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TECHNICAL REPORT REF: 20265R02RMWmw

ACOUSTIC CONSULTANCY FOR PLANNING

PROPOSED PP PLASMA FACTORY, ASHTON OLD ROAD, MANCHESTER



CLIENT: PP Plasma Limited
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Salford
M502GQ

.

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Contents

Executive Summary 4

1 Introduction 5

2 Proposed Development 6

3 Criteria 8
3.1 Noise impact 8
3.2 BS 4142: 1997 8

4 Noise survey 9
4.1 Survey procedure 9
4.2 Instrumentation 10
4.3 Calibration 10
4.4 Weather conditions 10

5 Results 11
5.1 Factory Noise Climate 11
5.2 Daytime Noise Level 11
5.3 Evening Noise Level 11

6 Assessment 12
6.2 Noise from Factory 12

7 Discussion of Results 14
7.2 BS 4142 ASSESSMENT 15
7.3 Noise at Work 15

8 Conclusions 17

References 18
Appendix A: Noise Perception and Terminology 19
Appendix B: Noise data 21

Executive Summary

Environoise Consulting Limited has been commissioned by Bradshaw Gass and Hope LLP on behalf of their client PP Plasma Limited to prepare a noise assessment in support of a full planning application for a new factory to be erected on a site at the corner of Ashton Old Road and Pottery Lane in Manchester.

The report presents the results of surveys done to establish the representative existing background noise levels (L_{A90}) during the proposed hours of operation of the factory. It also presents the results of noise measurements in the existing factory situated in Salford.

Plant noise levels at the nearest receptor will be below the lowest measured daytime background noise level and more than 5 dB below the background noise level for both daytime and evening and is therefore compliant with the requirements of Manchester City Council. Plant will not be operated for most of the night (23:00hrs – 07:00hrs), but the intention is to open the premises at 06.00hrs so a one hour period of 'night-time' has been included in this assessment.

The report concludes that plant and vehicle movements noise levels will not create a significant adverse impact at the nearest residential receptor.

1 Introduction

Environoise Consulting Limited was commissioned by Bradshaw Gass and Hope LLP on behalf of their client PP Plasma Limited to prepare a noise assessment in support of a full planning application for a factory proposed to be built in Manchester at the Junction of Ashton Old Road and Pottery Lane

On the basis of pre-application consultation with Manchester City Council, the scope of the noise assessment is as follows:

1. Assessment of the noise impacts arising from plant and operations in the proposed factory at the nearest residential dwellings

2. The nearest dwellings are flats situated along Falconwood Way. This is a slip road running parallel to and just north of Ashton Old Road.

3. As the factory operating hours are proposed between 06.00hrs and 22.00 hours, noise measurements at the receptors were taken during the afternoon and evening for the daytime period and between 06.00 and 07.00 hrs for the night-time period to establish the existing background noise level.

4. The local authority requires that the noise from external plant is assessed in accordance with the requirements of BS4142:1997 and ask that new industrial noise should be below the existing background and also 5dB or more below the existing background in each octave band.[1]

[1] Email from Mr Robert MacDonald, BSc (Hons), MIEnvSc, AMIOA Environmental and Public Protection Citywide Team Environmental Health Manchester City Council on 17 September 2012

2 Proposed Development

2.1.1 The applicant proposes a new factory with two storey offices situated to the north of the proposal site in Manchester. The proposed factory will incorporate internal stock stores and deliveries will be made by HGV to one of several loading bays on the western side of the building. The doors to the eastern façade are to be used by PP Plasma delivery vehicles, shipping out finished product. Figure 1 shows the outline of the proposed scheme.

2.1.2 The present factory in Salford has an external stock yard, accessed using a fork lift truck..

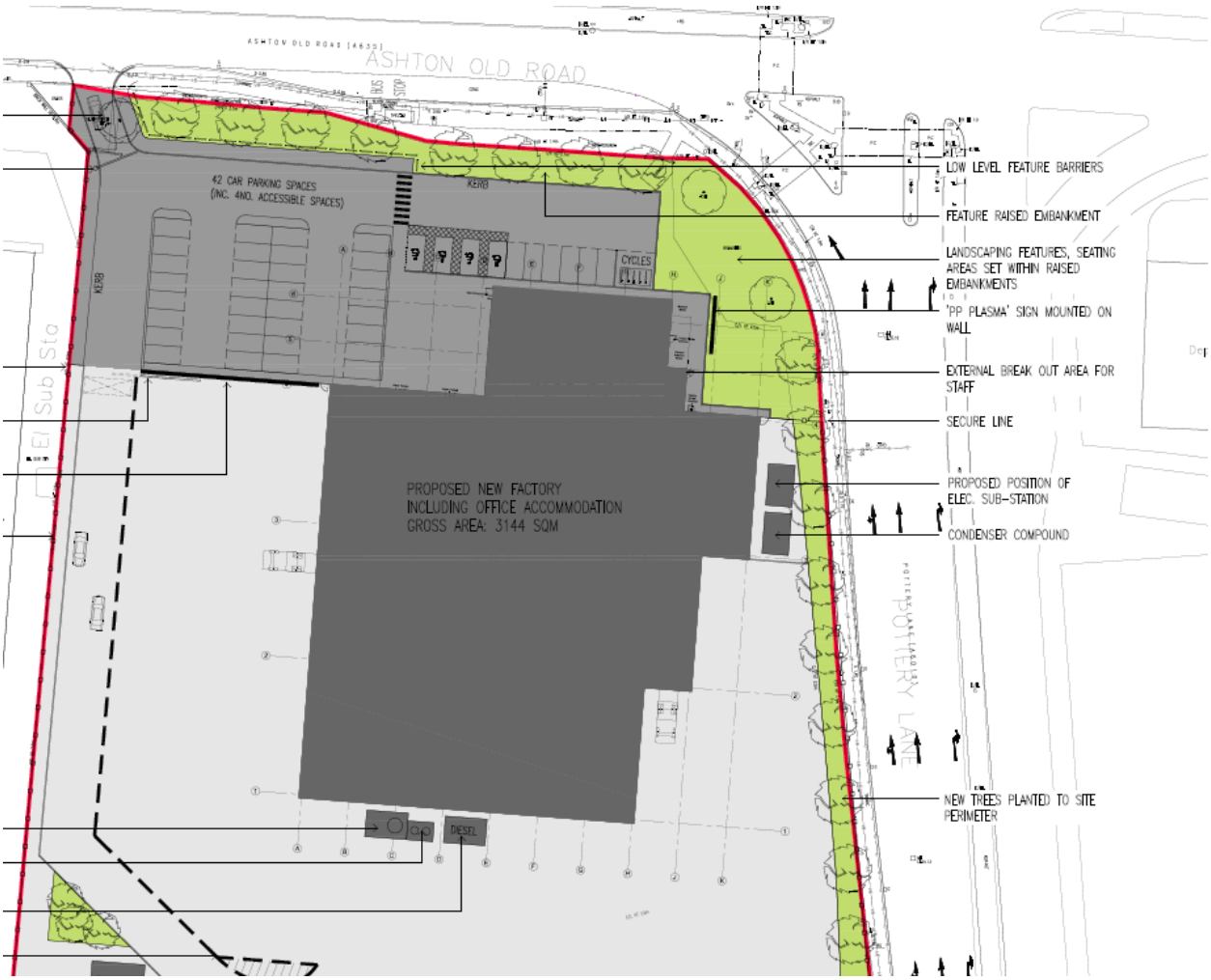

Figure 1: Proposed Factory Layout.



Figure 2: Proposed Factory showing Noise Measurement Location

2.1.3 Figure 2 shows the proposed factory layout superimposed on the Google satellite image. It can be seen that the nearest residential receptors are to the north of the site in Falconwood Way. The buildings in Falconwood Way are recently constructed flats with small balconies on the facades.

2.1.4 The noise survey measurement position is shown as 'X' on the image. The building to the east of Falconwood Way is a medical centre, which has a car park to its north. To the east of Pottery Lane, opposite the proposed factory is a large industrial building which can be seen on the front of this report.

2.1.5 To the north of the industrial building on the opposite side of Ashton Old Road are more recently constructed flats. These are at a greater distance from the proposed factory than those in Falconwood Way.

2.1.6 The noise climate in the area is dominated by traffic on Ashton Old Road and also to a lesser extent by traffic on Pottery Lane. There are traffic lights at the junction of these two roads which means that traffic can often be decelerating or accelerating, exacerbating the noise levels.

3 Criteria

3.1 Noise impact

City Council Consultation

3.1.1 In accordance with good practice, the scope of the noise assessment was determined through appropriate pre-application consultation with a Public Protection Officer (Mr Robert MacDonald) at Manchester City Council. Through pre-application discussions it was possible to agree appropriate measurement locations and methodology.

3.1.2 It was advised as a baseline position that the City Council require any new noise ($L_{Aeq,T}$) due to plant at the proposed factory should not be greater than 5dB below the existing background level (L_{A90}). This is in effect an evening noise limit since it is unlikely that factory noise would have a significant impact during the day given the site context (located on an industrial estate near to a road junction).

3.1.3 The assessment seeks to demonstrate that the proposed development would not generate any adverse noise impacts associated with operational plant and vehicular movements accessing and departing the site.

3.2 BS 4142*:* 1997

3.2.1 The proposed factory will have some plant items that must be assessed so that any noise arising would not generate any complaints by local residents.

3.2.2 BS4142: 'Method for rating Industrial Noise affecting Mixed Residential and Industrial Areas' 1997[i] provides a method of determining the 'likelihood of complaint' due to industrial noise sources. The basis of the BS4142 standard is a comparison between the background noise level (L_{A90}) in the vicinity of residential locations and the Rating Level of the industrial noise source under consideration. The Rating Level ($L_{Aeq,T}$) is the Specific Noise Level plus a 5 dB penalty added for the characteristic features of the noise.

- BS4142 suggests that a Rating Level excess of up to 5 dB(A) above the background noise level at the receptor is 'of marginal significance'.

- If the Rating Level due to the noise source exceeds the background noise level by more than 10 dB(A) then the indication is that 'complaints are likely'.

- If the Rating Level of the noise source is more than 10 dB(A) below the background noise level this is a positive indication that 'complaints are unlikely'.

4 Noise survey

4.1 Survey procedure

Existing Factory

4.1.1 A noise at work assessment report had been completed at the existing PP Plasma Ltd. factory in 2008[2]. The data in the report was used to help assess the potential noise which would be generated in the new factory.

4.1.2 In addition we visited the existing factory in Vere Street Salford. During the visit we measured octave band noise levels of the plasma cutting machine which is responsible for the highest noise levels in the factory and became familiar with operations performed at the factory on Wednesday 19th September 2012. From our noise measurements and the earlier report we established the potential typical noise climate likely to be experienced in the proposed new factory.

Proposal Site

4.1.3 The 'free-field' measurement location is shown in Figure 2. It was selected as it had a view of the Ashton Old Road and also was directly in line with the façade of the flats in Falconwood Way.

4.1.4 Noise levels were measured using a type 1 sound level meter fitted on a tripod approximately 1.5m above ground. Overall 'A' weighted ambient ($L_{Aeq,T}$), maximum ($L_{Amax,fast}$), background (L_{A90}) and L_{A10} and associated one-third and octave band noise levels were measured for contiguous 15 minute periods, see Table 1. We have not included the one-third octave data in this report, but it are available on request.

Table 1 Measurement Periods for Noise Survey.

Time (hh:mm) and date	Measurement Periods
(15:00hrs – 16:45hrs) Wednesday 19th September	6 x 15 minutes
(20:43hrs – 21:43hrs) Wednesday 19th September	4 x 15 minutes
(05.47hrs – 07.00hrs) Tuesday 13th November	14 x 5minutes

[2] Environmental Noise Survey, R. S. Bridge and Daughter, PP Plasma 24th June 2008

4.2 Instrumentation

4.2.1 The instrumentation used is shown in Table 2.

Table 2: Instrumentation details.

Manufacturer	Equipment type	Serial number	Calibration due date
Rion	NA-28 sound level meter	00501401	28th February 2013
	NH-23 preamplifier	01440	
	UC-59 Microphone	01836	
	NC-34 calibrator with ½" adaptor	34904967	
	Outdoor windshield		N/A

4.3 Calibration

4.3.1 The calibration of the sound level meter was checked at the start and end of the noise surveys, there was no recorded drift greater than 0.3dB at 1 kHz.

4.4 Weather conditions

4.4.1 Throughout the survey the weather was dry and cool with a southwest breeze of 5mph.

- Wednesday daytime - Mainly sunny, dry roads 14°C
- Wednesday evening - Mainly overcast, dry roads 9°C
- Tuesday early morning (officially 'night-time') overcast, damp roads SW breeze 12°C

4.4.2 The above weather conditions were suitable for environmental noise measurements.

5 Results

5.1 Factory Noise Climate

5.1.1 The measured noise levels and those extracted from the Noise at Work Assessment report are shown in Tables in Appendix B of this report.

5.2 Daytime Noise Level

5.2.1 Measurements were made in the afternoon between 15.00hrs and 16.45hrs. The background noise level was quite consistent at 59 to 60 dBL_{A90}. The noise climate was dominated entirely by road traffic with no other distinguishable sources. The parameter L_{A10} normally used in the assessment of traffic noise was also consistent at 67 to 68 dB $_{A10}$. This demonstrates a consistent level of traffic noise, supported by our subjective assessment.

5.3 Evening Noise Level

5.3.1 We understand that the proposed operational hours of the factory are from 08:00hrs to 22:00hrs. Therefore the potential for noise disturbance during the evening has been assessed. The requirement is that any new noise generated should be less than 5 dB below the overall existing background noise level and also in each octave band.

5.3.2 The lowest background noise level measured during the evening occurred between 20:43hrs and 20:58hrs at 52dB L_{A90}. An octave band spectrum of this level is shown in Table 2.

5.3.3 Although noise levels were, as expected, to be lower during the evening than during the daytime, the noise climate was still dominated by road traffic. The ambient noise level ($L_{Aeq,T}$) was between 62dB and 63dB $L_{Aeq,T}$ and the L_{10} was consistent at 66 dB L_{A10}.

5.4 Night-time Noise Level

5.4.1 Although the factory is not proposed to operate through the night, it may start up at 06.00hrs. To assess the existing background when the factory could be operating we have measured noise from just after 05.45 hrs to 07.00hrs.

5.4.2 The results show that the lowest background noise level during this period was 53dBL_{A90} which occurred during the 5 minute period around 06.00hrs. The L_{A10} ranged from 67dB to 71dB L_{A10}, which perhaps surprisingly was higher than measured during the afternoon. However subjectively during this early morning hour, the traffic seemed very heavy with many HGVs and buses.

6 Assessment

6.1 Overview

6.1.1 The assessment includes noise from operations inside the factory. It takes into account the maximum noise likely to be generated, the attenuation provided by the building and the distance to the receptors and the existing background noise level. For the sake of robustness we have endeavoured to satisfy the evening background noise level restriction since if this is achieved, the daytime noise issue will also be satisfied

6.2 Noise from Factory

6.2.1 The octave band data obtained from measurement of the noise from the plasma cutting machine at 6m has been used as the factory reverberant noise level.

6.2.2 The specification for the factory[3] will be an uninsulated profiled metal cladding of approximately 1.2mm thick on cold rolled cladding rails at approximately 1500mm centres. The acoustic performance of 1.2mm thick steel is given[ii] as shown in Table 1. This data is for flat steel sheet. Profiled cladding which will be used will have greater performance particularly at low frequency due to its inherent stiffness. We understand that glazing may be used on the northern façade of the factory and if so it should have acoustic performance equal to, or better than, that shown in Table 3.

Table 3: Sound Reduction Index (SRI) of 1.2mm thick steel.

Frequency Hz	63	125	250	500	1k	2k	4k
SRI dB	8	13	20	24	29	33	39

6.2.3 The lowest background noise octave band spectra measured at Falconwood Way during the daytime, evening and night are shown in Tables 4, 5 and 6 respectively. The requirement is to achieve 5 dB below this background in any octave band, and the targets are shown also:

Table 4: Octave Band Spectra of Background Noise Level (evening) and Noise Target.

Frequency Hz	63	125	250	500	1k	2k	4k	A weighted
Background Noise level L_{90} (dB)	61	54	50	48	49	44	29	52
Ambient Noise Target $L_{eq,T}$ (dB)	56	49	45	43	44	39	25	47

[3] Email from Sally Anne Beesley, Bradshaw Gass and Hope – Architects on 24th September 2012

Table 5: Octave Band Spectra of Lowest Background Noise Level (daytime) and Noise Limits.

Frequency Hz	63	125	250	500	1k	2k	4k	A weighted
Background Noise level L_{90} (dB)	68	61	57	55	55	50	37	59
Ambient Noise Target $L_{eq,T}$ (dB)	63	56	52	50	50	45	32	54

Table 6: Octave Band Spectra of Lowest Background Noise Level (night-time) and Noise Limits.

Frequency Hz	63	125	250	500	1k	2k	4k	A weighted
Background Noise level L_{90} (dB)	63	53	50	48	51	45	33	54
Ambient Noise Target $L_{eq,T}$ (dB)	58	51	45	43	46	40	28	49

Table 7: Octave Band Spectra of receptor noise level and target noise level.

Frequency Hz	63	125	250	500	1k	2k	4k	A weighted
Breakout 1: dB L_{eq}	55	47	40	36	31	32	25	40
Breakout 2: dB L_{eq}	55	47	40	37	33	36	32	42
Evening Target: dB	56	49	45	43	44	39	25	47
Daytime Target: dB	63	56	52	50	50	45	32	54
Night-time target:dB	58	51	45	43	46	40	28	49

6.2.4 Using the data shown in Table B1 (see Appendix B) as a reverberant internal noise level and the cladding attenuation data, we have calculated the noise breakout to the receptor location which is at 80 metres from the factory façade. The calculation results are shown in Table 7. The results entitled ‘Breakout 1’ are with the doors to the factory closed. Results entitled ‘Breakout 2’ are with the northernmost HGV loading door on the west façade open.

7 Discussion of Results

7.1.1 From the results shown in Table 7 it is clear that the overall target noise level at the nearest residential receptors will be met, whether the factory is operating during the daytime, night-time (i.e. between 06.00hrs and 07.00hrs) or the evening.

7.1.2 During normal operation with the northernmost factory HGV loading door closed, the noise target is met comfortably in all octave bands.

7.2 Delivery noise

7.2.1 We understand that deliveries to the factory will be during the daytime between the hours of 08:00hrs to 17:00hrs. Therefore HGV loading doors need only be opened during these times. Even if these doors are open (Breakout 2) whilst the plasma cutting machine is operating the noise target will be met in all octave bands.

7.2.2 We understand from the Bradshaw Gass and Hope drawing (number 1941 04 203A) that a 4m high screen is proposed in line with the northernmost main factory wall. Our calculation is based on a wall/screen height of 4m which is the minimum height needed such that the noise targets are met.

7.2.3 As discussed in the survey section, the noise climate in the area is heavily dominated by road traffic including HGVs. Therefore we have not assessed the potential impact of HGV movements, especially as the noise from them will be attenuated by the 4m height of the northern screen wall, and the HGVs will be some 100m distance from the nearest receptors which is substantially greater than the distance to the HGV carrying Ashton Old Road (approximately 15m).

7.2.4 The assessment has focussed on noise breakout from internal operations. We are not aware at the time of writing this report that any external plant is proposed. However if it is, the operational hours of any such plant such not extend beyond the normal operational hours of the factory (i.e. into the night-time period beyond 23:00hrs). Also any such plant should be designed/ specified that the noise generated by it should not exceed the octave and overall 'A' weighted level shown in Table 8. By achieving these plant noise figures, the combined noise of the external plant and the factory operations will still satisfy the requirement of the new noise being 5dB below the existing background.

Table 8: Octave Band Spectra of Maximum Plant Noise at Receptor location

Frequency (Hz)	63	125	250	500	1k	2k	4k	A weighted
Plant Noise: (dB)	49	45	43	42	44	37	20	46

7.3 BS 4142 ASSESSMENT

7.3.1 Although we have demonstrated using a robust approach that the noise target will be met, an assessment using BS 4142 provides an indication of the likelihood of the new noise causing complaints. A BS 4142 assessment follows:

BS 4142 Assessment – Factory Noise - Daytime

Existing Background Noise Level	L_{A90}	= 59 dB
Specific New Noise Level (HGV door open)	L_{Aeq}	= 42 dB
Correction for tonal noise		= +5dB
Rating Level		= 47 dB
Rating level – background level, 47-59		= -12 dB

As the Rating Level of the noise source is greater than 10 dB(A) below the background noise level this is a positive indication that 'complaints are unlikely.'

7.3.2 BS 4142 Assessment – Factory Noise - Evening

Existing Background Noise Level	L_{A90}	= 52 dB
Specific New Noise Level	L_{Aeq}	= 40 dB
Correction for tonal noise		= +5dB
Rating Level		= 45 dB
Rating level – background level, 45-52		= -7 dB

As the Rating Level of the noise source is 7dBA below the background noise level this is an indication that the noise is between 'of marginal significance, and 'a positive indication that complaints are unlikely.'

7.3.3 BS 4142 Assessment – Factory Noise – Night-time

Existing Background Noise Level	L_{A90}	= 54 dB
Specific New Noise Level	L_{Aeq}	= 40 dB
Correction for tonal noise		= +5dB
Rating Level		= 45 dB
Rating level – background level, 45-54		= -9 dB

As the Rating Level of the noise source is 9dBA below the background noise level this is an indication that the noise is between 'of marginal significance, and 'a positive indication that complaints are unlikely

7.4 Noise at Work

7.4.1 There are regulations in place throughout the EU on minimising noise level exposure for employees.[iii] The management and workforce of any industrial operation have obligations to minimise noise levels and their exposure to them. We have assumed for this assessment that no new noise control measures have been implemented and that plant is largely as per that in the existing factory. The adoption of noise control measures would help reduce internal noise

levels and the exposure of employees to them. There would be a corresponding reduction in external noise levels.

7.4.2 Whilst outside the scope of this assessment the introduction of absorptive screens or absorption to the internal building surfaces would be beneficial to internal and external noise levels.

8 Conclusions

8.1.1 The factory as proposed will not cause significant adverse noise impacts at the residential receptors.

8.1.2 Material stock deliveries scheduled (daytime only) will not create a significant adverse impact even when using the open loading door closest to the receptors

8.1.3 The screen/wall to be installed between the car park and HGV delivery area should be 4m high or more.

8.1.4 If any external plant is to be installed, it should satisfy the noise limits given in Table 5 so that the Manchester City Council noise targets are fully satisfied.

8.1.5 The noise generation due to the operation of the proposed PP Plasma factory is such that planning permission should be granted.

References

[i] BS4142: 'Method for rating Industrial Noise affecting Mixed Residential and Industrial Areas' 1997.

[ii] Engineering Noise Control by DA Bies and Hansen 'Sound Transmission through Partitions', Page 200

[iii] The Control of Noise at Work Regualtions:2005

Appendix A: Noise Perception and Terminology

Between the quietest audible sound and the loudest tolerable sound there is a million to one ratio in sound pressure (measured in Pascal, Pa). Because if this wide range a noise level scale based on logarithms is used in noise measurement called the decibel (dB) scale. Audibility of sound covers a range of approximately 0 to 140 dB.

The human ear system does not respond uniformly to sound across the detectable frequency range and consequently instrumentation used to measure noise is weighted to represent the performance of the ear. This is known as the 'A weighting' and annotated as dB (A)

Table 6 lists the sound pressure level in dB (A) for common situations.

Table 9: Noise levels for common situations.

Typical noise level dB(A)	Example
0	Threshold of hearing
30	Rural area at night, still air
40	Public library, refrigerator humming at 2m
50	Quiet office, no machinery, Boiling kettle at 0.5m
60	Normal conversation
70	Telephone ringing at 2m, Vacuum cleaner at 3m
80	General factory noise level, Heavy goods vehicle from pavement
90	Powered lawn motor, operators ear
100	Pneumatic drill at 5m
120	Discotheque – 1m in front of loudspeaker
140	Threshold of pain

The noise levels at a measurement point are rarely steady, even in rural areas, and vary over a range dependent upon the effects of local noise sources. Close to a busy motorway, the noise levels may vary over a range of 5 dB(A), whereas in a suburban area this may increase up to 40 dB(A) and more due to the multitude of noise sources in such areas (cars, dogs, aircraft etc.) and their variable operation. Furthermore, the range of night-time noise levels will often be smaller and the levels significantly reduced compared with daytime levels. When considering environmental noise, it is necessary to consider how to quantify the existing noise (the ambient noise) to account for these second to second variations.

Human subjects are generally only capable of noticing changes in steady levels of no less than 3 dB(A). It is generally accepted that a change of 10 dB(A) in an overall, steady noise level is perceived to the human ear as a doubling (or halving) of the noise level. (These findings do not necessarily apply to transient or non-steady noise sources such as changes in noise due to change in road traffic flow, or intermittent noise sources).

Equivalent Continuous Noise Level

The equivalent continuous A-weighted sound pressure level, L_{Aeq}, is the single number that represents the average sound energy measured over that period. The L_{Aeq} is the sound level of a notionally steady

sound having the same energy as a fluctuating sound over a specified measurement period. It is commonly used to express the energy value from individual sources that vary in level over their operational cycle.

Background Noise Level

A parameter that is widely accepted as reflecting human perception of ambient noise is the background noise level, L_{A90}. This is the noise level exceeded for 90% if the measurement period and generally reflects the noise level in the lulls between individual noise events. Over a 1 hour period, the L_{A90} will be the noise level exceeded for 45 minutes.

Maximum Instantaneous Noise Level

L_{Amax} is the maximum instantaneous sound pressure level attained during a measurement period (30 seconds, 5 minutes etc) and can be measured using slow (L_{Asmax}) or fast $L_{Amax,fast)}$ weighting. It is generally used when assessing the likelihood of night-time sleep disturbance

Most environmental noise measurements and assessments are undertaken for 'free-field', away from any existing reflecting surfaces (other than the ground). However, it is sometimes necessary to consider noise levels immediately external to a façade when considering the impact on residents inside properties and this requires the addition of 3 dB(A) to the predicted (or measured) free-field level due to noise reflection from the façade. The assessment of road traffic noise, for example, is based on predicted (or measured) façade noise level (using the L_{A10} statistical parameter).

Decibel (dB)
The unit used for many acoustic quantities to indicate the level with respect to a reference level.

Frequency
The number of pressure variations (or cycles) per second that gives a sound its distinctive tone. The unit of frequency is the Hertz (Hz).

Frequency band
A continuous range of frequencies between stated upper and lower limits, (see also octave band and one-third-octave band).

Hertz (Hz)
The unit of the frequency of a sound (formerly called cycles per second).

Octave band
A frequency band in which the upper limit of the band is twice the frequency of the lower limit.

Sound pressure level
A quantity related to the physical intensity of a sound.

Spectrum
The composition of a particular sound in terms of separate frequency bands.

Appendix B: Noise data

Table B1 Factory Noise Levels (Vere Street)

Frequency Hz	63	125	250	500	1k	2k	4k	A
Ambient with radio dB	79	83	74	71	72	72	65	85
Plasma Cutter @ 6m dB	85	82	82	82	82	87	86	92
Grinding at 1m dB								92
Water jet at 1m								90

Table B2: Daytime – Falconwood Way

Measurement start	$L_{Aeq, 15mins}$	$L_{Amax,fast}$	L_{A90}	L_{A10}
15.00	65	76	59	67
15.15	65	77	59	68
15.30	65	75	60	68
15.45	64	72	59	68
16.00	65	79	59	67
16.15	65	74	60	67

Table B3: Evening – Falconwood Way

Measurement start	$L_{Aeq, 15mins}$	$L_{Amax,fast}$	L_{A90}	L_{A10}
20.43	62	72	52	66
20.58	62	77	53	66
21.13	63	79	54	66
21.28	62	77	55	66

Table B4: Night-time – Falconwood Way

Measurement start	$L_{Aeq, 15mins}$	$L_{Amax,fast}$	L_{A90}	L_{A10}
05.47	64	73	55	68
05.52	64	75	56	67
05.57	62	75	53	66
06.02	65	83	56	68
06.07	66	79	56	69
06.12	68	84	58	70
06.17	65	73	57	69
06.22	65	73	54	70
06.27	66	74	57	71
06.32	67	74	60	71
06.35	66	75	58	69
06.42	67	74	57	70
06.47	66	76	55	71
06.52	66	75	58	70
06.57	66	80	60	70