1.8	15.8	3.7	0.0	-	21.3	9.6	25.8	4.3	0.0	-	39.7	2.6	10.9	12.3	0.0	-	25.8	5.3	6.9	1.1	0.0	-	13.3	-
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	9	93	21	0	-	123	59	152	27	0	-	238	15	65	70	0	-	150	30	42	7	0	-	79	590
% Cars & Light Goods	81.8	93.9	91.3	-	-	92.5	98.3	94.4	100.0	-	-	96.0	93.8	95.6	90.9	-	-	93.2	90.9	97.7	100.0	-	-	95.2	94.4
Buses	1	1	0	0	-	2	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	3
% Buses	9.1	1.0	0.0	-	-	1.5	0.0	0.0	0.0	-	-	0.0	0.0	1.5	0.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.5
Single-Unit Trucks	1	3	2	0	-	6	0	4	0	0	-	4	1	1	3	0	-	5	2	0	0	0	-	2	17
% Single-Unit Trucks	9.1	3.0	8.7	-	-	4.5	0.0	2.5	0.0	-	-	1.6	6.3	1.5	3.9	-	-	3.1	6.1	0.0	0.0	-	-	2.4	2.7
Articulated Trucks	0	1	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	3
% Articulated Trucks	0.0	1.0	0.0	-	-	0.8	0.0	1.2	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.5
Bicycles on Road	0	1	0	0	-	1	1	3	0	0	-	4	0	1	4	0	-	5	1	1	0	0	-	2	12
% Bicycles on Road	0.0	1.0	0.0	-	-	0.8	1.7	1.9	0.0	-	-	1.6	0.0	1.5	5.2	-	-	3.1	3.0	2.3	0.0	-	-	2.4	1.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	19	-	-	-	-	-	38	-	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Roger Street
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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519-896-3163 cbowness@ptsl.com

Count Name: Waterloo Street & Roger Street
Site Code: 250792
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Turning Movement Peak Hour Data (8:15 AM)

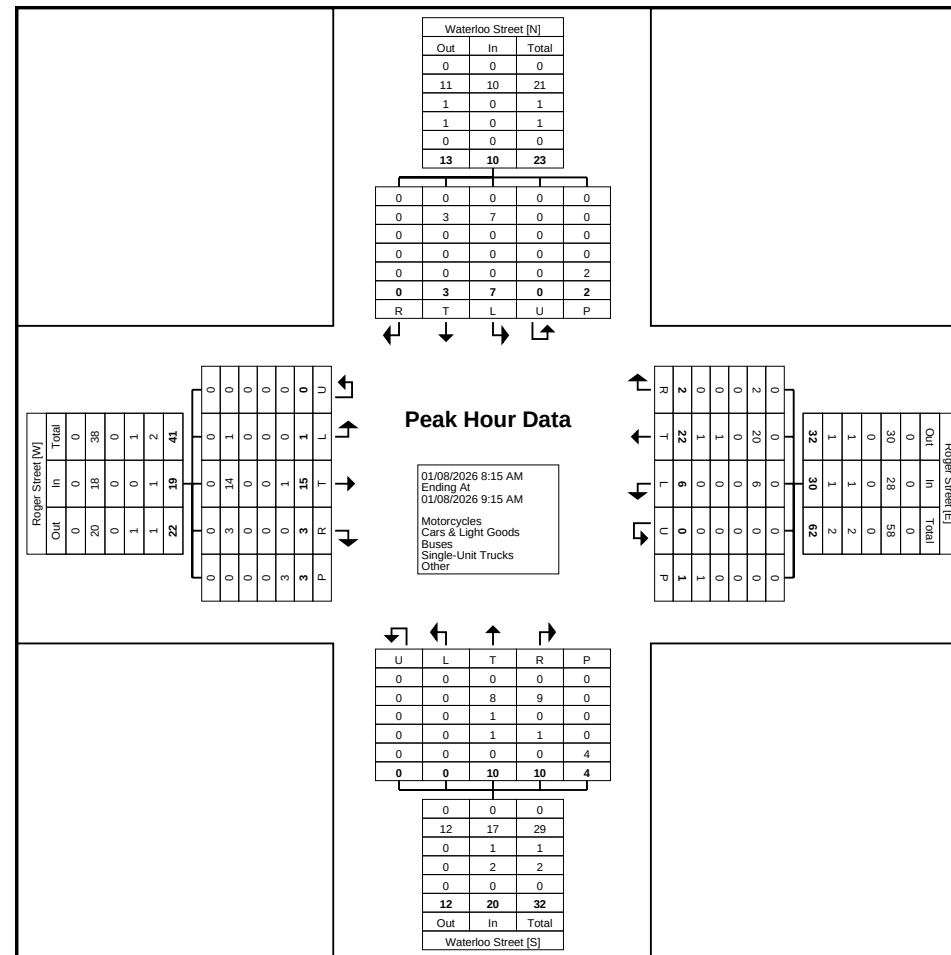
Start Time	Roger Street Eastbound						Roger Street Westbound						Waterloo Street Northbound						Waterloo Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:15 AM	0	2	0	0	0	2	3	5	0	0	0	8	0	3	4	0	0	7	3	0	0	0	1	3	20
8:30 AM	0	2	0	0	2	2	0	4	1	0	0	5	0	1	5	0	4	6	3	1	0	0	1	4	17
8:45 AM	0	4	2	0	0	6	3	6	0	0	0	9	0	4	1	0	0	5	1	1	0	0	0	2	22
9:00 AM	1	7	1	0	1	9	0	7	1	0	1	8	0	2	0	0	0	2	0	1	0	0	0	1	20
Total	1	15	3	0	3	19	6	22	2	0	1	30	0	10	10	0	4	20	7	3	0	0	2	10	79
Approach %	5.3	78.9	15.8	0.0	-	-	20.0	73.3	6.7	0.0	-	-	0.0	50.0	50.0	0.0	-	-	70.0	30.0	0.0	0.0	-	-	-
Total %	1.3	19.0	3.8	0.0	-	24.1	7.6	27.8	2.5	0.0	-	38.0	0.0	12.7	12.7	0.0	-	25.3	8.9	3.8	0.0	0.0	-	12.7	-
PHF	0.250	0.536	0.375	0.000	-	0.528	0.500	0.786	0.500	0.000	-	0.833	0.000	0.625	0.500	0.000	-	0.714	0.583	0.750	0.000	0.000	-	0.625	0.898
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	1	14	3	0	-	18	6	20	2	0	-	28	0	8	9	0	-	17	7	3	0	0	-	10	73
% Cars & Light Goods	100.0	93.3	100.0	-	-	94.7	100.0	90.9	100.0	-	-	93.3	-	80.0	90.0	-	-	85.0	100.0	100.0	-	-	-	100.0	92.4
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	10.0	0.0	-	-	5.0	0.0	0.0	-	-	-	0.0	1.3
Single-Unit Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	1	1	0	-	2	0	0	0	0	-	0	3
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	4.5	0.0	-	-	3.3	-	10.0	10.0	-	-	10.0	0.0	0.0	-	-	-	0.0	3.8
Articulated Trucks	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Articulated Trucks	0.0	6.7	0.0	-	-	5.3	0.0	4.5	0.0	-	-	3.3	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	2.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Turning Movement Peak Hour Data (12:30 PM)

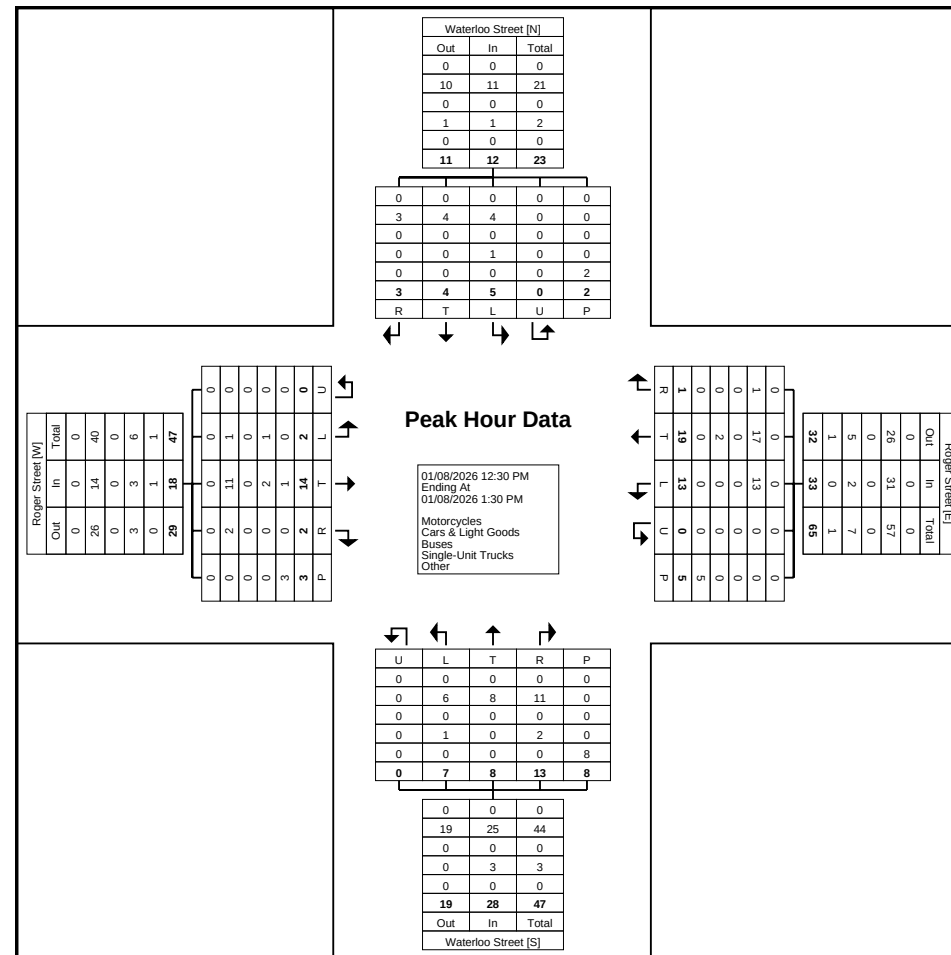
Start Time	Roger Street Eastbound						Roger Street Westbound						Waterloo Street Northbound						Waterloo Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:30 PM	0	2	0	0	3	2	3	4	0	0	0	7	1	4	4	0	5	9	2	2	0	0	0	4	22
12:45 PM	1	1	1	0	0	3	3	9	0	0	2	12	1	0	3	0	2	4	0	0	1	0	1	1	20
1:00 PM	1	3	1	0	0	5	5	3	1	0	3	9	4	0	1	0	0	5	3	2	1	0	0	6	25
1:15 PM	0	8	0	0	0	8	2	3	0	0	0	5	1	4	5	0	1	10	0	0	1	0	1	1	24
Total	2	14	2	0	3	18	13	19	1	0	5	33	7	8	13	0	8	28	5	4	3	0	2	12	91
Approach %	11.1	77.8	11.1	0.0	-	-	39.4	57.6	3.0	0.0	-	-	25.0	28.6	46.4	0.0	-	-	41.7	33.3	25.0	0.0	-	-	-
Total %	2.2	15.4	2.2	0.0	-	19.8	14.3	20.9	1.1	0.0	-	36.3	7.7	8.8	14.3	0.0	-	30.8	5.5	4.4	3.3	0.0	-	13.2	-
PHF	0.500	0.438	0.500	0.000	-	0.563	0.650	0.528	0.250	0.000	-	0.688	0.438	0.500	0.650	0.000	-	0.700	0.417	0.500	0.750	0.000	-	0.500	0.910
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	1	11	2	0	-	14	13	17	1	0	-	31	6	8	11	0	-	25	4	4	3	0	-	11	81
% Cars & Light Goods	50.0	78.6	100.0	-	-	77.8	100.0	89.5	100.0	-	-	93.9	85.7	100.0	84.6	-	-	89.3	80.0	100.0	100.0	-	-	91.7	89.0
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	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
Single-Unit Trucks	1	2	0	0	-	3	0	2	0	0	-	2	1	0	2	0	-	3	1	0	0	0	-	1	9
% Single-Unit Trucks	50.0	14.3	0.0	-	-	16.7	0.0	10.5	0.0	-	-	6.1	14.3	0.0	15.4	-	-	10.7	20.0	0.0	0.0	-	-	8.3	9.9
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	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
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	7.1	0.0	-	-	5.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	1.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	5	-	-	-	-	-	8	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Roger Street
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Turning Movement Peak Hour Data Plot (12:30 PM)



Paradigm Transportation Solutions Limited
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Count Name: Waterloo Street & Roger Street
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Turning Movement Peak Hour Data (4:15 PM)

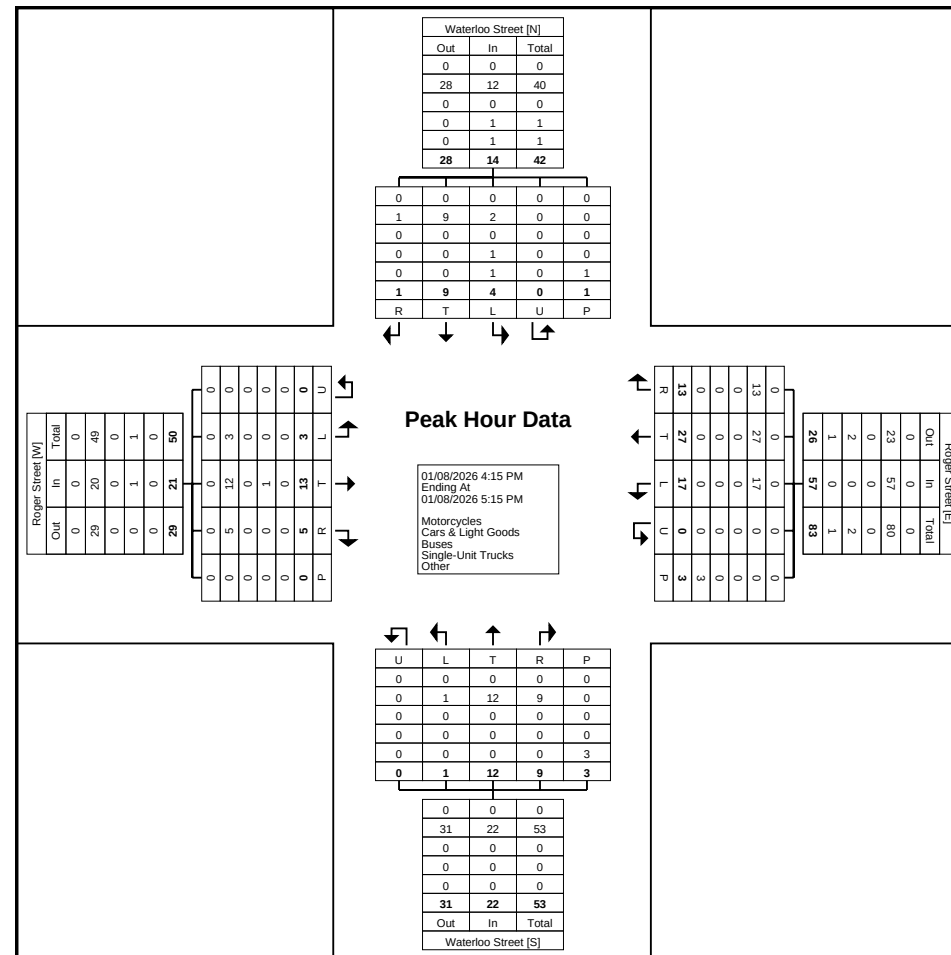
Start Time	Roger Street Eastbound						Roger Street Westbound						Waterloo Street Northbound						Waterloo Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	0	6	2	0	0	8	2	3	1	0	1	6	0	3	2	0	0	5	1	3	0	0	0	4	23
4:30 PM	2	2	0	0	0	4	5	7	6	0	1	18	1	4	3	0	0	8	2	2	0	0	0	4	34
4:45 PM	1	3	1	0	0	5	2	6	4	0	0	12	0	3	3	0	3	6	0	0	0	0	1	0	23
5:00 PM	0	2	2	0	0	4	8	11	2	0	1	21	0	2	1	0	0	3	1	4	1	0	0	6	34
Total	3	13	5	0	0	21	17	27	13	0	3	57	1	12	9	0	3	22	4	9	1	0	1	14	114
Approach %	14.3	61.9	23.8	0.0	-	-	29.8	47.4	22.8	0.0	-	-	4.5	54.5	40.9	0.0	-	-	28.6	64.3	7.1	0.0	-	-	-
Total %	2.6	11.4	4.4	0.0	-	18.4	14.9	23.7	11.4	0.0	-	50.0	0.9	10.5	7.9	0.0	-	19.3	3.5	7.9	0.9	0.0	-	12.3	-
PHF	0.375	0.542	0.625	0.000	-	0.656	0.531	0.614	0.542	0.000	-	0.679	0.250	0.750	0.750	0.000	-	0.688	0.500	0.563	0.250	0.000	-	0.583	0.838
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	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
Cars & Light Goods	3	12	5	0	-	20	17	27	13	0	-	57	1	12	9	0	-	22	2	9	1	0	-	12	111
% Cars & Light Goods	100.0	92.3	100.0	-	-	95.2	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	50.0	100.0	100.0	-	-	85.7	97.4
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	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
Single-Unit Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	2
% Single-Unit Trucks	0.0	7.7	0.0	-	-	4.8	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	25.0	0.0	0.0	-	-	7.1	1.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	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
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	25.0	0.0	0.0	-	-	7.1	0.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Waterloo Street & Roger Street
Site Code: 250792
Start Date: 01/08/2026
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 8:00 AM
To: 9:00 AM

Municipality: Waterloo
Intersection: Union St @ Moore Ave
Control: Signalized
Major Road: Union St

Weather conditions:
Cloudy/Dry
Person(s) who counted:
Cam

GeoID: 10641
Count Date: Wednesday, 13-Sep-23

North Leg Total:	218	% Trks	3%	0%	0%	
North Entering:	87	Heavys	1	0	0	1
North Peds:	30	Trucks	0	0	0	0
Peds Cross:	⌂	Cars	28	39	19	86
		Total	29	39	19	

Heavys	10
Trucks	3
Cars	118
Total	131

East Leg Total:	958
East Entering:	560
East Peds:	70
Peds Cross:	⌂

Heavys	9
Trucks	4
Cars	538
Total	551

Union St

% Trks	Heavys	Trucks	Cars	Total
11%	2	2	31	35
2%	5	1	346	352
0%	0	0	19	19
	7	3	396	

Moore Ave

Total	25	57	27	
Cars	24	55	27	106
Trucks	0	0	0	0
Heavys	1	2	0	3
% Trks	4%	4%	0%	

Union St

Cars	Trucks	Heavys	Total
392	1	5	398

Peds Cross: ⌂

West Peds: 34
West Entering: 406
West leg Total: 957

Heavys	1
Trucks	0
Cars	81
Total	82

Peds Cross: ⌂

South Peds: 17
South Entering: 109
South leg Total: 191

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,162**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **406**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 12:30 PM
To: 1:30 PM

Municipality: Waterloo
Intersection: Union St @ Moore Ave
Control: Signalized
Major Road: Union St

Weather conditions:
 Cloudy/Dry
Person(s) who counted:
 Cam

GeoID: 10641
Count Date: Wednesday, 13-Sep-23

North Leg Total: 203
North Entering: 112
North Peds: 6
Peds Cross: X

% Trks	0%	5%	0%	
Heavys	0	0	0	0
Trucks	0	3	0	3
Cars	30	60	19	109
Total	30	63	19	

Heavys 0
 Trucks 2
 Cars 89
 Total 91

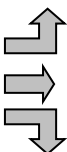
East Leg Total: 693
East Entering: 333
East Peds: 8
Peds Cross: X

Heavys 5
 Trucks 1
 Cars 340
 Total 346

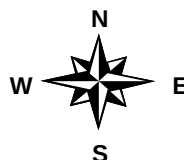


Union St

% Trks	Heavys	Trucks	Cars	Total
3%	0	1	28	29
2%	3	3	307	313
4%	1	0	24	25
	4	4	359	



Moore Ave



Moore Ave



Total	Cars	Trucks	Heavys	% Trks
20	19	1	0	5%
286	280	1	5	2%
27	26	1	0	4%
	325	3	5	

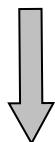
Union St



Cars 354
 Trucks 3
 Heavys 3
 Total 360

Peds Cross: X
West Peds: 8
West Entering: 367
West leg Total: 713

Heavys 1
 Trucks 4
 Cars 110
 Total 115



Total 30 42 28
 Cars 30 42 28 100
 Trucks 0 0 0 0
 Heavys 0 0 0 0
 % Trks 0% 0% 0%

Peds Cross: X
South Peds: 8
South Entering: 100
South leg Total: 215

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
 Therefore, total vehicles entering intersection = **912**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **367**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:15 PM
To: 5:15 PM

Municipality: Waterloo
Intersection: Union St @ Moore Ave
Control: Signalized
Major Road: Union St

Weather conditions:
Cloudy/Dry
Person(s) who counted:
Cam

GeoID: 10641
Count Date: Wednesday, 13-Sep-23

North Leg Total:	312	% Trks	2%	0%	0%	
North Entering:	188	Heavys	0	0	0	0
North Peds:	13	Trucks	1	0	0	1
Peds Cross:	⌕	Cars	48	99	40	187
		Total	49	99	40	

Heavys	0
Trucks	2
Cars	122
Total	124

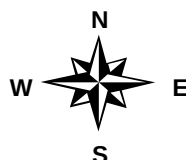
East Leg Total:	1,075
East Entering:	476
East Peds:	18
Peds Cross:	⌕

Heavys	4
Trucks	1
Cars	513
Total	518

Union St

% Trks	0%	Heavys	0	Trucks	0	Cars	26	Total	26
	1%		2		2		518		522
	0%		0		0		20		20
			2		2		564		

Moore Ave



Moore Ave

Total	33	Cars	31	Trucks	2	Heavys	0	% Trks	6%
	421		417		0		4		1%
	22		22		0		0		0%
	470				2		4		

Union St

Cars	595	Trucks	2	Heavys	2	Total	599
------	-----	--------	---	--------	---	-------	-----

Peds Cross:	⌕
West Peds:	16
West Entering:	568
West leg Total:	1,086

Heavys	0
Trucks	0
Cars	141
Total	141

Total	48	65	37	
Cars	48	65	37	150
Trucks	0	0	0	0
Heavys	0	0	0	0
% Trks	0%	0%	0%	

Peds Cross:	⌕
South Peds:	23
South Entering:	150
South leg Total:	291

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,382**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **568**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Total Count Diagram

Municipality: Waterloo
Intersection: Union St @ Moore Ave
Control: Signalized
Major Road: Union St

Weather conditions:
 Cloudy/Dry

Person(s) who counted:
 Cam

GeoID: 10641
Count Date: Wednesday, 13-Sep-23

North Leg Total: 1,738
North Entering: 933
North Peds: 102
Peds Cross: X
Bicycles Entering: 33
Buggies Entering: 0

% Trks	1%	2%	1%	
Heavys	1	3	1	5
Trucks	1	8	1	10
Cars	255	486	177	918
Total	257	497	179	

Heavys	23
Trucks	12
Cars	770
Total	805

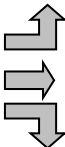
East Leg Total: 6,545
East Entering: 3,186
East Peds: 251
Peds Cross: X
Bicycles Entering: 16
Buggies Entering: 0

Heavys	Trucks	Cars	Total
38	22	3,266	3,326

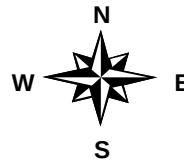


Union St

% Trks	Heavys	Trucks	Cars	Total
4%	5	4	210	219
2%	37	20	2,906	2,963
3%	2	4	182	188
	44	28	3,298	



Moore Ave



Moore Ave



Total	Cars	Trucks	Heavys	% Trks
180	165	5	10	8%
2,831	2,780	17	34	2%
175	168	4	3	4%
	3,113	26	47	

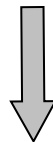
Union St



Cars	Trucks	Heavys	Total
3,295	24	40	3,359

Peds Cross: X
West Peds: 120
West Entering: 3,370
West leg Total: 6,696
Bicycles Entering: 6
Buggies Entering: 0

Heavys	8
Trucks	16
Cars	836
Total	860



Total	238	406	217	
Cars	231	395	212	838
Trucks	4	3	3	10
Heavys	3	8	2	13
% Trks	3%	3%	2%	

Peds Cross: X
South Peds: 107
South Entering: 861
South leg Total: 1,721
Bicycles Entering: 29
Buggies Entering: 0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
 Therefore, total vehicles entering intersection = **8,350**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **3,370**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Waterloo
Intersection: Union St @ Moore Ave
Control: Signalized
Major Road: Union St

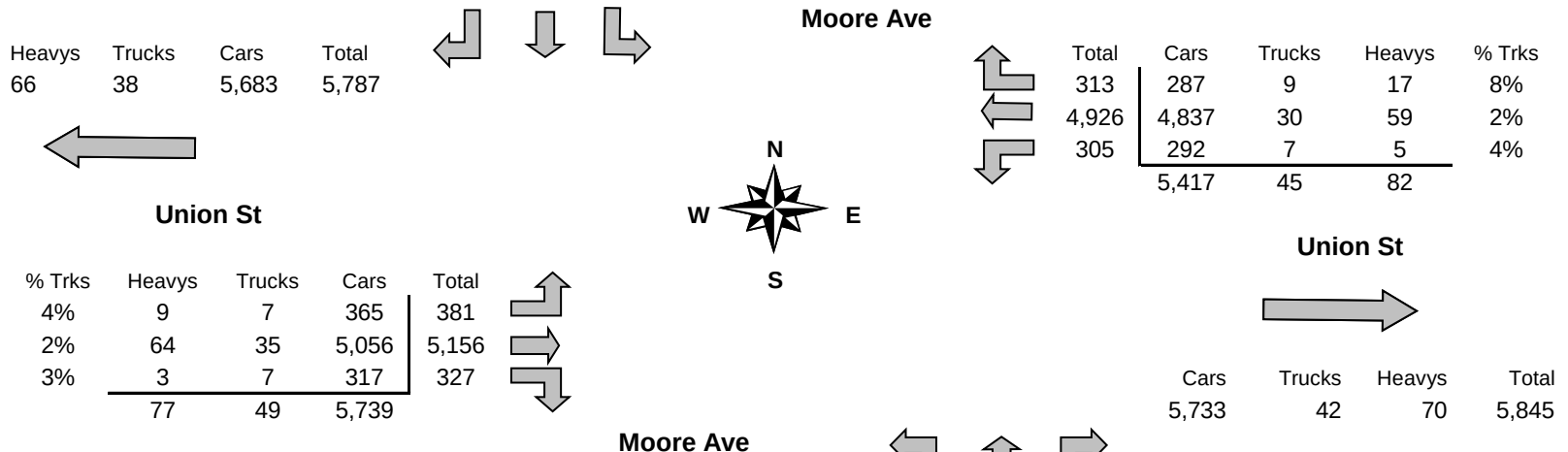
Weather conditions:
 Cloudy/Dry
Person(s) who counted:
 Cam

GeoID: 10641
Count Date: Wednesday, 13-Sep-23

North Leg Total:	3,024	% Trks	1%	2%	1%	
North Entering:	1,623	Heavys	2	5	2	9
North Peds:	N/A	Trucks	2	14	2	17
Peds Cross:	⌂	Cars	444	846	308	1,597
		Total	447	865	311	

Heavys	40
Trucks	21
Cars	1,340
Total	1401

East Leg Total:	11,388
East Entering:	5,544
East Peds:	N/A
Peds Cross:	⌂



Peds Cross: ⌂
West Peds: N/A
West Entering: 5,864
West leg Total: 11,651

Heavys	14
Trucks	28
Cars	1,455
Total	1,496

Total	414	706	378
Cars	402	687	369
Trucks	7	5	5
Heavys	5	14	3
% Trks	3%	3%	2%

Peds Cross: ⌂
South Peds: N/A
South Entering: 1,498
South leg Total: 2,995

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
 This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example:
$$\frac{(\text{West leg total} + \text{South leg total} + \text{East leg total} + \text{North leg total})}{2}$$
 EDT = 14,529

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Peak Hour Factor By Movement

Municipality: Waterloo
Intersection: Union St @ Moore Ave
Control: Signalized
Major Road: Union St

Weather conditions:
Cloudy/Dry
Person(s) who counted:
Cam

GeoID: 10641
Count Date: Wednesday, 13-Sep-23

North Approach PHF

AM Peak: 0.91
Mid-day Peak: 0.90
PM Peak: 0.87

East Approach PHF

AM Peak: 0.85
Mid-day Peak: 0.87
PM Peak: 0.95

Movement			
PM	0.77	0.75	0.77
MID	0.75	0.72	0.68
AM	0.73	0.81	0.79

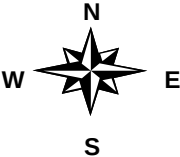
AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

Union St

Movement	PM	MID	AM
	0.81	0.81	0.73
	0.86	0.91	0.96
	0.71	0.78	0.79



Moore Ave



AM	MID	PM	Movement
0.81	0.56	0.75	
0.87	0.83	0.96	
0.55	0.84	0.69	

Union St



0.78	0.79	0.96	AM
0.58	0.66	0.78	MID
0.86	0.90	0.71	PM
Movement			

West Approach PHF

AM Peak: 0.94
Mid-day Peak: 0.94
PM Peak: 0.85

South Approach PHF

AM Peak: 0.85
Mid-day Peak: 0.83
PM Peak: 0.89

Comments

Intersection: Union St @ Moore Ave
 GeoID: 10641
 Municipality: Waterloo
 Major Road: Union St

Intersection Control: Signalized
 Date: Wednesday, 13-Sep-23
 Name: Cam
 Weather: Cloudy/Dry

Approach Control	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
	Signalized			Signalized			Signalized			Signalized				
7:30 to 7:45	4	71	5	8	87	4	5	8	2	1	8	4	207	1,018 1,089 1,162 1,121 1,039 998 905 870 882
7:45 to 8:00	7	84	4	2	106	5	5	13	7	3	7	3	246	
8:00 to 8:15	7	92	4	5	119	7	8	12	6	5	12	7	284	
8:15 to 8:30	10	92	6	2	108	12	7	18	7	3	10	6	281	
8:30 to 8:45	6	78	3	6	127	9	5	17	7	5	9	6	278	
8:45 to 9:00	12	90	6	11	143	11	5	10	7	6	8	10	319	
9:00 to 9:15	7	72	8	5	96	6	10	11	3	6	12	7	243	
9:15 to 9:30	6	55	11	3	82	6	4	11	5	5	6	5	199	
9:30 to 9:45	8	87	7	2	82	3	2	14	10	4	13	5	237	
9:45 to 10:00	3	74	7	5	86	2	5	8	8	5	15	8	226	
10:00 to 10:15	5	75	6	6	76	2	5	3	3	5	14	8	208	
10:15 to 10:30	4	58	5	7	80	5	7	10	6	2	20	7	211	
AM Peak Hour 8:00 to 9:00	35	352	19	24	497	39	25	57	27	19	39	29	1,162	
# of trucks in peak	2	1	0	0	4	1	0	0	0	0	0	0	8	
# of heavies in peak	2	5	0	1	7	6	1	2	0	0	0	1	25	
% heavies (Total)	11%	2%	0%	4%	2%	18%	4%	4%	0%	0%	0%	3%	3%	
12:00 to 12:15	7	72	5	6	76	2	12	11	5	4	14	8	222	900 879 912 883 869
12:15 to 12:30	4	73	5	6	63	8	5	11	2	7	12	5	201	
12:30 to 12:45	6	84	8	8	86	2	3	10	7	7	17	5	243	
12:45 to 13:00	9	80	8	8	72	5	9	16	4	4	9	10	234	
13:00 to 13:15	5	63	7	4	57	4	13	8	9	4	22	5	201	
13:15 to 13:30	9	86	2	7	71	9	5	8	8	4	15	10	234	
13:30 to 13:45	4	80	6	7	74	6	6	16	1	3	9	2	214	
13:45 to 14:00	8	83	6	8	66	1	6	11	5	3	12	11	220	
Midday Peak Hour 12:30 to 13:30	29	313	25	27	286	20	30	42	28	19	63	30	912	
# of trucks in peak	1	3	0	1	1	1	0	0	0	0	3	0	10	
# of heavies in peak	0	3	1	0	5	0	0	0	0	0	0	0	9	
% heavies (Total)	3%	2%	4%	4%	2%	5%	0%	0%	0%	0%	5%	0%	2%	
15:00 to 15:15	17	119	7	3	74	3	5	18	10	11	13	6	286	1,133 1,170 1,265 1,314 1,358 1,382 1,320 1,256 1,151
15:15 to 15:30	3	105	6	8	78	6	11	13	8	6	18	9	271	
15:30 to 15:45	11	118	5	4	85	3	9	14	9	8	20	7	293	
15:45 to 16:00	5	117	9	4	83	3	4	15	8	6	16	13	283	
16:00 to 16:15	8	126	9	8	87	6	11	12	11	7	30	8	323	
16:15 to 16:30	8	152	7	8	101	9	11	18	13	8	22	9	366	
16:30 to 16:45	6	132	5	5	104	9	14	14	10	13	19	11	342	
16:45 to 17:00	4	108	3	4	110	11	9	17	9	11	25	16	327	
17:00 to 17:15	8	130	5	5	106	4	14	16	5	8	33	13	347	
17:15 to 17:30	9	123	7	2	90	6	6	14	11	5	16	15	304	
17:30 to 17:45	7	97	3	2	93	6	7	13	10	4	26	10	278	
17:45 to 18:00	2	87	3	6	63	5	10	16	1	6	15	8	222	
PM Peak Hour 16:15 to 17:15	26	522	20	22	421	33	48	65	37	40	99	49	1,382	
# of trucks in peak	0	2	0	0	0	2	0	0	0	0	0	1	5	
# of heavies in peak	0	2	0	0	4	0	0	0	0	0	0	0	6	
% heavies (Total)	0%	1%	0%	0%	1%	6%	0%	0%	0%	0%	0%	2%	1%	

Intersection: Union St @ Moore Ave

GeoID: 10641

Municipality: Waterloo

Major Road: Union St

Intersection Control: Signalized

Date: Wednesday, 13-Sep-23

Name: Cam

Weather: Cloudy/Dry

PEDESTRIAN CROSSING							
Time		Crossing Approach					
		East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30 to 7:45		6	3	1	1	11	
7:45 to 8:00		7	4	5	7	23	
8:00 to 8:15		6	0	1	1	8	
8:15 to 8:30		1	1	1	0	3	45
8:30 to 8:45		15	6	3	3	27	61
8:45 to 9:00		48	27	25	13	113	151
9:00 to 9:15		11	11	10	0	32	175
9:15 to 9:30		1	0	1	0	2	174
9:30 to 9:45		1	2	0	2	5	152
9:45 to 10:00		1	0	3	0	4	43
10:00 to 10:15		4	1	3	1	9	20
10:15 to 10:30		1	0	1	1	3	21
AM Peak Hour						240	
8:00 to 9:00		70	34	30	17	151	
12:00 to 12:15		2	1	1	1	5	
12:15 to 12:30		1	0	0	3	4	
12:30 to 12:45		0	2	1	3	6	
12:45 to 13:00		1	1	2	3	7	22
13:00 to 13:15		4	1	1	1	7	24
13:15 to 13:30		3	4	2	1	10	30
13:30 to 13:45		4	0	0	6	10	34
13:45 to 14:00		7	1	0	2	10	37
Midday Peak Hour						59	
12:30 to 13:30		8	8	6	8	30	
15:00 to 15:15		17	11	3	8	39	
15:15 to 15:30		68	14	16	14	112	
15:30 to 15:45		8	0	1	7	16	
15:45 to 16:00		1	2	3	3	9	176
16:00 to 16:15		6	2	2	0	10	147
16:15 to 16:30		8	2	3	4	17	52
16:30 to 16:45		2	3	1	4	10	46
16:45 to 17:00		2	4	3	8	17	54
17:00 to 17:15		6	7	6	7	26	70
17:15 to 17:30		1	5	1	2	9	62
17:30 to 17:45		5	4	1	1	11	63
17:45 to 18:00		3	1	1	0	5	51
PM Peak Hour						281	
16:15 to 17:15		18	16	13	23	70	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2	Start Date: 10/03/23														
3	Start Time: 12:00:00 AM														
4	Site Code: 1500														
5	Station ID: T12														
6	Location 1: Moore Ave S from Union St to John St E														
7	Location 2:														
8															
9	Date	Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi
10	10/03/23	12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11	10/03/23	12:15 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
12	10/03/23	12:30 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
13	10/03/23	12:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
14	10/03/23	01:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
15	10/03/23	01:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
16	10/03/23	01:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
17	10/03/23	01:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
18	10/03/23	02:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
19	10/03/23	02:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
20	10/03/23	02:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
21	10/03/23	02:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
22	10/03/23	03:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
23	10/03/23	03:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0
24	10/03/23	03:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
25	10/03/23	03:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
26	10/03/23	04:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
27	10/03/23	04:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
28	10/03/23	04:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
29	10/03/23	04:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
30	10/03/23	05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
31	10/03/23	05:15 AM	0	1	0	0	0	1	0	0	0	0	0	0	0
32	10/03/23	05:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
33	10/03/23	05:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
34	10/03/23	06:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
35	10/03/23	06:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
36	10/03/23	06:30 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
37	10/03/23	06:45 AM	0	5	1	0	0	0	0	0	0	0	0	0	0
38	10/03/23	07:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
39	10/03/23	07:15 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
40	10/03/23	07:30 AM	0	3	1	0	0	0	0	0	0	0	0	0	0
41	10/03/23	07:45 AM	0	12	0	0	0	0	0	0	0	0	0	0	0
42	10/03/23	08:00 AM	0	15	1	0	0	0	0	0	0	0	0	0	0
43	10/03/23	08:15 AM	0	19	2	0	1	0	0	1	0	0	0	0	0
44	10/03/23	08:30 AM	1	16	0	1	0	0	0	0	0	0	0	0	0
45	10/03/23	08:45 AM	0	25	2	1	0	0	0	0	0	0	0	0	0
46	10/03/23	09:00 AM	1	33	0	1	0	0	0	0	0	0	0	0	0
47	10/03/23	09:15 AM	0	31	0	0	4	1	0	0	0	0	0	0	0
48	10/03/23	09:30 AM	1	19	2	1	2	2	0	0	0	0	0	0	0
49	10/03/23	09:45 AM	1	16	1	0	2	0	0	0	0	0	0	0	0
50	10/03/23	10:00 AM	1	17	1	0	2	0	0	0	0	0	0	0	0
51	10/03/23	10:15 AM	0	17	4	0	0	0	0	0	0	0	0	0	0
52	10/03/23	10:30 AM	0	11	0	0	1	0	0	0	0	0	0	0	0
53	10/03/23	10:45 AM	0	14	1	0	0	0	0	0	0	0	0	0	0
54	10/03/23	11:00 AM	0	18	0	0	0	1	0	0	0	0	0	0	0
55	10/03/23	11:15 AM	0	27	2	0	1	0	0	0	0	0	0	0	0
56	10/03/23	11:30 AM	0	17	1	0	1	0	0	0	0	0	0	0	0
57	10/03/23	11:45 AM	0	21	0	1	0	0	0	0	0	0	0	0	0
58	10/03/23	12:00 PM	0	17	3	0	1	0	0	0	0	0	0	0	0
59	10/03/23	12:15 PM	0	16	1	0	1	0	0	0	0	0	0	0	0
60	10/03/23	12:30 PM	0	26	0	0	0	0	0	1	0	0	0	0	0
61	10/03/23	12:45 PM	0	16	0	0	1	0	0	0	0	0	0	0	0
62	10/03/23	01:00 PM	1	19	1	0	1	0	0	0	0	0	0	0	0
63	10/03/23	01:15 PM	0	20	0	0	1	0	0	0	0	0	0	0	0
64	10/03/23	01:30 PM	1	26	4	0	0	0	0	0	0	0	0	0	0
65	10/03/23	01:45 PM	0	19	3	0	0	0	0	0	0	0	0	0	0
66	10/03/23	02:00 PM	0	13	1	0	0	0	0	0	0	0	0	0	0
67	10/03/23	02:15 PM	1	14	1	0	1	0	0	0	0	0	0	0	0
68	10/03/23	02:30 PM	0	21	1	0	0	0	0	0	0	0	0	0	0
69	10/03/23	02:45 PM	0	17	2	1	0	0	0	0	0	0	0	0	0
70	10/03/23	03:00 PM	0	26	1	1	0	0	0	0	0	0	0	0	0
71	10/03/23	03:15 PM	0	20	4	0	2	0	0	0	0	0	0	0	0
72	10/03/23	03:30 PM	0	29	1	1	0	0	0	0	0	0	0	0	0
73	10/03/23	03:45 PM	0	21	2	1	3	0	0	0	0	0	0	0	0
74	10/03/23	04:00 PM	1	16	3	0	0	1	0	0	0	0	0	0	0
75	10/03/23	04:15 PM	1	25	2	0	0	0	0	0	0	0	0	0	0
76	10/03/23	04:30 PM	0	36	2	0	1	0	0	0	0	0	0	0	0
77	10/03/23	04:45 PM	1	24	1	0	0	0	0	0	0	0	0	0	0
78	10/03/23	05:00 PM	0	37	0	0	0	1	0	0	0	0	0	0	0
79	10/03/23	05:15 PM	0	46	3	1	0	0	0	0	0	0	0	0	0
80	10/03/23	05:30 PM	1	35	2	0	1	0	0	0	0	0	0	0	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
81	10/03/23	05:45 PM	0	29	2	0	0	0	0	0	0	0	0	0	0
82	10/03/23	06:00 PM	0	24	0	0	0	0	0	0	0	0	0	0	0
83	10/03/23	06:15 PM	0	23	1	0	0	0	0	0	0	0	0	0	0
84	10/03/23	06:30 PM	1	24	1	0	0	1	0	0	0	0	0	0	0
85	10/03/23	06:45 PM	1	14	0	0	0	0	0	0	0	0	0	0	0
86	10/03/23	07:00 PM	0	12	2	0	1	0	0	0	0	0	0	0	0
87	10/03/23	07:15 PM	0	20	1	0	0	1	0	0	0	0	0	0	0
88	10/03/23	07:30 PM	0	20	1	0	0	0	0	0	0	0	0	0	0
89	10/03/23	07:45 PM	0	18	1	0	0	0	0	0	0	0	0	0	0
90	10/03/23	08:00 PM	0	20	0	0	0	0	0	0	0	0	0	0	0
91	10/03/23	08:15 PM	0	16	1	0	0	0	0	0	0	0	0	0	0
92	10/03/23	08:30 PM	0	9	0	0	0	0	0	0	0	0	0	0	0
93	10/03/23	08:45 PM	0	11	0	0	0	0	0	0	0	0	0	0	0
94	10/03/23	09:00 PM	0	11	0	0	0	0	0	0	0	0	0	0	0
95	10/03/23	09:15 PM	0	10	1	0	0	0	0	0	0	0	0	0	0
96	10/03/23	09:30 PM	0	7	0	0	0	0	0	0	0	0	0	0	0
97	10/03/23	09:45 PM	0	6	0	0	0	0	0	0	0	0	0	0	0
98	10/03/23	10:00 PM	0	4	0	0	0	0	0	0	0	0	0	0	0
99	10/03/23	10:15 PM	0	7	0	0	0	0	0	0	0	0	0	0	0
100	10/03/23	10:30 PM	0	7	0	0	0	0	0	0	0	0	0	0	0
101	10/03/23	10:45 PM	0	5	0	0	0	0	0	0	0	0	0	0	0
102	10/03/23	11:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0
103	10/03/23	11:15 PM	0	5	1	0	0	0	0	0	0	0	0	0	0
104	10/03/23	11:30 PM	0	3	0	0	0	0	0	0	0	0	0	0	0
105	10/03/23	11:45 PM	1	1	0	0	0	0	0	0	0	0	0	0	0
106	10/04/23	12:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
107	10/04/23	12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
108	10/04/23	12:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
109	10/04/23	12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
110	10/04/23	01:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
111	10/04/23	01:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
112	10/04/23	01:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
113	10/04/23	01:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
114	10/04/23	02:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
115	10/04/23	02:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0
116	10/04/23	02:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
117	10/04/23	02:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
118	10/04/23	03:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
119	10/04/23	03:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
120	10/04/23	03:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
121	10/04/23	03:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
122	10/04/23	04:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
123	10/04/23	04:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
124	10/04/23	04:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
125	10/04/23	04:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
126	10/04/23	05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
127	10/04/23	05:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
128	10/04/23	05:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
129	10/04/23	05:45 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
130	10/04/23	06:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
131	10/04/23	06:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
132	10/04/23	06:30 AM	0	7	0	0	0	0	0	0	0	0	0	0	0
133	10/04/23	06:45 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
134	10/04/23	07:00 AM	0	5	1	0	0	0	0	0	0	0	0	0	0
135	10/04/23	07:15 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
136	10/04/23	07:30 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
137	10/04/23	07:45 AM	0	6	1	0	0	0	0	0	0	0	0	0	0
138	10/04/23	08:00 AM	0	15	2	1	0	0	0	1	0	0	0	0	0
139	10/04/23	08:15 AM	0	16	1	0	0	0	0	0	0	0	0	0	0
140	10/04/23	08:30 AM	0	24	0	1	0	0	0	0	0	0	0	0	0
141	10/04/23	08:45 AM	0	24	3	1	1	0	0	0	0	0	0	0	0
142	10/04/23	09:00 AM	1	21	2	1	1	0	0	0	0	0	0	0	0
143	10/04/23	09:15 AM	0	29	1	0	4	0	0	0	0	0	0	0	0
144	10/04/23	09:30 AM	0	19	2	1	2	0	0	0	0	0	0	0	0
145	10/04/23	09:45 AM	0	19	1	1	0	0	0	0	0	0	0	0	0
146	10/04/23	10:00 AM	0	13	0	0	0	0	0	0	0	0	0	0	0
147	10/04/23	10:15 AM	0	23	2	0	1	0	0	0	0	0	0	0	0
148	10/04/23	10:30 AM	0	17	2	0	0	0	0	0	0	0	0	0	0
149	10/04/23	10:45 AM	0	12	0	0	0	0	0	0	0	0	0	0	0
150	10/04/23	11:00 AM	1	21	1	0	1	0	0	0	0	0	0	0	0
151	10/04/23	11:15 AM	0	15	2	0	0	0	0	0	0	0	0	0	0
152	10/04/23	11:30 AM	1	14	0	0	0	0	0	0	0	0	0	0	0
153	10/04/23	11:45 AM	1	17	1	0	1	0	0	0	0	0	0	0	0
154	10/04/23	12:00 PM	1	16	3	0	1	0	0	0	0	0	0	0	0
155	10/04/23	12:15 PM	0	15	4	0	0	0	0	0	0	0	0	0	0
156	10/04/23	12:30 PM	0	22	2	0	0	0	0	0	0	0	0	0	0
157	10/04/23	12:45 PM	0	35	2	0	0	0	0	0	0	0	0	0	0
158	10/04/23	01:00 PM	0	17	1	0	4	0	0	0	0	0	0	0	0
159	10/04/23	01:15 PM	0	21	4	0	1	0	0	0	0	0	0	0	0
160	10/04/23	01:30 PM	0	21	1	0	0	0	0	0	0	0	0	0	0
161	10/04/23	01:45 PM	0	15	2	0	1	0	0	0	0	0	0	0	0

[illegible]

[illegible]

[illegible]

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
81	10/03/23	05:45 PM	1	51	1	0	0	0	0	0	0	0	0	0	0
82	10/03/23	06:00 PM	1	36	4	0	1	0	0	0	0	0	0	0	0
83	10/03/23	06:15 PM	0	34	2	0	0	0	0	0	0	0	0	0	0
84	10/03/23	06:30 PM	1	39	4	0	1	0	0	0	0	0	0	0	0
85	10/03/23	06:45 PM	1	27	3	0	0	0	0	0	0	0	0	0	0
86	10/03/23	07:00 PM	0	22	3	0	0	0	0	0	0	0	0	0	0
87	10/03/23	07:15 PM	1	34	1	0	0	0	0	0	0	0	0	0	0
88	10/03/23	07:30 PM	0	29	2	0	0	0	0	0	0	0	0	0	0
89	10/03/23	07:45 PM	0	26	2	0	0	0	0	1	0	0	0	0	0
90	10/03/23	08:00 PM	0	18	1	0	0	0	0	0	0	0	0	0	0
91	10/03/23	08:15 PM	0	13	2	0	0	0	0	0	0	0	0	0	0
92	10/03/23	08:30 PM	0	18	1	0	0	0	0	0	0	0	0	0	0
93	10/03/23	08:45 PM	0	12	1	0	0	0	0	0	0	0	0	0	0
94	10/03/23	09:00 PM	0	15	0	0	0	0	0	0	0	0	0	0	0
95	10/03/23	09:15 PM	0	11	2	0	0	0	0	0	0	0	0	0	0
96	10/03/23	09:30 PM	0	12	1	0	0	0	0	0	0	0	0	0	0
97	10/03/23	09:45 PM	0	10	2	0	0	0	0	0	0	0	0	0	0
98	10/03/23	10:00 PM	0	6	2	0	0	0	0	0	0	0	0	0	0
99	10/03/23	10:15 PM	0	9	1	0	0	0	0	0	0	0	0	0	0
100	10/03/23	10:30 PM	0	11	1	0	0	0	0	0	0	0	0	0	0
101	10/03/23	10:45 PM	0	9	1	0	0	0	0	0	0	0	0	0	0
102	10/03/23	11:00 PM	0	5	0	0	0	0	0	0	0	0	0	0	0
103	10/03/23	11:15 PM	0	7	0	0	0	0	0	0	0	0	0	0	0
104	10/03/23	11:30 PM	0	5	0	0	0	0	0	0	0	0	0	0	0
105	10/03/23	11:45 PM	0	4	0	0	0	0	0	0	0	0	0	0	0
106	10/04/23	12:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
107	10/04/23	12:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
108	10/04/23	12:30 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
109	10/04/23	12:45 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
110	10/04/23	01:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
111	10/04/23	01:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
112	10/04/23	01:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
113	10/04/23	01:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
114	10/04/23	02:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
115	10/04/23	02:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
116	10/04/23	02:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
117	10/04/23	02:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
118	10/04/23	03:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
119	10/04/23	03:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
120	10/04/23	03:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
121	10/04/23	03:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
122	10/04/23	04:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
123	10/04/23	04:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
124	10/04/23	04:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
125	10/04/23	04:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
126	10/04/23	05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
127	10/04/23	05:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0
128	10/04/23	05:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
129	10/04/23	05:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
130	10/04/23	06:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
131	10/04/23	06:15 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
132	10/04/23	06:30 AM	0	2	1	0	0	0	0	0	0	0	0	0	0
133	10/04/23	06:45 AM	0	4	1	0	0	0	0	0	0	0	0	0	0
134	10/04/23	07:00 AM	0	7	2	0	0	0	0	0	0	0	0	0	0
135	10/04/23	07:15 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
136	10/04/23	07:30 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
137	10/04/23	07:45 AM	0	7	0	0	2	0	0	0	0	0	0	0	0
138	10/04/23	08:00 AM	0	11	0	0	1	0	0	0	0	0	0	0	0
139	10/04/23	08:15 AM	0	16	1	1	0	0	0	0	0	0	0	0	0
140	10/04/23	08:30 AM	0	18	3	0	2	0	0	0	0	0	0	0	0
141	10/04/23	08:45 AM	0	24	2	0	0	1	0	0	0	0	0	0	0
142	10/04/23	09:00 AM	2	26	2	0	0	0	0	0	0	0	0	0	0
143	10/04/23	09:15 AM	1	23	4	0	1	0	0	0	0	0	0	0	0
144	10/04/23	09:30 AM	0	21	1	0	0	0	0	0	0	0	0	0	0
145	10/04/23	09:45 AM	0	19	2	0	0	0	0	0	0	0	0	0	0
146	10/04/23	10:00 AM	0	20	1	0	0	0	0	0	0	0	0	0	0
147	10/04/23	10:15 AM	1	19	3	0	2	0	0	0	0	0	0	0	0
148	10/04/23	10:30 AM	0	20	4	0	2	0	0	0	0	0	0	0	0
149	10/04/23	10:45 AM	1	25	3	0	0	0	0	0	0	0	0	0	0
150	10/04/23	11:00 AM	0	19	2	0	0	1	0	0	0	0	0	0	0
151	10/04/23	11:15 AM	0	22	1	0	0	0	0	0	0	0	0	0	0
152	10/04/23	11:30 AM	1	17	2	0	1	1	0	0	0	0	0	0	0
153	10/04/23	11:45 AM	0	18	2	0	0	0	0	0	0	0	0	0	0
154	10/04/23	12:00 PM	1	15	5	0	1	0	0	0	0	0	0	0	0
155	10/04/23	12:15 PM	0	19	4	0	2	0	0	0	0	0	0	0	0
156	10/04/23	12:30 PM	0	21	4	0	1	0	0	0	0	0	0	0	0
157	10/04/23	12:45 PM	0	18	3	0	0	0	0	0	0	0	0	0	0
158	10/04/23	01:00 PM	0	36	3	0	3	0	0	1	0	0	0	0	0
159	10/04/23	01:15 PM	0	16	2	0	1	0	0	0	0	0	0	0	0
160	10/04/23	01:30 PM	0	23	3	0	1	0	0	0	0	0	0	0	0
161	10/04/23	01:45 PM	0	18	2	1	1	0	0	0	0	0	0	0	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
162	10/04/23	02:00 PM	0	21	1	0	2	0	0	0	0	0	0	0	0
163	10/04/23	02:15 PM	0	25	2	0	2	0	0	0	0	0	0	0	0
164	10/04/23	02:30 PM	0	22	4	0	1	0	0	0	0	0	0	0	0
165	10/04/23	02:45 PM	1	20	4	0	0	0	0	0	0	0	0	0	0
166	10/04/23	03:00 PM	0	27	1	1	1	0	0	0	0	0	0	0	0
167	10/04/23	03:15 PM	2	26	2	0	1	0	0	0	0	0	0	0	0
168	10/04/23	03:30 PM	0	31	4	0	1	0	0	0	0	0	0	0	0
169	10/04/23	03:45 PM	1	43	1	1	0	0	0	0	0	0	0	0	0
170	10/04/23	04:00 PM	0	40	1	0	0	0	0	0	0	0	0	0	0
171	10/04/23	04:15 PM	0	43	4	0	1	0	0	0	0	0	0	0	0
172	10/04/23	04:30 PM	0	39	2	1	0	0	0	0	0	0	0	0	0
173	10/04/23	04:45 PM	0	41	4	0	0	0	0	0	0	0	0	0	0
174	10/04/23	05:00 PM	0	53	4	0	0	0	0	0	0	0	0	0	0
175	10/04/23	05:15 PM	0	34	5	0	1	0	0	0	0	0	0	0	0
176	10/04/23	05:30 PM	0	41	2	0	1	1	0	0	0	0	0	0	0
177	10/04/23	05:45 PM	0	48	4	0	0	0	0	0	0	0	0	0	0
178	10/04/23	06:00 PM	1	47	1	0	0	0	0	0	0	0	0	0	0
179	10/04/23	06:15 PM	0	32	2	0	1	0	0	0	0	0	0	0	0
180	10/04/23	06:30 PM	0	27	4	0	1	0	0	0	0	0	0	0	0
181	10/04/23	06:45 PM	0	31	2	0	2	0	0	0	0	0	0	0	0
182	10/04/23	07:00 PM	2	33	4	0	1	0	0	0	0	0	0	0	0
183	10/04/23	07:15 PM	0	30	1	0	1	0	0	0	0	0	0	0	0
184	10/04/23	07:30 PM	1	21	5	0	0	1	0	0	0	0	0	0	0
185	10/04/23	07:45 PM	0	21	1	0	0	0	0	0	0	0	0	0	0
186	10/04/23	08:00 PM	0	12	2	0	0	0	0	0	0	0	0	0	0
187	10/04/23	08:15 PM	0	11	0	0	0	0	0	0	0	0	0	0	0
188	10/04/23	08:30 PM	0	11	2	0	0	0	0	0	0	0	0	0	0
189	10/04/23	08:45 PM	0	18	2	0	0	0	0	0	0	0	0	0	0
190	10/04/23	09:00 PM	0	20	0	0	0	0	0	0	0	0	0	0	0
191	10/04/23	09:15 PM	0	14	0	0	1	0	0	0	0	0	0	0	0
192	10/04/23	09:30 PM	0	15	1	0	0	0	0	0	0	0	0	0	0
193	10/04/23	09:45 PM	0	16	2	0	0	0	0	0	0	0	0	0	0
194	10/04/23	10:00 PM	0	7	0	0	0	0	0	0	0	0	0	0	0
195	10/04/23	10:15 PM	0	3	0	0	0	0	0	0	0	0	0	0	0
196	10/04/23	10:30 PM	0	11	1	0	0	0	0	0	0	0	0	0	0
197	10/04/23	10:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0
198	10/04/23	11:00 PM	0	4	0	0	0	0	0	0	0	0	0	0	0
199	10/04/23	11:15 PM	0	7	0	0	0	0	0	0	0	0	0	0	0
200	10/04/23	11:30 PM	1	5	2	0	0	0	0	0	0	0	0	0	0
201	10/04/23	11:45 PM	0	5	1	0	0	0	0	0	0	0	0	0	0
202	10/05/23	12:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
203	10/05/23	12:15 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
204	10/05/23	12:30 AM	0	2	1	0	0	0	0	0	0	0	0	0	0
205	10/05/23	12:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
206	10/05/23	01:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
207	10/05/23	01:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
208	10/05/23	01:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
209	10/05/23	01:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
210	10/05/23	02:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
211	10/05/23	02:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
212	10/05/23	02:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
213	10/05/23	02:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
214	10/05/23	03:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
215	10/05/23	03:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
216	10/05/23	03:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
217	10/05/23	03:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
218	10/05/23	04:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
219	10/05/23	04:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
220	10/05/23	04:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
221	10/05/23	04:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
222	10/05/23	05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
223	10/05/23	05:15 AM	0	2	1	0	0	0	0	0	0	0	0	0	0
224	10/05/23	05:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
225	10/05/23	05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
226	10/05/23	06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
227	10/05/23	06:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
228	10/05/23	06:30 AM	0	3	1	0	0	0	0	0	0	0	0	0	0
229	10/05/23	06:45 AM	0	1	2	0	0	0	0	0	0	0	0	0	0
230	10/05/23	07:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
231	10/05/23	07:15 AM	0	5	0	0	1	0	0	0	0	0	0	0	0
232	10/05/23	07:30 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
233	10/05/23	07:45 AM	0	6	0	0	1	0	0	0	0	0	0	0	0
234	10/05/23	08:00 AM	0	15	1	0	0	1	0	0	0	0	0	0	0
235	10/05/23	08:15 AM	1	17	4	0	0	0	0	0	0	0	0	0	0
236	10/05/23	08:30 AM	0	22	3	0	0	1	0	0	0	0	0	0	0
237	10/05/23	08:45 AM	0	15	0	0	0	0	0	0	0	0	0	0	0
238	10/05/23	09:00 AM	0	25	2	0	0	0	0	0	0	0	0	0	0
239	10/05/23	09:15 AM	2	30	0	1	1	0	0	0	0	0	0	0	0
240	10/05/23	09:30 AM	1	29	3	0	0	1	0	0	0	0	0	0	0
241	10/05/23	09:45 AM	1	24	1	0	0	0	0	1	0	0	0	0	0
242	10/05/23	10:00 AM	0	13	2	0	1	0	0	0	0	0	0	0	0

[illegible]

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2	Start Date: 6/06/23														
3	Start Time: 12:00:00 AM														
4	Site Code: 1408														
5	Station ID:														
6	Location 1: Union St E between Devitt Ave S & Moore														
7	Location 2: Ave S														
8															
9	Date	Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi
10	6/06/23	12:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
11	6/06/23	12:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
12	6/06/23	12:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
13	6/06/23	12:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
14	6/06/23	01:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
15	6/06/23	01:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
16	6/06/23	01:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0
17	6/06/23	01:45 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
18	6/06/23	02:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
19	6/06/23	02:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
20	6/06/23	02:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
21	6/06/23	02:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
22	6/06/23	03:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
23	6/06/23	03:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
24	6/06/23	03:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
25	6/06/23	03:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
26	6/06/23	04:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
27	6/06/23	04:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
28	6/06/23	04:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
29	6/06/23	04:45 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
30	6/06/23	05:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
31	6/06/23	05:15 AM	0	4	1	0	0	0	0	0	0	0	0	0	0
32	6/06/23	05:30 AM	0	9	2	0	0	0	0	0	0	0	0	0	0
33	6/06/23	05:45 AM	0	14	3	0	1	0	0	0	0	0	0	0	0
34	6/06/23	06:00 AM	0	20	2	0	1	0	0	0	0	0	0	0	0
35	6/06/23	06:15 AM	0	36	4	0	0	0	1	0	0	0	0	0	0
36	6/06/23	06:30 AM	0	38	6	0	0	0	0	0	0	0	0	0	0
37	6/06/23	06:45 AM	0	33	8	0	1	0	2	0	0	0	0	0	0
38	6/06/23	07:00 AM	0	41	10	0	0	0	1	1	0	0	1	1	0
39	6/06/23	07:15 AM	0	60	14	0	1	0	0	0	0	0	0	0	0
40	6/06/23	07:30 AM	0	62	12	0	2	0	0	0	0	0	0	0	0
41	6/06/23	07:45 AM	0	63	12	0	2	0	2	1	2	0	0	1	0
42	6/06/23	08:00 AM	0	76	10	0	0	1	0	0	0	0	0	0	0
43	6/06/23	08:15 AM	0	94	17	0	0	0	2	2	0	0	0	0	0
44	6/06/23	08:30 AM	0	72	13	0	1	1	0	1	0	0	0	2	0
45	6/06/23	08:45 AM	0	70	11	0	1	0	0	0	0	0	0	0	0
46	6/06/23	09:00 AM	0	62	16	0	0	1	0	1	0	0	1	0	1
47	6/06/23	09:15 AM	0	66	15	0	0	0	0	4	1	0	0	1	0
48	6/06/23	09:30 AM	0	63	12	0	1	0	3	1	0	0	1	2	0
49	6/06/23	09:45 AM	1	42	11	0	2	0	0	3	0	0	0	0	0
50	6/06/23	10:00 AM	0	55	10	0	1	0	0	2	0	0	0	0	0
51	6/06/23	10:15 AM	0	65	14	0	0	1	1	3	0	0	0	0	0
52	6/06/23	10:30 AM	0	52	14	0	0	0	1	2	0	0	0	0	1
53	6/06/23	10:45 AM	0	63	13	0	1	0	0	1	0	1	0	1	2
54	6/06/23	11:00 AM	2	64	15	0	0	1	1	3	0	0	1	0	0
55	6/06/23	11:15 AM	0	48	9	0	1	0	1	0	0	0	1	0	0
56	6/06/23	11:30 AM	1	71	16	0	0	1	2	3	0	0	0	0	0
57	6/06/23	11:45 AM	0	68	9	0	0	0	1	2	0	0	0	0	0
58	6/06/23	12:00 PM	0	86	15	0	1	0	1	0	0	0	0	0	0
59	6/06/23	12:15 PM	0	68	8	0	0	0	1	1	0	0	0	1	0
60	6/06/23	12:30 PM	0	64	10	0	1	1	2	0	0	1	1	0	0
61	6/06/23	12:45 PM	3	57	15	0	1	0	0	0	0	1	0	0	0
62	6/06/23	01:00 PM	0	77	13	1	0	1	2	3	0	0	0	1	0
63	6/06/23	01:15 PM	0	71	11	0	2	0	2	0	0	0	0	0	0
64	6/06/23	01:30 PM	0	59	11	0	0	1	1	2	0	0	0	1	0
65	6/06/23	01:45 PM	0	58	11	0	1	0	2	2	0	0	0	0	0
66	6/06/23	02:00 PM	0	71	19	0	0	1	2	1	2	0	0	0	0
67	6/06/23	02:15 PM	0	76	14	0	1	0	1	2	0	1	0	1	0
68	6/06/23	02:30 PM	2	74	12	0	2	1	1	3	0	0	0	0	0
69	6/06/23	02:45 PM	3	68	11	0	1	0	2	2	0	0	1	0	0
70	6/06/23	03:00 PM	1	86	19	0	2	1	1	1	0	0	0	1	0
71	6/06/23	03:15 PM	2	115	13	0	0	0	4	3	0	0	0	0	0
72	6/06/23	03:30 PM	0	114	20	0	1	2	3	2	0	0	0	1	2
73	6/06/23	03:45 PM	0	126	28	0	0	0	2	3	0	0	2	3	0
74	6/06/23	04:00 PM	0	108	18	0	0	0	0	2	0	0	0	0	2
75	6/06/23	04:15 PM	0	117	14	0	0	0	2	3	0	0	0	1	0
76	6/06/23	04:30 PM	0	125	18	0	0	1	3	2	0	0	0	0	0
77	6/06/23	04:45 PM	0	116	23	0	1	0	3	4	0	0	0	0	1
78	6/06/23	05:00 PM	0	129	19	0	0	0	2	4	0	0	0	0	0
79	6/06/23	05:15 PM	0	106	15	0	0	0	1	3	0	1	0	1	0
80	6/06/23	05:30 PM	0	74	10	0	1	0	2	1	0	0	0	2	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
81	6/06/23	05:45 PM	2	64	8	0	0	0	0	1	0	0	0	0	0
82	6/06/23	06:00 PM	1	70	7	0	1	0	1	2	0	0	1	2	0
83	6/06/23	06:15 PM	0	52	7	0	0	0	2	1	0	0	0	1	0
84	6/06/23	06:30 PM	0	74	13	0	0	0	0	2	0	0	0	0	0
85	6/06/23	06:45 PM	0	70	9	0	0	0	1	0	0	0	0	0	0
86	6/06/23	07:00 PM	0	49	3	0	0	0	0	1	0	0	0	0	0
87	6/06/23	07:15 PM	0	55	3	0	1	0	0	1	0	0	0	1	0
88	6/06/23	07:30 PM	0	51	6	0	0	0	1	0	0	0	0	0	0
89	6/06/23	07:45 PM	0	46	2	0	0	0	0	0	0	0	0	0	0
90	6/06/23	08:00 PM	0	39	5	0	1	0	0	0	0	0	0	0	0
91	6/06/23	08:15 PM	0	34	2	0	0	0	0	0	0	0	0	1	0
92	6/06/23	08:30 PM	0	33	2	0	0	0	0	0	0	0	0	0	1
93	6/06/23	08:45 PM	3	25	2	0	0	0	0	0	0	0	0	0	0
94	6/06/23	09:00 PM	0	25	5	0	0	0	0	0	0	0	0	0	0
95	6/06/23	09:15 PM	0	31	2	0	0	0	0	0	0	0	0	0	0
96	6/06/23	09:30 PM	0	20	6	0	0	0	0	0	0	0	0	0	0
97	6/06/23	09:45 PM	0	22	1	0	1	0	0	0	0	0	0	0	0
98	6/06/23	10:00 PM	0	26	2	0	0	0	0	0	0	0	0	0	0
99	6/06/23	10:15 PM	0	21	0	0	1	0	0	1	0	0	0	0	0
100	6/06/23	10:30 PM	0	28	1	0	0	0	0	1	0	0	0	0	0
101	6/06/23	10:45 PM	0	8	0	0	0	0	0	0	0	0	0	0	0
102	6/06/23	11:00 PM	0	14	1	0	0	0	0	0	0	0	0	0	0
103	6/06/23	11:15 PM	0	11	0	0	0	0	0	0	0	0	0	0	0
104	6/06/23	11:30 PM	0	7	2	0	1	0	0	0	0	0	0	0	0
105	6/06/23	11:45 PM	0	7	1	0	0	0	0	0	0	0	0	0	0
106	6/07/23	12:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
107	6/07/23	12:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
108	6/07/23	12:30 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
109	6/07/23	12:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
110	6/07/23	01:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
111	6/07/23	01:15 AM	0	1	1	0	0	0	0	0	0	0	0	0	0
112	6/07/23	01:30 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
113	6/07/23	01:45 AM	0	2	1	0	0	0	0	0	0	0	0	0	0
114	6/07/23	02:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
115	6/07/23	02:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
116	6/07/23	02:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
117	6/07/23	02:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
118	6/07/23	03:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
119	6/07/23	03:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
120	6/07/23	03:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
121	6/07/23	03:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
122	6/07/23	04:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
123	6/07/23	04:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
124	6/07/23	04:30 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
125	6/07/23	04:45 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
126	6/07/23	05:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
127	6/07/23	05:15 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
128	6/07/23	05:30 AM	0	10	2	0	0	0	0	0	0	0	0	0	0
129	6/07/23	05:45 AM	0	11	3	0	0	0	0	0	0	0	0	0	0
130	6/07/23	06:00 AM	0	31	4	0	0	0	0	0	0	0	0	0	0
131	6/07/23	06:15 AM	0	30	9	0	1	0	0	0	0	0	0	0	0
132	6/07/23	06:30 AM	0	38	6	0	0	0	0	0	0	0	0	0	0
133	6/07/23	06:45 AM	0	32	6	0	1	0	0	1	0	0	0	0	0
134	6/07/23	07:00 AM	0	46	12	0	1	0	0	0	0	0	0	0	0
135	6/07/23	07:15 AM	0	59	8	0	0	0	1	1	0	0	0	0	0
136	6/07/23	07:30 AM	0	53	9	0	1	1	2	0	0	0	0	0	0
137	6/07/23	07:45 AM	1	70	12	0	0	1	0	1	0	0	0	0	2
138	6/07/23	08:00 AM	0	58	14	0	2	2	0	1	1	0	2	1	0
139	6/07/23	08:15 AM	0	84	16	0	0	0	1	2	1	0	0	0	0
140	6/07/23	08:30 AM	0	71	10	0	1	0	2	4	0	0	0	0	0
141	6/07/23	08:45 AM	0	81	11	0	2	0	0	3	0	0	0	0	0
142	6/07/23	09:00 AM	0	65	17	0	0	1	0	3	0	0	0	0	0
143	6/07/23	09:15 AM	0	53	12	0	1	1	2	1	0	0	0	1	2
144	6/07/23	09:30 AM	0	55	16	0	0	1	2	3	0	1	0	1	0
145	6/07/23	09:45 AM	0	60	10	0	0	0	1	2	0	0	0	0	1
146	6/07/23	10:00 AM	0	58	14	0	1	0	2	0	0	0	0	0	0
147	6/07/23	10:15 AM	0	70	11	0	0	0	3	1	0	0	2	1	1
148	6/07/23	10:30 AM	0	54	12	0	0	1	3	1	0	0	3	0	0
149	6/07/23	10:45 AM	3	63	15	0	0	1	2	0	0	0	0	0	0
150	6/07/23	11:00 AM	0	77	16	0	1	0	1	0	0	0	1	1	0
151	6/07/23	11:15 AM	0	59	9	0	1	0	2	1	0	0	0	0	0
152	6/07/23	11:30 AM	0	61	13	1	0	0	1	1	0	2	0	1	0
153	6/07/23	11:45 AM	0	68	11	0	0	0	3	3	0	0	0	0	0
154	6/07/23	12:00 PM	0	70	11	0	0	0	3	2	0	0	2	0	0
155	6/07/23	12:15 PM	0	56	11	0	1	0	1	0	0	0	0	1	0
156	6/07/23	12:30 PM	0	78	15	0	0	0	2	4	0	0	0	1	0
157	6/07/23	12:45 PM	0	57	10	0	2	0	0	1	0	0	0	0	2
158	6/07/23	01:00 PM	0	61	11	0	1	1	1	1	0	0	0	1	0
159	6/07/23	01:15 PM	0	78	12	0	1	0	4	2	0	0	0	0	0
160	6/07/23	01:30 PM	0	64	13	0	0	0	1	0	2	0	0	0	2
161	6/07/23	01:45 PM	0	61	12	0	1	0	1	2	0	0	0	1	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
162	6/07/23	02:00 PM	0	84	12	0	1	0	0	1	0	1	0	1	0
163	6/07/23	02:15 PM	0	69	11	0	0	0	1	2	0	0	0	0	0
164	6/07/23	02:30 PM	0	76	15	0	1	0	1	1	0	0	0	0	2
165	6/07/23	02:45 PM	0	82	15	0	0	1	0	0	0	0	0	1	0
166	6/07/23	03:00 PM	0	92	24	0	1	0	1	1	0	0	2	1	2
167	6/07/23	03:15 PM	0	117	13	0	0	1	2	2	0	1	2	0	2
168	6/07/23	03:30 PM	0	94	17	0	1	1	1	1	1	1	1	1	0
169	6/07/23	03:45 PM	0	118	26	0	0	1	0	2	0	0	0	1	0
170	6/07/23	04:00 PM	2	126	15	0	1	0	1	2	0	0	0	2	2
171	6/07/23	04:15 PM	0	111	28	0	0	1	4	3	0	0	0	1	0
172	6/07/23	04:30 PM	2	130	17	0	0	1	2	1	2	1	1	0	2
173	6/07/23	04:45 PM	0	105	26	0	1	0	2	3	0	1	0	0	0
174	6/07/23	05:00 PM	0	138	10	0	2	0	0	3	0	0	0	0	0
175	6/07/23	05:15 PM	0	106	14	0	0	0	3	2	0	0	0	2	0
176	6/07/23	05:30 PM	0	102	14	0	1	1	2	2	0	0	2	1	0
177	6/07/23	05:45 PM	0	82	12	0	0	0	2	1	0	0	0	2	0
178	6/07/23	06:00 PM	0	76	11	0	1	0	1	2	0	0	0	1	0
179	6/07/23	06:15 PM	0	64	13	0	0	0	2	0	0	0	0	0	0
180	6/07/23	06:30 PM	0	67	9	0	1	0	0	2	0	0	0	0	0
181	6/07/23	06:45 PM	0	85	6	0	1	0	1	0	0	0	0	0	0
182	6/07/23	07:00 PM	0	43	6	0	0	0	0	0	2	0	0	0	0
183	6/07/23	07:15 PM	0	40	2	0	1	0	0	1	0	1	0	0	1
184	6/07/23	07:30 PM	0	39	3	0	0	0	0	0	0	0	0	0	0
185	6/07/23	07:45 PM	0	42	2	0	0	0	0	1	0	0	0	0	0
186	6/07/23	08:00 PM	0	44	2	0	0	0	0	0	0	1	0	0	0
187	6/07/23	08:15 PM	0	34	3	0	0	1	0	0	0	0	2	0	0
188	6/07/23	08:30 PM	0	22	3	0	0	0	1	0	0	0	0	0	0
189	6/07/23	08:45 PM	0	23	1	0	0	0	0	0	0	1	0	0	0
190	6/07/23	09:00 PM	0	31	3	0	0	0	0	0	0	0	0	0	0
191	6/07/23	09:15 PM	0	23	1	0	0	0	0	0	0	0	0	0	0
192	6/07/23	09:30 PM	0	25	2	0	0	0	0	0	0	0	0	0	0
193	6/07/23	09:45 PM	0	27	2	0	2	0	0	2	0	0	0	0	0
194	6/07/23	10:00 PM	0	23	1	0	0	0	2	0	0	0	0	0	0
195	6/07/23	10:15 PM	0	13	0	0	0	0	0	0	0	0	0	0	0
196	6/07/23	10:30 PM	0	19	1	0	0	0	0	0	0	0	0	0	0
197	6/07/23	10:45 PM	0	21	4	0	2	0	0	0	0	0	0	0	0
198	6/07/23	11:00 PM	0	14	4	0	0	0	0	0	0	0	0	0	0
199	6/07/23	11:15 PM	0	6	2	0	1	0	1	0	0	0	0	0	0
200	6/07/23	11:30 PM	0	9	1	0	1	0	0	1	0	0	0	0	0
201	6/07/23	11:45 PM	0	7	1	0	1	0	0	0	0	0	0	0	0
202	6/08/23	12:00 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
203	6/08/23	12:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
204	6/08/23	12:30 AM	0	2	1	0	0	0	0	0	0	0	0	0	0
205	6/08/23	12:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
206	6/08/23	01:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
207	6/08/23	01:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
208	6/08/23	01:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
209	6/08/23	01:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
210	6/08/23	02:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
211	6/08/23	02:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
212	6/08/23	02:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
213	6/08/23	02:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
214	6/08/23	03:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
215	6/08/23	03:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
216	6/08/23	03:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
217	6/08/23	03:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
218	6/08/23	04:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
219	6/08/23	04:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
220	6/08/23	04:30 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
221	6/08/23	04:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
222	6/08/23	05:00 AM	0	4	1	0	0	0	0	0	0	0	0	0	0
223	6/08/23	05:15 AM	0	7	1	0	0	0	0	0	0	0	0	0	0
224	6/08/23	05:30 AM	0	11	1	0	0	0	0	0	0	0	0	0	0
225	6/08/23	05:45 AM	0	21	4	0	1	0	0	1	0	0	0	0	0
226	6/08/23	06:00 AM	0	19	6	0	1	0	0	0	0	0	0	0	0
227	6/08/23	06:15 AM	0	33	8	0	0	0	0	0	0	0	0	0	0
228	6/08/23	06:30 AM	0	44	8	0	1	0	0	0	0	0	0	0	0
229	6/08/23	06:45 AM	0	38	10	0	0	0	0	0	0	0	0	0	0
230	6/08/23	07:00 AM	0	47	8	0	0	0	1	0	0	1	1	0	0
231	6/08/23	07:15 AM	0	57	13	0	0	0	1	0	0	0	0	0	0
232	6/08/23	07:30 AM	0	65	9	0	1	1	0	0	1	0	0	0	0
233	6/08/23	07:45 AM	0	71	14	0	0	2	0	0	0	0	0	1	0
234	6/08/23	08:00 AM	0	75	15	0	2	0	3	0	0	0	0	0	0
235	6/08/23	08:15 AM	0	68	13	0	1	0	1	3	0	0	0	1	0
236	6/08/23	08:30 AM	0	77	10	0	2	0	0	1	0	0	0	0	0
237	6/08/23	08:45 AM	0	70	14	0	1	2	2	1	0	0	0	1	2
238	6/08/23	09:00 AM	3	70	9	0	0	0	0	2	0	0	0	0	0
239	6/08/23	09:15 AM	0	55	12	0	1	1	2	2	0	0	0	2	0
240	6/08/23	09:30 AM	0	68	15	0	0	0	1	2	0	0	2	0	0
241	6/08/23	09:45 AM	0	76	14	0	0	1	0	0	0	0	0	2	0
242	6/08/23	10:00 AM	0	62	11	0	0	0	1	1	0	0	0	1	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
243	6/08/23	10:15 AM	0	48	10	0	1	0	0	1	0	0	0	1	2
244	6/08/23	10:30 AM	0	63	15	0	1	1	1	2	0	0	0	1	0
245	6/08/23	10:45 AM	1	55	13	0	0	0	0	2	4	0	0	0	0
246	6/08/23	11:00 AM	3	62	7	0	2	0	1	2	1	0	0	0	0
247	6/08/23	11:15 AM	0	76	9	0	1	0	2	0	0	0	0	0	0
248	6/08/23	11:30 AM	0	65	11	0	0	0	1	1	0	0	0	1	2
249	6/08/23	11:45 AM	0	76	21	0	0	0	0	2	0	0	0	0	0
250	6/08/23	12:00 PM	0	81	18	0	2	0	0	0	0	0	0	1	0
251	6/08/23	12:15 PM	0	85	16	0	0	2	1	1	0	1	0	0	0
252	6/08/23	12:30 PM	0	69	12	0	0	0	2	1	0	0	0	0	0
253	6/08/23	12:45 PM	0	85	12	0	2	1	0	1	0	0	0	0	0
254	6/08/23	01:00 PM	0	76	15	0	1	0	1	0	0	0	0	0	0
255	6/08/23	01:15 PM	0	67	13	1	0	0	1	2	1	0	2	0	0
256	6/08/23	01:30 PM	0	69	14	0	1	1	0	2	0	0	0	0	1
257	6/08/23	01:45 PM	1	73	15	0	1	0	1	1	0	0	2	1	0
258	6/08/23	02:00 PM	0	70	17	0	0	0	1	2	0	0	2	0	1
259	6/08/23	02:15 PM	3	100	17	0	0	0	2	1	0	1	1	0	0
260	6/08/23	02:30 PM	0	80	15	0	0	0	1	1	2	0	0	1	0
261	6/08/23	02:45 PM	0	85	13	0	0	1	1	1	0	0	0	0	0
262	6/08/23	03:00 PM	0	75	16	0	0	0	3	2	0	0	2	0	0
263	6/08/23	03:15 PM	0	113	18	0	1	1	3	4	0	0	4	0	0
264	6/08/23	03:30 PM	2	101	19	0	0	0	2	3	0	0	0	2	0
265	6/08/23	03:45 PM	0	119	23	0	1	0	3	2	0	0	0	0	0
266	6/08/23	04:00 PM	0	112	19	0	0	0	4	3	0	0	0	0	1
267	6/08/23	04:15 PM	0	131	28	0	1	0	3	2	0	0	0	0	0
268	6/08/23	04:30 PM	0	140	25	0	0	0	2	4	1	0	2	0	0
269	6/08/23	04:45 PM	1	116	16	0	0	1	1	3	0	0	0	1	0
270	6/08/23	05:00 PM	0	114	12	0	1	0	2	3	0	0	0	0	0
271	6/08/23	05:15 PM	0	126	13	0	0	0	3	2	0	0	1	1	0
272	6/08/23	05:30 PM	0	96	12	0	0	0	1	1	0	0	2	0	0
273	6/08/23	05:45 PM	0	88	13	0	0	0	0	3	0	0	1	0	0
274	6/08/23	06:00 PM	0	83	11	0	0	0	2	1	1	0	2	0	0
275	6/08/23	06:15 PM	0	68	4	0	1	0	2	0	0	0	0	2	0
276	6/08/23	06:30 PM	0	65	8	0	0	0	0	0	0	0	2	0	1
277	6/08/23	06:45 PM	0	76	4	0	0	1	1	1	0	0	1	0	0
278	6/08/23	07:00 PM	0	60	4	0	1	1	2	2	0	1	0	0	0
279	6/08/23	07:15 PM	0	55	3	0	0	1	1	0	1	0	0	0	0
280	6/08/23	07:30 PM	0	41	5	0	0	0	1	1	0	0	0	0	0
281	6/08/23	07:45 PM	0	42	4	0	0	0	0	1	0	0	0	0	0
282	6/08/23	08:00 PM	0	52	2	0	0	0	0	1	0	0	2	0	0
283	6/08/23	08:15 PM	3	34	5	0	0	0	0	0	1	0	0	0	0
284	6/08/23	08:30 PM	0	41	3	0	0	1	1	0	0	0	0	0	3
285	6/08/23	08:45 PM	0	35	2	0	0	0	0	0	0	0	0	0	0
286	6/08/23	09:00 PM	0	36	2	0	1	0	0	0	0	0	0	0	0
287	6/08/23	09:15 PM	0	40	3	0	0	0	0	0	0	0	0	0	0
288	6/08/23	09:30 PM	0	27	2	0	0	0	0	0	0	0	0	0	0
289	6/08/23	09:45 PM	0	25	1	0	2	0	0	0	0	0	0	0	0
290	6/08/23	10:00 PM	0	26	2	0	0	0	0	1	0	0	0	0	0
291	6/08/23	10:15 PM	0	15	1	0	0	0	0	0	0	0	0	0	0
292	6/08/23	10:30 PM	0	24	1	0	1	0	0	0	0	0	0	0	0
293	6/08/23	10:45 PM	0	11	2	0	0	0	0	0	0	0	0	0	0
294	6/08/23	11:00 PM	0	7	1	0	1	0	0	0	0	0	0	0	0
295	6/08/23	11:15 PM	0	6	0	0	0	0	0	0	0	0	0	0	0
296	6/08/23	11:30 PM	0	10	1	0	0	0	0	0	0	0	0	0	0
297	6/08/23	11:45 PM	0	7	1	0	0	0	0	0	0	0	0	0	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	WB														
2	Start Date: 6/06/23														
3	Start Time: 12:00:00 AM														
4	Site Code: 1408														
5	Station ID:														
6	Location 1: Union St E between Devitt Ave S & Moore														
7	Location 2: Ave S														
8															
9	Date	Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi
10	6/06/23	12:00 AM	0	4	1	0	0	0	0	0	0	0	0	0	0
11	6/06/23	12:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
12	6/06/23	12:30 AM	0	4	1	0	0	0	0	0	0	0	0	0	0
13	6/06/23	12:45 AM	0	1	2	0	0	0	0	0	0	0	0	0	0
14	6/06/23	01:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
15	6/06/23	01:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
16	6/06/23	01:30 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
17	6/06/23	01:45 AM	0	0	4	0	0	0	0	0	0	0	0	0	0
18	6/06/23	02:00 AM	0	2	1	0	0	0	0	0	0	0	0	0	0
19	6/06/23	02:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
20	6/06/23	02:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0
21	6/06/23	02:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
22	6/06/23	03:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
23	6/06/23	03:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
24	6/06/23	03:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
25	6/06/23	03:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	0
26	6/06/23	04:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
27	6/06/23	04:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
28	6/06/23	04:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
29	6/06/23	04:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
30	6/06/23	05:00 AM	0	2	1	0	0	0	0	0	0	0	0	0	0
31	6/06/23	05:15 AM	0	2	1	0	0	0	0	0	0	0	0	0	0
32	6/06/23	05:30 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
33	6/06/23	05:45 AM	0	14	4	0	0	0	0	0	0	0	0	0	0
34	6/06/23	06:00 AM	0	23	9	0	0	0	0	0	0	0	0	0	0
35	6/06/23	06:15 AM	1	31	8	0	0	0	0	0	0	0	0	0	0
36	6/06/23	06:30 AM	0	46	13	1	0	0	0	0	0	0	0	0	0
37	6/06/23	06:45 AM	0	64	5	0	3	0	0	0	0	0	0	0	0
38	6/06/23	07:00 AM	0	47	13	0	0	0	1	1	0	0	0	1	1
39	6/06/23	07:15 AM	0	55	13	0	0	0	0	0	0	0	0	2	0
40	6/06/23	07:30 AM	0	63	11	3	1	0	3	0	0	0	0	0	0
41	6/06/23	07:45 AM	1	88	25	1	2	0	0	1	0	0	0	0	0
42	6/06/23	08:00 AM	0	118	38	0	1	0	0	1	0	0	1	0	0
43	6/06/23	08:15 AM	2	116	31	1	2	0	0	2	2	0	0	0	0
44	6/06/23	08:30 AM	0	114	26	1	0	3	0	0	2	0	1	0	0
45	6/06/23	08:45 AM	1	92	18	1	0	0	2	3	0	0	0	0	0
46	6/06/23	09:00 AM	0	101	22	0	1	0	0	2	0	0	1	0	0
47	6/06/23	09:15 AM	0	83	20	1	0	0	0	0	0	2	1	0	0
48	6/06/23	09:30 AM	0	67	19	0	1	0	3	1	1	0	1	0	0
49	6/06/23	09:45 AM	0	70	19	0	0	0	0	2	0	0	0	1	0
50	6/06/23	10:00 AM	1	53	13	1	1	0	1	0	0	0	0	0	2
51	6/06/23	10:15 AM	0	56	16	0	1	0	2	1	1	2	0	0	1
52	6/06/23	10:30 AM	1	60	14	1	3	0	0	0	0	0	0	0	0
53	6/06/23	10:45 AM	0	69	18	0	0	0	2	1	1	0	1	0	2
54	6/06/23	11:00 AM	0	50	13	0	1	0	0	0	0	2	0	0	0
55	6/06/23	11:15 AM	0	73	20	0	0	0	0	1	0	0	0	0	0
56	6/06/23	11:30 AM	1	59	16	0	1	0	0	1	0	0	1	0	0
57	6/06/23	11:45 AM	0	57	11	1	0	0	0	0	0	0	0	0	0
58	6/06/23	12:00 PM	1	59	14	1	0	0	0	1	0	0	1	0	0
59	6/06/23	12:15 PM	0	66	13	0	0	0	0	1	2	0	0	0	0
60	6/06/23	12:30 PM	0	60	12	0	2	1	0	0	2	0	1	0	0
61	6/06/23	12:45 PM	2	68	15	0	1	3	0	1	0	0	0	0	0
62	6/06/23	01:00 PM	0	74	17	0	1	0	0	0	0	0	0	0	1
63	6/06/23	01:15 PM	0	61	11	1	0	0	0	1	2	0	0	0	0
64	6/06/23	01:30 PM	0	60	18	0	2	2	0	2	0	0	2	0	0
65	6/06/23	01:45 PM	0	58	15	0	0	0	0	2	0	0	0	0	0
66	6/06/23	02:00 PM	0	58	15	0	0	0	0	1	0	0	2	0	0
67	6/06/23	02:15 PM	1	65	14	0	1	0	1	0	0	0	1	0	0
68	6/06/23	02:30 PM	1	67	14	0	1	0	0	1	1	0	1	1	0
69	6/06/23	02:45 PM	0	90	20	0	1	0	0	1	1	0	0	0	0
70	6/06/23	03:00 PM	0	90	24	0	0	0	0	0	0	0	2	0	3
71	6/06/23	03:15 PM	2	100	20	1	0	0	1	1	0	0	1	0	0
72	6/06/23	03:30 PM	0	75	19	1	0	0	3	1	0	0	0	0	0
73	6/06/23	03:45 PM	0	78	15	0	0	0	0	0	0	2	0	0	0
74	6/06/23	04:00 PM	1	96	32	0	0	0	0	0	0	0	0	0	0
75	6/06/23	04:15 PM	2	96	18	0	2	1	1	0	0	0	1	0	0
76	6/06/23	04:30 PM	0	106	36	0	0	0	0	2	0	0	1	0	0
77	6/06/23	04:45 PM	1	125	20	0	0	0	0	0	0	0	0	1	0
78	6/06/23	05:00 PM	1	113	19	0	2	0	0	1	1	0	1	0	0
79	6/06/23	05:15 PM	1	92	21	0	0	0	0	1	0	0	0	1	0
80	6/06/23	05:30 PM	0	88	13	0	1	0	0	0	0	0	0	0	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
81	6/06/23	05:45 PM	0	79	11	0	0	0	0	1	0	0	1	1	2
82	6/06/23	06:00 PM	1	100	16	0	0	2	0	1	0	0	0	0	0
83	6/06/23	06:15 PM	0	66	18	0	0	0	0	0	0	0	0	0	2
84	6/06/23	06:30 PM	0	75	12	0	0	0	2	1	0	0	0	0	0
85	6/06/23	06:45 PM	0	54	12	1	0	0	0	0	2	0	0	0	0
86	6/06/23	07:00 PM	0	45	12	1	0	0	2	0	0	0	0	0	0
87	6/06/23	07:15 PM	0	39	10	0	0	0	0	0	0	2	1	0	0
88	6/06/23	07:30 PM	0	41	7	1	0	0	0	0	0	0	0	2	0
89	6/06/23	07:45 PM	0	41	5	0	0	0	0	0	1	0	0	0	0
90	6/06/23	08:00 PM	1	37	9	0	0	0	0	0	0	0	0	0	0
91	6/06/23	08:15 PM	0	29	4	0	0	3	1	0	0	0	0	0	0
92	6/06/23	08:30 PM	0	38	9	0	0	0	0	0	1	0	0	0	0
93	6/06/23	08:45 PM	1	36	3	0	0	0	0	0	0	0	0	0	0
94	6/06/23	09:00 PM	0	32	3	0	0	0	0	0	0	0	0	0	0
95	6/06/23	09:15 PM	0	21	6	0	0	0	0	0	0	0	0	0	0
96	6/06/23	09:30 PM	0	31	6	0	0	0	0	0	0	0	0	0	0
97	6/06/23	09:45 PM	0	22	1	0	0	0	0	0	0	0	0	0	0
98	6/06/23	10:00 PM	0	16	4	0	0	0	0	0	0	0	0	0	0
99	6/06/23	10:15 PM	0	16	2	1	0	0	0	0	0	0	0	0	0
100	6/06/23	10:30 PM	0	11	0	0	0	0	0	0	0	0	0	0	0
101	6/06/23	10:45 PM	2	12	2	0	0	0	0	0	0	0	0	0	0
102	6/06/23	11:00 PM	0	17	0	0	0	0	0	0	0	0	0	0	0
103	6/06/23	11:15 PM	0	14	1	0	0	0	0	0	0	0	0	0	0
104	6/06/23	11:30 PM	0	12	2	0	0	0	0	0	0	0	0	0	0
105	6/06/23	11:45 PM	0	5	2	0	0	0	0	0	0	0	0	0	0
106	6/07/23	12:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
107	6/07/23	12:15 AM	0	3	1	0	0	0	0	0	0	0	0	0	0
108	6/07/23	12:30 AM	0	7	0	0	1	0	0	0	0	0	0	0	0
109	6/07/23	12:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
110	6/07/23	01:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
111	6/07/23	01:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
112	6/07/23	01:30 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
113	6/07/23	01:45 AM	0	1	2	0	0	0	0	0	0	0	0	0	0
114	6/07/23	02:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
115	6/07/23	02:15 AM	0	0	2	0	0	0	0	0	0	0	0	0	0
116	6/07/23	02:30 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
117	6/07/23	02:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
118	6/07/23	03:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
119	6/07/23	03:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
120	6/07/23	03:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
121	6/07/23	03:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
122	6/07/23	04:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
123	6/07/23	04:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
124	6/07/23	04:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
125	6/07/23	04:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
126	6/07/23	05:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
127	6/07/23	05:15 AM	0	5	0	0	0	0	0	0	0	0	0	0	0
128	6/07/23	05:30 AM	0	5	1	0	0	0	0	0	0	0	0	0	0
129	6/07/23	05:45 AM	0	12	1	0	0	0	0	0	0	0	0	0	0
130	6/07/23	06:00 AM	0	14	2	0	0	0	0	0	0	0	0	0	0
131	6/07/23	06:15 AM	0	28	11	1	0	0	0	0	0	0	0	0	0
132	6/07/23	06:30 AM	0	37	7	0	0	0	0	0	0	0	0	0	0
133	6/07/23	06:45 AM	0	41	18	0	1	0	0	0	0	0	0	0	0
134	6/07/23	07:00 AM	0	45	12	1	0	0	1	0	0	0	0	1	0
135	6/07/23	07:15 AM	0	61	17	0	1	0	0	1	0	0	2	0	0
136	6/07/23	07:30 AM	0	96	17	0	1	0	0	3	0	0	4	1	0
137	6/07/23	07:45 AM	1	97	27	1	2	0	0	1	0	0	4	0	0
138	6/07/23	08:00 AM	1	108	25	0	0	0	1	0	0	0	1	0	0
139	6/07/23	08:15 AM	0	98	28	0	0	0	2	0	0	0	0	0	0
140	6/07/23	08:30 AM	0	120	27	1	1	0	0	0	0	0	0	0	0
141	6/07/23	08:45 AM	0	109	18	0	0	0	0	3	1	0	1	2	0
142	6/07/23	09:00 AM	1	95	26	1	0	0	0	2	0	2	0	0	0
143	6/07/23	09:15 AM	1	66	20	1	1	0	0	1	0	2	1	0	2
144	6/07/23	09:30 AM	1	79	20	1	0	0	2	1	0	0	1	0	0
145	6/07/23	09:45 AM	0	54	15	0	0	0	0	1	1	0	0	1	0
146	6/07/23	10:00 AM	0	60	14	0	0	0	0	0	0	0	0	1	2
147	6/07/23	10:15 AM	0	60	11	1	1	2	0	0	0	0	1	0	0
148	6/07/23	10:30 AM	0	68	18	0	0	0	0	0	0	0	1	0	0
149	6/07/23	10:45 AM	0	57	12	0	0	0	0	1	0	0	0	0	0
150	6/07/23	11:00 AM	0	42	14	0	0	0	0	0	0	2	0	0	4
151	6/07/23	11:15 AM	0	55	14	1	0	0	0	0	1	0	0	0	1
152	6/07/23	11:30 AM	0	69	17	1	1	0	0	1	0	0	1	1	0
153	6/07/23	11:45 AM	0	66	13	0	2	0	0	0	1	0	0	0	0
154	6/07/23	12:00 PM	0	63	16	1	0	0	0	0	0	0	2	2	0
155	6/07/23	12:15 PM	0	67	18	0	1	3	0	0	1	2	0	0	0
156	6/07/23	12:30 PM	0	63	15	0	1	0	0	1	0	0	0	0	0
157	6/07/23	12:45 PM	0	71	20	0	2	0	0	1	0	0	1	0	1
158	6/07/23	01:00 PM	0	60	13	1	2	0	3	0	0	0	0	0	0
159	6/07/23	01:15 PM	0	67	17	0	2	0	2	1	0	1	1	0	0
160	6/07/23	01:30 PM	0	81	15	0	1	0	0	0	2	0	0	0	0
161	6/07/23	01:45 PM	0	74	18	0	0	0	0	0	0	0	0	0	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
162	6/07/23	02:00 PM	0	74	15	0	0	0	1	0	0	0	0	0	0
163	6/07/23	02:15 PM	0	68	14	1	0	0	0	0	0	1	0	0	6
164	6/07/23	02:30 PM	0	69	13	0	2	0	0	0	0	0	0	0	0
165	6/07/23	02:45 PM	0	59	15	1	0	0	1	1	0	0	2	1	0
166	6/07/23	03:00 PM	0	103	19	0	1	0	0	1	0	0	1	0	0
167	6/07/23	03:15 PM	0	91	17	1	0	0	0	2	0	0	1	0	0
168	6/07/23	03:30 PM	0	79	27	1	1	0	0	0	0	2	0	0	2
169	6/07/23	03:45 PM	2	82	15	0	1	0	0	0	0	0	0	0	0
170	6/07/23	04:00 PM	0	97	25	1	2	0	0	1	0	1	1	0	0
171	6/07/23	04:15 PM	0	91	15	0	0	0	0	1	0	2	0	0	0
172	6/07/23	04:30 PM	1	93	25	0	0	0	2	0	0	0	0	0	1
173	6/07/23	04:45 PM	0	97	25	0	0	2	0	1	0	2	0	0	0
174	6/07/23	05:00 PM	1	95	23	0	0	0	0	0	0	0	1	0	0
175	6/07/23	05:15 PM	0	114	19	0	1	0	0	0	0	0	1	0	1
176	6/07/23	05:30 PM	0	102	22	0	0	1	1	1	0	0	0	0	2
177	6/07/23	05:45 PM	0	80	12	1	0	0	0	0	0	0	0	0	0
178	6/07/23	06:00 PM	0	87	24	0	0	0	0	0	2	0	0	0	0
179	6/07/23	06:15 PM	0	80	13	0	0	0	0	1	2	0	0	0	0
180	6/07/23	06:30 PM	0	64	10	0	0	2	0	0	2	0	0	2	0
181	6/07/23	06:45 PM	0	62	13	0	0	0	0	1	3	0	0	0	0
182	6/07/23	07:00 PM	2	53	9	1	0	0	0	0	0	0	0	0	0
183	6/07/23	07:15 PM	0	38	8	0	0	0	1	1	0	0	0	0	0
184	6/07/23	07:30 PM	0	42	11	0	0	0	0	0	0	0	0	0	0
185	6/07/23	07:45 PM	0	35	5	0	0	0	0	0	0	0	0	0	0
186	6/07/23	08:00 PM	0	36	7	0	0	0	0	0	2	0	0	0	0
187	6/07/23	08:15 PM	0	36	3	1	0	0	3	0	0	0	0	0	0
188	6/07/23	08:30 PM	1	37	3	0	0	0	0	0	0	0	0	1	0
189	6/07/23	08:45 PM	0	24	5	0	0	0	0	0	0	0	0	0	0
190	6/07/23	09:00 PM	0	43	8	0	0	0	0	0	0	0	0	0	0
191	6/07/23	09:15 PM	0	24	5	0	0	0	0	0	0	0	0	0	0
192	6/07/23	09:30 PM	0	24	5	1	0	0	0	0	0	0	0	0	0
193	6/07/23	09:45 PM	0	16	2	0	0	0	0	0	0	0	0	0	0
194	6/07/23	10:00 PM	0	15	2	0	0	0	0	0	0	0	0	0	0
195	6/07/23	10:15 PM	0	15	2	0	0	0	0	0	0	0	0	0	0
196	6/07/23	10:30 PM	0	11	3	0	0	0	0	0	0	0	0	0	0
197	6/07/23	10:45 PM	0	12	2	0	0	0	0	0	0	0	0	0	0
198	6/07/23	11:00 PM	0	13	2	0	0	0	0	0	0	0	0	0	0
199	6/07/23	11:15 PM	0	6	0	0	0	0	0	0	0	0	0	0	0
200	6/07/23	11:30 PM	0	9	0	0	0	0	0	0	0	0	0	0	0
201	6/07/23	11:45 PM	0	10	0	0	0	0	0	0	0	0	0	0	0
202	6/08/23	12:00 AM	0	3	1	0	0	0	0	0	0	0	0	0	0
203	6/08/23	12:15 AM	0	6	0	0	0	0	0	0	0	0	0	0	0
204	6/08/23	12:30 AM	0	8	1	0	0	0	0	0	0	0	0	0	0
205	6/08/23	12:45 AM	0	3	0	0	0	0	0	0	0	0	0	0	0
206	6/08/23	01:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
207	6/08/23	01:15 AM	0	6	1	0	0	0	0	0	0	0	0	0	0
208	6/08/23	01:30 AM	0	1	1	0	0	0	0	0	0	0	0	0	0
209	6/08/23	01:45 AM	0	3	1	0	0	0	0	0	0	0	0	0	0
210	6/08/23	02:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
211	6/08/23	02:15 AM	0	4	0	0	0	0	0	0	0	0	0	0	0
212	6/08/23	02:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
213	6/08/23	02:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
214	6/08/23	03:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
215	6/08/23	03:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0
216	6/08/23	03:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
217	6/08/23	03:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
218	6/08/23	04:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
219	6/08/23	04:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
220	6/08/23	04:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
221	6/08/23	04:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
222	6/08/23	05:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
223	6/08/23	05:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0
224	6/08/23	05:30 AM	0	4	2	0	0	0	0	0	0	0	0	0	0
225	6/08/23	05:45 AM	0	18	5	1	0	0	0	0	0	0	0	0	0
226	6/08/23	06:00 AM	0	16	4	0	0	0	0	0	0	0	0	0	0
227	6/08/23	06:15 AM	0	39	14	0	0	0	0	0	0	0	1	0	0
228	6/08/23	06:30 AM	1	39	9	0	1	0	0	0	0	0	0	0	0
229	6/08/23	06:45 AM	0	40	15	0	2	0	0	0	0	0	0	0	0
230	6/08/23	07:00 AM	0	37	11	0	1	0	2	0	2	0	0	0	1
231	6/08/23	07:15 AM	0	83	20	0	1	0	0	0	0	0	1	0	0
232	6/08/23	07:30 AM	0	72	13	0	2	0	0	0	0	0	0	1	0
233	6/08/23	07:45 AM	1	87	26	3	2	0	0	0	0	0	1	0	0
234	6/08/23	08:00 AM	0	107	19	0	0	0	0	3	2	2	0	0	0
235	6/08/23	08:15 AM	0	115	32	0	1	0	0	1	0	0	1	0	0
236	6/08/23	08:30 AM	1	93	27	0	2	0	2	1	2	0	0	0	0
237	6/08/23	08:45 AM	1	103	21	1	1	2	0	0	0	0	0	0	0
238	6/08/23	09:00 AM	1	92	23	0	1	0	0	2	0	0	1	2	0
239	6/08/23	09:15 AM	0	104	25	1	0	0	0	2	0	2	0	0	0
240	6/08/23	09:30 AM	2	81	23	1	1	0	0	1	0	0	1	0	0
241	6/08/23	09:45 AM	1	66	18	0	0	0	1	0	1	0	0	0	0
242	6/08/23	10:00 AM	0	48	13	1	1	0	0	1	0	0	0	0	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
243	6/08/23	10:15 AM	0	53	14	0	0	1	0	1	0	0	0	0	0
244	6/08/23	10:30 AM	1	58	12	1	0	1	0	0	0	0	1	0	0
245	6/08/23	10:45 AM	0	82	21	0	1	0	0	1	0	0	1	0	0
246	6/08/23	11:00 AM	0	64	16	1	1	0	0	0	0	1	1	2	0
247	6/08/23	11:15 AM	0	60	15	0	0	0	0	1	0	0	0	0	0
248	6/08/23	11:30 AM	0	58	16	0	1	0	0	0	0	0	0	0	0
249	6/08/23	11:45 AM	0	61	17	1	1	0	0	0	0	0	1	0	0
250	6/08/23	12:00 PM	0	71	15	0	1	0	0	0	0	1	0	1	0
251	6/08/23	12:15 PM	0	71	13	0	2	0	0	0	0	0	0	0	1
252	6/08/23	12:30 PM	1	78	18	2	1	0	1	0	0	0	1	0	0
253	6/08/23	12:45 PM	2	72	13	0	1	0	0	0	0	0	0	0	0
254	6/08/23	01:00 PM	0	69	18	1	0	0	0	1	0	0	0	0	1
255	6/08/23	01:15 PM	0	59	14	0	1	0	0	1	0	0	0	0	0
256	6/08/23	01:30 PM	0	67	14	0	2	0	0	0	0	0	1	0	0
257	6/08/23	01:45 PM	0	66	14	1	1	0	0	0	0	0	1	0	0
258	6/08/23	02:00 PM	0	63	14	0	0	2	0	1	0	0	0	1	0
259	6/08/23	02:15 PM	0	65	16	1	1	0	0	0	0	0	0	0	0
260	6/08/23	02:30 PM	0	77	20	0	0	0	0	1	0	0	0	0	0
261	6/08/23	02:45 PM	0	60	14	1	0	0	0	1	0	0	0	0	0
262	6/08/23	03:00 PM	0	92	25	0	1	0	0	0	0	0	1	0	0
263	6/08/23	03:15 PM	0	97	20	1	1	0	0	0	0	0	1	0	0
264	6/08/23	03:30 PM	1	82	20	0	2	0	2	0	0	0	0	0	0
265	6/08/23	03:45 PM	0	93	24	0	0	0	0	0	0	0	0	2	0
266	6/08/23	04:00 PM	0	78	26	0	2	0	0	0	0	1	1	0	0
267	6/08/23	04:15 PM	1	75	15	1	1	0	0	1	0	0	0	2	0
268	6/08/23	04:30 PM	0	94	15	1	0	0	1	0	0	0	0	2	0
269	6/08/23	04:45 PM	0	109	27	0	1	0	0	0	0	0	1	0	0
270	6/08/23	05:00 PM	0	102	18	0	0	0	0	0	0	0	0	0	0
271	6/08/23	05:15 PM	1	113	26	0	0	0	0	1	0	0	2	2	0
272	6/08/23	05:30 PM	0	94	23	0	0	0	0	1	0	0	0	0	0
273	6/08/23	05:45 PM	0	83	14	0	0	0	0	1	0	0	1	0	0
274	6/08/23	06:00 PM	0	101	16	0	0	0	0	0	0	0	0	0	0
275	6/08/23	06:15 PM	0	70	14	0	0	1	0	0	0	0	0	0	0
276	6/08/23	06:30 PM	0	71	12	1	0	0	1	0	0	0	0	0	0
277	6/08/23	06:45 PM	0	69	17	0	0	0	0	1	0	0	0	0	0
278	6/08/23	07:00 PM	0	41	8	1	0	0	1	0	0	1	0	0	0
279	6/08/23	07:15 PM	0	43	10	0	0	0	0	0	0	0	0	0	0
280	6/08/23	07:30 PM	0	43	6	1	0	0	0	1	0	0	0	2	0
281	6/08/23	07:45 PM	0	45	7	0	0	0	0	0	0	0	0	0	0
282	6/08/23	08:00 PM	0	35	5	0	0	0	0	0	0	0	1	0	0
283	6/08/23	08:15 PM	0	28	4	0	0	0	0	0	0	0	0	0	0
284	6/08/23	08:30 PM	0	28	5	0	0	2	0	0	0	0	0	0	2
285	6/08/23	08:45 PM	0	43	3	0	0	0	0	0	0	0	0	0	0
286	6/08/23	09:00 PM	0	27	3	1	0	0	0	0	0	0	0	0	0
287	6/08/23	09:15 PM	0	29	5	0	0	0	0	0	0	0	0	0	0
288	6/08/23	09:30 PM	0	19	4	0	0	0	0	0	0	0	0	0	0
289	6/08/23	09:45 PM	0	27	3	0	0	0	0	0	0	0	0	0	0
290	6/08/23	10:00 PM	0	20	2	1	0	0	0	0	0	0	0	0	0
291	6/08/23	10:15 PM	0	30	2	1	0	0	0	0	0	0	0	0	0
292	6/08/23	10:30 PM	0	12	3	0	0	0	0	0	0	0	0	0	0
293	6/08/23	10:45 PM	2	18	4	0	0	0	0	0	0	0	0	0	0
294	6/08/23	11:00 PM	2	15	1	0	0	0	0	0	0	0	0	0	0
295	6/08/23	11:15 PM	0	13	0	0	0	0	0	0	0	0	0	0	0
296	6/08/23	11:30 PM	0	4	1	0	0	0	0	0	0	0	0	0	0
297	6/08/23	11:45 PM	0	5	0	0	0	0	0	0	0	0	0	0	0



CURRENT TRAFFIC SIGNAL TIMING

INT #	82	WEBER STREET @ Union Street	T08-50/ 38W
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Date Prepared: December 3, 2025

Mode of Control Pre-timed running FIXED TIME

<u>Left Info</u>	Actuated	NB	LT	-	WEBER STREET
	Actuated	EB	LT	-	UNION STREET

*Offsets are a percentage of the cycle length and refers to the beginning of Main Street green

<u>Pattern 1</u>	7:00-10:00 Monday to Friday		OFFSET	0%
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WEBER STREET

NBL	Green Arrow	Min	5.0	seconds			
		Ext	3.0	seconds			
		Max	6.4	seconds			
NBL	Amber Arrow		3.0	seconds			
All Red			1.0	seconds			
Green			23.6	seconds			
Amber			4.0	seconds	Walk	7.6	seconds
All Red			2.0	seconds	FDW	16.0	seconds

Union Street

EB	Green Arrow	Min	5.0	seconds			
		Ext	3.0	seconds			
		Max	5.6	seconds			
EB	Amber Arrow		3.0	seconds			
All Red			1.0	seconds			
Green			24.4	seconds			
Amber			4.0	seconds	Walk	7.4	seconds
All Red			2.0	seconds	FDW	17.0	seconds
TOTAL			80.0	seconds			

<u>Pattern 2</u>	10:00-14:00 Monday to Friday		OFFSET	0%
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WEBER STREET

NBL	Green Arrow	Min	5.0	seconds			
		Ext	3.0	seconds			
		Max	6.4	seconds			
NBL	Amber Arrow		3.0	seconds			
All Red			1.0	seconds			
Green			23.6	seconds			
Amber			4.0	seconds	Walk	7.6	seconds
All Red			2.0	seconds	FDW	16.0	seconds

Union Street

EB	Green Arrow	Min	5.0	seconds			
		Ext	3.0	seconds			
		Max	5.6	seconds			
EB	Amber Arrow		3.0	seconds			
All Red			1.0	seconds			
Green			24.4	seconds			
Amber			4.0	seconds	Walk	7.4	seconds
All Red			2.0	seconds	FDW	17.0	seconds
TOTAL			80.0	seconds			

Min=Minimum Time
Ext=Extension Time
Max=Maximum Time

**This signal timing cannot be
presented as evidence in a court of law.**

Pattern 3

14:00-19:00 Mon-Fri, 8:30-19:00 Sat, 11:00-18:00 Sun

WEBER STREET

OFFSET

0%

NBL	Green Arrow	Min	5.0	seconds			
		Ext	3.0	seconds			
		Max	7.7	seconds			
NBL	Amber Arrow		3.0	seconds			
All Red			1.0	seconds			
Green			29.1	seconds			
Amber			4.0	seconds	Walk	13.1	seconds
All Red			2.0	seconds	FDW	16.0	seconds

Union Street

EB	Green Arrow	Min	5.0	seconds			
		Ext	3.0	seconds			
		Max	6.8	seconds			
EB	Amber Arrow		3.0	seconds			
All Red			1.0	seconds			
Green			26.4	seconds			
Amber			4.0	seconds	Walk	9.4	seconds
All Red			2.0	seconds	FDW	17.0	seconds
TOTAL			90.0	seconds			

Pattern 4

All Other Times

WEBER STREET

OFFSET

0%

Green			31.1	seconds			
Amber			4.0	seconds	Walk	15.1	seconds
All Red			2.0	seconds	FDW	16.0	seconds

Union Street

Green			26.9	seconds			
Amber			4.0	seconds	Walk	9.9	seconds
All Red			2.0	seconds	FDW	17.0	seconds
TOTAL			70.0	seconds			



CURRENT TRAFFIC SIGNAL TIMING

INT # 87 UNION STREET @ Moore Street T08-50/ 34W

Date Prepared: December 3, 2025

Mode of Control Pre-timed running FIXED TIME

*Offsets are a percentage of the cycle length and refers to the beginning of Main Street green

Pattern 1		7:00-10:00 Monday-Friday					OFFSET 70%	
UNION STREET								
Green	46.0	seconds						
Amber	4.0	seconds	Walk	38.0	seconds			
All Red	2.0	seconds	FDW	8.0	seconds			
Moore Street								
Green	22.0	seconds						
Amber	4.0	seconds	Walk	10.0	seconds			
All Red	2.0	seconds	FDW	12.0	seconds			
TOTAL	80.0	seconds						
Pattern 2		10:00-14:00 & 19:00-22:00 Monday-Friday, 8:30-22:00 Saturday, 9:00-18:00 Sunday					OFFSET 75%	
UNION STREET								
Green	46.0	seconds						
Amber	4.0	seconds	Walk	38.0	seconds			
All Red	2.0	seconds	FDW	8.0	seconds			
Moore Street								
Green	22.0	seconds						
Amber	4.0	seconds	Walk	10.0	seconds			
All Red	2.0	seconds	FDW	12.0	seconds			
TOTAL	80.0	seconds						
Pattern 3		14:00-19:00 Monday-Friday					OFFSET 59%	
UNION STREET								
Green	46.0	seconds						
Amber	4.0	seconds	Walk	38.0	seconds			
All Red	2.0	seconds	FDW	8.0	seconds			
Moore Street								
Green	22.0	seconds						
Amber	4.0	seconds	Walk	10.0	seconds			
All Red	2.0	seconds	FDW	12.0	seconds			
TOTAL	80.0	seconds						

Min=Minimum Time
Ext=Extension Time
Max=Maximum Time

This signal timing cannot be
presented as evidence in a court of law.

<u>Pattern 4</u>		ALL OTHER TIMES					OFFSET	73%
UNION STREET								
Green	36.0	seconds						
Amber	4.0	seconds	Walk	28.0	seconds			
All Red	2.0	seconds	FDW	8.0	seconds			
Moore Street								
Green	22.0	seconds						
Amber	4.0	seconds	Walk	10.0	seconds			
All Red	2.0	seconds	FDW	12.0	seconds			
TOTAL	70.0	seconds						
<u>Pattern 5</u>		LPI: 8:30-9:00 & 15:20-15:50 Monday-Friday (Sept-June)					OFFSET	0%
UNION STREET								
Green	43.5	seconds						
Amber	4.0	seconds	Walk	35.5	seconds			
All Red	2.0	seconds	FDW	8.0	seconds			
Moore Street								
Green	34.5	seconds						
Amber	4.0	seconds	Walk	22.5	seconds			
All Red	2.0	seconds	FDW	12.0	seconds			
TOTAL	90.0	seconds						

Appendix C

Base Year Operations



Lanes, Volumes, Timings

153 Union Street East, Waterloo TIS

1: Weber Street South & Union Street East

Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	296	73	65	391	71	86	796	53	26	598	117
Future Volume (vph)	136	296	73	65	391	71	86	796	53	26	598	117
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	25.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.978			0.980			0.991			0.975	
Flt Protected		0.987			0.994		0.950			0.950		
Satd. Flow (prot)	0	2894	0	0	2948	0	1603	3206	0	1603	3154	0
Flt Permitted		0.636			0.827		0.195			0.315		
Satd. Flow (perm)	0	1864	0	0	2451	0	329	3206	0	530	3154	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			23			11			30	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		291.5			221.3			213.4			417.0	
Travel Time (s)		21.0			15.9			15.4			30.0	
Confl. Peds. (#/hr)	3		7	7		3	3		10	10		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	6%	4%	2%	2%	4%	3%	2%	4%	3%	2%
Adj. Flow (vph)	136	296	73	65	391	71	86	796	53	26	598	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	505	0	0	527	0	86	849	0	26	715	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	24.4		24.4	24.4		5.0	23.6		23.6	23.6	
Minimum Split (s)	9.0	30.4		30.4	30.4		9.0	29.6		29.6	29.6	
Total Split (s)	9.6	40.0		30.4	30.4		10.4	40.0		29.6	29.6	
Total Split (%)	12.0%	50.0%		38.0%	38.0%		13.0%	50.0%		37.0%	37.0%	
Maximum Green (s)	5.6	34.0		24.4	24.4		6.4	34.0		23.6	23.6	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		0.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	C-Max		C-Max	C-Max	
Walk Time (s)		7.4		7.4	7.4			7.6		7.6	7.6	
Flash Don't Walk (s)		17.0		17.0	17.0			16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effect Green (s)		36.0			26.4		36.0	36.0		27.7	27.7	
Actuated g/C Ratio		0.45			0.33		0.45	0.45		0.35	0.35	
v/c Ratio		0.54			0.64		0.35	0.59		0.14	0.64	

Synchro 12 Report

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)		13.1			26.0		16.9	18.3		22.1	25.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		13.1			26.0		16.9	18.3		22.1	25.0	
LOS		B			C		B	B		C	C	
Approach Delay (s/veh)		13.1			26.0			18.1			24.9	
Approach LOS		B			C			B			C	
Queue Length 50th (m)		27.3			33.8		7.4	48.6		2.9	47.9	
Queue Length 95th (m)		41.5			50.3		15.4	66.3		9.0	66.8	
Internal Link Dist (m)		267.5			197.3			189.4			393.0	
Turn Bay Length (m)							30.0			25.0		
Base Capacity (vph)		927			824		249	1448		183	1110	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.54			0.64		0.35	0.59		0.14	0.64	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay (s/veh): 20.6

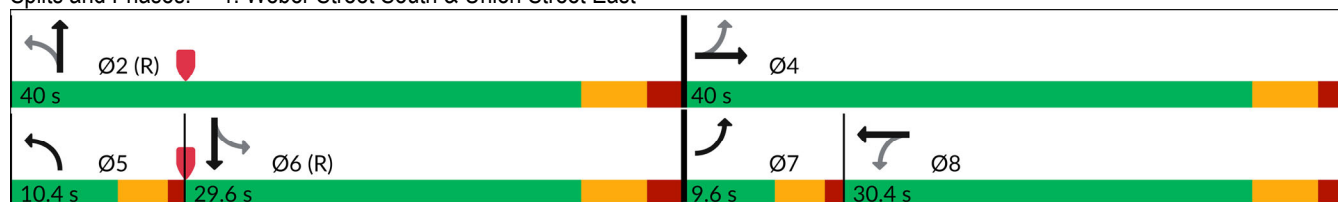
Intersection LOS: C

Intersection Capacity Utilization 99.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Weber Street South & Union Street East



Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	435	20	20	506	34	26	67	51	14	40	15
Future Volume (vph)	20	435	20	20	506	34	26	67	51	14	40	15
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	25.0		0.0	25.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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
Ped Bike Factor	0.99	1.00		0.99		0.95	0.94	0.96		0.94	0.98	
Frt		0.993				0.850		0.935			0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1502	1558	0	1668	1842	1428	1668	1416	0	1668	1466	0
Flt Permitted	0.393			0.429			0.721			0.681		
Satd. Flow (perm)	614	1558	0	748	1842	1363	1193	1416	0	1118	1466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				41		49			15	
Link Speed (k/h)		50			50			40			30	
Link Distance (m)		221.4			222.2			136.0			299.5	
Travel Time (s)		15.9			16.0			12.2			35.9	
Confl. Peds. (#/hr)	30		17	17		30	34		70	70		34
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	4%	0%	0%	2%	3%	0%	5%	2%	0%	3%	8%
Adj. Flow (vph)	20	435	20	20	506	34	26	67	51	14	40	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	455	0	20	506	34	26	118	0	14	55	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Minimum Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%	65.0%	35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	46.0	46.0		46.0	46.0	46.0	22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	38.0	38.0		38.0	38.0	38.0	10.0	10.0		10.0	10.0	
Flash Don't Walk (s)	8.0	8.0		8.0	8.0	8.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effect Green (s)	48.0	48.0		48.0	48.0	48.0	24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.30	0.30		0.30	0.30	
v/c Ratio	0.05	0.49		0.04	0.46	0.04	0.07	0.26		0.04	0.12	
Control Delay (s/veh)	7.2	11.1		5.4	7.8	1.3	20.8	14.8		20.4	16.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay (s/veh)	7.2	11.1		5.4	7.8	1.3	20.8	14.8		20.4	16.9	
LOS	A	B		A	A	A	C	B		C	B	
Approach Delay (s/veh)		10.9			7.3			15.9			17.6	

Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B			A			B			B		
Queue Length 50th (m)	1.2	35.6		1.0	28.3	0.3	2.8	7.9		1.5	4.4	
Queue Length 95th (m)	4.1	57.3		m1.5	39.2	m0.3	8.2	20.4		5.5	12.5	
Internal Link Dist (m)	197.4			198.2			112.0			275.5		
Turn Bay Length (m)	25.0			25.0			15.0			15.0		
Base Capacity (vph)	368	936		448	1105	834	357	459		335	450	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.05	0.49		0.04	0.46	0.04	0.07	0.26		0.04	0.12	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 56 (70%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay (s/veh): 10.2

Intersection LOS: B

Intersection Capacity Utilization 105.0%

ICU Level of Service G

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Moore Avenue South & Union Street East



Lanes, Volumes, Timings
3: Weber Street South & Roger Street

153 Union Street East, Waterloo TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	2	16	1	0	0	45	988	2	2	604	46
Future Volume (vph)	20	2	16	1	0	0	45	988	2	2	604	46
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt	0.943									0.989		
Flt Protected	0.974			0.950			0.998					
Satd. Flow (prot)	0	1261	0	0	1456	0	0	2998	0	0	2969	0
Flt Permitted	0.974			0.950			0.998					
Satd. Flow (perm)	0	1261	0	0	1456	0	0	2998	0	0	2969	0
Link Speed (k/h)	30			50			50			50		
Link Distance (m)	329.2			37.4			425.2			213.4		
Travel Time (s)	39.5			2.7			30.6			15.4		
Confl. Peds. (#/hr)							5			1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	50%	14%	0%	0%	0%	8%	3%	0%	0%	3%	7%
Adj. Flow (vph)	20	2	16	1	0	0	45	988	2	2	604	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	1	0	0	1035	0	0	652	0
Sign Control	Stop			Stop			Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	67.4%						ICU Level of Service C					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	2	16	1	0	0	45	988	2	2	604	46
Future Vol, veh/h	20	2	16	1	0	0	45	988	2	2	604	46
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	1	1	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	50	14	0	0	0	8	3	0	0	3	7
Mvmt Flow	20	2	16	1	0	0	45	988	2	2	604	46

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1220	1717	330	1387	1739	496	655	0	0	991	0	0
Stage 1	636	636	-	1080	1080	-	-	-	-	-	-	-
Stage 2	584	1081	-	307	659	-	-	-	-	-	-	-
Critical Hdwy	7.62	7.5	7.18	7.5	6.5	6.9	4.26	-	-	4.1	-	-
Critical Hdwy Stg 1	6.62	6.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.62	6.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.56	4.5	3.44	3.5	4	3.3	2.28	-	-	2.2	-	-
Pot Cap-1 Maneuver	132	54	632	104	88	525	889	-	-	706	-	-
Stage 1	423	368	-	236	297	-	-	-	-	-	-	-
Stage 2	455	207	-	683	464	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	121	50	629	90	81	524	885	-	-	705	-	-
Mov Cap-2 Maneuver	121	50	-	90	81	-	-	-	-	-	-	-
Stage 1	420	365	-	220	276	-	-	-	-	-	-	-
Stage 2	423	192	-	660	460	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Ctrl Dly, s/v	33.18		45.22		0.97		0.06	
HCM LOS	D		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	156	-	-	165	90	10	-
HCM Lane V/C Ratio	0.051	-	-	0.23	0.011	0.003	-
HCM Ctrl Dly (s/v)	9.3	0.6	-	33.2	45.2	10.1	0
HCM Lane LOS	A	A	-	D	E	B	A
HCM 95th %tile Q(veh)	0.2	-	-	0.9	0	0	-

Lanes, Volumes, Timings
4: Moore Avenue South & Roger Street

153 Union Street East, Waterloo TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	5	5	5	15	12	8	90	2	8	57	2
Future Volume (vph)	16	5	5	5	15	12	8	90	2	8	57	2
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.974			0.949			0.997			0.996	
Flt Protected		0.970			0.992			0.996			0.994	
Satd. Flow (prot)	0	1282	0	0	1389	0	0	1482	0	0	1492	0
Flt Permitted		0.970			0.992			0.996			0.994	
Satd. Flow (perm)	0	1282	0	0	1389	0	0	1482	0	0	1492	0
Link Speed (k/h)		30			30			40			40	
Link Distance (m)		200.9			172.2			179.3			129.9	
Travel Time (s)		24.1			20.7			16.1			11.7	
Confl. Peds. (#/hr)	16		5	5		16	18		11	11		18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	0%	0%	25%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	16	5	5	5	15	12	8	90	2	8	57	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	26	0	0	32	0	0	100	0	0	67	0
Sign Control		Stop			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											

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	5	5	5	15	12	8	90	2	8	57	2
Future Vol, veh/h	16	5	5	5	15	12	8	90	2	8	57	2
Conflicting Peds, #/hr	16	0	5	5	0	16	18	0	11	11	0	18
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	21	0	0	25	0	0	0	3	0	0	2	0
Mvmt Flow	16	5	5	5	15	12	8	90	2	8	57	2
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	222	211	81	199	211	118	77	0	0	103	0	0
Stage 1	92	92	-	118	118	-	-	-	-	-	-	-
Stage 2	130	119	-	81	93	-	-	-	-	-	-	-
Critical Hdwy	7.31	6.5	6.2	7.35	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.31	5.5	-	6.35	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.31	5.5	-	6.35	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.689	4	3.3	3.725	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	696	690	985	713	690	939	1535	-	-	1502	-	-
Stage 1	870	823	-	834	802	-	-	-	-	-	-	-
Stage 2	830	801	-	874	822	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	645	665	965	687	665	918	1511	-	-	1488	-	-
Mov Cap-2 Maneuver	645	665	-	687	665	-	-	-	-	-	-	-
Stage 1	852	806	-	821	790	-	-	-	-	-	-	-
Stage 2	789	789	-	856	805	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Ctrl Dly, s/v	10.4		10.04			0.59			0.89			
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	143	-	-	693	746	213	-	-				
HCM Lane V/C Ratio	0.005	-	-	0.038	0.043	0.005	-	-				
HCM Ctrl Dly (s/v)	7.4	0	-	10.4	10	7.4	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

Lanes, Volumes, Timings
5: Moore Avenue South & Waterloo Street

153 Union Street East, Waterloo TIS
Base Year AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	15	109	0	12	77
Future Volume (vph)	1	15	109	0	12	77
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.873					
Flt Protected	0.997					0.993
Satd. Flow (prot)	1413	0	1511	0	0	1566
Flt Permitted	0.997					0.993
Satd. Flow (perm)	1413	0	1511	0	0	1566
Link Speed (k/h)	30		40			40
Link Distance (m)	162.4		129.9			136.0
Travel Time (s)	19.5		11.7			12.2
Confl. Peds. (#/hr)		2		5	5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	8%	8%	0%	0%	4%
Adj. Flow (vph)	1	15	109	0	12	77
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	109	0	0	89
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	22.7%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	15	109	0	12	77
Future Vol, veh/h	1	15	109	0	12	77
Conflicting Peds, #/hr	0	2	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	8	8	0	0	4
Mvmt Flow	1	15	109	0	12	77
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	215	116	0	0	114	0
Stage 1	114	-	-	-	-	-
Stage 2	101	-	-	-	-	-
Critical Hdwy	6.4	6.28	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.372	-	-	2.2	-
Pot Cap-1 Maneuver	778	920	-	-	1488	-
Stage 1	916	-	-	-	-	-
Stage 2	928	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	768	915	-	-	1481	-
Mov Cap-2 Maneuver	768	-	-	-	-	-
Stage 1	912	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	9.05	0	1			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	904	243	-	
HCM Lane V/C Ratio	-	-	0.018	0.008	-	
HCM Ctrl Dly (s/v)	-	-	9.1	7.4	0	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Lanes, Volumes, Timings
6: Waterloo Street & Roger Street

153 Union Street East, Waterloo TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	17	3	7	25	2	0	11	11	8	3	0
Future Volume (vph)	1	17	3	7	25	2	0	11	11	8	3	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.981			0.992			0.932				
Flt Protected		0.998			0.990						0.965	
Satd. Flow (prot)	0	1420	0	0	1412	0	0	1242	0	0	1479	0
Flt Permitted		0.998			0.990						0.965	
Satd. Flow (perm)	0	1420	0	0	1412	0	0	1242	0	0	1479	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		172.2			76.9			123.3			67.1	
Travel Time (s)		20.7			9.2			14.8			8.1	
Confl. Peds. (#/hr)	2		4	4		2	3		1	1		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	0%	0%	9%	0%	0%	20%	10%	0%	0%	0%
Adj. Flow (vph)	1	17	3	7	25	2	0	11	11	8	3	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	0	0	34	0	0	22	0	0	11	0
Sign Control	Stop				Stop				Stop			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	20.4%											
Analysis Period (min)	15											
ICU Level of Service A												

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	17	3	7	25	2	0	11	11	8	3	0
Future Vol, veh/h	1	17	3	7	25	2	0	11	11	8	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	7	0	0	9	0	0	20	10	0	0	0
Mvmt Flow	1	17	3	7	25	2	0	11	11	8	3	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7	7.2	7.2	7.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	5%	21%	73%
Vol Thru, %	50%	81%	74%	27%
Vol Right, %	50%	14%	6%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	21	34	11
LT Vol	0	1	7	8
Through Vol	11	17	25	3
RT Vol	11	3	2	0
Lane Flow Rate	22	21	34	11
Geometry Grp	1	1	1	1
Degree of Util (X)	0.025	0.023	0.038	0.013
Departure Headway (Hd)	4.044	3.908	3.981	4.158
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	885	916	901	860
Service Time	2.07	1.93	2	2.186
HCM Lane V/C Ratio	0.025	0.023	0.038	0.013
HCM Control Delay, s/veh	7.2	7	7.2	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0

Lanes, Volumes, Timings
7: Union Street East & Dover Street

153 Union Street East, Waterloo TIS
Base Year AM

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	9	490	596	6	7	11
Future Volume (vph)	9	490	596	6	7	11
Ideal Flow (vphpl)	1775	1775	1775	1775	1765	1765
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.999		0.917	
Flt Protected		0.999			0.981	
Satd. Flow (prot)	0	3236	3261	0	1399	0
Flt Permitted		0.999			0.981	
Satd. Flow (perm)	0	3236	3261	0	1399	0
Link Speed (k/h)		50	50		30	
Link Distance (m)		222.2	291.5		370.1	
Travel Time (s)		16.0	21.0		44.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	2%	20%	0%	20%
Adj. Flow (vph)	9	490	596	6	7	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	499	602	0	18	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.3%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	490	596	6	7	11
Future Vol, veh/h	9	490	596	6	7	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	3	2	20	0	20
Mvmt Flow	9	490	596	6	7	11
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	602	0	-	0	862	301
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	263	-
Critical Hdwy	4.1	-	-	-	6.8	7.3
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.5
Pot Cap-1 Maneuver	985	-	-	-	298	644
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	763	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	985	-	-	-	295	644
Mov Cap-2 Maneuver	-	-	-	-	295	-
Stage 1	-	-	-	-	511	-
Stage 2	-	-	-	-	763	-
Approach	EB	WB		SB		
HCM Ctrl Dly, s/v	0.24	0		13.51		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	65	-	-	-	441	
HCM Lane V/C Ratio	0.009	-	-	-	0.041	
HCM Ctrl Dly (s/v)	8.7	0.1	-	-	13.5	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Lanes, Volumes, Timings
8: Roger Street & South Access

153 Union Street East, Waterloo TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	34	1	1	32	3	0	0	5	3	0	2
Future Volume (vph)	1	34	1	1	32	3	0	0	5	3	0	2
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.996			0.989			0.865			0.946	
Flt Protected		0.999			0.999						0.971	
Satd. Flow (prot)	0	1443	0	0	1401	0	0	663	0	0	1408	0
Flt Permitted		0.999			0.999						0.971	
Satd. Flow (perm)	0	1443	0	0	1401	0	0	663	0	0	1408	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		76.9			329.2			63.5			35.6	
Travel Time (s)		9.2			39.5			7.6			4.3	
Confl. Peds. (#/hr)	1		5	5		1	3		1	1		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	6%	0%	100%	6%	0%	0%	0%	100%	0%	0%	0%
Adj. Flow (vph)	1	34	1	1	32	3	0	0	5	3	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	0	0	36	0	0	5	0	0	5	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	16.2%				ICU Level of Service A							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	34	1	1	32	3	0	0	5	3	0	2
Future Vol, veh/h	1	34	1	1	32	3	0	0	5	3	0	2
Conflicting Peds, #/hr	1	0	5	5	0	1	3	0	1	1	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	6	0	100	6	0	0	0	100	0	0	0
Mvmt Flow	1	34	1	1	32	3	0	0	5	3	0	2
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	36	0	0	40	0	0	79	80	41	74	79	38
Stage 1	-	-	-	-	-	-	42	42	-	37	37	-
Stage 2	-	-	-	-	-	-	37	38	-	37	42	-
Critical Hdwy	4.1	-	-	5.1	-	-	7.1	6.5	7.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	3.1	-	-	3.5	4	4.2	3.5	4	3.3
Pot Cap-1 Maneuver	1588	-	-	1116	-	-	915	815	809	922	816	1040
Stage 1	-	-	-	-	-	-	978	864	-	984	869	-
Stage 2	-	-	-	-	-	-	984	867	-	984	864	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1112	-	-	906	809	805	913	810	1037
Mov Cap-2 Maneuver	-	-	-	-	-	-	906	809	-	913	810	-
Stage 1	-	-	-	-	-	-	973	860	-	982	867	-
Stage 2	-	-	-	-	-	-	978	866	-	976	860	-
Approach	EB			WB			NB			SB		
HCM Ctrl Dly, s/v	0.2			0.23			9.5			8.77		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	805	50	-	-	49	-	-	959				
HCM Lane V/C Ratio	0.006	0.001	-	-	0.001	-	-	0.005				
HCM Ctrl Dly (s/v)	9.5	7.3	0	-	8.2	0	-	8.8				
HCM Lane LOS	A	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

Lanes, Volumes, Timings

153 Union Street East, Waterloo TIS

1: Weber Street South & Union Street East

Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	475	85	43	283	70	92	743	90	53	820	110
Future Volume (vph)	164	475	85	43	283	70	92	743	90	53	820	110
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	25.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.982			0.973			0.984			0.982	
Flt Protected		0.989			0.995		0.950			0.950		
Satd. Flow (prot)	0	2980	0	0	2972	0	1668	3247	0	1668	3241	0
Flt Permitted		0.685			0.818		0.118			0.327		
Satd. Flow (perm)	0	2063	0	0	2443	0	207	3247	0	573	3241	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			30			20			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		291.5			221.3			213.4			417.0	
Travel Time (s)		21.0			15.9			15.4			30.0	
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	164	475	85	43	283	70	92	743	90	53	820	110
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	724	0	0	396	0	92	833	0	53	930	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	26.4		26.4	26.4		5.0	29.1		29.1	29.1	
Minimum Split (s)	9.0	32.4		32.4	32.4		9.0	35.1		35.1	35.1	
Total Split (s)	10.8	43.2		32.4	32.4		11.7	46.8		35.1	35.1	
Total Split (%)	12.0%	48.0%		36.0%	36.0%		13.0%	52.0%		39.0%	39.0%	
Maximum Green (s)	6.8	37.2		26.4	26.4		7.7	40.8		29.1	29.1	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		0.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	C-Max		C-Max	C-Max	
Walk Time (s)		9.4		9.4	9.4			13.1		13.1	13.1	
Flash Don't Walk (s)		17.0		17.0	17.0			16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effect Green (s)		39.2			28.4		42.8	42.8		33.5	33.5	
Actuated g/C Ratio		0.44			0.32		0.48	0.48		0.37	0.37	
v/c Ratio		0.74			0.50		0.43	0.54		0.25	0.76	

Synchro 12 Report

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)		25.0			25.7		19.5	17.7		25.3	30.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		25.0			25.7		19.5	17.7		25.3	30.2	
LOS		C			C		B	B		C	C	
Approach Delay (s/veh)		25.0			25.7			17.9			30.0	
Approach LOS		C			C			B			C	
Queue Length 50th (m)		45.8			26.6		8.4	49.6		6.5	74.6	
Queue Length 95th (m)		62.6			40.3		16.6	66.2		16.0	98.6	
Internal Link Dist (m)		267.5			197.3			189.4			393.0	
Turn Bay Length (m)							30.0			25.0		
Base Capacity (vph)		979			791		223	1554		213	1218	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.74			0.50		0.41	0.54		0.25	0.76	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay (s/veh): 24.5

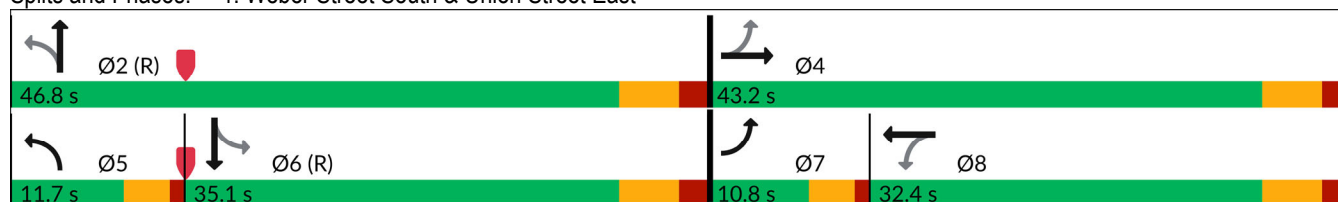
Intersection LOS: C

Intersection Capacity Utilization 108.4%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 1: Weber Street South & Union Street East



Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	585	18	20	454	23	49	74	51	35	103	46
Future Volume (vph)	41	585	18	20	454	23	49	74	51	35	103	46
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	25.0		0.0	25.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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
Ped Bike Factor	0.99	1.00		0.99		0.97	0.98	0.99		0.98	0.99	
Frt		0.996				0.850		0.939			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1573	1608	0	1668	1860	1471	1668	1495	0	1668	1533	0
Flt Permitted	0.430			0.326			0.633			0.672		
Satd. Flow (perm)	708	1608	0	568	1860	1425	1085	1495	0	1160	1533	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				41		44			29	
Link Speed (k/h)		50			50			40			30	
Link Distance (m)		221.4			222.2			136.0			299.5	
Travel Time (s)		15.9			16.0			12.2			35.9	
Confl. Peds. (#/hr)	13		23	23		13	16		18	18		16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	1%	0%	0%	1%	0%	0%	2%	0%	0%	0%	0%
Adj. Flow (vph)	41	585	18	20	454	23	49	74	51	35	103	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	603	0	20	454	23	49	125	0	35	149	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Minimum Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%	65.0%	35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	46.0	46.0		46.0	46.0	46.0	22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	38.0	38.0		38.0	38.0	38.0	10.0	10.0		10.0	10.0	
Flash Don't Walk (s)	8.0	8.0		8.0	8.0	8.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effect Green (s)	48.0	48.0		48.0	48.0	48.0	24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.30	0.30		0.30	0.30	
v/c Ratio	0.10	0.62		0.06	0.41	0.03	0.15	0.26		0.10	0.31	
Control Delay (s/veh)	7.6	13.8		7.3	9.8	1.2	22.1	15.8		21.3	19.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay (s/veh)	7.6	13.8		7.3	9.8	1.2	22.1	15.8		21.3	19.4	
LOS	A	B		A	A	A	C	B		C	B	
Approach Delay (s/veh)		13.4			9.3			17.6			19.8	

Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B			A			B			B		
Queue Length 50th (m)	2.5	52.6		1.1	32.9	0.0	5.4	9.1		3.8	13.6	
Queue Length 95th (m)	6.7	83.9		3.8	50.9	1.5	13.2	21.7		10.2	28.0	
Internal Link Dist (m)	197.4			198.2			112.0			275.5		
Turn Bay Length (m)	25.0			25.0			15.0			15.0		
Base Capacity (vph)	424	966		340	1116	871	325	479		348	480	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.62		0.06	0.41	0.03	0.15	0.26		0.10	0.31	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 47.2 (59%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.62

Intersection Signal Delay (s/veh): 13.3

Intersection LOS: B

Intersection Capacity Utilization 105.0%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 2: Moore Avenue South & Union Street East



Lanes, Volumes, Timings
3: Weber Street South & Roger Street

153 Union Street East, Waterloo TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	0	57	1	0	1	20	845	1	0	965	29
Future Volume (vph)	42	0	57	1	0	1	20	845	1	0	965	29
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.922			0.932						0.996	
Flt Protected		0.979			0.976			0.999				
Satd. Flow (prot)	0	1368	0	0	1394	0	0	3067	0	0	3058	0
Flt Permitted		0.979			0.976			0.999				
Satd. Flow (perm)	0	1368	0	0	1394	0	0	3067	0	0	3058	0
Link Speed (k/h)		30			50			50			50	
Link Distance (m)		329.2			37.4			425.2			213.4	
Travel Time (s)		39.5			2.7			30.6			15.4	
Confl. Peds. (#/hr)	2		1	1		2	6		2	2		6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	42	0	57	1	0	1	20	845	1	0	965	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	99	0	0	2	0	0	866	0	0	994	0
Sign Control	Stop		Stop				Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	58.8%				ICU Level of Service B							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	42	0	57	1	0	1	20	845	1	0	965	29
Future Vol, veh/h	42	0	57	1	0	1	20	845	1	0	965	29
Conflicting Peds, #/hr	2	0	1	1	0	2	6	0	2	2	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	2	0	0	0	0	1	0	0	1	0
Mvmt Flow	42	0	57	1	0	1	20	845	1	0	965	29

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1450	1874	504	1371	1888	427	1000	0	0	848	0	0
Stage 1	986	986	-	888	888	-	-	-	-	-	-	-
Stage 2	465	888	-	484	1000	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.94	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.32	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	94	73	513	107	71	582	700	-	-	798	-	-
Stage 1	270	329	-	309	365	-	-	-	-	-	-	-
Stage 2	553	365	-	538	324	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	89	69	510	91	68	580	697	-	-	797	-	-
Mov Cap-2 Maneuver	89	69	-	91	68	-	-	-	-	-	-	-
Stage 1	268	327	-	297	351	-	-	-	-	-	-	-
Stage 2	530	350	-	478	322	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Ctrl Dly, s/v	52.1		28.12		0.6		0	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	83	-	-	170	158	797	-
HCM Lane V/C Ratio	0.029	-	-	0.582	0.013	-	-
HCM Ctrl Dly (s/v)	10.3	0.4	-	52.1	28.1	0	-
HCM Lane LOS	B	A	-	F	D	A	-
HCM 95th %tile Q(veh)	0.1	-	-	3.1	0	0	-

Lanes, Volumes, Timings
4: Moore Avenue South & Roger Street

153 Union Street East, Waterloo TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	8	12	6	12	14	10	88	1	8	116	9
Future Volume (vph)	9	8	12	6	12	14	10	88	1	8	116	9
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.944			0.941			0.999			0.991	
Flt Protected		0.985			0.991			0.995			0.997	
Satd. Flow (prot)	0	1425	0	0	1429	0	0	1524	0	0	1514	0
Flt Permitted		0.985			0.991			0.995			0.997	
Satd. Flow (perm)	0	1425	0	0	1429	0	0	1524	0	0	1514	0
Link Speed (k/h)		30			30			40			40	
Link Distance (m)		200.9			172.2			179.3			129.9	
Travel Time (s)		24.1			20.7			16.1			11.7	
Confl. Peds. (#/hr)	2		3	3		2	6		13	13		6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	8	12	6	12	14	10	88	1	8	116	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	29	0	0	32	0	0	99	0	0	133	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.0%				ICU Level of Service A							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	8	12	6	12	14	10	88	1	8	116	9
Future Vol, veh/h	9	8	12	6	12	14	10	88	1	8	116	9
Conflicting Peds, #/hr	2	0	3	3	0	2	6	0	13	13	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	9	8	12	6	12	14	10	88	1	8	116	9
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	259	265	130	261	269	104	131	0	0	102	0	0
Stage 1	143	143	-	122	122	-	-	-	-	-	-	-
Stage 2	116	122	-	139	147	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	699	644	926	697	641	957	1467	-	-	1503	-	-
Stage 1	865	783	-	888	799	-	-	-	-	-	-	-
Stage 2	894	799	-	869	779	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	662	626	919	661	623	945	1459	-	-	1486	-	-
Mov Cap-2 Maneuver	662	626	-	661	623	-	-	-	-	-	-	-
Stage 1	856	774	-	872	785	-	-	-	-	-	-	-
Stage 2	859	784	-	842	771	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Ctrl Dly, s/v	10.1		10.08			0.76			0.45			
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	181	-	-	735	741	107	-	-				
HCM Lane V/C Ratio	0.007	-	-	0.039	0.043	0.005	-	-				
HCM Ctrl Dly (s/v)	7.5	0	-	10.1	10.1	7.4	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

Lanes, Volumes, Timings
5: Moore Avenue South & Waterloo Street

153 Union Street East, Waterloo TIS
Base Year PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	35	121	2	19	124
Future Volume (vph)	0	35	121	2	19	124
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865		0.998			
Flt Protected						0.993
Satd. Flow (prot)	1510	0	1600	0	0	1620
Flt Permitted						0.993
Satd. Flow (perm)	1510	0	1600	0	0	1620
Link Speed (k/h)	30		40			40
Link Distance (m)	162.4		129.9			136.0
Travel Time (s)	19.5		11.7			12.2
Confl. Peds. (#/hr)	3	2		15	15	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	1%	50%	0%	0%
Adj. Flow (vph)	0	35	121	2	19	124
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	123	0	0	143
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					

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	35	121	2	19	124
Future Vol, veh/h	0	35	121	2	19	124
Conflicting Peds, #/hr	3	2	0	15	15	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	1	50	0	0
Mvmt Flow	0	35	121	2	19	124
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	302	139	0	0	138	0
Stage 1	137	-	-	-	-	-
Stage 2	165	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	694	915	-	-	1458	-
Stage 1	895	-	-	-	-	-
Stage 2	869	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	674	901	-	-	1440	-
Mov Cap-2 Maneuver	674	-	-	-	-	-
Stage 1	883	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	9.16	0	1			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	901	239	-	
HCM Lane V/C Ratio	-	-	0.039	0.013	-	
HCM Ctrl Dly (s/v)	-	-	9.2	7.5	0	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Lanes, Volumes, Timings
6: Waterloo Street & Roger Street

153 Union Street East, Waterloo TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	15	6	19	31	15	1	14	10	5	10	1
Future Volume (vph)	3	15	6	19	31	15	1	14	10	5	10	1
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.966			0.969			0.946			0.992	
Flt Protected		0.994			0.986			0.998			0.985	
Satd. Flow (prot)	0	1402	0	0	1464	0	0	1447	0	0	1389	0
Flt Permitted		0.994			0.986			0.998			0.985	
Satd. Flow (perm)	0	1402	0	0	1464	0	0	1447	0	0	1389	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		172.2			76.9			123.3			67.1	
Travel Time (s)		20.7			9.2			14.8			8.1	
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	8%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%
Adj. Flow (vph)	3	15	6	19	31	15	1	14	10	5	10	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	65	0	0	25	0	0	16	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.7%				ICU Level of Service A							
Analysis Period (min)	15											

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	15	6	19	31	15	1	14	10	5	10	1
Future Vol, veh/h	3	15	6	19	31	15	1	14	10	5	10	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	8	0	0	0	0	0	0	0	25	0	0
Mvmt Flow	3	15	6	19	31	15	1	14	10	5	10	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7	7.2	7	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	13%	29%	31%
Vol Thru, %	56%	63%	48%	63%
Vol Right, %	40%	25%	23%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	24	65	16
LT Vol	1	3	19	5
Through Vol	14	15	31	10
RT Vol	10	6	15	1
Lane Flow Rate	25	24	65	16
Geometry Grp	1	1	1	1
Degree of Util (X)	0.027	0.026	0.071	0.02
Departure Headway (Hd)	3.834	3.894	3.908	4.524
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	930	917	916	789
Service Time	1.874	1.927	1.934	2.563
HCM Lane V/C Ratio	0.027	0.026	0.071	0.02
HCM Control Delay, s/veh	7	7	7.2	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.2	0.1

Lanes, Volumes, Timings
7: Union Street East & Dover Street

153 Union Street East, Waterloo TIS
Base Year PM

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	14	722	494	8	6	12
Future Volume (vph)	14	722	494	8	6	12
Ideal Flow (vphpl)	1775	1775	1775	1775	1765	1765
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.910	
Flt Protected		0.999			0.984	
Satd. Flow (prot)	0	3294	3296	0	1563	0
Flt Permitted		0.999			0.984	
Satd. Flow (perm)	0	3294	3296	0	1563	0
Link Speed (k/h)		50	50		30	
Link Distance (m)		222.2	291.5		370.1	
Travel Time (s)		16.0	21.0		44.4	
Confl. Peds. (#/hr)	2			2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	1%	1%	0%	0%	0%
Adj. Flow (vph)	14	722	494	8	6	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	736	502	0	18	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	42.0%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	
Traffic Vol, veh/h	14	722	494	8	6	12
Future Vol, veh/h	14	722	494	8	6	12
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	8	1	1	0	0	0
Mvmt Flow	14	722	494	8	6	12
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	504	0	-	0	889	253
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	389	-
Critical Hdwy	4.26	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.28	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1016	-	-	-	287	753
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	660	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1014	-	-	-	281	751
Mov Cap-2 Maneuver	-	-	-	-	281	-
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	660	-
Approach	EB	WB		SB		
HCM Ctrl Dly, s/v	0.3	0		12.75		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	68	-	-	-	482	
HCM Lane V/C Ratio	0.014	-	-	-	0.037	
HCM Ctrl Dly (s/v)	8.6	0.1	-	-	12.8	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Lanes, Volumes, Timings
8: Roger Street & South Access

153 Union Street East, Waterloo TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	29	1	3	65	0	0	0	4	1	0	0
Future Volume (vph)	0	29	1	3	65	0	0	0	4	1	0	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt	0.995							0.865				
Flt Protected					0.998						0.950	
Satd. Flow (prot)	0	1436	0	0	1486	0	0	1061	0	0	1456	0
Flt Permitted					0.998						0.950	
Satd. Flow (perm)	0	1436	0	0	1486	0	0	1061	0	0	1456	0
Link Speed (k/h)	30				30		30				30	
Link Distance (m)	76.9				329.2		63.5				35.6	
Travel Time (s)	9.2				39.5		7.6				4.3	
Confl. Peds. (#/hr)	5			5				3	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	100%	66%	0%	0%	0%	0%	25%	0%	0%	0%
Adj. Flow (vph)	0	29	1	3	65	0	0	0	4	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	68	0	0	4	0	0	1	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.1%				ICU Level of Service A							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	29	1	3	65	0	0	0	4	1	0	0
Future Vol, veh/h	0	29	1	3	65	0	0	0	4	1	0	0
Conflicting Peds, #/hr	0	0	5	5	0	0	3	0	1	1	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	3	100	66	0	0	0	0	25	0	0	0
Mvmt Flow	0	29	1	3	65	0	0	0	4	1	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	65	0	0	35	0	0	109	106	36	101	106	68
Stage 1	-	-	-	-	-	-	35	35	-	71	71	-
Stage 2	-	-	-	-	-	-	74	71	-	30	35	-
Critical Hdwy	4.1	-	-	4.76	-	-	7.1	6.5	6.45	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.794	-	-	3.5	4	3.525	3.5	4	3.3
Pot Cap-1 Maneuver	1550	-	-	1247	-	-	875	788	975	885	788	1001
Stage 1	-	-	-	-	-	-	987	870	-	944	840	-
Stage 2	-	-	-	-	-	-	940	840	-	992	870	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1550	-	-	1242	-	-	867	783	970	878	783	998
Mov Cap-2 Maneuver	-	-	-	-	-	-	867	783	-	878	783	-
Stage 1	-	-	-	-	-	-	982	867	-	941	838	-
Stage 2	-	-	-	-	-	-	936	838	-	987	866	-
Approach	EB			WB			NB			SB		
HCM Ctrl Dly, s/v	0			0.35			8.73			9.1		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	970	1550	-	-	79	-	-	878				
HCM Lane V/C Ratio	0.004	-	-	-	0.002	-	-	0.001				
HCM Ctrl Dly (s/v)	8.7	0	-	-	7.9	0	-	9.1				
HCM Lane LOS	A	A	-	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

Appendix D

Internal Capture Calculations



NCHRP 8-51 Internal Trip Capture Estimation Tool					
Project Name:	153 Union Street East			Organization:	PTSL (250792)
Project Location:	Waterloo			Performed By:	
Scenario Description:				Date:	
Analysis Year:				Checked By:	
Analysis Period:	AM Street Peak Hour			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822	3,740		14	7	7
Restaurant				0		
Cinema/Entertainment				0		
Residential	222		244	54	6	48
Hotel				0		
All Other Land Uses ²				0		
Total				68	13	55

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail	1.00			1.00		
Restaurant						
Cinema/Entertainment						
Residential	1.00			1.00		
Hotel						
All Other Land Uses ²						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	68	13	55
Internal Capture Percentage	0%	0%	0%
External Vehicle-Trips ³	68	13	55
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	0%	0%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	0%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Informational Report</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
³ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A
⁴ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
<i>Estimation Tool Developed by the Texas Transportation Institute</i>

Project Name:	153 Union Street East
Analysis Period:	AM Street Peak Hour

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	7	7	1.00	7	7
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	6	6	1.00	48	48
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	2		1	0	1	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	0	10	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	1		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	0	7	7	7	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	6	6	6	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	0	7	7	7	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	48	48	48	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool					
Project Name:	153 Union Street East			Organization:	PTSL (250792)
Project Location:	Waterloo			Performed By:	
Scenario Description:				Date:	
Analysis Year:				Checked By:	
Analysis Period:	PM Street Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822	3,740		22	11	11
Restaurant				0		
Cinema/Entertainment				0		
Residential	222		244	46	32	14
Hotel				0		
All Other Land Uses ²				0		
Total				68	43	25

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail	1.00			1.00		
Restaurant						
Cinema/Entertainment						
Residential	1.00			1.00		
Hotel						
All Other Land Uses ²						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail					0	
Restaurant						
Cinema/Entertainment						
Residential		0				
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	3	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	68	43	25
Internal Capture Percentage	12%	9%	16%
External Vehicle-Trips ³	60	39	21
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	9%	27%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	9%	7%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

³Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

⁴Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	153 Union Street East
Analysis Period:	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	11	11	1.00	11	11
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	32	32	1.00	14	14
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		3	0	3	1
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	6	3	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	1	0
Retail	0		0	0	15	0
Restaurant	0	6		0	5	0
Cinema/Entertainment	0	0	0		1	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	1	10	11	10	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	29	32	29	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	3	8	11	8	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	13	14	13	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

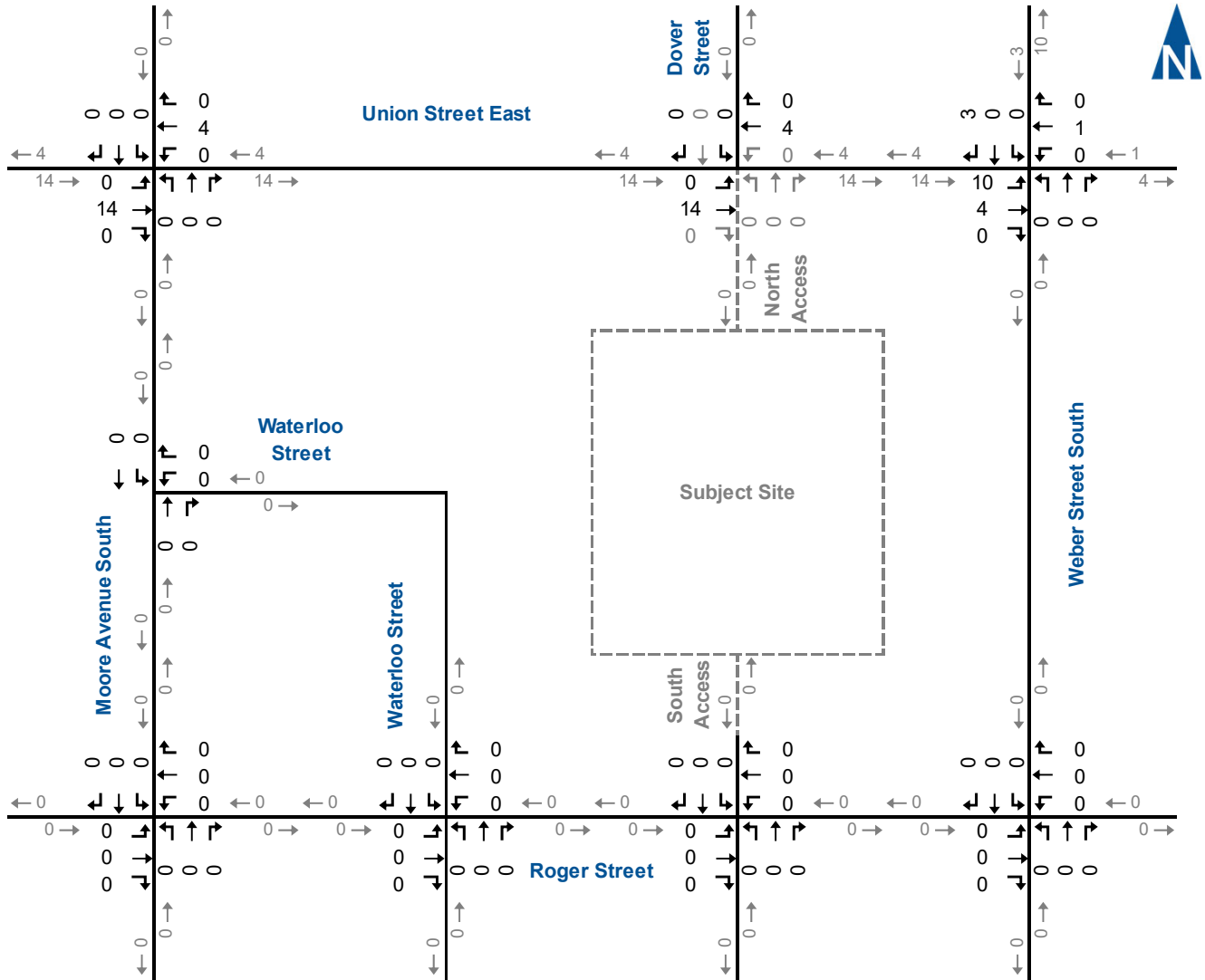
*Indicates computation that has been rounded to the nearest whole number.

Appendix E

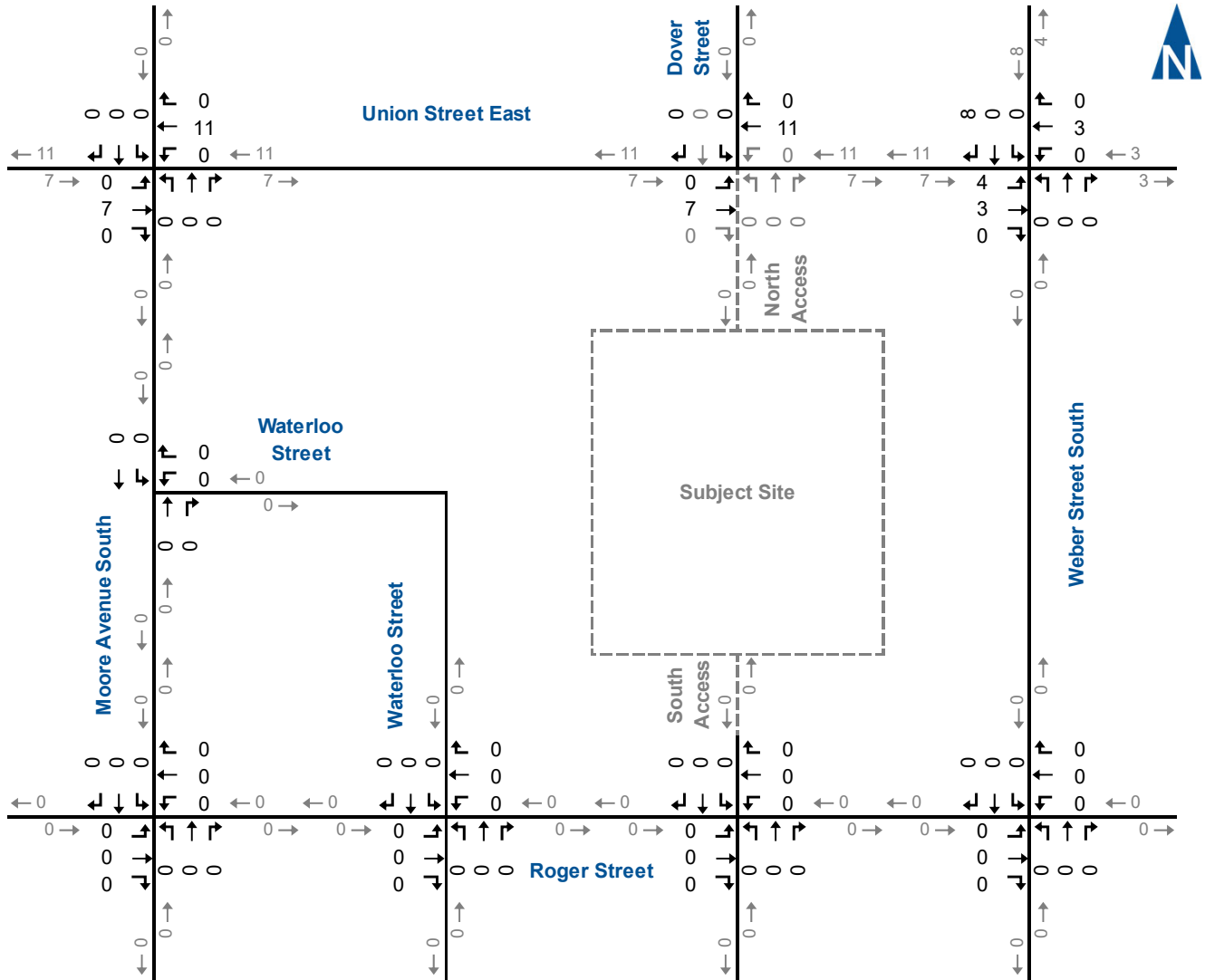
Background Development Traffic Volumes



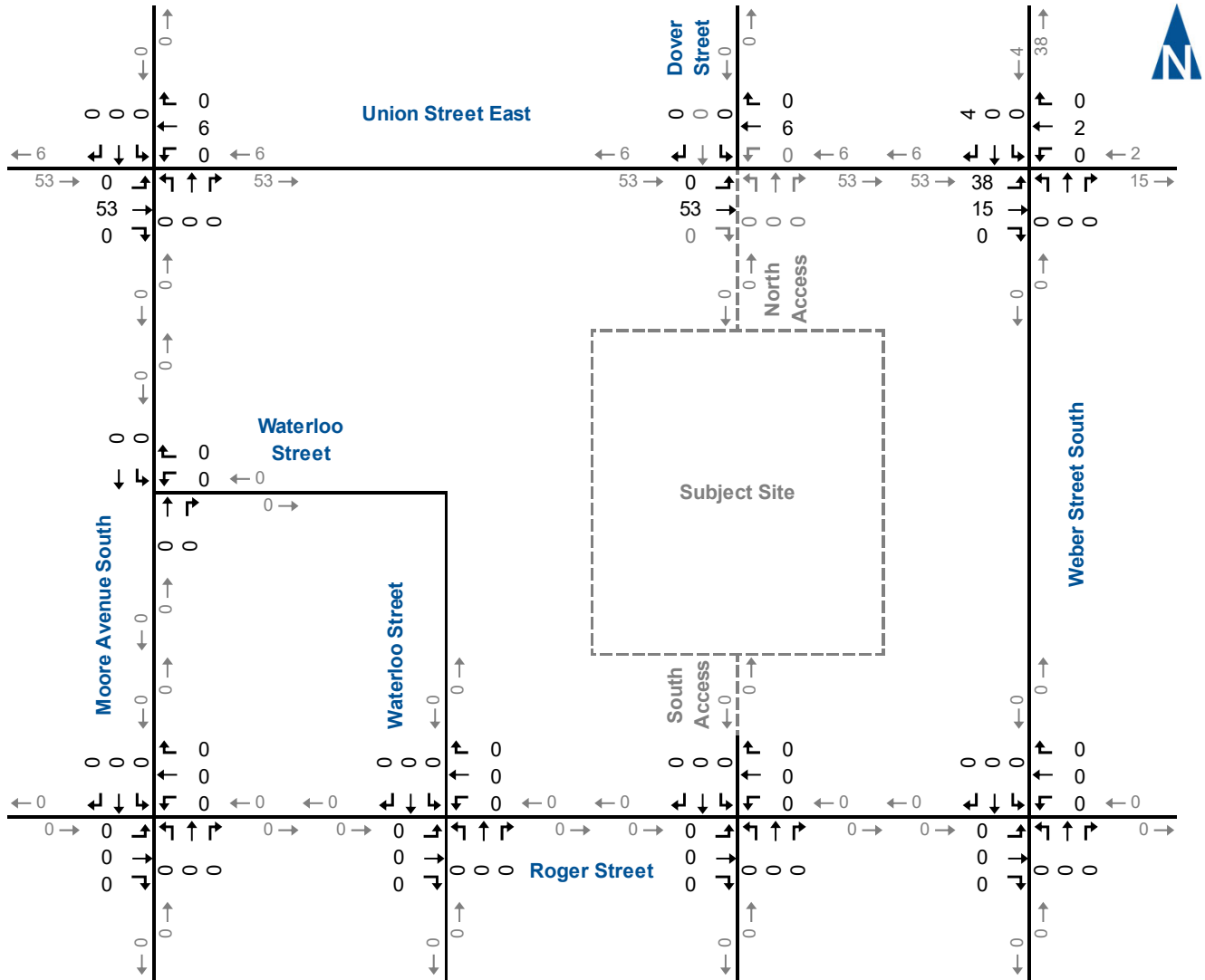
AM Peak Hour

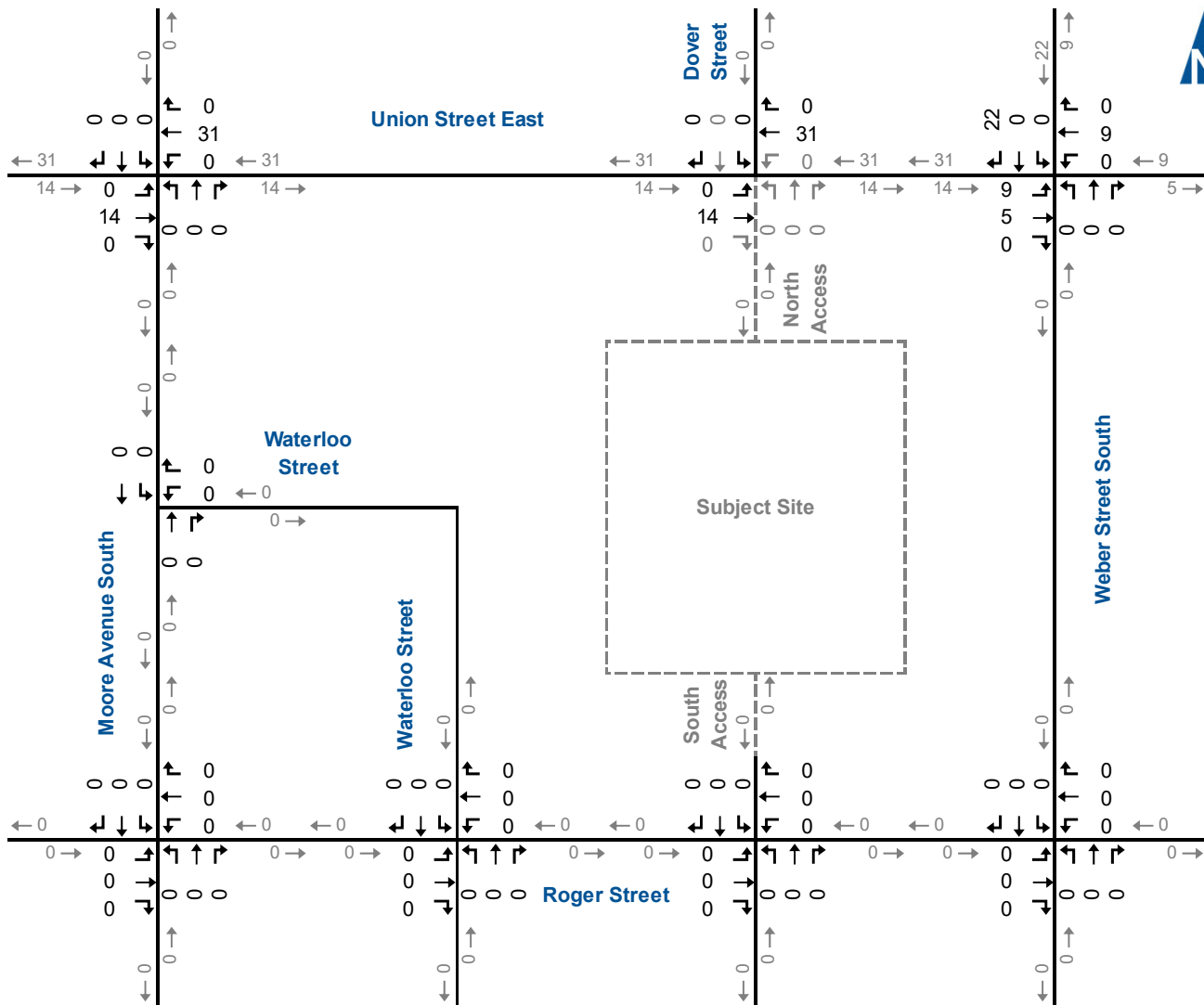


PM Peak Hour



AM Peak Hour





Appendix F

Background Operations



Lanes, Volumes, Timings

153 Union Street East, Waterloo TIS

1: Weber Street South & Union Street East

Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	359	84	75	452	82	99	914	61	30	687	141
Future Volume (vph)	204	359	84	75	452	82	99	914	61	30	687	141
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	25.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.981			0.980			0.991			0.974	
Flt Protected		0.984			0.994		0.950			0.950		
Satd. Flow (prot)	0	2894	0	0	2948	0	1603	3206	0	1603	3151	0
Flt Permitted		0.573			0.792		0.157			0.239		
Satd. Flow (perm)	0	1685	0	0	2348	0	265	3206	0	402	3151	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			23			11			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		291.5			221.3			213.4			417.0	
Travel Time (s)		21.0			15.9			15.4			30.0	
Confl. Peds. (#/hr)	3		7	7		3	3		10	10		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	6%	4%	2%	2%	4%	3%	2%	4%	3%	2%
Adj. Flow (vph)	204	359	84	75	452	82	99	914	61	30	687	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	647	0	0	609	0	99	975	0	30	828	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	24.4		24.4	24.4		5.0	23.6		23.6	23.6	
Minimum Split (s)	9.0	30.4		30.4	30.4		9.0	29.6		29.6	29.6	
Total Split (s)	9.0	39.4		30.4	30.4		9.0	40.6		31.6	31.6	
Total Split (%)	11.3%	49.3%		38.0%	38.0%		11.3%	50.8%		39.5%	39.5%	
Maximum Green (s)	5.0	33.4		24.4	24.4		5.0	34.6		25.6	25.6	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		0.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	C-Max		C-Max	C-Max	
Walk Time (s)		7.4		7.4	7.4			7.6		7.6	7.6	
Flash Don't Walk (s)		17.0		17.0	17.0			16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effect Green (s)		35.4			26.4		36.6	36.6		29.4	29.4	
Actuated g/C Ratio		0.44			0.33		0.46	0.46		0.37	0.37	
v/c Ratio		0.77			0.77		0.49	0.66		0.20	0.70	

Synchro 12 Report

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)		19.3			31.1		21.0	19.4		23.1	25.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		19.3			31.1		21.0	19.4		23.1	25.2	
LOS		B			C		C	B		C	C	
Approach Delay (s/veh)		19.3			31.1			19.5			25.2	
Approach LOS		B			C			B			C	
Queue Length 50th (m)		38.3			41.7		8.5	58.1		3.2	56.0	
Queue Length 95th (m)		#50.6			#61.8		17.2	78.5		10.1	77.0	
Internal Link Dist (m)		267.5			197.3			189.4			393.0	
Turn Bay Length (m)							30.0			25.0		
Base Capacity (vph)		835			790		204	1472		147	1178	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.77			0.77		0.49	0.66		0.20	0.70	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay (s/veh): 23.2

Intersection LOS: C

Intersection Capacity Utilization 104.0%

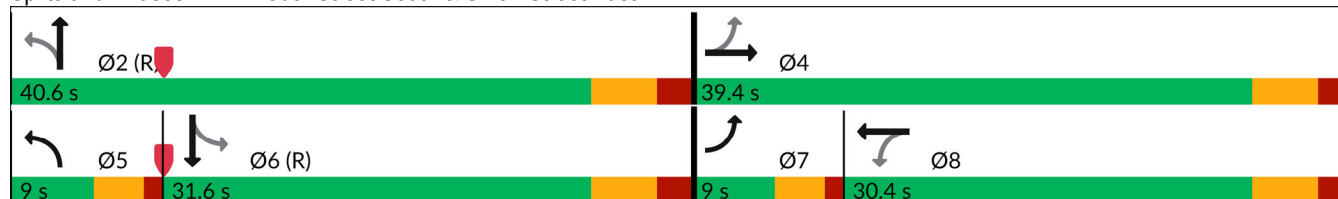
ICU Level of Service G

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Weber Street South & Union Street East



Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS
Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	567	23	23	591	39	30	77	59	16	46	17
Future Volume (vph)	23	567	23	23	591	39	30	77	59	16	46	17
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	25.0		0.0	25.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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
Ped Bike Factor	0.99	1.00		0.99		0.95	0.94	0.96		0.94	0.98	
Frt		0.994				0.850		0.935			0.960	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1502	1560	0	1668	1842	1428	1668	1416	0	1668	1468	0
Flt Permitted	0.334			0.335			0.716			0.654		
Satd. Flow (perm)	523	1560	0	585	1842	1363	1186	1416	0	1076	1468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				41		49			17	
Link Speed (k/h)		50			50			40			30	
Link Distance (m)		221.4			222.2			136.0			299.5	
Travel Time (s)		15.9			16.0			12.2			35.9	
Confl. Peds. (#/hr)	30		17	17		30	34		70	70		34
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	4%	0%	0%	2%	3%	0%	5%	2%	0%	3%	8%
Adj. Flow (vph)	23	567	23	23	591	39	30	77	59	16	46	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	590	0	23	591	39	30	136	0	16	63	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Minimum Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%	65.0%	35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	46.0	46.0		46.0	46.0	46.0	22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	38.0	38.0		38.0	38.0	38.0	10.0	10.0		10.0	10.0	
Flash Don't Walk (s)	8.0	8.0		8.0	8.0	8.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effect Green (s)	48.0	48.0		48.0	48.0	48.0	24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.30	0.30		0.30	0.30	
v/c Ratio	0.07	0.63		0.07	0.53	0.05	0.08	0.30		0.05	0.14	
Control Delay (s/veh)	7.5	14.0		5.0	7.7	1.4	21.0	16.0		20.6	17.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay (s/veh)	7.5	14.0		5.0	7.7	1.4	21.0	16.0		20.6	17.0	
LOS	A	B		A	A	A	C	B		C	B	
Approach Delay (s/veh)		13.7			7.2			16.9			17.7	

Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS
Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B			A			B			B		
Queue Length 50th (m)	1.4	52.6		1.1	33.1	0.0	3.2	10.1		1.7	5.1	
Queue Length 95th (m)	4.6	85.0		m1.4	m43.1	m0.3	9.1	24.1		5.9	13.8	
Internal Link Dist (m)	197.4			198.2			112.0			275.5		
Turn Bay Length (m)	25.0			25.0			15.0			15.0		
Base Capacity (vph)	313	938		351	1105	834	355	459		322	452	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.07	0.63		0.07	0.53	0.05	0.08	0.30		0.05	0.14	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 56 (70%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.63

Intersection Signal Delay (s/veh): 11.5

Intersection LOS: B

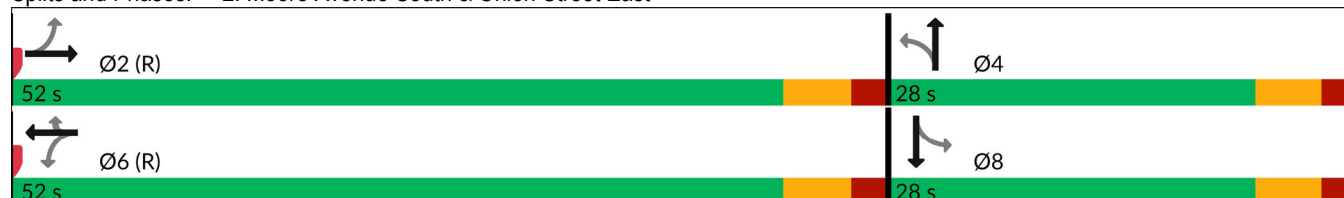
Intersection Capacity Utilization 105.0%

ICU Level of Service G

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Moore Avenue South & Union Street East



Lanes, Volumes, Timings
3: Weber Street South & Roger Street

153 Union Street East, Waterloo TIS
Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	2	18	1	0	0	52	1135	2	2	694	53
Future Volume (vph)	23	2	18	1	0	0	52	1135	2	2	694	53
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt	0.943										0.989	
Flt Protected	0.974		0.950				0.998					
Satd. Flow (prot)	0	1264	0	0	1456	0	0	2998	0	0	2969	0
Flt Permitted	0.974		0.950				0.998					
Satd. Flow (perm)	0	1264	0	0	1456	0	0	2998	0	0	2969	0
Link Speed (k/h)	30		50				50					
Link Distance (m)	329.2		37.4				425.2				213.4	
Travel Time (s)	39.5		2.7				30.6				15.4	
Confl. Peds. (#/hr)							5		1	1		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	50%	14%	0%	0%	0%	8%	3%	0%	0%	3%	7%
Adj. Flow (vph)	23	2	18	1	0	0	52	1135	2	2	694	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	1	0	0	1189	0	0	749	0
Sign Control	Stop		Stop				Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	75.4%				ICU Level of Service D							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	2	18	1	0	0	52	1135	2	2	694	53
Future Vol, veh/h	23	2	18	1	0	0	52	1135	2	2	694	53
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	1	1	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	50	14	0	0	0	8	3	0	0	3	7
Mvmt Flow	23	2	18	1	0	0	52	1135	2	2	694	53
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1401	1972	379	1593	1997	570	752	0	0	1138	0	0
Stage 1	730	730	-	1241	1241	-	-	-	-	-	-	-
Stage 2	672	1242	-	352	756	-	-	-	-	-	-	-
Critical Hdwy	7.62	7.5	7.18	7.5	6.5	6.9	4.26	-	-	4.1	-	-
Critical Hdwy Stg 1	6.62	6.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.62	6.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.56	4.5	3.44	3.5	4	3.3	2.28	-	-	2.2	-	-
Pot Cap-1 Maneuver	96	35	586	73	61	470	815	-	-	621	-	-
Stage 1	371	327	-	188	249	-	-	-	-	-	-	-
Stage 2	403	167	-	643	419	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	87	32	584	60	55	470	812	-	-	621	-	-
Mov Cap-2 Maneuver	87	32	-	60	55	-	-	-	-	-	-	-
Stage 1	368	324	-	171	226	-	-	-	-	-	-	-
Stage 2	365	152	-	617	416	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	51.08		65.65		1.22		0.07					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	157	-	-	120	60	9	-	-				
HCM Lane V/C Ratio	0.064	-	-	0.359	0.017	0.003	-	-				
HCM Ctrl Dly (s/v)	9.7	0.8	-	51.1	65.7	10.8	0	-				
HCM Lane LOS	A	A	-	F	F	B	A	-				
HCM 95th %tile Q(veh)	0.2	-	-	1.5	0.1	0	-	-				

Lanes, Volumes, Timings
4: Moore Avenue South & Roger Street

153 Union Street East, Waterloo TIS
Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	6	6	6	17	14	9	103	2	9	65	2
Future Volume (vph)	18	6	6	6	17	14	9	103	2	9	65	2
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.973			0.949			0.998			0.996	
Flt Protected		0.971			0.992			0.996			0.994	
Satd. Flow (prot)	0	1286	0	0	1387	0	0	1483	0	0	1492	0
Flt Permitted		0.971			0.992			0.996			0.994	
Satd. Flow (perm)	0	1286	0	0	1387	0	0	1483	0	0	1492	0
Link Speed (k/h)		30			30			40			40	
Link Distance (m)		200.9			172.2			179.3			129.9	
Travel Time (s)		24.1			20.7			16.1			11.7	
Confl. Peds. (#/hr)	16		5	5		16	18		11	11		18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	0%	0%	25%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	18	6	6	6	17	14	9	103	2	9	65	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	37	0	0	114	0	0	76	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.4%				ICU Level of Service A							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	6	6	6	17	14	9	103	2	9	65	2
Future Vol, veh/h	18	6	6	6	17	14	9	103	2	9	65	2
Conflicting Peds, #/hr	16	0	5	5	0	16	18	0	11	11	0	18
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	21	0	0	25	0	0	0	3	0	0	2	0
Mvmt Flow	18	6	6	6	17	14	9	103	2	9	65	2
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	248	236	89	224	236	131	85	0	0	116	0	0
Stage 1	102	102	-	133	133	-	-	-	-	-	-	-
Stage 2	146	134	-	91	103	-	-	-	-	-	-	-
Critical Hdwy	7.31	6.5	6.2	7.35	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.31	5.5	-	6.35	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.31	5.5	-	6.35	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.689	4	3.3	3.725	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	668	668	975	685	668	924	1524	-	-	1485	-	-
Stage 1	860	815	-	818	790	-	-	-	-	-	-	-
Stage 2	814	789	-	862	814	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	615	644	956	657	644	903	1501	-	-	1471	-	-
Mov Cap-2 Maneuver	615	644	-	657	644	-	-	-	-	-	-	-
Stage 1	841	797	-	805	778	-	-	-	-	-	-	-
Stage 2	768	777	-	842	796	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	10.64		10.23		0.59		0.88					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	142	-	-	668	725	212	-	-				
HCM Lane V/C Ratio	0.006	-	-	0.045	0.051	0.006	-	-				
HCM Ctrl Dly (s/v)	7.4	0	-	10.6	10.2	7.5	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-				

Lanes, Volumes, Timings
5: Moore Avenue South & Waterloo Street

153 Union Street East, Waterloo TIS
Background AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	17	125	0	14	88
Future Volume (vph)	1	17	125	0	14	88
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.872					
Flt Protected	0.997					0.993
Satd. Flow (prot)	1411	0	1511	0	0	1566
Flt Permitted	0.997					0.993
Satd. Flow (perm)	1411	0	1511	0	0	1566
Link Speed (k/h)	30		40			40
Link Distance (m)	162.4		129.9			136.0
Travel Time (s)	19.5		11.7			12.2
Confl. Peds. (#/hr)		2		5	5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	8%	8%	0%	0%	4%
Adj. Flow (vph)	1	17	125	0	14	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	125	0	0	102
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	28.7%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	17	125	0	14	88
Future Vol, veh/h	1	17	125	0	14	88
Conflicting Peds, #/hr	0	2	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	8	8	0	0	4
Mvmt Flow	1	17	125	0	14	88
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	246	132	0	0	130	0
Stage 1	130	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.4	6.28	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.372	-	-	2.2	-
Pot Cap-1 Maneuver	747	902	-	-	1468	-
Stage 1	901	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	736	896	-	-	1462	-
Mov Cap-2 Maneuver	736	-	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	905	-	-	-	-	-
Approach	WB	NB		SB		
HCM Ctrl Dly, s/v	9.15	0		1.03		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 886		247	-	
HCM Lane V/C Ratio	-	- 0.02		0.01	-	
HCM Ctrl Dly (s/v)	-	- 9.1		7.5	0	
HCM Lane LOS	-	- A		A	A	
HCM 95th %tile Q(veh)	-	- 0.1		0	-	

Lanes, Volumes, Timings
6: Waterloo Street & Roger Street

153 Union Street East, Waterloo TIS
Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	20	3	8	29	2	0	13	13	9	3	0
Future Volume (vph)	1	20	3	8	29	2	0	13	13	9	3	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.983			0.993			0.932				
Flt Protected		0.998			0.990						0.964	
Satd. Flow (prot)	0	1421	0	0	1412	0	0	1242	0	0	1478	0
Flt Permitted		0.998			0.990						0.964	
Satd. Flow (perm)	0	1421	0	0	1412	0	0	1242	0	0	1478	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		172.2			76.9			123.3			67.1	
Travel Time (s)		20.7			9.2			14.8			8.1	
Confl. Peds. (#/hr)	2		4	4		2	3		1	1		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	0%	0%	9%	0%	0%	20%	10%	0%	0%	0%
Adj. Flow (vph)	1	20	3	8	29	2	0	13	13	9	3	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	39	0	0	26	0	0	12	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.4%						ICU Level of Service A					
Analysis Period (min)	15											

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

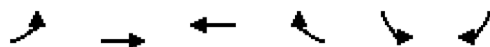
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	20	3	8	29	2	0	13	13	9	3	0
Future Vol, veh/h	1	20	3	8	29	2	0	13	13	9	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	7	0	0	9	0	0	20	10	0	0	0
Mvmt Flow	1	20	3	8	29	2	0	13	13	9	3	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.1	7.2	7.2	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	4%	21%	75%
Vol Thru, %	50%	83%	74%	25%
Vol Right, %	50%	13%	5%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	26	24	39	12
LT Vol	0	1	8	9
Through Vol	13	20	29	3
RT Vol	13	3	2	0
Lane Flow Rate	26	24	39	12
Geometry Grp	1	1	1	1
Degree of Util (X)	0.029	0.026	0.043	0.014
Departure Headway (Hd)	4.059	3.929	3.995	4.179
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	881	911	897	855
Service Time	2.087	1.954	2.016	2.21
HCM Lane V/C Ratio	0.03	0.026	0.043	0.014
HCM Control Delay, s/veh	7.2	7.1	7.2	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0

Lanes, Volumes, Timings
7: Union Street East & Dover Street

153 Union Street East, Waterloo TIS
Background AM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (vph)	10	630	695	7	8	13
Future Volume (vph)	10	630	695	7	8	13
Ideal Flow (vphpl)	1775	1775	1775	1775	1765	1765
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.999		0.916	
Flt Protected		0.999			0.981	
Satd. Flow (prot)	0	3236	3261	0	1396	0
Flt Permitted		0.999			0.981	
Satd. Flow (perm)	0	3236	3261	0	1396	0
Link Speed (k/h)		50	50		30	
Link Distance (m)		222.2	291.5		370.1	
Travel Time (s)		16.0	21.0		44.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	2%	20%	0%	20%
Adj. Flow (vph)	10	630	695	7	8	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	640	702	0	21	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 36.2% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	630	695	7	8	13
Future Vol, veh/h	10	630	695	7	8	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	3	2	20	0	20
Mvmt Flow	10	630	695	7	8	13
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	702	0	-	0	1034	351
Stage 1	-	-	-	-	699	-
Stage 2	-	-	-	-	335	-
Critical Hdwy	4.1	-	-	-	6.8	7.3
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.5
Pot Cap-1 Maneuver	905	-	-	-	231	596
Stage 1	-	-	-	-	460	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	905	-	-	-	228	596
Mov Cap-2 Maneuver	-	-	-	-	228	-
Stage 1	-	-	-	-	454	-
Stage 2	-	-	-	-	702	-
Approach	EB	WB		SB		
HCM Ctrl Dly, s/v	0.26	0		15.33		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	56	-	-	-	-	369
HCM Lane V/C Ratio	0.011	-	-	-	-	0.057
HCM Ctrl Dly (s/v)	9	0.1	-	-	-	15.3
HCM Lane LOS	A	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	-	0.2

Lanes, Volumes, Timings
8: Roger Street & South Access

153 Union Street East, Waterloo TIS
Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	39	1	1	37	3	0	0	5	3	0	2
Future Volume (vph)	1	39	1	1	37	3	0	0	5	3	0	2
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.997			0.990			0.865			0.946	
Flt Protected		0.999			0.999						0.971	
Satd. Flow (prot)	0	1444	0	0	1406	0	0	663	0	0	1408	0
Flt Permitted		0.999			0.999						0.971	
Satd. Flow (perm)	0	1444	0	0	1406	0	0	663	0	0	1408	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		76.9			329.2			63.5			35.6	
Travel Time (s)		9.2			39.5			7.6			4.3	
Confl. Peds. (#/hr)	1		5	5		1	3		1	1		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	6%	0%	100%	6%	0%	0%	0%	100%	0%	0%	0%
Adj. Flow (vph)	1	39	1	1	37	3	0	0	5	3	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	41	0	0	41	0	0	5	0	0	5	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	16.2%						ICU Level of Service A					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	39	1	1	37	3	0	0	5	3	0	2
Future Vol, veh/h	1	39	1	1	37	3	0	0	5	3	0	2
Conflicting Peds, #/hr	1	0	5	5	0	1	3	0	1	1	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	6	0	100	6	0	0	0	100	0	0	0
Mvmt Flow	1	39	1	1	37	3	0	0	5	3	0	2
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	41	0	0	45	0	0	89	90	46	84	89	43
Stage 1	-	-	-	-	-	-	47	47	-	42	42	-
Stage 2	-	-	-	-	-	-	42	43	-	42	47	-
Critical Hdwy	4.1	-	-	5.1	-	-	7.1	6.5	7.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	3.1	-	-	3.5	4	4.2	3.5	4	3.3
Pot Cap-1 Maneuver	1581	-	-	1111	-	-	902	804	804	908	805	1034
Stage 1	-	-	-	-	-	-	972	860	-	978	864	-
Stage 2	-	-	-	-	-	-	978	863	-	978	860	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1580	-	-	1106	-	-	892	799	799	900	800	1030
Mov Cap-2 Maneuver	-	-	-	-	-	-	892	799	-	900	800	-
Stage 1	-	-	-	-	-	-	968	856	-	976	863	-
Stage 2	-	-	-	-	-	-	972	862	-	970	856	-
Approach	EB			WB			NB			SB		
HCM Ctrl Dly, s/v	0.18			0.2			9.53			8.82		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	799	44	-	-	43	-	-	948				
HCM Lane V/C Ratio	0.006	0.001	-	-	0.001	-	-	0.005				
HCM Ctrl Dly (s/v)	9.5	7.3	0	-	8.3	0	-	8.8				
HCM Lane LOS	A	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

Lanes, Volumes, Timings

153 Union Street East, Waterloo TIS

1: Weber Street South & Union Street East

Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	554	98	49	337	80	106	853	103	61	942	156
Future Volume (vph)	201	554	98	49	337	80	106	853	103	61	942	156
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	25.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.983			0.974			0.984			0.979	
Flt Protected		0.988			0.995		0.950			0.950		
Satd. Flow (prot)	0	2980	0	0	2975	0	1668	3247	0	1668	3231	0
Flt Permitted		0.649			0.792		0.105			0.251		
Satd. Flow (perm)	0	1957	0	0	2368	0	184	3247	0	440	3231	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			29			20			24	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		291.5			221.3			213.4			417.0	
Travel Time (s)		21.0			15.9			15.4			30.0	
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	201	554	98	49	337	80	106	853	103	61	942	156
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	853	0	0	466	0	106	956	0	61	1098	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	26.4		26.4	26.4		5.0	29.1		29.1	29.1	
Minimum Split (s)	9.0	32.4		32.4	32.4		9.0	35.1		35.1	35.1	
Total Split (s)	9.0	42.0		33.0	33.0		9.0	48.0		39.0	39.0	
Total Split (%)	10.0%	46.7%		36.7%	36.7%		10.0%	53.3%		43.3%	43.3%	
Maximum Green (s)	5.0	36.0		27.0	27.0		5.0	42.0		33.0	33.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		0.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	C-Max		C-Max	C-Max	
Walk Time (s)		9.4		9.4	9.4			13.1		13.1	13.1	
Flash Don't Walk (s)		17.0		17.0	17.0			16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effect Green (s)		38.0			29.0		44.0	44.0		36.8	36.8	
Actuated g/C Ratio		0.42			0.32		0.49	0.49		0.41	0.41	
v/c Ratio		0.95			0.60		0.62	0.60		0.34	0.82	

Synchro 12 Report

PTSL (250792)

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)		45.9			27.7		29.8	18.2		26.4	30.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		45.9			27.7		29.8	18.2		26.4	30.3	
LOS		D			C		C	B		C	C	
Approach Delay (s/veh)		45.9			27.7			19.3			30.1	
Approach LOS		D			C			B			C	
Queue Length 50th (m)		59.2			32.8		9.4	58.4		7.3	87.9	
Queue Length 95th (m)		#102.2			48.6		#23.2	77.1		18.5	#120.0	
Internal Link Dist (m)		267.5			197.3			189.4			393.0	
Turn Bay Length (m)							30.0			25.0		
Base Capacity (vph)		894			782		172	1597		180	1335	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.95			0.60		0.62	0.60		0.34	0.82	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay (s/veh): 30.4

Intersection LOS: C

Intersection Capacity Utilization 116.4%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Weber Street South & Union Street East



Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS
Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	693	21	23	564	26	56	85	59	40	118	53
Future Volume (vph)	47	693	21	23	564	26	56	85	59	40	118	53
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	25.0		0.0	25.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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
Ped Bike Factor	1.00	1.00		0.99		0.97	0.98	0.99		0.98	0.98	
Frt		0.996				0.850		0.939			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1573	1608	0	1668	1860	1471	1668	1495	0	1668	1533	0
Flt Permitted	0.353			0.254			0.598			0.641		
Satd. Flow (perm)	582	1608	0	443	1860	1425	1027	1495	0	1107	1533	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				41		45			29	
Link Speed (k/h)		50			50			40			30	
Link Distance (m)		221.4			222.2			136.0			299.5	
Travel Time (s)		15.9			16.0			12.2			35.9	
Confl. Peds. (#/hr)	13		23	23		13	16		18	18		16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	1%	0%	0%	1%	0%	0%	2%	0%	0%	0%	0%
Adj. Flow (vph)	47	693	21	23	564	26	56	85	59	40	118	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	714	0	23	564	26	56	144	0	40	171	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Minimum Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%	65.0%	35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	46.0	46.0		46.0	46.0	46.0	22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	38.0	38.0		38.0	38.0	38.0	10.0	10.0		10.0	10.0	
Flash Don't Walk (s)	8.0	8.0		8.0	8.0	8.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effect Green (s)	48.0	48.0		48.0	48.0	48.0	24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.30	0.30		0.30	0.30	
v/c Ratio	0.13	0.74		0.09	0.51	0.03	0.18	0.30		0.12	0.36	
Control Delay (s/veh)	8.2	17.3		7.8	11.2	1.5	22.7	16.7		21.6	20.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay (s/veh)	8.2	17.3		7.8	11.2	1.5	22.7	16.7		21.6	20.6	
LOS	A	B		A	B	A	C	B		C	C	
Approach Delay (s/veh)		16.8			10.6			18.4			20.8	

Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS
Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B			B			B			C		
Queue Length 50th (m)	2.9	69.8		1.3	44.3	0.0	6.2	11.2		4.3	16.3	
Queue Length 95th (m)	7.8	113.6		4.4	67.7	1.8	14.8	25.1		11.4	32.2	
Internal Link Dist (m)	197.4			198.2			112.0			275.5		
Turn Bay Length (m)	25.0			25.0			15.0			15.0		
Base Capacity (vph)	349	966		265	1116	871	308	480		332	480	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.74		0.09	0.51	0.03	0.18	0.30		0.12	0.36	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 47.2 (59%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.74

Intersection Signal Delay (s/veh): 15.3

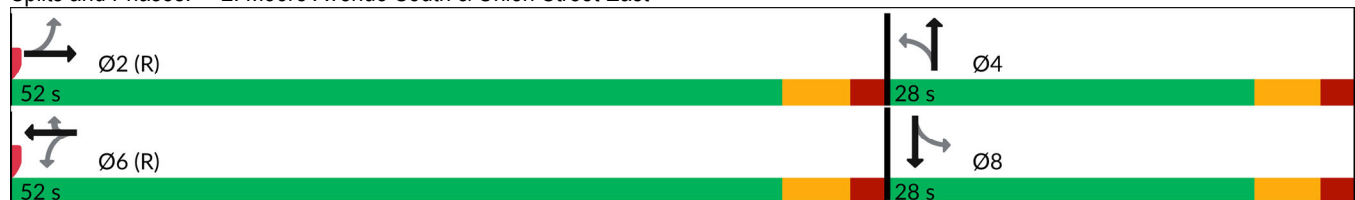
Intersection LOS: B

Intersection Capacity Utilization 105.0%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 2: Moore Avenue South & Union Street East



Lanes, Volumes, Timings
3: Weber Street South & Roger Street

153 Union Street East, Waterloo TIS
Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	0	65	1	0	1	23	971	1	0	1108	33
Future Volume (vph)	48	0	65	1	0	1	23	971	1	0	1108	33
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.922			0.932						0.996	
Flt Protected		0.979			0.976			0.999				
Satd. Flow (prot)	0	1368	0	0	1394	0	0	3067	0	0	3058	0
Flt Permitted		0.979			0.976			0.999				
Satd. Flow (perm)	0	1368	0	0	1394	0	0	3067	0	0	3058	0
Link Speed (k/h)		30			50			50			50	
Link Distance (m)		329.2			37.4			425.2			213.4	
Travel Time (s)		39.5			2.7			30.6			15.4	
Confl. Peds. (#/hr)	2		1	1		2	6		2	2		6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	48	0	65	1	0	1	23	971	1	0	1108	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	113	0	0	2	0	0	995	0	0	1141	0
Sign Control	Stop		Stop				Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	66.4%				ICU Level of Service C							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	0	65	1	0	1	23	971	1	0	1108	33
Future Vol, veh/h	48	0	65	1	0	1	23	971	1	0	1108	33
Conflicting Peds, #/hr	2	0	1	1	0	2	6	0	2	2	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	2	0	0	0	0	1	0	0	1	0
Mvmt Flow	48	0	65	1	0	1	23	971	1	0	1108	33
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1664	2151	578	1575	2167	490	1147	0	0	974	0	0
Stage 1	1131	1131	-	1020	1020	-	-	-	-	-	-	-
Stage 2	534	1020	-	555	1147	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.94	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.32	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	65	49	459	76	48	529	616	-	-	716	-	-
Stage 1	220	281	-	257	317	-	-	-	-	-	-	-
Stage 2	503	317	-	489	276	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	61	46	457	61	45	528	613	-	-	715	-	-
Mov Cap-2 Maneuver	61	46	-	61	45	-	-	-	-	-	-	-
Stage 1	219	280	-	244	300	-	-	-	-	-	-	-
Stage 2	476	300	-	419	275	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	131.32		38.36		0.79		0					
HCM LOS	F		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	83	-	-	122	110	715	-	-				
HCM Lane V/C Ratio	0.037	-	-	0.93	0.018	-	-	-				
HCM Ctrl Dly (s/v)	11.1	0.5	-	131.3	38.4	0	-	-				
HCM Lane LOS	B	A	-	F	E	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	6	0.1	0	-	-				

Lanes, Volumes, Timings
4: Moore Avenue South & Roger Street

153 Union Street East, Waterloo TIS
Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	9	14	7	14	16	11	101	1	9	133	10
Future Volume (vph)	10	9	14	7	14	16	11	101	1	9	133	10
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.943			0.942			0.999			0.991	
Flt Protected		0.985			0.991			0.995			0.997	
Satd. Flow (prot)	0	1424	0	0	1431	0	0	1524	0	0	1514	0
Flt Permitted		0.985			0.991			0.995			0.997	
Satd. Flow (perm)	0	1424	0	0	1431	0	0	1524	0	0	1514	0
Link Speed (k/h)		30			30			40			40	
Link Distance (m)		200.9			172.2			179.3			129.9	
Travel Time (s)		24.1			20.7			16.1			11.7	
Confl. Peds. (#/hr)	2		3	3		2	6		13	13		6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	9	14	7	14	16	11	101	1	9	133	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	33	0	0	37	0	0	113	0	0	152	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	23.5%						ICU Level of Service A					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	9	14	7	14	16	11	101	1	9	133	10
Future Vol, veh/h	10	9	14	7	14	16	11	101	1	9	133	10
Conflicting Peds, #/hr	2	0	3	3	0	2	6	0	13	13	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	9	14	7	14	16	11	101	1	9	133	10
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	294	299	147	295	304	117	149	0	0	115	0	0
Stage 1	162	162	-	137	137	-	-	-	-	-	-	-
Stage 2	132	137	-	159	167	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	662	616	905	661	613	941	1445	-	-	1487	-	-
Stage 1	845	768	-	872	787	-	-	-	-	-	-	-
Stage 2	876	787	-	848	764	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	622	598	898	623	594	929	1437	-	-	1470	-	-
Mov Cap-2 Maneuver	622	598	-	623	594	-	-	-	-	-	-	-
Stage 1	835	759	-	855	772	-	-	-	-	-	-	-
Stage 2	837	772	-	818	755	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	10.35		10.34		0.73		0.44					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	175	-	-	706	711	105	-	-				
HCM Lane V/C Ratio	0.008	-	-	0.047	0.052	0.006	-	-				
HCM Ctrl Dly (s/v)	7.5	0	-	10.3	10.3	7.5	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-				

Lanes, Volumes, Timings
5: Moore Avenue South & Waterloo Street

153 Union Street East, Waterloo TIS
Background PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	40	139	2	22	142
Future Volume (vph)	0	40	139	2	22	142
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865		0.998			
Flt Protected						0.993
Satd. Flow (prot)	1510	0	1601	0	0	1620
Flt Permitted						0.993
Satd. Flow (perm)	1510	0	1601	0	0	1620
Link Speed (k/h)	30		40			40
Link Distance (m)	162.4		129.9			136.0
Travel Time (s)	19.5		11.7			12.2
Confl. Peds. (#/hr)	3	2		15	15	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	1%	50%	0%	0%
Adj. Flow (vph)	0	40	139	2	22	142
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	141	0	0	164
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	34.4%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	40	139	2	22	142
Future Vol, veh/h	0	40	139	2	22	142
Conflicting Peds, #/hr	3	2	0	15	15	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	1	50	0	0
Mvmt Flow	0	40	139	2	22	142
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	344	157	0	0	156	0
Stage 1	155	-	-	-	-	-
Stage 2	189	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	657	894	-	-	1436	-
Stage 1	878	-	-	-	-	-
Stage 2	848	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	636	881	-	-	1418	-
Mov Cap-2 Maneuver	636	-	-	-	-	-
Stage 1	867	-	-	-	-	-
Stage 2	832	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	9.28	0	1.02			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	881	241	-	
HCM Lane V/C Ratio	-	-	0.045	0.016	-	
HCM Ctrl Dly (s/v)	-	-	9.3	7.6	0	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Lanes, Volumes, Timings
6: Waterloo Street & Roger Street

153 Union Street East, Waterloo TIS
Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	17	7	22	36	17	1	16	11	6	11	1
Future Volume (vph)	3	17	7	22	36	17	1	16	11	6	11	1
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.965			0.969			0.947			0.992	
Flt Protected		0.994			0.986			0.998			0.984	
Satd. Flow (prot)	0	1400	0	0	1464	0	0	1449	0	0	1381	0
Flt Permitted		0.994			0.986			0.998			0.984	
Satd. Flow (perm)	0	1400	0	0	1464	0	0	1449	0	0	1381	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		172.2			76.9			123.3			67.1	
Travel Time (s)		20.7			9.2			14.8			8.1	
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	8%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%
Adj. Flow (vph)	3	17	7	22	36	17	1	16	11	6	11	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	27	0	0	75	0	0	28	0	0	18	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.7%											
Analysis Period (min)	15											
ICU Level of Service A												

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	17	7	22	36	17	1	16	11	6	11	1
Future Vol, veh/h	3	17	7	22	36	17	1	16	11	6	11	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	8	0	0	0	0	0	0	0	25	0	0
Mvmt Flow	3	17	7	22	36	17	1	16	11	6	11	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.1	7.3	7	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	11%	29%	33%
Vol Thru, %	57%	63%	48%	61%
Vol Right, %	39%	26%	23%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	27	75	18
LT Vol	1	3	22	6
Through Vol	16	17	36	11
RT Vol	11	7	17	1
Lane Flow Rate	28	27	75	18
Geometry Grp	1	1	1	1
Degree of Util (X)	0.03	0.029	0.082	0.023
Departure Headway (Hd)	3.862	3.904	3.923	4.558
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	922	914	912	782
Service Time	1.907	1.94	1.951	2.602
HCM Lane V/C Ratio	0.03	0.03	0.082	0.023
HCM Control Delay, s/veh	7	7.1	7.3	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.3	0.1

Lanes, Volumes, Timings
7: Union Street East & Dover Street

153 Union Street East, Waterloo TIS
Background PM

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	850	609	9	7	14
Future Volume (vph)	16	850	609	9	7	14
Ideal Flow (vphpl)	1775	1775	1775	1775	1765	1765
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.910	
Flt Protected		0.999			0.984	
Satd. Flow (prot)	0	3294	3296	0	1563	0
Flt Permitted		0.999			0.984	
Satd. Flow (perm)	0	3294	3296	0	1563	0
Link Speed (k/h)		50	50		30	
Link Distance (m)		222.2	291.5		370.1	
Travel Time (s)		16.0	21.0		44.4	
Confl. Peds. (#/hr)	2			2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	1%	1%	0%	0%	0%
Adj. Flow (vph)	16	850	609	9	7	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	866	618	0	21	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	47.3%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	850	609	9	7	14
Future Vol, veh/h	16	850	609	9	7	14
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	8	1	1	0	0	0
Mvmt Flow	16	850	609	9	7	14
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	620	0	-	0	1073	311
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	457	-
Critical Hdwy	4.26	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.28	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	917	-	-	-	218	691
Stage 1	-	-	-	-	507	-
Stage 2	-	-	-	-	610	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	915	-	-	-	213	690
Mov Cap-2 Maneuver	-	-	-	-	213	-
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	610	-
Approach	EB	WB		SB		
HCM Ctrl Dly, s/v	0.36	0		14.62		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	67	-	-	-	395	
HCM Lane V/C Ratio	0.017	-	-	-	0.053	
HCM Ctrl Dly (s/v)	9	0.2	-	-	14.6	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	

Lanes, Volumes, Timings
8: Roger Street & South Access

153 Union Street East, Waterloo TIS
Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	33	1	3	75	0	0	0	4	1	0	0
Future Volume (vph)	0	33	1	3	75	0	0	0	4	1	0	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt	0.996							0.865				
Flt Protected					0.998						0.950	
Satd. Flow (prot)	0	1442	0	0	1492	0	0	1061	0	0	1456	0
Flt Permitted					0.998						0.950	
Satd. Flow (perm)	0	1442	0	0	1492	0	0	1061	0	0	1456	0
Link Speed (k/h)	30			30				30		30		
Link Distance (m)	76.9			329.2				63.5		35.6		
Travel Time (s)	9.2			39.5				7.6		4.3		
Confl. Peds. (#/hr)			5	5				3		1	1	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	100%	66%	0%	0%	0%	0%	25%	0%	0%	0%
Adj. Flow (vph)	0	33	1	3	75	0	0	0	4	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	34	0	0	78	0	0	4	0	0	1	0
Sign Control	Free			Free				Stop		Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.8%				ICU Level of Service A							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	33	1	3	75	0	0	0	4	1	0	0
Future Vol, veh/h	0	33	1	3	75	0	0	0	4	1	0	0
Conflicting Peds, #/hr	0	0	5	5	0	0	3	0	1	1	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	3	100	66	0	0	0	0	25	0	0	0
Mvmt Flow	0	33	1	3	75	0	0	0	4	1	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	75	0	0	39	0	0	123	120	40	115	120	78
Stage 1	-	-	-	-	-	-	39	39	-	81	81	-
Stage 2	-	-	-	-	-	-	84	81	-	34	39	-
Critical Hdwy	4.1	-	-	4.76	-	-	7.1	6.5	6.45	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.794	-	-	3.5	4	3.525	3.5	4	3.3
Pot Cap-1 Maneuver	1537	-	-	1242	-	-	857	775	970	867	774	988
Stage 1	-	-	-	-	-	-	982	867	-	932	832	-
Stage 2	-	-	-	-	-	-	929	832	-	987	866	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1537	-	-	1237	-	-	849	769	965	860	769	986
Mov Cap-2 Maneuver	-	-	-	-	-	-	849	769	-	860	769	-
Stage 1	-	-	-	-	-	-	978	863	-	930	829	-
Stage 2	-	-	-	-	-	-	924	829	-	982	863	-
Approach	EB			WB			NB			SB		
HCM Ctrl Dly, s/v	0			0.3			8.75			9.19		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	965	1537	-	-	69	-	-	860				
HCM Lane V/C Ratio	0.004	-	-	-	0.002	-	-	0.001				
HCM Ctrl Dly (s/v)	8.7	0	-	-	7.9	0	-	9.2				
HCM Lane LOS	A	A	-	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

Appendix G

Total Operations



Lanes, Volumes, Timings

153 Union Street East, Waterloo TIS

1: Weber Street South & Union Street East

Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	217	364	88	75	454	82	100	915	61	30	688	144
Future Volume (vph)	217	364	88	75	454	82	100	915	61	30	688	144
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	25.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.980			0.980			0.991			0.974	
Flt Protected		0.984			0.994		0.950			0.950		
Satd. Flow (prot)	0	2890	0	0	2948	0	1603	3206	0	1603	3151	0
Flt Permitted		0.570			0.788		0.156			0.239		
Satd. Flow (perm)	0	1674	0	0	2336	0	263	3206	0	402	3151	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			23			11			34	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		291.5			221.3			213.4			417.0	
Travel Time (s)		21.0			15.9			15.4			30.0	
Confl. Peds. (#/hr)	3		7	7		3	3		10	10		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	6%	4%	2%	2%	4%	3%	2%	4%	3%	2%
Adj. Flow (vph)	217	364	88	75	454	82	100	915	61	30	688	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	669	0	0	611	0	100	976	0	30	832	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	24.4		24.4	24.4		5.0	23.6		23.6	23.6	
Minimum Split (s)	9.0	30.4		30.4	30.4		9.0	29.6		29.6	29.6	
Total Split (s)	9.0	39.4		30.4	30.4		9.0	40.6		31.6	31.6	
Total Split (%)	11.3%	49.3%		38.0%	38.0%		11.3%	50.8%		39.5%	39.5%	
Maximum Green (s)	5.0	33.4		24.4	24.4		5.0	34.6		25.6	25.6	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		0.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	C-Max		C-Max	C-Max	
Walk Time (s)		7.4		7.4	7.4			7.6		7.6	7.6	
Flash Don't Walk (s)		17.0		17.0	17.0			16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effect Green (s)		35.4			26.4		36.6	36.6		29.4	29.4	
Actuated g/C Ratio		0.44			0.33		0.46	0.46		0.37	0.37	
v/c Ratio		0.81			0.78		0.49	0.66		0.20	0.71	

Synchro 12 Report

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)		21.3			31.5		21.2	19.4		23.1	25.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		21.3			31.5		21.2	19.4		23.1	25.3	
LOS		C			C		C	B		C	C	
Approach Delay (s/veh)		21.3			31.5			19.6			25.2	
Approach LOS		C			C			B			C	
Queue Length 50th (m)		39.9			42.0		8.6	58.2		3.2	56.3	
Queue Length 95th (m)		#58.6			#63.3		17.3	78.6		10.1	77.3	
Internal Link Dist (m)		267.5			197.3			189.4			393.0	
Turn Bay Length (m)							30.0			25.0		
Base Capacity (vph)		831			786		204	1472		147	1179	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.81			0.78		0.49	0.66		0.20	0.71	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay (s/veh): 23.7

Intersection LOS: C

Intersection Capacity Utilization 104.7%

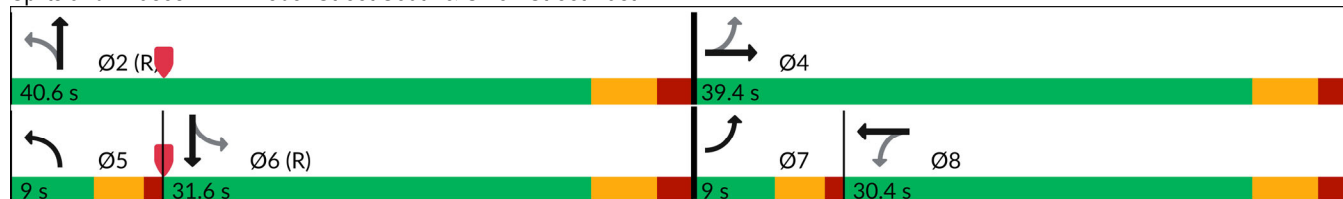
ICU Level of Service G

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Weber Street South & Union Street East



Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS

Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	569	23	23	599	47	33	80	59	18	46	17
Future Volume (vph)	23	569	23	23	599	47	33	80	59	18	46	17
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	25.0		0.0	25.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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
Ped Bike Factor	0.99	1.00		0.99		0.95	0.94	0.96		0.94	0.98	
Frt		0.994				0.850		0.936			0.960	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1502	1560	0	1668	1842	1428	1668	1418	0	1668	1468	0
Flt Permitted	0.329			0.334			0.716			0.649		
Satd. Flow (perm)	515	1560	0	583	1842	1363	1186	1418	0	1069	1468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				47		47			17	
Link Speed (k/h)		50			50			40			30	
Link Distance (m)		221.4			222.2			136.0			299.5	
Travel Time (s)		15.9			16.0			12.2			35.9	
Confl. Peds. (#/hr)	30		17	17		30	34		70	70		34
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	4%	0%	0%	2%	3%	0%	5%	2%	0%	3%	8%
Adj. Flow (vph)	23	569	23	23	599	47	33	80	59	18	46	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	592	0	23	599	47	33	139	0	18	63	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Minimum Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%	65.0%	35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	46.0	46.0		46.0	46.0	46.0	22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	38.0	38.0		38.0	38.0	38.0	10.0	10.0		10.0	10.0	
Flash Don't Walk (s)	8.0	8.0		8.0	8.0	8.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effect Green (s)	48.0	48.0		48.0	48.0	48.0	24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.30	0.30		0.30	0.30	
v/c Ratio	0.07	0.63		0.07	0.54	0.06	0.09	0.30		0.06	0.14	
Control Delay (s/veh)	7.5	14.0		5.1	7.9	1.4	21.2	16.5		20.7	17.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay (s/veh)	7.5	14.0		5.1	7.9	1.4	21.2	16.5		20.7	17.0	
LOS	A	B		A	A	A	C	B		C	B	
Approach Delay (s/veh)		13.8			7.3			17.4			17.8	

Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS

Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B			A			B			B		
Queue Length 50th (m)	1.4	52.9		1.0	34.1	0.0	3.5	10.7		1.9	5.1	
Queue Length 95th (m)	4.6	85.5		m1.4	m44.8	m0.4	9.7	24.8		6.5	13.8	
Internal Link Dist (m)	197.4			198.2			112.0			275.5		
Turn Bay Length (m)	25.0			25.0			15.0			15.0		
Base Capacity (vph)	309	938		349	1105	836	355	458		320	452	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.07	0.63		0.07	0.54	0.06	0.09	0.30		0.06	0.14	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 56 (70%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.63

Intersection Signal Delay (s/veh): 11.6

Intersection LOS: B

Intersection Capacity Utilization 105.0%

ICU Level of Service G

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Moore Avenue South & Union Street East



Lanes, Volumes, Timings
3: Weber Street South & Roger Street

153 Union Street East, Waterloo TIS

Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	2	28	1	0	0	55	1136	2	2	698	54
Future Volume (vph)	24	2	28	1	0	0	55	1136	2	2	698	54
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt	0.930									0.989		
Flt Protected	0.978			0.950			0.998					
Satd. Flow (prot)	0	1247	0	0	1456	0	0	2997	0	0	2969	0
Flt Permitted	0.978			0.950			0.998					
Satd. Flow (perm)	0	1247	0	0	1456	0	0	2997	0	0	2969	0
Link Speed (k/h)	30			50			50			50		
Link Distance (m)	329.2			37.4			425.2			213.4		
Travel Time (s)	39.5			2.7			30.6			15.4		
Confl. Peds. (#/hr)							5			1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	50%	14%	0%	0%	0%	8%	3%	0%	0%	3%	7%
Adj. Flow (vph)	24	2	28	1	0	0	55	1136	2	2	698	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	54	0	0	1	0	0	1193	0	0	754	0
Sign Control	Stop			Stop			Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	75.8%			ICU Level of Service D								
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	2	28	1	0	0	55	1136	2	2	698	54
Future Vol, veh/h	24	2	28	1	0	0	55	1136	2	2	698	54
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	1	1	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	50	14	0	0	0	8	3	0	0	3	7
Mvmt Flow	24	2	28	1	0	0	55	1136	2	2	698	54

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1412	1983	381	1602	2009	570	757	0	0	1139	0	0
Stage 1	734	734	-	1248	1248	-	-	-	-	-	-	-
Stage 2	678	1249	-	354	761	-	-	-	-	-	-	-
Critical Hdwy	7.62	7.5	7.18	7.5	6.5	6.9	4.26	-	-	4.1	-	-
Critical Hdwy Stg 1	6.62	6.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.62	6.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.56	4.5	3.44	3.5	4	3.3	2.28	-	-	2.2	-	-
Pot Cap-1 Maneuver	94	35	584	72	60	470	812	-	-	621	-	-
Stage 1	369	325	-	187	247	-	-	-	-	-	-	-
Stage 2	399	166	-	642	417	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	84	31	581	58	53	469	808	-	-	620	-	-
Mov Cap-2 Maneuver	84	31	-	58	53	-	-	-	-	-	-	-
Stage 1	366	322	-	168	222	-	-	-	-	-	-	-
Stage 2	359	149	-	604	413	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Ctrl Dly, s/v	47.91		68.25		1.3		0.07	
HCM LOS	E		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	166	-	-	136	58	9	-
HCM Lane V/C Ratio	0.068	-	-	0.397	0.017	0.003	-
HCM Ctrl Dly (s/v)	9.8	0.9	-	47.9	68.3	10.8	0
HCM Lane LOS	A	A	-	E	F	B	A
HCM 95th %tile Q(veh)	0.2	-	-	1.7	0.1	0	-

Lanes, Volumes, Timings
4: Moore Avenue South & Roger Street

153 Union Street East, Waterloo TIS
Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	6	6	6	17	20	9	103	2	9	65	2
Future Volume (vph)	18	6	6	6	17	20	9	103	2	9	65	2
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.973			0.937			0.998			0.996	
Flt Protected		0.971			0.993			0.996			0.994	
Satd. Flow (prot)	0	1286	0	0	1378	0	0	1483	0	0	1492	0
Flt Permitted		0.971			0.993			0.996			0.994	
Satd. Flow (perm)	0	1286	0	0	1378	0	0	1483	0	0	1492	0
Link Speed (k/h)		30			30			40			40	
Link Distance (m)		200.9			172.2			179.3			129.9	
Travel Time (s)		24.1			20.7			16.1			11.7	
Confl. Peds. (#/hr)	16		5	5		16	18		11	11		18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	0%	0%	25%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	18	6	6	6	17	20	9	103	2	9	65	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	43	0	0	114	0	0	76	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.7%						ICU Level of Service A					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	6	6	6	17	20	9	103	2	9	65	2
Future Vol, veh/h	18	6	6	6	17	20	9	103	2	9	65	2
Conflicting Peds, #/hr	16	0	5	5	0	16	18	0	11	11	0	18
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	21	0	0	25	0	0	0	3	0	0	2	0
Mvmt Flow	18	6	6	6	17	20	9	103	2	9	65	2
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	248	236	89	224	236	131	85	0	0	116	0	0
Stage 1	102	102	-	133	133	-	-	-	-	-	-	-
Stage 2	146	134	-	91	103	-	-	-	-	-	-	-
Critical Hdwy	7.31	6.5	6.2	7.35	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.31	5.5	-	6.35	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.31	5.5	-	6.35	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.689	4	3.3	3.725	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	668	668	975	685	668	924	1524	-	-	1485	-	-
Stage 1	860	815	-	818	790	-	-	-	-	-	-	-
Stage 2	814	789	-	862	814	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	611	644	956	657	644	903	1501	-	-	1471	-	-
Mov Cap-2 Maneuver	611	644	-	657	644	-	-	-	-	-	-	-
Stage 1	841	797	-	805	778	-	-	-	-	-	-	-
Stage 2	763	777	-	842	796	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	10.67		10.13		0.59		0.88					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	142	-	-	665	745	212	-	-				
HCM Lane V/C Ratio	0.006	-	-	0.045	0.058	0.006	-	-				
HCM Ctrl Dly (s/v)	7.4	0	-	10.7	10.1	7.5	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-				

Lanes, Volumes, Timings
5: Moore Avenue South & Waterloo Street

153 Union Street East, Waterloo TIS
Total AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	17	131	0	14	88
Future Volume (vph)	1	17	131	0	14	88
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.872					
Flt Protected	0.997					0.993
Satd. Flow (prot)	1411	0	1511	0	0	1566
Flt Permitted	0.997					0.993
Satd. Flow (perm)	1411	0	1511	0	0	1566
Link Speed (k/h)	30		40			40
Link Distance (m)	162.4		129.9			136.0
Travel Time (s)	19.5		11.7			12.2
Confl. Peds. (#/hr)		2		5	5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	8%	8%	0%	0%	4%
Adj. Flow (vph)	1	17	131	0	14	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	131	0	0	102
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.0%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	17	131	0	14	88
Future Vol, veh/h	1	17	131	0	14	88
Conflicting Peds, #/hr	0	2	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	8	8	0	0	4
Mvmt Flow	1	17	131	0	14	88
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	252	138	0	0	136	0
Stage 1	136	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.4	6.28	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.372	-	-	2.2	-
Pot Cap-1 Maneuver	741	895	-	-	1461	-
Stage 1	895	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	730	889	-	-	1454	-
Mov Cap-2 Maneuver	730	-	-	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	905	-	-	-	-	-
Approach	WB	NB		SB		
HCM Ctrl Dly, s/v	9.18	0		1.03		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	879		247	-	
HCM Lane V/C Ratio	-	0.02		0.01	-	
HCM Ctrl Dly (s/v)	-	9.2		7.5	0	
HCM Lane LOS	-	A		A	A	
HCM 95th %tile Q(veh)	-	0.1		0	-	

Lanes, Volumes, Timings
6: Waterloo Street & Roger Street

153 Union Street East, Waterloo TIS
Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	20	3	8	35	2	0	13	13	9	3	0
Future Volume (vph)	1	20	3	8	35	2	0	13	13	9	3	0
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.983			0.994			0.932				
Flt Protected		0.998			0.991						0.964	
Satd. Flow (prot)	0	1421	0	0	1411	0	0	1242	0	0	1478	0
Flt Permitted		0.998			0.991						0.964	
Satd. Flow (perm)	0	1421	0	0	1411	0	0	1242	0	0	1478	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		172.2			76.9			123.3			67.1	
Travel Time (s)		20.7			9.2			14.8			8.1	
Confl. Peds. (#/hr)	2		4	4		2	3		1	1		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	0%	0%	9%	0%	0%	20%	10%	0%	0%	0%
Adj. Flow (vph)	1	20	3	8	35	2	0	13	13	9	3	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	45	0	0	26	0	0	12	0
Sign Control	Stop											
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.7%						ICU Level of Service A					
Analysis Period (min)	15											

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	20	3	8	35	2	0	13	13	9	3	0
Future Vol, veh/h	1	20	3	8	35	2	0	13	13	9	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	7	0	0	9	0	0	20	10	0	0	0
Mvmt Flow	1	20	3	8	35	2	0	13	13	9	3	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.1	7.2	7.2	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	4%	18%	75%
Vol Thru, %	50%	83%	78%	25%
Vol Right, %	50%	13%	4%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	26	24	45	12
LT Vol	0	1	8	9
Through Vol	13	20	35	3
RT Vol	13	3	2	0
Lane Flow Rate	26	24	45	12
Geometry Grp	1	1	1	1
Degree of Util (X)	0.029	0.026	0.05	0.014
Departure Headway (Hd)	4.068	3.934	3.993	4.189
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	879	909	897	853
Service Time	2.1	1.96	2.015	2.223
HCM Lane V/C Ratio	0.03	0.026	0.05	0.014
HCM Control Delay, s/veh	7.2	7.1	7.2	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.2	0

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	630	4	6	695	7	16	0	22	8	0	13
Future Volume (vph)	10	630	4	6	695	7	16	0	22	8	0	13
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1550
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.999			0.922			0.916	
Flt Protected		0.999						0.979			0.981	
Satd. Flow (prot)	0	3005	0	0	3031	0	0	1356	0	0	1226	0
Flt Permitted		0.999						0.979			0.981	
Satd. Flow (perm)	0	3005	0	0	3031	0	0	1356	0	0	1226	0
Link Speed (k/h)		50			50			30			30	
Link Distance (m)		222.2			291.5			47.6			370.1	
Travel Time (s)		16.0			21.0			5.7			44.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	2%	2%	2%	20%	2%	2%	2%	0%	2%	20%
Adj. Flow (vph)	10	630	4	6	695	7	16	0	22	8	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	644	0	0	708	0	0	38	0	0	21	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 38.7%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Vol, veh/h	10	630	4	6	695	7	16	0	22	8	0	13
Future Vol, veh/h	10	630	4	6	695	7	16	0	22	8	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	3	2	2	2	20	2	2	2	0	2	20
Mvmt Flow	10	630	4	6	695	7	16	0	22	8	0	13
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	702	0	0	634	0	0	1012	1366	317	1046	1365	351
Stage 1	-	-	-	-	-	-	652	652	-	711	711	-
Stage 2	-	-	-	-	-	-	360	714	-	335	654	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	7.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.2	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.5
Pot Cap-1 Maneuver	905	-	-	945	-	-	194	146	679	186	146	596
Stage 1	-	-	-	-	-	-	423	462	-	395	435	-
Stage 2	-	-	-	-	-	-	631	433	-	658	461	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	905	-	-	945	-	-	185	143	679	176	143	596
Mov Cap-2 Maneuver	-	-	-	-	-	-	185	143	-	176	143	-
Stage 1	-	-	-	-	-	-	417	456	-	392	431	-
Stage 2	-	-	-	-	-	-	613	430	-	628	455	-
Approach	EB			WB			NB			SB		
HCM Ctrl Dly, s/v	0.25			0.14			17.76			17.38		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	320	55	-	-	30	-	-	312				
HCM Lane V/C Ratio	0.119	0.011	-	-	0.006	-	-	0.067				
HCM Ctrl Dly (s/v)	17.8	9	0.1	-	8.8	0.1	-	17.4				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.2				

Lanes, Volumes, Timings
8: Roger Street & South Access

153 Union Street East, Waterloo TIS

Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	39	1	1	37	7	0	0	5	14	0	8
Future Volume (vph)	1	39	1	1	37	7	0	0	5	14	0	8
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.997			0.979			0.865			0.951	
Flt Protected		0.999			0.999						0.969	
Satd. Flow (prot)	0	1444	0	0	1399	0	0	663	0	0	1412	0
Flt Permitted		0.999			0.999						0.969	
Satd. Flow (perm)	0	1444	0	0	1399	0	0	663	0	0	1412	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		76.9			329.2			63.5			35.6	
Travel Time (s)		9.2			39.5			7.6			4.3	
Confl. Peds. (#/hr)	1		5	5		1	3		1	1		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	6%	0%	100%	6%	0%	0%	0%	100%	0%	0%	0%
Adj. Flow (vph)	1	39	1	1	37	7	0	0	5	14	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	41	0	0	45	0	0	5	0	0	22	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	20.3%											
Analysis Period (min)	15											
	ICU Level of Service A											

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	39	1	1	37	7	0	0	5	14	0	8
Future Vol, veh/h	1	39	1	1	37	7	0	0	5	14	0	8
Conflicting Peds, #/hr	1	0	5	5	0	1	3	0	1	1	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	6	0	100	6	0	0	0	100	0	0	0
Mvmt Flow	1	39	1	1	37	7	0	0	5	14	0	8
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	45	0	0	45	0	0	89	94	46	86	91	45
Stage 1	-	-	-	-	-	-	47	47	-	44	44	-
Stage 2	-	-	-	-	-	-	42	47	-	42	47	-
Critical Hdwy	4.1	-	-	5.1	-	-	7.1	6.5	7.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	3.1	-	-	3.5	4	4.2	3.5	4	3.3
Pot Cap-1 Maneuver	1576	-	-	1111	-	-	902	800	804	906	803	1031
Stage 1	-	-	-	-	-	-	972	860	-	976	863	-
Stage 2	-	-	-	-	-	-	978	860	-	978	860	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1575	-	-	1106	-	-	887	795	799	897	798	1028
Mov Cap-2 Maneuver	-	-	-	-	-	-	887	795	-	897	798	-
Stage 1	-	-	-	-	-	-	968	856	-	974	861	-
Stage 2	-	-	-	-	-	-	967	858	-	970	856	-
Approach	EB			WB			NB			SB		
HCM Ctrl Dly, s/v	0.18			0.18			9.53			8.92		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	799	44	-	-	39	-	-	940				
HCM Lane V/C Ratio	0.006	0.001	-	-	0.001	-	-	0.023				
HCM Ctrl Dly (s/v)	9.5	7.3	0	-	8.3	0	-	8.9				
HCM Lane LOS	A	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1				

Lanes, Volumes, Timings

153 Union Street East, Waterloo TIS

1: Weber Street South & Union Street East

Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	557	99	50	340	80	108	853	103	61	944	163
Future Volume (vph)	205	557	99	50	340	80	108	853	103	61	944	163
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	25.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.983			0.974			0.984			0.978	
Flt Protected		0.988			0.995		0.950			0.950		
Satd. Flow (prot)	0	2980	0	0	2975	0	1668	3247	0	1668	3227	0
Flt Permitted		0.646			0.788		0.105			0.251		
Satd. Flow (perm)	0	1948	0	0	2356	0	184	3247	0	440	3227	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			28			20			25	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		291.5			221.3			213.4			417.0	
Travel Time (s)		21.0			15.9			15.4			30.0	
Confl. Peds. (#/hr)	3		1	1		3	2		6	6		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	205	557	99	50	340	80	108	853	103	61	944	163
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	861	0	0	470	0	108	956	0	61	1107	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	26.4		26.4	26.4		5.0	29.1		29.1	29.1	
Minimum Split (s)	9.0	32.4		32.4	32.4		9.0	35.1		35.1	35.1	
Total Split (s)	9.0	42.0		33.0	33.0		9.0	48.0		39.0	39.0	
Total Split (%)	10.0%	46.7%		36.7%	36.7%		10.0%	53.3%		43.3%	43.3%	
Maximum Green (s)	5.0	36.0		27.0	27.0		5.0	42.0		33.0	33.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		0.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	C-Max		C-Max	C-Max	
Walk Time (s)		9.4		9.4	9.4			13.1		13.1	13.1	
Flash Don't Walk (s)		17.0		17.0	17.0			16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effect Green (s)		38.0			29.0		44.0	44.0		36.8	36.8	
Actuated g/C Ratio		0.42			0.32		0.49	0.49		0.41	0.41	
v/c Ratio		0.97			0.60		0.63	0.60		0.34	0.83	

Synchro 12 Report

PTSL (250792)

Page 1

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)		48.6			28.0		30.8	18.2		26.4	30.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		48.6			28.0		30.8	18.2		26.4	30.7	
LOS		D			C		C	B		C	C	
Approach Delay (s/veh)		48.6			28.0			19.5			30.5	
Approach LOS		D			C			B			C	
Queue Length 50th (m)		60.0			33.3		9.6	58.4		7.3	89.0	
Queue Length 95th (m)		#105.0			49.3		#23.9	77.1		18.5	#126.6	
Internal Link Dist (m)		267.5			197.3			189.4			393.0	
Turn Bay Length (m)							30.0			25.0		
Base Capacity (vph)		890			778		172	1597		180	1334	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.97			0.60		0.63	0.60		0.34	0.83	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay (s/veh): 31.2

Intersection LOS: C

Intersection Capacity Utilization 116.6%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Weber Street South & Union Street East



Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS

Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	698	23	23	567	28	57	86	59	45	120	53
Future Volume (vph)	47	698	23	23	567	28	57	86	59	45	120	53
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	25.0		0.0	25.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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
Ped Bike Factor	1.00	1.00		0.99		0.97	0.98	0.99		0.98	0.99	
Frt		0.995				0.850		0.939			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1573	1606	0	1668	1860	1471	1668	1495	0	1668	1533	0
Flt Permitted	0.351			0.250			0.595			0.640		
Satd. Flow (perm)	579	1606	0	436	1860	1425	1022	1495	0	1106	1533	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				41		44			28	
Link Speed (k/h)		50			50			40			30	
Link Distance (m)		221.4			222.2			136.0			299.5	
Travel Time (s)		15.9			16.0			12.2			35.9	
Confl. Peds. (#/hr)	13		23	23		13	16		18	18		16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	1%	0%	0%	1%	0%	0%	2%	0%	0%	0%	0%
Adj. Flow (vph)	47	698	23	23	567	28	57	86	59	45	120	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	721	0	23	567	28	57	145	0	45	173	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Minimum Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (s)	52.0	52.0		52.0	52.0	52.0	28.0	28.0		28.0	28.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%	65.0%	35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	46.0	46.0		46.0	46.0	46.0	22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	38.0	38.0		38.0	38.0	38.0	10.0	10.0		10.0	10.0	
Flash Don't Walk (s)	8.0	8.0		8.0	8.0	8.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effect Green (s)	48.0	48.0		48.0	48.0	48.0	24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.30	0.30		0.30	0.30	
v/c Ratio	0.14	0.75		0.09	0.51	0.03	0.19	0.30		0.14	0.36	
Control Delay (s/veh)	8.2	17.7		7.9	11.2	1.7	22.8	17.0		21.9	20.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay (s/veh)	8.2	17.7		7.9	11.2	1.7	22.8	17.0		21.9	20.9	
LOS	A	B		A	B	A	C	B		C	C	
Approach Delay (s/veh)		17.1			10.7			18.6			21.1	

Lanes, Volumes, Timings
2: Moore Avenue South & Union Street East

153 Union Street East, Waterloo TIS

Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B			B			B			C		
Queue Length 50th (m)	2.9	71.0		1.3	44.6	0.0	6.3	11.5		4.9	16.7	
Queue Length 95th (m)	7.8	115.7		4.4	68.2	2.0	15.0	25.5		12.3	32.6	
Internal Link Dist (m)	197.4			198.2			112.0			275.5		
Turn Bay Length (m)	25.0			25.0			15.0			15.0		
Base Capacity (vph)	347	965		261	1116	871	306	479		331	479	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.14	0.75		0.09	0.51	0.03	0.19	0.30		0.14	0.36	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 47.2 (59%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.75

Intersection Signal Delay (s/veh): 15.5

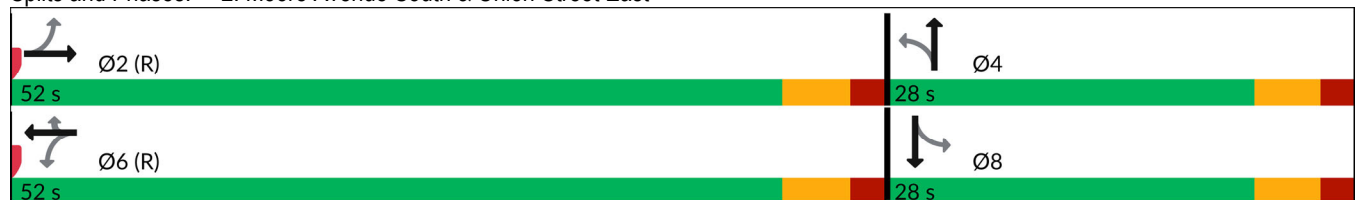
Intersection LOS: B

Intersection Capacity Utilization 105.0%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 2: Moore Avenue South & Union Street East



Lanes, Volumes, Timings
3: Weber Street South & Roger Street

153 Union Street East, Waterloo TIS

Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	0	68	1	0	1	30	973	1	0	1109	36
Future Volume (vph)	48	0	68	1	0	1	30	973	1	0	1109	36
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.921			0.932						0.995	
Flt Protected		0.980			0.976			0.999				
Satd. Flow (prot)	0	1367	0	0	1394	0	0	3067	0	0	3055	0
Flt Permitted		0.980			0.976			0.999				
Satd. Flow (perm)	0	1367	0	0	1394	0	0	3067	0	0	3055	0
Link Speed (k/h)		30			50			50			50	
Link Distance (m)		329.2			37.4			425.2			213.4	
Travel Time (s)		39.5			2.7			30.6			15.4	
Confl. Peds. (#/hr)	2		1	1		2	6		2	2		6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	48	0	68	1	0	1	30	973	1	0	1109	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	116	0	0	2	0	0	1004	0	0	1145	0
Sign Control	Stop		Stop				Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	72.7%				ICU Level of Service C							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	7.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	48	0	68	1	0	1	30	973	1	0	1109	36
Future Vol, veh/h	48	0	68	1	0	1	30	973	1	0	1109	36
Conflicting Peds, #/hr	2	0	1	1	0	2	6	0	2	2	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	2	0	0	0	0	1	0	0	1	0
Mvmt Flow	48	0	68	1	0	1	30	973	1	0	1109	36

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1682	2169	580	1591	2187	491	1151	0	0	976	0	0
Stage 1	1133	1133	-	1036	1036	-	-	-	-	-	-	-
Stage 2	549	1036	-	556	1151	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.94	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.32	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	63	47	458	73	46	529	614	-	-	715	-	-
Stage 1	219	280	-	252	311	-	-	-	-	-	-	-
Stage 2	493	311	-	488	275	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	58	44	455	58	43	527	611	-	-	714	-	-
Mov Cap-2 Maneuver	58	44	-	58	43	-	-	-	-	-	-	-
Stage 1	218	279	-	234	290	-	-	-	-	-	-	-
Stage 2	458	290	-	415	273	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Ctrl Dly, s/v	144.97		40.04		1.02		0	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	107	-	-	119	105	714	-
HCM Lane V/C Ratio	0.049	-	-	0.975	0.019	-	-
HCM Ctrl Dly (s/v)	11.2	0.7	-	145	40	0	-
HCM Lane LOS	B	A	-	F	E	A	-
HCM 95th %tile Q(veh)	0.2	-	-	6.4	0.1	0	-

Lanes, Volumes, Timings
4: Moore Avenue South & Roger Street

153 Union Street East, Waterloo TIS
Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	9	14	7	14	18	11	101	1	13	133	10
Future Volume (vph)	10	9	14	7	14	18	11	101	1	13	133	10
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.943			0.938			0.999			0.991	
Flt Protected		0.985			0.991			0.995			0.996	
Satd. Flow (prot)	0	1424	0	0	1425	0	0	1524	0	0	1513	0
Flt Permitted		0.985			0.991			0.995			0.996	
Satd. Flow (perm)	0	1424	0	0	1425	0	0	1524	0	0	1513	0
Link Speed (k/h)		30			30			40			40	
Link Distance (m)		200.9			172.2			179.3			129.9	
Travel Time (s)		24.1			20.7			16.1			11.7	
Confl. Peds. (#/hr)	2		3	3		2	6		13	13		6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	9	14	7	14	18	11	101	1	13	133	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	33	0	0	39	0	0	113	0	0	156	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.6%						ICU Level of Service A					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	9	14	7	14	18	11	101	1	13	133	10
Future Vol, veh/h	10	9	14	7	14	18	11	101	1	13	133	10
Conflicting Peds, #/hr	2	0	3	3	0	2	6	0	13	13	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	9	14	7	14	18	11	101	1	13	133	10
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	302	307	147	303	312	117	149	0	0	115	0	0
Stage 1	170	170	-	137	137	-	-	-	-	-	-	-
Stage 2	132	137	-	167	175	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	654	610	905	653	607	941	1445	-	-	1487	-	-
Stage 1	837	762	-	872	787	-	-	-	-	-	-	-
Stage 2	876	787	-	840	758	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	611	590	898	614	586	929	1437	-	-	1470	-	-
Mov Cap-2 Maneuver	611	590	-	614	586	-	-	-	-	-	-	-
Stage 1	824	751	-	855	772	-	-	-	-	-	-	-
Stage 2	836	772	-	807	747	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	10.4		10.34		0.73		0.62					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	175	-	-	699	714	148	-					
HCM Lane V/C Ratio	0.008	-	-	0.047	0.055	0.009	-					
HCM Ctrl Dly (s/v)	7.5	0	-	10.4	10.3	7.5	0					
HCM Lane LOS	A	A	-	B	B	A	A					
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-					

Lanes, Volumes, Timings
5: Moore Avenue South & Waterloo Street

153 Union Street East, Waterloo TIS
Total PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	40	141	2	22	146
Future Volume (vph)	0	40	141	2	22	146
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865		0.998			
Flt Protected						0.993
Satd. Flow (prot)	1510	0	1601	0	0	1620
Flt Permitted						0.993
Satd. Flow (perm)	1510	0	1601	0	0	1620
Link Speed (k/h)	30		40			40
Link Distance (m)	162.4		129.9			136.0
Travel Time (s)	19.5		11.7			12.2
Confl. Peds. (#/hr)	3	2		15	15	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	1%	50%	0%	0%
Adj. Flow (vph)	0	40	141	2	22	146
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	143	0	0	168
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	34.8%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	40	141	2	22	146
Future Vol, veh/h	0	40	141	2	22	146
Conflicting Peds, #/hr	3	2	0	15	15	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	1	50	0	0
Mvmt Flow	0	40	141	2	22	146
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	350	159	0	0	158	0
Stage 1	157	-	-	-	-	-
Stage 2	193	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	651	892	-	-	1434	-
Stage 1	876	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	631	879	-	-	1416	-
Mov Cap-2 Maneuver	631	-	-	-	-	-
Stage 1	865	-	-	-	-	-
Stage 2	828	-	-	-	-	-
Approach	WB	NB		SB		
HCM Ctrl Dly, s/v	9.29	0		0.99		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	879		236	-	
HCM Lane V/C Ratio	-	0.046		0.016	-	
HCM Ctrl Dly (s/v)	-	9.3		7.6	0	
HCM Lane LOS	-	A		A	A	
HCM 95th %tile Q(veh)	-	0.1		0	-	

Lanes, Volumes, Timings
6: Waterloo Street & Roger Street

153 Union Street East, Waterloo TIS

Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	21	7	22	38	17	1	16	11	6	11	1
Future Volume (vph)	3	21	7	22	38	17	1	16	11	6	11	1
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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
Ped Bike Factor												
Frt		0.970			0.970			0.947			0.992	
Flt Protected		0.995			0.986			0.998			0.984	
Satd. Flow (prot)	0	1403	0	0	1466	0	0	1449	0	0	1381	0
Flt Permitted		0.995			0.986			0.998			0.984	
Satd. Flow (perm)	0	1403	0	0	1466	0	0	1449	0	0	1381	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		172.2			76.9			123.3			67.1	
Travel Time (s)		20.7			9.2			14.8			8.1	
Confl. Peds. (#/hr)	1		3	3		1			3	3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	8%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%
Adj. Flow (vph)	3	21	7	22	38	17	1	16	11	6	11	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	31	0	0	77	0	0	28	0	0	18	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.4%				ICU Level of Service A							
Analysis Period (min)	15											

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	21	7	22	38	17	1	16	11	6	11	1
Future Vol, veh/h	3	21	7	22	38	17	1	16	11	6	11	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	8	0	0	0	0	0	0	0	25	0	0
Mvmt Flow	3	21	7	22	38	17	1	16	11	6	11	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.1	7.3	7	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	10%	29%	33%
Vol Thru, %	57%	68%	49%	61%
Vol Right, %	39%	23%	22%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	31	77	18
LT Vol	1	3	22	6
Through Vol	16	21	38	11
RT Vol	11	7	17	1
Lane Flow Rate	28	31	77	18
Geometry Grp	1	1	1	1
Degree of Util (X)	0.03	0.034	0.084	0.023
Departure Headway (Hd)	3.872	3.922	3.928	4.568
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	919	910	911	780
Service Time	1.921	1.959	1.957	2.615
HCM Lane V/C Ratio	0.03	0.034	0.085	0.023
HCM Control Delay, s/veh	7	7.1	7.3	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.3	0.1

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	848	12	14	607	9	7	0	10	7	0	14
Future Volume (vph)	16	848	12	14	607	9	7	0	10	7	0	14
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1550
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.998			0.921			0.910	
Flt Protected		0.999			0.999			0.980			0.984	
Satd. Flow (prot)	0	3056	0	0	3060	0	0	1356	0	0	1373	0
Flt Permitted		0.999			0.999			0.980			0.984	
Satd. Flow (perm)	0	3056	0	0	3060	0	0	1356	0	0	1373	0
Link Speed (k/h)		50			50			30			30	
Link Distance (m)		222.2			291.5			47.6			370.1	
Travel Time (s)		16.0			21.0			5.7			44.4	
Confl. Peds. (#/hr)	2					2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	1%	2%	2%	1%	0%	2%	2%	2%	0%	2%	0%
Adj. Flow (vph)	16	848	12	14	607	9	7	0	10	7	0	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	876	0	0	630	0	0	17	0	0	21	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 50.6%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Vol, veh/h	16	848	12	14	607	9	7	0	10	7	0	14
Future Vol, veh/h	16	848	12	14	607	9	7	0	10	7	0	14
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	8	1	2	2	1	0	2	2	2	0	2	0
Mvmt Flow	16	848	12	14	607	9	7	0	10	7	0	14
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	618	0	0	860	0	0	1218	1532	430	1098	1534	310
Stage 1	-	-	-	-	-	-	886	886	-	642	642	-
Stage 2	-	-	-	-	-	-	332	646	-	456	892	-
Critical Hdwy	4.26	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.28	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	918	-	-	777	-	-	137	116	573	170	115	692
Stage 1	-	-	-	-	-	-	306	361	-	434	467	-
Stage 2	-	-	-	-	-	-	656	465	-	559	358	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	917	-	-	777	-	-	128	110	573	159	110	691
Mov Cap-2 Maneuver	-	-	-	-	-	-	128	110	-	159	110	-
Stage 1	-	-	-	-	-	-	299	352	-	424	456	-
Stage 2	-	-	-	-	-	-	628	454	-	537	350	-
Approach	EB			WB			NB			SB		
HCM Ctrl Dly, s/v	0.36			0.41			21.47			16.76		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	236	64	-	-	78	-	-	327				
HCM Lane V/C Ratio	0.072	0.017	-	-	0.018	-	-	0.064				
HCM Ctrl Dly (s/v)	21.5	9	0.2	-	9.7	0.2	-	16.8				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	0.2				

Lanes, Volumes, Timings
8: Roger Street & South Access

153 Union Street East, Waterloo TIS
Total PM

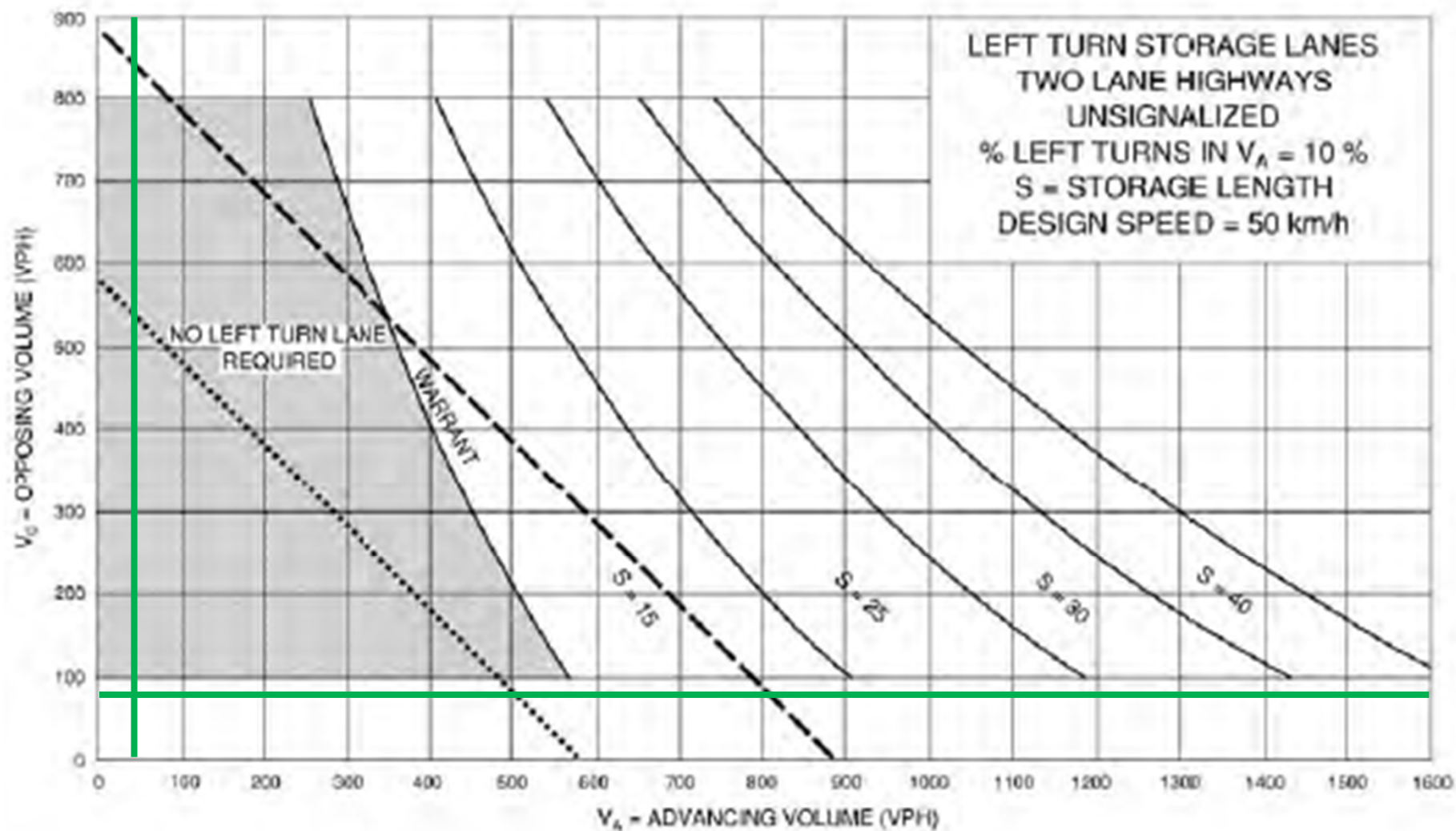
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	33	1	3	75	10	0	0	4	4	0	2
Future Volume (vph)	4	33	1	3	75	10	0	0	4	4	0	2
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.985			0.865			0.955	
Flt Protected		0.995			0.998						0.968	
Satd. Flow (prot)	0	1443	0	0	1474	0	0	1061	0	0	1417	0
Flt Permitted		0.995			0.998						0.968	
Satd. Flow (perm)	0	1443	0	0	1474	0	0	1061	0	0	1417	0
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		76.9			329.2			63.5			35.6	
Travel Time (s)		9.2			39.5			7.6			4.3	
Confl. Peds. (#/hr)			5	5			3		1	1		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	100%	66%	0%	0%	0%	0%	25%	0%	0%	0%
Adj. Flow (vph)	4	33	1	3	75	10	0	0	4	4	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	88	0	0	4	0	0	6	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.6%				ICU Level of Service A							
Analysis Period (min)	15											

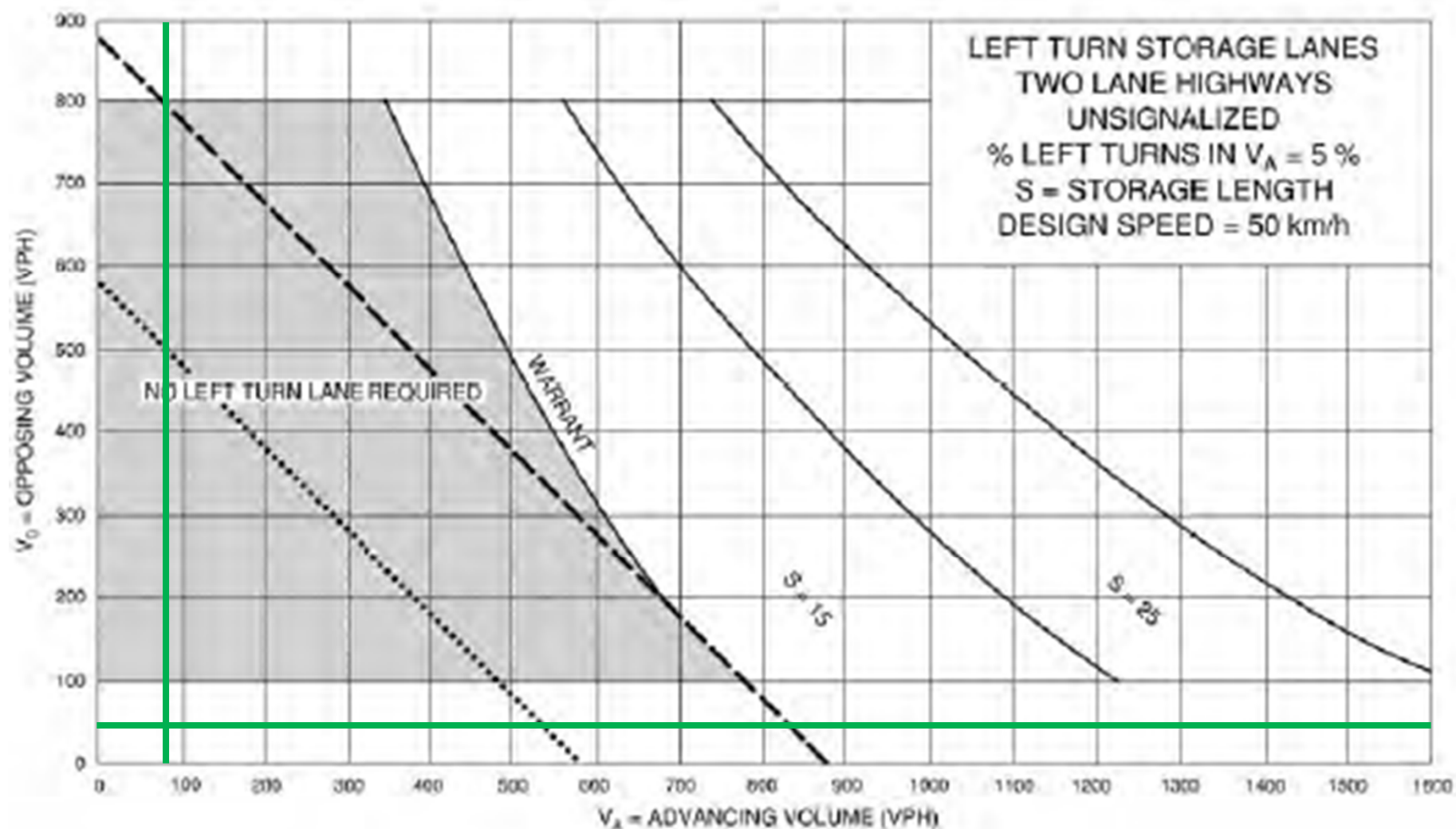
Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	33	1	3	75	10	0	0	4	4	0	2
Future Vol, veh/h	4	33	1	3	75	10	0	0	4	4	0	2
Conflicting Peds, #/hr	0	0	5	5	0	0	3	0	1	1	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	3	100	66	0	0	0	0	25	0	0	0
Mvmt Flow	4	33	1	3	75	10	0	0	4	4	0	2
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	85	0	0	39	0	0	131	138	40	128	133	83
Stage 1	-	-	-	-	-	-	47	47	-	86	86	-
Stage 2	-	-	-	-	-	-	84	91	-	42	47	-
Critical Hdwy	4.1	-	-	4.76	-	-	7.1	6.5	6.45	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.794	-	-	3.5	4	3.525	3.5	4	3.3
Pot Cap-1 Maneuver	1524	-	-	1242	-	-	847	757	970	850	761	982
Stage 1	-	-	-	-	-	-	972	860	-	927	827	-
Stage 2	-	-	-	-	-	-	929	823	-	978	860	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1524	-	-	1237	-	-	835	750	965	841	754	980
Mov Cap-2 Maneuver	-	-	-	-	-	-	835	750	-	841	754	-
Stage 1	-	-	-	-	-	-	966	854	-	924	825	-
Stage 2	-	-	-	-	-	-	922	821	-	970	854	-
Approach	EB			WB			NB			SB		
HCM Ctrl Dly, s/v	0.78			0.27			8.75			9.11		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	965	188	-	-	60	-	-	883				
HCM Lane V/C Ratio	0.004	0.003	-	-	0.002	-	-	0.007				
HCM Ctrl Dly (s/v)	8.7	7.4	0	-	7.9	0	-	9.1				
HCM Lane LOS	A	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

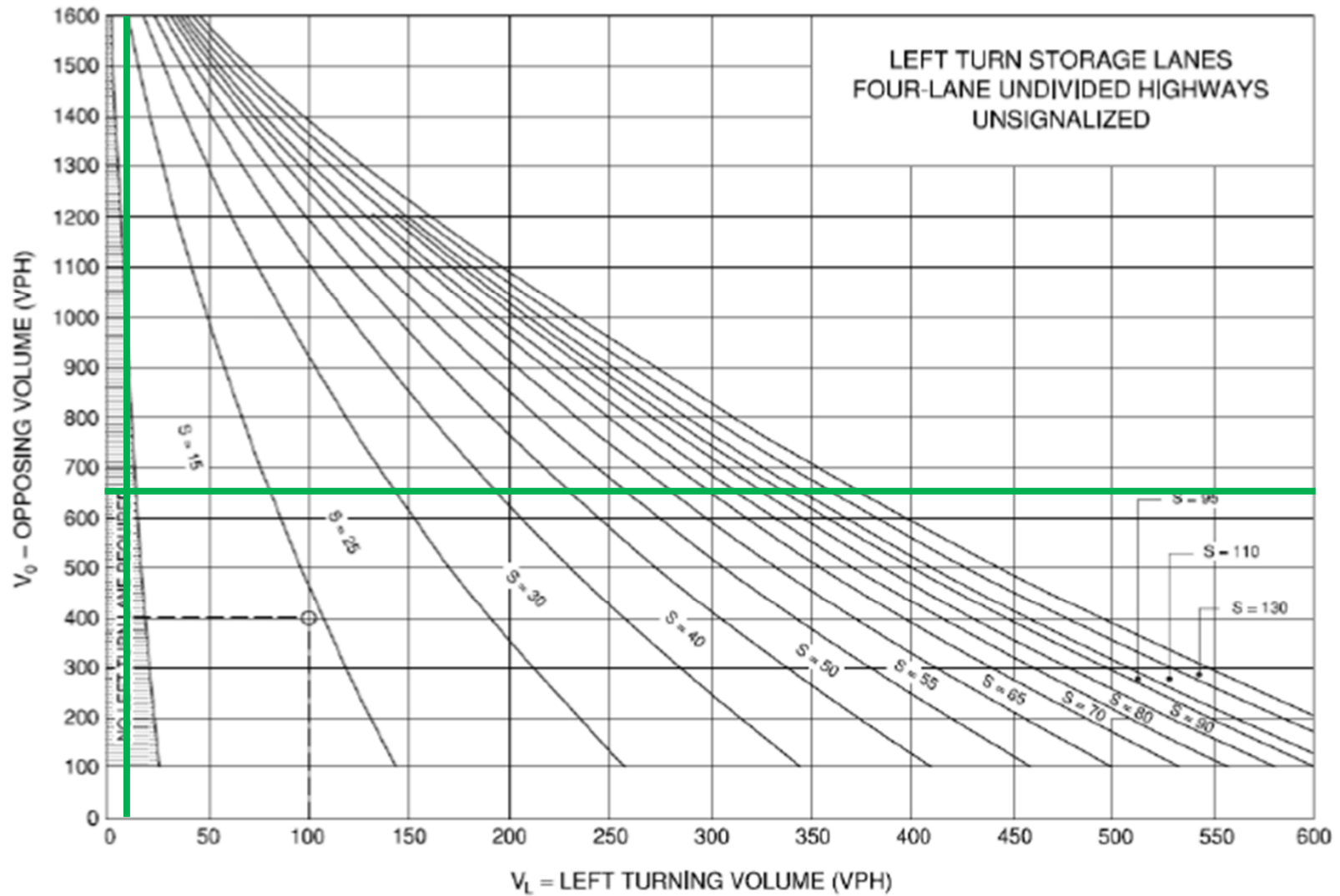
Appendix H

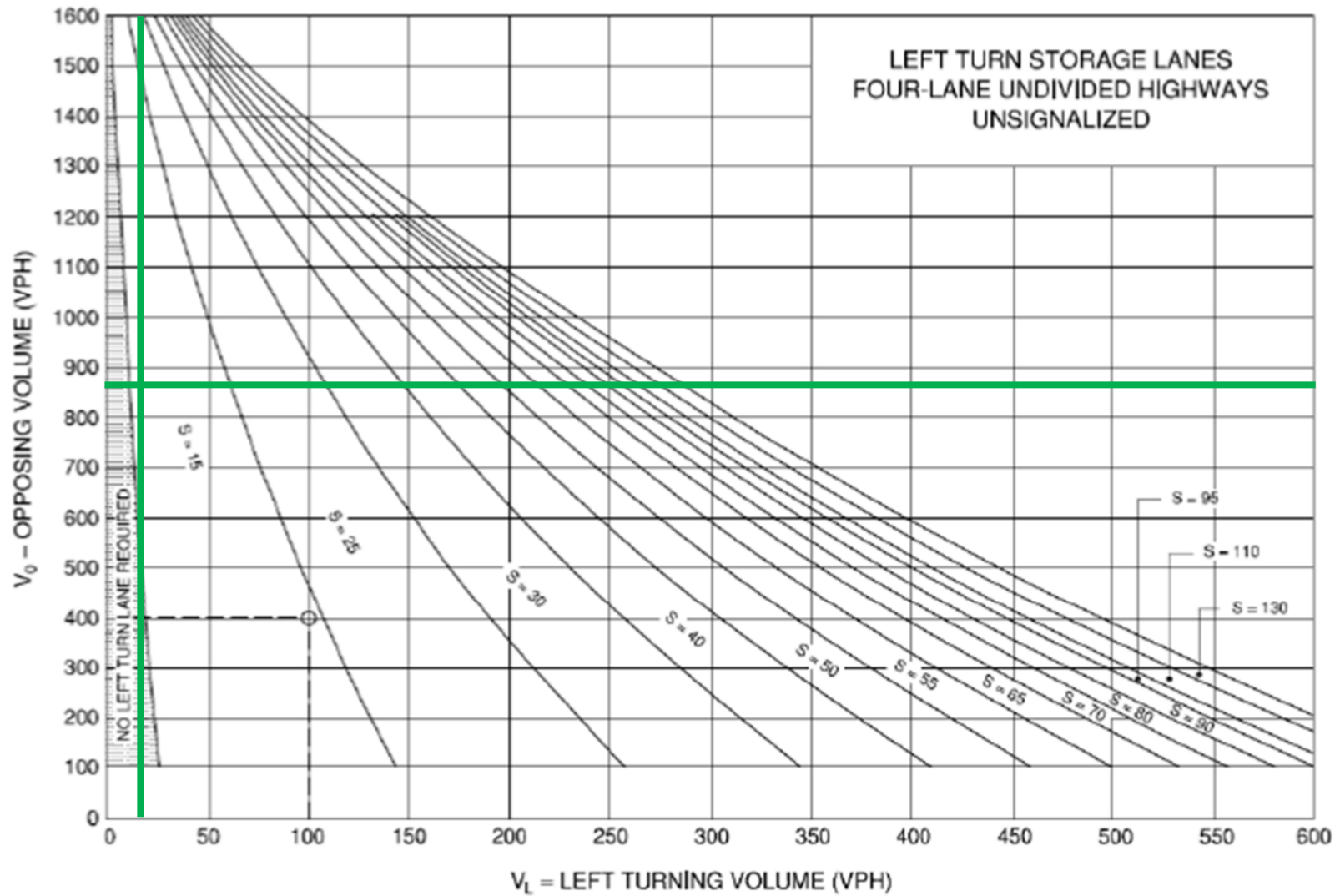
Left-Turn Lane Warrant

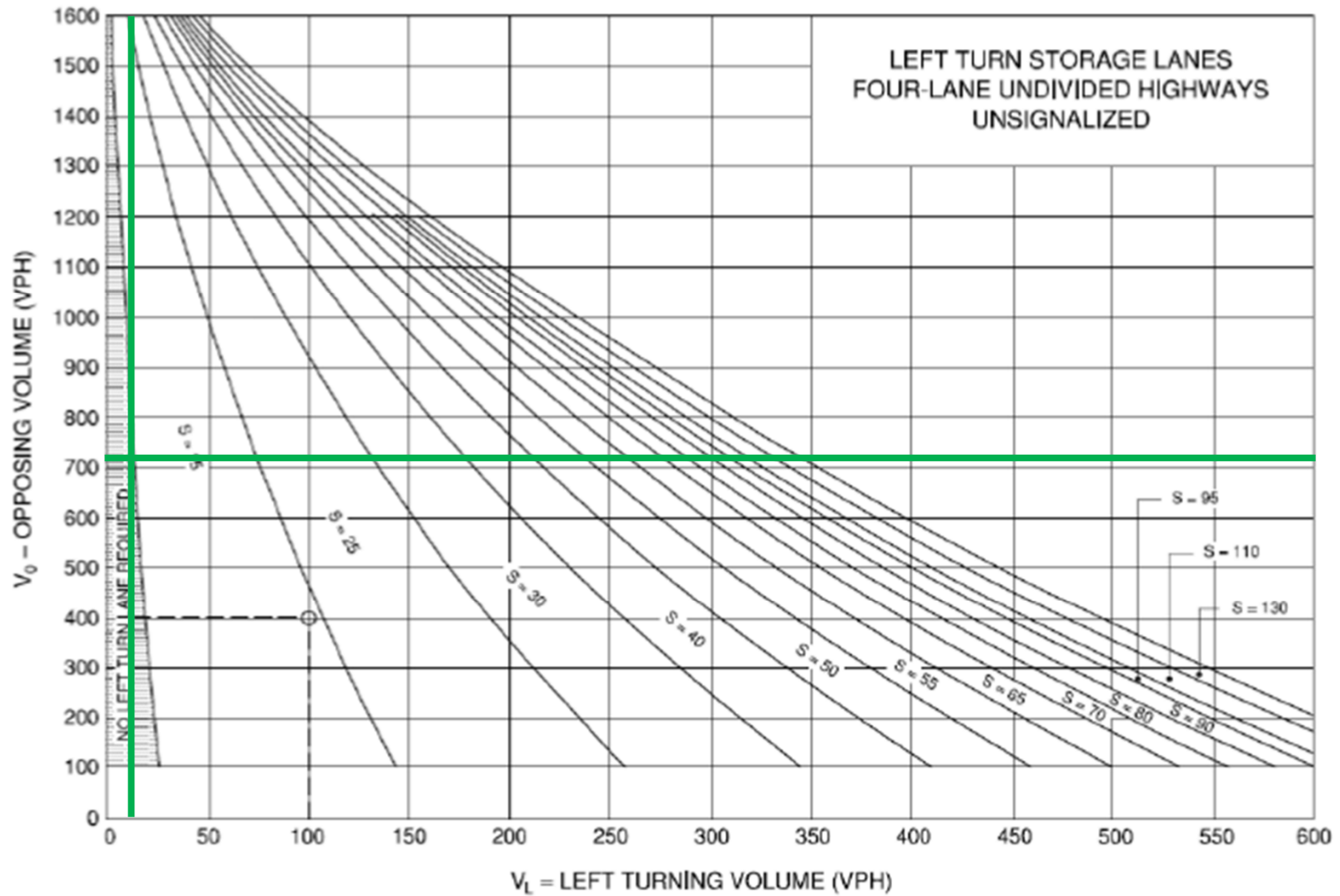


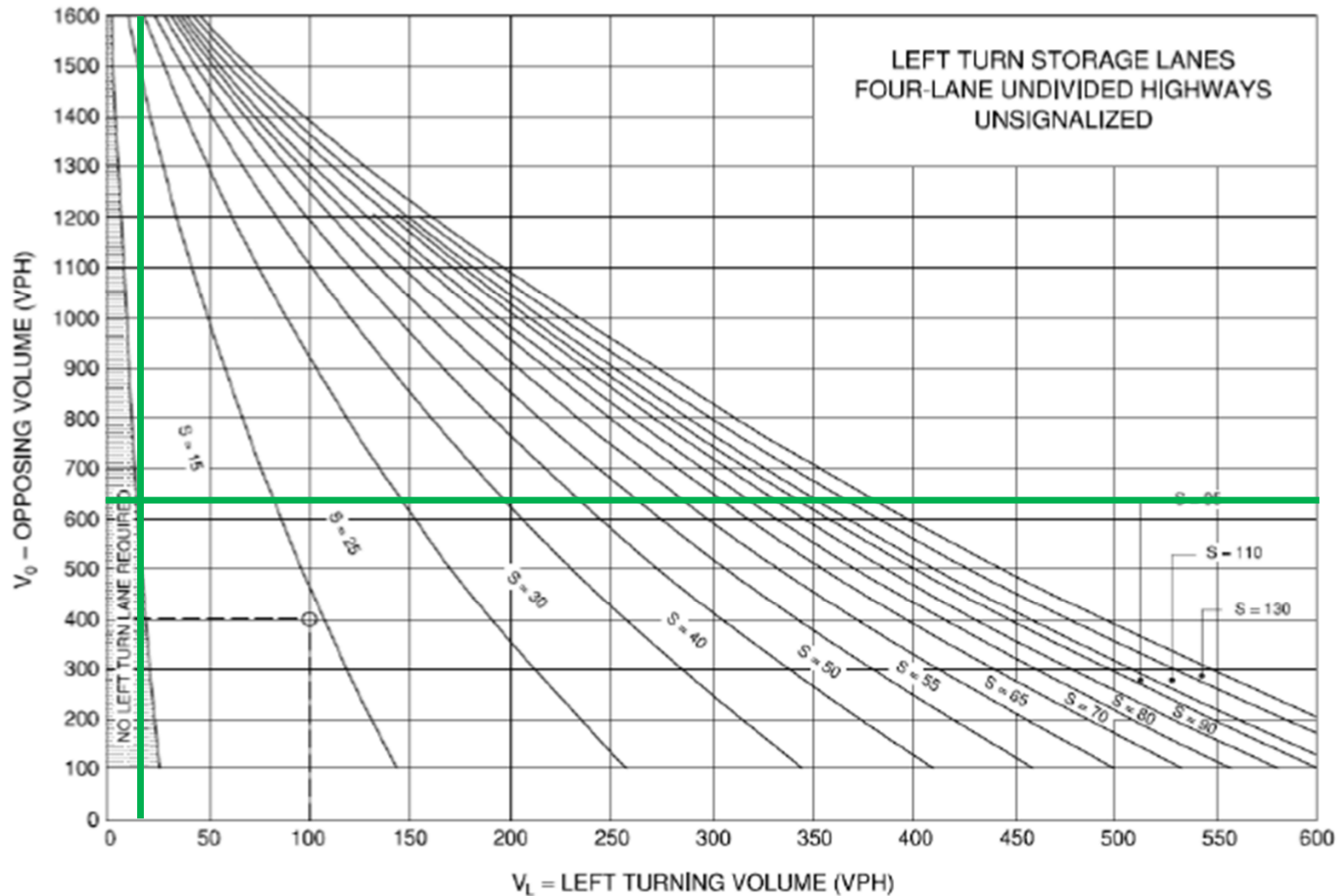


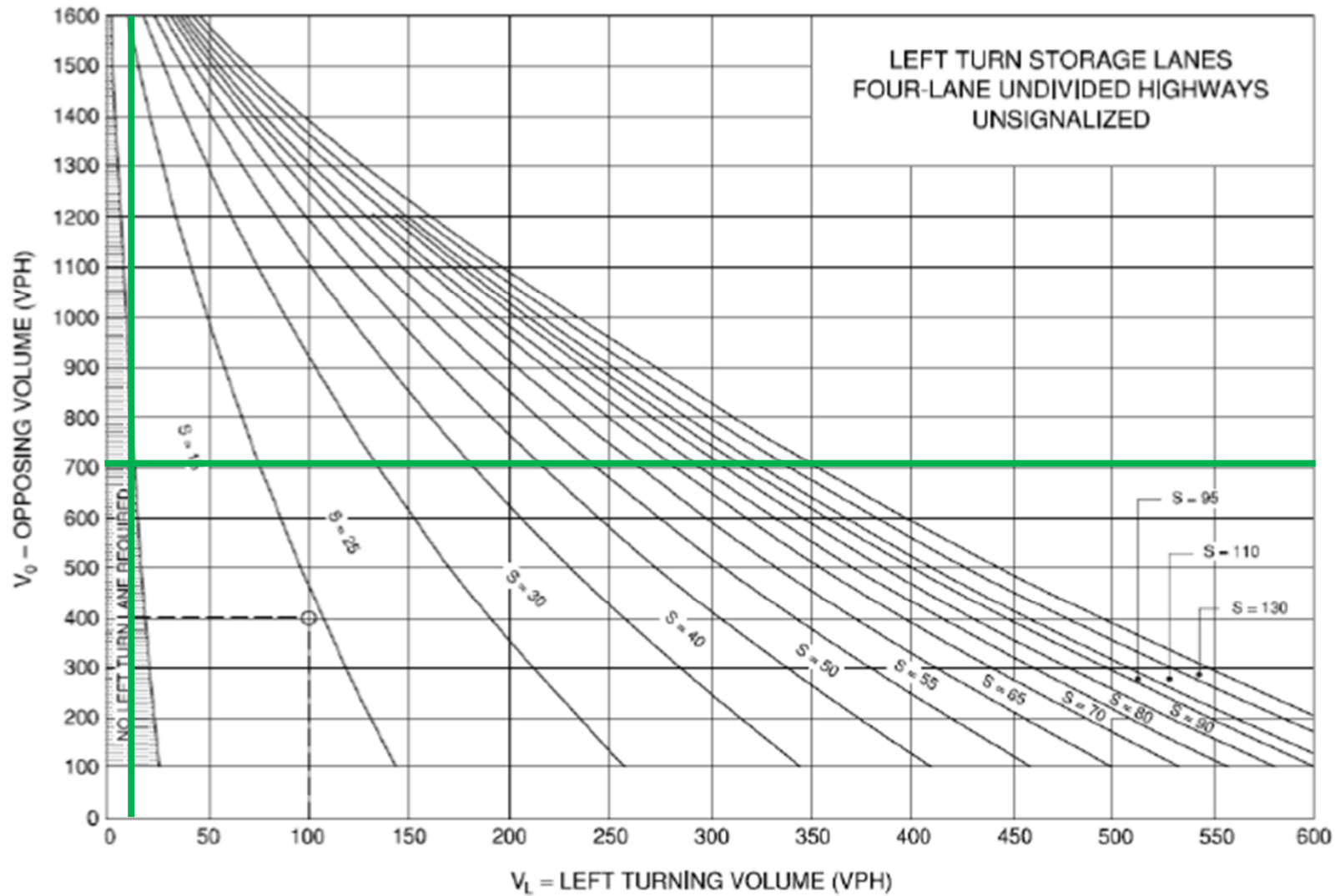


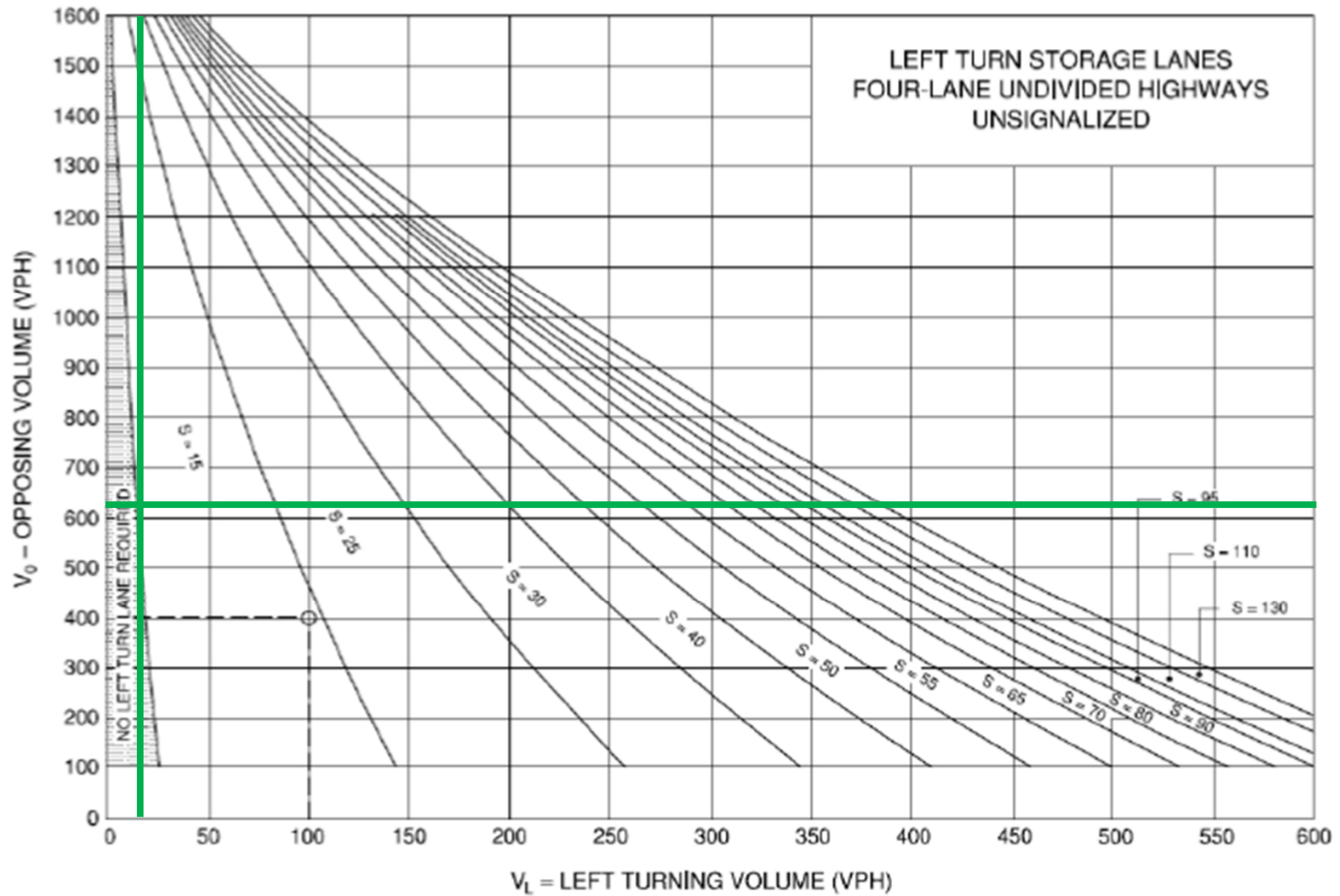


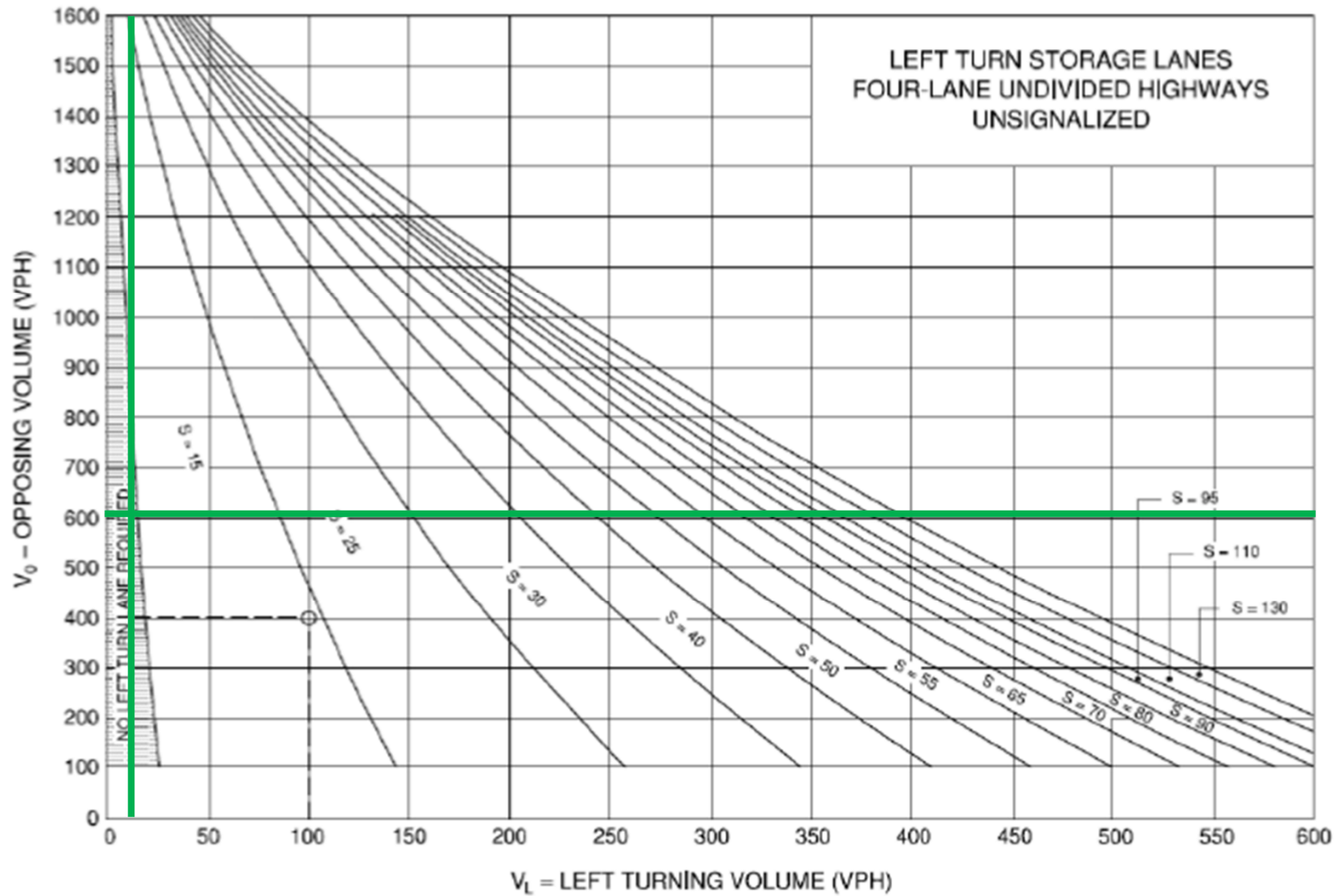


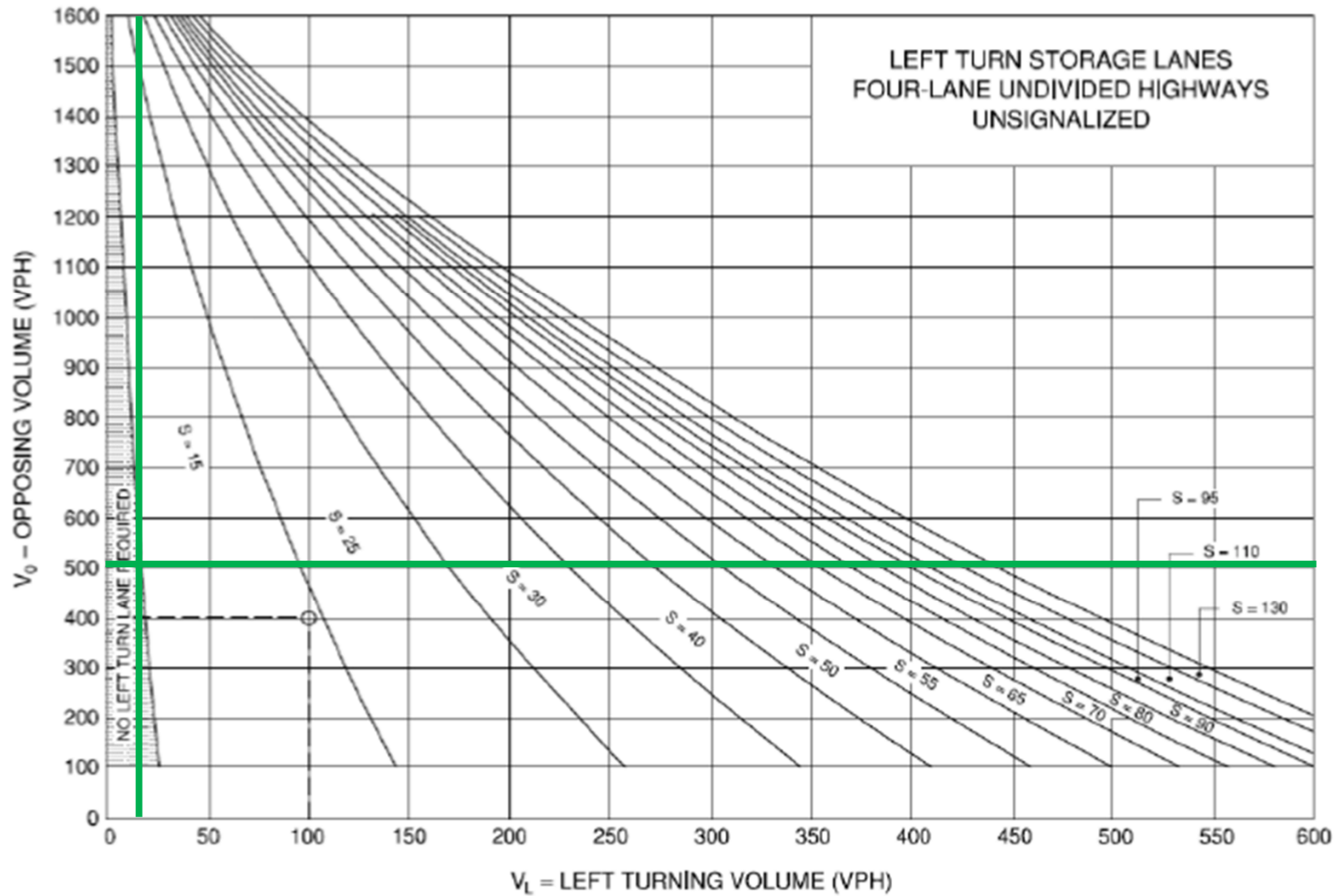












Union Street East at Dover Street/North Access Eastbound Left-Turn Lane Warrant

153 Union Street East, Waterloo TIS
250792

Base Year 2026 (PM Peak Hour)

Appendix I

Traffic Control Signal Warrant



Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2033 Total
Municipality: Waterloo

Project number: 250792

Major Street: Weber Street South
Minor Street: Roger Street

North/South?: Y

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

PM Forecast Only? N

Warrant Results		
200% Satisfied	No	Case 1: Signal is undoubtedly warranted
100% Satisfied	No	Case 2: Signal might be warranted
Case 3: Signal warrant is unlikely		

Time Period	Major Street						Minor Street						Peds Crossing
	Weber Street South						Roger Street						
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	55	1136	2	2	698	54	24	2	28	1	0	0	0
PM Peak Hour	30	973	1	0	1109	36	48	0	68	1	0	1	3
verage Hourly Volum	21	527	1	1	452	23	18	1	24	1	0	0	1

Warrant	AHV
1A - All	1067
1B - Minor	43
2A - Major	1024
2B - Cross	20

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	All Approaches	480	720	600	900	1067
					% Fulfilled	118.6%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	43
					% Fulfilled	25.4%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Major Street Approaches	480	720	600	900	1024
					% Fulfilled	113.8%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Traffic Crossing Major Street	50	75	50	75	20
					% Fulfilled	26.3%