S.I. ENVIRONMENTAL

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Environmental Noise Survey

British Standard, BS 4142: 2014 Method for rating industrial and commercial sound

ENVIRONMENTAL NOISE IMPACT ASSESSMENT REPORT

No. EISAI/0919/CR (Version 0)

Prepared for: ***Eisai Limited***
European Knowledge Centre
Mosquito Way
Hatfield
AL10 9SN

Prepared by: ***Mr. C. Renshaw - S.I. Environmental Limited***

Assessors signature:

Approved by: ***Mr. N. J. Fenwick – S.I. Environmental Limited***

Surveyor's signature:

Received by: ***Mr. Ralph Nethercoat (EHS Adviser)***

Responsible Person signature:

Date of Survey: ***10th September 2019***

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1.0 EXECUTIVE SUMMARY

S.I. Environmental Ltd was instructed by Mr. Ralph Nethercoat, EHS Adviser for Eisai Europe Limited, to carry out an environmental noise impact assessment at the company's Hatfield, Hertfordshire facility. The assessment, based on BS4142: 2014 'Method for rating industrial and commercial sound', was to assess the noise levels at the neighbouring sensitive receptors (dwellings), and determine the current ambient noise levels (LAeq) & background noise levels (LA90).

The environmental noise impact assessment would assess the likely impact of the noise generated by a proposed installation of a chiller and cooler unit on the neighbouring sensitive receptors. The assessment was required to satisfy conditions of a planning application approval. The installation of a chiller, required for a new production line, is planned to be located on an existing building roof, directly behind the high-bay warehouse building.

Welwyn Hatfield Borough Council have considered the application for the new chiller installation and recommended that the application is granted but with noise conditions. The condition being the standard plant / equipment installation condition; Noise from the plant and equipment associated with the new chiller installation shall be 10dB (LAeq) below the current background noise level (LA90) at the nearest sensitive receptors (residential properties) or 5dB (LAeq) below the current background noise level (LA90) if evidence is provided which shows that no tonality is present.

Two positions just inside the south perimeter of the Eisai Europe Limited, Hatfield facility, nearest to the adjacent residential properties, were identified as suitable environmental noise monitoring stations. The measuring protocol included; equivalent continuous noise levels, dB(A) Leq, and background noise measurements (LA90), recorded over intervals of 10 – 60 minutes. The noise sampling periods chosen were representative of the normal factory operational activities.

Noise attenuation calculations based on distance, provided by Eisia Europe Limited, show that the external noise level associated with the proposed new chiller, without consideration of the noise shielding from the high-bay warehouse building, is estimated at 47 dB(A) (see appendix 2), at the nearest residential properties (inside Eisia Europe's boundary). Therefore, to comply with this planning condition, the background noise level (LA90) at the Eisia Europe's boundary would have to be a minimum of 57 dB(A), based on tonality being present.

The results of the environmental noise monitoring survey have indicated average background noise levels (LA90) of 49.6 and 51.5 dB(A) at noise measuring stations no. 1 & 2 respectively. However, the current chillers and coolers were operating at a level which was significantly lower than their maximum capacity (see point 4.2).

The noise level was measured at the existing chiller plants installed in the energy centre. The noise level measured was 84 dB(A) at one meter from operating chiller units. Information provided by the suppliers of the new chiller plant show noise levels associated to the chiller

operation of 100.3 dB(A) at 1-meter distance when operating at maximum capacity (ambient air temperature >30^{o}C).

British Standard 4142: 2014 describes methods to determine the noise levels outside a building from factories, industrial buildings and from sources of an industrial nature from commercial buildings. It also describes methods for determining background noise levels and assessing whether noise of an industrial nature is likely to give rise to complaints from people living in nearby buildings. This is done by comparing the actual or expected industrial noise level corrected to reflect its nuisance value with respect to existing background noise levels.

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference is around +10dB or higher is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
d) 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 in an indication of the specific sound source having a low impact, depending on the context.

The results of the environmental noise survey and subsequent BS4142 2014 calculations, indicated marginal noise impact significance at noise monitoring station #1, as the noise excess over the background was measured and calculated at +3.7. However, at noise monitoring station #2, the rating level does not exceed the background sound level, which indicates that the specific sound source (proposed chiller) having a low impact, depending on the context. There is a level of uncertainty however, due to the environmental noise levels for the proposed new chiller being based on calculations of attenuation by distance).

RECOMMENDATIONS

Further noise attenuation, possibly through design change (reduced noise at source), should be considered for the proposed new chiller, cooler and associated equipment.

A further environmental noise impact assessment should be included as part of the commissioning procedure to validate the calculated noise predictions, and to ensure that noise does not impact on the nearest sensitive receptors.

Maintain all machinery to ensure efficiency and no undue noise emissions.

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2.0 INTRODUCTION

2.1 Eisai is one of the world's leading research-based pharmaceutical companies.

2.2 S.I. Environmental Ltd was instructed by Mr. Ralph Nethercoat, EHS Adviser for Eisai Europe Limited, to carry out an environmental noise impact assessment at the company's Hatfield, Hertfordshire facility. The assessment, based on BS4142: 2014 'Method for rating industrial and commercial sound', was to assess the noise levels on the neighbouring sensitive receptors (dwellings), and determine the current ambient noise levels (LAeq) & background noise levels (LA90).

2.3 The environmental noise impact assessment would assess the likely impact of the noise generated by the proposed installation of a chiller unit and associated equipment on the neighbouring sensitive receptors. The assessment was required to satisfy the conditions of a planning application approval. The installation of a chiller, required for a new production line, is planned to be located on an existing building roof, directly behind the high-bay warehouse building.

2.4 Welwyn Hatfield Borough Council, having considered the application for the new chiller installation, recommended that planning application is permitted but with noise conditions. The condition was the standard plant / equipment installation condition, which is: Noise from the plant and equipment associated with the new chiller installation shall be 10dB (LAeq) below the current background noise level (LA90) at the nearest sensitive receptors (residential properties) or 5dB (LAeq) below the current background noise level (LA90) if evidence is provided which shows that no tonality is present.

2.5 This environmental noise survey and assessment was carried out by Mr. C. Renshaw for and on behalf of S. I. Environmental Ltd. Mr Renshaw has the "Institute of Acoustics" Certificate of Competence in Environmental Noise Assessment. Mr Renshaw also holds National Diploma in Occupational Health & Safety.

3.0 DETAILS OF SITE

3.1 Eisia Europe Limited, Mosquito Way, Hatfield, is custom built pharmaceutical facility, on a 14.5-acre site located inside the Hatfield Business Park (north of London). The A1 motorway runs 'north to south' close to the site's Eastern boundary. The closest sensitive noise receptors, which are dwellings (apartments), are opposite Eisia Europe's South boundary.

4.0 INITIAL OBSERVATIONS / DESCRIPTION

4.1 Two positions just inside the south perimeter of the Eisai Europe Limited, Hatfield facility were identified for environmental noise monitoring stations (see appendix 1 – site plan). These positions were identified as:

- Position #1, South perimeter (South East corner), alongside 'Tablin Way' and opposite the apartments, well away from the factory building or any other noise reflecting features (Photographs 1 & 2).

- Position #2, South perimeter (adjacent to the access gates), alongside 'Tablin Way' and opposite the departments, well away from the factory building or any other noise reflecting features, (Photographs 3 & 4).

4.2 The noise surveys were carried out during the daytime on 10.09.2019. Eisai Europe's factory operations are five days per week, 06.00 – 22.00 hrs. The factory was fully operational during the noise monitoring periods. However, the current chillers and coolers only run at their maximum capacity (maximum noise) when the ambient air temperature >30^{o}C, and the air temperature during the survey, peaked at only 17^{o}C. it was therefore recognised that the measured ambient noise levels (LAeq) & background noise levels (LA90) would be significantly lower than current worst case.

4.3 Weather conditions during the noise monitoring survey was mainly clear skies, dry air and ground with light winds coming from the West. The air temperature was between 10-17^{o}C. The wind speed was monitored with a calibrated anemometer throughout the monitoring period, and was measured at: 1.0 - 1.5 m/s.

4.4 The existing and dominant noise sources recorded during the measurements came from:

- 'A1' motorway traffic noise (06.20 – 09.00 hrs).
- Factory plant room located above line #6 production.
- Factory energy centre currently housing three chiller units and associated equipment.
- Light traffic on the adjacent 'Tablin way'.

5.0 INSTRUMENTATION

5.1 Sound pressure levels were monitored using two CEL 633, Class 1, Integrating sound level meters (SLM), serial no.1839990 and 202753. The SLMs were calibrated before and after the survey periods, using CEL 120/1 acoustic calibrators to ensure the instruments remained in calibration and hence the validity of the recorded levels. Wind shields were used over the microphones to minimise interference from wind passing over the microphones' diaphragms.

5.2 The CEL 633 SLM and CEL 120/1 calibrator were calibrated by the manufacturer within the last one year.

6.0 MEASUREMENT PROTOCOL

6.1 Environmental noise measurements were taken at 1.2 – 1.5 meters above ground level with the noise instrument being fixed to a tripod, raised at an angle of 75 degrees from the horizontal.

6.2 The Integrating sound level meters were set to the "A" Weighting scale. The meters gave a direct readout of the equivalent continuous noise level, LAeq, over a selected measurement period. Noise measurements were set to the time weighting; 'Fast'.

6.3 06.20 – 20.30 hrs, 10th September 2019.
Equivalent continuous noise levels, dB(A) L_{Aeq}, residual noise measurements, background noise measurements and specific noise measurements were recorded over 10 – 60 minutes intervals. L_A Max levels were also recorded. The noise sampling periods used provided representative samples of the factory noise.

6.4 The exceedance levels 'L_{A90}' was measured and recorded for each noise measurement; the exceedance level is the noise level that was exceeded for 90% of the time during each measurement. 'L_{A90}' is used as an indication of the background noise level.

6.5 S.I. Environmental Ltd's personnel were present throughout the monitoring periods thereby ensuring that an accurate representation of the prevailing noise climate was recorded.

7.0 RESULTS AND DISCUSSION

7.1 Noise Measurement Results table: Position #1, 06.28 – 20.30 hrs, 10th September 2019

Monitoring Position	Monitoring Time Start (hrs)	Monitoring Run Time Minutes	LAeq / 10 - 60 minutes	LA90	LA Max	Comments
Position #1 – Eisai Europe Ltd's South perimeter (South East corner), alongside 'Tablin Way' and opposite the departments (dwellings), well away from the factory building or any other noise reflecting features (see appendix 1, site plan).	06.28	15	54.1	50.5	65.2	All factory activities operating normally. 06.20 – 07.30 hrs – Dominant noise source is 'A1' road traffic noise. Slight humming noise from factory plant room located above line #6 production. 07.00 hrs – weather: 100% clear sky, dry, sunny with little westerly breeze (1 m/s). 09.00 hrs – A1 road traffic noise cannot be heard. 09.00 hrs – weather: 10% clear sky, dry, with little westerly breeze (1 m/s). max 12°C. 13.15 hrs - Dominant noise source is energy centre chillers & production line #6.
	06.43	15	55.1	52.5	66.6	
	06.58	15	54.8	52.5	65.4	
	07.13	15	55.2	52.5	65.5	
	07.32	60	55.9	52.5	71.8	
	08.32	60	53.6	49.0	67.4	
	09.50	60	53.0	50.0	67.5	
	10.50	60	51.9	46.5	72.4	
	11.50	60	52.0	46.5	74.0	
	12.50	60	52.9	48.0	70.3	
	13.50	60	53.1	47.5	77.4	
	14.50	35	52.4	48.0	68.1	
						All factory activities operating normally + abnormal testing (measurements not included in the ambient or background noise calculations)
	15.32	10	54.8	49.0	72.2	
	15.42	10	52.4	49.0	64.1	
	15.52	10	51.9	49.0	58.2	
	16.12	10	52.7	48.5	71.2	All factory activities operating normally. No abnormal noise. 18.15 hrs – weather: 10% clear sky, dry, with little westerly breeze (1 m/s). max 12°C. Dominant noise source is energy centre chillers & production line #6.
	16.22	10	52.5	48.5	64.5	
	16.38	60	53.4	48.5	77.2	
	17.38	60	53.1	47.5	72.1	
	18.48	50	51.7	47.5	62.6	
	19.40	45	51.0	45.0	66.8	
Average Background (LA90) Noise Level (not including 15.32-14.02 hrs)				**49.6**		

7.2 Noise Measurement Results table: Position #2, 06.20 – 20.30 hrs, 10th September 2019

Monitoring Position	Monitoring Time Start (hrs)	Monitoring Run Time Minutes	Laeq / 10 - 60 minutes	La90	La Max	Comments
Position #2 – Eisai Europe Ltd's South perimeter (adjacent to the access gates), alongside 'Tablin Way' and opposite the departments (dwellings), well away from the factory building or any other noise reflecting features (see appendix 1, site plan).	06.20	15	54.9	51.5	74.5	All factory activities operating normally. 06.20 – 07.30 hrs – Dominant noise source is 'A1' road traffic noise and humming noise from factory plant room located above line #6 production. 07.00 hrs – weather: 100% clear sky, dry, sunny with no little westerly breeze (1 m/s). 09.00 hrs – A1 road traffic noise cannot be heard. 11.30 hrs - Dominant noise source is energy centre chillers & production line #6. 12.00 – 13.00 hrs – pedestrians passing through the access gates. 13.15 hrs – dominant noise is production line #6. weather: 50% cloud cover, dry, with no little westerly breeze (1-2 m/s). Maximum 17°C
	06.35	15	54.4	52.5	63.4	
	06.50	15	54.2	52.5	66.2	
	07.05	15	55.1	52.5	64.3	
	07.20	15	55.5	53.0	64.5	
	07.40	60	56.0	51.5	76.0	
	08.40	60	54.1	49.5	71.7	
	09.40	60	54.0	49.5	76.2	
	10.45	60	54.1	50.0	71.0	
	11.45	60	54.4	50.5	72.3	
	12.45	60	56.1	51.5	84.6	
	13.45	60	55.3	51.0	80.0	
	14.45	43	55.1	51.5	73.0	
						All factory activities operating normally + abnormal testing (measurements not included in the ambient or background noise calculations)
	15.32	10	55.9	52.0	74.5	
	15.42	10	56.5	52.0	74.0	
	15.52	10	54.9	52.5	65.0	
	16.13	10	55.0	52.0	64.3	All factory activities operating normally. No abnormal noise.
	16.23	10	55.1	52.0	68.3	
	16.43	60	56.0	51.5	70.2	
	17.43	60	55.6	52.0	75.4	
	18.50	60	54.8	51.0	69.4	
Average Background (LA90) Noise Level (not including 15.32-14.02 hrs)				**51.5**		

7.3 Information provided by Eisia Europe Limited shows that that the external noise level associated with the proposed new chiller is 67.3 dB(A) at 10-meter distance. The installation would be located approximately 115 meters from the nearest residential properties, there is also a high wall located (High bay warehouse building) between the proposed chiller location and the residential properties, which will provide additional noise shielding.

7.4 Noise attenuation calculations based on distance, provided by Eisia Europe Limited, show that the external noise level associated with the proposed new chiller, without consideration of the noise shielding from the high-bay warehouse building, is estimated at 47 dB(A) (see appendix 2), at the nearest residential properties (inside Eisia Europe's boundary). Therefore, to comply with this planning condition, the background noise level (LA90) at the perimeter would have to be a minimum of 57 dB(A), based on tonality being present.

7.5 The results of the environmental noise monitoring survey have indicated average background noise levels (LA90) of 49.6 and 51.5 dB(A) at noise measuring stations no. 1 & 2 respectively. However, the current chillers and coolers were operating at a level which was significantly lower than their maximum capacity (see point 4.2).

7.6 The noise level was measured at the existing chiller plants installed in the energy centre. The noise level measured was 84 dB(A) at one meter from operating chiller units. Information provided by the suppliers of the new chiller plant show noise levels associated to the chiller operation of 100.3 dB(A) at 1-meter distance, when operating at maximum capacity (ambient air temperature >30^{o}C).

7.7 BS4142 Calculations

7.7.1 Position **#1**. Position #1, 06.28 – 20.30 hrs, 10th September 2019

Description	Parameter	Value	BS4142 Clause	Comments
Measured Sound Level of normal activities + test fan (ambient sound).	LAeq dB	**47.3**	7.3.1	**Proposed new chiller (prediction based on attenuation by distance calculations).** Other factory operational noise is not included.
Residual Sound Level	$LAeq_{,10\text{-}60min}$ dB	**52.6** (Average taken from 06.28 – 15.30 & 16.12 – 20.00 hrs)	7.3.3	Current factory activities operating normally for indication of background Sound (no proposed chiller)
Correction for Residual Noise Level	dB	**0**	7.3.4 Table 1	The measured residual sound is 5.3 dB more than the predicted sound level. However, no correction is required (a correction is to allow for the contribution the residual sound has made to the measured level).
Specific Sound Level calculated by correcting the ambient sound level to remove the contribution of residual sound level	LAeq dB	**47.3**	7.3.4 7.3.5	The Sound from the **Proposed new chiller (prediction based on attenuation by distance calculations)** has been treated as continuous, therefore the specific Sound is equal to the measured Sound after correction for residual Sound.
Acoustic Feature Correction based on tonal, impulsivity and intermittency	dB	**+6 (maximum for tonality)**	9.2	There is an acoustic feature, which forms part of the chiller operations
Rating Level	LAeq dB	**53.3**	9.2	
Background Sound Level	$LA90_{,10\text{-}60min}$ dB	**49.6** (Average taken from 06.28 – 15.30 & 16.12 – 20.00 hrs)	8.1.3 8.3	All current factory activities operating normally for indication of background Sound.
Excess of Rating Over Background Sound Level	dB	**3.7**	11	**Conclusion** As the excess sound in the daytime over the background is **predicted at 3.7 dB** the assessment indicates that the installation of the proposed chiller and cooler would be of marginal noise impact significance.
Uncertainty			10	There is a level of uncertainty with the sound level results because these calculations are based partly on predicted noise levels by calculation

7.7.2 Position **#2**. 06.20 – 20.30 hrs, 10th September 2019

Description	Parameter	Value	BS4142 Clause	Comments
Measured Sound Level of normal activities + test fan (ambient sound).	LAeq dB	**47.3**	7.3.1	**Proposed new chiller (prediction based on attenuation by distance calculations).** Other factory operational noise is not included.
Residual Sound Level	$L_{Aeq,10\text{-}60min}$ dB	**55.2** (Average taken from 06.28 – 15.30 & 16.12 – 20.00 hrs)	7.3.3	Current factory activities operating normally for indication of background Sound (no proposed chiller)
Correction for Residual Noise Level	dB	**0**	7.3.4 Table 1	The measured residual sound is 7.9 dB more than the predicted sound level. However, no correction is required (a correction is to allow for the contribution the residual sound has made to the measured level).
Specific Sound Level calculated by correcting the ambient sound level to remove the contribution of residual sound level	LAeq dB	**47.3**	7.3.4 7.3.5	The Sound from the **Proposed new chiller (prediction based on attenuation by distance calculations)** has been treated as continuous, therefore the specific Sound is equal to the measured Sound after correction for residual Sound.
Acoustic Feature Correction based on tonal, impulsivity and intermittency	dB	**+6 (maximum for tonality)**	9.2	There is an acoustic feature, which forms part of the chiller operations
Rating Level	LAeq dB	**53.3**	9.2	
Background Sound Level	$L_{A90,10\text{-}60min}$ dB	**55.2** (Average taken from 06.28 – 15.30 & 16.12 – 20.00 hrs)	8.1.3 8.3	All current factory activities operating normally for indication of background Sound.
Excess of Rating Over Background Sound Level	dB	**-1.9**	11	**Conclusion** As rating level does not exceed the background sound level, this is in an indication of the specific sound source having a low impact, depending on the context.
Uncertainty			10	There is a level of uncertainty with the sound level results because these calculations are based partly on predicted noise levels by calculation

7.8 British Standard 4142: 2014 'Method for rating industrial and commercial sound' describes methods to determine the noise levels outside a building from factories, industrial buildings and from sources of an industrial nature from commercial buildings. It also describes methods for determining background noise levels and assessing whether noise of an industrial nature is likely to give rise to complaints from people living in nearby buildings. This is done by comparing the actual or expected industrial noise level corrected to reflect its nuisance value with respect to existing background noise levels.

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference is around +10dB or higher is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
d) 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 in an indication of the specific sound source having a low impact, depending on the context.

7.9 The results of the environmental noise survey and subsequent BS4142 2014 calculations, indicated marginal noise impact significance at noise monitoring station #1, as the noise excess over the background was measured and calculated at +3.7. However, at noise monitoring station #2, the rating level does not exceed the background sound level, which indicates that the specific sound source (proposed chiller) having a low impact, depending on the context. There is a level of uncertainty however, due to the environmental noise levels for the proposed new chiller being based on attenuation by distance calculations).

8.0 LIMITATIONS

8.1 Environmental noise varies greatly depending on a range of different factors such as time of day, types and nature of noise sources, weather conditions, terrain variations at a particular location etc. Many standards and legislation specify which parameters must be measured and, in most cases, prescribe how the measurements are to be performed and how to handle factors such as weather conditions.

8.2 Measuring noise level for the complete reference time interval is ideal measurement protocol, e.g. 1 hour for daytime, and 15 minutes for night-time assessment in relation to BS4142. This assessment has been based on taking measurements of ***representative samples*** and ***predicting an overall value*** for a given site/application.

8.3 Seasonal variations can affect the noise climate and many noise assessments do not take seasonal changes into account.

9.0 RECOMMENDATIONS

9.1 Further noise attenuation, possibly through change of design (reduced noise at source), should be considered for the proposed new chiller, cooler and associated equipment.

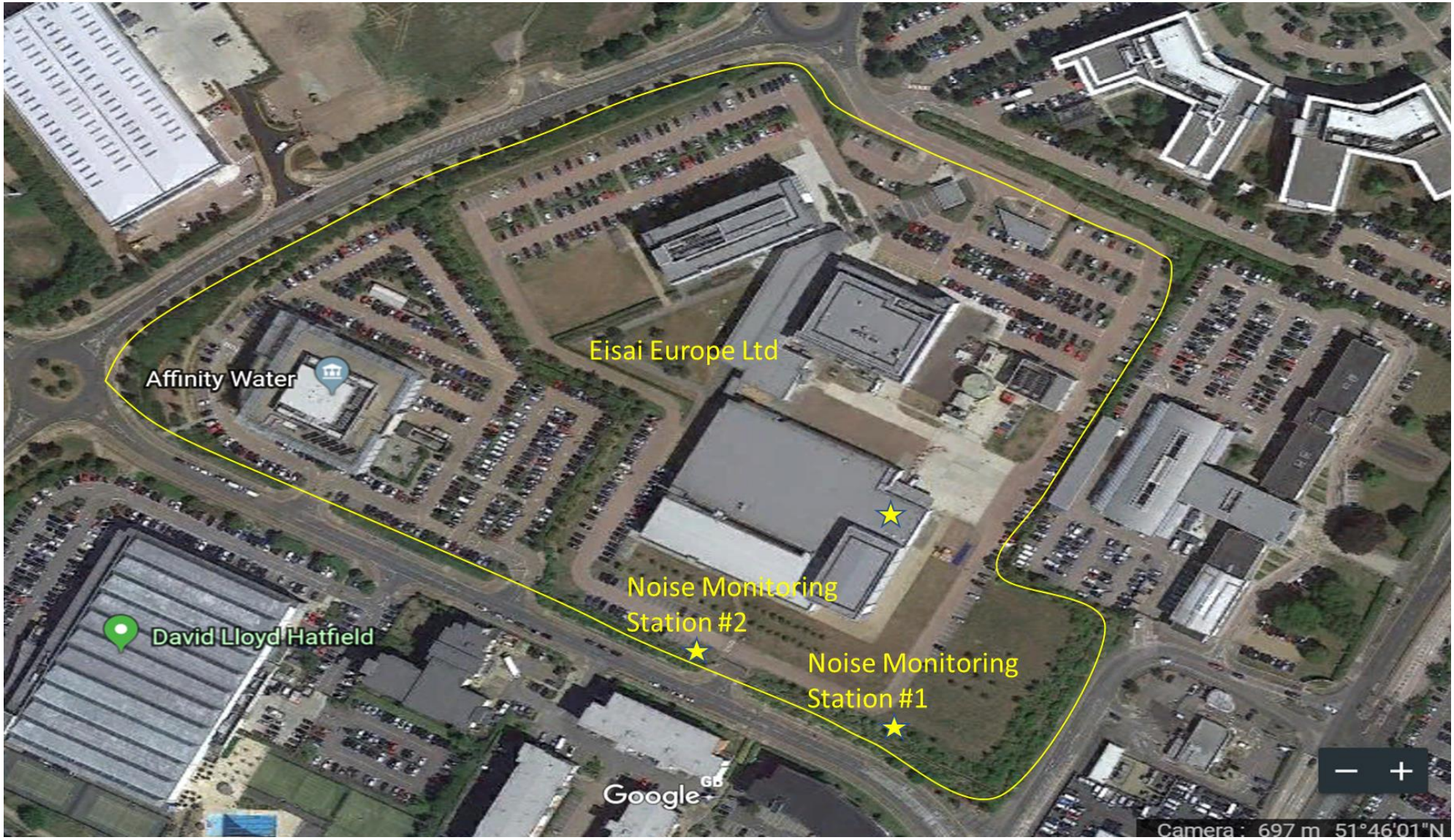
9.2 A further environmental noise impact assessment should be included as part of the commissioning procedure to validate the calculated noise predictions, and to ensure that noise does not impact on the nearest sensitive receptors.

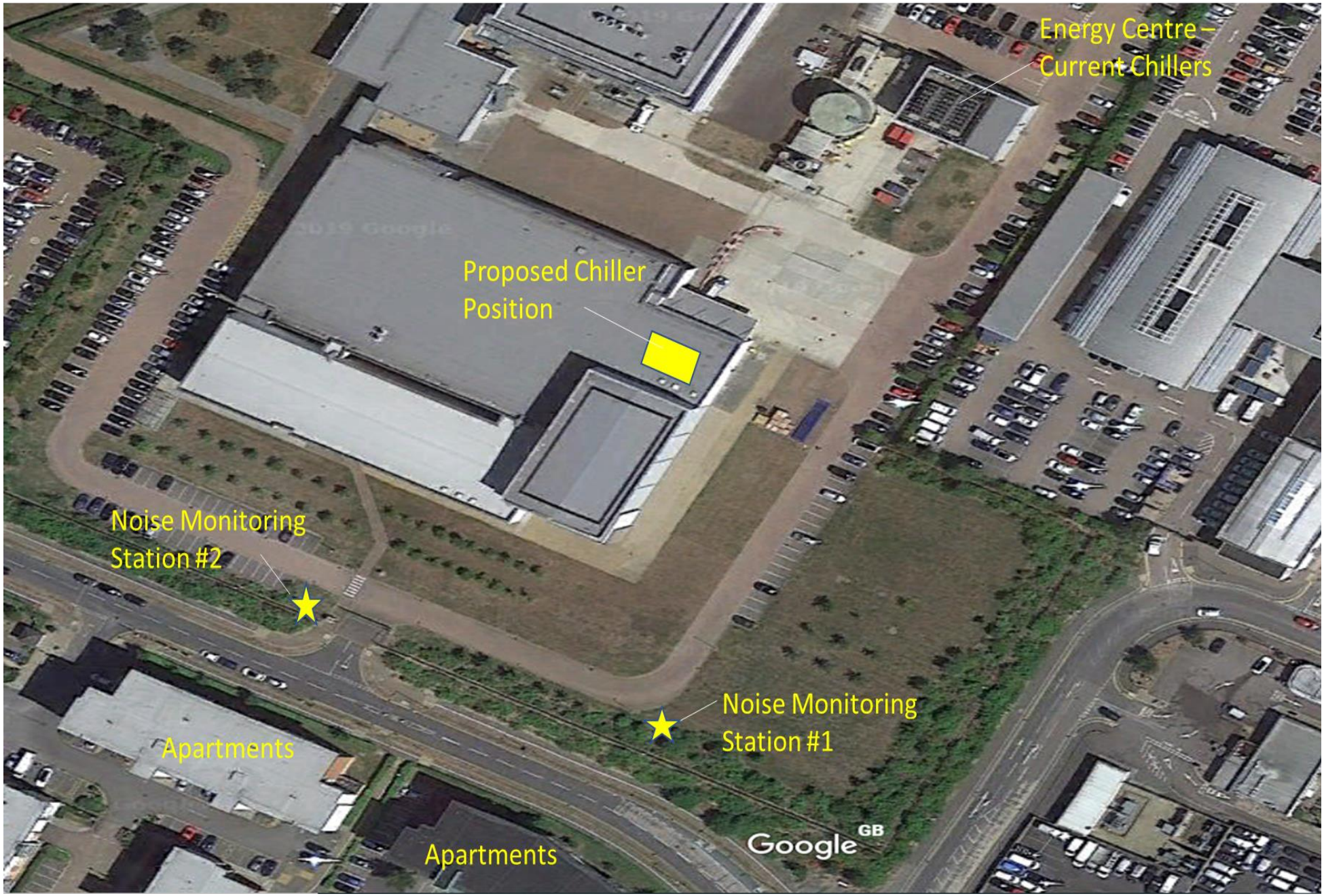
9.3 Maintain all machinery to ensure efficiency and no undue noise emissions.

APPENDICES 1 - Site Plans & Photographs

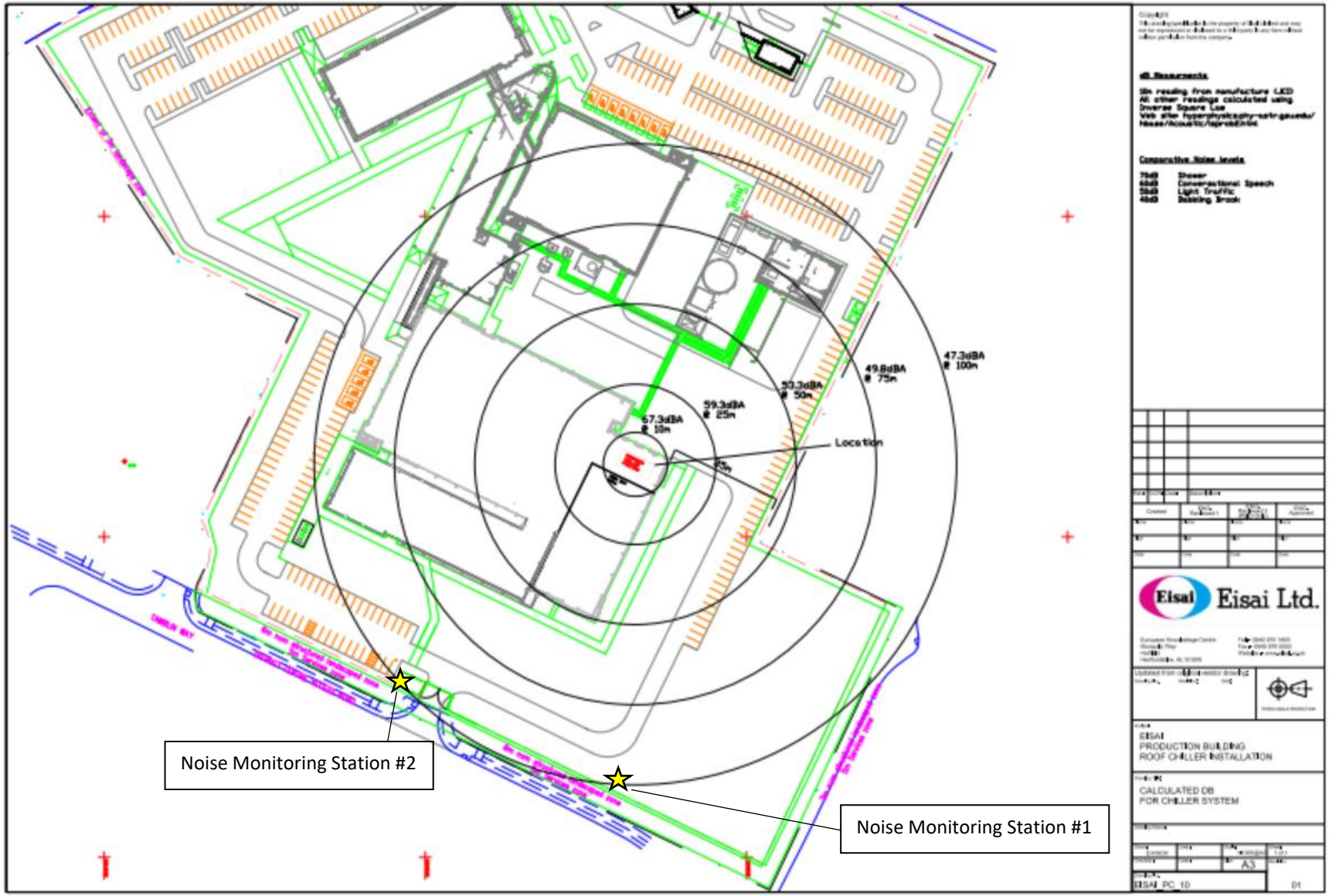
Photograph No.1 & 2. Position #1, South East corner of south perimeter, well away from the factory building or any other noise reflecting features

Photograph No.3 & 4. Position #2, South perimeter (adjacent to the access gates), alongside 'Tablin Way' and opposite the departments (dwellings), well away from the factory building or any other noise reflecting features.


Eisai Europe Ltd
Affinity Water
David Lloyd Hatfield
Noise Monitoring Station #2
Noise Monitoring Station #1
Google
Camera : 697 m 51°46'01"N


Energy Centre –
Current Chillers
Proposed Chiller
Position
Noise Monitoring
Station #2
Noise Monitoring
Station #1
Apartments
Apartments
Google GB

APPENDICES 2 – Distance Noise Attenuation Calculations



APPENDICES 3 - Sound Level Meter Calibration Certificates

www.casellasolutions.com

CASELLA

Certificate of Conformity and Calibration

Instrument Model:-	CEL-633B		
Serial Number	1029990		
Firmware revision	V1.23-09		
Microphone Type:-	CEL-251	Preamplifier Type:-	CEL-495
Serial Number	1234	Serial Number	001760
Instrument Class/Type:-	1		

Applicable standards:-

IEC 61672: 2002 / EN 60651 (Electroacoustics - Sound Level Meters)
IEC 60651 1979 (Sound Level Meters), ANSI S1.4: 1983 (Specifications For Sound Level Meters)

Note:- The test sequences performed in this report are in accordance with the current Sound level meter Standard - IEC61672. The combination of tests performed are considered to confirm the products electro acoustic performance to all applicable standards including superseded Sound Level Meter Standards - IEC60651 and IEC60804.

Test Conditions:-	21.9 °C	Test Engineer:-	Malcolm Neale
	54.8 %RH	Date of Issue:-	August 7, 2019
	1030.5 mBar		

Declaration of conformity:-

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications. Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9001:2008 quality procedures. This product is certified as being compliant to the requirements of the CE Directive.

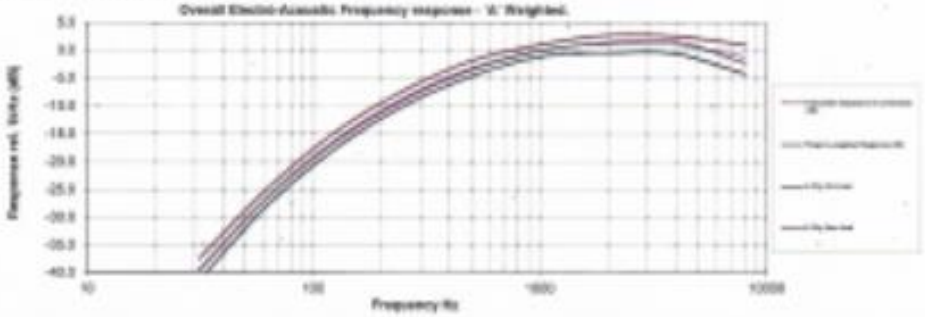
Test Summary:-

Self Generated Noise Test	All Tests Pass
Electrical Signal Test Of Frequency Weightings	All Tests Pass
Frequency & Time Weightings At 1 kHz	All Tests Pass
Level Linearity On The Reference Level Range	All Tests Pass
Toneburst Response Test	All Tests Pass
C-peak Sound Levels	All Tests Pass
Overload Indicator	All Tests Pass
Acoustic Tests	All Tests Pass

Combined Electro-Acoustic Frequency Response - A Weighted

Combined Electro-Acoustic Frequency Response - A Weighted (IEC 61672-3:2006)

The following A-Weighted frequency response graph shows this instrument's overall frequency response based upon the application of multi-frequency pressure field calibrations. The microphones Pressure to Free field correction coefficients are applied to pressure response. Reference level taken at 1kHz.



Casella UK
Casella USA
Casella India
Casella China
Casella Australia

CASELLA

Certificate of Conformity and Calibration

Customer:	S I Enviromental Ltd
Instrument:	CEL-120/1
Serial Number:	1539319
Job Number:	19678
Date of Issue:	07-Aug-2019
Engineer:	Malcolm Neale

Traceable Equipment:

Reference Calibrator	EQ11205
DVM type Fluke 45	EQ00318

Test Conditions:

Ambient Temperature	21.9	°C
Ambient Humidity	54.6	%RH
Ambient Pressure	1000	mBar

Results:

	Level 1	Level 2	Frequency
Initial Reading	114.20 dB	94.09 dB	1.0000 kHz
Final Reading	114.00 dB	93.99 dB	1.0000 kHz

Uncertainty:

Level	±	0.15	dB
Frequency	±	0.5	Hz

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications.
Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9000:2015 quality procedures.
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.
This certificate may not be reproduced other than in full, except with prior written approval of the issuing laboratory.

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Solutions for Risk Reduction

Certificate of Calibration

Issued by: BSRIA Instrument Solutions - A division of BSRIA Limited

Date of issue: 03 September 2019

Certificate number STD_117143

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BSRIA

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DARREN WALKDEN

Approved signatory

Customer: Instrument Solutions
Old Bracknell Lane West
Bracknell Berkshire RG12 7AH

Date received: 31 July 2019

Instrument:

BSRIA I.D.:	202753
Description:	Sound level meter, type 1, kit
Manufacturer:	CEL
Model:	633C
Serial number:	4257409
Procedure version:	BSF30V2

Laboratory conditions:

Temperature: 20 °C ± 4 °C Relative humidity: < 75 %rh
Mains voltage: 240 V ± 10 V Mains frequency: 50 Hz ± 1 Hz

Comments:

Unless otherwise stated all readings are made at 1 kHz.
Calibration performed acoustically.

Calibration information:

The instrument was calibrated by comparison against laboratory reference equipment whose values are traceable to recognised National Standards. This is an electronic document that has been signed digitally.

The uncertainties quoted refer to the calibration only and are not intended to indicate any long term instrument specification/performance. This certificate only relates to the items calibrated.

Calibrated by: M. Rule **Date of calibration:** 03 September 2019