Co-operative Store
Mariner Public House
South Shields

Environmental Noise Impact Assessment Report

22870/ENIA Rev D

9 November 2017

For:
AB Group Limited
(South) Bank Chambers
2 Church Street
Reigate
RH2 0AN

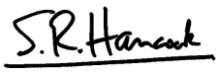
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Hann Tucker Associates

Environmental Noise Impact Assessment Report
22870/ENIA1 Rev D

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	12/02/2016	-	Nathan Green Assistant Consultant BSc (Hons), AMIOA	Simon Hancock Director BEng(Hons), CEng, MIMechE, MCIBSE, FIOA
A	18/07/2016	Revisions made to include Noise Impact Assessment	Nathan Green Assistant Consultant BSc (Hons), AMIOA	Jamie Ross Senior Consultant BEng (Hons), MSc, AMIOA
B	10/03/2017	Revised after receipt of revised CR3	Ryan Fernandez Technical Assistant	Simon Hancock Director BEng(Hons), CEng, MIMechE, MCIBSE, FIOA
C	07/11/2017	Revised after receipt of revised CR3	Nick Russell Principal Consultant MIOA	Simon Hancock Director BEng(Hons), CEng, MIMechE, MCIBSE, FIOA
D	09/11/2017	Revised to clarify plant locations		
			Nick Russell Principal Consultant MIOA	Simon Hancock Director BEng(Hons), CEng, MIMechE, MCIBSE, FIOA

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Attachments

Appendix A – Acoustic Terminology

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1.0 Introduction

New items of building services are proposed to be installed at this store. Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey to provide a basis for assessment of the environmental plant noise emissions for planning purposes.

2.0 Objectives

To inspect the site to familiarise ourselves with its layout and surroundings and to identify a suitable accessible location for environmental noise measurements.

To undertake noise level measurements during the quietest daytime and night-time periods on a typical weekday in general accordance with BS 7445. To record the A-weighted (dBA) L_{eq} and L_{90} environmental noise levels.

To recommend suitable plant noise emission criteria based on the requirements of the Local Authority and BS 4142:2014 so as to avoid causing a statutory noise nuisance.

3.0 Site Description

3.1 Location

The site is located on Mortimer Road, South Shields as shown on the Location Map below.



Location Map (Map Data ©2016 Google)

3.2 Description

The site is located in a predominantly residential area with residential properties been located on all sides. To the North is Cauldwell Avenue and to the East is Mortimer Road. Further to the East is Mortimer Primary School. The proposed plant is located in three positions. A Refrigeration pack is located inside the site overlooking Cauldwell Avenue while the shop floor air conditioning units and the refrigeration condenser are located on two parts of the first floor roof overlooking the car park. The exact locations of this plant can be seen on the attached AMCA Architects drawing S3_001.

See Site Plan below.



Site Plan (Imagery ©2016 Bluesky, Getmapping plc, Map Data ©2016 Google)

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Methodology

The survey was undertaken by Nathan Green BSc (Hons) AMIOA.

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 17:00 hours on Wednesday 10 February 2016 to 10:15 hours on Thursday 11 February 2016.

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period. However at the beginning and end of the survey period the weather conditions were calm and the sky was generally overcast**.** We understand that generally throughout the survey period the weather conditions were calm and dry. These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{90} and L_{eq} sound pressure levels over 15 minute periods.

5.2 Measurement Position

The microphone was located at first floor level attached to a tripod approximately 5 metres above ground level.

The position is shown on the plan below.



Plan Showing Unmanned Measurement Position (Imagery ©2016 Bluesky, Getmapping plc, Map Data ©2016 Google)

5.3 Instrumentation

The instrumentation used during the survey is presented in the table below:

Description	Manufacturer	Type	Serial Number	Laboratory Calibration
Type 1 Data Logging Sound Level Meter	Larson Davis	824	3824	07/01/2015
Type 1 Calibrator	Larson Davis	CAL200	3083	20/04/2015

The sound level meter, including the extension cable, was calibrated prior to and on completion of the survey. No significant change was found to have occurred (no more than 0.1 dB).

The sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. The microphone was fitted with a windshield.

6.0 Results

The results have been plotted on Time History Graph 22870/TH1 enclosed, presenting the 15 minute A-weighted (dBA) L_{90} and L_{eq} levels at the measurement position throughout the duration of the survey.

The lowest $L_{A90\ (15\ min)}$ measurements recorded during the survey are presented in the table below:

Lowest Measured $L_{A90\ (15\ mins)}$ (dB re $2x10^{-5}$ Pa)	
Daytime (07:00 – 23:00 hours)	**Night-time (23:00 – 07:00 hours)**
42 dBA	41 dBA

7.0 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise source was noted to be road traffic noise from Mortimer Road and Cauldwell Avenue.

8.0 Plant Noise Emission Criteria

8.1 Local Authority Requirements

The site lies within the jurisdiction of South Tyneside Council. Their advice regarding plant installation within their jurisdiction is as follows:

"Noise impact on the nearest noise sensitive properties should be minimised as much as possible, all assessments should be carried out in accordance with British Standard 4142:2014."

In light of the guidance offered by South Tyneside Council, we believe a plant noise emission criteria of -5dB below background (L_{90}) at 1 metre from the nearest noise sensitive window during both the daytime and night-time would be prudent.

8.2 BS 4142:2014

When setting plant noise emission criteria reference is commonly made to BS 4142: 2014 "*Methods for rating and assessing industrial and commercial sound".*

BS 4142 states that: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:*

- *"Typically, the greater this difference, the greater the magnitude of the impact."*

- *"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*

- *"A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."*

- *"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, depending on the context."*

The determination of the "rating level" and the "background level" are both open to interpretation, depending on the context.

In summary it is not possible to set plant noise emission criteria purely on the basis of BS 4142:2014. It is reasonable to infer from the above, however, that a difference of around -5dB corresponds to "No Observed Effect Level" as defined in the Noise Policy Statement for England.

8.3 Statutory Noise Nuisance

There is no quantitive definition of statutory noise nuisance. It is generally accepted however, that if the plant noise level is at least 5dB (or 10dB if tonal) below the minimum background $L_{90(15minutes)}$ at 1m from the nearest noise sensitive window, then the risk of a statutory noise nuisance is avoided. By adopting this as a design criterion the guidance contained in BS 4142:2014 should also be complied with.

8.4 Proposed Criteria

Based on the above criterion, and the results of the environmental noise survey, we recommend that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive residential window with all plant operating simultaneously.

Plant Noise Emission Criteria (dB re $2x10^{-5}$ Pa)	
Daytime (07:00 – 23:00 hours)	**Night-time (23:00 – 07:00 hours)**
37 dBA	36 dBA

If plant contains tonal or impulsive characteristics the external design criteria should be reduced by 5dBA.

It should be noted that the above are subject to the final approval of the Local Authority.

9.0 Plant Noise Impact Assessment

We have undertaken an assessment of atmospheric plant noise emissions based upon the information we have currently received from AB Group, in line with the current CR3 plant drawing and the Architects site plan accompanying this report.

The proposed plant from which atmospheric plant noise emissions needs to be considered comprises:

Description	Manufacturer	Qty	Plant Model	Sound Pressure Level (dBA)	Plant Location
Shop Floor A/C units	Mitsubishi	2	PUHZ-ZRP140YKA2	52 @ 1m (equating to 36dBA @ 10m)	External
Refrigeration Condenser	Kelvion	1	ASR-ZAP-EC-134-ECMP-384-H	25 @ 10m Daytime 20 @ 10m Night-time	External
Refrigeration Pack	A1 Engineering	1	R407a	25 @ 10m	External

For ease of comparison, where the manufacturer's noise data for the A/C units is quoted at 1m, the above table shows the equivalent noise level of the A/C units at a distance of 10m in brackets.

The following tables summarise our predictions of atmospheric noise emission from the proposed plant to the nearest noise sensitive residential windows, for the daytime and night-time periods. We have considered there are two separate areas in these calculations and that these areas are sufficiently distant from each other that there is not a common noise sensitive receptor.

9.1 Plant Area 1 Cauldwell Avenue

The refrigeration pack at the northwest part of the site is located within the shop demise and behind a fence. This fence should provide a significant acoustic barrier loss. We have considered that the nearest noise sensitive receiver is the property due north of the proposed plant and that this is at a distance of approximately 10m. There are other properties due east on Cauldwell Avenue but these are approximately 20 metres away.

	Sound Pressure Level (dBA)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
Refrigeration Pack	25 @ 10m	25 @ 10m
Radiation Mode Correction	+3	+3
Distance Correction (10m)	0	0
Barrier Correction	-5	-5
Façade Reflection	+3	+3
Calculated Noise Level at Receptor	26	26
Proposed Plant Noise Emission Criteria	37 dBA	36 dBA

Our calculations therefore indicate that noise levels from the proposed plant should be capable of achieving the proposed plant noise emission criteria presented in Section 8.0.

9.2 Plant Area 2 First Floor Roof

The shop floor condensers and the refrigeration condenser are to be installed on the first floor roof of the building. We have considered that the nearest noise sensitive receiver is the property northeast of the proposed plant and that this is at a distance of approximately 18m. The plant is to be installed behind an imperforate screen and this should provide a significant barrier loss.

	Sound Pressure Level (dBA)	
	Daytime (07:00 – 23:00 hours)	**Night-time (23:00 – 07:00 hours)**
Shop Floor A/C units	36 @ 10m	Not running
	36 @ 10m	Not running
Refrigeration Condenser	27 @ 10m	20 @ 10m
Cumulative Noise Level	39 @ 10m	26 @ 10m
Radiation Mode Correction	+3	+3
Distance Correction (18m)	-5	-5
Barrier Correction	-5	-5
Façade Reflection	+3	+3
Calculated Noise Level at Receptor	35	22
Proposed Plant Noise Emission Criteria	37 dBA	36 dBA

Our calculations therefore indicate that noise levels from the proposed plant should be capable of achieving the proposed plant noise emission criteria presented in Section 8.0.

10.0 Conclusions

An environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate.

Environmental plant noise emission criteria have been recommended based on the results of the noise survey and with reference to the requirements of the Local Authority and BS 4142 so as to avoid causing statutory noise nuisance.

An assessment has been carried out to determine the likely plant noise emissions to the nearest noise sensitive residential window. Our assessment indicates the proposed building services plant, should achieve the proposed environmental noise criteria.

Appendix A

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

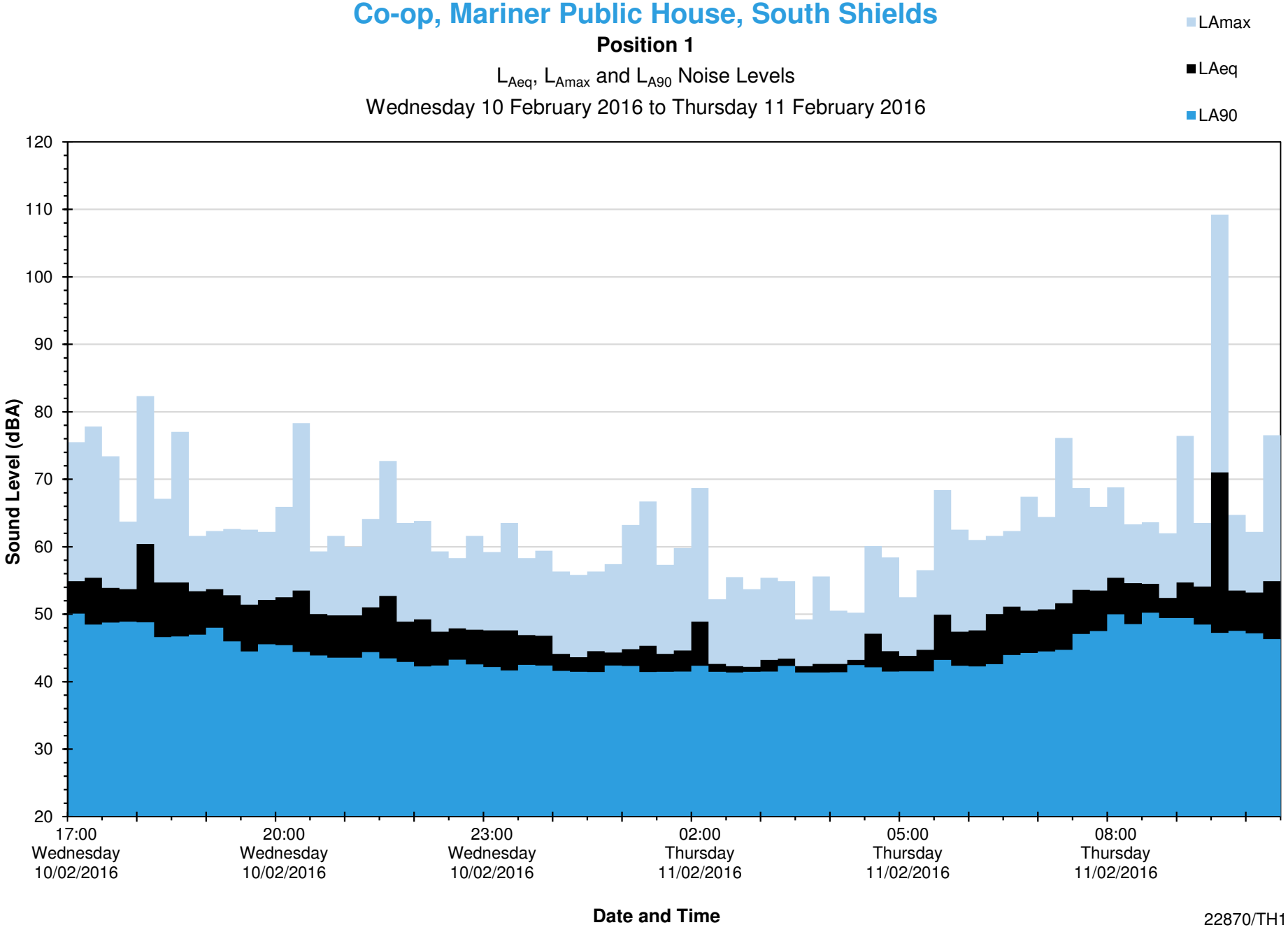
$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

Co-op, Mariner Public House, South Shields

Position 1

L_{Aeq}, L_{Amax} and L_{A90} Noise Levels

Wednesday 10 February 2016 to Thursday 11 February 2016



22870/TH1