

4175 Strandherd Drive

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Strategy Report

Prepared for:

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PN: 2026-100

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1 Screening

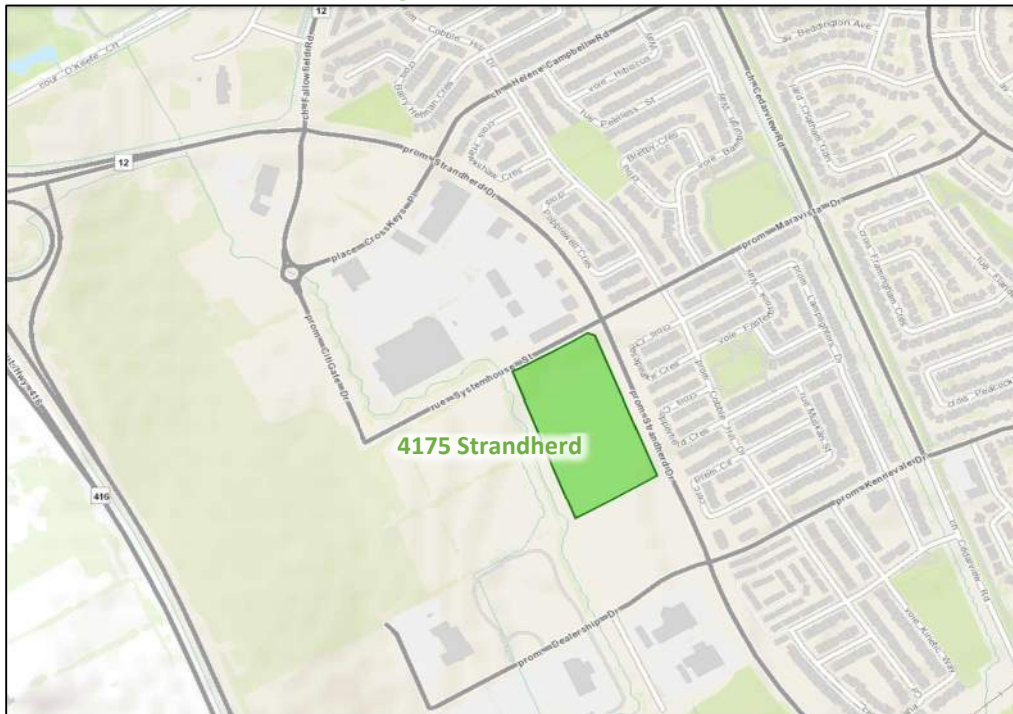
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines, incorporating the 2023 Revision to Transportation Impact Assessment Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required, and this study has been prepared to support a site plan application.

2 Existing and Planned Conditions

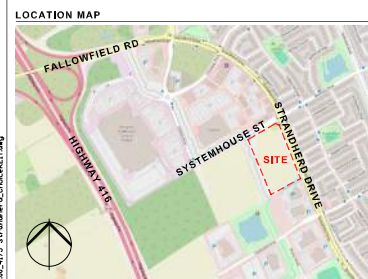
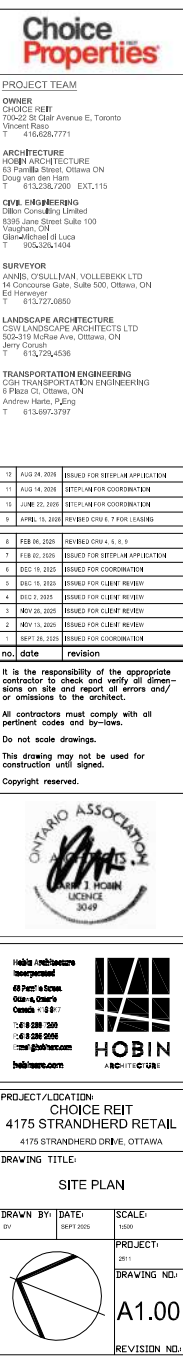
2.1 Proposed Development

The proposed site is located at 4175 Strandherd Drive and is currently zoned as Mixed Industrial Zone (IM[3033] H(18)). The proposed development includes a total of 122,956 sq. ft of retail spaces comprising a grocery store, a drugstore, three drive-through components, and additional retail spaces. A total of 497 vehicle parking spaces is proposed. The proposed access configuration includes a full-movement access on Systemhouse Street opposite of the Costco access, a right-in/right-out access and a new signalized intersection on Strandherd Drive. The anticipated buildout is 2028. Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: June 19, 2026



SURVEY INFORMATION

LEGAL DESCRIPTION:
Block 3 and Part of Block 27
registered Plan 4161338
City of Ottawa

PREPARED BY Anne, C.S., Sylvia, Volobelski, Ltd.
FIELD WORK COMPLETED ON February 5, 2015

NOTE:
DO NOT REFER TO LANDSCAPE PLAN FOR EXTERIOR FINISHES, PLANTING & SITE FURNITURE. REFER TO SITE SERVICING AND GRADING PLAN FOR RELEVANT INFO.

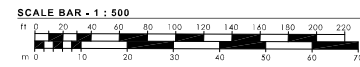
PROJECT INFORMATION	
CITY OF OTTAWA	
OFFICIAL PLAN:	SUBURBAN TRANSECT, MIXED INDUSTRIAL, ARTERIAL RD
ZONING:	IP[3033] H[18] INDUSTRIAL PARK
ADDRESS:	4175 STRANDHEARD DRIVE, OTTAWA
SITE AREA:	52,733 M ²

ZONING INFORMATION		
ZONING	REQUIRED	PROVIDED
PERMITTED USES:	Retail	Retail
	Retail Food Store	Retail Food Store
	Restaurant, Etc	Restaurant, Etc
MINIMUM LOT WIDTH	No Minimum	156.5m
MINIMUM LOT AREA	750m ²	52,73 m ²
MIN FRONT YARD (SYSTEM HOUSE)	6.0m	6.0m
MIN CORNER SIDE YARD (STRANDHERO)	6.0m	7.0m
MIN INTERIOR SIDE YARD (WEST)	3.0m	3.0m
MIN REAR YARD (SOUTH)	6.0m	11.0m
LOT COVERAGE	55% (max)	22%
FLOOR SPACE INDEX (FSI)	FSI 2 (max)	FSI 0.22
MAXIMUM HEIGHT	18.0m	9.6m
PARKING REQUIRED	3.6 / 100m ²	
	410	497
BICYCLE PARKING:	1/1000m ²	
	23 SPACES	30 SPACES

BUILDING AREA:	USE	GFA
CRU 1	GROCERY	264.0 m ²
CRU 2	DRUGSTORE	1592.0 m ²
CRU 3	RETAIL / ATHLETIC FACILITY	1915.0 m ²
CRU 4	RETAIL	1230.0 m ²
CRU 5	DRIVE-THROUGH	190.0 m ²
CRU 6	RETAIL / RESTAURANT	1258.0 m ²
CRU 7	RETAIL / RESTAURANT	961.0 m ²
CRU 8	DRIVE-THROUGH	409.0 m ²
CRU 9	RETAIL / RESTAURANT	751.0 m ²
CRU 10	DRIVE-THROUGH	464.0 m ²
PROJECT TOTAL:		11,423.0 m²

DRAWING LEGEND

	PROPERTY LINE		WATER VALVE
	ACCESSIBLE PARKING		MAN HOLE
	EV CHARGING		CATCH BASIN/CURB INLET
	FAMILY PARKING		CHAIN LINK FENCE WITH GATE
	DEPRESSED CURB		SWAVE CONNECTION
	ENTRANCE		EXTENDER HOSE BIB
	FIRE HYDRANT		PHASING LINE
	UTILITY POLE		FIRE ROUTE SIGN
	EXISTING SIGN		BARRIER FREE PARKING SIGN
	LIGHT STANDARD		BICYCLE PARKING



2.2 Existing Conditions

2.2.1 Area Road Network

Fallowfield Road: Fallowfield Road is a City of Ottawa arterial road with a four-lane rural cross-section west of Citigate Drive including a cycletrack on the south side of the road for approximately 160 metres, and a three-lane rural cross-section including paved shoulders north of Strandherd Drive. The posted speed limit is 60 km/h north of Strandherd Drive and 80 km/h west of Citigate Drive. The City protected right-of-way is 44.5 metres north of Strandherd Drive within the study area and the measured right-of-way varies west of Citigate Drive. Fallowfield Road is designated as a truck route.

Strandherd Drive: Strandherd Drive is a City of Ottawa arterial road with a four-lane, divided urban cross-section, including cycletracks and sidewalks on both sides of the road. Approximately 170 metres north of Dealership Drive, the posted speed limit transitions from 80 km/h to 70 km/h. The City protected right-of-way is 44.5 metres within the study area. Strandherd Drive is designated as a truck route.

Citigate Drive: Citigate Drive is a City of Ottawa major collector road with a two-lane urban cross-section. A sidewalk is provided along the west side of the road, and a multi-use pathway is provided on the east side of the road. The unposted speed limit is assumed to be 50 km/h, and the existing right of way is 24.0 metres north of CrossKeys Place, and 26.0 metres south of CrossKeys Place.

Helene-Campbell Road: Helene-Campbell Road is a City of Ottawa collector road with two-lane urban cross-section, including sidewalks on both sides of the road. The posted speed limit is 40 km/h, and the measured right-of-way is 24.0 metres.

CrossKeys Place: CrossKeys Place is a City of Ottawa collector road with a two-lane urban cross-section, including sidewalks on both sides of the road and a bike lane on the north side of the road for approximately 110 metres. The unposted speed limit is assumed to be 50 km/h, and the measured right-of-way is 24.0 metres mid-section and 34.0 metres near the intersection at Strandherd Drive.

Systemhouse Street: Systemhouse Street is a City of Ottawa collector road with a two-lane urban cross-section, including a sidewalk on the south side of the road and a sidewalk on the north side of the road transitioning to a multi-use pathway from approximately 165 metres west of Strandherd Drive. The unposted speed limit is assumed to be 50 km/h, and the measured right-of-way is 24.0 metres mid-section and 29.0 metres near the intersection at Strandherd Drive.

Maravista Drive: Maravista Drive is a City of Ottawa collector road with a two-lane urban cross-section, including a sidewalk on both sides of the road. The unposted speed limit is assumed to be 40 km/h, and the measured right-of-way is 21.5 metres.

Dealership Drive: Dealership Drive is a City of Ottawa collector road with a two-lane urban cross-section, including a sidewalk on both sides of the road. The unposted speed limit is assumed to be 50 km/h, and the measured right-of-way is 24.0 metres mid-section and 33.0 metres near the intersection at Strandherd Drive.

Kennevale Drive: Kennevale Drive is a City of Ottawa collector road with a two-lane urban cross-section, including a sidewalk on both sides of the road. The posted speed limit is assumed to be 40 km/h, and the measured right-of-way is 21.5 metres.

2.2.2 Existing Intersections

The existing signalized area intersections within one kilometre of the site have been summarized below:

Strandherd Drive at Fallowfield Road/Citigate Drive

The intersection of Strandherd Drive at Fallowfield Road/Citigate Drive is a signalized intersection. Strandherd Drive is assumed as N-S movements, and Fallowfield Road/Citigate Drive is E-W movements. The northbound approach consists of an auxiliary left-turn lane, two through lanes, an auxiliary right-turn lane, and the southbound approach consists of two auxiliary left-turn lanes, two through lanes, an auxiliary right-turn lane. The eastbound approach consists of two auxiliary left-turn lanes and a shared through/right-turn lane, and the westbound approach consists of an auxiliary left-turn lane, a through lane, and an auxiliary channelized right-turn lane. No turn restrictions were noted.

Strandherd Drive at CrossKeys Place/Helene-Campbell Road

The intersection of Strandherd Drive at CrossKeys Place/Helene-Campbell Road is a signalized intersection. Strandherd Drive is assumed as N-S movements, and CrossKeys Place/Helene-Campbell Road is E-W movements. The northbound approach consists of two auxiliary left-turn lanes, two through lanes, an auxiliary right-turn lane, and the southbound approach consists of an auxiliary left-turn lane, two through lanes, an auxiliary right-turn lane. The eastbound and westbound approaches each consists of an auxiliary left-turn lane, a through lane, a bike lane, and an auxiliary right-turn lane. No turn restrictions were noted.

Strandherd Drive at Systemhouse Street/Maravista Drive

The intersection of Strandherd Drive at Systemhouse Street/Maravista Drive is a signalized intersection. The northbound approach consists of two auxiliary left-turn lanes, a through lane, and a shared through/right-turn lane, and the southbound approach consists of an auxiliary left-turn lane, two through lanes, an auxiliary right-turn lane. The eastbound approach consists of two auxiliary left-turn lanes, a shared through/right-turn lane, and the westbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane. No turn restrictions were noted.

Strandherd Drive at Dealership Drive/Kennevale Drive

The intersection of Strandherd Drive at Dealership Drive/Kennevale Drive is a signalized intersection. The northbound approach consists of two auxiliary left-turn lanes, a through lane, and a shared through/right-turn lane, and the southbound approach consists of an auxiliary left-turn lane, two through lanes, an auxiliary right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, a through lane and an auxiliary right-turn lane, and the westbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane. Trucks are restricted on the east leg of the intersection.

Systemhouse Street at Citigate Drive

The intersection of Systemhouse Street at Citigate Drive is a T-intersection with stop-control on the minor approach of Systemhouse Street. The southbound approach consists of a shared left-turn/right-turn lane. The eastbound approach consists of a shared left-turn/through lane, and the westbound approach consists of a shared through/right-turn lane. No turn restrictions were noted.

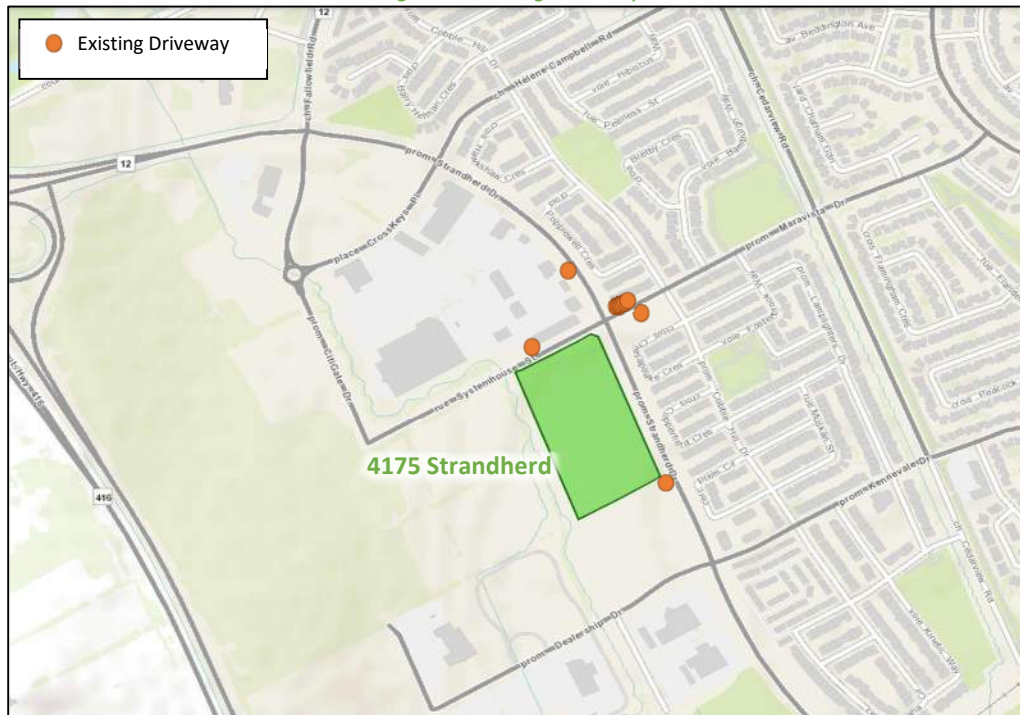
Systemhouse Street at Costco Access

The intersection of Systemhouse Street at Costco Access is a T-intersection with stop-control on the minor approach of Costco Access. The southbound approach consists of a shared left-turn/right-turn lane. The eastbound approach consists of an auxiliary left-turn lane and a through lane, and the westbound approach consists of a through lane and a right-turn lane. No turn restrictions were noted

2.2.3 Existing Driveways

Within 200 metres, driveways to retail spaces and auto dealer exist on the west side of Strandherd Drive and driveways to retail and residential land uses are present on Systemhouse Street. Figure 3 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: June 19, 2026

2.2.4 Cycling and Pedestrian Facilities

Figure 4 illustrates the pedestrian facilities in the study area and Figure 5 illustrates the cycling facilities.

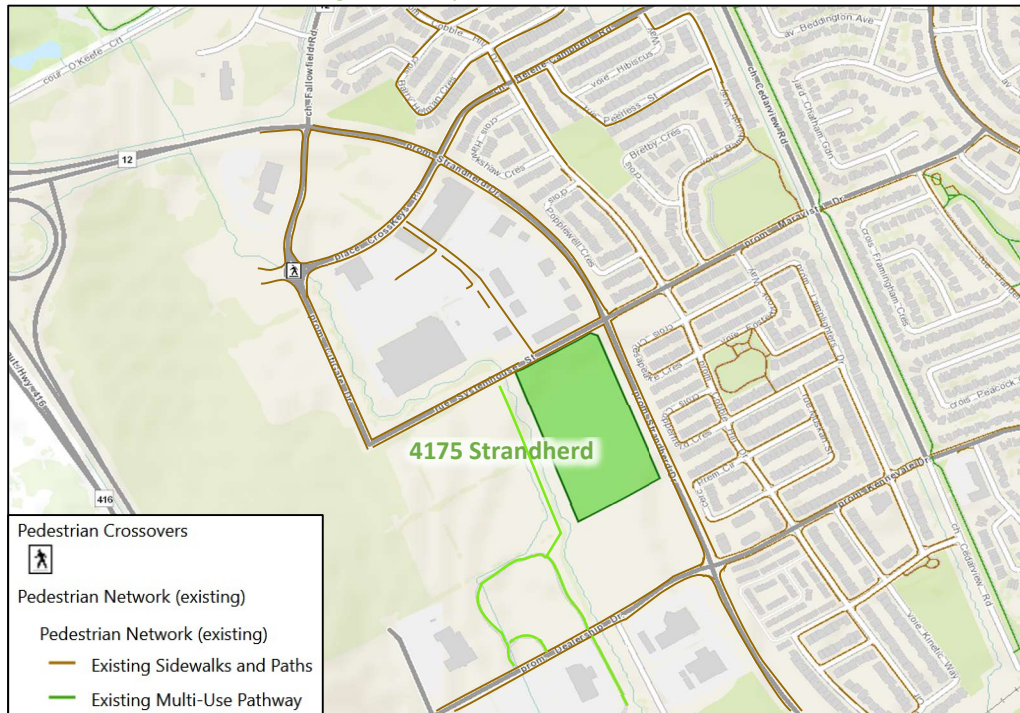
Sidewalks are provided along both sides of Strandherd Drive, CrossKeys Place, Helene-Campbell Road, Maravista Drive, Dealership Drive, Kennevale Drive, and on the south side of Fallowfield Road west of Citigate Drive for approximately 160 metres, east side of Citigate Drive, and south side of Systemhouse Street and on the north side of the road for approximately 165 metres west of Strandherd Drive.

A multi-use pathway is provided along the west side of Citigate Drive, north side of Systemhouse Street between approximately 165 metres west of Strandherd Drive and Citigate Drive.

The O'Keefe Drain pathway is also located west of the development.

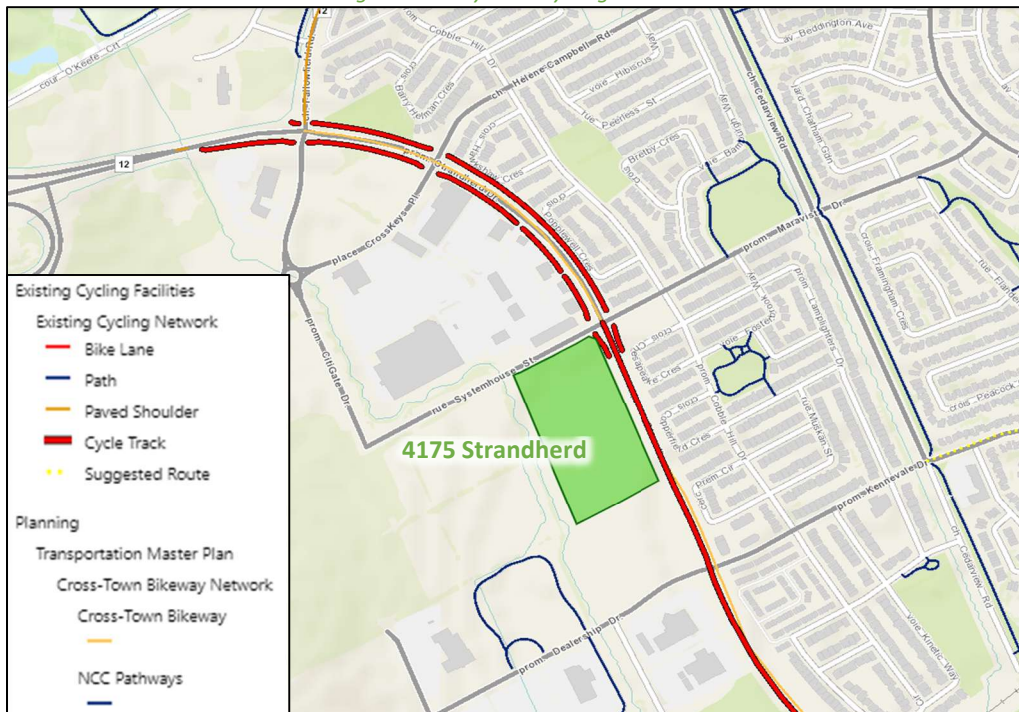
Cycling facilities include cycletracks on both sides of Strandherd Drive and on the south side of Fallowfield Road west of Citigate Drive for approximately 160 metres.

Figure 4: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: June 19, 2026

Figure 5: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: June 19, 2026

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 6 and Figure 7, respectively.

Figure 6: Existing Pedestrian Volumes

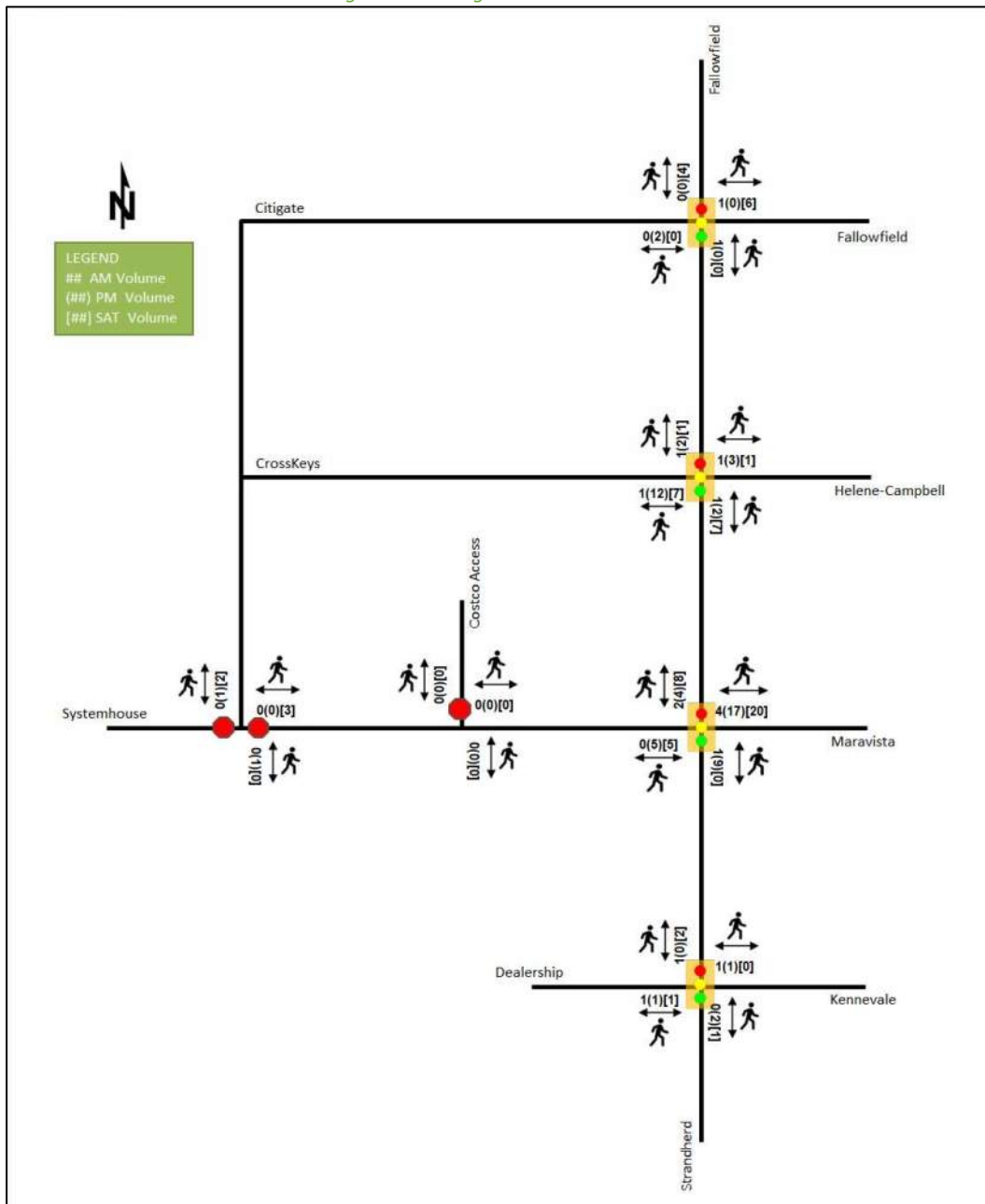
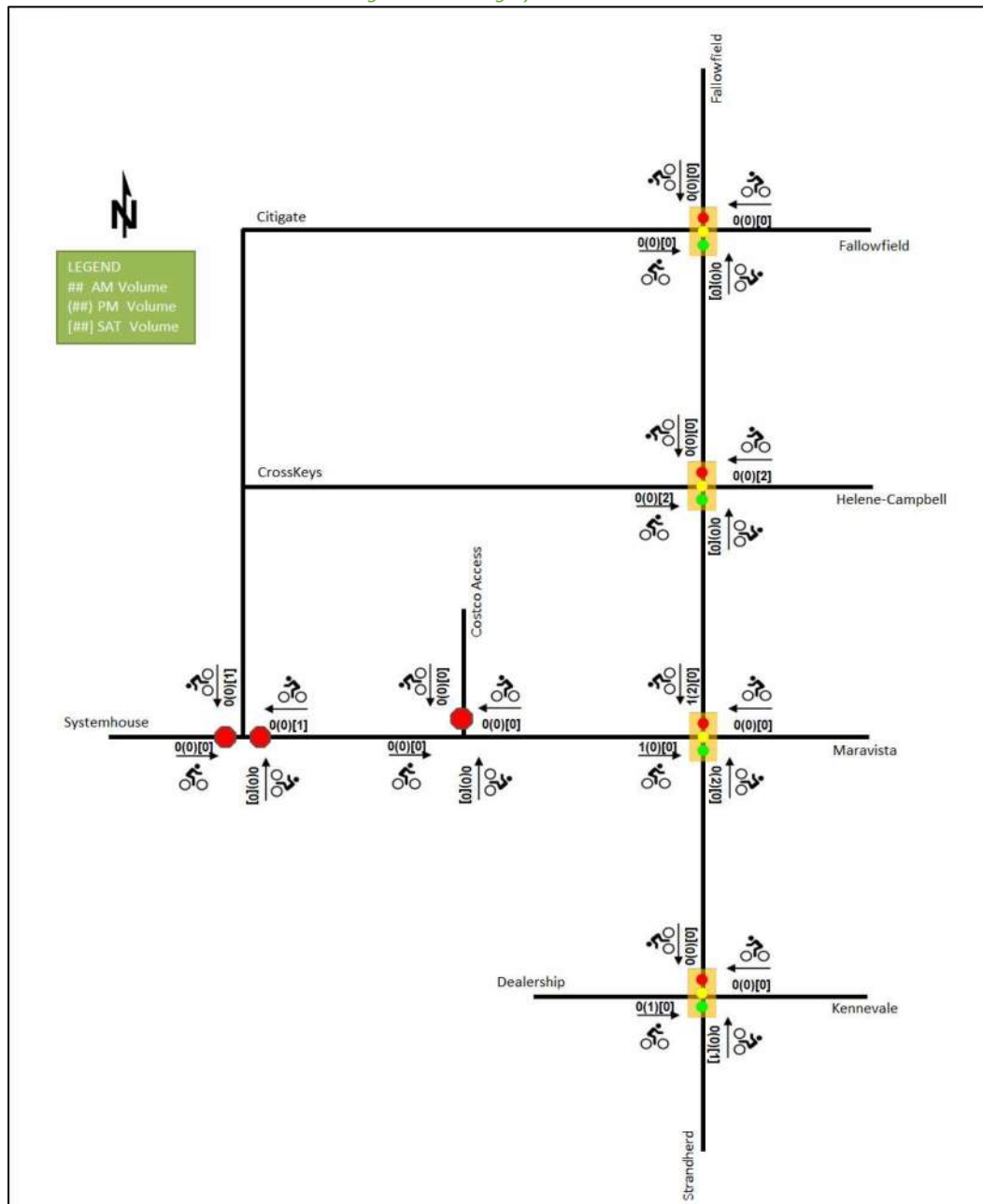


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

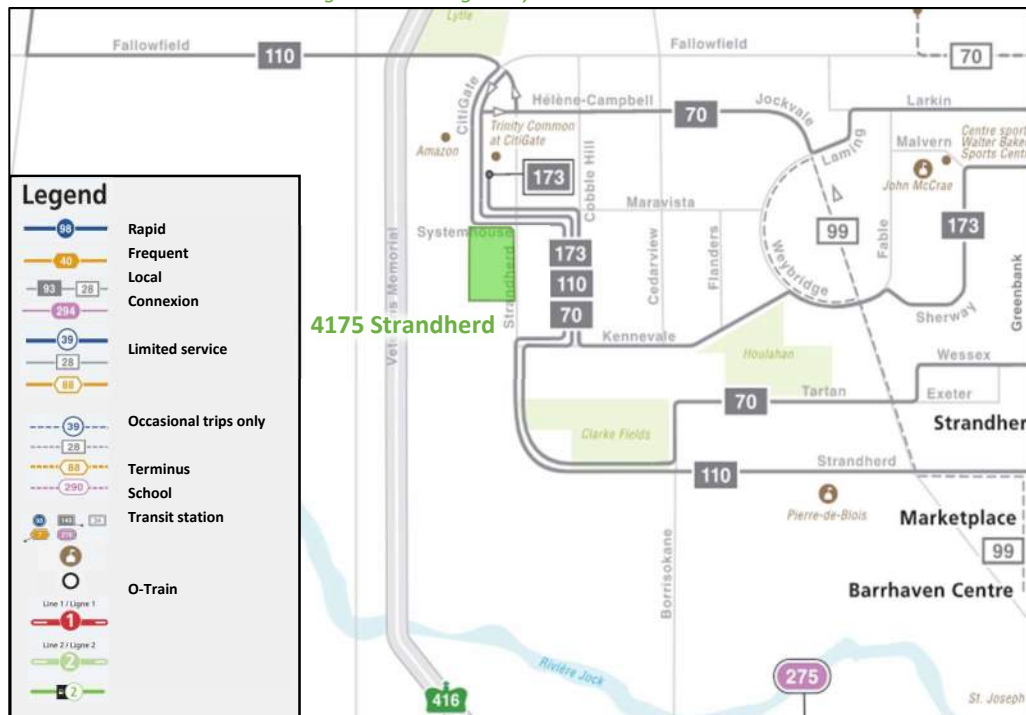
Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stops. All transit information is from June 19, 2026, and is included for general information purposes and context to the surrounding area.

Within the study area, the routes #70, #110 travel along Citigate Drive, Systemhouse Street, Kennevale Drive and Strandherd Drive south of Kennevale Drive and route #173 travels along Citigate Drive, Systemhouse Street, Kennevale Drive. The frequency of these routes within proximity of the proposed site based on June 19, 2026, service levels are:

- Route # 70 – 15-minute service in the peak period/direction, 30-minute service all-day

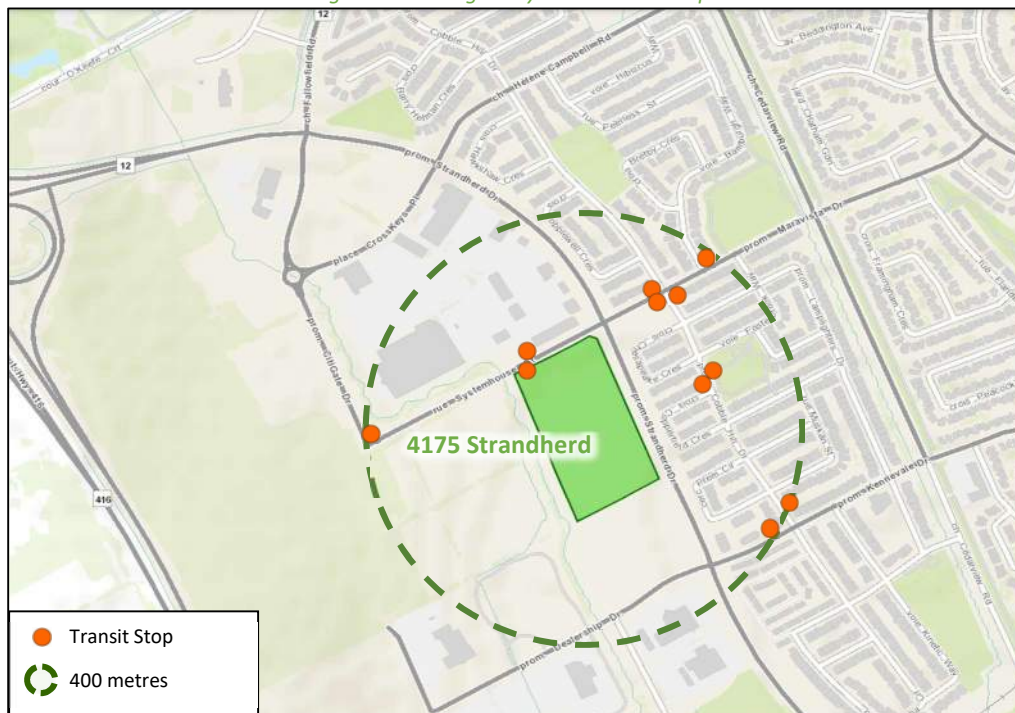
- Route # 110 – 30-minute service all-day
- Route # 173 – 30-minute service all-day

Figure 8: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: June 19, 2026

Figure 9: Existing Study Area Transit Stops



Source: <http://www.octranspo.com/> Accessed: June 19, 2026

2.2.6 Existing Area Traffic Management Measures

The existing area traffic management measures consist of flexible stake bollards on Maravista Drive and Kennevale Drive within the study area.

2.2.7 Existing Peak Hour Travel Demand

Table 1 summarizes the intersection count dates and sources.

Table 1: Intersection Count Date

Intersection	Count Date	Source
Strandherd Drive at Fallowfield Road/Citigate Drive	Tuesday, September 17, 2024 Saturday, September 14, 2024	Ontario Traffic Inc.
Strandherd Drive at CrossKeys Place/Helene-Campbell Road	Tuesday, September 17, 2024 Saturday, September 14, 2024	Ontario Traffic Inc.
Strandherd Drive at Systemhouse Street/Maravista Drive	Tuesday, April 09, 2024 Saturday, April 06, 2024	J & S Traffic Services
Strandherd Drive at Dealership Drive/Kennevale Drive	Tuesday, March 19, 2024 Saturday, March 23, 2024	J & S Traffic Services
Systemhouse Street at Citigate Drive	Thursday, October 03, 2024 Saturday, October 05, 2024	Ontario Traffic Inc.
Systemhouse Street at Costco Access	-	Estimated

Figure 10 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. Any U-turn volumes collected as part of the area counts have been modelled as left turns for the purpose of this study. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services, and average delay for unsignalized intersections. Given the existing configuration, the intersection of Systemhouse Street at Citigate Drive cannot be analyzed using HCM 2010; therefore, HCM 2000 was used for the analysis of this intersection. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

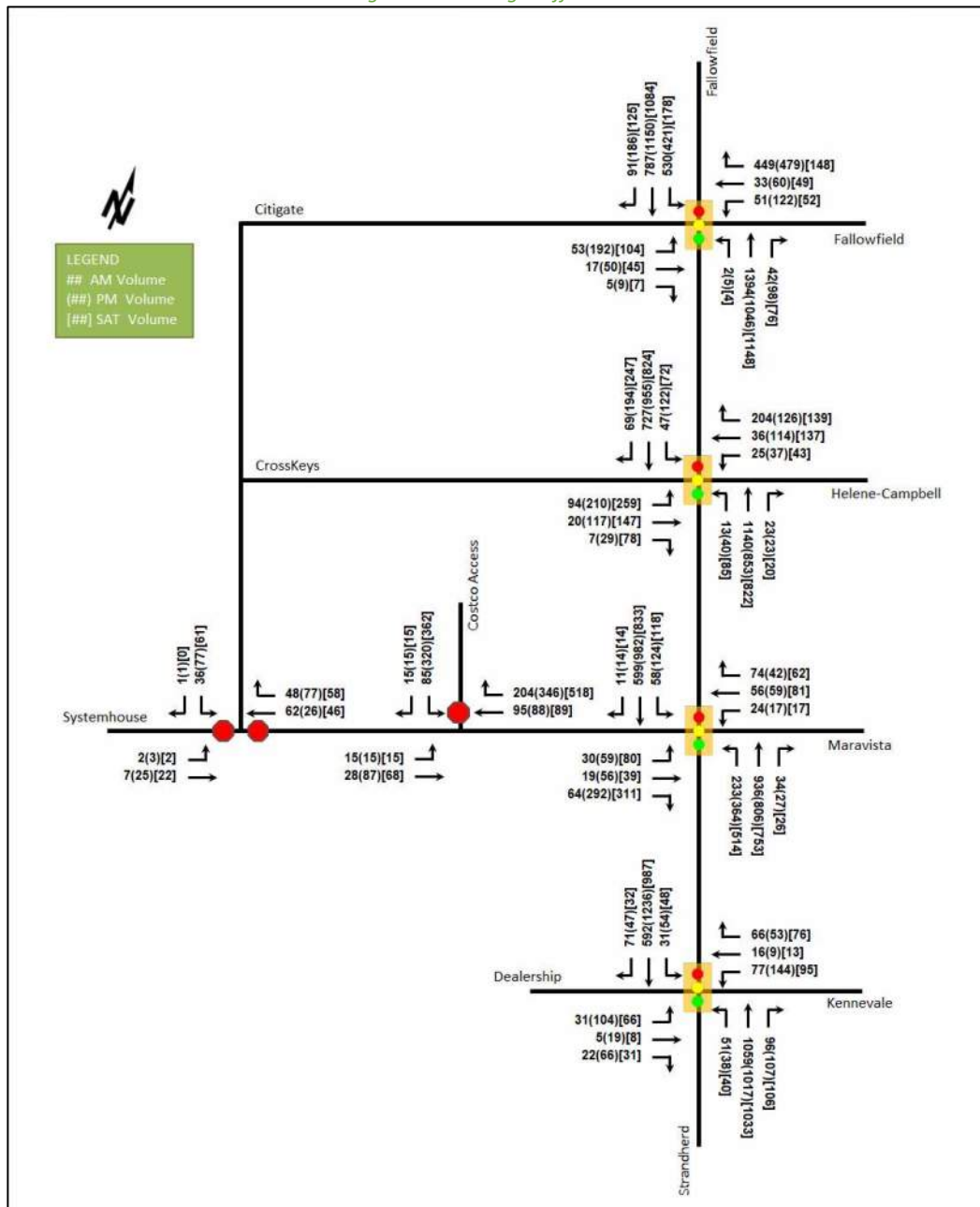


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Strandherd Drive at Fallowfield Road/Citigate Drive Signalized	EBL	A	0.35	59.8	14.0	A	0.58	57.4	#53.6	B	0.63	56.6	#29.1
	EBT/R	A	0.18	45.5	13.1	A	0.29	40.4	19.4	A	0.23	35.0	22.6
	WBL	A	0.19	39.0	19.8	A	0.38	46.0	#80.9	A	0.22	32.8	18.8
	WBT	A	0.14	37.1	13.6	A	0.19	36.2	21.2	A	0.18	28.9	15.8
	WBR	D	0.87	27.3	59.8	E	0.91	33.7	78.7	A	0.42	7.0	11.8
	NBL	A	0.04	56.0	3.2	A	0.10	73.6	m2.8	A	0.04	43.0	4.4
	NBT	F	1.70	350.0	#358.6	F	1.38	202.4	#244.1	F	1.30	171.4	#256.3
	NBR	A	0.08	0.3	0.0	A	0.21	2.3	m2.9	A	0.15	0.6	0.0
	SBL	C	0.76	49.6	#114.8	C	0.80	58.7	#93.6	A	0.52	41.5	32.8
	SBT	A	0.49	20.3	126.4	C	0.80	33.5	#242.0	C	0.78	25.8	#224.6
	SBR	A	0.11	2.7	7.8	A	0.21	3.2	14.0	A	0.17	3.0	9.9
Strandherd Drive at CrossKeys Place/Helene-Campbell Road Signalized	Overall	F	1.31	159.2	-	F	1.09	82.1	-	F	1.09	81.0	-
	EBL	A	0.55	58.9	35.2	C	0.77	56.8	72.0	D	0.85	58.4	82.2
	EBT	A	0.08	41.9	10.3	A	0.29	35.1	36.8	A	0.32	30.2	39.5
	EBR	A	0.03	0.1	0.0	A	0.07	0.3	0.0	A	0.17	3.7	7.2
	WBL	A	0.14	43.8	12.4	A	0.14	31.4	14.9	A	0.14	26.6	14.8
	WBT	A	0.15	43.9	15.9	A	0.28	35.0	36.0	A	0.30	29.8	37.0
	WBR	B	0.62	20.6	31.6	A	0.29	6.1	13.4	A	0.29	5.2	12.7
	NBL	A	0.09	76.5	m3.9	A	0.23	59.0	m6.0	A	0.40	53.8	18.4
	NBT	B	0.62	9.5	49.4	B	0.68	29.4	145.5	B	0.61	28.0	114.9
	NBR	A	0.03	0.0	m0.0	A	0.04	2.2	m1.0	A	0.03	0.1	0.0
	SBL	A	0.49	73.2	26.7	C	0.71	83.0	m#50.2	A	0.57	64.6	#38.9
Strandherd Drive at Systemhouse Street/Maravista Drive Signalized	SBT	A	0.37	12.0	95.8	B	0.62	12.1	57.5	B	0.63	27.7	118.2
	SBR	A	0.08	2.2	5.7	A	0.25	1.4	m3.4	A	0.33	4.1	16.8
	Overall	B	0.62	15.5	-	B	0.70	25.3	-	B	0.66	28.5	-
	EBL	A	0.26	64.4	9.8	A	0.43	64.5	15.3	A	0.48	61.2	18.5
	EBT/R	A	0.35	17.4	16.2	C	0.72	21.9	57.5	A	0.56	7.7	30.2
	WBL	A	0.33	70.5	16.8	A	0.24	62.6	12.3	A	0.21	57.2	11.8
	WBT/R	A	0.55	37.6	33.8	A	0.35	28.6	26.6	A	0.37	26.1	35.2
	NBL	C	0.71	66.8	#52.0	B	0.65	51.9	#100.4	C	0.76	52.4	#129.4
	NBT/R	A	0.57	24.0	#200.2	B	0.67	37.8	#156.1	C	0.72	40.4	#159.5
	SBL	A	0.51	74.9	32.8	B	0.70	51.2	#71.3	C	0.76	77.1	#56.8
	SBT	A	0.40	22.7	68.6	E	0.92	59.5	#206.1	F	1.19	137.2	#173.8
Strandherd Drive at Dealership Drive/Kennevale Drive Signalized	SBR	A	0.02	0.1	m0.0	A	0.03	0.1	m0.0	A	0.03	0.1	0.0
	Overall	A	0.56	31.2	-	D	0.81	45.9	-	E	0.92	68.2	-
	EBL	A	0.22	46.5	15.0	A	0.55	54.1	40.8	A	0.41	47.1	24.7
	EBT	A	0.03	40.2	4.6	A	0.07	38.9	10.4	A	0.03	35.4	5.3
	EBR	A	0.08	4.5	3.5	A	0.20	16.9	15.3	A	0.10	6.6	5.2
	WBL	A	0.50	56.8	31.1	C	0.74	66.4	55.0	A	0.55	52.2	33.7
	WBT/R	A	0.35	17.0	16.4	A	0.23	14.0	13.4	A	0.33	13.5	14.8
	NBL	A	0.28	56.7	13.3	A	0.22	56.2	10.6	A	0.23	52.0	10.3
	NBT/R	A	0.59	15.5	159.7	B	0.65	21.0	160.2	B	0.64	18.2	146.2
	SBL	A	0.32	60.3	17.9	A	0.45	58.3	m18.5	A	0.43	59.5	#26.3
	SBT	A	0.32	11.8	64.3	B	0.68	15.8	m92.7	A	0.54	15.4	117.5
Systemhouse Street at Citigate Drive Unsignalized	SBR	A	0.08	1.6	4.5	A	0.05	0.5	m0.0	A	0.04	0.1	0.0
	Overall	A	0.58	17.6	-	B	0.67	22.9	-	B	0.63	20.0	-
	EBL/T	A	0.01	9.9	0.3	B	0.05	10.7	1.1	B	0.04	10.3	0.9
	WBT/R	A	0.14	9.7	3.6	A	0.12	9.4	3.2	A	0.13	9.7	3.4
Systemhouse Street at Costco Access Unsignalized	SBL/R	A	0.03	7.2	0.3	A	0.05	7.3	1.3	A	0.04	7.4	1.0
	Overall	A	-	9.1	-	A	-	8.8	-	A	-	9.0	-
	EBL	A	0.01	8.0	0.0	A	0.02	8.8	0.8	A	0.02	9.4	0.8
	EBT	-	-	-	-	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-	-	-	-	-
	WBR	-	-	-	-	-	-	-	-	-	-	-	-
Systemhouse Street at Costco Access Unsignalized	SBL/R	B	0.14	10.1	3.8	B	0.50	14.4	21.0	C	0.55	15.1	24.8
	Overall	A	-	2.6	-	A	-	5.7	-	A	-	5.5	-

Notes:

Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90

Delay = average vehicle delay in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

At the intersection of Strandherd Drive at Fallowfield Road/Citigate Drive, the northbound through movement and the overall intersection are over theoretical capacity during all peak hours. During the AM peak hour, the southbound left movement may exhibit extended queues. During the PM peak hour, the eastbound left, westbound left, southbound left, and southbound through movements may exhibit extended queues. During the Saturday peak hour, the eastbound left and southbound through may exhibit extended queues. The over-capacity movements on the northbound and southbound approaches are influenced by the phase lengths for the eastbound and westbound through movements within the cycle, which include long pedestrian crossings. Therefore, limited opportunities to reallocate split are present.

At the intersection of Strandherd Drive at CrossKeys Place/Helene-Campbell Road, the southbound left movement may exhibit extended queues during the PM and Saturday peak hours.

At the intersection of Strandherd Drive at Systemhouse Street/Maravista Drive, the northbound left and northbound through/right movements may exhibit extended queues during all peak hours. The southbound left movement may exhibit extended queues during the PM and Saturday peak hours and the southbound through movement may exhibit extended queues and operates near theoretical capacity during the PM peak hour and is over theoretical capacity during the Saturday peak hour. Shifting six seconds from the northbound left movement to the southbound through movement during the Saturday peak hour would address the capacity issues and reduce the v/c of all movements to 1.00 or below.

At the intersection of Strandherd Drive at Dealership Drive/Kennevale Drive, the southbound left movement may exhibit extended queues during the Saturday peak hour.

2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study area road network (2018-2022). Table 3 summarizes the collision types and conditions in the study area, Figure 11 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of the locations analyzed. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2018-2022

		Number	%
Total Collisions		109	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	13	12%
	Property Damage Only	96	88%
Initial Impact Type	Approaching	0	0%
	Angle	11	10%
	Rear end	57	52%
	Sideswipe	26	24%
	Turning Movement	7	6%
	SMV Unattended	2	2%
	SMV Other	3	3%
	Other	3	3%
Road Surface Condition	Dry	80	73%
	Wet	11	10%
	Loose Snow	7	6%
	Slush	5	5%
	Packed Snow	2	2%

		Number	%
Total Collisions		109	100%
	Ice	2	2%
	Loose sand or gravel	2	2%
	Unknown	0	0%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

Figure 11: Study Area Collision Records

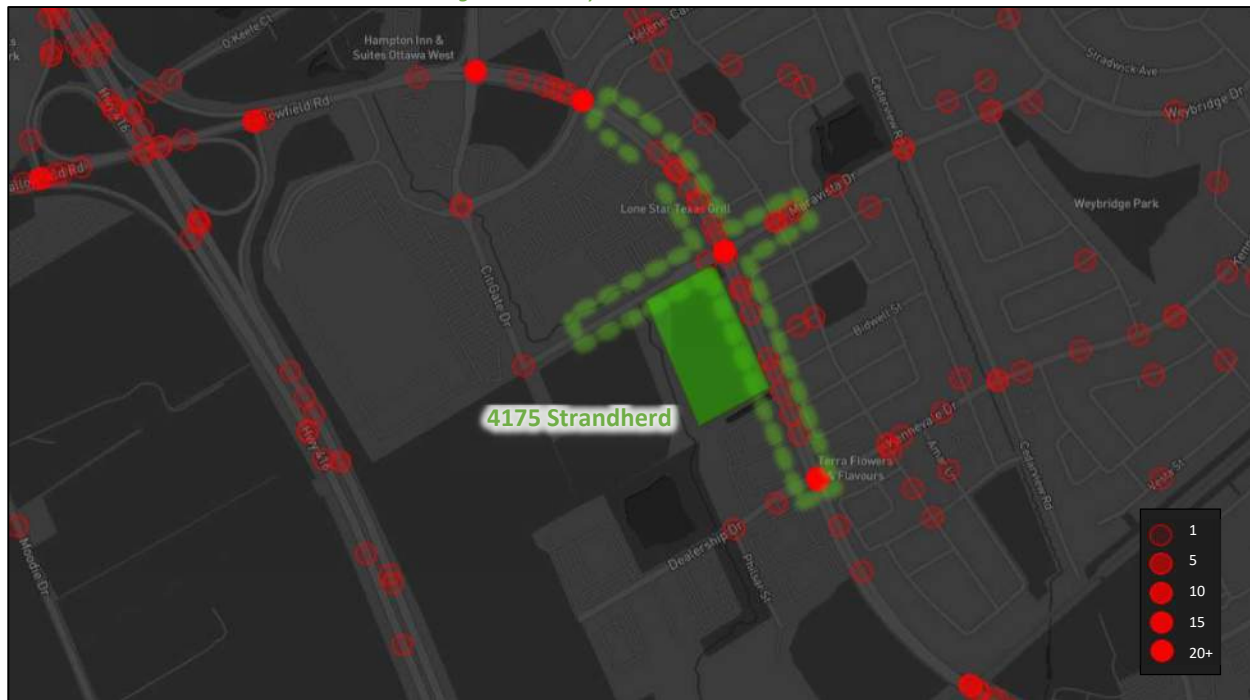


Table 4: Summary of Collision Locations, 2018-2022

	Number	%
Intersections / Segments	109	100%
Strandherd Drive at Systemhouse Street/Maravista Drive	46	42%
Strandherd Drive at Dealership Drive/Kennevale Drive	35	32%
Strandherd Drive between Maravista Drive and Kennevale Drive	11	10%
Strandherd Drive between Crosskeys Place/Helene-Campbell Road and Maravista Drive/Systemhouse Street	9	8%
Maravista Drive at Cobble Hill Drive	5	5%
Maravista Drive between Cobble Hill Drive and Bamburgh Way	2	2%
Systemhouse Street between Citigate Drive and Strandherd Drive	1	1%

Within the study area, the intersections of Strandherd Drive at Systemhouse Street/Maravista Drive and Strandherd Drive at Dealership Drive/ Kennevale Drive, and the segment of Strandherd Drive between Maravista Drive and Kennevale Drive are noted to have experienced higher collisions than other locations.

Table 5, Table 6, and Table 7 summarize the collision types and conditions for each of these locations, respectively.

Table 5: Strandherd Drive at Systemhouse Street/Maravista Drive Collision Summary

		Number	%
Total Collisions		46	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	5	11%
	Property Damage Only	41	89%
Initial Impact Type	Approaching	0	0%
	Angle	3	7%
	Rear end	24	52%
	Sideswipe	16	35%
	Turning Movement	1	2%
	SMV Unattended	0	0%
	SMV Other	1	2%
	Other	1	2%
Road Surface Condition	Dry	35	76%
	Wet	5	11%
	Loose Snow	3	7%
	Slush	1	2%
	Packed Snow	1	2%
	Ice	1	2%
	Unknown	0	0%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Strandherd Drive at Systemhouse Street/Maravista Drive intersection had a total of 46 collisions during the 2018-2022 time period, with 41 involving property damage only and the remaining five having non-fatal injuries. The collision types are most represented by rear end with 24 collisions, sideswipe with 16, angle with three, and turning movement, SMV other and other with one collision each. Weather conditions do not affect collisions at this location.

Based on the detailed collision records from 2017-2021 (representing a different analysis period), the rear end collisions were predominantly involving eastbound movements (9 of 22), northbound movements (6 of 22), or southbound movements (5 of 22), and sideswipe collisions were in the southbound (5 of 14), eastbound (4 of 14), or westbound (4 of 14) directions. The collisions in the eastbound direction may be associated with congestion, and in the northbound, southbound, and westbound directions may be associated with congestion and varying lane arrangements. It should be noted that construction activities were also ongoing in the area in 2020 and 2021 and may have contributed to these collision patterns.

From the detailed collision records, angle and turning movement collisions involved eastbound right-turning vehicles conflicting with southbound through, northbound U-turning, and westbound left-turning vehicles (3 of 7), which may be indicative of drivers pushing gaps in the traffic stream in congested conditions. Construction activities occurring in the study area may have affected congestions and driver behavior. Eastbound through vehicles conflicting with southbound through vehicles (2 of 5) may be indicative of drivers failing to obey traffic control. No further collision review is required at this location as part of this study.

Table 6: Strandherd Drive at Dealership Drive/Kennevale Drive Collision Summary

		Number	%
Total Collisions		35	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	4	11%
	Property Damage Only	31	89%
Initial Impact Type	Approaching	0	0%
	Angle	4	11%
	Rear end	19	54%
	Sideswipe	3	9%
	Turning Movement	6	17%
	SMV Unattended	0	0%
	SMV Other	1	3%
	Other	2	6%
Road Surface Condition	Dry	23	66%
	Wet	5	14%
	Loose Snow	1	3%
	Slush	4	11%
	Packed Snow	0	0%
	Loose Sand or Gravel	2	6%
	Ice	0	0%
	Unknown	0	0%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Strandherd Drive at Dealership Drive/Kennevale Drive intersection had a total of 35 collisions during the 2018-2022 time period, with 31 involving property damage only and the remaining four having non-fatal injuries. The collision types are most represented by rear end with 19 collisions, turning movement with six, angle with four, sideswipe with three, other with two, and SMV other with one collision. Weather conditions do not affect collisions at this location.

Based on the detailed collision records from 2017-2021 (representing a different analysis period), the rear end collisions were predominantly involving westbound movements (9 of 22) or southbound movements (7 of 22), and sideswipe collisions were in the southbound direction (2 of 2). The collisions in the westbound direction may be associated with congestion, and in the southbound direction may be associated with congestion and varying lane arrangements. It should be noted that construction activities along Strandherd Drive may have contributed to these collision patterns.

From the detailed collision records, turning movement collisions involved southbound left-turning vehicles conflicting with northbound through vehicles (5 of 9) and eastbound left-turning vehicles conflicting with westbound through vehicles (2 of 9). The signal timing provides fully protected northbound/southbound left-turn movements, which appears to be a change implemented post 2021 to address this issue. The collisions in the eastbound/westbound directions may be indicative of drivers pushing gaps in the traffic stream in congested conditions. The left-turn collisions are cluster around the AM, PM, and mid-day peaks.

Based on detailed collision records, the angle collisions predominantly involved westbound right-tuning vehicles conflicting with northbound through vehicles (2 of 4), which may be indicative of drivers pushing gaps in the traffic stream in congested conditions. Construction was noted in the study area, which may have affected these collisions. No further collision review is required at this location as part of this study.

Table 7: Strandherd Drive between Maravista Drive and Kennevale Drive Collision Summary

		Number	%
Total Collisions		11	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	2	18%
	Property Damage Only	9	82%
Initial Impact Type	Approaching	0	0%
	Angle	0	0%
	Rear end	8	73%
	Sideswipe	3	27%
	Turning Movement	0	0%
	SMV Unattended	0	0%
	SMV Other	0	0%
	Other	0	0%
Road Surface Condition	Dry	10	91%
	Wet	1	9%
	Loose Snow	0	0%
	Slush	0	0%
	Packed Snow	0	0%
	Loose Sand or Gravel	0	0%
	Ice	0	0%
	Unknown	0	0%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The segment of Strandherd Drive between Maravista Drive and Kennevale Drive had a total of 11 collisions during the 2018-2022 time period, with nine involving property damage only and the remaining two having non-fatal injuries. The collision types are most represented by rear end with eight collisions and sideswipe with three collisions. Weather conditions do not affect collisions at this location.

Based on the detailed collision records from 2017-2021 (representing a different analysis period), the rear end collisions were predominantly involving southbound movements (6 of 8) and sideswipe collisions were in the northbound direction (2 of 3). The collisions may be associated with congestion and varying lane arrangements. Also, construction occurring along the segment may have influenced the observed collision patterns. No further collision review is required at this location as part of this study.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

2.3.1.1 Transportation Master Plan (2025)

The recently approved Transportation Master Plan includes a Capital Infrastructure Plan identifying transportation investments to support the forecasted growth and strategic connectivity and livability targets for the City. It also identifies committed projects, and a subset of priority projects that are expected to be implemented by 2046 based on current affordability assumptions. Area projects anticipated to impact travel in the study area that are included within the Capital Infrastructure Plan are:

- Active Transportation Network
 - Pedestrian Projects with Prioritization
 - Multi-use pathway along Fallowfield Road from Strandherd Drive to Foragers Street

- Transit Network
 - Priority Network
 - Median bus rapid transit from Barrhaven Centre Station to Kilbirnie Station (Southwest Transitway)
 - Dedicated bus rapid transit from Longfields Drive to Greenbank Road (South Transitway)
 - Needs-Based Network
 - South Transitway from Limebank Station to Borrisokane Road, including dedicated bus rapid transit from Limebank Station to Nepean Woods Station, transitioning to median bus rapid transit in the Chapman Mills corridor
- Road Network
 - Committed
 - Realigned Greenbank Road and Widening between Chapman Mills Drive and Cambrian Road
 - Barnsdale Road/Highway 416 interchange
 - Priority Network
 - Fallowfield Road Urbanization between Greenbank Road and Strandherd Drive including new active transportation facilities likely in the form of a new multi-use pathway on the south side
 - Realigned Greenbank Road from Cambrian Road to Kilbirnie Drive, including a two-lane new road
 - Realigned Greenbank Road Extension from Kilbirnie Drive to Barnsdale Road, including a two-lane new road
 - Borrisokane Road Urbanization from Strandherd Drive to Cambrian Road, including implementation of new active transportation facilities on both sides of the road
 - Needs-Based Network
 - Fallowfield Road Widening from two to four lanes between Old Richmond Road and Moodie Drive
 - Barnsdale Road Widening from two to four lanes between Highway 416 and Realigned Greenbank Road Extension

2.3.1.2 *Highway 416 at Barnsdale Road Interchange*

The environmental assessment study and preliminary design for an interchange at the intersection of Highway 416 and Barnsdale Road were completed in September 2023. The ultimate configuration consists of a partial cloverleaf interchange on the south side of Barnsdale Road and a four-lane bridge over Highway 416 with a multi-use pathway. The interim configurations will be subject to traffic demands, and it is expected that the free flow ramps on the north side of Barnsdale Road will not be constructed as part of this configuration and are considered a long-term improvement once warranted. The ramps on the north side of Barnsdale Road will result in the discontinuation of Borrisokane Road and Trail Road. Specific intersection configurations have not been explored as part of the EA and the provision of the ultimate bridge structure may not be provided during the interim configuration. The City of Ottawa included a preferred solution for a Kilbirnie Drive extension to protect for future demands associated with Borrisokane Road becoming a cul-de-sac in the ultimate interchange configuration. On March 28, 2024, the Government of Ontario committed to constructing the Highway 416/Barnsdale Road interchange, including funding for the interchange planning and design over three years starting in 2025. It is expected that the interim conditions of the interchange will be completed by 2029.

2.3.2 Other Study Area Developments

4401 Fallowfield Road

The proposed development application includes a zoning by-law amendment application for a proposed change in land use within Phase 2 of the draft plan of subdivision including the automobile dealership, and veterinary clinic uses. The application includes parcels located at 75 & 95 Lusk Street (Office Park) as well as the proposed changes to Phase 2 (automobile dealership and veterinary clinic). The development is estimated to generate 497 new AM peak hour two-way vehicle trips and 379 new PM peak hour two-way vehicle trips. The development is assumed to be built beyond the subject study horizons. (Arcadis, 2024)

100 Lusk Street

The proposed development application includes a site plan application for the construction of a 20,400 sq. ft general office space. The development was initially anticipated to be built out by 2021 and to generate 23 new AM peak hour two-way vehicle trips and 22 new PM peak hour two-way vehicle trips. The development will be assumed to be built out by 2028. (Stantec, 2020)

115 Lusk Street

The proposed development application includes a site plan application for the construction of a 3,014 sq. ft quality restaurant and a 6,103 sq. ft medical office. The development was initially anticipated to be built out by 2023 and to generate 13 new AM peak hour two-way vehicle trips and 32 new PM peak hour two-way vehicle trips. The development will be assumed to be built out by 2028. (IBI Group, 2021)

120 Lusk Street

The proposed development application includes a site plan application for the construction of a 14,801 sq. ft medical office, 2,010 sq. ft sit-down restaurant, 15,962 sq. ft general office building, 1,992 sq. ft pharmacy, and 4,022 sq. ft daycare centre. The development is anticipated to be built out by 2027 and to generate 117 new AM peak hour two-way vehicle trips and 133 new PM peak hour two-way vehicle trips. (Arcadis, 2025)

135 Lusk Street

The proposed development application includes a site plan application for the construction of a hotel with 99 rooms. The development was initially anticipated to be built out by 2023 and to generate 42 new AM peak hour two-way vehicle trips and 53 new PM peak hour two-way vehicle trips. The development will be assumed to be built out by 2028. (IBI Group, 2021)

140 Lusk Street

The proposed development application includes a site plan application for the construction of a hotel with 88 rooms. The development was initially anticipated to be built out by 2023 and to generate 36 new AM peak hour two-way vehicle trips and 45 new PM peak hour two-way vehicle trips. The development will be assumed to be built out by 2028. (IBI Group, 2022)

2740 Cedarview Road, 4190-4236 Fallowfield Road

The proposed development application includes plan of subdivision application for the construction of six four-storey apartment buildings, four four-storey back-to-back terrace homes, and two three-storey terrace home comprising a total of 194 units. The development is anticipated to generate 111 new AM peak hour two-way vehicle trips and 111 new PM peak hour two-way vehicle trips. The development is currently under construction. (Novatech, 2018)

444 Citigate Drive, 560 Dealership Drive

The proposed development application includes a zoning by-law amendment and plan of subdivision application for the construction of six industrial/warehouse buildings for a total of 1,174,800 sq. ft. The development is anticipated to generate 623 new AM peak hour two-way vehicle trips and 548 new PM peak hour two-way vehicle trips. The development is assumed to be built beyond the subject study horizons. (Novatech, 2022)

575 Dealership Drive

The proposed development application includes a site plan application for the construction of 14,776 sq. m and 15,206 sq. m single-storey warehouse buildings with small office component. No TIA was available for this development.

540 Dealership Drive

The proposed development application includes a site plan application for the construction of a two-storey automobile dealership. No TIA was available for this development.

4149 Strandherd Drive

The proposed development application includes a site plan application for the construction of a 1,640 sq. m and 2,989 sq. m automobile sales buildings. The development was initially anticipated to be built out by 2023 and to generate 109 new AM peak hour two-way vehicle trips and 143 new PM peak hour two-way vehicle trips. The Phase 1 has already been constructed, and Phase 2 will be assumed to be built out by 2028. (Mcintosh Perry, 2022)

4433 Strandherd Drive

The proposed development application includes a site plan application for the construction of a five-storey hotel with 99 rooms. The development was initially anticipated to be built out by 2020 and to generate and to generate 48 new AM peak hour two-way vehicle trips, 53 new PM peak hour two-way vehicle trips, and 77 new Saturday peak hour two-way vehicle trips. The development was under construction at the time of the area traffic counts. (Novatech, 2018)

3387 Borrisokane Road (Glenview Homes)

The proposed development application includes a plan of subdivision application for the construction of 116 single family homes and 92 townhomes, as well as a school block. The development was initially anticipated to be built out by 2022 and to generate 200 new AM peak hour two-way vehicle trips and 203 new PM peak hour two-way vehicle trips. At the time of the area traffic counts were conducted, approximately 90% of the development had been completed. The remaining portion of the development will be assumed to be built out by 2028. (Stantec, 2017)

3555 Borrisokane Road

The proposed development application includes a site plan application for the construction of 2,913.5 sq. m Korean Community Church. The development was initially anticipated to be built out by 2024 and to generate 33 new AM peak hour two-way vehicle trips and 39 new PM peak hour two-way vehicle trips. The development will be assumed to be built out by 2028. (Castleglenn Consultants, 2024)

652 Flagstaff Drive

The proposed development application includes a site plan application for the construction of two commercial buildings comprising a total of 14,631 sq. ft of gross floor area. The development was initially anticipated to be built out by 2025. The associated trips have been included in the 3387 Borrisokane Road (Glenview Homes) plan of subdivision. (CGH Transportation, 2024)

3535 Borrisokane Road

The proposed development application includes a site plan application for the construction of 5,091.3 sq. ft car wash. The development was initially anticipated to be built out by 2023 and to generate 67 new PM peak hour two-way vehicle trips. The development will be assumed to be built out by 2028. (D.J. Halpenny & Associates Ltd., 2022)

3845 Cambrian Road

The proposed development application includes a site plan application for the construction of a 28,660 sq. ft grocery store and 5,430 sq. ft of retail store. The development was initially anticipated to be built out by 2025 and to generate 59 new AM peak hour two-way vehicle trips and 128 new PM peak hour two-way vehicle trips. The development will be assumed to be built out by 2028. (CGH Transportation, 2025)

3850 Cambrian Road

The proposed development application includes a site plan application for the construction of a 17,000 sq. ft pharmacy and 18,781 sq. ft of retail store. The development was initially anticipated to be built out by 2024 and to generate 30 new AM peak hour two-way vehicle trips, 39 new PM peak hour two-way vehicle trips, and 61 new Saturday peak hour two-way vehicle trips. The development will be assumed to be built out by 2028. (CGH Transportation, 2024)

3288 & 3300 Borrisokane Road, 4205, 4345 & 4375 McKenna Casey Drive (Caivan's Conservancy West)

The proposed development application includes a plan of subdivision application for the construction of 331 single detached homes and 1664 townhomes. The development is anticipated to be built out by 2030 and to generate 554 new AM peak hour two-way vehicle trips and 606 new PM peak hour two-way vehicle trips. Currently, Phase 1 of the development is planned for construction and includes 75 single detached homes and 507 townhomes and is expected to generate 199 new AM peak hour two-way vehicle trips and 216 new PM peak hour two-way vehicle trips. (CGH Transportation, 2024 & 2026)

3285, 3288, & 3305 Borrisokane Road (Caivan's Conservancy East)

The proposed development application includes a plan of subdivision application for the construction of 524 single detached homes and 741 townhomes. The development is anticipated to be built out by 2029 and to generate 398 new AM peak hour two-way vehicle trips and 447 new PM peak hour two-way vehicle trips. (CGH Transportation, 2021 & 2024)

3432 Greenbank Road (Minto Kennedy Lands)

The proposed development application includes a plan of subdivision application for the construction of 100 single family and 425 townhomes. The development was initially anticipated to be built out by 2024 and to generate 185 new AM peak hour two-way vehicle trips and 203 new PM peak hour two-way vehicle trips. The development will be assumed to be built out by 2028. (CGH Transportation, 2024)

3194 Jockvale Road

The proposed development application includes a plan of subdivision application for the construction of 216 stacked townhome units and approximately 201,157 sq. ft retail space. The development is anticipated to be built out by 2026 and to generate 224 new AM peak hour two-way vehicle trips and 596 new PM peak hour two-way vehicle trips. (CGH Transportation, 2019)

1034 McGarry Terrace

The proposed development application includes a site plan application for the construction of 592 residential units and 1,104.3 sq. m commercial spaces. The development is anticipated to be built out by 2026 and to generate 52

new AM peak hour two-way vehicle trips and 57 new PM peak hour two-way vehicle trips. (CGH Transportation, 2023)

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Strandherd Drive at:
 - Fallowfield Road/Citigate Drive
 - CrossKeys Place/Helene-Campbell Road
 - Systemhouse Street/Maravista Drive
 - Dealership Drive/Kennevale Drive
 - Site Access #1 (future conditions)
 - Site Access #2 (future conditions)
- Systemhouse Street at:
 - Citigate Drive
 - Costco Access
 - Site Access #3 (future conditions)

The boundary roads will be Strandherd Drive and Systemhouse Street and screenline 49 is beyond 1km from the site and will not be analyzed as part of this study.

3.2 Time Periods

As the proposed development is composed entirely of retail units the AM, PM, and Saturday peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2028. As a result, the full build-out plus five years horizon year is 2033.

4 Development-Generated Travel Demand

4.1 Mode Shares

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 South Nepean have been summarized in Table 8. The PM peak hour mode shares were used for the Saturday peak hour.

Table 8: TRANS Trip Generation Manual Recommended Mode Shares – South Nepean

Travel Mode	Commercial Generator		
	AM	PM	SAT
Auto Driver	74%	61%	61%
Auto Passenger	14%	27%	27%
Transit	1%	1%	1%
Cycling	0%	0%	0%
Walking	11%	11%	11%
Total	100%	100%	100%

4.2 Trip Generation

This TIA has been prepared using the vehicle trip rates and derived person trip rates for commercial components from the ITE Trip Generation Manual 12th Edition (2025) using the City-prescribed conversion factor of 1.28. The fast-food restaurant with drive-through window land-use (ITE LUC 934) has been assumed for CRU 5, CRU 8, and CRU 10, and a shopping plaza with supermarket (ITE LUC 821) has been assumed for the remaining CRUs within the site. Table 9 summarizes the person trip rates for the non-residential land uses by peak hour.

Table 9: Trip Generation Person Trip Rates by Peak Period

Land Use	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
Fast-Food Restaurant with Drive-Through Window	934 (ITE)	AM	33.24	42.55
		PM	31.60	40.45
		SAT	50.75	64.96
Shopping Plaza with Supermarket (40-150k)	821 (ITE)	AM	3.54	4.53
		PM	8.58	10.98
		SAT	7.67	9.82

Using the above person trip rates, the total person trip generation has been estimated. Table 10 summarizes the total person trip generation for the non-residential land uses.

Table 10: Total Residential Person Trip Generation by Peak Hour

Land Use	GFA (sq. ft)	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Fast-Food Restaurant with Drive-Through Window	11,507	250	240	490	242	223	465	381	366	747
Shopping Plaza with Supermarket (40-150k)	111,450	303	202	505	600	624	1224	536	558	1094

Internal capture rates from the ITE Trip Generation Handbook 3rd Edition have been assigned to the development's restaurant components for mixed-use developments. The rates summarized in Table 11 represent the percentage of trips to/from the restaurant use based on the retail component. The PM peak internal capture rates were used for the Saturday peak hour. The internal capture between the shopping plaza use is assumed inclusive of the trip generation for the 821 land use code.

Table 11: Internal Capture Rates

Land Use	AM		PM		Saturday	
	In	Out	In	Out	In	Out
Restaurant to/from Shopping Centre	50%	14%	29%	41%	29%	41%

Pass-by reductions were applied to the fast-food restaurant with drive-through window trip generation at a rate of 50% during all peak hours, and the shopping plaza (40-150 k) trip generation at a rate of 40% during all peak hours. The selected pass-by rates represent a moderately conservative interpretation of the values presented in the ITE Trip Generation Handbook 3rd Edition.

It is anticipated that 20% of the fast-food restaurants with drive-through windows and 50% of the shopping plaza will not open during the AM peak hour.

Using the above mode share targets, the internal capture and pass-by rates, and the person trip rates, the person trips by mode have been projected. Table 12 summarizes the non-residential trip generation by mode and peak hour.

Table 12: Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total	Mode Share	In	Out	Total
Fast-Food Restaurant with Drive-Through Window	Auto Driver	74%	37	61	98	61%	53	41	94	61%	82	80	162
	Auto Passenger	14%	14	23	37	27%	46	36	82	27%	73	70	143
	Transit	1%	1	2	3	1%	2	1	3	1%	3	3	5
	Cycling	0%	0	0	0	0%	0	0	0	0%	0	0	0
	Walking	11%	11	18	29	11%	19	15	34	11%	30	29	58
	Internal Capture	varies	-100	-27	-127	varies	-70	-91	-161	varies	-110	-106	-216
	Pass-by	50%	-37	-61	-98	50%	-52	-40	-92	50%	-83	-79	-162
	Total	100%	63	104	167	100%	120	93	213	100%	188	182	368
Shopping Centre	Auto Driver	74%	67	45	112	61%	220	229	449	61%	196	204	400
	Auto Passenger	14%	21	14	35	27%	162	168	330	27%	145	151	295
	Transit	1%	2	1	3	1%	6	6	12	1%	5	6	11
	Cycling	0%	0	0	0	0%	0	0	0	0%	0	0	0
	Walking	11%	17	11	28	11%	66	69	135	11%	59	61	120
	Pass-by	40%	-45	-30	-75	40%	-146	-152	-298	40%	-131	-136	-267
	Total	100%	107	71	178	100%	454	472	926	100%	405	422	826
Total	Auto Driver	74%	104	106	210	61%	273	270	543	61%	278	284	562
	Auto Passenger	14%	35	37	72	27%	208	204	412	27%	218	221	438
	Transit	1%	3	3	6	1%	8	7	15	1%	8	9	16
	Cycling	0%	0	0	0	0%	0	0	0	0%	0	0	0
	Walking	11%	28	29	57	11%	85	84	169	11%	89	90	178
	Internal Capture	varies	-100	-27	-127	varies	-70	-91	-161	varies	-110	-106	-216
	Pass-by	varies	-82	-91	-173	varies	-198	-192	-390	varies	-214	-215	-429
	Total	100%	170	175	345	100%	574	565	1139	100%	593	604	1194

As shown above, a total of 210 AM, 543 PM, and 562 Saturday new peak hour two-way vehicle trips are projected as a result of the proposed development.

4.3 Trip Distribution

Traffic distribution was based on knowledge of the area travel, the nature of the land use, and previous studies for adjacent developments within the Citigate area. Table 13 below summarizes the distributions.

Table 13: Trip Distribution

To/From	% of Trips
North	30%
South	5%
East	45%
West	20%
Total	100%

4.4 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. Table 14 summarizes the proportional assignment to the study area roadways, and Figure 12 illustrates the new site generated volumes, and Figure 13 illustrates the pass-by volumes.

Table 14: Trip Assignment

To/From	Via
North	25% Fallowfield Rd (E) 5% Costco Access (N)
South	5% Strandherd Dr (S)
East	40% Strandherd Dr (S) 5% Maravista Dr (E)
West	20% Fallowfield Rd (N)
Total	100%

Figure 12: New Site Generation Auto Volumes

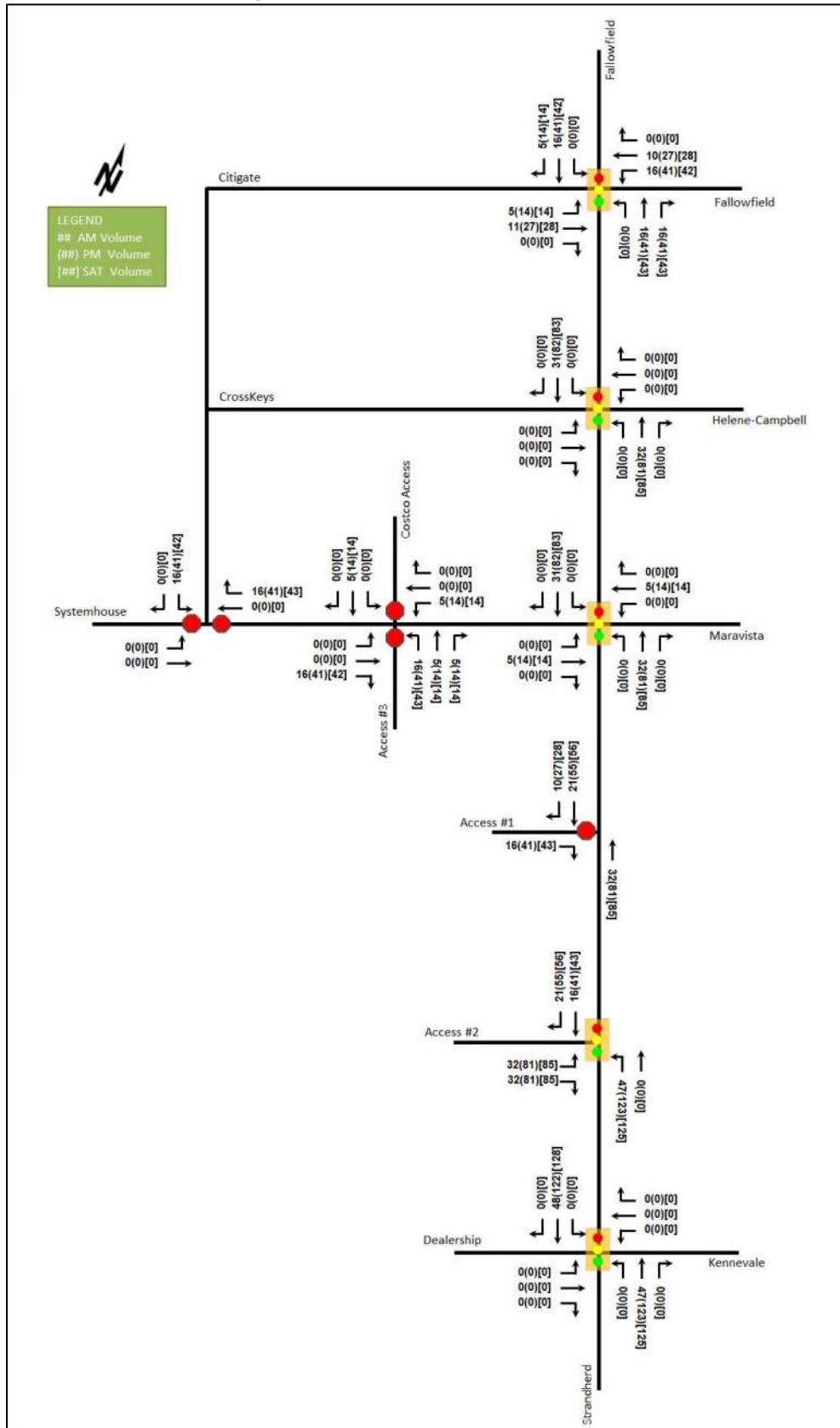
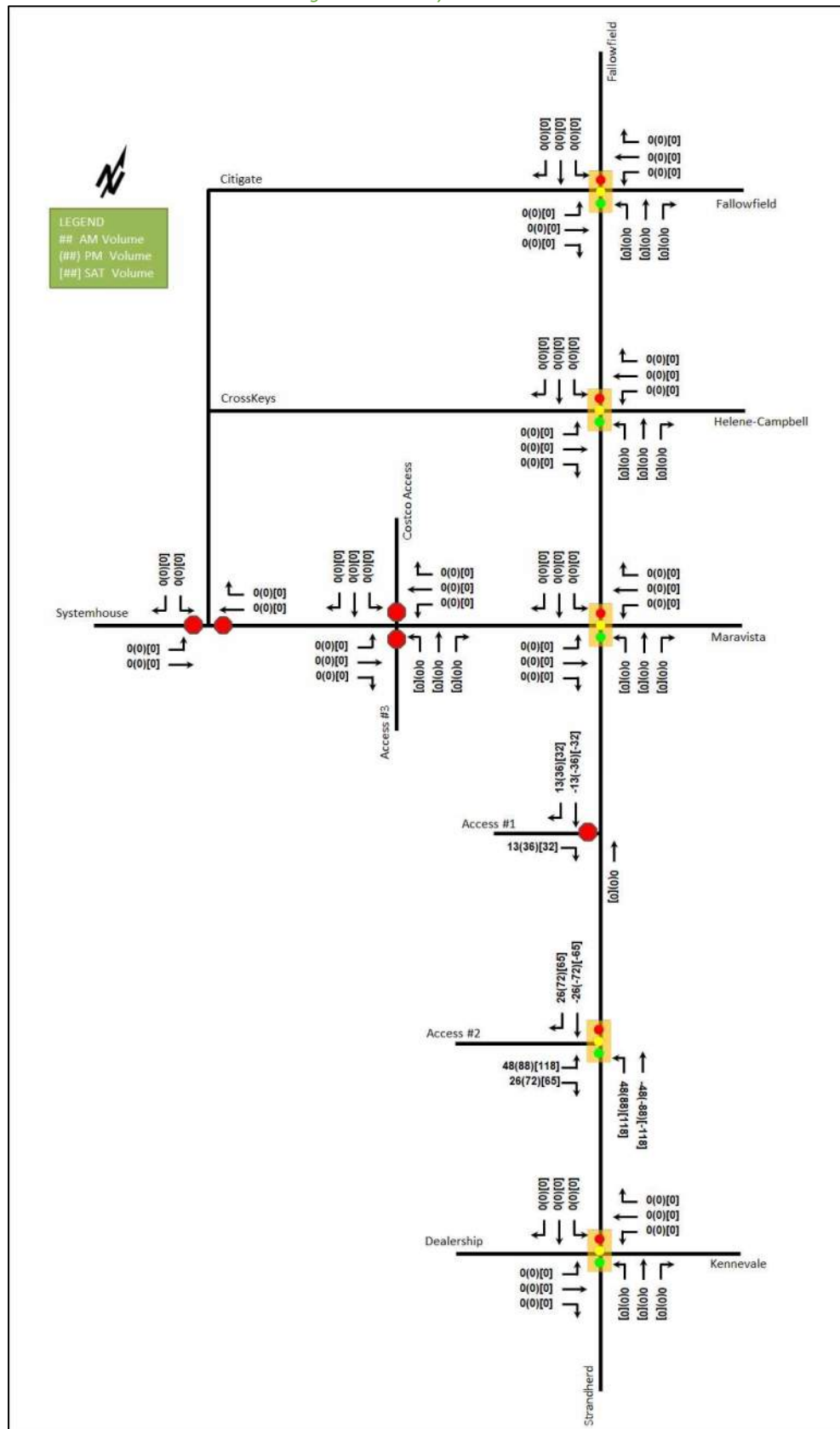


Figure 13: Pass-by Auto Volumes



5 Exemption Review

Table 15 summarizes the exemptions for this TIA.

Table 15: Exemption Review

Module	Element	Explanation	Exempt/Required
Site Design and TDM			
Development Design	4.1.2 Circulation and Access	Only required for site plan and zoning by-law applications	Required
	4.1.3 New Street Networks	Only required for plans of subdivision	Exempt
Parking	4.2.1 Parking Supply	Only required for site plan and zoning by-law applications	Required
Boundary Street Design		All applications	Required
Transportation Demand Management	All Elements	Only required when the development generates more than 60 person-trips	Required
Network Impact			
Background Network Travel Demand	All Elements	Only required when one or more other Network Impact Modules are triggered when the development generates more than 75 auto or transit trips	Required
Demand Rationalization		Only required when one or more other Network Impact Modules when the development generates more than 75 auto trips	Required
Neighbourhood Traffic Calming	4.6.1 Adjacent Neighbourhoods	If the development meets all of the following criteria along the route(s) site generated traffic is expected to utilize between an arterial road and the site's access: 1. Access to Collector or Local; 2. "Significant sensitive land use presence" exists, where there is at least two of the following adjacent to the subject street segment: • School (within 250m walking distance); • Park; • Retirement / Older Adult Facility (i.e. long-term care and retirement homes); • Licenced Child Care Centre; • Community Centre; or • 50%, or greater, of adjacent property along the route(s) is occupied by residential lands and a minimum of 10 occupied residential units are present on the route. 3. Application is for Zoning By-Law Amendment or Draft Plan of Subdivision; 4. At least 75 site-generated auto trips; 5. Site Trip Infiltration is expected. Site traffic will increase peak hour vehicle volumes along the route by 50% or more.	Exempt

Module	Element	Explanation	Exempt/Required
Transit	4.7.1 Transit Route Capacity	Only required when the development generates more than 75 transit trips	Exempt
	4.7.2 Transit Priority Requirements	Only required when the development generates more than 75 auto trips	Required
Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt
Intersection Design	4.4.1-2/4.9.1 Intersection Control	Only required when the development generates more than 75 auto trips	Required
	4.4.3/4.9.2 Intersection Design	Only required when the development generates more than 75 auto trips	Required

6 Development Design

6.1 Design for Sustainable Modes

The proposed development consists of 122,956 sq. ft retail space with surface vehicle parking located surrounding the buildings. Bicycle parking spaces are located in surface racks adjacent to the building entrances of Buildings CRU1, CRU2, CRU 4, CRU7, CRU9, and CRU 10. Sidewalks are proposed throughout the site, providing continuous pedestrian connectivity between the building entrances, parking areas, and the internal drive aisles. Pedestrian crossings are proposed throughout the site at locations of major pedestrian desire lines, including between each of the site buildings and between the buildings, and the pedestrian facilities at the site accesses. The pedestrian crossings are proposed to be accessed by depressed curbs. Building entrances are located north, south, east, and west of the buildings.

The site connects to the adjacent sidewalks and cycletracks along Strandherd Drive and an existing sidewalk along Systemhouse Street.

Bus stops are located on both sides of Systemhouse Street approximately 38 metres west of the site access on Systemhouse Street.

The infrastructure TDM checklist is provided in Appendix E.

6.2 Circulation and Access

Vehicular accesses are provided via an 8.0-meter-wide right-in/right-out access (Access #1) and a new signalized intersection on Strandherd Drive (Access #2), and a 9.0-metre-wide two-way full-movement access (Access #3) on Systemhouse Street opposite of the Costco access. Access #2, Access #3, and internal driveways are designated as fire routes. The internal driveways meet the minimum required clear width of 6.0 metres, with a minimum aisle width of 6.7 metres provided, and the minimum required centerline radius of 12.0 metres. The proposed fire route accommodates fire trucks, allowing access to and circulate throughout the site.

Loading and garbage collection areas are provided at the rear of buildings CRU1, CRU2, and CRU3. WB-20 design vehicles can enter the site via either Access #2 or Access #3 and circulate between buildings CRU1 and CRU2 to access the loading areas. WB-20 design vehicle can exit the site by circulating between buildings CRU1 and CRU2 or along the internal driveways between buildings CRU4 and CRU5 and ultimately exit via Access #3. No other areas within the site are required to accommodate WB-20 design vehicle. The loading area for building CRU4 meets the City's vehicle loading space requirements.

Garbage collection areas are also provided south of building CRU5, west of building CRU6, and south of the buildings CRU7, CRU8, and CRU10, in addition to the areas dedicated to buildings CRU 1 through CRU4. Garbage trucks can access the site via all three site accesses, circulate through the site to access the garbage collection areas, and exit the site via any of the site accesses. Turning templates are provided in Appendix F.

7 Parking

7.1 Parking Supply

The site is proposed to include a total of 497 vehicle parking spaces and 44 bicycle parking spaces.

Given the existing application for the subject development, it is understood that the legacy Zoning By-Law (2008-250) applies. Furthermore, Table 602 of the Zoning By-Law (2026-50) is not yet in force.

According to the legacy Zoning By-Law (2008-250) for Area C, a minimum parking ratio of 10 vehicle parking spaces per 100 m² of gross floor area is required for a fast food restaurant, and 3.6 vehicle parking spaces per 100 m² of gross floor area are required for a shopping centre, resulting in a minimum requirement of 107 spaces for restaurant and 373 spaces for a shopping centre, for a total minimum of 480 vehicle parking spaces. The legacy Zoning By-Law also requires a minimum of one bicycle parking space per 250 m² of gross floor area for a restaurant and one bicycle parking space per 500 m² of gross floor area for a shopping centre, resulting in a total minimum requirement of 25 bicycle parking spaces.

Therefore, the proposed vehicle and bicycle parking supply meets the requirements by the legacy Zoning By-Law (2008-250).

8 Boundary Street Design

Table 16 summarizes the MMLOS analysis for the boundary streets of Strandherd Drive and Systemhouse Street. No future improvements have been identified for the boundary streets; therefore, the existing and future roadway conditions are the same and have been presented in one row. Both roadways are within the “Suburban” area. Public Realm LOS has been provided for informational purpose only. The MMLOS worksheets have been provided in Appendix G.

Table 16: Boundary Street MMLOS Analysis

Segment	Conditions	Pedestrian LOS		Bicycle LOS		Transit LOS		Public Realm LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	PRLOS	Target
Strandherd Drive	Ex./Fut.	B	C	A	B	-	-	C	C
Systemhouse Street	Ex./Fut.	C	C	E	C	C	E/D	B	B

Strandherd Drive will meet the pedestrian and bicycle LOS targets in the existing and future conditions.

Systemhouse Street will not meet the bicycle LOS target in the existing and future conditions. To meet the bicycle LOS target, either 1.5-1.79-metre or 1.8-metre contraflow painted or physically separated bike lane with a 1.0-metre boulevard or a 1.8-1.99-metre bike lane, would be required. Systemhouse Street will meet the pedestrian and transit LOS targets in the existing and future conditions.

9 Transportation Demand Management

9.1 Context for TDM

The mode shares used within the TIA represent the unmodified district mode shares. Overall, the modal shares are likely to be achieved and supporting TDM measures should be provided to encourage shifts towards sustainable modes.

9.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel, and those assumptions have been carried through the analysis. The study area intersections are anticipated to have residual capacity and as the unmodified district mode shares have been applied, risks of failing to meet mode share targets is low.

9.3 TDM Program

The “suite of post occupancy TDM measures” has been summarized in the TDM checklists for the retail land uses. The checklist is provided in Appendix E. The key TDM measures recommended include:

- Display local area maps with walking/cycling access routes and key destinations at major entrances
- Display relevant transit schedules and route maps at entrances
- Provide transit incentives to encourage commuters to use transit
- Provide multimodal travel option information package to new employees

10 Background Network Travel Demands

10.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3 and have been considered in the analysis. At the 2033 plus five-year horizon, the interim Highway 416 at Barnsdale Road interchange is expected to be implemented, resulting in changes to the existing travel patterns as traffic shifts to use the interchange. Accordingly, a 10% shift of the existing traffic volumes to/from Highway 416 along Strandherd Drive has been assigned to the Barnsdale interchange. As noted in the Barrhaven South Future Neighbourhood Phase 3 Transportation Report, a 10% reduction has been applied at the intersection of Strandherd Drive at Borrisokane Road/Tartan Drive, and the resulting volumes have been carried through the study area network.

10.2 Background Growth

A 1% compound annual growth rate has been applied to the mainline traffic along Strandherd Drive to account for the background traffic growth within the study area network. The growth rate has been applied at the intersection of Strandherd Drive at Fallowfield Road/Citigate Drive, and the resulting volumes have been carried through the study area network.

10.3 Other Developments

The background developments explicitly considered in the background conditions (Section 10.2) include:

- 100 Lusk Street
- 115 Lusk Street
- 120 Lusk Street
- 135 Lusk Street
- 140 Lusk Street
- 2740 Cedarview Road, 4190-4236 Fallowfield Road

- 4149 Strandherd Drive (Phase 2)
- 4433 Strandherd Drive
- 3387 Borrisokane Road (Glenview Homes)
- 3555 Borrisokane Road
- 652 Flagstaff Drive
- 3535 Borrisokane Road
- 3845 Cambrian Road
- 3850 Cambrian Road
- 3288 & 3300 Borrisokane Road, 4205, 4345 & 4375 McKenna Casey Drive (Caivan's Conservancy West)
- 3285, 3288, & 3305 Borrisokane Road (Caivan's Conservancy East)
- 3432 Greenbank Road (Minto Kennedy Lands)
- 3194 Jockvale Road
- 1034 McGarry Terrace

The developments at 4433 Strandherd Drive and 3535 Borrisokane Road trip generation are noted to be updated to the ITE Trip Generation Manual 12th Edition (2025) and the developments at 2740 Cedarview Road, 4190-4236 Fallowfield Road, 3387 Borrisokane Road (Glenview Homes), and 3194 Jockvale Road are noted to be updated to the TRANS 2020 methodology. Approximately 90% of the Caivan's Conservancy East and Phase 1 of the Conservancy West developments have been included in the 2033 future horizon, based on the conditions of the subdivisions.

The background development volumes within the study area have been provided in Appendix H.

11 Demand Rationalization

11.1 2028 Future Background Intersection Operations

Figure 14 illustrates the 2028 background volumes and Table 17 summarizes the 2028 background intersection operations. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services, and average delay for unsignalized intersections. Given the configuration, the intersection of Systemhouse Street at Citigate Drive cannot be analyzed using HCM 2010; therefore, HCM 2000 was used for the analysis of this intersection. The synchro worksheets for the 2028 future background horizon are provided in Appendix I.

Figure 14: 2028 Future Background Volumes

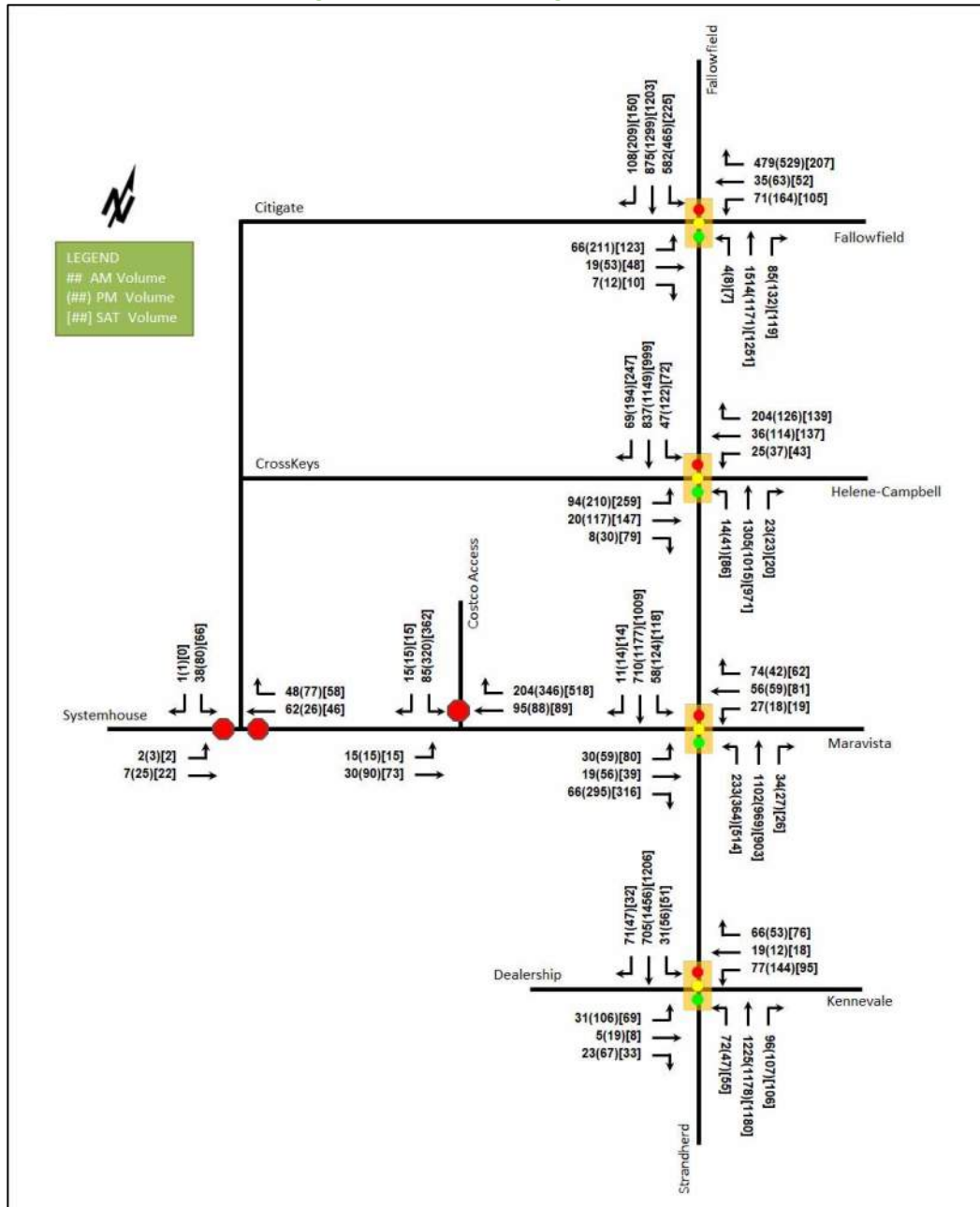


Table 17: 2028 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Strandherd Drive at Fallowfield Road/Citigate Drive <i>Signalized</i>	EBL	A	0.38	60.5	15.3	A	0.54	55.6	#53.1	B	0.67	59.6	#31.1
	EBT/R	A	0.23	46.3	13.3	A	0.28	39.0	18.9	A	0.29	35.7	22.2
	WBL	A	0.22	40.1	23.5	A	0.44	46.7	#97.6	A	0.31	35.1	30.3
	WBT	A	0.14	37.7	12.9	A	0.18	36.0	20.3	A	0.17	29.0	15.4
	WBR	D	0.86	25.8	54.5	E	0.91	33.3	77.1	A	0.49	8.2	14.5
	NBL	A	0.07	57.2	4.6	A	0.12	72.9	m3.5	A	0.07	43.0	6.0
	NBT	F	1.60	306.3	#349.5	F	1.41	219.1	#246.7	F	1.29	164.6	#250.4
	NBR	A	0.14	0.5	0.0	A	0.26	4.4	m5.6	A	0.22	2.3	4.3
	SBL	C	0.76	50.2	#112.8	C	0.80	58.8	#92.5	A	0.57	42.2	36.8
	SBT	A	0.48	19.9	126.8	D	0.83	34.9	#249.4	C	0.78	25.7	#225.9
	SBR	A	0.11	2.6	8.0	A	0.21	3.3	14.4	A	0.18	2.9	10.2
	Overall	F	1.25	138.5	-	F	1.10	86.4	-	F	1.07	75.3	-
Strandherd Drive at CrossKeys Place/Helene-Campbell Road <i>Signalized</i>	EBL	A	0.51	57.7	32.2	C	0.72	53.5	63.7	D	0.81	56.2	71.9
	EBT	A	0.08	42.3	9.6	A	0.27	35.4	33.5	A	0.31	31.5	36.2
	EBR	A	0.03	0.1	0.0	A	0.07	0.3	0.0	A	0.17	2.9	5.6
	WBL	A	0.13	43.9	11.2	A	0.13	31.7	13.8	A	0.14	27.8	13.8
	WBT	A	0.14	44.2	14.5	A	0.27	35.2	32.7	A	0.29	31.1	33.8
	WBR	A	0.57	16.9	25.9	A	0.28	6.3	12.7	A	0.28	5.6	12.2
	NBL	A	0.09	75.8	m3.6	A	0.22	59.4	m5.3	A	0.38	53.3	17.0
	NBT	B	0.63	9.6	#57.8	B	0.69	29.2	156.1	B	0.62	26.8	124.7
	NBR	A	0.02	0.0	m0.0	A	0.03	1.9	m0.3	A	0.03	0.1	0.0
	SBL	A	0.45	71.9	24.4	C	0.72	83.0	m#39.6	A	0.53	62.4	#33.0
	SBT	A	0.38	11.9	100.2	B	0.65	13.2	71.5	B	0.65	27.1	#142.0
	SBR	A	0.07	1.7	4.1	A	0.22	1.3	m2.6	A	0.30	4.0	16.1
	Overall	B	0.62	14.7	-	B	0.70	24.9	-	B	0.66	27.8	-
Strandherd Drive at Systemhouse Street/Maravista Drive <i>Signalized</i>	EBL	A	0.24	63.8	9.0	A	0.39	63.1	14.0	A	0.43	59.8	17.0
	EBT/R	A	0.33	17.6	15.4	B	0.66	17.4	46.2	A	0.53	7.5	27.6
	WBL	A	0.33	70.5	16.8	A	0.23	62.1	11.8	A	0.21	57.2	11.8
	WBT/R	A	0.51	34.6	29.9	A	0.31	26.7	23.8	A	0.34	24.7	31.5
	NBL	B	0.69	66.9	44.0	B	0.66	53.4	#88.7	C	0.77	54.7	#114.7
	NBT/R	A	0.59	23.9	#217.0	B	0.70	36.8	#174.9	C	0.76	41.5	#176.2
	SBL	A	0.48	73.7	30.6	C	0.72	53.4	m#56.8	C	0.71	72.8	#49.3
	SBT	A	0.41	22.6	73.8	E	0.93	58.3	#229.2	F	1.16	124.8	#195.0
	SBR	A	0.01	0.0	m0.0	A	0.02	0.1	m0.0	A	0.03	0.1	0.0
	Overall	A	0.57	30.1	-	D	0.82	45.3	-	E	0.93	67.0	-
Strandherd Drive at Dealership Drive/Kennevale Drive <i>Signalized</i>	EBL	A	0.20	46.6	13.9	A	0.53	54.2	37.5	A	0.40	47.3	23.5
	EBT	A	0.02	40.4	4.2	A	0.07	39.4	9.6	A	0.03	35.5	5.2
	EBR	A	0.07	4.1	3.2	A	0.19	16.1	13.9	A	0.10	6.2	4.9
	WBL	A	0.47	55.7	28.2	C	0.71	64.7	49.6	A	0.51	51.0	30.5
	WBT/R	A	0.34	18.2	16.2	A	0.23	15.6	13.4	A	0.33	14.9	15.3
	NBL	A	0.33	57.0	15.6	A	0.24	56.4	11.5	A	0.28	52.7	12.3
	NBT/R	A	0.60	15.3	165.7	B	0.66	20.6	167.0	B	0.64	17.9	149.7
	SBL	A	0.30	60.0	16.7	A	0.43	58.5	m17.4	A	0.42	59.3	#24.5
	SBT	A	0.34	12.1	70.8	C	0.71	17.0	m103.4	A	0.59	16.2	135.3
	SBR	A	0.07	1.3	3.2	A	0.05	0.4	m0.0	A	0.03	0.1	0.0
	Overall	A	0.59	17.5	-	B	0.70	22.8	-	B	0.62	20.0	-
Systemhouse Street at Citigate Drive <i>Unsignalized</i>	EBL/T	A	0.01	9.9	0.3	B	0.04	10.5	1.0	B	0.03	10.2	0.8
	WBT/R	A	0.12	9.6	3.2	A	0.11	9.3	2.8	A	0.12	9.6	3.0
	SBL/R	A	0.02	7.2	0.6	A	0.05	7.3	1.2	A	0.04	7.4	1.0
	Overall	A	-	9.0	-	A	-	8.7	-	A	-	8.9	-
Systemhouse Street at Costco Access <i>Unsignalized</i>	EBL	A	0.01	8.0	0.0	A	0.02	8.6	0.0	A	0.02	9.1	0.0
	EBT	-	-	-	-	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-	-	-	-	-
	WBR	-	-	-	-	-	-	-	-	-	-	-	-
	SBL/R	A	0.12	9.9	3.0	B	0.43	13.1	16.5	B	0.48	13.7	19.5
	Overall	A	-	2.5	-	A	-	5.2	-	A	-	4.9	-

Notes:

Saturation flow rate of 1800 veh/h/lane
PHF = 1.00

m = metered queue
= queue exceeds storage or mid-block length

During the AM, PM, and Saturday peak hours, the study area intersections at the 2028 future background horizon operate similarly to the existing conditions, with exception of the intersection of Strandherd Drive at CrossKeys Place/Helene-Campbell Road. The incremental improvement to the intersection operations is predominantly a result of the peak hour factor adjustment to 1.00 for forecasted conditions.

At the intersection of Strandherd Drive at CrossKeys Place/Helene-Campbell Road, the northbound through movement may exhibit extended queues during the AM peak hour, and the southbound through may exhibit extended queues during the Saturday peak hour, in addition to the queuing concerns identified in the existing conditions.

11.2 2033 Future Background Intersection Operations

The interim Highway 416 at Barnsdale Road interchange has been assumed to be in place by 2033, resulting in a 10% reduction in the existing traffic volumes to/from Highway 416 along Strandherd Drive.

Figure 15 illustrates the 2033 background volumes and Table 18 summarizes the 2033 background intersection operations. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services, and average delay for unsignalized intersections. Given the configuration, the intersection of Systemhouse Street at Citigate Drive cannot be analyzed using HCM 2010; therefore, HCM 2000 was used for the analysis of this intersection. The synchro worksheets for the 2033 future background horizon are provided in Appendix J.

Figure 15: 2033 Future Background Volumes

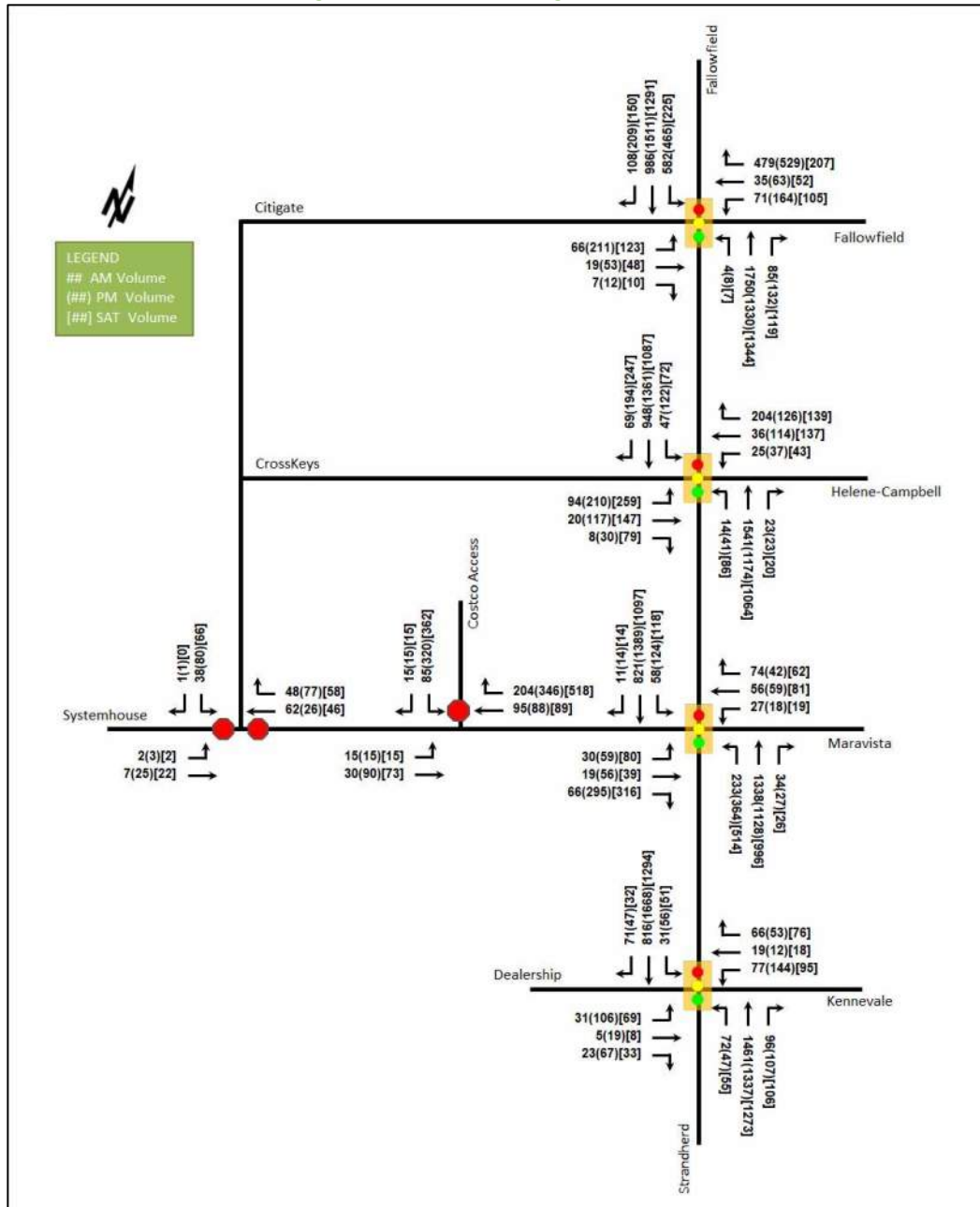


Table 18: 2033 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Strandherd Drive at Fallowfield Road/Citigate Drive <i>Signalized</i>	EBL	A	0.38	60.5	15.3	A	0.54	55.6	#53.1	B	0.67	59.6	#31.1
	EBT/R	A	0.23	46.3	13.3	A	0.28	39.0	18.9	A	0.29	35.7	22.2
	WBL	A	0.22	40.1	23.5	A	0.44	46.7	#97.6	A	0.31	35.1	30.3
	WBT	A	0.14	37.7	12.9	A	0.18	36.0	20.3	A	0.17	29.0	15.4
	WBR	D	0.86	25.8	54.5	E	0.91	33.3	77.1	A	0.49	8.2	14.5
	NBL	A	0.07	57.2	4.6	A	0.12	73.5	m3.4	A	0.07	43.0	6.0
	NBT	F	1.85	414.6	#410.2	F	1.60	301.6	#288.5	F	1.38	205.3	#272.6
	NBR	A	0.14	0.5	0.0	A	0.26	4.6	m4.7	A	0.22	2.3	4.3
	SBL	C	0.76	50.2	#112.8	C	0.80	58.8	#92.5	A	0.57	42.2	36.8
	SBT	A	0.54	20.9	#161.6	E	0.96	47.5	#304.4	D	0.84	27.8	#247.1
	SBR	A	0.11	2.6	8.0	A	0.21	4.2	17.4	A	0.18	3.3	11.4
	Overall	F	1.43	190.3	-	F	1.22	116.1	-	F	1.14	92.0	-
Strandherd Drive at CrossKeys Place/Helene-Campbell Road <i>Signalized</i>	EBL	A	0.51	57.7	32.2	C	0.72	53.8	63.7	D	0.81	56.2	71.9
	EBT	A	0.08	42.3	9.6	A	0.27	35.5	33.5	A	0.31	31.5	36.2
	EBR	A	0.03	0.1	0.0	A	0.07	0.3	0.0	A	0.17	2.9	5.6
	WBL	A	0.13	43.9	11.2	A	0.13	31.8	13.8	A	0.14	27.8	13.8
	WBT	A	0.14	44.2	14.5	A	0.27	35.3	32.7	A	0.29	31.1	33.8
	WBR	A	0.58	19.1	28.0	A	0.28	6.3	12.7	A	0.28	5.6	12.2
	NBL	A	0.09	76.1	m3.3	A	0.22	57.5	m4.4	A	0.38	53.3	17.0
	NBT	C	0.75	11.7	#273.5	C	0.79	33.2	#192.0	B	0.68	28.4	#151.5
	NBR	A	0.02	0.0	m0.0	A	0.03	2.0	m0.0	A	0.03	0.1	0.0
	SBL	A	0.45	71.9	24.4	C	0.72	77.9	m32.2	A	0.53	62.4	#33.0
	SBT	A	0.43	12.6	118.4	C	0.77	15.8	m#98.0	C	0.71	28.7	#163.4
	SBR	A	0.07	1.7	4.1	A	0.22	1.5	m2.2	A	0.30	4.0	16.1
	Overall	C	0.72	15.6	-	C	0.77	26.5	-	C	0.71	28.7	-
Strandherd Drive at Systemhouse Street/Maravista Drive <i>Signalized</i>	EBL	A	0.24	63.8	9.0	A	0.39	63.1	14.0	A	0.43	59.8	17.0
	EBT/R	A	0.33	17.6	15.4	B	0.66	17.4	46.2	A	0.53	7.5	27.6
	WBL	A	0.33	70.5	16.8	A	0.23	62.1	11.8	A	0.21	57.2	11.8
	WBT/R	A	0.51	34.6	29.9	A	0.31	26.7	23.8	A	0.34	24.7	31.5
	NBL	B	0.69	66.9	44.0	B	0.66	52.5	#88.5	C	0.77	54.7	#114.7
	NBT/R	C	0.71	26.4	#285.0	D	0.81	40.1	#217.0	D	0.84	44.6	#200.1
	SBL	A	0.48	72.7	30.7	C	0.72	53.1	m#43.9	C	0.71	72.8	#49.3
	SBT	A	0.48	24.0	89.7	F	1.10	98.7	#286.8	F	1.26	164.6	#217.5
	SBR	A	0.01	0.0	m0.0	A	0.02	0.1	m0.0	A	0.03	0.1	0.0
	Overall	B	0.68	31.0	-	E	0.94	62.3	-	E	0.99	81.8	-
Strandherd Drive at Dealership Drive/Kennevale Drive <i>Signalized</i>	EBL	A	0.20	46.6	13.9	A	0.53	54.2	37.5	A	0.40	47.3	23.5
	EBT	A	0.02	40.4	4.2	A	0.07	39.4	9.6	A	0.03	35.5	5.2
	EBR	A	0.07	4.1	3.2	A	0.19	16.1	13.9	A	0.10	6.2	4.9
	WBL	A	0.47	55.7	28.2	C	0.71	64.7	49.6	A	0.51	51.0	30.5
	WBT/R	A	0.34	18.2	16.2	A	0.23	15.6	13.4	A	0.33	14.9	15.3
	NBL	A	0.33	57.0	15.6	A	0.24	56.4	11.5	A	0.28	52.7	12.3
	NBT/R	C	0.71	17.9	#237.0	C	0.74	23.0	#218.0	B	0.69	19.2	168.3
	SBL	A	0.30	60.0	16.7	A	0.43	55.5	m15.3	A	0.42	59.3	#24.5
	SBT	A	0.40	12.8	84.6	D	0.81	21.0	m104.7	B	0.63	17.1	151.0
	SBR	A	0.07	1.3	3.2	A	0.05	0.4	m0.0	A	0.03	0.1	0.0
	Overall	B	0.69	18.8	-	C	0.79	25.1	-	C	-	20.7	-
Systemhouse Street at Citigate Drive <i>Unsignalized</i>	EBL/T	A	0.01	9.9	0.3	B	0.04	10.5	1.0	B	0.03	10.2	0.8
	WBT/R	A	0.12	9.6	3.2	A	0.11	9.3	2.8	A	0.12	9.6	3.0
	SBL/R	A	0.02	7.2	0.6	A	0.05	7.3	1.2	A	0.04	7.4	1.0
	Overall	A	-	9.0	-	A	-	8.7	-	A	-	8.9	-
Systemhouse Street at Costco Access <i>Unsignalized</i>	EBL	A	0.01	8.0	0.0	A	0.02	8.6	0.0	A	0.02	9.1	0.8
	EBT	-	-	-	-	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-	-	-	-	-
	WBR	-	-	-	-	-	-	-	-	-	-	-	-
	SBL/R	A	0.12	9.9	3.0	B	0.43	13.1	16.5	B	0.48	13.7	19.5
	Overall	A	-	2.5	-	A	-	5.2	-	A	-	4.9	-

Notes:

Saturation flow rate of 1800 veh/h/lane
PHF = 1.00

m = metered queue
= queue exceeds storage or mid-block length

At the intersection of Strandherd Drive at Fallowfield Road/Citigate Drive, the southbound through movement may exhibit extended queues during the AM peak hour, in addition to the capacity issues and queuing concerns identified in the 2028 future background conditions.

At the intersection of Strandherd Drive at CrossKeys Place/Helene-Campbell Road, the northbound through movement may exhibit extended queues during all peak hours, and the southbound through movement may exhibit extended queues during the PM and Saturday peak hours. During the Saturday peak hour, the southbound left movement may exhibit extended queues.

At the intersection of Strandherd Drive at Systemhouse Street/Maravista Drive, the southbound through movement is expected to be over theoretical capacity during the PM peak hour, in addition to the capacity issues and queuing concerns identified in the 2028 future background conditions. The overall intersection is also expected to operate near the theoretical capacity during the Saturday peak hour.

At the intersection of Strandherd Drive at Dealership Drive/Kennevale Drive, the northbound through/right movement may exhibit extended queues during the AM and PM peak hours, in addition to the queuing concerns identified in the 2028 future background conditions.

12 Transit

12.1 Transit Priority

Site traffic is anticipated to have a negligible impact on transit movements throughout the study area. Minor increase in delay for transit movements, resulting in an increase of less than 9.0 seconds, are noted at the intersections of Strandherd Drive at Fallowfield Road/Citigate Drive, Strandherd Drive at Systemhouse Street/Maravista Drive, and Strandherd Drive at Dealership Drive/Kennevale Drive.

13 Intersection Design

13.1 Location and Design of Access

The site access configuration includes a right-in/right-out access (Access #1) and a new signalized intersection on Strandherd Drive (Access #2), and a full-movement access (Access #3) on Systemhouse Street opposite of the Costco Access.

Access #1 is located approximately 92.0 metres from the northern property line and 106.0 metres from the intersection of Strandherd Drive at Systemhouse Street/Maravista Drive. Access #2 is located approximately 116.0 metres south of Access #1, 73.0 metres from the southern property line, and approximately 256.0 metres from the intersection of Strandherd Drive at Dealership Drive/Kennevale Drive. Access #3 is located approximately 40.0 metres from the western property line, 116.0 metres from the eastern property line, and 127.0 metres from the intersection of Strandherd Drive at Systemhouse Street/Maravista Drive. The Geometric Design Guide for Canadian Roads (TAC, 2017) suggests minimum corner clearance value of 70.0 metres for driveways on arterial roads and 50.0 metres for driveways on collector roads. The Private Approach By-Law requires a minimum offset of 3.0 metres from the adjacent property line and 75.0 metres from the adjacent road right-of-way and from any other vehicular access. Therefore, all site accesses meet these guidelines.

Access #1 is proposed to be 8.0-metre-wide at its typical width and 18.0-metre-wide at the curb line with corner radius of 5.0 metres on both sides. Access #3 is proposed to be 9.0-metre-wide at its typical width and 24.0-metre-wide at the curb line with corner radius of 6.0 metres on the west side and 9.0 metres on the east side to accommodate truck turning movement requirements. The maximum width of a two-way access from the private

Approach By-Law is 9.0 metres at the highway line and 19.0 metres in width at the curb line or roadway edge. Therefore, Access #1 meets the Private Approach By-Law width requirements, and the proposed widths of Access #3 are recommended to be approved. Access #2 is subject to the protected intersection design requirements and excluded from this access review.

The throat length at Access #1 to the first on-site conflict is approximately 37.0 metres, the throat length at Access #2 is approximately 35.0 metres, and the throat length at Access #3 is approximately 24.0 metres. According to the TAC Geometric Design Guidelines, the suggested minimum throat length for shopping centres smaller than 25,000 sq. m is 8.0 metres for accesses onto collector roads and 15.0 metres for accesses onto arterial roads. The drive-thru restaurant accesses are located off the primary drive aisle and beyond the throat length area. The proposed throat lengths meet the minimum requirements for shopping centres.

13.2 Intersection Control

No change to the existing signalized control is recommended for the network intersections.

Signal warrant analysis for Justification 7 was performed for the intersections of Strandherd Drive at Access #2 and Systemhouse Street at Costco Access/Access #3 for the 2028 and 2033 future total conditions. Based on the July 2024 Ontario Traffic Manual (OTM) Book 12, the intersection of Strandherd Drive at Access #2 falls within the Case 2 signal warrant category for minimum vehicular volume in the 2028 future total conditions, indicating that a traffic signal may be warranted. Given the operational requirements of the access, including long pedestrian crossing distance across Strandherd Drive and the improved pedestrian and cyclist connectivity that a new signalized intersection would provide to the community east of Strandherd Drive, signalization is recommended. No additional signal warrants were met in 2033 future total conditions. Signal warrant calculation sheets are provided in Appendix K.

The intersection of Systemhouse Street at Costco Access/Access #3 and the right-in/right-out access (Access #1) on Strandherd Drive are proposed to be minor stop-controlled on the minor approaches.

13.3 Intersection Design

13.3.1 2028 Future Total Intersection Operations

The 2028 future total intersection volumes are illustrated in Figure 16 and the intersection operations are summarized below in Table 19. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services, and average delay for unsignalized intersections. Given the configuration, the intersection of Systemhouse Street at Citigate Drive cannot be analyzed using HCM 2010; therefore, HCM 2000 was used for the analysis of this intersection. The synchro worksheets have been provided in Appendix L.

Figure 16: 2028 Future Total Volumes

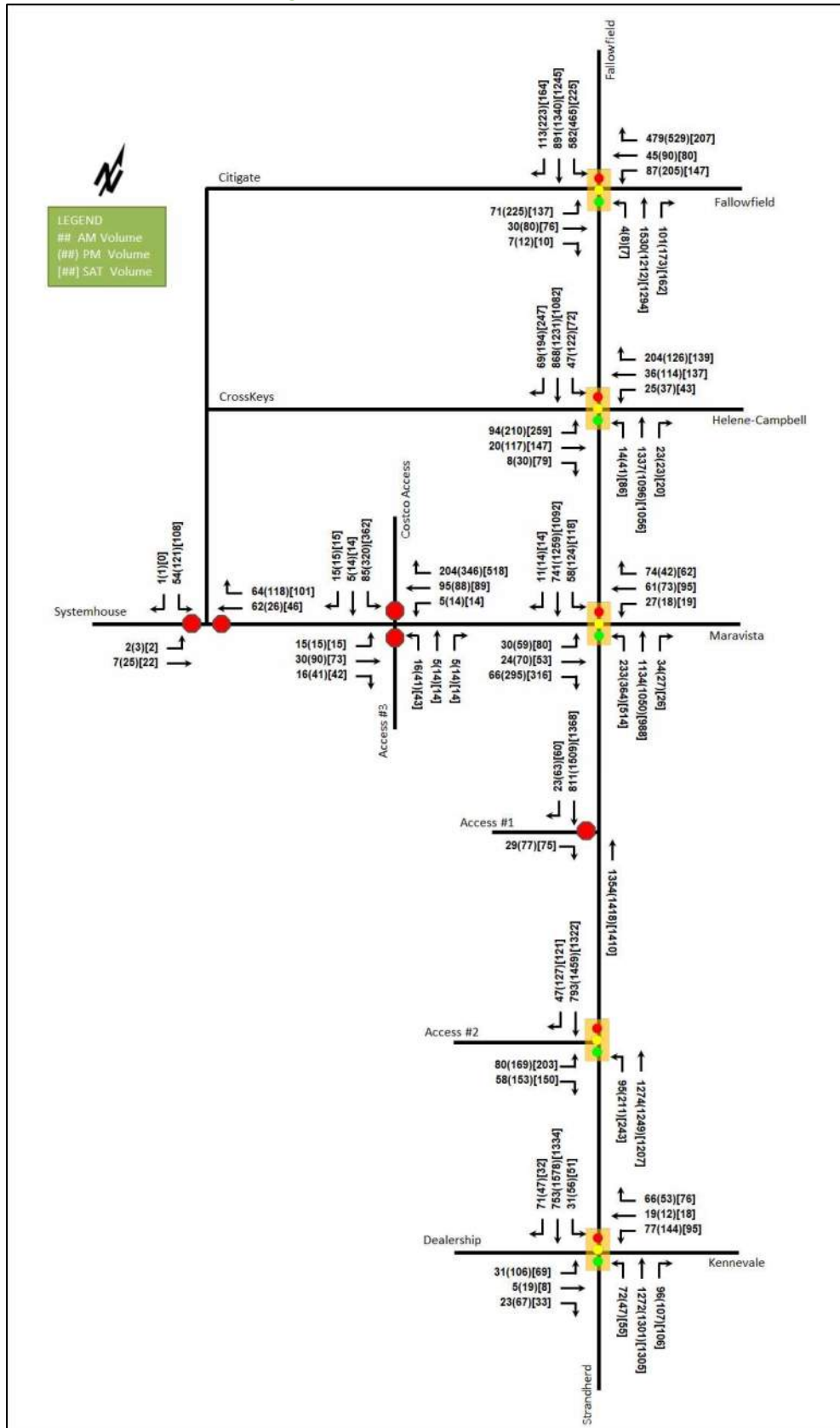


Table 19: 2028 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Strandherd Drive at Fallowfield Road/Citigate Drive <i>Signalized</i>	EBL	A	0.40	60.9	16.1	A	0.41	50.0	#57.1	C	0.74	64.6	#35.3
	EBT/R	A	0.31	50.9	17.4	A	0.38	44.4	26.1	A	0.40	39.2	30.7
	WBL	A	0.27	41.4	28.4	A	0.52	47.5	#122.1	A	0.57	47.1	42.6
	WBT	A	0.18	38.7	15.7	A	0.26	38.0	26.9	A	0.27	30.6	21.6
	WBR	D	0.86	26.2	55.4	D	0.90	33.1	77.4	A	0.49	8.2	14.5
	NBL	A	0.07	57.2	4.6	A	0.12	73.8	m3.3	A	0.07	43.1	6.0
	NBT	F	1.63	319.7	#353.4	F	1.67	331.1	#257.4	F	1.33	184.6	#260.8
	NBR	A	0.17	0.6	0.0	A	0.38	8.1	m8.5	A	0.30	5.8	14.1
	SBL	C	0.76	50.2	#112.8	D	0.88	68.6	#92.5	A	0.57	42.4	36.8
	SBT	A	0.49	20.2	#132.4	E	0.96	49.5	#260.0	D	0.81	26.8	#236.0
	SBR	A	0.12	2.6	8.1	A	0.22	3.5	15.6	A	0.20	3.1	11.4
	Overall	F	1.27	142.4	-	F	1.23	120.2	-	F	1.10	81.7	-
Strandherd Drive at CrossKeys Place/Helene-Campbell Road <i>Signalized</i>	EBL	A	0.51	57.7	32.2	C	0.72	53.8	63.7	D	0.81	56.2	71.9
	EBT	A	0.08	42.3	9.6	A	0.27	35.5	33.5	A	0.31	31.5	36.2
	EBR	A	0.03	0.1	0.0	A	0.07	0.3	0.0	A	0.17	2.9	5.6
	WBL	A	0.13	43.9	11.2	A	0.13	31.8	13.8	A	0.14	27.8	13.8
	WBT	A	0.14	44.2	14.5	A	0.27	35.3	32.7	A	0.29	31.1	33.8
	WBR	A	0.57	17.1	26.2	A	0.28	6.3	12.7	A	0.28	5.6	12.2
	NBL	A	0.09	75.2	m3.6	A	0.22	59.1	m4.8	A	0.38	53.3	17.0
	NBT	B	0.65	10.1	#71.6	C	0.74	30.7	#170.6	B	0.67	28.3	#149.6
	NBR	A	0.02	0.0	m0.0	A	0.03	1.8	m0.0	A	0.03	0.1	0.0
	SBL	A	0.45	71.9	24.4	C	0.72	76.0	m32.9	A	0.53	62.4	#33.0
	SBT	A	0.40	12.0	105.2	B	0.70	13.6	m70.9	C	0.71	28.6	#162.5
	SBR	A	0.07	1.7	4.1	A	0.22	1.4	m2.0	A	0.30	4.0	16.1
	Overall	B	0.63	14.9	-	C	0.74	25.1	-	C	0.71	28.7	-
Strandherd Drive at Systemhouse Street/Maravista Drive <i>Signalized</i>	EBL	A	0.24	63.8	9.0	A	0.39	63.1	14.0	A	0.43	59.8	17.0
	EBT/R	A	0.35	18.7	16.6	C	0.73	26.4	62.1	A	0.56	9.9	37.0
	WBL	A	0.33	70.5	16.8	A	0.23	62.1	11.8	A	0.21	57.2	11.8
	WBT/R	A	0.53	37.8	32.4	A	0.35	31.6	28.5	A	0.37	27.3	35.6
	NBL	B	0.69	66.9	44.0	B	0.66	51.3	#85.1	C	0.77	52.7	#113.6
	NBT/R	B	0.61	24.5	#226.4	C	0.76	34.9	#197.9	D	0.84	40.0	#197.0
	SBL	A	0.48	72.8	30.6	C	0.72	57.1	m#51.1	C	0.71	72.8	#49.3
	SBT	A	0.43	23.8	81.5	F	1.01	68.0	#252.1	F	1.27	166.5	#216.0
	SBR	A	0.01	0.0	m0.0	A	0.02	0.1	m0.0	A	0.03	0.1	0.0
	Overall	A	0.59	30.7	-	D	0.89	49.2	-	E	1.00	80.5	-
Strandherd Drive at Access #1 <i>Unsignalized</i>	EBR	B	0.05	11.5	1.5	C	0.23	18.9	6.8	C	0.20	17.0	5.3
	NBT	-	-	-	-	-	-	-	-	-	-	-	-
	SBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	Overall	A	-	0.2	-	A	-	0.5	-	A	-	0.4	-
Strandherd Drive at Access #2 <i>Signalized</i>	EBL	A	0.52	62.9	33.0	B	0.63	55.3	50.9	B	0.67	53.4	57.7
	EBR	A	0.30	16.3	12.1	A	0.41	9.1	15.1	A	0.38	8.1	14.5
	NBL	A	0.57	60.1	m38.5	C	0.78	67.2	m74.5	C	0.77	60.5	74.5
	NBT	A	0.49	5.7	78.9	A	0.53	10.9	101.3	A	0.53	10.9	112.4
	SBT	A	0.39	12.5	70.5	D	0.89	22.8	m#223.5	D	0.90	22.7	m#168.8
	SBR	A	0.05	6.6	7.9	A	0.17	9.5	m8.0	A	0.19	4.1	m2.2
	Overall	A	0.49	12.4	-	D	0.85	21.7	-	D	0.86	21.7	-
Strandherd Drive at Dealership Drive/Kennevale Drive <i>Signalized</i>	EBL	A	0.20	46.6	13.9	A	0.53	54.2	37.5	A	0.40	47.3	23.5
	EBT	A	0.02	40.4	4.2	A	0.07	39.4	9.6	A	0.03	35.5	5.2
	EBR	A	0.07	4.1	3.2	A	0.19	16.1	13.9	A	0.10	6.2	4.9
	WBL	A	0.47	55.7	28.2	C	0.71	64.7	49.6	A	0.51	51.0	30.5
	WBT/R	A	0.34	18.2	16.2	A	0.23	15.6	13.4	A	0.33	14.9	15.3
	NBL	A	0.33	57.0	15.6	A	0.24	56.4	11.5	A	0.28	52.7	12.3
	NBT/R	B	0.62	15.8	175.8	C	0.72	22.4	#208.5	C	0.71	19.7	#180.1
	SBL	A	0.30	82.2	18.5	A	0.43	70.3	m17.5	A	0.42	59.3	#24.5
	SBT	A	0.36	4.0	11.5	C	0.77	9.4	#86.4	B	0.65	17.6	158.7
	SBR	A	0.07	0.2	0.3	A	0.05	0.1	m0.0	A	0.03	0.1	0.0
	Overall	B	0.61	15.5	-	C	0.75	20.0	-	B	0.69	21.1	-
Systemhouse Street at Citigate Drive <i>Unsignalized</i>	EBL/T	B	0.01	10.2	0.3	B	0.05	11.4	1.1	B	0.04	11.1	0.9
	WBT/R	A	0.14	9.7	3.8	A	0.15	9.5	4.1	A	0.17	9.9	4.6
	SBL/R	A	0.03	7.3	0.8	A	0.08	7.4	1.9	A	0.07	7.5	1.7
	Overall	A	-	9.1	-	A	-	8.8	-	A	-	9.1	-
Systemhouse Street at Costco Access/Access #3 <i>Unsignalized</i>	EBL	A	0.01	8.0	0.0	A	0.02	8.6	0.0	A	0.02	9.1	0.8
	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	WBL/T	A	0.00	7.3	0.0	A	0.01	7.5	0.0	A	0.01	7.5	0.0
	WBR	A	-	0.0	-	A	-	0.0	-	A	-	0.0	-
	NB	B	0.04	10.6	0.8	B	0.13	13.0	3.8	B	0.15	14.2	3.8
	SB	B	0.14	10.4	3.8	C	0.54	16.8	24.0	C	0.60	18.3	30.0
	Overall	A	-	3.1	-	A	-	6.9	-	A	-	7.0	-

Notes:

Saturation flow rate of 1800 veh/h/lane
PHF = 1.00

m = metered queue
= queue exceeds storage or mid-block length

At the intersection of Strandherd Drive at Fallowfield Road/Citigate Drive, the southbound through movement may exhibit extended queues during the AM peak hour, in addition to the capacity issues and queueing concerns identified in the 2028 future background conditions.

At the intersection of Strandherd Drive at CrossKeys Place/Helene-Campbell Road, the northbound through movement may exhibit extended queues during all peak hours, in addition to the queueing concerns identified in the 2028 future background conditions.

At the intersection of Strandherd Drive at Systemhouse Street/Maravista Drive, the southbound through movement is expected to be over theoretical capacity during the PM peak hour and the overall intersection is expected to operate at the theoretical capacity during the Saturday peak hour, in addition to the capacity issues and queueing concerns identified in the 2028 future background conditions.

At the intersection of Strandherd Drive at Access #2, the southbound through movement may exhibit extended queues during the PM and Saturday peak hours. This is consistent with the operational conditions observed at adjacent intersections along the corridor due to long pedestrian crossings. Given the presence of a median refuge, two-stage pedestrian crossings would be accommodated at this intersection, reducing the 95th percentile queue on the southbound through movement from 223.5 metres to 45.4 metres during the PM peak hour and from 168.8 metres to 143.8 metres during the Saturday peak hour.

At the intersection of Strandherd Drive at Dealership Drive/Kennevale Drive, the northbound through/right movement may exhibit extended queues during the PM and Saturday peak hours, and the southbound through movement may exhibit extended queues during the PM peak hour, in addition to the queueing concerns identified in the 2028 future background conditions.

The intersections of Strandherd Drive at Access #1, Systemhouse Street at Citigate Drive, and Systemhouse Street at Costco Access/Access #3 are anticipated to operate well at the 2028 future total conditions.

13.3.2 2033 Future Total Intersection Operations

As noted in the 2033 future background conditions, the interim Highway 416 at Barnsdale Road interchange has been assumed to be in place by 2033, resulting in a 10% reduction in the existing traffic volumes to/from Highway 416 along Strandherd Drive.

The 2033 future total intersection volumes are illustrated in Figure 17 and the intersection operations are summarized below in Table 20. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services, and average delay for unsignalized intersections. Given the configuration, the intersection of Systemhouse Street at Citigate Drive cannot be analyzed using HCM 2010; therefore, HCM 2000 was used for the analysis of this intersection. The synchro worksheets have been provided in Appendix M.

Figure 17: 2033 Future Total Volumes

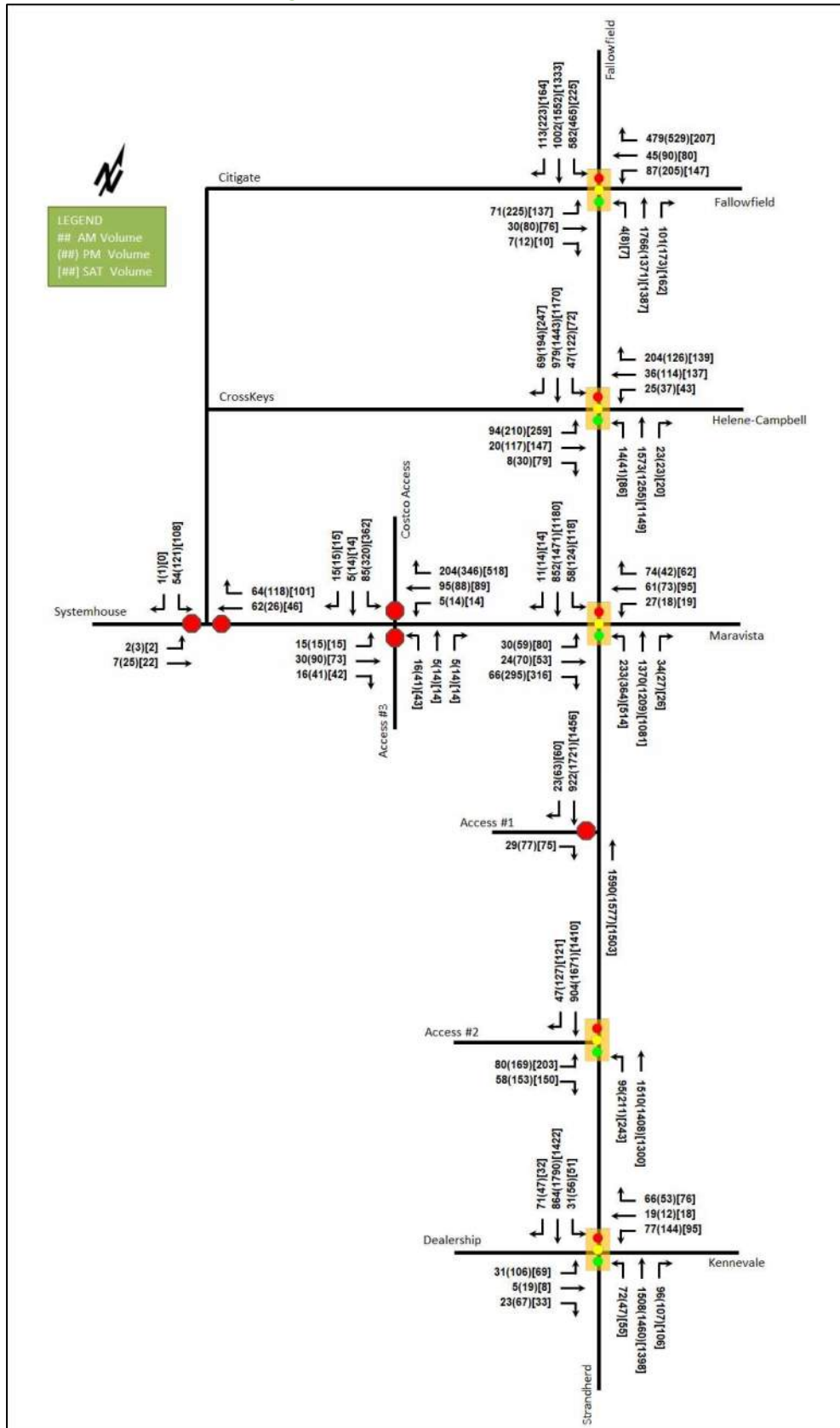


Table 20: 2033 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Strandherd Drive at Fallowfield Road/Citigate Drive <i>Signalized</i>	EBL	A	0.40	60.9	16.1	A	0.41	50.0	#57.1	C	0.74	64.6	#35.3
	EBT/R	A	0.31	50.9	17.4	A	0.38	44.4	26.1	A	0.40	39.2	30.7
	WBL	A	0.27	41.4	28.4	A	0.52	47.5	#122.1	A	0.57	47.1	42.6
	WBT	A	0.18	38.7	15.7	A	0.26	38.0	26.9	A	0.27	30.6	21.6
	WBR	D	0.86	26.2	55.4	D	0.90	33.1	77.4	A	0.49	8.2	14.5
	NBL	A	0.07	57.2	4.6	A	0.12	74.6	m2.9	A	0.07	43.1	6.0
	NBT	F	1.88	429.0	#414.5	F	1.89	426.3	#299.0	F	1.43	225.6	#282.7
	NBR	A	0.17	0.6	0.0	A	0.38	7.7	m7.3	A	0.30	5.8	14.1
	SBL	C	0.76	50.2	#112.8	D	0.88	68.6	#92.5	A	0.57	42.4	36.8
	SBT	A	0.55	21.3	#165.8	F	1.11	91.8	#315.0	D	0.87	29.4	#257.3
	SBR	A	0.12	2.6	8.1	A	0.22	4.6	19.0	A	0.20	3.4	12.6
	Overall	F	1.45	194.3	-	F	1.38	163.8	-	F	1.18	98.3	-
Strandherd Drive at CrossKeys Place/Helene-Campbell Road <i>Signalized</i>	EBL	A	0.51	57.7	32.2	C	0.72	53.8	63.7	D	0.81	56.2	71.9
	EBT	A	0.08	42.3	9.6	A	0.27	35.5	33.5	A	0.31	31.5	36.2
	EBR	A	0.03	0.1	0.0	A	0.07	0.3	0.0	A	0.17	2.9	5.6
	WBL	A	0.13	43.9	11.2	A	0.13	31.8	13.8	A	0.14	27.8	13.8
	WBT	A	0.14	44.2	14.5	A	0.27	35.3	32.7	A	0.29	31.1	33.8
	WBR	A	0.58	19.4	28.3	A	0.28	6.3	12.7	A	0.28	5.6	12.2
	NBL	A	0.09	74.7	m3.0	A	0.22	60.4	m4.2	A	0.38	53.3	17.0
	NBT	C	0.76	12.1	#276.4	D	0.85	34.9	#213.6	C	0.73	30.1	#172.1
	NBR	A	0.02	0.0	m0.0	A	0.03	1.9	m0.0	A	0.03	0.1	0.0
	SBL	A	0.45	71.9	24.4	C	0.72	66.9	m29.1	A	0.53	62.4	#33.0
	SBT	A	0.45	12.8	123.8	D	0.82	15.5	m#76.5	C	0.76	30.5	#183.7
	SBR	A	0.07	1.7	4.1	A	0.23	1.4	m1.9	A	0.30	4.0	16.1
	Overall	C	0.73	15.8	-	D	0.82	26.5	-	C	0.75	29.9	-
Strandherd Drive at Systemhouse Street/Maravista Drive <i>Signalized</i>	EBL	A	0.24	63.8	9.0	A	0.39	63.1	14.0	A	0.43	59.8	17.0
	EBT/R	A	0.35	18.7	16.6	C	0.73	26.4	62.1	A	0.56	9.9	37.0
	WBL	A	0.33	70.5	16.8	A	0.23	62.1	11.8	A	0.21	57.2	11.8
	WBT/R	A	0.53	37.8	32.4	A	0.35	31.6	28.5	A	0.37	27.3	35.6
	NBL	B	0.69	66.9	44.0	B	0.66	56.1	#85.9	C	0.77	61.1	#118.2
	NBT/R	C	0.73	27.2	#293.8	D	0.87	40.1	#239.2	E	0.91	46.0	#218.1
	SBL	A	0.48	71.8	30.7	C	0.72	55.5	m#39.8	C	0.71	72.8	#49.3
	SBT	A	0.50	25.0	97.5	F	1.18	123.5	#308.8	F	1.37	208.6	#238.2
	SBR	A	0.01	0.0	m0.0	A	0.02	0.1	m0.0	A	0.03	0.1	0.0
	Overall	B	0.70	31.7	-	F	1.01	73.5	-	F	1.07	98.6	-
Strandherd Drive at Access #1 <i>Unsignalized</i>	EBR	B	0.05	12.1	1.5	C	0.27	22.2	8.3	C	0.21	18.1	6.0
	NBT	-	-	-	-	-	-	-	-	-	-	-	-
	SBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	Overall	A	-	0.1	-	A	-	0.5	-	A	-	0.4	-
Strandherd Drive at Access #2 <i>Signalized</i>	EBL	A	0.52	62.9	33.0	B	0.63	55.3	50.9	B	0.67	53.4	57.7
	EBR	A	0.30	16.3	12.1	A	0.41	9.1	15.1	A	0.38	8.1	14.5
	NBL	A	0.57	59.7	m33.4	C	0.78	71.5	m67.9	C	0.77	60.5	74.5
	NBT	A	0.58	6.2	84.4	A	0.59	9.6	88.4	A	0.57	11.5	126.4
	SBT	A	0.45	13.2	83.5	F	1.01	26.8	m#227.3	E	0.96	19.9	m#186.6
	SBR	A	0.05	7.1	8.2	A	0.17	2.5	m1.6	A	0.19	4.4	m6.4
	Overall	A	0.58	12.4	-	E	0.96	22.6	-	D	0.90	20.5	-
Strandherd Drive at Dealership Drive/Kennevale Drive <i>Signalized</i>	EBL	A	0.20	46.6	13.9	A	0.53	54.2	37.5	A	0.40	47.3	23.5
	EBT	A	0.02	40.4	4.2	A	0.07	39.4	9.6	A	0.03	35.5	5.2
	EBR	A	0.07	4.1	3.2	A	0.19	16.1	13.9	A	0.10	6.2	4.9
	WBL	A	0.47	55.7	28.2	C	0.71	64.7	49.6	A	0.51	51.0	30.5
	WBT/R	A	0.34	18.2	16.2	A	0.23	15.6	13.4	A	0.33	14.9	15.3
	NBL	A	0.33	57.0	15.6	A	0.24	56.4	11.5	A	0.28	52.7	12.3
	NBT/R	C	0.73	18.5	#249.3	C	0.80	25.3	#250.7	C	0.75	21.1	#211.5
	SBL	A	0.30	79.8	m17.4	A	0.43	62.2	m15.4	A	0.42	59.3	#24.5
	SBT	A	0.42	4.4	14.4	D	0.87	17.5	m#124.2	B	0.69	18.7	#180.3
	SBR	A	0.07	0.2	0.1	A	0.05	0.4	m0.1	A	0.03	0.1	0.0
	Overall	C	0.71	16.7	-	D	0.84	24.3	-	C	0.73	22.1	-
Systemhouse Street at Citigate Drive <i>Unsignalized</i>	EBL/T	B	0.01	10.2	0.3	B	0.05	11.4	1.1	B	0.04	11.1	0.9
	WBT/R	A	0.14	9.7	3.8	A	0.15	9.5	4.1	A	0.17	9.9	4.6
	SBL/R	A	0.03	7.3	0.8	A	0.08	7.4	1.9	A	0.07	7.5	1.7
	Overall	A	-	9.1	-	A	-	8.8	-	A	-	9.1	-
Systemhouse Street at Costco Access/Access #3 <i>Unsignalized</i>	EBL	A	0.01	8.0	0.0	A	0.02	8.6	0.0	A	0.02	9.1	0.8
	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	WBL/T	A	0.00	7.3	0.0	A	0.01	7.5	0.0	A	0.01	7.5	0.0
	WBR	A	-	0.0	-	A	-	0.0	-	A	-	0.0	-
	NB	B	0.04	10.6	0.8	B	0.13	13.0	3.8	B	0.15	14.2	3.8
	SB	B	0.14	10.4	3.8	C	0.54	16.8	24.0	C	0.60	18.3	30.0
	Overall	A	-	3.1	-	A	-	6.9	-	A	-	7.0	-

Notes:

Saturation flow rate of 1800 veh/h/lane
PHF = 1.00

m = metered queue
= queue exceeds storage or mid-block length

During the AM, PM, and Saturday peak hours, the study area intersections at the 2033 future total horizon operate similarly to the 2033 future background conditions, with exception of the intersections of Strandherd Drive at Systemhouse Street/Maravista Drive and Strandherd Drive at Dealership Drive/Kennevale Drive.

At the intersection of Strandherd Drive at Systemhouse Street/Maravista Drive, the overall intersection is expected to operate over theoretical capacity during the PM and Saturday peak hours, in addition to the capacity issues and queuing concerns identified in the 2033 future background conditions.

At the intersection of Strandherd Drive at Dealership Drive/Kennevale Drive, the northbound through movement may exhibit extended queues during the Saturday peak hour and the southbound through movement may exhibit extended queues during the PM and Saturday peak hours, in addition to the capacity issues and queuing concerns identified in the 2033 future background conditions.

At the intersection of Strandherd Drive at Access #2, the southbound through movement is expected to operate over theoretical capacity during the PM peak hour and may exhibit extended queues during the Saturday peak hour. This is consistent with the operational conditions observed at adjacent intersections along the corridor due to long pedestrian crossings. Given the presence of a median refuge, two-stage pedestrian crossings would be accommodated at this intersection, reducing the 95th percentile queue on the southbound through movement from 227.3 metres to 199.7 metres during the PM peak hour and from 186.6 metres to 139.1 metres during the Saturday peak hour and reducing the v/c to below 1.00.

The intersections of Strandherd Drive at Access #1, Systemhouse Street at Citigate Drive, and Systemhouse Street at Costco Access/Access #3 are anticipated to operate well at the 2033 future total conditions.

13.3.3 Intersection MMLOS

Table 21 summarizes the MMLOS analysis for the signalized intersections. All intersections are within “Suburban” area. The MMLOS worksheets have been provided in Appendix G.

Table 21: Study Area Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	ALOS	Target
Strandherd Drive at Fallowfield Road/Citigate Drive	D	C	B	B	C	D/E	F	E
Strandherd Drive at CrossKeys Place/Helene-Campbell Road	D	C	B	B	D	D/E	B	E
Strandherd Drive at Systemhouse Street/Maravista Drive	C	C	B	B	C	D/E	E	E
Strandherd Drive at Dealership Drive/Kennevale Drive	C	C	C	B	D	D/E	B	E
Strandherd Drive at Access #2	B	C	B	B	-	-	E	E

The pedestrian LOS target will not be met at the intersection of Strandherd Drive at Fallowfield Road/Citigate Drive in the existing and future conditions. To meet the pedestrian LOS target, the maximum number of travel lane crossed would need to be reduced to six lanes on the north leg and five on the south leg. Alternatively, a smart channel with raised crossing with a maximum of six travel lanes crossed on the north and south legs would be required.

The pedestrian LOS target will not be met at the intersection of Strandherd Drive at CrossKeys Place/Helene-Campbell Road in the existing and future conditions. To meet the pedestrian LOS target, the maximum number of travel lane crossed would need to be reduced to six lanes on the north and south legs.

The bicycle LOS target will not be met at the intersection of Strandherd Drive at Dealership Drive/Kennevale Drive in the existing and future conditions. To meet the bicycle LOS target, a bike lane on either the east or west leg of the intersection would be required.

13.3.4 Recommended Design Elements

No study area intersection design elements are proposed for the network intersections as part of this study.

14 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposed development includes a total of 122,956 sq. ft of retail spaces comprising a grocery store, a drugstore, three drive-through components, and additional retail spaces
- The proposed access configuration includes a full-movement access on Systemhouse Street opposite of the Costco access, a right-in/right-out access and a new signalized intersection on Strandherd Drive
- The anticipated buildout is 2028

TIA Screening and Exemptions

- The TIA Screening form indicated a full TIA was required due to trip generation, location, and safety triggers
- The exemption review for the TIA did not require new street networks, neighbourhood traffic calming review, transit review, network concept review

Existing Conditions

- Fallowfield Road and Strandherd Drive are arterial roads, and Citigate Drive, Helene-Campbell Road, CrossKeys Place, Systemhouse Street, Maravista Drive, Dealership Drive, and Kennevale Drive are collector roads in the study area
- Sidewalks are provided along both sides of Strandherd Drive, CrossKeys Place, Helene-Campbell Road, Maravista Drive, Dealership Drive, Kennevale Drive, and on the south side of Fallowfield Road west of Citigate Drive for approximately 160 metres, east side of Citigate Drive, and south side of Systemhouse Street and on the north side of the road for approximately 165 metres west of Strandherd Drive
- A multi-use pathway is provided along the west side of Citigate Drive, north side of Systemhouse Street between approximately 165 metres west of Strandherd Drive and Citigate Drive
- The O'Keefe Drain pathway is located west of the development
- Cycletracks are provided on both sides of Strandherd Drive and on the south side of Fallowfield Road west of Citigate Drive for approximately 160 metres
- During the AM, PM, and Saturday peak hours, capacity issues were noted at the intersections Strandherd Drive at Fallowfield Road/Citigate Drive and Strandherd Drive at Systemhouse Street/Maravista Drive
- The collisions observed within the study area may be associated with congested conditions
- Construction activities along Strandherd Drive may also have contributed to the observed collision patterns

Planned Conditions

- Multi-use pathway along Fallowfield Road from Strandherd Drive to Foragers Street is identified as a priority project within the TMP Active Transportation Network
- Median bus rapid transit from Barrhaven Centre Station to Kilbirnie Station, dedicated bus rapid transit from Longfields Drive to Greenbank Road are identified as transit priority projects, and South Transitway from Limebank Station to Borrisokane Road is identified as a needs-based project within the TMP Transit Network
- Realigned Greenbank Road and Widening between Chapman Mills Drive and Cambrian Road and Barnsdale Road/Highway 416 interchange are identified as committed projects within the TMP Road Network
- Fallowfield Road Urbanization between Greenbank Road and Strandherd Drive, Realigned Greenbank Road from Cambrian Road to Barnsdale Road, and Borrisokane Road Urbanization from Strandherd Drive to Cambrian Road are identified as road priority projects within the TMP Road Network
- Fallowfield Road Widening from two to four lanes between Old Richmond Road and Moodie Drive and Barnsdale Road Widening from two to four lanes between Highway 416 and Realigned Greenbank Road Extension are identified as needs-based projects within the TMP Road Network

Development Generated Travel Demand

- The proposed development is forecasted produce 345 two-way people trips during the AM peak hour, 1139 two-way people trips during the PM peak hour, and 1194 two-way people trips during the Saturday peak hour
- Of the forecasted people trips, 210 two-way trips will be vehicle trips during the AM peak hour, 543 two-way trips will be vehicle trips during the PM peak hour, and 562 two-way trips will be vehicle trips during the Saturday peak hour
- Of the forecasted trips, 30% are anticipated to travel north, 45% to the east, and 20% to the west, and 5% to the south

Development Design

- The proposed development consists of 122,956 sq. ft retail space with surface vehicle parking located surrounding the buildings
- Bicycle parking spaces are located in surface racks adjacent to the building entrances of Buildings CRU1, CRU2, CRU 4, CRU7, CRU9, and CRU 10
- Sidewalks are proposed throughout the site, providing continuous pedestrian connectivity between the building entrances, parking areas, and the internal drive aisles
- Pedestrian crossings are proposed throughout the site at locations of major pedestrian desire lines
- The site connects to the adjacent sidewalks and cycletracks along Strandherd Drive and an existing sidewalk along Systemhouse Street
- Bus stops are located on both sides of Systemhouse Street approximately 38 metres west of the site access on Systemhouse Street
- Access #2, Access #3, and internal driveways are designated as fire routes and the proposed fire route accommodates fire trucks, allowing access to and circulate throughout the site
- The site can accommodate both loading trucks and garbage trucks

Parking

- The site is proposed to include a total of 497 vehicle parking spaces and 44 bicycle parking spaces
- The proposed vehicle and bicycle parking supply meets the requirements by the legacy Zoning By-Law (2008-250)

Boundary Street Design

- Strandherd Drive will meet the pedestrian and bicycle LOS targets in the existing and future conditions
- Systemhouse Street will not meet the bicycle LOS target in the existing and future conditions
- To meet the bicycle LOS target, either 1.5-1.79-metre or 1.8-metre contraflow painted or physically separated bike lane with a 1.0-metre boulevard or a 1.8-1.99-metre bike lane, would be required
- Systemhouse Street will meet the pedestrian and transit LOS targets in the existing and future conditions

TDM

- Supportive TDM measures to be included within the proposed development should include:
 - Display local area maps with walking/cycling access routes and key destinations at major entrances
 - Display relevant transit schedules and route maps at entrances
 - Provide transit incentives to encourage commuters to use transit
 - Provide multimodal travel option information package to new employees

Background Conditions

- The interim Highway 416 at Barnsdale Road interchange is expected to be implemented by 2029, resulting in changes to the existing travel patterns as traffic shifts to use the interchange
- A 10% reduction has been applied at the intersection of Strandherd Drive at Borrisokane Road/Tartan Drive, and the resulting volumes have been carried through the study area network per Barrhaven South Future Neighbourhood Phase 3 Transportation Report
- A 1% compound annual growth rate has been applied to the mainline traffic along Strandherd Drive to account for the background traffic growth within the study area network along with explicit background development volumes
- During the AM, PM, and Saturday peak hours, the study area intersections at the 2028 future background horizon operate similarly to the existing conditions, with exception of the intersection of Strandherd Drive at CrossKeys Place/Helene-Campbell Road
- During the AM, PM, and Saturday peak hours, additional capacity issues were noted at the intersection of Strandherd Drive at Systemhouse Street/Maravista Drive at the 2033 future background conditions

Transit

- Site traffic is anticipated to have a negligible impact on transit movements throughout the study area
- Minor increase in delay for transit movements, resulting in an increase of less than 9.0 seconds, are noted at the intersections of Strandherd Drive at Fallowfield Road/Citigate Drive, Strandherd Drive at Systemhouse Street/Maravista Drive, and Strandherd Drive at Dealership Drive/Kennevale Drive

Intersection Design

- Access #1 is proposed to be 8.0-metre-wide at its typical width and 18.0-metre-wide at the curb line with corner radius of 5.0 metres on both sides

- Access #3 is proposed to be 9.0-metre-wide at its typical width and 24.0-metre-wide at the curb line with corner radius of 6.0 metres on the west side and 9.0 metres on the east side
- The proposed accesses meet the offset requirement from the adjacent property line, from the adjacent road right-of-way, and from any other vehicular access from the Private Approach By-Law
- Throat lengths are considered adequate, and corner clearance meets the TAC suggested minimum values
- No change to the existing signalized control is recommended for the network intersections
- In the 2028 future total conditions, the intersections of Strandherd Drive at Access #2 falls within the Case 2 signal warrant category for minimum vehicular volume, indicating that a traffic signal might be warranted
- Given the operational requirements of the access, including long pedestrian crossing distance across Strandherd Drive and the improved pedestrian and cyclist connectivity that a new signalized intersection would provide to the community east of Strandherd Drive, the intersection of Strandherd Drive at Access #2 is recommended to be signalized
- No additional signal warrants were met in 2033 future total conditions
- The intersection of Systemhouse Street at Costco Access/Access #3 and the right-in/right-out access (Access #1) on Strandherd Drive are proposed to be minor stop-controlled on the minor approaches
- During the AM, PM, and Saturday peak hours, additional capacity issues were noted at the intersection of Strandherd Drive at Systemhouse Street/Maravista Drive at the 2028 future total conditions compared to the corresponding future background conditions
- Given the presence of a median refuge on Strandherd Drive at Access #2, two-stage pedestrian crossings would be accommodated, reducing the 95th percentile queue on the southbound through movement
- During the AM, PM, and Saturday peak hours, the study area intersections at the 2033 future total horizon operate similarly to the 2033 future background conditions, with exception of the intersections of Strandherd Drive at Systemhouse Street/Maravista Drive and Strandherd Drive at Dealership Drive/Kennevale Drive
- The pedestrian LOS target will not be met at the intersection of Strandherd Drive at Fallowfield Road/Citigate Drive in the existing and future conditions
- To meet the pedestrian LOS target, the maximum number of travel lane crossed would need to be reduced to six lanes on the north leg and five on the south leg. Alternatively, a smart channel with raised crossing with a maximum of six travel lanes crossed on the north and south legs would be required
- The pedestrian LOS target will not be met at the intersection of Strandherd Drive at CrossKeys Place/Helene-Campbell Road in the existing and future conditions
- To meet the pedestrian LOS target, the maximum number of travel lane crossed would need to be reduced to six lanes on the north and south legs.
- The bicycle LOS target will not be met at the intersection of Strandherd Drive at Dealership Drive/Kennevale Drive in the existing and future conditions
- To meet the bicycle LOS target, a bike lane on either the east or west leg of the intersection would be required

15 Conclusion

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

Prepared By:

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Appendix A

TIA Screening Form and PM Certification Form

City of Ottawa 2023 Revisions to 2017 TIA Guidelines
Step 1 - Screening Form

Date: 2026-08-20
Project Number: 2026-100
Project Reference: 4175 Strandherd Drive

1.1 Description of Proposed Development		
Municipal Address	4175 Strandherd Drive	
Description of Location	West of Strandherd Drive, between Systemhouse Street and Dealership Drive	
Land Use Classification	Mixed Industrial Zone (IM[3033] H(18))	
Development Size	A total of 122,956 sq. ft of retail spaces comprising a grocery store, a drugstore, three drive-through components, and additional retail spaces	
Accesses	a full-movement access on Systemhouse Street opposite of the Costco access, a right-in/right-out access and a new signalized intersection on Strandherd Drive	
Phase of Development	Single	
Buildout Year	2028	
TIA Requirement	Full TIA Required	
1.2 Trip Generation Trigger		
Land Use Type	Shopping Plaza with Supermarket & Fast-Food Restaurant with Drive-Through Window	
Development Size	122,956	G.F.A.
Trip Generation Trigger	Yes	
1.3 Location Triggers		
Does the development propose a new driveway to a boundary street that is designated as part of the Transit Priority Network, Rapid Transit network or Cross-Town Bikeways?	Yes	
Is the development in a Hub, a Protected Major Transit Station Area (PMTSA), or a Design Priority Area (DPA)?	No	
Location Trigger	Yes	
1.4. Safety Triggers		
Are posted speed limits on a boundary street 80 km/hr or greater?	Yes	
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No	
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	Yes	
Is the proposed driveway within auxiliary lanes of an intersection?	No	
Does the proposed driveway make use of an existing median break that serves an existing site?	Yes	
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	Yes	
Does the development include a drive-thru facility?	Yes	
Safety Trigger	Yes	



Certification Form for TIA Study PM

TIA Plan Reports

On April 14, 2022, the Province's Bill 109 received Royal Assent providing legislative direction to implement the More Homes for Everyone Act, 2022 aiming to increase the supply of a range of housing options to make housing more affordable. Revisions have been made to the TIA guidelines to comply with Bill 109 and streamline the process for applicants and staff.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that they meet the four criteria listed below.

CERTIFICATION



I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines; (Update effective July 2023)



I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;



I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and



I am either a licensed or registered¹ professional in good standing, whose field of expertise



is either transportation engineering



or transportation planning.

¹ License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

Dated at Ottawa this 17 day of August, 20 23.
(City)

Name : Andrew Harte

Professional title: Senior Transportation Engineer / Vice-President Ottawa



Signature of individual certifier that s/he/they meet the above criteria

Office Contact Information (Please Print)

Address: 6 Plaza Court

City / Postal Code: Ottawa, K2H 7W1

Telephone / Extension: 613-697-3797

Email Address: andrew.harte@cghtransportation.com

Stamp



Revision Date: June 2023

Appendix B

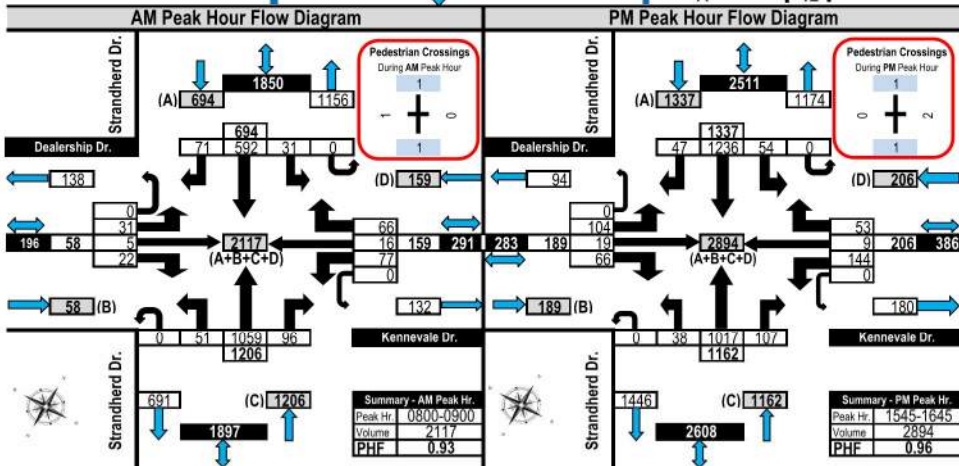
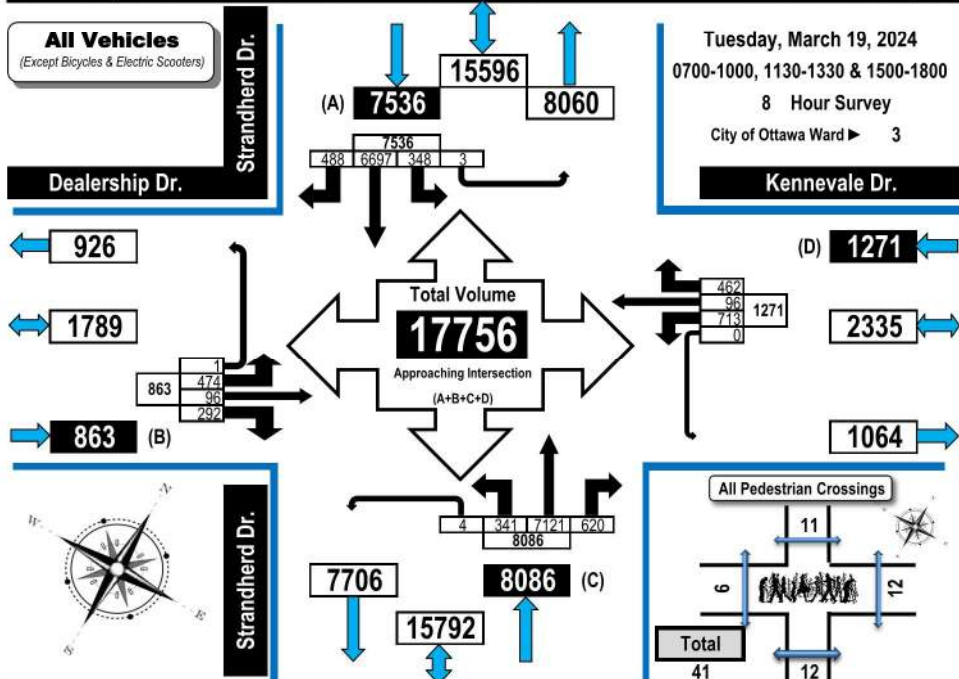
Turning Movement Counts



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



Dealership Drive/Kennevale Drive & Strandherd Drive Barrhaven West, ON



Printed on: 3/27/2024

Prepared by: J. Mousseau

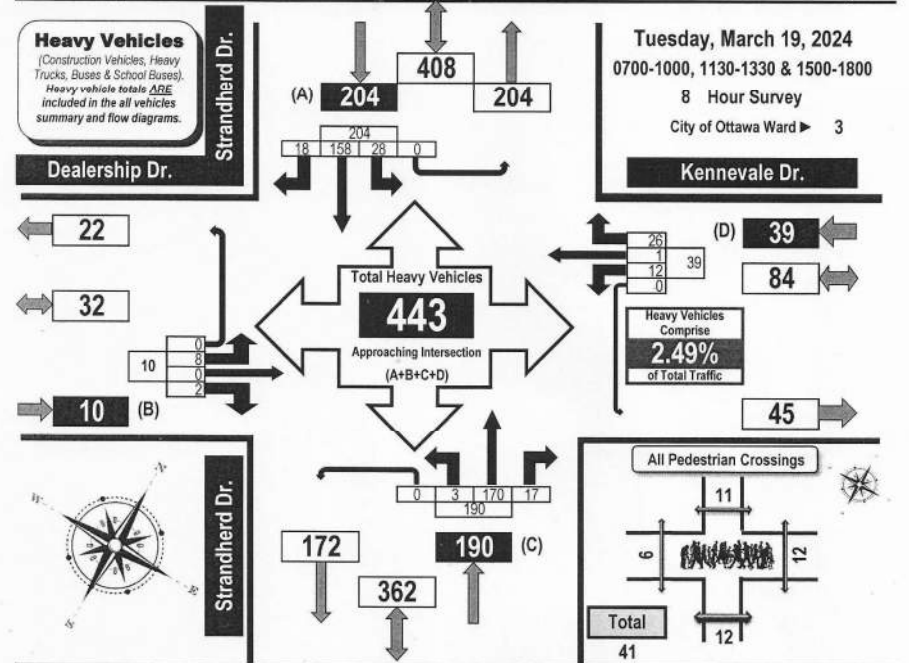
Flow Diagrams: AM PM Peak



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



Dealership Drive/Kennevale Drive & Strandherd Drive Barrhaven West, ON



Time Period	Dealership Dr. Eastbound				Kennevale Dr. Westbound				Strandherd Dr. Northbound				Strandherd Dr. Southbound				SB Tot	GR Tot
	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT		
0700-0800	0	0	0	0	0	1	0	2	0	3	0	16	0	0	0	16	5	71
0800-0900	1	0	0	0	1	2	0	1	0	3	0	16	7	0	0	23	2	64
0900-1000	1	0	0	0	1	0	0	4	0	4	0	42	8	0	0	50	7	86
1130-1230	3	0	0	0	3	0	1	6	0	7	2	22	0	0	0	24	4	57
1230-1330	0	0	0	0	0	0	0	5	0	5	0	19	1	0	0	20	3	52
1500-1600	2	0	2	0	4	3	0	3	0	6	1	22	0	0	0	23	4	55
1600-1700	1	0	0	0	1	6	0	2	0	8	0	26	0	0	0	26	1	41
1700-1800	0	0	0	0	0	0	0	3	0	3	0	7	1	0	0	8	2	17
Totals	8	0	2	0	10	12	1	26	0	39	3	170	17	0	0	190	28	443

Comments:

OC Transpo, Para Transpo and school buses comprise 30.93% of the heavy vehicle traffic.

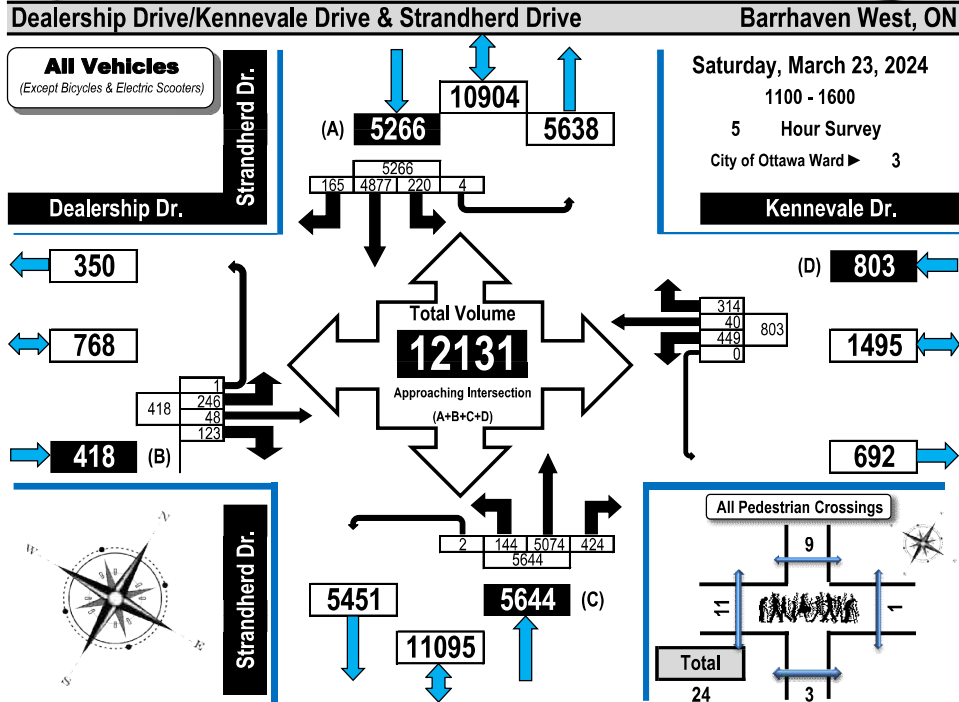
Printed on: 3/27/2024

Prepared by: J. Mousseau

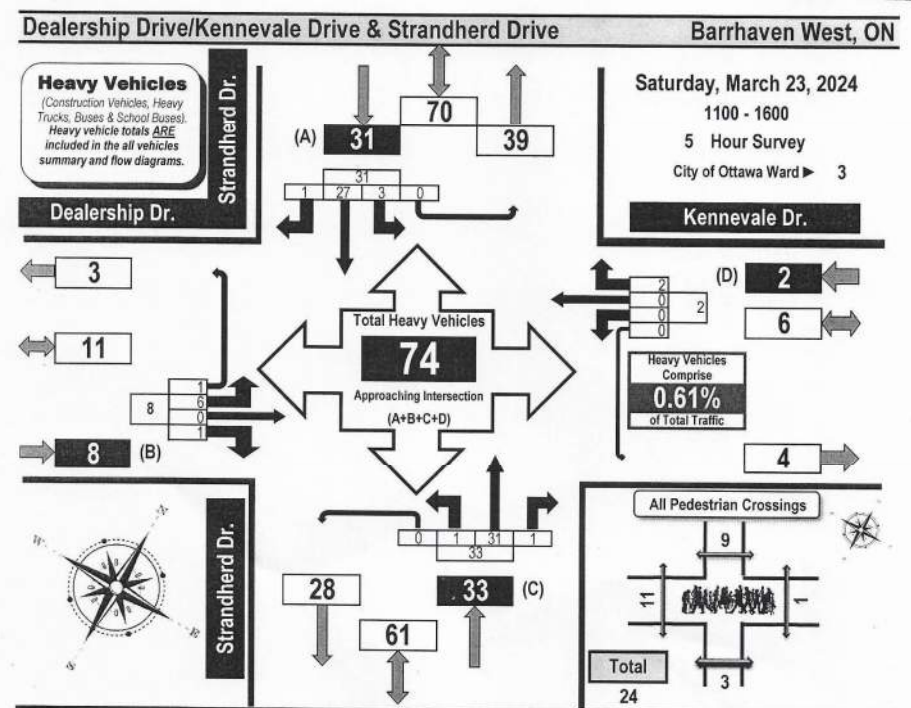
Summary: Heavy Vehicles



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



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



Time Period	Dealership Dr.				Kennevale Dr.				Strandherd Dr.				Strandherd Dr.				SB Tot	GR Tot
	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT		
1100-1200	0	0	0	0	0	0	0	0	0	0	0	0	7	0	4	1	0	12
1200-1300	1	0	1	0	2	0	0	0	0	6	0	0	6	0	6	0	0	14
1300-1400	2	0	0	0	2	0	0	1	0	1	1	10	11	1	6	0	0	21
1400-1500	1	0	0	0	1	0	0	0	0	0	2	0	2	0	4	0	0	7
1500-1600	2	0	0	1	3	0	0	1	0	1	0	7	7	2	7	0	0	20
Totals	6	0	1	1	8	0	0	2	0	2	1	31	33	3	27	1	0	74

Comments:

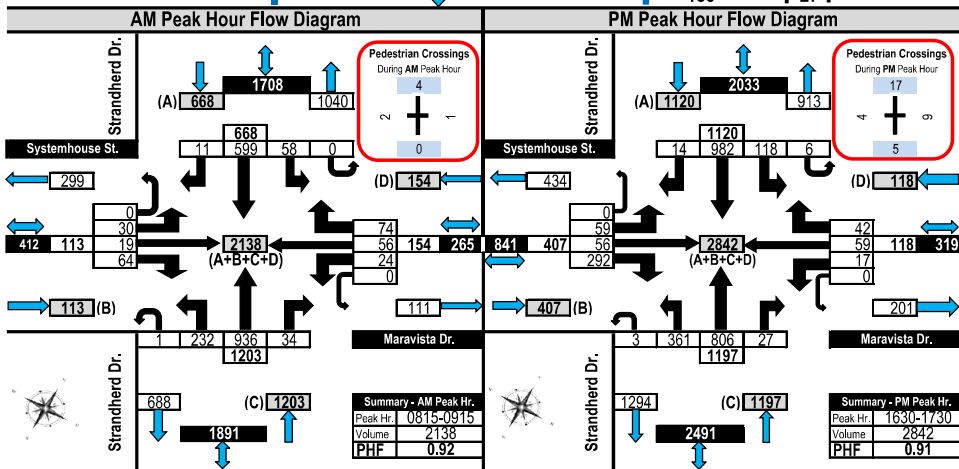
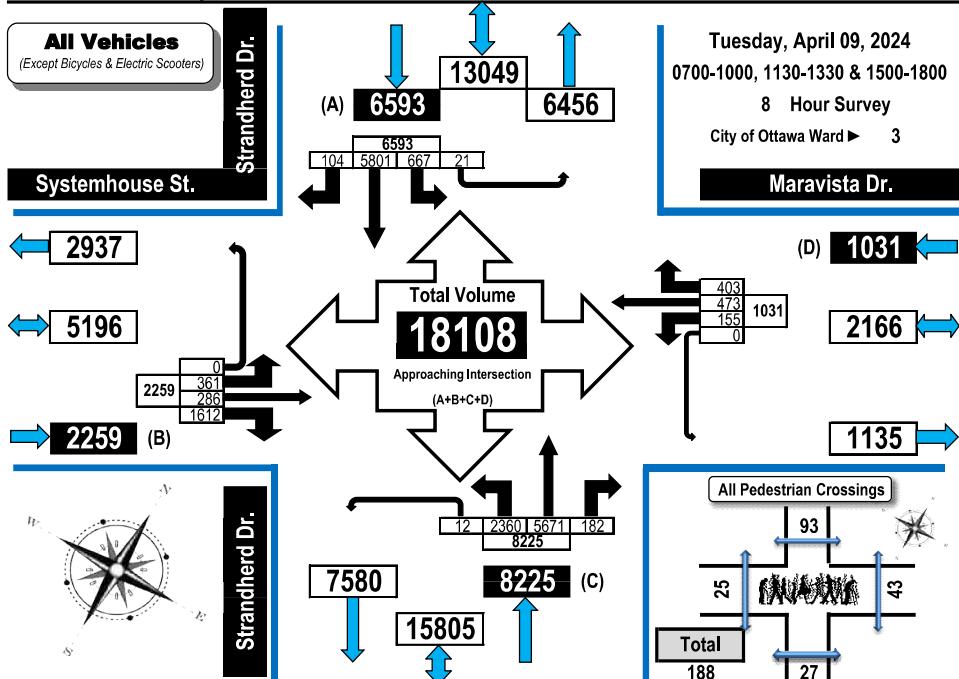
OC Transpo and Para Transpo buses comprise 31.08% of the heavy vehicle traffic.



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



Maravista Drive/Systemhouse Street & Strandherd Drive Barrhaven West, ON



Printed on: 4/12/2024

Prepared by: J. Mousseau

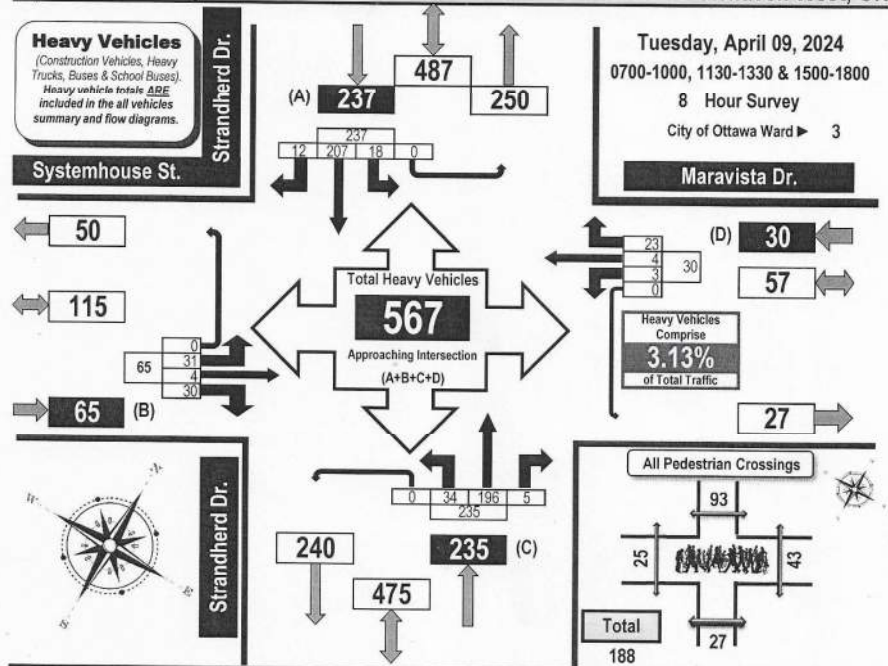
Flow Diagrams: AM PM Peak



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



Maravista Drive/Systemhouse Street & Strandherd Drive Barrhaven West, ON



Time Period	Systemhouse St.					Maravista Dr.					Strandherd Dr.					Strandherd Dr.					SB Tot	GR Tot
	Eastbound					Westbound					Northbound					Southbound						
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	4	1	2	0	7	0	0	3	0	3	5	15	0	0	20	0	51	2	0	53	83	
0800-0900	8	0	5	0	13	0	1	4	0	5	5	18	0	0	23	4	31	2	0	37	78	
0900-1000	4	0	3	0	7	0	0	3	0	3	5	34	1	0	40	3	40	3	0	46	96	
1130-1230	3	0	3	0	6	1	2	3	0	6	8	19	0	0	27	3	27	1	0	31	70	
1230-1330	4	0	7	0	11	1	1	2	0	4	5	22	1	0	28	2	25	0	0	27	70	
1500-1600	3	3	4	0	10	1	0	3	0	4	1	31	2	0	34	2	21	2	0	25	73	
1600-1700	2	0	2	0	4	0	0	3	0	3	2	38	1	0	41	2	7	1	0	10	58	
1700-1800	3	0	4	0	7	0	0	2	0	2	3	19	0	0	22	2	5	1	0	8	39	
Totals	31	4	30	0	65	3	4	23	0	30	34	196	5	0	235	18	207	12	0	237	567	

Comments:

OC Transpo and Para Transpo buses, private buses and school buses comprise 34.39% of the heavy vehicle traffic.

Printed on: 4/10/2024

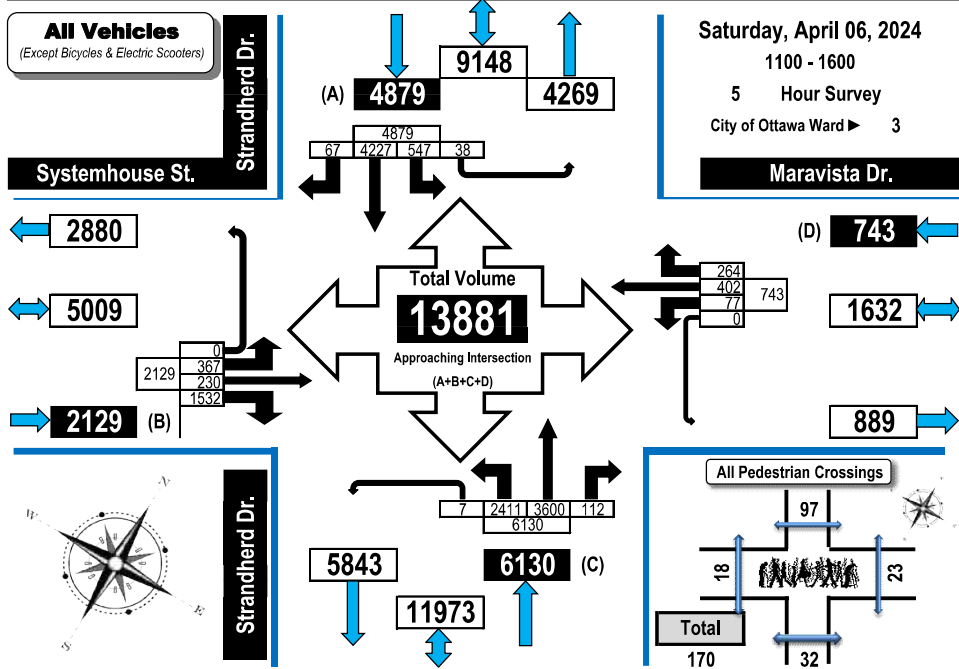
Prepared by: thetrafficsspecialist@gmail.com

Summary: Heavy Vehicles

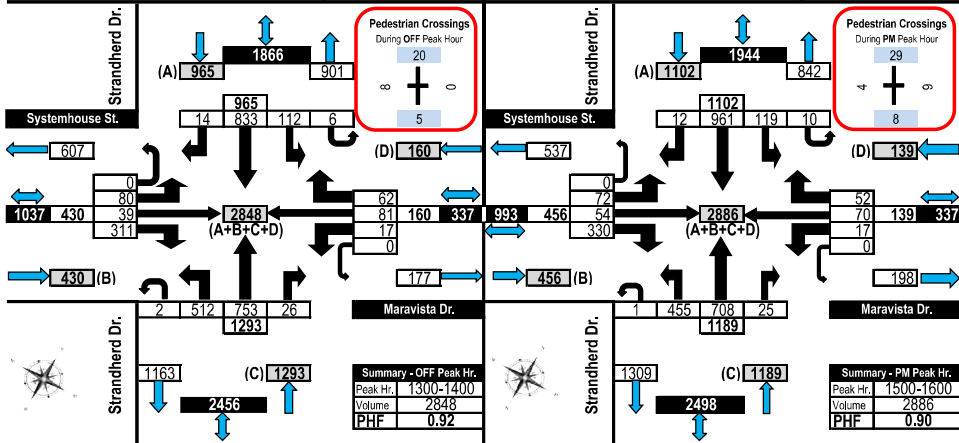
Turning Movement Count Summary, OFF and PM Peak Hour Flow Diagrams All Vehicles Except Bicycles



Maravista Drive/Systemhouse Street & Strandherd Drive Barrhaven West, ON



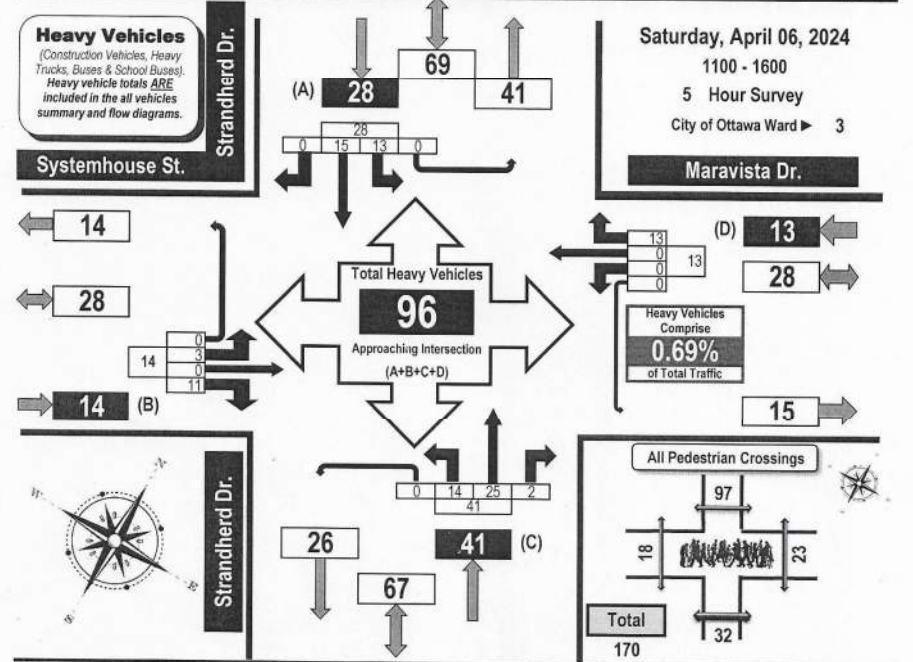
Off Peak Hour Flow Diagram PM Peak Hour Flow Diagram



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



Maravista Drive/Systemhouse Street & Strandherd Drive Barrhaven West, ON



Time Period	Systemhouse St.					Maravista Dr.					Strandherd Dr.					Strandherd Dr.					
	Eastbound					Westbound					Northbound					Southbound					
	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
1100-1200	0	0	3	0	3	0	0	2	0	2	3	9	0	0	12	2	4	0	0	6	23
1200-1300	0	0	3	0	3	0	0	2	0	2	3	4	1	0	8	3	3	0	0	6	19
1300-1400	1	0	2	0	3	0	0	4	0	4	3	5	0	0	8	2	4	0	0	6	21
1400-1500	1	0	2	0	3	0	0	3	0	3	3	3	0	0	6	4	3	0	0	7	19
1500-1600	1	0	1	0	2	0	0	2	0	2	2	4	1	0	7	2	1	0	0	3	14
Totals	3	0	11	0	14	0	0	13	0	13	14	25	2	0	41	13	15	0	0	28	96

Comments:

OC Transpo and Para Transpo buses comprise 45.83% of the heavy vehicle traffic.



Peak Hour Diagram

Specified Period

From: 07:00:00

To: 10:00:00

One Hour Peak

From: 07:45:00

To: 08:45:00

Intersection: Strandherd Dr & Citigate Dr - Fallowfield Rd
Site Code: 2436800001
Count Date: Sep 17, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Strandherd Dr runs E/W

North Approach

	Out	In	Total
	514	556	1070
	19	33	52
	0	0	0
Totals	533	589	1122

Fallowfield Rd

	0	0	0	0
	9	7	3	0
	440	26	48	0
Totals	449	33	51	0

East Approach

	Out	In	Total
	1369	778	2147
	69	65	134
	0	0	0
Totals	1438	843	2281

Strandherd Dr

	Out	In	Total
	0	0	0
	0	27	503
	0	59	728
	0	12	79
Totals	0	530	787

Peds: 1



Peds: 0

Strandherd Dr

	Out	In	Total
	0	0	0
	42	41	1
	1394	1327	67
	2	1	1
Totals	0	42	1394

West Approach

	Out	In	Total
	1310	1812	3122
	98	84	182
	0	0	0
Totals	1408	1896	3304

	53	17	5	0
	45	12	2	0
	8	5	3	0
	0	0	0	0
Totals	53	17	5	0

South Approach

	Out	In	Total
	59	106	165
	16	20	36
	0	0	0
Totals	75	126	201

Citigate Dr

- Cars

- Trucks

- Bicycles

Comments



Peak Hour Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Intersection: Strandherd Dr & Citigate Dr - Fallowfield Rd
Site Code: 2436800001
Count Date: Sep 17, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Strandherd Dr runs E/W

North Approach

	Out	In	Total
	639	557	1196
	22	11	33
	0	0	0
Totals	661	568	1229

Fallowfield Rd

	0	0	0	0
	18	4	0	0
	461	56	122	0
Totals	479	60	122	0

East Approach

	Out	In	Total
	1091	1256	2347
	58	25	83
	0	0	0
Totals	1149	1281	2430

Strandherd Dr

	Out	In	Total
	0	0	1
	0	7	413
	0	24	1126
	0	7	179
Totals	0	420	1150

Peds: 0



Peds: 2

Strandherd Dr

	Out	In	Total
	0	0	0
	98	97	1
	1046	991	55
	5	3	2
Totals	0	98	1046

West Approach

	Out	In	Total
	1719	1636	3355
	38	82	120
	0	0	0
Totals	1757	1718	3475

	192	50	9	0
	183	47	8	0
	9	3	1	0
	0	0	0	0
Totals	192	50	9	0

South Approach

	Out	In	Total
	238	238	476
	13	13	26
	0	0	0
Totals	251	251	502

Citigate Dr

- Cars

- Trucks

- Bicycles

Comments

Peak Hour Diagram

Specified Period

From: 11:00:00
To: 16:00:00

One Hour Peak

From: 12:00:00
To: 13:00:00

Intersection: Strandherd Dr & Citigate Dr - Fallowfield Rd
Site Code: 2436800001
Count Date: Sep 14, 2024

Weather conditions: Clear

** Signalized Intersection **

Major Road: Strandherd Dr runs E/W

North Approach

	Out	In	Total
Car	235	284	519
Truck	14	15	29
Bike	0	0	0
Totals	249	299	548

Fallowfield Rd

	0	0	0	0
Car	9	3	2	0
Truck	139	46	50	0
Bike	0	0	0	0
Totals	148	49	52	0

East Approach

	Out	In	Total
Car	1217	1085	2302
Truck	11	58	69
Bike	0	0	0
Totals	1228	1143	2371

Strandherd Dr

	0	0	0	Totals
Car	0	7	171	178
Truck	0	53	1031	1084
Bike	0	9	116	125

Peds: 6



Peds: 0

Strandherd Dr

	Totals	0	0	0	0
Car	76	72	4	0	0
Truck	1148	1142	6	0	0
Bike	4	3	1	0	0

West Approach

	Out	In	Total
Car	1318	1365	2683
Truck	69	35	104
Bike	0	0	0
Totals	1387	1400	2787

	Totals	104	45	7	0
Car	84	41	4	0	0
Truck	20	4	3	0	0
Bike	0	0	0	0	0

South Approach

	Out	In	Total
Car	129	165	294
Truck	27	13	40
Bike	0	0	0
Totals	156	178	334

Citigate Dr

Car - Cars

Truck - Trucks

Bike - Bicycles

Comments

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 07:45:00
To: 08:45:00

Intersection: Strandherd Dr & CrossKeys Place - Helene-Campbell Rd
Site Code: 2436800001
Count Date: Sep 17, 2024

Weather conditions: Clear

** Signalized Intersection **

Major Road: Strandherd Dr runs E/W

North Approach

	Out	In	Total
Car	262	87	349
Truck	3	3	6
Bike	0	0	0
Totals	265	90	355

Helene

	0	0	0	0
Car	3	0	0	0
Truck	201	36	25	0
Bike	0	0	0	0
Totals	204	36	25	0

East Approach

	Out	In	Total
Car	1115	700	1815
Truck	61	59	120
Bike	0	0	0
Totals	1176	759	1935

Strandherd Dr

	0	0	0	Totals
Car	0	3	44	47
Truck	0	59	668	727
Bike	0	3	66	69

Peds: 1



Peds: 1

Strandherd Dr

	Totals	0	0	0	0
Car	23	23	0	0	0
Truck	1140	1079	61	0	0
Bike	13	13	0	0	0

West Approach

	Out	In	Total
Car	778	1369	2147
Truck	65	69	134
Bike	0	0	0
Totals	843	1438	2281

	Totals	94	20	7	0
Car	89	20	7	0	0
Truck	5	0	0	0	0
Bike	0	0	0	0	0

South Approach

	Out	In	Total
Car	116	115	231
Truck	5	3	8
Bike	0	0	0
Totals	121	118	239

CrossKeys Place

Car - Cars

Truck - Trucks

Bike - Bicycles

Comments

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:00:00
To: 17:00:00

Intersection: Strandherd Dr & CrossKeys Place - Helene-Campbell Rd
Site Code: 2436800001
Count Date: Sep 17, 2024

Weather conditions: Clear

** Signalized Intersection **

Major Road: Strandherd Dr runs E/W

North Approach

	Out	In	Total
Car	273	259	532
Truck	4	2	6
Bike	0	0	0
Totals	277	261	538

Helene

	0	0	0	0
Car	3	0	1	0
Truck	123	114	36	0
Bike	0	0	0	0
Totals	126	114	37	0

East Approach

	Out	In	Total
Car	852	991	1843
Truck	64	31	95
Bike	0	0	0
Totals	916	1022	1938

Strandherd Dr

	0	0	0	0
Car	0	2	120	122
Truck	0	29	926	955
Bike	0	0	194	194
Totals	0	122	955	194

Peds: 2

	0	0	0	0
Car	0	2	120	122
Truck	0	29	926	955
Bike	0	0	194	194
Totals	0	122	955	194

Strandherd Dr

	0	0	0	0
Car	0	2	120	122
Truck	0	29	926	955
Bike	0	0	194	194
Totals	0	122	955	194

Peds: 2

	0	0	0	0
Car	0	2	120	122
Truck	0	29	926	955
Bike	0	0	194	194
Totals	0	122	955	194

West Approach

	Out	In	Total
Car	1240	1122	2362
Truck	31	67	98
Bike	0	0	0
Totals	1271	1189	2460

CrossKeys Place

South Approach

	Out	In	Total
Car	355	348	703
Truck	1	0	1
Bike	0	0	0
Totals	356	348	704

Car - Cars

Truck - Trucks

Bike - Bicycles

Comments

Peak Hour Diagram

Specified Period

From: 11:00:00
To: 16:00:00

One Hour Peak

From: 12:00:00
To: 13:00:00

Intersection: Strandherd Dr & CrossKeys Place - Helene-Campbell Rd
Site Code: 2436800001
Count Date: Sep 14, 2024

Weather conditions: Clear

** Signalized Intersection **

Major Road: Strandherd Dr runs E/W

North Approach

	Out	In	Total
Car	319	233	552
Truck	0	0	0
Bike	0	2	2
Totals	319	235	554

Helene

	0	0	0	0
Car	0	0	0	0
Truck	139	137	43	0
Bike	0	0	0	0
Totals	139	137	43	0

East Approach

	Out	In	Total
Car	917	892	1809
Truck	10	57	67
Bike	0	0	0
Totals	927	949	1876

Strandherd Dr

	0	0	0	0
Car	0	0	72	72
Truck	0	57	767	824
Bike	0	1	246	247
Totals	0	72	824	247

Peds: 7

	0	0	0	0
Car	0	0	72	72
Truck	0	57	767	824
Bike	0	1	246	247
Totals	0	72	824	247

Strandherd Dr

	0	0	0	0
Car	4	4	0	0
Truck	16	16	0	0
Bike	822	813	9	0
Totals	85	84	1	0

Peds: 1

	0	0	0	0
Car	4	4	0	0
Truck	16	16	0	0
Bike	822	813	9	0
Totals	85	84	1	0

West Approach

	Out	In	Total
Car	1085	1209	2294
Truck	58	11	69
Bike	0	0	0
Totals	1143	1220	2363

CrossKeys Place

South Approach

	Out	In	Total
Car	480	467	947
Truck	2	2	4
Bike	2	0	2
Totals	484	469	953

Car - Cars

Truck - Trucks

Bike - Bicycles

Comments

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 07:00:00
To: 08:00:00

Intersection: Citigate Dr & Systemhouse St
Site Code: 2436800007
Count Date: Oct 03, 2024

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: Systemhouse St runs E/W

North Approach

	Out	In	Total
	32	45	77
	5	5	10
	0	0	0
Totals	37	50	87

Citigate Dr

	0	0	0
	0	5	0
	1	31	0
Totals	1	36	0

East Approach

	Out	In	Total
	104	38	142
	6	5	11
	0	0	0
Totals	110	43	153

Commercial Access

	Out	In	Total
	0	0	0
	0	1	1
	0	0	7
Totals	0	2	7

Peds: 0



Peds: 0

Systemhouse St

	Out	In	Total
	0	0	0
	48	44	4
	62	60	2
Totals	0	48	62

Peds: 0

West Approach

	Out	In	Total
	8	61	69
	1	2	3
	0	0	0
Totals	9	63	72

- Cars

- Trucks

- Bicycles

Comments

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 17:00:00
To: 18:00:00

Intersection: Citigate Dr & Systemhouse St
Site Code: 2436800007
Count Date: Oct 03, 2024

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: Systemhouse St runs E/W

North Approach

	Out	In	Total
	70	76	146
	8	4	12
	0	0	0
Totals	78	80	158

Citigate Dr

	0	0	0
	0	8	0
	1	69	0
Totals	1	77	0

East Approach

	Out	In	Total
	99	94	193
	4	8	12
	0	0	0
Totals	103	102	205

Commercial Access

	Out	In	Total
	0	0	0
	0	3	3
	0	25	25
Totals	0	3	25

Peds: 1



Peds: 1

Systemhouse St

	Out	In	Total
	0	0	0
	77	73	4
	26	26	0
Totals	0	77	26

Peds: 0

West Approach

	Out	In	Total
	28	27	55
	0	0	0
	0	0	0
Totals	28	27	55

- Cars

- Trucks

- Bicycles

Comments

Peak Hour Diagram

Specified Period

From: 14:00:00
To: 18:00:00

One Hour Peak

From: 17:00:00
To: 18:00:00

Intersection: Citigate Dr & Systemhouse St
Site Code: 2436800008
Count Date: Oct 05, 2024

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: Systemhouse St runs E/W

North Approach

	Out	In	Total
	54	56	110
	6	4	10
	1	0	1
Totals	61	60	121

Citigate Dr

	0	1	0
	0	6	0
	0	54	0
Totals	0	61	0

East Approach

	Out	In	Total
	100	76	176
	4	6	10
	0	1	1
Totals	104	83	187

Commercial Access

	Out	In	Total
	0	0	0
	0	0	0
	0	2	2
Totals	0	2	2

Peds: 2

Peds: 3



Peds: 0

Peds: 0

Systemhouse St

	Out	In	Total
	0	0	0
	58	54	112
	46	46	92
Totals	104	100	204

West Approach

	Out	In	Total
	24	46	70
	0	0	0
	0	0	0
Totals	24	46	70

 - Cars

 - Trucks

 - Bicycles

Comments

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

Existing
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 					 		 		 	 	 
Traffic Volume (vph)	53	17	5	51	33	449	2	1394	42	530	787	91
Future Volume (vph)	53	17	5	51	33	449	2	1394	42	530	787	91
Satd. Flow (prot)	2853	1258	0	1595	1471	1483	1127	3221	1483	3124	3161	1339
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2850	1258	0	1595	1471	1464	1127	3221	1463	3123	3161	1339
Satd. Flow (RTOR)		6				378			225			101
Lane Group Flow (vph)	59	25	0	57	37	499	2	1549	47	589	874	101
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	13.0	48.0		13.0	48.0	48.0	13.0	31.0	31.0	28.0	46.0	13.0
Total Split (%)	10.8%	40.0%		10.8%	40.0%	40.0%	10.8%	25.8%	25.8%	23.3%	38.3%	10.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	7.2	12.5		22.1	21.5	21.5	5.7	33.9	33.9	29.9	68.3	81.1
Actuated g/C Ratio	0.06	0.10		0.18	0.18	0.18	0.05	0.28	0.28	0.25	0.57	0.68
v/c Ratio	0.35	0.18		0.19	0.14	0.87	0.04	1.70	0.08	0.76	0.49	0.11
Control Delay	59.8	45.5		39.0	37.1	27.3	56.0	350.0	0.3	49.6	20.3	2.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.8	45.5		39.0	37.1	27.3	56.0	350.0	0.3	49.6	20.3	2.7
LOS	E	D		D	D	C	E	F	A	D	C	A
Approach Delay		55.6			29.1			339.3			30.2	
Approach LOS		E			C			F			C	
Queue Length 50th (m)	6.9	4.2		12.1	7.6	29.6	0.5	~279.7	0.0	65.4	55.1	0.0
Queue Length 95th (m)	14.0	13.1		19.8	13.6	59.8	3.2	#358.6	0.0	#114.8	126.4	7.8
Internal Link Dist (m)		131.5			347.0			233.3			231.4	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	174	433		294	502	749	55	910	574	778	1799	925
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.06		0.19	0.07	0.67	0.04	1.70	0.08	0.76	0.49	0.11

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 101 (84%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

Existing
AM Peak Hour

Maximum v/c Ratio: 1.70

Intersection Signal Delay: 159.2

Intersection LOS: F

Intersection Capacity Utilization 91.5%

ICU Level of Service F

Analysis Period (min) 15

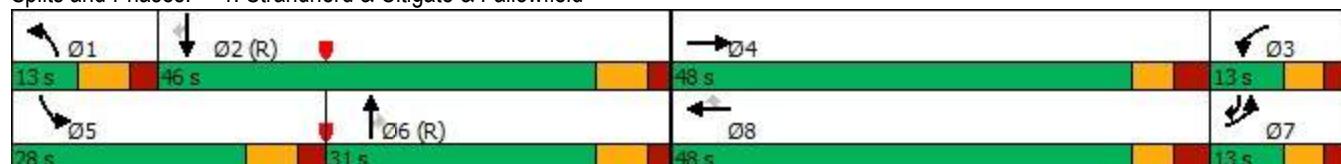
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

Existing
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	20	7	25	36	204	13	1140	23	47	727	69
Future Volume (vph)	94	20	7	25	36	204	13	1140	23	47	727	69
Satd. Flow (prot)	1610	1745	1483	1658	1745	1483	3216	3221	1483	1595	3131	1455
Flt Permitted	0.731			0.743			0.950			0.950		
Satd. Flow (perm)	1238	1745	1464	1295	1745	1464	3213	3221	1450	1595	3131	1435
Satd. Flow (RTOR)			90			168			97			97
Lane Group Flow (vph)	104	22	8	28	40	227	14	1267	26	52	808	77
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	16.0	65.0	65.0	16.0	65.0	65.0
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	12.3%	50.0%	50.0%	12.3%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	6.1	82.3	82.3	8.8	90.1	90.1
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.63	0.63	0.07	0.69	0.69
v/c Ratio	0.55	0.08	0.03	0.14	0.15	0.62	0.09	0.62	0.03	0.49	0.37	0.08
Control Delay	58.9	41.9	0.1	43.8	43.9	20.6	76.5	9.6	0.0	73.2	12.0	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.9	41.9	0.1	43.8	43.9	20.6	76.5	9.6	0.0	73.2	12.0	2.2
LOS	E	D	A	D	D	C	E	A	A	E	B	A
Approach Delay		52.6			26.0			10.1			14.6	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	25.8	5.1	0.0	6.5	9.3	14.0	1.9	21.2	0.0	13.0	30.0	0.0
Queue Length 95th (m)	35.2	10.3	0.0	12.4	15.9	31.6	m3.9	49.4	m0.0	26.7	95.8	5.7
Internal Link Dist (m)		138.8			171.2			424.3			233.3	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	393	554	526	411	554	579	225	2040	953	118	2169	1023
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.04	0.02	0.07	0.07	0.39	0.06	0.62	0.03	0.44	0.37	0.08

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 99 (76%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

Existing
AM Peak Hour

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 15.5

Intersection LOS: B

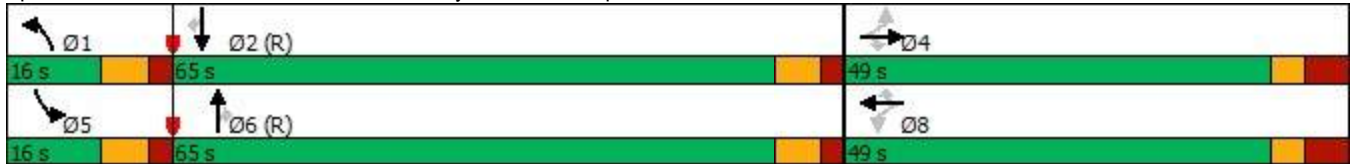
Intersection Capacity Utilization 74.2%

ICU Level of Service D

Analysis Period (min) 15

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

Existing
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 		 	 	
Traffic Volume (vph)	30	19	64	24	56	74	233	936	34	58	599	11
Future Volume (vph)	30	19	64	24	56	74	233	936	34	58	599	11
Satd. Flow (prot)	2583	1461	0	1658	1556	0	3216	3296	0	1580	3221	1282
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2570	1461	0	1658	1556	0	3210	3296	0	1579	3221	1262
Satd. Flow (RTOR)		71			54			3				96
Lane Group Flow (vph)	33	92	0	27	144	0	259	1078	0	64	666	12
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		20.0	47.0		20.0	47.0	14.0
Total Split (%)	10.8%	37.7%		10.8%	37.7%		15.4%	36.2%		15.4%	36.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	6.4	18.1		6.5	18.1		14.7	74.8		10.3	67.7	73.6
Actuated g/C Ratio	0.05	0.14		0.05	0.14		0.11	0.58		0.08	0.52	0.57
v/c Ratio	0.26	0.35		0.33	0.55		0.71	0.57		0.51	0.40	0.02
Control Delay	64.4	17.4		70.5	37.6		66.8	24.0		74.9	22.7	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	64.4	17.4		70.5	37.6		66.8	24.0		74.9	22.7	0.1
LOS	E	B		E	D		E	C		E	C	A
Approach Delay		29.8			42.8			32.3			26.8	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	4.2	5.0		6.8	22.5		33.0	93.6		16.8	34.2	0.0
Queue Length 95th (m)	9.8	16.2		16.8	33.8		#52.0	#200.2		32.8	68.6	m0.0
Internal Link Dist (m)		127.1			312.5			512.4			424.3	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	135	514		86	533		371	1897		160	1678	760
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	0.24	0.18		0.31	0.27		0.70	0.57		0.40	0.40	0.02

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 94 (72%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 3: Strandherd & Systemhouse/Maravista

Existing
AM Peak Hour

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 31.2

Intersection LOS: C

Intersection Capacity Utilization 63.7%

ICU Level of Service B

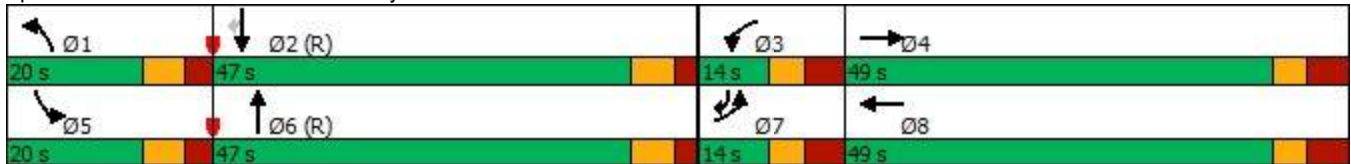
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

Existing
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	5	22	77	16	66	51	1059	96	31	592	71
Future Volume (vph)	31	5	22	77	16	66	51	1059	96	31	592	71
Satd. Flow (prot)	1642	1745	1483	1642	1519	0	3216	3259	0	1595	3191	1469
Flt Permitted	0.698			0.754			0.950			0.950		
Satd. Flow (perm)	1205	1745	1464	1301	1519	0	3213	3259	0	1595	3191	1449
Satd. Flow (RTOR)			37		73			10				105
Lane Group Flow (vph)	34	6	24	86	91	0	57	1284	0	34	658	79
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	21.0	37.0	37.0		21.0	62.0		21.0	62.0	62.0
Total Split (%)	30.8%	30.8%	17.5%	30.8%	30.8%		17.5%	51.7%		17.5%	51.7%	51.7%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.8	15.8	23.1	15.8	15.8		7.5	79.9		8.1	77.6	77.6
Actuated g/C Ratio	0.13	0.13	0.19	0.13	0.13		0.06	0.67		0.07	0.65	0.65
v/c Ratio	0.22	0.03	0.08	0.50	0.35		0.28	0.59		0.32	0.32	0.08
Control Delay	46.5	40.2	4.5	56.8	17.0		56.7	15.5		60.3	11.8	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	46.5	40.2	4.5	56.8	17.0		56.7	15.5		60.3	11.8	1.6
LOS	D	D	A	E	B		E	B		E	B	A
Approach Delay		30.2			36.3			17.2			12.9	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	7.5	1.3	0.0	19.6	3.9		6.7	86.0		7.8	33.6	0.0
Queue Length 95th (m)	15.0	4.6	3.5	31.1	16.4		13.3	159.7		17.9	64.3	4.5
Internal Link Dist (m)		259.4			125.1			519.0			512.4	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	299	433	385	323	432		364	2172		180	2063	974
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.11	0.01	0.06	0.27	0.21		0.16	0.59		0.19	0.32	0.08

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 29 (24%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

Existing
AM Peak Hour

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 17.6

Intersection LOS: B

Intersection Capacity Utilization 57.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis5: Systemhouse & Citigate

Existing
AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	7	62	48	36	1
Future Volume (Veh/h)	2	7	62	48	36	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	8	69	53	40	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	168	80	81	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	168	80	81	0	0	
tC, single (s)	7.6	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	4.0	4.0	4.0	3.4	2.3	
p0 queue free %	100	99	91	95	97	
cM capacity (veh/h)	609	789	786	1068	1548	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	10	122	41			
Volume Left	2	0	40			
Volume Right	0	53	1			
cSH	745	888	1548			
Volume to Capacity	0.01	0.14	0.03			
Queue Length 95th (m)	0.3	3.6	0.6			
Control Delay (s)	9.9	9.7	7.2			
Lane LOS	A	A	A			
Approach Delay (s)	9.9	9.7	7.2			
Approach LOS	A	A				
Intersection Summary						
Average Delay			9.1			
Intersection Capacity Utilization			16.5%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	28	95	204	85	15
Future Vol, veh/h	15	28	95	204	85	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	7	18	6	2	9	2
Mvmt Flow	17	31	106	227	94	17
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	333	0	-	0	171	106
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	65	-
Critical Hdwy	4.17	-	-	-	6.49	6.22
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.263	-	-	-	3.581	3.318
Pot Cap-1 Maneuver	1199	-	-	-	803	948
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1199	-	-	-	792	948
Mov Cap-2 Maneuver	-	-	-	-	792	-
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	940	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.8	0		10.1		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1199	-	-	-	812	
HCM Lane V/C Ratio	0.014	-	-	-	0.137	
HCM Control Delay (s)	8	-	-	-	10.1	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.5	

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

Existing
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	50	9	122	60	479	5	1046	98	421	1150	186
Future Volume (vph)	192	50	9	122	60	479	5	1046	98	421	1150	186
Satd. Flow (prot)	3124	1626	0	1658	1664	1455	1208	3221	1483	3216	3316	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3124	1626	0	1655	1664	1455	1208	3221	1483	3216	3316	1455
Satd. Flow (RTOR)		8				360			160			178
Lane Group Flow (vph)	213	66	0	136	67	532	6	1162	109	468	1278	207
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	14.0	48.0		14.0	48.0	48.0	24.0	34.0	34.0	24.0	34.0	14.0
Total Split (%)	11.7%	40.0%		11.7%	40.0%	40.0%	20.0%	28.3%	28.3%	20.0%	28.3%	11.7%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effect Green (s)	14.2	16.5		26.0	24.8	24.8	6.3	31.5	31.5	21.9	57.6	77.4
Actuated g/C Ratio	0.12	0.14		0.22	0.21	0.21	0.05	0.26	0.26	0.18	0.48	0.64
v/c Ratio	0.58	0.29		0.38	0.19	0.91	0.10	1.38	0.21	0.80	0.80	0.21
Control Delay	57.4	40.4		46.0	36.2	33.7	73.6	202.4	2.3	58.7	33.5	3.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.4	40.4		46.0	36.2	33.7	73.6	202.4	2.3	58.7	33.5	3.2
LOS	E	D		D	D	C	E	F	A	E	C	A
Approach Delay		53.4			36.2			184.7			36.3	
Approach LOS		D			D			F			D	
Queue Length 50th (m)	24.4	13.2		26.3	13.2	44.2	1.6	~201.7	0.7	52.8	126.0	2.0
Queue Length 95th (m)	#53.6	19.4		#80.9	21.2	78.7	m2.8	#244.1	m2.9	#93.6	#242.0	14.0
Internal Link Dist (m)		131.5			347.0			233.3			231.4	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	370	560		359	568	734	170	845	507	587	1590	1001
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.12		0.38	0.12	0.72	0.04	1.38	0.21	0.80	0.80	0.21

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 115 (96%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

Existing
PM Peak Hour

Maximum v/c Ratio: 1.38

Intersection Signal Delay: 82.1

Intersection LOS: F

Intersection Capacity Utilization 84.6%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

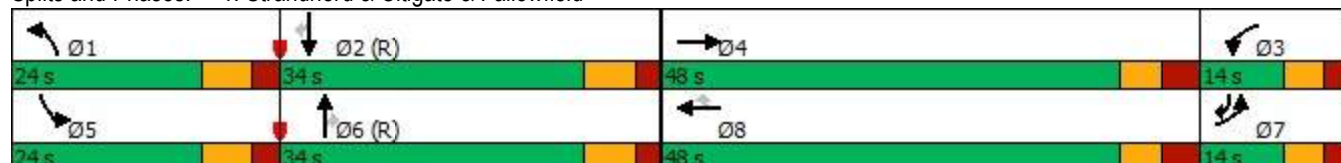
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

Existing
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	117	29	37	114	126	40	853	23	122	955	194
Future Volume (vph)	210	117	29	37	114	126	40	853	23	122	955	194
Satd. Flow (prot)	1658	1745	1469	1642	1745	1483	3216	3131	1483	1658	3283	1483
Flt Permitted	0.676			0.674			0.950			0.950		
Satd. Flow (perm)	1177	1745	1436	1155	1745	1462	3213	3131	1447	1656	3283	1461
Satd. Flow (RTOR)			97			140			105			216
Lane Group Flow (vph)	233	130	32	41	127	140	44	948	26	136	1061	216
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	17.0	54.0	54.0	17.0	54.0	54.0
Total Split (%)	40.8%	40.8%	40.8%	40.8%	40.8%	40.8%	14.2%	45.0%	45.0%	14.2%	45.0%	45.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	30.9	30.9	30.9	30.9	30.9	30.9	7.1	53.8	53.8	13.8	63.1	63.1
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26	0.26	0.06	0.45	0.45	0.12	0.53	0.53
v/c Ratio	0.77	0.29	0.07	0.14	0.28	0.29	0.23	0.68	0.04	0.71	0.62	0.25
Control Delay	56.8	35.1	0.3	31.4	35.0	6.1	59.0	29.4	2.2	83.0	12.1	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	35.1	0.3	31.4	35.0	6.1	59.0	29.4	2.2	83.0	12.1	1.4
LOS	E	D	A	C	C	A	E	C	A	F	B	A
Approach Delay		45.1			21.4			30.0			17.3	
Approach LOS		D			C			C			B	
Queue Length 50th (m)	51.9	25.1	0.0	7.6	24.5	0.0	4.7	121.8	0.0	34.1	21.5	0.2
Queue Length 95th (m)	72.0	36.8	0.0	14.9	36.0	13.4	m6.0	145.5	m1.0	m#50.2	57.5	m3.4
Internal Link Dist (m)		138.8			171.2			424.3			233.3	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	405	600	557	397	600	594	270	1404	707	191	1725	870
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.22	0.06	0.10	0.21	0.24	0.16	0.68	0.04	0.71	0.62	0.25

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 99 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 2: Strandherd & Crosskeys/Helene-Campbell

Existing
PM Peak Hour

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 25.3

Intersection LOS: C

Intersection Capacity Utilization 73.8%

ICU Level of Service D

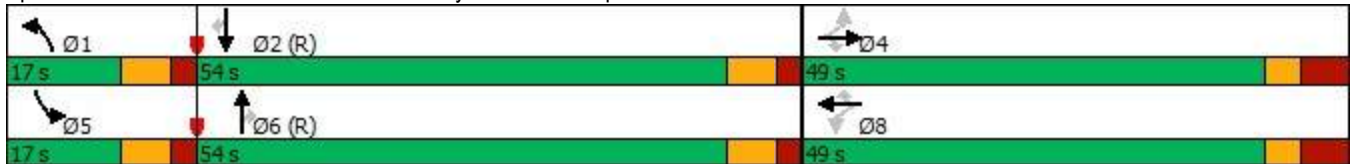
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

Existing
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	56	292	17	59	42	364	806	27	124	982	14
Future Volume (vph)	59	56	292	17	59	42	364	806	27	124	982	14
Satd. Flow (prot)	3185	1504	0	1658	1586	0	3216	3201	0	1658	3316	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3117	1504	0	1654	1586	0	3213	3201	0	1648	3316	1391
Satd. Flow (RTOR)		240			33			3				104
Lane Group Flow (vph)	66	386	0	19	113	0	404	926	0	138	1091	16
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	13.0	49.0		13.0	49.0		17.0	41.0		17.0	41.0	13.0
Total Split (%)	10.8%	40.8%		10.8%	40.8%		14.2%	34.2%		14.2%	34.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	5.8	27.9		5.7	22.7		23.2	51.7		14.2	42.7	47.9
Actuated g/C Ratio	0.05	0.23		0.05	0.19		0.19	0.43		0.12	0.36	0.40
v/c Ratio	0.43	0.72		0.24	0.35		0.65	0.67		0.70	0.92	0.03
Control Delay	64.5	21.9		62.6	28.6		51.9	37.8		51.2	59.5	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	64.5	21.9		62.6	28.6		51.9	37.8		51.2	59.5	0.1
LOS	E	C		E	C		D	D		D	E	A
Approach Delay		28.1			33.5			42.1			57.8	
Approach LOS		C			C			D			E	
Queue Length 50th (m)	7.9	33.0		4.4	18.2		47.7	69.4		24.7	142.8	0.0
Queue Length 95th (m)	15.3	57.5		12.3	26.6		#100.4	#156.1		#71.3	#206.1	m0.0
Internal Link Dist (m)		127.1			312.5			512.4			424.3	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	153	677		80	570		621	1380		196	1180	618
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	0.43	0.57		0.24	0.20		0.65	0.67		0.70	0.92	0.03

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 54 (45%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 3: Strandherd & Systemhouse/Maravista

Existing
PM Peak Hour

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 45.9

Intersection LOS: D

Intersection Capacity Utilization 81.5%

ICU Level of Service D

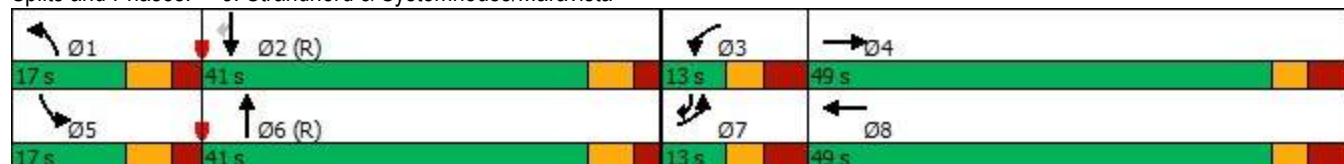
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

Existing
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	19	66	144	9	53	38	1017	107	54	1236	47
Future Volume (vph)	104	19	66	144	9	53	38	1017	107	54	1236	47
Satd. Flow (prot)	1658	1745	1483	1626	1480	0	3216	3233	0	1658	3316	1483
Flt Permitted	0.712			0.744			0.950			0.950		
Satd. Flow (perm)	1241	1745	1463	1272	1480	0	3216	3233	0	1656	3316	1483
Satd. Flow (RTOR)			37		59			12				105
Lane Group Flow (vph)	116	21	73	160	69	0	42	1249	0	60	1373	52
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	23.0	37.0	37.0		23.0	60.0		23.0	60.0	60.0
Total Split (%)	30.8%	30.8%	19.2%	30.8%	30.8%		19.2%	50.0%		19.2%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	20.4	27.3	20.4	20.4		7.0	70.8		9.7	73.4	73.4
Actuated g/C Ratio	0.17	0.17	0.23	0.17	0.17		0.06	0.59		0.08	0.61	0.61
v/c Ratio	0.55	0.07	0.20	0.74	0.23		0.22	0.65		0.45	0.68	0.05
Control Delay	54.1	38.9	16.9	66.4	14.0		56.2	21.0		58.3	15.8	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	54.1	38.9	16.9	66.4	14.0		56.2	21.0		58.3	15.8	0.5
LOS	D	D	B	E	B		E	C		E	B	A
Approach Delay		39.7			50.6			22.2			16.9	
Approach LOS		D			D			C			B	
Queue Length 50th (m)	25.3	4.2	6.2	36.2	2.0		4.9	102.4		14.9	31.7	0.0
Queue Length 95th (m)	40.8	10.4	15.3	55.0	13.4		10.6	160.2		m18.5	m92.7	m0.0
Internal Link Dist (m)		259.4			125.1			519.0			512.4	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	308	433	465	315	411		418	1913		215	2028	948
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.38	0.05	0.16	0.51	0.17		0.10	0.65		0.28	0.68	0.05

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 57 (48%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

Existing
PM Peak Hour

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 22.9

Intersection LOS: C

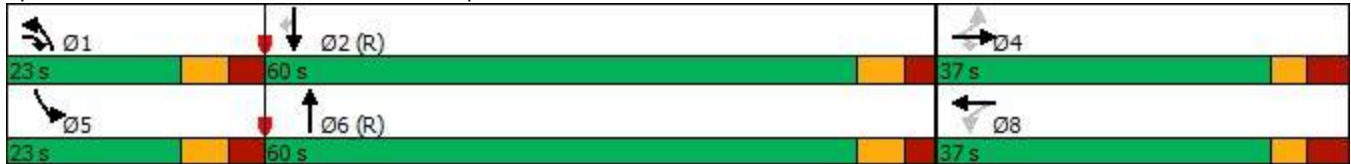
Intersection Capacity Utilization 73.7%

ICU Level of Service D

Analysis Period (min) 15

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

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

Existing
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	25	26	77	77	1
Future Volume (Veh/h)	3	25	26	77	77	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	28	29	86	86	1
Pedestrians		1	1			
Lane Width (m)		3.5	3.5			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	274	174	175	1	1	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274	174	175	1	1	
tC, single (s)	7.1	6.5	6.5	6.2	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.3	
p0 queue free %	99	96	96	92	95	
cM capacity (veh/h)	577	678	678	1074	1569	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	31	115	87			
Volume Left	3	0	86			
Volume Right	0	86	1			
cSH	667	936	1569			
Volume to Capacity	0.05	0.12	0.05			
Queue Length 95th (m)	1.1	3.2	1.3			
Control Delay (s)	10.7	9.4	7.3			
Lane LOS	B	A	A			
Approach Delay (s)	10.7	9.4	7.3			
Approach LOS	B	A				
Intersection Summary						
Average Delay			8.8			
Intersection Capacity Utilization			18.0%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	87	88	346	320	15
Future Vol, veh/h	15	87	88	346	320	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	27	3	5	2	2	2
Mvmt Flow	17	97	98	384	356	17
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	482	0	-	0	229	98
Stage 1	-	-	-	-	98	-
Stage 2	-	-	-	-	131	-
Critical Hdwy	4.37	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.443	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	962	-	-	-	759	958
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	895	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	962	-	-	-	745	958
Mov Cap-2 Maneuver	-	-	-	-	745	-
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	895	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.3	0		14.4		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	962	-	-	-	752	
HCM Lane V/C Ratio	0.017	-	-	-	0.495	
HCM Control Delay (s)	8.8	-	-	-	14.4	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	2.8	

Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

Existing
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	45	7	52	49	148	4	1148	76	178	1084	125
Future Volume (vph)	104	45	7	52	49	148	4	1148	76	178	1084	125
Satd. Flow (prot)	2757	1533	0	1626	1679	1427	1353	3316	1441	3154	3221	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2744	1533	0	1626	1679	1403	1350	3316	1441	3154	3221	1372
Satd. Flow (RTOR)		8				174			175			135
Lane Group Flow (vph)	116	58	0	58	54	164	4	1276	84	198	1204	139
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	12.0	48.0		12.0	48.0	48.0	19.0	31.0	31.0	19.0	31.0	12.0
Total Split (%)	10.9%	43.6%		10.9%	43.6%	43.6%	17.3%	28.2%	28.2%	17.3%	28.2%	10.9%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	None
Act Effct Green (s)	5.6	13.3		13.6	14.9	14.9	6.0	24.6	24.6	10.0	39.8	45.8
Actuated g/C Ratio	0.07	0.16		0.16	0.18	0.18	0.07	0.30	0.30	0.12	0.48	0.55
v/c Ratio	0.63	0.23		0.22	0.18	0.42	0.04	1.30	0.15	0.52	0.78	0.17
Control Delay	56.6	35.0		32.8	28.9	7.0	43.0	171.4	0.6	41.5	25.8	3.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	35.0		32.8	28.9	7.0	43.0	171.4	0.6	41.5	25.8	3.0
LOS	E	C		C	C	A	D	F	A	D	C	A
Approach Delay		49.4			16.7			160.5			25.8	
Approach LOS		D			B			F			C	
Queue Length 50th (m)	8.6	6.7		8.4	7.2	0.0	0.6	~123.4	0.0	14.0	64.0	0.2
Queue Length 95th (m)	#29.1	22.6		18.8	15.8	11.8	4.4	#256.3	0.0	32.8	#224.6	9.9
Internal Link Dist (m)		131.5			347.0			233.3			231.4	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	185	774		265	844	792	197	980	549	460	1538	818
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.07		0.22	0.06	0.21	0.02	1.30	0.15	0.43	0.78	0.17

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 83.3

Natural Cycle: 135

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.30

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

Existing
SAT Peak Hour

Intersection Signal Delay: 81.0

Intersection LOS: F

Intersection Capacity Utilization 70.5%

ICU Level of Service C

Analysis Period (min) 15

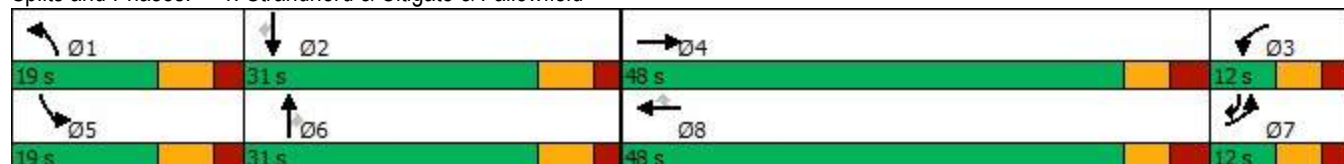
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

Existing
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	147	78	43	137	139	85	822	20	72	824	247
Future Volume (vph)	259	147	78	43	137	139	85	822	20	72	824	247
Satd. Flow (prot)	1658	1745	1483	1658	1745	1483	3216	3316	1483	1658	3161	1483
Flt Permitted	0.660			0.653			0.950			0.950		
Satd. Flow (perm)	1151	1745	1456	1134	1745	1463	3214	3316	1431	1651	3161	1464
Satd. Flow (RTOR)			106			154			115			274
Lane Group Flow (vph)	288	163	87	48	152	154	94	913	22	80	916	274
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	15.0	46.0	46.0	15.0	46.0	46.0
Total Split (%)	44.5%	44.5%	44.5%	44.5%	44.5%	44.5%	13.6%	41.8%	41.8%	13.6%	41.8%	41.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	32.4	32.4	32.4	32.4	32.4	32.4	8.0	49.6	49.6	9.4	50.8	50.8
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.07	0.45	0.45	0.09	0.46	0.46
v/c Ratio	0.85	0.32	0.17	0.14	0.30	0.29	0.40	0.61	0.03	0.57	0.63	0.33
Control Delay	58.4	30.2	3.7	26.6	29.8	5.2	53.8	28.0	0.1	64.6	27.7	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	30.2	3.7	26.6	29.8	5.2	53.8	28.0	0.1	64.6	27.7	4.1
LOS	E	C	A	C	C	A	D	C	A	E	C	A
Approach Delay		41.0			18.7			29.7			24.9	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	57.4	26.9	0.0	7.5	24.9	0.0	10.0	83.5	0.0	16.5	82.0	0.0
Queue Length 95th (m)	82.2	39.5	7.2	14.8	37.0	12.7	18.4	114.9	0.0	#38.9	118.2	16.8
Internal Link Dist (m)		138.8			171.2			424.3			233.3	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	432	655	612	425	655	645	247	1494	707	145	1460	824
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.25	0.14	0.11	0.23	0.24	0.38	0.61	0.03	0.55	0.63	0.33

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 108 (98%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

Existing
SAT Peak Hour

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 28.5

Intersection LOS: C

Intersection Capacity Utilization 76.8%

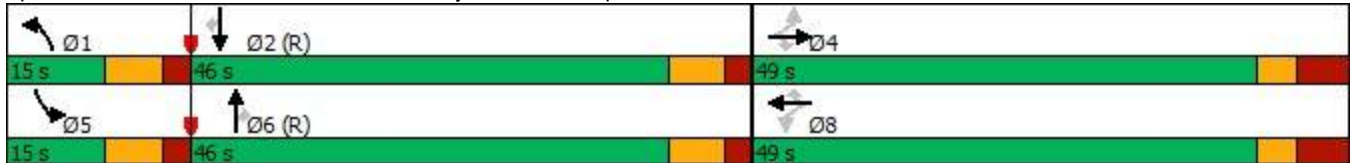
ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

Existing
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	39	311	17	81	62	514	753	26	118	833	14
Future Volume (vph)	80	39	311	17	81	62	514	753	26	118	833	14
Satd. Flow (prot)	3216	1491	0	1658	1585	0	3216	3299	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3144	1491	0	1654	1585	0	3200	3299	0	1658	3316	1449
Satd. Flow (RTOR)		346			38			3				108
Lane Group Flow (vph)	89	389	0	19	159	0	571	866	0	131	926	16
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		19.0	33.0		19.0	33.0	14.0
Total Split (%)	12.2%	42.6%		12.2%	42.6%		16.5%	28.7%		16.5%	28.7%	12.2%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	6.7	34.5		6.3	28.9		26.9	41.9		12.0	27.0	33.1
Actuated g/C Ratio	0.06	0.30		0.05	0.25		0.23	0.36		0.10	0.23	0.29
v/c Ratio	0.48	0.56		0.21	0.37		0.76	0.72		0.76	1.19	0.03
Control Delay	61.2	7.7		57.2	26.1		52.4	40.4		77.1	137.2	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	61.2	7.7		57.2	26.1		52.4	40.4		77.1	137.2	0.1
LOS	E	A		E	C		D	D		E	F	A
Approach Delay		17.7			29.4			45.2			127.8	
Approach LOS		B			C			D			F	
Queue Length 50th (m)	10.2	5.1		4.2	18.8		~95.4	~120.1		28.9	~134.5	0.0
Queue Length 95th (m)	18.5	30.2		11.8	35.2		#129.4	#159.5		#56.8	#173.8	0.0
Internal Link Dist (m)		127.1			312.5			512.4			424.3	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	190	786		98	596		751	1203		180	778	497
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	0.47	0.49		0.19	0.27		0.76	0.72		0.73	1.19	0.03

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

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

Natural Cycle: 135

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 3: Strandherd & Systemhouse/Maravista

Existing
SAT Peak Hour

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 68.2

Intersection LOS: E

Intersection Capacity Utilization 92.1%

ICU Level of Service F

Analysis Period (min) 15

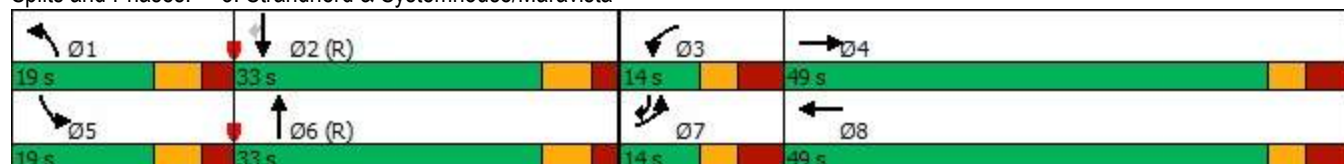
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

Existing
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	8	31	95	13	76	40	1033	106	48	987	32
Future Volume (vph)	66	8	31	95	13	76	40	1033	106	48	987	32
Satd. Flow (prot)	1642	1745	1483	1658	1520	0	3185	3262	0	1658	3316	1483
Flt Permitted	0.694			0.752			0.950			0.950		
Satd. Flow (perm)	1199	1745	1464	1311	1520	0	3182	3262	0	1657	3316	1462
Satd. Flow (RTOR)			41		84			13				115
Lane Group Flow (vph)	73	9	34	106	98	0	44	1266	0	53	1097	36
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	38.0	38.0	12.4	38.0	38.0		12.4	59.6		12.4	59.6	59.6
Total Split (%)	34.5%	34.5%	11.3%	34.5%	34.5%		11.3%	54.2%		11.3%	54.2%	54.2%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	16.3	16.3	22.7	16.3	16.3		6.6	66.4		8.3	67.9	67.9
Actuated g/C Ratio	0.15	0.15	0.21	0.15	0.15		0.06	0.60		0.08	0.62	0.62
v/c Ratio	0.41	0.03	0.10	0.55	0.33		0.23	0.64		0.43	0.54	0.04
Control Delay	47.1	35.4	6.6	52.2	13.5		52.0	18.2		59.5	15.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.1	35.4	6.6	52.2	13.5		52.0	18.2		59.5	15.4	0.1
LOS	D	D	A	D	B		D	B		E	B	A
Approach Delay		34.3			33.6			19.4			16.9	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	14.7	1.7	0.0	21.9	2.7		4.7	89.7		10.9	67.1	0.0
Queue Length 95th (m)	24.7	5.3	5.2	33.7	14.8		10.3	146.2		#26.3	117.5	0.0
Internal Link Dist (m)		259.4			125.1			519.0			512.4	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	335	488	336	367	486		191	1974		124	2048	946
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.22	0.02	0.10	0.29	0.20		0.23	0.64		0.43	0.54	0.04

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 93 (85%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 4: Strandherd & Dealership/Kennevale

Existing
SAT Peak Hour

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 20.0

Intersection LOS: B

Intersection Capacity Utilization 66.2%

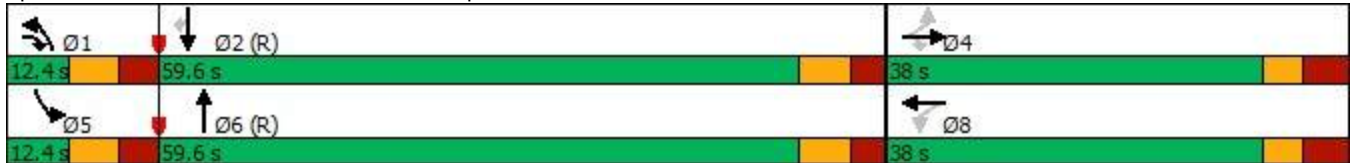
ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

Existing
SAT Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	22	46	58	61	0
Future Volume (Veh/h)	2	22	46	58	61	0
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	24	51	64	68	0
Pedestrians		2			3	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	230	138	138	3	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	138	138	3	0	
tC, single (s)	7.1	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.4	2.3	
p0 queue free %	100	97	93	94	96	
cM capacity (veh/h)	620	719	719	1064	1572	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	26	115	68			
Volume Left	2	0	68			
Volume Right	0	64	0			
cSH	710	877	1572			
Volume to Capacity	0.04	0.13	0.04			
Queue Length 95th (m)	0.9	3.4	1.0			
Control Delay (s)	10.3	9.7	7.4			
Lane LOS	B	A	A			
Approach Delay (s)	10.3	9.7	7.4			
Approach LOS	B	A				
Intersection Summary						
Average Delay		9.0				
Intersection Capacity Utilization		18.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM 2010 TWSC
6: Systemhouse & Costco Access

Existing
SAT Peak Hour

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	68	89	518	362	15
Future Vol, veh/h	15	68	89	518	362	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	20	3	4	2	2	2
Mvmt Flow	17	76	99	576	402	17
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	675	0	-	0	209	99
Stage 1	-	-	-	-	99	-
Stage 2	-	-	-	-	110	-
Critical Hdwy	4.3	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.38	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	837	-	-	-	779	957
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	915	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	837	-	-	-	763	957
Mov Cap-2 Maneuver	-	-	-	-	763	-
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	915	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.7	0		15.1		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	837	-	-	-	769	
HCM Lane V/C Ratio	0.02	-	-	-	0.545	
HCM Control Delay (s)	9.4	-	-	-	15.1	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.1	-	-	-	3.3	

Appendix D

Collision Data

Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition	# Vehicles	# Motorcycles	# Bicycles	# Pedestrians
2018-01-05	2018	3:35	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	07 - SMV other	04 - Slush	1	0	0	0
2018-03-07	2018	13:00	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2018-04-02	2018	12:57	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2018-10-07	2018	13:53	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2018-10-09	2018	16:15	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	3	0	0	0
2018-12-03	2018	7:20	KENNEVALE DR @ STRANDHERD DR (0010896)	02 - Rain	03 - Dawn	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
2018-12-27	2018	15:00	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	05 - Dusk	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
2018-12-19	2018	16:00	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	05 - Dusk	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
2019-03-09	2019	11:44	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2019-04-07	2019	20:13	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
2019-04-24	2019	15:45	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2019-05-11	2019	9:17	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2019-06-18	2019	10:01	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
2019-07-10	2019	9:03	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2019-08-23	2019	10:58	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
2019-08-28	2019	18:32	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2019-11-18	2019	18:40	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2019-11-20	2019	17:12	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2019-12-01	2019	12:51	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
2019-12-11	2019	15:47	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2020-01-02	2020	17:43	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	02 - Wet	3	0	0	0
2020-02-27	2020	16:00	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	04 - Slush	2	0	0	0
2020-06-11	2020	16:30	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	99 - Other	01 - Dry	2	0	0	0
2020-08-07	2020	8:38	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	99 - Other	01 - Dry	2	0	0	0
2021-02-07	2021	14:00	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	04 - Slush	2	0	0	0
2021-02-18	2021	13:45	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2021-09-12	2021	9:50	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2021-09-13	2021	18:13	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	08 - Loose sand or gravel	3	0	0	0
2021-10-18	2021	14:40	KENNEVALE DR @ STRANDHERD DR (0010896)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	3	0	0	0
2021-11-05	2021	11:54	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	08 - Loose sand or gravel	2	0	0	0
2021-11-14	2021	12:08	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
2022-01-28	2022	9:43	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	04 - Slush	2	0	0	0
2022-05-24	2022	16:59	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Traffic signal	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2022-09-23	2022	11:00	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2022-11-18	2022	13:00	KENNEVALE DR @ STRANDHERD DR (0010896)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	03 - Loose snow	2	0	0	0
2018-01-03	2018	17:07	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	05 - Dusk	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
2018-01-08	2018	12:08	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	02 - Snow	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Loose snow	2	0	0	0
2018-07-01	2018	17:16	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
2018-09-04	2018	9:40	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2018-11-16	2018	16:00	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	03 - Snow	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	07 - SMV other	03 - Loose snow	1	0	0	0
2018-12-10	2018	19:08	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2018-12-21	2018	13:58	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
2018-12-23	2018	21:25	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	03 - Loose snow	2	0	0	0
2019-01-27	2019	14:04	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
2019-01-29	2019	16:41	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	05 - Dusk	01 - Traffic signal	0	02 - Non-fatal injury	02 - Angle	05 - Packed snow	2	0	0	0
2019-03-08	2019	14:10	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2019-04-12	2019	17:05	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2019-06-24	2019	11:27	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2019-08-27	2019	18:30	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2019-07-24	2019	18:28	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2019-07-31	2019	16:00	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	99 - Other	01 - Dry	2	0	0	0
2019-10-06	2019	14:20	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2019-12-20	2019	10:36	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2020-01-18	2020	10:30	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2020-01-25	2020	14:20	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	03 - Snow	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	04 - Slush	2	0	0	0
2020-02-01	2020	18:41	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
2020-02-13	2020	14:56	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	03 - Snow	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
2020-03-13	2020	18:20	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2020-07-31	2020	20:10	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2020-08-19	2020	20:43	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	05 - Dusk	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2020-08-28	2020	14:30	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2020-09-03	2020	13:51	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2020-11-13	2020	20:00	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2021-01-25	2021	17:15	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	05 - Dusk	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2021-03-06	2021	8:34	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2021-05-27	2021	10:35	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2021-08-05	2021	17:04	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2021-08-07	2021	12:18	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2021-09-17	2021	10:40	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2021-09-27	2021	16:28	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
2021-10-08	2021	12:45	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2021-11-04	2021	20:40	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2022-12-05	2021	19:16	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2022-12-13	2021	15:30	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2022-02-23	2022	6:42	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	03 - Dawn	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	06 - Ice	3	0	0	0
2022-04-27	2022	13:40	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2022-05-20	2022	17:30	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2022-05-22	2022	13:30	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
2022-06-14	2022	17:03	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2022-08-01	2022	14:32	MARAVISTA DR\SYSTEMHOUSE ST @ STRANDHERD DR (0013565)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry				

2018-11-05	2018	19:50	COBBLE HILL DR @ MARAVISTA DR (0013653)	03 - Snow	07 - Dark	02 - Stop sign	0	03 - P.D. only	06 - SMV unattended vehicle	03 - Loose snow	1	0	0	0
2019-01-21	2019	16:46	COBBLE HILL DR @ MARAVISTA DR (0013653)	03 - Snow	05 - Dusk	02 - Stop sign	0	03 - P.D. only	02 - Angle	05 - Packed snow	2	0	0	0
2019-07-26	2019	10:10	COBBLE HILL DR @ MARAVISTA DR (0013653)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2019-09-12	2019	18:28	COBBLE HILL DR @ MARAVISTA DR (0013653)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2022-03-21	2022	7:30	COBBLE HILL DR @ MARAVISTA DR (0013653)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2018-02-25	2018	Unknown	MARAVISTA DR btwn COBBLE HILL DR & BAMBURGH WAY (___SNDGU6)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0
2021-07-15	2021	7:25	MARAVISTA DR btwn COBBLE HILL DR & BAMBURGH WAY (___SNDGU6)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2020-04-11	2020	15:56	SYSTEMHOUSE ST btwn CITIGATE DR & STRANDHERD DR (e____2H80)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0

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Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: KENNEVALE DR @ STRANDHERD DR

Traffic Control: Traffic signal

Total Collisions: 41

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2017-Jan-28, Sat,15:55	Clear	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Passenger van	Other motor vehicle	
2017-Jan-30, Mon,08:30	Clear	Rear end	P.D. only	Ice	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Apr-27, Thu,08:50	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-May-01, Mon,22:33	Clear	Other	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Pole (sign, parking meter)	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2017-May-02, Tue,16:00	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Pick-up truck	Other motor vehicle	
2017-May-27, Sat,17:52	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2017-Jun-08, Thu,17:15	Clear	Turning movement	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2017-Jun-19, Mon,06:53	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Delivery van	Other motor vehicle	
2017-Oct-07, Sat,16:48	Clear	Turning movement	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Oct-28, Sat,18:35	Rain	Angle	P.D. only	Wet	West	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jan-15, Mon,03:35	Clear	SMV other	P.D. only	Slush	North	Going ahead	Automobile, station wagon	Skidding/sliding	0
2018-Mar-17, Sat,13:00	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Turning right	Automobile, station wagon	Other motor vehicle	

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From: January 1, 2017 **To:** December 31, 2021

Location: KENNEVALE DR @ STRANDHERD DR

Traffic Control: Traffic signal

Total Collisions: 41

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2018-Apr-02, Mon,12:57	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Oct-07, Sun,13:53	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Oct-09, Tue,16:15	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Dec-03, Mon,07:20	Rain	Rear end	P.D. only	Wet	West	Going ahead	Truck-other	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-17, Mon,15:00	Snow	Turning movement	P.D. only	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Dec-19, Wed,16:00	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Mar-09, Sat,11:44	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Passenger van	Other motor vehicle	
2019-Apr-07, Sun,20:13	Clear	Turning movement	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Making "U" turn	Police vehicle	Other motor vehicle	
2019-Apr-24, Wed,15:45	Clear	Sideswipe	P.D. only	Dry	South	Unknown	Unknown	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2019-May-11, Sat,09:17	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jun-18, Tue,10:01	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	

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From: January 1, 2017 **To:** December 31, 2021

Location: KENNEVALE DR @ STRANDHERD DR

Traffic Control: Traffic signal

Total Collisions: 41

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2019-Jul-10, Wed,09:03	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Pick-up truck	Other motor vehicle	
2019-Aug-23, Fri,10:58	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Aug-28, Wed,18:32	Clear	Rear end	Non-fatal injury	Dry	East	Stopped	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Nov-18, Mon,18:40	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Nov-20, Wed,17:12	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Dec-01, Sun,12:51	Clear	Angle	P.D. only	Wet	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					East	Making "U" turn	Automobile, station wagon	Other motor vehicle	
2019-Dec-12, Thu,15:47	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2020-Jan-02, Thu,17:43	Clear	Turning movement	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2020-Feb-27, Thu,16:00	Snow	Rear end	P.D. only	Slush	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2020-Jun-11, Thu,16:30	Clear	Other	P.D. only	Dry	East	Reversing	Pick-up truck	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2020-Aug-07, Fri,08:38	Clear	Other	P.D. only	Dry	West	Going ahead	Passenger van	Debris falling off vehicle	0
					West	Unknown	Unknown	Other	



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From: January 1, 2017 **To:** December 31, 2021

Location: KENNEVALE DR @ STRANDHERD DR

Traffic Control: Traffic signal

Total Collisions: 41

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2021-Feb-07, Sun,14:00	Clear	Rear end	P.D. only	Slush	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2021-Feb-18, Thu,13:45	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Pick-up truck	Other motor vehicle	
2021-Sep-12, Sun,09:50	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	
2021-Sep-17, Fri,18:13	Clear	Rear end	P.D. only	Loose sand or gravel	North	Going ahead	Pick-up truck	Other motor vehicle	0
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2021-Oct-18, Mon,14:40	Rain	Rear end	P.D. only	Wet	South	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2021-Nov-05, Fri,11:54	Clear	Angle	P.D. only	Loose sand or gravel	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	
2021-Nov-14, Sun,12:08	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	

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From: January 1, 2017 **To:** December 31, 2021

Location: MARAVISTA DR/SYSTEMHOUSE ST @ STRANDHERD DR

Traffic Control: Traffic signal

Total Collisions: 46

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2017-Mar-13, Mon,15:20	Clear	Rear end	P.D. only	Dry	East	Stopped	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Mar-24, Fri,21:54	Freezing Rain	SMV other	P.D. only	Slush	East	Going ahead	Automobile, station wagon	Skidding/sliding	0
2017-May-18, Thu,17:23	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Jun-01, Thu,16:49	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
2017-Sep-26, Tue,19:50	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Oct-12, Thu,12:32	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Making "U" turn	Automobile, station wagon	Other motor vehicle	
2017-Nov-04, Sat,18:19	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jan-03, Wed,17:07	Clear	Sideswipe	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Jan-08, Mon,12:00	Snow	Rear end	Non-fatal injury	Loose snow	East	Unknown	Unknown	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jul-01, Sun,17:16	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Passenger van	Other motor vehicle	
2018-Sep-04, Tue,09:40	Clear	Rear end	P.D. only	Dry	East	Stopped	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	

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Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: MARAVISTA DR/SYSTEMHOUSE ST @ STRANDHERD DR

Traffic Control: Traffic signal

Total Collisions: 46

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2018-Nov-16, Fri,16:00	Snow	SMV other	P.D. only	Loose snow	South	Going ahead	Automobile, station wagon	Skidding/sliding	0
2018-Dec-10, Mon,19:00	Clear	Sideswipe	P.D. only	Dry	West	Overtaking	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Dec-21, Fri,13:58	Rain	Rear end	P.D. only	Wet	North	Stopped	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Dec-23, Sun,21:25	Clear	Rear end	P.D. only	Loose snow	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jan-27, Sun,14:04	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Delivery van	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jan-29, Tue,16:41	Clear	Angle	Non-fatal injury	Packed snow	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Mar-08, Fri,14:10	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Passenger van	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2019-Apr-12, Fri,17:05	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jun-24, Mon,11:27	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jun-27, Thu,18:30	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jul-24, Wed,18:28	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Jul-31, Wed,16:00	Clear	Other	P.D. only	Dry	North	Reversing	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	

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Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: MARAVISTA DR/SYSTEMHOUSE ST @ STRANDHERD DR

Traffic Control: Traffic signal

Total Collisions: 46

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2019-Oct-06, Sun,14:20	Clear	Rear end	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Dec-20, Fri,10:36	Clear	Sideswipe	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2020-Jan-18, Sat,10:30	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2020-Jan-25, Sat,14:20	Snow	Rear end	P.D. only	Slush	East	Going ahead	Pick-up truck	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2020-Feb-01, Sat,18:41	Clear	Turning movement	P.D. only	Dry	East	Turning right	Pick-up truck	Other motor vehicle	0
					West	Turning left	Pick-up truck	Other motor vehicle	
2020-Feb-13, Thu,14:56	Snow	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2020-Mar-13, Fri,18:20	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Passenger van	Other motor vehicle	
2020-Jul-31, Fri,20:10	Clear	Rear end	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2020-Aug-19, Wed,20:43	Clear	Rear end	P.D. only	Dry	East	Stopped	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Aug-28, Fri,14:30	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Pick-up truck	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2020-Sep-03, Thu,13:51	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2020-Nov-13, Fri,20:00	Clear	Rear end	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Automobile, station wagon	Other motor vehicle	

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From: January 1, 2017 **To:** December 31, 2021

Location: MARAVISTA DR/SYSTEMHOUSE ST @ STRANDHERD DR

Traffic Control: Traffic signal

Total Collisions: 46

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2021-Jan-25, Mon,17:15	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Passenger van	Other motor vehicle	0
					West	Turning left	Pick-up truck	Other motor vehicle	
2021-Mar-06, Sat,08:34	Clear	Angle	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2021-May-27, Thu,10:35	Clear	Rear end	P.D. only	Dry	North	Turning right	Pick-up truck	Other motor vehicle	0
					North	Turning right	Pick-up truck	Other motor vehicle	
2021-Aug-05, Thu,17:04	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Unknown	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2021-Aug-07, Sat,12:18	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2021-Sep-17, Fri,10:40	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Passenger van	Other motor vehicle	
2021-Sep-27, Mon,16:28	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2021-Oct-08, Fri,12:45	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Truck - dump	Other motor vehicle	
2021-Nov-04, Thu,20:40	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2021-Dec-05, Sun,19:16	Clear	Rear end	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle	0
					North	Turning left	Unknown	Other motor vehicle	
2021-Dec-13, Mon,15:30	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Unknown	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: STRANDHERD DR btwn MARAVISTA DR & KENNEVALE DR

Traffic Control: No control

Total Collisions: 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2017-Aug-18, Fri,09:50	Rain	SMV other	P.D. only	Wet	North	Going ahead	Passenger van	Ran off road	0
2017-Sep-28, Thu,18:07	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Apr-11, Wed,14:59	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jul-02, Tue,15:09	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Aug-01, Thu,16:25	Clear	Rear end	Non-fatal injury	Dry	East	Slowing or stopping	Passenger van	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Sep-20, Fri,17:39	Clear	Rear end	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	0
					West	Slowing or stopping	Pick-up truck	Other motor vehicle	
2019-Oct-01, Tue,17:56	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Passenger van	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2019-Dec-22, Sun,12:30	Clear	Rear end	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Apr-04, Sat,16:30	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Jul-27, Mon,14:30	Clear	Rear end	P.D. only	Dry	West	Unknown	Unknown	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2021-Jun-28, Mon,09:54	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Passenger van	Other motor vehicle	0
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: STRANDHERD DR btwn MARAVISTA DR & KENNEVALE DR

Traffic Control: No control

Total Collisions: 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2021-Oct-21, Thu, 17:00	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Unknown	Other motor vehicle	0
					West	Going ahead	Pick-up truck	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: SYSTEMHOUSE ST btwn CITIGATE DR & STRANDHERD DR

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2020-Apr-11, Sat, 15:56	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Municipal transit bus	Other motor vehicle	

Appendix E

TDM Checklist

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend	
REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	☒
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☒
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☒
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see <i>Official Plan policy 4.3.3</i>)	☒
REQUIRED	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see <i>Official Plan policy 4.3.12</i>)	☒

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see <i>Official Plan policy 4.3.10</i>)	☒
REQUIRED	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see <i>Official Plan policy 4.3.10</i>)	☒
REQUIRED	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see <i>Official Plan policy 4.3.11</i>)	☒
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☒
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☐
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (<i>see Official Plan policy 4.3.6</i>)	☒
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (<i>see Zoning By-law Section 111</i>)	☒
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (<i>see Zoning By-law Section 111</i>)	☒
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5 Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (<i>see Zoning By-law Section 111</i>)	☐
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
2.3 Shower & change facilities		
BASIC	2.3.1 Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2 In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
2.4 Bicycle repair station		
BETTER	2.4.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
4.2 Carpool parking		
BASIC	4.2.1 Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2 At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces (<i>see Zoning By-law Section 94</i>)	☐
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☒
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (<i>see Zoning By-law Section 104</i>)	☐
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (<i>see Zoning By-law Section 111</i>)	☐
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
7. OTHER		
7.1 On-site amenities to minimize off-site trips		
BETTER	7.1.1 Provide on-site amenities to minimize mid-day or mid-commute errands	☐

TDM Measures Checklist:

Non-Residential Developments (office, institutional, retail or industrial)

Legend	
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance
★	The measure is one of the most dependably effective tools to encourage the use of sustainable modes

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
1. TDM PROGRAM MANAGEMENT		
1.1 Program coordinator		
BASIC	★ 1.1.1 Designate an internal coordinator, or contract with an external coordinator	☐
1.2 Travel surveys		
BETTER	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
2. WALKING AND CYCLING		
2.1 Information on walking/cycling routes & destinations		
BASIC	2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances	☒
2.2 Bicycle skills training		
<i>Commuter travel</i>		
BETTER	★ 2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses	☐
2.3 Valet bike parking		
<i>Visitor travel</i>		
BETTER	2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	☐

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
3. TRANSIT		
3.1 Transit information		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances	☒
BASIC	3.1.2 Provide online links to OC Transpo and STO information	☐
BETTER	3.1.3 Provide real-time arrival information display at entrances	☐
3.2 Transit fare incentives		
<i>Commuter travel</i>		
BETTER	3.2.1 Offer preloaded PRESTO cards to encourage commuters to use transit	☒
BETTER ★	3.2.2 Subsidize or reimburse monthly transit pass purchases by employees	☐
<i>Visitor travel</i>		
BETTER	3.2.3 Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	☐
3.3 Enhanced public transit service		
<i>Commuter travel</i>		
BETTER	3.3.1 Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	☐
<i>Visitor travel</i>		
BETTER	3.3.2 Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	☐
3.4 Private transit service		
<i>Commuter travel</i>		
BETTER	3.4.1 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	☐
<i>Visitor travel</i>		
BETTER	3.4.2 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	☐

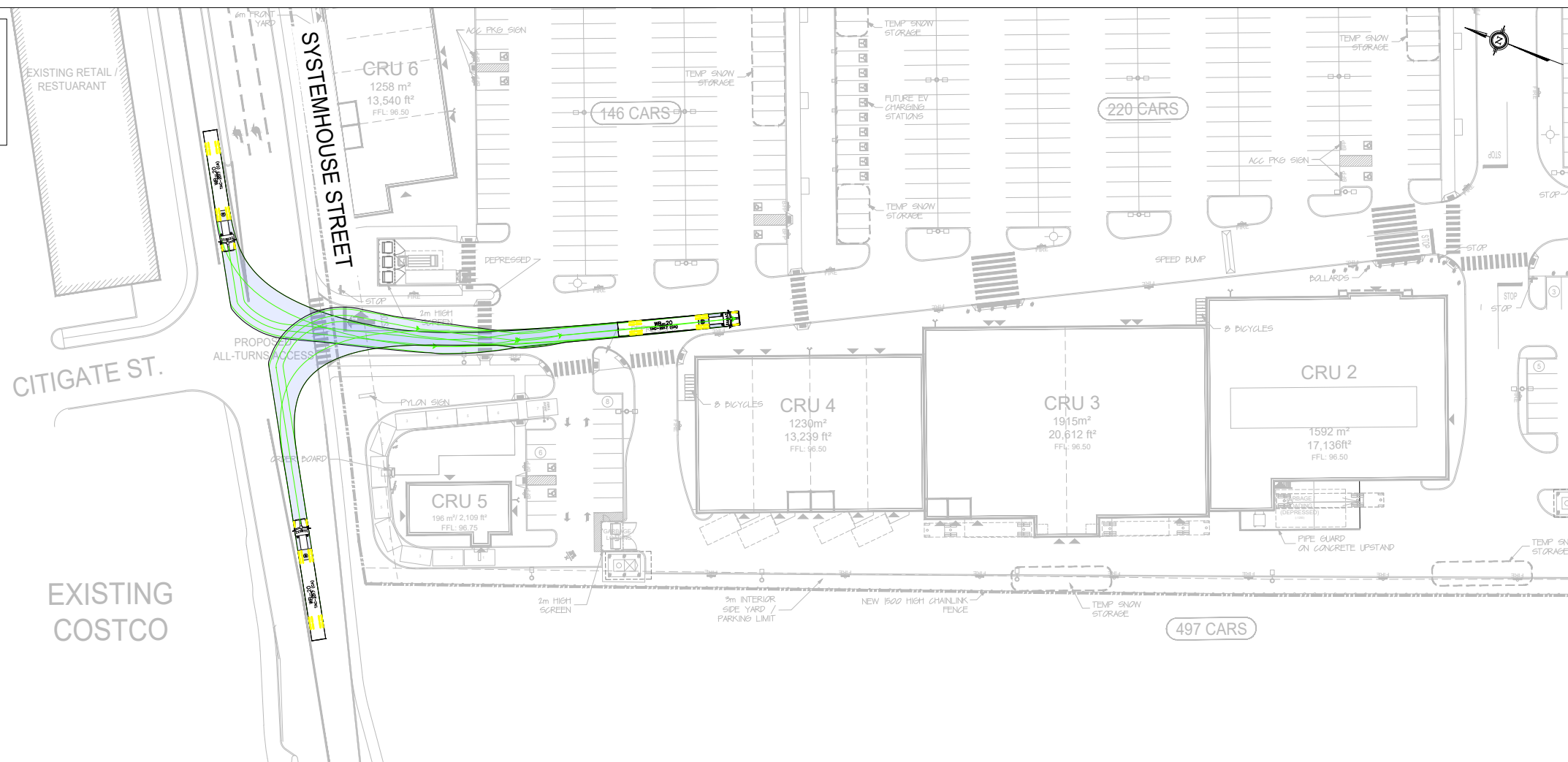
TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
4. RIDESHARING		
4.1 Ridematching service		
<i>Commuter travel</i>		
BASIC ★	4.1.1 Provide a dedicated ridematching portal at OttawaRideMatch.com	☐
4.2 Carpool parking price incentives		
<i>Commuter travel</i>		
BETTER	4.2.1 Provide discounts on parking costs for registered carpools	☐
4.3 Vanpool service		
<i>Commuter travel</i>		
BETTER	4.3.1 Provide a vanpooling service for long-distance commuters	☐
5. CARSHARING & BIKESHARING		
5.1 Bikeshare stations & memberships		
BETTER	5.1.1 Contract with provider to install on-site bikeshare station for use by commuters and visitors	☐
<i>Commuter travel</i>		
BETTER	5.1.2 Provide employees with bikeshare memberships for local business travel	☐
5.2 Carshare vehicles & memberships		
<i>Commuter travel</i>		
BETTER	5.2.1 Contract with provider to install on-site carshare vehicles and promote their use by tenants	☐
BETTER	5.2.2 Provide employees with carshare memberships for local business travel	☐
6. PARKING		
6.1 Priced parking		
<i>Commuter travel</i>		
BASIC ★	6.1.1 Charge for long-term parking (daily, weekly, monthly)	☐
BASIC	6.1.2 Unbundle parking cost from lease rates at multi-tenant sites	☐
<i>Visitor travel</i>		
BETTER	6.1.3 Charge for short-term parking (hourly)	☐

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
7. TDM MARKETING & COMMUNICATIONS		
7.1 Multimodal travel information		
<i>Commuter travel</i>		
BASIC	★ 7.1.1	Provide a multimodal travel option information package to new/relocating employees and students ☒
<i>Visitor travel</i>		
BETTER	★ 7.1.2	Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games) ☐
7.2 Personalized trip planning		
<i>Commuter travel</i>		
BETTER	★ 7.2.1	Offer personalized trip planning to new/relocating employees ☐
7.3 Promotions		
<i>Commuter travel</i>		
BETTER	7.3.1	Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes ☐
8. OTHER INCENTIVES & AMENITIES		
8.1 Emergency ride home		
<i>Commuter travel</i>		
BETTER	★ 8.1.1	Provide emergency ride home service to non-driving commuters ☐
8.2 Alternative work arrangements		
<i>Commuter travel</i>		
BASIC	★ 8.2.1	Encourage flexible work hours ☐
BETTER	8.2.2	Encourage compressed workweeks ☐
BETTER	★ 8.2.3	Encourage telework ☐
8.3 Local business travel options		
<i>Commuter travel</i>		
BASIC	★ 8.3.1	Provide local business travel options that minimize the need for employees to bring a personal car to work ☐
8.4 Commuter incentives		
<i>Commuter travel</i>		
BETTER	8.4.1	Offer employees a taxable, mode-neutral commuting allowance ☐
8.5 On-site amenities		
<i>Commuter travel</i>		
BETTER	8.5.1	Provide on-site amenities/services to minimize mid-day or mid-commute errands ☐

Appendix F

Turning Templates

WB-20
Inbound Movements
Systemhouse Street



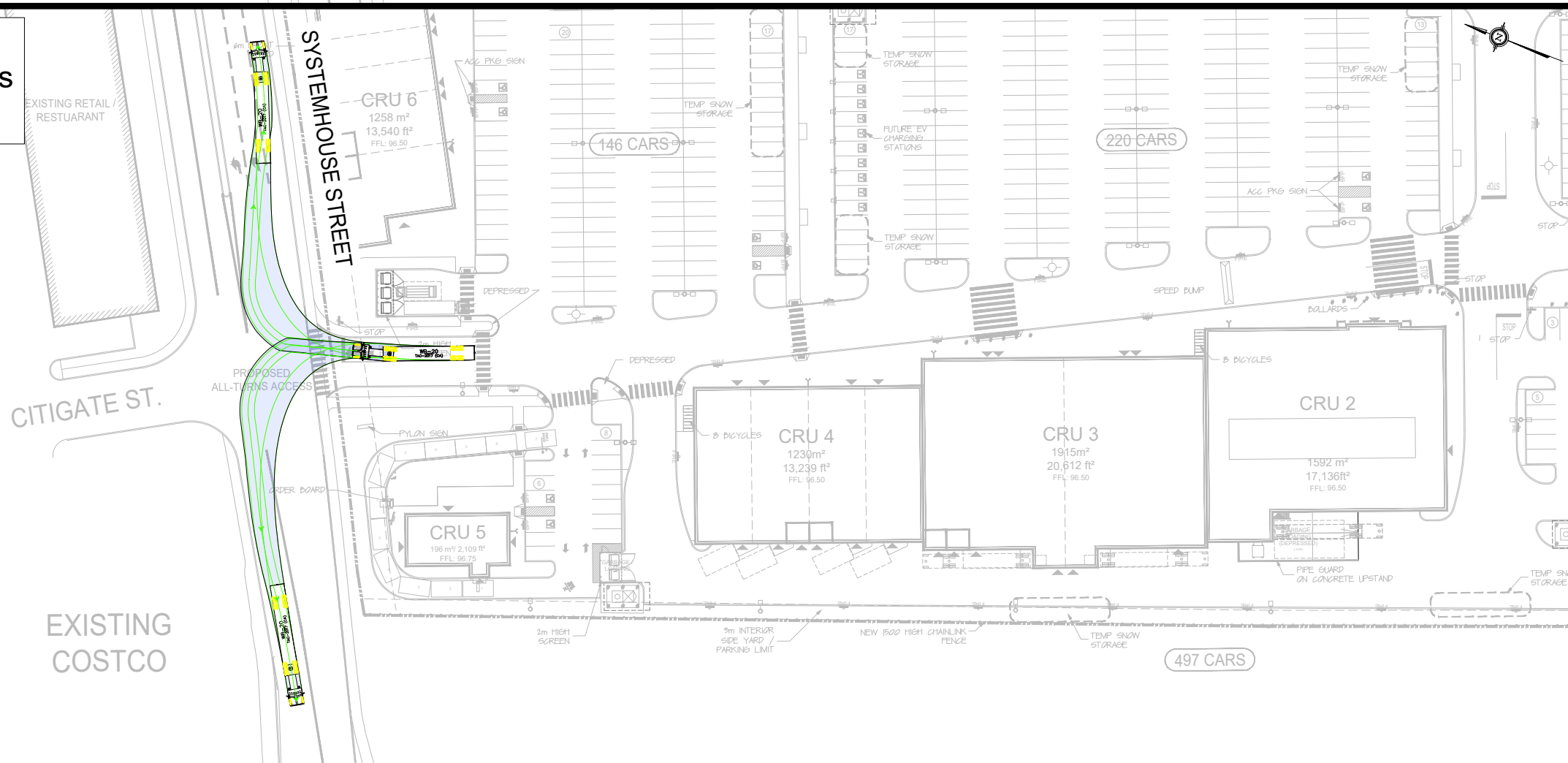
Notes:

Key Plan:

WB-20

Tractor Width	: 2600	Lock to Lock Time	: 6.0
Tractor Width	: 2600	Steering Angle	: 28.2
Tractor Track	: 2600	Articulating Angle	: 70.0
Tractor Track	: 2600		

WB-20
Outbound Movements
Systemhouse Street



03	Issued for review:	EA	2026-08-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation

6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT:

Choice Properties REIT

ARCHITECT:

SITE:

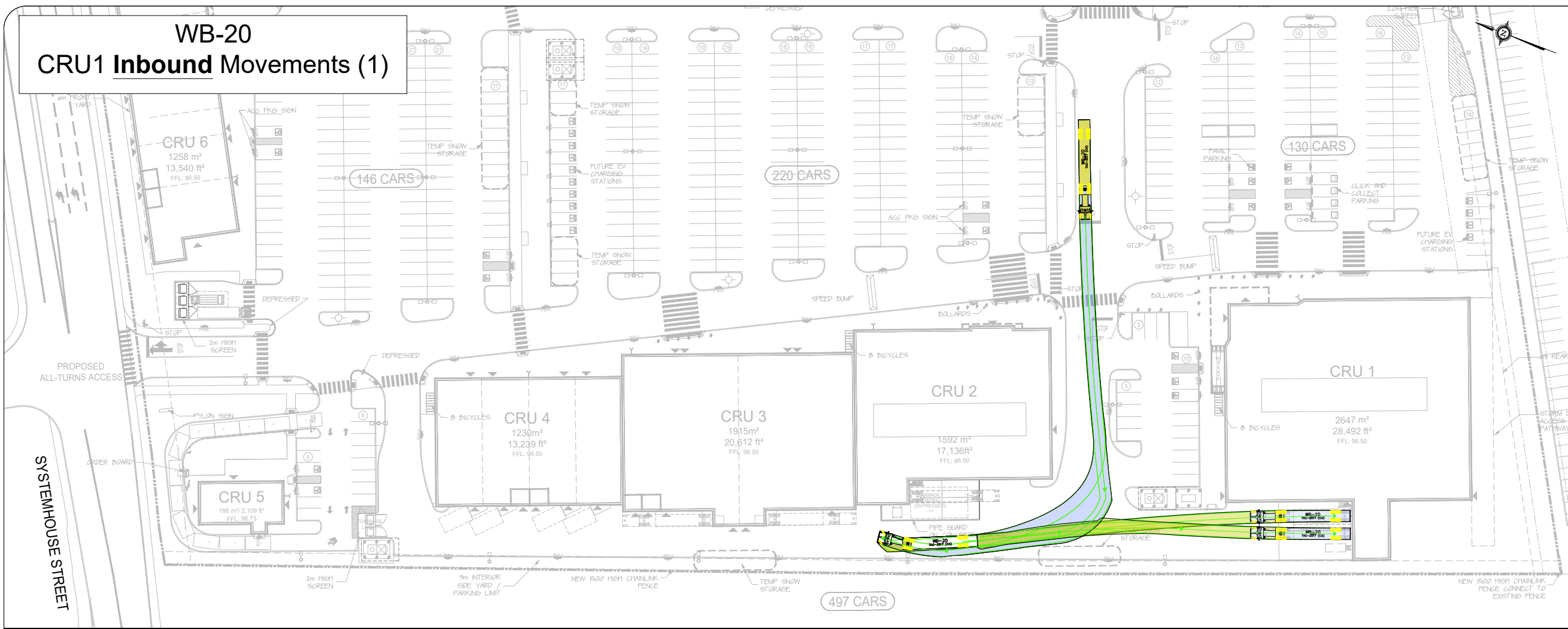
4175 Strandherd Drive

TITLE:

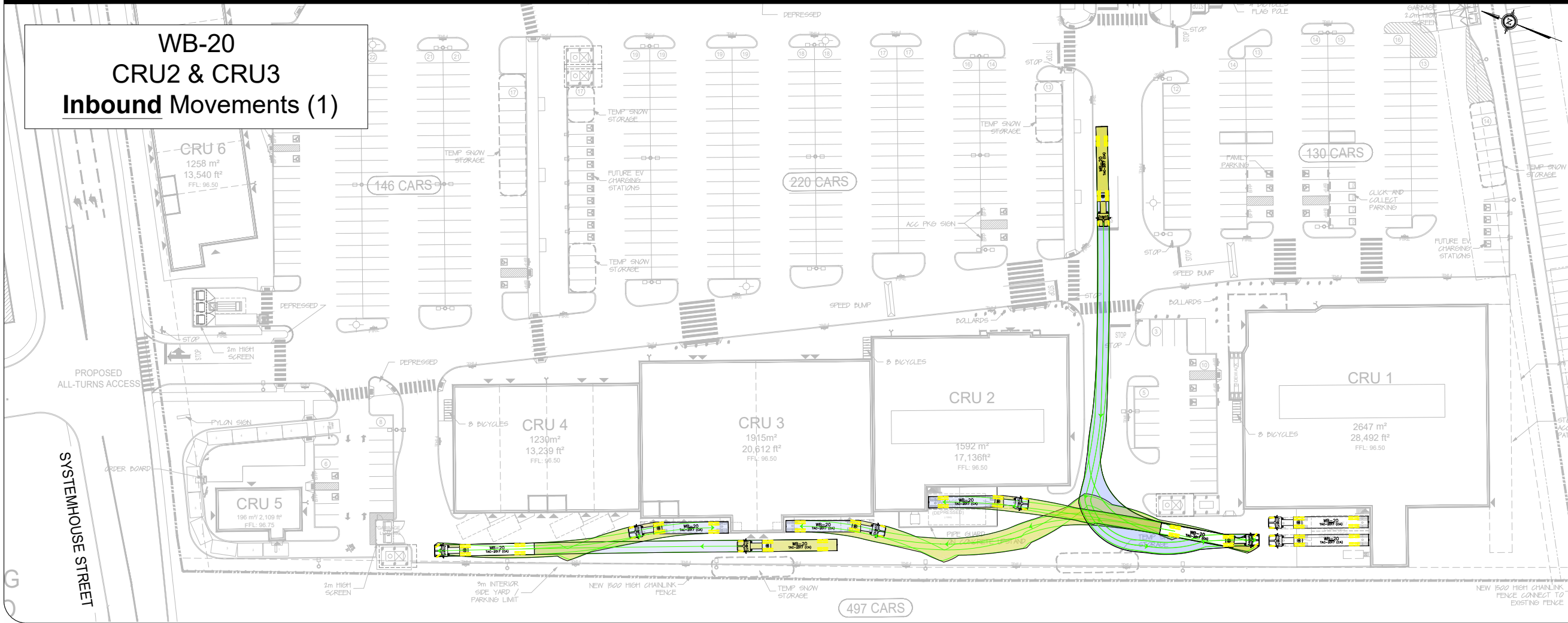
Turning Movement Analysis

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2026-08-25	EA	AL
PROJECT NO:	DRAWING NO:	REVISION:	
2026-100	001	03	

WB-20
CRU1 Inbound Movements (1)



WB-20
CRU2 & CRU3
Inbound Movements (1)



Notes:

Key Plan:

WB-20

	mm		
Tractor Width	: 2600	Lock to Lock Time	: 6.0
Trailer Width	: 2600	Steering Angle	: 28.2
Tractor Track	: 2600	Articulating Angle	: 70.0
Trailer Track	: 2600		

03	Issued for review:	EA	2026-08-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation

6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT:

Choice Properties REIT

ARCHITECT:

SITE:

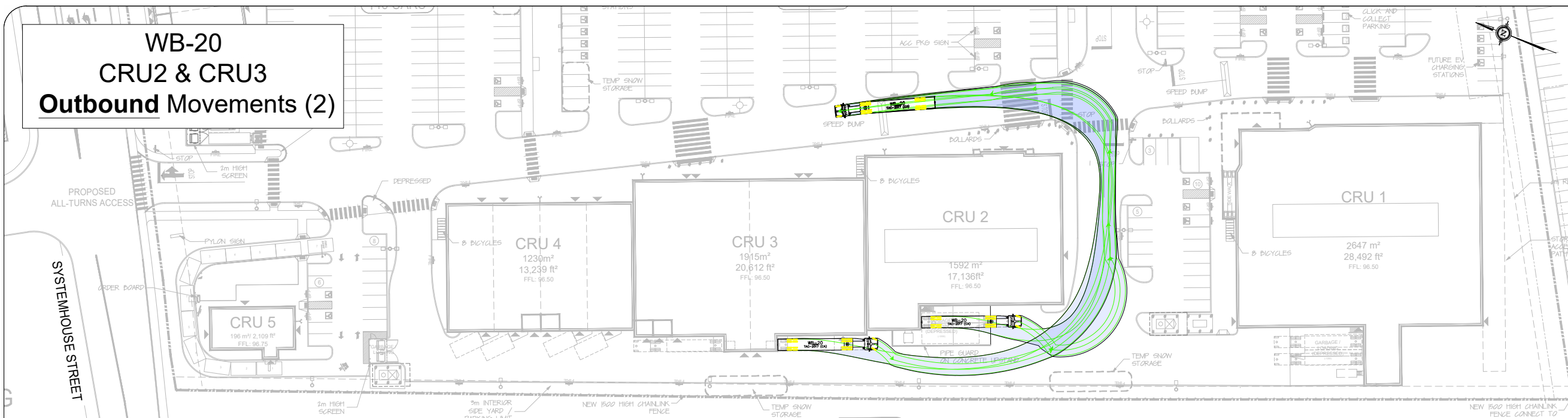
4175 Strandherd Drive

TITLE:

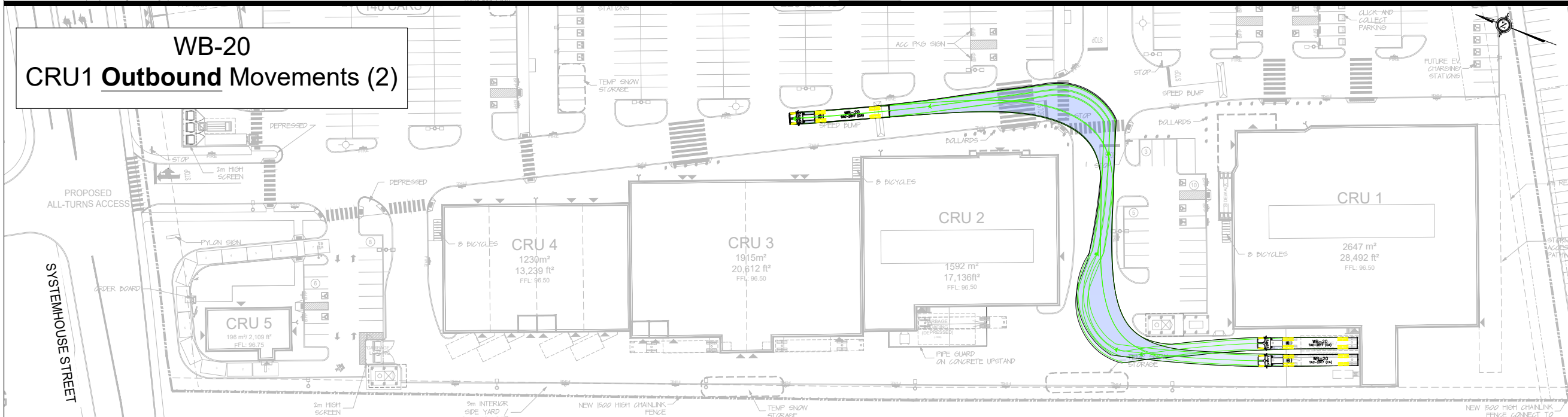
Turning Movement Analysis

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2026-08-25	EA	AL
PROJECT NO:	DRAWING NO:	REVISION:	
2026-100	002	03	

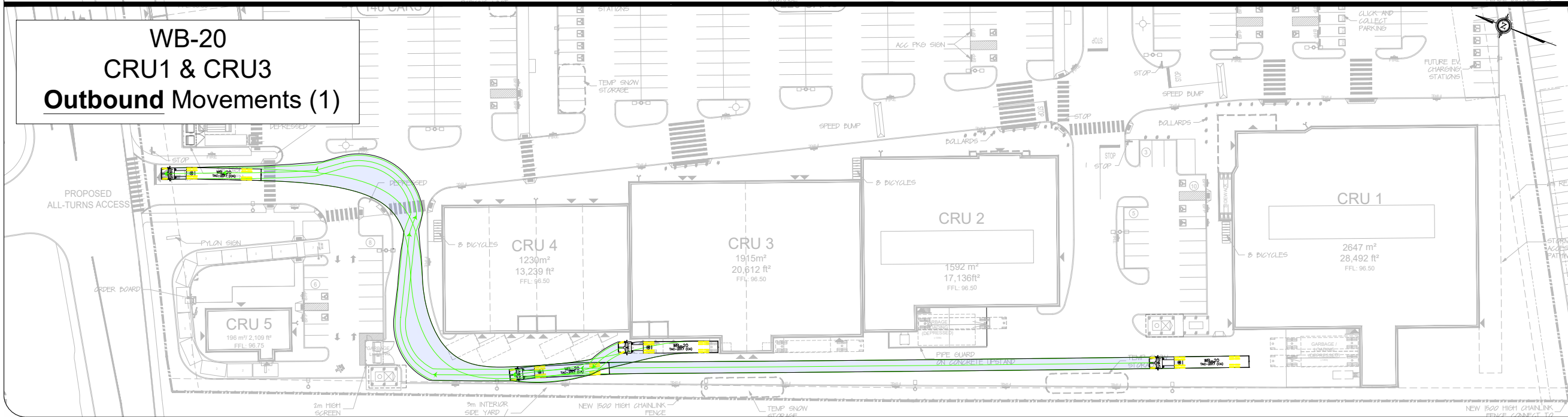
WB-20
CRU2 & CRU3
Outbound Movements (2)



WB-20
CRU1 Outbound Movements (2)



WB-20
CRU1 & CRU3
Outbound Movements (1)



Notes:

Key Plan:

WB-20

	mm		
Tractor Width	: 2600	Lock to Lock Time	: 6.0
Tractor Track	: 2600	Steering Angle	: 28.2
Trailer Track	: 2600	Articulating Angle	: 70.0

03	Issued for review:	EA	2026-08-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

 CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT:
Choice Properties REIT

ARCHITECT:

SITE:
4175 Strandherd Drive

TITLE:
Turning Movement Analysis

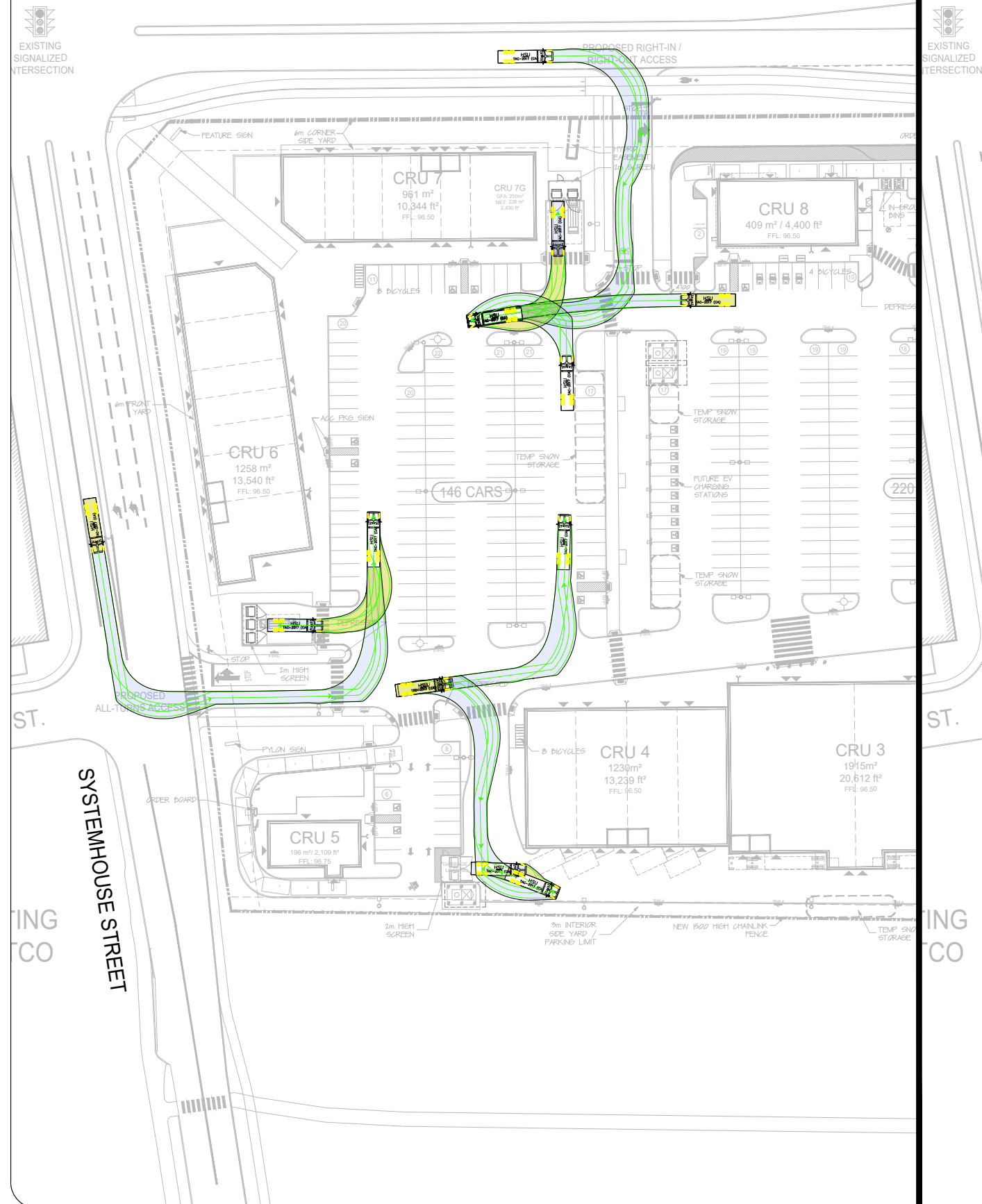
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N.T.S.	2026-08-25	EA	AL

PROJECT NO:	DRAWING NO:	REVISION:
2026-100	003	03

HSU Inbound Movements

Loading Area

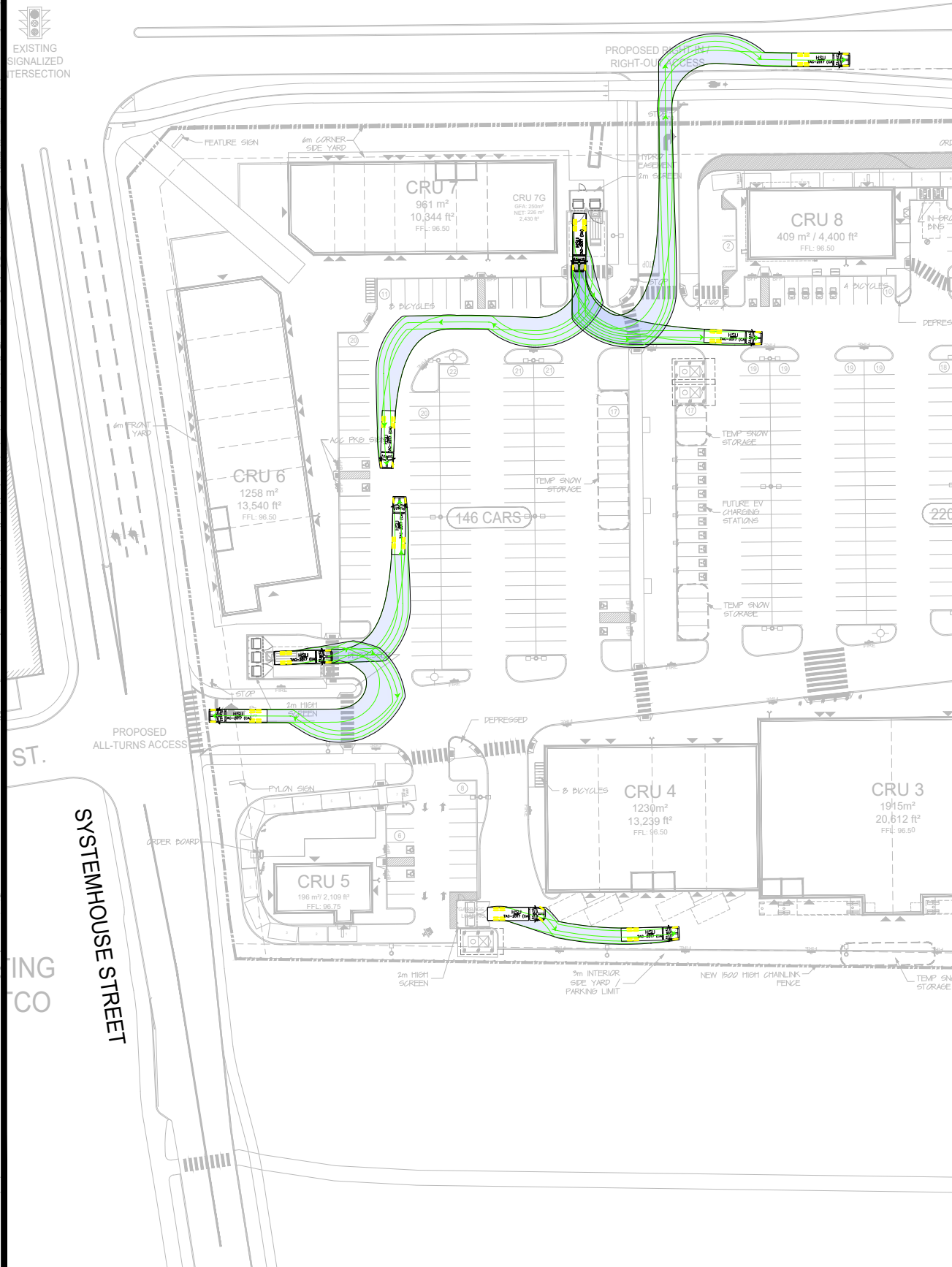
STRANDHERD DRIVE



HSU Outbound Movements

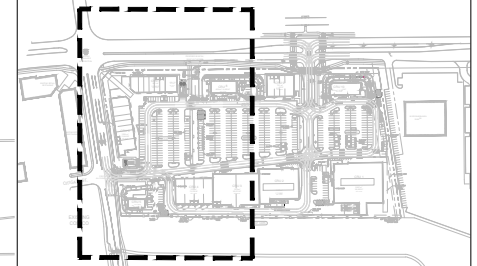
Loading Area

STRANDHERD DRIVE

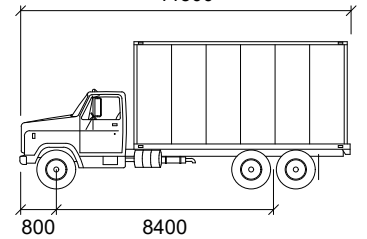


Notes:

Key Plan:



11500



HSU

mm

Width : 2600
Track : 2600
Lock to Lock Time : 6.0
Steering Angle : 40.0

03	Issued for review:	EA	2026-08-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			



CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT:

Choice Properties REIT

ARCHITECT:

SITE:

4175 Strandherd Drive

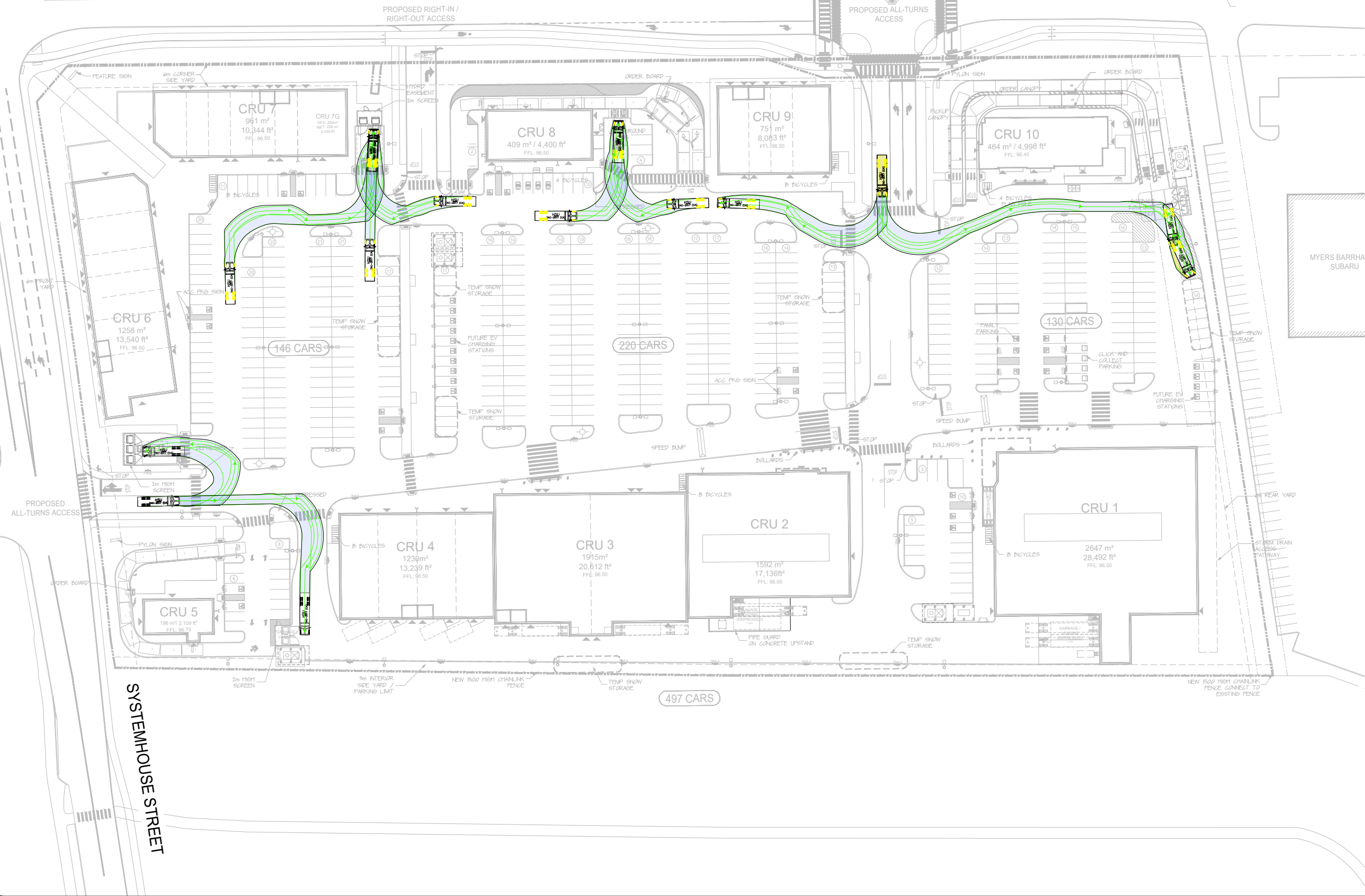
TITLE:

Turning Movement Analysis

SCALE AT A3: NTS	DATE: 2026-08-25	DRAWN: EA	CHECKED: AL
PROJECT NO: 2026-100	DRAWING NO: 005		REVISION: 03

HSU Inbound Movements
Garbage Area

STRANDHERD DRIVE



Notes:

Key Plan:

11500

800 8400

HSU

mm

Width : 2600

Track : 2600

Lock to Lock Time : 6.0

Steering Angle : 40.0

03	Issued for review:	EA	2026-08-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT:
Choice Properties REIT

ARCHITECT:

SITE:
4175 Strandherd Drive

TITLE:
Turning Movement Analysis

SCALE AT A3: NTS	DATE: 2026-08-25	DRAWN: EA	CHECKED: AL
PROJECT NO: 2026-100	DRAWING NO: 005	REVISION: 03	

HSU Outbound Movements
Garbage Area

STRANDHERD DRIVE



Notes:

Key Plan:

11500
800 8400

HSU

mm

Width : 2600
Track : 2600
Lock to Lock Time : 6.0
Steering Angle : 40.0

03 Issued for review: EA 2026-08-25
REV: DESCRIPTION: BY: DATE:
STATUS:

 CGH Transportation
6 Plaza Court
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K2H 7W1
(343) 999-9117

CLIENT:
Choice Properties REIT

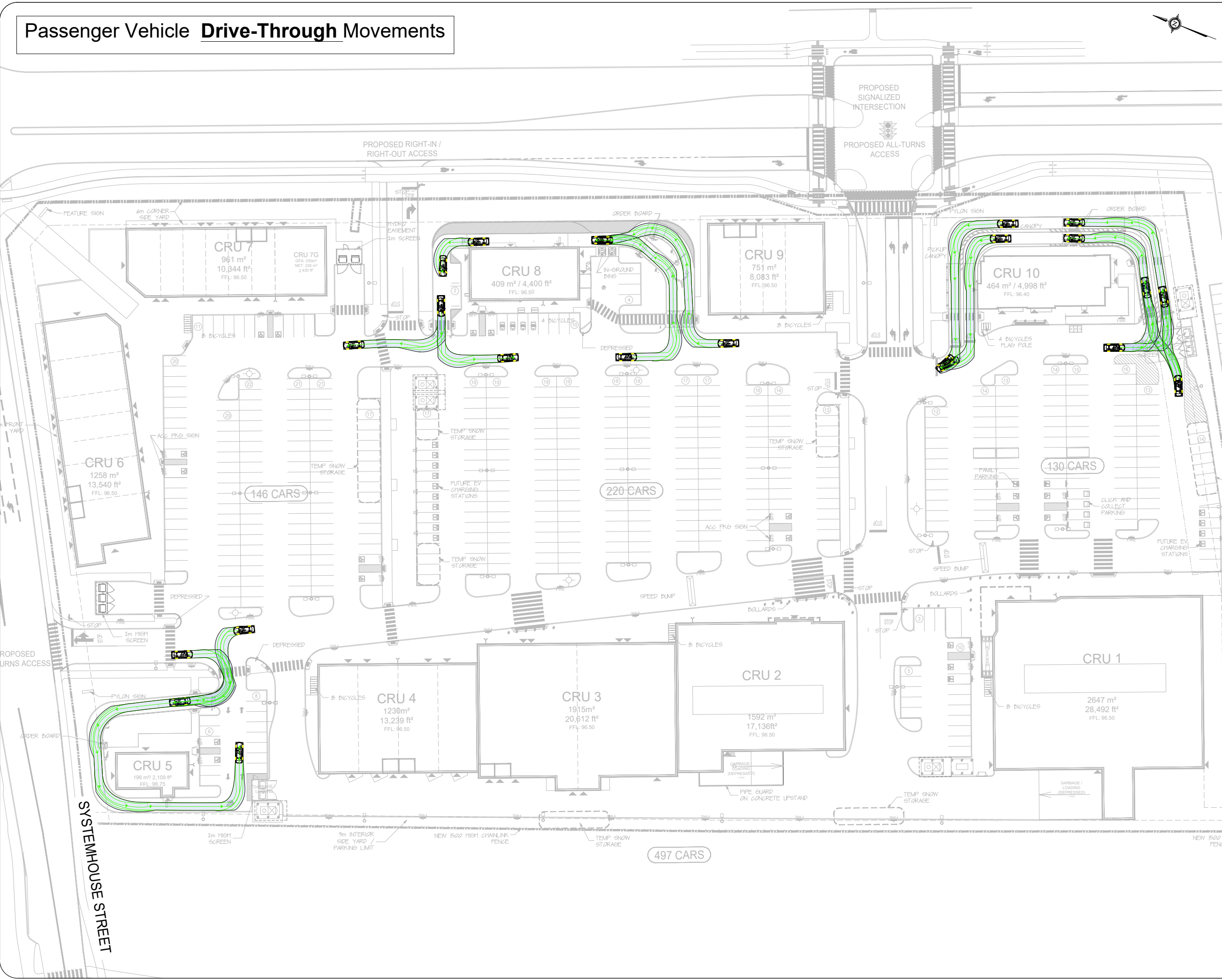
ARCHITECT:

SITE:
4175 Strandherd Drive

TITLE:
Turning Movement Analysis

SCALE AT A3: NTS	DATE: 2026-08-25	DRAWN: EA	CHECKED: AL
PROJECT NO: 2026-100	DRAWING NO: 006	REVISION: 03	

Passenger Vehicle Drive-Through Movements



Notes:

Key Plan:

5600

1100 3200

P

Width : 2000 mm

Track : 2000 mm

Lock to Lock Time : 6.0 mm

Steering Angle : 35.9 mm

03	Issued for review:	EA	2026-08-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT:
Choice Properties REIT

ARCHITECT:

SITE:
4175 Strandherd Drive

TITLE:
Turning Movement Analysis

SCALE AT A3: NTS	DATE: 2026-08-25	DRAWN: EA	CHECKED: AL
PROJECT NO: 2026-100	DRAWING NO: 007	REVISION: 03	

Fire Truck Site Circulation Movements (1)



Notes:

Key Plan:

12800

3090 5840

Aerial Fire

Width	: 2540
Track	: 2540
Lock to Lock Time	: 6.0
Steering Angle	: 37.0

03	Issued for review:	EA	2026-08-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT:

Choice Properties REIT

ARCHITECT:

SITE:

4175 Strandherd Drive

TITLE:

Turning Movement Analysis

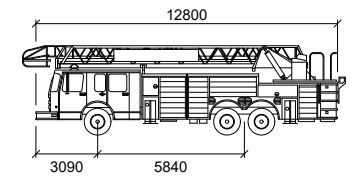
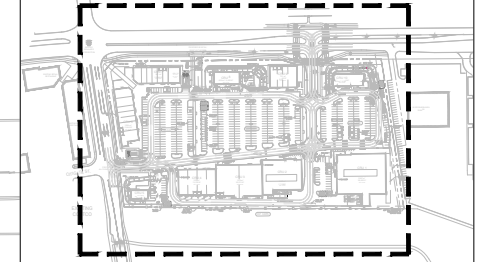
SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2026-08-25	EA	AL
PROJECT NO:	DRAWING NO:	REVISION:	
2026-100	008	03	

Fire Truck Site Circulation Movements (2)



Notes:

Key Plan:



Aerial Fire

	mm
Width	: 2540
Track	: 2540
Lock to Lock Time	: 6.0
Steering Angle	: 37.0

03	Issued for review:	EA	2026-08-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			



CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT:

Choice Properties REIT

ARCHITECT:

SITE:

4175 Strandherd Drive

TITLE:

Turning Movement Analysis

SCALE AT A3: NTS	DATE: 2026-08-25	DRAWN: EA	CHECKED: AL
PROJECT NO: 2026-100	DRAWING NO: 009		REVISION: 03

Appendix G

MMLOS Analysis

Multi-Modal Level of Service - Segments Form

Project: 4175 Strandherd Drive
Consultant: CGH Transportation
Date: 2026-07-29
Scenario: Existing/Future

Segment Name		Strandherd Drive		Systemhouse Street		
OP Transect / Policy Area		Outer Urban or Suburban		Outer Urban or Suburban		
Segment Component Side of Street		Majority (>50%)		Majority (>50%)		
		W		S		
Pedestrian	PLOS Inputs					
	Posted Speed (km/h)		80 km/h		50 km/h	
	Two-Way ADT		24,900		8,500	
	Pedestrian Facility		Sidewalk		Sidewalk	
	Does the facility meet the TMP Sidewalk or MUP Policy? If not, for MUPs, does the location have a low volume of peak daily users AND are pedestrian volumes likely less than 20% of total users?		Yes		Yes	
	Facility Width (m)		1.80m		1.80m	
	Offset from Motor Vehicle Travel Lanes (m)		≥ 3.0m		< 0.5m	
	Presence of Adjacent Parking?		No		-	
	General Purpose Curb Lane ADT		-		> 3000	
	Max. Distance between Controlled Crossings (m)		261-290m		≤ 200m	
Score		3.50 -		- 2.75		
PLOS		B -		- C		
Target PLOS		C		C		
Bicycle	BLOS Inputs					
	Cycling Route Classification		Cross-Town Bikeway		Elsewhere	
	Cycling Facility		Cycle Track		Input PLOS First	
	Is the minimum level of separation provided according to OTM Book 18 Pre-Selection Nomograph - Rural Context (Figure 5.6)? (for paved shoulders)		-		Painted or Physically Separated Bike Lanes	
	Facility Operation		Unidirectional		Unidirectional	
	Pedestrian/Cyclist Volume		-		-	
	Facility Width		1.8m-2.09m		1.8-1.99m	
	Boulevard/Buffer Width (excluding curb)		Outside clear zone or continuous traffic barrier provided		< 1.0m and no vertical measure or < 0.6m with adjacent parking	
	Unsignalized Roadway Crossing Type (where cyclists are required to yield)		None		Cross-Street	
	Number of Travel Lanes at Crossing		-		≤ 2	
	Crossing includes Median Refuge (≥ 2.7m)		-		No	
	Cross-street Posted Speed (km/h)		-		50 km/h	
	Cycling Path Blockages (e.g. bus stops and/or loading zones)		-		Rare	
	Score		4.50 -		- 2.60	
	BLOS		A -		- C	
Target BLOS		B		C		
Transit	TLOS Inputs					
	Transit Facility		Select Transit Designation		Mixed Traffic	
	Facility Type				Mixed Traffic	
	Expected Transit Running Time				Slightly Impeded	
	Transit Travel Speed (if available)				Enter Speed (if available)	
	TLOS		- -		- C	
Target TLOS		-		E (D for frequent transit routes)		
Public Realm	PRLOS Inputs					
	Context		Other Streets		Input PLOS and BLOS First	
	Inner Boulevard Width		1.5-1.99m		≤ 0.6m	
	Middle Boulevard Width		≤ 0.5m		≤ 0.5m	
	Outer Boulevard (Frontage) Width		1.5-1.99m		≥ 3.0m	
	Transit Route on Segment?		No		Yes	
	Bus Stop Elements		-		Curbside landing zone with no shelter	
	Number of Midblock Traffic Lanes (both travel directions)		4		≤ 2	
	Score		16.20 -		- 24.30	
PRLOS		C -		- B		
		C		B		

Multi-Modal Level of Service - Intersections Form

Project: 4175 Strandherd Drive
Consultant: CGH Transportation
Date: 2026-07-29
Scenario: Existing/Future

Intersection Name		Strandherd Drive at Fallowfield Road/Citigate Drive				Strandherd Drive at CrossKeys Place/Helene-Campbell Road				Strandherd Drive at Systemhouse Street/Maravista Drive			
OP Transect / Policy Area		Outer Urban or Suburban				Outer Urban or Suburban				Outer Urban or Suburban			
Pedestrian	PLOS Inputs												
	Pedestrians Crossing the	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
	Number of Travel Lanes Crossed	7	6	5	4	6	7	4	5	6	6	1-3	5
	Median Refuge (≥2.7m)	No	No	No	No	No	No	No	No	No	No	No	No
	Crosswalk Treatment	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings
	Signal Cycle Length (sec)	120.0				120.0				120.0			
	Effective Walk Time (sec)	11.0	11.0	7.0	7.0	29.0	29.0	7.0	7.0	16.0	16.0	8.0	8.0
	Conflict with Right-Turn Vehicles (For PLOS & BLOS)	WBR	EBR	NBR	SBR	WBR	EBR	NBR	SBR	WBR	EBR	NBR	SBR
	Right-Turn Geometry	Conventional Right-Turn Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel
	Right-Turn Signal Phasing	-	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
	Right-Turn Volume	> 300 veh/h	> 150 to 300 veh/h	≤ 150 veh/h	> 150 to 300 veh/h	> 150 to 300 veh/h	≤ 150 veh/h	≤ 150 veh/h	> 150 to 300 veh/h	≤ 150 veh/h	> 300 veh/h	≤ 150 veh/h	≤ 150 veh/h
	Right-Turn Effective Corner Radius	-	> 8m	> 8m	> 8m	> 8m	> 8m	> 8m	> 8m	> 8m	> 8m	> 8m	> 8m
	Cross-street Posted Speed (km/h)	60 km/h		80 km/h		50 km/h		80 km/h		50 km/h		80 km/h	
	Conflict with Left-Turn Vehicles (For PLOS & BLOS)	EBL	WBL	SBL	NBL	EBL	WBL	SBL	NBL	EBL	WBL	SBL	NBL
	Left-Turn Signal Phasing	Fully Protected	Fully Protected	Fully Protected	Fully Protected	Perm or Prot+Perm	Perm or Prot+Perm	Fully Protected	Fully Protected	Fully Protected	Fully Protected	Fully Protected	Fully Protected
Left-Turn Volume	-	-	-	-	> 100 veh/h	≤ 50 veh/h	-	-	-	-	-	-	
Left-Turn Opposing Lanes	-	-	-	-	-	-	-	-	-	-	-	-	
Score	1.15	1.90	2.80	3.10	1.85	1.90	3.40	2.50	2.35	1.75	4.00	2.80	
PLOS	E	D	C	C	D	D	C	C	D	D	B	C	
	D				D				C				
Target PLOS	C				C				C				
Bicycle	BLOS Inputs												
	Cycling Route Classification	Cross-Town Bikeway				Cross-Town Bikeway				Cross-Town Bikeway			
	Cyclists Crossing the	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
	Type of Cycling Facility Across Leg	Crossride	Crossride	Mixed Traffic	Mixed Traffic	Crossride	Crossride	Bike Lane Through Intersection	Bike Lane Through Intersection	Crossride	Crossride	Mixed Traffic	Mixed Traffic
	Two-Way ADT (in Cyclist Travel Direction)	29,050		9,150		21,850		6,350		23,150		5,250	
	Floating Bike Lane or Right-Turn Lane Crossover Approaching the Crossing?	No	No	No	No	No	No	Yes	Yes	No	No	No	No
	Crossride Operation	Unidirectional	Unidirectional	-	-	Unidirectional	Unidirectional	-	-	Unidirectional	Unidirectional	-	-
	Target Crossride Setback Met?	-	Yes	-	-	Yes	Yes	-	-	Yes	Yes	-	-
	Right-Turn Vehicle Volume from Adjacent Roadway > 100 veh/h?	-	-	-	-	-	-	-	-	-	-	-	-
	Cyclist Left-Turn Operation	WBL	EBL	NBL	SBL	WBL	EBL	NBL	SBL	WBL	EBL	NBL	SBL
	Cyclist Left-Turn Treatment Type	Protected Corner	Protected Corner	Protected Corner	Protected Corner	Protected Corner	Protected Corner	Protected Corner	Protected Corner	Protected Corner	Protected Corner	Protected Corner	Protected Corner
	Vehicle Lanes Crossed by Cyclists	-	-	-	-	-	-	-	-	-	-	-	-
	Score	100	130	80	60	90	140	75	75	140	100	80	80
	BLOS	B	A	C	D	C	A	C	C	A	B	C	C
		B				B				B			
Target BLOS	B				B				B				
Transit	TLOS Inputs												
	Transit Facility	Mixed Traffic				Mixed Traffic				Mixed Traffic			
	Vehicles Travelling	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound
	Average Transit Delay (if available)	≤ 10 sec	56-80 sec	36-55 sec		56-80 sec	36-55 sec		36-55 sec	36-55 sec		21-35 sec	
	Example Transit Priority Treatment	-	-	-		-	-		-	-		-	
	TLOS	A	E	-	D	E	-	D	D	-	-	D	C
		C				D				C			
Target TLOS	E (D for frequent transit routes)				E (D for frequent transit routes)				E (D for frequent transit routes)				
Auto	AutoLOS Inputs												
	Overall Intersection Volume to Capacity Ratio	> 1.00				0.61 to 0.70				0.91 to 1.00			
	Individual Movements V/C Ratios and Queue Lengths	See Separate Traffic Operations Table				See Separate Traffic Operations Table				See Separate Traffic Operations Table			
	AutoLOS	F				B				E			
	Target AutoLOS	E				E				E			

Multi-Modal Level of Service - Intersections Form

Project: 4175 Strandherd Drive
Consultant: CGH Transportation
Date: 2026-07-29
Scenario: Existing/Future

Intersection Name		Strandherd Drive at Dealership Drive/Kennevale Drive				Strandherd Drive at Access #2			
OP Transect / Policy Area		Outer Urban or Suburban				Outer Urban or Suburban			
Pedestrian	PLOS Inputs								
	Pedestrians Crossing the	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
	Number of Travel Lanes Crossed	6	6	1-3	5	5	5	No Crosswalk	1-3
	Median Refuge (≥2.7m)	No	No	No	No	Yes	Yes	-	No
	Crosswalk Treatment	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	-	Zebra Stripe Hi-Vis Markings
	Signal Cycle Length (sec)	120.0				120.0			
	Effective Walk Time (sec)	35.0	35.0	8.0	8.0	27.0	55.0	-	8.0
	Conflict with Right-Turn Vehicles (For PLOS & BLOS)	WBR	EBR	NBR	SBR	WBR	EBR	NBR	SBR
	Right-Turn Geometry	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	No Right-Turn / Prohib.	Right-Turn With No Channel	No Right-Turn / Prohib.	Right-Turn With No Channel
	Right-Turn Signal Phasing	Permissive	Permissive	Permissive	Permissive	-	Permissive	-	Permissive
	Right-Turn Volume	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	-	> 150 to 300 veh/h	-	≤ 150 veh/h
	Right-Turn Effective Corner Radius	> 8m	> 8m	> 8m	> 8m	-	> 8m	-	> 8m
	Cross-street Posted Speed (km/h)	50 km/h		70 km/h		40 km/h		70 km/h	
	Conflict with Left-Turn Vehicles (For PLOS & BLOS)	EBL	WBL	SBL	NBL	EBL	WBL	SBL	NBL
	Left-Turn Signal Phasing	Perm or Prot+Perm	Perm or Prot+Perm	Fully Protected	Fully Protected	Perm or Prot+Perm	No Left-Turn / Prohib.	No Left-Turn / Prohib.	Fully Protected
	Left-Turn Volume	> 100 veh/h	> 100 veh/h	-	-	> 100 veh/h	-	-	-
	Left-Turn Opposing Lanes	-	-	-	-	-	-	-	-
Score	2.35	2.35	4.05	2.85	3.70	3.60	-	4.05	
PLOS	D	D	B	C	B	B	-	B	
	C				B				
Target PLOS	C				C				
Bicycle	BLOS Inputs								
	Cycling Route Classification	Cross-Town Bikeway				Cross-Town Bikeway			
	Cyclists Crossing the	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
	Type of Cycling Facility Across Leg	Crossride	Crossride	Mixed Traffic	Mixed Traffic	Crossride	Crossride	Mixed Traffic	
	Two-Way ADT (in Cyclist Travel Direction)	25,000		4,000		34,150		3,200	
	Floating Bike Lane or Right-Turn Lane Crossover Approaching the Crossing?	No	No	No	No	No	No	No	
	Crossride Operation	Unidirectional	Unidirectional	-	-	Unidirectional	Unidirectional	-	
	Target Crossride Setback Met?	Yes	Yes	-	-	-	Yes	-	
	Right-Turn Vehicle Volume from Adjacent Roadway > 100 veh/h?	-	-	-	-	-	-	-	
	Cyclist Left-Turn Operation	WBL	EBL	NBL	SBL	WBL	EBL	NBL	SBL
	Cyclist Left-Turn Treatment Type	Protected Corner	Protected Corner	Protected Corner	Protected Corner	No Left-Turn	Protected Corner	Protected Corner	No Left-Turn
	Vehicle Lanes Crossed by Cyclists	-	-	-	-	-	-	-	-
	Score	100	100	80	80	90	130	100	-
	BLOS	B	B	C	C	C	A	B	-
		C				B			
Target BLOS	B				B				
Transit	TLOS Inputs								
	Transit Facility	Mixed Traffic				Select Transit Designation			
	Vehicles Travelling	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound
	Average Transit Delay (if available)	21-35 sec		56-80 sec					
	Example Transit Priority Treatment	-		-					
	TLOS	-	C	E	-	-	-	-	-
		D				-			
Target TLOS	E (D for frequent transit routes)				-				
Auto	AutoLOS Inputs								
	Overall Intersection Volume to Capacity Ratio	0.61 to 0.70				0.91 to 1.00			
	Individual Movements V/C Ratios and Queue Lengths	See Separate Traffic Operations Table				See Separate Traffic Operations Table			
	AutoLOS	B				E			
	Target AutoLOS	E				E			

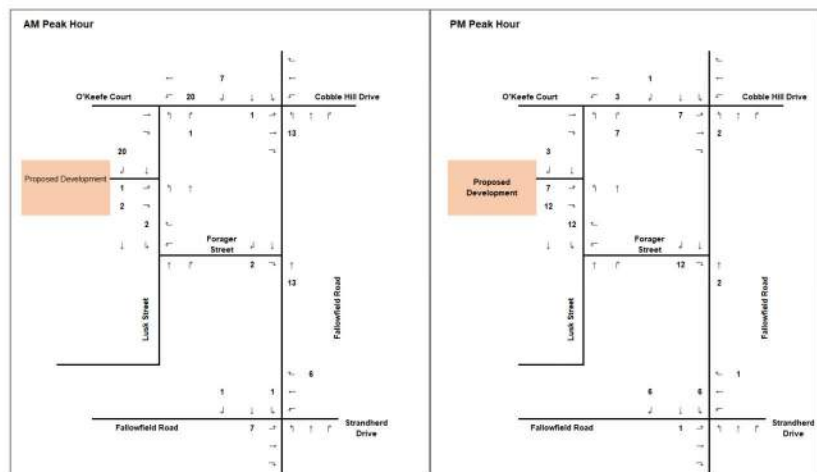
Appendix H

Background Developments

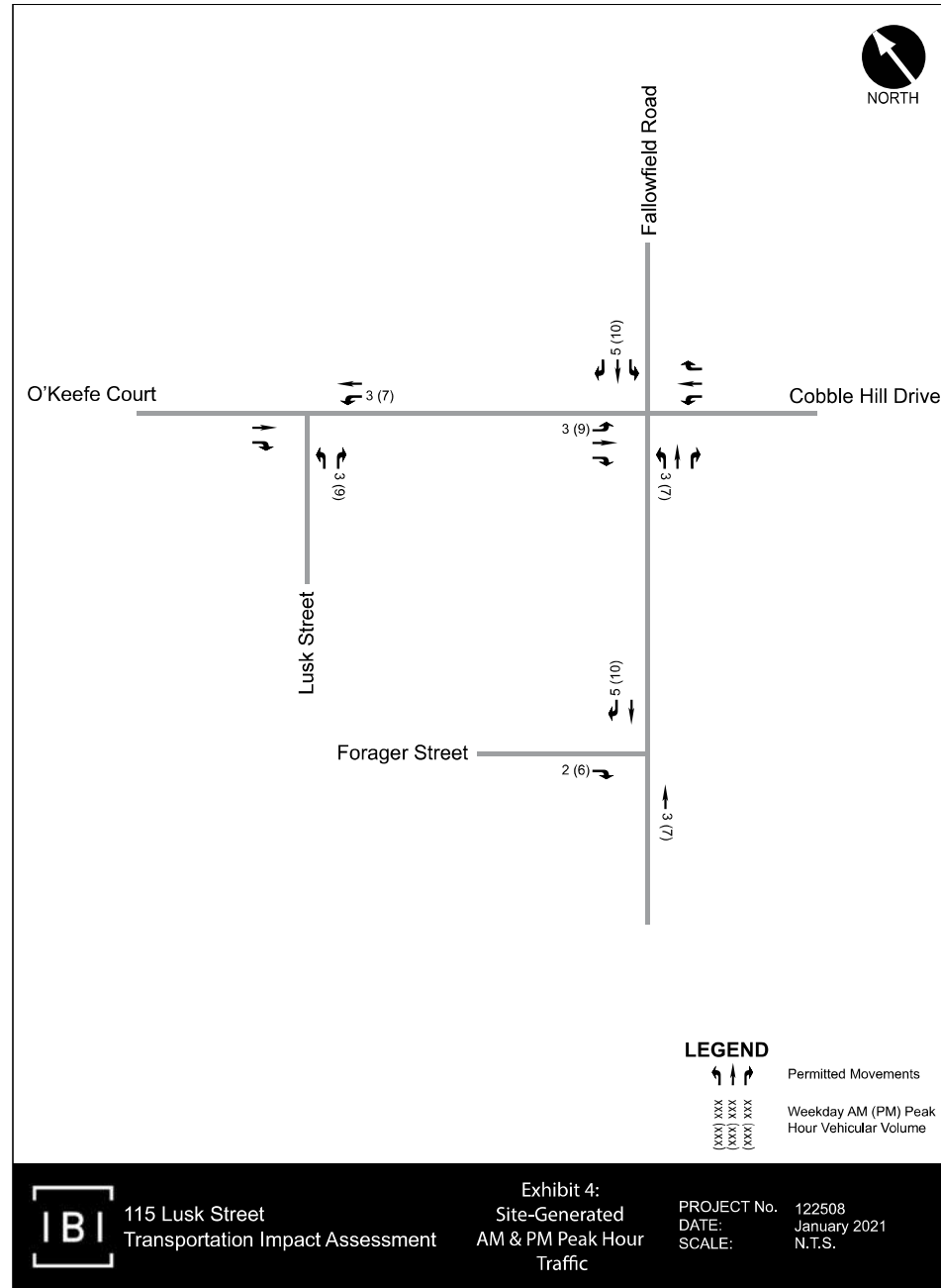
100 LUSK STREET TRANSPORTATION IMPACT ASSESSMENT

Forecasting
November 11, 2020

Figure 8 - Site Generated Traffic Volumes



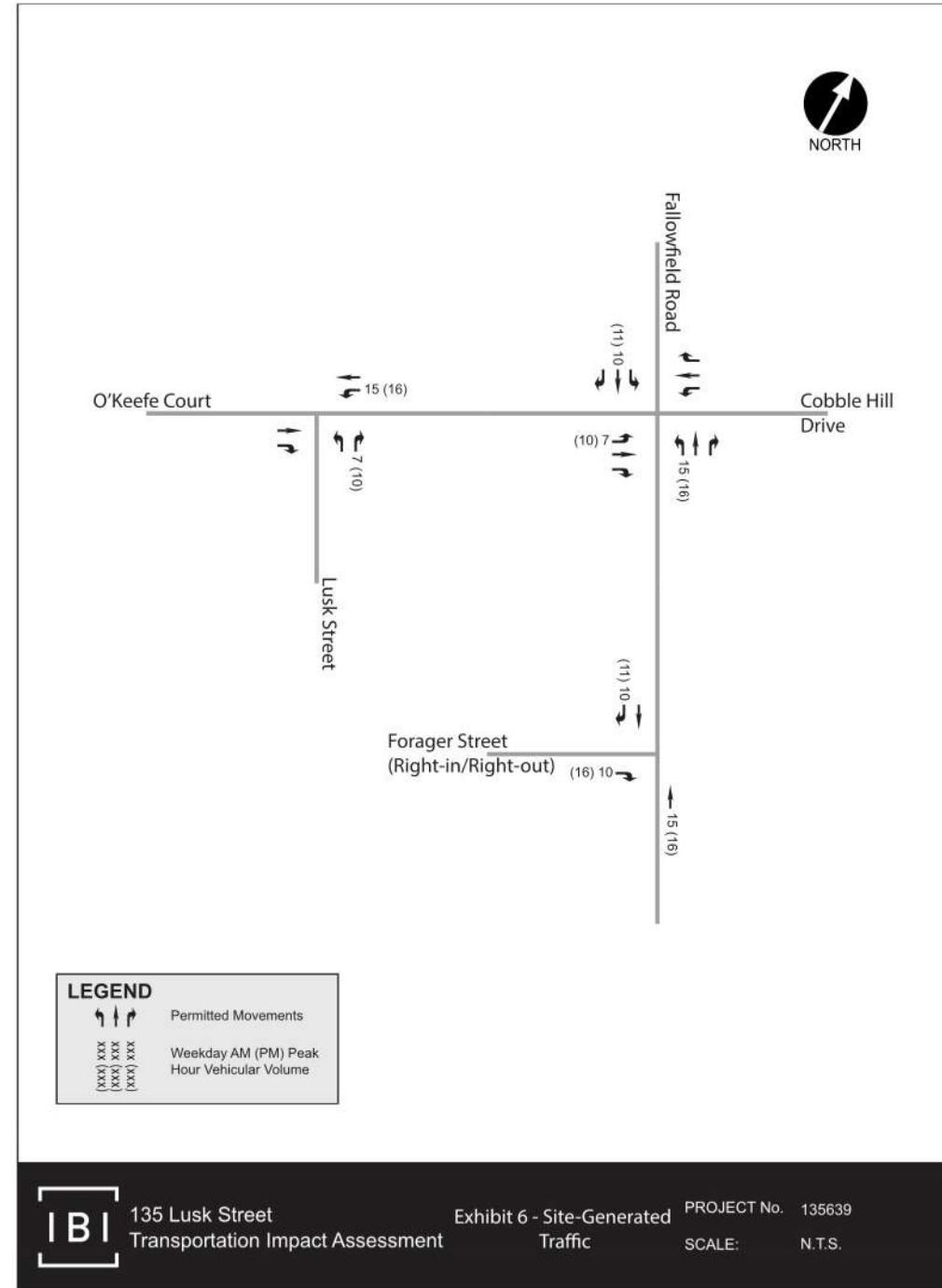
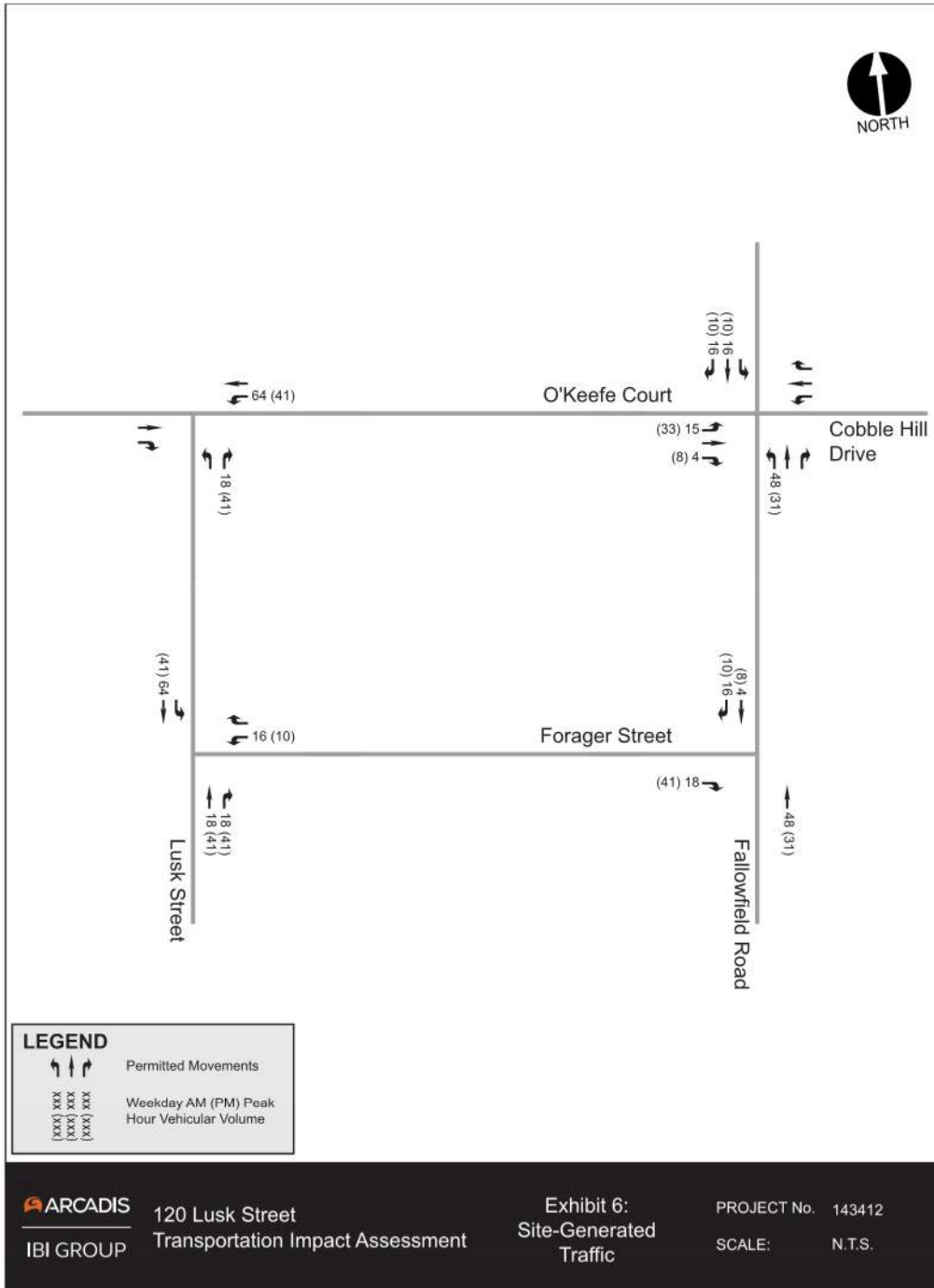
W:\active\1163401353\planning\report\uk_step 5 TIA\p100 Lusk MASTER 20201014_hi.docx



115 Lusk Street
Transportation Impact Assessment

Exhibit 4:
Site-Generated
AM & PM Peak Hour
Traffic

PROJECT No. 122508
DATE: January 2021
SCALE: N.T.S.



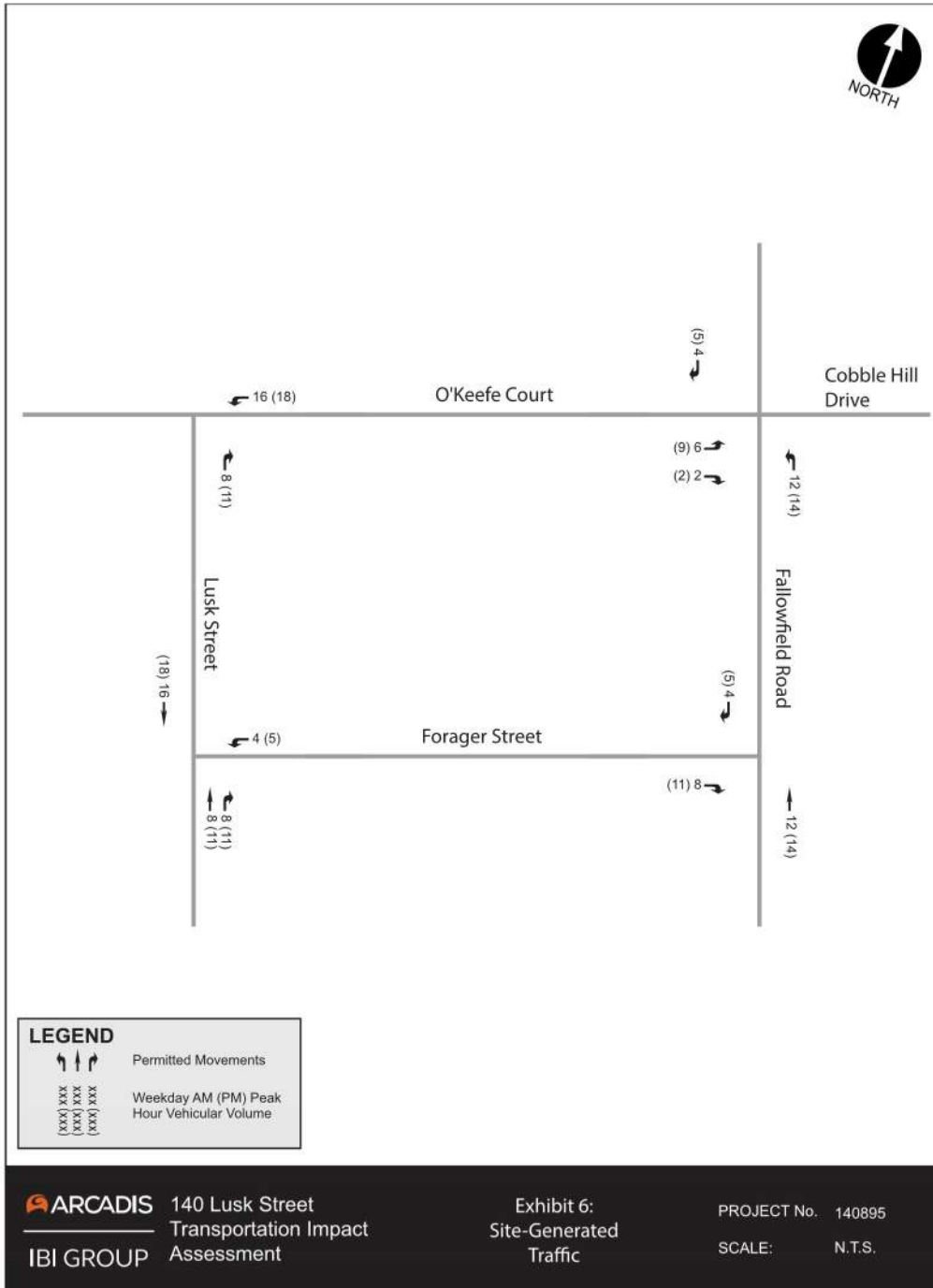


Figure 5: Site Generated Traffic

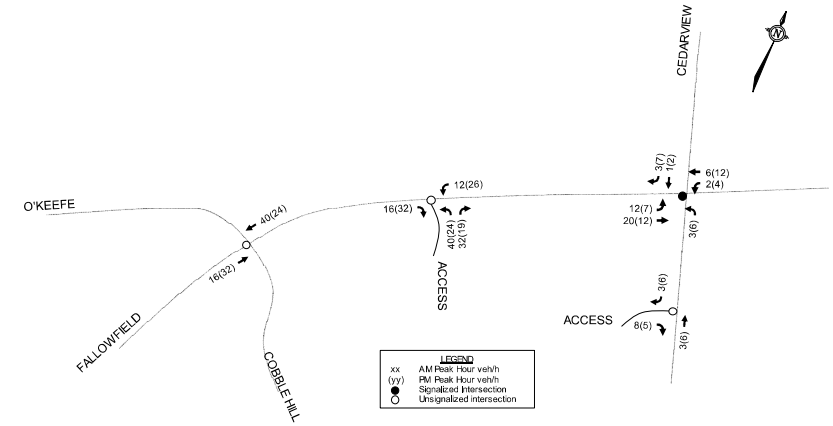




Exhibit 3-2 shows site-generated vehicle trips for the 2029 horizon year, assuming the Flagstaff Drive access is in place as a result of the development of the Halo Car Wash to the north.

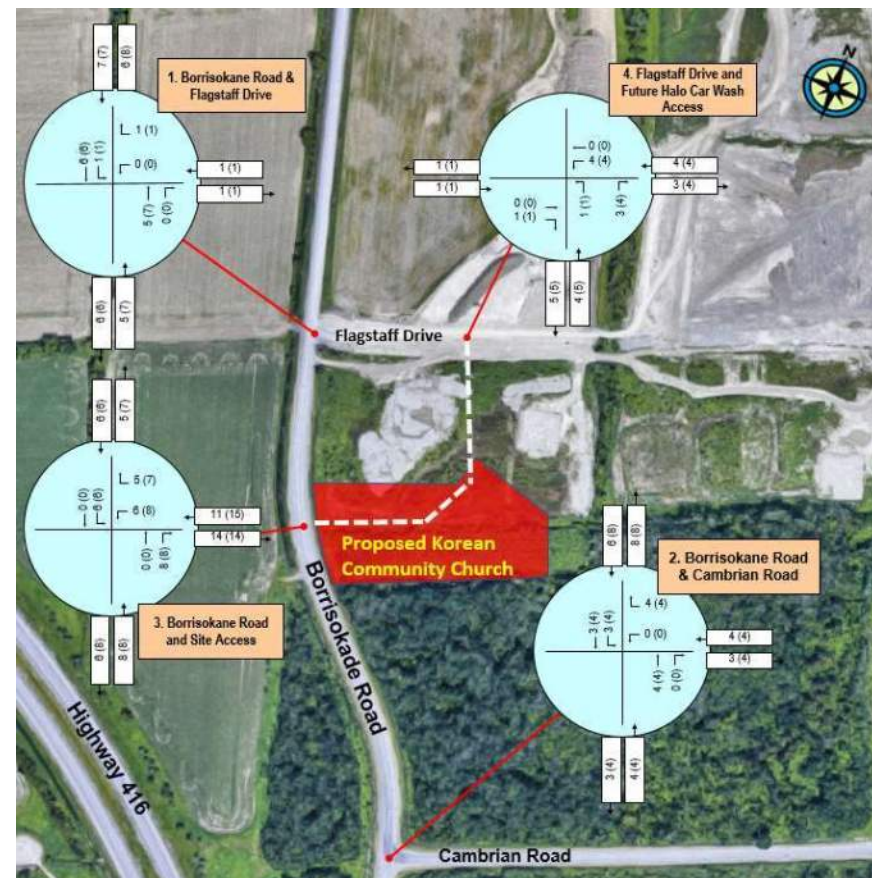
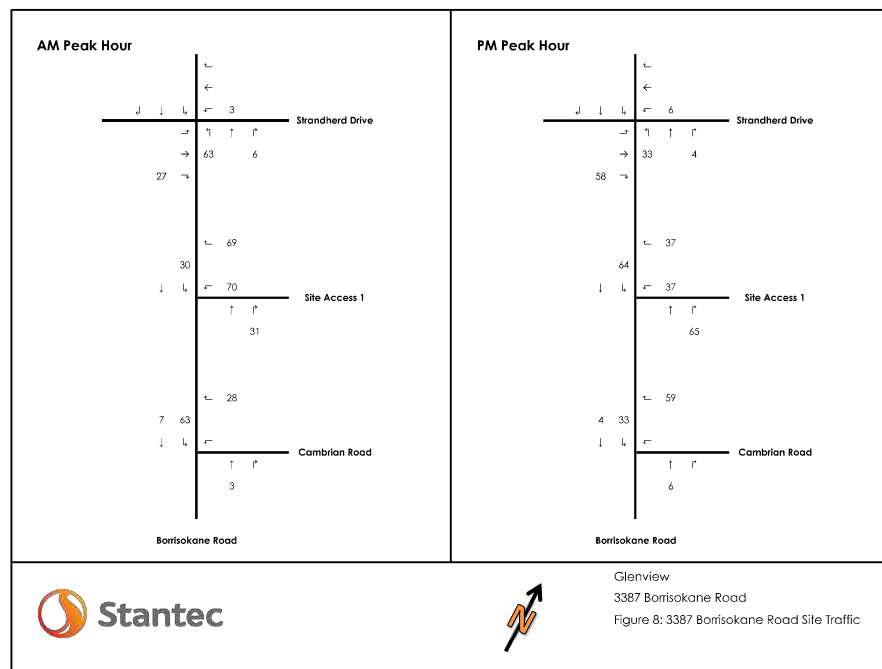
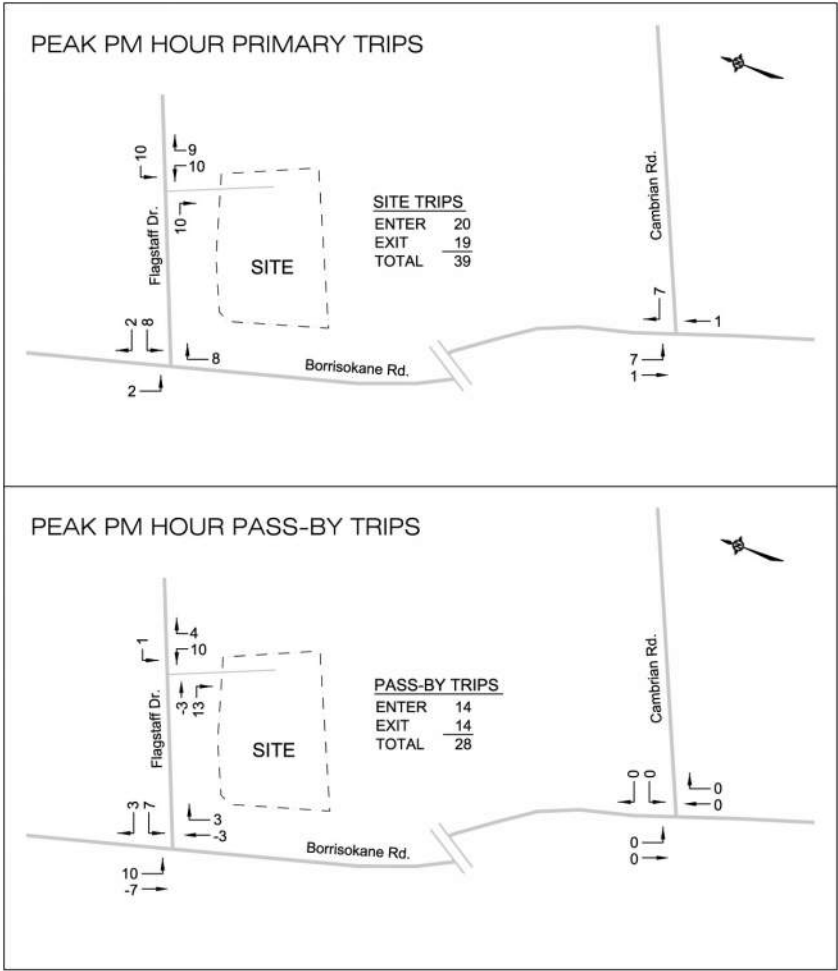


Exhibit 3-2: Site Generated Traffic 2029

FIGURE 3.2
PEAK PM HOUR SITE GENERATED PRIMARY AND PASS-BY TRIPS



NOT TO SCALE

Figure 11: New Site Generation Auto Volumes

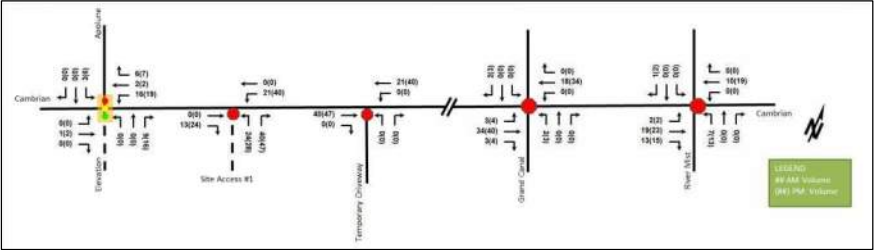


Figure 12: Pass-by Volumes

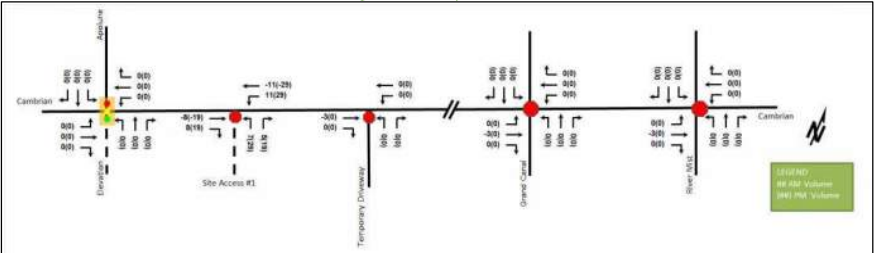


Figure 13: New Site Generation and Pass-by Auto Volumes – Beyond 2031 (informational only)

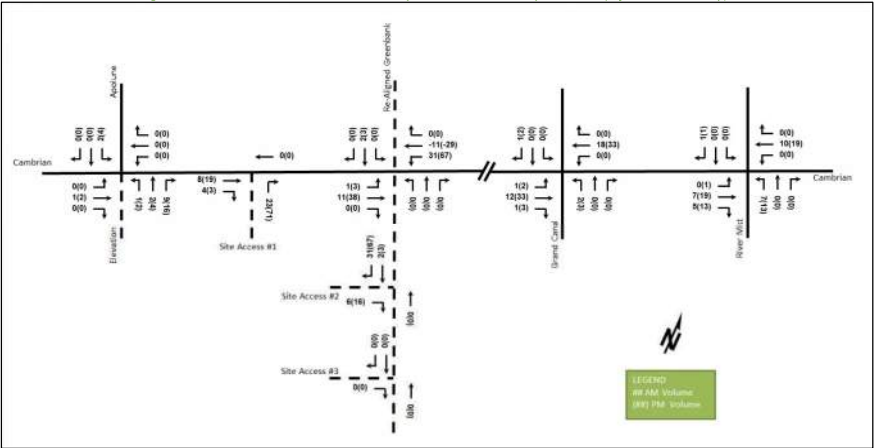


Figure 9: New Site Generation Auto Volumes – Blended Rate Mode Shares

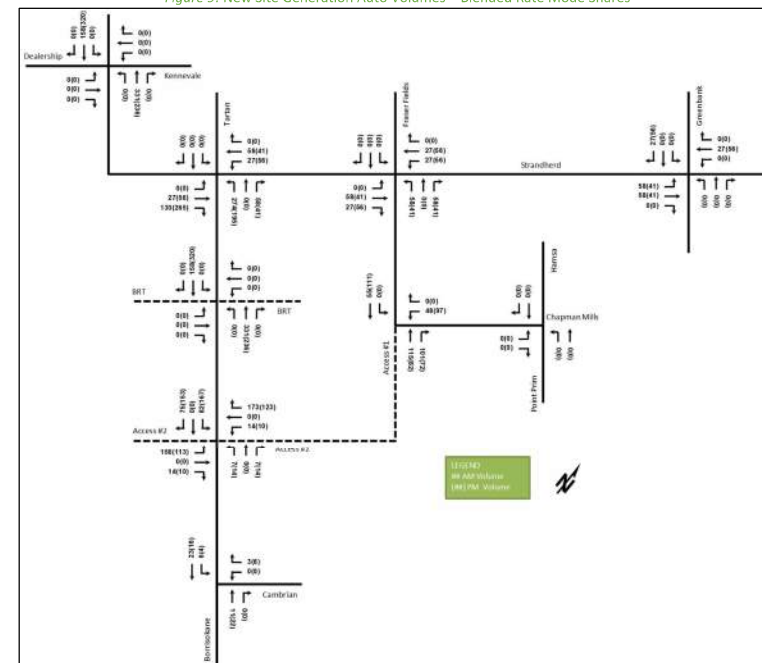
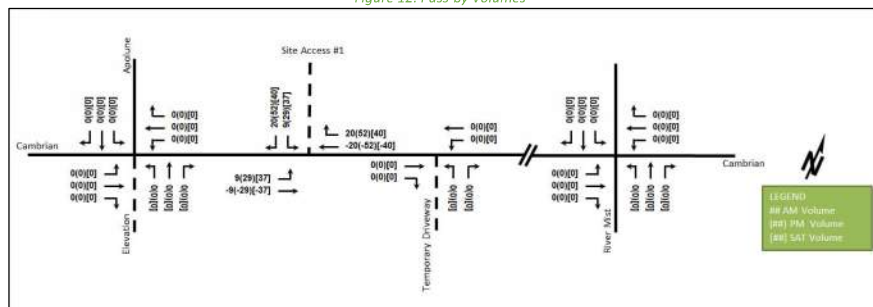


Figure 10: New Site Generation Auto Volumes – BRT Rate Mode Shares

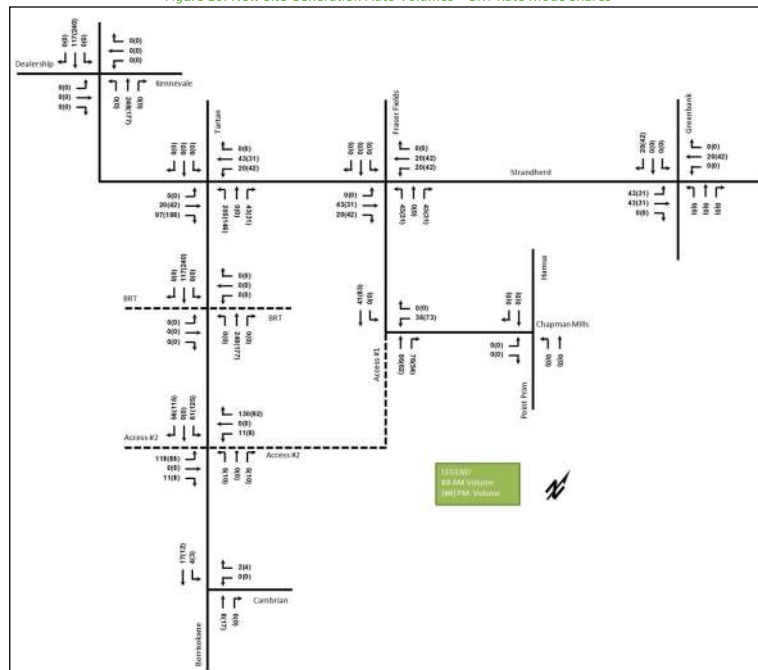


Figure 10: New Site Generated Auto Volumes

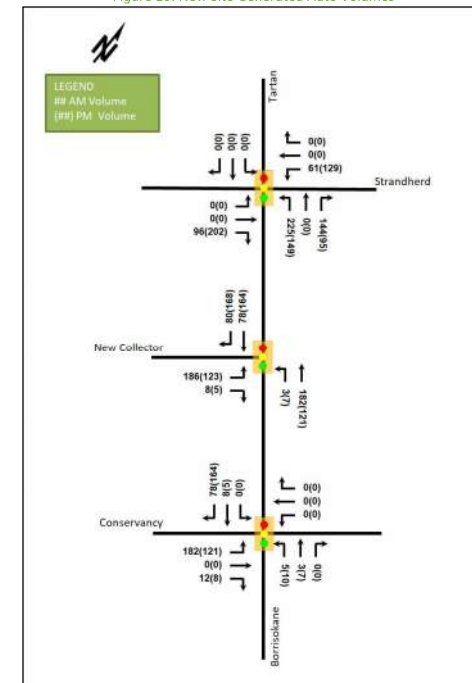


Figure 26: 2029 New Site Generated Auto Volumes

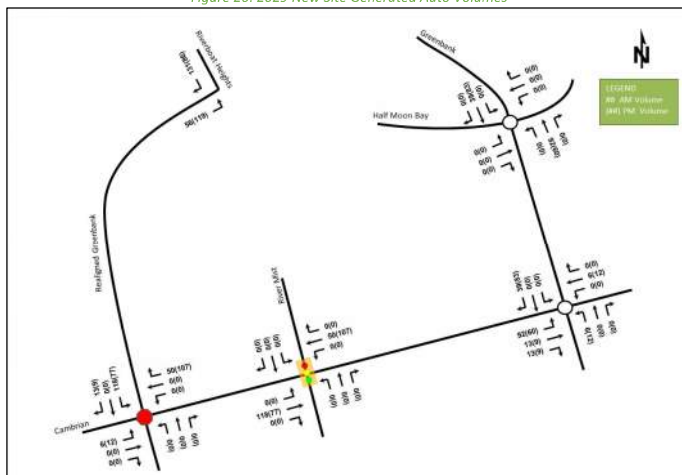


Figure 10: New Site Generation Auto Volumes

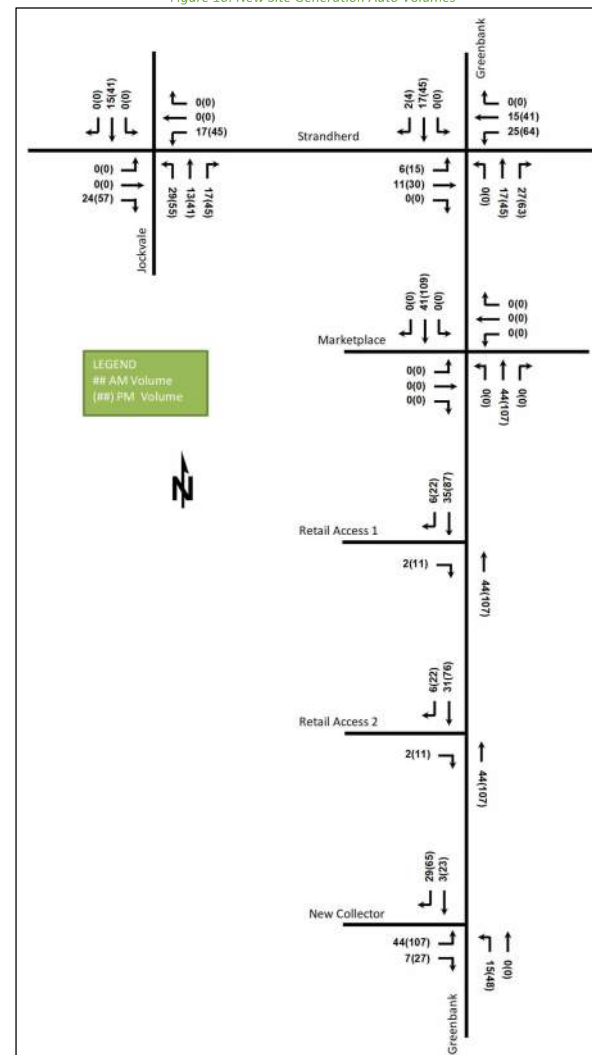


Figure 11: Pass-By Volumes

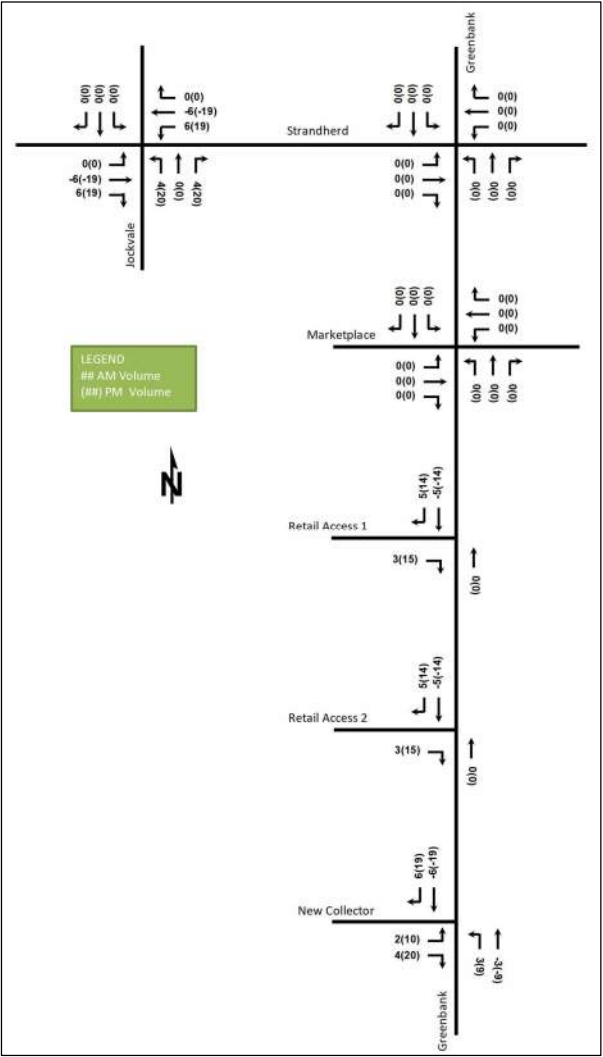
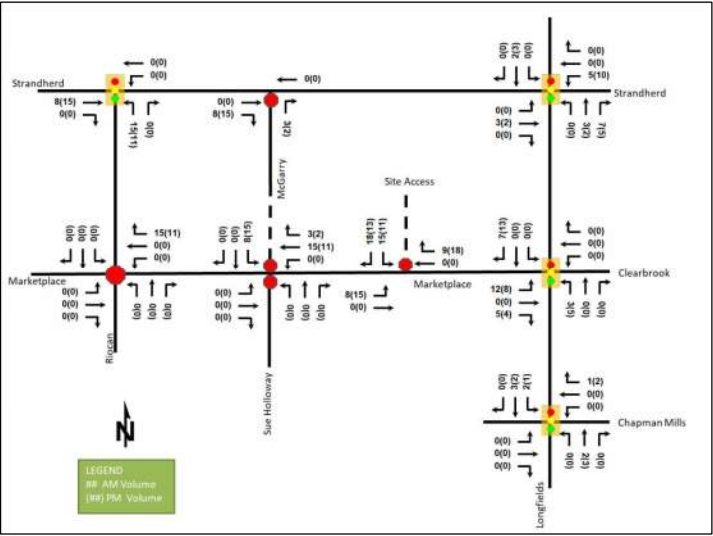


Figure 15: New Site Generation Auto Volumes



Appendix I

Synchro Intersection Worksheets – 2028 Future Background Conditions

Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FB2028
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	19	7	71	35	479	4	1514	85	582	875	108
Future Volume (vph)	66	19	7	71	35	479	4	1514	85	582	875	108
Satd. Flow (prot)	2853	1244	0	1595	1471	1483	1127	3221	1483	3124	3161	1339
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2850	1244	0	1595	1471	1464	1127	3221	1463	3123	3161	1339
Satd. Flow (RTOR)		7				371			225			108
Lane Group Flow (vph)	66	26	0	71	35	479	4	1514	85	582	875	108
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	13.0	48.0		13.0	48.0	48.0	13.0	31.0	31.0	28.0	46.0	13.0
Total Split (%)	10.8%	40.0%		10.8%	40.0%	40.0%	10.8%	25.8%	25.8%	23.3%	38.3%	10.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	7.4	10.1		24.6	20.6	20.6	5.9	35.2	35.2	29.3	69.1	82.0
Actuated g/C Ratio	0.06	0.08		0.20	0.17	0.17	0.05	0.29	0.29	0.24	0.58	0.68
v/c Ratio	0.38	0.23		0.22	0.14	0.86	0.07	1.60	0.14	0.76	0.48	0.11
Control Delay	60.5	46.3		40.1	37.7	25.8	57.2	306.3	0.5	50.2	19.9	2.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	46.3		40.1	37.7	25.8	57.2	306.3	0.5	50.2	19.9	2.6
LOS	E	D		D	D	C	E	F	A	D	B	A
Approach Delay		56.5			28.3			289.5			30.0	
Approach LOS		E			C			F			C	
Queue Length 50th (m)	7.7	4.3		15.5	7.3	25.8	0.9	~264.7	0.0	64.8	53.6	0.0
Queue Length 95th (m)	15.3	13.3		23.5	12.9	54.5	4.6	#349.5	0.0	#112.8	126.8	8.0
Internal Link Dist (m)		131.5			347.0			233.3			231.4	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	178	429		327	502	744	56	945	588	764	1818	937
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.06		0.22	0.07	0.64	0.07	1.60	0.14	0.76	0.48	0.12

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 101 (84%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FB2028
AM Peak Hour

Maximum v/c Ratio: 1.60

Intersection Signal Delay: 138.5

Intersection LOS: F

Intersection Capacity Utilization 96.9%

ICU Level of Service F

Analysis Period (min) 15

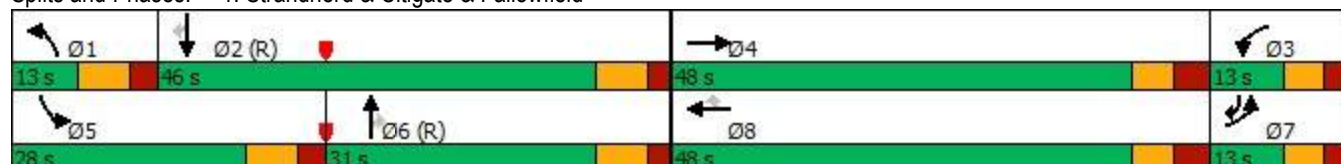
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings
2: Strandherd & Crosskeys/Helene-Campbell

FB2028
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	20	8	25	36	204	14	1305	23	47	837	69
Future Volume (vph)	94	20	8	25	36	204	14	1305	23	47	837	69
Satd. Flow (prot)	1610	1745	1483	1658	1745	1483	3216	3221	1483	1595	3131	1455
Flt Permitted	0.734			0.744			0.950			0.950		
Satd. Flow (perm)	1243	1745	1464	1297	1745	1464	3213	3221	1450	1595	3131	1435
Satd. Flow (RTOR)			90			165			97			97
Lane Group Flow (vph)	94	20	8	25	36	204	14	1305	23	47	837	69
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	16.0	65.0	65.0	16.0	65.0	65.0
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	12.3%	50.0%	50.0%	12.3%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	19.3	19.3	19.3	19.3	19.3	19.3	6.1	83.2	83.2	8.5	90.7	90.7
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.64	0.64	0.07	0.70	0.70
v/c Ratio	0.51	0.08	0.03	0.13	0.14	0.57	0.09	0.63	0.02	0.45	0.38	0.07
Control Delay	57.7	42.3	0.1	43.9	44.2	16.9	75.8	9.6	0.0	71.9	11.9	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.7	42.3	0.1	43.9	44.2	16.9	75.8	9.6	0.0	71.9	11.9	1.7
LOS	E	D	A	D	D	B	E	A	A	E	B	A
Approach Delay		51.4			23.2			10.1			14.1	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	23.4	4.6	0.0	5.9	8.5	9.2	1.8	18.4	0.0	11.8	30.1	0.0
Queue Length 95th (m)	32.2	9.6	0.0	11.2	14.5	25.9	m3.6	#57.8	m0.0	24.4	100.2	4.1
Internal Link Dist (m)		138.8			171.2			424.3			233.3	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	394	554	526	412	554	577	225	2062	963	116	2184	1030
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.04	0.02	0.06	0.06	0.35	0.06	0.63	0.02	0.41	0.38	0.07

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 99 (76%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FB2028
AM Peak Hour

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 14.7

Intersection LOS: B

Intersection Capacity Utilization 79.0%

ICU Level of Service D

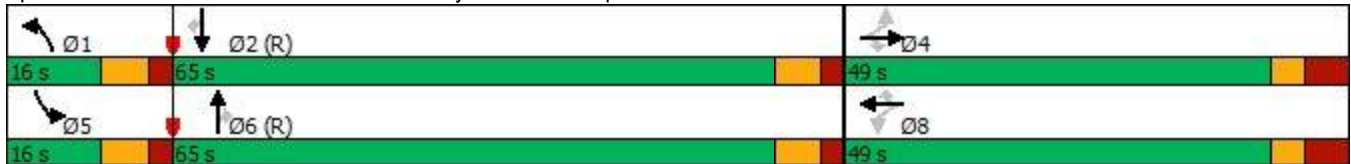
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2028
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	19	66	27	56	74	233	1102	34	58	710	11
Future Volume (vph)	30	19	66	27	56	74	233	1102	34	58	710	11
Satd. Flow (prot)	2583	1461	0	1658	1556	0	3216	3300	0	1580	3221	1282
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2569	1461	0	1658	1556	0	3209	3300	0	1580	3221	1262
Satd. Flow (RTOR)		66			54			2				96
Lane Group Flow (vph)	30	85	0	27	130	0	233	1136	0	58	710	11
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		20.0	47.0		20.0	47.0	14.0
Total Split (%)	10.8%	37.7%		10.8%	37.7%		15.4%	36.2%		15.4%	36.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	6.4	17.5		6.5	17.5		13.7	75.7		10.0	69.3	75.2
Actuated g/C Ratio	0.05	0.13		0.05	0.13		0.11	0.58		0.08	0.53	0.58
v/c Ratio	0.24	0.33		0.33	0.51		0.69	0.59		0.48	0.41	0.01
Control Delay	63.8	17.6		70.5	34.6		66.9	23.9		73.7	22.6	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.8	17.6		70.5	34.6		66.9	23.9		73.7	22.6	0.0
LOS	E	B		E	C		E	C		E	C	A
Approach Delay		29.7			40.8			31.2			26.0	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	3.8	4.6		6.8	18.9		29.8	98.2		15.5	36.2	0.0
Queue Length 95th (m)	9.0	15.4		16.8	29.9		44.0	#217.0		30.6	73.8	m0.0
Internal Link Dist (m)		127.1			312.5			512.4			424.3	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	135	511		86	533		351	1921		160	1717	774
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	0.22	0.17		0.31	0.24		0.66	0.59		0.36	0.41	0.01

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 94 (72%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 3: Strandherd & Systemhouse/Maravista

FB2028
AM Peak Hour

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 30.1

Intersection LOS: C

Intersection Capacity Utilization 68.5%

ICU Level of Service C

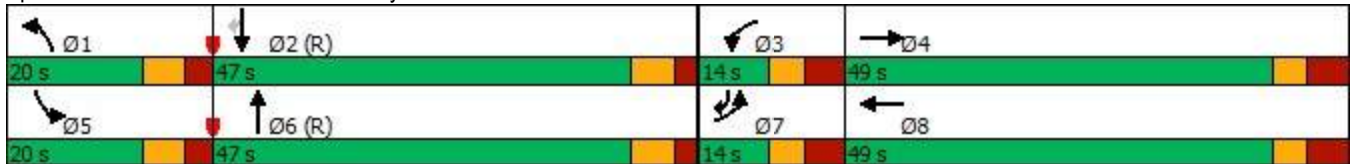
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FB2028
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	5	23	77	19	66	72	1225	96	31	705	71
Future Volume (vph)	31	5	23	77	19	66	72	1225	96	31	705	71
Satd. Flow (prot)	1642	1745	1483	1642	1527	0	3216	3268	0	1595	3191	1469
Flt Permitted	0.702			0.754			0.950			0.950		
Satd. Flow (perm)	1212	1745	1464	1301	1527	0	3213	3268	0	1595	3191	1449
Satd. Flow (RTOR)			37		66			9				105
Lane Group Flow (vph)	31	5	23	77	85	0	72	1321	0	31	705	71
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	21.0	37.0	37.0		21.0	62.0		21.0	62.0	62.0
Total Split (%)	30.8%	30.8%	17.5%	30.8%	30.8%		17.5%	51.7%		17.5%	51.7%	51.7%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.2	15.2	23.1	15.2	15.2		8.1	80.6		7.9	77.6	77.6
Actuated g/C Ratio	0.13	0.13	0.19	0.13	0.13		0.07	0.67		0.07	0.65	0.65
v/c Ratio	0.20	0.02	0.07	0.47	0.34		0.33	0.60		0.30	0.34	0.07
Control Delay	46.6	40.4	4.1	55.7	18.2		57.0	15.3		60.0	12.1	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	46.6	40.4	4.1	55.7	18.2		57.0	15.3		60.0	12.1	1.3
LOS	D	D	A	E	B		E	B		E	B	A
Approach Delay		29.5			36.0			17.5			13.0	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	6.8	1.1	0.0	17.6	4.1		8.5	87.5		7.1	36.3	0.0
Queue Length 95th (m)	13.9	4.2	3.2	28.2	16.2		15.6	165.7		16.7	70.8	3.2
Internal Link Dist (m)		259.4			125.1			519.0			512.4	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	300	433	379	323	428		364	2197		180	2064	974
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.10	0.01	0.06	0.24	0.20		0.20	0.60		0.17	0.34	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 29 (24%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FB2028
AM Peak Hour

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 17.5

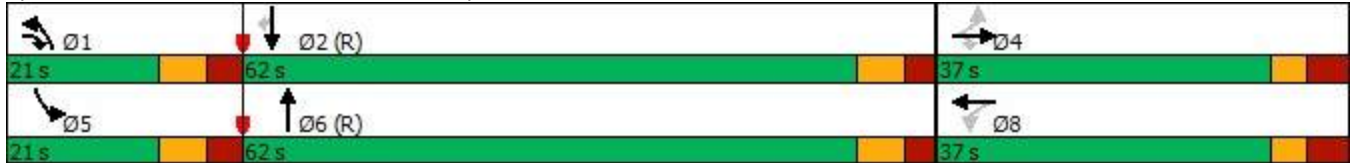
Intersection LOS: B

Intersection Capacity Utilization 62.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FB2028
AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	7	62	48	38	1
Future Volume (Veh/h)	2	7	62	48	38	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	7	62	48	38	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	156	76	77	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	156	76	77	0	0	
tC, single (s)	7.6	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	4.0	4.0	4.0	3.4	2.3	
p0 queue free %	100	99	92	96	98	
cM capacity (veh/h)	629	794	791	1068	1548	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	9	110	39			
Volume Left	2	0	38			
Volume Right	0	48	1			
cSH	750	892	1548			
Volume to Capacity	0.01	0.12	0.02			
Queue Length 95th (m)	0.3	3.2	0.6			
Control Delay (s)	9.9	9.6	7.2			
Lane LOS	A	A	A			
Approach Delay (s)	9.9	9.6	7.2			
Approach LOS	A	A				
Intersection Summary						
Average Delay			9.0			
Intersection Capacity Utilization			16.5%		ICU Level of Service	
Analysis Period (min)			15		A	

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	30	95	204	85	15
Future Vol, veh/h	15	30	95	204	85	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	7	18	6	2	9	2
Mvmt Flow	15	30	95	204	85	15

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	299	0	-	0	155
Stage 1	-	-	-	-	95
Stage 2	-	-	-	-	60
Critical Hdwy	4.17	-	-	-	6.49
Critical Hdwy Stg 1	-	-	-	-	5.49
Critical Hdwy Stg 2	-	-	-	-	5.49
Follow-up Hdwy	2.263	-	-	-	3.581
Pot Cap-1 Maneuver	1234	-	-	-	820
Stage 1	-	-	-	-	911
Stage 2	-	-	-	-	945
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1234	-	-	-	810
Mov Cap-2 Maneuver	-	-	-	-	810
Stage 1	-	-	-	-	900
Stage 2	-	-	-	-	945

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	9.9
HCM LOS	A		

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1234	-	-	-	830
HCM Lane V/C Ratio	0.012	-	-	-	0.12
HCM Control Delay (s)	8	-	-	-	9.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FB2028
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	53	12	164	63	529	8	1171	132	465	1299	209
Future Volume (vph)	211	53	12	164	63	529	8	1171	132	465	1299	209
Satd. Flow (prot)	3124	1614	0	1658	1664	1455	1208	3221	1483	3216	3316	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3124	1614	0	1655	1664	1455	1208	3221	1483	3216	3316	1455
Satd. Flow (RTOR)		10				360			160			177
Lane Group Flow (vph)	211	65	0	164	63	529	8	1171	132	465	1299	209
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	14.0	48.0		14.0	48.0	48.0	24.0	34.0	34.0	24.0	34.0	14.0
Total Split (%)	11.7%	40.0%		11.7%	40.0%	40.0%	20.0%	28.3%	28.3%	20.0%	28.3%	11.7%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	15.1	16.4		26.7	24.6	24.6	6.5	30.9	30.9	21.8	56.8	77.5
Actuated g/C Ratio	0.13	0.14		0.22	0.20	0.20	0.05	0.26	0.26	0.18	0.47	0.65
v/c Ratio	0.54	0.28		0.44	0.18	0.91	0.12	1.41	0.26	0.80	0.83	0.21
Control Delay	55.6	39.0		46.7	36.0	33.3	72.9	219.1	4.4	58.8	34.9	3.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.6	39.0		46.7	36.0	33.3	72.9	219.1	4.4	58.8	34.9	3.3
LOS	E	D		D	D	C	E	F	A	E	C	A
Approach Delay		51.7			36.5			196.6			37.2	
Approach LOS		D			D			F			D	
Queue Length 50th (m)	24.2	12.5		32.4	12.4	43.3	2.1	~206.5	2.4	52.5	128.5	2.2
Queue Length 95th (m)	#53.1	18.9		#97.6	20.3	77.1	m3.5	#246.7	m5.6	#92.5	#249.4	14.4
Internal Link Dist (m)		131.5			347.0			233.3			231.4	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	394	558		369	568	734	170	829	500	584	1568	1002
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.12		0.44	0.11	0.72	0.05	1.41	0.26	0.80	0.83	0.21

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 115 (96%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FB2028
PM Peak Hour

Maximum v/c Ratio: 1.41

Intersection Signal Delay: 86.4

Intersection LOS: F

Intersection Capacity Utilization 92.1%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

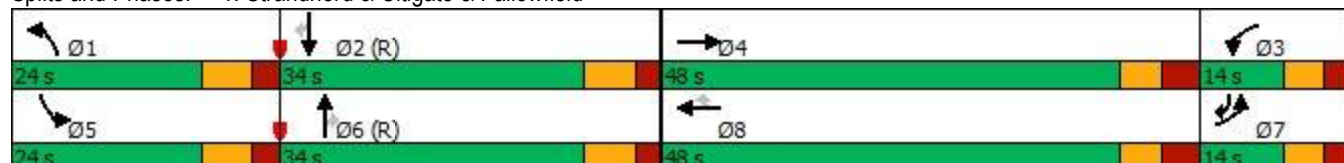
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings
2: Strandherd & Crosskeys/Helene-Campbell

FB2028
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	117	30	37	114	126	41	1015	23	122	1149	194
Future Volume (vph)	210	117	30	37	114	126	41	1015	23	122	1149	194
Satd. Flow (prot)	1658	1745	1469	1642	1745	1483	3216	3131	1483	1658	3283	1483
Flt Permitted	0.684			0.682			0.950			0.950		
Satd. Flow (perm)	1191	1745	1436	1168	1745	1462	3214	3131	1447	1656	3283	1461
Satd. Flow (RTOR)			97			126			105			194
Lane Group Flow (vph)	210	117	30	37	114	126	41	1015	23	122	1149	194
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	17.0	54.0	54.0	17.0	54.0	54.0
Total Split (%)	40.8%	40.8%	40.8%	40.8%	40.8%	40.8%	14.2%	45.0%	45.0%	14.2%	45.0%	45.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	29.6	29.6	29.6	29.6	29.6	29.6	7.0	56.7	56.7	12.3	64.5	64.5
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.06	0.47	0.47	0.10	0.54	0.54
v/c Ratio	0.72	0.27	0.07	0.13	0.27	0.28	0.22	0.69	0.03	0.72	0.65	0.22
Control Delay	53.5	35.4	0.3	31.7	35.2	6.3	59.4	29.2	1.9	83.0	13.2	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	35.4	0.3	31.7	35.2	6.3	59.4	29.2	1.9	83.0	13.2	1.3
LOS	D	D	A	C	D	A	E	C	A	F	B	A
Approach Delay		43.1			21.6			29.8			17.5	
Approach LOS		D			C			C			B	
Queue Length 50th (m)	46.8	23.0	0.0	7.0	22.4	0.0	4.4	131.2	0.0	30.5	25.4	0.2
Queue Length 95th (m)	63.7	33.5	0.0	13.8	32.7	12.7	m5.3	156.1	m0.3	m#39.6	71.5	m2.6
Internal Link Dist (m)		138.8			171.2			424.3			233.3	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	409	600	557	401	600	585	270	1479	739	169	1764	874
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.20	0.05	0.09	0.19	0.22	0.15	0.69	0.03	0.72	0.65	0.22

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 99 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 2: Strandherd & Crosskeys/Helene-Campbell

FB2028
PM Peak Hour

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 24.9

Intersection LOS: C

Intersection Capacity Utilization 79.5%

ICU Level of Service D

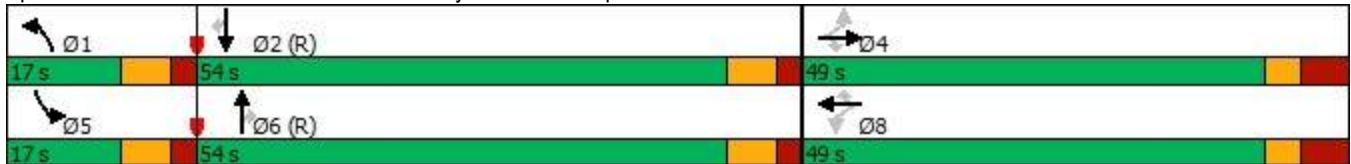
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2028
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	56	295	18	59	42	364	969	27	124	1177	14
Future Volume (vph)	59	56	295	18	59	42	364	969	27	124	1177	14
Satd. Flow (prot)	3185	1504	0	1658	1586	0	3216	3205	0	1658	3316	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3117	1504	0	1653	1586	0	3214	3205	0	1649	3316	1391
Satd. Flow (RTOR)		242			33			2				104
Lane Group Flow (vph)	59	351	0	18	101	0	364	996	0	124	1177	14
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	13.0	49.0		13.0	49.0		17.0	41.0		17.0	41.0	13.0
Total Split (%)	10.8%	40.8%		10.8%	40.8%		14.2%	34.2%		14.2%	34.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	5.8	27.7		5.7	22.5		20.5	53.6		12.5	45.6	50.8
Actuated g/C Ratio	0.05	0.23		0.05	0.19		0.17	0.45		0.10	0.38	0.42
v/c Ratio	0.39	0.66		0.23	0.31		0.66	0.70		0.72	0.93	0.02
Control Delay	63.1	17.4		62.1	26.7		53.4	36.8		53.4	58.3	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.1	17.4		62.1	26.7		53.4	36.8		53.4	58.3	0.1
LOS	E	B		E	C		D	D		D	E	A
Approach Delay		23.9			32.1			41.3			57.2	
Approach LOS		C			C			D			E	
Queue Length 50th (m)	7.0	23.2		4.2	15.5		43.4	71.2		23.0	154.7	0.0
Queue Length 95th (m)	14.0	46.2		11.8	23.8		#88.7	#174.9		m#56.8	#229.2	m0.0
Internal Link Dist (m)		127.1			312.5			512.4			424.3	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	153	678		80	570		549	1431		172	1260	649
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	0.39	0.52		0.23	0.18		0.66	0.70		0.72	0.93	0.02

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 54 (45%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2028
PM Peak Hour

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 45.3

Intersection LOS: D

Intersection Capacity Utilization 87.3%

ICU Level of Service E

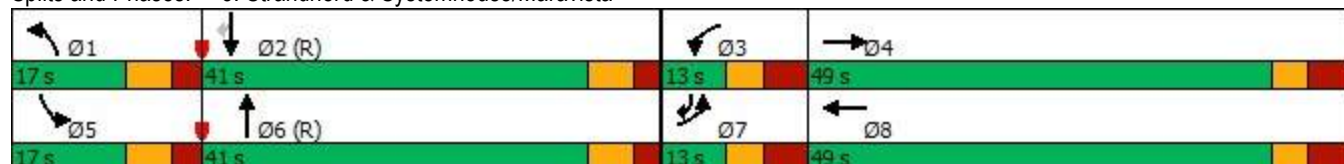
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FB2028
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	19	67	144	12	53	47	1178	107	56	1456	47
Future Volume (vph)	106	19	67	144	12	53	47	1178	107	56	1456	47
Satd. Flow (prot)	1658	1745	1483	1626	1492	0	3216	3240	0	1658	3316	1483
Flt Permitted	0.715			0.745			0.950			0.950		
Satd. Flow (perm)	1246	1745	1463	1274	1492	0	3216	3240	0	1657	3316	1483
Satd. Flow (RTOR)			37		53			10				105
Lane Group Flow (vph)	106	19	67	144	65	0	47	1285	0	56	1456	47
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	23.0	37.0	37.0		23.0	60.0		23.0	60.0	60.0
Total Split (%)	30.8%	30.8%	19.2%	30.8%	30.8%		19.2%	50.0%		19.2%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	19.3	19.3	26.3	19.3	19.3		7.2	72.2		9.4	74.4	74.4
Actuated g/C Ratio	0.16	0.16	0.22	0.16	0.16		0.06	0.60		0.08	0.62	0.62
v/c Ratio	0.53	0.07	0.19	0.71	0.23		0.24	0.66		0.43	0.71	0.05
Control Delay	54.2	39.4	16.1	64.7	15.6		56.4	20.6		58.5	17.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	54.2	39.4	16.1	64.7	15.6		56.4	20.6		58.5	17.0	0.4
LOS	D	D	B	E	B		E	C		E	B	A
Approach Delay		39.4			49.4			21.8			18.0	
Approach LOS		D			D			C			B	
Queue Length 50th (m)	23.3	3.9	5.2	32.6	2.4		5.5	103.3		13.7	28.4	0.0
Queue Length 95th (m)	37.5	9.6	13.9	49.6	13.4		11.5	167.0		m17.4	m103.4	m0.0
Internal Link Dist (m)		259.4			125.1			519.0			512.4	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	309	433	452	316	410		418	1952		215	2055	959
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.34	0.04	0.15	0.46	0.16		0.11	0.66		0.26	0.71	0.05

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 57 (48%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FB2028
PM Peak Hour

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 22.8

Intersection LOS: C

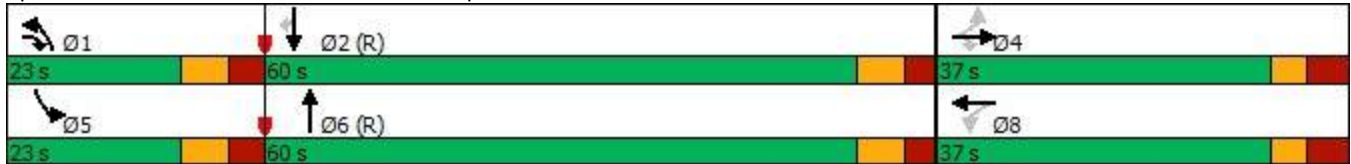
Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

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

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FB2028
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	25	26	77	80	1
Future Volume (Veh/h)	3	25	26	77	80	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	25	26	77	80	1
Pedestrians		1	1			
Lane Width (m)		3.5	3.5			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	252	162	163	1	1	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	252	162	163	1	1	
tC, single (s)	7.1	6.5	6.5	6.2	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.3	
p0 queue free %	100	96	96	93	95	
cM capacity (veh/h)	607	692	691	1074	1569	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	28	103	81			
Volume Left	3	0	80			
Volume Right	0	77	1			
cSH	681	942	1569			
Volume to Capacity	0.04	0.11	0.05			
Queue Length 95th (m)	1.0	2.8	1.2			
Control Delay (s)	10.5	9.3	7.3			
Lane LOS	B	A	A			
Approach Delay (s)	10.5	9.3	7.3			
Approach LOS	B	A				
Intersection Summary						
Average Delay			8.7			
Intersection Capacity Utilization			18.1%		ICU Level of Service	
Analysis Period (min)			15		A	

Intersection						
Int Delay, s/veh	5.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	90	88	346	320	15
Future Vol, veh/h	15	90	88	346	320	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	27	3	5	2	2	2
Mvmt Flow	15	90	88	346	320	15
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	434	0	-	0	208	88
Stage 1	-	-	-	-	88	-
Stage 2	-	-	-	-	120	-
Critical Hdwy	4.37	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.443	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1005	-	-	-	780	970
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	905	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1005	-	-	-	768	970
Mov Cap-2 Maneuver	-	-	-	-	768	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	905	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.2	0		13.1		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1005	-	-	-	775	
HCM Lane V/C Ratio	0.015	-	-	-	0.432	
HCM Control Delay (s)	8.6	-	-	-	13.1	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	2.2	

Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FB2028
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	48	10	105	52	207	7	1251	119	225	1203	150
Future Volume (vph)	123	48	10	105	52	207	7	1251	119	225	1203	150
Satd. Flow (prot)	2757	1509	0	1626	1679	1427	1353	3316	1441	3154	3221	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2744	1509	0	1626	1679	1403	1350	3316	1441	3154	3221	1372
Satd. Flow (RTOR)		10				207			175			146
Lane Group Flow (vph)	123	58	0	105	52	207	7	1251	119	225	1203	150
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	12.0	48.0		12.0	48.0	48.0	19.0	31.0	31.0	19.0	31.0	12.0
Total Split (%)	10.9%	43.6%		10.9%	43.6%	43.6%	17.3%	28.2%	28.2%	17.3%	28.2%	10.9%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	None
Act Effect Green (s)	5.6	10.7		17.4	14.9	14.9	6.2	24.6	24.6	10.6	40.2	46.2
Actuated g/C Ratio	0.07	0.13		0.21	0.18	0.18	0.07	0.29	0.29	0.13	0.48	0.55
v/c Ratio	0.67	0.29		0.31	0.17	0.49	0.07	1.29	0.22	0.57	0.78	0.18
Control Delay	59.6	35.7		35.1	29.0	8.2	43.0	164.6	2.3	42.2	25.7	2.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.6	35.7		35.1	29.0	8.2	43.0	164.6	2.3	42.2	25.7	2.9
LOS	E	D		D	C	A	D	F	A	D	C	A
Approach Delay		51.9			18.9			150.0			25.9	
Approach LOS		D			B			F			C	
Queue Length 50th (m)	9.2	6.5		15.7	7.0	0.0	1.0	~121.2	0.0	16.0	63.9	0.2
Queue Length 95th (m)	#31.1	22.2		30.3	15.4	14.5	6.0	#250.4	4.3	36.8	#225.9	10.2
Internal Link Dist (m)		131.5			347.0			233.3			231.4	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	184	758		337	838	804	196	973	546	457	1545	825
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.08		0.31	0.06	0.26	0.04	1.29	0.22	0.49	0.78	0.18

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 83.8

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.29

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FB2028
SAT Peak Hour

Intersection Signal Delay: 75.3

Intersection LOS: E

Intersection Capacity Utilization 77.5%

ICU Level of Service D

Analysis Period (min) 15

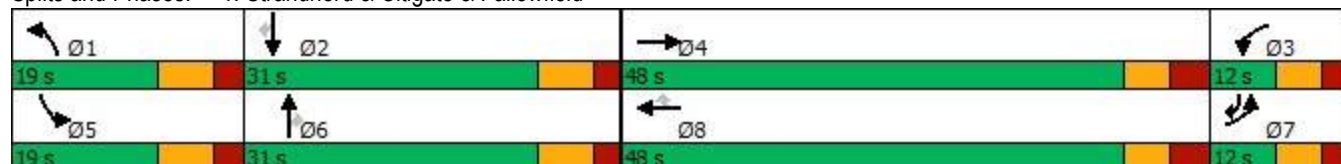
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FB2028
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	147	79	43	137	139	86	971	20	72	999	247
Future Volume (vph)	259	147	79	43	137	139	86	971	20	72	999	247
Satd. Flow (prot)	1658	1745	1483	1658	1745	1483	3216	3316	1483	1658	3161	1483
Flt Permitted	0.669			0.663			0.950			0.950		
Satd. Flow (perm)	1167	1745	1456	1152	1745	1463	3214	3316	1431	1651	3161	1464
Satd. Flow (RTOR)			106			139			115			247
Lane Group Flow (vph)	259	147	79	43	137	139	86	971	20	72	999	247
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	15.0	46.0	46.0	15.0	46.0	46.0
Total Split (%)	44.5%	44.5%	44.5%	44.5%	44.5%	44.5%	13.6%	41.8%	41.8%	13.6%	41.8%	41.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	7.9	52.1	52.1	9.1	53.3	53.3
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.07	0.47	0.47	0.08	0.48	0.48
v/c Ratio	0.81	0.31	0.17	0.14	0.29	0.28	0.38	0.62	0.03	0.53	0.65	0.30
Control Delay	56.2	31.5	2.9	27.8	31.1	5.6	53.3	26.8	0.1	62.4	27.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.2	31.5	2.9	27.8	31.1	5.6	53.3	26.8	0.1	62.4	27.1	4.0
LOS	E	C	A	C	C	A	D	C	A	E	C	A
Approach Delay		40.0			19.5			28.4			24.7	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	51.9	25.0	0.0	7.0	23.2	0.0	9.2	85.3	0.0	14.9	87.5	0.0
Queue Length 95th (m)	71.9	36.2	5.6	13.8	33.8	12.2	17.0	124.7	0.0	#33.0	#142.0	16.1
Internal Link Dist (m)		138.8			171.2			424.3			233.3	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	438	655	612	432	655	636	245	1569	737	143	1531	836
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.22	0.13	0.10	0.21	0.22	0.35	0.62	0.03	0.50	0.65	0.30

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 108 (98%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FB2028
SAT Peak Hour

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 27.8

Intersection LOS: C

Intersection Capacity Utilization 81.9%

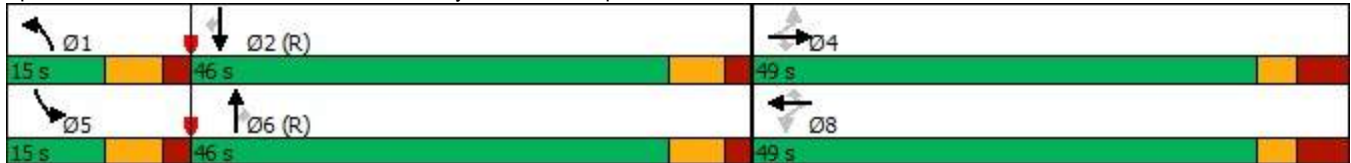
ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2028
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	39	316	19	81	62	514	903	26	118	1009	14
Future Volume (vph)	80	39	316	19	81	62	514	903	26	118	1009	14
Satd. Flow (prot)	3216	1490	0	1658	1585	0	3216	3302	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3142	1490	0	1654	1585	0	3198	3302	0	1658	3316	1449
Satd. Flow (RTOR)		316			37			2				108
Lane Group Flow (vph)	80	355	0	19	143	0	514	929	0	118	1009	14
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		19.0	33.0		19.0	33.0	14.0
Total Split (%)	12.2%	42.6%		12.2%	42.6%		16.5%	28.7%		16.5%	28.7%	12.2%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	6.6	34.3		6.3	28.7		24.0	42.5		11.6	30.1	36.1
Actuated g/C Ratio	0.06	0.30		0.05	0.25		0.21	0.37		0.10	0.26	0.31
v/c Ratio	0.43	0.53		0.21	0.34		0.77	0.76		0.71	1.16	0.03
Control Delay	59.8	7.5		57.2	24.7		54.7	41.5		72.8	124.8	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	59.8	7.5		57.2	24.7		54.7	41.5		72.8	124.8	0.1
LOS	E	A		E	C		D	D		E	F	A
Approach Delay		17.1			28.5			46.2			117.9	
Approach LOS		B			C			D			F	
Queue Length 50th (m)	9.1	4.6		4.2	16.3		~81.6	~136.1		25.9	~155.0	0.0
Queue Length 95th (m)	17.0	27.6		11.8	31.5		#114.7	#176.2		#49.3	#195.0	0.0
Internal Link Dist (m)		127.1			312.5			512.4			424.3	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	190	767		98	595		670	1221		178	868	533
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	0.42	0.46		0.19	0.24		0.77	0.76		0.66	1.16	0.03

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

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

Natural Cycle: 135

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2028
SAT Peak Hour

Maximum v/c Ratio: 1.16

Intersection Signal Delay: 67.0

Intersection LOS: E

Intersection Capacity Utilization 97.5%

ICU Level of Service F

Analysis Period (min) 15

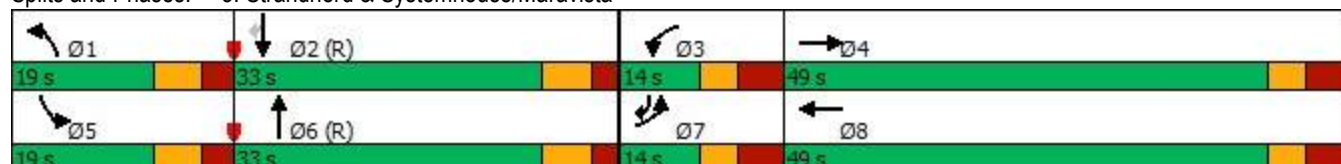
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FB2028
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	8	33	95	18	76	55	1180	106	51	1206	32
Future Volume (vph)	69	8	33	95	18	76	55	1180	106	51	1206	32
Satd. Flow (prot)	1642	1745	1483	1658	1534	0	3185	3270	0	1658	3316	1483
Flt Permitted	0.696			0.752			0.950			0.950		
Satd. Flow (perm)	1203	1745	1464	1311	1534	0	3181	3270	0	1657	3316	1462
Satd. Flow (RTOR)			41		76			12				115
Lane Group Flow (vph)	69	8	33	95	94	0	55	1286	0	51	1206	32
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	38.0	38.0	12.4	38.0	38.0		12.4	59.6		12.4	59.6	59.6
Total Split (%)	34.5%	34.5%	11.3%	34.5%	34.5%		11.3%	54.2%		11.3%	54.2%	54.2%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.8	15.8	22.4	15.8	15.8		6.8	67.1		8.1	68.3	68.3
Actuated g/C Ratio	0.14	0.14	0.20	0.14	0.14		0.06	0.61		0.07	0.62	0.62
v/c Ratio	0.40	0.03	0.10	0.51	0.33		0.28	0.64		0.42	0.59	0.03
Control Delay	47.3	35.5	6.2	51.0	14.9		52.7	17.9		59.3	16.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.3	35.5	6.2	51.0	14.9		52.7	17.9		59.3	16.2	0.1
LOS	D	D	A	D	B		D	B		E	B	A
Approach Delay		34.1			33.1			19.4			17.5	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	14.0	1.6	0.0	19.6	3.5		5.8	89.3		10.5	76.4	0.0
Queue Length 95th (m)	23.5	5.2	4.9	30.5	15.3		12.3	149.7		#24.5	135.3	0.0
Internal Link Dist (m)		259.4			125.1			519.0			512.4	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	336	488	332	367	484		198	1998		122	2057	950
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.21	0.02	0.10	0.26	0.19		0.28	0.64		0.42	0.59	0.03

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 93 (85%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FB2028
SAT Peak Hour

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 20.0

Intersection LOS: B

Intersection Capacity Utilization 68.9%

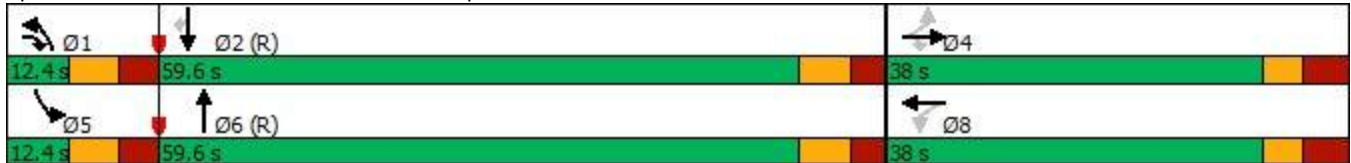
ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FB2028
SAT Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	22	46	58	66	0
Future Volume (Veh/h)	2	22	46	58	66	0
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	22	46	58	66	0
Pedestrians		2			3	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	218	134	134	3	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	218	134	134	3	0	
tC, single (s)	7.1	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.4	2.3	
p0 queue free %	100	97	94	95	96	
cM capacity (veh/h)	640	724	724	1064	1572	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	24	104	66			
Volume Left	2	0	66			
Volume Right	0	58	0			
cSH	716	881	1572			
Volume to Capacity	0.03	0.12	0.04			
Queue Length 95th (m)	0.8	3.0	1.0			
Control Delay (s)	10.2	9.6	7.4			
Lane LOS	B	A	A			
Approach Delay (s)	10.2	9.6	7.4			
Approach LOS	B	A				
Intersection Summary						
Average Delay			8.9			
Intersection Capacity Utilization			18.3%		ICU Level of Service	
Analysis Period (min)			15		A	

Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	73	89	518	362	15
Future Vol, veh/h	15	73	89	518	362	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	3	4	2	2	2
Mvmt Flow	15	73	89	518	362	15
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	607	0	-	0	192	89
Stage 1	-	-	-	-	89	-
Stage 2	-	-	-	-	103	-
Critical Hdwy	4.3	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.38	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	889	-	-	-	797	969
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	921	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	889	-	-	-	783	969
Mov Cap-2 Maneuver	-	-	-	-	783	-
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	921	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.6	0		13.7		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	889	-	-	-	789	
HCM Lane V/C Ratio	0.017	-	-	-	0.478	
HCM Control Delay (s)	9.1	-	-	-	13.7	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	2.6	

Appendix J

Synchro Intersection Worksheets – 2033 Future Background Conditions

Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FB2033
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	19	7	71	35	479	4	1750	85	582	986	108
Future Volume (vph)	66	19	7	71	35	479	4	1750	85	582	986	108
Satd. Flow (prot)	2853	1244	0	1595	1471	1483	1127	3221	1483	3124	3161	1339
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2850	1244	0	1595	1471	1464	1127	3221	1463	3124	3161	1339
Satd. Flow (RTOR)		7				371			225			108
Lane Group Flow (vph)	66	26	0	71	35	479	4	1750	85	582	986	108
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	13.0	48.0		13.0	48.0	48.0	13.0	31.0	31.0	28.0	46.0	13.0
Total Split (%)	10.8%	40.0%		10.8%	40.0%	40.0%	10.8%	25.8%	25.8%	23.3%	38.3%	10.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	7.4	10.1		24.6	20.6	20.6	5.9	35.2	35.2	29.3	69.1	82.0
Actuated g/C Ratio	0.06	0.08		0.20	0.17	0.17	0.05	0.29	0.29	0.24	0.58	0.68
v/c Ratio	0.38	0.23		0.22	0.14	0.86	0.07	1.85	0.14	0.76	0.54	0.11
Control Delay	60.5	46.3		40.1	37.7	25.8	57.2	414.6	0.5	50.2	20.9	2.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	46.3		40.1	37.7	25.8	57.2	414.6	0.5	50.2	20.9	2.6
LOS	E	D		D	D	C	E	F	A	D	C	A
Approach Delay		56.5			28.3			394.7			29.9	
Approach LOS		E			C			F			C	
Queue Length 50th (m)	7.7	4.3		15.5	7.3	25.8	0.9	~325.6	0.0	64.8	63.6	0.0
Queue Length 95th (m)	15.3	13.3		23.5	12.9	54.5	4.6	#410.2	0.0	#112.8	#161.6	8.0
Internal Link Dist (m)		131.5			347.0			233.3			231.4	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	178	429		327	502	744	56	945	588	764	1818	937
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.06		0.22	0.07	0.64	0.07	1.85	0.14	0.76	0.54	0.12

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 101 (84%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FB2033
AM Peak Hour

Maximum v/c Ratio: 1.85

Intersection Signal Delay: 190.3

Intersection LOS: F

Intersection Capacity Utilization 103.7%

ICU Level of Service G

Analysis Period (min) 15

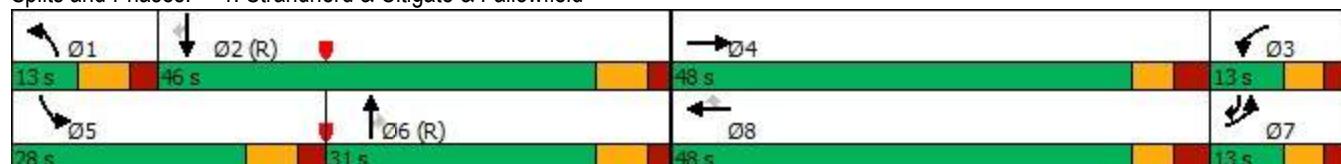
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FB2033
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	20	8	25	36	204	14	1541	23	47	948	69
Future Volume (vph)	94	20	8	25	36	204	14	1541	23	47	948	69
Satd. Flow (prot)	1610	1745	1483	1658	1745	1483	3216	3221	1483	1595	3131	1455
Flt Permitted	0.734			0.744			0.950			0.950		
Satd. Flow (perm)	1243	1745	1464	1297	1745	1464	3214	3221	1450	1595	3131	1435
Satd. Flow (RTOR)			90			156			97			97
Lane Group Flow (vph)	94	20	8	25	36	204	14	1541	23	47	948	69
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	16.0	65.0	65.0	16.0	65.0	65.0
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	12.3%	50.0%	50.0%	12.3%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	19.3	19.3	19.3	19.3	19.3	19.3	6.1	83.2	83.2	8.5	90.7	90.7
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.64	0.64	0.07	0.70	0.70
v/c Ratio	0.51	0.08	0.03	0.13	0.14	0.58	0.09	0.75	0.02	0.45	0.43	0.07
Control Delay	57.7	42.3	0.1	43.9	44.2	19.1	76.1	11.7	0.0	71.9	12.6	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.7	42.3	0.1	43.9	44.2	19.1	76.1	11.7	0.0	71.9	12.6	1.7
LOS	E	D	A	D	D	B	E	B	A	E	B	A
Approach Delay		51.4			24.9			12.1			14.5	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	23.4	4.6	0.0	5.9	8.5	11.4	1.9	18.5	0.0	11.8	35.7	0.0
Queue Length 95th (m)	32.2	9.6	0.0	11.2	14.5	28.0	m3.3	#273.5	m0.0	24.4	118.4	4.1
Internal Link Dist (m)		138.8			171.2			424.3			233.3	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	394	554	526	412	554	571	225	2062	963	116	2184	1030
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.04	0.02	0.06	0.06	0.36	0.06	0.75	0.02	0.41	0.43	0.07

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 99 (76%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FB2033
AM Peak Hour

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 15.6

Intersection LOS: B

Intersection Capacity Utilization 85.9%

ICU Level of Service E

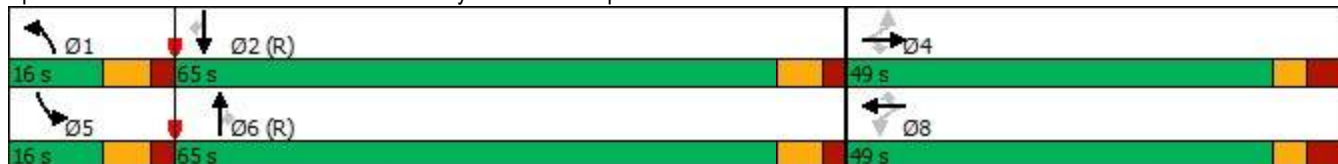
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2033
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	19	66	27	56	74	233	1338	34	58	821	11
Future Volume (vph)	30	19	66	27	56	74	233	1338	34	58	821	11
Satd. Flow (prot)	2583	1461	0	1658	1556	0	3216	3301	0	1580	3221	1282
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2569	1461	0	1658	1556	0	3210	3301	0	1580	3221	1262
Satd. Flow (RTOR)		66			54			2				96
Lane Group Flow (vph)	30	85	0	27	130	0	233	1372	0	58	821	11
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		20.0	47.0		20.0	47.0	14.0
Total Split (%)	10.8%	37.7%		10.8%	37.7%		15.4%	36.2%		15.4%	36.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	6.4	17.5		6.5	17.5		13.7	75.7		10.0	69.3	75.2
Actuated g/C Ratio	0.05	0.13		0.05	0.13		0.11	0.58		0.08	0.53	0.58
v/c Ratio	0.24	0.33		0.33	0.51		0.69	0.71		0.48	0.48	0.01
Control Delay	63.8	17.6		70.5	34.6		66.9	26.4		72.7	24.0	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.8	17.6		70.5	34.6		66.9	26.4		72.7	24.0	0.0
LOS	E	B		E	C		E	C		E	C	A
Approach Delay		29.7			40.8			32.3			26.9	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	3.8	4.6		6.8	18.9		29.8	133.2		15.2	41.5	0.0
Queue Length 95th (m)	9.0	15.4		16.8	29.9		44.0	#285.0		30.7	89.7	m0.0
Internal Link Dist (m)		127.1			312.5			512.4			424.3	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	135	511		86	533		351	1922		160	1717	774
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	0.22	0.17		0.31	0.24		0.66	0.71		0.36	0.48	0.01

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 94 (72%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 135
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 3: Strandherd & Systemhouse/Maravista

FB2033
AM Peak Hour

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 31.0

Intersection LOS: C

Intersection Capacity Utilization 75.4%

ICU Level of Service D

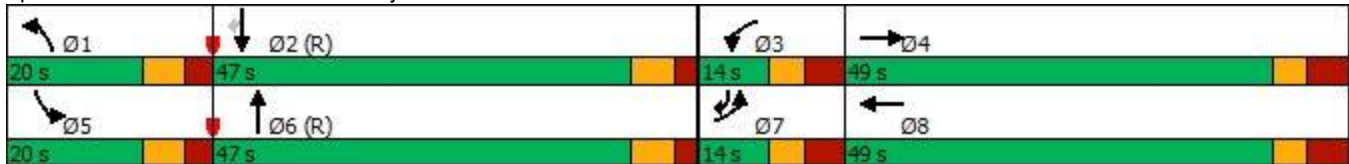
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

FB2033
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	5	23	77	19	66	72	1461	96	31	816	71
Future Volume (vph)	31	5	23	77	19	66	72	1461	96	31	816	71
Satd. Flow (prot)	1642	1745	1483	1642	1527	0	3216	3276	0	1595	3191	1469
Flt Permitted	0.702			0.754			0.950			0.950		
Satd. Flow (perm)	1212	1745	1464	1301	1527	0	3213	3276	0	1595	3191	1449
Satd. Flow (RTOR)			37		66			7				105
Lane Group Flow (vph)	31	5	23	77	85	0	72	1557	0	31	816	71
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	21.0	37.0	37.0		21.0	62.0		21.0	62.0	62.0
Total Split (%)	30.8%	30.8%	17.5%	30.8%	30.8%		17.5%	51.7%		17.5%	51.7%	51.7%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.2	15.2	23.1	15.2	15.2		8.1	80.6		7.9	77.6	77.6
Actuated g/C Ratio	0.13	0.13	0.19	0.13	0.13		0.07	0.67		0.07	0.65	0.65
v/c Ratio	0.20	0.02	0.07	0.47	0.34		0.33	0.71		0.30	0.40	0.07
Control Delay	46.6	40.4	4.1	55.7	18.2		57.0	17.9		60.0	12.8	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	46.6	40.4	4.1	55.7	18.2		57.0	17.9		60.0	12.8	1.3
LOS	D	D	A	E	B		E	B		E	B	A
Approach Delay		29.5			36.0			19.7			13.5	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	6.8	1.1	0.0	17.6	4.1		8.5	117.4		7.1	44.1	0.0
Queue Length 95th (m)	13.9	4.2	3.2	28.2	16.2		15.6	#237.0		16.7	84.6	3.2
Internal Link Dist (m)		259.4			125.1			519.0			512.4	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	300	433	379	323	428		364	2202		180	2064	974
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.10	0.01	0.06	0.24	0.20		0.20	0.71		0.17	0.40	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 29 (24%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

FB2033
AM Peak Hour

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 18.8

Intersection LOS: B

Intersection Capacity Utilization 69.4%

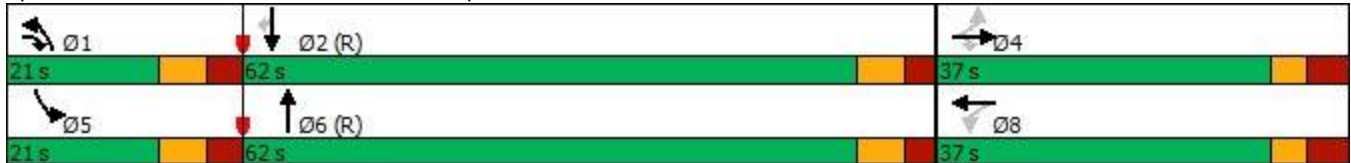
ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FB2033
AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	7	62	48	38	1
Future Volume (Veh/h)	2	7	62	48	38	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	7	62	48	38	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	156	76	77	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	156	76	77	0	0	
tC, single (s)	7.6	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	4.0	4.0	4.0	3.4	2.3	
p0 queue free %	100	99	92	96	98	
cM capacity (veh/h)	629	794	791	1068	1548	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	9	110	39			
Volume Left	2	0	38			
Volume Right	0	48	1			
cSH	750	892	1548			
Volume to Capacity	0.01	0.12	0.02			
Queue Length 95th (m)	0.3	3.2	0.6			
Control Delay (s)	9.9	9.6	7.2			
Lane LOS	A	A	A			
Approach Delay (s)	9.9	9.6	7.2			
Approach LOS	A	A				
Intersection Summary						
Average Delay			9.0			
Intersection Capacity Utilization			16.5%		ICU Level of Service	
Analysis Period (min)			15			
			A			

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	30	95	204	85	15
Future Vol, veh/h	15	30	95	204	85	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	7	18	6	2	9	2
Mvmt Flow	15	30	95	204	85	15
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	299	0	-	0	155	95
Stage 1	-	-	-	-	95	-
Stage 2	-	-	-	-	60	-
Critical Hdwy	4.17	-	-	-	6.49	6.22
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.263	-	-	-	3.581	3.318
Pot Cap-1 Maneuver	1234	-	-	-	820	962
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	945	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1234	-	-	-	810	962
Mov Cap-2 Maneuver	-	-	-	-	810	-
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	945	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.7	0		9.9		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1234	-	-	-	830	
HCM Lane V/C Ratio	0.012	-	-	-	0.12	
HCM Control Delay (s)	8	-	-	-	9.9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.4	

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FB2033
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	53	12	164	63	529	8	1330	132	465	1511	209
Future Volume (vph)	211	53	12	164	63	529	8	1330	132	465	1511	209
Satd. Flow (prot)	3124	1614	0	1658	1664	1455	1208	3221	1483	3216	3316	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3124	1614	0	1655	1664	1455	1208	3221	1483	3216	3316	1455
Satd. Flow (RTOR)		10				360			160			153
Lane Group Flow (vph)	211	65	0	164	63	529	8	1330	132	465	1511	209
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	14.0	48.0		14.0	48.0	48.0	24.0	34.0	34.0	24.0	34.0	14.0
Total Split (%)	11.7%	40.0%		11.7%	40.0%	40.0%	20.0%	28.3%	28.3%	20.0%	28.3%	11.7%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	15.1	16.4		26.7	24.6	24.6	6.5	30.9	30.9	21.8	56.8	77.5
Actuated g/C Ratio	0.13	0.14		0.22	0.20	0.20	0.05	0.26	0.26	0.18	0.47	0.65
v/c Ratio	0.54	0.28		0.44	0.18	0.91	0.12	1.60	0.26	0.80	0.96	0.21
Control Delay	55.6	39.0		46.7	36.0	33.3	73.5	301.6	4.6	58.8	47.5	4.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.6	39.0		46.7	36.0	33.3	73.5	301.6	4.6	58.8	47.5	4.2
LOS	E	D		D	D	C	E	F	A	E	D	A
Approach Delay		51.7			36.5			273.7			45.8	
Approach LOS		D			D			F			D	
Queue Length 50th (m)	24.2	12.5		32.4	12.4	43.3	2.1	~243.2	1.9	52.5	167.1	3.9
Queue Length 95th (m)	#53.1	18.9		#97.6	20.3	77.1	m3.4	#288.5	m4.7	#92.5	#304.4	17.4
Internal Link Dist (m)		131.5			347.0			233.3			231.4	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	394	558		369	568	734	170	829	500	584	1568	994
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.12		0.44	0.11	0.72	0.05	1.60	0.26	0.80	0.96	0.21

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 115 (96%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FB2033
PM Peak Hour

Maximum v/c Ratio: 1.60

Intersection Signal Delay: 116.1

Intersection LOS: F

Intersection Capacity Utilization 96.7%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

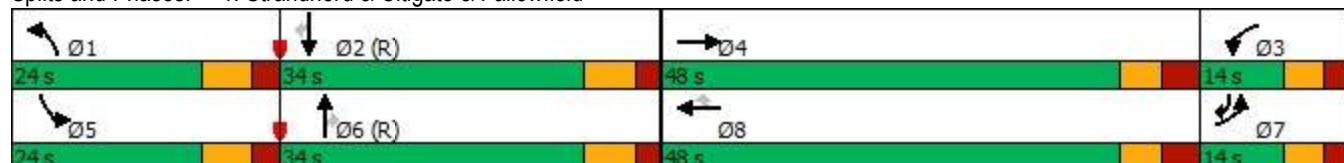
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FB2033
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	117	30	37	114	126	41	1174	23	122	1361	194
Future Volume (vph)	210	117	30	37	114	126	41	1174	23	122	1361	194
Satd. Flow (prot)	1658	1745	1469	1642	1745	1483	3216	3131	1483	1658	3283	1483
Flt Permitted	0.684			0.682			0.950			0.950		
Satd. Flow (perm)	1191	1745	1436	1168	1745	1462	3213	3131	1447	1656	3283	1461
Satd. Flow (RTOR)			97			126			105			172
Lane Group Flow (vph)	210	117	30	37	114	126	41	1174	23	122	1361	194
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	17.0	54.0	54.0	17.0	54.0	54.0
Total Split (%)	40.8%	40.8%	40.8%	40.8%	40.8%	40.8%	14.2%	45.0%	45.0%	14.2%	45.0%	45.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	29.5	29.5	29.5	29.5	29.5	29.5	7.0	56.8	56.8	12.3	64.6	64.6
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.06	0.47	0.47	0.10	0.54	0.54
v/c Ratio	0.72	0.27	0.07	0.13	0.27	0.28	0.22	0.79	0.03	0.72	0.77	0.22
Control Delay	53.8	35.5	0.3	31.8	35.3	6.3	57.5	33.2	2.0	77.9	15.8	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	35.5	0.3	31.8	35.3	6.3	57.5	33.2	2.0	77.9	15.8	1.5
LOS	D	D	A	C	D	A	E	C	A	E	B	A
Approach Delay		43.3			21.7			33.4			18.6	
Approach LOS		D			C			C			B	
Queue Length 50th (m)	46.9	23.1	0.0	7.0	22.5	0.0	3.9	152.6	0.0	30.6	27.8	0.2
Queue Length 95th (m)	63.7	33.5	0.0	13.8	32.7	12.7	m4.4	#192.0	m0.0	m32.2	m#98.0	m2.2
Internal Link Dist (m)		138.8			171.2			424.3			233.3	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	409	600	557	401	600	585	270	1482	740	169	1766	865
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.20	0.05	0.09	0.19	0.22	0.15	0.79	0.03	0.72	0.77	0.22

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 99 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FB2033
PM Peak Hour

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 26.5

Intersection LOS: C

Intersection Capacity Utilization 85.7%

ICU Level of Service E

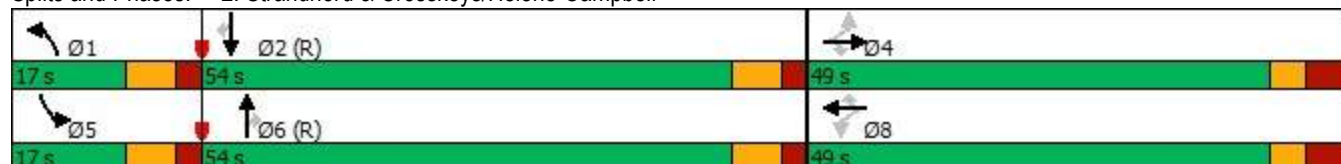
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2033
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	56	295	18	59	42	364	1128	27	124	1389	14
Future Volume (vph)	59	56	295	18	59	42	364	1128	27	124	1389	14
Satd. Flow (prot)	3185	1504	0	1658	1586	0	3216	3206	0	1658	3316	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3116	1504	0	1653	1586	0	3213	3206	0	1651	3316	1391
Satd. Flow (RTOR)		242			33			2				104
Lane Group Flow (vph)	59	351	0	18	101	0	364	1155	0	124	1389	14
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	13.0	49.0		13.0	49.0		17.0	41.0		17.0	41.0	13.0
Total Split (%)	10.8%	40.8%		10.8%	40.8%		14.2%	34.2%		14.2%	34.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	5.8	27.7		5.7	22.5		20.5	53.6		12.5	45.6	50.8
Actuated g/C Ratio	0.05	0.23		0.05	0.19		0.17	0.45		0.10	0.38	0.42
v/c Ratio	0.39	0.66		0.23	0.31		0.66	0.81		0.72	1.10	0.02
Control Delay	63.1	17.4		62.1	26.7		52.5	40.1		53.1	98.7	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.1	17.4		62.1	26.7		52.5	40.1		53.1	98.7	0.1
LOS	E	B		E	C		D	D		D	F	A
Approach Delay		23.9			32.1			43.1			94.1	
Approach LOS		C			C			D			F	
Queue Length 50th (m)	7.0	23.2		4.2	15.5		43.7	89.5		24.0	184.2	0.0
Queue Length 95th (m)	14.0	46.2		11.8	23.8		#88.5	#217.0		m#43.9	#286.8	m0.0
Internal Link Dist (m)		127.1			312.5			512.4			424.3	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	153	678		80	570		549	1432		172	1260	649
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	0.39	0.52		0.23	0.18		0.66	0.81		0.72	1.10	0.02

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 54 (45%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2033
PM Peak Hour

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 62.3

Intersection LOS: E

Intersection Capacity Utilization 93.5%

ICU Level of Service F

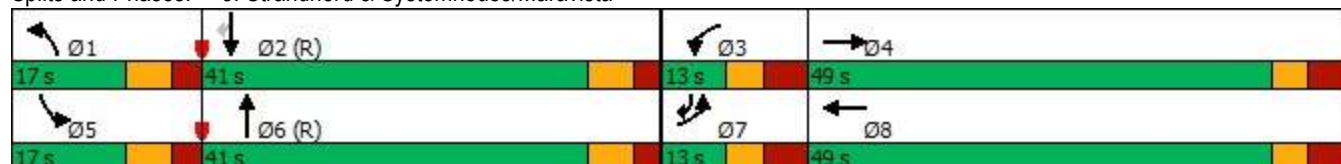
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FB2033
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	19	67	144	12	53	47	1337	107	56	1668	47
Future Volume (vph)	106	19	67	144	12	53	47	1337	107	56	1668	47
Satd. Flow (prot)	1658	1745	1483	1626	1492	0	3216	3244	0	1658	3316	1483
Flt Permitted	0.715			0.745			0.950			0.950		
Satd. Flow (perm)	1246	1745	1463	1274	1492	0	3216	3244	0	1657	3316	1483
Satd. Flow (RTOR)			37		53			9				105
Lane Group Flow (vph)	106	19	67	144	65	0	47	1444	0	56	1668	47
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	23.0	37.0	37.0		23.0	60.0		23.0	60.0	60.0
Total Split (%)	30.8%	30.8%	19.2%	30.8%	30.8%		19.2%	50.0%		19.2%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	19.3	19.3	26.3	19.3	19.3		7.2	72.2		9.4	74.4	74.4
Actuated g/C Ratio	0.16	0.16	0.22	0.16	0.16		0.06	0.60		0.08	0.62	0.62
v/c Ratio	0.53	0.07	0.19	0.71	0.23		0.24	0.74		0.43	0.81	0.05
Control Delay	54.2	39.4	16.1	64.7	15.6		56.4	23.0		55.5	21.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	54.2	39.4	16.1	64.7	15.6		56.4	23.0		55.5	21.0	0.4
LOS	D	D	B	E	B		E	C		E	C	A
Approach Delay		39.4			49.4			24.0			21.5	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	23.3	3.9	5.2	32.6	2.4		5.5	126.5		13.8	47.2	0.0
Queue Length 95th (m)	37.5	9.6	13.9	49.6	13.4		11.5	#218.0		m15.3	m104.7	m0.0
Internal Link Dist (m)		259.4			125.1			519.0			512.4	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	309	433	452	316	410		418	1954		215	2055	959
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.34	0.04	0.15	0.46	0.16		0.11	0.74		0.26	0.81	0.05

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 57 (48%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

FB2033
PM Peak Hour

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 25.1

Intersection LOS: C

Intersection Capacity Utilization 79.7%

ICU Level of Service D

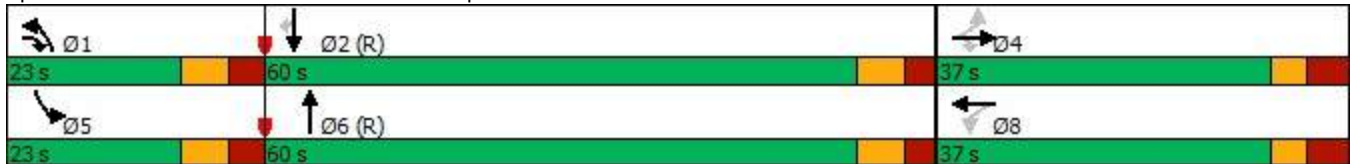
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FB2033
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	25	26	77	80	1
Future Volume (Veh/h)	3	25	26	77	80	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	25	26	77	80	1
Pedestrians		1	1			
Lane Width (m)		3.5	3.5			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	252	162	163	1	1	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	252	162	163	1	1	
tC, single (s)	7.1	6.5	6.5	6.2	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.3	
p0 queue free %	100	96	96	93	95	
cM capacity (veh/h)	607	692	691	1074	1569	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	28	103	81			
Volume Left	3	0	80			
Volume Right	0	77	1			
cSH	681	942	1569			
Volume to Capacity	0.04	0.11	0.05			
Queue Length 95th (m)	1.0	2.8	1.2			
Control Delay (s)	10.5	9.3	7.3			
Lane LOS	B	A	A			
Approach Delay (s)	10.5	9.3	7.3			
Approach LOS	B	A				
Intersection Summary						
Average Delay			8.7			
Intersection Capacity Utilization			18.1%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	5.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	90	88	346	320	15
Future Vol, veh/h	15	90	88	346	320	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	27	3	5	2	2	2
Mvmt Flow	15	90	88	346	320	15
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	434	0	-	0	208	88
Stage 1	-	-	-	-	88	-
Stage 2	-	-	-	-	120	-
Critical Hdwy	4.37	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.443	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1005	-	-	-	780	970
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	905	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1005	-	-	-	768	970
Mov Cap-2 Maneuver	-	-	-	-	768	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	905	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.2	0		13.1		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1005	-	-	-	775	
HCM Lane V/C Ratio	0.015	-	-	-	0.432	
HCM Control Delay (s)	8.6	-	-	-	13.1	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	2.2	

Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FB2033
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	48	10	105	52	207	7	1344	119	225	1291	150
Future Volume (vph)	123	48	10	105	52	207	7	1344	119	225	1291	150
Satd. Flow (prot)	2757	1509	0	1626	1679	1427	1353	3316	1441	3154	3221	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2744	1509	0	1626	1679	1403	1350	3316	1441	3154	3221	1372
Satd. Flow (RTOR)		10				207			175			136
Lane Group Flow (vph)	123	58	0	105	52	207	7	1344	119	225	1291	150
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	12.0	48.0		12.0	48.0	48.0	19.0	31.0	31.0	19.0	31.0	12.0
Total Split (%)	10.9%	43.6%		10.9%	43.6%	43.6%	17.3%	28.2%	28.2%	17.3%	28.2%	10.9%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	None
Act Effect Green (s)	5.6	10.7		17.4	14.9	14.9	6.2	24.6	24.6	10.6	40.2	46.2
Actuated g/C Ratio	0.07	0.13		0.21	0.18	0.18	0.07	0.29	0.29	0.13	0.48	0.55
v/c Ratio	0.67	0.29		0.31	0.17	0.49	0.07	1.38	0.22	0.57	0.84	0.18
Control Delay	59.6	35.7		35.1	29.0	8.2	43.0	205.3	2.3	42.2	27.8	3.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.6	35.7		35.1	29.0	8.2	43.0	205.3	2.3	42.2	27.8	3.3
LOS	E	D		D	C	A	D	F	A	D	C	A
Approach Delay		51.9			18.9			188.1			27.6	
Approach LOS		D			B			F			C	
Queue Length 50th (m)	9.2	6.5		15.7	7.0	0.0	1.0	~136.5	0.0	16.0	71.6	0.5
Queue Length 95th (m)	#31.1	22.2		30.3	15.4	14.5	6.0	#272.6	4.3	36.8	#247.1	11.4
Internal Link Dist (m)		131.5			347.0			233.3			231.4	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	184	758		337	838	804	196	973	546	457	1545	820
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.08		0.31	0.06	0.26	0.04	1.38	0.22	0.49	0.84	0.18

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 83.8

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.38

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FB2033
SAT Peak Hour

Intersection Signal Delay: 92.0

Intersection LOS: F

Intersection Capacity Utilization 80.2%

ICU Level of Service D

Analysis Period (min) 15

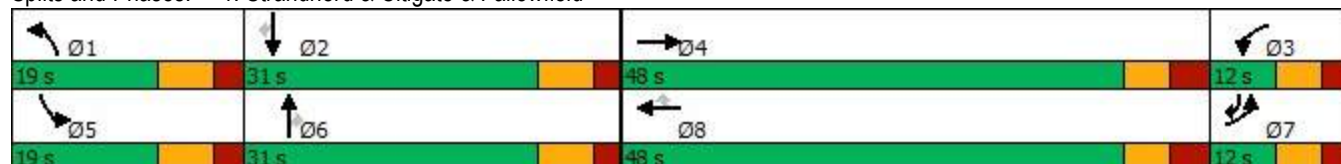
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FB2033
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	147	79	43	137	139	86	1064	20	72	1087	247
Future Volume (vph)	259	147	79	43	137	139	86	1064	20	72	1087	247
Satd. Flow (prot)	1658	1745	1483	1658	1745	1483	3216	3316	1483	1658	3161	1483
Flt Permitted	0.669			0.663			0.950			0.950		
Satd. Flow (perm)	1167	1745	1456	1152	1745	1463	3214	3316	1431	1652	3161	1464
Satd. Flow (RTOR)			106			139			115			247
Lane Group Flow (vph)	259	147	79	43	137	139	86	1064	20	72	1087	247
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	15.0	46.0	46.0	15.0	46.0	46.0
Total Split (%)	44.5%	44.5%	44.5%	44.5%	44.5%	44.5%	13.6%	41.8%	41.8%	13.6%	41.8%	41.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	7.9	52.1	52.1	9.1	53.3	53.3
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.07	0.47	0.47	0.08	0.48	0.48
v/c Ratio	0.81	0.31	0.17	0.14	0.29	0.28	0.38	0.68	0.03	0.53	0.71	0.30
Control Delay	56.2	31.5	2.9	27.8	31.1	5.6	53.3	28.4	0.1	62.4	28.7	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.2	31.5	2.9	27.8	31.1	5.6	53.3	28.4	0.1	62.4	28.7	4.0
LOS	E	C	A	C	C	A	D	C	A	E	C	A
Approach Delay		40.0			19.5			29.8			26.1	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	51.9	25.0	0.0	7.0	23.2	0.0	9.2	97.3	0.0	14.9	99.2	0.0
Queue Length 95th (m)	71.9	36.2	5.6	13.8	33.8	12.2	17.0	#151.5	0.0	#33.0	#163.4	16.1
Internal Link Dist (m)		138.8			171.2			424.3			233.3	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	438	655	612	432	655	636	245	1569	737	143	1531	836
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.22	0.13	0.10	0.21	0.22	0.35	0.68	0.03	0.50	0.71	0.30

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 108 (98%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FB2033
SAT Peak Hour

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 28.7

Intersection LOS: C

Intersection Capacity Utilization 84.5%

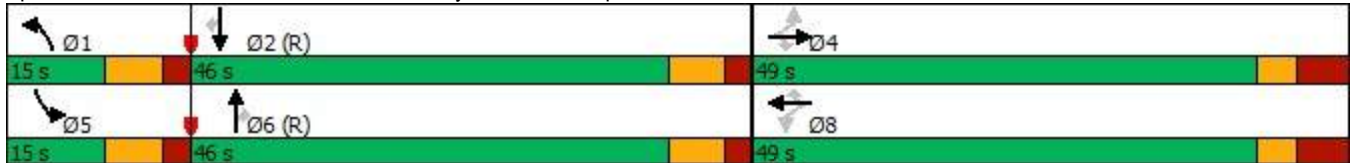
ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2033
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	39	316	19	81	62	514	996	26	118	1097	14
Future Volume (vph)	80	39	316	19	81	62	514	996	26	118	1097	14
Satd. Flow (prot)	3216	1490	0	1658	1585	0	3216	3302	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3142	1490	0	1654	1585	0	3202	3302	0	1658	3316	1449
Satd. Flow (RTOR)		316			37			2				108
Lane Group Flow (vph)	80	355	0	19	143	0	514	1022	0	118	1097	14
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		19.0	33.0		19.0	33.0	14.0
Total Split (%)	12.2%	42.6%		12.2%	42.6%		16.5%	28.7%		16.5%	28.7%	12.2%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effect Green (s)	6.6	34.3		6.3	28.7		24.0	42.5		11.6	30.1	36.1
Actuated g/C Ratio	0.06	0.30		0.05	0.25		0.21	0.37		0.10	0.26	0.31
v/c Ratio	0.43	0.53		0.21	0.34		0.77	0.84		0.71	1.26	0.03
Control Delay	59.8	7.5		57.2	24.7		54.7	44.6		72.8	164.6	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	59.8	7.5		57.2	24.7		54.7	44.6		72.8	164.6	0.1
LOS	E	A		E	C		D	D		E	F	A
Approach Delay		17.1			28.5			48.0			153.9	
Approach LOS		B			C			D			F	
Queue Length 50th (m)	9.1	4.6		4.2	16.3		~81.6	~159.4		25.9	~176.7	0.0
Queue Length 95th (m)	17.0	27.6		11.8	31.5		#114.7	#200.1		#49.3	#217.5	0.0
Internal Link Dist (m)		127.1			312.5			512.4			424.3	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	190	767		98	595		670	1221		178	868	533
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	0.42	0.46		0.19	0.24		0.77	0.84		0.66	1.26	0.03

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

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

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FB2033
SAT Peak Hour

Maximum v/c Ratio: 1.26

Intersection Signal Delay: 81.8

Intersection LOS: F

Intersection Capacity Utilization 100.1%

ICU Level of Service G

Analysis Period (min) 15

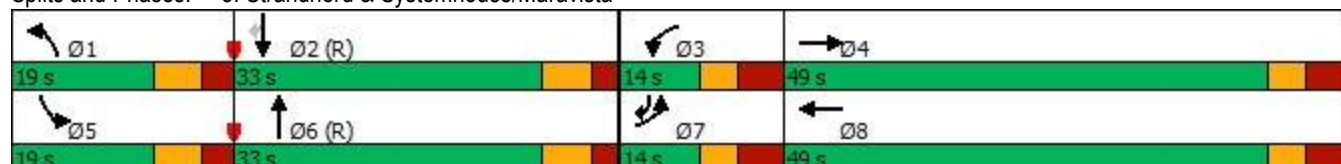
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FB2033
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	8	33	95	18	76	55	1273	106	51	1294	32
Future Volume (vph)	69	8	33	95	18	76	55	1273	106	51	1294	32
Satd. Flow (prot)	1642	1745	1483	1658	1534	0	3185	3270	0	1658	3316	1483
Flt Permitted	0.696			0.752			0.950			0.950		
Satd. Flow (perm)	1203	1745	1464	1311	1534	0	3182	3270	0	1657	3316	1462
Satd. Flow (RTOR)			41		76			11				115
Lane Group Flow (vph)	69	8	33	95	94	0	55	1379	0	51	1294	32
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	38.0	38.0	12.4	38.0	38.0		12.4	59.6		12.4	59.6	59.6
Total Split (%)	34.5%	34.5%	11.3%	34.5%	34.5%		11.3%	54.2%		11.3%	54.2%	54.2%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.8	15.8	22.4	15.8	15.8		6.8	67.1		8.1	68.3	68.3
Actuated g/C Ratio	0.14	0.14	0.20	0.14	0.14		0.06	0.61		0.07	0.62	0.62
v/c Ratio	0.40	0.03	0.10	0.51	0.33		0.28	0.69		0.42	0.63	0.03
Control Delay	47.3	35.5	6.2	51.0	14.9		52.7	19.2		59.3	17.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.3	35.5	6.2	51.0	14.9		52.7	19.2		59.3	17.1	0.1
LOS	D	D	A	D	B		D	B		E	B	A
Approach Delay		34.1			33.1			20.5			18.3	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	14.0	1.6	0.0	19.6	3.5		5.8	100.6		10.5	85.6	0.0
Queue Length 95th (m)	23.5	5.2	4.9	30.5	15.3		12.3	168.3		#24.5	151.0	0.0
Internal Link Dist (m)		259.4			125.1			519.0			512.4	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	336	488	332	367	484		198	1998		122	2057	950
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.21	0.02	0.10	0.26	0.19		0.28	0.69		0.42	0.63	0.03

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 93 (85%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FB2033
SAT Peak Hour

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.7

Intersection LOS: C

Intersection Capacity Utilization 68.9%

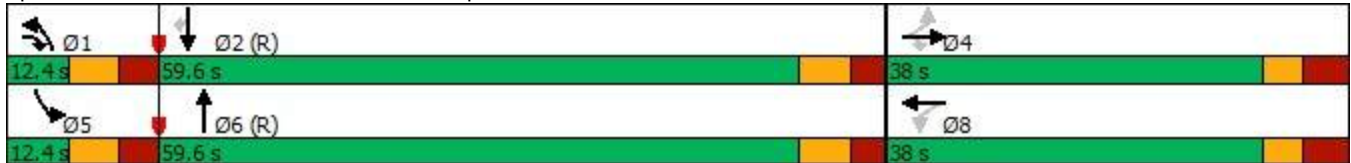
ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FB2033
SAT Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	22	46	58	66	0
Future Volume (Veh/h)	2	22	46	58	66	0
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	22	46	58	66	0
Pedestrians		2			3	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	218	134	134	3	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	218	134	134	3	0	
tC, single (s)	7.1	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.4	2.3	
p0 queue free %	100	97	94	95	96	
cM capacity (veh/h)	640	724	724	1064	1572	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	24	104	66			
Volume Left	2	0	66			
Volume Right	0	58	0			
cSH	716	881	1572			
Volume to Capacity	0.03	0.12	0.04			
Queue Length 95th (m)	0.8	3.0	1.0			
Control Delay (s)	10.2	9.6	7.4			
Lane LOS	B	A	A			
Approach Delay (s)	10.2	9.6	7.4			
Approach LOS	B	A				
Intersection Summary						
Average Delay			8.9			
Intersection Capacity Utilization			18.3%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	73	89	518	362	15
Future Vol, veh/h	15	73	89	518	362	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	3	4	2	2	2
Mvmt Flow	15	73	89	518	362	15

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	607	0	0 192 89
Stage 1	-	-	- 89 -
Stage 2	-	-	- 103 -
Critical Hdwy	4.3	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.38	-	- 3.518 3.318
Pot Cap-1 Maneuver	889	-	- 797 969
Stage 1	-	-	- 934 -
Stage 2	-	-	- 921 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	889	-	- 783 969
Mov Cap-2 Maneuver	-	-	- 783 -
Stage 1	-	-	- 918 -
Stage 2	-	-	- 921 -

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	13.7
HCM LOS	B		

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	889	-	-	-	789
HCM Lane V/C Ratio	0.017	-	-	-	0.478
HCM Control Delay (s)	9.1	-	-	-	13.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	2.6

Appendix K

Signal Warrant Calculation

Access #2 @ Strandherd Drive
2028 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Entire %	Signal
		1 Lane Highway		2 or More Lanes		Sectional			
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1429	159%	101%	Maybe (Case 2)
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	173	101%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	1314	146%	83%	No (Case 3)
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	62	83%		

Notes

1. Refer to OTM Book 12, pg 125, July 2024
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

Access #2 @ Strandherd Drive
2033 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Entire %	Signal
		1 Lane Highway		2 or More Lanes		Sectional			
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1608	179%	101%	Maybe (Case 2)
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	173	101%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	1493	166%	134%	Maybe (Case 2)
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	101	134%		

Notes

1. Refer to OTM Book 12, pg 125, July 2024
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

Access #3 @ Systemhouse Street
2028 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Entire %	Signal
		1 Lane Highway		2 or More Lanes		Sectional			
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	377	42%	42%	No (Case 3)
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	137	81%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	240	27%	27%	No (Case 3)
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	120	160%		

Notes

1. Refer to OTM Book 12, pg 125, July 2024
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

Access #3 @ Systemhouse Street
2028 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Entire %	Signal
		1 Lane Highway		2 or More Lanes		Sectional			
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	377	42%	42%	No (Case 3)
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	137	81%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	240	27%	27%	No (Case 3)
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	120	160%		

Notes

1. Refer to OTM Book 12, pg 125, July 2024
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

Appendix L

Synchro Intersection Worksheets – 2028 Future Total Conditions

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FT2028
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	30	7	87	45	479	4	1530	101	582	891	113
Future Volume (vph)	71	30	7	87	45	479	4	1530	101	582	891	113
Satd. Flow (prot)	2853	1283	0	1595	1471	1483	1127	3221	1483	3124	3161	1339
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2850	1283	0	1595	1471	1464	1127	3221	1463	3123	3161	1339
Satd. Flow (RTOR)		7				368			225			113
Lane Group Flow (vph)	71	37	0	87	45	479	4	1530	101	582	891	113
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	13.0	48.0		13.0	48.0	48.0	13.0	31.0	31.0	28.0	46.0	13.0
Total Split (%)	10.8%	40.0%		10.8%	40.0%	40.0%	10.8%	25.8%	25.8%	23.3%	38.3%	10.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	7.5	10.5		24.6	20.8	20.8	5.9	34.9	34.9	29.3	68.8	81.8
Actuated g/C Ratio	0.06	0.09		0.20	0.17	0.17	0.05	0.29	0.29	0.24	0.57	0.68
v/c Ratio	0.40	0.31		0.27	0.18	0.86	0.07	1.63	0.17	0.76	0.49	0.12
Control Delay	60.9	50.9		41.4	38.7	26.2	57.2	319.7	0.6	50.2	20.2	2.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	50.9		41.4	38.7	26.2	57.2	319.7	0.6	50.2	20.2	2.6
LOS	E	D		D	D	C	E	F	A	D	C	A
Approach Delay		57.5			29.3			299.3			29.9	
Approach LOS		E			C			F			C	
Queue Length 50th (m)	8.4	6.7		19.1	9.5	26.7	0.9	~270.3	0.0	64.8	55.5	0.0
Queue Length 95th (m)	16.1	17.4		28.4	15.7	55.4	4.6	#353.4	0.0	#112.8	#132.4	8.1
Internal Link Dist (m)		131.5			347.0			237.0			221.2	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	180	442		326	502	742	56	937	585	764	1811	936
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.08		0.27	0.09	0.65	0.07	1.63	0.17	0.76	0.49	0.12

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 101 (84%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FT2028
AM Peak Hour

Maximum v/c Ratio: 1.63

Intersection Signal Delay: 142.4

Intersection LOS: F

Intersection Capacity Utilization 97.3%

ICU Level of Service F

Analysis Period (min) 15

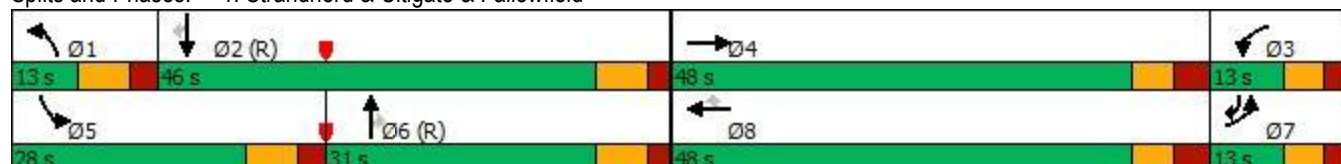
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings
2: Strandherd & Crosskeys/Helene-Campbell

FT2028
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	20	8	25	36	204	14	1337	23	47	868	69
Future Volume (vph)	94	20	8	25	36	204	14	1337	23	47	868	69
Satd. Flow (prot)	1610	1745	1483	1658	1745	1483	3216	3221	1483	1595	3131	1455
Flt Permitted	0.734			0.744			0.950			0.950		
Satd. Flow (perm)	1243	1745	1464	1297	1745	1464	3214	3221	1450	1595	3131	1435
Satd. Flow (RTOR)			90			164			97			97
Lane Group Flow (vph)	94	20	8	25	36	204	14	1337	23	47	868	69
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	16.0	65.0	65.0	16.0	65.0	65.0
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	12.3%	50.0%	50.0%	12.3%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	19.3	19.3	19.3	19.3	19.3	19.3	6.1	83.2	83.2	8.5	90.7	90.7
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.64	0.64	0.07	0.70	0.70
v/c Ratio	0.51	0.08	0.03	0.13	0.14	0.57	0.09	0.65	0.02	0.45	0.40	0.07
Control Delay	57.7	42.3	0.1	43.9	44.2	17.1	75.2	10.1	0.0	71.9	12.0	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.7	42.3	0.1	43.9	44.2	17.1	75.2	10.1	0.0	71.9	12.0	1.7
LOS	E	D	A	D	D	B	E	B	A	E	B	A
Approach Delay		51.4			23.3			10.6			14.2	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	23.4	4.6	0.0	5.9	8.5	9.4	1.9	18.8	0.0	11.8	31.5	0.0
Queue Length 95th (m)	32.2	9.6	0.0	11.2	14.5	26.2	m3.6	#71.6	m0.0	24.4	105.2	4.1
Internal Link Dist (m)		138.8			171.2			450.5			237.0	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	394	554	526	412	554	577	225	2062	963	116	2184	1030
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.04	0.02	0.06	0.06	0.35	0.06	0.65	0.02	0.41	0.40	0.07

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 99 (76%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FT2028
AM Peak Hour

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 14.9

Intersection LOS: B

Intersection Capacity Utilization 80.0%

ICU Level of Service D

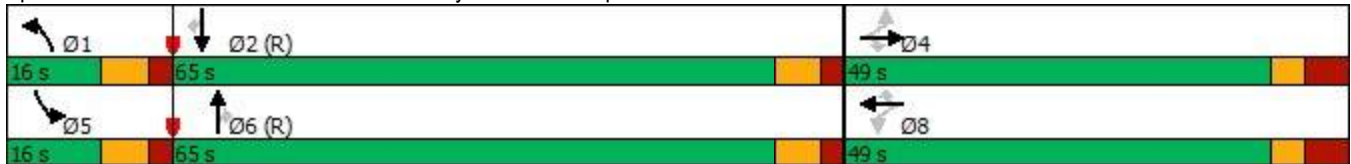
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2028
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	24	66	27	61	74	233	1134	34	58	741	11
Future Volume (vph)	30	24	66	27	61	74	233	1134	34	58	741	11
Satd. Flow (prot)	2583	1475	0	1658	1563	0	3216	3300	0	1580	3221	1282
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2570	1475	0	1658	1563	0	3210	3300	0	1580	3221	1262
Satd. Flow (RTOR)		66			49			2				96
Lane Group Flow (vph)	30	90	0	27	135	0	233	1168	0	58	741	11
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		20.0	47.0		20.0	47.0	14.0
Total Split (%)	10.8%	37.7%		10.8%	37.7%		15.4%	36.2%		15.4%	36.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	6.4	17.9		6.5	17.9		13.7	75.3		10.0	69.0	74.8
Actuated g/C Ratio	0.05	0.14		0.05	0.14		0.11	0.58		0.08	0.53	0.58
v/c Ratio	0.24	0.35		0.33	0.53		0.69	0.61		0.48	0.43	0.01
Control Delay	63.8	18.7		70.5	37.8		66.9	24.5		72.8	23.8	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.8	18.7		70.5	37.8		66.9	24.5		72.8	23.8	0.0
LOS	E	B		E	D		E	C		E	C	A
Approach Delay		30.0			43.2			31.5			27.0	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	3.8	5.7		6.8	21.4		29.8	104.0		15.5	38.6	0.0
Queue Length 95th (m)	9.0	16.6		16.8	32.4		44.0	#226.4		30.6	81.5	m0.0
Internal Link Dist (m)		134.5			312.5			100.5			450.5	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	135	515		86	532		351	1913		160	1709	771
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	0.22	0.17		0.31	0.25		0.66	0.61		0.36	0.43	0.01

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 94 (72%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 3: Strandherd & Systemhouse/Maravista

FT2028
AM Peak Hour

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 30.7

Intersection LOS: C

Intersection Capacity Utilization 69.5%

ICU Level of Service C

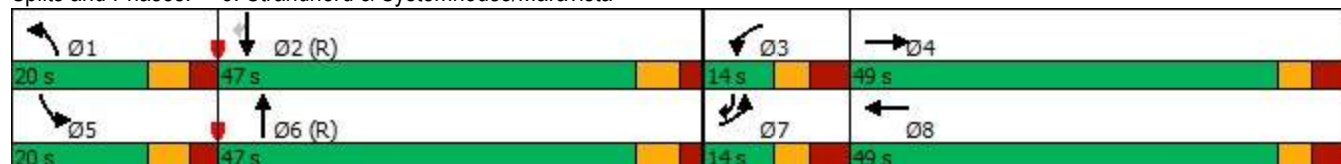
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

FT2028
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	5	23	77	19	66	72	1272	96	31	753	71
Future Volume (vph)	31	5	23	77	19	66	72	1272	96	31	753	71
Satd. Flow (prot)	1642	1745	1483	1642	1527	0	3216	3268	0	1595	3191	1469
Flt Permitted	0.702			0.754			0.950			0.950		
Satd. Flow (perm)	1212	1745	1464	1301	1527	0	3214	3268	0	1595	3191	1449
Satd. Flow (RTOR)			37		66			9				105
Lane Group Flow (vph)	31	5	23	77	85	0	72	1368	0	31	753	71
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	21.0	37.0	37.0		21.0	62.0		21.0	62.0	62.0
Total Split (%)	30.8%	30.8%	17.5%	30.8%	30.8%		17.5%	51.7%		17.5%	51.7%	51.7%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.2	15.2	23.1	15.2	15.2		8.1	80.6		7.9	77.6	77.6
Actuated g/C Ratio	0.13	0.13	0.19	0.13	0.13		0.07	0.67		0.07	0.65	0.65
v/c Ratio	0.20	0.02	0.07	0.47	0.34		0.33	0.62		0.30	0.36	0.07
Control Delay	46.6	40.4	4.1	55.7	18.2		57.0	15.8		82.2	4.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	46.6	40.4	4.1	55.7	18.2		57.0	15.8		82.2	4.0	0.2
LOS	D	D	A	E	B		E	B		F	A	A
Approach Delay		29.5			36.0			17.9			6.5	
Approach LOS		C			D			B			A	
Queue Length 50th (m)	6.8	1.1	0.0	17.6	4.1		8.5	92.8		7.8	6.7	0.0
Queue Length 95th (m)	13.9	4.2	3.2	28.2	16.2		15.6	175.8		18.5	11.5	0.3
Internal Link Dist (m)		259.4			125.1			511.6			272.2	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	300	433	379	323	428		364	2197		180	2064	974
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.10	0.01	0.06	0.24	0.20		0.20	0.62		0.17	0.36	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 29 (24%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

FT2028
AM Peak Hour

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 15.5

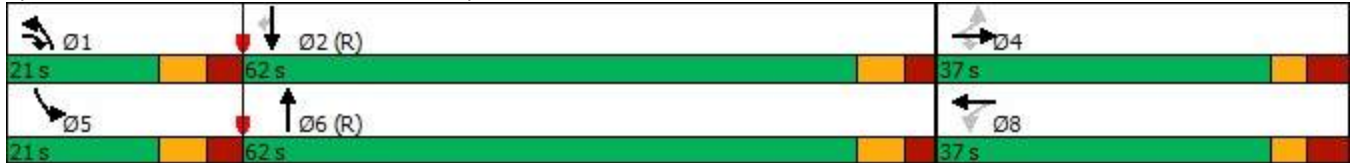
Intersection LOS: B

Intersection Capacity Utilization 63.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FT2028
AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	7	62	64	54	1
Future Volume (Veh/h)	2	7	62	64	54	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	7	62	64	54	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	204	108	109	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204	108	109	0	0	
tC, single (s)	7.6	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	4.0	4.0	4.0	3.4	2.3	
p0 queue free %	100	99	92	94	97	
cM capacity (veh/h)	568	754	752	1068	1548	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	9	126	55			
Volume Left	2	0	54			
Volume Right	0	64	1			
cSH	703	885	1548			
Volume to Capacity	0.01	0.14	0.03			
Queue Length 95th (m)	0.3	3.8	0.8			
Control Delay (s)	10.2	9.7	7.3			
Lane LOS	B	A	A			
Approach Delay (s)	10.2	9.7	7.3			
Approach LOS	B	A				
Intersection Summary						
Average Delay			9.1			
Intersection Capacity Utilization			17.6%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	30	16	5	95	204	16	5	5	85	5	15
Future Vol, veh/h	15	30	16	5	95	204	16	5	5	85	5	15
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	50	-	-	-	-	0	-	-	-	-	-	-
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, %	7	18	2	2	6	2	2	2	2	9	2	2
Mvmt Flow	15	30	16	5	95	204	16	5	5	85	5	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	299	0	0	46	0	0	285	377	38	178	181	95
Stage 1	-	-	-	-	-	-	68	68	-	105	105	-
Stage 2	-	-	-	-	-	-	217	309	-	73	76	-
Critical Hdwy	4.17	-	-	4.12	-	-	7.12	6.52	6.22	7.19	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.19	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.19	5.52	-
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.518	4.018	3.318	3.581	4.018	3.318
Pot Cap-1 Maneuver	1234	-	-	1562	-	-	667	555	1034	769	713	962
Stage 1	-	-	-	-	-	-	942	838	-	884	808	-
Stage 2	-	-	-	-	-	-	785	660	-	919	832	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1234	-	-	1562	-	-	645	546	1034	751	702	962
Mov Cap-2 Maneuver	-	-	-	-	-	-	645	546	-	751	702	-
Stage 1	-	-	-	-	-	-	931	828	-	873	805	-
Stage 2	-	-	-	-	-	-	765	657	-	898	822	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	2			0.1			10.6			10.4		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	670	1234	-	-	1562	-	-	773
HCM Lane V/C Ratio	0.039	0.012	-	-	0.003	-	-	0.136
HCM Control Delay (s)	10.6	8	-	-	7.3	0	-	10.4
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.5

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	29	0	1354	811	23
Future Vol, veh/h	0	29	0	1354	811	23
Conflicting Peds, #/hr	0	0	0	0	0	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, %	2	2	2	2	5	2
Mvmt Flow	0	29	0	1354	811	23

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 417	- 0	- 0
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -
Critical Hdwy	- 6.94	- -	- -
Critical Hdwy Stg 1	- -	- -	- -
Critical Hdwy Stg 2	- -	- -	- -
Follow-up Hdwy	- 3.32	- -	- -
Pot Cap-1 Maneuver	0 585	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 585	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 585	- -	- -
HCM Lane V/C Ratio	- 0.05	- -	- -
HCM Control Delay (s)	- 11.5	- -	- -
HCM Lane LOS	- B	- -	- -
HCM 95th %tile Q(veh)	- 0.2	- -	- -

Lanes, Volumes, Timings
8: Strandherd & Access #2

FT2028
AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	80	58	95	1274	793	47
Future Volume (vph)	80	58	95	1274	793	47
Satd. Flow (prot)	1658	1483	1658	3316	3221	1483
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1651	1483	1655	3316	3221	1446
Satd. Flow (RTOR)		58				24
Lane Group Flow (vph)	80	58	95	1274	793	47
Turn Type	Perm	Perm	Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	4	4				2
Detector Phase	4	4	1	6	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	42.5	42.5	11.9	28.6	28.6	28.6
Total Split (s)	44.0	44.0	23.0	76.0	53.0	53.0
Total Split (%)	36.7%	36.7%	19.2%	63.3%	44.2%	44.2%
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	4.2
All-Red Time (s)	4.2	4.2	2.7	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.9	6.6	6.6	6.6
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	11.2	11.2	12.2	94.7	75.6	75.6
Actuated g/C Ratio	0.09	0.09	0.10	0.79	0.63	0.63
v/c Ratio	0.52	0.30	0.57	0.49	0.39	0.05
Control Delay	62.9	16.3	60.1	5.7	12.5	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.9	16.3	60.1	5.7	12.5	6.6
LOS	E	B	E	A	B	A
Approach Delay	43.3			9.5	12.2	
Approach LOS	D			A	B	
Queue Length 50th (m)	18.2	0.0	23.3	31.5	45.0	1.9
Queue Length 95th (m)	33.0	12.1	m38.5	78.9	70.5	7.9
Internal Link Dist (m)	79.6			272.2	118.6	
Turn Bay Length (m)			100.0			25.0
Base Capacity (vph)	502	491	224	2616	2029	920
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	0.16	0.12	0.42	0.49	0.39	0.05
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 28 (23%), Referenced to phase 2:SBT and 6:NBT, Start of Green						
Natural Cycle: 85						
Control Type: Actuated-Coordinated						

Lanes, Volumes, Timings
8: Strandherd & Access #2

FT2028
AM Peak Hour

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 12.4

Intersection LOS: B

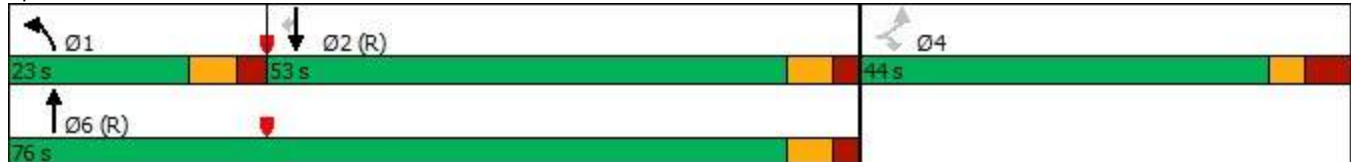
Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

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

Splits and Phases: 8: Strandherd & Access #2



Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FT2028
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	80	12	205	90	529	8	1212	173	465	1340	223
Future Volume (vph)	225	80	12	205	90	529	8	1212	173	465	1340	223
Satd. Flow (prot)	3124	1633	0	1658	1664	1455	1208	3221	1483	3216	3316	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3124	1633	0	1655	1664	1455	1208	3221	1483	3216	3316	1455
Satd. Flow (RTOR)		7				359			160			184
Lane Group Flow (vph)	225	92	0	205	90	529	8	1212	173	465	1340	223
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	14.0	48.0		14.0	48.0	48.0	24.0	34.0	34.0	24.0	34.0	14.0
Total Split (%)	11.7%	40.0%		11.7%	40.0%	40.0%	20.0%	28.3%	28.3%	20.0%	28.3%	11.7%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	20.9	17.3		28.5	24.8	24.8	6.5	27.1	27.1	19.6	50.8	77.3
Actuated g/C Ratio	0.17	0.14		0.24	0.21	0.21	0.05	0.23	0.23	0.16	0.42	0.64
v/c Ratio	0.41	0.38		0.52	0.26	0.90	0.12	1.67	0.38	0.88	0.96	0.22
Control Delay	50.0	44.4		47.5	38.0	33.1	73.8	331.1	8.1	68.6	49.5	3.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	44.4		47.5	38.0	33.1	73.8	331.1	8.1	68.6	49.5	3.5
LOS	D	D		D	D	C	E	F	A	E	D	A
Approach Delay		48.4			37.2			289.5			48.8	
Approach LOS		D			D			F			D	
Queue Length 50th (m)	25.7	19.4		42.1	18.0	43.5	2.0	~214.3	4.1	52.6	137.0	2.7
Queue Length 95th (m)	#57.1	26.1		#122.1	26.9	77.4	m3.3	#257.4	m8.5	#92.5	#260.0	15.6
Internal Link Dist (m)		131.5			347.0			236.5			231.2	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	544	562		393	568	733	170	727	458	526	1403	1002
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.16		0.52	0.16	0.72	0.05	1.67	0.38	0.88	0.96	0.22

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 115 (96%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FT2028
PM Peak Hour

Maximum v/c Ratio: 1.67

Intersection Signal Delay: 120.2

Intersection LOS: F

Intersection Capacity Utilization 93.7%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

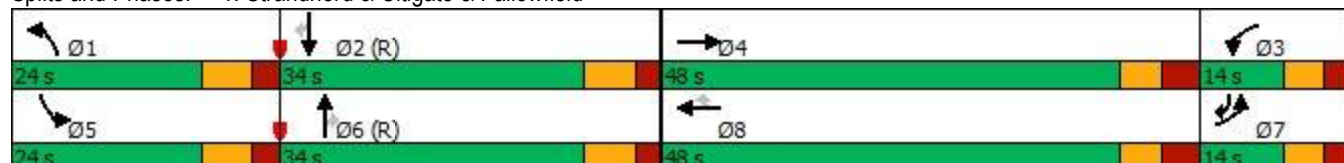
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FT2028
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	117	30	37	114	126	41	1096	23	122	1231	194
Future Volume (vph)	210	117	30	37	114	126	41	1096	23	122	1231	194
Satd. Flow (prot)	1658	1745	1469	1642	1745	1483	3216	3131	1483	1658	3283	1483
Flt Permitted	0.684			0.682			0.950			0.950		
Satd. Flow (perm)	1191	1745	1436	1168	1745	1462	3213	3131	1447	1656	3283	1461
Satd. Flow (RTOR)			97			126			105			190
Lane Group Flow (vph)	210	117	30	37	114	126	41	1096	23	122	1231	194
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	17.0	54.0	54.0	17.0	54.0	54.0
Total Split (%)	40.8%	40.8%	40.8%	40.8%	40.8%	40.8%	14.2%	45.0%	45.0%	14.2%	45.0%	45.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	29.5	29.5	29.5	29.5	29.5	29.5	7.0	56.8	56.8	12.3	64.6	64.6
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.06	0.47	0.47	0.10	0.54	0.54
v/c Ratio	0.72	0.27	0.07	0.13	0.27	0.28	0.22	0.74	0.03	0.72	0.70	0.22
Control Delay	53.8	35.5	0.3	31.8	35.3	6.3	59.1	30.7	1.8	76.0	13.6	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	35.5	0.3	31.8	35.3	6.3	59.1	30.7	1.8	76.0	13.6	1.4
LOS	D	D	A	C	D	A	E	C	A	E	B	A
Approach Delay		43.3			21.7			31.1			17.0	
Approach LOS		D			C			C			B	
Queue Length 50th (m)	46.9	23.1	0.0	7.0	22.5	0.0	3.8	141.8	0.0	29.9	30.3	0.3
Queue Length 95th (m)	63.7	33.5	0.0	13.8	32.7	12.7	m4.8	#170.6	m0.0	m32.9	m70.9	m2.0
Internal Link Dist (m)		138.8			171.2			448.7			236.5	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	409	600	557	401	600	585	270	1482	740	169	1766	873
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.20	0.05	0.09	0.19	0.22	0.15	0.74	0.03	0.72	0.70	0.22

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 99 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FT2028
PM Peak Hour

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 25.1

Intersection LOS: C

Intersection Capacity Utilization 81.9%

ICU Level of Service D

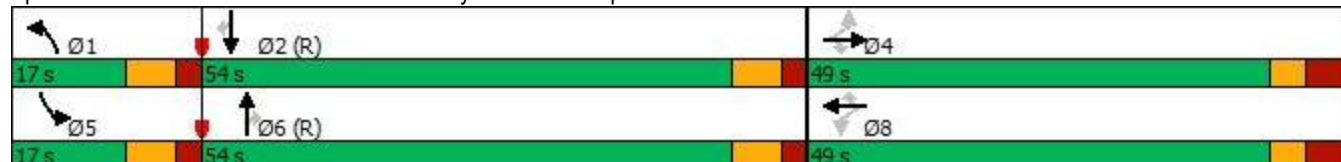
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2028
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	70	295	18	73	42	364	1050	27	124	1259	14
Future Volume (vph)	59	70	295	18	73	42	364	1050	27	124	1259	14
Satd. Flow (prot)	3185	1514	0	1658	1604	0	3216	3205	0	1658	3316	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3117	1514	0	1653	1604	0	3214	3205	0	1650	3316	1391
Satd. Flow (RTOR)		193			26			2				104
Lane Group Flow (vph)	59	365	0	18	115	0	364	1077	0	124	1259	14
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	13.0	49.0		13.0	49.0		17.0	41.0		17.0	41.0	13.0
Total Split (%)	10.8%	40.8%		10.8%	40.8%		14.2%	34.2%		14.2%	34.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effect Green (s)	5.8	28.0		5.7	22.8		20.5	53.2		12.5	45.3	50.4
Actuated g/C Ratio	0.05	0.23		0.05	0.19		0.17	0.44		0.10	0.38	0.42
v/c Ratio	0.39	0.73		0.23	0.35		0.66	0.76		0.72	1.01	0.02
Control Delay	63.1	26.4		62.1	31.6		51.3	34.9		57.1	68.0	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.1	26.4		62.1	31.6		51.3	34.9		57.1	68.0	0.1
LOS	E	C		E	C		D	C		E	E	A
Approach Delay		31.5			35.7			39.0			66.4	
Approach LOS		C			D			D			E	
Queue Length 50th (m)	7.0	39.2		4.2	20.2		37.3	92.5		23.6	166.3	0.0
Queue Length 95th (m)	14.0	62.1		11.8	28.5		#85.1	#197.9		m#51.1	#252.1	m0.0
Internal Link Dist (m)		134.8			312.5			95.3			448.7	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	153	649		80	571		549	1423		172	1251	646
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	0.39	0.56		0.23	0.20		0.66	0.76		0.72	1.01	0.02

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 54 (45%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2028
PM Peak Hour

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 49.2

Intersection LOS: D

Intersection Capacity Utilization 90.3%

ICU Level of Service E

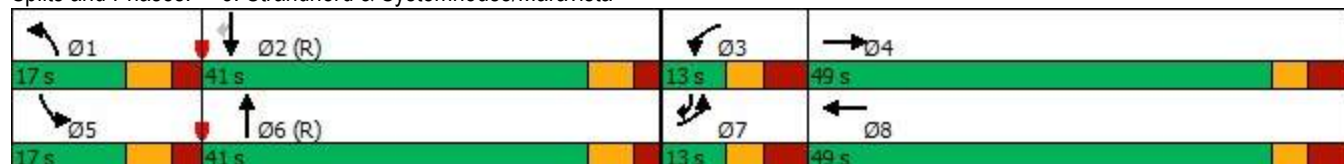
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FT2028
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	19	67	144	12	53	47	1301	107	56	1578	47
Future Volume (vph)	106	19	67	144	12	53	47	1301	107	56	1578	47
Satd. Flow (prot)	1658	1745	1483	1626	1492	0	3216	3244	0	1658	3316	1483
Flt Permitted	0.715			0.745			0.950			0.950		
Satd. Flow (perm)	1246	1745	1463	1274	1492	0	3216	3244	0	1657	3316	1483
Satd. Flow (RTOR)			37		53			9				105
Lane Group Flow (vph)	106	19	67	144	65	0	47	1408	0	56	1578	47
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	23.0	37.0	37.0		23.0	60.0		23.0	60.0	60.0
Total Split (%)	30.8%	30.8%	19.2%	30.8%	30.8%		19.2%	50.0%		19.2%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	19.3	19.3	26.3	19.3	19.3		7.2	72.2		9.4	74.4	74.4
Actuated g/C Ratio	0.16	0.16	0.22	0.16	0.16		0.06	0.60		0.08	0.62	0.62
v/c Ratio	0.53	0.07	0.19	0.71	0.23		0.24	0.72		0.43	0.77	0.05
Control Delay	54.2	39.4	16.1	64.7	15.6		56.4	22.4		70.3	9.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	54.2	39.4	16.1	64.7	15.6		56.4	22.4		70.3	9.4	0.1
LOS	D	D	B	E	B		E	C		E	A	A
Approach Delay		39.4			49.4			23.5			11.2	
Approach LOS		D			D			C			B	
Queue Length 50th (m)	23.3	3.9	5.2	32.6	2.4		5.5	120.6		14.0	11.7	0.0
Queue Length 95th (m)	37.5	9.6	13.9	49.6	13.4		11.5	#208.5		m17.5	#86.4	m0.0
Internal Link Dist (m)		259.4			125.1			518.0			265.6	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	309	433	452	316	410		418	1954		215	2055	959
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.34	0.04	0.15	0.46	0.16		0.11	0.72		0.26	0.77	0.05

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 57 (48%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

FT2028
PM Peak Hour

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 20.0

Intersection LOS: C

Intersection Capacity Utilization 77.0%

ICU Level of Service D

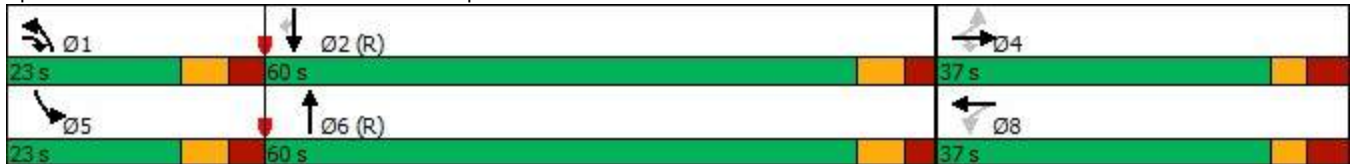
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FT2028
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	25	26	118	121	1
Future Volume (Veh/h)	3	25	26	118	121	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	25	26	118	121	1
Pedestrians		1	1			
Lane Width (m)		3.5	3.5			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	374	244	245	1	1	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	374	244	245	1	1	
tC, single (s)	7.1	6.5	6.5	6.2	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.3	
p0 queue free %	99	96	96	89	92	
cM capacity (veh/h)	471	606	605	1074	1569	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	28	144	122			
Volume Left	3	0	121			
Volume Right	0	118	1			
cSH	588	942	1569			
Volume to Capacity	0.05	0.15	0.08			
Queue Length 95th (m)	1.1	4.1	1.9			
Control Delay (s)	11.4	9.5	7.4			
Lane LOS	B	A	A			
Approach Delay (s)	11.4	9.5	7.4			
Approach LOS	B	A				
Intersection Summary						
Average Delay			8.8			
Intersection Capacity Utilization			23.1%		ICU Level of Service	
Analysis Period (min)			15		A	

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	90	41	14	88	346	41	14	14	320	14	15
Future Vol, veh/h	15	90	41	14	88	346	41	14	14	320	14	15
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	50	-	-	-	-	0	-	-	-	-	-	-
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, %	27	3	2	2	5	2	2	2	2	2	2	2
Mvmt Flow	15	90	41	14	88	346	41	14	14	320	14	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	434	0	0	131	0	0	445	603	111	271	277	88
Stage 1	-	-	-	-	-	-	141	141	-	116	116	-
Stage 2	-	-	-	-	-	-	304	462	-	155	161	-
Critical Hdwy	4.37	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.443	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1005	-	-	1454	-	-	523	413	942	682	631	970
Stage 1	-	-	-	-	-	-	862	780	-	889	800	-
Stage 2	-	-	-	-	-	-	705	565	-	847	765	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1005	-	-	1454	-	-	495	401	942	640	613	970
Mov Cap-2 Maneuver	-	-	-	-	-	-	495	401	-	640	613	-
Stage 1	-	-	-	-	-	-	849	768	-	876	790	-
Stage 2	-	-	-	-	-	-	673	558	-	807	754	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.9			0.2			13			16.8		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	520	1005	-	-	1454	-	-	648
HCM Lane V/C Ratio	0.133	0.015	-	-	0.01	-	-	0.539
HCM Control Delay (s)	13	8.6	-	-	7.5	0	-	16.8
HCM Lane LOS	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	3.2

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	77	0	1418	1509	63
Future Vol, veh/h	0	77	0	1418	1509	63
Conflicting Peds, #/hr	0	0	0	0	0	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, %	2	2	2	2	2	2
Mvmt Flow	0	77	0	1418	1509	63

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 786	- 0	- 0
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -
Critical Hdwy	- 6.94	- -	- -
Critical Hdwy Stg 1	- -	- -	- -
Critical Hdwy Stg 2	- -	- -	- -
Follow-up Hdwy	- 3.32	- -	- -
Pot Cap-1 Maneuver	0 335	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 335	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s	18.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 335	- -	- -
HCM Lane V/C Ratio	- 0.23	- -	- -
HCM Control Delay (s)	- 18.9	- -	- -
HCM Lane LOS	- C	- -	- -
HCM 95th %tile Q(veh)	- 0.9	- -	- -

Lanes, Volumes, Timings
8: Strandherd & Access #2

FT2028
PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	169	153	211	1249	1459	127
Future Volume (vph)	169	153	211	1249	1459	127
Satd. Flow (prot)	1658	1483	1658	3316	3316	1483
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1629	1458	1657	3316	3316	1443
Satd. Flow (RTOR)		153				33
Lane Group Flow (vph)	169	153	211	1249	1459	127
Turn Type	Perm	Perm	Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	4	4				2
Detector Phase	4	4	1	6	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	42.5	42.5	11.9	28.6	28.6	28.6
Total Split (s)	43.0	43.0	28.0	77.0	49.0	49.0
Total Split (%)	35.8%	35.8%	23.3%	64.2%	40.8%	40.8%
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	4.2
All-Red Time (s)	4.2	4.2	2.7	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.9	6.6	6.6	6.6
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	19.9	19.9	19.5	86.0	59.6	59.6
Actuated g/C Ratio	0.17	0.17	0.16	0.72	0.50	0.50
v/c Ratio	0.63	0.41	0.78	0.53	0.89	0.17
Control Delay	55.3	9.1	67.2	10.9	22.8	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	9.1	67.2	10.9	22.8	9.5
LOS	E	A	E	B	C	A
Approach Delay	33.3			19.0	21.8	
Approach LOS	C			B	C	
Queue Length 50th (m)	38.3	0.0	51.6	38.7	40.6	2.3
Queue Length 95th (m)	50.9	15.1	m74.5	101.3 m#	223.5	m8.0
Internal Link Dist (m)	79.2			265.6	132.9	
Turn Bay Length (m)			100.0			25.0
Base Capacity (vph)	481	539	299	2376	1647	733
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	0.35	0.28	0.71	0.53	0.89	0.17
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 53 (44%), Referenced to phase 2:SBT and 6:NBT, Start of Green						
Natural Cycle: 125						
Control Type: Actuated-Coordinated						

Lanes, Volumes, Timings 8: Strandherd & Access #2

FT2028
PM Peak Hour

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 21.7

Intersection LOS: C

Intersection Capacity Utilization 85.3%

ICU Level of Service E

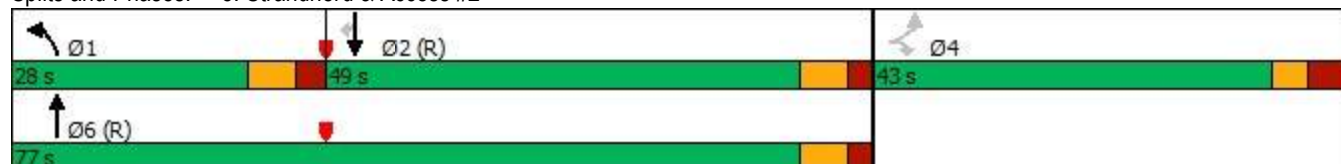
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 8: Strandherd & Access #2



Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FT2028
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	76	10	147	80	207	7	1294	162	225	1245	164
Future Volume (vph)	137	76	10	147	80	207	7	1294	162	225	1245	164
Satd. Flow (prot)	2757	1549	0	1626	1679	1427	1353	3316	1441	3154	3221	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2745	1549	0	1626	1679	1403	1351	3316	1441	3154	3221	1372
Satd. Flow (RTOR)		7				207			175			154
Lane Group Flow (vph)	137	86	0	147	80	207	7	1294	162	225	1245	164
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	12.0	48.0		12.0	48.0	48.0	19.0	31.0	31.0	19.0	31.0	12.0
Total Split (%)	10.9%	43.6%		10.9%	43.6%	43.6%	17.3%	28.2%	28.2%	17.3%	28.2%	10.9%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	None
Act Effect Green (s)	5.7	11.3		13.2	15.0	15.0	6.1	24.6	24.6	10.6	40.2	46.3
Actuated g/C Ratio	0.07	0.13		0.16	0.18	0.18	0.07	0.29	0.29	0.13	0.48	0.55
v/c Ratio	0.74	0.40		0.57	0.27	0.49	0.07	1.33	0.30	0.57	0.81	0.20
Control Delay	64.6	39.2		47.1	30.6	8.2	43.1	184.6	5.8	42.4	26.8	3.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.6	39.2		47.1	30.6	8.2	43.1	184.6	5.8	42.4	26.8	3.1
LOS	E	D		D	C	A	D	F	A	D	C	A
Approach Delay		54.8			25.5			164.1			26.6	
Approach LOS		D			C			F			C	
Queue Length 50th (m)	10.4	10.9		~28.0	11.0	0.0	1.0	~128.3	0.0	16.0	67.5	0.4
Queue Length 95th (m)	#35.3	30.7		42.6	21.6	14.5	6.0	#260.8	14.1	36.8	#236.0	11.4
Internal Link Dist (m)		131.5			347.0			234.1			231.1	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	186	775		256	836	803	195	971	545	456	1541	828
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.11		0.57	0.10	0.26	0.04	1.33	0.30	0.49	0.81	0.20

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 83.9

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.33

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FT2028
SAT Peak Hour

Intersection Signal Delay: 81.7

Intersection LOS: F

Intersection Capacity Utilization 80.7%

ICU Level of Service D

Analysis Period (min) 15

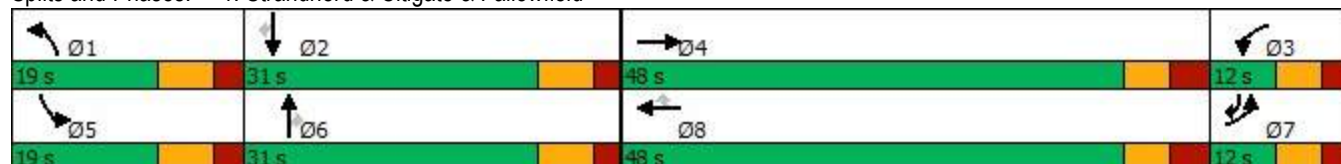
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FT2028
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	147	79	43	137	139	86	1056	20	72	1082	247
Future Volume (vph)	259	147	79	43	137	139	86	1056	20	72	1082	247
Satd. Flow (prot)	1658	1745	1483	1658	1745	1483	3216	3316	1483	1658	3161	1483
Flt Permitted	0.669			0.663			0.950			0.950		
Satd. Flow (perm)	1167	1745	1456	1152	1745	1463	3215	3316	1431	1652	3161	1464
Satd. Flow (RTOR)			106			139			115			247
Lane Group Flow (vph)	259	147	79	43	137	139	86	1056	20	72	1082	247
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	15.0	46.0	46.0	15.0	46.0	46.0
Total Split (%)	44.5%	44.5%	44.5%	44.5%	44.5%	44.5%	13.6%	41.8%	41.8%	13.6%	41.8%	41.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	7.9	52.1	52.1	9.1	53.3	53.3
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.07	0.47	0.47	0.08	0.48	0.48
v/c Ratio	0.81	0.31	0.17	0.14	0.29	0.28	0.38	0.67	0.03	0.53	0.71	0.30
Control Delay	56.2	31.5	2.9	27.8	31.1	5.6	53.3	28.3	0.1	62.4	28.6	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.2	31.5	2.9	27.8	31.1	5.6	53.3	28.3	0.1	62.4	28.6	4.0
LOS	E	C	A	C	C	A	D	C	A	E	C	A
Approach Delay		40.0			19.5			29.6			26.0	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	51.9	25.0	0.0	7.0	23.2	0.0	9.2	96.2	0.0	14.9	98.5	0.0
Queue Length 95th (m)	71.9	36.2	5.6	13.8	33.8	12.2	17.0	#149.6	0.0	#33.0	#162.5	16.1
Internal Link Dist (m)		138.8			171.2			463.9			234.1	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	438	655	612	432	655	636	245	1569	737	143	1531	836
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.22	0.13	0.10	0.21	0.22	0.35	0.67	0.03	0.50	0.71	0.30

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 108 (98%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FT2028
SAT Peak Hour

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 28.7

Intersection LOS: C

Intersection Capacity Utilization 84.3%

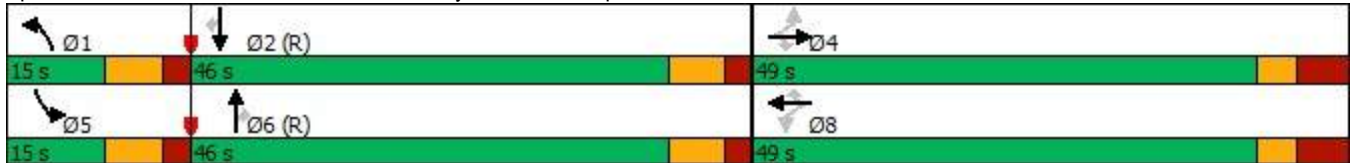
ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2028
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	53	316	19	95	62	514	988	26	118	1092	14
Future Volume (vph)	80	53	316	19	95	62	514	988	26	118	1092	14
Satd. Flow (prot)	3216	1501	0	1658	1599	0	3216	3302	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3144	1501	0	1654	1599	0	3203	3302	0	1658	3316	1449
Satd. Flow (RTOR)		292			32			2				108
Lane Group Flow (vph)	80	369	0	19	157	0	514	1014	0	118	1092	14
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		19.0	33.0		19.0	33.0	14.0
Total Split (%)	12.2%	42.6%		12.2%	42.6%		16.5%	28.7%		16.5%	28.7%	12.2%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effect Green (s)	6.6	34.6		6.3	29.0		24.0	42.3		11.6	29.9	35.9
Actuated g/C Ratio	0.06	0.30		0.05	0.25		0.21	0.37		0.10	0.26	0.31
v/c Ratio	0.43	0.56		0.21	0.37		0.77	0.84		0.71	1.27	0.03
Control Delay	59.8	9.9		57.2	27.3		52.7	40.0		72.8	166.5	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	59.8	9.9		57.2	27.3		52.7	40.0		72.8	166.5	0.1
LOS	E	A		E	C		D	D		E	F	A
Approach Delay		18.8			30.5			44.2			155.5	
Approach LOS		B			C			D			F	
Queue Length 50th (m)	9.1	9.3		4.2	19.5		~82.3	~158.3		25.9	~175.5	0.0
Queue Length 95th (m)	17.0	37.0		11.8	35.6		#113.6	#197.0		#49.3	#216.0	0.0
Internal Link Dist (m)		135.5			312.5			93.5			463.9	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	190	756		98	597		670	1214		178	861	530
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	0.42	0.49		0.19	0.26		0.77	0.84		0.66	1.27	0.03

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

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

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2028
SAT Peak Hour

Maximum v/c Ratio: 1.27

Intersection Signal Delay: 80.5

Intersection LOS: F

Intersection Capacity Utilization 100.6%

ICU Level of Service G

Analysis Period (min) 15

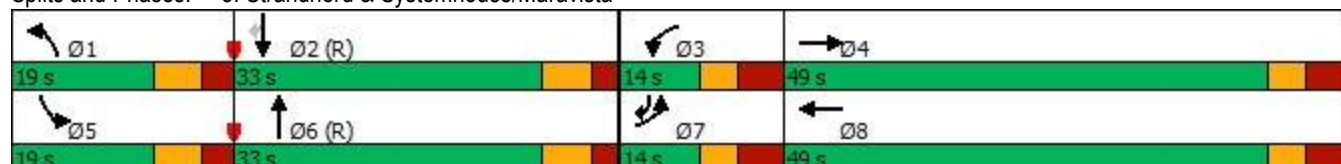
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FT2028
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	8	33	95	18	76	55	1305	106	51	1334	32
Future Volume (vph)	69	8	33	95	18	76	55	1305	106	51	1334	32
Satd. Flow (prot)	1642	1745	1483	1658	1534	0	3185	3274	0	1658	3316	1483
Flt Permitted	0.696			0.752			0.950			0.950		
Satd. Flow (perm)	1203	1745	1464	1311	1534	0	3183	3274	0	1657	3316	1462
Satd. Flow (RTOR)			41		76			10				115
Lane Group Flow (vph)	69	8	33	95	94	0	55	1411	0	51	1334	32
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	38.0	38.0	12.4	38.0	38.0		12.4	59.6		12.4	59.6	59.6
Total Split (%)	34.5%	34.5%	11.3%	34.5%	34.5%		11.3%	54.2%		11.3%	54.2%	54.2%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.8	15.8	22.4	15.8	15.8		6.8	67.1		8.1	68.3	68.3
Actuated g/C Ratio	0.14	0.14	0.20	0.14	0.14		0.06	0.61		0.07	0.62	0.62
v/c Ratio	0.40	0.03	0.10	0.51	0.33		0.28	0.71		0.42	0.65	0.03
Control Delay	47.3	35.5	6.2	51.0	14.9		52.7	19.7		59.3	17.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.3	35.5	6.2	51.0	14.9		52.7	19.7		59.3	17.6	0.1
LOS	D	D	A	D	B		D	B		E	B	A
Approach Delay		34.1			33.1			20.9			18.7	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	14.0	1.6	0.0	19.6	3.5		5.8	104.7		10.5	90.0	0.0
Queue Length 95th (m)	23.5	5.2	4.9	30.5	15.3		12.3	#180.1		#24.5	158.7	0.0
Internal Link Dist (m)		259.4			125.1			516.6			280.3	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	336	488	332	367	484		198	2000		122	2057	950
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.21	0.02	0.10	0.26	0.19		0.28	0.71		0.42	0.65	0.03

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 93 (85%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FT2028
SAT Peak Hour

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 21.1

Intersection LOS: C

Intersection Capacity Utilization 69.5%

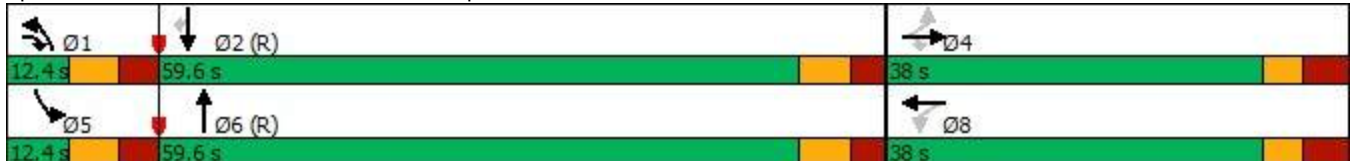
ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FT2028
SAT Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	22	46	101	108	0
Future Volume (Veh/h)	2	22	46	101	108	0
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	22	46	101	108	0
Pedestrians		2			3	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	345	218	218	3	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	345	218	218	3	0	
tC, single (s)	7.1	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.4	2.3	
p0 queue free %	100	97	93	91	93	
cM capacity (veh/h)	491	632	632	1064	1572	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	24	147	108			
Volume Left	2	0	108			
Volume Right	0	101	0			
cSH	618	877	1572			
Volume to Capacity	0.04	0.17	0.07			
Queue Length 95th (m)	0.9	4.6	1.7			
Control Delay (s)	11.1	9.9	7.5			
Lane LOS	B	A	A			
Approach Delay (s)	11.1	9.9	7.5			
Approach LOS	B	A				
Intersection Summary						
Average Delay		9.1				
Intersection Capacity Utilization		23.1%		ICU Level of Service	A	
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	15	73	42	14	89	518	43	14	14	362	14	15
Future Vol, veh/h	15	73	42	14	89	518	43	14	14	362	14	15
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	50	-	-	-	-	0	-	-	-	-	-	-
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, %	20	3	2	2	4	2	2	2	2	2	2	2
Mvmt Flow	15	73	42	14	89	518	43	14	14	362	14	15
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	607	0	0	115	0	0	515	759	94	255	262	89
Stage 1	-	-	-	-	-	-	124	124	-	117	117	-
Stage 2	-	-	-	-	-	-	391	635	-	138	145	-
Critical Hdwy	4.3	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.38	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	889	-	-	1474	-	-	470	336	963	698	643	969
Stage 1	-	-	-	-	-	-	880	793	-	888	799	-
Stage 2	-	-	-	-	-	-	633	472	-	865	777	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	889	-	-	1474	-	-	444	325	963	648	622	969
Mov Cap-2 Maneuver	-	-	-	-	-	-	444	325	-	648	622	-
Stage 1	-	-	-	-	-	-	865	780	-	873	786	-
Stage 2	-	-	-	-	-	-	602	464	-	823	764	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0.2			14.2			18.3		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	460	889	-	-	1474	-	-	655				
HCM Lane V/C Ratio	0.154	0.017	-	-	0.009	-	-	0.597				
HCM Control Delay (s)	14.2	9.1	-	-	7.5	0	-	18.3				
HCM Lane LOS	B	A	-	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	4				

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	75	0	1410	1368	60
Future Vol, veh/h	0	75	0	1410	1368	60
Conflicting Peds, #/hr	0	0	0	0	0	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, %	2	2	2	2	2	2
Mvmt Flow	0	75	0	1410	1368	60
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	714	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	374	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	374	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	17	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	374	-	-		
HCM Lane V/C Ratio	-	0.201	-	-		
HCM Control Delay (s)	-	17	-	-		
HCM Lane LOS	-	C	-	-		
HCM 95th %tile Q(veh)	-	0.7	-	-		

Lanes, Volumes, Timings
8: Strandherd & Access #2

FT2028
SAT Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	203	150	243	1207	1322	121
Future Volume (vph)	203	150	243	1207	1322	121
Satd. Flow (prot)	1658	1483	1658	3316	3316	1483
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1625	1458	1652	3316	3316	1423
Satd. Flow (RTOR)		150				32
Lane Group Flow (vph)	203	150	243	1207	1322	121
Turn Type	Perm	Perm	Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	4	4				2
Detector Phase	4	4	1	6	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	42.5	42.5	11.9	28.6	28.6	28.6
Total Split (s)	45.0	45.0	33.0	70.0	37.0	37.0
Total Split (%)	39.1%	39.1%	28.7%	60.9%	32.2%	32.2%
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	4.2
All-Red Time (s)	4.2	4.2	2.7	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.9	6.6	6.6	6.6
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	21.4	21.4	21.8	79.5	50.8	50.8
Actuated g/C Ratio	0.19	0.19	0.19	0.69	0.44	0.44
v/c Ratio	0.67	0.38	0.77	0.53	0.90	0.19
Control Delay	53.4	8.1	60.5	10.9	22.7	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	8.1	60.5	10.9	22.7	4.1
LOS	D	A	E	B	C	A
Approach Delay	34.2			19.2	21.1	
Approach LOS	C			B	C	
Queue Length 50th (m)	43.7	0.0	52.3	58.9	69.5	0.7
Queue Length 95th (m)	57.7	14.5	74.5	112.4 m#	168.8	m2.2
Internal Link Dist (m)	81.4			280.3	123.9	
Turn Bay Length (m)			100.0			25.0
Base Capacity (vph)	529	576	383	2292	1466	646
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	0.38	0.26	0.63	0.53	0.90	0.19
Intersection Summary						
Cycle Length: 115						
Actuated Cycle Length: 115						
Offset: 9 (8%), Referenced to phase 2:SBT and 6:NBT, Start of Green						
Natural Cycle: 125						
Control Type: Actuated-Coordinated						

Lanes, Volumes, Timings 8: Strandherd & Access #2

FT2028
SAT Peak Hour

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 21.7

Intersection LOS: C

Intersection Capacity Utilization 84.8%

ICU Level of Service E

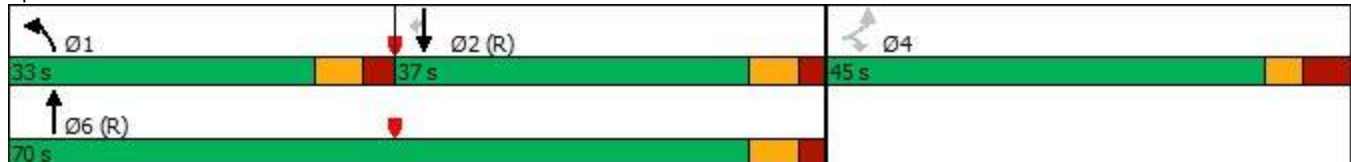
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 8: Strandherd & Access #2



Appendix M

Synchro Intersection Worksheets – 2033 Future Total Conditions

Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FT2033
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	30	7	87	45	479	4	1766	101	582	1002	113
Future Volume (vph)	71	30	7	87	45	479	4	1766	101	582	1002	113
Satd. Flow (prot)	2853	1283	0	1595	1471	1483	1127	3221	1483	3124	3161	1339
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2850	1283	0	1595	1471	1464	1127	3221	1463	3124	3161	1339
Satd. Flow (RTOR)		7				368			225			113
Lane Group Flow (vph)	71	37	0	87	45	479	4	1766	101	582	1002	113
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	13.0	48.0		13.0	48.0	48.0	13.0	31.0	31.0	28.0	46.0	13.0
Total Split (%)	10.8%	40.0%		10.8%	40.0%	40.0%	10.8%	25.8%	25.8%	23.3%	38.3%	10.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	7.5	10.5		24.6	20.8	20.8	5.9	34.9	34.9	29.3	68.8	81.8
Actuated g/C Ratio	0.06	0.09		0.20	0.17	0.17	0.05	0.29	0.29	0.24	0.57	0.68
v/c Ratio	0.40	0.31		0.27	0.18	0.86	0.07	1.88	0.17	0.76	0.55	0.12
Control Delay	60.9	50.9		41.4	38.7	26.2	57.2	429.0	0.6	50.2	21.3	2.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	50.9		41.4	38.7	26.2	57.2	429.0	0.6	50.2	21.3	2.6
LOS	E	D		D	D	C	E	F	A	D	C	A
Approach Delay		57.5			29.3			405.1			29.9	
Approach LOS		E			C			F			C	
Queue Length 50th (m)	8.4	6.7		19.1	9.5	26.7	0.9	~331.1	0.0	64.8	65.7	0.0
Queue Length 95th (m)	16.1	17.4		28.4	15.7	55.4	4.6	#414.5	0.0	#112.8	#165.8	8.1
Internal Link Dist (m)		131.5			347.0			237.0			221.2	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	180	442		326	502	742	56	937	585	764	1811	936
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.08		0.27	0.09	0.65	0.07	1.88	0.17	0.76	0.55	0.12

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 101 (84%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FT2033
AM Peak Hour

Maximum v/c Ratio: 1.88

Intersection Signal Delay: 194.3

Intersection LOS: F

Intersection Capacity Utilization 104.2%

ICU Level of Service G

Analysis Period (min) 15

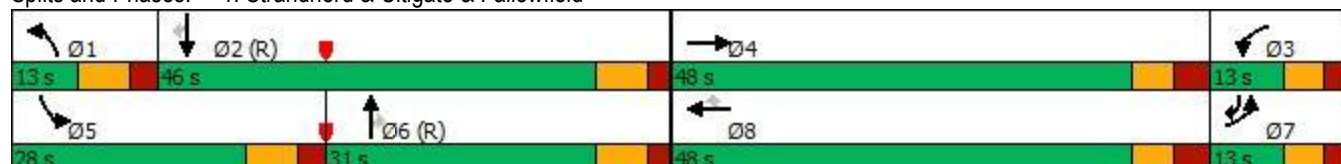
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings
2: Strandherd & Crosskeys/Helene-Campbell

FT2033
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	20	8	25	36	204	14	1573	23	47	979	69
Future Volume (vph)	94	20	8	25	36	204	14	1573	23	47	979	69
Satd. Flow (prot)	1610	1745	1483	1658	1745	1483	3216	3221	1483	1595	3131	1455
Flt Permitted	0.734			0.744			0.950			0.950		
Satd. Flow (perm)	1243	1745	1464	1297	1745	1464	3214	3221	1450	1595	3131	1435
Satd. Flow (RTOR)			90			155			97			97
Lane Group Flow (vph)	94	20	8	25	36	204	14	1573	23	47	979	69
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	16.0	65.0	65.0	16.0	65.0	65.0
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	12.3%	50.0%	50.0%	12.3%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	19.3	19.3	19.3	19.3	19.3	19.3	6.1	83.2	83.2	8.5	90.7	90.7
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.64	0.64	0.07	0.70	0.70
v/c Ratio	0.51	0.08	0.03	0.13	0.14	0.58	0.09	0.76	0.02	0.45	0.45	0.07
Control Delay	57.7	42.3	0.1	43.9	44.2	19.4	74.7	12.1	0.0	71.9	12.8	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.7	42.3	0.1	43.9	44.2	19.4	74.7	12.1	0.0	71.9	12.8	1.7
LOS	E	D	A	D	D	B	E	B	A	E	B	A
Approach Delay		51.4			25.1			12.5			14.6	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	23.4	4.6	0.0	5.9	8.5	11.7	1.9	19.0	0.0	11.8	37.5	0.0
Queue Length 95th (m)	32.2	9.6	0.0	11.2	14.5	28.3	m3.0	#276.4	m0.0	24.4	123.8	4.1
Internal Link Dist (m)		138.8			171.2			450.5			237.0	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	394	554	526	412	554	570	225	2062	963	116	2184	1030
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.04	0.02	0.06	0.06	0.36	0.06	0.76	0.02	0.41	0.45	0.07

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 99 (76%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FT2033
AM Peak Hour

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 15.8

Intersection LOS: B

Intersection Capacity Utilization 86.9%

ICU Level of Service E

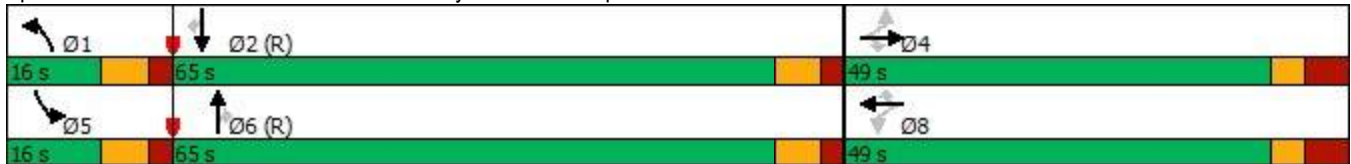
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2033
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	24	66	27	61	74	233	1370	34	58	852	11
Future Volume (vph)	30	24	66	27	61	74	233	1370	34	58	852	11
Satd. Flow (prot)	2583	1475	0	1658	1563	0	3216	3301	0	1580	3221	1282
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2570	1475	0	1658	1563	0	3210	3301	0	1580	3221	1262
Satd. Flow (RTOR)		66			49			2				96
Lane Group Flow (vph)	30	90	0	27	135	0	233	1404	0	58	852	11
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		20.0	47.0		20.0	47.0	14.0
Total Split (%)	10.8%	37.7%		10.8%	37.7%		15.4%	36.2%		15.4%	36.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	6.4	17.9		6.5	17.9		13.7	75.3		10.0	69.0	74.8
Actuated g/C Ratio	0.05	0.14		0.05	0.14		0.11	0.58		0.08	0.53	0.58
v/c Ratio	0.24	0.35		0.33	0.53		0.69	0.73		0.48	0.50	0.01
Control Delay	63.8	18.7		70.5	37.8		66.9	27.2		71.8	25.0	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.8	18.7		70.5	37.8		66.9	27.2		71.8	25.0	0.0
LOS	E	B		E	D		E	C		E	C	A
Approach Delay		30.0			43.2			32.9			27.7	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	3.8	5.7		6.8	21.4		29.8	140.6		15.2	44.1	0.0
Queue Length 95th (m)	9.0	16.6		16.8	32.4		44.0	#293.8		30.7	97.5	m0.0
Internal Link Dist (m)		134.5			312.5			100.5			450.5	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	135	515		86	532		351	1914		160	1709	771
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	0.22	0.17		0.31	0.25		0.66	0.73		0.36	0.50	0.01

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 94 (72%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 3: Strandherd & Systemhouse/Maravista

FT2033
AM Peak Hour

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 31.7

Intersection LOS: C

Intersection Capacity Utilization 76.3%

ICU Level of Service D

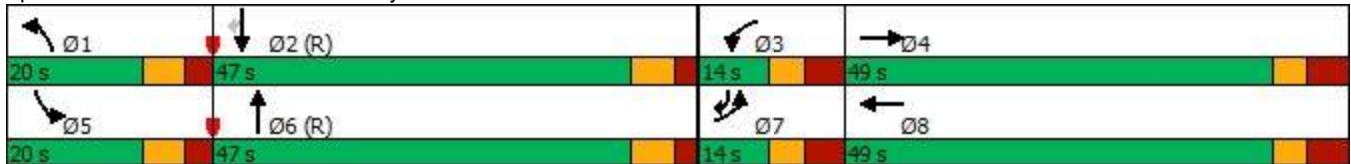
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FT2033
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	5	23	77	19	66	72	1508	96	31	864	71
Future Volume (vph)	31	5	23	77	19	66	72	1508	96	31	864	71
Satd. Flow (prot)	1642	1745	1483	1642	1527	0	3216	3276	0	1595	3191	1469
Flt Permitted	0.702			0.754			0.950			0.950		
Satd. Flow (perm)	1212	1745	1464	1301	1527	0	3214	3276	0	1595	3191	1449
Satd. Flow (RTOR)			37		66			7				105
Lane Group Flow (vph)	31	5	23	77	85	0	72	1604	0	31	864	71
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	21.0	37.0	37.0		21.0	62.0		21.0	62.0	62.0
Total Split (%)	30.8%	30.8%	17.5%	30.8%	30.8%		17.5%	51.7%		17.5%	51.7%	51.7%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.2	15.2	23.1	15.2	15.2		8.1	80.6		7.9	77.6	77.6
Actuated g/C Ratio	0.13	0.13	0.19	0.13	0.13		0.07	0.67		0.07	0.65	0.65
v/c Ratio	0.20	0.02	0.07	0.47	0.34		0.33	0.73		0.30	0.42	0.07
Control Delay	46.6	40.4	4.1	55.7	18.2		57.0	18.5		79.8	4.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	46.6	40.4	4.1	55.7	18.2		57.0	18.5		79.8	4.4	0.2
LOS	D	D	A	E	B		E	B		E	A	A
Approach Delay		29.5			36.0			20.2			6.5	
Approach LOS		C			D			C			A	
Queue Length 50th (m)	6.8	1.1	0.0	17.6	4.1		8.5	124.5		7.8	9.3	0.0
Queue Length 95th (m)	13.9	4.2	3.2	28.2	16.2		15.6	#249.3		m17.4	14.4	0.1
Internal Link Dist (m)		259.4			125.1			511.6			272.2	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	300	433	379	323	428		364	2202		180	2064	974
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.10	0.01	0.06	0.24	0.20		0.20	0.73		0.17	0.42	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 29 (24%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

4: Strandherd & Dealership/Kennevale

FT2033
AM Peak Hour

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 16.7

Intersection LOS: B

Intersection Capacity Utilization 70.7%

ICU Level of Service C

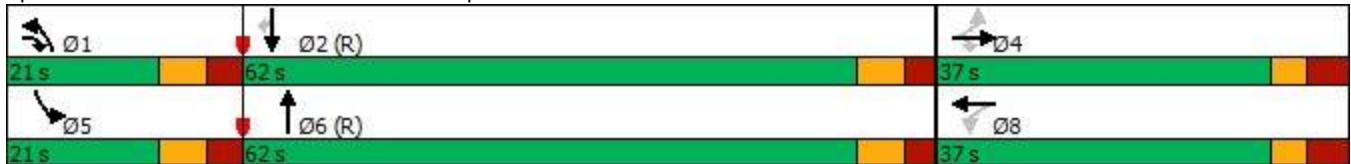
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FT2033
AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	7	62	64	54	1
Future Volume (Veh/h)	2	7	62	64	54	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	7	62	64	54	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	204	108	109	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204	108	109	0	0	
tC, single (s)	7.6	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	4.0	4.0	4.0	3.4	2.3	
p0 queue free %	100	99	92	94	97	
cM capacity (veh/h)	568	754	752	1068	1548	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	9	126	55			
Volume Left	2	0	54			
Volume Right	0	64	1			
cSH	703	885	1548			
Volume to Capacity	0.01	0.14	0.03			
Queue Length 95th (m)	0.3	3.8	0.8			
Control Delay (s)	10.2	9.7	7.3			
Lane LOS	B	A	A			
Approach Delay (s)	10.2	9.7	7.3			
Approach LOS	B	A				
Intersection Summary						
Average Delay			9.1			
Intersection Capacity Utilization			17.6%		ICU Level of Service	
Analysis Period (min)			15		A	

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	30	16	5	95	204	16	5	5	85	5	15
Future Vol, veh/h	15	30	16	5	95	204	16	5	5	85	5	15
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	50	-	-	-	-	0	-	-	-	-	-	-
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, %	7	18	2	2	6	2	2	2	2	9	2	2
Mvmt Flow	15	30	16	5	95	204	16	5	5	85	5	15
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	299	0	0	46	0	0	285	377	38	178	181	95
Stage 1	-	-	-	-	-	-	68	68	-	105	105	-
Stage 2	-	-	-	-	-	-	217	309	-	73	76	-
Critical Hdwy	4.17	-	-	4.12	-	-	7.12	6.52	6.22	7.19	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.19	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.19	5.52	-
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.518	4.018	3.318	3.581	4.018	3.318
Pot Cap-1 Maneuver	1234	-	-	1562	-	-	667	555	1034	769	713	962
Stage 1	-	-	-	-	-	-	942	838	-	884	808	-
Stage 2	-	-	-	-	-	-	785	660	-	919	832	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1234	-	-	1562	-	-	645	546	1034	751	702	962
Mov Cap-2 Maneuver	-	-	-	-	-	-	645	546	-	751	702	-
Stage 1	-	-	-	-	-	-	931	828	-	873	805	-
Stage 2	-	-	-	-	-	-	765	657	-	898	822	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2			0.1			10.6			10.4		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	670	1234	-	-	1562	-	-	773				
HCM Lane V/C Ratio	0.039	0.012	-	-	0.003	-	-	0.136				
HCM Control Delay (s)	10.6	8	-	-	7.3	0	-	10.4				
HCM Lane LOS	B	A	-	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.5				

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	29	0	1590	922	23
Future Vol, veh/h	0	29	0	1590	922	23
Conflicting Peds, #/hr	0	0	0	0	0	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, %	2	2	2	2	5	2
Mvmt Flow	0	29	0	1590	922	23
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	473	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	538	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	538	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	12.1	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	538	-	-		
HCM Lane V/C Ratio	-	0.054	-	-		
HCM Control Delay (s)	-	12.1	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0.2	-	-		

Lanes, Volumes, Timings
8: Strandherd & Access #2

FT2033
AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	80	58	95	1510	904	47
Future Volume (vph)	80	58	95	1510	904	47
Satd. Flow (prot)	1658	1483	1658	3316	3221	1483
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1651	1483	1655	3316	3221	1446
Satd. Flow (RTOR)		58				21
Lane Group Flow (vph)	80	58	95	1510	904	47
Turn Type	Perm	Perm	Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	4	4				2
Detector Phase	4	4	1	6	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	42.5	42.5	11.9	28.6	28.6	28.6
Total Split (s)	44.0	44.0	23.0	76.0	53.0	53.0
Total Split (%)	36.7%	36.7%	19.2%	63.3%	44.2%	44.2%
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	4.2
All-Red Time (s)	4.2	4.2	2.7	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.9	6.6	6.6	6.6
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	11.2	11.2	12.2	94.7	75.6	75.6
Actuated g/C Ratio	0.09	0.09	0.10	0.79	0.63	0.63
v/c Ratio	0.52	0.30	0.57	0.58	0.45	0.05
Control Delay	62.9	16.3	59.7	6.2	13.2	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.9	16.3	59.7	6.2	13.2	7.1
LOS	E	B	E	A	B	A
Approach Delay	43.3			9.4	12.9	
Approach LOS	D			A	B	
Queue Length 50th (m)	18.2	0.0	23.2	38.7	53.6	2.2
Queue Length 95th (m)	33.0	12.1	m33.4	84.4	83.5	8.2
Internal Link Dist (m)	79.6			272.2	118.6	
Turn Bay Length (m)			100.0			25.0
Base Capacity (vph)	502	491	224	2616	2029	919
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	0.16	0.12	0.42	0.58	0.45	0.05
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 30 (25%), Referenced to phase 2:SBT and 6:NBT, Start of Green						
Natural Cycle: 85						
Control Type: Actuated-Coordinated						

Lanes, Volumes, Timings 8: Strandherd & Access #2

FT2033
AM Peak Hour

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 12.4

Intersection LOS: B

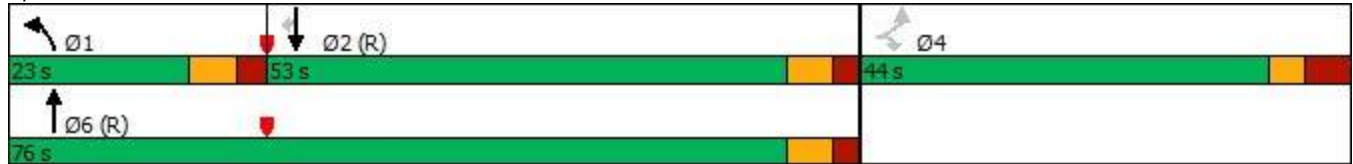
Intersection Capacity Utilization 60.5%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 8: Strandherd & Access #2



Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FT2033
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	80	12	205	90	529	8	1371	173	465	1552	223
Future Volume (vph)	225	80	12	205	90	529	8	1371	173	465	1552	223
Satd. Flow (prot)	3124	1633	0	1658	1664	1455	1208	3221	1483	3216	3316	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3124	1633	0	1655	1664	1455	1208	3221	1483	3216	3316	1455
Satd. Flow (RTOR)		7				359			160			158
Lane Group Flow (vph)	225	92	0	205	90	529	8	1371	173	465	1552	223
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	14.0	48.0		14.0	48.0	48.0	24.0	34.0	34.0	24.0	34.0	14.0
Total Split (%)	11.7%	40.0%		11.7%	40.0%	40.0%	20.0%	28.3%	28.3%	20.0%	28.3%	11.7%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	20.9	17.3		28.5	24.8	24.8	6.5	27.1	27.1	19.6	50.8	77.3
Actuated g/C Ratio	0.17	0.14		0.24	0.21	0.21	0.05	0.23	0.23	0.16	0.42	0.64
v/c Ratio	0.41	0.38		0.52	0.26	0.90	0.12	1.89	0.38	0.88	1.11	0.22
Control Delay	50.0	44.4		47.5	38.0	33.1	74.6	426.3	7.7	68.6	91.8	4.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	44.4		47.5	38.0	33.1	74.6	426.3	7.7	68.6	91.8	4.6
LOS	D	D		D	D	C	E	F	A	E	F	A
Approach Delay		48.4			37.2			377.9			78.3	
Approach LOS		D			D			F			E	
Queue Length 50th (m)	25.7	19.4		42.1	18.0	43.5	2.1	~256.6	3.4	52.6	177.6	4.6
Queue Length 95th (m)	#57.1	26.1		#122.1	26.9	77.4	m2.9	#299.0	m7.3	#92.5	#315.0	19.0
Internal Link Dist (m)		131.5			347.0			236.5			231.2	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	544	562		393	568	733	170	727	458	526	1403	993
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.16		0.52	0.16	0.72	0.05	1.89	0.38	0.88	1.11	0.22

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 115 (96%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FT2033
PM Peak Hour

Maximum v/c Ratio: 1.89

Intersection Signal Delay: 163.8

Intersection LOS: F

Intersection Capacity Utilization 98.4%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

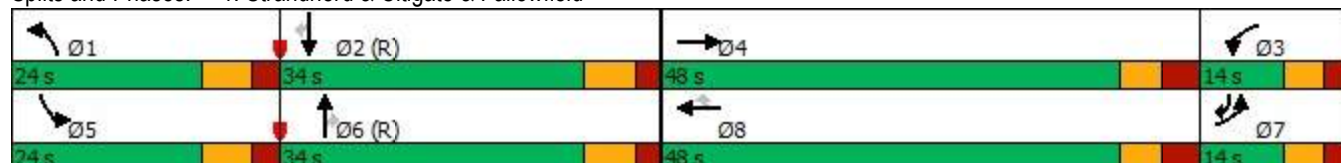
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings
2: Strandherd & Crosskeys/Helene-Campbell

FT2033
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	117	30	37	114	126	41	1255	23	122	1443	194
Future Volume (vph)	210	117	30	37	114	126	41	1255	23	122	1443	194
Satd. Flow (prot)	1658	1745	1469	1642	1745	1483	3216	3131	1483	1658	3283	1483
Flt Permitted	0.684			0.682			0.950			0.950		
Satd. Flow (perm)	1191	1745	1436	1168	1745	1462	3213	3131	1447	1656	3283	1461
Satd. Flow (RTOR)			97			126			105			162
Lane Group Flow (vph)	210	117	30	37	114	126	41	1255	23	122	1443	194
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	17.0	54.0	54.0	17.0	54.0	54.0
Total Split (%)	40.8%	40.8%	40.8%	40.8%	40.8%	40.8%	14.2%	45.0%	45.0%	14.2%	45.0%	45.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	29.5	29.5	29.5	29.5	29.5	29.5	7.0	56.8	56.8	12.3	64.6	64.6
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.06	0.47	0.47	0.10	0.54	0.54
v/c Ratio	0.72	0.27	0.07	0.13	0.27	0.28	0.22	0.85	0.03	0.72	0.82	0.23
Control Delay	53.8	35.5	0.3	31.8	35.3	6.3	60.4	34.9	1.9	66.9	15.5	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	35.5	0.3	31.8	35.3	6.3	60.4	34.9	1.9	66.9	15.5	1.4
LOS	D	D	A	C	D	A	E	C	A	E	B	A
Approach Delay		43.3			21.7			35.1			17.5	
Approach LOS		D			C			D			B	
Queue Length 50th (m)	46.9	23.1	0.0	7.0	22.5	0.0	4.0	164.4	0.0	30.1	36.0	0.8
Queue Length 95th (m)	63.7	33.5	0.0	13.8	32.7	12.7	m4.2	#213.6	m0.0	m29.1	m#76.5	m1.9
Internal Link Dist (m)		138.8			171.2			448.7			236.5	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	409	600	557	401	600	585	270	1482	740	169	1766	861
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.20	0.05	0.09	0.19	0.22	0.15	0.85	0.03	0.72	0.82	0.23

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 99 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FT2033
PM Peak Hour

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 26.5

Intersection LOS: C

Intersection Capacity Utilization 88.1%

ICU Level of Service E

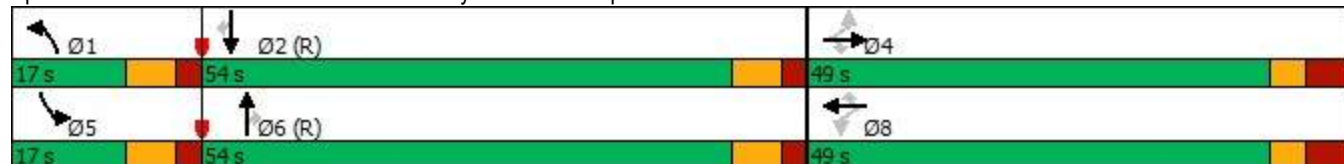
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2033
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	70	295	18	73	42	364	1209	27	124	1471	14
Future Volume (vph)	59	70	295	18	73	42	364	1209	27	124	1471	14
Satd. Flow (prot)	3185	1514	0	1658	1604	0	3216	3209	0	1658	3316	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3117	1514	0	1653	1604	0	3214	3209	0	1651	3316	1391
Satd. Flow (RTOR)		193			26			2				104
Lane Group Flow (vph)	59	365	0	18	115	0	364	1236	0	124	1471	14
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	13.0	49.0		13.0	49.0		17.0	41.0		17.0	41.0	13.0
Total Split (%)	10.8%	40.8%		10.8%	40.8%		14.2%	34.2%		14.2%	34.2%	10.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	5.8	28.0		5.7	22.8		20.5	53.2		12.5	45.3	50.4
Actuated g/C Ratio	0.05	0.23		0.05	0.19		0.17	0.44		0.10	0.38	0.42
v/c Ratio	0.39	0.73		0.23	0.35		0.66	0.87		0.72	1.18	0.02
Control Delay	63.1	26.4		62.1	31.6		56.1	40.1		55.5	123.5	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.1	26.4		62.1	31.6		56.1	40.1		55.5	123.5	0.1
LOS	E	C		E	C		E	D		E	F	A
Approach Delay		31.5			35.7			43.8			117.2	
Approach LOS		C			D			D			F	
Queue Length 50th (m)	7.0	39.2		4.2	20.2		43.8	111.0		24.5	~205.4	0.0
Queue Length 95th (m)	14.0	62.1		11.8	28.5		#85.9	#239.2		m#39.8	#308.8	m0.0
Internal Link Dist (m)		134.8			312.5			95.3			448.7	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	153	649		80	571		549	1424		172	1251	646
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	0.39	0.56		0.23	0.20		0.66	0.87		0.72	1.18	0.02

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 54 (45%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2033
PM Peak Hour

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 73.5

Intersection LOS: E

Intersection Capacity Utilization 96.5%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

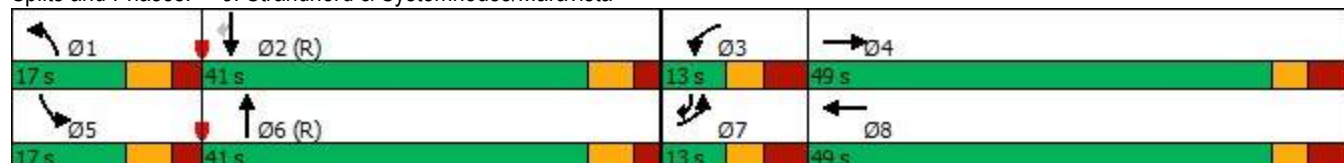
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FT2033
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	19	67	144	12	53	47	1460	107	56	1790	47
Future Volume (vph)	106	19	67	144	12	53	47	1460	107	56	1790	47
Satd. Flow (prot)	1658	1745	1483	1626	1492	0	3216	3247	0	1658	3316	1483
Flt Permitted	0.715			0.745			0.950			0.950		
Satd. Flow (perm)	1246	1745	1463	1274	1492	0	3216	3247	0	1657	3316	1483
Satd. Flow (RTOR)			37		53			8				105
Lane Group Flow (vph)	106	19	67	144	65	0	47	1567	0	56	1790	47
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	37.0	37.0	23.0	37.0	37.0		23.0	60.0		23.0	60.0	60.0
Total Split (%)	30.8%	30.8%	19.2%	30.8%	30.8%		19.2%	50.0%		19.2%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	19.3	19.3	26.3	19.3	19.3		7.2	72.2		9.4	74.4	74.4
Actuated g/C Ratio	0.16	0.16	0.22	0.16	0.16		0.06	0.60		0.08	0.62	0.62
v/c Ratio	0.53	0.07	0.19	0.71	0.23		0.24	0.80		0.43	0.87	0.05
Control Delay	54.2	39.4	16.1	64.7	15.6		56.4	25.3		62.2	17.5	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	54.2	39.4	16.1	64.7	15.6		56.4	25.3		62.2	17.5	0.4
LOS	D	D	B	E	B		E	C		E	B	A
Approach Delay		39.4			49.4			26.2			18.4	
Approach LOS		D			D			C			B	
Queue Length 50th (m)	23.3	3.9	5.2	32.6	2.4		5.5	147.3		14.1	40.1	0.0
Queue Length 95th (m)	37.5	9.6	13.9	49.6	13.4		11.5	#250.7		m15.4 m#124.2		m0.1
Internal Link Dist (m)		259.4			125.1			518.0			265.6	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	309	433	452	316	410		418	1955		215	2055	959
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.34	0.04	0.15	0.46	0.16		0.11	0.80		0.26	0.87	0.05

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 57 (48%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FT2033
PM Peak Hour

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 24.3

Intersection LOS: C

Intersection Capacity Utilization 83.2%

ICU Level of Service E

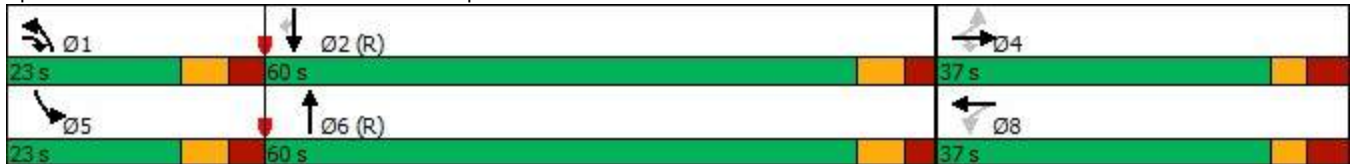
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FT2033
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	25	26	118	121	1
Future Volume (Veh/h)	3	25	26	118	121	1
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	25	26	118	121	1
Pedestrians		1	1			
Lane Width (m)		3.5	3.5			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	374	244	245	1	1	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	374	244	245	1	1	
tC, single (s)	7.1	6.5	6.5	6.2	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.3	
p0 queue free %	99	96	96	89	92	
cM capacity (veh/h)	471	606	605	1074	1569	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	28	144	122			
Volume Left	3	0	121			
Volume Right	0	118	1			
cSH	588	942	1569			
Volume to Capacity	0.05	0.15	0.08			
Queue Length 95th (m)	1.1	4.1	1.9			
Control Delay (s)	11.4	9.5	7.4			
Lane LOS	B	A	A			
Approach Delay (s)	11.4	9.5	7.4			
Approach LOS	B	A				
Intersection Summary						
Average Delay			8.8			
Intersection Capacity Utilization			23.1%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	90	41	14	88	346	41	14	14	320	14	15
Future Vol, veh/h	15	90	41	14	88	346	41	14	14	320	14	15
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	50	-	-	-	-	0	-	-	-	-	-	-
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, %	27	3	2	2	5	2	2	2	2	2	2	2
Mvmt Flow	15	90	41	14	88	346	41	14	14	320	14	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	434	0	0	131	0	0	445	603	111	271	277	88
Stage 1	-	-	-	-	-	-	141	141	-	116	116	-
Stage 2	-	-	-	-	-	-	304	462	-	155	161	-
Critical Hdwy	4.37	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.443	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1005	-	-	1454	-	-	523	413	942	682	631	970
Stage 1	-	-	-	-	-	-	862	780	-	889	800	-
Stage 2	-	-	-	-	-	-	705	565	-	847	765	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1005	-	-	1454	-	-	495	401	942	640	613	970
Mov Cap-2 Maneuver	-	-	-	-	-	-	495	401	-	640	613	-
Stage 1	-	-	-	-	-	-	849	768	-	876	790	-
Stage 2	-	-	-	-	-	-	673	558	-	807	754	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.9			0.2			13			16.8		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	520	1005	-	-	1454	-	-	648
HCM Lane V/C Ratio	0.133	0.015	-	-	0.01	-	-	0.539
HCM Control Delay (s)	13	8.6	-	-	7.5	0	-	16.8
HCM Lane LOS	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	3.2

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	77	0	1577	1721	63
Future Vol, veh/h	0	77	0	1577	1721	63
Conflicting Peds, #/hr	0	0	0	0	0	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, %	2	2	2	2	2	2
Mvmt Flow	0	77	0	1577	1721	63

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 892	- 0	- 0
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -
Critical Hdwy	- 6.94	- -	- -
Critical Hdwy Stg 1	- -	- -	- -
Critical Hdwy Stg 2	- -	- -	- -
Follow-up Hdwy	- 3.32	- -	- -
Pot Cap-1 Maneuver	0 285	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 285	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s	22.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 285	- -	- -
HCM Lane V/C Ratio	- 0.27	- -	- -
HCM Control Delay (s)	- 22.2	- -	- -
HCM Lane LOS	- C	- -	- -
HCM 95th %tile Q(veh)	- 1.1	- -	- -

Lanes, Volumes, Timings
8: Strandherd & Access #2

FT2033
PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	169	153	211	1408	1671	127
Future Volume (vph)	169	153	211	1408	1671	127
Satd. Flow (prot)	1658	1483	1658	3316	3316	1483
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1629	1458	1657	3316	3316	1443
Satd. Flow (RTOR)		153				29
Lane Group Flow (vph)	169	153	211	1408	1671	127
Turn Type	Perm	Perm	Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	4	4				2
Detector Phase	4	4	1	6	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	42.5	42.5	11.9	28.6	28.6	28.6
Total Split (s)	43.0	43.0	28.0	77.0	49.0	49.0
Total Split (%)	35.8%	35.8%	23.3%	64.2%	40.8%	40.8%
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	4.2
All-Red Time (s)	4.2	4.2	2.7	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.9	6.6	6.6	6.6
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	19.9	19.9	19.5	86.0	59.6	59.6
Actuated g/C Ratio	0.17	0.17	0.16	0.72	0.50	0.50
v/c Ratio	0.63	0.41	0.78	0.59	1.01	0.17
Control Delay	55.3	9.1	71.5	9.6	26.8	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	9.1	71.5	9.6	26.8	2.5
LOS	E	A	E	A	C	A
Approach Delay	33.3			17.7	25.1	
Approach LOS	C			B	C	
Queue Length 50th (m)	38.3	0.0	53.3	43.1	~35.8	1.1
Queue Length 95th (m)	50.9	15.1	m67.9	88.4 m#	227.3	m1.6
Internal Link Dist (m)	79.2			265.6	132.9	
Turn Bay Length (m)			100.0			25.0
Base Capacity (vph)	481	539	299	2376	1647	731
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	0.35	0.28	0.71	0.59	1.01	0.17
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 60 (50%), Referenced to phase 2:SBT and 6:NBT, Start of Green						
Natural Cycle: 145						
Control Type: Actuated-Coordinated						

Lanes, Volumes, Timings 8: Strandherd & Access #2

FT2033
PM Peak Hour

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 22.6

Intersection LOS: C

Intersection Capacity Utilization 91.4%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

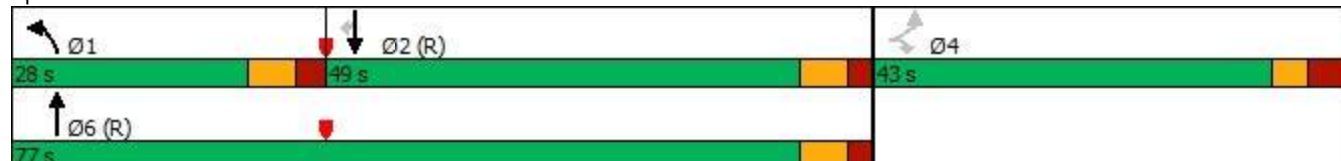
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 8: Strandherd & Access #2



Lanes, Volumes, Timings
1: Strandherd & Citigate & Fallowfield

FT2033
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	76	10	147	80	207	7	1387	162	225	1333	164
Future Volume (vph)	137	76	10	147	80	207	7	1387	162	225	1333	164
Satd. Flow (prot)	2757	1549	0	1626	1679	1427	1353	3316	1441	3154	3221	1414
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2745	1549	0	1626	1679	1403	1351	3316	1441	3154	3221	1372
Satd. Flow (RTOR)		7				207			175			144
Lane Group Flow (vph)	137	86	0	147	80	207	7	1387	162	225	1333	164
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	11.5	48.0		11.5	48.0	48.0	12.1	29.9	29.9	12.1	29.9	11.5
Total Split (s)	12.0	48.0		12.0	48.0	48.0	19.0	31.0	31.0	19.0	31.0	12.0
Total Split (%)	10.9%	43.6%		10.9%	43.6%	43.6%	17.3%	28.2%	28.2%	17.3%	28.2%	10.9%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	3.7
All-Red Time (s)	2.8	3.3		2.8	3.3	3.3	2.5	2.3	2.3	2.5	2.3	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.0		6.5	7.0	7.0	7.1	6.9	6.9	7.1	6.9	6.5
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	None
Act Effct Green (s)	5.7	11.3		13.2	15.0	15.0	6.1	24.6	24.6	10.6	40.2	46.3
Actuated g/C Ratio	0.07	0.13		0.16	0.18	0.18	0.07	0.29	0.29	0.13	0.48	0.55
v/c Ratio	0.74	0.40		0.57	0.27	0.49	0.07	1.43	0.30	0.57	0.87	0.20
Control Delay	64.6	39.2		47.1	30.6	8.2	43.1	225.6	5.8	42.4	29.4	3.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.6	39.2		47.1	30.6	8.2	43.1	225.6	5.8	42.4	29.4	3.4
LOS	E	D		D	C	A	D	F	A	D	C	A
Approach Delay		54.8			25.5			201.9			28.6	
Approach LOS		D			C			F			C	
Queue Length 50th (m)	10.4	10.9		~28.0	11.0	0.0	1.0	~143.6	0.0	16.0	75.6	0.8
Queue Length 95th (m)	#35.3	30.7		42.6	21.6	14.5	6.0	#282.7	14.1	36.8	#257.3	12.6
Internal Link Dist (m)		131.5			347.0			234.1			231.1	
Turn Bay Length (m)	90.0			140.0		125.0	95.0		90.0	127.0		96.5
Base Capacity (vph)	186	775		256	836	803	195	971	545	456	1541	824
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.11		0.57	0.10	0.26	0.04	1.43	0.30	0.49	0.87	0.20

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 83.9

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.43

Lanes, Volumes, Timings

1: Strandherd & Citigate & Fallowfield

FT2033
SAT Peak Hour

Intersection Signal Delay: 98.3

Intersection LOS: F

Intersection Capacity Utilization 83.4%

ICU Level of Service E

Analysis Period (min) 15

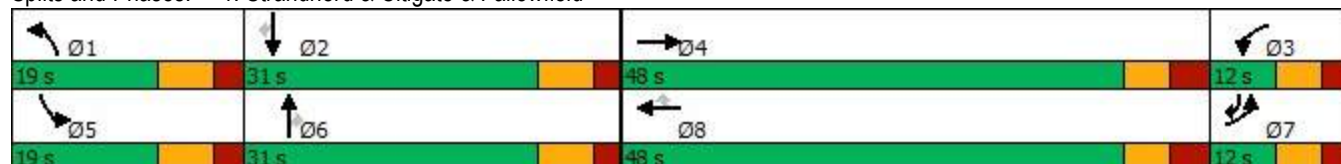
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Strandherd & Citigate & Fallowfield



Lanes, Volumes, Timings
2: Strandherd & Crosskeys/Helene-Campbell

FT2033
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	147	79	43	137	139	86	1149	20	72	1170	247
Future Volume (vph)	259	147	79	43	137	139	86	1149	20	72	1170	247
Satd. Flow (prot)	1658	1745	1483	1658	1745	1483	3216	3316	1483	1658	3161	1483
Flt Permitted	0.669			0.663			0.950			0.950		
Satd. Flow (perm)	1167	1745	1456	1152	1745	1463	3215	3316	1431	1653	3161	1464
Satd. Flow (RTOR)			106			139			115			247
Lane Group Flow (vph)	259	147	79	43	137	139	86	1149	20	72	1170	247
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	48.7	48.7	48.7	48.7	48.7	48.7	11.9	31.8	31.8	11.9	31.8	31.8
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	15.0	46.0	46.0	15.0	46.0	46.0
Total Split (%)	44.5%	44.5%	44.5%	44.5%	44.5%	44.5%	13.6%	41.8%	41.8%	13.6%	41.8%	41.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	2.3	2.2	2.2	2.3	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	7.7	7.7	7.7	7.7	7.7	6.9	6.8	6.8	6.9	6.8	6.8
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	7.9	52.1	52.1	9.1	53.3	53.3
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.07	0.47	0.47	0.08	0.48	0.48
v/c Ratio	0.81	0.31	0.17	0.14	0.29	0.28	0.38	0.73	0.03	0.53	0.76	0.30
Control Delay	56.2	31.5	2.9	27.8	31.1	5.6	53.3	30.1	0.1	62.4	30.5	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.2	31.5	2.9	27.8	31.1	5.6	53.3	30.1	0.1	62.4	30.5	4.0
LOS	E	C	A	C	C	A	D	C	A	E	C	A
Approach Delay		40.0			19.5			31.2			27.7	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	51.9	25.0	0.0	7.0	23.2	0.0	9.2	109.3	0.0	14.9	111.2	0.0
Queue Length 95th (m)	71.9	36.2	5.6	13.8	33.8	12.2	17.0	#172.1	0.0	#33.0	#183.7	16.1
Internal Link Dist (m)		138.8			171.2			463.9			234.1	
Turn Bay Length (m)	60.0		80.0	38.0		70.0	170.0		100.0	100.0		90.0
Base Capacity (vph)	438	655	612	432	655	636	245	1569	737	143	1531	836
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.22	0.13	0.10	0.21	0.22	0.35	0.73	0.03	0.50	0.76	0.30

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 108 (98%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

2: Strandherd & Crosskeys/Helene-Campbell

FT2033
SAT Peak Hour

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 29.9

Intersection LOS: C

Intersection Capacity Utilization 86.9%

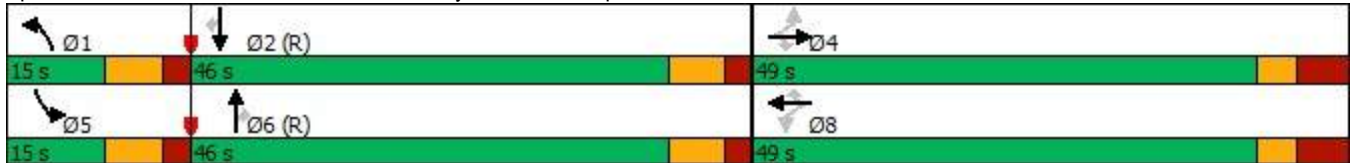
ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Strandherd & Crosskeys/Helene-Campbell



Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2033
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	53	316	19	95	62	514	1081	26	118	1180	14
Future Volume (vph)	80	53	316	19	95	62	514	1081	26	118	1180	14
Satd. Flow (prot)	3216	1501	0	1658	1599	0	3216	3302	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3144	1501	0	1654	1599	0	3203	3302	0	1658	3316	1449
Satd. Flow (RTOR)		292			32			2				108
Lane Group Flow (vph)	80	369	0	19	157	0	514	1107	0	118	1180	14
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases												2
Detector Phase	7	4		3	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	5.0
Minimum Split (s)	12.2	48.5		12.2	48.5		11.9	31.6		11.9	31.6	12.2
Total Split (s)	14.0	49.0		14.0	49.0		19.0	33.0		19.0	33.0	14.0
Total Split (%)	12.2%	42.6%		12.2%	42.6%		16.5%	28.7%		16.5%	28.7%	12.2%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2		4.2	4.2	3.3
All-Red Time (s)	3.9	4.2		3.9	4.2		2.7	2.4		2.7	2.4	3.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.5		7.2	7.5		6.9	6.6		6.9	6.6	7.2
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	None
Act Effct Green (s)	6.6	34.6		6.3	29.0		24.0	42.3		11.6	29.9	35.9
Actuated g/C Ratio	0.06	0.30		0.05	0.25		0.21	0.37		0.10	0.26	0.31
v/c Ratio	0.43	0.56		0.21	0.37		0.77	0.91		0.71	1.37	0.03
Control Delay	59.8	9.9		57.2	27.3		61.1	46.0		72.8	208.6	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	59.8	9.9		57.2	27.3		61.1	46.0		72.8	208.6	0.1
LOS	E	A		E	C		E	D		E	F	A
Approach Delay		18.8			30.5			50.8			194.2	
Approach LOS		B			C			D			F	
Queue Length 50th (m)	9.1	9.3		4.2	19.5		~79.8	~181.7		25.9	~197.2	0.0
Queue Length 95th (m)	17.0	37.0		11.8	35.6		#118.2	#218.1		#49.3	#238.2	0.0
Internal Link Dist (m)		135.5			312.5			93.5			463.9	
Turn Bay Length (m)				38.0			125.0			140.0		300.0
Base Capacity (vph)	190	756		98	597		670	1214		178	861	530
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	0.42	0.49		0.19	0.26		0.77	0.91		0.66	1.37	0.03

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

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

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

3: Strandherd & Systemhouse/Maravista

FT2033
SAT Peak Hour

Maximum v/c Ratio: 1.37

Intersection Signal Delay: 98.6

Intersection LOS: F

Intersection Capacity Utilization 103.1%

ICU Level of Service G

Analysis Period (min) 15

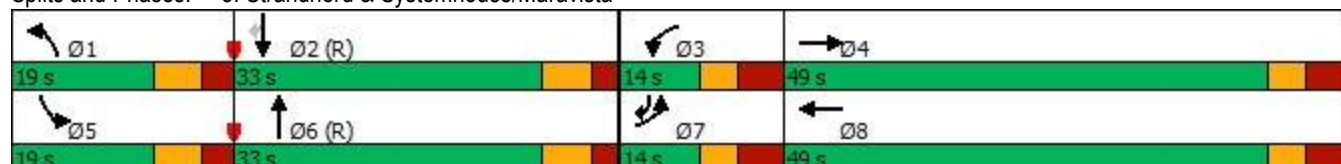
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Strandherd & Systemhouse/Maravista



Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FT2033
SAT Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	8	33	95	18	76	55	1398	106	51	1422	32
Future Volume (vph)	69	8	33	95	18	76	55	1398	106	51	1422	32
Satd. Flow (prot)	1642	1745	1483	1658	1534	0	3185	3274	0	1658	3316	1483
Flt Permitted	0.696			0.752			0.950			0.950		
Satd. Flow (perm)	1203	1745	1464	1311	1534	0	3183	3274	0	1657	3316	1462
Satd. Flow (RTOR)			41		76			10				115
Lane Group Flow (vph)	69	8	33	95	94	0	55	1504	0	51	1422	32
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4	1		8		1	6		5	2	
Permitted Phases	4		4	8								2
Detector Phase	4	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	36.2	36.2	12.4	36.2	36.2		12.4	32.1		12.4	32.1	32.1
Total Split (s)	38.0	38.0	12.4	38.0	38.0		12.4	59.6		12.4	59.6	59.6
Total Split (%)	34.5%	34.5%	11.3%	34.5%	34.5%		11.3%	54.2%		11.3%	54.2%	54.2%
Yellow Time (s)	3.3	3.3	4.2	3.3	3.3		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	3.9	3.9	3.2	3.9	3.9		3.2	2.9		3.2	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.2	7.2	7.4	7.2	7.2		7.4	7.1		7.4	7.1	7.1
Lead/Lag			Lead				Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.8	15.8	22.4	15.8	15.8		6.8	67.1		8.1	68.3	68.3
Actuated g/C Ratio	0.14	0.14	0.20	0.14	0.14		0.06	0.61		0.07	0.62	0.62
v/c Ratio	0.40	0.03	0.10	0.51	0.33		0.28	0.75		0.42	0.69	0.03
Control Delay	47.3	35.5	6.2	51.0	14.9		52.7	21.1		59.3	18.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.3	35.5	6.2	51.0	14.9		52.7	21.1		59.3	18.7	0.1
LOS	D	D	A	D	B		D	C		E	B	A
Approach Delay		34.1			33.1			22.2			19.7	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	14.0	1.6	0.0	19.6	3.5		5.8	117.4		10.5	100.4	0.0
Queue Length 95th (m)	23.5	5.2	4.9	30.5	15.3		12.3	#211.5		#24.5	#180.3	0.0
Internal Link Dist (m)		259.4			125.1			516.6			280.3	
Turn Bay Length (m)	120.0		125.0	60.0			95.0			70.0		115.0
Base Capacity (vph)	336	488	332	367	484		198	2000		122	2057	950
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.21	0.02	0.10	0.26	0.19		0.28	0.75		0.42	0.69	0.03

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 93 (85%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
4: Strandherd & Dealership/Kennevale

FT2033
SAT Peak Hour

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 22.1

Intersection LOS: C

Intersection Capacity Utilization 72.1%

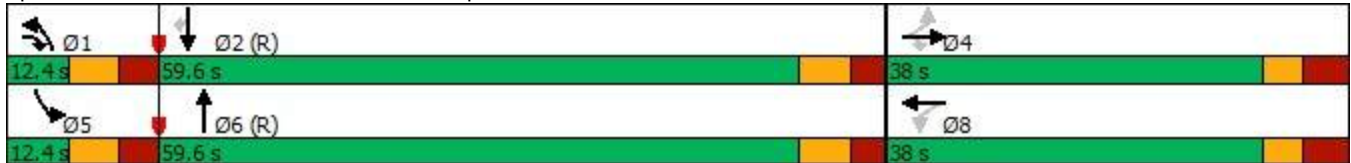
ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Strandherd & Dealership/Kennevale



HCM Unsignalized Intersection Capacity Analysis

5: Systemhouse & Citigate

FT2033
SAT Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	22	46	101	108	0
Future Volume (Veh/h)	2	22	46	101	108	0
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	22	46	101	108	0
Pedestrians		2			3	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	345	218	218	3	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	345	218	218	3	0	
tC, single (s)	7.1	6.5	6.5	6.3	4.2	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.4	2.3	
p0 queue free %	100	97	93	91	93	
cM capacity (veh/h)	491	632	632	1064	1572	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	24	147	108			
Volume Left	2	0	108			
Volume Right	0	101	0			
cSH	618	877	1572			
Volume to Capacity	0.04	0.17	0.07			
Queue Length 95th (m)	0.9	4.6	1.7			
Control Delay (s)	11.1	9.9	7.5			
Lane LOS	B	A	A			
Approach Delay (s)	11.1	9.9	7.5			
Approach LOS	B	A				
Intersection Summary						
Average Delay			9.1			
Intersection Capacity Utilization			23.1%	ICU Level of Service		A
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	15	73	42	14	89	518	43	14	14	362	14	15
Future Vol, veh/h	15	73	42	14	89	518	43	14	14	362	14	15
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	50	-	-	-	-	0	-	-	-	-	-	-
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, %	20	3	2	2	4	2	2	2	2	2	2	2
Mvmt Flow	15	73	42	14	89	518	43	14	14	362	14	15
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	607	0	0	115	0	0	515	759	94	255	262	89
Stage 1	-	-	-	-	-	-	124	124	-	117	117	-
Stage 2	-	-	-	-	-	-	391	635	-	138	145	-
Critical Hdwy	4.3	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.38	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	889	-	-	1474	-	-	470	336	963	698	643	969
Stage 1	-	-	-	-	-	-	880	793	-	888	799	-
Stage 2	-	-	-	-	-	-	633	472	-	865	777	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	889	-	-	1474	-	-	444	325	963	648	622	969
Mov Cap-2 Maneuver	-	-	-	-	-	-	444	325	-	648	622	-
Stage 1	-	-	-	-	-	-	865	780	-	873	786	-
Stage 2	-	-	-	-	-	-	602	464	-	823	764	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0.2			14.2			18.3		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	460	889	-	-	1474	-	-	655				
HCM Lane V/C Ratio	0.154	0.017	-	-	0.009	-	-	0.597				
HCM Control Delay (s)	14.2	9.1	-	-	7.5	0	-	18.3				
HCM Lane LOS	B	A	-	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	4				

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	75	0	1503	1456	60
Future Vol, veh/h	0	75	0	1503	1456	60
Conflicting Peds, #/hr	0	0	0	0	0	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, %	2	2	2	2	2	2
Mvmt Flow	0	75	0	1503	1456	60
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	758	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	350	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	350	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	18.1	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	350	-	-		
HCM Lane V/C Ratio	-	0.214	-	-		
HCM Control Delay (s)	-	18.1	-	-		
HCM Lane LOS	-	C	-	-		
HCM 95th %tile Q(veh)	-	0.8	-	-		

Lanes, Volumes, Timings
8: Strandherd & Access #2

FT2033
SAT Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (vph)	203	150	243	1300	1410	121
Future Volume (vph)	203	150	243	1300	1410	121
Satd. Flow (prot)	1658	1483	1658	3316	3316	1483
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1625	1458	1653	3316	3316	1423
Satd. Flow (RTOR)		150				30
Lane Group Flow (vph)	203	150	243	1300	1410	121
Turn Type	Perm	Perm	Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	4	4				2
Detector Phase	4	4	1	6	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	42.5	42.5	11.9	28.6	28.6	28.6
Total Split (s)	45.0	45.0	33.0	70.0	37.0	37.0
Total Split (%)	39.1%	39.1%	28.7%	60.9%	32.2%	32.2%
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	4.2
All-Red Time (s)	4.2	4.2	2.7	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.9	6.6	6.6	6.6
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	21.4	21.4	21.8	79.5	50.8	50.8
Actuated g/C Ratio	0.19	0.19	0.19	0.69	0.44	0.44
v/c Ratio	0.67	0.38	0.77	0.57	0.96	0.19
Control Delay	53.4	8.1	60.5	11.5	19.9	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	8.1	60.5	11.5	19.9	4.4
LOS	D	A	E	B	B	A
Approach Delay	34.2			19.2	18.7	
Approach LOS	C			B	B	
Queue Length 50th (m)	43.7	0.0	52.3	66.2	50.1	0.0
Queue Length 95th (m)	57.7	14.5	74.5	126.4 m#	186.6	m6.4
Internal Link Dist (m)	81.4			280.3	123.9	
Turn Bay Length (m)			100.0			25.0
Base Capacity (vph)	529	576	383	2292	1466	645
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	0.38	0.26	0.63	0.57	0.96	0.19
Intersection Summary						
Cycle Length: 115						
Actuated Cycle Length: 115						
Offset: 25 (22%), Referenced to phase 2:SBT and 6:NBT, Start of Green						
Natural Cycle: 135						
Control Type: Actuated-Coordinated						

Lanes, Volumes, Timings 8: Strandherd & Access #2

FT2033
SAT Peak Hour

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 20.5

Intersection LOS: C

Intersection Capacity Utilization 87.4%

ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 8: Strandherd & Access #2

