



AIRTIGHT & NOISECHECK LIMITED

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24HOUR NOISE IMPACT ASSESSMENT FOR

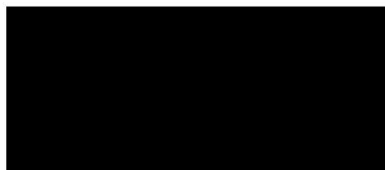
THE MALINS GROUP LTD
UNIT 7 HORIZON BUSINESS VILLAGE
1 BROOKLANDS ROAD
WEYBRIDGE
SURREY
KT13 0TJ

SITE ADDRESS

NORTH STREET ARCADE
NORTH STREET
HAVANT
HAMPSHIRE

TESTING DATE: 18TH – 19TH MARCH 2022

REPORT DATE: 11TH DECEMBER 2023



Acoustic Engineer:

Date: 18th – 19th March 2022

Michael Vine

AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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Customer Name:

Date: 18th – 19th March 2022

The Malins Group Ltd
Unit 7 Horizon Business Village
1 Brookland Road
Weybridge
Surrey
KT13 0TJ

Site Address:

North Street Arcade
North Street
Havant
Hampshire
PO9 1PX

Acoustic Engineer:

Mr. Michael Vine

Norsonic Environmental Analyser 121 – Serial No 29809 Calibration due July 2022

Analyser complies with the following standards:

IEC 60651 type 1
IEC 60804 type 1
IEC 61260 class 1
IEC 225
ANSI S1.4-1985 type 1
ANSI 1.43 -1997 type 1
ANSI S1.11-1986 order 3 type 1D
DIN 45 657
Norsonic Production Standard set for the Nor121

Measurement Microphone (Gras 40AF) – Serial No 51465 & (Nor 1225) serial no 72933, - Calibration due July 2022

Acoustic Calibrator - (Type 1251) – Serial No 31652, Calibration due July 2022

Measurement Procedure:

An unattended assessment measuring the current acoustic climate over a 24hour period was undertaken to determine the ambient noise levels at the proposed façades of the development site, at the proposed Northern & Eastern elevations of the proposed dwellings. The 24hour assessment took place between Friday 18th & Saturday 19th March 2022. The purpose of the noise assessment was to determine the impact of the railway line located circa 100m to the North of the site on the proposed scheme

The purpose of the assessment is to satisfy the following condition as shown in the correspondence from Havant Borough Council, Application Reference Number: APP/20/00251. This condition is shown below:

Prior to the occupation of the Housing (C3) element details of the acoustic mitigation measures to be employed with regard to the building envelope, including fenestration and ventilation, as to how the development will meet BS8223:2014 standards as recommended for indoor ambient noise levels for dwellings, especially in relation to living rooms and bedrooms i.e. during the day (07:00 to 23:00) 35 dB LAeq,16 hour and at night (23:00 to 07:00) 30 dB LAeq,8 hour for bedrooms shall be submitted to and agreed in writing by the Local Planning Authority. The development shall be carried out in accordance with the approved details and shall be retained at all times, unless otherwise agreed in writing by the Local Planning Authority.

This report will show, using measured noise levels & numerous calculations that this condition can be met and implemented to the development to ensure a suitable acoustic environment.

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Assessment Criteria:

The National Planning Policy Framework (NPPF) came into effect in March 2012 and was updated published in July 2021. 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 174 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 185. 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.

187. 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

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Executive Summary:

Airtight & Noisecheck Ltd were instructed by The Malins Group Ltd to undertake a Noise Impact Assessment (NIA) at The North Street Arcade, North Street, Havant. A planning application has been approved to erect 29 x purpose built residential dwellings on the site, the dwellings will be located to the East of North Street, South/West of Prince George Street and approximately 100m to the South of Havant train station.

The survey was undertaken for a 24hour period using two microphone locations. The microphone location for the proposed dwellings was used to determine the impact of the following noise sources on the proposed dwellings:

1. People & Vehicles using the local road network
2. Rail activity associated with Havant train station

The microphones were both located facing the local road network, one being located at the Northern elevation and the other at the Eastern elevation. The Southern & Western elevations will be screened from the noise sources once the buildings are built. By assessing the above noise sources, it is anticipated that a detailed approach to the proposals has been undertaken. The report clearly shows the required sound reductions needed for the scheme & these measures can be implemented to the residential dwellings to ensure the necessary criteria is achieved.

The conclusions of this report illustrate that the noise associated with the road traffic noise will not have an adverse impact on the proposed residential dwellings. Robust mitigation measures & measures taken by the client & a good acoustic design/orientation of dwellings will ensure that the residents will not be adversely affected by the noise associated with various sources in operation. Background ventilators and an MEV system will be included to all dwellings. Dwellings 3, 4, 6, 7, 8, 9, 11, 12, 14, 15, 16, 17, 21, 23, 25, 26, 27 & 28 face the road network and dwellings 1, 2, 5, 10, 13, 18, 19, 20, 22, 24 & 29 should be able to ventilate naturally by opening windows throughout the day time and night time period due to these dwellings being screened from the noise sources in operation. This is an effective and recognised measure in reducing overheating in residential dwellings, by way of situating dwellings in quieter locations away from the noise source. It is clear that these dwellings will be located away from the road noise and screened from it by the buildings, ensuring a lower noise level at this façade.

The measures to be taken by the client & the good acoustic design should ensure a satisfactory acoustic climate for the future residents of the proposed dwellings. The road traffic noise was the dominant noise source apparent at the site. This was measures for completeness despite not being part of the listed conditions of consent. Rail activity was audible whilst on site but by no means noticeable and the noise associated with the train station and line should not lead to an adverse impact on the future residential dwellings.

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Acoustic Design Statement:

The site is situated close to Havant Town Centre, and in a predominantly residential area. North Street is located to the West, Prince George Street to the North & East and the railway line and Havant train station circa 100m to the North of the proposed dwellings. There are existing dwellings located to the North, East & West with other commercial units also located to the West & South. The client will take steps and implement mitigation measures to ensure the impact of the external & internal noise should not have an adverse impact on the future residential dwellings. These steps include:

1. Orientation of dwellings – a lot of dwellings screened from the noise sources
2. Thermal mass applied to the dwellings to improve overheating – natural ventilation will be acceptable to screened dwellings
3. Natural ventilation will ensure a good thermal comfort & a balance between the internal noise levels & overheating
4. Install a robust glazing system to the dwellings to protect the residents from the external noise emissions when closed

The initial risk assessment has indicated that the day time noise levels fall into the low category for the dwellings facing the road network, with the noise levels for the rear dwellings fall into the negligible category, indicating noise should not be an issue when determining the planning application. Pro PG states that 'At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development'. Once the dwellings are built they will reduce the noise further for the screened dwellings as the buildings will screen the road noise so the levels at the proposed residential façade will be less than those currently measured on site.

If the mitigation measures are implemented, then there is no reason to suggest that the future occupants of the scheme cannot be adequately protected from the external noise emissions. The more robust measures are to be implemented to the front facades facing the road network, although natural ventilation can be achieved by opening windows for all dwellings.

1 Objective:

1.1 To demonstrate that the criteria listed in the condition shown on page 3 will be achieved and that the noise sources in operation will not have an adverse impact on the proposed residential scheme. A Planning application has been granted to erect 29 residential dwellings over 4 floors with dwellings located both facing the road network and also screened from the noise sources. In general terms, the front dwellings will face the road network with the rear dwellings screened.

2 Calibration:

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

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3 Site Layout & Microphone Position:

3.1 Havant is a town in the south-east corner of Hampshire, England between Portsmouth, and Chichester. Its borough comprises the town and its suburbs including the resort of Hayling Island as well as Rowland's Castle, the larger town of Waterlooville and Langstone Harbour.

3.2 The proposed site is located to the North of Havant Town Centre, and South of the train station and railway line. The site lies in a predominantly residential area with dwellings located to the West, North & East along with commercial units and buildings to various elevations and to the South. The local road network is located to the North & East of the site (and beyond the existing buildings to the West).

3.3 The measurement microphones were located:

- 1- At the proposed Northern façade of the dwellings – facing the road network. It was at least 2.5m from the ground and in excess of 3.5m from any other reflective surface
- 2- Eastern facade of the site location. It was at least 2.5m from the ground and in excess of 3.5m from any other reflective surface

4 Weather Conditions:

4.1 The weather was dry, sunny, and partly cloudy during the measurement procedure; the temperature ranged between 5-13 degrees. There was no rain during the assessment period.

5 Measurement Duration:

5.1 The continuous measurements were taken for 24hour period, both the train station and railway line and the local road traffic & network was at normality and thus offered a fair reflection of the noise associated with the road network.

6 Results – proposed dwellings:

6.1 The purpose of this measurement was to satisfy the condition shown on page 3 of this report. The levels will be compared to the necessary British Standards & relevant documents, also some bespoke measurements will be adopted.

LAeq 16hour & 8hour Noise Levels:

Mic Location	LAeq 16hour Value	Reduction needed for BS8233 compliance	LAeq 8hour Value	Reduction for BS8233 compliance	L _{Amax} Value	Reduction for compliance
North Facade - ML1	56dBA	21dB	48dBA	18dB	69dBA	24dB
East Facade – ML2	56dBA	21dB	48dBA	18dB	68dBA	23dB

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7 Results Conclusion:

7.1 The tables listed above clearly indicate the required sound reduction values at the proposed site. It is clear to see that the measured levels are relatively low on all elevations. The noise associated with the road traffic was the dominant noise source apparent at the site.

7.2 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 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.

7.3 Based on the measured levels and assuming a glazing specification offering a sound reduction of 30dBA (easily meets the levels required above) is installed the following internal levels would be achieved:

Room	External Level	Sound Reduction of windows	Internal Level	Criteria Met
Lounge	56dBA	30dB	26dBA	Yes
Bedroom – LAeq	48dBA	30dB	18dBA	Yes
Bedroom - LAmax	68-69dBA	30dB	38-39dBA	Yes

7.5 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 dwellings located to the rear façade with windows open. Section 2.30 and Figure 2 of the Pro PG document states that the internal guidelines of BS8233: 2014 can be relaxed by 5dBA (40dBA LAeq 16hour and 35dBA LAeq 8hour) when the dwellings are necessary or desirable and also that residents will accept a slight increase in noise levels to ensure natural ventilation. A relaxation of 5dBA will still ensure a reasonable standard of living. It is clear that this approach could be implemented to the development for the day time levels and the night time levels at the rear elevations. The below assumes a -15dB reduction offered by the proposed building fabric, and location of rooms (some habitable rooms located to the rear of the dwellings)

Room & period	External Value	Reduction offered by screening	Reduction offered by open window	Calculated Internal Value
Lounge - Day	56dBA	-15dB	-13dB	28dBA
Bedroom - Night	48dBA	-15dB	-13dB	20dBA

7.6 The levels shown in the table above indicate that a reasonable standard of living can be achieved with open windows for road traffic noise. The residents can open and close their windows at their own discretion to achieve a suitable tradeoff between overheating and noise ingress. This can also apply to the front façade for shorter periods of time, and it is anticipated that the rear dwellings can have open windows for extended periods of the day time and night time.

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7.7 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:

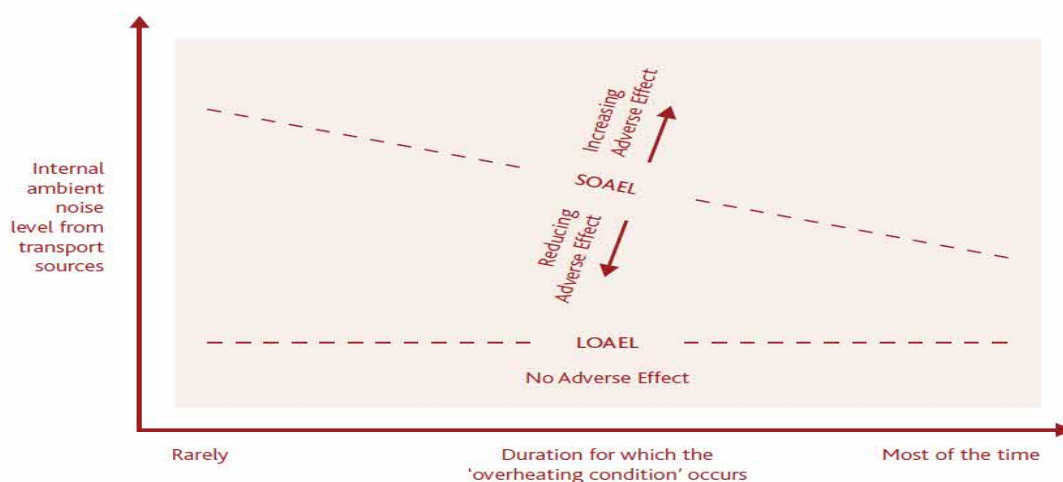
Internal ambient noise levels		
L _{Aeq} 16hour 0700-2300	L _{Aeq} 8hour 2300-0700	Individual noise events 2300-0700
>50dB	>42dB	Normally exceeds 65dB L _{AmaxT}

7.8 Using the above guidance (sliding scale as shown in the diagram below) the calculated internal levels at the front dwellings with the windows open are also shown below. 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.

Rear Facade	External Level	Sound Reduction of open windows	Internal Level
Lounge	56dBA	-13dB	43dBA
Bedroom – L _{Aeq}	48dBA	-13dB	35dBA
Bedroom - L _{Amax}	69dBA	-13dB	56dBA

7.9 The calculated internal values shown above with windows open for the dwellings facing the road network are below the threshold at which a material change of behavior is apparent and in addition the L_{Aeq} 8hour Value is within the reasonable standard of living as described in section 7.5 of this report. Therefore, it is accepted that the future residents will accept a slight increase in internal noise levels during the period whereby the windows are open to reduce over heating within the dwellings. The dwellings located to the rear will be screened from the noise source and able to open their windows as they desire.

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



7.10 The mitigation measures combined with the quieter rear facades should ensure a reasonable standard of living can be achieved for the proposed dwellings. The mitigation measures and orientation of the dwellings will lead to a suitable balance between noise, overheating and ventilation for the future residents of the scheme.

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14 Building Specifications:

14.1 It is anticipated that the scheme can be naturally ventilated with open windows, but all dwellings will be fitted with background ventilators to the windows and an MEV system.

14.2 Façade Detail – The proposed façade is believed to be something similar to: - Aggregate block cavity wall, minimum 100mm blocks (minimum density 1350kg/m³), minimum 75mm cavity between leaves, finished with 13mm plaster. 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'. Also, a cavity wall system comprising of 7N concrete blocks (two separate frames), have a sound reduction of approximately 53dB (predicted weighted sound reduction index values of Celcon Blockwork – from H&H Celcon).

14.3 Roof Detail – The proposed roof detail is believed to be similar to: 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'.

14.4 Windows - The proposed windows to be used are shown in the table below. It is clear to see that these windows easily achieve the minimum sound reduction required for the site, and thus will ensure a suitable acoustic environment for the future residents.

Glazing Units	Thickness	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Overall reduction
Guardian Glass 6.8mm acoustic lamiglass, 18mm cavity, 4mm float glass	28.8mm	20	28	37	45	51	47	Rw39-6Ctr=33dB

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16 Results Summary:

16.1 The findings of this survey indicate that the noise associated with the immediate area, including the road and rail activity will not have an adverse impact on the proposed dwellings, and that a balance between noise, overheating and ventilation will be required.

16.2 The noise associated with the road traffic & rail noise will not have an adverse impact on the proposed residential dwellings to be located on the corner of North Street and Prince George Street. The levels of sound reduction required for the proposed dwellings is clearly listed and can be achieved with the proposed mitigation.

16.3 The mitigation measures listed within this report offer suitable sound reduction for the necessary building elements and if they are implemented throughout the site then the future residents should be able to enjoy a reasonable standard of living. Upon implementation of the mitigation measures, the internal criteria of BS8233: 2014 should be met within the noise sensitive bedrooms at the proposed development.

16.4 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- Orientation of dwellings – a lot of dwellings screened from the noise sources
- 2- Thermal mass applied to the dwellings to improve overheating – natural ventilation will be acceptable to screened dwellings
- 3- Natural ventilation will ensure a good thermal comfort & a balance between the internal noise levels & overheating
- 4- Install a robust glazing system to the dwellings to protect the residents from the external noise emissions when closed

16.5 The measures taken by the client should ensure the future residents will not be adversely affected by the noise sources apparent and thus the criteria stated in the condition listed on page 3 of this report can be achieved.

16.6 The conclusion of this report is that the condition stated by the local planning authority can be achieved & noise associated with the local area will not have an adverse impact on the existing & proposed residential dwellings.

16.7 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).”

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

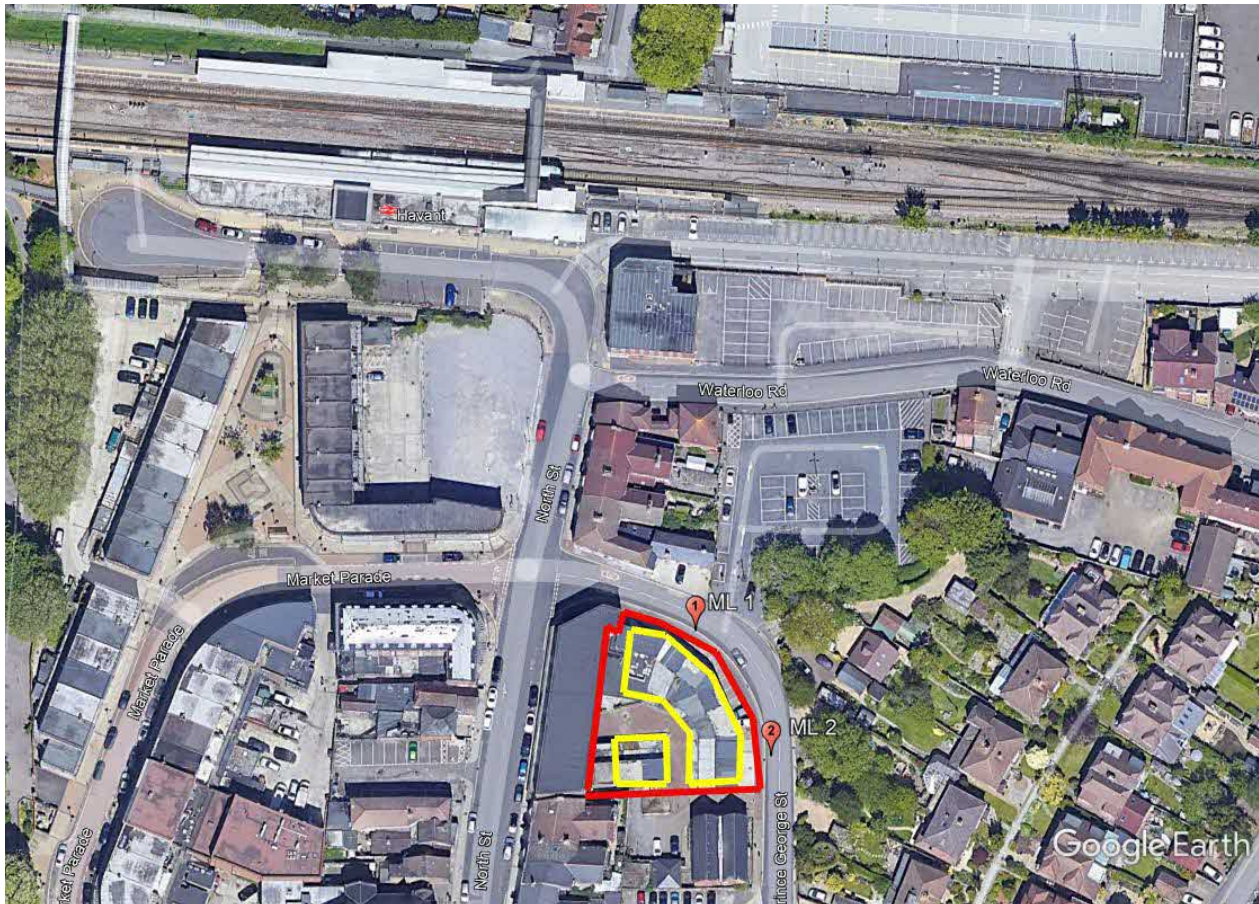
- a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;
- a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this 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 publically 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)

17 Site Plans:



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18 Google Maps:



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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:

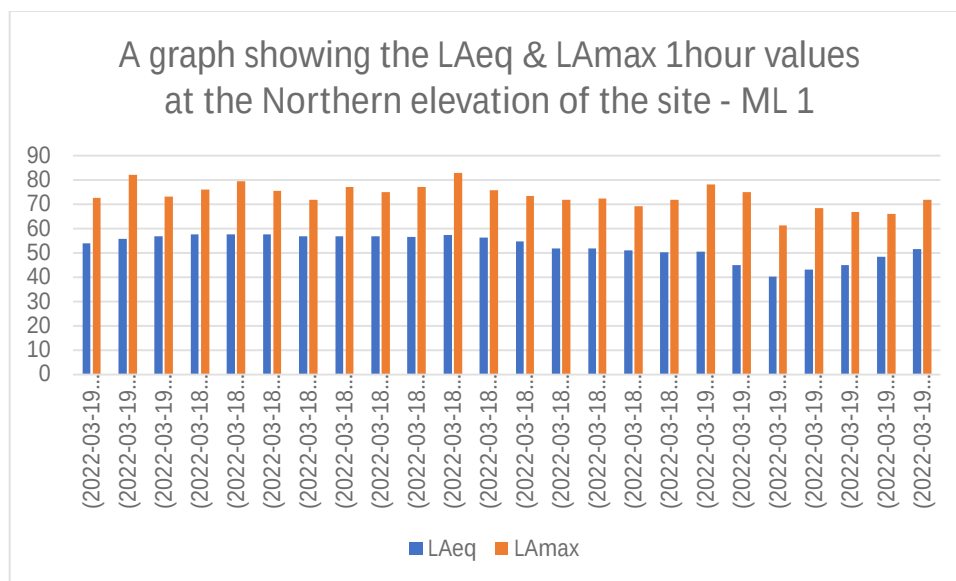
Code of Practice: BS8233: 2014 - Sound Insulation and noise reduction for buildings.

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

Pro PG — Planning & Noise, Residential Development — 2017

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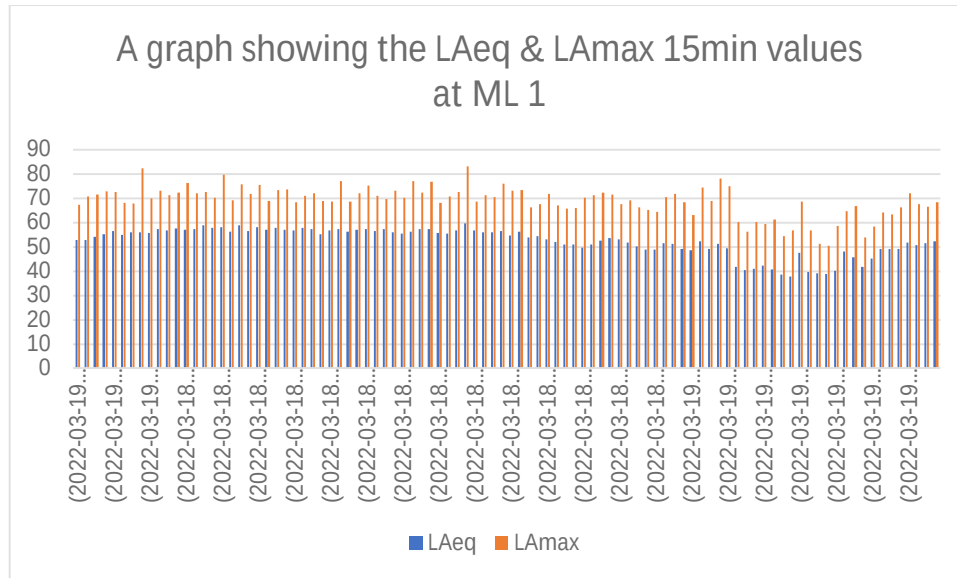
Time Period	LAeq	LAmx
(2022-03-19 07:00:05.600)	53.9	72.8
(2022-03-19 08:00:05.600)	55.8	82.3
(2022-03-19 09:00:05.600)	56.9	73.2
(2022-03-18 10:00:05.600)	57.8	76.2
(2022-03-18 11:00:05.600)	57.6	79.6
(2022-03-18 12:00:05.600)	57.6	75.5
(2022-03-18 13:00:05.600)	56.9	72
(2022-03-18 14:00:05.600)	56.9	77.1
(2022-03-18 15:00:05.600)	56.8	75.1
(2022-03-18 16:00:05.600)	56.6	77.2
(2022-03-18 17:00:05.600)	57.3	83
(2022-03-18 18:00:05.600)	56.4	75.9
(2022-03-18 19:00:05.600)	54.9	73.5
(2022-03-18 20:00:05.600)	51.8	71.9
(2022-03-18 21:00:05.600)	52	72.4
(2022-03-18 22:00:05.600)	51.2	69.3
(2022-03-18 23:00:05.600)	50.3	71.9
(2022-03-19 00:00:05.600)	50.6	78.2
(2022-03-19 01:00:05.600)	45	75
(2022-03-19 02:00:05.600)	40.3	61.4
(2022-03-19 03:00:05.600)	43.3	68.6
(2022-03-19 04:00:05.600)	45.1	66.8
(2022-03-19 05:00:05.600)	48.5	66.2
(2022-03-19 06:00:05.600)	51.6	72



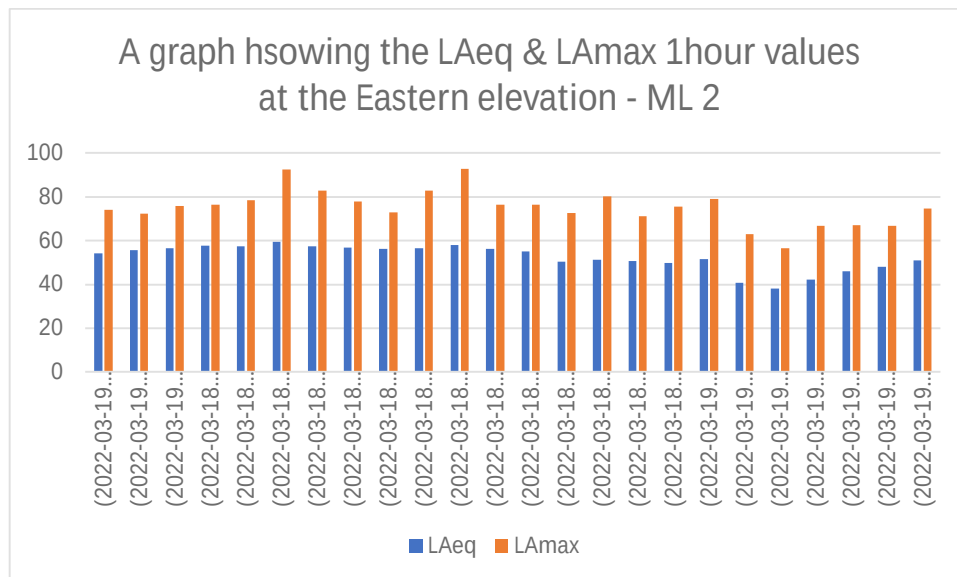
Time Period	LAeq	LAmx
(2022-03-19 07:00:05.600)	52.8	67.3
(2022-03-19 07:15:05.600)	52.9	70.7
(2022-03-19 07:30:05.600)	54.2	71.6
(2022-03-19 07:45:05.600)	55.2	72.8
(2022-03-19 08:00:05.600)	56.4	72.5
(2022-03-19 08:15:05.600)	55	68.2
(2022-03-19 08:30:05.600)	56	67.9
(2022-03-19 08:45:05.600)	55.9	82.3
(2022-03-19 09:00:05.600)	55.8	69.9
(2022-03-19 09:15:05.600)	57.2	73.2
(2022-03-19 09:30:05.600)	56.7	71.2
(2022-03-19 09:45:05.600)	57.6	72.2
(2022-03-18 10:00:05.600)	57.1	76.2
(2022-03-18 10:15:05.600)	57.4	72
(2022-03-18 10:30:05.600)	58.9	72.6
(2022-03-18 10:45:05.600)	57.8	70.2
(2022-03-18 11:00:05.600)	58.1	79.6
(2022-03-18 11:15:05.600)	56.3	69.1
(2022-03-18 11:30:05.600)	58.8	75.7
(2022-03-18 11:45:05.600)	56.5	71.7
(2022-03-18 12:00:05.600)	58.1	75.5
(2022-03-18 12:15:05.600)	57.1	68.8
(2022-03-18 12:30:05.600)	57.9	73.4
(2022-03-18 12:45:05.600)	57	73.7
(2022-03-18 13:00:05.600)	56.8	68.4
(2022-03-18 13:15:05.600)	57.8	71
(2022-03-18 13:30:05.600)	57.3	72
(2022-03-18 13:45:05.600)	55.1	68.9
(2022-03-18 14:00:05.600)	56.9	68.6
(2022-03-18 14:15:05.600)	57.4	77.1
(2022-03-18 14:30:05.600)	56.3	68.7
(2022-03-18 14:45:05.600)	57.1	72.1
(2022-03-18 15:00:05.600)	57.3	75.1
(2022-03-18 15:15:05.600)	56.5	71.1
(2022-03-18 15:30:05.600)	57.2	69.8
(2022-03-18 15:45:05.600)	56	73.1
(2022-03-18 16:00:05.600)	55.6	70.3
(2022-03-18 16:15:05.600)	56.2	77.2
(2022-03-18 16:30:05.600)	57.4	72.3
(2022-03-18 16:45:05.600)	57.2	76.7
(2022-03-18 17:00:05.600)	55.7	68.2
(2022-03-18 17:15:05.600)	55.5	70.7
(2022-03-18 17:30:05.600)	56.8	72.6
(2022-03-18 17:45:05.600)	59.7	83

(2022-03-18 18:00:05.600)	56.8	68.6
(2022-03-18 18:15:05.600)	56.1	71.2
(2022-03-18 18:30:05.600)	56	70.4
(2022-03-18 18:45:05.600)	56.6	75.9
(2022-03-18 19:00:05.600)	54.6	73.1
(2022-03-18 19:15:05.600)	56.3	73.5
(2022-03-18 19:30:05.600)	54	66.2
(2022-03-18 19:45:05.600)	54.5	67.5
(2022-03-18 20:00:05.600)	53.1	71.9
(2022-03-18 20:15:05.600)	52	67
(2022-03-18 20:30:05.600)	51	65.7
(2022-03-18 20:45:05.600)	50.9	66.1
(2022-03-18 21:00:05.600)	49.7	70.1
(2022-03-18 21:15:05.600)	51.1	71.3
(2022-03-18 21:30:05.600)	52.6	72.4
(2022-03-18 21:45:05.600)	53.6	71.6
(2022-03-18 22:00:05.600)	53	67.6
(2022-03-18 22:15:05.600)	51.7	69.3
(2022-03-18 22:30:05.600)	50.2	66.2
(2022-03-18 22:45:05.600)	48.9	65.3
(2022-03-18 23:00:05.600)	48.9	64.5
(2022-03-18 23:15:05.600)	51.5	70.6
(2022-03-18 23:30:05.600)	51.2	71.9
(2022-03-18 23:45:05.600)	49.1	68.4
(2022-03-19 00:00:05.600)	48.6	63
(2022-03-19 00:15:05.600)	52.3	74.4
(2022-03-19 00:30:05.600)	49.1	69
(2022-03-19 00:45:05.600)	51.2	78.2
(2022-03-19 01:00:05.600)	49.4	75
(2022-03-19 01:15:05.600)	41.8	60.2
(2022-03-19 01:30:05.600)	40.5	56.3
(2022-03-19 01:45:05.600)	41	60.2
(2022-03-19 02:00:05.600)	42.3	59.5
(2022-03-19 02:15:05.600)	40.8	61.4
(2022-03-19 02:30:05.600)	38.7	54.5
(2022-03-19 02:45:05.600)	37.9	56.9
(2022-03-19 03:00:05.600)	47.7	68.6
(2022-03-19 03:15:05.600)	39.7	56.7
(2022-03-19 03:30:05.600)	39.1	51.2
(2022-03-19 03:45:05.600)	39	50.6
(2022-03-19 04:00:05.600)	40.3	58.7
(2022-03-19 04:15:05.600)	48.2	64.6
(2022-03-19 04:30:05.600)	45.8	66.8
(2022-03-19 04:45:05.600)	41.9	54
(2022-03-19 05:00:05.600)	45.3	58.5
(2022-03-19 05:15:05.600)	49.2	64.1

(2022-03-19 05:30:05.600)	49.2	63.3
(2022-03-19 05:45:05.600)	49.2	66.2
(2022-03-19 06:00:05.600)	51.7	72
(2022-03-19 06:15:05.600)	50.7	67.5
(2022-03-19 06:30:05.600)	51.5	66.6
(2022-03-19 06:45:05.600)	52.2	68.3



Time Period	LAeq	LAmx
(2022-03-19 07:00:05.600)	54.1	74.1
(2022-03-19 08:00:05.600)	55.6	72.5
(2022-03-19 09:00:05.600)	56.5	75.8
(2022-03-18 10:00:05.600)	57.7	76.5
(2022-03-18 11:00:05.600)	57.4	78.6
(2022-03-18 12:00:05.600)	59.5	92.6
(2022-03-18 13:00:05.600)	57.5	83
(2022-03-18 14:00:05.600)	56.9	78
(2022-03-18 15:00:05.600)	56.2	72.9
(2022-03-18 16:00:05.600)	56.5	82.9
(2022-03-18 17:00:05.600)	58	93
(2022-03-18 18:00:05.600)	56.3	76.5
(2022-03-18 19:00:05.600)	55	76.5
(2022-03-18 20:00:05.600)	50.4	72.6
(2022-03-18 21:00:05.600)	51.4	80.3
(2022-03-18 22:00:05.600)	50.6	71.2
(2022-03-18 23:00:05.600)	49.8	75.7
(2022-03-19 00:00:05.600)	51.5	79
(2022-03-19 01:00:05.600)	40.8	63
(2022-03-19 02:00:05.600)	38.1	56.6
(2022-03-19 03:00:05.600)	42.1	66.8
(2022-03-19 04:00:05.600)	46	67.1
(2022-03-19 05:00:05.600)	48.1	66.9
(2022-03-19 06:00:05.600)	51.1	74.6



Time Period	LAeq	LAmx
(2022-03-19 07:00:05.600)	52.7	73
(2022-03-19 07:15:05.600)	53.1	72.4
(2022-03-19 07:30:05.600)	54.6	71
(2022-03-19 07:45:05.600)	55.3	74.1
(2022-03-19 08:00:05.600)	56.6	72.5
(2022-03-19 08:15:05.600)	55.5	72.4
(2022-03-19 08:30:05.600)	55.9	70.2
(2022-03-19 08:45:05.600)	54.2	67.2
(2022-03-19 09:00:05.600)	55.5	71.1
(2022-03-19 09:15:05.600)	56.7	71.6
(2022-03-19 09:30:05.600)	57	75.8
(2022-03-19 09:45:05.600)	56.7	74.6
(2022-03-18 10:00:05.600)	56.4	70.3
(2022-03-18 10:15:05.600)	57.2	74.9
(2022-03-18 10:30:05.600)	58.5	75.3
(2022-03-18 10:45:05.600)	58.4	76.5
(2022-03-18 11:00:05.600)	58	78.6
(2022-03-18 11:15:05.600)	56.6	71.1
(2022-03-18 11:30:05.600)	58.5	77
(2022-03-18 11:45:05.600)	56.1	77.8
(2022-03-18 12:00:05.600)	58	78.9
(2022-03-18 12:15:05.600)	57.5	73.5
(2022-03-18 12:30:05.600)	61	92.6
(2022-03-18 12:45:05.600)	60.3	91
(2022-03-18 13:00:05.600)	57.2	73
(2022-03-18 13:15:05.600)	58.9	83
(2022-03-18 13:30:05.600)	57.9	77.2
(2022-03-18 13:45:05.600)	54.9	70.2
(2022-03-18 14:00:05.600)	57.6	73.8
(2022-03-18 14:15:05.600)	56.7	78
(2022-03-18 14:30:05.600)	56.4	71.5
(2022-03-18 14:45:05.600)	56.8	77
(2022-03-18 15:00:05.600)	55.7	70.3
(2022-03-18 15:15:05.600)	55.8	69.3
(2022-03-18 15:30:05.600)	56.8	71.5
(2022-03-18 15:45:05.600)	56.3	72.9
(2022-03-18 16:00:05.600)	55.5	68.7
(2022-03-18 16:15:05.600)	56.9	82.9
(2022-03-18 16:30:05.600)	56.5	72
(2022-03-18 16:45:05.600)	57.1	71.2
(2022-03-18 17:00:05.600)	56.2	69.5
(2022-03-18 17:15:05.600)	54.9	69.2
(2022-03-18 17:30:05.600)	57.6	79.1
(2022-03-18 17:45:05.600)	60.9	93
(2022-03-18 18:00:05.600)	57.1	70.5

(2022-03-18 18:15:05.600)	55.9	72
(2022-03-18 18:30:05.600)	55.8	71.4
(2022-03-18 18:45:05.600)	56.5	76.5
(2022-03-18 19:00:05.600)	53.8	68.3
(2022-03-18 19:15:05.600)	56.9	76.5
(2022-03-18 19:30:05.600)	53.8	68.9
(2022-03-18 19:45:05.600)	54.8	69.6
(2022-03-18 20:00:05.600)	52.8	72.6
(2022-03-18 20:15:05.600)	49.8	67.7
(2022-03-18 20:30:05.600)	49.4	68
(2022-03-18 20:45:05.600)	48.4	62.8
(2022-03-18 21:00:05.600)	49.1	71
(2022-03-18 21:15:05.600)	49.5	71.3
(2022-03-18 21:30:05.600)	52.5	80.3
(2022-03-18 21:45:05.600)	53.1	72.2
(2022-03-18 22:00:05.600)	53.1	70.7
(2022-03-18 22:15:05.600)	51.3	71.2
(2022-03-18 22:30:05.600)	48.5	66.6
(2022-03-18 22:45:05.600)	47.1	67.3
(2022-03-18 23:00:05.600)	47.9	67.6
(2022-03-18 23:15:05.600)	50.3	71.4
(2022-03-18 23:30:05.600)	51.7	75.7
(2022-03-18 23:45:05.600)	47.9	74.8
(2022-03-19 00:00:05.600)	46	65.1
(2022-03-19 00:15:05.600)	51.7	76.4
(2022-03-19 00:30:05.600)	49.5	74.6
(2022-03-19 00:45:05.600)	54.6	79
(2022-03-19 01:00:05.600)	43.6	63
(2022-03-19 01:15:05.600)	39.4	52.8
(2022-03-19 01:30:05.600)	38.7	50.7
(2022-03-19 01:45:05.600)	39.5	58.3
(2022-03-19 02:00:05.600)	39.8	56.6
(2022-03-19 02:15:05.600)	37.9	51.9
(2022-03-19 02:30:05.600)	37.1	48.3
(2022-03-19 02:45:05.600)	37	54.4
(2022-03-19 03:00:05.600)	46.5	66.8
(2022-03-19 03:15:05.600)	38.5	51.2
(2022-03-19 03:30:05.600)	38.1	55.1
(2022-03-19 03:45:05.600)	38	48.6
(2022-03-19 04:00:05.600)	38.2	51.3
(2022-03-19 04:15:05.600)	48.2	65.4
(2022-03-19 04:30:05.600)	47.2	67.1
(2022-03-19 04:45:05.600)	45.4	61.6
(2022-03-19 05:00:05.600)	44.5	57.8
(2022-03-19 05:15:05.600)	49.1	62.4
(2022-03-19 05:30:05.600)	48.9	64.7

(2022-03-19 05:45:05.600)	48.4	66.9
(2022-03-19 06:00:05.600)	51	70.6
(2022-03-19 06:15:05.600)	49.1	65.3
(2022-03-19 06:30:05.600)	51.4	65.8
(2022-03-19 06:45:05.600)	52.3	74.6

