

Memo

To: Walter Ostojic & Sons Ltd.
From: Mike Walters
Date: November 20, 2025
Subject: Warehouse Street, St. Thomas – Transportation Brief
Our File: 25-1537

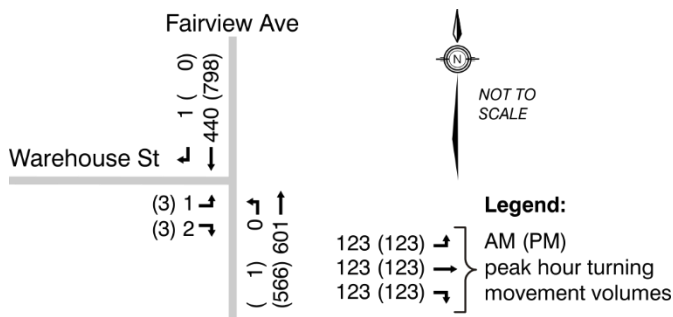
1. Introduction

This memorandum has been prepared to examine the impacts associated with a proposed residential development on the north side of Warehouse Street, west of Fairview Avenue, in the city of St. Thomas, Ontario. It presents the existing conditions at the Warehouse Street and Fairview Avenue intersection and the expected impacts of traffic generated by the proposed development on that intersection.

2. Existing Conditions

The existing traffic volumes at the Warehouse Street and Fairview Avenue intersection were extracted from the *Fairview Avenue Road Diet Study* completed by Paradigm Transportation Solutions Limited in June 2024. **Figure 1** illustrates these volumes.

Figure 1: Existing Traffic Volumes



The existing operations during the weekday AM and PM peak hours from the 2024 road diet study were confirmed using Trafficware's Synchro software (version 12). The existing intersection operations at the Warehouse Street and Fairview Avenue intersection are shown in **Table 1**.

Table 1: Existing Intersection Operations, Warehouse Street and Fairview Avenue

MOVEMENT	AM PEAK HOUR				PM PEAK HOUR			
	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)
Existing								
EBLTR	0.01	B	11	0	0.02	C	19	1
NBLTR	0.25	A	0	0	0.24	A	0	0
SBLTR	0.18	A	0	0	0.34	A	0	0

All movements currently operate at a reasonable level of service (LOS A–C) during both peak hours.

3. Future Road Network

The 2024 road diet study detailed the future plans for Fairview Avenue between Elm Street and Talbot Street. This roadway is planned to be reduced from a four-lane cross-section to a two-lane cross-section with one-way cycle tracks on both sides of the road. A mid-block pedestrian signal with crossrides is recommended between Warehouse Street and Talbot Street.

In the 2024 road diet study, future intersection operations were analyzed under an ultimate 2044 horizon year with a conservative 2% growth rate per year. Based on these traffic volumes, both the signalization of the Warehouse Street and Fairview Avenue intersection and the addition of a northbound left-turn lane were recommended due to poor operations during the weekday PM peak hour.

4. Proposed Development

The subject site (shown in **Figure 2**) is currently vacant. The residential development is proposed to consist of five semi-detached buildings (10 units) and seven four-plex's (28 units) for a total of 38 units. The concept plan is illustrated in **Figure 3**. The build-out year was assumed to be 2027.

An aerial photograph showing a residential neighborhood. A specific vacant lot is outlined with a white dashed line and labeled 'SUBJECT SITE'. This lot is situated between Talbot St to the north and Warehouse St to the south. To the east of the subject site is Fairview Ave, a major road with multiple lanes. Further east, there is a large green field. A north arrow and the text 'NOT TO SCALE' are located in the upper right corner of the image.

The site plan illustrates the proposed development layout. Key features include:

- Lot Dimensions and Setbacks:** Individual lot dimensions (e.g., 18.0m, 18.2m, 19.4m) and setbacks (e.g., 4.3m, 1.3m, 0.9m) are clearly marked for each of the 12 lots.
- Boundary and Easement Lines:** A red boundary line defines the main development area, while a blue line highlights a specific area within Lot 2. Various easement lines (e.g., 1.5m, 3.0m, 4.5m) are also indicated.
- Adjacent Features:** The plan shows the proximity to Park Avenue to the west and Warehouse Street to the south. A large blue area at the top represents a water body or wetland.

COUNTERPOINT LAND DEVELOPMENT by DILLON CONSULTING LIMITED

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Table 2 summarizes the number of trips that are expected to be generated by the proposed development. The fitted curve equation was used in the calculations where available. The average rate was used where the fitted curve equation was not provided.

Table 2: Trip Generation

	AM PEAK HOUR			PM PEAK HOUR		
	In	Out	Total	In	Out	Total
Five semi-detached buildings – 10 dwelling units						
In/Out/Rate	25%	75%	0.48	61%	39%	[1]
Vehicle trips	1	4	5	6	4	10
Seven four-plex's – 28 dwelling units						
In/Out/Rate	24%	76%	0.40	63%	37%	[2]
Vehicle trips	3	8	11	21	12	33
Total vehicle trips	4	12	16	27	16	43

[1] PM: $T = 0.60 (X) + 3.93$

[2] PM: $T = 0.43 (X) + 20.55$

The proposed residential development is anticipated to generate 16 vehicle trips (4 inbound, 12 outbound) during a weekday AM peak hour and 43 vehicle trips (27 inbound, 16 outbound) during a weekday PM peak hour.

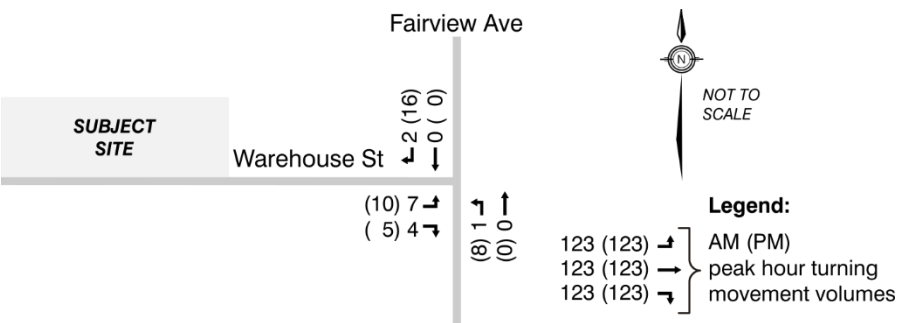
The trip distribution was based on the site's location in the context of the city of St. Thomas, the availability and attractiveness of various travel routes, and existing traffic patterns. **Table 3** lists the trip distribution applied to the site trips.

Table 3: Trip Distribution

TO/FROM	VIA	TRIP DISTRIBUTION %	
		AM PEAK HOUR	PM PEAK HOUR
North	Fairview Avenue	50%	50%
South	Fairview Avenue	40%	40%
West	Warehouse Street	10%	10%
TOTAL		100%	100%

Figure 4 illustrates how the vehicle trips generated by the development were distributed and assigned through the study area intersection. Trips assigned to/from the west via Warehouse Street (1 trip during the AM peak hour, 5 trips during the PM peak hour) were assumed to use the road network to the west and south of the site, and would therefore not pass through the Warehouse Street and Fairview Avenue intersection.

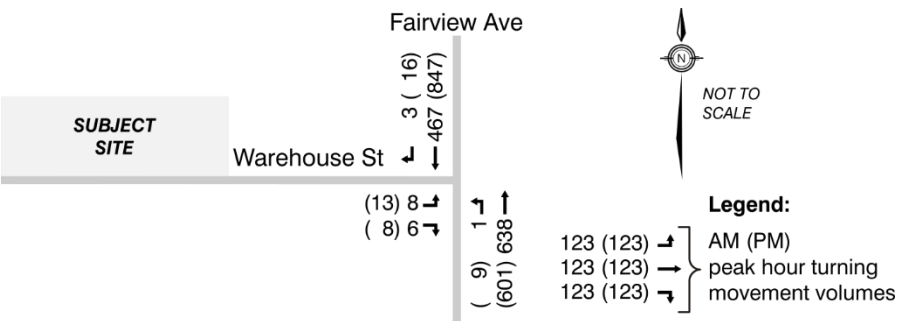
Figure 4: Site-Generated Trips



5. Future Traffic Volumes

To obtain the future background volumes, the existing traffic volumes were grown by a conservative 2% growth rate per annum, in accordance with the 2024 road diet study. The total future traffic volumes were calculated by adding the site trips to the future background traffic volumes. **Figure 5** illustrates the total future traffic volumes with the proposed development at its anticipated build-out year (2027).

Figure 5: Total Future Traffic Volumes (2027)



Intersection operational analyses were completed for the study area intersection using Trafficware's Synchro software (version 12). At the study area intersection, the volume-to-capacity (v/c) ratio, delay, level of service and 95th percentile queue were noted for any stop-controlled movements. Level of service (LOS) definitions are provided in **Attachment 1**. The Synchro analysis worksheets reports are provided in **Attachment 2**.

The total future traffic volumes were analyzed under two scenarios: the existing configuration (TWSC and a four-lane cross-section) and the future configuration as determined in the 2024 road diet study (signalized, a two-lane cross-section, and a northbound left-turn lane). The intersection operations at Warehouse Street and Fairview Avenue under each scenario are shown in **Table 4**.

Table 4: Future Intersection Operations - Warehouse Street and Fairview Avenue

MOVEMENT	AM PEAK HOUR				PM PEAK HOUR			
	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)
Existing configuration								
EB LTR	0.04	B	14.2	1	0.10	C	23.3	3
NB LTR	0.27	A	0.0	0	0.26	A	0.2	0
SB LTR	0.20	A	0.0	0	0.36	A	0.0	0
Future configuration								
EB LTR	0.06	B	13.8	5	0.08	B	13.9	6
NB LTR	0.39	A	2.1	40	0.36	A	2.1	38
SB LTR	0.28	A	1.7	26	0.52	A	3.3	75
Overall	–	A	2.1	–	–	A	2.9	–

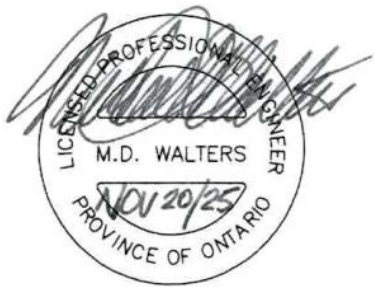
Under the existing configuration and two-way STOP control, the eastbound shared left/right movement is expected to operate well (LOS B) during the AM peak hour and reasonably (LOS C) during the PM peak hour. Delays are expected to reach up to 23 seconds for the eastbound movement. The northbound and southbound movements are anticipated to operate well (LOS A) with little to no queuing or delays.

Under the future configuration and with traffic signal control, the intersection is projected to operate at a good overall level of service (LOS A) with minimal delays during both peak hours. The eastbound shared left/right movement is anticipated to operate well at LOS B during both peak hours.

The development traffic is not expected to cause any future operational issues at the Warehouse Street and Fairview Avenue intersection.

Yours sincerely,

DILLON CONSULTING LIMITED



Mike Walters, P.Eng.
Transportation Engineer

Attachment 1:
LOS Definitions

LEVEL OF SERVICE¹

Level of Service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. This concept was introduced in the 1965 *Highway Capacity Manual* as a criteria for interrupted flow conditions. The 2000 *Highway Capacity Manual* changed the basis for measuring Level of Service at intersections to control delay².

Six Levels of Service are defined with LOS A representing the best operating conditions, and LOS F the worst (briefly described below). It should be noted that there is often significant variability in the amount of delay experienced by individual drivers.

- LOS A:** This Level of Service describes the highest quality of traffic flow and is referred to as free flow. The approach appears open, turning movements are easily made and drivers have freedom of operation. Control delay is less than 10 seconds/vehicle.
- LOS B:** This Level of Service is referred to as a stable flow. Drivers feel somewhat restricted and occasionally may have to wait to complete the minor movement. Control delay is 10-15 seconds/vehicle for unsignalized intersections and 10-20 seconds/vehicle for signalized intersections.
- LOS C:** At this level, the operation is stable. Drivers feel more restricted and may have to wait, with queues developing for short periods. Control delay is 15-25 seconds/vehicle at unsignalized intersections and 20-35 seconds/vehicle at signalized intersections.
- LOS D:** At this level, traffic is approaching unstable flow. The motorist experiences increasing restriction and instability of flow. There are substantial delays to approaching vehicles during short peaks within the peak period, but there are enough gaps to lower demand to permit occasional clearance of developing queues and prevent excessive back-ups. Control delay is 25-35 seconds/vehicle at unsignalized intersections and 35-55 seconds/vehicle at signalized intersections.
- LOS E:** At this level capacity occurs. Long queues of vehicles exist and delays to vehicles may extend. Control delay is 35-50 seconds/vehicle at unsignalized intersections and 55-80 seconds/vehicle at signalized intersections.
- LOS F:** At this Level of Service, the intersection has failed. Capacity of the intersection has been exceeded. Control delay exceeds 50 seconds/vehicle at unsignalized intersections and exceeds 80 seconds/vehicle at signalized intersections.

¹

Transportation Research Board: *Highway Capacity Manual 1965, 2000*

²

Control delay is defined as the component of delay that results when a control signal causes a lane group to reduce speed or to stop; it is measured by comparison with the uncontrolled condition.

Attachment 2:
Synchro Analysis Worksheets

HCM Unsignalized Intersection Capacity Analysis

100: Warehouse Street & Fairview Avenue

AM Peak Hour
Existing Configuration

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	6	1	638	467	3
Future Volume (Veh/h)	8	6	1	638	467	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	7	1	693	508	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	858	256	511			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	858	256	511			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	100			
cM capacity (veh/h)	300	750	1065			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	16	232	462	339	172	
Volume Left	9	1	0	0	0	
Volume Right	7	0	0	0	3	
cSH	406	1065	1700	1700	1700	
Volume to Capacity	0.04	0.00*	0.27	0.20	0.10	
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	
Control Delay (s/veh)	14.2	0.0	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s/veh)	14.2	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			28.3%	ICU Level of Service		A
Analysis Period (min)			15			
* Value less than 0.01.						

HCM Unsignalized Intersection Capacity Analysis 100: Warehouse Street & Fairview Avenue

PM Peak Hour
Existing Configuration

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	8	9	601	847	16
Future Volume (Veh/h)	12	8	9	601	847	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	9	10	653	921	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1276	469	938			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1276	469	938			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	98	99			
cM capacity (veh/h)	159	546	739			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	22	228	435	614	324	
Volume Left	13	10	0	0	0	
Volume Right	9	0	0	0	17	
cSH	224	739	1700	1700	1700	
Volume to Capacity	0.10	0.01	0.26	0.36	0.19	
Queue Length 95th (m)	2.5	0.3	0.0	0.0	0.0	
Control Delay (s/veh)	22.8	0.6	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s/veh)	22.8	0.2		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			33.9%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
100: Warehouse Street & Fairview Avenue

AM Peak Hour
Future Configuration

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	6	1	638	467	3
Future Volume (vph)	8	6	1	638	467	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.6		7.6			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.941				0.999	
Flt Protected	0.973		0.950			
Satd. Flow (prot)	1759	0	1825	1921	1919	0
Flt Permitted	0.973		0.475			
Satd. Flow (perm)	1759	0	913	1921	1919	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	7				1	
Link Speed (k/h)	64			80	80	
Link Distance (m)	172.2			236.3	203.7	
Travel Time (s)	9.7			10.6	9.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	7	1	693	508	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	1	693	511	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	
Minimum Split (s)	22.5		22.5	22.5	22.5	
Total Split (s)	22.5		22.5	22.5	22.5	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Maximum Green (s)	18.0		18.0	18.0	18.0	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5		4.5	4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Max	Max	Max	
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Don't Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effect Green (s)	5.9		37.2	37.2	37.2	
Actuated g/C Ratio	0.15		0.93	0.93	0.93	
v/c Ratio	0.06		0.00	0.39	0.28	
Control Delay (s/veh)	13.8		2.0	2.1	1.7	
Queue Delay	0.0		0.0	0.0	0.0	

Synchro 12 Report

Lanes, Volumes, Timings
100: Warehouse Street & Fairview Avenue

AM Peak Hour
Future Configuration

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay (s/veh)	13.8		2.0	2.1	1.7	
LOS	B		A	A	A	
Approach Delay (s/veh)	13.8			2.1	1.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	0.5		0.0	0.0	0.0	
Queue Length 95th (m)	4.6		0.3	40.2	25.6	
Internal Link Dist (m)	148.2			212.3	179.7	
Turn Bay Length (m)			15.0			
Base Capacity (vph)	808		854	1796	1794	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.02		0.00	0.39	0.28	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 39.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.39

Intersection Signal Delay (s/veh): 2.1

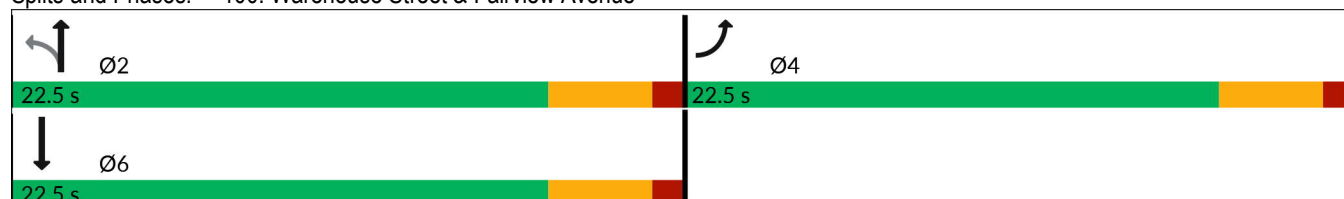
Intersection LOS: A

Intersection Capacity Utilization 45.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 100: Warehouse Street & Fairview Avenue



Lanes, Volumes, Timings
100: Warehouse Street & Fairview Avenue

PM Peak Hour
Future Configuration

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	8	9	601	847	16
Future Volume (vph)	12	8	9	601	847	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.6		7.6			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.945				0.998	
Flt Protected	0.971		0.950			
Satd. Flow (prot)	1763	0	1825	1921	1917	0
Flt Permitted	0.971		0.256			
Satd. Flow (perm)	1763	0	492	1921	1917	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	9				2	
Link Speed (k/h)	64			80	80	
Link Distance (m)	172.2			236.3	203.7	
Travel Time (s)	9.7			10.6	9.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	13	9	10	653	921	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	10	653	938	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	
Minimum Split (s)	22.5		22.5	22.5	22.5	
Total Split (s)	22.5		22.5	22.5	22.5	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Maximum Green (s)	18.0		18.0	18.0	18.0	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5		4.5	4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Max	Max	Max	
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Don't Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effect Green (s)	6.0		37.2	37.2	37.2	
Actuated g/C Ratio	0.15		0.93	0.93	0.93	
v/c Ratio	0.08		0.02	0.36	0.52	
Control Delay (s/veh)	13.8		1.7	2.1	3.3	
Queue Delay	0.0		0.0	0.0	0.0	

Synchro 12 Report

Lanes, Volumes, Timings
100: Warehouse Street & Fairview Avenue

PM Peak Hour
Future Configuration

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay (s/veh)	13.8		1.7	2.1	3.3	
LOS	B		A	A	A	
Approach Delay (s/veh)	13.8			2.1	3.3	
Approach LOS	B			A	A	
Queue Length 50th (m)	0.7		0.0	0.0	0.0	
Queue Length 95th (m)	5.6		1.2	37.4	74.5	
Internal Link Dist (m)	148.2			212.3	179.7	
Turn Bay Length (m)			15.0			
Base Capacity (vph)	810		460	1794	1791	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.03		0.02	0.36	0.52	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 39.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay (s/veh): 2.9

Intersection LOS: A

Intersection Capacity Utilization 57.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 100: Warehouse Street & Fairview Avenue

