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ENVIRONMENTAL NOISE ASSESSMENT

This report has been compiled for, and on behalf of, Environmental Essentials (UK) Ltd by the following competent consultant

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Date 3rd July 2017

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GLOSSARY OF TERMS

Ambient Noise

Totally encompassing sound in a given time usually composite of sounds from many other sources. [BS4142]

Attenuation

A reduction in the intensity of a sound signal.

A-weighting

The sound pressure level determined when using the frequency-weighting network A. The A-weighting network modifies the electrical response of a sound level meter so that the sensitivity of meter varies with frequency in approximately the same way that the sensitivity of the human hearing system.

The human ear has a non-linear frequency response; it is less sensitive at low and high frequencies and most sensitive in the range 1 to 4 kHz. The A-weighting is applied to measured or calculated sound pressure levels so that these levels correspond more closely to the response of the human ear. A-weighted sound levels are often denoted as dB(A).

Background Noise Level $L_{A90,T}$

The A-weighted sound pressure level of a non-specific noise in decibels exceeded for 90% of the given time, T. [BS4142]

Decibel dB

1. Unit level which denotes the ratio between two quantities that are proportional to power. The number of decibels corresponding to the ratio of two amounts of power is 10 times the logarithm to the base 10 of this ratio.
2. A linear numbering scale used to define a logarithmic amplitude scale, thereby compressing a wide range of amplitude values to a small set of numbers.
3. A unit that indicates that a quantity has a certain level above some pre-defined reference value.
4. The unit of measurement used for sound pressure levels. The scale is logarithmic rather than linear. The threshold of hearing is 0dB and the threshold of pain is 120dB. In practical terms these limits are seldom experienced and typical levels lie within the range 30dB (a quiet night time level in a bedroom) to 90dB (at the kerbside of a busy city street).

Equivalent Continuous A-Weighted Sound Pressure Level L_{Aeq}

Value of the A-weighted sound pressure level of a continuous steady sound that within a specified time interval, T (starting at t_1 and ending at t_2) and measured in decibels has the same mean square sound pressure as the sound under consideration whose level varies with time.

Maximum Sound Level $L_{pA,max}$

The highest value of the A-weighted sound pressure level that occurs during a given event or time period. The time weighting should be specified. [BS5228]

Measurement Time Interval T_M

The total time over which measurements are taken. [BS4142] [BS5228]

Percentile Level (Statistical Sound Level Indices L_{AN} L_{A90})

L_{AN} is the dB(A) level exceeded N% of the time, measured on a sound level meter with the Fast (F) time weighting e.g. L_{A90} the dB(A) level exceeded for 90% of the time is commonly used to estimate background noise level. L_{A10} the level exceeded for 10% of the time is commonly used in the assessment of road traffic noise.

Rating Level $L_{A,T}$

The equivalent continuous A-weighted sound pressure level during a specified time interval, plus specified adjustments for tonal character and impulsiveness of sound. [BS4142] [BS8233]

Sound Pressure Level L_p

1. The level of the pressure of the sound above the intentionally accepted reference value of $20 \mu\text{Pa}$ ($2 \times 10^{-5} \text{ N/m}^2$) which corresponds to the pressure of the quietest sound an average person can hear at the frequency of 1000Hz. It is a quantity that can be measured, thus the intensity of a sound can be derived from it.
2. The sound pressure level is a measure of a dynamic variation in atmospheric pressure. The pressure at a point in space minus the static pressure at that point.
3. A value equal to 20 times the logarithm to the base 10 ratio of the root-mean-square pressure of a sound to a reference pressure, which is normally taken to be $20 \times 10^{-5} \text{ N/m}^2$

Sound Power Level L_w

1. The sound power level of a sound source in decibels is 10 times the logarithm to the base 10 of the ratio of sound power radiated by the source to a reference power. The reference power is 1 picowatt ($1 \times 10^{-12} \text{ watt}$).
2. The sound power level is the fundamental measure of the total sound energy radiated by the source per unit time.
3. A value equal to 10 times the logarithm to the base 10 of the ratio of the total acoustic power emitted by a source to a reference power, which is normally taken to be 10^{-12} watt

EXECUTIVE SUMMARY

Environmental Essentials (UK) Ltd was commissioned by Jones Stroud Insulations Ltd (Krempel), to produce a noise assessment report for their facility in Longridge, Preston. Jones Stroud Insulations Ltd (Krempel) manufacture and supply electrical insulations and composite material from their premises and have operated out of the site since 1965.

The purpose of this report is to support a planning application submitted on behalf of Jones Stroud Insulations Ltd (Krempel).

This document will offer a comprehensive noise assessment report concerning the proposed use of the new building. This shall include:

- i. Details of the expected noise levels that are likely to be emitted from machinery in the proposed new building.
- ii. Construction of roof and walls (including insulation details)
- iii. Control of noise generating activities, and the
- iv. Consideration and provision of suitable acoustic barrier between the proposed development and existing residential buildings etc.”

The survey was conducted on the 23rd May 2017 and reflects the conditions prevailing at the time.

Assessment of current structure and noise emissions

The predictions are that noise levels emitted from the facility at the nearest residential properties would have noise levels which are less than the recommended WHO guidelines for outdoor noise levels during the day

However, the predicted noise levels emitted from the facility at the nearest residential properties would have noise levels which exceed the recommended WHO guidelines for night time noise.

With regards to BS8233, the predicted daytime noise level of 48dB which corresponds to an internal level of 36dB¹ is between the good and reasonable standards recommended as suitable internal levels for living areas during the day.

However, the predicted night time noise level of 49dB which corresponds to an internal level of 37dB² exceeds the reasonable standards recommended as suitable internal levels in bedrooms both during the day and the night.

The BS4142:2014 assessment indicates that at the nearest residential properties during the day, there is an indication of an adverse impact and a marginal significance for likelihood of complaints during the day.

The BS4142:2014 assessment indicates that at the nearest residential properties during the night, there is an indication of a significant adverse impact and a significant likelihood of complaints during the night.

What the above assessments show us is that the current noise levels emitted from the facility that have been measured at the nearest residential boundary are acceptable during the day but in all instances exceed the guidelines and standards during the night.

¹ Assuming 12dB attenuation for windows partially open for ventilation

² Assuming 12dB attenuation for windows partially open for ventilation

The other important outcome of the assessments is that an exact level of noise reduction can be predicted and implemented for the design of the proposed new building to eliminate the potential for noise complaints, community disturbance and annoyance during the night. The total reduction of noise required at the nearest residential boundary is 17dB resulting in a predicted noise level on the boundary of 32dB.

This reduction will result in the site being inaudible during the day and exceed the background level by only +5dB during the night, significantly reducing the potential for complaints.

Construction of roof and walls (including insulation details)

The noise levels that were measured internally at three sections of a coating machine indicate that levels of 70dB, 72dB and 76dB are to be expected.

This can be calculated using a distance calculation to predict the noise levels that would be expected at the boundary. From this we can recommend building materials that would offer the appropriate level of sound attenuation.

The proposed elevations of the building comprise of olive green profiled metal cladding while the roof will be grey profiled metal cladding. Any windows and/or doors will have dark grey metal frames. The weighted sound reduction index for the cladding used for the walls and on the roof, should be at least $R_w = 24\text{dB}$, where R_w is the Sound Reduction Index of the materials to be used.

Potential materials

A single skin construction, has a relatively low mass and the internal surface is effectively directly coupled with the external surface. For airborne noise, there will be very little energy absorption and the majority of the sound reduction will be due to internal reflection. In this instance R_w = the sound reduction index.

- A 0.7mm single skin cladding 32/100 profile will have a single figure rating R_w of 24dB
- By adding a layer of 120mm rock mineral wool 23kg/m^3 the single figure rating R_w increases to 40dB.
- By adding a liner sheet to the back of the insulation the single figure R_w increases to 41dB.
- By adding a 30mm dense acoustic slab to the rear of the insulation prior to covering with a liner sheet the single figure rating R_w increases to 47dB.

Control of external noise from current sources

What the environmental noise survey has indicated is that there are currently two significant sources of noise which contribute to the existing noise levels measured at the boundary of the nearest residential properties. To reduce the noise level at this boundary these sources must be prioritised for noise control measures.

Firstly, there is an enclosed extraction filter unit. It is understood that this will be moving to inside the building and/or relocated to another area of the site.

Secondly, there is a significant proportion of the noise generated externally emitted from an extraction vent or ventilation fan positioned by the corner of the current building and the newer metal clad building to the West of where the extension is proposed. The main concern would be that if this source was not controlled then the new structure may form a channel where the sound would focus towards 29 Trent Street potentially causing significant problems without effective noise control.

A potential noise source that is a cause for concern from the proposed plans is the position of the staff car park so close to the residential boundary and the façade of the residential buildings. It was observed on the night of the night time environmental noise assessment that employees would sit in their vehicles during break times and have the engines running and music playing. It is important that this form of noise nuisance is not allowed and that employees are made aware of this with information, instruction and the potential of disciplinary action should an employee disregard this prohibitive action. If required it may be necessary to improve the welfare facilities of the site and encourage employees to use these facilities as an alternative.

Acoustic barrier on the site/residential boundary.

In order to protect the occupants of the nearby residential properties it may be worth considering whether there is a need for an acoustic barrier between the proposed extension and the nearest residential properties.

Given that the proposed extension is likely to be continuously operating 24 hours a day and that there is a car park located in the space between the outer façade of the proposed extension and the facades of the nearest residential buildings a 2m high close boarded fence with no gaps or knot holes in the timber could be erected. This would provide an approximate 10dB noise reduction where the noise pathway is significantly obstructed.

INTRODUCTION

- 1.1 In order to provide an assessment of the noise on the site boundary, Jones Stroud Insulations Ltd commissioned Environmental Essentials (UK) Ltd to undertake an environmental noise survey around their premises in Lancashire.
- 1.2 The objectives of the survey were to:
- Assess the internal noise levels of the original building in order to predict the noise that is likely to be emitted from machinery in the new building.
 - Take noise measurements on the outside of the current building to predict the current transmission loss of the current structure and to identify any external noise sources
 - establish the background level of the local environment at the nearest noise sensitive properties during the day and during the night.
 - Provide details of insulation for both walls and roof that could be used as part of the design to ensure that noise emissions from the new build do not affect residents and the nearest sensitive properties during the day and during the night.
 - Provide details of the predicted noise levels with the new building in place and undertake an assessment in line with BS4142:2014.
 - Compare the predicted noise levels from the new building at the nearest noise sensitive property to the recommended noise levels stated in The World Health Organisation (WHO) documents *Guidelines for Community Noise* and the Environmental Noise Directive 2002/49/EC *Night Noise Guidelines for Europe*.
 - Compare the predicted noise levels from the new building at the nearest noise sensitive property to BS8223:2014 *Sound Insulation and Noise Reduction for Buildings – Code of Practice*.
- 1.3 The survey was undertaken by Christopher Parkin of Environmental Essentials (UK) Ltd on the 23rd and 24th May 2017 and reflects the conditions prevailing at the time.

LEGISLATION AND GUIDANCE

National Planning Policy Framework

- 2.1 The Planning Policy Guidance Note PPG24 *'Planning and Noise'* published in 1994 outlined the considerations to be taken into account by local authorities in determining planning applications both for noise sensitive developments and for those activities which will generate noise.

The Guidance acknowledged that noise can have a significant effect on the environment and on the quality of life enjoyed by individuals and communities. However, it advises that while the planning system should be used to minimise the adverse impact of noise, planning authorities should not place unreasonable restrictions on development, or add unduly to the costs and administrative burdens of business.

This Planning Policy Guidance Note has been replaced by the National Planning Policy Framework, published in 2012.

- 2.2 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

- 2.3 Throughout the NPPF is the presumption in favour of sustainable development. The presumption is subject to two exceptions. First it will not apply where any adverse impacts of allowing development would *"significantly and demonstrably"* outweigh the benefits when assessed against the policies in the NPPF as a whole. Secondly, the presumption will not apply where specific policies in the NPPF – such as those relating to green belt or national parks – indicate that development should be restricted.

- 2.4 With regards to noise, the NPPF notes that:

"The planning system should contribute to and enhance the natural and local environment by...

- *preventing both new and existing development from contributing to or being out at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"*

"Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *identify and protect areas tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

BS 4142:2014

- 2.5 British Standard 4142:2014 *Methods for rating and assessing industrial and commercial sound* describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:
- a) sound from industrial and manufacturing processes;
 - b) sound from fixed installations which comprise mechanical and electrical plant and equipment;
 - c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
 - d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.
- 2.6 BS4142 defines the following terms for describing existing and future noise levels:
- **Ambient Sound Level, $L_a = L_{Aeq,T}$**
Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far, at the assessment location over a given time interval, T
 - **Specific Sound Level, $L_s = L_{Aeq,T_r}$**
Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T_r
 - **Residual Sound Level, $L_r = L_{Aeq,T}$**
Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T
 - **Background Noise Level, $L_{A90,T}$**
A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T , measured using time weighting F and quoted to the nearest whole number of decibels
- 2.7 The standard states that, when possible, the background sound level should be measured at the assessment location. It should be ensured that the measurement time interval is of sufficient duration to obtain a representative value of the background sound level.
- 2.8 BS4142 notes that where it is not possible to determine the specific sound level directly by measurement, it may be appropriate to determine the specific sound level by a combination of measurement and calculation.
- 2.9 Certain acoustic features can increase the significance of impact over the basic comparison between the specific sound level and the background sound level.

2.10 Subjectively and where appropriate, such as for instances where a new, proposed sound cannot be measured, the specific sound level should be corrected if a tonal or impulsive characteristic is expected to be present.

- **Tonality**
Just perceptible, apply a penalty of 2dB
Clearly perceptible, apply a penalty of 4dB
Highly perceptible, apply a penalty of 6dB
- **Impulsivity**
Just perceptible, apply a penalty of 3dB
Clearly perceptible, apply a penalty of 6dB
Highly perceptible, apply a penalty of 9dB

For other sound characteristics which are not tonal or impulsive but readily distinguishable, a penalty of 3dB can be applied.

Where a specific sound is intermittent and readily distinctive, a penalty of 3dB can be applied.

2.11 If the subjective method is not sufficient for assessing the audibility or prominence of tones or impulsive sounds, identification can be made using the one-third octave method and a correction of 6dB added if present.

2.12 When making an assessment the impact of a specific sound, an initial estimation is made by subtracting the measured background sound level from the rating level. Typically, the greater the difference, the greater the magnitude of impact:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact
- A difference of around +5dB is likely to be an indication of an adverse impact
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact

Environmental Protection Act 1990

- 2.13 Chapter 43 of the Environmental Protection Act 1990 (EPA) makes provision for the improved control of pollution, including noise, arising from any industrial, commercial or activities of any other nature whatsoever. Specifically, the EPA re-enacts the provisions of the Control of Pollution Act 1974; it restates the law defining statutory nuisances and improves the summary procedures for dealing with them.
- 2.14 Section 80 of the EPA empowers local authorities to deal with statutory nuisances when they occur. The level at which a noise is deemed to be a statutory noise nuisance is not defined in the EPA, this is left to the judgement of individual local authorities. The EPA also grants the right to private citizens to bring a court case against the owner/operator of a noise source.
- 2.15 With regards to the term 'nuisance' there is no specific definition in the Act, so the tests as at common law apply. A definition often used in Court is "*A nuisance is a material interference with a person's use or enjoyment of their land or property*".
- 2.16 Case law supports the view that factors such as nature of noise, time of day or night it occurs, day of the week on which it occurs, how long it occurs for, how often it occurs and the character of the area in which it occurs should be taken into account when deciding whether the inference is material, as well as whether those affected are overly sensitive or whether they represent the "Man on the Clapham Omnibus".
- 2.17 In court proceedings for an offence, it is a defence to prove that 'best practicable means' were used to prevent or counteract the effects of noise. Under 79(9), 'best practicable means' is to be interpreted by reference to the following provisions:
- "practicable" means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications;
 - the means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures;
 - the test is to apply only so far as compatible with any duty imposed by law;
 - the test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances.

World Health Organisation Document *Guidelines for Community Noise*

- 2.18 The World Health Organisation (WHO) published the document *Guidelines for Community Noise* in 2000. This states that general outdoor noise levels of below 50dB L_{Aeq} during the day are desirable to prevent 'moderate' community annoyance. The guidance also recommends the L_{Aeq} should not exceed 30dB indoors if negative effects on sleep are to be avoided.
- 2.19 The World Health Organisation (WHO) published an extension document *Environmental Noise Directive 2002/49/EC Night Noise Guidelines for Europe* in 2002. This states that outdoor noise levels should not exceed 40dB L_{Aeq} during the night to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly.

British Standard BS8233: 2014

- 2.20 The scope of BS8233 *Sound Insulation and Noise Reduction for Buildings – Code of Practice* is the provision of recommendations for 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 or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.
- 2.21 The Standard suggests suitable internal noise levels within different types of buildings, including residential dwellings. It suggests that within bedrooms, an internal noise level of 30 dB $L_{Aeq,T}$ is a good standard, whilst 35 dB $L_{Aeq,T}$ is a reasonable standard. For living areas in the daytime, the Standard recommends 35 dB $L_{Aeq,T}$ as a good standard and 40 dB $L_{Aeq,T}$ as being a reasonable standard. BS8233 also states that individual noise events should not exceed 45 dB L_{Amax} in bedrooms at night.

EQUIPMENT AND STRATEGY

- 3.1 Measurements were made using the following equipment:
- CEL 633C Sound Level Meter (serial number 0462458)
 - CEL 120/1 Acoustic Calibrator (serial number 4358158)
- 3.2 All equipment was calibrated immediately prior to use and upon completion of the survey. No variation in calibration signal was observed.
- 3.3 Casella CEL calibrated the Sound Level Meter in February 2016 and the Acoustic Calibrator in January 2017. A copies of the calibration certificates are presented in Appendix C.
- 3.4 The weather conditions during the daytime survey were fine, dry, approximately 40-50% cloud cover wind speeds of below 5m/s and wind direction was from the South. The air temperature on the day was 15°C.
- 3.5 The weather conditions during the night time survey were fine, dry, overcast with 100% cloud cover wind speeds of below 5m/s and wind direction was from the South. The air temperature on at night was 12°C.
- 3.6 A representative of the Client selected the internal and external noise monitoring locations around the site in conjunction with Chris Parkin and the locations for the assessment are as follows:
1. Internal measurement of coating line, 2m from infeed section.
 2. Internal measurement of coating line, 2m from oven section.
 3. Internal measurement of coating line, 2m from talc station.
 4. External measurement No 1, 2m from the corner of the current building.
 5. External measurement No 2, 2m from the current building midway between the corner of the building and the extraction filter unit.
 6. External measurement No 3, 2m from the current building and by the extraction filter unit.
 7. External measurement No 4, boundary measurement of nearest residential property.
 8. Offsite Background No 1, Trent Street.
 9. Offsite Background No 2, Eskdale Road.
- 3.7 During the day, the assessment took the form of consecutive fifteen minute measurements at three internal locations to accurately establish the internal noise of the machinery which is intended to move into the proposed new building. Fifteen minutes was considered a representative sample time for the type of machinery being assessed and the constant nature of the noise being emitted.
- 3.8 Also during the day consecutive twenty minute measurements were taken at four external locations to assess the noise transmission loss of the current structure from the internal processes and to identify and measure any external sources.
- 3.9 To undertake a BS4142:2014 assessment it was also required to measure the background (L_{90}) at an off-site position representative of the local noise environment in the absence of any site noise this was done as a consecutive fifteen minute measurement.



- 3.10 The external locations selected were also measured during the night however for reduced sample times due to the reduction in noise interference from transportation and other various sources that are often audible during the day.
- 3.11 A plan and some photos showing the monitoring locations is available in Appendix A.

SITE OBSERVATIONS AND COMMENTS

- 4.1 Jones Stroud Insulations Ltd is a leading global manufacturer of specialist materials, which includes a wide range of Composite Materials, Electrical Insulations, Mica Products and a wide range of Textile Products. The site, NE of Preston, lies on the western edge of both Longridge main settlement and Ribble Valley Borough boundaries. The site occupies an area of approximately 2.6 hectares.
- 4.2 The facility is situated in a mixed industrial and residential area, with other industrial facilities located to the South West and residential properties to the North, North East, East and South East. The nearest noise sensitive properties are on Trent Street and Lee Street directly adjacent to the site boundary approximately twenty-one meters from the proposed development. The Western boundary is formed by Savick Brook with green belt beyond.
- 4.3 The site is located close to the cross roads with the busy Preston Road (B6244) and Whittingham Road (B5269) which are the main vehicle routes into and out of the local area.
- 4.4 The internal measurements were taken during normal operation of one of the coating lines which will be moved into the extended building.
- 4.5 External measurements were taken on the grassed area where the new development is being proposed and at the nearest site boundary directly adjacent to the nearest noise sensitive properties on Trent Street and Lee Street.
- 4.6 External measurements to establish a representative background level (L_{90}) in the absence of any site noise were taken during the day on Trent Street and during the night on Eskdale Road.
- 4.7 The external measurements taken approximately 2 metres from the façade of the current Queens Mill building were dominated by noise emitted from the partially enclosed filter changing extraction unit and from a ventilation fan or extraction vent. It was observed that production noise from inside the current structure was inaudible even at 2 metres from the façade whilst all doors to the Queens Mill building were closed. Noise was only barely audible when doors were opened.

DISCUSSION OF RESULTS

- 5.1 From information supplied by representatives of the Client, Environmental Essentials (UK) Ltd considers the measured levels on the day of the assessment to be representative of normal operational conditions.
- 5.2 It should be noted however that the working environment can change on a daily basis.
- 5.3 The noise survey recorded the following levels, as shown in Table 1:

Table 1
Internal Noise, dB

	Time	Duration	L _{Aeq}	L _{A90}	L _{Amax}	L _{Amin}
Internal Location 1	09:07	15:00	70	69	81	68
Internal Location 2	09:23	15:00	72	71	88	70
Internal Location 3	09:38	15:00	76	75	84	74

Table 2
External Noise, (Daytime) dB

	Time	Duration	L _{Aeq}	L _{A90}	L _{Amax}	L _{Amin}
External Location 1	10:20	15:00	57	57	75	56
	10:35	5:00	58			
			57			
External Location 2	10:41	20:00	54	54	66	52
External Location 3	11:03	20:00	54	53	59	51
External Location 4	11:59	20:00	48	48	59	47
L90 Background	11:38	15:00	44	42	63	40

Table 3
External Noise, (Night Time) dB

	Time	Duration	L_{Aeq}	L_{A90}	L_{Amax}	L_{Amin}
External Location 1	01:01	15:00	57	57	64	56
External Location 2	01:17	15:00	54	54	63	53
External Location 3	01:33	15:00	53	53	54	51
External Location 4	02:16	15:00	49	49	57	47
L90 Background	02:42	15:00	29	27	51	26

WHO Guidelines

Daytime

- 5.4 The World Health Organisation (WHO) published the document *Guidelines for Community Noise* in 2000. This states that general outdoor noise levels of below 50dB L_{Aeq} during the day are desirable to prevent 'moderate' community annoyance.
- 5.5 From the measured levels at the boundary of the nearest residential properties on Trent Street and Lee Street, the assessment indicates that the resulting outdoor L_{Aeq} of 48dB *is less than* the recommended 50dB which is desirable to prevent 'moderate' community annoyance during the day.

Night Time

- 5.6 The World Health Organisation (WHO) published an extension document Environmental Noise Directive 2002/49/EC *Night Noise Guidelines for Europe* in 2002. This states that outdoor noise levels should not exceed 40dB L_{Aeq} during the night to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly.
- 5.7 From the measured levels at the boundary of the nearest residential properties on Trent Street and Lee Street, the assessment indicates that the resulting outdoor L_{Aeq} of 49dB *exceeds* the 40dB that the Night Noise Guidelines recommend.

BS8233: 2014

- 5.8 BS8233: 2014 recommends suitable internal levels for living areas in a residential building, those being 35dB $L_{Aeq,T}$ as a good standard and 40dB $L_{Aeq,T}$ as being a reasonable standard; it also suggests that within bedrooms, an internal noise level of 30dB $L_{Aeq,T}$ is a good standard during the night, whilst 35dB $L_{Aeq,T}$ is a good standard during the day.
- 5.9 Using the predicted levels at the façade of the nearest noise sensitive properties during the day, the resulting predicted L_{Aeq} is 48dB which corresponds to an internal level of 36dB(A)³ and is between a *good and a reasonable* standard for living areas during the day.
- 5.10 Using the predicted levels at the façade of the nearest noise sensitive property during the night, the resulting predicted L_{Aeq} is 49dB which corresponds to an internal level of 37dB(A)⁴ which *exceeds* the both the reasonable standards for noise levels within bedrooms during the day and the night.

³ Assuming 12dB attenuation for windows partially open for ventilation

⁴ Assuming 12dB attenuation for windows partially open for ventilation

BS4142:2014 Calculations

BS4142 infers that for a given excess of the rating level over the background level, the likelihood of complains are as follows:

Table 4
BS4142:2014 Likelihood of complaints

Excess	Interpretation of Likelihood of Complaints
≥10dB	An indication of a significant adverse impact.
≥ 5dB	An indication of an adverse impact.
≥ 0dB ≥5 dB	An indication that it is unlikely that the specific sound source will have an adverse impact or a significant adverse impact.
<0dB	An indication that the specific sound source will have a low impact.

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

Table 5
Daytime BS4142:2014 assessment

Location	Measured Background Level LA90	Predicted Noise Level at Receptor dB(A)	Penalty for Tonality	Penalty for Intermittence	Rating Level dB(A)	Rating level over Background dB(A)
Nearest Residential properties	42	48	N	N	42	+6

5.11 The above BS4142:2014 assessment shows that noise from the specific source is currently having an adverse impact. This also suggests that there is a marginal significance for likelihood of complaints.

Table 6
Night time BS4142:2014 assessment

Location	Measured Background Level L_{A90}	Predicted Noise Level at Receptor dB(A)	Penalty for Tonality	Penalty for Intermittence	Rating Level dB(A)	Rating level over Background dB(A)
Nearest Residential properties	27	49	N	N	49	+22

5.12 The above BS4142:2014 assessment shows that noise from the specific source is currently having a significant adverse impact. This also suggests that complaints are very likely.

CONCLUSIONS

- 6.1 The predictions are that noise levels emitted from the facility at the nearest residential properties would have noise levels which are less than the recommended WHO guidelines for outdoor noise levels during the day

However, the predicted noise levels emitted from the facility at the nearest residential properties would have noise levels which exceed the recommended WHO guidelines for night time noise.

This assessment indicates that a noise reduction of at least 9dB is required to be compliant with the WHO guidelines

- 6.2 With regards to BS8233, the predicted daytime noise level of 48dB which corresponds to an internal level of 36dB⁵ is *between the good and reasonable standards* recommended as suitable internal levels for living areas during the day.

However, the predicted night time noise level of 49dB which corresponds to an internal level of 37dB⁶ *exceeds the reasonable standards* recommended as suitable internal levels in bedrooms both during the day and the night.

This assessment indicates that a noise reduction of at least 7dB is required to be compliant with this British standard.

- 6.3 The BS4142:2014 assessment indicates that at the nearest residential properties during the day, there is an indication of an adverse impact and a marginal significance for likelihood of complaints during the day.

The BS4142:2014 assessment indicates that at the nearest residential properties during the night, there is an indication of a significant adverse impact and a significant likelihood of complaints during the night.

This assessment indicates that a noise reduction of at least 12dB is required to be compliant with this British standard

- 6.4.1 What the above assessments show us is that the current noise levels emitted from the facility that have been measured at the nearest residential boundary are acceptable during the day but in all instances exceed the guidelines and standards during the night.

The other important outcome of the assessments is that an exact level of noise reduction can be predicted and implemented for the design of the proposed new building to eliminate the potential for noise complaints, community disturbance and annoyance during the night. The total reduction of noise required at the nearest residential boundary is 17dB resulting in a predicted noise level on the boundary of 32dB.

This reduction will result in the site being inaudible during the day and exceed the background level by only +5dB during the night, significantly reducing the potential for complaints.

⁵ Assuming 12dB attenuation for windows partially open for ventilation

⁶ Assuming 12dB attenuation for windows partially open for ventilation

Proposed Use of New Buildings

6.5 The proposed planning approval is for one new building on the already established industrial site to form an extension to the northern Queens Mill Building.

6.6.1 the new building is intended to be used for increased levels of production processes such as the process that were measured on the day of the assessment on the coating line. It is proposed that the new building will be 15 metres closer to the nearest residential properties than the current building. The proposed new building will be 2.5 metres high to the eaves and 4 metres high at the ridge. The appearance of the proposed extension is intended to reflect that of existing adjacent building materials

6.7 Construction of roof and walls (including insulation details)

The noise levels that were measured internally at three sections of a coating machine indicate that levels of 70dB, 72dB and 76dB are to be expected.

This can be calculated using a distance calculation to predict the noise levels that would be expected at the boundary. From this we can recommend building materials that would offer the appropriate level of sound attenuation.

6.8 In order to predict the noise levels at the nearest residential properties, the following equation is used:

$$L_{P2} = L_{P1} - 20 \log(r_2/r_1)$$

where, r_1 is the distance from source to measurement location; and
 r_2 is the distance from source to receptor

Receptor	Source	Measured Level (L _{P1})	Source to Measurement Location (m)	Source to Receptor (m)	Predicted Level at Receptor (L _{P2})
Nearest residential properties	Coating Machine Infeed	70	2	21	50
	Coating Machine Oven Section	72	2	21	52
	Coating Machine Talc Station	76	2	21	56

6.9 What this calculation shows is that the level of noise attenuation that will be required by the building materials intended for use must be at least 24dB to ensure that the noise emissions from production process transmitting through the structure of the building do not have a negative impact on the occupants of the nearest residential properties on Trent Street and Lee Street.

6.10 The proposed elevations of the building comprise of olive green profiled metal cladding while the roof will be grey profiled metal cladding. Any windows and/or doors will have dark grey metal frames. The weighted sound reduction index for the cladding used for the walls and on the roof, should be at least $R_w = 24$ dB.

- 6.11 The effectiveness of a wall or roof to attenuate sound depends on weight, airtightness, and isolation of the layers of construction. On a real building, it is important to recognise that sound will bypass acoustic walls (flanking) through bridging elements such as walls and floors, and through windows and doors which may have a lower performance than the wall, especially if they are left open.

Similarly, sound can escape through poorly sealed junctions in the construction, or if there are relatively rigid connections between the inside and outside faces of the wall. Noise control measures often fail to perform adequately on site because the building details are not constructed as the designer intended. Relatively minor variations by the contractor can have a significant effect on the acoustic performance. The designer should recognise this and provide sufficient construction details.

Noise control is only one part of environmental control in a building, and designers should be aware that the solution to a noise problem might produce difficulties in other aspects of the building's performance, for example condensation.

6.12 Potential materials

A single skin construction, has a relatively low mass and the internal surface is effectively directly coupled with the external surface. For airborne noise, there will be very little energy absorption and the majority of the sound reduction will be due to internal reflection. In this instance R_w = the sound reduction index.

- A 0.7mm single skin cladding 32/100 profile will have a single figure rating R_w of 24dB
- By adding a layer of 120mm rock mineral wool 23kg/m³ the single figure rating R_w increases to 40dB.
- By adding a liner sheet to the back of the insulation the single figure R_w increases to 41dB.
- By adding a 30mm dense acoustic slab to the rear of the insulation prior to covering with a liner sheet the single figure rating R_w increases to 47dB.

Different types of mineral wool will have differing sound absorption qualities. Increasing the density of the mineral wool will generally increase the sound absorption properties, increasing the transmission sound reduction index. Rock mineral wool insulation quilt has greater density than glass mineral wool insulation. This contributes additional mass to the construction and generally improves the sound absorption properties.

The most common approach to reduce the level of airborne noise transmission, is to include a layer of dense acoustic mineral wool slab. Dense acoustic mineral wool slab has very good sound absorption properties and also provides additional mass to the construction. The acoustic slab is used in conjunction with the insulation quilt. This is to maintain the low level of coupling between the two skins and maintain the thermal performance of the construction. Mineral wool acoustic slab on its own is fairly ridged and would result in a high degree of coupling and so compromising acoustic performance.

- 6.13 As the activities within the new building can be comparable to the processes measured on the day of the assessment, it is expected that a structure such as that proposed, certainly with the addition of the extra insulation noted for both the wall panels and the roofing panels will easily protect the nearby residential properties from noise emissions within the proposed extension.

Consideration must also be given to the number of windows and/or doors that are proposed in the design of the extension. Any breaks in the fabric of the structure will result in compromised acoustic performance. It is therefore recommended to reduce the number of doors, window or skylights to an absolute minimum. Where this cannot be reduced ensure that doors have similar acoustic properties and can be well sealed to the structure of the building. Ensure that windows, including glazing as well as the frames, are again designed to have similar acoustic properties and can be well sealed to the structure of the building.

6.14 **Control of Noise Generating Activities**

No matter how well designed the structure and building materials are there is the potential for other aspects to affect the acoustic performance of the proposed extension. It is therefore recommended that Jones Stroud Insulations implements a hierarchy of control to for any noise generating activities

The hierarchy for control should aim to:

- Prevent generation of noise at source by good design and maintenance
- Minimise or contain noise at source by observing good operational techniques and management practice
- Use physical barriers or enclosures to prevent the transmission to other media
- Increase the distance between source and receiver
- Sympathetic timing and control of unavoidable noisy operations

6.15 For a site such as Jones Stroud Insulations Ltd, there are effective noise control practices which can be introduced on a day to day basis during normal operating activities, some of which are already practised on site:

- Good design of the new buildings
 - Construction is undertaken with attention to detail.
 - Include suitable insulation.
 - Use double glazed window units.
 - Acoustically designed doors with high mass and soft close mechanism.
 - Ensure all doors and windows are well sealed.
 - Where possible reduce or eliminate the number of vents, ducting or stack systems which may be added to the proposed structure of the building.

- Good operational site practices
 - Keep doors and windows closed, especially at night.
 - Reduce or eliminating site vehicle movements during the night.
 - Ensure that employees are aware of the requirement to be considerate to neighbours.
 - Commit to keeping a log of any noise complaints and investigate and respond accordingly.
 - Undertake period maintenance of the production machinery to be used in the proposed extension.
 - Ensure that the structure and fabric of the building remains in good condition. Check and log this on a regular frequency.

6.16 Control of external noise from current sources

What the environmental noise survey has indicated is that there are currently two significant sources of noise which contribute to the existing noise levels measured at the boundary of the nearest residential properties. To reduce the noise level at this boundary these sources must be prioritised for noise control measures.

Firstly, there is an enclosed extraction filter unit. It is understood that this will be moving to inside the building and/or relocated to another area of the site.

Secondly, there is a significant proportion of the noise generated externally emitted from an extraction vent or ventilation fan positioned by the corner of the current building and the newer metal clad building to the West of where the extension is proposed. The main concern would be that if this source was not controlled then the new structure may form a channel where the sound would focus towards No 29 Trent Street potentially causing significant problems without effective noise control.

The extraction vent or ventilation fan can be controlled by:

- Reducing the noise at source by replacing the fan with a quieter alternative.
- Reduce the noise at source by installing a silencer.
- Potentially relocate the vent or fan.
- Providing a form of acoustic screening or enclosure along the pathway close to the noise source to prevent noise transmission.

A potential noise source that is a cause for concern from the proposed plans is the position of the staff car park so close to the residential boundary and the façade of the residential buildings. It was observed on the night of the night time environmental noise assessment that employees would sit in their vehicles during break times and have the engines running and music playing. It is important that this form of noise nuisance is not allowed and that employees are made aware of this with information, instruction and the potential of disciplinary action should an employee disregard this prohibitive action. If required it may be necessary to improve the welfare facilities of the site and encourage employees to use these facilities as an alternative.

6.17 Acoustic barrier on the site/residential boundary.

In order to protect the occupants of the nearby residential properties it may be worth considering whether there is a need for an acoustic barrier between the proposed extension and the nearest residential properties.

Given that the proposed extension is likely to be continuously operating 24 hours a day and that there is a car park located in the space between the outer façade of the proposed extension and the facades of the nearest residential buildings a 2m high close boarded fence with no gaps or knot holes in the timber could be erected. This would provide an approximate 10dB noise reduction where the noise pathway is significantly obstructed.

REFERENCES

1. National Planning Policy Framework, 2012
2. British Standard 4142 *Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas* 2014
3. World Health Organisation Document *Guidelines for Community Noise* 2000
4. World Health Organisation Document *Night Noise Guidelines Europe* 2002
5. Environmental Protection Act 1990
6. British Standard 8233: 2014 *Sound insulation and noise reduction for buildings. Code of practice*

APPENDIX A

CALIBRATION CERTIFICATES

CASELLA CEL

Certificate of Conformity and Calibration

Instrument Type: CEL-0240
Serial Number: 4301640
Firmware revision: V003-07
Microphone Type: DEL-351
Serial Number: 7685



Applicable standards:

IEC 61010-2:2002 / EN 60951 (Electroacoustics - Sound Level Meters)
 IEC 60941 1073 (Sound Level Meters), ANSI S1.4 1983 (Specifications for Sound Level Meters)

Note: The test procedures performed at this facility conform to the standards and test methods defined in the manufacturer's manual. The configuration of the instrument is documented to ensure the product's electro-acoustic performance to all applicable standards including superseded Sound Level Meter standards - IEC60941 and IEC60951.

Test Conditions: 20°C, 30% RH, 120% RH
Test Engineer: Mircea Holjovics
Date of Issue: October 19, 2012

Declaration of conformity:

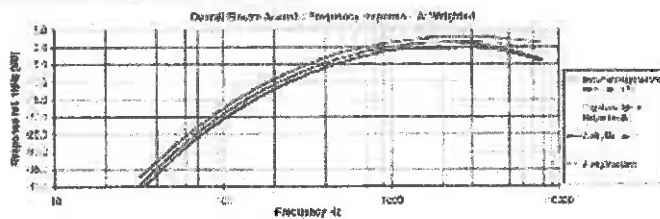
This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications. Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9001:2008 quality procedures. This product is certified as being compliant to the requirements of the CE Directive.

Test Summary:

Self Generated Noise Test	All Tests Pass
Electrical Signal Test Of Frequency Weights	All Tests Pass
Frequency & Time Weighting At 1 kHz	All Tests Pass
Level Linearity On The Reference Level Range	All Tests Pass
Frequency Response Test	All Tests Pass
Level Response Test	All Tests Pass
Overload Indicator	All Tests Pass
Accuracy Tests	All Tests Pass

Combined Electro-Acoustic Frequency Response - A Weighted

Combined Electro-Acoustic Frequency Response - A Weighted (IEC 61010-2:2002)
 The following A-weighted frequency response graph shows the instrument's overall frequency response across the frequency range of 10 Hz to 20 kHz. The response is measured in dB SPL and is plotted against frequency in Hz. The graph shows a flat response across the frequency range, indicating that the instrument is accurately measuring sound pressure levels across the entire range.



<p>Casella USA 18000 W. 18th St. Suite 100 Denver, CO 80202 USA</p>	<p>Casella UK 47-48 Park Road Wokingham, RG40 2BA UK</p>	<p>Casella Europe S.A. Poligonul Săpălaș Cluj Napoca Romania</p>
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CASELLA
MEASUREMENT

**Certificate of Conformance
and
Calibration**

Customer: Environmental Essentials UK
 Instrument: CEL-10/1 Calibrator
 Serial No 1: 340368
 Part No:
 Ref Number: 0463001/02
 Date of Issue: 19/10/2012
 PoOrd Num: 0710187

Firmware Ver: 4.008

Calibration Method:-

The instruments measured values for the measurement parameters have been validated using the tested traceable equipment which has been calibrated with traceability to National and International references.
 The uncertainties are for a confidence probability of not less than 95%.

Traceable Equipment:	Equip No.	Cal Date
DMF F140 45	08318	01/08/2012
Calibrator CEL-10/1	10779	12/12/2012

Test Conditions:-


Ambient Temperature: 26.5°C
 Ambient Humidity: 39.9%RH
 Ambient Pressure: 1004 mBar

Results:-

	Initial Reading:	Final Reading:	Tol (Class 1):	Tol (Class 2):
Frequency @ 1kHz:	1.0001	1.0001	±1 Hz @ 1 kHz	
SPL @ 144dB:	114.0	114.0	±0.15dB	±0.3dB
SPL @ 144dB:	94.1	94.0	±0.15dB	
With Coupler:	NONE			

Comments:

Casella Measurement:

Engineer:  Mike Hoyle
 Sg Calibration Date: 19 October 2012

Casella Measurement Report House, Walsley Road, Kempston, Bedford, MK42 7LJ
 Phone: +44(0)1234 344100; FAX: +44(0)1234 344160, E-mail: info@casellameas.com
 Web: www.casellameas.com

CC14 Issue C3

APPENDIX B

CERTIFICATES OF COMPETENCY



This is to confirm that

***Environmental Essentials UK
Ltd***

**is an Affiliate member of the
British Occupational Hygiene Society**



**On behalf of BOHS
10 February 2012**



This document states the holder's grade or membership on the date of issue.
Customers may wish to check the holder's current membership status should contact BOHS

British Occupational Hygiene Society, 5/6 Welbourn Business Centre, Millers Hill Way, Princes Park, Derby, DE24 8LZ.
Registered Charity No. 801417. A Company Limited by Guarantee No. 2350918

*Diploma
in
Acoustics and Noise Control*

This is to certify that

Christopher Parkin

*has satisfied the Examining Board in
the General Principles of Acoustics Module,
Laboratory, Project and Specialist Modules in*

*Environmental Noise
Noise and Vibration Control Engineering*



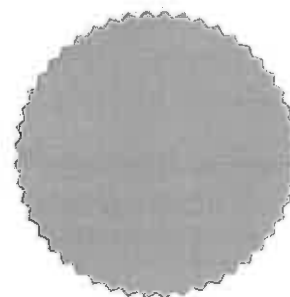
Chairman of the Examining Board



Institute Secretary

Date 30 August 2016

*Reference Number K0754
Centre University of Derby*

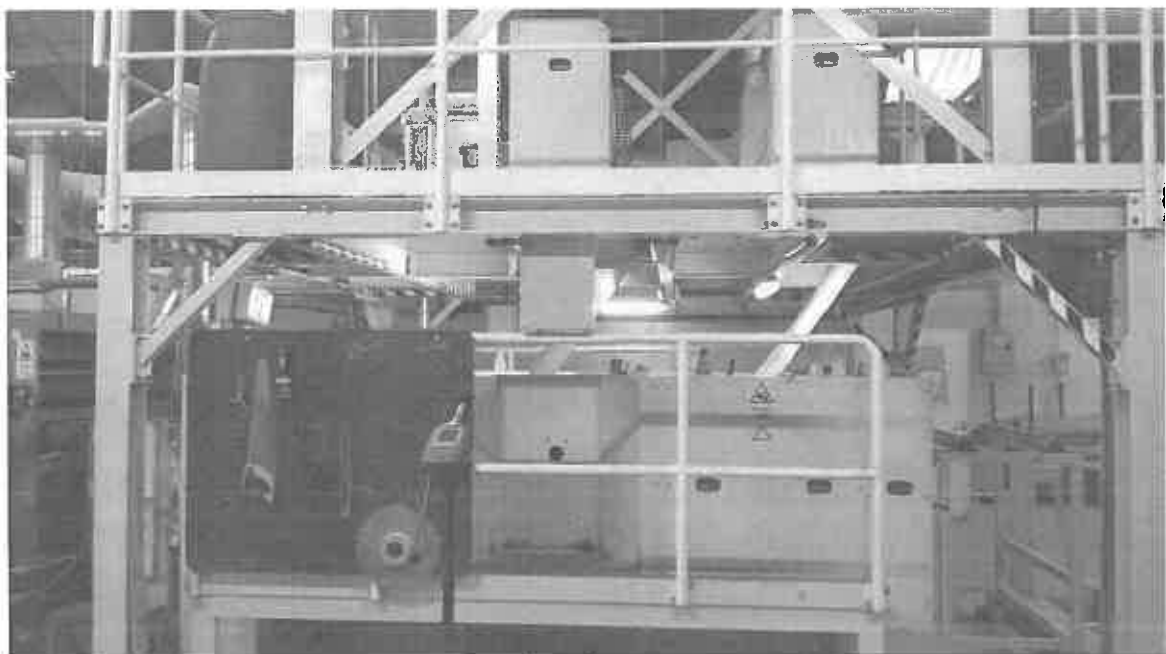


The Institute of Acoustics Limited, 3rd Floor, St Peter's House, 45-49 Victoria Street, St Albans, Hertfordshire AL1 3WZ
tel: +44 (0)1727 848195 fax: +44 (0)1727 850553 email: ioa@ioa.org.uk www.ioa.org.uk

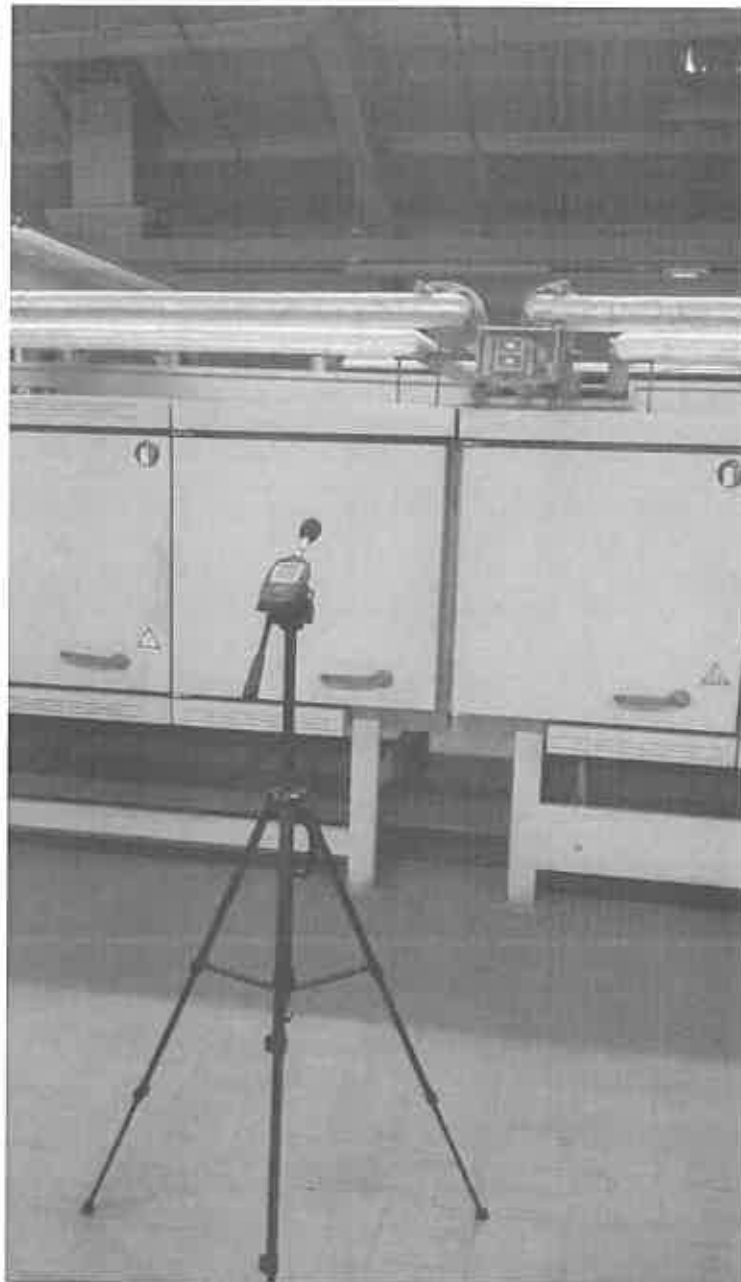
Incorporated by Companies Act and Registered in England, No. 1067290 Registered Charity No. 202685

APPENDIX C

PHOTOS AND PLAN SHOWING MONITORING LOCATIONS



**Internal monitoring location No1
By the Coating Machine Infeed Section**



**Internal monitoring location No2
By the Oven Section**



**Internal monitoring location No3
By Talc Station**



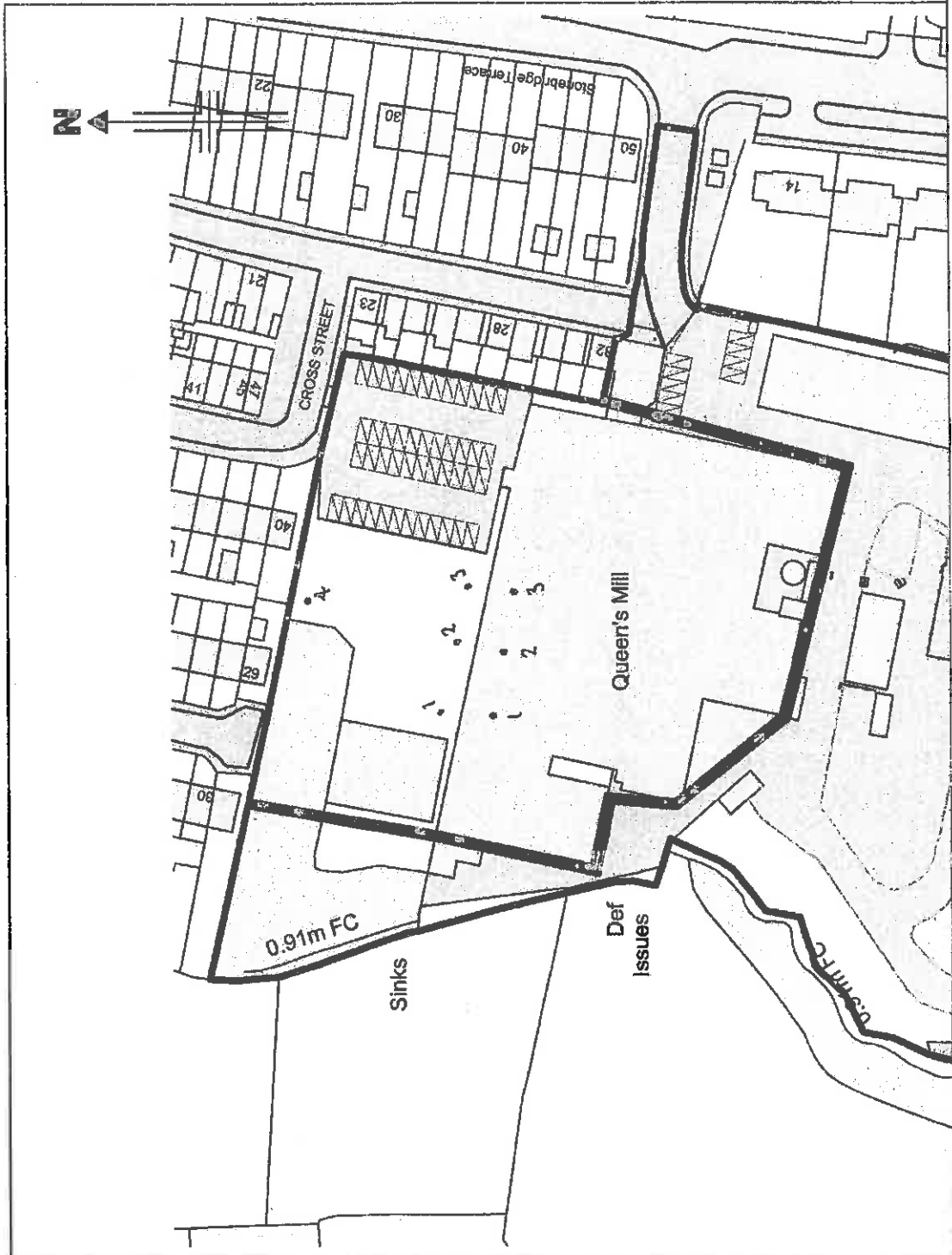
**External Monitoring Location No1
By the corner of the building and adjacent to the newer metal clad
building**



External monitoring location No2
Midway between extraction filter unit and monitoring location No1



**External Monitoring Location No3
By enclosed extraction filter unit**







APPENDIX D

TERMS AND CONDITIONS

TERMS AND CONDITIONS

The Company's pricing structure is based on the distribution of risk set out in these Terms and Conditions. Any request to vary these Terms will only be considered as part of a discussion of any consequent changes in the balancing of risks to be accepted by the parties, and any price increase considered appropriate. In allowing the Company to begin the Work, the Client agrees to the application of these Terms to the exclusion of any other terms that may have been proposed by the Client.

1.0 DEFINITIONS

- 1.1 "Company" means ENVIRONMENTAL ESSENTIALS UK Ltd
- 1.2 "Client" means the business entity to whom the proposal detailing the Work was submitted (unless otherwise agreed in writing by the Company);
- 1.3 "Limit of Liability" has the meaning given to it in clause 10.3;
- 1.4 "Report" means any findings, forecasts, statements of opinion, recommendations or report relating to or arising out of the Work;
- 1.5 "Price" means the fee rates, costs, expenses, lump sum price and any uplift or interest payable under these Terms;
- 1.6 "Work" means the services to be provided in accordance with the scope of work set out in the detailed written proposal submitted by the Company to the Client as may be modified under clause 2.3, including any Report.
- 1.7 "Authorised Employee" means any employee of the Company holding the office of Director of the Company.

2.0 COMPANY'S DUTIES

- 2.1 The Company will, subject to these Terms, carry out the Work for the Client with all the reasonable skill, care and diligence to be expected from a professional person or firm in the performance of similar services under these Terms and in the same circumstances, in accordance with relevant standards current at the time. No other warranty or representation, express or implied is included or intended in these Terms, the Report or the Company's written proposal to apply to the Work and it shall not do so.
- 2.2 The Company will promptly notify the Client if any aspect of the Work is found or expected to be significantly different from that addressed in the proposal if this is likely to have an effect on the Price or schedule of the Work.
- 2.3 The Company will perform the Work generally in accordance with the proposal, but reserves the right to vary the Work if it appears to the Company reasonably necessary to do so as a result of site conditions, new information, or of safety or environmental factors, on the basis that the Client agrees to bear the costs of additional work reasonably undertaken at the Company's standard rates or such rates as otherwise agreed in writing.
- 2.4 The Company will take all reasonable precautions to avoid damage to the Client's property. The Company shall not, however, be liable for any damage to services and structures that are not called to the Company's attention or are not located as shown on any plans which are provided to the Company.

3.0 CLIENT'S OBLIGATIONS

- 3.1 The Client acknowledges that in preparing the written proposal and in carrying out the Work, the Company has relied and continues to rely on the Client to make full disclosure of all known, assumed or suspected structures, tanks, utilities, pipelines, discharges, spillages, leachate and hazardous substances at, under or near the project site, together with all plans, surveys, reports, hydro graphic data, previous geotechnical or environmental investigations and any other relevant data. The Client shall promptly provide the Company with any new relevant information that becomes available.
- 3.2 The Client will co-operate with the Company in all reasonable ways and will make freely available or place at the Company's disposal all facilities and personnel reasonably required by the Company to carry out the Project including (without limitation) access, permits, power etc.
- 3.3 If the Client suspects at any time that the Work is or may be defective in any way whatsoever, the Client shall immediately draw the same to the attention of the Company and allow the Company the opportunity to correct the same. However, the Client acknowledges that the Work will not necessarily reveal all adverse conditions that could be identified either through a different formulation of the Work or through more detailed work being carried out.
- 3.4 When, following receipt of the Company's written proposal, the Client allows the Company to progress the work, the Company shall be entitled to assume the Client's acceptance of the written proposal and these Terms and Conditions.
- 3.5 When the Client allows the work to proceed in circumstances where the amount of the Company's fees have not been agreed, our standard hourly rates applicable at the time and disbursements shall apply (subject to any express written agreement to the contrary by an Authorised Employee).
- 3.6 The client cannot rely upon oral advice provided by any employee of the Company unless this advice has been confirmed in writing by ENVIRONMENTAL ESSENTIALS UK Ltd within 7 days.
- 3.7 The Company have assessed the substances hazardous to health which they use and the safety of the procedures used with these substances during the course of the work carried out on Clients' premises. The likely effects on health and safety of the Company's staff and Clients have been found to be trivial provided the substances are only used for the purposes intended and company procedures are followed.
- 3.8 The Client shall ensure that the Company and any Company employee working in the Client's undertaking are provided, in writing, with the following:



- i Comprehensive information on any risks to the health or safety of The Company employees that may arise out of, and in connection with, the conduct of the Client's undertaking.
- ii Appropriate instructions and comprehensible information regarding those risks and the protective and preventative measures taken by the Client in order to meet his statutory obligations.
- iii Sufficient information to enable the Company and its employees to identify, prior to the commencement of any contract, the person nominated for implementing emergency evacuation procedures and the procedures that should be followed in the event of any emergency occurring.

4.0 CONFIDENTIALITY

- 4.1 Each party will treat any information of a confidential nature relating to the other party which it comes across as a result of this agreement, and any information about the Work, as confidential.
- 4.2 Any Report will be addressed and delivered to the Client only. The parties will keep confidential the Report and neither will make it available or disclose its substance or contents to any third party.
- 4.3 Notwithstanding the foregoing, the Company reserves the right to use an outline description and generic image of the Work in its promotional literature.
- 4.4 This Clause shall not prevent the publication or disclosure of any such information once it has come within the public domain through no fault of the party which would otherwise owe the duty of confidentiality, information that has been lawfully acquired on a non-confidential basis, nor information published or disclosed under a duty or obligation owed to or imposed by any court, regulatory or governmental authority or body.

5.0 SAMPLE AND HAZARDOUS SUBSTANCES

- 5.1 Any hazardous substance or waste (including samples and contaminated equipment) arising from the Work shall be held by the Company as agent for the Client, whose property such materials shall remain. The Company will make all reasonable efforts to assist the Client with the safe handling and disposal of such materials; however the Client will be responsible for this disposal and for all associated costs.
- 5.2 The Client acknowledges and assumes the risk that commonly used exploration, investigative or remedial methods involve an inherent risk of contamination of previously uncontaminated soils and waters, including the potential migration of contaminants present on or beneath the surface of the project site or in the vicinity, and that any seal may be imperfect despite all reasonable or usual precautions.

6.0 DOCUMENTS AND REPORTS

- 6.1 All documentations made available by the Client under these Terms shall remain the property of the Client and shall be returned to the Client after use or on completion of the Work. The Company shall have the right to retain a copy of any document for its files. All other documents and records (including copies) generated by the Company and its sub-contractors etc. shall be the property of the Company.
- 6.2 Reports will remain the property of the Company until the Price is paid in full. Reports shall be used only by the Client for the purpose set out in the Company's written proposal and shall not be relied on or used for any other purpose whatsoever, or by any other party.
- 6.3 Copyright in the Company's written proposal and the Report and any intellectual property rights arising from the Work shall at all times belong to the Company, unless there is a specific written agreement otherwise, signed by an Authorised Employee.
- 6.4 The work provided by the Company is for the benefit of the Client only and shall not be relied upon by any third party without the written agreement of an Authorised Employee.

7.0 THE PRICE

- 7.1 Work will be carried out and charged on a time basis unless a fixed price or other basis is agreed in writing by an Authorised Employee. Any time charge contained or referred to in the Company's written proposal is for guidance only and relates to the fee rates and price schedule as at that date only. Invoices will be issued using the fee rates and price schedule in force at the time Work is carried out unless otherwise agreed in writing by an Authorised Employee. Any time charge or fixed price specified in the Company's written proposal will remain valid for a period of 30 days from the date of the proposal unless a different date is agreed in writing by an Authorised Employee.
- 7.2 Unless otherwise stated in the Company's written proposal, a charge will be made on all disbursements made by the Company associated with the Work in order to cover administrative costs. The disbursements include, but are not limited to: subcontractors, freight and packing charges, customs documentation, out-of-pocket expenses plus costs of travel,



accommodation and meals away from the normal place of business of the Company's personnel incurred in carrying out the Work.

- 7.3 Where utilised, a charge will be made for the use of the Company's in-house computer services in accordance with a schedule of charges in force at the time the Work is carried out, unless otherwise agreed in writing by an Authorised Employee.
- 7.4 An amount equivalent to 2.5% of the price payable under clause 7.1 will be charged to cover the cost of communications and photocopying unless otherwise agreed in writing with the Client.

8.0 TERMS OF PAYMENT

- 8.1 Invoices will be rendered monthly in arrears unless otherwise set out in the Company's written proposal and shall be paid (without deduction or set-off) by the Client within 30 days of the date of submission of the invoice by the Company. Any sums remaining unpaid at the expiry of any such 30 days will bear interest to accrue from day to day, at the rate of 2% (two per cent) above the base rate of Yorkshire Bank Plc. from time to time in force, cumulatively on the balance outstanding, before as well as after judgement.

Without prejudice to clause 14, the Company reserves the right to suspend its services hereunder if any invoice is not paid within 60 days of the date of submission by the Company and claim damages on the basis of such suspension.

- 8.2 Where any expense to be reimbursed by the Client is paid by the Company in a currency other than sterling, it shall be reimbursed in sterling calculated at the official purchase rate of exchange prevailing at the date when the expense was incurred, together with any additional charge payable under clause 7.2.
- 8.3 Unless agreed in writing to the contrary payment for Work carried out in each calendar month shall become due at the end of that month. An interim invoice on account may be submitted for payment. The Client accepts the Terms in 8.1.
- 8.4 The cost of services and expenses incurred will bear any applicable value added tax charge or the like at the rate current at the date of invoice. Non-UK Clients shall remit all payments free of any taxes, levies or claims or duties arising outside the UK, and shall pay in full any of the like which may be due according to the laws of its country or state.

9.0 COMPANY PERSONNEL

It is a condition of this agreement that the Client will not approach or contact with the intention of employing or retaining any employee of the Company engaged on or connected with the Work without the prior agreement of the Company. This restriction is to apply at all times during the Work and for a period of one year immediately following the completion of the Work.

10.0 LIABILITY OF THE COMPANY

- 10.1 Save for the obligations set out in these Terms, all other warranties, obligations and representations are hereby excluded to the fullest extent permitted by law, and all relations between the parties and all matters, issues or claims in relation to the Work shall be governed by these Terms to the exclusion of any other liability whatsoever or howsoever arising under the law or tort or its equivalent in any other country. Notwithstanding the foregoing, nothing in these Terms shall restrict the Company's liability for death or personal injury caused by negligence.
- 10.2 The Company's liability shall be limited to the extent of any injury or loss that is directly attributable to the failure of the Company, its employees, its subcontractors, and/or agents to comply with the obligations on the part of the Company under these Terms. In no circumstances whatsoever shall the Company be liable to the Client for economic or indirect or consequential loss.
- 10.3 The Client acknowledges and accepts that the Price does not contain a premium sufficient to cover the Company's risk of unlimited liability in respect of the Work and that a limitation on the Company's liability is therefore reasonable, bearing in mind the relevant circumstances, including the cost and availability or otherwise of insurance cover. Without prejudice to the remainder of this clause, the Company shall be liable to the Client for such direct losses of the Client as are attributable directly to the Company's defective work, limited to an aggregate amount equivalent to ten times the Price up to an absolute maximum of £2,000,000 (the Limit of Liability) and with a minimum limit per claim of the lower of £5,000 or one quarter of the Price. The Company shall have no further liability to the Client, its servants or agents in connection with the Work.

11.0 INSURANCE

- 11.1 The Company has professional indemnity insurance cover, and shall, if the Client requests, provide evidence that such insurance cover is available up to the Limit of Liability.

12.0 DELEGATION AND ASSIGNMENT

- 12.1 Neither the rights nor obligations of the Client under these Terms may be assigned.

13.0 FORCE MAJEURE

- 13.1 If the Company is delayed in the Work by any act or default of the Client or any other party or by any cause beyond the reasonable control of the Company, the period for completion of the Work shall be extended by a reasonable period, subject to clause 14.5, and the Company shall be paid for any additional reasonable costs incurred attributable to the delay.



13.2 Neither the Company nor the Client shall be liable for any failure to perform caused by circumstances or events beyond their reasonable control. Should such circumstances or events occur, it is agreed that both parties shall use all reasonable efforts to overcome difficulties arising and to resume as soon as reasonably possible the normal pursuit and schedule of the Work subject to clause 14.5.

14.0 TERMINATION OR SUSPENSION

14.1 If either party shall become bankrupt, go into liquidation (other than voluntary liquidation for the purposes of amalgamation or reorganisation only) have a receiver, administrative receiver or administrator appointed over any part of its business or assets, enter into a composition with its creditors or otherwise become, in the reasonable opinion of the other, insolvent (the "Bankrupt Party"), the other party shall be entitled forthwith by notice to the Bankrupt Party to suspend the Work or terminate this agreement with immediate effect.

14.2 If the Client fails to pay any sum due hereunder within 60 days of the date of submission of the Company's invoice, the Company may by notice to the Client suspend the Work and, at the same or a later time, terminate this agreement with immediate effect.

14.3 Save in circumstances to which clause 13 applies, if either party (the "Defaulting Party") breaches a material term of this agreement which remains unremedied for 30 days after service of written notice on it specifying such a breach, or if the breach is not capable of remedy or it appears that the Defaulting Party is in breach of a material provision of any statute, statutory instrument or common law, the other party may by notice in writing to the Defaulting Party suspend the Work and, at the same time or a later time, terminate this agreement with immediate effect.

14.4 The Client may terminate this agreement on 14 days written notice to the Company, to expire no later than 10 days before the intended commencement date.

14.5 If circumstances or events beyond the reasonable control of the affected party prevent the proper performance of a party's obligations under this Agreement for more than 90 days, then either party may immediately terminate this Agreement by written notice to the other.

14.6 If the Client terminates this agreement under clauses 14.1 or 14.3 above the Client shall pay to the Company only such sums as are payable in respect of Work done and costs incurred during the period up to the date of termination.

14.7 If the Company terminates this agreement under clauses 14.1, 14.2 or 14.3, either party terminates this agreement under clause 14.5, or the Client terminates this agreement under clause 14.4 the Client shall pay to the Company, in addition to the sums referred to in clause 14.6, such sums or costs as are reasonably expended or incurred by the Company in bringing the Work to an end in a prompt but orderly fashion and, where the Client terminates this agreement under clause 14.4, a cancellation fee of 10 per cent of the Price, such sums in aggregate not to exceed the Price (where fixed).

14.8 If the Work is suspended under clauses 14.1, 14.2, 14.3 or 14.5 or the circumstances referred to in clause 13.2 apply, and the Company is required to perform any additional work or incur additional costs in connection with the suspension or resumption of the Work, the Client shall pay the Company in respect of the same within 28 days of the suspension or resumption.

14.9 Termination shall not affect or prejudice the accrued rights, claims or defences of either party.

15.0 STATUS OF THESE TERMS

15.1 These Terms, together with, or as varied by, the Company's written proposal or the express written agreement referred to in clause 15.2, prevail over all other terms or representations and supersede all prior discussion. Negotiations, arrangements, understandings or agreements between the parties (whether oral or otherwise), and shall constitute the entire agreement between the parties.

15.2 These Terms may be varied or excluded (in whole or in part) by the Company's written proposal or by subsequent express agreement in writing signed on behalf of the Company by an Authorised Employee, but not otherwise.

15.3 If any provision of this agreement is or becomes invalid, illegal or unenforceable in any respect, the remaining parts of this agreement shall remain in force.

15.4 This agreement shall be governed by and construed in accordance with English law and each party agrees to submit to the non-exclusive jurisdiction of English courts.

16.0 DISPUTES

16.1 Provided both parties consider that there is a reasonable prospect of resolving any disputes or differences which arise between them out of or in connection with this agreement or the Work by negotiations between them in good faith, or by either of the procedures referred to below, before resorting to legal proceedings the parties shall attempt to settle the same.

17.0 NOTICE



Any notice to be given by one party to the other shall be served by sending the same by post or facsimile transmission to, or by leaving the same at, the address for each party shown in the Company's written proposal or notified in writing as the address for service. Any notice sent by facsimile transmission shall be presumed to have been served at the time of transmission, providing that the transmission report shows it was sent to the correct number. A notice sent by post shall be deemed to have been served 4 days after posting (for sendings within the United Kingdom) or within 10 days for all other sendings.

18.0 THIRD PARTIES

18.1 The Client acknowledges and agrees that these Terms shall not confer on any third party a right to enforce any term of the agreement between the Client and the Company. This provision confirms the intention of both parties for the purposes of Section 1(2) of the Contracts (Rights of Third Parties) Act 1999.