TECHNICAL MEMO

Our Ref: **7129_001M_6-0_DM**

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Date: **15 March 2024**

SUBJECT: KENNET CENTRE, NEWBURY - NOISE IMPACT ASSESSMENT

1 EXECUTIVE SUMMARY

Anderson Acoustics Ltd (AA) has been commissioned by Lochailort to undertake an assessment of noise impact associated with the redevelopment of the Kennet Centre, Newbury. The proposed development includes the partial demolition of the Kennet Centre and the construction of a new mixed-use scheme with flexible commercial use across the ground floor and residential use above.

A noise impact assessment has previously been submitted as part of the application, by Stuart Michael Associates, Report Ref: 6377/NA dated Sept 2023.

Following a consultation response, further information has been requested:

- An assessment of noise impact of town centre night-time economy on future occupiers.
- Consideration of the impact of future commercial operation on future and existing residential amenity.
- Consideration of the impact of the external spaces of the licenced premises on future residential amenity.
- Consideration of the impact of plant noise and vibration on future and existing residential amenity.

This memo considers the above implications in response to the consultation request and includes details of further noise measurements conducted on site. This memo does not consider the impact of transport noise on the development and the impact of noise and vibration during the construction phase. These items are adequately addressed in the Michael Associates report and are to be conditioned accordingly.

The assessment has found that the impact of live music from The Newbury will have an impact on future residential amenity. In all instances this can be mitigated through enhanced glazing, mechanical ventilation with comfort cooling, internal wall linings and the strategic use of winter gardens. These mitigation measures will need to be further developed during the latter design phases and as such should be conditioned accordingly as part of the planning approval.

The potential impact of both plant and commercial noise has also been discussed, however given the lack of detail available at this stage, this would need to be addressed during the detail design phases, enforced through appropriately worded planning conditions.

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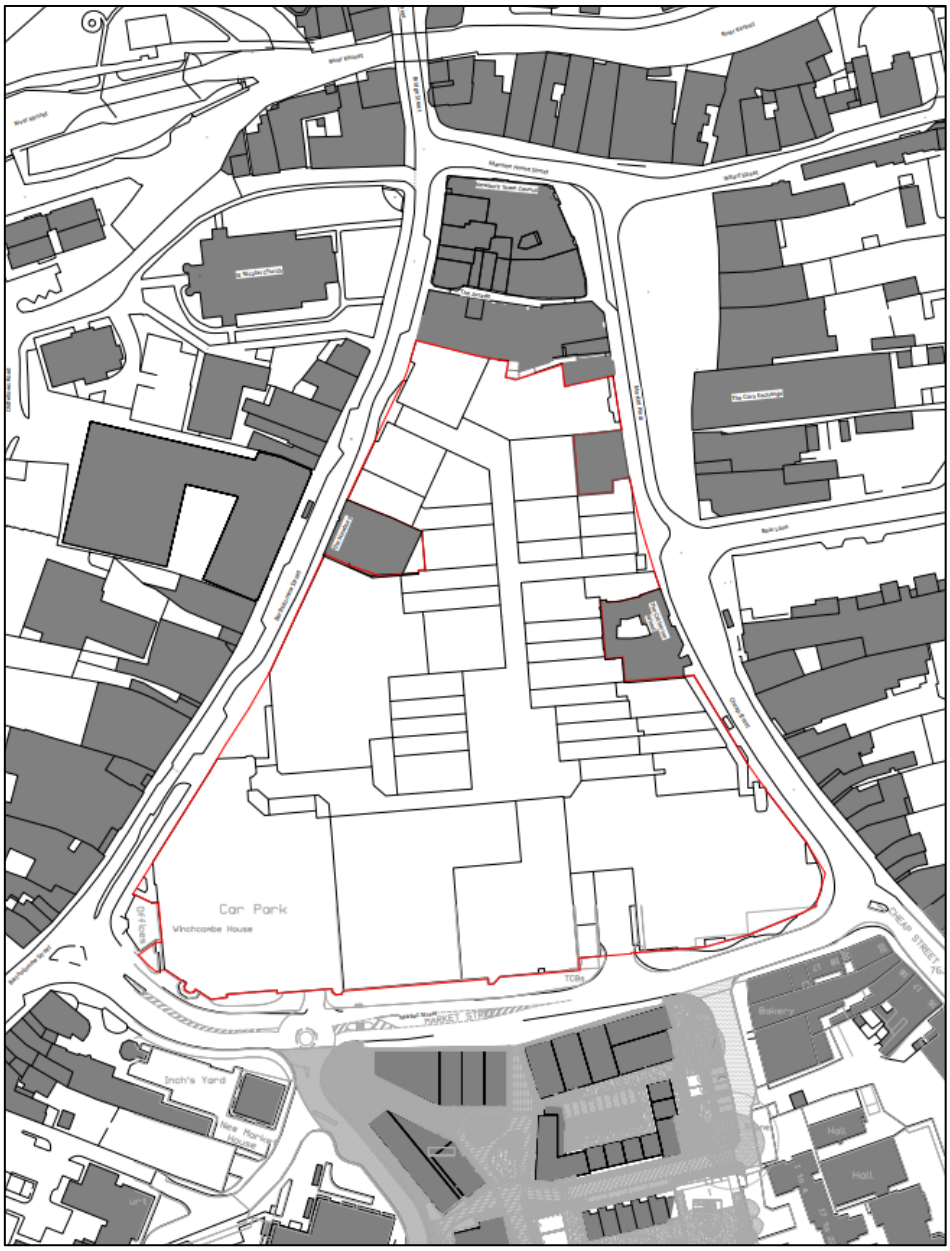
2 SITE DETAILS

2.1 Existing site

The development site is located within the centre of Newbury, currently occupied by the Kennet Centre, a shopping precinct with associated multi-storey parking, see Figure 2.1.

The site is bound by Cheap Street to the east, Market Street to the south and Bartholomew Street to the west. The site surroundings comprise a mix of residential and commercial properties as well as three notable licensed premises, The Newbury to the west and The Catherine Wheel and The Corn Exchange to the east.

Figure 2.1: Location plan with red line site boundary



2.2 Site Proposals

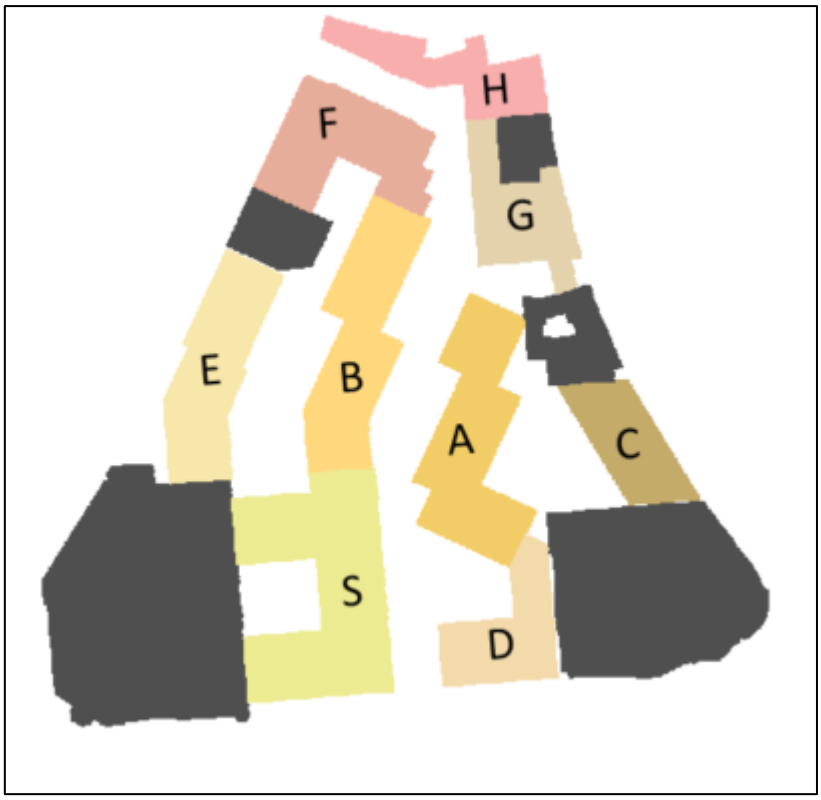
The Kennet centre will be partially demolished and re-constructed to provide new flexible use commercial premises at ground floor with residential apartments and associated external amenity space above.

Figure 2.2 presents the proposed layout at first floor level, which provides some context in terms of residential use in proximity to surrounding licensed premises.

Figure 2.2: Proposed site layout plan (2nd floor)

The development is spread across 9 blocks as indicated in Figure 2.3 below.

Figure 2.3: Proposed site block plan



3 IMPACT OF TOWN CENTRE NIGHT-TIME ECONOMY

3.1 General

To quantify and assess the impact of existing town centre night-time economy on future occupiers, an attended noise survey was carried out during a weekend evening period.

This enabled a subjective understanding of how the local licensed premises are operated and provided us with associated noise data to inform acoustic design.

3.2 Guidance

3.2.1 Internal Noise Levels

There are no British Standards for suitable internal noise criteria associated with noise sources that contain specific features such as patron/music noise.

Whilst BS 8233 was used within the Stuart Michael Associates report, this is only deemed suitable for traffic or other 'anonymous' sources. The document itself states:

"Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. For simplicity, only noise without character is considered in Table 4… Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate"

Research papers on the topic include *NANR 163* and *Proposed criteria for the assessment of lower frequency noise disturbance* conducted on behalf of The Department for Environmental Food and Rural Affairs (DEFRA).

The outcome of which suggests the following criteria as appropriate, which has been adopted for this assessment.

› To protect the amenity of future occupants, noise intrusion should be limited to not exceed a level of NR 25 and L_{Aeq} 27 dB inside habitable rooms of the new apartments.

3.2.2 External Amenity Noise Levels

In respect of external noise levels, guidance in BS 8233:2014 suggests that "it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T,}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments".

BS 8233:2014 however acknowledges that "these guideline values are not achievable in all circumstances where development might be desirable". In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited".

In respect of roof gardens and terraces, BS 8233:2014 states that "In these locations, specification of noise limits is not necessarily appropriate..

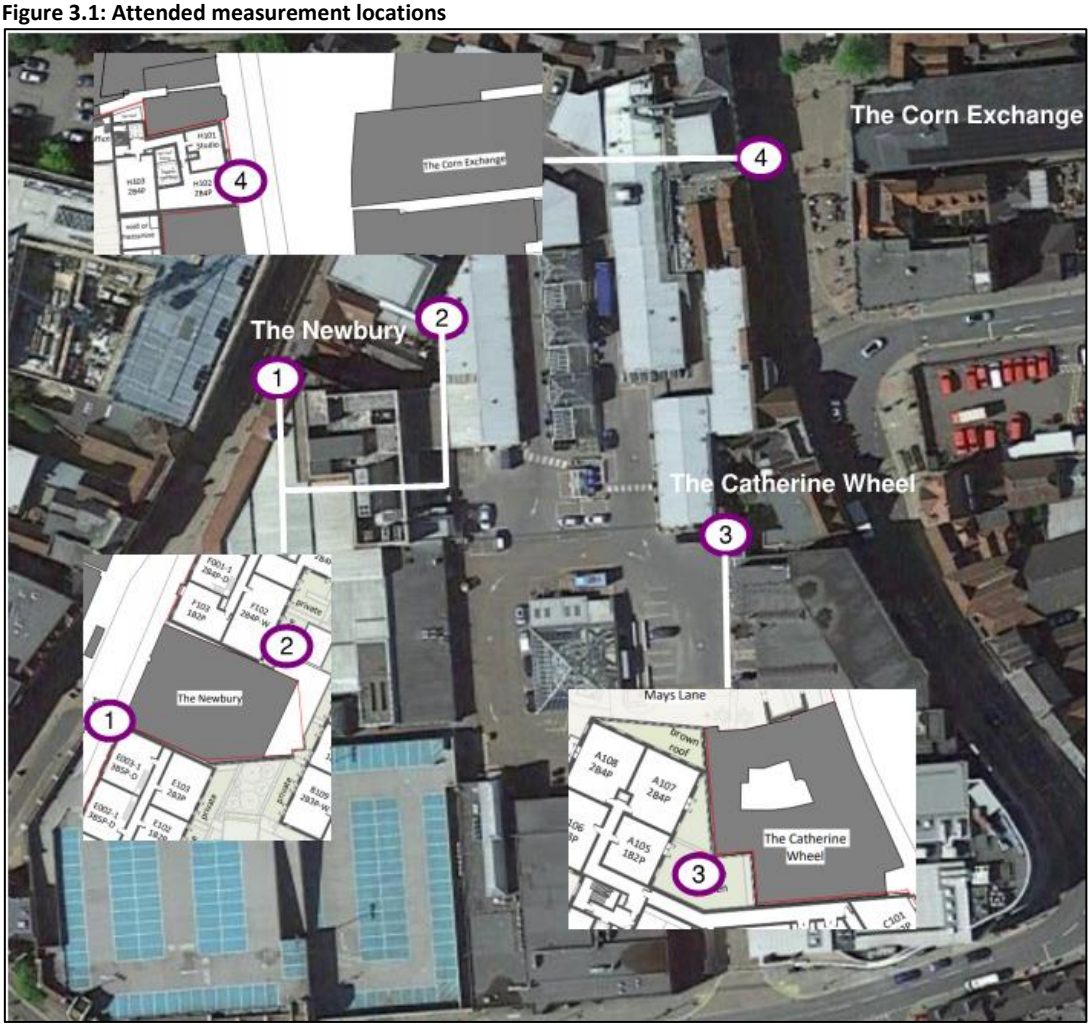
3.3 Survey Methodology

AA visited the site between the hours of 19:00 and 23:00 on Friday 24th November 2023 to undertake attended noise measurements.

Following a site walk around, four measurement locations were selected as appropriate to capture the key sources of entertainment noise incident on the proposed residential element of the development.

Figure 3.1 shows these locations on a site map (existing) and overlays the equivalent location in the future development scenario.

Figure 3.1: Attended measurement locations



All acoustic measurement equipment used during the noise survey conformed to Class 1 specification of British Standard 61672. A full inventory of this equipment is shown in Table 3.1 below. All equipment's calibration certificates are available on request.

Table 3.1: Equipment details

Equipment	Make & Model	Serial No	Calibration Due
Class 1 Sound Level Meter	Svantek SV 971A	131627	06/03/2025*
Calibrator	Svantek SV 36	112518	29/08/2024*

*Certificates are appended to this document

The equipment was calibrated before and after the survey with no significant drift observed.

Weather conditions during the survey were considered favourable for noise measurements, being dry with light winds.

3.4 Results

Table 3.2 below shows the results of the 9 measurements carried out at the 4 attended positions shown in Figure 3.1. For each measurement position, the $L_{Aeq,15min}$ and L_{AFmax} levels have been obtained under free-field conditions.

Table 3.2: Attended Survey Results, dB

Ref	Position	Start Time	$L_{Aeq,15min}$	L_{AFmax}	Description of Noise Environment
1	Location 3 - Rear of The Catherine Wheel at first floor level	19:01	57	77	• Measurement dominated by plant noise from property to the north (dominant noise source) • Chatter emanating from the 1st floor window of the pub – kitchen/staff area. • Conversation noise from pub smoking area • Car/motorbike pass-bys (likely L_{max} noise event)
2	Location 2 - Rear of the Newbury at first floor level	19:19	62	82	• Measurement dominated by conversations occurring in the smoking area • Constant background hum from plant located behind the smoking area.
3	Location 3 - Ground floor opposing The Corn Exchange	19:49	51	67	• Minimal plant noise from rooftop plant units • Infrequent road traffic noise • Light pedestrian conversation
4	Location 1 - Ground floor outside the Newbury	20:49	66	79	• Measurement dominated by road traffic noise • Patrons staffing outside the pub having conversations. • Music from within the pub is audible but not dominant

Ref	Position	Start Time	$L_{Aeq,15min}$	L_{AFmax}	Description of Noise Environment
5	Location 2 - Rear of the Newbury at first floor level	21:11	79	88	• Measurement dominated by live band. • Patrons having conversations in the smoking area • Plant is not audible due to live band music
6	Location 3 - Rear of The Catherine Wheel at first floor level	21:29	58	67	• Measurement still dominated by plant noise from property to the north (dominant noise source) • Conversations between patrons within from pub smoking area
7	Location 3 - Ground floor opposing The Corn Exchange	21:53	65	79	• Conversations between pedestrians • Light road traffic noise – occasional built up of traffic noise due to nearby traffic lights • Conversations between patrons within the Hatchet Inn smoking area
8	Location 2 - Rear of the Newbury at first floor level	22:13	81	89	• Measurement dominated by live band (likely source of L_{max} event)
9	Location 3 - Rear of The Catherine Wheel at first floor level	22:33	59	68	• Conversations between patrons within from pub smoking area • Plant from earlier measurement is no longer audible. • Background music from pub is audible • Live band music from the Newbury is audible

3.5 Discussion of Results

During the survey The Newbury was hosting a live band within their semi enclosed rooftop terrace to the rear of the building, shown in Figures 3.2 and 3.3 below:

Figure 3.2: Semi-enclosed events space

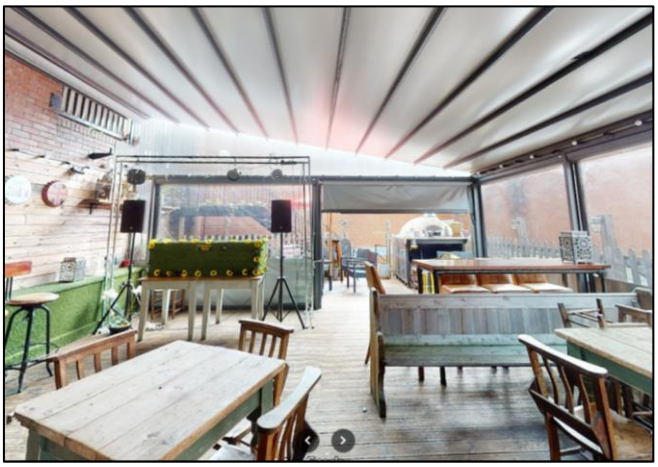


Figure 3.3: Semi-enclosed events space (during measurement, view from measurement position)

Considering the event space location and the noise levels recorded at the rear of The Newbury, the amenity of the proposed apartments overlooking the rooftop terrace will be adversely impacted unless suitable mitigation measures are implemented. This is considered further in the next section.

In this location noise levels of 66$L_{Aeq,15min}$ were captured when entertainment noise was not in operation, however this level increased to between 79 and 81 $L_{Aeq,15min}$ when the entertainment noise started.

It is understood that the Newbury hosts evening events within the rooftop terrace on Friday and Saturday evenings and occasionally during the week. It is understood that events may take place in the afternoons during the summer period and that live music is not played after 23:00.

Noise levels captured from The Catherine Wheel ranged from 56 to 59dB $L_{Aeq,15min,}$ with an L_{Amax} of around 67 to 77dB – caused by pedestrians talking within close proximity of the measurement position. It should be noted that The Catherine Wheel has a beer garden to the rear, which was not busy during our survey. During warmer periods of the year, this area is likely to get busy and therefore may adversely impact the amenity of the nearby proposed apartments of Block A (eastern elevation).

Regarding the noise emanating from The Corn Exchange, worst case noise levels of around 65dB $L_{Aeq,15min}$ and 79dB L_{Amax} were captured and comprised road traffic noise and conversations among pedestrians nearby. A performance of Beauty and the Beast was occurring at The Corn Exchange during the survey and no breakout noise could be heard.

Entertainment noise from The Corn Exchange is not expected to be excessive and as such the glazing specification defined in the Stuart Michael Associates noise report, which is informed by local traffic noise, should suffice in achieving suitable internal ambient noise levels within respective apartments.

Following comments from the local authority, a worst-case patron noise assessment has been included to account for the activity noise arising from The Catherine Wheel's beer garden, this is presented in Section 3.8 of this report. The purpose of this assessment is to determine noise levels affecting the proposed development, when the beer garden experiences increased activity, such as during the warmer summer months.

3.6 Noise Modelling of Entertainment Noise – The Newbury

3.6.1 General

A detailed 3D noise model has been built using the noise modelling software CadnaA 2019 to estimate the noise levels at sensitive receptors due to noise emissions emanated from the Newbury during a typical entertainment activity.

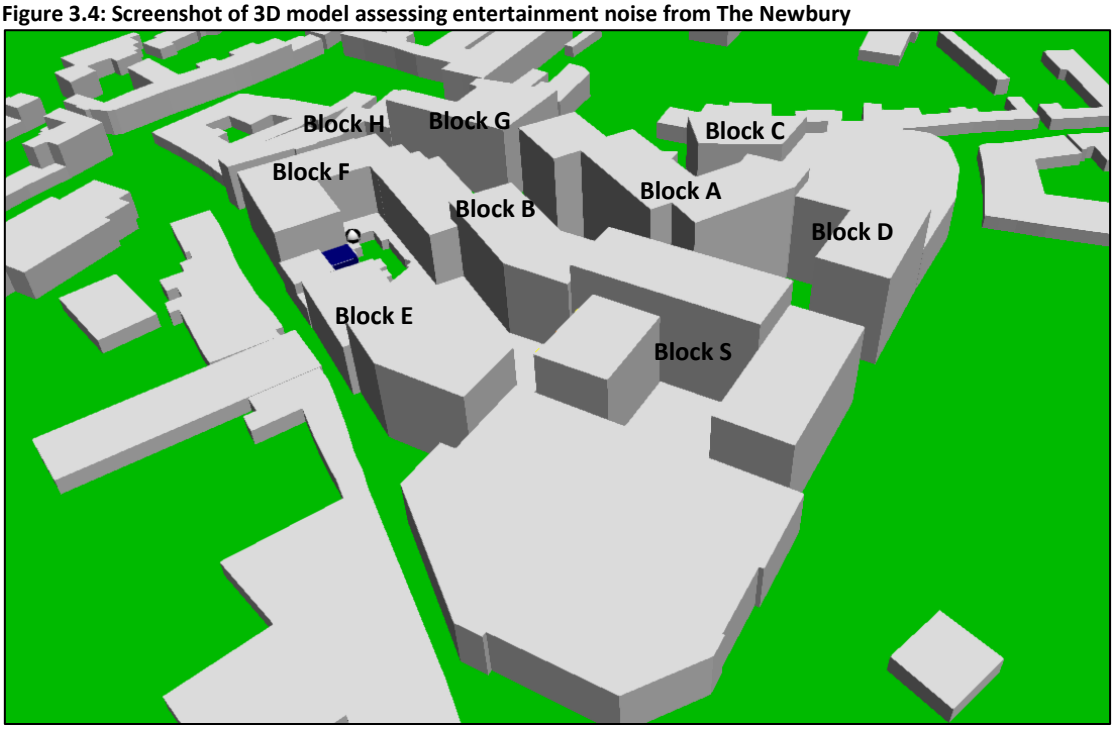
The predictions were carried out using the noise-modelling suite Cadna/A 2023, in accordance with the CRTN and ISO 9613 prediction methodologies, which allow consideration of the effects of the acoustic screening provided by both existing buildings surrounding the site and buildings of the development itself.

The results of the noise modelling were used to determine the likely noise levels incident on each building across the completed site. These predictions have formed the basis of the mitigation proposals.

In addition to the entertainment noise (detailed in the previous section) used in the predictions, the model considers the effects of ground absorption, atmospheric absorption, acoustic reflections and acoustic screening correction to represent a worst-case.

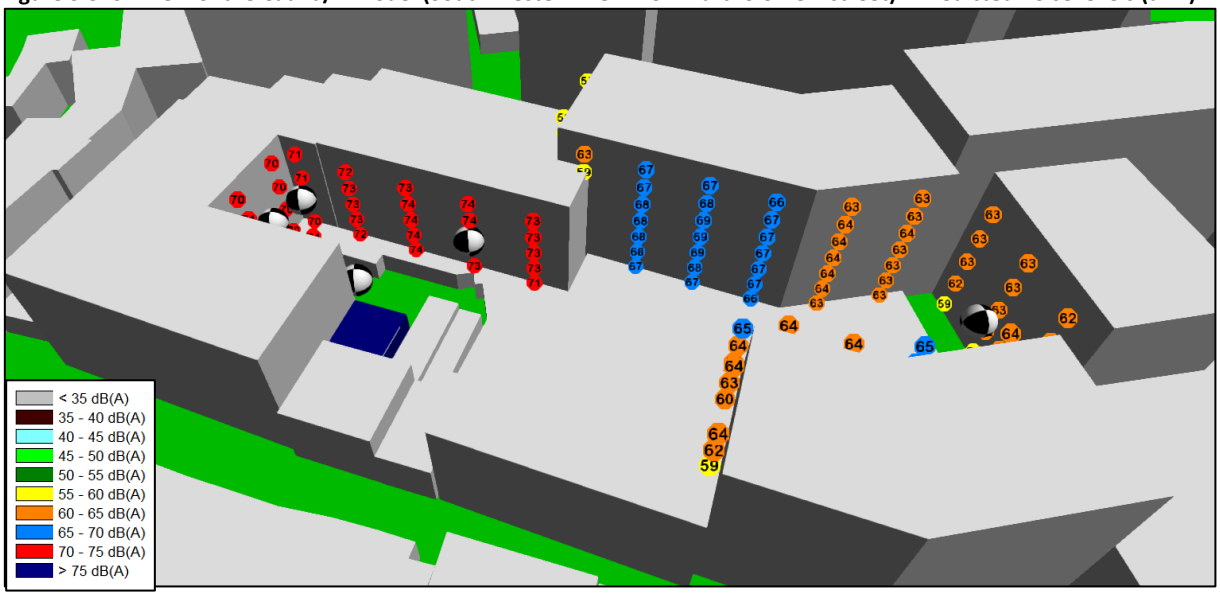
The model was used to determine typical worst-case $L_{Aeq,T}$ noise levels at various façade locations around the site that will be impacted by entertainment noise.

Figure 3.4: Screenshot of 3D model assessing entertainment noise from The Newbury



See an example view of the 3D noise model in CadnaA in Figures 3.5, with detailed noise contour plots provided in the Appendix of this report (Figure A1).

Figure 3.5: 3D view of the Cadna/A model (South western view from Bartholomew street) – Predicted noise levels (dBA)



The predicted worst-case external ambient noise levels incident at each affected block is summarised in Table 3.3 below.

Table 3.3: Worst-case predicted entertainment noise levels per elevation (free-field)

Block	Elevations onlooking inner courtyard	Entertainment Noise $L_{Aeq,T}$
B	West	75
E	East	71
F	East	76
	South	71
	West	71
S	North	62

The results indicate that that the elevations of blocks B and F onlooking the inner courtyard (and with direct line of site to The Newbury) will be exposed to the highest levels of entertainment noise. It is worth noting that, proposals indicate the northern facing elevation of Block E and the southern elevation of block F will not have windows overlooking The Newbury's rooftop terrace and are therefore are not considered sensitive.

3.6.2 External Building Fabric Assessment

Based on the results of the noise modelling an external building fabric assessment has been undertaken to determine the required sound insulation necessary to ensure the internal ambient noise levels within proposed dwellings are met.

The façade of the proposed apartments will serve as the main form of mitigation to protect the amenity of the future occupants.

Based on our experienced on similar schemes the room dimensions and façade areas highlighted in Table 3.4 below have been used in this assessment.

Table 3.4: Assumed room dimensions and facade areas

Block	Room Volume (m^2)	Non-glazed Façade surface (m^2)	Glazing surface (m^2)
Living room	50	7.5	3
Bedroom	30	5	2.5

An assessment of the external building fabric elements has been undertaken. Calculations have been undertaken following the general method set out in BS EN 12354-3:2017 to determine a suitable glazing, ventilation and external wall configuration that will ensure that the internal ambient noise criteria set out in Section 3.2.1 is achieved.

At this stage the external wall build-up is not known – based on our experience of contemporary newly built apartments, the following build-up has been assumed:

Slip brick cladding

- Brick cladding
- 40mm vented cavity
- 130mm thermal insulation
- 2 x 12.5mm fire rated boards
- 100mm SFS frame filled with 100mm mineral wool
- 2 x 15mm dense plasterboard

We would expect the proposed external wall to achieve the following minimum sound reduction performance, based on experience of similar wall constructions and sound reduction performance estimated with specialist software Insul:

Table 3.5: Estimated sound reduction index (dB) of the proposed external wall construction

Dwelling	125	250	500	1k	2k	4k	R_w / R_w + C_{tr}
Slip brick cladding	35	41	49	54	56	56	50 / 46

In order to achieve a higher level of sound insulation from external sources, there are instances where we would propose either an additional internal lining to the external wall or the installation of winter gardens (highlighted in Table 3.6).

The internal lining will be completely independent from the external wall, comprising two layers of 12.5mm plasterboard and 25mm insulation within a 50mm cavity.

The winter gardens will fully encapsulate the external façades (of Block B and F directly onlooking The Newbury), with the front and side panes being fully glazed with 10mm toughened glass. The glazed pane can feature a sliding door element; however, they must be adequately sealed. These winter gardens will act as effective noise buffers between external noise sources and sensitive dwellings.

Regarding ventilation, we recommend implementing a fully mechanical ventilation system with comfort cooling for apartments of blocks B, E, F and S that are facing the inner courtyard (ADF System 4 – continuous mechanical supply and extract with heat recovery, MVHR). This approach aims to prevent means of background ventilation compromising the integrity of the façade. Additionally, it eliminates the necessity for occupants to open windows during the summer months to avoid overheating (while entertainment noise is active). Our calculations have therefore assumed that noise break-in through the ventilation system is negligible.

Based upon the GA drawings and elevations available on the planning portal, detailed calculations have been undertaken to determine the minimum acoustic performances required for the glazed elements of the façade. The resulting minimum performance requirements are presented in Table 3.6 with example specifications provided, along with glazing specification mark-ups Figure A2, which can be found in the Appendix of this report.

Below are the minimum sound reduction performances for the glazed elements in apartments where the criteria can be met through a feasible façade design. Detailed calculations for the habitable rooms in the development can be found in the Appendix of this report (Figures A3 to A14)

Table 3.6: Minimum sound reduction performance R (dB) for the glazed elements of each façade

Block	Elevation	Room	Glazing example	125	250	500	1k	2k	4k	R_w / R_w + C_{tr}
B	Directly West	Living Rooms and bedrooms	6/16/6 mm[2]	22	22	30	38	34	38	**33 / 29**
	West (set further back)	Living Rooms and bedrooms	10/200/(6/12/6) mm Secondary Glazing[1]	40	51	51	51	61	70	**53 / 50**
	West (set even further back)	Living Rooms and bedrooms	6/150/4 mm Secondary Glazing	29	35	45	56	52	50	**47 / 40**
E	East	Living Rooms and bedrooms	10/200/(6/12/6) mm Secondary Glazing[1]	40	51	51	51	61	70	**53 / 50**
	East (set further set back)	Living Rooms and bedrooms	6/150/4 mm Secondary Glazing	29	35	45	56	52	50	**47 / 40**
F	**East**	Living Rooms and bedrooms	6/16/6 mm[2]	22	22	30	38	34	38	**33 / 29**
	South	Living Rooms and bedrooms	10/200/(6/12/6) mm Secondary Glazing[1]	40	51	51	51	61	70	**53 / 50**
S	North	Living Rooms and bedrooms	6/150/4 mm Secondary Glazing	29	35	45	56	52	50	**47 / 40**

1) These façades should incorporate an internal wall lining (IWL) to the external wall
2) These façades should include a 10mm fully glazed winter garden

Windows should still be openable for purge or rapid ventilation, as recommended by Building Regulations Approved Document F. Internal noise level guidelines are generally not applicable under these exceptional events, which should only occur occasionally (i.e. to remove odour from painting, cooking, etc.).

The sound insulation requirements of the glazing are applicable to the window system as a whole, including frames, mullions and panels. They are based on BS EN ISO 10140: 2010 "*Acoustics - Laboratory measurement of sound insulation of building elements"* and rated in accordance with BS EN ISO 717-1:2013 "*Acoustics – Rating of sound insulation in buildings and of building elements Part 1. Airborne sound insulation*".

3.6.3 Winter Gardens for Worst-Affected Apartments

As mentioned above, winter gardens have been proposed for the worse-affected apartments. Calculations have been undertaken on the worse-case example (Block F, east facing façade) to demonstrate that the noise criteria can be achieved through suitable design.

The winter gardens will be installed approximately 1.5m from the external façade and encapsulate the entire external façade (as mentioned above). The roof to the winter gardens should incorporate a Class A acoustic ceiling. Detailed drawings of the winter gardens have been included in the Appendix.

The calculation shown in Figure A15 accounts for the worst-case predicated entertainment noise ingress via the 10mm glazed panes of the winter garden, minimum sound reduction performance for this glazing is presented in in Table 3.7 below. Figure A16 shows the calculation of noise transfer from within the winter garden into the sensitive dwellings via the external façade.

Table 3.7: Minimum sound reduction performance R (dB) for the glazed elements of winter gardens

Block	Elevation	Room	Glazing example	125	250	500	1k	2k	4k	R_w / R_w + C_{tr}
B / F	West / East	Living Rooms and bedrooms	10mm single pane	26	27	34	35	36	44	**36 / 33**

As shown in the calculations, the noise criteria detailed in Section 3.2.1 should be met.

The above noise mitigation solutions would need to be developed during the latter design phases and as such should be conditioned accordingly as part of the planning approval. Wording towards a suitable condition is provided below.

Prior to the first use or occupation of the development as hereby permitted, noise from the The Newbury shall be mitigated to ensure a level of NR 25 and L_{Aeq} 27 dB is not exceeded inside habitable rooms of the new apartments. , either at source or through the building façade design, so that nuisance will not be caused to the future occupiers of residential units.

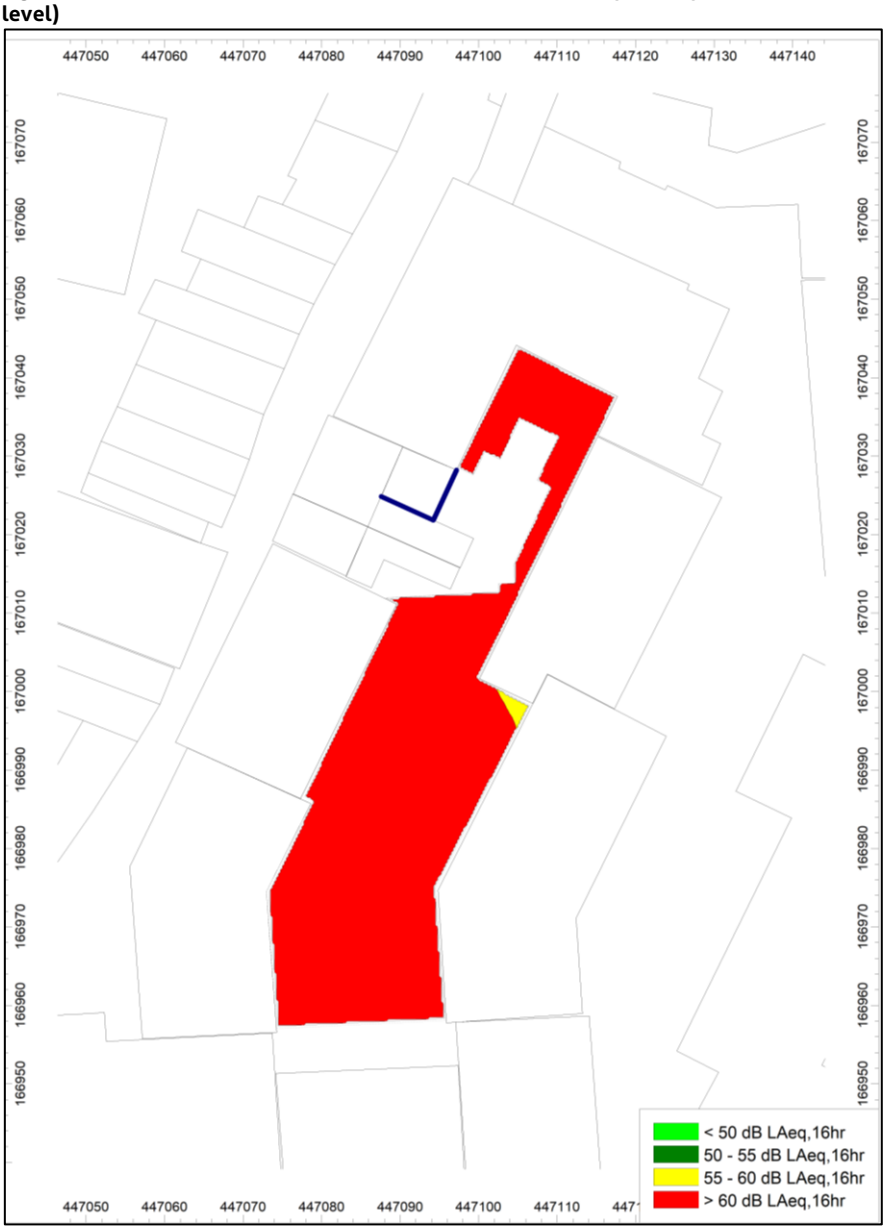
Following mitigation works, a verification survey and report shall be carried out by a suitably qualified acoustic consultant and provided to the Local Planning Authority for approval.

3.7 External Amenity Area Noise

Proposals indicate all apartments will be provided outdoor amenity areas in the form of private gardens as well as a communal garden (a podium garden is located in the inner courtyard surrounded by Block B, E and F; a communal terrace located at 3rd floor level and communal garden located in the inner courtyard of Block S).

Figure 3.6 below shows the predicted noise levels across the development, including the ground floor communal areas (green to the west of Block 2 and the play area behind Block 3 – highlighted in blue hatched boxes).

Figure 3.6: Predicted entertainment noise levels across development (plots show levels at 1.5m above podium garden level)



Our acoustic model indicates that the predicted entertainment noise levels in the communal gardens surrounded by Blocks B, E and F will exceed the target set out by WHO (55 dB $L_{Aeq,T}$). This criteria may also be

exceeded in the private gardens onlooking The Catherine Wheel's rear beer garden during busy periods. However, where winter gardens are proposed the criteria should be satisfied (see Figure A15).

It should be noted that, it is unlikely for events at The Newbury to be regular during the winter months therefore the criteria should be met during these periods. Furthermore, it is understood that the venue typically hosts events in the evening therefore during the daytime, when residents are mostly likely to spend time outdoors the noise criteria will be satisfied.

However, due to the exceedances in the criteria, guidance set out by the Professional Practice Guidance on Planning & Noise (ProPG) has been used to put into context the extent and impact of these exceedances. The guidance suggests four alternatives to alleviate the potential impact of noisy external amenity areas in developments located in busy, urban areas.

The Stage 2 - Element 3 of the ProPG guidance document states the following:

3(v) Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:

- *a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or*
- *a relatively quiet alternative or additional external amenity space for sole use by a household, e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or*
- *a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *a relatively quiet, protected, publicly accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.*

The presence of the communal amenity located at the inner courtyard of Block S (where noise levels should satisfy the WHO requirement) and the nearby green space located at Victoria Park (about 5 minute walk); both fulfil the last 2 bullet points in the ProPG guidance above and will provide most residents a quieter, protected, alternative communal space compliant with the 55 dB $L_{Aeq,16hour}$ criterion.

3.8 Patron Noise Assessment

Comments from West Berkshire Council regarding this report highlighted some concerns regarding the potential noise impact from patron noise whist occupying the external spaces of the licenced premises surrounding the proposed development. The following was stated:

"In addition, it will not have been possible to fully assess the customer noise from voices while using the external spaces at all of the licensed premises surrounding the development site due to the assessment being carried out in winter at a time when these spaces would not have been in full use."

In light of the external noise generated by customers of The Newbury's terrace, the apartments exposed to entertainment noise will be effectively mitigated by the measures detailed in Section 3.6.2 and 3.6.3 above. These measures not only address the primary source of noise (entertainment noise) but will also significantly reduces any potential disturbance from customers using the terrace (given patron activity noise is much lower in level).

Regarding The Corn Exchange, as detailed in Section 3.5 measurements indicate moderate levels of noise, comprising road traffic noise and conversations among pedestrians nearby – it is considered that customer activity would not change throughout the year therefore designing the affected facades to the captured noise levels will suffice in suitably controlling noise ingress.

Regarding the Catherine Wheels external beer garden, the noise survey did not capture the level of patron noise that could potential be present during busier warmer periods. To address this concern an outline worst-case assessment has been carried out to predict the potential noise impact from gathering of customers within this beer garden.

It should be noted that the premises license (premises license number 013352) allows The Catherine Wheel to open during the following times:

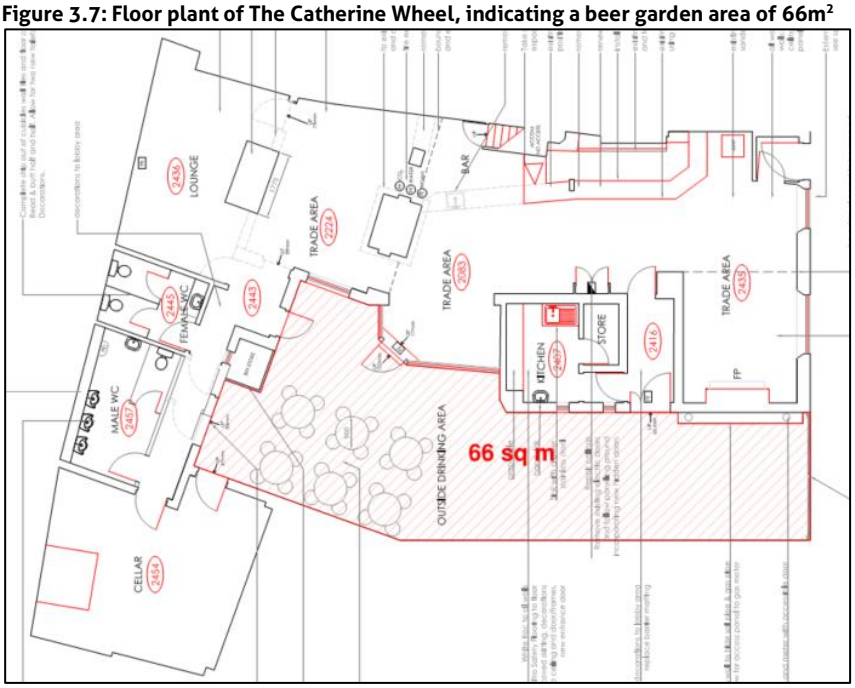
- Monday to Wednesday from 10:00 to 23:00
- Thursday to Saturday from 10:00 to 03:00
- Sunday from 10:00 to 22:30

It's worth noting the premises license doesn't explicitly authorize outdoor activities. In any case, we have considered the potential impact during worst-case hours, which are typically night-time periods (from 23.00 hrs onward) but especially on weekends where larger gatherings of people are more likely (Fridays, Saturdays and Sundays).

3.8.1 Source Levels

As we were unable to capture representative activity noise levels (as the beer garden was not in use due to the time of year), historic source data from sites of similar nature has been used to estimate the potential impact of patron activity emanating from the beer garden. The beer garden area has been based on drawings taken from the planning portal as shown in Figure 3.7 below, indicating an approximate area of 66m^2 for potential patron activity.

Figure 3.7: Floor plant of The Catherine Wheel, indicating a beer garden area of 66m^2



The following sound power levels have been used to predict external noise levels incident on the northern and eastern façades of Block A:

Table 3.8: Sound Power levels of typical customer activity source data for nominally 6m2 of busy external seating/terrace

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	A
Customer Activity Noise (dB L	71	73	78	77	71	66	56	71	80

It should be noted that the above sound power levels were extrapolated from attended sound source measurements undertaken in a central London public house; in a small, busy dedicated external terrace/seating area dominated by patron noise (reference occupancy 2 patrons per m2 i.e. ppm2). It is not considered that the same level of occupation nor levels may be representative of patrons occupying the Cathrine Wheels beer garden. As such, corrections have been applied to reduce the occupation pattern and provide a more reasonable assessment.

It should also be noted that other metrics for very short, instantaneous events such as the L_{max} or SEL levels have not been assessed, as it is considered that these would be generally 5-10 dB higher than the assumed sound power level in L_{eq} terms; which will not change the outcome of our assessment as the internal ambient noise criteria increases by 15 dB (from a 30 dB $L_{Aeq,T}$ in bedrooms at night to a 45 dB L_{max}). The increase in source terms would be smaller than the increase in the internal ambient noise level target, therefore the L_{eq} assessment constitutes the worst-case possible scenario. The source levels proposed in Table 5.1 above already contain high levels of patron activity for short term events (including loud shouting and laughing) in L_{eq} terms, therefore it is considered robust for the purpose of our assessment; so we reference to L_{max} levels is not necessary in this instance as the L_{eq} assessment will represent the worst-case scenario.

As mentioned above The Catherine Wheels beer garden has an area of approximately 66m2 and comprises of low-density tables and bench style seating. Assuming a worst-case scenario of a similar number of standing customers (i.e. a density of 1 patron per m2), the following corrections shall be applied to the levels detailed in Table 3.8:

- -3 dB correction for the occupation density [10 LOG (1ppm2/2ppm2)] (Where ppm2 = patron per m2)
- +11 dB correction for source area [10 LOG (70/6)]

Using the aforementioned data and the noise modelling techniques described in Section 3.6.1, a model has been created to predict the patron noise levels incidence on the Block's worst effected façades – worst-case noise levels are presented Table 3.9 below, with a 3D illustration shown in Figure 3.6 below (with a plan view provided shown in Figure A17 in the Appendix of this report).

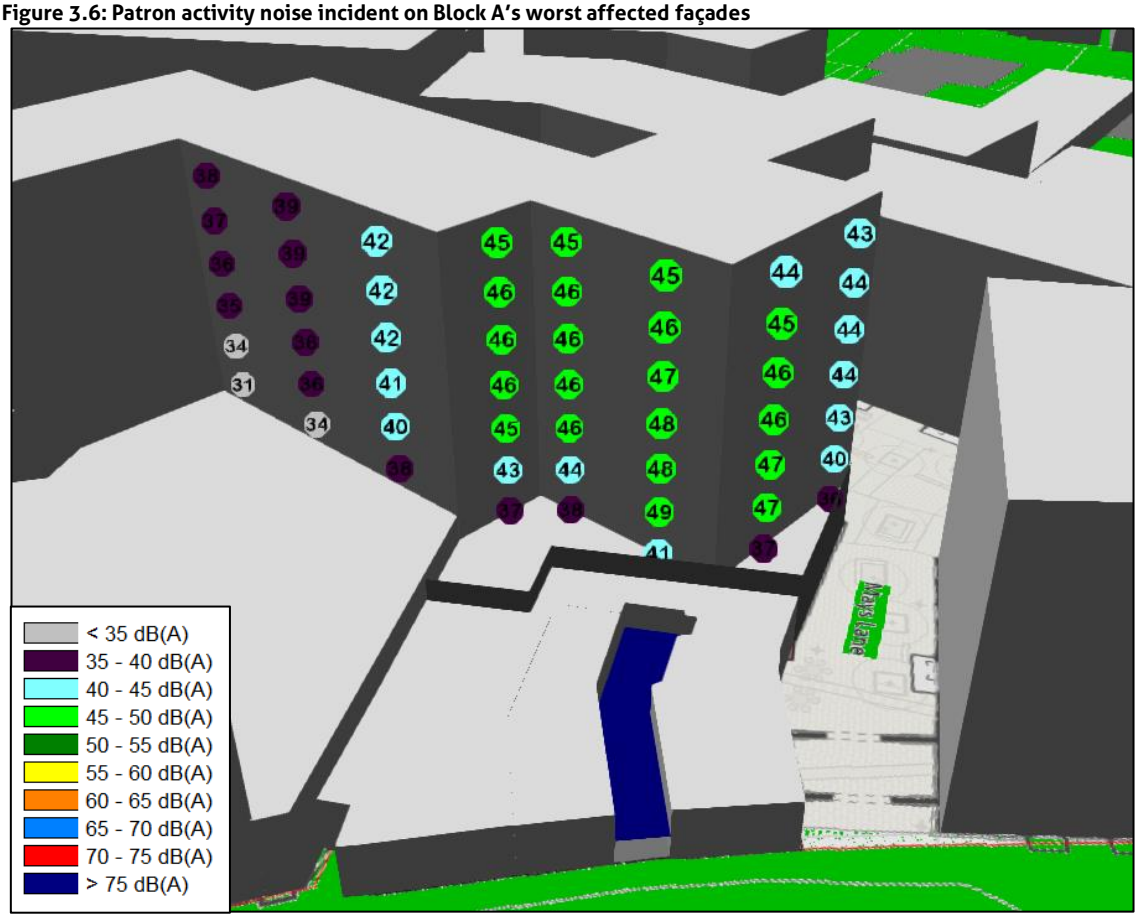
Figure 3.9: Predicted worst-case sound pressure levels from beer garden activity, L_{eq}

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	A
2nd floor apartments	45	42	45	49	44	39	29	21	49

The above noise spectrum has been used to determine the internal noise levels within worst-affect bedrooms located on the eastern façade of Block A. The calculation is shown in Figure A18 of the Appendix and factors in the external façade build-up described in Section 3.6.2 with the use of standard glazing (6/16/16mm, 33 dB R_w).

The calculation shows that internal noise levels comfortably meet the 30dB requirement for bedrooms at night, suggesting that noise from patrons in the Catherine Wheel's beer garden will not negatively affect the amenity of the proposed dwellings.

Figure 3.6: Patron activity noise incident on Block A's worst affected façades



4 IMPACT OF PLANT NOISE EMISSIONS

At this stage of the project sufficient information is not available to assess the impact of plant noise and vibration on the development itself and the wider surroundings. All commercial buildings will include external plant and it's likely the residential blocks will also be served by external plant, subject to heating and ventilation strategy.

Experience indicates that noise level from these sources will not give rise to a significant impact if they are controlled to a BS4142 rating of at least 5 dB below background.

Regarding plant installed as part of the development, it is typical that this be enforced by a planning condition as per that suggested in the Local Authority consultation response.

To ensure the control of noise emissions is maintained post completion, we recommend clauses such as that below be included as part of a commercial fit-out contract with prospective tenants.

Noise emissions from all items of plant shall comply with Local Authority requirements at noise sensitive receptors (both within and outside the development). The tenant shall provide details of proposals to Lochailort to demonstrate how the noise requirements are achieved for any air-handling, refrigeration and ventilation equipment to be installed.

All plant shall be adequately vibration isolated such that vibration is not perceptible within residential apartments. All plant likely to cause vibration into the landlord structure is to be isolated using vibration isolation mounts and bases as appropriate to provide 95% isolation. All such measures are to be provided by the tenant.

5 IMPACT OF COMMERCIAL OPERATIONAL NOISE

Similarly to plant, there is not enough information at this point to assess, in detail, what level of acoustic mitigation is required to protect residential amenity from commercial operational sources.

Ensuring separating walls and floors between commercial and residential use achieve a minimum airborne sound insulation performance of 55 dB $D_{nTw} + C_{tr}$ should address commercial noise disturbance in most cases.

Where future operators wish to operate at higher levels (e.g. gym, restaurant, bar etc), additional measures may be required. Where these form part of the development , it is typical that this be enforced by a planning condition as per that suggested in the Local Authority consultation response (Ref. Condition – Noise Management Plan for Use Class E Premises.)

Where commercial units are being handed over at shell condition and fitted out by future tenants, we recommend clauses such as the below be included as part of any contract.

The tenant is responsible for ensuring that adequate sound insulation is provided to suit their commercial use, so noise does not unduly affect the living conditions of neighbouring residential properties.

The tenant shall control noise emissions form the leased area(s) at all times to prevent disturbance to others and shall comply with any additional noise emission limits or restrictions on operating hours imposed by the Local authority of licensing bodies.

Full details of typical noise levels and any proposed sound insulation measures should be forwarded to Lochailort for approval.

APPENDIX

NOISE CONTORS, GLAZING SPECIFCATION, DETAILED CALCULATIONS AND PROPOSED WINTER GARDEN DRAWINGS

Figure A1 – Plan view of predicted external noise levels across the affected blocks (please note the maximum predicted level across all floors is shown per receptor)

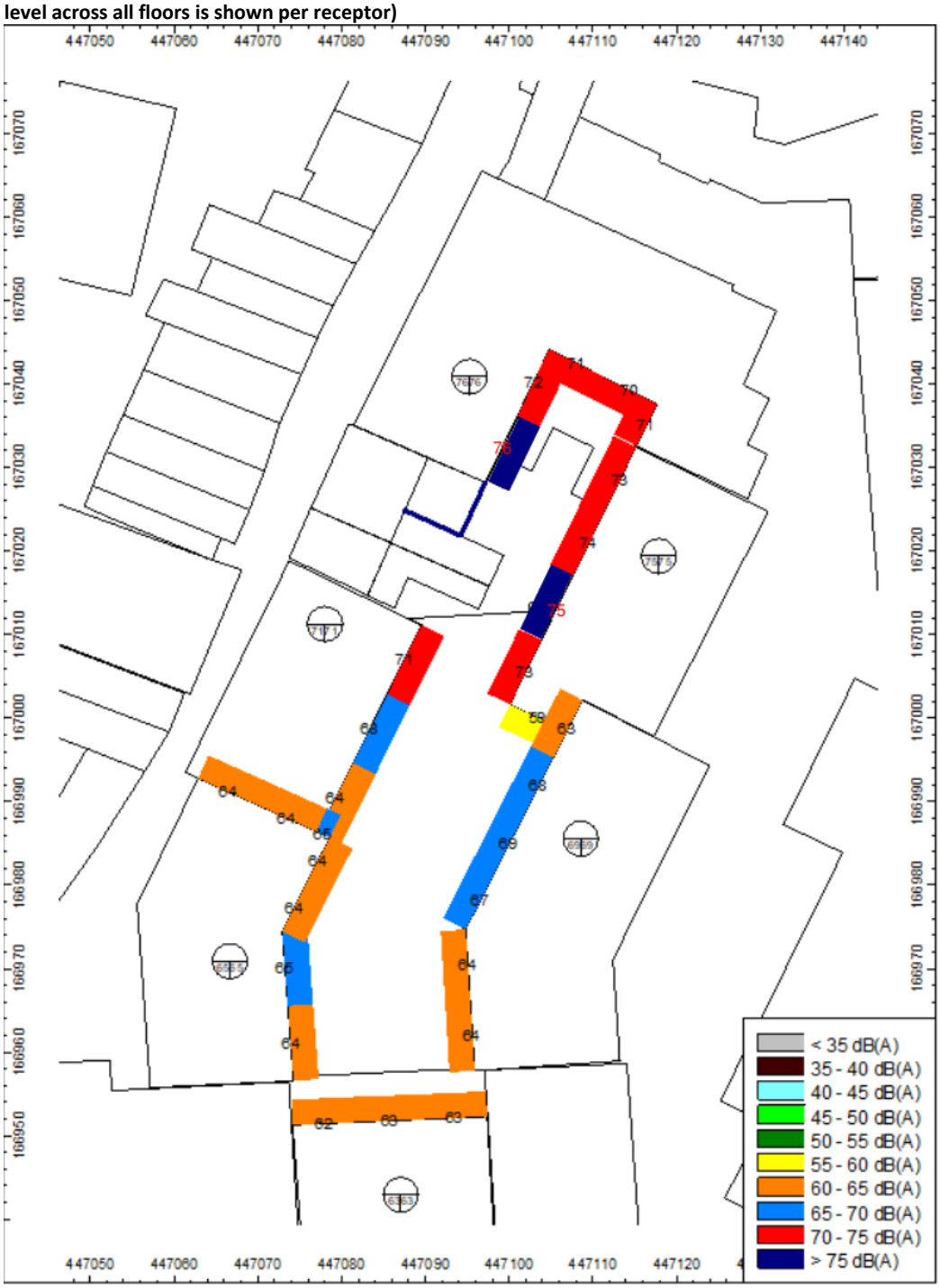


Figure A2 – Glazing specification

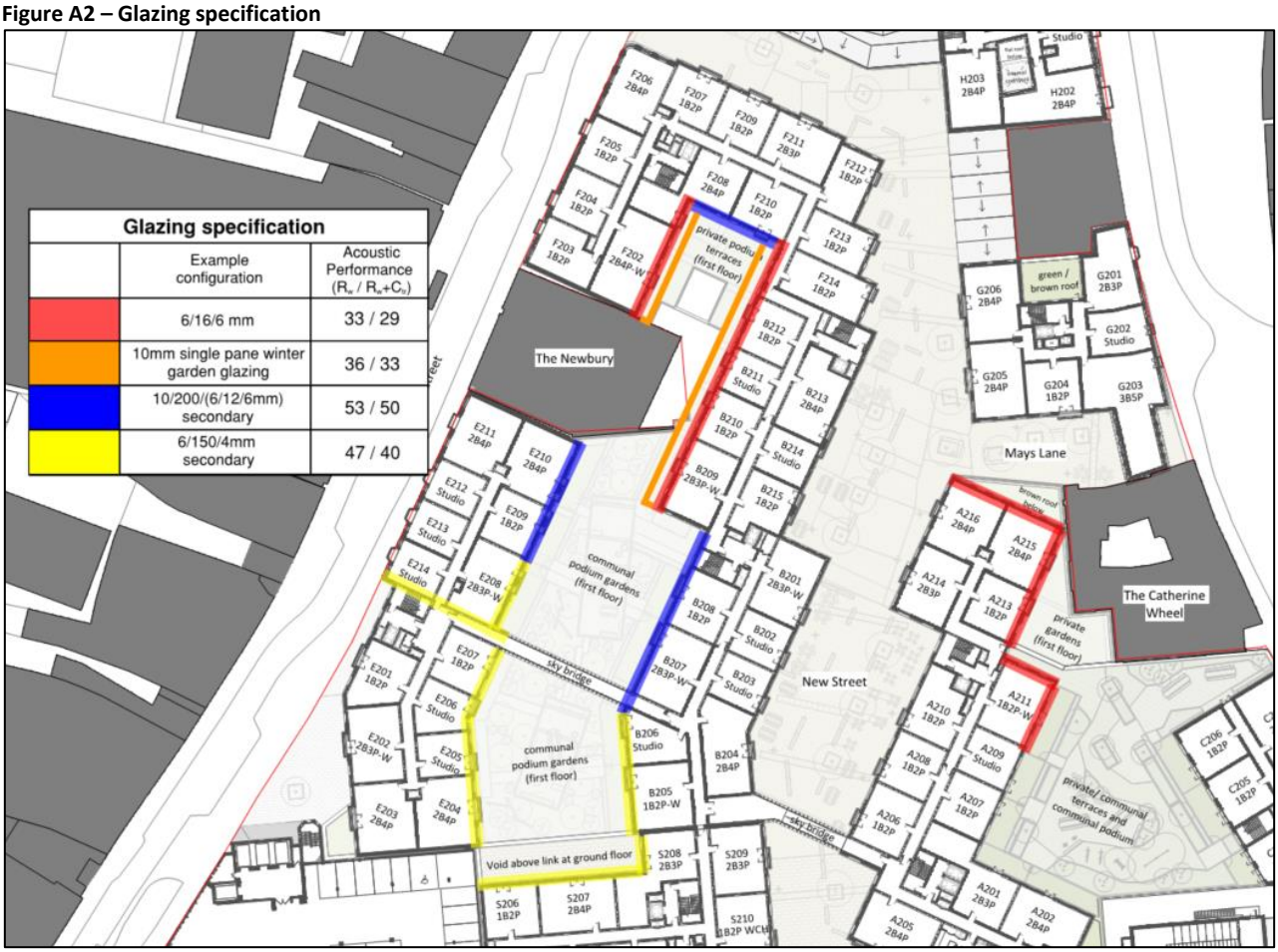


Figure A3 – Noise break-in calculations – Block B west (elevation area set further away from The Newbury) – living room

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block B west (set further back from The Newbury)

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**25**	**dB $L_{A\ eq,T}$**
Criterion:	**27**	**dB $L_{A\ eq,T}$**
Difference:	**-2**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	1.0	s	1.0	1.0	1.0	1.0	1.0	1.0	
	Receiver Room Volume	50.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		79	72	69	62	56	49	70
-R	Lightweight wall + internal wall lining			40	46	54	59	61	61	
+10logS	Element Area	7.5	m^2	9	9	9	9	9	9	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				38	26	15	2	-5	-12	**24**
L2tot	Running total			38	26	15	2	-5	-12	24
Element 2										
L1	Window (user data)	Leq		79	72	69	62	56	49	
-R	10/200/(6/12/6 double) secondary			40	51	51	51	61	70	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				34	16	13	6	-10	-26	**19**
L2tot	Running total			40	26	17	7	-4	-12	25

Figure A4 – Noise break-in calculations – Block B west (elevation area set further away from The Newbury) – bedroom

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block B west (set further back from The Newbury)

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**23**	**dB $L_{A\ eq,T}$**
Criterion:	**27**	**dB $L_{A\ eq,T}$**
Difference:	**-4**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	0.5	s	0.5	0.5	0.5	0.5	0.5	0.5	
	Receiver Room Volume	30.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		79	72	69	62	56	49	70
-R	Lightweight wall + internal wall lining			40	46	54	59	61	61	
+10logS	Element Area	5.0	m^2	7	7	7	7	7	7	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				36	23	12	0	-7	-15	**21**
L2tot	Running total			36	23	12	0	-7	-15	21
Element 2										
L1	Window (user data)	Leq		79	72	69	62	56	49	
-R	10/200/(6/12/6 double) secondary			40	51	51	51	61	70	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				33	15	12	5	-10	-27	**18**
L2tot	Running total			38	24	15	6	-6	-15	23

Figure A5 – Noise break-in calculations – Block B west (elevation area set even further away from The Newbury) – living room

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block B west (set even further back from The Newbury

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**26**	**dB $L_{A\ eq,T}$**
Criterion:	27	**dB $L_{A\ eq,T}$**
Difference:	**-1**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz						
				125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	1.0	s	1.0	1.0	1.0	1.0	1.0	1.0	
	Receiver Room Volume	50.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		72	66	63	56	51	43	64
-R	Lightweight wall (eg cementitious board, 100mm cavity, 2 layers of plasterboard)			35	41	49	54	56	56	
+10logS	Element Area	7.5	m^2	9	9	9	9	9	9	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				37	25	14	2	-6	-14	**23**
L2tot	Running total			37	25	14	2	-6	-14	23
Element 2										
L1	Window (database)	Leq		72	66	63	56	51	43	
-R	6/150/4mm secondary glazing			29	35	45	56	52	50	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				38	26	13	-5	-7	-12	**24**
L2tot	Running total			41	29	17	2	-3	-10	26

Figure A6 – Noise break-in calculations – Block B west (elevation area set even further away from The Newbury) – bedroom

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block B west (set even further back from The Newbury

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**25**	**dB $L_{A\ eq,T}$**
Criterion:	27	**dB $L_{A\ eq,T}$**
Difference:	**-2**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz						
				125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	0.5	s	0.5	0.5	0.5	0.5	0.5	0.5	
	Receiver Room Volume	30.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		72	66	63	56	51	43	64
-R	board, 100mm cavity, 2 layers of plasterboard)			35	41	49	54	56	56	
+10logS	Element Area	5.0	m^2	7	7	7	7	7	7	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				35	22	11	-1	-8	-16	**20**
L2tot	Running total			35	22	11	-1	-8	-16	20
Element 2										
L1	Window (database)	Leq		72	66	63	56	51	43	
-R	6/150/4mm secondary glazing			29	35	45	56	52	50	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				38	25	12	-6	-7	-13	**23**
L2tot	Running total			39	27	15	0	-5	-11	25

Figure A7 – Noise break-in calculations – Block E east – living room

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block E east - Living room

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**27**	**dB $L_{A\ eq,T}$**
Criterion:	27	**dB $L_{A\ eq,T}$**
Difference:	**0**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	1.0	s	1.0	1.0	1.0	1.0	1.0	1.0	
	Receiver Room Volume	50.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		80	73	70	63	57	50	71
-R	Lightweight wall + internal wall lining			40	46	54	59	61	61	
+10logS	Element Area	7.5	m^2	9	9	9	9	9	9	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				40	27	16	3	-4	-11	**25**
L2tot	Running total			40	27	16	3	-4	-11	25
Element 2										
L1	Window (user data)	Leq		80	73	70	63	57	50	
-R	10/200/(6/12/6 double) secondary			40	51	51	51	61	70	
+10logS	Element Area	3.0	m^2	5	5	5	5	5	5	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				36	18	15	7	-8	-24	**21**
L2tot	Running total			41	28	18	9	-3	-11	27

Figure A8 – Noise break-in calculations – Block E east – bedroom

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block E east - Bedroom

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**24**	**dB $L_{A\ eq,T}$**
Criterion:	27	**dB $L_{A\ eq,T}$**
Difference:	**-3**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	0.5	s	0.5	0.5	0.5	0.5	0.5	0.5	
	Receiver Room Volume	30.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		80	73	70	63	57	50	71
-R	Lightweight wall + internal wall lining			40	46	54	59	61	61	
+10logS	Element Area	5.0	m^2	7	7	7	7	7	7	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				37	24	13	1	-7	-14	**23**
L2tot	Running total			37	24	13	1	-7	-14	23
Element 2										
L1	Window (user data)	Leq		80	73	70	63	57	50	
-R	10/200/(6/12/6 double) secondary			40	51	51	51	61	70	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				34	16	13	6	-10	-26	**19**
L2tot	Running total			39	25	16	7	-5	-14	24

Figure A9 – Noise break-in calculations – Block E east (elevation area further away from The Newbury) – living room

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block E east (set further back from The Newbury)

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**25**	**dB $L_{A\ eq,T}$**
Criterion:	**27**	**dB $L_{A\ eq,T}$**
Difference:	**-2**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	1.0	s	1.0	1.0	1.0	1.0	1.0	1.0	
	Receiver Room Volume	50.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		72	65	62	54	49	41	63
-R	Lightweight wall (eg cementitious board, 100mm cavity, 2 layers of plasterboard)			35	41	49	54	56	56	
+10logS	Element Area	7.5	m^2	9	9	9	9	9	9	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				36	24	13	0	-8	-16	**22**
L2tot	Running total			36	24	13	0	-8	-16	22
Element 2										
L1	Window (database)	Leq		72	65	62	54	49	41	
-R	6/150/4mm secondary glazing			29	35	45	56	52	50	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				37	25	12	-7	-8	-15	**23**
L2tot	Running total			40	27	15	1	-5	-12	25

Figure A10 – Noise break-in calculations – Block E east (elevation area further away from The Newbury) – bedroom

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block E east (set further back from The Newbury)

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**24**	**dB $L_{A\ eq,T}$**
Criterion:	**27**	**dB $L_{A\ eq,T}$**
Difference:	**-3**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	0.5	s	0.5	0.5	0.5	0.5	0.5	0.5	
	Receiver Room Volume	30.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		72	65	62	54	49	41	63
-R	Lightweight wall (eg cementitious board, 100mm cavity, 2 layers of plasterboard)			35	41	49	54	56	56	
+10logS	Element Area	5.0	m^2	7	7	7	7	7	7	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				34	21	10	-3	-10	-18	**19**
L2tot	Running total			34	21	10	-3	-10	-18	19
Element 2										
L1	Window (database)	Leq		72	65	62	54	49	41	
-R	6/150/4mm secondary glazing			29	35	45	56	52	50	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				37	24	11	-8	-9	-15	**22**
L2tot	Running total			38	26	14	-1	-7	-14	24

Figure A11 – Noise break-in calculations – Block F South – Living room

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block F South

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**26**	**dB $L_{A\ eq,T}$**
Criterion:	27	**dB $L_{A\ eq,T}$**
Difference:	**-1**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	1.0	s	1.0	1.0	1.0	1.0	1.0	1.0	
	Receiver Room Volume	50.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		79	72	70	62	57	50	70
-R	Lightweight wall + internal wall lining			40	46	54	59	61	61	
+10logS	Element Area	7.5	m^2	9	9	9	9	9	9	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				39	26	15	3	-4	-12	**24**
L2tot	Running total			39	26	15	3	-4	-12	24
Element 2										
L1	Window (user data)	Leq		79	72	70	62	57	50	
-R	10/200/(6/12/6 double) secondary			40	51	51	51	61	70	
+10logS	Element Area	3.0	m^2	5	5	5	5	5	5	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				35	17	14	7	-8	-25	**20**
L2tot	Running total			40	27	18	8	-3	-12	26

Figure A12 – Noise break-in calculations – Block F South – Bedroom

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block F South

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**23**	**dB $L_{A\ eq,T}$**
Criterion:	27	**dB $L_{A\ eq,T}$**
Difference:	**-4**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	0.5	s	0.5	0.5	0.5	0.5	0.5	0.5	
	Receiver Room Volume	30.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		79	72	70	62	57	50	70
-R	Lightweight wall + internal wall lining			40	46	54	59	61	61	
+10logS	Element Area	5.0	m^2	7	7	7	7	7	7	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				36	23	13	0	-7	-14	**22**
L2tot	Running total			36	23	13	0	-7	-14	22
Element 2										
L1	Window (user data)	Leq		79	72	70	62	57	50	
-R	10/200/(6/12/6 double) secondary			40	51	51	51	61	70	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				33	15	13	5	-10	-26	**19**
L2tot	Running total			38	24	16	6	-5	-14	23

Figure A13 – Noise break-in calculations – Block S North – Living room

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block S north - Living room

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**25**	**dB $L_{A\ eq,T}$**
Criterion:	27	**dB $L_{A\ eq,T}$**
Difference:	**-2**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	1.0	s	1.0	1.0	1.0	1.0	1.0	1.0	
	Receiver Room Volume	50.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		70	64	62	54	49	40	62
-R	Lightweight wall (eg cementitious board, 100mm cavity, 2 layers of plasterboard)			35	41	49	54	56	56	
+10logS	Element Area	7.5	m^2	9	9	9	9	9	9	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				35	23	12	0	-8	-16	**21**
L2tot	Running total			35	23	12	0	-8	-16	21
Element 2										
L1	Window (database)	Leq		70	64	62	54	49	40	
-R	6/150/4mm secondary glazing			29	35	45	56	52	50	
+10logS	Element Area	3.0	m^2	5	5	5	5	5	5	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				37	25	12	-6	-8	-14	**22**
L2tot	Running total			39	27	15	1	-5	-12	25

Figure A14 – Noise break-in calculations – Block S North – Bedroom

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block S north - Bedroom

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**23**	**dB $L_{A\ eq,T}$**
Criterion:	27	**dB $L_{A\ eq,T}$**
Difference:	**-4**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	0.5	s	0.5	0.5	0.5	0.5	0.5	0.5	
	Receiver Room Volume	30.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		70	64	62	54	49	40	62
-R	board, 100mm cavity, 2 layers of plasterboard)			35	41	49	54	56	56	
+10logS	Element Area	5.0	m^2	7	7	7	7	7	7	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				32	21	10	-3	-10	-19	**18**
L2tot	Running total			32	21	10	-3	-10	-19	18
Element 2										
L1	Window (database)	Leq		70	64	62	54	49	40	
	Pilk 6/150/4mm secondary			29	35	45	56	52	50	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				35	24	11	-8	-9	-16	**21**
L2tot	Running total			37	25	13	-2	-7	-14	23

Figure A15 – Noise break-in calculations – Block F East – Winter Garden

Job name:	The Kennet Centre
Job no.:	7129
Façade:	Bock F East Living - Winter Garden Ingress

RESULT SUMMARY: LAeq Day
Predicted Internal Level: **50** **dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz						
				125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	0.4	s	0.4	0.4	0.4	0.4	0.4	0.4	
	Receiver Room Volume	18.0	m^3							
Element 1				Façade						
L1	Window (database)	Leq		84	77	74	66	61	54	75
-R	Pilk 10mm			26	27	34	35	36	44	
+10logS	Element Area	19.0	m^2	13	13	13	13	13	13	
-10logA	where A=0.16V/T			9	9	9	9	9	9	
+0				0	0	0	0	0	0	
=L2				62	54	44	36	29	14	**50**
L2tot	Running total			62	54	44	36	29	14	50

Figure A16 – Room to room noise transfer – Block F East – Winter Garden to Living room

Job No.	Made By	Date Created	Sheet No.						
7129	DM	12/01/24	1						
Job Name		Date last revised	Rev						
Kennet Centre, Newbury		12/01/24	1						
Calculation Description				Octave Band Centre Frequency					
Room to Room noise transfer (WG to Dwelling)				125	250	500	1k	2k	4k
			Lp1 (dBA)	Source room sound pressure level Lp1 (dB)					
Source Room	Noise level within Winter Garden		50	62	54	44	36	29	14
Partition details	Slip brick cladding + 6/16/6 standard glazing	Area S (m2)	Rw (dB)	Sound Insulation Performance R or R' (dB)					
Composite performance of External façade		11.0		27	27	35	43	39	43
Receiver Room	Living room	Volume V (m3)		Reverberation Time RT (s)					
		50.0		1	1	1	1	1	1
				Absorption A (sabine)					
				8	8	8	8	8	8
			Lp2 (dBA)	Receiver room sound pressure level Lp2 (dB)					
		Predicted level	23	36	28	10	-5	-9	-27
		Target NR level	NR25	44	35	28	25	22	20
		Difference		-7	-7	-18	-30	-30	-47
Room to Room Airborne Noise transfer Version 0.01		Anderson Acoustics							

Figure A17 – Plan view of predicted patron noise activity from The Catherine Wheel's beer garden across the worst-affected blocks (please note the maximum predicted level across all floors is shown per receptor)

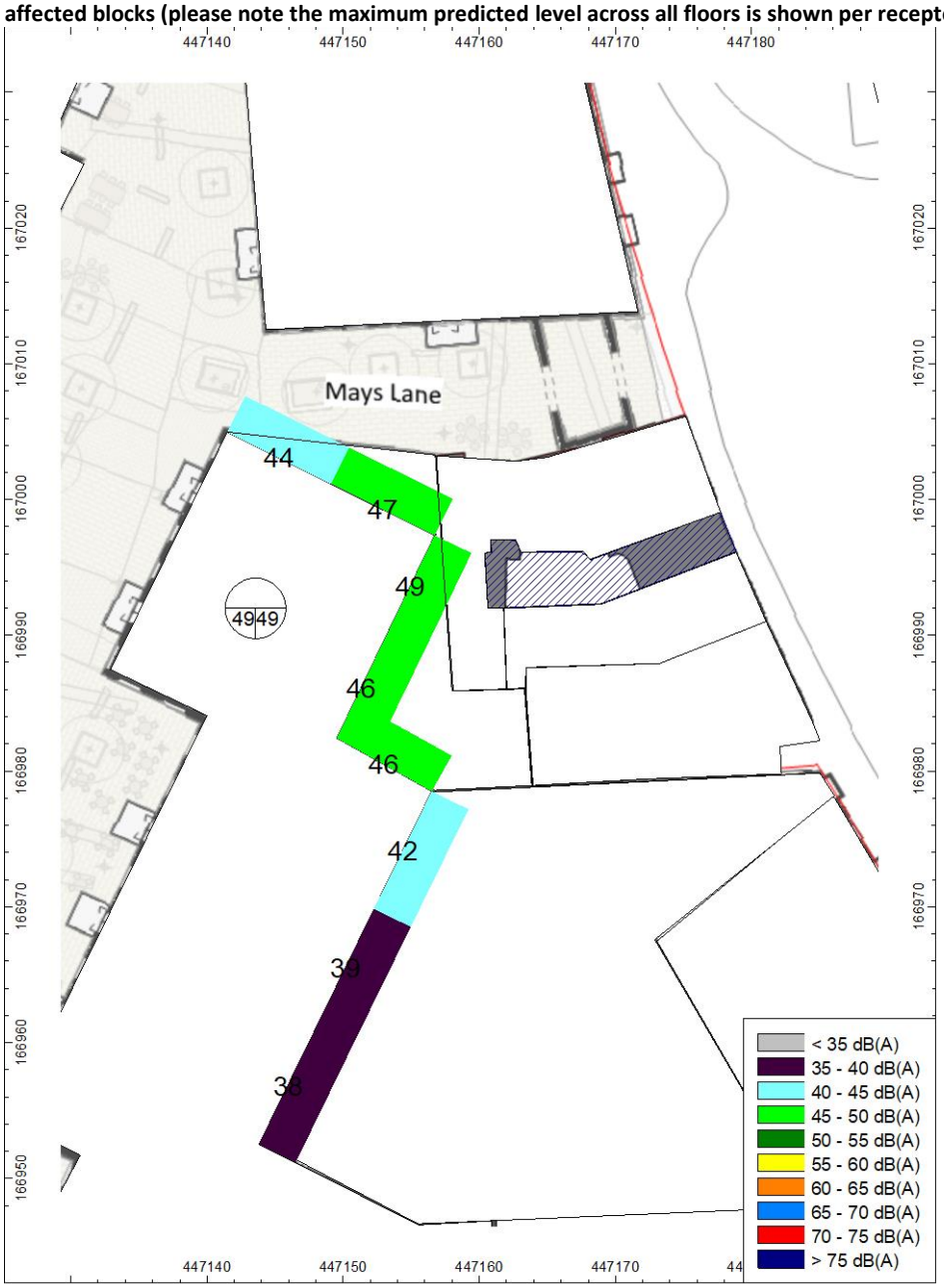


Figure A18 – Noise break-in calculations – Block A East – Bedroom

Job name:	Kennet Centre, Newbury
Job no.:	7129
Façade:	Block A Eastern façade (worst-affected apartmnet)

RESULT SUMMARY:	LAeq Day	
Predicted Internal Level:	**13**	**dB $L_{A\ eq,T}$**
Criterion:	30	**dB $L_{A\ eq,T}$**
Difference:	**-17**	**dB $L_{A\ eq,T}$**

SOUND INSULATION BY ELEMENT

Formula	Description	Data	Units	Octave band centre frequency, Hz 125	250	500	1000	2000	4000	dB(A)
	Reverberation Time	0.5	s	0.5	0.5	0.5	0.5	0.5	0.5	
	Receiver Room Volume	30.0	m^3							
Element 1				Façade						
L1	Wall (user data)	Leq		42	45	49	44	39	29	49
-R	Lightweight wall (eg cementitious board, 100mm cavity, 2 layers of plasterboard)			35	41	49	54	56	56	
+10logS	Element Area	5.0	m^2	7	7	7	7	7	7	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				4	1	-3	-13	-20	-30	**-3**
L2tot	Running total			4	1	-3	-13	-20	-30	-3
Element 2										
L1	Window (database)	Leq		42	45	49	44	39	29	
-R	6mm / 16mm / 6mm			22	22	30	38	34	38	
+10logS	Element Area	2.5	m^2	4	4	4	4	4	4	
-10logA	where A=0.16V/T			10	10	10	10	10	10	
+0				0	0	0	0	0	0	
=L2				14	17	13	0	-1	-15	**13**
L2tot	Running total			15	17	13	0	-1	-15	13