LENNON QUARRIES LTD

NOISE ASSESSMENT AT A MATERIAL RECOVERY FACILITY IN TALLAGH, BELMULLET, CO. MAYO

JANUARY 2009

TOBIN CONSULTING ENGINEERS

TOBIN
Patrick J. Tobin & Co. Ltd.

REPORT

PROJECT: **Noise Assessment at a waste recovery facility in Tallagh, Belmullet, Co. Mayo.**

CLIENT:

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Belmullet
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Project:	**Noise Assessment**
Title:	**Noise Assessment at a waste recovery facility in Tallagh, Belmullet, County Mayo**

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TOBIN Consulting Engineers							

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1 NOISE AND VIBRATION

1.1 INTRODUCTION

TOBIN Consulting Engineers were requested to undertake a Noise Assessment for a waste recovery facility in Tallagh, Belmullet, County Mayo by Lennon Quarries Ltd.

This report will accompany a Waste Licence Application to the EPA for an inert waste recovery facility on a 27.22ha (including entrance road) site. This site currently operates under a Waste Permit (Ref: PER 144) recovering material from within the local area, with a consequential benefit for improving land for agricultural use.

Acoustic Terminology

Sound is simply the pressure oscillations that reach our ears. These are characterised by their amplitude, measured in decibels (dB), and their frequency, measured in Hertz (Hz). Noise is unwanted or undesirable sound, it does not accumulate in the environment and is normally localised. Environmental noise is normally assessed in terms of A-weighted decibels, dB (A), when the 'A-weighted' filter in the measuring device elicits a response, which provides a good correlation with the human ear.

The criterion for environmental noise control is one of annoyance or nuisance rather than damage. In general a noise level is liable to provoke a complaint whenever its level exceeds by a certain margin the pre-existing noise level or when it attains an absolute level. A change in noise level of 3 dB (A) is 'barely perceptible', while an increase in noise level of 10 dB (A) is perceived as a twofold increase in loudness.

1.2 METHODOLOGY

1.2.1 Instrumentation Used

The following instrumentation was used in the baseline survey:

- One Larson Davis 824 Precision Integrating Sound Level Analyser/Data logger with Real-Time Frequency Analyser Facility
- Wind Shield Type: Larson Davis 2120 Windscreen.
- Calibration Type: Larson Davis Precision Acoustic Calibrator Model CAL200.

1.2.2 Measurement Procedure

Noise monitoring was carried out on 7th January 2009 during the day (for 30 minute intervals) at three site boundary locations and two noise sensitive locations (nearest residential dwellings). Noise monitoring was undertaken at these 5 no. locations when the site was non-operational and again when the site was operational. All the environmental noise analysers had data logging facilities set on real-time, the logged data was later downloaded via a personal computer using software. The measurement locations were all away from reflecting surfaces and at 1.5m height above local ground.

All acoustic instrumentation was calibrated before and after the survey period and no drift of calibration was observed (calibration level 114dB at 1000Hz).

1.3 THE EXISTING ENVIRONMENT

1.3.1 Introduction

The site is located approximately 3km north of Belmullet town centre, County Mayo. The location is rural in nature with a low population density consisting of one-off dwellings located along local roads. The site is bordered to the north, south and west by adjacent bog habitat and to the immediate southeast by a mushroom factory. A derelict Roman Catholic chapel is also located immediately east of the site entrance road. Planning permission is currently being sought to develop Gaelic Athletic Association (GAA) facilities immediately outside the western site boundary. Access to the site is by an entrance road leading off a regional road to the south which runs from Belmullet to Ballyglass.

The site comprises approximately 27.22ha (including entrance road) of which will include a deposition area of approximately 20.48ha and a buffer zone adjacent the northern site boundary comprising approximately 4.46ha.

1.3.2 Receptors

Housing in the vicinity of the site is of low density and is separated from the site boundaries by areas of bogland habitat. All the closest receptors identified are located off the local roads around the site. Noise monitoring was conducted at the two closest residential dwellings along these roads, and at three site boundary locations (Refer to Figure 1.1). The local landscape in undulating with the current working area positioned behind a hill to its immediate south, therefore acting as a buffer between the site and the closest residential dwelling located to the southwest.

1.3.3 Existing Noise Environment

The existing noise environment in the vicinity of the existing waste recovery site at Tallagh, Belmullet, County Mayo, has been characterised by a series of baseline noise measurements completed at the site boundaries and at two noise sensitive receptors in the surrounding area. The measurements were completed in accordance with the requirements of ISO1996: Acoustics - Description and measurement of environmental noise and with reference to the EPA publication Environmental Noise Survey, Guidance Document.

In total, measurements were taken at 5 no. locations in the vicinity of the site as described in Table 1.1. Noise measurements were taken for a period of 30 minutes at each location when the facility was non-operational and again when it was operational. A Hitachi 200 excavator is the only piece of plant equipment on site and works intermittently throughout the day.

The noise measurement results are presented in Tables 1.2 and 1.3 of this report. The noise monitoring locations are marked as N1 to N5 on Figure 1.1.

Table 1-1 Noise Monitoring Locations

Monitoring Location	Description
N1	Western Site Boundary
N2	Southern Site Boundary
N3	Eastern Site Boundary
N4 (Noise Sensitive Location)	Residential Dwelling located to the northeast
N5 (Noise Sensitive Location)	Residential Dwelling located to the southwest

It was established during the course of completing the noise survey that the area in the vicinity of the site is primarily influenced by passing road traffic on local roads and general environmental noise. According to the EPA BATNEEC Guidance Note on Noise, if the total noise level from all sources is taken into account, noise levels at noise sensitive receptors should be kept below a level of 55dB(A) during the daytime and below 45dB(A) during the night-time in order to avoid noise nuisance or disturbance as reflected in the EPA Guidelines. Therefore it is to these commonly applied noise limit values, that the potential noise impact of the waste recovery site has been assessed.

The proposed operating hours for the site will be limited to the daytime period between 08:00 – 18:00hrs Monday to Friday and 08.00 – 14.00pm on Saturday. Waste acceptance will be from 08.30 – 17.30pm Monday to Friday and 08.30 – 13.30pm Saturday. The noise survey was conducted between these hours in order to categorise the existing noise climate in the vicinity of local receptors and to establish the current noise impact the existing facility has.

The baseline noise levels recorded at the 5 no. monitoring locations (N1-N5) when the facility was non-operational ranged between 39.0 – 55.4dB(A) LAeq, 30mins (the equivalent continuous sound level recorded over 30 minutes). The noise levels recorded at the 5 no. monitoring locations (N1-N5) when the facility was operational ranged between 37.9 – 56.9dB(A) LAeq, 30mins (the equivalent continuous sound level recorded over 30 minutes). The dominant noise sources observed in the vicinity of all receptors was identified as being intermittent passing road traffic comprised mainly of private cars and agricultural vehicles. Passing aircraft and farm animals also contributed to general noise levels in the area. In addition, the influence of agricultural machinery operating in the southwest area also contributed to the noise climate of the area.

The background noise levels (expressed as LA90 values) recorded during both the non-operational and operational monitoring were consistent ranging from 33.6 to 36.1dB(A) LA90, 30mins are typical of the expected range of background noise values for a rural environment.

The results of the noise survey are typical of the levels expected for a rural environment, which is not significantly influenced by any continuous or dominant noise source. The noise monitoring results undertaken during both the non-operational and operational periods of the facility are presented overleaf in Tables 1.2 and 1.3.

Table 1-2 **Noise Monitoring Results when facility is non-operational –dB(A) and 30 minute intervals**

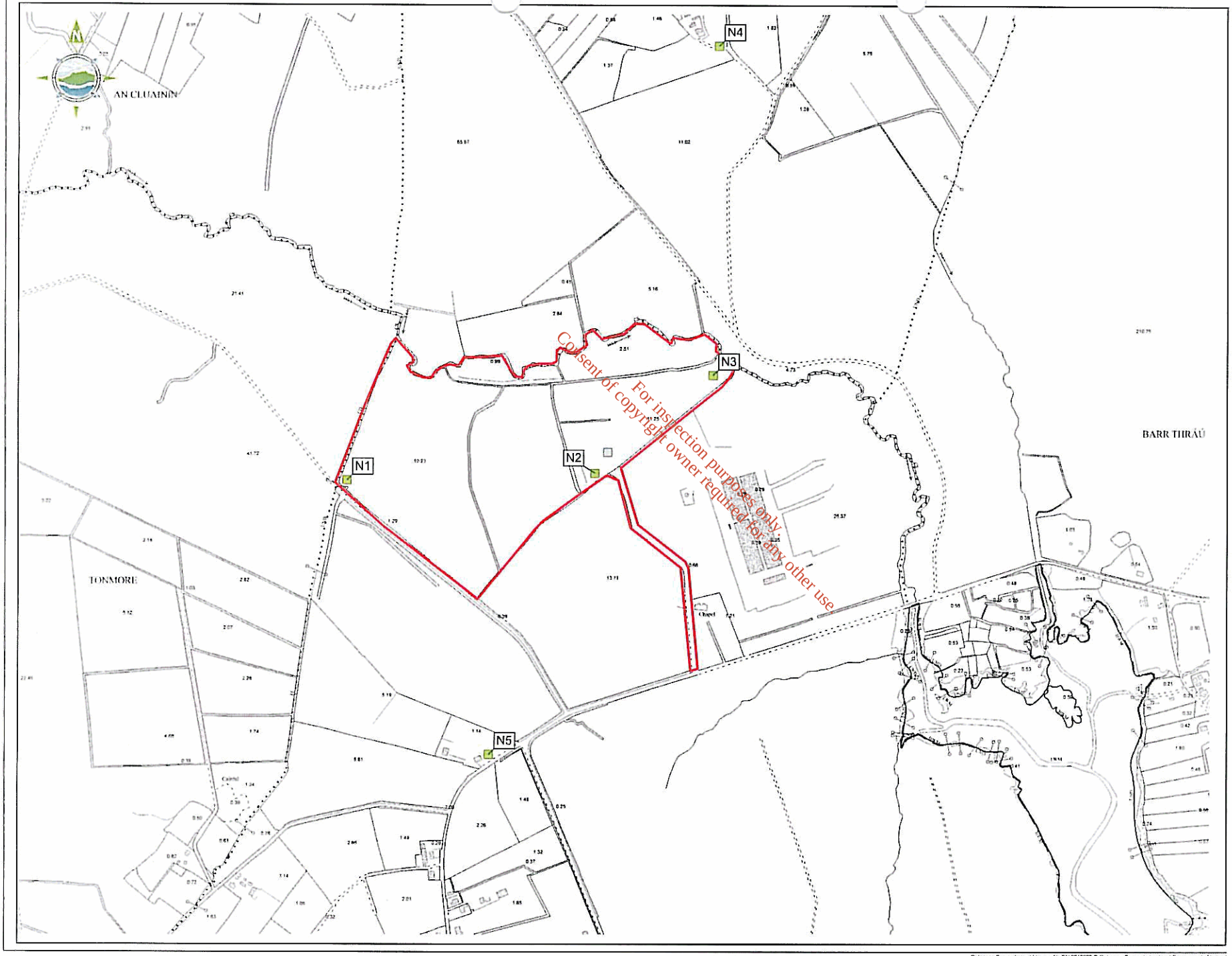
Location	Date	Time	Leq	L_{10}	L_{90}
N1	07/01/09	11:53	39.0	40.5	34.5
N2	07/01/09	08:56	40.9	43.9	35.6
N3	07/01/09	09:45	41.6	42.9	33.6
N4	07/01/09	10:35	55.4	40.0	34.2
N5	07/01/09	11:15	54.6	58.6	35.8

Table 1-3 **Noise Monitoring Results when facility is operational –dB(A) and 30 minute intervals**

Location	Date	Time	Leq	L_{10}	L_{90}
N1	07/01/09	15:23	37.9	39.3	35.4
N2	07/01/09	12:45	55.1	57.9	45.6
N3	07/01/09	13:24	38.9	40.9	35.4
N4	07/01/09	14:11	48.1	41.9	34.2
N5	07/01/09	14:47	56.9	60.6	36.1

There were no impulsive noise components or tonal noise components audible at any of the noise monitoring locations.

However, after downloading the noise measurement data the results (Appendix 1) indicate that a pure tone was present (at 63Hz) during the non- operational period at monitoring location N4 which is a NSL to the northeast. This pure tone was not recorded at N4 during the operational period. During the operational period pure tones were present at N1 (at 80 Hz and at 125Hz), N2 (at 63Hz) and N3 (at 63Hz). No tonal components were recorded during this period at either NSL. As a pure tone at 63Hz was recorded at N4 during the non-operational period it is therefore not a result of site activities. It is considered that the pure tone (at 63Hz) recorded at N2 and N3 during the operational period are also not from site activities. The pure tones recorded at N1 (at 80 Hz and at 125Hz), during the operational period is also considered not to be from site activities as this location is positioned at a greater distance from the source of site noise than N2 or N3. These pure tones were not audible during monitoring.



Legend

- Waste Licence Application Site Boundary
- Noise Monitoring Points
- Noise Source

0 0.04 0.08 0.16 0.24 0.32
Kilometers

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO OVERHANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd
A	16.01.09	Issued	A/S	AA

Client: LENNON QUARRIES LTD

Project: NOISE ASSESSMENT

Title: NOISE MONITORING LOCATIONS

Scale @ A3: 1:7,500

Prepared by:	Checked:	Date:
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Drawing No: Figure 1.1 | Issue: A

1.4 POTENTIAL IMPACT

Potential impacts from the waste recovery facility will be from the operational phase only. There are no construction works proposed to take place at the site.

1.5 OPERATIONAL PHASE

1.5.1 Noise impacts

Working hours during the operational phase of the facility will be from 08:00 – 18:00pm, Monday to Friday and 08.00 to 14.00pm Saturday. Waste will be accepted at the site between 08.30 – 17.30pm Monday -Friday and 08.30 – 13.30pm Saturday. It is not proposed to operate the facility on Sundays or Public Holidays.

Noise from site operations will be associated with the deposition and levelling of inert materials. The predicted noise levels that will be experienced at the nearest residences to the site as a result of facility activities have been calculated using the activity LAeq method outlined in BS 5228: Part 1: *Noise and vibration control on construction and open sites*.

The noise limits which apply to industrial developments under the EPA Integrated Pollution Control Licensing system are defined in the EPA BATNEEC Guidance Note for noise as LAeq, 1hr = 55 dB (A) and LAeq, 15 min = 45 dB (A) for daytime and night time operation respectively. These limits are widely recognised as representing BATNEEC for industrial developments and are commonly imposed by Local Authorities in Ireland.

Night time hours are normally specified to occur between 22:00hrs to 08:00hrs and therefore no night time operations are proposed at this site. Daytime hours are specified to occur between 08.00hrs to 22.00hrs and therefore all activities at the site will occur within the daytime period.

The maximum predicted value of noise impact from site operations on the existing noise climate of local receptors is presented below in Table 1.4.

Table 1-4 Noise impacts of site operation activities on the existing noise climates of local receptors between 08:00 and 22:00

FACILITY PLANT NOISE (No attenuation for berms allowed here)		
BS5228 Calculations	Estimated Construction noise levels at varying distances LAeq 1 hour	
	N5	N4
Plant	412m	701m
Tracked excavator	47	41

1.6 TRAFFIC IMPACTS

There is potential for noise impact from HGV traffic associated with the facility in the operational phase.

The predicted noise level at the nearest noise sensitive receptors to the site boundaries as a result of HGV traffic movements on local roads has been calculated using the method outlined in BS 5228: Part 1: 1997, D3.5 Method for mobile plant using a well defined route. The calculation assumed a worst case scenario of 1 HGV movements per hour at 50km/hr, a maximum Sound Power Level of 104dB(A) for the trucks and the minimum distance between the site entrance road and the nearest noise sensitive receptors.

$SPL = SWL - 33 + 10*\log_{10}(\text{Flow rate}) - 10*\log_{10}(\text{Velocity}) - 10*\log_{10}(\text{Distance})$

The maximum predicted L_{Aeq}, 1hr as a result of the traffic movements at the closest residences to the site is 27dB(A).

The predicted maximum noise level of 27dB (A) attributable to HGV movements at the site is significantly lower than the NRA criterion of 65dB (A) for acceptability of traffic noise. The maximum predicted values are presented below in Table 1.5.

Table 1-5 Average Noise impact of internal road traffic at local receptors

Noise Sensitive receptor	Predicted average Internal Traffic Noise dB(A)
N5	27
N4	25

Road traffic noise from the site along local roads will be low intensity and will be in keeping with existing ambient noise levels as a result of traffic. This is not considered a significant noise impact.

1.6.1 Combined impact of all on-site operations

The combined noise impact of all site activities including deposition / levelling of material and internal traffic movements was assessed at each noise sensitive receptor. The results of these calculations are presented in Table 1.6.

The maximum predicted noise levels at the 2 assessment locations will not exceed the commonly applied daytime limit of 55dB(A). The predicted noise levels in Table 1.6 are likely to overestimate the actual noise experienced, since the maximum noise levels associated with the item of plant was used, and simultaneous operation of this plant item was assumed. This is unlikely to be the working scenario during the operation of the facility even during busy periods.

Table 1-6 Combined noise levels predicted as a result of the facility operation

Noise Sensitive Location	Predicted operational noise at full production dB(A)	Predicted internal traffic noise at full production dB(A)	Combined noise level dB(A)
N5	47	27	47
N4	41	25	41

NOTE
[1] All values represent $L_{Aeq, 1\ hour}$

1.6.2 Vibration Impacts

Ground vibration at sensitive receptors is measured as peak particle velocity (PPV) in mm/sec. The acceptable vibration limit at sensitive receptors in Ireland is 12mm/sec (peak particle velocity, PPV) as defined in the Environmental Protection Agency BATNEEC Guidance Note for Noise in respect of Scheduled Activities. There will be no significant sources of vibration as a result of site activities and therefore the vibration limit at the surrounding sensitive receptors can be expected to be within the above mentioned limit.

1.7 MITIGATION MEASURES

A quantitative assessment of the potential noise impacts at nearby noise sensitive receptors as a result of the operation phase of the waste recovery facility has shown that no adverse nuisance impacts will occur as a result of its operation.

The proposed hours of operation are 08.00 to 18.00pm, Monday to Friday and 08.00 to 14.00pm Saturday. The proposed hours for accepting waste are 08:30 to 17:30 Monday to Friday and 08.30 to 13.30pm Saturday. No works will be undertaken on Sunday or bank holidays. Potential impacts on the noise environment in the vicinity of the site are therefore limited to daytime hours.

Traffic associated with the facility will involve approximately 1 HGV movements per hour. Noise associated with this notably low number of vehicle movements will be not have an adverse impact on the noise climates at local receptors.

1.7.1 Noise Mitigation

The considerable distance between source and receptor will result in significant noise attenuation and subsequently minimise impacts at local receptors. The undulating topography surrounding the site also assists noise attenuation.

Working hours during the operational phase of the facility will be from 08:00 – 18:00, Monday to Friday and 08.00 -14.00pm on Saturday. The site will not be open on Sunday or public holidays. Potential impacts on the noise climate in the vicinity of the site are therefore limited to the daytime period, which will reduce the impacts on local residents.

The following recommended practices will also ensure that noise generated by the site operations will be minimised wherever possible:

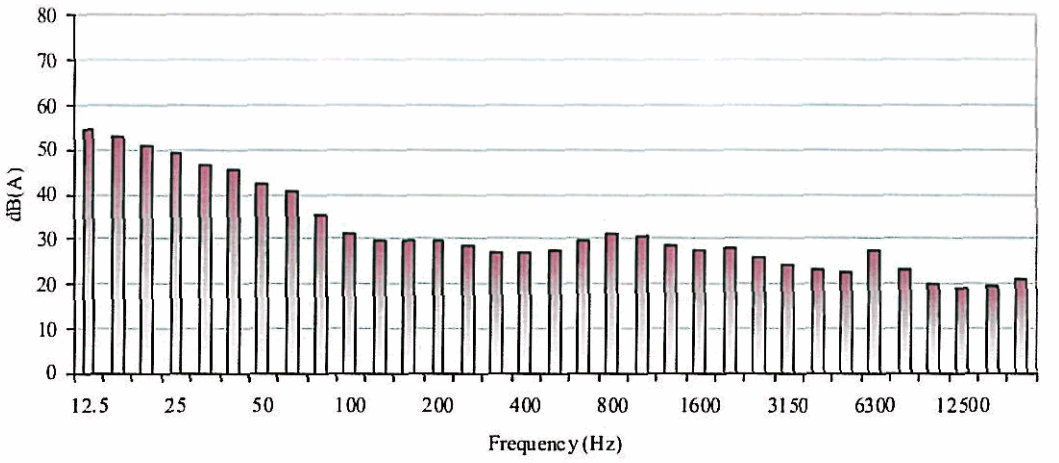
- Regular maintenance of items of plant to ensure that they are operating efficiently;
- Turn off vehicles when not in use;
- Reduce turn-over time for deliveries to site;
- Maintenance of site vehicles so that they are not excessively noisy
- Items of plant and equipment used at the site will conform to the noise emission limits as specified in *Statutory Instrument SI No. 359 of 1996 European Communities (Construction Plant and Equipment)(Permissible Noise Levels)(Amendment) Regulations, 1996*
- The use of vehicle horns will be discouraged during the daytime period and will be banned during the early morning periods before 09:00hrs

1.8 CONCLUSIONS

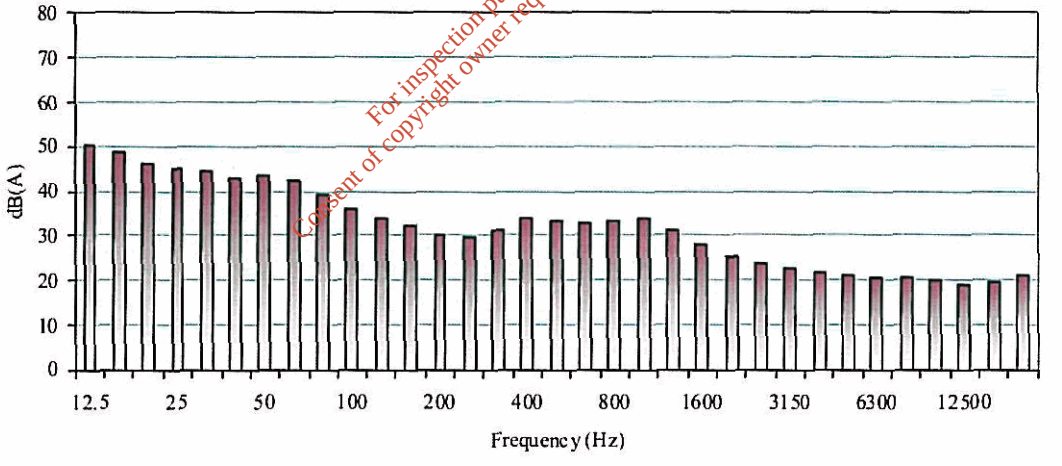
A comprehensive assessment of the potential noise and vibration impacts associated with the waste recovery site has been completed. Site activities will be effectively managed to ensure that all potential noise and vibration impacts are minimised to acceptable levels. There are no significant adverse or unacceptable noise or vibration impacts predicted at local sensitive receptors in the vicinity of the site as a result of the waste recovery facility operating.

Appendix 1

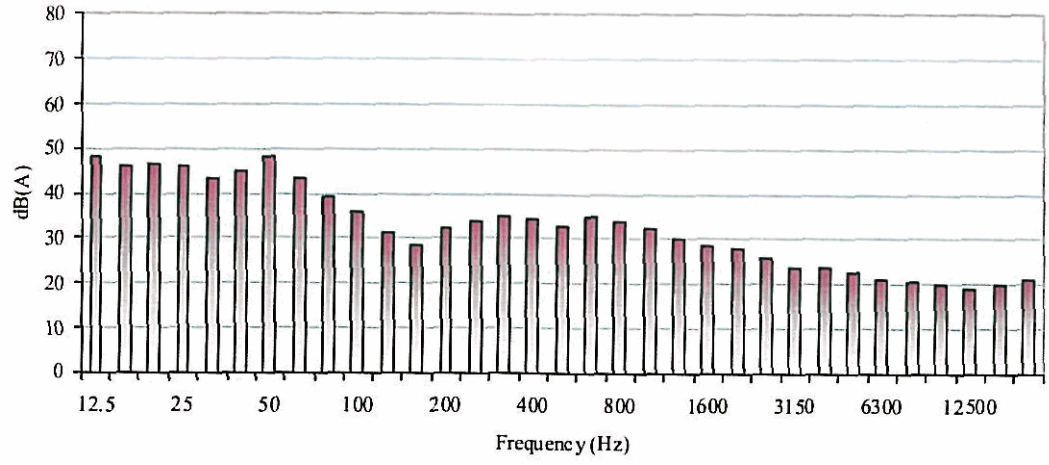
Frequency Analysis



Frequency Analysis at N1 (Site Non – operational)



Frequency Analysis at N2 (Site Non – operational)



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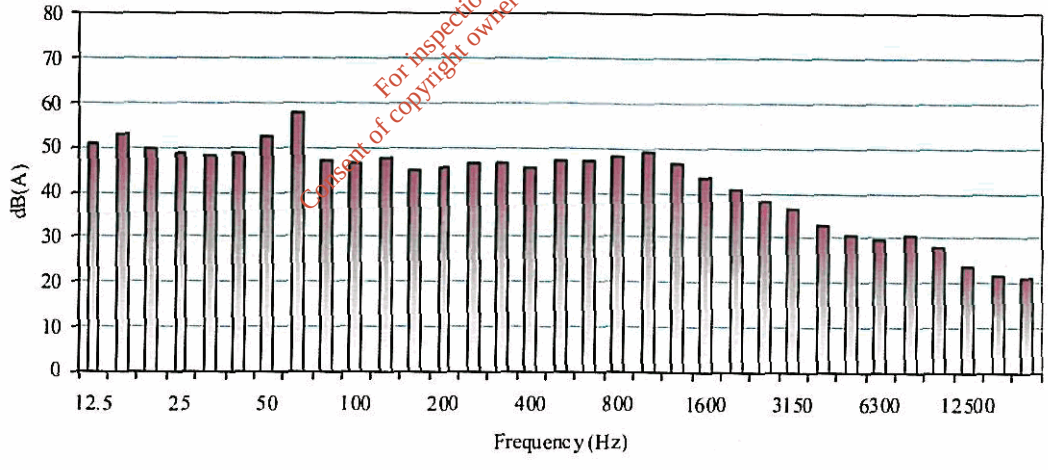
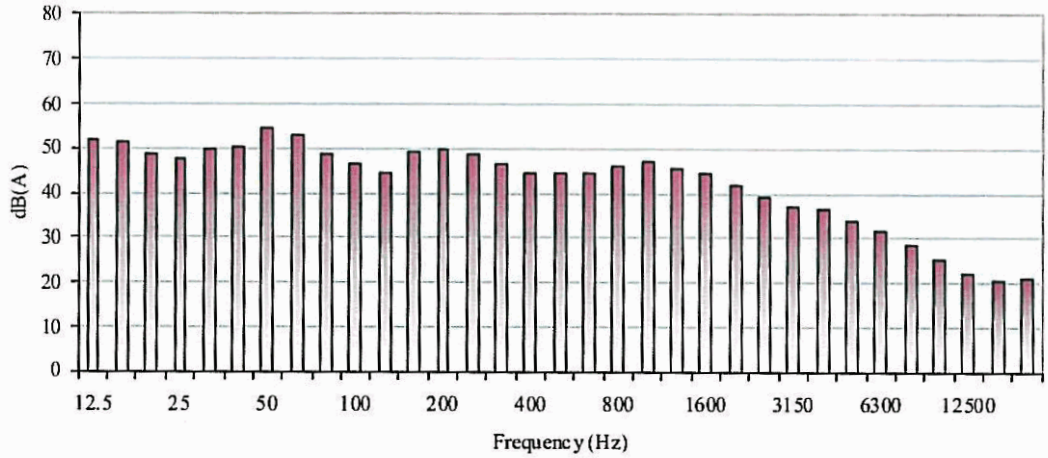
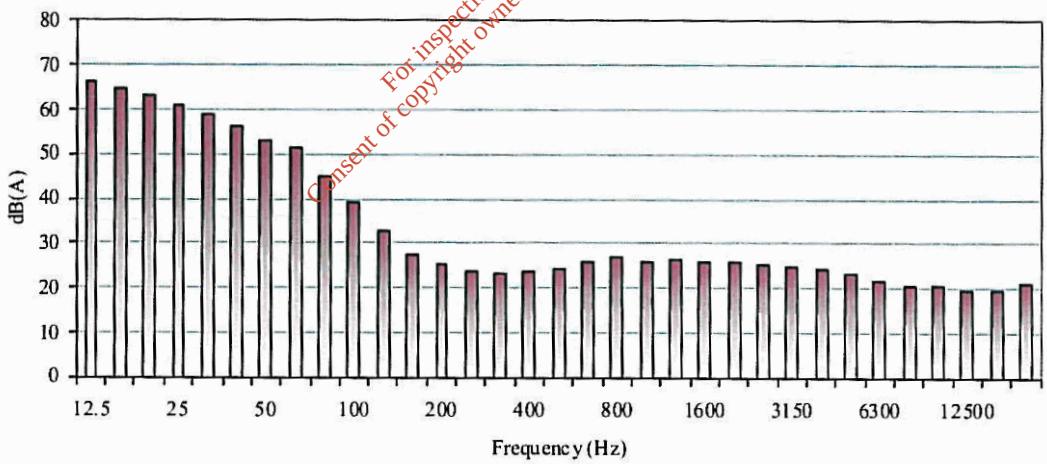


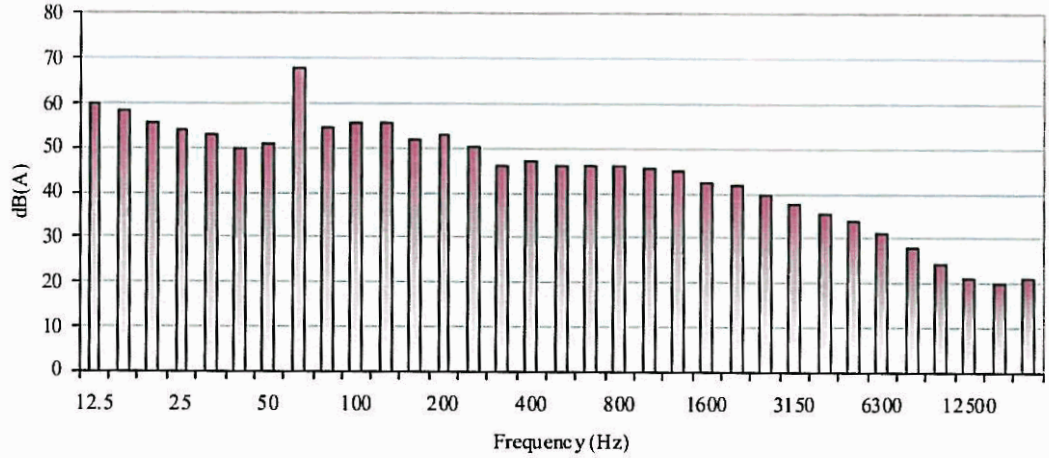
Frequency Analysis at N4 (Site Non – operational)



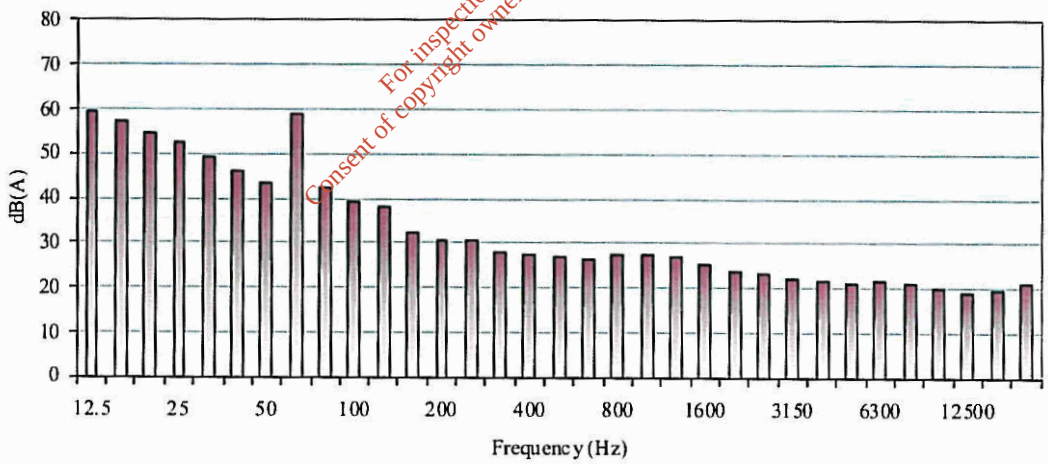
Frequency Analysis at N5 (Site Non – operational)



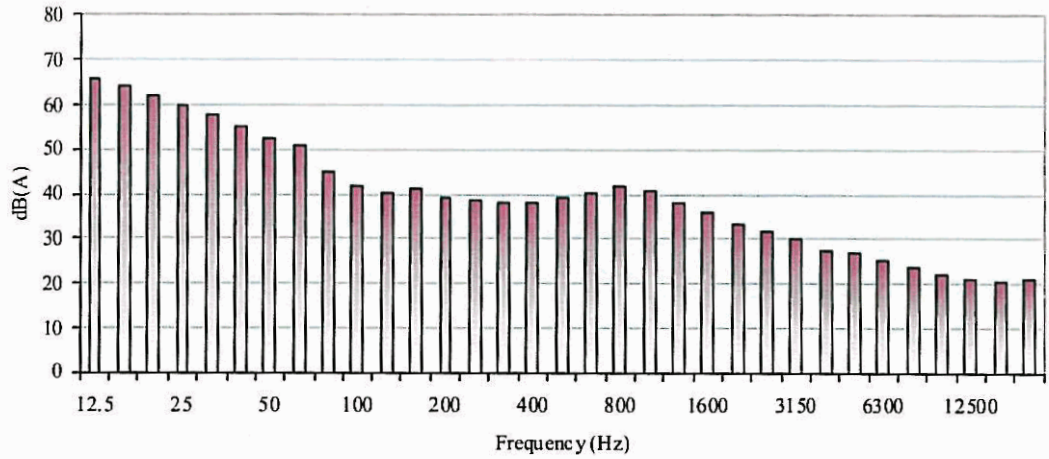
Frequency Analysis at N1 (Site Operational)



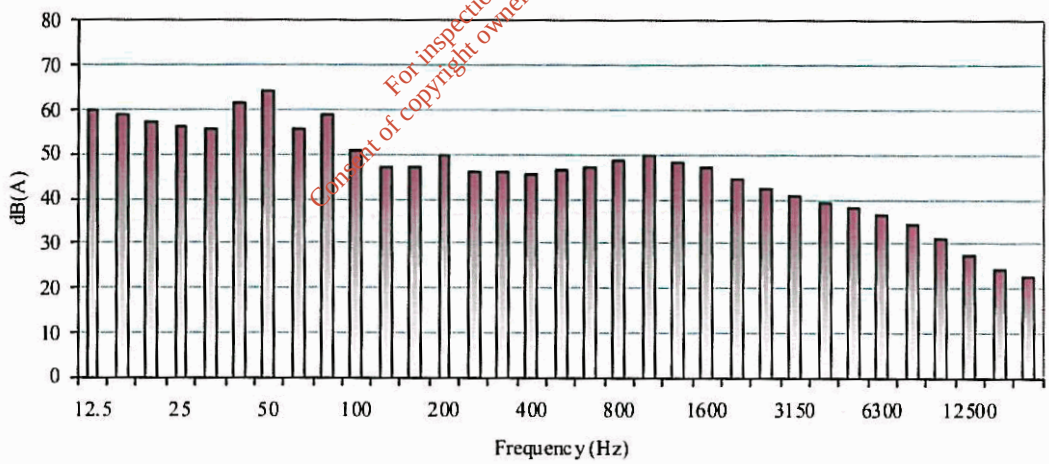
Frequency Analysis at N2 (Site Operational)



Frequency Analysis at N3 (Site Operational)



Frequency Analysis at N4 (Site Operational)



Frequency Analysis at N5 (Site Operational)

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