Sainsbury's Local
14 Eagle Parade
Buxton
SK17 6EQ

Plant Noise
Impact Assessment Report

On behalf of

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1.0 Introduction

1.1. Noise Solutions Ltd (NSL) has been commissioned by AB Group to provide a noise impact assessment for new plant serving an existing Sainsbury's Local store located along Eagle Parade in Buxton.

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. Cumulative plant noise emission levels for the proposed plant have been predicted at the most affected 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.

2.0 Details of development proposals

2.1. The Sainsbury's Local store occupies a two-storey building located along Eagle Parade in Buxton. New air conditioning (AC) and refrigeration plant will replace existing plant on the roof of the building.

2.2. The AC unit 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**.

3.0 Nearest noise-sensitive receptors

3.1. The area surrounding the site is mixed residential and commercial in nature. The closest residential dwellings are in Hartington Gardens (Reference R1) behind the store approximately 50m east of the proposed plant and the properties along Fountain Street (Reference R2) approximately 14m south of the plant. The residential dwellings at R2 are screened from the plant by the commercial building between the store and the residential properties.

4.0 Existing noise climate

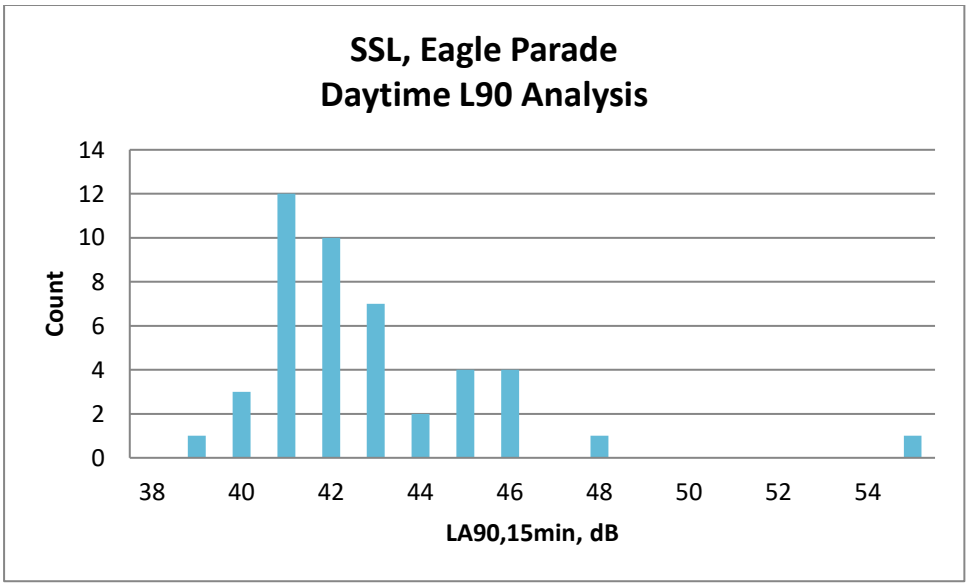
4.1. An environmental noise survey was undertaken to establish the typical background sound levels at a location representative of the noise climate outside the façades of the nearest noise sensitive receptors to the proposed plant area during the quietest times at which the plant will operate.

4.2. The results of the environmental sound survey are summarised in Table 1 below. The full set of measurement results and details of the survey methodology are presented in **Appendix C**.

Table 1 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)			
	$L_{Aeq(15mins)}$	$L_{Amax(15mins)}$	$L_{A10(15mins)}$	$L_{A90(15mins)}$
Daytime (07.00 – 23.00 hours)	41-61	50-77	43-64	39-55
Night-time (23.00 – 07.00 hours)	40-48	49-69	42-50	38-44

Figure 1 Histogram of daytime L_{A90} background sound pressure levels



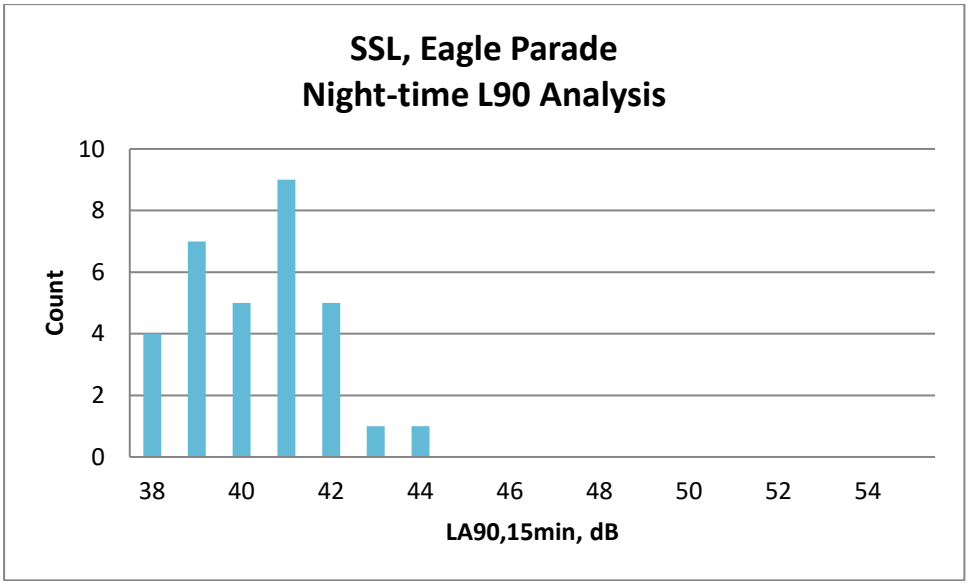
4.3. Further statistical analysis has been carried out on the data; the mean, modal and median values are shown in Table 2 below.

Table 2 Statistical analysis of $L_{A90,15min}$ levels during the daytime period

dB, L_{A90} daytime period	
mean	43
modal	41
median	42

4.4. From the histogram analysis, 40dB has been selected to be a robust representation of the background noise level during the daytime period.

Figure 2 Histogram of night-time L_{A90} background sound pressure levels



4.5. Further statistical analysis has been carried out on the data; the mean, modal and median values are shown in Table 3 below.

Table 3 Statistical analysis of $L_{A90,15min}$ levels during the night-time period

dB, L_{A90} night-time period	
mean	40
modal	41
median	40

4.6. Again, from the histogram analysis, 39dB has been selected to be a robust representation of the background sound level during the night-time period.

4.7. Therefore, the following values are considered to be the lowest existing background sound pressure levels at nearby noise sensitive premises:

- 40dB L_{A90} during the daytime period; and
- 39dB L_{A90} during the night-time period.

5.0 Plant noise design criteria

National Planning Policy Framework

5.1. A new edition of NPPF was published in July 2021 and came into effect immediately. The original National Planning Policy Framework (NPPF[1]) was published in March 2012, with revisions in July 2018 and February 2019 - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The 2021 revised edition contains no new directions or guidance with respect to noise, and hence, all previous references remain extant. The paragraph references quoted below relate to the July 2021 edition.

5.2. Paragraph 174 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by (amongst others) *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land stability."*

5.3. The NPPF goes on to state in Paragraph 185:

" planning policies and decisions should ...

a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development, - and avoid noise giving rise to significant adverse impacts on health and quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason ...

5.4. The NPPF document does not refer to any other documents or British Standards regarding noise other than the Noise Policy Statement for England (NPSE[2]).

5.5. Paragraph 2 of the NPPF states that *"planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise."*

5.6. Paragraph 12 of the NPPF states that *"The presumption in favour of sustainable development does not change the statutory status of the development plan as the starting point for decision making. Where a planning application conflicts with an up-to-date development plan (including any neighbourhood plans that form part of the development plan), permission should not usually be granted. Local planning authorities may take decisions that depart from an up-to-date development plan, but only if material considerations in a particular case indicate that the plan should not be followed".*

[1] National Planning Policy Framework, DCLG, March 2012
[2] Noise Policy Statement for England, DEFRA, March 2010

5.7. Paragraph 119 states that *"Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land"*.

High Peak Borough Council

5.8. An online review of planning applications with the High Peak Borough Council shows that they generally require noise emissions from fixed plant to be *"low impact"* according to BS 4142:2014.

BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

5.9. BS 4142:2014+A1:2019 is intended to be used to assess the likely effects of sound on people residing in nearby dwellings. The scope of BS 4142:2014+A1:2019 includes *"sound from fixed plant installations which comprise mechanical and electrical plant and equipment"*.

5.10. The procedure contained in BS 4142:2014+A1:2019 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.

5.11. 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.

5.12. 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."*

5.13. 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."*

5.14. 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.*

5.15. 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.*"

5.16. 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."*

5.17. 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."

5.18. BS 4142:2014+A1:2019 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.

Summary of criteria

5.19. In order to comply with the typical council condition, the cumulative plant noise level of proposed plant should be controlled to a level that does not exceed the representative L_{A90} background sound level at the nearest residential property. This would result in, at worst, a 'low impact' according to BS 4142:2014A1:2019 (depending on the context) and therefore avoid any adverse impact.

5.20. The cumulative noise level for the proposed plant at the nearest residential windows should not therefore exceed the limits shown in the table below:

Table 4 Proposed plant sound emissions level limits at nearest residential receptors

Receptor	Period	Plant rating level (dB $L_{Ar,Tr}$)
Residential	Daytime (07.00 – 23.00 hours)	40
	Night-time (23.00 – 07.00 hours)	39

6.0 Plant noise impact assessment

6.1. The cumulative plant noise level at the most affected noise sensitive receptor has been predicted based on manufacturer's noise data for the proposed equipment. The assessment has taken into consideration distance attenuation, screening, directivity and reflections.

6.2. It should be noted that the proposed plant is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. All proposed plant will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. In order to be robust, however, a +3dB feature correction has been applied to the noise level predictions as advised in 4142:2014+A1:2019.

6.3. Table 5 summarises the results of the assessment at the most affected properties. All other nearby receptors benefit from increased distance/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 E**:

Table 5 Assessment of predicted rating levels at the nearest noise sensitive receptors

Receptor	Period	Predicted ratinglevel at receptor, L_{Aeq} (dB)	Criterion (dB)	Difference
R1	Daytime (07.00 - 23.00 hours)	30	40	-10
	Night-time (23.00 - 07.00 hours)	19	39	-20
R2	Daytime (07.00 - 23.00 hours)	31	40	-9
	Night-time (23.00 - 07.00 hours)	20	39	-19

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 (NSL) has been commissioned by AB Group to provide a noise impact assessment for new plant serving an existing Sainsbury's Local store located along Eagle Parade in Buxton.

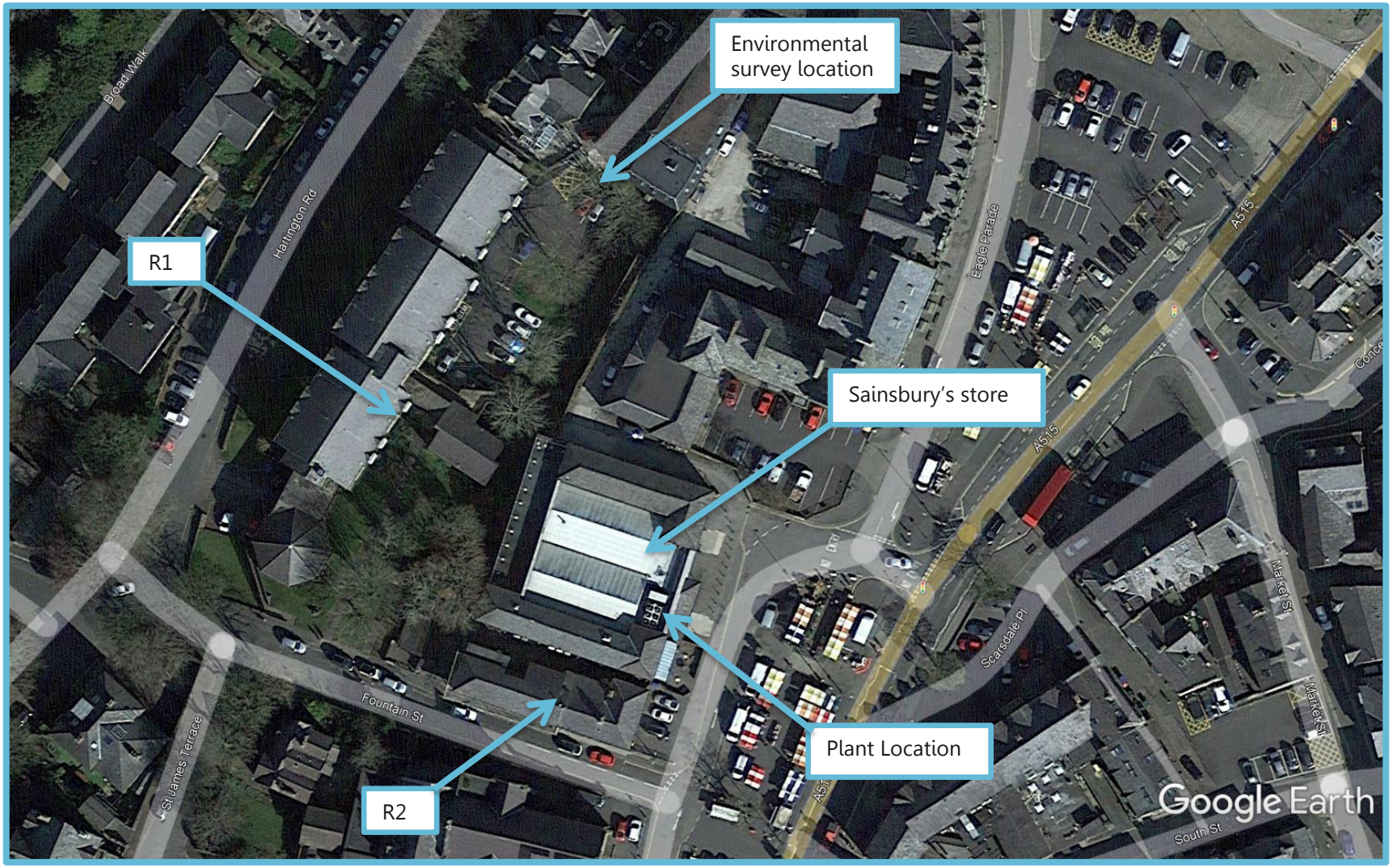
7.2. An environmental noise survey has been undertaken to establish the existing prevailing noise levels at a location representative of the noise climate outside the nearest noise sensitive receptors to the proposed site.

7.3. The cumulative plant noise emission levels for the proposed plant have been predicted at the most affect noise sensitive receptor locations and assessed taking into consideration the typical requirements of High Peak Borough Council. Therefore, the plant proposals should not be a reason for refusal of planning permission.

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 s1 and s2 is given by 20 $\log_{10}$ (s1/s2). 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 20μPa. 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 areas of interest



Appendix C Environmental sound survey

Details of environmental sound survey

C.1 Measurements of the existing background sound levels were undertaken between 14.30 hours on Thursday 27th October and 09.45 hours on Friday 28th October 2022.

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 representative measurement position was located on a lamp post along Eagle Street. This location is approximately representative of the levels of road traffic noise at the closest receptor. The approximate location of the microphone is 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

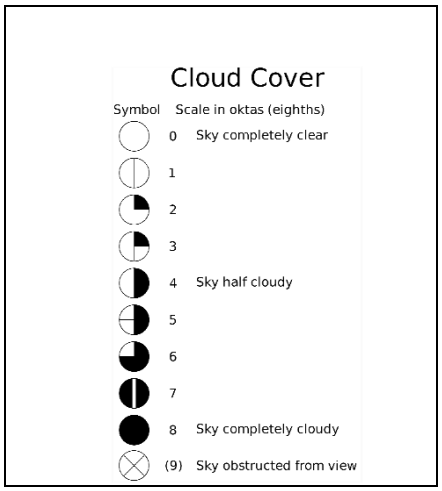
C.5 Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change (+/-0.2 dB) in the calibration level was noted.

Environmental noise survey

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 971A / 124655	26/07/2022	Factory conformation certificate
Condenser microphone	ACO Pacific 7152 / 84710		
Preamplifier	Svantek SV18A / 126200		
Calibrator	Svantek SV33B / 125706	09/09/2022	Factory conformation certificate

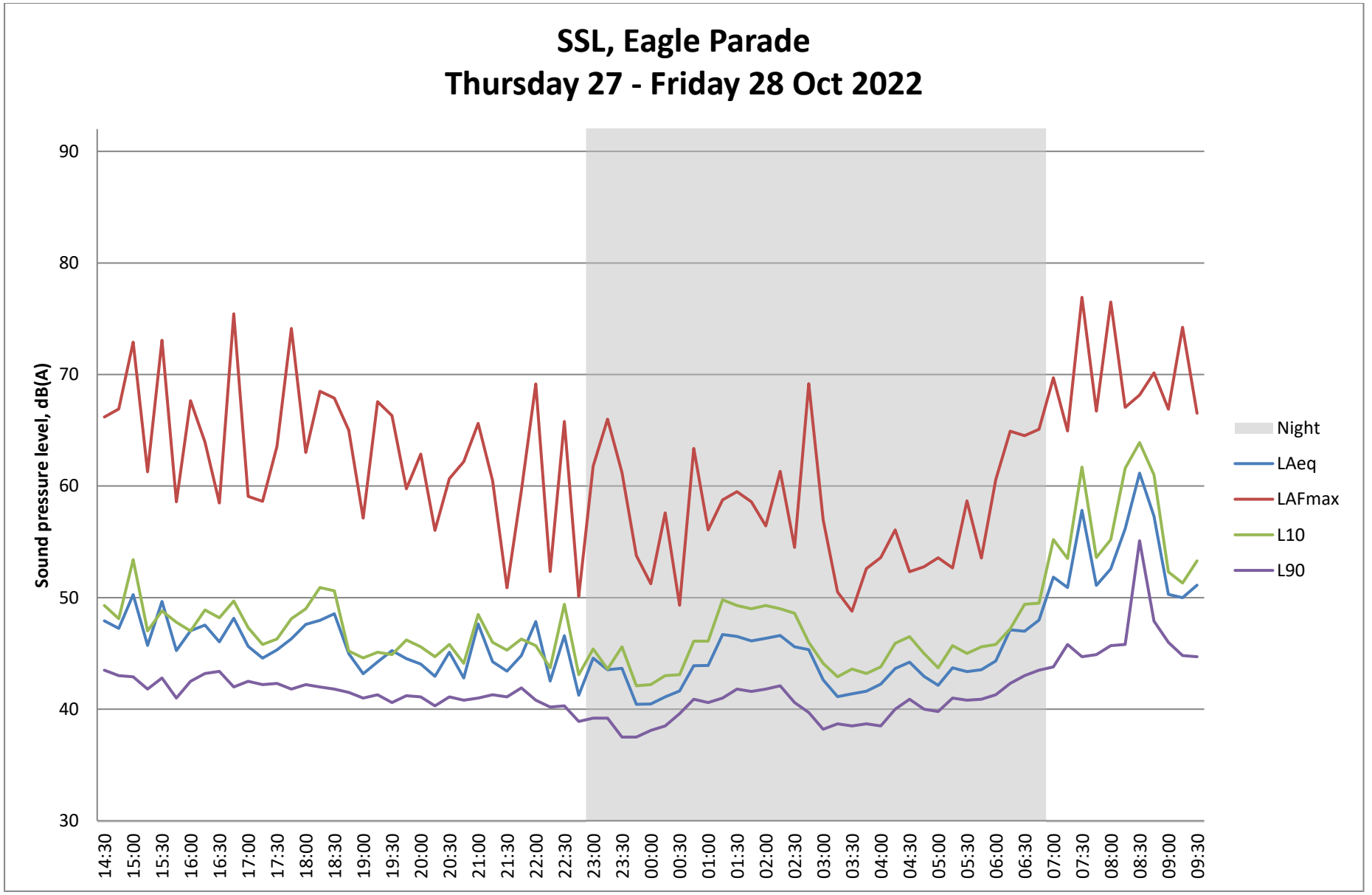
Weather conditions

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	14.30 27/10/22 - 09.45 28/10/22	Temperature (°C)	14	13
		Precipitation:	Yes	Yes
		Cloud cover (oktas - see guide)	8	8
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	Yes	Yes
		Wind Speed (m/s)	-	2
		Wind Direction	-	North easterly
		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. The predominant noise source affecting the area was local traffic. The results of the survey are presented in a time history graph overleaf.


SSL, Eagle Parade
Thursday 27 - Friday 28 Oct 2022
Sound pressure level, dB(A)
90
80
70
60
50
40
30
14:30
15:00
15:30
16:00
16:30
17:00
17:30
18:00
18:30
19:00
19:30
20:00
20:30
21:00
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02:30
03:00
03:30
04:00
04:30
05:00
05:30
06:00
06:30
07:00
07:30
08:00
08:30
09:00
09:30
Night
LAeq
LAFmax
L10
L90

Appendix D Plant information and manufacturer published sound pressure levels

Plant Item	Make/Model	Quantity	Sound pressure level (dBA)
Gas cooler	Kelvion/GF-MD102G3H-091M-AMHE-10FPI	1	27 at 10m
AC1-3	Mitsubishi/PUZ-ZM140YKA	3	52 at 1m (each)
AC4	Mitsubishi/PUZ-ZM35VKA	1	46 at 1m (each)

Appendix E Noise level predictions

Receptor R1 daytime

Plant	Maximum plant noise level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS4142 feature correction (dB)	Plant rating noise level at receptor (dBA)
	L_p (dBA)	Distance (m)	Distance (m)	Correction (dB)				
Gas cooler	27	10	50	-14	+3	0	+3	19
AC1	52	1	50	-34	+3	0	+3	24
AC2	52	1	50	-34	+3	0	+3	24
AC3	52	1	50	-34	+3	0	+3	24
AC4	46	1	50	-34	+3	0	+3	18
	Cumulative rating level (day and night)							**30**

Receptor R1 night-time

Plant	Maximum plant noise level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS4142 feature correction (dB)	Plant rating noise level at receptor (dBA)
	L_p (dBA)	Distance (m)	Distance (m)	Correction (dB)				
Gas cooler	27	10	50	-14	+3	0	+3	19
	Cumulative rating level (day and night)							**19**

Receptor R2 daytime

Plant	Maximum plant noise level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS4142 feature correction (dB)	Plant rating noise level at receptor (dBA)
	L_p (dBA)	Distance (m)	Distance (m)	Correction (dB)				
Gas cooler	27	10	14	-3	+3	-10	+3	20
AC1	52	1	14	-23	+3	-10	+3	25
AC2	52	1	14	-23	+3	-10	+3	25
AC3	52	1	14	-23	+3	-10	+3	25
AC4	46	1	14	-23	+3	-10	+3	19
	Cumulative rating level (day and night)							**31**

Receptor R1 night-time

Plant	Maximum plant noise level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS4142 feature correction (dB)	Plant rating noise level at receptor (dBA)
	L_p (dBA)	Distance (m)	Distance (m)	Correction (dB)				
Gas cooler	27	10	14	-3	+3	-10	+3	20
	Cumulative rating level (day and night)							**20**

Appendix F Plant layout

