

SHARPS REDMORE

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Report

Lower Thames Crossing – Proposed M25 widening and related works

Prepared by

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Project No 2321638

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1.0 Introduction

- 1.1 Sharps Redmore has been instructed on behalf of the owner of Franks Farm, St Mary's Lane, Cranham, Upminster, RM14 3NU to undertake an acoustic review of the noise and vibration assessment carried out as part of the Lower Thames Crossing (LTC) Development Consent Order (DCO). As part of the development it is proposed to widen the M25 which runs along the eastern boundary of the property as shown below:

Franks Farm, St Mary's Lane



- 1.2 Sharps Redmore has previously carried out a review of the LTC consultation documents, which included a noise survey to establish baseline conditions. The review considered the impact of both construction noise and road traffic noise and concluded the following:

Construction Noise

No details of the construction methodology have been carried out however it is likely that due to site constraints construction to build the new highway will result in evening and night time working. During these periods there is potential for noise from construction works to cause significant adverse impacts to Franks Farm. Due to the topography of the site it will not be possible to screen these works.

Operational Noise

- 1.3 Existing noise levels from road traffic on the M25 currently exceed the recommended guideline values in BS 8233:2014, which has a significant impact on the quality of life of our client. Noise from road traffic has increased since the owner purchased the property in 1980, and opportunities to mitigate the noise during either the original construction of the M25 and the widening works in 2012 have not been taken. Therefore, although it was agreed that the change in noise level would be negligible the proposals will exacerbate the existing situation and it is SR's view that consideration must be given to mitigate, through either acoustic screening along the boundary of the new carriageway or an alternative scheme which will not result in increased noise levels.
- 1.3 An Environmental Statement has been submitted as part of the DCO application, Chapter 12 considers the impact of noise and vibration, including the creation of two additional lanes on the western side of the M25 which forms the eastern boundary of Franks Farm.

- 1.4 The purpose of this report is to consider the impact of both the construction and operational phase of the proposed works. The assessment takes into account the information provided in Chapter 12 'Noise and Vibration' of the Environmental Statement and the relevant appendices. The report also refers to the policy aims contained within the National Policy Statement of National Networks (NPPSNN).
- 1.5 Sharps Redmore has also carried out an updated noise baseline noise survey at Franks Farm. Full details of the survey are included in section 3.0 of this report.
- 1.6 The report is structured as follows:
- Section 2.0: Assessment Methodology and Criteria
 - Section 3.0: Existing noise levels
 - Section 4.0: Noise from construction phase
 - Section 4.0: Noise from Road Traffic
 - Section 5.0: Summary and Conclusions

2.0 Assessment Methodology

2.1 The primary guidance on national road projects which will be used by the Secretary of State (SoS) for making decisions on DCO applications is the NPSNN. Paragraphs 5.186 to 5.200 sets out the factors that will likely determine noise impacts from the project. Specifically, para 5.188 of the NPSNN identifies factors that will determine the likely noise impact and includes:

- Construction noise and the inherent operational noise from the proposed development and its characteristics;
- The proximity of the proposed development to noise sensitive premises;
- The proximity of the proposed development to quiet places and other areas that are particularly valued for their tranquillity;
- The proximity of the proposed development to designated sites where noise may have adverse impact on the special features of interest.

2.2 The main policy aims in relation to noise are contained within section 5.195 of the NPSNN are as follows:

“Should not grant development consent unless satisfied that the proposals will meet the following aims:

- *Avoid significant adverse impacts on health and quality of life from noise as a result of the new development;*
- *Mitigate and minimise other adverse impacts on health and quality of life from noise from the new development;*
- *Contribute to improvements to health and quality of life through the effective management and control of noise, where possible.”*

2.3 With regard to decision-making it is recommended that the project should demonstrate good design to minimise noise emissions and where possible use landscaping, bunds or barriers to reduce noise transmission.

2.4 The NPSNN is currently under review (March 2023) however in terms of noise there are no material changes to the guidance.

2.5 The policy aims of the NPSNN are consistent with those found in the both the National Planning Policy Framework (NPPF) and the Noise Policy Statement for England (NPSE).

2.6 The NPPF, sets out the Government’s planning policies for England and “these policies articulate the Government’s vision of sustainable development.” In respect of noise, Paragraph 180 of the NPPF states the following:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they 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 the 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; and*
- c) *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation”.*

2.7 The Noise Policy Statement for England(NPSE), states three policy aims, as follows:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

2.8 From a review of the main policy documents it is clear that any development should not only avoid giving rise to significant adverse impacts but should where possible, contribute to the improvement of health and quality life. This is particularly relevant in this case where, as advised in section 1.0, of this report the health and quality of life of the owner has gradually deteriorated through as a result of construction and previous widening of the M25.

Legislative Requirements

Construction Noise

Control of Pollution Act 1974

2.9 Part III of the Control of Pollution Act 1974, which gives local authorities the power to control noise from construction sites either by prior consent (section 61) or by service of notice (section 60). Applications for prior consent under section 61 are made by the construction contractor to the relevant local authority and generally contain a method statement of the works and steps to be taken to minimise noise.

BS 5288-1 and BS 5228-2: 2009+A1:2014

2.10 Further guidance on the assessment of construction noise and vibration is contained within the above standards, which provides a method for predicting noise from construction activity or equipment. It is the accepted Standard employed for the assessment of construction noise and vibration. The Standard also provides a framework for good practice and guidance on the mitigation of noise by, for example, the selection of plant or use of screens and enclosures.

2.11 Annex E of BS 5228 provides guidance on criteria for the assessment of significance of noise effects and outlines three approaches:

- i. That noise levels should not exceed 70 – 75 dB L_{AeqT} ;
- ii. That noise levels should not exceed thresholds determined from existing ambient noise levels:

A – 65 dB L_{Aeq} (daytime) where ambient noise levels (rounded to the nearest 5 dB are less than this value;

B – 70 dB L_{Aeq} (daytime) where ambient noise levels (rounded to the nearest 5 dB are the same as the threshold A value;

C – 75 dB L_{Aeq} (daytime) where ambient noise levels (rounded to the nearest 5 dB are above the threshold are above the threshold A value; and

iii. That noise levels are deemed to be significant if the total noise (ambient + construction noise) exceeds the pre-construction ambient noise level by 5 dB or more, subject to a lower cut-off values of 65 dB ($L_{Aeq,period}$)

2.12 The standard suggests that evening limits 5 dB lower than daytime limits and a further reduction of 5 dB for night time activity and that noise levels may need to be as low as $LA_{Aeq1hr} = 40$ dB at night to avoid sleep disturbance and that noise limits during the evening may have to be as much as 10 dBA below the daytime limit.

Operation Noise

Noise Insulation Regulations 1975 (amended 1988)

2.13 The Noise Insulation Regulations 1975 (amended 1988) places a duty on local authorities to carry out or make grants for the cost of, work to insulate certain residential properties. There is a mandatory duty on the highways authority in case of:

- a) a new highway;
- b) a highway for which an additional carriageway has been or is to be constructed;
- c) a highway or additional carriageway first opened to public traffic after 16 October 1971.

The entitlement to sound insulation works depends on compliance with certain qualifying conditions:

- a) the use of the highway to which the regulations apply must cause or to be expected to cause noise at a level not less than 68 dB $L_{A10(18\text{ hour})}$ when measured one metre in front of the most exposed of any windows and doors in the façade of a building;
- b) The noise levels referred to above must exceed the noise level attributable to traffic at the same measurement points by at least 1 dB(A);
- c) The noise caused or expected to be caused by traffic using or expected to use the highway must make an effective contribution to the noise measured of at least 1 dB(A).

Land Compensation Act 1973

2.11 Part 1 of the Land Compensation Act provides a means by which compensation can be paid by Noise Making Authorities to owners of land or property which has experienced a loss in value caused by the use of public works, such as new or improved roads. Noise and vibration are two of the factors which would be considered for any claims for compensation.

Design Guidance

There are a number of guidance documents that contain recommended guideline noise values. These are discussed below.

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

- 2.12 The current nationally recommended internal noise levels for dwellings are given in BS 8233:2014 'Guidance on Sound Insulation & Noise Reduction for Buildings'. BS 8233 recommends the following internal noise standards:

Table 1: Internal Noise Level Criteria

BS 8233:2014 Table 4 – Indoor ambient noise levels for dwellings			
Activity	Location	0700 to 2300	2300 to 0700
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

- 2.13 There is no longer a L_{AMAX} standard for bedrooms in BS 8233. However, footnote 4 to Table 4 states that “Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values.” In this case, it is proposed that the previous BS 8233 internal standard (also referenced in World Health Organisation Guidelines for Community Noise) is applied. This is 45 dB L_{AMAX} , inside bedrooms.

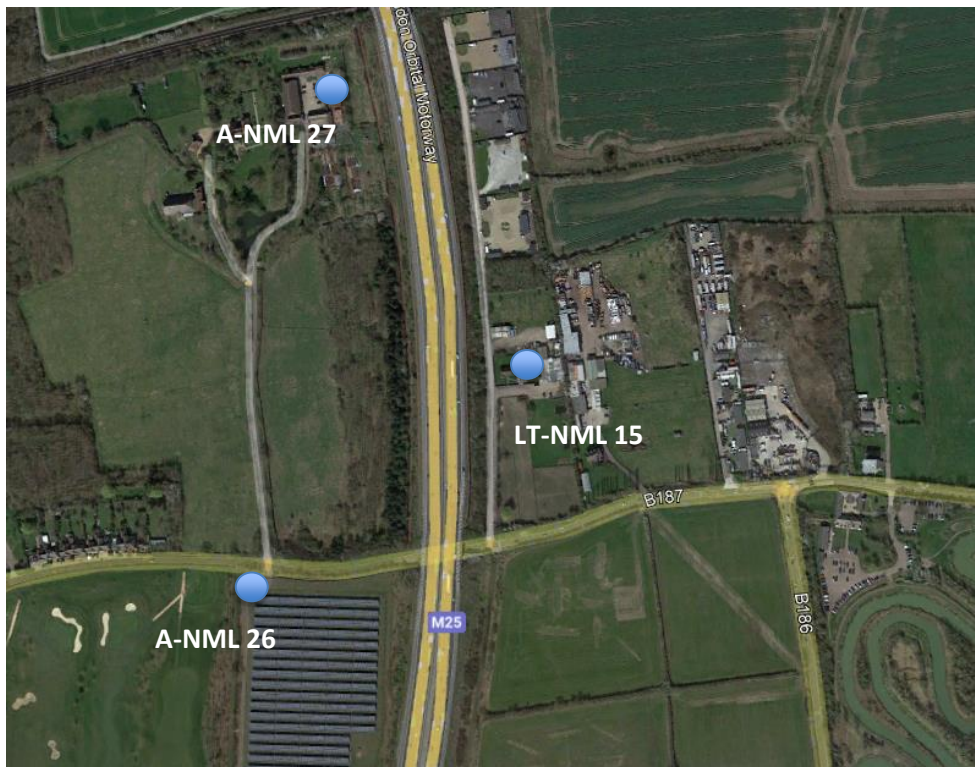
External Areas (Garden and Balconies)

- 2.14 For outdoor areas (i.e. balconies), BS 8233:2014 recommends that “it is desirable that the external noise level does not exceed 50 dB L_{AeqT} , with an upper guideline value of 55 dB L_{AeqT} ” However, the document recognises that these guideline values are not achievable in all circumstances and in higher noise areas, a compromise might be warranted. In such circumstances, development should be designed to achieve the lowest practicable levels in these external amenity spaces.

3.0 Existing Noise Environment

3.1 Baseline conditions are considered in section 12.4 of the Environmental Statement. Due to the size of the study the survey area was divided into eight discrete geographical sections. Franks Farm is included in the section (e) 'Along the existing M25 between the Dartford Crossing and M25 junction 28.' Within this section, a total of three-hour attended, one 24-hour unattended and three seven-day unattended noise surveys were carried out. Locations relevant to Franks Farm, include the attended noise monitoring locations (A-NML) 26 -St Marys Lane, A-NML 27– Fitness & in Health, Franks Farm and the long term attended measurements (LT-NML) 15 – Latchford Farm Aquatics, St Marys Lane. The survey locations are shown below.

FIGURE 2: Survey Locations



3.2 The results of the survey are shown in Appendix 12.5 of the ES and summarised in Table 2 below:

TABLE 2: Summary Noise Survey Results

Reference	Survey Date	Daytime (0700 -2300hrs)		Night time (2300 – 0700 hrs)	
		L _{A10,18hr}	L _{Aeq,16hr}	L _{A10,6hr}	L _{Aeq8hr}
A-NML 26	22.07.19	65.2	63.2 ^[1]	--	--
A-NML 27	05.06.18	65.6	63.6 ^[1]	--	--
LT-NML 15	15.07.19 – 23.07.19	63.2	62.3	61.5	59.5

[1] Calculated using equation $L_{Aeq16hr} = L_{A10,18hr} - 2dB$

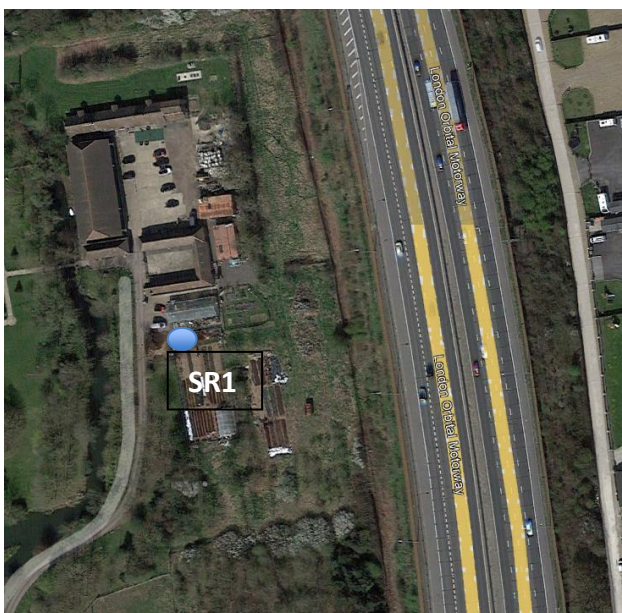
3.4 Sharps Redmore carried out its own survey in 2018 as part of its review of the LTC consultation documents. Measurements at a similar location to A-NML 27 but unlike the above survey included both daytime and night time noise levels. Weather conditions during the survey were varied however only results when weather conditions were suitable for taking noise measurements have been included. The survey results are summarised in table 3 below:

TABLE 3: Sharps Redmore Noise Survey – Franks Farm -November 2018

Day time (0700 – 2300 hrs)		Night time (2300 – 0700 hrs)	
L _{A10,18hr}	L _{Aeq,16hr}	L _{A10,6hr}	L _{Aeq,8hr}
67	66	66	65

3.5 To update the survey a further survey was carried out between 24 and 28 March 2023. The sound level was set up at the same location (SR1) as the previous survey carried out by SR in 2018, approximately 65 metres from the M25. The site location is shown below:

FIGURE 3: SR Monitoring Location



3.6 The survey was carried out using a Norsonic type 1 sound level meter which was calibrated before and after the survey with no drift in accuracy was found. Weather conditions during the survey were generally satisfactory for carrying out noise measurements with the exception of Saturday 25 March, when there was a strong westerly breeze. These results are shown but not included in any analysis of the data. Full survey results are included in Appendix A to this report and summarised below.

FIGURE 4: Survey Results SR1 – 24 – 28 March 2023.

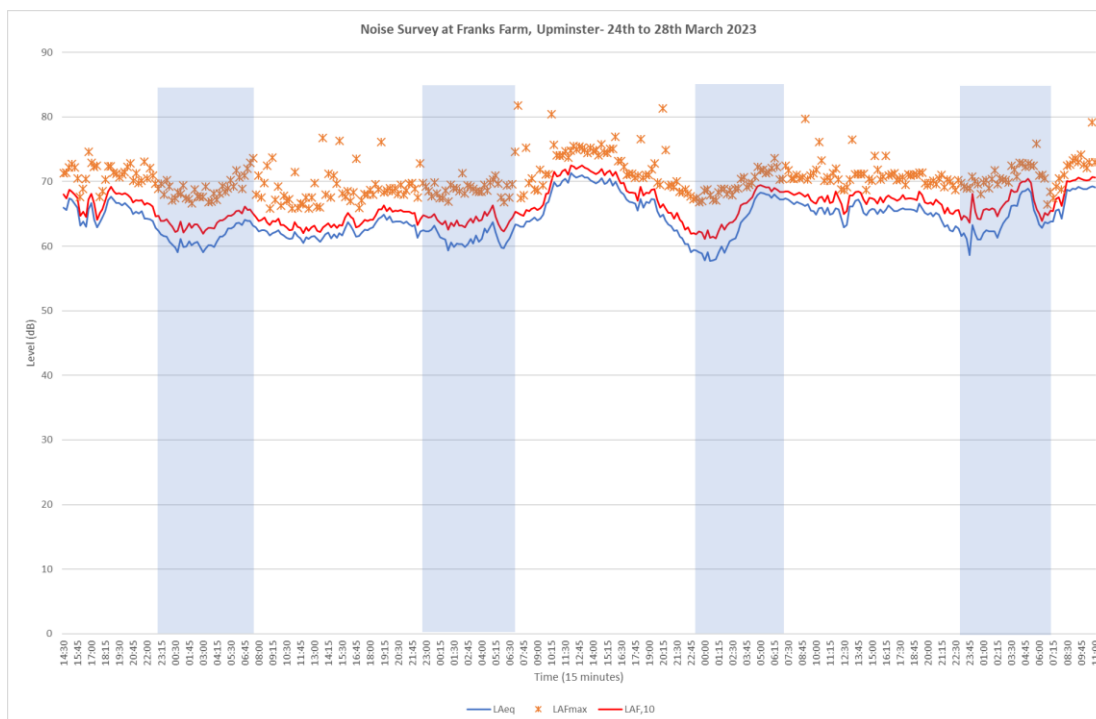


TABLE 4: Sharps Redmore Survey – Franks Farm

Date	Day time (0700 – 2300 hrs)		Night time (2300 – 0700 hrs)		Weather conditions
	L _{A10,18hr}	L _{Aeq,16hr}	L _{A10,6hr}	L _{Aeq,8hr}	
24.3.23	66.7 ^[2]	65.5 ^[2]	63.2	61.4	SW breeze, short period rain
25.3.23	64.1	62.6	63.9	61.4	Strong W breeze
26.3.23	67.8	67.8	65.2	64.5	Light, N/NW breeze
27.3.23	67.1	65.6	67.0	64.6	Light breeze
28.2.23	68.2 ^[2]	67.9 ^[2]	--	--	

^[2] Part day only

- 3.7 Noise levels measured on a weekday were typically 67 dB L_{A10,18r} during the day and 65 dB during the L_{Aeq,16hr}, this is slightly higher than those measured and reported at A-NML-27. It would appear from the survey details provided in Appendix 12.5 of the ES that A-NML-27 was taken in the yard, which unlike the SR1 was partially screened from the M25 by buildings. This is likely to account for the differences in noise levels measured.
- 3.8 As discussed during the review of the consultation documents an environmental survey was carried out at Franks Farm, in 2010. This survey by Acoustical Investigation and Research Organisation Ltd (AIRO) was undertaken prior to the widening of the M25 motorway (Junctions 29 to 30) from 3 lanes to the current 4 lanes. The report prepared by AIRO Reference 6465 (dated 29 November 2010) includes details of a noise survey undertaken at Franks Farm. Noise levels were recorded at two locations as shown below:

FIGURE 5: Monitoring locations AIRO survey 2010



3.7 Table 5 below shows the noise levels measured by AIRO at location A and B.

TABLE 5: AIRO Survey Results – 19th – 23rd October 2010

	Day Time (0700 – 2300 hrs)			Night time (2300 – 0700 hrs)		
	L _{Aeq}	L _{Amax}	L _{A10} ¹	L _{Aeq}	L _{Amax}	L _{A10}
Location A	62	82	63	63	78	--
Location B	62	81	62	62	72	--

¹L_{A10,18hr} is based on 06:00 to 24:00 period.

3.8 To compare the noise levels measured by SR to those recorded at locations A and B by AIRO, approximately 115 metres from the site boundary, the above results have been corrected based on distance correction $10 \log^{(65/115)}$.

TABLE 6: Noise levels 2010 v Noise levels 2019 – Franks Farmhouse

	Day Time (0700 – 2300 hrs)		Night time (2300 – 0700 hrs)
	L _{Aeq,16hr}	L _{A10,18hr}	L _{Aeq}
AIRO Location A	64	65	65
AIRO Location B	64	64	64
SR Nov 2019	66	67	65
SR March 2023	66	67	64

3.9 Based on surveyed noise levels there has been a slight increase in noise from M25 since the road was widened to add a 4 carriageway in 2010. This is not unexpected taking into account the increased traffic flows on M25 since the work was carried out.

4.0 Construction Noise and Vibration

- 3.1 Calculations for the assessment of noise and vibration from construction activity are included in Appendix 12.4 of the Environmental Statement. In relation to Franks Farm, location CN134, 8 Franks Cottages, St Marys Lane is considered relevant.
- 3.2 Based on the calculations provided it has been concluded that, prior to mitigation, noise from construction activity will exceed the Significant Observed Adverse Effect Level (SOAEL) during the both the evening and night time period. This is the same as the results of the initial assessment carried out by SR at the consultation stage.
- 3.3 It is advised in Appendix 12.4. that best practicable means (REAC Ref NV007) will be employed and included as embedded mitigation to reduce noise levels. It has been suggested that this will reduce noise levels by at least 10 dB with additional mitigation in the form of localised enclosures around drilling equipment to reduce noise levels by around 15 dB. Based on the mitigation measures it is concluded that the impact from construction noise would be reduced to below the SOAEL and therefore would not constitute a significant effect.
- 3.6 The impact of noise from construction activity is based on assumptions made regarding the type and number of construction plant. This is not unusual for developments at the planning stage where the contractor is yet to be appointed, however it does mean that there is a degree of uncertainty in the calculations and effectiveness of the mitigation measures. This should be taken into account when appraising the conclusions of the construction assessment and in particular the proposed reduction suggested from the mitigation measures, which have not been quantified.
- 3.7 Due to the operational constraints on the work it is inevitable that a significant amount of work will take place during the evening and night time period, especially with regard to the works to widen the bridge over the rail line which runs to the north of the site.
- 3.9 Whilst construction work is generally regarded as temporary, due to the scale of the project it is likely that construction works including evening and night time activity will potentially occur continuously for several months if not years during the construction phase.
- 3.10 The majority of the works will take place within 100 metres from our client's property and therefore even having regard to the mitigation measures proposed, construction noise will have the potential to cause impacts such as sleep disturbance to the owner during these periods.

5.0 Noise from road traffic

- 5.1 Operational noise impacts have been assessed in accordance with the Highways England Design Manual for Road and Bridges (DMRB) LA111 Noise and Vibration. This document set out the requirements for noise and vibration effects associated with construction, improvement, use and maintenance of motorways and all-purpose trunk roads. In accordance with the guidance in LA111 noise predictions, both short-term and long-term have been carried out in accordance with the Calculation of Road Traffic Noise (CRTN). The results of the modelling is presented in Figure 12.7 'Opening year noise contour' and Figure 12.8 'Future year noise contour'.
- 5.2 The impact of operational noise on Franks Farm is considered in paragraphs 12.6.150 and 12.6.160 of the ES Chapter within the section 'Along the existing M25 between M25 junction 28 and the Dartford Crossing. Although it is not specifically referenced within the assessment based on noise predictions carried out as presented in Figure 12.7 and 12.8 it would indicate that there will be an overall noise reduction in noise levels of at least 3dB. As a result, there will be a moderate or greater beneficial change in noise levels at Franks Farm. This is due to the new highway partially screening the M25. Based on our noise measurements which indicated that noise levels are around 2 dB higher than those reported in the Environmental Statement, there would still be a reduction in noise levels, however the actual noise levels would be still be around 63 dB $L_{Aeq,16hr}$ during the day and 61 dB $L_{Aeq,8hr}$ during the night.
- 5.3 While it is not possible to validate the noise predictions carried out, we can confirm (as advised above) that they have been carried out in accordance with relevant guidance and are also consistent with the findings of the consultation documents which also indicated a slight reduction in noise levels.
- 5.4 Notwithstanding the above as discussed in section 2.0 of the report, one of the underlying aims of national policy, including the NPSNN, is that developments should contribute to improvements to health and quality of life through the effective management and control of noise. The occupier of Franks Farm has lived in the property for many years and has seen noise levels steadily rise as a result of increased traffic on the M25 and the previous widening works which have been carried out. Even taking into account a 3dB reduction in noise levels as predicted, overall noise levels at Franks Farm would still be the same as in 2010 before the previous widening of the M25 in 2010 and the owners of Franks Farm would continue to experience high levels of noise.
- 5.5 Noise levels in the garden at Franks Farm would still be significantly above those recommended in BS 8233:2014 which recommends the external noise levels in gardens should be between 50 – 55 dB $L_{Aeq,16hr}$. The site is adjacent to the M25 and therefore this is not to be unexpected, however the current works do provide an opportunity to further reduce noise levels and improve the health and quality of life of our client by including an acoustic barrier along the western boundary of the new slip road.
- 5.6 Sharps Redmore has previously considered the effect of a 2m high acoustic fence along the eastern boundary of the new carriageway and calculated that this would reduce noise levels by around 6 dB. This would be a noticeable reduction and combined with the reduction in noise levels predicted in the Environmental Statement would result in a significant improvement to the health and quality of life of residents at Franks Farm.

6.0 Summary and Conclusions

6.1 Sharps Redmore has been instructed on behalf of the owner of Franks Farm, St Mary's Lane, Cranham, to undertake an acoustic review of the statutory consultation for the Lower Thames Crossing (LTC).

6.2 Having reviewed the documents submitted as part of the DCO application including Chapter 12 'Noise and Vibration' of the Environmental Statement, and based on this information and an updated noise survey the following has been concluded:

Baseline Noise Levels

6.3 A survey of existing baseline noise levels has been carried out at Franks Farm. It is shown that existing noise levels are higher than those measured as part of the baseline survey as specified in the Environmental Statement.

Construction Noise

6.4 An assessment of construction noise has been carried out and identified a potential significant risk at Franks Farm during the evening and night time periods. Mitigation measures, based on good industry practice, are recommended and estimation made to quantify the impact of these measures. No evidence has been provided to support the assumptions made, and without this there is an element of uncertainty in the conclusion that no significant adverse impact will occur. Taking into account the duration of the works, which is likely to take months and possibly years to complete these is a risk that construction work, particularly during the night time period, will cause sleep disturbance and impact on the health and quality of life of our client.

Operational Noise

6.5 The predicted noise levels from road traffic from both short term and long term will reduce following the development resulting in a potential moderate beneficial impact at Franks Farm.

6.6 However, even taking into account the reduction in noise levels the proposed noise levels would only be returned to the level measured in 2010 prior to the previous widening works carried out. Noise levels would still be above those when the property was purchased in 1980 and will be above the recommended criteria for external criteria in BS 8233:2014.

6.6 It is SR's view that consideration should be given to mitigate, through acoustic screening along the boundary of the new carriageway to reduce noise levels and in line with the policy aims of the NPSNN to improve health and quality of life.

APPENDIX A

SURVEY RESULTS

Date	Noise Level dB				
	L _{Aeq}	L _{Afmax}	L _{Afmin}	L _{A10}	L _{Af,90}
(2023/03/24 14:30:01.00)	66	71.3	60.7	68	62.8
(2023/03/24 14:45:01.00)	65.6	71.4	60.5	67.4	63.1
(2023/03/24 15:00:01.00)	67.4	72.2	63.3	68.7	65.8
(2023/03/24 15:15:01.00)	67.2	72.7	62.3	68.5	65.5
(2023/03/24 15:30:01.00)	66.6	72.2	62.1	68	64.8
(2023/03/24 15:45:01.00)	66	70.5	61.2	67.5	63.9
(2023/03/24 16:00:01.00)	63.2	67.6	59	64.7	61.2
(2023/03/24 16:15:01.00)	63.8	68.9	59.5	65.3	61.9
(2023/03/24 16:30:01.00)	63	70.4	58.3	64.5	60.8
(2023/03/24 16:45:01.00)	65.7	74.6	62.1	67.2	63.8
(2023/03/24 17:00:01.00)	66.7	72.9	62.2	68.1	64.8
(2023/03/24 17:15:01.00)	64.1	72.3	59.6	66.6	61.5
(2023/03/24 17:30:01.00)	62.9	72.5	58.8	64.1	61.1
(2023/03/24 17:45:01.00)	63.7	67.6	59.8	65.2	61.8
(2023/03/24 18:00:01.00)	64.4	68.5	60.8	65.7	62.7
(2023/03/24 18:15:01.00)	65.4	70.3	61.3	67	63.4
(2023/03/24 18:30:01.00)	67.1	72.4	63.1	68.5	65.3
(2023/03/24 18:45:01.00)	67.7	72.4	63.6	69.2	65.9
(2023/03/24 19:00:01.00)	67.1	71.4	63.4	68.5	65.6
(2023/03/24 19:15:01.00)	66.7	71.2	62.8	68.1	65
(2023/03/24 19:30:01.00)	66.7	70.7	62.7	68.2	64.7
(2023/03/24 19:45:01.00)	66.3	71.1	59.5	68	63.9
(2023/03/24 20:00:01.00)	66.7	71.5	60.6	68.2	64.5
(2023/03/24 20:15:01.00)	66.2	72.3	60.5	67.9	64
(2023/03/24 20:30:01.00)	65.8	72.8	60.7	67.5	63.5
(2023/03/24 20:45:01.00)	65	70.1	59.2	66.8	62.6
(2023/03/24 21:00:01.00)	65.3	71.3	60	67.1	62.8
(2023/03/24 21:15:01.00)	65.1	69.8	58.9	67	62.4
(2023/03/24 21:30:01.00)	65.4	70.1	58.2	67.1	63
(2023/03/24 21:45:01.00)	64.3	73.1	58.5	66.4	61.2
(2023/03/24 22:00:01.00)	64.3	70.5	54.8	66.7	60.2
(2023/03/24 22:15:01.00)	64.2	72.1	55.6	66.5	60.6
(2023/03/24 22:30:01.00)	63.9	70.9	56.8	66.1	60.5
(2023/03/24 22:45:01.00)	62.8	69.7	56.2	64.6	59.9
(2023/03/24 23:00:01.00)	62.4	68.9	55	64.7	58.7
(2023/03/24 23:15:01.00)	61.8	69.7	53	63.9	58.3
(2023/03/24 23:30:01.00)	61.6	68	53.2	63.9	57.6
(2023/03/24 23:45:01.00)	61.5	70.2	48.3	64.2	55.4
(2023/03/25 00:00:01.00)	60.7	69.2	51.5	63.5	55.8
(2023/03/25 00:15:01.00)	60.2	67.1	52.5	63	55.9
(2023/03/25 00:30:01.00)	59.8	67.4	52.7	62.2	56
(2023/03/25 00:45:01.00)	59.1	68.3	47.5	62.4	51.6

(2023/03/25 01:00:01.00)	61.1	68.1	51.5	63.8	55.8
(2023/03/25 01:15:01.00)	59.9	69.4	52.7	62.1	56.1
(2023/03/25 01:30:01.00)	60	67.4	50	62.7	55.8
(2023/03/25 01:45:01.00)	60.8	67.3	51.4	63.5	56.1
(2023/03/25 02:00:01.00)	60.1	66.6	51	62.8	55
(2023/03/25 02:15:01.00)	60.5	68.8	50	63.4	55.5
(2023/03/25 02:30:01.00)	60.7	67.7	50.7	63.4	55.5
(2023/03/25 02:45:01.00)	59.9	67.6	49.5	62.7	53.8
(2023/03/25 03:00:01.00)	59.1	67.6	48.1	61.9	53.7
(2023/03/25 03:15:01.00)	59.6	69.2	49.7	62.5	54.6
(2023/03/25 03:30:01.00)	60.1	66.8	50.5	62.8	54.9
(2023/03/25 03:45:01.00)	60.1	66.9	51.1	62.8	54.2
(2023/03/25 04:00:01.00)	59.9	68.2	50.6	62.7	54.5
(2023/03/25 04:15:01.00)	60.8	67.2	51.7	63.6	56.2
(2023/03/25 04:30:01.00)	61.5	68.2	52.6	64	57.4
(2023/03/25 04:45:01.00)	61.5	69.3	51.2	64	57.6
(2023/03/25 05:00:01.00)	61.8	68.4	54.9	64.3	58
(2023/03/25 05:15:01.00)	62.7	69	54.8	64.7	59.7
(2023/03/25 05:30:01.00)	62.7	70.2	56.3	64.7	60
(2023/03/25 05:45:01.00)	63	69.2	56.4	65	60.3
(2023/03/25 06:00:01.00)	63.5	71.7	58.2	65.4	60.9
(2023/03/25 06:15:01.00)	63.6	70.7	57.9	65.5	61.1
(2023/03/25 06:30:01.00)	63.3	68.9	57.9	65.1	60.7
(2023/03/25 06:45:01.00)	64.1	70.9	58.3	66.1	61.4
(2023/03/25 07:00:01.00)	63.9	72	58.6	65.6	61.3
(2023/03/25 07:15:01.00)	63.9	72.9	59	65.7	61.7
(2023/03/25 07:30:01.00)	63.2	73.6	55.3	65.1	60.3
(2023/03/25 07:45:01.00)	62.9	68	58.1	64.5	60.8
(2023/03/25 08:00:01.00)	62.3	70.9	57.9	63.9	60.6
(2023/03/25 08:15:01.00)	62.5	67.5	57.4	64.1	60.5
(2023/03/25 08:30:01.00)	62.5	69.8	57.6	64.4	60
(2023/03/25 08:45:01.00)	62.3	72.5	58	63.7	60.4
(2023/03/25 09:00:01.00)	61.7	65.8	56.9	63.3	59.9
(2023/03/25 09:15:01.00)	62	73.7	55	63.9	58.5
(2023/03/25 09:30:01.00)	62.2	67.2	58.1	63.8	60.2
(2023/03/25 09:45:01.00)	62.5	69.2	57.5	64.3	60.3
(2023/03/25 10:00:01.00)	61.9	66.3	58.3	63.3	60.2
(2023/03/25 10:15:01.00)	61.7	67.8	57.2	63.3	59.7
(2023/03/25 10:30:01.00)	61.3	67	57.4	62.9	59.4
(2023/03/25 10:45:01.00)	61.1	67.3	57.3	62.5	59.5
(2023/03/25 11:00:01.00)	61.2	65.8	57	62.6	59.4
(2023/03/25 11:15:01.00)	62.2	71.5	58.2	63.7	60.4
(2023/03/25 11:30:01.00)	61.6	65.9	57.8	63	59.9
(2023/03/25 11:45:01.00)	61.2	66.6	57	62.8	59.2
(2023/03/25 12:00:01.00)	60.5	66.5	57	62	58.7
(2023/03/25 12:15:01.00)	61.4	67.5	57	62.9	59.6
(2023/03/25 12:30:01.00)	61.1	65.8	57.6	62.4	59.5

(2023/03/25 12:45:01.00)	61.5	67.5	57.5	62.9	59.8
(2023/03/25 13:00:01.00)	61.6	69.8	57.9	63.2	59.8
(2023/03/25 13:15:01.00)	61.1	66.1	57.9	62.4	59.3
(2023/03/25 13:30:01.00)	60.7	66	56.9	62.2	58.7
(2023/03/25 13:45:01.00)	61.3	76.8	56.7	62.9	59.2
(2023/03/25 14:00:01.00)	61.8	68	58.1	63.2	60.2
(2023/03/25 14:15:02.00)	62.1	71.2	57.2	63.5	60.2
(2023/03/25 14:30:01.00)	61.2	67.5	56.3	62.9	59.3
(2023/03/25 14:45:01.00)	61.8	70.9	57.5	63.4	59.7
(2023/03/25 15:00:01.00)	61.3	69.7	57.3	62.8	59.4
(2023/03/25 15:15:01.00)	62	76.3	57	63.3	59.6
(2023/03/25 15:30:01.00)	61.7	68.2	57	63.2	59.9
(2023/03/25 15:45:02.00)	62.7	67.6	58.2	64.4	60.2
(2023/03/25 16:00:02.00)	63.7	68.5	59.2	65.2	61.9
(2023/03/25 16:15:01.00)	63.1	67	58.8	64.5	61.4
(2023/03/25 16:30:01.00)	62.5	68.3	57.4	64.3	60.2
(2023/03/25 16:45:01.00)	61.5	73.5	57.6	62.9	59.6
(2023/03/25 17:00:01.00)	61.6	65.9	58	63.1	59.8
(2023/03/25 17:15:01.00)	62.1	67.1	58.4	63.5	60.3
(2023/03/25 17:30:01.00)	62.6	68.1	58.8	64.1	60.9
(2023/03/25 17:45:01.00)	62.5	68	57.5	63.9	60.6
(2023/03/25 18:00:02.00)	62.7	68.7	59.3	64.1	61
(2023/03/25 18:15:02.00)	62.9	68	59.5	64.1	61.3
(2023/03/25 18:30:01.00)	63.6	69.6	58.6	64.8	62.2
(2023/03/25 18:45:01.00)	64.3	68.8	60.6	65.7	62.8
(2023/03/25 19:00:01.00)	64.5	76.1	60.1	65.7	62.7
(2023/03/25 19:15:02.00)	64.9	68.3	60.4	66.3	63.1
(2023/03/25 19:30:02.00)	64.1	68.6	59.9	65.4	62.5
(2023/03/25 19:45:01.00)	64.6	69	59.7	66	62.5
(2023/03/25 20:00:01.00)	63.7	68.5	55.8	65.3	61.6
(2023/03/25 20:15:01.00)	63.8	69	58.3	65.5	61.6
(2023/03/25 20:30:02.00)	63.8	68.1	58.2	65.4	61.8
(2023/03/25 20:45:01.00)	63.8	69.5	56.7	65.6	61.2
(2023/03/25 21:00:01.00)	63.5	68	55.6	65.3	60.9
(2023/03/25 21:15:01.00)	63.8	68.6	58.9	65.3	61.5
(2023/03/25 21:30:02.00)	63.4	69.7	57.9	65.3	60.9
(2023/03/25 21:45:02.00)	63.1	69.8	55.1	65.1	60.3
(2023/03/25 22:00:02.00)	63.3	68.9	56.6	65.2	60.7
(2023/03/25 22:15:01.00)	61.3	67.5	54.1	63.3	58.1
(2023/03/25 22:30:01.00)	62.3	72.8	55.6	64.2	59.1
(2023/03/25 22:45:01.00)	62.5	69.8	51.9	64.8	58
(2023/03/25 23:00:02.00)	62.3	69.2	52.9	64.6	58.5
(2023/03/25 23:15:02.00)	62.3	68.5	55.6	64.4	59.1
(2023/03/25 23:30:02.00)	62.6	67.7	54.8	64.5	60
(2023/03/25 23:45:02.00)	63.2	69.9	54.8	65	60.3
(2023/03/26 00:00:02.00)	62.3	68.2	56.2	64.1	59.4
(2023/03/26 00:15:01.00)	61.4	67.4	53.1	63.6	58

(2023/03/26 00:30:01.00)	61.2	67.4	52.8	63.4	56.6
(2023/03/26 00:45:01.00)	61	68.6	51	63.9	55
(2023/03/26 01:00:01.00)	59.3	66.9	50.8	62.6	54
(2023/03/26 01:15:01.00)	60.6	69.5	50	63.6	53.8
(2023/03/26 01:30:01.00)	59.9	69	50	63.1	54.1
(2023/03/26 01:45:01.00)	60.4	69	47.7	64	53.3
(2023/03/26 02:00:01.00)	60.3	68.5	46.1	63.2	53.4
(2023/03/26 02:15:01.00)	60.3	71.3	47.5	63.2	54.8
(2023/03/26 02:30:01.00)	59.9	68.2	48.3	62.9	53.6
(2023/03/26 02:45:01.00)	60.3	69.4	46.4	63.7	54.1
(2023/03/26 03:00:01.00)	61.1	69.2	49.1	64.3	54.9
(2023/03/26 03:15:01.00)	60.4	68.9	45.4	63.6	54
(2023/03/26 03:30:01.00)	61.7	68.5	52.8	64.6	56.7
(2023/03/26 03:45:01.00)	60.7	68.4	47.6	63.9	54
(2023/03/26 04:00:01.00)	61.1	68.4	50.5	64.1	55.8
(2023/03/26 04:15:01.00)	62.7	69.5	50.9	65.3	57.7
(2023/03/26 04:30:01.00)	62.1	68.6	53	64.7	57.8
(2023/03/26 04:45:01.00)	62.9	69.9	54	65.4	58.1
(2023/03/26 05:00:01.00)	63.7	70.3	54.1	66.3	59.4
(2023/03/26 05:15:01.00)	62.1	70.9	54.9	64.5	58.6
(2023/03/26 05:30:01.00)	60.8	69.7	52.3	63.4	56.9
(2023/03/26 05:45:01.00)	59.8	67.5	50.8	62.6	55.3
(2023/03/26 06:00:01.00)	59.7	66.8	52	62.3	55.8
(2023/03/26 06:15:01.00)	60.6	69.4	53.3	63	57.2
(2023/03/26 06:30:01.00)	61.2	67.5	54.4	63.9	57.4
(2023/03/26 06:45:01.00)	62.3	69.6	53.7	64.4	58.6
(2023/03/26 07:00:01.00)	63.4	74.6	58	65.3	60.8
(2023/03/26 07:15:01.00)	63.3	81.8	56.7	65.2	59.9
(2023/03/26 07:30:01.00)	63	67.4	56.2	64.9	60
(2023/03/26 07:45:01.00)	63	67.9	58.3	64.7	60.7
(2023/03/26 08:00:01.00)	63.8	75.2	59.3	65.6	61.4
(2023/03/26 08:15:01.00)	63.8	69.8	59.5	65.4	61.8
(2023/03/26 08:30:01.00)	64.1	70.5	59.3	65.8	61.9
(2023/03/26 08:45:01.00)	64.4	68.8	57.4	66	62
(2023/03/26 09:00:01.00)	64	68.6	58	65.6	62
(2023/03/26 09:15:01.00)	64.3	71.8	60	65.9	62.2
(2023/03/26 09:30:01.00)	64.9	69.4	60.8	66.4	62.9
(2023/03/26 09:45:01.00)	66.6	71.1	62.1	68.1	64.7
(2023/03/26 10:00:01.00)	66.9	71.1	61.5	68.2	65
(2023/03/26 10:15:01.00)	68.4	80.4	63.6	70	65.9
(2023/03/26 10:30:01.00)	69.9	75.7	63.2	71.5	67.9
(2023/03/26 10:45:01.00)	69.3	74.1	64.5	70.8	67.3
(2023/03/26 11:00:01.00)	69.5	74	64.6	71	67.5
(2023/03/26 11:15:01.00)	70.1	74.1	65.1	71.6	68.1
(2023/03/26 11:30:01.00)	70.4	74.7	65.6	71.9	68.7
(2023/03/26 11:45:02.00)	69.8	73.7	65.6	71.1	68.1
(2023/03/26 12:00:01.00)	71.3	74.8	67.2	72.5	69.6

(2023/03/26 12:15:02.00)	70.9	75.5	66.2	72.3	69
(2023/03/26 12:30:01.00)	70.6	75	65.9	72	68.9
(2023/03/26 12:45:01.00)	70.8	75.4	66	72.2	69.1
(2023/03/26 13:00:01.00)	71	75.2	66	72.5	69
(2023/03/26 13:15:01.00)	70.6	74.9	65.4	72.1	68.4
(2023/03/26 13:30:01.00)	70.6	74.4	66.4	72	68.8
(2023/03/26 13:45:01.00)	70.2	75.2	65.7	71.6	68.3
(2023/03/26 14:00:01.00)	70	74.7	64.4	71.4	68.2
(2023/03/26 14:15:01.00)	69.7	74.9	64.5	71.2	67.7
(2023/03/26 14:30:01.00)	70	74.1	65.8	71.4	68.1
(2023/03/26 14:45:01.00)	70.5	75.8	65.4	72	68.7
(2023/03/26 15:00:01.00)	69.6	74.5	65	71	68
(2023/03/26 15:15:01.00)	69.8	74.4	65.2	71.4	68
(2023/03/26 15:30:01.00)	70.4	75.1	66.3	71.7	68.7
(2023/03/26 15:45:01.00)	69.4	75.1	65.2	70.9	67.5
(2023/03/26 16:00:01.00)	70	76.9	65.6	71.5	68.1
(2023/03/26 16:15:01.00)	69	73.2	64.2	70.4	67
(2023/03/26 16:30:01.00)	68.4	73.2	64.2	69.7	67
(2023/03/26 16:45:01.00)	68	72.3	61.5	69.8	65.9
(2023/03/26 17:00:01.00)	67.2	71	62.3	68.6	65.4
(2023/03/26 17:15:01.00)	66.9	71.2	63.6	68.3	65.2
(2023/03/26 17:30:02.00)	66.8	71.2	62.8	68.3	65.1
(2023/03/26 17:45:02.00)	66.6	70.6	61.4	68.2	64.8
(2023/03/26 18:00:02.00)	65.5	70.9	61.5	67	63.7
(2023/03/26 18:15:01.00)	67.3	76.6	61.8	69.2	64.5
(2023/03/26 18:30:01.00)	66	70.6	58.9	67.8	63.6
(2023/03/26 18:45:01.00)	66.9	71	62	68.3	65
(2023/03/26 19:00:02.00)	66.7	71	61.9	68.2	64.6
(2023/03/26 19:15:01.00)	67.3	71.9	62.6	68.7	65.5
(2023/03/26 19:30:01.00)	67.2	72.8	59.9	68.8	64.9
(2023/03/26 19:45:02.00)	65.4	69.9	59.5	67.1	63.3
(2023/03/26 20:00:01.00)	64.5	69.5	58.5	66	62.4
(2023/03/26 20:15:02.00)	64.9	81.3	58.4	66.5	62.4
(2023/03/26 20:30:02.00)	64	74.9	58.2	65.9	61.4
(2023/03/26 20:45:01.00)	63.4	69.3	56.6	65.2	60.7
(2023/03/26 21:00:02.00)	63.1	69.5	55.2	65.2	60.1
(2023/03/26 21:15:01.00)	62.4	69.1	55.4	64.3	59.8
(2023/03/26 21:30:02.00)	62.5	70	52.1	65.2	57.9
(2023/03/26 21:45:02.00)	61.5	68.4	51.3	64.1	57
(2023/03/26 22:00:02.00)	61.2	68.3	52.6	63.7	57.5
(2023/03/26 22:15:02.00)	60.3	68.8	50.3	62.6	56.8
(2023/03/26 22:30:02.00)	60.3	68.2	52.2	62.9	56.2
(2023/03/26 22:45:02.00)	59.1	67.7	50.6	61.9	55.1
(2023/03/26 23:00:01.00)	59.4	67.3	50.7	62	55.3
(2023/03/26 23:15:02.00)	59.3	67.4	50.9	61.8	55.3
(2023/03/26 23:30:02.00)	59.1	66.8	43.7	62.3	54.1
(2023/03/26 23:45:02.00)	58.9	67	44.5	62.1	53

(2023/03/27 00:00:02.00)	57.8	68.6	47.4	61.1	52.2
(2023/03/27 00:15:01.00)	59.1	68.8	47.9	62.5	53.1
(2023/03/27 00:30:01.00)	57.7	67.9	43.3	61.3	50.1
(2023/03/27 00:45:01.00)	57.8	67.2	46.7	61.5	51.7
(2023/03/27 01:00:01.00)	58	67.1	45.4	61.2	52
(2023/03/27 01:15:01.00)	59.1	68.3	47	62.4	53
(2023/03/27 01:30:01.00)	60	68.9	46.6	63.4	53.8
(2023/03/27 01:45:01.00)	59	68.9	42.3	62.6	50.6
(2023/03/27 02:00:01.00)	59.8	68.1	47.6	63.2	52.4
(2023/03/27 02:15:01.00)	60.8	68.7	49.9	63.6	55.3
(2023/03/27 02:30:01.00)	61	67.9	50.6	63.7	55.5
(2023/03/27 02:45:01.00)	61.2	68.9	48.6	64.2	55.8
(2023/03/27 03:00:01.00)	62.4	69	53.4	65.1	57.5
(2023/03/27 03:15:01.00)	63.6	70.4	54.7	66.3	59
(2023/03/27 03:30:01.00)	64.2	70.7	54.8	66.6	60.5
(2023/03/27 03:45:01.00)	64.6	69.1	57.5	66.7	61.4
(2023/03/27 04:00:01.00)	65.2	69.5	59.2	67.1	62.5
(2023/03/27 04:15:01.00)	66.1	69.8	61.5	67.6	64.2
(2023/03/27 04:30:01.00)	67.2	70.8	63.3	68.5	65.4
(2023/03/27 04:45:01.00)	67.9	72.3	63.8	69.3	66.3
(2023/03/27 05:00:01.00)	68.3	71.7	64.8	69.5	66.8
(2023/03/27 05:15:01.00)	68.2	71.8	64.3	69.3	66.8
(2023/03/27 05:30:01.00)	68	71.3	64	69.1	66.5
(2023/03/27 05:45:01.00)	67.9	71.5	63.3	69.1	66.5
(2023/03/27 06:00:01.00)	67.5	72.1	64.2	68.5	66.2
(2023/03/27 06:15:01.00)	68	73.6	64.4	69	66.7
(2023/03/27 06:30:01.00)	67.6	72.3	64	68.7	66
(2023/03/27 06:45:01.00)	67.2	70.3	63.4	68.4	65.7
(2023/03/27 07:00:01.00)	67.2	70.4	63	68.4	65.8
(2023/03/27 07:15:01.00)	67.4	72.5	62.4	68.5	66.1
(2023/03/27 07:30:01.00)	67.2	71.7	63.4	68.5	65.5
(2023/03/27 07:45:01.00)	66.9	70.5	62.5	68.2	65.2
(2023/03/27 08:00:01.00)	66.5	70.4	61.4	67.9	64.7
(2023/03/27 08:15:01.00)	66.9	71	62.7	68.1	65.2
(2023/03/27 08:30:01.00)	66.7	70.5	61.3	68.3	64.7
(2023/03/27 08:45:01.00)	66.5	70.7	61.5	68	64.7
(2023/03/27 09:00:01.00)	66.2	79.7	60.6	67.7	64
(2023/03/27 09:15:01.00)	66.5	70.3	61.6	68	64.6
(2023/03/27 09:30:01.00)	65.5	70.9	60.4	67.1	63.2
(2023/03/27 09:45:01.00)	65.4	71.3	58.8	66.8	63.4
(2023/03/27 10:00:01.00)	64.9	71.8	59	66.6	62.5
(2023/03/27 10:15:01.00)	65.9	76.1	60.1	67.5	63.2
(2023/03/27 10:30:01.00)	66	73.3	60.6	67.7	63.5
(2023/03/27 10:45:01.00)	65	70.1	57.5	66.9	61.3
(2023/03/27 11:00:01.00)	66	70.7	59.1	67.8	63.5
(2023/03/27 11:15:01.00)	64.9	70.1	58.1	66.7	62.3
(2023/03/27 11:30:01.00)	65.1	71.3	58.6	66.9	62.4

(2023/03/27 11:45:01.00)	65.9	72	57.8	68.5	61.3
(2023/03/27 12:00:01.00)	65.7	70.3	54.9	67.5	62.9
(2023/03/27 12:15:01.00)	64.2	68.8	58.4	66.5	61.1
(2023/03/27 12:30:01.00)	62.9	68.7	56.6	65	59.6
(2023/03/27 12:45:01.00)	63.3	69.1	56.2	65.4	59.7
(2023/03/27 13:00:02.00)	66.1	70.3	59.2	67.8	63.4
(2023/03/27 13:15:02.00)	66.1	76.5	60.6	67.8	63.6
(2023/03/27 13:30:01.00)	67	71.1	62.3	68.4	65.1
(2023/03/27 13:45:01.00)	67.2	71.2	62.8	68.5	65.4
(2023/03/27 14:00:02.00)	66.6	71.1	61.7	68.3	64.5
(2023/03/27 14:15:01.00)	65.2	71.2	55.3	67.2	61.5
(2023/03/27 14:30:01.00)	64.8	68.7	57.8	66.5	62.3
(2023/03/27 14:45:01.00)	65.5	70.4	57.9	67.5	63
(2023/03/27 15:00:01.00)	65.8	70.1	61.8	67.4	63.7
(2023/03/27 15:15:01.00)	65.7	74	61	67.2	63.7
(2023/03/27 15:30:01.00)	65	71.8	59.5	66.6	63
(2023/03/27 15:45:01.00)	65.7	70.3	58.2	67.6	62.8
(2023/03/27 16:00:01.00)	65.2	70.8	58.4	66.8	63
(2023/03/27 16:15:02.00)	65.7	74	60.2	67.6	63
(2023/03/27 16:30:01.00)	66.3	70.9	61.8	67.8	64.5
(2023/03/27 16:45:01.00)	65.9	71.1	61.3	67.5	63.6
(2023/03/27 17:00:01.00)	65.4	71.3	59.5	67.3	62.6
(2023/03/27 17:15:01.00)	65.4	70.2	61	67	63.2
(2023/03/27 17:30:01.00)	65.7	70.3	61.6	67.3	63.6
(2023/03/27 17:45:01.00)	65.9	70.7	59.1	67.9	63
(2023/03/27 18:00:01.00)	65.7	69.5	59.5	67.3	63.5
(2023/03/27 18:15:01.00)	65.7	71.1	60.8	67.4	63.4
(2023/03/27 18:30:02.00)	65.7	70.9	60.8	67.4	63.5
(2023/03/27 18:45:01.00)	65.6	71.1	60.8	67.3	63.3
(2023/03/27 19:00:01.00)	65.3	71	59.7	67.1	62.7
(2023/03/27 19:15:02.00)	66.6	71.4	61.7	68.5	64
(2023/03/27 19:30:01.00)	65.9	71.4	60.2	67.9	63.6
(2023/03/27 19:45:02.00)	65.2	69.8	60	66.8	63
(2023/03/27 20:00:01.00)	64.9	69.4	60.9	66.6	63.1
(2023/03/27 20:15:01.00)	65.2	69.8	59	66.8	63.2
(2023/03/27 20:30:01.00)	64.6	70.1	57.5	66.4	61.8
(2023/03/27 20:45:01.00)	65.2	69.6	58.7	67.2	62.3
(2023/03/27 21:00:02.00)	64.9	70.5	58.8	66.8	62.2
(2023/03/27 21:15:02.00)	63.9	71	56.5	66.4	60.6
(2023/03/27 21:30:02.00)	63	69.1	53.1	65.1	59.5
(2023/03/27 21:45:01.00)	63.3	70.3	55.2	66	58.9
(2023/03/27 22:00:02.00)	62.5	70	51.4	65.2	57.3
(2023/03/27 22:15:02.00)	62.3	69.4	50.6	65	57.3
(2023/03/27 22:30:02.00)	63.1	68.7	52.2	65.5	59.4
(2023/03/27 22:45:02.00)	62.7	70.2	48.8	65.6	56.7
(2023/03/27 23:00:02.00)	61.6	69.8	48.8	64.1	55.8
(2023/03/27 23:15:02.00)	62	69.2	52.1	64.7	57.2

(2023/03/27 23:30:02.00)	61.1	69	47.6	64.4	55.2
(2023/03/27 23:45:02.00)	58.6	69	46.6	63.6	50.8
(2023/03/28 00:00:01.00)	63.3	70.8	40.2	68.1	45.8
(2023/03/28 00:15:01.00)	61.8	70	44.8	65.3	51.1
(2023/03/28 00:30:01.00)	61	69.6	48.5	64.3	54.4
(2023/03/28 00:45:01.00)	61	68.1	43.5	64.2	52.3
(2023/03/28 01:00:01.00)	62	69.9	43.2	65.6	52
(2023/03/28 01:15:01.00)	62.5	70.2	46	65.8	54.8
(2023/03/28 01:30:01.00)	62.3	69	50.4	65.6	55.3
(2023/03/28 01:45:01.00)	62.3	70.4	48.1	65.9	53.7
(2023/03/28 02:00:01.00)	62.3	71.7	46.3	65.7	53
(2023/03/28 02:15:01.00)	61.3	69.6	47.4	64.6	54.2
(2023/03/28 02:30:01.00)	62.6	70.5	52.2	65.7	57.1
(2023/03/28 02:45:01.00)	63.5	70.3	52.5	66.3	57.8
(2023/03/28 03:00:01.00)	64.2	70.2	47.6	66.9	58.5
(2023/03/28 03:15:01.00)	64.5	69.9	54.3	67	60.1
(2023/03/28 03:30:01.00)	66.2	72.5	56.8	68.7	61.7
(2023/03/28 03:45:01.00)	66.3	71.8	59.7	68.4	63.3
(2023/03/28 04:00:01.00)	66.2	70.8	59.1	68.5	62.8
(2023/03/28 04:15:01.00)	67.9	72.9	59.8	69.7	64.7
(2023/03/28 04:30:01.00)	68.5	72.8	62.2	70	66.4
(2023/03/28 04:45:01.00)	68.6	72.3	63.6	70	66.6
(2023/03/28 05:00:01.00)	68.9	72.8	64.5	70.4	67.2
(2023/03/28 05:15:01.00)	68.3	72.5	63.2	69.8	65.5
(2023/03/28 05:30:01.00)	65.6	72.5	61.8	67.1	63.5
(2023/03/28 05:45:01.00)	64.5	75.9	60.5	65.7	62.4
(2023/03/28 06:00:01.00)	63.4	70.9	59.3	65.1	61.6
(2023/03/28 06:15:01.00)	62.8	71	59.9	63.9	61.5
(2023/03/28 06:30:01.00)	63.7	70.5	60.2	65.2	62.1
(2023/03/28 06:45:01.00)	63.5	66.5	59.4	64.8	61.9
(2023/03/28 07:00:01.00)	63.8	68.4	59.8	65.5	61.7
(2023/03/28 07:15:01.00)	63.8	67.4	60.4	65.4	61.9
(2023/03/28 07:30:02.00)	65.5	69.2	60.4	67.3	62.8
(2023/03/28 07:45:01.00)	65.7	70.5	60.6	67.6	62.6
(2023/03/28 08:00:01.00)	64.3	68.8	59	66.2	61.2
(2023/03/28 08:15:01.00)	66.7	71	61.9	68.3	64.4
(2023/03/28 08:30:01.00)	68.7	72.5	63.9	70.1	66.8
(2023/03/28 08:45:01.00)	68.6	72.6	62.5	70	66.9
(2023/03/28 09:00:01.00)	68.9	73.3	64	70.2	67.1
(2023/03/28 09:15:01.00)	68.8	73.6	62.9	70.3	66.9
(2023/03/28 09:30:01.00)	69.2	73	64.9	70.6	67.6
(2023/03/28 09:45:01.00)	69	74.2	64.8	70.4	67.3
(2023/03/28 10:00:01.00)	68.8	72.6	63.5	70.3	66.7
(2023/03/28 10:15:01.00)	68.8	72.1	63.9	70.2	66.6
(2023/03/28 10:30:01.00)	69.1	73	64.8	70.3	67.5
(2023/03/28 10:45:01.00)	69.3	79.2	65.4	70.7	67.6

Acoustic Terminology

C1 Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sounds is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. 50 dB + 50 dB = 53 dB. Increases in continuous sound are perceived in the following manner:

1 dB increase - barely perceptible.

3 dB increase - just noticeable.

10 dB increase - perceived as twice as loud.

C2 Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz (Hz) = 1 cycle/second. The range of frequencies audible to the human ear is around 20Hz to 18000Hz (or 18kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.

C3 To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability automatically to weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).

C4 The second important characteristic of sound is amplitude or level. Two units are used to express level, a) sound power level - L_w and b) sound pressure level - L_p . Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity, etc. The sound level that is measured on a meter is the sound pressure level, L_p .

C5 External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to different noises has been found to vary dependent on the type and temporal distribution of a particular type of noise. A set of statistical indices have been developed for the subjective response to these different noise sources.

C6 The main noise indices in use in the UK are:

L_{A90} : The sound level (in dBA) exceeded for 90% of the time. This level gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background sound level" of an area.

L_{Aeq} : The equivalent continuous sound level in dBA. This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the intermittent noise". In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as aircraft and trains.

LA10: The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given sample. It has been used over many years to measure and assess road traffic noise.

LAMAX The maximum level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.

C7 The sound energy of a transient event may be described by a term SEL - Sound Exposure Level. This is the LAeq level normalised to one second. That is the constant level in dBA which lasting for one second has the same amount of acoustic energy as a given A weighted noise event lasting for a period of time. The use of this unit allows the prediction of the LAeq level over any period and for any number of events using the equation;

$$L_{AeqT} = SEL + 10 \log n - 10 \log T \text{ dB.}$$

Where

n = Number of events in time period T.

T = Total sample period in seconds.

C8 In the open, known as free field, sound attenuates at a rate of 6 dB per each doubling of distance. This is known as geometric spreading or sometimes referred to as the Inverse Square Law. As noise is measured on a Logarithmic scale, this attenuation in distance = 20 Log (ratio of distances), e.g. for a noise level of 60 dB at ten metres, the corresponding level at 160 metres is:

$$60 - 20 \text{ Log } \frac{160}{10} = 60 - 24 = 36 \text{ dB}$$