REPORT TITLE:

Central Somers Town -Plot 1 Block A - Residential Accommodation

CLIENT DETAILS:

Neilcott Construction Ltd

DATE:

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REPORT REFERENCE:

PC-17-0287-RP5

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Contents

1. Introduction

Pace Consult Ltd was commissioned by Neilcott Construction Ltd to review the acoustic requirements of the residential scheme and to write an acoustic design strategy for the Plot 1 Nursery and Community Play development named Central Somers Town. This report covers the acoustic design of the residential accommodation in block A 1st to 5th floors. The residential development is intended to achieve compliance with Building Regulations Approved Document E and should have the design capability of achieving a 5dB improvement above the requirements of the building regulations.

This report assesses the requirements for the sound insulation of walls, floors doors and the acoustic absorption in common areas. The report will lay out the criteria for each section and set out how these will be achieved by the design of the building.

This report has been prepared in accordance with Building Regulations Approved Document E and BREEAM New Construction 2014 with reference to the acoustic credits in particular.

The development is a mixed-use project with residential and nursery / community use elements. General arrangement drawings of floor 1 to 5 is shown in Figure 1 below.

Figure 1: Plot 1 – Block A

2. Residential Internal Design Criteria

2.1 External Noise Break-in to the Residential Accommodation

The ER's require that unoccupied internal ambient noise levels in habitable rooms (with windows shut and with normal background ventilation provided by natural or mechanical means) due to ingress of environmental noise shall not exceed:

- Habitable Rooms including bedrooms (0700-2300): 35 dB $L_{Aeq(16H)}$
- Bedrooms (2300 – 0700): 30 dB $L_{Aeq(8H)}$

The levels above are inline with the guidance set out in BS8233:2014 Guidance on sound insulation and noise reduction for buildings".

2.2 Sound Insulation

2.2.1 Party Walls and Floors

The criterion for the sound insulation of separating walls and floors is set out in the Building Regulations, Approved Document E 2003 as amended (ADE). The performance standards from ADE are shown below.

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

	Airborne sound insulation sound insulation $D_{nT,w} + C_{tr}$ 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

The employer's requirements and the planning conditions set during the determination of the planning application require that the design should be capable achieving acoustic design target 5 dB better than the values given in table 1a of ADE.

For selection purposes sound insulation performances for separating building elements in this report are given in terms of the weighted sound reduction index, $R_w + C_{tr}$. This is a value determined within an acoustic test laboratory.

Pre-Completion Testing must be carried out towards the end of construction to confirm compliance with Approved Document E.

2.2.2 Internal Walls

Internal walls should be designed to the criteria below. These are not subject to pre-completion testing.

Table 2: **Laboratory values for new internal walls and floors within: dwelling-houses, flats and rooms for residential purposes, whether purpose built or formed by material change of use.**

	Airborne sound insulation R_w dB (Minimum values)
Walls	40
Floors	40

2.2.3 Doors

Approved document E also provides sound insulation criteria for doors; this is shown in the excerpt below.

2.26 Ensure that any door has good perimeter sealing (including threshold where practical) and a minimum mass per unit area of 25kg/m2 or a minimum sound reduction index of 29dB Rw (measured according to BS EN ISO 140-3:1995 and rated according to BS EN ISO 717-1:1997).

2.3 Absorption in Common Areas

The objective is to absorb sound in corridors, entrance halls and stairwells. Regulation 7 in Approved Document Part E of the Building regulations gives the requirements for absorption in common areas. A section from the building regulations is set out below.

7.6 Two methods are described to satisfy Requirement E3, Method A and Method B.

7.7 ***Method A:*** *Cover a specified area with an absorber of an appropriate class that has been rated according to BS EN ISO 11654:1997 Acoustics - Sound absorbers for use in buildings - Rating of sound absorption.*

7.8 ***Method B:*** *Determine the minimum amount of absorptive material using a calculation procedure in octave bands.* ***Method B*** *is intended only for corridors, hallways and entrance halls as it is not well suited to stairwells.*

7.9 Where additional guidance is required, specialist advice should be sought at an early stage.

Method A

7.10 For entrance halls, corridors or hallways, cover an area equal to or greater than the floor area, with a Class C absorber or better. It will normally be convenient to cover the ceiling area with the additional absorption.

7.11 For stairwells or a stair enclosure, calculate the combined area of the stair treads, the upper surface of the intermediate landings, the upper surface of the landings (excluding ground floor) and the ceiling area of the top floor. Either cover at least an area equal to this calculated area with a Class D absorber or cover an area equal to at least 50% of this calculated area with a Class C absorber or better. The absorptive material should be equally distributed between al floor levels.

It will normally be convenient to cover the underside of intermediate landings, the underside of the other landings, and the ceiling area on the top floor.

7.12 Method A can generally be satisfied by the use of proprietary acoustic ceilings. However, the absorptive material can be applied to any surface that faces into the space.

Method B

7.13 In comparison with Method A, Method B takes account of the existing absorption provided by all surfaces. In some cases, Method B should allow greater flexibility in meeting Requirement E3 and require less additional absorption than Method A.

7.14 For an absorptive material of surface area, S in m^2, and sound absorption coefficient, α the absorption area A is equal to the product of S and α.

7.15 The total absorption area, A_T, in square metres is defined as the hypothetical area of a totally absorbing surface, which if it were the only absorbing element in the space would give the same reverberation times as the space under consideration.

7.16 For n surfaces in a space, the total absorption area, A_T, can be found using the following equation.

$$A_T = \alpha_1 S_1 + \alpha_2 S_2 + ... + \alpha_n S_n$$

7.17 For entrance halls, provide a minimum of 0.20 m^2 total absorption area per cubic metre of the volume. The additional absorptive material should be distributed over the available surfaces. 7.18 For corridors or hallways, provide a minimum of 0.25 m^2 total absorption area per cubic metre of the volume. The additional absorptive material should be distributed over one or more of the surfaces.

3. Achieving the External Noise Break-in Criteria to the Residential Accommodation

3.1 Max Fordham Noise Survey

A long term unattended noise survey (approx. 64 hours) was conducted at the site of the existing Community Facilities building on 23-26 April 2015 by Max Fordham LLP Acoustics Team in order to determine typical mean (L_{Aeq}) and background (L_{A90}) sound levels in the vicinity of the proposed buildings. Mean noise levels of 54 dBA $L_{Aeq,16hr}$ (day) and 46 dBA $L_{Aeq,8hr}$ (night) were derived for the site.

Considering the external noise results, it is recommended that the residential façade constructions should provide an overall sound level difference of at least 26 dB outside to inside in order to meet all of the internal noise criteria given above, including a significant safety margin.

3.2 Façade / Glazing Construction

This proposed building is to have a façade constructed from dense cavity masonry with double glazed casement windows.

To achieve the level of sound insulation indicated above the glazing will not need a specific sound insulation rating. Any standard fully sealed thermal double window will be acoustically suitable. Internal noise levels will be well within the guideline indoor ambient noise level limits in BS 8233:2014.

Note: We have not included an assessment of noise from the proposed external play areas associated with development. This has not been considered in previous assessments of the facade build-up. A previous assessment by Max Fordham has indicated that a noise level of 55 dB(A) @ 20m is expected from the MUGA, Noise from the MUGA is likely to be audible at the façade of the block A residential accommodation during some periods

3.3 Ventilation of Residential Accommodation

Background ventilation to the flats will be provided with whole house MVHR systems (supply and extract), and thus there is no requirement for window trickle vents. Windows will be openable for purge and over-heating ventilation. The sound transmission from outside to inside through MVHR systems is negligible and will not compromise the acoustic performance of the facades.

4. Achieving the Residential Internal Design Criteria

4.1 Internal & Separating Walls

The required laboratory sound insulation performance of the separating wall structures and internal walls is indicated in the marked-up drawing including in appendix A of this report.

4.1.1 Separating Wall Performance≥

Our calculations indicate that the proposed accommodation will need a laboratory sound insulation rating value of 53 dB $R_{w.+}C_{TR}$ to be certain of achieving 50 dB Dnt,w + Ctr on site.

The proposed masonry separating wall construction between dwelling is:

> **Masonry Block 215mm wide 1850-2300 kg/m³, full block laid thickness on its side, single course, stretcher bond. The masonry wall is to be finished with a 15mm thick 2-coat wet plaster finish covering the entire area of the masonry wall or other finish suitable to seal the face of the blockwork**

Lignacite quote a 215mm wall performance of 57-58 dB R_w for their Lignacrete blocks. Experience indicates 215mm concrete blocks to have a C_{tr} correction of -5 dB based upon previous site test work. So the expected laboratory performance including the C_{tr} value is in the region of 52-53 dB R_w.+ C_{tr}

Previous site test work on this wall construction has shown that the proposed build-up is capable of achieving the required sound insulation 49-52 dB $D_{nt,w} + C_{tr}$

The proposed 215mm masonry blockwork design has the acoustic potential with good acoustic detailing to achieve the required sound insulation performance of ≥50 dB $D_{nt,w} + C_{tr}$

Where acoustic detailing is not ideal there is an isolated risk that that the 215mm blockwork wall may just fall below an on-site sound insulation value of 50 dB $D_{ntw} + C_{tr}$.

Please Note: The Inner leaf of the external wall should ideally be broken at the line of the separating wall and be tied to the face of the separating 215mm blockwork. The Inner leaf must be 100mm thick concrete block (1350 kg/m^3 to 1600 kg/m^3 or 1850 kg/m^3 to 2300 kg/m^3)

Mortar beds may be 10-15mm thick to permit coursing to junction with inner leaf of the external wall.

To obtain the best sound insulation possible you must
:

- Close cavity with flexible cavity stop unless it is fully filled with built-in mineral wool insulation
- Ensure blocks are laid on side for 215mm full wall width
- Ensure that blockwork is single course stretcher bond
- Ensure all joints are fully filled
- Ensure inner leaf is either abutted and tied to face of separating wall or bonded in every two courses
- Ensure no chasing occurs on face of separating wall

The separating wall structure must be built off the structural concrete slab NOT the floated screed. The screed is to installed around the separating walls with 5mm (min thickness) resilient flanking strip or isolating edge strip installed to all perimeters of the screed to isolate the floor from all the walls and skirtings

4.1.2 Walls to common areas of the building.

ADE requires that walls which separate dwellings from common areas of the building to be built from a construction that has the same potential sound insulation performance to a wall that separates neighbouring dwellings.

In most cases the same 215mm thick masonry wall structure is to be used

In some cases, a different construction type is proposed for walls which separate bedrooms from the stairwell. Here the 200mm thick cast in situ concrete sheer wall is to be independently lined with 2 layers of 15mm dense plasterboard supported on a metal furring frame. I recommend that you add a 50mm thick mineral wool quilt hung throughout the cavity to this build-up.

With this additional quilt the wall build-up proposed will provide the required acoustic separation to achieve the requirements of ADE.

4.1.3 Detailing to Lift Cores

For any instance in which a lift shaft is positioned next to an apartment an independent wall liner (minimum 50mm ‘I’ stud) should be installed with a 10mm gap to the concrete, 50mm mineral wool (16-20 kg/m^3) insulation within the stud and lined using two layers of dense plasterboard.

4.2 Internal Walls

Building regulations state that all new internal walls should have a sound reduction performance of 40 dB. The proposed internal wall construction is as follows:

100 mm thick Dense Conrete Blockwork (1850-2300 kg/m³) with wet coat plaster to both sides.

The laboratory sound insulation performance of the proposed construction is >40dB Rw which is compliant with the Building Regulation ADE requirements.

Construct the internal wall directly off core floor with the screed installed around the internal walls a 5mm (min thickness) resilient flanking strip or isolating edge strip, is installed to all perimeters of the screed to isolate the floor from all the walls and skirtings

4.3 Floor Sound Insulation

The proposed separating floor construction between residential apartments is:

- Floor finish
- 65mm screed
- 10 mm Resilient Layer
- 250mm Concrete Slab
- 150-200mm Ceiling zone with a 50mm mineral wool quilt (16-20 kg/m^3) laid throughout.
- Plasterboard Ceiling consisting of One layer of 15mm thick dense plasterboard

We have completed an assessment of the floor build-up and we are happy that proposed build-up is capable of achieving a sound insulation performance in excess of the required airborne and impact criteria, 50 dB $D_{nt,w} + C_{tr}$ and 57 dB $L'_{nT,w}$.

The suitable 10mm resilient floor layer can be sourced from a number of suppliers Cellecta YELOfon HD10+ or Regupol (multiple underscreed materials) available from CMS Danskin are two popular options.

Pace Consult is happy to approve the resilient products chosen. Please send us the manufacuters airborne and impact test data for approval

Provided there is a minimum ceiling void as stated above downlighters or recessed lighting may be installed in the ceiling at no more than one light per $2m^2$ of ceiling area in each room at centres not less than 0.75m into openings not exceeding 100mm diameter or 100x100mm. Particular attention should also be paid to Building Regulations Part B - Fire Safety

4.4 Door Sound Insulation

Requirement: 2.26 Ensure that any door has good perimeter sealing (including threshold where practical) and a minimum mass per unit area of 25kg/m2 or a minimum sound reduction index of 29dB Rw (measured according to BS EN ISO 140-3:1995 and rated according to BS EN ISO 717-1:1997).

4.5 Additional Residential Sound Insulation Requirements

4.5.1 Details

The head, base and junction details must be built to agreed details to control flanking noise transmission

The final junction details such as party wall/floor – external wall etc. should be provided to Pace Consult so that they can be reviewed prior to construction.

Services must not penetrate separating walls between habitable rooms.

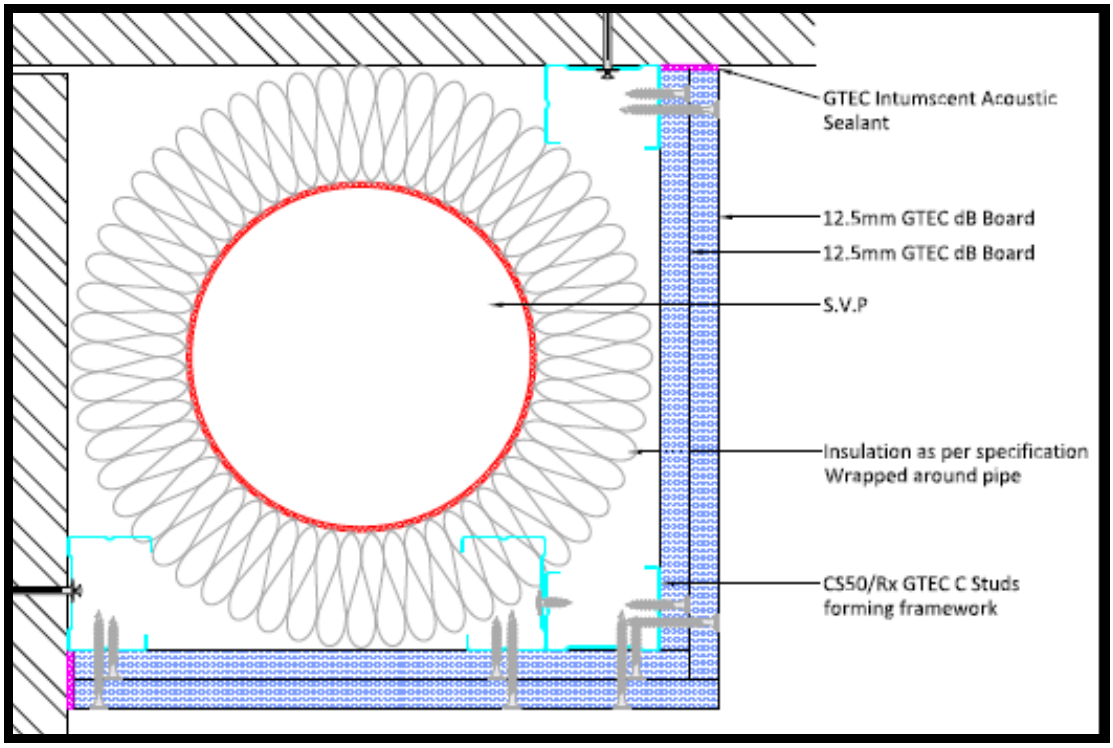
4.5.3 Sockets

Where possible, services should not be built into the separating wall.

Chasing is must be kept to a minimum. Chases must not be located back to back. Care must be taken to ensure all voids are fully filled with mortar prior to plastering.

4.5.4 Floor Penetrations

Ducts or pipes which penetrate a floor separating habitable rooms should be in an enclosure, both above and below the floor. The material of the enclosure should have a mass of 15 Kg/m^2 or be of a masonry construction. Either line the enclosure or wrap the duct or pipe within the enclosure with 25 mm unfaced mineral wool. Penetrations through a separating floor ducts should have fire protection in accordance with approved document B, Fire Safety. Fire stopping should be dense, flexible, and also prevent rigid contact between the pipe and the floor. Where the pipes and ducts penetrate the party structures, the penetrations must be kept as small as possible and be finished with an intumescent sealant bead to both sides. It is recommended that the mineral fibre does not touch the plasterboard. Typical detail is indicated overleaf.


GTEC Intumscent Acoustic Sealant
12.5mm GTEC dB Board
12.5mm GTEC dB Board
S.V.P
Insulation as per specification Wrapped around pipe
CS50/Rx GTEC C Studs forming framework

4.6 Absorption in Common Areas

To meet requirements of Approved Doc E (2003 as amended), it is necessary to add acoustic absorption to corridors, hallways stairwells and entrance halls that give **direct** access to flats or rooms for residential purposes.

For corridors, hallways and entrance halls cover an area equal to the floor with a Class C absorber. Normally it is convenient to apply this absorption to the ceiling.

For stairwells it is necessary to calculate the combined area of the stair treads, the upper surface of the intermediate landings, the upper surface of the landings (excluding the ground floor) and the ceiling area at the top of the stairwell. Either cover and area equal to the combined total with a class D absorber or cover an area equal to 50% of the calculated total with a class C absorber.

The areas of entrance hall that give direct access (i.e. contain the flat entrance doors) to the residential accommodation will need to have an acoustically absorbent class ‘C’ ceiling. I understand that this planned but details have not been finalised yet. Place Consult is happy to review the proposals when they are available

The stairwell on this project does not give direct access to the proposed residential accommodation. It is therefore not considered necessary to add absorption to this common area of the building.

6. Conclusion

The development has been assessed in accordance with the relevant standards and guidelines.

The development is intended to comply with the Building Regulation's sound insulation performance standards. The proposed party walls and floors have been assessed and are expected to be compliant with the requirements.

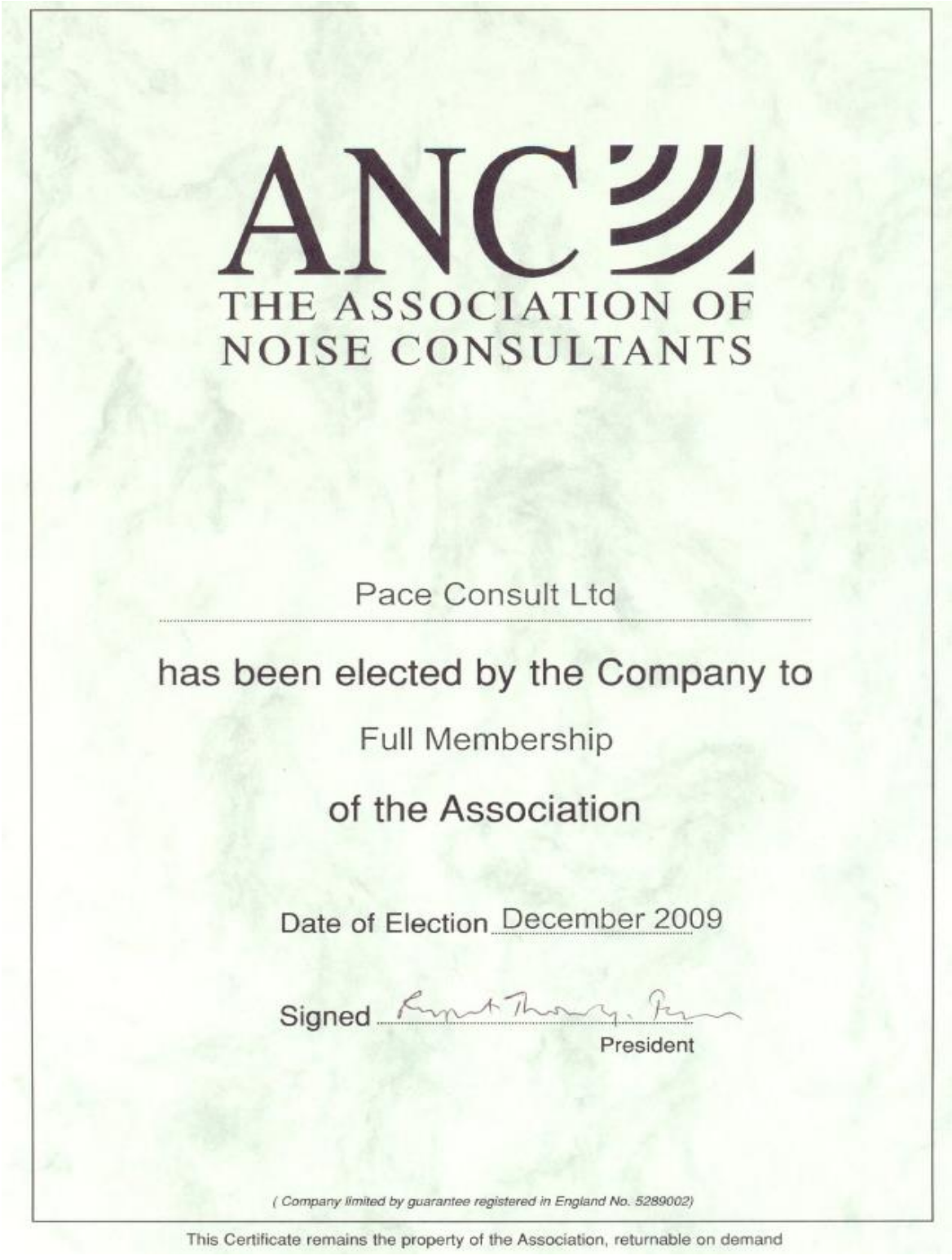
The Building Regulation absorption requirements for communal corridors have been considered. Options have been provided which may be used to achieve compliant with the absorption requirement.

Initial recommendations for detailing, penetrations and sockets have been made in order to prevent the degradation of the sound reduction performance of the dividing structures.

Appendix A – Partition Sound Insulation Ratings

Appendix B – ANC Accreditation

The author is a corporate member of the institute of acoustics (MIOA) which fulfils the BREEAM requirements for a 'suitably qualified acoustician'.



ANC

THE ASSOCIATION OF NOISE CONSULTANTS

Pace Consult Ltd

has been elected by the Company to

Full Membership

of the Association

Date of Election December 2009

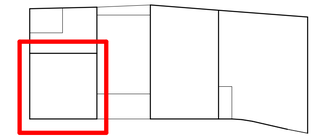
Signed

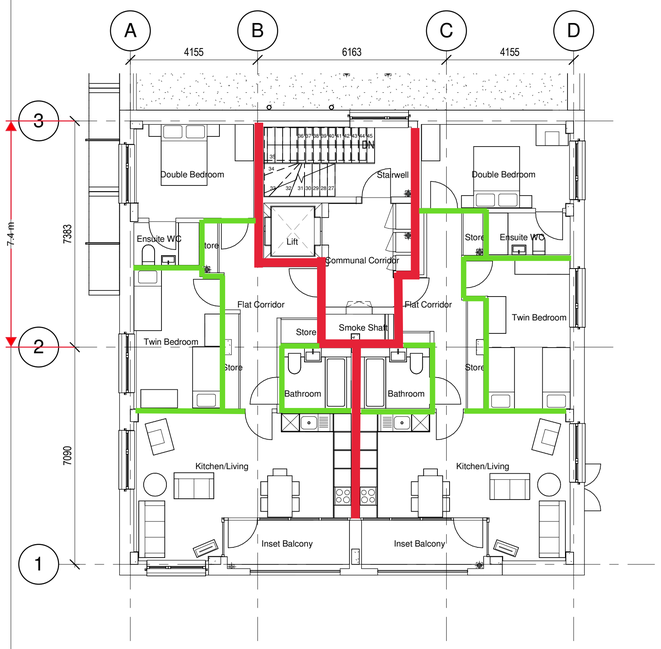
President

(Company limited by guarantee registered in England No. 5289002)

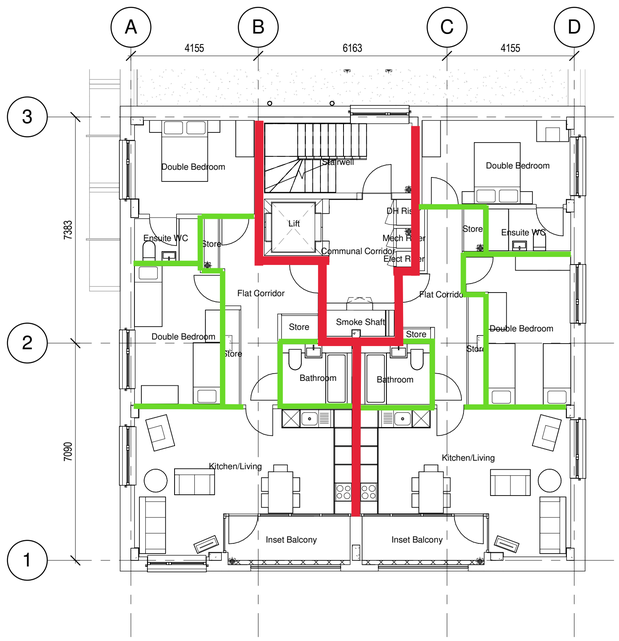
This Certificate remains the property of the Association, returnable on demand

KEY PLAN - BLOCK A





1 **GA First Floor Plan**
1 : 100



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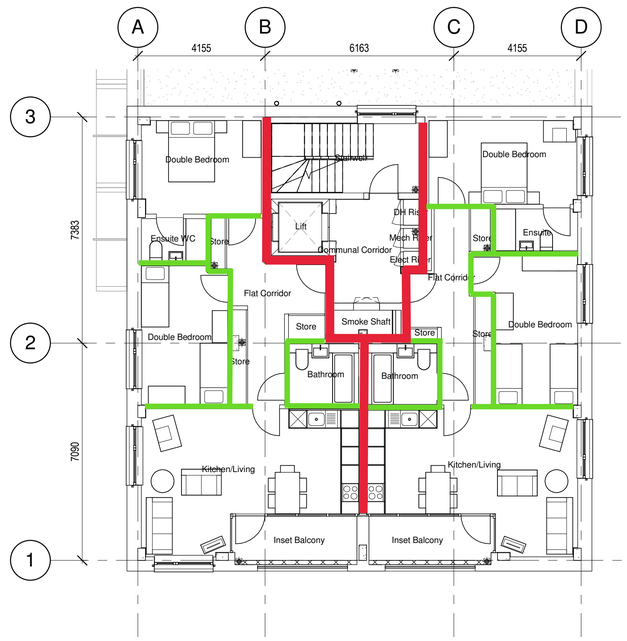

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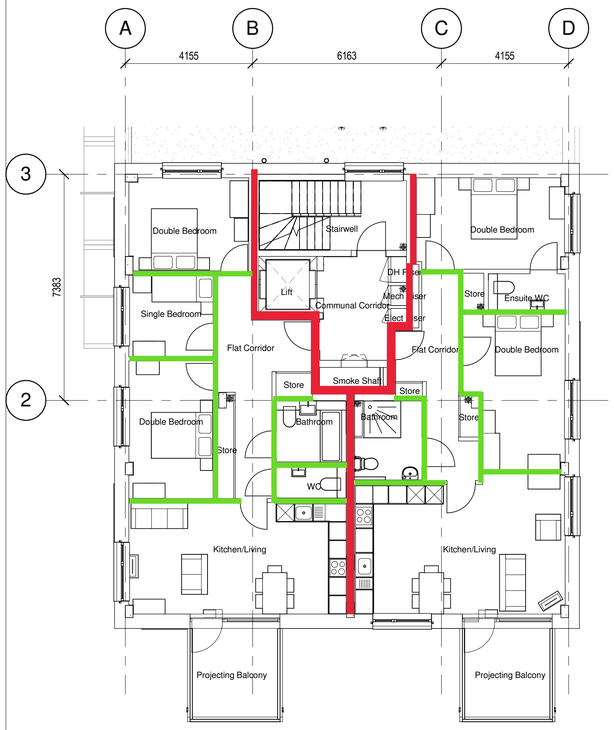

4 **GA Fourth Floor Plan**
1 : 100

5 **GA Fifth Floor Plan**
1 : 100

	Project Name. : Central Somers Town	Central Somers Town	Date :	18/06/2018
paceconsult	Prepared By :	Cait Smith	Checked By :	N Swainston
Partition Type	Sound Insulation Requirement	Wall Construction		
	40 dB Rw	Mansory Blockwork 100 mm thick, (1850-2300 kg/m3) with wet coat plaster to both sides.		
	52 dB $R_w + C_{tr}$	Masonry Block 215mm wide, (1850-2300 kg/m^3), full block laid flat, single course, stretcher bond. The masonry wall is to be finished with a 15mm thick 2-coat wet plaster finish		

1:100 0 1m 2 3 4 5 6 7 8 9 10 11 12m

rev	description	drawn	checked	date
1	First Construction Issue	ST	NF	27/03/18
revisions				

status: CONSTRUCTION

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NEILCOTT

project: Central Somers Town
Plot 1

title: Block A - GA First to Fifth Floor Plans

scale: 1 : 100 @ A1
date: 20/11/17
drawn: NS
checked: ST

Project ID: 170044 | Originator: PTA | Drawing No: P1-XX-DR-A-06-101 | revision: C1