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49 WILLOW ROAD

LONDON

SOUND INSULATION REVIEW -CONDITION 8

Technical Report: R7865-3 Rev 1

Date: 27th October 2022

For: Mr Dylan McNeil
C/o Charlton Brown Architects
The Belvedere
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London
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24 Acoustics Document Control Sheet

Project Title: 49 Willow Road, London – Sound Insulation Review - Condition 8

Report Ref: R7865-3 Rev 1

Date: 27th October 2022

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For and on behalf of 24 Acoustics Ltd				

Document Status and Approval Schedule

Revision	Description	Prepared By	Reviewed By	Approved By
0	Approved for issue	Chris McConnell	Neil McLeod	Stephen Gosling
1	Updated with latest floor layouts	Chris McConnell	Neil McLeod	Stephen Gosling

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CONTENTS

1.0 INTRODUCTION

1.1 Planning permission has been granted by the London Borough of Camden (Reference 2021/3607/P) for works at 49 Willow Road, London comprising the extension and change of use of the ground and basement floors (former pottery studio).

1.2 24 Acoustics Ltd has been instructed by Mr Dylan McNeil to undertake a review of the design in relation to the acoustic performance of party interfaces between commercial and residential areas, to address the requirements of planning condition 8.

1.3 The scheme will comprise a children's theatre on the basement floor, with auditorium seating, stage, back of house and control room. The ground floor area will comprise a bookshop, café and foyer associated with the theatre. The first, second and third floors will comprise a single residential maisonette as per the previous use. The adjoining property at 36 Gayton Road comprises residential use on all floors, with reception rooms at lower ground floor and ground floor.

1.4 All recommendations apply to the acoustic design of the new build residential and communal areas. Compliance with other requirements (e.g. fire/structural) should be checked by other members of the design team.

1.5 An explanation of acoustical terms used in this report is provided in Appendix A.

2.0 CRITERIA

Planning Condition 8

2.1 Planning condition 8 states the following:

> *"Prior relevant part of work begun, details shall be submitted to and approved in writing by the Council, of the sound insulation of the floor/ ceiling/ walls separating the commercial part(s) of the premises from noise sensitive premises in residential use. Details shall demonstrate that the sound insulation value DnT,w and L'nT,w is enhanced by at least 10dB above the Building Regulations value and, where necessary, additional mitigation measures are implemented to contain commercial noise within the commercial premises and to achieve the criteria of BS8233:2014 within the dwellings/ noise sensitive premises."*

The details as approved shall be implemented prior to occupation of the development and thereafter be permanently retained.
Reason: To safeguard the amenities of the future occupiers in accordance with the requirements of policies A1 and A4 of the London Borough of Camden Local Plan 2017."

Approved Document E - Commercial to Residential Sound Insulation

2.2 The minimum airborne sound insulation performances for 'Dwelling-houses and flats formed by material change of use' under Part E of the Building Regulations [Reference 1] are shown in Table 1.

Separating Element (Material Change of Use)	**Airborne Sound Insulation**
Floors	Not less than 43 dB $D_{nT,w} + C_{tr}$
Wall	Not less than 43 dB $D_{nT,w} + C_{tr}$

Table 1: Minimum Airborne Sound Insulation Performances – Approved Document E

2.3 As the residential dwelling is located above the commercial uses, impact sound transmission is not relevant under planning condition 8.

2.4 A higher airborne sound insulation performance will be required between residential and communal areas in order to comply with the requirements of planning condition 8. The required minimum airborne sound insulation performances for walls and floors between the commercial and residential and uses are shown in Table 2 alongside the adjacencies in Figures 1 to 3.

Commercial Use	**Residential Room**	**Interface**	**Airborne Sound Insulation Requirement**
Lower Ground Floor Children's Theatre	Lower Ground Floor 36 Gayton Road	Wall	≥ 53 dB $D_{nT,w} + C_{tr}$
Ground Floor Bookshop, Café, Foyer	Ground Floor 36 Gayton Road		
Ground Floor Bookshop, Café, Foyer	First Floor Maisonette Living Room / Kitchen	Floor	≥ 53 dB $D_{nT,w} + C_{tr}$

Table 2: Required Airborne Sound Insulation Performances – Walls and Floors

3.0 COMMERCIAL TO RESIDENTIAL - SOUND INSULATION REVIEW

Commercial to Residential Walls

3.1 The separating wall construction types between the commercial uses and neighbouring residential property are described in the following sections.

3.2 Wall types RW01 and RW02 separate the lower ground floor theatre from the adjacent property, shown on drawing 1822-T-21-001-Rev C01 in Appendix B and described below.

TYPE RW 01 (retaining wall)

- 440 mm RC Concrete (≥ 2,300 kg/m^3) below existing solid brick wall (min 300mm brickwork)
- 10mm Cavity drain membrane
- 120mm Cavity
- 90mm GypLyner IWL I Studs with 90mm Mineral Wool infill
- Vapour Control Layer
- 12mm Ply
- 2 x 12.5mm Gyproc Soundbloc

TYPE RW 02 (retaining wall)

- 350 mm RC Concrete (≥ 2,300 kg/m^3) below existing solid brick wall (min 300mm brickwork)
- 10mm Cavity drain membrane
- 25mm Cavity
- 90mm GypLyner IWL I Studs with 90mm Mineral Wool infill
- Vapour Control Layer
- 12mm Ply
- 2 x 12.5mm Gyproc Soundbloc

3.3 At ground floor level, the bookshop and café will be separated from the adjacent property with wall types INT-W 07 (drawing 1822-T-22-002-Internal Wall Types 02-Rev C01) and wall type EW 02 (drawing 1822-T-21-002-Rev C01) shown in Appendix B and described below.

TYPE INT-W 07 (internal lining to party wall)

- RC Concrete wall (≥ 2,300 kg/m3) or existing solid brick wall (min 300mm depth)
- Gypframe GL1 Lining Channel & Gypframe Bracket
- 12.5mm Gyproc Soundbloc
- 12mm Plywood

TYPE EW 02 (internal lining to external/party wall)

- Existing solid brick wall 230mm
- 25mm cavity
- 90mm GypLyner IWL I Studs with 90mm Mineral Wool infill
- Vapour Control Layer
- 12mm Plywood
- 2 x 12.5mm Gyproc Soundbloc

3.4 With good workmanship, the wall constructions described above would be capable of achieving the requirements of planning condition 8 (53 dB $D_{nt,w} + C_{tr}$).

<u>Commercial to Residential Floor – Ground Level to First Floor</u>

3.5 The separating floor and ceiling constructions between the ground floor commercial and first floor residential dwelling are shown on Charlton Brown Architects' drawing numbers 1822-T-23-003 (details 1 and 2) and 1822-T-45-002-G (details 1 and 2) shown in Appendix C, and are described below.

- 25mm floor finish
- 18mm chipboard
- 45mm deep resilient battens
- 25mm mineral wool (minimum density 33kg/m^3) between battens
- 18mm chipboard
- Existing 230mm deep timber joists OR new 150mm deep timber joists
- Services void (depth varies – minimum 300mm)
- Independent timber joists, with no contact to existing/new floor joists above
- 100mm mineral wool (minimum density 33kg/m^3) above ceiling boards
- 2 x 15mm high density plasterboard ceiling

3.6 With good workmanship and suitable flanking conditions (as described in the following section), the above floor construction would be capable of achieving the requirements of planning condition 8 (53 dB $D_{nt,w} + C_{tr}$).

Commercial to Residential Floor – Flanking Details

3.7 Flanking sound transmission via the external flank walls will be controlled by the proposed external wall types and linings as described on drawing 1822-T-21-002-Rev C01 and shown in Appendix D.

3.8 Walls to the staircase and riser are also shown in Appendix D, as described below

3.9 The staircase to the first-floor maisonette will be enclosed on the ground floor with a metal stud partition, specified as 56 dB R_w, and described below (wall type INT-W 01 on drawing 1822-T-22-001-Internal Wall Types 01-Rev C01).

TYPE INT-W 01 (staircase)

- 2 x 15mm Gyproc Soundbloc
- 70mm Gypframe C Studs @ 600mm centres with
- 50mm Isover Acoustic Partition (APR 1200) in cavity
- 2 x 15mm Gyproc Soundbloc

3.10 The services riser on ground and first floor will be enclosed with the following construction (wall type INT-W 06 on drawing 1822-T-22-002-Internal Wall Types 02-Rev C01), specified as 44 dB R_w:

TYPE INT-W 06 (riser shaftwall)

- 2 x 12.5mm Gyproc Fireline
- Gypframe 60 I 70 I stud at 600mm centres
- 19mm Gyproc Coreboard between studs secured by retaining channel
- 25mm Isover Acoustic Partition Roll (APR 1200) in the cavity.

3.11 The flanking construction as described above are suitable for controlling flanking sound transmission and therefore in line with the airborne sound insulation target of 53 dB $D_{nt,w} + C_{tr}$.

Detailing and Workmanship

3.12 Achieving the required sound insulation performance between commercial and residential areas will depend on careful workmanship and attention to detail.

3.13 The success of the constructions is heavily reliant on workmanship and detailing; hence the contractor shall undertake regular checks and daily inspections to ensure that the details are being built as planned.

4.0 CONCLUSIONS

4.1 Mr Dylan McNeil has instructed 24 Acoustics Ltd to undertake a review of internal sound insulation for the change of use at 49 Willow Road, London, to address planning condition 8.

4.2 This report has addressed the sound insulation performance of the party wall and floor constructions, and associated flanking elements, between commercial spaces and residential dwellings.

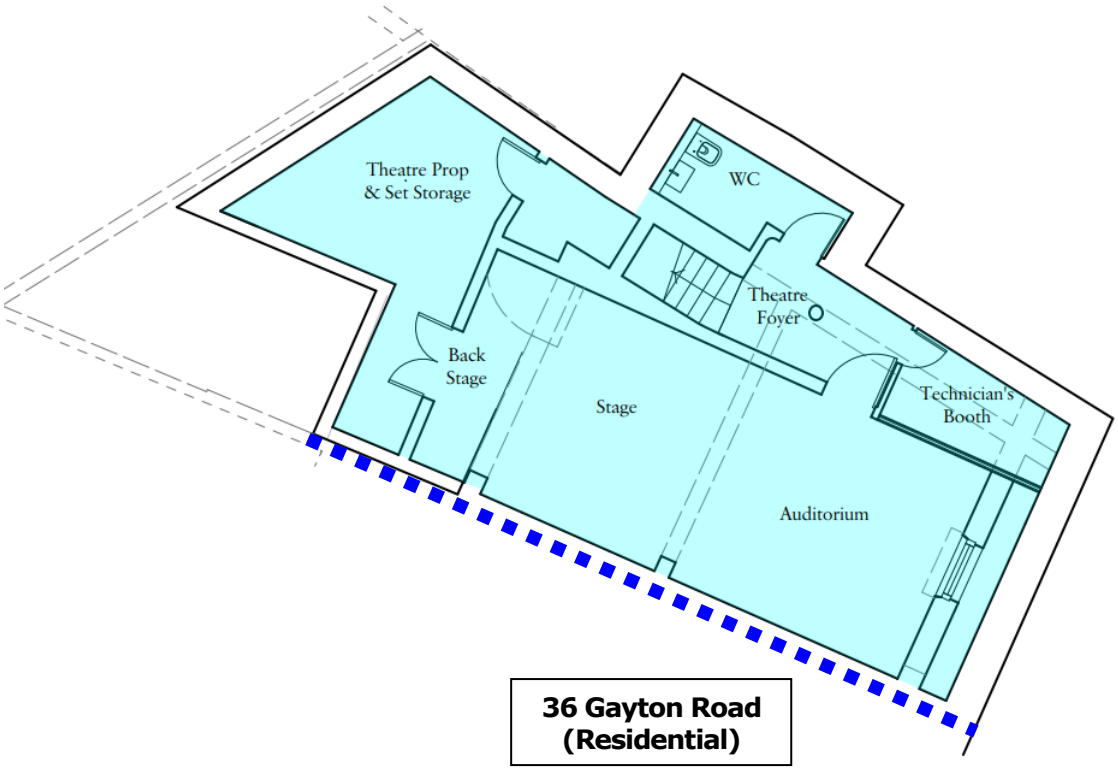
4.3 It is concluded that the proposed constructions between commercial and residential uses would achieve the sound insulation requirements of planning condition 8.

REFERENCES

1. Approved Document E "Resistance to the Passage of Sound"

FIGURES

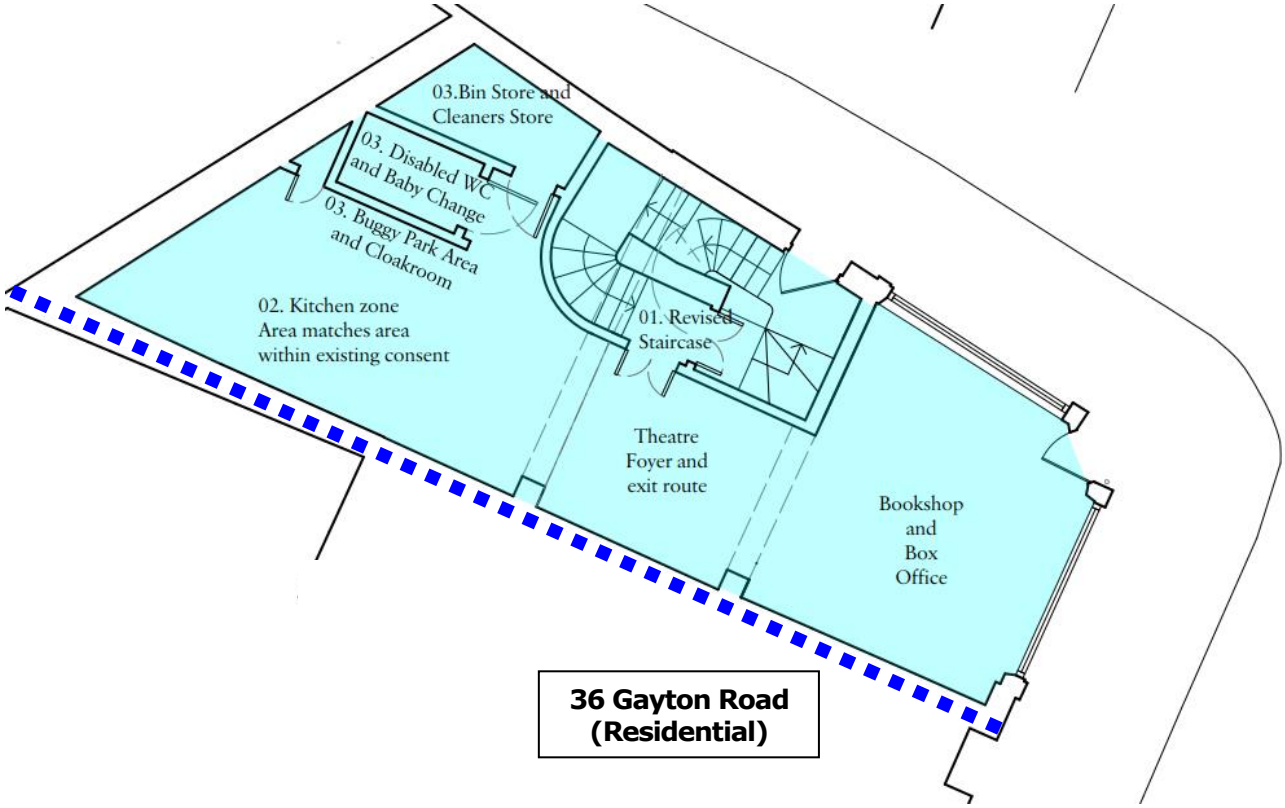
Figure 1 –Lower Ground Floor



LEGEND

Wall between Commercial and Residential (53 dB $D_{nT,w} + C_{tr}$):

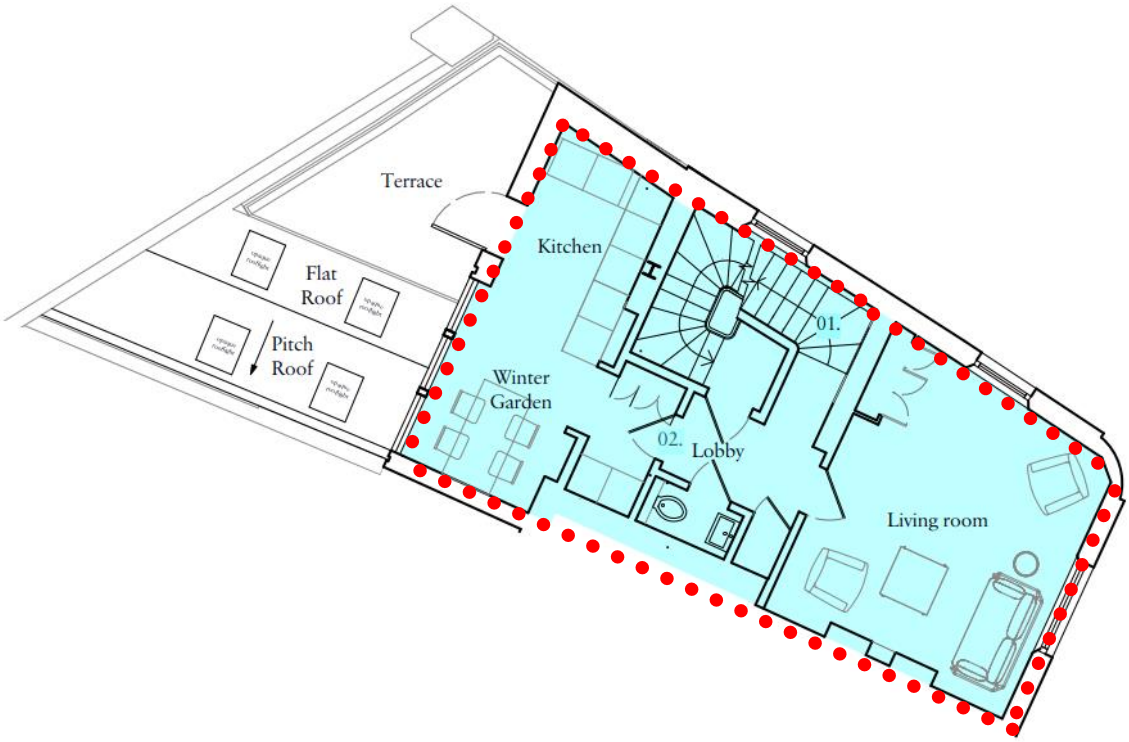
Figure 2 – Ground Floor



LEGEND

Wall between Commercial and Residential (53 dB $D_{nT,w} + C_{tr}$):

Figure 3 – First Floor



LEGEND

Floor between Commercial (ground) and Residential (first) (53 dB $D_{nT,w} + C_{tr}$):

APPENDIX A: ACOUSTIC TERMINOLOGY

Airborne Sound Insulation

Voices, hi-fi systems, television and radio sound and musical instruments are all sources of airborne sound. They excite the air around them and the vibration in the air is transmitted to surrounding surfaces, such as walls, ceilings and floors. This sets these constructions into vibration and this vibration is re-radiated in neighbouring rooms as sound. Energy is lost in the transmission path and this is referred to as transmission loss or more generally, airborne sound insulation. The most simple measure of sound insulation between two rooms is the sound level difference, D, which is the arithmetic difference between the sound level, in dB, in the source room and the sound level in the receiving room.

Other measures of sound insulation include the sound reduction index (R, obtained by laboratory test), the apparent sound reduction index (R', obtained in field tests) and the standardised level difference (DnT, used mainly in the sound insulation of rooms in dwellings and other cellular rooms). The relevant test procedures are laid down in BS EN ISO 16283-1. The results are obtained over a range of frequencies. A single-figure "weighted" result can be obtained from one-third octave band results measured over the frequency range 100 - 3150Hz by using a curve-fitting procedure laid down in BS EN ISO 717. The subscript "w" is added to the descriptors above, for example; $D_{nT,w}$.

Impact Sound Isolation

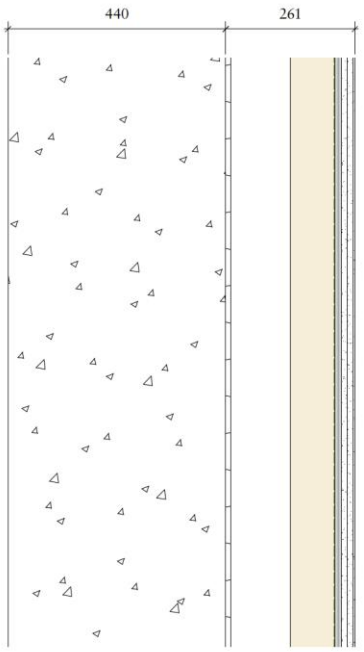
In the case of impact sound, the building construction is caused to vibrate as a result of a physical impact. Footsteps on floors are the most obvious example. The vibration is radiated as sound in neighbouring rooms. Impact insulation is measured using a standard tapping machine, which drops weights cyclically onto a floor. The sound pressure level is measured in the receiving room below and the result is known as the impact level, L_i. This test is used in the evaluation of domestic separating floors. As with airborne sound, the test procedures are set out in BS EN ISO 140 and the single-figure weighting of the results is described in BS EN ISO 717. The descriptor for the final result of a field test is $L'_{nT,w}$.

Reverberation time

The reverberation time is a measure of the rate of decay of sound in a room and this influences the sound pressure level of noise in that room. It is defined as the time taken, in seconds, for the level of sound in a room to decrease by 60 dB (a millionth of its original energy value) after the discontinuation of a sound. Reverberation time is measured in accordance with the requirements of BS EN ISO 140.

APPENDIX B: PARTY WALL CONSTRUCTION DETAILS

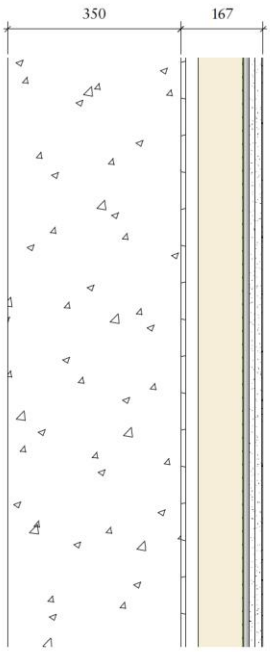
Drawing 1822-T-21-001-Rev C01 – Retaining Wall Types (Lower Ground Floor)



TYPE RW 01

UValue: 0.22W/m2K

- 440 mm RC Concrete Ref to SE's drgs and specs for details
  Koster Polysil TG500 Anti lime Coating
  Primer - Koster NB1 Waterpoofing Slurry System (2 coats)
- 10mm Cavity drain membrane
- 120mm Cavity
- 90mm GypLyner IWL I Studs with 90mm Mineral Wool infill
- Vapour Control Layer
- 12mm Ply
- 12.5mm Gyproc Soundbloc
- 12.5mm Gyproc Soundbloc
- 3mm skim

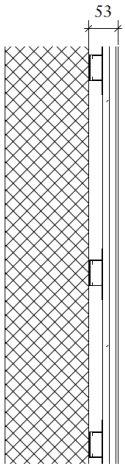


TYPE RW 02

UValue: 0.22W/m2K

- 350 mm RC Concrete Ref to SE's drgs and specs for details
  Koster Polysil TG500 Anti lime coating
  Primer - Koster NB1 Waterpoofing Slurry System (2 coats)
- 10mm Cavity drain membrane
- 25mm Cavity
- 90mm GypLyner IWL I Studs with 90mm Mineral Wool infill
- Vapour Control Layer
- 12mm Ply
- 12.5mm Gyproc Soundbloc
- 12.5mm Gyproc Soundbloc
- 3mm skim

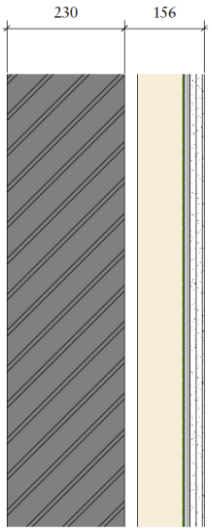
Drawing 1822-T-22-002-Internal Wall Types 02-Rev C01 – Ground Floor



TYPE INT-W 07

- RC Concrete wall
- Gypframe GL1 Lining Channel &
  Gypframe Bracket fixed with
  Gypframe GL11 GypLyner Anchor
- 12.5mm Gyproc Soundbloc
- 12mm Plywood
- 3mm Skim

Drawing 1822-T-21-002-Rev C01 – Ground Floor



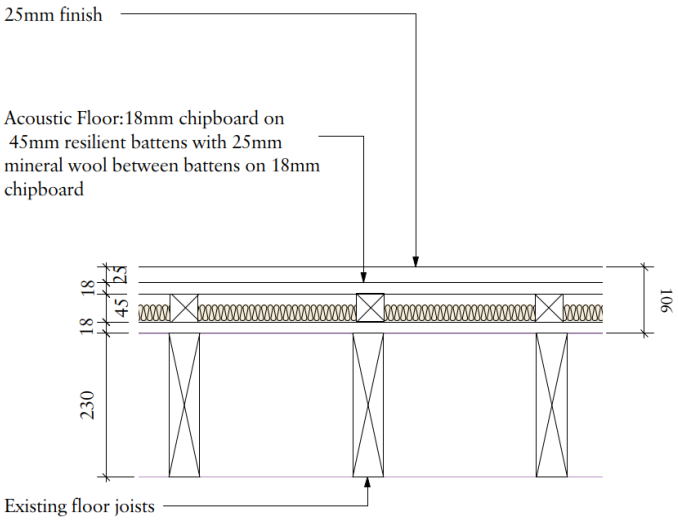
TYPE EW 02

UValue: 0.25W/m2K

- Existing Solid Brickwall 230mm
- 25mm cavity
- 90mm GypLyner IWL I Studs
  90mm Mineral Wool infill
- Vapour Control Layer
- 12mm Ply
- 12.5mm Gyproc Soundbloc
- 12.5mm Gyproc Soundbloc
- 3mm skim

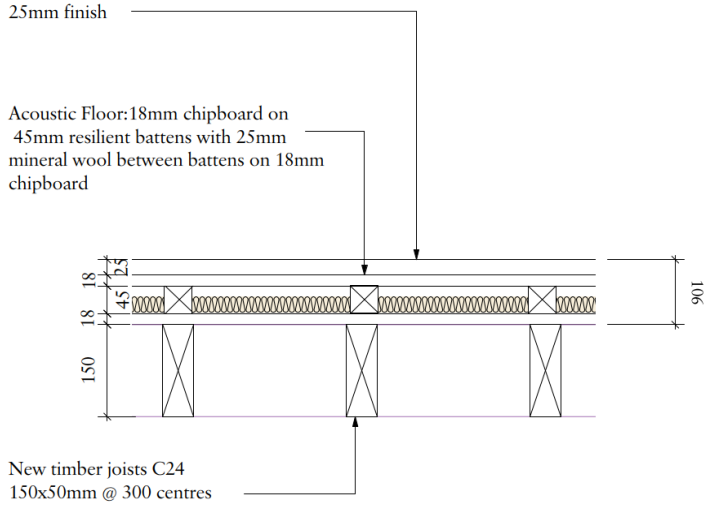
APPENDIX C: FLOOR AND CEILING CONSTRUCTION DETAILS

Drawing 1822-T-23-003 – First Floor Types



FLOOR TYPE 06 - First Floor Build-up on Existing Joists

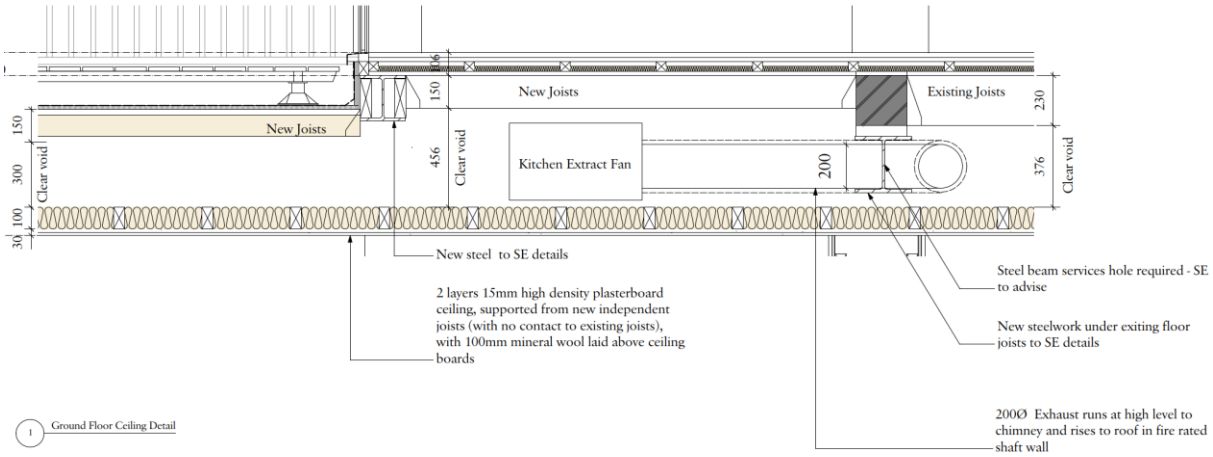
1 Floor Type 06
Scale: 1:5

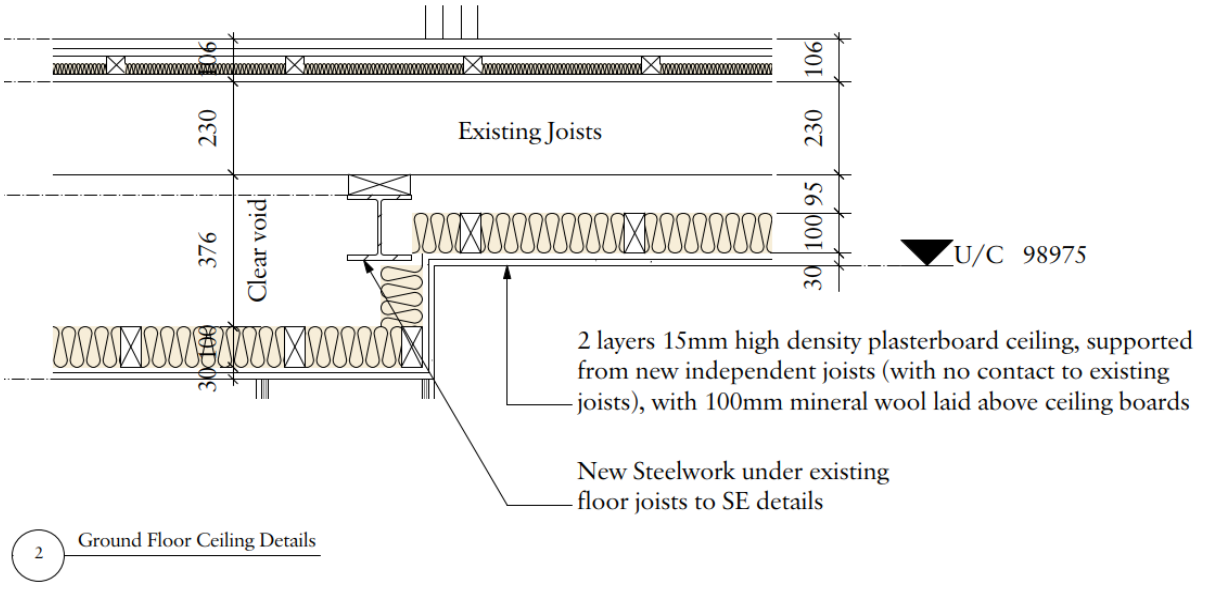


FLOOR TYPE 07 - First Floor Build-up on New Joists

2 Floor Type 07
Scale: 1:5

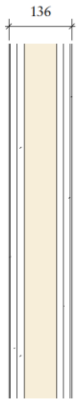
Drawing 1822-T-45-002-G – Floor Ceiling Finishes





APPENDIX D: FLANKING WALL CONSTRUCTION DETAILS

Drawing 1822-T-22-001-Internal Wall Types 01-Rev C01

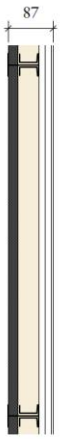


TYPE INT-W 01

- 3mm skim
- 15mm Gyproc Soundbloc
- 15mm Gyproc Soundbloc
- 70mm Gypframe C Studs @ 600mm centres with
  50mm Isover Acoustic Partition (APR 1200) in cavity
- 15mm Gyproc Soundbloc
- 15mm Gyproc Soundbloc
- 3mm skim

90 MINUTE FIRE RESISTANCE EN
56 dB Rw partition
British Gypsum Reference A206231

Drawing 1822-T-22-002-Internal Wall Types 02-Rev C01

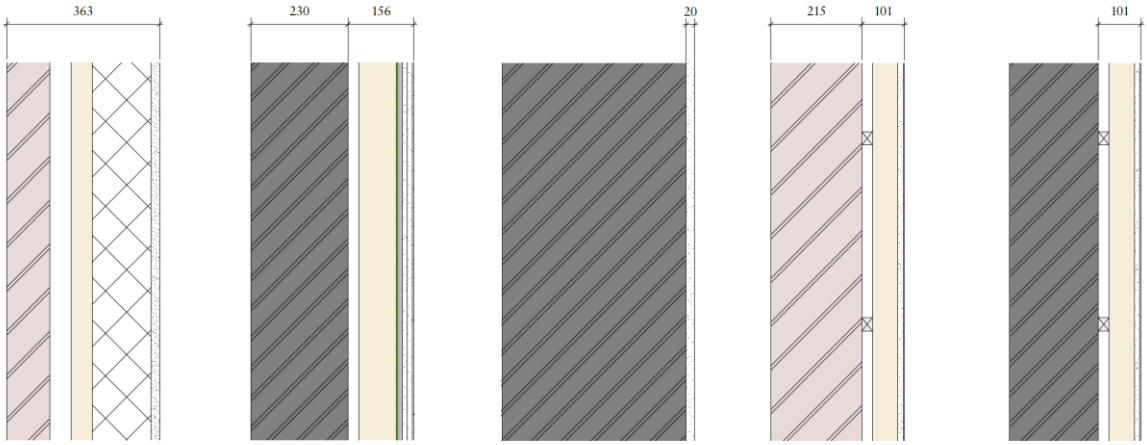


TYPE INT-W 06

- 3mm Skim
- 12.5mm Gyproc Fireline
- 12.5mm Gyproc Fireline
- Gypframe 60 I 70 I stud at 600mm centres
- 19mm Gyproc Coreboard between studs
  secured by Gypframe G102 retaining channel
  25mm Isover Acoustic Partition Roll (APR 1200) in the cavity.

60 MINUTE FIRE RESISTANCE EN
44 dB Rw partition
4400mm Maximum Height
British Gypsum Reference A206231

Drawing 1822-T-21-002-Rev C01 External Wall Types



TYPE EW 01

UValue: 0.25W/m2K

- 103mm facing Brickwork
- 50mm Cavity
- 50mm Kooltherm K108
- 140mm High Strength 7 Blockwork
- 20mm internal finish

TYPE EW 02

UValue: 0.25W/m2K

- Existing Solid Brickwall 230mm
- 25mm cavity
- 90mm GypLyner IWL I Studs
  90mm Mineral Wool infill
- Vapour Control Layer
- 12mm Ply
- 12.5mm Gyproc Soundbloc
- 12.5mm Gyproc Soundbloc
- 3mm skim

TYPE EW 03

- 20mm plaster render finish

TYPE EW 04

UValue: 0.25W/m2K

- 215mm Brickwall (Raised Party wall)
- 25mm Timber Batten cavity
- 60mm Kooltherm K118
- 12.5mm plasterboard
- 3mm Skim

TYPE EW 05

UValue: 0.25W/m2K

- Existing masonry - thickness varies
- 25mm timber batten cavity
- 60mm Kooltherm K118
- 12.5mm plasterboard finish
- 3mm Skim