Technical Memorandum

To:	Tim Lee	Date:	2022-05-05
Cc:	Christopher Gordon – CGH		
From:	Michelle Chen – CGH	Project Number:	2022-040

Re: Cardinal Creek Village – Phase 7 Transportation Brief

1 Introduction

1.1 Cardinal Creek Village Background

Cardinal Creek Village is a developing residential subdivision in the east end of Ottawa, located east of Trim Road between Old Montreal Road and Ottawa Road 174. Phases 1 to 6 have been approved and all prior phases are constructed or under construction.

A Transportation Impact Assessment was completed for the overall community in 2013, which considered 7 phases for the development and identified the necessary transportation network requirements to accommodate the future anticipated demands. Interim traffic assessments have been completed for each phase of development. The following memorandum is consistent with the conclusions from the overall community transportation study.

1.2 Cardinal Creek Village Phase 7

Phase 7 of Cardinal Creek Village will add 159 new homes to the community made up of 58 semi-detached and 87 townhouse units. Access will be provided via three extensions of internal roads from prior phases, accessing Old Montreal Road via Cardinal Creek Drive and Famille-Laporte Avenue (see Attachment 1).

2 Existing 2022 Intersection Operations

Existing turning movement counts for the weekday AM and PM peak hours were provided by The Traffic Specialist. Table 1 summarizes the count locations, data source, and identified peak hours. The 2022 existing intersection volumes are illustrated in Figure 1 and the operations are summarized in Table 2. The level of service is based on HCM 2010 average delay for unsignalized intersections. Detailed turning movement count data can be found in Attachment 2, and the Synchro worksheets have been provided in Attachment 3.

Table 1: Turning Movement Count Data Dates

Location	Count Date	AM Peak Hour (PM Peak Hour)	Data Source
Old Montreal Road & Famille-Laporte Avenue	Thursday, April 28, 2022	7:30 – 8:30 (15:45 – 16:45)	The Traffic Specialist
Old Montreal Road & Cardinal Creek Drive			

Figure 1: 2022 Existing Intersection Volumes

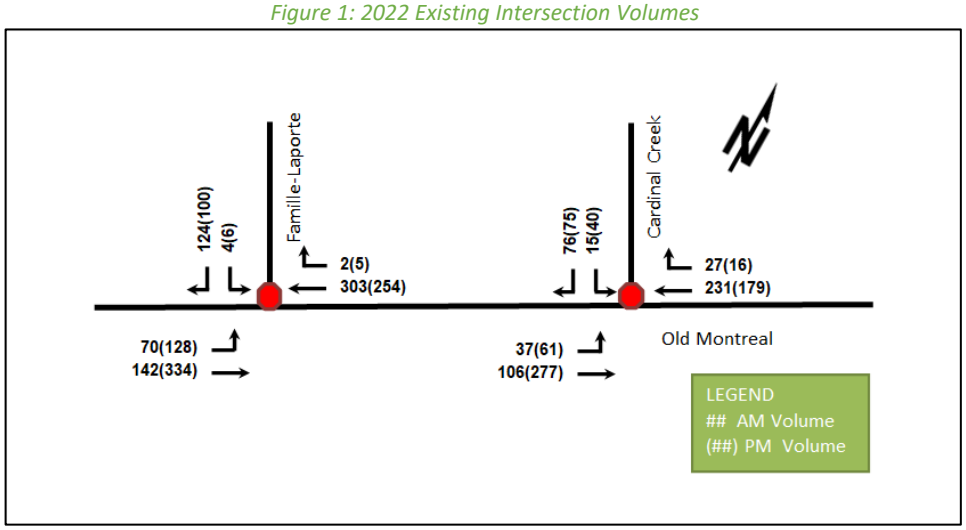


Table 2: 2022 Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Old Montreal Road & Famille Laporte Avenue *Unsignalized*	EBL	A	0.06	8.2	1.5	A	0.11	8.2	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.21	11.6	6.0	B	0.17	11.4	4.5
	Overall	**A**	**-**	**3.2**	**-**	**A**	**-**	**2.7**	**-**
Old Montreal Road & Cardinal Creek Drive *Unsignalized*	EB	A	0.03	7.9	0.8	A	0.05	7.8	1.5
	WB	-	-	-	-	-	-	-	-
	SB	B	0.14	10.9	3.8	B	0.23	13.3	6.8
	Overall	**A**	**-**	**2.6**	**-**	**A**	**-**	**3.1**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The existing intersections of Old Montreal Road and Famille-Laporte Avenue and Old Montreal Road and Cardinal Creek Village Drive operate well during both peak hours. No capacity, delay, or queueing issues are noted.

3 Cardinal Creek Village Phase 7 Trip Generation

The trip generation has been prepared using the person trip rates for the residential components using the TRANS Trip Generation Manual (2020). Table 3 summarizes the person trip rates for the proposed land use for each peak period.

Table 3: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Period	Person Trip Rates
Multi-Unit (Low-Rise)	220 (TRANS)	AM	1.35
		PM	1.58

Using the above person trip rates, the total person trip generation has been estimated. Table 4 below illustrates the total person trip generation.

Table 4: Total Person Trip Generation

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Multi-Unit (Low-Rise)	145	59	137	196	128	101	229

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the subject district, derived from the most recent National Capital Region Origin-Destination survey (OD Survey), the existing average district mode shares by land use for Orleans have been summarized in Table 5.

Table 5: TRANS Trip Generation Manual Recommended Mode Shares – Orleans

Travel Mode	Multi-Unit (Low-Rise)	
	AM	PM
Auto Driver	47%	51%
Auto Passenger	15%	19%
Transit	29%	24%
Cycling	1%	1%
Walking	9%	6%
Total	**100%**	**100%**

Using the above mode shares and person trip rates, the person trips by mode have been projected. Table 6 summarizes the trip generation by mode. As no transit service is available in the off-peak direction, these trips have been shifted to the 'auto driver' mode.

Table 6: Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Multi-Unit (Low-Rise)	Auto Driver	**47%**	22	31	53	**51%**	28	34	62
	Auto Passenger	**15%**	4	10	14	**19%**	11	8	19
	Transit	**29%**	0	22	22	**24%**	15	0	15
	Cycling	**1%**	1	1	2	**1%**	0	0	0
	Walking	**9%**	3	7	10	**6%**	4	3	7
	Total	**100%**	**30**	**71**	**101**	**100%**	**54**	**45**	**103**

As shown above, a total of 53 AM and 62 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

3.1 Trip Distribution

To understand the travel patterns of the subject development, the OD Survey distributions were reviewed and have been summarized below in Table 7.

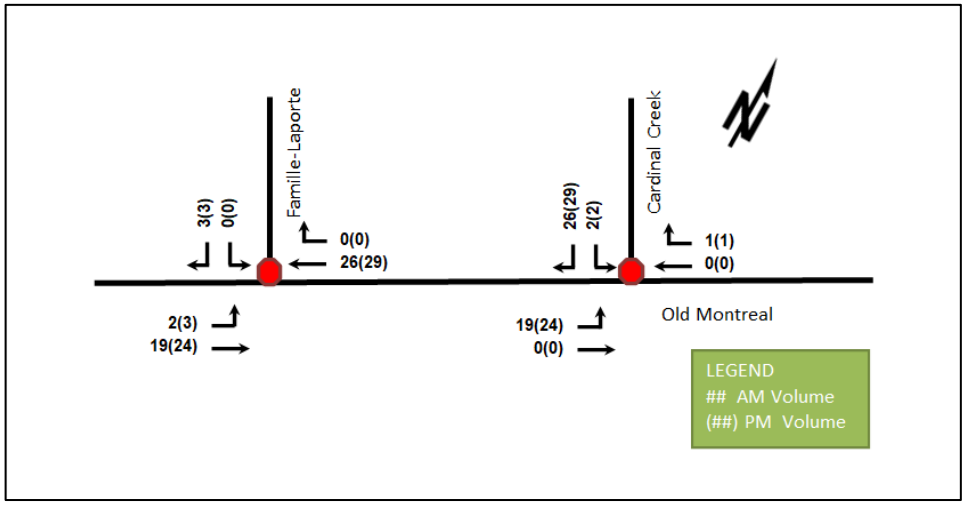
Table 7: OD Survey Existing Mode Share – Orleans

To/From	% of Trips
North	0%
South	15%
East	5%
West	80%
Total	100%

3.2 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. Figure 2 illustrates the new Phase 7 site-generated volumes.

Figure 2: Cardinal Creek Village Phase 7 New Site Trips



4 Cardinal Creek Village Phase 7 Future Intersection Operations

4.1 2023 Future Total Intersection Operations

The 2023 future total intersection volumes are illustrated in Figure 3 and the operations are summarized in Table 8. The synchro worksheets have been provided in Attachment 4.

Figure 3: 2023 Future Total Intersection Volumes

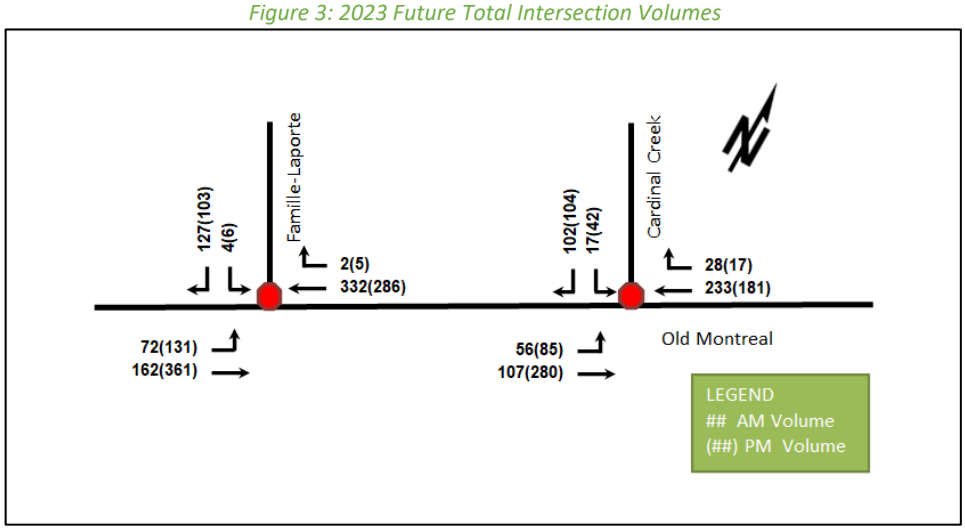


Table 8: 2023 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Old Montreal Road & Famille Laporte Avenue *Unsignalized*	EBL	A	0.07	8.2	1.5	A	0.12	8.3	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.22	12.0	6.0	B	0.19	11.9	5.3
	Overall	**A**	**-**	**3.1**	**-**	**A**	**-**	**2.7**	**-**
Old Montreal Road & Cardinal Creek Drive *Unsignalized*	EB	A	0.05	8.0	1.5	A	0.07	7.9	1.5
	WB	-	-	-	-	-	-	-	-
	SB	B	0.19	11.2	5.3	B	0.29	13.9	9.0
	Overall	**A**	**-**	**3.3**	**-**	**A**	**-**	**3.8**	**-**

Notes:
Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The 2023 future conditions are forecasted to operate well during both peak hours and similarly to the existing conditions. No capacity, delay, or queueing issues are noted.

4.2 2028 Future Total Intersection Operations

The 2028 future total intersection volumes are illustrated in Figure 4 and the operations are summarized in Table 9. The synchro worksheets have been provided in Attachment 5.

Figure 4: 2028 Future Total Intersection Volumes

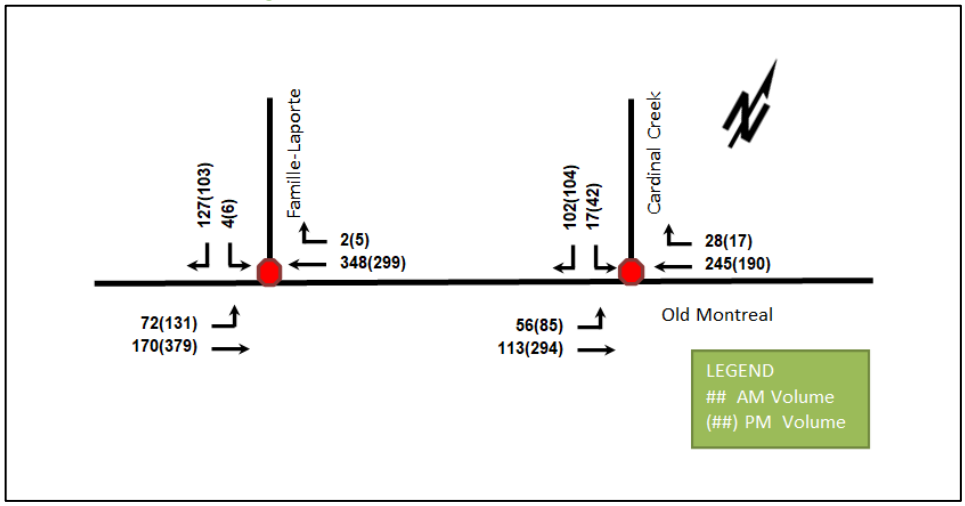


Table 9: 2028 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Old Montreal Road & Famille Laporte Avenue *Unsignalized*	EBL	A	0.07	8.3	1.5	A	0.12	8.3	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.23	12.2	6.8	B	0.19	12.1	5.3
	Overall	**A**	**-**	**3.0**	**-**	**A**	**-**	**2.6**	**-**
Old Montreal Road & Cardinal Creek Drive *Unsignalized*	EB	A	0.05	8.0	1.5	A	0.07	7.9	1.5
	WB	-	-	-	-	-	-	-	-
	SB	B	0.19	11.4	5.3	B	0.29	14.2	9.0
	Overall	**A**	**-**	**3.2**	**-**	**A**	**-**	**3.8**	**-**

Notes:
Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The 2028 future conditions are forecasted to operate well during both peak hours. No capacity, delay, or queueing issues are noted.

5 Left Turn Warrant

The existing traffic volumes were used to assess turn lane volume warrants provided in Appendix 9 of The MTO Design Supplement for the Geometric Design Guide for Canadian Roads Design Standards (TAC, 2017) for the eastbound left-turn movement at the intersection of Old Montreal Road at Cardinal Creek Drive. Attachment 6 provides the turn lane warrants.

The eastbound left-turn is not warranted during both peak hours for the existing conditions and future background horizons. However, the volume warrants for the eastbound left-turn lane were met for the PM peak hour in the future total horizons. The required storage length for the potential eastbound left-turn lane was calculated using the Geometric Design Guide for Canadian Roads (TAC, 2017) equation 9.14.1 and was found to be 20 metres at the 2028 horizon.

Operationally, the intersection is forecasted to operate with a level of service of 'A' for the eastbound movement at all horizons. If an eastbound left-turn lane were to be included in the operational analysis, the delay of less than eight seconds at both peak hours for all horizons would shift to the new auxiliary lane, and the through lane would operate as a free-flow condition. From an operations perspective, the queues in the eastbound direction are forecast to be less than two metres during the peak hours and incur negligible increases in delay with the new phase's traffic over the existing and background conditions. Therefore, the turn lane is not required to support the development based upon the projected volumes.

6 Conclusion

Considering the Phase 7 traffic demands both study area intersections will continue to operate with a good level of service under their existing configurations. The monitoring of the intersection of Old Montreal Road at Cardinal Creek Drive should continue to determine the need for an eastbound left-turn phase in the future.

It is recommended that, from a transportation perspective, the proposed development application proceed.

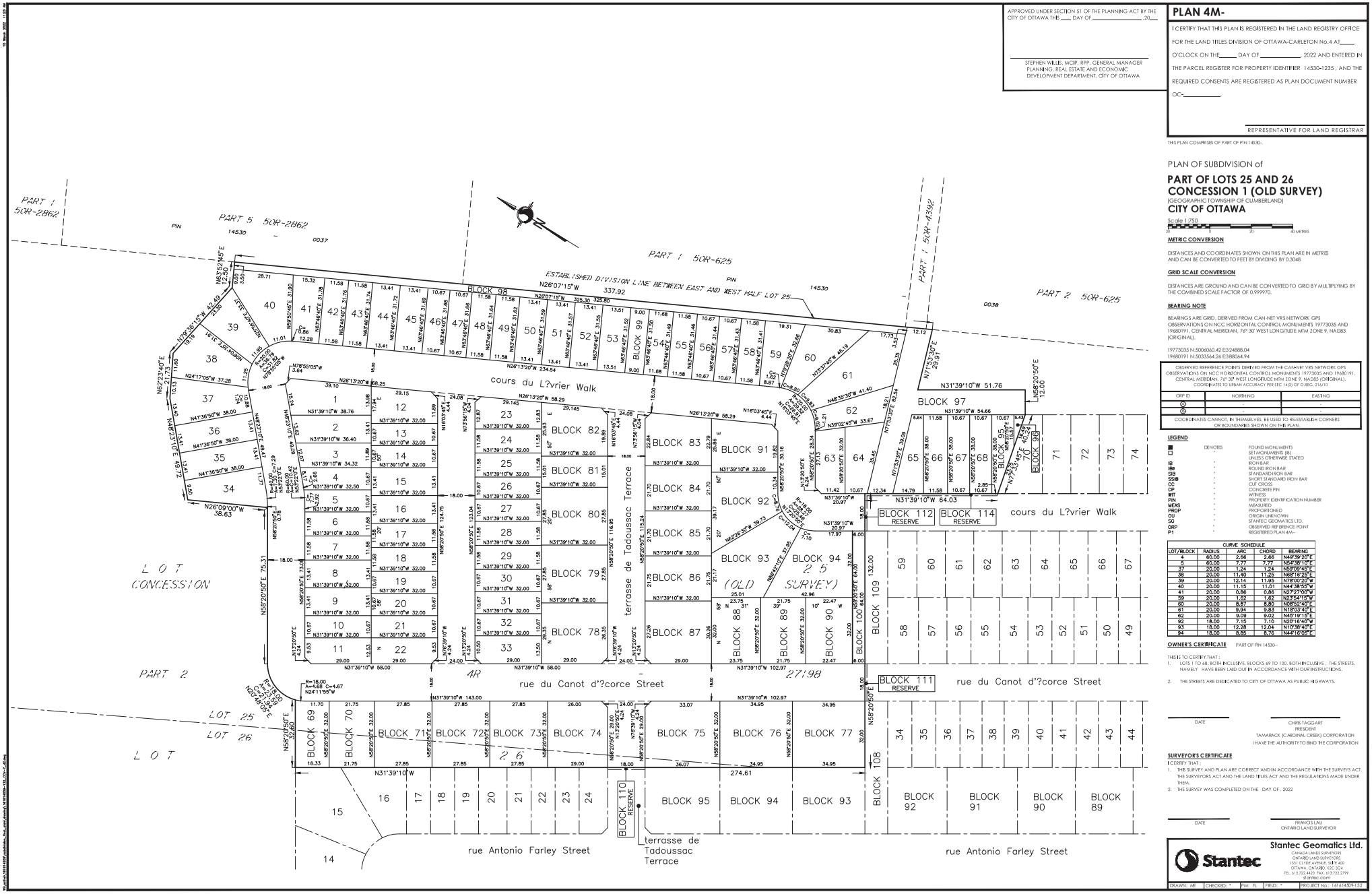
Prepared By:

Yu-Chu Chen, EIT
Transportation Engineering-Intern

Reviewed By:

Christopher Gordon, P.Eng.
Senior Transportation Engineer

Attachment 1



APPROVED UNDER SECTION 51 OF THE PLANNING ACT BY THE CITY OF OTTAWA THIS ___ DAY OF _____, 20__

STEPHEN WILLIS, MCIP, RPP, GENERAL MANAGER
PLANNING, REAL ESTATE AND ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

PLAN 4M-

I CERTIFY THAT THIS PLAN IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON No.4 AT ____ O'CLOCK ON THE ____ DAY OF _____, 2022 AND ENTERED IN THE PARCEL REGISTER FOR PROPERTY IDENTIFIER 14530-1235 , AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NUMBER OC-_____.

REPRESENTATIVE FOR LAND REGISTRAR

THIS PLAN COMPRISES OF PART OF PIN 14530-.

PLAN OF SUBDIVISION of

PART OF LOTS 25 AND 26 CONCESSION 1 (OLD SURVEY)

(GEOGRAPHIC TOWNSHIP OF CUMBERLAND)

CITY OF OTTAWA

Scale 1:750

0 10 20 40 METRES

METRIC CONVERSION

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

GRID SCALE CONVERSION

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999970.

BEARING NOTE

BEARINGS ARE GRID, DERIVED FROM CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL).

19773035 N:5006040.42 E:3248818.04
19680191 N:5003564.26 E:3188064.94

OBSERVED REFERENCE POINTS DERIVED FROM THE CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL). COORDINATES TO URBAN ACCURACY PER SEC 14(3) OF O.REG. 216/10

ORP ID	NORTHING	EASTING
⊗	-	-
⊗	-	-

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

LEGEND

■	DENOTES	FOUND MONUMENTS
□	"	SET MONUMENTS (IB) UNLESS OTHERWISE STATED
IB	"	IRON BAR
IRB	"	ROUND IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
CC	"	CUT CROSS
CP	"	CONCRETE PIN
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
SG	"	STANTEC GEOMATICS LTD.
ORP	"	OBSERVED REFERENCE POINT
P1	"	REGISTERED PLAN 4M--

CURVE SCHEDULE

LOT/BLOCK	RADIUS	ARC	CHORD	BEARING
4	60.00	2.66	2.66	N49°39'20"E
5	60.00	7.77	7.77	N54°38'10"E
37	20.00	1.24	1.24	N59°09'45"E
38	20.00	11.40	11.25	N68°16'25"E
39	20.00	12.14	11.95	N78°00'20"W
40	20.00	11.15	11.01	N44°38'55"W
41	20.00	0.86	0.86	N27°27'00"W
59	20.00	1.62	1.62	N23°54'15"W
60	20.00	8.87	8.80	N08°52'40"E
61	20.00	9.94	9.83	N18°03'40"E
62	20.00	9.09	9.02	N45°19'15"E
92	18.00	7.15	7.10	N20°16'40"W
93	18.00	12.28	12.04	N10°38'40"E
94	18.00	8.85	8.76	N44°16'05"E

OWNER'S CERTIFICATE PART OF PIN 14530-

THIS IS TO CERTIFY THAT :

1. LOTS 1 TO 68, BOTH INCLUSIVE, BLOCKS 69 TO 100, BOTH INCLUSIVE , THE STREETS, NAMELY HAVE BEEN LAID OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.
2. THE STREETS ARE DEDICATED TO CITY OF OTTAWA AS PUBLIC HIGHWAYS.

DATE

CHRIS TAGGART
PRESIDENT
TAMARACK (CARDINAL CREEK) CORPORATION
I HAVE THE AUTHORITY TO BIND THE CORPORATION

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE DAY OF , 2022

DATE

FRANCIS LAU
ONTARIO LAND SURVEYOR

Stantec
Stantec Geomatics Ltd.
CANADA LANDS SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 400
OTTAWA, ONTARIO, K2C 3G4
TEL. 613.722.4420 FAX. 613.722.2799
@stantec.com

DRAWN: ME | CHECKED: * | PM: PL | FIELD: * | PROJECT NO.: 161614309-132

ACCURATE TRUSTED TRAFFIC DATA

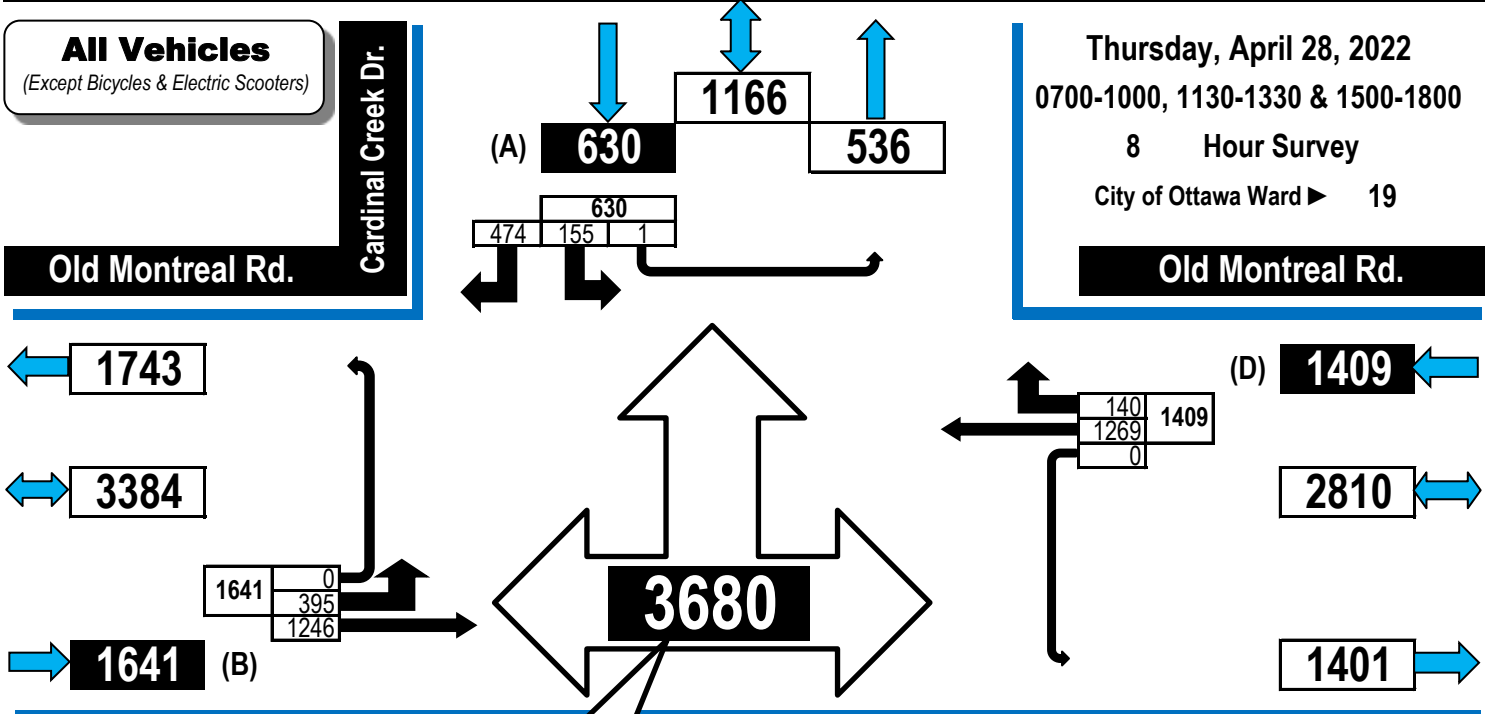
Attachment 2

Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams
All Vehicles Except Bicycles

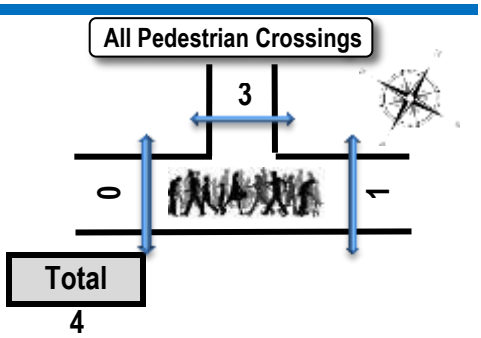
Cardinal Creek Drive & Old Montreal Road — Orléans, ON

All Vehicles
(Except Bicycles & Electric Scooters)

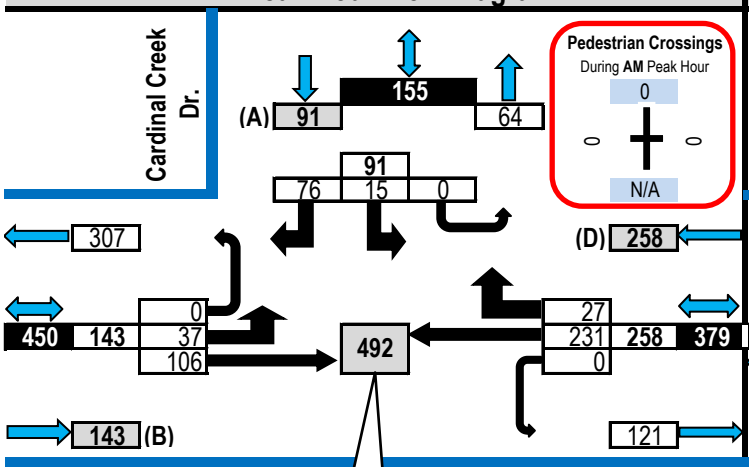
Thursday, April 28, 2022
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ▶ 19



Total vehicle volume, all approaches. (A + B + D)



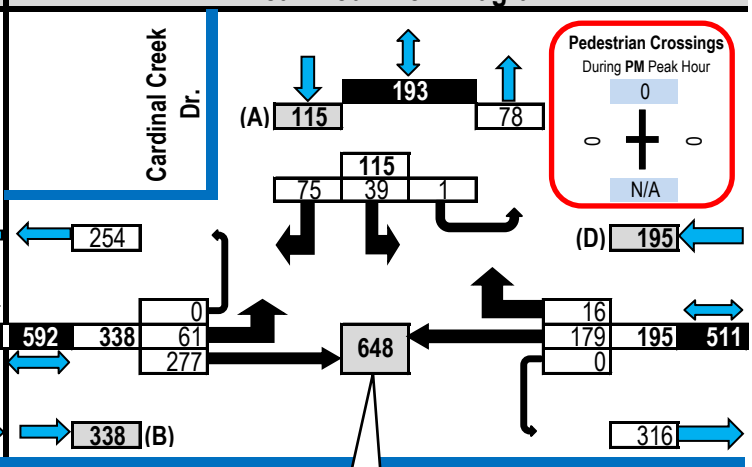
AM Peak Hour Flow Diagram



Total **AM Peak Hour** vehicle volume, all approaches. (A + B + D)

Summary - AM Peak Hr.	
Peak Hr.	0730-0830
Volume	492
PHF	0.97

PM Peak Hour Flow Diagram



Total **PM Peak Hour** vehicle volume, all approaches. (A + B + D)

Summary - PM Peak Hr.	
Peak Hr.	1545-1645
Volume	648
PHF	0.90

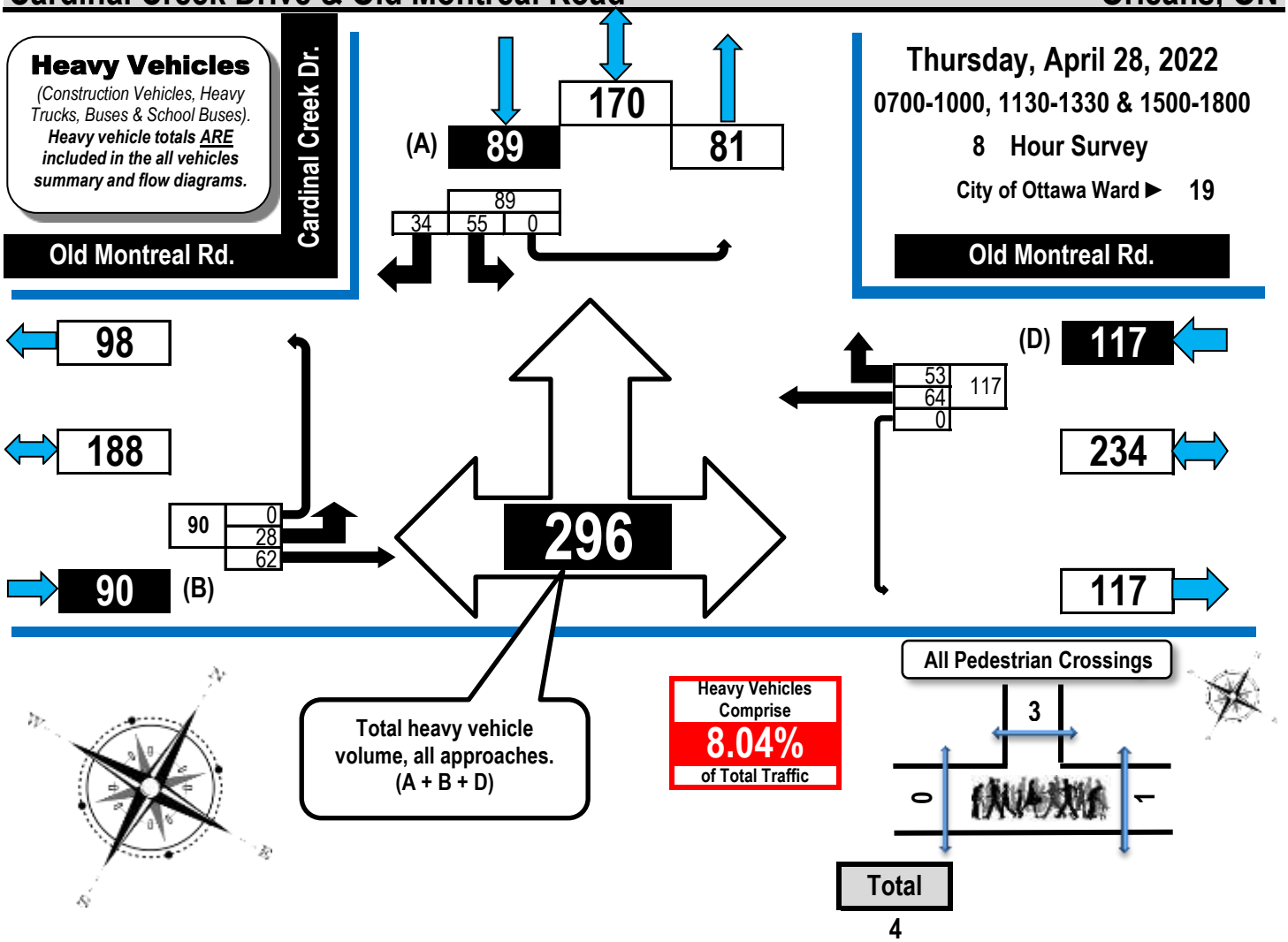
Turning Movement Count
Heavy Vehicle Summary (FHWA Class 4-13)
Flow Diagram

Cardinal Creek Drive & Old Montreal Road — Orléans, ON

Heavy Vehicles
(Construction Vehicles, Heavy Trucks, Buses & School Buses).
Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

Cardinal Creek Dr.

Old Montreal Rd.



Thursday, April 28, 2022
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 19

Old Montreal Rd.

	Old Montreal Rd. Eastbound					Old Montreal Rd. Westbound					N/A Northbound					Cardinal Creek Dr. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	2	7		0	9		11	11	0	22						7		2	0	9	40
0800-0900	7	12		0	19		12	8	0	20						4		6	0	10	49
0900-1000	4	10		0	14		12	6	0	18						6		4	0	10	42
1130-1230	4	11		0	15		10	9	0	19						8		4	0	12	46
1230-1330	5	6		0	11		9	7	0	16						8		2	0	10	37
1500-1600	5	6		0	11		6	9	0	15						13		8	0	21	47
1600-1700	0	6		0	6		4	3	0	7						8		7	0	15	28
1700-1800	1	4		0	5		0	0	0	0						1		1	0	2	7
Totals	28	62		0	90		64	53	0	117						55		34	0	89	296

Comments:
OC Transpo buses and school buses comprise 17.57% of the heavy vehicle traffic. With the lack of an eastbound left-turn lane, some eastbound drivers pass stopped vehicles by driving on the paved shoulder along the south side of Old Montreal Road.

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count

Summary Report Including Peak Hours, AADT and Expansion Factors

All Vehicles Except Bicycles

Cardinal Creek Drive & Old Montreal Road — Orléans, ON

Survey Date: Thursday, April 28, 2022 **Start Time:** 0700 **AADT Factor:** 0.9

Weather AM: Partly cloudy 0° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0700-1000, 1130-1330 & 1500-1800

Weather PM: Clear & sunny +9° C **Surveyor(s):** T. Carmody

	Old Montreal Rd.					Old Montreal Rd.						N/A					Cardinal Creek Dr.						
	Eastbound					Westbound						Northbound					Southbound						
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	27	78		0	105		224	28	0	252	357						13		44	0	57	57	414
0800-0900	41	108		0	149		200	16	0	216	365						12		82	0	94	94	459
0900-1000	45	94		0	139		138	14	0	152	291						12		54	0	66	66	357
1130-1230	54	135		0	189		131	16	0	147	336						20		51	0	71	71	407
1230-1330	47	110		0	157		127	12	0	139	296						19		61	0	80	80	376
1500-1600	61	240		0	301		141	17	0	158	459						43		67	1	111	111	570
1600-1700	61	262		0	323		174	20	0	194	517						30		66	0	96	96	613
1700-1800	59	219		0	278		134	17	0	151	429						6		49	0	55	55	484
Totals	395	1246		0	1641		1269	140	0	1409	3050						155		474	1	630	630	3680

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 ➡12 expansion factor of 1.39

Equ. 12 Hr	549	1732	0	0	2281	0	1764	195	0	1959	4240	0	0	0	0	0	215	0	659	1	876	876	5115

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9

AADT 12-hr	494	1559	0	0	2053	0	1588	175	0	1763	3816	0	0	0	0	0	194	0	593	1	788	788	4604

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 ➡24 expansion factor of 1.31

AADT 24 Hr	647	2042	0	0	2689	0	2080	229	0	2309	4998	0	0	0	0	0	254	0	777	2	1032	1032	6031

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor ➡ 0.97												Highest Hourly Vehicle Volume Between 0700h & 1000h										
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0730-0830	37	106	0	0	143	0	231	27	0	258	401	0	0	0	0	0	15	0	76	0	91	91	492
OFF Peak Hour Factor ➡ 0.82												Highest Hourly Vehicle Volume Between 1130h & 1330h										
OFF Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1200-1300	61	133	0	0	194	0	139	14	0	153	347	0	0	0	0	0	18	0	57	0	75	75	422
PM Peak Hour Factor ➡ 0.90												Highest Hourly Vehicle Volume Between 1500h & 1800h										
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1545-1645	61	277	0	0	338	0	179	16	0	195	533	0	0	0	0	0	39	0	75	1	115	115	648

Comments:

OC Transpo buses and school buses comprise 17.57% of the heavy vehicle traffic. With the lack of an eastbound left-turn lane, some eastbound drivers pass stopped vehicles by driving on the paved shoulder along the south side of Old Montreal Road.

Notes:

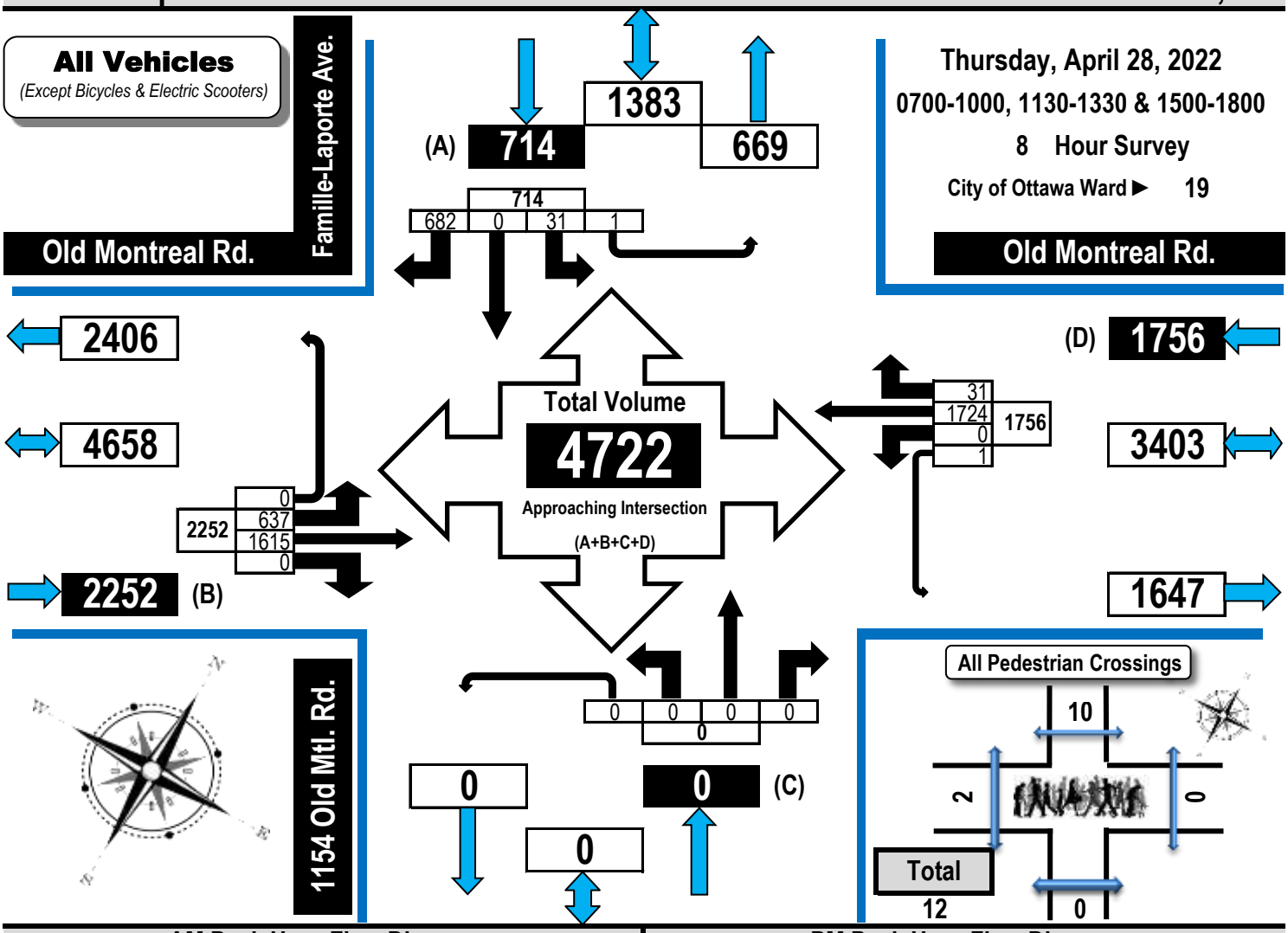
1. Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams
All Vehicles Except Bicycles

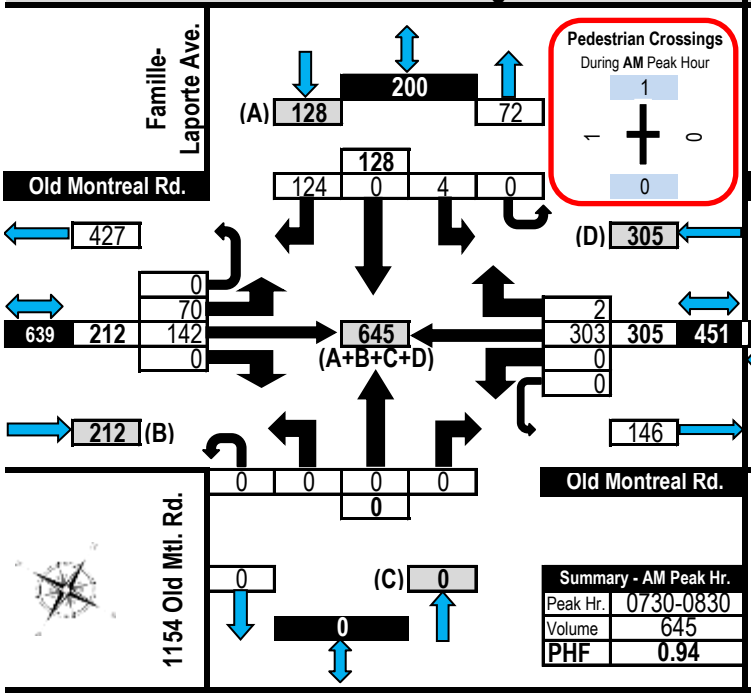
Famille-Laporte Avenue & Old Montreal Road — Orléans, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Thursday, April 28, 2022
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 19

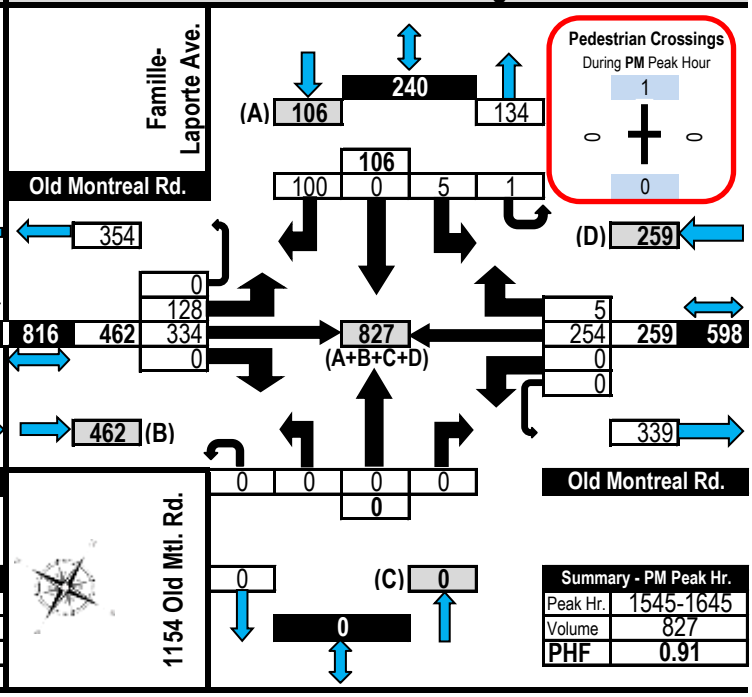


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0730-0830
Volume	645
PHF	0.94

PM Peak Hour Flow Diagram



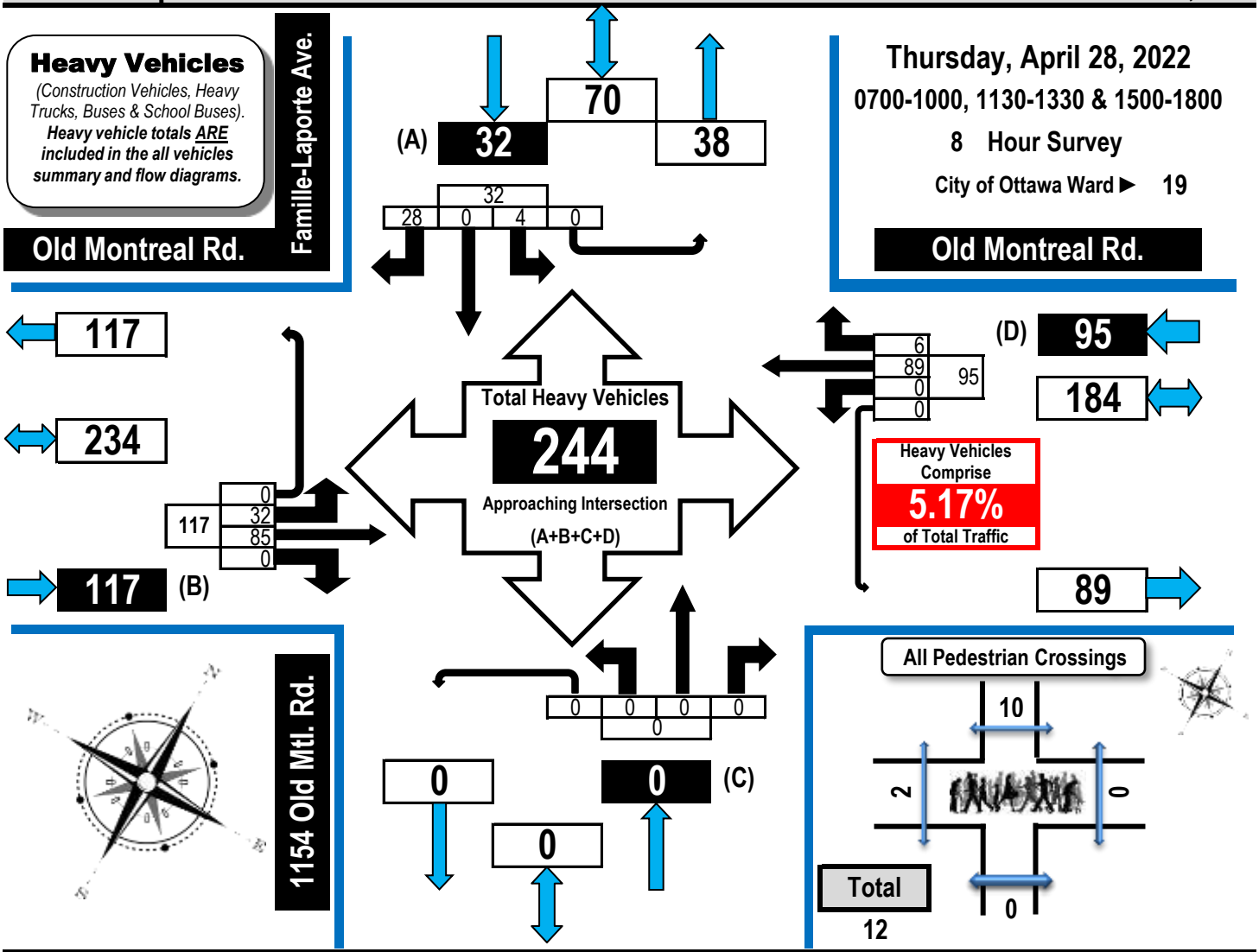
Summary - PM Peak Hr.	
Peak Hr.	1545-1645
Volume	827
PHF	0.91

Turning Movement Count
Heavy Vehicle Summary (FHWA Class 4-13)
Flow Diagram

Famille-Laporte Avenue & Old Montreal Road — Orléans, ON

Heavy Vehicles
(Construction Vehicles, Heavy Trucks, Buses & School Buses).
Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

Thursday, April 28, 2022
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 19



	Old Montreal Rd. Eastbound					Old Montreal Rd. Westbound					1154 Old Mtl. Rd. Northbound					Famille-Laporte Ave. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	1	8	0	0	9	0	9	2	0	11	0	0	0	0	0	0	0	6	0	6	26
0800-0900	9	16	0	0	25	0	17	0	0	17	0	0	0	0	0	1	0	8	0	9	51
0900-1000	3	12	0	0	15	0	13	3	0	16	0	0	0	0	0	2	0	2	0	4	35
1130-1230	2	16	0	0	18	0	15	0	0	15	0	0	0	0	0	0	0	3	0	3	36
1230-1330	2	11	0	0	13	0	10	1	0	11	0	0	0	0	0	0	0	4	0	4	28
1500-1600	8	11	0	0	19	0	14	0	0	14	0	0	0	0	0	1	0	2	0	3	36
1600-1700	6	7	0	0	13	0	10	0	0	10	0	0	0	0	0	0	0	3	0	3	26
1700-1800	1	4	0	0	5	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	6
Totals	32	85	0	0	117	0	89	6	0	95	0	0	0	0	0	4	0	28	0	32	244

Comments:

OC Transpo buses and school buses comprise 27.05% of the heavy vehicle traffic. A few eastbound vehicles utilized the eastbound left-turn lane as a through lane when there were no left-turning vehicles waiting to turn onto Famille-Laporte Avenue. The bicycle total includes 2 E-bicycles.

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count

Summary Report Including Peak Hours, AADT and Expansion Factors

All Vehicles Except Bicycles

Famille-Laporte Avenue & Old Montreal Road — Orléans, ON

Survey Date: Thursday, April 28, 2022 **Start Time:** 0700 **AADT Factor:** 0.9

Weather AM: Partly cloudy 0º C **Survey Duration:** 8 Hrs. **Survey Hours:** 0700-1000, 1130-1330 & 1500-1800

Weather PM: Clear & sunny +9º C **Surveyor(s):** T. Carmody

	Old Montreal Rd.					Old Montreal Rd.						1154 Old Mtl. Rd.					Famille-Laporte Ave.						
	Eastbound					Westbound						Northbound					Southbound						
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	29	102	0	0	131	0	262	4	0	266	397	0	0	0	0	0	2	0	102	0	104	104	501
0800-0900	77	144	0	0	221	0	280	5	0	285	506	0	0	0	0	0	4	0	111	0	115	115	621
0900-1000	50	139	0	0	189	0	192	6	0	198	387	0	0	0	0	0	5	0	72	0	77	77	464
1130-1230	72	187	0	0	259	0	180	2	0	182	441	0	0	0	0	0	4	0	65	0	69	69	510
1230-1330	69	154	0	0	223	0	186	5	0	191	414	0	0	0	0	0	4	0	63	0	67	67	481
1500-1600	112	292	0	0	404	0	202	5	0	207	611	0	0	0	0	0	6	0	75	1	82	82	693
1600-1700	120	326	0	0	446	0	240	2	0	242	688	0	0	0	0	0	2	0	109	0	111	111	799
1700-1800	108	271	0	0	379	0	182	2	1	185	564	0	0	0	0	0	4	0	85	0	89	89	653
Totals	637	1615	0	0	2252	0	1724	31	1	1756	4008	0	0	0	0	0	31	0	682	1	714	714	4722

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 ➡12 expansion factor of 1.39

Equ. 12 Hr	885	2245	0	0	3130	0	2396	43	1	2441	5571	0	0	0	0	0	43	0	948	1	992	992	6564

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9

AADT 12-hr	797	2020	0	0	2817	0	2157	39	1	2197	5014	0	0	0	0	0	39	0	853	1	893	893	5907

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 ➡24 expansion factor of 1.31

AADT 24 Hr	1044	2647	0	0	3691	0	2825	51	2	2878	6568	0	0	0	0	0	51	0	1118	2	1170	1170	7738

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor ➡ 0.94												Highest Hourly Vehicle Volume Between 0700h & 1000h										
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0730-0830	70	142	0	0	212	0	303	2	0	305	517	0	0	0	0	0	4	0	124	0	128	128	645
OFF Peak Hour Factor ➡ 0.84												Highest Hourly Vehicle Volume Between 1130h & 1330h										
OFF Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1145-1245	77	192	0	0	269	0	183	4	0	187	456	0	0	0	0	0	6	0	67	0	73	73	529
PM Peak Hour Factor ➡ 0.91												Highest Hourly Vehicle Volume Between 1500h & 1800h										
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1545-1645	128	334	0	0	462	0	254	5	0	259	721	0	0	0	0	0	5	0	100	1	106	106	827

Comments:

OC Transpo buses and school buses comprise 27.05% of the heavy vehicle traffic. A few eastbound vehicles utilized the eastbound left-turn lane as a through lane when there were no left-turning vehicles waiting to turn onto Famille-Laporte Avenue. The bicycle total includes 2 E-bicycles.

Notes:

1. Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	142	303	2	4	124
Future Vol, veh/h	70	142	303	2	4	124
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	104	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	78	158	337	2	4	138

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	339	0	-	0	652	338
Stage 1	-	-	-	-	338	-
Stage 2	-	-	-	-	314	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1220	-	-	-	433	704
Stage 1	-	-	-	-	722	-
Stage 2	-	-	-	-	741	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1220	-	-	-	405	704
Mov Cap-2 Maneuver	-	-	-	-	405	-
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	741	-

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1220	-	-	-	688
HCM Lane V/C Ratio	0.064	-	-	-	0.207
HCM Control Delay (s)	8.2	-	-	-	11.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.8

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	37	106	231	27	15	76
Future Vol, veh/h	37	106	231	27	15	76
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	118	257	30	17	84

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	287	0	-	0	472	272
Stage 1	-	-	-	-	272	-
Stage 2	-	-	-	-	200	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1275	-	-	-	551	767
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	834	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1275	-	-	-	532	767
Mov Cap-2 Maneuver	-	-	-	-	532	-
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	834	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1275	-	-	-	715
HCM Lane V/C Ratio	0.032	-	-	-	0.141
HCM Control Delay (s)	7.9	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	128	334	254	5	6	100
Future Vol, veh/h	128	334	254	5	6	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	104	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	142	371	282	6	7	111

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	288	0	-	0	940	285
Stage 1	-	-	-	-	285	-
Stage 2	-	-	-	-	655	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1274	-	-	-	293	754
Stage 1	-	-	-	-	763	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1274	-	-	-	260	754
Mov Cap-2 Maneuver	-	-	-	-	260	-
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	517	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1274	-	-	-	681
HCM Lane V/C Ratio	0.112	-	-	-	0.173
HCM Control Delay (s)	8.2	-	-	-	11.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.6

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	61	277	179	16	40	75
Future Vol, veh/h	61	277	179	16	40	75
Conflicting Peds, #/hr	0	0	0	0	107	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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	308	199	18	44	83

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	217	0	-	0	759	208
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	551	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1353	-	-	-	374	832
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	577	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1353	-	-	-	351	832
Mov Cap-2 Maneuver	-	-	-	-	351	-
Stage 1	-	-	-	-	777	-
Stage 2	-	-	-	-	577	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	13.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1353	-	-	-	563
HCM Lane V/C Ratio	0.05	-	-	-	0.227
HCM Control Delay (s)	7.8	0	-	-	13.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	71	162	332	2	4	127
Future Vol, veh/h	71	162	332	2	4	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	104	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	180	369	2	4	141

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	371	0	-	0	708	370
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	338	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1188	-	-	-	401	676
Stage 1	-	-	-	-	699	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1188	-	-	-	375	676
Mov Cap-2 Maneuver	-	-	-	-	375	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	722	-

Approach	EB	WB	SB
HCM Control Delay, s	2.5	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1188	-	-	-	660
HCM Lane V/C Ratio	0.066	-	-	-	0.221
HCM Control Delay (s)	8.2	-	-	-	12
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.8

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	56	107	233	28	17	102
Future Vol, veh/h	56	107	233	28	17	102
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	62	119	259	31	19	113

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	290	0	-	0	518	275
Stage 1	-	-	-	-	275	-
Stage 2	-	-	-	-	243	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1272	-	-	-	518	764
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1272	-	-	-	491	764
Mov Cap-2 Maneuver	-	-	-	-	491	-
Stage 1	-	-	-	-	731	-
Stage 2	-	-	-	-	797	-

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1272	-	-	-	708
HCM Lane V/C Ratio	0.049	-	-	-	0.187
HCM Control Delay (s)	8	0	-	-	11.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	131	361	286	5	6	103
Future Vol, veh/h	131	361	286	5	6	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	104	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	146	401	318	6	7	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	324	0	-	0	1014	321
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	693	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1236	-	-	-	264	720
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	496	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1236	-	-	-	233	720
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	648	-
Stage 2	-	-	-	-	496	-

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1236	-	-	-	646
HCM Lane V/C Ratio	0.118	-	-	-	0.187
HCM Control Delay (s)	8.3	-	-	-	11.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.7

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	85	280	181	17	42	104
Future Vol, veh/h	85	280	181	17	42	104
Conflicting Peds, #/hr	0	0	0	0	107	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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	94	311	201	19	47	116

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	220	0	-	0	817	211
Stage 1	-	-	-	-	211	-
Stage 2	-	-	-	-	606	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1349	-	-	-	346	829
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1349	-	-	-	317	829
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	545	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	13.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1349	-	-	-	566
HCM Lane V/C Ratio	0.07	-	-	-	0.287
HCM Control Delay (s)	7.9	0	-	-	13.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1.2

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	72	170	348	2	4	127
Future Vol, veh/h	72	170	348	2	4	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	104	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	189	387	2	4	141

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	389	0	-	0	737	388
Stage 1	-	-	-	-	388	-
Stage 2	-	-	-	-	349	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1170	-	-	-	386	660
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	714	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1170	-	-	-	360	660
Mov Cap-2 Maneuver	-	-	-	-	360	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	714	-

Approach	EB	WB	SB
HCM Control Delay, s	2.5	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1170	-	-	-	644
HCM Lane V/C Ratio	0.068	-	-	-	0.226
HCM Control Delay (s)	8.3	-	-	-	12.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	56	113	245	28	17	102
Future Vol, veh/h	56	113	245	28	17	102
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	62	126	272	31	19	113

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	303	0	-	0	538	288
Stage 1	-	-	-	-	288	-
Stage 2	-	-	-	-	250	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1258	-	-	-	504	751
Stage 1	-	-	-	-	761	-
Stage 2	-	-	-	-	792	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1258	-	-	-	477	751
Mov Cap-2 Maneuver	-	-	-	-	477	-
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	792	-

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1258	-	-	-	694
HCM Lane V/C Ratio	0.049	-	-	-	0.191
HCM Control Delay (s)	8	0	-	-	11.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	131	379	299	5	6	103
Future Vol, veh/h	131	379	299	5	6	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	104	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	146	421	332	6	7	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	338	0	-	0	1048	335
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	713	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1221	-	-	-	252	707
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	486	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1221	-	-	-	222	707
Mov Cap-2 Maneuver	-	-	-	-	222	-
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	486	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1221	-	-	-	631
HCM Lane V/C Ratio	0.119	-	-	-	0.192
HCM Control Delay (s)	8.3	-	-	-	12.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.7

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	85	294	190	17	42	104
Future Vol, veh/h	85	294	190	17	42	104
Conflicting Peds, #/hr	0	0	0	0	107	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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	94	327	211	19	47	116

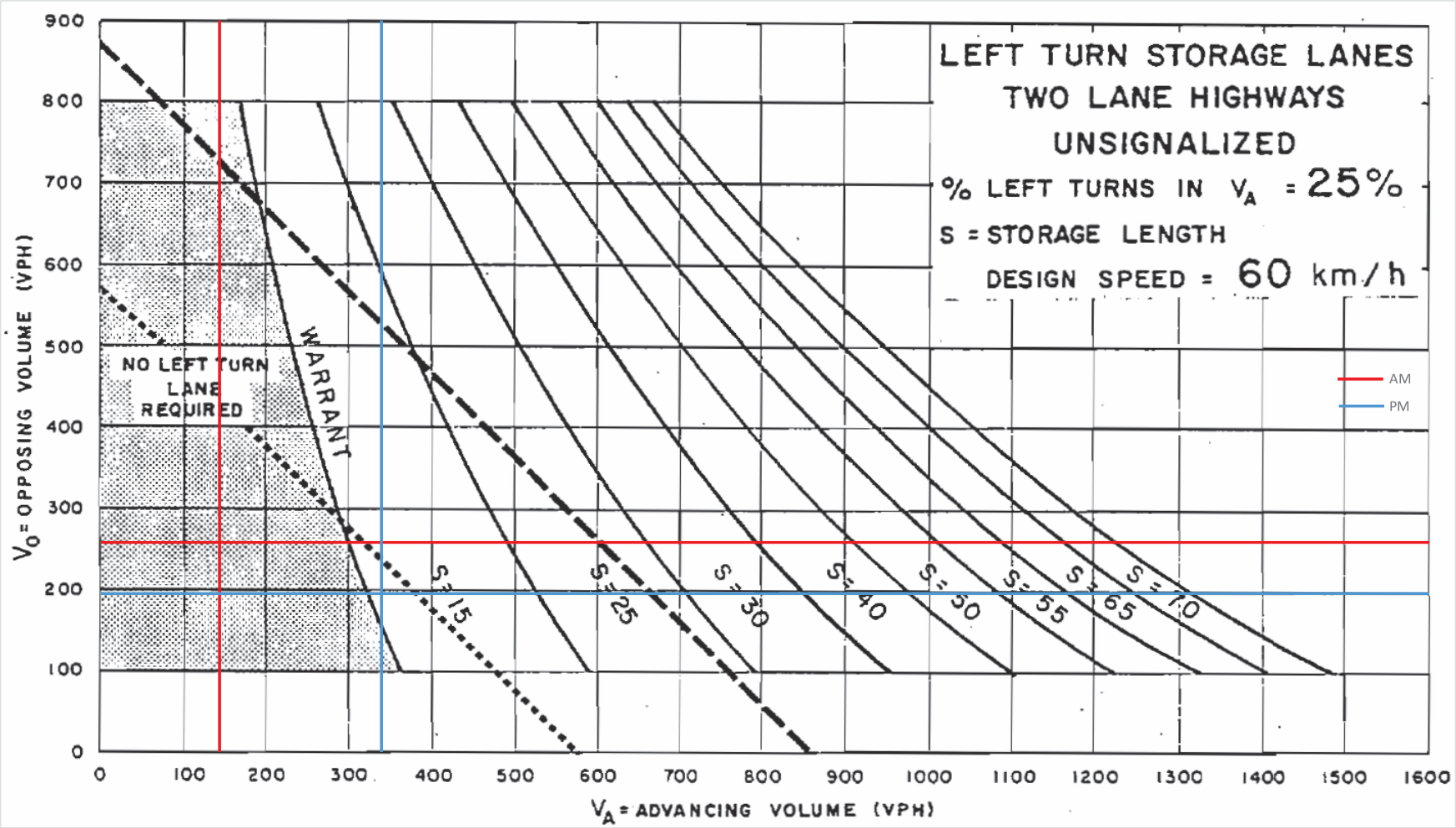
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	230	0	-	0	843	221
Stage 1	-	-	-	-	221	-
Stage 2	-	-	-	-	622	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1338	-	-	-	334	819
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	535	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1338	-	-	-	305	819
Mov Cap-2 Maneuver	-	-	-	-	305	-
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	535	-

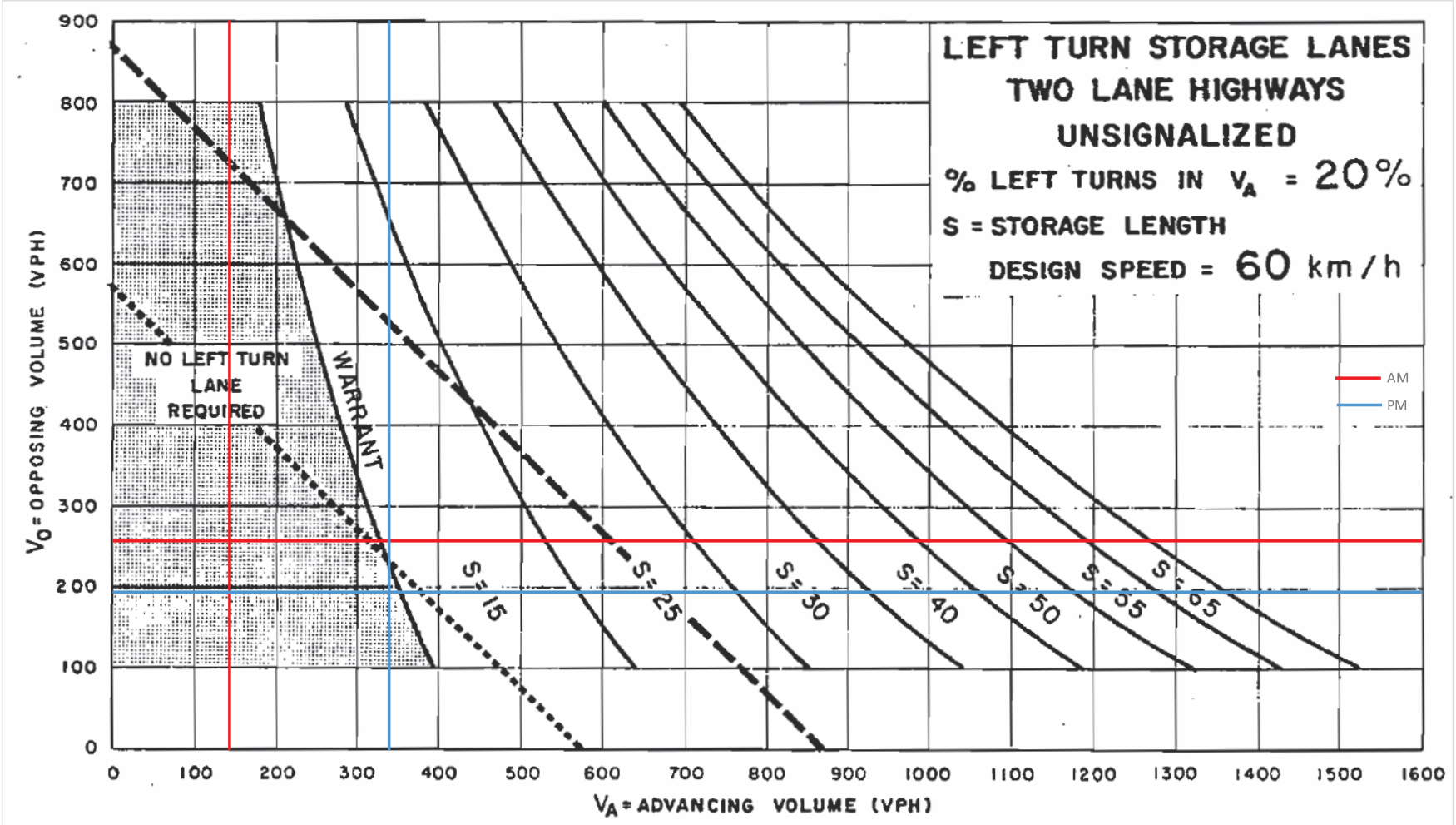
Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1338	-	-	-	552
HCM Lane V/C Ratio	0.071	-	-	-	0.294
HCM Control Delay (s)	7.9	0	-	-	14.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1.2

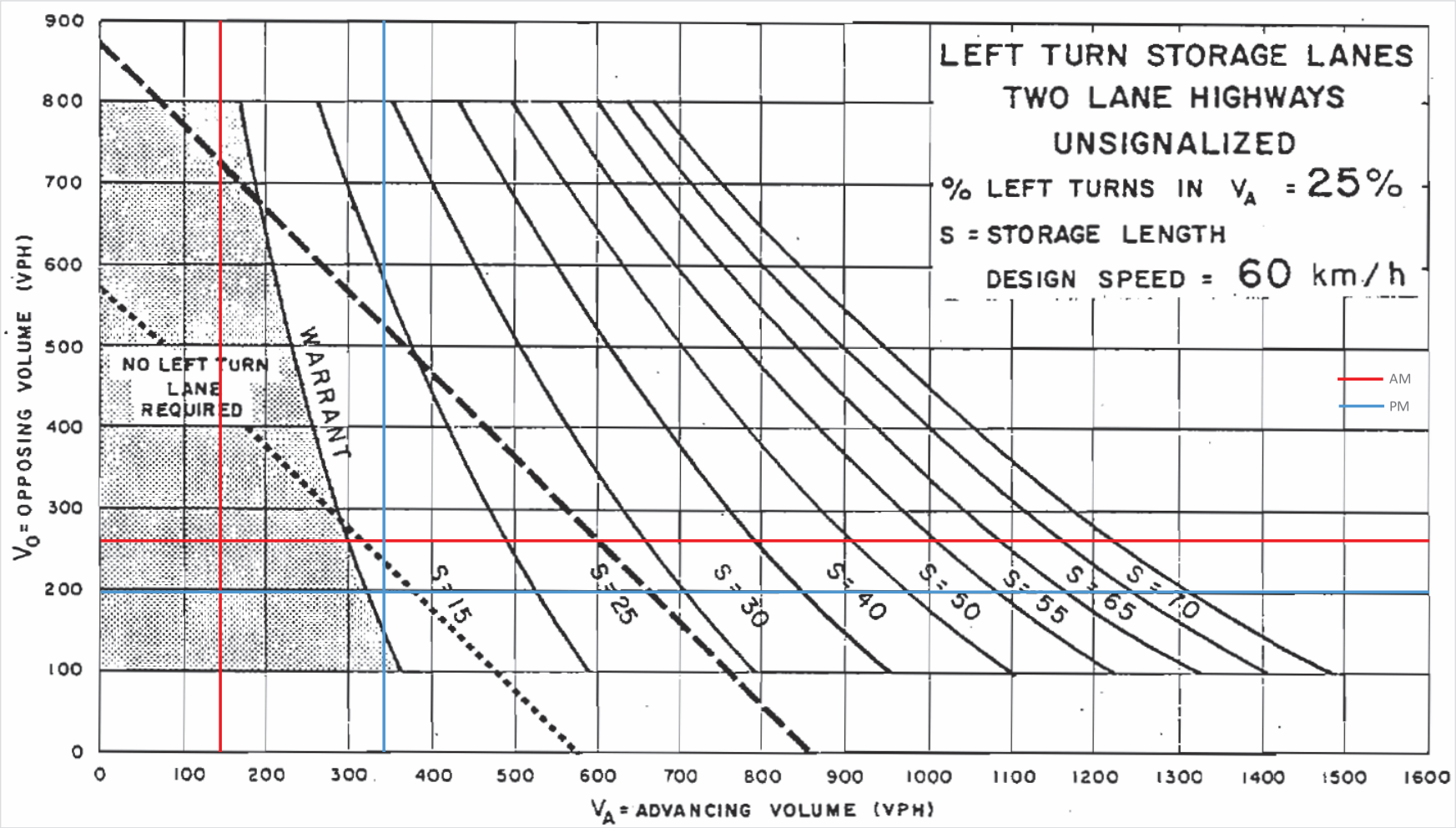
Attachment 6

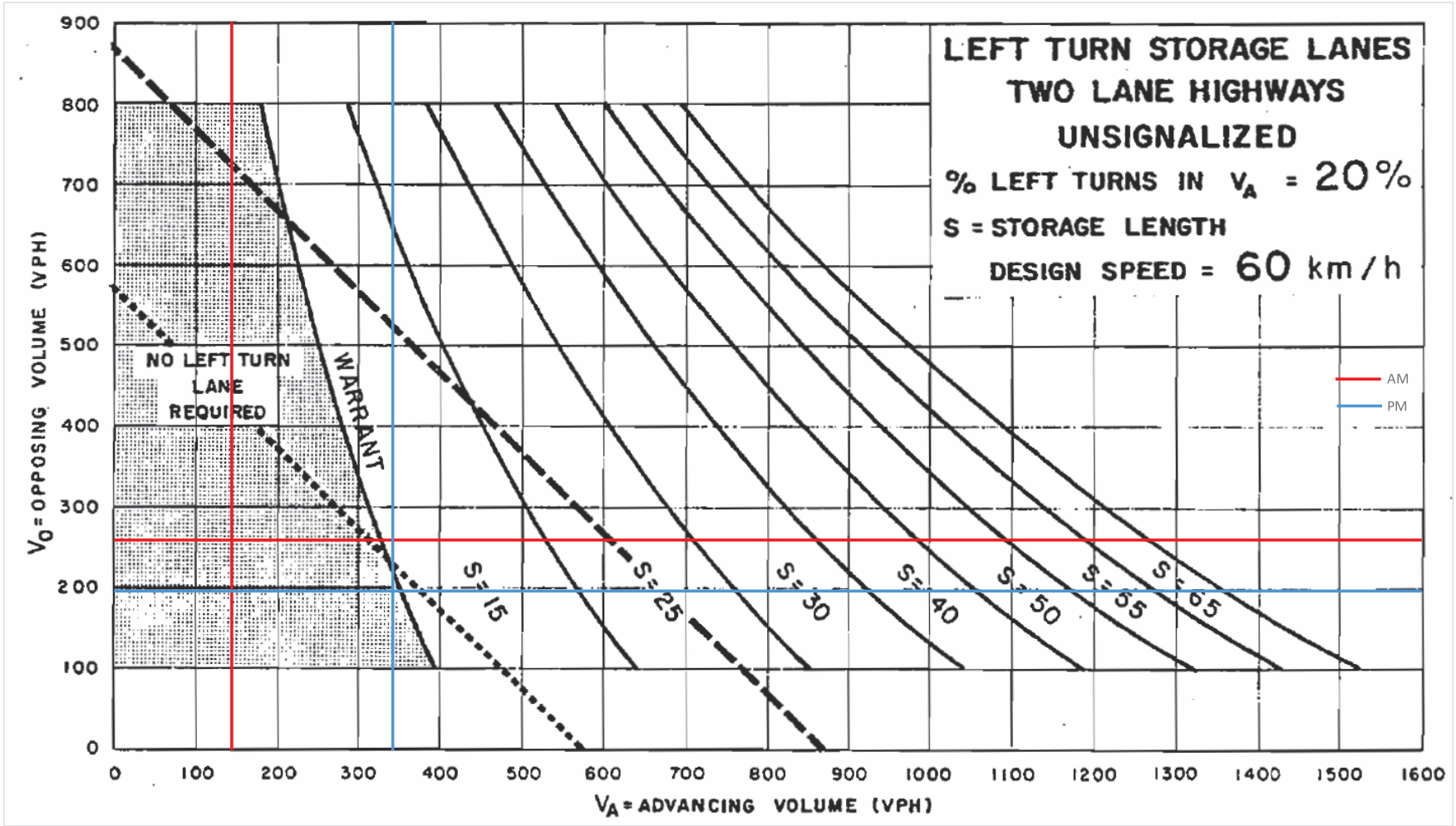
Existing



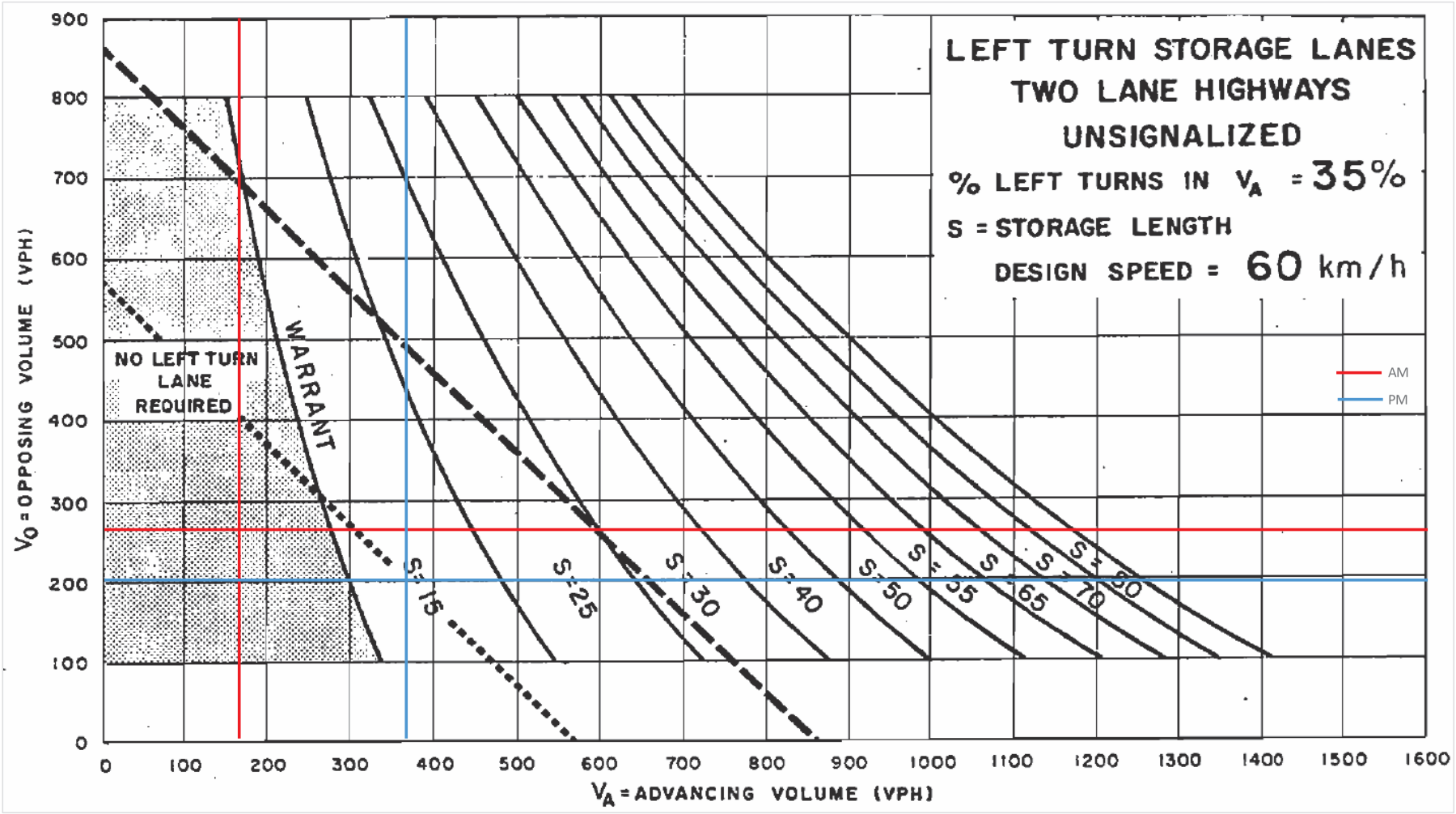

LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 20%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

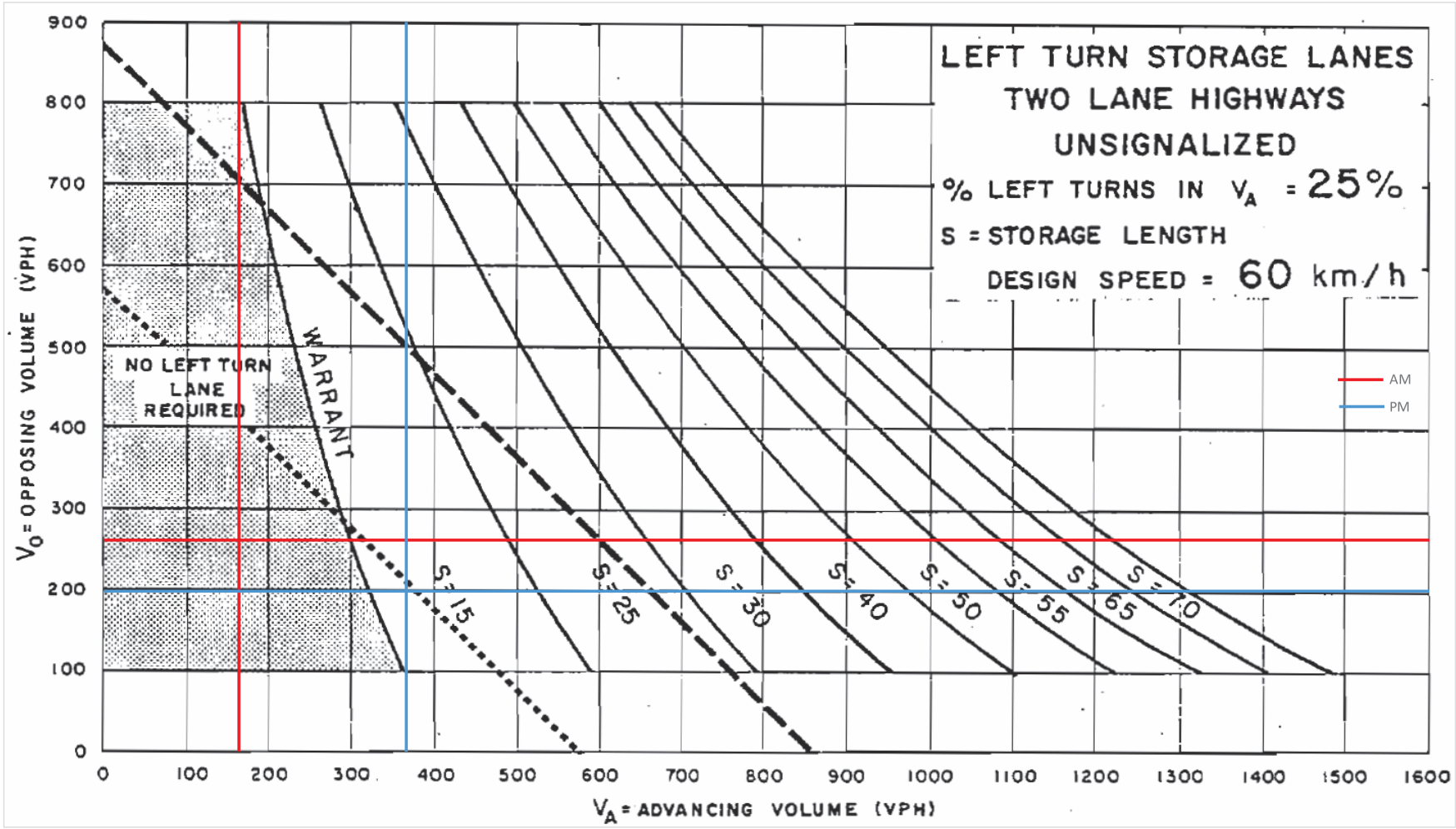
FB2023


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 25%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
S = 50
S = 55
S = 65
S = 110
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

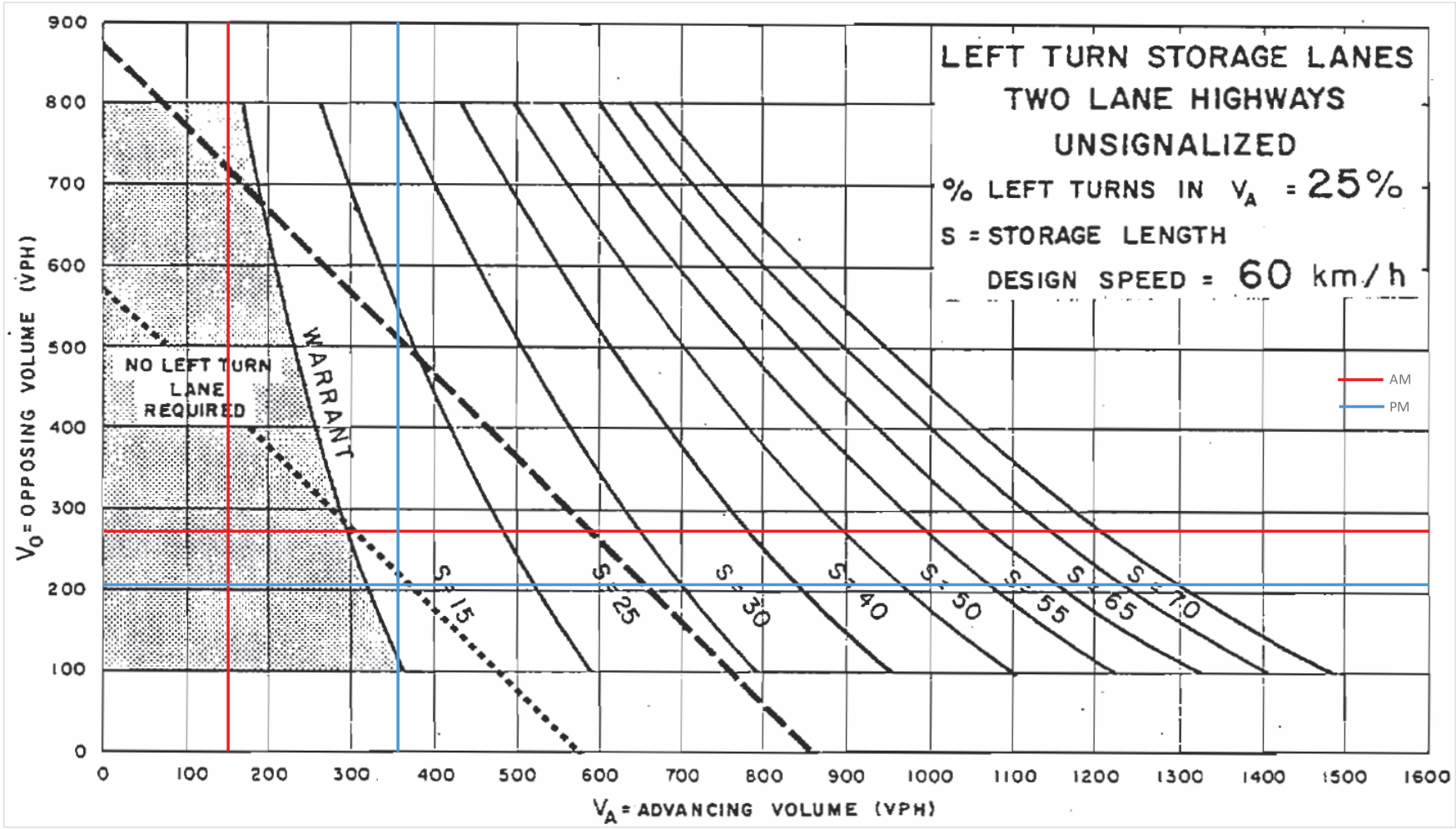

LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 20%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

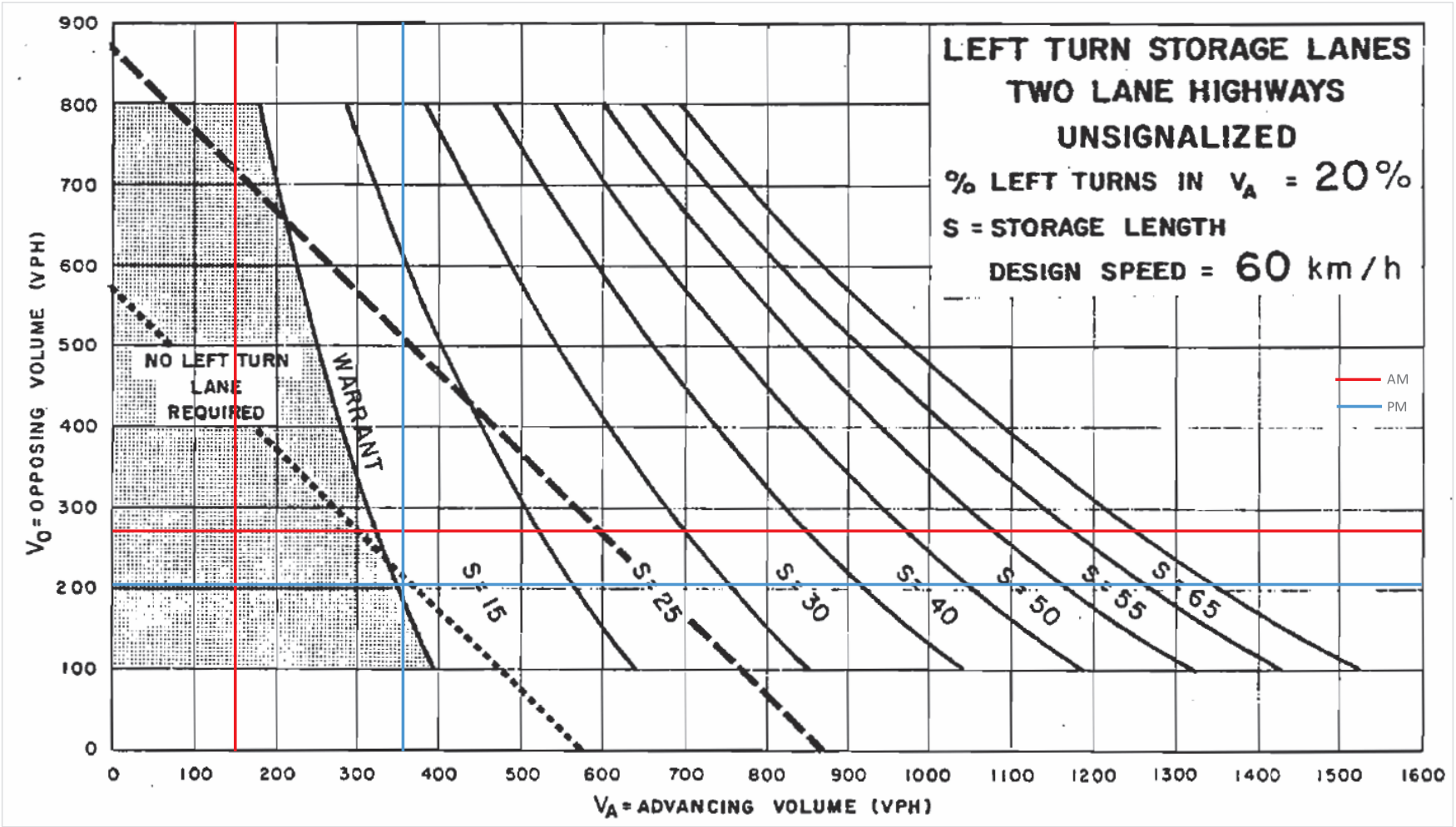
FT2023


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 35%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
S=80
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

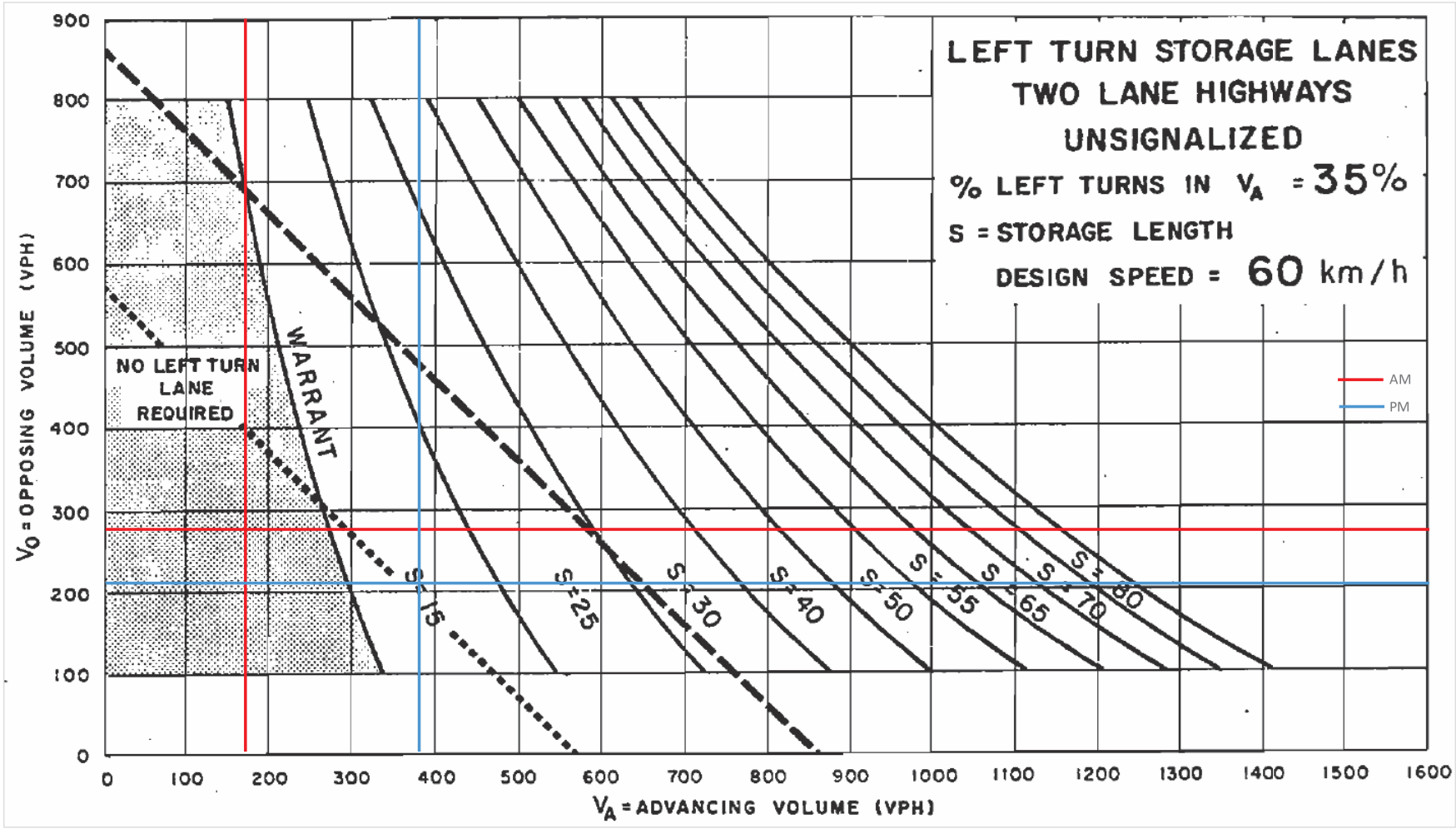

LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 25%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

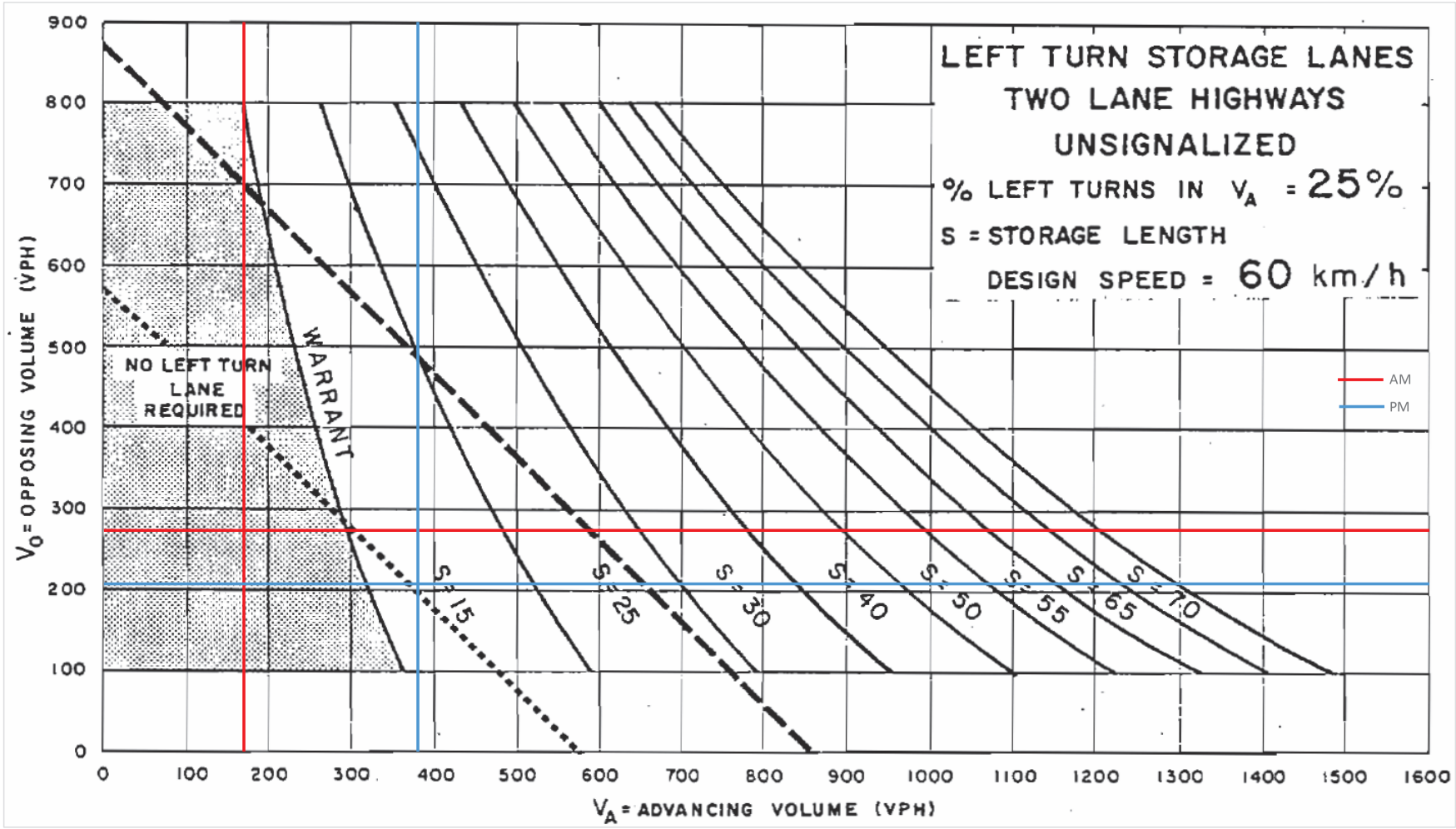
FB2028


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 25%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 20%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
S = 50
S = 55
S = 65
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

FT2028


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 35%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
S=80
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 25%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600