

E. NESBITT'S **THE**  
**RAILWAY**  
**CHILDREN**

WRITTEN BY MIKE KENNY DIRECTED BY DAMIAN CRUDEN

The Railway Children - Planning Application  
Our Reference (D-TRC-KX-14-014)

# Sound Management Plan

## Client

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## Introduction

This document has been written in support of an application for a temporary theatre venue which is proposed for Zone A, Goods Way, King's Cross Central, London N1C 4UR. The proposal is to install a temporary clearspan marquee structure to accommodate a theatre venue on the site at King's Cross to house a showing of the successful stage show, 'The Railway Children', produced by Theatre Tracks Limited.



The project is a time limited theatrical production, staged in a 967 seat temporary theatre auditorium for a fourteen month period from December 2014 until January 2016. The show is intrinsically linked to a temporary theatre structure which provides the custom designed auditorium space, and the ability to house the star of the show – a 44 tonne Victorian Steam Engine – for this reason the show cannot take place in a 'normal' theatre building.

The team are world leaders in providing tent-based theatrical shows and bring together experienced theatrical production and touring show specialists. The company has a history of working in temporary structures.

## Background

In the summer of 2008 The National Railway Museum played host to a unique and remarkable event – a spectacular stage production of E. Nesbit's classic children's book, *The Railway Children*. This adaptation, written by Mike Kenny, was produced in conjunction with the York Theatre Royal and after a sell out run and acclaimed reviews, returned in 2009.

In 2010 a consortium of West End Theatre producers acquired the rights in the production and subsequently brought it to London staging it at the former Eurostar Terminal in Waterloo Station where a 1,000 seat venue was built around the railway tracks with audiences seated on either side.

Following fourteen four star reviews and after winning a prestigious Olivier Award for "Best Entertainment" the production was hailed as London's theatrical sell out event of the year and ran for 28 weeks. After closing for works to be carried out by Network Rail on the station, the production was remounted in June 2011 where it ran for a further 18 week sell out run eventually closing in January 2012 due to the announcement of the abolition of BRB and Network Rail repossessing the building. A second production was also mounted in Canada, at Toronto's historic Roundhouse Park in 2011.

Written by Mike Kenny, directed by Damian Cruden, designed by Joanna Scotcher, lit by Richard G Jones, with music by Christopher Madin, and sound by Craig Vear, this extraordinary production perfectly captures both the tone and wonder in Nesbit's picaresque tale of three children, Bobby, Peter and Phyllis, whose lives change dramatically after their father is arrested on suspicion of espionage. They move from a large comfortable house in London to a poor cottage in rural Yorkshire where they befriend the local railway porter and embark on a magical journey of discovery, friendship and adventure.

Performed on moving platforms that glide on and off the real tracks and on the wooden platforms either side – the play is set within a country railway station in Yorkshire – providing the perfect stage for the show's star – a real, live period steam train ... and setting the scene for the final emotional return of the children's father. "I was in shameless emotional thrall to "The Railway Children," the York Theater Royal's inventive adaptation of E. Nesbit's much-loved novel from the early 1900s" **Ben Brantley, New York Times.**

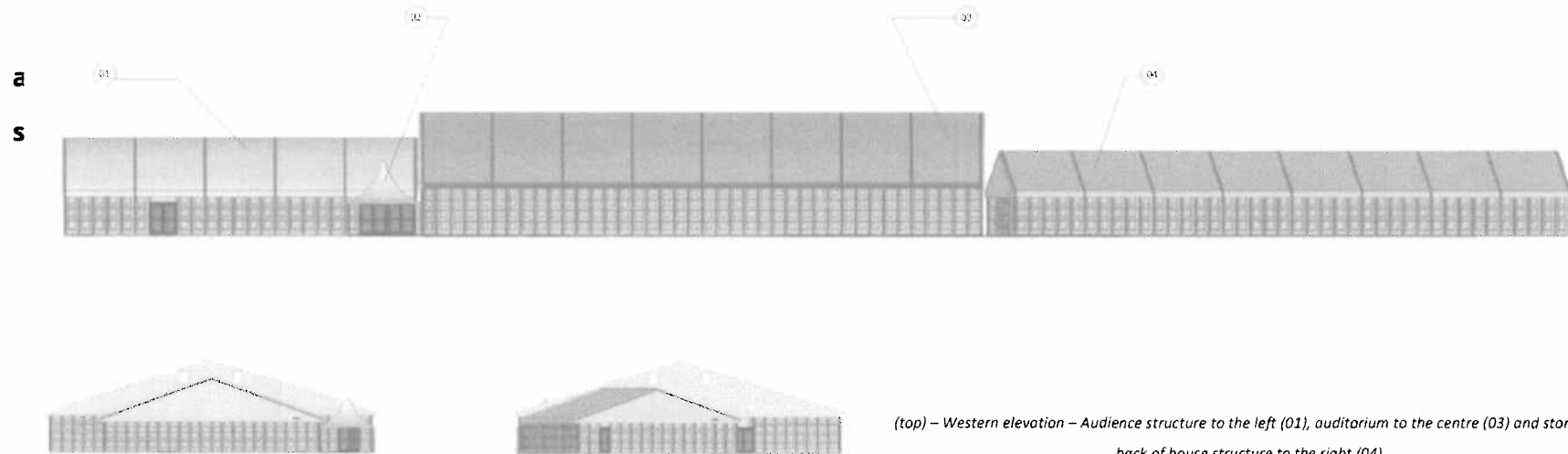
## About the Structure

The show will take place in a series of clearspan marquee structures to provide spaces for the auditorium, audience gathering and back of house storage and dressing rooms.

The requirements of the show, combined with a limited site footprint and quick build time have led the producers to European temporary structure specialists, DeBoer who, in conjunction with the designers, creative and production teams have created a venue which will successfully ensure a safe, reliable and exciting performance venue with no internal support columns, meaning every seat in the house has a great view of the action.

There are four structures used in the production of the show:

- 01) Audience bar/ circulation space
- 02) Entrance tent
- 03) Auditorium
- 04) Back of house and storage



*(top) – Western elevation – Audience structure to the left (01), auditorium to the centre (03) and storage / back of house structure to the right (04)*

*(bottom left) – Northern elevation - Audience structure (01) to the foreground with the auditorium behind (03)*

*(bottom right) – Southern elevation – Back of house structure (04) to the foreground with the auditorium behind (03)*

## About Theatre Tracks Limited

We have been behind some of London's most innovative theatre productions over the last 5 years. Our company focuses on creating engaging and exciting theatre in unusual site-specific locations for a broad demographic. The amalgamation of drama and beauty, scale and intimacy, entertainment and fun are integral to what we are all about.

Our past successes have included a large-scale production of the much-loved children's classic *Peter Pan* staged in a 1,300 seat state of the art tent in Kensington Gardens where J.M Barrie wrote the original story; The Olivier award winning production of E. Nesbitt's *The Railway Children* staged on the platforms of the disused Eurostar terminal at Waterloo Station both in 2010 and 2011; Rupert Goold's restaging of *The Lion The Witch and The Wardrobe* outside Kensington Palace, again staged in a 1,500 seat state of the art tent.

With all of these productions we demonstrated that first class family theatre can be staged for an extended period in a cherished location, without detracting from the natural beauty of the setting whilst also attracting a broad demographic audience, many of whom that are new to both theatre and the local area.

### OLIVER ROYDS (PRODUCER)

Oliver is an Olivier award-winning, West End theatre producer. His theatre credits include the award winning production of *The Railway Children* at Waterloo Station and subsequently at The Roundhouse Park in Toronto. Stephen Daldry's award winning production of J.B Priestley's *An Inspector Calls* at both The Novello and The Wyndham's Theatre in the West End followed by two highly successful UK tours. Most recently he General Managed Rupert Goold's 2 million pound production of *The Lion The Witch and The Wardrobe* in Kensington Gardens in a bespoke, 1,500-seat purpose built, tent. In 2009 he general managed *Peter Pan* in Kensington Gardens and at the O2 Arena. He was General Manager of PW Productions from 2008 - 2012 for which he looked after their touring and West End productions including *The Woman In Black* and Arthur Miller's *Broken Glass*. In 2007, he produced a sell out run of James McLure's hilarious double bill *Lone Star and Private Wars* at The King's Head Theatre starring Shane Richie and James Jagger and was an associate producer on the UK Tour of Andrew Lloyd Webber's *Aspects of Love* starring David Essex. After graduating from Newcastle with a BA Hons in History, Oliver set up his own

production company B.O.S Productions Ltd in 2004. The following year he won the Shell Entrepreneur of the Year award and was the subject of a Channel Four documentary called '*The Producers*.' He has recently been appointed as a board member of The York Theatre Royal.

### SUE SCOTT DAVISON (PRODUCER)

Following over 25 years as an actress, Sue was awarded a Stage One New Producer's Bursary in 2004. She won a Meridian Theatre Interact Award for the development and production of Glyn Maxwell's *Liberty*, which she co-produced with Shakespeare's Globe in 2008, followed by a UK tour. This was the first Globe co-production, and indeed the first show to tour from the mainstage. Other productions include: The critically acclaimed and Laurence Olivier Award-winning *The Railway Children* at Waterloo Station (2010-12) and in Toronto, *After Troy* (Oxford Playhouse and Shaw, 2011), *Future Me* (Theatre 503) and UK tour 2007-09), *Two Way Mirror* (Courtyard, 2006) and *The Lifeblood* (Edinburgh Fringe and Riverside Studios, 2004-05). Most recently, she co-produced the acclaimed revival of *Our Boys* at The Duchess Theatre. As well as producing, Sue has been casting for over 10 years. Outside of her own projects above, she has also cast: *The Railway Children* at Waterloo Station, *To Kill A Mocking Bird* (The Touring Consortium), *The Mystery Cycle*, *A Funny Thing Happened On the Way To The Forum* and *Little Shop Of Horrors* (York Theatre Royal). She is currently casting a season of plays for Andy Jordan for the West End and UK touring.

### TRISTAN BAKER (PRODUCER)

Tristan is an award-winning theatre producer. He most recently produced E. Nesbit's classic *THE RAILWAY CHILDREN* live on the former Eurostar platforms at Waterloo Station with a real steam train. This production also ran for an extended season in Toronto. He also co-produces *FOOTLOOSE* The Musical which has so far completed five UK tours, two West End seasons at the Novello and Playhouse Theatres and its first international season in Johannesburg, South Africa. Tristan co-produced *NEVER FORGET* the musical based on the songs of TAKE THAT which completed two major UK national tours and a run at the Savoy Theatre in London's West End. His other productions include *Bad Girls* at the Garrick Theatre, the UK tour of the multi-award winning Broadway and West End production of *Kiss Me Kate*, a UK tour of *Love Shack* and the UK tour of the classic musical *Calamity Jane* and its subsequent season at the Shaftesbury Theatre in the West End.

## About the Venue

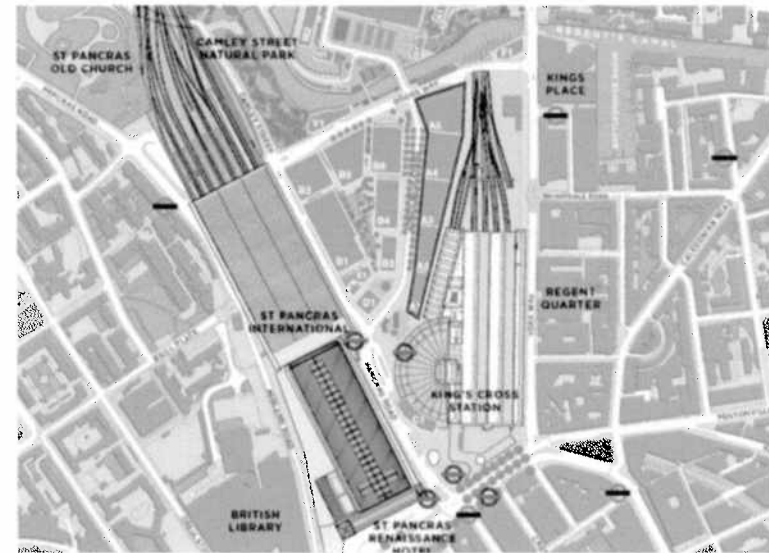
The Railway Children at King's Cross hopes to continue the successes seen by previous iterations of the show in York, London UK and Toronto Canada.

There will be seven show days per week. At King's Cross the schedule for build and de-rig, as well as the running of the show itself will be as follows:

- **Event build** December 2014
- **Rehearsals** December 2014
- **Live Shows** December 2014 – January 2016
- **Event de-rig** February 2016

## About the Location

The King's Cross Theatre will be located at Zone A, Goods Way, King's Cross Central, London N1C 4UR



The site is currently laid to gravel and is largely unused as it is awaiting redevelopment as part of the King's Cross Central scheme regeneration.

To the north of the site lies Goods Way (public highway), the Regent's Canal and then further developments including offices, shops, leisure spaces and residences which form the King's Cross Development site. To the west of the site is King's Boulevard (pedestrian walkway), with additional office space further to the West.

To the south of the site is additional empty land and the King's Cross/ St Pancras entranceway and to the east of the site are a number of railway lines and associated buildings / yards which feed King's Cross station.

## Overview

This application is for a time limited, temporary installation of the following equipment:

Four clearspan marquee structures containing theatre performance space, theatre seating, bar and refreshment areas, production spaces, offices, dressing rooms, storage and associated ancillary equipment:

- Temporary toilet facilities
- Temporary catering facilities
- Waste collection and recycling point
- Generation and Air Conditioning Plant Equipment
- Perimeter Fencing

The following dates will apply:

- Venue Opens: December 14<sup>th</sup> 2014
- Venue Closes: approx. January 31<sup>st</sup> 2016
- Derig Commences: approx. February 1<sup>st</sup> 2016
- Site Clear: approx. February 28<sup>th</sup> 2016

The show by numbers

- There will be approximately 976 people attending each show, and there will be seven show days per week.
- There will be approximately 50 technical, show and performance staff
- There will be approximately 50 front of house, bar and customer service staff

## The Purpose of this Document

The purpose of this document is to describe the management process for the management and control of sound systems for the proposed theatrical performance of The Railway Children, to be held in a temporary structure on Zone A, Goods Way, King's Cross Central, London N1C 4UR.

The document will also describe the monitoring scheme proposed to measure the levels of sound at residential premises and explain how these processes will jointly ensure the minimum disruption and impact that the show will have on local residential properties.

Definitions of the terms used can be found at the end of this document.

This statement forms part of the application for planning permission for these facilities.

## The Show

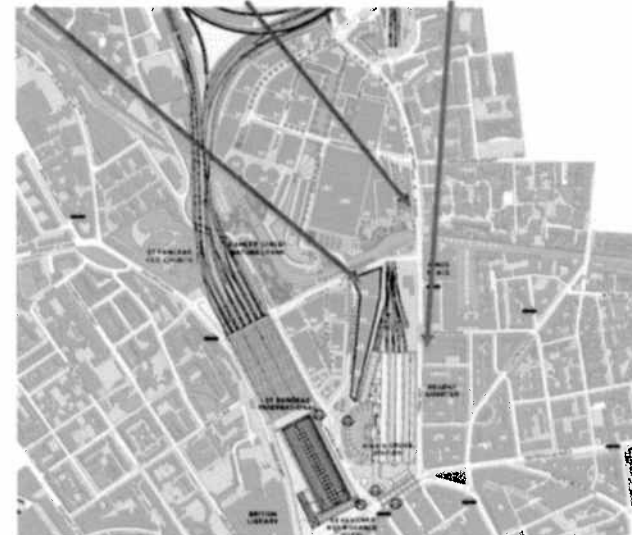
The Railway Children is a theatrical production and is very much a piece of theatre (a play) rather than a musical or in the style of a pantomime. Whilst elements of music are used within the show, these are very much incidental to the performance of the play and account for less than 10 percent of the running time of the show. The Railway Children will take place in a temporary theatre venue, which is to be known as The King's Cross Theatre.

## The Location

The proposed site for The King's Cross Theatre is an open area of land to the north of the King's Cross railway buildings, which will eventually be redeveloped as office accommodation. Currently the space is unused.

The area is a level, open space which is laid with a hard core surface. The site has been proposed following consultation with Argent LLP, the development and asset manager of the King's Cross Central scheme site.

Proposed Site      Residential Dwellings      Residential Dwellings



It is accepted that there are considerations to be made for the use of the site, specifically regarding the location of the nearest residential neighbours. The following locations have been identified as those which contain residential accommodation.

Location	Direction	Distance	Background sound levels
York Central	East	125m	68dB
Block J	North East	210m	58dB

## The Structure

The King's Cross Theatre auditorium is constructed from a large, clear span marquee venue, with no internal supporting roof beams, meaning that there are excellent sight lines from virtually all the seats. For an internal view of the floorplan please see drawing P-TRC-KX-14-004.

The stage is located in the centre of the structure, and cuts the space into two halves (east and west), with the stage (and the railway line) running through the centre. This unique theatre experience (with the stage at the centre) means that there is no 'front' stage area and that audio is produced to cover both sides of the structure equally. This means that the audio can be directed to focus on the areas where the audience sits. The benefit of this system is that there is a large number of small, but very directional speakers, rather than a large stack of speakers on the front of the stage, projecting to the back of an auditorium. This means that the sound design team can directly control the sound system to ensure that the majority of the sound is contained within the temporary structure and that sound 'bleed' is minimised.

In addition, the controllable and directional nature of the system means that it can be run at a much lower sound level than would otherwise be necessary.

The performance is contained within a large marquee structure that uses fabric which will give an approximate attenuation of 10db. In addition the side wallings of the structure are constructed from a solid ABS plastic and internally drapes will be used where required to dampen the sound that does spill outside of audience areas.

## Sound in the Show

The show is a piece of theatre, rather than a musical or concert and, although there are some musical elements to the show these are very much to complement and support the 'play' rather than as a part of the show as would be the case in a musical type performance.

In addition to the musical elements there are occasional sound 'effects' which are used to support the characters and the storyline – these however are limited in both their use and length. All of the music and sound effects are pre-recorded and played back by the sound operator.

## Noise Control Guidelines

### Noise Guidance – Existing Residential

As with other licensed premises across London, and following consultation with the Local Authority, it has been decided that events at The King's Cross Theatre should follow the general guidance given in the Noise Council Code of Practice on Environmental Noise Control at Concerts. The Code gives guidance depending upon the number of concerts per year and for the most frequent category (30 times per year), it is recommended that music noise levels (LAeq 15 min) should not exceed the background LA90 by more than 5dB(A).

The performances at The King's Cross Theatre are programmed to finish no later than 2300, however there are times where the owners of the venue may extend these opening hours to 0100 for smaller shows with a greatly reduced soundscape (i.e. a comedian or similar). This has not been confirmed and very careful consideration will be undertaken prior to shows of this nature being confirmed.

It is proposed that the event will operate on a daily basis for approximately 14 months (dependent on ticket sales) which could generate almost 400 show days (which is more than 30 times in the year). As it is located in a temporary structure, it is considered that a more stringent guideline should be adopted.

The following targets will be adopted by the producers of the show:

- The noise from the shows should not be discernible inside residential properties.
- The external music LAeq should be 5dB below the existing LA90 background noise level.

These are very stringent criteria and often apply for events operating after 2300 hours. For after 2300 hours, it is recommended by the Local Authority that the music noise should not be discernible inside residential premises. This is in line with the recommendations of the Noise Council Code of Practice which recommends inaudibility inside residential properties after 2300 hours.

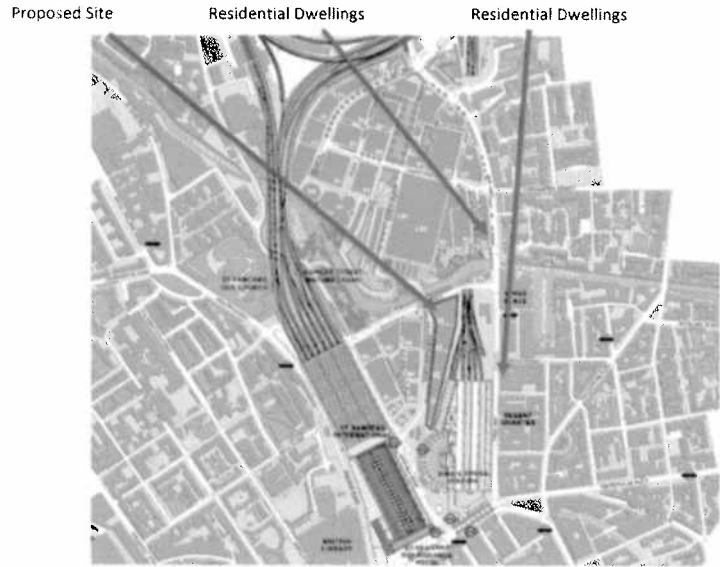
### Noise Guidance – New Residential

For new residential properties, proposed close to The King's Cross Theatre, advice should be followed as given in BS8233:1999. A scheme of sound insulation should be presented with the planning application to ensure that the required internal noise levels can be achieved within the new development with regard to music and ancillary noise associated with the King's Cross Central scheme.

## Sound Management

A baseline noise monitoring protocol has been proposed by the show producers for the proposed King's Cross Theatre. Residential properties, (as shown below) have been identified as the closest properties to the venue, and the most likely to be disturbed by noise levels generated by shows.





## Noise Management Mitigation

The Railway Children is not a performance with high sound levels.

Previous experience of other shows in similar tented structures show that reduction in sound from the performances can be achieved through the use of directional loudspeaker equipment, with the tent structure providing 10dB attenuation.

The event layout has been designed to ensure that the majority of the sound system is facing away from the nearest residences (to the north and east). Large existing buildings, as well as the natural ground layout mean that much if not all of the structure and sound system are incredibly shielded from all other locations. In addition sound screening will be incorporated around plant equipment if sound source issues are identified once the site is built and commissioned.

Theatre Tracks Limited will work in consultation with Camden Environmental Health Officers to ensure that the sound generated is not an issue for those living in the nearby locality.

## Communications

Theatre Tracks Limited will write to the local residents in the local residential premises which are identified as being sensitive to the temporary venue. The letter text will be in a pre-agreed format and provide information of the show timings, telephone numbers that residents can use to contact the site management team in the event that they have an issue or question as well as details of who enquiries can be passed to at Theatre Tracks Limited and Camden Council (see document D-TRC-KX-14-017).

## Monitoring

Prior to the first performance of The Railway Children, sound propagation testing will be completed to set the music noise limit within the tent to meet the environmental noise limits at the community locations. This will be completed during the rehearsals period in the lead up to the opening night of the performance. Directional control of the line array sound system and fine tuning will also be carried out at this time in order to obtain the maximum sound level inside the tent whilst complying with external limits. This will be completed with both Argent LLP and Camden Council.

The first two shows will be monitored by the Theatre Tracks Limited technical production team to ensure that the external noise limits are being met.

Discussion will take place with the Environmental Health Department on the best form of action to be taken if complaints of noise arise from the venue. On request, the complaints log will be issued to the local authority. The log will include the time, nature and location of the complaint including the action that was taken. Background sound tests were taken on the evening of October 9<sup>th</sup> 2014.

Location	Direction	Distance	Background sound levels LAeq 15minutes	Minimum sound level LAeq
York Central	East	125m	68dBA	54.3dBA
Block J	North East	210m	58dBA	49.6dBA

## Calculations

Background level at nearest property

Having examined our own survey we have concluded that for the purposes of this calculation a prudent background sound level figure at the nearest property (York Central) can be seen to be 50 db. This is lower than both our average reading, and the minimum reading taken.

Level transmitted at Peter Pan in Kensington Gardens

Given the difficulty in assessing the as yet, unbuilt venue, we have chosen to use data from previous events, which show that the show will run at no more than 90dbA inside the venue at the mix position. This kind of noise level in the auditorium would be appropriate and expected based on the audience makeup and on the basis of the same show, in the same configuration and same sound system as 2010.

#### Attenuating factors

The manufacturer states that a loss of 10db can be expected through the tent fabric

Sound is reduced over distance using this equation  $20 \times \text{LOG}(\text{distance})$

The nearest property is 125 metres from the tent so :-

$$20 \times \text{LOG}(125 \text{ metres}) = 41.93\text{dB}$$

This means that theoretically we will lose around 41.93 decibels over the 125m between the marquee and the nearest building

Estimated sound level received at the nearest property from The King's Cross Theatre

Sound received at the nearest property = Source – Attenuating factors

$$90\text{db} - (10\text{db} + 41.93) = 38.06\text{dB}$$

Difference between background noise and noise received from The King's Cross Theatre at the nearest property

$$38.06\text{db} - 50\text{db} = -11.94\text{dB}$$

This means that theoretically the sound from the show will be lower than that of background noise, given the distance that it has to travel and the relatively high background level (mainly from traffic noise around the area). It can be seen that the theoretical levels are below those required by BS8233:1999.

This is however, only theoretical. Once the theatre site has been built and the sound system installed, it will be possible for sound readings and monitoring to be undertaken. Team members from the Environmental Health Department will be invited to the sound testing of the venue to take readings and work with the production team to ensure compliance with the levels required.

## Glossary of Terms

### Definitions and Units

Noise is defined as unwanted sound. The range of audible sound is from 0dB to 140dB, which is taken to be the threshold of pain. The sound pressure detected by the human ear covers an extremely wide range. The decibel (dB) is used to condense this range into a manageable scale by taking the logarithm of the ratio of the sound pressure and a reference sound pressure.

The unit of frequency is Hz. 1 Hz is one pressure fluctuation in one second. The frequency response of the ear is usually taken to be about 16Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high frequency component of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most used and which correlates best with the subjective response to noise is the dB(A) weighting. This electronic filter matches the variation in the frequency sensitivity of the meter to that of the human ear. This is an internationally accepted standard for noise measurements.

The ear can just distinguish a difference in loudness between two noise sources when there is a 3dB(A) difference between them. Also when two sound sources of the same noise level are combined the resultant level is 3dB(A) higher than the single source. When two sounds differ by 10dB(A) one is said to be twice as loud as the other.

### Sound Level, dB(A) Environmental Condition

0 – 10	Threshold of hearing
10 - 20	Broadcasting Studio
20 – 30	Bedroom at night
30 – 40	Library
40 – 50	Living room urban area
50 – 60	Typical Business Offices
60 – 70	Conversation Speech
70 – 80	Average traffic on street corner
80 – 90	Inside bus
100 – 110	Alarm Clock (1m away)
110 – 120	Loud car horn (1m away)
120 – 130	Pneumatic drill (1m away)
130 - 140	Threshold of pain

The subjective response to a noise is dependent not only upon the sound pressure level and its frequency, but also its intermittency. Various statistical indices have been developed to try and correlate annoyances with the noise level and its fluctuations in a changing noise environment. The indices and parameters used in this report are defined below:

LAeq: Equivalent Continuous Sound Pressure Level The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation. It is in effect the energy average level over the specified measurement period (T) and is the most widely used indicator for environmental noise.

LAN: the A-weighted sound level exceeded for N% of the measurement period. In BS7445 the LA90 is used to define the background noise level, i.e. the noise that would remain once all local noise sources were removed. The LA10 gives an indication of the upper limit of fluctuating noise and is used in the assessment of road traffic noise.

## Contacts and Further Information

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