

Date: February 20, 2024
Memo No.: Vibration Assessment Report
Project: 6th Concession Road Residential Development
6th Concession Road, Windsor Ontario
Project #: 21-150

Baird AE has performed a ground vibration monitoring to support draft plan of subdivision process for the planned residential development located in Windsor, Ontario. This report addresses traffic vibration effects on the nearest sensitive receptors.

The subject land is approximately 0.84 hectares in size and bounded by 6th Concession Road to the West and existing residential to the North, South and East. The development proposal consists of 27 townhouse dwelling units, a landscape area, stormwater management and roadway. The location of the property is illustrated in Exhibit 1.



Exhibit 1: Development location

The City of Windsor shows concern that the heavy road traffic along 6th Concession Road may cause annoyance to the new owners and damage buildings due to vibration induced by road traffic.

Traffic vibrations are mainly caused by heavy vehicles such as buses and trucks. Based on traffic counts on 6th Concession Road, the morning traffic is approximately 391 veh/h with 2% of heavy traffic and evening traffic is approximately 644 veh/h with 0.6% heavy traffic.

There are no such national standards exist in Canada for vibration, but Ministry of Environment has publication Noise Pollution Control NPC 119 (MOE, 1982) and ISO 2631-2 (ISO, 1985) provide guidelines and regulatory requirement applied in the prediction of vibration effect. Other factor contributing to vibration amplitude includes vehicle speed, soil type and roughness of road.

The traffic vibration are assessed based on peak particle velocity (PPV) in mm/s to address effect on structure of houses. As shown in Sheet 1 – Vibration Information Plan (Appendix A), the back of proposed new units are approximately 29m and 28m from roadway. The amplitude of the vibration usually ranges between 0.05 and 25 mm/s (0.005 and 2 m/s²). And MOE cautionary levels are set to 10.0 mm/s when routine monitoring is conducted (see NPC 119) and an upper limit of 12.5 mm/s when vibration monitoring is conducted. For ground vibration, the threshold of human perception is in the order of 0.15 and 0.2 mm/s

Vibration monitoring was conducted at two sensitive locations are shown in Sheet 1. The measurements were completed on June 6 and June 7, 2023 during the peak traffic hours. The vibration analyser SSEYL Landtek VM3670 was securely placed on top of the concrete surface to measure the ground vibration generated by light and heavy vehicles. Monitoring results are provided in table 1.

Table 1: Monitoring Results

Monitoring Location	Morning (June 7)			Evening (June 6)		
	Time of Day	PPC	Distance to centerline of 6 th Conc	Time of Day	PPC	Distance to centerline of 6 th Conc
Monitoring 1	8:55am	0.05 - 29 mm/s	15.43m	4:55pm	0.06 - 29 mm/s	15.43m
Monitoring 2	8:40am	0.01 - 23 mm/s	12.85m	4:45pm	0.01 - 17 mm/s	12.85m

The results shows that the PPVs at receiver location B are within range of 0.05 and 25mm/s. Whereas, maximum vibration level is slightly higher at Receiver B. It can be noted that the Receiver B is closer to road as compared to Receiver A,

The traffic vibration can be characterized by a source-path-receive. Using the interpolation formula, the peak particle velocity measurements at receiver locations at distance will have decreased to maximum of 12 mm/s. To evaluate the effect of vibration on a building, measurements should be normally be made on building façade and midpoints of the floor.

Table 2: Vibration Results

Receiver Location	Peak Particle Velocity (PPV; mm/s)	Distance to Receptor	Sensitive Receptors
Receiver A	15.9 / 14.4	28.08m / 31.08m	Building façade/ Mid-Point of Room
Receiver B	10.2 / 9.3	28.98m / 31.82m	Building façade/ Mid-Point of Room

Based on the interpolation results, vibration from road may felt at sensitive receiver location A. The levels are not considered high enough to cause damage to buildings but are likely to complain of home owners. Following statement to be included in the agreement:

"Purchasers/tenants are advised that due to the proximity of the adjacent roadway, vibration from the roadway may be felt."

Further, based on acoustical report prepared by Baird AE dated December 2022, an acoustical fence of 1.8m high will be installed along the westerly limit of development. This acoustical fence will also help reduce vibration amplitudes.

We conclude that this vibration effect from surrounding roadway will be minimum effects and the development can be carried out safely.

If you have any questions or wish to discuss our findings, please advise us.

Yours truly,

Shurjeel Tunio, P.Eng.
Senior Project Manager
Baird AE



Appendix A



LEGEND

- RECEIVER LOCATION
- PROPOSED DEVELOPMENT
- NOISE SOURCES
- VIBRATION

102 - 27 PRINCESS STREET
LEAMINGTON, ONTARIO
N8H 2X8

201 - 330 RICHMOND STREET,
CHATHAM, ONTARIO
N7M 1P7

1000 - 267 PEUSSIER STREET,
WINDSOR, ONTARIO
N9A 4K4.

PROJECT TITLE:
6TH CONCESSION ROAD
CITY OF WINDSOR
WINDSOR, ON

SHEET TITLE:
SHEET 1 - NOISE INFORMATION PLAN

DRAWN BY: S.T.	SCALE: NTS	DATE: FEB 14 2024
CHK'D BY: ST.	SHEET No. : 1 OF 4	PROJECT No. : 21-150

Sixth Concession Rd @ Holburn St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Windsor
Site #: 000000001
Intersection: Sixth Concession Rd & Holburn St
TFR File #: 1
Count date: 26-Jul-2022

Weather conditions:
 Cloudy/Dry
Person(s) who counted:
 Matt

**** Non-Signalized Intersection ****

Major Road: Sixth Concession Rd runs N/S

North Leg Total: 250

North Entering: 84

North Peds: 4

Peds Cross: \times

Heavys	0	2	0	2
Trucks	1	2	0	3
Cars	5	67	7	79
Totals	6	71	7	



Heavys 1

Trucks 5

Cars 160

Totals 166

East Leg Total: 202

East Entering: 142

East Peds: 0

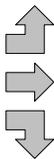
Peds Cross: \times

Heavys	0	Trucks	1	Cars	19	Totals	20
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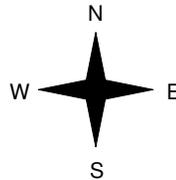


Holburn St

Heavys	0	Trucks	1	Cars	20	Totals	21
	0		0		11		11
	0		0		23		23
	0		1		54		



Sixth Concession Rd



Cars	16	Trucks	0	Heavys	1	Totals	17
	6		0		0		6
	118		1		0		119
	140		1		1		

Holburn St



Cars	60	Trucks	0	Heavys	0	Totals	60
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Peds Cross: \times

West Peds: 0

West Entering: 55

West Leg Total: 75

Cars	208	Cars	8	124	42	174
Trucks	3	Trucks	0	4	0	4
Heavys	2	Heavys	0	0	0	0
Totals	213	Totals	8	128	42	



Peds Cross: \times

South Peds: 1

South Entering: 178

South Leg Total: 391

Comments

Sixth Concession Rd @ Holburn St

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 11:45:00

To: 12:45:00

Municipality: Windsor
Site #: 000000001
Intersection: Sixth Concession Rd & Holburn St
TFR File #: 1
Count date: 26-Jul-2022

Weather conditions:
 Cloudy/Dry
Person(s) who counted:
 Matt

**** Non-Signalized Intersection ****

Major Road: Sixth Concession Rd runs N/S

North Leg Total: 347
 North Entering: 189
 North Peds: 1
 Peds Cross: \times

Heavys	0	5	0	5
Trucks	0	2	0	2
Cars	15	150	17	182
Totals	15	157	17	



Heavys	0
Trucks	4
Cars	154
Totals	158

East Leg Total: 211
 East Entering: 116
 East Peds: 2
 Peds Cross: \times

Heavys	0
Trucks	0
Cars	56
Totals	56

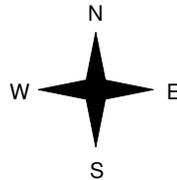


Sixth Concession Rd

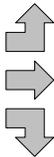
Cars	16	1	0	17
Trucks	19	0	0	19
Heavys	79	1	0	80
Totals	114	2	0	



Holburn St



Heavys	0
Trucks	1
Cars	15
Totals	16
Heavys	0
Trucks	1
Cars	9
Totals	10
Heavys	0
Trucks	0
Cars	19
Totals	19
Heavys	0
Trucks	2
Cars	43
Totals	45



Sixth Concession Rd

Holburn St



Cars	93	1	1	95
Trucks				
Heavys				
Totals	95			

Peds Cross: \times
 West Peds: 1
 West Entering: 45
 West Leg Total: 101

Cars	248	22	123	67	212
Trucks	3	0	2	0	2
Heavys	5	0	0	1	1
Totals	256	22	125	68	



Peds Cross: \times
 South Peds: 0
 South Entering: 215
 South Leg Total: 471

Comments

Sixth Concession Rd @ Holburn St

Afternoon Peak Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 17:00:00
To: 18:00:00

Municipality: Windsor
Site #: 000000001
Intersection: Sixth Concession Rd & Holburn St
TFR File #: 1
Count date: 26-Jul-2022

Weather conditions:
Cloudy/Dry
Person(s) who counted:
Matt

** Non-Signalized Intersection **

Major Road: Sixth Concession Rd runs N/S

North Leg Total: 440
North Entering: 246
North Peds: 5
Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	23	190	33	246
Totals	23	190	33	



Heavys	0
Trucks	1
Cars	193
Totals	194

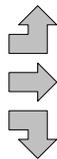
East Leg Total: 333
East Entering: 155
East Peds: 1
Peds Cross: \times

Heavys	0
Trucks	0
Cars	87
Totals	87

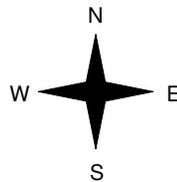


Holburn St

Heavys	0
Trucks	0
Cars	27
Totals	27
0	0
0	16
0	25
0	68



Sixth Concession Rd



Cars	22	0	0	22
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	22	0	0	22
21	0	0	0	21
110	2	0	0	112
153	2	0	0	

Holburn St



Cars	177	0	1	178
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	177	0	1	178

Peds Cross: \times
West Peds: 2
West Entering: 68
West Leg Total: 155

Cars	325	Cars	43	144	128	315
Trucks	2	Trucks	0	1	0	1
Heavys	0	Heavys	0	0	1	1
Totals	327	Totals	43	145	129	



Peds Cross: \times
South Peds: 5
South Entering: 317
South Leg Total: 644

Comments

Sixth Concession Rd @ Holburn St

Total Count Diagram

Municipality: Windsor
Site #: 000000001
Intersection: Sixth Concession Rd & Holburn St
TFR File #: 1
Count date: 26-Jul-2022

Weather conditions:
 Cloudy/Dry
Person(s) who counted:
 Matt

**** Non-Signalized Intersection ****

Major Road: Sixth Concession Rd runs N/S

North Leg Total: 2657
 North Entering: 1356
 North Peds: 19
 Peds Cross: \times

Heavys	0	7	1	8
Trucks	3	11	0	14
Cars	146	1027	161	1334
Totals	149	1045	162	



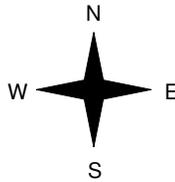
Heavys	6
Trucks	19
Cars	1276
Totals	1301

East Leg Total: 1805
 East Entering: 986
 East Peds: 8
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
1	8	448	457



Holburn St



Heavys	Trucks	Cars	Totals
1	2	147	150
0	3	83	86
0	1	186	187
1	6	416	



Sixth Concession Rd

Cars	Trucks	Heavys	Totals
146	2	1	149
113	4	0	117
714	5	1	720
973	11	2	

Holburn St



Cars	Trucks	Heavys	Totals
804	3	12	819

Peds Cross: \times
 West Peds: 4
 West Entering: 423
 West Leg Total: 880

Cars	1927	Cars	189	983	560	1732
Trucks	17	Trucks	1	15	0	16
Heavys	8	Heavys	1	4	11	16
Totals	1952	Totals	191	1002	571	



Peds Cross: \times
 South Peds: 20
 South Entering: 1764
 South Leg Total: 3716

Comments