Noise Impact Assessment

C10761

The Queen of the loch, Alexandria

Prepared for

Osprey Charging Network
1st floor
3 More London Riverside
London
SE1 2RE

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Prepared by	Richard Burrows			
Signature				
Position	Acoustic Consultant			
Reviewed by	Elizabeth Samphier			
Signature				
Position	Principal Acoustic Consultant			
Project number	C10761/NIA/1.0			

North

Business First, Millennium City Park, Millennium Road, Preston

PR2 5BL

01772 963 024

Midlands

12 High Pavement,

Lace Market, Nottingham

NG1 1HN

0115 7043 492

South

3-6 The Quarterdeck,

Pork Solent, Portsmouth

PO6 4TP

01489 808 088

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Executive Summary

Site Address	The Queen of the Loch, Alexandria

Executive Summary

Omnia was instructed by Osprey Charging Network to prepare a Noise Impact Assessment to support the planning application for the installation of a substation and Kempower units at The Queen of the Loch, Alexandria.

An environmental noise survey has been undertaken to quantify the existing background and ambient noise level present at the Site.

The Noise Impact Assessment has been completed with due regard to the requirements as stated within, BS4142:2014. A CadnaA noise model has been constructed including all significant noise sources and existing buildings. Topography was not used in the noise model due to a lack of data on the Department for Environmental Food and Rural Affairs (DEFRA) survey data website. However, when conducting the necessary survey works, the Acoustic Consultant defined the land that pertains to the site as 'flat', as it is situated in a region of greater relief. The noise model has been used to predict the noise levels present at the nearest noise sensitive dwellings due to the proposed operations of the substation.

An assessment has been undertaken in accordance with Planning Advice Notice 1/2011: Planning and Noise and BS4142:2014+A1:2019 to determine the impact of the proposed substation and kempower units from the Queen of the Loch public house upon the existing residential dwellings. The rating level of the proposed substation and Kempower units will fall below the existing background noise level. The proposed plant will have no significant adverse effect upon the existing residential dwellings in accordance with the measured background noise level and the criteria as stated within BS4142:2014 and the Planning Advice Notice: Planning and Noise.

The assessment has been based upon robust and worst-case assumptions and demonstrates that, in principle, there should not be a significant adverse impact due to the existing noise sources.

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APPENDICES

1 INTRODUCTION

1.1 Background

Omnia was instructed by Osprey Charging Network to prepare a Noise Impact Assessment ('the Assessment') to support the planning application for the installation of a substation and kempower units at The Queen of the Loch, Alexandria, to be referred to hereafter as the 'Site'.

This Assessment has been undertaken to assess the noise associated with the proposed plant which may have the potential to adversely impact the nearest noise-sensitive dwellings. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance. Additionally, this assessment has been completed in accordance with Planning Advice Notice 1/2011: Planning and Noise and British Standard 4142:2014+A1:2019 which are applicable to the assessment of noise impacts and are detailed in Section 2.

1.2 Site Location and Proposed Development

The site is located in Alexandria, off the main road running through the center of the village with the A811 approximately 197m to the south. The immediate vicinity is predominantly made up of residential properties and external amenity space. The closest receptor is a residential dwelling which is adjacent to the site, along the eastern boundary approximately 18 meters away.

This assessment has been undertaken with due regard to the supplied documents shown on the following drawings:

- Kempower C500-series Charging Power Unit datasheet Rev D 05-2020;
- ENA Technical Specification 35-1 Part 1 – Issued 6 2014;
- IDNO Network Design -Drawing reference: IE - dated 20/05/2022; and
- Location Plan - dated 20/06/2022.

The Site Location from these document is shown in Figure 1 of Appendix III.

1.3 Acronyms

All acronyms used within this report are defined in the Glossary presented in Appendix II.

1.4 Limitations

The limitations of this report are presented in Appendix I.

1.5 Confidentiality

This report has been prepared solely for the use of the Client. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Omnia; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

The Government updated the National Planning Policy Framework (NPPF) on 20th July 2021 and its associated National Planning Practice Guidance (NPPG) on 22nd July 2019. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.

The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.

Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. The Observed Effect Levels are as follows:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.

Table 2.1 Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required

Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable adverse effect	Prevent

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

These factors include:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day - this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;

- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;

- The spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- Where applicable, the cumulative impacts of more than one source should be taken into account along

with the extent to which the source of noise is intermittent and of limited duration;

- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and,

- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2 Planning Advice Notice 1/2011: Planning and Noise

This standard provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. It supersedes Circular 10/1999 Planning and Noise and PAN 56 Planning and Noise. Information and advice on Noise Impact Assessment (NIA) methods is provided in the associated Technical Advice Note. Planning Advice Notice 1/2011: planning and noise Chapter 3 Section 3.16 Example 2: new noisy development (incl. commercial and recreation) affecting a noise-sensitive building states:

"This example illustrates the procedure for assessing the noise impact on a residential property where an industrial development is proposed. The assessment is based on the principles described in BS 4142:1997; Method of rating industrial noise affecting mixed industrial and residential areas, but does not adhere to the BS 4142: 1997 method of evaluation".

In accordance with the Planning Advice Notice 1/2011: planning and noise this Noise Impact Assessment will adhere to the criteria as stated in BS4142:2014+A1:2019.

2.3 BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes;

- Sound from fixed installations which comprise mechanical and electrical plant and equipment;

- Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and,

- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical.'

The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 - 23:00): 1 hour; and

- Night-time (23:00 - 07:00): 15 minutes.

There are a number of 'penalties' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subject method):

Tonality

- +2dB: where the tonality is just perceptible;
- +4dB: where the tonality is clearly perceptible; and
- +6dB: where the tonality is highly perceptible.

Impulsivity

- +3dB: where the impulsivity is just perceptible;
- +6dB: where the impulsivity is clearly perceptible; and
- +9dB: where the impulsivity is highly perceptible.

Intermittency

- +3dB: where the intermittency is readily distinctive against the acoustic environment.

Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.

In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment.

BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of 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; and
- 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state 'The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident'. Example 6 in the Standard states 'In addition to the

rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.

With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

3 NOISE SURVEYS

3.1 Background and Ambient Noise Survey

Omnia has undertaken a Background and Ambient Sound Survey over a full weekday and weekend period at a location considered representative of the nearest noise sensitive dwelling. The survey was carried out over the following period:

- Wednesday 13th July to Wednesday 20th July 2022.

The following noise measurement position was chosen for the Background and Ambient Sound Survey:

- Noise Measurement Position 1 (NMP1): Omnia have undertaken an Ambient and Background sound survey which was completed over a full weekday and weekend period in a position considered to be representative of the existing residential dwelling. The sound level meter was positioned in situ at a height of 1.5 meters within the premises of the site towards the south west.

A summary of the measured Background Sound Levels are presented in Table 3.1 below. The 15-minute levels are used to inform a worst-case assessment.

Table 3.1 Summary of Measured Background Noise Levels

Day	Median Measured Sound Pressure Level, Free-Field (dB)		Weather Summary
	Day: $L_{A90,1hr}$	Night: $L_{A90,15mins}$	
13/07/2022	38.8	31.6	Dry weather with low wind speeds
14/07/2022	42.8	42.5	Dry weather with low wind speeds
15/07/2022	44.0	32.5	Dry weather with low wind speeds
16/07/2022	41.9	32.2	Dry weather with low wind speeds
17/07/2022	42.4	32.0	Dry weather with low wind speeds
18/07/2022	42.5	32.0	Dry weather with low wind speeds
19/07/2022	40.8	32.8	Dry weather with low wind speeds

During the noise surveys the weather conditions were largely conducive to the measurement of environmental noise, i.e. wind speeds of no more than 5m/s and dry conditions.

3.2 Plant Noise

The plant noise specifications have been provided to Omnia by the client in document ENA Technical Specification 35-1 Part 1 and Advanced Satellite Charging System Technical Datasheet as referenced in Section 1.2. The following table presents the sound pressure levels calibrated at their respective distances at a Receiver height of 1.5m.

Table 3.2 Summary of Sound Pressure Levels

Plant Type (Specific Product)	Distance to Receiver (m)	Sound Pressure Level (dBA)

Substation with 5 way TOC (Rated Power 500kVA)	1m	45.5dBA
150kW Kempower unit (500kVA)	1m	40.1dBA

3.3 Noise Survey Equipment

The following equipment was used for the Noise Surveys.

Table 3.3 Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
NMP1	Sound Level Meter	01dB Fusion	14009	22nd April 2023
	Pre-amplifier	01dB PRE22	2018032	
	Microphone	GRAS 40CD	428395	
	Calibrator	01dB CAL-31	95428	14th March 2023

The sound level meters were field calibrated prior to and following the noise surveys and there was no drift beyond the allowable limit of 1dB.

4 NOISE IMPACT ASSESSMENT

4.1 British Standard 4142:2014 – Proposed Plant

The assessment uses the sound pressure levels, provided to Omnia by the client (Osprey Charging Network), and the criteria contained within BS4142:2014 to quantify the likelihood of adverse impact upon the closest noise sensitive residential dwellings.

The specific level due to noise at the closest window of the existing residential dwellings are used to inform a worst-case scenario.

Table 4.1 indicates penalties applied using the subjective methodology described in BS4142:2014.

Table 4.1 Noise Penalties

Penalty	Applicable?	Attributable Penalty	Comment
Tonality	Yes	+2dB	Tonality likely from proposed Substation and Kempower units.
Impulsivity	No	0	No notable impulsivity.
Intermittency	No	0	No notable intermittency.
Other Sound Characteristics	No	0	No notable characteristics.

Using noise modelling software CadnaA 2021, a noise grid has been created using point sources for the proposed plant on the ground floor. Omnia has used the worst-case level of the plant operating at full speed to provide a robust assessment. The grid noise map has found that the specific noise level present 1m from the façade of the nearest existing noise sensitive dwelling is 29.6dBA. Accordingly, this figure has been used for the worst-case assessment. The grid noise map can be found in Figure 2 of Appendix III.

The median background sound levels from the survey period have been adopted. Where two weekday periods are surveyed, the lowest has been used to inform a worst-case assessment.

The table below illustrates the BS4142:2014 calculation for the day and night time periods respectively at the nearest existing noise sensitive dwelling. It has been assumed that the plant can run for any period of time during both the day and night time periods.

This assessment is based on $L_{A,r} = L_{A90}$, the criterion provided within BS4142:2014. This is considered robust. The median background sound levels from the survey period have been adopted.

Table 4.2 BS4142:Assessment

Day	Period	Calculated Specific Noise Level, $L_{Aeq,15min}$ (dB)	Acoustic Penalty (dB)	Rating Level (dB)	Background Sound Level, L_{A90} (dB)	Difference +/- (dB)
Weekday	Day	29.6dB	+2	31.6	44.0	-12.4
	Night				32.5	-0.9
Saturday	Day				41.9	-10.3
	Night				32.2	-0.8
Sunday	Day				42.4	-10.8
	Night				32.0	-0.4

Table 4.2 above indicates that the proposed plant falls below the existing background level with the addition of the proposed plant weekend night-time periods with particular consideration to Sundays as the, typically, quietest period.

It is concluded that the NOAEL is achieved which would be noticeable and not intrusive resulting in the following:

"Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life."

5 MITIGATION

The rating level of the proposed substation and Kempower units will fall below the existing background noise level. The noise can be heard but does not cause any change in behaviour or attitude. The proposed plant will have no significant adverse effect upon the existing residential dwellings in accordance with the measured background noise level and the criteria as stated within BS4142:2014 and the Planning Advice Notice 1/2011: Planning and Noise.

Accordingly, no further mitigation is required to protect existing residential external amenities.

6 CONCLUSION

Omnia was instructed by Osprey Charging Network to prepare a Noise Impact Assessment to support the planning application for the installation of substation unit at The Queen of the Loch, Alexandria.

An environmental noise survey has been undertaken to quantify the existing background and ambient noise level present at the Site.

The Noise Impact Assessment has been completed with due regard to the requirements as stated within, BS4142:2014. A CadnaA noise model has been constructed including all significant noise sources, existing buildings. The noise model has been used to predict the noise levels present at the nearest noise sensitive dwellings due to the proposed operations of the substation.

An assessment has been undertaken in accordance with Planning Advice Notice 1/2011: Planning and Noise and BS4142:2014+A1:2019 to determine the impact of the proposed substation and kempower units from the Queen of the Loch public house upon the existing residential dwellings. The rating level of the proposed substation and Kempower units will fall below the existing background noise level. The proposed plant will have no significant adverse effect upon the existing residential dwellings in accordance with the measured background noise level and the criteria as stated within BS4142:2014 and the Planning Advice Notice: Planning and Noise.

The assessment has been based upon robust and worst-case assumptions and demonstrates that, in principle, there should not be any adverse impact due to the existing noise sources.

END OF REPORT

APPENDIX I

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Omnia and the Client as indicated in Section 1.3.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination, which are enforced, by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.

8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

9. Omnia cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Omnia is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by OEC in this connection without their explicit written agreement there to by Omnia.

10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II

GLOSSARY OF ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid- frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or LAeq, LA90 etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A1: Typical Sound Pressure Levels

Sound Pressure Level (dB)	Location/Example
0	Threshold of hearing
20 - 30	Quiet bedroom at night
30 - 40	Living room during the day
40 - 50	Typical office
50 - 60	Inside a car
60 - 70	Typical high street
70 - 90	Inside factory
100 - 110	Burglar alarm at 1m away
110 - 130	Jet aircraft on take off
140	Threshold of pain

Table A2: Terminology

Descriptor	Explanation
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean square pressure of the sound field and a reference pressure (2x10-5Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A – weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} & L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	2A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX III

FIGURES

Figure 1: Noise Measurement Positions (NMP)

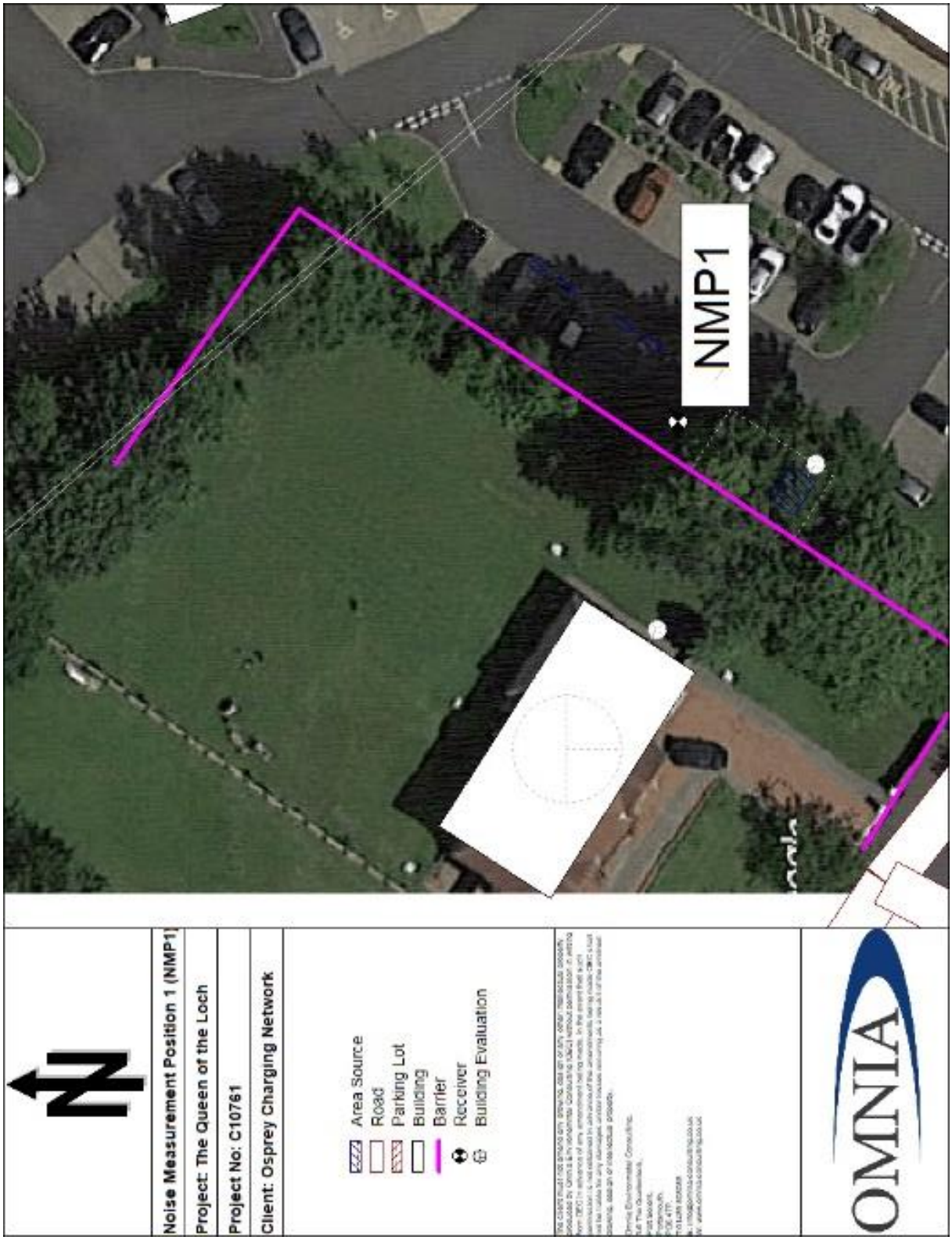
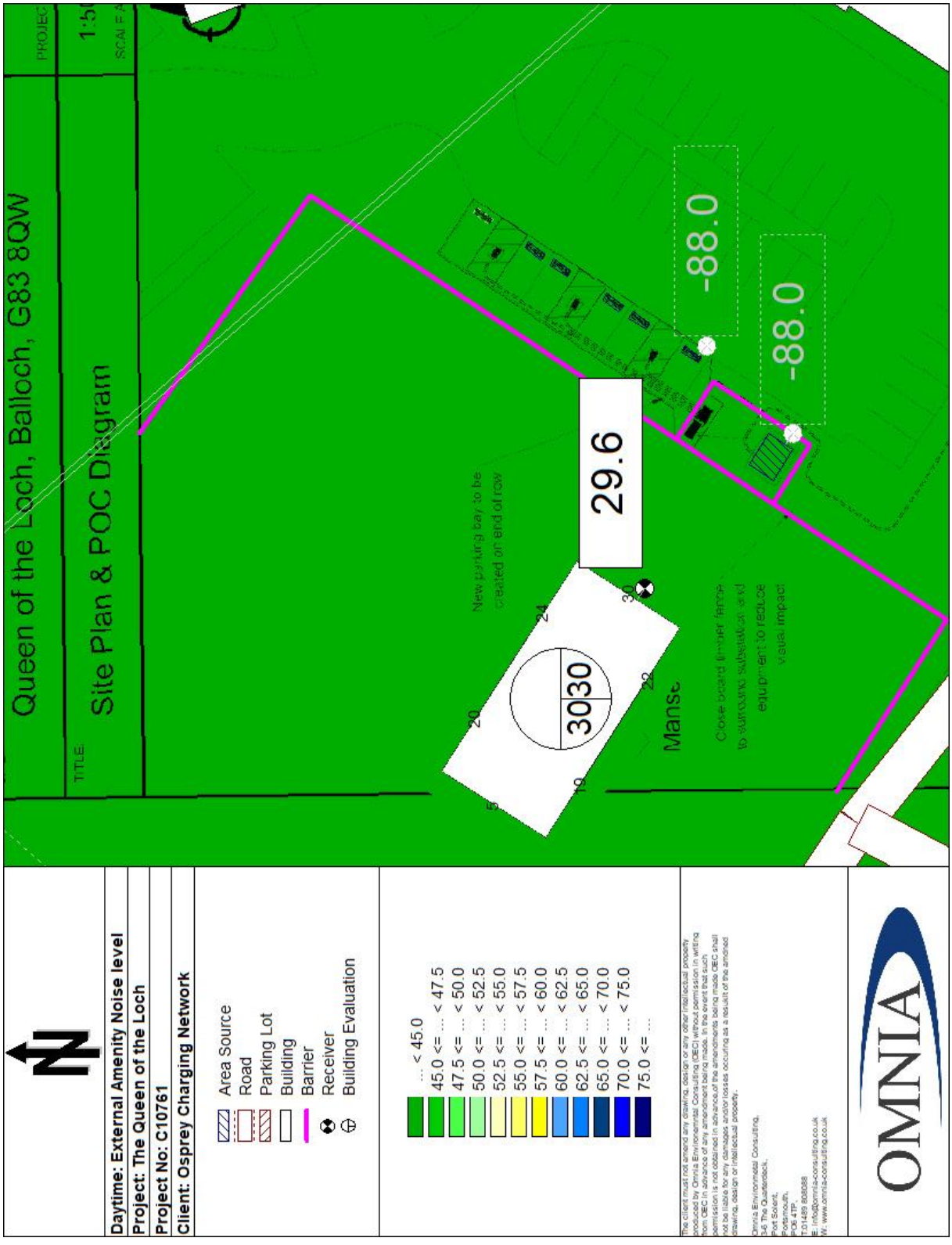


Figure 2: BS4142:2014 Assessment Daytime - Receiver at 1m from exisiting noise sensitive receptor



APPENDIX IV

Background and Ambient Measurements

Table A3: Measured Background and Ambient Noise Levels

Period start	Measured Sound Pressure Level, dB	
	$L_{Aeq,1hr}$	$L_{A90,1hr}$
13/07/2022 18:00	52.8	42.5
13/07/2022 19:00	48.8	41.2
13/07/2022 20:00	45.8	39.4
13/07/2022 21:00	47.2	39.8
13/07/2022 22:00	42.7	36
13/07/2022 23:00	41.0	33.6
14/07/2022 07:00	47.1	40.0
14/07/2022 08:00	51.1	41.0
14/07/2022 09:00	49.1	43.3
14/07/2022 10:00	49.4	44.2
14/07/2022 11:00	52.2	45
14/07/2022 12:00	50.8	44.8
14/07/2022 13:00	54.1	46.4
14/07/2022 14:00	50.6	46
14/07/2022 15:00	59.7	46.4
14/07/2022 16:00	49.7	45.2
14/07/2022 17:00	50.3	43.8
14/07/2022 18:00	57.6	42.7
14/07/2022 19:00	47.7	43.0
14/07/2022 20:00	47.0	41.5
14/07/2022 21:00	47.0	41.0
14/07/2022 22:00	45.0	39.1
14/07/2022 23:00	42.8	33.7
15/07/2022 07:00	53.1	48.5
15/07/2022 08:00	51.2	45.1
15/07/2022 09:00	53.5	44.8
15/07/2022 10:00	52.5	45.1
15/07/2022 11:00	50.7	45.2
15/07/2022 12:00	51.5	47.2
15/07/2022 13:00	51.2	45.6
15/07/2022 14:00	57.9	44.9
15/07/2022 15:00	50.8	45.4
15/07/2022 16:00	51.2	45.7
15/07/2022 17:00	50.5	45.0
15/07/2022 18:00	52.2	43.8
15/07/2022 19:00	58.8	43.8
15/07/2022 20:00	47.6	41.4

15/07/2022 21:00	47.7	41.5
15/07/2022 22:00	49.3	38.7
15/07/2022 23:00	45.0	36.7
16/07/2022 07:00	46.0	37.9
16/07/2022 08:00	49.2	40.8
16/07/2022 09:00	56.2	42.6
16/07/2022 10:00	49.4	43.7
16/07/2022 11:00	51.5	43.9
16/07/2022 12:00	49.0	44.7
16/07/2022 13:00	50.6	44.5
16/07/2022 14:00	49.1	43.9
16/07/2022 15:00	50.4	44.6
16/07/2022 16:00	52.0	46.3
16/07/2022 17:00	49.0	43.8
16/07/2022 18:00	47.7	42.4
16/07/2022 19:00	49.5	41.7
16/07/2022 20:00	46.2	40.9
16/07/2022 21:00	46.9	39.3
16/07/2022 22:00	44.8	37.7
16/07/2022 23:00	42.4	33.7
17/07/2022 07:00	44.6	40.4
17/07/2022 08:00	52.0	41.7
17/07/2022 09:00	49.1	43.7
17/07/2022 10:00	49	43.8
17/07/2022 11:00	49.1	44.0
17/07/2022 12:00	49.7	43.7
17/07/2022 13:00	50.7	46.9
17/07/2022 14:00	50.0	45.3
17/07/2022 15:00	50.0	45.0
17/07/2022 16:00	50.2	45.3
17/07/2022 17:00	49.0	44.7
17/07/2022 18:00	50.2	45.3
17/07/2022 19:00	49.0	44.4
17/07/2022 20:00	47.5	40.4
17/07/2022 21:00	51.8	38.0
17/07/2022 22:00	42.3	36.0
17/07/2022 23:00	41.2	32.9
18/07/2022 07:00	47.0	39.9
18/07/2022 08:00	50.1	40.4

18/07/2022 09:00	51.9	41.5
18/07/2022 10:00	50.5	43.2
18/07/2022 11:00	51.5	42.8
18/07/2022 12:00	51.4	43.6
18/07/2022 13:00	50.8	45.5
18/07/2022 14:00	52.0	45.7
18/07/2022 15:00	52.9	46.2
18/07/2022 16:00	50.8	44.8
18/07/2022 17:00	50.5	45.4
18/07/2022 18:00	54.5	44.5
18/07/2022 19:00	47.9	42.7
18/07/2022 20:00	48.5	41.8
18/07/2022 21:00	46.9	41.5
18/07/2022 22:00	46.5	40.3
18/07/2022 23:00	44.5	33.5
19/07/2022 07:00	47.8	40.6
19/07/2022 08:00	48.7	41.2
19/07/2022 09:00	55.1	41.1
19/07/2022 10:00	48.5	40.7
19/07/2022 11:00	51.8	43
19/07/2022 12:00	49.9	42.8
19/07/2022 13:00	48.9	42.5
19/07/2022 14:00	49.3	41.7
19/07/2022 15:00	49.2	41.7
19/07/2022 16:00	50.0	43.9
19/07/2022 17:00	50.0	42.9
19/07/2022 18:00	47.9	41.4
19/07/2022 19:00	47.0	40.5
19/07/2022 20:00	47.0	40.5
19/07/2022 21:00	46.2	41.3
19/07/2022 22:00	46.2	37.8
19/07/2022 23:00	42.0	30.6

Period start	Measured Sound Pressure Level, dB	
	$L_{Aeq,15min}$	$L_{A90,15min}$
13/07/2022 23:00	40.3	33.8
13/07/2022 23:15	43.4	32.8
13/07/2022 23:30	39.6	34.4
13/07/2022 23:45	39.6	33.4
14/07/2022 00:00	41.9	32.9
14/07/2022 00:15	38.1	31.0
14/07/2022 00:30	34.6	28.9
14/07/2022 00:45	32.5	26.6
14/07/2022 01:00	37.6	26.5
14/07/2022 01:15	33.9	28.3
14/07/2022 01:30	32.0	24.7
14/07/2022 01:45	30.5	25.9
14/07/2022 02:00	31.5	25.1
14/07/2022 02:15	33.6	24.3
14/07/2022 02:30	40.1	26.3
14/07/2022 02:45	35.6	27.3
14/07/2022 03:00	31.4	25.2
14/07/2022 03:15	32.7	25.2
14/07/2022 03:30	37.0	35.4
14/07/2022 03:45	37.0	33.9
14/07/2022 04:00	33.1	31.2
14/07/2022 04:15	33.7	29.5
14/07/2022 04:30	36.0	30.8
14/07/2022 04:45	39.1	31.2
14/07/2022 05:00	38.3	33.3
14/07/2022 05:15	41.4	35.4
14/07/2022 05:30	42.2	36.0
14/07/2022 05:45	43.0	37.8
14/07/2022 06:00	42.3	38.5
14/07/2022 06:15	43.6	38.9
14/07/2022 06:30	44.0	39.7
14/07/2022 06:45	43.9	39.5
14/07/2022 07:00	43.7	39.1
14/07/2022 23:00	43.6	36.7
14/07/2022 23:15	41.7	34.3
14/07/2022 23:30	40.3	32.3
14/07/2022 23:45	44.4	33.8

15/07/2022 00:00	46.3	40.7
15/07/2022 00:15	49.1	43.9
15/07/2022 00:30	48.0	42.2
15/07/2022 00:45	49.8	43.2
15/07/2022 01:00	43.8	37.7
15/07/2022 01:15	38.2	34.8
15/07/2022 01:30	39.3	33.9
15/07/2022 01:45	38.8	32.9
15/07/2022 02:00	40.7	35.3
15/07/2022 02:15	38.5	35.0
15/07/2022 02:30	41.1	32.4
15/07/2022 02:45	43.9	38.3
15/07/2022 03:00	46.8	41.3
15/07/2022 03:15	51.4	49.7
15/07/2022 03:30	51.1	49.7
15/07/2022 03:45	51.5	49.8
15/07/2022 04:00	52.1	50.8
15/07/2022 04:15	52.2	50.4
15/07/2022 04:30	51.1	48.9
15/07/2022 04:45	52.8	50.4
15/07/2022 05:00	51.0	48.4
15/07/2022 05:15	47.4	44.0
15/07/2022 05:30	47.8	42.0
15/07/2022 05:45	47.4	43.8
15/07/2022 06:00	51.4	47.3
15/07/2022 06:15	55.0	52.2
15/07/2022 06:30	52.8	50.0
15/07/2022 07:00	54.3	50.3
15/07/2022 23:00	45.1	38
15/07/2022 23:15	45.5	37.8
15/07/2022 23:30	44.6	34.5
15/07/2022 23:45	44.4	36.6
16/07/2022 00:00	43.5	34.3
16/07/2022 00:15	40.8	34.5
16/07/2022 00:30	41.0	34.6
16/07/2022 00:45	40.3	32.8
16/07/2022 01:00	39.0	33.3
16/07/2022 01:15	37.9	30.8
16/07/2022 01:30	37.7	30.8

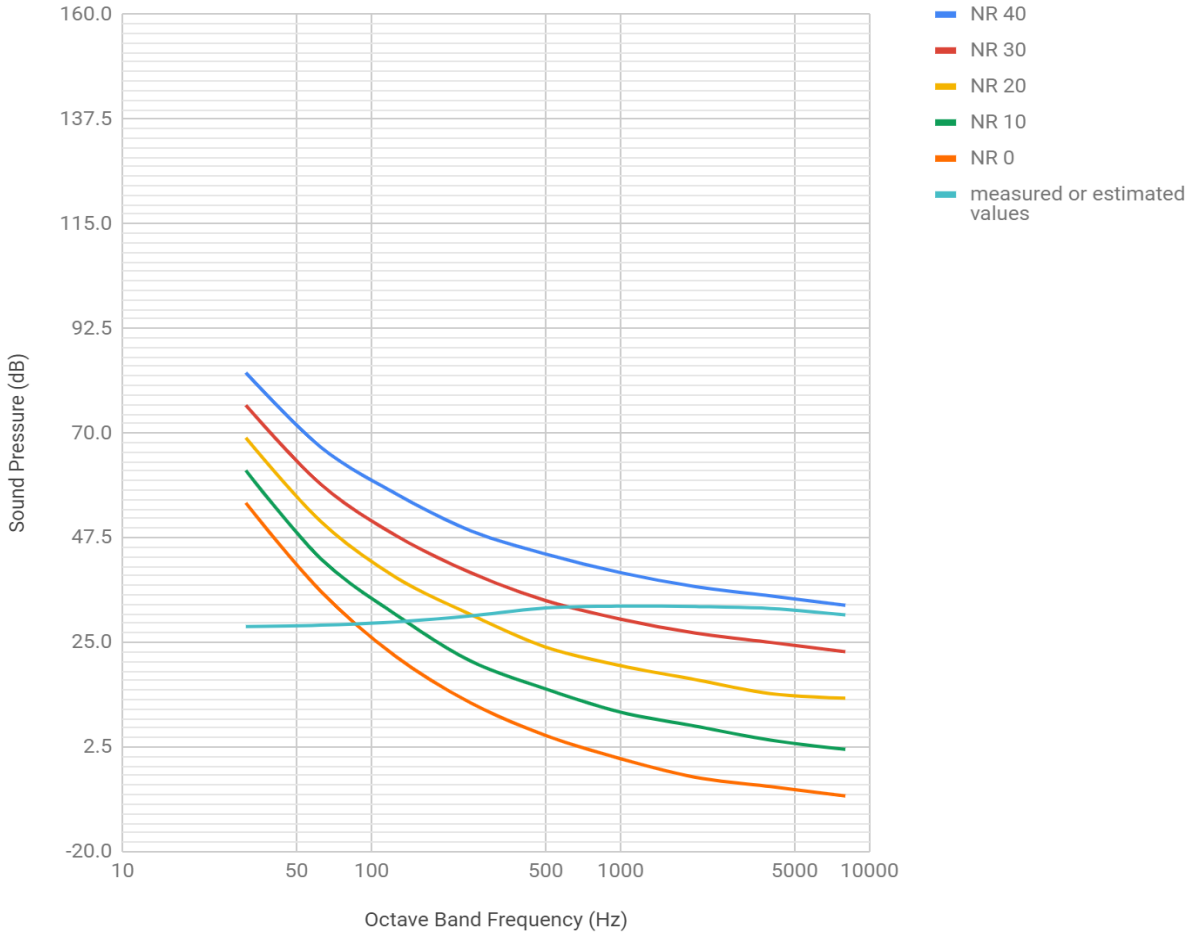
16/07/2022 01:45	34.4	29.3
16/07/2022 02:00	35.0	25.7
16/07/2022 02:15	37.4	28.3
16/07/2022 02:30	38.3	29.9
16/07/2022 02:45	39.9	26.6
16/07/2022 03:00	34.3	27.0
16/07/2022 03:15	34.1	30.5
16/07/2022 03:30	38.1	29.7
16/07/2022 03:45	34.8	27.9
16/07/2022 04:00	34.2	30.0
16/07/2022 04:15	35.3	30.5
16/07/2022 04:30	37.2	32.1
16/07/2022 04:45	37.4	32.3
16/07/2022 05:00	40.1	34.4
16/07/2022 05:15	42.6	32.5
16/07/2022 05:30	43.5	34.1
16/07/2022 05:45	41.7	34.1
16/07/2022 06:00	44.6	35.0
16/07/2022 06:15	43.2	35.3
16/07/2022 06:30	46.7	36.8
16/07/2022 06:45	41.1	36.6
16/07/2022 07:00	42.7	36.9
16/07/2022 23:00	44.3	37.4
16/07/2022 23:15	41.2	34.3
16/07/2022 23:30	42.6	34.1
16/07/2022 23:45	40.2	32.1
17/07/2022 00:00	42.0	32.4
17/07/2022 00:15	42.3	34.9
17/07/2022 00:30	44.9	34.5
17/07/2022 00:45	39.2	31.2
17/07/2022 01:00	38.0.	300
17/07/2022 01:15	38.3	30.3
17/07/2022 01:30	37.0	27.5
17/07/2022 01:45	32.8	26.2
17/07/2022 02:00	36.5	30.1
17/07/2022 02:15	34.9	31.6
17/07/2022 02:30	36.0	26.9
17/07/2022 02:45	36.9	27.2
17/07/2022 03:00	35.9	28.6

17/07/2022 03:15	33.6	29.4
17/07/2022 03:30	34.7	28.3
17/07/2022 03:45	33.3	27.3
17/07/2022 04:00	34.5	25.5
17/07/2022 04:15	31.3	26.1
17/07/2022 04:30	35.4	26.6
17/07/2022 04:45	45.0	28.9
17/07/2022 05:00	49.5	32.2
17/07/2022 05:15	40.3	37.3
17/07/2022 05:30	44.1	37.8
17/07/2022 05:45	42.5	37.9
17/07/2022 06:00	45.0	37.8
17/07/2022 06:15	42.5	38.5
17/07/2022 06:30	44.6	39.1
17/07/2022 06:45	43.3	40.1
17/07/2022 07:00	42.5	39.7
17/07/2022 23:00	41.5	33.7
17/07/2022 23:15	40.5	34.0
17/07/2022 23:30	42.4	33.1
17/07/2022 23:45	40.1	31.5
18/07/2022 00:00	38.0	31.2
18/07/2022 00:15	36.1	29.2
18/07/2022 00:30	38.2	28.4
18/07/2022 00:45	39.2	30.9
18/07/2022 01:00	36.8	31.0
18/07/2022 01:15	34.0	30.3
18/07/2022 01:30	36.1	28.7
18/07/2022 01:45	37.7	28.9
18/07/2022 02:00	32.8	27.8
18/07/2022 02:15	32.5	25.6
18/07/2022 02:30	33.7	24.2
18/07/2022 02:45	35.7	32.6
18/07/2022 03:00	34.8	33.5
18/07/2022 03:15	35.6	33.9
18/07/2022 03:30	35.4	33.4
18/07/2022 03:45	31.3	25.7
18/07/2022 04:00	32.2	25.2
18/07/2022 04:15	32.2	29.0
18/07/2022 04:30	39.3	30.9

18/07/2022 04:45	37.8	31.0
18/07/2022 05:00	36.9	32.7
18/07/2022 05:15	38.7	33.9
18/07/2022 05:30	43.9	34.9
18/07/2022 05:45	44.5	34.9
18/07/2022 06:00	43.5	37.4
18/07/2022 06:15	43.2	38.9
18/07/2022 06:30	44.9	39.1
18/07/2022 06:45	45.9	39.6
18/07/2022 07:00	46.3	39.6
18/07/2022 23:00	47.9	36.7
18/07/2022 23:15	44.4	34.5
18/07/2022 23:30	40.6	33.9
18/07/2022 23:45	41.1	32.4
19/07/2022 00:00	37.3	29.7
19/07/2022 00:15	36.9	29.0
19/07/2022 00:30	39.0	28.1
19/07/2022 00:45	32.4	27.7
19/07/2022 01:00	37.7	29.3
19/07/2022 01:15	35.1	27.6
19/07/2022 01:30	33.9	27.2
19/07/2022 01:45	40.9	27.0
19/07/2022 02:00	35.0	27.2
19/07/2022 02:15	30.7	27.1
19/07/2022 02:30	31.0	27.3
19/07/2022 02:45	33.7	27.3
19/07/2022 03:00	31.3	27.1
19/07/2022 03:15	31.6	27.7
19/07/2022 03:30	29.2	27.2
19/07/2022 03:45	34.0	29.0
19/07/2022 04:00	36.8	33.4
19/07/2022 04:15	35.9	33.0
19/07/2022 04:30	40.9	33.9
19/07/2022 04:45	39.0	34.6
19/07/2022 05:00	41.9	32.6
19/07/2022 05:15	49.3	33.1
19/07/2022 05:30	43.9	35.8
19/07/2022 05:45	48.9	37.0
19/07/2022 06:00	45.5	38.7

19/07/2022 06:15	45.9	39.3
19/07/2022 06:30	43.7	39.1
19/07/2022 06:45	45.6	40.6
19/07/2022 07:00	45.5	40.8
19/07/2022 23:00	42.0	33.1
19/07/2022 23:15	39.2	30.9
19/07/2022 23:30	41.5	30.5
19/07/2022 23:45	43.9	29.4
20/07/2022 00:00	67.0	51.3
20/07/2022 00:15	37.2	27.7
20/07/2022 00:30	40.5	28.8
20/07/2022 00:45	53.8	30.7

NR - Noise Rating



1/3 Octave Bands	31.5	63	125	250	500	1000	2000	4000	8000
Calculated Frequency content 1m away from existing noise sensitive receptor	28.4	28.7	29.4	30.7	32.4	32.8	32.7	32.3	30.9
NR Curve Rating Associated with the corresponding frequency at 1/3 octave band in Accordance with BS8233:2014	NR0	NR0	NR5	NR20	NR25	NR30	NR35	NR35	NR35

DISCLAIMER: Omnia have determined that the receptor, at a distance of 1m from the existing residential dwelling, achieves as a worst-case Noise Rating NR35. This assessment has been undertaken externally and without subject to the existing residential dwelling ventilation and glazing attenuation specification. Therefore, the existing residential dwelling internal Noise Rating Curve has potential to fall below NR35.