Noise Feasibility Study for Ottawa Community Housing

Branch Street and Jockvale Road/Longfields Drive, Ottawa, ON

Prepared for:

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Revision Log

Version	Date	Prepared by	Reviewed by	Description
00	11/10/2024	Srinivasa-Rao Ippili	Pascal Everton	Noise Feasibility Study Report - DRAFT

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1 Introduction

Lemay Michaud (the *Client*) retained Soft dB to prepare a noise feasibility study report to assess the proposed Ottawa Community Housing (OCH) project plans. This proposed development is currently in the pre-design stage and is currently envisioned as a new 9-storey, 96-unit residential apartment building and 16 3-storey stacked townhouses, fronting Branch Street and Jockvale Road/Longfields Drive, Ottawa (see Figure 1). This study has been requested by Lemay Michaud due to the close proximity of the subject site to transportation noise sources (roads) to identify the need for any specific noise mitigation measures and to evaluate the feasibility of the proposed development.

This proposed development is located adjacent to Jockvale Road/Longfields Drive on the north and east of the subject site, respectively. This noise feasibility study was conducted according to the Ministry of the Environment, Conservation and Parks (MECP) noise control guidelines, NPC-300.

Two pre-design stage building design plan alternatives are provided, namely Plan - V and Plan – Z. See Appendix A for the respective site plan documents.

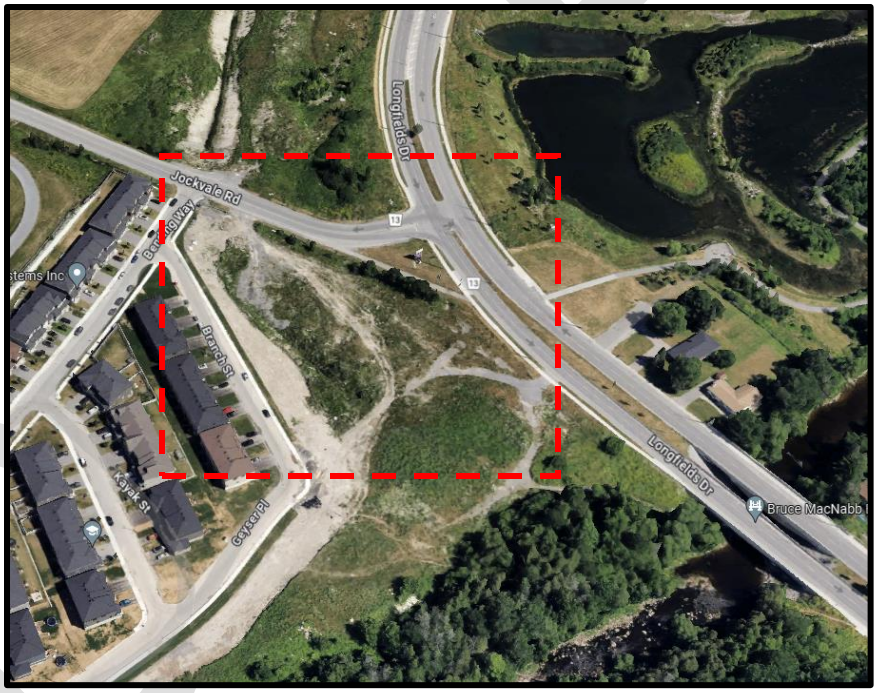


Figure 1: General site location (source: Google Earth)

The objectives of the noise impact study are:

- To assess the noise impact on the proposed development due to the transportation noise sources (road); and
- To provide recommendations, if needed, to reduce any negative noise impact to comply with the municipal and provincial guidelines.

2 Methodology

The following methodology was followed to conduct the noise assessment for the proposed residential development:

- Identification of all potential transportation (major roads) noise sources based on the aerial imagery analysis;
- Identification of the noise sensitive points of reception (POR) for the proposed development;
- Analysis of the road traffic data and incorporating their forecasted traffic values (for year 2034) in an acoustical model prepared in CadnaA 2024 to predict the expected sound levels due to transportation noise sources at the PORs corresponding to the proposed development;
- Assess the compliance of the calculated sound levels with the sound level limits provided in NPC-300;
- If required, provide noise control recommendations to achieve compliance with applicable sound level limits.

3 Assessment Criteria

3.1 MECP – Environmental noise guidelines (NPC-300)

Part C of NPC-300 contains guidelines for addressing and controlling noise emissions for land use planning purposes. It also includes sound level limits for proposed noise sensitive land and specifies procedures for evaluating the sound level on the site of the proposed development due to transportation sources.

For a noise sensitive area, compliance with the sound level limits is typically established at the following points of reception (POR) depending on the type of noise sources affecting the proposed development:

- **Plane of Window (POW):** Represents the point in the space corresponding with the location of the centre of a window in a noise sensitive space. The noise impact assessment excludes the effect of sound reflection from the noise sensitive window under assessment. For transportation noise sources, the sound level at POW determines the requirements for ventilation and air-conditioning. Based on the POW sound levels, indoor noise levels are predicted which may dictate the requirements for any building element upgrades.

- **Outdoor Living Area (OLA):** Corresponds to the part of a noise sensitive land use that is intended and designed for the quiet enjoyment of the outdoor environment and readily accessible from the building environment, such as backyards, balconies, parks, etc. If the noise sensitive area is affected by transportation and/or stationary sources, a point of reception is placed at the OLA. To qualify as an OLA,

    - The point of assessment must be at least 3 metres from the building façade;
    - 1.5 metres above grade aligned with midpoint of subject façade.

If no at-grade points satisfy these requirements, balconies and elevated terraces (e.g., rooftop, etc.) can be considered as an OLA, provided they are not enclosed and have a minimum depth of 4 metres.

Since the proposed development is currently in the pre-design stage, there are no finalized floor plan layouts available. As a result, receptor points are assumed based on provided plans.

3.1.1 Transportation Noise Sources (Road)

According to Part C of the NPC-300 guidelines[1], while predicting sound levels from transportation sources, consideration should be given to future sound levels. For transportation sources (road), a minimum 10-year prediction is usually taken into consideration. All the predictions were made to forecast the rail traffic data until the year of **2034**.

Further, as mentioned in Part C of NPC-300, the sound levels should be assessed in an Outdoor Living Area (OLA) representing a patio, backyard or common outdoor amenity area, and at the plane of window (POW) corresponding to the noise sensitive indoor space. Compliance with the sound levels inside the proposed development is calculated from the predicted sound level at the façade of the respective spaces. The sound level limits for transportation noise sources as mentioned in the NPC-300 are summarized in Table 1.

Table 1: Sound level limits according to NPC-300

Location	Type of space	Time Period	Road Sound Level (dBA)
OLA (outdoor play area, patio, etc.)	Outdoor	Day Time (07:00–23:00)	55
Living areas	Indoor	Day Time (07:00–23:00)	45
		Nighttime (23:00–07:00)	45
Sleeping Quarters	Indoor	Day Time (07:00–23:00)	45
		Nighttime (23:00–07:00)	40

In cases where there is an exceedance of these sound level limits, noise control measures may be required. Noise control measures may include warning clauses, improved architectural design, installing noise barriers, upgrading building envelope elements such as windows, exterior walls, doors, etc. with upgraded sound isolation performance, and/or the requirement for central air-conditioning.

As per NPC-300, a "*warning clause means a notification of or obligation to notify a potential purchaser or tenant of a potential annoyance due to an existing source of environmental noise. When circumstances warrant, agreements that are registered on title to the lands in question should incorporate provisions for using warning clauses. Warning clauses would be included in agreements of offers of purchase and sale, lease/rental agreements and condominium declarations. Alternatively, easements in respect of noise may also be appropriate in some circumstances*." Appendix B outlines all the potential warning clauses as defined in the environmental noise guidelines NPC-300.

[1] https://www.ontario.ca/page/environmental-noise-guideline-stationary-and-transportation-sources-approval-and-planning

Table 2 summarizes the noise control measures when an OLA's sound level limit is exceeded. Table 3 summarizes the ventilation requirements when the sound level at a POW of a bedroom or living/dining spaces is exceeded.

Table 2: Noise control measures for an OLA due to road traffic

Assessment Location	Time	Sound Level (dBA)	Noise control measures
OLA	Daytime (07:00–23:00)	≤ 55	• None
		> 55 ≤ 60	• Provide noise control measures to reduce sound levels to 55 dBA. • If noise control measures are not provided, warning clause Type A must be included in rental/purchase agreements.
		> 60	• Provide noise control measures to reduce the sound level to 55 dBA. • If noise control measures are not feasible for technical, economic or administrative reasons, an exceedance over the 55 dBA limit will be acceptable with warning clause Type B. *Any such exceedance above 60 dBA is not acceptable.*

Table 3: Ventilation requirements for road traffic

Assessment Location	Time	Sound Level (dBA)	Ventilation Requirement	Warning Clause
Exterior façade at the POW of a bedroom or living/dining room	Day Time (07:00–23:00)	≤ 55	None	None
		> 55 ≤ 65	Provision for central air-conditioning	Recommended–Type C
		> 65	Central air-conditioning required	Yes–Type D
	Nighttime (23:00–07:00)	≤ 50	None	None
		> 50 ≤ 60	Provision for central air-conditioning	Recommended–Type C
		> 60	Central air-conditioning required	Yes–Type D

Noise mitigation measures such as noise barriers, improved architectural design, upgrading building envelope elements such as windows, exterior walls, doors, etc. may be required if the sound levels at exterior façade (POW) due to road traffic exceeds 65 dBA during the daytime and/or 60 dBA during nighttime.

4 Supporting Information

4.1 Noise sources

4.1.1 Transportation Noise Source

The transportation noise sources, as defined by NPC-300, comprise the noise generated by the road, railway and air traffic near the location of the site. The acoustical environment at the subject land is mainly dominated by the noise from road traffic from Jockvale Road and Longfields Drive, see Appendix C.

Road Traffic Data

The road traffic data (AADT, traffic split, etc.) for Jockvale Road and Longfields Drive were obtained from the Turning Movement Count (TMC) – Study Results report for the year 2023 provided by the Transportation Services, City of Ottawa (See Appendix D). Mismatches in labeling were identified in the TMC report provided by the City of Ottawa. Specifically, the north-south road intended to be Longfields Drive is incorrectly labeled as Jockvale Road throughout the report. Likewise, the east-west road, which should be Jockvale Road, is misrepresented as Longfields Drive. These errors have been corrected for and accounted for in the road traffic data. The traffic percentage split for the day and nighttime was assumed to be 92%/8% for both Jockvale Road and Longfields Drive and the total truck traffic percentage and the heavy to medium truck ratio is as shown in Table 4.

The TMC report from the City of Ottawa provided only the total count of cars and heavy vehicles. For assessment purposes, heavy vehicles were assumed to be heavy trucks. The percentage of heavy trucks was calculated based on their proportion of the total vehicle count, and this same percentage was applied to medium trucks. To estimate the overall percentage of trucks (both medium and heavy), a combined total was derived, with a conservative assumption that 50% of the trucks are heavy trucks.

As per the requirements of NPC-300, all the sound level predictions and recommendations provided should account for future increase in traffic (10 years for this project, *i.e.*, until 2034). The AADT for year 2034 was forecasted based on the available traffic data assuming a conservative annual increase of 2.5% in order to predict the future sound levels likely to be experienced at the sensitive points of reception. Table 4 presents the available and the forecasted road traffic data.

Table 4: Road traffic data

Description of road	AADT		Percentage (%) of Trucks	Heavy: Medium Truck Ratio	Day/Night Traffic Ratio*
	From official data (2023)	Forecasted for 2034			
Jockvale Road	3,627	4,703	8	50 : 50	92/8
Longfields Drive (North bound)	10,737	13,954	4	50 : 50	
Longfields Drive (South bound)	18,488	24,037	4		

4.2 Noise Sensitive Receptors

The sound levels at the proposed residential buildings due to transportation noise sources are assessed at the building facades and the OLAs (outdoor play area, patio, etc.) for both building plans.

Based on a review of development drawings, three noise sensitive receptor point were identified for Building Plan – V, of which two points (OLA-2a and OLA-2b) correspond to the central common yard area and one point (OLA-1) near the east yard area adjacent to the north-south bound Longfields Drive. Similarly, two noise sensitive receptor points (OLA-3a and OLA-3b) were identified for Building Plan – Z, which correspond to the central common yard area.

Figure 2 denotes the PORs selected for Building Plan – V and Figure 3 denotes the PORs selected for Building Plan – Z.

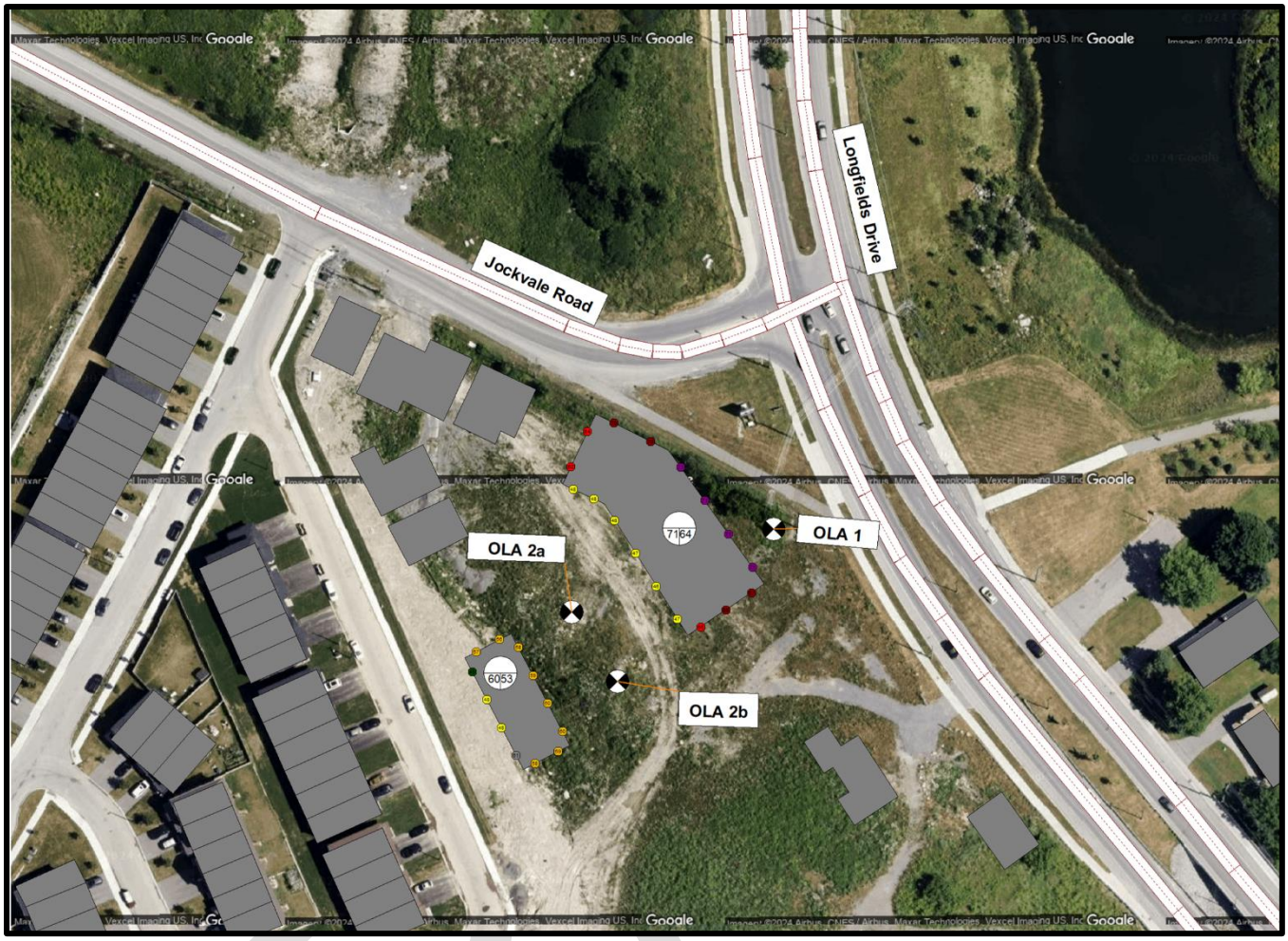


Figure 2: Location of the noise sensitive PORs for Building Plan – V

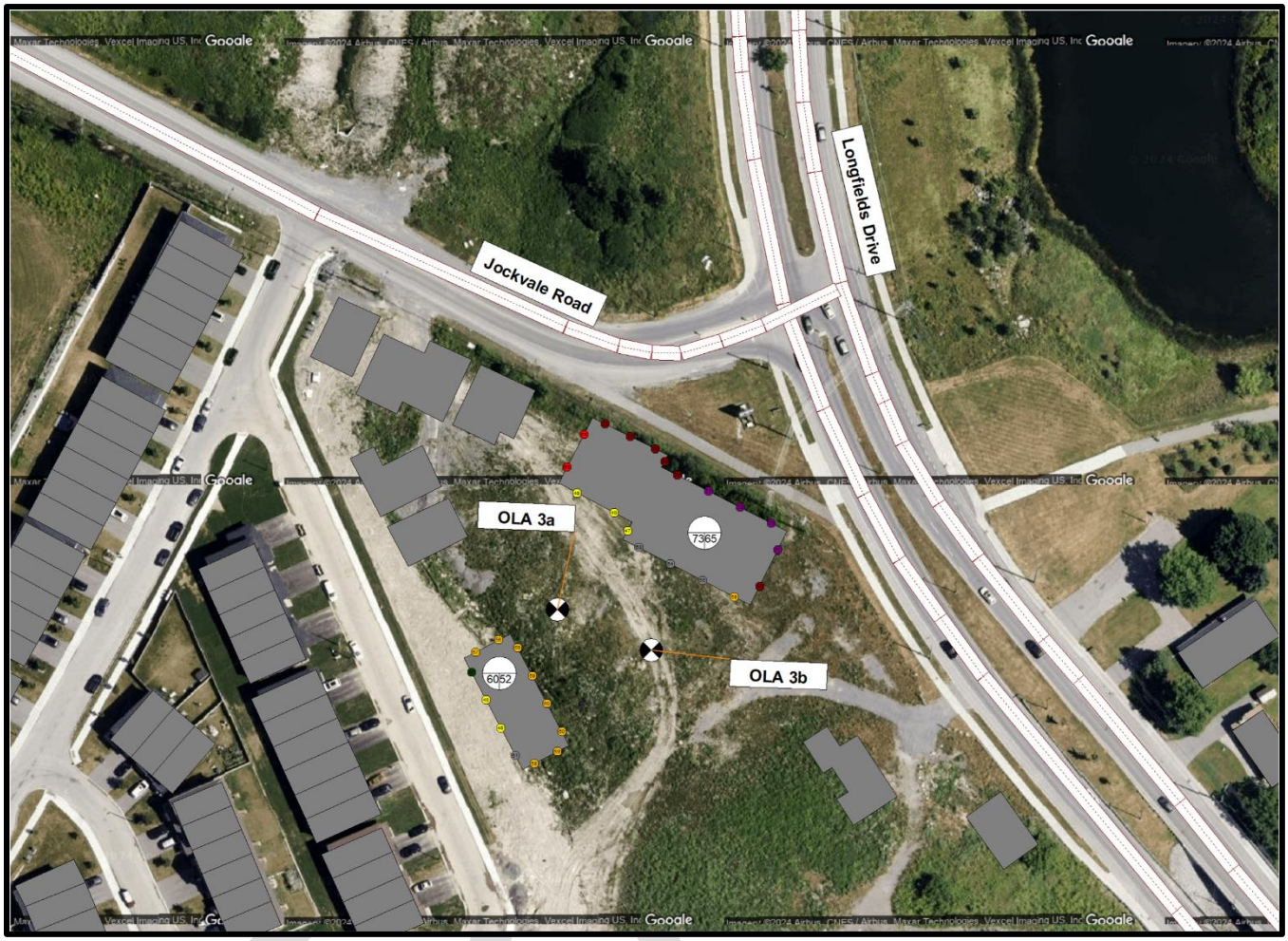


Figure 3: Location of the noise sensitive PORs for Building Plan – Z

5 Acoustic Model

For this assessment, CadnaA 2024 (developed by DataKustik GmbH) was used to calculate the sound levels at the identified receptor locations due to transportation noise sources. TNM 2.5 (Traffic Noise Model) by the U.S. FHWA (United States Federal Highway Administration) module within CadnaA was used for traffic noise modelling.

The acoustical model parameters were set to consider two (2) orders of reflection from prominent surfaces such as buildings, barriers, etc. except any building(s) associated with the receptor location(s) and a ground factor of 0.2 was assumed. All the applicable data for the transportation noise sources (road) were entered into the acoustic model to predict the sound levels at the OLA.

All the applicable data for the transportation noise sources (vehicle count/hour, percentage (%) of trucks, heavy and medium truck ratio, etc.) were entered into the CadnaA acoustic model to predict the sound levels at the identified receptor points.

6 Noise Level Predictions

6.1 Transportation Sources - Outdoor Noise Evaluation

Table 5 and Table 6 present the details for the daytime period (07:00 – 23:00) noise compliance assessment for the identified PORs (OLAs and POWs) for the year 2034. Table 7 and Table 8 present the details for the Nighttime period (23:00 – 07:00) noise compliance assessment for the identified PORs (POWs only) for the year 2034. The predicted individual sound levels due to the road are evaluated for all building facades to assess the need for the design of the enhanced building components (*i.e.*, window glazing, walls, doors, etc.). Subsequently, the POW values presented in Table 5, Table 6, Table 7 and Table 8 represent the maximum noise levels estimated for each respective façade.

Table 5: Daytime (07:00-23:00) - OLA and POW noise compliance assessment for Building Plan - V

Receptor location (POR)	Sound level limit	Compliance assessment		
	Road	Predicted sound levels, Leq, T (dBA)	Need for physical noise control/ventilation requirements	Comments
OLA - 1	55	**73**	**YES**	**See Note 1**
OLA – 2a	55	**54**	**NO**	**-**
OLA - 2b	55	**60**	**YES**	**See Note 2**
POW - 1 (North Façade of 9 Storey building)	55	**64**	**YES**	**See Note 3**
POW - 2 (East Façade of 9 Storey building)	55	**71**	**YES**	**See Note 4**
POW - 3 (West Façade of 9 Storey building)	55	**48**	**NO**	**-**
POW - 4 (South Façade of 9 Storey building)	55	**67**	**YES**	**See Note 4**
POW - 5 (North Façade of Townhome building)	55	**57**	**YES**	**See Note 3**
POW - 6 (East Façade of Townhome building)	55	**60**	**YES**	**See Note 3**
POW - 7 (West Façade of Townhome building)	55	**51**	**NO**	**-**
POW - 8 (South Façade of Townhome building)	55	**59**	**YES**	**See Note 3**

Table 6: Daytime (07:00-23:00) - OLA and POW noise compliance assessment for Building Plan - Z

Receptor location (POR)	Sound level limit	Compliance assessment		
	Road	Predicted sound levels, Leq, T (dBA)	Need for physical noise control/ventilation requirements	Comments
OLA – 3a	55	**59**	**YES**	**See Note 2**
OLA - 3b	55	**62**	**YES**	**See Note 1**
POW - 9 (North Façade of 9 Storey building)	55	**64**	**YES**	**See Note 3**
POW - 10 (East Façade of 9 Storey building)	55	**73**	**YES**	**See Note 4**
POW - 11 (West Façade of 9 Storey building)	55	**59**	**YES**	**See Note 3**
POW - 12 (South Façade of 9 Storey building)	55	**71**	**YES**	**See Note 4**
POW - 13 (North Façade of Townhome building)	55	**57**	**YES**	**See Note 3**
POW - 14 (East Façade of Townhome building)	55	**60**	**YES**	**See Note 3**
POW - 15 (West Façade of Townhome building)	55	**51**	**NO**	**-**
POW - 16 (South Façade of Townhome building)	55	**59**	**YES**	**See Note 3**

Table 7: Nighttime (23:00-07:00) - POW noise compliance assessment for Building Plan - V

Receptor location (POR)	Sound level limit	Compliance assessment		
	Road	Predicted sound levels, Leq, T (dBA)	Need for physical noise control/ventilation requirements	Comments
POW - 1 (North Façade of 9 Storey building)	50	**57**	**YES**	**See Note 3**
POW - 2 (East Façade of 9 Storey building)	50	**64**	**YES**	**See Note 4**
POW - 3 (West Façade of 9 Storey building)	50	**41**	**NO**	**-**
POW - 4 (South Façade of 9 Storey building)	50	**60**	**YES**	**See Note 3**
POW - 5 (North Façade of Townhome building)	50	**49**	**NO**	**-**
POW - 6 (East Façade of Townhome building)	50	**53**	**YES**	**See Note 3**
POW - 7 (West Façade of Townhome building)	50	**44**	**NO**	**-**
POW - 8 (South Façade of Townhome building)	50	**51**	**YES**	**See Note 3**

Table 8: Nighttime (23:00-07:00) - POW noise compliance assessment for Building Plan - Z

Receptor location (POR)	Sound level limit	Compliance assessment		
	Road	Predicted sound levels, Leq, T (dBA)	Need for physical noise control/ventilation requirements	Comments
POW - 9 (North Façade of 9 Storey building)	50	**57**	**YES**	**See Note 3**
POW - 10 (East Façade of 9 Storey building)	50	**65**	**YES**	**See Note 4**
POW - 11 (West Façade of 9 Storey building)	50	**51**	**YES**	**See Note 3**
POW - 12 (South Façade of 9 Storey building)	50	**63**	**YES**	**See Note 4**
POW - 13 (North Façade of Townhome building)	50	**49**	**NO**	**-**
POW - 14 (East Façade of Townhome building)	50	**52**	**YES**	**See Note 3**
POW - 15 (West Façade of Townhome building)	50	**44**	**NO**	**-**
POW - 16 (South Façade of Townhome building)	50	**51**	**YES**	**See Note 3**

Notes:

1. The predicted combined sound level at the respective OLA exceeds 60 dBA. Hence, physical noise control measures such as a berm, barrier, etc. may be applied to reduce the sound level to 55 dBA. If the measures are not provided, then the inclusion of warning clause Type B (see Appendix A) in the offers of purchase/sale/lease/rental agreements is required.
2. The predicted combined sound level at the respective OLA exceeds 55 dBA and less than 60 dBA. Hence, physical noise control measures such as a berm, barrier, etc. may be applied to reduce the sound level to 55 dBA. If the measures are not provided, then the inclusion of warning clause Type A (see Appendix A) in the offers of purchase/sale/lease/rental agreements is required.
3. The maximum predicted sound levels at the façade of the 9-storey building exceeds 55 dBA but not 65 dBA (road) during daytime and exceeds 50 dBA but not 60 dBA (road) during nighttime. Hence, the building components including windows, walls and doors, air conditioning where applicable, should be designed so that the indoor sound levels comply with the sound level limits specified in Table 3, with the inclusion of warning clause Type C (see Appendix A) in the offers of purchase/sale/lease/rental agreements is required.
4. The maximum predicted sound levels at the façade of the 9-storey building exceeds 65 dBA (road) during daytime and exceeds 60 dBA (road) during nighttime. Hence, the building components including windows, walls and doors, air conditioning where applicable, should be designed so that the indoor sound levels comply with the sound level limits specified in Table 3, with the inclusion

of warning clause Type D (see Appendix A) in the offers of purchase/sale/lease/rental agreements is required.

6.2 General Remarks

It is to be noted that if the suggested barriers (as shown in Figure 4 and Figure 5) have been added to a future building plans, a revaluation of the noise levels need to be performed (for all OLAs and all POWs) by a qualified acoustical consultant. Additionally, they must also review any proposed façade components when the design progresses in order to verify that they comply with the NPC-300 guidelines.

Figure 4: Barrier design example for Building Plan – V

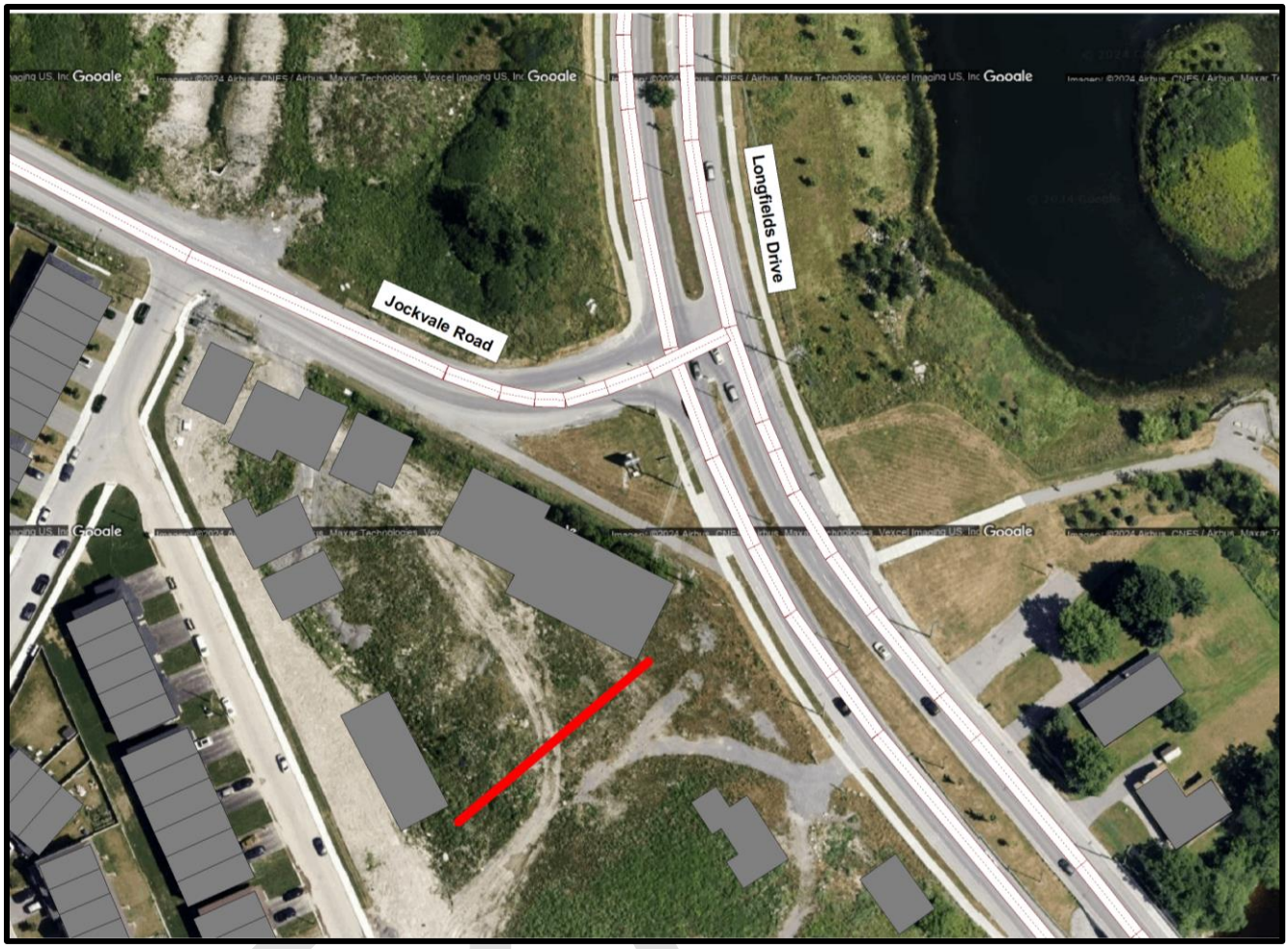


Figure 5: Barrier design example for Building Plan – Z

7 Conclusion

Lemay Michaud (the *Client*) retained Soft dB to prepare a noise feasibility study report to assess the proposed Ottawa Community Housing (OCH) project plans. This proposed development is currently in the pre-design stage and is currently envisioned as a new 9-storey, 96-unit residential apartment building and 16 3-storey stacked townhouses, fronting Branch Street and Jockvale Road/Longfields Drive, Ottawa (see Figure 1). The noise feasibility study was carried out in accordance with the MECP noise control guidelines, NPC-300.

The primary objective of this current report was to evaluate the potential noise impact from future road traffic (up to the year 2034) at the proposed development site. Given that the planned buildings will be residential dwellings and the project is currently in the pre-design stage, noise-sensitive points of reception (PORs) have been identified, focusing on both plane of window (POWs) location and the outdoor living areas (OLAs) adjacent to the proposed building locations.

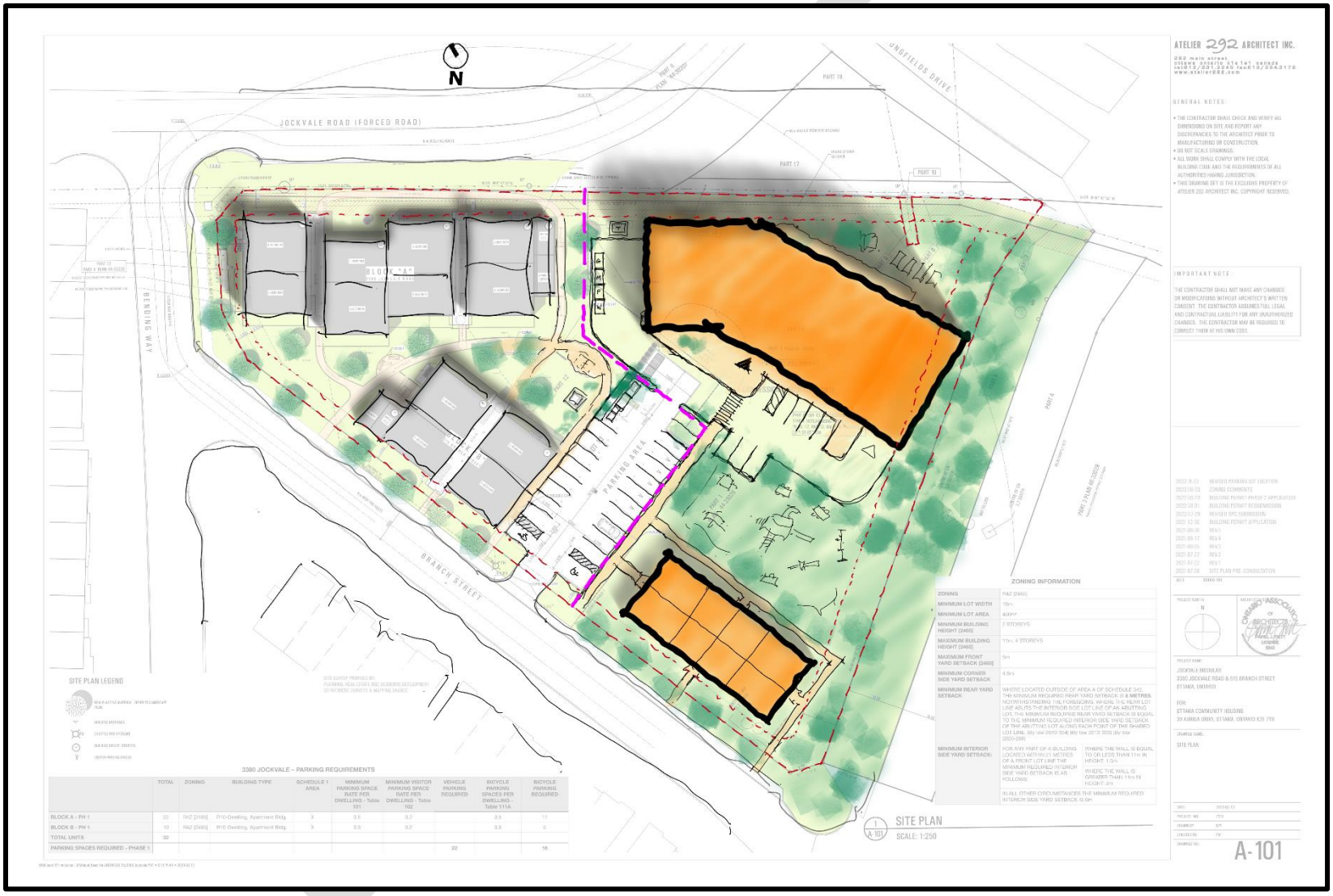
Section 6 presents the noise level predictions at the PORs due to future road traffic. Based on the analysis and review of the available site plan information, it can be concluded that the proposed Community Housing building is acoustically feasible for construction only if future design plans incorporate

appropriate noise control measures. This includes choosing appropriate building façade specifications (e.g., doors, windows) and installing suitable air conditioning for noise control measures near POWs. Additionally, the proposed outdoor living area must always be shielded from traffic noise by using barriers to block direct lines of sight to the adjacent roads, thereby reducing noise exposure.

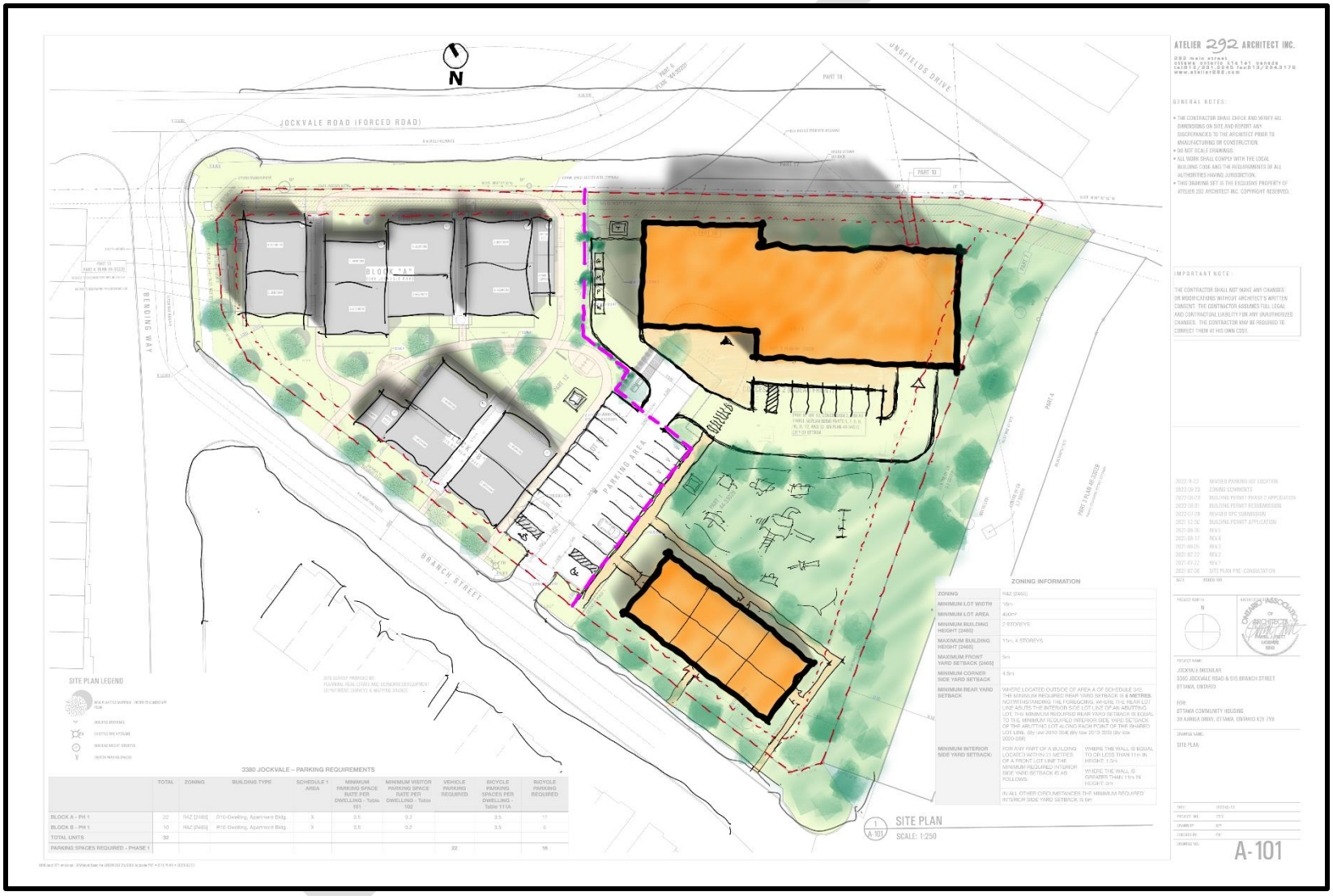
As the design progresses and changes are made to the site layout as well as specification for building construction, an additional assessment should be conducted by a qualified acoustical consultant.

Appendix A Site Plan – V and Site Plan – Z

Site Plan V


JOCKVALE ROAD (FORCED ROAD)
BENDING WAY
BRANCH STREET
JUNGFIELDS DRIVE
PARKING AREA
SITE PLAN LEGEND
3380 JOCKVALE – PARKING REQUIREMENTS
ZONING INFORMATION
SITE PLAN
SCALE: 1:250
ATELIER 292 ARCHITECT INC.
GENERAL NOTES:
IMPORTANT NOTE:
A-101

Site Plan Z


N
JOCKVALE ROAD (FORCED ROAD)
JUNGFIELDS DRIVE
BENDING WAY
BRANCH STREET
PARKING AREA
BLOCK A
SITE PLAN LEGEND
3380 JOCKVALE – PARKING REQUIREMENTS
ZONING INFORMATION
SITE PLAN
SCALE: 1:250
ATELIER 292 ARCHITECT INC.
GENERAL NOTES:
IMPORTANT NOTE:
A-101

Appendix B NPC-300 Warning Clauses

Type A

Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

Type B

Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions interfere with some activities of the occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

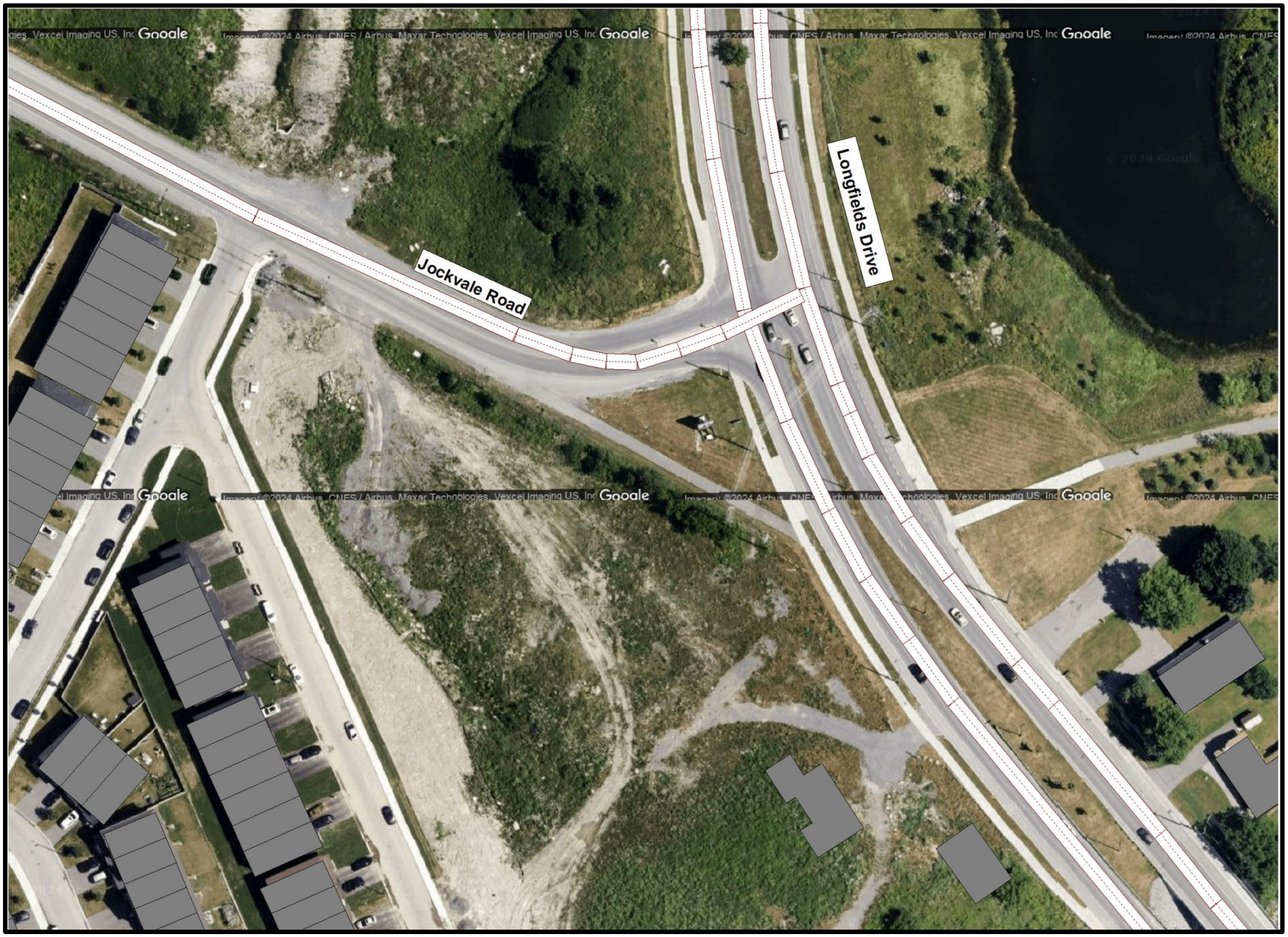
Type C

This facility has been designed with the provision for adding central air-conditioning at the occupant's discretion. Installation of central air-conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.

Type D

This facility has been supplied with a central air-conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.

Appendix C Transportation Noise Sources


Jockvale Road
Longfields Drive

Appendix D Road Traffic Data

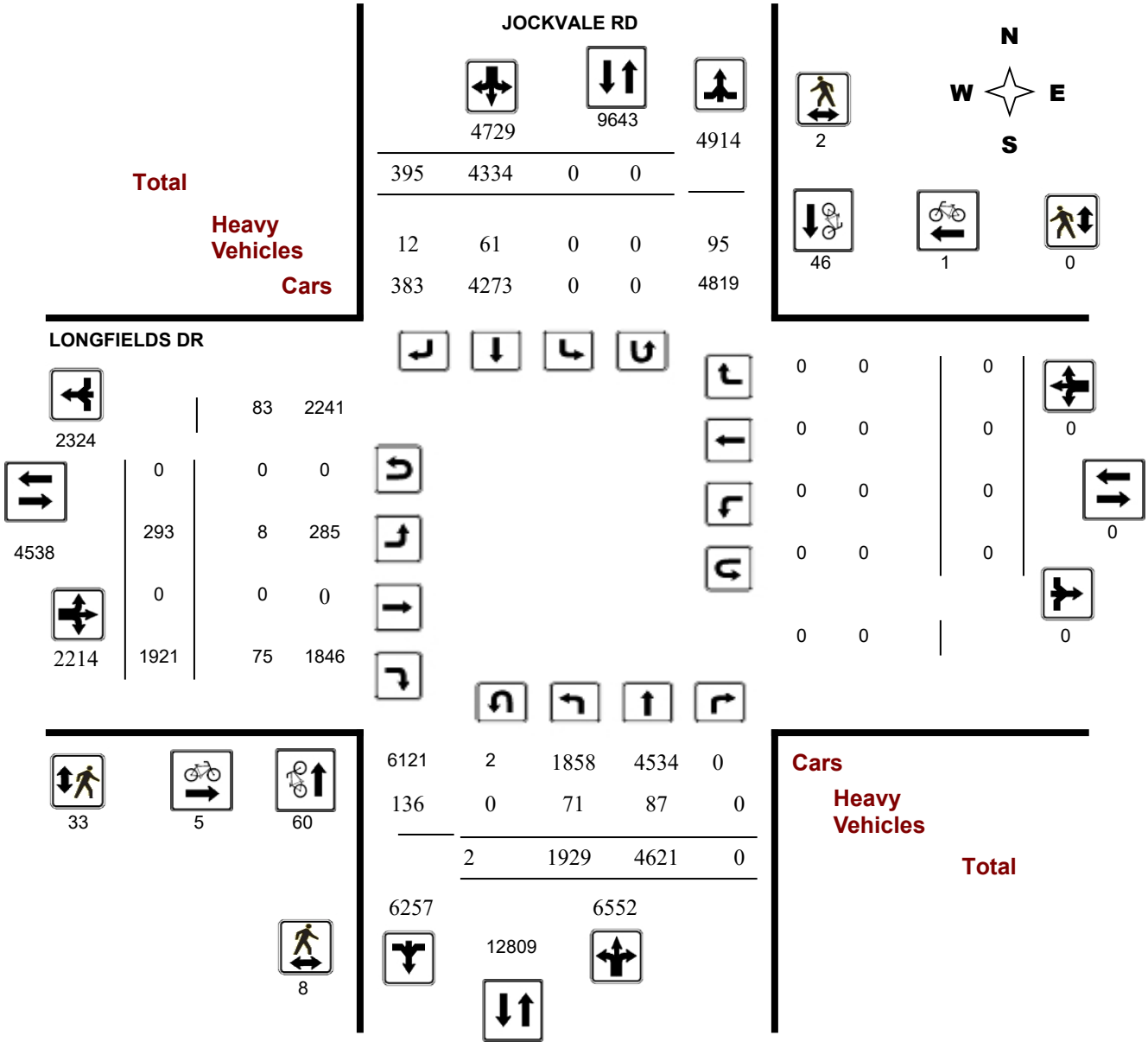
Transportation Services - Traffic Services

Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023
Start Time: 07:00
WO No: 40996
Device: Miovision

Full Study Diagram



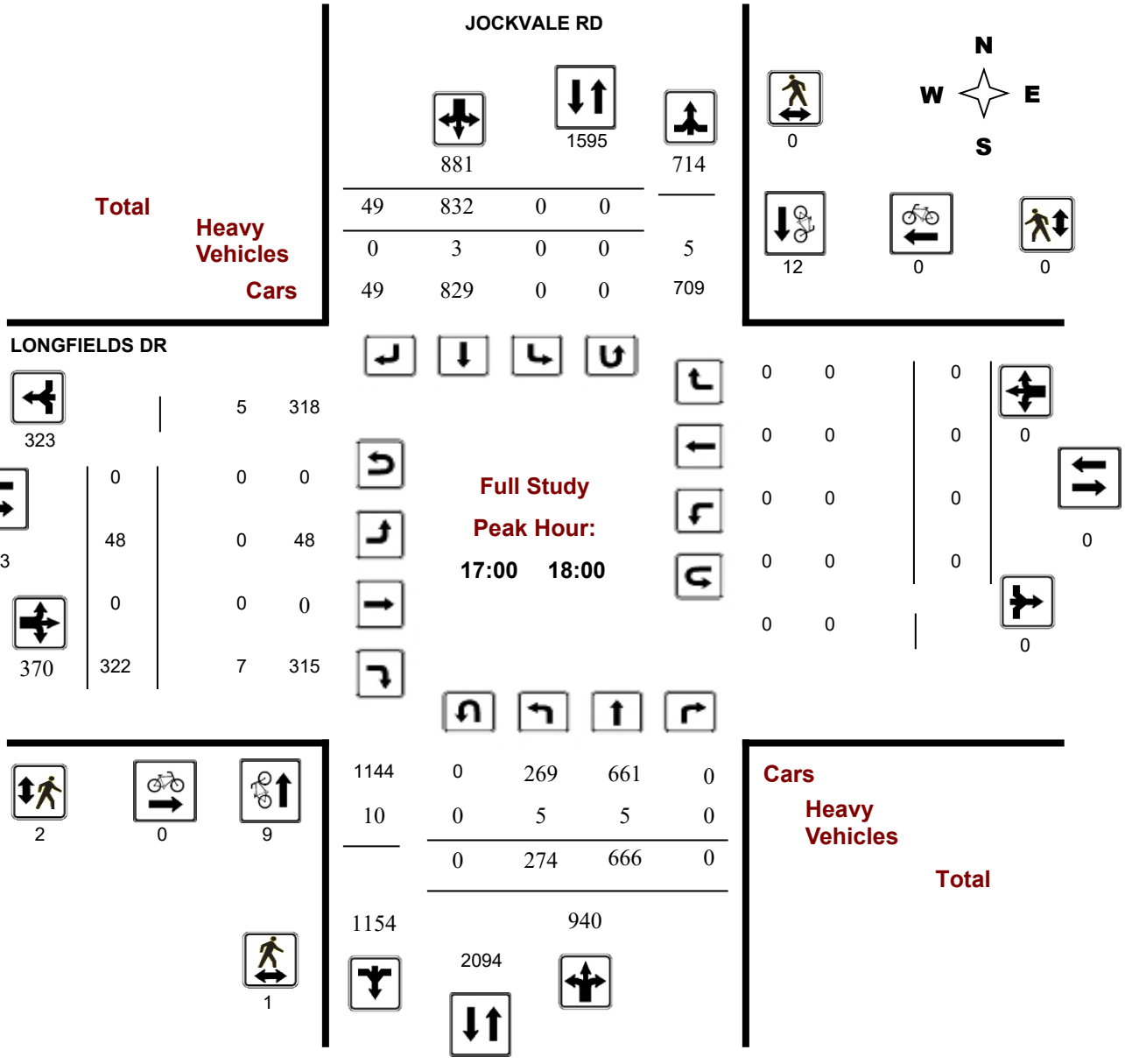
Transportation Services - Traffic Services

Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023
Start Time: 07:00
WO No: 40996
Device: Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

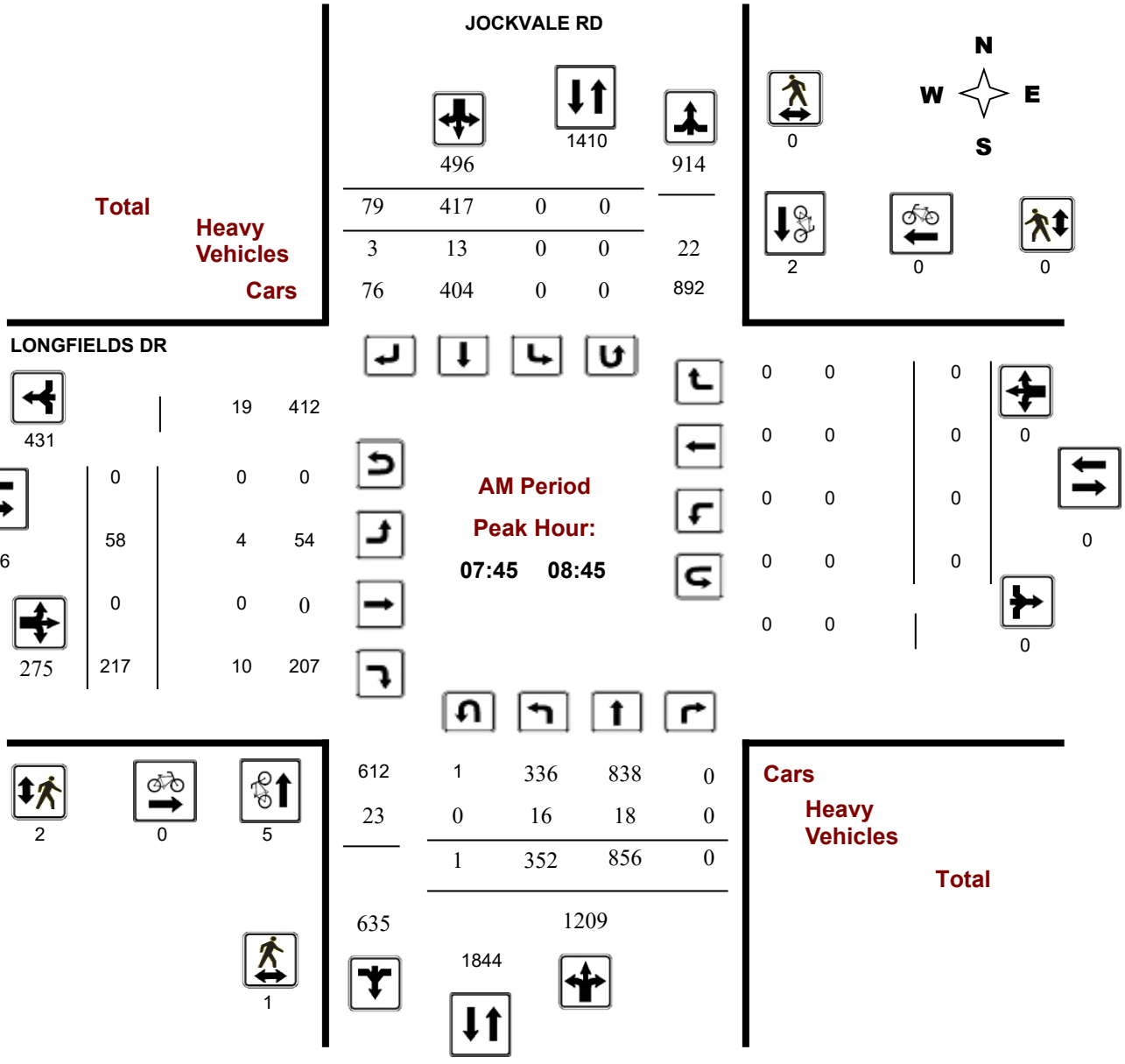
Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023 **WO No:** 40996

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

AM Period Peak Hour Diagram



Transportation Services - Traffic Services

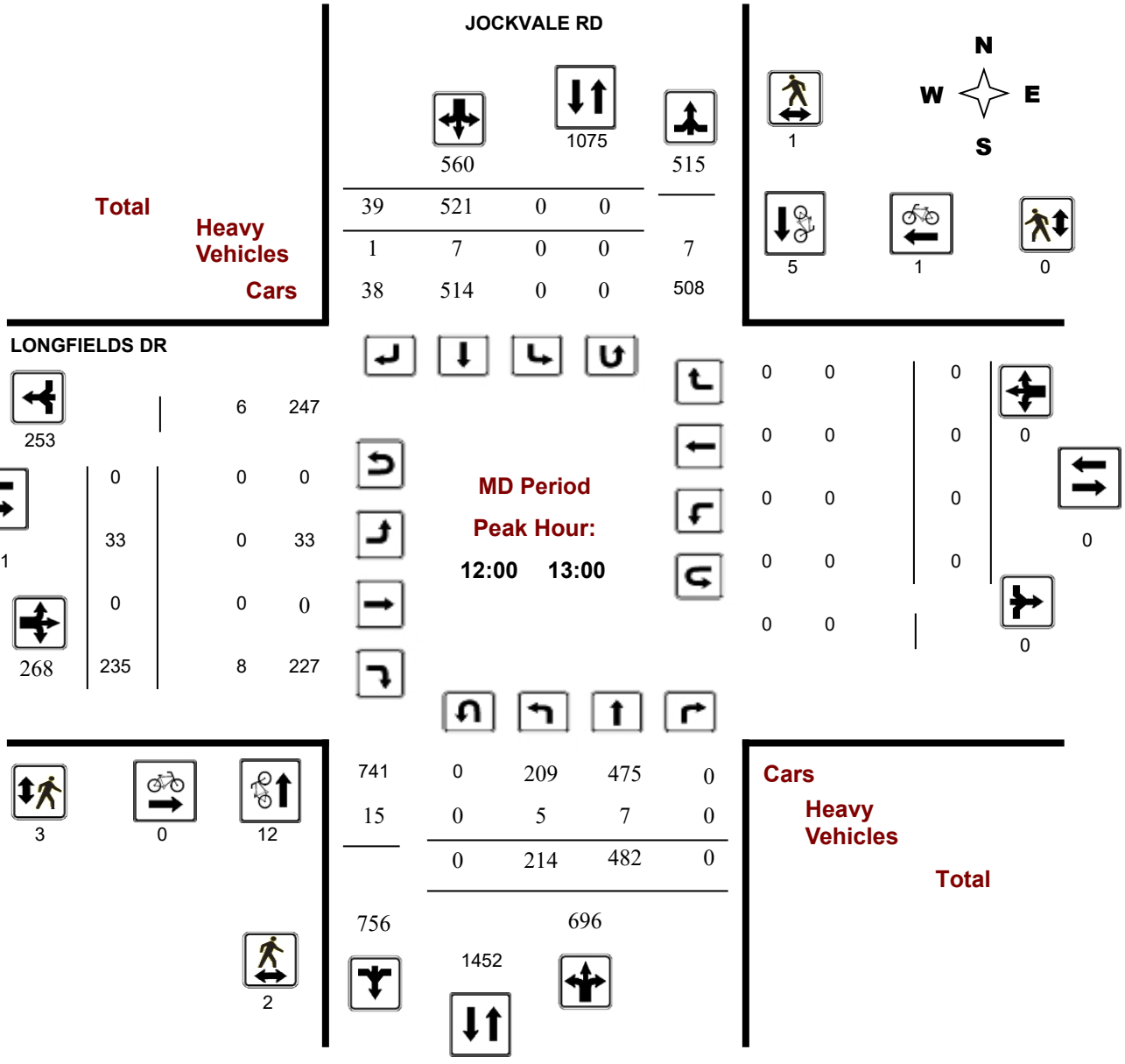
Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023 **WO No:** 40996

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

MD Period Peak Hour Diagram



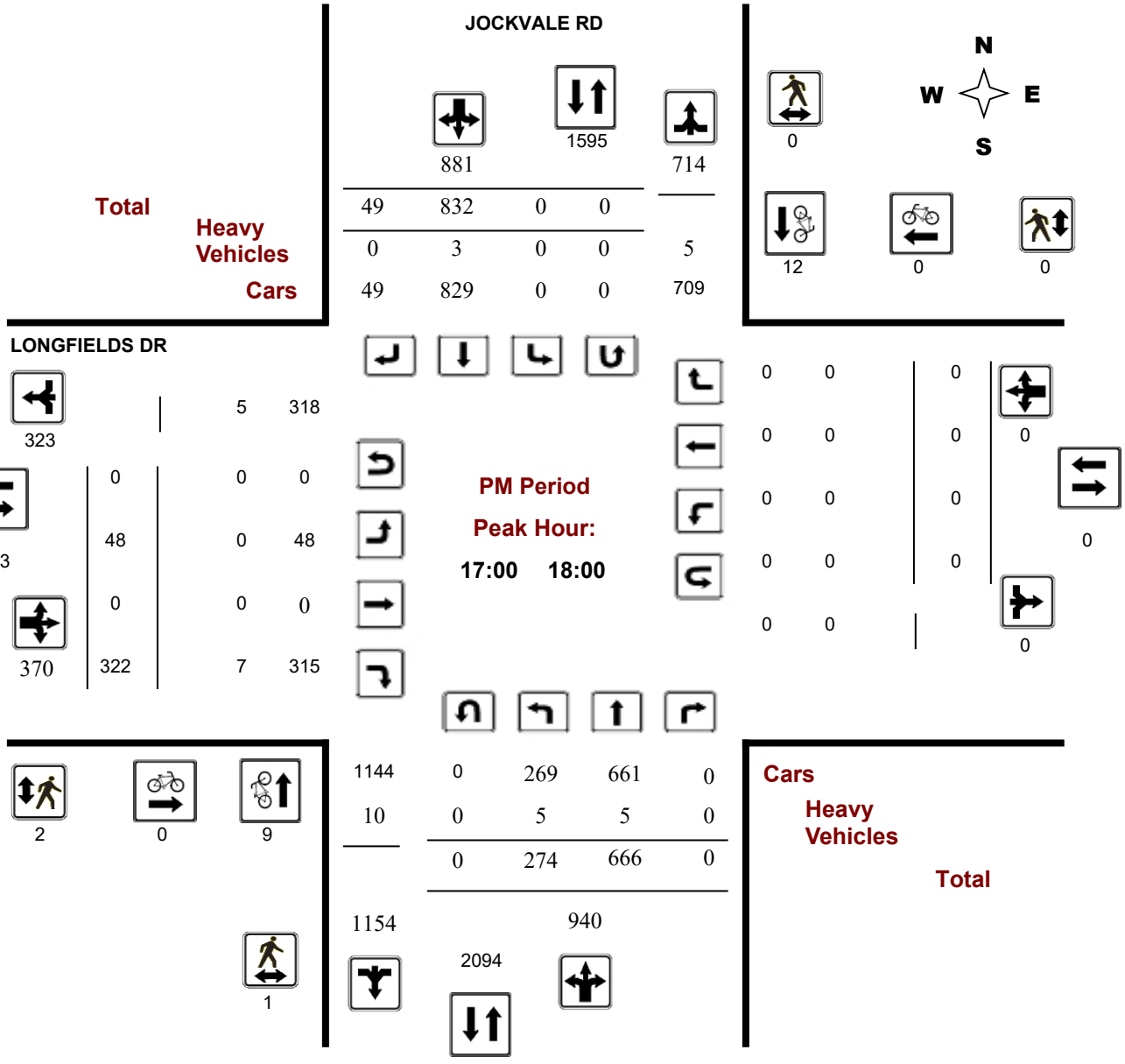
Transportation Services - Traffic Services

Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023
Start Time: 07:00
WO No: 40996
Device: Miovision

PM Period Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023 **WO No:** 40996

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, June 21, 2023

Total Observed U-Turns

Northbound: 2 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor

.90

	JOCKVALE RD								LONGFIELDS DR									
	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	312	602	0	**914**	0	267	98	**365**	**1279**	39	0	208	**247**	0	0	0	**0**	**247**	**1526**
08:00 09:00	288	795	0	**1083**	0	458	48	**506**	**1589**	47	0	191	**238**	0	0	0	**0**	**238**	**1827**
09:00 10:00	220	513	0	**733**	0	366	36	**402**	**1135**	22	0	177	**199**	0	0	0	**0**	**199**	**1334**
11:30 12:30	215	495	0	**710**	0	426	42	**468**	**1178**	43	0	222	**265**	0	0	0	**0**	**265**	**1443**
12:30 13:30	206	429	0	**635**	0	572	32	**604**	**1239**	30	0	233	**263**	0	0	0	**0**	**263**	**1502**
15:00 16:00	194	523	0	**717**	0	659	38	**697**	**1414**	28	0	267	**295**	0	0	0	**0**	**295**	**1709**
16:00 17:00	220	598	0	**818**	0	754	52	**806**	**1624**	36	0	301	**337**	0	0	0	**0**	**337**	**1961**
17:00 18:00	274	666	0	**940**	0	832	49	**881**	**1821**	48	0	322	**370**	0	0	0	**0**	**370**	**2191**
Sub Total	1929	4621	0	**6550**	0	4334	395	**4729**	**11279**	293	0	1921	**2214**	0	0	0	**0**	**2214**	**13493**
U Turns				**2**				**0**	**2**				**0**				**0**	**0**	**2**
Total	1929	4621	0	**6552**	0	4334	395	**4729**	**11281**	293	0	1921	**2214**	0	0	0	**0**	**2214**	**13495**
EQ 12Hr	2681	6423	0	**9107**	0	6024	549	**6573**	**15681**	407	0	2670	**3077**	0	0	0	**0**	**3077**	**18758**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	2413	5781	0	**8196**	0	7103	647	**5916**	**14113**	366	0	2403	**2769**	0	0	0	**0**	**2769**	**16882**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**.90**					
AVG 24Hr	3161	7573	0	**10737**	0	9305	848	**7750**	**18488**	479	0	3148	**3627**	0	0	0	**0**	**3627**	**22115**
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

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023 **WO No:** 40996

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

Full Study 15 Minute Increments

		JOCKVALE RD									LONGFIELDS DR									
		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
17:00	17:15	61	145	0	206	0	228	11	239	445	12	0	79	91	0	0	0	0	91	536
17:15	17:30	66	161	0	227	0	212	16	228	455	12	0	83	95	0	0	0	0	95	550
17:30	17:45	81	151	0	232	0	189	12	201	433	11	0	88	99	0	0	0	0	99	532
16:45	17:00	71	175	0	246	0	181	9	190	436	7	0	78	85	0	0	0	0	85	521
07:00	07:15	36	79	0	116	0	47	4	51	167	0	0	24	24	0	0	0	0	24	191
07:15	07:30	50	123	0	173	0	77	11	88	261	8	0	36	44	0	0	0	0	44	305
07:45	08:00	129	236	0	365	0	86	44	130	495	19	0	82	101	0	0	0	0	101	596
08:00	08:15	61	221	0	282	0	102	10	112	394	16	0	62	78	0	0	0	0	78	472
08:15	08:30	78	207	0	285	0	114	16	130	415	14	0	43	57	0	0	0	0	57	472
08:30	08:45	84	192	0	277	0	115	9	124	401	9	0	30	39	0	0	0	0	39	440
08:45	09:00	65	175	0	240	0	127	13	140	380	8	0	56	64	0	0	0	0	64	444
11:30	11:45	57	105	0	162	0	103	13	116	278	12	0	55	67	0	0	0	0	67	345
12:00	12:15	55	139	0	194	0	109	9	118	312	13	0	59	72	0	0	0	0	72	384
12:45	13:00	50	119	0	169	0	153	11	164	333	11	0	59	70	0	0	0	0	70	403
13:00	13:15	53	96	0	149	0	150	10	160	309	6	0	51	57	0	0	0	0	57	366
13:15	13:30	44	114	0	158	0	124	2	126	284	10	0	55	65	0	0	0	0	65	349
15:00	15:15	54	130	0	184	0	161	7	168	352	7	0	44	51	0	0	0	0	51	403
15:15	15:30	45	138	0	183	0	172	11	183	366	5	0	79	84	0	0	0	0	84	450
15:30	15:45	38	117	0	155	0	153	10	163	318	9	0	86	95	0	0	0	0	95	413
16:00	16:15	44	155	0	199	0	182	14	196	395	10	0	80	90	0	0	0	0	90	485
16:15	16:30	59	126	0	185	0	196	20	216	401	10	0	73	83	0	0	0	0	83	484
16:30	16:45	46	142	0	188	0	195	9	204	392	9	0	70	79	0	0	0	0	79	471
15:45	16:00	57	138	0	195	0	173	10	183	378	7	0	58	65	0	0	0	0	65	443
17:45	18:00	66	209	0	275	0	203	10	213	488	13	0	72	85	0	0	0	0	85	573
11:45	12:00	53	127	0	180	0	100	10	110	290	12	0	59	71	0	0	0	0	71	361
07:30	07:45	97	164	0	261	0	57	39	96	357	12	0	66	78	0	0	0	0	78	435
09:45	10:00	42	98	0	140	0	91	9	100	240	6	0	38	44	0	0	0	0	44	284
09:00	09:15	66	169	0	235	0	100	10	110	345	5	0	55	60	0	0	0	0	60	405
09:15	09:30	47	132	0	179	0	105	7	112	291	5	0	38	43	0	0	0	0	43	334
09:30	09:45	65	114	0	179	0	70	10	80	259	6	0	46	52	0	0	0	0	52	311
12:15	12:30	50	124	0	174	0	114	10	124	298	6	0	49	55	0	0	0	0	55	353
12:30	12:45	59	100	0	159	0	145	9	154	313	3	0	68	71	0	0	0	0	71	384
Total:		1929	4621	0	6552	0	4334	395	4729	11281	293	0	1921	2214	0	0	0	0	2214	13,495

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023 **WO No:** 40996

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

Full Study Cyclist Volume

Time Period		JOCKVALE RD			LONGFIELDS DR			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
17:00	17:15	2	5	7	0	0	0	7
17:15	17:30	4	3	7	0	0	0	7
17:30	17:45	0	2	2	0	0	0	2
16:45	17:00	3	2	5	1	0	1	6
07:00	07:15	1	3	4	0	0	0	4
07:15	07:30	3	0	3	0	0	0	3
07:45	08:00	1	1	2	0	0	0	2
08:00	08:15	2	0	2	0	0	0	2
08:15	08:30	2	0	2	0	0	0	2
08:30	08:45	0	1	1	0	0	0	1
08:45	09:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
12:00	12:15	6	2	8	0	1	1	9
12:45	13:00	1	0	1	0	0	0	1
13:00	13:15	1	1	2	0	0	0	2
13:15	13:30	3	1	4	1	0	1	5
15:00	15:15	1	3	4	0	0	0	4
15:15	15:30	4	2	6	0	0	0	6
15:30	15:45	3	3	6	0	0	0	6
16:00	16:15	2	3	5	1	0	1	6
16:15	16:30	1	0	1	0	0	0	1
16:30	16:45	2	4	6	1	0	1	7
15:45	16:00	2	2	4	1	0	1	5
17:45	18:00	3	2	5	0	0	0	5
11:45	12:00	2	0	2	0	0	0	2
07:30	07:45	2	2	4	0	0	0	4
09:45	10:00	1	0	1	0	0	0	1
09:00	09:15	2	1	3	0	0	0	3
09:15	09:30	1	0	1	0	0	0	1
09:30	09:45	0	0	0	0	0	0	0
12:15	12:30	4	0	4	0	0	0	4
12:30	12:45	1	3	4	0	0	0	4
Total		60	46	**106**	5	1	6	112

Transportation Services - Traffic Services

Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023 **WO No:** 40996

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

Full Study Pedestrian Volume

	JOCKVALE RD			LONGFIELDS DR			
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**
17:00 17:15	0	0	**0**	1	0	**1**	**1**
17:15 17:30	0	0	**0**	0	0	**0**	**0**
17:30 17:45	1	0	**1**	1	0	**1**	**2**
16:45 17:00	0	0	**0**	1	0	**1**	**1**
07:00 07:15	0	1	**1**	3	0	**3**	**4**
07:15 07:30	0	0	**0**	1	0	**1**	**1**
07:45 08:00	1	0	**1**	0	0	**0**	**1**
08:00 08:15	0	0	**0**	2	0	**2**	**2**
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**
11:30 11:45	0	0	**0**	0	0	**0**	**0**
12:00 12:15	0	0	**0**	0	0	**0**	**0**
12:45 13:00	1	0	**1**	0	0	**0**	**1**
13:00 13:15	0	0	**0**	3	0	**3**	**3**
13:15 13:30	0	0	**0**	6	0	**6**	**6**
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**	2	0	**2**	**2**
16:00 16:15	2	0	**2**	0	0	**0**	**2**
16:15 16:30	0	0	**0**	1	0	**1**	**1**
16:30 16:45	1	0	**1**	1	0	**1**	**2**
15:45 16:00	0	0	**0**	2	0	**2**	**2**
17:45 18:00	0	0	**0**	0	0	**0**	**0**
11:45 12:00	0	0	**0**	1	0	**1**	**1**
07:30 07:45	0	0	**0**	3	0	**3**	**3**
09:45 10:00	1	0	**1**	0	0	**0**	**1**
09:00 09:15	0	0	**0**	0	0	**0**	**0**
09:15 09:30	0	0	**0**	1	0	**1**	**1**
09:30 09:45	0	0	**0**	1	0	**1**	**1**
12:15 12:30	1	0	**1**	0	0	**0**	**1**
12:30 12:45	0	1	**1**	3	0	**3**	**4**
Total	8	2	**10**	33	0	**33**	**43**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023 **WO No:** 40996

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

Full Study Heavy Vehicles

		JOCKVALE RD									LONGFIELDS DR									
		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
17:00	17:15	1	2	0	**3**	0	1	0	**1**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**4**
17:15	17:30	1	1	0	**2**	0	0	0	**0**	**2**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
17:30	17:45	1	1	0	**2**	0	0	0	**0**	**2**	0	0	6	**6**	0	0	0	**0**	**6**	**8**
16:45	17:00	1	2	0	**3**	0	1	0	**1**	**4**	0	0	2	**2**	0	0	0	**0**	**2**	**6**
07:00	07:15	2	0	0	**2**	0	1	0	**1**	**3**	0	0	2	**2**	0	0	0	**0**	**2**	**5**
07:15	07:30	3	2	0	**5**	0	2	1	**3**	**8**	0	0	1	**1**	0	0	0	**0**	**1**	**9**
07:45	08:00	3	6	0	**9**	0	7	3	**10**	**19**	2	0	3	**5**	0	0	0	**0**	**5**	**24**
08:00	08:15	3	3	0	**6**	0	3	0	**3**	**9**	0	0	3	**3**	0	0	0	**0**	**3**	**12**
08:15	08:30	7	0	0	**7**	0	1	0	**1**	**8**	1	0	2	**3**	0	0	0	**0**	**3**	**11**
08:30	08:45	3	9	0	**12**	0	2	0	**2**	**14**	1	0	2	**3**	0	0	0	**0**	**3**	**17**
08:45	09:00	5	4	0	**9**	0	1	0	**1**	**10**	1	0	0	**1**	0	0	0	**0**	**1**	**11**
11:30	11:45	2	2	0	**4**	0	1	1	**2**	**6**	0	0	1	**1**	0	0	0	**0**	**1**	**7**
12:00	12:15	1	0	0	**1**	0	0	0	**0**	**1**	0	0	1	**1**	0	0	0	**0**	**1**	**2**
12:45	13:00	1	2	0	**3**	0	3	1	**4**	**7**	0	0	3	**3**	0	0	0	**0**	**3**	**10**
13:00	13:15	1	3	0	**4**	0	2	0	**2**	**6**	0	0	4	**4**	0	0	0	**0**	**4**	**10**
13:15	13:30	2	3	0	**5**	0	2	0	**2**	**7**	0	0	3	**3**	0	0	0	**0**	**3**	**10**
15:00	15:15	3	1	0	**4**	0	4	1	**5**	**9**	1	0	1	**2**	0	0	0	**0**	**2**	**11**
15:15	15:30	1	6	0	**7**	0	1	0	**1**	**8**	1	0	4	**5**	0	0	0	**0**	**5**	**13**
15:30	15:45	1	6	0	**7**	0	5	0	**5**	**12**	0	0	6	**6**	0	0	0	**0**	**6**	**18**
16:00	16:15	1	1	0	**2**	0	6	1	**7**	**9**	1	0	5	**6**	0	0	0	**0**	**6**	**15**
16:15	16:30	3	1	0	**4**	0	2	1	**3**	**7**	0	0	5	**5**	0	0	0	**0**	**5**	**12**
16:30	16:45	0	1	0	**1**	0	1	0	**1**	**2**	0	0	1	**1**	0	0	0	**0**	**1**	**3**
15:45	16:00	3	6	0	**9**	0	3	0	**3**	**12**	0	0	3	**3**	0	0	0	**0**	**3**	**15**
17:45	18:00	2	1	0	**3**	0	2	0	**2**	**5**	0	0	1	**1**	0	0	0	**0**	**1**	**6**
11:45	12:00	2	1	0	**3**	0	2	0	**2**	**5**	0	0	3	**3**	0	0	0	**0**	**3**	**8**
07:30	07:45	4	7	0	**11**	0	3	2	**5**	**16**	0	0	1	**1**	0	0	0	**0**	**1**	**17**
09:45	10:00	2	3	0	**5**	0	1	1	**2**	**7**	0	0	1	**1**	0	0	0	**0**	**1**	**8**
09:00	09:15	3	2	0	**5**	0	0	0	**0**	**5**	0	0	3	**3**	0	0	0	**0**	**3**	**8**
09:15	09:30	1	1	0	**2**	0	0	0	**0**	**2**	0	0	3	**3**	0	0	0	**0**	**3**	**5**
09:30	09:45	5	5	0	**10**	0	0	0	**0**	**10**	0	0	1	**1**	0	0	0	**0**	**1**	**11**
12:15	12:30	2	3	0	**5**	0	1	0	**1**	**6**	0	0	2	**2**	0	0	0	**0**	**2**	**8**
12:30	12:45	1	2	0	**3**	0	3	0	**3**	**6**	0	0	2	**2**	0	0	0	**0**	**2**	**8**
Total:	None	71	87	0	**158**	0	61	12	**73**	**231**	8	0	75	**83**	0	0	0	**0**	**83**	**314**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

JOCKVALE RD @ LONGFIELDS DR

Survey Date: Wednesday, June 21, 2023 **WO No:** 40996

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

Full Study 15 Minute U-Turn Total

		JOCKVALE RD		LONGFIELDS DR		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
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
16:45	17:00	0	0	0	0	0
07:00	07:15	1	0	0	0	1
07:15	07:30	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
11:30	11:45	0	0	0	0	0
12:00	12:15	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
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
15:45	16:00	0	0	0	0	0
17:45	18:00	0	0	0	0	0
11:45	12:00	0	0	0	0	0
07:30	07:45	0	0	0	0	0
09:45	10:00	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
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
Total		2	0	0	0	2