



Princes Ltd, Bridge Road, Long Sutton, PE12 9EQ

Planning Noise Assessment Pea Processing Plant

December 2018

Waterman Infrastructure & Environment Limited

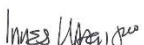
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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

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Comments

Comments

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1. Introduction

As part of an investment in facilities Princes wish to rationalise their Long Sutton site to maximise site efficiency. The proposal includes the relocation of the Pea Processing Plant northwards together with the construction of a new Pea Plant enclosure.

The report provides an assessment of the potential change to operational noise emissions from the Pea Processing Plant at the nearest residential receptors to the site as a result of the proposed changes.

A glossary of the acoustic terminology used within this report is presented in **Appendix A**.

1.1 Site Description

The Princes Long Sutton site is located in a rural location, predominantly surrounded by arable land use. Bridge Road runs directly adjacent to the northern boundary. There are several residential dwellings on Bridge Road which overlook the eastern area of the site together with a small number of residential dwellings adjacent to the eastern site boundary proximate to Bridge Road.

The existing location of the Pea Processing Plant is illustrated in **Figure 1** together with the existing site layout. It is partially enclosed by a single profile steel structure on all sides and roof except the south façade facing into the Site which is open.

The site operates 24/5 with seasonal operation 24/7. Pea processing is a seasonable operation relying upon the supply of the pea crop and as such operated only between mid-June and mid-August subject to the variation of growing conditions. For the remainder of the year the plant is not in use.

1.2 Development Description

The Pea Processing Plant will be located north of the main warehouse building, as illustrated in **Figure 2**. The new full enclosure comprises a composite wall and roof panels with 150mm rockwool core providing an acoustic rating R_w (C; Ctr) of 34 (-2; -4). The new enclosure has been designed to limit the extent of openings thereby reducing the level of noise breakout. On the eastern elevation there are 3 no. conveyor apertures $\sim 1\text{m}^2$ set approximately 1m above ground level. On the western elevation there is a small aperture set above the 6m high roller shutter door.

Inherent to the overall Development is provision of a 3.5m acoustic grade fence on the northern and eastern boundary of the service yard which also provides some screening to the Pea Plant operations.

Figure 2 presents the proposed development layout.

2. Noise Assessment Criteria

2.1 Local Authority Consultation

The Environmental Health Department of South Holland District Council (SHDC) were consulted prior to conducting the baseline noise survey to agree the strategy and assessment approach. SHDC confirmed by e-mail that they agreed in principle with the baseline survey strategy and assessment approach.

2.2 Comparative Noise Assessment

Essentially there is no change to the Pea Processing operations *per se* just location changes to existing permitted operations, albeit within a new higher acoustic performing enclosure. On this basis a comparative noise assessment of this proposed developmental change has been undertaken.

The comparative assessment predicts the change in prevailing baseline noise conditions due to the proposed relocation and new enclosure of the Pea Plant. Generally, a noise level change from an existing noise source of 3dB is just discernible whereas an increase or decrease of 10dB is perceived as a doubling or halving of the noise level. **Table 1** presents the potential level of noise impact from comparative changes in source noise levels.

Table 1: Potential Noise Impact From Comparative Changes in Existing Source Noise Level

Change in Source Noise Level dB	Impact	Comments
+≤3dB	Negligible	Just perceptible depending on prevailing ambient noise levels and therefore should be acceptable without mitigation.
+>3-4.9dB	Minor	Potentially perceptible depending on prevailing ambient noise levels. May require consideration of mitigation depending on absolute noise level, frequency and time of day.
+5 to 9.9 dB	Moderate	Potentially clearly perceptible depending on prevailing ambient noise levels that could result in behaviour changes by residents such as closing of windows. Mitigation is likely to be required to reduce the potential impact, depending on absolute noise level, frequency and time of day.
+>10dB	Substantial	Potentially unacceptable to residents depending on the prevailing ambient noise levels. Mitigation is likely to be required to reduce the impact.

3. Environmental Noise Survey

3.1 Sensitive Receptors

The nearest sensitive receptors to the Site are the residential houses fronting Bridge Road to the north of the eastern area of the site and several isolated dwellings adjacent to the eastern site boundary. **Table 2** presents the identified sensitive receptors which are illustrated in **Figure 1**.

Table 2: Identified Residential Sensitive Receptors

Ref (Figure 1)	Description	Distance from Site Boundary (m approx.)	Distance from relocated pea processing unit (m approx.)
SR A	Residential houses Bridge Road	30	60
SR B	Residential houses east of site	5	180

3.2 Environmental Noise Survey

A baseline environmental noise survey was conducted at Princes Long Sutton, from Wednesday 18th July to Thursday 19th July 2018 to establish the prevailing ambient noise levels within the vicinity of the nearest existing sensitive receptors to the site.

Environmental noise loggers were installed at the eastern site boundary (LT1) in line with the rear garden of the house (approximately 60m south of Bridge Road and within the vicinity of the northern boundary with Bridge Road (LT2 approximately 15 metres from the road edge). LT2 was considered to be representative of prevailing noise levels within the vicinity of the houses fronting onto Bridge Road.

Table 3 presents a summary of the environmental noise survey results with monitoring locations illustrated in Figure 1. Full details of the baseline survey are presented in **Appendix B**. The daytime period is taken as 07:00-23:00 with night-time period as 23:00-07:00.

Table 3: Summary of Baseline Survey Results

ID	Description	Period	L _{Aeq} ¹	L _{AFmax} ²	L _{A10} ³	L _{A90,5min} Range	L _{A90} ³	Modal L _{A90}
LT1	Eastern Boundary (SR B)	Day	51	68	50	38-52	44	44
		Night	46	59	47	37-48	40	40
LT2	Northern Boundary (SR A)	Day (1300-2300)	59	78	63	38-49	44	45
		Night	53	75	51	38-50	43	44

Note: ¹ Logarithmic average. ² 95th Percentile. ³ Arithmetic average.

The weather conditions during the survey period were monitored remotely with reference to weather station ID ISPALDIN8 at Long Sutton located approximately 2.2km to the west of the Site. Conditions during the survey period were suitable for noise monitoring, being dry and wind speed less than 5 m/s.

At both locations road traffic noise was considered to be the dominant noise source. Traffic movements on Bridge Road were noted as being frequent but not continuous. Noise from the A17 was noted as being distant but continuous during the daytime period. Noise from the Princes Site was also noted as being

occasionally discernible and subjectively considered to contribute to the environmental noise climate at both noise monitoring locations.

Time history plots for both locations are presented in **Appendix B**.

When operational, noise emissions from the Pea Plant contributes to the existing environmental noise levels, as evidenced by the time history plots presented within **Appendix B**.

4. Noise Impact Assessment

4.1 Pea Processing Plant Noise Source Data

Noise levels within the proposed relocated Pea Processing Plant within its new enclosure are estimated from noise measurement undertaken at 35 metres south of the current Pea Processing Plant, conducted on Thursday 19th July 2018 as part of the baseline noise survey. The southern façade of the current unit is open. Full details are presented within **Appendix C**.

Cadna-A noise modelling software has been used to predict break-out noise levels from the proposed relocated Pea Plant and new enclosure, together with prediction of noise levels at the nearest residential receptors on Bridge Road and at the isolated dwellings adjacent to the eastern site boundary.

The assessment is based on the following assumptions:

- Building façade and roof comprising of Eurobond 150mm Rockspan Xtra (refer to **Appendix C**);
- Building enclosed excepting 3 no. conveyor apertures on eastern façade approximately 1m² and 1m above ground level and 1 no aperture on the western façade approximately 1 m² above the high roller shutter door;
- Approximate building dimensions; length 30m, width 18m, height to eaves 9m, height to apex 9.8m;
- Boundary acoustic fence 3.5m height on northern and eastern site boundary of service yard.

Table 4 presents the predicted change in prevailing noise levels together with the potential impact resultant from change in ambient noise level. **Figure 3** presents the CadnaA contour output and predicted noise level at the receptors.

Table 4: Predicted Change in Prevailing Noise from New Pea Processing Unit

Receptor / Period	Measured Noise Level dB LAeq,T	Pea Processing Predicted Noise Level dB LAeq,T	Predicted Combined Noise Level dB LAeq,T	Predicted Change in Noise Level During Pea Processing Operations	Significance
Nearest Receptor Eastern Site Boundary (SR A)					
Day	51	37	51	<+1	Negligible
Night	46	37	<47	<+1	Negligible
Nearest Bridge Road Receptor (SR B)					
Day	59	48	59	<+1	Negligible
Night	53	48	54	+1	Negligible

The break-out noise from the relocated Pea Processing Plant together with the new enclosure is predicted to have negligible impact on the nearest sensitive receptors. The greatest contribution is from break-out noise through the 3 no. conveyor apertures.

5. Conclusions

The level of break-out noise from the relocated, fully enclosed (34dB R_w), excepting for 3 no conveyor apertures on the eastern façade, Pea Processing Plant, is predicted to increase the prevailing noise level by less than 1dB, except at the nearest receptor on Bridge Road during the night-time period when a 1dB increase is predicted. This level of change in prevailing noise levels is considered to be negligible.

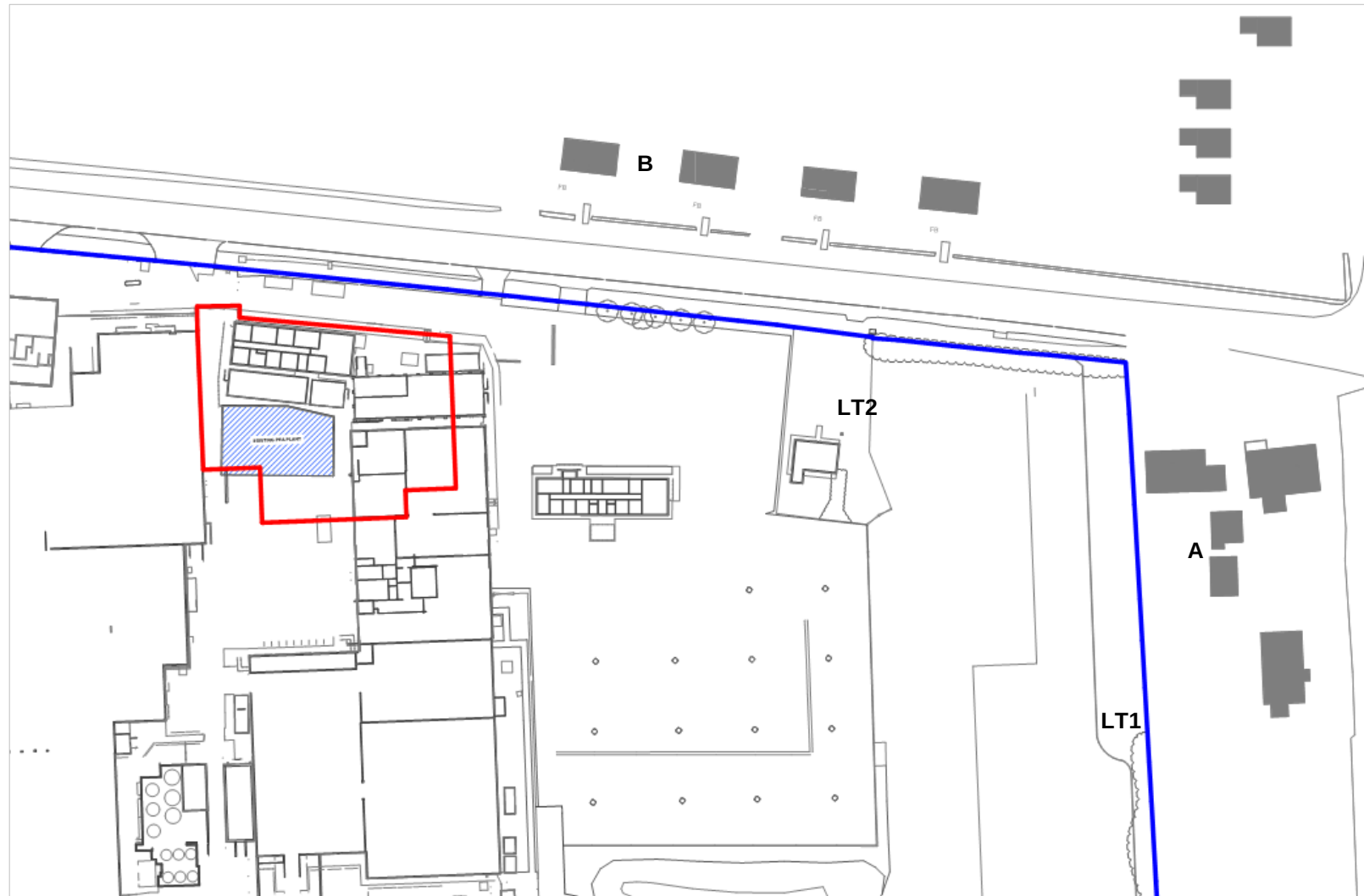
Although the predicted impact is negligible, given the largest contribution is from break-out through the conveyor apertures on the eastern façade it is recommended that consideration is given to:

- Inclusion of acoustic absorption internally within the Pea Processing Plant building to reduce the build-up of reverberant noise. This could be achieved through inclusion of acoustically absorbent baffles or panels as required.
- Incorporation of design measures to reduce break-out through the conveyor apertures through provision of acoustic plastic curtains or lined acoustic shroud.

6. Figures

Figures

Figure 1: Existing Site Layout and Noise Monitoring Locations



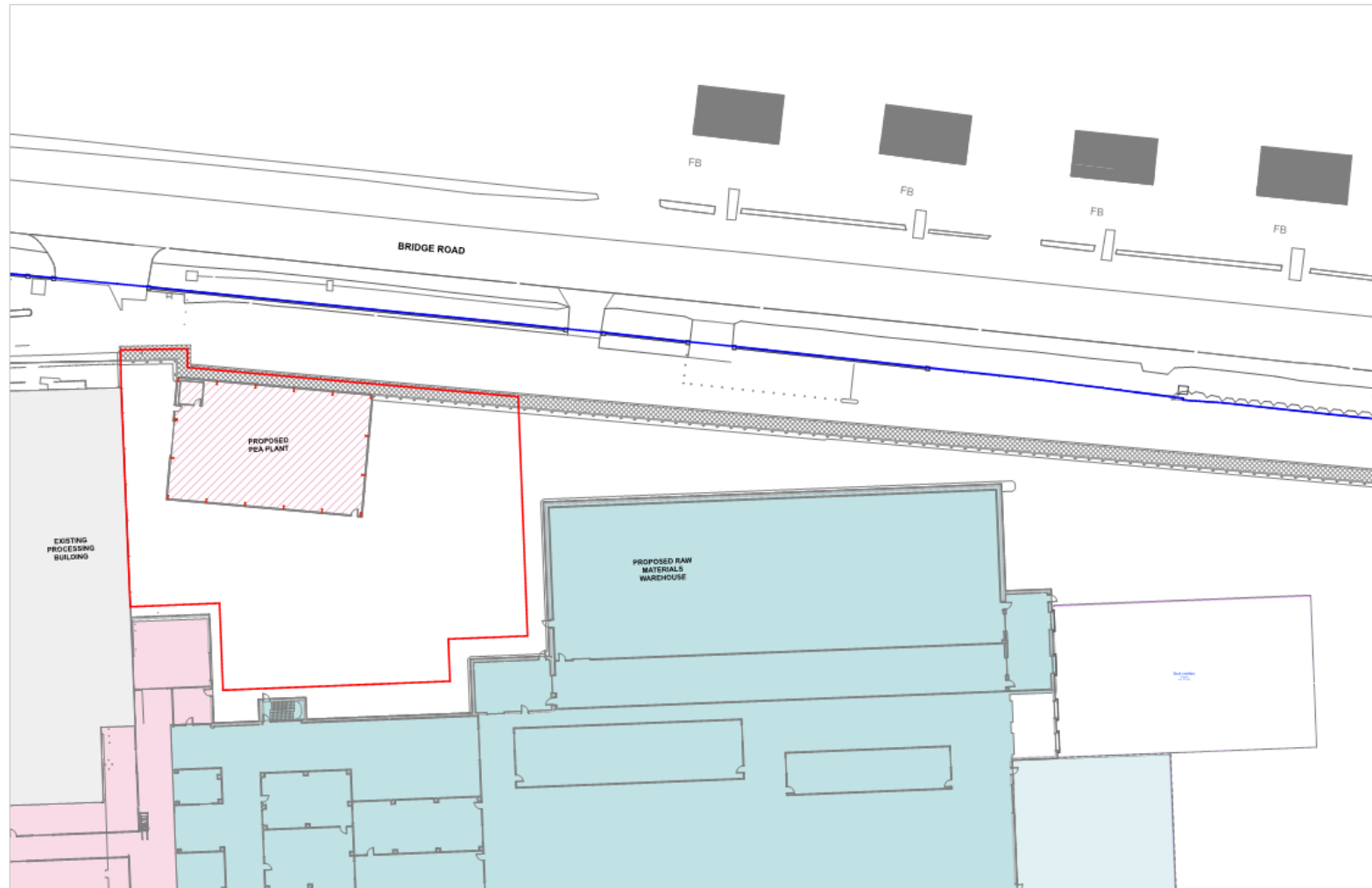
Figures

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Figure 2: Pea Plant Proposed Development



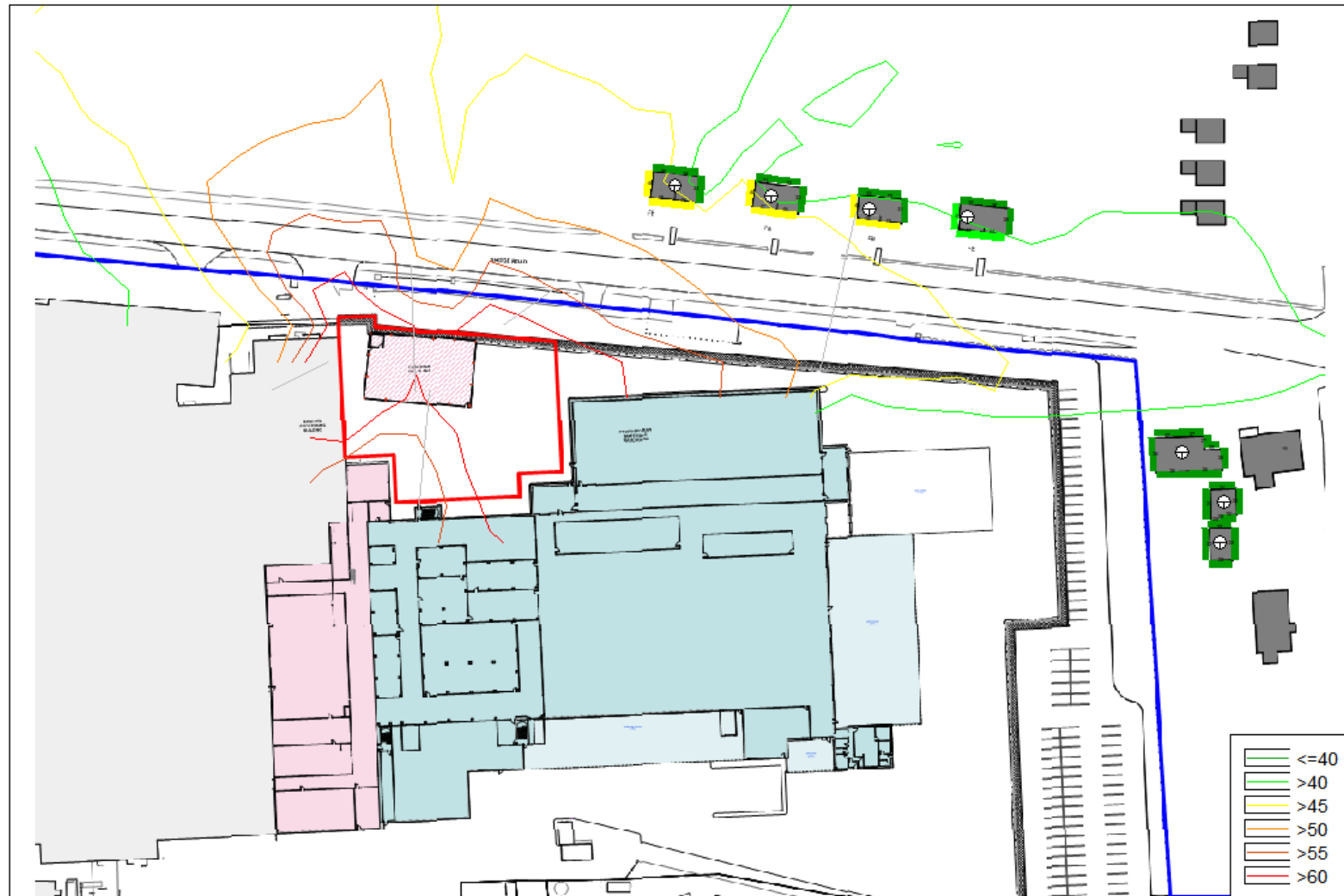
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Figure 3: CadnaA Noise Contours & Predicted Noise Levels At Sensitive Receptors (dB L_{Aeq,T} 4 m agl)



Figures

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APPENDICES

A. Glossary of Acoustic Terms

Ambient sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.																		
Assessment period	The period in a day over which assessments are made.																		
A-weighting	A frequency weighting applied to measured or predicted sounds levels in order to compensate for the non-linearity of human hearing.																		
Background noise	Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{90} noise level (see below).																		
Broadband	Containing the full range of frequencies.																		
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound that is heard. The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping. Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds: <table> <tr> <td>Four engine jet aircraft at 100m</td><td>120 dB</td></tr> <tr> <td>Riveting of steel plate at 10m</td><td>105 dB</td></tr> <tr> <td>Pneumatic drill at 10m</td><td>90 dB</td></tr> <tr> <td>Circular wood saw at 10m</td><td>80 dB</td></tr> <tr> <td>Heavy road traffic at 10m</td><td>75 dB</td></tr> <tr> <td>Telephone bell at 10m</td><td>65 dB</td></tr> <tr> <td>Male speech, average at 10m</td><td>50 dB</td></tr> <tr> <td>Whisper at 10m</td><td>25 dB</td></tr> <tr> <td>Threshold of hearing, 1000 Hz</td><td>0 dB</td></tr> </table>	Four engine jet aircraft at 100m	120 dB	Riveting of steel plate at 10m	105 dB	Pneumatic drill at 10m	90 dB	Circular wood saw at 10m	80 dB	Heavy road traffic at 10m	75 dB	Telephone bell at 10m	65 dB	Male speech, average at 10m	50 dB	Whisper at 10m	25 dB	Threshold of hearing, 1000 Hz	0 dB
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Male speech, average at 10m	50 dB																		
Whisper at 10m	25 dB																		
Threshold of hearing, 1000 Hz	0 dB																		
dB(A): A-weighted decibels	The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the 'A' filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.																		
Façade Noise Level	A noise level measured or predicted at the façade of a building, typically at a distance of 1m, containing a contribution made up of reflections from the façade itself (+3 dB).																		
Free-Field Noise Level	A sound field region with no adjacent reflecting surfaces. Normally taken as a measurement location at a distance of at least 3.5m from reflecting surfaces (except the ground).																		
L_{Amax} noise level	This is the maximum noise level recorded over the measurement period.																		
L_{Amin} noise level	This is the lowest level during the measurement period.																		
$L_{Aeq,T}$ noise level	This is the 'equivalent continuous A-weighted sound pressure level, in decibels' and is defined in British Standard 7445 as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'.																		

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	It is a unit commonly used to describe construction noise, noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise.
L_{A90} noise level	This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.
L_{A10} noise level	This is the noise level which is achieved for 10% of the monitoring period and is often used to describe road traffic noise.
Residual sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Reverberant Sound Field	The region of an enclosed space in which the reverberant sound is the major contributor to the total sound pressure level.
Rating Level, L_{A,r,Tr}	Specific sound level plus any adjustment for the characteristic features of the sound.
Sound Reduction Index (R)	The sound reduction index is a single-number rating of the sound reduction through a wall or other building element. Since the sound reduction may be different at different frequencies, test measurements are subjected to a standard procedure which yields a single number that is about equal to the average sound reduction in the middle of the human hearing range.
Specific sound level, L_{Aeq,T}	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.
Weighted Sound Reduction Index (R_w)	Single number rating used to describe the laboratory airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
C_{TR}	An adjustment to the R _w scale to take account of the lower performance against a typical spectrum of road traffic noise dominated by low frequencies.
D_{ne,W}	Weighted element normalised level difference.

Appendices

B. Baseline Noise Survey

An unattended baseline noise survey was conducted at the eastern site boundary (LT1) and at 15 metres set-back from the northern site boundary with Bridge Road (LT2) from Wednesday 18th July to Thursday 19th July 2018.

The noise monitoring locations are described in Table B1 and illustrated in Figure 1.

The baseline strategy was agreed with Environmental Health of South Holland District Council (SHDC).

Table B1: Noise Monitoring Locations

Monitoring Location (Figure 1)	Description	Observations and Predominant Noise Sources
LT1	Un-attended long-term monitoring location at eastern site boundary. Environmental sound level meter used, with microphone mounted on an integral steel pole 1.2 metres above ground level.	Intermittent road traffic noise Bridge Road and distant road traffic noise from A17. Industrial noise discernible. Pea processing unit discernible when operational.
LT2	Un-attended long-term monitoring location at eastern site boundary. Environmental sound level meter used, with microphone mounted on an integral steel pole 1.2 metres above ground level.	Intermittent road traffic noise Bridge Road. Industrial noise discernible. Pea processing unit discernible when operational.

The noise parameters logged throughout the survey period were L_{Aeq} , L_{A90} , L_{A10} , and L_{Amax} measured as contiguous 5-minute periods. These parameters are described in full in Appendix A. The L_{Aeq} level is the equivalent continuous sound pressure level over the measurement period; L_{A90} is used as a descriptor of background noise levels and is the noise level exceeded for 90% of the measurement period, L_{A10} is the noise level which is achieved for 10% of the monitoring period and is often used to describe road traffic noise and L_{Amax} is an indicator of the highest sound level during the measurement period.

In addition 1/3 octave noise measurements were taken of the L_{eq} parameter.

Monitoring was undertaken by trained and competent Member of the Institute of Acoustics (MIOA).

The sound level meters were field calibrated before and on completion with no significant drift detected. Table B2 presents details of the equipment used in the baseline noise survey. All equipment used holds a valid calibration certificate which are available on request.

Table B2: Equipment Details

Location	Equipment	Model	Serial No.
LT1	Sound Level Meter	Rion NL-52 Type 1 Sound Level Meter	01043379
	Microphone	Rion UC-59 Microphone	02547
	Pre-amplifier	Rion NH-25 Pre-amplifier	10199
LT2	Sound Level Meter	Rion NL-52 Type 1 Sound Level Meter	976152
	Microphone	Rion UC-59 Microphone	12045
	Pre-amplifier	Rion NH-25 Pre-amplifier	76269
All	Acoustic Calibrator	Acoustic Calibrator Rion NC-74	35173533

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The weather conditions during the survey period were monitored remotely with reference to weather station ID ISPALDIN8 at Long Sutton located approximately 2.2km to the west of the Site. On Wednesday 18th July 2018 average temperature was 18.7°C, dry, sunny, calm up to 3 m/s northerly wind speed and direction. On Thursday 19th July 2018 average temperature was 20.8°C, dry, sunny, calm up to 3 m/s SSW wind speed and direction.

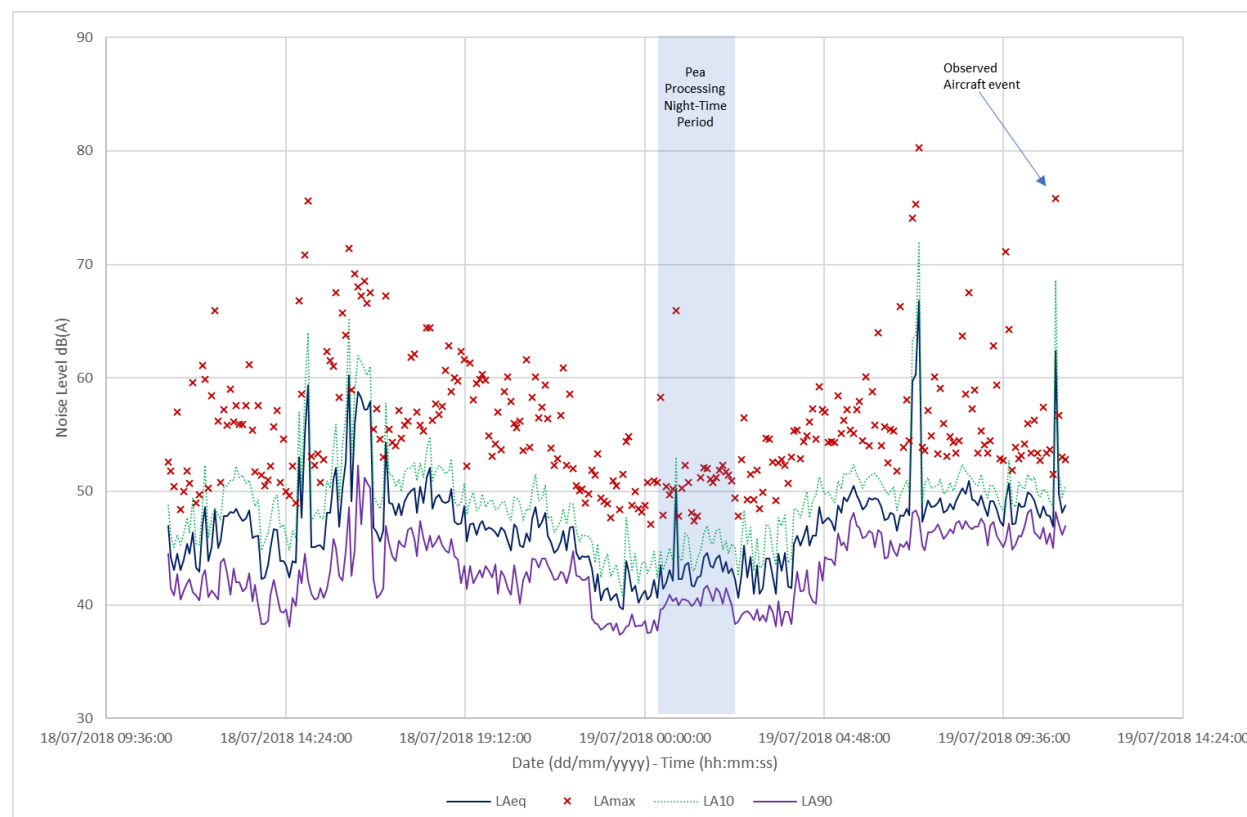
A summary of the baseline survey results are presented as Table B3 with time history plot of LT1 and LT2 presented as Figures B1 and B2 respectively. Figures B3 and B4 present the day and night L_{A90} modal plots for LT1 respectively and Figures B5 and B6 present the day and night L_{A90} modal plots for LT2 respectively.

Table B3: Summary of Baseline Survey Results

ID	Description	Period	L_{Aeq}^1	L_{AFmax}^2	L_{A10}^3	$L_{A90,5min}$ Range	L_{A90}^3	Modal L_{A90}
LT1	Eastern Boundary (SR A)	Day	51	68	50	38-52	44	44
		Night	46	59	47	37-48	40	40
LT2	Northern Boundary (SR B)	Day (1300-2300)	59	78	63	38-49	44	45
		Night	53	75	51	38-50	43	44

Note: ¹ Logarithmic average. ² 95th Percentile. ³ Arithmetic average.

Figure B1: Time History Plot of Noise Levels at LT1 (Eastern Site Boundary)



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Figure B2: Time History Plot of Noise Levels at LT2 (15m Set Back Northern Site Boundary Bridge Road)

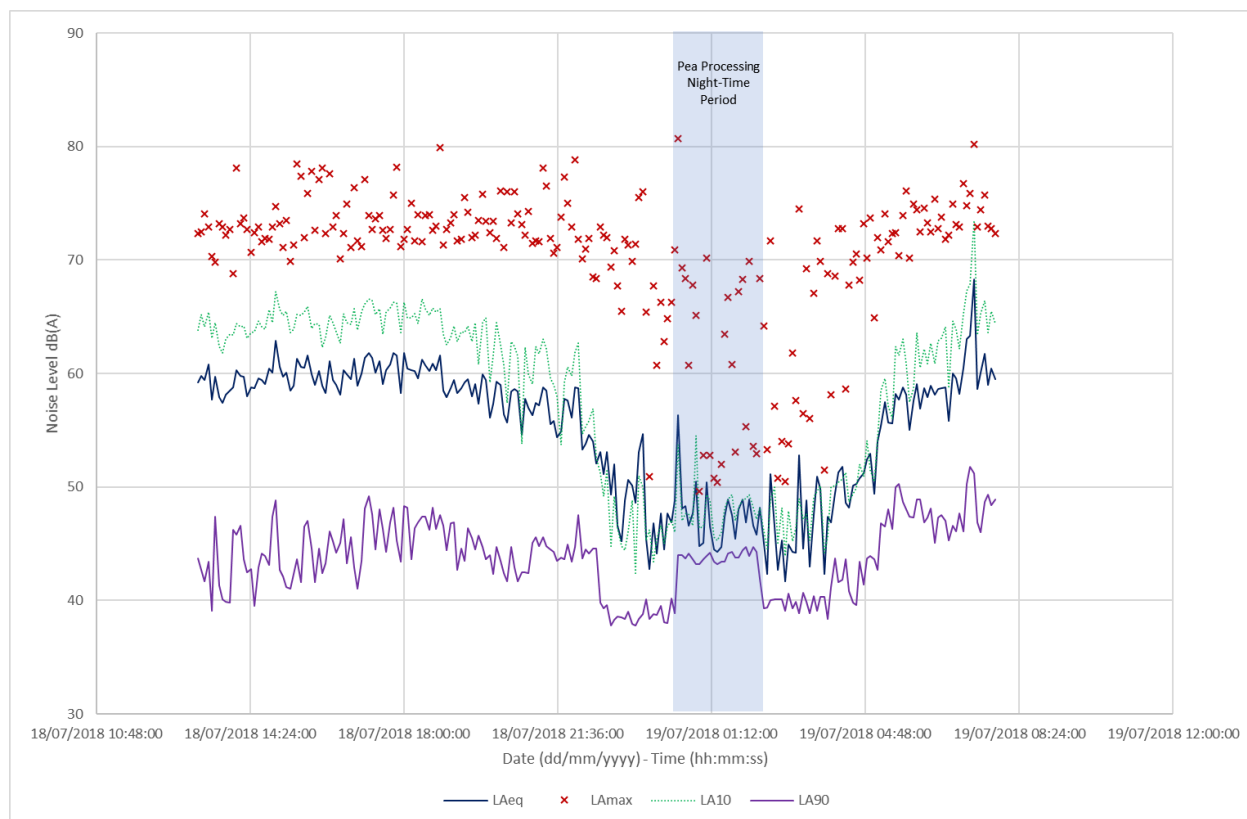
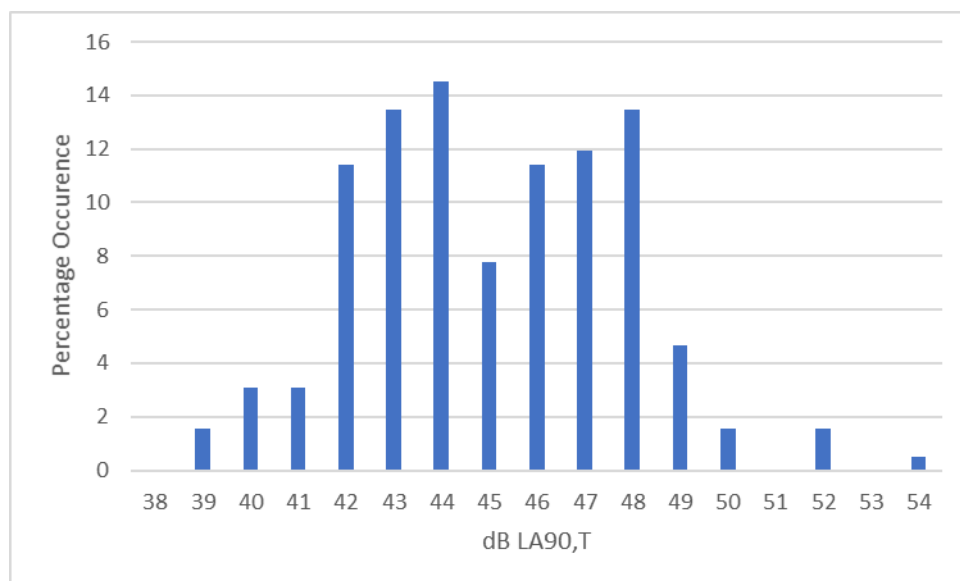


Figure B3: LT1 Day (07:00-23:00) LA90 Modal



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Figure B4: LT1 Night (23:00-07:00) LA₉₀ Modal

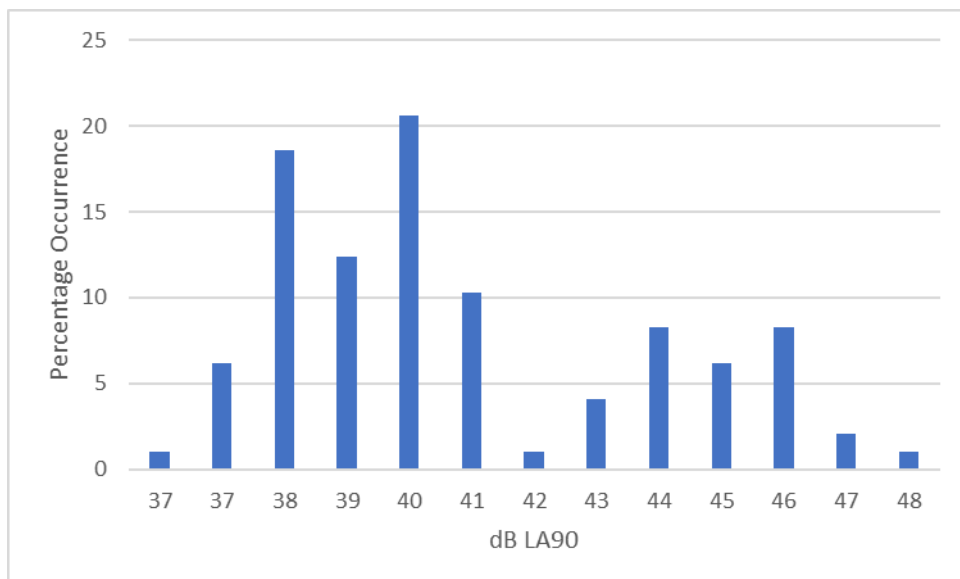
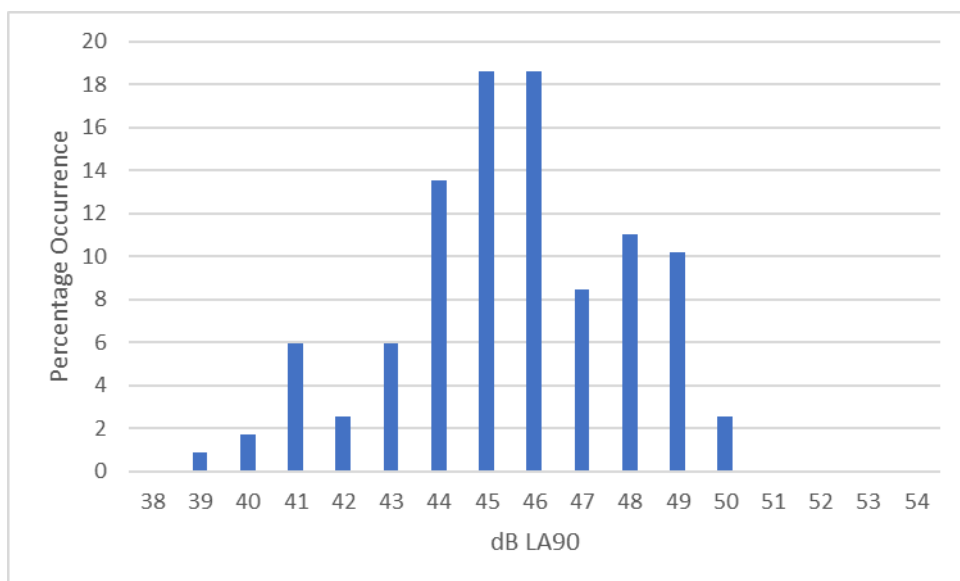
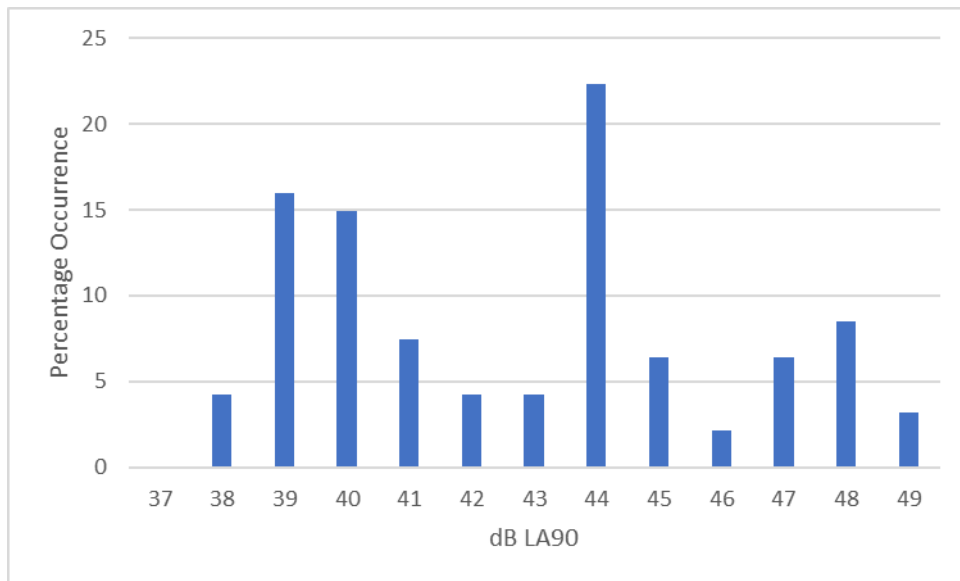


Figure B5: LT2 Day (07:00-23:00) LA₉₀ Modal



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Figure B6: LT2 Night (23:00-07:00) LA₉₀ Modal



Photographs B1 and B2 present the LT1 and LT2 noise monitoring locations.

Photograph B1: LT1 Noise Monitoring Location – Eastern Boundary



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Photograph B2: LT2 Noise Monitoring Location – Bridge Road



Table B4 presents the measured noise levels at a distance of 35 metres from the southern façade of the Pea Processing Unit.

Table B4: Pea Processing Unit (35m from southern façade)

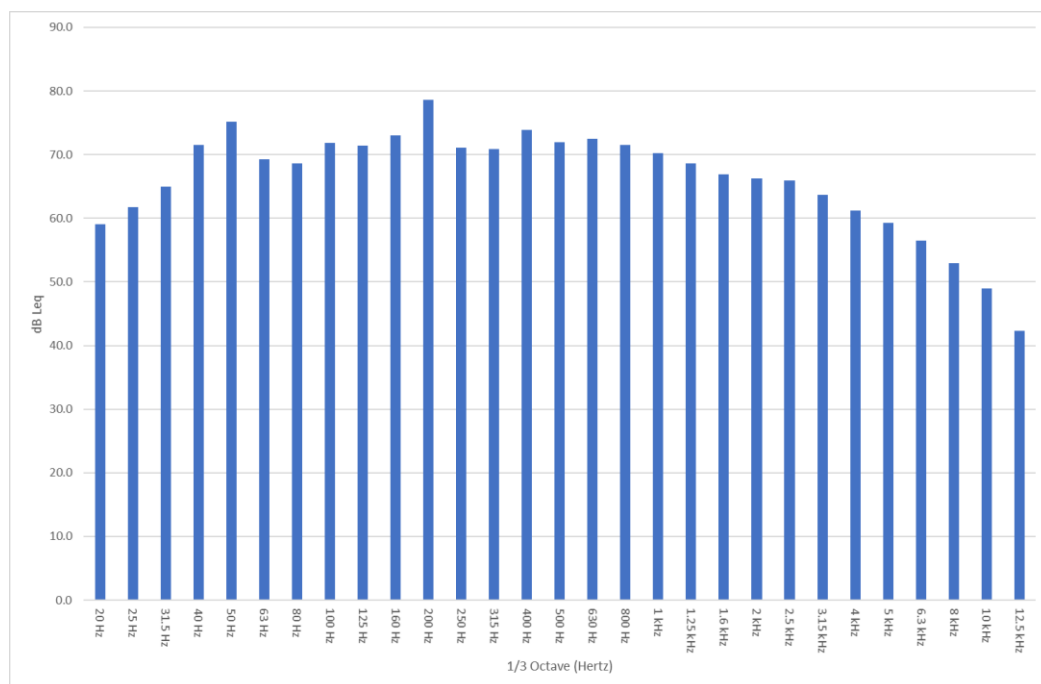
	LAeq ¹	LAm ²	LA10 ³	LA90
Average	79.7	81.4	80.1	78.9
Min	79.0	80.6	80.0	76.7
Max	79.9	81.6	80.2	79.6

Note: ¹ Logarithmic average. ² 95th percentile ³ Arithmetic Average

Figure B7 presents the 1/3 octave measured noise levels at 35 metres from Pea Processing Unit. The measured noise levels are not identified as tonal based on BS4142 Annex C 'Objective method for assessing the audibility of tone in sound: One-Third Octave Method'.

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Figure B7: 1/3 Octave Plot of Measured Leq Pea Processing Unit (35m)



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C. CadnaA Noise Model Inputs

Pea Processing Plant

Measured noise levels at 35m

	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz		Overall
Leq	76.9	76.9	79.9	77.6	75.1	71.2	66.5	58.6		84.8
A-wt	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1		
LAeq	50.7	60.8	71.3	74.4	75.1	72.4	67.5	57.5		79.9

Spectrum

ID: Pea

Name: Pea

Source: Pea

Type: Lw from Lp + distance + sphere partition

Spectrum: Linear

Tot-A: 98.8

Tot-Lin: 103.7

☐ 1/3-Oktave Band Spectrum

Convert...

25

50

100

200

400

800

1600

3150

6300

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

31.5

63

125

250

500

1000

2000

4000

8000

0.0

76.9

76.9

79.9

77.6

75.1

71.2

66.5

58.6

40

80

160

315

630

1250

2500

5000

10000

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

Distance (m): 35.00

Sphere Part (%): 0.5

OK

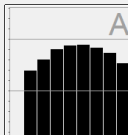
Cancel

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New

Help



The walls of the Pea Processing Building were input as vertical area sources with the roof as area sources. The transmission loss is based on the Eurobond 150mm product (reduced by the level of uncertainty detailed within the laboratory test report). All apertures are modelled with zero transmission loss.

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Sound Insulation of Pea Processing Building

Spectrum

ID:

Euro

Name:

Eurobond 150mm

Source:

Supplier

Spectrum:

Rw (C; Ctr) = 35 (-2; -4)

☐ 1/3-Oktave Band Spectrum

Convert...

25

50

100

200

400

800

1600

3150

6300

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

31.5

63

125

250

500

1000

2000

4000

8000

0.0

19.2

23.1

28.4

32.5

30.9

40.7

49.7

64.0

40

80

160

315

630

1250

2500

5000

10000

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

OK

Cancel

<--

-->

New

Help

Zero TL is input for conveyor apertures.

Hz	SRL Rw	Insul Predicted Rw (+/- 3dB)	SRL uncertainty (+/-)	Cadna Input Rw
63Hz	21.8	21	2.6	19.2
125Hz	25.5	25	2.4	23.1
250Hz	29.9	30	1.5	28.4
500Hz	33.7	33	1.2	32.5
1kHz	31.9	29	1	30.9
2kHz	41.7	41	1	40.7
4kHz	50.8	50	1	49.7
8kHz	65.0		1	64.0

Appendices

Laboratory Test Data – Eurobond 150mm

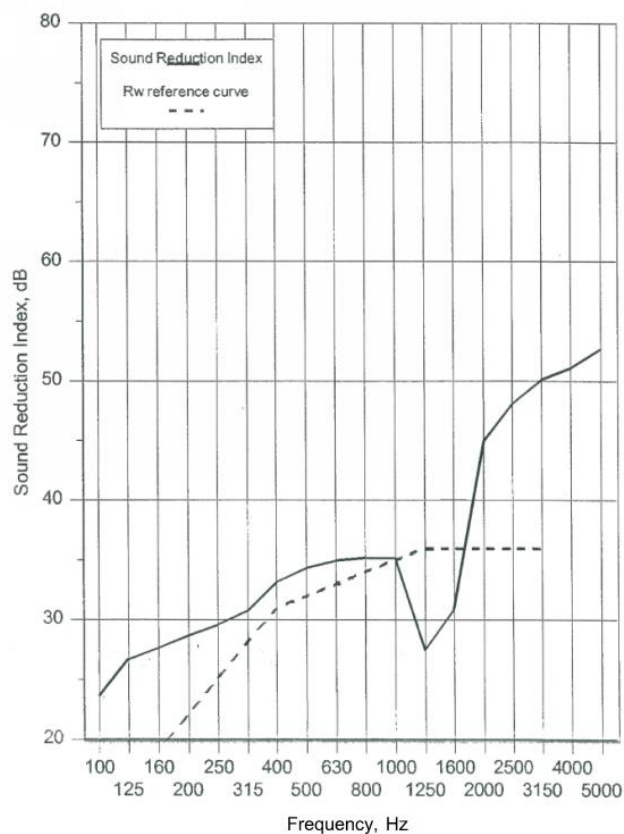
SRL

Data Sheet 1

Test Number : 1
Client: Eurobond
Test Date: 23/02/2011
Sample height: 2.915 m
Sample width: 3.86 m
Product Rainspan 150
Identification:

Air temperature: 14.8 °C
Air humidity: 42 %
Receiving room volume 50 m³
Source room volume: 55 m³
Sample weight: n/a kg/m²

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	20.9	21.8
63+	21.8	
80+	22.8	
100	23.9	25.5
125	25.9	
160	26.7	
200	28.4	29.9
250	29.5	
315	31.9	
400	32.8	33.7
500	33.9	
630	34.4	
800	34.6	31.9
1000	33.6	
1250	27.6	
1600	31.9	41.7
2000	45.4	
2500	47.8	
3150	49.9	50.8
4000	50.3	
5000	52.1	
6300+	77.4 *	65.0
8000+	70.6 *	
10000+	60.8	
Average 100-3150	33.6	Version v1.7



Rating according to BS EN ISO 717-1:1 997
 Rw(C;Ctr)= **34 (-2;-4) dB**

* shows measurement corrected for background
 # shows limit of measurement due to background
 + shows frequency beyond standard and not UKAS accredited

Appendices

S R L

Appendix 1

Test Procedure

Measurement of Sound Transmission in accordance with BS EN ISO 140-3 : 1995 - TP15

In the laboratory, airborne sound transmission is determined from the difference in sound pressure levels measured across a test sample installed between two reverberant rooms. The difference in measured sound pressure levels is corrected for the amount of absorption in the receiving room. The test is done under conditions which restrict the transmission of sound by paths other than directly through the sample. The source sound field is randomly incident on the sample.

The test sample forms the whole of a 3.9m wide x 2.9m high dividing wall between the two rectangular reverberant rooms, both of which are constructed from 215mm brick with reinforced concrete floors and roofs.

One of the rooms is used as the receiving room and has a volume of 50 cubic metres. It is isolated from the surrounding structure and the adjoining room by the use of resilient mountings and seals ensuring good acoustic isolation. The adjoining source room has a volume of 55 cubic metres.

Broad band noise is produced in the source room from an electronic generator, power amplifier and loudspeaker. The resulting sound pressure levels in both rooms are sampled using a microphone mounted on an oscillating boom and connected to a real time analyser. The signal is filtered into one third octave band widths, integrated and averaged. The value obtained at each frequency is known as the average sound pressure level for either the source or the receiving room. The change in level across the test sample is termed the sound pressure level difference, i.e.

$$D = L_1 - L_2$$

where

D is the equivalent Sound Pressure level difference in dB

L₁ is the equivalent Sound Pressure level in the source room in dB

L₂ is the equivalent Sound Pressure level in the receiving room in dB

Appendices

S R L

The Sound Reduction Index (R) also known by the American terminology Sound Transmission Loss, is defined as the number of decibels by which sound energy randomly incident on the test sample, is reduced in transmitting through it and is given by the formula:

$$R = D + 10 \log_{10} \frac{S}{A} \dots \text{in decibels}$$

where

S is the area of the sample

A is the total absorption in the receiving room

both dimensions being in consistent units

The Sound Reduction Index is an expression of the laboratory sound transmission performance of a particular element or construction. It is a function of the mass, thickness, sealing method of mounting etc. and is independent of the overall area of the sample.

However, when an example of this construction is installed on site, the sound insulation obtained will depend upon its surface area, as well as the absorption in the receiving room. The larger the area the greater the sound energy transmitted. Also, the overall sound insulation is affected by the sound transmission through other building elements, some of which may have an inferior performance to the sample tested. In practice, therefore, the potential sound reduction index of a construction is not fully realised on site. Furthermore, the sound reduction index of a particular sample of that construction can only be measured accurately in a laboratory, because only under such controlled conditions can the sound transmission path be limited to the sample under test.

R_w , C and C_{tr} have been calculated in accordance with the relevant section of BS EN ISO 717-1 :1997 from the results of laboratory tests carried out in accordance with BS EN ISO 140-3 : 1995.

Appendices

SRL

Appendix 2

Measurement Uncertainty BS EN ISO 140-3:1995 - TP15

The following values of uncertainty are based on a standard uncertainty multiplied by a coverage factor of $k = 2$, which provides a level of confidence of approximately 95%.

Frequency, Hz	Uncertainty, $\pm$ dB
100	2.6
125	2.4
160	2.1
200	2.1
250	1.5
315	1.5
400	1.2
500	1.2
800	1.0
1000	1.0
1250	1.0
1600	1.0
2000	1.0
2500	1.0
3150	1.0

Appendices

Insul Predicted Performance

Sound Insulation Prediction (v7.0.13)

Program copyright Marshall Day Acoustics 2012

- Key No. 2517

Margin of error is generally within $R_w \pm 3$ dB

Job Name:

Job No.:

Date: 5 Sep 18

File Name: insul

Page No.:

Initials: tim ashley

Notes:



R_w 34 dB

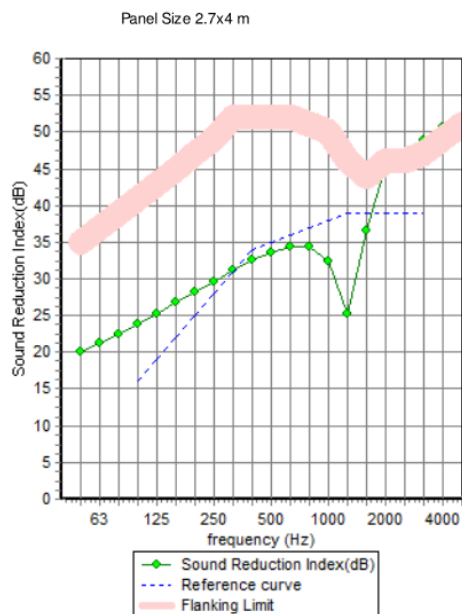
C -3 dB

C_{tr} -4 dB

System description

Panel 1 Outer layer: 1 x 150.0 mm Rockspan Extra 150mm- ($m=29.4$ kg/m², $f_c=17857$ Hz, Damping=0.01) Profile

frequency (Hz)	R(dB)	R(dB)
50	20	
63	21	21
80	22	
100	24	
125	25	25
160	27	
200	28	
250	30	30
315	31	
400	33	
500	34	33
630	34	
800	34	
1000	32	29
1250	25	
1600	37	
2000	45	41
2500	47	
3150	49	
4000	51	50
5000	52	



Appendices

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UK and Ireland Office Locations

