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## The Co-operative

Hugh Street,  
Hugh Town,  
Saint Mary's,  
Isles of Scilly

### Plant Noise Impact Assessment

On behalf of



Project Reference: 86738 | Revision: - | Date: 20<sup>th</sup> February 2025

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## Document Information

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For and on behalf of Noise Solutions Ltd				

Revision	Date	Description	Prepared	Reviewed/ Approved

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## **Executive Summary**

Noise Solutions Limited has been appointed to undertake a noise impact assessment of proposed replacement plant to be installed at a Co-operative store at Hugh Street, Saint Mary's, Isles of Scilly.

The assessment shows that noise from the proposed plant will comply with the local authority's usual requirements and should therefore be acceptable.

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## 1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned to undertake a noise impact assessment of proposed replacement plant at the Co-operative store on Hugh Street, St Mary's, Isles of Scilly.
- 1.2. An environmental sound survey has been undertaken to establish the prevailing background sound pressure levels at a location representative of the sound levels outside the nearest noise sensitive receptors to the site.
- 1.3. Plant noise levels have been predicted at the nearest noise-sensitive receptors and assessed against the local authority's usual requirements..
- 1.4. To assist with the understanding of this report a glossary of acoustic terms can be found in [Appendix A](#). An in-depth glossary of acoustic terms can be viewed online at [www.acoustic-glossary.co.uk](http://www.acoustic-glossary.co.uk).

## 2.0 Details of development proposals

- 2.1. It is proposed to replace the existing plant serving the Co-operative store on Hugh Street, St Mary's, Isles of Scilly.
- 2.2. Plant is to comprise two combined gas cooler and compressor packs along with two external air conditioning (AC) condensers. The AC units will be installed within acoustic enclosures. The AC plant will operate only when the store is open; the refrigeration plant will operate at all times but will typically run at reduced duty at night.
- 2.3. A site plan showing the site and surrounding area and the noise monitoring location used in this assessment is presented in [Appendix B](#). A proposed layout is shown in [Appendix D](#).
- 2.4. Manufacturer noise data for the equipment is given in [Appendix E](#).

## 3.0 Nearest noise sensitive receptors

- 3.1. The area surrounding the site is a mixture of commercial and residential properties and is adjacent to a beach.
- 3.2. The nearest noise sensitive properties to the potential noise sources are the flats above the Co-op store (R1). These properties are likely to have full line of sight of the plant area, with the nearest window being around 4m from the plant.
- 3.3. [Appendix B](#) shows the locations of the receptors.

## 4.0 Existing noise climate

4.1. An environmental noise survey was undertaken to establish the typical background sound levels at a location representative of the noise climate outside the façades of the nearest noise sensitive receptors to the proposed plant area during the quietest times at which the plant will operate. Measurements were taken at two locations:

- NMP1 – on the beach behind the store;
- NMP2 – on Thorofare at ground level.

4.2. The results of the environmental sound survey are summarised in Table 1 below. The full details of the survey methodology are presented in [Appendix C](#).

*Table 1 Summary of survey results*

Location	Measurement times	Range of recorded sound pressure levels (dB)			
		L <sub>Aeq</sub> (15mins)	L <sub>Amax</sub> (15mins)	L <sub>A10</sub> (15mins)	L <sub>A90</sub> (15mins)
Daytime (07.00 – 23.00 hours)					
NMP2	11/2/2025 21.00 to 22.00	44-45	63-70	45-46	41-41
NMP1	11/2/2025 22.30 to 23.00	42-43	60-68	44-45	39-39
Night-time (23.00 – 07.00 hours)					
NMP2	12/2/2025 02.00 to 03.15	42-44	53-63	44-45	40-41

4.3. Measurements at NMP2 are broadly similar to those at NMP1 on the beach. Measurements at NMP1 are used for all assessments in order to be maximally robust. 39dBA has therefore been selected to be a robust representation of the background noise level during the daytime period.

4.4. Similarly for the night-time period, 39dBA has been selected to be a robust representation of the background sound level, so as not to give rise to higher limits at night.

## 5.0 Plant noise design criteria

### Council of the Isles of Scilly

5.1. In the absence of specific confirmed criteria, it is proposed to assess noise from the plant against the methodology set out in BS4142:2014+A1:2019.

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## **BS 4142:2014 Methods for rating and assessing industrial and commercial sound**

- 5.2. BS 4142:2014 is intended to be used to assess the likely effects of sound on people residing in nearby dwellings. The scope of BS 4142:2014 includes "sound from fixed plant installations which comprise mechanical and electrical plant and equipment".
- 5.3. The procedure contained in BS 4142:2014 is to quantify the "specific sound level", which is the measured or predicted level of sound from the source in question over a one hour period for the daytime and a 15 minute period for the night-time. Daytime is defined in the standard as 07:00 to 23:00 hours, and night-time as 23:00 to 07:00 hours.
- 5.4. The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for either potentially tonal or impulsive elements. The standard sets out objective methods for determining the presence of tones or impulsive elements, but notes that it is acceptable to subjectively determine these effects.
- 5.5. The penalty for tonal elements is between 0dB and 6dB, and the standard notes: "Subjectively, this can be converted to a 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."
- 5.6. The penalty for impulsive elements is between 0dB and 9dB, and the standard notes: "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."
- 5.7. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:
- Typically, the greater this difference, the greater 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.

- 5.8. The standard does state that "adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."
- 5.9. The standard goes on to note that: "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."
- 5.10. In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

*"An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context."*

- 5.11. BS 4142:2014 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

### Proposed criteria

- 5.12. For design purposes, it is considered appropriate to use the strictest criterion of BS 4142:2014, that the rating level at the nearest residential receptors is no higher than the existing representative background sound level.
- 5.13. The cumulative noise level for the proposed plant at the nearest residential receptors should not therefore exceed the limits shown in Table 2 below:

*Table 2 Proposed plant noise rating level limits at noise sensitive residential receptors*

Period	Cumulative plant rating level, dB(A)
Daytime (07.00 – 23.00 hours)	39
Night-time (23.00 – 07.00 hours)	39

## 6.0 Plant noise impact assessment

- 6.1. Plant noise levels at the nearest noise sensitive receptors have been predicted based on manufacturer's noise data for the proposed equipment. The assessment has taken into consideration distance attenuation and directivity.



- 6.2. The proposed plant is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. All proposed external plant will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. To provide a robust assessment, a 3dB acoustic feature correction as described in BS 4142:2014+A1:2019 for the possible presence of "...characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment..." has been applied.
- 6.3. Table 3 summarises the results of the assessment at the most affected properties. All other nearby receptors benefit from increased distance and / or screening to the plant such that resulting noise levels will be lower than at the receptors considered. The full set of calculations can be found in **Appendix F**.

*Table 3 Guidance on maximum plant noise emission limits*

Receptor	Period	Predicted rating level at receptor, $L_{A,r,Tr}$ dB	Criterion dB, $L_{A,r,Tr}$	Excess, dB
R1	Daytime (07.00 – 23.00 hours)	39	39	0
	Night-time (23.00 – 07.00 hours)	32	39	-7

### Assessment of uncertainties

- 6.4. Where possible uncertainty in this assessment has been minimised by taking the following steps:
- The measurement of the background sound levels was undertaken over a period including the quietest times of the day and night.
  - The sound level meter and calibrator used have a traceable laboratory calibration and the meter was field calibrated before and after the measurements.
  - Uncertainty in the calculated impact has been reduced by the use of a well-established calculation method.
  - Care was taken to ensure that the measurement position was representative of the noise climate outside the nearby residential dwellings and not at a position where higher noise levels are present.

## 7.0 Summary

- 7.1. Noise Solutions Ltd has been commissioned to provide a noise impact assessment of proposed replacement plant to serve the Co-operative store on Hugh Street, St Marys, Isles of Scilly.

- 
- 7.2. An environmental noise survey has been undertaken to establish the existing prevailing noise levels at a location representative of the noise climate outside the nearest noise sensitive receptors to the site.
- 7.3. Plant noise levels have been predicted at the nearest noise-sensitive receptors. The assessment shows that noise from the proposed plant will comply with the local authority's usual requirements and other recognised guidance and should therefore be acceptable

## Appendix A Acoustic terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ( $L_{Aeq,T}$ ).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds $s_1$ and $s_2$ is given by $20 \log_{10} (s_1/s_2)$ . The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$ . The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), $L_{Ax}$	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. $L_{max}$ is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall $L_{eq}$ noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. $L_{10}$ can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. Generally used to describe background noise level.

## Appendix B      Photograph of site showing Receptors and Noise Monitoring Positions



## Appendix C Environmental sound survey

### Details of environmental sound survey

- C.1 Measurements of the existing background and ambient sound levels were undertaken between the times tabulated.
- C.2 The sound level meter was programmed to record the A-weighted  $L_{eq}$ ,  $L_{90}$ ,  $L_{10}$  and  $L_{max}$  noise indices for consecutive fifteen-minute sample periods for the duration of the survey.

### Measurement position

- C.3 The approximate measurement locations are indicated on the plan in [Appendix B](#).
- C.4 In accordance with BS 7445-2:1991 'Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use', the measurements were undertaken under free-field conditions.

### Equipment

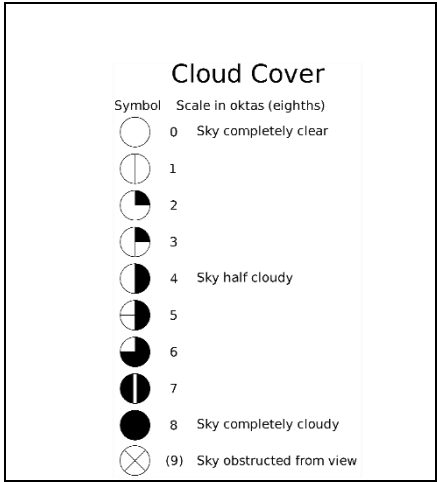
- C.5 Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change ( $\pm 0.2$  dB) in the calibration level was noted.

#### *Environmental noise survey*

Description	Model / serial no.	Calibration date	Calibration certificate no.
Type 1 Sound level meter	Rion NL-52 / 00654035	06/07/2023	TCRT23/1489
Condenser microphone	Rion UC-59 / 14826		
Preamplifier	Rion NH-25 / 87474		
Calibrator	Rion NC-74 / 34235932	09/10/2024	1509847-1

### Weather conditions

- C.6 Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

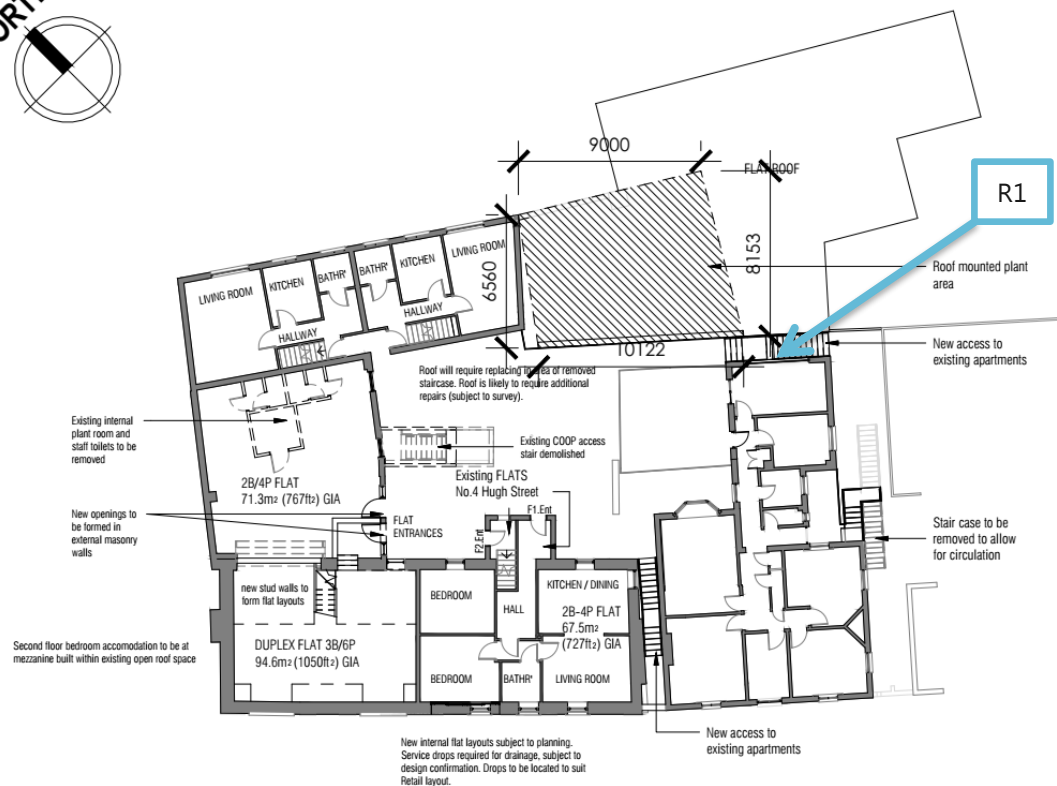
Weather Conditions				
Measurement Location	Date/Time	Description	Beginning of Survey	End of Survey
As indicated on Appendix B	21.00 11/2/2025 - 03.00 12/2/2025	Temperature (°C)	8	8
 <p><b>Cloud Cover</b></p> <p>Symbol    Scale in oktas (eighths)</p> <p>0    Sky completely clear</p> <p>1</p> <p>2</p> <p>3</p> <p>4    Sky half cloudy</p> <p>5</p> <p>6</p> <p>7</p> <p>8    Sky completely cloudy</p> <p>(9)    Sky obstructed from view</p>		Precipitation:	No	No
		Cloud cover (oktas - see guide)	8	0
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	Damp	No
		Wind Speed (m/s)	2	3
		Wind Direction	E	SE
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

## Results

- C.7 The results of the environmental survey are considered to be representative of the background sound pressure levels at the façades of the nearest noise sensitive receptors during the quietest times at which the plant will operate.
- C.8 The predominant noise sources noted throughout the surveys were waves breaking at close range on the beach and, at a similar level, from large distances outside the harbour area.



## Appendix D Proposed development plans



Proposed first floor plan @ 1 : 200



SCHEME INFORMATION NOTES:  
Stage: Stage 1  
Acquisition Exec: JAMES CARTER  
Project Manager: JACK MIDDLETON  
Red Edge Site Area: 0.096Ha (Title Plan)  
Build Type: New Build

Developer Shell  
Non-retail Conversion  
In-demise Extension  
Out-of-demise Extension  
Fit Out

Proposed delivery pull distance: n/a - Fork lift  
Proposed shop front length: 10.8m

Store Type: Pop-In  
On the Go  
Everyday Convenience  
Everyday Convenience+

Development Type: Existing Retail  
Standalone  
Mixed with other Retail  
Mixed with Commercial  
Mixed with Residential

Locate: Retail  
Commercial  
Residential  
Industrial

EXISTING AREAS:  
Sales Floor Gross internal Area = 2,860sqft  
Back of House Gross internal Area = 4,227sqft  
Gross internal Area = 7,078sqft

PROPOSED AREAS:  
Sales Floor Gross internal Area = 4,757sqft  
Back of House Gross internal Area = 3,800sqft  
Proposed extension Gross internal Area = 1,479sqft  
Total Gross internal Area = 8,557sqft  
Sales / B.O.H ratio as % of GIA = 55/45  
Expected Format Sales / B.O.H ratio % = 67/33

PARKING ALLOCATION:  
Shared Customer Spaces = N/A  
Allocated Customer Spaces = N/A  
Full Accessible Spaces = N/A  
Parent and Child Spaces = N/A  
TOTAL Spaces = N/A

Cooperative Sales Area  
Cooperative BOH Area  
Proposed Plant Area

RISK RATINGS:  
DELIVERIES: RAG

Acceptability subject to TCG distribution review

PLANT SOLUTION:

Acceptability subject to engineering review

Location subject to Acoustic requirements

MEANS OF ESCAPE:

Adequate number / location MOE

PLANNING - Consents required:

Building Conservation Shop front Listed Building Signage TPO's ATM

Plant Front Satellite

STRUCTURAL SOLUTIONS

CHECKLIST OF ABNORMAL ITEMS

Refer to abnormal checklist produced by PH.

Project Address

4 Hugh Street, St Mary's  
Isles of Scilly, TR21 0LL

Drawing Title

STAGE 1: FEASIBILITY (PALLET OPTION)

PROPOSED FIRST FLOOR LAYOUT

Date Scale Drawn Checked Revision

16/10/2024 1:200 @ A3 MF AA A

6704 (FS)109

Refrigeration Pack Data										Model: Series Low Series										Refrigerant	
Part No	Comment	Rev	Material	WPI	Capacity	WPI Unit	Design Comment	ISA	ISA Unit	Power Input	WPI/ISA Unit	ISA Ratio	WPI Ratio	WPI Unit	Revised	Current Item #	Revised				
HR	12/20/2000 (Standard)	Rev	Copper	4°C	1.00	0.01	TRC	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
JA	12/20/2000 (Standard)	Rev	Copper	4°C	1.00	0.01	TRC	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
TOTAL, Current Item #																					

Refrigeration Gas Cooler										Refrigerant	
Part No	Model	Temp	Material	WPI	Capacity	WPI Unit	Design Comment	ISA	ISA Unit	Power Input	WPI/ISA Unit
DAI DCS	CPH01-2, CDAH01-2, PPH01-2	Rev	Copper & Conduits	0.01	0.01	0.01	Cooling	4000/1000/0000	TRC	2 x 1/2 in	0.00

Air Conditioning - Outdoor										Refrigerant		R22	
ACU	Model	Power/Part	Type	Location	WPI Rating (in)	Power Rating	Part No	WPI/ISA Unit	WPI Unit	Revised	Current Item #	Revised	WPI Unit
ACU1	Microbus PHL2000	Condensing Unit	Not Part/Part No		35	004415000	23	0.00	0.00	0.00	0.00	0.00	0.00
ACU2	Microbus PHL2000	Condensing Unit	Not Part/Part No		35	004415000	23	0.00	0.00	0.00	0.00	0.00	0.00
ACU3	Microbus PHL2000	Condensing Unit	Not Part/Part No		35	004415000	23	0.00	0.00	0.00	0.00	0.00	0.00

- [illegible]



## Appendix E      Manufacturer plant noise levels

Plant Item	Make/Model	Quantity	Operating period	Sound pressure level (dBA)
AC1-2	Mitsubishi PUZ-ZM250	2	Daytime only	62dBA at 1m
DA1-2 Gas cooler; compressor pack	GFHD1.2-126AMg-FN063.H3; Copeland compressors	2	24hr	23dBA at 10m

## Appendix F Calculations

### Receptor R1 – Daytime

Plant	Plant noise level at source		DISTANCE		Directivity (dB)	Attenuation (dB)	BS 4142:2014 feature correction	Plant rating noise level at receptor (dBA)
	L <sub>p</sub> (dBA)	Distance (m)	Distance (m)	Correction (dB)				
DA1	23	10	9	1	0	0	3	27
DA2	23	10	6.5	4	0	0	3	30
AC1	62	1	3	-10	0	-18*	3	37
AC2	62	1	9	-19	0	-18*	3	28
							<b>Cumulative</b>	<b>39</b>

*\*AC units in acoustic enclosures giving minimum reduction of 18dB*

### Receptor R1 – Night-time

Plant	Plant noise level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS 4142:2014 feature correction	Plant rating noise level at receptor (dBA)
	L <sub>p</sub> (dBA)	Distance (m)	Distance (m)	Correction (dB)				
DA1	23	10	9	1	0	0	3	27
DA2	23	10	6.5	4	0	0	3	30
							<b>Cumulative</b>	<b>32</b>