BUROHAPPOLD ENGINEERING

# Design Note

Project St Giles' Circus
Subject Extension of hours - noise assessment
Project no 032930
Date 2 February 2017

| Revision | Description | Issued by | Date |
|---|---|---|---|
| 00 | Design note – draft for approval | MH | 2/2/2017 |

## 1 Background

### 1.1 Background

The London Borough of Camden granted planning permission for a development on the 'St Giles Circus' site on the 31st March 2015 (Planning Application No 2012/6858/P). This development comprises a number of elements including two new buildings facing Centre Point Tower and a third on Denmark Place. These provide access and circulation connections to a basement 'Event Gallery' and to an 'Urban Gallery' at ground floor level.

Since the granting of planning permission a detailed Licensing Policy submission has been made to Camden's Licensing Committee to support and extension of operating hours for the licensable premises. As part of this there was an increase in capacity of the Event Gallery from 800 persons to 2000 (excluding staff). The license was subsequently approved.

With respect to this approval, a Section 73 Application is being prepared to amend Planning Condition #49 to read

*49 The ground floor 'urban gallery' and the basement venue shall have a maximum capacity of 550 people and 2000 people respectively*

and to apply for the deletion of Planning Condition #50 which restricts the frequency of maximum capacity events within both the urban gallery and the basement venue.

A further Section 73 Application is being prepared to amend Planning Conditions #33 and #34 to read

*33 None of the A1, A3 or A4 uses hereby permitted shall occur outside of 08:00 to 01:00 Monday to Sunday. No members of the public shall be permitted within the premises 30 minutes after the latest time for the provision of licensable activities*

*34 None of the Sui Generis uses (the urban gallery and basement venue) hereby permitted shall occur outside of the following times: 09:00-23:00 Monday to Thursday, 09:00-midnight Friday and Saturday; and 09:00-22.30 Sunday. On 104 occasions per year the Sui Generis uses may operate within the following times: 09:00 – 02:00. No members of the public shall be permitted within the premises 30 minutes after the latest time for the provision of licensable activities.*

The variations to Planning Conditions #33 and #34 reflect the extension of hours as approved by the recently granted licenses for the site. The variations to Planning Conditions #33 reflect a variation in licensing hours as follows:

| | | |
|---|---|---|
| Monday to Saturday | From: 08:00 to 23:30 | To: 08:00-01:00 |
| Sunday | From: 11:00 to 22.30 | To: 08:00-01:00 |

In addition, the time during which the premises are being vacated by the public is extended by 30 minutes.

The variations to Planning Conditions #34 reflect a variation in licensable hours as follows:

| | | |
|---|---|---|
| Monday to Wednesday | From: 09:00 to 23:30 | To: unchanged |
| Thursday | From: 09:00 to midnight | To: 09:00 to 23:30 |
| Friday to Saturday | From: 09:00 to midnight | To: unchanged |
| Sunday | From: 09:00 to 22:30 | To: unchanged |
| Monday to Sunday | on 104 occasions from 09:00 – 02:00. | |

In addition, the time during which the premises are being vacated by the public is extended by 30 minutes.

## 1.2 Purpose of this Design Note

This Design Note provides a noise assessment to accompany the Section 73 Applications described above.

Specifically, it considers the noise impact of the event gallery once its capacity is extended to 2000 persons (excluding staff) and:

- Related A1 (shops), A3 (restaurant and cafes) and A4 (drinking establishments) licensable hours are extended to 01:00 hours Monday to Sunday and these licensed premises open 3 hours on Sunday mornings at 08:00 hrs.
- Patrons have a further 30 minutes to leave such A1, A3 and A4 premises after the latest permitted time for licensable activities
- Sui generis uses of the event gallery are extended from midnight to 02:00hrs on 104 occasions in a year
- Patrons have a further 30 minutes to leave such the event and urban galleries after the latest permitted time for licensable activities

## 1.3 Statement of professional competence

This noise assessment has been prepared by Dr Matthew Harrison CEng, MIOA, MIMechE, Phd.

Matthew is a competent person for the assessment of noise impact being both a Chartered Engineer and a corporate member of the Institute of Acoustics. Matthew trained in acoustics with a BEng(Hons) and a PhD, both obtained from the Institute of Sound and Vibration Research at the University of Southampton. Matthew has more than 25 years of postgraduate experience in acoustics and is the Group Director and discipline leader for acoustics at Buro Happold Engineering. Matthew has been the lead acoustician on the St Giles' Circus project since February 2014.

### 1.4 Planning conditions relating to noise

There are a number of planning conditions applied to the St Giles' Circus development that relate to noise. For convenience, these are listed in Appendix A.

Of these planning conditions, the following are relevant to the increase in capacity of the event gallery and the extension of the licensing hours:

| | |
|---|---|
| Planning Condition #20 | Sound insulation to adjacent residential units |
| Planning Condition #21 | Extract ventilation noise |
| Planning Condition #23 | Plant noise |
| Planning Condition #24 | BS8233 / WHO internal noise standards for residential units |
| Planning Condition #26 | Noise management plan |

The first three relate to the engineering of the event gallery, urban gallery and the buildings and plant that support the operation of these.

The final planning condition relates to the human activity noise involved in the operation of the Event Gallery and the Urban Gallery. How human activity noise will be affected by an increase in venue capacity and extension in hours, notably the noise created by patrons queueing to enter the venue and then dispersing after they leave is an important part of this noise assessment.

Additional controls are secured through the Section 106 legal agreement in the form of a Venue Managements Plan and event specific Event Management Plans.

These two classes of noise generation (engineering and human activity) are considered in detail in the noise assessment provided in Section 2.

# 2 Noise assessment

### 2.1 Engineering noise sources

#### 2.1.1 List of landlord and tenant items

As set out in Section 1.4 there are sources of noise relating to the increase in venue capacity and the extension in licensing hours that originate from the engineering of the buildings and their plant. Specifically these are:

Landlord engineering items

- Emergency smoke extract fans for the event gallery and other communal areas: located on the roof of Building A and on the roof of 22 Denmark Street
- Chillers on roof of Building C
- Combined Heat and Power (CHP) unit in Building D plant room
- Emergency generator in Building D plant room

Tenant engineering items

- Air handling units (AHUs) in Building A level 4 plant rooms
- AHUs in Building B Level 1 plant room
- AHUs in B3 basement of the Event Gallery with supply and extract louvers on the rear façade of Building D
- Cooling systems for LED screens in Event Gallery and Urban Gallery

### 2.1.2 Proof of acoustic design at RIBA Stage 4

The engineering noise sources listed in Section 2.1 underwent proof of principal acoustic design at RIBA Stage 4, for 2000 person capacity in the Event Gallery as per the following report:

St Giles' Circus
Stage 3 – Zone 1&2 acoustics
Buro Happold
May 2016

The adopted design standards are listed in Table: 1 alongside the noise level at the nearest noise sensitive receiver for which a proof of principle design was provided by Buro Happold in the RIBA Stage 4 report.

| **Plant item** | **Design standard** | **Proof of principal freefield design noise level at nearest residential receiver** |
|---|---|---|
| Building D CHP unit | 5 dB below minimum expected night time $L_{90}$ | $L_{Aeq}$ 35 dBA at rear of 25 Denmark St |
| Building C chillers | 5 dB below minimum expected night time $L_{90}$ | $L_{Aeq}$ 42 dBA at rear of 23 Denmark St |
| Event gallery AHUs (sized for 2000 person capacity) | 5 dB below minimum expected night time $L_{90}$ | $L_{Aeq}$ 35 dBA at rear of 25 Denmark St |
| Building A AHUs | 5 dB below minimum expected night time $L_{90}$ | $L_{Aeq}$ 44 dBA at rear of 18-21 Denmark St |
| Building B AHUs | 5 dB below minimum expected night time $L_{90}$ | $L_{Aeq}$ 35 dBA at rear of Building D |
| LED cooling screens for Urban Gallery / Event Gallery | 5 dB below minimum expected night time $L_{90}$ | $L_{Aeq}$ 44 dBA at rear of 18-21 Denmark St |
| Life systems emergency generator | 10 dB above minimum daytime $L_{90}$ for monthly testing | $L_{Aeq}$ 50 dBA at rear of 25 Denmark St |

**Table 1** **Proof of principle acoustic design (summarised from Buro Happold Stage 4 acoustic report)**

### 2.1.3 Measured background noise levels

Planning Condition #23 relates permissible plant noise levels to the prevailing background noise level. Background noise levels were measured as part of the environmental assessment for the project. The results are reproduced in Tables 2 and 3.


**Figure 1** **2012 noise survey locations (Source: St Giles' Circus Environmental Statement)**

**Daytime (free field levels)**

| Position | $L_{Aeq,\ 16\ hour}$ dB | $L_{Amax}$ dB | $L_{Amin}$ dB | Lowest $L_{A90,\ 15\ min}$ dB | Lowest $L_{A10,15\ min}$ dB |
|---|---|---|---|---|---|
| 1 | 69 | 91 | 61 | 63 | 71 |
| 2 | 72 | 91 | 59 | 62 | 75 |
| 3 | 64 | 93 | 55 | 58 | 66 |
| 4 | 73 | 90 | 55 | 60 | 76 |
| 5 | 73 | 85 | 60 | 66 | 75 |
| 6 | 64 | 93 | 53 | 54 | 74 |
| 7 | 62 | 90 | 53 | 54 | 73 |

**Table 2 2012 daytime noise survey results reproduced from St Giles' Circus Environmental Statement**

**Night time (free field levels)**

| Position | $L_{Aeq,\ 8\ hour}$ dB | $L_{Amax}$ dB | $L_{Amin}$ dB | Lowest $L_{A90,\ 15\ min}$ dB | Lowest $L_{A10,15\ min}$ dB |
|---|---|---|---|---|---|
| 1 | 65 | 80 | 49 | 52 | 67 |
| 2 | 70 | 95 | 55 | 57 | 71 |
| 3 | 63 | 83 | 48 | 50 | 63 |
| 4 | 66 | 82 | 48 | 52 | 68 |
| 5 | 70 | 89 | 54 | 57 | 73 |
| 6 | 62 | 83 | 54 | 54 | 77 |
| 7 | 61 | 90 | 53 | 54 | 76 |

**Table 3 2012 daytime noise survey results reproduced from St Giles' Circus Environmental Statement**

The lowest free field background noise levels measured in the 2012 survey were $L_{A90}$ 54 dBA during the day and $L_{A90}$ 52 dBA during the night. Supplementary noise measurements were undertaken by the project team in June 2016. **It is noteworthy that the minimum night time background noise level was recorded on the roof of 24 Denmark Street at 03:00hrs on each of the three consecutive nights that noise measurements were made. The minimum $L_{90}$ recorded was 47 dBA at 03:00hrs. At 02:00hrs, the minimum background noise level was $L_{90}$ 49 dBA.**

### 2.1.4 Assessment of engineering noise sources

Table: 1 shows that the RIBA Stage 4 proof of principal acoustic designs achieved freefield nigh time noise levels at the nearest residential noise receiver in the range $L_{Aeq}$ 35-44 dBA.

All are at least 5dB below the lowest night time background noise level recorded in 2012 and are also at least 5 dB below the 02:00hrs background noise level measured in 2016.

**Therefore, the RIBA Stage 4 proof of concept acoustic design for 2000 persons in the Event Gallery demonstrate that Planning Condition #23 will be met even with extended licensing hours.**

## 2.2 Human activity noise sources

### 2.2.1 Noise management plan

Planning Condition #26 refers to a noise management plan. However, the operational management policies that will determine the human activity noise arising from the increase in venue capacity and extension in hours are contained within:

- The Venue Management Plan (Charcoal Blue, 2012)
- Event Gallery crowd flow study (Buro Happold, 2016)

as these deal specifically with arrangements for patrons queueing to enter the venue and then dispersing after they leave.

The Venue Management plan sets out the proposed method of operation for the Event Gallery and any appointed independent operator will be required to adopt the core principles set out therein. In addition, there will be a requirement for each event organiser wishing to hire the Event Gallery to produce an Event Management Plan. This provides a double assurance that the issue of human activity noise around the venue will be considered diligently.

The Venue Management Plan is validated by the findings of the Event Gallery crowd flow study. Figures: 2 and 3 from that study show how the the maximum extent of queueing for a 2000 capacity crowd could be accommodated in two ways. Option 1 shows the whole 500 person queue contained within the Urban Gallery and the pedestrian link between Buildings A and B: both areas are screened from any residential units.

Option 2 shows that the same size of queue can still be accommodated when the Urban Gallery cannot be used for queuing for any reason. In this case, 350 persons are screened away from residential units with the remainder queuing along Denmark Street.

Figure: 4 shows the egress routes for a 2000 capacity crowd. These are in directions away from residential units.


**Figure 2** **25% of 2000 capacity crowd queueing – Option 1 arrangement (Source: Buro Happold)**

**Figure 3** **25% of 2000 capacity crowd queueing – Option 2 arrangement (Source: Buro Happold)**

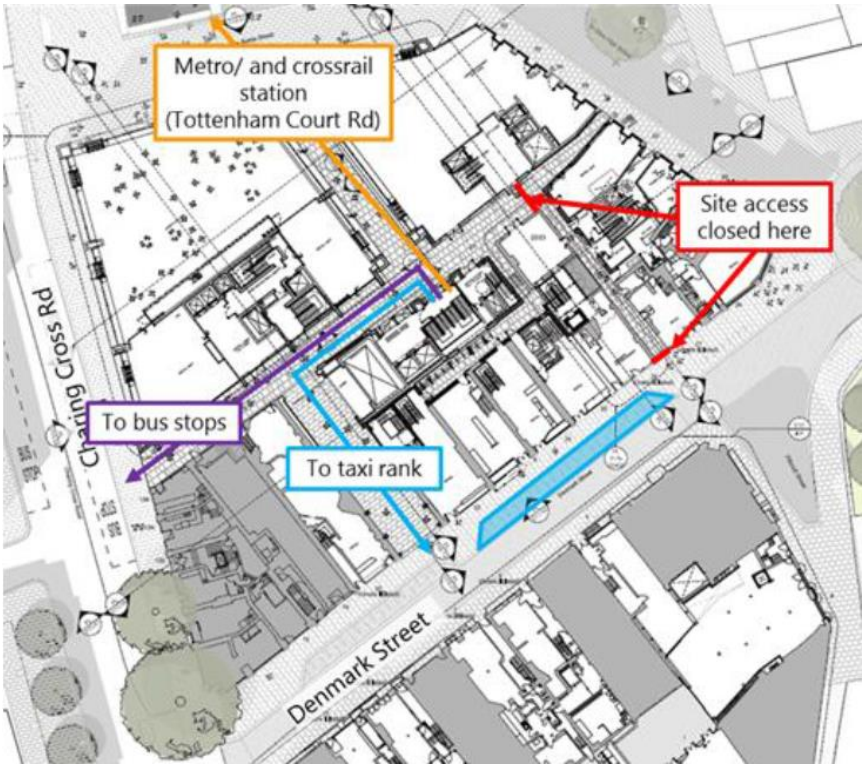


**Figure 4** **2000 capacity crowd – egress routes (Source: Buro Happold)**

## 2.3 Assessment of human activity noise sources

The queueing and egress arrangements for a 2000 capacity crowd described in the Section 2.1 above, and under-pinning the Venue Management Plan, demonstrate that arrangements can be put in place to manage a 2000 capacity crowd; directing them away from residential areas and into areas that are screened from residential units. Maximum use of covered and internal spaces reduces the number of people queueing in open air and those that do are kept away from residential units.

Table: 2 and Table: 3 show that daytime (0700-2300hrs) noise levels in the vicinity of St Giles' Circus areas are in the range $L_{Aeq}$ 62 – 73 dBA. These levels are 10 dB above the expected voice level of individuals conversing. Therefore, assuming that the queue will consist of people conversing in small groups and others waiting in silence, queuing will not have a

significant impact on local noise levels. In addition, sound from people in the queue will be effectively masked by other local noise sources (road traffic noise in particular) and therefore there is a low probability of annoyance to residents from the sound of people queueing.

The impact of activity noise caused by egress will be mitigated through the effects of dispersal across the site (Figure: 3) and will blend into the general activity noise in a part of London which is set to become significantly busier at night once Crossrail opens.

# 3 Summary and conclusions

## 3.1 Summary

The RIBA Stage 4 proof of concept acoustic design undertaken for 2000 persons in the Event Gallery demonstrate that Planning Condition #23 will be met even with extended licensing hours.

It is evident that the management of issues concerned with human activity noise are well developed for the case of a 2000 capacity crowd and therefore the impact of activity noise will not be significant.

## 3.2 Conclusions

The noise assessment set out above demonstrates that, because the St Giles' Circus development has been engineered to accommodate significant numbers of visitors, the noise impact of the increase in capacity of the Event Gallery and the proposed extension in licensable hours is not significant.

# 4 Appendix A

There are a number of planning conditions applied to the St Giles' Circus development that relate to noise. For convenience, these are listed here.

**Planning condition #8**

*None of the development hereby permitted shall be commenced until detailed design and method statements for all of the ground floor structures, foundations and basements and for any other structures below ground level, including piling (temporary and permanent), have been submitted to and approved in writing by the Local Planning Authority which:*

*(a) Accommodate the proposed location of the Crossrail structures and tunnels,*
*(b) Accommodate ground movement arising from the construction thereof, and*
***(c) Mitigate the effects of noise and vibration arising from the operation of the Crossrail railway within the tunnels.***

*The method statements to be submitted under this condition shall include arrangements to secure that, during any period when concurrent construction is taking place of both the development hereby permitted and of the Crossrail structures and tunnels in or adjacent to the site of that development, the construction of the Crossrail structures and tunnels is not impeded.*

*The development shall be carried out in all respects in accordance with the approved design and method statement, and all structures and works comprised within the development hereby permitted which are required by the approved design statements in order to procure the matters mentioned in paragraphs (a) to (c) of this condition shall be completed, in their entirety, before any part of the building[s] hereby permitted is/are occupied.*

**Planning condition #10**

*The development hereby permitted shall not be commenced until detailed design and method statements (developed in consultation with London Underground) for all of the foundations, basement and ground floor structures, or for any other structures below ground level, including piling (temporary and permanent), have been submitted to and approved in writing*

*by the Local Planning Authority which:*

- *provide details on all structures*
- *accommodates the location of the existing London Underground structures and tunnels (including the Crossrail infrastructure)*
- *accommodates ground movement arising from the construction thereof*
- ***mitigates the effects of noise and vibration arising from the adjoining operations within the structures and tunnels and***
- *provide details on the impact on security features within the 'public realm'*

*The development shall thereafter be carried out in all respects in accordance with the approved design and method statements, and all structures and works comprised within the development hereby permitted which are required by the approved design statements in order to procure the matters mentioned in paragraphs of this condition shall be completed, in their entirety, before any part of the building hereby permitted is occupied.*

**Planning condition #20**

*Before the residential units are occupied sound insulation shall be provided between all B1, A1, A3, A4 floorspace or plant rooms to adjacent floors in the same building or adjacent properties on the same floor, in accordance with a scheme to be submitted to and approved in writing by the Local Planning Authority prior to each phase of the development. The use shall thereafter not be carried out other than in complete compliance with the approved scheme.*

**Planning condition #21**

*Prior to the first use of the premises for the basement venue, A3 or A4 floorspace hereby permitted, full details of a scheme for extract ventilation, including manufacturers specifications, noise levels and attenuation, shall be submitted to and approved by the Local Planning Authority in writing. The use shall not proceed other than in complete accordance with such scheme as has been approved. All such measures shall be retained and maintained in accordance with the manufacturers' recommendations. In the event of no satisfactory ventilation plant and / or machinery being provided, no primary cooking shall take place on the premises.*

**Planning condition #22**

*No plant or machinery (other than that otherwise approved under condition no. 21 shall be installed on the external parts of the buildings other than in the areas identified within the approved plans.*

**Planning condition #23**

*Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement ($L_{A90}$), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10dB(A) below the $L_{A90}$, expressed in dB(A).*

**Planning condition #24**

*Glazing to the new residential units shall be sufficient to achieve internal noise levels of LAeq, 8hour 30dB in bedrooms and LAeq 16hour 35dB in living rooms as per BS 8233 and the WHO internal noise levels guides and all shall be permanently retained and maintained thereafter.*

**Planning condition #26**

*Prior to occupation of any of the approved uses, a Noise Management Plan shall be submitted to and approved in writing by the Local Planning Authority, having regard to condition 27 and including a noise mitigation strategy, detailing:*

- *The location and direction of any speakers in the urban gallery;*
- *Method of transporting deliveries, refuse and associated servicing to and from the service bays on Denmark Street, including any bottle crushing;*
- *Location of smoking areas;*
- *Location of external tables and chairs;*
- *The operation of the upper floor louvers to building A and B; and*

- *The use of the residential roof terrace at 21-25 Denmark Street.*

**Planning conditions #27 - #29**

*Noise levels emitted from the use of the urban gallery (from the digital screens and associated speakers) shall be as follows:*

***27 Between 07:00 and 23:00 hours***

*1. The A-weighted equivalent continuous noise level (LAeq) emanating, as measured one metre from any facade of any noise sensitive premises over a 5 minute period when the screens and speakers are in use, shall not increase by more than 5dB as compared to the same measure, from the same position and over a comparable period with the screens and speakers not in use.*

*2. The unweighted equivalent noise level (Leq) in the 63Hz Octave band, measured using the "fast" time constant, inside any living room of any noise sensitive premises, with the windows open or closed, over any five minute period with the screens and speakers in use, should show no increase as compared to the same measure, from the same location(s) and over a comparable period with the screens and speakers not in use.*

***28 Between 23:00 hours and midnight***

*1. The A-weighted equivalent continuous noise level ($L_{Aeq}$) emanating, as measured one metre from any facade of any noise sensitive premises over a 5 minute period when the screens and speakers are in use, shall not increase by more than 3dB as compared to the same measure, from the same position and over a comparable period with the screens and speakers not in use.*

*2. The A weighed equivalent noise level ($L_{Aeq}$) in the 63Hz Octave band, measured using the "fast" time constant, inside any living room of any noise sensitive premises, with the windows open or closed, over any five minute period with the screens and speakers in use, should show no increase as compared to the same measure, from the same location(s) and over a comparable period with the screens and speakers not in use*

***29 Between midnight and 07:00 hours***

*1. No sound emanating from the operation of the screens or speakers shall be audible a metre from the facade of the nearest noise sensitive premises.*

**Planning condition #30**

*No music from the roof terraces to Building A or B, hereby approved, shall be audible from 1m outside of or on the balcony of the nearest noise sensitive façade.*

**Planning condition #31**

*The upper floor louvers and ground floor shopfront to Building A and Building B shall be closed between midnight and 07:00 every day of the week.*

**Planning condition #33 (to be amended as per Section 1.1 above)**

*[None of the A1, A3 or A4 uses hereby permitted shall occur outside of 08:00 to 23:30 Monday to Saturday and 11:00 to 22:30 Sundays and no customers shall be permitted within these premises outside of the approved hours of use.]*

**Planning condition #34 (to be amended as per Section 1.1 above)**

*[None of the Sui Generis uses (the urban gallery and basement venue) hereby permitted shall occur outside of the following times: 09:00-23:30 Monday to Wednesday, 09:00-midnight Thursday, Friday and Saturday; and 09:00-22.30 Sunday and no customers shall be permitted within these premises outside of the approved hours of use.]*

**Planning condition #35**

*The approved roof terraces at sixth floor level to Building A (fronting Denmark Place and Charing Cross Road) and at fourth floor level to Building B (fronting Andrew Borde Street and the new pedestrian link) shall not be used outside the hours of 08:00 to 22:00, 7 days a week.*

**Planning condition #49 (to be amended as per Section 1.1 above)**

*[The ground floor 'urban gallery' and the basement venue shall have a maximum capacity of 550 people and 800 people respectively.]*

**Planning condition #50 (to be deleted as per Section 1.1 above)**

*[The ground floor 'urban gallery' and the basement venue shall have a maximum of one event per month where both venues are used together for the same event to maximum capacity and a maximum of two events per week where each venue is used separately to a maximum capacity of 550 and 800 people respectively.]*