

Memo

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Date: 6 January 2008 **No. Pages:** 9 (including this page)

Cumulative Noise Impact Assessment Proposed Highlands Quarry & Proposed Duntroon Quarry Expansion

1.0 Introduction

This memo considers the cumulative noise impacts of two proposed adjacent quarries: the Highlands Quarry and the Duntroon Quarry Expansion, see Figure 1. The assessment of cumulative impacts is based on the following noise study reports which consider the noise impacts of the individual proposed quarries.

- Ref. 1. Acoustical Study of the Proposed Highlands Quarry, Township of Grey Highlands, prepared by Hugh Williamson Associates Inc., 5 January 2008.
- Ref. 2. Sound Impact Analysis, Duntroon Quarry, Proposed Quarry Expansion, Clearview Township, prepared by Valcoustics Canada Ltd., September 2005.

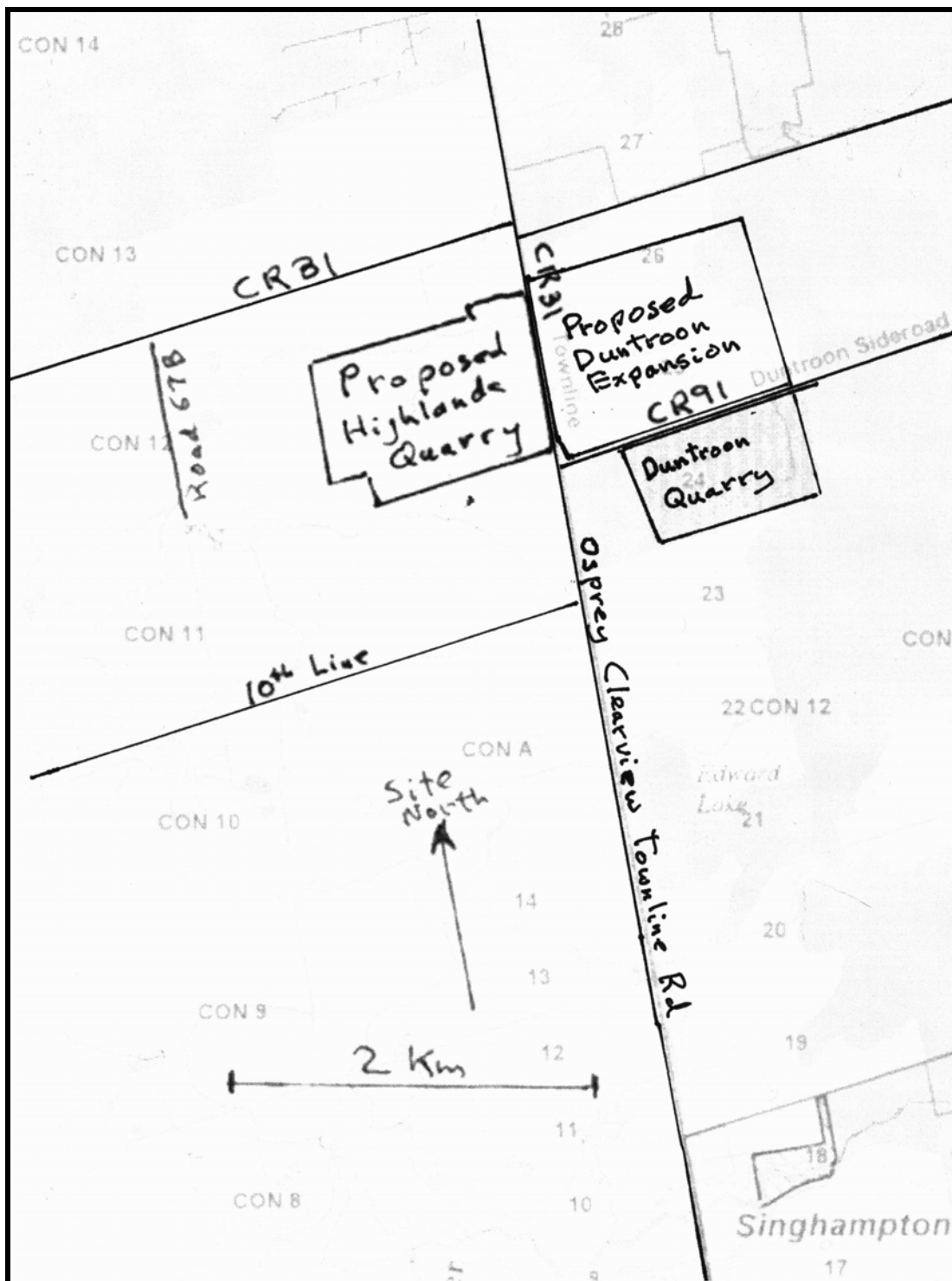
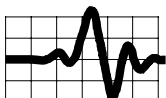


Figure 1 Proposed Quarries - Schematic



2.0 Analysis Background

Both the above noise studies have been conducted according to Ministry of Environment, MoE, guidelines for noise assessment. The essence of the MoE procedures is that noise impacts from the individual proposed quarries are assessed at nearby noise sensitive receptors, such as residences, schools or hospitals. For the two proposed quarries, all receptors are rural residences and sound level limits, as set out in MoE guidelines, must be met anywhere within 30 m of these residences.

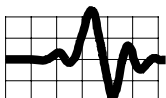
In both studies, nearest receptors have been selected for detailed analysis, as it can be assumed that more distant receptors will be less affected. The nearest receptors, R1 to R8, to the proposed Highlands Quarry are shown in Figure 2 and the nearest receptors, *R1* to *R4*, to the proposed Duntroon Quarry Expansion are shown in Figure 3. (To avoid confusion, receptor designations from the Duntroon Quarry Expansion Report are written here in *italics*, i.e. *R1*, *R2*, *R3* and *R4*.) Table 1 lists the receptors from both studies.

In both studies, assessment is based on the ‘predictable worst case’ of noise impact, as required by MoE guidelines. For the worst case, it is assumed that all quarry operations, for example crushing, rock drilling, truck loading and truck movements, are occurring simultaneously and all operations are at locations which will cause the most severe impact on each individual receptor. Such situations rarely occur in practice, and, if they do occur, will only be for a brief period over the whole of the life of a quarry, say 30 to 50 years.

In both studies, mitigation measures are developed such that the MoE noise limits are met at each of the nearest receptors under ‘predictable worst case’ assumptions. The cumulative impact analysis in this memo assumes that the noise mitigation measures recommended in the reports are implemented at both quarries.

3.0 General Assessment (‘predictable worst case’)

Consider the scenario where the ‘predictable worst case’ occurs at both quarries simultaneously with respect to a particular receptor. Under this scenario, noise from each quarry individually reaches the MoE limit at that receptor. The cumulative noise from both quarries under this scenario would be 3 dBA higher than the MoE limit at that receptor. Changes in sound level by 3 dBA are only just noticeable to most people, and are normally considered to be insignificant in environmental noise analyses. Because a ‘predictable worst case’ is a relatively rare event for each quarry, the coincidence of both quarries being in this state simultaneously would also be a very rare event. Under most circumstances, sound levels will be less than this cumulative worst case event. Thus it can be concluded, in general, that the cumulative noise impact of both quarries will not significantly exceed MoE noise limits at the receptors.



4.0 Assessment of Individual Closest Receptors

Receptors R1 to R5 are significantly further from the proposed Duntroon Expansion than the closest receptors considered in the Duntroon Expansion Noise study. It can therefore be assumed that the noise from the Duntroon Expansion would be well below the MoE limit at these receptors and that the cumulative noise impact of both quarries will not significantly exceed MoE limits at these receptors.

Receptor R6 (R3 in the Duntroon Expansion Report) is a closest receptor for both studies and is approximately the same distance from both excavation limits. The above 'predictable worst case' situation would apply at this receptor, leading to the conclusion that the cumulative noise impact of both quarries will not be significantly exceed MoE noise limits at this receptor.

Receptors R7, R8, R1 and R2 are located on the proposed quarry lands. If both quarries proceed, then these residences will cease to become noise sensitive receptors under MoE definitions.

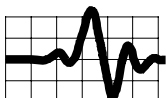
Receptor R4 is considered a nearby receptor to the proposed Duntroon Quarry Expansion and is approximately 700 m from the proposed Highlands Quarry. Because 'predictable worst case' noise from the proposed Highlands Quarry will be controlled to meet MoE limits at closer receptors, it can be assumed that noise from the Highlands Quarry will be below MoE noise limits at R4. Hence it can be concluded that the cumulative noise impact of both quarries will not significantly exceed MoE limits at R4.

5.0 MoE Limits at Receptor R6 (R3 in the Duntroon Expansion study)

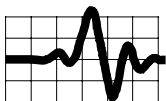
The noise study for the proposed Highlands Quarry takes the conservative approach that receptors R1 to R8 are located in Class 3 (Rural) Areas leading to MoE sound level limits of 45 dBA during the day and 40 dBA at night. The noise study for the proposed Duntroon Quarry Expansion takes a somewhat less conservative approach by assuming that receptors R1, R2 and R3 are located in Class 2 (Urban) Areas and that Receptor R4 is located in a Class 3 (Rural) Area. The MoE sound level limits for a Class 2 (Urban) area are 5 dBA higher than for a Class 3 (Rural) Area.

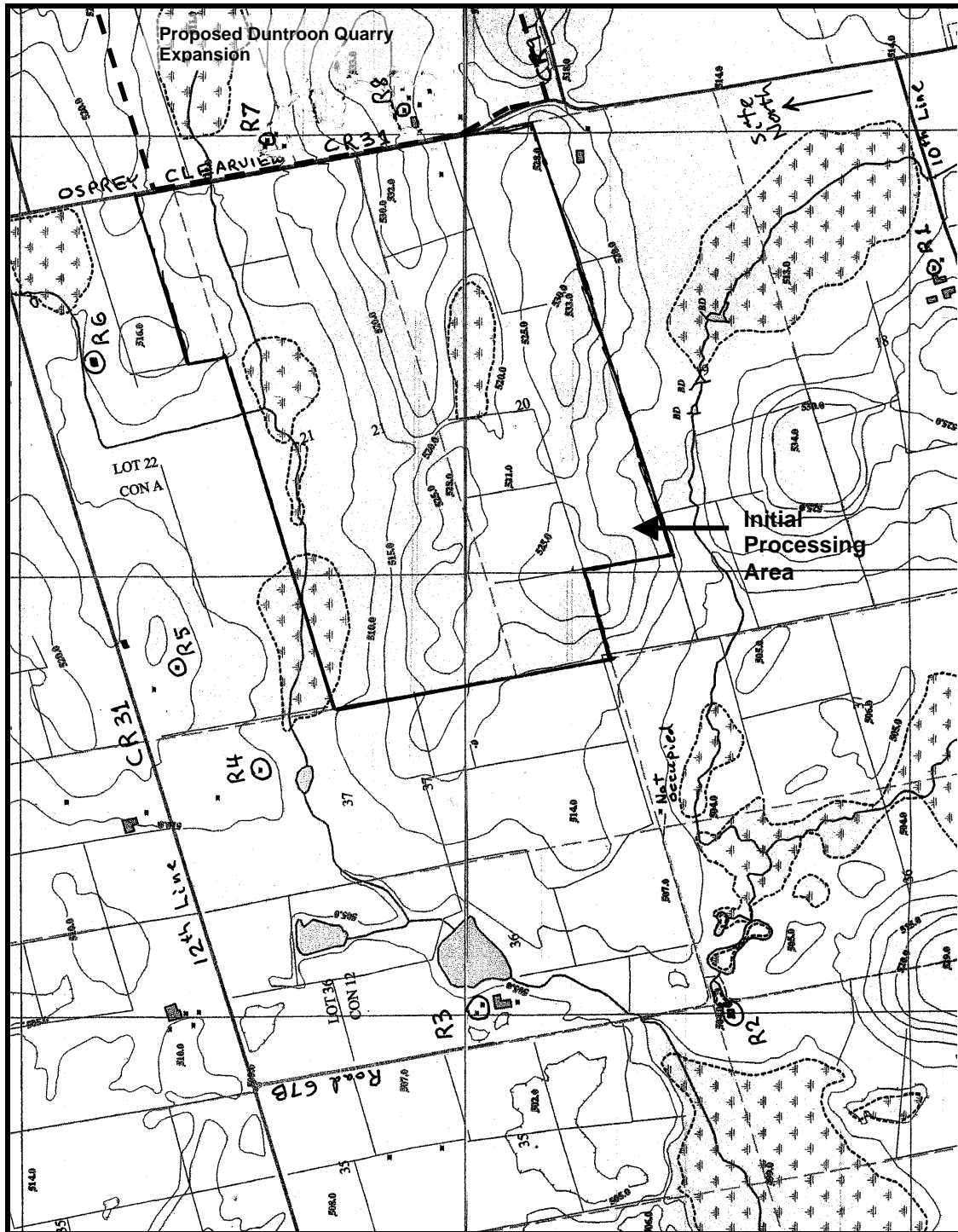
For the purpose of assessing the cumulative impact, the only receptor, which is relatively close to both quarries and where this difference in sound level limits exists, is receptor R6 (R3 in the Duntroon Expansion study).

If one accepts the less conservative noise limits of the Duntroon Expansion Study, then the cumulative noise impact of both quarries should readily satisfy the noise limit because the 'predictable worst case' noise from the Highlands Quarry will be 5 dBA below that from the Duntroon Quarry Expansion.



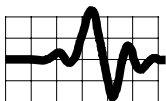
If one accepts the more conservative noise limits of the Highland Quarry study, then the cumulative sound level at R6 (R3 in the Duntroon Expansion study) would exceed the limit by approximately 6 dBA under the rare occurrence of 'predictable worst case' conditions at both quarries simultaneously. Because this occurrence is rare, the more conservative noise limits are expected to be satisfied most of the time.





Grid spacing 1 km

Figure 2 Proposed Highlands Quarry and Nearest Receptors



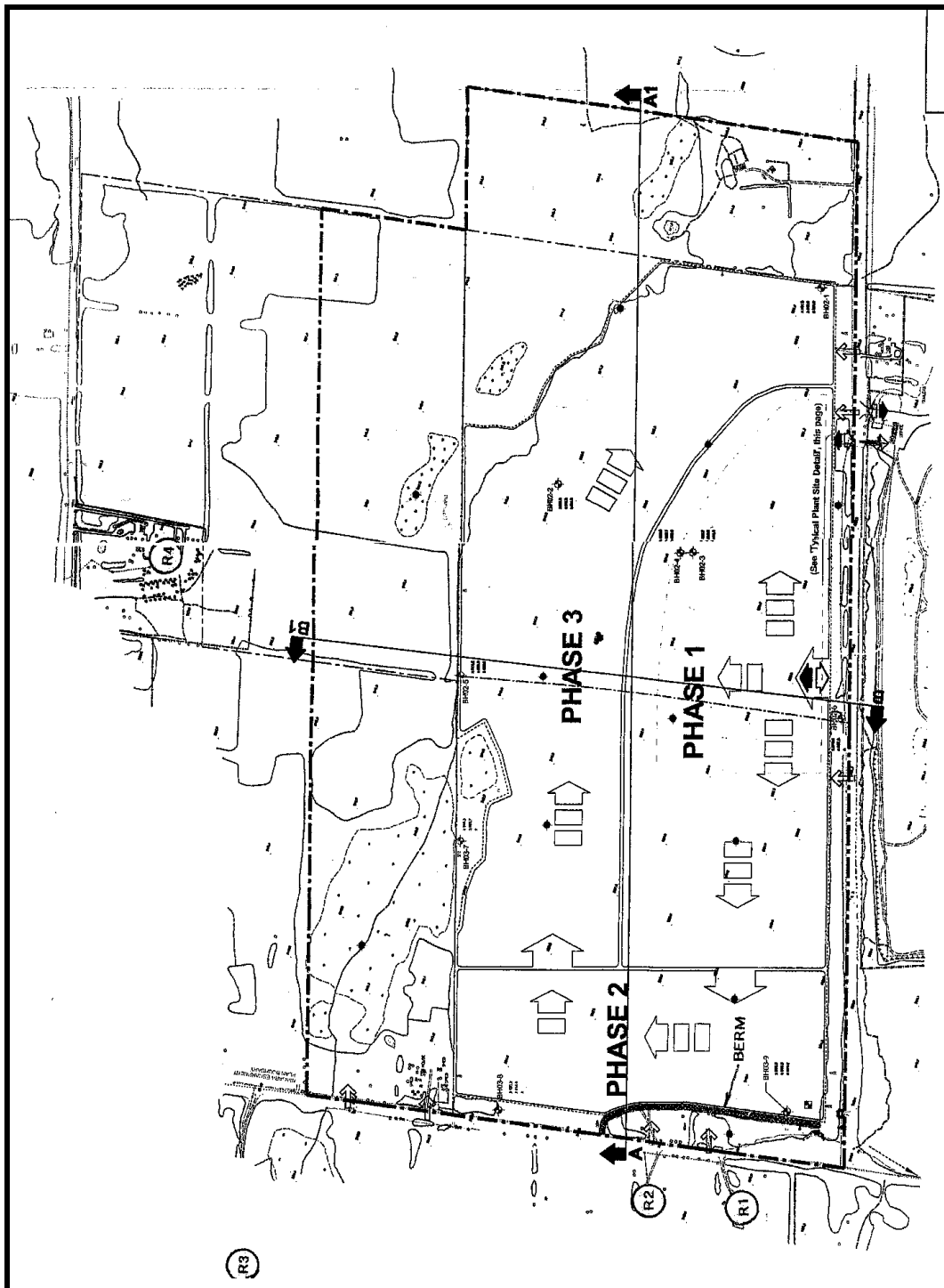
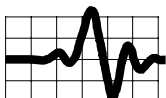


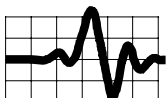
Figure 3 Proposed Duntroon Quarry Extension and Nearest Receptors



Receptor Designation in Highlands Quarry Report	Receptor Designation in Duntroon Quarry Expansion Report	Description and Location	Comment
R1		Adjacent residences on 10 th Concession Road, #447749 & #447789	More than 700 m from the proposed Duntroon Expansion
R2		Residence on Road 67B, # 674552	Approximately 2 km from the proposed Duntroon Expansion
R3		Residence on Road 76B, # 675573	Approximately 2 km from the proposed Duntroon Expansion
R4		'Northern Lights Centre', residential Grey County Road, #469698	Approximately 1.5 km from the proposed Duntroon Expansion
R5		Residences, Grey County Road, #469724 & #469738	Approximately 1.5 km from the proposed Duntroon Expansion
R6	R3	Residences, Grey County Road, #469812	At a similar distance, approximately 600 m from the proposed excavations of both quarries
R7		Residence, Osprey Clearview Road, #794565	No combined impact.*
R8		Residence, Osprey Clearview Road, #794533	No combined impact.*
-	R1	Residence, Osprey Clearview Road, western side	No combined impact.*
-	R2	Residence, Osprey Clearview Road, western side	No combined impact.*
-	R4	Residence, Nottawasaga Side Road	Approximately 700 m from the proposed Highlands Quarry

* If both quarries proceed, these residences would be on quarry land and no longer be considered to be noise sensitive receptors.

Table 1 Nearest Receptors



6.0 Conclusions

This memo contains an analysis of the cumulative noise impacts of two proposed quarries: the Highlands Quarry and the Duntroon Quarry Expansion. The analysis is based on noise studies of the individual proposed quarries.

The following conclusions have been reached.

- 6.1 Because both individual noise studies for the proposed quarries have been based on MoE 'predictable worst case' methodology, it can be concluded, in general, that the cumulative noise impact of both quarries will not significantly exceed MoE noise limits at receptors.
- 6.2 Only one receptor (R6 in the Highlands Study, R3 in the Duntroon Expansion Study) is a closest receptor with respect to both proposed quarries. The cumulative noise impact at this receptor may be approximately equal to, but not significantly in excess of, the MoE sound level limits under the rare circumstances of 'predictable worst case' conditions occurring at both quarries simultaneously.
- 6.3 All other receptors are closest receptors to only one of the proposed quarries and hence the cumulative noise impacts at these receptors will be even less likely to exceed MoE sound level limits.
- 6.4 The two studies have used differing assumptions with respect to the applicable MoE sound level limits at some receptors. This difference is discussed in Section 5.0 above.



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Member, Canadian Acoustical Association

