



MACH
RESIDENTIAL

NORTH WALES HM PRISON, WREXHAM

Assessment – BS 4142: 2014



NORTH WALES HM PRISON, WREXHAM

Assessment – BS 4142: 2014

Lendlease

Document Version	Revision	Description	Author	Checked by	Issued by	Issue Date
01	00	First Issue	Leonard Terry	Patrick Shuttleworth	Leonard Terry	02/01/2018

MACH Acoustics Ltd
3rd Floor 4 York Court
Upper York Street
Bristol
BS2 8QF

t: 0117 944 1388
e: info@machacoustics.com
w: www.machacoustics.com

Tagwright House
35-41 Westland Place
London
N1 7LP

Consultants

AR	Andrew Rickard	andrew@machacoustics.com
CB	Claire Bye	claire@machacoustics.com
CJ	Chris Jones	chris@machacoustics.com
JC	Josh Childs	josh@machacoustics.com
LT	Leonard Terry	leonard@machacoustics.com
MR	Max Reynolds	max@machacoustics.com
PS	Patrick Shuttleworth	patrick@machacoustics.com
PJ	Phil Jordan	phil@machacoustics.com
RP	Rory Peliza	rory@machacoustics.com
SH	Stefan Hannan	stefan@machacoustics.com
SD	Steffan Davies	steffan.d@machacoustics.com
YW	Hsuan-Yang Wang	yang@machacoustics.com
ZN	Ze Nunes	ze@machacoustics.com
ZV	Zoe Vernon	zoe@machacoustics.com
TT	Tracy Toal	tracy@machacoustics.com
ZG	Zheng Ge	zheng@machacoustics.com

Finance

1.0	INTRODUCTION	1
2.0	SITE DESCRIPTION	1
2.1	Environmental Noise Sources	1
2.2	Noise Sensitive Receptors	1
3.0	ENVIRONMENTAL NOISE SURVEY	2
3.1	Methodology	2
3.2	Measurement Equipment	2
3.3	Weather Conditions	2
4.0	RESULTS	3
4.1	Fixed Measurement Results	3
4.2	Spot Measurement Results	4
5.0	PLANT NOISE ASSESSMENT	4
5.1	Rating Level Target	4
5.2	Assessment of pre- and post-development noise levels	4
6.0	CONCLUSION	5

1.0 INTRODUCTION

MACH Residential has been appointed by Lendlease to undertake an environmental noise assessment at North Wales HM Prison in order to sign off planning condition 22, which relates to noise generated by the development once complete.

The purpose of the assessment is to determine current background noise levels compared to the assessment dated 16th February 2015. Planning condition 22 requires that noise levels should not increase by more than 5dB(A) at the worst affected dwellings to the proposed development. This assessment has been benchmarked against a noise survey carried out between the 9th and 10th of January 2018.

2.0 SITE DESCRIPTION

Plant associated with the prison is located in a number of areas across the site - boundary indicated in Figure 2.1. The nearest residential receptors are also indicated in Figure 2.1.

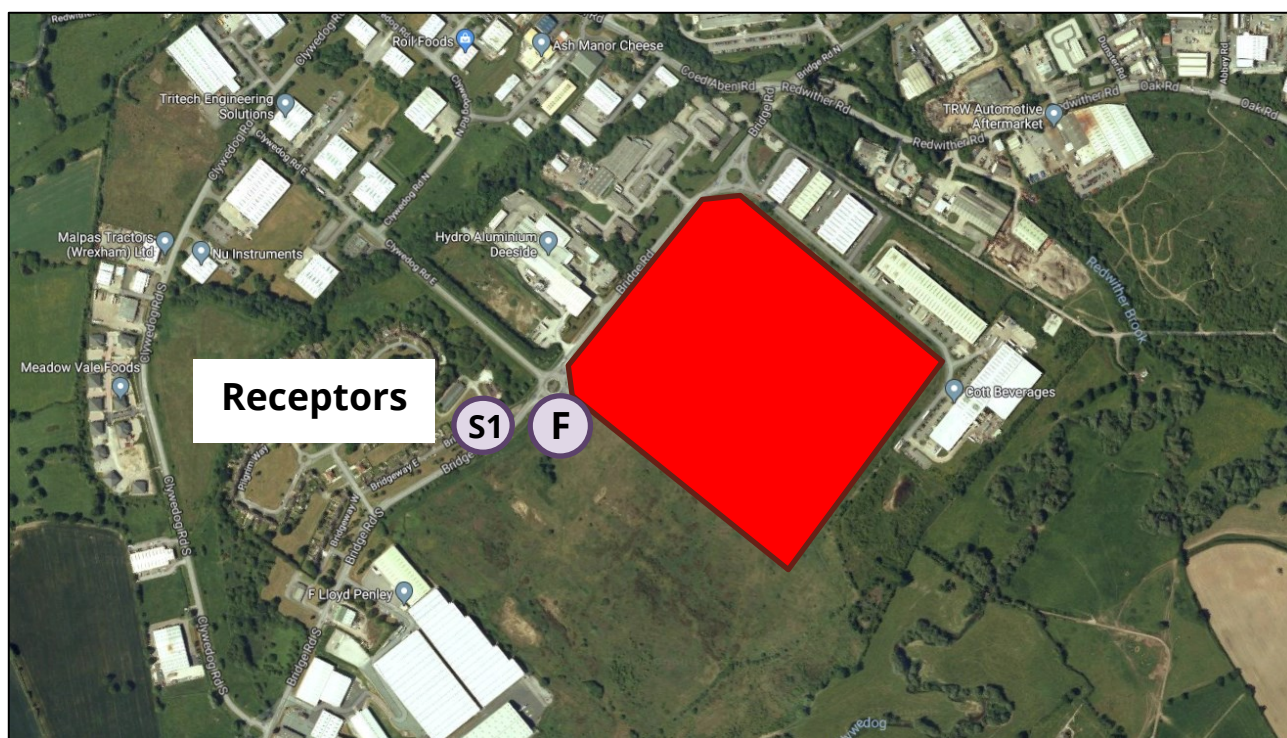


Figure 2.1: Site Location

2.1 Environmental Noise Sources

Traffic on Bridge Road is seen to constitute a primary contributor to background noise levels on site, with noise from existing industrial noise sources also contributing toward overall levels.

2.2 Noise Sensitive Receptors

The nearest noise sensitive receptors are located on Bridge Road South as indicated in Figure 2.1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Methodology

In order to establish the environmental noise levels on site, a noise survey was conducted between 12:50 on 09/01/18 and 11:20 on 10/01/18.

A fixed microphone position was used to determine the change in noise levels during typical operating hours of the noise source, with the fixed long term meter set to measure consecutive 'A' weighted 5 minute time samples. Measurements have been taken in free-field conditions.

The fixed measurement location (F) is shown in Figure 2.1. The location is comparable to the receptor location in terms of background noise, which has been verified on site. The results of the environmental noise survey are provided within Section 4.0 of this report.

3.2 Measurement Equipment

The measurement equipment illustrated in Table 3.1 was used during the survey, all equipment complies with BS EN 60942:2003 i.e. a class 1 device.

Name	Serial Number	Last Calibrated	Calibration Due
Norsonic Precision Sound Analyser Type 118	30562	June 16	June 18
Norsonic Type 1206 Pre-amplifier	30249	June 16	June 18
GRAS 40AF Microphone	114670	June 16	June 18
Norsonic Precision Sound Analyser Type 140	1403249	Oct 17	Oct 19
Norsonic Type 1209 Pre-amplifier	12563	Oct 17	Oct 19
Norsonic Type 1225 Microphone	68830	Oct 17	Oct 19
Norsonic Sound Calibrator Type 1251	32090	June 17	June 18

Table 3.1: Measurement Equipment Calibration

3.3 Weather Conditions

The following climate conditions were recorded for the site:

Wind: Less than 5 m/s.
Humidity: The weather was cloudy with a slight breeze.
Temperature: 2 - 11°C.

The above weather conditions are suitable for the measurement of environmental noise in accordance with BS7445 *Description and Measurement of Environmental Noise*.

4.0 RESULTS

4.1 Fixed Measurement Results

The following graph presents the background noise levels recorded over the measurement period at the fixed location (F). The complete set of measurement data is available on request.

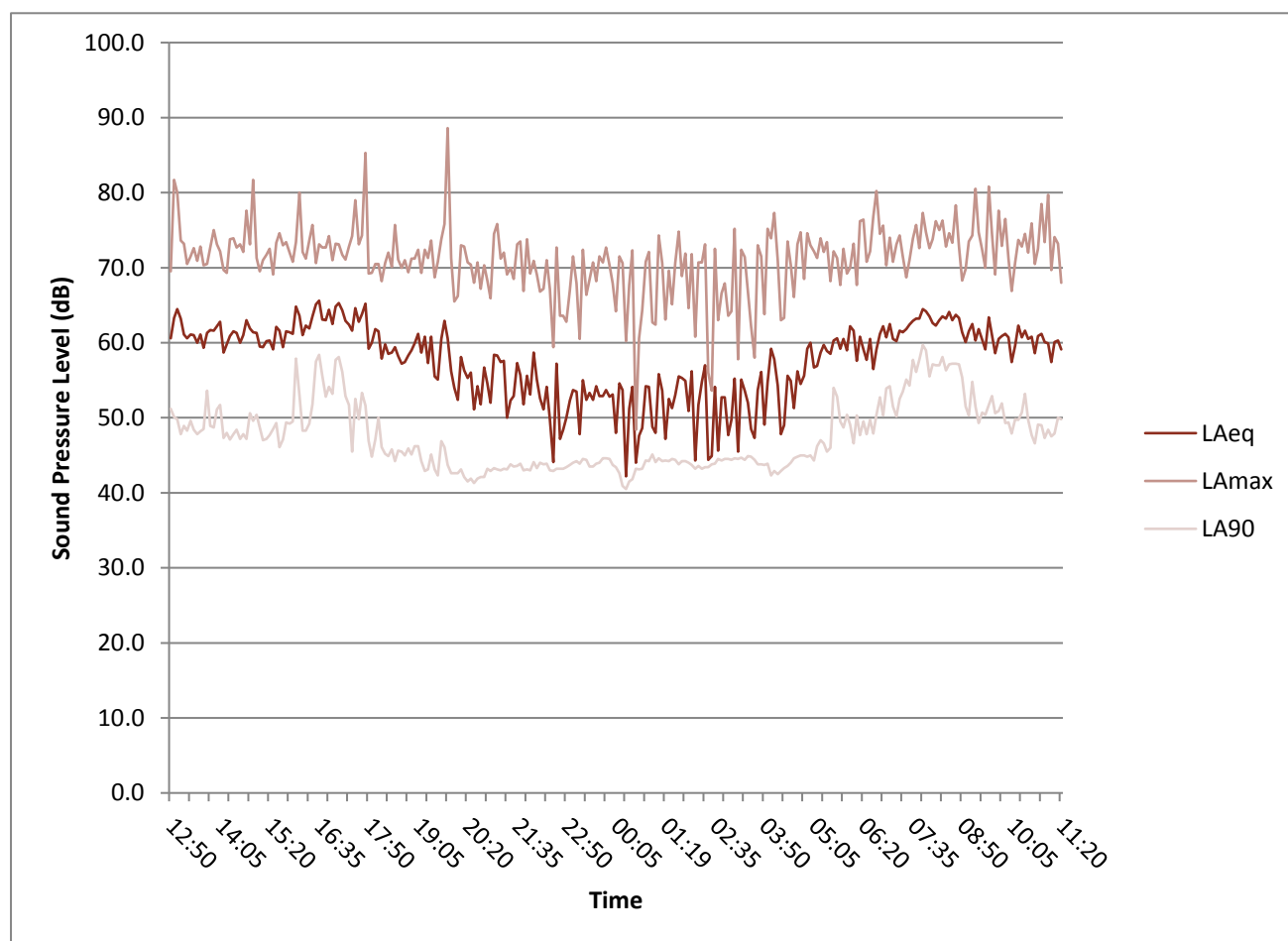


Figure 4.1: Fixed Measurement Graph (F1), L_{Aeq} , L_{Amax} , L_{A90}

Measurement	Maximum	Minimum	Average
L_{Aeq}	66	44	61
L_{A90}	60	41	51
L_{Amax}	89	59	75
Day time 07:00 – 23:00			
L_{Aeq}	62	42	56
L_{A90}	54	41	46
L_{Amax}	80	48	72
Night time 23:00 – 07:00			

Table 4.1: Fixed Measurement Results (F1)

4.2 Spot Measurement Results

Spot measurements were recorded at 1 locations to help quantify noise levels at the nearest residents. The L_{Amax} and L_{Aeq} levels measured from these spot measurements are shown in Table 4.2.

Position	Time	L_{Aeq} , dB	L_{A90} dB	L_{Amax} , dB
S1	22:30 – 23:00	51	34	69
S1	23:00 – 00:30	52	32	77

Table 4.2: Spot Measurements

The spot measurements will be used in conjunction with the fixed position to assess current noise levels compared to the previous survey in 2014.

5.0 PLANT NOISE ASSESSMENT

5.1 Rating Level Target

Planning condition 22 states that noise levels should not increase by more than 5dB.

5.2 Assessment of pre- and post-development noise levels

Table 5.1 shows a comparison of measured environmental noise levels for pre- and post-development. The parameters include: average L_{Aeq} and minimum L_{A90} . Engineer observations at the time of measurement found that there was no perceivable plant noise coming from the prison development, as industrial noise from the Hydro factory was dominant, as described by the original survey.

It can be seen that average ambient noise levels (L_{Aeq}) do not exceed 3 dB(A) above the previous noise survey, and is therefore compliant with planning condition 22. Furthermore, measured background noise levels (L_{A90}) in the most recent survey are up to 4dB and 3dB lower during the day and night time, respectively.

Period	Pre-development		Post-development		Difference	
	L_{Aeq} (dB)	L_{A90} (dB)	L_{Aeq} (dB)	L_{A90} (dB)	L_{Aeq} (dB)	L_{A90} (dB)
0700 – 2300	58	45	61	41	3	- 4
2300 – 0700	53	44	56	41	3	- 3

Table 5.1: Comparison of noise levels for pre- and post-development

Spot measurements, undertaken over a comparative time period to the previous survey show that noise levels at the nearest residencies are not adversely affected by any increase in background noise levels.

Period	Pre-development	Post-development	Difference
	LA90 (dB)	LA90 (dB)	LA90 (dB)
22:30 – 23:00	38	34	- 4
23:00 – 00:30	33	32	- 1

Table 5.2: Comparison of noise levels for pre- and post-development at nearest residents

6.0 CONCLUSION

MACH Residential has been appointed by Lendlease to undertake an environmental noise assessment for the proposed plant at North Wales HM Prison, Wrexham.

The assessment has indicated that the rating level of installed plant is be compliant with planning condition 22, and Pol-5. As such the assessment indicates that there is no adverse noise impact at the worst affected noise sensitive receptors.