NOISE AND VIBRATION STUDY REPORT

119-115 DELHOUSIE STREET

Prepared by:
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NEPEAN, Ontario
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February 2022

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1.0 INTRODUCTION AND SUMMARY

Arch-Nova was retained to investigate the potential impact of environmental noise and vibration on the proposed residential development located at 109-115 Dalhousie Street situated between Bolton Street and Boteler Street in Ottawa Ontario. The assessment is based on the proposed development, existing and future noise and vibration sources, and the environmental noise and vibration guidelines of the Ministry of the Environment, Conservation and Parks ("MECP") and the City of Ottawa. A noise and vibration study is required by the municipality as part of the planning and approvals process.

This report was prepared based on a Site Plan prepared by Rosaline J. Hill Architects, dated November 2021.

The proposed development consists of four (4) storey residential building, located at 109-115 Dalhousie Street. The building consists of twenty-four (24) residential units. The basement contains four (4) units, ground floor contains six (6) units, second floor four (4) units, and both third and fourth floor contains five (5) units.

The proposed balconies located on the third and forth floor located on the front side of the proposed building and balconies associated with ground and first floor units located on the back side of the building qualifies as outdoor living area (OLA) under City of Ottawa or MECP guidelines. In addition, there is the area at the back of the proposed building which was not identified as an amenity area. This study will evaluate this area as OLA to include potential variations in the design of the development.

The site is bounded by residential to the east, west and south side. A 12-story apartment building is located to the west.

Figure 1 shows the proposed site including the surrounding area. Zoning maps for the surrounding area are attached in Appendix B.

2.0 ENVIRONMENTAL NOISE ASSESSMENT

The main environmental noise sources external to the project which were identified and have the potential to adversely affect the development are motor vehicle traffic noise on Dalhousie Street, Bolton Street and Boteler Street.

2.1 Traffic Noise Sources

2.1.1 Road Traffic

Road traffic associated with Dalhousie Street is the dominant environmental noise source in the vicinity of the proposed development. In addition, there is traffic noise from Bolton Street and Boteler Street.

Fully developed road traffic data was used in the analysis. The traffic counts for Dalhousie Street (2019), Bolton Street (2019) and Boteler Street (2016), were obtained from the City of Ottawa transportation department. In addition, a yearly growth rate of 2.5% was used to calculate the traffic data. In order to calculate the fully developed road traffic volumes, numbers were grown to the year 2032. Traffic data was split into daytime/nighttime and autos/medium/heavy using City of Ottawa "Environmental Noise Control Guidelines." Conservatively, the total number of vehicles obtained from the City of Ottawa were increased from 269 to 2930 for Boteler Street and from 560 to 2700 vehicles for Bolton Street to satisfy the minimum of 40 v/hr required by the modeling software. Posted speed limits were used in the analysis. Data used in the noise modelling are found in Table 1.

Table 1: Year 2032 Road Traffic Data Used in Analysis

Street	Time of Day	Vehicles	Medium Trucks	Heavy Trucks	Total*
Dalhousie Street	0700-2300	6906	601	0*	7507
	2300-0700	363	32	0*	395
	Total	7269	632	0*	7902
Bolton Street	0700-2300	3530	186	0*	3716
	2300-0700	307	16	0*	323
	Total	3837	202	0*	4039
Boteler Street	0700-2300	3503	184	0*	3688
	2300-0700	305	16	0*	321
	Total	3808	200	0*	4008

Note: * Streets are small residential streets, with no industry, so no heavy trucks are expected

Provided road traffic data and road traffic calculations used for the study are included in Appendix C.

2.1.2 Rail Traffic

There is no rail traffic within the zone of influence as per City of Ottawa Noise Protocol. Therefore, no further assessment was performed.

2.1.3 Air Traffic

Proposed project is located out of the zone of influence from the Airport Operating Influence Zone (AOIZ) and NEF/NEP contours lines. Therefore, no further assessment was performed.

2.2 Stationary Noise Sources

Based on investigation of the surrounding areas, there are no potential stationary industrial sources of noise in the vicinity of the proposed development. The MOE D-series guidelines were developed as guidance for recommended separation distances and other control measures for land use planning proposals to prevent or minimize 'adverse effects' from the encroachment of incompatible land uses where a facility either exists or is proposed. Additionally, the MECP developed the noise guidelines for stationary source noise impacting residential developments called the MECP Publication NPC-300 "Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning" Since no industrial sources are located in the vicinity of the proposed development, neither the D-series guidelines nor NPC-300 have been considered further in this study.

3.0 TRAFFIC NOISE IMPACT

3.1 Applicable Noise Guideline

City of Ottawa noise guidelines for transportation noise impacting residential developments are given in the publication "City of Ottawa Environmental Noise Control Guidelines" (Appendix C). A summary of the City of Ottawa noise requirements is provided Table 2 below.

Table 2: City of Ottawa Noise Control Guidelines – Road Traffic Noise Requirements

Receiver Category	Time Period	Road Traffic		Requirements
		Criterion Averaged over Time Period[1]		
		Leq (dBA)	Applies at	
Outdoor	0700-2300	55 [2]	OLA	None
		56 to 60		Warning Clause
		> 60		Alternative Land Use Alternative Layout Berm or barrier Possible Warning Clause
Plane of Window	0700-2300	55 to 65	Plane of Window	Provision for central air conditioning + warning clause
		> 65 [3]		Central air conditioning is required.
	2300-0700	50 to 60[3]	Plane of Window	Provision for central air conditioning + warning clause
		> 60 [3]		Central air conditioning + warning clause
Indoor	0700-2300	45	Living Area	If Central AC is required, facade must be designed to meet these levels
	2300-0700	40	Sleeping Area	

Notes: [1] Cumulative Impacts

[2] The criterion may be exceeded by an amount not greater than 5 dBA, subject to justification and use of a Warning Clause.

[3] If façade levels exceed these criteria, building components must be designed to meet Indoor Criteria.

For OLAs, a design goal of 55 dBA $L_{EQ,day}$ is required. An unmitigated sound exposure due to road traffic of up to 60 dBA is considered a minor excess and is permissible, provided a warning clause advising the occupant of the potential noise levels is used. A sound exposure greater than 60 dBA must be reduced to 60 dBA or less using physical mitigation methods such as berms or barriers, or combination of both.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom windows exceed 60 dBA or where daytime sound levels outside living room windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom windows are in the range of 51 to 60 dBA or when daytime sound levels at living room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise and when the plane of window sound level is greater than 55 dBA due to rail traffic noise. The use of warning clauses to notify future residents of possible excesses is also recommended.

3.2 Traffic Noise Impact Assessment

$L_{EQ,night}$ and $L_{EQ,day}$ attributable to Sweetland Avenue, Somerset Street East and Russell Avenue were calculated using STAMSON v5.0, the computerized road, rail, and transit traffic noise prediction model of the MECP. Since the City of Ottawa requires projected sound exposures be based on ultimate traffic volumes for roadways, sound exposure levels were based on 2026 (future) road traffic predictions. Screening due to surrounding buildings and terrain was accounted for in the analysis.

The proposed development will have four (4) floors. There is a two storey residential houses located to the north and south of the proposed development. Therefore, the noise impact at the ground and second floor units will be reduced, because of the shielding from the existing houses and no direct exposure of proposed units to the noise sources to the south and north. It was assumed, that if the noise impact levels at the upper floors are acceptable (floor with larger exposure), the ground and second floor residential units will be satisfied as well. Similarly, the building façade to the north, south and east will heave lesser noise impact when compared with the exposure of the west side.

Table 3 summarizes the predicted unmitigated daytime and nighttime sound exposures levels at predictable worst-case locations at the proposed development. Sample sound exposure calculation and analysis assumptions are included in Appendix D.

Table 3: Predicted Unmitigated Road Traffic Sound Exposures

Floor	Façade	Street	Sound Level (dBA)		Total Sound Level (dBA)	
			0700-2300	2300-0700	0700-2300	2300-0700
Unit 5	West	Dalhousie	62[1]	54[1]	62	54
	West	Bolton	44	36		
	West	Boteler	45	38		
Unit 15	West	Dalhousie	62[1]	54[1]	62	54
	West	Bolton	44	37		
	West	Boteler	46	39		
Unit 20	West	Dalhousie	62[1]	54[1]	62	54
	West	Bolton	45	37		
	West	Boteler	47	39		
Unit 19	West	Dalhousie	62[1]	54[1]	62	54
	West	Bolton	46	39		
	West	Boteler	45	37		
Unit 24	West	Dalhousie	62[1]	54[1]	62	54
	West	Bolton	46	39		
	West	Boteler	45	37		
Backyard	OLA	Dalhousie	52[2]	44[2]	50	52
Backyard	OLA	Bolton	36[2]	29[2]		
Backyard	OLA	Boteler	35[2]	27[2]		

Note:
[1]Sound level adjusted by 2 dBA to account for distance difference (12 m actual vs 15m model)
[2]Façade and OLA of the east side of building assumed to have lesser noise levels by 10 dBA.

4.0 VIBRATION IMPACT

4.1 Applicable Vibration Guideline

Since the Environmental Assessment Act and the MECP guidelines do not provide distance setbacks within or beyond which vibration assessments are to be prepared, the City is recommending that the necessary submissions address the vibration potential due to Light Rail Transit undertakings based on the following minimum areas of influence containing vibration sensitive receptors measured from the corridor right-of-way:

- 75 metres for its ground-borne vibration assessment

Generally, vibration assessment of the LRT is based on a set of draft protocols developed by the combined efforts of the MECP and the Toronto Transit Commission (TTC). The vibration impact criteria attempt to address two potential impacts from vibration generated by the LRT.

- First, the criteria consider perceptible vibration levels which address vibration that can be felt by occupants in a building. The limit for perceptible vibration levels has been set to 0.10 mm/s rms (root-mean-square) velocity.

- Secondly, the criteria document also mentions the sound from vibration (vibration induced noise) but does not set a limit.

4.2 Vibration Impact Assessment

Since the proposed development is not in the area with Light Rail Transit and the most significant vibration is assumed to come from light vehicle road traffic on Dalhousie Street. It was conservatively assumed that the separation distance for roadways will be at least half of that for Light Rail Transit. Having an insignificant traffic on Dalhousie Street and low speed, it was assumed that vibration levels are insignificant, and no further analysis was performed.

5.0 DISCUSION AND RECOMMENDATION

5.1 Outdoor Leaving Areas (OLA)

The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, backyard, terrace, or other area where passive recreation is expected to occur, provided that it has a minimum depth of 4 m, and is outside the exterior building façade and unenclosed.

As per the site plans received from Rosaline J. Hill Architects, dated November 2021 there are balconies located on the west (front) and east (back) sides of the building, but hey have depth less than 4 m. Backyard area located at the back of the building, represent the OLA as part of a proposed future development. Analysis confirmed that the noise levels are acceptable at the proposed OLA (Ref. Table 3).

5.2 Indoor Leaving Area

Most exposed floors of the proposed development have predicted nighttime sound levels that are greater than 50 dBA but less than 60 dBA. To address these excesses, the City of Ottawa "Environmental Noise Control Guidelines" and MECP guidelines recommend that these dwelling units be equipped with a forced air ventilation systems with ducts sized to accommodate the future installation of air conditioning by the occupant.

Window or through-the-wall air conditioning units are not recommended for any residential units because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-216, Residential Air Conditioning Devices.

5.3 Building Façade Construction

Most exposed floors in the development will have nighttime sound levels at the façade that are less than 60 dBA and daytime sound levels at the façade that are less than 65 dBA. Therefore, any exterior wall, and double glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the dwelling units.

5.4 Warning Clauses

The City of Ottawa "Environmental Noise Control Guidelines" and MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for dwelling units with anticipated traffic sound level excesses. Examples are provided below. Suggested wording for future dwelling units which have sound level excesses but do not require mitigation measures is given below.

Type A:

> *Purchasers/tenants are advised that sound levels due to increasing road and rail traffic may occasionally interfere with some activities of the dwelling unit occupants as the sound levels exceed the Municipality's and the Ministry of the Environment's noise criteria.*

Suitable wording for future dwellings requiring forced air ventilation systems is given below.

Type C:

Purchasers/tenants are advised that this dwelling unit has been fitted with a forced air heating system and the ducting etc., was sized to accommodate central air conditioning. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria. Purchasers/tenants are advised that the outdoor air cooled condenser unit itself can produce noise to interfere with outdoor recreational activities. Due consideration should be given to this noise factor when selecting the air cooled condenser units location or an alternative quieter type of unit could be selected. The condenser unit sound rating should not exceed 7.6 bels in accordance with ANSI Standard 270-84 for units 3.5 ton or less. The location and installation of the outdoor air conditioning device should be done so as to minimize the noise impacts and have due regard for compliance with criteria of MOE publication NPC-216, Residential Air Conditioning Devices.

6.0 CONCLUSION

The noise feasibility study was conducted to meet the noise guidelines developed by the City of Ottawa and the MECP under Guideline NPC-300. Noise impacts at the proposed development have been evaluated and are predicted to meet MECP and City of Ottawa noise requirements. Noise abatement measures are not required to mitigate potential impacts. However, warning clauses advising the future occupants of the potential noise impacts will be required. Similarly, the vibration feasibility study was conducted to meet the MOE and TTC draft protocol, It was determined that no further vibration abatement measures are required to mitigate potential impacts.

The development is considered feasible from an environmental noise and vibration impact perspective.

Sincerely ,

Professional Engineers Ontario

Authorized by Professional Engineers of Ontario to provide professional services to public

ARCH-Nova Design Inc

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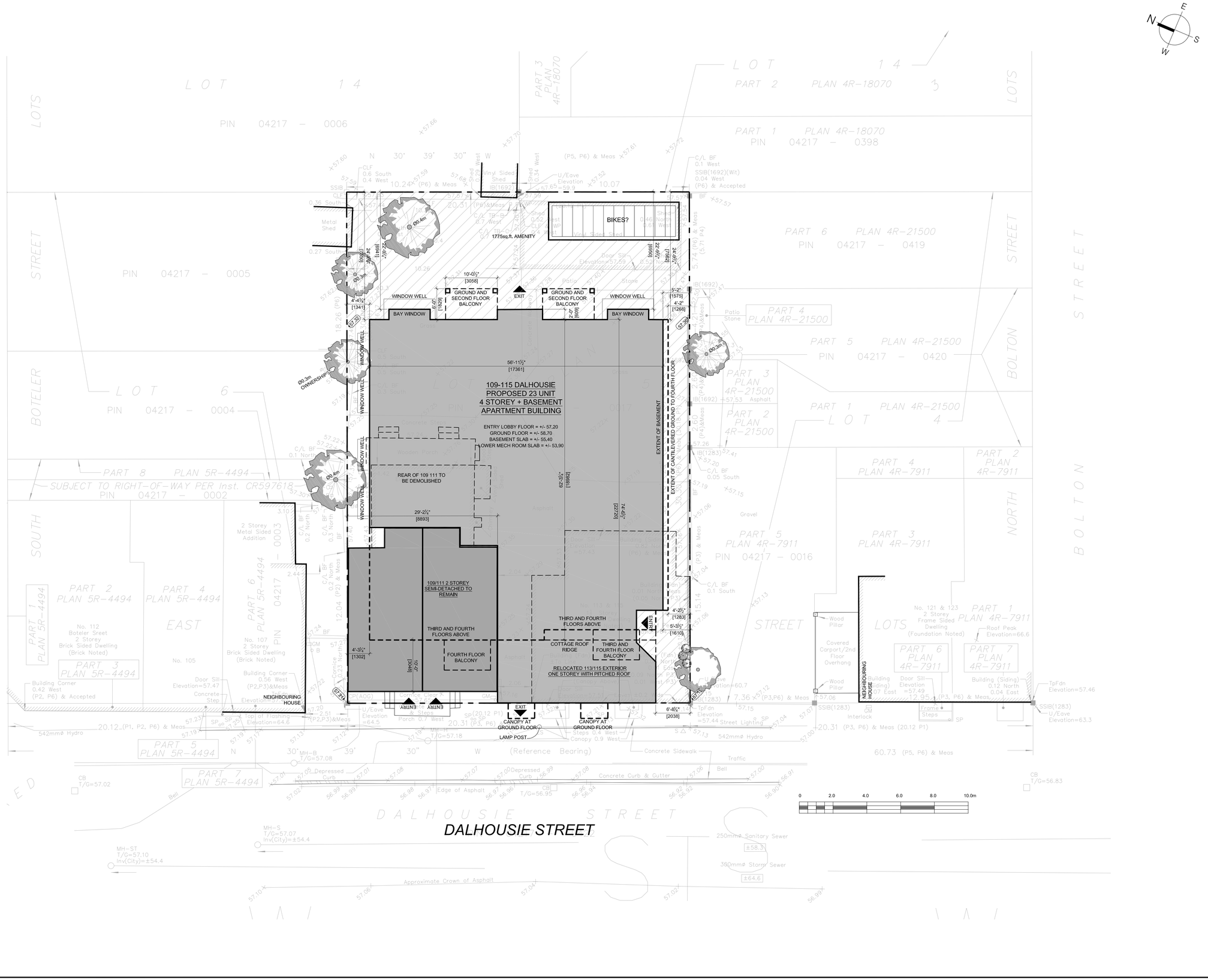
Figure 1

Proposed Development Site Plans



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www.rjhill.ca • rosaline@rjhill.ca

No.	Y / M / D	REVISION
1.	YYYY-M-D	XXXXXXXX

It is the responsibly of the appropriate contractor to check & verify all dimensions on site and report all errors &/or omissions to the architect. All contractors must comply with all pertinent codes & by-laws, & use proprietary products as directed by the manufacturer. Do not scale drawings. Copyright reserved.

LOWERTOWN APT. BLDG.
109-115 Dalhousie St., Ottawa, Ontario, K1N 7C1

SITE PLAN

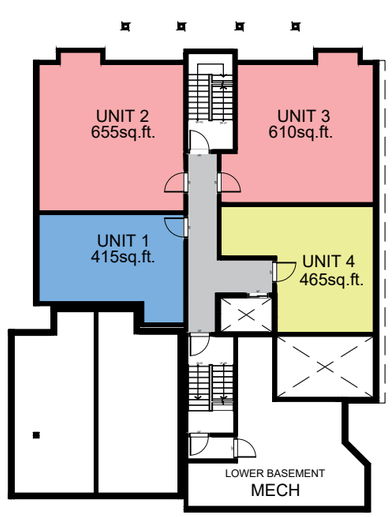
Drawn By:	Date:	
AW	NOV. 2021	A1.0
Project No: 2113	Scale: 1:100	

PLOTTED Wed, 17 Nov 2021

Drawing name: C:\Users\Alistair\Desktop\Work From Home March 16\2113 Dalhousie\2113 Arch\ACAD\2113 SPA1 Site Plan.dwg

Appendix A

Proposed Development Floor and Elevation Plans



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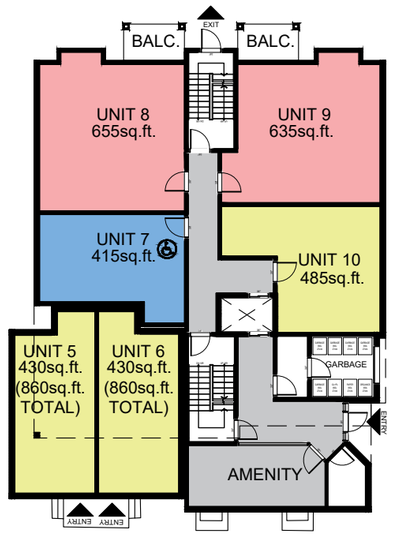
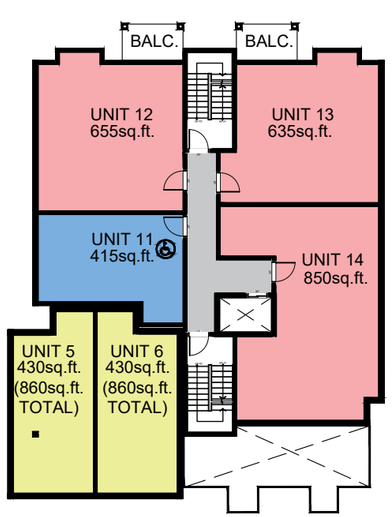


GROUND FLOOR



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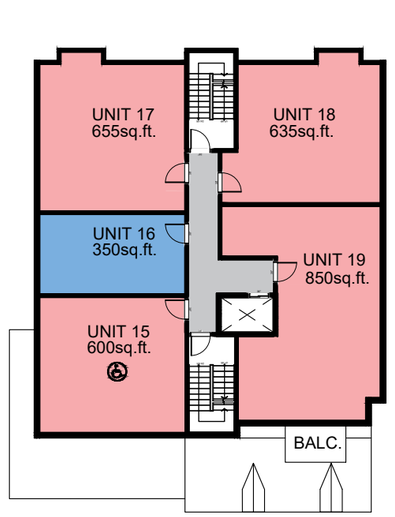

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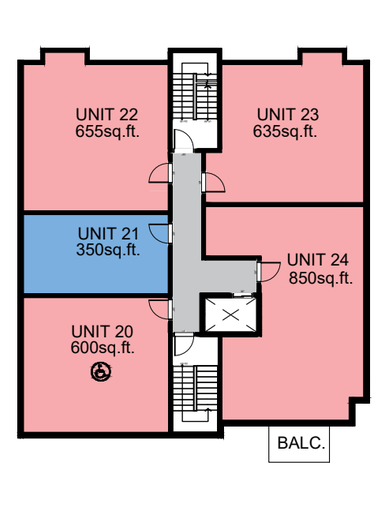

FOURTH FLOOR

ACCESSIBLE UNIT
COMMON
BACHELOR
1 BED
2 BED

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109-115 Dalhousie St., Ottawa, Ontario, K1N 7C1

Nov. 02 2021 SCALE: 1 : 300

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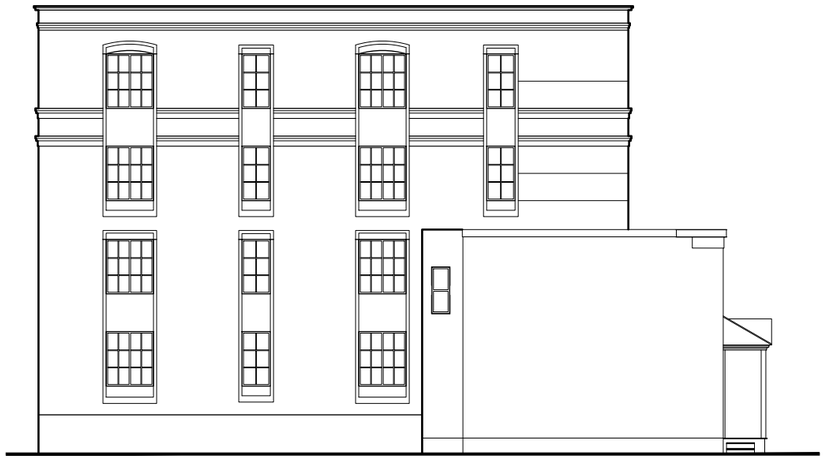
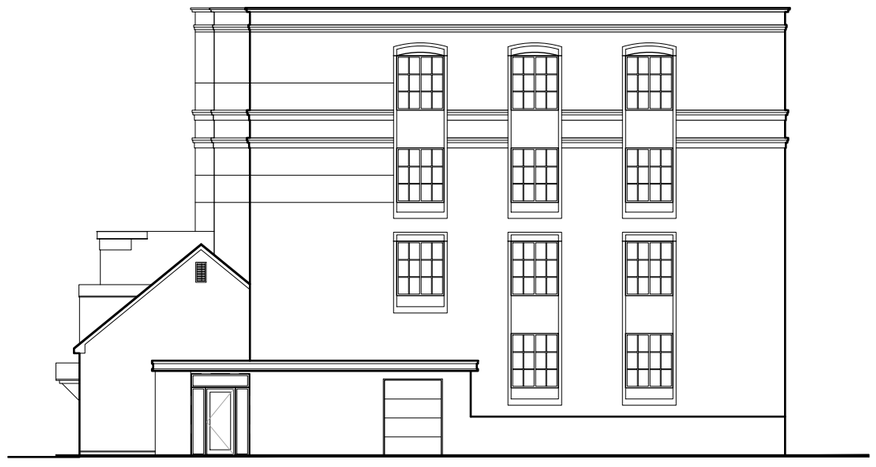
PLOTTED Tue, 02 Nov 2021

FRONT ELEVATION



LEFT ELEVATION

REAR ELEVATION



RIGHT ELEVATION

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109-115 Dalhousie St., Ottawa, Ontario, K1N 7C1

2022 01 06

SCALE:1/16" = 1'-0"

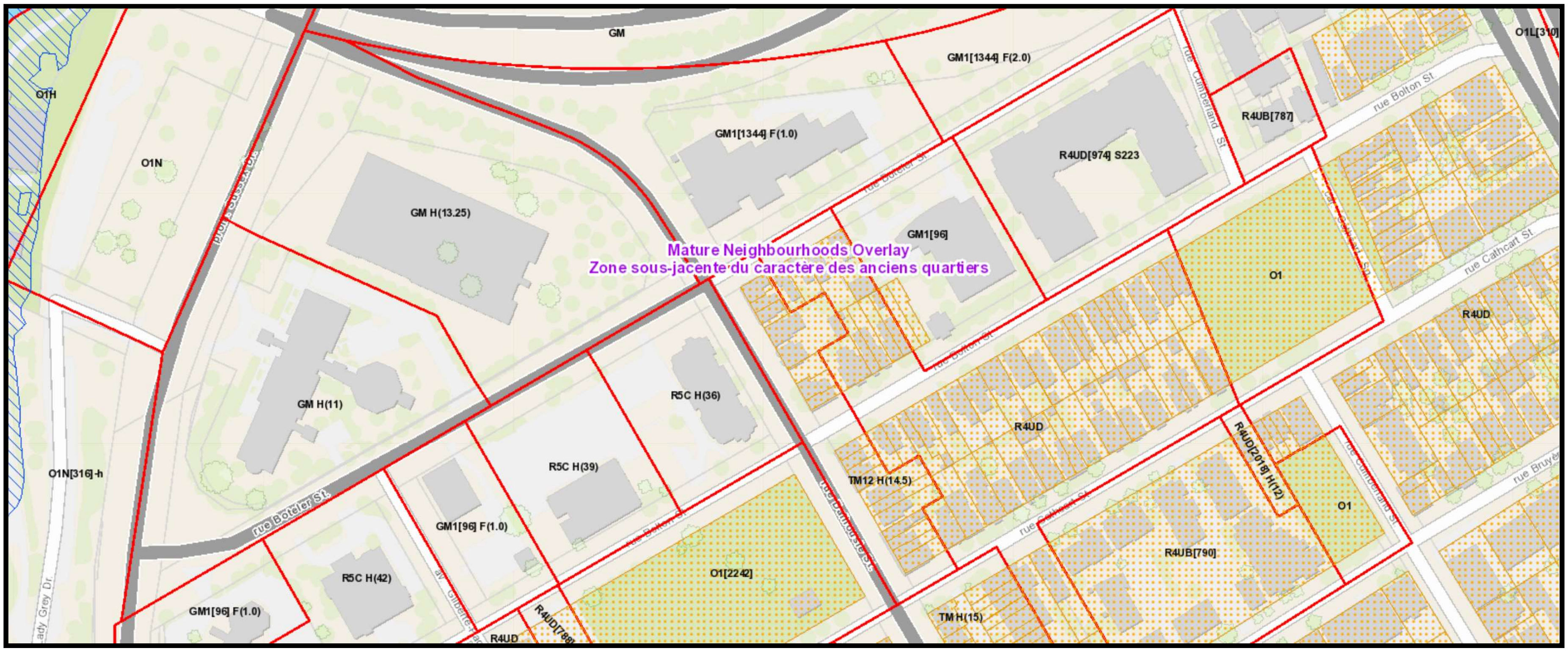
PRELIMINARY BUILDING ELEV.

Drawing name: Z:\2113 Dalhousie\2113 dwgs\2113 AutoCAD\2113 Temp Files\2113 EL01 ELEVATIONS-SECT-DETAILS.dwg

PLOTTED Thu, 06 Jan 2022

Appendix B

Land-Use Zoning Maps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O1H
O1N
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R4UB[787]
R4UD[974] S223
GM H(13.25)
GM1[96]
Mature Neighbourhoods Overlay
Zone sous-jacente du caractère des anciens quartiers
O1
R4UD
GM H(11)
R5C H(36)
O1N[316]-h
R5C H(39)
TM12 H(14.5)
O1
GM1[96] F(1.0)
R4UB[790]
R5C H(42)
O1[2242]
GM1[96] F(1.0)
TM H(15)
R4UD
rue Boteler St.
rue Bolton St
rue Cathcart St
rue Cumberland St

Appendix C

Road Traffic Data

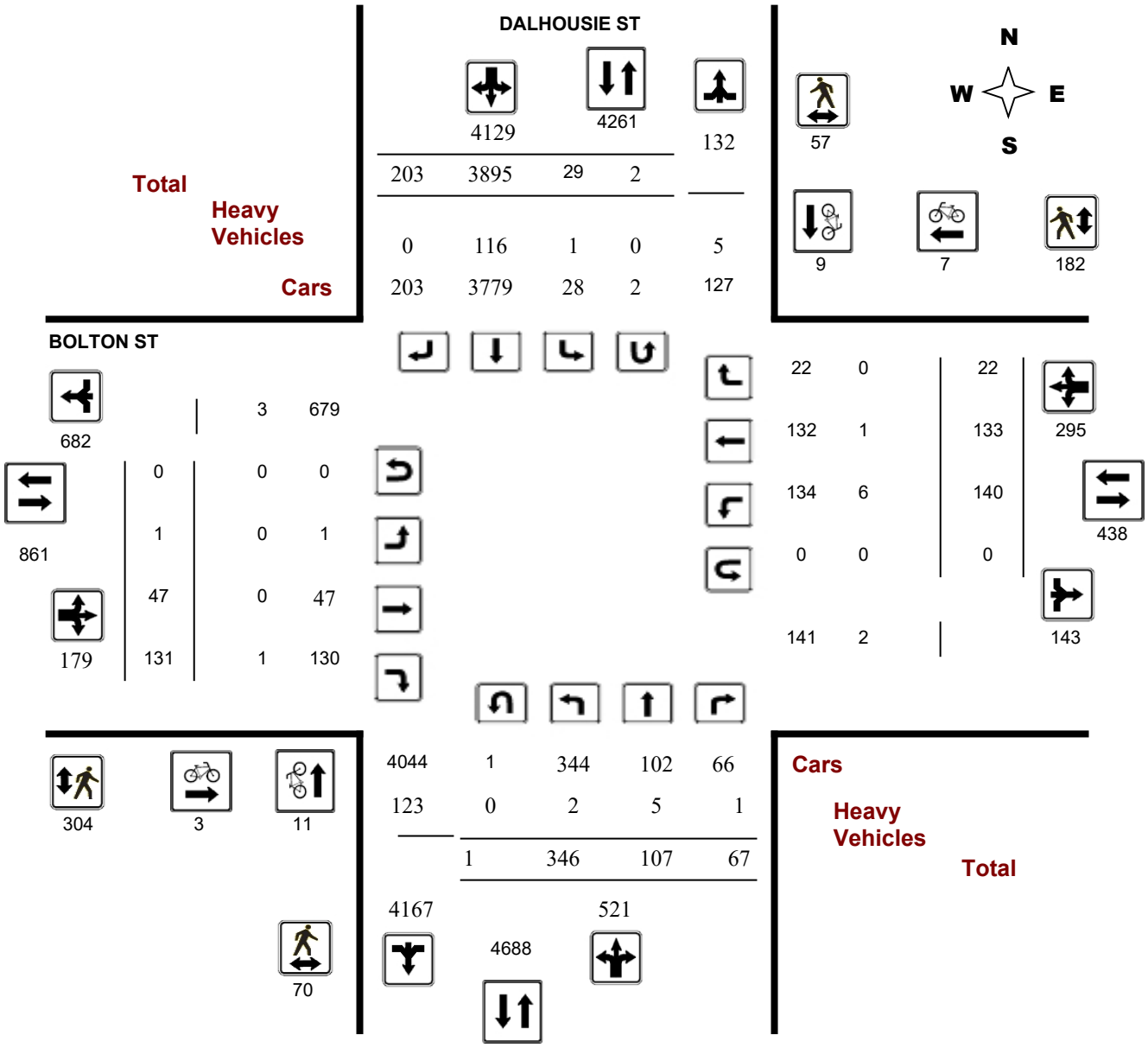
Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016
Start Time: 07:00
WO No: 36562
Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016
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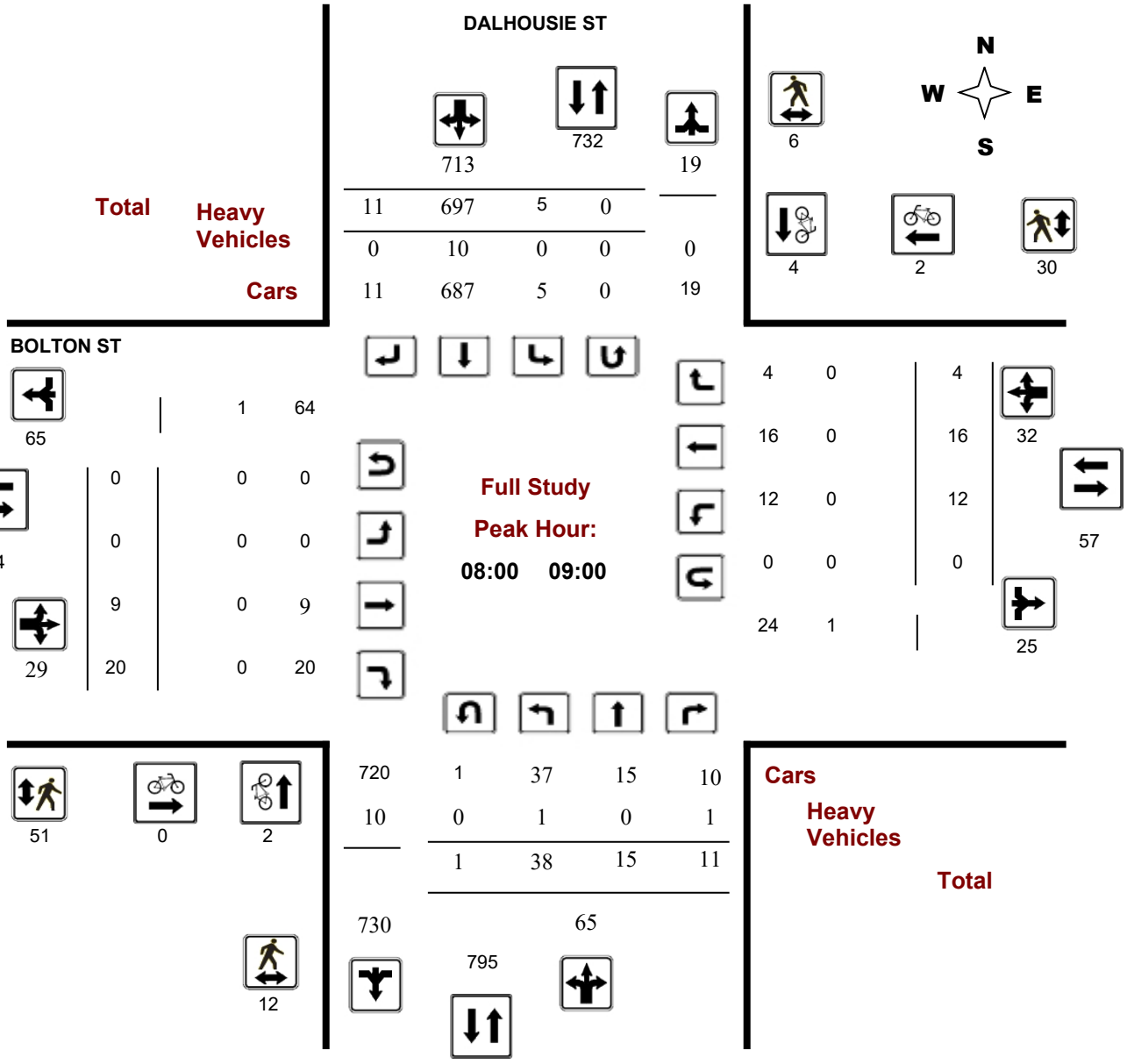
WO No: 36562
Device: Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOLTON ST @ DALHOUSIE ST

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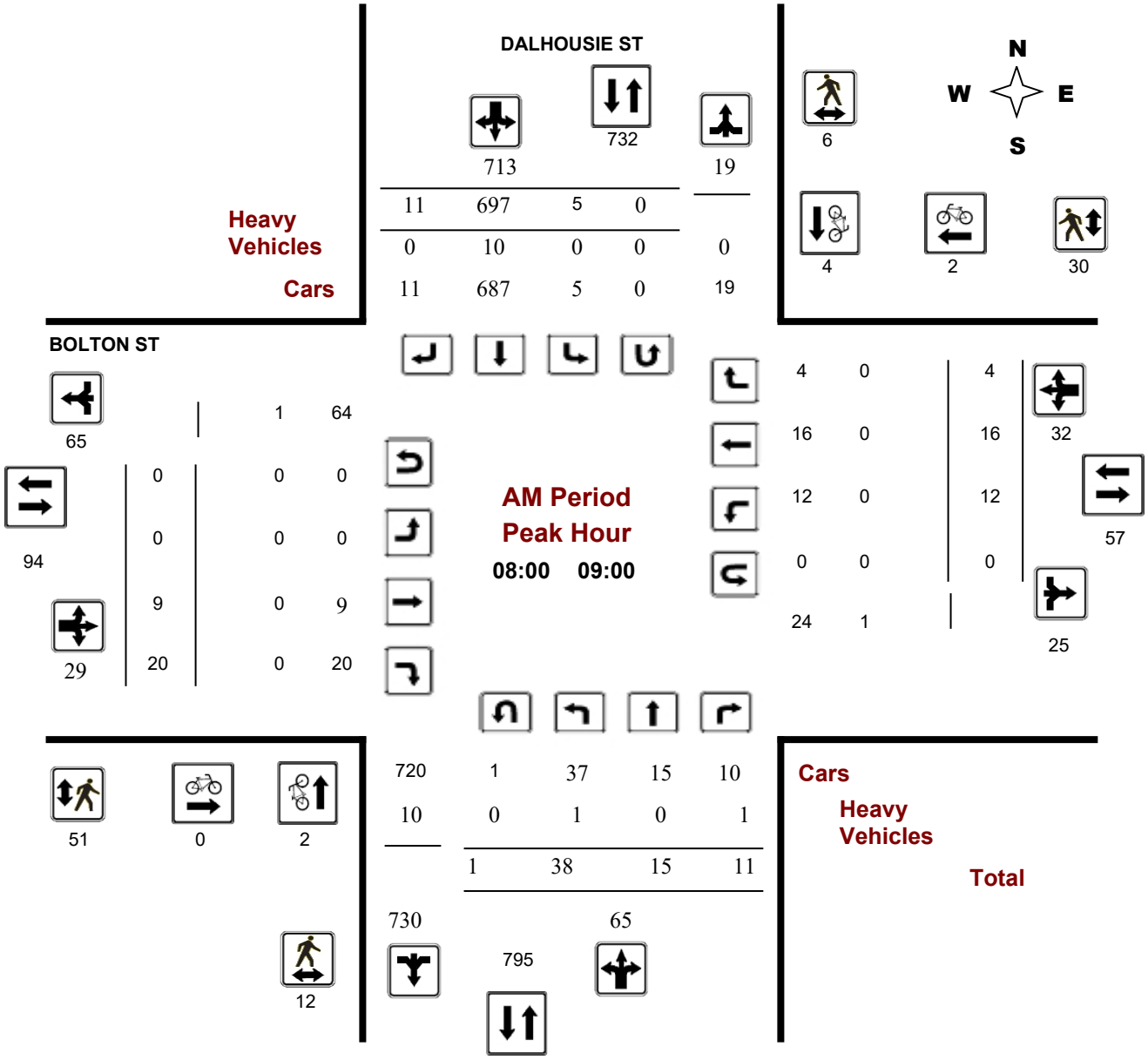
Start Time: 07:00 **Device:** Miovision



Comments

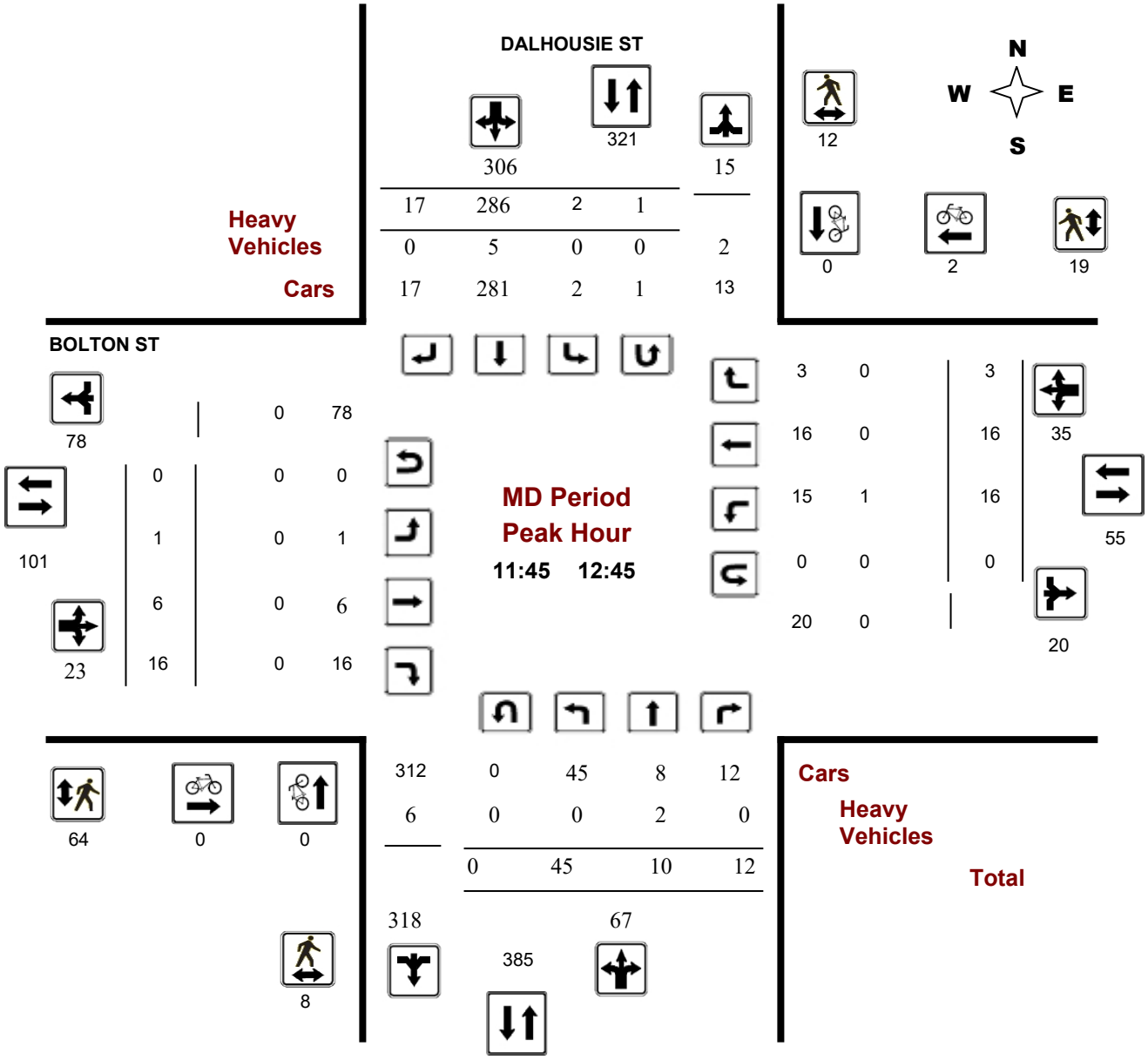
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016 **WO No:** 36562

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



Comments

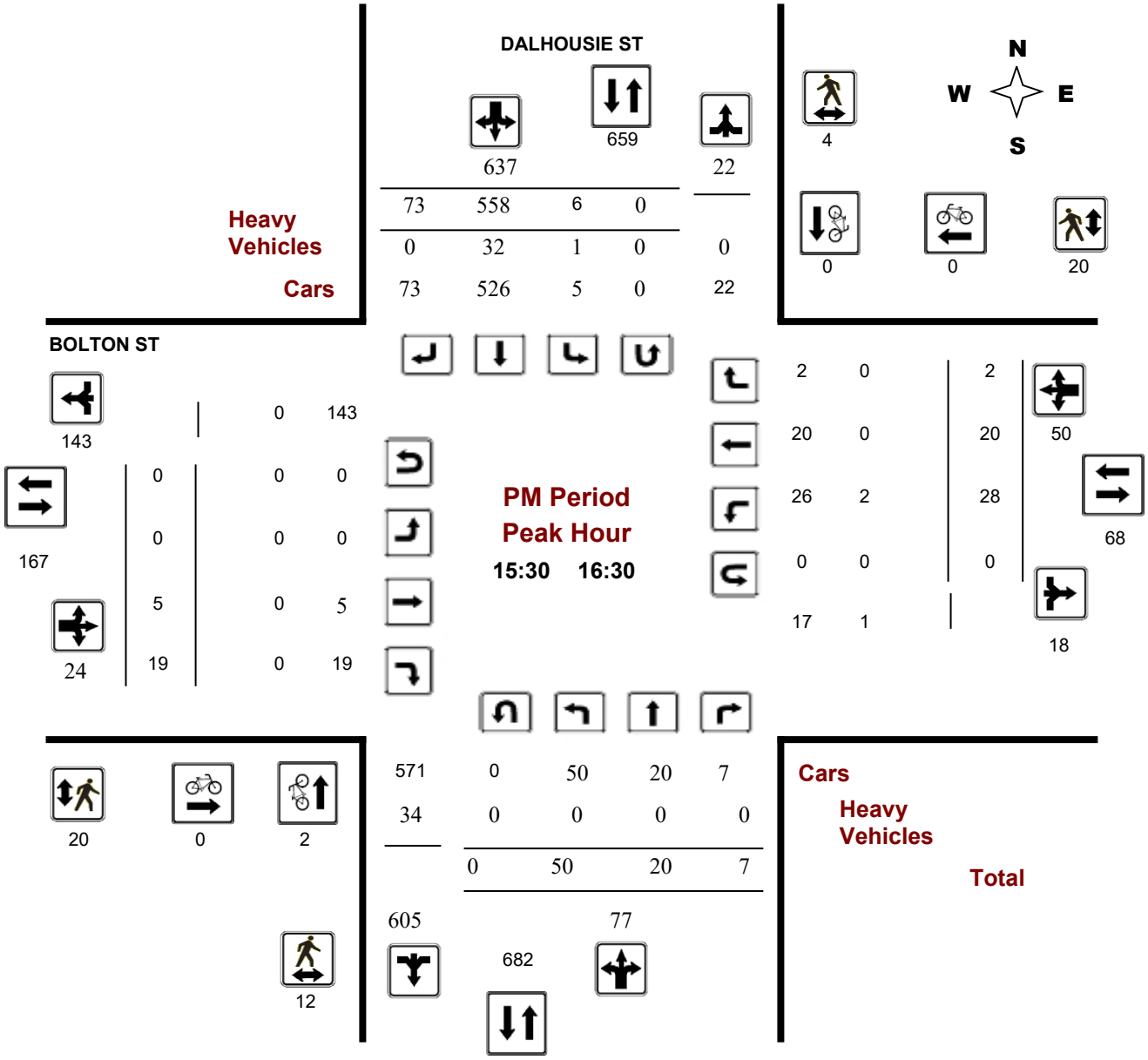
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016 **WO No:** 36562

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016 **WO No:** 36562

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, November 30, 2016

Total Observed U-Turns

Northbound: 1 Southbound: 2

Eastbound: 0 Westbound: 0

AADT Factor

1.25

	DALHOUSIE ST									BOLTON ST									
	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	28	7	4	**39**	2	736	12	**750**	**789**	0	8	12	**20**	13	7	2	**22**	**42**	**831**
08:00 09:00	38	15	11	**64**	5	697	11	**713**	**777**	0	9	20	**29**	12	16	4	**32**	**61**	**838**
09:00 10:00	44	10	9	**63**	7	452	5	**464**	**527**	0	3	13	**16**	16	19	2	**37**	**53**	**580**
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12:30 13:30	46	16	10	**72**	4	263	8	**275**	**347**	1	4	20	**25**	17	19	2	**38**	**63**	**410**
15:00 16:00	62	16	7	**85**	3	477	53	**533**	**618**	0	8	21	**29**	28	26	2	**56**	**85**	**703**
16:00 17:00	43	16	5	**64**	4	519	60	**583**	**647**	0	6	12	**18**	13	19	1	**33**	**51**	**698**
17:00 18:00	42	15	11	**68**	2	472	35	**509**	**577**	0	5	19	**24**	23	19	6	**48**	**72**	**649**
Sub Total	346	107	67	**520**	29	3895	203	**4127**	**4647**	1	47	131	**179**	140	133	22	**295**	**474**	**5121**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	346	107	67	**520**	29	3895	203	**4127**	**4647**	1	47	131	**179**	140	133	22	**295**	**474**	**5121**
EQ 12Hr	481	149	93	**724**	40	5414	282	**5739**	**6464**	1	65	182	**249**	195	185	31	**410**	**659**	**7122**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	433	134	84	**652**	36	4873	254	**5165**	**5818**	1	59	164	**224**	175	166	28	**369**	**593**	**6410**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**0.9**					
AVG 24Hr	567	175	110	**854**	48	6383	333	**6767**	**7621**	2	77	215	**293**	229	218	36	**483**	**776**	**8397**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

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

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016 **WO No:** 36562

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

Full Study 15 Minute Increments

		DALHOUSIE ST									BOLTON ST									
		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	4	3	0	7	1	186	2	189	390	0	1	5	6	0	0	0	0	390	202
07:15	07:30	13	3	2	18	0	183	1	184	395	0	2	2	4	5	2	0	7	395	213
07:30	07:45	3	0	1	4	1	191	4	196	396	0	3	3	6	2	1	0	3	396	209
07:45	08:00	8	1	1	10	0	176	5	181	378	0	2	2	4	6	4	2	12	378	207
08:00	08:15	4	3	3	10	2	181	3	186	385	0	4	1	5	3	4	1	8	385	209
08:15	08:30	8	6	2	16	1	172	2	175	378	0	1	5	6	1	3	3	7	378	204
08:30	08:45	14	1	2	18	1	182	3	186	398	0	3	7	10	3	1	0	4	398	218
08:45	09:00	12	5	4	21	1	162	3	166	366	0	1	7	8	5	8	0	13	366	208
09:00	09:15	10	5	5	20	2	151	3	156	346	0	2	7	9	5	5	2	12	346	197
09:15	09:30	11	3	1	15	2	119	2	123	268	0	0	3	3	5	3	0	8	268	149
09:30	09:45	8	0	1	9	1	89	0	90	191	0	0	1	1	2	7	0	9	191	109
09:45	10:00	15	2	2	19	2	93	0	95	215	0	1	2	3	4	4	0	8	215	125
11:30	11:45	8	6	2	16	0	80	6	86	196	0	1	4	5	4	0	0	4	196	111
11:45	12:00	9	2	2	13	0	58	7	66	150	0	1	2	3	7	3	1	11	150	93
12:00	12:15	15	3	2	20	0	70	3	73	174	0	1	5	6	2	3	1	6	174	105
12:15	12:30	11	1	4	16	2	71	3	76	173	0	1	3	4	5	2	1	8	173	104
12:30	12:45	10	4	4	18	0	87	4	91	209	1	3	6	10	2	8	0	10	209	129
12:45	13:00	13	6	0	19	2	56	0	58	149	0	0	3	3	7	3	0	10	149	90
13:00	13:15	11	3	3	17	0	56	0	56	144	0	1	6	7	5	3	1	9	144	89
13:15	13:30	12	3	3	18	2	64	4	71	166	0	0	5	5	3	5	1	9	166	103
15:00	15:15	14	2	1	17	0	77	3	80	178	0	3	1	4	1	10	0	11	178	112
15:15	15:30	17	3	2	22	0	129	17	146	312	0	3	6	9	5	5	1	11	312	188
15:30	15:45	20	9	1	30	2	127	12	141	329	0	2	8	10	13	6	1	20	329	201
15:45	16:00	11	2	3	16	1	144	21	166	343	0	0	6	6	9	5	0	14	343	202
16:00	16:15	10	3	2	15	0	139	20	159	322	0	1	3	4	2	8	1	11	322	189
16:15	16:30	9	6	1	16	3	148	20	171	347	0	2	2	4	4	1	0	5	347	196
16:30	16:45	13	4	1	18	1	97	6	104	228	0	2	4	6	1	6	0	7	228	135
16:45	17:00	11	3	1	15	0	135	14	149	311	0	1	3	4	6	4	0	10	311	178
17:00	17:15	14	2	3	19	1	125	8	134	296	0	1	9	10	4	4	3	11	296	174
17:15	17:30	7	6	3	16	1	134	13	148	316	0	1	4	5	7	6	1	14	316	183
17:30	17:45	13	3	2	18	0	132	11	143	309	0	2	3	5	9	6	1	16	309	182
17:45	18:00	8	4	3	15	0	81	3	84	191	0	1	3	4	3	3	1	7	191	110
Total:		346	107	67	521	29	3895	203	4129	8949	1	47	131	179	140	133	22	295	8949	5,124

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016 **WO No:** 36562

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

Full Study Cyclist Volume

Time Period		DALHOUSIE ST			BOLTON ST			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	1	1	0	0	0	1
07:45	08:00	0	0	0	1	0	1	1
08:00	08:15	1	3	4	0	0	0	4
08:15	08:30	0	1	1	0	1	1	2
08:30	08:45	0	0	0	0	1	1	1
08:45	09:00	1	0	1	0	0	0	1
09:00	09:15	0	2	2	0	0	0	2
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	1	1	1	0	1	2
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	1	1	1
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	1	1	1
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	1	0	1	0	0	0	1
13:15	13:30	1	0	1	0	0	0	1
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	1	0	1	0	0	0	1
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	1	0	1	0	0	0	1
16:30	16:45	3	0	3	0	1	1	4
16:45	17:00	0	1	1	1	1	2	3
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	1	0	1	0	0	0	1
17:30	17:45	0	0	0	0	1	1	1
17:45	18:00	1	0	1	0	0	0	1
Total		11	9	**20**	3	7	10	30

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016 **WO No:** 36562

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

Full Study Pedestrian Volume

	DALHOUSIE ST			BOLTON ST			
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	1	1	**2**	1	2	**3**	**5**
07:15 07:30	4	1	**5**	9	5	**14**	**19**
07:30 07:45	0	1	**1**	7	4	**11**	**12**
07:45 08:00	2	2	**4**	9	7	**16**	**20**
08:00 08:15	1	0	**1**	7	8	**15**	**16**
08:15 08:30	7	1	**8**	9	9	**18**	**26**
08:30 08:45	2	4	**6**	15	6	**21**	**27**
08:45 09:00	2	1	**3**	20	7	**27**	**30**
09:00 09:15	2	1	**3**	13	6	**19**	**22**
09:15 09:30	0	1	**1**	10	6	**16**	**17**
09:30 09:45	1	1	**2**	10	3	**13**	**15**
09:45 10:00	2	0	**2**	6	3	**9**	**11**
11:30 11:45	1	4	**5**	4	5	**9**	**14**
11:45 12:00	2	1	**3**	13	1	**14**	**17**
12:00 12:15	0	1	**1**	27	5	**32**	**33**
12:15 12:30	2	4	**6**	14	9	**23**	**29**
12:30 12:45	4	6	**10**	10	4	**14**	**24**
12:45 13:00	3	2	**5**	13	8	**21**	**26**
13:00 13:15	0	3	**3**	7	6	**13**	**16**
13:15 13:30	4	1	**5**	10	2	**12**	**17**
15:00 15:15	1	2	**3**	4	4	**8**	**11**
15:15 15:30	3	2	**5**	9	8	**17**	**22**
15:30 15:45	7	1	**8**	4	7	**11**	**19**
15:45 16:00	0	0	**0**	6	0	**6**	**6**
16:00 16:15	2	0	**2**	7	5	**12**	**14**
16:15 16:30	3	3	**6**	3	8	**11**	**17**
16:30 16:45	5	1	**6**	9	6	**15**	**21**
16:45 17:00	2	5	**7**	12	13	**25**	**32**
17:00 17:15	2	1	**3**	10	6	**16**	**19**
17:15 17:30	2	0	**2**	11	8	**19**	**21**
17:30 17:45	2	5	**7**	9	4	**13**	**20**
17:45 18:00	1	1	**2**	6	7	**13**	**15**
Total	70	57	**127**	304	182	**486**	**613**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016 **WO No:** 36562

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

Full Study Heavy Vehicles

		DALHOUSIE ST									BOLTON ST									
		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	0	0	**4**	0	4	0	**4**	**8**	0	0	0	**0**	0	0	0	**0**	**0**	**4**
07:15	07:30	0	0	0	**4**	0	2	0	**2**	**6**	0	0	0	**0**	2	0	0	**2**	**2**	**4**
07:30	07:45	0	0	0	**4**	0	4	0	**4**	**8**	0	0	0	**0**	0	0	0	**0**	**0**	**4**
07:45	08:00	0	0	0	**2**	0	2	0	**2**	**4**	0	0	0	**1**	0	1	0	**1**	**2**	**3**
08:00	08:15	0	0	1	**6**	0	5	0	**5**	**11**	0	0	0	**0**	0	0	0	**1**	**1**	**6**
08:15	08:30	0	0	0	**2**	0	2	0	**2**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
08:30	08:45	0	0	0	**2**	0	2	0	**2**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
08:45	09:00	1	0	0	**2**	0	1	0	**1**	**3**	0	0	0	**1**	0	0	0	**0**	**1**	**2**
09:00	09:15	0	0	0	**2**	0	1	0	**1**	**3**	0	0	1	**1**	0	0	0	**0**	**1**	**2**
09:15	09:30	1	0	0	**5**	0	3	0	**3**	**8**	0	0	0	**1**	1	0	0	**1**	**2**	**5**
09:30	09:45	0	0	0	**1**	0	1	0	**1**	**2**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
09:45	10:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
11:30	11:45	0	2	0	**6**	0	4	0	**6**	**12**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
11:45	12:00	0	1	0	**2**	0	0	0	**1**	**3**	0	0	0	**0**	1	0	0	**1**	**1**	**2**
12:00	12:15	0	1	0	**3**	0	2	0	**3**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**3**
12:15	12:30	0	0	0	**1**	0	1	0	**1**	**2**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
12:30	12:45	0	0	0	**2**	0	2	0	**2**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
12:45	13:00	0	0	0	**2**	0	2	0	**2**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
13:00	13:15	0	0	0	**3**	0	3	0	**3**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**3**
13:15	13:30	0	0	0	**1**	0	1	0	**1**	**2**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
15:00	15:15	0	0	0	**7**	0	7	0	**7**	**14**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
15:15	15:30	0	0	0	**8**	0	8	0	**8**	**16**	0	0	0	**0**	0	0	0	**0**	**0**	**8**
15:30	15:45	0	0	0	**10**	0	8	0	**8**	**18**	0	0	0	**0**	2	0	0	**2**	**2**	**10**
15:45	16:00	0	0	0	**6**	0	6	0	**6**	**12**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
16:00	16:15	0	0	0	**10**	0	10	0	**10**	**20**	0	0	0	**0**	0	0	0	**0**	**0**	**10**
16:15	16:30	0	0	0	**8**	1	8	0	**9**	**17**	0	0	0	**0**	0	0	0	**1**	**1**	**9**
16:30	16:45	0	0	0	**3**	0	3	0	**3**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**3**
16:45	17:00	0	0	0	**6**	0	6	0	**6**	**12**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
17:00	17:15	0	0	0	**1**	0	1	0	**1**	**2**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
17:15	17:30	0	1	0	**7**	0	6	0	**7**	**14**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
17:30	17:45	0	0	0	**8**	0	8	0	**8**	**16**	0	0	0	**0**	0	0	0	**0**	**0**	**8**
17:45	18:00	0	0	0	**3**	0	3	0	**3**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**3**
Total:	None	2	5	1	**131**	1	116	0	**122**	**253**	0	0	1	**4**	6	1	0	**9**	**13**	**133**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOLTON ST @ DALHOUSIE ST

Survey Date: Wednesday, November 30, 2016 **WO No:** 36562

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

Full Study 15 Minute U-Turn Total

Time Period		DALHOUSIE ST Northbound U-Turn Total	DALHOUSIE ST Southbound U-Turn Total	BOLTON ST Eastbound U-Turn Total	BOLTON ST 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	1	0	0	0	1
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	1	0	0	1
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	1	0	0	1
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		1	2	0	0	3

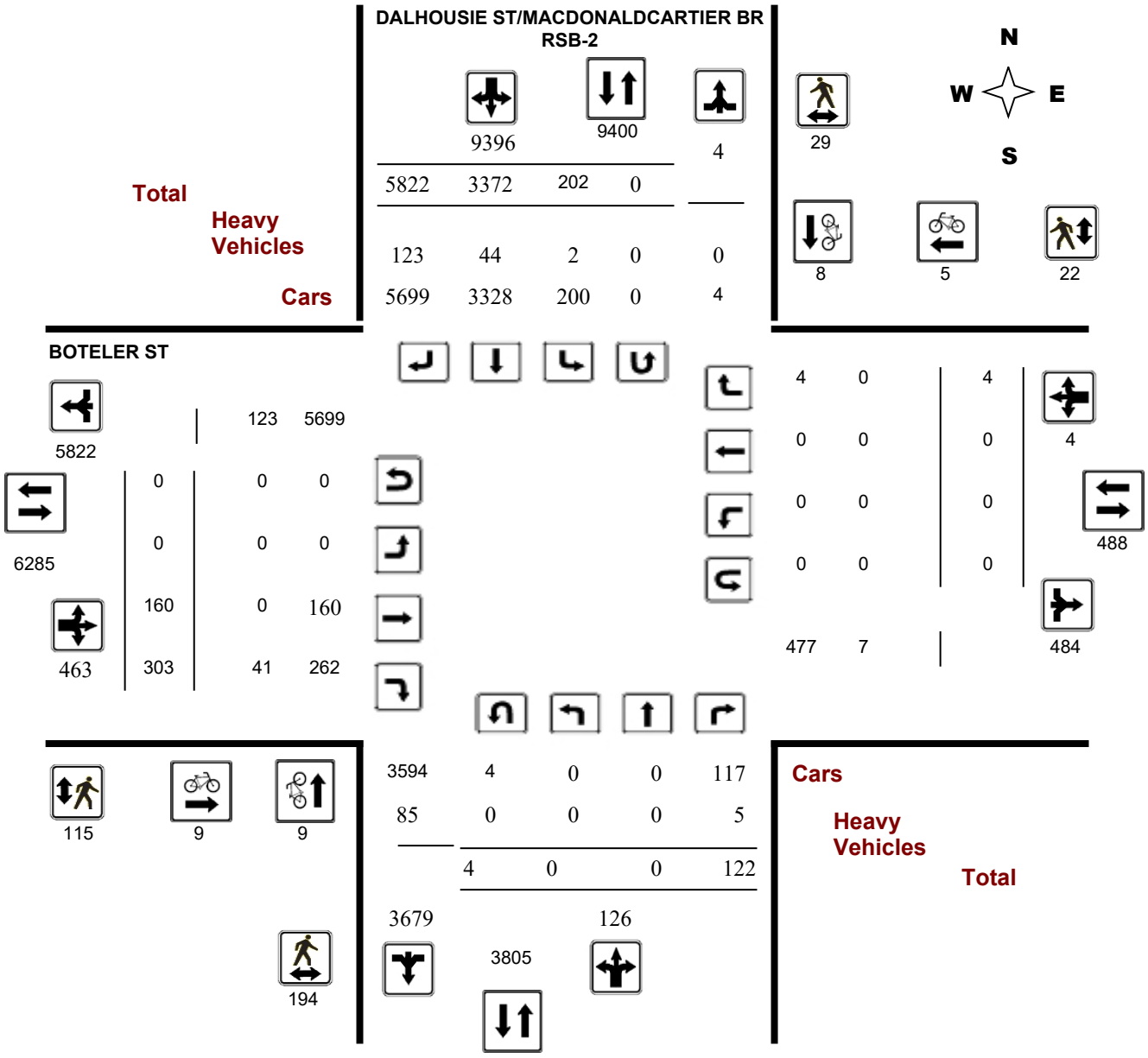
Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019
Start Time: 07:00
WO No: 39072
Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

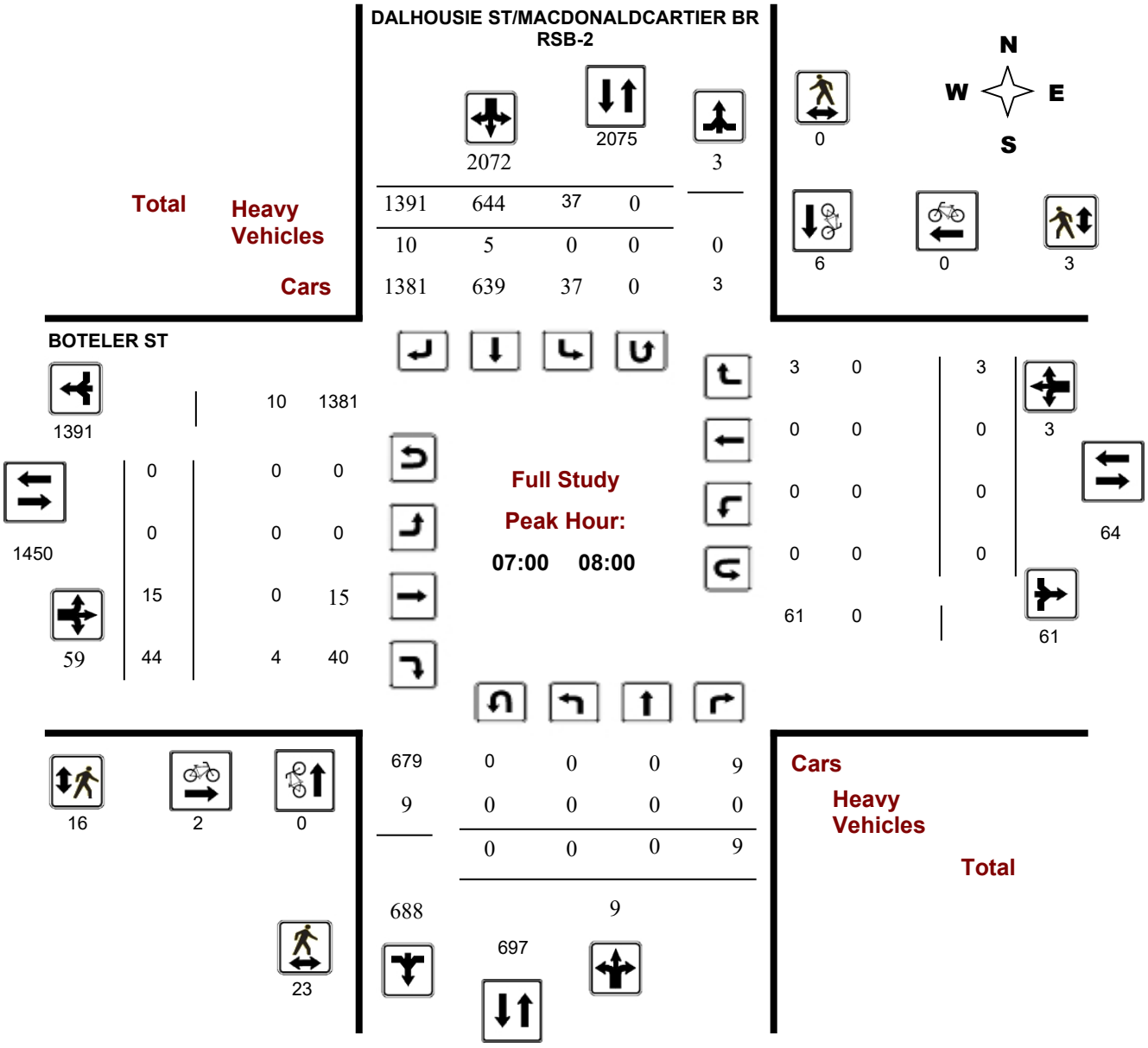
Turning Movement Count - Study Results

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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

Full Study Peak Hour Diagram



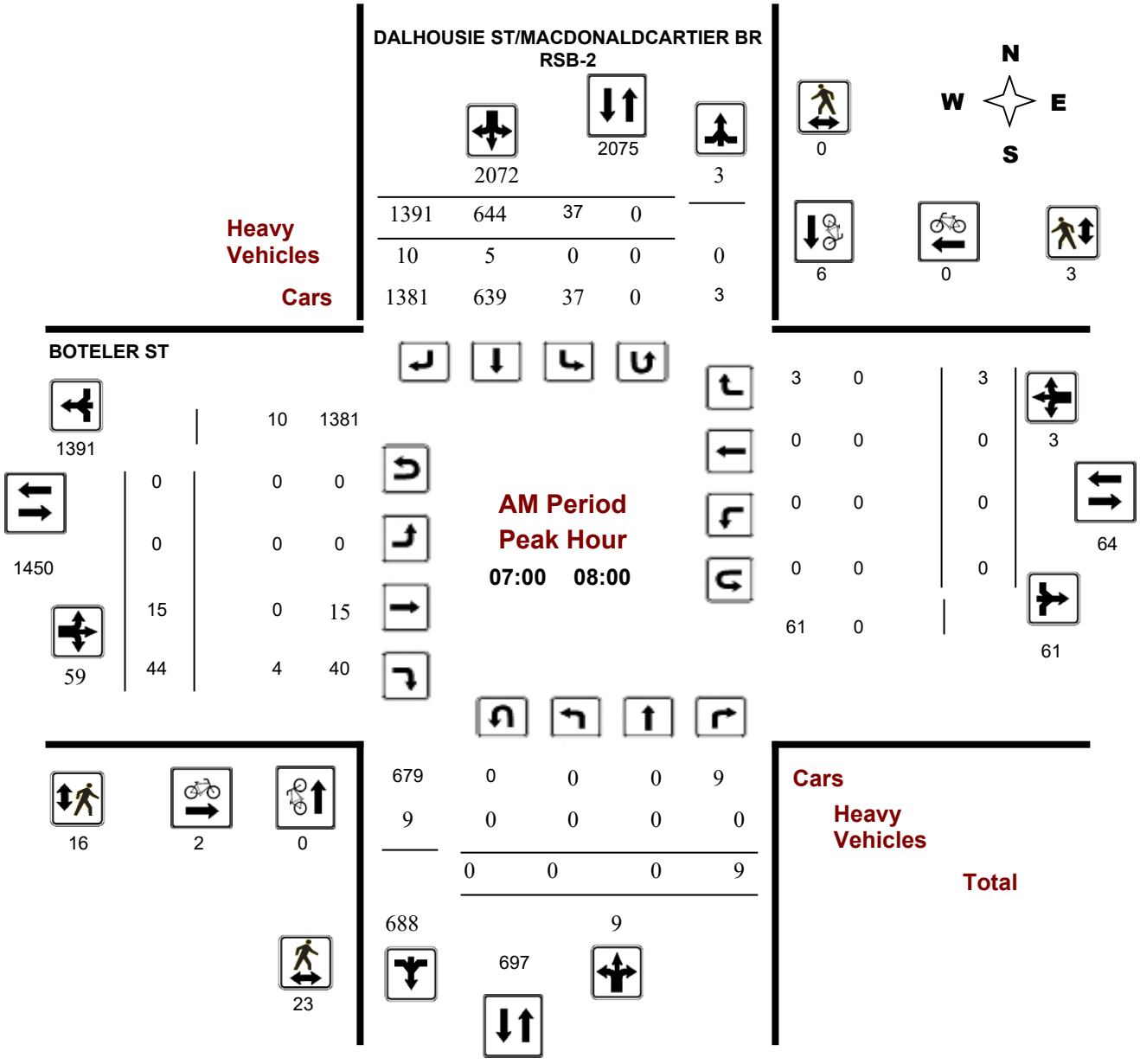
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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



Comments

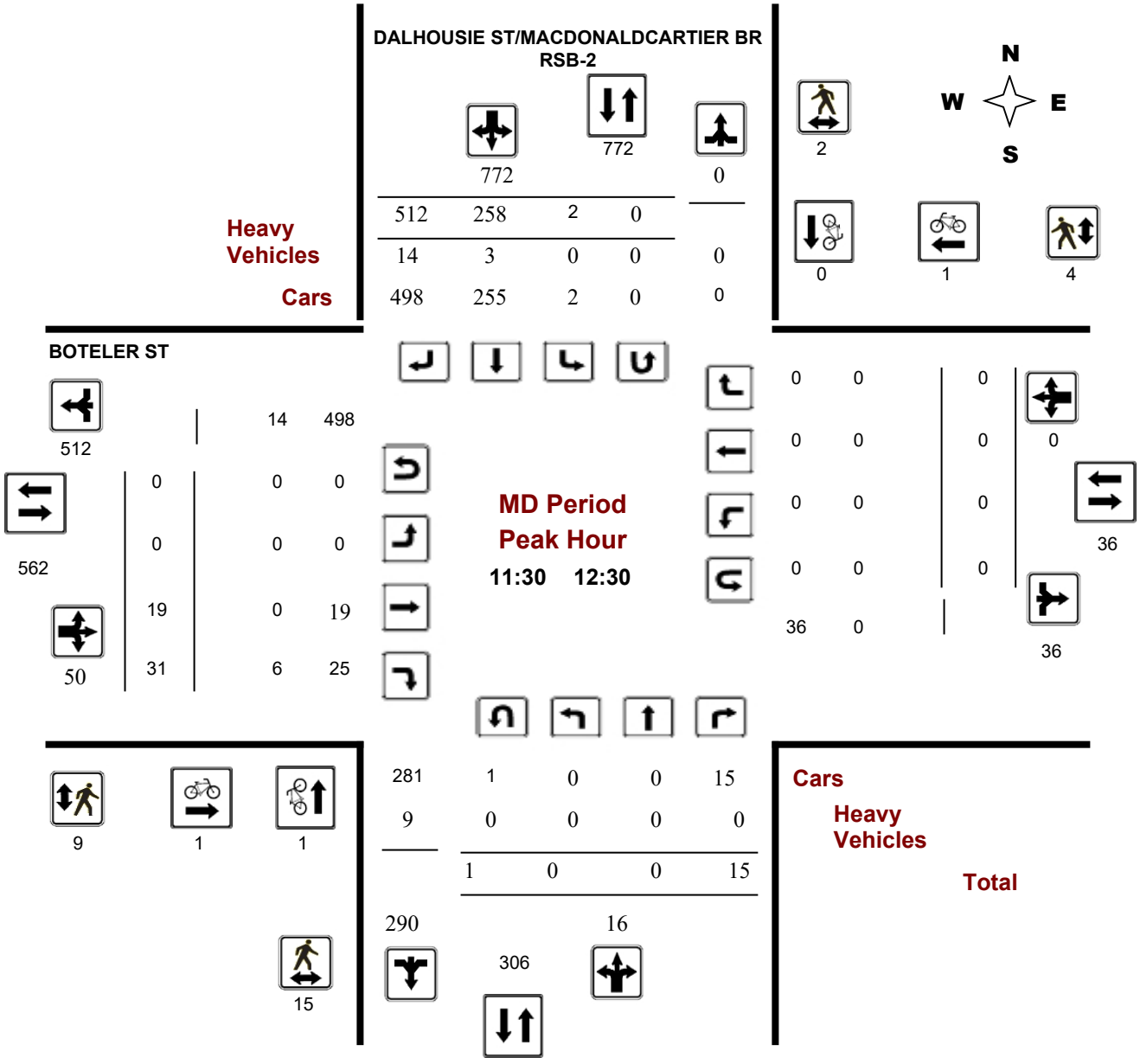
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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



Comments

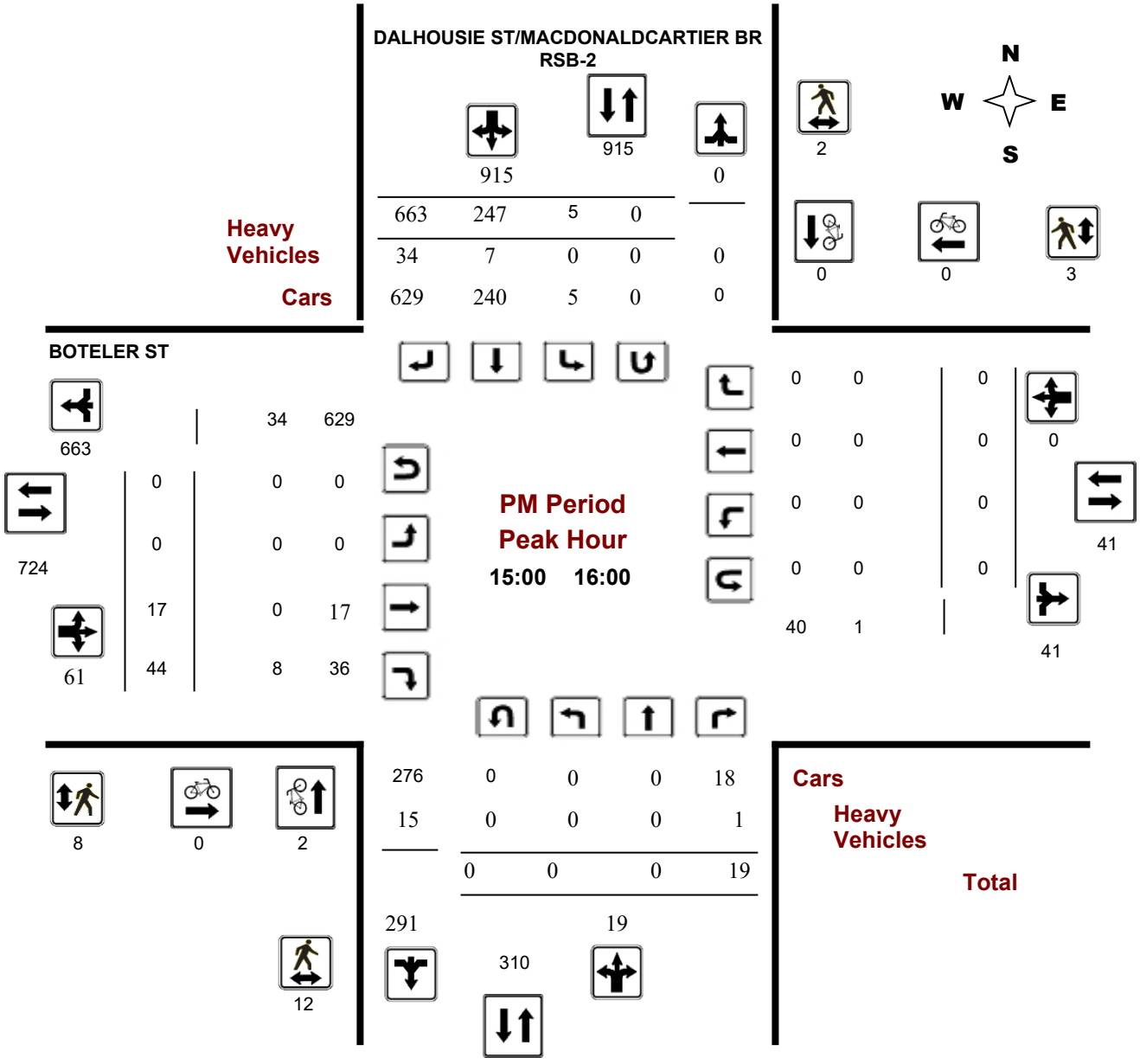
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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

Full Study Summary (8 HR Standard)

Survey Date: Thursday, November 21, 2019

Total Observed U-Turns

Northbound: 4 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor

1.25

DALHOUSIE ST/MACDONALDCARTIER BR RSB-2 — BOTELER ST

Period	Northbound LT	Northbound ST	Northbound RT	NB TOT	Southbound LT	Southbound ST	Southbound RT	SB TOT	STR TOT	Eastbound LT	Eastbound ST	Eastbound RT	EB TOT	Westbound LT	Westbound ST	Westbound RT	WB TOT	STR TOT	Grand Total
07:00 08:00	0	0	9	**9**	37	644	1391	**2072**	**2081**	0	15	44	**59**	0	0	3	**3**	**62**	**2143**
08:00 09:00	0	0	18	**18**	93	639	1153	**1885**	**1903**	0	39	67	**106**	0	0	0	**0**	**106**	**2009**
09:00 10:00	0	0	18	**18**	27	462	841	**1330**	**1348**	0	22	34	**56**	0	0	1	**1**	**57**	**1405**
11:30 12:30	0	0	15	**15**	2	258	512	**772**	**787**	0	19	31	**50**	0	0	0	**0**	**50**	**837**
12:30 13:30	0	0	16	**16**	5	204	461	**670**	**686**	0	13	20	**33**	0	0	0	**0**	**33**	**719**
15:00 16:00	0	0	19	**19**	5	247	663	**915**	**934**	0	17	44	**61**	0	0	0	**0**	**61**	**995**
16:00 17:00	0	0	13	**13**	19	540	296	**855**	**868**	0	20	30	**50**	0	0	0	**0**	**50**	**918**
17:00 18:00	0	0	14	**14**	14	378	505	**897**	**911**	0	15	33	**48**	0	0	0	**0**	**48**	**959**
Sub Total	0	0	122	**122**	202	3372	5822	**9396**	**9518**	0	160	303	**463**	0	0	4	**4**	**467**	**9985**
U Turns				**4**				**0**	**4**				**0**				**0**	**0**	**4**
Total	0	0	122	**126**	202	3372	5822	**9396**	**9522**	0	160	303	**463**	0	0	4	**4**	**467**	**9989**
EQ 12Hr	0	0	170	**175**	281	4687	8093	**13060**	**13236**	0	222	421	**644**	0	0	6	**6**	**649**	**13885**

Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**

AVG 12Hr	0	0	153	**158**	253	4218	7283	**11754**	**11912**	0	200	379	**579**	0	0	5	**5**	**584**	**12496**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **0.9**

AVG 24Hr	0	0	200	**206**	331	5526	9541	**15398**	**15604**	0	262	497	**759**	0	0	7	**7**	**766**	**16370**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

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

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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

Full Study 15 Minute Increments

		DALHOUSIE ST/MACDONALDCARTIER BR RSB-2									BOTELER ST									
		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	0	3	3	2	132	367	501	644	0	2	5	7	0	0	3	3	644	514
07:15	07:30	0	0	2	2	4	179	354	537	727	0	3	9	12	0	0	0	0	727	551
07:30	07:45	0	0	1	1	9	171	351	531	718	0	7	15	22	0	0	0	0	718	554
07:45	08:00	0	0	3	3	22	162	319	503	683	0	3	15	18	0	0	0	0	683	524
08:00	08:15	0	0	2	2	24	167	296	487	673	0	4	17	21	0	0	0	0	673	510
08:15	08:30	0	0	4	4	30	156	295	481	658	0	6	17	23	0	0	0	0	658	508
08:30	08:45	0	0	9	9	11	159	293	463	652	0	13	21	34	0	0	0	0	652	506
08:45	09:00	0	0	3	3	28	157	269	454	626	0	16	12	28	0	0	0	0	626	485
09:00	09:15	0	0	6	6	16	159	283	458	634	0	9	10	19	0	0	1	1	634	484
09:15	09:30	0	0	5	5	5	118	240	363	496	0	3	10	13	0	0	0	0	496	381
09:30	09:45	0	0	3	3	4	83	170	257	350	0	5	7	12	0	0	0	0	350	272
09:45	10:00	0	0	4	4	2	102	148	252	365	0	5	7	12	0	0	0	0	365	268
11:30	11:45	0	0	2	2	1	68	152	221	300	0	4	9	13	0	0	0	0	300	236
11:45	12:00	0	0	4	4	1	75	108	184	269	0	3	6	9	0	0	0	0	269	197
12:00	12:15	0	0	5	6	0	60	117	177	248	0	7	4	11	0	0	0	0	248	194
12:15	12:30	0	0	4	4	0	55	135	190	261	0	5	12	17	0	0	0	0	261	211
12:30	12:45	0	0	3	3	0	57	122	179	245	0	5	6	11	0	0	0	0	245	193
12:45	13:00	0	0	6	6	1	61	108	170	244	0	1	7	8	0	0	0	0	244	184
13:00	13:15	0	0	5	6	2	52	118	172	234	0	1	3	4	0	0	0	0	234	182
13:15	13:30	0	0	2	2	2	34	113	149	189	0	6	4	10	0	0	0	0	189	161
15:00	15:15	0	0	5	5	0	63	212	275	353	0	1	10	11	0	0	0	0	353	291
15:15	15:30	0	0	5	5	1	62	156	219	301	0	4	15	19	0	0	0	0	301	243
15:30	15:45	0	0	6	6	0	51	160	211	275	0	6	7	13	0	0	0	0	275	230
15:45	16:00	0	0	3	3	4	71	135	210	296	0	6	12	18	0	0	0	0	296	231
16:00	16:15	0	0	5	5	4	126	79	209	349	0	7	9	16	0	0	0	0	349	230
16:15	16:30	0	0	2	2	4	142	69	215	364	0	4	5	9	0	0	0	0	364	226
16:30	16:45	0	0	2	2	4	122	85	211	341	0	2	6	8	0	0	0	0	341	221
16:45	17:00	0	0	4	4	7	150	63	220	384	0	7	10	17	0	0	0	0	384	241
17:00	17:15	0	0	2	2	5	156	65	226	398	0	4	14	18	0	0	0	0	398	246
17:15	17:30	0	0	5	7	3	92	143	238	348	0	5	9	14	0	0	0	0	348	259
17:30	17:45	0	0	3	3	3	64	152	219	290	0	4	4	8	0	0	0	0	290	230
17:45	18:00	0	0	4	4	3	66	145	214	290	0	2	6	8	0	0	0	0	290	226
Total:		0	0	122	126	202	3372	5822	9396	13205	0	160	303	463	0	0	4	4	13205	9,989

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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

Full Study Cyclist Volume

		DALHOUSIE ST/MACDONALDCARTIER BR RSB-2			BOTELER ST			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	1	1	0	0	0	1
07:15	07:30	0	1	1	0	0	0	1
07:30	07:45	0	1	1	0	0	0	1
07:45	08:00	0	3	3	2	0	2	5
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	1	1	3	0	3	4
09:15	09:30	1	0	1	0	0	0	1
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	1	0	1	0	1	1	2
12:15	12:30	0	0	0	1	0	1	1
12:30	12:45	0	0	0	1	0	1	1
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	1	0	1	0	0	0	1
13:15	13:30	1	0	1	0	0	0	1
15:00	15:15	1	0	1	0	0	0	1
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	1	0	1	0	0	0	1
16:00	16:15	0	1	1	0	0	0	1
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	1	0	1	0	1	1	2
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	1	1	1
17:30	17:45	2	0	2	2	2	4	6
17:45	18:00	0	0	0	0	0	0	0
Total		9	8	**17**	9	5	14	31

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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

Full Study Pedestrian Volume

Time Period	DALHOUSIE ST/MACDONALDCARTIER BR RSB-2			BOTELER ST			
	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**	3	2	**5**	**7**
07:15 07:30	5	0	**5**	2	0	**2**	**7**
07:30 07:45	4	0	**4**	4	0	**4**	**8**
07:45 08:00	12	0	**12**	7	1	**8**	**20**
08:00 08:15	8	0	**8**	4	0	**4**	**12**
08:15 08:30	7	4	**11**	6	1	**7**	**18**
08:30 08:45	9	1	**10**	1	0	**1**	**11**
08:45 09:00	5	3	**8**	4	0	**4**	**12**
09:00 09:15	9	0	**9**	6	2	**8**	**17**
09:15 09:30	15	0	**15**	1	0	**1**	**16**
09:30 09:45	7	0	**7**	3	1	**4**	**11**
09:45 10:00	2	0	**2**	3	1	**4**	**6**
11:30 11:45	4	0	**4**	5	0	**5**	**9**
11:45 12:00	1	1	**2**	0	2	**2**	**4**
12:00 12:15	7	1	**8**	0	0	**0**	**8**
12:15 12:30	3	0	**3**	4	2	**6**	**9**
12:30 12:45	4	1	**5**	3	0	**3**	**8**
12:45 13:00	5	4	**9**	5	1	**6**	**15**
13:00 13:15	3	0	**3**	0	2	**2**	**5**
13:15 13:30	10	0	**10**	1	0	**1**	**11**
15:00 15:15	3	0	**3**	1	2	**3**	**6**
15:15 15:30	3	0	**3**	2	0	**2**	**5**
15:30 15:45	2	1	**3**	3	0	**3**	**6**
15:45 16:00	4	1	**5**	2	1	**3**	**8**
16:00 16:15	3	0	**3**	3	0	**3**	**6**
16:15 16:30	4	0	**4**	3	0	**3**	**7**
16:30 16:45	10	2	**12**	6	0	**6**	**18**
16:45 17:00	4	4	**8**	8	2	**10**	**18**
17:00 17:15	11	0	**11**	7	1	**8**	**19**
17:15 17:30	14	1	**15**	7	0	**7**	**22**
17:30 17:45	5	2	**7**	5	0	**5**	**12**
17:45 18:00	9	3	**12**	6	1	**7**	**19**
Total	194	29	**223**	115	22	**137**	**360**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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

Full Study Heavy Vehicles

		DALHOUSIE ST/MACDONALDCARTIER BR RSB-2									BOTELER ST									
		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	0	0	**2**	0	1	3	**4**	**6**	0	0	1	**4**	0	0	0	**0**	**4**	**5**
07:15	07:30	0	0	0	**2**	0	1	0	**1**	**3**	0	0	1	**1**	0	0	0	**0**	**1**	**2**
07:30	07:45	0	0	0	**2**	0	1	4	**5**	**7**	0	0	1	**5**	0	0	0	**0**	**5**	**6**
07:45	08:00	0	0	0	**3**	0	2	3	**5**	**8**	0	0	1	**4**	0	0	0	**0**	**4**	**6**
08:00	08:15	0	0	0	**1**	0	0	1	**1**	**2**	0	0	1	**2**	0	0	0	**0**	**2**	**2**
08:15	08:30	0	0	0	**4**	1	3	2	**6**	**10**	0	0	1	**3**	0	0	0	**1**	**4**	**7**
08:30	08:45	0	0	0	**3**	0	1	1	**2**	**5**	0	0	2	**3**	0	0	0	**0**	**3**	**4**
08:45	09:00	0	0	0	**2**	0	2	1	**3**	**5**	0	0	0	**1**	0	0	0	**0**	**1**	**3**
09:00	09:15	0	0	0	**3**	0	2	2	**4**	**7**	0	0	1	**3**	0	0	0	**0**	**3**	**5**
09:15	09:30	0	0	1	**2**	0	0	5	**5**	**7**	0	0	1	**6**	0	0	0	**1**	**7**	**7**
09:30	09:45	0	0	0	**2**	0	1	6	**7**	**9**	0	0	1	**7**	0	0	0	**0**	**7**	**8**
09:45	10:00	0	0	0	**2**	0	2	6	**8**	**10**	0	0	0	**6**	0	0	0	**0**	**6**	**8**
11:30	11:45	0	0	0	**1**	0	0	5	**5**	**6**	0	0	1	**6**	0	0	0	**0**	**6**	**6**
11:45	12:00	0	0	0	**1**	0	1	4	**5**	**6**	0	0	0	**4**	0	0	0	**0**	**4**	**5**
12:00	12:15	0	0	0	**5**	0	2	0	**2**	**7**	0	0	3	**3**	0	0	0	**0**	**3**	**5**
12:15	12:30	0	0	0	**2**	0	0	5	**5**	**7**	0	0	2	**7**	0	0	0	**0**	**7**	**7**
12:30	12:45	0	0	1	**2**	0	1	4	**5**	**7**	0	0	0	**4**	0	0	0	**1**	**5**	**6**
12:45	13:00	0	0	0	**4**	0	3	7	**10**	**14**	0	0	1	**8**	0	0	0	**0**	**8**	**11**
13:00	13:15	0	0	1	**2**	0	0	4	**4**	**6**	0	0	1	**5**	0	0	0	**1**	**6**	**6**
13:15	13:30	0	0	0	**2**	0	0	4	**4**	**6**	0	0	2	**6**	0	0	0	**0**	**6**	**6**
15:00	15:15	0	0	0	**3**	0	1	8	**9**	**12**	0	0	2	**10**	0	0	0	**0**	**10**	**11**
15:15	15:30	0	0	1	**7**	0	5	10	**15**	**22**	0	0	1	**11**	0	0	0	**1**	**12**	**17**
15:30	15:45	0	0	0	**3**	0	1	8	**9**	**12**	0	0	2	**10**	0	0	0	**0**	**10**	**11**
15:45	16:00	0	0	0	**3**	0	0	8	**8**	**11**	0	0	3	**11**	0	0	0	**0**	**11**	**11**
16:00	16:15	0	0	1	**4**	0	2	5	**7**	**11**	0	0	1	**6**	0	0	0	**1**	**7**	**9**
16:15	16:30	0	0	0	**5**	0	3	0	**3**	**8**	0	0	2	**2**	0	0	0	**0**	**2**	**5**
16:30	16:45	0	0	0	**3**	0	2	3	**5**	**8**	0	0	1	**4**	0	0	0	**0**	**4**	**6**
16:45	17:00	0	0	0	**5**	0	2	3	**5**	**10**	0	0	3	**6**	0	0	0	**0**	**6**	**8**
17:00	17:15	0	0	0	**6**	1	5	0	**6**	**12**	0	0	1	**1**	0	0	0	**1**	**2**	**7**
17:15	17:30	0	0	0	**2**	0	0	6	**6**	**8**	0	0	2	**8**	0	0	0	**0**	**8**	**8**
17:30	17:45	0	0	0	**1**	0	0	4	**4**	**5**	0	0	1	**5**	0	0	0	**0**	**5**	**5**
17:45	18:00	0	0	0	**1**	0	0	1	**1**	**2**	0	0	1	**2**	0	0	0	**0**	**2**	**2**
Total:	None	0	0	5	**90**	2	44	123	**169**	**259**	0	0	41	**164**	0	0	0	**7**	**171**	**215**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOTELER ST @ DALHOUSIE ST/MACDONALDCARTIER BR

Survey Date: Thursday, November 21, 2019 **WO No:** 39072

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

Full Study 15 Minute U-Turn Total

Time Period		DALHOUSIE ST/MACDONALDCARTIER BR RSB-2		BOTELER ST		
		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	1	0	0	0	1
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	1	0	0	0	1
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	2	0	0	0	2
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		4	0	0	0	4

Appendix D

Road Traffic Modelling

STAMSON 5.0 NORMAL REPORT Date: 06-02-2022 17:37:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: unit5.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Dalhousie (day/night)

Car traffic volume	6906/601	veh/TimePeriod *
Medium truck volume	363/32	veh/TimePeriod *
Heavy truck volume	0/0	veh/TimePeriod *
Posted speed limit	50 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	5732
Percentage of Annual Growth	2.50
Number of Years of Growth	13.00
Medium Truck % of Total Volume	5.00
Heavy Truck % of Total Volume	0.00
Day (16 hrs) % of Total Volume	92.00

Data for Segment # 1: Dalhousie (day/night)

Angle1 Angle2	-90.00 deg	90.00 deg
Wood depth	0	(No woods.)
No of house rows	0 / 0	
Surface	1	(Absorptive ground surface)
Receiver source distance	15.00 / 15.00	m
Receiver height	1.50 / 4.00	m
Topography	1	(Flat/gentle slope; no barrier)
Reference angle	0.00	

```
Road data, segment # 2: Boteler (day/night)
------------------------------------------
Car traffic volume  :  3530/307   veh/TimePeriod  *
Medium truck volume :   186/16    veh/TimePeriod  *
Heavy truck volume  :     0/0     veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   2930
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  13.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   0.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Boteler (day/night)
-----------------------------------------
Angle1   Angle2           : -45.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground
surface)
Receiver source distance  :  34.00 / 34.00  m
Receiver height           :   1.50 / 4.00   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00
```

```
Road data, segment # 3: Bolton (day/night)
------------------------------------------
Car traffic volume  :  3503/305   veh/TimePeriod  *
Medium truck volume :   184/16    veh/TimePeriod  *
Heavy truck volume  :     0/0     veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   2700
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  16.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   0.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Bolton (day/night)
----------------------------------------
Angle1   Angle2           :   0.00 deg   45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground
surface)
Receiver source distance  :  45.00 / 45.00  m
Receiver height           :   1.50 / 4.00   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00
```

Results segment # 1: Dalhousie (day)

Source height = 0.50 m

ROAD (0.00 + 59.48 + 0.00) = 59.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	60.94	0.00	0.00	-1.46	0.00	0.00	0.00	59.48

Segment Leq : 59.48 dBA

```
Results segment # 2: Boteler (day)
----------------------------------

Source height = 0.50 m

ROAD (0.00 + 45.80 + 0.00) = 45.80 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
   -45      0   0.66  58.03   0.00  -5.90  -6.33   0.00   0.00
0.00  45.80
-------------------------------------------------------------------
-----------

Segment Leq : 45.80 dBA
```

```
Results segment # 3: Bolton (day)
---------------------------------

Source height = 0.50 m

ROAD (0.00 + 43.74 + 0.00) = 43.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
     0     45   0.66  57.99   0.00  -7.92  -6.33   0.00   0.00
0.00  43.74
-------------------------------------------------------------------
-----------

Segment Leq : 43.74 dBA

Total Leq All Segments: 59.77 dBA
```

```
Results segment # 1: Dalhousie (night)
--------------------------------------

Source height = 0.50 m

ROAD (0.00 + 51.99 + 0.00) = 51.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
   -90     90   0.62  53.37   0.00   0.00  -1.38   0.00   0.00
0.00  51.99
-------------------------------------------------------------------
-----------

Segment Leq : 51.99 dBA
```

```
Results segment # 2: Boteler (night)
-----------------------------------

Source height = 0.50 m

ROAD (0.00 + 38.36 + 0.00) = 38.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
   -45      0   0.62  50.41   0.00  -5.74  -6.31   0.00   0.00
0.00  38.36
-------------------------------------------------------------------
-----------

Segment Leq : 38.36 dBA
```

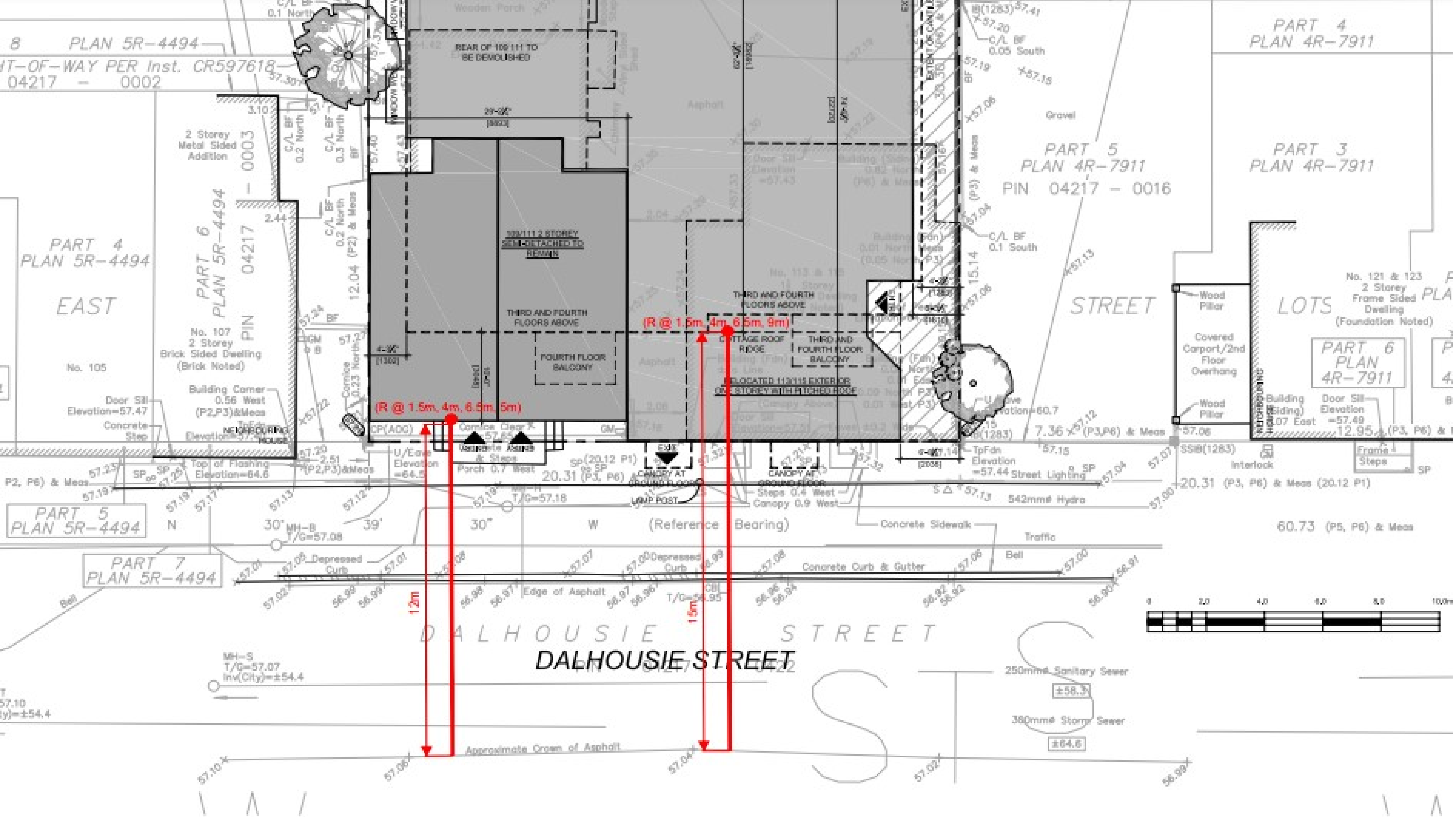
```
Results segment # 3: Bolton (night)
-----------------------------------

Source height = 0.50 m

ROAD (0.00 + 36.38 + 0.00) = 36.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
     0     45   0.62  50.39   0.00  -7.71  -6.31   0.00   0.00
0.00  36.38
-------------------------------------------------------------------
-----------

Segment Leq : 36.38 dBA

Total Leq All Segments: 52.29 dBA
```



PLAN 5R-4494
PART 4
PLAN 5R-4494
EAST
PART 6
PLAN 5R-4494
PIN 04217 - 0003
No. 107
2 Storey
Brick Sided Dwelling
(Brick Noted)
No. 105
2 Storey
Metal Sided
Addition
REAR OF 109/111 TO
BE DEMOLISHED
109/111 2 STOREY
SEMI-DETACHED TO
REMAIN
THIRD AND FOURTH
FLOORS ABOVE
FOURTH FLOOR
BALCONY
(R @ 1.5m, 4m, 6.5m, 5m)
(R @ 1.5m, 4m, 6.5m, 9m)
THIRD AND FOURTH
FLOORS ABOVE
COTTAGE ROOF
RIDGE
THIRD AND
FOURTH FLOOR
BALCONY
RELOCATED 113/115 EXTERIOR
ONE STOREY WITH PITCHED ROOF
CANOPY AT
GROUND FLOOR
LAMP POST
PART 4
PLAN 4R-7911
PART 5
PLAN 4R-7911
PIN 04217 - 0016
PART 3
PLAN 4R-7911
STREET
LOTS
No. 121 & 123
2 Storey
Frame Sided
Dwelling
(Foundation Noted)
PART 6
PLAN
4R-7911
Covered
Carport/2nd
Floor
Overhang
Wood
Pillar
PART 5
PLAN 5R-4494
PART 7
PLAN 5R-4494
(Reference Bearing)
Concrete Sidewalk
Concrete Curb & Gutter
Edge of Asphalt
12m
15m
DALHOUSIE STREET
DALHOUSIE STREET
250mmø Sanitary Sewer
360mmø Storm Sewer
Approximate Crown of Asphalt

TOTAL Leq FROM ALL SOURCES (DAY): 59.77
(NIGHT): 52.29

Appendix E

City of Ottawa Noise Guidelines

PLANNING AND GROWTH MANAGEMENT
URBANISME ET GESTION DE LA CROISSANCE

ENVIRONMENTAL NOISE CONTROL GUIDELINES: Introduction and Glossary

January 2016