

Sainsbury's Superstore

Shripney Road
Bognor Regis
PO22 9FB

Plant Noise Impact Assessment

On behalf of



Project Reference: 89002 | Revision: 00 | Date: 17th December 2019

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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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1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by AB Group to undertake a noise impact assessment for new external plant serving an existing Sainsbury's Superstore store located along Shripney Road in Bognor Regis.
- 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 receptor and assessed using the typical requirements of Arun District Council.
- 1.4. A glossary of acoustic terminology is given 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 Superstore occupies a dedicated building located along Shripney Road. It is understood that replacement refrigeration plant will be installed in place of the existing plant above the delivery bay along the southern elevation of the building.
- 2.2. The proposed refrigeration plant will operate continuously 24 hours each day.
- 2.3. [Appendix C](#) contains a table with the manufacturer's published sound pressure levels for the proposed plant.

3.0 Nearest noise sensitive receptors

- 3.1. The area immediately surrounding the site is commercial in nature, with residential properties at a greater distance. The nearest noise sensitive properties are the residential dwellings (Reference R1) located along Whitfield Close, approximately 77m from the nearest plant item. The residential properties along Whitfield Close are screened from the plant by the Sainsbury's Superstore building envelope.
- 3.2. An aerial photograph showing the site and surrounding area, the nearest noise sensitive properties and noise monitoring location used in this assessment is presented in [Appendix B](#).

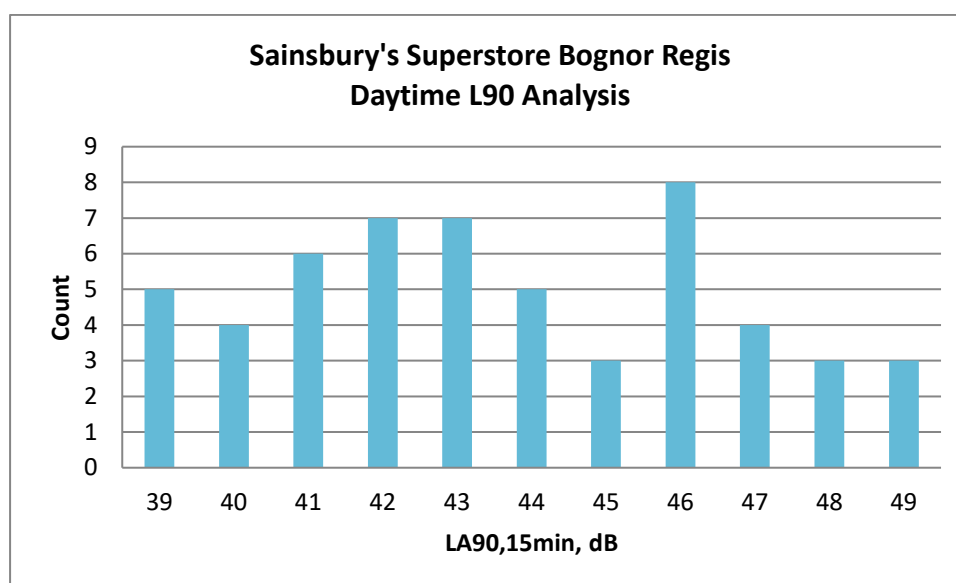
4.0 Existing noise climate

- 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 D](#).

Table 1 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)			
	L _{Aeq} (15mins)	L _{AFmax} (15min)	L _{A10} (15mins)	L _{A90} (15mins)
Daytime (07.00 – 23.00 hours)	43-54	55-79	44-55	39-49
Night-time (23.00 – 07.00 hours)	35-51	46-69	37-56	33-45

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



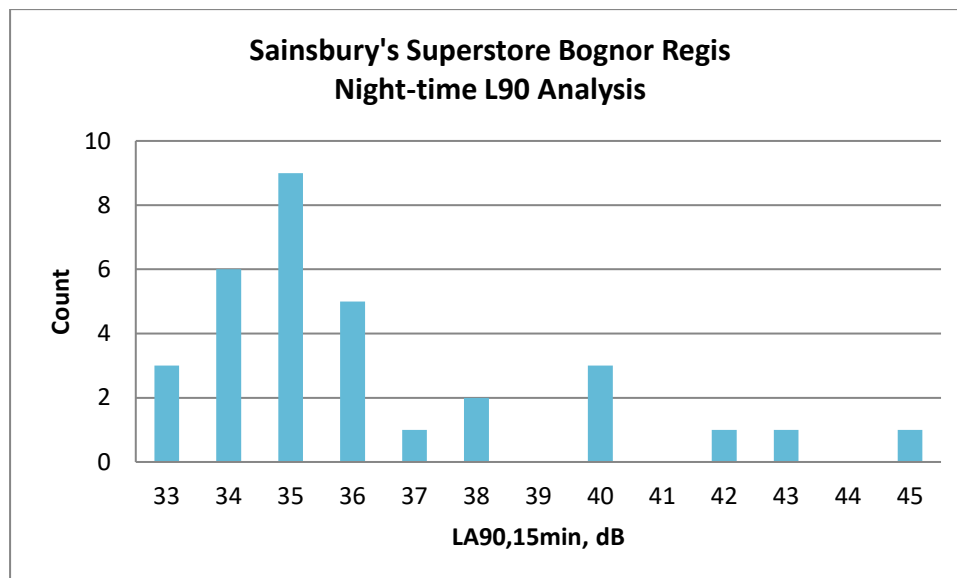
- 4.3. Further statistical analysis has been carried out on the data, and the mean and median values are shown in Table 2 below.

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

dB, L _{A90} daytime period	
Mean	44
Mode	46
Median	43

- 4.4. From the histogram analysis, 41dB 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 and the mean 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	36
Mode	35
Median	35

- 4.6. Again from the histogram analysis, 34dB has been chosen to be representative of the background sound level during the night-time period.
- 4.7. Therefore, the following values are considered representative of the existing background sound pressure levels at nearby noise sensitive premises:
- 41dB L_{A90} during the daytime period; and
 - 34dB 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 February 2019 and came into effect immediately. The original National Planning Policy Framework (NPPF¹) was published in March 2012, with a revision in July 2018 - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The 2019 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 February 2019 edition.
- 5.2. Paragraph 170 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 180:
- "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 (NPSE²).
- 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 117 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".*

Arun District Council / Planning Noise Advice Document: Sussex 2015

- 5.8. The Planning Noise Advice Document for Sussex, which has been adopted by Arun District Council, contains the following paragraph in relation to Industrial and Commercial Noise Sources.

The starting point for designing any industrial/ commercial development should be to minimise noise "as far as reasonably practicable". The rating level of the plant/process, when measured in accordance with BS4142:2014, should, where practicable, be no greater than the existing background levels when measured in accordance with BS4142:2014. There may be instances, for specific sites, where a rating level below background is deemed appropriate. This can be determined through prior discussion with the Local Planning Authority or Local Environmental Health Department. For example, a rating level of 10 dBA below background may be required in certain instances if there are specific concerns such as the potential for noise creep. It is considered that meeting these criteria would avoid adverse noise impacts, in the interests of ensuring a good standard of amenity and protecting human health. Where these criteria are not attainable, the noise report should explain why, and how best practicable means will be implemented to control noise in order to satisfy the LPA that the development is acceptable.

- 5.9. Since the proposed plant will replace the existing, there is no potential for noise creep and therefore meeting the normal criteria would be appropriate.

Summary of criteria

- 5.10. It is proposed that the plant sound pressure level is no higher than the existing representative background sound pressure level at the nearest residential premises. Noise from the new plant should therefore not exceed the limits shown in the table below:

Table 4 Plant noise emissions limits at receptor

Receptor	Period	Cumulative plant sound pressure level, dB(A)
R1 (Residential)	Daytime (07.00 – 23.00 hours)	41
	Night-time (23.00 – 07.00 hours)	34

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 existing and proposed equipment. The assessment has taken into consideration distance attenuation and directivity.
- 6.2. The predictions have been based on all plant operating at maximum duty during both the daytime and night-time periods.
- 6.3. The predictions are inclusive of 5dB sound reduction due to screening from the building envelope between the proposed plant and the receptor at R1.
- 6.4. It should be noted that all proposed plant is high-quality and no impulsive characteristics are anticipated provided the equipment is well maintained. All plant items are inverter driven, which means the fans gently ramp to cope with system demands. In any case, in order to be robust, a +3dB feature correction has been applied to noise level predictions at residential receptors.
- 6.5. Table 5, below, summarises the cumulative sound pressure levels of the proposed external plant at the nearest noise-sensitive windows. All other nearby receptors benefit from increased distance/screening to the plant. The full set of calculations can be found in [Appendix E](#).

Table 5 Assessment of noise levels at nearby receptor due to proposed plant

Receptor	Period	Predicted plant rating level at receptor, LAeq (dB)	Existing background sound level (dB)	Difference (dB)
R1	Daytime period (07.00 – 23.00 hours)	34	41	-7
	Night-time period (23.00 – 07.00 hours)	34	34	0

- 6.6. The above assessment demonstrates that cumulative plant noise levels will be at or below the proposed noise limits at the nearest residential properties.

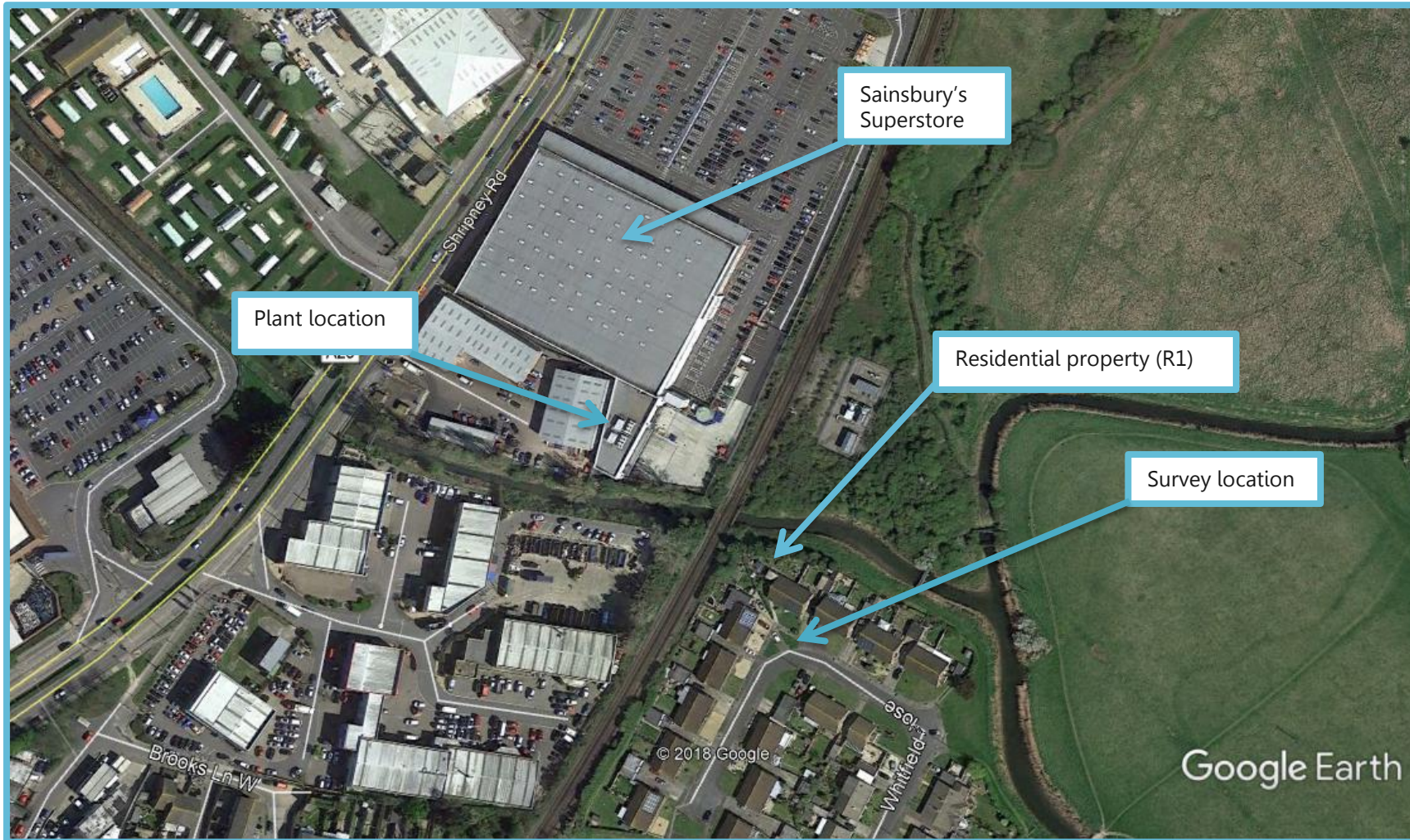
7.0 Summary

- 7.1. Noise Solutions Ltd (NSL) has been commissioned by AB Group to undertake a noise impact assessment for new external plant serving an existing Sainsbury's Superstore store located along Shripney Road in Bognor Regis.
- 7.2. 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.
- 7.3. Cumulative plant noise emission levels for the proposed plant have been predicted at the most affected noise sensitive receptor and assessed using the typical requirements of Arun District Council.
- 7.4. The assessment has demonstrated compliance with national and local policies. Therefore, noise from the 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 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 that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Photograph of site showing areas of interest



Appendix C Manufacturer plant noise emissions

Proposed plant

Plant Item	Make/Model	Quantity	Sound pressure level (dBA)
Gas cooler	Kelvion/GF-PB204G4H-091M-AMHE-10FPI	2	48dB at 10m

Appendix D Environmental sound survey

Details of sound surveys

- D.1 Measurements of the existing background sound levels were undertaken between 13.15 hours on Tuesday 3rd December and 10.45 hours on Wednesday 4th December 2019.
- D.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 15-minute sample periods for the duration of the noise survey.

Measurement position

- D.3 The sound level meter was positioned along Whitfield Close near to the closest residential receptor (location indicated on the site plan in [Appendix B](#)). 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

- D.4 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	Rion NL-31 / 00593603	05/11/2019	TCRT18/1382
Condenser microphone	Rion UC-53A / 316131		
Preamplifier	Rion NH-21 / 30366		
Calibrator	Rion NC-74 / 35094453	30/05/2019	TCRT19/1430

Weather conditions

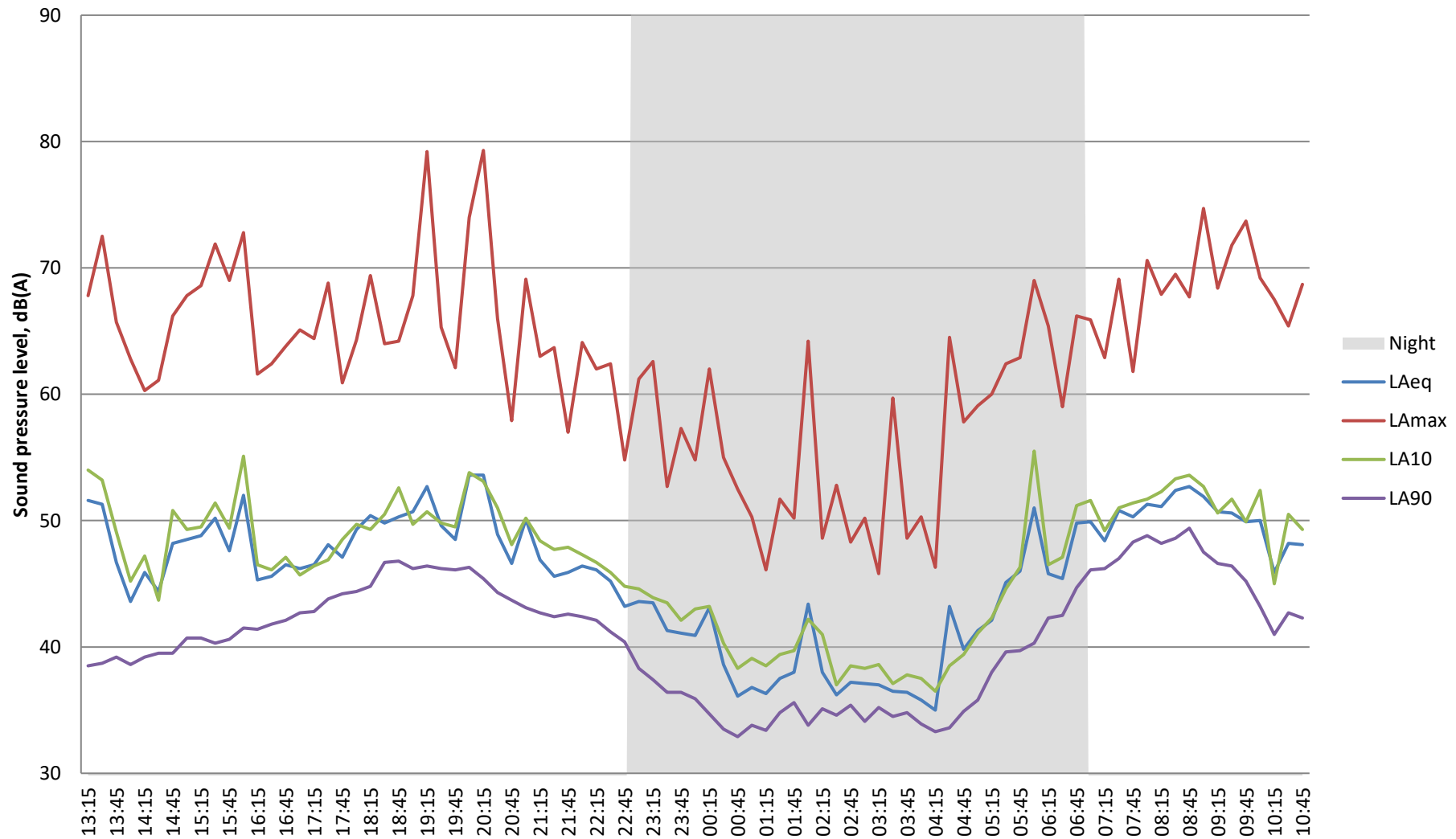
- D.5 Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

Weather Conditions				
Measurement Location	Date/Time	Description	Beginning of Survey	End of Survey
As indicated on Appendix B	13:15 3/12/2019- 10:45 4/12/2019	Temperature (°C)	9	8
Cloud Cover Symbol Scale in oktas (eighths) 0 Sky completely clear 1 2 3 4 Sky half cloudy 5 6 7 8 Sky completely cloudy (9) Sky obstructed from view		Precipitation:	No	No
		Cloud cover (oktas - see guide)	1	2
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	No	Yes
		Wind Speed (m/s)	0	0
		Wind Direction	-	-
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

Results

- D.6 The results of the survey are considered to be representative of the background sound pressure levels at the façades of the most affected noise sensitive receptors to the plant area during the quietest times at which the plant will operate. The noise climate at the measurement position was dominated by noise from local traffic. The results of the survey are presented in a time history graph overleaf.

Sainsbury's Superstore Bognor Regis Tuesday 03 - Wednesday 04 Dec 2019



Appendix E Noise level predictions at Receptors

Receptor 1

Plant	Maximum plant sound pressure level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS4142 Feature correction (dB)	Plant sound pressure level at receptor (dBA)
	Lp (dBA)	Distance (m)	Distance (m)	Correction (dB)				
Gas cooler	48	10	77	-18	3	-5	3	31
Gas cooler	48	10	77	-18	3	-5	3	31
	Cumulative sound pressure level (day)							34

ROOF LEVEL "A" @ 1:50

ROOF LEVEL OVERVIEW (NTS)

Dual Temperature Refrigeration Plant Details.

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL
17-01	17-01-01	1	UNIT	100.00	100.00
17-02	17-02-01	1	UNIT	100.00	100.00

KELVON GAS COOLER

LEGEND

- EXISTING WORKING PLATFORM WITH ACCESS STEPS AND HANDRAILS
- NEW KELVON GAS COOLER
- EXISTING REFRIGERATION PACK
- EXISTING STEEL SUPPORT AND PLATFORM TO BE MODIFIED BY MC

NOTES

- ALL WORK TO BE COMPLETED BY THE CONTRACTOR.
- ALL WORK TO BE COMPLETED BY THE CONTRACTOR.
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- ALL WORK TO BE COMPLETED BY THE CONTRACTOR.

PRELIMINARY

11 Preliminary, rev. 1

12 Preliminary, rev. 2

13 Preliminary, rev. 3

REVISIONS

NO.	DESCRIPTION	DATE
1	11 Preliminary, rev. 1	11/11/2019
2	12 Preliminary, rev. 2	11/11/2019
3	13 Preliminary, rev. 3	11/11/2019