

The Co-operative
Ash Bank Road
Werrington
ST9 0JR

**Plant Noise
Impact Assessment**

On behalf of

TSA Riley

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Executive summary

Noise Solutions Limited has been commissioned to assess the impact of plant noise from a proposed Co-operative convenience store adjacent to Ash Bank Road, Werrington. This report is provided in support of a revised application following a prior refusal, of which noise was not grounds for refusal of planning permission.

The assessment of noise from the proposed plant, with close boarded timber fencing, shows that the cumulative rating levels at the nearest residential premises will comply with the local council's typical requirements.

Based on the findings of this assessment, noise should not be grounds for refusal of planning permission for the proposed development.

1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned to undertake assessments of plant noise at a proposed Co-operative convenience store adjacent to Ash Bank Road, Werrington.
- 1.2. This report presents the results of an environmental noise survey, the applicable policies and guidance, and a plant noise impact assessment to support a planning application.
- 1.3. To assist with the understanding of this report a brief glossary of acoustic terms can be found in **Appendix A**. A more in-depth glossary of acoustic terms can be assessed at the following web address <http://www.acoustic-glossary.co.uk/>.

2.0 Details of development proposals

- 2.1. The proposed Co-operative store is to occupy a standalone single storey building.
- 2.2. The proposed plant is to comprise of refrigeration plant and air-conditioning (AC) plant. The plant area will be located in a service yard at the rear of the store to the south. Close boarded timber fencing is proposed around the plant area, with the exception of the northeast boundary which is bounded by palisade fencing.
- 2.3. The proposed refrigeration plant will potentially operate 24 hours a day, although it should be noted that these units operate as required to meet demand and that store demands for cooling are generally reduced at night. AC plant will only operate during store opening hours.
- 2.4. Plans of the development are shown in **Appendix B**. Manufacturer's plant noise data is given in **Appendix D**.

3.0 Nearest noise-sensitive receptors

- 3.1. The area surrounding the site is mainly residential in nature. The nearest noise-sensitive receptor to the plant area will be the house on Salters Lane (Receptor R1), approximately 10m west of the plant area.
- 3.2. The next closest noise-sensitive receptor to the plant area will be the house on Salters Close (Receptor R2), approximately 15m southeast of the plant area.
- 3.3. **Appendix B** contains an aerial photograph showing the site and surrounding area.

4.0 Noise policy

Noise Policy Statement for England

- 4.1. The Noise Policy Statement for England (NPSE¹), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are: *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*
- *avoid significant adverse effects on health and quality of life;*
 - *mitigate and minimise adverse effects on health and quality of life; and*
 - *where possible, contribute to the improvement of health and quality of life."*
- 4.2. The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and quality of life occur.
- 4.3. The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the NPSE). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case: *"...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development."*
- 4.4. Importantly, the NPSE goes on to state that: *"This does not mean that such adverse effects cannot occur."*
- 4.5. The NPSE does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that: *"Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*
- 4.6. It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

¹ Noise Policy Statement for England, Defra, March 2010

National Planning Policy Framework

- 4.7. A new edition of the NPPF was published in December 2024 and came into effect immediately, with corrections published in February 2025. The original National Planning Policy Framework (NPPF²) was published in March 2012, with subsequent revisions made periodically - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The December 2024/February 2025 revised edition contains no new directions or guidance with respect to noise. The paragraph references quoted below relate to the December 2024/ February 2025 edition.
- 4.8. Paragraph 187 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) *"preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability."*
- 4.9. The NPPF goes on to state in Paragraph 198:
- "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 ...*
- 4.10. The NPPF document does not refer to any other documents or British Standards regarding noise other than the Noise Policy Statement for England (NPSE³).
- 4.11. 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."*
- 4.12. 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."*

² National Planning Policy Framework, DCLG, March 2012

³ Noise Policy Statement for England, DEFRA, March 2010

- 4.13. Paragraph 124 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”.*

Staffordshire Moorlands District Council

- 4.14. Staffordshire Moorlands District Council’s policy for the assessment of noise from fixed plant installations has been advised as follows:

“The machinery, plant or equipment including installed or operated in connection with the carrying out of this permission shall be so enclosed and/or attenuated that the noise generated by the operation of the machinery shall not increase the background noise levels during day time expressed as LA90 [1hour] (day time 07:00-23:00 hours) and/or (b) LA90 [15 mins] during night time (night time 23:00-07:00 hours) at any adjoining noise sensitive locations or premises in separate occupation above that prevailing when the machinery is not operating. Noise measurements for the purpose of this condition shall be pursuant to BS 4142:2014. The details and location of any plant or machinery to be installed under this permission should be submitted to and approved of in writing by the Local Planning Authority.”

5.0 Acoustic Standards and Guidance

BS 4142:2014+A1:2019 Methods for Rating and Measuring Industrial and Commercial Sound

- 5.1. BS 4142:2014+A1:2019⁴ describes a method for rating and assessing sound of an industrial or commercial nature, which includes:
- Sound from industrial and manufacturing processes;
 - Sound from fixed installations which comprise mechanical and electrical plant and equipment;
 - Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
 - Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

⁴ For the purposes of brevity, references in this report to “BS 4142:2014” or “BS 4142” should be read as BS 4142:2014 + A1:2019

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- 5.2. The industrial or commercial sound is assessed outside a dwelling or premises used for residential purposes, upon which sound is incident.
- 5.3. The procedure contained in BS 4142 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 background sound level should be established in terms of the L_{A90} noise index. The standard states that the background sound level should be measured over a period of sufficient length to obtain a representative value. This should not normally be less than 15-minute intervals. The standard states that: "A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."
- 5.8. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:
- a) Typically, the greater this difference, the greater the magnitude of the impact.*
 - b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
 - c) A difference of around +5 dB 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 an indication of the specific sound source having a low impact, depending on the context.

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."

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."

- 5.9. 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."

- 5.10. BS 4142 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.

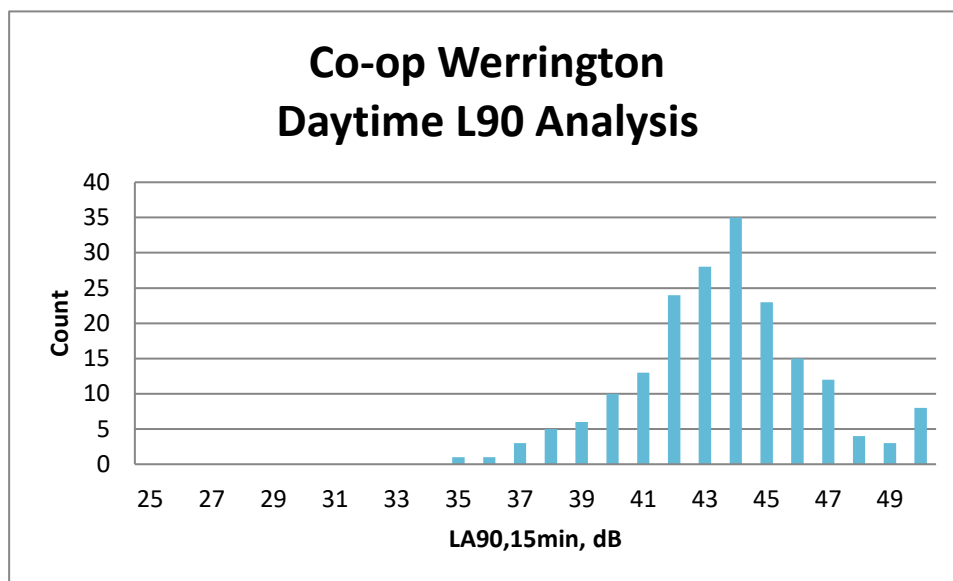
6.0 Existing noise climate

- 6.1. 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.
- 6.2. 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)	43-69	59-93	46-68	35-50
Night-time (23.00 – 07.00 hours)	32-53	52-75	31-56	25-45

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



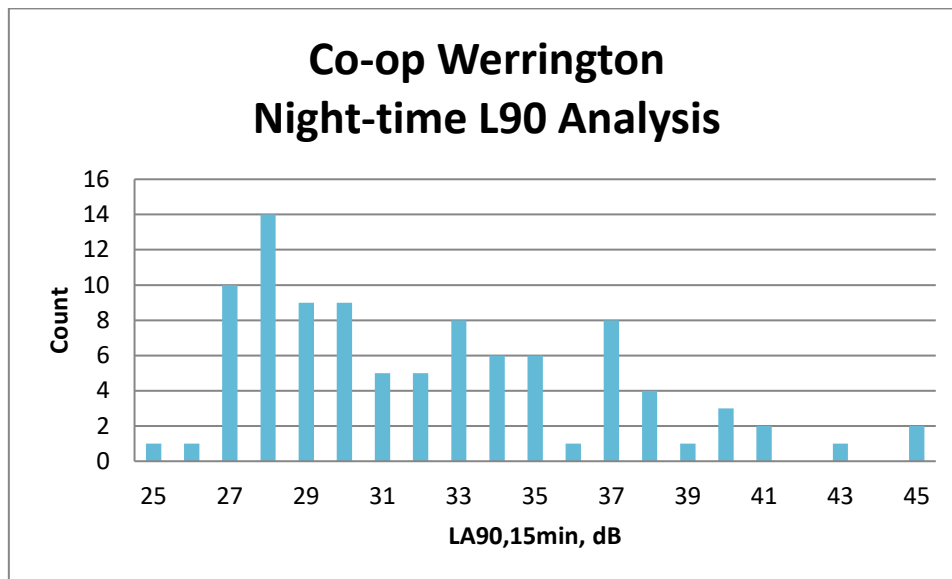
- 6.3. Additional statistical analysis has been undertaken. As shown in Table 2, the mean, median, and modal values have been calculated:

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

dB, L_{A90} daytime period	
Mean	44
Median	44
Mode	44

- 6.4. From reviewing the above histogram, 42dB has been selected to be robustly representative of the background sound level in this area.

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



- 6.5. Additional statistical analysis has been undertaken. As shown in Table 3, the mean, median, and modal values have been calculated:

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

dB, L_{A90} night-time period	
Mean	32
Median	31
Mode	28

- 6.6. From reviewing the above histogram, 27dB has been selected to be representative of the night-time background sound level in this area.

6.7. Therefore, the following values are considered as representative of the existing background sound pressure levels at nearby noise sensitive premises:

- 42dB L_{A90} during the daytime period;
- 27dB L_{A90} during the night-time period;

7.0 Plant noise design criteria

7.1. In accordance with Staffordshire Moorlands District Council requirements, it is proposed that during the daytime the noise level of the plant should be 10dB below the existing background noise level at the nearest residential receptor.

7.2. In view of the low background sound levels at night, and in accordance with the recommendations in BS 4142:2014 in such circumstances, it is proposed that at night the plant noise level at the nearest residential window is no higher than 30dBA. At worst this will result in internal noise levels of around 15-20dBA when windows are open, a level lower than that resulting from domestic refrigerators etc. within the dwellings.

7.3. The noise level resulting from the proposed plant, at the nearest residential receptors, should therefore not exceed the limits shown in the table below:

Table 4 Proposed plant noise emissions level limits at noise sensitive residential receptors

Period	Cumulative plant noise level, dB(A)
Daytime (07.00 – 23.00 hours)	32
Night-time (23.00 – 07.00 hours)	30

8.0 Plant noise impact assessment

8.1. 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 and directivity.

8.2. The predictions are inclusive of screening attenuation from 1.8m tall close boarded timber fence installed on the southwest and southeast boundaries of the plant area. The fence must be close boarded and imperforate with no gaps in or under the screen. The fence will have a minimum density of 15kg/m².

8.3. 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 D](#).

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

Receptor	Period	Predicted sound pressure level at receptor, L_{Aeq} (dB)	Criterion (dB)	Difference
R1	Daytime (07.00 - 23.00 hours)	32	32	+0
	Night-time (23.00 - 07.00 hours)	17	30	-13
R2	Daytime (07.00 - 23.00 hours)	26	32	-6
	Night-time (23.00 - 07.00 hours)	16	30	-14

- 8.4. The assessment shows that with the proposed fence in place, the cumulative plant noise levels will comply with the proposed criteria.
- 8.5. Where possible uncertainty in the above assessments has been minimised by taking the following steps:
- The measurement of the background sound levels was taken over a 72-hour weekend period.
 - The meter and calibrator used have a traceable laboratory calibration and was field calibrated before and after the measurements.
 - Uncertainty in the calculated impacts has been reduced by the use of a well-established calculation method.
 - Care was taken to ensure that the measurement positions were representative of the noise climate outside the nearby residential dwellings and not in positions where higher noise levels were present.

9.0 Summary

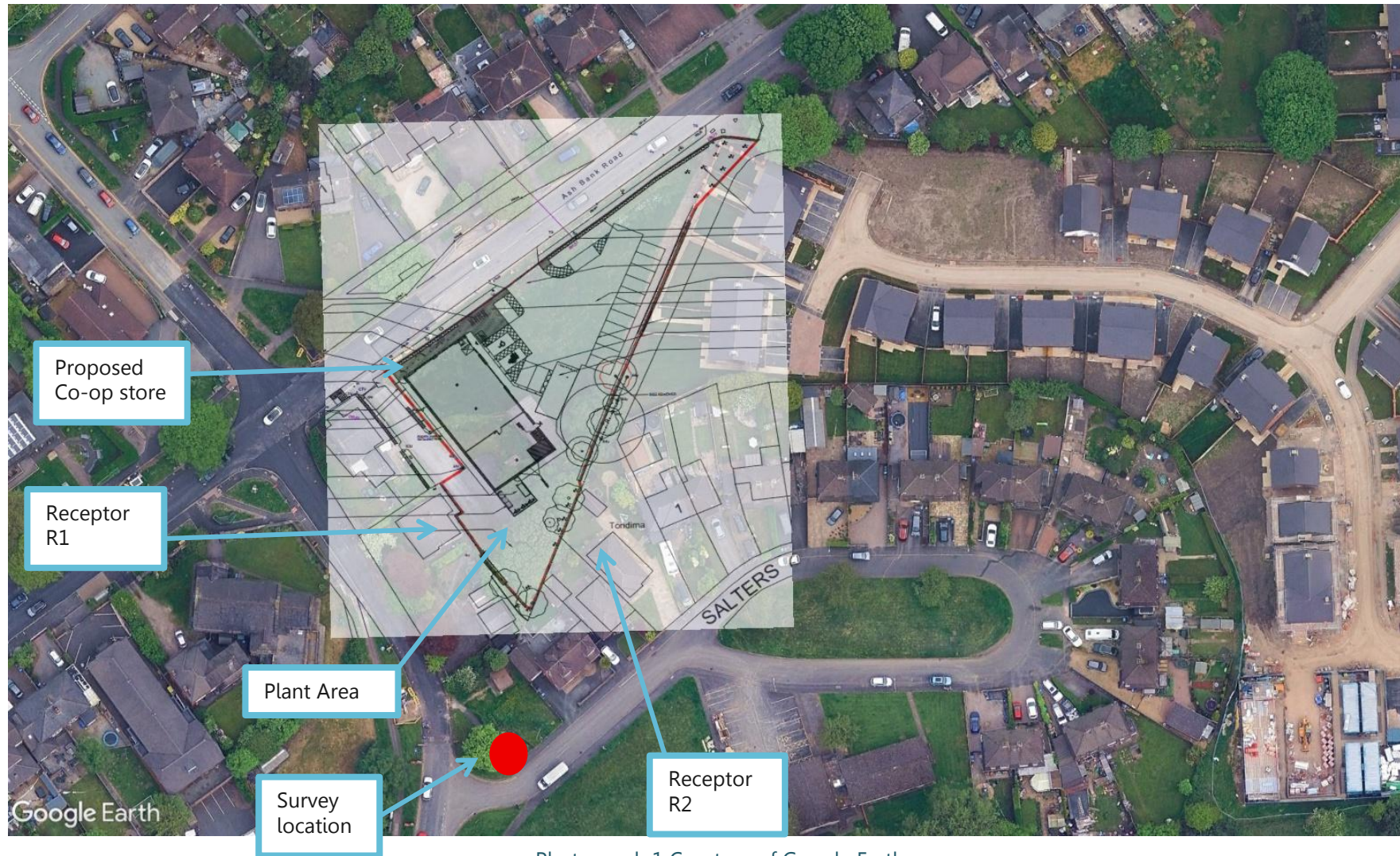
- 9.1. Noise Solutions Ltd (NSL) has been commissioned to undertake assessments of plant noise at a proposed Co-operative convenience store adjacent to Ash Bank Road, Werrington.
- 9.2. An environmental noise survey has been undertaken to establish the existing prevailing noise levels at a location representative of the noise climate outside the nearest noise sensitive receptors.

-
- 9.3. With the close boarded timber fence in place, the cumulative noise emissions from the proposed plant serving the store will result in no worse than a "low impact" when assessed using the methodology in BS 4142:2014 + A1:2019.
- 9.4. Based on the findings of this assessment, noise should not be grounds for refusal of planning permission for the proposed development.

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 and images of site showing areas of interest



Appendix C Environmental sound survey

Details of environmental sound surveys

- C.1 Measurements of the existing environmental sound levels were undertaken between 10.15 hours on Friday 7th November and 10.00 hours on Monday 10th November 2025.
- 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 lamppost on Salters Close, representative of the nearest noise-sensitive property (location indicated on the site plan in [Appendix B](#)). In accordance with BS 7445-2:21991 '*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.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.

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 977/ 97446	16/01/2025	1511004-1
Condenser microphone	Microtech MK255 / 20194		
Preamplifier	Microtech MK255 / 20194		
Calibrator	Svantek SV 30A / 10847	13/06/2025	1512563-1

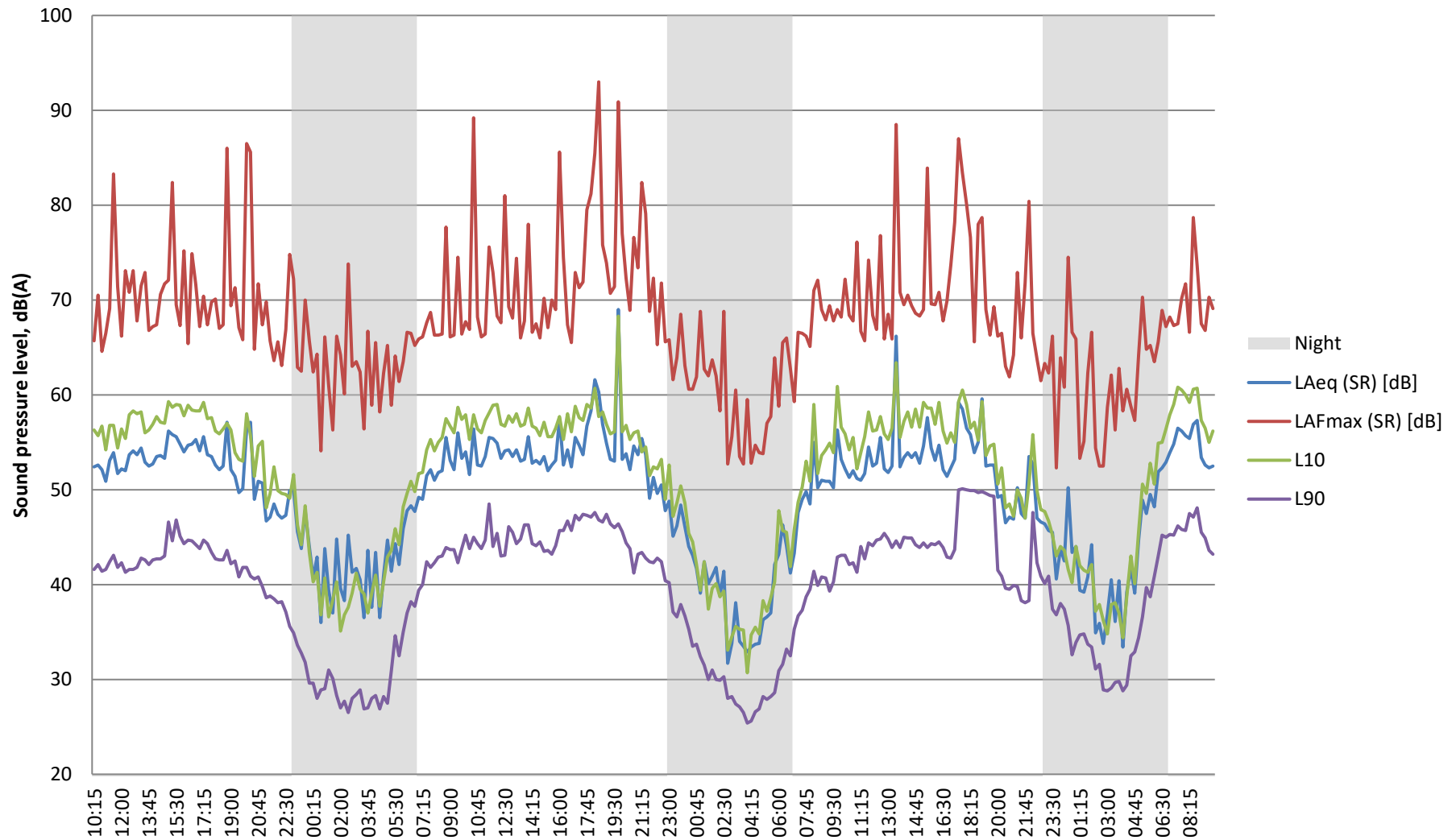
- C.5 Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the installation and removal of the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

Weather Conditions				
Measurement Location	Time/Date	Description	Beginning of Survey	End of Survey
As indicated on Appendix B	10.15 7/11/25 - 10.00 10/11/25	Temperature (°C)	11	11
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)	8	3
		Presence of fog/snow/ice	Fog	No
		Presence of damp roads/wet ground	No	Yes
		Wind Speed (m/s)	0.6	0.1
		Wind Direction	SE	SE
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

Results

- C.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 installation and removal of the meter, the noise climate at the measurement position was dominated by distant road traffic, with occasional noise from birds.
- C.7 The results of the survey are presented in a time history graph overleaf.

Co-op Werrington Friday 07 - Monday 10 Nov 2025



Appendix D Plant noise calculations

Manufacturer's noise data

Plant	Make / Model	No. of units	Sound Pressure Level
Refrigeration Pack	Space Engineering ST – 3A Pack	1	20dBA @ 10m
Gas Cooler	Kelvion GF-SA103F5H-063M038	1	22dBA @ 10m
AC1-3	Mitsubishi PUZ-ZM125YKA w/Deflector	3	54dBA @ 1m

Plant	Plant noise level at source		Distance to receptor		Directivity	Acoustic Screening	Resultant at receptor dB(A)
	Noise level, dB(A)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	
Refrigeration Pack	20	10	14	-3	3	-5	15
Gas Cooler	22	10	11	-1	3	-11	13
AC1	54	1	13	-22	3	-7	28
AC2	54	1	14	-23	3	-7	27
AC3	54	1	16	-24	3	-7	26
Combined sound pressure level, dB L _{Aeq}							32

Plant	Plant noise level at source		Distance to receptor		Directivity	Acoustic Screening	Resultant at receptor dB(A)
	Noise level, dB(A)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	
Refrigeration Pack	20	10	14	-3	3	-5	15
Gas Cooler	22	10	11	-1	3	-8	13
Combined sound pressure level, dB L _{Aeq}							17

Plant	Plant noise level at source		Distance to receptor		Directivity	Acoustic Screening	Resultant at receptor dB(A)
	Noise level, dB(A)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	
Refrigeration Pack	20	10	16	-4	3	-5	14
Gas Cooler	22	10	17	-5	3	-9	11
AC1	54	1	21	-26	3	-10	21
AC2	54	1	20	-26	3	-10	21
AC3	54	1	19	-26	3	-10	21
Combined sound pressure level, dB L _{Aeq}							26

Plant	Plant noise level at source		Distance to receptor		Directivity	Acoustic Screening	Resultant at receptor dB(A)
	Noise level, dB(A)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	
Refrigeration Pack	20	10	16	-4	3	-5	14
Gas Cooler	22	10	17	-5	3	-9	11
Combined sound pressure level, dB L _{Aeq}							16