

Planning Noise Assessment

Proposed Residential Development at 54-58 Queens Road, Reading

Report ref.

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Issued to

The Harris Partnership

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SECTION	TITLE	PAGE
1.	INTRODUCTION	1
2.	SITE DESCRIPTION	1
3.	RELEVANT GUIDANCE	1
3.1	NATIONAL PLANNING POLICY FRAMEWORK (NPPF).....	1
3.2	NOISE POLICY STATEMENT FOR ENGLAND (NPSE)	2
3.3	PLANNING PRACTICE GUIDANCE.....	2
3.4	WORLD HEALTH ORGANISATION (WHO) – GUIDELINES FOR COMMUNITY NOISE	3
3.5	BS 8233:2014 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS	4
4.	NOISE SURVEY	4
4.1	METHODOLOGY	4
4.2	RESULTS	5
5.	ASSESSMENT	6
5.1	INTERNAL AMBIENT NOISE LEVEL	6
5.2	SCHEME OF MITIGATION.....	7
5.3	NOISE IN OUTDOOR LIVING SPACES	7
6.	CONCLUSIONS	8

APPENDIX A: Site layout plans and elevations

APPENDIX B: Noise monitoring locations and results

APPENDIX C: Noise ingress calculations



1. INTRODUCTION

Pinemace Ltd are planning to convert a building currently used for offices to residential use under Permitted Development (PD) at Queen's Road, Reading.

An initial review of the site in April 2018 concluded that the likely impacts of noise from commercial premises on the intended occupiers of the development is not sufficient to constitute a material factor on the proposals. Therefore, no noise assessment would be required for the development under the PD scheme.

However, a further planning application is to be made in relation to a residential extension to the development for which a noise assessment would be required.

Spectrum Acoustic Consultants have been instructed by The Harris Partnership, on behalf of Pinemace, to carry out the necessary noise assessment to support the application for the extension.

2. SITE DESCRIPTION

The site is located on the corner of Queen's Road with Sidmouth Street in Reading and comprises a three storey office block. There are existing residential dwellings adjacent to the site to the west and opposite on the northern side of Queen's Road. To the south is another commercial building. On the opposite side of Sidmouth Street, to the east, is the University College of Estate Management. The surrounding area is generally a mix of residential and commercial uses.

The proposal is to build a new three storey extension to the south of the PD scheme providing an additional six flats. Additionally, three further flats are to be built within the roof of the extension and existing building. A communal external amenity area is also to be provided at roof level to the rear.

The proposed site layout plans and elevations are included in Appendix A.

3. RELEVANT GUIDANCE

3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The NPPF was first published in March 2012 and revised in July 2018 and February 2019. It sets out the Government's planning policies for England and how these should be applied by establishing a framework within which locally prepared plans for development can be produced.

Paragraph 170 of the NPPF states that *planning policies and decisions should contribute to and enhance the natural and local environment by [...] preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of [...] noise pollution.*

Paragraph 180 requires that planning policies and decisions take into account the likely effects (including cumulative effects) of development and in doing so should:



- a) *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; and*
- b) *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

Throughout the NPPF reference is made to other policies, such as the Noise Policy Statement for England (NPSE), which should also be applied as appropriate.

3.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The NPPF refers to the Noise Policy Statement for England (NPSE) which sets out the long term vision of Government noise policy as follows:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

The NPSE aims to clarify the principles and aims in existing policy documents, legislation and guidance that relate to noise. Its noise policy aims are to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life

through the effective management and control of environmental, neighbour and neighbourhood noise.

These aims are developed by reference to concepts from toxicology, namely NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level). NPSE also refers to SOAEL (Significant Observed Adverse Effect Level).

It recognises that there is no universally applicable measure for the concepts. Consequently, the SOAEL is likely to be different for different noise sources and receptors and at different times. Even so, significant effects should be avoided, taking account of sustainability aims.

Where noise impact is between LOAEL and SOAEL, the NPSE requires that all reasonable steps should be taken to mitigate adverse effects while taking account sustainable development aims. It notes (para. 2.7) that *the NPSE should consider noise alongside other relevant issues and noise should not to be considered in isolation.*

3.3 PLANNING PRACTICE GUIDANCE

In March, 2014, new government guidance on the role of noise in the planning process was released. This provides advice on issues such as when noise is relevant to planning, how to determine noise impact, discussion on the context of noise and how the impact of noise can be mitigated.

It summarises a hierarchy of noise exposure based on the likely average response. The noise exposure categories are summarised below.



- **No Observed Adverse Effect:** noise can be heard but does not cause any change in behaviour or attitude.
- **Observed Adverse Effect:** noise can be heard and causes small changes in behaviour and/or attitude.
- **Significant Observed Adverse Effect:** noise causes a material change in behaviour and/or attitude.
- **Unacceptable Adverse Effect:** extensive and regular changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or psychological effects.

The guidance advises that where there is no observed adverse effect, no specific measures are required to manage the acoustic environment; where there is an observed adverse effect, consideration needs to be given to mitigating and minimising those effects; where there is a significant adverse effect, the planning process should be used to avoid these effects occurring; where there are unacceptable adverse effects, the situation should be prevented.

It further advises that in looking to mitigate and minimise the effects of noise, the economic and social benefits being derived from the activity causing the noise should be taken into account.

No guidance is given on how noise levels might be assessed in terms of the above defined categories. However, there is good evidence within existing standards and guidance, based on social surveys, of the subjective response of people to noise of various types and levels and therefore this will continue to be referred to.

3.4 WORLD HEALTH ORGANISATION (WHO) – GUIDELINES FOR COMMUNITY NOISE

New guidance from World Health Organisation (WHO) titled Environmental Noise Guidelines for the European Region (ENG) was published in 2018. The document takes a very different approach to guidance set out in the previous Guidelines for Community Noise (GCN) document by identifying separate thresholds for specific sources rather than for community noise as a whole. Consequently, much of the earlier guidance set out in GCN is now absent from ENG. While ENG was intended to supersede GCN, it recognises this absence and states that 'indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid.'

GCN gives guidance on suitable noise levels for sleeping and resting conditions in dwellings. It recommends internal noise levels of 30dB(A) at night for bedrooms, and 35dB(A) during the day for living-rooms. The guideline levels are based on annual average data.

To avoid sleep disturbance in bedrooms during the night time period, it also recommends that noise levels from single sound events should not regularly exceed L_{Amax} 45dB. WHO defines 'regular' as not more than 10-15 events per night.

WHO also gives guidance on suitable noise levels for outdoor living areas such as gardens. The WHO guidelines state that 'to protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq} .'

The preface to GCN states that community noise includes road, rail and air traffic, industries, construction and public work, and the neighbourhood.

3.5 BS 8233:2014 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* gives guidance on indoor ambient noise levels to be achieved in dwellings for reasonable resting and sleeping conditions. The guidance in BS 8233:2014 is based on guidelines issued by the WHO, Guidelines for Community Noise (1999). The guideline levels are shown in Table 1, copied from BS 8233:2014.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 1: BS 8233 guideline noise level limits in dwellings for resting and sleeping

BS 8233 advises that *"If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the facade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment."*

It also advises that *"Where development is considered necessary or desirable...the internal target levels may be relaxed by up to 5 dB and reasonable conditions still achieved."*

The standard also advises that *"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFmax} depending on the character and number of events per night. Sporadic noise events could require separate values."* It does not give guidance on what might constitute a guideline value. However, as the standard does cross reference Guidelines for Community Noise - World Health Organization, 1999 (WHO), we suggest that the guideline value of L_{AFmax} 45 dB, inside bedrooms, should not be exceeded during the night more than 10-15 times, which reflects the WHO position.

4. NOISE SURVEY

4.1 METHODOLOGY

To inform the noise assessment, two unattended noise loggers were utilised for the recording of continuous noise measurements at the front the proposed development, one facing Queen's Road, the other facing Sidmouth Street. The measurement locations are shown in Appendix B.

Measurements were carried out continuously between Wednesday 17 and Tuesday 23 July 2019. Measurements consisted of contiguous five minute periods. Throughout the survey, weather conditions were warm and dry, with low to medium wind speeds.

Noise measurement parameters consisted of equivalent continuous (L_{Aeq}) noise levels and maximum (L_{AFmax}) noise levels as well as statistical noise levels (termed L'_n , where n is the percentage of time the

level is exceeded during the measurement period). Of the statistical parameters, the L_{A90} is typically used to describe the Background Sound Level (defined as the level exceeded for 90% of a period, in the absence of noise from the proposed development). Both overall and 1/1 octave band measurements were stored for later analysis.

The following equipment was used:

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 2726905
- Bruel & Kjaer Type 4189 Microphone s/n 2710995
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2730220
- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3000713
- Bruel & Kjaer Type 4189 Microphone s/n 2780512
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3001598

Before and after the survey, the sound level meters were field-calibrated in accordance with the manufacturer's guidelines, and no significant drift was observed. The meters, microphones and field calibrators are laboratory calibrated biennially in accordance with UKAS procedures or to traceable National Standards.

4.2 RESULTS

The results of the noise measurement survey are presented in Appendix B in graphical form. The ambient and background sound levels summarised in Table 2. The ambient noise levels are the log averages of the measurements carried out over the combined day and night periods, calculated as $L_{Aeq,16hour}$ and $L_{Aeq,8hour}$ values to represent the daytime and night time periods, respectively. The L_{Amax} levels shown are the average of the 15th highest measured levels during each of the night time periods, which indicates the levels would not be regularly exceeded (10-15 events per night as per WHO guidelines).

Measurement position	Day L_{Aeq} (dB)	Night L_{Aeq} (dB)	Night typical L_{Amax} (dB)
NML 1: facing Queen's Street	73	67	82
NML 2: facing Sidmouth Street	69	64	80

Table 2: Summary of noise measurement results

Noise levels incident on the site are dominated by noise from road traffic movements on Queen's Road and Sidmouth Street with contributions also from road traffic movements on other nearby and distant roads during both the daytime and night time periods.

At both noise monitoring locations (NML) noise levels follow diurnal fluctuations typical of a city centre affected by road traffic noise, with levels remaining consistent throughout the day until around 9-10pm when levels begin to decrease in line with reducing road traffic flows into the night time period. Levels are lowest between 2am and 5am at which point noise levels begin to rise with increasing road traffic flows, reaching typical daytime levels again by around 7am.



5. ASSESSMENT

5.1 INTERNAL AMBIENT NOISE LEVEL

Calculations of the noise intrusion into a sample of sensitive dwellings have been carried out using the method set out in BS 8233.

Façade noise levels have been calculated by taking a log average of the measured noise levels, in terms of $L_{Aeq,16hour}$ and $L_{Aeq,8hour}$ to represent the daytime and night time periods, respectively. Incident (free-field) noise levels have then been calculated from the measured façade levels by taking into account the reflection of noise from the existing building and any façade shape correction factors, as required, for the proposed development with reference to the methodology set out in BS EN 12354-3.

It is understood the existing façade is a brick and block construction.

The roof construction is assumed to comprise tile/slate on 100mm timber joists with 12.5mm plasterboard ceiling and mineral wool insulation in the void to achieve a sound reduction performance of both R_w 46dB and R_w+C_{tr} 39dB. The dormer window construction is assumed to have an equal acoustic performance to the roof.

Sound insulation data for windows and ventilation systems has been taken from manufacturers' data for typical systems.

The calculations assume typical internal finishes for habitable rooms, based on reverberation times that Spectrum have measured in a range of occupied dwellings at other sites, and on the room geometry and volumes taken from the floor plans and elevation drawings in Appendix A.

The detailed calculations are presented in Appendix C and the resultant internal ambient noise levels summarised in Table 3. The calculations include a mitigation scheme for the façades of the proposed development, as detailed in Section 5.2.

Room	External noise levels (dB)		Internal noise levels (dB)	
	Incident L_{Aeq}	Typical incident L_{Amax}	L_{Aeq}	Typical L_{Amax}
Unit B9				
Living/kitchen/dining (day)	69	-	33	-
Bedroom (day)	69	-	34	-
Bedroom (night)	63	77	28	45
Unit B2				
Living/kitchen/dining (day)	66	-	30	-
Bedroom (day)	66	-	32	-
Bedroom (night)	61	77	27	45

Table 3: Calculated indoor ambient noise levels

The results show that internal ambient noise levels can meet the criteria for desirable sleeping and resting conditions, as set out in BS 8233 and by the WHO, in all the habitable rooms at the proposed development.



5.2 SCHEME OF MITIGATION

A scheme of mitigation has been developed to ensure acceptable internal noise levels are achieved in each dwelling, in accordance with the criteria.

Acceptable internal ambient noise levels will be achieved with the following façade element specifications.

- Glazing with an acoustic performance specification of both R_w 40dB and R_w+C_{tr} 34dB (e.g. Pilkington Optiphon 6/16argon/6.8).
- Trickle vents with an acoustic performance specification of both $D_{n,e,w}$ 45dB and $D_{n,e,w}+C_{tr}$ 42dB (e.g. Greenwood 2500EAW.AC2 (Acoustic trickle)).
- Roof and dormer units with an acoustic performance specification of both R_w 46dB and R_w+C_{tr} 39dB (e.g. tile/slate on 100mm timber joists with 12.5mm plasterboard ceiling and mineral wool insulation in the void).

It is important to note that while example constructions are given it is the numerical performance specification that must be achieved.

Glazing is specified using the weighted sound reduction index, R_w , with a correction applied to account for the acoustic character of road traffic noise, C_{tr} . Vents are specified using the normalised element weighted sound level difference, $D_{n,e,w}$, also corrected for traffic noise, C_{tr} . The acoustic specifications should be met both with and without the traffic noise correction term.

Additionally, the glazing acoustic specification should apply to the window set as a whole, not just the glazing. For many windows, the influence of the frame materials on the composite sound reduction of the window set is largely negligible. However, for windows that must achieve R_w 40dB and R_w+C_{tr} 34dB, or more, the influence of the frame becomes increasingly significant and must be taken into account. In these cases, it is recommended that compliance is demonstrated by comparing the results of supplier test data with the required specifications.

With the above mitigation in place, acceptable noise levels inside dwellings at the proposed development site would be achieved, in line with the results of the calculations indicated in Table 3.

5.3 NOISE IN OUTDOOR LIVING SPACES

As set out in Section 3.5, BS 8233 suggests guidelines for noise levels in external spaces that are used for amenity space, such as gardens and patios. *"It is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline of 55 dB $L_{Aeq,T}$, which would be acceptable in noisier environments."*

Measured noise levels 1m from the façade of the building are up to L_{Aeq} 73dB during the day, which is equivalent to an incident (free field) noise level of L_{Aeq} 70dB. The roof terrace area is screened from the road by the raised roof section and is also more distant from the road than the building façade. Accordingly, noise levels in the roof terrace areas are expected to not exceed L_{Aeq} 51dB during the day. It is considered, therefore, that acceptable levels will be achieved.

6. CONCLUSIONS

A noise assessment has been carried out to establish the impact of noise affecting the proposed residential extension to the PD scheme development at 54-58 Queens Road, Reading, RG1 4RP. The proposed development comprises constructing nine flats by extending an existing building to the south and constructing a new storey above the existing building.

The assessment has demonstrated that acceptable internal noise levels can be achieved at the site, as per the guidance set out by BS 8233 and WHO. Acceptable internal ambient noise levels can be achieved by implementing the proposed scheme of mitigation. The scheme of mitigation includes an acoustic performance specification for glazing and ventilation, as well as for the roof and dormer units.

Noise in external amenity areas has also been assessed and acceptable noise levels are expected to be achieved.

A P P E N D I X A

Site layout plans and elevations

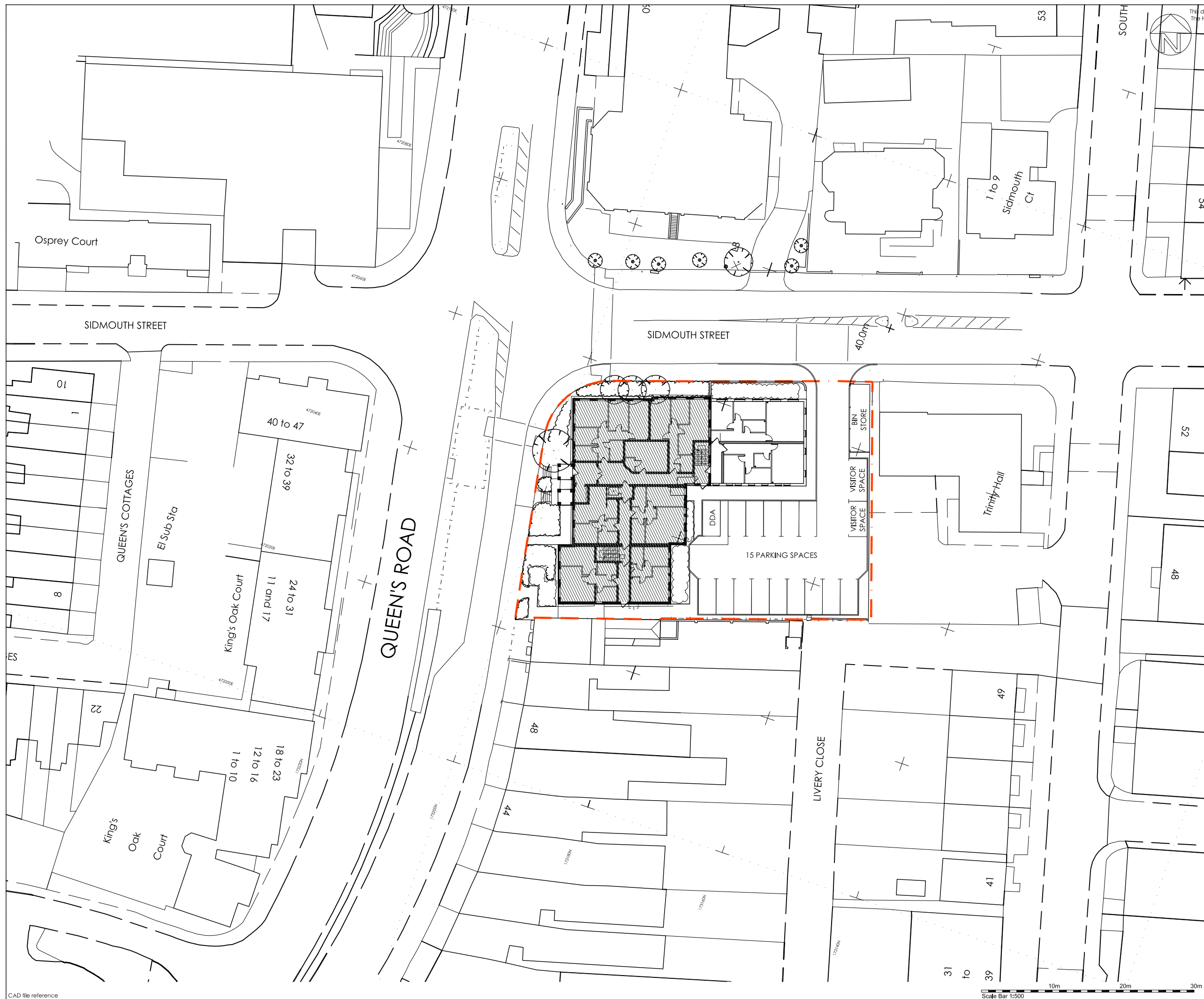
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PERMITTED DEVELOPMENT		
UNIT / FLOOR	SIZE OF UNIT	BED / PERSON
GROUND FLOOR		
UNIT 1	58.1sqm	1 BED - 2 PERSON
UNIT 2	40.8sqm	1 BED - 1 PERSON
UNIT 3	54.5sqm	1 BED - 2 PERSON
UNIT 4	40.1sqm	1 BED - 1 PERSON
UNIT 5	77.4sqm	2 BED - 4 PERSON
UNIT 6	62sqm	2 BED - 3 PERSON
FIRST FLOOR		
UNIT 7	58.1sqm	1 BED - 2 PERSON
UNIT 8	40.8sqm	1 BED - 1 PERSON
UNIT 9	54.5sqm	1 BED - 2 PERSON
UNIT 10	40.1sqm	1 BED - 1 PERSON
UNIT 11	40.4sqm	1 BED - 1 PERSON
UNIT 12	44.4sqm	1 BED - 1 PERSON
UNIT 13	62sqm	2 BED - 3 PERSON
SECOND FLOOR		
UNIT 14	58.1sqm	1 BED - 2 PERSON
UNIT 15	40.8sqm	1 BED - 1 PERSON
UNIT 16	54.5sqm	1 BED - 2 PERSON
UNIT 17	40.1sqm	1 BED - 1 PERSON
UNIT 18	40.4sqm	1 BED - 1 PERSON
UNIT 19	44.4sqm	1 BED - 1 PERSON
UNIT 20	62sqm	2 BED - 3 PERSON

EXTENSION		
UNIT / FLOOR	SIZE OF UNIT	BED / PERSON
GROUND FLOOR		
UNIT B1	63.4sqm	2 BED - 3 PERSON
UNIT B2	73.7sqm	2 BED - 4 PERSON
FIRST FLOOR		
UNIT B3	63.4sqm	2 BED - 3 PERSON
UNIT B4	73.7sqm	2 BED - 4 PERSON
SECOND FLOOR		
UNIT B5	63.4sqm	2 BED - 3 PERSON
UNIT B6	73.7sqm	2 BED - 4 PERSON
ATTIC FLOOR		
UNIT B7	98.4sqm	3 BED - 5 PERSON
UNIT B8	58.6sqm	1 BED - 2 PERSON
UNIT B9	70.9sqm	2 BED - 4 PERSON

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Status	PLANNING					
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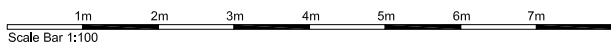
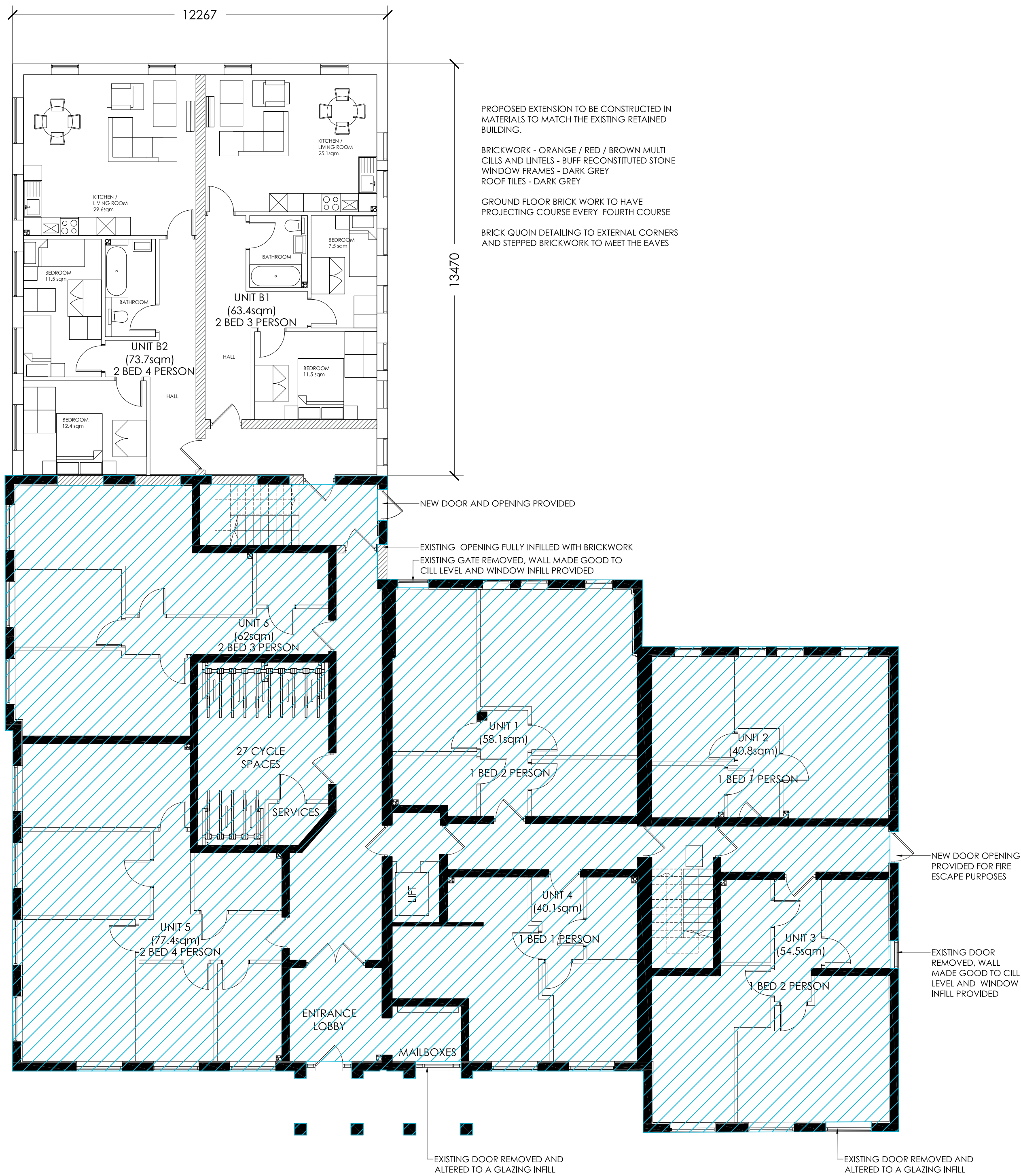
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Client	PINEMACE LTD		
Status	PLANNING		
Scale	1:100	Drawing Size	A2
Date	19/06/2019	Drawn By	JS
		Checked	TVT

Rev	Date	Description	Rev By	Chk'd By
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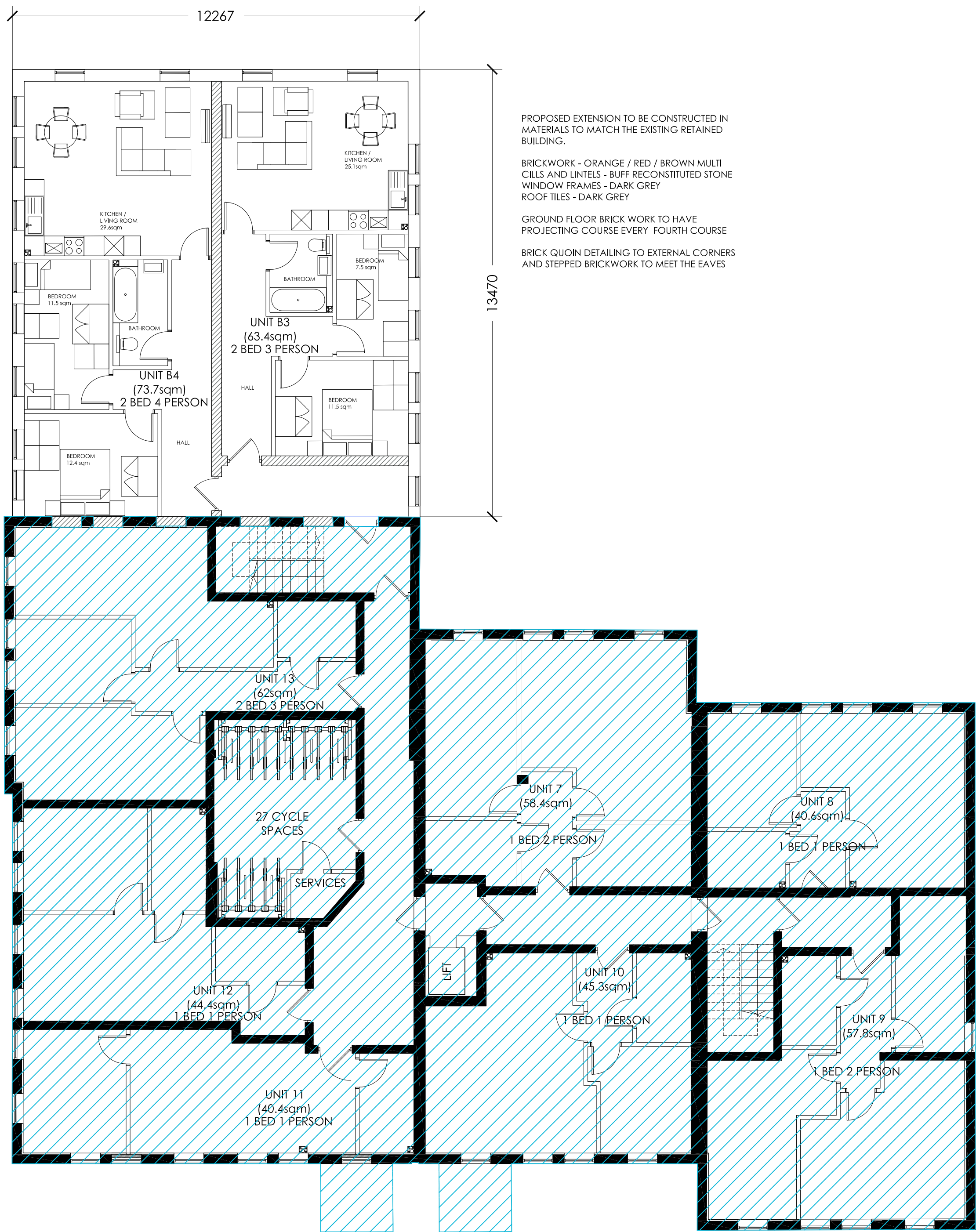


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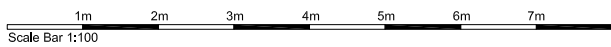


PROPOSED EXTENSION TO BE CONSTRUCTED IN MATERIALS TO MATCH THE EXISTING RETAINED BUILDING.

BRICKWORK - ORANGE / RED / BROWN MULTI CILLS AND LINTELS - BUFF RECONSTITUTED STONE WINDOW FRAMES - DARK GREY ROOF TILES - DARK GREY

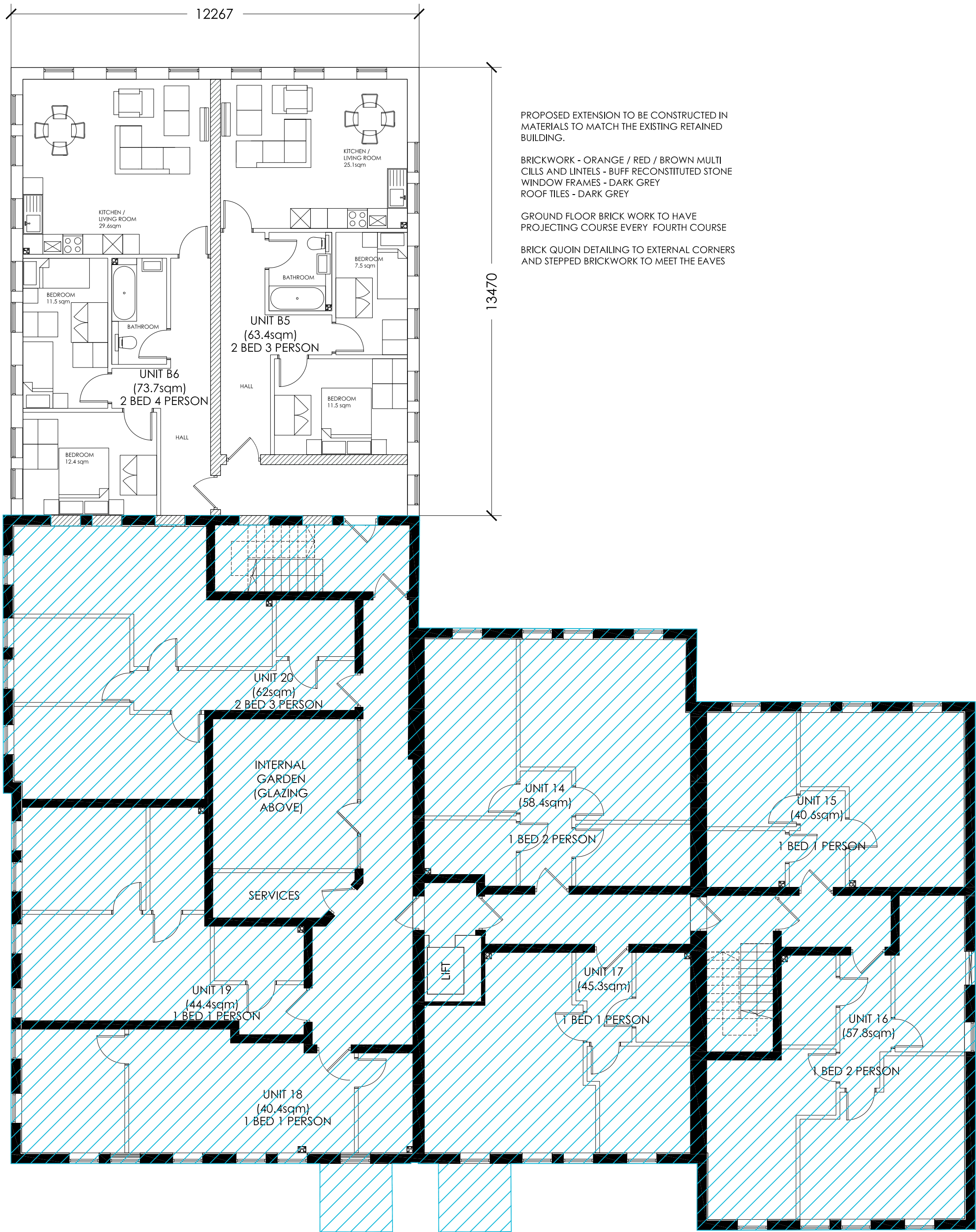
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Client	PINEMACE LTD		
Status	PLANNING		
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Date	19/06/2019	Drawn By	JS
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PROPOSED EXTENSION TO BE CONSTRUCTED IN MATERIALS TO MATCH THE EXISTING RETAINED BUILDING.

BRICKWORK - ORANGE / RED / BROWN MULTI
CILLS AND LINTELS - BUFF RECONSTITUTED STONE
WINDOW FRAMES - DARK GREY
ROOF TILES - DARK GREY

GROUND FLOOR BRICK WORK TO HAVE
PROJECTING COURSE EVERY FOURTH COURSE

BRICK QUOIN DETAILING TO EXTERNAL CORNERS
AND STEPPED BRICKWORK TO MEET THE EAVES

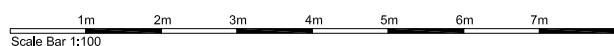
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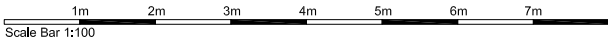
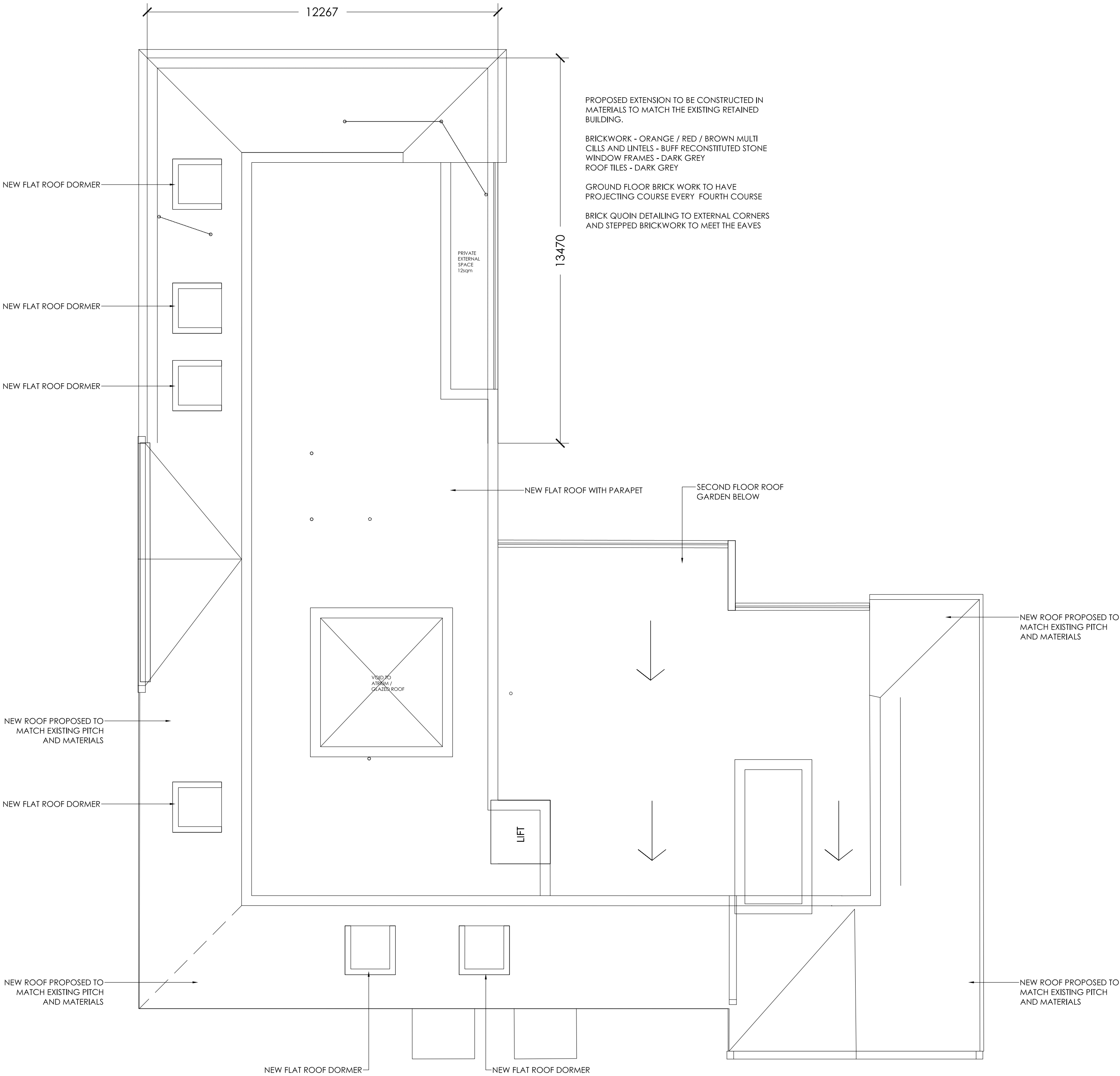
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Project Title		PROPOSED RESIDENTIAL EXTENSION				Drawing Title		PROPOSED ROOF PLAN			
		54-58 QUEENS ROAD READING RG1 4RP				Job-Dwg No		15261-116		Rev	-
Client		PINEMACE LTD				☐ 2 St. Johns North, Wakefield, WF1 3QA t. 01924 291800 ☐ Carvers Warehouse, 77 Dale Street, Manchester, M1 2HG t. 0161 2388555 ☐ The Old Rectory, 79 High Street, Newport Pagnell, MK16 8AB t. 01908 211577 ☒ 101 London Road, Reading, RG1 5BY t. 0118 9507700 ☐ 10 Gees Court, St Christophers Place, London, W1U 1JJ t. 0207 4091215					
Status		PLANNING									
Scale		1:100		Drawing Size							
Date		19/06/2019	Drawn By	PJC/TVT	Checked	TVT					



CAD file reference CAD FILE REFERENCE

NORTH-EAST/ SIDMOUTH STREET ELEVATION

NEW FLAT ROOF DORMER WITH GLAZING TO MATCH EXISTING WINDOWS

NEW FLAT ROOF DORMER WITH GLAZING TO MATCH EXISTING WINDOWS

NEW ROOF PROPOSED TO MATCH EXISTING PITCH AND MATERIALS

Tiles

Brick

ALARM

ALARM

CAMERA

HANDRAIL

EXISTING DOOR REMOVED AND ALTERED TO A GLAZING INFILL

EXISTING DOOR REMOVED AND ALTERED TO A GLAZING INFILL

NORTH-WEST/ QUEENS ROAD ELEVATION

1m 2m 3m 4m 5m 6m 7m
Scale Bar 1:100

Project Title	PROPOSED RESIDENTIAL EXTENSION			
	52-58 QUEENS ROAD READING RG1 4RP			
Client	PINEMACE LTD			
Status	PLANNING			
Scale	1:100	Drawing Size A2		
Date	19/06/2019	Drawn By	PJC/TVT	Checked TVT

Rev	Date	Description	Rev By	Chk'd By
Drawing Title		SIDMOUTH ST & QUEENS RD ELEVATIONS		
Job-Dwg No	15261-117		Rev	-

☐ 2 St. Johns North, Wakefield, WF1 3QA t. 01924 291800

☐ Carvers Warehouse, 77 Dale Street, Manchester, M1 2HG t. 0161 2388555

☐ The Old Rectory, 79 High Street, Newport Pagnell, MK16 8AB t. 01908 211577

☒ 101 London Road, Reading, RG1 5BY t. 0118 9507700

☐ 10 Gees Court, St Christophers Place, London, W1U 1JJ t. 0207 4091215

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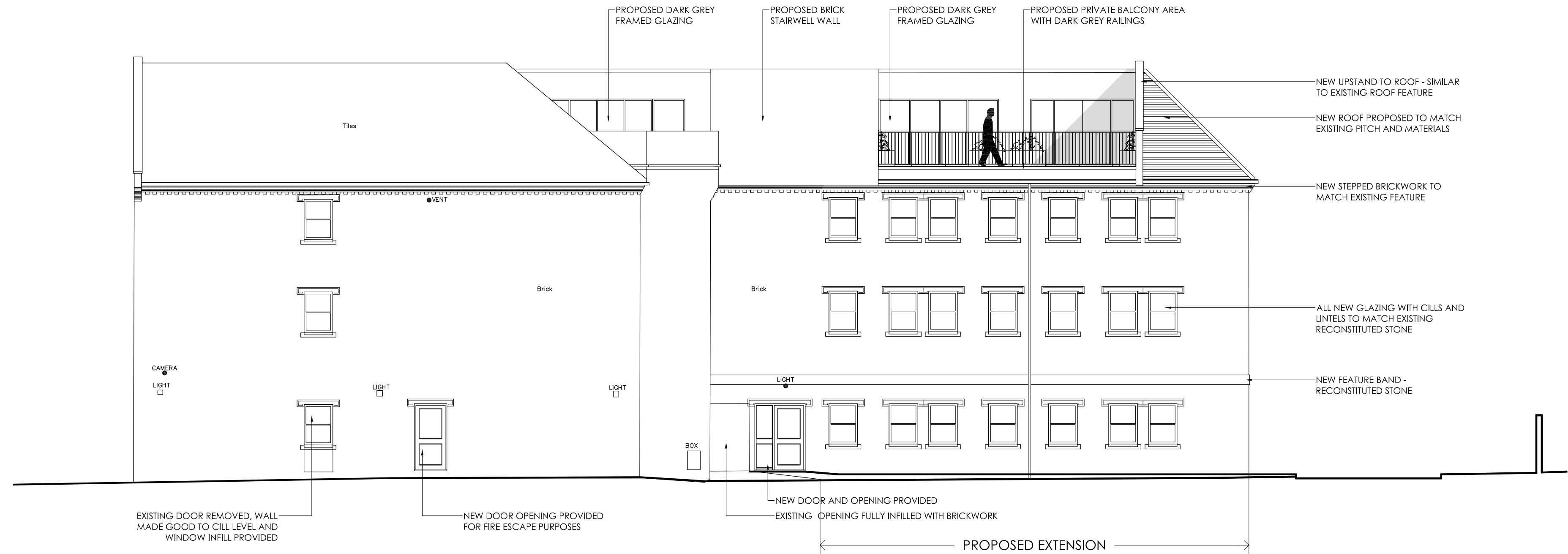
[illegible]

Rev	Date	Description	Rev By	Chk'd By
Drawing Title		SIDMOUTH ST & QUEENS RD ELEVATIONS		
Job-Dwg No	15261-117		Rev	-

- ☐ 2 St. Johns North,
Wokefield, WF1 3QA
t. 01924 271800
- ☐ Carvers Warehouse, 77 Dale Street,
Manchester, M1 2HG
t. 0161 2388555
- ☐ The Old Rectory, 79 High Street,
Newport Pagnell, MK16 8AB
t. 01908 211577
- ☒ 101 London Road,
Reading, RG1 5BY
t. 0118 9507700
- ☐ 10 Gees Court, St Christophers Place,
London, W1U 1JJ
t. 0207 4091215



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SOUTH-WEST/ COURTYARD ELEVATION



SOUTH-EAST/ COURTYARD/ SIDE ELEVATION

Project Title		PROPOSED RESIDENTIAL EXTENSION		Drawing Title		COURTYARD ELEVATIONS	
Client		PINEMACE LTD		Job-Dwg No		15261-118	
Status		PLANNING		Rev		A	
Scale		1:100		Drawing Size		A2	
Date		19/06/2019		Drawn By		PJC/TVT	
				Checked		TVT	

Rev	Date	Description	Rev By	Chk'd By
A	05-09-19	LANDSCAPING LAYOUT REVISED	LDH	TVT

☐ 2 St. Johns North, Wakefield, WF1 3QA t. 01924 291800

☐ Carvers Warehouse, 77 Dale Street, Manchester, M1 2HG t. 0161 2388555

☐ The Old Rectory, 79 High Street, Newport Pagnell, MK16 8AB t. 01908 211577

☒ 101 London Road, Reading, RG1 5BY t. 0118 9507700

☐ 10 Gees Court, St Christophers Place, London, W1U 1JJ t. 0207 4091215

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A P P E N D I X B

Noise monitoring locations and results

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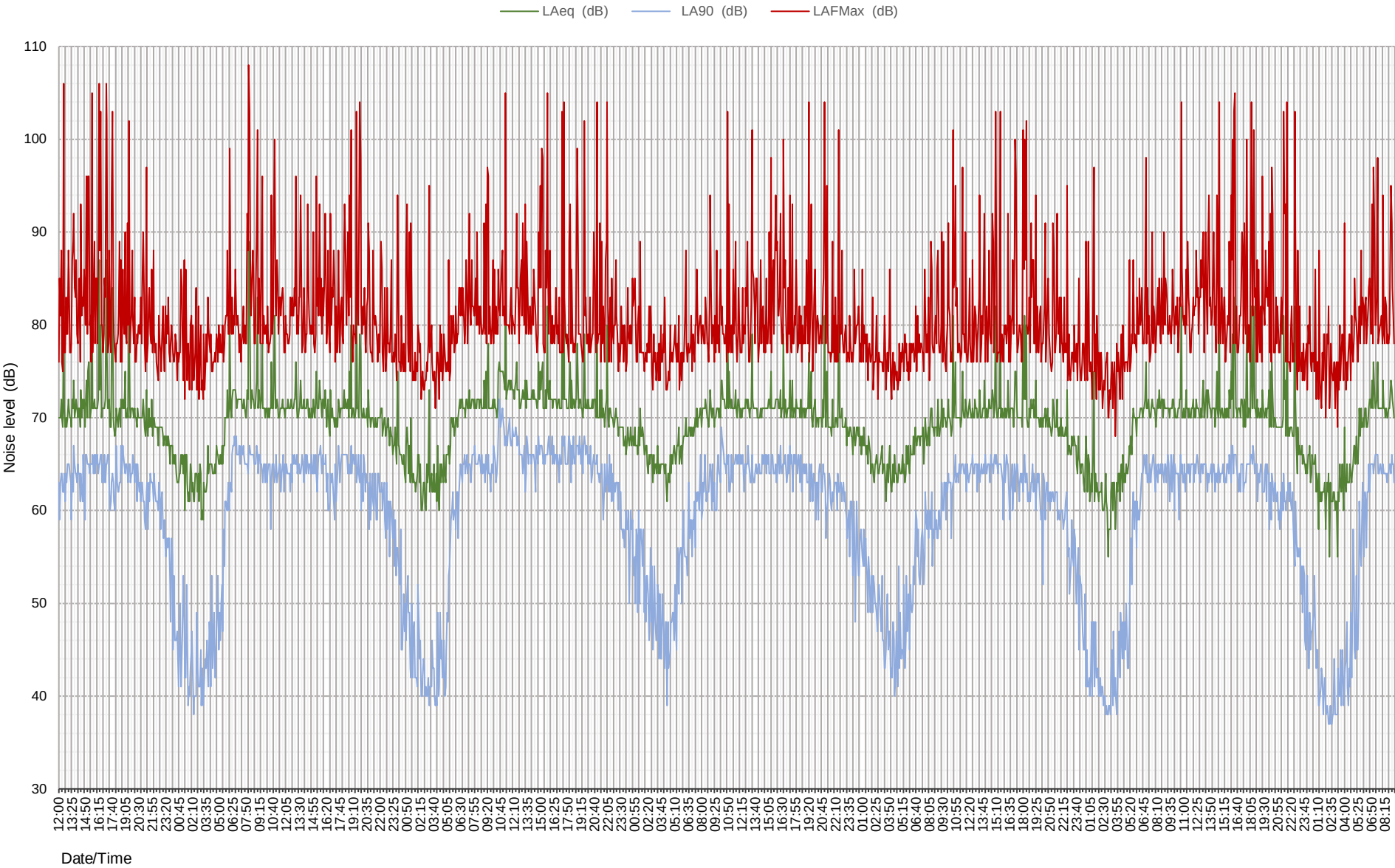


Noise monitoring Locations (NML)

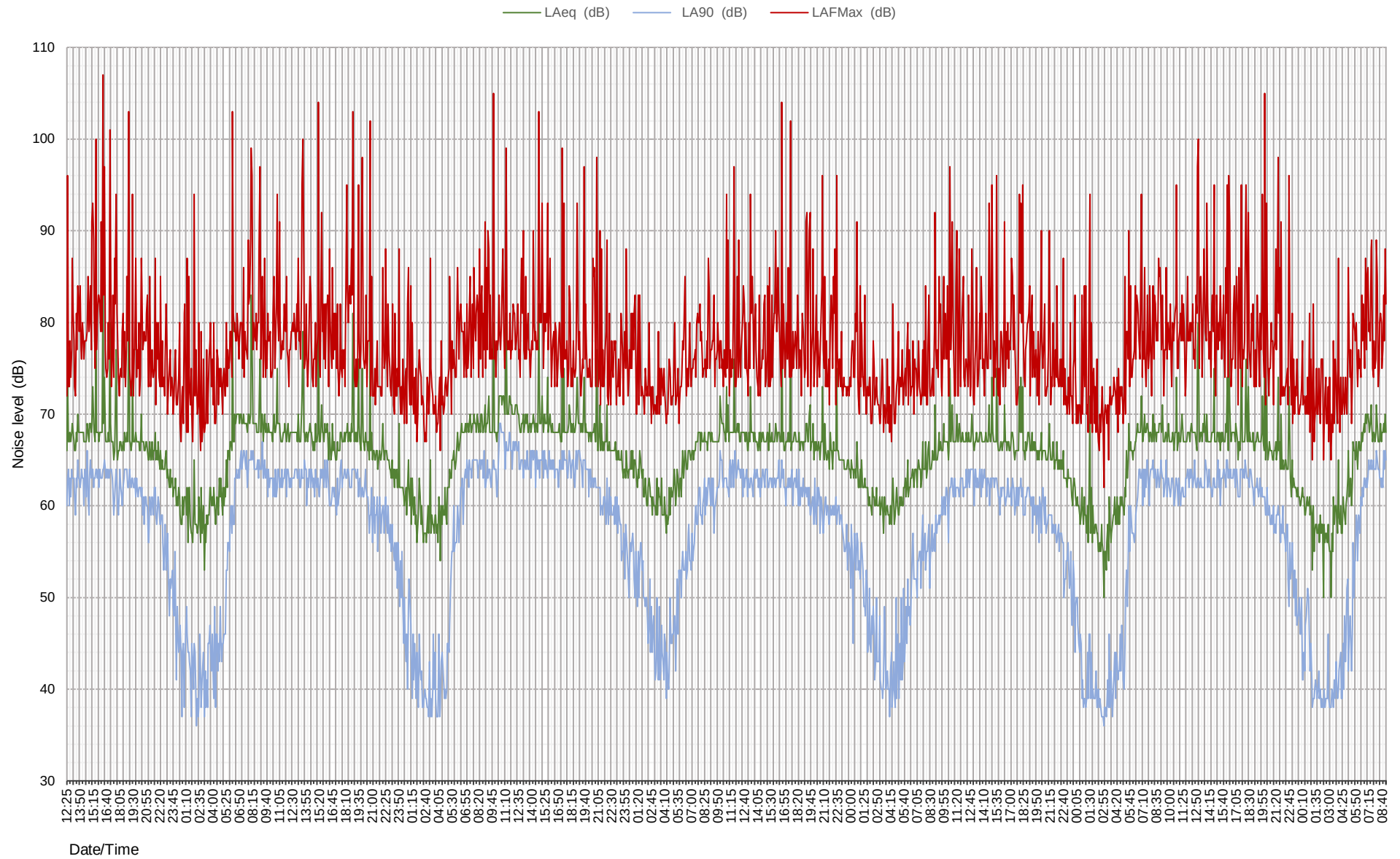
NML 1 - 2250/3 on second floor of 58 Queens Road

NML 2 - 2250/2 on second floor of 58 Queens Road

Noise levels at location 1: Queen's Road (17 to 23 July 2019)



Noise levels at location 2: Sidmouth Street (17 to 23 July 2019)



A P P E N D I X C

Noise ingress calculations

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Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	54-58 Queen's Road, Reading
Project number:	18016
Date:	14/08/2019

Plot:	Unit B9
Room:	LKD

Daytime (<i>L</i> _{Aeq,16hr})				Octave band centre frequency												Broadband term	
Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k						
EXTERNAL NOISE LEVEL																	
External noise level			Façade 1	<i>L</i> _{eq,1}	73	70	69	66	70	67	56	48		<i>L</i> _{Aeq,1}	73 dB		
Façade correction factor				C	4	4	4	4	4	4	4	4					
INCIDENT FAÇADE NOISE LEVEL																	
Incident noise level			Façade 1	<i>L</i> _{eq,ff}	69	66	65	62	66	63	52	44		<i>L</i> _{Aeq,ff}	69 dB		
ROOM DATA																	
Room description and reverberation time		Volume	64	Living Room	RT60	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3		s		
FAÇADE ELEMENTS (Façade 1)																	
Glazing		Area	1.6	Pilkington Optiphon 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57	Rw / Rw+Ctr	40 / 34 dB		
Roof		Area	17.1	Tile/slate 12.5mm plbd ceiling absorbing layer	Rw	22	27	37	43	48	52	56	60	Rw / Rw+Ctr	46 / 39 dB		
Vent		No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55	Dn,e,w / Dn,e,w+Ctr	45 / 42 dB		
None				--													
RESULTS																	
Total calculated indoor noise level				<i>L</i> _{eq,2}	51	43	34	29	24	16	1	-		<i>L</i> _{Aeq,2}	33 dB		

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	54-58 Queen's Road, Reading
Project number:	18016
Date:	14/08/2019

Plot:	Unit B9
Room:	Bedroom

Daytime (<i>L</i> _{Aeq,16hr})				Octave band centre frequency											
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term		
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	<i>L</i> _{Aeq,1}	73	70	69	66	70	67	56	48	<i>L</i> _{Aeq,1} 73 dB		
Façade correction factor				C	4	4	4	4	4	4	4	4			
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	<i>L</i> _{Aeq,ff}	69	66	65	62	66	63	52	44	<i>L</i> _{Aeq,ff} 69 dB		
ROOM DATA															
Room description and reverberation time		Volume	28	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2	s	
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	1.6	Pilkington Optiphon 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57	Rw / Rw+Ctr 40 / 34 dB		
Roof	Area	9.5	Tile/slate 12.5mm plbd ceiling absorbing layer	Rw	22	27	37	43	48	52	56	60	Rw / Rw+Ctr 46 / 39 dB		
Vent	No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55	Dn,e,w / Dn,e,w+Ctr 45 / 42 dB		
None			--												
RESULTS															
Total calculated indoor noise level				<i>L</i> _{Aeq,2}	51	45	36	31	25	17	2	-	<i>L</i> _{Aeq,2} 34 dB		

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	54-58 Queen's Road, Reading
Project number:	18016
Date:	14/08/2019

Plot:	Unit B9
Room:	Bedroom

Night time ($L_{Aeq,8hr}$)				Octave band centre frequency										Broadband term	
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k			
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{eq,1}$	67	64	63	61	64	59	51	43	$L_{Aeq,1}$	67 dB	
Façade correction factor				C	4	4	4	4	4	4	4	4			
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{eq,ff}$	63	60	59	57	60	55	47	39	$L_{Aeq,ff}$	63 dB	
ROOM DATA															
Room description and reverberation time	Volume	28	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		s	
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	1.6	Pilkington Optiphon 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57	Rw / Rw+Ctr	40 / 34 dB	
Roof	Area	9.5	Tile/slate 12.5mm plbd ceiling absorbing layer	Rw	22	27	37	43	48	52	56	60	Rw / Rw+Ctr	46 / 39 dB	
Vent	No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55	Dn,e,w / Dn,e,w+Ctr	45 / 42 dB	
None			--												
RESULTS															
Total calculated indoor noise level				$L_{eq,2}$	45	39	30	26	19	9	-	-	$L_{Aeq,2}$	28 dB	

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	54-58 Queen's Road, Reading
Project number:	18016
Date:	14/08/2019

Plot:	Unit B9
Room:	Bedroom

Night time ($L_{A\max}$)				Octave band centre frequency										Broadband term	
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k			
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{A\max,1}$	85	83	79	77	77	73	67	62	$L_{A\max,1}$	81 dB	
Façade correction factor				C	4	4	4	4	4	4	4	4			
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{A\max,ff}$	81	79	75	73	73	69	63	58	$L_{A\max,ff}$	77 dB	
ROOM DATA															
Room description and reverberation time	Volume	28	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		s	
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	1.6	Pilkington Optiphon 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57	Rw / Rw+Ctr	40 / 34 dB	
Roof	Area	9.5	Tile/slate 12.5mm plbd ceiling absorbing layer	Rw	22	27	37	43	48	52	56	60	Rw / Rw+Ctr	46 / 39 dB	
Vent	No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55	Dn,e,w / Dn,e,w+Ctr	45 / 42 dB	
None			--												
RESULTS															
Total calculated indoor noise level				$L_{A\max,2}$	63	57	45	42	32	23	13	6	$L_{A\max,2}$	45 dB	

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	54-58 Queen's Road, Reading
Project number:	18016
Date:	14/08/2019

Plot:	Unit B2
Room:	LKD

Daytime (<i>L</i> _{Aeq,16hr})				Octave band centre frequency										Broadband term	
Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k				
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	<i>L</i> _{eq,1}	71	67	66	63	66	63	54	47		<i>L</i> _{Aeq,1}	69 dB
Façade correction factor				C	3	3	3	3	3	3	3	3			
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	<i>L</i> _{eq,ff}	68	64	63	60	63	60	51	44		<i>L</i> _{Aeq,ff}	66 dB
ROOM DATA															
Room description and reverberation time		Volume	95	Living Room	RT60	0.6	0.6	0.5	0.5	0.4	0.4	0.3			s
FAÇADE ELEMENTS (Façade 1)															
Glazing		Area	9.2	Pilkington Optiphon 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57	Rw / Rw+Ctr	40 / 34 dB
Wall		Area	16.9	Brick and block external wall	Rw	34	40	44	45	51	56	60	63	Rw / Rw+Ctr	50 / 47 dB
Vent		No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55	Dn,e,w / Dn,e,w+Ctr	45 / 42 dB
None				--											
RESULTS															
Total calculated indoor noise level				<i>L</i> _{eq,2}	47	42	33	26	19	12	-	-		<i>L</i> _{Aeq,2}	30 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	54-58 Queen's Road, Reading
Project number:	18016
Date:	14/08/2019

Plot:	Unit B2
Room:	Bedroom

Daytime (<i>L</i> _{Aeq,16hr})				Octave band centre frequency													
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term				
EXTERNAL NOISE LEVEL																	
External noise level			Façade 1	<i>L</i> _{eq,1}	71	67	66	63	66	63	54	47		<i>L</i> _{Aeq,1}	69 dB		
Façade correction factor				C	3	3	3	3	3	3	3	3					
INCIDENT FAÇADE NOISE LEVEL																	
Incident noise level			Façade 1	<i>L</i> _{eq,ff}	68	64	63	60	63	60	51	44		<i>L</i> _{Aeq,ff}	66 dB		
ROOM DATA																	
Room description and reverberation time	Volume	37	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2			s		
FAÇADE ELEMENTS (Façade 1)																	
Glazing	Area	6.8	Pilkington Optiphon 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57		Rw / Rw+Ctr	40 / 34 dB		
Wall	Area	4	Brick and block external wall	Rw	34	40	44	45	51	56	60	63		Rw / Rw+Ctr	50 / 47 dB		
Vent	No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55		Dn,e,w / Dn,e,w+Ctr	45 / 42 dB		
None			--														
RESULTS																	
Total calculated indoor noise level				<i>L</i> _{eq,2}	48	44	35	29	21	13	0	-		<i>L</i> _{Aeq,2}	32 dB		

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	54-58 Queen's Road, Reading
Project number:	18016
Date:	14/08/2019

Plot:	Unit B2
Room:	Bedroom

Night time ($L_{Aeq,8hr}$)				Octave band centre frequency											
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term		
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{eq,1}$	65	61	60	58	61	56	48	42	$L_{Aeq,1}$	64 dB	
Façade correction factor				C	3	3	3	3	3	3	3	3			
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{eq,ff}$	62	58	57	55	58	53	45	39	$L_{Aeq,ff}$	61 dB	
ROOM DATA															
Room description and reverberation time	Volume	37	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		s	
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	6.8	Pilkington Optiphan 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57	Rw / Rw+Ctr	40 / 34 dB	
Wall	Area	4	Brick and block external wall	Rw	34	40	44	45	51	56	60	63	Rw / Rw+Ctr	50 / 47 dB	
Vent	No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55	Dn,e,w / Dn,e,w+Ctr	45 / 42 dB	
None			--												
RESULTS															
Total calculated indoor noise level				$L_{eq,2}$	42	38	29	24	16	6	-	-	$L_{Aeq,2}$	27 dB	

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	54-58 Queen's Road, Reading
Project number:	18016
Date:	14/08/2019

Plot:	Unit B2
Room:	Bedroom

Night time ($L_{A\text{Max}}$)				Octave band centre frequency											
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term		
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{\text{Max},1}$	84	82	78	76	76	72	66	61		$L_{A\text{Max},1}$	80 dB
Façade correction factor				C	3	3	3	3	3	3	3	3			
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{\text{Max},\text{ff}}$	81	79	75	73	73	69	63	58		$L_{A\text{Max},\text{ff}}$	77 dB
ROOM DATA															
Room description and reverberation time	Volume	37	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		s	
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	6.8	Pilkington Optiphan 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57		Rw / Rw+Ctr	40 / 34 dB
Wall	Area	4	Brick and block external wall	Rw	34	40	44	45	51	56	60	63		Rw / Rw+Ctr	50 / 47 dB
Vent	No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55		Dn,e,w / Dn,e,w+Ctr	45 / 42 dB
None			--												
RESULTS															
Total calculated indoor noise level				$L_{\text{Max},2}$	62	58	47	41	31	23	12	5		$L_{A\text{Max},2}$	45 dB

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