

Environmental Noise Assessment

Unit 4, Fall Bank Industrial Estate, Dodworth, Barnsley

March 2012

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Environmental Noise Assessment

Unit 4, Fall Bank Industrial Estate, Dodworth, Barnsley

Client Name: ELG Haniel Metals Ltd
Document Reference: EED12649-105-R-1.1.2-IU
Project Number: EED12649

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2008 and BS EN ISO 14001: 2004)

Issue	Date	Prepared by	Checked by	Approved by
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EXECUTIVE SUMMARY

ELG Haniel Metal Ltd is seeking to obtain planning permission for the change of use for the property known as Unit 4 Fall Bank Industrial Estate, Dodworth (hereafter the 'Site'). The proposals would see the change of use from B1, B2 & B8 uses to Sui Generis in order to recycle high value nickel alloys, including the operation of a washing and drying facility, subject to suitable environmental permitting.

The potential for the proposed development to impact on noise levels at nearby residential dwellings primarily associated with possible 24/7 operation of the thermal oxidiser, has been evaluated. Other impacts assessed are break-out noise from the warehouse, deliveries and service yard activities. The latter two occur during the daytime period only.

In order that the development, as proposed, does not adversely impact on amenity of local residential receptors, mitigation measures have been proposed.

Given the adoption of suitable mitigation measures secured by way of suitably worded planning conditions, the local amenity of the area would be maintained and the proposed development would be suitable for use.

1. Introduction

Waterman Energy, Environment & Design Ltd (hereafter 'Waterman) has been instructed by ELG Haniel Metals Ltd (hereafter 'the Applicant') to undertake an assessment of environmental noise associated with the proposed recycling of high value nickel alloys. This report is submitted in support of the planning application for the change of use for the property known as Unit 4 Fall Bank Industrial Estate, Dodworth (hereafter the 'Site'). The proposals would seek the change of use from B1, B2 & B8 uses to Sui Generis in order to recycle high value nickel alloys, including the operation of a washing and drying facility, subject to suitable environmental permitting.

The potential for the proposed development to impact on noise levels at nearby residential dwellings associated with the operation of the externally located thermal oxidiser, together with deliveries, service yard activities, and break-out noise from the industrial unit has been evaluated.

A glossary of acoustic terms is presented in Appendix A.

2. Site Description and Development Proposals

2.1 Site Description

The proposed development site is currently occupied by a disused warehouse referred to as Unit 4, Fall Bank Industrial Estate. Figure 1 presents the existing site layout. Access to the site is from the north directly from Fall Bank Crescent.

The land use immediately to the west, north and east is industrial. The warehouse unit located immediately to the west of the site is un-occupied, those to the north and east are occupied. The M1 motorway is located some 1.3km east of the Site. Immediately to the south the site is bound by the Penistone Railway Line which runs in slight cutting, beyond which are the residential houses of Foxmire Grove and Champany Fields. The nearest residential properties of these are approximately 30 metres from the site boundary and approximately 60 metres from the warehouse's southern facade.

2.2 Development Proposals

It is proposed that the site be used for the recycle of high value nickel alloys. This would require planning consent for change of use from B1, B2 & B8 uses to Sui Generis.

The proposal is to store, grade and process recycled high value alloys including a washing and drying process. The received high value nickel alloy swarf would be treated to remove residues of cutting fluid, making it suitable for re-use as a raw material. Swarf would be supplied by and returned to customers in the aerospace industry.

Swarf brought to site would first be crushed and then sent through a vibratory shaker table where hot water and detergent would be used to remove residues of cutting fluid. The metal would then be transferred in bins via fork-lift trucks to a gas-fired rotary kiln for drying. The chips are then sent through another vibratory shaker table and a series of magnets before being baled and sent off site for use as a raw material. Other processes taking place within the warehouse include shot blasting, plasma cutting of solid scrap metal blocks and alligator shears. A thermal oxidiser is to be located externally adjacent to the southern facade. The throughput of metal for this process is expected to be 10,000 tonnes annually, at maximum productivity.

The shot blasting of scrap metal blocks is to occur within an enclosed area within the warehouse. All other process are not enclosed.

ELG is proposing to re-open a previous vehicle access point at the northern edge of the site in order to create separate entrance points for heavy goods vehicles (HGVs) and for employee vehicles. A new vehicle entrance with a roller shutter door is proposed to be installed on the southern façade of the building, to provide access for delivery vehicles and fork-lift trucks.

The proposal includes the movement of approximately 30 to 40 HGV vehicles per week (6 to 8 per day) during the daytime period only. Delivery and collection vehicles would consist mainly of flat-bed trucks. Vehicle movements from shift workers would also produce small amounts of traffic in and out of the site. ELG is proposing to operate 2 or 3 shifts initially. The Site is well served by public transport and is located within close proximity to Dodworth Railway Station.

3. Planning Policy Guidance and Legislation

3.1 Planning Policy Guidance Note 24: Planning Noise (PPG 24)

The principal national source of guidance on matters of planning and noise is the Planning Policy Guidance Note 24 (PPG24), issued in September 1994. Its aim is *'to provide guidance on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the cost and administrative burdens of businesses*. As such, it outlines some of the main considerations which local planning authorities should take into account when determining planning applications for development that would either generate noise or be exposed to existing noise sources.

When considering the introduction of noise of an industrial nature close to existing noise sensitive receptors PPG 24 refers the reader to BS 4142:1997 'Method for rating industrial noise affecting mixed residential and industrial areas'. The document is discussed below.

3.2 BS 4142: 1997 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas'

The guidance provided in BS 4142 is intended to be used to assess whether noise from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises is likely to give rise to complaints from residents of nearby dwellings.

The standard sets out a methodology whereby the likelihood of complaints due to noise emissions can be assessed. The measured or predicted noise level from the source in question, the 'specific noise' level, immediately outside of the dwellings is compared with the 'background noise' level. Where the noise contains a 'distinguishable discreet continuous note (whine, hiss, screech, hum *etc*) or if there are distinct impulses in the noise (bangs, clinks, clatters or thumps), or if the noise is irregular enough to attract attention' then a correction of +5 dB is added to the specific noise level to obtain the 'rating noise' level.

The likelihood of noise provoking complaints is assessed by subtracting the background noise level from the rating noise level. The likelihood of complaints is then assessed against the criteria provided in Table 1**Error! Reference source not found.**

Table 1: BS 4142: 1997 Assessment Criteria

Difference in noise levels (dB(A)	Likelihood of complaints
-10	Complaints Unlikely
+5	Results are of marginal significance
+10	Positive indication that complaints are likely

For the daytime, this assessment is carried out over a one hour reference period and during the night-time, over a five minute period. Day and night are not defined in the Standard but it states that night should cover the times when the general adult population are preparing for sleep or actually sleeping. For the purpose of this assessment it has been assumed that the day and night periods reflect those stated in PPG 24, i.e. daytime is 07:00 – 23:00 and night 23:00 - 07:00.

It should be noted however, that the BS4142 method is not suitable when the background and rating noise levels are both very low. The standard states that 'background noise levels below about 30dB and rating levels below about 35dB are considered to be very low.

3.3 BS 8233: 'Sound Insulation and Noise Reduction for Buildings' – 1999

BS 8233:1999 'Sound Insulation and Noise Reduction for Buildings' aims to provide recommendations with regards to the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings, or refurbished buildings undergoing a change in use. However, it can be used with caution to assess the changes in the existing external noise climate on existing sensitive receptors.

The standard suggests good and reasonable internal noise levels for various uses. It is normal procedure for a residential suitability assessment to follow these criteria to assist in the design of façade construction, glazing and ventilation strategy of proposed dwellings.

Table 2: Indoor ambient noise levels (BS 8233, 1999)

Location	Internal Noise Level
Living rooms (07:00 – 23:00)	Good Standard 30 dB L_{Aeq} Reasonable Standard 40 dB L_{Aeq}
Bedrooms (2300-0700hrs)	Good Standard 30 dB L_{Aeq} Reasonable Standard 35 dB L_{Aeq} Maximum Noise Level 45dB L_{Amax}

With regards to external noise levels BS 8233 states:

'It is desirable that the steady state noise level does not exceed 50 dB $L_{Aeq,T}$ and 55 dB $L_{Aeq,T}$ should be regarded as the upper limit.'

Although the guideline noise limits provided in this document are based upon social surveys regarding the adverse effects of transportation noise, they can be used with caution to place noise limits and predicted noise levels in context.

3.4 World Health Organisation (WHO)

The WHO published guidance on the desirable levels of environmental noise in 2000. In this document, Guidelines for Community Noise, the authors consider that sleep disturbance criteria should be taken as an internal noise level of 30dB $L_{Aeq,8hr}$ or an external level of 45dB $L_{Aeq,8hr}$, measured at 1m from the façade. It is also suggested that internal L_{Amax} levels of 45dB and external L_{Amax} levels of 60dB, should not be exceeded.

For daytime levels, it is considered that:

'To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB L_{Aeq} on balconies, terraces, and outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB L_{Aeq}. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.'

4. Baseline Conditions

4.1 Noise Sensitive Receptors

The closest noise sensitive receptors (NSRs) to the site were identified following a site walkover. The NSRs are illustrated by Figure 2 and described in Table 3.

Table 3: Noise Sensitive Receptors

NSR	Description	Distance from Current Site Boundary	Distance from Warehouse Building
A	Residential properties on Foxmire Grove	30m	60m
B	Residential properties on Champany Fields	30m	60m

4.2 Noise Survey

A baseline noise monitoring survey was undertaken between Saturday 18th February and Tuesday 21st February 2012. A single noise monitoring location was installed adjacent to the southern boundary of the site at a comparable distance from the railway line as the residential houses on Foxmire Grove and Champany Fields. This location was selected as it was considered to be representative of the noise climate within the vicinity of NSRs. The noise monitoring locations are presented as Figure 2.

The noise monitoring location and methodology was agreed in principle with the Environmental Health Officer at Barnsley Borough Council (BBC).

Monitored noise levels were recorded at five minute intervals throughout the survey period. The parameters logged were L_{Aeq}, L_{A90} L_{Amax} and L_{A10}. The monitored noise levels are presented in full in Appendix B and summarised in Table 4 below.

Table 4: Summary of Baseline Noise Measurements

Day Period		Noise Level dB			
		L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
Saturday Day	Average	46.9	40.1	47.5	53.1
	Min	36.4	34.4	38.0	36.5
	Max	54.1	45.6	55.2	66.0
Saturday Night	Average	39.5	32.0	39.4	43.4
	Min	25.8	24.6	27.1	27.1
	Max	53.0	39.0	52.1	59.7
Sunday Day	Average	41.2	33.5	40.2	39.4
	Min	25.4	22.9	27.8	25.3
	Max	52.6	39.6	51.5	70.4
Sunday Night	Average	39.0	28.3	33.4	33.2
	Min	22.2	21.2	23.1	22.6
	Max	54.4	42.9	54.2	70.4

Day Period		Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
Monday Day	Average	46.7	40.9	46.8	50.7
	Min	35.9	33.8	37.7	37.1
	Max	54.6	45.2	55.5	68.6
Monday Night	Average	40.7	33.2	40.4	46.3
	Min	31.4	29.3	32.6	33.4
	Max	52.1	40.3	51.4	60.8

With reference to Table 4 it can be seen that the noise levels on Saturday and Monday were comparable with average noise levels of 47dB L_{Aeq} and 40-41dB L_{A90} during the daytime period and 40 to 41dB L_{Aeq} and 32-33dB L_{A90} during the night-time period. As anticipated, the measured noise levels on Sunday were lower; 41dB L_{Aeq} and 34dB L_{A90} during the daytime period and 39dB L_{Aeq} and 28dB L_{A90} during the night-time period.

During set-up, interim visit on a Sunday and collection of kit on Tuesday, the dominant noise source was considered to be road traffic noise from the local area road net-work together with the constant distant rumble of road traffic noise on the M1. Very occasional train by pass events also contributed to the noise climate at this location. Two trains pass by every hour during the week and Saturday's with two every two hours on Sunday. Other occasional noise sources included level crossing alarms and station tannoy announcements. Noise from the other warehouse units was not considered to contribute significantly to the noise measured at the logger position due to screening afforded by the current warehouse building. On Tuesday it was noted that some external loading activity did occur at DSM Roofing Ltd located to the east of the site. It's operational hours were noted as 08:00 to 4:30 Monday to Friday.

5. Impact Assessment

The potential impacts of the proposed development have been assessed. The primary noise impacts associated with the operation of the proposed development have been identified as:

- Noise emissions from the thermal oxidiser;
- Goods vehicle (HGV) movements;
- Noise breakout from industrial unit.

The assessment results for each of the above are summarised in the following paragraphs. Calculations are provided in full as Appendix C. It should be noted that when considering the night-time noise climate the prevailing night-time noise levels within the vicinity of the NSRs are, in accordance with BS4142 advice, too low to undertake a BS4142 assessment. In this respect, BBC has requested that a night-time noise criteria of 35dB L_{Aeq} at the nearest residents boundary be satisfied.

5.1 Thermal Oxidiser

The proposed thermal oxidiser is to be located adjacent to the southern façade of the existing structure some 40-50m from the closest NSR. The proposed thermal oxidiser is to be of a bespoke design and as such specific noise data for the plant is unavailable.

As such, a noise limiting criteria for the thermal oxidiser has been proposed to ensure that the 35dB L_{Aeq} night-time criterion is achieved. In the absence of mitigation a limiting criteria of 63dB L_{Aeq} at a distance of 1.5m from the thermal oxidiser unit when operating at full duty would be required. Should the thermal oxidiser be screened by a suitable acoustic barrier the noise limiting criteria could conceivably be increased by an amount just less than the performance provided by such a barrier. Furthermore, at this stage of the design it is considered that the thermal oxidiser could be designed so as to mitigate the potential for tonal noise emissions.

In view of the above it is considered that all design matters relating to the operation of the proposed thermal oxidiser could be controlled by way of a suitably worded planning condition.

5.2 Deliveries – Heavy Goods Vehicles

Following consultation with the applicant it was determined that there would be a maximum of 1 HGV delivery in any hour during the daytime period. The HGV would enter the site, travel to the southern façade where it would reverse into the warehouse via the roller shutter doors for unloading. It is expected that the roller shutter doors would be closed during the unloading process to reduce break-out noise from the warehouse and un-loading activities.

On occasion, un-loading may also take place at the eastern façade of the warehouse in the area of the existing loading bays. In order to allow for a worst case assessment noise levels as a result of HGV deliveries adjacent to the eastern façade of the structure have been predicted.

In order to assess the impacts of service and delivery noise, the source noise levels summarised in Table 5 have been utilised. The source noise levels are based on historical field measurements from service yard movements (HGV deliveries) within similar operational developments. To allow comparison between the three activities of arrival, unloading and departure, the source noise levels have been converted into a sound exposure level (SEL), which is the noise energy of the event standardised to a one second period.

Table 5: Delivery Vehicle Noise Levels

Activity	SEL
Delivery	86

Note: * T in seconds

The change in ambient noise levels as a result of service and delivery vehicles has been predicted. The assessment results are presented in Table 6. The predicted noise levels have been corrected to façade noise levels through the addition of 3dB(A).

Table 6: HGV Service Yard Event Noise

Parameter	Resultant Noise Levels – Daytime (1 hour)
HGV SEL	86
SEL to L_{Aeq} Correction	-36
Distance Correction (20Log(10/40))	-12
Façade Correction	+3
Total Activity Noise Level (dB)	41
Monitored Ambient Noise Level	47
Total Noise Level (predicted +ambient)	48
Change in noise level	+1

Note: [1] – Evening noise level.

The assessment results presented in Table 6 indicate that noise levels arising from HGV deliveries would give rise to a maximum increase in ambient noise levels of 1dB(A) during the delivery period. An increase in noise levels of this magnitude would be imperceptible at nearby noise sensitive receptors and as such is unlikely to adversely affect the amenity of residents local to the proposed development.

5.3 Break-Out Noise

In addition to the external noise sources presented above there would also be the potential for noise breakout from within the units to be experienced. At this time noise emission data for plant located within the structure is unavailable, however, for assessment purposes it is considered appropriate to adopt the Lower Action Limit of 80dB as set out in the Noise at Work Regulations as an approximation of the likely internal reverberant noise level.

To predict the levels of noise that would be experienced externally to the existing structure noise break out calculations were undertaken assuming that the proposed structure provides a composite weighted sound reduction index of 25dB $R_{W;Ctr}$. The composite sound reduction allows for the attenuation provided by a single skin profiled steel façade coupled with an acoustically insulated roller shutter door. It is understood that the roller shutter door would remain closed at all times other than to allow vehicles ingress and egress from the structure.

The predicted noise levels generated as a result of noise breakout from the proposed development are presented as Table 7 below. The assessment has been undertaken based upon an absolute limit level of 35dB(A) at a location 1m from the façade of the closest sensitive receptor to the proposed development.

Table 7: Assessment of Noise Breakout

Parameter	Noise Level
Predicted Noise Level at NSR (dB)	33

Limit Level (dB)	35
Difference	-2

The assessment results presented in Table 7 indicate that noise levels as a result of noise break out from the industrial units would fall below the adopted limit level. As such it is predicted that the proposed development would have a negligible impact upon the amenity of local residents.

6. Mitigation

The impact assessment has demonstrated that many of the activities associated with the proposed development are for the most part of negligible significance. This is due to distance separation and deliveries and service yard activity restricted to the daytime period only. However in the absence of mitigation and noise control measures there would be the potential for noise associated with the thermal oxidiser to give rise to adverse comment. Potential noise control and mitigation measures are discussed in the following paragraphs.

6.1 Thermal Oxidiser

At this stage in the design process, plant specification is sufficiently flexible to ensure that suitably quiet non tonal plant can be designed / procured and/or mitigation options such as screening be investigated as necessary to ensure that required noise criteria are met.

Mitigation in the form of a suitably worded planning condition as previously discussed is recommended.

6.2 Service Yard Activities

Experience suggests that the greatest concern for many residents with regards to noise from developments such as that which is proposed is delivery noise particularly during the early morning period (07:00). In order to alleviate these fears and minimise the potential for noise complaints, it is recommended that the following mitigation measures and control procedures be introduced:

- When waiting to be unloaded vehicle engines to be switched off;
- Drivers to be advised not to use vehicle horns unless in an emergency;
- HGVs not to be over revved, and
- Roller shutter door to be closed when not in use.

7. Conclusions

A noise assessment has been undertaken to assess the potential noise impacts associated with the proposed development. Noise surveys were completed during both the day (07:00–23:00) and night-time (23:00-07:00) periods to ensure that representative ambient noise levels were monitored when expected activities of the Development would be operational.

It is considered that without appropriate mitigation operation of the proposed development could have the potential to give rise to disturbance at neighboring residential dwellings. Noise impacts are primarily associated with operation of the thermal oxidiser, HGV deliveries and service yard activities.

Negligible impact on the local noise environment, associated with the Development, is predicted provided the proposed mitigation measures are implemented.

It is therefore considered that, with the inclusion of the proposed mitigation measures and through the use of suitably worded planning conditions the local amenity of the area could be maintained and the proposed development would be suitable for use.

FIGURES

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Figure No:2

Job No: EED12649.102

Date: 6 February 2012

Site Boundary

Scale: 1:1,250

Drawn By: AH

N

SITE ACCESS

OFFICES

LOADING BAYS

WAREHOUSE

PENISTONE RAILWAY LINE

CHAMPANY FIELDS

FOXMIRE GROVE

Fall Bank Industrial Estate

FALL BANK CRESCENT

Tanks

Tank

Path

Drain

156.2m

El P

El Sub Sta

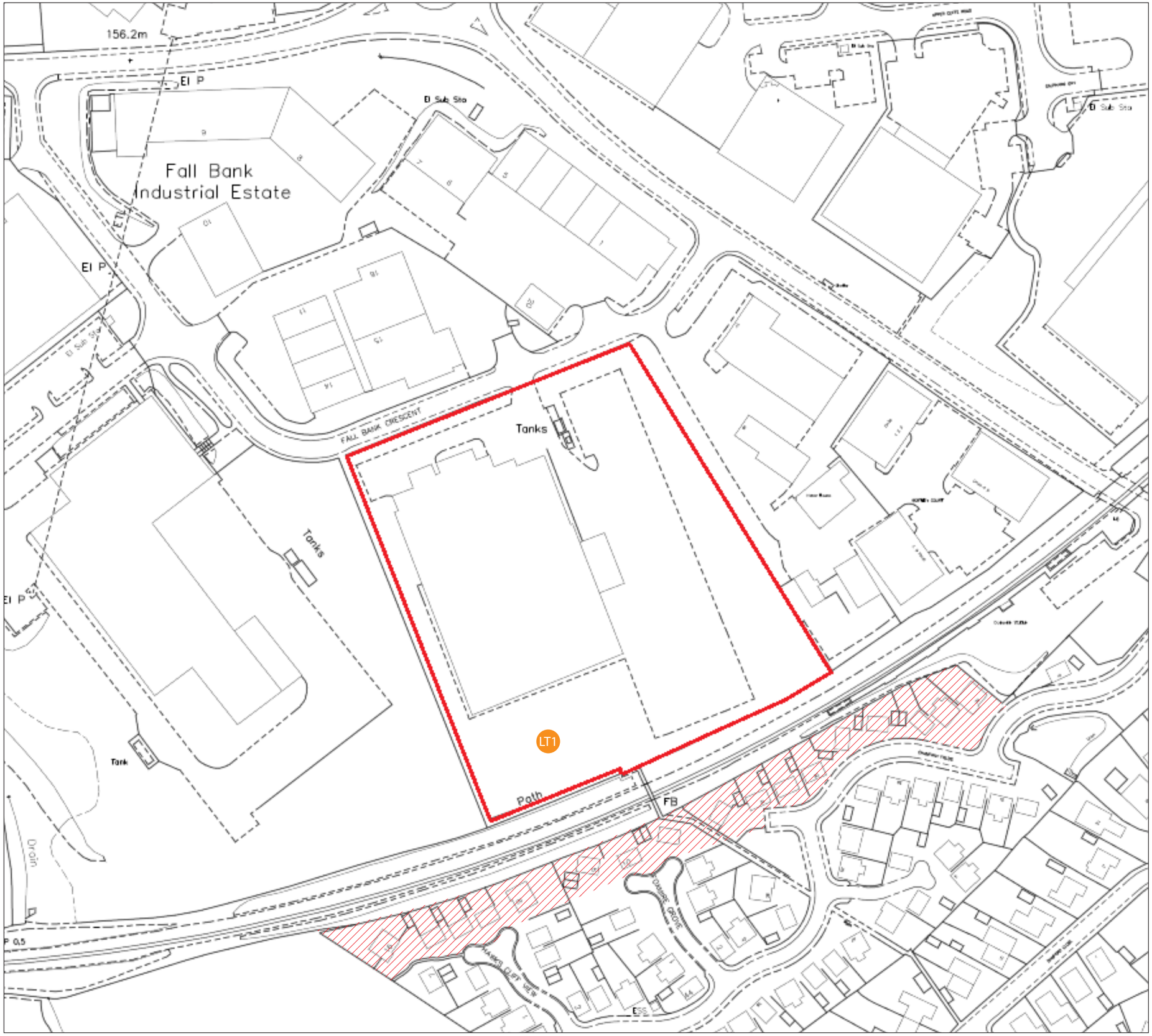
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Project Details	E13649-102 ELG Fall Bank Noise Assessment
Figure Title	Figure 1: Existing SIte Layout
Figure Ref	E13649-102_GR_NM_1A
Date	February 2012
File Location	\\nt-lncs\weedl\projects\e13649\102\graphics\nm\issued figures

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Site Boundary

LT1 Long Term Noise Monitoring Location

Noise Sensitive Receptors

N

Project Details	E13649-102 ELG Fall Bank Noise Assessment
Figure Title	Figure 2: NSR's and Noise Monitoring Locations
Figure Ref	E13649-102_GR_NM_2A
Date	February 2012
File Location	\\nt-lncs\weedl\projects\e13649\102\graphics\nm\issued figures

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APPENDICES

Appendix A Acoustic Terminology

AAWT — Annual Average Weekday Traffic

Acoustic barrier — Solid walls or partitions, solid fences, earth mounds, buildings, etc used to reduce noise, without eliminating it.

Ambient sound — The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.

Assessment period — The period in a day over which assessments are made.

Background noise — Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{90} noise level (see below).

Barrier — See "Acoustic barrier", a solid object used to attenuate sound.

Broadband — Containing the full range of frequencies.

Decibel [dB] — The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound is heard.

The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping.

Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds;

• Four engine jet aircraft at 100m	120 dB
• Riveting of steel plate at 10m	105 dB
• Pneumatic drill at 10m	90 dB
• Circular wood saw at 10m	80 dB
• Heavy road traffic at 10m	75 dB
• Telephone bell at 10m	65 dB
• Male speech, average at 10m	50 dB
• Whisper at 10m	25 dB
• Threshold of hearing, 1000 Hz	0 dB

dB(A): A-weighted decibels — The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted dB(A) or as L_A dB. Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.

Free-Field	A situation in which the radiation from a sound source is completely unaffected by the presence of any reflecting surfaces.
Heavy vehicle	Heavy vehicles are assumed to be buses, rigid trucks and semi trailer trucks with a weight greater than 3 tonnes. Also heavy vehicles can be defined in terms of length as buses, or trucks with a length exceeding 5.25 metres.
Lnn noise descriptors	Because noise varies with time, a single noise value cannot adequately define the noise ambient. For this reason, the acoustic environment is described using a number of noise level descriptors as follows;
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
$L_{10,1\text{-hour}}$	The L_{10} level measured over a 1 hour period.
$L_{A10,18\text{-hour}}$	The arithmetic average of the A-weighted $L_{10,1\text{-hour}}$ levels for the 18 hour period between 6am and 12 midnight on a normal working day. It is a common traffic noise descriptor.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level. The A-weighted L_{90} is expressed as the L_{A90}.
L_{eq}	Equivalent sound pressure level - the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
$L_{Aeq,1\text{-hour}}$	The A-weighted L_{eq} noise level for a specific one-hour period.
L_{Amax}	The maximum RMS A-weighted sound pressure level occurring within a specified time period.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on. That is, the sound of 85 dB is 400% times the loudness of a sound of 65 dB.
Microphone	An electro acoustic transducer which receives an acoustic signal and delivers a corresponding electric signal.
Noise	Sound which a listener does not wish to hear.
Sound exposure level (L_{AE})	A measure of A-weighted sound energy used to describe noise events such as the passing of train or aircraft; it is the A-weighted sound pressure level which, if occurring over a period of 1 second, would contain the same amount of A-weighted sound energy as the event.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.

Appendix B Noise Monitoring Survey

A noise monitoring exercise was undertaken between Saturday 18th February and Tuesday 21st February 2012. A noise logger was installed at the southern part of the site at a comparable distance from the railway line as the residential houses on Foxmire Grove and Champany Fields. This location was selected as it was considered to be representative of the noise climate within the vicinity of NSRs.

Agreement in principle was gained from the relevant EHO of Barnsley Borough Council on the noise monitoring location and strategy. During set-up, interim visit on Sunday and collection of kit on Tuesday, the dominant noise source was considered to be road traffic noise on the local area road net-work together with the constant distant rumble of road traffic on the M1. Very occasional train by pass events also contributed to the noise climate at this location. Two trains pass by every hour during the week and Saturday's with two every two hours on Sunday. Other occasional noise sources included level crossing alarms and station tanoy announcements. Noise from the other industrial units was not considered to contribute significantly due to screening afforded by the current warehouse building. On Tuesday is was noted that some external loading activity did occur at DSM Roofing Ltd located to the east of the site. It's operational hour are 08:00 to 4:30 Monday to Friday.

Monitored noise levels were recorded at five minute intervals throughout the survey period. The parameters logged were L_{Aeq}, L_{A90} L_{Amax} and L_{A10}. The noise monitoring equipment used during the surveys is described in Appendix B together with full details of the noise survey.

The sound level meter was calibrated both before and after the survey period and exhibited negligible drift from the reference level of 94 dB. Traceable calibration certificates for the monitoring equipment are available on request.

All measurements were undertaken in free field conditions (e.g. there were no nearby reflecting surfaces). Measurements were taken at a height of approximately 1.5m from ground level. Photograph B1 illustrates the noise monitoring kit looking towards the residential houses of Foxmire Grove and Champany Fields.

Photograph B1: Noise Monitoring Kit



Table B1 details the noise equipment used in the survey.

Table B1: Noise Monitoring Equipment

Sound Level Meter	
Meter Model	Rion NA-28
Serial Number	01170649
Calibrator	
Calibrator Model	NC-74
Serial Number	35173533
Calibration Level (dB)	94 dB
Microphone	
Microphone Type	UC- 59
Microphone Serial Number	00741

Noise measurements were taken from 16:00 on Saturday 18th February until 07:00 Tuesday 21st February 2012. The weather conditions during the monitoring period are presented in Table B2.

Table B2: Weather During Noise Survey

Day	Period	Temp 0^C	Wind Speed m/s	Weather
Saturday	Afternoon (from 4pm.)	4	4-5 WNW	Cloudy
	Evening (from 7pm)	2	3-4 WNW	Clear
	Night (from 11pm)	1	2-3 WNW	Clear
Sunday	Day (from 7 am)	4	2-3 WNW	Sunny
	Evening (from 7pm)	1	2-3 WNW	Clear
	Night (from 11pm)	1	1-2 NW	Clear to cloudy
Monday	Day (from 7 am)	6	4-5 SW	Cloudy with some showers
	Evening (from 7pm)	7	4-5 SW	Cloudy with some showers
	Night (from 11pm)	7	3-4 SW	Cloudy

Table B3 present the measured noise levels

Table B3: Noise Survey Data

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
18/02/2012 16:00	42.8	39.6	44.9	50.0
18/02/2012 16:05	47.9	39.6	48.2	45.7
18/02/2012 16:10	44.6	40.7	46.2	53.1
18/02/2012 16:15	40.9	38.8	42.5	43.4
18/02/2012 16:20	42.2	38.6	44.8	51.5
18/02/2012 16:25	42.2	39.4	43.9	51.7
18/02/2012 16:30	43.1	39.9	45.4	51.6
18/02/2012 16:35	42.9	39.2	44.8	46.9
18/02/2012 16:40	42.5	39.8	44.7	47.1
18/02/2012 16:45	42.5	39.7	44.5	44.0
18/02/2012 16:50	49.2	41.0	53.2	60.2
18/02/2012 16:55	43.9	40.8	45.8	51.0
18/02/2012 17:00	43.8	40.7	45.9	54.6
18/02/2012 17:05	46.8	42.3	49.1	57.0
18/02/2012 17:10	51.5	40.1	52.4	55.8
18/02/2012 17:15	41.0	38.5	42.5	54.2
18/02/2012 17:20	40.3	38.5	41.6	45.5
18/02/2012 17:25	41.0	37.9	41.9	42.1
18/02/2012 17:30	41.0	38.6	42.9	48.1
18/02/2012 17:35	41.4	37.7	44.0	50.5
18/02/2012 17:40	44.7	41.1	47.6	49.5
18/02/2012 17:45	45.4	40.0	48.6	59.3
18/02/2012 17:50	46.8	41.7	49.6	50.0
18/02/2012 17:55	40.8	38.3	42.0	48.2
18/02/2012 18:00	44.8	39.5	46.4	63.4
18/02/2012 18:05	41.7	40.1	43.0	50.3
18/02/2012 18:10	44.1	40.5	46.3	56.7
18/02/2012 18:15	53.4	42.6	53.7	48.6
18/02/2012 18:20	48.8	42.8	52.5	56.6
18/02/2012 18:25	51.8	44.0	55.2	57.8
18/02/2012 18:30	50.5	44.3	53.5	49.3
18/02/2012 18:35	51.1	44.8	54.3	65.2
18/02/2012 18:40	51.6	45.6	54.9	57.6
18/02/2012 18:45	49.0	44.9	51.3	60.0
18/02/2012 18:50	48.0	43.5	50.0	60.7
18/02/2012 18:55	49.7	42.9	53.8	66.0
18/02/2012 19:00	49.1	43.5	51.6	62.6

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
18/02/2012 19:05	48.0	43.5	50.6	52.4
18/02/2012 19:10	50.8	43.4	53.9	46.9
18/02/2012 19:15	47.9	42.9	50.0	47.0
18/02/2012 19:20	48.1	42.2	51.8	54.1
18/02/2012 19:25	48.5	43.0	51.4	63.9
18/02/2012 19:30	45.5	41.7	48.5	55.2
18/02/2012 19:35	44.9	41.9	47.2	53.5
18/02/2012 19:40	46.7	42.8	49.6	45.5
18/02/2012 19:45	48.5	42.5	51.8	57.4
18/02/2012 19:50	46.9	41.6	49.4	62.1
18/02/2012 19:55	47.6	42.1	50.7	51.2
18/02/2012 20:00	45.1	42.2	47.4	54.4
18/02/2012 20:05	48.5	42.8	51.8	57.9
18/02/2012 20:10	48.8	42.1	52.2	63.0
18/02/2012 20:15	54.1	41.9	54.4	51.2
18/02/2012 20:20	44.2	40.3	46.6	57.3
18/02/2012 20:25	46.1	41.0	49.1	50.0
18/02/2012 20:30	46.4	41.9	49.8	50.5
18/02/2012 20:35	45.2	40.9	47.8	43.9
18/02/2012 20:40	47.2	40.6	50.5	57.6
18/02/2012 20:45	44.8	39.5	47.5	58.5
18/02/2012 20:50	44.4	39.1	47.4	60.0
18/02/2012 20:55	44.2	37.7	47.6	59.0
18/02/2012 21:00	44.7	38.3	47.6	53.6
18/02/2012 21:05	41.2	36.9	43.8	48.1
18/02/2012 21:10	48.4	39.8	50.7	61.1
18/02/2012 21:15	44.0	38.5	47.0	52.7
18/02/2012 21:20	42.3	37.7	45.4	54.2
18/02/2012 21:25	41.1	36.7	43.5	53.8
18/02/2012 21:30	41.1	37.3	43.0	57.5
18/02/2012 21:35	45.1	37.8	47.8	58.4
18/02/2012 21:40	45.1	40.9	47.4	51.5
18/02/2012 21:45	46.0	40.3	48.5	54.4
18/02/2012 21:50	51.9	41.4	52.7	55.6
18/02/2012 21:55	45.6	40.6	48.0	62.3
18/02/2012 22:00	44.4	39.3	47.1	56.4
18/02/2012 22:05	42.4	38.6	44.7	51.0

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
18/02/2012 22:10	46.2	38.0	50.5	58.7
18/02/2012 22:15	43.5	37.7	46.2	57.3
18/02/2012 22:20	51.8	36.4	51.0	44.2
18/02/2012 22:25	37.9	35.6	39.9	44.4
18/02/2012 22:30	37.2	34.4	39.4	40.1
18/02/2012 22:35	39.2	35.4	42.2	50.3
18/02/2012 22:40	36.4	34.6	38.0	36.5
18/02/2012 22:45	36.7	34.6	38.3	49.3
18/02/2012 22:50	36.9	34.8	38.8	40.5
18/02/2012 22:55	39.4	35.4	41.3	53.3
18/02/2012 23:00	39.8	35.4	41.1	59.7
18/02/2012 23:05	38.6	36.8	40.0	44.8
18/02/2012 23:10	46.0	39.0	47.3	45.5
18/02/2012 23:15	42.2	37.8	44.9	53.1
18/02/2012 23:20	41.7	37.9	43.1	51.5
18/02/2012 23:25	39.7	36.5	41.6	41.6
18/02/2012 23:30	39.1	35.9	40.9	50.0
18/02/2012 23:35	53.0	37.4	52.1	45.2
18/02/2012 23:40	36.8	34.2	38.6	40.4
18/02/2012 23:45	37.4	34.3	40.0	52.3
18/02/2012 23:50	39.2	36.2	41.0	45.5
18/02/2012 23:55	38.7	35.1	40.7	53.3
19/02/2012 00:00	39.6	35.3	41.3	52.6
19/02/2012 00:05	40.2	36.1	42.8	43.9
19/02/2012 00:10	40.4	36.6	43.2	44.8
19/02/2012 00:15	41.7	36.5	44.3	58.7
19/02/2012 00:20	38.7	35.8	40.7	38.9
19/02/2012 00:25	38.5	34.9	40.8	50.5
19/02/2012 00:30	40.5	34.7	43.0	56.6
19/02/2012 00:35	39.3	34.0	41.1	49.1
19/02/2012 00:40	38.0	34.0	39.8	39.5
19/02/2012 00:45	36.4	33.3	37.8	41.6
19/02/2012 00:50	40.0	35.2	42.6	55.6
19/02/2012 00:55	41.4	35.5	44.4	54.5
19/02/2012 01:00	37.9	34.9	39.9	42.3
19/02/2012 01:05	39.1	35.2	41.3	50.6
19/02/2012 01:10	42.2	36.9	44.8	49.4

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
19/02/2012 01:15	41.9	35.5	43.8	56.9
19/02/2012 01:20	41.5	33.7	45.5	47.8
19/02/2012 01:25	40.9	35.6	43.8	45.5
19/02/2012 01:30	40.8	35.0	43.7	57.3
19/02/2012 01:35	41.5	36.3	44.5	49.1
19/02/2012 01:40	43.0	37.0	45.7	54.5
19/02/2012 01:45	41.0	34.9	44.1	52.7
19/02/2012 01:50	39.9	34.4	42.6	50.0
19/02/2012 01:55	36.0	32.7	38.3	45.0
19/02/2012 02:00	40.3	34.3	42.9	42.4
19/02/2012 02:05	42.0	37.3	44.5	46.3
19/02/2012 02:10	39.8	35.9	42.0	55.5
19/02/2012 02:15	41.0	35.9	43.8	49.5
19/02/2012 02:20	41.7	35.4	43.8	49.0
19/02/2012 02:25	38.3	34.4	40.4	46.0
19/02/2012 02:30	36.2	33.1	38.5	49.7
19/02/2012 02:35	37.1	33.4	39.6	44.3
19/02/2012 02:40	36.8	33.5	39.1	50.9
19/02/2012 02:45	38.1	33.5	40.4	49.4
19/02/2012 02:50	38.3	32.7	40.1	56.6
19/02/2012 02:55	37.5	33.4	40.1	44.9
19/02/2012 03:00	37.4	32.8	39.4	53.5
19/02/2012 03:05	37.6	33.1	39.4	55.1
19/02/2012 03:10	35.8	31.9	38.1	45.8
19/02/2012 03:15	32.3	30.1	33.8	35.0
19/02/2012 03:20	32.2	29.1	34.2	45.0
19/02/2012 03:25	32.5	29.9	34.6	39.2
19/02/2012 03:30	33.5	29.8	35.8	44.5
19/02/2012 03:35	33.6	29.4	37.2	44.6
19/02/2012 03:40	37.2	32.0	39.7	55.6
19/02/2012 03:45	36.4	32.3	38.6	42.7
19/02/2012 03:50	34.8	31.0	37.3	46.5
19/02/2012 03:55	33.7	28.8	35.8	46.9
19/02/2012 04:00	30.4	27.3	32.5	38.4
19/02/2012 04:05	31.2	27.5	32.6	29.6
19/02/2012 04:10	30.3	25.7	32.5	35.4
19/02/2012 04:15	33.5	28.5	36.0	37.7

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
19/02/2012 04:20	31.8	27.6	33.3	43.5
19/02/2012 04:25	29.6	26.7	31.7	35.1
19/02/2012 04:30	35.4	27.6	39.5	38.3
19/02/2012 04:35	30.0	26.8	32.0	32.7
19/02/2012 04:40	27.6	24.9	30.3	28.0
19/02/2012 04:45	25.8	24.6	27.1	27.5
19/02/2012 04:50	28.1	24.9	29.4	28.4
19/02/2012 04:55	32.1	26.2	35.6	29.7
19/02/2012 05:00	31.0	26.2	34.4	27.1
19/02/2012 05:05	32.0	27.7	34.7	33.9
19/02/2012 05:10	30.5	28.4	32.3	34.3
19/02/2012 05:15	30.8	28.4	32.8	33.1
19/02/2012 05:20	30.6	27.5	33.0	31.3
19/02/2012 05:25	33.0	26.9	33.6	31.4
19/02/2012 05:30	32.1	28.0	35.2	37.8
19/02/2012 05:35	39.9	31.2	43.7	50.3
19/02/2012 05:40	34.2	27.8	38.1	31.3
19/02/2012 05:45	36.4	28.9	39.9	34.3
19/02/2012 05:50	34.3	27.5	38.1	29.8
19/02/2012 05:55	32.4	26.4	36.2	28.2
19/02/2012 06:00	32.9	27.0	36.8	31.8
19/02/2012 06:05	34.8	27.1	37.9	36.2
19/02/2012 06:10	38.4	29.2	42.1	29.5
19/02/2012 06:15	34.6	30.3	38.5	31.2
19/02/2012 06:20	42.9	30.1	47.5	51.0
19/02/2012 06:25	35.9	29.6	38.9	35.6
19/02/2012 06:30	38.5	30.2	42.9	43.7
19/02/2012 06:35	35.5	30.4	39.6	40.5
19/02/2012 06:40	36.0	30.3	40.0	42.2
19/02/2012 06:45	36.1	31.6	39.4	39.9
19/02/2012 06:50	35.4	30.6	38.9	38.0
19/02/2012 06:55	41.0	33.0	45.6	34.0
19/02/2012 07:00	36.1	32.0	39.5	32.5
19/02/2012 07:05	44.3	32.4	48.5	47.8
19/02/2012 07:10	35.5	33.0	37.2	41.6
19/02/2012 07:15	34.5	32.4	36.2	40.4
19/02/2012 07:20	36.6	32.6	39.6	37.3

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
19/02/2012 07:25	43.3	33.9	47.0	37.8
19/02/2012 07:30	37.5	33.9	40.0	37.8
19/02/2012 07:35	42.5	34.2	46.2	35.0
19/02/2012 07:40	37.3	33.5	40.3	35.7
19/02/2012 07:45	37.2	34.3	39.3	37.4
19/02/2012 07:50	39.2	33.9	40.6	37.2
19/02/2012 07:55	38.5	34.5	41.4	37.2
19/02/2012 08:00	40.8	35.4	43.5	44.3
19/02/2012 08:05	37.8	33.4	40.5	47.3
19/02/2012 08:10	39.0	33.8	41.2	34.9
19/02/2012 08:15	42.3	34.1	45.3	43.3
19/02/2012 08:20	38.7	34.5	41.8	33.8
19/02/2012 08:25	38.3	34.3	39.8	44.8
19/02/2012 08:30	40.1	34.9	44.0	36.2
19/02/2012 08:35	42.4	35.1	46.4	47.2
19/02/2012 08:40	39.1	34.9	39.8	39.4
19/02/2012 08:45	40.7	34.3	44.8	46.3
19/02/2012 08:50	39.9	34.8	41.2	36.9
19/02/2012 08:55	42.8	36.3	42.1	40.6
19/02/2012 09:00	38.8	34.6	41.1	45.6
19/02/2012 09:05	40.3	35.4	43.4	40.7
19/02/2012 09:10	38.2	34.5	40.3	38.4
19/02/2012 09:15	39.3	35.2	39.9	40.3
19/02/2012 09:20	39.4	34.8	41.4	44.6
19/02/2012 09:25	39.8	36.7	41.8	46.0
19/02/2012 09:30	39.8	35.4	43.1	50.9
19/02/2012 09:35	38.1	35.4	39.9	41.6
19/02/2012 09:40	40.7	35.6	44.1	41.9
19/02/2012 09:45	43.4	36.0	40.0	36.8
19/02/2012 09:50	40.2	36.7	42.6	44.4
19/02/2012 09:55	38.9	35.8	41.1	36.6
19/02/2012 10:00	42.9	36.3	44.7	40.4
19/02/2012 10:05	37.1	35.2	38.7	39.5
19/02/2012 10:10	39.3	35.5	42.3	38.7
19/02/2012 10:15	51.1	38.2	51.0	69.3
19/02/2012 10:20	37.9	35.3	39.7	45.3
19/02/2012 10:25	38.1	35.8	39.9	41.9

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
19/02/2012 10:30	41.9	36.7	43.4	37.8
19/02/2012 10:35	40.9	37.5	43.3	42.0
19/02/2012 10:40	41.9	36.5	40.6	39.3
19/02/2012 10:45	41.7	37.3	44.1	45.6
19/02/2012 10:50	39.9	37.3	41.7	37.8
19/02/2012 10:55	45.4	38.5	48.8	43.5
19/02/2012 11:00	46.1	38.4	49.7	51.8
19/02/2012 11:05	47.7	39.6	51.5	42.1
19/02/2012 11:10	39.3	37.4	40.6	40.5
19/02/2012 11:15	42.9	37.0	46.7	48.3
19/02/2012 11:20	39.6	37.3	41.7	37.2
19/02/2012 11:25	39.9	37.2	41.5	38.8
19/02/2012 11:30	38.7	36.2	40.5	40.4
19/02/2012 11:35	40.1	36.8	41.6	49.1
19/02/2012 11:40	38.3	35.8	40.3	44.3
19/02/2012 11:45	39.8	37.3	41.1	40.9
19/02/2012 11:50	39.8	36.5	41.9	43.4
19/02/2012 11:55	39.7	37.5	41.6	48.2
19/02/2012 12:00	39.8	37.2	41.7	45.8
19/02/2012 12:05	39.6	37.1	41.7	39.8
19/02/2012 12:10	44.8	39.5	47.3	40.9
19/02/2012 12:15	41.5	37.0	43.7	39.1
19/02/2012 12:20	43.3	37.8	46.4	39.7
19/02/2012 12:25	38.7	36.0	40.8	39.7
19/02/2012 12:30	38.5	35.4	40.9	39.9
19/02/2012 12:35	46.3	36.4	45.0	41.2
19/02/2012 12:40	46.6	36.2	42.7	44.2
19/02/2012 12:45	38.7	35.4	41.1	44.8
19/02/2012 12:50	42.7	35.7	46.6	54.9
19/02/2012 12:55	43.1	36.6	45.9	43.0
19/02/2012 13:00	40.1	36.7	41.4	41.1
19/02/2012 13:05	40.2	36.2	43.1	46.1
19/02/2012 13:10	49.9	35.2	47.5	43.1
19/02/2012 13:15	41.8	35.3	45.7	38.4
19/02/2012 13:20	39.9	35.0	43.1	40.6
19/02/2012 13:25	39.7	35.4	42.5	38.2
19/02/2012 13:30	38.2	35.4	40.2	37.6

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
19/02/2012 13:35	37.5	34.9	39.7	36.9
19/02/2012 13:40	36.3	33.6	38.6	34.5
19/02/2012 13:45	36.7	34.1	38.7	36.0
19/02/2012 13:50	52.6	34.0	40.5	38.3
19/02/2012 13:55	40.1	33.7	42.7	41.1
19/02/2012 14:00	37.0	33.6	39.0	38.4
19/02/2012 14:05	36.8	33.4	39.7	35.0
19/02/2012 14:10	49.8	34.7	43.6	70.4
19/02/2012 14:15	45.3	35.0	43.3	67.2
19/02/2012 14:20	37.8	35.1	39.8	37.7
19/02/2012 14:25	37.3	32.8	40.0	39.6
19/02/2012 14:30	42.8	34.6	45.5	56.4
19/02/2012 14:35	37.2	33.1	39.9	36.7
19/02/2012 14:40	36.2	33.9	38.2	35.6
19/02/2012 14:45	38.4	33.9	41.2	47.8
19/02/2012 14:50	35.1	32.9	37.2	34.8
19/02/2012 14:55	40.6	33.8	41.3	34.5
19/02/2012 15:00	36.3	33.5	38.1	37.4
19/02/2012 15:05	47.3	32.5	44.4	35.8
19/02/2012 15:10	35.8	32.2	38.2	39.5
19/02/2012 15:15	36.8	33.2	38.3	36.6
19/02/2012 15:20	36.2	33.0	38.4	34.5
19/02/2012 15:25	38.8	33.9	41.6	33.9
19/02/2012 15:30	36.2	32.6	38.6	39.0
19/02/2012 15:35	37.4	33.2	40.3	35.8
19/02/2012 15:40	37.1	33.7	39.1	36.2
19/02/2012 15:45	35.3	32.9	36.5	34.9
19/02/2012 15:50	38.5	34.8	39.8	37.6
19/02/2012 15:55	40.0	33.7	40.7	36.0
19/02/2012 16:00	40.0	35.2	41.4	43.9
19/02/2012 16:05	45.3	36.6	49.0	39.8
19/02/2012 16:10	39.7	36.5	42.0	39.6
19/02/2012 16:15	47.6	34.5	48.4	41.9
19/02/2012 16:20	37.0	34.6	38.8	38.1
19/02/2012 16:25	38.6	35.6	40.3	41.9
19/02/2012 16:30	36.9	34.0	39.0	38.4
19/02/2012 16:35	38.8	35.7	41.1	37.1

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
19/02/2012 16:40	37.2	34.3	39.2	37.0
19/02/2012 16:45	36.7	33.7	39.1	34.0
19/02/2012 16:50	37.0	34.0	39.2	45.1
19/02/2012 16:55	37.3	33.0	39.7	39.5
19/02/2012 17:00	37.6	34.2	39.4	37.6
19/02/2012 17:05	37.8	33.9	39.7	36.6
19/02/2012 17:10	36.8	33.0	39.3	38.4
19/02/2012 17:15	36.4	33.4	39.1	35.0
19/02/2012 17:20	48.7	33.4	47.1	59.2
19/02/2012 17:25	38.1	34.0	41.2	39.1
19/02/2012 17:30	37.1	34.0	39.5	35.8
19/02/2012 17:35	38.0	34.0	40.3	38.4
19/02/2012 17:40	36.9	33.6	39.4	36.9
19/02/2012 17:45	38.5	34.3	40.8	38.9
19/02/2012 17:50	35.3	32.3	37.8	33.2
19/02/2012 17:55	38.8	34.0	41.6	50.4
19/02/2012 18:00	38.2	35.1	40.9	40.5
19/02/2012 18:05	43.4	35.0	43.5	56.8
19/02/2012 18:10	36.7	33.0	37.7	40.0
19/02/2012 18:15	35.7	32.9	37.5	39.5
19/02/2012 18:20	50.9	34.0	49.7	69.7
19/02/2012 18:25	35.9	33.8	37.8	33.1
19/02/2012 18:30	36.1	32.6	39.2	35.4
19/02/2012 18:35	36.6	33.1	39.8	33.4
19/02/2012 18:40	36.1	33.1	38.9	35.4
19/02/2012 18:45	35.4	33.7	36.8	35.0
19/02/2012 18:50	34.1	32.8	35.6	33.7
19/02/2012 18:55	35.6	33.4	37.3	34.5
19/02/2012 19:00	35.2	33.5	36.8	35.3
19/02/2012 19:05	35.9	33.3	38.0	36.1
19/02/2012 19:10	36.1	33.5	37.9	37.2
19/02/2012 19:15	34.0	32.1	35.7	36.0
19/02/2012 19:20	34.6	32.7	36.2	33.2
19/02/2012 19:25	34.3	32.2	35.8	33.7
19/02/2012 19:30	34.2	32.0	36.0	32.7
19/02/2012 19:35	35.8	33.2	38.1	33.5
19/02/2012 19:40	34.7	31.1	36.8	39.4

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
19/02/2012 19:45	33.0	30.9	34.7	32.0
19/02/2012 19:50	32.8	31.0	34.6	32.0
19/02/2012 19:55	40.4	32.5	42.5	36.0
19/02/2012 20:00	34.4	32.2	36.6	32.1
19/02/2012 20:05	34.3	31.6	36.6	38.2
19/02/2012 20:10	50.3	31.3	49.3	66.9
19/02/2012 20:15	38.0	31.5	41.8	36.1
19/02/2012 20:20	33.6	31.5	35.3	34.4
19/02/2012 20:25	34.9	31.2	37.0	32.4
19/02/2012 20:30	33.4	30.6	34.9	33.8
19/02/2012 20:35	34.6	31.3	36.0	33.2
19/02/2012 20:40	45.0	32.5	49.5	57.8
19/02/2012 20:45	32.6	30.5	34.6	35.6
19/02/2012 20:50	30.5	28.4	32.2	30.7
19/02/2012 20:55	32.0	29.5	33.4	31.5
19/02/2012 21:00	34.6	29.7	36.7	38.6
19/02/2012 21:05	33.4	28.4	36.1	35.6
19/02/2012 21:10	32.3	28.4	34.8	31.3
19/02/2012 21:15	35.8	28.4	39.3	50.2
19/02/2012 21:20	31.2	28.3	32.7	34.5
19/02/2012 21:25	30.3	28.4	31.7	30.5
19/02/2012 21:30	35.2	27.9	34.9	27.0
19/02/2012 21:35	34.6	27.9	33.9	30.7
19/02/2012 21:40	34.3	28.5	37.7	29.5
19/02/2012 21:45	30.8	27.9	33.3	28.4
19/02/2012 21:50	30.3	28.3	32.3	30.3
19/02/2012 21:55	31.6	28.2	33.7	32.5
19/02/2012 22:00	31.7	26.9	31.7	27.5
19/02/2012 22:05	35.4	28.2	39.1	31.3
19/02/2012 22:10	30.9	27.9	33.2	30.4
19/02/2012 22:15	38.7	26.7	42.5	51.7
19/02/2012 22:20	38.1	26.2	42.6	30.5
19/02/2012 22:25	27.8	24.9	29.7	30.8
19/02/2012 22:30	25.4	22.9	27.8	25.3
19/02/2012 22:35	26.8	24.1	28.8	27.2
19/02/2012 22:40	41.0	26.0	45.1	29.9
19/02/2012 22:45	28.5	25.6	31.2	29.2

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
19/02/2012 22:50	27.8	25.2	29.8	25.6
19/02/2012 22:55	29.6	27.0	31.3	33.9
19/02/2012 23:00	26.8	25.5	27.9	26.7
19/02/2012 23:05	27.2	25.5	29.0	26.3
19/02/2012 23:10	27.3	25.5	29.0	26.1
19/02/2012 23:15	28.4	26.3	30.1	35.5
19/02/2012 23:20	28.0	25.5	30.0	31.1
19/02/2012 23:25	28.2	25.7	30.3	31.8
19/02/2012 23:30	28.8	25.2	30.8	30.5
19/02/2012 23:35	28.8	26.8	30.5	28.4
19/02/2012 23:40	28.4	24.5	30.6	28.9
19/02/2012 23:45	26.8	23.4	29.7	32.7
19/02/2012 23:50	25.0	21.9	27.5	26.1
19/02/2012 23:55	27.9	23.4	31.3	24.5
20/02/2012 00:00	24.5	21.5	26.7	27.7
20/02/2012 00:05	22.2	21.2	23.1	22.6
20/02/2012 00:10	29.0	23.3	32.6	31.0
20/02/2012 00:15	27.8	22.3	31.0	26.2
20/02/2012 00:20	24.8	21.3	27.6	22.8
20/02/2012 00:25	27.1	22.4	29.5	25.3
20/02/2012 00:30	24.0	21.9	25.5	30.6
20/02/2012 00:35	25.8	22.2	28.7	24.2
20/02/2012 00:40	25.8	22.1	28.5	24.1
20/02/2012 00:45	25.4	22.6	28.4	30.6
20/02/2012 00:50	29.3	23.2	32.4	32.0
20/02/2012 00:55	25.8	23.6	27.5	24.1
20/02/2012 01:00	24.1	22.7	25.5	23.9
20/02/2012 01:05	25.8	23.8	27.3	23.9
20/02/2012 01:10	27.3	23.9	30.0	26.6
20/02/2012 01:15	28.0	25.8	29.7	28.6
20/02/2012 01:20	28.8	26.0	31.1	27.4
20/02/2012 01:25	27.3	24.5	29.1	27.3
20/02/2012 01:30	26.4	24.2	27.9	29.2
20/02/2012 01:35	30.2	25.2	33.0	28.8
20/02/2012 01:40	25.6	22.9	27.5	26.3
20/02/2012 01:45	26.6	24.9	28.0	31.5
20/02/2012 01:50	27.5	24.9	29.7	37.3

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
20/02/2012 01:55	25.9	22.6	27.6	27.0
20/02/2012 02:00	24.7	23.1	25.8	27.4
20/02/2012 02:05	26.6	23.2	28.7	27.7
20/02/2012 02:10	26.2	23.5	27.9	28.7
20/02/2012 02:15	28.0	24.1	30.6	32.9
20/02/2012 02:20	29.3	22.7	33.7	29.5
20/02/2012 02:25	23.4	22.1	24.6	26.9
20/02/2012 02:30	24.5	23.0	25.9	30.1
20/02/2012 02:35	24.6	23.2	26.0	31.3
20/02/2012 02:40	27.1	23.9	30.1	25.8
20/02/2012 02:45	24.9	23.0	26.7	29.3
20/02/2012 02:50	24.3	22.7	25.6	29.9
20/02/2012 02:55	25.4	23.9	26.6	25.0
20/02/2012 03:00	25.1	23.2	26.0	32.5
20/02/2012 03:05	24.7	23.1	26.1	27.8
20/02/2012 03:10	26.3	24.1	28.1	28.4
20/02/2012 03:15	28.0	26.0	29.6	26.9
20/02/2012 03:20	27.6	24.6	29.9	28.4
20/02/2012 03:25	27.3	25.4	28.9	26.5
20/02/2012 03:30	29.4	26.1	31.7	31.1
20/02/2012 03:35	29.2	26.1	31.5	30.8
20/02/2012 03:40	29.6	26.1	32.1	28.4
20/02/2012 03:45	31.8	27.8	33.6	29.3
20/02/2012 03:50	33.7	28.8	36.8	39.0
20/02/2012 03:55	33.9	28.7	36.9	32.3
20/02/2012 04:00	32.3	28.9	34.5	36.9
20/02/2012 04:05	32.2	29.8	34.2	34.3
20/02/2012 04:10	31.5	29.2	33.1	34.5
20/02/2012 04:15	35.0	30.5	38.0	32.3
20/02/2012 04:20	34.5	30.6	37.4	30.8
20/02/2012 04:25	33.0	27.7	36.2	29.4
20/02/2012 04:30	31.7	25.1	34.6	35.0
20/02/2012 04:35	27.5	25.2	29.2	26.0
20/02/2012 04:40	29.0	26.4	31.3	27.5
20/02/2012 04:45	30.8	28.0	33.1	28.5
20/02/2012 04:50	32.0	28.8	34.5	33.5
20/02/2012 04:55	33.8	30.4	36.6	32.5

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
20/02/2012 05:00	34.6	30.9	37.1	41.0
20/02/2012 05:05	36.4	33.2	38.8	39.2
20/02/2012 05:10	35.1	32.1	37.2	35.9
20/02/2012 05:15	34.5	31.8	36.3	34.3
20/02/2012 05:20	35.0	32.3	36.8	35.3
20/02/2012 05:25	35.6	33.3	37.5	34.6
20/02/2012 05:30	36.8	34.7	38.4	37.9
20/02/2012 05:35	41.3	38.9	43.1	43.3
20/02/2012 05:40	43.2	41.2	44.7	43.7
20/02/2012 05:45	43.4	41.7	44.6	44.0
20/02/2012 05:50	43.6	41.4	45.4	43.7
20/02/2012 05:55	44.6	41.9	46.4	57.9
20/02/2012 06:00	43.2	41.3	44.8	45.2
20/02/2012 06:05	45.5	39.9	48.9	60.2
20/02/2012 06:10	41.8	39.2	43.9	43.9
20/02/2012 06:15	54.4	40.5	54.2	70.4
20/02/2012 06:20	43.5	41.2	45.2	51.2
20/02/2012 06:25	42.8	41.5	44.0	46.3
20/02/2012 06:30	43.3	41.6	44.6	43.4
20/02/2012 06:35	44.7	42.4	46.0	46.9
20/02/2012 06:40	45.9	42.3	48.3	45.6
20/02/2012 06:45	44.7	42.9	46.0	45.7
20/02/2012 06:50	43.8	42.4	45.2	46.6
20/02/2012 06:55	45.6	42.3	46.6	56.9
20/02/2012 07:00	42.9	41.4	44.3	44.5
20/02/2012 07:05	43.2	41.7	44.4	44.1
20/02/2012 07:10	53.2	41.5	51.8	68.4
20/02/2012 07:15	43.5	41.3	45.2	41.8
20/02/2012 07:20	42.8	40.0	45.1	41.7
20/02/2012 07:25	43.4	40.8	45.4	46.2
20/02/2012 07:30	43.0	41.0	44.7	42.6
20/02/2012 07:35	44.4	42.0	46.0	47.8
20/02/2012 07:40	44.5	42.0	46.0	49.8
20/02/2012 07:45	45.2	43.2	46.6	46.2
20/02/2012 07:50	48.0	43.4	49.4	60.5
20/02/2012 07:55	43.5	41.2	45.1	43.7
20/02/2012 08:00	43.9	42.0	45.6	43.7

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
20/02/2012 08:05	43.9	42.0	45.7	45.1
20/02/2012 08:10	51.5	41.2	51.5	68.6
20/02/2012 08:15	42.7	40.1	44.4	44.8
20/02/2012 08:20	42.1	39.8	43.9	41.7
20/02/2012 08:25	41.4	39.7	42.9	41.3
20/02/2012 08:30	43.7	40.9	44.1	47.5
20/02/2012 08:35	42.6	41.3	43.8	41.5
20/02/2012 08:40	42.3	40.7	43.7	45.9
20/02/2012 08:45	41.6	39.7	42.8	40.4
20/02/2012 08:50	45.8	40.3	46.6	40.8
20/02/2012 08:55	50.3	39.3	47.5	48.9
20/02/2012 09:00	42.3	39.4	44.3	50.4
20/02/2012 09:05	54.0	41.3	53.4	54.6
20/02/2012 09:10	43.5	40.4	45.8	45.7
20/02/2012 09:15	42.9	40.5	44.6	50.2
20/02/2012 09:20	42.0	39.9	43.9	43.6
20/02/2012 09:25	44.2	40.9	46.6	56.2
20/02/2012 09:30	42.7	39.7	45.3	41.7
20/02/2012 09:35	44.3	40.6	47.0	50.9
20/02/2012 09:40	45.1	40.4	47.9	50.6
20/02/2012 09:45	43.9	41.4	45.8	48.6
20/02/2012 09:50	46.5	41.8	48.4	46.9
20/02/2012 09:55	47.0	41.1	50.5	45.2
20/02/2012 10:00	44.9	40.5	43.9	52.9
20/02/2012 10:05	53.7	40.6	55.5	58.8
20/02/2012 10:10	43.2	40.2	44.6	52.4
20/02/2012 10:15	42.3	40.2	44.3	48.7
20/02/2012 10:20	42.4	40.6	44.2	49.4
20/02/2012 10:25	43.7	40.6	45.1	47.5
20/02/2012 10:30	43.1	40.8	44.8	45.7
20/02/2012 10:35	42.6	40.1	44.5	48.9
20/02/2012 10:40	41.7	39.9	43.1	47.9
20/02/2012 10:45	42.8	40.3	44.8	43.7
20/02/2012 10:50	47.2	41.2	50.8	57.0
20/02/2012 10:55	42.1	39.7	43.9	43.7
20/02/2012 11:00	41.3	39.7	42.8	48.5
20/02/2012 11:05	45.6	39.4	45.4	44.7

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
20/02/2012 11:10	51.3	39.7	47.2	67.3
20/02/2012 11:15	43.2	39.1	44.3	45.5
20/02/2012 11:20	41.9	38.3	44.6	40.3
20/02/2012 11:25	42.5	39.3	45.1	49.5
20/02/2012 11:30	43.2	40.5	45.5	43.4
20/02/2012 11:35	41.8	39.8	43.3	48.0
20/02/2012 11:40	43.3	39.7	45.5	50.7
20/02/2012 11:45	45.0	41.7	47.4	52.3
20/02/2012 11:50	47.3	41.2	48.8	48.2
20/02/2012 11:55	42.6	39.9	44.6	48.2
20/02/2012 12:00	43.8	41.1	45.7	55.2
20/02/2012 12:05	53.7	42.0	54.2	57.9
20/02/2012 12:10	44.1	41.2	46.1	47.4
20/02/2012 12:15	44.0	41.6	45.9	54.0
20/02/2012 12:20	44.1	40.3	46.5	47.9
20/02/2012 12:25	43.2	40.8	44.7	54.0
20/02/2012 12:30	42.3	40.7	43.8	47.5
20/02/2012 12:35	41.6	39.9	42.6	47.1
20/02/2012 12:40	44.2	40.6	45.8	51.2
20/02/2012 12:45	43.3	41.2	44.9	50.6
20/02/2012 12:50	43.6	41.2	45.2	45.3
20/02/2012 12:55	46.3	40.3	47.2	42.4
20/02/2012 13:00	42.0	40.0	43.8	44.4
20/02/2012 13:05	41.8	39.9	43.4	48.7
20/02/2012 13:10	53.1	40.8	53.5	46.5
20/02/2012 13:15	44.3	40.5	46.9	47.7
20/02/2012 13:20	43.1	41.5	44.4	53.0
20/02/2012 13:25	42.7	40.1	45.2	50.8
20/02/2012 13:30	43.6	40.9	45.7	48.7
20/02/2012 13:35	42.8	40.6	44.7	46.5
20/02/2012 13:40	42.7	40.5	44.5	48.9
20/02/2012 13:45	44.3	41.5	46.4	55.3
20/02/2012 13:50	46.7	40.9	48.4	45.9
20/02/2012 13:55	42.8	40.9	44.1	41.8
20/02/2012 14:00	44.7	41.3	45.5	57.1
20/02/2012 14:05	51.7	40.8	47.8	46.4
20/02/2012 14:10	47.0	41.8	48.3	53.4

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
20/02/2012 14:15	44.5	42.1	46.3	53.7
20/02/2012 14:20	44.1	41.5	45.9	48.8
20/02/2012 14:25	44.3	41.5	46.4	43.5
20/02/2012 14:30	45.5	42.6	47.8	53.5
20/02/2012 14:35	47.4	41.6	50.5	52.3
20/02/2012 14:40	45.0	42.4	47.3	49.7
20/02/2012 14:45	43.6	42.1	44.8	45.1
20/02/2012 14:50	46.9	41.8	48.2	46.8
20/02/2012 14:55	43.5	41.6	44.5	57.9
20/02/2012 15:00	44.5	41.5	46.6	48.8
20/02/2012 15:05	54.0	42.7	55.1	46.5
20/02/2012 15:10	45.2	42.8	47.0	46.9
20/02/2012 15:15	44.8	42.8	46.3	47.2
20/02/2012 15:20	44.6	42.7	45.7	53.6
20/02/2012 15:25	46.8	43.2	49.2	59.7
20/02/2012 15:30	45.2	42.6	47.0	50.7
20/02/2012 15:35	46.4	43.0	49.1	46.0
20/02/2012 15:40	46.1	43.1	48.6	57.1
20/02/2012 15:45	46.6	43.5	48.7	47.7
20/02/2012 15:50	48.7	42.8	51.8	53.6
20/02/2012 15:55	48.0	43.0	51.0	56.7
20/02/2012 16:00	46.4	42.6	49.1	55.4
20/02/2012 16:05	52.9	42.1	53.9	54.5
20/02/2012 16:10	45.8	43.3	47.4	55.1
20/02/2012 16:15	47.8	43.6	51.0	52.2
20/02/2012 16:20	45.5	43.3	47.3	49.3
20/02/2012 16:25	46.5	43.4	49.1	51.2
20/02/2012 16:30	45.9	42.6	48.1	54.6
20/02/2012 16:35	47.5	44.6	49.7	51.1
20/02/2012 16:40	45.3	43.0	47.2	51.0
20/02/2012 16:45	46.3	44.0	47.6	55.5
20/02/2012 16:50	48.8	42.8	50.6	50.3
20/02/2012 16:55	45.3	43.5	46.5	55.6
20/02/2012 17:00	48.1	44.0	48.7	58.7
20/02/2012 17:05	45.7	44.1	47.3	50.7
20/02/2012 17:10	52.4	45.0	53.6	53.0
20/02/2012 17:15	49.9	44.9	53.1	62.0

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
20/02/2012 17:20	51.3	44.3	53.3	64.5
20/02/2012 17:25	48.2	44.4	50.3	64.4
20/02/2012 17:30	47.1	44.3	49.2	53.6
20/02/2012 17:35	48.5	44.3	51.3	58.9
20/02/2012 17:40	48.3	43.8	51.3	57.4
20/02/2012 17:45	46.1	43.4	48.3	53.5
20/02/2012 17:50	48.4	44.2	51.7	57.4
20/02/2012 17:55	49.0	43.9	52.5	59.0
20/02/2012 18:00	46.0	43.7	47.8	54.8
20/02/2012 18:05	46.5	42.9	49.2	55.9
20/02/2012 18:10	52.0	42.8	55.5	61.0
20/02/2012 18:15	46.8	43.6	49.2	53.0
20/02/2012 18:20	48.1	43.3	51.0	51.4
20/02/2012 18:25	46.4	43.1	49.0	54.2
20/02/2012 18:30	46.4	42.7	48.4	58.9
20/02/2012 18:35	47.2	43.1	50.5	55.8
20/02/2012 18:40	48.8	42.8	50.9	67.0
20/02/2012 18:45	47.4	43.4	50.0	55.7
20/02/2012 18:50	46.9	43.3	48.9	58.0
20/02/2012 18:55	45.5	42.1	47.4	57.2
20/02/2012 19:00	49.5	42.6	52.9	59.1
20/02/2012 19:05	47.8	43.6	50.7	56.1
20/02/2012 19:10	47.4	43.2	49.9	61.9
20/02/2012 19:15	54.6	45.2	55.4	55.1
20/02/2012 19:20	50.6	43.4	54.0	61.3
20/02/2012 19:25	46.6	42.6	48.2	62.2
20/02/2012 19:30	46.5	42.7	48.3	59.0
20/02/2012 19:35	48.3	42.9	51.2	60.6
20/02/2012 19:40	47.2	42.5	49.4	49.5
20/02/2012 19:45	46.3	41.0	49.0	62.4
20/02/2012 19:50	44.2	41.8	46.2	49.8
20/02/2012 19:55	49.3	41.9	54.1	57.6
20/02/2012 20:00	42.0	40.2	43.8	45.5
20/02/2012 20:05	43.9	40.5	46.1	53.1
20/02/2012 20:10	45.1	40.4	48.7	49.8
20/02/2012 20:15	50.9	40.8	50.8	52.3
20/02/2012 20:20	41.7	39.6	43.2	49.3

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
20/02/2012 20:25	40.8	38.8	41.9	43.9
20/02/2012 20:30	41.1	38.5	42.3	53.5
20/02/2012 20:35	40.2	38.5	41.3	47.2
20/02/2012 20:40	40.2	38.8	41.3	48.6
20/02/2012 20:45	40.2	38.6	41.9	46.7
20/02/2012 20:50	40.7	38.4	42.0	42.5
20/02/2012 20:55	42.9	39.5	45.7	47.1
20/02/2012 21:00	45.0	38.5	48.1	54.4
20/02/2012 21:05	38.9	37.5	39.9	39.7
20/02/2012 21:10	42.5	38.9	45.7	50.0
20/02/2012 21:15	53.4	38.2	54.6	45.7
20/02/2012 21:20	39.4	37.0	41.5	50.4
20/02/2012 21:25	39.7	37.2	41.7	48.2
20/02/2012 21:30	39.8	37.1	41.7	45.0
20/02/2012 21:35	44.1	36.8	48.7	52.0
20/02/2012 21:40	38.8	36.4	39.7	50.0
20/02/2012 21:45	38.7	36.5	40.5	40.2
20/02/2012 21:50	39.4	36.4	40.5	51.2
20/02/2012 21:55	49.3	37.2	54.3	47.2
20/02/2012 22:00	41.5	36.1	44.8	46.7
20/02/2012 22:05	39.8	35.3	41.3	46.1
20/02/2012 22:10	38.6	36.0	40.4	48.7
20/02/2012 22:15	52.7	35.1	51.4	47.8
20/02/2012 22:20	37.7	34.9	39.4	50.8
20/02/2012 22:25	35.9	34.1	37.7	37.1
20/02/2012 22:30	37.5	34.1	38.9	49.0
20/02/2012 22:35	37.7	35.1	39.7	49.9
20/02/2012 22:40	40.5	34.1	43.7	48.7
20/02/2012 22:45	38.7	34.3	41.3	49.0
20/02/2012 22:50	39.3	33.8	42.1	46.1
20/02/2012 22:55	46.9	34.6	48.7	50.8
20/02/2012 23:00	34.2	32.4	35.7	33.7
20/02/2012 23:05	35.0	32.7	36.7	43.0
20/02/2012 23:10	36.2	32.8	38.4	35.9
20/02/2012 23:15	51.3	35.0	51.2	56.4
20/02/2012 23:20	39.4	33.3	43.0	46.0
20/02/2012 23:25	43.0	33.8	45.4	57.8

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
20/02/2012 23:30	40.3	33.3	42.2	53.2
20/02/2012 23:35	38.3	33.1	40.9	54.1
20/02/2012 23:40	37.3	33.6	39.7	50.3
20/02/2012 23:45	37.9	33.2	37.8	55.9
20/02/2012 23:50	38.7	33.6	41.6	51.6
20/02/2012 23:55	34.9	32.7	36.2	42.1
21/02/2012 00:00	34.6	32.3	35.7	42.4
21/02/2012 00:05	35.6	32.1	38.3	43.8
21/02/2012 00:10	32.9	31.0	33.7	39.2
21/02/2012 00:15	32.0	30.9	32.8	36.5
21/02/2012 00:20	35.1	31.3	37.6	44.2
21/02/2012 00:25	34.6	30.9	36.9	40.4
21/02/2012 00:30	38.6	33.3	42.1	46.2
21/02/2012 00:35	37.9	34.3	39.9	55.0
21/02/2012 00:40	43.7	35.1	46.8	52.3
21/02/2012 00:45	41.6	36.5	44.2	52.1
21/02/2012 00:50	44.2	35.7	46.8	60.8
21/02/2012 00:55	44.6	37.3	48.0	52.1
21/02/2012 01:00	43.6	36.6	47.0	54.7
21/02/2012 01:05	40.7	33.0	43.6	49.4
21/02/2012 01:10	38.8	32.6	41.7	50.3
21/02/2012 01:15	38.0	31.5	40.9	53.6
21/02/2012 01:20	35.4	30.2	35.6	49.3
21/02/2012 01:25	32.9	29.9	33.7	50.7
21/02/2012 01:30	32.4	30.5	33.9	37.4
21/02/2012 01:35	33.1	30.1	35.4	43.1
21/02/2012 01:40	33.0	30.1	35.2	41.1
21/02/2012 01:45	31.4	29.9	32.8	33.4
21/02/2012 01:50	35.5	30.4	39.2	39.8
21/02/2012 01:55	35.9	30.4	35.9	52.7
21/02/2012 02:00	33.2	31.3	34.9	36.1
21/02/2012 02:05	33.4	31.3	35.6	41.9
21/02/2012 02:10	33.6	30.6	35.0	47.3
21/02/2012 02:15	32.2	30.2	32.9	45.3
21/02/2012 02:20	33.3	30.7	33.9	46.6
21/02/2012 02:25	34.9	29.9	36.5	46.4
21/02/2012 02:30	40.4	31.7	42.7	49.8

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
21/02/2012 02:35	34.1	30.2	35.9	36.9
21/02/2012 02:40	31.5	30.1	32.6	37.5
21/02/2012 02:45	32.9	30.9	34.6	33.9
21/02/2012 02:50	33.9	31.5	34.9	39.4
21/02/2012 02:55	42.6	30.9	47.3	50.5
21/02/2012 03:00	34.3	30.2	37.1	37.2
21/02/2012 03:05	32.8	30.8	34.1	42.2
21/02/2012 03:10	32.1	29.4	33.4	43.0
21/02/2012 03:15	34.3	31.1	37.1	41.5
21/02/2012 03:20	36.0	31.8	38.1	47.1
21/02/2012 03:25	37.9	32.0	41.0	43.3
21/02/2012 03:30	41.0	33.5	42.5	56.4
21/02/2012 03:35	44.1	34.8	48.2	55.5
21/02/2012 03:40	36.4	32.5	38.2	54.1
21/02/2012 03:45	39.9	31.8	41.8	58.4
21/02/2012 03:50	35.3	30.4	37.6	47.3
21/02/2012 03:55	33.2	29.3	35.1	36.7
21/02/2012 04:00	36.4	31.1	39.9	45.3
21/02/2012 04:05	36.1	31.3	38.8	42.7
21/02/2012 04:10	36.2	31.3	39.0	44.0
21/02/2012 04:15	35.8	32.5	38.4	37.9
21/02/2012 04:20	36.6	31.6	39.3	39.5
21/02/2012 04:25	35.8	31.4	38.2	49.1
21/02/2012 04:30	37.1	33.1	39.7	42.2
21/02/2012 04:35	37.6	34.1	39.1	47.5
21/02/2012 04:40	40.5	35.4	43.1	45.4
21/02/2012 04:45	43.3	36.3	45.2	47.6
21/02/2012 04:50	43.6	37.2	46.1	56.9
21/02/2012 04:55	43.0	36.4	46.6	54.9
21/02/2012 05:00	42.7	34.3	45.5	53.5
21/02/2012 05:05	40.6	35.4	43.5	52.2
21/02/2012 05:10	43.0	35.5	46.2	56.5
21/02/2012 05:15	42.6	36.1	45.6	45.5
21/02/2012 05:20	41.9	34.7	44.8	54.2
21/02/2012 05:25	37.8	33.3	40.8	49.2
21/02/2012 05:30	37.4	33.0	39.1	48.6
21/02/2012 05:35	40.7	34.8	43.8	49.1

Date Time	Noise Level dB L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
21/02/2012 05:40	37.5	34.3	40.3	41.2
21/02/2012 05:45	40.0	35.2	43.3	40.2
21/02/2012 05:50	38.6	33.2	41.9	53.6
21/02/2012 05:55	38.6	35.2	41.0	39.2
21/02/2012 06:00	41.1	34.1	43.5	39.2
21/02/2012 06:05	52.1	35.7	51.4	44.0
21/02/2012 06:10	38.3	35.4	40.7	41.6
21/02/2012 06:15	40.2	35.9	42.2	40.7
21/02/2012 06:20	39.6	36.4	41.9	47.0
21/02/2012 06:25	41.4	36.6	44.7	53.3
21/02/2012 06:30	42.5	37.3	46.0	44.7
21/02/2012 06:35	40.5	37.0	43.4	46.4
21/02/2012 06:40	44.9	38.5	48.7	39.2
21/02/2012 06:45	42.9	39.1	45.6	41.2
21/02/2012 06:50	45.8	40.3	49.3	55.9
21/02/2012 06:55	42.9	39.5	46.0	41.5

Appendix C Noise Calculations

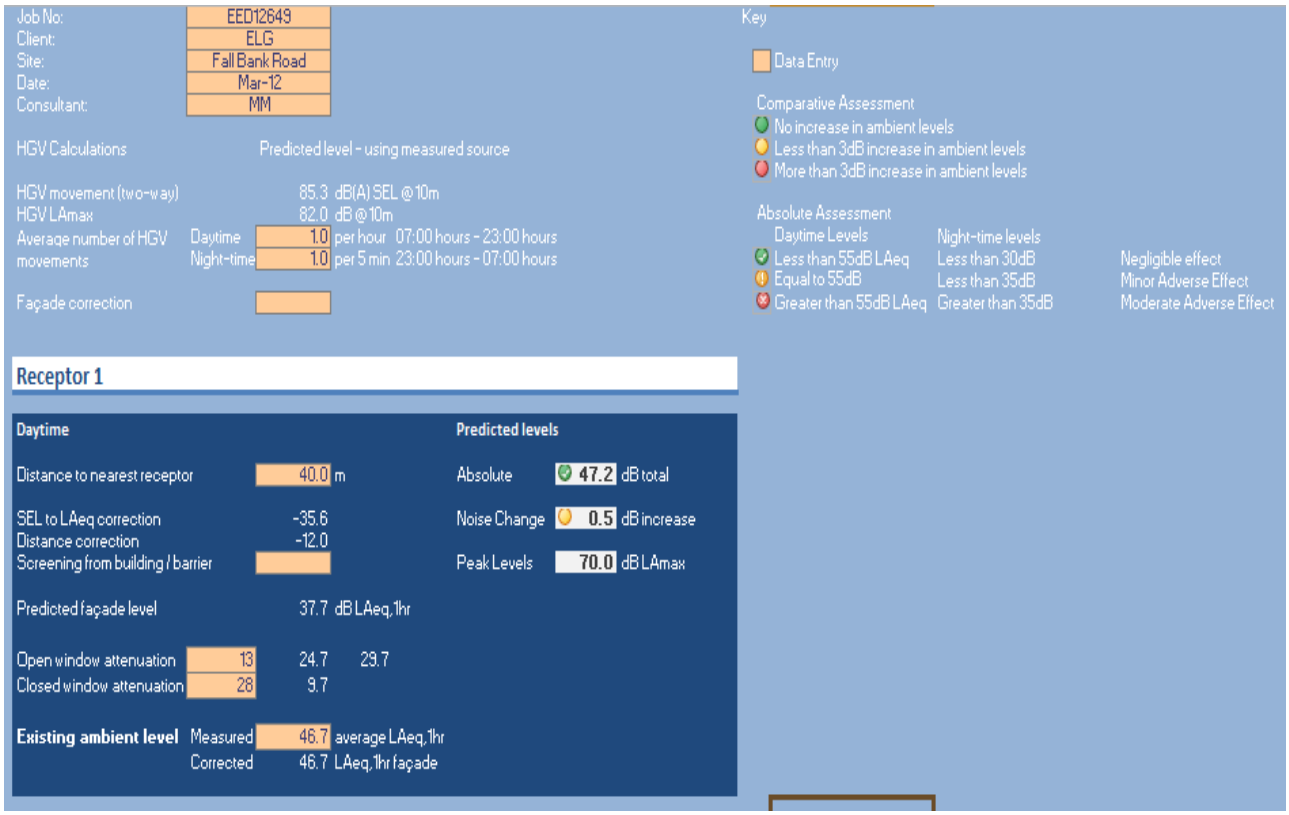
Thermal Oxidiser

	Noise Level 1.5m from Fan Inlet dB(A)	Required dB(A) Noise Level @ 1.5 m
Fan 1	78	57
Fan 2	72	57
Fan 3	79	57
Fan 4	72	57
Overall Noise Level dB LAeq	82	63

Noise Level @ NSR Boundary (40m from Thermal Oxidiser)

LAeq – 63 – 20 x LOG (40/1.5) = 34.5dB

HGV Deliveries



Break-Out Noise Level

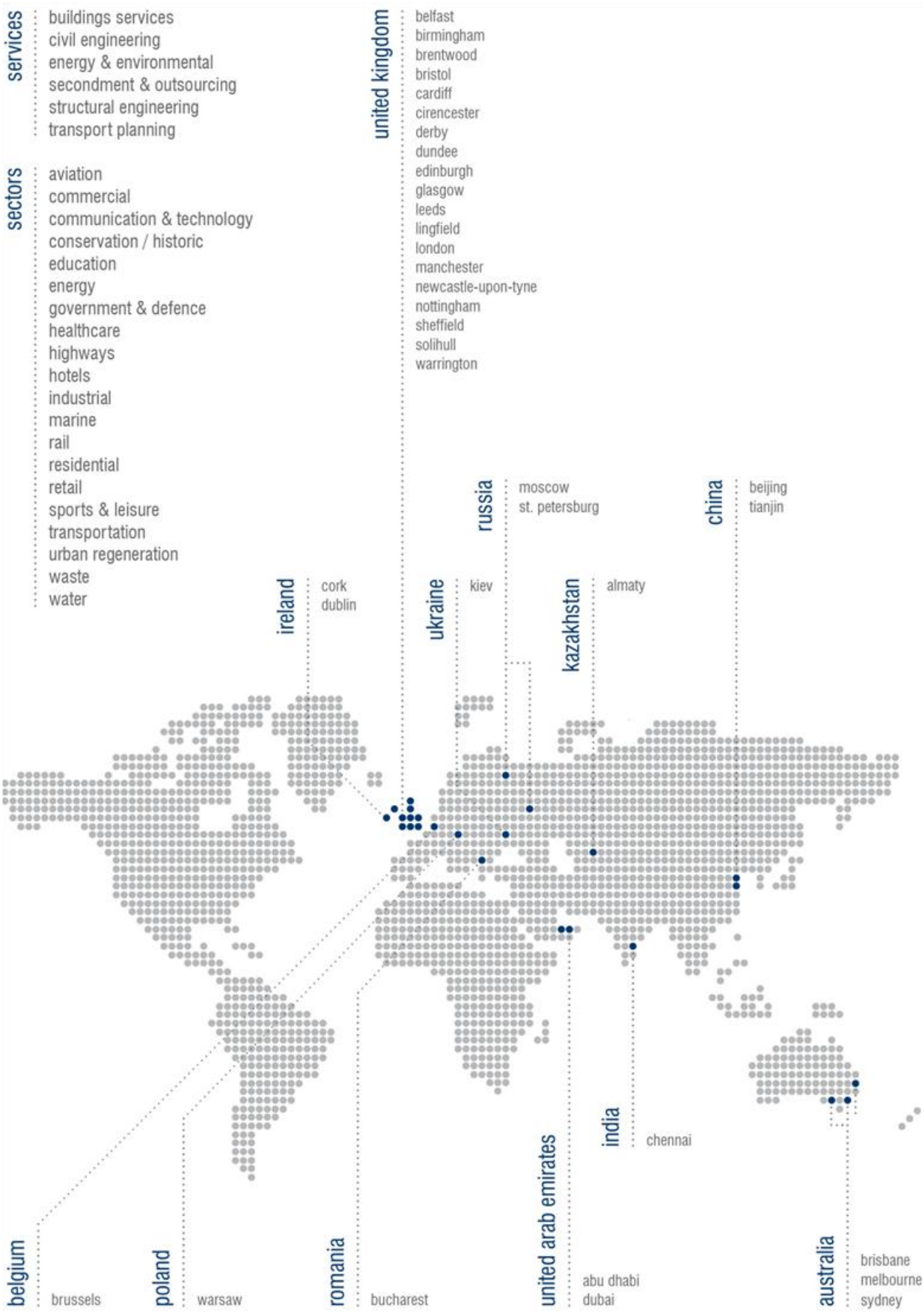
Reverberant Sound Pressure Level Inside At Wall Lwall = Sound Power Level - 10 Log A +6

A = Surface Area (m2) x absorption coefficient α

SPL Contribution at NSR from reverberant noise = Internal SPL - Rav +10 log Sp - 20 log r - 14

Assumed Lw	110				
A	1393.2	Surface Area (m^2)	13932	α	0.1
Façade (Single Profiled Steel)					
Rw	25				
Area Façade (m2)	528				
Lrev	70				
LAeq @ NSR	33				

waterman


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buildings services
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energy & environmental
secondment & outsourcing
structural engineering
transport planning
sectors
aviation
commercial
communication & technology
conservation / historic
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energy
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highways
hotels
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marine
rail
residential
retail
sports & leisure
transportation
urban regeneration
waste
water
united kingdom
belfast
birmingham
brentwood
bristol
cardiff
cirencester
derby
dundee
edinburgh
glasgow
leeds
lingfield
london
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newcastle-upon-tyne
nottingham
sheffield
solihull
warrington
russia
moscow
st. petersburg
china
beijing
tianjin
ireland
cork
dublin
ukraine
kiev
kazakhstan
almaty
india
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