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NOISE IMPACT STUDY - Project: 19260.01

Edworthy West Pit

Township of North Dumfries, Ontario

Prepared for:

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November 11, 2022



Revision History

Version	Description	Author	Reviewed	Date
1	Initial Report	AD	DF	November 11, 2022

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1 Introduction

Cambridge Aggregates Inc. is applying for a Class A licence for the proposed Edworthy West Pit extension area located at parts of Lots 16, 17, and 18, Concession 9, Township of North Dumfries, Regional Municipality of Waterloo. The proposed extraction area consists of approximately 35.2 hectares.

Aercoustics Engineering Limited (Aercoustics) has been retained to prepare a Noise Impact Study for the proposed Edworthy West Pit. The purpose of this study is to provide noise control recommendations for the aggregate pit operations to satisfy the Ministry of the Environment, Conservation, and Parks (MECP) noise guidelines.

Sound level limits for the aggregate pit noise on the nearby noise sensitive receptors were first established based on the noise guidelines of the MECP. The noise impact of the pit operations on these receptors was then predicted. Where the predicted sound levels were found to exceed the applicable MECP sound level limits, noise control measures were recommended to satisfy these limits.

Figure 1 provides a key plan showing the location of the aggregate pit. Figure 2 provides a site plan illustrating the aggregate pit area and the locations of nearby receptors. A comprehensive list of the proposed noise control recommendations is provided in Appendix A.

2 Site Description

The proposed aggregate pit is located north of Greenfield Road and west of Spragues Road in the Township of North Dumfries. Nearby lands include agricultural, a small woodland area to the south, aggregate operations to the east and further north, and residential dwellings in all directions. Figure 1 provides a key plan showing the location of the proposed Edworthy West Pit and surrounding area.

The existing single-family dwellings in the vicinity of the pit have been identified as R01 to R16. A vacant lot northeast of the proposed aggregate pit is zoned to permit noise sensitive uses such as dwellings that could introduce new receptors. The potential noise sensitive use of the vacant lot has been identified and considered in this assessment as receptor VL17, which represents a two-storey dwelling. The location of the receptor within the vacant lot has been determined in accordance with the MECP's Noise Pollution Control Publication, NPC-300 "Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning" (August 2013). Figure 2 provides the receptor locations for R01 to R16 and VL17.

The proposed aggregate pit addressed by this noise impact study consists of operations within the lands of each phase outlined in Figure 2. These operations include excavation and aggregate haulage and shipping. The annual tonnage proposed to be removed from the Edworthy West Pit is 1 million tonnes.

3 Noise Criteria

3.1 Acoustical Classification

The appropriate noise criteria for the receptors in the vicinity of the proposed Edworthy West Pit were based on the MECP Publication NPC-300.

Receptors R01 to R16 have an acoustic environment consistent with the Class 2 (Urban) designation as defined by MECP Publication NPC-300. In a Class 2 area, the background sound levels during the daytime (07:00 to 19:00) are defined by man-made noise sources, and during the evening (19:00 to 23:00) and nighttime (23:00 to 07:00) are defined by natural sounds with little to no road traffic. In this case, the man-made noise sources include nearby road traffic from Greenfield Road, Spragues Road, Alps Road, and Shouldice Side Road.

Receptor VL17 is representative of the vacant lot located northeast of the site and is consistent with adjacent developments, such as R16, which share the same access road (Alps Road). Any future dwelling located on this lot would be considered Class 2.

3.2 MECP Sound Level Limits

The applicable limits for noise from a stationary source at a noise sensitive point of reception (receptor) in a Class 2 (Urban) area are outlined in Table 1.

Time of Day	Sound Level Exclusion Limit – Class 2 (Urban)*
Daytime (07:00 to 19:00)	50
Evening or Nighttime (19:00 to 07:00)	45

Table 1: Sound Level Exclusion Limits for Stationary Sources – Hourly Leq (dBA)

*or the minimum existing hourly background sound level Leq, whichever is higher

The noise from a stationary source should not exceed, in any hour, the higher of either the exclusion limits listed in Table 1 or the minimum existing background sound level.

For receptors R12 and R13, the maximum pit noise would occur at the front of the house where the minimum background sound level from traffic noise on Spragues Road is expected to increase the sound level limits.

Noise impact calculations were performed in accordance with the MECP Guidelines and the Guidelines of the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT). Sample copies of the traffic noise predictions from MECP's Road and Rail Traffic Noise Prediction Model STAMSON (Version 5.04) are included in Appendix C. The minimum background sound levels were determined based on the lowest predicted one-hour period during each of the daytime and nighttime periods.

It is possible that the remaining receptors are also subject to background sound levels that exceed the MECP exclusion limits. For simplicity and conservatism, the exclusion limits have been used for these receptors.

A summary of the applicable sound level limits used in this environmental noise impact study is provided in Table 2.

	Decenter	Sound Level Limit (dBA)							
Receptor	Height (m)	Daytime (07:00 to 19:00)	Evening or Nighttime (19:00 to 23:00)						
R01	1.5	50	45						
R02	1.5	50	45						
R03	4.5	50	45						
R04	4.5	50	45						
R05	1.5	50	45						
R06	4.5	50	45						
R07	1.5	50	45						
R08	4.5	50	45						
R09	1.5	50	45						
R10	4.5	50	45						
R11	1.5	50	45						
R12	1.5	52*	45						
R13	1.5	52*	45						
R14	1.5	50	45						
R14	1.5	50	45						
R16	4.5	50	45						
VL17	4.5	50	45						

Table 2: Applicable Sound Level Limits for Stationary Sources – Hourly Leq (dBA)

*Based on minimum existing hourly background sound level at the receptor location.

4 Pit Operations

The site plan for the proposed Edworthy West Pit outlines the phases and direction of extraction during operations. In general terms, the operations include site preparation and rehabilitation, extraction, and aggregate haulage and shipping off-site.

4.1 Hours of Operation

The proposed hours of operation are summarised in Table 3. Equipment maintenance is limited to small vehicles and considered acoustically insignificant and therefore may take place outside of normal operating hours.

Table 3: Hours of Operation

Time of Day	Day of Week	Operations
06:00 to 07:00	Monday to Friday	Shipping
07:00 to 17:00	Monday to Friday	Full Operation (Extraction, Loading, and Shipping)

4.2 Site Preparation and Rehabilitation

Site preparation includes the removal of topsoil and overburden to facilitate the construction of berms and visual screens as specified on the operation plan. This work will be done primarily with bulldozers, scrapers, trucks, loaders, and excavators. Rehabilitation phases will involve similar equipment in establishing the final grading for the site. Rehabilitation of the site will be progressive and is planned to consist of a lake with shallow littoral areas and naturalised side slopes.

The site preparation and rehabilitation work described above is not part of the daily operation of the pit and is of short duration. These construction activities are not considered in the noise control analysis. The equipment used for these activities must satisfy the noise emission requirements of the MECP document NPC-115 "Construction Equipment". By defining a maximum permissible noise emission for construction equipment rather than directly limiting the noise impact at a sensitive point of reception, the MECP is recognizing that construction is a temporary and largely unavoidable source of noise.

To minimize the noise impact associated with the construction activities, it is suggested that operations be restricted to the daytime hours (07:00 to 19:00). When possible, site preparation should be conducted during the fall, winter, or spring months when there is a reduced level of extraction and when residential windows are more likely to remain closed.

4.3 Extraction, Processing, and Shipping

The maximum annual tonnage proposed to be removed from the Edworthy West Pit is 1 million tonnes. The proposed extraction of the pit will occur above the water table and material will be hauled to the main North Dumfries Pit located at the northwest corner of Alps Road, north of the Edworthy West Pit. The extraction will be phased moving in a southerly direction in Phase 1, a westerly and southerly direction in Phase 2, and a northerly and easterly direction in Phase 3.

Aggregate will be extracted from the working face using up to one extraction excavator and two extraction loaders. Material will be stockpiled and then transported off-site with highway trucks as required. Loaders used for shipping operations are assumed to operate with a 50% duty cycle.

4.4 Equipment

The extraction and shipment equipment operating in the proposed pit are limited to:

- 1 Excavator
- 2 Loaders (Extraction or Shipment)
- 20 Highway Truck trips per hour (40 passes per hour)

5 Noise Predictions and Controls

5.1 Noise Prediction Methodology

The proposed aggregate pit operations, as described above, were modelled using DataKustik's noise prediction software CadnaA. This modelling is based on established noise prediction methods outlined in the ISO 9613-2 standard entitled "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method and calculation".

Noise predictions were conducted based on the predictable worst-case noise impact for each of the aggregate pit operation areas at each of the receptors. This represents a design case where the pit is running at full capacity with all the equipment operating simultaneously and at locations where the noise impact is highest for each receptor. Most of the time, work would be occurring in other areas of the site, resulting in lower associated noise impacts. Noise levels were predicted using existing topography under conditions of downwind propagation, generally with hard ground modelled in the pit area and soft ground conditions elsewhere.

The noise impact of the pit operation was predicted. Where exceedances to the applicable MECP sound level limits were predicted, noise control measures were modelled, and the noise impact was recalculated. This process was repeated until the sound level limits were satisfied.

5.2 Pit Noise Sources

The reference sound levels used for the aggregate pit equipment are outlined in Table 4 and were determined based on similar equipment data from the Aercoustics database.

Equipment	Reference Sound Pressure Level at 30 m (dBA)
Extraction Excavator	70
Extraction Loader	70
Shipment Loader	67 ¹
Highway Truck – 25 km/h	65

 Table 4: Reference Sound Pressure Levels of Aggregate Pit Equipment

¹ Loaders used for shipping operations were assumed to operate at a 50% duty cycle.

5.3 Recommended Noise Controls

The recommended noise controls presented in this report have been determined, through noise impact predictions, to be effective in limiting the noise impact from the aggregate pit operations to levels which comply with the applicable MECP sound level limits. It should be noted that there may be other effective noise controls that could replace or revise those put forth in this report. Prior to the implementation of any changes to the noise controls, appropriate studies should be undertaken to demonstrate that the MECP sound level limits will be satisfied.

Refer to Appendix A for a comprehensive summary of the recommended noise controls for the proposed Edworthy West Pit.

No additional noise controls would be required to address the potential dwelling at vacant lot receptor VL17. The location of the vacant lot receptor was determined using the NPC-300 guidelines. If a dwelling is constructed on a noise sensitive zoned lot in a materially different location than the receptor location shown, the noise control requirements should be reviewed and revised as required by a qualitied acoustical consultant. The qualified consultant should confirm and account for the assumed location, assumed equipment noise levels, ambient acoustical classification, and type of construction of the new dwelling.

Refer to Figures 3 to 5 for an illustration of the proposed Edworthy West Pit phasing and implementation of noise controls at each of the Phases 1 to 3. Noise controls include perimeter berms and equipment restrictions. The locations of the equipment in the figures are conceptual; the equipment may be located anywhere within the phase area during operations in each phase, except where specifically indicated in the noise controls.

An acoustic barrier is required to be solid, with no gaps or openings, and shall satisfy a minimum area density of 20 kg/m². It could take the form of a pit face, stockpile, acoustic fence, ISO containers, a combination of these, or any other construction satisfying the requirements of an acoustic barrier.

5.4 Predicted Sound Levels with Noise Controls

The predicted worst case noise levels produced by operations within the proposed Edworthy West Pit are summarized in Table 5.

	Extraction and L (07:00 te	oading/Shipping o 17:00)	Loading/Shipping Only (06:00 to 07:00)			
Receptor	Daytime Sound Level Limit	Predicted Maximum Sound Level	Evening or Nighttime Sound Level Limit	Predicted Maximum Sound Level		
R01	50	33	45	29		
R02	50	42	45	37		
R03	50	45	45	40		
R04	50	50	45	43		
R05	50	48	45	41		
R06	50	38	45	33		
R07	50	43	45	37		
R08	50	47	45	40		
R09	50	46	45	40		
R10	50	44	45	37		
R11	50	45	45	38		
R12	52	51	45	44		
R13	52	45	45	41		
R14	50	45	45	39		
R14	50	49	45	42		
R16	50	35	45	29		
VL17	50	35	45	29		

Table 5: Worst-Case Predicted Sound Levels and Limits – Hourly Leg (dBA)

The worst-case has been assessed for all planned operations within the proposed Edworthy West Pit, as shown in the above noise predictions. With the incorporation of the recommended noise controls, the predicted noise impact will satisfy the applicable MECP sound level limits at all receptor locations.

5.5 Cumulative Noise Impact

There is an existing Greenfield Rd Pit (Licence #625482) located directly adjacent to the proposed Edworthy West Pit, across Spragues Road. Given the variability in the timing of operations and the difference in setback distances for each pit, it is unlikely that the existing operation cycle of the Greenfield Rd Pit will occur where noise impact is highest at the same receptor at the same time as the proposed Edworthy West Pit.

In the unlikely event that this overlap of worst-case operation occurs between both aggregate sites, a combined noise level of 3 dB above the sound level limits is possible at some receptors. In environmental noise, a change in sound level of 3 dB is perceived as minor and represents a change in sound level that most people would just barely notice.

This analysis assumes that the existing nearby operations are designed with the same MECP noise limits.

6 Truck Traffic Noise on Haul Route

The noise impact of truck traffic on public roadways is not addressed in the MECP noise guidelines. However, the MECP requires consideration of noise impact in choosing the off-property haul route. Further, the MECP document titled, "Noise Guidelines for Landfill Sites", dated October 1998, provides general guidelines for evaluating the noise impact of truck traffic associated with external haul routes.

A summary of the qualitative assessments of the perceived noise impact from increased noise levels along these external haul routes is provided in Table 1.

Increase in Sound Level	Perceived Increase in Noise Environment
1 dB to 3 dB	Insignificant
3 dB to 5 dB	Noticeable
5 dB to 10 dB	Significant
10+ dB	Very Significant

Table 6: Human Perception of Change in Sound Level

The following section considers these guidelines in qualitatively assessing the potential increase in the noise environment on noise-sensitive dwellings along the proposed Edworthy West haul route. The aggregate from the pit will be shipped via Spragues Road from the entrance located off Spragues Road at the east side of the site. It is understood that the peak one-hour truck traffic from the pit will be 40 trucks (20 in / 20 out). Sample copies of the traffic noise predictions from MECP's Road and Rail Traffic Noise Prediction Model STAMSON (Version 5.04) are included in Appendix C.

6.1 Existing Noise Environment

The minimum one-hour traffic volume is representative of the traffic counts during the one-hour period with the minimum predicted traffic noise levels, as determined based on municipal traffic data for Spragues Road. The minimum one-hour period is expected to be from 06:00 to 07:00. The average traffic volume was calculated across all periods the pit is proposed to operate. All traffic volumes include traffic traveling in both directions (two-way) on the roadway.

6.2 Noise Impact of Truck Traffic on Haul Route

The potential noise impact to the noise sensitive dwellings along the proposed haul route has been evaluated conservatively by introducing the assumed maximum truck volumes to the existing minimum and average one hour traffic counts and subsequently determining the perceived impact on the noise environment. The predicted worst-case hourly increase in noise level along Spragues Road is 9 dB, with a predicted average increase in noise level of approximately 5 dB. As the predicted noise level increases are relative changes in the overall road traffic sound level, all points of reception along the respective roadway will perceive the same relative increase in noise level.

Based on these predicted levels, the increased truck traffic is expected to produce a noticeable to significant increase in noise impact from existing road traffic on the nearby dwellings along Spragues Road, depending on the time of day. However, it should be noted that the proposed haul route already carries some truck traffic from existing aggregate pits in the area, which is not represented in the existing noise environment shown here. Furthermore, the Region of Waterloo's "Transportation Master Plan" (July 2018) outlines that goods movement in the Waterloo Region is primarily via commercial trucks, including the hauling of aggregate resources, and Regional Roads are designed to accommodate these goods movements via heavy truck traffic or long vehicles. Spragues Road is a Regional Road that has been identified by the Region of Waterloo as being part of the Regional Truck Network and is expected to have existing heavy truck traffic. Based on these factors, it is expected that the increase in noise level may be lower than predicted.

In addition, based on the municipal traffic data for all roads surrounding the site, Spragues Road has the highest existing traffic volume. It is also an established existing haul route for other aggregate operations. As a result, any other potential haul routes would result in a greater increase from the existing noise environment. Therefore, Spragues Road will have the lowest perceived impact out of any potential haul routes for the site and is considered the preferred haul route in the context of noise impact.

7 Conclusion

Aercoustics has conducted a noise impact study for the proposed Edworthy West Pit. The purpose of this study is to provide noise control recommendations for the aggregate pit operations to satisfy the MECP noise guidelines.

Sound level limits were developed based on the MECP noise guidelines. Calculations were then carried out to determine the worst-case noise impact for each phase of the aggregate pit operation, at each noise sensitive receptor. Where noise predictions indicated potential exceedance of the MECP sound level limits, noise control recommendations were provided. With the implementation of the recommended noise controls, the proposed aggregate pit operation is predicted to satisfy the MECP noise guidelines.

Appendix D provides a summary of the qualifications of the authors of this report.

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Appendix A Noise Control Recommendations



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<u>General</u>

1. The hours of operation shall be as described in Table 1:

Table 1: Hours of Operation

Time of Day	Day of Week	Operations
06:00 to 07:00	Monday to Friday	Shipping
07:00 to 17:00	Monday to Friday	Full Operation (Extraction, Loading, and Shipping)

- 2. The extraction, loading, and shipping equipment operating in the pit are limited to the following:
 - 1 Excavator
 - 2 Loaders (Extraction or Shipment)
 - 20 Highway Truck trips per hour (40 passes per hour)
- 3. The pit equipment shall satisfy the noise emission levels listed in Table 2:

Table 2: Reference Sound Pressure Levels of Pit Equipment

Equipment	Reference Sound Pressure Level at 30 m (dBA)
Extraction Excavator	70
Extraction Loader	70
Shipment Loader	67 ¹
Highway Truck – 25 km/h	65

¹ Loaders used for shipping operations were assumed to operate at a 50% duty cycle.

- 4. The sound emissions of all construction equipment involved in site preparation and rehabilitation activities shall comply with the sound level limits specified in the MECP publication NPC-115 "Construction Equipment".
- 5. New equipment technology or different configurations may allow proposed changes to any portion of the extraction and processing operations, including additional equipment to operate on the site, equipment to be substituted, and/or different berm heights, while still meeting the applicable sound level limits. Changes may be permitted to the site operations and noise controls provided that the changes still meet the sound level limits, as confirmed through documentation prepared by a Professional Engineer specializing in noise control.
- 6. Prior to extraction in Phase 1, an acoustic barrier with a minimum top-of-barrier elevation of 333 MASL shall be installed to the east of the Phase 1 area as shown in the Operation Plan (Berm A). Where the site entrance bisects the berm, a

staggered berm configuration shall be used to form an effectively continuous barrier between the Phase 1 area and receptors R12 and R13, as shown in the Operation Plan. This barrier shall remain in place for the lifetime of the pit.

- 7. Prior to extraction in Phase 2, the following two acoustic barriers shall be installed and remain in place for lifetime of the pit:
 - a) An acoustic barrier with a minimum top-of-barrier elevation of 335 MASL shall be installed to the northwest of the Phase 2 area as shown in the Operation Plan (Berm B).
 - b) An acoustic barrier with a minimum top-of-barrier elevation of 335 MASL shall be installed to the south of the Phase 2 area as shown in the Operation Plan (Berm C).
- 8. Prior to extraction in Phase 3, an acoustic barrier with a minimum top-of-barrier elevation of 328 MASL shall be installed to the east of the Phase 3 area as shown in the Operation Plan (Berm D). This barrier shall remain in place for the lifetime of the pit.
- 9. During extraction in Phase 2 within 200 m of the west extraction limit, equipment is limited to a single Extraction Loader or Excavator, as indicated in the Operation Plan by the hatched area.
- 10. Shipping operations during nighttime hours (06:00 to 07:00) are not permitted within 200 m of the west extraction limit, as indicated in the Operation Plan by the hatched area.
- 11. Shipping operations during nighttime hours (06:00 to 07:00) are limited to one Shipment Loader in all phases.

Appendix B Sample Stationary Noise Source Calculations



Project: Edworthy West Pit NIS Project Number: 19260.01

												Point of Reception R06	
		Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day
D03_loader	Excavator	1147	27	796	32	737	33	658	35	719	31	1058	29
D03_loader	Loaders	1151	30	800	35	741	36	662	38	722	34	1059	32
D03_HWY_trucks	Trucks	1210	16	854	21	792	22	710	24	761	21	1078	17
Total Level	[dBA]		32		36		38		40		36		33

		Point of Reception R07		Point of Reception R08		Point of Reception R09		Point of Reception R10		Point of Reception R11		Point of Reception R12	
		Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day
D03_loader	Excavator	656	33	569	35	345	43	352	39	316	40	164	46
D03_loader	Loaders	657	36	570	38	344	43	348	42	311	43	160	49
D03_HWY_trucks	Trucks	668	21	581	24	341	31	296	30	253	31	121	39
Total Level	[dBA]		38		40		46		44		45		51

Source ID		Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day
D03_loader	Excavator	217	41	592	34	602	35	1352	26	1401	26
D03_loader	Loaders	215	43	593	37	604	38	1356	29	1405	29
D03_HWY_trucks	Trucks	206	32	608	22	641	24	1406	15	1459	15
Total Level	[dBA]		45		39		40		31		31

Receiver: R01 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)			
Day	32			
		-		
Receiver Name	Receiver ID			Z
R01	R01	551618.06 m	4797259.66	n331.27 m

Source ID	Source Name	Х	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	72.2	0.0	0.0	3.5	3.7	0.0	0.0	0.0	0.0	0.0	27
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	72.2	0.0	0.0	3.5	3.8	0.0	0.0	0.0	0.0	0.0	30

Receiver: R02 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)	
Day	36	
Receiver Name	Receiver ID	

R02 R02 S51759.20 m4796836.39 n335.11

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	69.0	0.0	-0.6	3.9	2.9	0.0	0.0	0.0	0.0	0.0	32
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	69.1	0.0	-0.6	3.9	3.0	0.0	0.0	0.0	0.0	0.0	35
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	69.6	0.0	-1.0	4.2	3.5	0.0	0.0	0.0	0.0	0.0	18

Receiver: R03 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	38
Penniver Nome	Poppiyor ID

				<u> </u>
R03	R03	551788.84 m	4796751.72 n	334.49 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	68.3	0.0	-2.4	4.7	2.8	0.0	0.0	0.0	0.0	0.0	33
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	Α	68.4	0.0	-2.4	4.7	2.8	0.0	0.0	0.0	0.0	0.0	36
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	69.0	0.0	-2.8	4.8	3.3	0.0	0.0	0.0	0.0	0.0	20
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	68.6	0.0	-2.9	4.8	3.1	0.0	0.0	0.0	0.0	0.0	16

Receiver: R04 Project: Edworthy West Pit NIS Project Number: 19260.01

Day 40

Receiver Name	Receiver ID			Ζ
R04	R04	551847.05 m	n4796670.75 n	333.50 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	67.4	0.0	-3.3	4.8	2.6	0.0	0.0	0.0	0.0	0.0	35
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	67.4	0.0	-3.3	4.8	2.6	0.0	0.0	0.0	0.0	0.0	38
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	68.0	0.0	-3.6	4.8	3.0	0.0	0.0	0.0	0.0	0.0	23
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	67.6	0.0	-3.6	4.8	2.9	0.0	0.0	0.0	0.0	0.0	18

Receiver: R05 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	35
Receiver Name	Receiver ID

R05	R05	551765.60 m	4796503.89 n	335.28 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	68.1	0.0	-1.0	6.4	2.7	0.0	0.0	0.0	0.0	0.0	31
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	68.2	0.0	-1.0	6.4	2.8	0.0	0.0	0.0	0.0	0.0	34
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	68.6	0.0	-1.4	5.0	3.2	0.0	0.0	0.0	0.0	0.0	19

Receiver: R06 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)			
Day	33			
		-		
Receiver Name	Receiver ID			
R06	R06	551509.97 m	4796097.07	n335.62 m

Source ID	Source Name	Х	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	71.5	0.0	-1.3	4.5	3.6	0.0	0.0	0.0	0.0	0.0	29
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	71.5	0.0	-1.3	4.5	3.6	0.0	0.0	0.0	0.0	0.0	32

Receiver: R07 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	38
Receiver Name	Receiver ID

				_
R07	R07	551929.56 m	4796157.58 ı	n337.50 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	67.3	0.0	0.1	3.7	2.6	0.0	0.0	0.0	0.0	0.0	33
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	Α	67.4	0.0	0.1	3.7	2.6	0.0	0.0	0.0	0.0	0.0	36
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	67.5	0.0	1.6	3.5	2.8	0.0	0.0	0.0	0.0	0.0	19
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	67.5	0.0	-0.1	4.0	2.8	0.0	0.0	0.0	0.0	0.0	16

Receiver: R08 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	40
Receiver Name	Receiver ID

R08	R08	552001.58 m	4796206.92 r	1337.63 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	66.1	0.0	-1.5	4.6	2.3	0.0	0.0	0.0	0.0	0.0	35
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	66.1	0.0	-1.5	4.6	2.3	0.0	0.0	0.0	0.0	0.0	38
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	66.3	0.0	0.2	4.4	2.5	0.0	0.0	0.0	0.0	0.0	21
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	66.3	0.0	-1.9	4.8	2.5	0.0	0.0	0.0	0.0	0.0	18

Receiver: R09 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	46

Receiver Name	Receiver ID			Z
R09	R09	552256.28 m	n4796249.59 n	341.00 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	61.8	0.0	-0.2	0.0	1.6	0.7	0.0	0.0	0.0	0.0	43
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	61.7	0.0	-0.1	4.0	1.6	0.0	0.0	0.0	0.0	0.0	43
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	61.7	0.0	1.6	0.0	1.6	0.0	0.0	0.0	0.0	0.0	30
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	62.0	0.0	-0.1	4.1	1.7	0.0	0.0	0.0	0.0	0.0	22
D03_HWY_trucks	Trucks	552545.8	4796415.7	332.8	0	76	13.0	А	61.5	0.0	1.7	0.0	1.6	0.0	0.0	0.0	0.0	0.0	24

Receiver: R10 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	44
D 1 N	

Receiver Name	Receiver ID			Z
R10	R10	552566.08 m	1 <mark>4796165.91 n</mark>	334.44 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	61.9	0.0	-0.7	5.0	1.6	0.0	0.0	0.0	0.0	0.0	39
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	61.8	0.0	-0.6	5.1	1.6	0.0	0.0	0.0	0.0	0.0	42
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	60.5	0.0	0.3	8.5	1.4	0.0	0.0	0.0	0.0	0.0	24
D03_HWY_trucks	Trucks	552545.8	4796415.7	332.8	0	76	13.0	А	59.0	0.0	0.4	0.0	1.2	0.0	0.0	0.0	0.0	0.0	28
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	61.7	0.0	-0.8	6.5	1.6	0.0	0.0	0.0	0.0	0.0	21

Receiver: R11 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	45

Receiver Name	Receiver ID			Z
R11	R11	552664.54 m	4796248.74 n	337.24 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	61.0	0.0	0.3	4.3	1.5	0.0	0.0	0.0	0.0	0.0	40
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	60.9	0.0	0.4	4.5	1.5	0.0	0.0	0.0	0.0	0.0	43
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	59.0	0.0	1.5	7.3	1.2	0.0	0.0	0.0	0.0	0.0	26
D03_HWY_trucks	Trucks	552545.8	4796415.7	332.8	0	76	13.0	А	57.2	0.0	1.5	0.0	1.0	0.0	0.0	0.0	0.0	0.0	29
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	60.6	0.0	0.4	6.6	1.4	0.0	0.0	0.0	0.0	0.0	21

Receiver: R12 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	51
Receiver Name	Receiver ID

	=	
R12	R12	552645.22 m4796478.30 n336.50 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	55.3	0.0	0.0	4.8	0.9	0.0	0.0	0.0	0.0	0.0	46
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	55.1	0.0	0.1	5.0	0.9	0.0	0.0	0.0	0.0	0.0	49
D03_HWY_trucks	Trucks	552523.9	4796470.8	328.0	0	76	17.8	А	52.7	0.0	0.9	7.8	0.6	0.0	0.0	0.0	0.0	0.0	31
D03_HWY_trucks	Trucks	552534.4	4796431.2	331.5	0	76	13.4	А	52.6	0.0	1.4	0.0	0.6	0.0	0.0	0.0	0.0	0.0	34
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	54.2	0.0	0.3	6.7	0.8	0.0	0.0	0.0	0.0	0.0	28
D03_HWY_trucks	Trucks	552545.8	4796415.7	332.8	0	76	13.0	А	52.4	0.0	1.4	0.0	0.6	0.0	0.0	0.0	0.0	0.0	34

Receiver: R13 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	45

Receiver Name	Receiver ID			Z
R13	R13	552688.34 n	n4796580.90 n	334.50 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	57.7	0.0	-0.3	7.8	1.1	0.0	0.0	0.0	0.0	0.0	41
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	57.7	0.0	-0.2	8.3	1.1	0.0	0.0	0.0	0.0	0.0	43
D03_HWY_trucks	Trucks	552525.1	4796466.3	328.4	0	76	18.4	А	57.0	0.0	1.0	9.1	1.0	0.0	0.0	0.0	0.0	0.0	26
D03_HWY_trucks	Trucks	552535.6	4796426.8	331.9	0	76	11.0	А	57.7	0.0	1.5	0.0	1.1	0.0	0.0	0.0	0.0	0.0	26
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	57.1	0.0	0.0	9.9	1.0	0.0	0.0	0.0	0.0	0.0	22
D03_HWY_trucks	Trucks	552545.8	4796415.7	332.8	0	76	13.0	А	57.8	0.0	1.5	0.0	1.1	0.0	0.0	0.0	0.0	0.0	28

Receiver: R14 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	39
Dessiver Name	Dessiver ID

Receiver Name	Receiver ID	Х	Y	Z
R14	R14	552890.34 m	4796939.15 n	1325.40 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	66.4	0.0	-0.1	3.9	2.4	0.0	0.0	0.0	0.0	0.0	34
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	66.5	0.0	0.0	3.9	2.4	0.0	0.0	0.0	0.0	0.0	37
D03_HWY_trucks	Trucks	552525.8	4796463.7	328.6	0	76	18.7	А	66.6	0.0	1.0	6.1	2.6	0.0	0.0	0.0	0.0	0.0	18
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	66.3	0.0	-0.1	4.2	2.5	0.0	0.0	0.0	0.0	0.0	17

Receiver: R15 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)
Day	40
Receiver Name	Receiver ID

R15	R15	552734.98 m	4797055.83	n325.50 m

Source ID	Source Name				Refl.	Lw	L/A		Adiv		Agr		Aatm			Cmet	Dc		
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	66.6	0.0	-1.6	4.4	2.4	0.0	0.0	0.0	0.0	0.0	35
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	Α	66.6	0.0	-1.6	4.4	2.4	0.0	0.0	0.0	0.0	0.0	38
D03_HWY_trucks	Trucks	552526.7	4796460.2	328.9	0	76	19.1	А	67.0	0.0	-2.0	4.5	2.7	0.0	0.0	0.0	0.0	0.0	22
D03_HWY_trucks	Trucks	552502.6	4796502.5	325.4	0	76	14.4	А	66.6	0.0	-2.0	4.5	2.6	0.0	0.0	0.0	0.0	0.0	18

Receiver: R16 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)			
Day	31			
Receiver Name	Receiver ID			
R16	R16	552320.59 m	4797850.20 n	316.78 n

Source ID	Source Name	Х	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	73.6	0.0	-2.0	5.0	4.2	0.0	0.0	0.0	0.0	0.0	26
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	73.6	0.0	-2.0	4.9	4.2	0.0	0.0	0.0	0.0	0.0	29

Receiver: VL17 Project: Edworthy West Pit NIS Project Number: 19260.01

Time Period	Total (dBA)			
Day	31			
Receiver Name	Receiver ID			Z
VL17	VL17	552578.22 m	4797906.24	n324.56 m

Source ID	Source Name	Х	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
D03_loader	Excavator	552484.3	4796508.1	325.5	0	107	0.0	А	73.9	0.0	-2.0	4.6	4.2	0.0	0.0	0.0	0.0	0.0	26
D03_loader	Loaders	552487.3	4796504.6	325.5	0	110	0.0	А	74.0	0.0	-2.0	4.6	4.3	0.0	0.0	0.0	0.0	0.0	29

Appendix C Road Traffic Data & Sample Calculations



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*2015 Average Annual Daily Traffic

	-
4585	SWAN ST (Regional Road 58) AT Brant Waterloo Rd
5025	SPRAGUES RD (Regional Road 75) BTWN Alps & Cam./ND Bndry
4892	SPRAGUES RD (Regional Road 75) AT Alps Rd
3741	SPRAGUES RD (Regional Road 75) BTWN Alps & Greenfield
5026	SPRAGUES RD (Regional Road 75) AT Greenfield Rd
5346	SPRAGUES RD (Regional Road 75) BTWN Greenfield & Shouldice Side
4615	SPRAGUES RD (Regional Road 75) AT Shouldice Side Rd
3337	SPRAGUES RD (Regional Road 75) BTWN Beke & Shouldice Side
3897	SPRAGUES RD (Regional Road 75) AT Beke Rd
3949	SPRAGUES RD (Regional Road 75) BTWN Beke & WRIGLEY
7622	SPRAGUES RD (Regional Road 75) AT WRIGLEY RD
7696	SPRAGUES RD (Regional Road 75) BTWN Willow & WRIGLEY
6331	SPRAGUES RD (Regional Road 75) AT Willow Cr
4406	SPRAGUES RD (Regional Road 75) BTWN Brant Waterloo & Willow
4915	SPRAGUES RD (Regional Road 75) AT Brant Waterloo Rd
6284	TRUSSLER RD (Regional Road 70) BTWN BRIDGE/NEW DUNDEE & Oxford-Waterloo
7866	TRUSSLER RD (Regional Road 70) AT Oxford-Waterloo Rd
6363	TRUSSLER RD (Regional Road 70) BTWN Oxford-Waterloo & Roseville
7146	TRUSSLER RD (Regional Road 70) AT Roseville Rd
5956	TRUSSLER RD (Regional Road 70) BTWN Roseville & Twp Rd 14
6871	TRUSSLER RD (Regional Road 70) AT Twp Rd 14
5962	TRUSSLER RD (Regional Road 70) BTWN CEDAR CREEK & Twp Rd 14
8177	TRUSSLER RD (Regional Road 70) AT CEDAR CREEK RD
2669	TRUSSLER RD (Regional Road 70) BTWN CEDAR CREEK & Blandford-Blenheim Twp Rd 12
3739	TRUSSLER RD (Regional Road 70) AT Blandford-Blenheim Twp Rd 12
2746	TRUSSLER RD (Regional Road 70) BTWN Alps Rd West & Blandford-Blenheim Twp Rd 12
3299	TRUSSLER RD (Regional Road 70) AT Alps Rd West
2823	TRUSSLER RD (Regional Road 70) BTWN Alps Rd West & 110 m North of Hwy 401
3502	TRUSSLER RD (Regional Road 70) AT Greenfield Rd/Blandford-Blenheim Twp Rd 11
2886	TRUSSLER RD (Regional Road 70) BTWN Greenfield/B-B Twp 11 & Welsh/B-B Twp 10
3059	TRUSSLER RD (Regional Road 70) AT Welsh Dr/Blandford-Blenheim Twp Rd 10
2873	TRUSSLER RD (Regional Road 70) BTWN Gladstone & Welsh/B-B Twp Rd 10
3800	TRUSSLER RD (Regional Road 70) AT Gladstone Rd
2875	TRUSSLER RD (Regional Road 70) BTWN Gladstone & Piper
3323	TRUSSLER RD (Regional Road 70) AT Piper St
3234	TRUSSLER RD (Regional Road 70) BTWN Piper & Blandford-Blenheim Twp Rd 9
4289	TRUSSLER RD (Regional Road 70) AT Blandford-Blenheim Twp Rd 9
3321	TRUSSLER RD (Regional Road 70) BTWN Blandford-Blenheim Twp Rd 9 & Brant Waterloo
4829	TRUSSLER RD (Regional Road 70) AT Brant Waterloo Rd
2045	WRIGLEY RD/SCOTT ST (Regional Road 49) BTWN Hilltop & Reidsville
2045	WRIGLEY RD/SCOTT ST (Regional Road 49) BTWN Hilltop & Reidsville
3434	WRIGLEY RD (Regional Road 49) AT Reidsville Rd (Westerly Intersection)

*2015 = Average Annual Daily Traffic calculated based on actual count data or extrapolated from adjacent locations

**CAM = Cambridge, KIT = Kitchener, NDF = North Dumfries, WAT = Waterloo, WEL = Wellesley, WIL = Wilmot, WOO = Woolwich

STAMSON 5.0 COMPREHENSIVE REPORT Date: 31-03-2022 12:55:44 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT Time Period: 1 hours Filename: existing.te Description: Existing Minimum Hour (6-7AM) Road data, segment # 1: _____ Car traffic volume : 103 veh/TimePeriod Medium truck volume : 3 veh/TimePeriod Heavy truck volume : 3 veh/TimePeriod Posted speed limit : 70 km/h Road gradient : 0 % Road pavement : 1 (Typical asphalt or concrete) Data for Segment # 1: _____ Angle1Angle2: -90.00 deg90.00 degWood depth: 0(No woods.No of house rows: 0Surface: 1(Absorptive) (No woods.) (Absorptive ground surface) Receiver source distance : 55.00 m Receiver height : 1.50 m Topography : 1 (Flat/gentle slope; no barrier) Reference angle : 0.00 Segment # 1: _____ Source height = 1.29 mROAD (0.00 + 49.54 + 0.00) = 49.54 dBAAngle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq _____ -----____ -----_____ ____ ____ _____ -90 90 0.66 60.36 0.00 -9.37 -1.46 0.00 0.00 0.00 49.54 _____ ____ Segment Leq : 49.54 dBA Total Leg All Segments: 49.54 dBA

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TOTAL Leq FROM ALL SOURCES: 49.54

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STAMSON 5.0 NORMAL REPORT Date: 31-03-2022 12:10:44 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT Filename: existing.te Time Period: 1 hours Description: New Worst-Case Hour (6-7AM) Road data, segment # 1: _____ Car traffic volume : 103 veh/TimePeriod Medium truck volume : 3 veh/TimePeriod Heavy truck volume : 43 veh/TimePeriod Posted speed limit : 70 km/h Road gradient : 0 % Road pavement : 1 (Typical asphalt or concrete) Data for Segment # 1: _____ _____ Angle1Angle2: -90.00 deg90.00 degWood depth: 0(No woods.No of house rows: 0Surface: 1(Absorptive) (No woods.) (Absorptive ground surface) Receiver source distance : 55.00 m Receiver height : 1.50 m Topography : 1 (Flat/gentle slope; no barrier) Topography : 1 Reference angle : 0.00 Results segment # 1: _____ Source height = 2.32 m ROAD (0.00 + 58.24 + 0.00) = 58.24 dBAAngle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq _____ -----____ _____ _____ -----_____ _____ -90 90 0.64 68.88 0.00 -9.23 -1.42 0.00 0.00 0.00 58.24 _____ Segment Leq : 58.24 dBA Total Leg All Segments: 58.24 dBA

TOTAL Leq FROM ALL SOURCES: 58.24



Appendix D Qualification of the Authors



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Derek Flake M.Sc., P.Eng.

Profile

Derek is an employee of Aercoustics Engineering Limited, an engineering consulting company specializing in acoustics, noise and vibration. Prior to that, he worked for several years at another acoustics, noise and vibration firm and he completed a Master of Science in the field of ultrasound transducer design. Derek is a Professional Engineer with the Professional Engineers Ontario.

Derek has been recognized by the Local Planning Appeal Tribunal (LPAT) and previously by the Ontario Municipal Board (OMB) as an expert in environmental noise and has provided expert opinion testimony to the Board and in civil litigation.

Employment History

2012 – Present	Acoustical Engineer,	Aercoustics E	Engineering	Limited

2009 - 2012Engineering Intern, Jade Acoustics Incorporated

Additional Activities / Committees

2019 – Present	Officer on the Board Committee at the Air Ontario Section (OS)	of Directors and Chair of the Membership & Waste Management Association (A&WMA)	
2018 – Present	Member of Environment Committee at the Ontario Sand, Stone and Gravel Association (OSSGA)		
2014 – Present	Member of Training and Development Committee at the Ontario Sand, Stone and Gravel Association (OSSGA)		
Education			
Master of Science (M	.Sc.)	Medical Biophysics (Ultrasound Physics) University of Toronto	
Bachelor of Applied Science (B.A.Sc.)		Engineering Physics (Mechanical)	

Queen's University

Professional Registration / Affiliations

Licensed Professional Engineer with the Professional Engineers of Ontario (PEO)

Courses and Speaking Events

Instructor, Municipal Law Enforcement Officers' Association (MLEOA) Environmental Noise training courses. This is an annual four-day training program which provides the officers with an understanding of sound measurement and its relationship with environmental noise impact. The officer is trained in the utilization of technical equipment required in the application of sound measurement theories. This course also covers the unique elements of qualitative noise regulations and is authorized by the Ministry of the Environment and Climate Change.

Speaker, "Overview of Noise & Vibration Issues in Land-Use Planning", A&WMA OS Environment Issues in Land-Use Planning, Guelph, October 30, 2019.

Attended A&WMA Course "Consultant Liability and Expert Witness Testimony", Guelph, 2019.

Speaker, "Environmental Noise: Modelling Techniques to Quiet your Acoustic Troubles", ACE 2019, Quebec City, 2019.

Attended PSMJ Resources Project Management Bootcamp, Toronto, 2016.

Attended OSSGA Health and Safety Seminar courses "Aggregates 101" and "Aggregates 201", Toronto, 2015. Mr. Flake both attended and aided in the development for parts of the course.

Speaker, "*The New NPC-300 Noise Guideline: What does it mean for your noise by-law?*" MLEOA Annual General Meeting, Kingston, 2014.

Professional Activities

Land Use Planning

In the field of environmental acoustics, Mr. Flake has completed numerous projects involving noise impact from planned stationary sources as well as noise impact studies for proposed new noise sensitive uses. These projects included conducting studies for proposed operations and developments and addressing noise concerns for existing operations. Peer reviews of noise studies prepared by other acoustic consultants were also conducted by Mr. Flake. In the land use planning process, Mr. Flake has completed studies which provide assessments of the noise impact on proposed residential, commercial, institutional and industrial developments from the local environment which includes noise from road, rail, and aircraft traffic and stationary noise sources such as industrial and commercial uses. Also, vibration measurements and studies were conducted to assess vibration from rail traffic such as trains, streetcars and subways. The studies include recommendations for noise control of the sources, dwelling building components, wall, window, and door constructions to satisfy the Ministry of Environment, Conservation and Parks noise guidelines.



In addition, Mr. Flake has conducted architectural drawing reviews and provided design advice for residential and commercial developments. These have ensured the construction plans will meet the municipal and Ontario Building Code requirements.

Environmental Compliance Approvals & EASR

Mr. Flake was involved in noise and vibration impact studies for industrial, institutional and commercial uses. He has prepared Acoustic Assessment Reports for use in applications for Environmental Compliance Approvals (ECA) and the Environmental Activity & Sector Registry (EASR). These studies provided conceptual as well as detailed designs of noise mitigation to reduce in-plant noise or noise emission into the environment. In-plant projects generally involved noise surveys, detailed noise and vibration measurements of equipment, data analysis and computer modelling of noise controls to evaluate effectiveness. In some cases, detailed designs and specifications have been provided. Mr. Flake has a good record of submitting applications that are accepted as fully complete according to MECP records.

Aggregates

Mr. Flake has done work in the aggregates industry which involved the preparation and support of noise impact studies to determine technical feasibility of aggregate licence applications to the Ministry of Natural Resources & Forestry. This work included preparing the noise impact studies, supporting the findings at public meetings, and performing acoustic audits to confirm compliance with the noise requirements.

Mining

Mr. Flake has acted as a third-party peer reviewer for the City of Timmins, overseeing all aspects of environmental compliance (including acoustics, noise & vibration) for the Hollinger Pit Open Mine in Timmins.

Acoustic Audits were also conducted at Goldcorp's Red Lake Balmerton & Cochenour sites.

Renewable Energy

Mr. Flake has performed IEC 61400 testing of Wind Turbines and Transformer Station noise audits.

Noise Source Investigations and Room Acoustics

Mr. Flake has completed several projects involving design of spaces where sound privacy and room acoustics were critical. These projects have included noise complaint investigation, room acoustics, mechanical noise, noise measurements to quantify sound isolation, and environmental noise impact. Examples of spaces include cinemas, offices, hospitals and residential condominiums.





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Alexandra Davidson P.Eng.

- Project Manager at Aercoustics Engineering Limited. Joined full-time in October 2018 after previously completing a student internship with Aercoustics from 2016 to 2017.
- Managed and performed environmental noise studies for institutional, industrial, and • commercial facilities, including Petro-Canada Lubricants Inc, Chris Gibson Recreational Centre, Hydro One Networks Inc, Sanofi Pasteur, Digital Realty Data Centers Santa Clara CA & Richardson TX, Centennial College Centre for Aerospace and Aviation, and Milton Sports Centre.
- Performed architectural/residential interior and room acoustics modelling and design work for a variety of spaces, including University of Toronto Experiential Learning Commons, Shopify Toronto & Vancouver, TD Toronto, Ryerson Science Building, Osler Bluff Ski Club, Peel Region Police Auditorium, Toronto City Hall, CBC Montreal, University of Toronto Daniels Faculty of Architecture, 500 Lakeshore retail and residential, Brampton Council Chamber renovation, and Yorkville Village.
- Completed vibration measurements and studies on several projects, including residential developments in Gravenhurst and New Market, Finch West LRT, West Thornhill Sewer Main, Pearson International Airport, Peter Munk Cardiac Centre, Permacon Bolton, and TD Centre Towers.
- Managed or assisted in noise and/or vibration studies for multiple Toronto Transit Commission (TTC) projects, including streetcar analysis at King & Sumach and other intersections, Keele Subway Track Fastener Trial, Keele Yard, McNicoll Bus Garage design, and measurements at Davisville Yard and Mount Dennis Bus Garage.
- Managed acoustic audit for **South Kent Wind Project** and receptor identification for Engie Canada wind projects in Saskatchewan, and coordinated or assisted in receptor selection, wind farm acoustic audits, and solar farm site planning for over 20 other sites across Ontario, Saskatchewan, and Alberta.
- B.A.Sc. in Engineering Science, Aerospace Engineering, University of Toronto, 2018

End of Report



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