

Noise Mitigation Strategy

Project Name	Misery Site, Land Off Providence Hill, Bursledon, Hants
Design Note Title	Noise Mitigation Strategy
Document Reference	11310
Author	Andy Keane
Revision	01
Date	27 th June 2022

MSAFE Technologies Ltd have been appointed by Foreman Homes to provide a Noise Mitigation Strategy for the proposed residential development at Misery Site, land off Providence Hill, Bursledon, Hampshire.

This Noise Mitigation Strategy summarises the requirements of the Noise Impact Assessment carried out by Resource & Environmental Consultants (REC) Ref: AC102141-1R8 dated 11th December 2018 in accordance with Planning Condition 15 below:

“15. Prior to the commencement of development a detailed noise mitigation strategy and plan to address highway noise shall be submitted to, and approved by, the Local Planning Authority. The details shall demonstrate how satisfactory internal and external noise standards will be met in accordance with the recommendations of the Noise Impact Assessment dated 11 December 2018 (Ref: AC102141-1R8) with reference to construction, glazing, mechanical ventilation, acoustic screening. The approved noise mitigation measures shall be fully installed and verified as performing as expected prior to the first occupation and shall thereafter be retained.”

Please note, all measurements & calculations carried out by REC include the proposed 3m acoustic bund/barrier as per their statement *“This assessment includes in the baseline assessment the 3m acoustic bund/barrier specified in the site layout by Foreman Homes to control noise from the M27, and a further revised layout”* – See Appendix Figure 1

REC’s recommended Mitigation Measures state;

“This assessment recommends the following mitigation measures in order to ensure an adequate level of protection from noise within external and internal areas.

- *Alternative ventilation should be made available for specified habitable rooms as determined by their intended use in order to control internal noise levels as an alternative to opening windows.*
- *A small number of specified facades require slightly higher specification glazing (≤ 35 dBA).*

Subject to the incorporation of the identified mitigation measures, it is considered that in principle, the Site is suitable for the promotion of residential development”.

External Noise Impact in Garden Areas for Proposed Dwellings (REC 4.2.1)

Figure 3 shows that baseline levels without additional mitigation meet the 55 dBA criterion limit for all plots, with many below 50 dBA, with the exception of plots 74 and 75.

Section 4 found that the external noise criterion of 55 dBA over 50% of each garden area is met for all private gardens, except for plots 74 and 75.

A noise model was created with 2.5m fencing as marked up in Figure 10. This showed a suitable reduction in noise levels such that the criterion is met, and also reduces the noise levels in adjacent gardens.

Based on the above, REC has recommended that the entire site can use 1.8m high fencing to ensure compliance with the 55 dBA external noise criterion limit for all plots, whereas 2.5m high fencing is required to ensure Plots 74 & 75 achieve this 55 dBA criterion. See Appendix for REC Figure 10.

Internal Noise Impact for Proposed Dwellings (REC 4.2.2)

In order to accurately determine the noise level within habitable rooms, external noise levels immediately outside the facades have been derived in the noise model for the proposed layout with no additional mitigation besides 1.8m fencing.

BS8233:2014 suggests that a Saint Gobain standard double-glazing unit with configuration 6mm glass/12mm air space/6mm glass affords sound insulation performance of the order of 33dB; this however this is for a pink noise spectrum. The same unit, weighted for road traffic noise using the '+C_{tr}' correction, has a sound insulation performance of approximately 30dB and so this value has been used to calculate internal noise levels. BS8233:2014 also goes on to recommend that a partially open window provides approximately 15dB attenuation, and this value is also used here.

Daytime Noise Criteria (35 dBA)

There are facades where alternative ventilation is required to provide adequate airflow without opening windows and consequently exceeding internal noise criteria. These are marked with cyan lines. See Appendix

There are facades where non-standard double glazing is required if rooms are intended for daytime amenity (ie not kitchens/bathrooms). These are marked with black lines. See Appendix.

Night-Time Noise Criteria (30 dBA)

At all storeys, there are facades where alternative ventilation is required to provide adequate airflow without opening windows and consequently exceeding internal noise criteria. These are marked with cyan lines.

There are facades where non-standard double glazing is required. These are marked with black lines.

For some facades, it is found that standard double glazing provides insufficient attenuation to meet daytime and night-time internal L_{Aeq} level criteria. Exceedances are small and comparable

in both cases. Note that these exceedances are all for those facades closest to, and facing, the M27.

While this can be mitigated by using these facades for less noise sensitive rooms such as kitchens and bathrooms, greater flexibility in interior design can be obtained by using slightly higher specification glazing. The results here suggest that a specification R_w+C_{tr} of 35 dBA will be sufficient for these most exposed facades, as marked on the figures with black lines where these are used for the period assessed (ie as bedrooms). Many specifications exist for such glazing.

Ventilation

It is found that for some facades, marked with cyan lines in the figures, internal noise levels exceed the target criteria for either/both daytime and night-time with a partially open window. Accordingly, it is necessary to consider an alternative ventilation scheme which does not require the opening of windows to provide fresh air flow and background ventilation.

This might take the form of a through-frame window mounted trickle ventilator incorporated into the glazing unit of such habitable rooms so that fresh air can enter the room without having to open windows and provide background ventilation.

The exact requirement for alternative ventilation ultimately falls to the developer and, from an Acoustic perspective, needs to ensure that fresh air flow can be achieved without the need for opening windows. It is necessary to meet the requirements given in BS 8233:2014, Section 8.4.5.4, which states that:

“The Building Regulations’ supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant’s choice.

Alternatively, acoustic ventilation units (see 7.7.2) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans.”

Section 7.7.2 states:

“NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.”

In general, wherever possible habitable rooms should be located away from the noise source with less noise-sensitive rooms facing the noise source.

Conclusion

The REC Noise Impact Assessment has recommended alternative ventilation for habitable rooms on a number of facades as an alternative to opening windows. In some cases it is desirable to locate noise sensitive rooms on relatively quiet facades of the dwellings, partially circumventing these requirements.

Additionally, a number of facades require an enhanced glazing specification as dictated by their use as bedrooms or for daytime amenity.

Subject to the incorporation of the identified mitigation measures, it is considered that in principle, the Site is suitable for the promotion of residential development.

REC Report Ref: AC102141-1R8 dated 11th December 2018, requires the vast majority of all facades "to consider an alternative ventilation scheme which does not require the opening of windows to provide fresh air flow and background ventilation."

"Acoustic ventilation units are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans."

All dwellings (except Plots 25-36 & 62-73 - see below) require standard glazing with $R_w+C_{tr} \geq 30$ dB as shown in REC Figures 4-9 (Cyan Line)

REC state; BS8233:2014 suggests that a Saint Gobain standard double-glazing unit with configuration 6mm glass/12mm air space/6mm glass affords sound insulation performance of the order of 33dB; this however this is for a pink noise spectrum. The same unit, weighted for road traffic noise using the '+C_{tr}' correction, has a sound insulation performance of approximately 30dB.

Please note, the above glazing specification would need to be verified. An alternative glazing specification would be Pilkington double glazed (10mm glass/6-16mm air space/4mm glass) unit with performance R_w+C_{tr} 30 dB. See Appendix.

For some facades, it is found that standard double glazing provides insufficient attenuation to meet daytime and night-time internal L_{Aeq} level criteria. Exceedances are small and comparable in both cases. Note that these exceedances are all for those facades closest to, and facing, the M27.

While this can be mitigated by using these facades for less noise sensitive rooms such as kitchens and bathrooms, greater flexibility in interior design can be obtained by using slightly higher specification glazing. The results here suggest that a specification R_w+C_{tr} of 35 dBA will be sufficient for these most exposed facades, as marked on the figures with black lines where these are used for the period assessed (ie as bedrooms). Many specifications exist for such glazing.

Example glazing specifications with performance R_w+C_{tr} 35 dBA or above would be;

Double Glazed - 6mm glass / 6-16mm air space / 6mm Laminated - R_w+C_{tr} 38 dBA

or

Double Glazed - 6mm glass / 16mm argon / 8.8mm Optiphon - R_w+C_{tr} 35 dBA

(See Appendix)

The higher glazing specification above (R_w+C_{tr} 35 dBA) is required in Plots 25-36 & 62-73 as shown in REC Figures 4-9 (Black Line)

"Subject to the incorporation of the identified mitigation measures, it is considered that in principle, the Site is suitable for the promotion of residential development".

In accordance with Planning Condition 15; *"The approved noise mitigation measures shall be fully installed and verified as performing as expected prior to the first occupation and shall thereafter be retained."*

MSAFE have been instructed by Foreman Homes to carry out on-site acoustic measurements to demonstrate performance once the noise mitigation measures above have been fully installed, prior to first occupation.

This report has been prepared by MSAFE Technologies Limited (MSAFE) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between MSAFE and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by MSAFE unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.



GENERAL NOTES

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This drawing is only to the stated scale if it is printed correctly. HGP cannot accept responsibility for the incorrect scaling of drawings printed by third parties.

All dimensions are in mm unless noted otherwise.

Buildings are illustrated at design levels only. Actual building levels may be adjusted by +/- 0.25m during construction to achieve a minimum waste to landfill as required under the National Planning Policy for Waste.

The general direction of the car park and site falls are shown indicatively only. All car parking and internal site road levels may be locally varied with some falls potentially reversed during construction to achieve a minimum waste to landfill as required under the National Planning Policy for Waste.

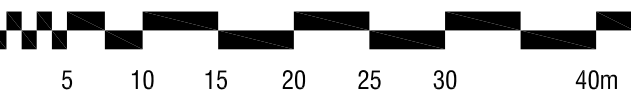
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SAFETY, HEALTH & ENVIRONMENTAL INFORMATION

In addition to the hazards/ risks normally associated with the type of work detailed on this drawing, please note the following:

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement.



Additional HA Unit added	15.01.19	HE	HE	K
Amended to client's comments	08.01.19	JR	HJE	J
Amended to client's comments	03.12.18	JR	HJE	I
Amended to client's comments	24.10.18	JR	HJE	H
Coloured site plan	18.10.18	JR	HJE	G
Amended to client's comments	17.10.18	JR	HJE	F
Amended to client's comments	30.07.18	HE	HJE	E
Amended to client's comments	23.07.18	JR	HJE	D
Amended to client's comments	12.07.18	VP	HJE	C
Indicative house types shown. Sheet now A1	05.07.18	VP	HJE	B
Amended to new layout	04.07.18	VP	HJE	A

REVISIONS	DATE	DRN	OKD	REV
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CLIENT

**FOREMAN
HOMES**

PROJECT

**Land off Providence Hill,
Bursledon**

TITLE

Site Plan

STATUS

Planning

Drawn	Checked	Scale	Date
VP	HJE	1:500 @ A1	Jul '18

Drawing No.	Revision
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16.115.03

K

HGP
ARCHITECTS

FURZEHALL FARM, WICKHAM ROAD
FAREHAM, HAMPSHIRE, PO16 7JH

T: 01329 283 225
F: 01329 237 004
E: EMAIL@HGP-ARCHITECTS.CO.UK
W: WWW.HGP-ARCHITECTS.CO.UK

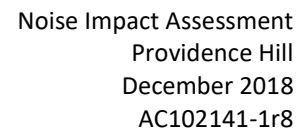


Figure 1 Aerial photograph of the study area showing the location of the study site (indicated by a red dot) relative to the surrounding landscape. The map includes a scale bar (0 to 1000 meters) and a north arrow. The study site is located in the central part of the map, near the intersection of the main road and the river. The surrounding area is a mix of agricultural land, forest, and some built-up areas. The map is labeled with "Study Area" and "Location of Study Site".





FIGURE 4 – Daytime Baseline Ground floor

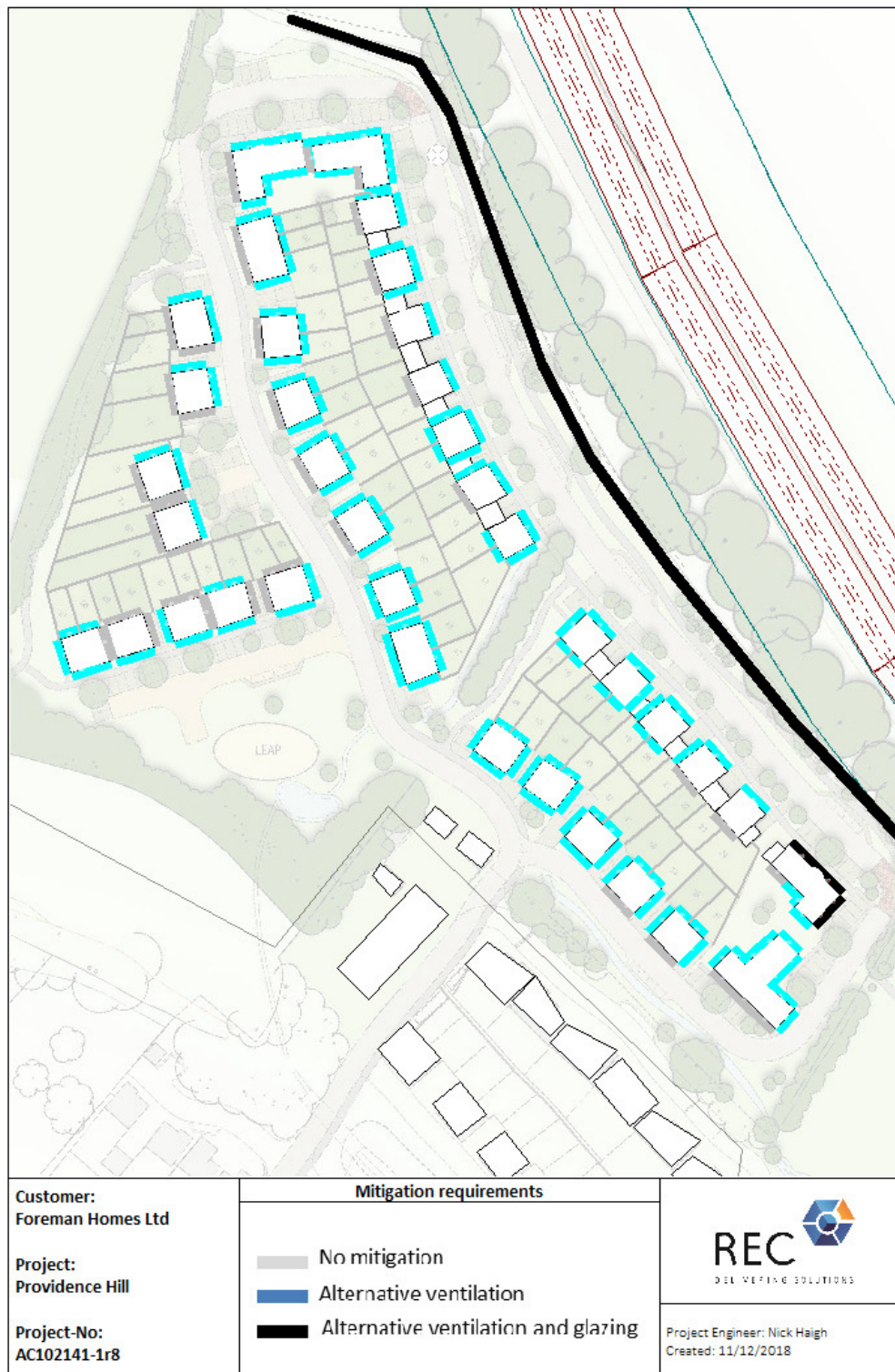




FIGURE 5 – Daytime Baseline 1st floor

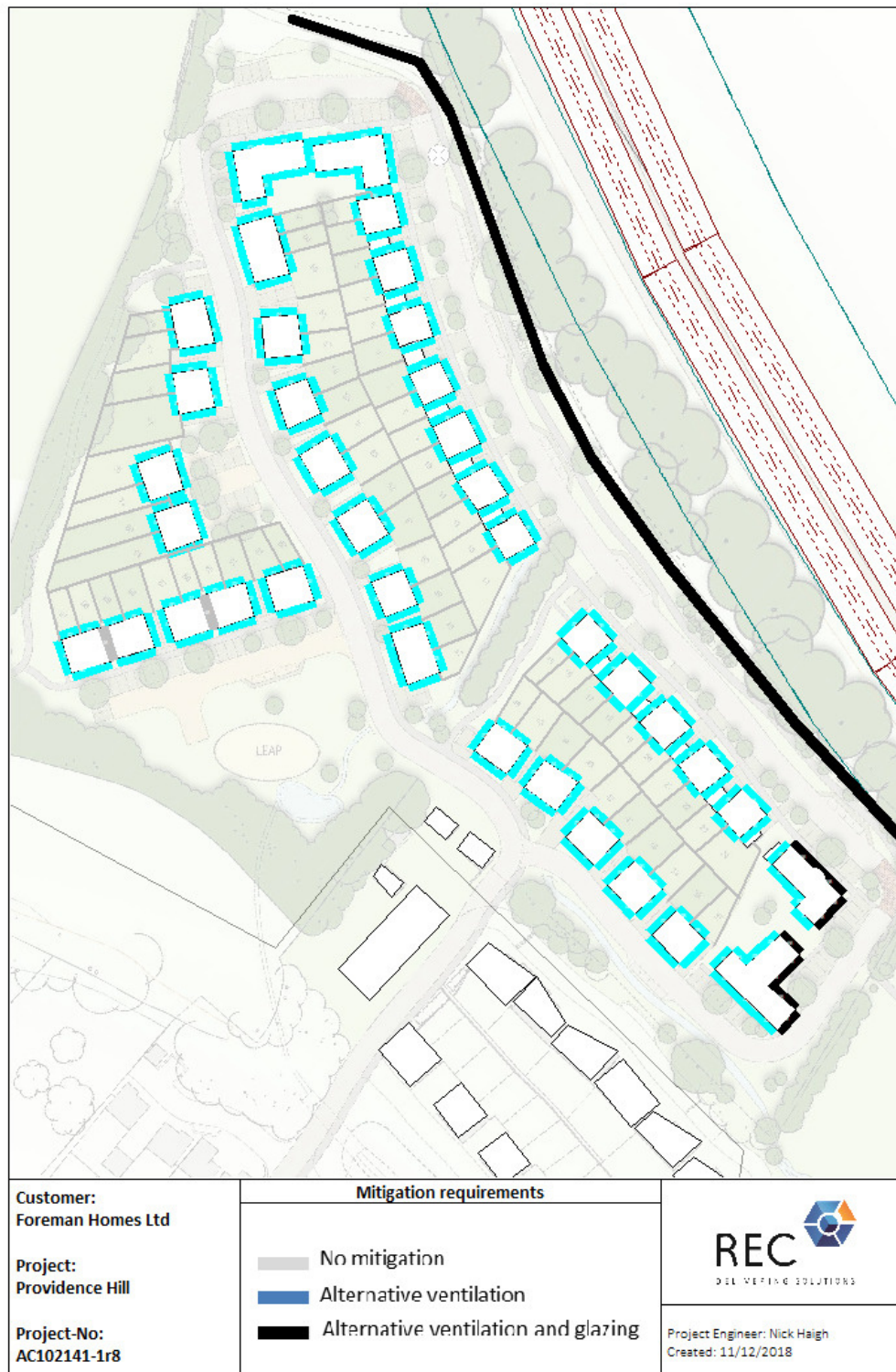




FIGURE 6 – Daytime Baseline 2nd floor

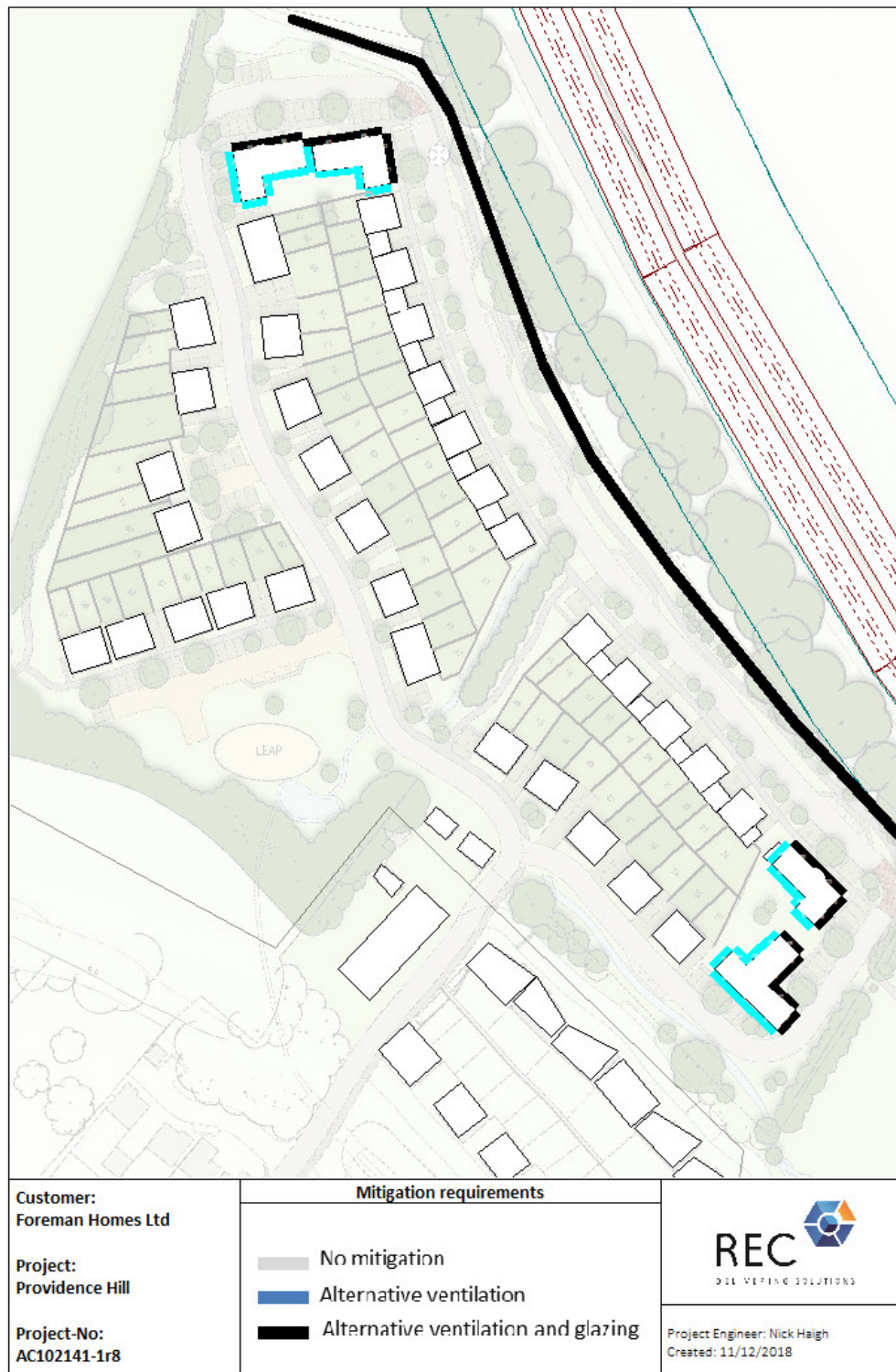




FIGURE 7 – Night-time Ground floor

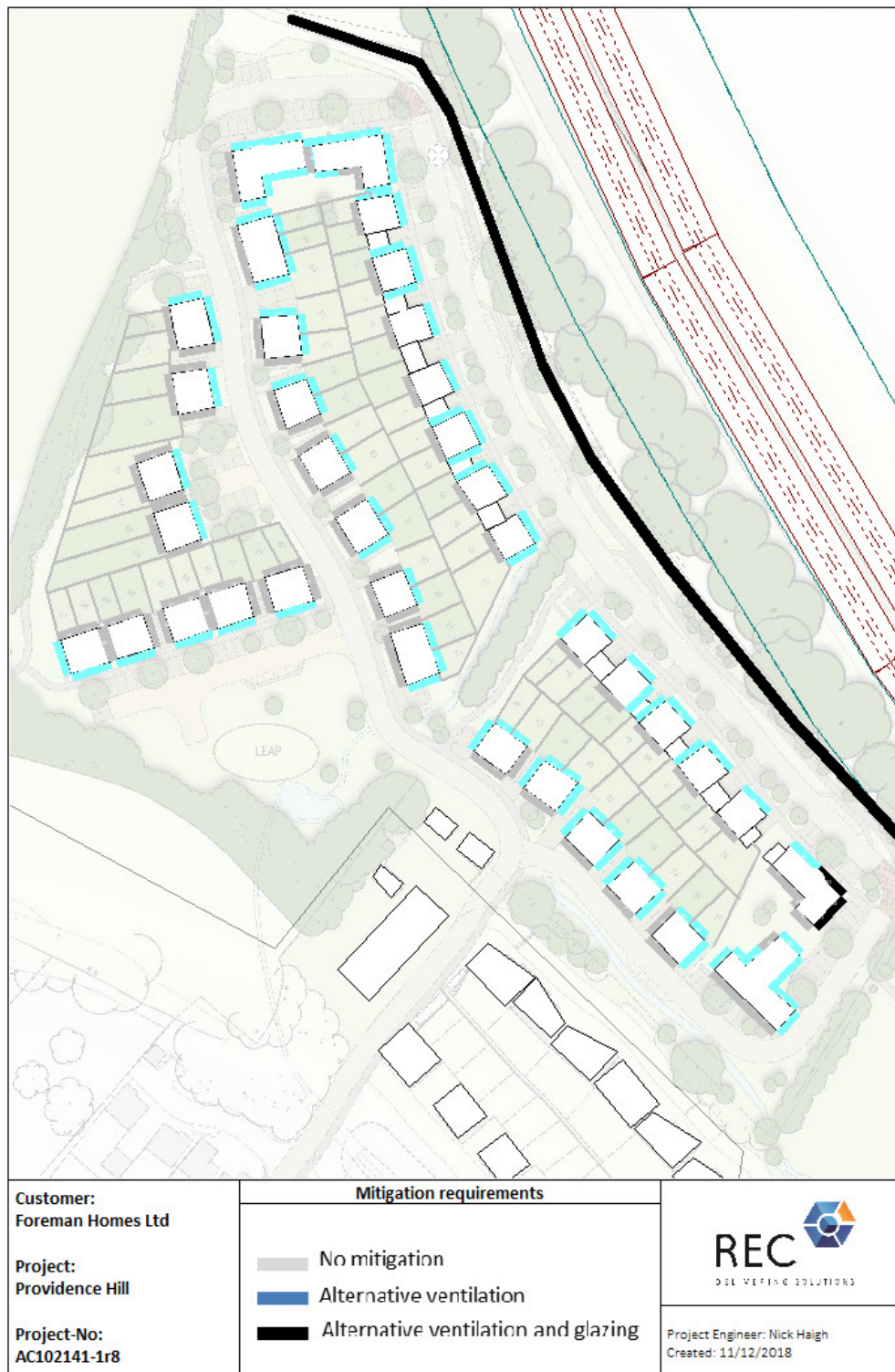




FIGURE 8 – Night-time 1st floor

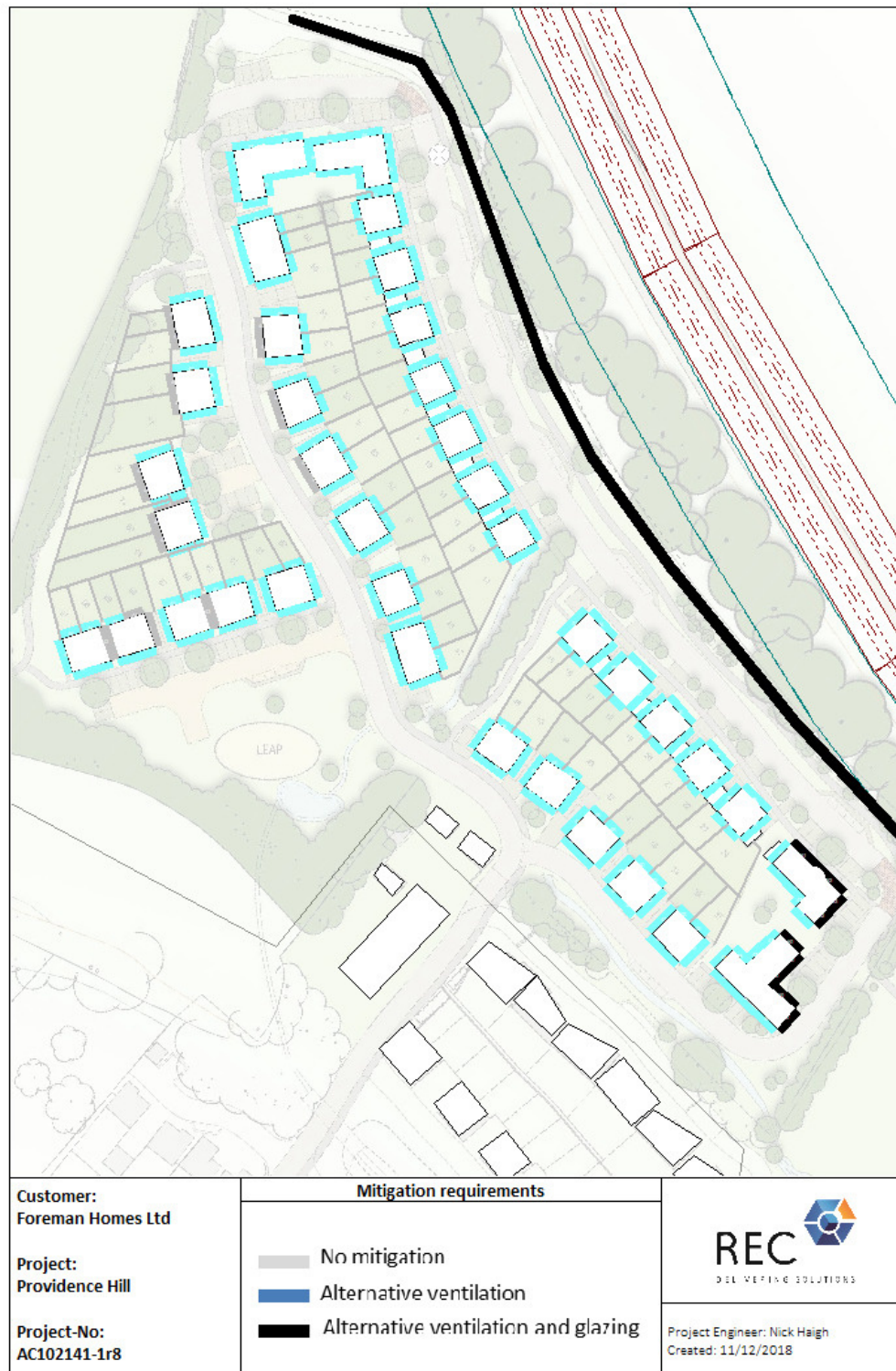




FIGURE 9 – Night-time 2nd floor

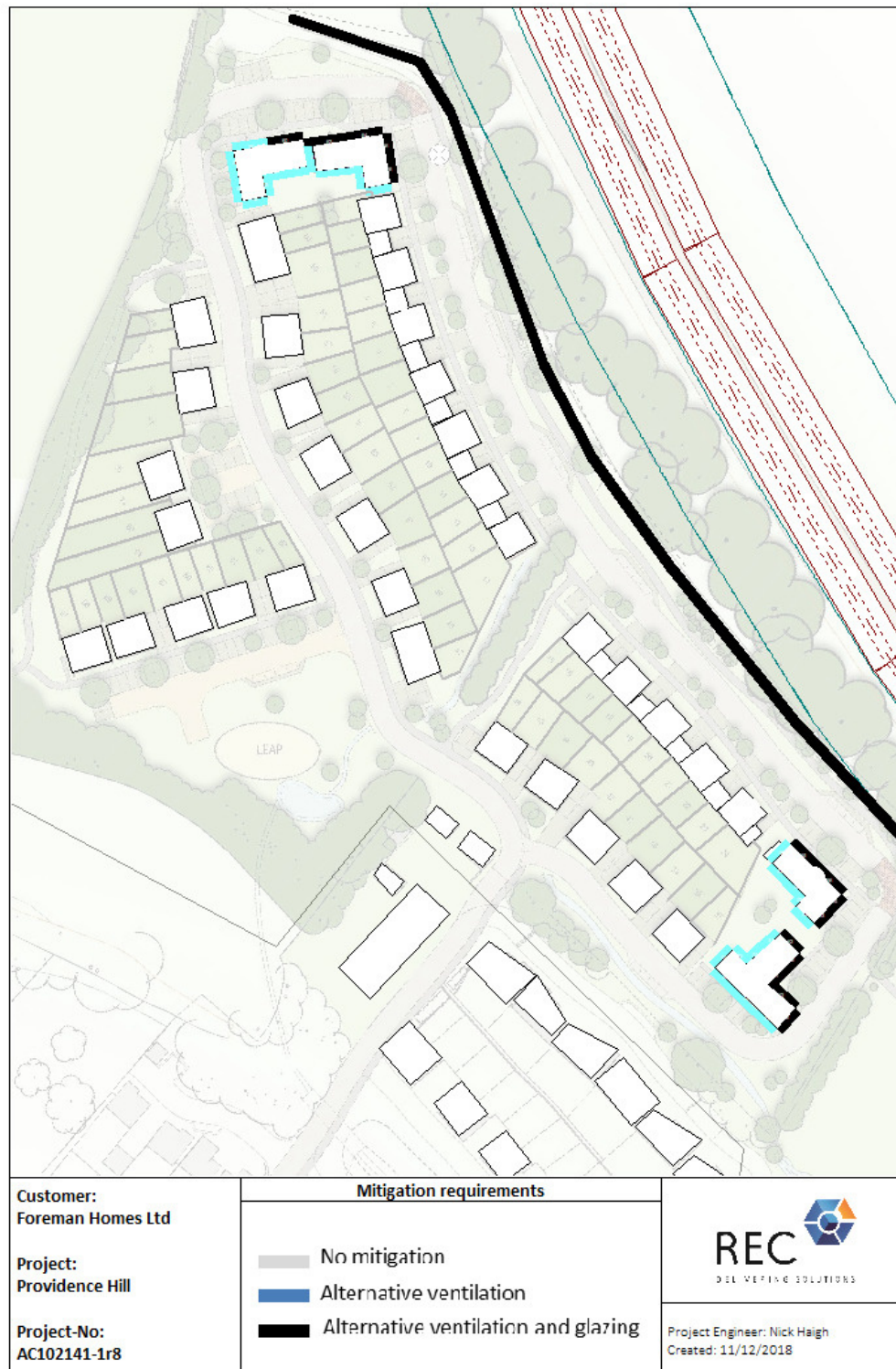
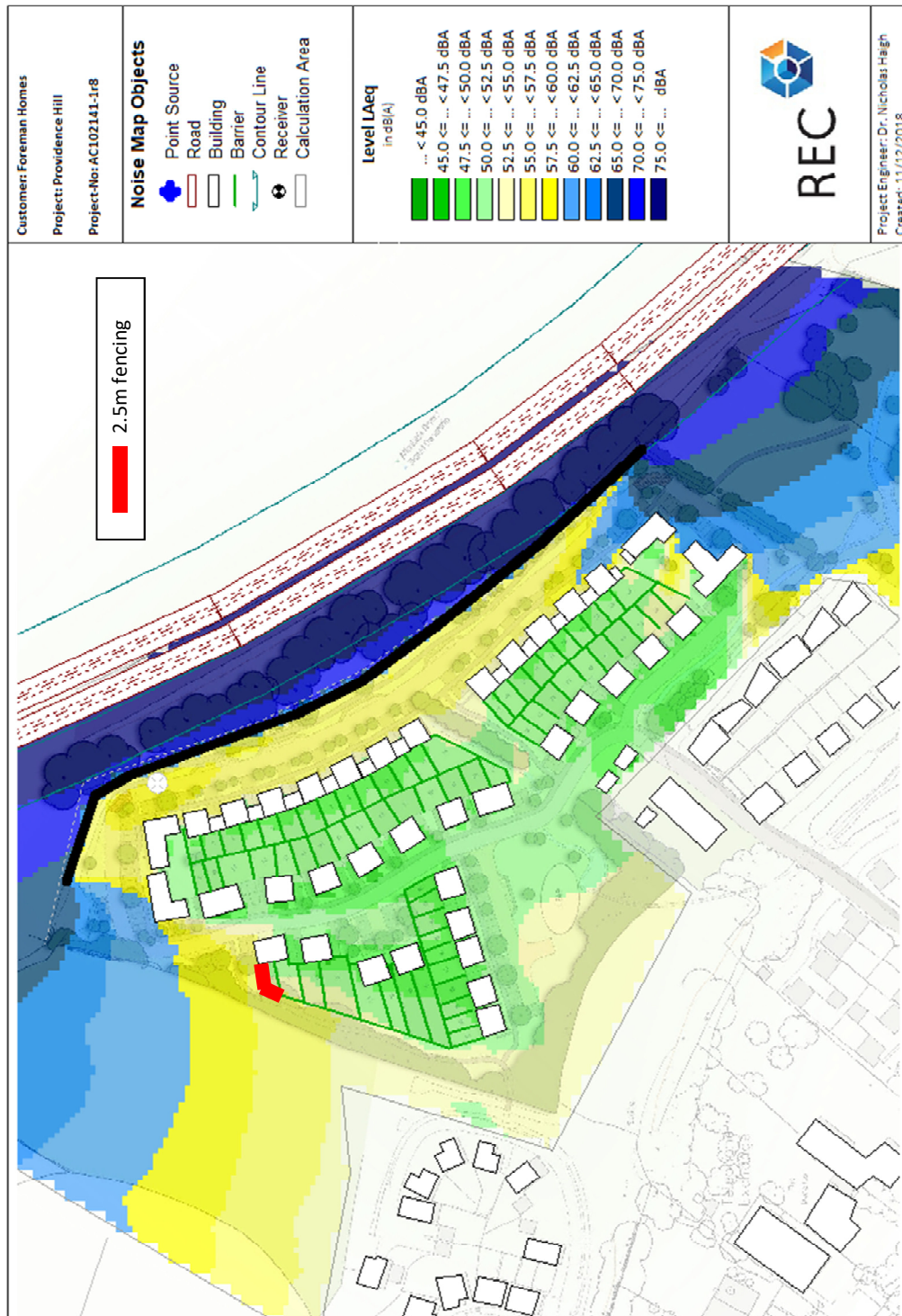




FIGURE 10 – Daytime Mitigation External Amenity at 1.5m



Sound insulation data for Pilkington **Optiphon™**

Glass	Sound reduction index (dB)									
	Octaveband Centre Frequency (Hz)						R _w (C; C _{tr})	R _w	R _w + C	R _w + C _{tr}
	125	250	500	1000	2000	4000				
Single glazing										
6.8 mm Pilkington Optiphon™	22	26	31	37	40	40	36 (-1; -4)	36	35	32
8.8 mm Pilkington Optiphon™	27	29	34	38	40	43	37 (0; -2)	37	37	35
10.8 mm Pilkington Optiphon™	26	30	35	39	40	46	38 (-1; -3)	38	37	35
12.8 mm Pilkington Optiphon™	29	32	36	41	42	51	40 (-1; -3)	40	39	37
16.8 mm Pilkington Optiphon™	31	33	38	41	43	54	41 (-1; -3)	41	40	38
Insulating glass units										
6 mm / 16 mm argon / 6.8 mm Pilkington Optiphon™	21	28	37	48	48	54	40 (-2; -6)	40	38	34
6 mm / 16 mm argon / 8.8 mm Pilkington Optiphon™	25	27	38	48	47	55	41 (-2; -6)	41	39	35
8 mm / 16 mm argon / 8.8 mm Pilkington Optiphon™	21	30	39	47	50	55	42 (-3; -8)	42	39	34
10 mm / 16 mm argon / 8.8 mm Pilkington Optiphon™	28	31	42	45	50	58	44 (-2; -6)	44	42	38
10 mm / 20 mm argon / 8.8 mm Pilkington Optiphon™	28	36	43	47	49	58	46 (-2; -6)	46	44	40
8.8 mm Pilkington Optiphon™ / 16 mm argon / 12.8 mm Pilkington Optiphon™	28	36	45	53	56	64	48 (-2; -7)	48	46	41
10.8 mm Pilkington Optiphon™ / 24 mm argon / 16.8 mm Pilkington Optiphon™	35	41	48	53	55	65	52 (-2; -6)	52	50	46
12.8 mm Pilkington Optiphon™ / 20 mm argon / 16.8 mm Pilkington Optiphon™	35	45	49	50	54	65	51 (-1; -4)	51	50	47

Measurements undertaken in accordance with BS EN ISO 10140 and R_w (C; C_{tr}) determined in accordance with BS EN ISO 717-1.

For insulating glass units, there is little difference in the sound insulation for cavity widths in the range 6 to 16 mm.

To calculate performance data for Pilkington products, please use our Spectrum online calculator at <https://spectrum.pilkington.com/>

For glass combinations to achieve an R_w value higher than 52 dB, please contact us for more details.



Sound insulation data for standard products

Glass	Sound reduction index (dB)									
	Octaveband Centre Frequency (Hz)						R _w (C; C _{tr})	R _w	R _w + C	R _w + C _{tr}
	125	250	500	1000	2000	4000				
Single glazing										
4 mm Float Glass	17	20	26	32	33	26	29 (-2; -3)	29	27	26
6 mm Float Glass	18	23	30	35	27	32	31 (-2; -3)	31	29	28
8 mm Float Glass	20	24	29	34	29	37	32 (-2; -3)	32	30	29
10 mm Float Glass	23	26	32	31	32	39	33 (-2; -3)	33	31	30
12 mm Float Glass	27	29	31	32	38	47	34 (0; -2)	34	34	32
6 mm Laminated Glass	20	23	29	34	32	38	32 (-1; -3)	32	31	29
8 mm Laminated Glass	20	25	32	35	34	42	33 (-1; -3)	33	32	30
10 mm Laminated Glass	24	26	33	33	35	44	34 (-1; -3)	34	33	31
12 mm Laminated Glass	24	27	33	32	37	46	35 (-1; -3)	35	34	32
16 mm Laminated Glass	26	31	30	35	43	51	36 (-1; -3)	36	35	33
Insulating glass units										
4 mm / (6 - 16 mm) / 4 mm	21	17	25	35	37	31	29 (-1; -4)	29	28	25
6 mm / (6 - 16 mm) / 4 mm	21	20	26	38	37	39	32 (-2; -4)	32	30	28
6 mm / (6 - 16 mm) / 6 mm	20	18	28	38	34	38	31 (-1; -4)	31	30	27
8 mm / (6 - 16 mm) / 4 mm	22	21	28	38	40	47	33 (-1; -4)	33	32	29
8 mm / (6 - 16 mm) / 6 mm	20	21	33	40	36	48	35 (-2; -6)	35	33	29
10 mm / (6 - 16 mm) / 4 mm	24	21	32	37	42	43	35 (-2; -5)	35	33	30
10 mm / (6 - 16 mm) / 6 mm	24	24	32	37	37	44	35 (-1; -3)	35	34	32
6 mm / (6 - 16 mm) / 6 mm Laminated	20	19	30	39	37	46	33 (-2; -5)	33	31	38
6 mm / (6 - 16 mm) / 10 mm Laminated	24	25	33	39	40	49	37 (-1; -5)	37	36	32

The above are generally accepted values for generic products taken from EN 12758. They are conservative values that can be used in the absence of measured data. Data for laminated glass is based on pvb interlayers (excluding acoustic pvb interlayers). Glass thickness for laminated glass excludes interlayer thickness. Data can be adopted for air or argon gas-filled cavities