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www.mlm.uk.com

Multidisciplinary Consulting

MLM Acoustics
Eldon House, 2 Eldon Street, London, EC2M 7LS

TEL: 0207 422 7800
FAX: 0207 426 2095

Levitt Bernstein

Eastfields Estate, Merton

Sound Insulation Test Report

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Prepared: Adrien Vinay
Acoustic Technician

Checked: Theo I. Niaounakis BSC MSC MIOA
Technical Director

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1 INTRODUCTION

MLM Acoustics by full appointment have undertaken sound insulation test for Building Regulations compliance purposes on behalf of Levitt Bernstein, 1 Kingsland Passage, London E8 2BB.

The existing development for which this report has been prepared is known as Eastfields Estate and is located at Merton, London, CR4.

It is understood that sound insulation testing is required for a representative sample of Flats and houses in the existing Eastfield Estate, Merton to establish their current sound insulation performance and compare this against the requirements of Approved Document E.

2 BASIS OF ASSESSMENT

The Building Regulations Approved Document E provides minimum design and in-situ performance standard requirements for various forms of residential accommodation. A summary of the in-situ performance standards forming the basis of assessment for the tests undertaken are provided in Appendix 1 attached.

For ease of reference acoustic terminology used in this report is provided in Appendix 2 attached.

Eastfields Eastate comprises 464 residential units in total. The demises in which sound insulation tests were conducted at the Eastfields Estate development site comprised 3-storey houses (3-bedrooms) and flats (one and two-bedrooms).

3 CONSTRUCTION FORMS TESTED

Separating walls

The constructional details of the separating wall constructions tested are not available but it is thought to be of masonry/concrete construction.

Separating floors
The constructional details of the separating floor constructions tested are not available but it is thought to be of concrete construction with a plastered finish below. No suspended ceiling was observed in separating floor constructions.

4 TEST METHODOLOGY

The airborne tests detailed in this report have been carried out in full accordance with the measurement procedures of BS EN ISO 140-4:1998[1] for field measurements of airborne sound insulation.

The impact tests detailed in this report have been carried out in full accordance with the measurement procedures of BS EN ISO 140-7:1998[4] for field measurements of impact sound pressure level.

[1] BS EN ISO 140-4:1998 "*Acoustics – Measurement of sound insulation in buildings and of building elements – Part 4: Field measurements of airborne sound insulation between rooms*"

All tests have been carried out in accordance with the MLM Acoustics Field Test Methodology. A copy of this methodology is provided in Appendix 3 attached.

All the procedures in Annex B of the Approved Document E[1,2] to the Building Regulations have been followed except for the details provided in Appendix 4 attached.

Table 1 below provides a summary of procedural settings for the sound insulation testing undertaken using the manual sweep measurement position approach implemented on site for both airborne and impact test types.

Table 1: Measurement Procedure Settings				
Procedural Description	**Number of Source Room Positions**	**Number of Receiver Room Positions**	**Number of Loudspeaker Positions**	**Averaging Time For Level Measurements**
Airborne	1+1 (Sweep)	1+1 (Sweep)	2	30s
Impact	N/A	1+1+1+1	N/A	30s
Procedural Description	**Number of Reverberation Time Positions**	**Number of Decays At Each Reverberation Time Position**	**Number of Background Measurement Positions**	**Number of Tapping Machine Positions**
Airborne	3+3	1	2	N/A
Impact	3+3	1	3	4

A pink noise source was used for all level measurements and as the interrupted source for all the reverberation time measurements.

Appendix 3 provides a summary of the test methodology undertaken on site.

5 TEST INSTRUMENTATION

The main details of instrumentation and equipment used during the sound insulation tests are given in Table 2 below.

All noise measurements were undertaken by a consultant certified as competent in sound insulation testing. All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 61672[2].

The noise measurement equipment used during the testing was calibrated at the start and end of each measurement. The calibrator used had itself been calibrated by a UKAS accredited calibration laboratory within the twelve months preceding the measurements. No significant drift in calibration was found to have occurred. A full inventory of this equipment is shown in Table 3 below.

TABLE 2: INVENTORY OF MEASUREMENT EQUIPMENT		
Item	**Make & Model**	**Serial Number**
Sound Level Meter	Rion NA-28	00370297
Pre-amplifier	Rion NH-23	60306
Microphone	Rion UC-59	00386
Calibrator	NC-74	34315165
Tapping Machine	ANV TM-02	TM02015
Loudspeaker	Mackie SRM350	203383801AKCY0105

[2] British Standard 61672: 2003: *Electroacoustics. Sound level meters.* Part 1 *Specifications.* BSI.

6 TEST RESULTS

The sound insulation tests were performed on 21, 23 and 31 October 2014 between separating wall and floor constructions, in flats and between separating wall constructions, in houses as house are only separated by walls.
The measured sound insulation and impact sound values have been rated in accordance with both BS EN ISO 717-1:1997, Amendment No.1, 2006[5] (airborne) and BS EN ISO 717-2:1997, Amendment No.1, 2006[6] (impact) for single number quantification.

Table 4 below provides the results of the field sound insulation tests undertaken. The measured levels have been compared to the requirements of Approved Document E of the Building Regulations 2000 to determine the 'Pass' or 'Fail' categorisation as required.

TABLE 4: AIRBORNE SOUND INSULATION MEASUREMENT RESULTS

Test	Source Room		Receiver Room		$D_{nT,w} + C_{tr}$ (dB)	Approved Document E Minimum Requirement (dB)	Comment
	Description	Volume (m^3)	Description	Volume (m^3)			
1 Wall	House 41 Potter Close (Living Room)	32	House 42 Potter Close (Living Room)	47	50	>45	Pass
2 Wall	House 2 Moore Close (Kitchen/Dining)	34	House 3 Moore Close (Kitchen/Dining)	34	48	>45	Pass
3 Wall	Flat 14 Thrupp Close (Living Room)	49.2	Flat 15 Thrupp Close (Living Room)	49.2	48	>45	Pass
4 Wall	Flat 17 Thrupp Close (Bedroom)	29	Flat 16 Thrupp Close (Bedroom)	29	46	>45	Pass
5 Floor	Flat 16 Thrupp Close (Living Room)	49.2	Flat 14 Thrupp Close (Living Room)	49.2	48	>45	Pass
6 Floor	Flat 17 Thrupp Close (Bedroom)	29	Flat 15 Thrupp Close (Bedroom)	29	48	>45	Pass

TABLE 5: IMPACT SOUND TRANSMISSION MEASUREMENT RESULTS - FLOORS

Test	Source Room		Receiver Room		$L'_{nT,w}$ (dB)	Approved Document E Minimum Requirement (dB)	Comment
	Description	Volume (m^3)	Description	Volume (m^3)			
7 Floor	Flat 16 Thrupp Close (Living Room)	49.2	Flat 14 Thrupp Close (Living Room)	49.2	54	<62	Pass
8 Floor	Flat 17 Thrupp Close (WC)	9	Flat 15 Thrupp Close (WC)	9	68	<62	Failed

7 OBSERVATIONS AND COMMENTS

With the exception of the unoccupied flat 16 Thrupp Close, all the tested rooms were furnished. Our observations are as follows:

The impact sound insulation test between the bathrooms was performed on the marble floor finish of the bathroom above.

The impact sound insulation test between the living room of Flat 16 and the living room of Flat 14 at Thrupp Close was performed on lino-on concrete floor finish of the room above. Therefore, the obtained result does not represent the impact sound insulation of the concrete floor which is expected to exhibit a significantly lower impact sound insulation performance when tested without the lino floor finish.

The impact sound insulation test between the bathrooms of Flat 17 and Flat 15 at Thrupp Close do not comply with the minimum Approved Document E volume requirements due to their small size but they were the only non-carpeted rooms between these flats for an impact sound insulation testing. These results should be treated as indicative and do not represent the actual impact sound insulation of the floor.

Background noise levels were moderately low and generally due to outside environmental noises and indoor elements such as clock, boiler, fridge.

8 SUMMARY AND CONCLUSIONS

MLM Acoustics by full appointment have undertaken sound insulation tests for Building Regulations compliance purposes on behalf of Levitt Bernstein.

The existing development for which this report has been prepared is known as Eastfields Estate and is located at Merton, London, CR4.

The sound insulation tests were performed on 21, 23 and 31 October 2014 between separating wall and floor constructions, in flats and between separating wall constructions, in houses as house are only separated by walls.

The test results obtained for separating wall constructions between the sample of houses tested, meet the minimum requirements (new-build) of Approved Document E for airborne sound insulation by a margin of 3-5 dB.

The test results obtained for separating wall constructions between the sample of flats tested, meet the minimum requirements (new-build) of Approved Document E for airborne sound insulation by a margin of 2-3 dB.

The test results obtained for separating floor constructions between the sample of flats tested, meet the minimum requirements (new-build) of Approved Document E for airborne sound insulation by a margin of 3 dB.

The impact sound insulation test between the living room of Flat 16 and the living room of Flat 14 at Thrupp Close was performed on lino-on concrete floor finish of the room above. Therefore, the obtained result does not represent the impact sound insulation of the concrete floor which is expected to exhibit a significantly lower impact sound insulation performance when tested without the lino floor finish.

The impact sound insulation test between the bathrooms of Flat 17 and Flat 15 at Thrupp Close do not comply with the minimum Approved Document E volume requirements due to their small size but they were the only non-carpeted rooms between these flats for an impact sound insulation testing. These results should be treated as indicative and may not represent the actual impact sound insulation of the floor.

10.0 REFERENCES

1 Approved Document E : 2003 Edition 'Resistance to the passage of sound', Office of the Deputy Prime Minister, TSO, 2003

2 Amendments 2004 to Approved Document E 'Resistance to the passage of sound', Office of the Deputy Prime Minister, TSO, 2004

3 BS EN ISO 140 'Acoustics – Measurement of sound insulation of buildings and of building elements', Part 4 'Field measurements of airborne sound insulation between rooms', British Standards Institution, 1998

4 BS EN ISO 140 'Acoustics – Measurement of sound insulation of buildings and of building elements', Part 7 'Field measurements of impact sound insulation of floors', British Standards Institution, 1998

(5/6) (BS EN ISO 717 'Acoustics – Rating of sound insulation in buildings and of building elements', Part 1 'Airborne sound insulation', British Standards Institution, 1997, including Amendment No.1, 2006

BS EN ISO 717 'Acoustics – Rating of sound insulation in buildings and of building elements', Part 2 'Impact sound insulation', British Standards Institution, 1997, including Amendment No.1, 2006)

(6) BS EN ISO 717 'Acoustics – Rating of sound insulation in buildings and of building elements', Part 2 'Impact sound insulation', British Standards Institution, 1997, including Amendment No.1, 2006

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TEST RESULTS

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: Date of test: 21/10/2014

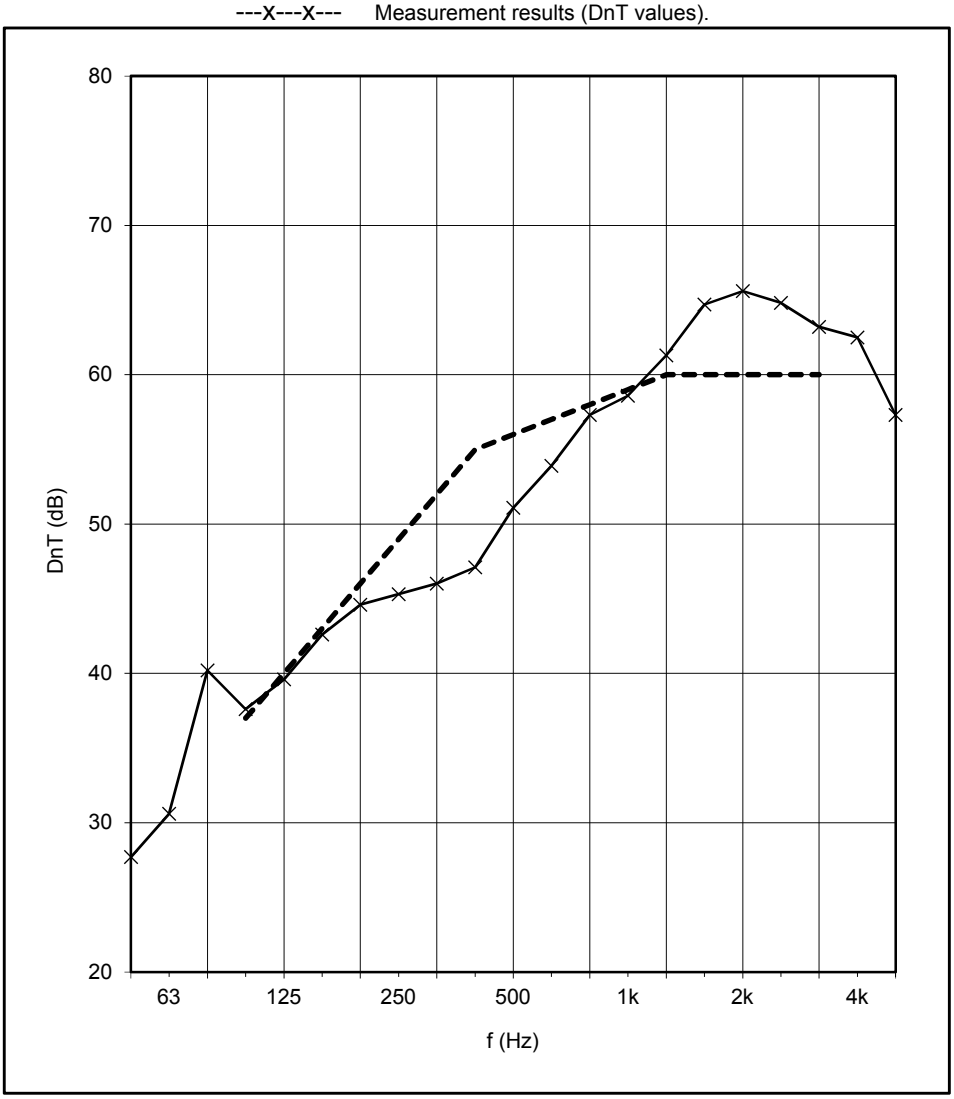
Project: 100624-Eastfield Estate

Airborne sound insulation test results of the partition wall between living rooms 1st floor of houses 41 and 42 Potter Close
All rooms were furnished

Source room volume (m^3): 32
Receiving room volume (m^3): 47

- - - - - - - Shifted reference curve.
---x---x--- Measurement results (DnT values).

Frequency f Hz	DnT (1/3 octave) dB
50	27.7
63	30.6
80	40.2
100	37.6
125	39.6
160	42.6
200	44.6
250	45.3
315	46.0
400	47.1
500	51.1
630	53.9
800	57.3
1000	58.6
1250	61.3
1600	64.7
2000	65.6
2500	64.8
3150	63.2
4000	62.5
5000	57.3



Rating according to ISO 717-1

DnT,w (C; Ctr) = 56 (-2; -6) dB

No background noise influence on DnT,w
No background noise influence on C and Ctr

Evaluation based on field measurement
results obtained by an engineering method

No. of test report: Name of test institute:

Date: Signature:

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: Date of test: 31/10/2014

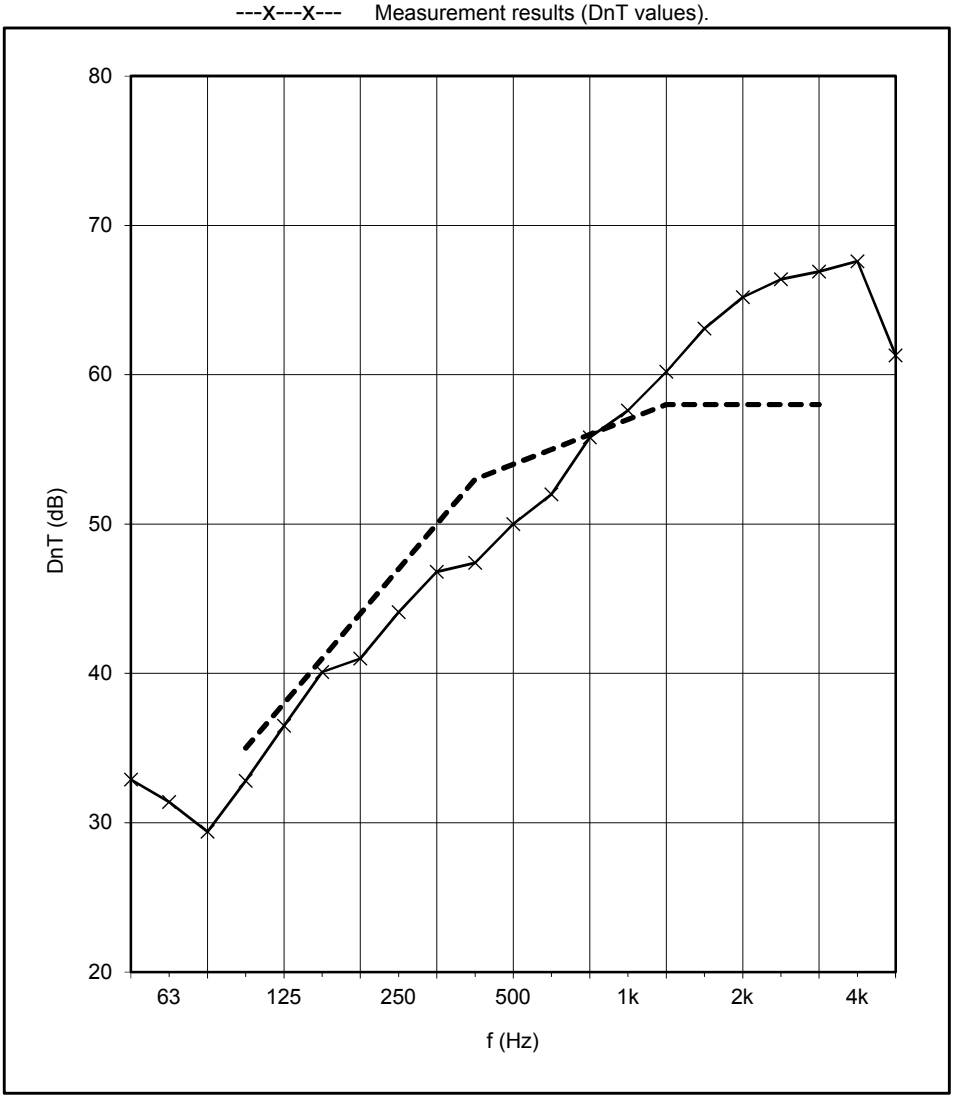
Project: 100624-Eastfields Estate

Airborne sound insulation test results of the partition wall between kitchens ground floor of houses 2 and 3 Moore Close
All rooms were furnished

Source room volume (m^3): 34
Receiving room volume (m^3): 34

- - - - - - - Shifted reference curve.
---x---x--- Measurement results (DnT values).

Frequency f Hz	DnT (1/3 octave) dB
50	32.9
63	31.4
80	29.4
100	32.8
125	36.5
160	40.1
200	41.0
250	44.1
315	46.8
400	47.4
500	50.0
630	52.0
800	55.8
1000	57.6
1250	60.2
1600	63.1
2000	65.2
2500	66.4
3150	66.9
4000	>= 67.6
5000	61.3



Rating according to ISO 717-1

DnT,w (C; Ctr) = 54 (-1; -6) dB

No background noise influence on DnT,w
No background noise influence on C and Ctr

Evaluation based on field measurement
results obtained by an engineering method

No. of test report: Name of test institute:

Date: Signature:

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

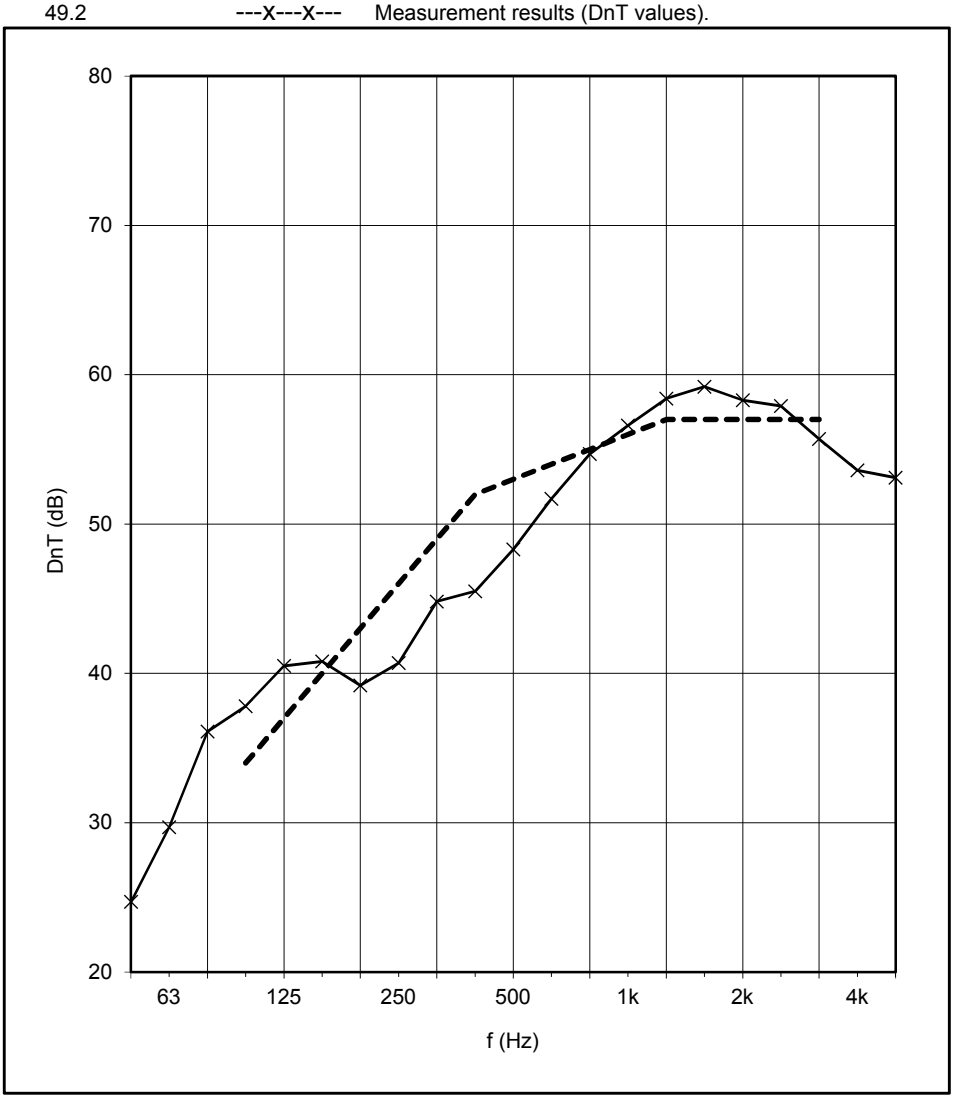
Client: Date of test: 23/10/2014

Project: 100624 Eastfields Estate

Airborne sound insulation test results of the wall between Living Room of Flat 14 Thrupp Close (2nd Floor, furnished) and Living Room of flat 15 Thrupp Close (1st Floor, furnished)

Source room volume (m^3): 49.2 - - - - - - - Shifted reference curve.
Receiving room volume (m^3): 49.2 ---x---x--- Measurement results (DnT values).

Frequency f Hz	DnT (1/3 octave) dB
50	24.7
63	29.7
80	36.1
100	37.8
125	40.5
160	40.8
200	39.2
250	40.7
315	44.8
400	45.5
500	48.3
630	51.7
800	54.7
1000	56.6
1250	58.4
1600	59.2
2000	58.3
2500	57.9
3150	55.7
4000	53.6
5000	53.1



Rating according to ISO 717-1

DnT,w (C; Ctr) = 53 (-2; -5) dB

No background noise influence on DnT,w
No background noise influence on C and Ctr

Evaluation based on field measurement results obtained by an engineering method

No. of test report: Name of test institute:

Date: Signature:

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: Date of test: 31/10/2014

Project: 100624-Eastfields Estate

Airborne sound insulation test results of the partition wall between bedrooms 2nd floor of flats 17 and 16 Thrupp Close

Source room volume (m^3): 29
Receiving room volume (m^3): 29

furnished - - - - - - -
unfurnished ---x---x---

Shifted reference curve.
Measurement results (DnT values).

Frequency f Hz	DnT (1/3 octave) dB
50	29.8
63	30.5
80	34.7
100	37.1
125	35.4
160	34.0
200	41.2
250	41.4
315	41.7
400	46.1
500	47.9
630	50.5
800	53.1
1000	53.8
1250	53.9
1600	55.2
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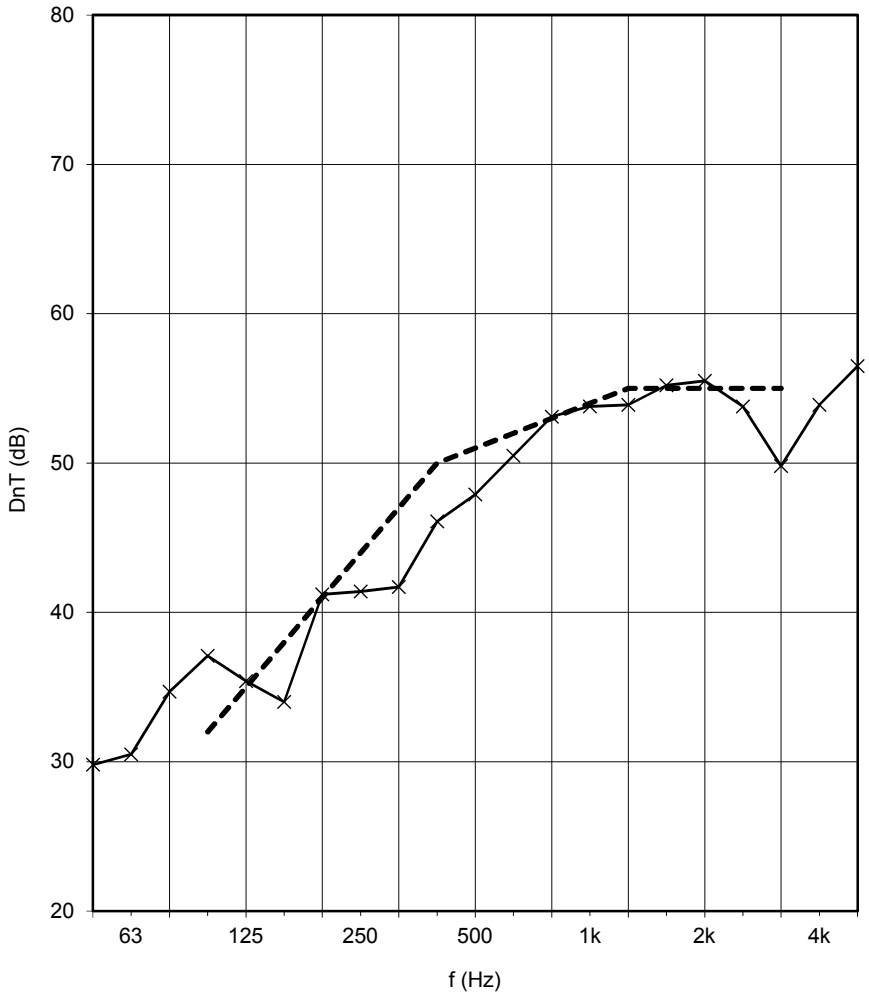
2500	53.8
3150	49.8
4000	53.9
5000	56.5



Rating according to ISO 717-1

DnT,w (C; Ctr) = 51 (-2; -5) dB

No background noise influence on DnT,w
No background noise influence on C and Ctr

Evaluation based on field measurement
results obtained by an engineering method

No. of test report: Name of test institute:

Date: Signature:

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: Date of test: 23/10/2014

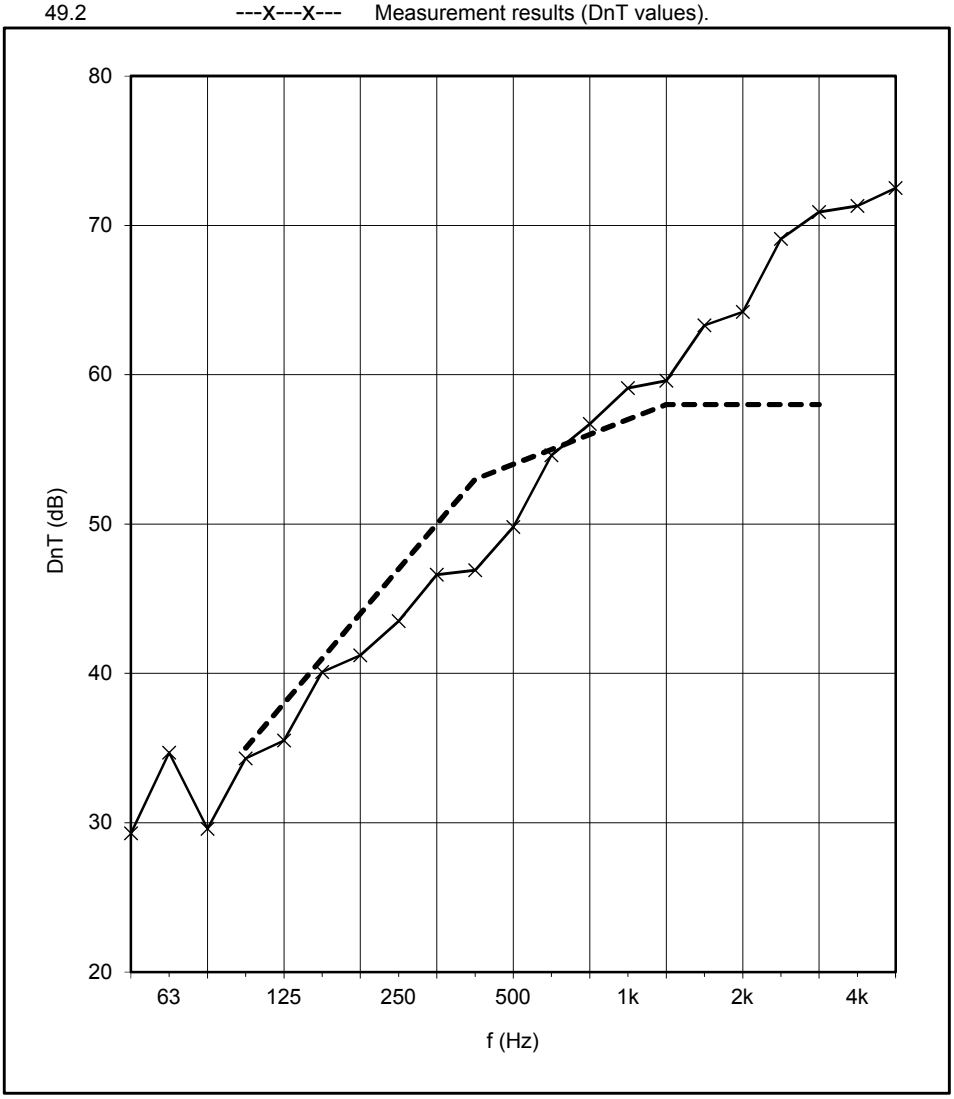
Project: 100624 Eatsfields Estate

Airborne sound insulation test results of the floor between Living Room of Flat 16 Thrupp Close (2nd Floor unfurnished) and Living Room of flat 14 Thrupp Close (1st Floor furnished)

Source room volume (m^3): 49.2 - - - - - - - Shifted reference curve.

Receiving room volume (m^3): 49.2 ---x---x--- Measurement results (DnT values).

Frequency f Hz	DnT (1/3 octave) dB
50	29.3
63	34.7
80	29.6
100	34.3
125	35.5
160	40.1
200	41.2
250	43.5
315	46.6
400	46.9
500	49.8
630	54.6
800	56.7
1000	59.1
1250	59.6
1600	63.3
2000	64.2
2500	69.1
3150	70.9
4000	71.3
5000	72.5



Rating according to ISO 717-1

DnT,w (C; Ctr) = 54 (-1; -6) dB

No background noise influence on DnT,w
No background noise influence on C and Ctr

Evaluation based on field measurement results obtained by an engineering method

No. of test report: Name of test institute:

Date: Signature:

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: Date of test: 31/10/2014

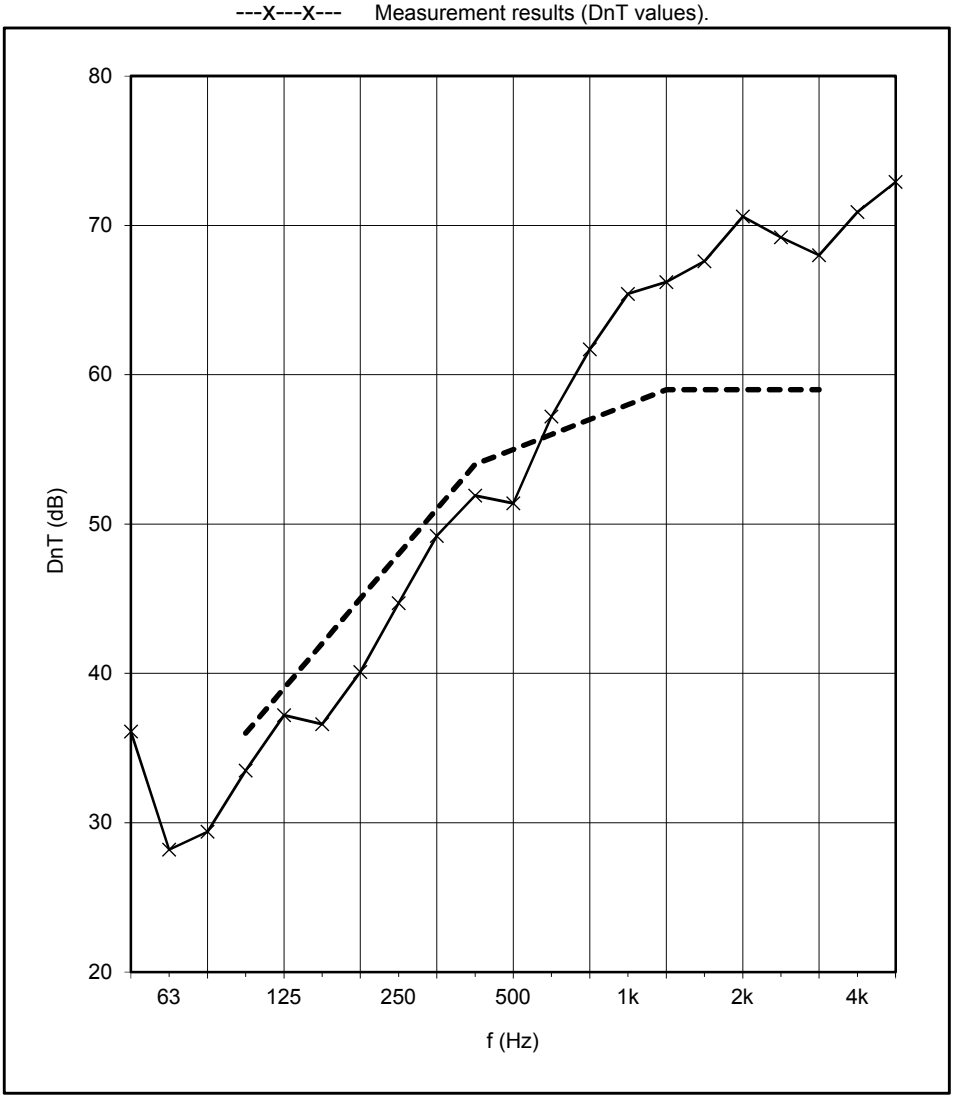
Project: 100624-Eastfields Estate

Airborne sound insulation test results of the partition floor between bedroom 2nd floor flat 17
and bedroom 1st floor flat 15 Thrupp Close
All rooms were furnished

Source room volume (m^3): 29
Receiving room volume (m^3): 29

- - - - - - - Shifted reference curve.
---x---x--- Measurement results (DnT values).

Frequency f Hz	DnT (1/3 octave) dB
50	36.1
63	28.2
80	29.4
100	33.5
125	37.2
160	36.6
200	40.1
250	44.7
315	49.2
400	51.9
500	51.4
630	57.2
800	61.7
1000	65.4
1250	66.2
1600	67.6
2000	70.6
2500	69.2
3150	68.0
4000	>= 70.9
5000	>= 72.9



Rating according to ISO 717-1

DnT,w (C; Ctr) = 55 (-1; -7) dB

No background noise influence on DnT,w
No background noise influence on C and Ctr

Evaluation based on field measurement
results obtained by an engineering method

No. of test report: Name of test institute:

Date: Signature:

Standardized impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Client: Date of test: 23/10/2014

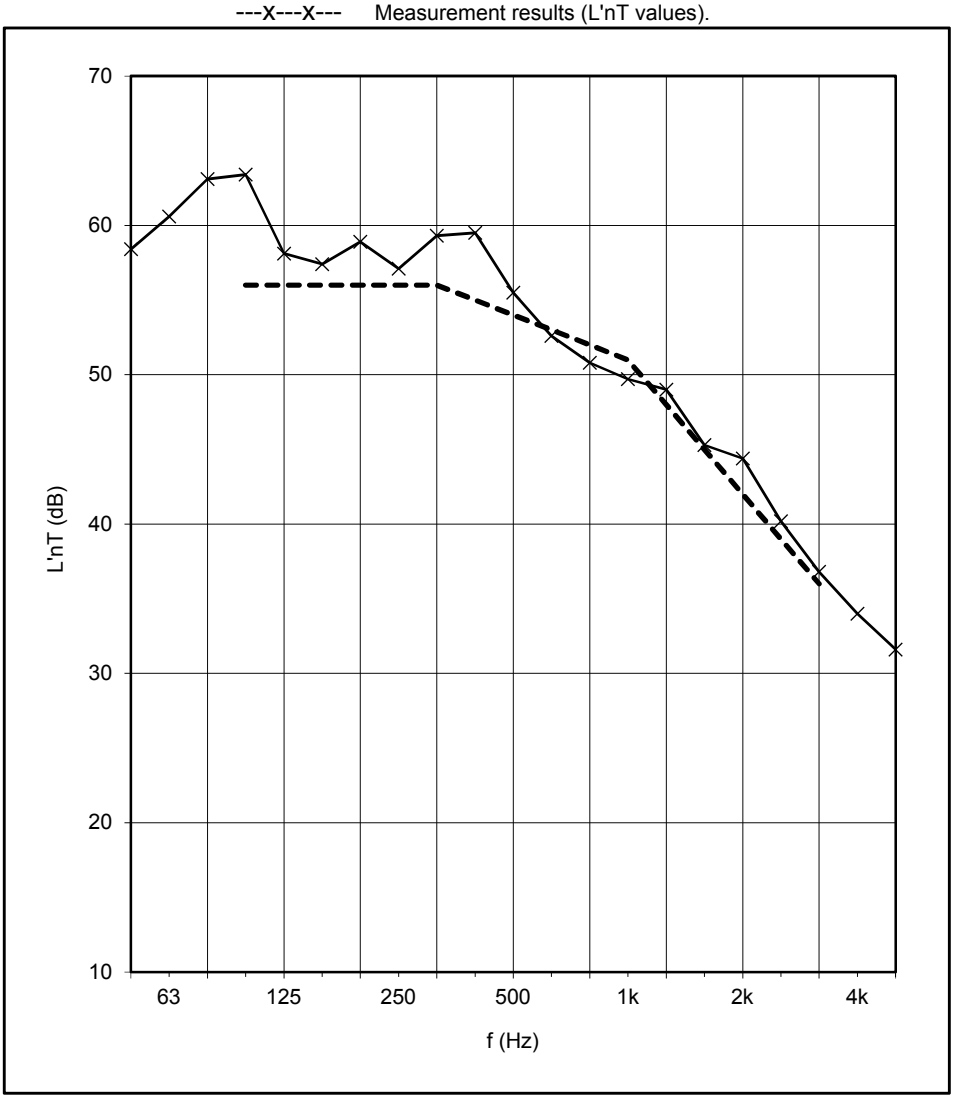
Project: 100624-Eastfields Estate

Impact sound insulation test results of the floor between Living Room of Flat 16 Thrupp Close (2nd Floor unfurnished) and Living Room of flat 14 Thrupp Close (1st Floor furnished)
High RT has been spotted in receiving room in a high frequency during RT measurement on site

Receiving room volume (m^3): 49.2

- - - - - - - Shifted reference curve.
---x---x--- Measurement results (L'nT values).

Frequency f Hz	L'nT (1/3 octave) dB
50	58.4
63	60.6
80	63.1
100	63.4
125	58.1
160	57.4
200	58.9
250	57.1
315	59.3
400	59.5
500	55.5
630	52.6
800	50.8
1000	49.7
1250	49.0
1600	45.3
2000	44.4
2500	40.2
3150	36.8
4000	34.0
5000	31.6



Rating according to ISO 717-2

L'nT,w (Cl) = 54 (0) dB

No background noise influence on L'nT,w
No background noise influence on Cl

Evaluation based on field measurement
results obtained by an engineering method

No. of test report: Name of test institute:

Date: Signature:

Standardized impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Client: Date of test: 31/10/2014

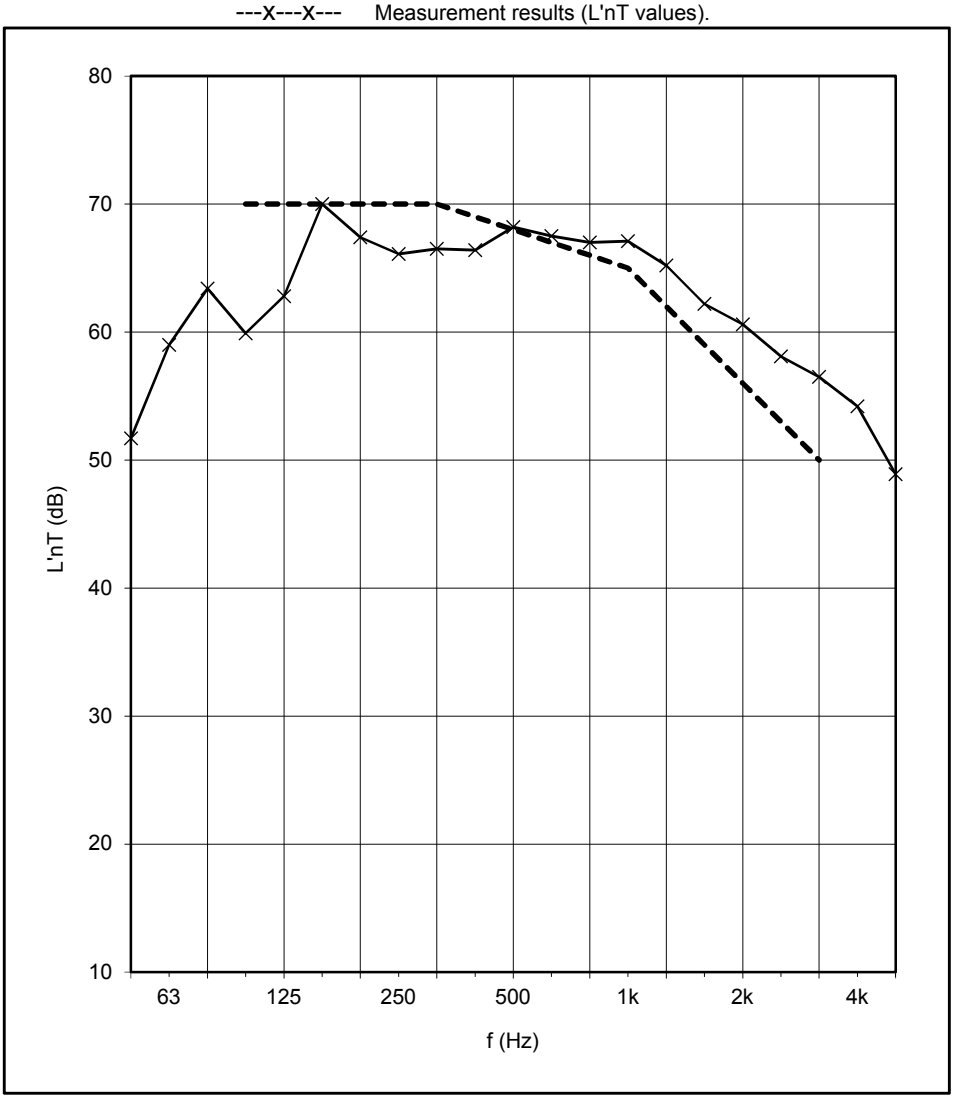
Project: 100624-Eastfields Estate

Impact sound insulation test results of the partition floor between bathroom 2nd floor flat 17
and bathroom 1st floor flat 15 Thrupp Close

Finishes, one conrete wall, other walls are plasterboards, marble floor, concrete ceiling
Noise has been identified coming from the ceiling and the walls within the receiving room
All rooms were furnished
Receiving room volume (m^3): 9

- - - - - - - Shifted reference curve.
---x---x--- Measurement results (L'nT values).

Frequency f Hz	L'nT (1/3 octave) dB
50	51.7
63	59.0
80	63.4
100	59.9
125	62.8
160	70.0
200	67.4
250	66.1
315	66.5
400	66.4
500	68.2
630	67.5
800	67.0
1000	67.1
1250	65.2
1600	62.2
2000	60.6
2500	58.1
3150	56.5
4000	54.2
5000	48.9



Rating according to ISO 717-2

L'nT,w (Cl) = 68 (-5) dB

No background noise influence on L'nT,w
No background noise influence on Cl

Evaluation based on field measurement
results obtained by an engineering method

No. of test report: Name of test institute:

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Appendices

APPENDIX 1
APPROVED DOCUMENT E IN-SITU PERFORMANCE REQUIREMENTS

Protection against sound from other parts of the building and adjoining buildings

E1. Dwelling-houses, flats and rooms for residential purpose shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining buildings.

In the Secretary of State's view the normal way of satisfying Requirement E1 will be to build separating walls, separating floors and stairs that have a separating function, together with the associated flanking construction, in such a way that they achieve the sound insulation values for dwellings-houses and flats set out in Table 1a, and the values for rooms for residential purposes set out in Table 1b. For walls that separate rooms for residential purposes from adjoining dwelling-houses and flats, the performance standards given in Table 1a should be achieved.

Table 1a: Dwellings-houses and flats – performance standards for separating walls, separating floors, and stairs that have a separating function.

Description of Area	**Airborne Sound Insulation $D_{nT,w + Ctr}$ dB (Minimum Values)**	**Impact Sound Insulation $L'_{nT,w}$ dB (Maximum Values)**
Purpose built dwelling-houses and flats		
Walls	45	-
Floors and stairs	45	62
Dwelling-houses and flats formed by material change of use		
Walls	43	-
Floors and stairs	43	64

Table 1b: Rooms for residential purposes – performance standards for separating walls, separating floors, and stairs that have a separating function.

Description of Area	**Airborne Sound Insulation DnT,w + Ctr dB (Minimum Values)**	**Impact Sound Insulation L'nT,w dB (Maximum Values)**
Purpose built rooms for residential purposes		
Walls	43	-
Floors and stairs	45	62
Rooms for residential purposes formed by material change of use		
Walls	43	-
Floors and stairs	43	64

APPENDIX 2

ACOUSTIC TERMINOLOGY

Decibel (dB)

The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithm's are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Octave and Third Octave Bands

The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

A-Weighting

The 'A' weighting is a correction term applied to the frequency range in order to mimic the sensitivity of the human ear to noise. It is generally used to obtain an overall noise level from octave or third octave band frequencies. An 'A' weighted value would be written as dB(A).

Level Difference, D

This is defined as the difference in decibels between the average sound pressure level in a source room on one side of a separating structure and the average sound pressure level in a receiving room on the other side. The level difference is an absolute measure of the sound insulation of a separating structure.

Standardised Level Difference, D_{nT}

This is a measure of the level difference, corresponding to a reference value of the reverberation time in the receiving room. A correction term of ten times the common logarithm (to base 10) of the ratio of the actual reverberation time to the reference reverberation time is added to the level difference, D. For residential dwellings the reference reverberation time is 0.5s. The D_{nT} is measured in decibels. It is used as an airborne noise measurement parameter in sound insulation tests.

Reverberation Time, T

The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level, once the noise source has stopped. It is measured in seconds. Often a 60 dB decay can not be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20

(time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Standardised Impact Sound Pressure Level, L'_{nT}

This is a measure of the average noise level in a receiving room generated by use of a standard impact source on a separating floor reduced by a correction term corresponding to a reference value of the reverberation time. A correction of ten times the common logarithm (to base 10) of the ratio of the actual reverberation time to the reference reverberation time is subtracted from the received average noise level. For residential dwellings the reference reverberation time is 0.5s. The L'_{nT} is measured in decibels. It is used as an impact noise measurement parameter in sound insulation tests.

Airborne Single Number Quantity Weighting

This is a weighting procedure defined in BS EN ISO 717, Part 1 for converting third octave band R, R', D and D_{nT} values to a single number quantity denoted as R_w, R'_w, D_w or $D_{nT,w}$. It is a decibel value.

Impact Single Number Quantity Weighting

This is a weighting procedure defined in BS EN ISO 717, Part 2 for converting third octave band L'_{nT} values to a single number quantity denoted in $L'_{nT,w}$. It is a decibel value.

Spectrum Adaptation Term C_{tr}

This is a correction factor calculated from the measured R_w, $R'_{w,}$, $D_{nT.w}$ and the corresponding third octave band R, R' and D_{nT} values. It uses a set of weighting levels in third octave bands derived from a road traffic noise spectrum. It is applied to airborne test results and is measured in dB.

APPENDIX 3
MLM ACOUSTICS TEST METHODOLOGY

Airborne Sound Insulation Field Test

This procedure for conducting measurements during airborne sound insulation tests has been prepared to provide compliance with the Association of Noise Consultants and best practice.

Test Arrangement;

- All rooms to be empty of building materials and movable furniture (where possible).
- All doors to be closed.
- All windows to be closed.
- All trickle ventilators to be temporarily blocked up or closed.
- Any cupboard doors or kitchen unit doors are to be open during the testing (unless there is a specific reason for them not to be).
- Ideally select test rooms of a volume equal to or greater than 25m^3 (where possible).
- The source is to be located in the lower of the rooms, so as not to directly excite the test floor, unless test rooms are of unequal volume, where the larger room is always to be the source room.

Test Method

Source Room Measurements;

- Use two loudspeaker generation positions. Each loudspeaker is to be mounted on the stand and varied in height between each position. The two positions used are to be at different proximities to the edges of the room and as a minimum 0.5m distant. The loudspeaker positions shall not be less than 1.4m from each other ideally and under no circumstances less than 0.7m from each position (in small rooms).
- Use either a 10s hand-held sweep measurement prior to commencing on source room measurements and check the 6dB difference condition between adjacent third octave bands or undertake the source room measurements and check the average reading. If necessary make adjustments to the loudspeaker settings and positioning in the room until a satisfactory condition exists.
- Use one sweep measurement for each of the two loudspeaker positions evenly spread within the room and ensure to vary the height of the sound level meter during each sweep.
- The duration of measurement should be 30 seconds per sweep measurement.
- Keep at least 0.5m away from any reflecting surface.
- Each measurement position must be at least 1.0m away from the loudspeaker.

Receive Room Measurements;

- Use one sweep measurement for each of the two loudspeaker source positions evenly spread within the room and ensure to vary the height of the sound level meter during each sweep.
- The duration of measurement should be 30 seconds per microphone position.
- Keep at least 0.5m away from any reflecting surface (including diffusers).

Background Noise Measurements;

- Use one sweep measurement similar to those of the receive room measurements evenly spread within the room and ensure to vary the height of the sound level meter during each sweep.
- The duration of measurement should be 30 seconds per microphone position.

- Keep at least 0.5m away from any reflecting surface (as far as possible horizontally and vertically in small rooms).

Reverberation Time Measurements ;

- Use two loudspeaker generation positions utilising any of the receive room corners. The loudspeaker is to be at least 0.5m from any room boundary and mounted on a stand.
- Use three fixed measurement positions for each loudspeaker position (no sweeps).
- Ensure to vary the height of the measurements between each fixed position.

Impact Sound Insulation Field Test

This procedure for conducting measurements during impact party floor field sound insulation test has been prepared to provide compliance with the Association of Noise Consultants Registration Scheme and best practice.

Test Arrangement;

- All rooms to be empty of building materials and movable furniture (where possible).
- All doors to be closed.
- All windows to be closed.
- All trickle ventilators to be temporarily blocked up or closed.
- Any cupboard doors or kitchen unit doors are to be open during the testing (unless there is a specific reason for them not to be).
- Ideally select test rooms of a volume equal to or greater than $25m^3$ (where possible).

Source Room Arrangements:

- Locate the tapping machine near one corner of the room, but at least 0.5m from any edge. It is to be set at an angle of 45° (degrees) to the room edges.
- Adjust the height of the tapping machine until there is a 40mm hammer drop height present.
- Switch on the tapping machine and ensure there is a steady state noise condition (i.e. no time dependent pattern of noise set-up that would affect the readings to be taken.
- During the course of the measurements, the tapping machine will need to be located in four separate positions. Each time it is repositioned the orientation should be alternated so that it is at the opposite 45° (degree) angle to the room edges.
- Maintain a distance of at least 0.7m between adjacent tapping machine positions.

Receive Room Measurements;

- Record a minimum of one sweep measurement for each of the four tapping machine positions evenly spread within the room and ensure to vary the height of the sound level meter during each sweep.
- The duration of measurement should be 30 seconds per microphone position.
- Keep at least 0.5m away from any room boundary reflecting surface (including diffusers).
- Keep at least 1.0m away from the upper floor being excited (preferably a greater distance).

Background Noise Measurements;

- Use one sweep measurement similar to those of the receive room measurements evenly spread within the room and ensure to vary the height of the sound level meter during each sweep.
- The duration of measurement should be 30 seconds per microphone position.

- Keep at least 0.5m away from any reflecting surface (as far as possible horizontally and vertically in small rooms).

Reverberation Time Measurements;

- Use two loudspeaker generation positions utilising any of the receive room corners. The loudspeaker is to be at least 0.5m from any room boundary and mounted on a stand.
- Use three fixed measurement positions for each loudspeaker position (no sweeps).
- Ensure to vary the height of the measurements between each fixed position.

(APPENDIX 4
DEVIATIONS FROM STANDARD TEST PROCEDURE)

As required by Annex B of Approved Document E[1], where any site introduced deviations have occurred from the measurement protocol of Annex B of Approved Document E[1], these are reported in full below.

Section of Annex B	Annex B Requirement	Reason for Non-Compliance	Procedure Carried Out
B2.11	Section 1 gives guidance on the room types that should be used for testing. These rooms should have volumes of at least 25m^3. If this is not possible then the volumes of the rooms used for testing should be reported.	Only dividing non-carpeted floor available for conducting impact sound insulation testing between Flat 17 and Flat 15 at Thrupp Close	Reported room volumes within report.
B2.13	Impact sound insulation tests should be conducted on a floor without a soft covering (e.g. carpet, foam backed vinyl etc) except in the case of (a) separating floor type 1, as described in this Approved Document, or (b) a concrete structural floor base which has a soft covering as an integral part of the floor.	Impact sound insulation testing between Flat 16 and Flat 14 at Thrupp Close was conducted on lino-on concrete. Only dividing floor available.	Normal testing procedure required was followed. For that reason impact test results may be overestimated.
B2.14	If a soft covering has been installed on any other type of floor, it should be taken up. If that is not possible, at least half of the floor should be exposed and the tapping machine should be placed only on the exposed part of the floor.	Not possible to remove the lino finish. See above	See above
B2.15	When measuring airborne sound insulation between a pair of rooms of unequal volume, the sound source should be in the larger room.	The airborne sound insulation test between the living room of House 41 to living room of House 42 at Potter Close was conducted from the smaller room as a source due to on-site operational reasons.	Results may be overestimated to some extent.