

Acoustic South East



Assessment of External Amenity Spaces

Report by: Scott Castle BSc (Hons) CEnvH, MCIEH MIOA

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Project: J3885

Issue 1

Site: **Maltings Farm, Malthouse Lane, Hurstpierpoint, BN6 9JZ**

Client: **Mr Chris Gargan c/o KSD Support Services**

Contents

1	Introduction and Executive Summary	- 3 -
2	Context, Noise Criteria & Noise Assessment Methodology	- 4 -
2.1	Scope.....	- 4 -
2.2	Site Location	- 4 -
2.3	Context and Planning.....	- 6 -
2.4	Soundscape.....	- 6 -
2.5	Relevant Guidance	- 6 -
3	Methodology	- 8 -
4	Survey Data	- 9 -
4.1	Shortened Survey(s)	- 9 -
5	Noise Modelling Software	- 9 -
5.1	Noise Model Inputs	- 10 -
5.2	Noise Model Outputs.....	- 10 -
5.3	Model Accuracy	- 11 -
5.4	Summary of Noise Model Information	- 11 -
6	Noise Level Change	- 11 -
7	External Amenity Areas and Guidance	- 12 -
8	Conclusion	- 13 -

Tables

Table 1.	Survey Information	- 8 -
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Figures

Figure 1.	Site Location and A24 to the East	- 4 -
Figure 2.	Site Location with Wall Annotated	- 5 -
Figure 3.	Image of Wall	- 5 -
Figure 4.	DMRB/LA111 Change Indicators (Long Term)	- 7 -
Figure 5.	Location of Sound Level Meters	- 8 -
Figure 6.	Shortened CRTN Assessment and Calculation	- 9 -
Figure 7.	Shortened CRTN Assessment and Calculation	- 9 -
Figure 8.	Existing/With Wall Scenario	- 10 -
Figure 9.	Historic/No Wall Scenario	- 11 -
Figure 10.	Perception and Noise Level Change	- 12 -

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Report by: Scott Castle BSc (Hons) CEnvH, MIOA

Checked by: Peter Attwood BSc(Hons) MSc MCIOB MIOA

Issue 1	06/08/2024	Original Issue
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1 Introduction and Executive Summary

Acoustic South East have been appointed to undertake an acoustic assessment to support a retrospective planning application. Specifically, the building of a wall for privacy and road noise mitigation has been constructed by the client.

Standards and guidance referenced for this assessment include:

- BS8233 (Sound insulation and noise reduction for buildings) 2014
- National Planning Policy Framework (NPPF), 2023
- World Health Organisation Guidelines for Community Noise dated 1999(Revised 2018)
- ProPG2017 – Planning and Noise
- Design of Roads and Bridges Manual (DMRB), LA111

Measurements have been made by Acoustic South East to understand how the site soundscape differs from the roadside of the new wall and the residential side.

A 2.8m wall has been constructed around part of the site perimeter to reduce noise levels and increase privacy. The dominant element of the site soundscape is the nearby A24/Jane Murray Way.

A simultaneous measurement from outside the wall close to the roadside, to a position close to the building façade indicates a reduction of 11.7dB in the site soundscape ($L_{Aeq,16\text{ hour}}$).

A noise model was used to predict the noise impact without the wall in place, with the model predicting that the noise levels close to the house and in the proposed garden area would exceed the criterion as listed in BS8233:2014, World Health Organisation Guidelines for Community Noise and ProPG2017.

The construction and length of the wall therefore provide positive impacts in terms of the reduction in the site soundscape for the site occupants. The walled garden area therefore benefits the client in providing reduced noise levels which ensure compliance with the current doctrine around the use and design of external amenity areas. The change in sound pressure levels with and without the wall in place remains significant and noticeable.

It is therefore advised based on the measurements carried out to date, that planning consent is not withheld in view of the positive benefit being achieved by the wall compared to the exceedance of noise guidelines that would result from its removal.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Scope

The scope of the report is to assess the acoustic impact that the newly constructed wall has on the living conditions for the client and to consider what the soundscape might have been without the wall in place.

2.2 Site Location

The site is located as below in Figures 1 and 2. Note the positioning of the newly constructed wall in Figure 2.

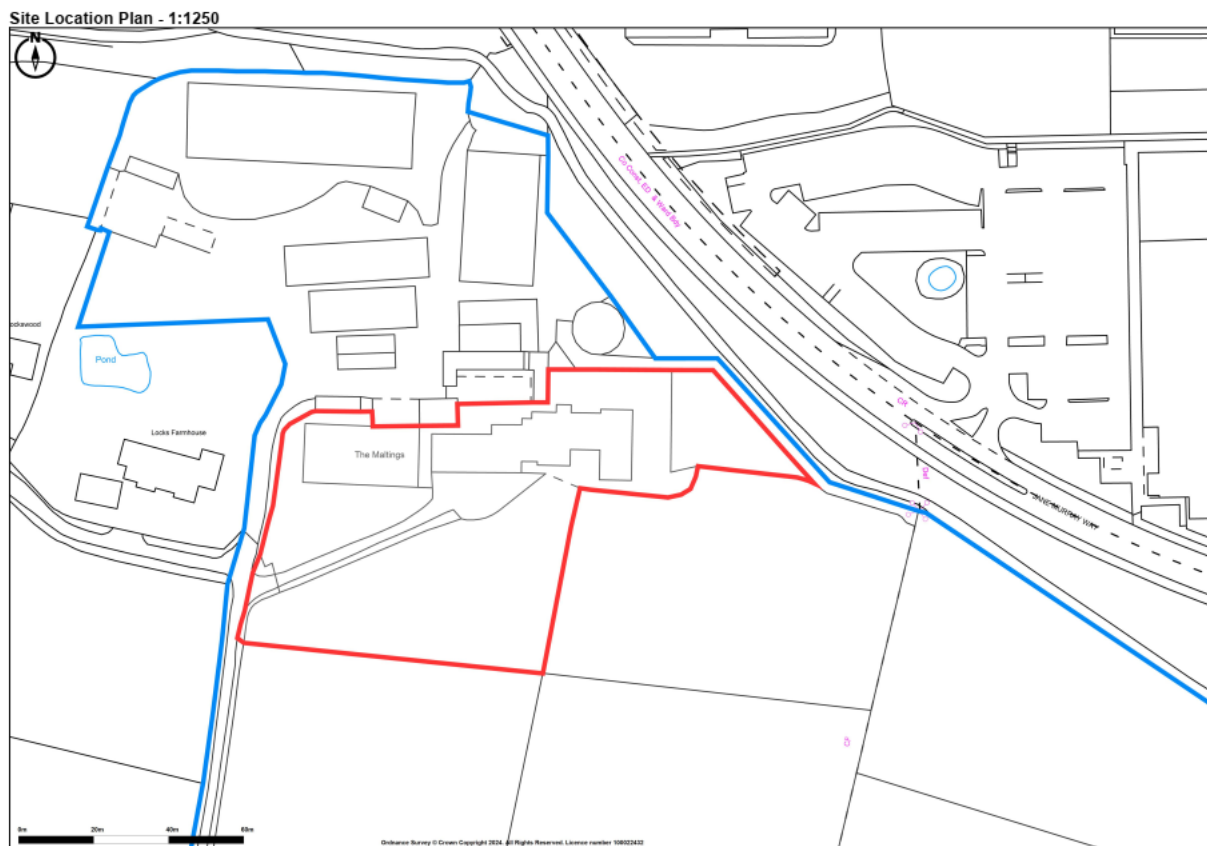


Figure 1. Site Location and A24 to the East

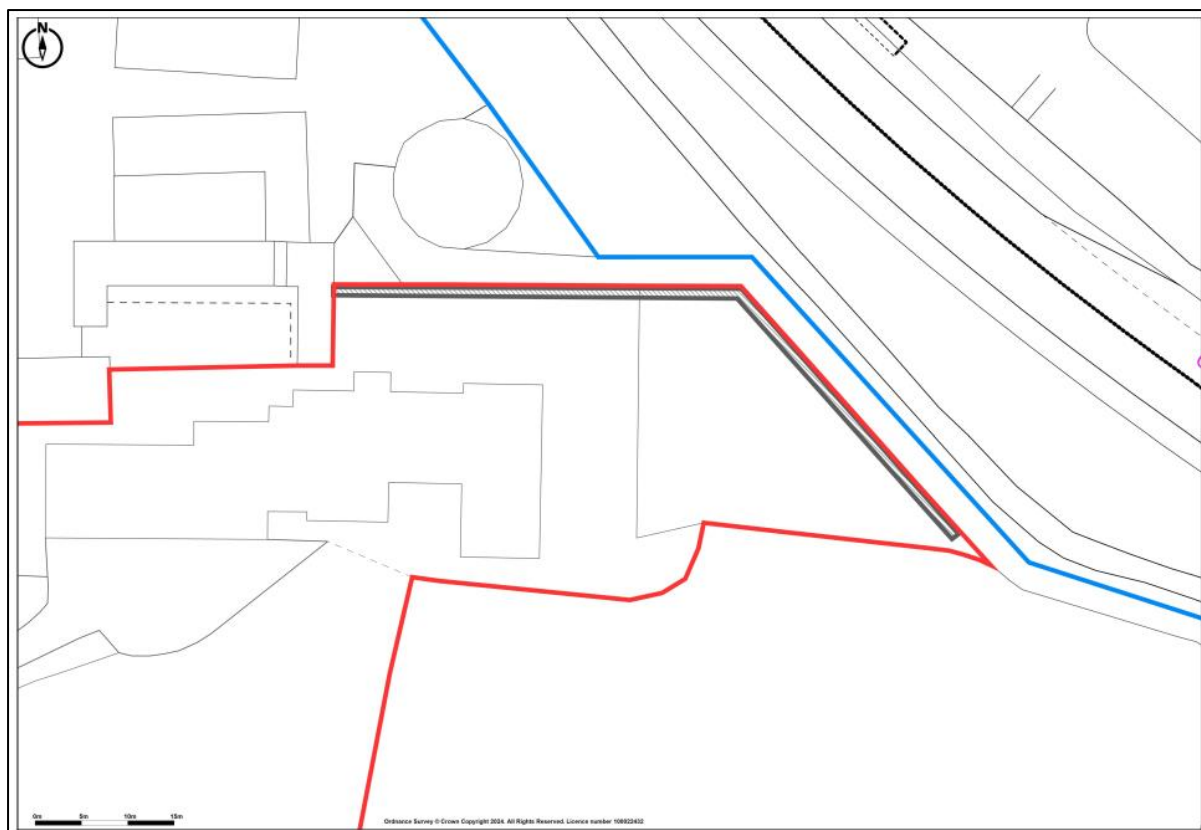


Figure 2. Site Location with Wall Annotated



Figure 3. Image of Wall

2.3 Context and Planning

This assessment supports the recent construction of a wall partially around the perimeter of the clients dwelling.

A previous planning application to consent the wall was refused under DM/24/0013 on 17th May 2024. A revised retrospective planning application is therefore being made to Mid Sussex District Council.

In terms of context, the application concerns only the exterior of the property and the facades affected by the wall.

The wall exists at present and can be seen in Figure 2 above.

Prior to the wall being constructed, the only barrier that existed prior is a 1.7m wooden slat fence that separates the property from a public track, both of which are still present. No other buildings or constructions existed between the fence and the property before the construction of the wall.

The purpose of constructing the wall in the first instance was to seek to reduce the noise levels from the nearby A24/Jane Murray Way and how these impact on the residential property.

The newly constructed wall extends from the North side of the site boundary, angling around the perimeter to the South-East side. The A273 (Jane Murray Way) extends down from the north, curving past the residence to continue East. The A273 is a 40mph two lane road.

2.4 Soundscape

The dominant sound source is that of road traffic noise from the A24, which was continuous and anonymous. Aviation noise was also noted. For the avoidance of doubt, it should be noted that road traffic noise is a line source and attenuates poorly with distance.

2.5 Relevant Guidance

2.5.1 BS8233:2014- Guidance on sound insulation and noise reduction for buildings

The following text has been taken directly from BS8233:2014

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed

50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

2.5.2 World Health Organisation Guidelines for Community Noise dated 1999(Revised 2018)

Within the WHO guidance reference is made to the onset of moderate annoyance at 50dB $L_{Aeq, 16 \text{ hours}}$ and the onset of serious annoyance at 55dB $L_{Aeq, 16 \text{ hours}}$.

2.5.3 Design Manual for Roads and Bridges, LA111

In terms of long-term change, the following table has been extracted from LA111.

Table 3.54b Magnitude of change - long term

Long term magnitude	Long term noise change (dB $L_{A10,18hr}$ or L_{night})
Major	Greater than or equal to 10.0
Moderate	5.0 to 9.9
Minor	3.0 to 4.9
Negligible	less than 3.0

Figure 4. DMRB/LA111 Change Indicators (Long Term)

2.5.4 ProPG2017 – Planning and Noise, May 2017

Stage 2, Element 3 of the iterative assessment process requires a consideration of the external amenity area. This effectively requires that the acoustic environment of external areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range of 50-55dB $L_{Aeq,16 \text{ hour}}$.

3 Methodology

To identify the site soundscape and how this was impacted from the A24, a shortened road traffic noise assessment was carried out consistent with the requirements of the Calculation of Road Traffic Noise (CRTN) dated 1988. This used two class 1 sound level meters to identify the impact of the road traffic noise both to the East of the wall and additionally to the East of the dwelling.

A computer noise model was then used to plot the existing site soundscape to calibrate the A24 to the data measured. A second computer noise model was then used to remove the wall and identify the noise impact without the wall present.

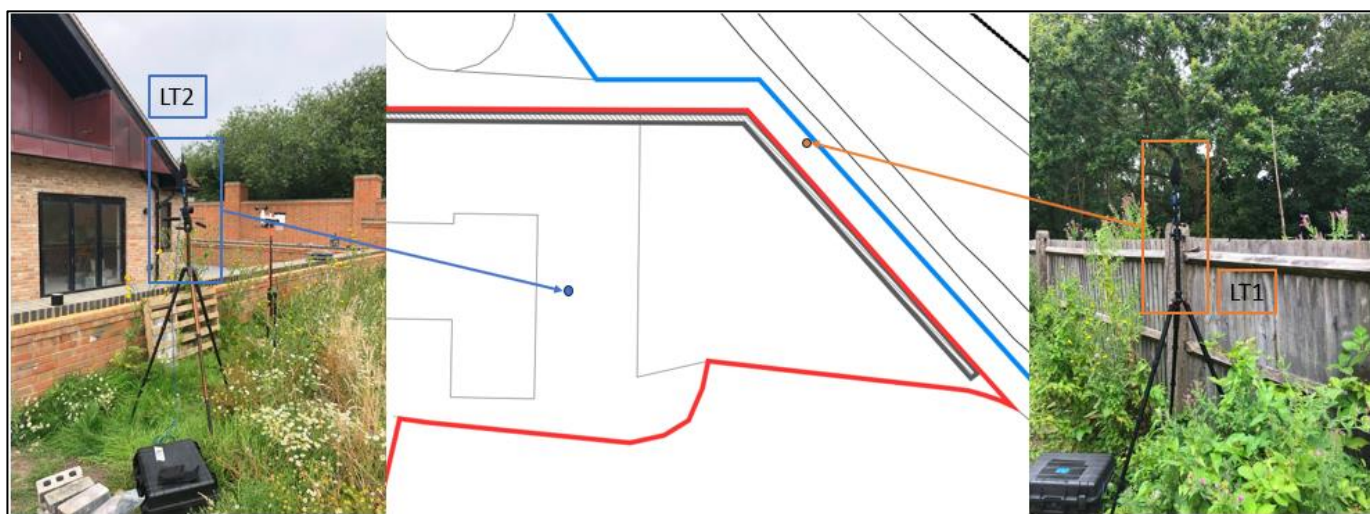


Figure 5. Location of Sound Level Meters

Both sound level meters measured in fast and A weighted conditions. Both had environmental windshields fitted and were calibrated before and after the readings. Both sound level meters were time aligned to ensure a like for like comparison and measured in repeat 1-hour formats to ensure three consecutive hours of data.

Survey(s) carried out by	Josh Robinson Affiliate Member of the Institute of Acoustics
Equipment Used	LT1 Norsonic 118 Class 1 Sound Level Meter – Mounted on Tripod LT2 Norsonic 118 Class 1 Sound Level Meter – Mounted on Tripod
Equipment Used	Norsonic Acoustic Calibrator – Serial No. 31083
Location	LT1 – 2m from ground, 3.2 meters from the wall. W3W: portfolio.fearfully.votes LT2 – 2.1 meters from ground, 5.3 meters from house. W3W: fortunes.evaded.selection
Duration	1 st of August 12pm – 1 st August 3pm

Table 1. Survey Information

The weather conditions were hot and dry (25-30°C) with minimal wind and still conditions, ideal for noise monitoring.

4 Survey Data

It is relevant to consider the measured survey data.

4.1 Shortened Survey(s)

A shortened Calculation of Road Traffic Noise (CRTN) assessment was made at the Maltings Farm South-East wall and at the East facade of the property on Thursday 1st of August 2024. This utilised 3 consecutive 1-hour measurements with time aligned class 1 sound level meters

Shortened CRTN Calculation - Roadside	
Time Period	L10, 1 Hour
12:00-13:00	64.4
13:00-14:00	64.1
14:00-15:00	64
Aritmetic average	64.2
Minus 1dB-L10, 18 Hour	63.2
Minus 2dB-L10, 18 Hour to LAeq, 16 Hour	61.2

Figure 6. Shortened CRTN Assessment and Calculation

Shortened CRTN Calculation - Houseside	
Time Period	L10, 1 Hour
12:00-13:00	52.6
13:00-14:00	53.3
14:00-15:00	51.9
Aritmetic average	52.6
Minus 1dB-L10, 18 Hour	51.6
Minus 2dB-L10, 18 Hour to LAeq, 16 Hour	49.6

Figure 7. Shortened CRTN Assessment and Calculation

As one would expect with a 2.8m wall present, the measured sound pressure level difference between the two locations accounts for a 12dB (rounded) difference in sound pressure levels. This is a positive benefit.

5 Noise Modelling Software

In order to see how noise varies at different positions around the proposed development it is possible to produce a noise contour map. Specifically, the noise modelling software was used to remove the wall and determine the subsequent soundscape and change in noise levels.

A computer noise model has been completed using the computer package IMMI. Drawings of the area have been used to complete the noise models and the topography of the location recreated. IMMI faithfully implements the propagation method of ISO-9613:1996; Acoustics – Attenuation of sound during propagation outdoors.

The noise modelling software predicts freefield external and A weighted dB values.

5.1 Noise Model Inputs

A noise model was created of the dwelling house, the wall and the A24 with the measured details, as per Figure 4 above.

The spectral content of the roadside class 1 sound level meter was used to ensure that the road traffic sound source was as accurate as possible.

The height of the wall was constructed as 2.8m above ground level, consistent with the client's architects' section for where the measurements took place.

Laser measurements were used to identify the measurement positions

5.2 Noise Model Outputs

5.2.1 Current Situation – With Wall

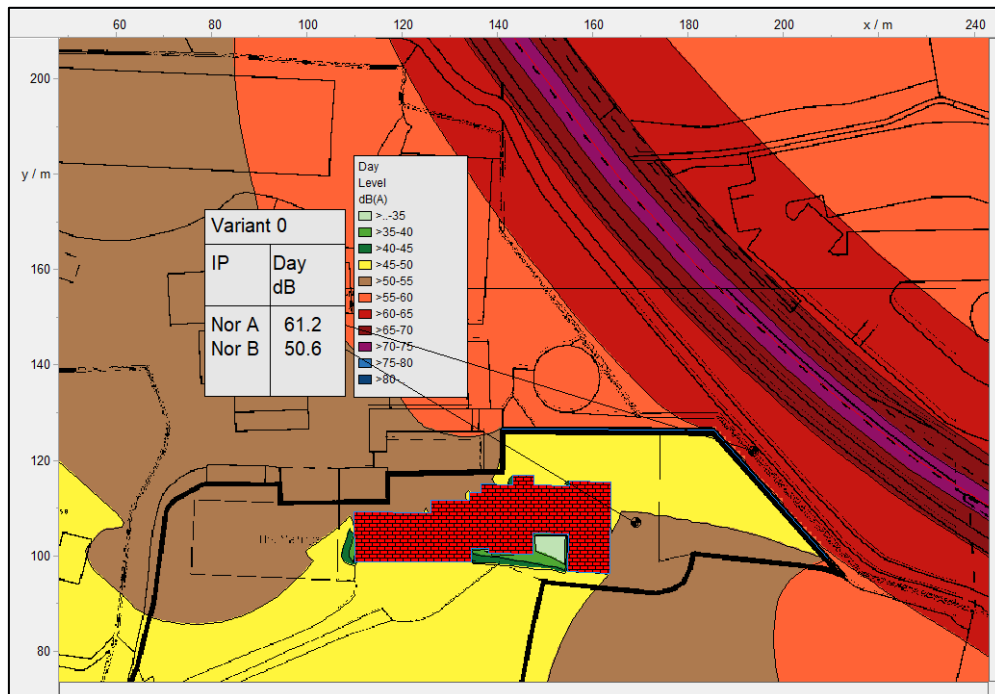


Figure 8. Existing/With Wall Scenario

5.2.2 Historic Situation – No Wall

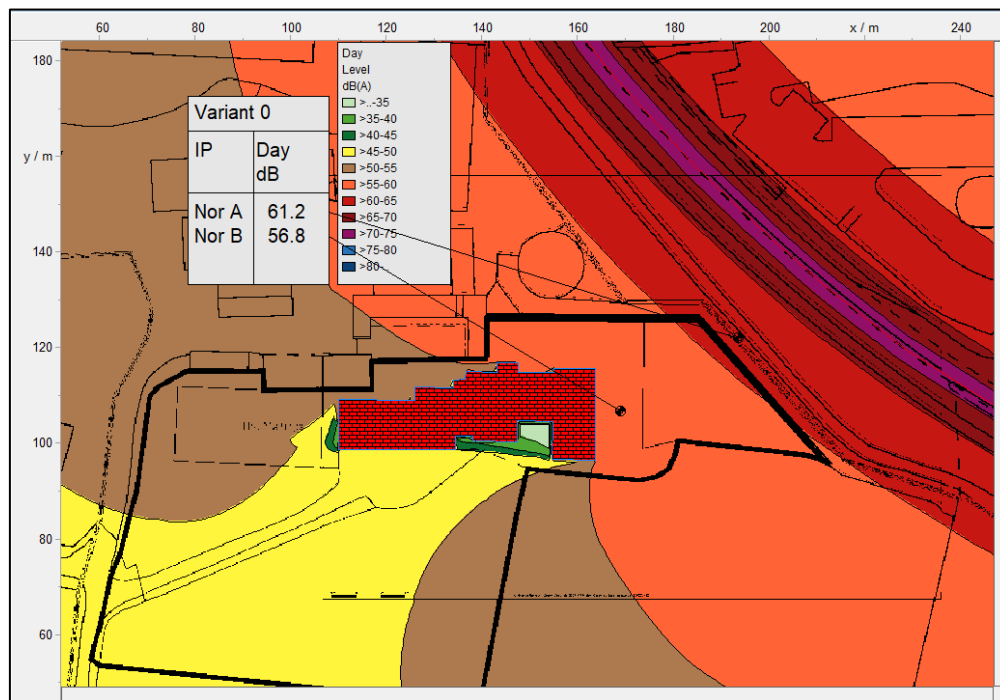


Figure 9. Historic/No Wall Scenario

5.3 Model Accuracy

It was noted that the model predictions for the “current/with wall” scenario are 1dB different from what was actually measured on the site on 1st August 2024. As per Figure 6, the predicted external sound pressure level close to the dwelling (5.3m from façade) was 49.6dB $L_{Aeq, 16 \text{ hour}}$.

5.4 Summary of Noise Model Information

The noise model without the wall present indicates an increase of 7.2dB for the daytime period for the position close to the dwelling. It is relevant to note that whilst the CRTN, 1988 guidance was followed to ensure a robust assessment, there will clearly be periods of sound where they are above this level such as morning and evening rush-hour times.

6 Noise Level Change

The change in the same sound source (ie steady and continuous and anonymous) has been nicely summarised in the following Bruel and Kjaer “Environmental Noise” document dated 2000

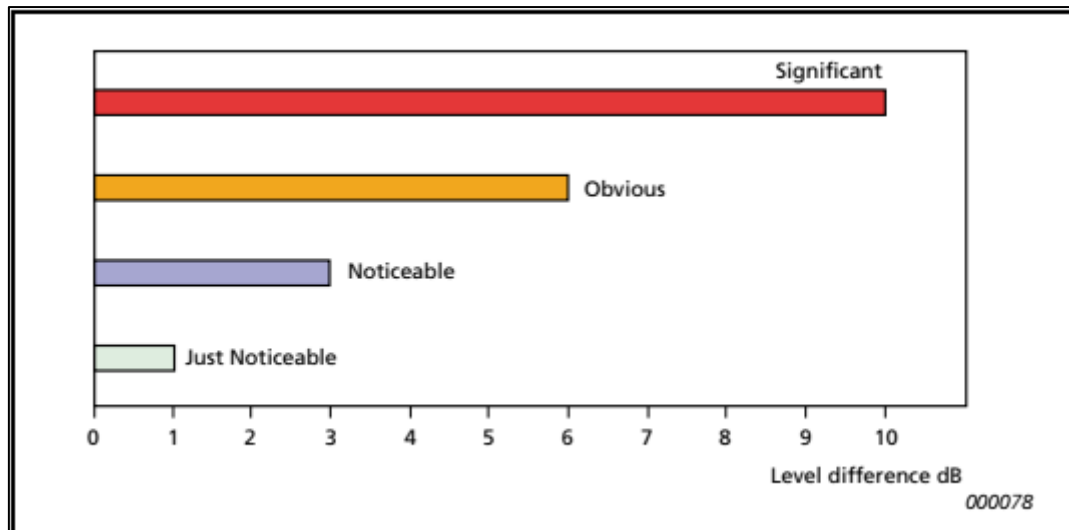


Figure 10. Perception and Noise Level Change

This indicates that with the wall removed, the increased soundscape at the dwelling and garden area resulting in a change of sound pressure levels of 7.2dB is beyond obvious and significant.

7 External Amenity Areas and Guidance

Both BS8233:2014 and the WHO Guidance on Community Noise Levels indicate that for external amenity spaces the upper limit, measured over the daytime period (ie 07:00-23:00 hours) is 55dB $L_{Aeq, 16 \text{ hour}}$.

The onset of moderate annoyance is likely to occur around 50dB $L_{Aeq, 16 \text{ hours}}$ and the onset of serious annoyance at 55dB $L_{Aeq, 16 \text{ hour}}$.

The Design Manual for Roads and Bridges (DMRB) (LA111) also contains data which relates to long term noise change and this indicates that moderate/significant change occurs between 5-9.9dB.

Bearing in mind, the above criteria, the measured garden soundscape without the wall present would comfortably exceed these. It follows too, that positions closer to the East and the noisy A24 boundary will increase in terms of sound pressure levels, the further East travelled.

In terms of long-term change and subjectivity, it is recognised that the measurement metric within LA111, is in fact $L_{A10,18 \text{ hour}}$. To consider this for the position closest to the dwelling, this has already been calculated with the wall in place as detailed in Figure 6 as being 51.6dB $L_{A10,18 \text{ hour}}$.

The predicted external sound pressure level from the noise modelling software is 56.8dB, albeit in $L_{Aeq, 16 \text{ hour}}$. To convert this to $L_{A10,18 \text{ hour}}$, 2 dB is added making the resulting prediction as 58.8dB $L_{A10,18 \text{ hour}}$. The difference in noise levels is again 7.2dB making the change a moderate and therefore significant change in noise levels without the wall present.

8 Conclusion

A 2.8m wall has been constructed around part of the site perimeter to reduce noise levels and increase privacy. The dominant element of the site soundscape is the nearby A24/Jane Murray Way.

A simultaneous measurement from outside the wall close to the roadside, to a position close to the building façade indicates a reduction of 11.7dB in the site soundscape ($L_{Aeq,16\text{ hour}}$).

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