

NOISE IMPACT ASSESSMENT

Brigend Green Hydrogen Scheme

Noise Impact
Assessment
JAH03178-REPT-01-R2
27 March 2023

REPORT

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
00	Draft	Stephen Hale BSc (Hons), MIOA	Alex Stronach BSc (Hons), Ph.D. PgDip, AMIOA	Joe Grimes MSc, MIOA	21/12/2022
01	Issue	Stephen Hale BSc (Hons), MIOA	Lise W. Tjellesen MSc Eng Acoustics, MIOA	Lise W. Tjellesen MSc Eng Acoustics, MIOA	15/03/2023
02	Issue	Stephen Hale BSc (Hons), MIOA	Lise W. Tjellesen MSc Eng Acoustics, MIOA	Lise W. Tjellesen MSc Eng Acoustics, MIOA	27/03/2023

QA of Data processing, Calculations and/or Models

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EXECUTIVE SUMMARY

RPS has been commissioned by Marubeni Europower Ltd to undertake a noise impact assessment (NIA) to form part of a planning application for a proposed Bridgend Green Hydrogen Scheme on land south of Attlee Street, Brynmenyn Industrial Estate, Brynmenyn, Bridgend CF32 9TQ. The site is located within the administrative boundary of the Bridgend County Borough Council (BCBC).

This report considers the impact of operational noise from the proposed hydrogen centre only.

The noise impact assessment (NIA) has been carried out in accordance with the methodology in Technical Advice Note (Wales) 11. TAN 11 states noise from industrial development should be assessed according to British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS 4142) methodology, which is the industry standard methodology for the assessment of commercial and industrial sound.

The NIA has been undertaken based upon information describing the proposed development provided by the Client.

In order to establish baseline sound conditions at the nearest NSRs, 2 unattended long-term (LT) sound level monitors were on site over a 7-day period from 13:15 hours on 4th October 2022 to 15:00 hours on 11th October 2022, the locations are shown in Appendix A as LT1 and LT2. Additional attended measurements were undertaken on site 11:00 hours on 11th October 2022 to 14:00 hours on 11th October 2022.

In order to calculate noise impacts associated with operation of the proposed development at NSRs, a 3D sound model has been built using SoundPLAN v8.2 noise modelling software. The model predicts sound levels under light down-wind conditions based on hemispherical sound propagation with corrections for atmospheric absorption, ground effects, screening and directivity based on the procedure detailed in ISO 9613-2:1996 'Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation'. The noise generating aspects of the development included in the model are summarised giving details of the assumed power level of each noise source and how they have been modelled in the assessment. The daytime assessment is based on a one-hour assessment period, whilst the night-time assessment is a 15-minute assessment as required by BS 4142:2014+A1:2019.

Worst-case assumptions have been made with regards the noise sources on site using British Standard BS 5228-1:2009, CIBSE Guide 4 and the RPS SoundPLAN data library. Any alterations to the acoustic performance of these noise sources will result in a change of noise level at the noise sensitive receptor.

The initial BS 4142:2014+A1:2019 assessment indicates that impacts are likely to be significant adverse impacts at the NSRs considered within this assessment, depending on the context.

Also, the initial estimate of impact indicates that the daytime and night-time levels do not meet the criteria set by Shared Regulatory Services (SRS). Therefore, in order to meet the SRS requirements plant noise emissions limits at the NSRs have been identified.

It is concluded that with mitigation measures levels of sound arising from the operation of the facility will not result in adverse impacts, significant or otherwise, at any of the nearby NSRs when considered with BS 4142:2014+A1:2019 and also criteria set by Shared Regulatory Services

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1 INTRODUCTION

- 1.1 RPS has been commissioned by Marubeni Eurowpower Ltd to undertake a noise impact assessment (NIA) to form part of a planning application for a proposed Bridgend Green Hydrogen Scheme on land south of Attlee Street, Brynmenyn Industrial Estate, Brynmenyn, Bridgend CF32 9TQ. The site is located within the administrative boundary of the Bridgend County Borough Council (BCBC).
- 1.2 This report looks at the impact of operational noise from the proposed hydrogen centre only.
- 1.3 The noise impact assessment (NIA) has been carried out in accordance with the methodology in Technical Advice Note (Wales) 11. TAN 11 states that noise from industrial development should be assessed according to British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' [i] methodology, which is the industry standard methodology for the assessment of commercial and industrial sound.
- 1.4 The NIA has been undertaken based upon information provided by the Client.
- 1.5 RPS is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. The NIA has been undertaken with integrity, objectivity and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.
- 1.6 This assessment was carried out by Stephen Hale (Acoustic Consultant) under the supervision of Lise Tjellesen (Technical Director). Personnel and individual qualifications are provided within the Quality Management table at the start of this report.
- 1.7 This assessment has been undertaken in accordance with the requirement of Section 12 of British Standard (BS) 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'. This report has been peer reviewed within the RPS team to ensure that it is technically robust and meets the requirements of our Integrated Management System.

2 POLICY, GUIDANCE AND STANDARDS

2.1 Technical Advice Note (Wales) 11, Noise - October 1997

2.1.1 Technical Advice Note (Wales) 11 [ii], (TAN 11) offers guidance to local authorities on the assessment of noise and its potential impact on noise sensitive dwellings.

2.1.2 TAN 11 states the following with regard to industrial noise:

'The NEC noise levels should not be used to assess the impact of industrial noise on proposed residential development because the nature of this type of noise, and local circumstances, may necessitate individual assessment and because there is insufficient information on people's response to industrial noise to allow detailed guidance to be given. However, at a mixed noise site where industrial noise is present but not dominant, its contribution should be included in the noise level used to establish the appropriate NEC.'

2.1.3 TAN 11 goes on to state that where the standard is appropriate, noise from industrial development should be assessed according to British Standard 4142 (BS 4142) [iii] now as revised to the 2019 version.

2.2 British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

2.2.1 BS 4142:2014+A1:2019 primarily provides a numerical method by which to determine the significance of sound of an industrial nature (i.e., the 'specific sound' from the proposed development) at residential NSRs. The specific sound level may then be corrected for the character of the sound (e.g., perceptibility of any tones and/or impulsive characteristics), if appropriate, and it is then termed the 'rating level', whether or not a rating penalty is applied. The 'residual sound' is defined as the 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.

2.2.2 The specific sound levels should be determined separately in terms of the $L_{Aeq,T}$ index over a period of $T = 1$ -hour during the daytime and $T = 15$ -minutes during the night-time. For the purpose of the Standard, daytime hours are typically between 07:00 and 23:00 hours and night-time hours are typically between 23:00 and 07:00 hours.

2.2.3 BS 4142:2014+A1:2019 requires that the background sound levels adopted for the assessment are representative for the period being assessed. The Standard recommends that the background sound level should be derived from continuous measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated. However, the Standard states that there is no 'single' background sound level that can be derived from such measurements.

2.2.4 BS 4142:2014+A1:2019 states that measurement locations should be outdoors, where the microphone is at least 3.5 m from any reflecting surfaces other than the ground and, unless there is a specific reason to use an alternative height, at a height of between 1.2 m and 1.5 m above ground level. However, where it is necessary to make measurements above ground floor level, the measurement position, height and distance from reflecting surfaces should be reported, and ideally measurements should be made at a position 1 m from the façade of the relevant floor if it is not practical to make the measurements at least 3.5 m from the facade.

2.2.5 With regards to the rating correction, paragraph 9.2 of BS 4142:2014+A1:2019 states:

“Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.”

- 2.2.6 The commentary to paragraph 9.2 of BS 4142:2014+A1:2019 suggests the following subjective methods for the determination of the rating penalty for tonal, impulsive and/or intermittent specific sounds:

“Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a rating penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

NOTE 2 If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant to the exclusion of the others then it might be appropriate to apply a reduced or even zero correction for the minor characteristics.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. ... If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.”

- 2.2.7 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level of the specific sound. In the context of the Standard, adverse impacts include, but are not limited to, annoyance and sleep disturbance. Typically, the greater this difference, the greater is the magnitude of the impact:
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - A difference of around +5 dB 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.

2.2.8 Definitions of some of the key terms from this standard, and used in this report, are provided below.

Table 2.1: Definitions of acoustic terms

Terminology	Definition
Rating Level, $L_{Ar,T}$	The specific sound level plus any adjustment for the characteristic features of the sound.
Background Sound Level, $L_{A90,T}$	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T , measured using fast time-weighting, F , and quoted to the nearest whole number of decibels.
Residual Sound Level, $L_{Aeq,T}$	The 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
Ambient Sound Level, $L_{Aeq,T}$	The steady sound level which, over a period of time T , contains the same amount of A-weighted sound energy as the time varying sound over the same period. Also known as the equivalent continuous sound pressure level. <i>NOTE The ambient sound level is a measure of the residual sound and the specific sound when present.</i>
Specific Sound Level, $L_{Aeq,T}$	The equivalent continuous A-weighted sound pressure level produced by the specific noise source at the assessment location over a given reference time interval, T_r .

2.3 Local Authority - Bridgend County Borough Council

2.3.1 This section includes both local planning policy for the area, as well as correspondence between RPS and the EHO team at BCBC.

Bridgend Local Development Plan 2006-2021

2.3.2 The Bridgend Local Development Plan 2006-2021 [iv] sets out its objectives for the development and use of land in Bridgend County Borough over the plan period to 2021, and its policies to implement them. The plan is used by the Council to guide and manage development, providing a basis for consistent and appropriate decision-making.

2.3.3 Policy SP2 of the document states

“Strategic Policy SP2: Design and Sustainable Place Making

All development should contribute to creating high quality, attractive, sustainable places which enhance the community in which they are located, whilst having full regard to the natural, historic and built environment by:

- 1) Complying with all relevant national policy and guidance where appropriate;*
- 2) Having a design of the highest quality possible, whilst respecting and enhancing local character and distinctiveness and landscape character;*
- 3) Being of an appropriate scale, size and prominence;*
- 4) Using land efficiently by:*

- (i) being of a density which maximises the development potential of the land whilst respecting that of the surrounding development; and*
- (ii) having a preference for development on previously developed land over greenfield land;*
- 5) Providing for an appropriate mix of land uses;*
- 6) Having good walking, cycling, public transport and road connections within and outside the site to ensure efficient access;*
- 7) Minimising opportunities for crime to be generated or increased;*
- 8) Avoiding or minimising noise, air, soil and water pollution;*
- 9) Incorporating methods to ensure the site is free from contamination (including invasive species);*
- 10) Safeguarding and enhancing biodiversity and green infrastructure;*
- 11) Ensuring equality of access by all;*
- 12) Ensuring that the viability and amenity of neighbouring uses and their users / occupiers will not be adversely affected;*
- 13) Incorporating appropriate arrangements for the disposal of foul sewage, waste and water;*
- 14) Make a positive contribution towards tackling the causes of, and adapting to the impacts of Climate Change; and*
- 15) Appropriately contributing towards local, physical, social and community infrastructure which is affected by the development.*

2.3.4 Policy ENV7 of the document states:

"Policy ENV7 - Natural Resource Protection and Public Health

Development proposals will only be permitted where it can be demonstrated that they would not cause a new, or exacerbate an existing, unacceptable risk of harm to health, biodiversity and/or local amenity due to:

- 1) Air Pollution;*
- 2) Noise Pollution;*
- 3) Light Pollution;*
- 4) Contamination (including invasive species);*
- 5) Land Instability;*
- 6) Water (including groundwater) Pollution;*
- 7) Any other identified risk to Public Health or Safety.*

Development in areas currently subject to the above will need to demonstrate mitigation measures to reduce the risk of harm to public health, biodiversity and/or local amenity to an acceptable level.

2.3.5 Policy ENV18 of the document states:

“Policy ENV18 - Renewable Energy Developments

Proposals for renewable energy developments will be permitted provided that:

- 1) In the case of wind farm developments of 25MW or more, they are within the boundary of the refined Strategic Search Area and required to meet the indicative generating capacity;*
- 2) The availability of identified mineral resources or reserves will not be sterilised;*
- 3) Appropriate monitoring and investigation can demonstrate that the development will not have any significant impacts on nature conservation;*
- 4) Appropriate arrangements have been made for the preservation and/or recording of features of local archaeological, architectural or historic interest;*
- 5) They can be safely accessed to permit regular maintenance without detriment to the environment or the public rights of way network;*
- 6) They will not detrimentally affect local amenity by reason of noise emission, visual dominance, shadow flicker, reflected light, the emission of smoke, fumes, harmful gases, dust, nor otherwise cause pollution to the local environment.*
- 7) They will not lead to electromagnetic disturbance to existing transmitting and receiving systems (which includes navigation and emergency services), thereby prejudicing public safety;*
- 8) Local receptors of heat and energy from the proposal are identified and, where appropriate, are connected to/benefit from the facility; and*
- 9) Provision has been made for the removal of all infrastructure from, and reinstatement of the site following termination of the use.*

EHO Correspondence

2.3.6 RPS contacted BCBC via email with our approach to the noise assessment (Ref: 3178 - Consultation regards our approach to a noise assessment at Marubni Hydrogen Power Plant. Dated 22nd September 2022), this email was forwarded to Helen Williams at the following email address hewilliams@valeofglamorgan.gov.uk.

2.3.7 RPS received a reply 26th September 2022 with the following comments:

“The Planning Guidance you have quoted below is English policy - Wales is Planning Policy Wales, TAN 11 and Noise and Soundscape Action Plan

For short term attendance measurements (which I am assuming are the purple dots), I would prefer to see the one at Chilcott Avenue (at the edge of the industrial site) moved to further down the bottom of the site for the hydrogen plant (so that it is closer to the property at Leyshon Way)

With regards to your comments 'Based on the available information in the planning portal, no future noise sensitive receptors have been identified at the vicinity of the proposed site. Please could you confirm our findings?'- I would advise that a pre-application enquiry has been received for a proposed development in close proximity to the proposed hydrogen plant. However, due to the confidential nature of pre-application enquiries, I cannot provide you with further details at this stage.

For fixed plant from a development, SRS usually request the criteria of no more than -10dB below background initially, particularly as the development is close to residential properties (albeit on the edge of the industrial estate) and so as not to significantly increase the existing background levels. However, where this is not achievable, -5dB would usually be accepted with justification."

- 2.3.8 These comments have been taken on board, addressed and agreed via telephone conversation with Helen Williams.

2.4 Shared Regulatory Services (Wales)- Developers Guide to Noise and Planning

- 2.4.1 The Shared Regulatory Services (SRS) Developers Guide to Noise and Planning [v] provides applicants with greater certainty when making a planning application where noise may be in issue.
- 2.4.2 The document does not cover all potential options, it is suggested that the applicant or their representatives have a Pre-application discussion with the Local Planning Authority.
- 2.4.3 The document gives guidance in line with the principles of Good Acoustic Design, with the starting point for any development should be to minimise noise at source wherever possible.
- 2.4.4 Paragraph 2.2.2 of the guidance states:

"If noise is an inevitable consequence of the development then a rating level of no more than 10dB below the background noise level should be applied in accordance with the principles of BS4142:2014."

- 2.4.5 Paragraph 2.2.3 of the guidance states:

"Where background noise levels are very low (i.e. less than 30dB LA90), or best available techniques are to be applied, as outlined, to mitigate the noise then a more permissive rating level may be applied on a case by case basis. Any movement from the default position of no more than 10dB below background noise level shall be subject to discussions with and approval by the Local Planning Authority (LPA)."

3 SITE DESCRIPTION

3.1 Site Description

- 3.1.1 The site is based land approximately 20 m south of Attlee Street, Brynmenyn Industrial Estate, Bridgend CF32 9TQ. The A4065 is approximately 45m to the east of the site boundary running north to south. Leyshon Way, a residential road, is approximately 195 m to the south of the site boundary.
- 3.1.2 Most of the land uses immediately surrounding the site are industrial. However, there are residential dwellings to the south and east of the site.
- 3.1.3 The industrial estate which the proposed site is located adjacent to has flat topography, however local residential dwellings are raised above the site on a hill.
- 3.1.4 The site location is illustrated below in Figure 3.1, with further details given in [Appendix A](#).

Figure 3.1: Site Overview



3.2 Description of Proposed Site Activities

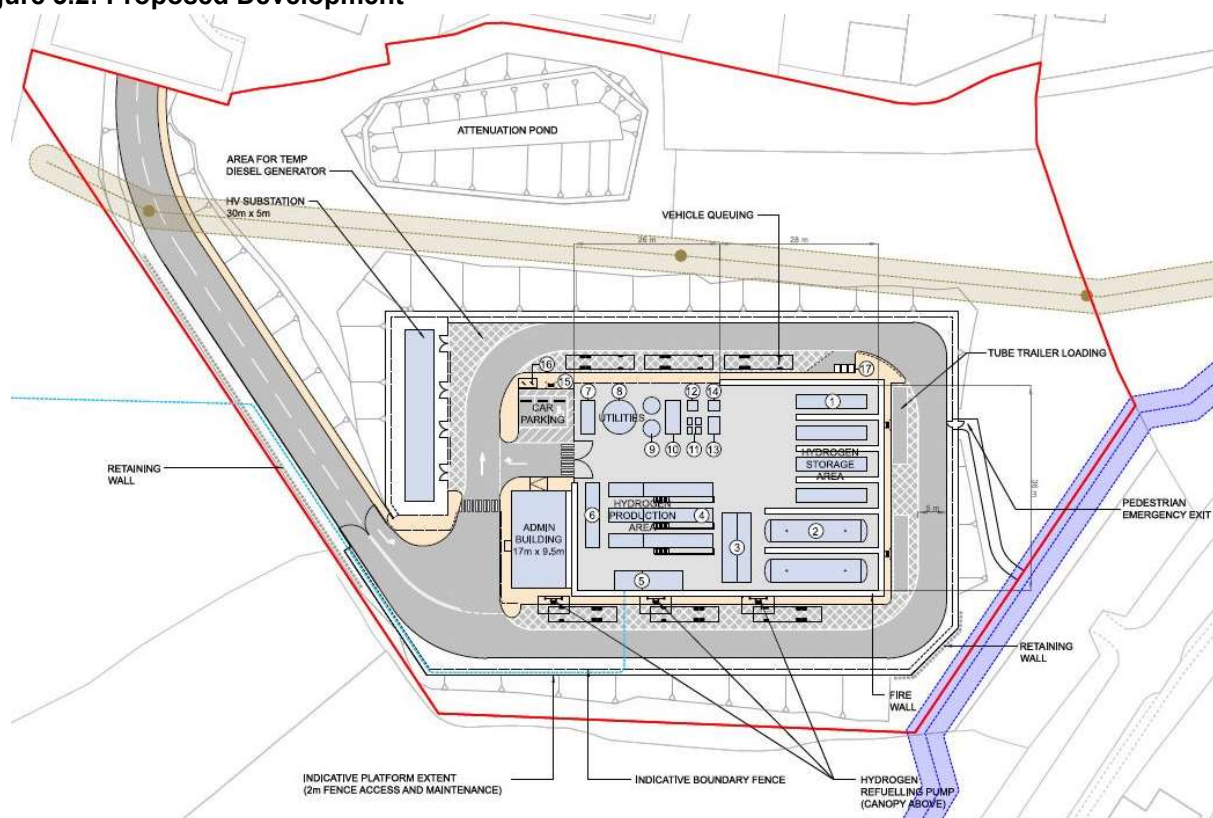
- 3.2.1 The proposal is for the development of a new purpose-built facility to provide green hydrogen.
- 3.2.2 The proposed development will introduce new noise sources to the local area mainly in the form of plant noise, with much of this being housed internally and additional heavy goods vehicle (HGV) movements.
- 3.2.3 It is understood that the main noise sources will be:

Table 3.1: Noise Sources of the Development

Name	Operational Day/Night	Number of Units	Information
HGV Movements	Day	8 per hour	Movements in and around the site
Hydrogen Refuelling Station	Day	3	HGV to use with hydrogen refuelling stations with engine off.
HV Substation	Day & Night	1	Internally housed in HV Substation Building
Fin Fan Unit	Day & Night	3	Model unknown
Compressor	Day & Night	1	Model unknown

- 3.2.4 The proposed site layout is shown below in Figure 3.2, this taken from the drawing received from the client (Proposed Site Layout - 1454 PL101 - Dated 24/03/2023)

Figure 3.2: Proposed Development



3.3 Noise Sensitive Receptors

3.3.1 The nearest noise sensitive receptors (NSRs) to the site are described below in Table 3.2 with locations illustrated in [Appendix A](#).

Table 3.2: NSR Location and Distances to Site

NSR	Name	NSR Type	Direction from Site	Approximate Distance from Site Boundary (m)	Approximate Distance to Nearest Noise Source (m)
A	Davies Ave/ Rowans Lane	Residential	East	35	51
B	Leyshon Way	Residential	South	185	205

4 BASELINE NOISE DESCRIPTION

4.1 Baseline Monitoring Dates and Locations

- 4.1.1 In order to establish baseline sound conditions at the nearest NSRs, 2 unattended long-term (LT) sound level monitors were installed on site over a 7-day period from 13:15 hours on 4th October 2022 to 15:00 hours on 11th October 2022, the monitoring locations are shown in [Appendix A](#) as LT1 and LT2.
- 4.1.2 The purpose of the long-term monitoring was to capture the baseline sound levels considered representative at the closest NSR. LT1 was therefore chosen to be representative of residential dwellings identified as NSR A, with LT2 chosen to be representative of residential dwellings identified as NSR B.
- 4.1.3 Additional attended measurements were undertaken on site from 11:00 hours on 11th October 2022 to 14:00 hours on 11th October 2022, the location is shown in [Appendix A](#) as ST1, ST2 and ST3.
- 4.1.4 The purpose of the short-term monitoring was to capture the baseline sound levels considered representative surrounding the area. ST1 and ST1 was therefore chosen to be representative of noise levels from the industrial estate, with ST3 chosen to be representative of residence at NSR B as per EHOs requests (see paragraph 2.3.7).
- 4.1.5 The monitoring locations are detailed below in Table 4.1. Monitoring locations along with NSR locations, are shown in [Appendix A](#).

Table 4.1: Monitoring Locations

Monitor Name	Approximate Distance from SLM to NSR (m)	Approximate Distance from SLM to Site Boundary (m)	Approximate Distance from SLM to Nearest Noise Source (m)
LT1	25	15	30
LT2	20	200	205
ST1	230	25	25
ST2	131	15	60
ST3	165	155	175

- 4.1.6 Site survey sheets detailing on-site observations during the noise survey are included in [Appendix B](#).

4.2 Instrumentation

- 4.2.1 The microphones at each LT position were mounted on a pole 1.5 m above ground level in a free-field position (at least 3.5 m from any reflecting surface, excluding the ground) using a IPX3 water-resistant WS-15 microphone weather shield.
- 4.2.2 The microphones at each ST position were mounted on a tripod 1.2 m above ground level in a free-field position (at least 3.5 m from any reflecting surface, excluding the ground) using a IPX3 water-resistant WS-16 microphone weather shield.

- 4.2.3 Details of the instrumentation used during the survey are provided in Table 4.2 below. Calibration certificates of the equipment are available upon request. Calibration of the equipment was carried out before and after measurements with no significant drift ($< \pm 0.5$ dB) observed.

Table 4.2: Sound Survey Instrumentation

Measurement Location	Make / Model	Serial Number	Calibration Ref / Start / End	Last Calibration Date
LT1	Rion NL52	386735	94.0 / 94.0 / 94.0	19/11/2020
LT2	Rion NL52	998566	94.0 / 94.0 / 94.0	02/03/2022
ST1 / ST2 / ST3	Rion NL52	164423	94.0 / 94.0 / 94.0	19/04/2021
Calibrator	Rion NC-74	110090	N/A	25/04/2022

- 4.2.4 All sound level measurements were made using 'Class 1' Rion NL-52 sound level meters (SLM) in accordance with BS 7445-2:1991 [vi]. The SLMs were set up to log the A-weighted broadband sound pressure level (SPL) in 100 ms periods. Levels were post-processed into 15-minute periods.
- 4.2.5 The equipment calibration level was checked prior to and after the monitoring periods. No significant deviation (i.e., above 0.5 dB) was noted.

4.3 Meteorological Conditions

- 4.3.1 Meteorological conditions were captured using the RPS weather station. This was deployed at LT1.
- 4.3.2 During the survey period, there were a total of 9 rain events. Wind speeds were below 3 m/s throughout the survey. Data collected during periods of rain has been removed from the subsequent analysis.
- 4.3.3 The weather data can be seen graphically in the time histories provided in [Appendix C](#).

4.4 Results and Discussion

- 4.4.1 Table 4.3 below provides a summary of baseline sound levels measured at LT1 over the 7-day survey period.
- 4.4.2 [Appendix C](#) provides a graphical presentation of 15-minute time history measurement data at LT1 and LT2.
- 4.4.3 Table 4.3 presents the 'representative' background sound level at the measurement location. This has been chosen by reviewing the statistical spread of $L_{A90,15min}$ measurements over the survey period and by reviewing the time history data contained in [Appendix B](#).

Table 4.3: Baseline Sound Levels

Location	Period	Residual Noise Level, dB L _{Aeq,T}	'Representative' L _{A90,15min}
LT1	Daytime (T = 07:00 to 23:00)	71	47
	Night-time (T = 23:00 to 07:00)	65	37
LT2	Daytime (T = 07:00 to 23:00)	50	40
	Night-time (T = 23:00 to 07:00)	45	36

4.4.4 A summary of the short term attended measurement results at locations ST1, ST2 and ST3 are presented in Table 4.4.

Table 4.4: Short-Term Baseline Sound Levels

Location	Period	Residual Noise Level, dB L _{Aeq}	Range of L _{A90,15min} Values Recorded, dB
ST1	11:00 to 12:00 hours	61	60 - 62
ST2	12:15 to 13:15 hours	52	47 - 62
ST3	13:30 to 14:00 hours	55	52 - 58

4.5 Subjective Assessment of Noise Climate

- 4.5.1 When deploying and concluding the noise survey at LT1 the noise climate was judged to be subjectively 'quiet'. The main sources of noise audible in this location was noted as constant road traffic. Natural sounds were also audible from time to time (wind in trees, bird calls, insects, sheep in the field etc.).
- 4.5.2 When deploying and concluding the noise survey at LT2 the noise climate was judged to be subjectively 'quiet'. The main sources of noise audible in this location were noted as industrial noise from the garage/workshop at Leyshon Way. The existing industrial site could also be heard in this location with intermittent distant road traffic. Natural sounds were also audible (wind in trees, bird calls, insects, dog from local garage etc.).

5 CALCULATIONS AND MODELLING

5.1 Modelling

- 5.1.1 In order to calculate noise impacts associated with operation of the proposed development at NSRs, a 3D sound model has been built using SoundPLAN v8.2 noise modelling software.
- 5.1.2 The model predicts sound levels under light down-wind conditions based on hemispherical sound propagation with corrections for atmospheric absorption, ground effects, screening and directivity based on the procedure detailed in ISO 9613-2:1996 'Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation' [vii].
- 5.1.3 The noise generating aspects of the development included in the model are summarised in Table 5.1 below.
- 5.1.4 Table 5.1 gives details of the assumed power level of each noise source and how they have been modelled for the assessment. The daytime assessment is based on a one-hour assessment period, whilst the night-time assessment is a 15-minute assessment as required by BS 4142:2014+A1:2019.
- 5.1.5 The results from the modelling software are shown graphically in [Appendix D](#).

Table 5.1: Noise Sources of the Development

Name	Scenario	Quantity	Sound Power Level (dBA LW)	On Time	Input Type	Additional Information
HGV Movements	Day	8 per hour per day	85	100%	Haul Road Calculation ref. BS 5228	No vehicle movements per night
2 x Compressors	Day	1	100	100%	Industrial Building (5 sides radiating)	Spectrum is from CIBSE Guide B4
HV Substation	Day & Night	1	85	100%	Point source	Housed within HV Substation
Fin Fan Units	Day & Night	3	95	100%	Industrial Building (4 sides radiating)	Spectrum is from RPS SoundPlan data library
Compressor	Day	1	96	100%	Industrial Building (5 sides radiating)	Spectrum is from CIBSE Guide B4
Oxygen Vent	Day & Night	1	90	100%	Point source	Information from client

- 5.1.6 Full spectral data for all noise sources is provided in [Appendix E](#).

- 5.1.7 The modelled layout of the site has been based on the drawing submitted as part of the planning application (10939-MMD-BRGR-XX-DR-C-0002 Rev H).
- 5.1.8 The following assumptions have been incorporated into the noise model:
- Noise levels and spectral data for all plant items has been based on values found in British Standard BS 5228-1:2009, CIBSE Guide 4 and the RPS SoundPLAN data library.
 - It is understood that lorries will not idle when using the external hydrogen refuelling stations and therefore noise from idling vehicles has not been included in the noise model.
 - The HGV movements have been modelled as electric trucks at constant speed of 20 km/h using octave band data from a reputable source [viii].
 - The HV Substation in the model have been assigned a building envelope consisting of walls and roof modelled as lightweight cladding with a minimum acoustic performance rating of 30 dB R_w.
 - The topography of the site and the surrounding area has been obtained from site surveyed topographical data and Ordnance Survey OS) open data (Terrain 50).
 - The effect of screening from solid structures (buildings) has been incorporated into the modelling process by importing OS Open Data 'Settlement Area' shape file data into the model; and
 - The ground type in the model has been set to soft (G=1) with areas of hard ground (G=0) for surrounding areas that are built up of residential dwellings and commercial units.
- 5.1.9 Any noise generating building services equipment associated with the development should be designed so that when assessed in accordance with BS 4142:2014+A1:2019, noise emissions are below a level whereby adverse impacts would be expected to occur. If required, this could be secured using an appropriate planning condition.

5.2 Model Results

5.2.1 Table 5.2 below provides a summary of modelled specific sound levels at the nearest NSRs for the daytime and night-time periods.

5.2.2 Daytime and night-time noise levels across the site are presented graphically in [Appendix E](#).

Table 5.2: Initial Predicted Specific Sound Levels

NSR Name		Daytime (07:00 to 23:00 hours) L _{Aeq,1Hr} dB	Night-time (23:00 to 07:00 hours) L _{Aeq,15min} dB
NSR A	Davis Ave/Rowans Lane	51	45
	Davis Ave/Rowans Lane Gardens	49	42
NSR B	Property Off Leyshon Way	39	32
	Property Off Leyshon Way Garden	36	27

6 ASSESSMENT

6.1 Initial BS 4142:2014+A1:2019 Assessment

- 6.1.1 With reference to BS 4142:2014+A1:2019, a character correction can be applied to the specific sound level depending on the acoustic characteristics of the sound, including tonality, intermittency and impulsivity.
- 6.1.2 A tonality correction has been applied at the properties on Davies Ave/Rowans Lane as it is thought that noise from the fin fan units may contain tonal content which will just be perceivable in this location due to the proximity to site.
- 6.1.3 Table 6.1 below provides an initial estimate of the noise impact of the hydrogen centre at the nearest NSRs in accordance with BS 4142:2014+A1:2019 during operation during the daytime and night-time periods respectively.

Table 6.1: BS 4142:2014 Assessment (Initial Estimate)

	NSR	Specific Sound Level $L_{Aeq,Tr}$ dB	Character Correction, dB	Rating Level, dB $L_{Ar,Tr}$	Background Level dB $L_{90,1hour}$	Rating - Background Level Difference dB
Day-time Operation						
NSR A	Davis Ave/Rowans Lane	51	2	53	47	+6
	Davis Ave/Rowans Lane Gardens	49	2	51	47	+4
NSR B	Property Off Leyshon Way	39	0	39	40	-1
	Property Off Leyshon Way Garden	36	0	36	40	-4
Night-time Operation						
NSR A	Davis Ave/Rowans Lane	45	2	47	37	+10
	Davis Ave/Rowans Lane Gardens	42	2	44	37	+7
NSR B	Property Off Leyshon Way	32	0	32	36	-4
	Property Off Leyshon Way Garden	27	0	29	36	-7

- 6.1.4 With regards to the rating / background level difference, BS 4142:2014+A1:2019 states:
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

- A difference of around +5 dB 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 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.

- 6.1.5 However, with reference to paragraph 2.3.7, SRS request the criteria of no greater than 10 dB below background so as not to significantly increase the existing background levels. However, where this is not achievable the SRS suggests 5 dB below background would usually be accepted with justification.
- 6.1.6 With reference to Table 6.1, it has been found that rating levels exceed background levels at Davis Ave/Rowans Lane (NSR A) during the daytime and night-time periods with up to 10 dB. In BS 4142:2014+A1:2019 terms this indicates an adverse or significant adverse impact, depending on the context.
- 6.1.7 Also, with reference to Table 6.1, it has been found that rating levels do not exceed background levels at property off Leyshon Way during daytime and night-time periods.
- 6.1.8 The initial BS4142:2014+A1:2019 assessment therefore indicates low impact at Property Off Leyshon Way / Property Off Leyshon way Garden (NSR B), depending on the context.

6.2 Assessment of Plant Noise Emission Limits

- 6.2.1 SRS request the criteria of no greater than 10 dB below background sound levels so as not to significantly increase the existing background levels. However, where this is not achievable the SRS suggests 5 dB below background sound levels would usually be accepted with justification, as detailed in paragraph 2.3.7.
- 6.2.2 As demonstrated by the initial BS 4142:2014+A1:2019 assessment the plant exceeds this requirement. To meet the criteria level of 5 dB below existing background sound levels set within the SRS, noise levels across site would need to be reduced.
- 6.2.3 Table 6.2 gives the plant noise emission limit in terms of sound power levels of each noise source in order to achieve the 5 dB below criterion at each NSR of the proposed development.

Table 6.2: Limiting Plant Noise Emission Level for Noise Sources of the Development

Name	Scenario	Quantity	Sound Power Level (dBA LW)	On Time	Input Type	Additional Information
HGV Movements	Day	8 per hour per day	85	100%	Haul Road Calculation ref. BS 5228	No vehicle movements per night
2 x Compressors	Day	1	78	100%	Industrial Building (5 sides radiating)	Spectrum is from CIBSE Guide B4
HV Substation	Day & Night	1	85	100%	Point source	Housed within HV Substation
Fin Fan Units	Day & Night	3	72	100%	Industrial Building (4 sides radiating)	Spectrum is from RPS SoundPlan data library
Compressor	Day	1	78	100%	Industrial Building (5 sides radiating)	Spectrum is from CIBSE Guide B4
Oxygen Vent	Day & Night	1	70	100%	Point source	Information from client

6.2.4 An updated 3D SoundPLAN scenario has been created with noise levels across site reduced. Daytime and night-time noise levels across the site are presented graphically in [Appendix F](#).

6.2.5 Table 6.3 below provides an initial estimate of the noise impact of the hydrogen centre at the nearest NSRs in accordance with BS 4142:2014+A1:2019 during operation during the daytime and night-time periods respectively.

Table 6.3: Initial BS 4142:2014+A1:2019 Assessment for SRS Requirement

NSR	Specific Sound Level L _{Aeq,Tr} dB	Character Correction, dB	Rating Level, dB L _{Ar,Tr}	Background Level dB L _{90,1hour}	Rating - Background Level Difference dB
Day-time Operation					
Davis Ave/Rowans Lane	40	2	42	47	-5
Davis Ave/Rowans Lane Gardens	38	2	40	47	-7

NSR	Specific Sound Level L _{Aeq,Tr} dB	Character Correction, dB	Rating Level, dB L _{Ar,Tr}	Background Level dB L _{90,1hour}	Rating - Background Level Difference dB
Property Off Leyshon Way	29	0	29	40	-9
Property Off Leyshon Way Garden	27	0	27	40	-11
Night-time Operation					
Davis Ave/Rowans Lane	30	2	32	37	-5
Davis Ave/Rowans Lane Gardens	28	2	30	37	-7
Property Off Leyshon Way	21	0	23	36	-13
Property Off Leyshon Way Garden	18	0	20	36	-16

6.2.6 With the noise sources not exceeding the limiting noise emission levels given in Table 6.2, the initial BS 4241:2014+A1:2019 assessment demonstrates that the rating levels do not exceed the criteria set within the SRS at any NSR during the daytime or night-time periods. In BS 4142:2014+A1:2019 terms where the rating levels do not exceed the measured background sound levels, this is an indication of the specific sound source having a low impact, depending on the context.

6.3 BS 4142:2014+A1:2019 Consideration of Context

6.3.1 BS4142:2014+A1:2019 states; “*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 sources exceeds the background sound level and the context in which the sound occurs*”.

6.3.2 The first requirement of the above statement has been determined in the noise impact assessment section above. To establish the context in which the industrial / commercial sound will reside three pertinent factors must be considered, these are;

- The absolute sound level;
- The character and level of the residual sound compared to the character and level of the specific sound; and,
- The sensitivity of the receptor.

Absolute Level of Sound

- 6.3.3 To determine the first context in BS 4142:2014+A1:2019 it is necessary to determine whether the residual and background sound levels are high or low. Section 11 of BS 4142:2014+A1:2019 states:
- “Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*
- Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.”*
- 6.3.4 The results in Table 6.3, show the rating sound levels at NSR A and NSR B to be 40-42 dB(A) and 27-29 dB(A) respectively during the daytime. The background sound level at NSR A and NSR B is between 47 dB and 40 dB L_{A90} respectively during the daytime. The rating levels are considered to be low to moderate and background sound levels are considered to be moderate.
- 6.3.5 The absolute levels during the daytime, at NSR A and NSR B is 71 dB(A) and 50 dB(A) which is considered to be moderate to high.
- 6.3.6 The results in Table 6.3 show the rating sound levels at NSR A and NSR B to be 30-32 dB(A) and 20-23 dB(A) respectively during night-time. The background sound levels at NSR A and NSR B are 37 dB and 36 dB L_{A90} respectively during the night-time. The rating levels are considered to be low and background sound levels are considered to be moderate.
- 6.3.7 The absolute levels during the night-time at NSR A and NSR B are 65 dB(A) and 45 dB(A) respectively which is considered to be moderate to high.
- 6.3.8 Thus, in terms of the absolute level of sound, the differences between rating level and background sound levels presented in Table 6.3 are considered to be negligible, as the absolute levels of sound are between 11 and 29 dB above the rating levels at the noise sensitive receptors during daytime and between 22 and 33 dB above the rating levels during night-time. The likelihood of an impact, adverse or significant, occurring is therefore unlikely.

Character and level of the Residual and Specific Sound

- 6.3.9 The residual sound at the NSRs is expected to comprise primarily of transportation noise from local link roads, and industrial sources from the existing Brynmenyn Industrial Estate.
- 6.3.10 The proposed sources which contribute to the specific sound associated with the proposed development as outlined in Table 3.1, will be similar in character to that of the residual sound which comprises predominantly low to mid frequency noise from road traffic noise. However, some sources from the proposed site may have tonal characteristics, therefore, noise from the site may not be entirely masked by residual sound.
- 6.3.11 However, the residual sound level (see Table 4.3) at the most affected dwellings (NSR A) is 71 dB(A), and the specific sound level is 40 dB(A), i.e. 31 dB lower. Therefore, it is likely that noise from the proposed development will not be audible, or distinctly audible at the receptors during the daytime periods.
- 6.3.12 During the night-time periods, the residual sound level at the most affected dwellings (NSR A) is between 65 dB(A), and the specific sound level is 30 dB(A), i.e. 35 dB lower. Therefore, it is likely that noise from the proposed development will not be audible, or distinctly audible at receptors during the night-time periods.

- 6.3.13 Based on the above considerations, it is assumed that noise from the proposed development will be in keeping with the character of the existing acoustic environment. It is also considered likely that the proposed development will be inaudible over the residual sound level at NSRs, which is thought to further reduce any noise impacts caused by the development on NSRs.

Sensitivity of Receptor

- 6.3.14 With regard to pertinent factors to be taken into consideration, Section 11 of BS 4142:2014+A1:2019 states:

“The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal design and/or outdoor acoustic conditions, such as:

- i. Façade insulate treatment;*
- ii. Ventilation and/or cooling that will reduce the need to have windows open as to provide rapid or purge ventilation; and*
- iii. Acoustic screening.”*

- 6.3.15 As the glazing and ventilation strategy for existing or future NSRs is not known, it has been assumed that the NSRs will rely on open windows to maintain sufficient background ventilation. It is generally agreed that an open window provides 13 dB(A) of attenuation, therefore, this allows for a robust assessment of noise levels at receptors.
- 6.3.16 With the 13 dB(A) attenuation provided by an open window considered, internal noise levels generated by the proposed site, at the worst affected receptors, are expected to be 40 dB(A) during the daytime and 34 dB(A) during the night-time.
- 6.3.17 No specific additional mitigation measures are therefore considered to be necessary to protect receptors from industrial noise.

6.4 BS 4142:2014+A1:2019 Assessment Summary

- 6.4.1 A BS 4142:2014+A1:2019 assessment has been undertaken to assess the potential noise impacts caused by the proposed development on nearby existing and future noise sensitive receptors.
- 6.4.2 The calculated noise levels, expected to be generated by the proposed development are above the measured background sound level at some receptors during the daytime and night-time.
- 6.4.3 SRS request the criteria of no greater than 10 dB below background sound levels so as not to significantly increase the existing background levels. However, where this is not achievable the SRS suggests 5 dB below background sound would usually be accepted with justification, as detailed in paragraph 2.3.7.
- 6.4.4 To meet the criteria level of 5 dB below existing background sound levels set within the SRS, noise levels across site would need to be reduced.
- 6.4.5 By adopting the limiting plant noise emission levels identified in Table 6.2 the initial BS 4142:2014+A1:2019 assessment indicates that the rating levels are 5 dB below measured background sound levels. In BS 4142:2014+A1:2019 terms this indicates that the specific sound source is having a low impact, depending on the context.
- 6.4.6 The associated context assessment shows that the noise associated with the proposed development when adopting the limiting plant noise emissions levels will result in negligible or low impact at all noise sensitive receptors at both daytime and night-time.

- 6.4.7 Therefore, mitigation measures will need to be implemented during the design stage to reduce the plant noise levels to the identified limiting plant noise emission levels, so operational noise/ from the proposed Bridgend Green Hydrogen site at nearby NSR will have a negligible or low impact.
- 6.4.8 With adoption of the identified limiting plant noise emission levels, the results of the assessment demonstrate that the proposed Bridgend Green Hydrogen facility will not result in an adverse impact to amenity at the nearby receptors.
- 6.4.9 It is therefore considered that the development is compliant with the requirements of national and local planning policy. Noise should therefore not be considered a material issue in terms of planning.

7 UNCERTAINTY

- 7.1 In all assessments, it is good practice to consider uncertainty which can arise from a number of different aspects. There are degrees of uncertainty associated with: instrumentation used for surveying; measurement technique and the variables influencing the measurement results such as transmission path and weather conditions; source assumptions used for modelling; calculation uncertainty; assessment uncertainty; and the subjective response of residents to noise sources.
- 7.2 Uncertainty due to instrumentation has been significantly reduced with the introduction of more modern instrumentation and is reduced further by undertaking field calibration checks on sound level meters before and after each measurement period and that all instrumentation is within accepted laboratory calibration intervals.
- 7.3 Every effort has been made to reduce the uncertainty of the baseline sound level measurements. The duration of the baseline survey is considered to significantly reduce the uncertainty associated with the baseline sound levels. Based on professional judgement including substantial experience of acquiring and analysing baseline data for numerous sites in various locations, and a desk-based review of the site and surrounding area, it is considered that the baseline data acquired during the survey is typical of the area.
- 7.4 Calculation uncertainty and assessment uncertainty have been reduced by peer review of all baseline data, model input data, model results and assessment calculations, and by using the appropriate level of precision at each stage of the assessment calculations.
- 7.5 A quantitative assessment has been undertaken based on source levels measured by RPS personnel, provided by the project team for the proposed equipment or based on recognised and accepted empirical calculation methodologies. Where assumptions have been made, they have favoured a worst-case scenario.
- 7.6 Areas and potential consequences of uncertainty have been minimised where possible at each stage of the assessment process. On the basis of the above, it is considered that uncertainty associated with the assessment process is unlikely to significantly change the conclusions of this noise impact assessment.

8 CONCLUSIONS

- 8.1 RPS has been commissioned by Marubeni Eurowpower Ltd. to undertake a noise impact assessment (NIA) to form part of a planning application for a proposed Bridgend Green Hydrogen Scheme on land south of Attlee Street, Brynmenyn Industrial Estate, Brynmenyn, Bridgend CF32 9TQ. The site is located within the administrative boundary of the Bridgend County Borough Council (BCBC).
- 8.2 Baseline noise conditions at the nearest noise sensitive receptors (NSRs) were established by the baseline monitoring undertaken on site over a 7-day period from 13:15 hours on 4th October 2022 to 15:00 hours on 11th October 2022.
- 8.3 The assessment was carried out in accordance with the British Standard (BS) 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS 4142) methodology, which is the industry standard for assessment of commercial and industrial sound.
- 8.4 Worse case assumptions have been made with regards the noise sources on site using British Standard BS 5228-1:2009, CIBSE Guide 4 and the RPS SoundPlan data library. Any alterations to the acoustics performance will result in a change of noise level at the noise sensitive receptor.
- 8.5 The BS 4142:2014+A1:2019 initial estimate of impact indicates that impacts are likely to be significant with adverse impacts likely to occur at any of the NSRs considered within this assessment, depending on the context.
- 8.6 Also, the initial estimate of impact indicated the daytime and night-time levels do not meet the criteria set by Shared Regulatory Services (SRS) and therefore mitigation required to meet this noise limit.
- 8.1.1 An alternative method of mitigation considered could be reducing the noise levels of the proposed plant of the site. Using SoundPLAN v8.2 noise modelling software a mitigation scenario was created to calculate noise impacts associated with operation of the proposed development at NSRs.
- 8.1.2 Results from the assessment with reduced sound levels applied estimate an indicated of reduction in sound levels at the NSR, giving a minimum result of -5 dB difference between rating level and background level.
- 8.1.3 The estimate of impact with mitigation indicated the daytime and night-time levels meet the criteria set by Shared Regulatory Services.
- 8.1.4 Taking into account the context, the BS 4142:2014+A1:2019 initial estimate of impact is confirmed and therefore no adverse impacts are predicted at any of the NSRs.
- 8.1.5 On the basis of the above, it is concluded that with mitigation measures levels of sound arising from the operation of the facility will not result in adverse impacts, significant or otherwise, at any of the nearby NSRs when considered with BS 4142:2014+A1:2019 and also criteria set by Shared Regulatory Services.



APPENDICES

Appendix A

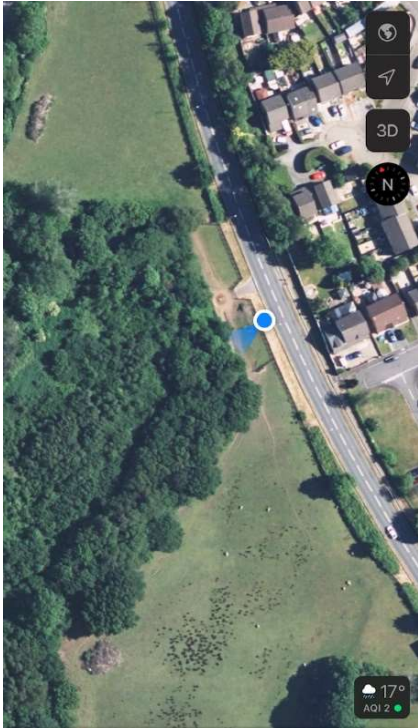

Detailed Site Map



Appendix B

Noise Survey Records

Location			LT1 - 3178							
Purpose of Monitoring			Industrial Noise							
Relevant Guidance / Standard			TAN11 - BS4142							
Sound Measurement System										
RPS ID	Manufacturer / Model		Serial Number		Last Lab Verification		Filename		Memory Card ID	
147	Rion-NL-52		386736		19/10/2021		001		✓	
Mic Height	Measurement Interval	Dynamic Range (dB)	Time Weighting		Frequency Weighting		Façade / Freefield		Photo?	
1.5	1ms	25 - 138	F		A		Freefield		✓	
			START				END			
Personnel			SDH				SDH			
Date / time			04/10/2022 13:15				11/10/2022 15:00			
Calibrator	RPS ID		33				33			
	Manufacturer / Model		RION-NC-74				RION-NC-74			
	Serial Number		34472822				34472822			
	Date last verification		27/09/2022				27/09/2022			
	Reference level (dB)		94.0				94.0			
	Meter reading (dB)		94.0				93.9			
Wind speed (m/s) & dir'n Av.			0.4		SE		1.0		S	
Cloud cover (100%= 8 oktas)			8				4			
Temperature (degrees Celsius)			18				15			
Relative Humidity (%)			not taken				not taken			
Likely temp. inversion / Precipitation / Fog / Wet ground / Frozen ground / Snow cover? (tick boxes)			TI	P	F	S	TI	P	F	S
			x	✓	x	x	x	x	x	x
Subjective description / additional details										
Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))										
SLM located on soft ground at the road side between NSR and site.										
Description of sound environment at start of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)										
Dominating source was RTN of nearby road this included HGVs										
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)										
Dominating source was RTN of nearby road this included HGVs										

Location	LT1 - 3178
Photographs of measurement location	
	

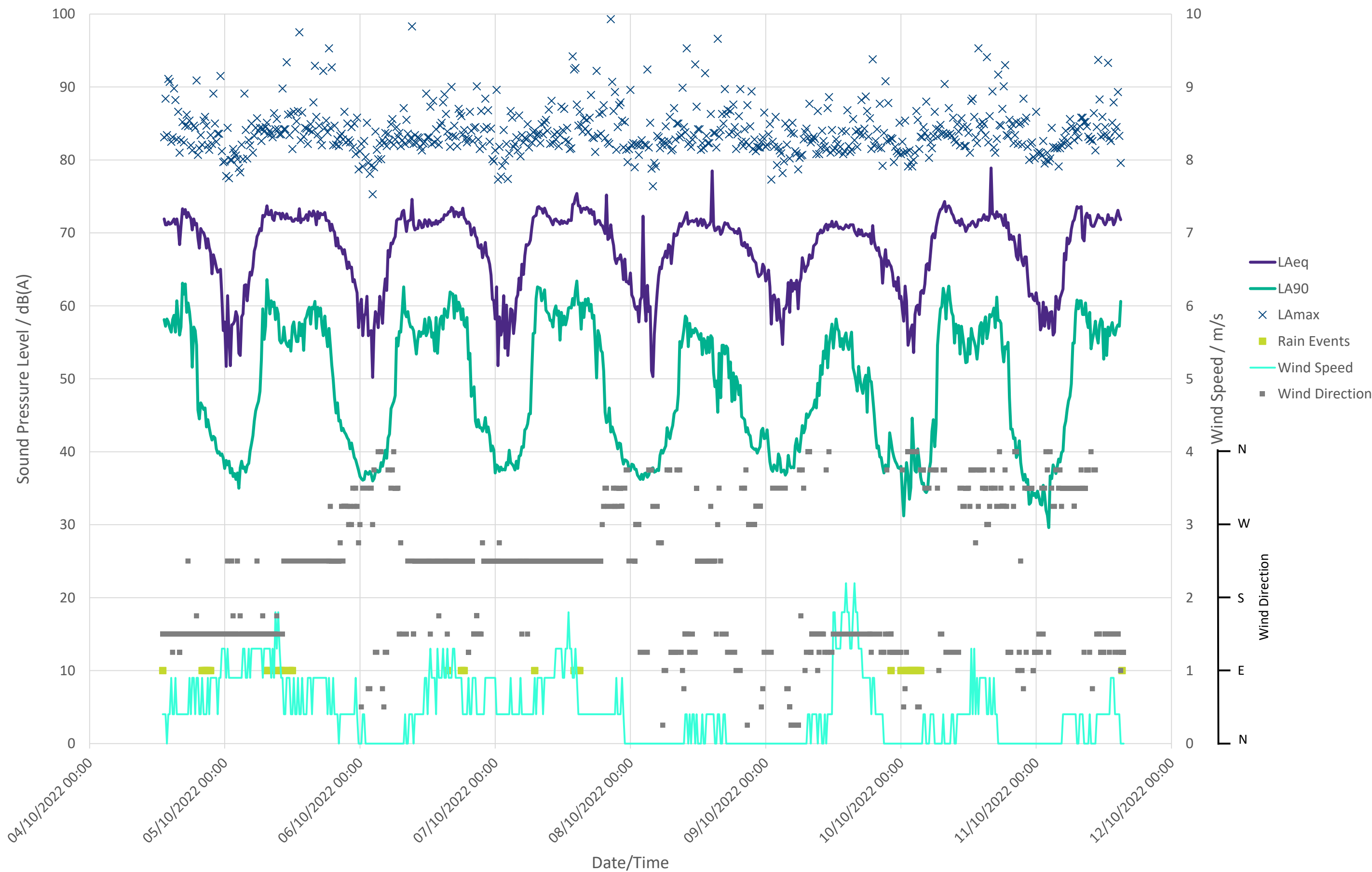
Location			LT2 - 3178							
Purpose of Monitoring			Industrial Noise							
Relevant Guidance / Standard			TAN11 - BS4142							
Sound Measurement System										
RPS ID	Manufacturer / Model		Serial Number		Last Lab Verification		Filename		Memory Card ID	
166	Rion-NL-52		998566		02/03/2022		002		✓	
Mic Height	Measurement Interval	Dynamic Range (dB)	Time Weighting		Frequency Weighting		Façade / Freefield		Photo?	
1.5	1ms	25 - 138	F		A		Freefield		✓	
			START				END			
Personnel			SDH				SDH			
Date / time			04/10/2022 13:30				11/10/2022 14:45			
Calibrator	RPS ID		33				33			
	Manufacturer / Model		RION-NC-74				RION-NC-74			
	Serial Number		34472822				34472822			
	Date last verification		27/09/2022				27/09/2022			
	Reference level (dB)		94.0				94.0			
	Meter reading (dB)		94.0				93.9			
Wind speed (m/s) & dir'n Av.			0.4		SE		1.0		S	
Cloud cover (100%= 8 oktas)			8				4			
Temperature (degrees Celsius)			18				15			
Relative Humidity (%)			not taken				not taken			
Likely temp. inversion / Precipitation / Fog / Wet ground / Frozen ground / Snow cover? (tick boxes)			TI	P	F	S	TI	P	F	S
			x	✓	x	x	x	x	x	x
Subjective description / additional details										
Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))										
SLM located on soft ground at the rear of NSR, chained to fence. The NSR also features a local repair garage										
Description of sound environment at start of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)										
Dominating source was noise from the industril site and radio from local garage.										
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)										
Dominating source was noise from the industril site and radio from local garage.										

Location	LT2 - 3178
Photographs of measurement location	
	

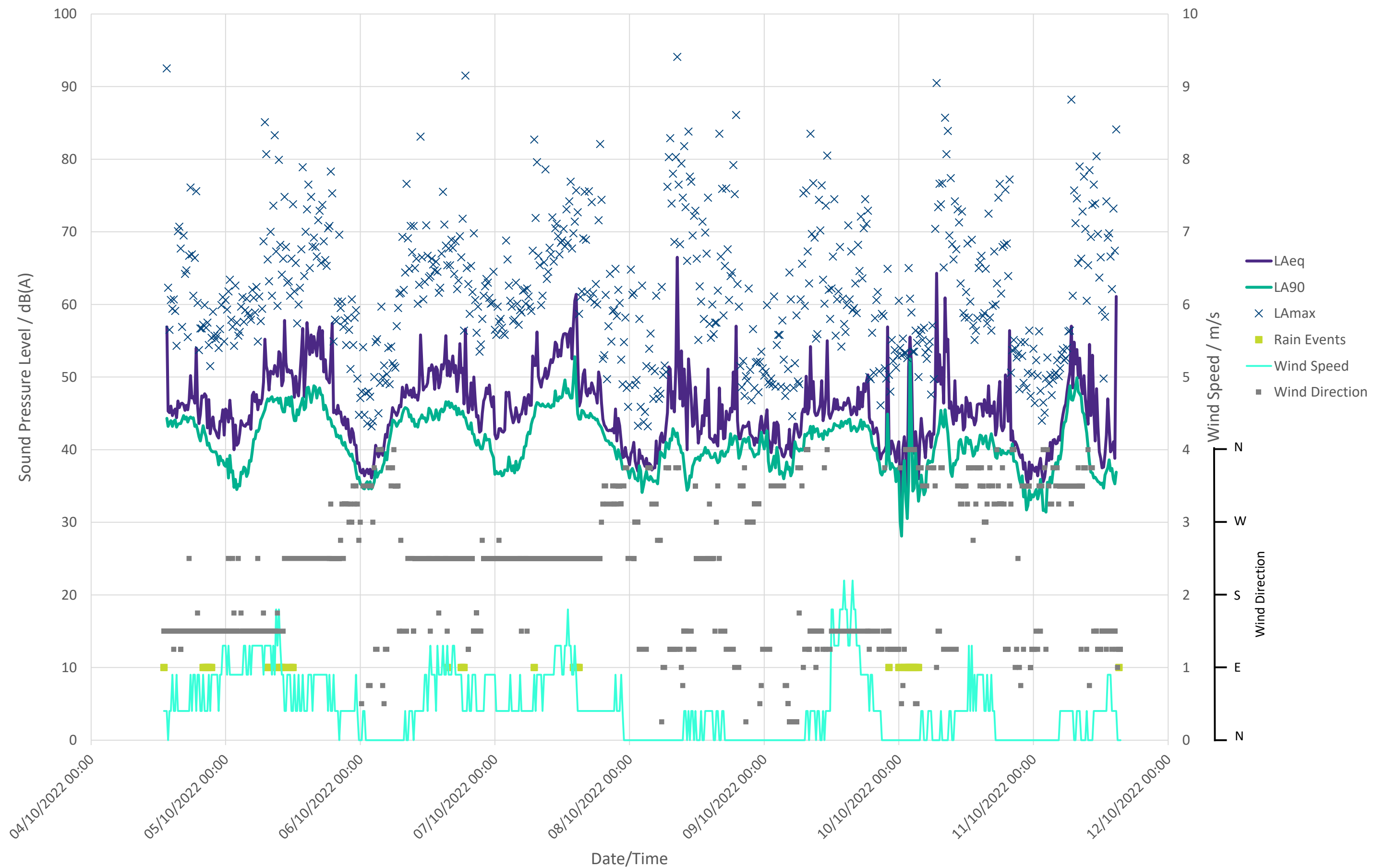
Appendix C

Noise Survey Time History Data

LT1 Time History

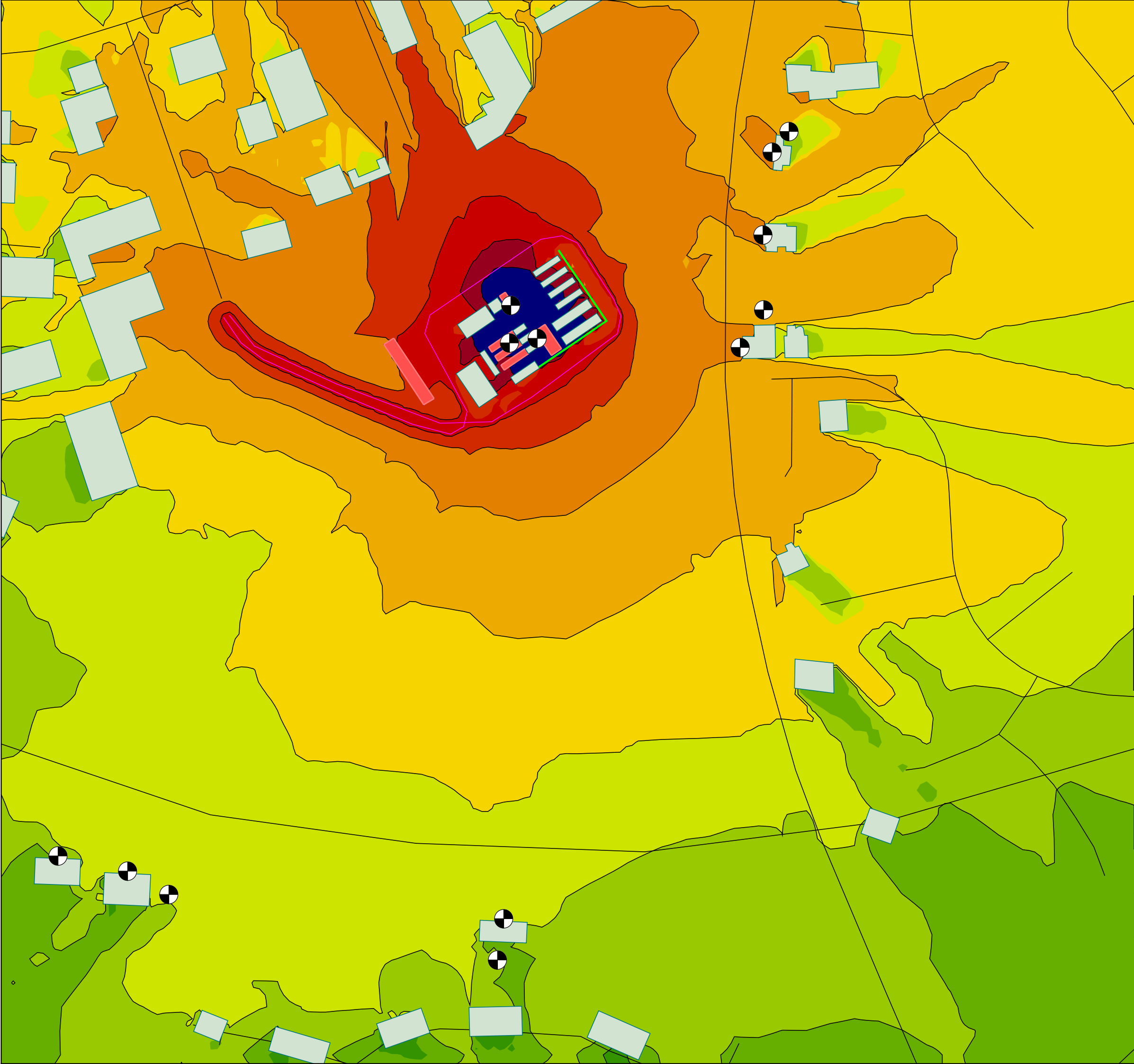


LT2 Time History



Appendix D

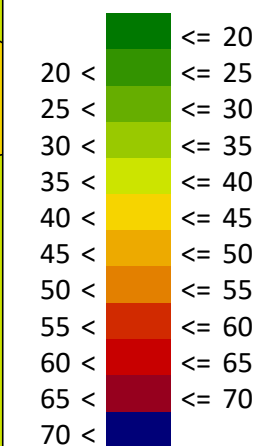
Grid Noise Maps



Key

- Basemap
- Roads
- Existing Dwellings
- Monitoring Location
- Industrial building; Room
- Facade as source
- Base line
- Wall

Daytime Noise Levels (dB L_{Aeq, 16 hrs})



Notes

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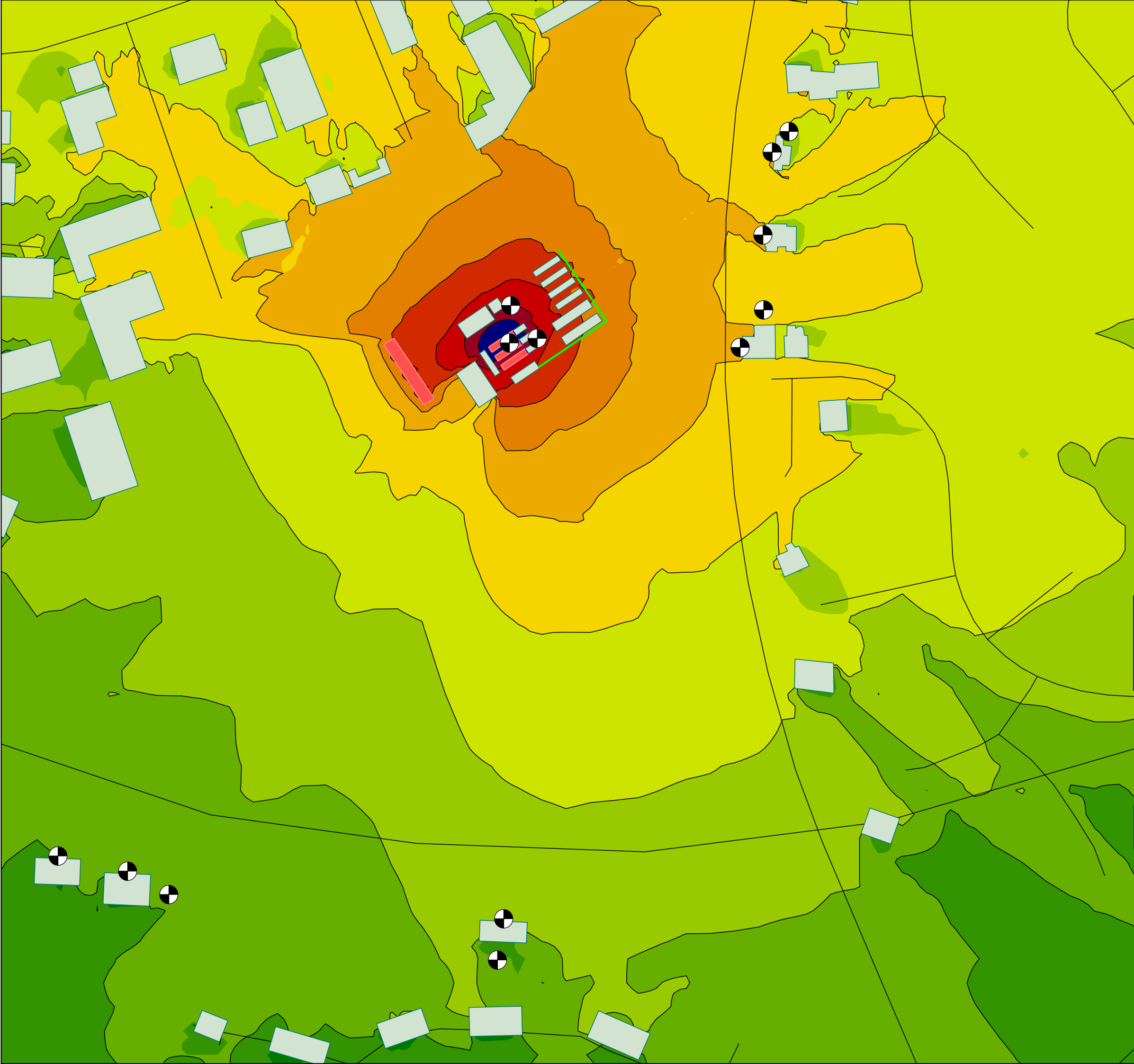
DRG Size A3	Scale 1:1490	Date Drawn 28/03/2023
Drawn by SDH	Checked by	Approved by

Client:
Marubeni Europower Limited

Project:
Marubeni - Hydrogen Center

DRG No:
Figure 1

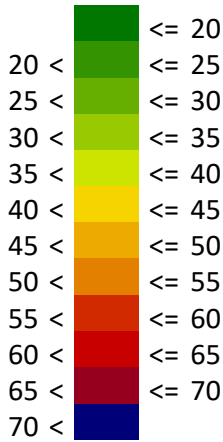
Title:
Daytime Specific Noise Levels @ 1m Height



Key

- Basemap
- Roads
- Existing Dwellings
- Monitoring Location
- Industrial building; Room
- Facade as source
- Base line
- Wall

Nighttime Noise Levels (dB L_{Aeq}, 8 hrs)



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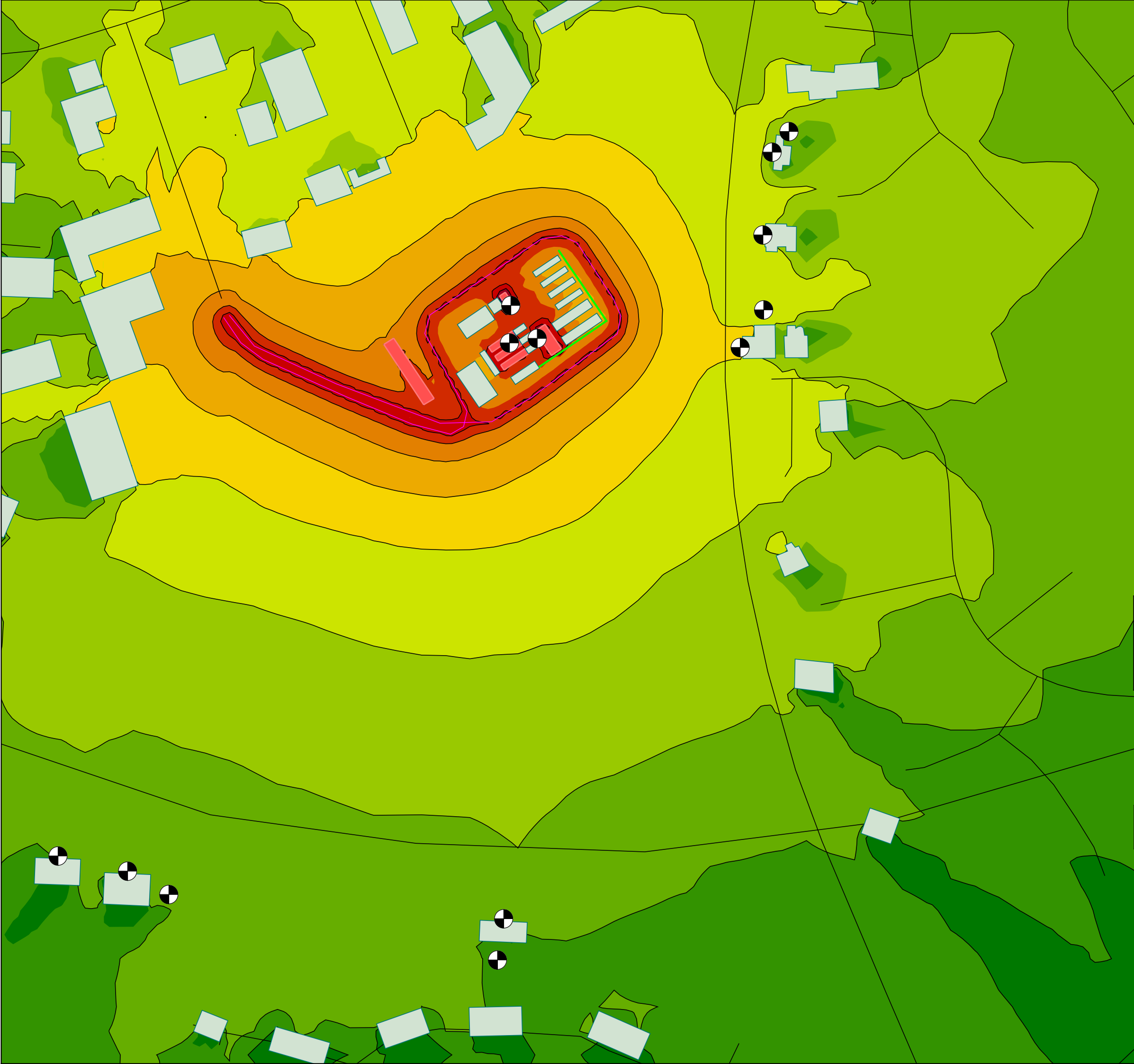
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Figure 2

Title:
Night-time Specific Noise Levels @ 4m Height

Appendix E

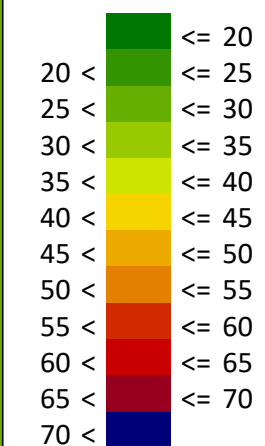
Mitigation Grid Noise Maps



Key

- Basemap
- Roads
- Existing Dwellings
- Monitoring Location
- Industrial building; Room
- Facade as source
- Base line
- Wall

Daytime Noise Levels (dB L_{Aeq, 16 hrs})



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Figure 3

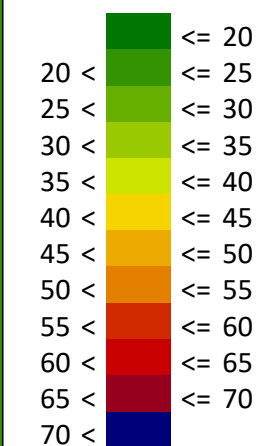
Title:
Daytime Specific Noise Levels @ 1m Height To Achieve
-5dB Below Existing Background Noise Levels



Key

- Basemap
- Roads
- Existing Dwellings
- Monitoring Location
- Industrial building; Room
- Facade as source
- Base line
- Wall

Nighttime Noise Levels (dB L_{Aeq}, 8 hrs)



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Figure 4

Title:
Night-time Specific Noise Levels @ 4m Height To Achieve
-5dB Below Existing Background Noise Levels

Appendix F

Spectral Data Used in Model

Name	Quanta	Source		Height above Ground (m)	Overall Sound Power Level, dBA	Sound Power Level per Octave Band, dB							
		Type	Index			63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Fin Fans	4	Point	L _w	1.5	80	118	116	112	108	107	102	99	88
Compressor	1	Point	L _w	1.5	93	80	80	80	83	86	86	86	93
HV Substation	1	Point	L _w	1.5	90	99	94	91	87	84	81	79	77
Refuelling	3	Point	L _w	1.5	85	80	80	80	83	86	86	86	93
HGV Movements	1	Line	L _w	1	105	119	107	105	102	99	97	92	89

Material/ Element	Applied to	Sound Reduction Index (dB)								
		Broad-band Rw	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Lightweight Cladding	Walls & Roof of HV Substation	30	14	23	23	26	31	31	36	41

Material/ Element	Applied to	Absorption Coefficient							
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Concrete	All internal surfaces	0.02	0.02	0.02	0.02	0.03	0.04	0.04	0.05

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- v Bridgend County Borough Council. Bridgend Local Development Plan 2006-2021. Deposit Plan June 2011
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