



THINKING **DIFFERENTLY**

MINETY PRIMARY SCHOOL

Acoustic Design Report

Stepnell

MINETY PRIMARY SCHOOL

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1.0 PROJECT OVERVIEW

The purpose of this document is to provide information related to the acoustic strategy for demonstrating compliance with BB93 and any employers’ requirements for the proposed Minety Primary School.

This report provides an overview of the performance standards on which the acoustic design of the development will be assessed.

1.1 Performance Requirements

The table below outlines the various performance standards and guidance documents which have formed the basis of the acoustic performance targets and subsequent design guidance.

Document	Comments
BB93: Acoustic Design of Schools – Performance Standards	Compliance mandatory under Approved Document E, Regulation E4.
Acoustics of Schools: A Design Guide	Supplementary good practice design guidance to support BB93.

Table 1.1: Performance Standards Used

1.2 Project Summary Table

Project Summary	
Level of information provided	Design
Client	Stepnell
Construction	
No. storeys	1
Build type	Refurbishment
Frame	Unknown
Scheme	
BREEAM	N/A
DfE	N/A
Ventilation strategy	Mixed MVHR/NVHR
Noise Climate	
Survey conducted by	MACH
Climate	Quiet (< 55 dB)
Outdoor amenity assessment	No outdoor amenity assessment included
Façade specification	Simple
CadnaA	N/A
Non-standard Spaces	
HCD spaces	No HCD spaces within development
Large unfurnished spaces	No large unfurnished spaces within development
Open plan spaces	No open plan spaces within development
Music spaces	No music spaces within development
Bespoke classifications	No bespoke classifications within development
Sound insulation	
High noise areas	NR limits for high noise areas to be provided
Flanking	
Curtain walling	N/A

Table 1.2: Project Summary Table

1.3 Room Classifications – BB93

As the development is a refurbished primary school, the basis of room classifications has been based on the BB93 room classification provided.

2.0 INDOOR AMBIENT NOISE LIMITS

Building Bulletin 93 – Acoustic Design of Schools: Performance Standards (2015) specifies maximum indoor ambient noise levels in terms of an $L_{Aeq,30min}$, where these noise limits are dependent on specific room classifications and ventilation method.

These noise levels apply to unoccupied, fully operational buildings and are seen to be the overall noise levels which is predominantly the sum of both:

- External noise ingress
- Building services noise

BB93 also sets a maximum “L1” noise level of 60 dB $L_{A1,30min}$ in teaching spaces and is used to assess short transient noise levels associated with aircraft, railways and other similar sources. **This is achieved by default for spaces with indoor ambient noise levels up to 40 dB $L_{Aeq,30min}$** , but requires assessment in spaces with indoor ambient noise level targets of 45dB $L_{Aeq,30min}$ or above.

These classifications and criteria have been applied to each room within this development and are presented in Appendix A.

2.1 BB93 Relaxations

In addition to the normal limits, BB93 also permits a number of relaxations to indoor ambient noise limits depending on the ventilation system and condition for the building.

Condition	Ventilation System	Internal Ambient Noise Limit Relaxation
Normal - ventilation for normal teaching and learning activities	Mechanical	No relaxation
	Natural	+ 5 dB
	Hybrid	Mechanical system noise: No relaxation
		Total noise level: + 5 dB
Summertime - ventilation under the local control of teacher to prevent overheating - allowable during the hottest 200 hrs of the year	Mechanical	+ 5 dB
	Natural or Hybrid	≤ 55 dB
Intermittent boost - ventilation under the local control of teacher for dilution of fumes during practical activities as in practical spaces for science, art, food technology and design and technology	Mechanical	+ 5 dB
	Natural or Hybrid	≤ 55 dB
Process - extract can be automatic ventilation for safety and/or under local control of teacher	Mechanical and/or natural	See IoA/ANC guide ‘Acoustics of Schools: a design guide’ for operational noise levels

Table 2.1: summary of ventilation condition, system type and associated IANL tolerance

2.1.1 Natural/Hybrid Ventilation

Where a natural ventilation strategy is to be employed, the indoor ambient noise limits can be relaxed by 5dB $L_{Aeq,30min}$ where the “normal condition” is achieved. However, this does not apply to spaces with an indoor ambient noise limit of 45dB $L_{Aeq,30min}$ or higher. For hybrid ventilation systems, the mechanical system noise component must comply with the limits set out in Table 1 of BB93, however the overall noise limit can also be relaxed by 5dB $L_{Aeq,30min}$.

BB93 states that the normal condition for a natural or hybrid ventilation mode is defined as when the system is operating to limit the daily average CO₂ concentration to no more than 1,500 ppm with the maximum concentration not exceeding 2,000 ppm for more than 20 consecutive minutes on any day. This would normally equate to a minimum ventilation rate of approximately 5 l/s per person.

2.1.2 Summertime/Intermittent Boost Ventilation

BB93 also permits a further relaxation during the summertime. Summertime is defined as the hottest 200 hours in peak summertime. During summertime, natural and hybrid ventilation systems are permitted to relax indoor ambient noise limits to an upper limit of 55 dB $L_{Aeq,30min}$. The ventilation must be under the local control of the teacher so that the noise level can be reduced to normal levels when needed. Mechanical ventilation systems are permitted to relax indoor ambient noise limits by 5dB $L_{Aeq,30min}$. However, this does not apply to spaces with an indoor ambient noise limits of 45 dB $L_{Aeq,30min}$ or higher. Summertime noise limit relaxation does not apply to classrooms intended specifically for students with special hearing and communication needs, or to speech therapy rooms.

The peak summertime condition is defined as the 200 hottest hours that occur using the design summer year (DSY) weather file during normal daily school operating hours including the summer holiday period. Thermal modelling and assessment of acoustic performance should be carried out as if the school were occupied through the summer holiday period. This corresponds to a much lower number of hours during normal term time (equivalent to typically 40 teaching hours in a school year) as most of the hottest hours occur during the holiday period.

2.2 Internal Ambient Noise Limit Criteria

The table below details the BB93 internal ambient noise limit criteria as per the room classification, for both new build and refurbished development. These classifications and criteria have been applied to each room within this development and are presented in APPENDIX A

BB93 Room Classification	Internal Ambient Noise Limit L _{Aeq, 30min} [dB]	
	New Build	Refurbishment
Classroom (Nursery / Primary / Secondary)	35	40
Open-Plan Teaching / Resource Area	40	45
Music Room (Classroom / Practice / Group / Performance / Recital)	35	40
Ensemble Room (Music)	30	35
Recording Studio	30	35
Control Room (Music / Recording)	35	40
Lecture Room	35	40
Teaching space intended specifically for students with special hearing and communication needs	30	35
SEN Calming Room	35	35
Study Room (Individual Study, Withdrawal, Remedial Work, Teacher Preparation)	40	45
Libraries: Quiet Study Areas	40	45
Libraries: Resource Areas	40	45
Science Laboratory	40	45
Drama Studio	35	40
Resistant Materials, CAD/CAM Areas	40	45
Electronics/Control, Textiles, Food, Graphics, Design/Resource Area, ICT Room, Art	40	45
Assembly /Multi-Purpose Hall (Drama, PE, Audio/Visual Presentations, Assembly, Occasional Music)	35	40
Atrium, Circulation Space not intended for teaching and learning	45	50
Sports Hall	40	45
Dance Studio	40	45
Gymnasium/Activity Studio	40	45
Swimming Pool	50	55
Meeting Room, Interviewing/Counselling Room, Video Conference Room	40	45
Dining Room	45	50
Kitchen ¹	50	55
Office, Medical Room, Staff Room ¹	40	45
Corridor, Stairwell, Coats and Locker Area ¹	45	55
Changing Area ¹	50	55
Toilet ¹	50	55
¹ Considered administration or ancillary, therefore, guidance only		

Table 2.2: Internal Ambient Noise Limit Criteria

2.3 Building Services Noise Limits

Noise from building services must be considered as a contributor towards indoor ambient noise levels, therefore targets specific to building services noise are presented in APPENDIX A

3.0 EXTERNAL NOISE BREAK-IN ASSESSMENT

3.1 Noise Survey by MACH

To establish the existing environmental noise levels on site, a noise survey was conducted between 11:05 on the 25/02/2026 and 14:05 on the 26/02/2026. For more information on the methodology of this survey, site information and survey data, see APPENDIX C.

3.2 Site Description

The site is located at beside the existing secondary school at Minety C of E School and is situated in Minety. The site is situated in a rural village, and is approximately 230 m from a railway line and is adjacent to Horbury Hill, the main street of the village.

3.3 Site Map

Figure 3.1 below shows a map of the site, with closest noise-sensitive receivers shown in context.



Figure 3.1 - Proposed Development (Red), Existing school site (Orange) and Nearest Noise Sensitive Receivers (Blue)

3.4 Summary of $L_{Aeq,30min}$ Noise Levels (MACH)

Based on the results of the environmental noise survey as outlined within APPENDIX C, the $L_{Aeq, 30mins}$ noise levels representative of the local noise climate of the eastern façade is summarised below.

Location	Date	Start	End	Duration	$L_{Aeq,30min}$ (dB)
FP1	25/02/2026	11:05:00	11:35:00	00:30	58*
		11:35:00	12:05:00	00:30	49
		12:05:00	12:35:00	00:30	55
		12:35:00	13:05:00	00:30	57*
		13:05:00	13:35:00	00:30	48
		13:35:00	14:05:00	00:30	46
		14:05:00	14:35:00	00:30	58*
		14:35:00	15:05:00	00:30	51
		15:05:00	15:35:00	00:30	52
		15:35:00	16:05:00	00:30	54
	26/02/2026	16:05:00	16:35:00	00:30	51
		08:35:00	09:05:00	00:30	50
		09:05:00	09:35:00	00:30	50
		09:35:00	10:05:00	00:30	48
		10:05:00	10:35:00	00:30	56**
		10:35:00	11:05:00	00:30	57**
		11:05:00	11:35:00	00:30	51
		11:35:00	12:05:00	00:30	54
		12:05:00	12:35:00	00:30	58**
		12:35:00	13:05:00	00:30	60
		13:05:00	13:35:00	00:30	58**
		13:35:00	14:05:00	00:30	56**

Table 3.1: $L_{Aeq, 30mins}$ Summary

*Levels during break and lunchtimes, as well as during use of the external field during lessons are not considered representative of residual ambient noise levels.

** Noise levels on the 26th are not considered completely representative due to higher than average wind speeds

Considering the above, it is considered that the worst-case typical noise levels are considered to be of the order of **55 dB $L_{Aeq, 30min}$** , the highest representative measured $L_{Aeq, 30mins}$ noise level at the fixed measurement position.

3.5 Summary of Background Noise Levels, L_{A90}

The table below presents representative measured noise levels of the L_{A90} values measured on site. These will be discussed further in the plant noise impact assessment to ensure a representative value will be used in relation to the proposed operational hours.

Measurement Position	$L_{A90,T}$ Method	Background Noise Level $L_{A90,T}$	
		Daytime (07:00 – 23:00)	Night-Time (23:00 – 07:00)
Fixed Measurement Location 1	Min. Modal	32	26

Table 3.2: Summary of Background Noise Level Measurements

3.6 Façade Noise Levels

The noise levels at fixed position 1 are considered representative of the noise levels at the proposed façade. Therefore, as detailed in APPENDIX C the façade levels are predicted to be of the order of 55 dB $L_{Aeq,30min}$ in the worst-case.

4.0 EXTERNAL NOISE BREAK-IN ASSESSMENT

4.1 Design Targets

The most onerous internal ambient noise level target provided by BB93 for this development is anticipated to be ≤ 35 dB $L_{Aeq,30min}$ for the classroom. With the additional natural ventilation relaxation of +5 dB, that means the most onerous indoor ambient noise level requirement for this development is 40 dB $L_{Aeq,30min}$.

4.2 Façade Specification & Suitable Ventilation Strategies

4.2.1 Natural Ventilation Feasibility

An open window typically provides of the order of 10 - 15 dB attenuation. Subtracting this figure from the predicted façade noise level gives a predicted internal noise level.

Layout Option	Internal Ambient Noise Limit (dB $L_{Aeq,30min}$)	Predicted Façade Noise Levels (dB $L_{Aeq,30min}$)	Open Window Attenuation (dB)	Predicted Internal Ambient Noise Level (dB $L_{Aeq,30min}$)
Nursery Classrooms, New-build	40	55	15	40
*includes +5dB relaxation for natural ventilation				

Table 4.1: Natural Ventilation Feasibility

As the table shows, based on a standard openable window ventilation strategy, the predicted internal noise level is seen to be at the design limit. As noise levels do not exceed the indoor ambient noise levels, a natural ventilation strategy is considered feasible for the development.

4.3 Façade Specification

As site noise level are not especially loud, the solid elements of the façade are likely to be sufficient as fairly standard ratings. The minimum recommended façade specifications are likely to be sufficient as follows:

- External Wall - 43dB R_w
- Window - 32dB R_w
- Roof - 40dB R_w

Please note that the suitability of these would require verification through more detailed assessment in the following stage of the project.

4.4 Façade Review

The minimum level of sound insulation is considered to be achieved by both wall types:

- W01 – Facing Brickwork wall-build-up
- W02 – Timber Cladding on Blockwork wall build up

Based on proposed constructions as provided in: 2425-FTP-XX-MSZZ-DR-A-4201_Proposed Detailed Section_P01_Information

W01:

- 103mm Facing Brickwork – Buff Brick
- 50mm Clear cavity
- 200mm Mineral Wool Cavity Insulation, Rockwool or Equal
- 100mm Thermalite Aircrete Hi-Strength7 Block – K'value 0.18 W/m²K
- (7.3N/MM2 - all to engineers requirements)
- 15mm Plasterboard on dabs, Gyproc Wallboard or equal, fully taped
- Mist coat and 3 coats of emulsion finish

W02:

- 44x44mm Vertical Brookclad Cladding battens
- 21x160mm Vertical Brookclad Cladding boards
- 25mm treated timber battens
- 25mm treated timber counter battens
- 100mm Fairtex Dense Blockwork 2000 kg/m³ (k-value = 1.13 W/mK - all to engineers requirements)
- 50mm Clear cavity
- 200mm Mineral Wool Cavity Insulation, Rockwall or Equal
- 100mm Thermalite Aircrete Hi-Strength7 Block - K'value 0.18 W/m²K (7.3N/MM2 - all to engineers requirements)
- 15mm Plasterboard on dabs, Gyproc Wallboard or equal, fully taped
- Mist coat and 3 coats of emulsion finish

5.0 RAIN NOISE

5.1 Rain Noise Criteria

Rain noise is considered separate to other forms of external noise ingress and as such is assessed in isolation. The criteria stated in the table below shall be demonstrated through laboratory test and/or calculation, and includes any glazing, or lightweight structure. A roof construction with a surface mass less than 150 kg/m² is considered to be lightweight.

Any repairs to existing roofs are exempt from this requirement, however, any new roofing elements must comply. Compliance with requirements should be demonstrated through calculation.

Rain Type (as defined by BS EN ISO 140-18)	Rain Noise Limit (dB L _{Aeq,30min})
Heavy Rainfall	≤ Indoor Ambient Noise Limit* + 25 dB

Table 5.1: Rain Noise Limits

* Indoor ambient noise limits are detailed in Section 2.2.

5.2 Rain Noise Requirements

The spaces with the lowest indoor ambient noise limits within the development, and thus the most sensitive to rain noise are listed below along with their respective rain noise targets.

Room / Room Type	Internal Ambient Noise Limit (dB L _{Aeq,30min})	"Heavy" Rain Noise Limit (dB L _{Aeq,30min})	Minimum Roof Performance (dB L _{IA})
0.01 Classroom	35	60	≤ 52
0.02 Group Room	35	60	≤ 52

Table 5.2: Rain Noise Limits

5.3 Rain Noise Design Guidance – Example Roof Constructions

The table below provides example roof constructions and here corresponding rain noise performance. The roof performance will determine the roof suitability to achieve the rain noise criteria detailed in Table 5.2.

Construction	Performance (dB L _{IA})	Performance with lay-in-grid Ceiling * (dB L _{IA})
Single-ply membrane 100mm Rigid PIR Insulation Profiled Metal Deck	≤ 60	≤ 53
Fleece Backed single ply membrane 110mm Rigid PIR Insulation Profiled Metal Deck with Vapour control layer	≤ 56	≤ 49
0.9mm Aluminium 160mm compressed to 155mm mineral wool 0.7mm steel liner sheet		
Single-ply membrane 150mm Hardrock Dual Density Roofing Board Profiled Metal Deck with Vapour control layer	≤ 52	≤ 45
0.9mm Aluminium 250mm compressed to 240mm mineral wool 0.7mm steel liner sheet		
* Full lay in grid ceiling (minimum 10 dB Rw)		

Table 5.3: Example Roof Construction(s)

Please note, that any rooflights specified in any spaces should also be at least double glazed and should achieve a rain noise intensity of ≤52 dB L_{IA}. In ALN spaces the rooflight should not exceed 2m².

Please note: This guidance only assesses the roof construction regarding rain noise in isolation. The construction may have other performance requirements that will need to be achieved in combination with the rain noise criteria (e.g., airborne sound insulation from external noise).

5.3.1 Rooflights

Please note, that any rooflights specified in any spaces should also be at least double glazed and should typically achieve a rain noise intensity of at least ≤ 52 dB L_{IA}.

This is typically a sufficient level of rain noise mitigation, however, should there be a significant area of rooflights within a space, then this may not be sufficient and may require further review to ensure that rain noise is suitably mitigated.

5.4 Rain Noise Review

The pitched roof build-up is understood to be as provided below:

- Concrete Interlocking Roof Tile, unventilated
- 25mm x 50mm treated SW timber counterbattens at max 600 c/c
- 25mm x 50mm treated SW timber battens at max 600 c/c
- Vapour permeable roof underlay, or equal
- 100mm above rafter + 200mm between rafter Mineral Wool Insulation
- 200x50mm C24 Roof rafters to engineers design and spacings
- 1000g Vapour Control Layer
- 15mm Plasterboard, Gyproc Wallboard or equal, fully taped
- Mist coat and 3 coats of emulsion finish
- Acoustic Ceiling Board where required

This build-up is not considered light-weight, and would be considered suitable in terms of minimising rain noise and suitably reaching the targets outlined in Table 5.2

6.0 INTERNAL SOUND INSULATION

6.1 Internal Sound Insulation – Design Criteria

6.1.1 Airborne Sound Insulation Criteria – $D_{nT,w}$

The onsite acoustic performance criteria for the airborne sound insulation ($D_{nT,w}$) of walls and floors are dependent on the room classification of the source and receiving rooms.

The table below presents the minimum airborne sound insulation design criteria between rooms based upon the Activity Noise and Noise Tolerance of each room for new build developments.

New Build Minimum $D_{nT,w}$ (dB)		Activity Noise in Source Room			
		Low	Average	High	Very High
Noise Tolerance in Receiving Room	High	n/a	35	45	50
	Medium	40	45	50	55
	Low	45	50	55	55

Table 6.1: New build design criteria for airborne sound insulation between spaces

BB93 provides relaxed targets for refurbished buildings as detailed below. The targets are also what should be considered the minimum requirements for any alternative performance standards.

Refurbishment Minimum $D_{nT,w}$ (dB)		Activity Noise in Source Room			
		Low	Average	High	Very High
Noise Tolerance in Receiving Room	High	n/a	30	35	45
	Medium	30	40	45	45
	Low	35	40	50	50

Table 6.2: Refurbishment design criteria for airborne sound insulation between spaces

Each room classification has an Activity Noise and Noise Tolerance rating. These classifications and criteria have been applied to each room within this development and are presented in APPENDIX A.

6.1.2 Exceptions Permitted Within BB93

Exception	Scenario	Element(s)	Minimum Requirements
A	Doors and service hatches between kitchens and multi-purpose halls (not dedicated dining spaces)	Serving hatch	≥ 18 dB R_w ¹
B	Interconnecting door between teaching space and another occupied room	Doorset	≥ 35 dB R_w
		Composite sound reduction (wall, door and glazing)	≥ 45 dB R_w
C	Folding partitions between teaching spaces and halls	Operable wall	≥ 40 dB $D_{nT,w}$ ²
D1	Vision panels between multi-purpose halls, music rooms and control rooms requiring visual communication only	Solid vision panel	≥ 45 dB R_w
		Separating partition	≥ 55 dB R_w
D2	Vision panels between multi-purpose halls, music rooms and control rooms requiring visual and audio communication	Sliding vision panel	N/A
		Separating partition	≥ 45 dB R_w

¹ Adjacency should be avoided where possible, or a servery included between kitchen and hall, recommend timetabling use of hall so noise sensitive activities, e.g., exams, do not take place in the hall when the kitchen is in use.
² Performance of operable wall may not facilitate simultaneous independent use of adjacent spaces

Table 6.3: Allowed Sound Insulation Exceptions

Where any of these exceptions apply, this has been highlighted in the relevant subsequent sections and the appropriate exception sound reduction requirements have been applied.

6.1.3 Walls To Circulation Spaces

Where there is a door and partition between a shared circulation spaces and other spaces used by students, the targets below are applicable. These classifications and criteria have been applied to each room within this development and are presented in the appendix.

Area	Requirements			
	Wall & Glazing (dB R_w)		Doorset (dB R_w)	Ventilators * (dB $D_{n,e,w} + 10\log N$ ¹)
	New	Refurb		
Secondary School Music Room Control Room for Recording Drama Room Multi-Purpose Hall Teaching space specifically for students with special hearing or communication needs	≥ 45	≥ 40	≥ 35	≥ 37
Primary Music Room All other rooms used for teaching or learning	≥ 40	≥ 35	≥ 30	≥ 32

¹ Where N is the number of ventilators with airborne sound insulation $D_{n,e,w}$
* Please note that in any instance where the wall and door performance has been increased to 45 dB R_w and 35 dB R_w respectively to mitigate noise transfer into teaching space that the ventilator specification should also be increased to 37 dB $D_{n,e,w}$, such to not compromise the sound insulation specified."

Table 6.4: Sound Insulation Requirements to Circulation Spaces

6.1.4 High Noise Areas

Any spaces that have the potential to generate relatively high noise levels have the potential to disturb nearby noise sensitive spaces.

Therefore, any instances where this occurs, the noise breakthrough from the high noise generating area will be assessed against the indoor ambient noise limit set within any adjacent noise sensitive spaces, where the separating partition will be specified along with any noise limits within the noise generating space that should not be exceeded.

6.2 Internal Sound Insulation – Wall Specification

The table below details the minimum on-site requirements ($D_{nT,w}$), and the subsequent calculated performance requirements of the floor (R_w), as calculated based on the equation provided within “Acoustics of Schools A Design Guide”, noting any instances where a BB93 exception has been applied. Partitions that are included as movable walls have also been noted as these will require additional design consideration.

Please note that the table below is not exhaustive, therefore please refer to the sound insulation markups presented within APPENDIX B.

Room 1	Room 2	Minimum On-site Requirement (dB $D_{nT,w}$)	Calculated SRI Requirement for Partition (dB R_w)	Simplified SRI Requirement for Partition (dB R_w)
0.02 Group Room	0.01 Classroom	45	54	55
0.08 Group Room	0.01 Classroom	45	50	50
0.08 Group Room	0.06 Hygiene Room	45	52	55

Table 6.5: Wall Specification Summary

The above table is not exhaustive, please refer to the sound insulation markups for further information.

6.3 Internal Sound Insulation – High Noise Areas

There are a number of plant spaces that can potentially generate high noise levels, potentially causing disturbance to nearby spaces.

Any mechanical plant with moving parts needs to be fixed to the structure using resilient anti vibration mounts, to minimise reradiated noise into occupied rooms through structural vibration. The manufacturer should be able to advise appropriate mounts or mitigation methods.

Noise limits will need to be imposed upon building services rooms, based upon the proposed surrounding constructions, such that internal noise level targets in adjacent spaces are met.

At this stage, indicative wall ratings have been applied to these spaces, but this will require further review and design co-ordination at the next stage.

6.4 Separating Walls – Design Guidance

6.4.1 Separating Partitions (Masonry)

Construction	Thickness (no skim) (mm)	Calculated Laboratory Rating (dB R_w)	Suitable for Walls Rated to Achieve; (dB R_w)
100 mm Concrete Block (1400 kg/m ³)	100	42	40
140 mm Concrete Block (1400 kg/m ³)	140	46	45
200 mm Concrete Block (1400 kg/m ³)	200	52	50
100 mm Concrete Block (1400 kg/m ³) 70 mm Metal Studs (600 mm centres), 25 mm mineral wool (min. 10 kg/m ²) 1 x 12.5 mm Wallboard (8 kg/m ²)	183	56	55
100 mm Concrete Block (1400 kg/m ³) 70 mm Metal Studs (600 mm centres), 25 mm mineral wool (min. 10 kg/m ²) 2 x 15 mm Wallboard (9.8 kg/m ²)	200	60	60
200 mm Concrete Block (1400 kg/m ³) 70 mm Metal Studs (600 mm centres), 25 mm mineral wool (min. 10 kg/m ²) 2 x 15 mm Wallboard (9.8 kg/m ²)	300	66	65

Table 6.6: Example Masonry Wall Constructions

6.4.2 Internal Doors

BB93 provides guidance on typical door constructions capable of achieving different levels of sound insulation.

- R_w 30 doors typically have a minimum surface density of 27kg/m² and are at least 44mm thick.
- R_w 35 doors typically have a minimum surface density of 29kg/m² and are at least 54mm thick.

Both doors would typically have the following features:

- Solid core, or laminate, door leaf.
- Perimeter seals, including the threshold.
- A latching mechanism ensuring adequate compression of all door seals, and gentle contact with the door frame, devoid of noise, or structural impact.

Where vision panels can be installed in doors, the size of the glazing and performance of the glazing must be such that it has an equal performance to that of the door slug.

6.4.3 Riser Doors

Riser doors should be at least 44mm thick and formed from a solid or laminate core. Acoustic compressions seals should be installed between the door leaf and rebated frame around the entire perimeter. There are no acoustic requirements relating to these doors, however, should a riser link two occupied spaces, this would introduce risk of sound transfer through the riser between the spaces, which may require additional mitigation measures to not compromise the overall sound insulation.

6.4.4 Internal Screens

The table below provides example of glazing configurations for different R_w requirements. Constructions provided are based on data published by Saint Gobain, but other manufacturers may provide similar systems.

R_w Rating	Description
35	4mm Glass / 20mm Void / 6mm Glass
40	6mm Glass / 27mm Void / 10mm Glass
45	10mm Glass / 16mm Void / 8.4mm Laminated Glass
50	8.8mm Laminated Glass / 24mm Void / 12.8mm Laminated Glass

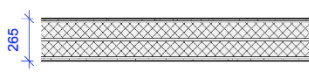
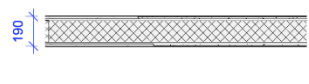
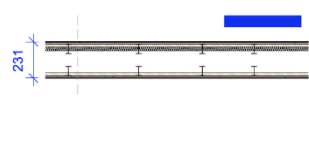
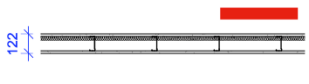
Table 6.7: Glazing Configurations and Corresponding R_w Ratings

6.4.5 Hand Dryers

Noise from hand dryers has the potential to cause disturbance to nearby spaces. Fixing hand dryers directly to separating partitions should be avoided and the exact placement of the hand dryers should be considered to reduce noise disturbance. Should there be particular concern over noise from hand dryers, low velocity hand dryers should be specified to reduce noise generation.

6.5 Proposed Wall Type Review

MACH has reviewed the proposed wall types, which the wall type constructed and assessed sound insulation performance is detailed in the table below.

Ref	Illustration of Construction	Description	Predicted Performance dB (R_w)
Type 01		1x 15mm Gyproc DuraLine 215mm Thermalite Hi-Strength 7 Blockwork/ 2x 100mm dense blockwork** 1x 15mm Gyproc DuraLine	-
	Modelled Description	INSUL 2x 15mm Gyproc DuraLine(SM: 27.8 kg/m ²) + 2x 100mm concrete block (SM: 376 kg/m ²)	56
Type 02		1x 15mm Gyproc DuraLine 140mm dense blockwork** 1x 15mm Gyproc DuraLine	-
	Modelled Description	INSUL 2x 15mm Gyproc DuraLine (SM: 27.8 kg/m ²) + 1x 140mm concrete block (SM: 263.2 kg/m ²)	52
Type 03		1x 15mm Gyproc DuraLine - Gypframe 60 I 50 at 600mm centres 25mm Isover Acoustic Partition Roll (APR 1200) 200mm cavity - Gypframe 60 I 50 at 600mm centres 1x 15mm Gyproc DuraLine	-
	Modelled Description	INSUL 1 x 15mm Gyproc Duraline (SM: 13.9 kg/m ²) + Steel stud (0.55mm) in 200mm empty cavity + 26mm fibreglass (10kg/m ³) + 1 x 15mm Gyproc Duraline (SM: 13.9 kg/m ²)	54
Type 04		1x 15mm Gyproc DuraLine - Gypframe 92 S 60 'C' Studs at 600mm centres 25mm Isover Acoustic Partition Roll (APR 1200) 1x 15mm Gyproc DuraLine	-
	Modelled Description	INSUL 1 x 15mm Gyproc Duraline (SM: 13.9 kg/m ²) + Steel stud (0.55mm) + 26mm fibreglass (10 kg/m ³) + 1 x 15mm Gyproc Duraline (SM: 13.9 kg/m ²)	52

*Calculated sound insulation performance from INSUL should be taken with a tolerance of ± 3 dB.

**Surface masses for various blockworks have been assumed for the assessment. This will require further confirmation from structural engineer.

Table 6.8: Proposed Wall Types

The proposed wall types assessed above are required to be specified in appropriate locations in order to achieve the sound insulation requirements detailed in Section 6.2 and in the markups in APPENDIX B.

7.0 FLANKING SOUND

7.1 Flanking Sound Introduction

Flanking sound can be described as the transmission of sound which does not pass through the main separating element such as a separating wall or separating floor, where the sound flanks around the main separating element. BS EN 12354-1:2000 'Estimation of acoustic performance of buildings from the performance of elements' demonstrates the contributions to the sound transmission within a room and various flanking paths as shown in the figures below.

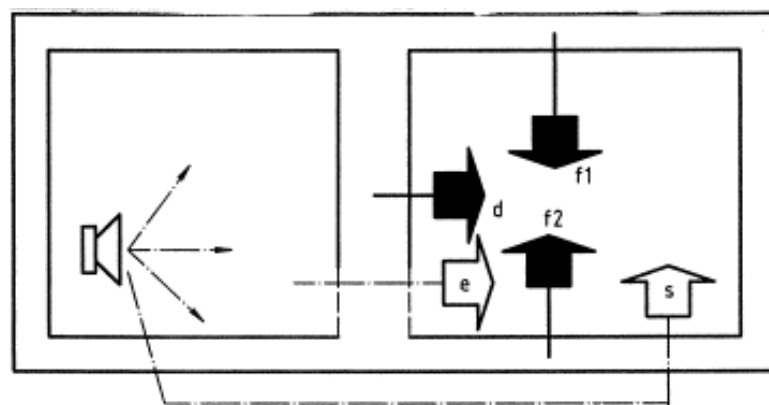


Figure 7.1: Illustration of the different contributions to the total sound transmission to a room: d- radiated directly from the separating element, f1 and f2 - radiated from flanking elements, e - radiated from components in the separating element, s - indirect transmission.

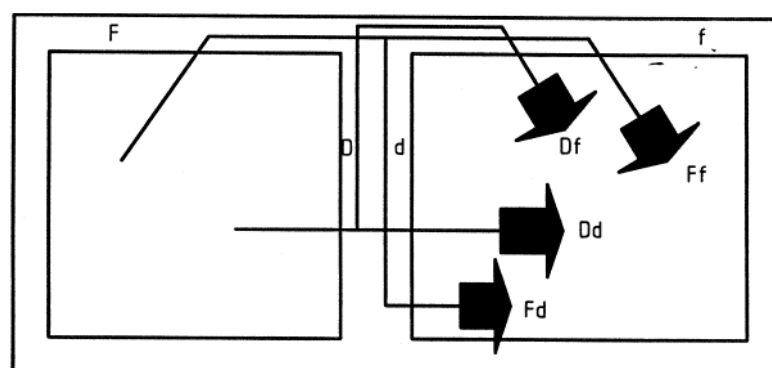


Figure 7.2: Sound transmission paths between rooms

The above figures can be treated as a section or plan view indicating flanking around the side of a partition between rooms or over the top/under a partition into a neighbouring room.

7.2 Flanking Sound Detailing

Due to the potentially significant contribution flanking sound can make to sound separation between adjacent spaces, all junctions and interfaces between building elements, need to be appropriately detailed to ensure that these sound paths are sufficiently mitigated, and they do not introduce a flanking sound path that compromises the on site sound insulation.

Should additional support in this area be required, MACH can provide this support upon request.

8.0 PENETRATION DETAILING

8.1 Cable Trays and Trunking

No service penetrations should be made through separating floors, i.e. between occupied spaces, and all services should enter the room via a corridor, and not pass directly from room to room. The table and figures below outline ways to maintain the acoustic integrity. For each figure, the upper half of each image should be used for penetrations within lightweight constructions, and the lower half for masonry.

Penetration type	Detailing	Figure ref
Cable tray & trunking	Tightly pack rockwool fire pillows into opening Insert plasterboard lining under tray Seal with non-hardening mastic	Figure 8.1
Penetration with < 5 mm clearance	Seal with non-hardening mastic	Figure 8.2
Penetration with 5 – 20 mm clearance	Pack gap between wall and penetration with insulation Reduce gap around penetration to ≤ 5 mm with plasterboard Seal remaining gap with non-hardening mastic	Figure 8.2
Penetration with > 5 mm clearance	Pack gap between wall and penetration with insulation Reduce gap around penetration to ≤ 5 mm with plasterboard collar Seal remaining gap with non-hardening mastic	Figure 8.2

Table 8.1: Penetration Detailing

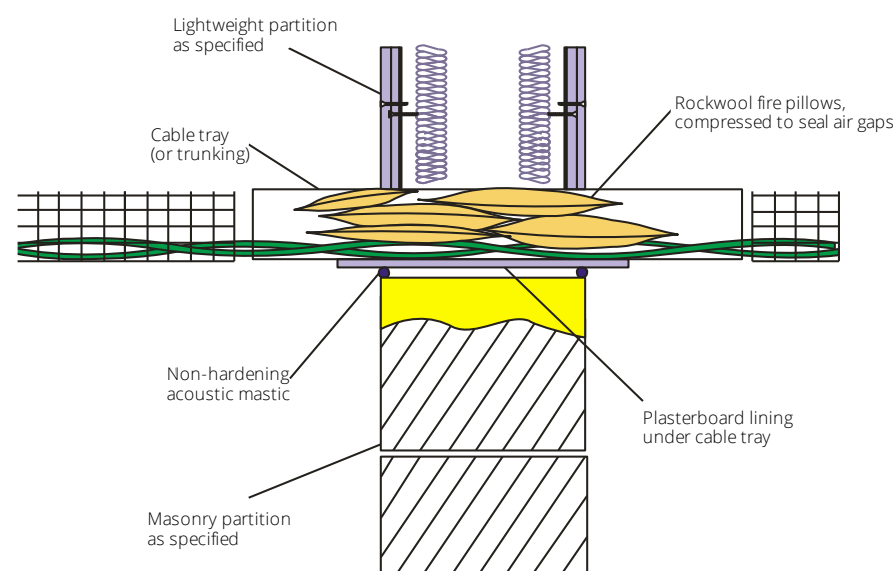


Figure 8.1: Cable Tray and Trunking Detailing

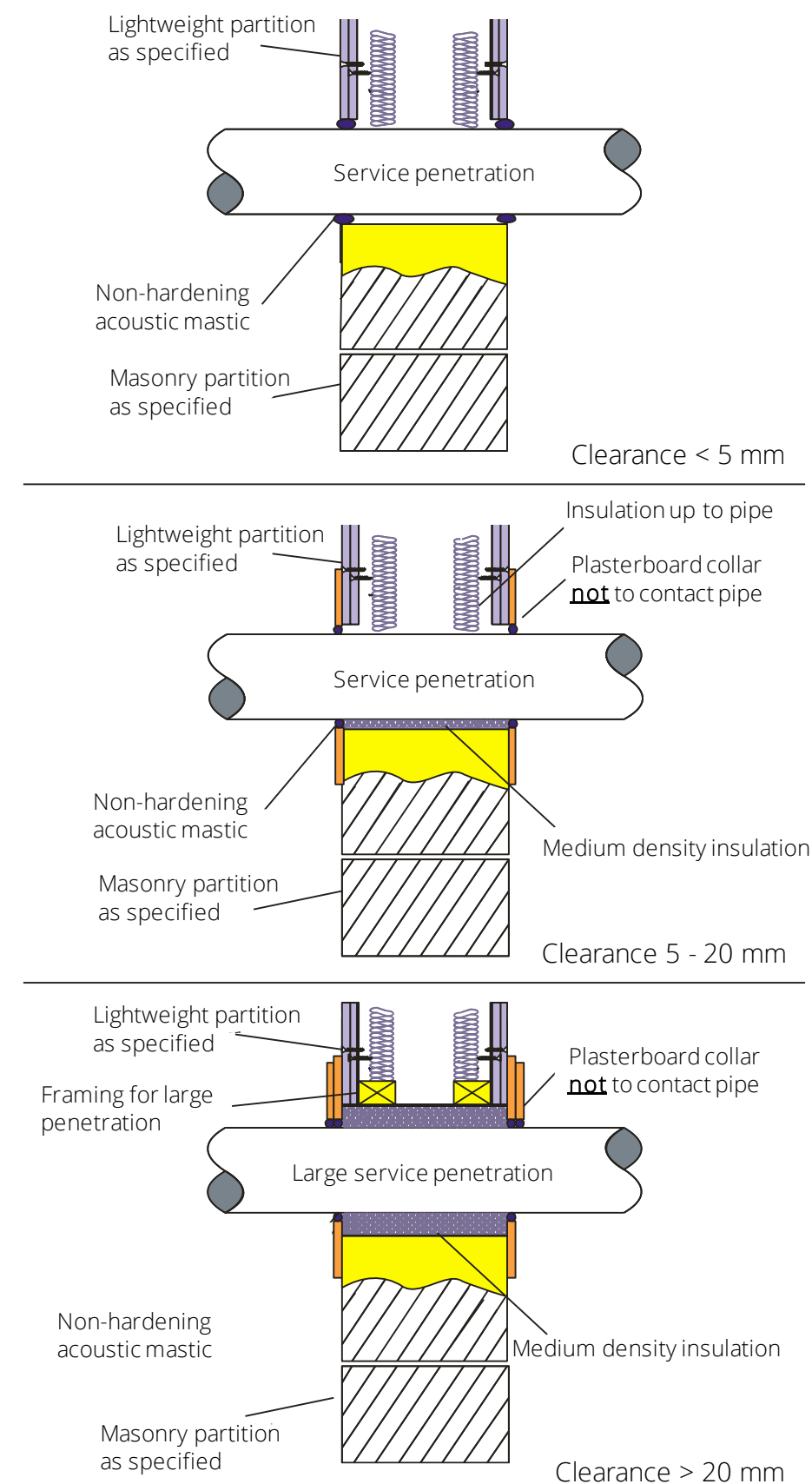


Figure 8.2: Service Penetration Detailing

8.2 Recessed Sockets and Switches

Recessed plug sockets located back to back either side of separating walls may compromise the sound insulation of the partition. Therefore, all sockets and switches should be staggered by 150 mm, and be detailed and sealed in such a way that the acoustic integrity of the separating partition is not compromised.

The table below outlines possible options to maintain the acoustic integrity.

Separating Wall Scenario	Detailing Options
Sound insulation requirement ≤ 45 dB R_w	Putty Pad , note, any gaps or openings around a putty pad compromise the sound insulation performance. Acoustic Back Box Plasterboard backing , as per Robust Standard Details guidance
Sound insulation requirement > 45 dB R_w	Acoustic Back Box Plasterboard backing , as per Robust Standard Details guidance
Sockets/switches back-to-back, or < 150 mm apart	Plasterboard backing , as per Robust Standard Details guidance

Table 8.2: Recessed socket/switch detailing

8.3 Cross Talk Through Ventilation Systems

If ventilation ducts link two spaces, cross talk attenuators will be required. To ensure the acoustic integrity of separating structures, the passage of sound through ventilation systems is required to achieve D_{new} values at least 7 dB higher than the $D_{nT(mf,max)w}$ ratings provided within the airborne sound insulation table.

The above $D_{n,e,w}$ figures are provided purely as guidance, and it is seen to be the responsibility of the M&E engineer/contractor to ensure that appropriate levels of cross talk attenuation are added to ventilation systems.

The figure below provides an example penetration detail for cross talk attenuators and the key concepts to be considered.

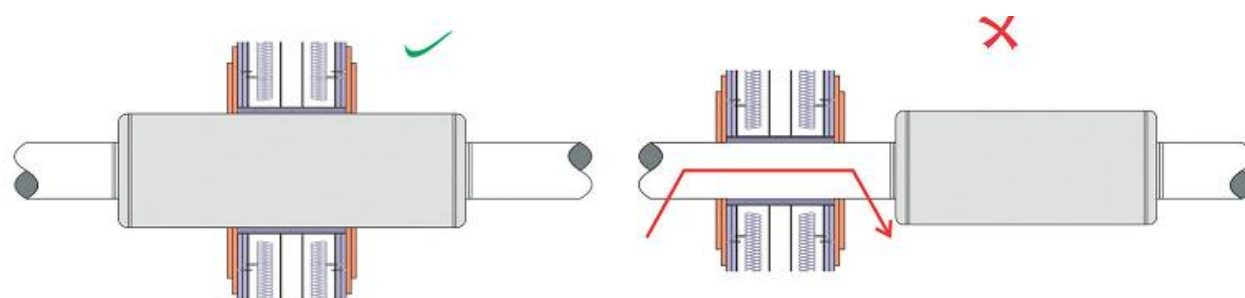


Figure 8.3: Crosstalk Attenuator Penetration Detail

9.0 ROOM ACOUSTICS – STANDARD SPACES

Standard spaces are any spaces that BB93 applies a reverberation time limit across the mid frequencies (T_{mf}) to that does not have any additional requirements to be met for room acoustic performance. Spaces that also have set acoustic treatment quantities to be included, expressed as a percentage of the floor area are also covered within this section.

9.1 Reverberation Time Targets – Standard Spaces

BB93 sets maximum reverberation limits where the T_{mf} is the arithmetic average of the octave bands 500Hz, 1 kHz and 2 kHz, unless stated otherwise.

The table below details the BB93 reverberation time criteria as per the room classification, for both new build and refurbished development. These classifications and criteria have been applied to each room within this development and are presented in the room classifications appendix.

BB93 Room Classification	Reverberation Time Targets T_{mf} [s]	
	New Build	Refurbishment
Primary / Nursery School: Classroom, Class Base, General Teaching Area, Small Group Room	≤ 0.6	≤ 0.8
Secondary School: Classroom, Teaching Area, Seminar / Tutorial Room, Science Lab, Resistant Materials, CAD/CAM, Electronics/Control, Textiles, Food, Graphics, Design, ICT Room, Art.	≤ 0.8	≤ 1.0
Music Room, Performance / Recital Room	≤ 1.0	≤ 1.0
Small Practice/Group Room (Music) (<30m³)	≤ 0.6	≤ 0.8
Large Practice/Group Room (Music) (>30m³)	≤ 0.8	≤ 1.0
Ensemble Room (Music)	≤ 0.6	≤ 0.6
Recording Studio / Control Room	≤ 0.5	≤ 0.6
SEN Calming Room	≤ 0.6	≤ 0.8
Study Room (Individual Study, Withdrawal, Remedial Work, Teacher Preparation)	≤ 0.8	≤ 1.0
Libraries:	≤ 1.0	≤ 1.2
Drama Studio	≤ 1.0	≤ 1.0
Assembly / Multi-Purpose Hall (Drama, PE, Audio/Visual Presentations, Assembly, Occasional Music)	≤ 0.8	≤ 0.8
Atrium, Circulation Space not intended for teaching and learning	≤ 1.5	≤ 2.0
Sports Hall / Swimming Pool	1.5 – 2.0	≤ 2.0
Dance Studio	≤ 1.2	≤ 1.5
Gymnasium/Activity Studio	≤ 1.5	≤ 2.0
Meeting Room, Interviewing/Counselling Room, Video Conference Room	≤ 0.8	≤ 0.8
Dining Room	≤ 1.0	≤ 1.5
Kitchen ¹	≤ 1.5	≤ 2.0
Office, Medical Room, Staff Room ¹	≤ 1.0	≤ 1.2

BB93 Room Classification	Reverberation Time Targets T_{mf} [s]	
	New Build	Refurbishment
Coats and Locker Area, Changing Area ¹	≤ 1.5	≤ 2.0
¹ Considered administration or ancillary, therefore, guidance only		

Table 9.1: Reverberation Time Targets – Standard Cellular Spaces

9.2 Corridors, Stairwells and Circulation Spaces

The amount of absorption required in corridors, entrance halls and stairwells should be calculated as per Section 7 of Approved Document E (ADE). Method A within Section 7 of ADE states the following.

Area	Absorption Provision Requirements
Corridors, entrance halls	An area equal to the floor area should be covered with a Class C absorber or better.
Stairwells	An area equal to 50% of the sum of the following areas should be covered with a Class C absorber or better. - stair treads, - upper surface of intermediate landings - upper surface of landings (excluding the ground floor) - ceiling area of top floor Alternatively, 100% of the above area may be covered with a Class D absorber.

Table 9.2: Minimum Absorption Requirements for Circulation Spaces

9.3 Minimum Acoustic Treatment Quantities – Standard Spaces

The following table outlines acoustic treatment requirements for standard spaces within the development.

Please note: Acoustic treatment quantities are presented as different options, i.e. Class A OR Class C etc.

Room	Floor Area (m²)	Height (m)	Floor Finish	T _{mr} Target (s)	Acoustic Treatment Required (m²)				Acoustic Treatment Required (Number of units)
					Class A	<u>OR</u>	Class C	<u>OR</u>	
0.01 Classroom	60.2	2.7	Carpet	≤ 0.6	32		47		9
0.02 Group Room	12.1	2.7	Carpet	≤ 0.6	7		10		2
0.08 Group Room	16.9	2.7	Carpet	≤ 0.6	9		13		3
0.06 Hygiene Room	12.2	2.7	Hard	≤ 1.0	5		7		2
¹ Considered administration or ancillary, therefore, guidance only *Based on Ecophon 2400 x 1200 Rafts suspended by 400mm									

Table 9.3:Minimum Acoustic Treatment Requirements – Standard Spaces

9.4 Additional Design Guidance

9.4.1 Suspended Treatment

For suspended treatment, both the layout and the suspension height(s) can influence their performance. The suspension height should be no less than what has been stated in the treatment table and layouts should ensure that treatment is spaced apart such that gaps between them and any walls on at least two edges is at least the smallest dimension of the treatment. For example, 2400 mm x 1200 mm rafts should be at least 1200 mm from any other rafts or walls, on at least two edges.

9.5 Acoustic Treatment Review – Standard Spaces

This section will be completed at a later stage.

10.0 NOISE POLLUTION

10.1 Assessment Method

BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” describes a method of determining the level of noise of an industrial nature, together with the procedures for assessing whether the noise in question is likely to give rise to complaints from persons living in the vicinity. As such, an assessment to BS 4142 is typically called for within planning conditions.

The likelihood of complaints in response to a noise depends on various factors. BS 4142 assesses the likelihood of complaints by considering the margin by which the noise in question exceeds the background noise level.

10.2 Design Target

It is currently unknown whether the local authority has specific plant noise limits; therefore, the plant noise rating level limits at the nearest noise sensitive receptor will be set at a later date in accordance with any planning conditions set for this development by the local authority.

This will be assessed against the existing background noise levels, L_{A90} . For the purposes of assessment, MACH Acoustics has used statistical analysis of commonly occurring background noise levels to establish the minimum representative daytime and night-time background noise levels. For more information on the methodology, please refer to APPENDIX C.

Position	Time Period	Assessed Background Noise Level (dB L_{A90})
Fixed	Daytime (07:00 - 23:00)	32
	Night-Time (23:00 - 07:00)	26

Table 10.1: L_{A90} Background Noise Levels for Plant Noise Break-out Assessment

10.3 Items of Noise Generating Plant

The development is to include two Air Source Heat Pumps in an external enclosure to the west of the proposed extension. The assessment will incorporate the specification once final selection of plant units is confirmed.

10.4 Plant Noise Impact Assessment

There is approximate 40m between intended plant unit location and noise sensitive receptor windows, as shown below in Figure 10.1



Figure 10.1: Source and Receiver in context

For a point source propagating hemispherically, approximately 40 dB of attenuation would be anticipated over a distance of 40m.

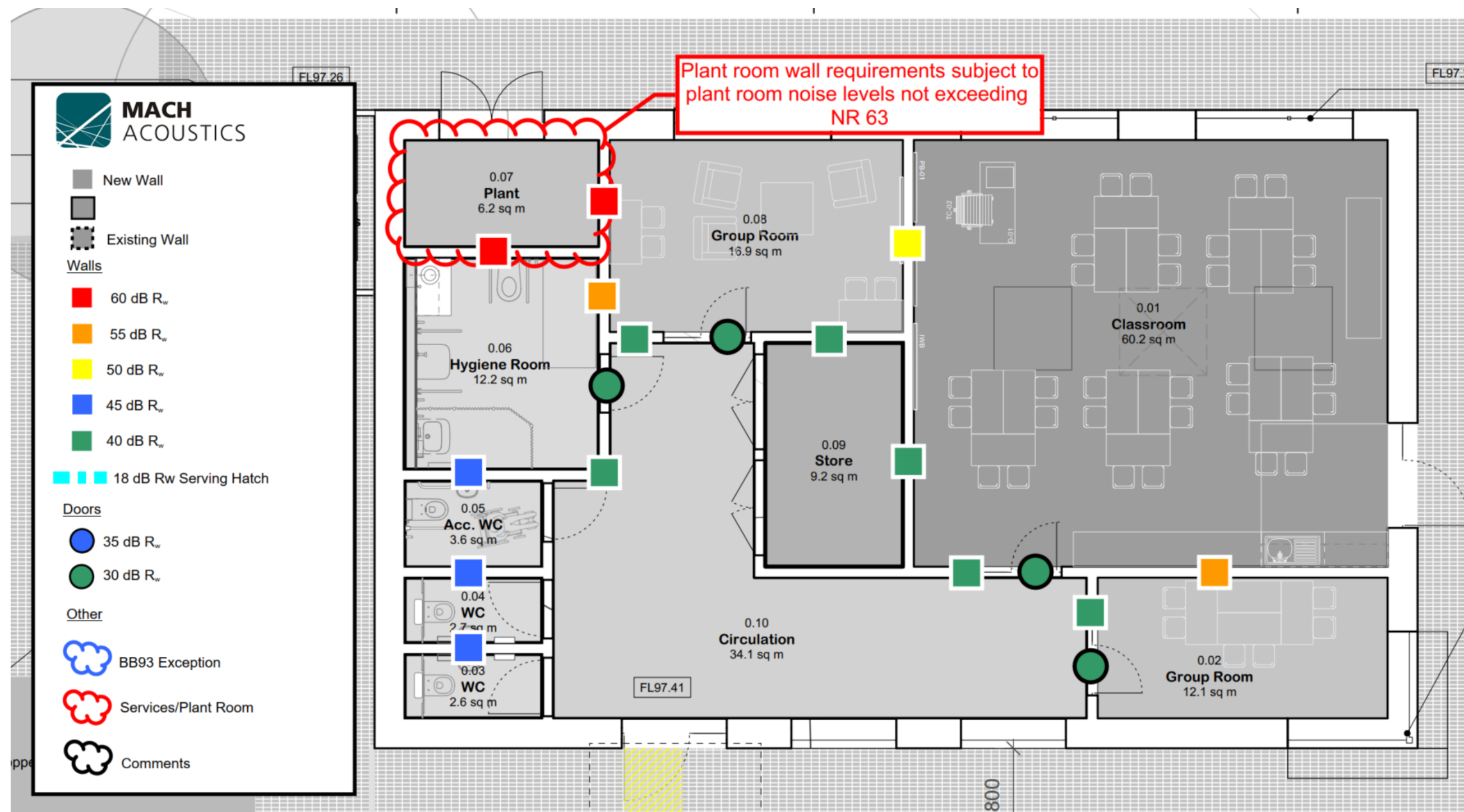
Without taking attenuation provided by the enclosure into account, it would be recommended that the combined sound power level of both units not exceed 72 dB(A) during the daytime or 66 dB(A) during the night-time, so as to not exceed the existing lowest typical background noise level.

In practice, higher levels may be permissible based on the design and performance of the enclosure, which is to be reviewed. It is considered that this criterion can be readily achieved based on known sound power levels of typical ASHP units and typical attenuation from plant enclosures.

APPENDIX A ROOM CLASSIFICATIONS

Room	BB93 Classification	Indoor Ambient Noise Limit (dB L _{Aeq,30min})	Services Noise Limit (dB L _{Aeq,30min})	Reverberation Limit (s T _{mf})	Impact Sound Limit (dB L' _{nTw})	Activity Noise	Noise Tolerance	To Circulation		
								Walls & Glazing (dB R _w)	Doors (dB R _w)	Ventilators (dB D _{new})
Standard Spaces										
Circulation	Corridor, Stairwell, Coats and Locker Area ¹	≤ 45	≤ 42	-	≤ 65	Average	High	-	-	-
Stairs	Corridor, Stairwell, Coats and Locker Area ¹	≤ 45	≤ 42	-	≤ 65	Average	High	-	-	-
WC	Toilet ¹	≤ 50	≤ 47	≤ 1.5	≤ 65	Average	High	-	-	-
0.01 Classroom	Primary School: Classroom, Class Base, General Teaching Area, Small Group Room	≤ 35	≤ 32	≤ 0.6	≤ 60	Average	Medium	≥ 40	≥ 30	≥ 32
0.02 Group Room	Primary School: Classroom, Class Base, General Teaching Area, Small Group Room	≤ 35	≤ 32	≤ 0.6	≤ 60	Average	Medium	≥ 40	≥ 30	≥ 32
0.08 Group Room	Primary School: Classroom, Class Base, General Teaching Area, Small Group Room	≤ 35	≤ 32	≤ 0.6	≤ 60	Average	Medium	≥ 40	≥ 30	≥ 32
0.06 Hygiene Room	Office, Medical Room, Staff Room ¹	≤ 40	≤ 37	≤ 1.0	≤ 65	Low	Medium	≥ 40	≥ 30	≥ 32
¹ Considered administration or ancillary, therefore, guidance only										

APPENDIX B SOUND INSULATION MARKUPS



APPENDIX C ENVIRONMENTAL NOISE SURVEY

To establish the existing environmental noise levels on site, a noise survey was conducted between 11:10 on the 25/02/2026 and 14:05 on the 26/02/2026.

This site assessment was undertaken by Owen McLain of MACH Group.

C.1 Site Description

The site is located at Minety C of E School and is situated in Minety. The site is situated in a rural village, and is approximately 230 m from a railway line and is adjacent to the main street of the village, which is Horbury Hill

C.1.1 Subjective Noise Climate (On-site)

Noise Type	Noise Characteristics	Sources
Dominant	A primary contributor of noise levels on the site.	Traffic Noise School Noise
Other Noise Contributions	Contributors to the remainder of the noise climate on site.	Bird Song Train Noise Angle Grinder Noise

Table C.1.2 Subjective Summary of the Noise Sources

C.1.2 Non-Representative Noise Sources

During the survey, no noise events occurred which would be deemed as atypical of the site location.

Data collected after 06:00 on the 26/02/2026 may not be representative of sound climate due to windspeeds of ≥ 5 m/s.

C.2 All Measurement Locations

To help with the understanding of the site and measurement locations all the measurement positions are presented on the map below. Photos of the locations in situ are in the following sections.



Figure C.2.2 Measurement Locations on a Map

C.3 Fixed Measurement

A fixed microphone position was used to record noise levels between 11:05 on the 25/02/2026 and 14:05 on the 26/02/2026, where the fixed long-term meter was set to measure consecutive 'A' weighted 5-minute time samples.

To help with the understanding of the site and the measurement locations, the figures below present the location of the microphone position(s) in situ.

C.3.1 Fixed measurement Location – F1



Figure C.3.3 Fixed measurement location in situ

C.3.2 Fixed Measurement Results

The following graph presents the noise levels recorded over the measurement period at the fixed location (F1).

Data collected after 06:00 on the 26/02/2026 may not be representative of sound climate due to windspeeds of ≥ 5 m/s

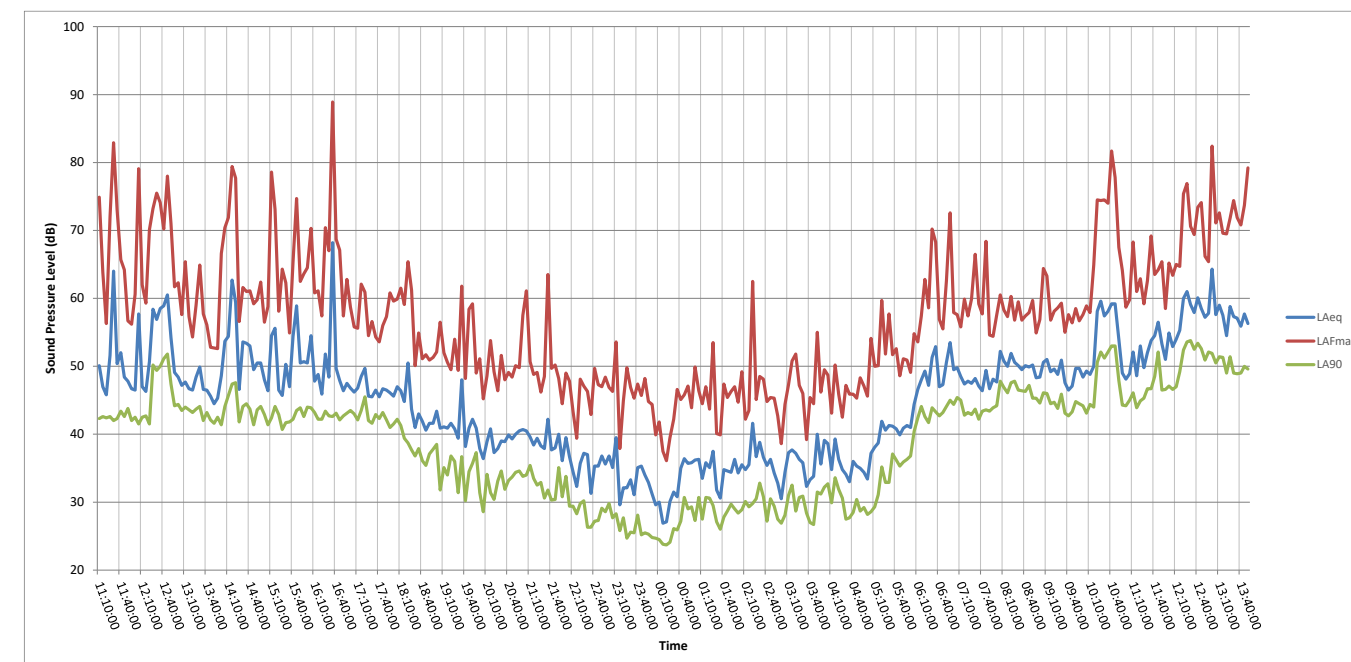


Figure C.3.4 Sound Pressure Level at fixed location, F1

C.4 Spot Measurement

Spot measurements help quantify existing noise levels at different points around the site.

The figures below present the location of the microphone position(s) in situ.

The results of the measured levels at these location(s) are also presented in section C.5 Table C.5.3.

C.4.1 Spot Measurement - S1

This spot measurement was taken between 10:22 and 10:45 on 25/02/2026.



Figure C.4.5 - Spot Measurement S1 in situ

C.4.2 Spot Measurement – S2

This spot measurement was taken between 11:23 and 11:50 on 25/02/2026



Figure C.4.6 - Spot Measurement S2 in situ

C.5 All Spot Measurement Results

The LAeq, LAFmax, and LA90 levels measured from all spot measurements are shown in Table 4.2 below.

Spot Measurement Position	Date	Start	End	Duration	LAeq, T (dB)	LAFmax	LA90
1	25/02/2026	10:22	10:25	00:02:04	59	75	46
		10:25	10:30	00:05:00	61	78	49
		10:30	10:35	00:05:00	62	83	46
		10:35	10:40	00:05:00	58	76	45
		10:40	10:45	00:05:00	57	74	44
		10:45	10:45	00:00:58	53	63	46
2	26/02/2026	11:23	11:25	00:01:54	61	74	46
		11:25	11:30	00:05:00	64	83	47
		11:30	11:35	00:05:00	58	76	47
		11:35	11:40	00:05:00	57	72	46
		11:40	11:45	00:05:00	66	85	48
		11:45	11:50	00:05:00	60	77	46
		11:50	11:50	00:00:01	54	57	50

Table C.5.3 - Spot Measurement Results Table

C.6 Measurement Equipment

Item	Serial No.	Certificate No.	Last Calibration	Calibration Due
NTI Precision Sound Analyser XL2 TA	A2A-11002-E0	239096	25/04/2025	25/04/2027
NTI Pre-amplifier MA220	7183	239096	25/04/2025	25/04/2027
Cirrus Microphone Capsule MK:224	214341A	239096	25/04/2025	25/04/2027
Svantek Acoustic Calibrator SV31	32531	253979	21/11/2025	21/11/2026
NTI Precision Sound Analyser XL2 TA	A2A-15207-E0	233716	24/02/2025	24/02/2027
NTI Pre-amplifier MA220	7856	233716	24/02/2025	24/02/2027
Cirrus Microphone Capsule MK:224	219415D	233672	24/02/2025	24/02/2027

Table C.6.4 Measurement Equipment

C.7 Meteorological Conditions

Data Taken from: <https://www.timeanddate.com/weather/>

Date	Time (hh:mm)	Temperature (High / Low) (°C)	Humidity (%)	Pressure (hPa)	Wind Speed (m/s)	Wind Direction	Conditions
25/02/2026	06:00	13/9	90	1014	2.2	SSW	Partly Sunny
	12:00	15/13	73	1015	3.0	SW	Scattered Clouds
	18:00	12/10	88	1016	2.5	S	Passing Clouds
26/02/2026	00:00	11/10	90	1016	2.5	SW	Passing Clouds
	06:00	13/11	80	1015	5.0	SSW	Partly Sunny
	12:00	13/11	77	1012	5.9	SSW	Partly Sunny

Table C.7.5 Meteorological Conditions