



**Orchard West
Dartford West**

Noise Impact Assessment Report

12 December 2023

For
Dartford Borough Council

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SUMMARY

A temporary theatre is proposed on currently vacant land adjacent to Orchard Street and Hythe Street Dartford. The proposals have the potential to generate noise, therefore a noise impact assessment has undertaken to accompany a planning application.

auricl has liaised with Dartford Borough Council to agree our measurement and assessment methodology, as well as specific noise impact assessment criteria.

We have undertaken a detailed environmental noise survey to determine existing baseline ambient and background noise levels representative of the nearest noise sensitive (residential) properties, over weekday and weekend periods when the site will be operational.

Calculations have been undertaken to predict noise emissions associated with music noise emissions, vehicle movements and building services plant, the results of which are summarised as follows:

- Noise break-out levels during performances outside the nearest noise sensitive properties are predicted to be less than the existing ambient noise levels. By comparison with the proposed significance criteria, it is concluded that this would result in a **negligible noise impact**.
- By comparison of the predicted future noise level differences with the proposed noise impact criteria, it is concluded that the predicted noise impact of the vehicle movements would result in a **negligible noise impact**.
 - Noise emissions due to building services plant are not predicted to exceed the existing background noise level at the nearest noise sensitive properties. By comparison with the guidance given in BS 4142: 2014, it is concluded that the building services plant would give rise to a **low noise impact** at the nearest existing residential properties during the proposed theatre operating period.

In order to maintain the findings of our assessments and avoid an adverse impact, various controls have been proposed in the form of a noise management plan.

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1.0 Introduction

A temporary theatre is proposed on currently vacant land adjacent to Orchard Street and Hythe Street Dartford. The proposals have the potential to generate noise, therefore a noise impact assessment has undertaken to accompany a planning application.

This report presents the methodology and results of a noise survey and an assessment of the noise impact of the proposals.

Appendix A presents an explanation of the various acoustic terminology used in this report.

2.0 Description of Site and Surroundings

The site is currently occupied mainly by vacant land but also by a vacant commercial building at the south-western corner fronting onto Spital Street (the 'Co-Op building'). The surrounding area consists of various uses, with retail units located along Spital Street and Hythe Street, and residential properties located along Orchard Street and Hythe Street.

Figure 2.1 shows the approximate main site extent in red, and the nearest noise sensitive properties highlighted in blue.

Figure 2.1 Existing Site Extent and Surrounding Properties



3.0 Noise Impact Assessment Criteria

3.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) sets out the Government's core policies and principles with respect to land use planning in England. In respect to noise, the Framework states at paragraph 180 that planning policies and decisions should aim to:

- 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 quality of life; and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

The Noise Policy Vision is to 'promote good health and a good quality of life through the effective management of noise within the context of government policy on sustainable development'. Through effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development, there are the following aims:

- 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.

3.2 Planning Practice Guidance (PPG) on Noise

The Planning Practice Guidance on Noise (PPG) ensures noise be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustics environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard or amenity can be achieved.

3.3 Noise Policy Statement for England (NPSE)

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The Observed Effect Levels are as follows:

- Significant Observed Adverse Effect Level (SOAEL): This is the level of noise exposure above which adverse effects on health and quality of life occur;
- Lowest Observed Adverse Effect Level (LOAEL): This is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No Observed Effect Level (NOEL): This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 3.1 summarises the noise exposure hierarchy, based on the likely average response.

Table 3.1 Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any changes in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
Lowest observed adverse effect level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant observed adverse effect level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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 effect	Prevent
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable adverse effect	Prevent

3.4 Liaison with Dartford Borough Council

Prior to preparing this report, **auricl** liaised with Chris Butler (Dartford Borough Council Environmental Protection Officer) via email. We put forward the following scope for measurement and assessment, with queries/clarifications shown in **bold**:

- Undertake an environmental noise survey over a 4-day period including a weekend, using automated noise monitoring equipment installed at three secure, accessible positions representative of background noise levels at the nearest noise sensitive properties to the site. **Note: this has been completed, with baseline noise measurements undertaken at positions on the eastern, northern and western site boundaries, close to the nearest noise sensitive receptors.**
- Undertake calculations to predict noise emissions associated with internal activities, based on typical internal theatre noise levels and details of the proposed building envelope. **These will be assessed against IEMA noise impact guidance and/or any specific Dartford Borough Council policy requirements – please advise.**
- Undertake calculations to predict noise levels associated with vehicle movements associated with the proposals. **These will be assessed against IEMA noise impact guidance and/or any specific Dartford Borough Council policy requirements – please advise.**
- Undertake a preliminary assessment of noise emissions associated with the proposed building services plant. **These will be assessed against BS 4142: 2014+A1: 2019 noise impact guidance and/or any specific Dartford Borough Council policy requirements – please advise.**
- Propose noise control measures and a noise management plan.
- Produce an acoustic report, presenting the methodology and results of the noise survey, together with the proposed noise impact assessment criteria, our assessments and a description of the agreed noise control measures, as well as a noise management plan.

Chris Butler's response is as follows:

"Thank you for your e-mail.

I concur with the methodology set out below. I would point out that historically complaints are more likely from the Kent Road, Essex Road area and also the site known as The Cloisters.

The standards we would normally be looking at would be those you have quoted i.e. BS 4142:2014; BS 8233:2014 (either below or no higher than background LA90) and WHO. In the past we have required a level of no more than 45 dB(A) at the façade of the NSR.

I am not sure what entertainment is intended for the site and how much amplified music may play a part. The concerns here are that specific controls may be required for low frequency bass and as such a more detailed frequency analysis may be needed.?

Hours of operation will play a part but I am not sure if there is any intention to go beyond 23:00?"

We have therefore considered the above in our measurements and assessment methodologies.

3.5 Music and Vehicle Noise Impact Assessment Criteria

In assessing noise due to music and vehicle movements, we have sought guidance from the IEMA document "*Guidelines for Environmental Noise Impact Assessment*" (November 2014) which states the noise impact criteria shown in Table 3.2.

Table 3.2 Noise Impact Assessment Criteria

Noise Level Change (dB, L_{Aeq})	Noise Impact
< 3	Negligible
3 – 5	Moderate
5 – 10	Substantial
> 10	Very Substantial

As the site will operate during daytime periods only between 09:00-21:00 hours, we have considered hourly periods as is standard practice e.g. as recommended by BS 4142: 2014+A1: 2019.

3.6 Building Services Plant Noise

British Standard (BS) 4142: 2014+A1: 2019 (referred to hereafter as BS 4142) provides a procedure for the measurement and rating of noise levels from industrial and commercial noise sources. A methodology for predicting the likelihood of adverse impact is provided in the document.

The rating level ($L_{Ar,Tr}$) is defined in BS 4142 and is used to rate the industrial source (known as the specific noise source) at the assessment location. This level is obtained by adding a correction of between 0 and 6 dB, for tonal noise sources, and a correction of between 0 and 9 dB for impulsive sources. Additionally, corrections of 3 dB can be made for other sound characteristics and intermittency of the noise source.

The method for predicting the likelihood of complaints is based on differences between the rating level and the background $L_{A90,T}$ noise level. The standard states that:

- a) *“Typically, the greater this difference, the greater the magnitude of the impact.*
- b) *A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on context.*

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or 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.”

4.0 Baseline Noise Survey

4.1 Methodology

Unmanned environmental noise surveys were undertaken at the site over 4-day periods including weekends between Thursday 26 October 2023 and Monday 30 October 2023, and between Friday 3 November 2023 and Tuesday 7 November 2023.

The noise survey period was selected to determine existing baseline ambient and background noise levels over weekday and weekend periods when the temporary theatre will be operating.

The measurement positions are indicated in purple on Figure 4.1 and described in Table 4.1.

Figure 4.1 Site Plan Indicating Approximate Locations of Measurement Positions

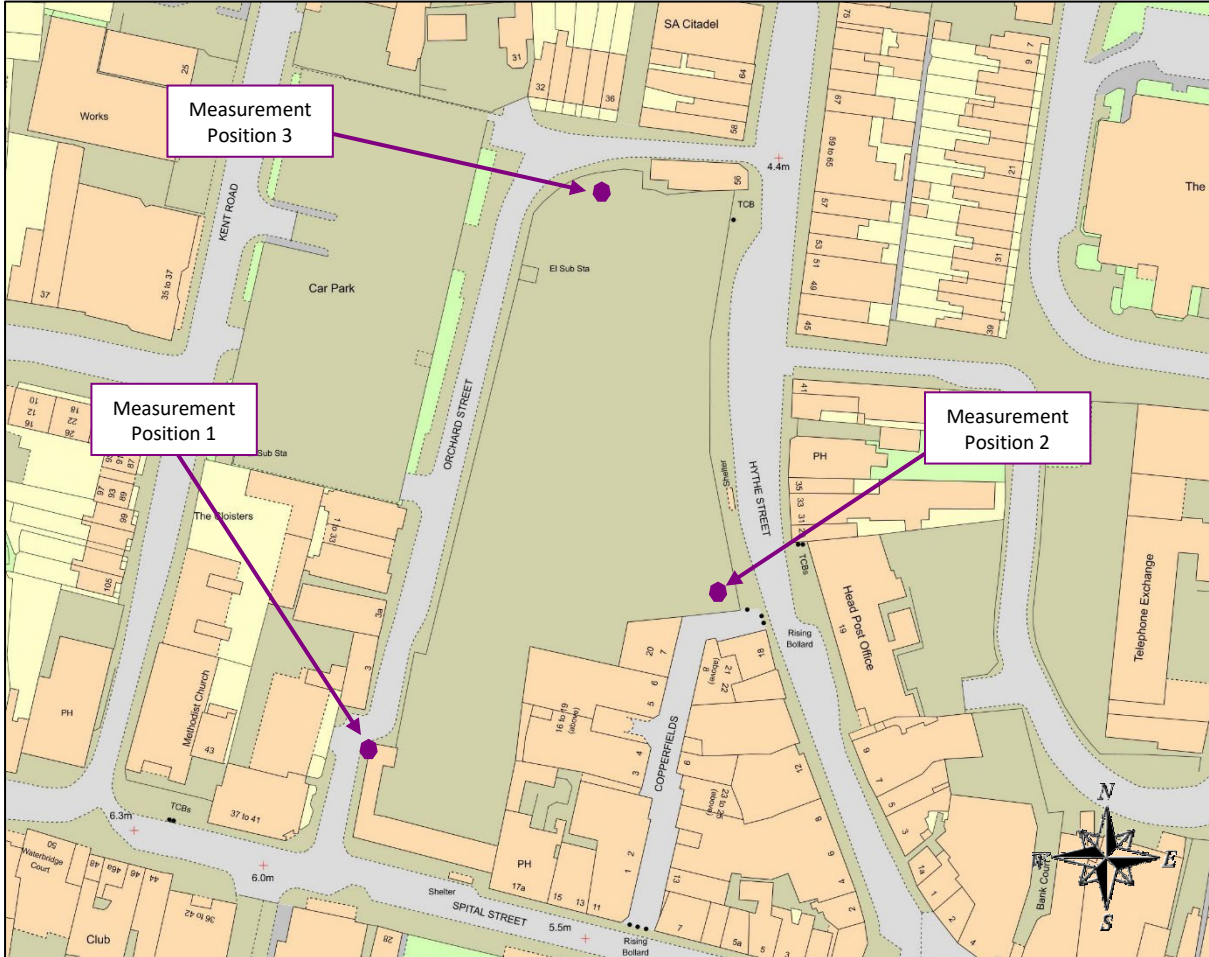


Table 4.1 Description of Noise Measurement Positions

Measurement Position	Description
1	On the roof of the existing Co-Op building which fronts onto Spital Street, at the north-eastern corner of the building over Orchard Street
2	Attached to the boundary fencing on the eastern site boundary adjacent to Hythe Street, approximately 4m above ground level.
3	Mounted on a tripod approximately 1.5m above ground level, approximately 4m from the northern site boundary.

Measurement positions 1, 2 and 3 were selected as being representative of ambient and background noise levels at the nearest noise sensitive properties of the affecting the western, eastern and northern site boundaries respectively.

The equipment used for the noise survey is listed in Table 4.2.

Table 4.2 Description of Equipment used for Noise Survey

Measurement Position	Item	Make & Model	Serial Number
1	Type 1 automated logging sound level meter	01dB DUO	10506
	Type 1 ½" microphone	GRAS 40CD	144941
2	Type 1 automated logging sound level meter	Norsonic 140	1405947
	Type 1 ½" microphone	Norsonic 1225	355507
3	Type 1 automated logging sound level meter	Norsonic 140	1403413
	Type 1 ½" microphone	GRAS 40AF	207390
Calibrator		Norsonic 1255	125525261

L_{Aeq} and L_{A90} sound pressure levels were measured throughout the noise survey over contiguous 125-millisecond intervals.

Due to the nature of the noise survey, i.e. unmanned, we are unable to comment on the weather conditions throughout the entire noise survey period. However, at the beginning and end of the survey periods, there was noted to be light rainfall, an overcast sky and only light wind. These conditions are understood to be representative of the survey period and are considered appropriate for undertaking environmental noise measurements.

Between Friday 3 November 2023 and Sunday 5 November 2023, measurement position 1 was noted to be affected by noise due to fireworks (20:00 – 22:45 hours), therefore these periods have been removed from further analysis due to being affected by atypical noise sources.

The noise monitoring equipment was calibrated before and after the noise survey period. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

4.2 Noise Survey Results

Appendix B presents time history graphs showing the L_{Aeq} and L_{A90} sound pressure levels measured at the measurement position throughout the noise survey (shown as 15-minute periods).

We would consider the levels measured to be reasonable, taking into account the location of the measurement position and the dominant nearby noise sources.

Summaries of the typical (modal) ambient (L_{Aeq} (1 hour)) and background (L_{A90} (1 hour)) noise levels measured during the noise survey between the main proposed theatre operating hours (19:30 – 22:30 hours) and the overall site operating hours (12:00 – 22:30 hours) are presented in Tables 4.3 and 4.4.

Table 4.3 Summary of Noise Survey Results (19:30 – 22:30 hours)

Position	Typical (Modal) Noise Levels (dB) (19:30 – 22:30 hours)	
	Ambient L _{Aeq} (1 hour)	Background L _{A90} (1 hour)
1	51	49
2	58	49
3	54	52

Table 4.4 Summary of Noise Survey Results (12:00 – 22:30 hours)

Position	Typical (Modal) Noise Levels (dB) (12:00 – 22:30 hours)	
	Ambient L _{Aeq} (1 hour)	Background L _{A90} (1 hour)
1	52	49
2	58	49
3	54	51

Due to the nature of the unmanned noise survey, we are unable to comment on the exact external noise climate throughout the entire survey period. However, at the beginning and end of the survey period the daytime noise climate at the measurement positions was noted to be dominated by road traffic using nearby roads.

5.0 Noise Impact Assessment – Performances

5.1 Basis of Assessment

We have undertaken calculations to predict noise transmission from the proposed building to the nearest residential properties based on typical internal noise levels.

The source noise levels used in our calculations for the proposed classrooms are taken from our in-house library for audience/applause as well as amplified music/performance noise. These have been adjusted to fit into the 1-hour daytime assessment period, with audience/applause noise being apparent for 10 minutes out of each hour and music/performance noise being apparent for the remaining 50 minutes out of each hour.

The source noise levels used in our calculations are presented in Table 5.1.

Table 5.1 Internal Activity Noise Levels

Source	Source $L_{eq,T}$ (dB) Sound Pressure Level at Octave Band Centre Frequency (Hz)							$L_{Aeq,T}$ (dB)
	63	125	250	500	1k	2k	4k	
Audience/ Applause	60	68	75	79	85	84	75	89
Amplified Music/ Performance	72	68	65	73	72	64	64	75
TOTAL (Time Adjusted)	71	68	69	75	78	76	69	82

The walls and floors of the main theatre auditorium are understood to consist of insulated panels, with external doors in the main theatre walls.

The predicted overall composite sound reduction performance of the façade elements is shown in Table 5.2.

Table 5.2 Predicted External Building Envelope Sound Reduction

Element	Predicted Sound Reduction Index (R dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Walls (including doors)	15	16	19	23	26	30	31	30
Roof	15	16	19	23	26	30	30	30

5.2 Noise Break-Out Predictions

We have undertaken calculations to predict noise break-out from the theatre in accordance with the methodology specified in BS EN 12354: 2000 “*Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 4. Transmission of indoor sound to the outside*”.

Our calculations are based on the typical internal activity noise levels shown in Table 5.1, the predicted sound reduction performance of the building envelope shown in Table 5.2 and the distances to the nearest noise sensitive properties on Orchard Street (west 20m and north 40m) and Hythe Street (east 40m).

Our noise break-out calculations are summarised in Table 5.3.

Table 5.3 Music Noise Break-Out Calculations Summary

Noise Sensitive Property	Level (dB)		
	Predicted Noise Level	Existing Typical Ambient Noise Level	Difference
Orchard Street (West)	49	51	-2
Orchard Street (North)	43	58	-15
Hythe Street	43	54	-11

It can therefore be seen that the total predicted noise break-out levels outside the nearest noise sensitive properties are less than the existing ambient noise levels.

By comparison with the significance criteria proposed in Section 3.5, it can be seen that this would result in a **negligible noise impact**.

6.0 Noise Impact Assessment – Vehicle Movements

It is considered that vehicle movements are most likely between 12:00 hours and 23:00 hours daily, via the main entrance midway down the eastern boundary on Hythe Street.

We have considered 4 box vans arriving and unloading during a typical hour of the operating period, and 4 box vans then loading and departing during the final hour of the operating period. We have also considered 4 cars arriving and departing during each of these periods respectively.

auricl has previously measured typical vehicle movement noise levels as follows:

- Box van arrive and park 86 dB L_{AE} at 5m
- General loading/unloading 76 dB L_{AE} at 5m
- Box van depart 79 dB L_{AE} at 5m
- Car arrive, manoeuvre and park 70 dB L_{AE} at 5m
- Car manoeuvre and depart 67 dB L_{AE} at 5m

(Note: L_{AE} = Sound Exposure Level of complete event = L_{Aeq} (1 sec)).

As a worst-case, we have considered the nearest noise sensitive properties on Hythe Street to the east, approximately 15m from the main entrance and approximately 30m from the main parking area.

The noise sensitive properties on Orchard Street (west and north) will be subject to additional attenuation due to distance and screening (from the proposed theatre structure) and therefore will be subject to lower noise levels than those predicted in this assessment.

Our vehicle noise calculations for the scenarios described above are presented in Tables 6.1 and 6.2.

Table 6.1 Vehicle Noise Calculations – Arrival and Unloading

Element	Level (dB)		
	Van Arrival	Van Unloading	Car Arrival
L_{AE} at 5m	86	76	70
Distance Attenuation	-10	-16	-10
Quantity Correction	+5	+5	+5
Correction to L_{Aeq} (1 hour)	-36	-36	-36
Predicted L_{Aeq} (1 hour) due to Proposed Vehicle Movements	45	29	29
TOTAL Predicted L_{Aeq} (1 hour) due to Proposed Vehicle Movements	46		
Typical Measured Existing L_{Aeq} (1 hour)	54		
Total Predicted L_{Aeq} (1 hour)	55		
Predicted Difference in L_{Aeq} (1 hour)	+1		

Table 6.2 Vehicle Noise Calculations – Loading and Departure

Element	Level (dB)		
	Van Loading	Van Depart	Car Depart
L_{AE} at 5m	76	79	67
Distance Attenuation	--10	-16	-10
Quantity Correction	+5	+5	+5
Correction to L_{Aeq} (1 hour)	-36	-36	-36
Predicted L_{Aeq} (1 hour) due to Proposed Vehicle Movements	35	32	26
TOTAL Predicted L_{Aeq} (1 hour) due to Proposed Vehicle Movements	38		
Typical Measured Existing L_{Aeq} (1 hour)	54		
Total Predicted L_{Aeq} (1 hour)	54		
Predicted Difference in L_{Aeq} (1 hour)	0		

By comparison of the future noise level differences with the noise impact criteria in Section 3.6, it can be seen that the predicted noise impact of the vehicle movements is **negligible**.

7.0 Noise Impact Assessment – Building Services Plant

7.1 Noise Limits

Based on the measured background noise levels and the Dartford Borough Council requirements, the noise limits for building services plant are presented in Table 7.1.

Table 7.1 Building Services Plant Noise Limits

Noise Sensitive Property	Total Plant Noise Limit ($L_{Ar,Tr}$ dB) (12:00 – 22:30 hours)
Orchard Street (West)	49
Orchard Street (North)	49
Hythe Street	52

The limits apply to the total cumulative noise level due to all relevant plant items operating simultaneously and are to be achieved at a distance of 1m external to the nearest noise sensitive properties. If the plant noise is intermittent, impulsive or contains unfavourable characteristics (e.g. tonal elements), a correction shall be applied to the plant noise in accordance with BS 4142: 2014+A1: 2019.

7.2 Plant Noise Assessment

The following plant items are proposed and are shown with the manufacturer’s noise data and approximate proposed location:

- Heater unit (1No) 69 dB L_{pA} at 2m Western boundary
- 100kVA Generator 66 dB L_{pA} at 7m (each) South-Eastern Corner
- 100kVA Generator 66 dB L_{pA} at 7m (each) North of Site

The plant items will be surrounded by acoustic screens to ensure there is no visual or acoustic line of sight between the plant and the nearest noise sensitive properties.

Our calculations to predict the plant noise levels at each of the nearest noise sensitive properties, and comparison with the existing background noise levels during the proposed theatre operating period (19:30 – 22:30 hours), are shown in Tables 7.2, 7.3 and 7.4.

Table 7.2 Building Services Plant Noise Calculations (Orchard Street West)

Element	Heater	Generator (South-East)	Generator (North)
Source Sound Level	69	66	66
Distance Attenuation	-20	-18	-21
Screening Attenuation	-5	-5	-5
Predicted Noise Level at Noise Sensitive Property	44	43	40
Total Predicted Noise Level at Noise Sensitive Property	47		
Existing Background Noise Level	49		
Difference	-2		

Table 7.3 Building Services Plant Noise Calculations (Hythe Street)

Element	Heater	Generator (South-East)	Generator (North)
Source Sound Level	69	66	66
Distance Attenuation	-30	-13	-20
Screening Attenuation	-5	-5	-5
Predicted Noise Level at Noise Sensitive Property	35	48	41
Total Predicted Noise Level at Noise Sensitive Property	49		
Existing Background Noise Level	49		
Difference	0		

Table 7.3 Building Services Plant Noise Calculations (Orchard Street North)

Element	Heater	Generator (South-East)	Generator (North)
Source Sound Level	69	66	66
Distance Attenuation	-30	-23	-9
Screening Attenuation	-5	-5	-5
Predicted Noise Level at Noise Sensitive Property	34	38	52
Total Predicted Noise Level at Noise Sensitive Property	52		
Existing Background Noise Level	49		
Difference	+3		

By comparison with the guidance given in BS 4142: 2014, it can be seen that a “**low noise impact**” is predicted at the nearest existing residential properties during the proposed theatre operating period.

8.0 Noise Management Plan

In order to maintain the findings of our assessments and avoid an adverse impact, various controls have been proposed in the form of a noise management plan, which are outlined in this section.

1.1 Purpose of the Noise Management Plan

The purpose of this noise management plan is summarised as follows:

- To identify potential sources of noise from the proposed activities
- To describe measures that will be implemented to minimise noise emissions to nearby noise sensitive properties, to prevent nuisance
- To comply with the noise assessments undertaken in the Noise Impact Assessment Report
- To describe measures for responding to any complaints that are received

1.2 Noise Break-Out from the Building

The following will be implemented to control noise break-out from the building:

- The building will only be used during the consented operating hours
- The external envelope of the main auditorium (external doors and windows) shall be kept closed when amplified music, amplified voices or singing are taking place
- Any ventilation openings in the external building envelope (natural or mechanical) will be fitted with suitable acoustic attenuation
- Where possible, loudspeakers will not be located near to external doors or windows
- Bass noise will be limited to reasonable levels
- No music, singing or performance shall be permitted outside the building at any time

- The doors to the main auditorium shall be manned at all times before, after and during performances, as well as during intervals, to ensure doors are open for minimal periods

1.3 Pedestrian & Vehicle Noise

The following will be implemented to control noise from pedestrians and vehicles associated with the building:

- All visitors to the site will be made aware of the sensitivity of the site neighbours by way of clear signage inside and outside the main building access points
- Signs will request that visitors respect the privacy and peace of the site neighbours during their arrival and departure
- Guest arrival will be closely managed to ensure avoid the need for large groups of site guests outside the building
- Site staff will work with visitors to reduce the potential for raised voices externally and to discourage loitering outside the building
- Clear car park signage will indicate access and egress points, to ensure safe, well-managed use of the car park
- Signage in the car park will also request that visitors close car doors quietly, do not use horns at all and that car engines are not left to idle
- To reduce vehicle quantities, visitors will be encouraged, prior to their visit (email, website, etc.), to travel to the site by walking, cycling or using local bus services whenever possible (health benefits, etc.). The site is noted to be well placed and readily accessible via each of these modes of transport

1.4 Building Services Plant Noise Emissions

Noise mitigation measures that shall be considered in the selection, location and operation of any new items of plant are as follows:

- Use of low-noise, attenuated plant wherever possible
- Operation of plant only when necessary and only during the consented operation hours
- Location of building services plant within the building wherever possible, to contain noise radiating from the plant casings
- Use of acoustic screens and acoustic enclosures on plant, where required

1.5 Personnel

A responsible person should be appointed as the 'noise control person' and assigned the responsibility of dealing with any noise complaints. The appointed person must be present throughout the duration of each event. Any noise complaints received shall be reported to the Environmental Health department the following working day.

A responsible person shall also be appointed to man the complaints hotline throughout an event.

An acoustic consultant should be appointed to undertake pre-event planning and particularly to determine actual operating noise levels and noise limits.

1.6 Noise Monitoring

Permanent off-site monitoring stations will be located at the site boundaries closest to the nearest noise sensitive properties.

Supplementary music noise measurements outside of the site may be required, where necessary.

To supplement and facilitate a more rapid response and control system, a wireless network link is to be established with all sound measuring equipment both inside and outside the building.

The music sound levels at all the mixing desk positions and the agreed permanent site boundary positions will be continually monitored in terms of 15-minute and 1-minute L_{Aeq} , L_{Amax} and octave band levels (31.5Hz to 8kHz).

This information will be relayed to a suitable central control point, to be agreed. This point will be permanently monitored by a consultant/engineer and will enable real time music levels to be viewed via a laptop computer.

Should the off-site monitoring levels reach a critical level it will be possible to view the relevant on-site front-of-house levels and judge whether a particular activity/speaker array has caused the exceedance or whether this may be due to other extraneous environmental factors.

Where necessary, an intervention can then be made via the central control point to reduce the on-site levels at the relevant mixer positions.

1.7 Noise Complaints Handling Procedure

Any complaints that are received in relation to noise associated with the site will be acted upon promptly and positively.

Contact details (telephone, email) shall be displayed on the outside of the building (or on the website) to ensure that any complaints can be communicated directly.

A complaints telephone hotline shall be operated whilst the temporary theatre is in place.

The number shall be manned at all times by an appointed 'hotline person'. The hotline number should be adequately advertised prior to the event, and included within an information leaflet detailing the event start and finishing times, and sent to local residents 2 weeks prior to the event.

Should complaints of music noise arise during the event, the details will be logged by the on-site team and passed onto the acoustic consultants as soon as possible, who will then assess the music noise level at the closest permanent external monitor with the location details of the complaint. This will assist in building up a geographical picture of complaints.

Where a resident wishes for a consultant to visit, this will be undertaken (wherever practicable) and location measurements recorded.

Where an intervention will be necessary to ensure music noise levels are compliant, instruction will be conveyed by two-way radio communication with the central control point, with intervention instructions then relayed to the relevant sound engineer.

The following details shall be recorded for any complaint:

- Date and time of event
- Name of complainant
- Receptor location/s (address, internal/external)
- Specific noise issue causing the problem
- Observations and nature of the issue (continuous/intermittent, character of noise)
- Effect of the issue on the receptor (nuisance, sleep disturbance, outside/inside, etc.)
- Longevity of the issue (ongoing, short-term, etc.)
- Weather conditions at time of issue
- Relevant staff name/s

Any complaints will be acted upon immediately to understand the extent of the issue and to take all necessary action to mitigate the problem.

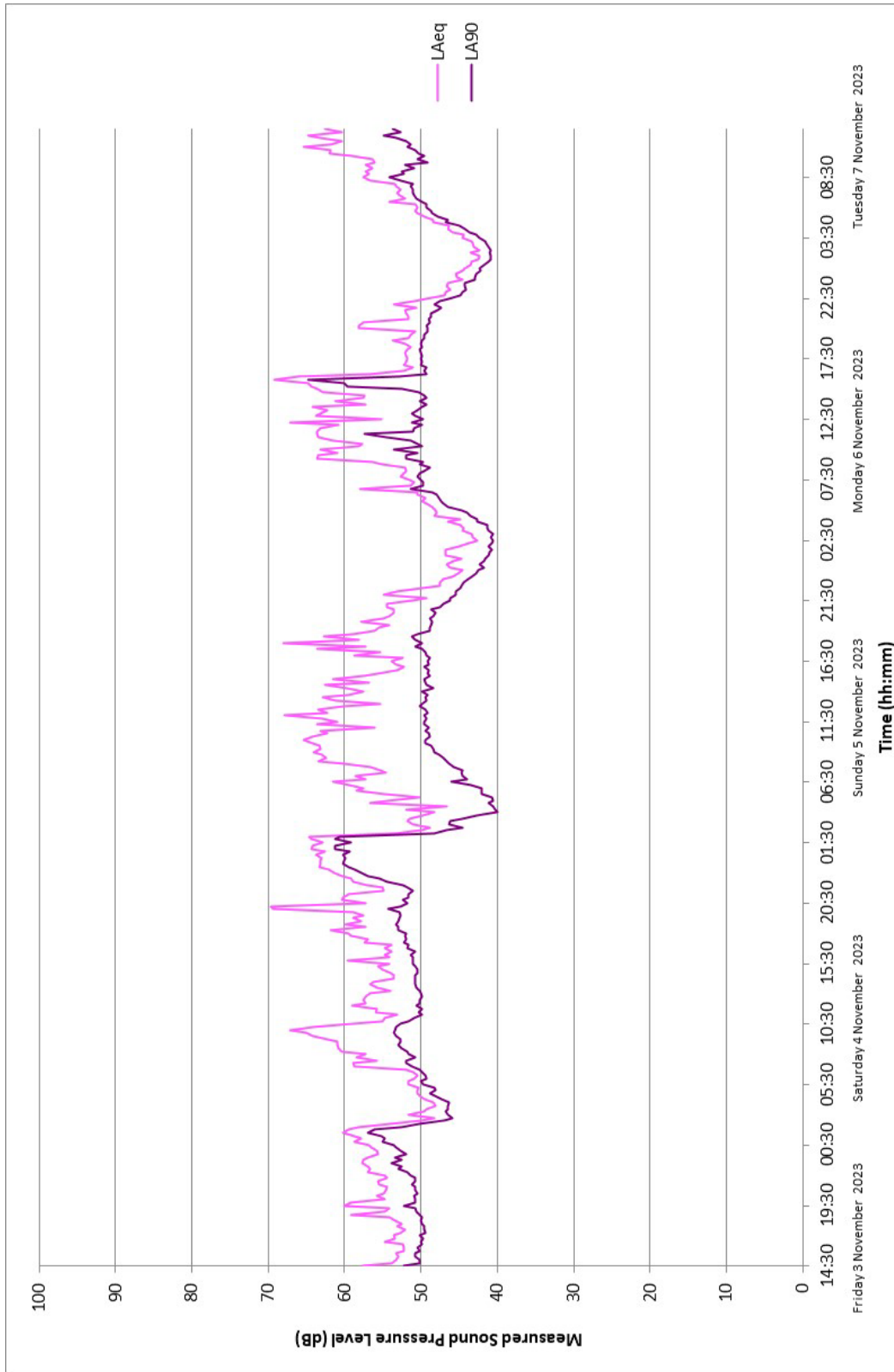
This noise management plan shall be reviewed every 3 months.

Appendix A – Acoustic Terminology

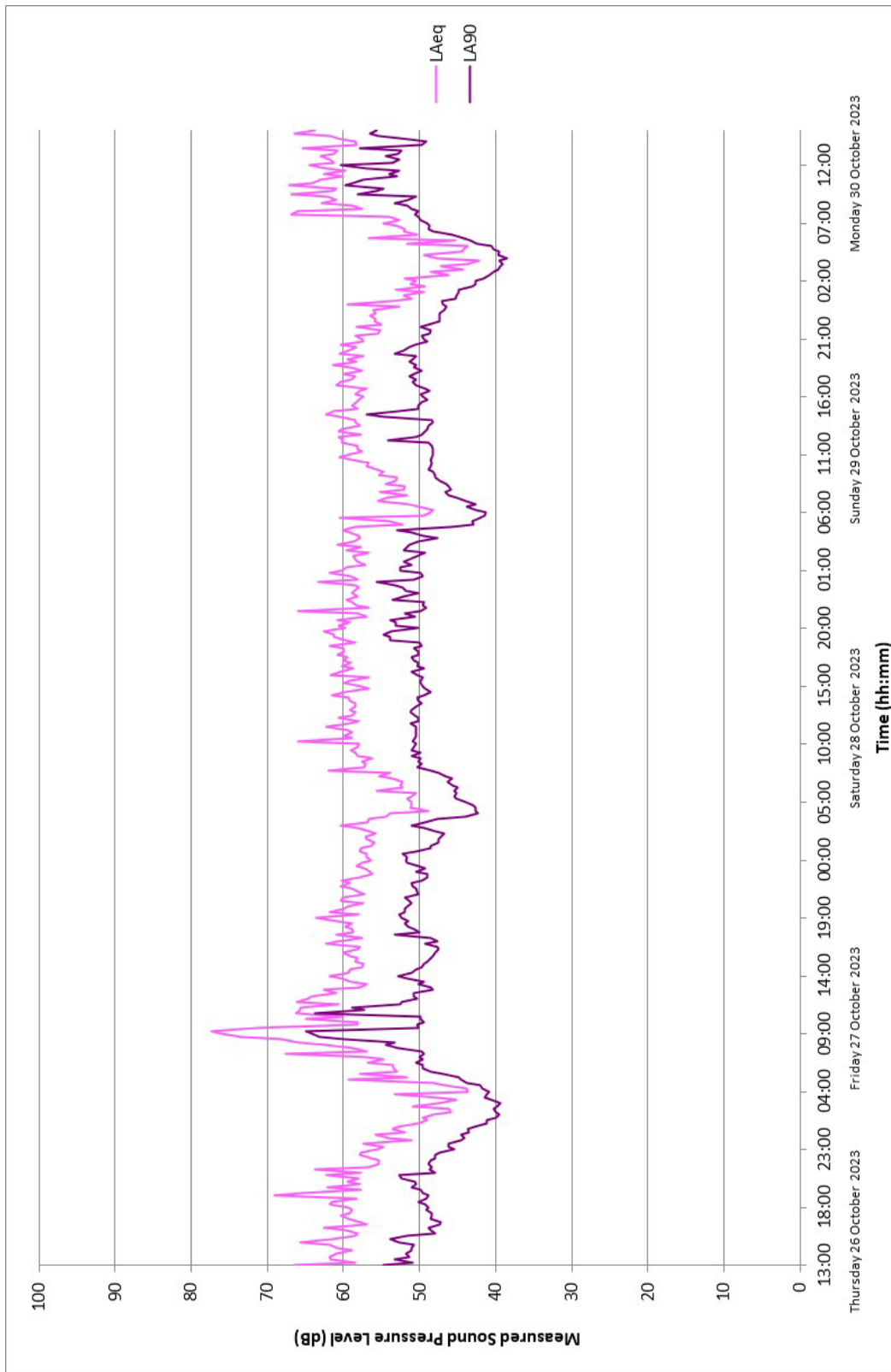
Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing (20×10^{-6} Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L_A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
$L_{Aeq,T}$	<p>The A-weighted equivalent continuous noise level over the time period T (typically T= 1 hour for noise impact assessments during daytime periods and T = 15 minutes for night-time periods).</p> <p>This is the sound level that is equivalent to the average energy of noise recorded over a given period.</p>

Appendix B – Time History Graphs

Measurement Position 1



Measurement Position 2



Measurement Position 3

