

Report:
Temple Dinsley.FEASIBILITY

For:
SCABAL / The Door UK

Date:
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TEMPLE DINSLEY

ACOUSTIC DESIGN - FEASIBILITY

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1.0 INTRODUCTION

Gillieron Scott Acoustic Design (GSAD) have been appointed as acoustic consultants to carry out a feasibility study on the refurbishment of Temple Dinsley Preston, SG4 7RT, in collaboration with SCABAL Architects.

Temple Dinsley Estate is Grade II* listed. The 'Old House' dates from 17th Century and has since been extended in 1909 (and again later) by Edwin Lutyens, until it became a Boarding School (Princess Helena). The Estate is currently not in use having closed since 2021.

The site is proposed to contain 61 houses/apartments to be either refurbished, converted or new buildings. The main building is proposed to be refurbished and converted into about 40 apartments, while several other agricultural (and other use) buildings are proposed to be converted into homes. The Sports Centre is proposed to be demolishing and replaced with new houses.

The site is located in the countryside and surrounded by small roads. The façade and glazing are proposed to remain as existing. The rooms are proposed to be naturally ventilated, with extract fans to kitchen/bathrooms/toilets as required.

GSAD has carried out an initial site visit on the 8th June 2023 with SCABAL Architects and the Historic Recorder. Comments and observations are presented in this report.

Airborne and impact sound insulation testing has been carried out on 20th July 2023 to measure the existing performance of typical walls and floors around the building.

This report sets out acoustic criteria with outline methods to achieve Approved Document E – Resistance to the Passage of Sound, 2003 edition (ADE 2003) for party walls and floors, internal partitions and reverberation time for common parts. Part E regulations set out different acoustic criteria for change of use and new build.

Car park for approximately 120 cars would be required as part of the conversion. A traffic plan study might be required to assess noise levels from cars coming and leaving the site for the proposed residential developments as well as assessing the difference between before (when the site was used as a boarding school) and proposed and the acoustic implications of increased car activity for neighbours around the site.

In this report, for airborne sound transmission $D_{nT,w} + C_{tr}$ should be regarded as insitu values and R_w should be regarded as laboratory values. For impact sound $L'_{nT,w}$ should be regarded as insitu values and $L_{n,w}$ should be regarded as laboratory values.

Markup plans are shown in Appendix D.

2.0 DESIGN TARGETS

2.1 Party Walls and Floors

Table 1 shows airborne and impact minimum requirements for party walls and floors, as set out in Approved Document E (2003 Edition) (ADE) of the Building Regulations 2010 for new build and conversion (in green).

For this project, depending on the existing floor/wall build-up, what is achievable within the constraints of the site and the Client's aspirations, minimum Part E requirements or better will be targeted.

Table 1 – Sound and Impact Insulation Performance of ADE of the Building Regulations - Residential

Type of property	Walls	Floors
	Airborne $D_{nT,w} + C_{tr}$ (dB)	Impact $L'_{nT,w}$ (dB)
New Build dwelling-house / Flat	≥45	≤62
Dwelling-house / Flat - by material change of use	≥43	≤64
Rooms for residential purposes	≥43	≤62
Rooms for residential purposes - by material change of use	≥43	≤64

Notes:

Higher $D_{nT,w}$ values = greater sound insulation

Lower $L'_{nT,w}$ values = better sound insulation.

For flats/houses by material change of use, 43dB $D_{nT,w} + C_{tr}$ for separating walls, separating floors and stairs is required. For new flats/houses, 45dB $D_{nT,w} + C_{tr}$ for separating walls, separating floors and stairs is required.

It is recommended to select specifications capable of achieving a laboratory rating of 52 dB $R_w + C_{tr}$ for material change of use and 54 dB $R_w + C_{tr}$ for new flats.

This assumes all flanking paths are appropriately detailed, ideal site lay-out exists and a high quality of workmanship is applied.

For timber floor construction, a minimum reduction of 10dB is typical for timber constructions when comparing site performance, $L'_{nT,w}$, to laboratory performance, $L_{n,w}$.

Therefore for flats by material change of use 54dB $L_{n,w}$ is recommended and 52dB $L_{n,w}$ for new flats.

Corridor walls should be of the same rating as party walls.

Corridor doors should have good perimeter sealing (including threshold seals) and a minimum mass of 25kg/m² or a minimum sound reduction index of 29dB R_w .

ADE provides the following information for historic buildings:

'In the case of some historic buildings undergoing a material change of use, it may not be practical to improve the sound insulation to the standards set out in Tables 1a and 1b. [Defining the performance standards for separating walls, floors and stairs].

'The need to conserve the special characteristics of such historic buildings needs to be recognised, and in such work, the aim should be to improve sound insulation to the extent that it is practically possible, always provided that the work does not prejudice the character of the historic building, or increase the risk of long-term deterioration to the building fabric or fittings.

'In arriving at an appropriate balance between historic building conservation and improving sound insulation it would be appropriate to take into account the advice of the local planning authorities conservation officer.

'In such cases it will be reasonable to improve the sound insulation as much as is practical, and to affix a notice showing the sound insulation value(s) obtained by testing in accordance with Regulation 41 or 20(1) and (5), in a conspicuous place inside the building.'

(Approved Document E, page 13 paragraph 0.7)

2.2 Internal Partitions

In the Approved Document E (2003 Edition) of the Building Regulations 2010, internal partitions (walls and floors) should have a minimum airborne sound insulation performance level of R_w 40dB. However we recommend internal partitions without doors in partition, where feasible, to be at least 5dB higher. Depending on the standard of insulation performance and level of privacy desired, higher performance might be required, e.g. +10dB.

Lifts are not currently proposed for this project.

Roof build-up should be assessed so that rain noise does not exceed 50dB L_{Aeq} in residential dwellings with intense rainfall.

2.3 Reverberation Time - Building Regulations: Approved Document E – Part 3

Reverberation in common internal parts of the building should be effectively controlled. In corridors, an area equal to or greater than the floor surface should be covered with a Class C absorber or better. In stairwells, 50% of an area equal to or greater than the area of the stair treads + upper surface of the intermediate landing + upper surface of the landings (excluding ground floor) + ceiling area on the top floor should be covered with a Class C absorber or better.

Only corridors and stairwells with rooms entering directly off them need to be controlled in terms of reverberation under the Building Regulations.

Stairs and corridors adjacent to bedrooms/living areas should be treated with isolation materials. The use of carpet with underlay or acoustic vinyl e.g. MARMOLEUM dB is recommended.

3.0 SURVEY RESULTS

See Appendix H for annotated site plans, indicating locations of the tests presented in this section.

Table 2 – Walls (Airborne Sound Insulation)

Test Number	Room		Measured Airborne $D_{nT,w} + C_{tr}$ (dB)	Margin (dB)	PASS/FAIL
	Source	Receiver			
1	F60 2F	Corridor 2F	43	0	PASS
2	F107 2F	F122 2F	35	-8	FAIL
3	F107 2F	F107 Door 2F	22	-21	FAIL
4	F122 2F	F107 2F	40	-3	FAIL
5	F44 2F	F44 Corridor 2F	41	-2	FAIL
6	T221 2F	F122 Corridor 2F	36	-7	FAIL
7	D86 1F	D86 Door 1F	34	-9	FAIL
10	F50 1F	F50 Toilet 1F	41	-2	FAIL
11	F110 1F	F60 Hall 1F	41	-2	FAIL
12	F110 1F	F50 Middle 1F	39	-4	FAIL
13	F48 1F	F84 (SF) 1F	36	-7	FAIL
14	F92 1F	F92 Left partition 1F	31	-12	FAIL
16	F110 1F	F60 Hall Door 1F	55	12	PASS
18	F48 1F	F48 Door 1F	40	-3	FAIL
66	F163 GF	F83 GF	51	8	PASS
67	ENTRANCE STAIRS GF	F125 GF	44	1	PASS
68	ENTRANCE STAIRS GF	F185 GF	36	-7	FAIL
75	F151 GF	F95 GF	46	3	PASS
76	F151 GF	F151 GF	32	-11	FAIL
78	F152 FF	F111 FF	44	1	PASS

Table 3 – Flors (Airborne Sound Insulation)

Test Number	Room		Measured Airborne $D_{nT,w} + C_{tr}$ (dB)	Margin	PASS/FAIL
	Source	Receiver			
8	F50 1F	F60 2F	33	-10	FAIL
9	F50 1F	F185 GF	41	-2	FAIL
15	F110 1F	F107 2F	43	0	PASS
17	F110 1F	F125 GF	45	2	PASS
19	F48 1F	F48 GF	49	6	PASS
20	F92 1F	F163 GF	50	7	PASS
21	F112 GF	F124 B	32	-11	FAIL
22	F163 GF	F112 B	42	-1	FAIL
77	F151 GF	F155 1F	39	-4	FAIL
79	F111 1F	F66 GF	49	6	PASS

Table 4 – Floors (Impact Sound Insulation) – tested on carpet or directly on timber floor

Test Number	Room		Measured Impact $L'_{nT,w}$ (dB)	Margin	PASS/FAIL
	Source	Receiver			
69	F60 2F	F60 1F	61	-3	PASS
70	F122 2F	F110 1F	71	7	FAIL
71	T221 2F	T221 1F	68	4	FAIL
72	F77 1F	F185 GF	53	-11	PASS
73	ENTRANCE STAIRS 1F	ENTRANCE STAIRS GF	60	-4	PASS
74	F84 1F	F80 GF	69	5	FAIL

4.0 CONSTRUCTION BUILD-UP

Details of the existing floor and wall constructions are not known at this stage. Sound insulation testing has been carried out to measure the existing performance of the separating walls and floors.

4.1 FLOORS

For this study, it is assumed that the floor is made of timber joists construction without mineral wool in cavity, floorboard on top and plaster or plasterboard ceiling below fixed directly to the underside of the joists.

Results from the tests show that

- the floor between first and second floor provides between 33 and 43dB $D_{nT,w}+C_{tr}$ airborne and between 61 and 71 dB $L'_{nT,w}$ impact
- the floor between first and ground floor provides between 39 and 50 dB $D_{nT,w}+C_{tr}$ and between 53 and 69 dB $L'_{nT,w}$ impact
- the floor between ground and basement performs between 32-42 dB $D_{nT,w}+C_{tr}$.

Although some separating floors meet the minimum Part E regulations for refurbishment, most rooms will need to be upgraded for party floors. The performance for internal partitions is met throughout except for test 21 (F112 GF to F124 B). Some preliminary options are provided below, to achieve minimum Part E requirements.

Option 1: Alterations from above only

- Existing flooring to be removed to expose timber joists
- Void to be filled 50% with mineral wool (>30 kg/m³)
- Silent floor e.g. GYPFRAME SIF Floor Channel to be installed to top of timber joists (note: the isolated layer might need to be replaced with 10mm neoprene strip)
- 19mm e.g. GYPROC PLANK installed between SIF Floor Channels
- 2x18mm T&G cement board on top
- 15mm underlay min 15kg/m² e.g. ACOUSTILAY 15
- Floor finish

Option 2: Alterations from below only

- Existing ceiling to be removed to expose joists
- 19mm e.g. GYPROC PLANK fixed to the underside of the floorboard
- Void to be filled 50% with mineral wool (>30 kg/m³)
- 2x15mm dense plasterboard e.g. SOUNDBLOC on MF ceiling suspended using acoustic hangers e.g. GYPFRAME ACOUSTIC HANGERS, to give minimum 300mm cavity.

Option 3: Alterations to both sides of party floor

- Existing ceiling to be removed to expose joists
- Void to be filled 50% with mineral wool (>30 kg/m³) 1x19mm e.g. GYPROC PLANK + 1x12.5mm e.g. GYPROC FIRELINE fixed to the underside of the joists via resilient bars
- Remove existing floor finish

- Silent floor e.g. GYPFRAME SIF Floor Channel to be installed to top of timber joists (note: the isolated layer might need to be replaced with 10mm neoprene strip)
- 19mm GYPROC PLANK between floor channels
- 18mm T&G cement board
- Floor finish e.g. 20mm engineered timber, or carpet with 18mm T&G plywood installed underneath.

Refer to Appendix B for proposed floor build-up construction.

Depending on the standard of insulation performance and level of privacy desired, higher performance might be required, e.g. +3dB or +5dB.

4.2 WALLS

4.2.1 Party walls

Results from the tests show that most walls fail to meet the minimum Part regulations for refurbishment except where shown in Table 2.

There are many different ways of achieving Part E requirements depending on construction methods.

Examples of wall build-up construction to achieve minimum Part E requirements are shown below:

Drylining partitions:

E.g. British Gypsum GypWall quiet performance - 48mm Gypframe 'C' Studs with cross braces
2 layers of 15mm dense plasterboard e.g. SOUNDBLOC both sides of two separate steel studs with 190mm cavity between inner sides of plasterboard. 75mm mineral wool in cavity. Stud frameworks braced at 1200mm centres (Reference A216011)

Or staggered studs: 2 layers of 15mm dense plasterboard e.g. SOUNDBLOC both sides of two rows of Gypframe 92I90 'I' studs. 148mm cavity with 25mm mineral wool in cavity. (Reference A233008/028)

If timber studs used: Two separate timber frames spaced 50mm apart, consisting of 89mmx38mm timber studs at 600mm centres with noggings. 2 layers of 15mm dense plasterboard e.g. SOUNDBLOC both side. 230mm cavity with 100mm mineral wool in cavity (Reference A036002)

Masonry partitions:

Brick wall (thickness to be confirmed) lined on one side with e.g. GYPLYNER UNIVERSAL to give 50mm cavity, cavity filled with 25mm ISOVER APR 1200 and 2 layers of 12.5mm plasterboard e.g. WALLBOARD.

Refer to Appendix C for proposed wall build-up construction.

4.2.2 Internal partitions

Drylining partitions

R_w 40dB e.g. 1x15mm plasterboard e.g. WALLBOARD both sides of 48mm C-stud, 25mm mineral wool in cavity >10kg/m³.

R_w 45dB e.g. 1x15mm dense plasterboard e.g. SOUNDBLOC both sides of 70mm C-studs. 25mm mineral wool >10kg/m³ in cavity.

R_w 50dB e.g. 1x12.5mm plasterboard e.g. WALLBOARD both sides of 70mm C-studs. 50mm mineral wool >10kg/m³ in cavity.

If timber studs used:

R_w 40dB: 1x15mm dense plasterboard e.g. SOUNDBLOC both sides of 63 x 38mm timber studs. No insulation in cavity.

R_w 45dB: 2 x 12.5mm dense plasterboard e.g. SOUNDBLOC both sides of 75 x 38mm timber studs. 25mm mineral wool in cavity.

R_w 50dB: 2 x 12.5mm plasterboard e.g. WALLBOARD both sides of 75 x 38mm timber studs, with resilient bars fixed horizontally to one side. 50mm mineral wool in cavity.

Masonry partitions

R_w 40dB: Brick wall (density >1700kg/m³) min thickness 80mm

R_w 45dB: Brick wall (density >1700kg/m³) min thickness 110mm

R_w 50dB: Brick wall (density >1700kg/m³) min thickness 103mm with 13mm plaster each side + wall lining e.g. Gypframe GL1 Lining Channel framework fixed to one side to give 35mm cavity, 1x12.5mm dense plasterboard e.g. SOUNDBLOC. Cavity filled with 25mm mineral wool >10kg/m³.

5.0 PENETRATIONS / ANTI-VIBRATION MOUNTS

Recessed sockets, lights, speakers and other one side penetrations should not degrade the sound insulation of the party floor.

Electrical sockets should be staggered 600mm at least in plan, backed with a proprietary acoustic box or putty pads in accordance with good practice acoustic procedures.

6.0 RAINWATER AND WASTEWATER/DRAINAGE PIPEWORK AND DUCTWORK

Rainwater, wastewater/drainage/soil pipework should not go through critical rooms such as bedrooms. Otherwise, they should be boxed in builder's work with 25mm drylining with a mineral fibre fill (>30kg/m³) and lagged with 10kg/m² sound insulating pipe wrapping e.g. CMS SUPERLAG PIPE LAG. Pipework should be fixed to surrounding structure via rubber insulation hangers e.g. HILTI MP-MI pipe clamp with sound inlay. Ductwork should be lagged with acoustic lagging 10kg/m² e.g. CMS SUPERLAG 10/50 and fixed to surrounding structure via anti-vibration mounts and attenuated as required to reduce noise from fans internally and to atmosphere.

7.0 REVERBERATION TIME

In corridors and stairwells with rooms entering directly off them, reverberation time needs to be controlled.

Examples of acoustic treatment:

Acoustic spray e.g. ACOSPRAY by STIL ACOUSTIC

Acoustic plaster e.g. BASWA Acoustic or Pacy & Wheatley

Perforated/slatted timber (min 30% open area) with mineral wool in void e.g. STIL ACOUSTIC or GUSTAFS.

Perforated plasterboard with mineral wool in void e.g. ECOPHON or BRITISH GYPSUM

Acoustic panels e.g. WALLSORBA by SOUNDSORBA.

Refer to Appendix E.

8.0 DOORS

Corridor doors should have good perimeter sealing (including threshold seals) and a minimum mass of 25kg/m² or a minimum sound reduction index of 29dB R_w.

Depending on the thickness and conditions of the doors, front doors to flats could be refurbished with acoustic seals added or new acoustic doors installed.

Where entrance to flats is located on the common corridors, it is preferably that lobbies are introduced or higher performance doorset installed to contain the noise.

Inner rooms should have normal solid core door sets.

9.0 FACADE

The building is located in the countryside within the estate of Dinsley.

The nearest third party houses are located about 140m from the existing building.

The site is surrounded by small roads such as School Lane, St Albans Hwy, Preston Road. The nearest train station is located about 4 miles away in Hitchin town. During the site visit, planes or helicopters have not been noted. A noise survey has not been carried out however from site observation, the building is located in a quiet rural environment.

It is understood that external glazing will not be upgraded therefore noise levels from external environment will remain unchanged. The flats are proposed to be naturally ventilated.

Car park for approximately 120 cars would be required as part of the conversion. A traffic plan study might be required to assess noise levels from cars coming and leaving the site on the proposed residential developments as well as assessing the difference between before (when the site was used as a boarding school) and proposed and the acoustic implications for neighbours around increased car activity.

10.0 NOISE FROM MECHANICAL VENTILATION

Noise limits from mechanical services in critical areas will be established and mechanical services attenuated to reduce noise internally and to atmosphere for the residents on the Estate.

If new items of plant are to be installed, a noise impact assessment will need to be undertaken in line with the Local Authority's specific noise policy.

Table 5 –Building Services Noise in Internal Areas

Location	Internal services installation
Bedrooms	NR 22 / 28 dB(A) Night NR 27 / 32 dB(A) Day
Living rooms	NR 27 / 32 dB (A) 24 hours
Bathroom	NR 30
Hallways/landings	NR 30
Entrance lobbies	NR 30
Residential Common Corridors	NR40

Duct velocities shall not exceed the following, (m/s):

Table 6 - Maximum air velocities in ducts

Noise Criterion	Primary Ducts (m/s)	Secondary Ducts (m/s)	Runouts (m/s)
NR 22	4.0	3.0	1.6
NR 27	5.0	4.0	2.0
NR 30	6.5	5.0	3.0
NR 40	8.0	7.0	5.0

Noise in all areas shall be free from tonal noise, defined as noise measured with a 1/3 octave filter which exceeds the average 1/3 octave sound pressure level of the bands adjacent to it by 6 dB or more.

Where applicable in areas rated at NR 30 or less, terminal attenuation will be required, behind grilles or diffusers. This should be in the form of short attenuators or sections of lined duct or lined plena.

11.0 EXAMPLES OF PROJECTS CONVERTED INTO RESIDENTIAL

Linton House, Maple Building, Kentish Town London (CLIVE SALL ARCHITECTURE) - The former factory (heritage building) has been restored to create 50 one, two and three bedrooms luxury apartments. Seven new penthouses have also been constructed on the 5th and 6th floors.

Dating back to the 1890s, the building was originally home to Maple & Co, furniture makers for the royal family. Then in the First World War, sections of the factory were secretly modified to produce fighter plane components, canvas tents and other supplies for front line troops. More recently the building was used for office space until developers acquired it, turning an old converted warehouse into five floors of luxury apartments and penthouses.

Photos are shown in Appendix F.

12.0 CONCLUSION

This report sets out acoustic criteria with outline methods to achieve Approved Document E – Resistance to the Passage of Sound, 2003 edition (ADE 2003) for party walls and floors, internal partitions and reverberation time for common parts.

Acoustic testing has been carried out to determine existing performances of walls and floors.

Three options of recommendations for improvements to the floor/ceiling have been provided, allowing changes to be made from above only, below only, or to both sides of the party floor to achieve minimum Part E requirements for both airborne and impact noise.

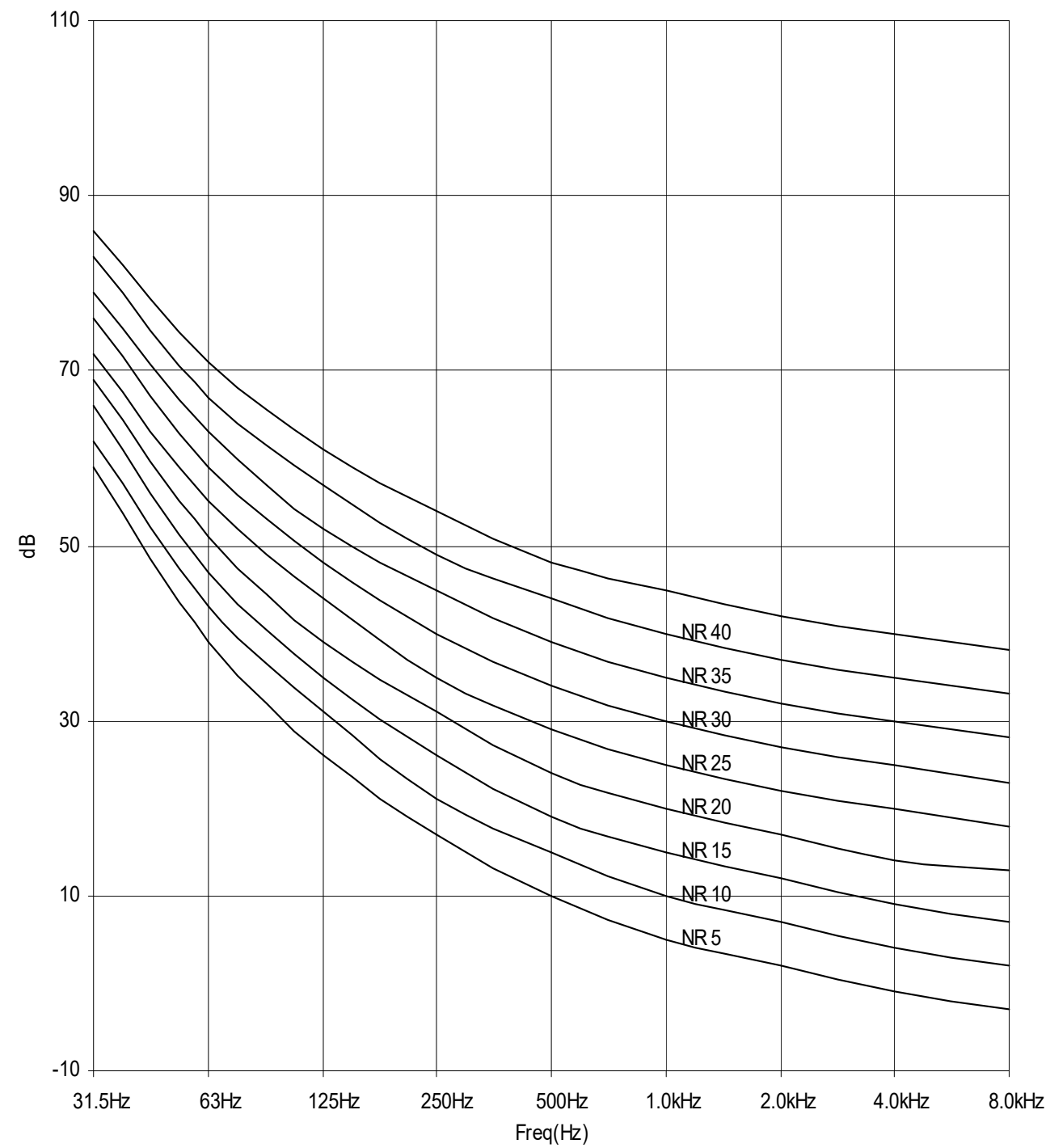
Metal and timber stud construction build-up have been provided for party walls and internal partitions.

Examples of products to control reverberation time in common parts have also been provided.

All proposed build-up presented in this report should be reviewed by the design team including Architect, Structural Engineer and others as required (e.g. Fire Consultant).

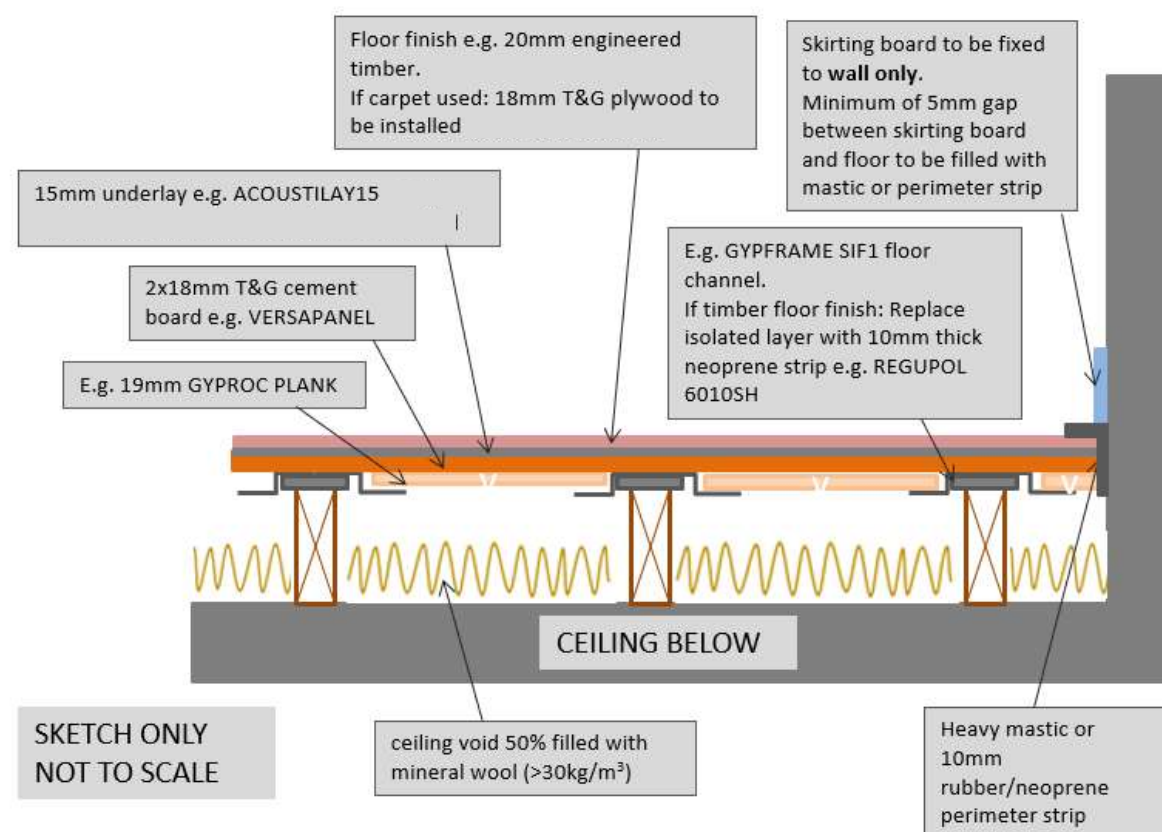
APPENDICES

APPENDIX A NOISE RATING (NR) CURVES

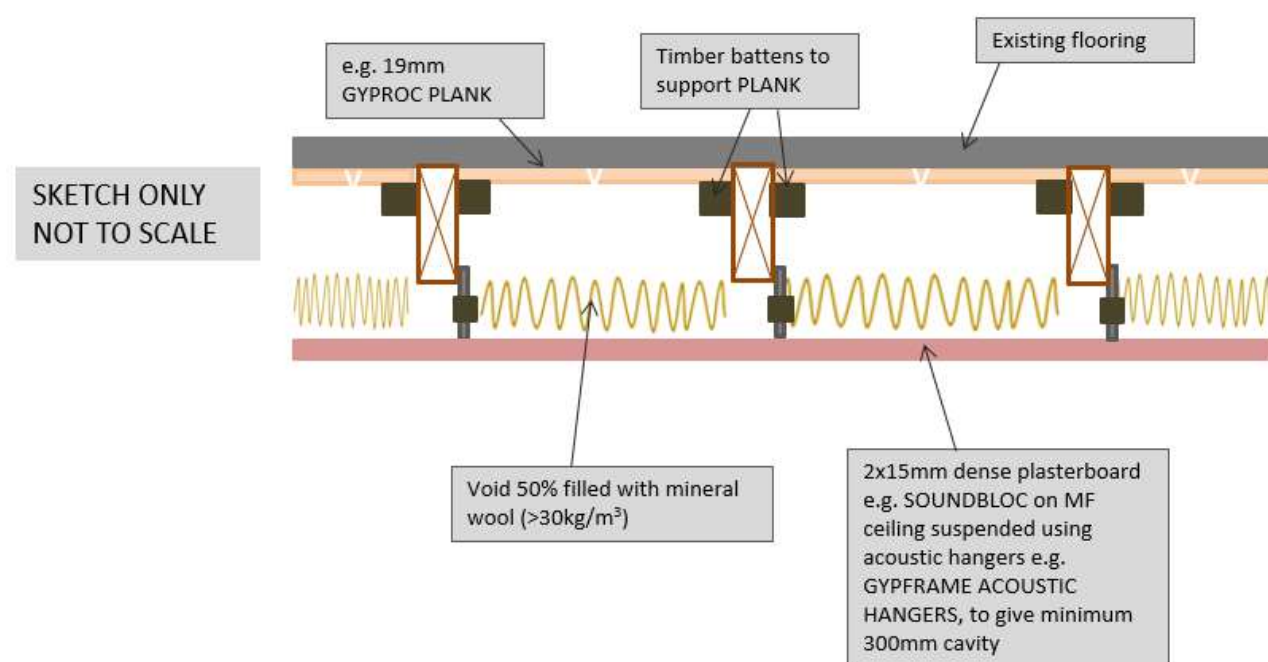


APPENDIX B PROPOSED FLOOR BUILD-UP CONSTRUCTION

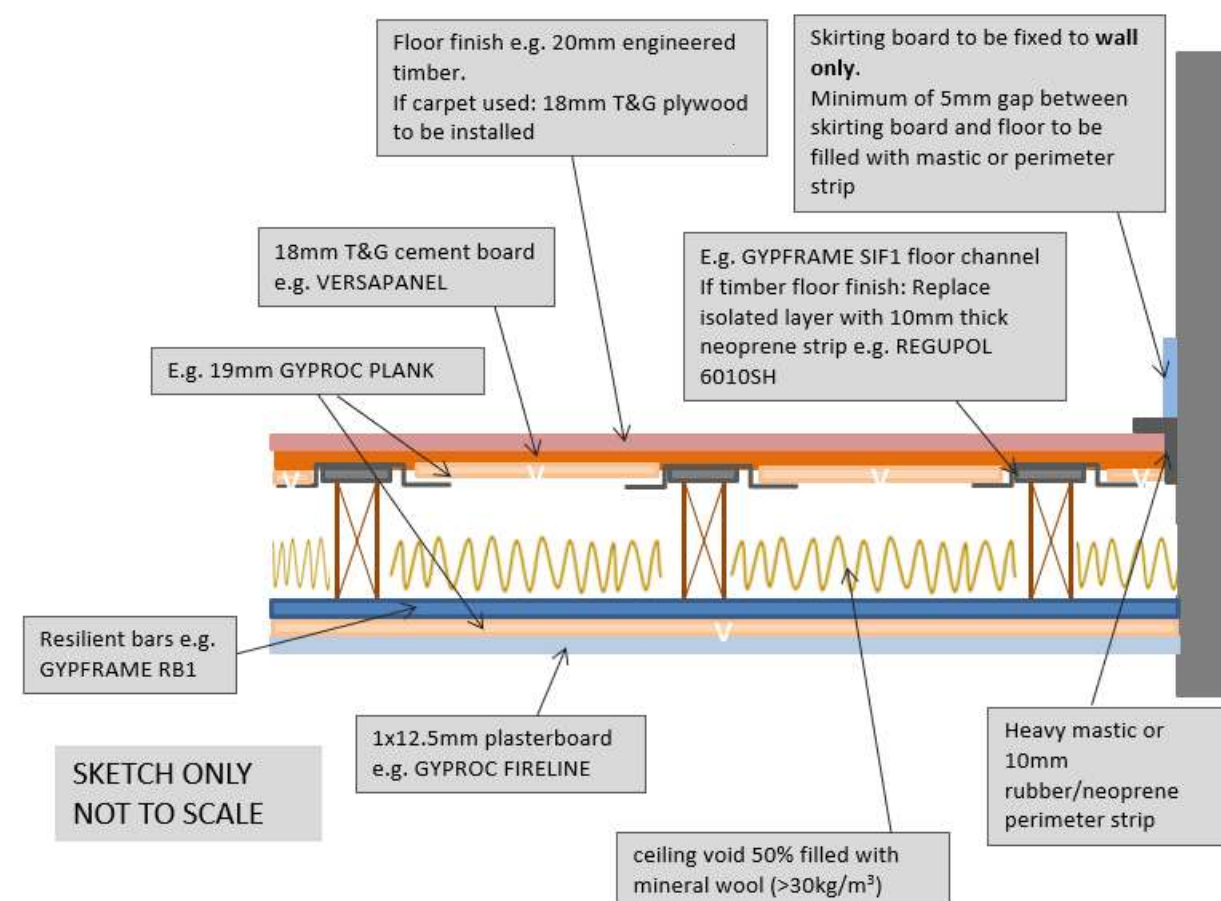
Option 1 – Alterations to floor above only



Option 2 – Alterations to ceiling below only



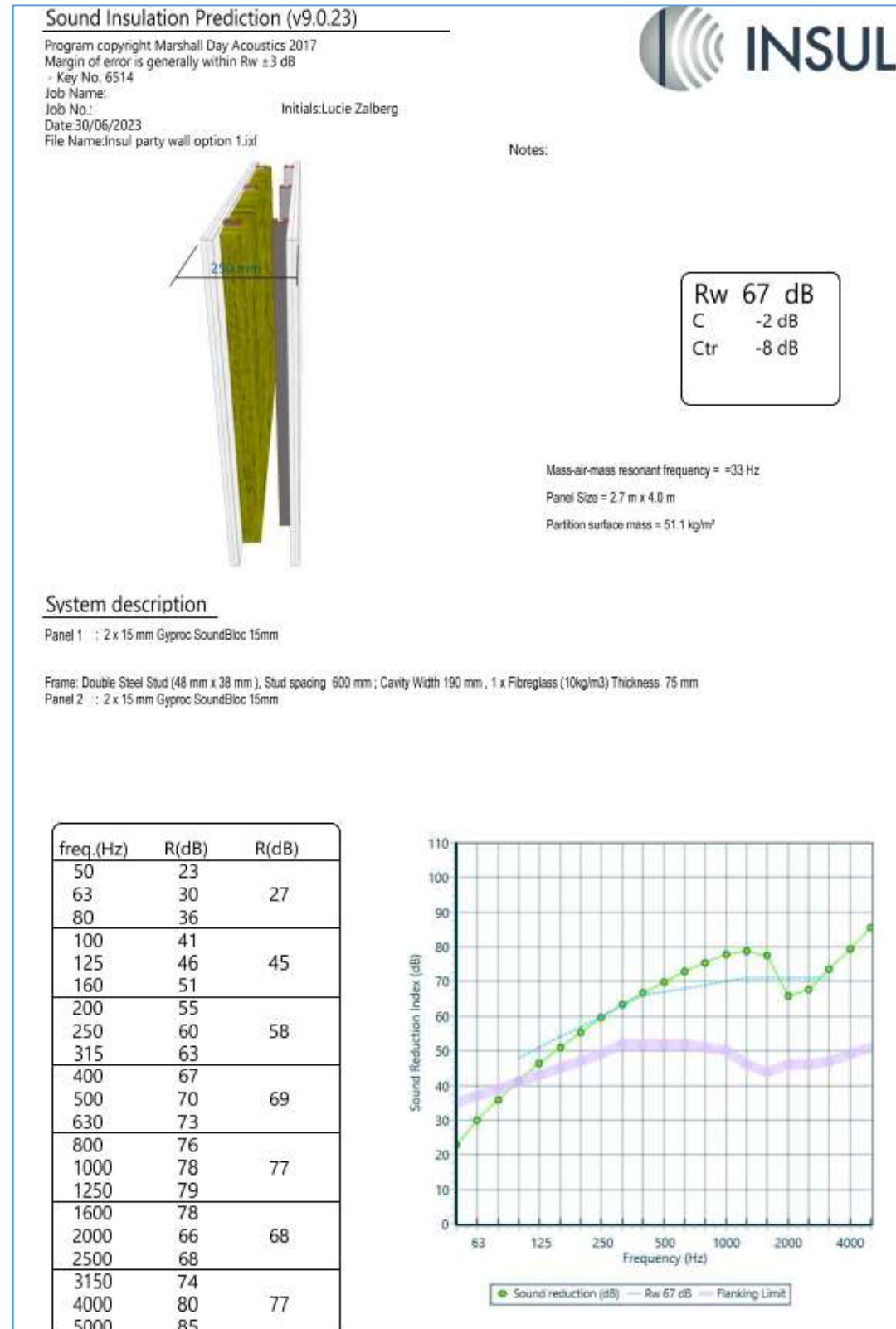
Option 3 – Alterations to both sides of partition



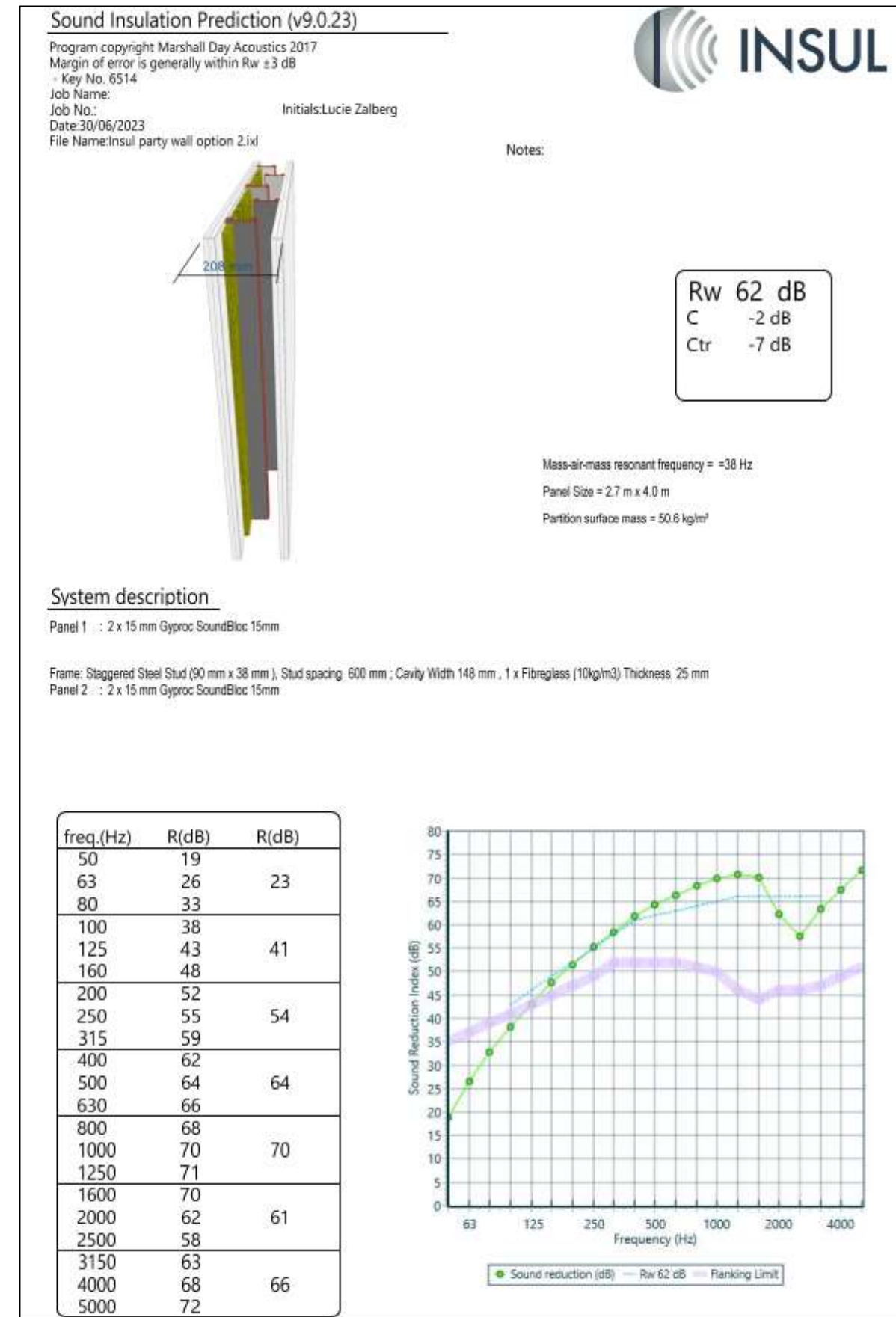
APPENDIX C PROPOSED PARTY WALL BUILD-UP CONSTRUCTION

Drylining wall

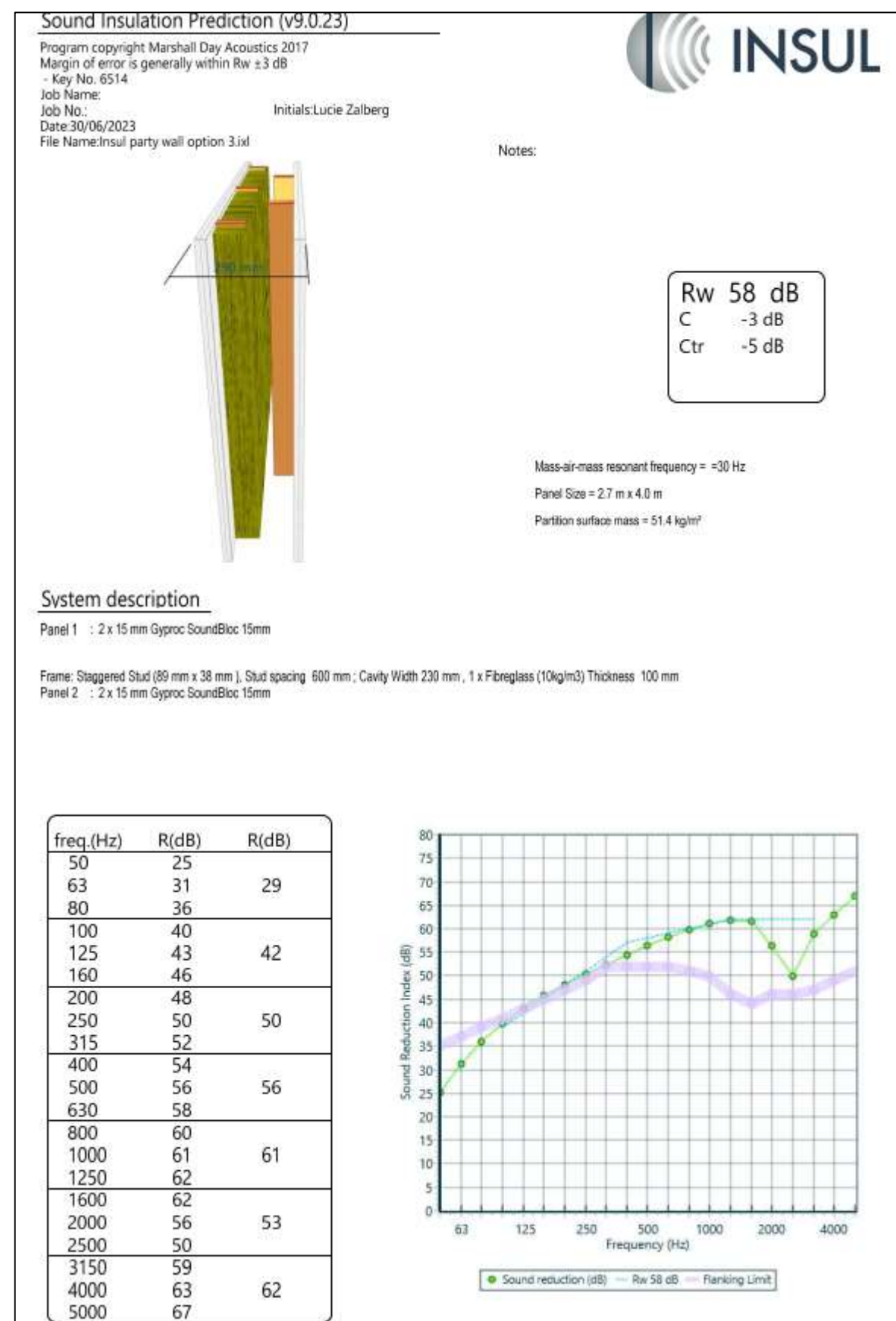
Party wall option 1



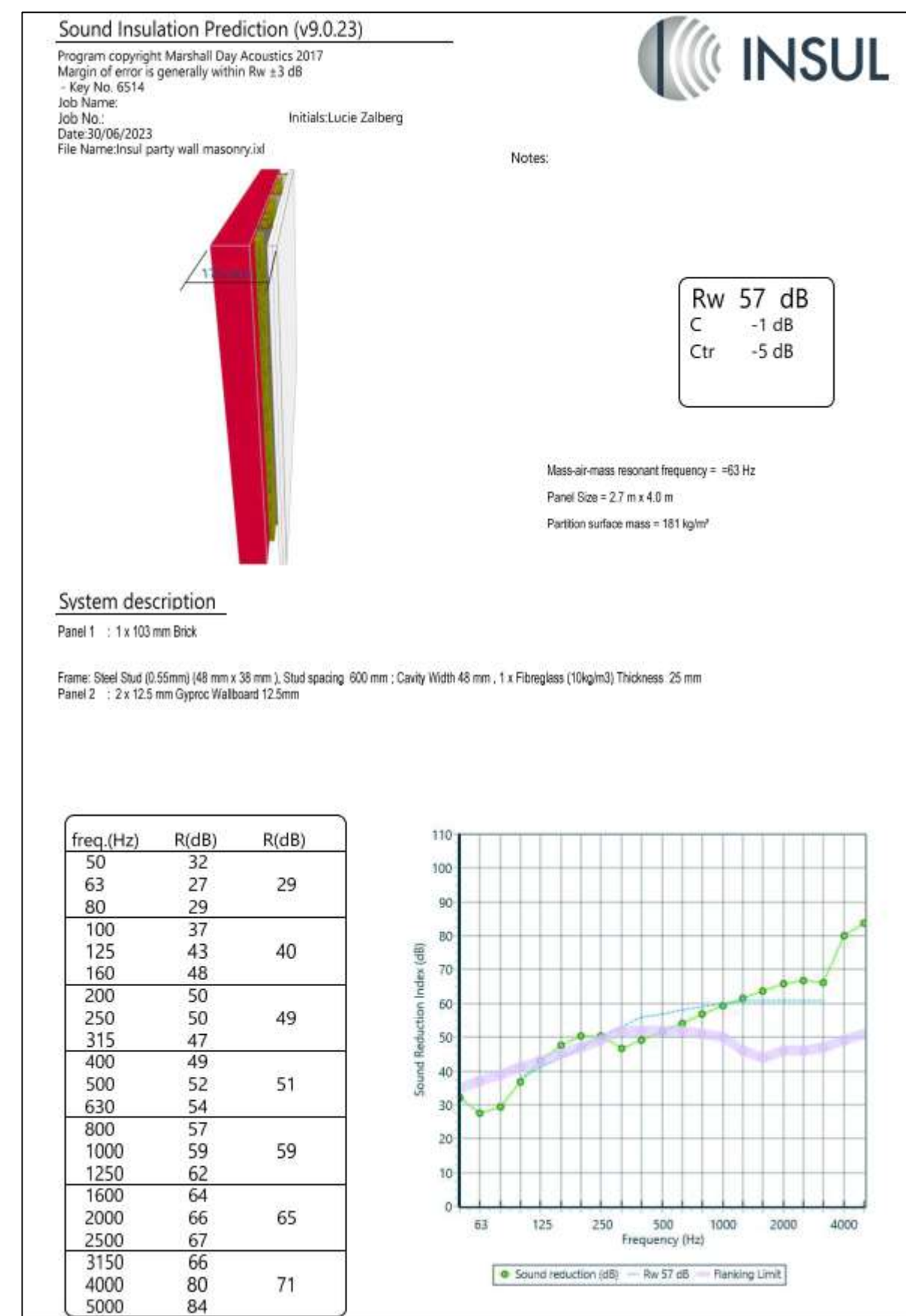
Party wall option 2



Party wall option 3



Masonry wall



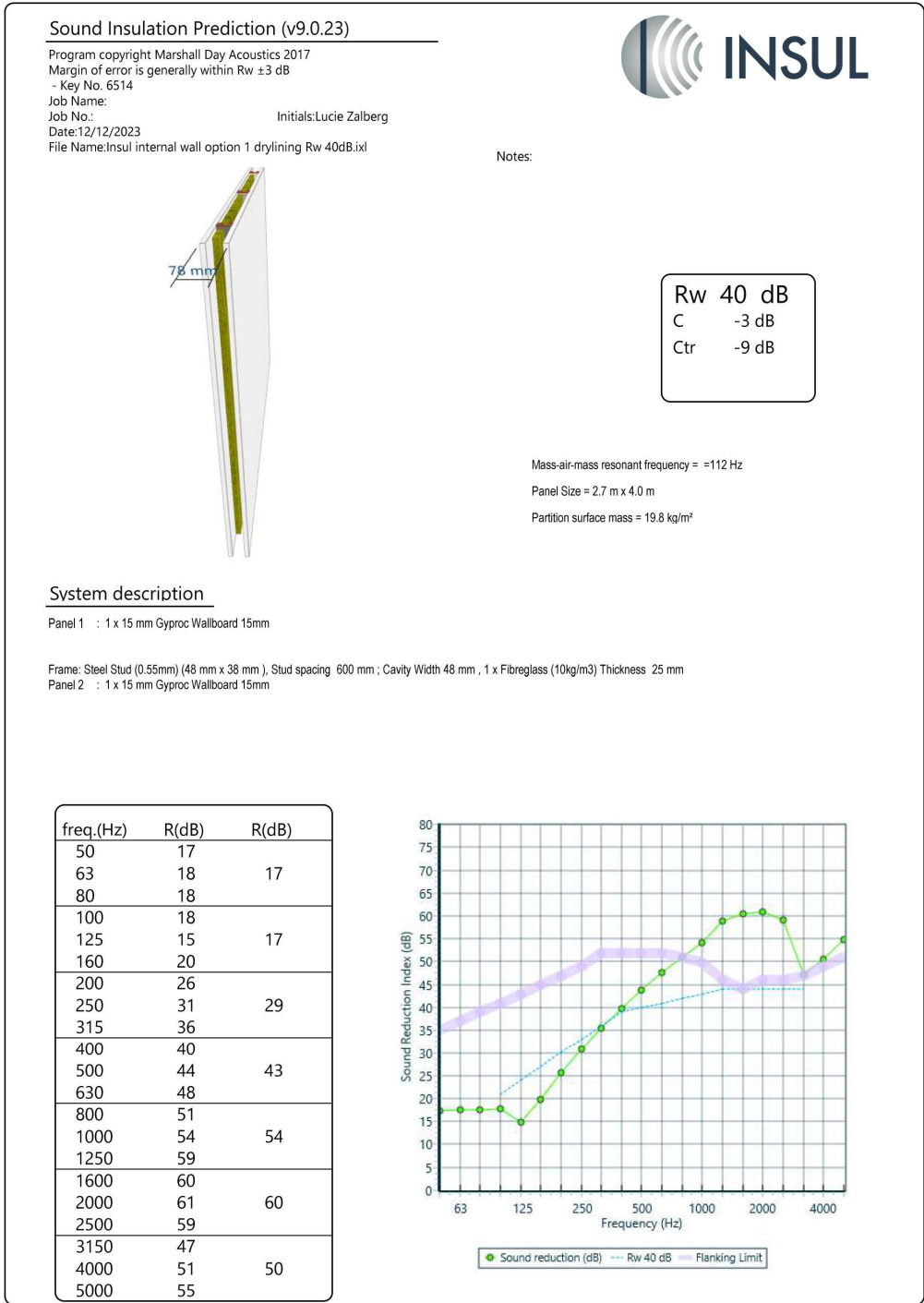
APPENDIX C PROPOSED INTERNAL WALL BUILD-UP CONSTRUCTION

INTERNAL SEPARATING WALLS

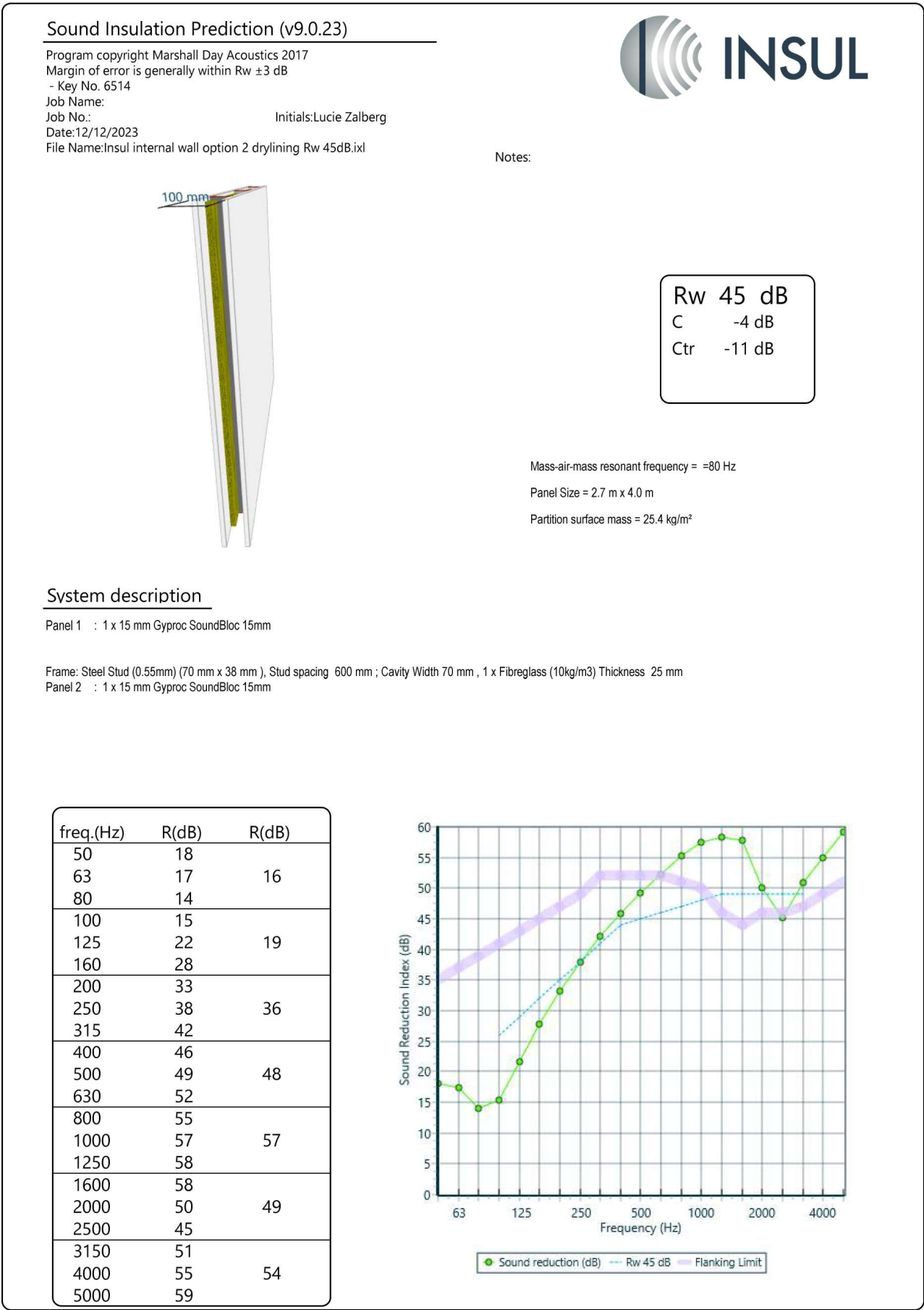
Minimum R_w 40dB. However we recommend internal partitions without doors in partition, where feasible, to be at least 5dB higher. Depending on the standard of insulation performance and level of privacy desired, higher performance might be required, e.g. +10dB.

DRYLINING

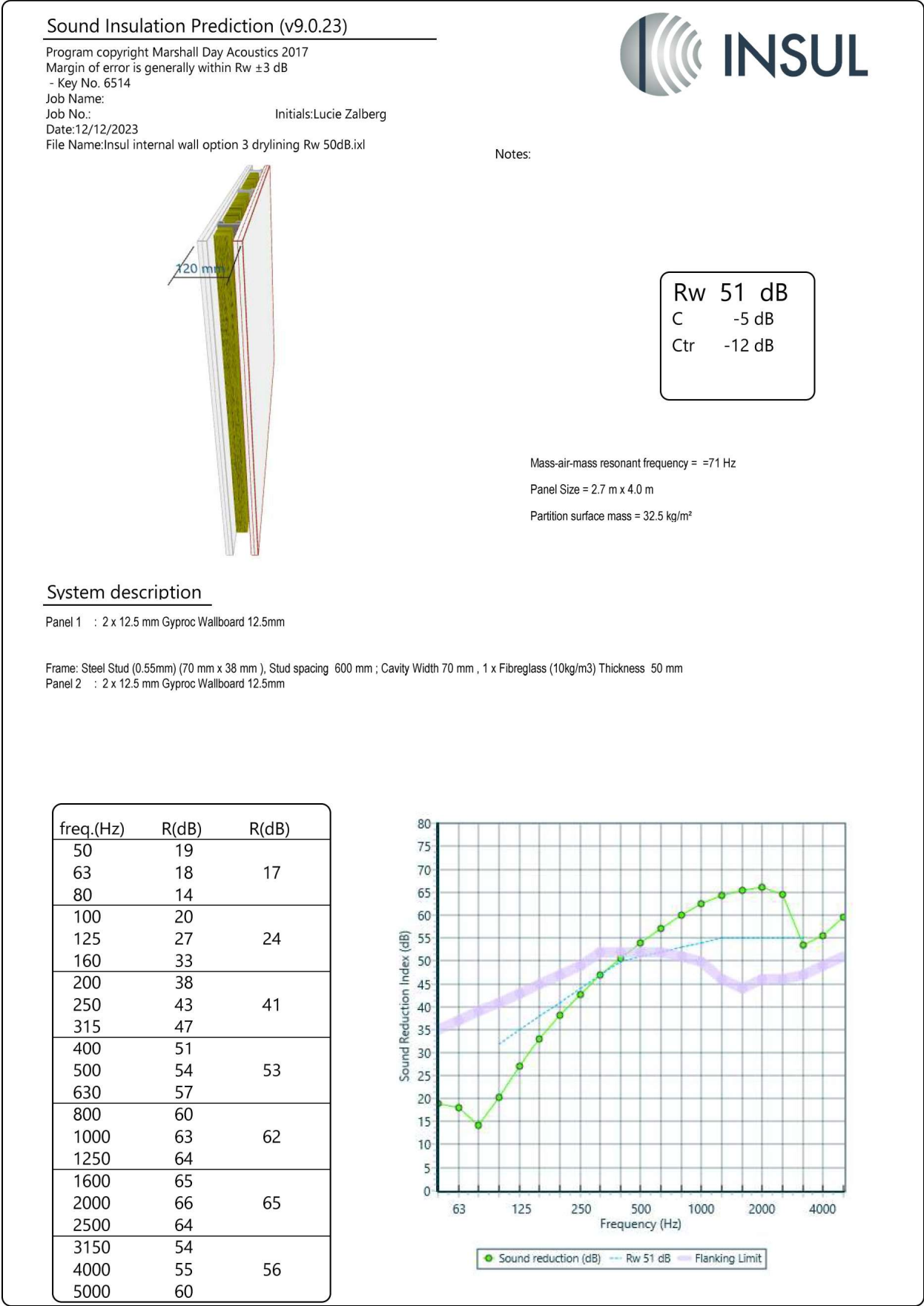
Option 1 – R_w 40dB



Option 2 – R_w 45dB

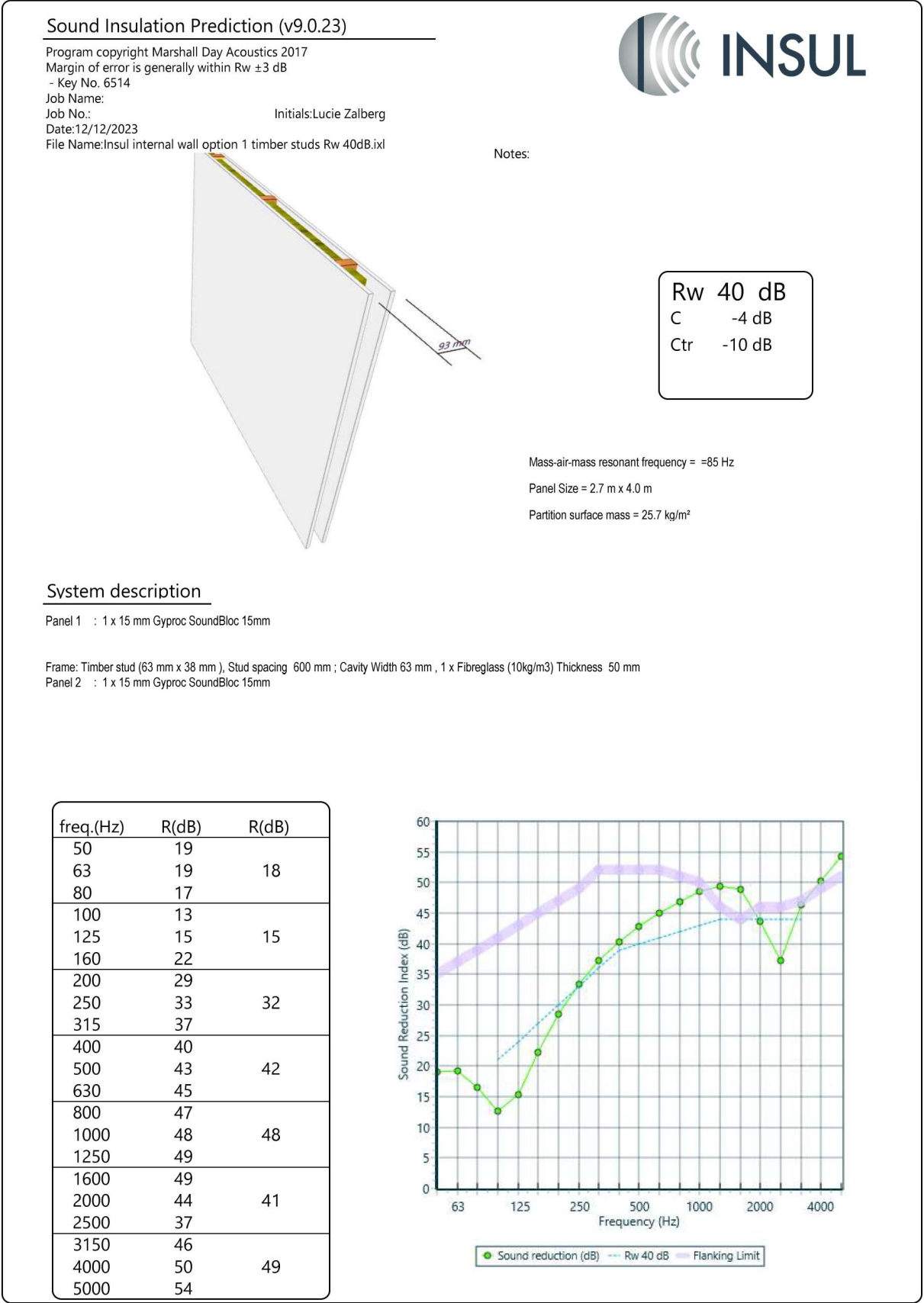


Option 3 – Rw 50dB

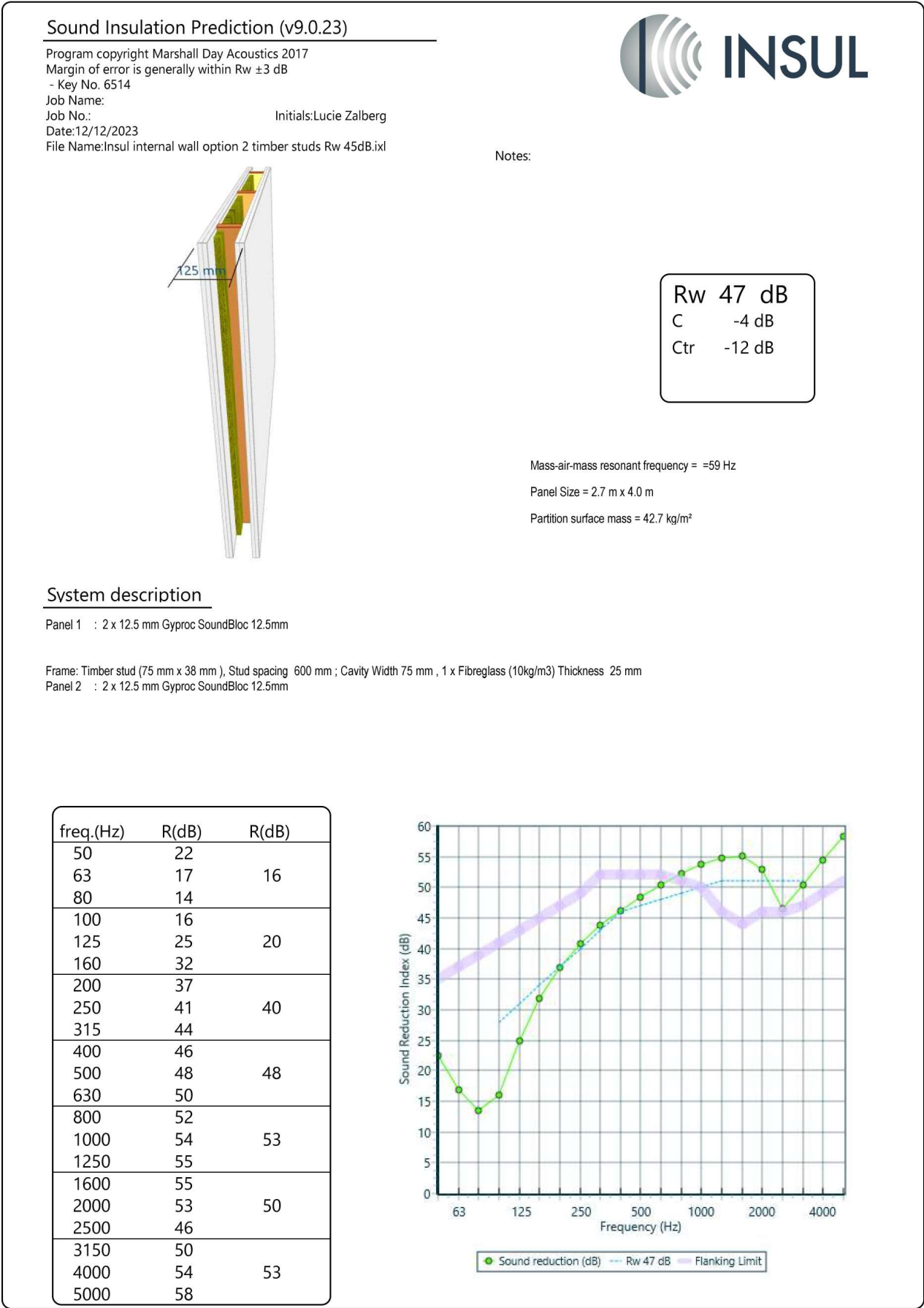


Timber stud partitions

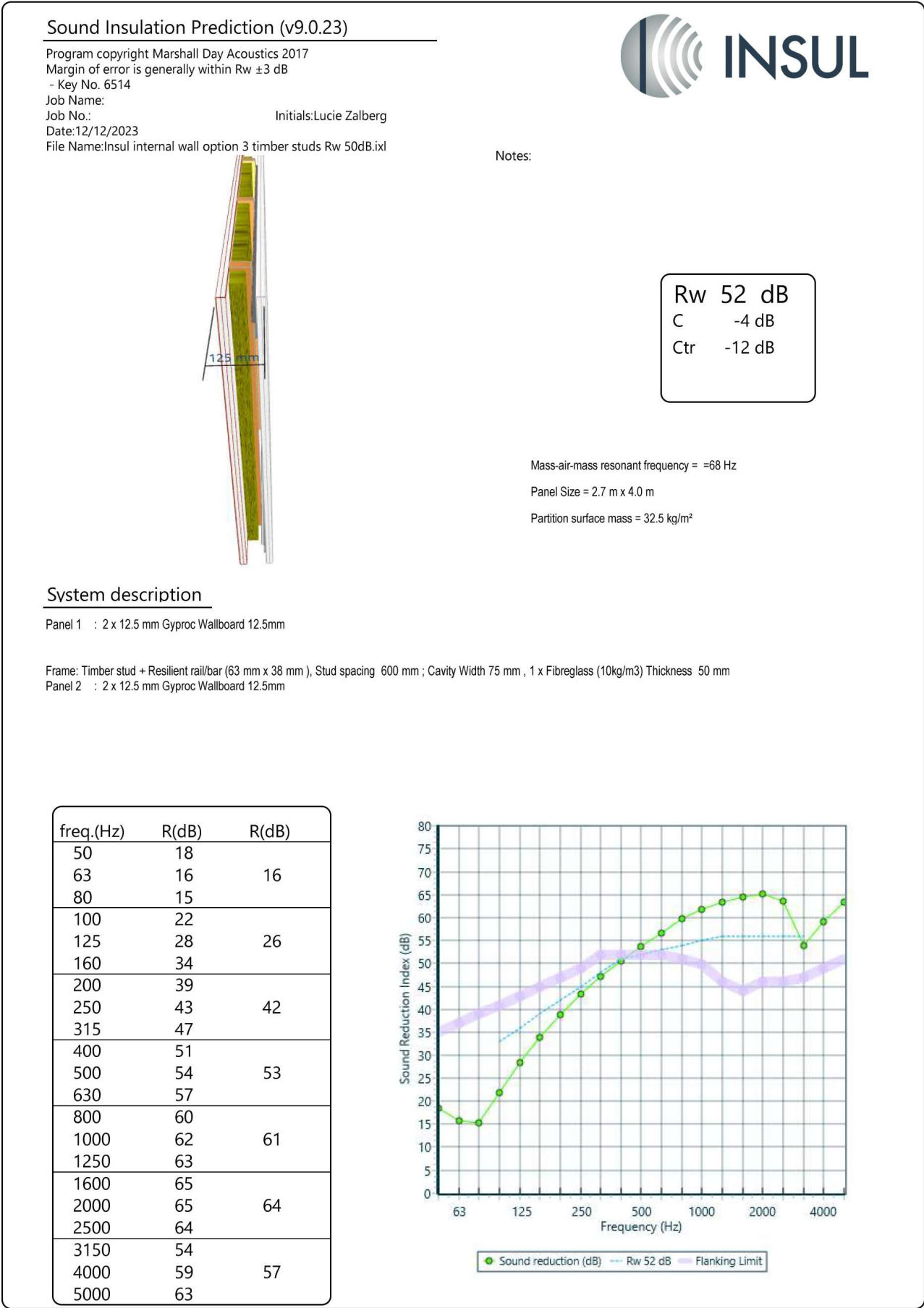
Option 1 – Rw 40dB



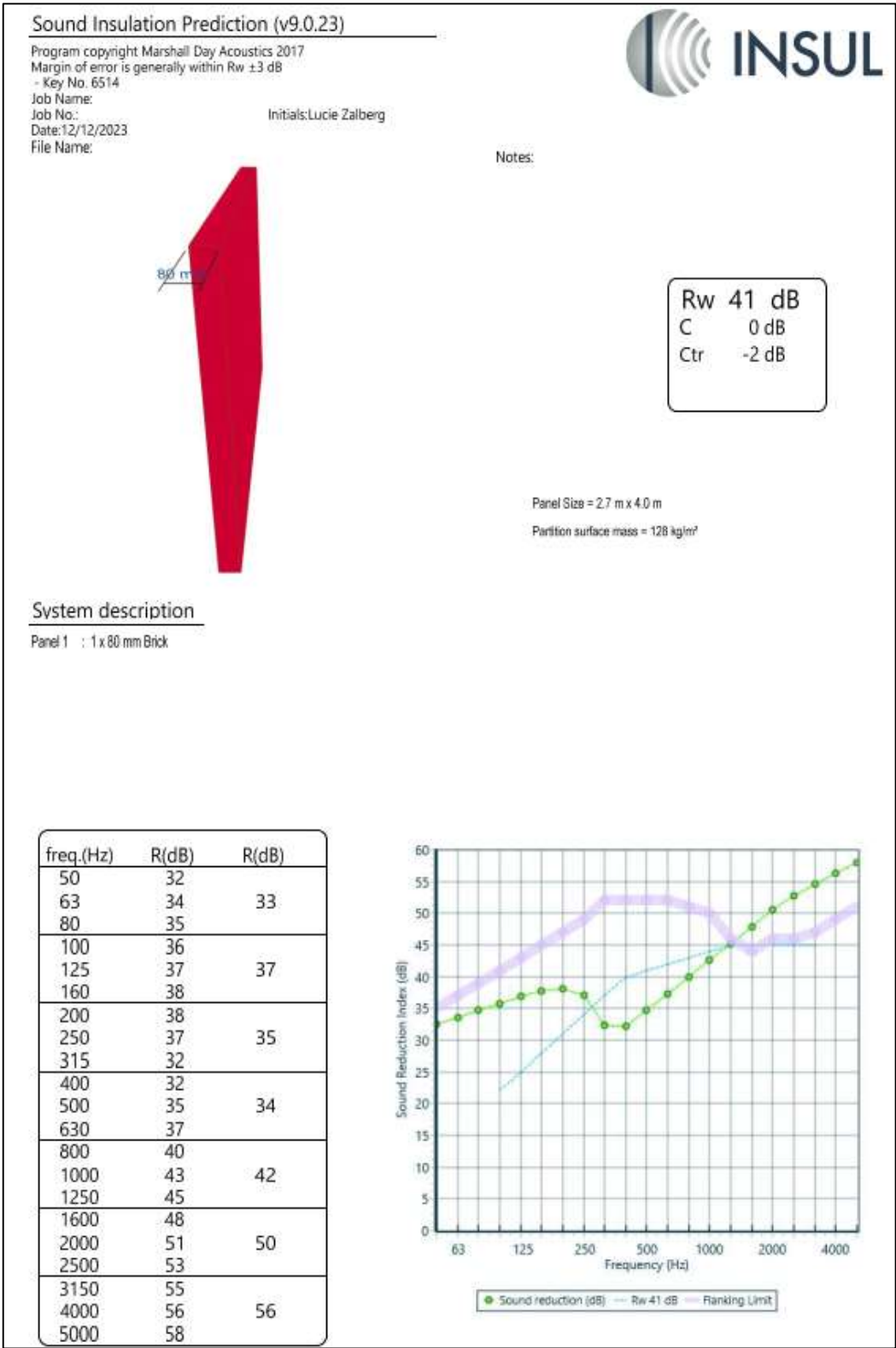
Option 2 – Rw 45dB



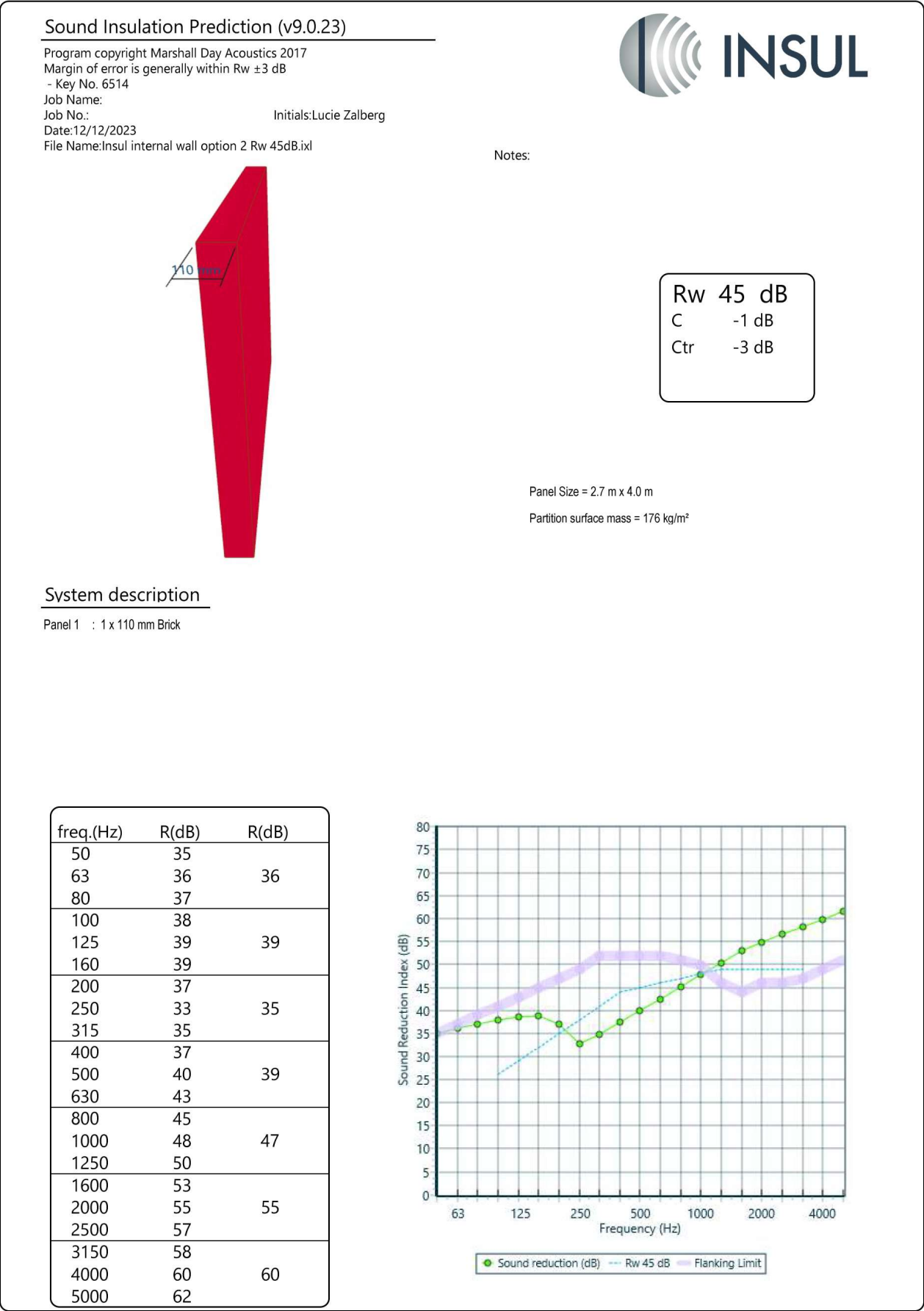
Option 3 – Rw 50dB



Option 1 – Rw 40dB



Option 2 – Rw 45dB



Sound Insulation Prediction (v9.0.23)

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within $R_w \pm 3$ dB
- Key No. 6514
Job Name:
Job No.:
Date:12/12/2023
File Name:Insul internal wall option 3 Rw 50dB.txt

Initials:Lucie Zalberg



Notes:



Rw 54 dB
C -2 dB
Ctr -8 dB

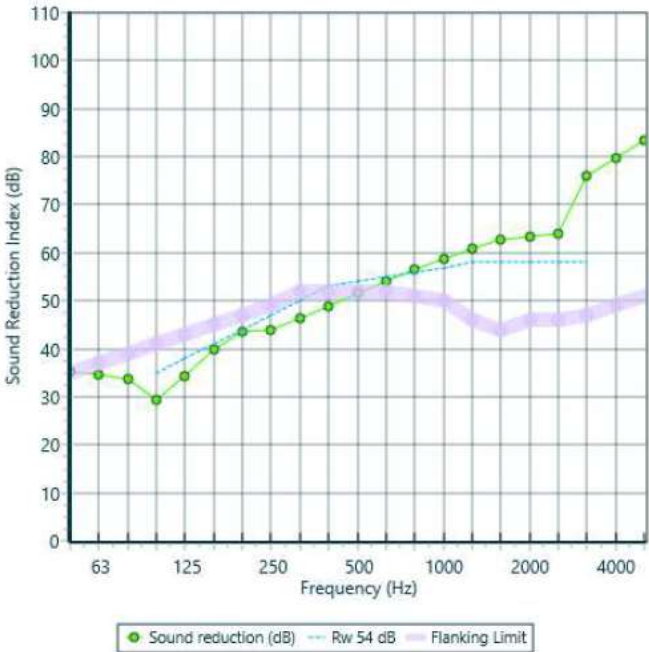
Mass-air-mass resonant frequency = 91 Hz
Panel Size = 2.7 m x 4.0 m
Partition surface mass = 176 kg/m²

System description

Panel 1 : 1 x 103 mm Brick

Frame: Steel Stud (0.55mm) (35 mm x 38 mm), Stud spacing 600 mm; Cavity Width 35 mm, 1 x Fibreglass (10kg/m³) Thickness 25 mm
Panel 2 : 1 x 12.5 mm Gyproc SoundBloc 12.5mm

freq.(Hz)	R(dB)	R(dB)
50	35	
63	35	34
80	34	
100	29	
125	34	33
160	40	
200	44	
250	44	44
315	46	
400	49	
500	51	51
630	54	
800	56	
1000	59	58
1250	61	
1600	63	
2000	63	63
2500	64	
3150	76	
4000	80	79
5000	84	



APPENDIX D PLANS

Proposed flats within the main house have been divided based on the categories below. Markup plans are shown below.

As is, leave well alone ~ *works only to floors and ceilings (includes A*)*,

Barely touch ~ *works only to openings, selected walls, floors and ceilings*,

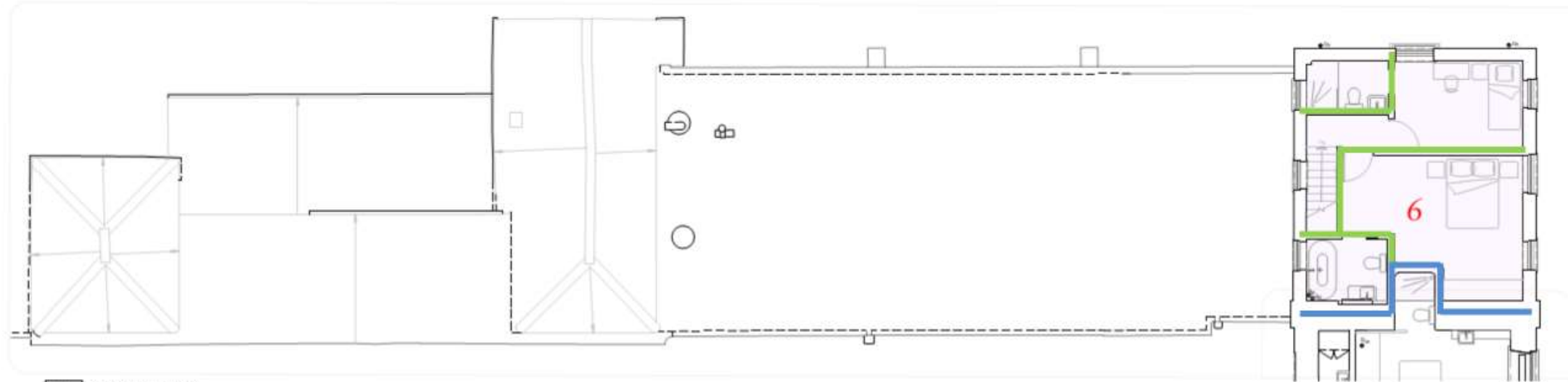
Cut away ~ *take back to "historic", preserving specific parts / features*,

Demolish ~ *EG Light well and west shed-room on the Teaching Block etc.,*

D*ismantle for reuse ~ *EG Sports Hall,*

Extend ~ *add to the existing building ~ EG West spur, annexe north,*

Face ~ *Changes to the existing building that alter its elevations.*



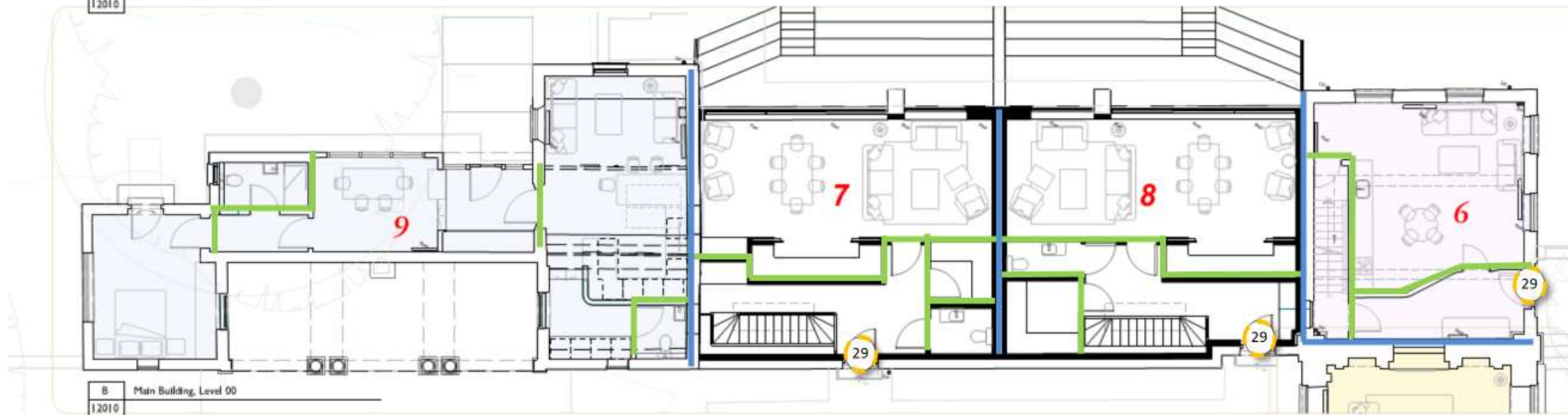
A Main Building, Level 01
12010

Rw 40dB
Rw 45dB
43dB DnT,w+Ctr
45dB DnT,w+Ctr

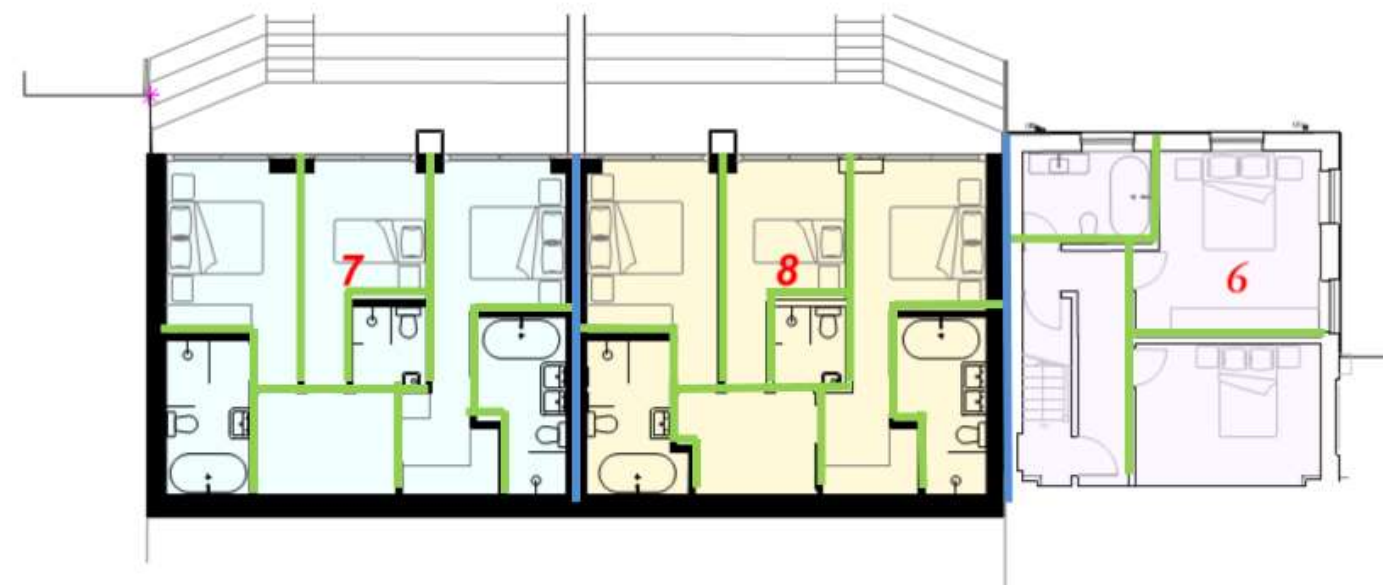
xx Doors R_w (dB)

All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing.

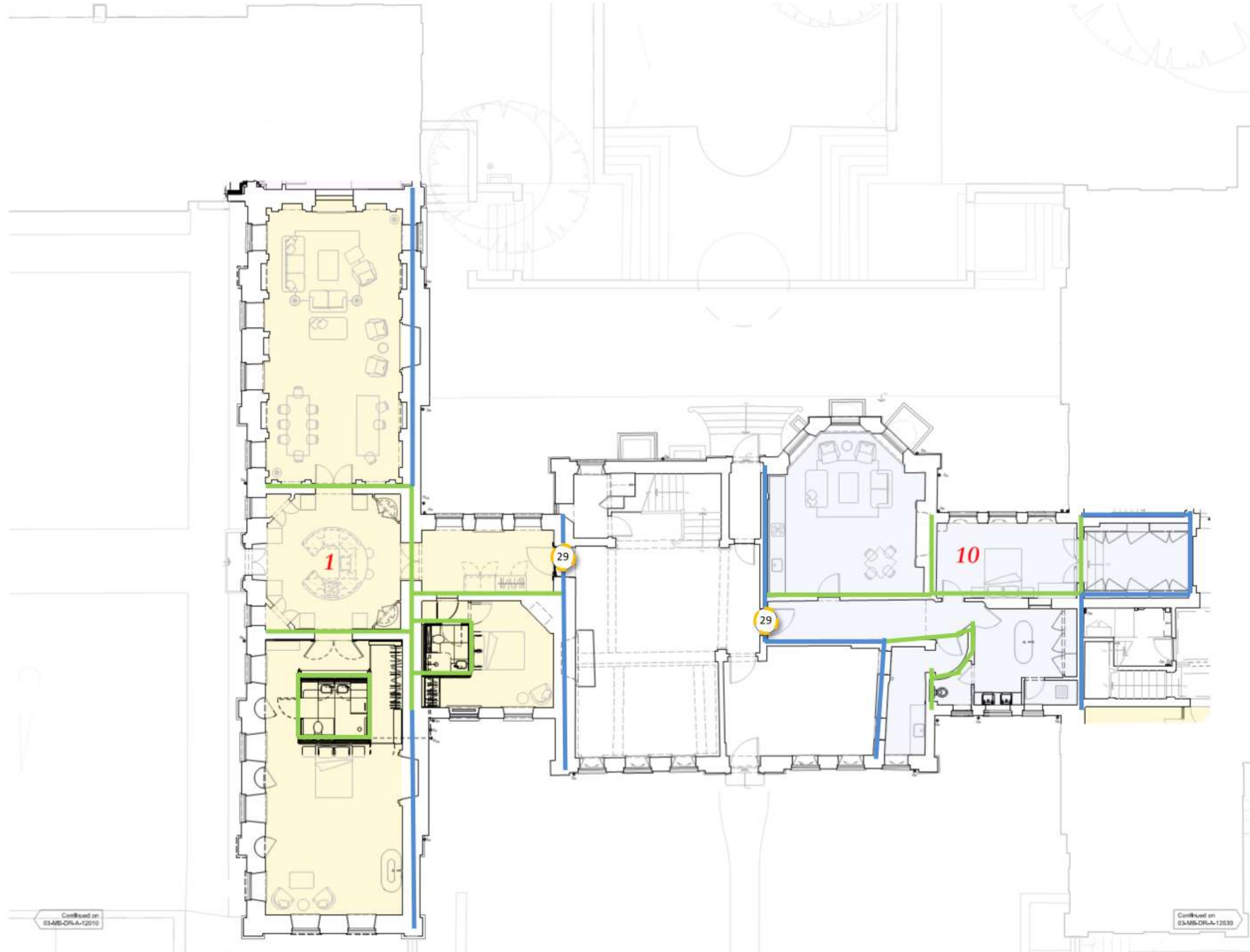


B Main Building, Level 00
12010



C Main Building, Level B1
12010

Continued on
23-MB-DR-A-12020

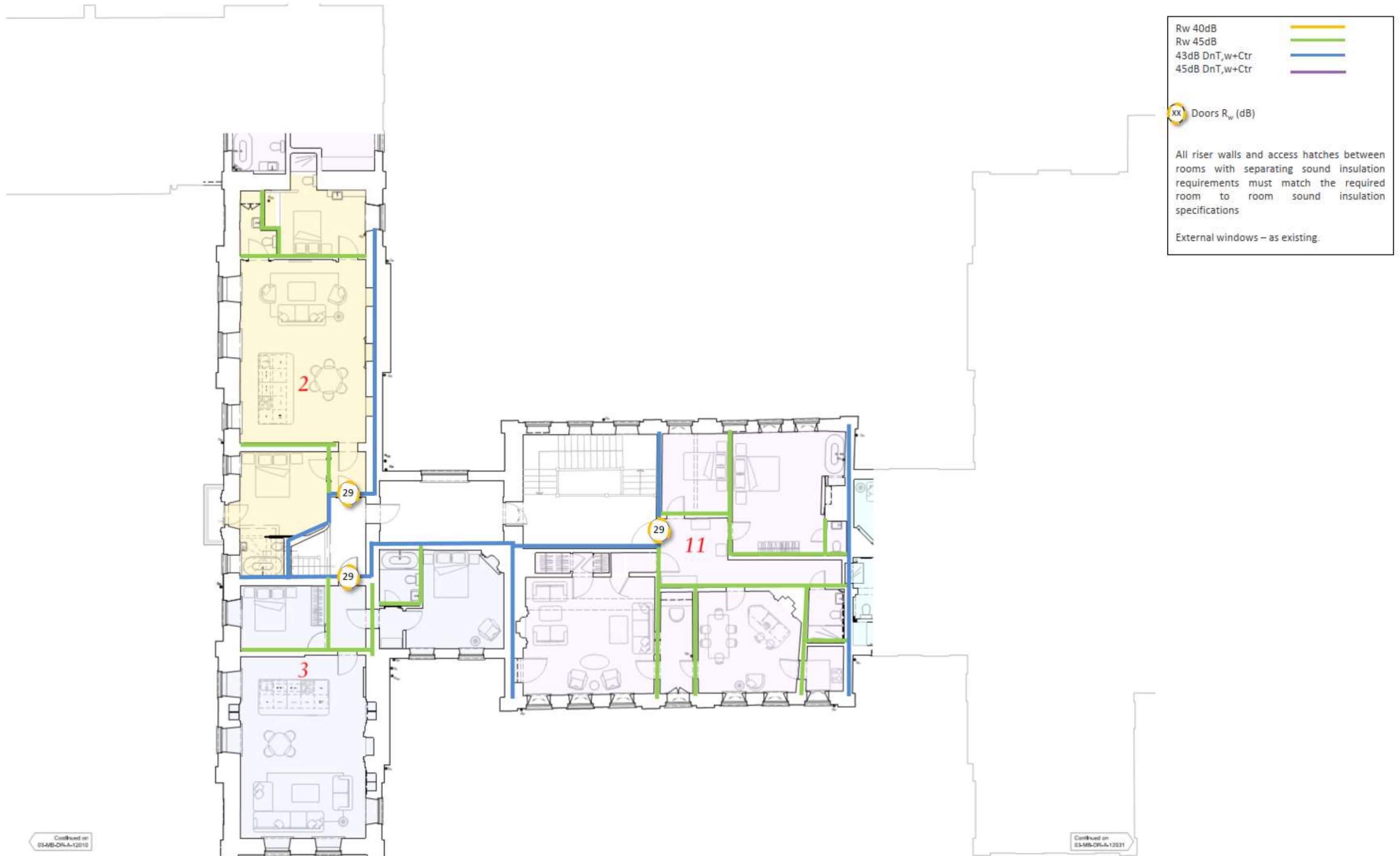


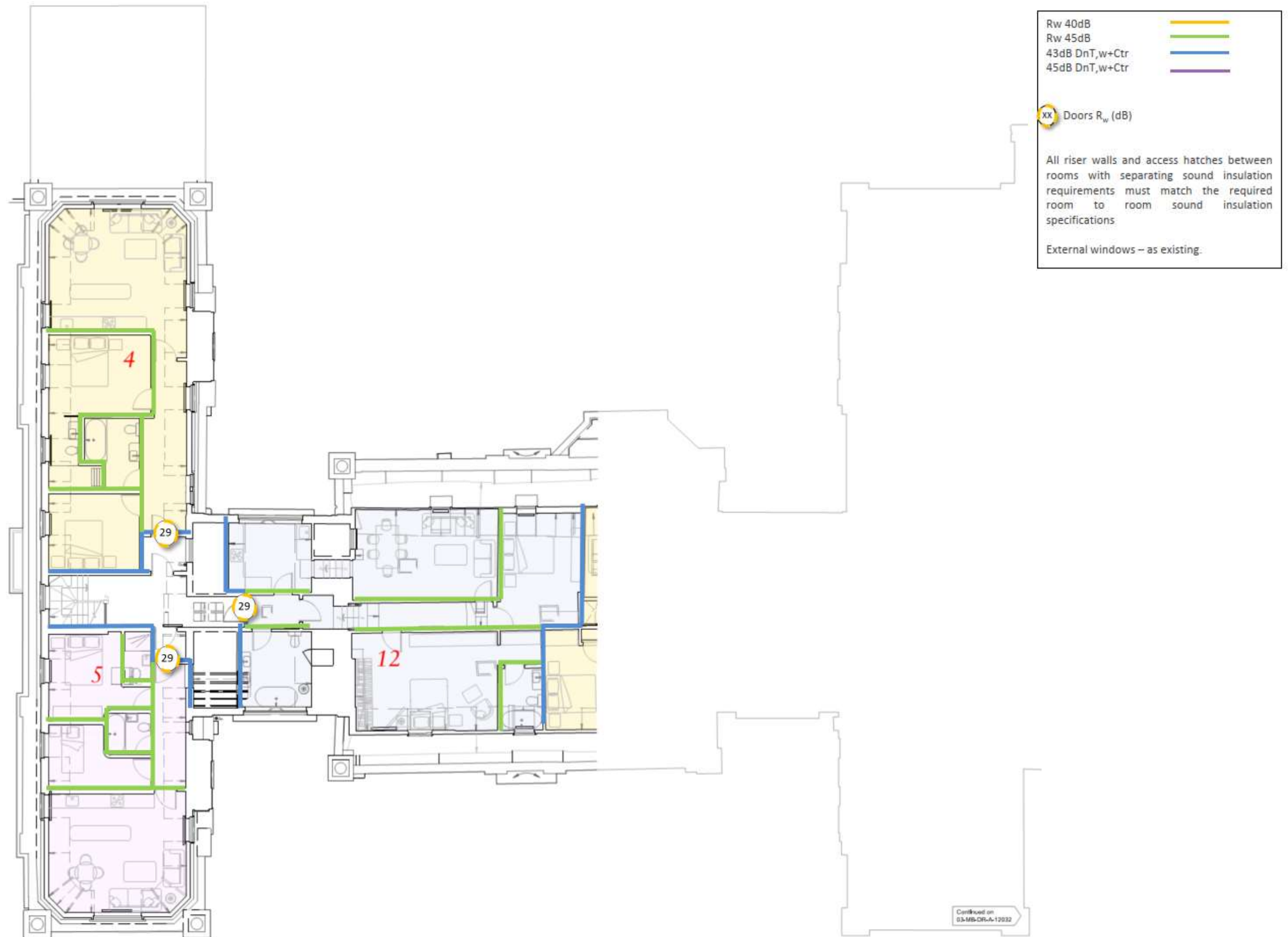
Rw 40dB	—
Rw 45dB	—
43dB DnT,w+Ctr	—
45dB DnT,w+Ctr	—

xx Doors R_w (dB)

All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing.







Rw 40dB	Yellow line
Rw 45dB	Green line
43dB DnT,w+Ctr	Blue line
45dB DnT,w+Ctr	Purple line

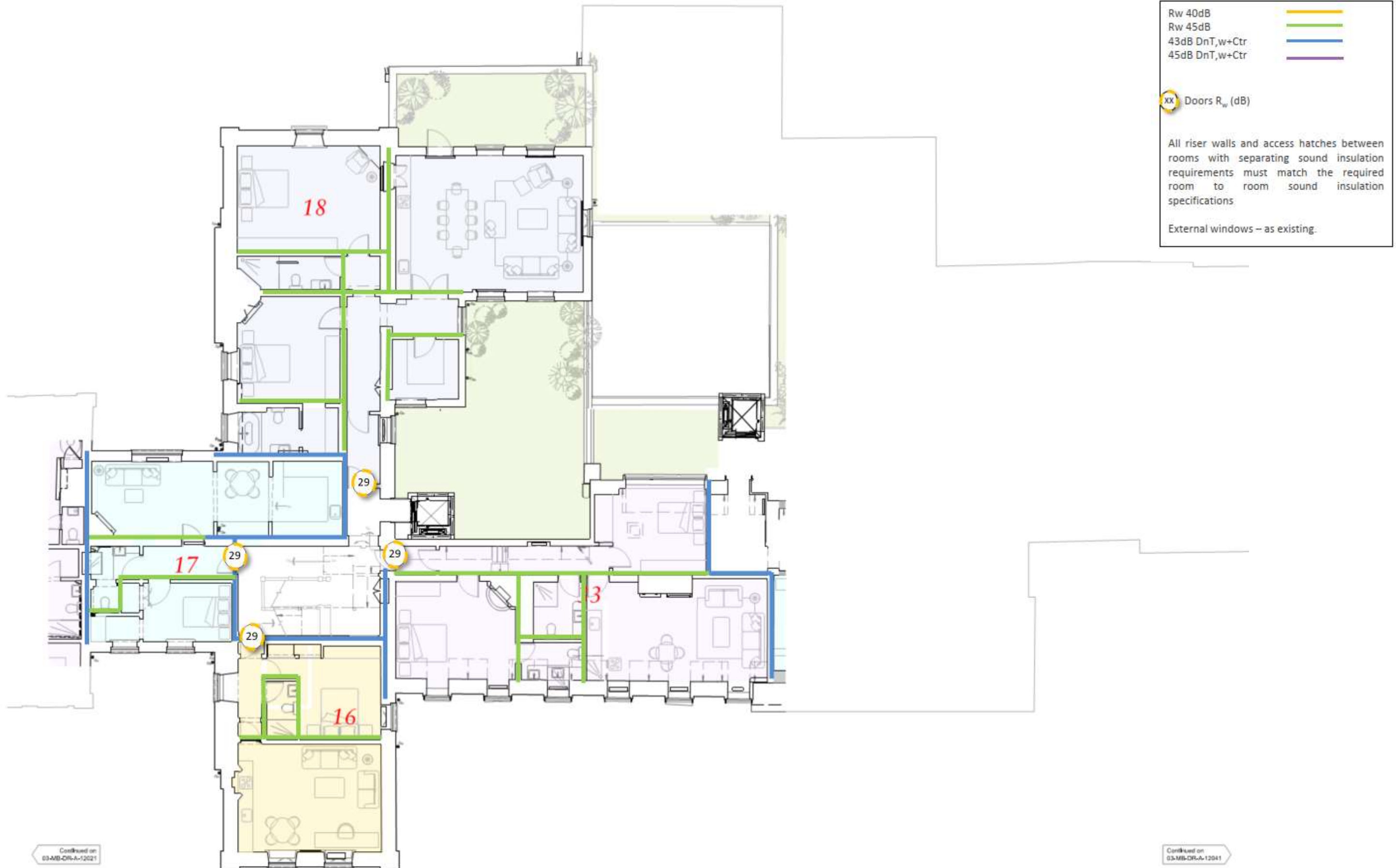
xx Doors R_w (dB)

All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing.

Continued on
03-MB-ORA-12020

Continued on
03-MB-ORA-12040





Rw 40dB
Rw 45dB
43dB DnT,w+Ctr
45dB DnT,w+Ctr

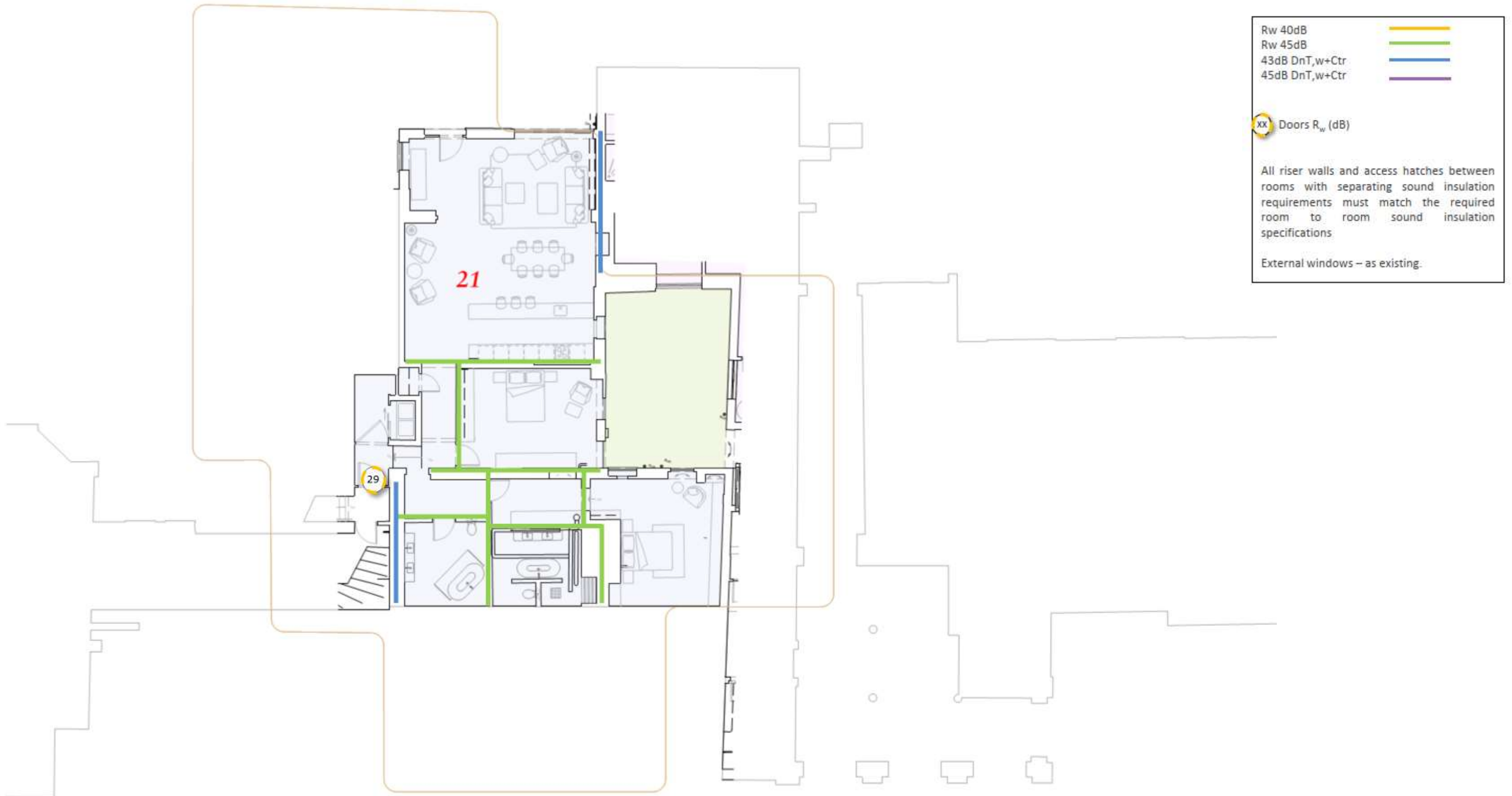
xx Doors R_w (dB)

All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing

Continued on
03-MB-DR-A-12022

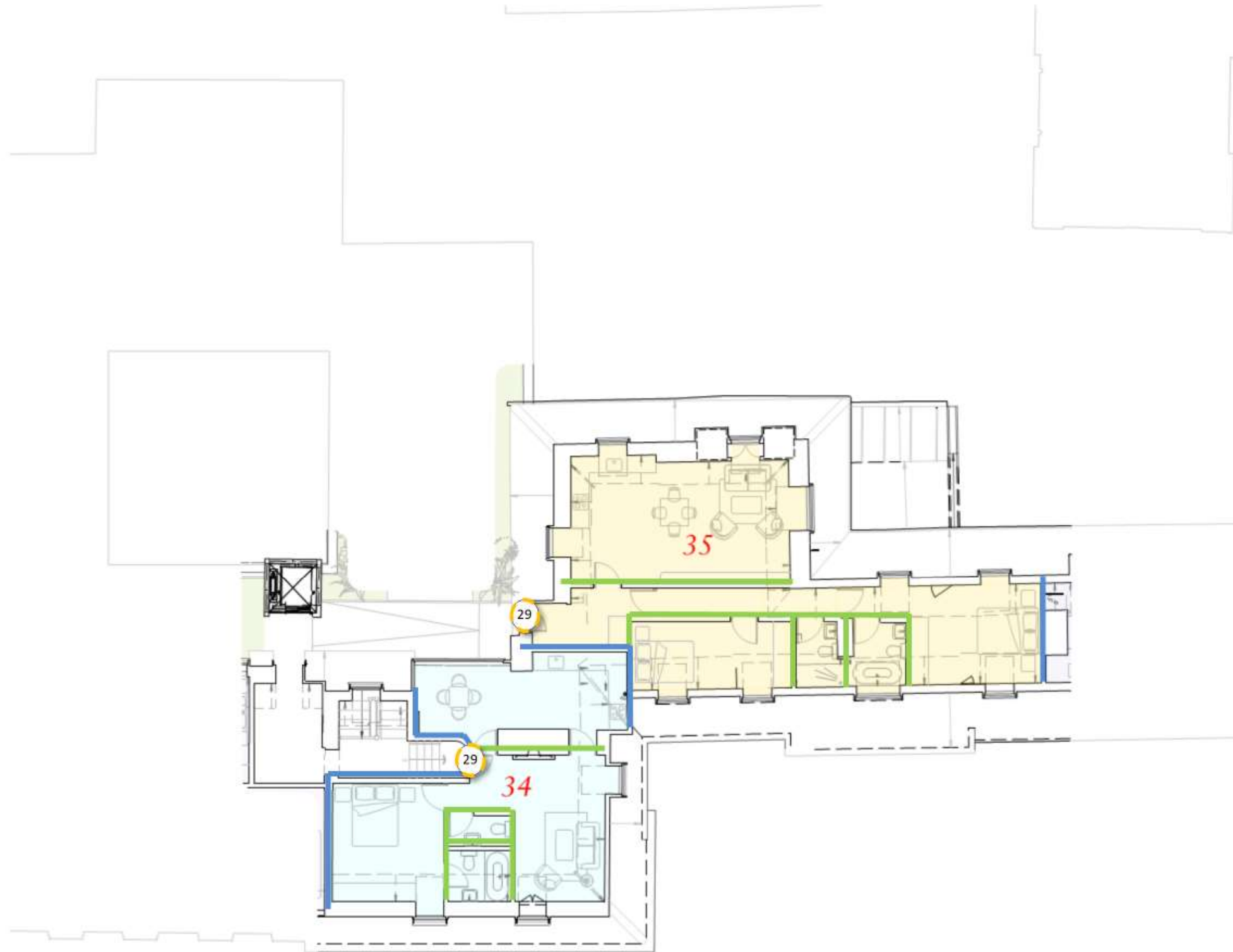
Continued on
03-MB-DR-A-1204X



Continued on
03-MB-DR-A-12023

Continued on
03-MB-DR-A-12042





Rw 40dB	Yellow line
Rw 45dB	Green line
43dB DnT,w+Ctr	Blue line
45dB DnT,w+Ctr	Purple line

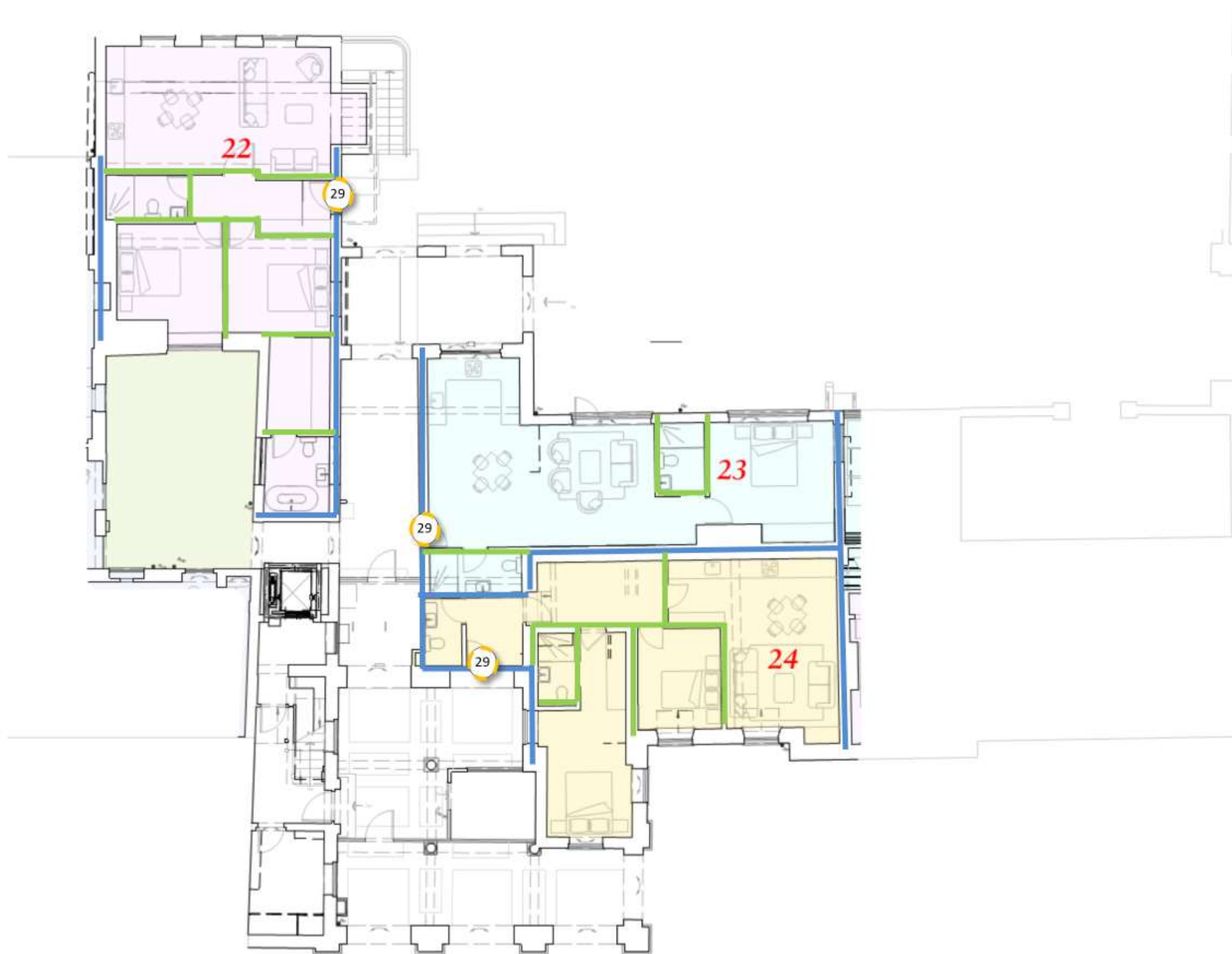
xx Doors R_w (dB)

All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing

Continued on
S3-MB-CR-A-12031

Continued on
S3-MB-CR-A-1205X



Rw 40dB	Yellow line
Rw 45dB	Green line
43dB DnT,w+Ctr	Blue line
45dB DnT,w+Ctr	Purple line

xx Doors R_w (dB)

All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing

Continued on
03-MB-DR-A-12033

Continued on
03-MB-DR-A-12050



A Main Building, Level B1
12050



B Main Building, Level 01
12050



C Main Building, Level B2
12050



D Main Building, Level 00
12050

Rw 40dB
Rw 45dB
43dB DnT,w+Ctr
45dB DnT,w+Ctr

xx Doors R_w (dB)

All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing.

Continued on
03-MB-OR-A-12040

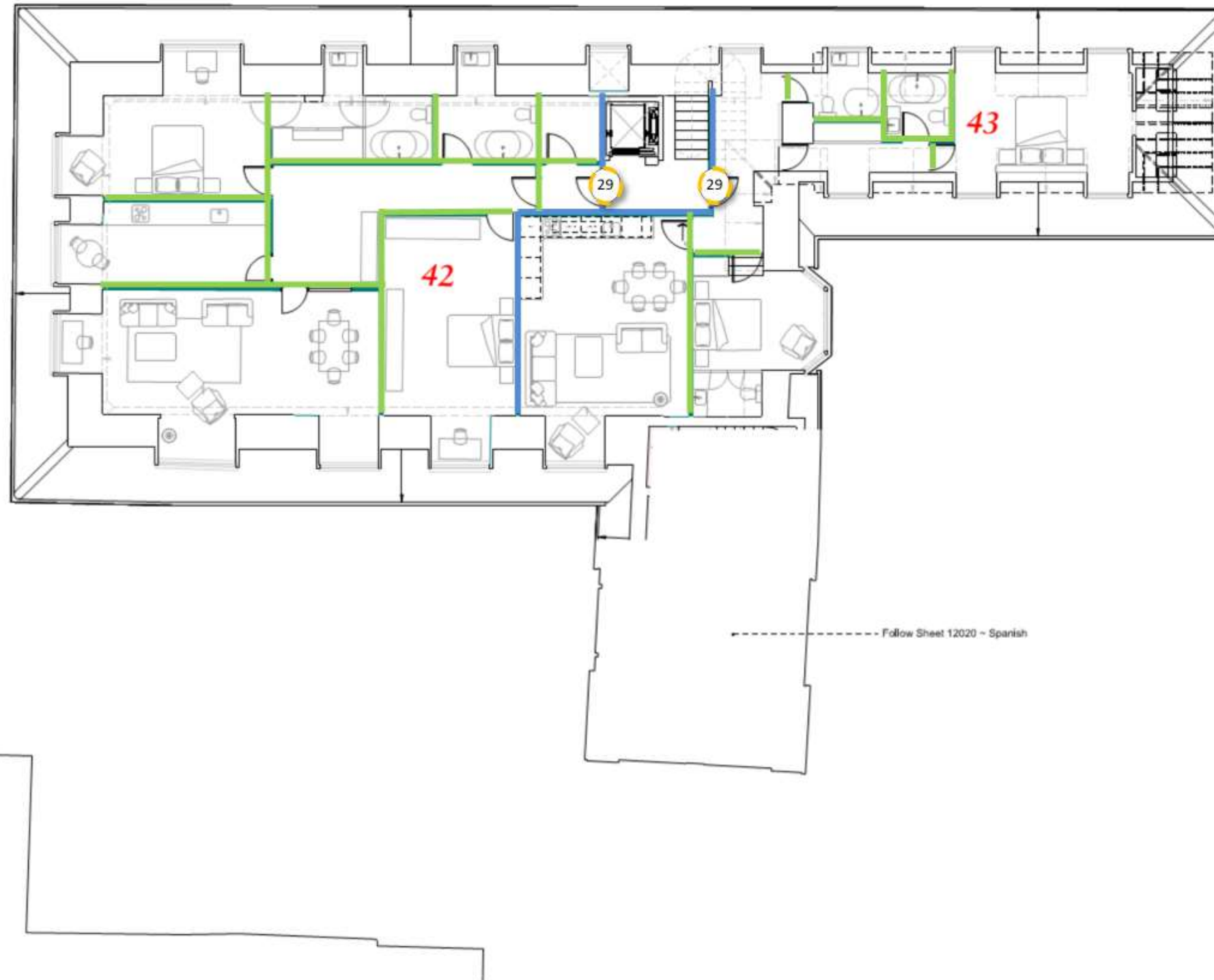


Rw 40dB	Yellow line
Rw 45dB	Green line
43dB DnT,w+Ctr	Blue line
45dB DnT,w+Ctr	Purple line

xx Doors R_w (dB)

All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing.

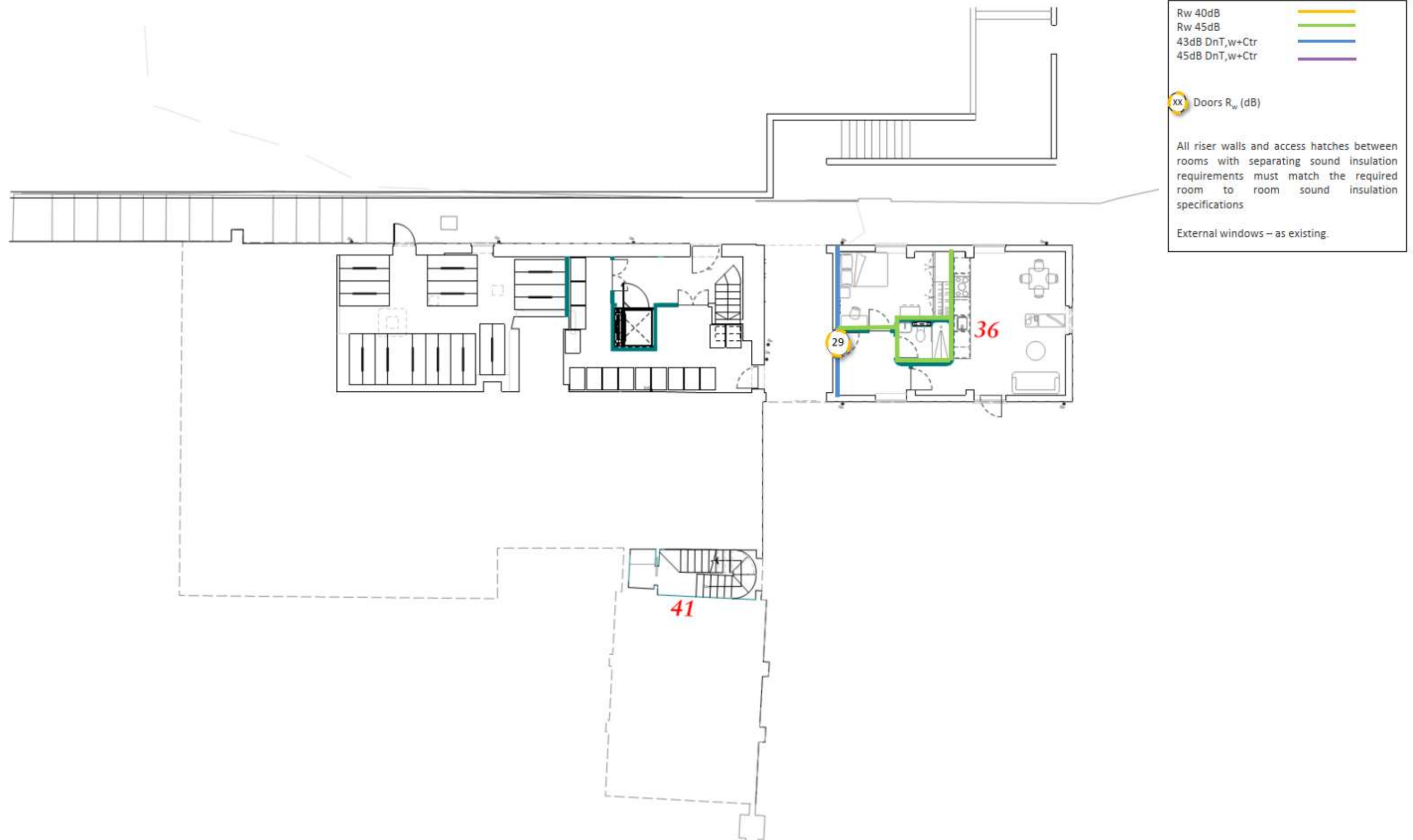


Rw 40dB	—
Rw 45dB	—
43dB DnT,w+Ctr	—
45dB DnT,w+Ctr	—

xx Doors R_w (dB)

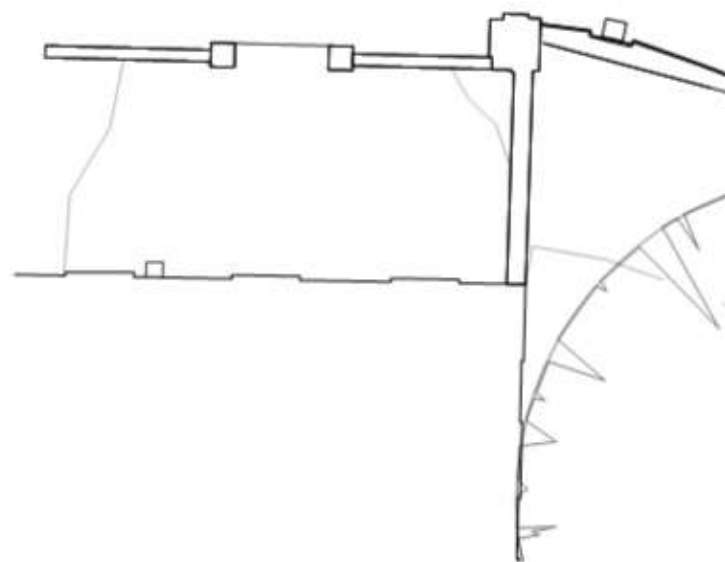
All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing.

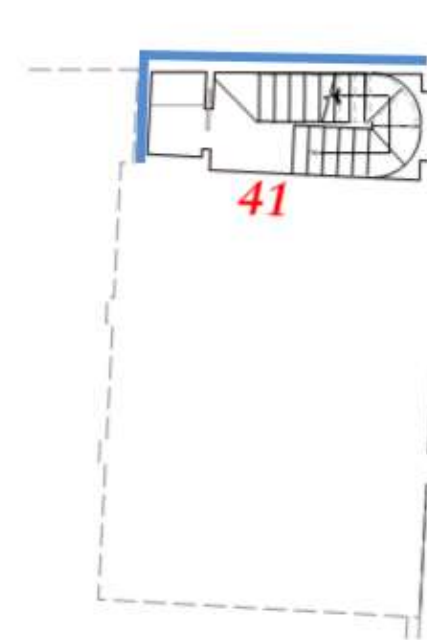




A	Teaching Block, Level B1
02020	



B	Teaching Block, Level 00
02020	



C	Teaching Block, Level B2
02020	

Rw 40dB	—
Rw 45dB	—
43dB DnT,w+Ctr	—
45dB DnT,w+Ctr	—

xx Doors R_w (dB)

All riser walls and access hatches between rooms with separating sound insulation requirements must match the required room to room sound insulation specifications

External windows – as existing.



Main Building Apartments

Apartment No.	Name	Architect's drawing
9	Pavilion	
7	Art Room W	12010
8	Art Room E	
6	Bakersfield	
1	Landwehr	12020
10	Ohing Room	
15	Butler	
27	Assembly Hall	12030
14	Housekeeper	
31	Still Room	
28	Refectory	
29	Kitchen	12040
30	Servant Room	
32	Safe	
25	Workshop	12050
26	Racquets	

Teaching Block Apartments

Apartment No.	Name	Architect's drawing
41	Spanish	12020
42	Maths	12011
43	English	12011



Main Building Apartments

Apartment No.	Name	Sheet
6	Bakerfield	12010
2	Norman and Burt	
3	Vivian Palm	12021
11	Planonville	
17	Alma	
16	Crabbe	12031
18	George	
33	Scudery	
34	Pantry	12041
35	Garage	
26	Racquets	12050



Main Building Apartments

Apartment No.	Name	Sheet
4	Felix	12022
5	Lander	
12	Atto West	12032
13	Atto East	
19	Hedera	
20	Vinaver	





Main Building Apartments

Apartment No.	Name	Sheet
25	Workshop	12050
26	Racquets	

Teaching Block Apartments

Apartment No.	Name	Sheet
36	Latin	12012

APPENDIX E EXAMPLES OF ACOUSTIC TREATMENT

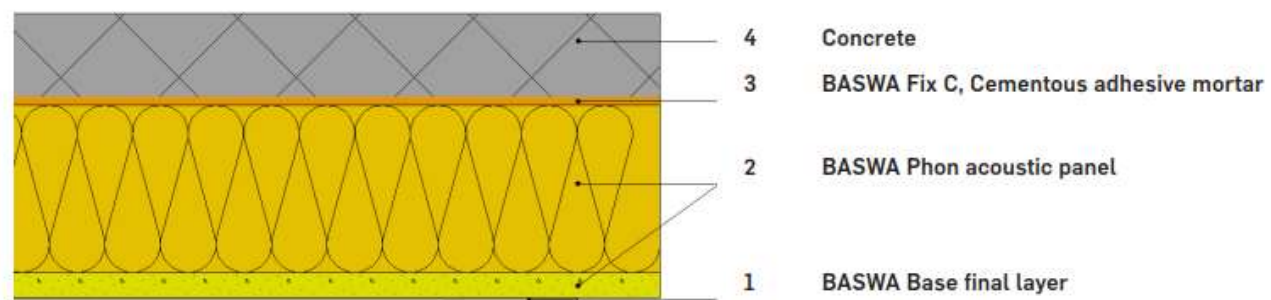
Acoustic Spray

<https://stil-acoustics.co.uk/Seamless-Acoustic/Acospray.html>

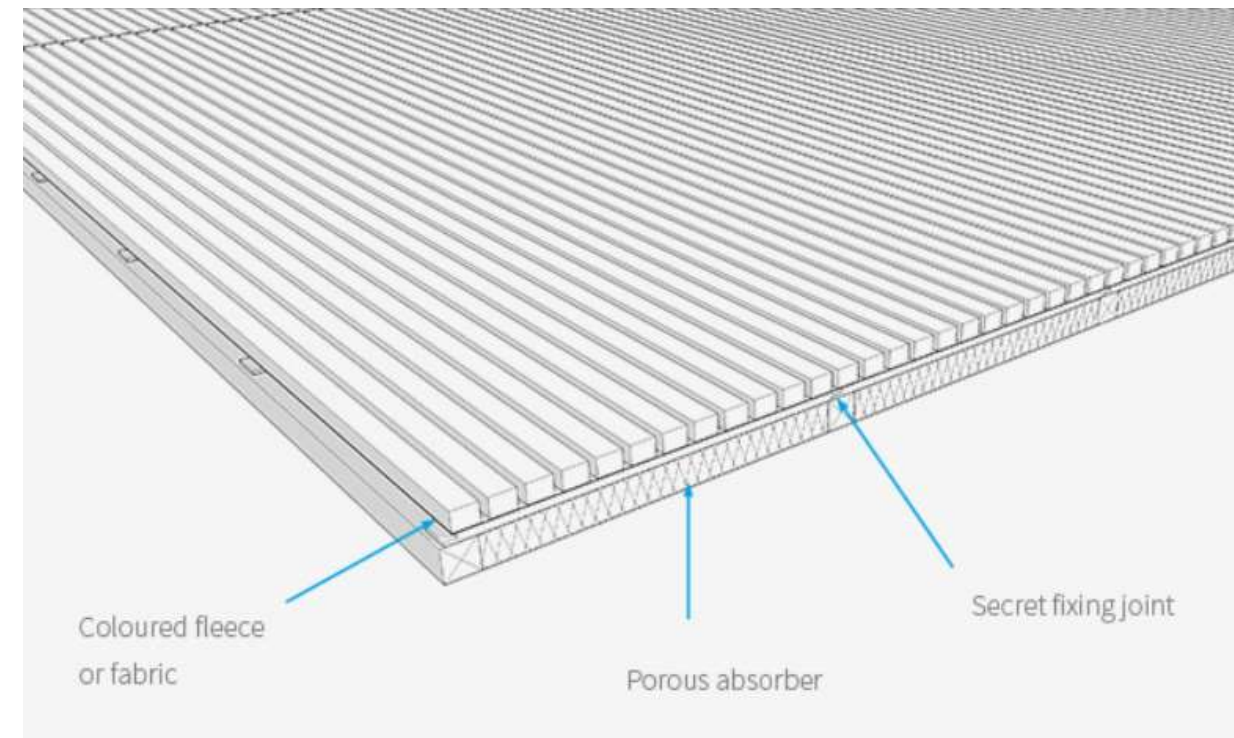


Acoustic Plaster

BASWA Phon BASE 40mm



Perforated or slatted timber panels



Perforated plasterboard

Acoustic panels

<http://www.soundsorba.com/wallsorba.html>

SOUNDSORBA[®]

ACOUSTIC PRODUCTS

Noise control solutions

Tel: 01494 536888 Email: info@soundsorba.com

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Acoustic Info

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Wallsorba
WALLSORBA acoustic panels are used to reduce reverberant noise levels in buildings. WALLSORBA panels transform a stark, echoing area into a warm, quieter, congenial work place.

WALLSORBA panels are pre-decorated and therefore they decorate and solve the acoustics in one operation.

Wallsorba

Acoustic Wall Panels Solutions for Noise and Reverberation

For examples of Wallsorba please visit our case studies of a [School Classroom](#), [Sports Hall](#) and [HMP Prison](#).

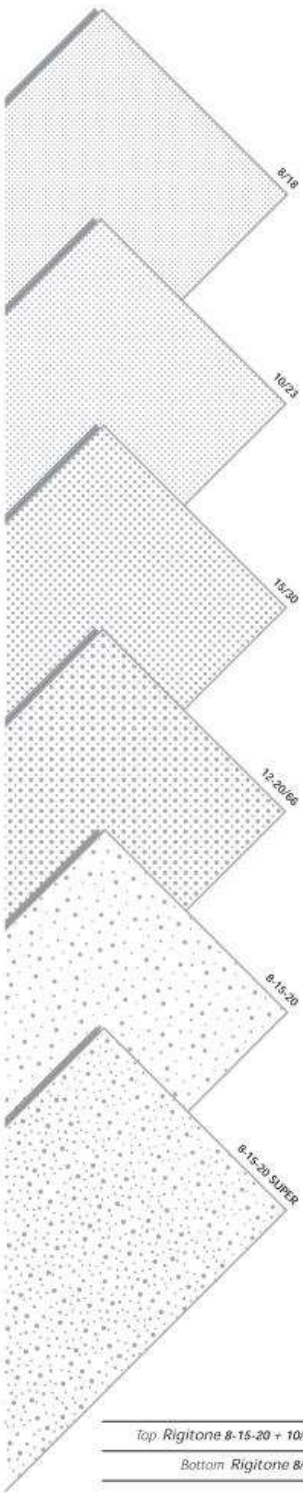
Product Description	Acoustic	Installation	Technical
Wallsorba are high specification acoustic panel systems. These are the most popular aesthetic sound absorbing panels. They are durable, fire rated, visually pleasing and offer excellent acoustic performance.			
They are the decorative solution to your sound control needs. The panels are used extensively to transform areas such as multi-purpose halls, open-plan offices, conference suites, studios and interview rooms into workable environments.			
Wallsorba are high specification acoustic panel systems. These are the most popular aesthetic sound absorbing panels. They are durable, fire rated, visually pleasing and offer excellent acoustic performance.		Panels are finished in high quality acoustic fabrics available in 80 various colours. Three standard panel versions are offered.	

Wallsorba Brochure

(Downloadable Brochure)



(Downloadable Colour Chart)



Board design

Arteco Rigitone boards are available in many diverse designs:

- regular perforations
- regularly staggered perforations
- irregular scattered perforations

Arteco Rigitone boards can be easily cut on site to suit any layout of room.

Surface

Arteco Rigitone boards have an untreated surface which should be primed using Gyproc Drywall Primer, then matt emulsion painted with a paint roller. The paint should not be applied with a spray diffuser as this will impair the acoustic performance.

Sitework

Arteco Rigitone boards are installed in the **CasoLine MF** grid system and are fixed using a high performance jointing system. Where plenum depths are restricted, use **Gyplyner UNIVERSAL** ceiling system.

Curved ceilings

Arteco Rigitone boards can be used in conjunction with the **CasoLine CURVE** system to form curved ceilings with a minimum radius of 5000mm.



APPENDIX F EXAMPLES OF PROJECTS

Linton House, Maple Building



APPENDIX G GLOSSARY OF ACOUSTIC TERMS

DECIBEL (dB) - A unit of sound pressure measurement

Sound Pressure Level in dB (L_p) = $20 \log (\text{Measured sound pressure/Reference sound pressure} = 20 \mu\text{Pa})$

dB(A) - The A -weighted sound pressure level, the weighting network reduces low frequency sound in a similar way to the human ear.

REVERBERATION TIME (RT or T) – decay of sound in rooms

The time taken for a sound, once terminated, to fall through 60dB i.e. to one millionth of its original sound intensity. T_{30} – RT for first 30dB of decay. RT_{500} - Mid frequency RT.

HERTZ (Hz) - a unit of frequency measurement. The normal range of hearing is from 20Hz to about 15kHz.

ABSORPTION COEFFICIENT – degree to which a material absorbs sound.

The ratio of absorbed to incident sound energy (perfect absorber = 1)

SOUND REDUCTION INDEX R – quantity which describes a material’s ability to reduce the sound pressure level across it (e.g. a wall or floor)

$$R = L_1 - L_2 + 10 \log (S/A)$$

L_1 - Average sound pressure level in source room (averaged from 100 Hz – 3150 Hz)

L_2 - Average sound pressure level in receiving room (averaged from 100 Hz – 3150 Hz)

S – Wall Area (m^2)

A – Total absorption in receiving room (m^2 units)

R_w – weighted sound reduction index

AVERAGE ROOM TO ROOM LEVEL DIFFERENCE – D , dB = $L_1 - L_2$, averaged 1/3 octave bands from 100Hz – 3150kHz.

D_w – weighted value of D (usually 2 - 3dB higher)

$D_{nT, w}$ – D_w corrected for reverberation time of receiving room

NOISE RATING CURVES (NR CURVES) – set of curves used to describe optimum background noise levels for different tasks.

$L_{10/90}$ LEVEL (dB) - The level in dB of a time varying sound pressured level (e.g. traffic) exceeded for 10%/90% of the time of measurement.

L_{90} is usually called the BACKGROUND NOISE LEVEL.

L_{eq} AVERAGE SOUND PRESSURE LEVEL – level dB of a time varying sound pressure level with equal amounts of energy above and below it, for the time of measurement.

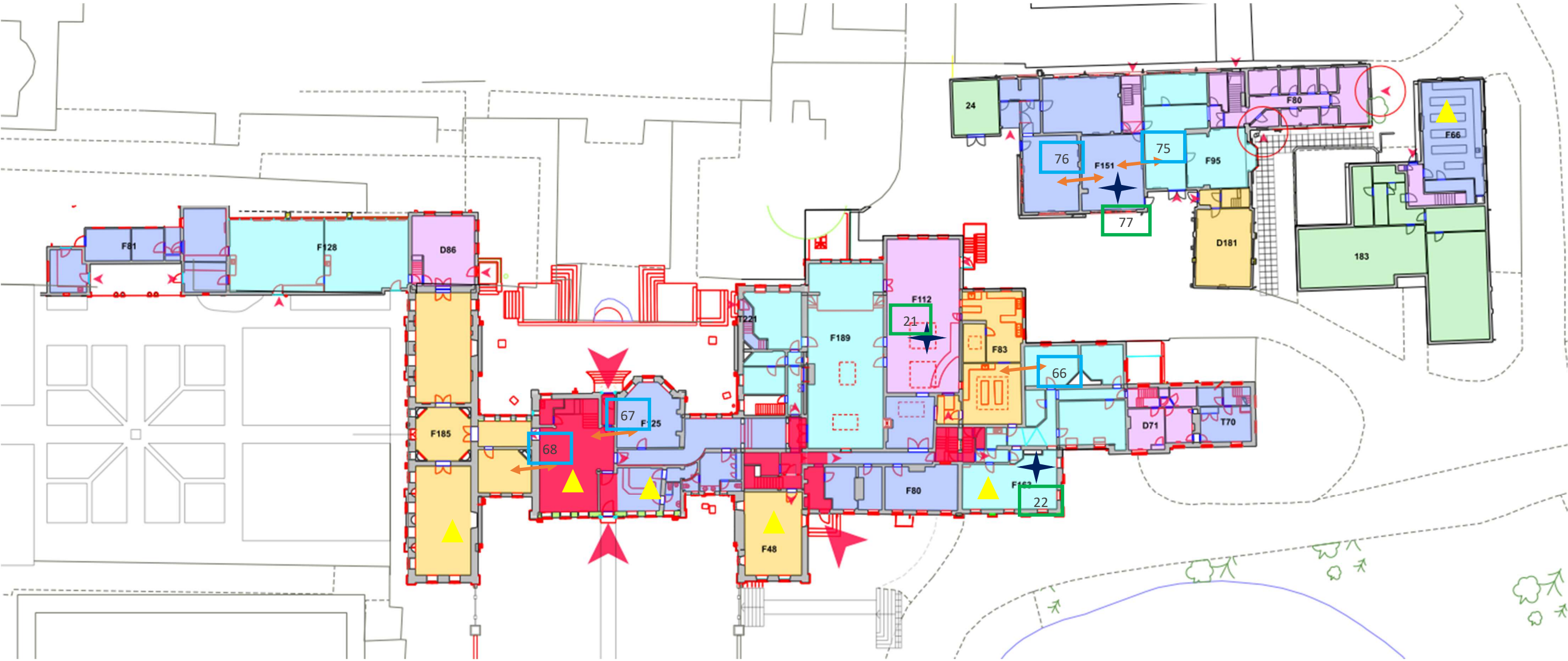
TONAL NOISE – noise of a single frequency (or a narrow band of frequencies that can be perceived as a tone), audible above the broad band noise background. Noise which is at least 5dB above the average of the 1/3 octave band sound pressure levels immediately on either side of it.

APPENDIX H SITE PLAN TEST MARKUP

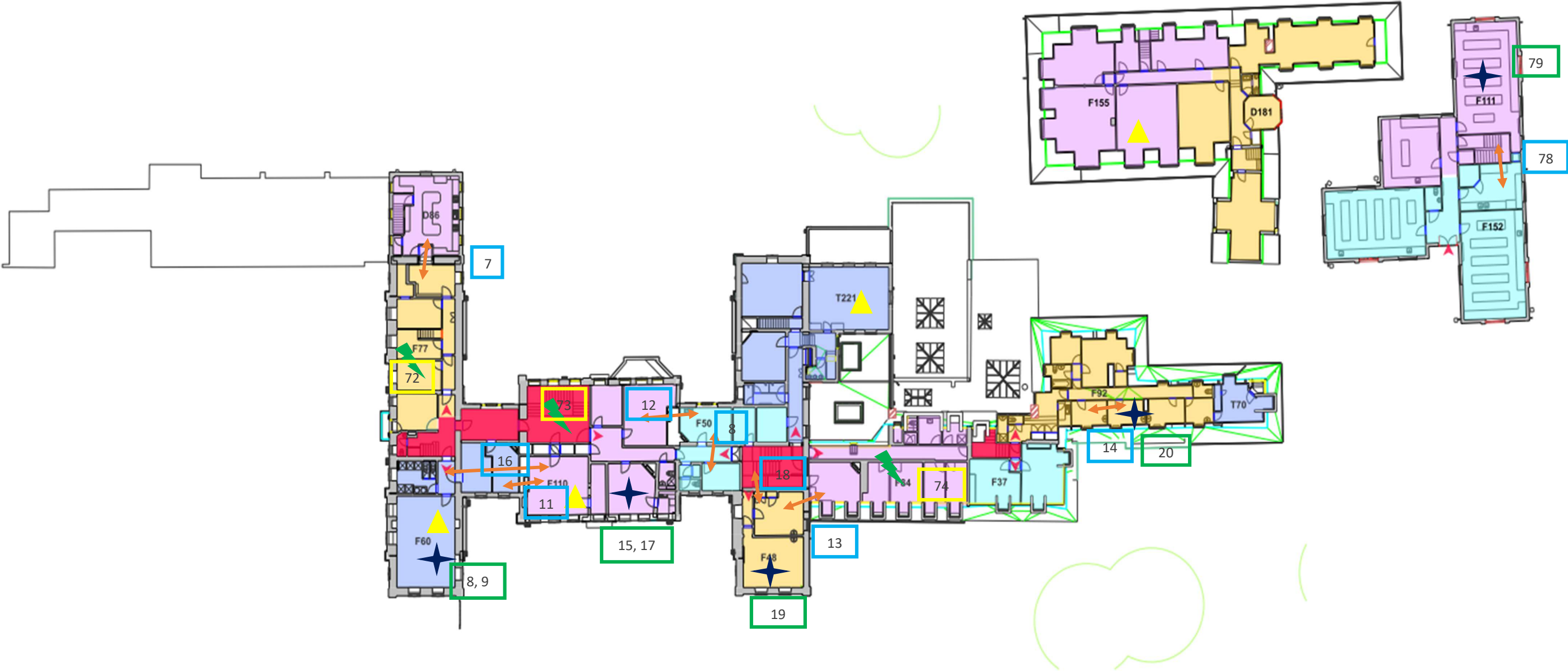
KEY

-  - Airborne noise source location
-  - Airborne wall partition test
-  - Receiver location
-  - Impact noise source location
-  - Airborne wall partition test number
-  - Airborne floor partition test number
-  - Impact floor partition test number

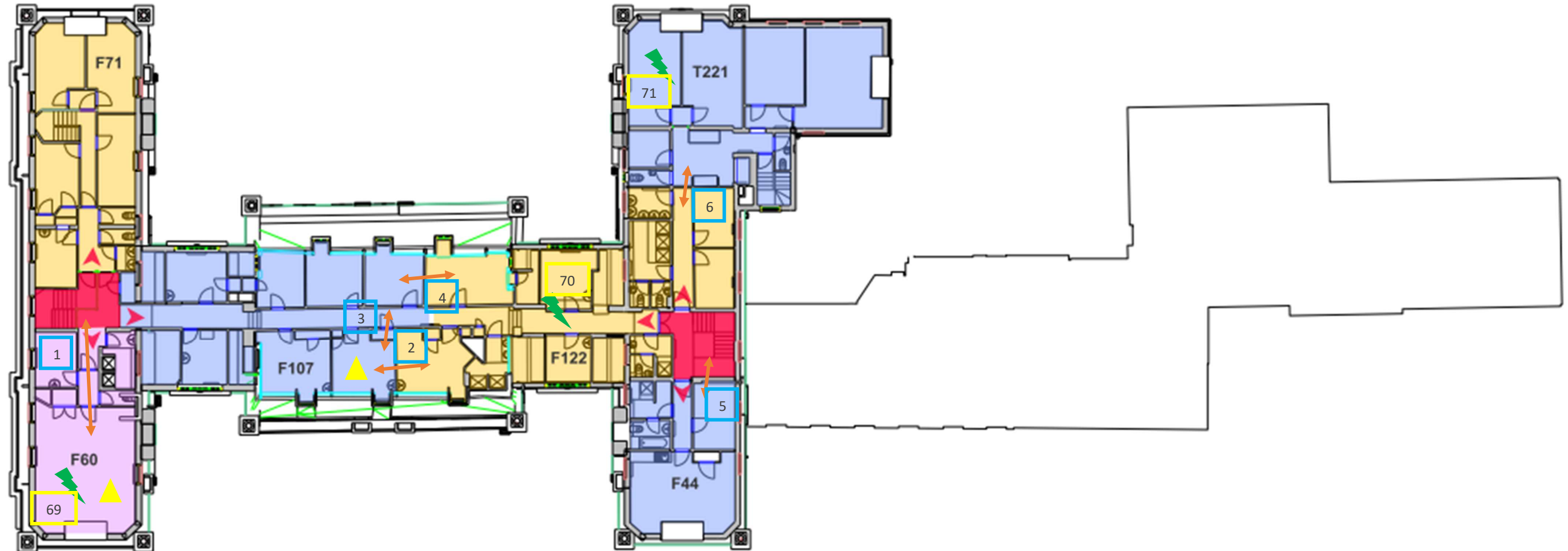
GROUND FLOOR



FIRST FLOOR



SECOND FLOOR



BASEMENT

