



Plant Noise Impact Assessment Report

147 Parrock Street, Gravesend, DA12 1EY

Report Reference: NIA-DA12-R00

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1. INTRODUCTION

EMC Acoustics has been commissioned by Mr Okkes Omalar to measure background noise levels and carry out an environmental noise impact assessment for the existing kitchen extract system serving the premises.

This assessment has been prepared in support of the previous planning application (Ref: 20221254) and aims to demonstrate compliance with the Local Authority's noise criteria, as required by the conditions attached to the planning consent.

In this report, the relevant planning history is summarised, and a detailed analysis has been undertaken to outline the historical progression of the site, document measured noise levels and assess the current acoustic performance of the installation.

1.1 Site Description

The site is located at 147 Parrock Street, Gravesend, DA12 1EY, on the eastern side of Parrock Street. The building comprises commercial units on the ground floor, with residential flats above. The local acoustic environment is dominated by road traffic noise along Parrock Street, with occasional interference from neighbouring commercial plant operations. Given the mixed commercial and residential nature of the surroundings, the noise climate is influenced by both daytime business activity and the continuous flow of vehicles.

1.2 Nearest Noise – Sensitive Receptor

According to the Local Authority, the nearest noise-sensitive receptor (NSR) is the residential flat located adjoining 146 Parrock Street. This is based on the findings of the previous Delegated Report, which states:

"A Noise Impact Assessment has been submitted which calculates the predicted noise at the nearest noise-sensitive premises, which is deemed to be the flat above 147. It is understood that this is in the same ownership as the proposed takeaway, so it would have been more sensible to have calculated the noise levels at the nearest 'independent' premises, which would be 146 Parrock Street. It is understood that the extract system currently in place is to be moved closer to 146, but no mention of the distance from the windows of this property has been made in the report."

Based on this statement, the second floor (R1) and third floor (R2) flats at 146 Parrock Street have been considered the nearest independent residential receptors for the purposes of this assessment.

2. ASSESSMENT CRITERIA

The assessment of noise emissions from the kitchen extract system has been carried out in accordance with the principles and procedures set out in BS 4142:2014+A2:2019 – Methods for rating and assessing industrial and commercial sound. This standard provides a framework for assessing the impact of sound from mechanical plant and equipment on nearby residential premises, taking into account both the measured background noise levels and the specific characteristics of the sound under investigation.

The Local Authority, Gravesham Borough Council, has imposed the following condition to ensure adequate protection of residential amenity:

"The rating level of the noise emitted from plant, machinery, or equipment at the premises shall not exceed the existing background noise level by more than -10 dB at the nearest noise-sensitive premises when measured and assessed in accordance with BS 4142:2014."

This requirement represents a stringent criterion, typically applied where equipment is situated in close proximity to residential properties. Achieving a rating level 10 dB below the existing background noise is generally indicative of a low likelihood of adverse impact, thereby providing confidence that the installation will not give rise to noise disturbance at nearby dwellings.

The assessment has therefore been structured to determine compliance with this criterion through representative background noise measurements and prediction of operational noise levels from the installed extract system.

2.1 Relevant Planning History

2020 – Application Ref. 20200615 (Approved 11 September 2020)

The first application sought a change of use from a retail unit (Class A1) to a hot-food takeaway (now Sui Generis).

A Noise Impact Assessment (Venta Acoustics, June 2020) accompanied the submission.

Environmental Protection questioned the methodology, particularly the derivation of attenuation values and the absence of BS 4142 penalties for tonality. Nevertheless, no formal objection was raised, and permission was granted subject to strict conditions:

- Noise rating level from plant and equipment not to exceed background by more than –10 dB at the nearest residential receptor.
- All equipment to be mounted on anti-vibration supports and include silencers.
- Extraction system to operate only between 11:00 and 23:00 hours.

These conditions established the baseline requirement for acoustic performance.

2022 – Application Ref. 20220843 (Refused 6 October 2022)

A variation was sought to widen the permitted use from pizza to Turkish cuisine and to regularise a new extraction system already installed.

Environmental Protection advised that the applicant had reused the 2020 Venta Acoustics report, which was no longer valid because of new plant and a higher-odour cooking process. They required a new noise and odour impact assessment based on actual measurements of the installed system.

The submission was judged insufficient, and the application was refused on the ground that insufficient evidence was provided to demonstrate that noise emissions from the new extract system would safeguard neighbouring amenity (contrary to Policy CS19).

2023 – Application Ref. 20221254 (Approved 28 February 2023)

A further variation was submitted with new documentation by Goya Works and Sound Licensing Ltd including a Vibration Assessment (17 November 2022) and a Noise Impact Assessment (17 November 2022), respectively.

Gravesham's Environmental Protection Team Environmental Protection accepted the new scheme in principle, noting that:

- The system included silencers, an acoustic fan jacket and anti-vibration mounts.
- Predicted noise levels were 10 dB(A) below background, in line with council criteria.
- It is advised that post-completion testing be required at the nearest independent residential property (146 Parrock Street) to confirm compliance with BS 4142.

Subject to these conditions, permission was granted, resolving the previous refusal reason.

2024 – Application Ref. 20230754 (Refused 27 February 2024)

An application to discharge conditions 5 and 6 (odour and noise) was submitted with relative commissioning reports.

Gravesham's Environmental Protection Team found the submission inadequate:

- No post-completion noise testing had been undertaken.
- The report lacked verification of installed equipment, serial numbers, and acoustic performance data.

The Local Authority therefore refused to discharge the noise condition, requiring a full post-installation BS 4142 assessment demonstrating that the extract system achieves at least 10 dB(A) below background at the nearest independent receptor (around 23:00 hours).

2.1.1 Summary

Since 2020, four planning stages have addressed noise from the kitchen extract system. The site has consistently been conditioned to meet a –10 dB(A) rating level criterion at the nearest independent resident (146 Parrock Street). While later submissions improved design documentation, final compliance evidence through on-site measurements remains outstanding, as confirmed by the 2024 refusal to discharge the noise condition.

3. NOISE SURVEY RESULTS AND ANALYSIS

This section summarises the background noise levels, previously measured and predicted plant noise levels reported by Sound Licensing Ltd (2022) and in the Post-Verification Report (2024), along with the most recent noise measurements and predictions undertaken by EMC Acoustics. The purpose is to establish a comprehensive timeline of acoustic data and evaluate compliance with the Local Authority's planning condition requiring plant noise levels to remain at least 10 dB below the existing background level.

3.1 The Previously Measured Background Noise Levels (Sound Licensing Ltd 2022)

Previous background noise data were established by Sound Licensing Ltd (2022), who adopted measurement data from the Venta Acoustics (2021) report (Ref: VA3730.210818.NIA1.1) conducted for the adjoining commercial premises at 148 Parrock Street. Measurements were taken at a representative location near the site. The measured background noise levels during the relevant operational periods were 48 dB $L_{A90,15min}$, which has been consistently used as the design reference value for subsequent assessments.

The Post-Verification Survey (Sound Licensing Ltd, 2024) recorded daytime background levels in the range of 40 - 41 dBA. However, to maintain consistency with the Local Authority's planning condition, a background level of 48 dBA has been retained as the benchmark for comparison.

For the purposes of this assessment, background sound levels were re-measured by EMC Acoustics on 2 October 2025 to verify the current noise climate at the site and confirm whether any material change has occurred since the previous surveys.

3.2 The Previously Measured and Predicted Plant Noise Levels (Sound Licensing Ltd 2022)

The 2022 Noise Impact Assessment predicted the following noise emissions from the proposed kitchen extraction system prior to installation:

Plant Item	Predicted Sound Level (LAeq,T)	Comments
Extraction fan motor casing	28 dB	Breakout noise
Extraction duct terminus	30 dB	Duct outlet
Air intake	31 dB	Intake outlet
Cumulative rating level (including +3 dB intermittency)	38 dB LAeq,T	10 dB below background noise level

Table 1 – Plant noise assessment (Sound Licensing Ltd, 2024)

This configuration was therefore expected to comply with Gravesham Borough Council's condition requiring the plant noise to be 10 dB below background, indicating a low likelihood of adverse impact. The 2024 Post-Verification Assessment, undertaken after installation, measured a specific plant noise level of 56 dB LAeq,1hour at the nearest receptor, which was 8 dBA above the background level (48 dB LAeq,15min). This exceeded the permitted limit and was assessed as having a significant adverse impact in its unmitigated state. Following mitigation installation of an Acoustica CP01-M45-120 silencer and a Helios acoustic jacket, the noise level at the nearest residential façade was predicted to reduce to 37 dB representing 11 dB below background, thus complying with the Council's requirement.

3.3 Current Measurements

A further set of on-site measurements was undertaken by EMC Acoustics to verify the existing noise levels and confirm whether the installed system currently meets the planning condition.

3.3.1 Methodology

To establish representative background and ambient noise levels, unattended noise monitoring was conducted between 12:15 on Thursday 2 October and 12:15 on Friday 29 September 2025, during a period when mechanical plant operations would coincide with expected lower background noise levels.

The sound level meter was positioned 1 meter away from façade at second-floor level. The monitoring position is considered representative of background noise levels at the nearest identified noise-sensitive properties, as shown in Figure 1.

3.3.2 Measurement Equipment

The measurement equipment illustrated in Table 1 was used during the survey, all equipment complies with IEC 61672-3:2013, Class 1 and IEC 60942:2017, Class 1.

Name	Serial Number	Calibrated	Certificate No
NTI XL2- TA Acoustic Analyser	A2A-10100-E0	08/08/2024	UCRT24/2079
M2230 Measurement Microphone	5478	08/08/2024	UCRT24/2079
Larson Davis Class 1 Calibrator	20235	08/08/2024	UCRT24/2068

Table 2 – Equipment

3.3.4 Weather Conditions

Weather conditions throughout the entire noise survey period were noted to be mild, between 9 – 16 degrees Celsius, dry and partially (%40) cloudy during the measurement period, and a light wind (<5metres per second) from north at the start of the survey. These conditions were maintained throughout most of the survey period and are considered reasonable for undertaking environmental noise measurements.

3.3.5 Background Noise Levels

A summary of the measured noise levels over the 24-hour monitoring period is presented in Table 2 below.

Noise Survey Summary			
Fixed Microphone Position	Time, T	Ambient Noise $L_{Aeq,T}$	Background Noise $L_{A90,15mins}$
Second-floor façade	Operational hours 11:00 – 23:00	54	49

Table 3 – Noise Survey Summary

The typical background sound level during the trading hours was determined 49 dBA. This value is used as the reference background level for the purposes of the BS 4142 assessment. Full measurement data, including time history plots and statistical levels, is provided in Appendix C of this report.

3.3.6 Mechanical Plant Noise Levels

During the recent site visit, it was observed that the system comprises a Helios GBW 450/4 kitchen extraction fan connected to 450 mm diameter ductwork extending approximately 3.5 metres, with the flue terminating above roof level at a height of around 8 metres. Two attenuators are installed on the atmospheric side of the system, and an acoustic enclosure is fitted around the fan casing to further reduce breakout noise.

Measurements of the mechanical plant were undertaken while both the extraction fan and the fresh air unit fan were operating under normal load conditions. Therefore, the recorded ambient noise levels represent the combined noise emissions from both sources.

The specific sound level of the mechanical plant has been derived from the difference between the measured ambient noise level (plant on) and the measured background noise level (plant off), in accordance with BS 4142:2014 + A2:2019.

The measured ambient and specific sound levels are summarised in Table 4 below.

Noise Survey Summary			
Microphone Position	Ambient Noise $L_{Aeq,1min}$	Residual Noise $L_{Aeq,1min}$	Specific Noise Level $L_{Aeq,1min}$
1 meter from the fan	51.7	42.5	51.1
1 meter from the flue termination point	51	45	49.7
Cumulative Noise emissions			53

Table 4 – Plant Noise Levels

3.3.7 Tone Analysis

An assessment was carried out to determine whether the mechanical plant noise exhibited any audible tonal components, following the reference method set out in Annex D (Normative) of BS 4142:2014 + A2:2019 – *Objective method for assessing the audibility of tones in sound*.

The analysis was performed using narrow-band Fast Fourier Transform (FFT) analysis of one-minute averaged, A-weighted spectra, applying a Hanning window and ensuring an effective bandwidth of less than 5 % of the critical-band width in accordance with ISO 1996-2.

Potential tonal components were identified by examining the averaged spectrum for any local maxima exceeding the surrounding masking sound by more than 8 dB, as defined in the standard.

The FFT spectrum for the mechanical plant did not display any distinct tonal components that met the prominence criteria outlined in Annex D. The spectrum showed only broadband fan and airflow noise characteristics, with no discrete tones at the fan's blade-pass frequency or harmonic intervals. The narrow-band spectrum plot presented in Figure 1 shows a smooth broadband distribution without any significant prominent tone.

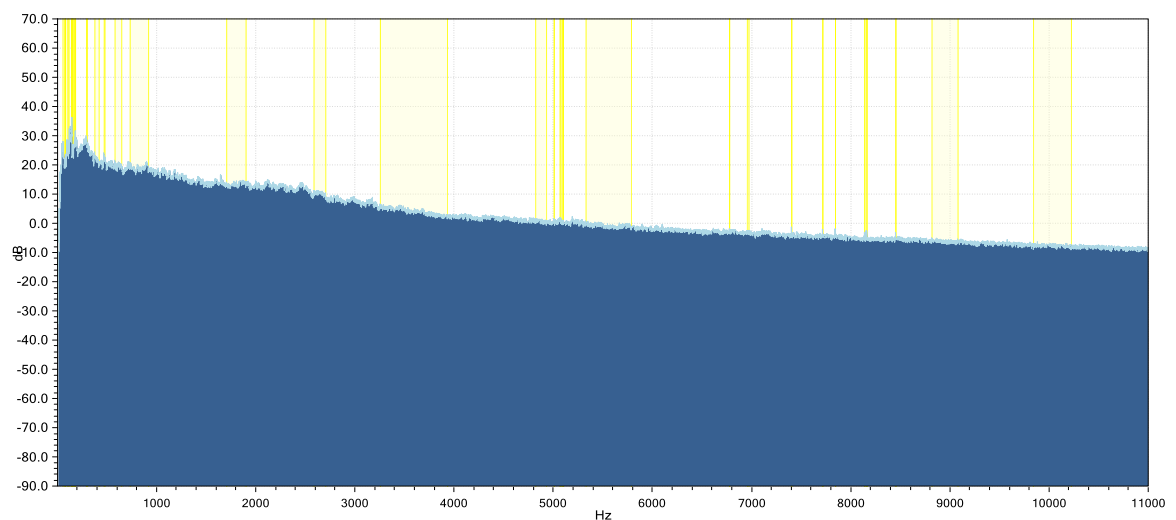


Figure 1 – Tone Analysis

As no significant tones were identified, no tonal correction (0 dB) has been applied to the specific sound level when determining the rating level in accordance with BS 4142:2014 + A2:2019. The frequency spectrum is presented in Table 4 confirming the absence of tonal features.

4. NOISE IMPACT ASSESSMENT

4.1 Noise Modelling

In order to predict the impact of noise on the identified Noise-Sensitive Receptors (NSRs), the measurement results presented in Section 3.3.6 have been used to produce a detailed three-dimensional, geo-referenced noise model. This model enables the prediction of noise propagation from defined sources across the site and adjacent receptors.

Noise predictions were carried out using the CadnaA environmental noise modelling software, in accordance with ISO 9613-2:2024 – Acoustics: Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors.

Both the fan motor and flue termination point measured plant noise levels at the reference position were processed to determine appropriate sound power levels (L_{WA}) required for model input. For the primary plant source, the L_{Aeq,T} levels were derived by calculation and with reference to the measurement position.

The model was then run to validate these assumptions, with predicted results compared against the measured data to ensure that the simulated levels correlated closely with observed sound levels at nearby positions.

Noise contour maps generated by the model illustrate the predicted sound pressure levels at the centre of the second and third-floor windows of the nearest noise-sensitive receptors.

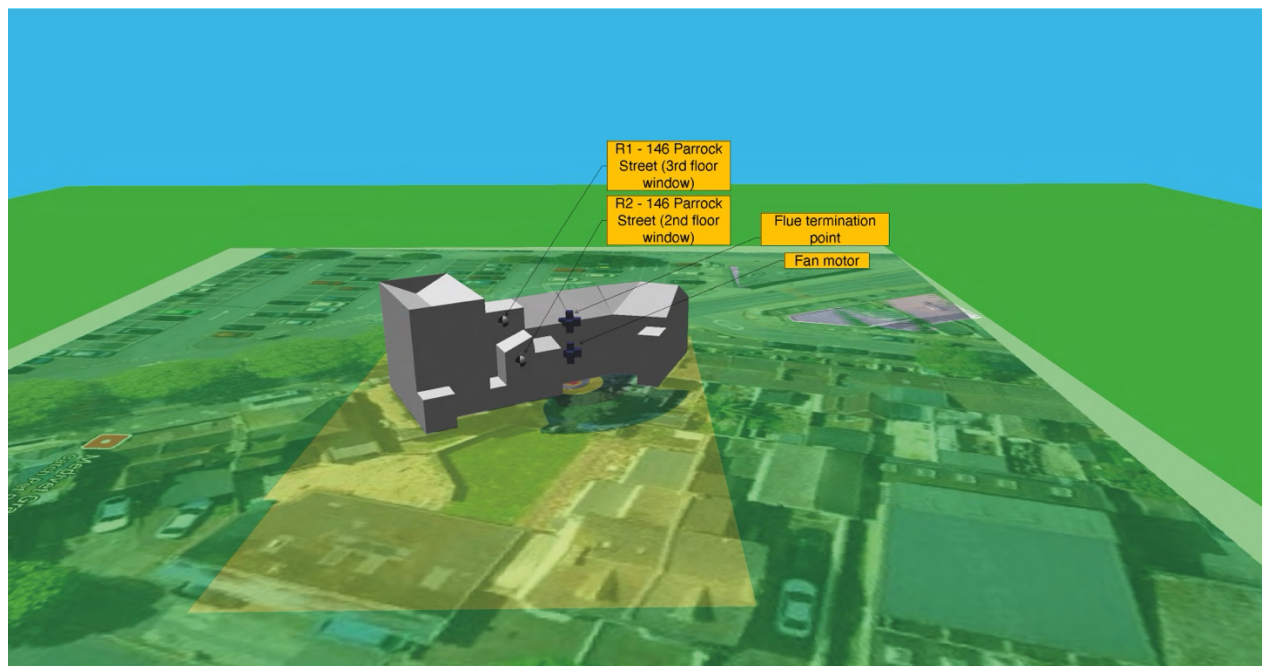


Figure 2 – 3D view both noise sources and NSRs



Figure 3 – Noise emissions results at nearest NSRs

4.2 Results

The results of the noise modelling are summarised in Table 5 below, showing the predicted sound pressure levels at the façades of the nearest residential receptors. The target level represents the Local Authority's noise criterion, which requires that the rating level remains at least 10 dB below the measured background noise level of 49 dB L_{A90} .

Location	Rating Level, $L_{Aeq,T}$ dB	Background Level L_{A90} dB	Target $L_{Aeq,T}$ dB	Difference (Target – Predicted), dB	Assessment Outcome
Second-floor window (R2)	32	49	39	7	Complies
Third floor window (R1)	35	49	39	4	Complies

Table 5 – Predicted Noise Levels at Nearest Noise-Sensitive Receptors

The predicted sound levels at both the second and third-floor façades are comfortably below the background level of 49 dB $L_{Aeq,T}$, achieving of 17 dB at R2 and 14 dB at R1, respectively. These results demonstrate compliance with the Local Authority's requirement that the rating level shall not exceed the background noise level at the nearest noise-sensitive premises.

As no tonal or impulsive characteristics were identified (see Section 3.3.6), no acoustic feature corrections have been applied to the specific sound level. Consequently, the rating level is equivalent to the specific sound level predicted by the model.

4.3 BS 8223 Assessment

This assessment also considers the guidance provided in BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings, which sets out recommended internal ambient noise levels for residential spaces. For typical living rooms and bedrooms, the guideline internal noise limits are as follows:

- ≤ 35 dB $L_{Aeq,16hr}$ during the daytime (07:00–23:00)
- ≤ 30 dB $L_{Aeq,8hr}$ during the night-time (23:00–07:00)

Assuming windows are partially open, which typically provides 10–13 dB of sound attenuation from external to internal levels, the corresponding external noise levels at the façade should ideally remain:

- Below 45 dB L_{Aeq} during the day
- Around 40 dB L_{Aeq} during the night

Based on the measured and modelled data presented in this report, the predicted plant noise levels at the façades of the nearest residential windows (32 - 35 dB $L_{Aeq,T}$) are well below these external thresholds.

Accordingly, internal ambient noise levels within the nearest residential spaces are expected to remain within the BS 8233:2014 guideline limits for both daytime and night-time periods, confirming that the plant operation is not expected to cause disturbance to NSRs.

5. CONCLUSIONS

The purpose of this assessment was to verify the noise impact associated with the existing kitchen extract and fresh air systems serving 147 Parrock Street, and to determine compliance with the Local Authority's planning condition requiring the rating level to be at least 10 dB below the existing background noise level at the nearest residential receptors.

The latest background noise survey conducted by EMC Acoustics established a representative background level of 49 dB $L_{A90,15min}$ during operational hours. Measurements of the current system, undertaken with both the extraction fan and fresh air unit fan operating simultaneously, were used to derive specific sound levels for modelling and assessment.

The results of the CadnaA noise model indicate that the combined plant noise achieves predicted façade levels of 32 dB $L_{Aeq,T}$ at the second-floor window (R2) and 35 dB $L_{Aeq,T}$ at the third-floor window (R1) of the nearest noise-sensitive receptor. These results are 17 dB and 14 dB below the background noise level of 49 dB $L_{Aeq,T}$, respectively.

No tonal, impulsive, or intermittency corrections were applicable, as confirmed by the tonal analysis in Section 3.3.6. Accordingly, the rating level is equivalent to the specific sound level predicted by the model.

Previous noise assessments undertaken in 2022 and 2024 identified potential exceedances prior to the implementation of mitigation and subsequently recommended acoustic measures including a silencer and motor enclosure. These improvements have since been installed. The measurements and predictions also confirm that the implementation of the acoustic enclosure around the fan casing and the attenuators fitted to the atmospheric side of the system have been effective in reducing noise emissions and ensuring compliance with the Local Authority's criteria.

The assessment demonstrates that the existing kitchen extract and fresh air systems comply with the noise condition imposed by Gravesham Borough Council. The rating level at the nearest noise-sensitive receptor is more than 10 dB below the background noise level, which, under the methodology of BS 4142:2014 + A2:2019, *"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"*.

It is therefore concluded that the installation meets the relevant planning noise criteria, and that the current configuration of the plant does not give rise to any significant adverse effects on residential amenity.

APPENDIX A

Glossary of Acoustic Terms

- **Annoyance:** A feeling of displeasure associated with any agent or condition known or believed by an individual or a group to be adversely affecting them. Emotion associated with any noise perceived as irritating or a nuisance.
- **Decibel, dB:** A unit of logarithmic ratio between a sound pressure and a known reference pressure.
- **dB(A):** A weighted dB. A-weighting is an electronic frequency weighting network which attempts to build the human response to different frequencies into the reading indicated by a sound level meter, so that it will relate to this loudness of the noise.
- **Background sound level, $L_{A90,T}$:** A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of given time interval T measured using time weighting F and quoted the nearest whole number of decibels.
- **Ambient sound level, $L_{Aeq,T}$:** Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
- **Residual sound level, $L_{Aeq,T}$:** Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
- **Specific sound level, $L_{Aeq,Tr}$:** Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, Tr .
- **Rating level, $L_{A,Tr}$:** Specific sound level plus an adjustment for the characteristic features of the sound.

APPENDIX B

Policies and Standards

Local Authority Requirements

Gravesham Local Plan Core Strategy (2014)

The Local Plan Core Strategy is the main planning document within the Gravesham Local Plan. Its role is to:

- Set out a long-term vision for the future of Gravesham, based on evidence of need, to support communities and outline what makes Gravesham a distinctive and attractive place to live and work.
- Support and inform sustainable development through investment in infrastructure, economic development, and regeneration proposals within the borough, while promoting healthy communities.
- Provide a consistent and transparent basis for planning application decisions.

British Standard BS 4142:2014 + A1:2019

Methods for rating and assessing industrial and commercial sound

BS 4142 sets out a method for assessing the likely effect of sound from factories, industrial premises, fixed installations, or other sources of an industrial nature within commercial premises, on people who may be inside or outside dwellings or other residential buildings nearby.

The procedure involves comparing the measured or predicted specific sound level ($L_{Aeq,T}$) from the source with the background sound level ($L_{A90,T}$) at the assessment location.

Where the sound contains tonality, impulsivity, intermittency, or other identifiable characteristics, a correction (penalty) is applied to the specific sound level to obtain the rating sound level ($L_{A,r,T}$). A further correction may be included to account for uncertainty in sound measurements, data, or calculations where appropriate.

BS 4142 states:

"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs.

- *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."*

BS 8233:2014 - Guidance on Sound Insulation and Noise Reduction for Buildings

This standard provides recommended guideline values for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation (WHO) document, Guidelines for Community Noise (1999). These guideline noise levels are shown in Table 6 below.

Activity	Location	$L_{Aeq,T}$	
		07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB, $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB, $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB, $L_{Aeq,16h}$	30 dB, $L_{Aeq,8h}$

Table 6: Target values for ambient noise levels in dBA inside residential rooms. BS 8233 (2014)

APPENDIX C

Measurement Data

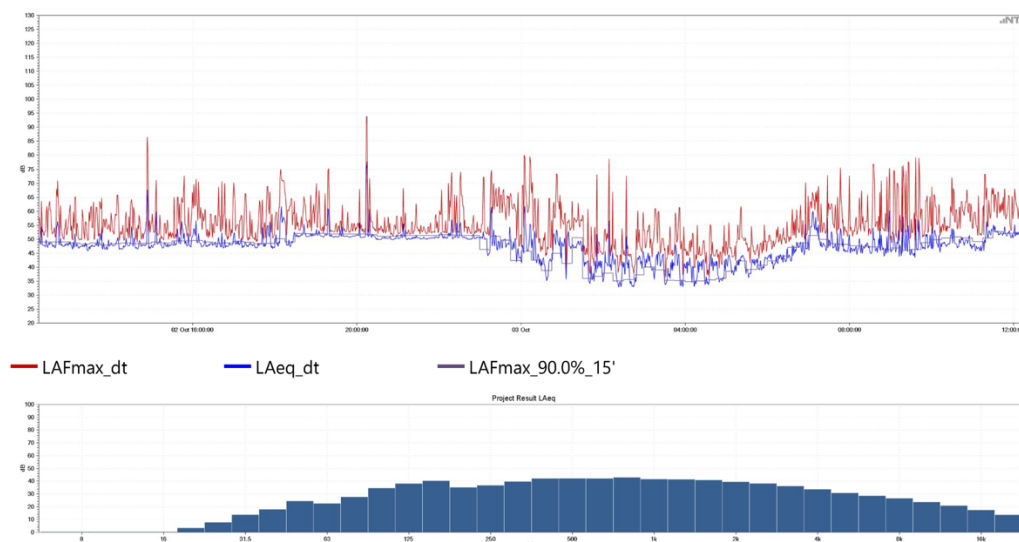


147 Parrock Street, Gravesend, DA12 1EY

Start: 2025-10-02 12:15:02

End: 2025-10-03 12:15:02

Measured Background and Ambient Noise Levels at fixed microphone position.





Results

Type	Start	Duration	LAFmax [dB]	LAeq [dB]	LAFmax
					90.0% [dB]
Recorded	2025-10-02 12:15:02	1 00:00:00	93.7	52.0	
Project Result		1 00:00:00	93.7	52.0	42.9

Audit Intervals

Type	Start	Duration	LAFmax [dB]	LAeq [dB]	LAFmax
					90.0% [dB]
15'	2025-10-02 12:15:00	00:14:58	63.6	49.1	49.0
15'	2025-10-02 12:30:00	00:15:00	71.0	51.1	49.0
15'	2025-10-02 12:45:00	00:15:00	62.0	48.1	49.0
15'	2025-10-02 13:00:00	00:15:00	65.0	48.2	48.6
15'	2025-10-02 13:15:00	00:15:00	60.6	47.3	48.2
15'	2025-10-02 13:30:00	00:15:00	63.4	48.6	48.5
15'	2025-10-02 13:45:00	00:15:00	64.7	48.5	47.8
15'	2025-10-02 14:00:00	00:15:00	65.7	48.2	48.3
15'	2025-10-02 14:15:00	00:15:00	63.3	48.0	48.5
15'	2025-10-02 14:30:00	00:15:00	64.2	49.3	48.3
15'	2025-10-02 14:45:00	00:15:00	86.5	57.1	48.4
15'	2025-10-02 15:00:00	00:15:00	71.1	51.2	49.0
15'	2025-10-02 15:15:00	00:15:00	56.9	47.7	48.6
15'	2025-10-02 15:30:00	00:15:00	65.0	50.8	49.3
15'	2025-10-02 15:45:00	00:15:00	72.6	49.8	49.3
15'	2025-10-02 16:00:00	00:15:00	71.5	51.1	49.5
15'	2025-10-02 16:15:00	00:15:00	60.7	48.1	48.9
15'	2025-10-02 16:30:00	00:15:00	70.6	48.5	48.4
15'	2025-10-02 16:45:00	00:15:00	70.2	48.3	48.5
15'	2025-10-02 17:00:00	00:15:00	66.3	48.8	49.2
15'	2025-10-02 17:15:00	00:15:00	66.2	48.0	48.8
15'	2025-10-02 17:30:00	00:15:00	64.0	48.6	48.3
15'	2025-10-02 17:45:00	00:15:00	68.8	50.8	48.4
15'	2025-10-02 18:00:00	00:15:00	74.9	55.6	50.1
15'	2025-10-02 18:15:00	00:15:00	64.5	50.0	48.9
15'	2025-10-02 18:30:00	00:15:00	65.2	51.8	52.0
15'	2025-10-02 18:45:00	00:15:00	65.7	51.2	51.9
15'	2025-10-02 19:00:00	00:15:00	69.9	51.6	52.0
15'	2025-10-02 19:15:00	00:15:00	75.2	54.1	51.8
15'	2025-10-02 19:30:00	00:15:00	62.3	51.5	51.8
15'	2025-10-02 19:45:00	00:15:00	59.7	51.0	51.8



15'	2025-10-02 20:00:00	00:15:00	93.7	67.8	51.7
15'	2025-10-02 20:15:00	00:15:00	71.7	52.9	51.5
15'	2025-10-02 20:30:00	00:15:00	57.8	50.2	51.0
15'	2025-10-02 20:45:00	00:15:00	58.2	50.3	51.0
15'	2025-10-02 21:00:00	00:15:00	68.2	51.3	51.3
15'	2025-10-02 21:15:00	00:15:00	62.6	50.4	51.3
15'	2025-10-02 21:30:00	00:15:00	54.9	50.1	51.2
15'	2025-10-02 21:45:00	00:15:00	58.8	50.4	51.3
15'	2025-10-02 22:00:00	00:15:00	70.0	51.1	51.5
15'	2025-10-02 22:15:00	00:15:00	73.8	52.2	51.4
15'	2025-10-02 22:30:00	00:15:00	74.0	51.5	51.2
15'	2025-10-02 22:45:00	00:15:00	58.6	50.5	51.2
15'	2025-10-02 23:00:00	00:15:00	72.1	49.4	46.2
15'	2025-10-02 23:15:00	00:15:00	74.6	53.4	51.0
15'	2025-10-02 23:30:00	00:15:00	67.8	49.5	49.6
15'	2025-10-02 23:45:00	00:15:00	66.8	46.6	42.3
15'	2025-10-03 00:00:00	00:15:00	79.9	53.9	45.6
15'	2025-10-03 00:15:00	00:15:00	70.3	46.3	42.4
15'	2025-10-03 00:30:00	00:15:00	64.6	40.8	38.7
15'	2025-10-03 00:45:00	00:15:00	73.3	49.7	44.9
15'	2025-10-03 01:00:00	00:15:00	63.5	48.6	41.3
15'	2025-10-03 01:15:00	00:15:00	62.9	47.9	50.5
15'	2025-10-03 01:30:00	00:15:00	60.7	40.9	35.9
15'	2025-10-03 01:45:00	00:15:00	73.0	42.7	36.7
15'	2025-10-03 02:00:00	00:15:00	78.7	46.4	37.8
15'	2025-10-03 02:15:00	00:15:00	53.8	38.4	35.0
15'	2025-10-03 02:30:00	00:15:00	72.6	41.9	35.5
15'	2025-10-03 02:45:00	00:15:00	60.1	42.2	37.2
15'	2025-10-03 03:00:00	00:15:00	54.9	41.6	40.0
15'	2025-10-03 03:15:00	00:15:00	60.8	42.8	39.0
15'	2025-10-03 03:30:00	00:15:00	54.4	39.0	35.3
15'	2025-10-03 03:45:00	00:15:00	61.2	42.3	35.1
15'	2025-10-03 04:00:00	00:15:00	52.2	39.8	34.7
15'	2025-10-03 04:15:00	00:15:00	54.9	39.9	35.0
15'	2025-10-03 04:30:00	00:15:00	55.2	40.3	35.4
15'	2025-10-03 04:45:00	00:15:00	55.0	38.7	35.9
15'	2025-10-03 05:00:00	00:15:00	55.8	41.0	38.4
15'	2025-10-03 05:15:00	00:15:00	61.6	42.2	42.2
15'	2025-10-03 05:30:00	00:15:00	54.6	40.6	39.1
15'	2025-10-03 05:45:00	00:15:00	55.1	41.3	40.6
15'	2025-10-03 06:00:00	00:15:00	53.4	42.7	42.1
15'	2025-10-03 06:15:00	00:15:00	56.2	43.4	44.0



15'	2025-10-03 06:30:00	00:15:00	60.7	45.8	47.0
15'	2025-10-03 06:45:00	00:15:00	70.2	48.6	48.6
15'	2025-10-03 07:00:00	00:15:00	68.9	55.5	51.3
15'	2025-10-03 07:15:00	00:15:00	72.7	49.9	49.9
15'	2025-10-03 07:30:00	00:15:00	65.1	48.8	48.3
15'	2025-10-03 07:45:00	00:15:00	75.4	49.2	48.1
15'	2025-10-03 08:00:00	00:15:00	64.8	46.6	47.5
15'	2025-10-03 08:15:00	00:15:00	67.3	47.1	47.4
15'	2025-10-03 08:30:00	00:15:00	76.7	49.0	47.1
15'	2025-10-03 08:45:00	00:15:00	75.3	51.3	46.3
15'	2025-10-03 09:00:00	00:15:00	74.4	48.4	46.8
15'	2025-10-03 09:15:00	00:15:00	77.5	51.2	46.0
15'	2025-10-03 09:30:00	00:15:00	79.1	50.5	46.3
15'	2025-10-03 09:45:00	00:15:00	65.5	48.8	48.7
15'	2025-10-03 10:00:00	00:15:00	68.6	50.1	49.7
15'	2025-10-03 10:15:00	00:15:00	72.0	49.4	50.4
15'	2025-10-03 10:30:00	00:15:00	68.2	49.5	50.7
15'	2025-10-03 10:45:00	00:15:00	67.7	49.1	50.4
15'	2025-10-03 11:00:00	00:15:00	65.4	47.0	49.1
15'	2025-10-03 11:15:00	00:15:00	73.1	52.1	50.3
15'	2025-10-03 11:30:00	00:15:00	68.2	52.6	52.6
15'	2025-10-03 11:45:00	00:15:00	68.0	51.8	52.0
15'	2025-10-03 12:00:00	00:15:00	74.1	53.5	52.3
15'	2025-10-03 12:15:00	00:00:02	51.1	49.8	51.1

APPENDIX D

Survey Photographs



Figure 4 – Site Measurements