



AIRTIGHT & NOISECHECK LIMITED

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NOISE IMPACT ASSESSMENT FOR

BSR READING LTD
89-91 BASINGSTOKE ROAD
READING
RG2 0HA

SITE ADDRESS

89-91 BASINGSTOKE ROAD
READING
RG2 0HA

Acoustic Engineer:

Date: 6th – 7th August 2024

Michael Vine

AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTINGCustomer Name: Date: 6th – 7th August 2024BSR Reading Ltd
89-91 Basingstoke Road
Reading
RG2 0HASite Address:
89-91 Basingstoke Road
Reading
RG2 0HAAcoustic Engineer:
Mr. Michael Vine

Equipment used:

Norsonic Environmental Analyser 140 BS EN IEC 61672-1 2013 Class 1 – Associated frequency analyser to BS EN IEC 61260: 1996 Class 1 – serial 1407126 – calibration due March 2026

Measurement Microphone (Nor 1225) – Serial Number 305215 – calibration due March 2026

Acoustic Calibrator - (Type 1251) – Serial No 31652, Calibration due November 2024

Measurement Procedure:

The external ambient noise levels were recorded for a 24-hour period in one external location between 1130hrs on Tuesday 6th & 1130hrs on Wednesday 7th August 2024 to measure the existing noise levels at the Western boundary of the proposed site. This is the façade that face the noise associated with the local area. Further measurements were taken of the plant associated with the ground floor commercial unit to assess the impact of these on the proposed dwellings.

The rating level of the plant will be measured against both the LA90 values and the values listed in BS8233: 2014 for robustness.

The local authority have stated the following comments in relation to the scheme:

Noise impact on development

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.

The noise assessment data should also include noise events (LAMax) and the design should aim to prevent noise levels from noise events exceeding 45dB within bedrooms at night, as this is linked with sleep disturbance.

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

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Where the new residential use may be affected by noise from commercial premises, the assessment should also include consideration of the impact of the commercial noise sources using BS4142:2014 A 2019 methodology and/or other relevant guidance for particular noise sources such as music noise, as penalties may need to be applied to the acceptable internal noise levels to take into account non anonymous noise sources.

The scheme should be designed, specified and constructed so that the sound insulation performance of the structure and the layout of the dwellings are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of BS 8233:2014 and the and that the individual noise events do not exceed 45 dB LA,max,F more than 10 times a night. Appropriate penalties shall be applied for non-anonymous noise sources. Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233:2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system with cool air bypass as an alternative means of cooling and ventilation. Noise from the system should not result in BS8233 internal levels being exceeded.

Executive Summary:

Airtight & Noisecheck Ltd were instructed by BSR Reading Ltd to undertake a detailed Noise Impact Assessment (NIA) at 89-91 Basingstoke Road, Reading, RG2 0HA. A Prior approval Part 3 Class MA: Commercial, business and service uses to dwellinghouses pursuant to permitted development rights has been submitted Change of use of 1st Floor from Class E (offices) to C3 (dwellinghouses). Prior Notification under Class MA, Part 3 of Schedule 2 of the Town and Country Planning (General Permitted Development) Order 2015.

The noise levels were measured for a 24hour period at the front (Western) boundary of the site, with further measurements taken at the rear of the building to account for the new plant associated with the ground floor commercial unit.

The external noise levels were measured at the Western façade in order to assess the vehicular traffic using Basingstoke Road & the commercial uses beyond that. This assessment is concerned with the commercial activity only under permitted development, which are located to the rear of the building and also on the other side of the road to the West, including a car dealership & tyre replacement centre further on.

The noise levels & calculations indicate that there is no reason to suggest that the future residents of the proposed dwellings will be adversely affected by the noise emissions created by the commercial external sources. The measures to be implemented to the glazing & an alternative ventilation system will ensure the internal acoustic criteria can be achieved.

There is no reason to suggest that the future residents of the proposed residential development will be adversely affected by the noise emissions apparent in the immediate area. The measures already apparent within the building are listed within this report.

The external noise levels are higher at the front than the rear of the site for obvious reasons, however the glazing & façade construction proposed will ensure suitable sound insulation values for the dwellings, all windows will need to ensure compliance with the levels stated in this report. However, the plant located at the rear of the building has been assessed and mitigated against in order to ensure no adverse impact on the future residents of the scheme.

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Assessment Criteria:

The National Planning Policy Framework (NPPF) came into effect in March 2012 and was updated published in December 2023. It replaced other documents such as PPG24. The NPPF and provides a number of objectives and aims that are directed towards avoiding significant adverse impacts and reducing others on quality of life and health. This document states that:

Paragraph 180 states Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, considering relevant information such as river basin management plans.

Paragraph **191** Planning policies and decisions should also ensure that new development is appropriate for its location considering the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- (a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life ⁶⁵;
- (b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

193. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

The Planning Practice Guidance has guidance on noise, date 22nd July 2019 and also has the noise hierarchy table as shown below. Paragraphs 009 & 011 are referenced later in this report.

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Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

NOEL – No Observed Effect Level This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observed Adverse Effect Level This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level This is the level above which significant adverse effects on health and quality of life occur.

The NPSE (Noise Policy Statement for England) states the following aims with respect to noise policy:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of the Government policy on sustainable development:

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

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PROPG: PLANNING & NOISE (2017) NEW RESIDENTIAL DEVELOPMENT [PROPG 2017]

The ProPG Planning & Noise document was published in 2017, its development supported by the Institute of Acoustics, the Association of Noise Consultants, and the Chartered Institute of Environmental Health. The aim of the document is to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.

ProPG advocates a systematic, proportionate risk-based, 2 stage approach which:

1. Encourages early consideration of noise issues;
2. Facilitates straightforward accelerated decision making for lower risk sites;
3. Assists proper consideration of noise issues where the acoustic environment is challenging.

A summary of the overall ProPG approach is included in Appendix B. The two sequential stages of the overall approach are:

1. Stage 1 – an initial noise risk assessment of the proposed development site; and
2. Stage 2 – a systematic consideration of four key elements.

The four key elements to be undertaken in parallel during Stage 2 are:

1. Element 1 – demonstrating a “Good Acoustic Design Process”;
2. Element 2 – observing internal “Noise Level Guidelines”;
3. Element 3 – undertaking an “External Amenity Area Noise Assessment”; and
4. Element 4 – consideration of “Other Relevant Issues”.

The approach is underpinned by the preparation and delivery of an “Acoustic Design Statement” [ADS]. The ADS is intended to conclude in the provision of one of the following four recommendations to the decision maker:

1. Planning consent may be granted without any need for noise conditions;
2. Planning consent may be granted subject to the inclusion of suitable noise conditions;
3. Planning consent should be refused on noise grounds in order to avoid significant adverse effects (“avoid”); or
4. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects (“prevent”).

The overall ProPG 2017 approach is intended for implementation with projects at an earlier stage than the subject of this report. This report provides a full noise mitigation strategy for the site, rather than an initial recommendation to the decision maker.

ProPG 2017 contains the most up to date guidance available on industry-wide adopted best-practise interpretation of relevant guidance regarding acceptable internal and external noise levels i.e. BS8233:2014 and WHO Guidelines.

WHO GUIDELINES FOR COMMUNITY NOISE (1999)

The guidance in this document recommends design criteria for internal noise levels within residential and commercial buildings. A summary of the recommended guidance is shown in Table 2.1. **Table 2.1 – Excerpt from WHO [dB ref. 20µPa]**

Criterion	Environment	Design range LAeq,T dB
Maintain speech intelligibility, avoid moderate annoyance, daytime & evening	Living Rooms	35
Prevent sleep disturbance, night time	Bedrooms	30

This guidance also states:

For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB LAmax more than 10-15 times a night (Vallet & Vernet 1991)

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For outdoor living areas, it is stated that:

To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB LAeq on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB LAeq. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development

BS8233:2014 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

The guidance in this document indicates acceptable noise levels for various activities within residential dwellings. A summary of the recommended guidance is shown in the following table as listed in BS8233: 2014

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB LAeq, 16 hour	-
Dining	Dining Room	40 dB LAeq, 16 hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16 hour	30 dB LAeq, 8 hour

Acoustic Design Statement:

It is clear that the site is situated close to a busy area with a variety of activity to the front of the building and will be exposed to moderate external noise levels, however robust mitigation measures are already in place to ensure the impact of the external & internal noise will not have an adverse impact on the future residential dwellings. These measures that are already apparent include:

1. A secondary glazing system will be implemented to the 1st floor to increase sound insulation of the current glazing
2. Alternative ventilation system with cooling used to habitable rooms so good ventilation can be achieved without opening windows
3. Option to open windows to offer natural ventilation for shorter periods to strike a balance between noise, ventilation & overheating

The above measures are a clear indication of the sound reduction already offered by the building fabric & proposed internal layout to reduce the potential impact of the noise sources in operation.

Based on the measured noise levels, the proposed mitigation measures, the location of the development and the type of noise apparent it is anticipated that the noise will fall at The NOEL value (No adverse effect level) and maybe towards the LOAEL (Lowest observed adverse effect level) and as such the noise should not have a detrimental effect on the future residents providing adequate measures are implemented to the building fabric & elements. For noise sources at the LOAEL, it is anticipated that the noise will be noticeable but not intrusive if suitable mitigation measures are implemented to the development.

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1 Objective:

1.1 To determine the noise levels associated over a 24hour period at the proposed residential facades of the development. The noise levels associated with all facades facing the noise source were measured to ensure that the future residents of the proposed scheme will not be adversely affected by the noise emissions created in the immediate area. The site currently comprises of a commercial building with Class E (commercial, business & service) located at ground floor & Class E (offices) at 1st floor. A Prior approval Part 3 Class MA: Commercial, business and service uses to dwellinghouses pursuant to permitted development rights has been submitted Change of use of 1st Floor from Class E (offices) to C3 (dwellinghouses). Prior Notification under Class MA, Part 3 of Schedule 2 of the Town and Country Planning (General Permitted Development) Order 2015.

1.2 This assessment uses guidance in Sch. 2 Pt. 3 Class MA inserted (21.4.2021) by The Town and Country Planning (General Permitted Development etc.) (England) (Amendment) Order 2021 (S.I. 2021/428), arts. 1(1), 6 (with art. 15(3)).

Permitted development

MA. Development consisting of a change of use of a building and any land within its curtilage from a use falling within Class E (commercial, business and service) of Schedule 2 to the Use Classes Order to a use falling within Class C3 (dwellinghouses) of Schedule 1 to that Order.

MA.2.—(1) Development under Class MA is permitted subject to the following conditions.

(d) impacts of noise from commercial premises on the intended occupiers of the development.

There are no actual commercial noise sources present in the area other than the plant associated with the ground floor commercial use so this noise was also measured and referenced. This assessment has confirmed that the property will not be negatively impacted acoustically by these noise sources. This report is working towards the comments listed on Pages 3 & 4.

2 Calibration:

2.1 The measurement microphones were calibrated before and after testing in each measurement location and there were no drifts recorded during the assessments.

3 Site Layout & Microphone Position:

3.1 The proposed site is located to the East of Basingstoke Road, Reading. The immediate area comprises of mixed use buildings with commercial, industrial & residential apparent close by. The current building layout comprises of a convenience store at ground floor.

3.3 There are other commercial units located in the area, including car sales, tyre repair shops, a business park, plumbing centre. All of which were in operation during the assessment. There is also a convenience store at ground floor level.

3.3 The dwellings will be located at 1st floor, with one at the front and one at the rear. The microphone was located:

- 1- Western façade (front) of the site with the microphone approximately 4metres from ground floor level & 15metres from the centre of Basingstoke Road. It was positioned circa 1m from the façade so a -3dB reduction has been applied for reflection.
- 2- Further measurements were taken at the rear of the building where the plant is located. There are 3 x chiller units mounted to the façade.

4 Weather Conditions:

4.1 The weather was dry & warm during the measurement procedures, the temperatures ranged between 12 - 22degrees on Tuesday and 10-21degrees on Wednesday. There was no wind or rain during the measurement procedure. There was some rain before the assessment began on Tuesday morning.

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5 External Results:

5.1 The purpose of this measurement procedure was to calculate the noise levels apparent at the noise sensitive facades and ensure suitable mitigation measures are implemented so that the requirements of BS8233 & WHO can be met. The night time L_{Amax} values have also been derived so that they can be mitigated against.

Table 1 - L_{Aeq} & L_{Amax} Values – Front & Side of building:

Mic Location	L_{Aeq} 16hour Value	Reduction needed for BS8233 compliance	L_{Aeq} 8hour Value	Reduction for BS8233 compliance	L_{Amax} value – night time	Reduction for WHO compliance
ML 1 – Front	64dBA	29dB	56dBA	26dB	75dBA	30dB

The above results include the -3dB acoustic feature correction for reflection from the façade.

6 Results Conclusion:

6.1 The levels of reduction apparent for the noise associated with the site is listed in the table above. The highest level of sound reduction for the front is shown above is 30dBA. The same glazing is recommended to be installed throughout the building, which meets the sound reduction levels shown above and thus ensure a very good internal acoustic criteria. It is anticipated that the future residents of this scheme will be able to open their windows for periods in the day time and night time to reduce overheating and offer natural ventilation, but an alternative ventilation system is recommended to be installed to ensure suitable levels of ventilation during periods when windows are closed.

6.2 The WHO guidelines for community noise - 2000 state that the internal L_{Amax} level (night time) should not exceed 45dB(A). If it exceeds this level on a regular basis then sleep disturbance may be caused. This is the internal level that should be achieved.

6.3 Plant levels to rear:

Results

Commentary

Ambient Sound Level	Sound Pressure Level = 69dBA @1m – if all on	Measured source level (no AFC) unit 1 & 2 = 65dBA, unit 3 = 61dBA = combined = 69dBA
Residual Sound Level	51dBA	Measured at receptor – L_{Aeq} during opening hours – with neighbouring plant not in operation
Specific Sound Level	69dB	
Acoustic Feature Correction	+3dB for intermittency +3dB for noticeable	Intermittent and audible
Reductions due to distance	-6dB for level at 2m	$L_2 - L_1 - 20\log(r_2/r_1)$
Rating Level	69dBA	Plant level at façade
Background Sound level	40dBA	Measured on site – with no plant
Excess of rating over background	$(60-40) = +29dB$	
Assessment indicates adverse impact at receptor – inaudible at façade		No mitigation possible to units so all mitigation at receptor

6.4 The above table indicates a rating level of 69dBA at the nearest residential window which is 2m away above the units. However, these windows will not be opened as there is another window serving the bedroom (bedroom 2) located on the Southern façade. This window is also located circa 2m from the plant but it is screened by the building facade so this will reduce the noise levels by circa 5dB – giving a rating level of 64dBA at the window, indicating a required level of reduction of 24dBA to ensure the L_{A90} is not exceeded. Bedroom 1 is located 3m from the plant with a rating level of 62dBA, giving a required reduction of 22dBA.

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6.4 During the attended visit, the 3 x units were not on at the same time but the above has been included to indicate worst case scenario for the dwelling located at 1st floor level. If these levels were compared to the recommended values listed in BS8233: 2014 then a total sound reduction of 39dBA would be apparent if all 3 units were in operation (including intermittency & being noticeable) but this will probably not be the case. However, this report has included some secondary glazing specifications that will achieve this reduction.

6.5 The more apparent reduction is that of between 32-34dB (if the plant is to be compared to the BS8233: 2014 levels, again this level of reduction is achieved with the installation of secondary glazing and an alternative ventilation system. However, noise such as plant is usually compared to the LA90 values as shown in the BS4142: 2014 + A1: 2019 table on the previous page, which would be a more accurate indication of mitigation required.

6.6 BS4142: 2014 states that:

1- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

2- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

3- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level this is an indication of the specific sound source having a low impact, depending on the context.

7 Building Specifications:

7.1 It is anticipated that an alternative ventilation system is installed to the 1st floor dwellings to ensure suitable levels of ventilation when the windows are closed. some options are listed below:

Make	Model	Type
Vent-Axia	Sentinel Kinetic Plus	Whole House Ventilation
Titon	HRV1.25 Q Plus with Trimbox NO2 Filter®	Whole House Ventilation

Another option may be something similar to a wall mounted ventilator, such as:

Make	Model	Type
Titon Direct	Sonair F+	Wall mounted acoustic Ventilation

7.2 Façade Detail – The building façade comprises of: - cavity brick wall construction. This system should achieve a sound reduction of between 50-52dB DnT,w + Ctr 'Code of Practice BS8233: 2014, Page 60 – Table E.1B – Airborne sound insulation of walls and partitions'.

7.3 Roof Detail – The roof detail comprises of: Tiles on felt, pitched roof with 100mm mineral wool on plasterboard ceiling. This system should achieve a sound reduction of 43dB Rw 'BS8233: 2014, page 41 - Table 8 - The sound insulation of roofs'.

7.4 Windows - The existing window specification is unknown, but they appear to be double glazed, so the levels of reduction listed below should be exceeded.

Possible Units	Thickness	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Overall reduction
Pilkingtons 10-100-6	110mm	29	36	42	47	50	56	46-6=40dB
Pilkingtons 6-150-4	160mm	25	35	45	56	52	50	47-7=40dB

7.5 There are many other suitable products, and the client will have to show compliance for the windows before installation, the manufacturer will have the acoustic data for the windows.

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8 Results Summary - External:

8.1 This report is concerned with the activity located to the front & rear of the site. The results indicate that suitable mitigation measures can be applied to the glazing & ventilation system of the building to protect the future residents from noise break in.

8.2 The mitigation measures listed within this report are very robust and comprehensive. They have been implemented throughout the site and the future residents will be able to enjoy a good standard of living. Based on the measured levels & the comprehensive glazing already installed, the internal criteria of BS8233: 2014 should be met within the noise sensitive dwellings at the proposed development. The proposed mitigation will ensure that the condition set by the local authority for road traffic can be achieved.

8.5 Based on the measured values, the extensive configuration of the proposed upper floors and the robust and comprehensive mitigation measures already afford to the building fabric is it clear that the future residents of the proposed scheme will not be adversely affected by the commercial noise source in operation.

8.6 Planning ProPG states that a good acoustic design process is a vital part of new developments. The client has taken steps to ensure that the future occupants are protected from the noise source, these steps include:

- 1- A secondary glazing system will be implemented to the 1st floor to increase sound insulation of the current glazing
- 2- Alternative ventilation system with cooling used to habitable rooms so good ventilation can be achieved without opening windows
- 3- Option to open windows to offer natural ventilation for shorter periods to strike a balance between noise, ventilation & overheating

8.7 The measures taken by the client, should ensure the future residents will not be adversely affected by the noise sources associated with the public house & car park.

8.8 The proposed measures indicate that the development follows the approach recommended in the PPG Guidance (Paragraph 009) regarding the closure of windows which states: *"The agent of change will also need to define clearly the mitigation being proposed to address any potential significant adverse effects that are identified. Adopting this approach may not prevent all complaints from the new residents/users about noise or other effects but can help to achieve a satisfactory living or working environment and help to mitigate the risk of a statutory nuisance being found if the new development is used as designed (for example, keeping windows closed and using alternative ventilation systems when the noise or other effects are occurring)."*

8.9 Paragraph 011 of the same guidance states: Noise impacts may be partially offset if residents have access to one or more of:

- a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling.
- a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects.
- 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, external publicly accessible 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-minute walking distance).

8.10 The proposed scheme will also have further measures also include installing alternative ventilation measures to all dwellings to ensure suitable levels of ventilation when the windows are closed, but all residents will have the ability to open their windows at their own discretion.

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8.11 Based on the measured noise levels, the proposed mitigation measures, the location of the development and the type of noise apparent it is anticipated that the noise will fall between The NOEL value (No adverse effect level) and the LOAEL (Lowest observed adverse effect level) and as such the noise should not have a detrimental effect on the future residents. For noise sources at the LOAEL, it is anticipated that the noise will be noticeable but not be intrusive due to the suitable mitigation measures implemented to the development.

8.12 Based on the measured levels and the proposed glazing specification offering a sound reduction of 40dBA then the following internal levels would be achieved for entire site using the levels measured at the front elevation:

Room	External Level	Sound Reduction of windows	Internal Level	Criteria Met
Lounge	64dBA	40dB	24dBA	Yes
Bedroom – LAeq	56dBA	40dB	16dBA	Yes
Bedroom - LAmax	75dBA	40dB	35dBA	Yes

8.13 The levels above indicate that the internal levels can be achieved with the windows closed. The table below shows the calculated single figure values of the habitable rooms with the secondary glazing windows open to indicate the levels apparent during periods of the day time and night time whereby the dwellings can be naturally ventilated, to ensure a balance between noise, ventilation & overheating.

Room & period	External Value	Reduction offered by open window	Calculated Internal Value
Lounge - Day	64dBA	-17 to -24dB	40-47dBA
Bedroom - Night	56dBA	-17 to -24dB	32-37dBA
Rear Façade – day & night (plant)	62dBA 64dBA	-17 to -24dB -17 to -24dB	38-45dBA 40-47dBA

8.14 The levels shown in the table above indicate that a good standard of living can be achieved with open windows for dwellings on the side elevation, having facades screened from the dominant noise source is an effective method of avoiding overheating. The rear facades will achieve the day time values listed on the next page but for periods of the night time the windows may be closed.

8.15 The requirements listed within the LPA statement can't be achieved with windows open, so the dwellings will be fitted with an alternative ventilation system. The building is already fitted with a mechanical ventilation and cooling system serving all spaces. There are periods of time (and with the installation of secondary glazing offering higher levels of sound reduction when open) should ensure periods of the day time and night time that the residents will open their windows to achieve natural ventilation for the dwellings, ensuring a balance between noise, ventilation & overheating.

8.16 The ventilation system will ensure that the appropriate air changes can be achieved, in line with Part F of the building regulations and with consideration of summer overheating, without reliance on windows being open.

8.17 The measures proposed at the site ensures that the future residents of the proposed scheme will be adequately protected from the external noise sources in operation at the site. The robust and comprehensive mitigation measure should ensure a suitable acoustic criterion with adequate levels of ventilation via the alternative ventilation system with summer bypass (cooling).

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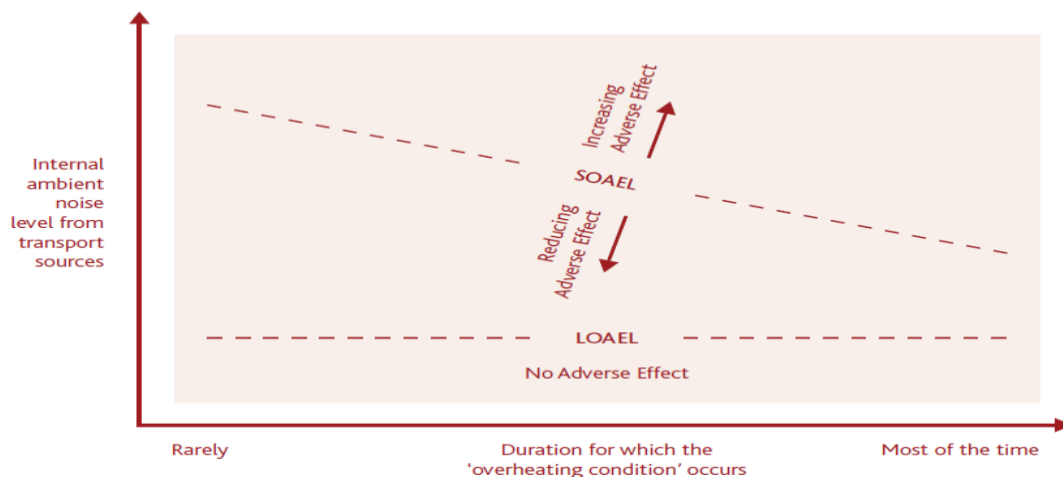
8.19 The levels shown in the table above indicate that a reasonable standard of living can be achieved with open windows. Even if this is for short periods of time, it will ensure a balance is struck between noise, overheating & ventilation for the new dwellings.

8.20 Table 3.3 – Guidance for level 2 assessment of noise from transport services in the ANC AVO guide states that ‘Noise causes a material change in behaviour e.g., having to keep windows closed most of the time’ if the following levels are exceeded for longer periods of time:

Internal ambient noise levels		
L_{Aeq} 16hour 0700-2300	L_{Aeq} 8hour 2300-0700	Individual noise events 2300-0700
>50dB	>42dB	Normally exceeds 65dB L _{AmaxT}

8.21 Using the above guidance (sliding scale as shown in the diagram below) the calculated internal levels at all facades (facing the PH) and other screened facades with the windows open are also shown on the previous page. It is anticipated that the future occupants will accept an increase in the noise levels for periods of time to ensure good thermal comfort for the dwellings.

Figure 3-2 Qualitative guidance on combined effect of internal ambient noise level and duration for the overheating situation



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APPENDIX

Continuous equivalent noise level, LAeq — The steady noise level (usually in dBA) which, over the period of time under consideration, contains the same amount of sound energy as the time varying noise.

L_{Amax} - The maximum value that the A-weighted sound pressure level reaches during a measurement period.

dB (A) — The A-weighted sound pressure level.

Decibel (dB) — A unit used for many acoustic qualities to indicate the level of sound with respect to a reference level.

A-weighting — A frequency weighting that relates to the response of the human ear.

Background noise level — Prevailing noise level in a specified environment measured in the absence of the noise being studied.

Habitable Room — A room used for sleeping or recreation/relaxation

D_{ne,w} Weighted element normalised level difference — A single-number quantity which characterises the airborne sound insulation of a small building elements.

EPU — Environmental Protection Unit

R_w Weighted sound reduction index — A single-number quantity which characterises the airborne sound insulation of a material or building element measured in the laboratory.

LA₁₀ — The A-weighted noise level exceeded for 10% of the measurement duration.

LA₉₀ - The A-weighted noise level exceeded for 90% of the measurement duration.

British Standards & associated documents:

Code of Practice: BS8233: 2014 - Sound Insulation and noise reduction for buildings.

World Health Organization (WHO) - Guidelines for Community Noise.

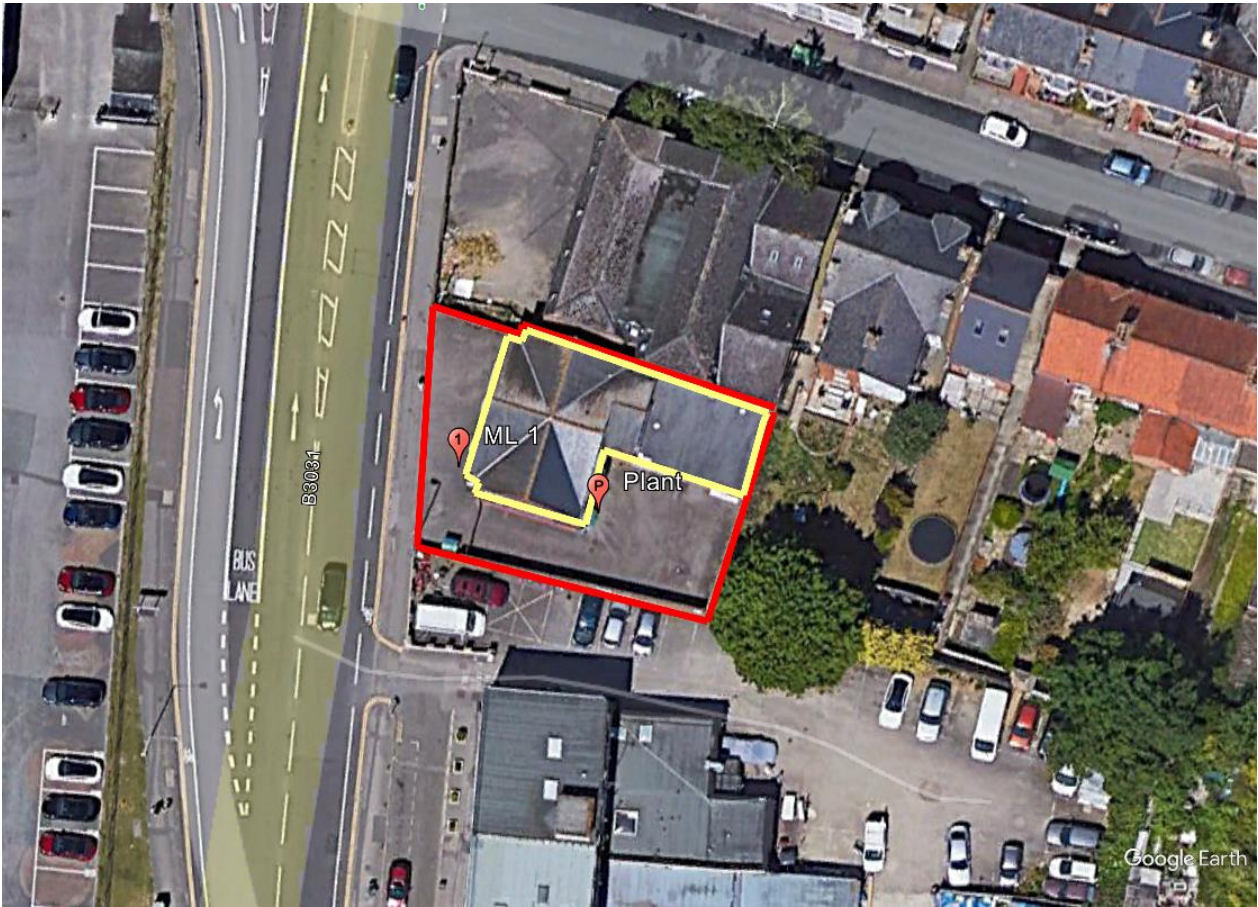
2021 No. 814

TOWN AND COUNTRY PLANNING, ENGLAND

The Town and Country Planning (General Permitted Development etc.) (England) (Amendment) (No. 2) Order 2021

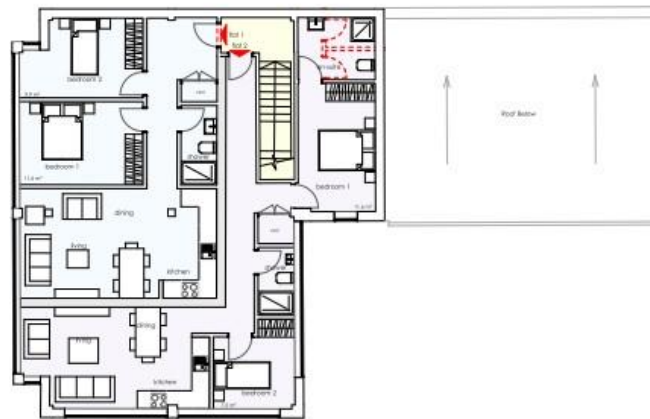
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13 Google Earth:



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14 Site Plans:



Proposed First Floor Plan

flat 1 (2 bed, 3 persons) GIA 61m² (NDSS min 61 m²)
flat 2 (2 bed, 3 persons) GIA 61m² (NDSS min 61 m²)
communal space GIA 8m²

The following information is provided for the purpose of providing information to the public. It is not intended to be used for any other purpose. It is not intended to be used for any other
--

key

-  existing
-  demolished
-  proposed



project
89-91 Basingstoke Road,
Reading,
RG2 9HA.

BSR Beading LTD
Proposed: First Floor Plan

Stage	Step
Planning	15/03/2024
Design	16/03/2024
Development	17/03/2024
Testing	18/03/2024
Deployment	19/03/2024

2403 PR 105 A

T2 architects
22-01-10 Business Centre
100-1000

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www.TSI-Direct.com

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Table 3-3 Guidance for Level 2 assessment of noise from transport noise sources^[Note 1] relating to overheating condition

Internal ambient noise level ^[Note 2]			Examples of Outcomes ^[Note 5]	
$L_{Aeq,T}$ ^[Note 3] during 07:00 – 23:00 ^[Note 6]	$L_{Aeq,th}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 ^[Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{AF,max}$	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. Having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.
			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. ^[Note 8]
≤ 35 dB	≤ 30 dB	Do not normally exceed $L_{AF,max}$ 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response ^[Note 9] . Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

Note 1 The noise levels suggested in Tables 3-2 and 3-3 assume a steady road traffic noise source but may be adapted for other types of transport.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING

Table B-5 Examples of passive ventilation solutions providing enhanced sound insulation

Design option	Description and references	Approximate Level Difference (external free field level – internal reverberant level)	Improvement relative to a window providing a similar amount of ventilation
Standard opening windows	Window(s) open sufficiently to provide a ventilation free-area equivalent to 2% of the floor area. ^[42]	13 dB	0 dB
Open windows with sound attenuating balconies	Window(s) as above. Balconies may have a solid balustrade or be enclosed to a further degree (maintaining an open area for ventilation). Absorption may be provided to the balcony soffit or potentially to other surfaces. ^[49, 50, 51]	17 – 23 dB	4 – 10 dB
Attenuated or plenum windows	Dual windows (spaced by around 200mm) with staggered openings and absorptive linings to the cavity reveals. Various other configurations also possible in principle. ^[52, 53]	17 – 24 dB	4 – 11 dB
Attenuated vents/ louvres	Ventilation openings with integral means of attenuating sound. Typically this may be acoustic louvres or acoustically lined ducts/plena. ^[54, 55]	17 – 29 dB	4 – 16 dB
Attenuated windows or vents/ louvres with sound attenuating balconies	Combined use of balconies to provide screening and acoustically attenuated windows or vents. Refer to above for description of each element.	21 – 39 dB	8 – 26 dB

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING

Time Period - 3mins	LAeq	LAmx
(2024/08/06 11:30:02.00)	65.3	75.3
(2024/08/06 11:33:02.00)	66.8	82.8
(2024/08/06 11:36:02.00)	65.9	75.9
(2024/08/06 11:39:02.00)	66.1	77
(2024/08/06 11:42:02.00)	65.1	72.2
(2024/08/06 11:45:02.00)	65.3	78.1
(2024/08/06 11:48:02.00)	66.8	81.1
(2024/08/06 11:51:02.00)	64.2	73.2
(2024/08/06 11:54:02.00)	66.3	76.1
(2024/08/06 11:57:02.00)	67	76.3
(2024/08/06 12:00:02.00)	66.6	75.5
(2024/08/06 12:03:02.00)	66.2	77.5
(2024/08/06 12:06:02.00)	67.3	77
(2024/08/06 12:09:02.00)	66.1	74.5
(2024/08/06 12:12:02.00)	66.6	75.7
(2024/08/06 12:15:02.00)	66.7	78.3
(2024/08/06 12:18:02.00)	67.5	76.5
(2024/08/06 12:21:02.00)	65.7	74.6
(2024/08/06 12:24:02.00)	67.5	73.7
(2024/08/06 12:27:02.00)	68.2	80
(2024/08/06 12:30:02.00)	66.7	74.7
(2024/08/06 12:33:02.00)	67.6	86.2
(2024/08/06 12:36:02.00)	67.1	76.4
(2024/08/06 12:39:02.00)	67.6	80.4
(2024/08/06 12:42:02.00)	65.9	73.5
(2024/08/06 12:45:02.00)	67.4	76
(2024/08/06 12:48:02.00)	65.9	73.8
(2024/08/06 12:51:02.00)	65.8	75.5
(2024/08/06 12:54:03.00)	66	75.5
(2024/08/06 12:57:02.00)	66.5	74.7
(2024/08/06 13:00:02.00)	66.6	79.1
(2024/08/06 13:03:02.00)	70.6	84.7
(2024/08/06 13:06:02.00)	67.9	83.6
(2024/08/06 13:09:02.00)	66.9	79.7
(2024/08/06 13:12:02.00)	65.8	72.9
(2024/08/06 13:15:02.00)	66.9	76.2
(2024/08/06 13:18:02.00)	67.6	73.6
(2024/08/06 13:21:02.00)	65.6	79.8
(2024/08/06 13:24:02.00)	67.6	75.4
(2024/08/06 13:27:02.00)	66.8	77.1
(2024/08/06 13:30:02.00)	67.5	80.6
(2024/08/06 13:33:02.00)	68.1	82.5
(2024/08/06 13:36:02.00)	64.6	76

(2024/08/06 13:39:02.00)	67.4	81.3
(2024/08/06 13:42:02.00)	64.6	71.1
(2024/08/06 13:45:02.00)	65.5	75.3
(2024/08/06 13:48:02.00)	66.5	75.1
(2024/08/06 13:51:02.00)	67.6	78.7
(2024/08/06 13:54:02.00)	65.7	75.1
(2024/08/06 13:57:02.00)	67.6	76.1
(2024/08/06 14:00:02.00)	67.8	85.1
(2024/08/06 14:03:02.00)	66.9	74.5
(2024/08/06 14:06:02.00)	67.1	73
(2024/08/06 14:09:02.00)	66.4	78
(2024/08/06 14:12:02.00)	68.2	86.5
(2024/08/06 14:15:02.00)	66.2	75.5
(2024/08/06 14:18:02.00)	66	76.4
(2024/08/06 14:21:02.00)	68	81
(2024/08/06 14:24:02.00)	65.8	77.9
(2024/08/06 14:27:02.00)	65.5	74.6
(2024/08/06 14:30:02.00)	68.2	78.9
(2024/08/06 14:33:02.00)	66.4	78.6
(2024/08/06 14:36:02.00)	66.7	75
(2024/08/06 14:39:02.00)	67	75.5
(2024/08/06 14:42:03.00)	70.5	96.4
(2024/08/06 14:45:02.00)	66.4	72.6
(2024/08/06 14:48:02.00)	65.9	74.4
(2024/08/06 14:51:02.00)	68.4	80.2
(2024/08/06 14:54:02.00)	66	75.5
(2024/08/06 14:57:02.00)	67.8	79.7
(2024/08/06 15:00:02.00)	67.5	80.8
(2024/08/06 15:03:02.00)	65.9	74.2
(2024/08/06 15:06:02.00)	66.1	76.3
(2024/08/06 15:09:02.00)	65.6	74.4
(2024/08/06 15:12:02.00)	67.3	77.7
(2024/08/06 15:15:02.00)	65.8	79.3
(2024/08/06 15:18:02.00)	67.5	76.1
(2024/08/06 15:21:03.00)	67.5	77.3
(2024/08/06 15:24:02.00)	66.9	74.5
(2024/08/06 15:27:02.00)	65.1	73.9
(2024/08/06 15:30:02.00)	66.2	72.3
(2024/08/06 15:33:02.00)	66	76.9
(2024/08/06 15:36:02.00)	73.9	91.1
(2024/08/06 15:39:02.00)	65.5	74.6
(2024/08/06 15:42:02.00)	63	73.4
(2024/08/06 15:45:02.00)	65.9	76.5
(2024/08/06 15:48:02.00)	67.2	78.8
(2024/08/06 15:51:02.00)	66.3	74
(2024/08/06 15:54:02.00)	67.1	75.3

(2024/08/06 15:57:02.00)	65.9	75.3
(2024/08/06 16:00:02.00)	65.9	75.8
(2024/08/06 16:03:02.00)	66.8	75.3
(2024/08/06 16:06:02.00)	66.9	78.4
(2024/08/06 16:09:02.00)	66.8	74.7
(2024/08/06 16:12:02.00)	65.6	74.3
(2024/08/06 16:15:02.00)	68.6	83.2
(2024/08/06 16:18:02.00)	65.6	77.7
(2024/08/06 16:21:02.00)	66.6	79.1
(2024/08/06 16:24:02.00)	64.3	72.4
(2024/08/06 16:27:02.00)	66.1	74.4
(2024/08/06 16:30:02.00)	72	89.4
(2024/08/06 16:33:02.00)	67.1	79.6
(2024/08/06 16:36:02.00)	66	75.5
(2024/08/06 16:39:02.00)	66.5	74.2
(2024/08/06 16:42:02.00)	65	78.7
(2024/08/06 16:45:02.00)	65.7	73.1
(2024/08/06 16:48:02.00)	65.4	72.4
(2024/08/06 16:51:02.00)	65.1	72.3
(2024/08/06 16:54:02.00)	66.3	81.6
(2024/08/06 16:57:02.00)	66.8	77.9
(2024/08/06 17:00:02.00)	65.7	74.6
(2024/08/06 17:03:02.00)	66.8	78.8
(2024/08/06 17:06:02.00)	66.5	73.6
(2024/08/06 17:09:02.00)	65.8	75.1
(2024/08/06 17:12:02.00)	66.5	74.8
(2024/08/06 17:15:02.00)	67.1	73.9
(2024/08/06 17:18:02.00)	66.1	73.6
(2024/08/06 17:21:02.00)	65.6	75.4
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(2024/08/06 17:27:02.00)	65	71.5
(2024/08/06 17:30:02.00)	65.5	75.3
(2024/08/06 17:33:02.00)	67	75.1
(2024/08/06 17:36:02.00)	65.8	78.8
(2024/08/06 17:39:02.00)	66.1	75
(2024/08/06 17:42:02.00)	66.3	76
(2024/08/06 17:45:02.00)	68.4	82.9
(2024/08/06 17:48:02.00)	66.4	77.2
(2024/08/06 17:51:02.00)	67.5	77.8
(2024/08/06 17:54:02.00)	66.3	74.5
(2024/08/06 17:57:02.00)	65.4	77
(2024/08/06 18:00:02.00)	66	74.7
(2024/08/06 18:03:02.00)	65.1	78.2
(2024/08/06 18:06:02.00)	65.9	74.2
(2024/08/06 18:09:02.00)	66.3	75.1
(2024/08/06 18:12:02.00)	67	77.3

(2024/08/06 18:15:02.00)	65.5	75.1
(2024/08/06 18:18:02.00)	66.3	73.9
(2024/08/06 18:21:02.00)	66.4	74.3
(2024/08/06 18:24:02.00)	66	78.1
(2024/08/06 18:27:02.00)	65.7	75
(2024/08/06 18:30:02.00)	64.8	76.2
(2024/08/06 18:33:02.00)	66	76.1
(2024/08/06 18:36:02.00)	65.7	85.4
(2024/08/06 18:39:02.00)	66.4	74.3
(2024/08/06 18:42:02.00)	65.4	75.5
(2024/08/06 18:45:02.00)	65.4	78.7
(2024/08/06 18:48:02.00)	64.9	71.6
(2024/08/06 18:51:02.00)	64.2	72.8
(2024/08/06 18:54:02.00)	67.9	82.1
(2024/08/06 18:57:02.00)	63.6	79.2
(2024/08/06 19:00:02.00)	64.7	74.4
(2024/08/06 19:03:02.00)	65	72.1
(2024/08/06 19:06:02.00)	63.5	73.2
(2024/08/06 19:09:02.00)	65.1	81.1
(2024/08/06 19:12:02.00)	65.8	74.4
(2024/08/06 19:15:02.00)	71.1	91.9
(2024/08/06 19:18:02.00)	64.1	75.9
(2024/08/06 19:21:02.00)	65.5	75.2
(2024/08/06 19:24:02.00)	65.3	74.3
(2024/08/06 19:27:02.00)	62.5	72
(2024/08/06 19:30:02.00)	63.9	73.7
(2024/08/06 19:33:02.00)	64.6	74.7
(2024/08/06 19:36:02.00)	65.9	73.8
(2024/08/06 19:39:02.00)	63	72.4
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(2024/08/06 19:48:02.00)	64.7	77.7
(2024/08/06 19:51:02.00)	63.3	73
(2024/08/06 19:54:02.00)	61.7	71.5
(2024/08/06 19:57:02.00)	65.9	83.1
(2024/08/06 20:00:02.00)	65.1	76.8
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(2024/08/06 20:21:02.00)	63.8	72.1
(2024/08/06 20:24:02.00)	62.6	74.8
(2024/08/06 20:27:02.00)	62.7	70.7
(2024/08/06 20:30:02.00)	61.1	70.8

(2024/08/06 20:33:02.00)	61.7	78.5
(2024/08/06 20:36:02.00)	63.2	78.3
(2024/08/06 20:39:02.00)	64.8	77
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(2024/08/06 20:51:02.00)	62.4	71.8
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(2024/08/06 21:18:02.00)	59.8	71.2
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(2024/08/06 21:51:02.00)	63	73.7
(2024/08/06 21:54:02.00)	69.4	87.1
(2024/08/06 21:57:02.00)	61	72.8
(2024/08/06 22:00:02.00)	64.2	76.4
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(2024/08/06 22:06:02.00)	65.3	86.6
(2024/08/06 22:09:02.00)	64.5	78.3
(2024/08/06 22:12:02.00)	62.2	75.9
(2024/08/06 22:15:02.00)	63.8	76.3
(2024/08/06 22:18:02.00)	61	72.7
(2024/08/06 22:21:02.00)	62.4	75.7
(2024/08/06 22:24:02.00)	63.5	78.1
(2024/08/06 22:27:02.00)	61	70.6
(2024/08/06 22:30:02.00)	60.6	71.9
(2024/08/06 22:33:02.00)	62	74.2
(2024/08/06 22:36:02.00)	63.3	77.7
(2024/08/06 22:39:02.00)	58.8	69.5
(2024/08/06 22:42:02.00)	60.4	75
(2024/08/06 22:45:02.00)	63	72.7
(2024/08/06 22:48:02.00)	61.9	73

(2024/08/06 22:51:02.00)	59.6	71.3
(2024/08/06 22:54:02.00)	74.8	90.9
(2024/08/06 22:57:02.00)	58.7	70.8
(2024/08/06 23:00:02.00)	56.7	71.1
(2024/08/06 23:03:02.00)	63.9	77.1
(2024/08/06 23:06:02.00)	58.8	72
(2024/08/06 23:09:02.00)	57.5	74.1
(2024/08/06 23:12:02.00)	61.7	73
(2024/08/06 23:15:02.00)	61	73.6
(2024/08/06 23:18:02.00)	59.7	73.3
(2024/08/06 23:21:02.00)	58.7	72.6
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(2024/08/06 23:27:02.00)	59.2	72.9
(2024/08/06 23:30:02.00)	61.5	76.4
(2024/08/06 23:33:02.00)	62.5	79.1
(2024/08/06 23:36:02.00)	57.3	68.6
(2024/08/06 23:39:02.00)	59.5	71.1
(2024/08/06 23:42:02.00)	58.1	74.5
(2024/08/06 23:45:02.00)	59.2	72.3
(2024/08/06 23:48:02.00)	55.7	69.2
(2024/08/06 23:51:02.00)	56.2	69.4
(2024/08/06 23:54:02.00)	52.2	67
(2024/08/06 23:57:02.00)	55.6	67.1
(2024/08/07 00:00:03.00)	60.3	73.2
(2024/08/07 00:03:02.00)	57.8	71
(2024/08/07 00:06:02.00)	51.8	65.2
(2024/08/07 00:09:02.00)	58.2	73.6
(2024/08/07 00:12:02.00)	55.7	69.7
(2024/08/07 00:15:02.00)	57.2	71.5
(2024/08/07 00:18:02.00)	54.2	70.1
(2024/08/07 00:21:02.00)	61	75.4
(2024/08/07 00:24:02.00)	62.7	82.1
(2024/08/07 00:27:02.00)	55.9	73.2
(2024/08/07 00:30:02.00)	56.6	70.5
(2024/08/07 00:33:02.00)	56.9	72.3
(2024/08/07 00:36:02.00)	57.8	71.9
(2024/08/07 00:39:02.00)	50.2	66.4
(2024/08/07 00:42:02.00)	54.3	71.3
(2024/08/07 00:45:02.00)	57.9	75.1
(2024/08/07 00:48:02.00)	58.2	70.2
(2024/08/07 00:51:02.00)	56.4	71.1
(2024/08/07 00:54:02.00)	59.3	77.1
(2024/08/07 00:57:02.00)	56.4	72.1
(2024/08/07 01:00:02.00)	53.8	67.5
(2024/08/07 01:03:02.00)	55.2	72.9
(2024/08/07 01:06:02.00)	46.2	54.2

(2024/08/07 01:09:02.00)	44.8	54
(2024/08/07 01:12:02.00)	55.5	73
(2024/08/07 01:15:02.00)	48.5	63.6
(2024/08/07 01:18:02.00)	54.2	71.5
(2024/08/07 01:21:02.00)	53	70.8
(2024/08/07 01:24:02.00)	57	71.5
(2024/08/07 01:27:02.00)	53.1	70.9
(2024/08/07 01:30:02.00)	59.7	79.1
(2024/08/07 01:33:02.00)	57.3	72.7
(2024/08/07 01:36:02.00)	54	69.7
(2024/08/07 01:39:02.00)	45.3	53.7
(2024/08/07 01:42:02.00)	54.2	72.8
(2024/08/07 01:45:02.00)	43.8	50.7
(2024/08/07 01:48:02.00)	49.9	65.6
(2024/08/07 01:51:02.00)	54.7	69.8
(2024/08/07 01:54:02.00)	44.2	49.3
(2024/08/07 01:57:02.00)	50.6	67.3
(2024/08/07 02:00:02.00)	53.6	68.8
(2024/08/07 02:03:02.00)	54.4	66.2
(2024/08/07 02:06:02.00)	44.9	53.7
(2024/08/07 02:09:02.00)	47.1	59.2
(2024/08/07 02:12:02.00)	58.7	74
(2024/08/07 02:15:02.00)	53.7	68.9
(2024/08/07 02:18:02.00)	47	60.9
(2024/08/07 02:21:02.00)	55.8	73.2
(2024/08/07 02:24:02.00)	55.1	69.7
(2024/08/07 02:27:02.00)	52	69.1
(2024/08/07 02:30:02.00)	41.8	48.2
(2024/08/07 02:33:02.00)	52.3	64.9
(2024/08/07 02:36:02.00)	44.3	54
(2024/08/07 02:39:02.00)	44.4	53.3
(2024/08/07 02:42:02.00)	54.3	72.9
(2024/08/07 02:45:02.00)	47.8	62.2
(2024/08/07 02:48:02.00)	55.4	73.9
(2024/08/07 02:51:02.00)	52.3	69.5
(2024/08/07 02:54:02.00)	54.4	70
(2024/08/07 02:57:02.00)	50.2	68.6
(2024/08/07 03:00:02.00)	52.7	68.2
(2024/08/07 03:03:02.00)	55.9	71.8
(2024/08/07 03:06:02.00)	55.8	72
(2024/08/07 03:09:02.00)	54.7	73.7
(2024/08/07 03:12:02.00)	43.1	53.2
(2024/08/07 03:15:02.00)	42	50.4
(2024/08/07 03:18:02.00)	42.8	49.6
(2024/08/07 03:21:02.00)	54.6	73.4
(2024/08/07 03:24:02.00)	43.2	47.6

(2024/08/07 03:27:02.00)	53.4	68.3
(2024/08/07 03:30:02.00)	52.3	69.4
(2024/08/07 03:33:02.00)	53.6	73.4
(2024/08/07 03:36:02.00)	54.8	70
(2024/08/07 03:39:02.00)	51.6	64.3
(2024/08/07 03:42:02.00)	54.3	70.2
(2024/08/07 03:45:02.00)	55.7	70.5
(2024/08/07 03:48:02.00)	57.9	73.6
(2024/08/07 03:51:02.00)	47.5	59.7
(2024/08/07 03:54:02.00)	55.6	70.8
(2024/08/07 03:57:02.00)	55.4	71.8
(2024/08/07 04:00:02.00)	52.9	67.5
(2024/08/07 04:03:02.00)	51.6	64.1
(2024/08/07 04:06:02.00)	55.5	71.1
(2024/08/07 04:09:02.00)	53.4	70.3
(2024/08/07 04:12:02.00)	47.9	66
(2024/08/07 04:15:02.00)	57.7	73.7
(2024/08/07 04:18:02.00)	50.8	64.5
(2024/08/07 04:21:02.00)	57.1	75
(2024/08/07 04:24:02.00)	52.6	71.2
(2024/08/07 04:27:02.00)	57.3	71.5
(2024/08/07 04:30:02.00)	51.5	66.4
(2024/08/07 04:33:02.00)	56.1	70.7
(2024/08/07 04:36:02.00)	58.5	75.7
(2024/08/07 04:39:02.00)	53.9	71.2
(2024/08/07 04:42:02.00)	53.9	71.3
(2024/08/07 04:45:02.00)	58.8	74
(2024/08/07 04:48:02.00)	60.4	73.3
(2024/08/07 04:51:02.00)	54.3	69.6
(2024/08/07 04:54:02.00)	59.7	74.2
(2024/08/07 04:57:02.00)	59	76.1
(2024/08/07 05:00:02.00)	52.3	65.5
(2024/08/07 05:03:02.00)	55.5	68.9
(2024/08/07 05:06:02.00)	48.3	58.7
(2024/08/07 05:09:02.00)	57.8	70.6
(2024/08/07 05:12:02.00)	60.2	71.7
(2024/08/07 05:15:02.00)	58.7	71.8
(2024/08/07 05:18:02.00)	59.6	74.1
(2024/08/07 05:21:02.00)	58.7	71.7
(2024/08/07 05:24:02.00)	56.9	70.2
(2024/08/07 05:27:02.00)	63.5	80
(2024/08/07 05:30:02.00)	55	70.1
(2024/08/07 05:33:02.00)	63.6	80
(2024/08/07 05:36:02.00)	60.1	74.8
(2024/08/07 05:39:02.00)	59.4	73.9
(2024/08/07 05:42:02.00)	57.1	70.8

(2024/08/07 05:45:02.00)	61.2	73.3
(2024/08/07 05:48:02.00)	60.9	71.6
(2024/08/07 05:51:02.00)	64	83
(2024/08/07 05:54:02.00)	59	75
(2024/08/07 05:57:02.00)	61.4	73.8
(2024/08/07 06:00:02.00)	60.3	74.7
(2024/08/07 06:03:02.00)	63.3	76.4
(2024/08/07 06:06:02.00)	61.9	72.5
(2024/08/07 06:09:02.00)	59	70.9
(2024/08/07 06:12:02.00)	63.5	75.7
(2024/08/07 06:15:02.00)	63.8	75.7
(2024/08/07 06:18:02.00)	64.9	73.5
(2024/08/07 06:21:02.00)	61.3	72.5
(2024/08/07 06:24:02.00)	65.6	85.6
(2024/08/07 06:27:02.00)	63.3	75.7
(2024/08/07 06:30:02.00)	61.2	73.7
(2024/08/07 06:33:02.00)	70.4	87.6
(2024/08/07 06:36:02.00)	64.5	76.1
(2024/08/07 06:39:02.00)	61.6	73.6
(2024/08/07 06:42:02.00)	63.7	75.1
(2024/08/07 06:45:02.00)	64.7	73.6
(2024/08/07 06:48:02.00)	65.4	78.1
(2024/08/07 06:51:02.00)	64.8	73.3
(2024/08/07 06:54:02.00)	66	78.8
(2024/08/07 06:57:02.00)	63.3	73.8
(2024/08/07 07:00:02.00)	65.2	75.1
(2024/08/07 07:03:02.00)	64.9	76.9
(2024/08/07 07:06:02.00)	66.4	79.1
(2024/08/07 07:09:02.00)	67.2	77.2
(2024/08/07 07:12:02.00)	66	79.5
(2024/08/07 07:15:02.00)	63.6	74.8
(2024/08/07 07:18:02.00)	65.2	74.8
(2024/08/07 07:21:02.00)	64.5	74.9
(2024/08/07 07:24:02.00)	65.4	75.8
(2024/08/07 07:27:02.00)	65.4	75.5
(2024/08/07 07:30:02.00)	67.8	82.6
(2024/08/07 07:33:02.00)	65.8	74.9
(2024/08/07 07:36:02.00)	66.8	78.9
(2024/08/07 07:39:02.00)	66.9	78.8
(2024/08/07 07:42:02.00)	65.5	79.1
(2024/08/07 07:45:02.00)	66.1	72.7
(2024/08/07 07:48:02.00)	66.8	76.2
(2024/08/07 07:51:02.00)	65.6	77.5
(2024/08/07 07:54:02.00)	65.5	74.6
(2024/08/07 07:57:02.00)	65.3	73.4
(2024/08/07 08:00:02.00)	65.7	75.7

(2024/08/07 08:03:02.00)	64.7	73.2
(2024/08/07 08:06:02.00)	64.3	75.5
(2024/08/07 08:09:02.00)	65.2	75.2
(2024/08/07 08:12:02.00)	64.3	74.7
(2024/08/07 08:15:02.00)	66	77.5
(2024/08/07 08:18:02.00)	65.7	75.4
(2024/08/07 08:21:02.00)	64.5	74.4
(2024/08/07 08:24:02.00)	65.5	75.1
(2024/08/07 08:27:02.00)	67.6	77.3
(2024/08/07 08:30:02.00)	65.1	75.9
(2024/08/07 08:33:02.00)	64.2	74.4
(2024/08/07 08:36:02.00)	66.4	76
(2024/08/07 08:39:02.00)	65.1	75.1
(2024/08/07 08:42:02.00)	65.5	74.9
(2024/08/07 08:45:02.00)	66.4	72.7
(2024/08/07 08:48:02.00)	66.6	75.8
(2024/08/07 08:51:02.00)	64.2	74.6
(2024/08/07 08:54:02.00)	66.3	74.2
(2024/08/07 08:57:02.00)	65.7	76.7
(2024/08/07 09:00:02.00)	64.9	74.3
(2024/08/07 09:03:02.00)	66.1	73.2
(2024/08/07 09:06:02.00)	65.5	77.4
(2024/08/07 09:09:02.00)	65.4	75.8
(2024/08/07 09:12:02.00)	65.7	72.5
(2024/08/07 09:15:02.00)	65.1	76
(2024/08/07 09:18:02.00)	67.2	79.1
(2024/08/07 09:21:02.00)	66	76.7
(2024/08/07 09:24:02.00)	65.6	82.7
(2024/08/07 09:27:02.00)	64.7	79.3
(2024/08/07 09:30:02.00)	66.7	73
(2024/08/07 09:33:02.00)	66.2	79.8
(2024/08/07 09:36:02.00)	70.8	92.1
(2024/08/07 09:39:02.00)	65.3	78
(2024/08/07 09:42:02.00)	66	80.5
(2024/08/07 09:45:02.00)	65.1	74.2
(2024/08/07 09:48:02.00)	66	74
(2024/08/07 09:51:02.00)	64.9	76.1
(2024/08/07 09:54:02.00)	62.9	71.6
(2024/08/07 09:57:02.00)	65.4	76.5
(2024/08/07 10:00:02.00)	66.7	80.7
(2024/08/07 10:03:02.00)	65.4	75
(2024/08/07 10:06:02.00)	66.8	77.4
(2024/08/07 10:09:02.00)	64.7	73.7
(2024/08/07 10:12:02.00)	74.3	94.5
(2024/08/07 10:15:02.00)	66.1	76.8
(2024/08/07 10:18:02.00)	67.6	78.2



(2024/08/07 10:21:02.00)	65.8	76.1
(2024/08/07 10:24:02.00)	63.9	72.9
(2024/08/07 10:27:02.00)	67.2	78.4
(2024/08/07 10:30:02.00)	63.1	72.8
(2024/08/07 10:33:02.00)	65	72.3
(2024/08/07 10:36:02.00)	68.3	85.9
(2024/08/07 10:39:02.00)	65.5	80.2
(2024/08/07 10:42:02.00)	65.7	79
(2024/08/07 10:45:02.00)	65.6	83.3
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(2024/08/07 10:54:02.00)	65.6	73.6
(2024/08/07 10:57:02.00)	66.4	75.2
(2024/08/07 11:00:02.00)	65.8	72
(2024/08/07 11:03:02.00)	66.3	75.2
(2024/08/07 11:06:02.00)	67.1	78.3
(2024/08/07 11:09:02.00)	66.1	77.1
(2024/08/07 11:12:02.00)	66.2	79.9
(2024/08/07 11:15:02.00)	67.2	84.1
(2024/08/07 11:18:02.00)	65.7	75.3
(2024/08/07 11:21:02.00)	65.5	75.4
(2024/08/07 11:24:02.00)	66.1	75.2
(2024/08/07 11:27:02.00)	65.2	74.3

