114 University II Transportation Impact Assessment

January 8, 2021

Prepared for:

2226436 Alberta Ltd.

Prepared by:

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Sign-off Sheet

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Table of Contents

1.0 INTRODUCTION 1
1.1 STUDY SCOPE 2
1.2 PREVIOUS STUDIES 3

2.0 EXISTING CONDITIONS 4
2.1 EXISTING ROAD NETWORK 4
2.2 EXISTING TRAFFIC VOLUMES 6
2.2.1 Traffic Counts 6
2.2.2 Background Traffic Growth 6
2.2.3 Pedestrian Traffic Volumes 8

3.0 PROPOSED DEVELOPMENT 10
3.1 TRIP GENERATION 11
3.2 MODE SPLIT TRIP REDUCTIONS 11
3.3 TRIP DISTRIBUTION AND ASSIGNMENT 12
3.4 ADJACENT DEVELOPMENTS 14
3.5 FUTURE TOTAL TRAFFIC VOLUMES 18

4.0 TRAFFIC ANALYSIS 21
4.1 COLLECTOR AND LOCAL ROADWAY CAPACITY 21
4.2 INTERSECTION OPERATIONS 22
4.2.1 Intersection Capacity Analysis 22
4.2.2 114 Street & University Avenue Operations 25

5.0 ALLEY OPERATIONS 26
5.1 ALLEY IMPROVEMENTS 26

6.0 ACTIVE MODES AND TRANSIT ASSESSMENT 27
6.1 PEDESTRIAN FACILITIES 27
6.2 BICYCLE FACILITIES 27
6.3 TRANSIT SERVICES 29

7.0 PARKING ASSESSMENT 32
7.1 BICYCLE PARKING 32
7.2 EXISTING ON-STREET PARKING 32

8.0 CONCLUSION 34

1.0 INTRODUCTION

2226436 Alberta Ltd. has retained Stantec Consulting Ltd. (Stantec) to complete a Transportation Impact Assessment (TIA) for a multifamily development ("114 University II") in the McKernan neighbourhood. The project site is located south of University Avenue between 113 and 114 Streets and covers five lots which are currently occupied by existing single-family homes. These five lots are:

- 11323 University Ave NW
- 11325 University Ave NW
- 11329 University Ave NW
- 11333 University Ave NW
- 11335 University Ave NW

The proposed 114 University II will consist of a 6-story residential apartment building with up to 132 units, requiring it to be rezoned from the existing Single Detached Residential (RF3) to a Site-Specific Development Control Provision (DC2). Another proposed multifamily development, McKernan Gates, is located on the southeast corner of 114 Street and University Avenue, which is adjacent to the 114 University II site to the west.

Figure 1.1 presents the 114 University II project site location & proposed access location. As shown in **Figure 1.1**, a shared underground structure for parking of both McKernan Gates and 114 University II developments was proposed, with one parking ramp located in the southeast corner of the McKernan Gates Development (see details in the following **Section 3.0** Proposed Development).This parking ramp access to both development sites will be provided by the E-W Alley to the south, which connects to 114 Street in the west and 113 Street in the east. Accesses will not be provided by University Avenue to the north, which is expected to be closed to vehicle traffic in the building's vicinity.

Figure 1.1 – Project Site Location & Proposed Access Location

1.1 STUDY SCOPE

Stantec understands the scope of the work to include the following:

- Reviewing the existing transportation network and gathering background information.
- Reviewing the existing traffic count data.
- Estimating multi-modal trip generation (i.e., walking, cycling, transit, and driving) for the proposed development during the AM and PM peak hours, based on the City of Edmonton's rates, industry best practices, and tailored considerations based on the context of the development and its location. Trip reductions due to modal shift will be considered for this study.
- Establishing trip distribution and assignment for trips generated by the development during the AM and PM peak hours.
- Reviewing background traffic, site-generated traffic, and future total traffic at the study intersections. It is expected that two analysis horizons (AM and PM peak hours) will be required, including:
  - Existing Conditions (2020)
  - Site Full Buildout Horizon (assumed 2025)
- Based on discussions with the City of Edmonton, intersection capacity analysis is required for only two of the study intersections: 114 Street & 76 Avenue, and 112 Street & 76 Avenue.
- Recommending infrastructure improvements to address development-related impacts if necessary.
- Reviewing the E-W Alley operations and safety and identifying potential mitigation methods, as necessary.
- Reviewing the active transportation facilities (i.e., pedestrian, bicycle, and transit facilities) in the project vicinity and identifying any gaps.

- Reviewing and evaluating the proposed parking supply relative to the bylaw parking requirements for this development in its proposed location.

This scope has been developed through discussions with and approved by the City of Edmonton.

1.2 PREVIOUS STUDIES

Stantec previously completed the “McKernan Multifamily Site Traffic Impact Assessment” in May 2019, for the site immediately to the west of this site, consisting similarly of five existing single-family residential lots. This site is now referred to as “McKernan Gates” and therefore, the TIA will be referred to in this study as “the McKernan Gates TIA.” Several assumptions have been carried forward from that study to this one for consistency.

2.0 EXISTING CONDITIONS

2.1 EXISTING ROAD NETWORK

The site is located south of University Avenue between 113 Street and 114 Street. The analysis focuses on the road network and study intersections adjacent to the development. This road network includes:

- 114 Street is a four-lane divided arterial roadway. The Capital Line LRT runs parallel to 114 Street to the west.
- 113 Street is a two-lane local roadway with on-street parking on both sides of the road.
- 112 Street is a two-lane local roadway with parking prohibited on the east side of the road and shared-use lanes for cyclists and motorists.
- University Avenue is a four-lane arterial roadway which continues as 82 Avenue east of 114 Street.
  - East of 114 Street, “University Avenue” is a local roadway running parallel to 82 Avenue to the south, which ends in a cul-de-sac and does not connect through to 114 Street. This local road provides a shared roadway (low traffic) for both cyclists and motorists.
- 78 Avenue is a two-lane local roadway with on-street parking on both sides of the road.
- 76 Avenue is a two-lane collector roadway with bike lanes on both sides of the road. Due to the proximity to McKernan School, 76 Avenue is a designated playground zone with a posted speed limit of 30 km/hr. from 114 Street to east of 113 Street.

The E-W Alley, located between 79 Avenue and University Avenue, is a two-way paved alley that runs along the south side of the development and will provide site access to the underground parkade for both McKernan Gates and 114 University II developments.

McKernan Neighbourhood Renewal construction took place in 2017-2018 and included the replacement of sidewalks, curbs and gutters, and reconstruction and paving of the road, as well as bike lane infrastructure along 76 Avenue.

This TIA will focus on the following eight study intersections:

- University Avenue (82 Avenue) & 114 Street
- E-W Alley & 114 Street
- E-W Alley & 113 Street
- 78 Avenue & 114 Street
- 78 Avenue & 113 Street
- 78 Avenue & 112 Street
- 76 Avenue & 114 Street
- 76 Avenue & 112 Street

As noted previously, intersection analysis will be completed at the 76 Avenue intersections only. The road network and study intersections are shown in **Figure 2.1**.

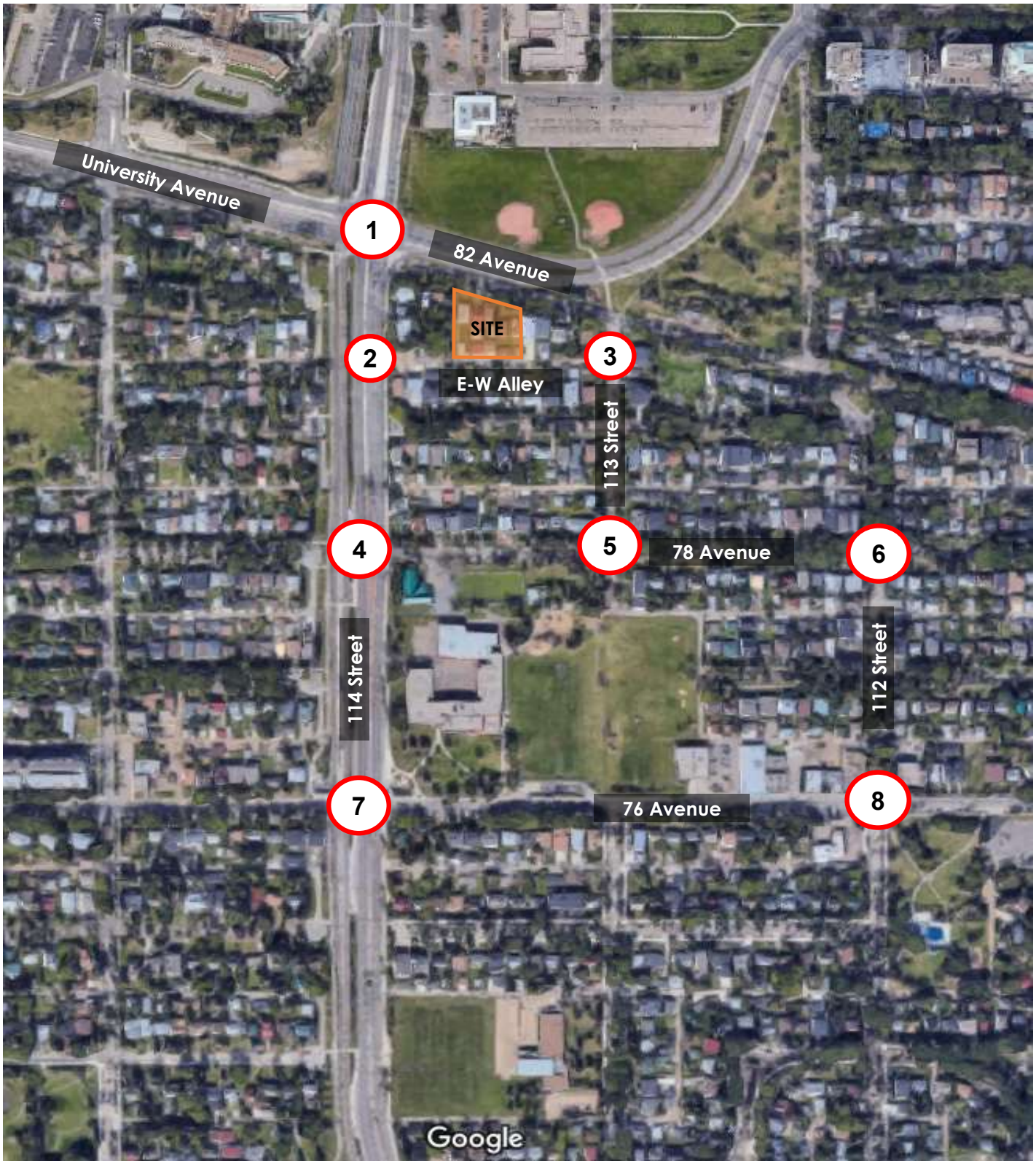

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Figure No.
2.1

Title
Road Network & Study Intersections

2.2 EXISTING TRAFFIC VOLUMES

2.2.1 Traffic Counts

Traffic counts at these eight study intersections during the AM and PM peak hour periods were taken from the McKernan Gates TIA. The traffic data for this study was based on City of Edmonton traffic count data, supplemented by traffic counts collected in April 2018. Adjustments were made to the City traffic data from 2016/17 to grow it to 2018. The detailed traffic count data from the McKernan Gates TIA is included in **Appendix A**.

2.2.2 Background Traffic Growth

The City of Edmonton's AAWDT data was used to review daily traffic volumes in the area from 2013 to 2018. The available traffic data and the average annual growth rates calculated based on the most recent 6-year and 3-year AAWDT data are presented in **Table 2.1**.

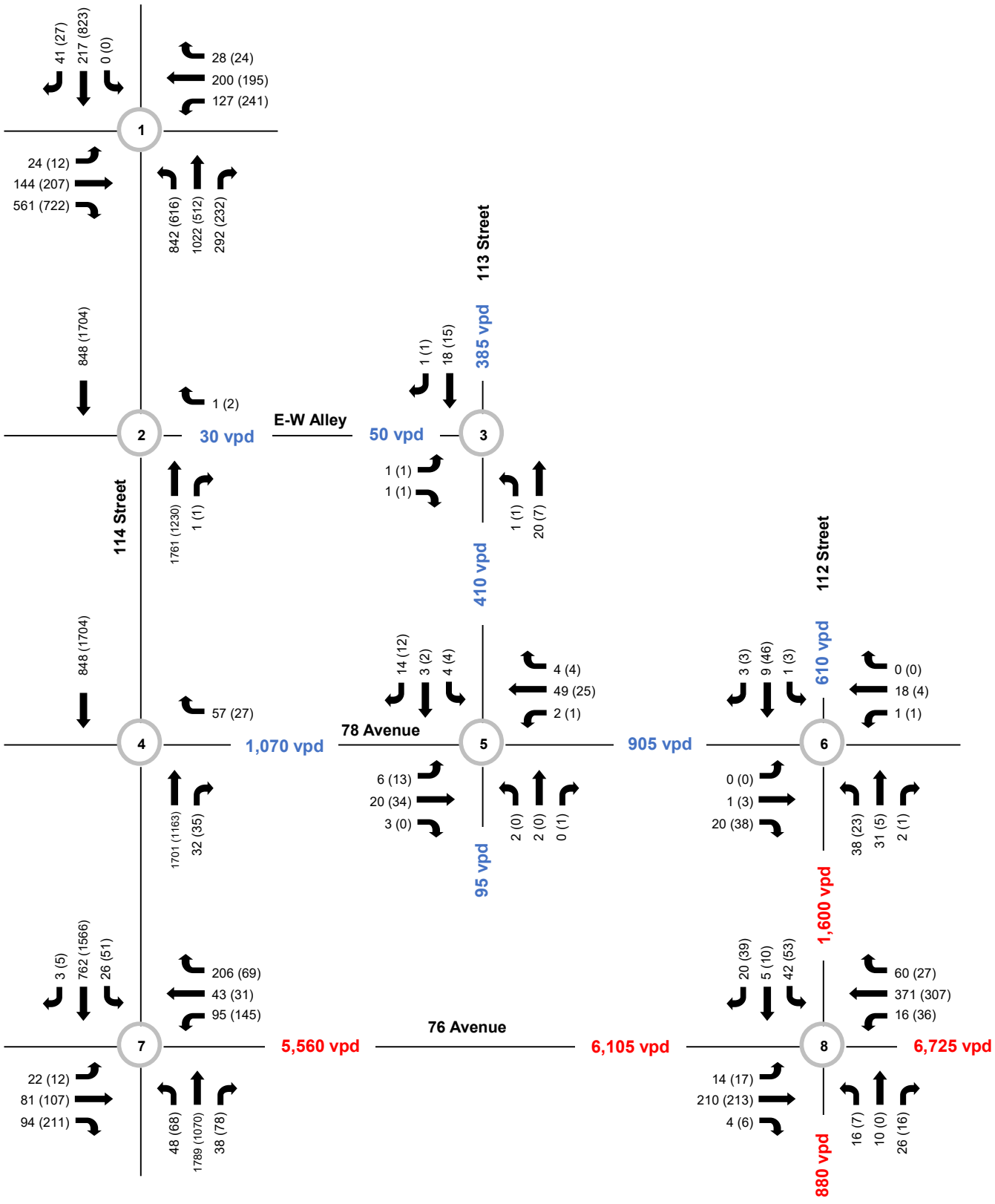
Table 2.1 – Historic Traffic Data

Road & Location	2013	2014	2015	2016	2017	2018	Average Annual Growth Rate	
							(2013-2018)	(2016-2018)
114 Street								
North of 73 Ave	37800	38900	39000	41900	40300	38300	0.4%	-4.4%
North of 76 Ave	36800	40900	37400	39800	37700	35800	-0.3%	-5.2%
76 Avenue								
West of 111 St	5700	5800	6000	5700	6600	6300	2.3%	5.6%
West of 114 St	3800	4000	4200	4700	4800	4600	4.0%	-1.0%
82/University Avenue								
West of 111St	21000	21600	21600	20500	20600	19600	-1.3	-2.2%
East of 114 St	13200	13600	13600	12900	13200	12500	-1.0	-1.5%

The data shows a low rate of annual traffic growth, with traffic volumes generally decreasing over the most recent three years. As the area is fairly built out, a significant increase in background traffic volumes is not expected in the future. Therefore, the existing (2018) traffic volumes from the McKernan Gates TIA were carried through as the assumed 2020 traffic volumes and the future background traffic volumes for this study. These existing peak hour traffic volumes are illustrated in **Figure 2.2.**

It is noted that due to the original traffic counts being collected at different times, there are volume imbalances between some adjacent intersections, for example, southbound on 114 Street. However, for consistency with the McKernan Gates TIA, these volumes have not been balanced.

Daily traffic volumes on the roadways in the study area were estimated using the formula: Daily Traffic Volumes (D) = k*(AM Peak Hour Volumes +PM Peak Hour Volumes). The available traffic data was reviewed, and k-values between 5 and 6.75 were found (typically lower within the neighbourhood and higher along the arterials). To be consistent throughout the network, a k-value of 6 was used for the study.



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5,560 vpd	Two-way Daily Traffic Volumes (based on 24 hr count)
905 vpd	Two-way Daily Traffic Volumes (estimated)
206 (69)	AM (PM) Peak Hour Traffic Volumes

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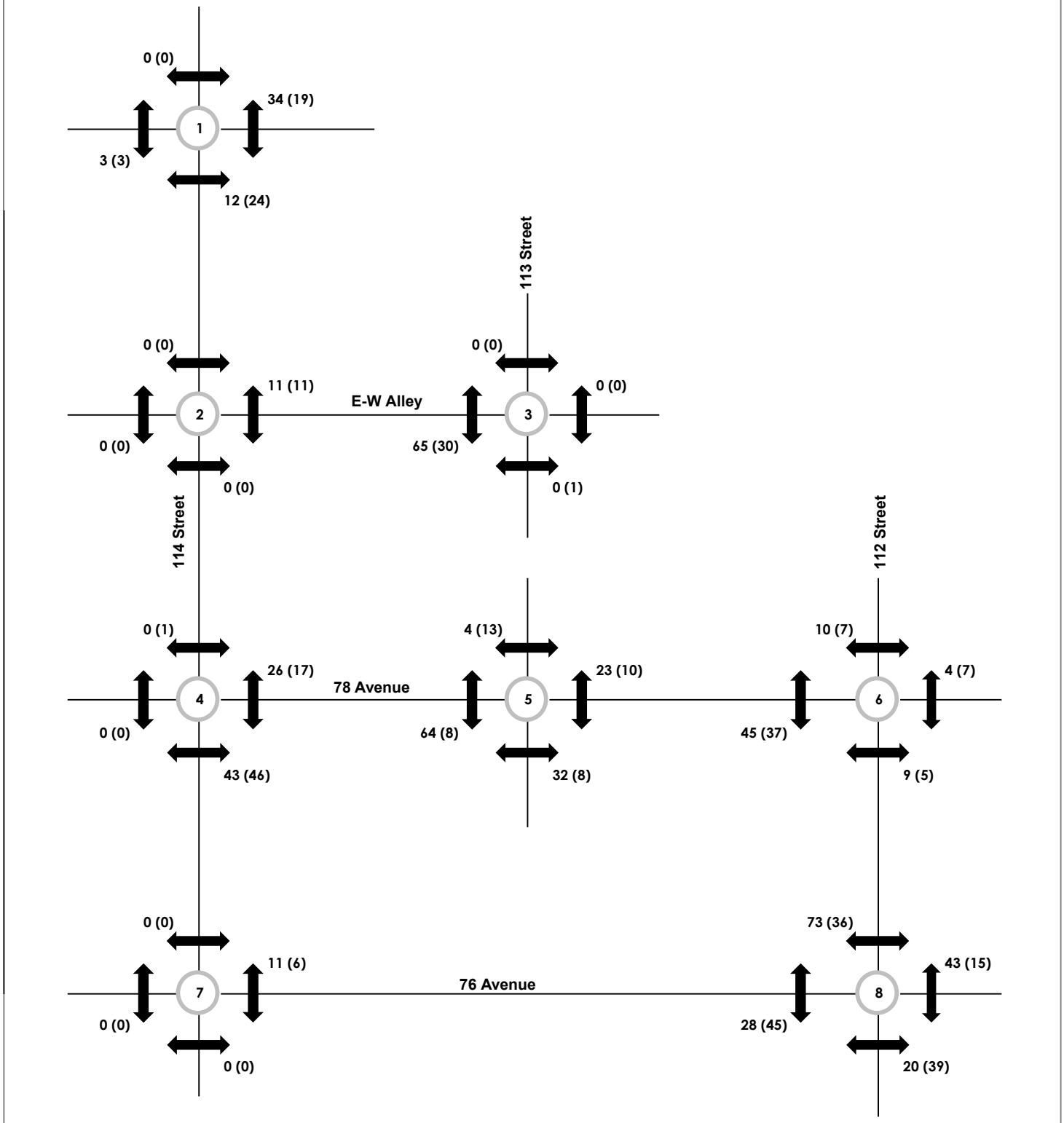
Figure No.
2.2

Title
Existing Traffic Volumes
2020

2.2.3 Pedestrian Traffic Volumes

Based on the site context, a relatively high number of pedestrian trips are currently experienced in the project area. The existing pedestrian volumes at the study intersections are shown in **Figure 2.3,** as included in the traffic count data and consistent with the McKernan Gates TIA.



(##) - AM Peak (PM Peak)

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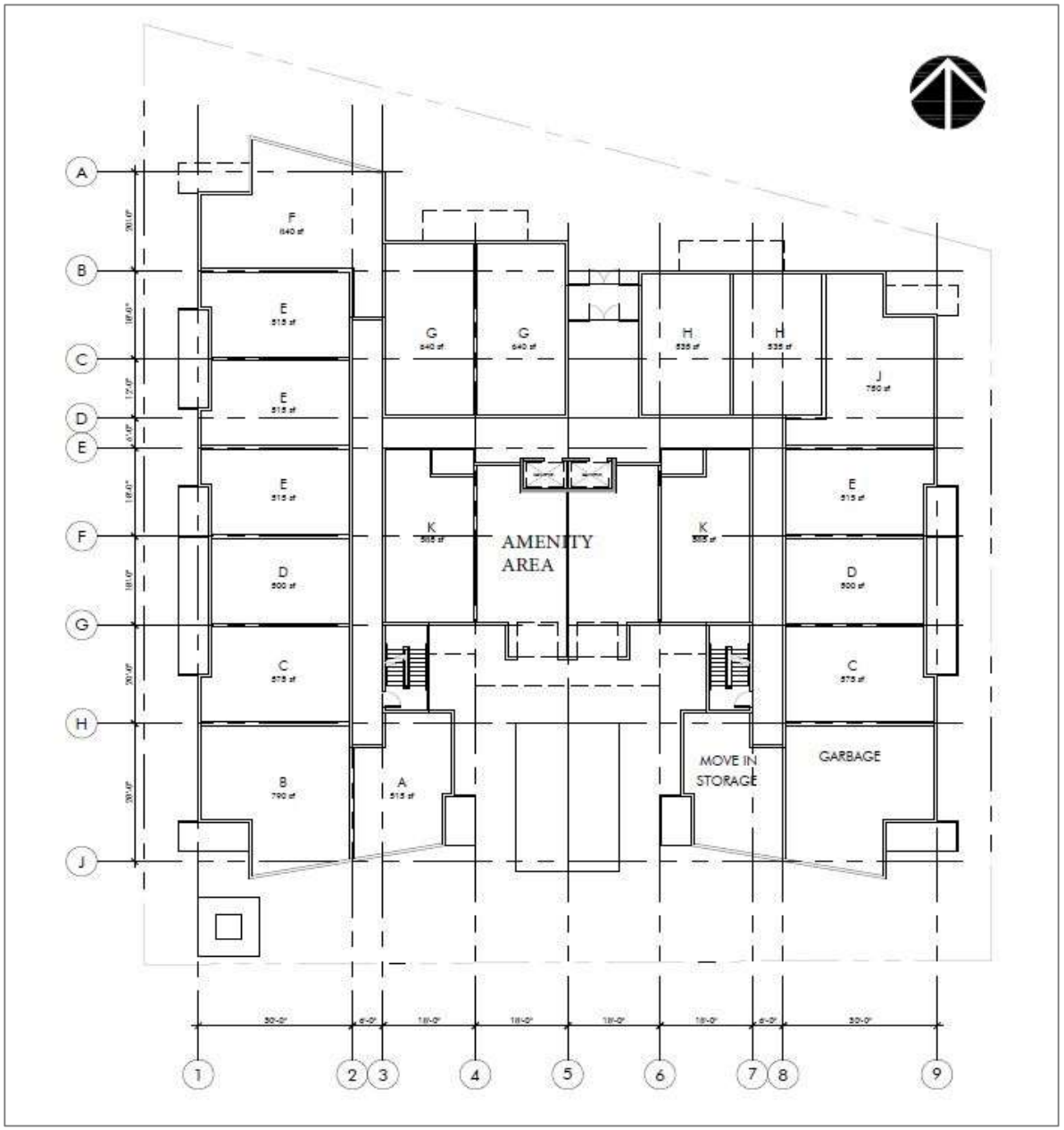
Figure No.
2.3

Title
Existing Pedestrian Volumes
2020

3.0 PROPOSED DEVELOPMENT

The proposed 114 University II will consist of up to 132 residential units. There will be a ramp, located at the southeast corner of the McKernan Gates via the E-W Alley to the south, to access the proposed shared underground parkade for both developments. **Figure 3.1** illustrates the site concept plan for this development.

Figure 3.1 – Proposed 114 University II Site Concept Plan



3.1 TRIP GENERATION

Trip generation for the site was calculated based on the City of Edmonton 2013 Trip Generation Rates, specifically based on "Residential: RA7 & RA8 – Apartment Housing" rates.

Table 3.1 presents the total number of trips generated by the full build-out of the development.

Table 3.1 – Site-Generated Trips – 132 Dwelling Units

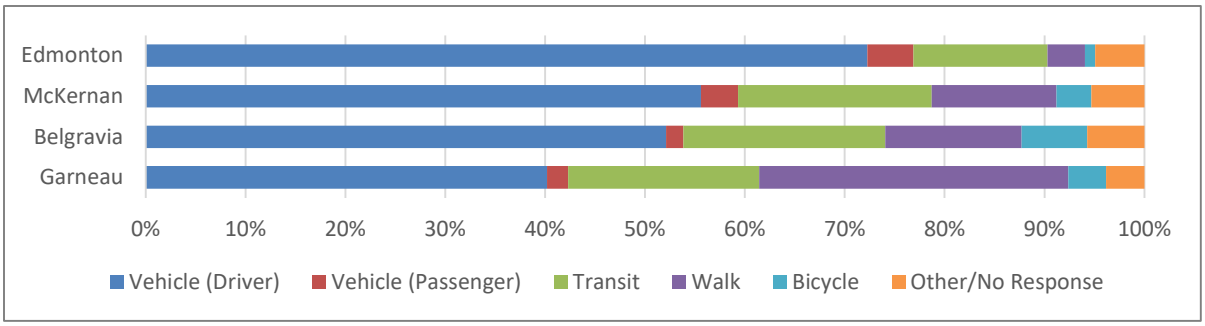
AM Peak Hour				PM Peak Hour				DAILY			
Trip Rate	Vehicle Trips			Trip Rate	Vehicle Trips			Trip Rate	Vehicle Trips		
	TOTAL	IN	OUT		TOTAL	IN	OUT		TOTAL	IN	OUT
0.34 trips/DU (17% in / 83% out)	45	8	37	0.40 trips/DU (63% in / 37% out)	53	33	20	5.81 trips/DU (50% in / 50% out)	766	383	383

3.2 MODE SPLIT TRIP REDUCTIONS

The 114 University II is in a highly pedestrian and transit-oriented area. As a result, the vehicular trip generation by the development is likely significantly less than the typical trip generation rates, with travel modes such as walking, biking, and transit as popular alternatives.

Edmonton's 2016 Municipal Census provides data on the primary mode of transportation from home to work with results organized by neighbourhoods. While this development is in the McKernan neighbourhood, its location at the very northeast boundary and proximity to the University of Alberta suggest that the mode split may be even higher than the neighbourhood. As a comparison, the various mode split for trips City-wide and the neighbourhoods of McKernan, Belgravia, and Garneau are shown in **Figure 3.2**.

Figure 3.2 – Edmonton 2016 Municipal Census: Main Mode of Transportation from Home to Work



The overall City of Edmonton mode split shows that 72% of respondents drove a vehicle as their primary mode of transportation from home to work. Comparatively, the nearby neighbourhoods range from 40% to 56% of respondents driving a vehicle as their primary mode of transportation, a 22-44% relative decrease from the City-wide results. Based on these numbers, it can reasonably be assumed that the suggested vehicle trips for this development will be approximately 30% lower than the standard trip generation rates. This 30% reduction in vehicle trips would be reallocated to other travel mode choices, such as walking and cycling. The revised vehicle trip generation is

summarized in **Table 3.2**. Directional allocation of trips (in/out) was calculated based on the City of Edmonton Origin-Destination tables; further information on trip distribution is included in **Section 3.3**.

Table 3.2 – Site-Generated Trips with Mode Split

		Total Trips	Trips IN	Trips OUT
AM Peak Hour	**Original Generated Trips**	45	8	37
	30% Mode Split Reduction	-13	-2	-11
	Revised Vehicle Trips	**32**	**6**	**26**
PM Peak Hour	**Original Generated Trips**	53	33	20
	30% Mode Split Reduction	-16	-10	-6
	Revised Vehicle Trips	**37**	**23**	**14**
Daily	**Original Generated Trips**	766	383	383
	30% Mode Split Reduction	-230	-115	-115
	Revised Vehicle Trips	**536**	**268**	**268**

3.3 TRIP DISTRIBUTION AND ASSIGNMENT

Access to the shared underground parkade for 114 University II will be provided via the E-W Alley to the south. Site-generated vehicular traffic to and from this development is expected to be distributed to the surrounding road network based on the City's 2030 origin-destination data. There are five external gates which correspond to the routes into and out of the study area. The trip distribution percentages to/from these gates are summarized in **Table 3.3**. The distribution is based on the logical routes to and from the 19 Sectors in the City's O-D data.

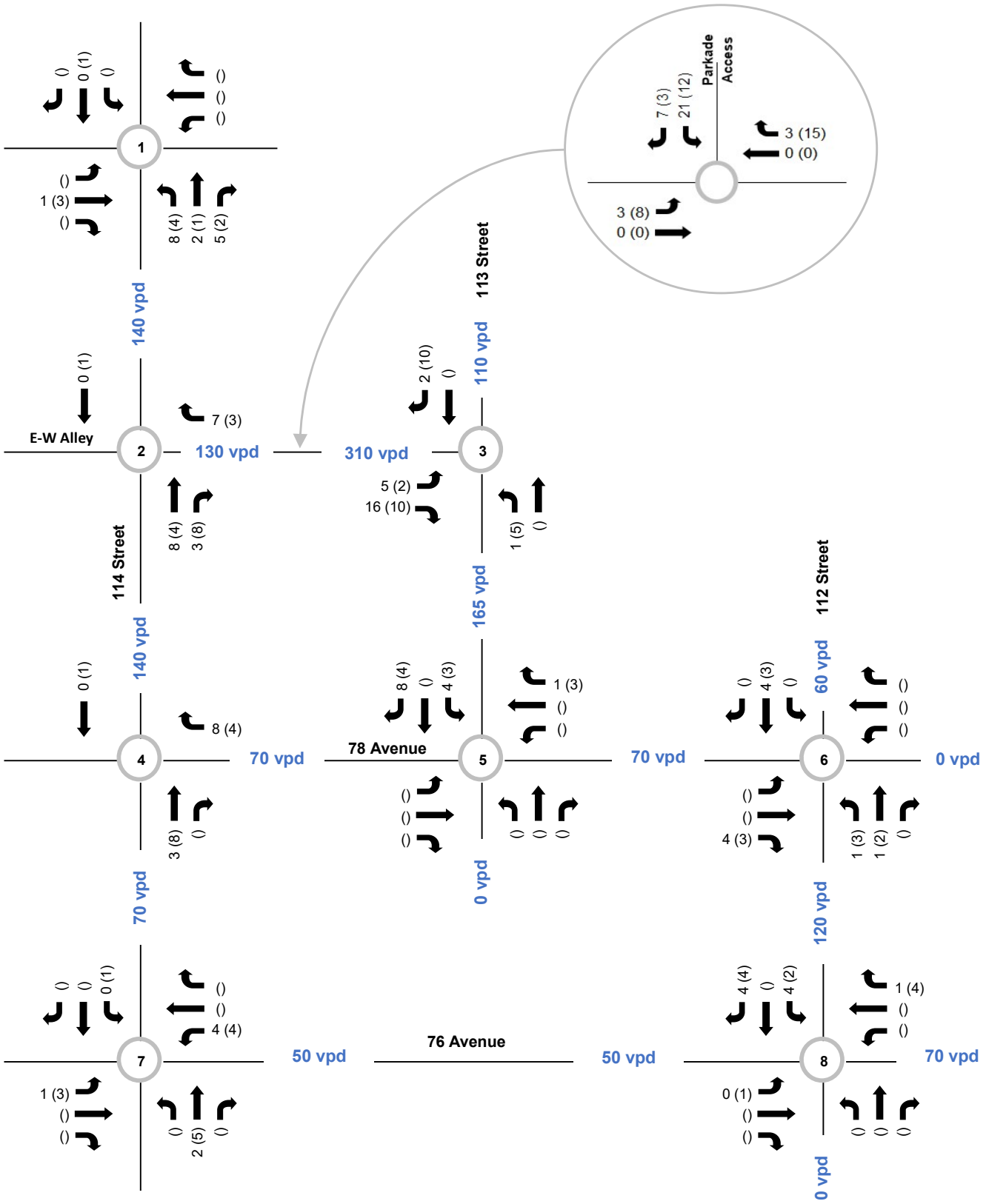
Table 3.3 – Trip Distribution

External Gate		AM Peak		PM Peak	
		Inbound	Outbound	Inbound	Outbound
A	114 Street North	0%	7%	4%	7%
B	University Ave West	20%	30%	26%	29%
C	82 Avenue East	20%	33%	30%	21%
D	114 Street South	40%	15%	22%	29%
E	76 Avenue East	20%	15%	18%	14%
Total		**100%**	**100%**	**100%**	**100%**

Detailed origin-destination and trip distribution data is included in **Appendix B**.

It is noted that 112 Street between 79 and 82 Avenue is a one-way street section with southbound traffic only between 79 and 80 Avenue and northbound traffic only between 80 Avenue and 82 Avenue. This configuration essentially eliminates 112 Street as a potential route for site-generated vehicle traffic destined to 82 Avenue. This traffic will instead utilize 114 Street or travel further east through the neighbourhood via University Avenue.

The resulting assigned site-generated vehicular peak hour traffic volume estimates for 114 University II are illustrated in **Figure 3.3**.



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4 (4) AM (PM) Peak Hour Traffic Volumes

50 vpd Two-way Daily Traffic Volumes (estimated)

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Figure No.
3.3

Title
Site-Generated Traffic

3.4 ADJACENT DEVELOPMENTS

As discussed, Stantec previously completed the McKernan Gates TIA for the site immediately to the west of this site. The trips generated by that site have been included in the analysis for this site as an adjacent development. Additionally, it is assumed that the remainder of the block, consisting of another five single family lots, will also be redeveloped to a similar density as 114 University II and McKernan Gates[1]; therefore, this has also been included as an adjacent (future) development. These two sites are illustrated in **Figure 3.4**.

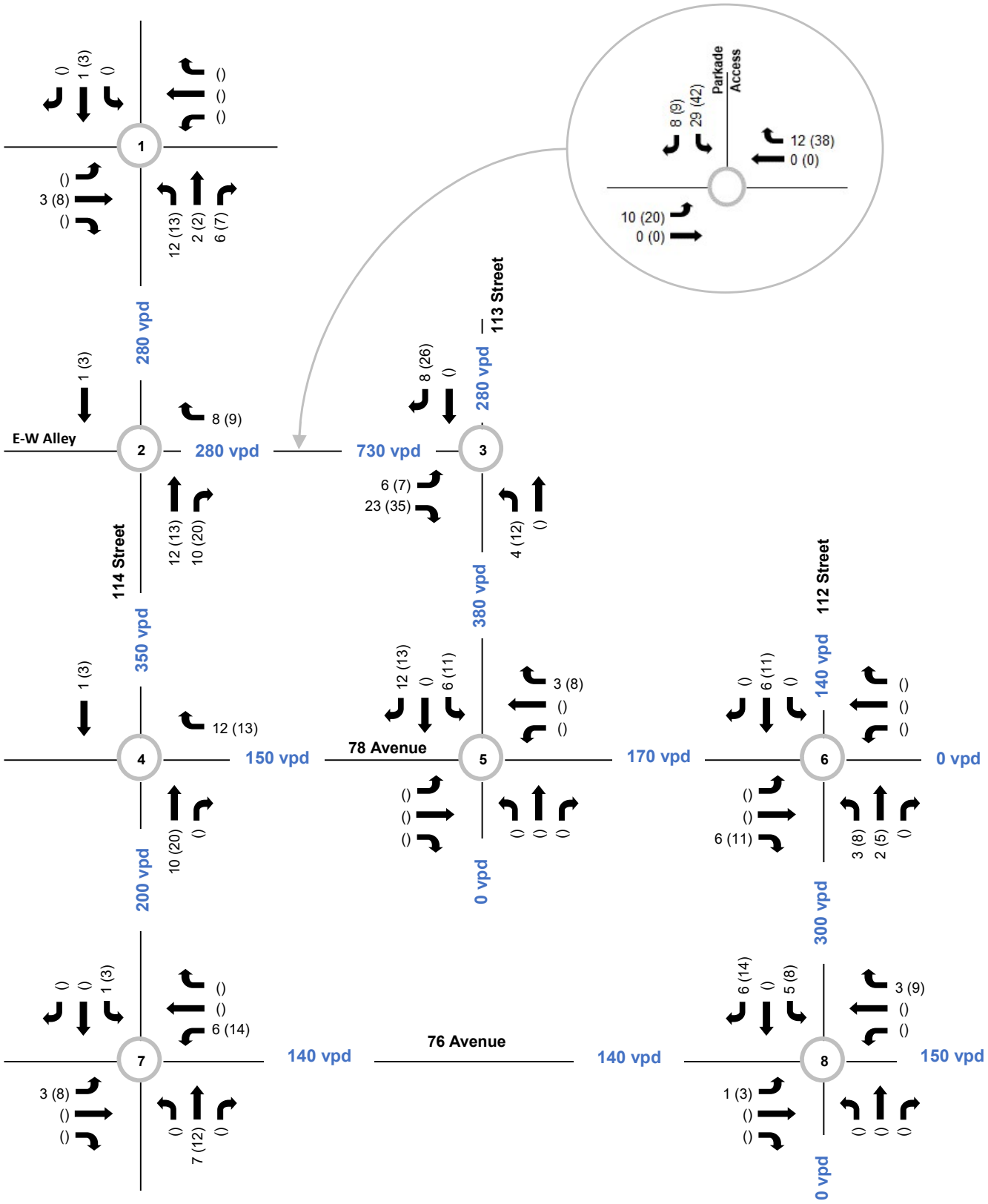
Figure 3.4 – Adjacent Development Locations

Trip generation for McKernan Gates was collected from the previous TIA and is illustrated in **Figure 3.5**.

For the future development site to the east, a site density of 497 units/hectare was assumed, representing the average of the McKernan Gates and 114 University II densities. Trip generation, distribution, and assignment were completed following the process and assumptions described in the previous section.

[1] The proposed future development to the east of site is assumed and it may not happen.

The estimated site-generated traffic volumes for the adjacent future development to the east of 114 University II are illustrated in **Figure 3.6**.



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6 (14) AM (PM) Peak Hour Traffic Volumes
140 vpd Two-way Daily Traffic Volumes (estimated)

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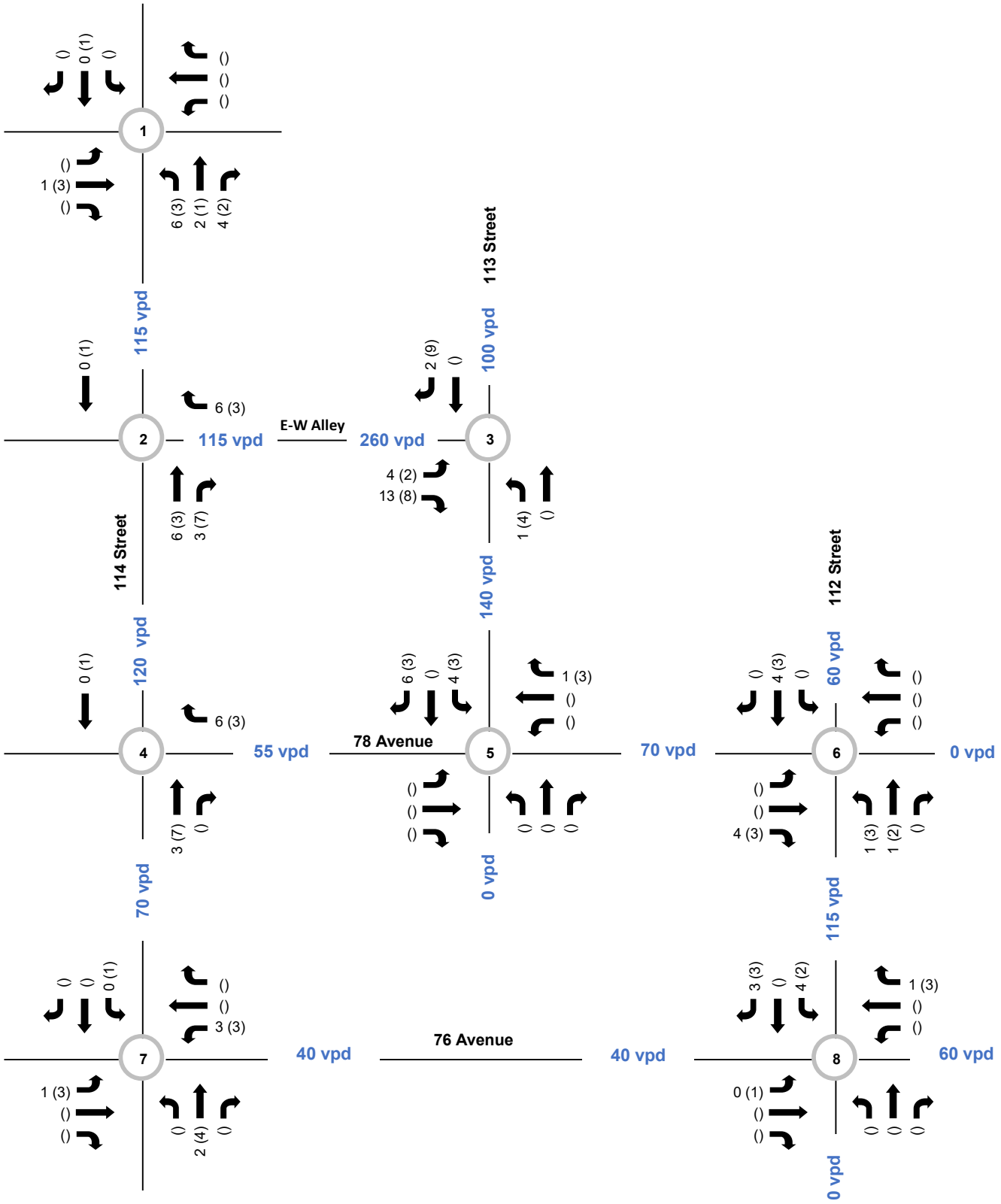
Figure No.
3.5

Title
Adjacent Generated Traffic (McKernan Gates)



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3 (3) AM (PM) Peak Hour Traffic Volumes
40 vpd Two-way Daily Traffic Volumes (estimated)

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Figure No.
3.6

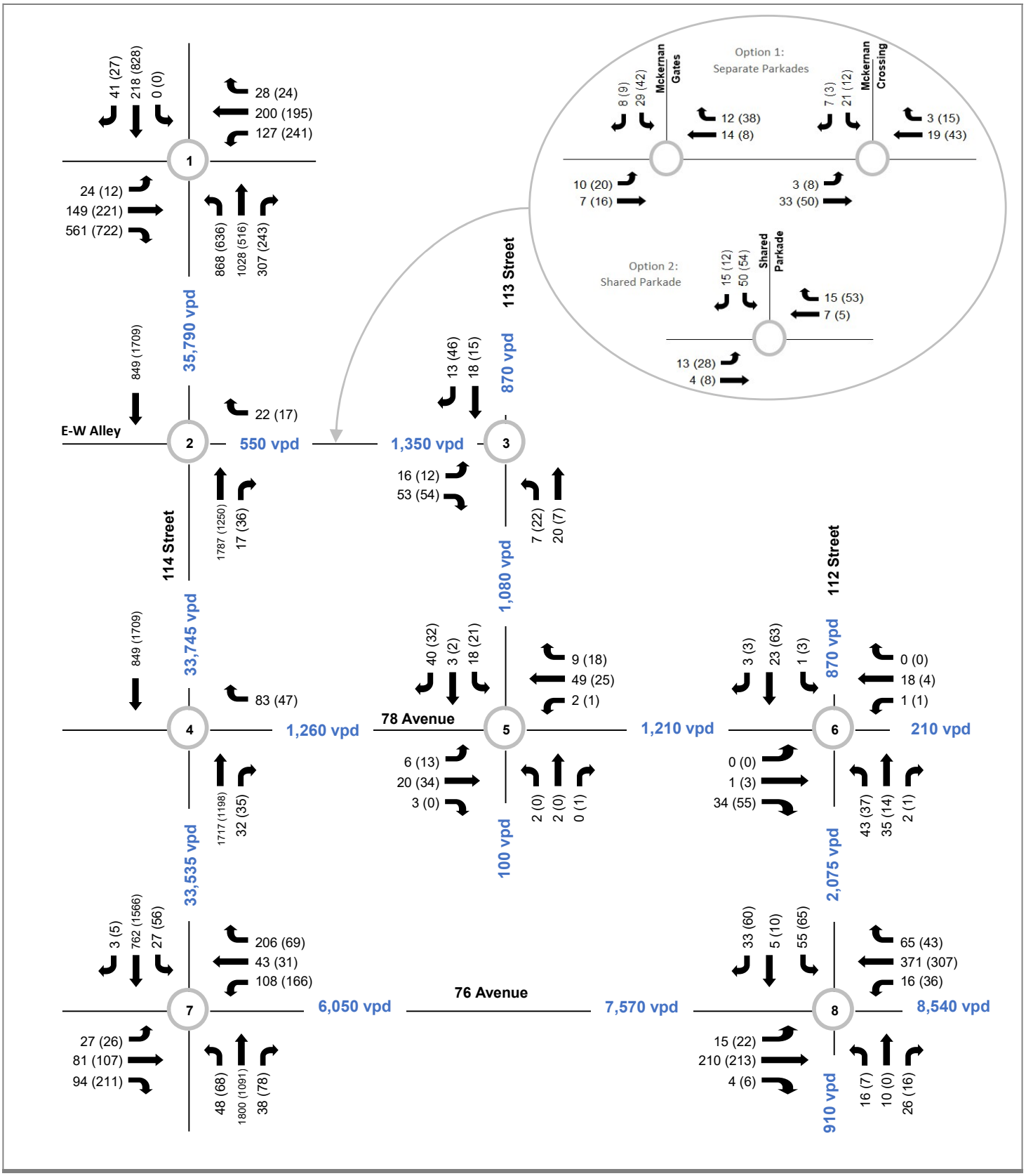
Title
Adjacent Generated Traffic (Future East Development)

3.5 FUTURE TOTAL TRAFFIC VOLUMES

The future total traffic volumes were established by superimposing the site-generated traffic volumes from 114 University II, McKernan Gates, and the adjacent future development, over the background traffic volumes. The resulting total traffic volumes are illustrated in **Figure 3.7.** As described in **Section 2.2.2**, daily traffic volumes on roadways were estimated using the formula: D = 6*(AM Peak Hour Volumes +PM Peak Hour Volumes).

As described previously, a shared underground parkade for both McKernan Gates and 114 University II developments is proposed for the site. Both shared and separate parkade entrance options are shown in **Figure 3.7** for additional information for this TIA.

As shown, the greatest increases in traffic are projected in the alley, particularly towards the east end. From there, the trips are distributed throughout the neighbourhood and arterial/collector/local roadway networks.



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6,050 vpd Two-way Daily Volume
206 (69) AM (PM) Peak Hour

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Figure No.
3.7

Title
Total Vehicular Traffic Volumes

4.0 TRAFFIC ANALYSIS

4.1 COLLECTOR AND LOCAL ROADWAY CAPACITY

The existing and projected total two-way daily traffic volumes along the study roadways in the vicinity of the proposed 114 University II are summarized in **Table 4.1**. This table also includes the high-level link volume thresholds for the roadway types provided by the City (based on TAC).

Table 4.1 – Roadway Daily Volumes and Capacity

Roadway	Current Classification	Existing Max. Daily Volumes	Projected Max. Daily Volumes	General Volume Threshold for Road
E-W Alley	Residential Alley	50 vpd	1,350 vpd	1,000 vpd[1]
78 Avenue	Local (parking on both sides)	1,070 vpd	1,260 vpd	1,000 vpd
76 Avenue	Collector (bike lanes on both sides)	6,725 vpd	8,540 vpd	5,000-10,000 vpd[2]
113 Street	Local (parking on both sides)	410 vpd	1,080 vpd	1,000 vpd
112 Street	Local (parking west side only)	1,600 vpd	2,075 vpd	1,000 vpd

[1]The City of Edmonton does not provide traffic volume thresholds for alleys; however, it is believed that capacity would be similar to that of a local road which has a capacity of 1,000 vpd.

[2]Depending on mitigation measures such as parking restrictions, limitation and/or removal of front drive access, intersection spacing, and access control.

With the full buildout of the 113-114 Street block, daily traffic volumes along 78 Avenue and 113 Street are projected to exceed the general threshold for a local roadway by approximately 26% and 8%, respectively. This is within a reasonable range of the threshold at this high-level planning stage and is expected to operate acceptably and within expectations for a core neighbourhood. 112 Street is already experiencing volumes beyond the threshold and is expected to increase to greater than double the volume threshold. This is mitigated by the prohibition of parking on the east side of the road, allowing for additional functional lane width. On these local roadways, vehicles may occasionally need to slow down or pull over to the side to let opposing vehicles pass.

The projected increase in daily traffic volumes on 76 Avenue is in the order of 27%; it is anticipated that this collector roadway can accommodate the volume increase.

Daily traffic volumes within the adjacent E-W Alley are expected to see a significant increase, which will impact operations. This is discussed further in **Section 5** (Alley Operations).

4.2 INTERSECTION OPERATIONS

4.2.1 Intersection Capacity Analysis

An intersection capacity analysis (ICA) was conducted by using Synchro 10 software, which is based on the Highway Capacity Manual (HCM 2010) methodology. Based on discussions with the City, ICA was completed for the 76 Avenue intersections only. The methodology considers the intersection geometry, traffic volumes, posted speed limit and type of intersection control. The average delays for each individual movement and the overall intersections were calculated. A level of service (LOS) was then assigned based on the calculated average delay. The level of service criteria for both signalized and unsignalized intersections is described in **Table 4.2**.

Table 4.2 – Level of Service Criteria

Level of Service	Average Control Delay (s/veh)		Comment
	Signalized Intersection	Unsignalized Intersection	
A	10.0 or less	10.0 or less	Very good operation
B	10.1 to 20.0	10.1 to 15.0	Good operation
C	20.1 to 35.0	15.1 to 25.0	Acceptable operation
D	35.1 to 55.0	25.1 to 35.0	Congestion
E	55.1 to 80.0	35.1 to 50.0	Significant congestion
F	More than 80.0	More than 50.0	Unacceptable operation
Breakdown	Very high	Very high	Conditions so poor that capacity calculations are meaningless

The volume-to-capacity (v/c) ratio was also considered. Current City of Edmonton operational standards identify LOS ≤ D and v/c < 0.85 as acceptable thresholds for short-term planning (i.e.10-15 years). Where traffic operations exceed the thresholds, it has been highlighted for further discussion.

114 Street & 76 Avenue Operations

The 114 Street and 76 Avenue intersection is a signalized all-directional Collector-Arterial intersection south of the proposed development site, with high volumes of northbound and southbound traffic. The McKernan/Belgravia LRT Station is located at the northwest corner of the intersection, and the LRT crosses 76 Avenue at-grade immediately west of the intersection. This LRT crossing is understood to have a significant impact on the traffic operations at this intersection. Pedestrians and cyclists crossing 114 Street at the intersection are accommodated through an underground passage under 114 Street providing access to the LRT station to/from communities to the east.

Synchro software does not have functional modules to analyze the capacity of an intersection with the operation of an adjacent LRT crossing. In order to more accurately reflect the conditions at this intersection, the saturation flow rate was adjusted to represent traffic delays associated with the impact of LRT crossing. Approximately 12 northbound and 12 southbound trains stop at McKernan/Belgravia LRT Station during the peak hours (8 Capital Line trains and 4 Metro Line trains). It was assumed that the LRT crossing gates are lowered for approximately 30 seconds for each crossing, resulting in a cumulative total of 6 min of “crossing time” for both northbound and southbound trains during the peak hour. If northbound and southbound trains overlap 10% of the time, this means that the intersection is

impeded by an LRT crossing approximately 19% of the time during the peak hour. Therefore, the saturation flow rates were decreased by 19% (from 1,850 to 1,500 pcu/hr/ln) for the impacted movements, which includes all but the northbound and southbound through movements. These two remaining movements were maintained at the standard 1,850 pcu/hr/ln saturation flow rate.

The intersection was modelled in Synchro with the above methodology under both the existing traffic volumes and the projected full build-out (complete block) volumes. Signal timing plans were provided by the City and used for this analysis, and are included in **Appendix C**. The results of this analysis are summarized in **Table 4.3** and the full Synchro output reports are included in **Appendix D**.

Currently the eastbound through, westbound through, northbound left and southbound left traffic volumes are experiencing significant delays (LOS E or F). The heavy northbound and southbound through movements operate with acceptable delays (LOS D or better); however, they do experience long queue lengths (e.g. 305 m southbound in the PM peak hour).

Under the projected full build-out volumes, these delays are expected to increase slightly. No new movements are expected to be pushed into unacceptable operation. While this intersection experiences capacity constraints and delays as noted above, it is believed that the intersection is currently built-out to its ultimate geometry and intersection geometry improvements are not being considered by the City of Edmonton. It is expected that as congestion increases over the peak hours, drivers may choose alternate routes, travel outside of the peak hours, or choose to travel by other modes including transit, LRT, walking, and cycling. Instead of roadway infrastructure improvements, alternate travel mode accommodations are being considered, for example, the 76 Avenue bike lanes and the Bus Network Redesign strategy.

112 Street & 76 Avenue Operations

The 112 Street and 76 Avenue intersection is an all-directional Collector-Local intersection south of the proposed development site, with high volumes of eastbound and westbound traffic. Pedestrian actuated signals are provided for the marked crosswalks on the east and west legs of the intersection. Since Synchro software does not include the signal timing setting for pedestrian actuated signals, this intersection was modeled as a semi-actuated uncoordinated signal, where the eastbound and westbound movements are held on green unless there is a northbound/southbound call. This is believed to be a relatively accurate representation of the existing conditions. The results of this analysis are summarized in **Table 4.3** and the full Synchro output reports are included in **Appendix D**.

In both the existing and projected full build-out conditions, all movements operate with acceptable delays (LOS D or better).

Table 4.3 - Intersection Capacity Analysis Results

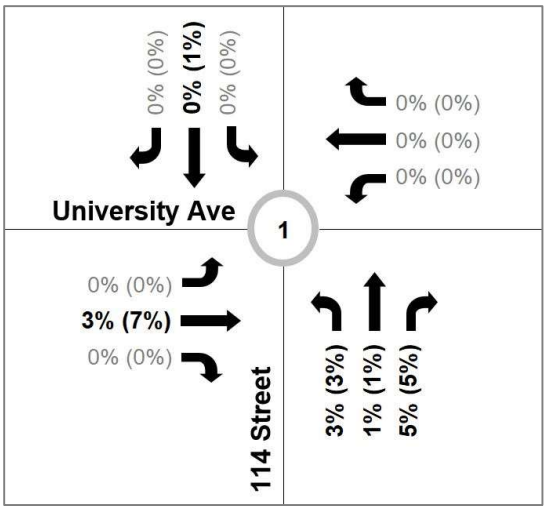
		EXISTING CONDITIONS												FULL BUILD OUT											
		EB			WB			NB			SB			EB			WB			NB			SB		
		L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R
Intersection #1 - 114 Street & 76 Avenue		***AM Peak Hour -***												***AM Peak Hour -***											
	Geometry	LT / R			LT / R			L / T / TR			L / T / T / R			LT / R			LT / R			L / T / TR			L / T / T / R		
	Volume (vph)	22	81	94	95	43	206	48	1789	38	26	762	3	27	81	94	108	43	206	48	1800	38	27	762	3
	V/C		0.48	0.35		0.74	0.66	0.55	0.87		0.55	0.43	0.01		0.53	0.37		0.77	0.68	0.57	0.88		0.57	0.43	0.01
	Delay (s)		76.1	16.5		91.2	26.8	101.4	31		76	25.5	0		80	16.9		93.4	31.6	105.1	31.1		80.1	25.1	0
	LOS		E	B		F	C	F	C		E	C	A		E	B		F	C	F	C		F	C	A
	95th Queue (m)		59	19		74.4	42.7	33.2	303		#25.3	107.3	0		62.3	19.2		80.9	49.1	#34.5	302.3		#26.8	104.7	0
	Total Volume (vph)	**3207**			**Intersection Delay**		**34.4**				**Intersection LOS**		**C**	**3237**			**Intersection Delay**		**35.4**				**Intersection LOS**		**D**
		PM Peak Hour -												***PM Peak Hour -***											
	Geometry	LT / R			LT / R			L / T / TR			L / T / T / R			LT / R			LT / R			L / T / TR			L / T / T / R		
	Volume (vph)	13	105	208	143	31	72	67	1113	77	50	1543	5	26	107	211	166	31	69	68	1091	78	56	1566	5
	V/C		0.64	0.64		0.85	0.27	0.69	0.54		0.24	0.9	0.02		0.7	0.66		0.88	0.25	0.75	0.56		0.29	0.91	0.02
	Delay (s)		91.5	21.1		105.4	8.9	115.1	19		28.7	47	0.2		96.5	26		108.1	8.4	126.5	20.9		31.5	49	0.2
	LOS		F	C		F	A	F	B		C	D	A		F	C		F	A	F	C		C	D	A
	95th Queue (m)		#74	35.4		#102.7	9.6	#47.7	136.6		21.3	305.7	0		#84.7	42.4		#115.7	9.5	#53.5	147.3		24.2	309.2	0
	Total Volume (vph)	**3427**			**Intersection Delay**		**40.8**				**Intersection LOS**		**D**	**3474**			**Intersection Delay**		**43.7**				**Intersection LOS**		**D**
Intersection #2 - 112 Street & 76 Avenue		***AM Peak Hour -***												***AM Peak Hour -***											
	Geometry	LTR			LTR			LTR			LTR			LTR			LTR			LTR			LTR		
	Volume (vph)	14	132	4	16	309	59	16	10	26	41	5	20	15	210	4	16	371	65	16	10	26	55	5	33
	V/C		0.16			0.31			0.36			0.5			0.16			0.32			0.32			0.6	
	Delay (s)		2.6			3.2			32.9			48.1			3.2			3.9			29.3			48.2	
	LOS		A			A			C			D			A			A			C			D	
	95th Queue (m)		16			33.4			15.9			22.3			18.5			39			15.4			28.2	
	Total Volume (vph)	**652**			**Intersection Delay**		**8.8**				**Intersection LOS**		**A**	**691**			**Intersection Delay**		**10.3**				**Intersection LOS**		**B**
		PM Peak Hour -												***PM Peak Hour -***											
	Geometry	LTR			LTR			LTR			LTR			LTR			LTR			LTR			LTR		
	Volume (vph)	17	209	6	35	211	27	7	1	16	52	10	38	22	213	6	36	307	43	7	0	16	65	10	60
	V/C		0.17			0.28			0.14			0.65			0.18			0.3			0.12			0.71	
	Delay (s)		3.4			3.9			21.4			50.8			4.3			4.8			19.3			49.3	
	LOS		A			A			C			D			A			A			B			D	
	95th Queue (m)		19.2			31.5			7.8			29.9			22.5			37.6			7.4			36	
	Total Volume (vph)	**629**			**Intersection Delay**		**10.8**				**Intersection LOS**		**B**	**692**			**Intersection Delay**		**12.7**				**Intersection LOS**		**B**

4.2.2 114 Street & University Avenue Operations

114 Street & University (82) Avenue is a major Arterial-Arterial intersection in Edmonton, with around 45,000 vehicles per day passing through it. This intersection is currently operating at capacity, with significant delays and queuing for the critical movements during the peak hours. The at-grade LRT crossing along the west side of the intersection adds some additional signal timing and capacity challenges, particularly in the eastbound direction.

The projected increase in traffic volumes at this intersection as a result of the developments is shown in **Figure 4.1** in terms of a percent increase.

Figure 4.1 – Increase in Traffic Volumes due to Developments



As shown, the increase in traffic is between 1-10% of the key movements. It is unlikely that residents and commuters will notice this increase to the existing high traffic volumes at this intersection and the low projected traffic volumes associated with these developments are not expected to impact the operations at this intersection.

5.0 ALLEY OPERATIONS

The E-W Alley is currently built to a residential standard with an approximately 4 m wide paved surface in a 5 m right of way (ROW). A power line runs along the south side of the alley, and power poles are built within the ROW approximately every 20 m. Additionally, some driveways and landscaping from the lots to the south extend out into the alley ROW. This encroachment and the overall width limit the ability for opposing vehicles to pass each other comfortably within this alley, forcing them to yield to an oncoming vehicle before maneuvering around a power pole.

The existing traffic volumes in the area are in the order of 30-50 vpd, meaning that these opposing traffic conflicts are likely infrequent currently. With the addition of 114 University II as well as the previous McKernan Gates and future development to the east, daily traffic volumes are expected to increase to 550 vpd at the west entrance and 1,350 vpd at the east entrance to the alley. This increase means that vehicles will more frequently encounter opposing vehicles. The City of Edmonton does not provide traffic volume thresholds for alleys; however, it is believed that capacity would be similar to that of a local road which has a capacity of 1,000 vpd.

While the projected daily volumes are higher than this threshold, they were calculated using a number of conservative assumptions. For example, the actual mode split reduction may be higher than the 30% used in this analysis. Limiting parking supply on-site may help to reduce vehicular volumes as it will require more users to select alternative travel modes. This is discussed further in **Section 7** (Parking Assessment).

Parking is currently prohibited along the roads abutting the alley, allowing for clear sightlines for exiting traffic. As traffic volumes along 113 Street are relatively low, vehicles will likely be able to navigate this intersection without significant difficulties. The volumes along 114 Street are much higher and provide fewer gaps for vehicles exiting the alley to enter the traffic flow. The northbound left-turn queue at the University Avenue /114 Street intersection often extends past the alley access during the peak hours, making it a difficult maneuver for vehicles exiting the alley to enter these lanes to turn westbound onto University Drive. Therefore, it was assumed that all vehicles destined to the west gate from the alley would likely choose another route, for example, travelling through the neighbourhood to enter 114 Street at 78 Avenue. It was observed that there are generally breaks in the northbound queue allowing vehicles to exit the alley and continue to go northbound through on 114 Street or northbound right on 82 Avenue.

5.1 ALLEY IMPROVEMENTS

The DC2 provision for McKernan Gates included a commitment to repaving the E-W Alley to a “residential standard.” Considering the likely future development of the entire block, a commercial standard may be more appropriate to accommodate the increase in traffic volumes. A commercial alley is typically a 6m wide ROW, paved across the entire width. This may not be possible in this case due to the limitations in ROW and the impediment of the power poles. To mitigate this, it is recommended that development be restricted such that building facades and any other barriers (fencing, landscaping, etc.) be set back to allow a 6 m wide “functional width.” For example, the first 2 m of the site property could be paved to allow for vehicles to utilize the space to pass each other comfortably.

The developer may also consider other opportunities to activate the alley space to make it more welcoming to the public, particularly pedestrian and bike users. These opportunities may include alternative surfaces (e.g. paving stones), landscaping, public art, and street furniture.

6.0 ACTIVE MODES AND TRANSIT ASSESSMENT

6.1 PEDESTRIAN FACILITIES

The site is in an urban area and therefore sidewalks are generally available on both sides of the streets in the project area. The intersection of 114 Street & University Drive has crosswalks on all but the west leg of the intersection, with an additional crosswalk across the northbound right turn lane.

On the north side of the site, University Avenue ends in a cul-de-sac just east of 114 Street. A sidewalk is provided on the south side of this portion of University Avenue. As part of the 2018 neighbourhood renewal, a sidewalk was constructed along the north side of University Avenue, replacing the existing “goat trail” running along the south side of 82 Avenue.

The McKernan-Belgravia Station Area Redevelopment Plan (ARP) has identified University Avenue between 113 and 115A Street as a future green boulevard, “a multi-purpose greenway to include a shared-use path, rain gardens or bio-swale and natural landscaping.” This park space will allow for pedestrian facilities which will accommodate the pedestrians currently using the goat trail. Timing for this improvement is currently unknown.

It is understood that the existing monowalk on the east side of 114 Street will be reconstructed as part of the adjacent McKernan Gates development to include a boulevard and 2 m sidewalk, which will enhance the pedestrian experience along this segment of 114 Street. However, it is noted that vehicles exiting the alley onto 114 Street will be required to stop further away from the roadway due to the relocation of the sidewalk. Existing landscaping along 114 Street south of the alley should be minimized to preserve sightlines for drivers exiting the alley and viewing northbound traffic on 114 Street to the south.

Primary pedestrian access to the building will be to the north, connecting into the future greenway. Additional pedestrian access will be provided to the south (to the alley) via a secondary access to the lobby/atrium.

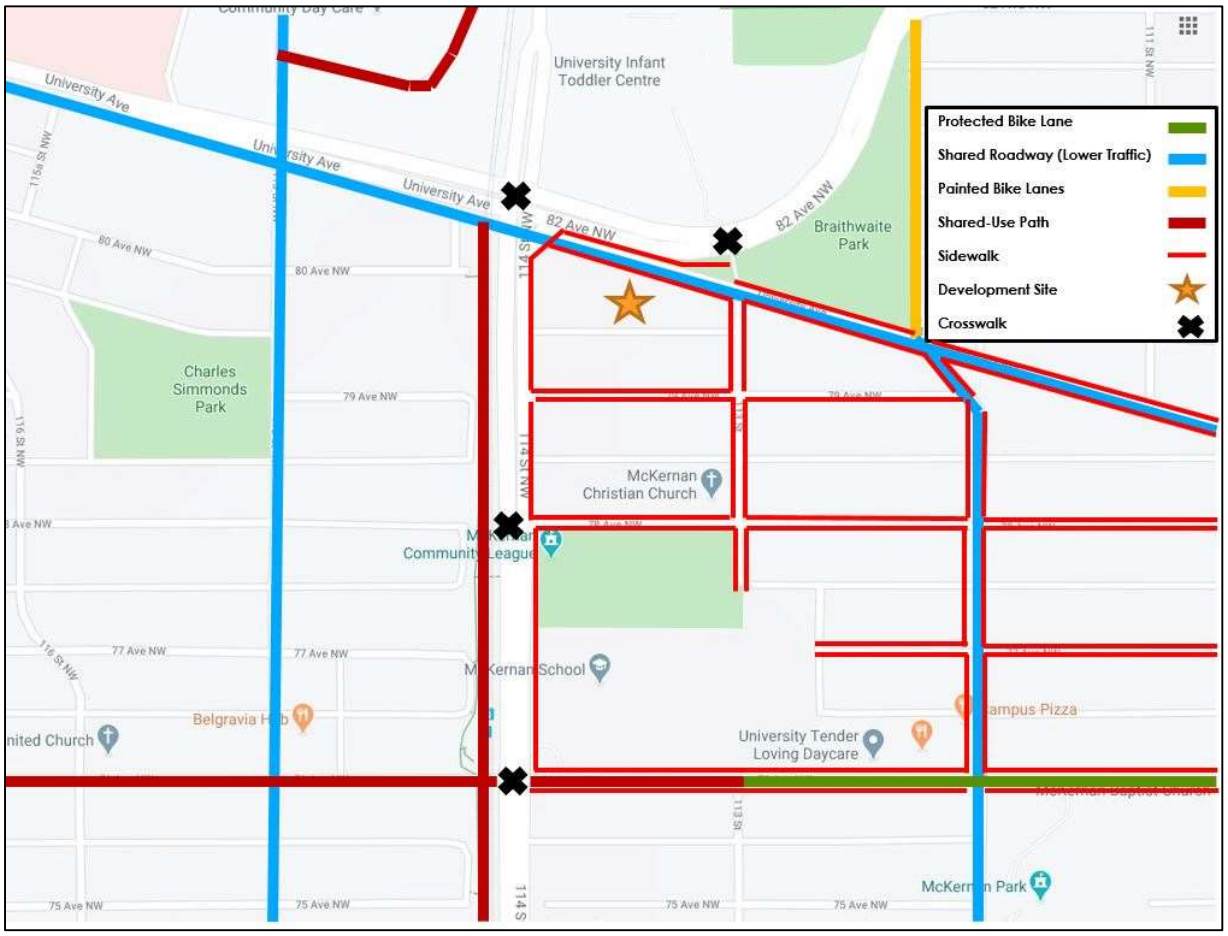
6.2 BICYCLE FACILITIES

There are no protected bike facilities immediately adjacent to the development site. Facilities in the surrounding area include the following:

- Protected bike lanes and shared-use path on 76 Avenue (approximately 400 m south of the site) which were constructed in 2017-2018
- Painted bike lanes on a portion of 112 Street, as well as on 110 and 111 Street (approximately 300 m, 500 m, and 700 m east of the site, respectively)
- Shared-Use Path running parallel to 114 Street, west of the LRT line (<100 m west of the site)
- Shared roadways with lower traffic volumes on University Avenue, 112 Street, and 115 Street (north, east, and west of the site)

The existing pedestrian and bike facilities are also illustrated in **Figure 6.1**.

Figure 6.1 – Study Area Existing Pedestrian and Bike Facilities



It is expected that most cyclists from this area who intend to bike to the University of Alberta or Downtown will be able to do so using existing biking facilities for most of their journey. Many will use the adjacent low traffic shared roadways to access the shared-use path/protected bike lane facilities along 76 Avenue or the shared-use path running parallel to the LRT line.

Cyclists are generally expected to access the building from the alley to the south. A secure bike storage room with access to both the alley and the main building is provided, as well as additional bike parking expected within the shared parkade.

The City of Edmonton Complete Streets Design and Construction Standards, **Table 3.7** Framework for Consideration of Bikeway Facilities, suggests daily traffic volume ranges for the selection of various bicycle infrastructure treatments. This table generally suggests 1,500 vpd as the threshold for a painted bike lane, and 3,000 vpd for a protected bike lane, although these are noted to just be a starting point for selecting a facility. 112 Street is currently experiencing approximately 1,600 vpd and projected to increase to approximately 2,075 vpd. It is therefore recommended that 112 Street be considered for upgrading to include a painted bike facility between 78 Avenue and 76 Avenue.

Based on Table 3.9 of the City's Complete Streets Design and Construction Standards, the design domain for a painted bike lane includes a width between 1.8 m and 2.1 m. In this case, the minimum recommended limit of 1.8 m is recommended due to the available right of way. Currently, 112 Street is a 9 m urban local residential road (17 m right of way). In order to accommodate the operation of all design vehicles, including passenger cars, medium single-unit trucks, waste collection trucks and fire trucks, it is recommended that a one-way painted bike lane be implemented on the east side only of 112 Street between 76 Avenue NW and 78 Avenue NW. This bike lane will connect to the existing and future proposed bike networks which were illustrated in the City's latest Draft Bike Plan.

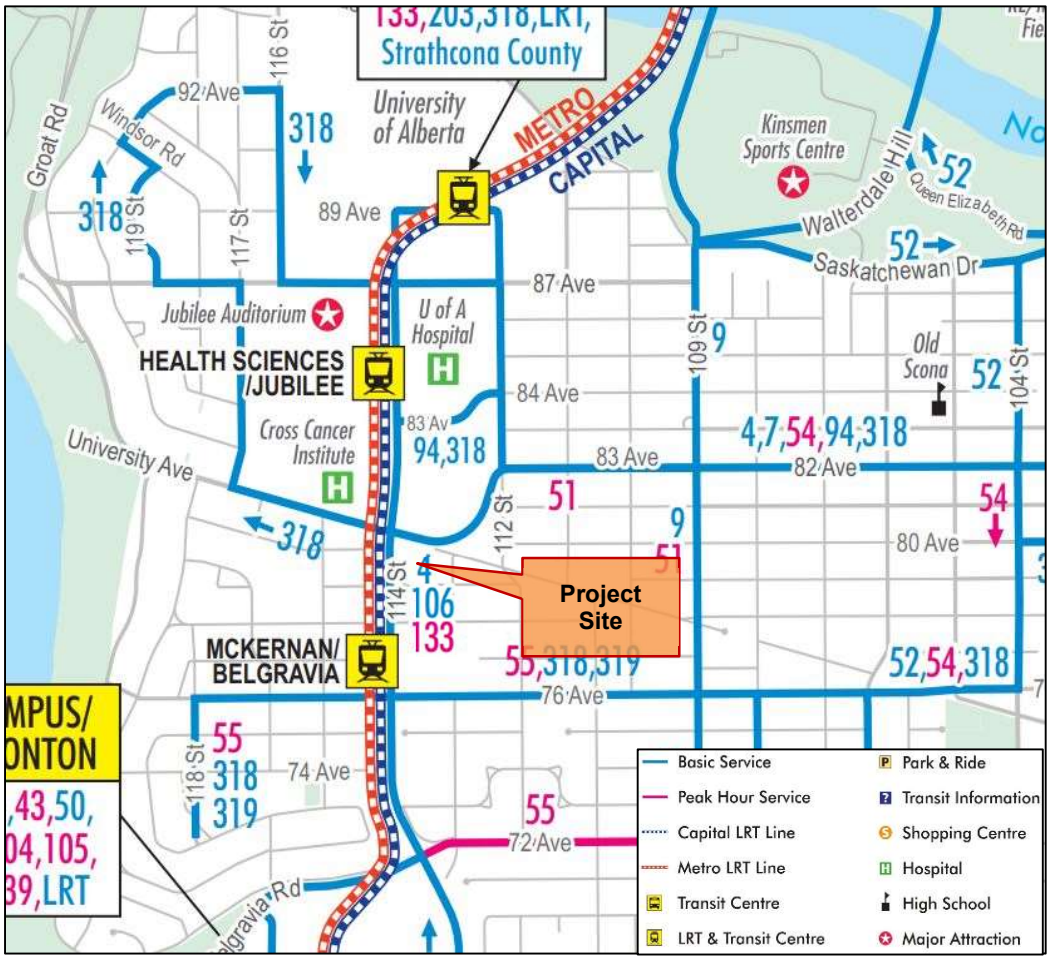
6.3 TRANSIT SERVICES

The site is currently well-serviced by transit with several routes running along 114 Street, 82 Avenue, and 76 Avenue. The site is also located approximately 400 m walking distance from both the McKernan/Belgravia and the Health Sciences Jubilee LRT Stations. Due to its proximity to the LRT, the site is classified as a Transit-Oriented Development (TOD) site. The following bus routes have stops in the close vicinity of the site:

- Route 4: Lewis Farms - West Edmonton Mall - South Campus/Ft Edmonton - University – Capilano
- Route 7: Jasper Place - Downtown – University
- Route 51: Parkallen – University
- Route 54: South Campus/Ft. Edmonton – University
- Route 55: Southgate - Belgravia
- Route 57: University - Downtown
- Route 94: Capilano - Bonnie Doon – University
- Route 106: Lessard - West Edmonton Mall - South Campus/Ft. Edmonton - University
- Route 133: Lewis Farms - West Edmonton Mall - University
- Route 318/319: Belgravia - University - Windsor Park - Southgate

The closest bus stops for transit users from the site are located on 114 Street near 78 Avenue at a walking distance of 350 m for the northbound stop and 400 m for the southbound stop. A crosswalk with pedestrian-actuated signals is located at 78 Avenue, providing a safe connection to the southbound stop. The City of Edmonton Existing Transit System Map in the project vicinity is illustrated in **Figure 6.2**.

Figure 6.2 – City of Edmonton Existing Transit System Map



The City of Edmonton's Bus Network Redesign and Transit Service Policy were approved in November 2019. It is expected that bus service will continue along 114 Street, University Avenue (west of 114 Street), 82 Avenue (east of 112 Street) and 76 Avenue in the study area. Specifically, 114 Street will provide:

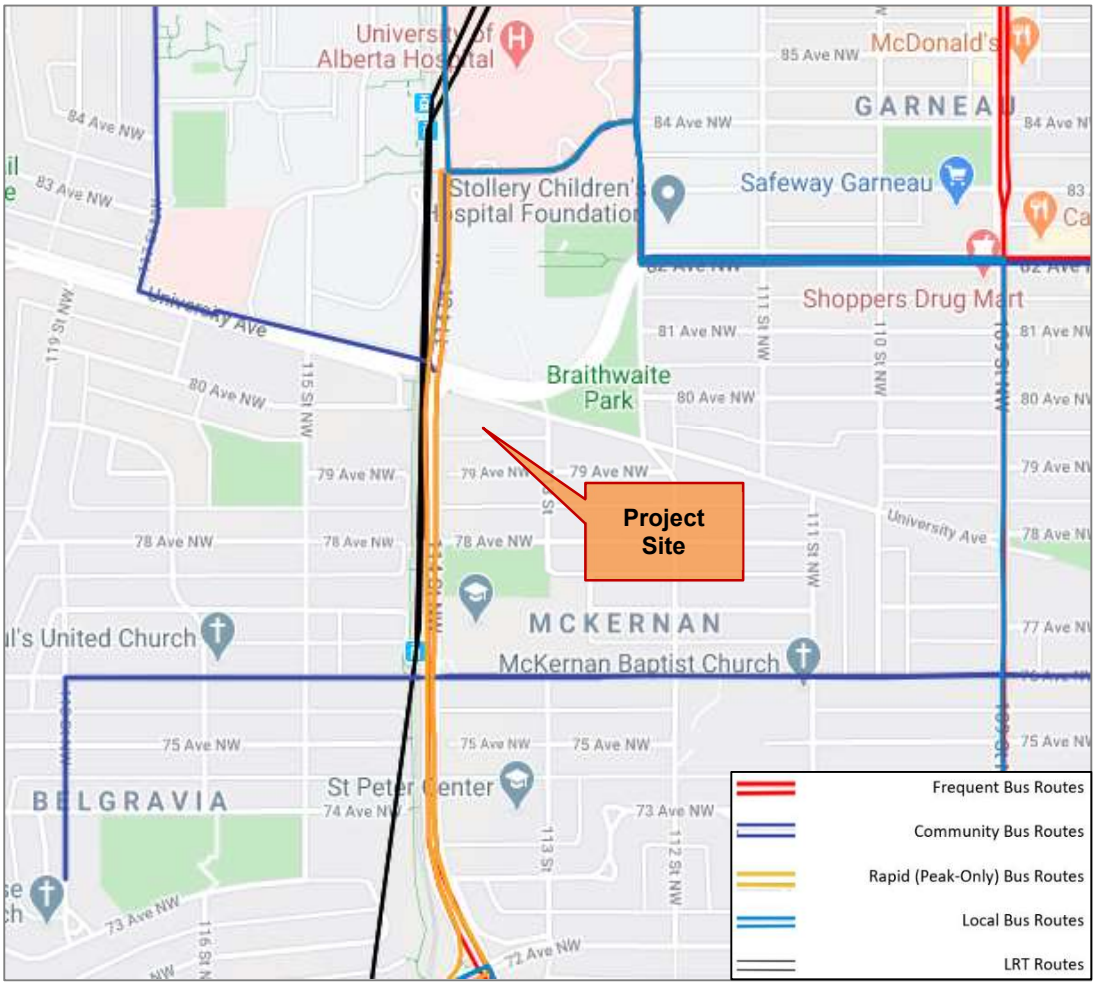
- Frequent Bus Routes, which are intended to provide more frequent bus service with buses coming every 15 mins or better at most times of the day, seven days per week.
- Rapid (Peak-Only) Bus Routes, which are intended to provide express bus service to connect downtown and suburban areas with limited stops. These express bus routes will operate during peak hours only.

University Avenue and 76 Avenue will provide:

- Community Bus Routes, which are intended to provide service in proximity to seniors' residences, schools, and local activity centres.

The latest future bus network is illustrated in **Figure 6.3.**

Figure 6.3 – City of Edmonton Future Bus Network Map



7.0 PARKING ASSESSMENT

Open Option Parking was approved by City Council at the June 23, 2020 Public Hearing. This policy removes the minimum on-site parking requirements from Edmonton's Zoning bylaw and allows the developer to determine how much parking to provide based on market conditions. For the developer's information, the previous minimum requirements are shown below to represent estimated parking demand. The site is located within approximately 400 m of two LRT Stations, designating it as a potential Transit Oriented Development. Therefore, *Schedule 1(C), TOD and Main Streets Guidelines* was used to calculate the estimated demand based on the current unit breakdown for the site. **Table 7.1** summarizes the estimated parking demand as per this zoning.

Table 7.1 – Estimated Parking Demand (Schedule 1C)

Land Use	Units	Min. Parking Rate	Min Parking Stalls
1 Bedroom Dwelling	109	0.5/DU	55
2 Bedroom Dwelling	23	0.75/DU	17
Visitor Parking	132	1.0/10 DU (after first 10)	13
TOTAL	**132**		**85**

This estimated demand should be taken into consideration when determining the proposed number of provided parking stalls. Transportation Demand Management (TDM) measures could be considered by the developer to further encourage alternative travel modes and reduce the parking demand. These may include:

- Additional bicycle parking in excess of the minimum requirements
- Supplemental cycling facilities such as a bicycle wash/repair stand area within the parkade
- Bike sharing station (services provided by others)
- Parking stalls for public car shares on site
- Transit pass subsidies as a purchase or rental incentive

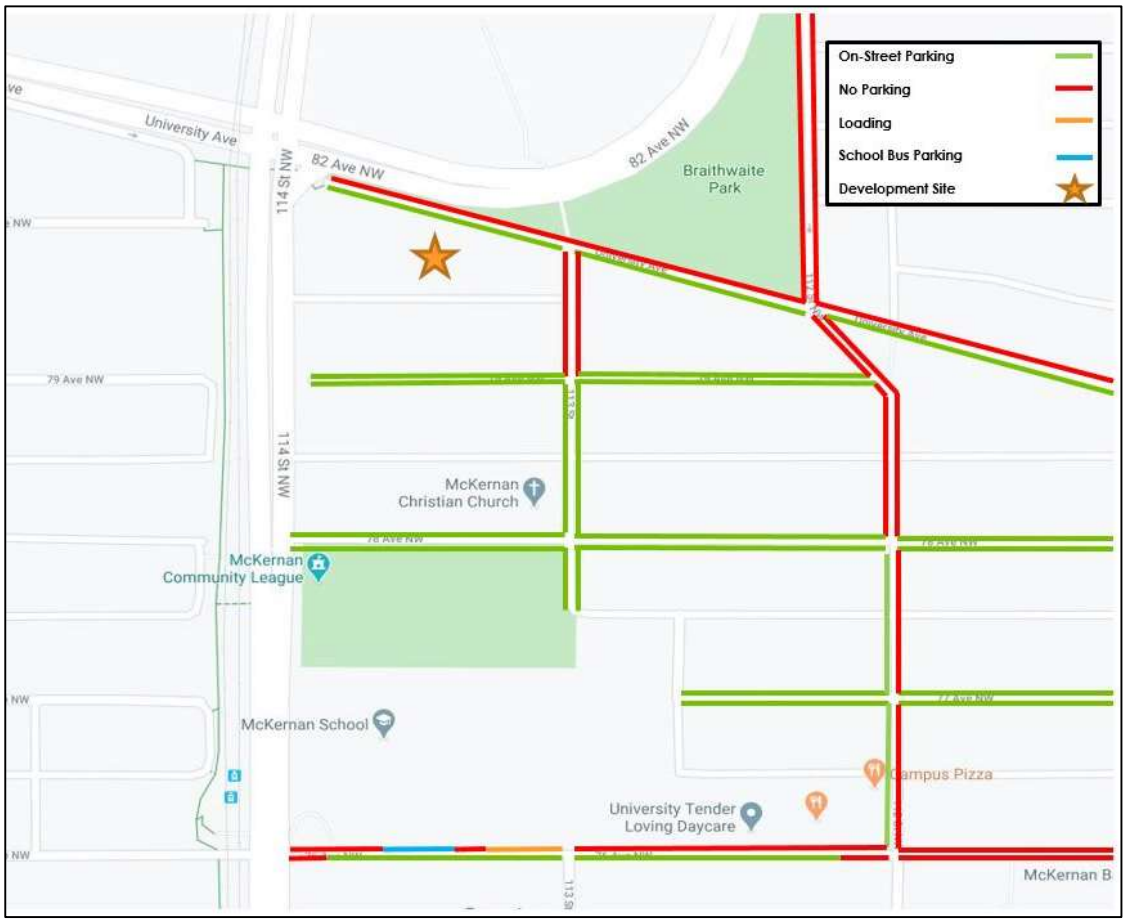
7.1 BICYCLE PARKING

The Edmonton Zoning Bylaw maintains requirements for bicycle parking. For multi-unit residential housing developments, a minimum of 0.5 bicycle parking spaces per dwelling shall be provided, with at least 10% allocated as short-term spaces. For 114 University II, this represents a minimum of 65 bicycle parking spaces with at least 7 allocated as short-term. The developer is currently reviewing the potential to provide additional bike parking beyond this minimum requirement.

7.2 EXISTING ON-STREET PARKING

Existing on-street parking within the McKernan neighbourhood is illustrated in **Figure 7.1**.

Figure 7.1 – Existing On-Street Parking Characteristics



The areas where parking is permitted are generally restricted to two hours for non-residents from 8 AM to 6 PM Monday to Friday (with no restrictions outside these hours). Residents have a parking tag to allow for extended parking in these zones; however, this would not apply for multi-family residences like 114 University II. This will allow for visitors to the site to utilize street parking for short visits but will limit residents from overloading the local street parking supply. It is anticipated that with a high active modes & transit mode split and some underground parking provided on site, it is not expected that this development will significantly impact the adjacent on-street parking network.

8.0 CONCLUSION

2226436 Alberta Ltd. is proposing to redevelop the site located south of University Avenue between 113 and 114 Streets in the McKernan neighbourhood of Edmonton. The site currently contains five single-family lots and is zoned Single Detached Residential (RF3). The proposed 114 University II development will consist of a 6-story residential apartment building with up to 132 units, requiring it to be rezoned from the existing RF3 to a Site Specific Development Control Provision (DC2). Parking will be provided with an underground parkade accessed via the alley to the south.

The site is well connected to the roadway network via 114 Street, 76 Avenue and other adjacent neighbourhood roadways. Vehicle trips generated by the site, as well as the adjacent developments including McKernan Gates to the west and an assumed future development to the east will be distributed throughout the neighbourhood. The existing traffic volumes on the adjacent arterial/collector roadway network including 114 Street, University Avenue, and 76 Street are all relatively high, and minimal traffic volume increases are expected on these roadways.

Traffic analysis completed for the site indicated that minimal transportation impacts are expected. The 114 Street & 76 Avenue intersection currently experiences significant delays and queuing in the peak hours. Under the projected full build-out volumes, these delays are expected to increase slightly with some movements worsening from LOS E to F, although no new movements are expected to be pushed into unacceptable operation. It should be noted that the projected future traffic volumes used in this analysis include conservative assumptions regarding the redevelopment of the land located east of this site, which may not come to fruition.

No intersection improvements are recommended at this intersection in relation to this redevelopment. The intersection is already built out to its ultimate geometry and it is expected that as traffic congestion increases, drivers may choose alternate routes, travel outside of the peak hours, or choose to travel by other modes. Alternative transportation mode improvements including the 76 Avenue bike lanes and the Bus Network Redesign strategy may also help to decrease traffic congestion in this area.

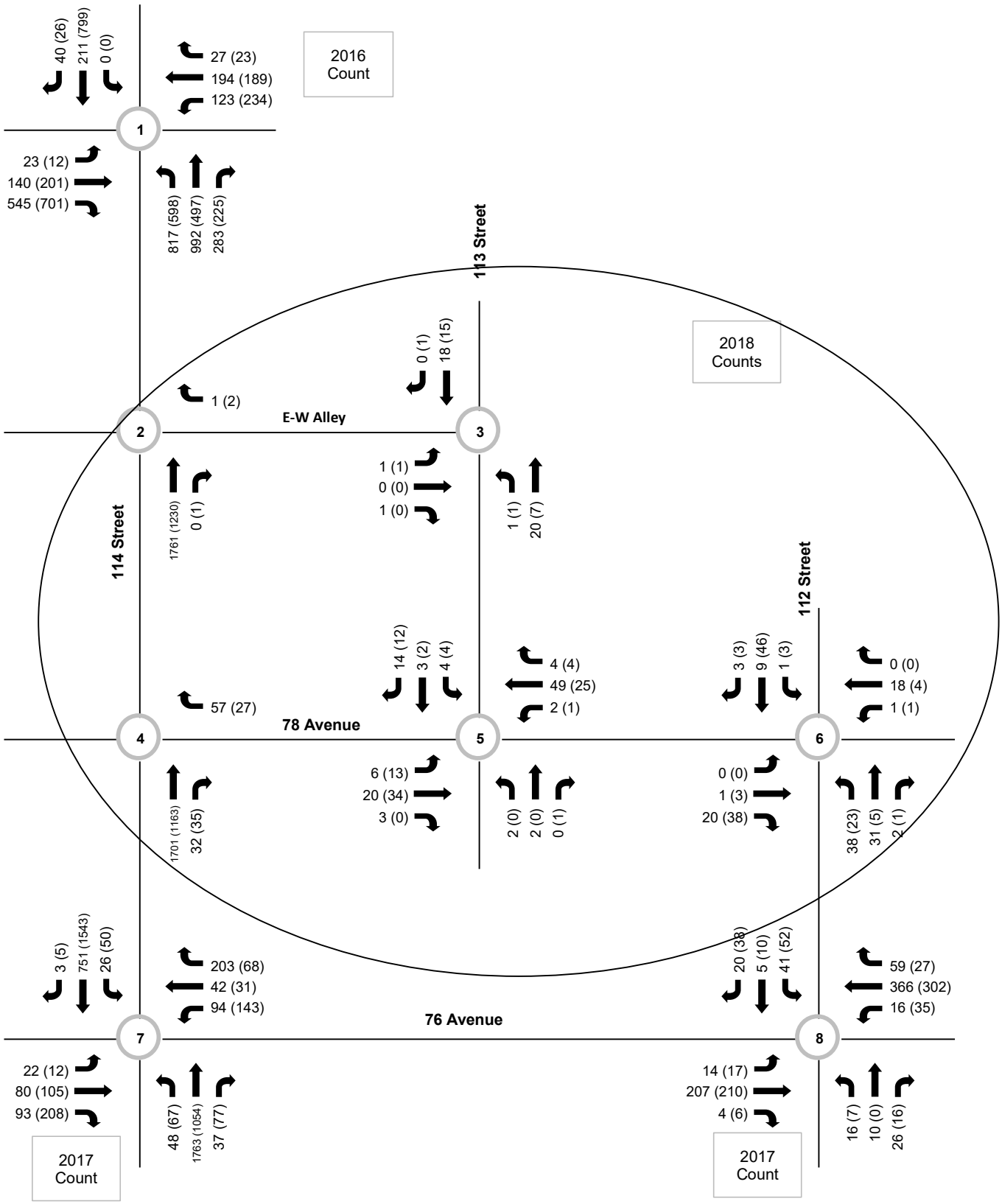
Daily alley traffic volumes are expected to increase significantly. It is recommended that the alley therefore be upgraded to a commercial standard, with a 6 m wide paved surface where possible. Where constraints exist in achieving this 6 m, building setbacks are recommended to allow for two-way traffic throughout the alley. Sightlines at the alley entrances are sufficient, and it is expected that the alley intersections should be able to accommodate the increase in traffic volumes.

The site is located in a core neighbourhood with several multi-modal transportation facilities serving the area, including sidewalks, bike lanes, and transit routes. It is anticipated that these existing facilities will continue to provide quality services to the re-development and to the surrounding areas to accommodate the needs for pedestrians, cyclists, and transit users once the re-development is completed.

A minimum of 65 bicycle parking stalls will be provided on site in accordance with the revised zoning bylaw. Vehicle parking requirements are no longer mandated by the City of Edmonton Zoning Bylaw; however, based on the previous TOD overlay parking rates, parking demand is expected to be in the order of 85 parking stalls. On-street parking is available and is generally limited to 2-hour parking within weekday hours.

APPENDIX A

Traffic Count Data



Stantec

400-10220 103 Avenue NW
Edmonton AB

Client/Project
114 University II TIA
2226436 Alberta Ltd.

Nov 2020

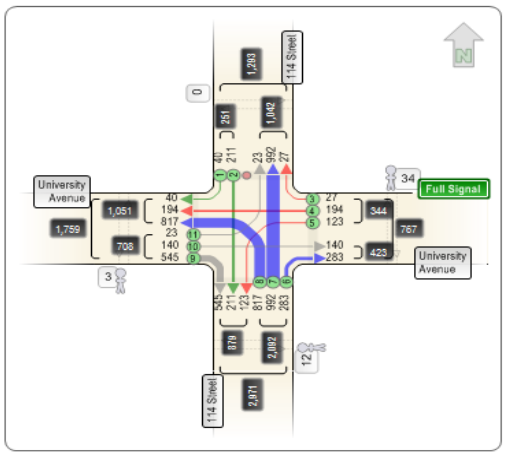
Figure No.

Title
Existing Traffic Volumes
Raw Count Data

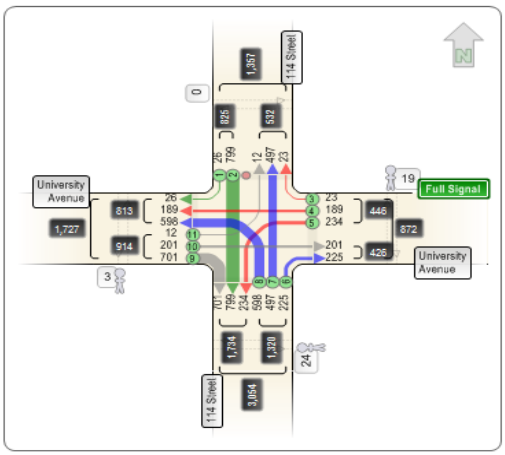
Turning Movement Count

Location	**University Avenue and 114 Street**
Site Number	**237826**
Date	**2016/Oct/12 12:00:00 AM-2016/Oct/13 12:00:00 AM**
Vehicle Type	**VEHICLE**
Weather	**Cloudy**
County	**South West**

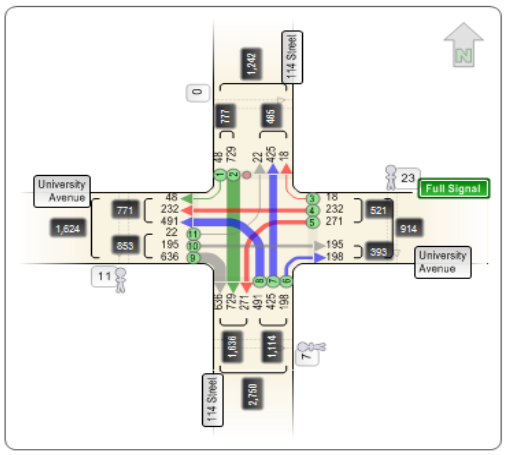
Peak Hour AM
7:45 AM - 8:45 AM



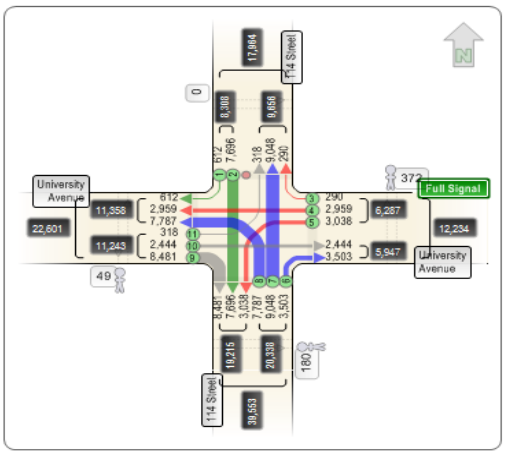
Peak Hour PM
4:50 PM - 5:50 PM



Off Peak Hour
2:30 PM - 3:30 PM



Estimated 24 Hour



	Approach: West (EBD)			Approach: East (WBD)			Approach: South (NBD)			Approach: North (SBD)		
	L	T	R	L	T	R	L	T	R	T	R	**Sum**
Peak Hour AM 7:45 AM-8:45 AM	23	140	545	123	194	27	817	992	283	211	40	3395
Peak Hour PM 4:50 PM-5:50 PM	12	201	701	234	189	23	598	497	225	799	26	3505
Off Peak Hour 2:30 PM-3:30 PM	22	195	636	271	232	18	491	425	198	729	48	3265
Estimated 24 Hour	318	2444	8481	3038	2959	290	7787	9048	3503	7696	612	46176
Sum Whole Traffic Count	318	2444	8481	3038	2959	290	7787	9048	3503	7696	612	46176
Peak Hour AM Per Flow	31 8:25 AM-9:25 AM	146 8:15 AM-9:15 AM	563 7:40 AM-8:40 AM	128 7:30 AM-8:30 AM	203 7:30 AM-8:30 AM	32 7:55 AM-8:55 AM	833 7:50 AM-8:50 AM	1002 7:55 AM-8:55 AM	300 8:20 AM-9:20 AM	258 7:00 AM-8:00 AM	57 8:20 AM-9:20 AM	3553
Peak Hour PM Per Flow	14 3:30 PM-4:30 PM	210 4:05 PM-5:05 PM	701 4:50 PM-5:50 PM	260 3:30 PM-4:30 PM	202 3:30 PM-4:30 PM	24 5:30 PM-6:30 PM	598 4:50 PM-5:50 PM	584 5:30 PM-6:30 PM	243 4:20 PM-5:20 PM	899 4:25 PM-5:25 PM	29 4:25 PM-5:25 PM	3764
Off Peak Hour Per Flow	42 12:15 PM-1:15	211 11:35 AM-	647 2:10 PM-3:10 PM	284 2:20 PM-3:20 PM	248 12:25 PM-1:25	28 9:55 AM-10:55	538 9:30 AM-10:30	633 9:35 AM-10:35	232 11:55 AM-	729 2:30 PM-3:30 PM	71 1:30 PM-2:30 PM	3663

Study Name	114 St & Lane
Start Date	Wednesday, April 11, 2018 7:15 AM
End Date	Wednesday, April 11, 2018 6:15 PM
Site Code	1

Report Summary

		Southbound				Westbound				Northbound					Crosswalk	
Time Period	**Class.**	**I**	**O**	**R**	**U**	**I**	**O**	**R**	**T**	**I**	**O**	**Total**		**:destria**	**Total**
Peak 1	Lights	0	1728	1	0	1	0	0	1727	1727	0	1728	N	0	0
Specified Period	%	0%	98%	100%	0%	100%	0%	0%	98%	98%	0%	98%		0%	
7:15 AM - 9:15 AM	Other Vehicles	0	34	0	0	0	0	0	34	34	0	34	E	11	11
One Hour Peak	%	0%	2%	0%	0%	0%	0%	0%	2%	2%	0%	2%		100%	
7:15 AM - 8:15 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	S	0	0
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
	Total	**0**	**1762**	**1**	**0**	**1**	**0**	**0**	**1761**	**1761**	**0**	**1762**		**11**	**11**
	PHF	0	0.94	0.25	0	0.25	0	0	0.94	0.94	0	0.94			
	Approach %	0%	100%			0%	0%			100%	0%				
Peak 2	Lights	0	1199	2	0	2	1	1	1197	1198	0	1200	N	0	0
Specified Period	%	0%	97%	100%	0%	100%	100%	100%	97%	97%	0%	97%		0%	
4:15 PM - 6:15 PM	Other Vehicles	0	33	0	0	0	0	0	33	33	0	33	E	11	11
One Hour Peak	%	0%	3%	0%	0%	0%	0%	0%	3%	3%	0%	3%		100%	
4:30 PM - 5:30 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	S	0	0
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
	Total	**0**	**1232**	**2**	**0**	**2**	**1**	**1**	**1230**	**1231**	**0**	**1233**		**11**	**11**
	PHF	0	0.93	0.5	0	0.5	0.25	0.25	0.93	0.93	0	0.93			
	Approach %	0%	100%			0%	0%			100%	0%				

Study Name	113 St & Lane
Start Date	Wednesday, April 11, 2018 7:15 AM
End Date	Wednesday, April 11, 2018 6:15 PM
Site Code	2

Report Summary

		Southbound					Northbound					Eastbound						Crosswalk	
Time Period	**Class.**	**R**	**T**	**U**	**I**	**O**	**T**	**L**	**U**	**I**	**O**	**R**	**L**	**U**	**I**	**O**	**Total**		**destria**	**Total**
Peak 1	Lights	0	17	0	17	20	19	1	0	20	18	1	1	0	2	1	39	N	0	0
Specified Period	%	0%	94%	0%	94%	95%	95%	100%	0%	95%	95%	100%	100%	0%	100%	100%	95%		0%	
7:15 AM - 9:15 AM	Other Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
7:45 AM - 8:45 AM	Bicycles on Road	0	1	0	1	1	1	0	0	1	1	0	0	0	0	0	2	W	65	65
	%	0%	6%	0%	6%	5%	5%	0%	0%	5%	5%	0%	0%	0%	0%	0%	5%		100%	
	Total	**0**	**18**	**0**	**18**	**21**	**20**	**1**	**0**	**21**	**19**	**1**	**1**	**0**	**2**	**1**	**41**		**65**	**65**
	PHF	0	0.5	0	0.5	0.88	0.83	0.25	0	0.88	0.53	0.25	0.25	0	0.25	0.25	0.79			
	Approach %				44%	51%				51%	46%				5%	2%				
Peak 2	Lights	1	14	0	15	8	7	1	0	8	14	0	1	0	1	2	24	N	0	0
Specified Period	%	100%	93%	0%	94%	100%	100%	100%	0%	100%	93%	0%	100%	0%	100%	100%	96%		0%	
4:15 PM - 6:15 PM	Other Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	1	1
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		100%	
4:15 PM - 5:15 PM	Bicycles on Road	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	1	W	30	30
	%	0%	7%	0%	6%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	4%		100%	
	Total	**1**	**15**	**0**	**16**	**8**	**7**	**1**	**0**	**8**	**15**	**0**	**1**	**0**	**1**	**2**	**25**		**31**	**31**
	PHF	0.25	0.62	0	0.67	0.67	0.58	0.25	0	0.67	0.62	0	0.25	0	0.25	0.25	0.69			
	Approach %				64%	32%				32%	60%				4%	8%				

Study Name	114 St & 78 Ave
Start Date	Wednesday, April 11, 2018 7:15 AM
End Date	Wednesday, April 11, 2018 6:15 PM
Site Code	3

Report Summary

		Southbound				Westbound				Northbound				Crosswalk	
Time Period	**Class.**	**I**	**O**	**R**	**U**	**I**	**O**	**R**	**T**	**I**	**O**	**Total**		**edestria**	**Total**
Peak 1	Lights	0	1707	55	0	55	29	29	1652	1681	0	1736	N	0	0
Specified Period	%	0%	97%	96%	0%	96%	91%	91%	97%	97%	0%	97%		0%	
7:15 AM - 9:15 AM	Other Vehicles	0	50	2	0	2	3	3	48	51	0	53	E	26	26
One Hour Peak	%	0%	3%	4%	0%	4%	9%	9%	3%	3%	0%	3%		100%	
8:00 AM - 9:00 AM	Bicycles on Road	0	1	0	0	0	0	0	1	1	0	1	S	43	43
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		100%	
	Total	**0**	**1758**	**57**	**0**	**57**	**32**	**32**	**1701**	**1733**	**0**	**1790**		**69**	**69**
	PHF	0	0.89	0.68	0	0.68	0.57	0.57	0.89	0.89	0	0.9			
	Approach %	0%	98%			3%	2%			97%	0%				
Peak 2	Lights	0	1160	27	0	27	35	35	1133	1168	0	1195	N	1	1
Specified Period	%	0%	97%	100%	0%	100%	100%	100%	97%	97%	0%	98%		100%	
4:15 PM - 6:15 PM	Other Vehicles	0	30	0	0	0	0	0	30	30	0	30	E	17	17
One Hour Peak	%	0%	3%	0%	0%	0%	0%	0%	3%	3%	0%	2%		100%	
4:30 PM - 5:30 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	S	46	46
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		100%	
	Total	**0**	**1190**	**27**	**0**	**27**	**35**	**35**	**1163**	**1198**	**0**	**1225**		**64**	**64**
	PHF	0	0.87	0.75	0	0.75	0.8	0.8	0.87	0.87	0	0.87			
	Approach %	0%	97%			2%	3%			98%	0%				

Study Name	113 St & 78 Ave
Start Date	Wednesday, April 11, 2018 7:15 AM
End Date	Wednesday, April 11, 2018 6:15 PM
Site Code	4

Report Summary

		Southbound						Westbound						Northbound						Eastbound								Crosswalk	
Time Period	**Class.**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**Total**		**Pedestria**	**Total**
Peak 1	Lights	14	3	4	1	22	13	4	47	2	0	53	23	0	2	2	0	4	8	3	19	6	2	30	65	109	N	4	4
Specified Period	%	100%	100%	100%	100%	100%	100%	100%	96%	100%	0%	96%	96%	0%	100%	100%	0%	100%	100%	100%	95%	100%	100%	97%	97%	97%		100%	
7:15 AM - 9:15 AM	Other Vehicles	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	1	1	2	E	23	23
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	4%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	3%	1%	2%		100%	
7:45 AM - 8:45 AM	Bicycles on Road	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	S	32	32
	%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%		100%	
	Total	**14**	**3**	**4**	**1**	**22**	**13**	**4**	**49**	**2**	**0**	**55**	**24**	**0**	**2**	**2**	**0**	**4**	**8**	**3**	**20**	**6**	**2**	**31**	**67**	**112**	W	64	64
	PHF	0.58	0.38	0.5	0.25	0.5	0.81	0.5	0.72	0.5	0	0.76	0.75	0	0.5	0.25	0	0.5	0.5	0.75	0.71	0.75	0.25	0.7	0.67	0.7		100%	
	Approach %					20%	12%					49%	21%					4%	7%					28%	60%			**123**	**123**
Peak 2	Lights	11	2	4	0	17	17	4	25	1	0	30	39	1	0	0	0	1	3	0	34	13	0	47	36	95	N	13	13
Specified Period	%	92%	100%	100%	0%	94%	100%	100%	100%	100%	0%	100%	100%	100%	0%	0%	0%	100%	100%	0%	100%	100%	0%	100%	97%	99%		100%	
4:15 PM - 6:15 PM	Other Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	10	10
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		100%	
4:30 PM - 5:30 PM	Bicycles on Road	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	S	8	8
	%	8%	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	1%		100%	
	Total	**12**	**2**	**4**	**0**	**18**	**17**	**4**	**25**	**1**	**0**	**30**	**39**	**1**	**0**	**0**	**0**	**1**	**3**	**0**	**34**	**13**	**0**	**47**	**37**	**96**	W	8	8
	PHF	0.6	0.5	0.5	0	0.64	0.71	0.33	0.69	0.25	0	0.83	0.75	0.25	0	0	0	0.25	0.38	0	0.71	0.54	0	0.69	0.77	0.77		100%	
	Approach %					19%	18%					31%	41%					1%	3%					49%	39%			**39**	**39**

Study Name	112 St & 78 Ave
Start Date	Wednesday, April 11, 2018 7:15 AM
End Date	Wednesday, April 11, 2018 6:15 PM
Site Code	5

Report Summary

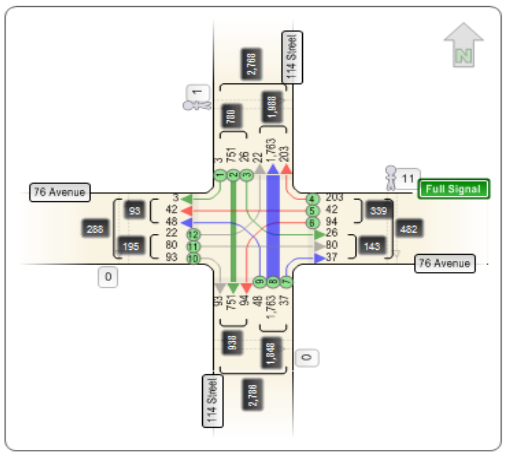
		Southbound						Westbound						Northbound						Eastbound								Crosswalk	
Time Period	**Class.**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**Total**		**:destria**	**Total**
Peak 1	Lights	3	8	1	0	12	21	0	16	1	0	17	4	2	21	38	0	61	28	19	1	0	0	20	57	110	N	10	10
Specified Period	%	100%	89%	100%	0%	92%	68%	0%	89%	100%	0%	89%	100%	100%	68%	100%	0%	86%	93%	95%	100%	0%	0%	95%	97%	89%		100%	
7:15 AM - 9:15 AM	Other Vehicles	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	1	2	E	4	4
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	5%	0%	0%	0%	0%	0%	0%	3%	5%	0%	0%	0%	5%	2%	2%		100%	
7:30 AM - 8:30 AM	Bicycles on Road	0	1	0	0	1	10	0	1	0	0	1	0	0	10	0	0	10	1	0	0	0	0	0	1	12	S	9	9
	%	0%	11%	0%	0%	8%	32%	0%	6%	0%	0%	5%	0%	0%	32%	0%	0%	14%	3%	0%	0%	0%	0%	0%	2%	10%		100%	
	Total	**3**	**9**	**1**	**0**	**13**	**31**	**0**	**18**	**1**	**0**	**19**	**4**	**2**	**31**	**38**	**0**	**71**	**30**	**20**	**1**	**0**	**0**	**21**	**59**	**124**	W	45	45
	PHF	0.38	0.75	0.25	0	0.81	0.65	0	0.56	0.25	0	0.59	0.25	0.25	0.65	0.63	0	0.66	0.75	0.71	0.25	0	0	0.75	0.7	0.79		100%	
	Approach %					10%	25%					15%	3%					57%	24%					17%	48%			**68**	**68**
Peak 2	Lights	3	31	2	0	36	5	0	4	1	0	5	6	1	5	23	0	29	70	38	3	0	0	41	30	111	N	7	7
Specified Period	%	100%	67%	67%	0%	69%	100%	0%	100%	100%	0%	100%	86%	100%	100%	100%	0%	100%	82%	100%	100%	0%	0%	100%	100%	87%		100%	
4:15 PM - 6:15 PM	Other Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	7	7
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		100%	
4:30 PM - 5:30 PM	Bicycles on Road	0	15	1	0	16	0	0	0	0	0	0	1	0	0	0	0	0	15	0	0	0	0	0	0	16	S	5	5
	%	0%	33%	33%	0%	31%	0%	0%	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	18%	0%	0%	0%	0%	0%	0%	13%		100%	
	Total	**3**	**46**	**3**	**0**	**52**	**5**	**0**	**4**	**1**	**0**	**5**	**7**	**1**	**5**	**23**	**0**	**29**	**85**	**38**	**3**	**0**	**0**	**41**	**30**	**127**	W	37	37
	PHF	0.75	0.77	0.75	0	0.81	0.42	0	0.33	0.25	0	0.42	0.58	0.25	0.42	0.72	0	0.6	0.82	0.79	0.38	0	0	0.73	0.68	0.76		100%	
	Approach %					41%	4%					4%	6%					23%	67%					32%	24%			**56**	**56**

Turning Movement Count

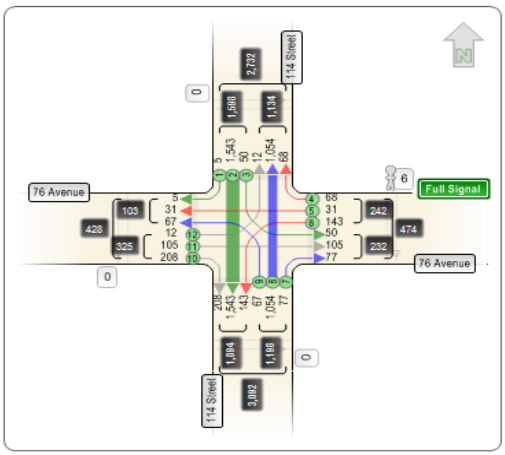
Location	**76 Avenue and 114 Street**
Site Number	**235870**
Date	**2017/May/25 12:00:00 AM-2017/May/26 12:00:00 AM**
Vehicle Type	**-**
Weather	**Rain**
County	**South West**

24 hour count

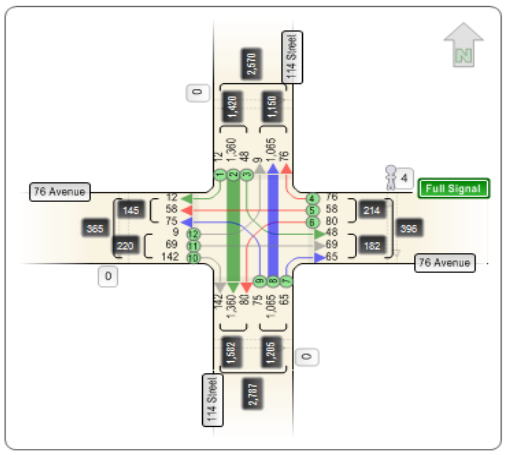
Peak Hour AM
7:45 AM - 8:45 AM



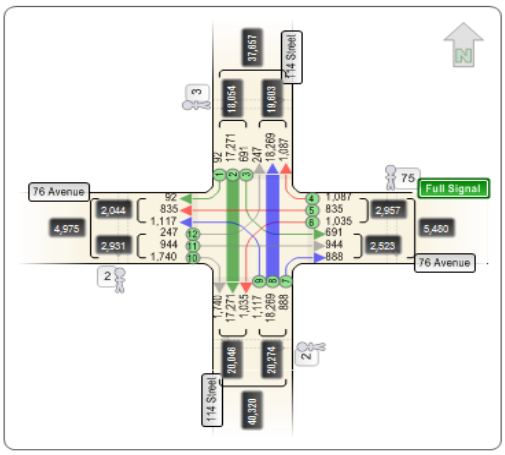
Peak Hour PM
4:55 PM - 5:55 PM



Off Peak Hour
2:30 PM - 3:30 PM



Estimated 24 Hour



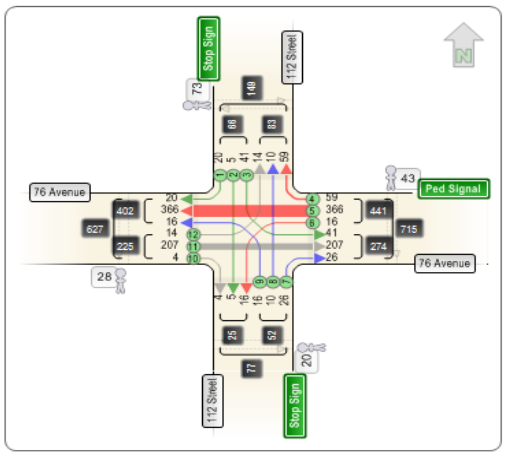
	Approach: West (EBD)			Approach: East (WBD)			Approach: South (NBD)			Approach: North (SBD)			
	L	T	R	L	T	R	L	T	R	L	T	R	Sum
Peak Hour AM 7:45 AM-8:45 AM	22	80	93	94	42	203	48	1763	37	26	751	3	3162
Peak Hour PM 4:55 PM-5:55 PM	12	105	208	143	31	68	67	1054	77	50	1543	5	3363
Off Peak Hour 2:30 PM-3:30 PM	9	69	142	80	58	76	75	1065	65	48	1360	12	3059
Estimated 24 Hour	247	944	1740	1035	835	1087	1117	18269	888	691	17271	92	44216
Sum Whole Traffic Count	247	944	1740	1035	835	1087	1117	18269	888	691	17271	92	44216
Peak Hour AM Per Flow	27 7:25 AM-8:25 AM	80 7:40 AM-8:40 AM	98 7:35 AM-8:35 AM	99 7:40 AM-8:40 AM	52 8:05 AM-9:05 AM	207 7:30 AM-8:30 AM	61 8:15 AM-9:15 AM	1763 7:45 AM-8:45 AM	53 6:30 AM-7:30 AM	31 8:30 AM-9:30 AM	765 7:20 AM-8:20 AM	6 8:05 AM-9:05 AM	3242
Peak Hour PM Per Flow	17 5:15 PM-6:15 PM	105 4:50 PM-5:50 PM	211 4:30 PM-5:30 PM	149 4:50 PM-5:50 PM	59 4:00 PM-5:00 PM	76 5:15 PM-6:15 PM	92 3:30 PM-4:30 PM	1106 5:15 PM-6:15 PM	89 4:20 PM-5:20 PM	57 5:05 PM-6:05 PM	1635 3:50 PM-4:50 PM	7 5:20 PM-6:20 PM	3603
Off Peak Hour Per Flow	21 12:50 PM-1:50	69 2:30 PM-3:30 PM	142 2:30 PM-3:30 PM	80 2:30 PM-3:30 PM	76 12:10 PM-1:10	76 2:20 PM-3:20 PM	79 2:15 PM-3:15 PM	1169 9:35 AM-10:35	65 2:30 PM-3:30 PM	63 1:00 PM-2:00 PM	1360 2:30 PM-3:30 PM	13 2:20 PM-3:20 PM	3213

Turning Movement Count

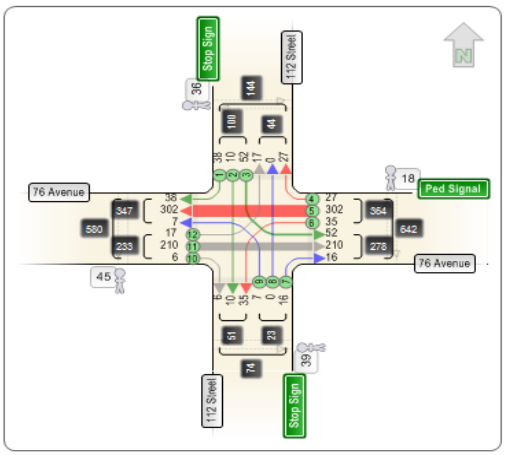
Location	**76 Avenue and 112 Street**
Site Number	**235846**
Date	**2017/May/25 12:00:00 AM-2017/May/26 12:00:00 AM**
Vehicle Type	**-**
Weather	**Rain**
County	**South West**

24 hour count

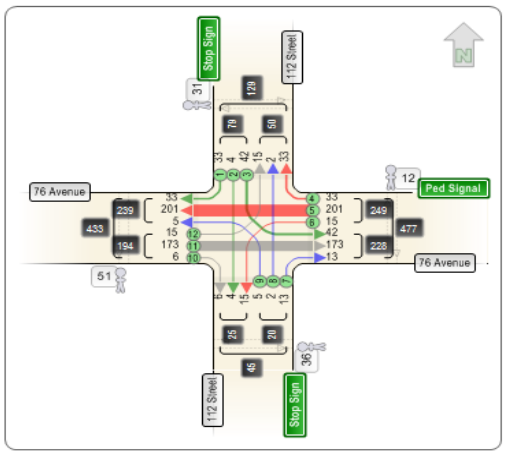
Peak Hour AM
7:40 AM - 8:40 AM



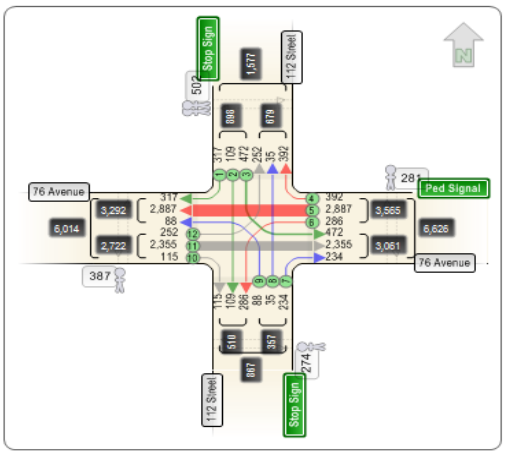
Peak Hour PM
4:30 PM - 5:30 PM



Off Peak Hour
2:30 PM - 3:30 PM



Estimated 24 Hour



	Approach: West (EBD)			Approach: East (WBD)			Approach: South (NBD)			Approach: North (SBD)			
	L	T	R	L	T	R	L	T	R	L	T	R	Sum
Peak Hour AM 7:40 AM-8:40 AM	14	207	4	16	366	59	16	10	26	41	5	20	784
Peak Hour PM 4:30 PM-5:30 PM	17	210	6	35	302	27	7	0	16	52	10	38	720
Off Peak Hour 2:30 PM-3:30 PM	15	173	6	15	201	33	5	2	13	42	4	33	542
Estimated 24 Hour	252	2355	115	286	2887	392	88	35	234	472	109	317	7542
Sum Whole Traffic Count	252	2355	115	286	2887	392	88	35	234	472	109	317	7542
Peak Hour AM Per Flow	16 7:50 AM-8:50 AM	207 7:40 AM-8:40 AM	9 6:30 AM-7:30 AM	20 7:55 AM-8:55 AM	366 7:40 AM-8:40 AM	64 7:45 AM-8:45 AM	21 8:05 AM-9:05 AM	11 7:50 AM-8:50 AM	31 7:20 AM-8:20 AM	49 8:20 AM-9:20 AM	7 7:25 AM-8:25 AM	23 8:20 AM-9:20 AM	824
Peak Hour PM Per Flow	22 5:20 PM-6:20 PM	215 4:20 PM-5:20 PM	10 4:45 PM-5:45 PM	36 4:45 PM-5:45 PM	302 4:30 PM-5:30 PM	38 3:30 PM-4:30 PM	11 5:05 PM-6:05 PM	4 5:30 PM-6:30 PM	18 3:55 PM-4:55 PM	68 3:55 PM-4:55 PM	14 3:45 PM-4:45 PM	42 5:10 PM-6:10 PM	780
Off Peak Hour Per Flow	25 1:40 PM-2:40 PM	173 2:30 PM-3:30 PM	10 11:10 AM-	20 11:40 AM-	201 2:30 PM-3:30 PM	35 2:25 PM-3:25 PM	8 2:15 PM-3:15 PM	5 11:45 AM-	16 11:50 AM-	42 2:30 PM-3:30 PM	11 12:40 PM-1:40	33 2:30 PM-3:30 PM	579

APPENDIX B

Origin-Destination and Multi-Modal Distribution Data

Peak Hour' ORIGIN - DESTINATION CAR DRIVER TRIPS FOR EDMONTON AND THE SURROUNDING REGION

Table P5: 2030 AM Peak Period (Percentage for Origin Trips)

		DESTINATION SECTOR																		
ORIGIN SECTOR		Sector 1 CBD	Sector 2 University	Sector 3 CBD Fringe	Sector 4 NW Inner	Sector 5 NE Inner	Sector 6 SE Inner	Sector 7 SW Inner	Sector 8 West Inner	Sector 9 NW Suburb	Sector 10 NE Suburb	Sector 11 SE Suburb	Sector 12 SW Suburb	Sector 13 West Suburb	Sector 14 Sherwood Park	Sector 15 St. Albert	Sector 16 Strathcona County	Sector 17 Leduc County	Sector 18 Parkland County	Sector 19 Sturgeon County	Sum
Sector 1	CBD	16.8%	3.9%	14.5%	6.2%	5.3%	6.5%	5.5%	3.9%	8.3%	3.5%	10.6%	3.7%	2.8%	3.4%	1.9%	0.6%	1.2%	0.9%	0.5%	100.0%
Sector 2	University	9.2%	13.0%	7.3%	4.2%	2.8%	7.0%	11.2%	3.6%	8.2%	2.0%	14.8%	6.5%	3.2%	2.3%	1.5%	0.4%	1.5%	1.0%	0.3%	100.0%
Sector 3	CBD Fringe	12.6%	3.0%	15.7%	8.6%	5.2%	5.0%	3.8%	4.2%	14.0%	4.2%	10.2%	2.9%	2.4%	2.4%	1.9%	0.6%	1.3%	1.2%	0.6%	100.0%
Sector 4	NW Inner	9.3%	3.9%	9.1%	12.9%	6.5%	4.2%	2.4%	4.0%	17.7%	6.9%	9.8%	2.0%	2.1%	2.3%	3.0%	0.7%	0.8%	1.4%	0.9%	100.0%
Sector 5	NE Inner	7.3%	1.9%	5.8%	7.6%	15.4%	5.3%	2.1%	2.1%	12.6%	14.4%	11.3%	1.6%	1.4%	3.6%	2.0%	1.1%	1.0%	1.1%	2.3%	100.0%
Sector 6	SE Inner	12.0%	4.9%	5.2%	3.2%	4.0%	16.3%	3.8%	1.7%	5.6%	3.7%	26.2%	2.4%	1.3%	3.9%	0.9%	0.6%	3.0%	0.7%	0.4%	100.0%
Sector 7	SW Inner	10.1%	8.9%	5.0%	2.6%	1.9%	3.9%	16.9%	2.1%	6.9%	1.7%	17.9%	11.1%	2.9%	2.6%	1.0%	0.5%	2.6%	1.2%	0.3%	100.0%
Sector 8	West Inner	10.5%	4.4%	6.8%	5.1%	2.3%	2.5%	3.1%	16.2%	16.4%	2.6%	9.0%	4.1%	8.9%	1.5%	2.4%	0.4%	1.4%	1.9%	0.5%	100.0%
Sector 9	NW Suburb	6.4%	3.2%	5.5%	7.9%	5.4%	3.0%	1.8%	3.6%	26.8%	8.0%	8.1%	2.3%	3.8%	2.3%	5.6%	0.9%	1.0%	2.9%	1.7%	100.0%
Sector 10	NE Suburb	5.0%	1.4%	3.7%	5.8%	11.7%	3.9%	1.5%	1.6%	13.0%	25.4%	10.3%	1.5%	1.3%	4.1%	2.5%	1.7%	1.1%	1.1%	3.6%	100.0%
Sector 11	SE Suburb	5.3%	2.8%	2.1%	1.4%	1.6%	6.2%	3.6%	1.3%	3.6%	2.0%	49.4%	5.7%	1.5%	3.9%	0.6%	0.7%	7.2%	0.8%	0.3%	100.0%
Sector 12	SW Suburb	7.4%	5.6%	3.6%	2.0%	1.2%	2.2%	6.9%	2.0%	7.7%	1.7%	15.9%	29.1%	3.2%	2.2%	1.3%	0.6%	5.2%	1.7%	0.4%	100.0%
Sector 13	West Suburb	6.8%	3.4%	3.9%	3.1%	1.7%	2.1%	3.0%	9.5%	15.8%	2.2%	9.9%	6.0%	22.3%	1.4%	2.4%	0.5%	2.1%	3.3%	0.6%	100.0%
Sector 14	Sherwood Park	5.9%	1.3%	3.1%	2.2%	2.6%	3.8%	1.8%	1.0%	5.1%	4.4%	13.4%	2.1%	0.9%	43.0%	1.0%	5.6%	1.6%	0.7%	0.6%	100.0%
Sector 15	St. Albert	8.6%	1.3%	3.7%	3.5%	2.1%	1.5%	1.2%	2.4%	16.0%	3.7%	4.7%	2.0%	2.4%	1.4%	39.5%	0.7%	1.0%	1.9%	2.3%	100.0%
Sector 16	Strathcona County	3.5%	0.9%	1.7%	1.6%	1.9%	2.1%	1.0%	0.5%	3.2%	7.6%	8.2%	1.1%	0.5%	18.0%	0.9%	45.0%	0.9%	0.3%	1.0%	100.0%
Sector 17	Leduc County	2.6%	1.8%	1.5%	0.8%	0.6%	1.6%	2.1%	0.8%	2.4%	0.8%	15.2%	8.1%	2.8%	1.5%	0.4%	0.3%	55.5%	1.0%	0.1%	100.0%
Sector 18	Parkland County	3.5%	1.6%	2.6%	2.4%	1.2%	1.1%	1.5%	1.5%	13.7%	1.5%	5.0%	3.1%	3.8%	0.8%	2.7%	0.2%	1.6%	51.5%	0.5%	100.0%
Sector 19	Sturgeon County	3.9%	1.1%	3.2%	3.5%	3.0%	1.2%	0.8%	1.5%	11.9%	10.0%	3.6%	1.1%	1.5%	2.2%	10.4%	2.9%	0.4%	1.8%	36.1%	100.0%

Table P7: 2030 PM Peak Period (Percentage for Origin Trips)

		DESTINATION SECTOR																		
ORIGIN SECTOR		Sector 1 CBD	Sector 2 University	Sector 3 CBD Fringe	Sector 4 NW Inner	Sector 5 NE Inner	Sector 6 SE Inner	Sector 7 SW Inner	Sector 8 West Inner	Sector 9 NW Suburb	Sector 10 NE Suburb	Sector 11 SE Suburb	Sector 12 SW Suburb	Sector 13 West Suburb	Sector 14 Sherwood Park	Sector 15 St. Albert	Sector 16 Strathcona County	Sector 17 Leduc County	Sector 18 Parkland County	Sector 19 Sturgeon County	Sum
Sector 1	CBD	10.5%	2.0%	9.7%	5.8%	5.7%	6.8%	5.9%	5.3%	4.9%	4.4%	8.2%	9.4%	6.5%	4.6%	4.7%	1.6%	1.4%	1.5%	1.0%	100.0%
Sector 2	University	4.6%	8.3%	4.4%	4.1%	3.1%	6.8%	13.2%	4.3%	5.4%	2.5%	10.9%	16.1%	6.6%	2.1%	1.7%	0.8%	2.2%	2.1%	0.7%	100.0%
Sector 3	CBD Fringe	7.9%	2.1%	18.6%	8.9%	7.9%	5.0%	4.0%	4.9%	6.5%	5.5%	5.6%	5.5%	5.0%	3.0%	3.1%	1.2%	1.4%	2.3%	1.6%	100.0%
Sector 4	NW Inner	4.3%	1.4%	7.3%	17.1%	10.8%	3.6%	2.1%	4.1%	13.5%	8.8%	4.7%	3.6%	4.4%	3.2%	3.8%	1.3%	0.9%	2.7%	2.4%	100.0%
Sector 5	NE Inner	3.2%	1.2%	4.3%	7.9%	25.2%	4.0%	1.5%	1.7%	8.4%	21.0%	4.5%	2.2%	2.4%	3.7%	2.5%	1.8%	0.8%	1.4%	2.5%	100.0%
Sector 6	SE Inner	4.0%	2.7%	4.3%	3.8%	6.7%	20.7%	4.6%	1.9%	3.8%	5.7%	20.2%	4.9%	2.9%	6.1%	1.4%	1.8%	2.5%	1.2%	0.8%	100.0%
Sector 7	SW Inner	3.0%	3.8%	3.3%	2.0%	2.2%	4.5%	23.5%	2.3%	2.4%	1.9%	16.7%	19.3%	4.3%	2.9%	1.1%	1.0%	3.6%	1.7%	0.4%	100.0%
Sector 8	West Inner	3.6%	1.5%	4.9%	4.9%	2.9%	1.8%	3.0%	20.2%	8.8%	2.7%	4.4%	6.0%	23.2%	1.4%	3.6%	0.6%	1.6%	3.9%	1.2%	100.0%
Sector 9	NW Suburb	1.8%	0.9%	3.3%	7.4%	6.0%	2.2%	1.9%	4.7%	22.2%	7.6%	4.8%	5.7%	9.5%	2.7%	6.9%	1.2%	1.3%	6.5%	3.6%	100.0%
Sector 10	NE Suburb	1.5%	0.7%	2.2%	4.7%	15.8%	2.4%	1.0%	1.1%	7.9%	36.5%	4.1%	2.1%	2.0%	4.2%	2.9%	4.3%	0.8%	1.2%	4.5%	100.0%
Sector 11	SE Suburb	1.2%	1.3%	1.5%	1.7%	2.5%	6.2%	5.3%	1.5%	2.3%	3.1%	44.4%	10.0%	3.2%	4.5%	1.0%	1.7%	6.7%	1.3%	0.6%	100.0%
Sector 12	SW Suburb	1.2%	1.8%	1.4%	1.0%	0.9%	1.4%	9.2%	1.6%	2.1%	1.0%	13.1%	48.8%	4.4%	1.7%	1.0%	0.6%	6.7%	1.7%	0.3%	100.0%
Sector 13	West Suburb	1.7%	0.9%	2.1%	2.2%	1.6%	1.0%	2.9%	10.0%	7.9%	1.7%	4.0%	7.5%	43.8%	0.9%	2.9%	0.4%	2.2%	5.3%	0.9%	100.0%
Sector 14	Sherwood Park	0.8%	0.4%	1.3%	1.4%	2.9%	3.0%	1.5%	0.6%	1.9%	4.4%	8.1%	2.9%	1.2%	54.9%	0.9%	11.1%	1.4%	0.6%	0.7%	100.0%
Sector 15	St. Albert	0.7%	0.4%	1.6%	2.8%	2.3%	0.8%	0.8%	1.9%	9.3%	3.5%	1.5%	2.4%	4.1%	1.0%	55.9%	0.6%	0.6%	2.9%	7.1%	100.0%
Sector 16	Strathcona County	0.6%	0.2%	0.6%	0.8%	1.5%	0.9%	0.6%	0.3%	1.5%	3.5%	3.0%	1.2%	0.7%	12.3%	0.9%	68.4%	0.7%	0.3%	1.8%	100.0%
Sector 17	Leduc County	0.7%	0.4%	0.6%	0.4%	0.5%	0.9%	1.6%	0.5%	0.8%	0.8%	9.2%	7.2%	1.7%	1.1%	0.5%	0.5%	71.3%	1.2%	0.2%	100.0%
Sector 18	Parkland County	0.7%	0.3%	0.8%	0.9%	0.8%	0.4%	0.8%	1.1%	3.3%	1.0%	1.7%	2.5%	4.2%	0.5%	1.6%	0.2%	1.2%	77.3%	0.8%	100.0%
Sector 19	Sturgeon County	0.9%	0.3%	1.2%	1.7%	4.9%	0.6%	0.5%	0.8%	4.7%	10.3%	1.5%	1.3%	1.9%	2.5%	10.3%	3.0%	0.4%	1.5%	51.7%	100.0%

Table P6: 2030 AM Peak Period (Percentage for Destination Trips)

ORIGIN SECTOR		DESTINATION SECTOR																	
		Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8	Sector 9	Sector 10	Sector 11	Sector 12	Sector 13	Sector 14	Sector 15	Sector 16	Sector 17	Sector 18	Sector 19
		CBD	University	CBD Fringe	NW Inner	NE Inner	SE Inner	SW Inner	West Inner	NW Suburb	NE Suburb	SE Suburb	SW Suburb	West Suburb	Sherwood Park	St. Albert	Strathcona County	Leduc County	Parkland County	Sturgeon County
Sector 1	CBD	3.9%	2.0%	5.3%	2.6%	2.2%	2.7%	2.5%	2.1%	1.2%	1.0%	1.0%	0.8%	1.1%	0.9%	0.7%	0.3%	0.3%	0.3%	0.4%
Sector 2	University	1.2%	3.7%	1.5%	1.0%	0.7%	1.6%	2.9%	1.1%	0.7%	0.3%	0.8%	0.8%	0.7%	0.4%	0.3%	0.1%	0.2%	0.2%	0.1%
Sector 3	CBD Fringe	5.4%	2.8%	10.5%	6.6%	4.0%	3.8%	3.2%	4.2%	3.8%	2.2%	1.8%	1.2%	1.8%	1.2%	1.4%	0.5%	0.5%	0.7%	0.9%
Sector 4	NW Inner	4.6%	4.2%	7.1%	11.4%	5.8%	3.7%	2.3%	4.6%	5.6%	4.1%	2.0%	1.0%	1.8%	1.4%	2.5%	0.7%	0.4%	1.0%	1.5%
Sector 5	NE Inner	5.5%	3.1%	6.9%	10.3%	21.1%	7.1%	3.1%	3.6%	6.2%	13.1%	3.5%	1.2%	1.8%	3.3%	2.6%	1.8%	0.7%	1.1%	5.7%
Sector 6	SE Inner	6.5%	5.8%	4.4%	3.1%	3.9%	15.7%	4.0%	2.2%	1.9%	2.4%	5.9%	1.3%	1.2%	2.5%	0.9%	0.7%	1.6%	0.5%	0.6%
Sector 7	SW Inner	5.0%	9.5%	3.9%	2.3%	1.7%	3.4%	16.2%	2.5%	2.2%	1.0%	3.7%	5.4%	2.5%	1.5%	0.8%	0.6%	1.3%	0.8%	0.5%
Sector 8	West Inner	5.1%	4.7%	5.2%	4.5%	2.1%	2.2%	3.0%	18.5%	5.2%	1.5%	1.8%	2.0%	7.7%	0.9%	2.0%	0.5%	0.7%	1.3%	0.8%
Sector 9	NW Suburb	5.2%	5.6%	7.0%	11.5%	7.9%	4.4%	2.8%	6.8%	14.1%	7.8%	2.7%	1.8%	5.5%	2.2%	7.8%	1.6%	0.8%	3.2%	4.5%
Sector 10	NE Suburb	5.4%	3.2%	6.2%	11.1%	22.7%	7.4%	3.1%	4.0%	9.0%	32.8%	4.6%	1.6%	2.4%	5.2%	4.5%	4.0%	1.2%	1.6%	12.6%
Sector 11	SE Suburb	9.6%	11.0%	6.0%	4.6%	5.3%	20.3%	12.8%	5.7%	4.2%	4.5%	37.5%	10.2%	4.9%	8.6%	1.8%	2.9%	13.2%	1.9%	1.8%
Sector 12	SW Suburb	13.0%	21.3%	9.8%	6.1%	3.9%	6.9%	23.5%	8.0%	8.7%	3.6%	11.5%	50.0%	9.9%	4.6%	3.7%	2.2%	9.1%	4.0%	2.2%
Sector 13	West Suburb	6.9%	7.6%	6.3%	5.6%	3.0%	3.7%	5.9%	22.3%	10.3%	2.6%	4.2%	6.0%	39.6%	1.7%	4.1%	1.1%	2.1%	4.6%	2.0%
Sector 14	Sherwood Park	5.3%	2.6%	4.3%	3.5%	4.2%	6.0%	3.2%	2.1%	2.9%	4.8%	5.0%	1.8%	1.3%	45.6%	1.5%	10.8%	1.4%	0.9%	1.7%
Sector 15	St. Albert	6.5%	2.2%	4.4%	4.7%	2.9%	2.0%	1.8%	4.1%	7.8%	3.4%	1.5%	1.5%	3.2%	1.2%	50.6%	1.1%	0.7%	2.0%	5.7%
Sector 16	Strathcona County	2.4%	1.4%	1.8%	2.0%	2.4%	2.6%	1.3%	0.9%	1.4%	6.3%	2.4%	0.8%	0.6%	14.7%	1.0%	66.9%	0.6%	0.3%	2.3%
Sector 17	Leduc County	3.0%	4.4%	2.7%	1.5%	1.3%	3.2%	4.7%	2.2%	1.8%	1.1%	7.2%	9.1%	5.6%	2.1%	0.8%	0.8%	63.2%	1.5%	0.4%
Sector 18	Parkland County	3.7%	3.8%	4.3%	4.6%	2.4%	2.1%	3.0%	3.6%	9.3%	1.9%	2.2%	3.2%	7.1%	1.0%	4.8%	0.5%	1.7%	73.1%	1.8%
Sector 19	Sturgeon County	1.8%	1.2%	2.3%	2.9%	2.5%	1.0%	0.7%	1.6%	3.6%	5.5%	0.7%	0.5%	1.2%	1.2%	8.2%	2.9%	0.2%	1.1%	54.5%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table P8: 2030 PM Peak Period (Percentage for Destination Trips)

ORIGIN SECTOR		DESTINATION SECTOR																	
		Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8	Sector 9	Sector 10	Sector 11	Sector 12	Sector 13	Sector 14	Sector 15	Sector 16	Sector 17	Sector 18	Sector 19
		CBD	University	CBD Fringe	NW Inner	NE Inner	SE Inner	SW Inner	West Inner	NW Suburb	NE Suburb	SE Suburb	SW Suburb	West Suburb	Sherwood Park	St. Albert	Strathcona County	Leduc County	Parkland County	Sturgeon County
Sector 1	CBD	20.3%	6.8%	13.7%	7.1%	5.2%	8.4%	6.3%	7.8%	3.6%	3.2%	2.9%	4.4%	4.4%	3.3%	4.4%	1.8%	0.8%	1.1%	1.6%
Sector 2	University	4.4%	13.7%	3.1%	2.5%	1.4%	4.1%	6.9%	3.1%	1.9%	0.9%	1.9%	3.7%	2.2%	0.8%	0.8%	0.4%	0.6%	0.7%	0.6%
Sector 3	CBD Fringe	11.9%	5.5%	20.4%	8.4%	5.6%	4.8%	3.3%	5.6%	3.7%	3.1%	1.6%	2.0%	2.6%	1.7%	2.2%	1.0%	0.7%	1.3%	2.0%
Sector 4	NW Inner	6.9%	3.8%	8.5%	17.2%	8.2%	3.7%	1.9%	5.0%	8.1%	5.2%	1.4%	1.4%	2.5%	2.0%	2.9%	1.2%	0.4%	1.6%	3.3%
Sector 5	NE Inner	5.7%	3.7%	5.5%	8.8%	21.2%	4.6%	1.5%	2.2%	5.6%	13.9%	1.5%	0.9%	1.5%	2.5%	2.1%	1.8%	0.4%	0.9%	3.9%
Sector 6	SE Inner	5.9%	7.0%	4.6%	3.6%	4.6%	19.5%	3.7%	2.2%	2.1%	3.1%	5.5%	1.7%	1.5%	3.4%	1.0%	1.5%	1.1%	0.7%	1.0%
Sector 7	SW Inner	5.3%	11.6%	4.2%	2.2%	1.9%	5.1%	22.9%	3.2%	1.6%	1.2%	5.5%	8.3%	2.7%	2.0%	1.0%	1.0%	1.9%	1.1%	0.7%
Sector 8	West Inner	4.2%	3.0%	4.2%	3.6%	1.6%	1.3%	1.9%	17.9%	3.9%	1.2%	0.9%	1.7%	9.5%	0.6%	2.0%	0.4%	0.6%	1.7%	1.2%
Sector 9	NW Suburb	7.1%	6.4%	9.2%	18.0%	11.0%	5.5%	4.0%	14.1%	32.5%	11.0%	3.4%	5.4%	13.1%	3.9%	12.8%	2.5%	1.6%	9.3%	12.2%
Sector 10	NE Suburb	3.8%	3.1%	4.0%	7.3%	18.4%	3.8%	1.3%	2.1%	7.4%	33.4%	1.9%	1.3%	1.7%	3.9%	3.4%	6.0%	0.6%	1.1%	9.6%
Sector 11	SE Suburb	7.6%	14.2%	7.1%	6.8%	7.7%	25.4%	18.6%	7.2%	5.5%	7.5%	52.5%	15.6%	7.3%	10.8%	3.1%	6.1%	13.1%	3.1%	3.1%
Sector 12	SW Suburb	4.1%	10.2%	3.4%	2.0%	1.3%	3.0%	16.6%	4.1%	2.6%	1.2%	7.9%	38.8%	5.1%	2.1%	1.6%	1.1%	6.6%	2.1%	0.9%
Sector 13	West Suburb	4.0%	3.7%	3.5%	3.2%	1.7%	1.5%	3.7%	17.6%	6.9%	1.5%	1.7%	4.2%	35.8%	0.8%	3.2%	0.5%	1.5%	4.5%	1.9%
Sector 14	Sherwood Park	2.1%	1.6%	2.3%	2.2%	3.5%	4.8%	2.0%	1.2%	1.8%	4.1%	3.8%	1.8%	1.1%	52.2%	1.1%	15.6%	1.1%	0.5%	1.7%
Sector 15	St. Albert	1.4%	1.2%	2.2%	3.3%	2.0%	0.9%	0.8%	2.7%	6.6%	2.5%	0.5%	1.1%	2.7%	0.7%	50.9%	0.6%	0.3%	2.0%	11.8%
Sector 16	Strathcona County	0.9%	0.6%	0.7%	0.7%	1.1%	0.8%	0.5%	0.4%	0.8%	1.9%	0.8%	0.4%	0.4%	6.8%	0.6%	56.0%	0.3%	0.2%	2.3%
Sector 17	Leduc County	2.2%	2.1%	1.3%	0.8%	0.8%	1.8%	2.8%	1.2%	0.9%	0.9%	5.3%	5.5%	1.9%	1.3%	0.7%	0.9%	67.4%	1.4%	0.4%
Sector 18	Parkland County	1.6%	1.3%	1.3%	1.3%	0.9%	0.6%	1.0%	2.0%	2.9%	0.9%	0.7%	1.4%	3.5%	0.4%	1.8%	0.2%	0.8%	66.3%	1.7%
Sector 19	Sturgeon County	0.8%	0.5%	0.7%	1.0%	2.0%	0.4%	0.2%	0.5%	1.6%	3.4%	0.3%	0.3%	0.6%	0.8%	4.4%	1.5%	0.1%	0.5%	39.8%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Multi Modal Trip Generation

Original Total Trips Generated:

AM Peak		PM Peak	
IN	OUT	IN	OUT
8	37	33	20

		O/D Percentages				Total Person-Trips				Mode Split Assumption					Total Vehicle Trips				Total Bicycle Trips				Total PedestrianTrips				Total Transit Trips			
		AM Peak		PM Peak		AM Peak		PM Peak							AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	Vehicle (Driver)	Vehicle (Pass.)	Transit	Walk	Bicycle	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Sector 1	CBD	2.0%	9.2%	6.8%	4.6%	0	3	2	1	40%	1%	29%	15%	15%	0	1	1	0	0	1	0	0	0	1	0	0	0	1	1	0
Sector 2	**University**	3.7%	13.0%	13.7%	8.3%	0	5	5	2	20%	1%	12%	57%	10%	0	1	1	0	0	0	0	0	0	3	3	1	0	1	1	0
Sector 3	CBD Fringe	2.8%	7.3%	5.5%	4.4%	0	3	2	1	50%	2%	30%	8%	10%	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0
Sector 4	NW Inner	4.2%	4.2%	3.8%	4.1%	0	2	1	1	75%	3%	15%	3%	4%	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Sector 5	NE Inner	3.1%	2.8%	3.7%	3.1%	0	1	1	1	70%	3%	20%	3%	4%	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sector 6	SE Inner	5.8%	7.0%	7.0%	6.8%	0	3	2	1	57%	3%	22%	8%	10%	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0
Sector 7	SW Inner	9.5%	11.2%	11.6%	13.2%	1	4	4	3	57%	3%	22%	8%	10%	0	2	2	1	0	0	0	0	0	0	0	0	0	1	1	1
Sector 8	West Inner	4.7%	3.6%	3.0%	4.3%	0	1	1	1	70%	3%	18%	4%	5%	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Sector 9	NW Suburb	5.6%	8.2%	6.4%	5.4%	0	3	2	1	94%	4%	2%	0%	0%	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Sector 10	NE Suburb	3.2%	2.0%	3.1%	2.5%	0	1	1	0	94%	4%	2%	0%	0%	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sector 11	SE Suburb	11.0%	14.8%	14.2%	10.9%	1	6	5	2	94%	4%	2%	0%	0%	1	5	4	2	0	0	0	0	0	0	0	0	0	0	0	0
Sector 12	SW Suburb	21.3%	6.5%	10.2%	16.1%	2	2	3	3	94%	4%	2%	0%	0%	2	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Sector 13	West Suburb	7.6%	3.2%	3.7%	6.6%	1	1	1	1	94%	4%	2%	0%	0%	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Sector 14	Sherwood Park	2.6%	2.3%	1.6%	2.1%	0	1	1	0	96%	3%	1%	0%	0%	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sector 15	St. Albert	2.2%	1.5%	1.2%	1.7%	0	1	0	0	96%	3%	1%	0%	0%	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sector 16	Strathcona County	1.4%	0.4%	0.6%	0.8%	0	0	0	0	97%	3%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sector 17	Leduc County	4.4%	1.5%	2.1%	2.2%	0	1	1	0	97%	3%	0%	0%	0%	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sector 18	Parkland County	3.8%	1.0%	1.3%	2.1%	0	0	0	0	97%	3%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sector 19	Sturgeon County	1.2%	0.3%	0.5%	0.7%	0	0	0	0	97%	3%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					TOTAL	**8**	**37**	**33**	**20**	68	3	12	10	5	**6**	**25**	**23**	**14**	**0**	**2**	**2**	**1**	**0**	**4**	**4**	**2**	**1**	**5**	**4**	**2**
										70%	3%	12%	10%	5%																

Vehicle Trip Distribution by Sector

		Total Vehicle Trips								
		AM Peak		PM Peak		Gate A	Gate B	Gate C	Gate D	Gate E
		IN	OUT	IN	OUT	N 114	W Univ	E 82 Ave	S 114	E 76
Sector 1	CBD	0	1	1	0		25%	75%		
Sector 2	**University**	**0**	**1**	**1**	**0**	**80%**	**10%**	**10%**		
Sector 3	CBD Fringe	0	1	1	0	5%	70%	25%		
Sector 4	NW Inner	0	1	1	1	10%	90%			
Sector 5	NE Inner	0	1	1	0		25%	75%		
Sector 6	SE Inner	0	1	1	1			80%		20%
Sector 7	SW Inner	0	2	2	1			10%	60%	30%
Sector 8	West Inner	0	1	1	1	5%	75%		20%	
Sector 9	NW Suburb	0	3	2	1	10%	90%			
Sector 10	NE Suburb	0	1	1	0		40%	60%		
Sector 11	SE Suburb	1	5	4	2			60%		40%
Sector 12	SW Suburb	2	2	3	3				80%	20%
Sector 13	West Suburb	1	1	1	1	5%	65%		30%	
Sector 14	Sherwood Park	0	1	1	0			100%		
Sector 15	St. Albert	0	1	0	0	10%	80%		10%	
Sector 16	Strathcona County	0	0	0	0			100%		
Sector 17	Leduc County	0	1	1	0			40%	10%	50%
Sector 18	Parkland County	0	0	0	0	5%	65%		30%	
Sector 19	Sturgeon County	0	0	0	0	10%	80%		10%	
		6	**25**	**23**	**14**					

Overall Vehicle Distribution	**Gate A**	**Gate B**	**Gate C**	**Gate D**	**Gate E**
AM Peak - IN	0.19	1.73	1.48	1.82	0.96
AM Peak - OUT	1.4	7.7	8.1	4.0	3.8
PM Peak - IN	1.2	6.2	7.1	4.6	3.7
PM Peak - OUT	0.6	4.0	3.7	3.9	2.2
	3	20	20	14	11
	5%	29%	30%	21%	16%

Corrected & Rounded	**Gate A**	**Gate B**	**Gate C**	**Gate D**	**Gate E**
AM Peak - IN	0	1	1	2	1
AM Peak - OUT	2	8	9	4	4
PM Peak - IN	1	6	7	5	4
PM Peak - OUT	1	4	3	4	2
	4	19	20	15	11
	6%	28%	29%	22%	16%

Adjusted & Rounded	**AM IN**	**AM OUT**	**PM IN**	**PM OUT**
Gate A	0	2	1	1
Gate B	1	8	6	4
Gate C	1	9	7	3
Gate D	2	4	5	4
Gate E	1	4	4	2
TOTAL	**5**	**27**	**23**	**14**

Overall Distribution Percentages	**Gate A**	**Gate B**	**Gate C**	**Gate D**	**Gate E**
AM Peak - IN	0.0%	20.0%	20.0%	40.0%	20.0%
AM Peak - OUT	7.4%	29.6%	33.3%	14.8%	14.8%
PM Peak - IN	4.3%	26.1%	30.4%	21.7%	17.4%
PM Peak - OUT	7.1%	28.6%	21.4%	28.6%	14.3%

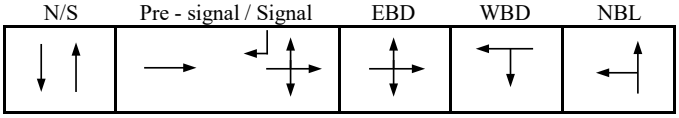
APPENDIX C

Signal Timing Plans

Location: **76 Avenue - 114 Street**

Implementation Date: July 20, 2015

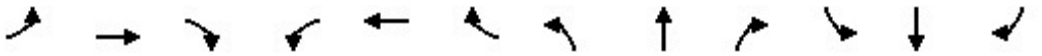
Detailed Timings:

		Direction	N/S	Fixed Pre - signal / Signal	Fixed EBD	Act. WBD	Prot. Only Act. NBL
		Phase					
		Intergreen	3+2	3+2	3+2	3+2	3+5
		Ped. Clr.	10+5				
		Walk	8				
	Normal	Min. G.	10	7	3	10	6
	Pre-empt	Min. G.	7	3	3	7	5

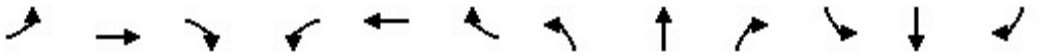
Time Plan	**Cycle**	**Offset**	**Φ1**	**Φ2**	**Φ3**	**Φ4**	**Φ5**	
AM Peak	186 max	n/a	105 max	21	3	10 - 20	6 - 9	M-F: 0630-0930
PM Peak	190 max	n/a	105 max	20	3	10 - 20	6 - 14	M-F: 1515-1830
Off Peak	155 max	n/a	75 max	20	3	10 - 20	6 - 9	Rest of time
Night	117 max	n/a	42 max	15	3	10 - 20	6 - 9	M-F: 2300-0630 Wknd: 2200-0900

APPENDIX D

Synchro Output Reports



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	81	94	95	43	206	48	1789	38	26	762	3
Future Volume (vph)	22	81	94	95	43	206	48	1789	38	26	762	3
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1850	1850	1850	1850	1500
Storage Length (m)	0.0		40.0	0.0		100.0	75.0		0.0	55.0		55.0
Storage Lanes	0		1	0		1	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	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								1.00				
Frt			0.850			0.850		0.997				0.850
Flt Protected		0.989			0.967		0.950			0.950		
Satd. Flow (prot)	0	1454	1250	0	1422	1250	1397	3432	0	1723	3446	1250
Flt Permitted		0.989			0.967		0.950			0.051		
Satd. Flow (perm)	0	1454	1250	0	1422	1250	1397	3432	0	93	3446	1250
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			168		2				88
Link Speed (k/h)		50			30			50			50	
Link Distance (m)		512.8			387.6			471.9			563.1	
Travel Time (s)		36.9			46.5			34.0			40.5	
Confl. Peds. (#/hr)									6	6		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	81	94	95	43	206	48	1789	38	26	762	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	103	94	0	138	206	48	1827	0	26	762	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.04	1.04	1.04	1.04	1.35
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Perm	Prot	NA		Perm	NA	Over



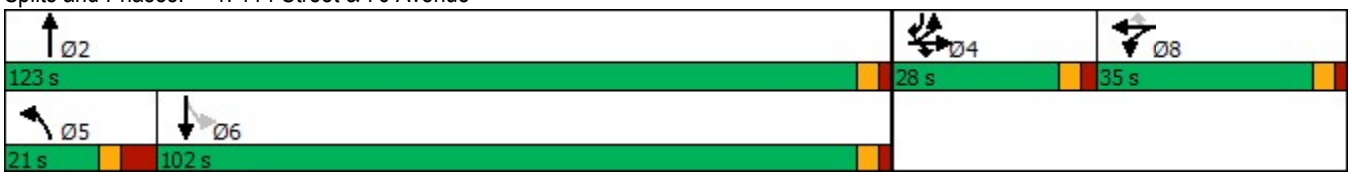
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	4	4	4	8	8		5	2			6	4
Permitted Phases						8				6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	6.0	10.0		10.0	10.0	10.0
Minimum Split (s)	20.0	20.0	20.0	15.0	15.0	15.0	14.0	33.0		15.0	15.0	20.0
Total Split (s)	28.0	28.0	28.0	35.0	35.0	35.0	21.0	123.0		102.0	102.0	28.0
Total Split (%)	15.1%	15.1%	15.1%	18.8%	18.8%	18.8%	11.3%	66.1%		54.8%	54.8%	15.1%
Maximum Green (s)	23.0	23.0	23.0	30.0	30.0	30.0	13.0	118.0		97.0	97.0	23.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	5.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.5	0.5		0.5	0.5	0.5	0.5		0.5	0.5	0.5
Total Lost Time (s)		5.5	5.5		5.5	5.5	8.5	5.5		5.5	5.5	5.5
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max	Max	None	None	None	None	Min		Min	Min	Max
Walk Time (s)								8.0				
Flash Dont Walk (s)								10.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)		23.2	23.2		20.6	20.6	9.8	94.9		80.1	80.1	23.2
Actuated g/C Ratio		0.15	0.15		0.13	0.13	0.06	0.61		0.51	0.51	0.15
v/c Ratio		0.48	0.35		0.74	0.66	0.55	0.87		0.55	0.43	0.01
Control Delay		76.1	16.5		91.2	26.8	101.4	31.0		76.0	25.5	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		76.1	16.5		91.2	26.8	101.4	31.0		76.0	25.5	0.0
LOS		E	B		F	C	F	C		E	C	A
Approach Delay		47.7			52.6			32.8			27.1	
Approach LOS		D			D			C			C	
90th %ile Green (s)	23.0	23.0	23.0	30.0	30.0	30.0	13.0	118.0		97.0	97.0	23.0
90th %ile Term Code	MaxR	MaxR	MaxR	Max	Max	Max	Max	Max		Max	Max	MaxR
70th %ile Green (s)	23.0	23.0	23.0	27.3	27.3	27.3	13.0	118.0		97.0	97.0	23.0
70th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Max	Max		Hold	Hold	MaxR
50th %ile Green (s)	23.0	23.0	23.0	22.5	22.5	22.5	11.5	97.1		77.6	77.6	23.0
50th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Gap	Gap		Hold	Hold	MaxR
30th %ile Green (s)	23.0	23.0	23.0	16.8	16.8	16.8	8.8	82.6		65.8	65.8	23.0
30th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Gap	Gap		Hold	Hold	MaxR
10th %ile Green (s)	23.0	23.0	23.0	11.8	11.8	11.8	0.0	65.1		65.1	65.1	23.0
10th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Skip	Gap		Hold	Hold	MaxR
Queue Length 50th (m)		30.2	0.0		41.8	10.7	14.8	238.4		5.7	81.0	0.0
Queue Length 95th (m)		59.0	19.0		74.4	42.7	33.2	303.0		#25.3	107.3	0.0
Internal Link Dist (m)		488.8			363.6			447.9			539.1	
Turn Bay Length (m)			40.0			100.0	75.0			55.0		55.0
Base Capacity (vph)		216	266		278	379	115	2659		59	2205	261
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		0.48	0.35		0.50	0.54	0.42	0.69		0.44	0.35	0.01

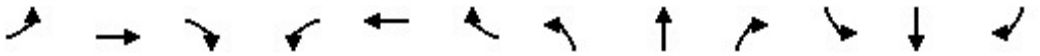
Intersection Summary

Area Type:	Other	
Cycle Length: 186		
Actuated Cycle Length: 155.8		
Natural Cycle: 90		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.87		
Intersection Signal Delay: 34.4		Intersection LOS: C
Intersection Capacity Utilization 90.3%		ICU Level of Service E
Analysis Period (min) 15		
90th %ile Actuated Cycle: 186		
70th %ile Actuated Cycle: 183.3		
50th %ile Actuated Cycle: 157.6		
30th %ile Actuated Cycle: 137.4		
10th %ile Actuated Cycle: 114.9		

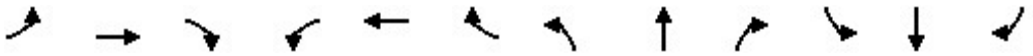
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: 114 Street & 76 Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	210	4	16	371	60	16	10	26	42	5	20
Future Volume (vph)	14	210	4	16	371	60	16	10	26	42	5	20
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98			0.92			0.92	
Frt		0.998			0.982			0.932			0.960	
Flt Protected		0.997			0.998			0.985			0.970	
Satd. Flow (prot)	0	1799	0	0	1741	0	0	1608	0	0	1600	0
Flt Permitted		0.970			0.988			0.903			0.855	
Satd. Flow (perm)	0	1745	0	0	1718	0	0	1411	0	0	1370	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			14			26			17	
Link Speed (k/h)		30			30			30			50	
Link Distance (m)		387.6			628.7			168.8			195.7	
Travel Time (s)		46.5			75.4			20.3			14.1	
Confl. Peds. (#/hr)	36		39	39		36	45		15	15		45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	210	4	16	371	60	16	10	26	42	5	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	228	0	0	447	0	0	52	0	0	67	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	

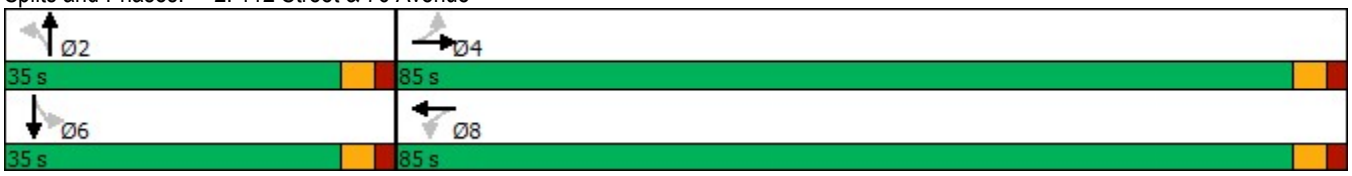


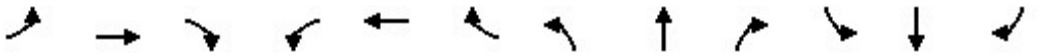
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		23.0	23.0		22.0	22.0	
Total Split (s)	85.0	85.0		85.0	85.0		35.0	35.0		35.0	35.0	
Total Split (%)	70.8%	70.8%		70.8%	70.8%		29.2%	29.2%		29.2%	29.2%	
Maximum Green (s)	80.0	80.0		80.0	80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.5			0.5			0.5			0.5	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		13.0	13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		88.8			88.8			9.1			9.1	
Actuated g/C Ratio		0.84			0.84			0.09			0.09	
v/c Ratio		0.16			0.31			0.36			0.50	
Control Delay		2.6			3.2			32.9			48.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		2.6			3.2			32.9			48.1	
LOS		A			A			C			D	
Approach Delay		2.6			3.2			32.9			48.1	
Approach LOS		A			A			C			D	
90th %ile Green (s)	80.0	80.0		80.0	80.0		13.8	13.8		13.8	13.8	
90th %ile Term Code	MaxR	MaxR		MaxR	MaxR		Hold	Hold		Gap	Gap	
70th %ile Green (s)	82.2	82.2		82.2	82.2		11.2	11.2		11.2	11.2	
70th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
50th %ile Green (s)	88.0	88.0		88.0	88.0		9.5	9.5		9.5	9.5	
50th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
30th %ile Green (s)	95.0	95.0		95.0	95.0		7.7	7.7		7.7	7.7	
30th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
10th %ile Green (s)	95.0	95.0		95.0	95.0		0.0	0.0		0.0	0.0	
10th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Skip	Skip		Skip	Skip	
Queue Length 50th (m)		7.7			17.1			5.2			10.1	
Queue Length 95th (m)		16.0			33.4			15.9			22.3	
Internal Link Dist (m)		363.6			604.7			144.8			171.7	
Turn Bay Length (m)												
Base Capacity (vph)		1469			1448			414			396	
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		0.16			0.31			0.13			0.17	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	

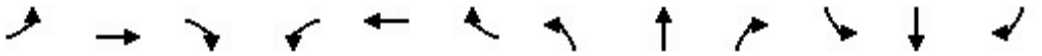
Actuated Cycle Length: 105.5	
Natural Cycle: 45	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 51.2%	ICU Level of Service A
Analysis Period (min) 15	
90th %ile Actuated Cycle: 103.8	
70th %ile Actuated Cycle: 103.4	
50th %ile Actuated Cycle: 107.5	
30th %ile Actuated Cycle: 112.7	
10th %ile Actuated Cycle: 100	

Splits and Phases: 2: 112 Street & 76 Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	107	211	145	31	69	68	1070	78	51	1566	5
Future Volume (vph)	12	107	211	145	31	69	68	1070	78	51	1566	5
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1850	1850	1850	1850	1500
Storage Length (m)	0.0		40.0	0.0		100.0	75.0		0.0	55.0		55.0
Storage Lanes	0		1	0		1	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	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								1.00		0.99		
Frt			0.850			0.850		0.990				0.850
Flt Protected		0.995			0.960		0.950			0.950		
Satd. Flow (prot)	0	1463	1250	0	1412	1250	1397	3400	0	1723	3446	1250
Flt Permitted		0.995			0.960		0.950			0.230		
Satd. Flow (perm)	0	1463	1250	0	1412	1250	1397	3400	0	415	3446	1250
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			197			86		8				86
Link Speed (k/h)		50			30			50			50	
Link Distance (m)		512.8			387.6			471.9			563.1	
Travel Time (s)		36.9			46.5			34.0			40.5	
Confl. Peds. (#/hr)									6	6		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	107	211	145	31	69	68	1070	78	51	1566	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	119	211	0	176	69	68	1148	0	51	1566	5
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.04	1.04	1.04	1.04	1.35
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Perm	Prot	NA		Perm	NA	Over

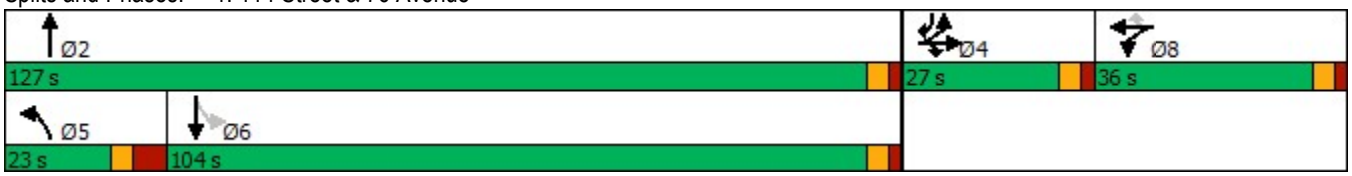


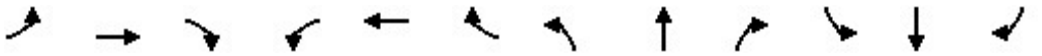
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	4	4	4	8	8		5	2			6	4
Permitted Phases						8				6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	6.0	10.0		10.0	10.0	10.0
Minimum Split (s)	20.0	20.0	20.0	15.0	15.0	15.0	14.0	33.0		15.0	15.0	20.0
Total Split (s)	27.0	27.0	27.0	36.0	36.0	36.0	23.0	127.0		104.0	104.0	27.0
Total Split (%)	14.2%	14.2%	14.2%	18.9%	18.9%	18.9%	12.1%	66.8%		54.7%	54.7%	14.2%
Maximum Green (s)	22.0	22.0	22.0	31.0	31.0	31.0	15.0	122.0		99.0	99.0	22.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	5.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.5	0.5		0.5	0.5	0.5	0.5		0.5	0.5	0.5
Total Lost Time (s)		5.5	5.5		5.5	5.5	8.5	5.5		5.5	5.5	5.5
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max	Max	None	None	None	None	Min		Min	Min	Max
Walk Time (s)								8.0				
Flash Dont Walk (s)								10.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)		21.9	21.9		25.3	25.3	12.2	107.4		86.6	86.6	21.9
Actuated g/C Ratio		0.13	0.13		0.15	0.15	0.07	0.63		0.50	0.50	0.13
v/c Ratio		0.64	0.64		0.85	0.27	0.69	0.54		0.24	0.90	0.02
Control Delay		91.5	21.1		105.4	8.9	115.1	19.0		28.7	47.0	0.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		91.5	21.1		105.4	8.9	115.1	19.0		28.7	47.0	0.2
LOS		F	C		F	A	F	B		C	D	A
Approach Delay		46.5			78.2			24.3			46.3	
Approach LOS		D			E			C			D	
90th %ile Green (s)	22.0	22.0	22.0	31.0	31.0	31.0	15.0	122.0		99.0	99.0	22.0
90th %ile Term Code	MaxR	MaxR	MaxR	Max	Max	Max	Max	Hold		Max	Max	MaxR
70th %ile Green (s)	22.0	22.0	22.0	31.0	31.0	31.0	15.0	122.0		99.0	99.0	22.0
70th %ile Term Code	MaxR	MaxR	MaxR	Max	Max	Max	Max	Hold		Max	Max	MaxR
50th %ile Green (s)	22.0	22.0	22.0	29.1	29.1	29.1	14.7	118.6		95.9	95.9	22.0
50th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Gap	Hold		Gap	Gap	MaxR
30th %ile Green (s)	22.0	22.0	22.0	23.3	23.3	23.3	11.5	100.4		80.9	80.9	22.0
30th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Gap	Hold		Gap	Gap	MaxR
10th %ile Green (s)	22.0	22.0	22.0	16.5	16.5	16.5	8.0	78.5		62.5	62.5	22.0
10th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Gap	Hold		Gap	Gap	MaxR
Queue Length 50th (m)		43.0	4.7		63.8	0.0	24.8	115.9		10.2	265.7	0.0
Queue Length 95th (m)		#74.0	35.4		#102.7	9.6	#47.7	136.6		21.3	305.7	0.0
Internal Link Dist (m)		488.8			363.6			447.9			539.1	
Turn Bay Length (m)			40.0			100.0	75.0			55.0		55.0
Base Capacity (vph)		187	331		256	296	120	2459		243	2018	234
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		0.64	0.64		0.69	0.23	0.57	0.47		0.21	0.78	0.02

Intersection Summary

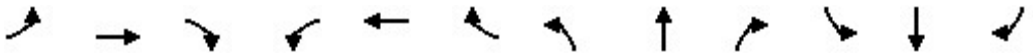
Area Type:	Other		
Cycle Length: 190			
Actuated Cycle Length: 171.5			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 40.8		Intersection LOS: D	
Intersection Capacity Utilization 87.0%		ICU Level of Service E	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 190			
70th %ile Actuated Cycle: 190			
50th %ile Actuated Cycle: 184.7			
30th %ile Actuated Cycle: 160.7			
10th %ile Actuated Cycle: 132			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: 114 Street & 76 Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	213	6	36	307	27	7	0	16	53	10	39
Future Volume (vph)	17	213	6	36	307	27	7	0	16	53	10	39
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98			0.92			0.91	
Frt		0.997			0.990			0.906			0.948	
Flt Protected		0.996			0.995			0.985			0.975	
Satd. Flow (prot)	0	1794	0	0	1767	0	0	1541	0	0	1564	0
Flt Permitted		0.967			0.955			0.923			0.825	
Satd. Flow (perm)	0	1733	0	0	1680	0	0	1389	0	0	1290	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			6			18			26	
Link Speed (k/h)		30			30			30			50	
Link Distance (m)		387.6			628.7			168.8			195.7	
Travel Time (s)		46.5			75.4			20.3			14.1	
Confl. Peds. (#/hr)	36		39	39		36	45		15	15		45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	17	213	6	36	307	27	7	0	16	53	10	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	236	0	0	370	0	0	23	0	0	102	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	

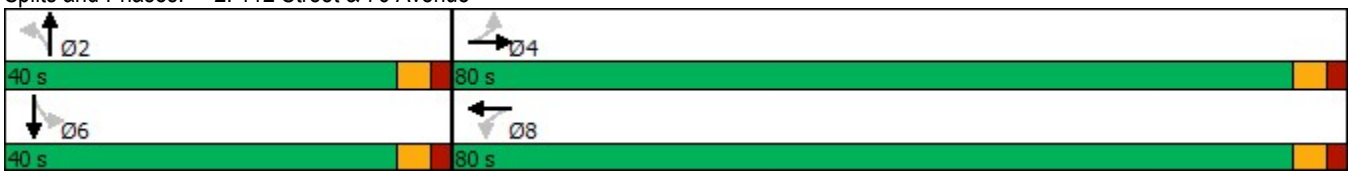


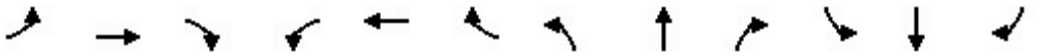
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		23.0	23.0		22.0	22.0	
Total Split (s)	80.0	80.0		80.0	80.0		40.0	40.0		40.0	40.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	75.0	75.0		75.0	75.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.5			0.5			0.5			0.5	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		13.0	13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		82.3			82.3			10.9			10.9	
Actuated g/C Ratio		0.79			0.79			0.10			0.10	
v/c Ratio		0.17			0.28			0.14			0.65	
Control Delay		3.4			3.9			21.4			50.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		3.4			3.9			21.4			50.8	
LOS		A			A			C			D	
Approach Delay		3.4			3.9			21.4			50.8	
Approach LOS		A			A			C			D	
90th %ile Green (s)	75.0	75.0		75.0	75.0		16.6	16.6		16.6	16.6	
90th %ile Term Code	MaxR	MaxR		MaxR	MaxR		Hold	Hold		Gap	Gap	
70th %ile Green (s)	77.2	77.2		77.2	77.2		13.3	13.3		13.3	13.3	
70th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
50th %ile Green (s)	82.3	82.3		82.3	82.3		11.3	11.3		11.3	11.3	
50th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
30th %ile Green (s)	90.0	90.0		90.0	90.0		9.3	9.3		9.3	9.3	
30th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
10th %ile Green (s)	90.0	90.0		90.0	90.0		5.8	5.8		5.8	5.8	
10th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
Queue Length 50th (m)		9.1			15.5			0.9			14.8	
Queue Length 95th (m)		19.2			31.5			7.8			29.9	
Internal Link Dist (m)		363.6			604.7			144.8			171.7	
Turn Bay Length (m)												
Base Capacity (vph)		1369			1328			472			444	
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		0.17			0.28			0.05			0.23	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	

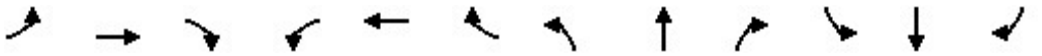
Actuated Cycle Length: 104.2	
Natural Cycle: 45	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 10.8	Intersection LOS: B
Intersection Capacity Utilization 51.8%	ICU Level of Service A
Analysis Period (min) 15	
90th %ile Actuated Cycle: 101.6	
70th %ile Actuated Cycle: 100.5	
50th %ile Actuated Cycle: 103.6	
30th %ile Actuated Cycle: 109.3	
10th %ile Actuated Cycle: 105.8	

Splits and Phases: 2: 112 Street & 76 Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	81	94	108	43	206	48	1800	38	27	762	3
Future Volume (vph)	27	81	94	108	43	206	48	1800	38	27	762	3
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1850	1850	1850	1850	1500
Storage Length (m)	0.0		40.0	0.0		100.0	75.0		0.0	55.0		55.0
Storage Lanes	0		1	0		1	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	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								1.00				
Frt			0.850			0.850		0.997				0.850
Flt Protected		0.988			0.965		0.950			0.950		
Satd. Flow (prot)	0	1453	1250	0	1419	1250	1397	3432	0	1723	3446	1250
Flt Permitted		0.988			0.965		0.950			0.050		
Satd. Flow (perm)	0	1453	1250	0	1419	1250	1397	3432	0	91	3446	1250
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			153		2				88
Link Speed (k/h)		50			30			50			50	
Link Distance (m)		512.8			387.6			471.9			563.1	
Travel Time (s)		36.9			46.5			34.0			40.5	
Confl. Peds. (#/hr)									6	6		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	81	94	108	43	206	48	1800	38	27	762	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	94	0	151	206	48	1838	0	27	762	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.04	1.04	1.04	1.04	1.35
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Perm	Prot	NA		Perm	NA	Over

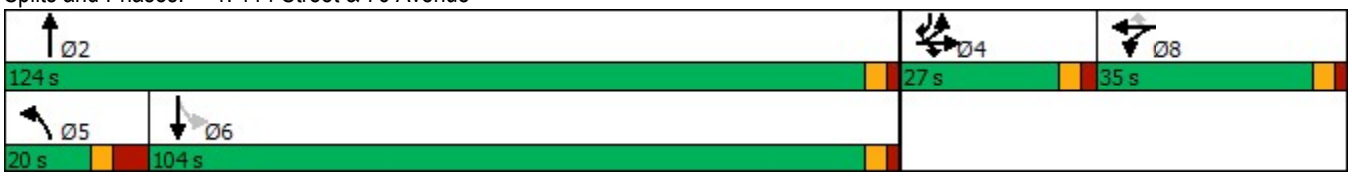


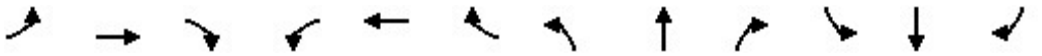
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	4	4	4	8	8		5	2			6	4
Permitted Phases						8				6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	6.0	10.0		10.0	10.0	10.0
Minimum Split (s)	20.0	20.0	20.0	15.0	15.0	15.0	14.0	33.0		15.0	15.0	20.0
Total Split (s)	27.0	27.0	27.0	35.0	35.0	35.0	20.0	124.0		104.0	104.0	27.0
Total Split (%)	14.5%	14.5%	14.5%	18.8%	18.8%	18.8%	10.8%	66.7%		55.9%	55.9%	14.5%
Maximum Green (s)	22.0	22.0	22.0	30.0	30.0	30.0	12.0	119.0		99.0	99.0	22.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	5.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.5	0.5		0.5	0.5	0.5	0.5		0.5	0.5	0.5
Total Lost Time (s)		5.5	5.5		5.5	5.5	8.5	5.5		5.5	5.5	5.5
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max	Max	None	None	None	None	Min		Min	Min	Max
Walk Time (s)								8.0				
Flash Dont Walk (s)								10.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)		22.2	22.2		21.8	21.8	9.5	96.1		81.7	81.7	22.2
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.06	0.61		0.52	0.52	0.14
v/c Ratio		0.53	0.37		0.77	0.68	0.57	0.88		0.57	0.43	0.01
Control Delay		80.0	16.9		93.4	31.6	105.1	31.1		80.1	25.1	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		80.0	16.9		93.4	31.6	105.1	31.1		80.1	25.1	0.0
LOS		E	B		F	C	F	C		F	C	A
Approach Delay		50.6			57.8			33.0			26.9	
Approach LOS		D			E			C			C	
90th %ile Green (s)	22.0	22.0	22.0	30.0	30.0	30.0	12.0	119.0		99.0	99.0	22.0
90th %ile Term Code	MaxR	MaxR	MaxR	Max	Max	Max	Max	Max		Max	Max	MaxR
70th %ile Green (s)	22.0	22.0	22.0	29.3	29.3	29.3	12.0	119.0		99.0	99.0	22.0
70th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Max	Max		Hold	Hold	MaxR
50th %ile Green (s)	22.0	22.0	22.0	24.3	24.3	24.3	11.6	98.9		79.3	79.3	22.0
50th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Gap	Gap		Hold	Hold	MaxR
30th %ile Green (s)	22.0	22.0	22.0	18.1	18.1	18.1	8.9	84.0		67.1	67.1	22.0
30th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Gap	Gap		Hold	Hold	MaxR
10th %ile Green (s)	22.0	22.0	22.0	12.7	12.7	12.7	0.0	65.9		65.9	65.9	22.0
10th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Skip	Gap		Hold	Hold	MaxR
Queue Length 50th (m)		32.7	0.0		46.5	15.3	15.0	245.0		6.1	82.0	0.0
Queue Length 95th (m)		62.3	19.2		80.9	49.1	#34.5	302.3		#26.8	104.7	0.0
Internal Link Dist (m)		488.8			363.6			447.9			539.1	
Turn Bay Length (m)			40.0			100.0	75.0			55.0		55.0
Base Capacity (vph)		205	257		275	365	105	2655		58	2230	252
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		0.53	0.37		0.55	0.56	0.46	0.69		0.47	0.34	0.01

Intersection Summary

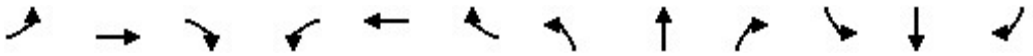
Area Type:	Other		
Cycle Length: 186			
Actuated Cycle Length: 157.2			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 35.4		Intersection LOS: D	
Intersection Capacity Utilization 90.6%		ICU Level of Service E	
Analysis Period (min) 15			
90th %ile Actuated Cycle: 186			
70th %ile Actuated Cycle: 185.3			
50th %ile Actuated Cycle: 160.2			
30th %ile Actuated Cycle: 139.1			
10th %ile Actuated Cycle: 115.6			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: 114 Street & 76 Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	210	4	16	371	65	16	10	26	55	5	33
Future Volume (vph)	15	210	4	16	371	65	16	10	26	55	5	33
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.97			0.93			0.91	
Frt		0.998			0.981			0.932			0.952	
Flt Protected		0.997			0.998			0.985			0.971	
Satd. Flow (prot)	0	1800	0	0	1737	0	0	1608	0	0	1572	0
Flt Permitted		0.967			0.988			0.881			0.842	
Satd. Flow (perm)	0	1739	0	0	1713	0	0	1382	0	0	1326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			14			26			23	
Link Speed (k/h)		30			30			30			50	
Link Distance (m)		387.6			628.7			168.8			195.7	
Travel Time (s)		46.5			75.4			20.3			14.1	
Confl. Peds. (#/hr)	36		39	39		36	45		15	15		45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	210	4	16	371	65	16	10	26	55	5	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	229	0	0	452	0	0	52	0	0	93	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	

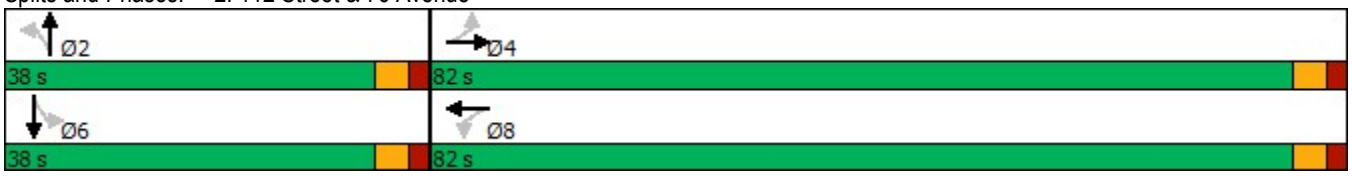


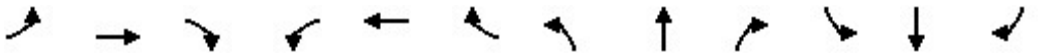
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		23.0	23.0		22.0	22.0	
Total Split (s)	82.0	82.0		82.0	82.0		38.0	38.0		38.0	38.0	
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%		31.7%	31.7%	
Maximum Green (s)	77.0	77.0		77.0	77.0		33.0	33.0		33.0	33.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.5			0.5			0.5			0.5	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		13.0	13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		84.3			84.3			10.5			10.5	
Actuated g/C Ratio		0.82			0.82			0.10			0.10	
v/c Ratio		0.16			0.32			0.32			0.60	
Control Delay		3.2			3.9			29.3			48.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		3.2			3.9			29.3			48.2	
LOS		A			A			C			D	
Approach Delay		3.2			3.9			29.3			48.2	
Approach LOS		A			A			C			D	
90th %ile Green (s)	77.0	77.0		77.0	77.0		16.5	16.5		16.5	16.5	
90th %ile Term Code	MaxR	MaxR		MaxR	MaxR		Hold	Hold		Gap	Gap	
70th %ile Green (s)	77.0	77.0		77.0	77.0		13.0	13.0		13.0	13.0	
70th %ile Term Code	MaxR	MaxR		MaxR	MaxR		Hold	Hold		Gap	Gap	
50th %ile Green (s)	81.3	81.3		81.3	81.3		11.0	11.0		11.0	11.0	
50th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
30th %ile Green (s)	90.1	90.1		90.1	90.1		9.0	9.0		9.0	9.0	
30th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
10th %ile Green (s)	92.0	92.0		92.0	92.0		0.0	0.0		0.0	0.0	
10th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Skip	Skip		Skip	Skip	
Queue Length 50th (m)		8.6			19.3			4.8			13.4	
Queue Length 95th (m)		18.5			39.0			15.4			28.2	
Internal Link Dist (m)		363.6			604.7			144.8			171.7	
Turn Bay Length (m)												
Base Capacity (vph)		1431			1412			456			437	
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		0.16			0.32			0.11			0.21	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	

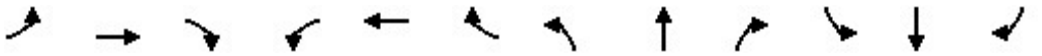
Actuated Cycle Length: 102.4	
Natural Cycle: 45	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 10.3	Intersection LOS: B
Intersection Capacity Utilization 52.0%	ICU Level of Service A
Analysis Period (min) 15	
90th %ile Actuated Cycle: 103.5	
70th %ile Actuated Cycle: 100	
50th %ile Actuated Cycle: 102.3	
30th %ile Actuated Cycle: 109.1	
10th %ile Actuated Cycle: 97	

Splits and Phases: 2: 112 Street & 76 Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	107	211	166	31	69	68	1091	78	56	1566	5
Future Volume (vph)	26	107	211	166	31	69	68	1091	78	56	1566	5
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1850	1850	1850	1850	1500
Storage Length (m)	0.0		40.0	0.0		100.0	75.0		0.0	55.0		55.0
Storage Lanes	0		1	0		1	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	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								1.00		1.00		
Frt			0.850			0.850		0.990				0.850
Flt Protected		0.990			0.960		0.950			0.950		
Satd. Flow (prot)	0	1456	1250	0	1412	1250	1397	3400	0	1723	3446	1250
Flt Permitted		0.990			0.960		0.950			0.216		
Satd. Flow (perm)	0	1456	1250	0	1412	1250	1397	3400	0	390	3446	1250
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			181			86		7				86
Link Speed (k/h)		50			30			50			50	
Link Distance (m)		512.8			387.6			471.9			563.1	
Travel Time (s)		36.9			46.5			34.0			40.5	
Confl. Peds. (#/hr)									6	6		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	107	211	166	31	69	68	1091	78	56	1566	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	133	211	0	197	69	68	1169	0	56	1566	5
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.04	1.04	1.04	1.04	1.35
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Perm	Prot	NA		Perm	NA	Over



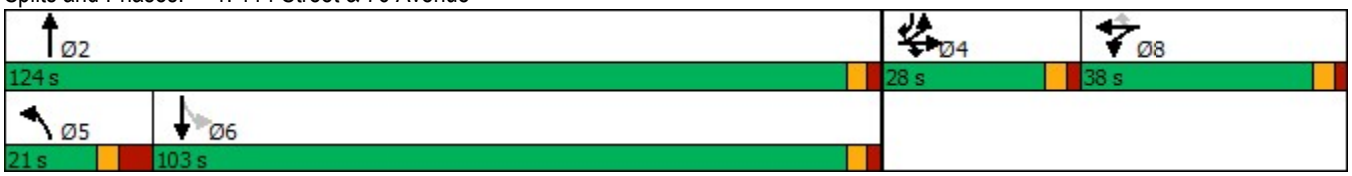
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	4	4	4	8	8		5	2			6	4
Permitted Phases						8				6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	6.0	10.0		10.0	10.0	10.0
Minimum Split (s)	20.0	20.0	20.0	15.0	15.0	15.0	14.0	33.0		15.0	15.0	20.0
Total Split (s)	28.0	28.0	28.0	38.0	38.0	38.0	21.0	124.0		103.0	103.0	28.0
Total Split (%)	14.7%	14.7%	14.7%	20.0%	20.0%	20.0%	11.1%	65.3%		54.2%	54.2%	14.7%
Maximum Green (s)	23.0	23.0	23.0	33.0	33.0	33.0	13.0	119.0		98.0	98.0	23.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	5.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.5	0.5		0.5	0.5	0.5	0.5		0.5	0.5	0.5
Total Lost Time (s)		5.5	5.5		5.5	5.5	8.5	5.5		5.5	5.5	5.5
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max	Max	None	None	None	None	Min		Min	Min	Max
Walk Time (s)								8.0				
Flash Dont Walk (s)								10.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)		22.8	22.8		28.0	28.0	11.5	108.1		88.0	88.0	22.8
Actuated g/C Ratio		0.13	0.13		0.16	0.16	0.07	0.62		0.50	0.50	0.13
v/c Ratio		0.70	0.66		0.88	0.25	0.75	0.56		0.29	0.91	0.02
Control Delay		96.5	26.0		108.1	8.4	126.5	20.9		31.2	49.0	0.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		96.5	26.0		108.1	8.4	126.5	20.9		31.2	49.0	0.2
LOS		F	C		F	A	F	C		C	D	A
Approach Delay		53.3			82.2			26.7			48.3	
Approach LOS		D			F			C			D	
90th %ile Green (s)	23.0	23.0	23.0	33.0	33.0	33.0	13.0	119.0		98.0	98.0	23.0
90th %ile Term Code	MaxR	MaxR	MaxR	Max	Max	Max	Max	Hold		Max	Max	MaxR
70th %ile Green (s)	23.0	23.0	23.0	33.0	33.0	33.0	13.0	119.0		98.0	98.0	23.0
70th %ile Term Code	MaxR	MaxR	MaxR	Max	Max	Max	Max	Hold		Max	Max	MaxR
50th %ile Green (s)	23.0	23.0	23.0	32.6	32.6	32.6	13.0	119.0		98.0	98.0	23.0
50th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Max	Hold		Max	Max	MaxR
30th %ile Green (s)	23.0	23.0	23.0	26.6	26.6	26.6	12.3	105.0		84.7	84.7	23.0
30th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Gap	Hold		Gap	Gap	MaxR
10th %ile Green (s)	23.0	23.0	23.0	18.9	18.9	18.9	8.7	82.2		65.5	65.5	23.0
10th %ile Term Code	MaxR	MaxR	MaxR	Gap	Gap	Gap	Gap	Hold		Gap	Gap	MaxR
Queue Length 50th (m)		49.8	10.5		73.2	0.0	25.8	128.1		11.9	274.8	0.0
Queue Length 95th (m)		#84.7	42.4		#115.7	9.5	#53.5	147.3		24.2	309.2	0.0
Internal Link Dist (m)		488.8			363.6			447.9			539.1	
Turn Bay Length (m)			40.0			100.0	75.0			55.0		55.0
Base Capacity (vph)		189	319		265	304	100	2329		219	1941	237
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		0.70	0.66		0.74	0.23	0.68	0.50		0.26	0.81	0.02

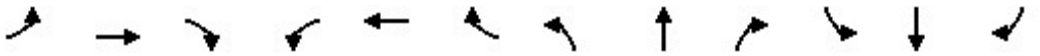
Intersection Summary

Area Type:	Other	
Cycle Length: 190		
Actuated Cycle Length: 175.7		
Natural Cycle: 100		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.91		
Intersection Signal Delay: 43.7		Intersection LOS: D
Intersection Capacity Utilization 88.5%		ICU Level of Service E
Analysis Period (min) 15		
90th %ile Actuated Cycle: 190		
70th %ile Actuated Cycle: 190		
50th %ile Actuated Cycle: 189.6		
30th %ile Actuated Cycle: 169.6		
10th %ile Actuated Cycle: 139.1		

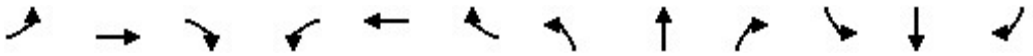
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: 114 Street & 76 Avenue





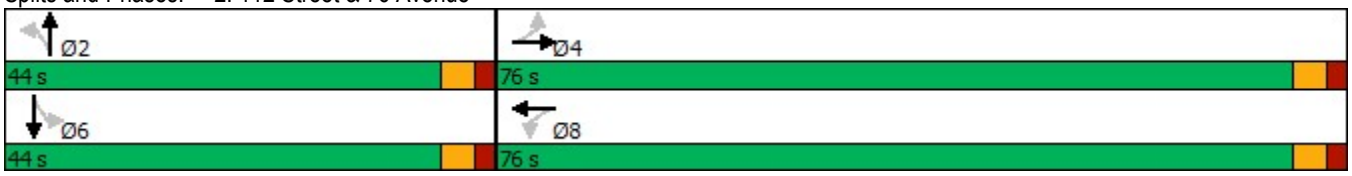
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	213	6	36	307	43	7	0	16	65	10	60
Future Volume (vph)	22	213	6	36	307	43	7	0	16	65	10	60
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.97			0.92			0.90	
Frt		0.997			0.985			0.906			0.940	
Flt Protected		0.995			0.995			0.985			0.976	
Satd. Flow (prot)	0	1792	0	0	1747	0	0	1541	0	0	1534	0
Flt Permitted		0.953			0.957			0.921			0.835	
Satd. Flow (perm)	0	1707	0	0	1666	0	0	1391	0	0	1282	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			9			18			35	
Link Speed (k/h)		30			30			30			50	
Link Distance (m)		387.6			628.7			168.8			195.7	
Travel Time (s)		46.5			75.4			20.3			14.1	
Confl. Peds. (#/hr)	36		39	39		36	45		15	15		45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	213	6	36	307	43	7	0	16	65	10	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	241	0	0	386	0	0	23	0	0	135	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		23.0	23.0		22.0	22.0	
Total Split (s)	76.0	76.0		76.0	76.0		44.0	44.0		44.0	44.0	
Total Split (%)	63.3%	63.3%		63.3%	63.3%		36.7%	36.7%		36.7%	36.7%	
Maximum Green (s)	71.0	71.0		71.0	71.0		39.0	39.0		39.0	39.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.5			0.5			0.5			0.5	
Total Lost Time (s)		5.5			5.5			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		13.0	13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		76.1			76.1			12.5			12.5	
Actuated g/C Ratio		0.76			0.76			0.13			0.13	
v/c Ratio		0.18			0.30			0.12			0.71	
Control Delay		4.2			4.8			19.3			49.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		4.2			4.8			19.3			49.3	
LOS		A			A			B			D	
Approach Delay		4.2			4.8			19.3			49.3	
Approach LOS		A			A			B			D	
90th %ile Green (s)	71.0	71.0		71.0	71.0		19.4	19.4		19.4	19.4	
90th %ile Term Code	MaxR	MaxR		MaxR	MaxR		Hold	Hold		Gap	Gap	
70th %ile Green (s)	71.0	71.0		71.0	71.0		15.2	15.2		15.2	15.2	
70th %ile Term Code	MaxR	MaxR		MaxR	MaxR		Hold	Hold		Gap	Gap	
50th %ile Green (s)	74.3	74.3		74.3	74.3		12.8	12.8		12.8	12.8	
50th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
30th %ile Green (s)	81.0	81.0		81.0	81.0		10.6	10.6		10.6	10.6	
30th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
10th %ile Green (s)	86.0	86.0		86.0	86.0		6.9	6.9		6.9	6.9	
10th %ile Term Code	Dwell	Dwell		Dwell	Dwell		Hold	Hold		Gap	Gap	
Queue Length 50th (m)		10.2			17.8			0.8			18.1	
Queue Length 95th (m)		22.5			37.6			7.4			36.0	
Internal Link Dist (m)		363.6			604.7			144.8			171.7	
Turn Bay Length (m)												
Base Capacity (vph)		1303			1274			548			517	
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		0.18			0.30			0.04			0.26	

Intersection Summary	
Area Type:	Other

Cycle Length: 120

Actuated Cycle Length: 99.6	
Natural Cycle: 45	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 52.4%	ICU Level of Service A
Analysis Period (min) 15	
90th %ile Actuated Cycle: 100.4	
70th %ile Actuated Cycle: 96.2	
50th %ile Actuated Cycle: 97.1	
30th %ile Actuated Cycle: 101.6	
10th %ile Actuated Cycle: 102.9	

Splits and Phases: 2: 112 Street & 76 Avenue