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**Plant Noise
Survey Report**

On behalf of
D & A Engineering

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1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by D & A Engineering to investigate noise complaints relating to the factory along Bury Mead Road in Hitchin.
- 1.2. It is understood that the Local Authority require a noise Impact assessment for the fixed plant close to the residential dwellings to the west of the site.
- 1.3. 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 Site layout

- 2.1. The factory occupies a dedicated building located along Bury Mead Road in Hitchin.
- 2.2. External plant is located in an enclosure along the south-west elevation close to the residential dwellings at Platinum Court to the west. It is understood that the plant operates only during operating hours and therefore does not run 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 Noise sensitive receptor

- 3.1. The nearest residential dwellings are the flats to the west at Platinum Court (Receptor R1) around 5m from the enclosure with full line of sight.

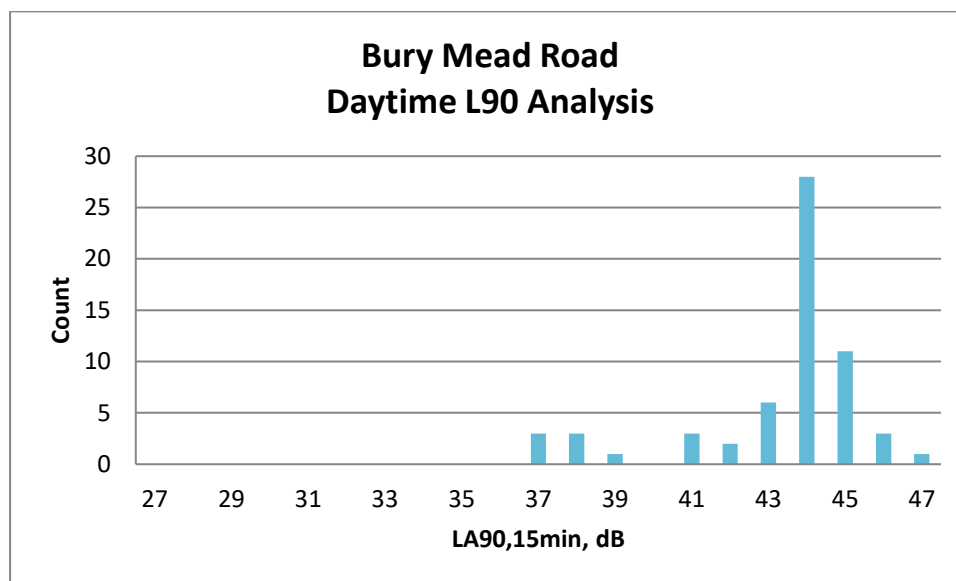
4.0 Existing noise climate

- 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 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)	42-59	57-80	43-62	37-47
Night-time (23.00 – 07.00 hours)	31-52	39-77	33-51	27-44

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



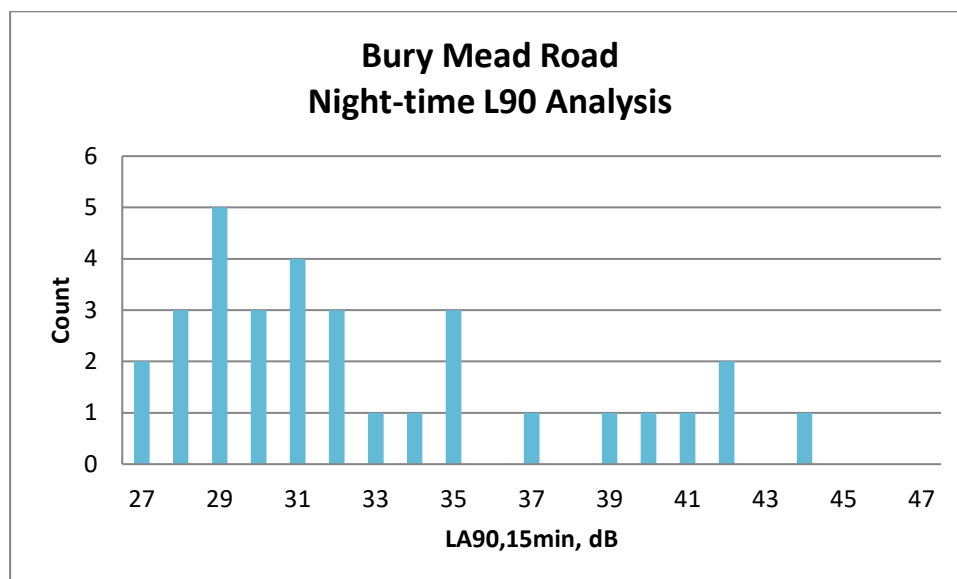
- 4.3. Further statistical analysis has been carried out on the data; the mean, modal and median values are shown in Table 2 below.

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

dB, L _{A90} daytime period	
mean	43
modal	44
median	44

- 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; 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	33
modal	29
median	31

- 4.6. Again, from the histogram analysis, 29dB 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 representative existing background sound pressure levels at nearby noise sensitive premises:
- 41dB L_{A90} during the daytime period; and
 - 31dB L_{A90} during the night-time period.

5.0 Plant noise design criteria

North Hertfordshire District Council

- 5.1. The NHDC Local Plan 2011-2031 Proposed submission was published in October 2016. Policy D3 *Protecting living conditions* states:

Planning permission will be granted for development proposals which do not cause unacceptable harm to living conditions.

Where the living conditions of proposed developments would be affected by an existing use or the living conditions of an existing development would be affected by a proposed use, the Council will consider whether there are mitigation measures that can be taken to mitigate the harm to an acceptable level. If the Council is not satisfied that mitigation proposals would address the identified harm, development proposals will not be permitted.

- 5.2. The narrative to the policy indicates that "such harm may arrive from ... noise" as well as other issues, needs to be considered.
- 5.3. A review of decision notices for similar installations indicates that the local authority's usual requirement is:

Prior to the commencement of the development the developer shall carry out a noise survey following the guidelines set out by BS4142:2014. This survey shall take into account all proposed plant as part of the development and shall include noise control measures which should be submitted for written approval by the Local Planning Authority (LPA). No plant shall be installed and operated at the site until the noise survey has been approved by the LPA. Noise mitigation measures shall be such as to achieve 5dB below existing background levels.

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

- 5.4. 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".
- 5.5. 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.
- 5.6. 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.
- 5.7. 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."

- 5.8. 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."*
- 5.9. The penalty for intermittency is 3dB and the standard notes: *"If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied"*.
- 5.10. 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.*
- 5.11. 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."*
- 5.12. 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."*
- 5.13. 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."*
- 5.14. 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.

Low background levels

- 5.15. Due to the particularly low prevailing environmental noise levels measured during the survey for the night-time period, it is suggested that the plant noise design criteria at the nearest residences should be limited at 30dBA. This proposed criterion is based on guidance found in Section 11 of BS 4142:2014+A1:2019 which states:

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.

- 5.16. A plant noise level of 30dBA at the façade would result in an internal noise level of 15dBA, which is likely to be lower than self-generated noise internally (for example, from domestic refrigerators). This assumption is based on guidance found in BS 8233:2014, which states that approximately 15dB of insulation is provided by a partially open window

Summary of requirements

- 5.17. In accordance with the local authority's usual requirements, it is proposed that the noise emitted by the proposed plant should be controlled to at least 5dB(A) below the representative L_{A90} background sound level at the nearest residential property.
- 5.18. The cumulative noise level for the proposed plant at the nearest receptors considered should not therefore exceed the limits shown in the table below:

Table 4 Proposed plant noise level limits at noise sensitive residential/commercial receptors

Period	Cumulative plant Rating noise level, dB(A)
Daytime (07.00 – 23.00 hours)	36
Night-time (23.00 – 07.00 hours)	30

6.0 Site Visit Tuesday 18th November 2025

- 6.1. An investigation was undertaken on Tuesday 18th November 2025 during the hours of 14.00-15.00 hours in order to conduct on/off plant noise testing.

Plant noise survey methodology

- 6.2. Measurements of sound pressure levels were undertaken with the microphone positioned on the between the plant enclosure and the closest residential dwellings.

- 6.3. Measurements were taken with closest loudest plant running over a normal cycle and also switched off. This is a Nitrogen generator which compresses atmospheric air into a tank then extracts Nitrogen from the compressed air tank into storage bottles.
- 6.4. The compressor runs for approximately two minutes then the Nitrogen is extracted from the compressed air over a longer period. This cycle runs on demand depending on the use within the factory but usually three times during a week.
- 6.5. Both broadband and one-third octave band frequency data was measured. The measured L_{A90} noise measurements have been used in this assessment since noise from the plant was constant during operational cycles: again, this minimised influence from extraneous sources.
- 6.6. The initial measurements are shown in Table 5 below:

Table 5 External plant sound pressure level survey results

Cycle	Sound pressure levels (dB)		
	Plant on	Plant off	Specific level
Compressor	57	43	57
Nitrogen extraction	50	43	49

- 6.1. The closest receptor is approximately 4m from the enclosure. Calculated rating levels, and a comparison with the established emissions criteria, are shown in Table 6. Calculations are shown in [Appendix C](#). The plant noise was readily noticeable as intermittent so a penalty of 3dB as described in BS 4142:2014 has been applied.

Table 6 Cumulative plant noise levels outside nearest residential windows

Cycle	Sound rating level, L_{Aeq} (dB)	Emissions criterion (dBA)	Difference (dBA)
Compressor	33	36	-3
Nitrogen extraction	40	36	+4
Overall	40	36	+4

Assessment of uncertainties

- 6.2. 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 Recommendations

- 7.1. The rating level L_{Atr} from the Nitrogen extraction plant was found to be +4dB over the emissions criteria.
- 7.2. This is a small exceedance and could be remedied by lining the enclosure internally with dense gypsum-based board (e.g. BG SoundBloc or similar) with a minimum mass of 10kg/m².
- 7.3. This material would be installed directly to the existing plant enclosure to reduce the breakout noise. The lining needs to be suitable for industrial applications (i.e. with appropriate impact-, moisture- and fire-resistance).
- 7.4. The installation would need to comprise mechanical fixings to the internal faces of the enclosure. All joints are to be sealed, and care would need to be taken to avoid any gaps around doors, penetrations and base connections.

8.0 Summary

- 8.1. Noise Solutions Ltd (NSL) has been commissioned by D & A Engineering to investigate noise complaints relating to the factory along Bury Mead Road in Hitchin.
- 8.2. 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.
- 8.3. Recommendations have been provided to reduce the noise from the plant enclosure to acceptable levels.

Appendix A Acoustic terminology

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

Appendix B Photograph of site showing areas of interest



Appendix C Plant noise calculations

Cycle	Measured Sound Pressure Level, dBA, 5m from louvres			On time		Distance Correction to receptor		BS 4142 intermittency correction, dB	Rating level at receptor, dB $L_{Ar,Tr}$
	Plant On	Plant Off	Specific Sound Level	On time, s	Correction (dB)	Distance, m	Correction, dB		
Compressor	57	43	57	120	-15	4	-12	+3	33
Nitrogen extraction	50	43	49	3480	0	4	-12	+3	40