Mace Ltd

Hawley Wharf, London
Planning condition discharge report - Condition 9 - 52 - 54 (Building envelope)
31/01/2016 Revision 01
ACOUSTICS

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Hawley Wharf Planning condition discharge report - Condition 9 - 52 - 54 (Building envelope)

Audit sheet

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ACOUSTICS

Hawley Wharf Planning condition discharge report - Condition 9 - 52 - 54 (Building envelope)

Contents

1. Introduction

This document provides information in response to noise related Planning Condition 52 and 54 (ref. 2012/4928/P) for Building C and WX and D, and Planning Condition 9 (reference 2015/1937/P) for Building E to enable their discharge with the focus on the building envelopes.

The conditions are reproduced below for ease of reference. The report has been structured to align with the requirements of the planning conditions and should be read in conjunction with the Allford Hall Monaghan Morris reports '*161128_E_condition 52_sound insulation*' and '*161128_E_condition 9_sound insulation'*.

Planning Condition 9 and 52

'Before development commences for any of the buildings that contain a residential use, sound insulation and details of mitigation shall be provided in accordance with a scheme to be approved in writing by the local planning authority. The residential units shall not thereafter be occupied other than in accordance with the approved should insulation scheme'.

Planning Condition 54

'Noise levels arising from external sources within all habitable rooms during the night period (23:00 - 07:00) shall not exceed 30dB $L_{Aeq\ (8\ hours)}$ nor 45dB $L_{Amax\ (fast)}$. Similarly, noise levels in habitable rooms shall not exceed 35 dB $L_{Aeq\ (16\ hours)}$ during the day time (07:00 - 23:00). Details of sound insulation measures for all relevant residential windows shall be submitted to and approved in writing by the Local Planning Authority. The approved sound insulation measures shall be installed prior to occupation of any of the student units, and retained and maintained thereafter'.

2. Response to Condition 9, 52 and 54 – Building envelopes

Figure 1 below indicates the residential areas within the Hawley Wharf scheme called to be addressed in the planning condition discharge procedure.

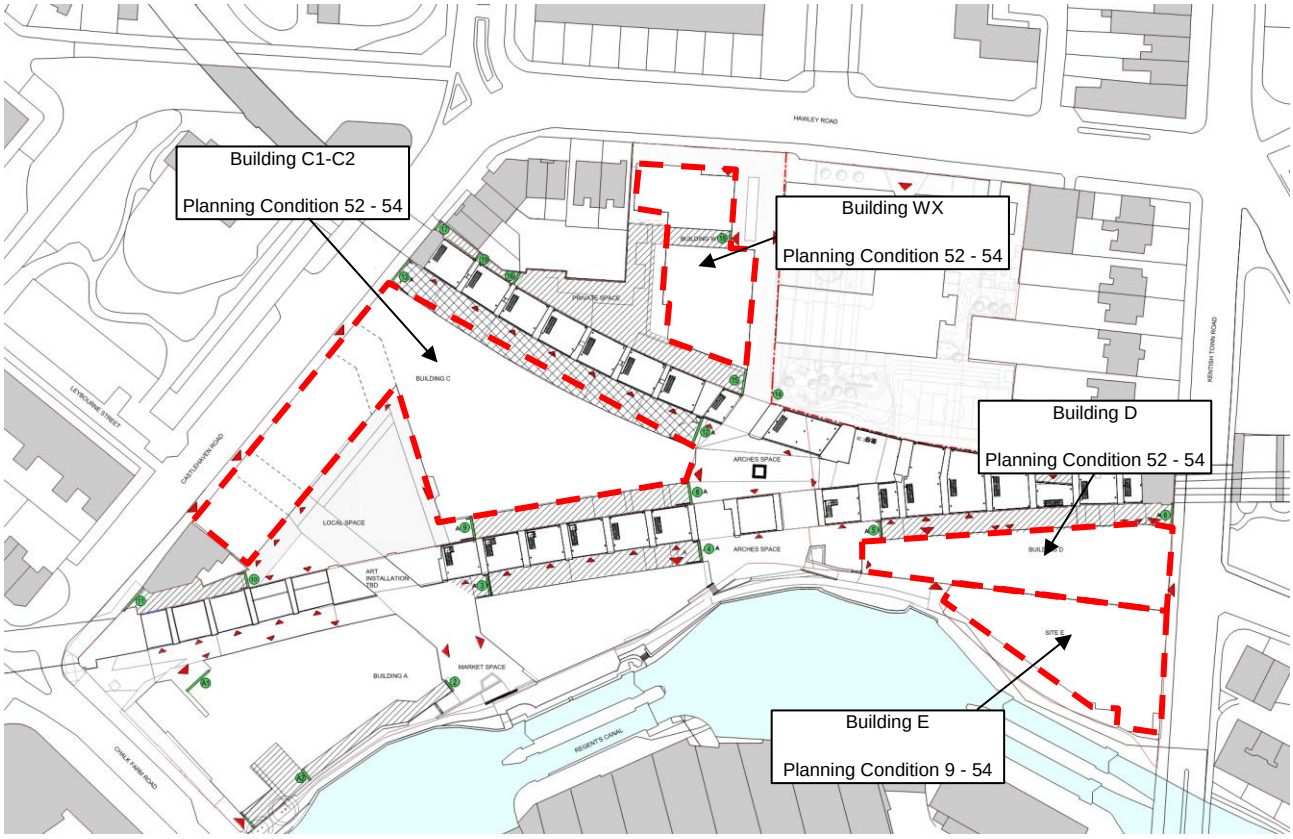


Figure 1 - Camden Lock Village Residential Areas

2.1 Required internal noise levels due to external noise intrusion

Planning Condition 54 states that the below indoor levels deriving from external sources have to be achieved in all habitable rooms.

Period	Parameter	Criteria, dB
Day-time (0700-2300)	$L_{Aeq,T}$	35
Night-time (2300-0700)	$L_{Aeq,T}$	30
	$L_{Amax,(fast)}$	45

2.2 Assessment of the noise levels at residential façades and façade performance requirements

Sound measurements were made during initial stages to gain an understanding of the local environment around the Hawley Wharf area.

Noise levels affecting the site are generally high. In particular, freight train movements and local buses can be high with maximum levels of 85-90 dB L_{Amax}.

Complete details of the measurements are reported in the Hoare Lea's Stage E report (*ref. REP-1005534-5A-20150529-Appendix A Acoustic Stage E-1*).

The acoustic data collected have been used to assess the required performance of the external walls and glazing systems in order to comply with the internal level criteria.

The facade acoustic ratings have been assessed by using the Hoare Lea in house software "FAD". The worst case scenario is represented by the maximum levels of noise on Castlehaven Rd, Hawley Rd and Kentish Town Rd. An average of the measured L_{Amax} from typical sources such as buses and trucks have been used to assess the most onerous requirements in order to comply with the internal night-time criteria. The assessments also take into account the typical dimensions of rooms and the façade components (main wall and window surfaces).

The following figures show the typical noise levels across each building façade and the advised façade sound reduction requirements to reduce the external levels to the recommended ones. Details of the requirements are reported in Appendix B.

Block C1

Room Type	Indoor noise standard	Typical Noise Level across façade dB(A)	Guidance on façade sound reduction performance		
			External wall	Windows	
			Rw, dB	Rw, dB	Indicative glazing configuration
Bedroom (Night-time)	30	65-70 ~ 87 dB L_{Amax}	55	50	Double Glazing: 12.8 Silence (24) 14.8 Silence Thickness (mm): 52
		60-65 ~ 85 dB L_{Amax}	55	48	Double Glazing :12.8 Silence (24) 14.8 Silence Thickness (mm): 52
		55-60	50	40	Double Glazing: 8 (16) 6.4 Silence
Living Room (Daytime)	35 [32]*	70-75	55	46 [49]	Double Glazing: 8.8A (20) 10.8 [12.8 Silence (24) 14.8 Silence]
		65-70	55	42 [45]	Double Glazing: 8 (20) 6.4 Silence [Double Glazing: 10 (16) 8.4 Silence]
		60-65	50	35 [38]	Double Glazing: 4 (16) 8 [Double Glazing: 6 (16) 8.8]

Façade levels up to first floor

Façade levels from second floor

** Stanley Sidings consider reduction of external noise to be a key quality factor and on the basis of a specialist listening demonstration, it was decided that a more onerous daytime standard equal to 32 dB(A) would be ideally be preferred.*

Figure 2 - Block C1 typical noise level at façade and sound performance requirements

Block C2

Room Type	Indoor noise standard	Typical Noise Level across façade dB(A)	Guidance on façade sound reduction performance		
			External wall	Windows	
			Rw, dB	Rw, dB	Indicative glazing configuration
Bedroom (Night-time)	30	55-60	50	40	Double Glazing: 8 (16) 6.4 Silence
Living Room (Daytime)	35 [32]*	60-65	50	35 [38]	Double Glazing: 4 (16) 8 [Double Glazing: 6 (16) 8.8]

Façade levels from 1st floor

** Stanley Sidings consider reduction of external noise to be a key quality factor and on the basis of a specialist listening demonstration, it was decided that a more onerous daytime standard equal to 32 dB(A) would be ideally be preferred.*

Figure 3 - Block C2 typical noise levels at façade and sound performance requirements

Block D/E

Room Type	Indoor noise standard	Typical Noise Level across façade dB(A)	Guidance on façade sound reduction performance		
			External wall	Windows	
			Rw, dB	Rw, dB	Indicative glazing configuration
Bedroom (Night-time)	30	60-65 ~ 83 dB L_{Amax}	55	48	Double Glazing :12.8 Silence (24) 14.8 Silence Thickness (mm): 52
		55-60 ~ 80 dB L_{Amax}	50	40	Double Glazing: 8 (16) 6.4 Silence
		55-60	50	35	Double Glazing: 4 (16) 8
Living Room (Daytime)	35 [32]*	65-70	55	42 [45]	Double Glazing: 8 (20) 6.4 Silence [Double Glazing: 10 (16) 8.4 Silence]
		60-65	50	35 [38]	Double Glazing: 4 (16) 8 [Double Glazing: 6 (16) 8.8]

Façade levels from to 1st floor

** Stanley Sidings consider reduction of external noise to be a key quality factor and on the basis of a specialist listening demonstration, it was decided that a more onerous daytime standard equal to 32 dB(A) would be ideally be preferred.*

Figure 4 - Block D/E typical noise levels at façade and sound performance requirements

Block WX

Room Type	Indoor noise standard	Typical Noise Level across façade dB(A)	Guidance on façade sound reduction performance		
			External wall	Windows	
			Rw, dB	Rw, dB	Indicative glazing configuration
Bedroom (Night-time)	30	60-65 ~ 85 dB L_{Amax}	55	48	Double Glazing :12.8 Silence (24) 14.8 Silence Thickness (mm): 52
		55-60	50	40	Double Glazing: 8 (16) 6.4 Silence
		50-55	50	35	Double Glazing: 4 (16) 8
Living Room (Daytime)	35 [32]*	65-70	55	42 [45]	Double Glazing: 8 (20) 6.4 Silence [Double Glazing: 10 (16) 8.4 Silence]
		60-65	50	35 [38]	Double Glazing: 4 (16) 8 [Double Glazing: 6 (16) 8.8]
		55-60	50	30 [33]	Double Glazing: 4 (16) 4

Façade levels up to 1st floor

Façade levels from to 2nd floor

** Stanley Sidings consider reduction of external noise to be a key quality factor and on the basis of a specialist listening demonstration, it was decided that a more onerous daytime standard equal to 32 dB(A) would be ideally be preferred.*

Figure 5 - Block WX typical noise levels at façade and sound performance requirements

The final requirements of the facade acoustic performances to achieve for each building are displayed in the series 48 of the Employer's Requirement (ER) drawings produced by AHMM. The drawings are reported in Appendix C.

2.3 Building envelope proposals

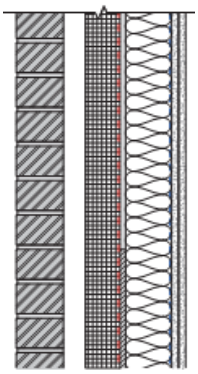
2.3.1 External Wall

Block C1, C2 and D/E

A minimum performance of 55 dB R_w has been advised in the previous stages and required by the ER to be provided by the external walls. This meets or exceed the requirements given in Section 2.2 above.

Currently there is a single construction intended for the façades of Block C1, C2 and D/E. The external wall build up is as follow:

- Brickwork
- 50mm cavity
- Partial filled rigid insulation
- Breather membrane
- Sheathing board
- Infill mineral wool insulation
- Steel frame system
- Vapour barrier
- 2x15mm plasterboard



The system is expected to provide a minimum sound reduction of 55 dB R_w. Details are given in Appendix D.

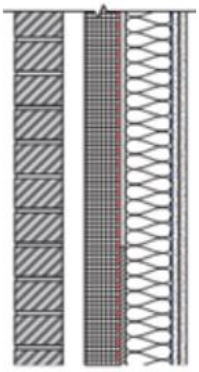
Block WX

Minimum performances of 50 and 55dB R_w respectively have been advised in the previous stages and required by the ER to be provided by the external walls for the W and X areas of the building.

There are two constructions proposed, one with brickwork finishes for the X zone and one with terracotta cladding for the W zone.

The brickwork external wall build up is as follows:

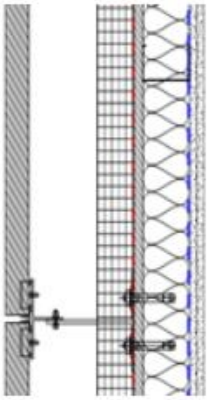
- Brickwork
- 50mm cavity
- Partial filled rigid insulation
- Breather membrane
- Sheathing board
- Infill mineral wool insulation
- Steel frame system
- Vapour barrier
- 2x15mm plasterboard



The system is expected to provide a minimum sound reduction of at least 55 dB R_w. The estimated performance assessment of the proposed external wall system is reported in Appendix D.

The proposed terracotta cladding external wall build up is as follow:

- Terracotta rainscreen
- Support Framing
- 143mm cavity
- Partial filled rigid insulation
- Breather membrane
- Sheathing board
- Infill mineral wool insulation
- Steel frame system
- Vapour barrier
- 2x15mm plasterboard



The system is expected to provide a minimum sound reduction in the region of 55 dB R_w. The performance assessment of the proposed external wall system is reported in Appendix D.

2.3.2 Windows schedule

A review of the window schedule for Block C, D/E and WX has been undertaken against the advised minimum required performances.
The proposed acoustic ratings for the gazing systems meet or exceed the minimum requirements and the ER. It is therefore expected that levels in habitable rooms caused by the external sources will be reduced to set internal levels.
Details are shown in Appendix E.

3. Conclusions

An assessment of the noise levels on the Hawley Wharf residential façades has been carried out in the previous stages.

Acoustic rating for the external walls and glazing systems have been provided.

An assessment of the proposed facade build-ups have been carried out. They have been shown to achieve internal noise levels in accordance with the relevant planning conditions.

Appendix A

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 logarithms 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).

Equivalent Noise Level L_{eq},
The Leq, is a parameter defined as the equivalent continuous sound pressure level. Over a defined time period 'T', it is the sound pressure level equivalent to the acoustic energy of the fluctuating sound signal. The Leq,T can be seen to be an "average" sound pressure level over a given time period (although it is not an arithmetic average). Typically the Leq,T will be an 'A' weighted noise level in dB(A). It is commonly used to describe all types of environmental noise sources.

L_{AFmax}
The maximum RMS A-weighted sound pressure level occurring within a specified time period. Fast time weighting indicates sound pressure level measurements undertaken using a 125millisecond moving average time weighting period

Background Noise Level L90
The L90,T is a parameter defined as the sound pressure level exceeded for 90% of the measurement period 'T'. It is a statistical parameter and cannot be directly combined to other acoustic parameters. It is generally used to describe the prevailing background noise level or underlying noise level.

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.

Appendix B – Assessment of the envelope acoustic rating

The following tables show the averaged maximum levels generated by different events obtained during the acoustic surveys at the Hawley Wharf site at façade level of each block. These levels are generally high in the ranging between 82 and 92 dB(A) and represent the main external noise sources to be acoustically reduced in order to comply with the set internal residential acoustic levels.

Different type of glazing systems have been considered to show that the with adequate window selections the maximum noise events can be reduced to the set L_{Amax} limit in abatable rooms.

Block C

Noise Survey – Measurement Results – Block C

Vehicle type	Measured Sound Pressure Level (dB L_{Amax}) at Octave Band Centre Frequency (Hz)								Total, dB(A)
	63	125	250	500	1k	2k	4k	8k	
Bus (Average)	90	85	86	85	81	78	74	68	86
Motorcycle (Average)	91	95	93	91	83	83	77	71	92
Truck (Average)	91	85	79	81	78	76	73	68	83
Mean Average (91 events)	**90**	**88**	**86**	**86**	**80**	**79**	**74**	**69**	**87**

Indoor levels due to maximum level of noise with different glazing systems – Block C

Main Wall	Glazing system	Sound Reduction Indices (dB*) at Octave Band Centre Frequency (Hz)									SPL, dB L_{Amax},
		63	125	250	500	1k	2k	4k	8k	R_w	
Current brickwork external wall build up	10.8/24/12.8	29	32	40	46	53	52	56	56	**49**	45
	12.8/20/14.8	29	34	40	46	52	51	56	56	**49**	45
	12.8/24/14.8	27	38	41	46	51	53	57	57	**50**	44

** Minimum performance required at each frequency band to achieve the overall indoor L_{Amax}*

The assessment above shows that in order to reduce the typical maximum levels to the L_{Amax} limit of 45 dB in habitable rooms, a minimum sound reduction of 49 dB R_w is required by the glazing systems located at the first floor of Block C on Castlehaven Rd.

Block D/E

Noise Survey – Measurement Results – Block D/E

Vehicle type	Measured Sound Pressure Level (dB L_{Amax}) at Octave Band Centre Frequency (Hz)								Total, dB(A)
	63	125	250	500	1k	2k	4k	8k	
Bus (Average of 29 events)	88	82	80	77	75	76	75	74	**83**

Indoor levels due to maximum level of noise with advised glazing system – Block D/E

Main Wall	Glazing system	Sound Reduction Indices (dB*) at Octave Band Centre Frequency (Hz)									SPL, dB L_{Amax},
		63	125	250	500	1k	2k	4k	8k	R_w	
Current brickwork external wall build up	12.8/24/14.8	26	33	40	44	48	52	58	58	**48**	44

** Minimum performance required at each frequency band to achieve the overall indoor L_{Amax}*

The assessment above shows that in order to reduce the typical maximum levels to the L_{Amax} limit of 45 dB in habitable rooms, a minimum sound reduction of 48 dB R_w is required by the glazing systems located on Hawley Rd.

Block W

Noise Survey – Measurement Results – Block WX

Vehicle type	Measured Sound Pressure Level (dB L_{Amax}) at Octave Band Centre Frequency (Hz)								Total, dB(A)
	63	125	250	500	1k	2k	4k	8k	
Bus (Average)	88	82	80	77	75	76	75	74	83
Motorcycle (Average)	83	90	81	78	74	74	68	64	82
Truck (Average)	86	86	80	78	75	77	76	67	83
Mean Average (38 events)	**86**	**86**	**80**	**78**	**75**	**75**	**73**	**68**	**82**

Indoor levels due to maximum level of noise with advised glazing system – Block WX

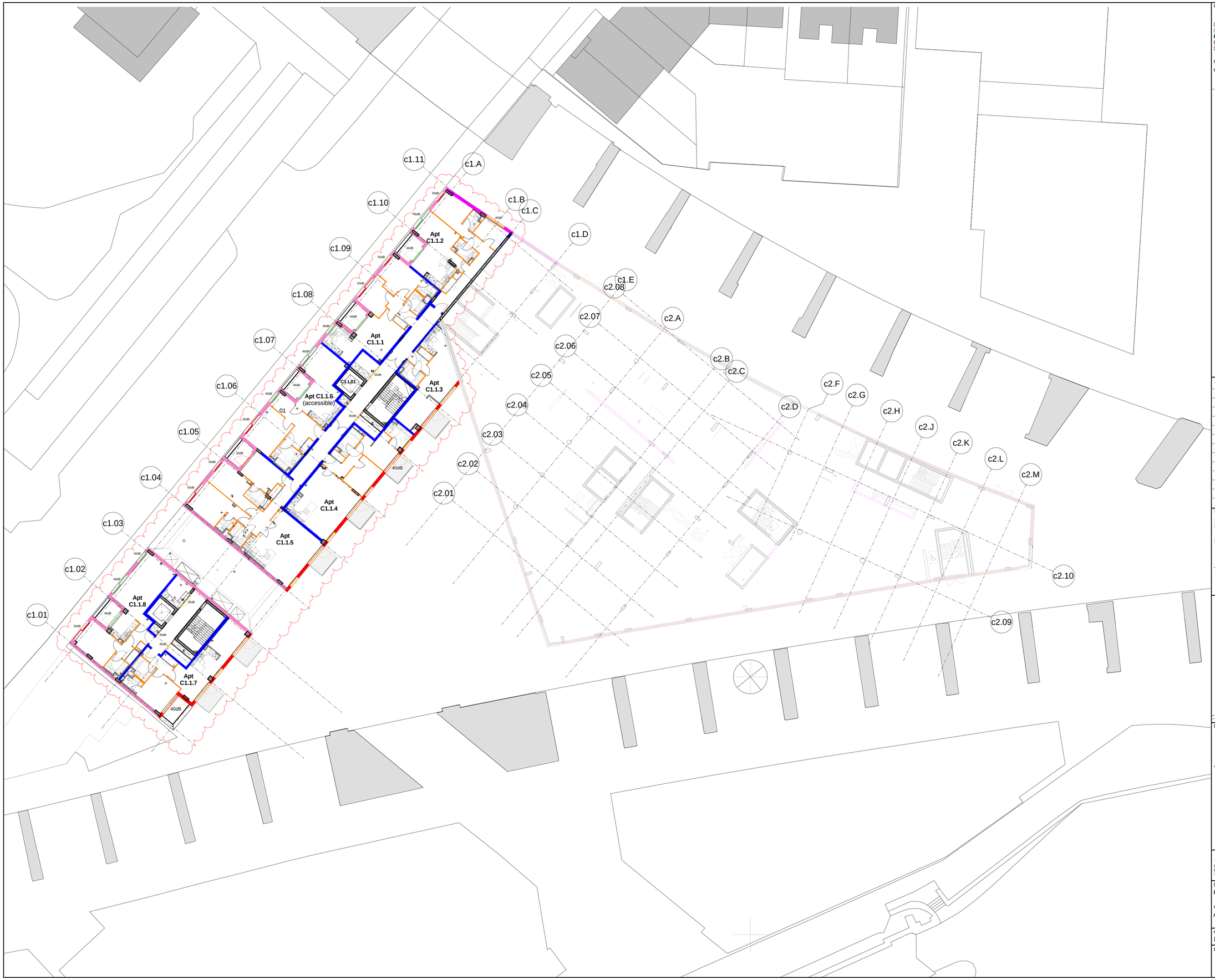
Main Wall	Glazing system	Sound Reduction Indices (dB*) at Octave Band Centre Frequency (Hz)									SPL, dB
		63	125	250	500	1k	2k	4k	8k	R_w	L_{Amax},
Current brickwork external wall build up	8.8/24/14.8	25	27	38	44	50	53	59	59	48	45
	12.8/24/14.8	26	33	40	44	48	52	58	59	48	43

** Minimum performance required at each frequency band to achieve the overall indoor L_{Amax}*

The assessment above shows that in order to reduce the typical maximum levels to the L_{Amax} limit of 45 dB in habitable rooms, a minimum sound reduction of 48 dB R_w is required by the glazing systems located on Kentish Town Rd.

Appendix C – Acoustic Employment Requirements

Block C



KEY - REQUIRED ACOUSTIC RATING

Rw	Rw	Dnt,w + Ctr
65 dB	50 dB	60 dB
60 dB	45 dB	50 dB
58 dB	40 dB	45 dB
55 dB	35 dB	
53 dB	25 dB	

NOTE

Refer to Acoustic Report for further information

REV	DATE	DESCRIPTION
T 0 3	18/12/15	Issued for ER's
T 0 2	07/08/15	Stage E - Residential Issue
T 0 1	26/06/15	Stage E Tender Issue

CONSULTANTS	
CLIENT:	Stanley Sidings
CONTRACTOR:	-
STRUCTURAL ENGINEER:	Walsh Group
MECHANICAL ENGINEER:	Hoare Lea
COST CONSULTANT:	Gardiner & Theobald
PROJECT MANAGER:	Gardiner & Theobald
ACOUSTIC CONSULTANT:	Hoare Lea
TRANSPORT CONSULTANT:	Arup
PLANNING CONSULTANT:	Gerald Eve
LANDSCAPE ARCHITECT:	Fabrik
CDM CO-ORDINATOR:	MSA Safety

NOTE

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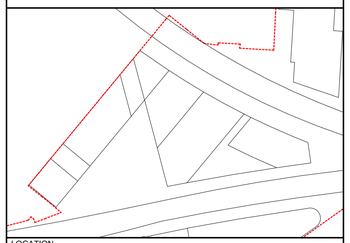

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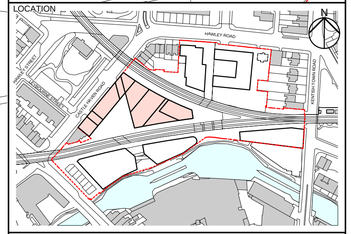

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job title

CAMDEN LOCK VILLAGE

drawing title / location

ACOUSTIC RATINGS - C1 FIRST FLOOR

drawn by	checked	scale	status
MD	HM	1 : 200 @ A1	ER issue

project	drawing no.	revision
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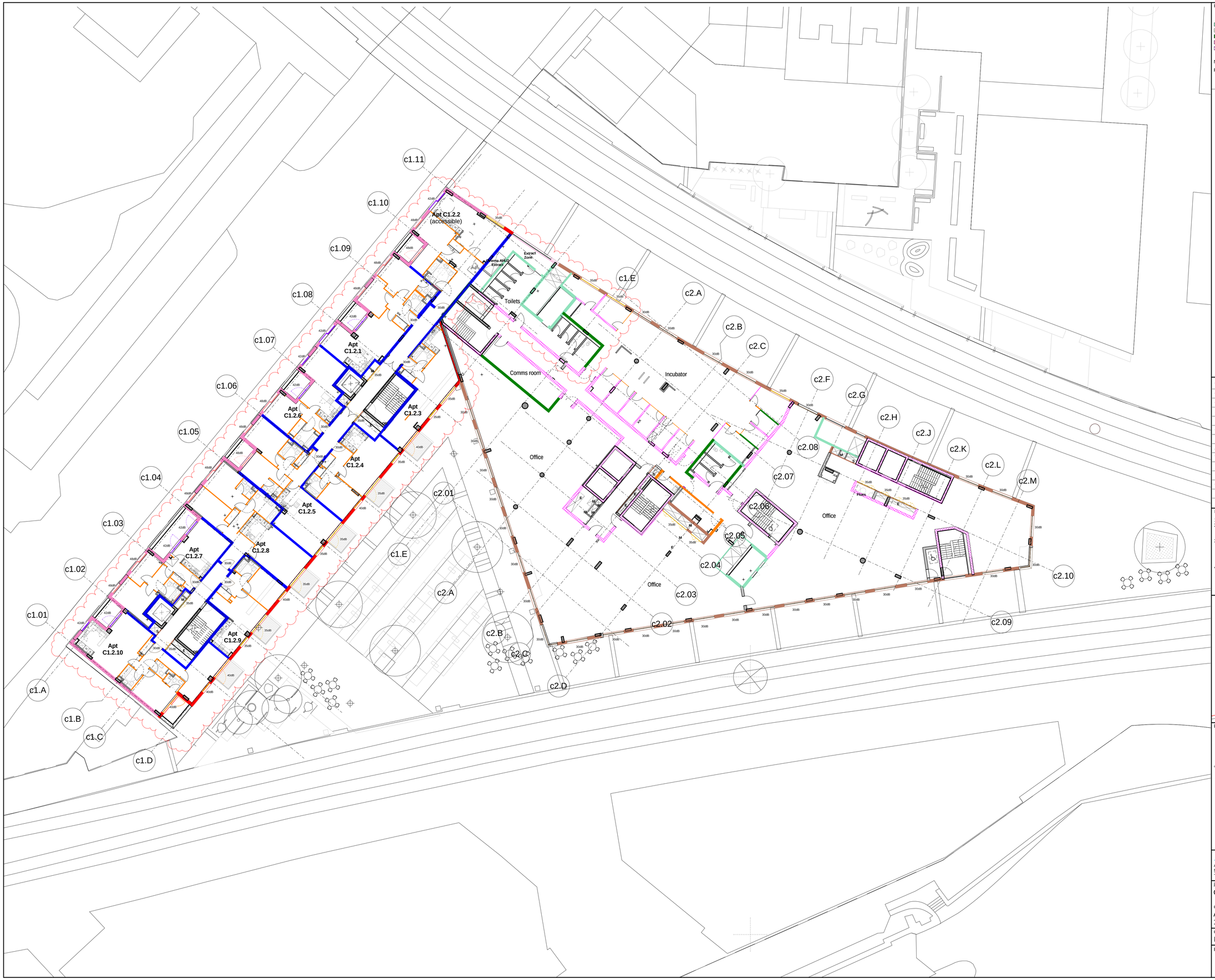

KEY - REQUIRED ACOUSTIC RATING

Rw	Rw	Dnt,w + Ctr
65 dB	50 dB	60 dB
60 dB	45 dB	50 dB
58 dB	40 dB	45 dB
55 dB	35 dB	
53 dB	25 dB	

NOTE

Refer to Acoustic Report for further information

REV	DATE	DESCRIPTION
T 0 4	18/12/15	Issued for ER's
T 0 3	17/08/15	Stage E Tender Issue Amendments - Building C
T 0 2	07/08/15	Stage E - Residential Issue
T 0 1	26/06/15	Stage E Tender Issue

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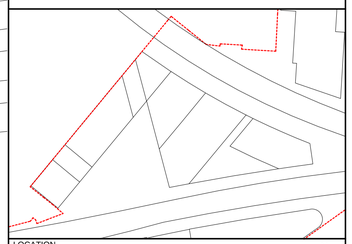

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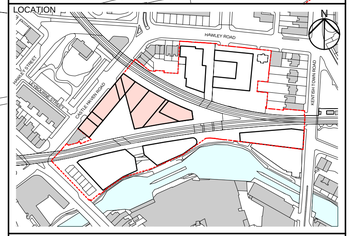

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job title

CAMDEN LOCK VILLAGE

drawing title / location

ACOUSTIC RATINGS - C1 - LEVEL 2, C2 LEVEL 1

drawn by	checked	scale	status
MD	HM	1 : 200 @ A1	ER issue

project	drawing no.	revision
14045	CX_(48)_ 1230	T04