



READING POLICE STATION

Planning Stage Report

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Prepared: 15 May 2026

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PSH Consulting

5th Floor

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London

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Planning Stage Report



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1	Update to reflect design freeze	23 March 2026	James Hardacre	David Johnston
2	Update to address RBC comments	16 April 2026	James Hardacre	David Johnston
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The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.



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1. INTRODUCTION

A new residential development is proposed at the site of the former Reading Police Station. The development proposals consist of the demolition of the existing structures and construction of 2 new buildings to provide residential apartments over levels 01 to 15 and non-residential space at basement and ground floor levels.

An assessment has been carried out in relation to the noise levels likely to be incident on the proposed building façades and to provide acoustic performance specifications such that acceptable internal noise criteria can be achieved.

This report details the results of the noise survey undertaken by RBA Acoustics at the development site and sets out the acoustic performance requirements of the external building fabric elements. Preliminary analysis has been carried out of the predicted façade noise levels in relation to Approved Document O (ADO). In addition, suitable plant noise emission criteria have been developed based upon the survey results and the requirements of the Reading Borough Council.

2. SITE DESCRIPTION

The site is located off Castle Street in Reading. The site is bounded by the Inner Distribution Road (IDR) to the west, Reading Magistrates Court to the east, the Hexagon to the north and a mix of commercial and residential properties to the south. It is understood that this development is on the outskirts of a wider Reading Town Centre Framework.

We understand there to be proposals as part of the Reading Town Centre Framework to develop the land separating the Reading Police Station site and the Hexagon to provide residential towers. On this basis, it is anticipated that in the long term any noise break-out from events at the Hexagon will be screened by this future development. Despite this, the potential for noise from any events including vehicular movements and patron ingress and egress was considered prior to arranging site visits.

The noise climate around site was largely dominated by road traffic noise primarily from the IDR. Due to the location of the site in relation to the IDR, i.e. at a junction, the noise climate is generally louder than typical as the main carriageway passes underneath the roundabout that forms the junction, thus introducing highly localised reflections resulting in generally higher road traffic noise levels. Further contribution to the noise climate was noted from Castle Street, however, this is significantly less prominent as the road is used significantly less than the IDR.

The site is shown in relation to its surroundings in the site plan in Figure 1 (Appendix F).

3. EXTERNAL BUILDING FABRIC CRITERIA

The sections below outline the assessment criteria required by Reading Borough Council and reference additional relevant standards.

A summary of acoustic terminology is included in Appendix A.

3.1 Local Authority Requirements

Reading Borough Council have provided Pre-App comments on the development. We understand the following to be their relevant commentary on the site in regards to noise impacts:

"Noise Impact on Development"

The development is likely to be affected by road noise from the IDR, and also noise from the proposed commercial uses,

A noise assessment should be submitted in support of applications for new residential proposed in noisy areas.

The noise assessment will be assessed against the recommendations for internal noise levels within dwellings and external noise levels within gardens / balconies in accordance with BS 8233:2014 and WHO guidelines for Community Noise. The report should identify any mitigation measures that are necessary to ensure that the recommended standard is met.

Where appropriate, the noise assessment data should also include noise events ($L_{A_{Max}}$) and the design should aim to prevent noise levels from noise events exceeding 45 dB within bedrooms at night. Noise levels above 45 dB are linked with sleep disturbance.

It may be possible through clever design to reduce the need for additional noise mitigation measures, for example, ensuring that noise sensitive rooms are located on the quieter façades and bathrooms, kitchens, hallways and cupboards etc on the noisiest facades.

Noise mitigation is likely to focus on the weak point in the structure; glazing. Given that the acoustic integrity would be compromised should the windows be opened, ventilation details must also be provided, where mitigation relies on closed windows. Ventilation measures should be selected which do not allow unacceptable noise ingress and should provide sufficient ventilation to avoid the need to open windows in hot weather, however non-openable windows are not considered an acceptable solution due to the impact on living standards.

Internal noise criteria (taken from BS8233:2014)

Room	Design Criteria	Upper limit
Bedrooms (23:00 to 07:00)	<30dB LAeq,8hour	
Living rooms (07:00 – 23:00)	<35dB LAeq,16hour	
Gardens & Balconies	<50dB LAeq,T	<55dB LAeq,T

Noise generating development

Applications which include noise generating plant when there are nearby noise sensitive receptors should be accompanied by an acoustic assessment carried out in accordance with BS4142:2014;+A2019 methodology. It is likely that this development will include noisy mechanical plant such as air conditioning, kitchen extraction, generator, externally ventilated plant room.

The noise assessment needs to establish the predicted noise rating level taking account of any characteristic factors like tonality or impulsiveness of the noise. The rating level should be compared with the background noise level.

The noise source specific noise level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor and the rating level should not exceed the background level (as measured in accordance with BS4142:2014)."

3.2 British Standard 8233:2014

British Standards Institution (2014) *BS 8233:2014: Guidance on Sound Insulation and Noise Reduction for Buildings* draws on the results of research and experience to provide information on achieving internal acoustic environments appropriate to their functions.

The noise level values given are in terms of an average (L_{Aeq}) level.

The standard advises internal ambient noise levels for achieving suitable resting and sleeping conditions within residential properties as set out in Table 1.

Table 1 – BS 8233:2014 Residential Criteria

Room	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Living Rooms	35 dB $L_{Aeq,16hour}$	--
Dining Room/area	40 dB $L_{Aeq,16hour}$	--
Bedrooms	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

A summary of acoustic terminology is included in Appendix A.

3.3 World Health Organisation (WHO) Guidelines

WHO (2018) *Environmental Noise Guidelines for the European Region* sets out to define “recommended exposure levels for environmental noise in order to protect population health”. The guidance document relates specifically to external noise levels, and recommends that “all CNG [WHO (1999) *Guidelines for Community Noise*] indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid”. RBA therefore make reference to Guidelines for Community Noise for recommendations on internal noise levels.

Guidelines for Community Noise describes guideline levels that are “essentially values for the onset of health effects from noise exposure”. A table of guideline values is included, relating to adverse health effects, defined as any temporary or long-term deterioration in physical, psychological, or social functioning that is associated with noise exposure. The following is an extract from Table 4.1: Guideline values for community noise in specific environments, as stated in the WHO document.

Table 2 – Guideline Values for Community Noise

Specific Environment	Critical Health Effect(s)	L_{Aeq} (dB)	Time Base (hours)	L_{Amax} (dB)
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-times	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

With reference to maximum noise levels the following guidance is provided within the WHO guidance:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times per night (Vallet & Vernet 1991) and most studies show an increase in the percentage of awakenings at SEL values of 55-60 dBA (Passchier-Vermeer 1993; Finegold et al. 1994; Pearsons et al. 1995). For intermittent events that approximate aircraft noise, with an effective duration of 10-30s, SEL values of 55-60 corresponds to a L_{Amax} value of 45dB. Ten to 15 of these events during an 8 hour night-time implies a $L_{Aeq, 8h}$ of 20-25dB. This is 10-15dB below the $L_{Aeq, 8h}$ or 30dB for continuous night-time noise exposure, and shows that intermittent character of noise must be taken into account when setting night-time noise limits for noise exposure. For example, this can be achieved by considering the number of noise events and the difference between the maximum sound pressure level and the background of these events.”

Therefore, the frequency of occurrence of maximum noise events should not typically exceed 10-15 times in any night.

3.4 Building Regulations Approved Document O (ADO)

Building Regulations Approved Document O (2021 edition) provides guidance for mitigating overheating within residential developments. The document states that the building should be constructed to meet the requirement using passive means as far as reasonably practicable. With regards to removing excess heat, the first choice is therefore to use openable windows to mitigate overheating.

The document provides a simplified method for demonstrating compliance and an alternative, more detailed, dynamic thermal modelling approach. With regards to acoustic impact the following references are made:

- 3.1 *The standards in this section may mean that the standards of the simplified method cannot be met. For example, if external noise is an issue, it is unlikely that windows would be opened by an occupant and therefore the minimum free areas of the simplified method cannot be met. In such cases, **dynamic thermal modelling** should be used.*

Noise

- 3.2 *In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating strategy should take into account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*
- 3.3 *Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*

- (a) *40 dB $L_{Aeq,T}$ averaged over 8 hours (between 11pm and 7am)*
 (b) *55 dB L_{AFmax} more than 10 times a night (between 11pm and 7am)*

3.4 Where in-situ noise measurements are used as evidence of that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants' Acoustics, Ventilation and Overheating: Residential Design Guide (2020)."

With reference to the above Paragraph 3.3, the following limiting external free-field levels (as would be measured on a site prior to development) are implied (as no specific external threshold limits are provided directly). External noise levels above these values would not permit the use of the simplified method (as referred to in Paragraph 3.1) and dynamic thermal modelling should be used to demonstrate compliance:

Table 3* – External Noise Levels above which the Simplified Method cannot be Used

Parameter	High Risk Location	Moderate Risk Location
$L_{Aeq, 8h}$, averaged over 8 hours (between 23:00 – 07:00)	44dB	49dB
L_{AFmax} , more than 10 times a night (between 23:00 – 07:00)	59dB	64dB

* This table has been reproduced with reference to the IOA & ANC document 'Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O – July 2022'.

The following should be noted with regards to the above:

- High / Moderate Risk refers to the risk of overheating (not noise)
- The noise thresholds are low and likely to be exceeded at most sites within towns and cities and also those in proximity to infrastructure / transport routes etc.

3.5 Summary of Internal Noise Level Criteria

The adopted project criteria are given below for habitable rooms used during the daytime (e.g.: living rooms and bedroom) and during the night-time (e.g.: bedrooms):

Table 4 – Summary of Internal Noise Level Criteria

Measurement Period	Period-Averaged Noise Level, $L_{Aeq,T}$ (dB)	Maximum Noise Level, $L_{AFmax,5min}$ (dB)
Daytime (07:00 – 23:00)	≤ 35	-
Night-time (23:00 – 07:00)	≤ 30	≤ 45

4. ENVIRONMENTAL NOISE SURVEY

4.1 Survey Methodology

Due to the site being an operational police station at the time of our survey (July 2025), access to the roof and internal areas of the existing building was not feasible. As such, it was decided that an alternative survey methodology would be required to continuous unattended monitoring. On this basis, the approach decided was to undertake an attended survey to measure noise levels at critical positions around the site. The attended measurements were undertaken during the following periods:

- 11:00 to 14:00 Wednesday 9 July 2025,
- 23:00 Wednesday 9 July to 02:00 Thursday 10 July 2025.

During the survey periods the meteorological conditions were noted to be calm and clear, and can be considered suitable for obtaining representative noise measurements.

Measurements were made of the L_{A90} , L_{A10} , L_{Amax} and L_{Aeq} noise levels over sample periods of 15 minutes.

4.2 Measurement Locations

To determine the existing noise climate around the site measurements were undertaken at the following locations:

Measurement Position 1 – Inner Distribution Road (IDR): The sound level meter was mounted on top of a tripod approximately 1.5m above ground level. The unit in turn was positioned on the edge of the roundabout approximately 8m above the central reservation of the IDR. The dominant background noise at this position was noted to be road traffic noise from the IDR (A329). The measurements obtained at this position can be considered to have been measured in the free field and are representative of noise levels experienced at the future facades of the development.

Measurement Position 2 – Castle Street: The sound level meter was mounted on top of a tripod approximately 1.5m above ground level. The unit in turn was positioned on the edge of the pavement on Castle Street. The dominant background noise at this position was noted to be traffic noise from Castle Street. The measurements obtained at this position can be considered to have been measured in the free field and are representative of noise levels experienced at the future facades of the development.

Measurement Position 3 – San Francisco Libre Walk: The sound level meter was mounted on top of a tripod approximately 1.5m above ground level. The unit in turn was positioned on the edge of San Francisco Libre Walk to the rear of site. The dominant background noise level noted at this position was distant road traffic noise from the IDR. The measurements obtained at this position can be considered to be in the free field have been measured in the free field and are representative of noise levels experienced at the future facades of the development.

The measurement positions are also illustrated on the site plan attached in Figure 1 (Appendix F).

Whilst on site an event at the Hexagon Theatre was noted not to result in any increased noise impact at the site, neither in terms of vehicular movements, patron egress and ingress, nor breakout from the venue itself. The Hexagon is discussed specifically in Section 7.

4.3 Instrumentation

For information regarding the equipment used for the measurements please refer to Appendix D.

The sound level meter was calibrated both prior to and on completion of the survey with no significant calibration drift observed.

4.4 Results

The measured period-averaged L_{Aeq} and typical night-time L_{AFmax} noise levels are summarised in Table 5, below:

Table 5 – Baseline Survey Measured Noise Levels

Measurement Position	Measurement Period	Period-Averaged Noise Level, L_{Aeq} [dB]	Measured L_{A90} Noise Level, [dB]	Measured L_{A10} Noise Level, [dB]	Maximum Noise Level, L_{AFmax} [dB]
1	11:15 – 11:30	76	69	79	86
	12:05 – 12:20	79	69	80	105
	13:00 – 13:15	77	70	79	93
	23:00 – 23:15	71	59	75	86
	00:00 – 00:15	71	58	75	94
	01:00 – 01:15	66	48	70	82
2	11:45 – 12:00	66	52	70	79
	12:25 – 12:40	65	53	70	81
	13:18 – 13:33	66	54	70	83
	23:17 – 23:32	59	45	61	76
	00:17 – 00:32	57	43	59	77
3	12:40 – 12:55	58	54	60	77
	23:35 – 23:50	51	45	53	71

The survey results affirm our on site observations that there is a significant drop off in noise level overnight. This is primarily due to the IDR being very busy during the daytime, with traffic levels dropping off significantly overnight. The maximum levels measured were generally as a result of larger, modified or emergency vehicles travelling around the local road network. It is worth noting that during the night-time survey police vehicles were noted to be exiting the under blue light conditions, however, generally the sirens were not activated until the vehicle had progressed down the road away from site. As such, it can be assumed that the removal of the police station will not result in a reduction in number of maxima events.

5. EXTERNAL BUILDING FABRIC ASSESSMENT

5.1 Background

Analyses of the external building fabric have been undertaken in order to ascertain the required acoustic performance of the glazing and other external fabric elements to achieve the project criteria.

5.2 Assumptions

Our external building fabric analyses have assumed the following:

5.2.1 Drawings

The assessment has been based on the information provided in the following drawings:

Drawing/Document Number	Revision	Description	Date
01962-JTP-SP_01	D11	Proposed Sitewide - Basement Plan	23 February 2026
01962-JTP-SP_02	D7	Proposed Sitewide - Ground Floor Plan	20 February 2026
01962-JTP-SP_03	D7	Proposed Sitewide - Level 01 Plan	20 February 2026
01962-JTP-SP_04	D7	Proposed Sitewide - Level 02 Plan	20 February 2026
01962-JTP-SP_05	D7	Proposed Sitewide - Level 03 Plan	20 February 2026
01962-JTP-SP_06	D7	Proposed Sitewide - Level 04 Plan	20 February 2026
01962-JTP-SP_07	D7	Proposed Sitewide - Level 05 Plan	20 February 2026
01962-JTP-SP_08	D7	Proposed Sitewide - Level 06 Plan	20 February 2026
01962-JTP-SP_09	D7	Proposed Sitewide - Level 07 Plan	20 February 2026
01962-JTP-SP_10	D7	Proposed Sitewide - Level 08 Plan	20 February 2026
01962-JTP-SP_11	D7	Proposed Sitewide - Level 09 Plan	20 February 2026
01962-JTP-SP_12	D7	Proposed Sitewide - Level 10 Plan	20 February 2026
01962-JTP-SP_13	D7	Proposed Sitewide - Level 11 Plan	20 February 2026
01962-JTP-SP_14	D7	Proposed Sitewide - Level 12 Plan	20 February 2026
01962-JTP-SP_15	D7	Proposed Sitewide - Level 13 Plan	20 February 2026
01962-JTP-SP_16	D7	Proposed Sitewide - Level 14 Plan	20 February 2026
01962-JTP-SP_17	D7	Proposed Sitewide - Level 15 Plan	20 February 2026
01962-JTP-SP_18	D6	Proposed Sitewide - Level 16 Plan	20 February 2026
01962-JTP-SP_22	D6	Proposed Sitewide - Roof Plan	20 February 2026

5.2.2 Noise Levels

The assessment has been based on the measured noise levels as detailed in 4.4.

5.2.3 Room Absorption

The calculations assume that bedrooms are acoustically 'soft' with carpets, curtains and other soft furnishings. The living rooms are assumed to be less acoustically absorptive (with a hard floor finish, although with furnishings).

Details of the absorption coefficients assumed in the calculations are provided in Appendix B.

5.2.4 External Wall

The exact external wall build up has not been confirmed, however it is expected to be formed of a lightweight steel frame structure. As such, RBA have assumed the following sound reduction indices (equating to an overall R_w of 46 dB) for all non-glazed façade areas:

Table 6 – Assumed Sound Reduction Indices of Non-Glazed Elements

Assumed Minimum Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
20	26	37	44	50	55	55	55

Should the proposals for non-glazed areas change, it is critical RBA are informed at the earliest opportunity as this could have a significant impact on the sound insulation performance requirements of the glazing systems.

5.2.5 Ventilation

At this stage of the design, it is understood that there is no specific intent with regards to ventilation, as such the following section outlines the required glazing specification both with and without trickle ventilation, where the external noise levels allow for a natural ventilation scheme.

5.3 Specification & Guidance Constructions

Appendix C details the sound reduction performance specification for the ventilators and glazed elements of the external building fabric.

The glazing performance specifications apply to the glazing package as a whole - inclusive of glazing, louvres, spandrel panels, framing, opening lights, doors, seals, etc. The performance of the glazing system will depend on many factors such as the glazing configuration, size of window panels, quality of framing, quality of sealing, etc.

Please note – The glazing configurations described in Table 7 and ventilator types described in Table 8 are given for costing purposes only. All window systems should be capable of meeting the performance specifications shown in Appendix C, with laboratory test certificates being made available in support of the quoted performance. Glazing proposals which simply reflect the guidance constructions indicated in this report will not, in isolation, be sufficient evidence that a window configuration will meet the performance specification.

For guidance purposes RBA would typically expect the following glazing configurations to prove commensurate with achieving the sound insulation performance specifications detailed within Appendix C.

Table 7 – Guidance on Glazing Constructions

Glazing Type	Minimum Required R_w	Example Glazing Configuration
G1	R_w 43 dB	10/12/16.8
G2	R_w 40 dB	10/12/8.4
G3	R_w 31 dB	4/6/4

For guidance purposes RBA would typically expect the following trickle ventilator types to prove commensurate with achieving the sound insulation performance specifications detailed within Appendix C.

Table 8 – Guidance on Trickle Ventilators

Ventilator Type	Minimum Required $D_{n,e,w}$	Example Ventilator Type
V1	$D_{n,e,w}$ 32 dB	Trickle Ventilator with Direct Air-Path (8000mm ²) – $D_{n,e,w}$ 32 dB

5.4 Applicable Zoning

Due to the differences in the prevailing noise climate around the site and the types of rooms at each floor level, three primary glazing zones have been defined, as indicated on the façade zoning plans provided in Figure 2 – 8 in Appendix F.

Table 9 – Glazing & Ventilator Zoning

Zone	Habitable Room Receptor	Glazing Type	Ventilator Type
1	Night-time usage (Bedrooms)	G2	MVHR
	Daytime usage (Living, Dining, LKD)	G1	MVHR
2a	Night-time usage (Bedrooms)	G2	MVHR
	Daytime usage (Living, Dining, LKD)	G2	MVHR
3	Night-time usage (Bedrooms)	G3	V1
	Daytime usage (Living, Dining, LKD)	G4	V1

It is worth noting that two options are provided for façade zone 2 to consider a mechanically ventilated solution, e.g. MVHR, and a naturally ventilated solution.

5.5 Flanking Specification

RBA also advise on the flanking specification for any curtain walling or continuous glazing systems proposed.

Flanking Performance Specification

The previous sections relate to external noise intrusion through the façade, including any curtain walling, to internal areas. Curtain walling systems can also compromise the sound insulation performance of separating walls and floors. It is therefore important that an additional specification for the curtain walling package be introduced, achievement of which will limit the amount of sound transfer across separating wall and floor lines through the curtain walling system. A flanking performance specification is attached within Appendix C – Section 3.0.

Achievement of the specification can be demonstrated by laboratory acoustic testing in general accordance with BS EN ISO 10848-2:2017. This can be a complex and costly testing procedure and therefore the supplier may, following tender reviews, be allowed to demonstrate by other means that the specification can be achieved. This is reflected in the specification wording within Appendix C.

The specification should also be introduced within the tender documentation for any other packages which could affect the transmission of flanking sound at separating wall and floor lines.

It is likely insulated double/split mullions and transoms will be required in order to achieve the flanking specification; these can have a large impact on the design of any curtain walling system and should be investigated at the earliest opportunity to ensure the specification is achieved.

5.6 Approved Document O (Overheating & Noise)

5.6.1 Noise Levels

External noise levels assumed in the methodology are based on the details provided in Section 4.0

5.6.2 Assessment Methodology

This site, located in Reading, falls within the moderate risk area for overheating as specified in Appendix C of Approved Document O (Areas with a high risk of its buildings overheating). As such, the external noise limits for allowing the use of the simplified methods are as follows:

- $L_{Aeq, 8h}$ averaged over 8 hours (between 23:00 – 07:00) 49 dB
- L_{AFmax} more than 10 times a night (between 23:00 – 07:00) 64 dB

Should these levels be exceeded externally, thermal dynamic modelling may show that lower free area requirements may still achieve the overheating criteria. This could still be achieved by fully opening windows. Experience indicates that fully opening a window offers in the region of 4dB to 9dB reduction from measured external noise level to internal level.

Based on the above, the following noise risk categorisation has been developed as outlined in Table 10.

Table 10 – Acoustics and Overheating External Noise Risk Categorisation

Noise Risk Category	External Night-time (23:00 to 07:00 hours) Façade Noise Levels		Description
	Average L_{Aeq} Levels (dB)	Typical L_{AFmax} Level (dB)	
A	≤ 44	≤ 59	Internal noise levels highly likely to be below ADO criteria.
B	45 - 49	60 – 64	Internal noise levels likely to be within ADO criteria.
C	50 - 54	65 - 69	Internal noise levels may be within ADO criteria, depending on window opening area.
D	55	≥ 70	Internal noise levels likely to be above ADO criteria.

5.6.3 Results

The noise risk assessment for overheating is with regards to noise levels at the façade of the proposed development. As such, the façade incident noise levels have been calculation based on measurement data obtained in Section 4.0 and the drawings provided by JTP Architects. The façade incident noise levels have been used in the acoustics and overheating noise risk categorisation. The results of the assessment are given in Table 11.

Table 11 – Façade Incident levels and Risk Categorisation

Façade Zone*	Night-time L_{Aeq} Noise Level (dB)	Acoustics and Overheating External Noise Risk Categorisation	Typical Night-Time L_{AFmax}	Acoustics and Overheating External Noise Risk Categorisation
1	63	D	83	D
2	60	D	70	D
3	51	C	65	C

*Note – For simplicity these zones are the same as outlined in Section 5.4

5.6.4 Discussion

The results of the assessment indicate that the external noise levels are above the threshold values outlined in Table 10 to allow a simplified assessment of overheating be undertaken and, as such, dynamic thermal modelling is required to demonstrate compliance with the requirements of Building Regulations Approved Document O.

The assessment indicates that the majority of the site is a risk category D, which indicates that internal noise level criteria outlined in Building Regulations Approved Document O will be exceeded when windows are fully open to mitigate overheating.

Report reference 3778-PSH-ZZ-ZZ-RP-SE-0002, prepared by PSH, the project MEP Consultants, includes details of dynamic thermal modelling undertaken for the scheme. The report concludes that “*MVHR peak lopping (providing cooling to all habitable rooms) is proposed to meet the requirements of ADO in areas of noise intrusion exceeding ADO guidance.*”

6. AMENITY AREAS

BS 8233:2014 provides the following guidance in relation to amenity areas:

“For traditional external areas 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 value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

*Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, **specification of noise limits is not necessarily appropriate**. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”*

Noise levels in the podium gardens and the ground level landscaping to the northeast of the development buildings are within the recommended levels of 50-55 dBA. There is therefore provision of amenity space within the overall scheme where noise levels are in line with the guidance within BS 8233.

However, façade-incident noise levels of approximately 68-73 dBA $L_{eq,16hour}$ are predicted at lower levels of the building facades closest to the IDR. It should be accepted that noise levels in amenity areas (balconies) which are in close proximity to the main roads passing the site will be subject to higher noise levels than the guideline levels in BS 8233:2014.

If at a later stage it was considered desirable to control the noise levels incident on balcony amenity areas further the following mitigation measures could be considered:

- Provision of solid balustrades to the balconies – solid balustrades extending from the floor of balconies to a minimum height of 1.2 – 1.5m high would reduce noise levels on balconies. In conjunction with:
- Provision of acoustic absorption to external surfaces –external walls / balcony soffits can be lined with weather-proof acoustically absorbent linings to mitigate reflections and build-up of sound. In conjunction with the provision of solid balustrades a 3-5 dB reduction could be achieved.

It should be noted that the reductions mentioned above are perceptible although minor and will need to be considered in the wider context of spatial, structural and aesthetic constraints. The above measures do not constitute a recommendation but merely a presentation of possible routes forward were it to be necessary to reduce external noise levels in amenity areas.

It should also be noted that BS 8233:2014 specifically states that specification of noise limits for balconies is not necessarily appropriate, especially where other, quieter amenity is available elsewhere in the scheme.

7. THE HEXAGON

The Hexagon Theatre is an arts venue situated approximately 60m to the north of the proposed development. Concern has been raised with regards the potential for noise impact of the Hexagon on future residents leading to complaints about loss of amenity and of noise disturbance. RBA Acoustics have undertaken a review of the typical operations of the theatre and the potential for noise impact is considered low risk. The following are the bases of this conclusion:

- The loading bay for large vehicles loading in and out of the venue is located on the opposite side of the building, accessed via the IDR slip road. Any out of hours vehicle movements would be focussed here. Noise from these activities will not be distinguishable against the background noise from the IDR.
- The road to the east of the Hexagon is only for exiting the car park and would not be used by large vehicles used for loading in and out of the venue outside normal hours. Noise from car park movements is captured in our assessment and is indistinguishable against the background noise from the IDR.
- Patron ingress and egress has the potential to be, in part, past the eastern boundary of the site, down Cusden Walk. However, the majority of patron movements are likely to be along Dusseldorf Way and Queens Walk, which lead to the main transport hubs in Reading Town Centre, or from the car park.
- Flats on Cusden Walk are elevated above street level, which would reduce impact of people walking past, although it should be stated that both the volume and intensity of patrons passing the site is not anticipated to be high, even for popular shows.
- The proposed development at Broad Street Mall is both closer to The Hexagon, and situated on two of the major access routes to the venue. Measured levels before and during an event at the Hexagon showed no overall noise increase, and therefore no noise impact due to operation of the theatre.
- The new proposed Hexagon Studio Theatre is low capacity and also located on the opposite side of the building from the development.

Impacts of noise on the development from operation of The Hexagon are therefore considered to be unlikely and low risk.

8. PLANT NOISE IMPACT ASSESSMENT

Reading Borough Council's expectations regarding new building services plant are outlined in their Pre-Application comments outlined in Section 3.1 of this report.

In line with these requirements, we would propose items of mechanical services be designed so that noise emissions from the plant do not exceed the following levels when assessed at the nearest noise sensitive location:

Table 12 – Plant Noise Limits at Measurement Positions

Assessment Period	Plant Noise Criteria to be achieved at 1m outside the window of the nearest Noise-Sensitive Receptor (NSR), L_{Aeq} (dB)					
	Position 1		Position 2		Position 3	
	Specific Noise Level	Rating Level	Specific Noise Level	Rating Level	Specific Noise Level	Rating Level
Daytime (07:00 – 23:00)	59	69	42	52	44	54
Night-time (23:00 – 07:00)	38	48	33	43	35	45

It should be noted that the above requirements are applied at the nearest residential adjacencies and alternative criteria should be incorporated if there are also commercial properties affected by the plant installations.

Predicted noise levels from proposed mechanical plant is considered in a separate assessment and report.

9. CONCLUSION

RBA Acoustics have undertaken noise monitoring at the proposed development site at the former Reading Police Station on Castle Street, Reading. The measured noise levels are presented within this report. The resultant noise levels have been used in the assessment of the glazing package and ventilator requirements to ensure suitable internal noise levels are achieved at the proposed development with reference to BS 8233:2014, WHO Guidelines and Local Authority requirements.

Target specifications for glazing packages and ventilators are included in Appendix C to this report. The specifications are commensurate with achieving the noise criteria for the scheme, including both internal ambient noise levels and external amenity noise levels.

Appendix A – Acoustic Terminology

A-weighting (e.g. dB(A))	A correction applied across the frequency bands to take into account the response of the human ear, and therefore considered to be more representative of the sound levels people hear.
DeciBel (dB)	Unit used for many different acoustic parameters. It is the logarithmic ratio of the level being assessed to a standard reference level.
$D_{n,e,w}$	A single number weighted quantity which characterises the airborne sound insulation through a specified small element. A higher numerical quantity represents a better performance.
$D_{n,f,w}$	A single number weighted quantity which characterises the airborne sound insulation between rooms via a specified flanking path. A higher numerical quantity represents a better performance.
$L_{eq,T}$	The level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
$L_{Aeq,T}$	The A-weighted level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
L_{An} (e.g. L_{A10} , L_{A90})	The sound level exceeded for n% of the time. E.g. L_{A10} is the A-weighted level exceeded for 10% of the time and as such can be used to represent a typical maximum level. Similarly, L_{A90} is the level exceeded for 90% of the measurement period, and is often used to describe the underlying background noise.
$L_{Amax,T}$	The instantaneous maximum A-weighted sound pressure level which occurred during the measurement period, T . It is commonly used to measure the effect of very short duration bursts of noise, e.g. sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the ambient level.
Octave band	A frequency band in which the upper limit of the band is twice the frequency of the lower limit.
1/3 Octave band	A frequency band which is one-third of an octave band.
R_w	A single number quantity which characterises the airborne sound insulation of a material or building element in a laboratory test.

Appendix B – Room Absorption Coefficients

For the purpose of the analyses RBA Acoustics have assumed the absorption coefficients detailed in Table B1 for Bedrooms and Table B2 for living rooms.

Table B1 – Bedroom Absorption Coefficients

Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
0.15	0.18	0.25	0.27	0.31	0.32	0.32	0.32

Table B2 – Living Room Absorption Coefficients

Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
0.15	0.18	0.20	0.22	0.22	0.22	0.23	0.27

Appendix C – External Building Fabric Acoustic Specification

External facade constructions and components, such as brise soleil, grilles, ventilators, curtain walling systems or other architectural features, are not to give rise to intrusive whistling, creaking, rattling or other noises as a result of wind or other climatic effects.

The Contractor shall take reasonable precautions to avoid unwanted noise including creaking, rattling and whistling being generated by the Contractors works when subject to environmental conditions (including wind) and thermal expansion over the life of the façade.

1.0 Window Sound Insulation Performance

Glazed units (inclusive of glazing, louvres, timber panels, spandrel panels, infill panels, framing, opening lights, balcony/terrace doors, seals, etc. as appropriate) should achieve the following minimum sound reduction indices as tested in general accordance with BS EN ISO 10140-2:2021:

Table C1 – Window Sound Insulation Performance Specification

Type	Minimum Recommended Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)								R_w (dB)
	63	125	250	500	1k	2k	4k	8k	
G1	23	27	31	42	44	46	53	53	43
G2	30	27	29	38	42	47	54	54	40
G3	19	23	24	23	32	38	35	35	31

Note: R_w is the “overall weighted sound reduction index” tested in a laboratory.

N.B. as the internal noise criteria is expressed in overall terms, other frequency-specific performance levels may ultimately prove acoustically acceptable. Test data for representative samples of all glazing systems shall be submitted to RBA Acoustics for approval to demonstrate compliance with the above performance specifications.

2.0 Ventilator Sound Insulation Performance

Trickle ventilators (in their open state) should achieve the following minimum element-normalised level differences as tested in accordance with BS EN 20140-10:2021:

Table C2 – Ventilator Sound Insulation Performance Specification

Type	Minimum Recommended $D_{n,e}$ (dB) at Octave Band Centre Frequency (Hz)								$D_{n,e,w}$ (dB)
	63	125	250	500	1k	2k	4k	8k	
V2	28	32	32	31	33	31	31	31	32

Note: $D_{n,e,w}$ is the “overall weighted element normalised level difference” tested in a laboratory.

Please note the above specifications assume one trickle ventilator will be installed per room, i.e. a continuous mechanical extract system (ADF System 3) will be utilised. The specifications should be increased by a factor of $10\log(N)$ should N ventilators be required per room, i.e. increase by +3dB or +5dB respectively should two or three ventilators be required per room.

N.B. as the internal noise criteria are expressed in overall terms, other frequency specific performance levels may ultimately prove acoustically acceptable. Test data for the trickle vents in their open state shall be submitted to RBA Acoustics for approval.

3.0 Acoustic Flanking Specification

Extent

There is potential for any curtain walling or continuous system to transmit sound across the separating floors and walls, and to undermine the sound insulation performance.

The following specifications should therefore be introduced within the tender documentation to ensure the system components are adequately designed to control flanking sound transmission.

The following specifications apply to all curtain walling or continuous elements between residential units and, if applicable, between residential units and commercial areas. Between non-residential areas (e.g. commercial to commercial) a reduced performance of 50 dB $D_{n,f,w}$ is typically acceptable.

With regard to potential flanking through cladding panels, the specifications are commensurate with achieving relatively high sound insulation levels. Achievement of the specifications will require careful consideration of the panel design, in particular the insulation type and construction make-up of the panel skin. In addition, it is likely to be necessary to design the cladding such that double/twin insulated mullions and transoms are included.

Horizontal Flanking at Separating Wall Lines

The curtain walling/continuous system shall achieve a horizontal weighted normalised flanking level difference of at least 60 dB $D_{n,f,w}$ when tested in general accordance with BS EN ISO 10848:2017 or subsequent versions (the methodology amended accordingly).

The supplier shall demonstrate by the provision of previous test reports (and comparative calculations if required) that the specification can be achieved. The Client, however, reserves the right to insist on laboratory acoustic testing if any doubts remain as to the flanking performance of the system.

The curtain walling system shall provide suitable surfaces against which a good acoustic seal can be made with future separating walls.

Vertical Flanking at Separating Floor Lines

The curtain walling system shall achieve a vertical weighted normalised flanking level difference of 60 dB $D_{n,f,w}$ when tested in general accordance with BS EN ISO 10848:2017 or subsequent versions (the methodology amended accordingly).

The supplier shall demonstrate by the provision of previous test reports (and comparative calculations if required) that the specification can be achieved. The Client, however, reserves the right to insist on laboratory acoustic testing if any doubts remain as to the flanking performance of the system.

The curtain walling system shall provide suitable surfaces against which a good acoustic seal can be made with future separating floors

Appendix D – Instrumentation

The following equipment was used for the measurements.

Table D1 – Equipment Calibration Details				
Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Expiry Date
Norsonic Type 1 Sound Level Meter	Nor140	1403226	UCRT25/1108	16 January 2027
Norsonic Pre Amplifier	1209A	12066		
Norsonic ½" Microphone	1225	168180		
Norsonic Sound Calibrator	1251	31988	UCRT25/1104	16 January 2027

Appendix E – CDM Considerations

The Likelihood (L) the harm will occur can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Remote (almost never)
- 2 – Unlikely (occurs rarely)
- 3 – Possible (could occur, but uncommon)
- 4 – Likely (recurrent but not frequent)
- 5 – Very likely (occurs frequently)

The Severity of harm (S) can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Trivial (e.g. discomfort, slight bruising, self-help recovery)
- 2 – Minor (e.g. small cut, abrasion, basic first aid need)
- 3 – Moderate (e.g. strain, sprain, incapacitation for more than 3 days)
- 4 – Serious (e.g. fracture, hospitalisation for more than 24 hours, incapacitation for more than 4 weeks)
- 5 – Fatal (single or multiple)

The rating value is obtained by multiplying the two scores and is then used to determine the course of action.

Table E1 – Risk Ratings

Rating Bands (Likelihood x Severity)		
Low Risk (1 – 8)	Medium Risk (9 -12)	High Risk (15 – 25)
May be ignored but ensure controls remain effective	Continue, but implement additional reasonable practicable controls where possible	Avoidance action is required; therefore alternative design solutions must be examined. Activity must not proceed until risks are reduced to a low or medium level

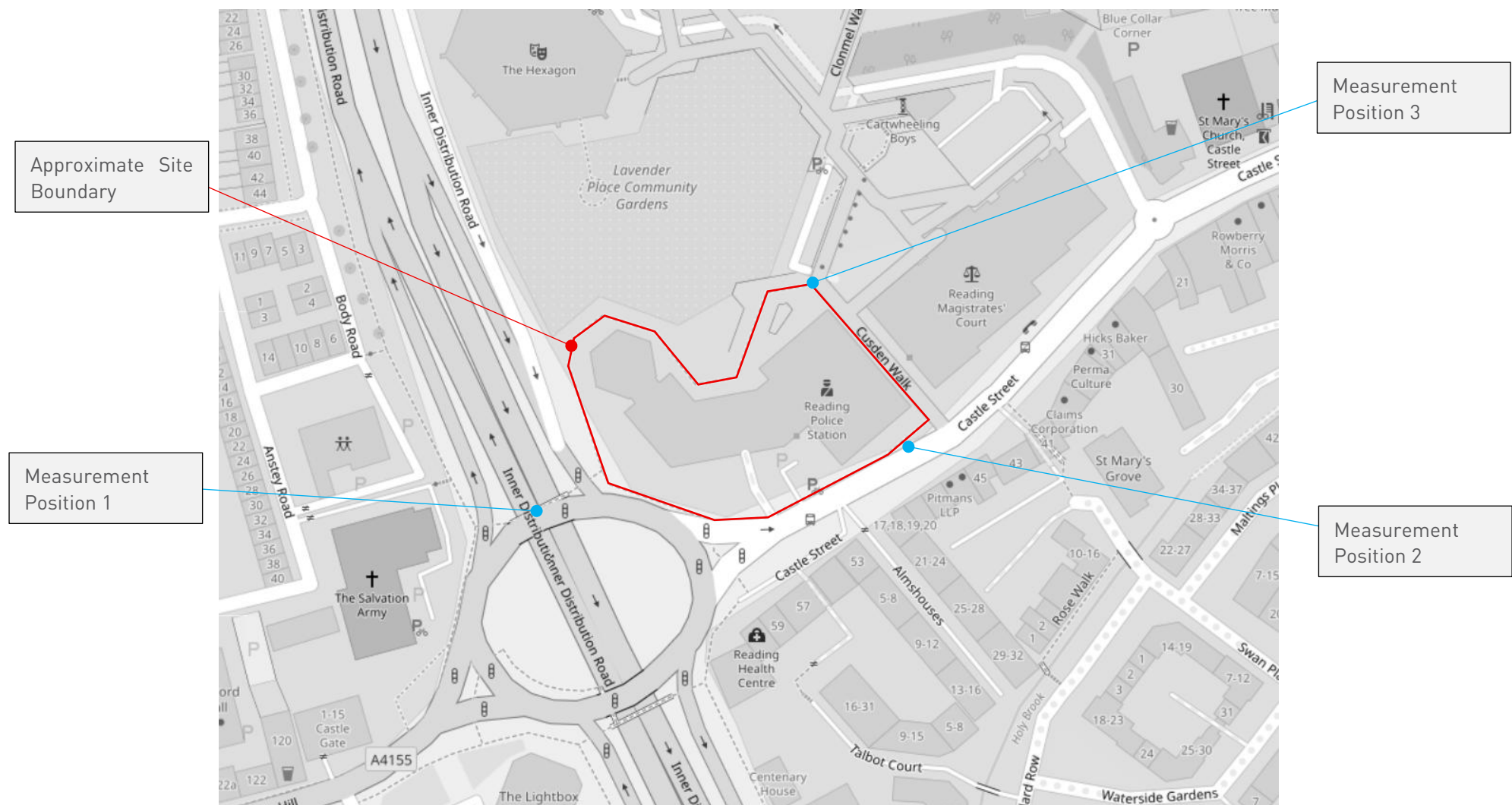
The following hazards pertinent to our design input have been identified and control measures suggested:

Table E2 – Risk Assessment

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Acoustic doors - weight	Strain of neck, limbs or back	Contractors	3	4	12	Provide sufficient manpower/ lifting gear	1	4	4
Plant room noise levels may be above lower exposure action level	Hearing damage.	Contractors/ Operators	3	4	12	Employer should undertake noise at work assessment.	1	4	4
Vibration Isolators	Injury to hands	Contractors	3	3	9	Care needs to be taken during adjustment. Follow manufacturers guidance	1	3	3
Attenuators/ Acoustic Lagging	Strain of neck, limbs or back.	Contractors	3	4	12	Provide sufficient manpower/ lifting gear	1	4	4
Attenuators/ Acoustic Lagging	Skin & respiratory irritation	Contractors	4	3	12	Wear gloves and mask	1	3	3
Acoustic glazing - weight	Strain of neck, limbs or back. Fall from height.	Contractors	3	5	15	Provide sufficient manpower, lifting gear and structural support	1	5	5

L: Likelihood S: Severity R: Rating

Appendix F – Site Plans



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Figure 1 – Site Layout and Measurement Positions

Reading Police Station

Project 14449

15 May 2026

Not to Scale



Project 14449

Not to Scale





- Zone 1 - —
- Zone 2 - —
- Zone 3 - —

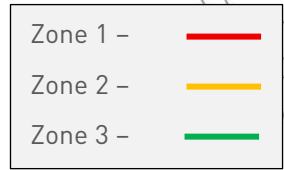
Figure 3 - L04 - L05 External Zoning Markup

Reading Police Station

Project 14449

15 May 2026

Not to Scale



Project 14449

Not to Scale



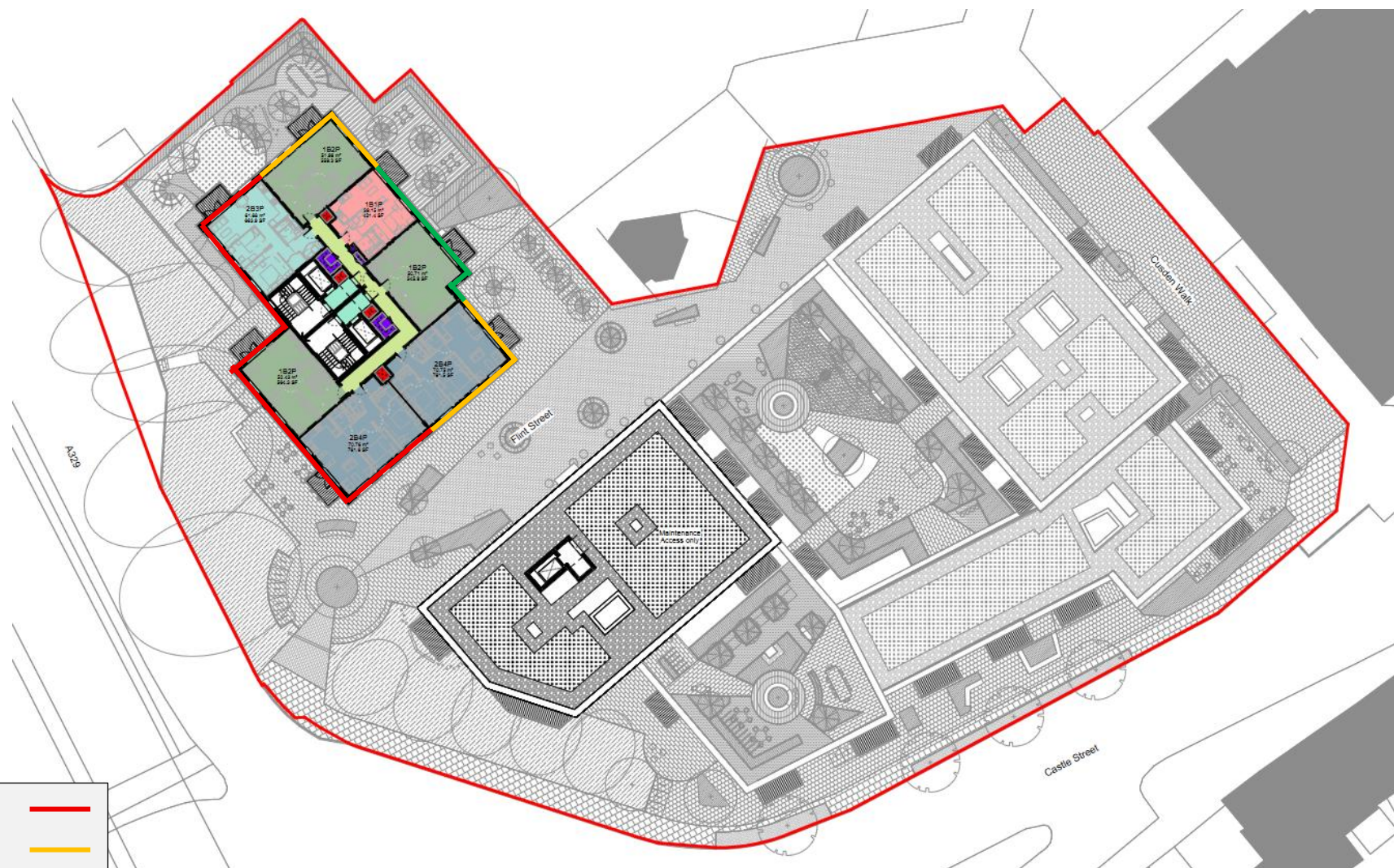


- Zone 1 – —
- Zone 2 – —
- Zone 3 – —

Figure 5 – L07 – L09 External Zoning Markup
 Reading Police Station
 Project 14449

15 May 2026
 Not to Scale





- Zone 1 - —
- Zone 2 - —
- Zone 3 - —

Figure 6 - L10 - L11 External Zoning Markup

Reading Police Station

Project 14449

15 May 2026

Not to Scale





Project 14449

Not to Scale



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