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Byron/Ravenhill Avenue Rezoning

Transportation Impact Assessment

Byron / Ravenhill Avenue Rezoning

Transportation Impact Assessment

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

March 2018

Novatech File: 116168
Ref: R-2018-038

NOVATECH
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March 15, 2018

City of Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: **Mr. Wally Dubyk**
Project Manager, Infrastructure Approvals

Dear Mr. Dubyk:

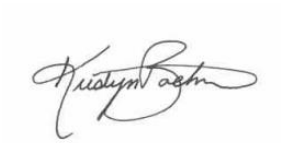
Reference: **Byron / Ravenhill Avenue Rezoning**
Transportation Impact Assessment
Novatech File No. 116168

We are pleased to submit the following Transportation Impact Assessment (TIA) in support of a Zoning By-Law Amendment for the eastern portion of the City block bounded by Byron Avenue to the north, Roosevelt Avenue to the east, Ravenhill Avenue to the south and Golden Avenue to the west. The structure and format of this report is in accordance with the 2017 City of Ottawa TIA Guidelines.

If you have any questions or comments regarding this report, please feel free to contact Jennifer Luong, or the undersigned.

Yours truly,

NOVATECH



Kristyn Boehme, E.I.T.
Engineering Intern

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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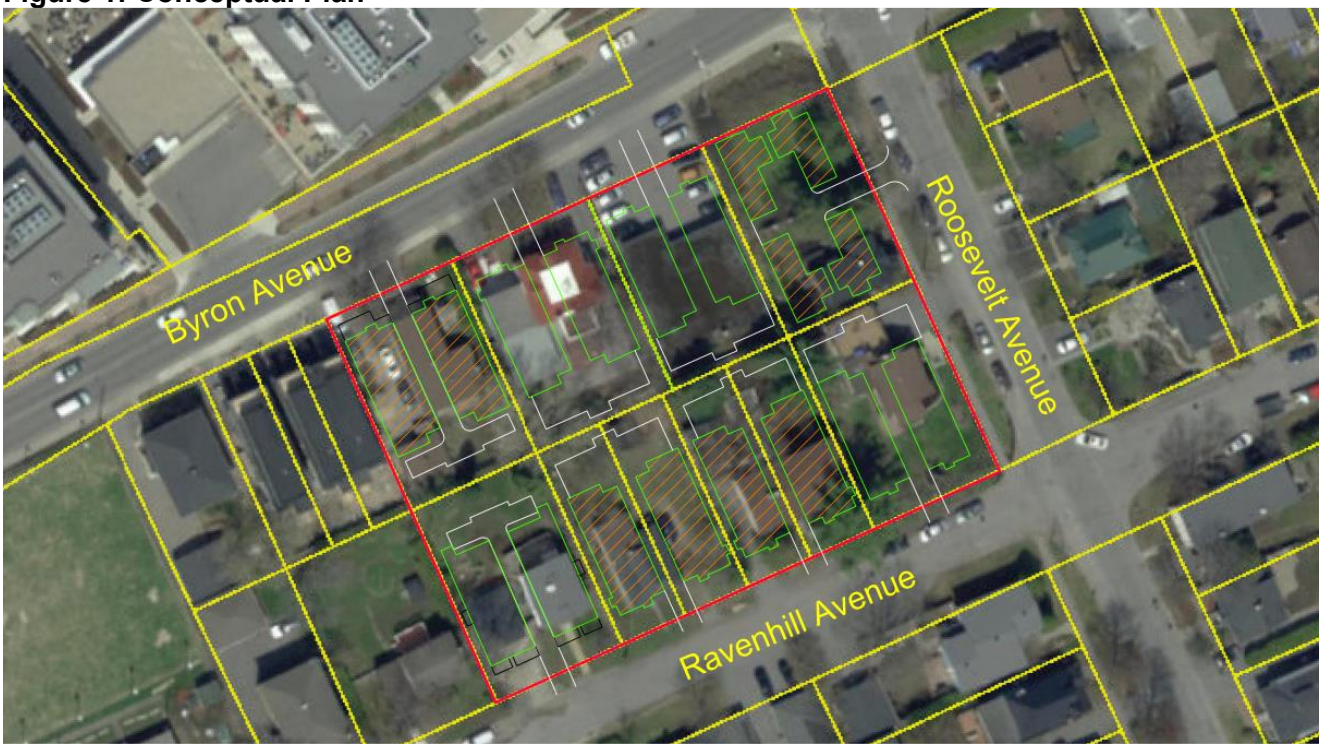
1.0 INTRODUCTION

This Transportation Impact Assessment (TIA) has been prepared in support of a Zoning By-Law Amendment for the properties located at 576, 570 and 566 Byron Avenue, 440 and 436 Roosevelt Avenue, and 425, 419, 417, 415 and 411 Ravenhill Avenue (the "Subject Site"). The Subject Site is currently occupied by a range of low-rise residential dwellings, including detached, semi-detached and three-unit dwellings.

The Subject Site will be rezoned from Residential Third Density, subzone R (R3R) to Residential Fourth Density, Subzone G (R4G) which enables the construction of low-rise apartment dwellings on the properties. The proposed rezoning would permit an increase in the number of dwelling units from 34 (existing/approved) to a maximum of 64. The proposed redevelopment is anticipated to be constructed in 2019.

The conceptual plan is provided in **Figure 1**.

Figure 1: Conceptual Plan



The subject site is surrounded by the following:

- Byron Avenue to the north;
- Roosevelt Avenue to the east;
- Ravenhill Avenue to the south; and
- Existing residential developments/a Lawn Bowling club to the west.

A view of the subject site is provided in **Figure 2**.

Figure 2: View of the Subject Site

2.0 PROPOSED DEVELOPMENT

The rezoning will enable the construction of low-rise apartment dwellings on the Subject Site.

The proposed rezoning would permit a maximum of 64 residential units (an increase of 30 units compared to existing/approved number of units), limited surface parking and shared driveway accesses with access to Byron and Ravenhill.

3.0 SCREENING AND SCOPING

3.1 Screening Form

The City's 2017 TIA Guidelines identify three triggers for completing a TIA report, including trip generation, location, and safety. The criteria for each trigger are outlined in the City's TIA Screening Form.

The trigger results are as follows:

- Trip Generation Trigger: During peak hours, the development is expected to generate 20 to 30 vehicle trips/hour, which is equivalent to approximately 30 to 40 person trips/hour based on an adjustment factor of 1.28. The Trip Generation Trigger of 60 person trips/hour is not satisfied; further assessment is not required based on this trigger.

- Location Triggers – The development is not located along a Transit Priority, Rapid Transit Route, or Spine Cycling Route; further assessment is not required based on this trigger.

- Safety Triggers – Proposed driveways are within 150m of the traffic signal at Byron/Roosevelt; a TIA assessing the Design Review component only is required based on this trigger.

A copy of the TIA Screening Form is included in **Appendix A**.

3.2 Existing Conditions

3.2.1 Roadways

Byron Avenue is a collector road, that generally runs on an east-west alignment between Woodroffe Avenue and Holland Avenue. It extends west of Woodroffe to Richmond as a local road. It has a two-lane undivided urban cross-section and an unposted regulatory speed limit of 50km/hr under the *Ontario Highway Traffic Act.* On-street parking is not permitted on the either side of Byron Avenue in the vicinity of the subject site. A loading zone is located on the north side of Byron, opposite the subject site.

Roosevelt Avenue is a local roadway that generally runs on a north-south alignment between the Transitway and Cole Avenue. In the vicinity of the subject site, it has a two-lane undivided urban cross-section and a regulatory speed limit of 40km/hr. On-street parking is permitted on the west side in the vicinity of the subject site.

Ravenhill Avenue is a local roadway that generally runs in an east-west alignment between Golden Avenue and Churchill Avenue. It is discontinuous west of Melbourne Avenue. Adjacent to the site, it has a two-lane undivided rural cross-section and an unposted regulatory speed limit of 50km/hr. On-street parking is permitted on both the north and south sides in the vicinity of the subject site.

3.2.2 Intersections

Byron Avenue/Roosevelt Avenue

- Signalized intersection
- Eastbound/Westbound: one shared through/right/left turn lane
- Northbound/Southbound: one shared through/right/left turn lane

Ravenhill Avenue/Roosevelt Avenue

- Yield controlled intersection
- Eastbound/Westbound: one shared through/right/ left turn lane under yield control
- Northbound/Southbound: one shared through/right/left turn lane under free flow

3.2.3 Driveways

In accordance with the City's 2017 TIA guidelines, a review of adjacent driveways along the boundary roads are provided as follows:

Byron, North Side:
- Driveway to commercial/residential development at 410 Richmond Road

Byron, South Side:
- Driveways to residential dwellings at 586, 582, 580, and 578 Byron

Roosevelt, East Side:
- Driveways to residential dwellings at 431,433 and 439 Roosevelt
- Driveway to residential dwelling at 397 Ravenhill

Roosevelt, West Side:
- Not applicable

Ravenhill, North Side:
- Driveways to residential dwellings at 431 and 435 Ravenhill
- Driveway to residential dwelling at 439 Golden Avenue

Ravenhill, South Side:
- Driveways to residential dwellings at 432, 436 and 438 Ravenhill
- Driveway to residential dwelling at 451 Cole Avenue
- Driveway to residential dwelling at 453 Golden Avenue
- Driveway to residential dwelling at 450 Roosevelt

3.2.4 Pedestrian and Cycling Facilities

Sidewalks are provided on both sides of Byron Avenue (concrete on the south side; units pavers on the north side). An asphalt sidewalk is provided on the west side of Roosevelt Avenue. There are no existing sidewalks on Ravenhill Avenue.

Byron Avenue and Roosevelt Avenue are classified as local cycling routes in the City's Ultimate Cycling Network. No dedicated cycling facilities are provided along any of the streets adjacent to the subject site.

Byron Avenue has an eastbound bike lane from Roosevelt Avenue to Churchill Avenue, east of the site.

3.2.5 Transit

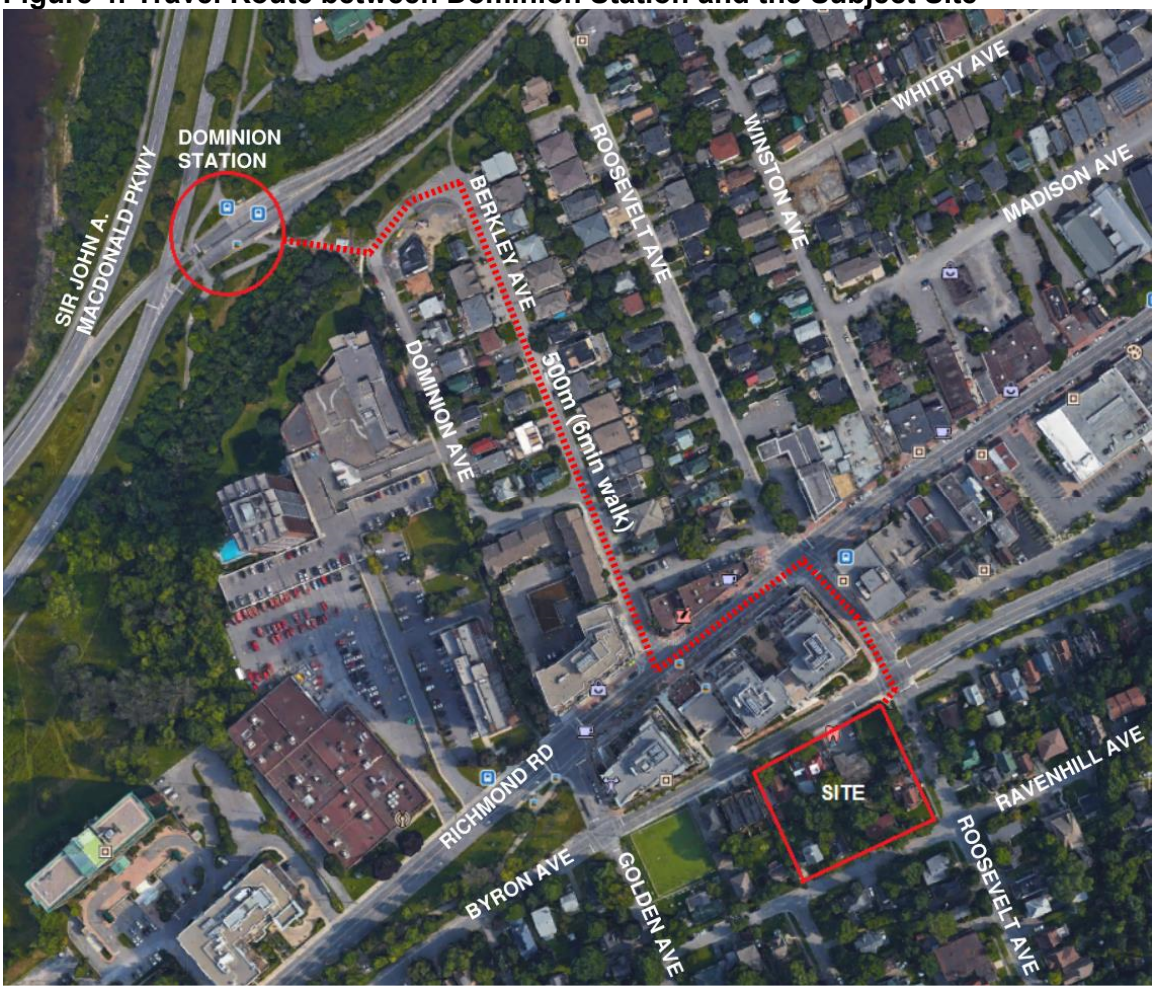
The nearest bus stops include OC Transpo bus stops #2436 and #7406 at the southeast and northeast corners of Richmond/Roosevelt which serve route 11 and bus stops #7538 and #7539 at the southeast and southwest corners of Byron/Churchill which serve route 50. The aforementioned bus stop locations are shown in **Figure 3**.

Figure 3: OC Transpo Bus Stop Locations

OC Transpo route 11 is a frequent route that travels between the Bayshore transit station and the Rideau transit station. This route operates every 15 minutes on weekdays between 8:00am and 8:00pm. This bus route operates seven days a week. OC Transpo route 50 travels between Tunney's Pasture transit station and Lincoln Fields transit station. This route operates every 15 minutes between 7:00am and 9:00am and every 30 minutes between 9:00am and 9:00pm on weekdays. This bus route operates every day, with the exception of Sundays.

The site is located 500m (approximately 6-minute walk) from Dominion Transit Station, with access to approximately two dozen transit routes. The aforementioned travel route between Dominion Station and the subject site is shown in **Figure 4**.

Figure 4: Travel Route between Dominion Station and the Subject Site



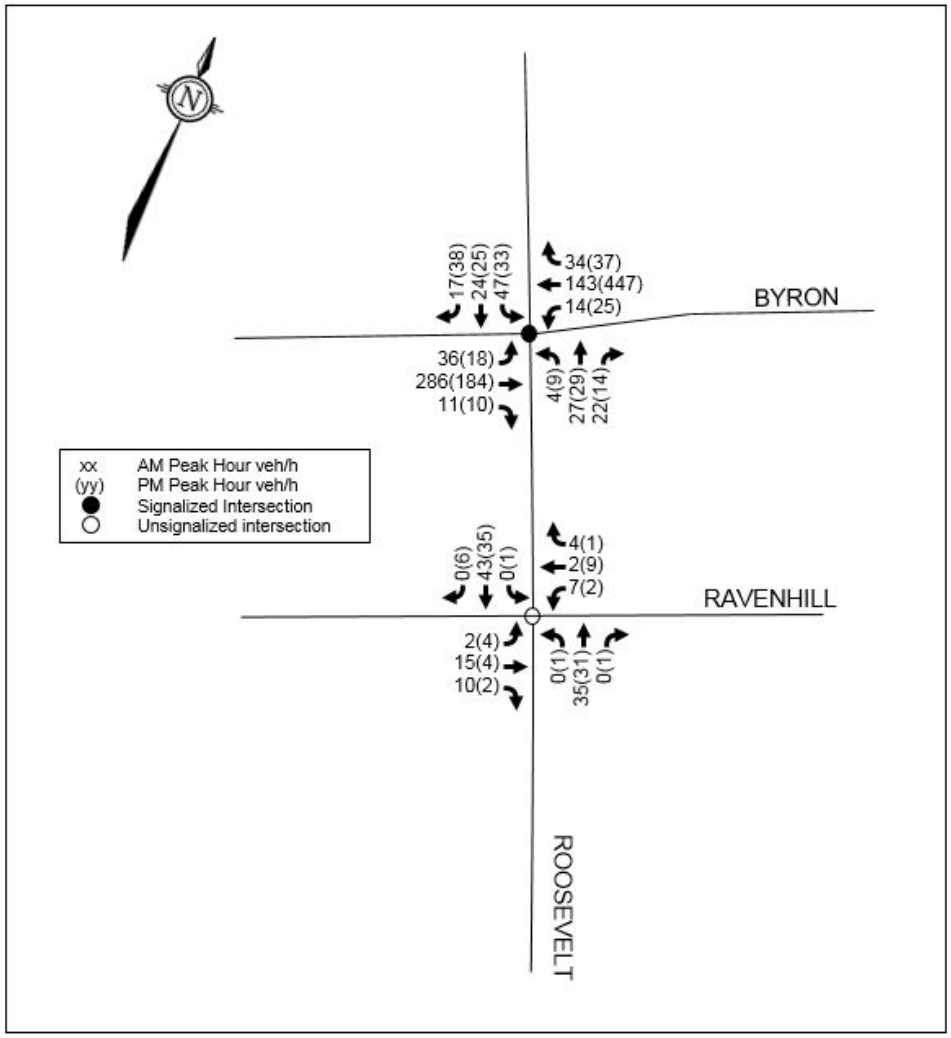
3.2.6 Existing Traffic Volumes

Weekday traffic counts completed by the City of Ottawa were used to determine the existing pedestrian, cyclist and vehicular traffic volumes at the study area intersections. The traffic counts were completed on the following dates:

- Byron Avenue/Roosevelt Avenue June 01, 2017
- Ravenhill Avenue/Roosevelt Avenue August 08, 2008

There are no recent traffic counts conducted for the intersection of Ravenhill/Roosevelt. However, considering the short length of Ravenhill Avenue, the dead end to the east and the number of homes has not changed significantly in the past 10 years, it can be assumed that the traffic volumes on Ravenhill have not significantly changed and therefore the 2008 data can be referenced. Peak hour summary sheets of the above traffic counts are included in **Appendix B**. Existing weekday AM and PM peak hour traffic volumes at the study area intersections are shown in **Figure 5**.

Figure 5: Existing Traffic Volumes



3.2.7 Collision Records

Historical collision data from the last five years was obtained from the City's Public Works and Service Department for the study area intersections. Copies of the collision summary reports are included in **Appendix C**.

The collision data has been evaluated to determine if there are any identifiable collision patterns. The following **Table 1** summarizes the number of collisions at each intersection and roadway segment from January 1, 2011 to January 1, 2016.

Table 1: Reported Collisions

Intersection	Number of Reported Collisions
Byron/Roosevelt	23
Roosevelt/Ravenhill	No available data

Byron/Roosevelt
A total of 23 collisions were reported at the Byron Avenue/Roosevelt Avenue intersection over the last five years. Twenty-one were angle impacts and two were turning movement impacts. Six of the collisions caused personal injuries, but none caused fatalities.

Twelve of the twenty-one angle impacts occurred with vehicles travelling in the southbound and eastbound direction. Sight lines may have been a factor in these two directions.

The two turning movement impacts involved cyclists.

A pedestrian signal was installed at the intersection of Byron and Roosevelt on the west leg between 2010-2011. Pedestrian activated signals were provided for vehicles along Byron, while stop controls were provided for drivers on Roosevelt. Danforth Avenue and Byron Place connect into Roosevelt on either side of the intersection. From January 1, 2011 to January 1, 2015 twenty-one collisions occurred. The overall collision data during this time equates to approximately five collisions per year.

Due to the high number of collisions, City staff installed a full, four-way traffic signal in 2015. Existing shrubs and trees were removed from the southwest corner to improve sight lines. Since the installation of the traffic signal, collisions have reduced. From January 2, 2015 to January 1, 2016 two collisions occurred.

Roosevelt/Ravenhill
Data was not available for this intersection.

3.3 Planned Conditions

The City of Ottawa's 2013 TMP does not identify any roadway or transit projects along the adjacent streets within its Affordable Road Network and Affordable Rapid Transit and Transit Priority (RTTP) Network. However, several nearby projects are planned.

Richmond Road is identified as a Transit Priority Measures Corridor under the 2031 Affordable RTTP Network. Stage 2 of the LRT extension will run from Scott Street to Bayshore Station. Dominion Station is planned to be rebuilt into a rail transit station. The station will consist of open air LRT platforms on the lower level and local bus platforms at the street level.

The 2013 Ottawa Cycling Plan identifies a major pathway connection along Byron Avenue between an existing east-west pathway west of Golden Avenue and east of Churchill Avenue.

The City of Ottawa's Byron Avenue Traffic Calming project is scheduled for implementation in 2018. The project consists of traffic calming support measures such as speed humps, mini roundabouts, raised intersections, road narrowing and corner tightening along Byron Avenue from Sherbourne Road to Island Park Drive. The design for Byron Avenue adjacent to the aforementioned properties includes a bulbout at the southeast corner of Byron/Golden (cycling ride-over design), an eastbound painted bike lane and a westbound mixed-use lane with painted bike sharrows. The existing road width of 8.1m is to be reallocated as a 1.5m eastbound bike lane, a 3.0m eastbound travel lane and a 3.6m westbound travel lane.

3.4 Study Area and Time Periods

The study area for this report will include Byron Avenue, Roosevelt Avenue and Ravenhill Avenue, within the vicinity of the subject area. The study area includes the signalized intersection of Byron/Roosevelt and the unsignalized intersection of Roosevelt/Ravenhill.

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the 'worst case' combination of site generated traffic and adjacent street traffic. Anticipated parking requirements will also be reviewed for the subject site. The proposed residential development is anticipated to be constructed with full occupancy of the development by 2019. The following TIA will review intersection operations for the existing and build-out condition.

3.5 Exemptions Review

As the trip generation and location triggers were not met, the Transportation Demand Management (Module 4.5), Neighbourhood Traffic Management (Module 4.6), Transit (Module 4.7), Network Concept (Module 4.8) and Network Intersections (Module 4.9) are omitted from the required analysis. The following modules will be included in the TIA report:

- Module 4.1 – Development Design
- Module 4.2 – Parking
- Module 4.3 – Boundary Streets
- Module 4.4 – Access Intersections

4.0 FORECASTING

4.1 Development-Generated Traffic

4.1.1 Trip Generation

Trips generated by the proposed concept plan have been estimated using the relevant peak hour rates identified in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition. The trips generated by 30 new units during the weekday AM and PM peak hours are outlined in the following **Table 2**.

Table 2: ITE Trip Generation

Land Use	Code	Units/ GFA	AM Peak (vph[1])			PM Peak (vph)		
			In	Out	Total	In	Out	Total
Low-Rise Apartment	221	30	4	17	21	17	9	26

1. vph denotes vehicles per hour

The ITE trips have been converted to person trips using a factor of 1.28, consistent with the TIA guidelines. Person trips generated by the proposed units are shown in the following **Table 3**.

Table 3: Person Trip Generation

Land Use	Units	Peak Hour	In (vph)	Out (vph)	Total (vph)	Person Trip Factor	In (pph[1])	Out (pph)	Total (pph)
Low-Rise Apartment	30	AM	4	17	21	**x 1.28** →	5	22	27
		PM	17	9	26		22	12	34

1. pph denotes persons per hour

The number of car trips that the proposed development will generate has been estimated by categorizing the person trips by modal share. The modal shares are based on observed percentages in the *2011 TRANS O-D Survey Report* that are specific to the region referred to as the Ottawa West district. The modal share values applied to the trips generated by the proposed development are based on all observed trips within the Ottawa West district, including those with an origin or destination beyond that area. A full breakdown of the projected person trips by modal share and arrival/departure is shown in the following **Table 4**.

Table 4: Site-Generated Trips by Modal Share

Travel Mode		Modal Share	AM Peak			PM Peak		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Proposed Units (30)	Total Person Trips		5	22	27	22	12	34
	Auto Driver	**40%**	**2**	**9**	**11**	**9**	**5**	**14**
	Auto Passenger	13%	1	3	4	3	2	5
	Transit	25%	1	5	6	5	3	8
	Non-Auto	22%	1	5	6	5	2	7

4.1.2 Trip Distribution

The assumed distribution of trips generated by the proposed development has been derived from existing traffic patterns on the study area roadways. Trips generated by the proposed development will be distributed to the road network as follows:

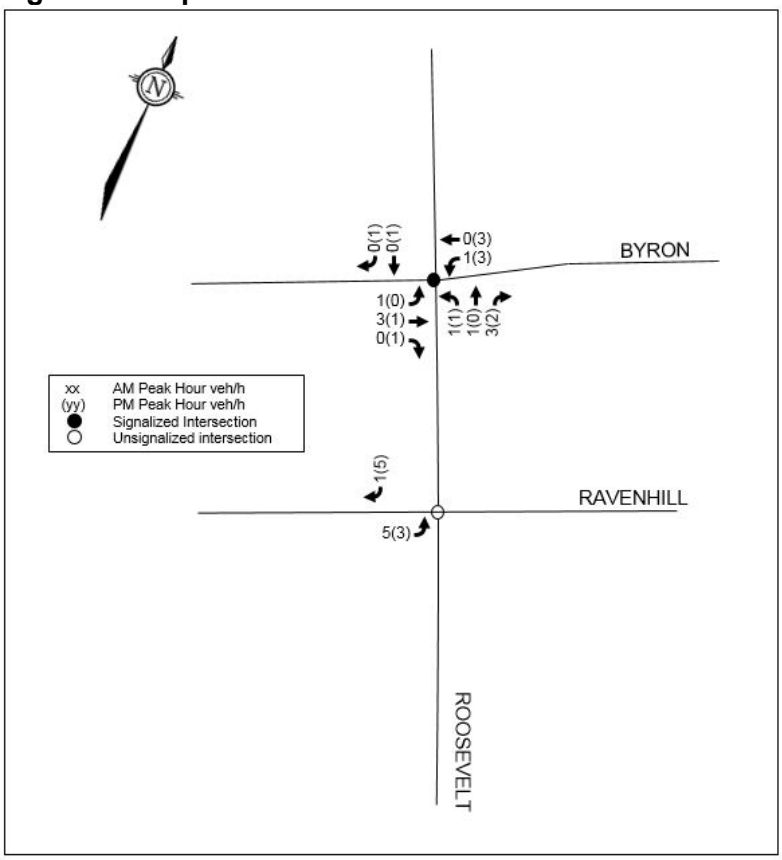
- 15% to/from the north via Roosevelt Avenue
- 5% to/from the south via Roosevelt Avenue
- 55% to/from the east via Byron Avenue
- 25% to/from the west via Byron Avenue

4.1.2 Trip Assignment

The conceptual plan (**Figure 1**) consists of three accesses along Byron Avenue, one access along Roosevelt Avenue and four accesses along Ravenhill Avenue. Due to this configuration, it is assumed that 50% of site generated trips would access from the Byron/Roosevelt intersection and 50% of site generated trips would access from the Ravenhill/Roosevelt intersection.

Site generated traffic volumes from the proposed (30) units are shown in **Figure 6** for the weekday a.m. and p.m. peak hours.

Figure 6: Proposed Site Generated Traffic Volumes



4.2 Background Traffic

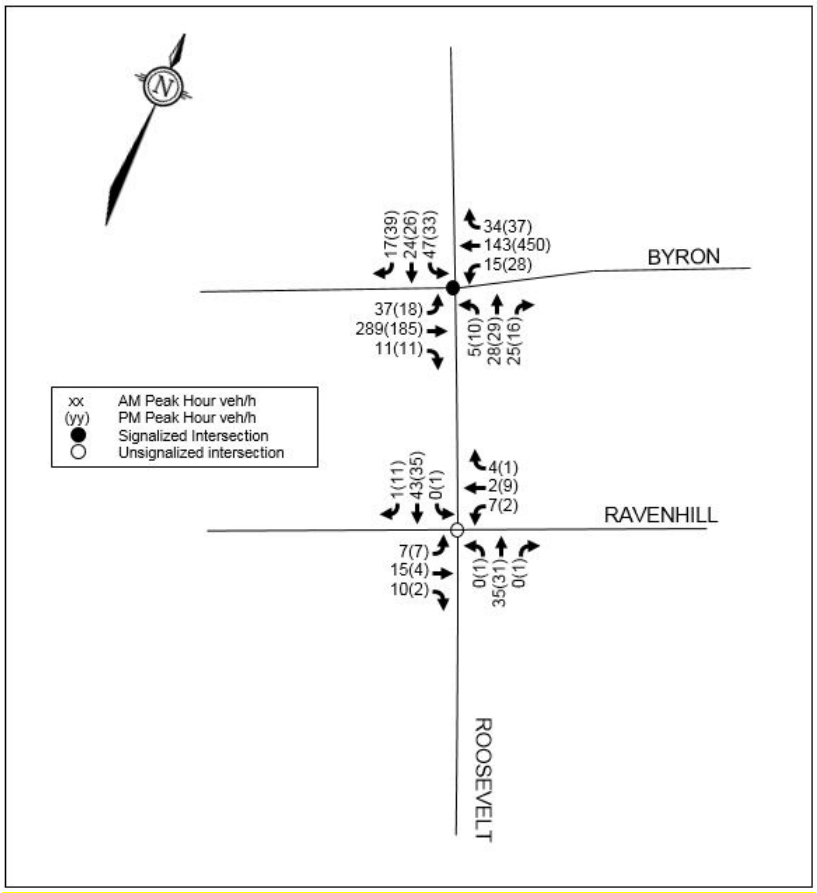
Background growth rates were not reviewed due to the low volume of site generated traffic.

4.2.1 Other Area Development

It is our understanding that there are no other developments under construction, approved, or in the approval process within the study area.

The total existing, approved and proposed site generated traffic volumes are shown in **Figure 7** for the weekday a.m. and p.m. peak hours.

Figure 7: Total Traffic Volumes



5.0 ANALYSIS

5.1 Development Design

A review of the development design and Transportation Demand Management (TDM) – *Supportive Development Design and Infrastructure Checklist* can be conducted at the site plan stage, if required.

The walking distance from the southeast corner of the site (425 Ravenhill Avenue) to the bus stops at Richmond/Ravenhill is 260m. The walking distance from the same corner of the site to the bus stops at Byron/Churchill is 450m. As noted in section 3.2.5. the site is within 500m (approx. 6 min walk) from the Dominion Transit Station. Deliveries and municipal services including garbage collection and emergency vehicles will be accommodated curbside.

5.2 Parking

The subject site is located in Area X (Inner Urban) of Schedule 1A to the City of Ottawa's *Zoning By-law* (ZBL). For a low-rise apartment building with less than 12 units, no vehicle parking, or visitor parking is required. The minimum bicycle parking space rate is 0.50 per dwelling unit.
Based on the proposed conceptual four-plex units, no on-site parking is required for each property. Each four-plex requires 2 bicycle parking spaces.

5.3 Boundary Streets

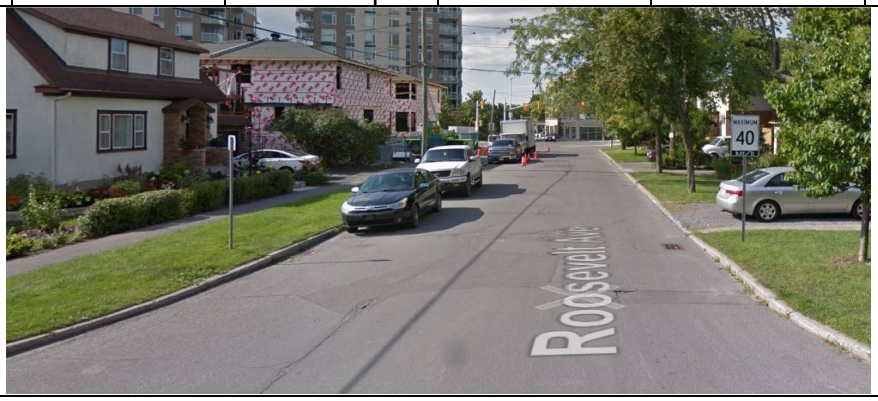
This section provides a review of the boundary streets using complete streets principles. The Multi-Modal Level of Service (MMLOS) guidelines produced by IBI Group in October 2015 were used to evaluate the LOS of all roadway segments for pedestrian, bicycle and auto modes of transportation. Transit and truck modes have not been evaluated as none of the study area roads has bus or truck routes. Schedule B of the City of Ottawa's Official Plan indicates all roadway segments are located in the General Urban Area.

5.3.1 Pedestrian Level of Service (PLOS)

Exhibits 4, 5 and 6 of the MMLOS guidelines have been used to evaluate the existing segment and intersection PLOS within the project limits. Exhibit 22 of the MMLOS guidelines suggest a target PLOS C for collector and local roads in the General Urban Areas.

The results of the segment PLOS analysis are summarized in **Table 5**:

Table 5: PLOS Segment Analysis

Sidewalk Width	Boulevard Width	Motor Vehicle AADT	Presence of On-Street Parking	Operating Speed[1]	Segment PLOS
Byron Avenue (Golden Avenue to Roosevelt Avenue)					
2.0m	None	> 3000 vpd	No	50km/hr	C
					
Roosevelt Avenue (Byron Avenue to Ravenhill Avenue)					
1.5m	> 2m	< 3000 vpd	N/A	40km/hr	C
					

Sidewalk Width	Boulevard Width	Motor Vehicle AADT	Presence of On-Street Parking	Operating Speed[1]	Segment PLOS
Ravenhill Avenue (Golden Avenue to Roosevelt Avenue)					
No sidewalk	N/A			50km/hr	F
					

5.3.2 Bicycle Level of Service (BLOS)

Exhibit 11 of the MMLOS guidelines has been used to evaluate the existing segment BLOS within the project limits. BLOS for future conditions with the Byron Avenue Traffic Calming project has also been evaluated as bicycle facilities will be added in 2018. Exhibit 22 of the MMLOS guidelines suggests a target BLOS B for local and collector roads with local cycling routes and BLOS D for elsewhere in the General Urban Area.

The results of the segment BLOS analysis are shown in **Table 6**.

Table 6: BLOS Segment Analysis

Condition	Type of Bikeway	Travel Lanes and/or Speed	LOS
Byron Avenue (Golden Avenue to Roosevelt Avenue)			
Existing	Mixed Traffic	2 to 3 travel lanes; 50km/h	D
Future	Bike Lanes Not Adjacent to Parking Lane	1.5m wide bike lane	B
Roosevelt Avenue (Byron Avenue to Ravenhill Avenue)			
Existing	Mixed Traffic	2 travel lanes; 40km/h; no marked centerline or classified as residential	A
Ravenhill Avenue (Golden Avenue to Roosevelt Avenue)			
Existing	Mixed Traffic	2 travel lanes; 50km/h; no marked centerline or classified as residential	B

5.3.3 Vehicular Level of Service (Auto-LOS)

The vehicular LOS analysis has been completed in accordance with the City's 2017 Transportation Impact Assessment (TIA) Guidelines.

Exhibit 22 of the MMLOS Guidelines suggests that the minimum desirable Auto-LOS target is LOS D for collector and local roads in the General Urban Area.

Lane capacity of a two-way collector and a local roadway with on-street parking and at-grade intersections is estimated at 600 vph per lane and 400 vph per lane, respectively. Traffic counts at the Byron/Roosevelt and Ravenhill/Roosevelt and intersections were used to estimate peak hour traffic along the three roadway segments.

Results of the segment Auto-LOS analysis are summarized in **Table 7**.

Table 7: Auto-LOS Segment Analysis - Existing Conditions

Road Segment	AM Peak				PM Peak			
	Volume (vph)	Capacity (vph)	v/c	LOS	Volume (vph)	Capacity (vph)	v/c	LOS
Byron Avenue (Golden Avenue to Roosevelt Avenue)								
Eastbound	333	600	0.55	A	212	600	0.35	A
Westbound	191	600	0.32	A	509	600	0.85	D
Roosevelt Avenue (Byron Avenue to Ravenhill Avenue)								
Northbound	53	400	0.13	A	52	400	0.13	A
Southbound	88	400	0.22	A	96	400	0.24	A
Ravenhill Avenue (Golden Avenue to Roosevelt Avenue)								
Eastbound	27	400	0.07	A	10	400	0.03	A
Westbound	13	400	0.03	A	12	400	0.03	A

5.3.4 MMLOS Summary

A summary of the results of the existing segment MMLOS analysis is provided in **Table 8.**

Table 8: Existing Segments MMLOS Summary

Segments		Byron – Golden to Roosevelt	Roosevelt – Byron to Ravenhill	Ravenhill – Golden to Roosevelt
Pedestrian	Sidewalk Width	2.0m	1.5m	N/A
	Boulevard Width	N/A	> 2.0m	N/A
	AADT	>3000	≤3000	N/A
	On-Street Parking	no	N/A	yes
	Operating Speed	>30km/h to 50km/h	40km/h	50km/h
	Level of Service	**C**	**C**	**F**
Cyclist	Number of Travel Lanes (per direction)	2	2	2
	Type of Bikeway	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Operating Speed	50km/h	40km/h	40km/h
	Level of Service	**D**	**A**	**B**
Auto	**Level of Service**	**D**	**A**	**A**

Byron Avenue from Golden Avenue to Roosevelt Avenue currently meets the target PLOS and Auto-LOS, however fails to meet the target BLOS for a local cycling route in the General Urban Area based on the existing conditions. The City plans to implement additional bicycle facilities in the summer of 2018. The planned improvements for Byron Avenue include a 1.5m wide eastbound bike lane, bringing the BLOS to B for the eastbound lane, which meets the target. The westbound lane will consist of a mixed-use lane with painted bike sharrows and the BLOS will not change.

Roosevelt Avenue from Byron Avenue to Ravenhill Avenue meets the target PLOS, BLOS and Auto-LOS for the General Urban Area.

Ravenhill Avenue from Golden Avenue to Roosevelt Avenue meets the target BLOS and Auto-LOS, however does not meet the target PLOS in the General Urban Area. If the City wishes to address this deficiency, they could consider re-design for an operating speed of 30km/h or less, or the installation of sidewalks to provide an acceptable PLOS of C. This section of Ravenhill has a ROW width of 16m, a paved surface of 8.5m and a rural cross section. Above-ground hydro is located on the north side of the road allowance, approximately 1m from the edge of pavement.

5.4 Access Intersections Design

The conceptual plan consists of 8 accesses, which includes three on Byron Avenue, one on Roosevelt Avenue and four on Ravenhill Avenue. For simplicity, one access on Byron Avenue (the roadway with highest existing volume of traffic) was modeled using the Synchro 10 software package to evaluate the total site-generated Auto-LOS. The following analysis is based on the City's vehicular LOS criteria.

The access intersection analysis has been completed using 2017 traffic count data from the intersection of Byron Avenue and Roosevelt Avenue. Byron Avenue is considered free-flow conditions and the access is considered a stop-controlled condition. The intersection parameters used in the analysis are consistent with the TIA guidelines (saturated flow rate: 1800vphpl, PHF: 1.0).

The results of the access intersection Auto-LOS analysis are summarized in **Table 9** for the weekday AM and PM peak hours. Detailed reports are included in **Appendix D.**

Table 9: Auto-LOS Analysis - Total

Intersection	AM Peak			PM Peak		
	Max V/C	LOS	Movement	Max V/C	LOS	Movement
Byron Avenue/Access	0.20	B	EBT/R	0.13	B	EBT/R

The access intersection operates with LOS B during the weekday AM and PM peak hours, meeting the target Auto-LOS for the General Urban Area. Based on the lower traffic volumes along Roosevelt Avenue and Ravenhill Avenue, it is assumed that the access intersections along these roadways will operate with the same Auto-LOS, or better than Byron Avenue. The proposed concept essentially results in the same number of driveways as the existing condition with an additional 1-2 vehicle trips at each driveway during the peak hours. No significant impact is anticipated as a result of the proposed development.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing, the conclusions and recommendations of this TIA can be summarized as follows:

- Twelve of the twenty-one angle impacts at the Byron/Roosevelt intersection occurred with vehicles travelling in the southbound and eastbound direction. Sight lines may have been a factor in these two directions.

- Full traffic signal installed in 2015 at Byron/Roosevelt and trees were removed to improve sightlines.

- A review of the development design and Transportation Demand Management (TDM) – *Supportive Development Design and Infrastructure Checklist* can be conducted at the site plan stage, if required.

- Based on the proposed conceptual four-plex units, no on-site parking is required for each property. Each four-plex requires 2 bicycle parking spaces

- Based on the results of the segment multi-modal level of service (MMLOS) analysis, Byron, Roosevelt and Ravenhill meet the minimum desirable Auto-LOS target LOS D for collector and local roads in the General Urban Area.

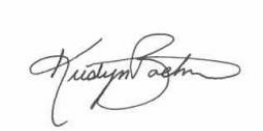
- Based on the results of the segment multi-modal level of service (MMLOS) analysis, Byron and Roosevelt meet the target pedestrian level of service (PLOS), however Ravenhill Avenue did not. If the City wishes to address this deficiency, they could consider re-design for an operating speed of 30km/h or less, or the installation of sidewalks to provide an acceptable PLOS of C. This section of Ravenhill has a ROW width of 16m, a paved surface of 8.5m and a rural cross section. Above-ground hydro is located on the north side of the road allowance, approximately 1m from the edge of pavement.

- Based on the results of the segment multi-modal level of service (MMLOS) analysis, Roosevelt and Ravenhill meet the target bicycle level of service (BLOS), however Byron does not meet the target BLOS for a local cycling route in the General Urban Area based on existing conditions. The City plans to implement bicycle facilities in the summer of 2018. The planned improvements for Byron Avenue includes a 1.5m wide eastbound bike lane, bringing the BLOS to B for the eastbound lane, which meets the target. The westbound lane will continue to remain as a mixed-use lane with painted bike sharrows and the BLOS will not change.

- Under the total traffic conditions, the access intersections are anticipated to operate with a LOS B or better during the weekday AM and PM peak hours, meeting the target for the General Urban Area.

NOVATECH

Prepared by:



Kristyn Boehme, E.I.T.
Engineering Intern

Reviewed By:

Jennifer Luong, P.Eng.
Senior Project Manager | Transportation/Traffic

APPENDIX A

TIA Screening Form

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	**576, 570, 566 and 436 Byron Avenue, 425,419,417,415 and 411 Ravenhill Avenue, and 440 Roosevelt Avenue**
Description of Location	**Eastern portion of the lots surrounded by Byron Ave, Roosevelt Ave, Ravenhill Ave and Golden Ave**
Land Use Classification	**Apartments**
Development Size (units)	**30**
Development Size (m^2)	**4925**
Number of Accesses and Locations	**TBD**
Phase of Development	
Buildout Year	**2019**

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		✓
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		✓

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		✓
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		✓
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	✓	
Is the proposed driveway within auxiliary lanes of an intersection?		✓
Does the proposed driveway make use of an existing median break that serves an existing site?		✓
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		✓
Does the development include a drive-thru facility?		✓

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?		✓
Does the development satisfy the Location Trigger?		✓

APPENDIX B

Traffic Count Data

Transportation Services - Traffic Services

W.O. 37081

Turning Movement Count - 15 Minute Summary Report

BYRON AVE @ ROOSEVELT AVE

Survey Date: Thursday, June 01, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

		ROOSEVELT AVE									BYRON AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	1	0	**1**	3	0	1	**4**	**5**	2	16	0	**18**	0	11	2	**13**	**31**	**36**
07:15	07:30	0	4	2	**6**	0	4	2	**6**	**12**	1	27	0	**28**	5	19	3	**27**	**55**	**67**
07:30	07:45	0	4	2	**6**	4	5	1	**10**	**16**	0	48	1	**49**	0	20	6	**26**	**75**	**91**
07:45	08:00	3	6	2	**11**	3	4	7	**14**	**25**	5	72	3	**80**	3	39	8	**50**	**130**	**155**
08:00	08:15	2	6	2	**10**	6	7	4	**17**	**27**	9	69	4	**82**	2	24	7	**33**	**115**	**142**
08:15	08:30	0	7	11	**18**	11	5	3	**19**	**37**	7	74	3	**84**	2	27	11	**40**	**124**	**161**
08:30	08:45	1	6	5	**12**	13	3	4	**20**	**32**	14	83	5	**102**	3	32	8	**43**	**145**	**177**
08:45	09:00	0	9	4	**13**	11	10	5	**26**	**39**	6	66	1	**73**	6	51	5	**62**	**135**	**174**
09:00	09:15	3	5	2	**10**	12	6	5	**23**	**33**	9	63	2	**74**	3	33	10	**46**	**120**	**153**
09:15	09:30	1	9	2	**12**	7	6	3	**16**	**28**	6	46	3	**55**	7	34	6	**47**	**102**	**130**
09:30	09:45	1	5	3	**9**	7	5	3	**15**	**24**	6	31	2	**39**	3	31	9	**43**	**82**	**106**
09:45	10:00	0	1	5	**6**	7	2	4	**13**	**19**	4	49	2	**55**	2	36	7	**45**	**100**	**119**
11:30	11:45	1	6	5	**12**	9	3	6	**18**	**30**	2	44	7	**53**	4	39	6	**49**	**102**	**132**
11:45	12:00	2	7	3	**12**	19	7	7	**33**	**45**	5	32	0	**37**	8	51	8	**67**	**104**	**149**
12:00	12:15	3	8	8	**19**	17	5	7	**29**	**48**	4	47	4	**55**	5	45	8	**58**	**113**	**161**
12:15	12:30	0	5	3	**8**	9	5	12	**26**	**34**	5	40	1	**46**	9	43	8	**60**	**106**	**140**
12:30	12:45	3	9	3	**15**	11	3	14	**28**	**43**	4	53	4	**61**	7	44	9	**60**	**121**	**164**
12:45	13:00	1	7	2	**10**	16	5	11	**32**	**42**	10	42	3	**55**	1	50	10	**61**	**116**	**158**
13:00	13:15	2	9	2	**13**	13	4	6	**23**	**36**	4	38	3	**45**	2	46	11	**59**	**104**	**140**
13:15	13:30	0	5	4	**9**	13	3	10	**26**	**35**	13	31	2	**46**	0	48	12	**60**	**106**	**141**
15:00	15:15	2	10	4	**16**	12	10	7	**29**	**45**	5	36	6	**47**	2	66	2	**70**	**117**	**162**
15:15	15:30	3	3	5	**11**	13	9	7	**29**	**40**	2	53	3	**58**	1	57	11	**69**	**127**	**167**
15:30	15:45	1	4	4	**9**	9	10	6	**25**	**34**	2	56	0	**58**	5	65	7	**77**	**135**	**169**
15:45	16:00	5	11	2	**18**	10	6	11	**27**	**45**	4	54	3	**61**	5	73	9	**87**	**148**	**193**
16:00	16:15	2	4	5	**11**	17	10	7	**34**	**45**	7	59	5	**71**	3	99	7	**109**	**180**	**225**
16:15	16:30	3	5	5	**13**	15	6	9	**30**	**43**	4	42	1	**47**	5	102	8	**115**	**162**	**205**
16:30	16:45	3	7	2	**12**	7	4	9	**20**	**32**	4	43	2	**49**	5	103	8	**116**	**165**	**197**
16:45	17:00	2	6	3	**11**	5	7	7	**19**	**30**	4	44	4	**52**	10	108	11	**129**	**181**	**211**
17:00	17:15	4	7	4	**15**	14	7	10	**31**	**46**	4	50	2	**56**	3	120	10	**133**	**189**	**235**
17:15	17:30	0	9	5	**14**	7	7	12	**26**	**40**	6	47	2	**55**	7	116	8	**131**	**186**	**226**
17:30	17:45	3	4	6	**13**	7	5	2	**14**	**27**	6	35	1	**42**	6	103	10	**119**	**161**	**188**
17:45	18:00	1	11	3	**15**	12	6	9	**27**	**42**	8	45	1	**54**	1	89	14	**104**	**158**	**200**
TOTAL:		52	200	118	**370**	319	179	211	**709**	**1079**	172	1535	80	**1787**	125	1824	259	**2208**	**3995**	**5074**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
37081

BYRON AVE @ ROOSEVELT AVE

Count Date: Thursday, June 01, 2017 **Start Time:** 07:00

	ROOSEVELT AVE			BYRON AVE			
Time Period	Northbound	Southbound	**Street Total**	Eastbound	Westbound	**Street Total**	**Grand Total**
07:00 08:00	10	9	**19**	18	6	**24**	**43**
08:00 09:00	22	19	**41**	8	7	**15**	**56**
09:00 10:00	6	8	**14**	9	8	**17**	**31**
11:30 12:30	5	8	**13**	0	6	**6**	**19**
12:30 13:30	1	10	**11**	3	3	**6**	**17**
15:00 16:00	25	19	**44**	4	9	**13**	**57**
16:00 17:00	6	28	**34**	8	13	**21**	**55**
17:00 18:00	1	25	**26**	7	10	**17**	**43**
Total	76	126	**202**	57	62	**119**	**321**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

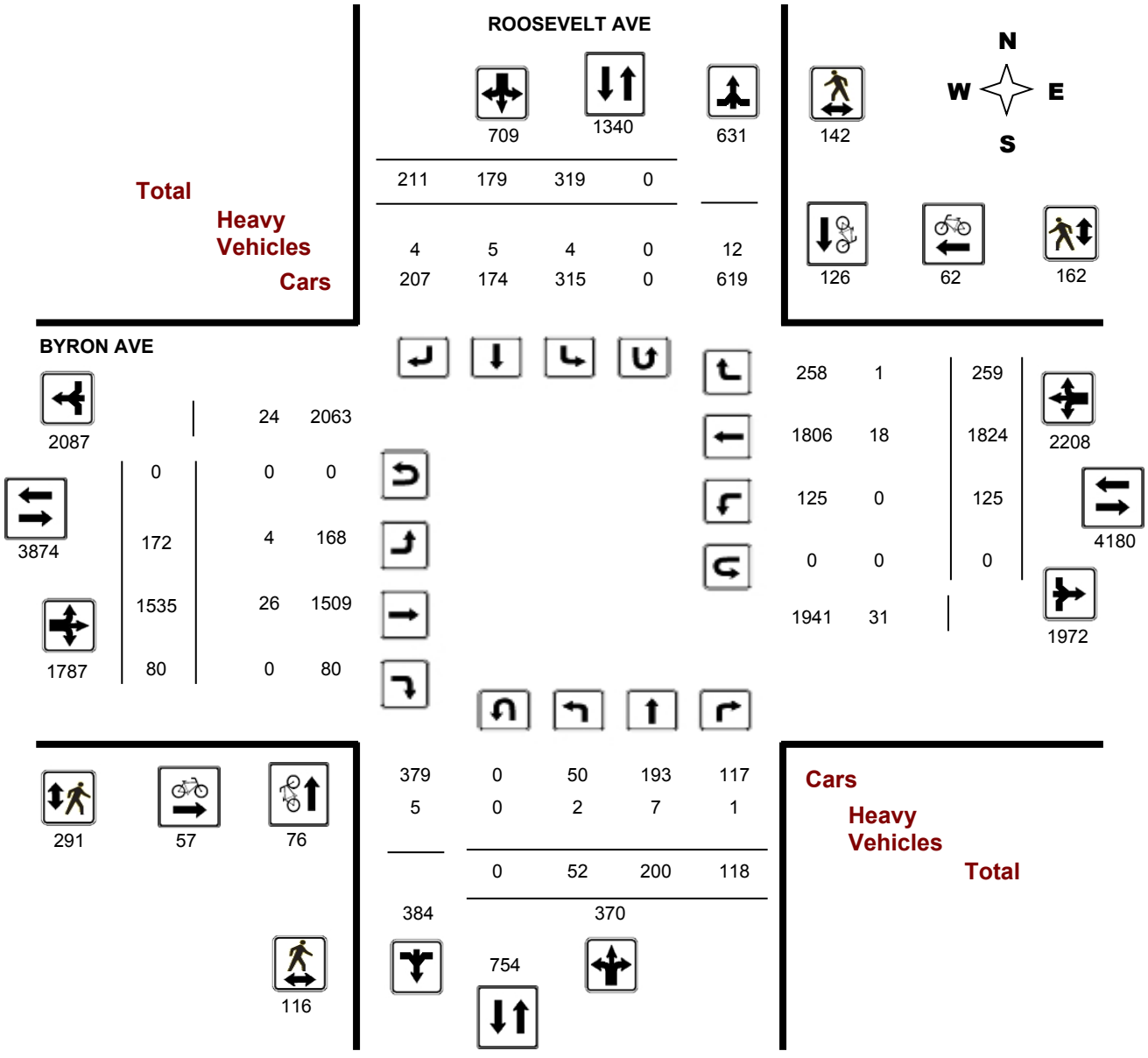
Turning Movement Count - Full Study Diagram

BYRON AVE @ ROOSEVELT AVE

Survey Date: Thursday, June 01, 2017

WO#: 37081

Device: Miovision



Comments

Transportation Services - Traffic Services

W.O. 37081

Turning Movement Count - Heavy Vehicle Report

BYRON AVE @ ROOSEVELT AVE

Survey Date: Thursday, June 01, 2017

		ROOSEVELT AVE									BYRON AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	08:00	0	3	0	**3**	0	2	2	**4**	**7**	0	2	0	**2**	0	1	0	**1**	**3**	**10**
08:00	09:00	0	0	0	**0**	0	1	0	**1**	**1**	2	4	0	**6**	0	3	1	**4**	**10**	**11**
09:00	10:00	1	0	0	**1**	1	0	2	**3**	**4**	0	4	0	**4**	0	5	0	**5**	**9**	**13**
11:30	12:30	0	1	0	**1**	1	1	0	**2**	**3**	0	1	0	**1**	0	2	0	**2**	**3**	**6**
12:30	13:30	0	1	0	**1**	1	0	0	**1**	**2**	2	4	0	**6**	0	4	0	**4**	**10**	**12**
15:00	16:00	1	2	0	**3**	0	1	0	**1**	**4**	0	5	0	**5**	0	1	0	**1**	**6**	**10**
16:00	17:00	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	2	0	**2**	**4**	**4**
17:00	18:00	0	0	1	**1**	1	0	0	**1**	**2**	0	4	0	**4**	0	0	0	**0**	**4**	**6**
Sub Total		2	7	1	**10**	4	5	4	**13**	**23**	4	26	0	**30**	0	18	1	**19**	**49**	**72**
U-Turns (Heavy Vehicles)					**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total		2	7	1	**0**	4	5	4	**13**	**23**	4	26	0	**30**	0	18	1	**19**	**49**	**72**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order
37081

Turning Movement Count - Pedestrian Volume Report

BYRON AVE @ ROOSEVELT AVE

Count Date: Thursday, June 01, 2017 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	2	0	**2**	2	0	**2**	**4**
07:15 07:30	3	1	**4**	1	1	**2**	**6**
07:30 07:45	1	6	**7**	6	2	**8**	**15**
07:45 08:00	8	1	**9**	12	1	**13**	**22**
07:00 08:00	14	8	**22**	21	4	**25**	**47**
08:00 08:15	5	5	**10**	9	3	**12**	**22**
08:15 08:30	6	2	**8**	7	1	**8**	**16**
08:30 08:45	6	13	**19**	10	7	**17**	**36**
08:45 09:00	8	2	**10**	8	5	**13**	**23**
08:00 09:00	25	22	**47**	34	16	**50**	**97**
09:00 09:15	4	9	**13**	6	8	**14**	**27**
09:15 09:30	3	8	**11**	6	3	**9**	**20**
09:30 09:45	6	1	**7**	8	5	**13**	**20**
09:45 10:00	2	4	**6**	7	4	**11**	**17**
09:00 10:00	15	22	**37**	27	20	**47**	**84**
11:30 11:45	0	4	**4**	8	3	**11**	**15**
11:45 12:00	3	9	**12**	12	7	**19**	**31**
12:00 12:15	1	5	**6**	11	8	**19**	**25**
12:15 12:30	1	4	**5**	6	2	**8**	**13**
11:30 12:30	5	22	**27**	37	20	**57**	**84**
12:30 12:45	2	3	**5**	9	3	**12**	**17**
12:45 13:00	7	5	**12**	10	5	**15**	**27**
13:00 13:15	2	4	**6**	8	5	**13**	**19**
13:15 13:30	0	5	**5**	9	4	**13**	**18**
12:30 13:30	11	17	**28**	36	17	**53**	**81**
15:00 15:15	7	2	**9**	13	1	**14**	**23**
15:15 15:30	6	6	**12**	9	2	**11**	**23**
15:30 15:45	2	2	**4**	12	12	**24**	**28**
15:45 16:00	3	7	**10**	15	4	**19**	**29**
15:00 16:00	18	17	**35**	49	19	**68**	**103**
16:00 16:15	8	4	**12**	11	13	**24**	**36**
16:15 16:30	4	5	**9**	11	7	**18**	**27**
16:30 16:45	4	1	**5**	10	0	**10**	**15**
16:45 17:00	5	7	**12**	17	14	**31**	**43**
16:00 17:00	21	17	**38**	49	34	**83**	**121**
17:00 17:15	2	7	**9**	17	16	**33**	**42**
17:15 17:30	1	3	**4**	5	11	**16**	**20**
17:30 17:45	1	5	**6**	13	3	**16**	**22**
17:45 18:00	3	2	**5**	3	2	**5**	**10**
17:00 18:00	7	17	**24**	38	32	**70**	**94**
Total	116	142	**258**	291	162	**453**	**711**

Comment:

Transportation Services - Traffic Services

Work Order
37081

Turning Movement Count - Full Study Summary Report

BYRON AVE @ ROOSEVELT AVE

Survey Date: Thursday, June 01, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
.90

Full Study

	ROOSEVELT AVE									BYRON AVE									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	**NB TOT**	LT	ST	RT	**SB TOT**	**STR TOT**	LT	ST	RT	**EB TOT**	LT	ST	RT	**WB TOT**	**STR TOT**	**Grand Total**
07:00 08:00	3	15	6	**24**	10	13	11	**34**	**58**	8	163	4	**175**	8	89	19	**116**	**291**	**349**
08:00 09:00	3	28	22	**53**	41	25	16	**82**	**135**	36	292	13	**341**	13	134	31	**178**	**519**	**654**
09:00 10:00	5	20	12	**37**	33	19	15	**67**	**104**	25	189	9	**223**	15	134	32	**181**	**404**	**508**
11:30 12:30	6	26	19	**51**	54	20	32	**106**	**157**	16	163	12	**191**	26	178	30	**234**	**425**	**582**
12:30 13:30	6	30	11	**47**	53	15	41	**109**	**156**	31	164	12	**207**	10	188	42	**240**	**447**	**603**
15:00 16:00	11	28	15	**54**	44	35	31	**110**	**164**	13	199	12	**224**	13	261	29	**303**	**527**	**691**
16:00 17:00	10	22	15	**47**	44	27	32	**103**	**150**	19	188	12	**219**	23	412	34	**469**	**688**	**838**
17:00 18:00	8	31	18	**57**	40	25	33	**98**	**155**	24	177	6	**207**	17	428	42	**487**	**694**	**849**
Sub Total	52	200	118	**370**	319	179	211	**709**	**1079**	172	1535	80	**1787**	125	1824	259	**2208**	**3995**	**5074**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	52	200	118	**370**	319	179	211	**709**	**1079**	172	1535	80	**1787**	125	1824	259	**2208**	**3995**	**5074**
EQ 12Hr	72	278	164	**514**	443	249	293	**986**	**1500**	239	2134	111	**2484**	174	2535	360	**3069**	**5553**	**7053**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	65	250	148	**463**	399	224	264	**887**	**1350**	215	1920	100	**2236**	156	2282	324	**2762**	**4998**	**6348**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	85	328	193	**606**	523	293	346	**1162**	**1768**	282	2516	131	**2929**	205	2989	424	**3618**	**6547**	**8315**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Comments:

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

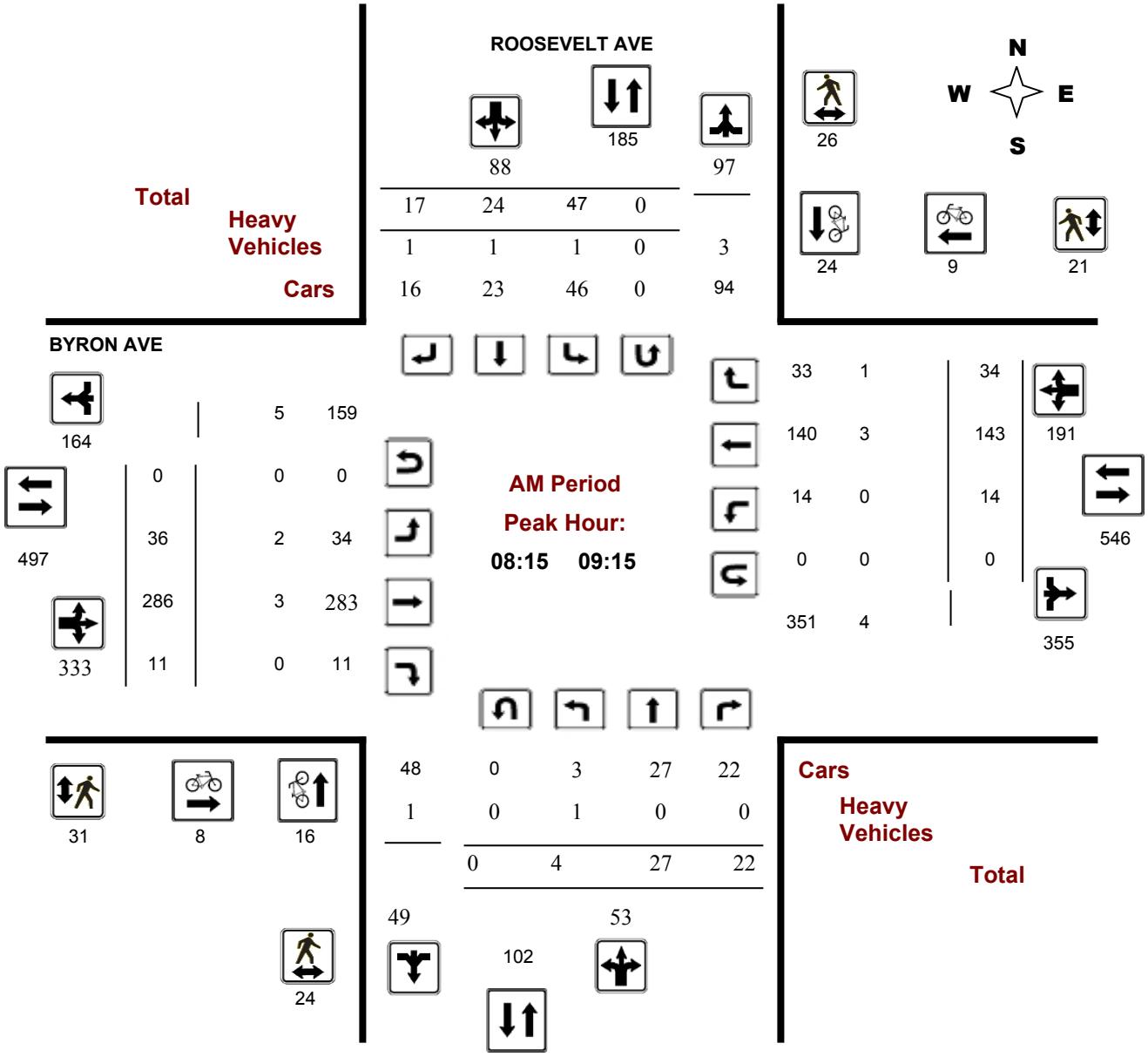
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BYRON AVE @ ROOSEVELT AVE

Survey Date: Thursday, June 01, 2017
Start Time: 07:00

WO No: 37081
Device: Miovision



Comments

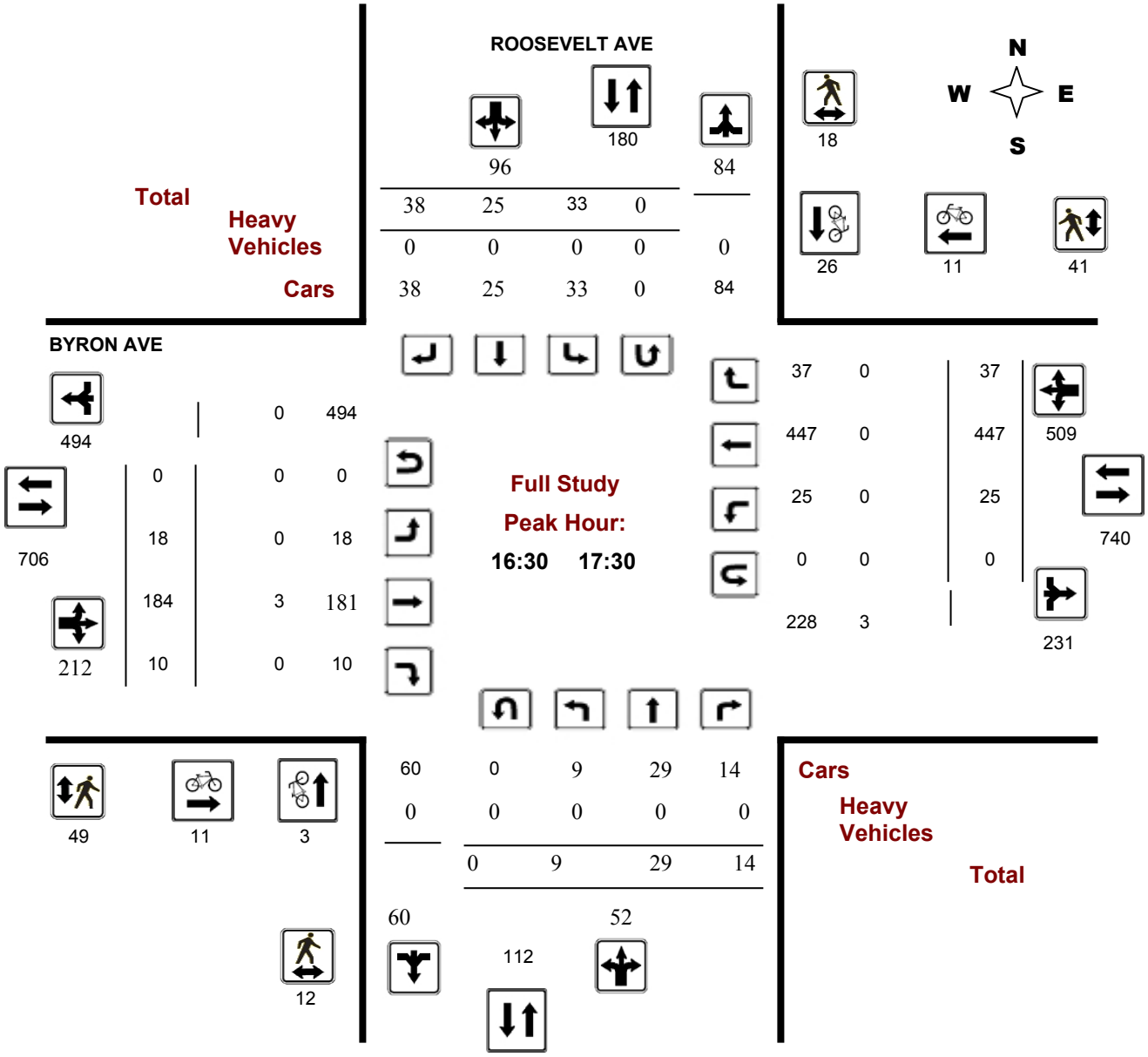
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BYRON AVE @ ROOSEVELT AVE

Survey Date: Thursday, June 01, 2017
Start Time: 07:00

WO No: 37081
Device: Miovision



Comments

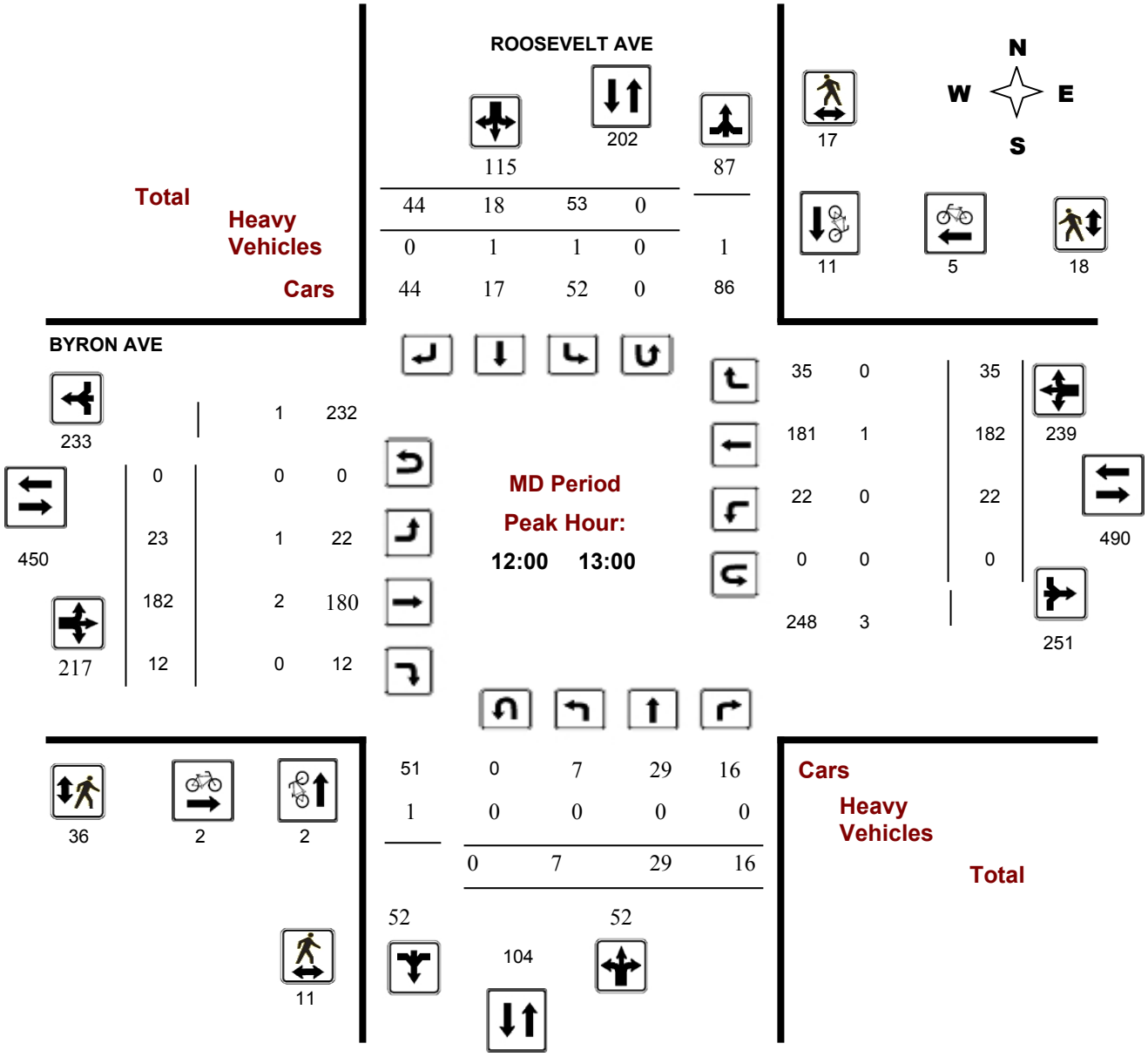
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BYRON AVE @ ROOSEVELT AVE

Survey Date: Thursday, June 01, 2017
Start Time: 07:00

WO No: 37081
Device: Miovision



Comments

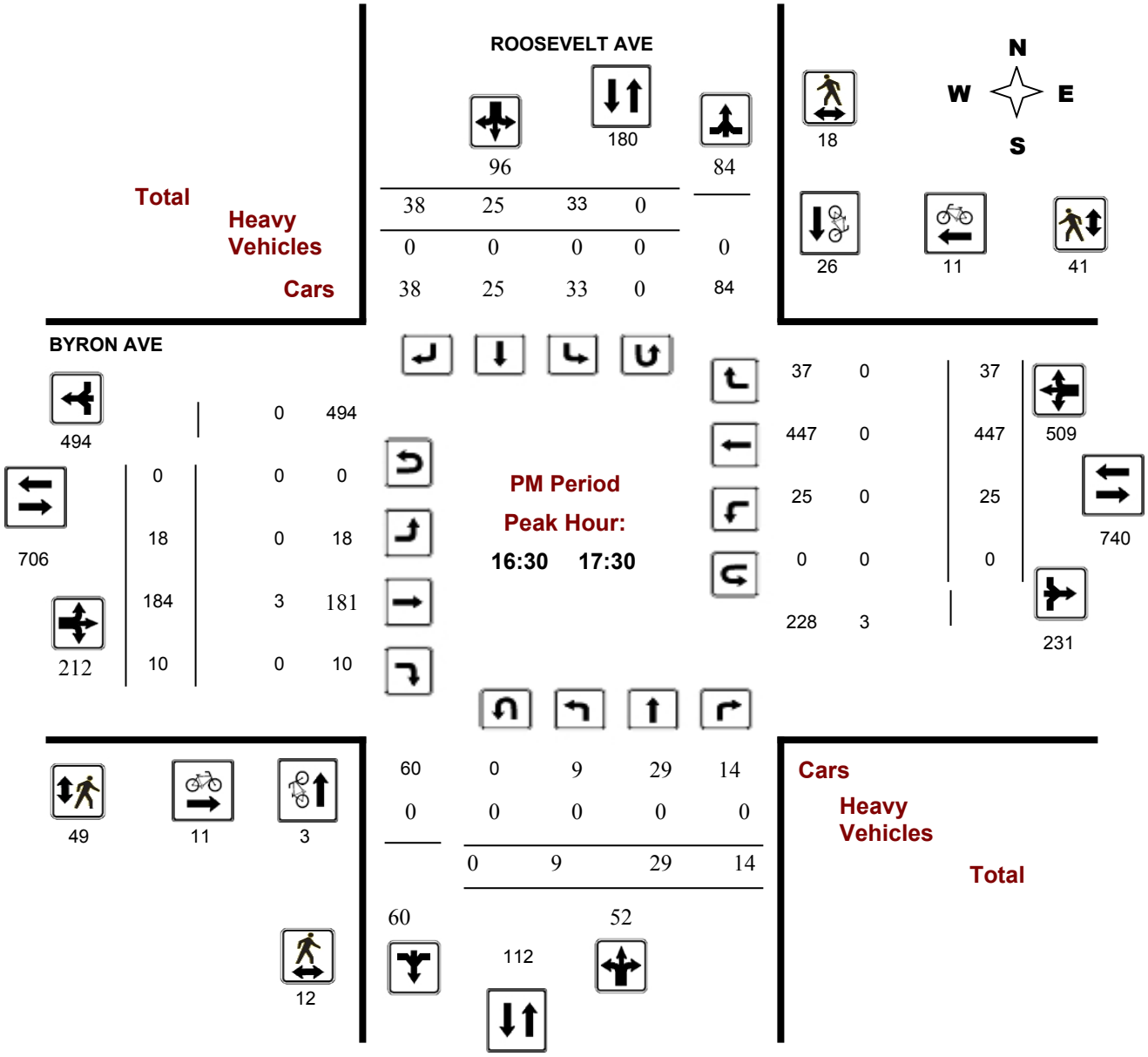
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BYRON AVE @ ROOSEVELT AVE

Survey Date: Thursday, June 01, 2017
Start Time: 07:00

WO No: 37081
Device: Miovision



Comments

Transportation Services - Traffic Services

Work Order
37081

Turning Movement Count - 15 Min U-Turn Total Report

BYRON AVE @ ROOSEVELT AVE

Survey Date: Thursday, June 01, 2017

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

Transportation Services - Traffic Services

W.O. 25214

Turning Movement Count - 15 Minute Summary Report

RAVENHILL AVE @ ROOSEVELT AVE

Survey Date: Friday, August 08, 2008

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	7	0	**7**	0	5	0	**5**	**12**	0	0	0	**0**	0	0	0	**0**	**0**	**12**
07:15	07:30	0	11	0	**11**	0	16	0	**16**	**27**	0	2	0	**2**	4	0	0	**4**	**6**	**33**
07:30	07:45	0	10	0	**10**	0	14	0	**14**	**24**	0	2	7	**9**	1	1	1	**3**	**12**	**36**
07:45	08:00	0	7	0	**7**	0	8	0	**8**	**15**	2	11	3	**16**	2	1	3	**6**	**22**	**37**
08:00	08:15	0	2	0	**2**	0	1	0	**1**	**3**	0	0	0	**0**	0	0	0	**0**	**0**	**3**
08:15	08:30	3	6	0	**9**	0	4	2	**6**	**15**	1	0	1	**2**	0	0	0	**0**	**2**	**17**
08:30	08:45	0	13	1	**14**	0	7	1	**8**	**22**	0	0	0	**0**	0	0	1	**1**	**1**	**23**
08:45	09:00	0	11	0	**11**	0	4	0	**4**	**15**	1	0	2	**3**	0	0	1	**1**	**4**	**19**
09:00	09:15	0	3	0	**3**	0	3	0	**3**	**6**	2	0	0	**2**	0	0	0	**0**	**2**	**8**
09:15	09:30	1	6	0	**7**	0	3	0	**3**	**10**	1	1	2	**4**	0	0	0	**0**	**4**	**14**
09:30	09:45	0	1	0	**1**	0	2	1	**3**	**4**	1	2	2	**5**	0	0	0	**0**	**5**	**9**
09:45	10:00	0	5	0	**5**	1	4	0	**5**	**10**	0	0	0	**0**	0	0	0	**0**	**0**	**10**
11:30	11:45	1	10	0	**11**	1	13	0	**14**	**25**	0	1	0	**1**	1	0	2	**3**	**4**	**29**
11:45	12:00	1	4	0	**5**	1	12	2	**15**	**20**	0	0	1	**1**	1	0	1	**2**	**3**	**23**
12:00	12:15	1	8	1	**10**	0	11	1	**12**	**22**	1	0	0	**1**	0	0	1	**1**	**2**	**24**
12:15	12:30	1	16	0	**17**	0	7	3	**10**	**27**	0	0	0	**0**	0	0	1	**1**	**1**	**28**
12:30	12:45	7	17	8	**32**	0	13	1	**14**	**46**	0	1	0	**1**	0	1	1	**2**	**3**	**49**
12:45	13:00	0	15	0	**15**	0	15	2	**17**	**32**	0	0	1	**1**	0	0	0	**0**	**1**	**33**
13:00	13:15	2	8	0	**10**	0	10	5	**15**	**25**	0	2	2	**4**	3	0	0	**3**	**7**	**32**
13:15	13:30	1	4	0	**5**	0	8	1	**9**	**14**	3	0	2	**5**	0	0	2	**2**	**7**	**21**
15:00	15:15	0	5	1	**6**	0	11	4	**15**	**21**	1	3	0	**4**	2	9	1	**12**	**16**	**37**
15:15	15:30	0	2	0	**2**	0	7	0	**7**	**9**	0	1	0	**1**	0	0	0	**0**	**1**	**10**
15:30	15:45	1	12	0	**13**	1	5	0	**6**	**19**	3	0	1	**4**	0	0	0	**0**	**4**	**23**
15:45	16:00	0	12	0	**12**	0	12	2	**14**	**26**	0	0	1	**1**	0	0	0	**0**	**1**	**27**
16:00	16:15	0	14	0	**14**	2	8	0	**10**	**24**	0	0	0	**0**	0	0	0	**0**	**0**	**24**
16:15	16:30	1	9	0	**10**	0	5	2	**7**	**17**	0	0	0	**0**	0	1	0	**1**	**1**	**18**
16:30	16:45	0	8	1	**9**	0	5	1	**6**	**15**	0	0	0	**0**	0	0	0	**0**	**0**	**15**
16:45	17:00	0	6	0	**6**	0	4	0	**4**	**10**	2	0	1	**3**	0	0	0	**0**	**3**	**13**
17:00	17:15	1	10	1	**12**	0	5	2	**7**	**19**	0	0	2	**2**	0	0	1	**1**	**3**	**22**
17:15	17:30	1	4	0	**5**	0	9	1	**10**	**15**	0	0	1	**1**	0	0	1	**1**	**2**	**17**
17:30	17:45	0	5	1	**6**	1	8	1	**10**	**16**	0	0	0	**0**	0	0	0	**0**	**0**	**16**
17:45	18:00	0	5	0	**5**	0	12	0	**12**	**17**	0	0	2	**2**	1	0	0	**1**	**3**	**20**
TOTAL:		22	256	14	**292**	7	251	32	**290**	**582**	18	26	31	**75**	15	13	17	**45**	**120**	**702**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
25214

RAVENHILL AVE @ ROOSEVELT AVE

Count Date: Friday, August 08, 2008 **Start Time:** 07:00

Time Period	Northbound	Southbound	**Street Total**	Eastbound	Westbound	**Street Total**	**Grand Total**
07:00 08:00	0	0	**0**	0	0	**0**	**0**
08:00 09:00	4	8	**12**	0	0	**0**	**12**
09:00 10:00	1	1	**2**	0	0	**0**	**2**
11:30 12:30	2	4	**6**	0	0	**0**	**6**
12:30 13:30	0	0	**0**	0	0	**0**	**0**
15:00 16:00	2	4	**6**	1	1	**2**	**8**
16:00 17:00	1	0	**1**	0	0	**0**	**1**
17:00 18:00	5	9	**14**	0	0	**0**	**14**
Total	15	26	**41**	1	1	**2**	**43**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

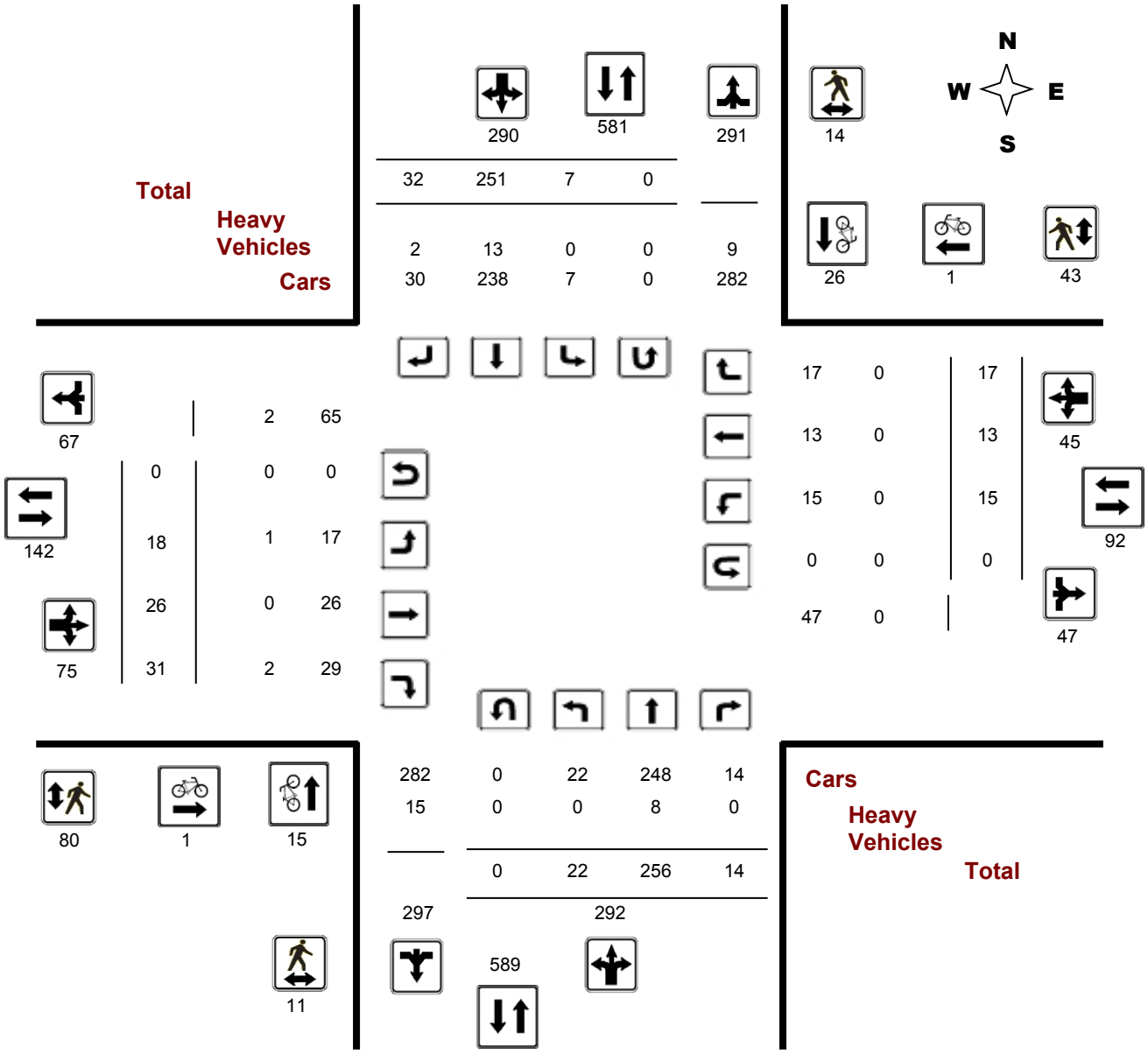
Transportation Services - Traffic Services

Turning Movement Count - Full Study Diagram

RAVENHILL AVE @ ROOSEVELT AVE

Survey Date: Friday, August 08, 2008 **WO#:** 25214

Device:



Comments

Transportation Services - Traffic Services

W.O. 25214

Turning Movement Count - Heavy Vehicle Report

RAVENHILL AVE @ ROOSEVELT AVE

Survey Date: Friday, August 08, 2008

Time Period		Northbound				Southbound					Eastbound				Westbound						
		LT	ST	RT	**N TOT**	LT	ST	RT	**S TOT**	**STR TOT**	LT	ST	RT	**E TOT**	LT	ST	RT	**W TOT**	**STR TOT**	**Grand Total**
07:00	08:00	0	1	0	**1**	0	8	0	**8**	**9**	0	0	0	**0**	0	0	0	**0**	**0**	**9**
08:00	09:00	0	0	0	**0**	0	2	0	**2**	**2**	0	0	1	**1**	0	0	0	**0**	**1**	**3**
09:00	10:00	0	0	0	**0**	0	0	0	**0**	**0**	1	0	1	**2**	0	0	0	**0**	**2**	**2**
11:30	12:30	0	5	0	**5**	0	1	0	**1**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
12:30	13:30	0	0	0	**0**	0	0	1	**1**	**1**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
15:00	16:00	0	0	0	**0**	0	1	0	**1**	**1**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
16:00	17:00	0	1	0	**1**	0	0	1	**1**	**2**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
17:00	18:00	0	1	0	**1**	0	1	0	**1**	**2**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
Sub Total		0	8	0	**8**	0	13	2	**15**	**23**	1	0	2	**3**	0	0	0	**0**	**3**	**26**
U-Turns (Heavy Vehicles)					**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total		0	8	0	**0**	0	13	2	**15**	**23**	1	0	2	**3**	0	0	0	**0**	**3**	**26**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order
25214

Turning Movement Count - Pedestrian Volume Report

RAVENHILL AVE @ ROOSEVELT AVE

Count Date: Friday, August 08, 2008 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	**0**	2	4	**6**	**6**
07:15 07:30	0	4	**4**	0	8	**8**	**12**
07:30 07:45	0	0	**0**	0	0	**0**	**0**
07:45 08:00	0	0	**0**	0	0	**0**	**0**
07:00 08:00	0	4	**4**	2	12	**14**	**18**
08:00 08:15	0	0	**0**	3	1	**4**	**4**
08:15 08:30	2	0	**2**	7	2	**9**	**11**
08:30 08:45	0	0	**0**	3	0	**3**	**3**
08:45 09:00	0	0	**0**	1	3	**4**	**4**
08:00 09:00	2	0	**2**	14	6	**20**	**22**
09:00 09:15	0	0	**0**	0	0	**0**	**0**
09:15 09:30	0	2	**2**	1	1	**2**	**4**
09:30 09:45	0	0	**0**	0	0	**0**	**0**
09:45 10:00	4	0	**4**	0	2	**2**	**6**
09:00 10:00	4	2	**6**	1	3	**4**	**10**
11:30 11:45	1	0	**1**	0	0	**0**	**1**
11:45 12:00	1	0	**1**	6	0	**6**	**7**
12:00 12:15	0	1	**1**	4	2	**6**	**7**
12:15 12:30	0	1	**1**	4	0	**4**	**5**
11:30 12:30	2	2	**4**	14	2	**16**	**20**
12:30 12:45	0	0	**0**	2	2	**4**	**4**
12:45 13:00	0	0	**0**	3	0	**3**	**3**
13:00 13:15	0	4	**4**	4	1	**5**	**9**
13:15 13:30	1	1	**2**	0	2	**2**	**4**
12:30 13:30	1	5	**6**	9	5	**14**	**20**
15:00 15:15	0	0	**0**	7	1	**8**	**8**
15:15 15:30	0	0	**0**	0	0	**0**	**0**
15:30 15:45	0	0	**0**	4	2	**6**	**6**
15:45 16:00	0	0	**0**	1	8	**9**	**9**
15:00 16:00	0	0	**0**	12	11	**23**	**23**
16:00 16:15	0	0	**0**	4	0	**4**	**4**
16:15 16:30	0	0	**0**	4	0	**4**	**4**
16:30 16:45	0	0	**0**	4	2	**6**	**6**
16:45 17:00	0	0	**0**	1	0	**1**	**1**
16:00 17:00	0	0	**0**	13	2	**15**	**15**
17:00 17:15	0	0	**0**	3	1	**4**	**4**
17:15 17:30	0	0	**0**	7	0	**7**	**7**
17:30 17:45	0	0	**0**	5	0	**5**	**5**
17:45 18:00	2	1	**3**	0	1	**1**	**4**
17:00 18:00	2	1	**3**	15	2	**17**	**20**
Total	11	14	**25**	80	43	**123**	**148**

Comment:

Transportation Services - Traffic Services

Work Order 25214

Turning Movement Count - Full Study Summary Report

RAVENHILL AVE @ ROOSEVELT AVE

Survey Date: Friday, August 08, 2008

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

Full Study

	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	**NB TOT**	LT	ST	RT	**SB TOT**	**STR TOT**	LT	ST	RT	**EB TOT**	LT	ST	RT	**WB TOT**	**STR TOT**	**Grand Total**
07:00 08:00	0	35	0	**35**	0	43	0	**43**	**78**	2	15	10	**27**	7	2	4	**13**	**40**	**118**
08:00 09:00	3	32	1	**36**	0	16	3	**19**	**55**	2	0	3	**5**	0	0	2	**2**	**7**	**62**
09:00 10:00	1	15	0	**16**	1	12	1	**14**	**30**	4	3	4	**11**	0	0	0	**0**	**11**	**41**
11:30 12:30	4	38	1	**43**	2	43	6	**51**	**94**	1	1	1	**3**	2	0	5	**7**	**10**	**104**
12:30 13:30	10	44	8	**62**	0	46	9	**55**	**117**	3	3	5	**11**	3	1	3	**7**	**18**	**135**
15:00 16:00	1	31	1	**33**	1	35	6	**42**	**75**	4	4	2	**10**	2	9	1	**12**	**22**	**97**
16:00 17:00	1	37	1	**39**	2	22	3	**27**	**66**	2	0	1	**3**	0	1	0	**1**	**4**	**70**
17:00 18:00	2	24	2	**28**	1	34	4	**39**	**67**	0	0	5	**5**	1	0	2	**3**	**8**	**75**
Sub Total	22	256	14	**292**	7	251	32	**290**	**582**	18	26	31	**75**	15	13	17	**45**	**120**	**702**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	22	256	14	**292**	7	251	32	**290**	**582**	18	26	31	**75**	15	13	17	**45**	**120**	**702**
EQ 12Hr	31	356	19	**406**	10	349	44	**403**	**809**	25	36	43	**104**	21	18	24	**63**	**167**	**976**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	28	320	18	**365**	9	314	40	**363**	**728**	23	33	39	**94**	19	16	21	**56**	**150**	**878**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	36	420	23	**479**	11	411	52	**475**	**954**	29	43	51	**123**	25	21	28	**74**	**197**	**1151**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Comments:

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

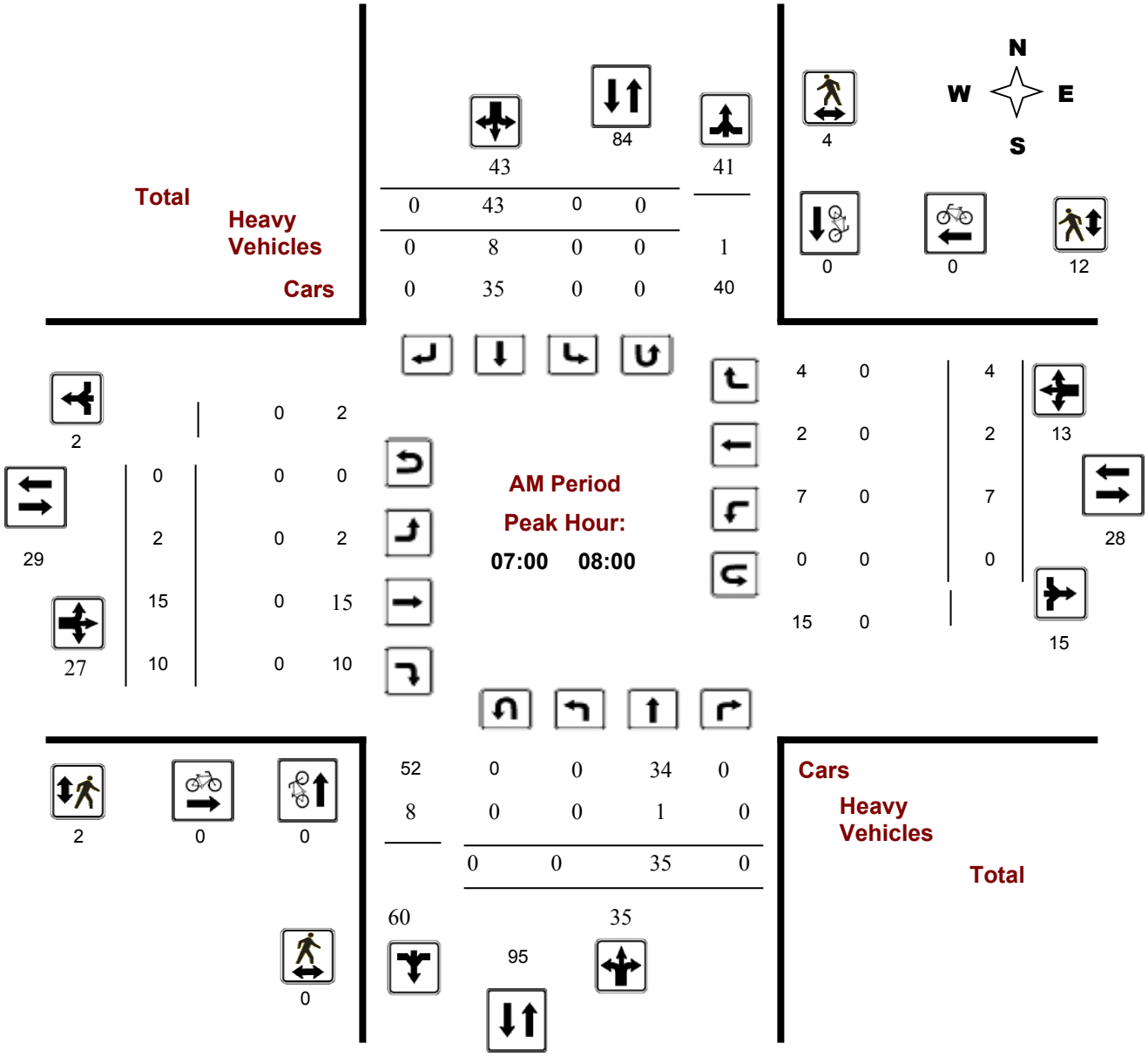
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

RAVENHILL AVE @ ROOSEVELT AVE

Survey Date: Friday, August 08, 2008 **WO No:** 25214

Start Time: 07:00 **Device:**



Comments

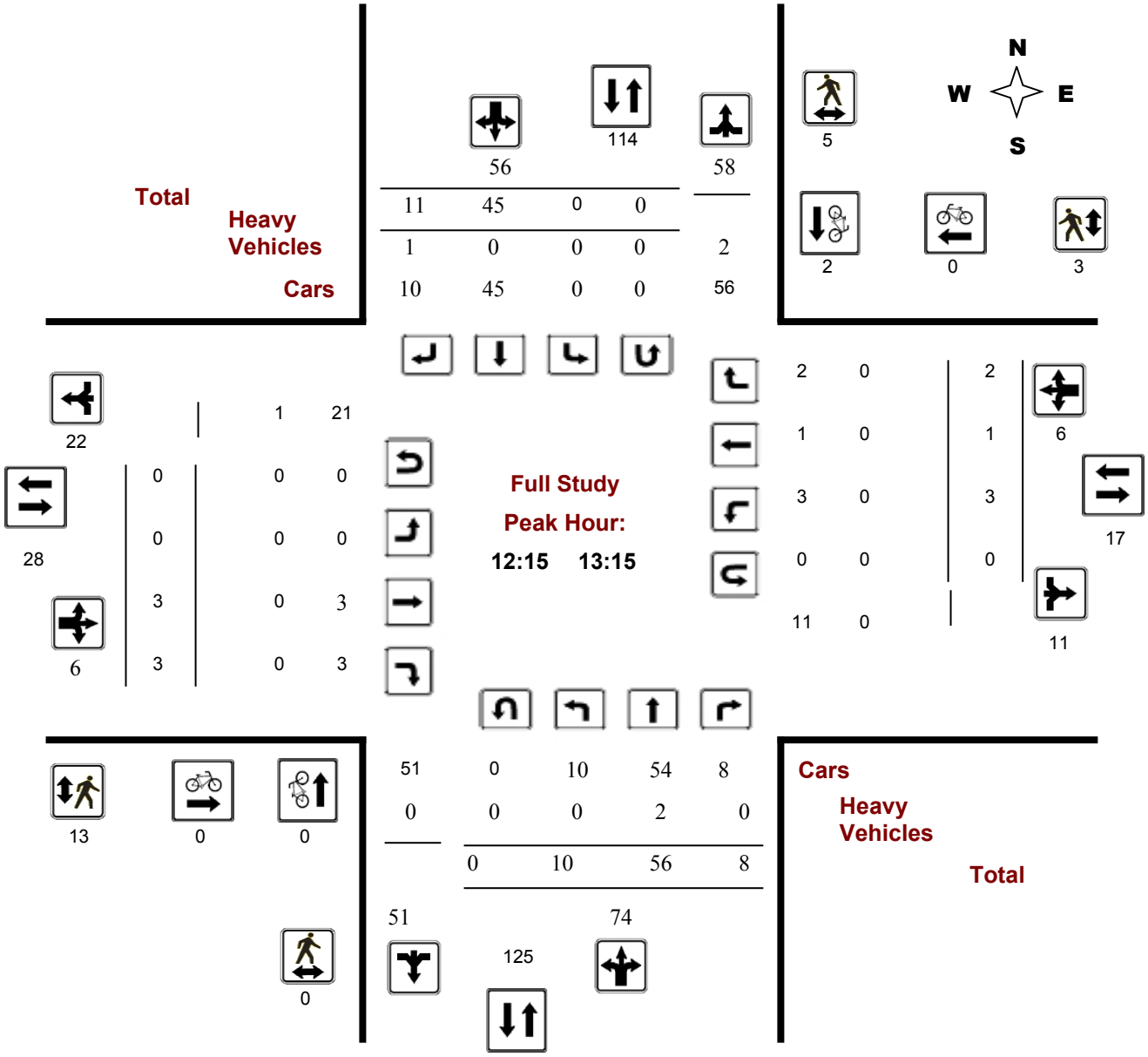
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

RAVENHILL AVE @ ROOSEVELT AVE

Survey Date: Friday, August 08, 2008 **WO No:** 25214

Start Time: 07:00 **Device:**



Comments

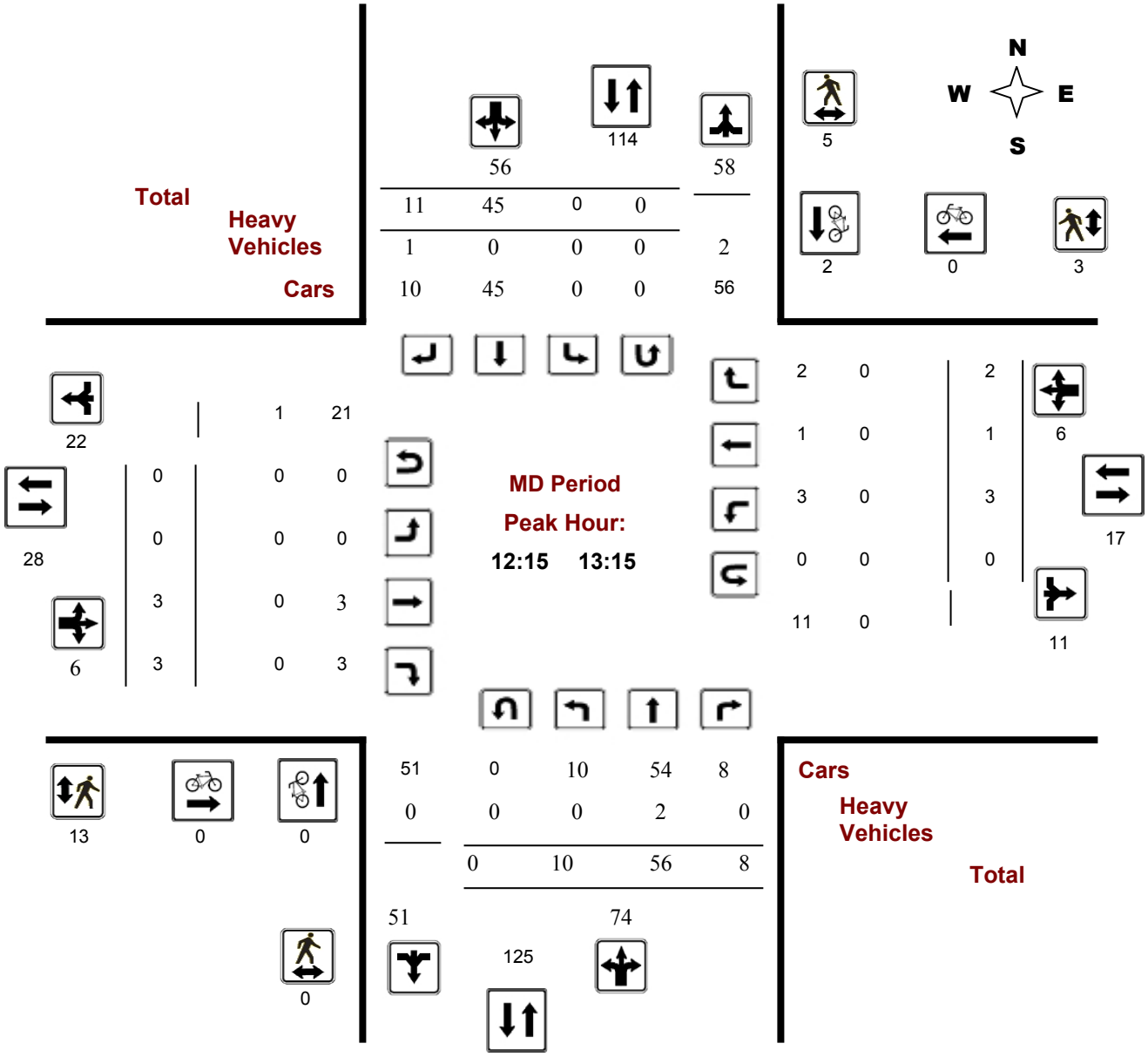
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

RAVENHILL AVE @ ROOSEVELT AVE

Survey Date: Friday, August 08, 2008 **WO No:** 25214

Start Time: 07:00 **Device:**



Comments

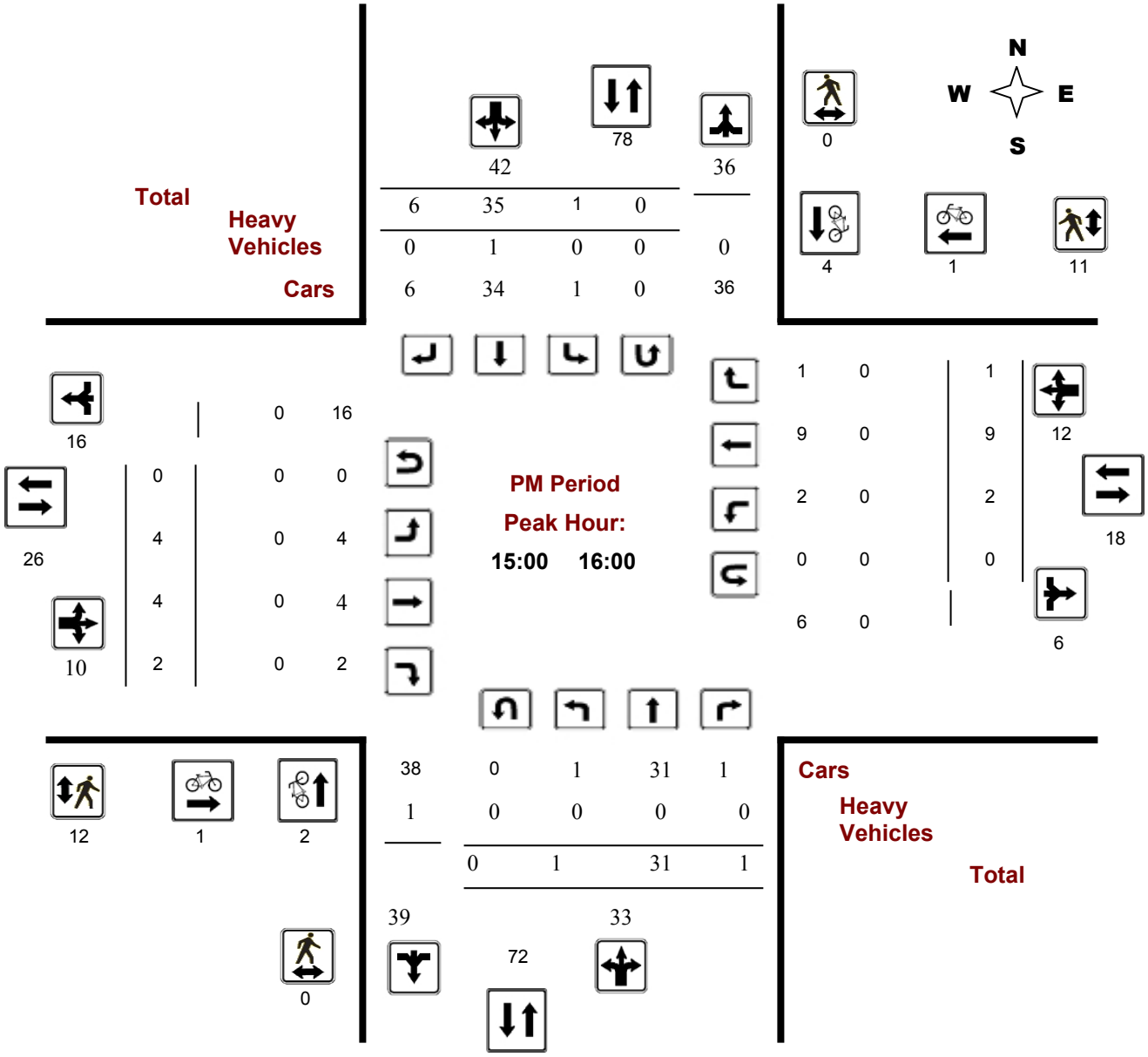
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

RAVENHILL AVE @ ROOSEVELT AVE

Survey Date: Friday, August 08, 2008 **WO No:** 25214

Start Time: 07:00 **Device:**



Comments

Transportation Services - Traffic Services

Work Order
25214

Turning Movement Count - 15 Min U-Turn Total Report

RAVENHILL AVE @ ROOSEVELT AVE

Survey Date: Friday, August 08, 2008

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

APPENDIX C

Collision Records

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** January 1, 2016

Location: BYRON AVE @ ROOSEVELT AVE

Traffic Control: Traffic signal

Total Collisions: 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-18, Sat,11:34	Clear	Angle	P.D. only	Wet	North	Going ahead	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Feb-26, Wed,14:44	Clear	Angle	Non-fatal injury	Dry	South	Turning left	Pick-up truck	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2014-Oct-09, Thu,12:31	Clear	Angle	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Cyclist	
					South	Going ahead	Bicycle	Other motor vehicle	
2014-Mar-06, Thu,16:43	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Sep-13, Sat,13:00	Rain	Angle	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Motorcycle	Other motor vehicle	
2014-Sep-17, Wed,15:24	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	

					West	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Jun-24, Tue,10:58	Rain	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2015-Mar-22, Sun,10:47	Clear	Angle	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle
					East	Turning right	Automobile, station wagon	Other motor vehicle
2015-Sep-18, Fri,13:57	Clear	Turning movement	Non-fatal injury	Dry	West	Turning left	Bicycle	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Cyclist

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

BYRON AVE & ROOSEVELT AVE

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **14**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
1	2011-04-30	Sat	14:14	Clear	Daylight	Turning	Non-fatal	V1 S	Dry	Turning left	Automobile, station	Cyclist	0
								V2 N	Dry	Going ahead	Bicycle	Other motor vehicle	
2	2011-06-11	Sat	19:15	Rain	Daylight	Angle	P.D. only	V1 W	Wet	Going ahead	Pick-up truck	Other motor vehicle	0
								V2 S	Wet	Turning left	Pick-up truck	Other motor vehicle	
3	2011-09-24	Sat	07:31	Clear	Daylight	Angle	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle	
4	2011-11-10	Thu	14:03	Clear	Daylight	Angle	P.D. only	V1 S	Dry	Going ahead	Delivery van	Other motor vehicle	0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle	
5	2011-11-15	Tue	12:14	Clear	Daylight	Angle	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle	
6	2012-02-25	Sat	09:05	Snow	Daylight	Angle	P.D. only	V1 S	Loose snow	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Loose snow	Going ahead	Automobile, station	Other motor vehicle	
7	2012-09-30	Sun	11:44	Rain	Daylight	Angle	P.D. only	V1 S	Wet	Turning left	Pick-up truck	Other motor vehicle	0
								V2 W	Wet	Going ahead	Automobile, station	Other motor vehicle	
8	2013-01-10	Thu	00:45	Clear	Dark	Angle	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle	
9	2013-05-04	Sat	13:40	Clear	Daylight	Angle	P.D. only	V1 N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Going ahead	Automobile, station	Other motor vehicle	
10	2013-08-01	Thu	16:08	Clear	Daylight	Angle	Non-fatal	V1 N	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle	
11	2013-09-07	Sat	12:18	Clear	Daylight	Angle	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Going ahead	Passenger van	Other motor vehicle	
12	2013-11-14	Thu	22:52	Clear	Dark	Angle	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

13	2013-11-20	We	12:33	Clear	Daylight	Angle	P.D. only	V1	S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle	
14	2013-12-03	Tue	08:30	Clear	Daylight	Angle	P.D. only	V1	S	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

APPENDIX D

Access Intersection Synchro Reports

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	333	0	1	164	0	4
Future Volume (Veh/h)	333	4	1	164	4	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	333	4	1	164	4	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			337		501	335
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			337		501	335
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1222		529	707

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	337	165	5
Volume Left	0	1	4
Volume Right	4	0	1
cSH	1700	1222	557
Volume to Capacity	0.20	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.2
Control Delay (s)	0.0	0.1	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	11.5
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	212	1	4	494	0	2
Future Volume (Veh/h)	212	2	4	494	2	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	212	2	4	494	2	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			214		715	213
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			214		715	213
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1356		396	827

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	214	498	6
Volume Left	0	4	2
Volume Right	2	0	4
cSH	1700	1356	607
Volume to Capacity	0.13	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.2
Control Delay (s)	0.0	0.1	11.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	11.0
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		