5163-5187 JOYCE STREET TRANSPORTATION ASSESSMENT AND MANAGEMENT STUDY

Part 1: Transportation Impact Study (DRAFT)

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1.0 INTRODUCTION

WATT Consulting Group (WATT) was retained by 1128587 BC Ltd. to prepare a Transportation Assessment and Management Study (Study) for a proposed rezoning application at 5163-5187 Joyce Street in Vancouver, BC for the City of Vancouver (application number: PS-2017-00402). The application consists of a 32-storey high-rise building with multi-family residential strata, library, and retail uses proposed.

The Study consists of two reports to satisfy the City of Vancouver's *Transportation Assessment and Management Study Guidelines* and the terms of reference for the scope of work as approved by the City:

1. Part 1: Transportation Impact Study; and
2. Part 2: Transportation Demand Management Plan.

The information presented in this report (Part 1: Transportation Impact Study) is based on the proposed development program and drawings as of July 29, 2020, unless otherwise noted.

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1.1 STUDY OBJECTIVES

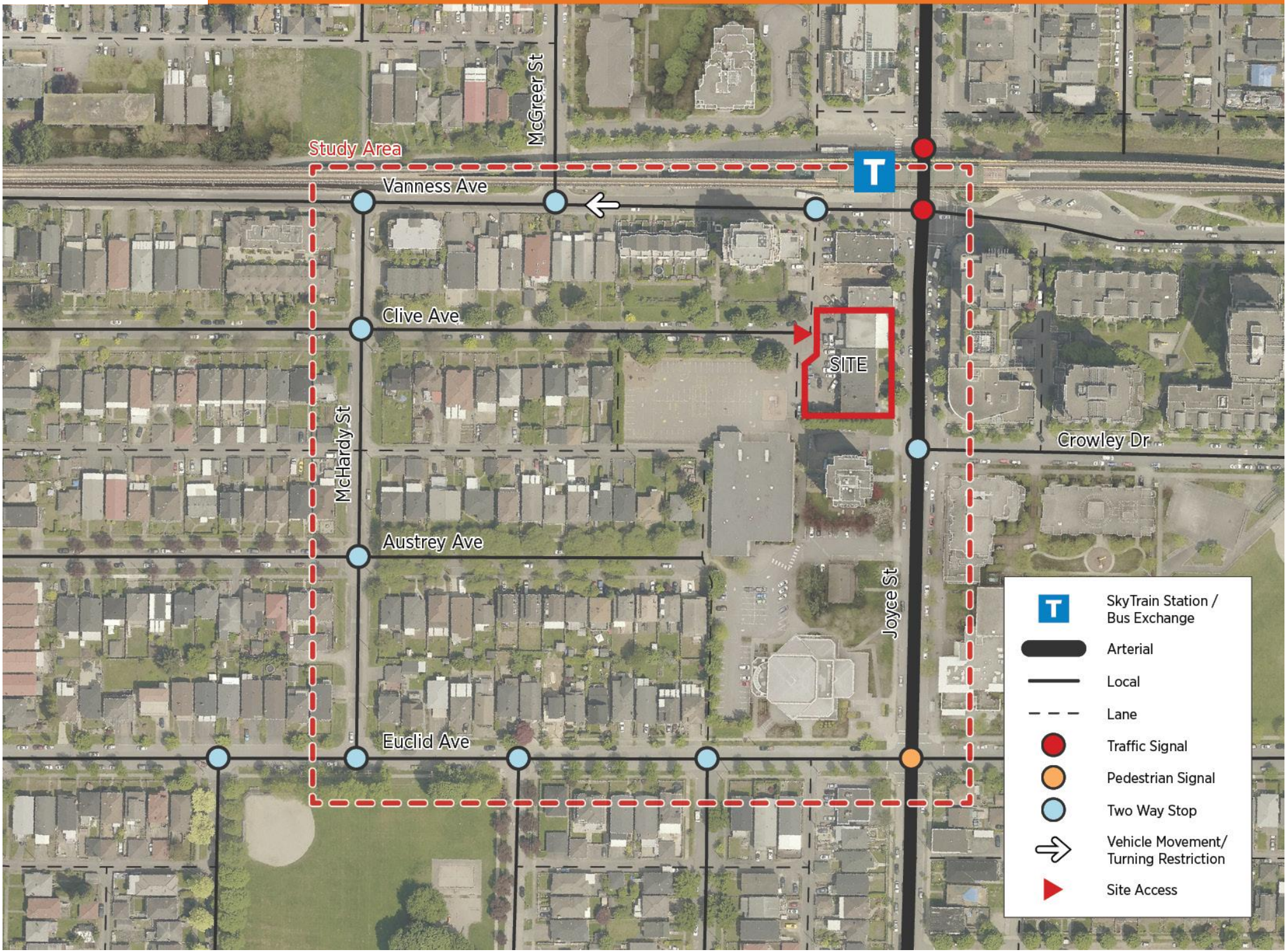
The objectives of the Transportation Impact Study are to:

1. Estimate future site traffic generation, distribution, and assignment on the adjacent road network for the weekday morning and afternoon peak periods;
2. Evaluate traffic operations of the adjacent road network and identify potential operational issues and transportation impacts due to the development;
3. Recommend mitigation measures to address off-site transportation impacts due to the development on the adjacent road network if required; and
4. Evaluate the proposed on-site circulation and design.

1.2 STUDY AREA AND SUBJECT SITE

The study area is bounded by Vanness Avenue to the north, Joyce Street to the east, Euclid Avenue to the south, and McHardy Street to the west (see **Figure 1**).

Figure 1: Study Area



2.0 METHODOLOGY

2.1 STUDY TIME PERIODS

The AM and PM peak hours were determined based on a review of historic 2015 and 2017 traffic volumes. The peak hours used for this study are as follows:

1. **Weekday morning (AM) peak hour:** 8:00 to 9:00 am; and
2. **Weekday afternoon (PM) peak hour:** 5:00 to 6:00 pm.

2.2 STUDY YEARS AND SCENARIOS

Traffic operational analysis was conducted for three horizon years, with the opening day and 10-year horizon analyzed with and without the development traffic:

1. **2020:** existing conditions;
2. **2024:** opening day of full build-out, background conditions;
3. **2024:** opening day of full build-out, post-development conditions;
4. **2034:** opening day plus 10-year horizon, background conditions; and
5. **2034:** opening day plus 10-year horizon, post-development conditions.

2.3 TRAFFIC DATA COLLECTION

Traffic volume data was collected by WATT for vehicles, heavy vehicles, bicycles, and pedestrians during the weekday morning (7:00 to 8:00 am) and afternoon (4:00 to 5:00 pm) to assess existing transportation conditions in the study area as follows:

- Wednesday, February 12, 2020
  - Lane/Vanness Avenue
  - McHardy Street/Euclid Avenue
  - McHardy Street/Clive Avenue
  - McHardy Street/Vanness Avenue
- Wednesday, February 19, 2020
  - Joyce Street/Vanness Avenue
  - Joyce Street/Euclid Avenue

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Additional traffic volume data was provided by the City of Vancouver for the Joyce Street/Vanness Avenue intersection (2017 volumes for 7:00 to 9:00 am and 4:00 to 6:00 pm) and Joyce Street/Euclid Avenue (2015 volumes for 7:00 am to 7:00 pm).

The collected 2020 traffic volume data (for the hour beginning at 7:00 am and 4:00 pm) were adjusted to represent conditions at 8:00 am and 5:00 pm respectively for the traffic operational analysis, as these were determined to be the peak hours.

- 2020 volumes were adjusted to 8:00 am to 9:00 am and 5:00 pm to 6:00 pm based on hourly adjustment factors from the 2015 and 2017 volumes.
- For Lane/Vanness Avenue, eastbound volumes on Vanness Avenue were removed to reflect the eastbound restrictions that were put into place in 2019.
- Lastly, vehicle volumes were balanced following the peak hour adjustment to reconcile differences in the turning movement volumes attributed to different data collection dates and the adjustment factors.

2.4 TRAFFIC OPERATIONAL ANALYSIS

Traffic analysis at the operational level was conducted using Synchro Studio 9 (Synchro and SimTraffic) following the Highway Capacity Manual (HCM) 2010 methodology.

Four measures of effectiveness were used to describe and evaluate traffic operations of the study intersections in this study: Level of Service (LOS), volume/capacity (V/C) ratio, total delay, and the 95th percentile queue length. **Appendix A** provides definitions and background on these performance measures. The 95th percentile queue lengths results are estimated using SimTraffic (average of 5 runs) for signalized intersections, and Synchro for unsignalized intersections.

Mitigation measures, including roadway improvements, traffic control improvements, and/or transportation demand management measures, are required by the City of Vancouver when the 95th percentile queue length exceeds available storage.

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3.0 EXISTING CONDITIONS

3.1 LAND USE

The subject site is located on two parcels. It is currently improved with two existing two-storey mixed-use buildings with residential and at-grade commercial retail and restaurant uses. The surrounding area is a transit hub characterized by a mix of residential and commercial uses, including retail, restaurant, and office.

3.2 TRANSPORTATION NETWORK

3.2.1 ROAD NETWORK

There are six roadways within the study area (see **Figure 1** for an overview of the study area, including road classification and traffic control).

- **Joyce Street** is a divided two-lane, two-way arterial road that runs north-south. There is a dedicated bus lane in both directions. On-street parking is not permitted on either side. The posted speed limit is 50 km/h.
- **Vanness Avenue** is an undivided two-lane, two-way local road that runs east-west. There is an eastbound movement restriction beginning at McGreer Street, restricting eastbound access to Rupert Street (outside the study area to the west) from Joyce Street. On-street parking is permitted on the south side for a segment west of McGreer Street. The posted speed limit is 30 km/h west of Joyce Street, and 50 km/h east of Joyce Street.
- **Euclid Avenue** is an undivided two-lane, two-way local road that runs east-west. On-street parking is permitted on both sides of the road. The posted speed limit is 30 km/h. The road has a school zone on it for the Collingwood Neighbourhood School, which is part of a civic complex located on the southeast corner of Joyce Street and Euclid Avenue.
- **McHardy Street** is an undivided two-lane, two-way local road that runs north-south. On-street parking is permitted on both sides. The posted speed limit is 30 km/h.

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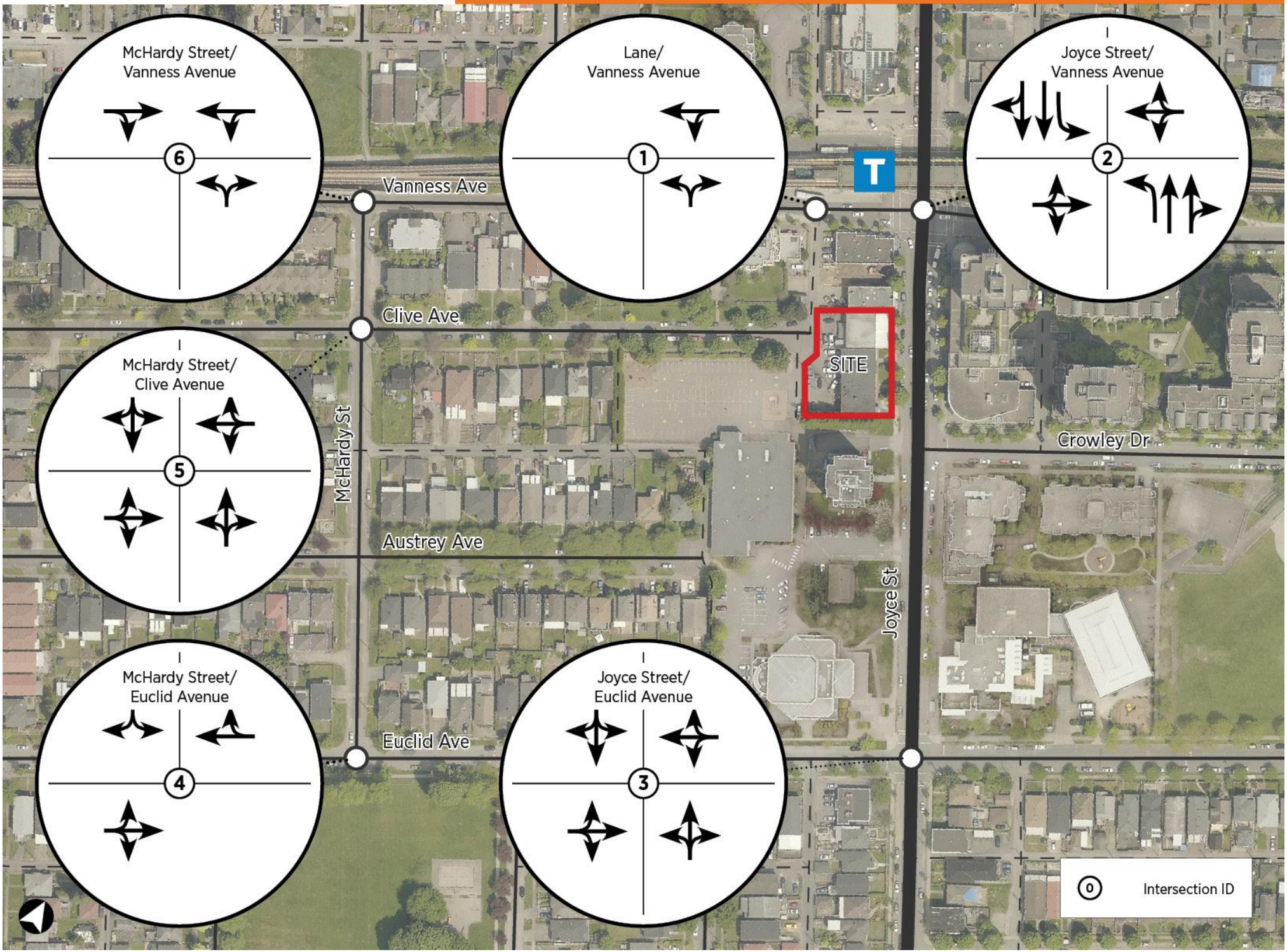
- **Clive Avenue** an undivided two-lane, two-way local road that runs east-west. On-street parking is permitted on both sides. The posted speed limit is 30 km/h.
- **Lane (between Vanness Avenue and Clive Avenue)** is a north-south lane that provides access to the residential and non-residential properties located from 5103 Joyce Street to 5187 Joyce Street, and 3362 Vanness Avenue. The speed limit is 15 km/h.

There are six study intersections in the study area (see **Figure 2** for an overview of the study intersections and their existing lane configuration).

- **Lane/Vanness Avenue** is a T-intersection with stop control for the northbound (Lane) approach.
- **Joyce Street/Vanness Avenue** is a four-leg, signalized intersection with protected/permitted left-turn phasing in the northbound and southbound directions. It is coordinated with the traffic signal to the north on Joyce Street by the Joyce-Collingwood Station bus loop.
- **Joyce Street/Euclid Avenue** is a four-leg intersection with a pedestrian signal on the north and south leg of Joyce Street and stop control for the Euclid Avenue approaches.
- **McHardy Street/Euclid Avenue** is a T-intersection with stop control on McHardy Street.
- **McHardy Street/Clive Avenue** is a four-leg intersection with stop control on McHardy Street.
- **McHardy Street/Vanness Avenue** is a T-intersection with stop control on McHardy Street.

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Figure 2: Study Intersections and Existing Laning



3.2.2 TRANSIT NETWORK

The study area is within an important transit hub in East Vancouver and is part of TransLink's Frequent Transit Network service area, defined as 15 minutes or better transit service until 9:00 pm every day.

Joyce–Collingwood Station is located on the northern edge of the study area (approximately 50 m, or a minute walk from the subject site). It provides access to the SkyTrain (Expo Line) and the following bus routes:

- R4 (41st Ave);
- 26 (Joyce Station / 29th Avenue Station);
- 27 (Kootenay Loop / Joyce Station);
- 28 (Capilano University / Phibbs Exchange / Joyce Station); and
- 41 (Joyce Station / Crown).

3.2.3 PEDESTRIAN AND CYCLING NETWORK

Shared Pedestrian and Cycling Facilities

The BC Parkway is located on the northern edge of the study area approximately 90 m from the subject site and crosses through Joyce-Collingwood Station. It is a 26 km, multi-use pathway that parallels the Expo Line connecting Vancouver to Surrey. This pathway is a shared bicycle and pedestrian facilities that is separated from vehicular traffic.

Pedestrian Facilities

The sidewalk network is generally complete within the study area with the exception of segments on McHardy Street.

Cycling Facilities

Vanness Avenue is a designated east-west local street bikeway, running parallel to the BC Parkway and is shared with vehicular traffic. There are no other cycling facilities in the study area. The study area is also located outside of the City's public bike share (Mobi) station zone.

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3.3 EXISTING TRAFFIC CONDITIONS

Existing weekday AM and PM traffic conditions for 2020 are summarized in **Table 2**, and peak hour volumes are shown in **Figure 3** (see **Appendix B** for Synchro reports). The following outlines the key results:

- Joyce Street/Vanness Avenue currently operates at an overall intersection LOS F during the weekday AM peak hour and LOS E during the PM peak hour.
    - All individual movements operate at LOS D or better, except for the westbound approach during the AM and PM peak hour (LOS F).
    - The east leg has a 95th percentile queue length extending to within the bus loop during the AM (72 m) and PM (60 m) peak hour. There are high outbound bus volumes in the westbound direction for both periods.
    - The northbound through movement operates at LOS E during the PM peak hour and the 95th percentile queue length extends past Joyce Street/Crowley Drive during the AM (113 m) and PM (82 m) peak hour.
    - The existing northbound left-turn lane storage (36 m) is exceeded during the AM (queue length of 37 m, exceeding by 1 m, less than a passenger car length) and PM peak hour (queue length of 49 m, exceeding by 13 m). There are high inbound bus volumes in this direction for both periods.
- Joyce Street/Euclid Avenue currently operates at an overall intersection LOS C as a pedestrian signal during the weekday AM and PM peak hour.[1]
    - Euclid Avenue movements operates at LOS F during the AM peak hour and LOS E during the PM peak hour.
    - Joyce Street operates at LOS B during both periods in both directions.
- For the unsignalized intersections, all individual movements currently operate at LOS B or better during both the weekday AM and PM peak hours.
- Passenger vehicles were observed to be illegally using the dedicated bus lane on Joyce Street approaching and following Euclid Avenue in both directions.

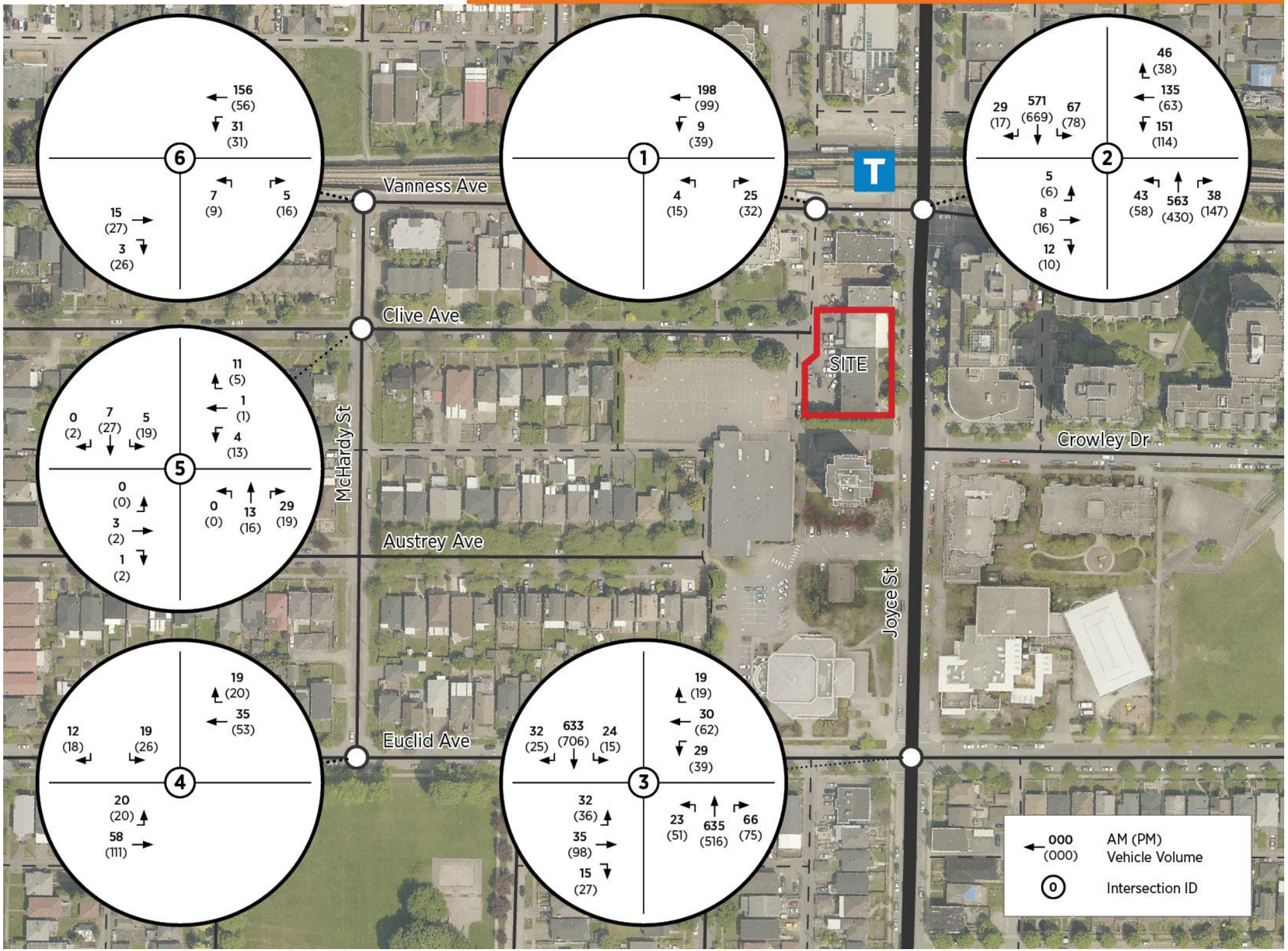
[1] The Joyce Street/Euclid Avenue intersection is modelled as a fixed time signal in Synchro due to software limitations in modelling pedestrian signals. The timing plan is based on the City's existing signal timing plan adjusted for observed traffic volumes and pedestrian crossings.

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TABLE 1: EXISTING WEEKDAY TRAFFIC CONDITIONS (2020)

Intersection	Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)	V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)
1: Lane/ Vanness Avenue	WB L	0.02	A	8	1	0.03	A	8	1
	WB T	-	A	0	0	-	A	0	0
	NB LR	0.05	A	9	2	0.12	B	11	3
	Overall	**LOS A**				**LOS A**			
2: Joyce Street/ Vanness Avenue	EB LTR	0.11	B	16	9	0.14	B	17	10
	WB LTR	1.51	F	271	72	1.36	F	214	60
	NB L	0.28	B	11	37	0.44	B	17	49
	NB TR	0.84	C	31	113	1.01	E	58	82
	SB L	0.43	B	12	24	0.63	C	24	31
	SB T	0.83	C	29	81	0.90	D	36	94
	SB R	0.10	A	2	11	0.04	A	0	22
	Overall	**LOS F**				**LOS E**			
3: Joyce Street/ Euclid Avenue	EB LTR	0.92	F	114	40	0.87	E	65	55
	WB LTR	0.89	F	101	33	0.86	E	66	36
	NB LTR	0.76	B	13	54	0.74	B	15	53
	SB LTR	0.72	B	13	94	0.73	B	14	105
	Overall	**LOS C**				**LOS C**			
4: McHardy Street/ Eucild Avenue	EB L	0.02	A	8	1	0.02	A	8	1
	EB T	-	A	0	0	-	A	0	0
	WB TR	-	A	0	0	-	A	0	0
	SB LR	0.08	B	10	2	0.08	B	10	2
	Overall	**LOS A**				**LOS A**			
5: McHardy Street/ Clive Avenue	EB L	-	A	0	0	0.00	A	7	0
	EB TR	-	A	0	0	-	A	0	0
	WB L	0.00	A	7	0	0.01	A	7	0
	WB TR	-	A	0	0	-	A	0	0
	NB LTR	0.06	A	9	2	0.05	A	9	2
	SB LTR	0.02	A	10	1	0.08	A	10	2
	Overall	**LOS A**				**LOS A**			
6: McHardy Street/ Vanness Avenue	EB TR	-	A	0	0	-	A	0	0
	WB L	0.03	A	8	1	0.03	A	8	1
	WB T	-	A	0	0	-	A	0	0
	NB LR	0.04	B	10	1	0.04	A	10	1
	Overall	**LOS A**				**LOS A**			

Figure 3: Existing Weekday Traffic Volumes (2020)



3.4 EXISTING IMPROVEMENTS MEASURES

No improvements are required for the unsignalized intersections. At Joyce Street/ Vanness Avenue, the northbound left-turn lane (36 m) is recommended to be extended by 14 m to provide 50 m to store the PM peak hour 95th percentile queue length.

At Joyce Street/Euclid Avenue, traffic signal warrants were reviewed as the side street is operating poorly. The TAC traffic signal warrant and MOTI four-hour and peak-hour volume traffic signal warrants were met using existing 2020 volumes (see **Appendix C** for more details). Based on the results of the warrants, a full traffic signal is warranted at this intersection and should be planned for by the City of Vancouver. With the implementation of a traffic signal, separate left-turn lanes on the north and south legs are recommended.

- The northbound left-turn lane is recommended to be 30 m.
- The southbound left-turn lane is recommended to be 15 m.

The existing right-of-way is approximately 22 to 24 m at Joyce Street/Euclid Avenue. There is sufficient right-of-way to accommodate the existing vehicle and bus lanes, and a new left-turn lane; however, the curbs may need to be relocated.

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4.0 FUTURE CONDITIONS

4.1 PROPOSED LAND USE AND SITE ACCESS

The proposed land uses for the site are:

- Multi-family residential strata: 293 dwelling units;
- Library: 1,277 m^2 GFA (13,746 sq. ft.); and
- Retail: 578 m^2 GFA (6,222 sq. ft.).

The development is planned to occur in one phase, with a planned opening day of 2024. Vehicular access to an underground parking facility and loading access is proposed to be located off of the rear laneway intersected by Vanness Avenue and Clive Avenue on the east side of the property (see **Figure 6** for the proposed site plan).

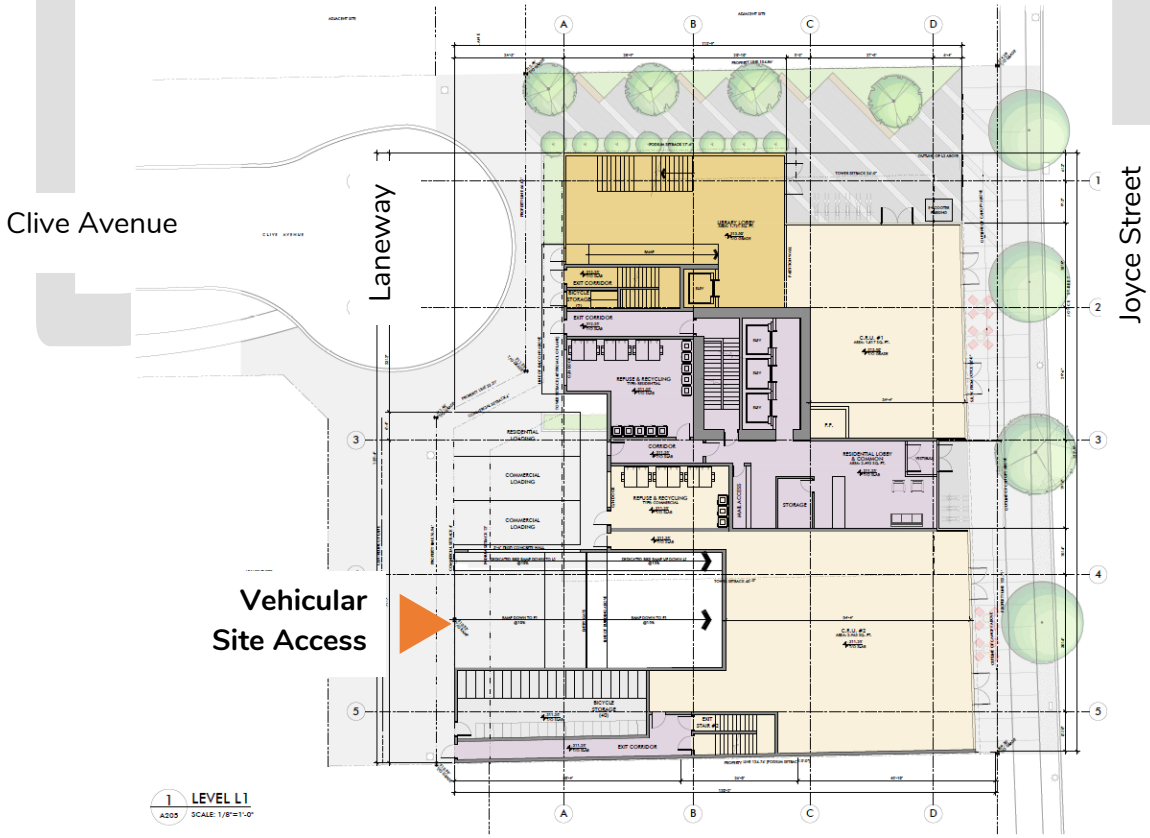


Figure 4: Proposed Site Plan

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4.2 TRAFFIC FORECAST

4.2.1 BACKGROUND TRAFFIC

Background traffic volumes in the study area for the 2024 and 2034 horizon years were forecast using a 1.0% linear growth rate per annum applied to existing 2020 traffic volumes. This rate is assumed to account for traffic volume changes attributed to city-wide and area-specific growth.

There are currently three active rezoning applications being considered under the Joyce-Collingwood Station Precinct Plan as of March 2020:

- 5055 Joyce Street (307 residential strata units and 420 m^2 of retail);
- 3235-3261 Clive Avenue (68 residential strata units); and
- 3279-3297 Vanness Avenue (102 residential social housing units).

There are two developments under construction as of March 2020:

- 5055 Joyce Street (256 residential strata units and 470 m^2 of retail).
- 3304 Clive Avenue (3 residential strata units).

The traffic from these developments is assumed to be covered by the 1% growth rate.

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4.2.2 SITE TRAFFIC: TRIP GENERATION

The number of external vehicle trips generated by the proposed development was estimated using the average trip generation rates from the *Trip Generation Manual, 10th Edition* for the library and retail space, and local multi-family residential rate from the Bunt & Associates *report, "5050-5080 Joyce Street Transportation Impact Assessment"* (dated June 29, 2016). Vehicle trip generation rates for the weekday AM and PM peak hour are shown in **Table 3**.

TABLE 2: SITE VEHICLE TRIP GENERATION RATES

Land Use	Trip Generation Source	Units	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
			Rate	In	Out	Rate	In	Out
Residential	Bunt Report	units	0.24	21%	79%	0.22	55%	45%
Library	ITE 590	sq. ft.	1.00	71%	29%	8.16	48%	52%
Retail	ITE 820	sq. ft.	0.94	62%	38%	3.81	48%	52%

TABLE 3: SITE VEHICLE TRIPS

Land Use	Quantity		Weekday AM			Weekday PM		
			Total	In	Out	Total	In	Out
Residential	293	units	70	15	55	64	35	29
Library	13,746	sq. ft.	14	10	4	112	54	58
Retail	6,222	sq. ft.	6	4	2	24	12	12
		Total	**90**	**29**	**61**	**200**	**101**	**99**

The number of external vehicle trips from the site are potentially overestimated and the traffic operational analysis results are conservative for the following reasons:

- While the site is a mixed-use, infill development that is located proximate to rapid transit, internal capture and mode share adjustments were not applied as per the methodology and procedures outlined in the *Trip Generation Handbook* and the *NCHRP Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Development*. The residential trip generation rate used here partially reflect mode share adjustments already, and there is no internal capture data available for library uses.
- Pass-by and diverted trips were not estimated due to the limited size of the commercial retail uses proposed.
- Trip reductions associated with transportation demand management (TDM) measures (see **Report 2: TDM Plan**) were not considered as there is limited data in the literature to estimate reductions in trips (except for parking demand).

Vehicle trips generated from the existing subject site were not removed from the background volume calculations as they are expected to have minimal effect due to the lack of existing off-street visitor parking and small development size at the existing site.

4.2.3 SITE TRAFFIC: TRIP DISTRIBUTION AND ASSIGNMENT

The trip distribution and assignment pattern for the site trips were estimated by a combination of the observed directional splits in the adjacent road network from the existing 2020 volume, consideration of major trip generators/attractors within and outside the study area, and local knowledge of the area.

The weekday AM and PM peak hour distribution are as follows:

- **65% of trips** to/from the north (East 29th Avenue), east (Boundary Road), and/or south (Kingsway):
  - **10% of trips to/from the north (East 29th Avenue)** via Vanness Avenue → Joyce Street.
  - **29% of trips to/from the east (Boundary Road)** via Vanness Avenue.
  - **26% of trips to/from the south (Kingsway)** via Vanness Avenue → Joyce Street.
- **25% of trips to/from the west (Rupert Street)** via Vanness Avenue (outbound) and Vanness Avenue → McHardy Street → Clive Avenue (inbound).
- **10% of trips to/from the south (Kingsway)** via Clive Avenue → McHardy Street → Euclid Avenue → Joyce Street.

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Figure 7 shows the trip distribution for the site traffic and **Figure 8** shows the trip assignment for the site traffic.

Figure 7: Site Traffic: Trip Distribution

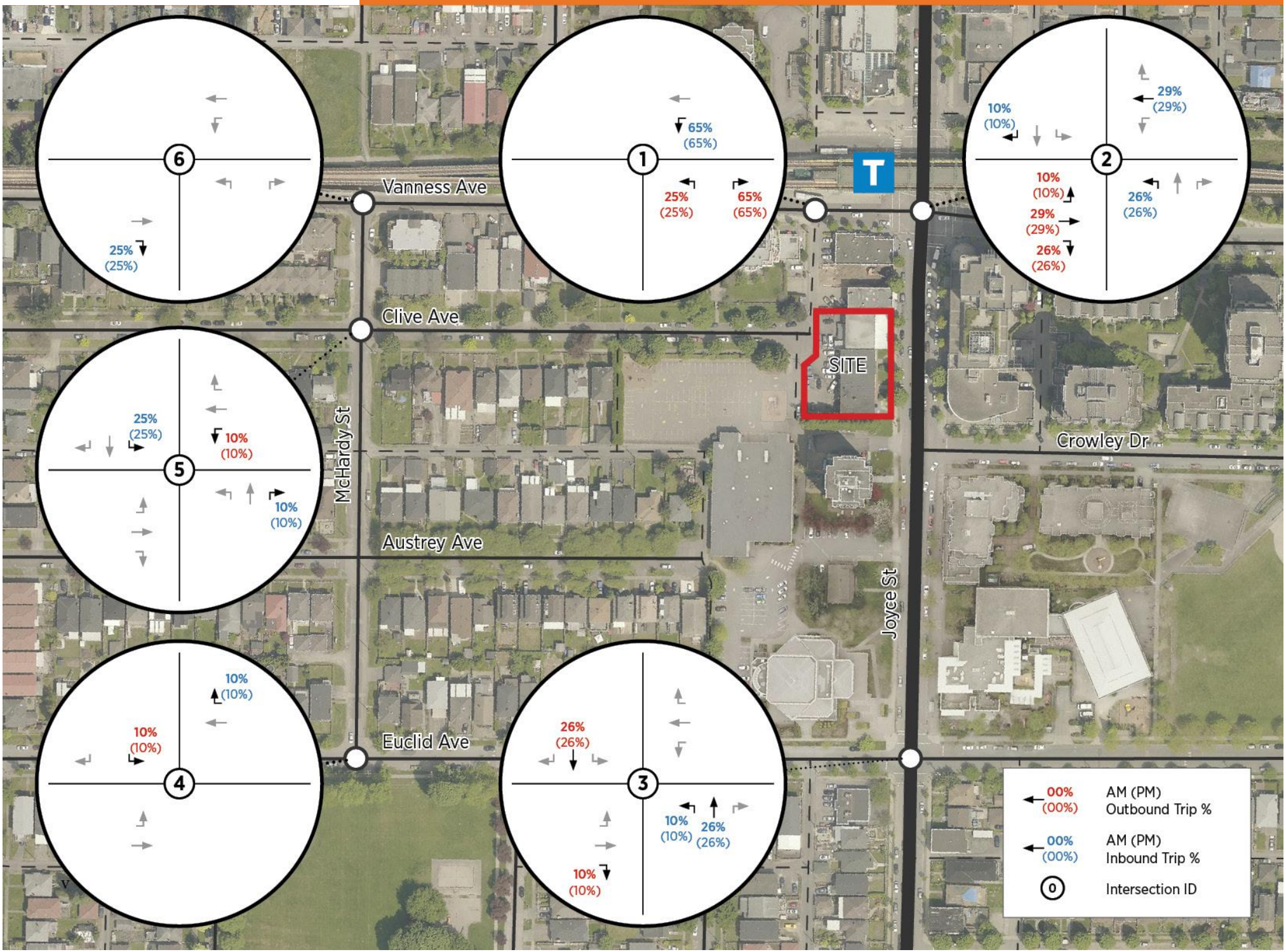
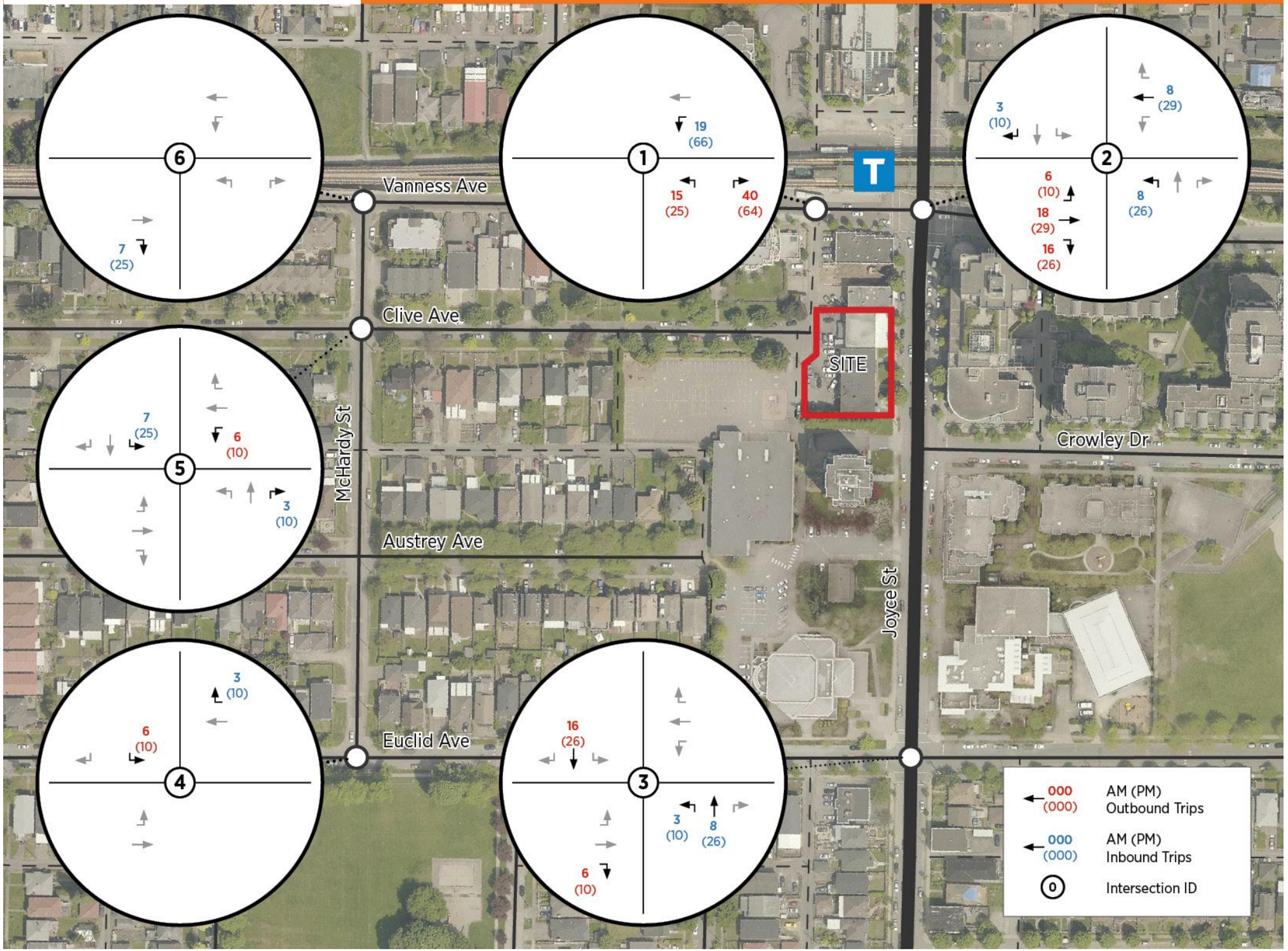


Figure 8: Site Traffic, Trip Assignment



4.3 BACKGROUND TRAFFIC CONDITIONS

4.3.1 2024 BACKGROUND

Background weekday AM and PM traffic conditions for 2024 are summarized in **Table 5**, and peak hour volumes are shown in **Figure 9**. The following outlines the key results:

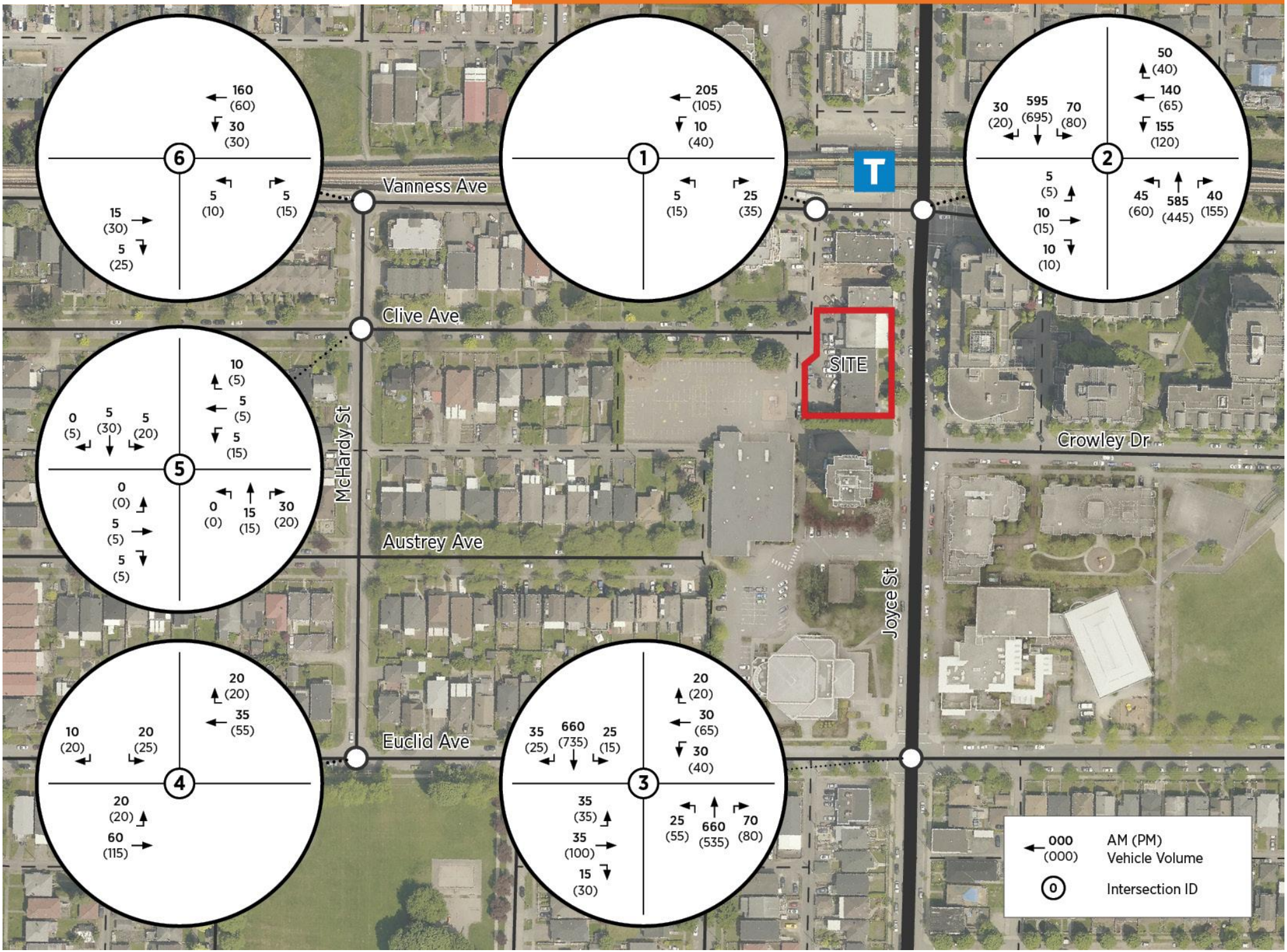
- Joyce Street/Vanness Avenue is forecasted to continue to operate at an overall LOS F during the weekday AM peak hour and LOS E during the PM peak hour.
    - The east leg continues to operate at LOS F during both peak hours. The 95th percentile queue length extends to within the bus loop during the AM (70 m) and PM (53 m) peak hour. There are high outbound bus volumes in the westbound direction for both periods.
    - The northbound through movement continues to operate at LOS E during the PM peak hour. The 95th percentile queue length extends past Joyce Street/Crowley Drive during the AM (141 m) and PM (108 m) peak hour.
    - The northbound left-turn lane storage, if extended to 50 m based on existing conditions, is exceeded during the PM peak hour by 4 m, less than a passenger car (95th percentile queue length of 54 m). There are high inbound bus volumes in this direction for both periods.
    - The existing southbound left-turn lane storage (35 m) is exceeded during the PM peak hour by 15 m (95th percentile queue length of 50 m) and during the AM peak hour by 7 m (queue length of 42 m).
- Joyce Street/Euclid Avenue is forecasted to continue to operate at an overall LOS C during the weekday AM and PM peak hour if it remains as a pedestrian signal.
    - Euclid Avenue movements continue to operate at LOS F during the AM peak hour and LOS E during the PM peak hour.
    - Joyce Street movements continue to operate at LOS B during both periods in both directions.
- For the unsignalized intersections, all individual movements are forecast to operate at LOS B or better during both the weekday AM and PM peak hours.

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TABLE 4: BACKGROUND WEEKDAY TRAFFIC CONDITIONS (2024)

Intersection	Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)	V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)
1: Lane/ Vanness Avenue	WB L	0.02	A	8	1	0.03	A	8	1
	WB T	-	A	0	0	-	A	0	0
	NB LR	0.05	A	9	2	0.13	B	11	4
	Overall	**LOS A**				**LOS A**			
2: Joyce Street/ Vanness Avenue	EB LTR	0.10	B	17	7	0.13	B	17	10
	WB LTR	1.57	F	296	70	1.43	F	240	53
	NB L	0.32	B	12	41	0.45	B	17	54
	NB TR	0.88	C	34	142	1.05	E	69	108
	SB L	0.48	B	14	42	0.65	C	26	50
	SB T	0.86	C	32	93	0.94	D	41	100
	SB R	0.10	A	2	29	0.05	A	1	23
	Overall	**LOS F**				**LOS E**			
3: Joyce Street/ Euclid Avenue	EB LTR	0.99	F	132	32	0.89	E	69	49
	WB LTR	0.93	F	109	34	0.92	E	77	42
	NB LTR	0.80	B	14	53	0.78	B	17	53
	SB LTR	0.75	B	15	92	0.76	B	15	142
	Overall	**LOS C**				**LOS C**			
4: McHardy Street/ Eucild Avenue	EB L	0.02	A	8	1	0.02	A	8	1
	EB T	-	A	0	0	-	A	0	0
	WB TR	-	A	0	0	-	A	0	0
	SB LR	0.08	B	11	2	0.08	B	10	2
	Overall	**LOS A**				**LOS A**			
5: McHardy Street/ Clive Avenue	EB L	0.00	A	7	0	0.00	A	7	0
	EB TR	-	A	0	0	-	A	0	0
	WB L	0.01	A	8	0	0.01	A	7	0
	WB TR	-	A	0	0	-	A	0	0
	NB LTR	0.07	A	10	2	0.06	A	10	2
	SB LTR	0.03	A	10	1	0.09	B	10	2
	Overall	**LOS A**				**LOS A**			
6: McHardy Street/ Vanness Avenue	EB TR	-	A	0	0	-	A	0	0
	WB L	0.03	A	8	1	0.03	A	8	1
	WB T	-	A	0	0	-	A	0	0
	NB LR	0.04	A	10	1	0.04	A	10	1
	Overall	**LOS A**				**LOS A**			

Figure 9: Background Weekday Traffic Volumes (2024)



4.3.2 2034 BACKGROUND

Background weekday AM and PM traffic conditions for 2034 are summarized in **Table 6**, and peak hour volumes are shown in **Figure 10**. The following outlines the key results:

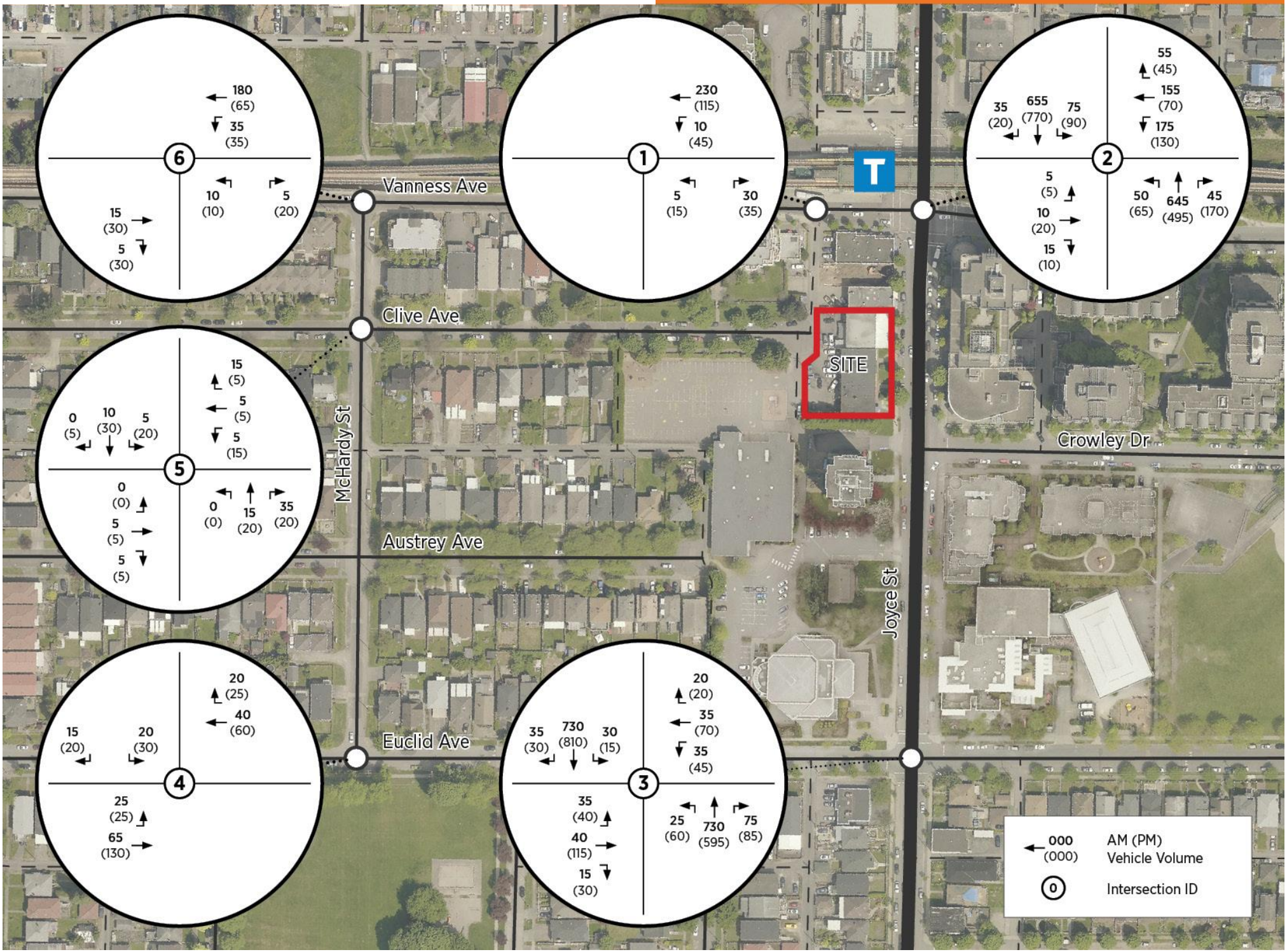
- Joyce Street/Vanness Avenue is forecasted to continue to operate at an overall LOS F during the weekday AM peak hour, and drop to LOS F during the PM peak hour compared to the 2024 background scenario.
    - The east leg continues to operate at LOS F during the AM and PM peak hour, with a queue length extending to within the bus loop.
    - The northbound through movement continues to operate at LOS E during the AM peak hour, and drops to LOS F during the PM peak hour.
    - The southbound through movement begins to operate at LOS E during the PM peak hour.
    - The northbound left-turn storage length will need to be extended to 60 m to accommodate the projected PM peak hour 95th percentile queue length (57 m) if extended to 55 m based on 2024 background conditions.
    - The southbound left-turn storage length will need to be extended to 75 m to accommodate the projected PM peak hour 95th percentile queue length (74 m) if extended to 50 m based on 2024 background conditions.
- Joyce Street/Euclid Avenue is forecasted to operate at an overall LOS D during the weekday AM and PM peak hour if it remains as a pedestrian signal.
    - Euclid Avenue movements will continue to operate at LOS F during the AM and PM peak hour.
    - Joyce Street movements drop to LOS C in both directions during the AM peak hour, and drops to LOS C in the northbound direction only during the PM peak hour.
- For the unsignalized intersections, all movements are forecast to operate at LOS B or better during both the weekday AM and PM peak hours.

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TABLE 5: BACKGROUND WEEKDAY TRAFFIC CONDITIONS (2034)

Intersection	Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)	V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)
1: Lane/ Vanness Avenue	WB L	0.06	A	8	1	0.09	A	8	1
	WB T	-	A	0	0	-	A	0	0
	NB LR	0.16	B	10	2	0.41	C	15	4
	Overall	**LOS A**				**LOS A**			
2: Joyce Street/ Vanness Avenue	EB LTR	0.26	B	18	12	0.41	C	21	10
	WB LTR	1.58	F	303	64	1.49	F	265	63
	NB L	0.42	B	16	38	0.63	C	30	56
	NB TR	0.88	C	34	183	1.05	E	69	200
	SB L	0.49	B	14	45	0.65	C	26	74
	SB T	0.91	D	38	94	0.94	D	41	101
	SB R	0.13	A	2	37	0.08	A	2	24
	Overall	**LOS F**				**LOS F**			
3: Joyce Street/ Euclid Avenue	EB LTR	1.02	F	137	32	0.94	E	77	69
	WB LTR	0.94	F	112	36	0.94	F	83	32
	NB LTR	0.83	B	16	54	0.85	C	22	50
	SB LTR	0.77	B	16	129	0.78	B	16	227
	Overall	**LOS C**				**LOS C**			
4: McHardy Street/ Eucild Avenue	EB L	0.02	A	8	1	0.02	A	8	1
	EB T	-	A	0	0	-	A	0	0
	WB TR	-	A	0	0	-	A	0	0
	SB LR	0.10	B	11	2	0.10	B	11	2
	Overall	**LOS A**				**LOS A**			
5: McHardy Street/ Clive Avenue	EB L	0.00	A	7	0	0.00	A	7	0
	EB TR	-	A	0	0	-	A	0	0
	WB L	0.01	A	8	0	0.02	A	7	0
	WB TR	-	A	0	0	-	A	0	0
	NB LTR	0.08	A	10	2	0.07	A	10	2
	SB LTR	0.04	B	10	1	0.15	B	11	2
	Overall	**LOS A**				**LOS A**			
6: McHardy Street/ Vanness Avenue	EB TR	-	A	0	0	-	A	0	0
	WB L	0.03	A	8	1	0.03	A	8	1
	WB T	-	A	0	0	-	A	0	0
	NB LR	0.04	A	10	1	0.04	A	10	1
	Overall	**LOS A**				**LOS A**			

Figure 10: Background Weekday Traffic Volumes (2034)



4.4 POST-DEVELOPMENT TRAFFIC CONDITIONS

4.4.1 2024 (OPENING YEAR)

Post-development weekday AM and PM traffic conditions for 2024 are summarized in **Table 7**, and peak hour volumes are shown in **Figure 11**. The following outlines the key results:

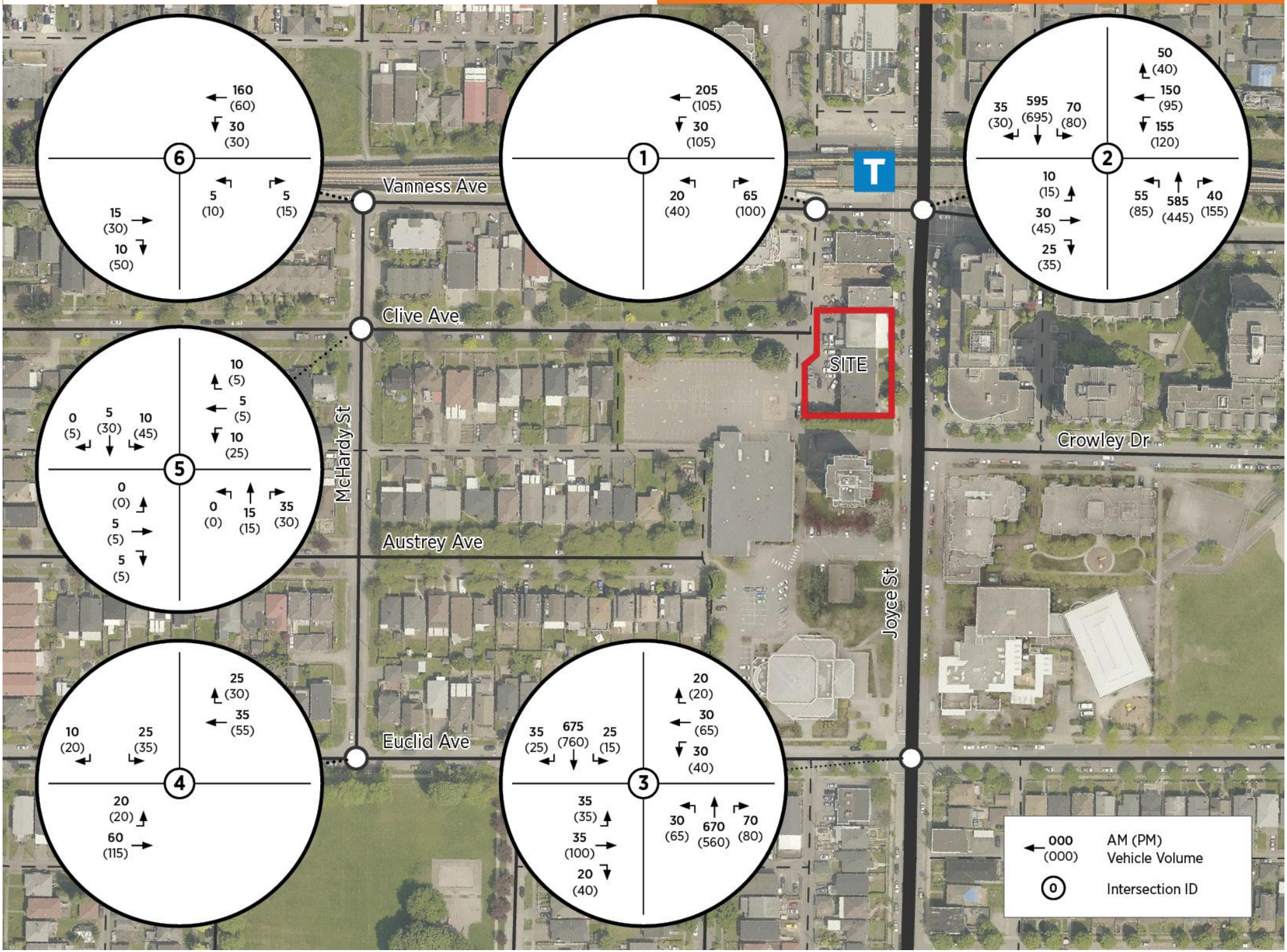
- Joyce Street/Vanness Avenue is forecasted to operate at the same overall intersection LOS F as the 2024 background conditions.
    - The majority of individual movements generally operate at the same LOS during peak hours as the background. The LOS for the southbound through, northbound left, and the eastbound movements drop, but remain at an acceptable LOS.
    - The northbound left-turn storage length will need to be extended to 65 m to accommodate the projected PM peak hour 95th percentile queue length (63 m) due to development traffic if extended to 55 m based on 2024 background conditions.
    - The southbound left-turn storage length will need to be extended to 70 m to accommodate the projected PM peak hour 95th percentile queue length (67 m) due to development traffic if extended to 50 m based on 2024 background conditions.
- Joyce Street/Euclid Avenue is forecasted to operate at the same overall intersection LOS C during the weekday AM and PM peak hour.
    - The northbound movement for Joyce Street drops from LOS B to LOS C during the PM peak hour, while the other movements remain at LOS B as background conditions.
    - Euclid Avenue remains at LOS F during the AM peak hour. The westbound movement drops from LOS E to LOS F during the PM peak hour, while the eastbound movement remains at LOS E.
- For the unsignalized intersections, all movements are forecast to operate at LOS C or better during both the weekday AM and PM peak hours, remaining at an acceptable LOS.

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TABLE 6: POST-DEVELOPMENT WEEKDAY TRAFFIC CONDITIONS (2024)

Intersection	Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)	V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)
1: Lane/ Vanness Avenue	WB L	0.06	A	8	1	0.09	A	8	1
	WB T	-	A	0	0	-	A	0	0
	NB LR	0.17	B	10	2	0.41	C	16	4
	Overall	**LOS A**				**LOS A**			
2: Joyce Street/ Vanness Avenue	EB LTR	0.28	B	17	19	0.43	C	22	28
	WB LTR	1.83	F	407	64	1.63	F	327	58
	NB L	0.50	C	22	49	0.66	C	33	63
	NB TR	1.00	E	55	141	1.16	F	111	130
	SB L	0.65	C	27	39	0.74	C	34	67
	SB T	0.98	D	50	99	1.04	E	66	105
	SB R	0.14	A	3	12	0.08	A	2	30
	Overall	**LOS F**				**LOS F**			
3: Joyce Street/ Euclid Avenue	EB LTR	1.08	F	153	52	1.07	F	110	47
	WB LTR	1.09	F	153	37	1.09	F	123	34
	NB LTR	0.91	C	24	53	0.95	D	36	51
	SB LTR	0.87	C	26	95	0.86	C	22	177
	Overall	**LOS D**				**LOS D**			
4: McHardy Street/ Eucild Avenue	EB L	0.02	A	8	1	0.03	A	8	1
	EB T	-	A	0	0	-	A	0	0
	WB TR	-	A	0	0	-	A	0	0
	SB LR	0.11	B	11	2	0.12	B	11	2
	Overall	**LOS A**				**LOS A**			
5: McHardy Street/ Clive Avenue	EB L	0.00	A	7	0	0.00	A	7	0
	EB TR	-	A	0	0	-	A	0	0
	WB L	0.01	A	8	0	0.02	A	7	0
	WB TR	-	A	0	0	-	A	0	0
	NB LTR	0.09	A	10	2	0.08	A	10	2
	SB LTR	0.05	B	10	1	0.15	B	11	2
	Overall	**LOS A**				**LOS A**			
6: McHardy Street/ Vanness Avenue	EB TR	-	A	-	0	-	A	0	0
	WB L	0.04	A	8	1	0.04	A	8	1
	WB T	-	A	0	0	-	A	0	0
	NB LR	0.05	B	11	2	0.05	A	10	1
	Overall	**LOS A**				**LOS A**			

Figure 11: Post-Development Weekday Traffic Volumes (2024)



4.4.2 2034 CONDITIONS (10-YEAR HORIZON)

Background weekday AM and PM traffic conditions for 2034 are summarized in **Table 8**, and peak hour volumes are shown in **Figure 12**. The following outlines the key results:

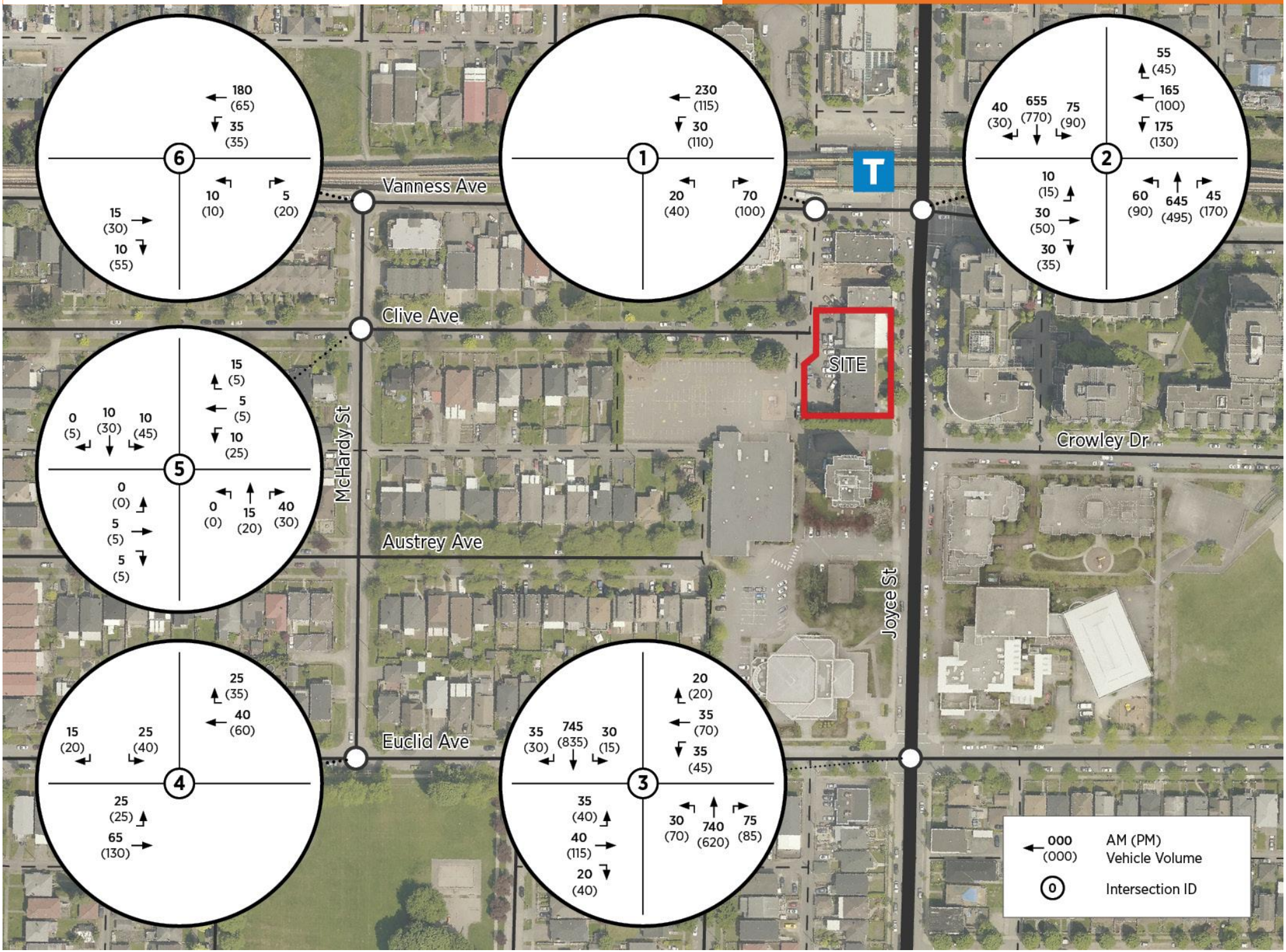
- Joyce Street/Vanness Avenue is forecasted to operate at the same overall intersection LOS F as the 2034 background conditions.
    - Individual movements continue to operate the same or similarly as the background, with the westbound and northbound through movements operating at LOS E or F during the AM and PM peak hours, and the southbound through operating at LOS E during the PM peak hour.
    - The northbound left-turn storage length will need to be extended to 70 m to accommodate the projected PM peak hour 95th percentile queue length (66 m) due to development traffic if extended to 60 m based on 2034 background conditions.
    - The southbound left-turn storage length will need to be extended to 85 m to accommodate the projected PM peak hour 95th percentile queue length (81 m) due to development traffic if extended to 75 m based on 2034 background conditions.
- Joyce Street/Euclid Avenue is forecasted to continue to operate at the same overall intersection LOS C during the weekday AM and PM peak hour.
    - Northbound on Joyce Street drops to LOS D during the PM peak hour.
    - Euclid Avenue continues to operate at LOS F for both peak hours.
- For the unsignalized intersections, all movements are forecast to operate at LOS C or better during both the weekday AM and PM peak hours.

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TABLE 7: POST-DEVELOPMENT WEEKDAY TRAFFIC CONDITIONS (2034)

Intersection	Movement	Weekday AM Peak Hour					Weekday PM Peak Hour				
		Vol (veh)	V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)	Vol (veh)	V/C Ratio	LOS	Delay (s/veh)	Queue 95th (m)
1: Lane/ Vanness Avenue	WB L	10	0.06	A	8	1	45	0.09	A	8	1
	WB T	230	-	A	0	0	115	-	A	0	0
	NB LR	35	0.17	B	10	2	50	0.41	C	16	4
	Overall	**LOS A**					**LOS A**				
2: Joyce Street/ Vanness Avenue	EB LTR	30	0.28	B	17	18	35	0.43	C	22	29
	WB LTR	385	1.83	F	407	64	245	1.63	F	327	66
	NB L	50	0.50	C	22	62	65	0.66	C	33	66
	NB TR	690	1.00	E	55	166	665	1.16	F	111	169
	SB L	75	0.65	C	27	57	90	0.74	C	34	81
	SB T	655	0.98	D	50	99	770	1.04	E	66	92
	SB R	35	0.14	A	3	24	20	0.08	A	2	30
	Overall	**LOS F**					**LOS F**				
3: Joyce Street/ Euclid Avenue	EB LTR	90	1.08	F	153	46	185	1.07	F	110	67
	WB LTR	90	1.09	F	153	35	135	1.09	F	123	43
	NB LTR	830	0.91	C	24	57	740	0.95	D	36	53
	SB LTR	795	0.87	C	26	222	855	0.86	C	22	224
	Overall	**LOS D**					**LOS D**				
4: McHardy Street/ Eucild Avenue	EB L	25	0.02	A	8	1	25	0.03	A	8	1
	EB T	65	-	A	0	0	130	-	A	0	0
	WB TR	60	-	A	0	0	85	-	A	0	0
	SB LR	35	0.11	B	11	2	50	0.12	B	11	2
	Overall	**LOS A**					**LOS A**				
5: McHardy Street/ Clive Avenue	EB L	0	0.00	A	7	0	0	0.00	A	7	0
	EB TR	5	-	A	0	0	0	-	A	0	0
	WB L	5	0.01	A	8	0	15	0.02	A	7	0
	WB TR	15	-	A	0	0	5	-	A	0	0
	NB LTR	50	0.09	A	10	2	40	0.08	A	10	2
	SB LTR	15	0.05	B	10	1	50	0.15	B	11	2
	Overall	**LOS A**					**LOS A**				
6: McHardy Street/ Vanness Avenue	EB TR	20	-	A	-	0	60	-	A	0	0
	WB L	35	0.04	A	8	1	35	0.04	A	8	1
	WB T	180	-	A	0	0	65	-	A	0	0
	NB LR	15	0.05	B	11	2	30	0.05	A	10	1
	Overall	**LOS A**					**LOS A**				

Figure 12: Post-Development Weekday Traffic Volumes (2034)



4.5 POST-DEVELOPMENT MITIGATION MEASURES

No improvements are required for the unsignalized intersections due to the development. At Joyce Street/Vanness Avenue, the following left-turn storage extensions are recommended:

- Northbound left-turn storage length extended to 70 m in 2034 (extension of 10 m beyond the required storage of 60 m due to background conditions).
- Southbound left-turn storage length extended to 85 m in 2034 (extension of 10 m beyond the required storage of 75 m due to background conditions).

At Joyce Street/Euclid Avenue, the following left-turn storage extensions are recommended if fully signalized based on the findings of the traffic signal warrant in 2020:

- Northbound left-turn storage extended to 35 m to accommodate both background and post-development conditions in 2034.
- Southbound left-turn storage extended to 35 m to accommodate post-development conditions in 2034 (extension of 15 m beyond the required storage of 20 m due to background conditions).

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5.0 ACCESS AND CIRCULATION REVIEW

5.1 SITE ACCESS

5.1.1 VEHICLE ACCESS

The location of the access, off of the laneway by Clive Avenue and Vanness Avenue on the east side of the property, is appropriate based on TAC guidelines. The intersection will operate as a left-in/right-out configuration as the laneway terminates at the south end of the property.

A review of the sight distances at the proposed access found sightlines for passenger vehicles were satisfied based on TAC guidelines. Since departing vehicles from the driveway will not to observe vehicles approaching from the left side, the required turning sight distance of 40 m (to the left) is not applicable. The stopping sight distance of 20 m (design speed of 20 km/h) is exceeded for vehicles approaching behind to be able to stop for a vehicle making a left-turn from the laneway into the driveway. Therefore, sight distances are not an issue at the site access.

5.1.2 LOADING ACCESS

Three Class B loading spaces (SU-9 design vehicle) are proposed at the rear of the site off of the laneway. No issues are anticipated with the design.

5.1.3 PEDESTRIAN AND BICYCLE ACCESS

Pedestrian access is proposed on the Joyce Street frontage of the site, with separate entrances for the proposed residential, library, and retail uses. Bicycle access to the short-term Class B bicycle spaces is proposed on the Joyce Street frontage. Access to the long-term Class A bicycle spaces will be available through the following options:

- Separated ramp from vehicles to the underground parking on P1; and
- At-grade bicycle room by the laneway.

No issues are anticipated with the design. The laneway's low vehicular volumes allow for bicycles and vehicles to share the laneway and not create any issues.

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5.2 NEIGHBOURHOOD CIRCULATION

For site traffic originating and destined to the south (Kingsway), a portion of vehicles are expected to divert into the surrounding neighbourhood via Clive Avenue, McHardy Street, and Euclid Avenue due to the existing and forecast congestion on Joyce Street. Euclid Avenue is already currently traffic calmed with a posted 30 km/h speed limit and speed humps. The additional traffic volumes due to the development relatively low, so no additional mitigation measures are required to calm traffic in the neighbourhood.

6.0 SUSTAINABLE TRANSPORTATION REVIEW

6.1 PEDESTRIAN AND CYCLING NETWORK

There are no gaps in the pedestrian and cycling network continuity, and no impacts to the adjacent pedestrian and cycling network are anticipated due to the development.

6.2 TRANSIT NETWORK

A transit bus stop (Bay 1 of the Joyce-Collingwood Station) is located by the on Joyce Street immediately north of the site. There are no expected impacts to this bus stop due to the development and mitigation measures required for transit.

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7.0 CONCLUSION

Traffic operational analysis was conducted to evaluate existing (2020) and opening day (2024) and 10-year horizon (2034) traffic conditions of the adjacent road network with and without the proposed development.

There are multiple movements that operate at a LOS F at Vanness Avenue and Euclid Avenue in the existing 2020 conditions. However, the only movement that requires mitigation is the northbound left-turn at Joyce Street/Vanness Avenue that needs to be extended to 50 m. Signal warrants were reviewed for the intersection of Joyce Street/Euclid Avenue to determine if the existing pedestrian signal should be upgraded to a full signal based on existing traffic volumes and operations. The results of the warrant analysis were that a full traffic signal is warranted based on existing conditions. This signal should be upgraded to a full signal by the City of Vancouver. Sufficient right-of-way is available to add separate left turn lanes on Joyce Street with the new signal; however, curbs may need to be relocated.

As background traffic increases, the northbound left-turn will need to be extended to 60 m, and the southbound left-turn extended to 75 m at Joyce Street/Vanness Avenue. With the addition of the development traffic, operations generally remain similar to the background. However, the northbound left-turn at Joyce Street/Vanness Avenue should be extended to 70 m from 60 m in the background, and the southbound left-turn extended to 85 m from 75 m in the background. The proposed library use (Vancouver Public Library's Collingwood Branch) is forecast to generate the majority (56%) of site trips during the PM peak hour.

The proposed vehicular access off the laneway will operate at an acceptable LOS and is appropriately located on the lowest classified roadway. A review of the sight distances at the driveway found that it exceeds the TAC guidelines for a 20 km/h design speed. The pedestrian, bicycle and transit network does not require any mitigation and/or improvements due to the development. The site is can easily be accessed by all modes of transportation.

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8.0 RECOMMENDATIONS

It is recommended the City of Vancouver:

1. Upgrade Joyce Street/Euclid Avenue to a full signal with a 35 m northbound left-turn lane and a 35 m southbound left-turn lane in 2020.
2. For Joyce Street/Vanness Avenue, extend the existing northbound left-turn lane to 60 m, and the southbound left-turn lane to 75 m.

It is recommended the developer:

3. For Joyce Street/Euclid Avenue, contribute to extending the southbound left-turn lane to 35 m.
4. For Joyce Street/Vanness Avenue, extend the northbound left-turn lane to 70 m, and the southbound left-turn lane to 85 m.

The extension of the left-turn lanes should be done in conjunction with the City works.

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APPENDIX A

Synchro Background Information & Measures of Effectiveness

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Four measures of effectiveness were used to describe and evaluate traffic operations of the study intersections in this study:

- **Level of Service (LOS)** is a qualitative measure used to describe a roadway's operational condition based on factors such as speed, travel time, delay, and traffic control. It is a stratification based on six letter grades, ranging from the LOS A (excellent conditions with minimal or no delay) to LOS F (poor conditions with extensive delay). The table below summarizes the criteria.
- **Volume/capacity (V/C) ratio** is the ratio between the demand volume and the capacity of the roadway. A V/C ratio that exceeds 1.00 indicates more vehicles are using the roadway than can be accommodated, resulting in a congested intersection with delays. A ratio of less than 0.90 is desirable in urban settings.
- **Total delay** (seconds per vehicle) is the total additional travel time for a vehicle due to all delay components, including traffic control, queuing, etc.
- **95th percentile queue length** (meters) is the maximum length of the queue that has a probability of 5% or less of being exceeded during the peak hour.

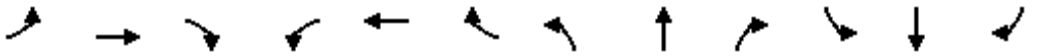
Level of Service (LOS)	Average Control Delay (seconds per vehicle)	
	Signalized	Unsignalized
A	Less than or equal to 10	Less than or equal to 10
B	>10 to 20	>10 to 15
C	>20 to 35	>15 to 25
D	>35 to 55	>25 to 35
E	>55 to 80	>35 to 50
F	More than 80	More than 50

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APPENDIX B

Synchro Reports

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	8	12	151	135	46	43	563	38	67	571	29
Future Volume (vph)	5	8	12	151	135	46	43	563	38	67	571	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.83			0.81			0.96				0.55
Frt		0.946			0.979			0.989				0.850
Flt Protected		0.985			0.979		0.950			0.950		
Satd. Flow (prot)	0	1458	0	0	1366	0	1123	1642	0	1623	1740	1566
Flt Permitted		0.878			0.840		0.174			0.197		
Satd. Flow (perm)	0	1236	0	0	1020	0	206	1642	0	336	1740	866
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			12			7				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	269		180	180		269	207		258	258		207
Peak Hour Factor	0.42	0.67	0.75	0.74	0.71	0.63	0.84	0.92	0.77	0.54	0.79	0.61
Heavy Vehicles (%)	2%	2%	8%	26%	15%	29%	59%	9%	7%	10%	8%	2%
Adj. Flow (vph)	12	12	16	204	190	73	51	612	49	124	723	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	467	0	51	661	0	124	723	48
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.1			23.1		42.8	37.1		43.6	39.1	39.1
Actuated g/C Ratio		0.30			0.30		0.55	0.48		0.56	0.50	0.50
v/c Ratio		0.11			1.51		0.28	0.84		0.43	0.83	0.10
Control Delay		15.5			270.8		10.9	30.7		12.0	28.6	1.7
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		15.5			270.8		10.9	30.7		12.0	28.6	1.7
LOS		B			F		B	C		B	C	A
Approach Delay		15.5			270.8			29.3			24.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			F			C			C	
Queue Length 50th (m)		2.6			~100.1		2.9	84.3		7.3	95.4	0.0
Queue Length 95th (m)		6.5			#111.2		6.6	#148.8		7.9	#116.3	0.0
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		376			309		184	785		287	871	474
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.11			1.51		0.28	0.84		0.43	0.83	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 78			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.51			
Intersection Signal Delay: 80.5		Intersection LOS: F	
Intersection Capacity Utilization 74.4%		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: 2: Joyce Street & Vanness Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	35	15	29	30	19	23	635	66	24	633	32
Future Volume (vph)	32	35	15	29	30	19	23	635	66	24	633	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.89			0.99			0.99	
Frt		0.980			0.954			0.982			0.991	
Flt Protected		0.980			0.983			0.998			0.997	
Satd. Flow (prot)	0	1558	0	0	1328	0	0	1690	0	0	1662	0
Flt Permitted		0.708			0.772			0.943			0.911	
Satd. Flow (perm)	0	1062	0	0	1030	0	0	1595	0	0	1518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			15			19			9	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	61		16	16		61	152		94	94		152
Confl. Bikes (#/hr)			6			11			1			
Peak Hour Factor	0.60	0.58	0.75	0.64	0.71	0.42	0.63	0.79	0.52	0.55	0.83	0.56
Heavy Vehicles (%)	2%	2%	7%	2%	2%	20%	2%	9%	2%	2%	12%	2%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	53	60	20	45	42	45	37	804	127	44	763	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	133	0	0	132	0	0	968	0	0	864	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (%)	16.4%	16.4%		16.4%	16.4%		83.6%	83.6%		83.6%	83.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			111.0			111.0	
Actuated g/C Ratio		0.13			0.13			0.79			0.79	
v/c Ratio		0.92			0.89			0.76			0.72	
Control Delay		114.3			101.1			12.5			11.1	
Queue Delay		0.0			0.0			0.0			1.8	
Total Delay		114.3			101.1			12.5			12.8	
LOS		F			F			B			B	
Approach Delay		114.3			101.1			12.5			12.8	
Approach LOS		F			F			B			B	
Queue Length 50th (m)		35.2			32.1			115.3			95.1	
Queue Length 95th (m)		35.2			#45.9			116.0			110.7	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		144			149			1268			1205	
Starvation Cap Reductn		0			0			0			188	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.92			0.89			0.76			0.85	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 140			
Control Type: Pretimed			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 24.6		Intersection LOS: C	
Intersection Capacity Utilization 71.1%		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: 3: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	13.0	62.4	65.4	114.8	36.9	83.1	15.4
Average Queue (m)	2.6	49.1	14.0	73.7	10.9	49.6	3.6
95th Queue (m)	9.0	71.5	37.1	113.4	24.1	81.0	11.2
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)		44				2	
Queuing Penalty (veh)		0				0	
Storage Bay Dist (m)			36.0		35.0		15.0
Storage Blk Time (%)			0	22	0	30	0
Queuing Penalty (veh)			0	9	1	23	1

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	52.2	41.6	53.2	100.7
Average Queue (m)	20.9	15.1	37.0	48.1
95th Queue (m)	39.5	32.5	53.7	94.0
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		0	13	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 34

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	9	198	4	25
Future Vol, veh/h	0	0	9	198	4	25
Conflicting Peds, #/hr	0	20	20	0	14	22
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	38	69	75	64
Heavy Vehicles, %	2	2	33	25	2	6
Mvmt Flow	0	0	24	287	5	39

Major/Minor	Major2		Minor1	
Conflicting Flow All	20	0	368	42
Stage 1	-	-	20	-
Stage 2	-	-	348	-
Critical Hdwy	4.43	-	6.42	6.26
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.42	-
Follow-up Hdwy	2.497	-	3.518	3.354
Pot Cap-1 Maneuver	1416	-	632	1017
Stage 1	-	-	-	-
Stage 2	-	-	715	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1390	-	608	981
Mov Cap-2 Maneuver	-	-	608	-
Stage 1	-	-	-	-
Stage 2	-	-	700	-

Approach	WB	NB
HCM Control Delay, s	0.6	9.1
HCM LOS		A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	914	1390	-
HCM Lane V/C Ratio	0.049	0.017	-
HCM Control Delay (s)	9.1	7.6	0
HCM Lane LOS	A	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	58	35	19	19	12
Future Vol, veh/h	20	58	35	19	19	12
Conflicting Peds, #/hr	32	0	0	32	20	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	75	85	54	50	44	75
Heavy Vehicles, %	8	2	2	2	2	2
Mvmt Flow	27	68	65	38	43	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	135	0	-	0	258	124
Stage 1	-	-	-	-	116	-
Stage 2	-	-	-	-	142	-
Critical Hdwy	4.18	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.272	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1413	-	-	-	731	927
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1403	-	-	-	678	896
Mov Cap-2 Maneuver	-	-	-	-	678	-
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	844	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1403	-	-	-	726
HCM Lane V/C Ratio	0.019	-	-	-	0.082
HCM Control Delay (s)	7.6	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	3	1	4	1	11	0	13	29	5	7	1
Future Vol, veh/h	0	3	1	4	1	11	0	13	29	5	7	1
Conflicting Peds, #/hr	10	0	8	8	0	10	8	0	78	78	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	25	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	12	4	5	4	26	0	14	39	7	8	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	40	0	0	24	0	0	63	73	100	156	62	35
Stage 1	-	-	-	-	-	-	22	22	-	38	38	-
Stage 2	-	-	-	-	-	-	41	51	-	118	24	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1570	-	-	1591	-	-	932	817	956	810	829	1038
Stage 1	-	-	-	-	-	-	996	877	-	977	863	-
Stage 2	-	-	-	-	-	-	974	852	-	887	875	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1559	-	-	1486	-	-	909	802	887	706	814	1022
Mov Cap-2 Maneuver	-	-	-	-	-	-	909	802	-	706	814	-
Stage 1	-	-	-	-	-	-	989	871	-	969	853	-
Stage 2	-	-	-	-	-	-	954	842	-	780	869	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.1	9.4	9.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	863	1559	-	-	1486	-	-	785
HCM Lane V/C Ratio	0.061	-	-	-	0.004	-	-	0.021
HCM Control Delay (s)	9.4	0	-	-	7.4	0	-	9.7
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	15	3	31	156	7	5
Future Vol, veh/h	15	3	31	156	7	5
Conflicting Peds, #/hr	0	30	30	0	4	44
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	55	50	63	69	63	25
Heavy Vehicles, %	9	50	2	2	2	2
Mvmt Flow	27	6	49	226	11	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	63	0	388	104
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	328	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1540	-	616	951
Stage 1	-	-	-	-	963	-
Stage 2	-	-	-	-	730	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1483	-	576	892
Mov Cap-2 Maneuver	-	-	-	-	576	-
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	700	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	746	-	-	1483	-
HCM Lane V/C Ratio	0.042	-	-	0.033	-
HCM Control Delay (s)	10	-	-	7.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Lanes, Volumes, Timings
2: Joyce Street & Vanness Avenue

03-25-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	16	10	114	63	38	58	430	147	78	669	17
Future Volume (vph)	6	16	10	114	63	38	58	430	147	78	669	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.79			0.66			0.93				0.90
Frt		0.958			0.973			0.959				0.850
Flt Protected		0.989			0.973		0.950			0.950		
Satd. Flow (prot)	0	1464	0	0	1367	0	1312	1605	0	1750	1807	1566
Flt Permitted		0.911			0.799		0.106			0.106		
Satd. Flow (perm)	0	1274	0	0	825	0	146	1605	0	195	1807	1415
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			16			31				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	287		330	330		287	37		115	115		37
Confl. Bikes (#/hr)						4						
Peak Hour Factor	0.50	0.67	0.63	0.61	0.76	0.56	0.81	0.77	0.71	0.55	0.84	0.55
Heavy Vehicles (%)	2%	2%	2%	18%	2%	31%	36%	5%	3%	2%	4%	2%
Adj. Flow (vph)	12	24	16	187	83	68	72	558	207	142	796	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	0	0	338	0	72	765	0	142	796	31
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.0			23.0		43.9	37.0		44.8	39.0	39.0
Actuated g/C Ratio		0.29			0.29		0.55	0.46		0.56	0.49	0.49
v/c Ratio		0.14			1.36		0.44	1.01		0.63	0.90	0.04
Control Delay		17.2			213.9		16.7	58.0		24.3	36.2	0.1
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		17.2			213.9		16.7	58.0		24.3	36.2	0.1
LOS		B			F		B	E		C	D	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		17.2			213.9			54.5			33.3	
Approach LOS		B			F			D			C	
Queue Length 50th (m)		3.9			~66.6		4.2	~109.4		8.4	109.9	0.0
Queue Length 95th (m)		8.1			#90.3		8.3	#138.6		8.9	#162.3	0.0
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		377			248		167	758		225	880	731
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.14			1.36		0.43	1.01		0.63	0.90	0.04

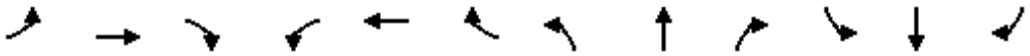
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.36			
Intersection Signal Delay: 68.8		Intersection LOS: E	
Intersection Capacity Utilization 71.2%		ICU Level of Service C	
Analysis 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: 2: Joyce Street & Vanness Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	98	27	39	62	19	51	516	75	15	706	25
Future Volume (vph)	36	98	27	39	62	19	51	516	75	15	706	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.95			0.95			0.99			1.00	
Frt		0.977			0.984			0.982			0.995	
Flt Protected		0.988			0.985			0.995			0.999	
Satd. Flow (prot)	0	1536	0	0	1565	0	0	1688	0	0	1727	0
Flt Permitted		0.823			0.737			0.843			0.976	
Satd. Flow (perm)	0	1244	0	0	1148	0	0	1428	0	0	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			7			19			5	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	79		48	48		79	42		111	111		42
Confl. Bikes (#/hr)			1			2			1			2
Peak Hour Factor	0.63	0.74	0.69	0.60	0.53	0.75	0.66	0.95	0.77	0.71	0.90	0.81
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	2%	9%	2%	2%	8%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	57	132	39	65	117	25	77	543	97	21	784	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	228	0	0	207	0	0	717	0	0	836	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (%)	25.6%	25.6%		25.6%	25.6%		74.4%	74.4%		74.4%	74.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			61.0			61.0	
Actuated g/C Ratio		0.21			0.21			0.68			0.68	
v/c Ratio		0.87			0.86			0.74			0.73	
Control Delay		65.0			66.3			14.8			14.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		65.0			66.3			14.8			14.0	
LOS		E			E			B			B	
Approach Delay		65.0			66.3			14.8			14.0	
Approach LOS		E			E			B			B	
Queue Length 50th (m)		36.3			33.2			66.9			79.0	
Queue Length 95th (m)		#53.6			29.6			112.4			124.3	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		263			241			973			1144	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.87			0.86			0.74			0.73	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 25.6		Intersection LOS: C	
Intersection Capacity Utilization 83.7%		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.			

Splits and Phases: 3: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	13.0	65.8	65.8	93.3	64.7	88.9	44.8
Average Queue (m)	3.9	35.4	19.6	45.6	10.6	62.0	3.7
95th Queue (m)	10.2	59.8	49.3	81.8	30.6	94.2	22.3
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)		16				6	
Queuing Penalty (veh)		0				0	
Storage Bay Dist (m)			36.0		35.0		15.0
Storage Blk Time (%)			1	11		33	0
Queuing Penalty (veh)			3	6		25	0

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	71.9	41.7	56.5	126.6
Average Queue (m)	29.6	18.1	43.4	49.6
95th Queue (m)	54.8	35.7	53.2	104.9
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		0	33	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 34

Intersection	
Int Delay, s/veh	5.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	39	99	15	32
Future Vol, veh/h	0	0	39	99	15	32
Conflicting Peds, #/hr	0	93	93	0	37	115
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	88	84	58	59
Heavy Vehicles, %	2	2	2	2	14	2
Mvmt Flow	0	0	44	118	26	54

Major/Minor	Major2		Minor1	
Conflicting Flow All	93	0	336	208
Stage 1	-	-	93	-
Stage 2	-	-	243	-
Critical Hdwy	4.12	-	6.54	6.22
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.54	-
Follow-up Hdwy	2.218	-	3.626	3.318
Pot Cap-1 Maneuver	1501	-	636	832
Stage 1	-	-	-	-
Stage 2	-	-	770	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1355	-	565	692
Mov Cap-2 Maneuver	-	-	565	-
Stage 1	-	-	-	-
Stage 2	-	-	743	-

Approach	WB	NB
HCM Control Delay, s	2.1	11.4
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	645	1355	-
HCM Lane V/C Ratio	0.124	0.033	-
HCM Control Delay (s)	11.4	7.7	0
HCM Lane LOS	B	A	A
HCM 95th %tile Q(veh)	0.4	0.1	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	111	53	20	26	18
Future Vol, veh/h	20	111	53	20	26	18
Conflicting Peds, #/hr	18	0	0	18	37	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	83	77	95	86	61
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	29	134	69	21	30	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	108	0	-	0	327	103
Stage 1	-	-	-	-	97	-
Stage 2	-	-	-	-	230	-
Critical Hdwy	4.12	-	-	-	6.44	6.22
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.218	-	-	-	3.536	3.318
Pot Cap-1 Maneuver	1483	-	-	-	663	952
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	803	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1475	-	-	-	629	933
Mov Cap-2 Maneuver	-	-	-	-	629	-
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	774	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1475	-	-	-	750
HCM Lane V/C Ratio	0.02	-	-	-	0.08
HCM Control Delay (s)	7.5	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	2	2	13	1	5	1	16	19	19	27	2
Future Vol, veh/h	1	2	2	13	1	5	1	16	19	19	27	2
Conflicting Peds, #/hr	6	0	5	5	0	6	5	0	50	50	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	50	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	50	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	8	4	17	4	12	1	17	25	25	30	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	22	0	0	17	0	0	84	74	65	134	70	21
Stage 1	-	-	-	-	-	-	17	17	-	51	51	-
Stage 2	-	-	-	-	-	-	67	57	-	83	19	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1593	-	-	1600	-	-	903	816	999	838	821	1056
Stage 1	-	-	-	-	-	-	1002	881	-	962	852	-
Stage 2	-	-	-	-	-	-	943	847	-	925	880	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1586	-	-	1532	-	-	858	799	953	758	804	1046
Mov Cap-2 Maneuver	-	-	-	-	-	-	858	799	-	758	804	-
Stage 1	-	-	-	-	-	-	997	876	-	956	838	-
Stage 2	-	-	-	-	-	-	892	833	-	845	875	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	3.8	9.3	9.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	884	1586	-	-	1532	-	-	796
HCM Lane V/C Ratio	0.049	0.001	-	-	0.011	-	-	0.075
HCM Control Delay (s)	9.3	7.3	0	-	7.4	0	-	9.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.2

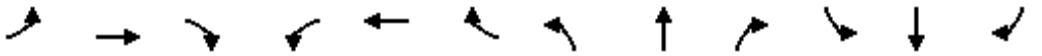
Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	27	26	31	56	9	16
Future Vol, veh/h	27	26	31	56	9	16
Conflicting Peds, #/hr	0	29	29	0	5	13
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	57	60	66	74	100	75
Heavy Vehicles, %	2	2	2	1	2	2
Mvmt Flow	47	43	47	76	9	21

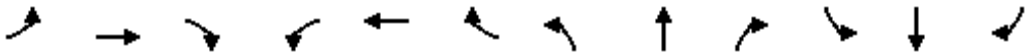
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	120	0	273	111
Stage 1	-	-	-	-	98	-
Stage 2	-	-	-	-	175	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1468	-	716	942
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1452	-	672	909
Mov Cap-2 Maneuver	-	-	-	-	672	-
Stage 1	-	-	-	-	903	-
Stage 2	-	-	-	-	822	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	823	-	-	1452	-
HCM Lane V/C Ratio	0.037	-	-	0.032	-
HCM Control Delay (s)	9.5	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	10	10	155	140	50	45	585	40	70	595	30
Future Volume (vph)	5	10	10	155	140	50	45	585	40	70	595	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.85			0.80			0.96				0.55
Frt		0.956			0.978			0.989				0.850
Flt Protected		0.985			0.979		0.950			0.950		
Satd. Flow (prot)	0	1521	0	0	1359	0	1123	1640	0	1623	1740	1566
Flt Permitted		0.874			0.842		0.149			0.176		
Satd. Flow (perm)	0	1287	0	0	1020	0	176	1640	0	301	1740	866
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			12			7				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	269		180	180		269	207		258	258		207
Peak Hour Factor	0.42	0.67	0.75	0.74	0.71	0.63	0.84	0.92	0.77	0.54	0.79	0.61
Heavy Vehicles (%)	2%	2%	8%	26%	15%	29%	59%	9%	7%	10%	8%	2%
Adj. Flow (vph)	12	15	13	209	197	79	54	636	52	130	753	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	485	0	54	688	0	130	753	49
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.1			23.1		42.8	37.1		43.6	39.1	39.1
Actuated g/C Ratio		0.30			0.30		0.55	0.48		0.56	0.50	0.50
v/c Ratio		0.10			1.57		0.32	0.88		0.48	0.86	0.10
Control Delay		16.6			295.5		12.2	34.2		13.5	31.5	1.7
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		16.6			295.5		12.2	34.2		13.5	31.5	1.7
LOS		B			F		B	C		B	C	A
Approach Delay		16.6			295.5			32.6			27.5	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			F			C			C	
Queue Length 50th (m)		3.0			~106.0		3.1	90.3		7.7	102.5	0.0
Queue Length 95th (m)		6.8			#116.4		6.8	#158.1		8.2	#136.8	0.0
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		389			309		169	784		269	871	474
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.10			1.57		0.32	0.88		0.48	0.86	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 78			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.57			
Intersection Signal Delay: 88.1		Intersection LOS: F	
Intersection Capacity Utilization 76.5%		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: 2: Joyce Street & Vanness Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	35	15	30	30	20	25	660	70	25	660	35
Future Volume (vph)	35	35	15	30	30	20	25	660	70	25	660	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.89			0.99			0.99	
Frt		0.980			0.953			0.982			0.991	
Flt Protected		0.979			0.983			0.998			0.998	
Satd. Flow (prot)	0	1557	0	0	1321	0	0	1690	0	0	1664	0
Flt Permitted		0.683			0.769			0.936			0.908	
Satd. Flow (perm)	0	1023	0	0	1021	0	0	1584	0	0	1513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			16			19			9	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	61		16	16		61	152		94	94		152
Confl. Bikes (#/hr)			6			11			1			
Peak Hour Factor	0.60	0.58	0.75	0.64	0.71	0.42	0.63	0.79	0.52	0.55	0.83	0.56
Heavy Vehicles (%)	2%	2%	7%	2%	2%	20%	2%	9%	2%	2%	12%	2%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	58	60	20	47	42	48	40	835	135	45	795	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	138	0	0	137	0	0	1010	0	0	903	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (%)	16.4%	16.4%		16.4%	16.4%		83.6%	83.6%		83.6%	83.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			111.0			111.0	
Actuated g/C Ratio		0.13			0.13			0.79			0.79	
v/c Ratio		0.99			0.93			0.80			0.75	
Control Delay		132.1			109.0			14.4			12.3	
Queue Delay		0.0			0.0			0.0			2.2	
Total Delay		132.1			109.0			14.4			14.5	
LOS		F			F			B			B	
Approach Delay		132.1			109.0			14.4			14.5	
Approach LOS		F			F			B			B	
Queue Length 50th (m)		36.9			33.4			130.5			106.0	
Queue Length 95th (m)		36.6			#48.6			129.7			123.9	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		139			148			1259			1201	
Starvation Cap Reductn		0			0			0			172	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.99			0.93			0.80			0.88	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 140			
Control Type: Pretimed			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 27.8		Intersection LOS: C	
Intersection Capacity Utilization 73.5%		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.			

Splits and Phases: 3: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	12.3	65.8	65.6	180.3	64.7	94.4	45.0
Average Queue (m)	2.8	46.6	14.6	81.1	16.7	55.2	7.2
95th Queue (m)	8.6	70.1	40.9	141.8	42.3	92.7	29.1
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)		32				4	
Queuing Penalty (veh)		0				0	
Storage Bay Dist (m)			36.0		35.0		15.0
Storage Blk Time (%)				26	0	29	0
Queuing Penalty (veh)				11	2	24	0

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	40.8	40.5	53.2	111.5
Average Queue (m)	17.7	17.0	38.2	43.9
95th Queue (m)	31.9	34.1	52.6	91.5
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		0	12	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 37

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	10	205	5	25
Future Vol, veh/h	0	0	10	205	5	25
Conflicting Peds, #/hr	0	20	20	0	14	22
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	38	69	75	64
Heavy Vehicles, %	2	2	33	25	2	6
Mvmt Flow	0	0	26	297	7	39

Major/Minor	Major2		Minor1	
Conflicting Flow All	20	0	384	42
Stage 1	-	-	20	-
Stage 2	-	-	364	-
Critical Hdwy	4.43	-	6.42	6.26
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.42	-
Follow-up Hdwy	2.497	-	3.518	3.354
Pot Cap-1 Maneuver	1416	-	619	1017
Stage 1	-	-	-	-
Stage 2	-	-	703	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1390	-	595	981
Mov Cap-2 Maneuver	-	-	595	-
Stage 1	-	-	-	-
Stage 2	-	-	688	-

Approach	WB	NB
HCM Control Delay, s	0.6	9.2
HCM LOS		A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	896	1390	-
HCM Lane V/C Ratio	0.051	0.019	-
HCM Control Delay (s)	9.2	7.6	0
HCM Lane LOS	A	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	60	35	20	20	10
Future Vol, veh/h	20	60	35	20	20	10
Conflicting Peds, #/hr	32	0	0	32	20	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	75	85	54	50	44	75
Heavy Vehicles, %	8	2	2	2	2	2
Mvmt Flow	27	71	65	40	45	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	137	0	-	0	261	125
Stage 1	-	-	-	-	117	-
Stage 2	-	-	-	-	144	-
Critical Hdwy	4.18	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.272	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1411	-	-	-	728	926
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	883	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1401	-	-	-	675	895
Mov Cap-2 Maneuver	-	-	-	-	675	-
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	842	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1401	-	-	-	715
HCM Lane V/C Ratio	0.019	-	-	-	0.082
HCM Control Delay (s)	7.6	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	5	5	5	5	10	5	15	30	5	5	5
Future Vol, veh/h	5	5	5	5	5	10	5	15	30	5	5	5
Conflicting Peds, #/hr	10	0	8	8	0	10	8	0	78	78	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	25	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	20	7	20	24	5	16	40	7	6	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	54	0	0	48	0	0	110	116	116	202	114	50
Stage 1	-	-	-	-	-	-	49	49	-	55	55	-
Stage 2	-	-	-	-	-	-	61	67	-	147	59	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1551	-	-	1559	-	-	868	774	936	756	776	1018
Stage 1	-	-	-	-	-	-	964	854	-	957	849	-
Stage 2	-	-	-	-	-	-	950	839	-	856	846	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1540	-	-	1456	-	-	838	756	868	653	758	1003
Mov Cap-2 Maneuver	-	-	-	-	-	-	838	756	-	653	758	-
Stage 1	-	-	-	-	-	-	955	846	-	946	838	-
Stage 2	-	-	-	-	-	-	923	828	-	746	838	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	1	9.7	9.6
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	833	1540	-	-	1456	-	-	808
HCM Lane V/C Ratio	0.074	0.004	-	-	0.005	-	-	0.028
HCM Control Delay (s)	9.7	7.3	0	-	7.5	0	-	9.6
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	15	5	30	160	5	5
Future Vol, veh/h	15	5	30	160	5	5
Conflicting Peds, #/hr	0	30	30	0	4	44
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	55	50	63	69	63	25
Heavy Vehicles, %	9	50	2	2	2	2
Mvmt Flow	27	10	48	232	8	20

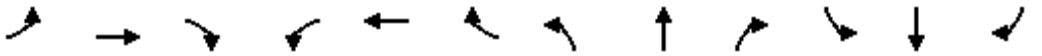
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	67	0	393	106
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	331	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1535	-	611	948
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1478	-	572	890
Mov Cap-2 Maneuver	-	-	-	-	572	-
Stage 1	-	-	-	-	937	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	769	-	-	1478	-
HCM Lane V/C Ratio	0.036	-	-	0.032	-
HCM Control Delay (s)	9.9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Lanes, Volumes, Timings
2: Joyce Street & Vanness Avenue

03-25-2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	15	10	120	65	40	60	445	155	80	695	20
Future Volume (vph)	5	15	10	120	65	40	60	445	155	80	695	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.79			0.66			0.93				0.90
Frt		0.955			0.973			0.959				0.850
Flt Protected		0.990			0.973		0.950			0.950		
Satd. Flow (prot)	0	1437	0	0	1368	0	1312	1604	0	1750	1807	1566
Flt Permitted		0.920			0.801		0.106			0.103		
Satd. Flow (perm)	0	1272	0	0	824	0	146	1604	0	190	1807	1415
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			16			32				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	287		330	330		287	37		115	115		37
Confl. Bikes (#/hr)						4						
Peak Hour Factor	0.50	0.67	0.63	0.61	0.76	0.56	0.81	0.77	0.71	0.55	0.84	0.55
Heavy Vehicles (%)	2%	2%	2%	18%	2%	31%	36%	5%	3%	2%	4%	2%
Adj. Flow (vph)	10	22	16	197	86	71	74	578	218	145	827	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	48	0	0	354	0	74	796	0	145	827	36
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.0			23.0		43.9	37.0		44.8	39.0	39.0
Actuated g/C Ratio		0.29			0.29		0.55	0.46		0.56	0.49	0.49
v/c Ratio		0.13			1.43		0.45	1.05		0.65	0.94	0.05
Control Delay		16.7			240.3		17.3	69.3		26.2	41.3	0.5
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		16.7			240.3		17.3	69.3		26.2	41.3	0.5
LOS		B			F		B	E		C	D	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		16.7			240.3			64.8			37.7	
Approach LOS		B			F			E			D	
Queue Length 50th (m)		3.5			~71.8		4.3	~129.4		8.6	117.6	0.0
Queue Length 95th (m)		7.5			#95.6		8.7	#147.6		9.1	#172.1	0.0
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		377			248		167	759		223	880	731
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.13			1.43		0.44	1.05		0.65	0.94	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.43			
Intersection Signal Delay: 79.1		Intersection LOS: E	
Intersection Capacity Utilization 73.1%		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: 2: Joyce Street & Vanness Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	100	30	40	65	20	55	535	80	15	735	25
Future Volume (vph)	35	100	30	40	65	20	55	535	80	15	735	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.95			0.95			0.99			1.00	
Frt		0.975			0.983			0.981			0.995	
Flt Protected		0.988			0.985			0.994			0.999	
Satd. Flow (prot)	0	1530	0	0	1562	0	0	1684	0	0	1727	0
Flt Permitted		0.822			0.726			0.830			0.976	
Satd. Flow (perm)	0	1240	0	0	1129	0	0	1405	0	0	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			7			20			5	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	79		48	48		79	42		111	111		42
Confl. Bikes (#/hr)			1			2			1			2
Peak Hour Factor	0.63	0.74	0.69	0.60	0.53	0.75	0.66	0.95	0.77	0.71	0.90	0.81
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	2%	9%	2%	2%	8%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	56	135	43	67	123	27	83	563	104	21	817	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	234	0	0	217	0	0	750	0	0	869	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (%)	25.6%	25.6%		25.6%	25.6%		74.4%	74.4%		74.4%	74.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			61.0			61.0	
Actuated g/C Ratio		0.21			0.21			0.68			0.68	
v/c Ratio		0.89			0.92			0.78			0.76	
Control Delay		68.6			76.6			17.1			15.1	
Queue Delay		0.0			0.0			0.0			0.1	
Total Delay		68.6			76.6			17.1			15.2	
LOS		E			E			B			B	
Approach Delay		68.6			76.6			17.1			15.2	
Approach LOS		E			E			B			B	
Queue Length 50th (m)		37.4			35.4			74.7			85.4	
Queue Length 95th (m)		#55.7			31.1			129.4			135.6	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		263			237			958			1144	
Starvation Cap Reductn		0			0			0			10	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.89			0.92			0.78			0.77	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 28.4		Intersection LOS: C	
Intersection Capacity Utilization 87.7%		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.			

Splits and Phases: 3: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	13.1	56.3	65.8	118.9	64.7	92.2	45.0
Average Queue (m)	3.5	29.8	17.9	56.8	17.5	68.6	4.6
95th Queue (m)	10.0	52.5	53.5	108.3	50.0	100.0	23.4
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)		3				8	
Queuing Penalty (veh)		0				0	
Storage Bay Dist (m)			36.0		35.0		15.0
Storage Blk Time (%)			0	18		36	0
Queuing Penalty (veh)			0	10		28	0

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	61.0	48.7	53.2	230.0
Average Queue (m)	25.9	21.8	42.5	72.7
95th Queue (m)	48.5	42.0	53.0	142.0
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		2	32	0
Queuing Penalty (veh)		0	0	1
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 40

Intersection	
Int Delay, s/veh	5.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	40	105	15	35
Future Vol, veh/h	0	0	40	105	15	35
Conflicting Peds, #/hr	0	93	93	0	37	115
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	88	84	58	59
Heavy Vehicles, %	2	2	2	2	14	2
Mvmt Flow	0	0	45	125	26	59

Major/Minor	Major2		Minor1	
Conflicting Flow All	93	0	346	208
Stage 1	-	-	93	-
Stage 2	-	-	253	-
Critical Hdwy	4.12	-	6.54	6.22
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.54	-
Follow-up Hdwy	2.218	-	3.626	3.318
Pot Cap-1 Maneuver	1501	-	627	832
Stage 1	-	-	-	-
Stage 2	-	-	762	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1355	-	557	692
Mov Cap-2 Maneuver	-	-	557	-
Stage 1	-	-	-	-
Stage 2	-	-	735	-

Approach	WB	NB
HCM Control Delay, s	2.1	11.4
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	645	1355	-
HCM Lane V/C Ratio	0.132	0.034	-
HCM Control Delay (s)	11.4	7.7	0
HCM Lane LOS	B	A	A
HCM 95th %tile Q(veh)	0.5	0.1	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	115	55	20	25	20
Future Vol, veh/h	20	115	55	20	25	20
Conflicting Peds, #/hr	18	0	0	18	37	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	83	77	95	86	61
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	29	139	71	21	29	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	110	0	-	0	334	106
Stage 1	-	-	-	-	100	-
Stage 2	-	-	-	-	234	-
Critical Hdwy	4.12	-	-	-	6.44	6.22
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.218	-	-	-	3.536	3.318
Pot Cap-1 Maneuver	1480	-	-	-	657	948
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	800	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1472	-	-	-	624	929
Mov Cap-2 Maneuver	-	-	-	-	624	-
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	771	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1472	-	-	-	755
HCM Lane V/C Ratio	0.02	-	-	-	0.082
HCM Control Delay (s)	7.5	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	5	5	15	5	5	5	15	20	20	30	5
Future Vol, veh/h	5	5	5	15	5	5	5	15	20	20	30	5
Conflicting Peds, #/hr	6	0	5	5	0	6	5	0	50	50	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	50	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	50	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	10	20	20	12	5	16	27	27	34	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	38	0	0	35	0	0	134	119	80	179	118	37
Stage 1	-	-	-	-	-	-	41	41	-	72	72	-
Stage 2	-	-	-	-	-	-	93	78	-	107	46	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1572	-	-	1576	-	-	838	771	980	783	772	1035
Stage 1	-	-	-	-	-	-	974	861	-	938	835	-
Stage 2	-	-	-	-	-	-	914	830	-	898	857	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1565	-	-	1509	-	-	784	751	935	704	752	1025
Mov Cap-2 Maneuver	-	-	-	-	-	-	784	751	-	704	752	-
Stage 1	-	-	-	-	-	-	967	855	-	930	819	-
Stage 2	-	-	-	-	-	-	852	814	-	817	851	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	2.9	9.5	10.2
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	848	1565	-	-	1509	-	-	761
HCM Lane V/C Ratio	0.057	0.003	-	-	0.013	-	-	0.092
HCM Control Delay (s)	9.5	7.3	0	-	7.4	0	-	10.2
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3

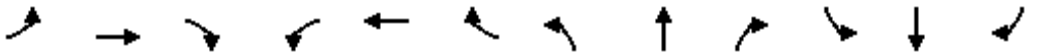
Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	25	30	60	10	15
Future Vol, veh/h	30	25	30	60	10	15
Conflicting Peds, #/hr	0	29	29	0	5	13
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	57	60	66	74	100	75
Heavy Vehicles, %	2	2	2	1	2	2
Mvmt Flow	53	42	45	81	10	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	123	0	279	115
Stage 1	-	-	-	-	102	-
Stage 2	-	-	-	-	177	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1464	-	711	937
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	854	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1448	-	668	904
Mov Cap-2 Maneuver	-	-	-	-	668	-
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	822	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	809	-	-	1448	-
HCM Lane V/C Ratio	0.037	-	-	0.031	-
HCM Control Delay (s)	9.6	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	10	15	175	155	55	50	645	45	75	655	35
Future Volume (vph)	5	10	15	175	155	55	50	645	45	75	655	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.83			0.80			0.96				0.55
Frt		0.943			0.978			0.989				0.850
Flt Protected		0.987			0.979		0.950			0.950		
Satd. Flow (prot)	0	1440	0	0	1361	0	1123	1640	0	1623	1740	1566
Flt Permitted		0.878			0.837		0.104			0.113		
Satd. Flow (perm)	0	1237	0	0	1014	0	123	1640	0	193	1740	866
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			12			7				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	269		180	180		269	207		258	258		207
Peak Hour Factor	0.42	0.67	0.75	0.74	0.71	0.63	0.84	0.92	0.77	0.54	0.79	0.61
Heavy Vehicles (%)	2%	2%	8%	26%	15%	29%	59%	9%	7%	10%	8%	2%
Adj. Flow (vph)	12	15	20	236	218	87	60	701	58	139	829	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	0	0	541	0	60	759	0	139	829	57
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.0			23.0		43.9	37.0		45.6	41.0	41.0
Actuated g/C Ratio		0.29			0.29		0.55	0.46		0.57	0.51	0.51
v/c Ratio		0.13			1.80		0.43	1.00		0.64	0.93	0.12
Control Delay		15.2			397.7		18.2	55.3		25.4	39.5	2.2
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		15.2			397.7		18.2	55.3		25.4	39.5	2.2
LOS		B			F		B	E		C	D	A
Approach Delay		15.2			397.7			52.5			35.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			F			D			D	
Queue Length 50th (m)		2.9			~124.5		3.5	107.9		8.3	~135.2	0.0
Queue Length 95th (m)		6.9			#132.9		8.3	#183.5		8.6	#159.6	0.2
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		369			300		142	762		217	891	483
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.13			1.80		0.42	1.00		0.64	0.93	0.12

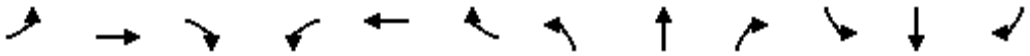
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.80			
Intersection Signal Delay: 121.4		Intersection LOS: F	
Intersection Capacity Utilization 82.1%		ICU Level of Service E	
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: 2: Joyce Street & Vanness Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	40	15	35	35	20	25	730	75	30	730	35
Future Volume (vph)	35	40	15	35	35	20	25	730	75	30	730	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.94			0.90			0.99			0.99	
Frt		0.982			0.957			0.982			0.991	
Flt Protected		0.981			0.982			0.998			0.997	
Satd. Flow (prot)	0	1566	0	0	1347	0	0	1690	0	0	1663	0
Flt Permitted		0.683			0.725			0.934			0.881	
Satd. Flow (perm)	0	1035	0	0	982	0	0	1580	0	0	1469	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			14			19			8	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	61		16	16		61	152		94	94		152
Confl. Bikes (#/hr)			6			11			1			
Peak Hour Factor	0.60	0.58	0.75	0.64	0.71	0.42	0.63	0.79	0.52	0.55	0.83	0.56
Heavy Vehicles (%)	2%	2%	7%	2%	2%	20%	2%	9%	2%	2%	12%	2%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	58	69	20	55	49	48	40	924	144	55	880	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	147	0	0	152	0	0	1108	0	0	998	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (%)	16.4%	16.4%		16.4%	16.4%		83.6%	83.6%		83.6%	83.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			111.0			111.0	
Actuated g/C Ratio		0.13			0.13			0.79			0.79	
v/c Ratio		1.04			1.08			0.88			0.86	
Control Delay		143.1			148.6			20.2			18.7	
Queue Delay		0.0			0.0			0.0			5.4	
Total Delay		143.1			148.6			20.2			24.0	
LOS		F			F			C			C	
Approach Delay		143.1			148.6			20.2			24.0	
Approach LOS		F			F			C			C	
Queue Length 50th (m)		~42.1			~42.5			174.4			147.7	
Queue Length 95th (m)		#40.4			#59.2			167.6			173.5	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		141			141			1256			1166	
Starvation Cap Reductn		0			0			0			122	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.04			1.08			0.88			0.96	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 140			
Control Type: Pretimed			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 37.4		Intersection LOS: D	
Intersection Capacity Utilization 77.7%		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: 3: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	13.8	62.4	65.8	222.1	64.8	94.4	45.0
Average Queue (m)	5.5	52.5	14.7	88.8	15.2	57.3	10.3
95th Queue (m)	12.3	63.8	37.5	183.3	44.7	94.0	37.2
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)		48				6	
Queuing Penalty (veh)		0				0	
Storage Bay Dist (m)			36.0		35.0		15.0
Storage Blk Time (%)			1	22		33	0
Queuing Penalty (veh)			4	10		30	2

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	39.6	45.8	56.2	130.1
Average Queue (m)	17.7	19.3	43.1	66.7
95th Queue (m)	32.3	35.7	53.8	129.3
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		0	17	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 47

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	10	230	5	30
Future Vol, veh/h	0	0	10	230	5	30
Conflicting Peds, #/hr	0	20	20	0	14	22
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	38	69	75	64
Heavy Vehicles, %	2	2	33	25	2	6
Mvmt Flow	0	0	26	333	7	47

Major/Minor	Major2		Minor1	
Conflicting Flow All	20	0	420	42
Stage 1	-	-	20	-
Stage 2	-	-	400	-
Critical Hdwy	4.43	-	6.42	6.26
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.42	-
Follow-up Hdwy	2.497	-	3.518	3.354
Pot Cap-1 Maneuver	1416	-	590	1017
Stage 1	-	-	-	-
Stage 2	-	-	677	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1390	-	567	981
Mov Cap-2 Maneuver	-	-	567	-
Stage 1	-	-	-	-
Stage 2	-	-	661	-

Approach	WB	NB
HCM Control Delay, s	0.6	9.3
HCM LOS		A

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	899	1390	-
HCM Lane V/C Ratio	0.06	0.019	-
HCM Control Delay (s)	9.3	7.6	0
HCM Lane LOS	A	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	65	40	20	20	15
Future Vol, veh/h	25	65	40	20	20	15
Conflicting Peds, #/hr	32	0	0	32	20	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	75	85	54	50	44	75
Heavy Vehicles, %	8	2	2	2	2	2
Mvmt Flow	33	76	74	40	45	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	146	0	-	0	289	134
Stage 1	-	-	-	-	126	-
Stage 2	-	-	-	-	163	-
Critical Hdwy	4.18	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.272	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1400	-	-	-	702	915
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	866	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1391	-	-	-	648	884
Mov Cap-2 Maneuver	-	-	-	-	648	-
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	821	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1391	-	-	-	706
HCM Lane V/C Ratio	0.024	-	-	-	0.093
HCM Control Delay (s)	7.7	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	5	5	5	5	15	5	15	35	5	10	5
Future Vol, veh/h	5	5	5	5	5	15	5	15	35	5	10	5
Conflicting Peds, #/hr	10	0	8	8	0	10	8	0	78	78	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	25	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	20	7	20	36	5	16	47	7	11	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	66	0	0	48	0	0	119	128	116	211	120	56
Stage 1	-	-	-	-	-	-	49	49	-	61	61	-
Stage 2	-	-	-	-	-	-	70	79	-	150	59	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1536	-	-	1559	-	-	857	763	936	746	770	1011
Stage 1	-	-	-	-	-	-	964	854	-	950	844	-
Stage 2	-	-	-	-	-	-	940	829	-	853	846	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1526	-	-	1456	-	-	822	745	868	639	752	996
Mov Cap-2 Maneuver	-	-	-	-	-	-	822	745	-	639	752	-
Stage 1	-	-	-	-	-	-	955	846	-	939	833	-
Stage 2	-	-	-	-	-	-	907	818	-	737	838	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.8	9.7	9.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	832	1526	-	-	1456	-	-	788
HCM Lane V/C Ratio	0.082	0.004	-	-	0.005	-	-	0.035
HCM Control Delay (s)	9.7	7.4	0	-	7.5	0	-	9.7
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	15	5	35	180	10	5
Future Vol, veh/h	15	5	35	180	10	5
Conflicting Peds, #/hr	0	30	30	0	4	44
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	55	50	63	69	63	25
Heavy Vehicles, %	9	50	2	2	2	2
Mvmt Flow	27	10	56	261	16	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	67	0	438	106
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	376	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1535	-	576	948
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1478	-	535	890
Mov Cap-2 Maneuver	-	-	-	-	535	-
Stage 1	-	-	-	-	937	-
Stage 2	-	-	-	-	661	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	688	-	-	1478	-
HCM Lane V/C Ratio	0.052	-	-	0.038	-
HCM Control Delay (s)	10.5	-	-	7.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lanes, Volumes, Timings
2: Joyce Street & Vanness Avenue

03-25-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	20	10	130	70	45	65	495	170	90	770	20
Future Volume (vph)	5	20	10	130	70	45	65	495	170	90	770	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.82			0.66			0.93				0.90
Frt		0.961			0.972			0.959				0.850
Flt Protected		0.991			0.973		0.950			0.950		
Satd. Flow (prot)	0	1491	0	0	1359	0	1312	1605	0	1750	1807	1566
Flt Permitted		0.933			0.797		0.106			0.103		
Satd. Flow (perm)	0	1351	0	0	820	0	146	1605	0	190	1807	1415
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			17			31				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	287		330	330		287	37		115	115		37
Confl. Bikes (#/hr)						4						
Peak Hour Factor	0.50	0.67	0.63	0.61	0.76	0.56	0.81	0.77	0.71	0.55	0.84	0.55
Heavy Vehicles (%)	2%	2%	2%	18%	2%	31%	36%	5%	3%	2%	4%	2%
Adj. Flow (vph)	10	30	16	213	92	80	80	643	239	164	917	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	56	0	0	385	0	80	882	0	164	917	36
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.0			23.0		43.9	37.0		44.8	39.0	39.0
Actuated g/C Ratio		0.29			0.29		0.55	0.46		0.56	0.49	0.49
v/c Ratio		0.14			1.56		0.48	1.16		0.74	1.04	0.05
Control Delay		17.5			295.2		19.2	110.9		33.7	65.7	0.5
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		17.5			295.2		19.2	110.9		33.7	65.7	0.5
LOS		B			F		B	F		C	E	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		17.5			295.2			103.3			58.9	
Approach LOS		B			F			F			E	
Queue Length 50th (m)		4.4			~81.8		4.6	~157.5		9.8	~158.2	0.0
Queue Length 95th (m)		8.7			#105.6		9.9	#173.7		10.1	#200.6	0.0
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		399			247		167	758		223	880	731
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.14			1.56		0.48	1.16		0.74	1.04	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.56			
Intersection Signal Delay: 111.0		Intersection LOS: F	
Intersection Capacity Utilization 78.2%		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: 2: Joyce Street & Vanness Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	115	30	45	70	20	60	595	85	15	810	30
Future Volume (vph)	40	115	30	45	70	20	60	595	85	15	810	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.95			0.96			0.99			1.00	
Frt		0.978			0.984			0.982			0.995	
Flt Protected		0.988			0.984			0.995			0.999	
Satd. Flow (prot)	0	1538	0	0	1565	0	0	1688	0	0	1727	0
Flt Permitted		0.799			0.675			0.817			0.976	
Satd. Flow (perm)	0	1214	0	0	1054	0	0	1385	0	0	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			7			19			5	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	79		48	48		79	42		111	111		42
Confl. Bikes (#/hr)			1			2			1			2
Peak Hour Factor	0.63	0.74	0.69	0.60	0.53	0.75	0.66	0.95	0.77	0.71	0.90	0.81
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	2%	9%	2%	2%	8%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	63	155	43	75	132	27	91	626	110	21	900	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	234	0	0	827	0	0	958	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (%)	25.6%	25.6%		25.6%	25.6%		74.4%	74.4%		74.4%	74.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			61.0			61.0	
Actuated g/C Ratio		0.21			0.21			0.68			0.68	
v/c Ratio		1.02			1.05			0.88			0.84	
Control Delay		97.0			111.8			24.2			19.4	
Queue Delay		0.0			0.0			0.0			0.1	
Total Delay		97.0			111.8			24.2			19.5	
LOS		F			F			C			B	
Approach Delay		97.0			111.8			24.2			19.5	
Approach LOS		F			F			C			B	
Queue Length 50th (m)		~44.3			~43.1			95.6			105.8	
Queue Length 95th (m)		#66.5			34.1			#193.2			#178.4	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		257			222			944			1144	
Starvation Cap Reductn		0			0			0			9	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.02			1.05			0.88			0.84	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 1.05			
Intersection Signal Delay: 39.5		Intersection LOS: D	
Intersection Capacity Utilization 94.9%		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: 3: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	13.1	62.4	66.9	230.3	64.8	94.4	45.0
Average Queue (m)	3.0	38.0	22.0	102.0	30.0	79.4	4.6
95th Queue (m)	9.6	63.1	56.7	200.2	74.1	101.0	23.8
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)		25		1		32	
Queuing Penalty (veh)		0		4		0	
Storage Bay Dist (m)			37.0		35.0		15.0
Storage Blk Time (%)			1	30	1	47	0
Queuing Penalty (veh)			4	19	7	41	0

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	93.1	40.2	53.2	231.5
Average Queue (m)	34.8	18.2	44.3	115.1
95th Queue (m)	68.7	31.5	50.2	226.9
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		0	60	8
Queuing Penalty (veh)		0	0	71
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 146

Intersection	
Int Delay, s/veh	5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	45	115	15	35
Future Vol, veh/h	0	0	45	115	15	35
Conflicting Peds, #/hr	0	93	93	0	37	115
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	88	84	58	59
Heavy Vehicles, %	2	2	2	2	14	2
Mvmt Flow	0	0	51	137	26	59

Major/Minor	Major2		Minor1	
Conflicting Flow All	93	0	369	208
Stage 1	-	-	93	-
Stage 2	-	-	276	-
Critical Hdwy	4.12	-	6.54	6.22
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.54	-
Follow-up Hdwy	2.218	-	3.626	3.318
Pot Cap-1 Maneuver	1501	-	608	832
Stage 1	-	-	-	-
Stage 2	-	-	744	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1355	-	537	692
Mov Cap-2 Maneuver	-	-	537	-
Stage 1	-	-	-	-
Stage 2	-	-	713	-

Approach	WB	NB
HCM Control Delay, s	2.1	11.5
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	636	1355	-
HCM Lane V/C Ratio	0.134	0.038	-
HCM Control Delay (s)	11.5	7.8	0
HCM Lane LOS	B	A	A
HCM 95th %tile Q(veh)	0.5	0.1	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	130	60	25	30	20
Future Vol, veh/h	25	130	60	25	30	20
Conflicting Peds, #/hr	18	0	0	18	37	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	83	77	95	86	61
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	37	157	78	26	35	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	122	0	-	0	376	115
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	267	-
Critical Hdwy	4.12	-	-	-	6.44	6.22
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.218	-	-	-	3.536	3.318
Pot Cap-1 Maneuver	1465	-	-	-	621	937
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1458	-	-	-	585	918
Mov Cap-2 Maneuver	-	-	-	-	585	-
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	740	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1458	-	-	-	710
HCM Lane V/C Ratio	0.025	-	-	-	0.095
HCM Control Delay (s)	7.5	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	5	5	15	5	5	5	20	20	20	30	5
Future Vol, veh/h	5	5	5	15	5	5	5	20	20	20	30	5
Conflicting Peds, #/hr	6	0	5	5	0	6	5	0	50	50	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	50	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	50	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	10	20	20	12	5	21	27	27	34	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	38	0	0	35	0	0	134	119	80	182	118	37
Stage 1	-	-	-	-	-	-	41	41	-	72	72	-
Stage 2	-	-	-	-	-	-	93	78	-	110	46	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1572	-	-	1576	-	-	838	771	980	779	772	1035
Stage 1	-	-	-	-	-	-	974	861	-	938	835	-
Stage 2	-	-	-	-	-	-	914	830	-	895	857	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1565	-	-	1509	-	-	784	751	935	696	752	1025
Mov Cap-2 Maneuver	-	-	-	-	-	-	784	751	-	696	752	-
Stage 1	-	-	-	-	-	-	967	855	-	930	819	-
Stage 2	-	-	-	-	-	-	852	814	-	810	851	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	2.9	9.6	10.2
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	837	1565	-	-	1509	-	-	758
HCM Lane V/C Ratio	0.064	0.003	-	-	0.013	-	-	0.093
HCM Control Delay (s)	9.6	7.3	0	-	7.4	0	-	10.2
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	2.7

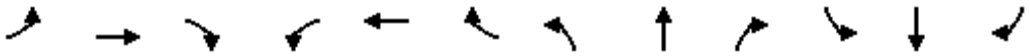
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	30	35	65	10	20
Future Vol, veh/h	30	30	35	65	10	20
Conflicting Peds, #/hr	0	29	29	0	5	13
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	57	60	66	74	100	75
Heavy Vehicles, %	2	2	2	1	2	2
Mvmt Flow	53	50	53	88	10	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	132	0	306	120
Stage 1	-	-	-	-	107	-
Stage 2	-	-	-	-	199	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1453	-	686	931
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1437	-	640	898
Mov Cap-2 Maneuver	-	-	-	-	640	-
Stage 1	-	-	-	-	894	-
Stage 2	-	-	-	-	799	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	809	-	-	1437	-
HCM Lane V/C Ratio	0.045	-	-	0.037	-
HCM Control Delay (s)	9.7	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	25	155	150	50	55	585	40	70	595	35
Future Volume (vph)	10	30	25	155	150	50	55	585	40	70	595	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.86			0.82			0.96				0.55
Frt		0.956			0.979			0.989				0.850
Flt Protected		0.988			0.979		0.950			0.950		
Satd. Flow (prot)	0	1527	0	0	1366	0	1123	1640	0	1623	1740	1566
Flt Permitted		0.856			0.836		0.123			0.177		
Satd. Flow (perm)	0	1276	0	0	1038	0	145	1640	0	302	1740	866
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			12			7				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	269		180	180		269	207		258	258		207
Peak Hour Factor	0.42	0.67	0.75	0.74	0.71	0.63	0.84	0.92	0.77	0.54	0.79	0.61
Heavy Vehicles (%)	2%	2%	8%	26%	15%	29%	59%	9%	7%	10%	8%	2%
Adj. Flow (vph)	24	45	33	209	211	79	65	636	52	130	753	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	499	0	65	688	0	130	753	57
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.1			23.1		42.8	37.1		42.8	37.1	37.1
Actuated g/C Ratio		0.30			0.30		0.55	0.48		0.55	0.48	0.48
v/c Ratio		0.26			1.58		0.42	0.88		0.49	0.91	0.13
Control Delay		18.2			303.2		16.2	34.2		13.6	37.6	2.3
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		18.2			303.2		16.2	34.2		13.6	37.6	2.3
LOS		B			F		B	C		B	D	A
Approach Delay		18.2			303.2			32.6			32.1	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			F			C			C	
Queue Length 50th (m)		8.1			~109.6		3.7	90.3		7.7	102.5	0.0
Queue Length 95th (m)		13.2			#119.7		7.9	#158.1		8.2	#136.8	0.2
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		398			315		155	784		267	827	454
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.26			1.58		0.42	0.88		0.49	0.91	0.13

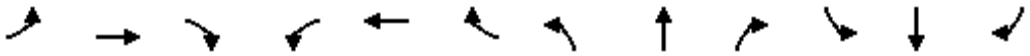
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 78			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.58			
Intersection Signal Delay: 90.6		Intersection LOS: F	
Intersection Capacity Utilization 76.9%		ICU Level of Service D	
Analysis 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: 2: Joyce Street & Vanness Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	35	20	30	30	20	30	670	70	25	675	35
Future Volume (vph)	35	35	20	30	30	20	30	670	70	25	675	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.89			0.99			0.99	
Frt		0.975			0.953			0.982			0.991	
Flt Protected		0.980			0.983			0.998			0.998	
Satd. Flow (prot)	0	1541	0	0	1321	0	0	1691	0	0	1664	0
Flt Permitted		0.693			0.754			0.920			0.907	
Satd. Flow (perm)	0	1030	0	0	1001	0	0	1557	0	0	1511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			16			19			9	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	61		16	16		61	152		94	94		152
Confl. Bikes (#/hr)			6			11			1			
Peak Hour Factor	0.60	0.58	0.75	0.64	0.71	0.42	0.63	0.79	0.52	0.55	0.83	0.56
Heavy Vehicles (%)	2%	2%	7%	2%	2%	20%	2%	9%	2%	2%	12%	2%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	58	60	27	47	42	48	48	848	135	45	813	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	145	0	0	137	0	0	1031	0	0	921	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (%)	16.4%	16.4%		16.4%	16.4%		83.6%	83.6%		83.6%	83.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			111.0			111.0	
Actuated g/C Ratio		0.13			0.13			0.79			0.79	
v/c Ratio		1.02			0.94			0.83			0.77	
Control Delay		137.0			112.3			16.4			13.0	
Queue Delay		0.0			0.0			0.0			2.5	
Total Delay		137.0			112.3			16.4			15.5	
LOS		F			F			B			B	
Approach Delay		137.0			112.3			16.4			15.5	
Approach LOS		F			F			B			B	
Queue Length 50th (m)		~40.2			33.5			143.1			111.8	
Queue Length 95th (m)		37.6			#49.4			140.7			129.8	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		142			146			1238			1199	
Starvation Cap Reductn		0			0			0			165	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.02			0.94			0.83			0.89	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 140			
Control Type: Pretimed			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 29.7		Intersection LOS: C	
Intersection Capacity Utilization 76.2%		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: 3: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	27.6	62.4	65.9	166.9	64.6	94.4	15.6
Average Queue (m)	7.8	56.9	21.4	75.0	12.5	57.7	3.3
95th Queue (m)	18.6	63.9	48.9	141.3	39.2	98.9	11.9
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)	0	89				4	
Queuing Penalty (veh)	0	0				0	
Storage Bay Dist (m)			36.0		35.0		15.0
Storage Blk Time (%)			0	22		28	1
Queuing Penalty (veh)			0	12		24	3

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	71.9	48.1	49.2	113.3
Average Queue (m)	25.5	19.0	40.6	50.0
95th Queue (m)	52.0	36.8	52.6	95.3
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		2	14	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 40

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	30	205	20	65
Future Vol, veh/h	0	0	30	205	20	65
Conflicting Peds, #/hr	0	20	20	0	14	22
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	38	69	75	64
Heavy Vehicles, %	2	2	33	25	2	6
Mvmt Flow	0	0	79	297	27	102

Major/Minor	Major2		Minor1	
Conflicting Flow All	20	0	489	42
Stage 1	-	-	20	-
Stage 2	-	-	469	-
Critical Hdwy	4.43	-	6.42	6.26
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.42	-
Follow-up Hdwy	2.497	-	3.518	3.354
Pot Cap-1 Maneuver	1416	-	538	1017
Stage 1	-	-	-	-
Stage 2	-	-	630	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1390	-	493	981
Mov Cap-2 Maneuver	-	-	493	-
Stage 1	-	-	-	-
Stage 2	-	-	587	-

Approach	WB	NB
HCM Control Delay, s	1.6	10.2
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	814	1390	-
HCM Lane V/C Ratio	0.158	0.057	-
HCM Control Delay (s)	10.2	7.7	0
HCM Lane LOS	B	A	A
HCM 95th %tile Q(veh)	0.6	0.2	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	60	35	25	25	10
Future Vol, veh/h	20	60	35	25	25	10
Conflicting Peds, #/hr	32	0	0	32	20	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	75	85	54	50	44	75
Heavy Vehicles, %	8	2	2	2	2	2
Mvmt Flow	27	71	65	50	57	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	147	0	-	0	266	130
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	144	-
Critical Hdwy	4.18	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.272	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1399	-	-	-	723	920
Stage 1	-	-	-	-	903	-
Stage 2	-	-	-	-	883	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1390	-	-	-	671	889
Mov Cap-2 Maneuver	-	-	-	-	671	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	842	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1390	-	-	-	704
HCM Lane V/C Ratio	0.019	-	-	-	0.1
HCM Control Delay (s)	7.6	0	-	-	10.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	5	5	10	5	10	5	15	35	10	5	5
Future Vol, veh/h	5	5	5	10	5	10	5	15	35	10	5	5
Conflicting Peds, #/hr	10	0	8	8	0	10	8	0	78	78	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	25	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	20	13	20	24	5	16	47	13	6	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	54	0	0	48	0	0	123	129	116	219	128	50
Stage 1	-	-	-	-	-	-	49	49	-	69	69	-
Stage 2	-	-	-	-	-	-	74	80	-	150	59	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1551	-	-	1559	-	-	852	762	936	737	763	1018
Stage 1	-	-	-	-	-	-	964	854	-	941	837	-
Stage 2	-	-	-	-	-	-	935	828	-	853	846	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1540	-	-	1456	-	-	820	741	868	629	742	1003
Mov Cap-2 Maneuver	-	-	-	-	-	-	820	741	-	629	742	-
Stage 1	-	-	-	-	-	-	955	846	-	930	822	-
Stage 2	-	-	-	-	-	-	905	814	-	737	838	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	1.7	9.7	10
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	831	1540	-	-	1456	-	-	747
HCM Lane V/C Ratio	0.082	0.004	-	-	0.009	-	-	0.039
HCM Control Delay (s)	9.7	7.3	0	-	7.5	0	-	10
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

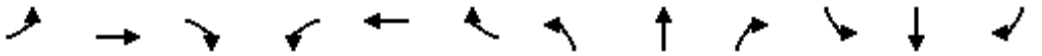
Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	15	10	30	160	5	5
Future Vol, veh/h	15	10	30	160	5	5
Conflicting Peds, #/hr	0	30	30	0	4	44
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	55	50	63	69	63	25
Heavy Vehicles, %	9	50	2	2	2	2
Mvmt Flow	27	20	48	232	8	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	77	0	398	111
Stage 1	-	-	-	-	67	-
Stage 2	-	-	-	-	331	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1522	-	607	942
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1465	-	567	884
Mov Cap-2 Maneuver	-	-	-	-	567	-
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	698	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	763	-	-	1465	-
HCM Lane V/C Ratio	0.037	-	-	0.033	-
HCM Control Delay (s)	9.9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	45	35	120	95	40	85	445	155	80	695	30
Future Volume (vph)	15	45	35	120	95	40	85	445	155	80	695	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.78			0.73			0.93				0.90
Frt		0.951			0.976			0.959				0.850
Flt Protected		0.990			0.976		0.950			0.950		
Satd. Flow (prot)	0	1401	0	0	1409	0	1312	1604	0	1750	1807	1566
Flt Permitted		0.889			0.757		0.106			0.103		
Satd. Flow (perm)	0	1207	0	0	884	0	146	1604	0	190	1807	1415
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			14			32				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	287		330	330		287	37		115	115		37
Confl. Bikes (#/hr)						4						
Peak Hour Factor	0.50	0.67	0.63	0.61	0.76	0.56	0.81	0.77	0.71	0.55	0.84	0.55
Heavy Vehicles (%)	2%	2%	2%	18%	2%	31%	36%	5%	3%	2%	4%	2%
Adj. Flow (vph)	30	67	56	197	125	71	105	578	218	145	827	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	153	0	0	393	0	105	796	0	145	827	55
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.0			23.0		44.0	37.0		44.8	39.0	39.0
Actuated g/C Ratio		0.29			0.29		0.55	0.46		0.56	0.49	0.49
v/c Ratio		0.41			1.49		0.63	1.05		0.65	0.94	0.08
Control Delay		21.4			264.7		29.5	69.3		26.2	41.3	1.7
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		21.4			264.7		29.5	69.3		26.2	41.3	1.7
LOS		C			F		C	E		C	D	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		21.4			264.7			64.6			37.1	
Approach LOS		C			F			E			D	
Queue Length 50th (m)		13.8			~82.1		6.2	~129.4		8.6	117.6	0.0
Queue Length 95th (m)		19.5			#105.5		#18.0	#147.6		9.1	#172.1	0.0
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		372			264		167	759		223	880	731
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.41			1.49		0.63	1.05		0.65	0.94	0.08

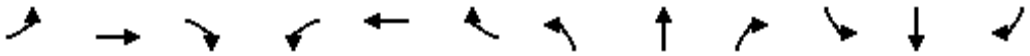
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.49			
Intersection Signal Delay: 82.3		Intersection LOS: F	
Intersection Capacity Utilization 75.0%		ICU Level of Service D	
Analysis 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: 2: Joyce Street & Vanness Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	100	40	40	65	20	65	560	80	15	760	25
Future Volume (vph)	35	100	40	40	65	20	65	560	80	15	760	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.94			0.96			0.99			1.00	
Frt		0.969			0.983			0.982			0.995	
Flt Protected		0.989			0.985			0.994			0.999	
Satd. Flow (prot)	0	1513	0	0	1562	0	0	1688	0	0	1727	0
Flt Permitted		0.830			0.704			0.808			0.975	
Satd. Flow (perm)	0	1239	0	0	1096	0	0	1371	0	0	1685	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			7			19			4	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	79		48	48		79	42		111	111		42
Confl. Bikes (#/hr)			1			2			1			2
Peak Hour Factor	0.63	0.74	0.69	0.60	0.53	0.75	0.66	0.95	0.77	0.71	0.90	0.81
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	2%	9%	2%	2%	8%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	56	135	58	67	123	27	98	589	104	21	844	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	249	0	0	217	0	0	791	0	0	896	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (%)	25.6%	25.6%		25.6%	25.6%		74.4%	74.4%		74.4%	74.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			61.0			61.0	
Actuated g/C Ratio		0.21			0.21			0.68			0.68	
v/c Ratio		0.94			0.94			0.85			0.78	
Control Delay		76.5			83.2			21.6			16.2	
Queue Delay		0.0			0.0			0.0			0.1	
Total Delay		76.5			83.2			21.6			16.3	
LOS		E			F			C			B	
Approach Delay		76.5			83.2			21.6			16.3	
Approach LOS		E			F			C			B	
Queue Length 50th (m)		39.8			35.6			87.1			91.1	
Queue Length 95th (m)		#60.0			31.3			#181.5			146.0	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		266			230			935			1143	
Starvation Cap Reductn		0			0			0			9	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.94			0.94			0.85			0.79	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 31.9		Intersection LOS: C	
Intersection Capacity Utilization 95.1%		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.			

Splits and Phases: 3: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	32.6	62.4	65.9	144.2	65.0	90.4	45.0
Average Queue (m)	14.2	35.3	26.1	68.0	25.4	65.1	8.3
95th Queue (m)	28.0	58.4	62.6	130.3	67.0	104.6	30.4
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)	1	10				10	
Queuing Penalty (veh)	1	0				0	
Storage Bay Dist (m)			36.0		35.0		15.0
Storage Blk Time (%)			4	28		36	0
Queuing Penalty (veh)			23	22		31	2

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	59.7	39.4	53.2	222.9
Average Queue (m)	27.4	19.9	44.5	80.5
95th Queue (m)	46.9	34.0	51.4	177.0
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		0	45	0
Queuing Penalty (veh)		0	0	0
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 80

Intersection	
Int Delay, s/veh	9.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	105	105	40	100
Future Vol, veh/h	0	0	105	105	40	100
Conflicting Peds, #/hr	0	93	93	0	37	115
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	88	84	58	59
Heavy Vehicles, %	2	2	2	2	14	2
Mvmt Flow	0	0	119	125	69	169

Major/Minor	Major2		Minor1	
Conflicting Flow All	93	0	494	208
Stage 1	-	-	93	-
Stage 2	-	-	401	-
Critical Hdwy	4.12	-	6.54	6.22
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.54	-
Follow-up Hdwy	2.218	-	3.626	3.318
Pot Cap-1 Maneuver	1501	-	514	832
Stage 1	-	-	-	-
Stage 2	-	-	651	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1355	-	429	692
Mov Cap-2 Maneuver	-	-	429	-
Stage 1	-	-	-	-
Stage 2	-	-	590	-

Approach	WB	NB
HCM Control Delay, s	3.9	15.2
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	588	1355	-
HCM Lane V/C Ratio	0.406	0.088	-
HCM Control Delay (s)	15.2	7.9	0
HCM Lane LOS	C	A	A
HCM 95th %tile Q(veh)	2	0.3	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	115	55	30	35	20
Future Vol, veh/h	20	115	55	30	35	20
Conflicting Peds, #/hr	18	0	0	18	37	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	83	77	95	86	61
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	29	139	71	32	41	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	121	0	-	0	339	111
Stage 1	-	-	-	-	105	-
Stage 2	-	-	-	-	234	-
Critical Hdwy	4.12	-	-	-	6.44	6.22
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.218	-	-	-	3.536	3.318
Pot Cap-1 Maneuver	1467	-	-	-	653	942
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	800	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1460	-	-	-	619	923
Mov Cap-2 Maneuver	-	-	-	-	619	-
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	770	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1460	-	-	-	726
HCM Lane V/C Ratio	0.02	-	-	-	0.101
HCM Control Delay (s)	7.5	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	5	5	25	5	5	5	15	30	45	30	5
Future Vol, veh/h	5	5	5	25	5	5	5	15	30	45	30	5
Conflicting Peds, #/hr	6	0	5	5	0	6	5	0	50	50	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	50	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	50	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	10	33	20	12	5	16	40	60	34	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	38	0	0	35	0	0	160	146	80	213	145	37
Stage 1	-	-	-	-	-	-	41	41	-	99	99	-
Stage 2	-	-	-	-	-	-	119	105	-	114	46	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1572	-	-	1576	-	-	806	745	980	744	746	1035
Stage 1	-	-	-	-	-	-	974	861	-	907	813	-
Stage 2	-	-	-	-	-	-	885	808	-	891	857	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1565	-	-	1509	-	-	749	720	935	654	721	1025
Mov Cap-2 Maneuver	-	-	-	-	-	-	749	720	-	654	721	-
Stage 1	-	-	-	-	-	-	967	855	-	900	791	-
Stage 2	-	-	-	-	-	-	817	786	-	799	851	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	3.8	9.6	11
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	850	1565	-	-	1509	-	-	700
HCM Lane V/C Ratio	0.072	0.003	-	-	0.022	-	-	0.148
HCM Control Delay (s)	9.6	7.3	0	-	7.4	0	-	11
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.5

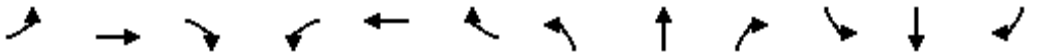
Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	50	30	60	10	15
Future Vol, veh/h	30	50	30	60	10	15
Conflicting Peds, #/hr	0	29	29	0	5	13
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	57	60	66	74	100	75
Heavy Vehicles, %	2	2	2	1	2	2
Mvmt Flow	53	83	45	81	10	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	165	0	300	136
Stage 1	-	-	-	-	123	-
Stage 2	-	-	-	-	177	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1413	-	691	913
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	854	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1397	-	648	881
Mov Cap-2 Maneuver	-	-	-	-	648	-
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	821	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.8	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	787	-	-	1397	-
HCM Lane V/C Ratio	0.038	-	-	0.033	-
HCM Control Delay (s)	9.8	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	30	175	165	55	60	645	45	75	655	40
Future Volume (vph)	10	30	30	175	165	55	60	645	45	75	655	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.85			0.82			0.96				0.55
Frt		0.950			0.979			0.989				0.850
Flt Protected		0.989			0.979		0.950			0.950		
Satd. Flow (prot)	0	1491	0	0	1367	0	1123	1640	0	1623	1740	1566
Flt Permitted		0.854			0.829		0.106			0.111		
Satd. Flow (perm)	0	1251	0	0	1030	0	125	1640	0	190	1740	866
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			12			7				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	269		180	180		269	207		258	258		207
Peak Hour Factor	0.42	0.67	0.75	0.74	0.71	0.63	0.84	0.92	0.77	0.54	0.79	0.61
Heavy Vehicles (%)	2%	2%	8%	26%	15%	29%	59%	9%	7%	10%	8%	2%
Adj. Flow (vph)	24	45	40	236	232	87	71	701	58	139	829	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	109	0	0	555	0	71	759	0	139	829	66
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.0			23.0		43.9	37.0		44.8	39.0	39.0
Actuated g/C Ratio		0.29			0.29		0.55	0.46		0.56	0.49	0.49
v/c Ratio		0.28			1.83		0.50	1.00		0.65	0.98	0.14
Control Delay		17.4			407.3		22.3	55.3		26.6	49.6	3.1
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		17.4			407.3		22.3	55.3		26.6	49.6	3.1
LOS		B			F		C	E		C	D	A
Approach Delay		17.4			407.3			52.4			43.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			F			D			D	
Queue Length 50th (m)		8.1			~128.2		4.1	107.9		8.3	~135.2	0.0
Queue Length 95th (m)		13.2			#136.0		11.0	#183.5		8.6	#159.6	1.0
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		386			304		143	762		213	848	464
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.28			1.83		0.50	1.00		0.65	0.98	0.14

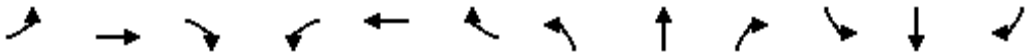
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.83			
Intersection Signal Delay: 125.2		Intersection LOS: F	
Intersection Capacity Utilization 82.6%		ICU Level of Service E	
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.

Splits and Phases: 2: Joyce Street & Vanness Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	40	20	35	35	20	30	740	75	30	745	35
Future Volume (vph)	35	40	20	35	35	20	30	740	75	30	745	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.94			0.90			0.99			0.99	
Frt		0.976			0.957			0.983			0.992	
Flt Protected		0.982			0.982			0.998			0.997	
Satd. Flow (prot)	0	1549	0	0	1347	0	0	1693	0	0	1665	0
Flt Permitted		0.693			0.709			0.918			0.881	
Satd. Flow (perm)	0	1040	0	0	961	0	0	1555	0	0	1470	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			14			18			8	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	61		16	16		61	152		94	94		152
Confl. Bikes (#/hr)			6			11			1			
Peak Hour Factor	0.60	0.58	0.75	0.64	0.71	0.42	0.63	0.79	0.52	0.55	0.83	0.56
Heavy Vehicles (%)	2%	2%	7%	2%	2%	20%	2%	9%	2%	2%	12%	2%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	58	69	27	55	49	48	48	937	144	55	898	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	154	0	0	152	0	0	1129	0	0	1016	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (s)	23.0	23.0		23.0	23.0		117.0	117.0		117.0	117.0	
Total Split (%)	16.4%	16.4%		16.4%	16.4%		83.6%	83.6%		83.6%	83.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			111.0			111.0	
Actuated g/C Ratio		0.13			0.13			0.79			0.79	
v/c Ratio		1.08			1.09			0.91			0.87	
Control Delay		153.1			153.4			23.9			20.0	
Queue Delay		0.0			0.0			0.0			6.3	
Total Delay		153.1			153.4			23.9			26.2	
LOS		F			F			C			C	
Approach Delay		153.1			153.4			23.9			26.2	
Approach LOS		F			F			C			C	
Queue Length 50th (m)		~45.5			~43.3			194.0			156.3	
Queue Length 95th (m)		#43.2			#60.0			184.3			183.4	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		142			139			1236			1167	
Starvation Cap Reductn		0			0			0			116	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.08			1.09			0.91			0.97	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 140			
Control Type: Pretimed			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 41.0		Intersection LOS: D	
Intersection Capacity Utilization 79.6%		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: 3: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	26.1	65.8	66.0	174.8	64.8	96.7	44.9
Average Queue (m)	9.5	56.4	22.2	92.1	22.3	64.9	4.8
95th Queue (m)	18.3	64.0	62.3	166.1	57.2	99.4	23.9
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)	0	84				8	
Queuing Penalty (veh)	0	0				0	
Storage Bay Dist (m)			36.0		35.0		15.0
Storage Blk Time (%)			1	26	1	36	0
Queuing Penalty (veh)			4	15	6	33	0

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	60.6	40.9	53.2	231.7
Average Queue (m)	22.8	19.2	37.7	106.7
95th Queue (m)	45.8	35.3	56.9	222.3
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		0	24	3
Queuing Penalty (veh)		0	0	21
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 79

Intersection	
Int Delay, s/veh	3.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	30	230	20	70
Future Vol, veh/h	0	0	30	230	20	70
Conflicting Peds, #/hr	0	20	20	0	14	22
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	38	69	75	64
Heavy Vehicles, %	2	2	33	25	2	6
Mvmt Flow	0	0	79	333	27	109

Major/Minor	Major2		Minor1	
Conflicting Flow All	20	0	525	42
Stage 1	-	-	20	-
Stage 2	-	-	505	-
Critical Hdwy	4.43	-	6.42	6.26
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.42	-
Follow-up Hdwy	2.497	-	3.518	3.354
Pot Cap-1 Maneuver	1416	-	513	1017
Stage 1	-	-	-	-
Stage 2	-	-	606	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1390	-	469	981
Mov Cap-2 Maneuver	-	-	469	-
Stage 1	-	-	-	-
Stage 2	-	-	564	-

Approach	WB	NB
HCM Control Delay, s	1.5	10.4
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	808	1390	-
HCM Lane V/C Ratio	0.168	0.057	-
HCM Control Delay (s)	10.4	7.7	0
HCM Lane LOS	B	A	A
HCM 95th %tile Q(veh)	0.6	0.2	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	65	40	25	25	15
Future Vol, veh/h	25	65	40	25	25	15
Conflicting Peds, #/hr	32	0	0	32	20	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	75	85	54	50	44	75
Heavy Vehicles, %	8	2	2	2	2	2
Mvmt Flow	33	76	74	50	57	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	156	0	-	0	294	139
Stage 1	-	-	-	-	131	-
Stage 2	-	-	-	-	163	-
Critical Hdwy	4.18	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.272	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1388	-	-	-	697	909
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	866	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1379	-	-	-	643	878
Mov Cap-2 Maneuver	-	-	-	-	643	-
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	821	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1379	-	-	-	691
HCM Lane V/C Ratio	0.024	-	-	-	0.111
HCM Control Delay (s)	7.7	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	5	5	10	5	15	5	15	40	10	10	5
Future Vol, veh/h	5	5	5	10	5	15	5	15	40	10	10	5
Conflicting Peds, #/hr	10	0	8	8	0	10	8	0	78	78	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	25	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	20	13	20	36	5	16	53	13	11	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	66	0	0	48	0	0	132	141	116	229	134	56
Stage 1	-	-	-	-	-	-	49	49	-	75	75	-
Stage 2	-	-	-	-	-	-	83	92	-	154	59	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1536	-	-	1559	-	-	840	750	936	726	757	1011
Stage 1	-	-	-	-	-	-	964	854	-	934	833	-
Stage 2	-	-	-	-	-	-	925	819	-	848	846	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1526	-	-	1456	-	-	803	730	868	615	737	996
Mov Cap-2 Maneuver	-	-	-	-	-	-	803	730	-	615	737	-
Stage 1	-	-	-	-	-	-	955	846	-	923	819	-
Stage 2	-	-	-	-	-	-	889	805	-	727	838	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	1.4	9.8	10.1
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	830	1526	-	-	1456	-	-	736
HCM Lane V/C Ratio	0.09	0.004	-	-	0.009	-	-	0.047
HCM Control Delay (s)	9.8	7.4	0	-	7.5	0	-	10.1
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	15	10	35	180	10	5
Future Vol, veh/h	15	10	35	180	10	5
Conflicting Peds, #/hr	0	30	30	0	4	44
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	55	50	63	69	63	25
Heavy Vehicles, %	9	50	2	2	2	2
Mvmt Flow	27	20	56	261	16	20

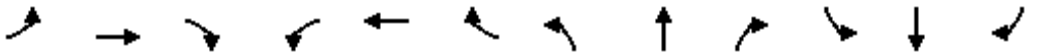
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	77	0	443	111
Stage 1	-	-	-	-	67	-
Stage 2	-	-	-	-	376	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1522	-	572	942
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1465	-	531	884
Mov Cap-2 Maneuver	-	-	-	-	531	-
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	661	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	683	-	-	1465	-
HCM Lane V/C Ratio	0.053	-	-	0.038	-
HCM Control Delay (s)	10.6	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lanes, Volumes, Timings
2: Joyce Street & Vanness Avenue

03-25-2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	50	35	130	100	45	90	495	170	90	770	30
Future Volume (vph)	15	50	35	130	100	45	90	495	170	90	770	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	37.0		10.0	0.0		0.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.79			0.73			0.93				0.90
Frt		0.953			0.975			0.959				0.850
Flt Protected		0.991			0.976		0.950			0.950		
Satd. Flow (prot)	0	1422	0	0	1399	0	1312	1605	0	1750	1807	1566
Flt Permitted		0.889			0.747		0.106			0.103		
Satd. Flow (perm)	0	1230	0	0	870	0	146	1605	0	190	1807	1415
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			15			31				82
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		46.1			54.4			240.8			27.7	
Travel Time (s)		5.5			6.5			17.3			2.0	
Confl. Peds. (#/hr)	287		330	330		287	37		115	115		37
Confl. Bikes (#/hr)						4						
Peak Hour Factor	0.50	0.67	0.63	0.61	0.76	0.56	0.81	0.77	0.71	0.55	0.84	0.55
Heavy Vehicles (%)	2%	2%	2%	18%	2%	31%	36%	5%	3%	2%	4%	2%
Adj. Flow (vph)	30	75	56	213	132	80	111	643	239	164	917	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	161	0	0	425	0	111	882	0	164	917	55
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	23.0	23.0		23.0	23.0		5.0	19.0		5.0	19.0	19.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	24.0		9.0	24.0	24.0
Total Split (s)	28.0	28.0		28.0	28.0		10.0	42.0		10.0	42.0	42.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		12.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.5		4.0	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		0.0	1.5		0.0	1.5	1.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0			5.0		4.0	5.0		4.0	5.0	5.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max		None	Max		None	Max	Max
Act Effct Green (s)		23.0			23.0		44.0	37.0		44.8	39.0	39.0
Actuated g/C Ratio		0.29			0.29		0.55	0.46		0.56	0.49	0.49
v/c Ratio		0.43			1.63		0.66	1.16		0.74	1.04	0.08
Control Delay		22.2			326.8		32.8	110.9		33.7	65.7	1.7
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		22.2			326.8		32.8	110.9		33.7	65.7	1.7
LOS		C			F		C	F		C	E	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		22.2			326.8			102.2			58.0	
Approach LOS		C			F			F			E	
Queue Length 50th (m)		15.1			~92.9		6.6	~157.5		9.8	~158.2	0.0
Queue Length 95th (m)		20.9			#116.0		#20.3	#173.7		10.1	#200.6	0.0
Internal Link Dist (m)		22.1			30.4			216.8			3.7	
Turn Bay Length (m)							37.0					
Base Capacity (vph)		377			260		167	758		223	880	731
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.43			1.63		0.66	1.16		0.74	1.04	0.08

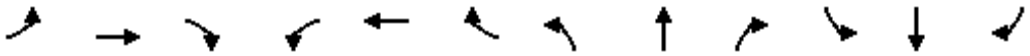
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.63			
Intersection Signal Delay: 114.1		Intersection LOS: F	
Intersection Capacity Utilization 80.4%		ICU Level of Service D	
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: 2: Joyce Street & Vanness Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	115	40	45	70	20	70	620	85	15	835	30
Future Volume (vph)	40	115	40	45	70	20	70	620	85	15	835	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.95			0.96			0.99			1.00	
Frt		0.972			0.984			0.983			0.995	
Flt Protected		0.989			0.984			0.994			0.999	
Satd. Flow (prot)	0	1522	0	0	1565	0	0	1690	0	0	1727	0
Flt Permitted		0.807			0.653			0.788			0.975	
Satd. Flow (perm)	0	1213	0	0	1021	0	0	1338	0	0	1684	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			7			18			5	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		244.2			51.9			43.2			240.8	
Travel Time (s)		29.3			6.2			3.1			17.3	
Confl. Peds. (#/hr)	79		48	48		79	42		111	111		42
Confl. Bikes (#/hr)			1			2			1			2
Peak Hour Factor	0.63	0.74	0.69	0.60	0.53	0.75	0.66	0.95	0.77	0.71	0.90	0.81
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	2%	9%	2%	2%	8%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	63	155	58	75	132	27	106	653	110	21	928	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	276	0	0	234	0	0	869	0	0	986	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (s)	23.0	23.0		23.0	23.0		67.0	67.0		67.0	67.0	
Total Split (%)	25.6%	25.6%		25.6%	25.6%		74.4%	74.4%		74.4%	74.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		18.5			18.5			61.0			61.0	
Actuated g/C Ratio		0.21			0.21			0.68			0.68	
v/c Ratio		1.07			1.09			0.95			0.86	
Control Delay		109.7			122.7			35.5			21.4	
Queue Delay		0.0			0.0			0.0			0.2	
Total Delay		109.7			122.7			35.5			21.5	
LOS		F			F			D			C	
Approach Delay		109.7			122.7			35.5			21.5	
Approach LOS		F			F			D			C	
Queue Length 50th (m)		~50.6			~44.4			115.8			113.4	
Queue Length 95th (m)		#71.1			34.4			#215.8			#218.9	
Internal Link Dist (m)		220.2			27.9			19.2			216.8	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		259			215			912			1142	
Starvation Cap Reductn		0			0			0			8	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.07			1.09			0.95			0.87	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 46.9		Intersection LOS: D	
Intersection Capacity Utilization 102.5%		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: Joyce Street & Euclid Avenue



Intersection: 2: Joyce Street & Vanness Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	R
Maximum Queue (m)	32.1	65.8	65.9	169.4	64.9	97.7	45.0
Average Queue (m)	13.8	50.3	31.9	97.5	36.0	85.6	7.5
95th Queue (m)	29.4	66.4	66.4	169.3	80.9	91.5	30.0
Link Distance (m)	29.9	46.6		228.6		78.5	
Upstream Blk Time (%)	1	47				53	
Queuing Penalty (veh)	1	0				0	
Storage Bay Dist (m)			36.0		35.0		15.0
Storage Blk Time (%)			3	30		51	0
Queuing Penalty (veh)			16	26		48	2

Intersection: 3: Joyce Street & Euclid Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	79.8	58.1	53.2	230.3
Average Queue (m)	37.2	25.0	46.1	118.1
95th Queue (m)	67.0	43.4	52.5	223.6
Link Distance (m)	228.8	44.1	37.3	228.6
Upstream Blk Time (%)		1	61	4
Queuing Penalty (veh)		0	0	31
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 124

Intersection	
Int Delay, s/veh	9.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	110	115	40	100
Future Vol, veh/h	0	0	110	115	40	100
Conflicting Peds, #/hr	0	93	93	0	37	115
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	88	84	58	59
Heavy Vehicles, %	2	2	2	2	14	2
Mvmt Flow	0	0	125	137	69	169

Major/Minor	Major2		Minor1	
Conflicting Flow All	93	0	517	208
Stage 1	-	-	93	-
Stage 2	-	-	424	-
Critical Hdwy	4.12	-	6.54	6.22
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.54	-
Follow-up Hdwy	2.218	-	3.626	3.318
Pot Cap-1 Maneuver	1501	-	498	832
Stage 1	-	-	-	-
Stage 2	-	-	635	-
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1355	-	413	692
Mov Cap-2 Maneuver	-	-	413	-
Stage 1	-	-	-	-
Stage 2	-	-	572	-

Approach	WB	NB
HCM Control Delay, s	3.8	15.5
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	WBL	WBT
Capacity (veh/h)	579	1355	-
HCM Lane V/C Ratio	0.412	0.092	-
HCM Control Delay (s)	15.5	7.9	0
HCM Lane LOS	C	A	A
HCM 95th %tile Q(veh)	2	0.3	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	130	60	35	40	20
Future Vol, veh/h	25	130	60	35	40	20
Conflicting Peds, #/hr	18	0	0	18	37	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	83	77	95	86	61
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	37	157	78	37	47	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	133	0	-	0	381	120
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	267	-
Critical Hdwy	4.12	-	-	-	6.44	6.22
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.218	-	-	-	3.536	3.318
Pot Cap-1 Maneuver	1452	-	-	-	617	931
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1445	-	-	-	582	912
Mov Cap-2 Maneuver	-	-	-	-	582	-
Stage 1	-	-	-	-	892	-
Stage 2	-	-	-	-	740	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1445	-	-	-	684
HCM Lane V/C Ratio	0.025	-	-	-	0.116
HCM Control Delay (s)	7.6	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	5	5	25	5	5	5	20	30	45	30	5
Future Vol, veh/h	5	5	5	25	5	5	5	20	30	45	30	5
Conflicting Peds, #/hr	6	0	5	5	0	6	5	0	50	50	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	25	50	75	25	42	92	94	75	75	89	50
Heavy Vehicles, %	2	2	50	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	10	33	20	12	5	21	40	60	34	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	38	0	0	35	0	0	160	146	80	216	145	37
Stage 1	-	-	-	-	-	-	41	41	-	99	99	-
Stage 2	-	-	-	-	-	-	119	105	-	117	46	-
Critical Hdwy	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1572	-	-	1576	-	-	806	745	980	740	746	1035
Stage 1	-	-	-	-	-	-	974	861	-	907	813	-
Stage 2	-	-	-	-	-	-	885	808	-	888	857	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1565	-	-	1509	-	-	749	720	935	647	721	1025
Mov Cap-2 Maneuver	-	-	-	-	-	-	749	720	-	647	721	-
Stage 1	-	-	-	-	-	-	967	855	-	900	791	-
Stage 2	-	-	-	-	-	-	817	786	-	791	851	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	3.8	9.7	11.1
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	838	1565	-	-	1509	-	-	695
HCM Lane V/C Ratio	0.08	0.003	-	-	0.022	-	-	0.149
HCM Control Delay (s)	9.7	7.3	0	-	7.4	0	-	11.1
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	55	35	65	10	20
Future Vol, veh/h	30	55	35	65	10	20
Conflicting Peds, #/hr	0	29	29	0	5	13
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	57	60	66	74	100	75
Heavy Vehicles, %	2	2	2	1	2	2
Mvmt Flow	53	92	53	88	10	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	173	0	326	140
Stage 1	-	-	-	-	127	-
Stage 2	-	-	-	-	199	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1404	-	668	908
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1389	-	623	876
Mov Cap-2 Maneuver	-	-	-	-	623	-
Stage 1	-	-	-	-	877	-
Stage 2	-	-	-	-	798	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	789	-	-	1389	-
HCM Lane V/C Ratio	0.046	-	-	0.038	-
HCM Control Delay (s)	9.8	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

APPENDIX C

Traffic Signal Warrant Analysis

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TAC TRAFFIC SIGNAL WARRANT

A Transportation Association of Canada (TAC) traffic signal warrant analysis was conducted for the Joyce Street/Euclid Avenue intersection. The warrant is based on an assessment of roadway geometrics, local demographics, and vehicular and pedestrian volumes. A value of 100 cumulative warrant points is considered the minimum value to warrant a traffic signal control.

2015 Historic Volumes

- Six hours of volume data were used with the morning (7:00 to 9:00 am), mid-day (11:00 to 1:00 pm), and afternoon (4:00 to 6:00 pm) periods.
- The warrant score was calculated to be 205, with 56 points related to vehicle-vehicle conflict and 149 points related to vehicle-pedestrian conflict. The side street volume (Euclid Avenue) threshold of 75 vehicles was not satisfied.
- The TAC traffic signal warrant was not met using historic 2015 volumes due to insufficient side street volumes.

2020 Existing Volumes

- Six hours of volume data were used with the morning (7:00 to 9:00 am), mid-day (11:00 to 1:00 pm), and afternoon (4:00 to 6:00 pm) periods.
- The warrant score was calculated to be 188, with 84 points related to vehicle-vehicle conflict and 104 points related to vehicle-pedestrian conflict. The side street volume (Euclid Avenue) threshold of 75 vehicles was satisfied.
- The TAC traffic signal warrant was met using existing 2020 volumes.

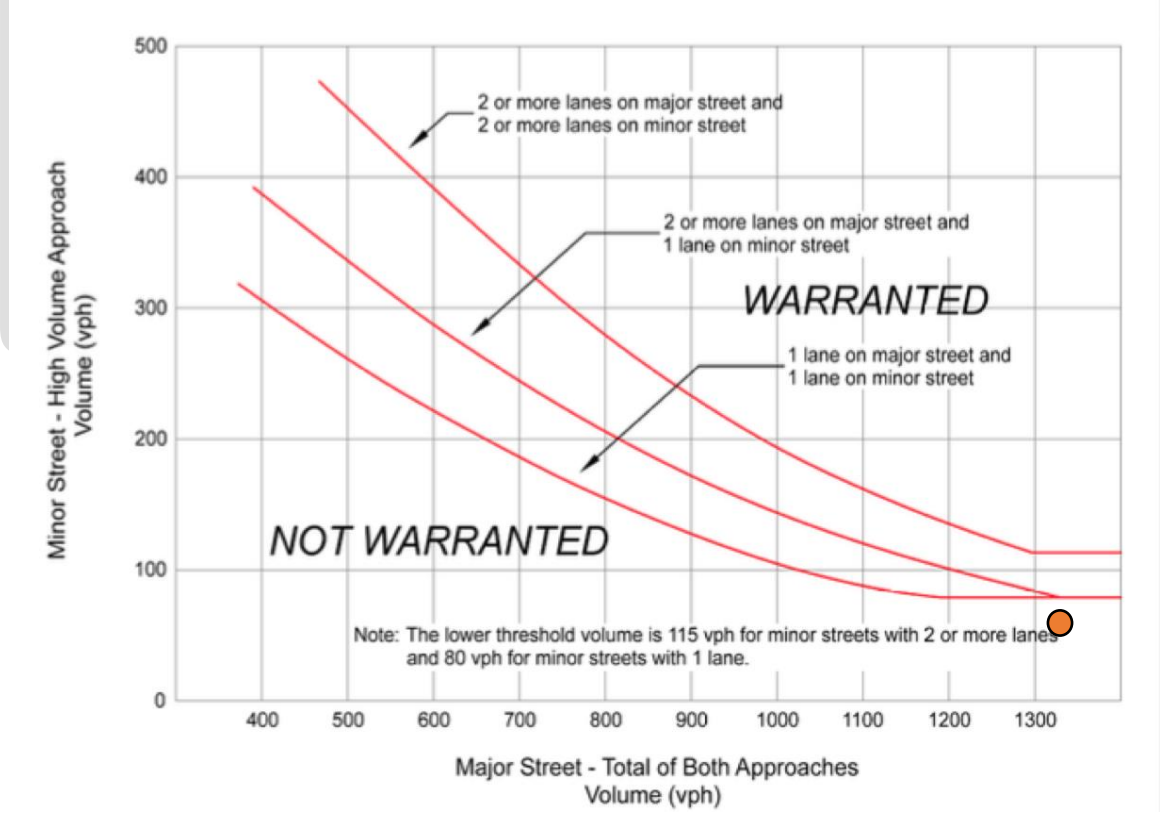
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BC MOTI TRAFFIC SIGNAL WARRANT (WARRANT 7: FOUR HOUR VOLUME)

A BC Ministry of Transportation and Infrastructure (MOTI) traffic signal warrant (Warrant 7) was conducted for the Joyce Street/Euclid Avenue intersection (see Section 400 of the *Electrical and Traffic Engineering Manual*) using four hours of volume data. The warrant for a "Large Urban (population of 10,000 or more) with a major (posted or 85th percentile) road speed of 70 km/h or less was selected.

2015 Historic Volumes

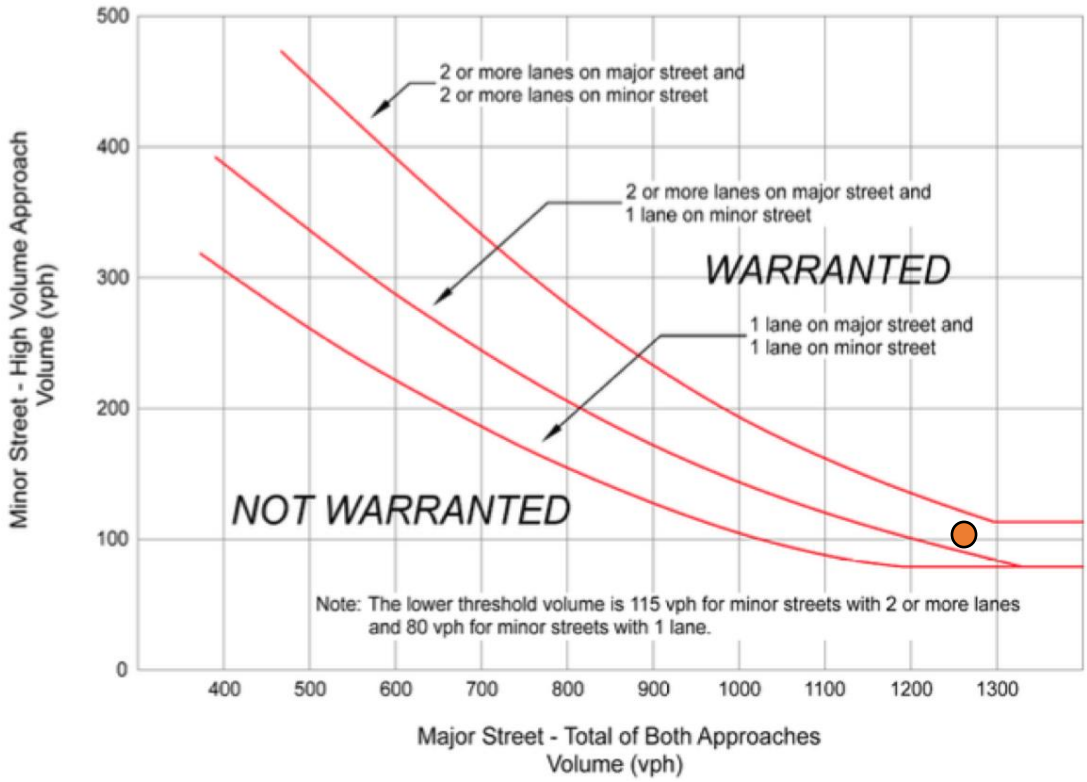
Using an average major approach (Joyce Street) volume of 1,332 vehicles per hour and average minor approach (Euclid Avenue) volume of 65 vehicles in the eastbound direction, the four-hour volume warrant was not satisfied.



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2020 Existing Volumes

Using an average major approach (Joyce Street) volume of 1,271 vehicles per hour and average minor approach (Euclid Avenue) volume of 102 vehicles in the eastbound direction, the four-hour volume warrant was satisfied.



BC MOTI TRAFFIC SIGNAL WARRANT (WARRANT 8: PEAK HOUR DELAY)

A BC Ministry of Transportation and Infrastructure (MOTI) traffic signal warrant (Warrant 8) was conducted for the Joyce Street/Euclid Avenue intersection (see Section 400 of the *Electrical and Traffic Engineering Manual*) using peak hour delay. In order to satisfy the warrant all three criteria must be met.

- Criteria 1 (Delay): The total delay experienced by traffic on one minor street approach in one direction only and controlled by a stop sign equals or exceeds four vehicle hours for a one-lane approach and five vehicle hours for a two-lane approach.
- Criteria 2 (Minor Volume): The volume of the same minor street approach in one direction only equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes.
- Criteria 3 (Total Volume): The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.

2020 Existing Conditions

- Criteria 1 (Delay): The total vehicle delay for the Euclid Avenue eastbound approach is 1.5 hours (= 161 vehicles × 65 seconds / 3600 seconds). The threshold of four vehicle hours is not satisfied.
- Criteria 2 (Minor Volume): The volume for the Euclid Avenue eastbound approach is 161 vph. The threshold of ≥100 vph is satisfied.
- Criteria 3 (Total Volume): The total entering volume for the intersection is 1,669 vph. The threshold of ≥800 vph is satisfied.
- Therefore in 2020 the warrant is not satisfied.

2024 Post-Development Conditions

- Criteria 1 (Delay): The total vehicle delay for the Euclid Avenue eastbound approach is 3.5 hours (= 165 vehicles × 77 seconds / 3600 seconds). The threshold of four vehicle hours is not satisfied.
- Criteria 2 (Minor Volume): The volume for the Euclid Avenue eastbound approach is 161 vph. The threshold of ≥100 vph is satisfied.
- Criteria 3 (Total Volume): The total entering volume for the intersection is 1,669 vph. The threshold of ≥800 vph is satisfied.
- Therefore in 2020 the warrant is not satisfied.

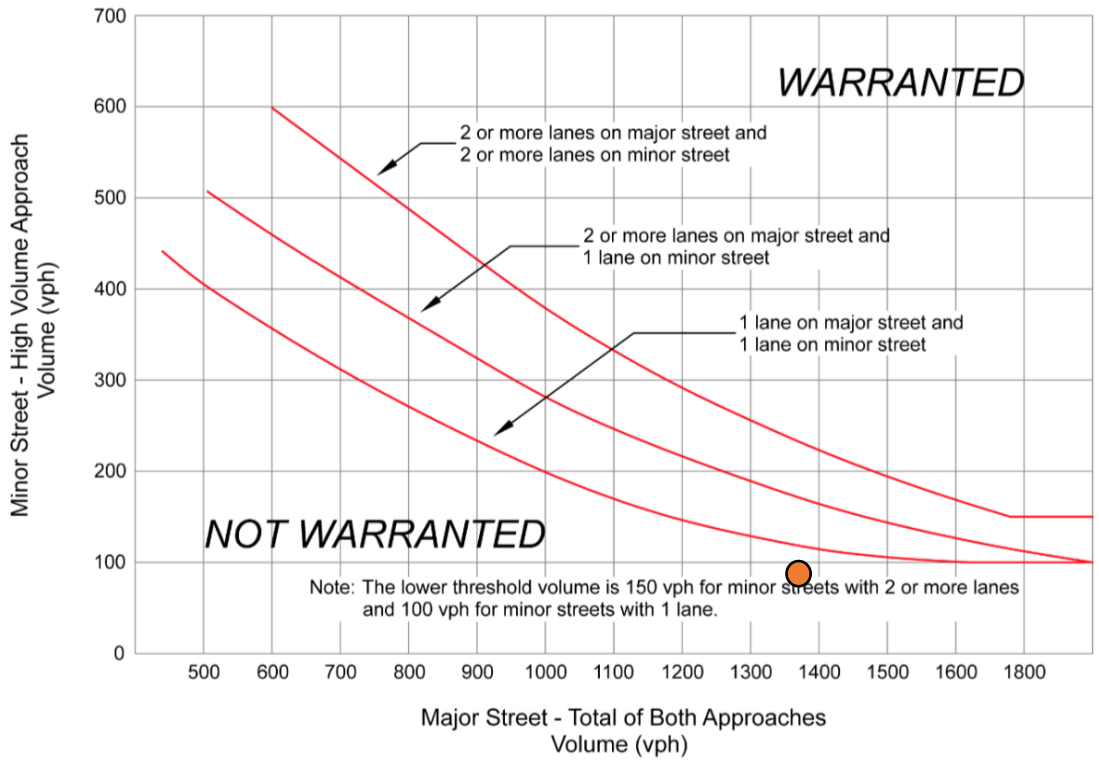
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BC MOTI TRAFFIC SIGNAL WARRANT (WARRANT 9: PEAK HOUR VOLUME)

A BC Ministry of Transportation and Infrastructure (MOTI) traffic signal warrant (Warrant 9) was conducted for the Joyce Street/Euclid Avenue intersection (see Section 400 of the *Electrical and Traffic Engineering Manual*) using peak hour volumes (PM period). The warrant for a "Large Urban (population of 10,000 or more) with a major (posted or 85th percentile) road speed of 70 km/h or less was selected.

2015 Historic Volumes

Using an average major approach (Joyce Street) volume of 1,385 vehicles per hour and average minor approach (Euclid Avenue) volume of 94 vehicles in the eastbound direction, the peak hour volume warrant was not satisfied.



2020 Existing Volumes

Using an average major approach (Joyce Street) volume of 1,388 vehicles per hour and average minor approach (Euclid Avenue) volume of 161 vehicles in the eastbound direction, the peak hour volume warrant was satisfied.

