

5<sup>th</sup> October 2012

**Technical Report**  
**DAA12031943-05**

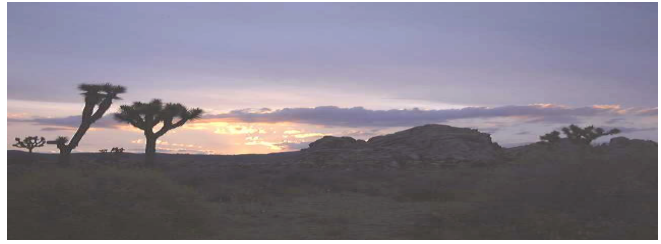
**Acoustic Report**

**Project:**      **New Premier House**  
                     **150 Southampton Row**  
                     **Bloomsbury**  
                     **London W1B 5AL.**

## Issue Log

### Revisions

000	28/06/12	Information
001	03/07/12	General Issue
002	16/07/12	Plans up-date
003	26/09/12	Plans up-date
004	27/09/12	Roof Plan Added
005	05/10/12	NPPF review noise emission cal's added



**5<sup>th</sup> October 2012**

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150 Southampton Row  
Bloomsbury  
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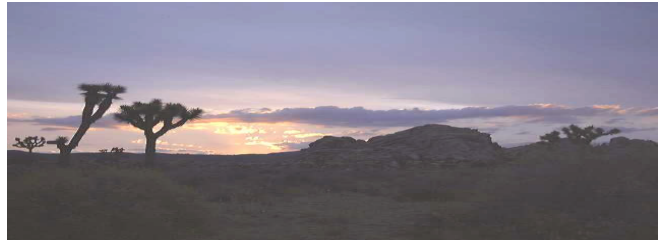
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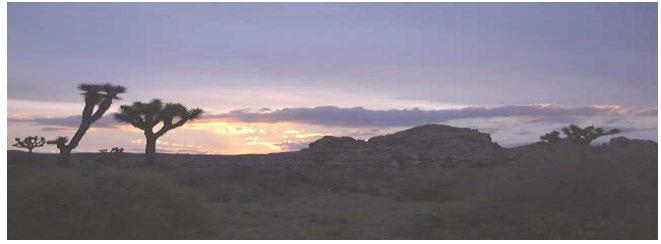
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## **1.0 EXECUTIVE SUMMARY**

Although the NPPF was introduced in March 2012 with paragraph 123 relevant to this development, it is still prudent that the design practice follow the previous statutory requirement because the new framework does not provide specific noise criteria.

Therefore this report has been prepared with reference to the requirements of Camden Policy DP28 and CPG6 Ch4. The report summarises the results of the environmental noise and vibration survey.

The levels of background vibration were very low and not perceivable in the building.

The report also summarises a PPG24 assessment for reference.

The development site would have been classified in the Noise Exposure Category (NEC) C.

In order to mitigate external noise an acoustic review has been carried out on the facade.

Glazing noise reduction levels have been advised.

In order to achieve optimum internal noise levels secondary glazing or potentially comparable systems are required.

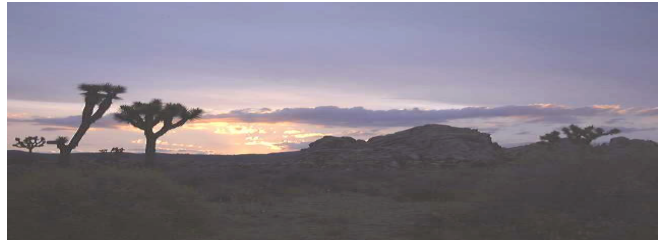
The internal noise levels will comply with the 'reasonable' standard for bedrooms as described in BS 8233:1999.

An assessment has been carried out on the accommodation internal structures against 'Building Regulation ADE'.

The internal structures will exceed the requirements of ADE. Sample test reports covering post completion acoustic testing are included for reference.

An acoustic review has been carried out on the separating floor structure between the commercial units and accommodation units on the first floor.

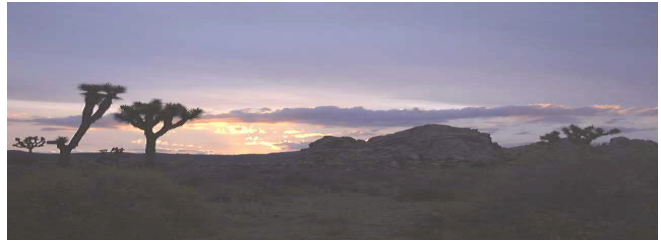
The floor slab and floor treatment above will provide an overall noise reduction 10 dB greater than the requirements of ADE.



The report also recommends noise criteria for mechanical services plant in order to comply with Camden Council current noise policy.

The mechanical plant noise shall be attenuated to over 10dB below the lowest recorded background noise level  $LA_{90}$  at the nearest adjacent noise sensitive receptor, in the central light well and adjoining light well. This complies with Camden Council noise policy.

Refer to the 'Noise Emission Calculations in Section 10.3.



## 2.0 INTRODUCTION

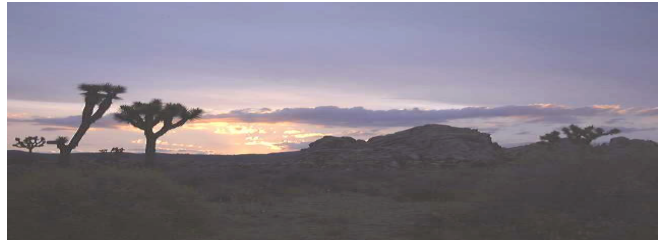
### 2.1 Background

Deane Austin Associates LLP (DAA) has been appointed to undertake an environmental noise & vibration survey and acoustic review at 150 Southampton Row, London, WC1B 5AL.

### 2.2 Scope

The scope of this report includes:

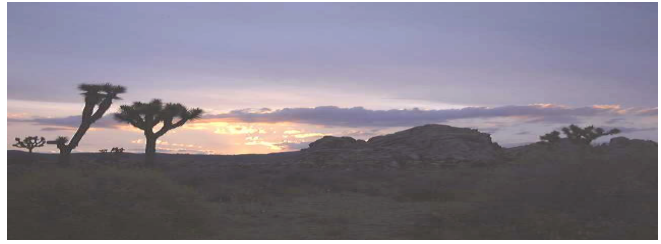
- Determine the prevailing environmental noise & vibration levels affecting the site due to prevailing noise sources.
- Assess vibration levels at the site.
- Assess the results against NPPF & PPG24.
- Review internal noise against BS8233:1999.
- Review of the facade, glazing and internal noise levels.
- Review internal structures against Building Regulations Approved Document E.
- Review the noise emission from the proposed mechanical services plant and impact on adjacent properties.



## 3.0 REFERENCES

The following articles and publications have either been specifically referred to in the body of the report or have informed our analysis and conclusions.

- 3.1 BS7445:2003 Description and measurement of environmental noise.
- 3.2 BS8233:1999 Sound insulation and noise reduction for buildings – Code of practice.
- 3.3 BS4142:1997 Rating Industrial Noise affecting mixed residential and industrial areas
- 3.4 BS6472:1992 Evaluation of human exposure to vibration in buildings.
- 3.5 Camden Planning Guidance CPG 6 (4) and Local Development Framework DP28 Noise & Vibration.
- 3.6 Planning Policy Guidance 24 (PPG24).
- 3.7 Building Regulations 2010 Approved Document E.
- 3.8 NPPF March 2012.



## 4.0 SITE DESCRIPTION

### 4.1 Building:

The property is a seven storey office building.

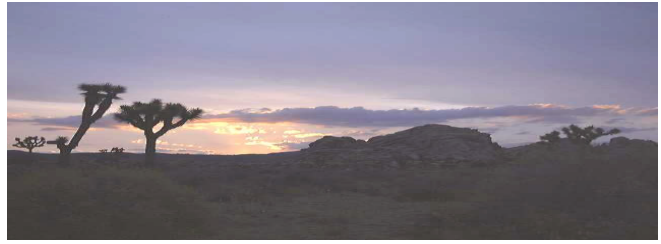
### 4.2 Location:

The building is located on Southampton Row (A4200) near to the junction of Guildford Street.  
The building is in a mixed residential and commercial area.



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#### **4.3 Noise Sources:**

**Traffic Noise:** The dominant noise source in this area is traffic on A4200 Southampton Row and surrounding area.  
**Aircraft Noise:** The site is exposed to intermittent aircraft and helicopter movements.  
**Mechanical Services Plant:** Mechanical services plant is operating adjacent buildings.

### **5.0 SURVEY METHODOLOGY**

**Both manned and unmanned environmental noise & vibration surveys were undertaken at the site.**

**The surveys were conducted between Thursday 21<sup>st</sup> to Monday 25<sup>th</sup> June 2012.**

#### **5.1 Noise Survey.**

##### **5.1.1 Continuous noise level logging:**

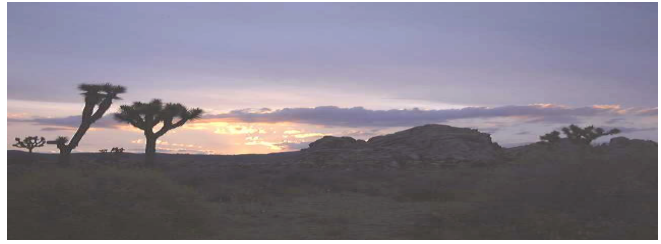
**The dominant noise source is road traffic along the front elevation of Southampton Row.**

##### **5.1.2 General noise measurements:**

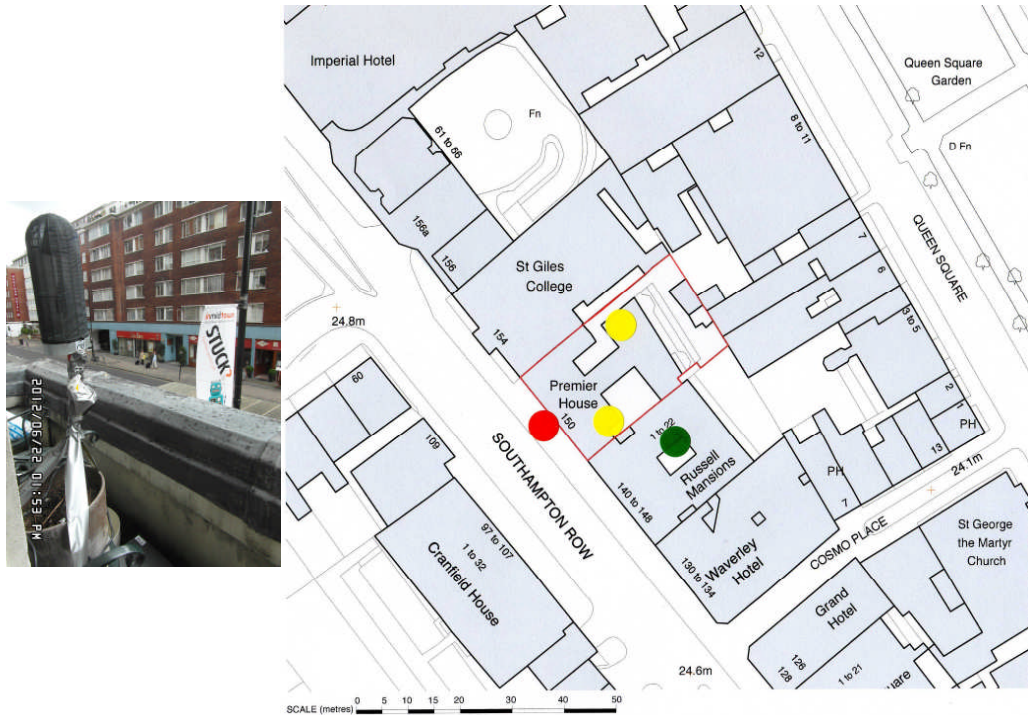
**Measurements were recorded at different levels of the front facade to assess the variation of noise levels around the site.**

**Measurements were recorded at roof level near the nearest sensitive noise receptors.**

**The results of the sample measurements are used in the PPG24 and BS4142 assessments.**



## 5.2 Measurement Positions:



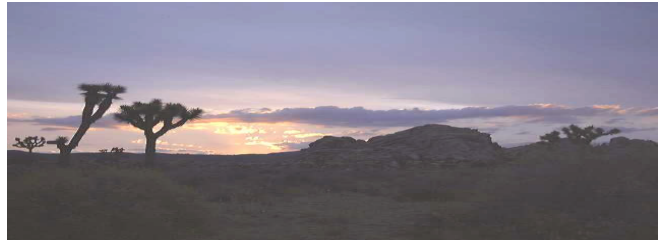
### Key:

- Primary Test Location.
- Secondary Test Locations.
- Nearest Affected Sensitive Windows



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## 5.3 Survey Equipment:

The noise data was obtained using the following instruments: Svantek SVAN 957 Environmental Noise & Vibration Meter complying with IEC 61672:2002, TYPE1. IEC 61260:2001, Type 1. ISO 8041-1: 2005. ISO 108816-1: 1995. Serial No: Calibration Cert: 20625.

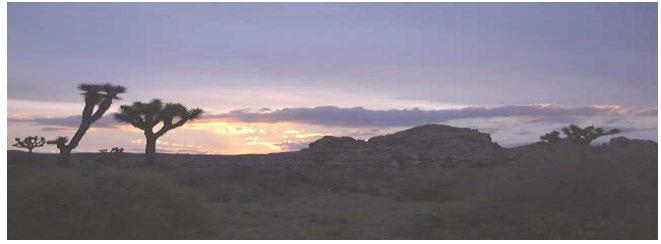
CEL 262 Environmental Noise Meter complying with Type 1 specification of BS EN 60651:1994 and BS EN 60804:1994.

CEL 573 Type 1. Precision computing sound and vibration level meter was used for sample measurements. Serial No: 3/081789.

Nomis 5400 Seismograph. Serial No: 4146.

The meters were calibrated before and after the survey. There was no deviation.





#### 5.4 Noise Indices:

The equipment was set to record a continuous series of broadband sound pressure levels for 5 minute and 15 minute periods.

The sound pressure level measurements recorded included the following noise percentiles:

- $L_{Aeq, T}$  The 'A' weighted equivalent continuous sound level over the period.
- $L_{AFmax, T}$  The 'A' weighted maximum sound pressure level recorded over the time period.
- $L_{A10, T}$  The 'A' weighted sound pressure level exceeded for 10% of the time period. Indicative of traffic noise.
- $L_{A90, T}$  The 'A' weighted sound pressure level exceeded for 90% of the time period. Indicative of background noise.

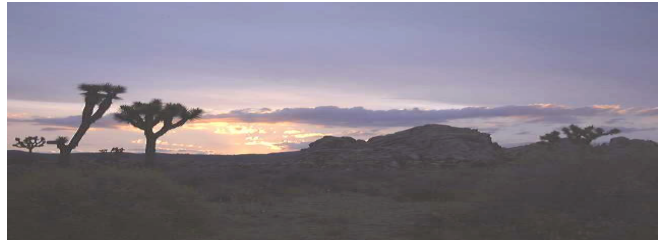
Detailed explanation of noise indices can be found in BS7445:Part1:2003. *'Description and measurement of environmental noise, Part 1. Guide to quantities and procedures'*.

#### 5.5 Weather:

The weather conditions during the survey period were mild with occasional precipitation.

Wind was generally light except for the afternoon and evening of Friday 22<sup>nd</sup>. The data recorded during this period has been discounted.

The conditions for the remainder of the survey were considered suitable for obtaining representative noise level measurements.



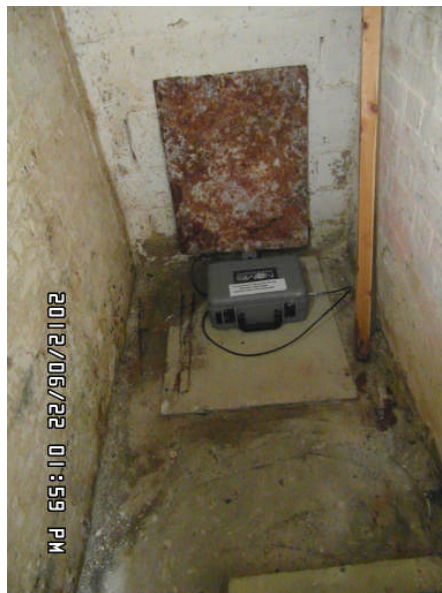
**5.6 Vibration Survey:**

**Vibration measurements were undertaken in the basement along the front elevation.**

**The sample vibration readings were obtained using: Svantek SVAN 957 Environmental Noise & Vibration Meter complying with IEC 61672:2002, TYPE1. IEC 61260:2001, Type 1. ISO 8041-1: 2005. ISO 108816-1:1995. Serial No: Calibration Cert: 20625.**

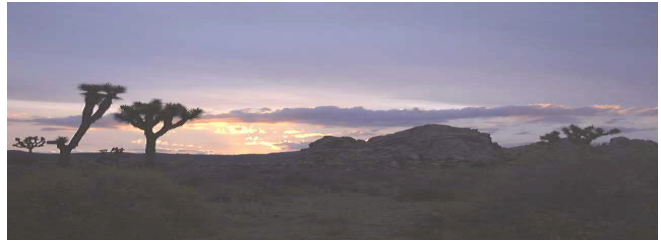
**Nomis 5400 Seismograph. Serial No: 4146.**

**The meters were calibrated before and after the survey. There was no deviation.**



**5.7 Vibration Indices:**

**Measurements were undertaken of longitude, transverse and vertical Peak particle velocity PPV (mm/s) and vertical (z-axis) FFT r.m.s vibration acceleration levels.**



## 6.0 SURVEY RESULTS & OBSERVATIONS.

### 6.1 Noise Survey:

A 48hr external noise measurement survey was carried out at the front elevation of the building.

The results of these measurements are detailed in Table 1& Graph 1.

Further surveys were carried out at roof level to determine the lowest background noise level ( $L_{A90, 5min}$ )

The results of these measurements are detailed in Table 2.

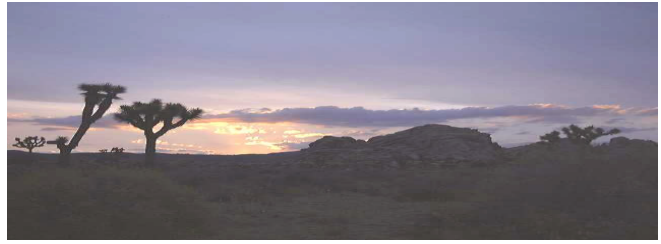
#### 6.1.1 Summary Average Daytime and night-Time noise levels based on the front elevation.

Averaged Daytime Noise Levels LAeq (16 hour)	Averaged Nigh-time Noise Levels LAeq (8 hour)
69	64

#### 6.1.2 Summary Lowest Background Noise Levels $L_{A90}$ :

Survey Period	Lowest Week day Background noise level <sup>*</sup>
Daytime $L_{A90, (15min)}$ (07:00–19:00)	61
Evening $L_{A90, (15min)}$ (19:00–23:00)	57
Night-time $L_{A90, (5min)}$ (23:00–07:00)	54





## **6.1 Vibration Survey:**

**Measured FFT r.m.s. vibration acceleration levels covering background vibration are shown in Figure 1.**

**Overall maximum and average vibration levels are plotted on *Figure 4 of BS6472:1992 Building curves for acceleration (r.m.s).***

**Curve 1 is considered as a satisfactory magnitude of continuous vibration within critical work areas, eg. Hospital Operating Theatres.**

**Curve 1.4 represents a satisfactory magnitude of continuous vibration for residential buildings during night-time periods.**

**Curve 2-4 represent the variation in satisfactory magnitudes of continuous vibration for residential buildings during daytime periods.**

**Curve 4 also represents satisfactory magnitudes of continuous vibration for office buildings.**

**The background vibration levels are less than all of the BS6472 curves.**

**Refer to Figure 1:**

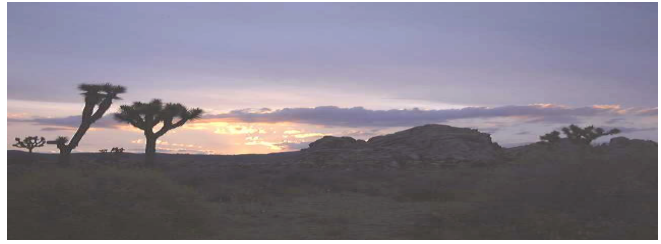
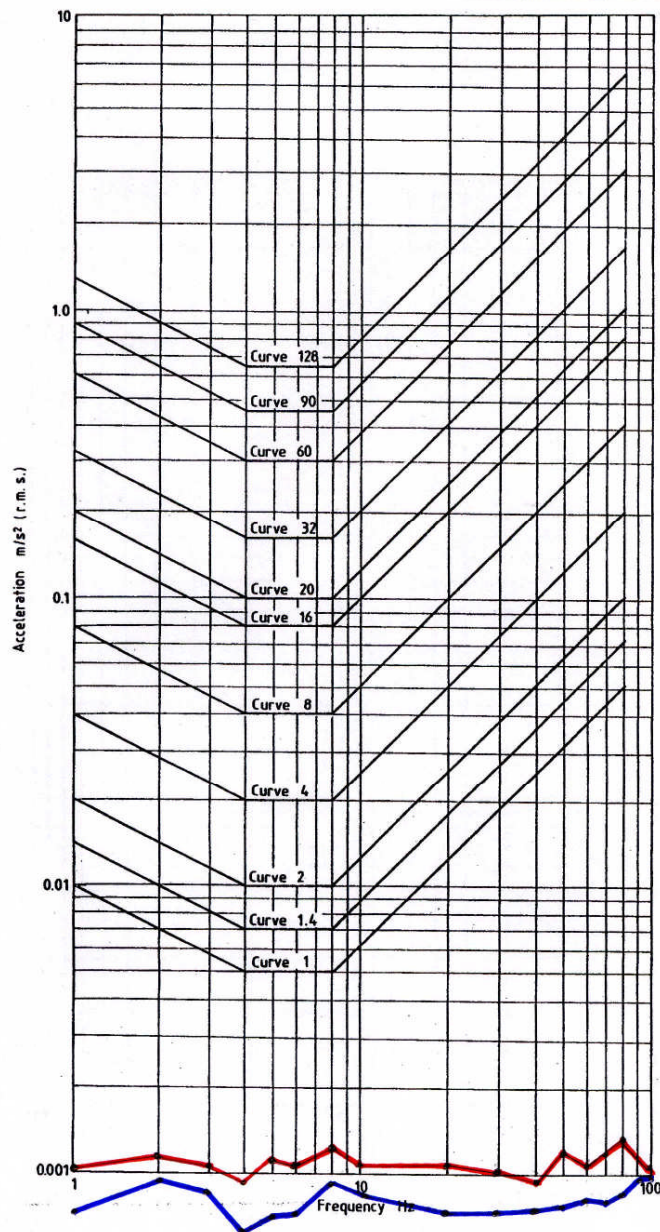


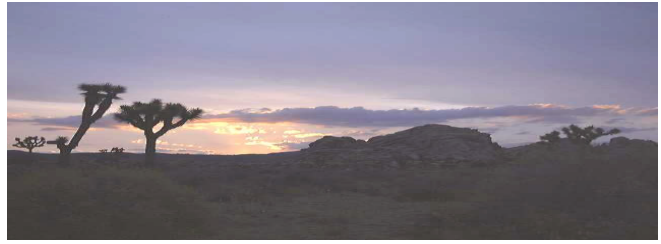
Figure 1: Background Vibration Levels:  
Basement.



NOTE. The curves shown correspond to various multiplying factors in accordance with table 5.

Figure 4. Building vibration z-axis curves for acceleration (r.m.s.)





## 7.0 PPG24 ASSESSMENT.

This section reviews the results of the environmental noise survey against the Department of the Environment previous 'Planning Policy Guidance' PPG 24.

PPG24 defines noise exposure categories (NEC) for dwellings, designed to assist local authorities in their consideration of applications for new residential developments near transport related noise sources.

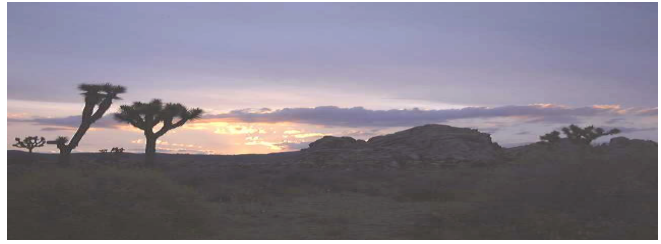
### 7.1 Criteria:

A site is categorised into one of four NEC's (A, B, C or D) based on daytime (07:00-23:00hrs) and night-time (23:00-07:00hrs) noise levels.

Recommended noise level limits for each NEC given in PPG24 and summarised in the following table.

Recommended Noise Exposure Categories (NEC's)  
PPG 24. Road Traffic / Mixed Sources:

Time	Category NEC	Noise Levels ( L <sub>Aeq, T</sub> dB)
07:00-23:00	A	<55
23:00-07:00	A	<45
07:00-23:00	B	<55-63
23:00-07:00	B	<45-57
07:00-23:00	C	<63-72
23:00-07:00	C	<57-66
07:00-23:00	D	>72
23:00-07:00	D	>66



## NEC

- A 'Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level'.
- B 'Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise'.
- C 'Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise'.
- D 'Planning permission would normally be refused'.

The Noise exposure Categories are defined in terms of the LAeq averaged separately over the night-time (23:00 - 07:00) and daytime periods (07:00 - 23:00). The daytime and night-time categories can differ, and the 'worst' NEC is selected.

## 7.2 PPG24 Noise Exposure Category:

PPG24 requires that noise levels be assessed on an open site at a height of approximately 1.5 metres above ground level. However, for reasons of practicality, the noise logging equipment was located at the first floor balcony.

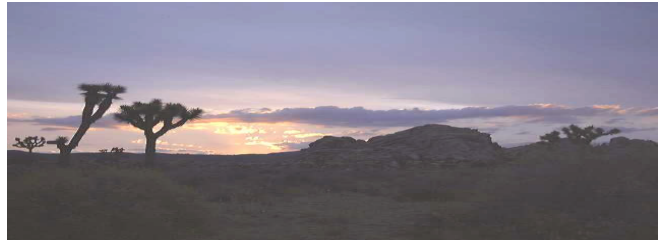
### 7.2.1 Southampton Row Elevation:

- Daytime: 69 LAeq (16hr)
- Night time: 64 LAeq (8hr)

***The building location falls into Noise Exposure Category (NEC) C category.***

#### PPG24 Extract:

*'Conditions should be imposed to ensure a commensurate level of protection against noise to meet the Council's indoor noise level'.*

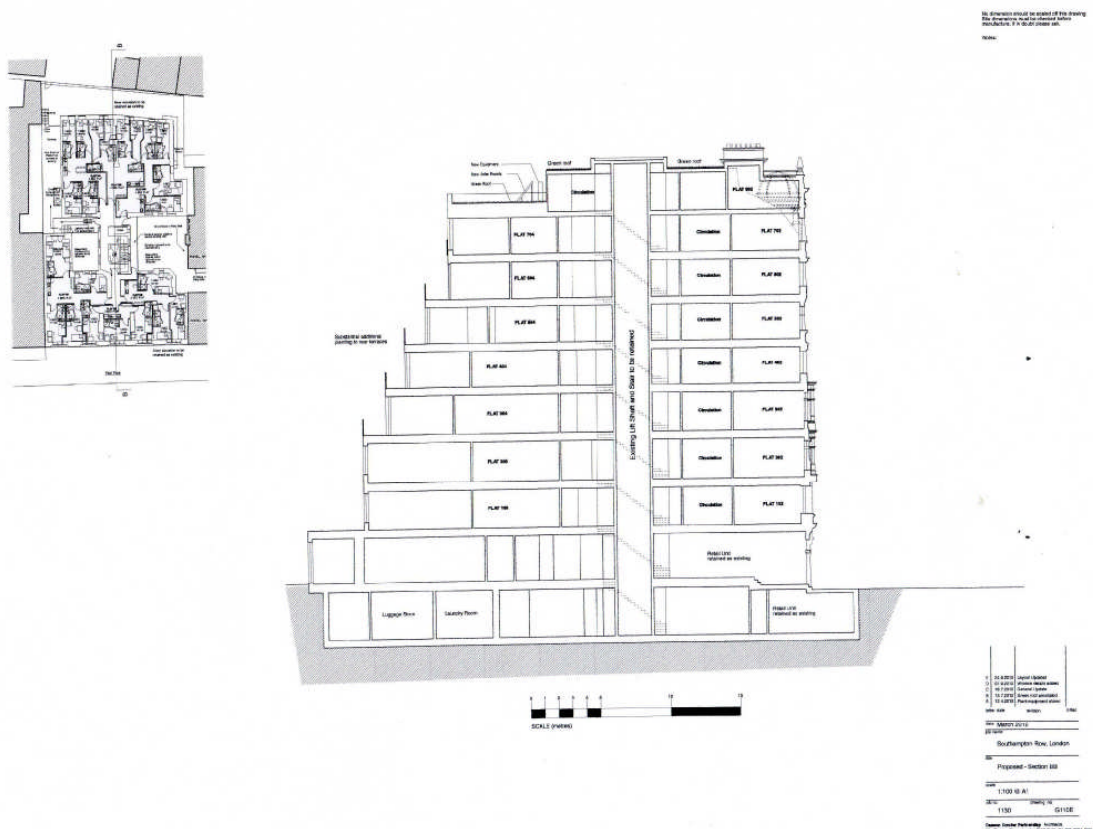


## 8.0 INTERNAL NOISE CRITERIA REVIEW.

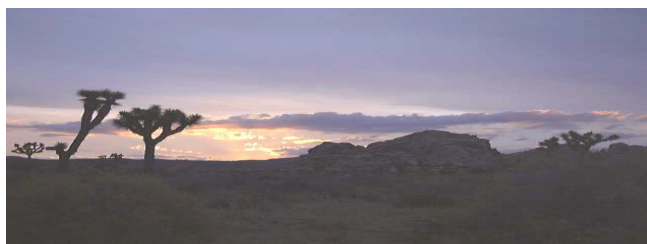
The proposed refurbishment of the building is to provide residential units for Student Accommodation. The scheme is detailed within Casson Conder Partnership architectural drawings project No: 1130.

The design criteria outlined in BS8233:1999 must be considered when setting the internal design criteria and limits for intrusive external noise.

Typical floor section and layout:



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## 8.1 Noise Criteria for Accommodation Units:

BS 8233:1999	Typical Situation	Design Range $L_{Aeq,T}$ dB	
		Good	Reasonable
Reasonable conditions For study and sleep	Living rooms (Study Rooms)	30	40
	Bedrooms	30	35

\*1 for a reasonable standard in bedrooms at night, individual noise events should not normally exceed 45dB  $L_{A(max)}$ .

## 8.2 Preliminary Facade Glazing Sound Reduction Requirements:

Noise logging and sample measurements carried out around the site the typical noise levels at the front and rear facades of the building are summarised in the table below.

Preliminary facade glazing sound insulation requirements \* are advised to meet the 'Reasonable' internal noise criteria for bedrooms. This based on the short form calculation in BS 8233.

Fresh air will be introduced into the building by mechanical ventilation.

### 8.2.1 Day Time - $L_{Aeq}$

	Facade Noise Level	Noise Criteria	Required Glazing Performance
Facade	$L_{Aeq}$ dB	BS 8233	$Rw_{tr}$ dB
Front	69	35	37*
Rear	63	35	31*

### 8.2.2 Night Time - $L_{Aeq}$

	Facade Noise Level	Noise Criteria	Required Glazing Performance
Facade	$L_{Aeq}$ dB	BS 8233	$Rw_{tr}$ dB
Front	64	35	33
Rear	58	35	26



## 8.3 Review Building Regulations ADE:

**Resistance to the passage of Sound Approved Document E 2003.**

This document must be adhered to when building houses, flats, and rooms for residential purposes, schools and hostels.

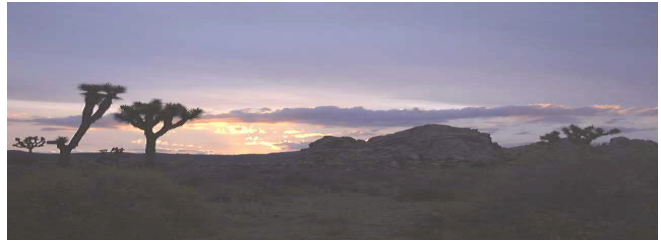
The document comprises four parts:

- Part E1 – Provides protection against sound from separating walls and floors between dwellings.
- Part E2 – Provides protection against sound internally within a dwelling.
- Part E3 – Provides protection against sound in the common internal parts of buildings containing flats or rooms for residential purposes.
- Part E4 – Provides protection against sound in schools.

There are two methods of compliance to Approved Document E: Pre-completion and Robust Details.

**Requirement for Separating Walls, Floors and Stairs in Dwellings and Flats:**

New Build	Airborne Sound Insulation (DnT,w+Ctr dB Minimum values)	Impact Sound Insulation (L'nT,w dB Maximum values)
Walls	45	
Floors and Stairs	45	62
Material Change of Use:		
Walls	43	
Floors and Stairs	43	64

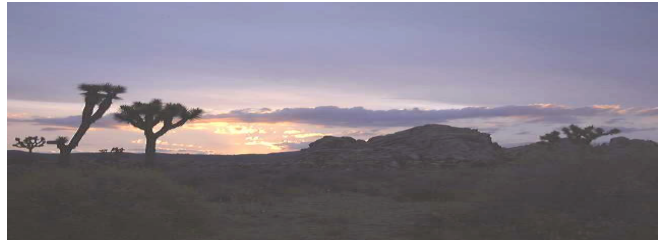


## Requirements for Separating Walls, Floors and Stairs in Rooms for Residential Purposes (hostels, hotels, boarding houses, halls of residence or residential homes):

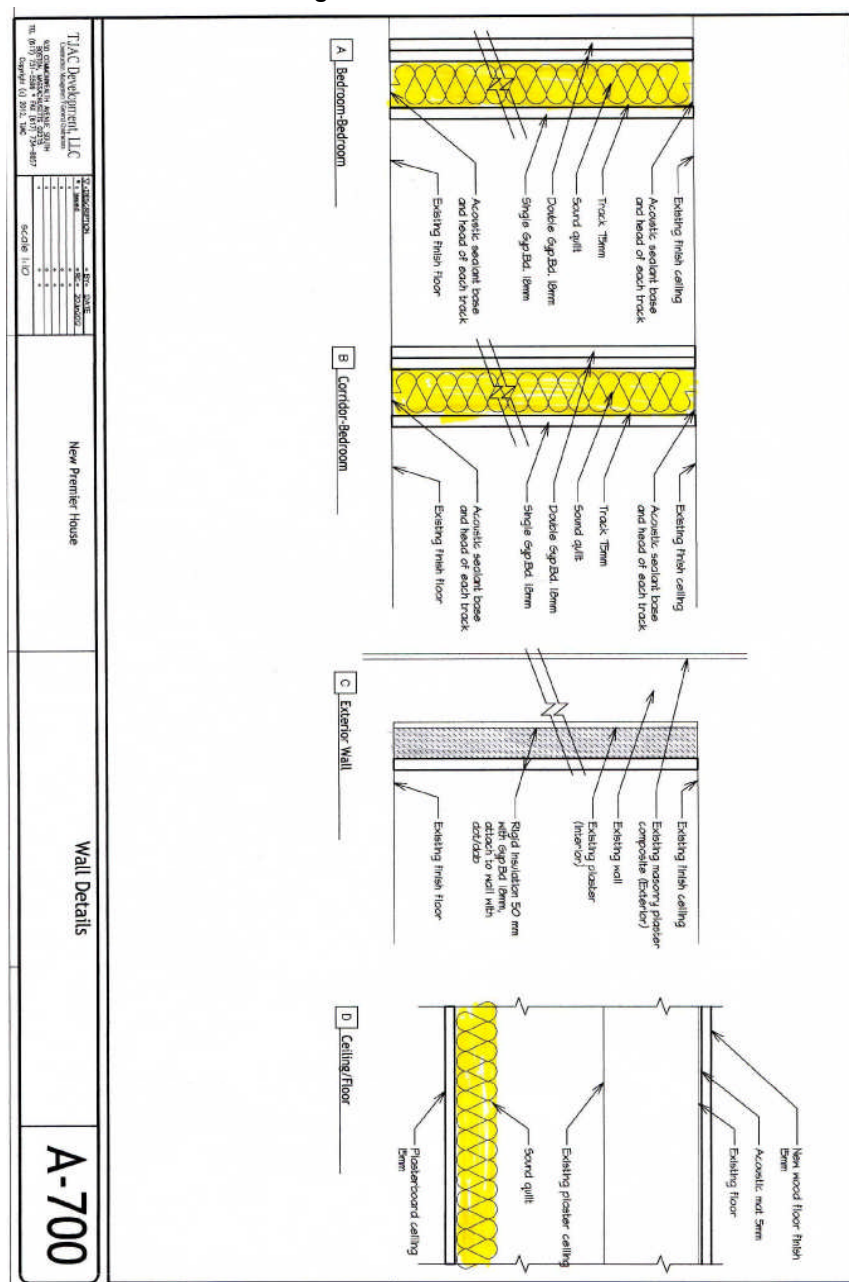
New Build	Airborne Sound Insulation (DnT,w+Ctr dB Minimum values)	Impact Sound Insulation (L'nT,w dB Maximum values)
Walls	43	
Floors and Stairs	45	62
Material Change of Use:		
Walls	43	
Floors and Stairs	43	64

## Requirements for Internal Walls, Floors, Stairs and Rooms for Residential Purposes:

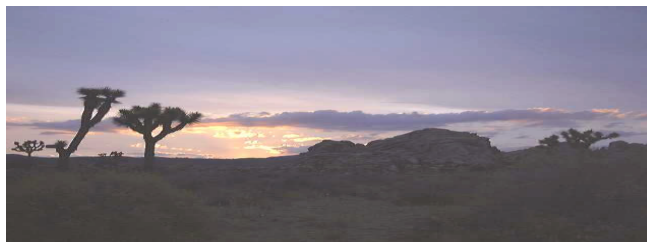
New Build and Conversions	Airborne Sound Insulation (Rw dB Minimum values)
Walls	40
Floors and Stairs	40



## 8.4 Noise Reduction of Student Room Structure: Typical accommodation unit construction details are detailed in drawing A-700.







The acoustic performances of the structures detailed in A700 have been tested on previous projects.

The tests Table 3 & Table 4 demonstrate that the performance of the structures exceeded the requirements of ADE.

**Table 3 Airborne Sound Insulation Minimum requirements for Part E**

Test Report No	Source Room		Receiver Room		Partition	Measured	Required	Pass/Fail
	Description	Volume (m <sup>3</sup> )	Description	Volume (m <sup>3</sup> )	Type	DnT,w + C'tr dB	DnT,w + C'tr dB	
08-10-20145N1AA	Room 206 B	45	Room 306 B1	29	Floor	?48	?43	Pass
08-10-20145N1AB	Room 206 B	45	Room 106 B	69	Floor	?46	?43	Pass
08-10-20145N1AC	Room 203 B	45	Room 201 B1	28	Wall	?50	?43	Pass
08-10-20145N1AD	Room 203 B	45	Room 303 B	45	Floor	?46	?43	Pass
08-10-20145N1AE	Room 201 B2	29	Room 301 B2	29	Floor	?48	?43	Pass
08-10-20145N1AF	Room 201 B2	29	Room 101 B	36	Floor	?47	?43	Pass
08-10-20145N1AG	Room G01 B1	29	Room LG01 B	52	Floor	?48	?43	Pass

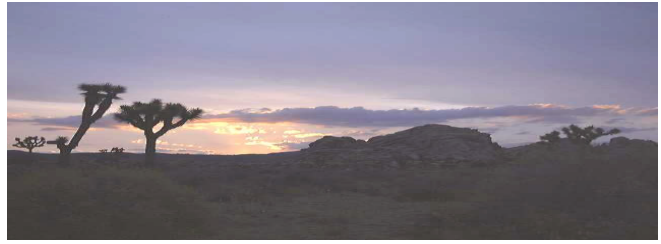
**Table 4 Impact Sound Insulation Minimum requirements for Part E**

	Test Report No	Source Room		Receiver Room		Measured	Required	Pass/Fail
		Description	Volume (m <sup>3</sup> )	Description	Volume (m <sup>3</sup> )	L'nT,w dB	L'nT,w dB	
	08-10-20145N1IA	Room 306 B1	29	Room 206 B	45	58	? 64	Pass
	08-10-20145N1IB	Room 206 B	45	Room 106 B	69	58	? 64	Pass
	08-10-20145N1ID	Room 303 B	45	Room 203 B	45	59	? 64	Pass
	08-10-20145N1IE	Room 301 B2	29	Room 201 B2	29	60	? 64	Pass
	08-10-20145N1IF	Room 201 B2	29	Room 101 B	36	58	? 64	Pass
	08-10-20145N1IG	Room G01 B1	29	Room LG01 B	52	54	? 64	Pass

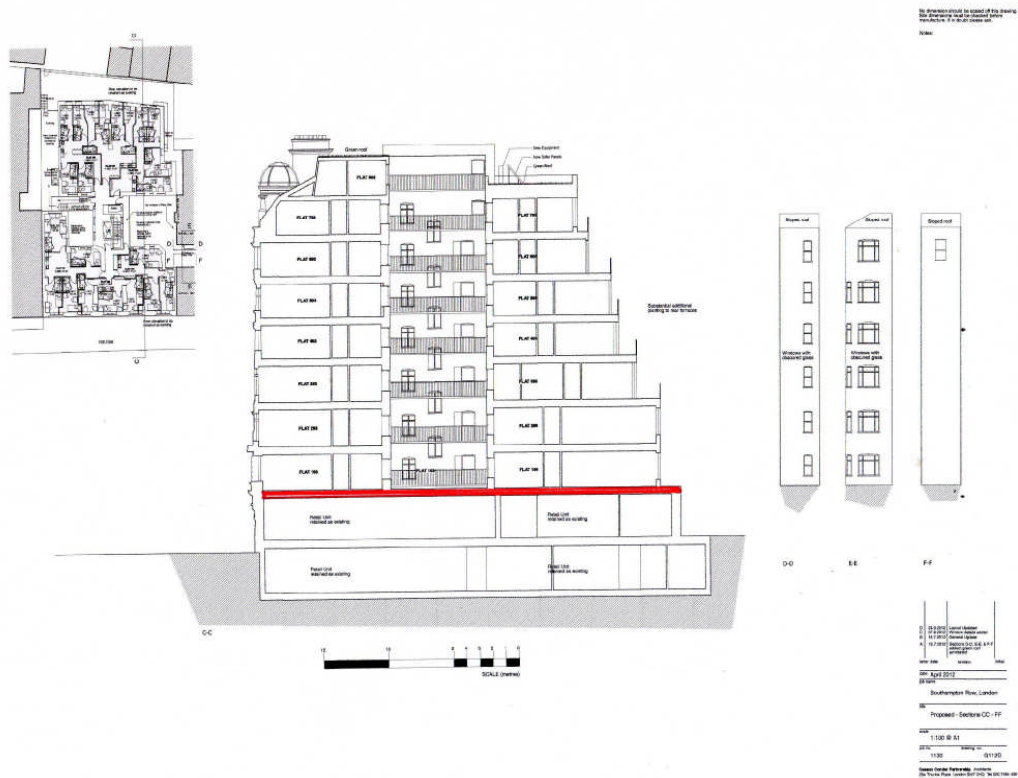
**8.4.1 Entrance doors to Student Accommodation:**  
Doors to flats must have a sound reduction of 29dB Rw to meet the minimum requirement of Part E.

**8.4.2 Common Area Hallways and Stairs:**  
The stairs and common hallways are outside the demise of the flats. The reverberation time in these areas are to no greater than 0.7s RT<sub>60</sub> (500).





## 8.5 Noise Reduction of Separating Structure to Commercial Areas:



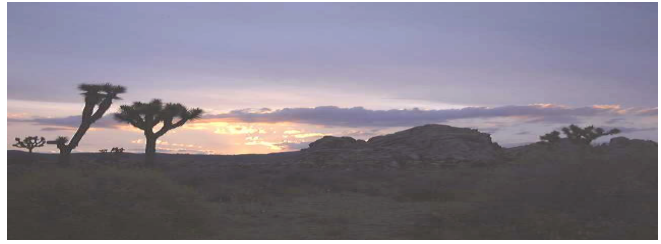
The existing first floor slab is nominally 450mm RC. The floor and ceiling arrangement will provide a nominal sound reduction index SRI dB of 56dB.

The resilient raised floor finish of the accommodation units will provide a further 2dB SRI.

Total reduction nominally 58dB SRI.  
(Approx: 60dB Dnt, w+Ctr).

The activity noise expected from the Restaurant below is nominally 75dBA. The resultant break-in / flanking noise in the accommodation will be ≈25dBA.

This is 10dB below the recommended 'Reasonable' noise criteria in BS 8233:1999.



**9.0 REVIEW OF ENVIRONMENTAL NOISE CRITERIA.**

The buildings adjacent to Premier House are St Giles College and Russell Mansions.

The Imperial and Bedford Hotels are in the immediate vicinity.

It is important that noise emission from new mechanical services plant associated with the proposed new development does not cause a noise nuisance or loss of amenity at the adjacent properties.

The nearest noise sensitive receptor is a flat window located in Russell Mansions.

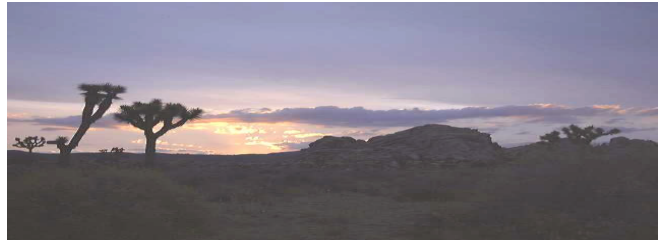
In order to assess the potential risk the following criteria are considered.

**9.1 Residential Design Criteria (BS4142:1997).**

BS4142:1997 “Method for rating industrial noise affecting mixed residential and industrial areas” describes a method of determining the level of the noise of an industrial nature together with procedures for assessing whether the noise in question is likely to give rise to complaint from local residents. In general, the likelihood of complaints in response to a noise depends on factors including the margin by which it exceeds the background noise level. The standard states that a difference of +5 dB is of marginal significance whereas a difference of +10 dB is most likely to cause complaints.

**9.2 Camden Noise Policy:**

Camden Council response to noise criteria normally requires that noise emission from new mechanical services plant to be 5dB below the lowest recorded background noise  $LA_{90(15)}$ , measured 1 metre from the nearest sensitive receptor.



If the plant noise levels contain any discrete frequencies it will be necessary to reduce the plant noise emission by a further 5dB. In addition the plant shall not create an audible tonal noise nor cause perceptible vibration to be transmitted through the structure of the building.

### **9.3 Summary of Environmental Noise Criteria.**

In order to comply with the relevant codes of practice and minimise the risk of noise complaints from owners of neighbouring properties the following noise limits should be set.

These levels are based on accumulative plant noise level as measured 1 metre from the nearest sensitive receptor.

Because the main air conditioning condenser plant operation is intermittent the noise criteria is set 10dB below the background levels recorded at the site.

In order to comply with the relevant codes of practice and minimise the risk of noise complaints the total plant noise must be at least 10dB below the background noise.

The maximum plant noise levels are based on accumulative plant noise level as measured 1 metre from the window of the nearest noise sensitive property.

#### **9.3.1 Lowest recorded background noise level: 51dB\* L<sub>A90</sub> (23:00 – 07:00)**

**\*Notes:**

- (i) Background has been adjusted for weekend operation: minus 3dB.
- (ii) Plant with intermittent operation or tonal characteristics must reduce noise emission by a further 5dB.



## **10.0 REVIEW OF MECHANICAL SERVICES PLANT.**

The building is fully comfort cooled with fresh air introduced with mechanical ventilation.

The calculation is based on the nearest sensitive window located at the Russell Mansions nominally 20 metres away.

The neighbour's windows that are adjacent to the existing light well are impacted less than those windows 20 metres away.

The overall noise level experienced by the windows in the adjoining light well will be reduced because of the new plant and more importantly the removal of the substantial old condenser units which are located in that light well.

The proposed new air conditioning plant is located at roof level within an acoustic plant screen.

The plant operating period will be 24/7.

### **10.1 Proposed mechanical services plant comprises:**

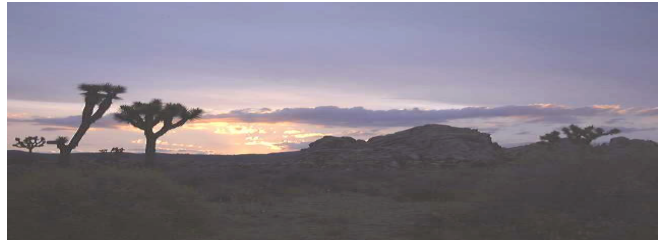
#### **10.1.1 Daikin VRV Condenser Units & Extract Plant:**

REY Q 8 P9Y 1B	1Qty
REY Q 10 P9Y 1B	2Qty
REY Q 12 P9Y 1B	2Qty
REY Q 14 P9Y 1B	1Qty

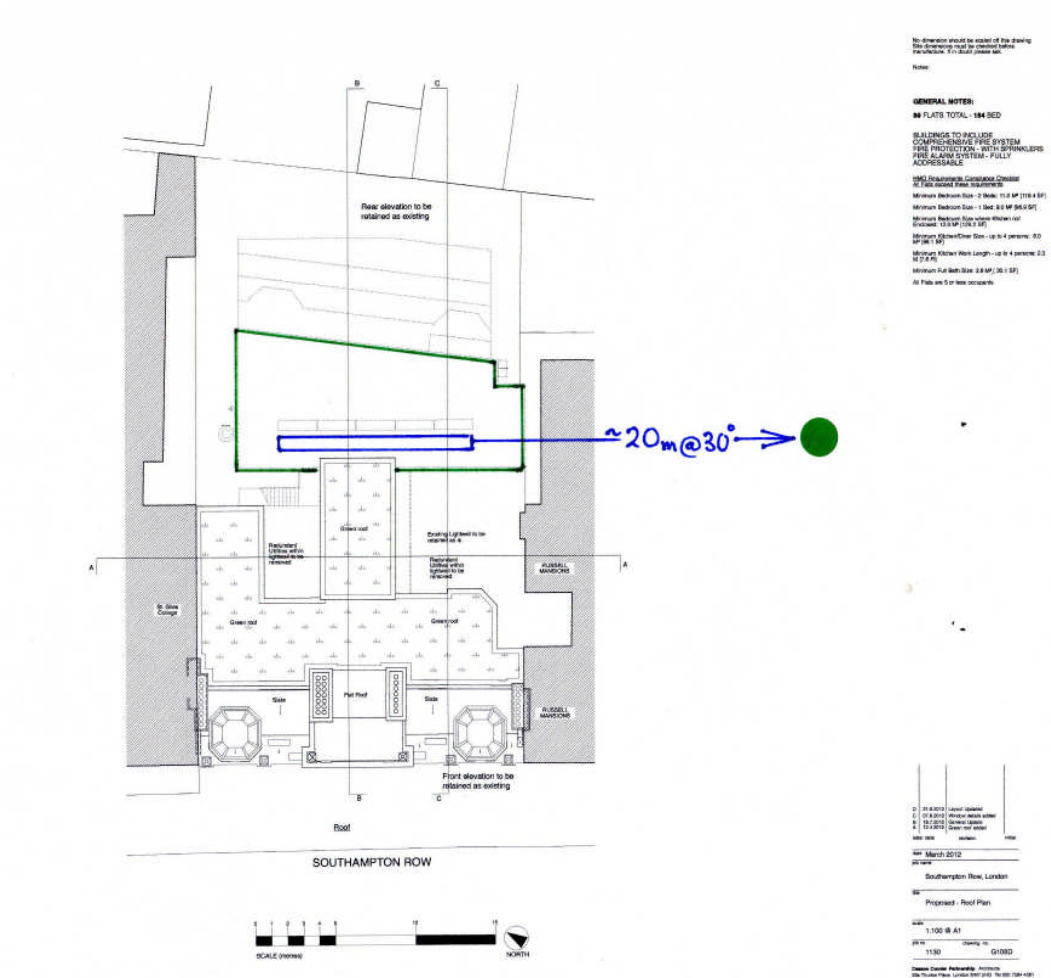
The condenser units will incorporate a speed set back 10dBA during night -time operation 2300 to 0700 hours.

#### **10.1.2 VES Weather master Extract Units:**

VES FLO 327-WH	1Qty
VES WEB 327	1Qty



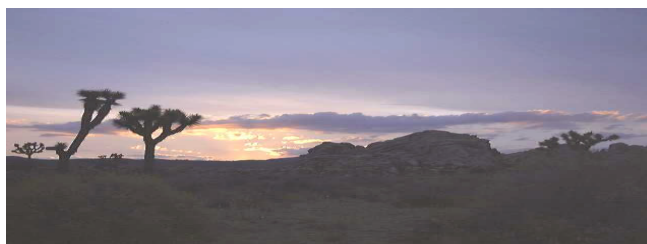
## 10.2 Plant location.



**Key:**

- **Nearest Affected Window**  
Russell Mansions. Nom: 20 metres.

**Tacitus House. PO Box 274. Aldershot. Hants. GU11 1XQ.**  
Tel: +44(0)1252 333727. Fax: +44(0) 1252 318773  
e-mail: [daallp@tacitus.co.uk](mailto:daallp@tacitus.co.uk)



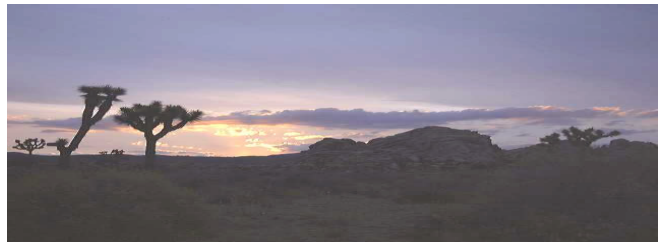
## 10.3 Noise Emission Calculations:

### 10.3.1 Nearest adjacent noise sensitive receptor:

Nearest Adjacent Noise Sensitive Receptor.													
NOISE EMISSION CALCULATION													
ITEM	PARAMETER			Hz		125	250	500	1K	2K	4K	8K	dBA
	<b>Schedule of Plant</b>	Qty											
	<b>Daikin VRV Condensers:</b>												
1	REY Q 8 P9Y 1B	2	Swl	dB	+	84	79	76	73	67	65	61	75
2	REY Q 10 P9Y 1B	2	Swl	dB	+	84	80	77	73	66	60	53	74
3	REY Q 12 P9Y 1B	2	Swl	dB	+	85	81	79	75	69	64	58	76
4	REY Q 14 P9Y 1B	1	Swl	dB	+	84	80	80	75	68	63	62	76
5	<b>Combined Swl:</b>	7	Swl	dB	+	90	86	84	80	74	69	66	81
6	Plant Area Screening. Path difference:	1	-	dB	-	12	14	18	20	23	25	26	18
7	<b>Total Combined Swl</b>	-	-	dB	+	78	72	66	60	51	44	40	63
8	Distance to reference point Metres:	20	-	dB	-	26	26	26	26	26	26	26	26
9	Spherical radiation	-	-	dB	-	11	11	11	11	11	11	11	11
10	Intermittant characteristic correction	-	-	dB	+	5	5	5	5	5	5	5	5
11	Facade correction	3.0	-	dB	+	3	3	3	3	3	3	3	3
12	Direct Lp at reference point	-	-	dB	+	49	43	37	31	22	15	11	34
13	Night Time Shift	Minus	-	dB	-	4	4	4	4	4	4	4	4
14	Modified direct Lp at reference point		Spl	dB	+	45	39	33	27	18	11	7	30
				dB									
15	<b>VES Weathermaster Extract Units:</b>	-	-	dB									
16	VES FLO 327-WH	-	Swl	dB	+	75	68	72	74	73	70	65	77
17	VES WEB 327	-	Swl	dB	+	75	68	72	74	73	70	65	77
18	<b>Combined Swl:</b>	-	Swl	dB	+	78	71	75	77	76	73	68	80
19	Breakout correction	-	-	dB	-	13	9	6	5	5	5	5	5
20	Plant Area Screening. Path difference:	1	-	dB	-	12	14	18	20	23	25	26	22
21	<b>Revised Combined Swl (Fans)</b>	-	Swl	dB	+	53	48	51	52	48	43	37	53
22	Spherical radiation	-	-	dB	-	11	11	11	11	11	11	11	11
23	Distance to reference point Metres:	20	-	dB	-	26	26	26	26	26	26	26	26
24	Facade reflection:	-	-	dB	+	3	3	3	3	3	3	3	3
25	<b>Resultant plant noise level: (Fans)</b>	-	Spl	dB	+	19	14	17	18	14	9	3	19
26	<b>Combined specific noise level (1m from receptor)</b>	-	Spl	dB	+	45	39	33	28	19	13	8	30
27	<b>Lowest Corrected Background Noise Level: LA90</b>	-	Spl	dB									51
28	<b>Difference: (Assessment level)</b>	Minus	-	dB	-								-21
	E&OE												

The calculation indicates that the proposed new air conditioning plant will be 21dB below the lowest recorded night time background and 20dB below the lowest recorded day/evening background noise.

The levels are within the requirements of Camden Council.



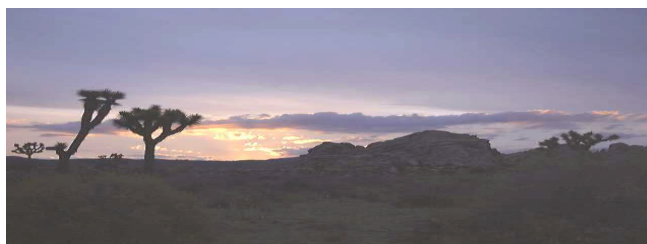
## 10.3.2 Central Light well:

Central Lightwell.													
NOISE EMISSION CALCULATION													
ITEM	PARAMETER			HZ		125	250	500	1K	2K	4K	8K	dBA
	<b>Schedule of Plant</b>	Qty											
	<b>Daikin VRV Condensers:</b>												
1	REY Q 8 P9Y 1B	2	Swl	dB	+	84	79	76	73	67	65	61	75
2	REY Q 10 P9Y 1B	2	Swl	dB	+	84	80	77	73	66	60	53	74
3	REY Q 12 P9Y 1B	2	Swl	dB	+	85	81	79	75	69	64	58	76
4	REY Q 14 P9Y 1B	1	Swl	dB	+	84	80	80	75	68	63	62	76
5	<b>Combined Swl:</b>	7	Swl	dB	+	90	86	84	80	74	69	66	81
6	Plant Area Screening, Path difference:	2	-	dB	-	14	15	18	20	24	27	29	19
7	<b>Total Combined Swl</b>	-	-	dB	+	76	71	66	60	50	42	37	62
8	Distance to reference point Metres:	5	-	dB	-	14	14	14	14	14	14	14	14
9	Spherical radiation	-	-	dB	-	11	11	11	11	11	11	11	11
10	Intermittant characteristic correction	-	-	dB	+	5	5	5	5	5	5	5	5
11	Facade correction	3.0	-	dB	+	3	3	3	3	3	3	3	3
12	Direct Lp at reference point	-	-	dB	+	59	54	49	43	33	25	20	45
13	Night Time Shift	Minus	-	dB	-	4	4	4	4	4	4	4	4
14	Modified direct Lp at reference point		Spl	dB	+	55	50	45	39	29	21	16	41
				dB									
15	<b>VES Weathermaster Extract Units:</b>	-	-	dB									
16	VES FLO 327-WH	-	Swl	dB	+	75	68	72	74	73	70	65	77
17	VES WEB 327	-	Swl	dB	+	75	68	72	74	73	70	65	77
18	<b>Combined Swl:</b>	-	Swl	dB	+	78	71	75	77	76	73	68	80
19	Breakout correction	-	-	dB	-	13	9	6	5	5	5	5	5
20	Plant Area Screening, Path difference:	2	-	dB	-	14	15	18	20	24	27	29	22
21	<b>Revised Combined Swl (Fans)</b>	-	Swl	dB	+	51	47	51	52	47	41	34	52
22	Spherical radiation	-	-	dB	-	11	11	11	11	11	11	11	11
23	Distance to reference point Metres:	7	-	dB	-	17	17	17	17	17	17	17	17
24	Facade reflection:	-	-	dB	+	3	3	3	3	3	3	3	3
25	<b>Resultant plant noise level: (Fans)</b>	-	Spl	dB	+	26	22	26	27	22	16	9	27
26	<b>Combined specific noise level:</b>	-	Spl	dB	+	55	50	45	39	30	23	17	41
	(7th floor level, existing lightwell)												
27	<b>Lowest Corrected Background Noise Level: LA90</b>	-	Spl	dB									51
28	<b>Difference: (Assessment level)</b>	Minus	-	dB	-								-10
	E&OE												

The calculation indicates that the proposed new air conditioning plant will be 10dB below the lowest recorded night time background outside the open able windows in the central light well.

The levels are within the requirements of Camden Council.





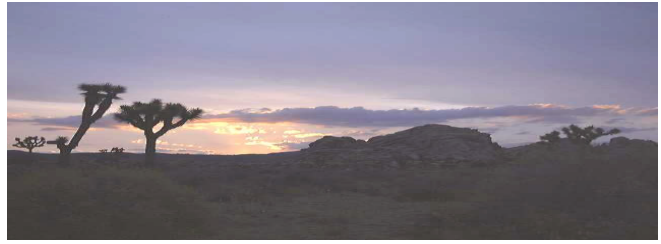
## 10.3.3 Adjoining Light well:

Adjoining Lightwell													
NOISE EMISSION CALCULATION													
ITEM	PARAMETER			HZ		125	250	500	1K	2K	4K	8K	dBA
	Schedule of Plant	Qty											
	Daikin VRV Condensers:												
1	REY Q 8 P9Y 1B	2	Swl	dB	+	84	79	76	73	67	65	61	75
2	REY Q 10 P9Y 1B	2	Swl	dB	+	84	80	77	73	66	60	53	74
3	REY Q 12 P9Y 1B	2	Swl	dB	+	85	81	79	75	69	64	58	76
4	REY Q 14 P9Y 1B	1	Swl	dB	+	84	80	80	75	68	63	62	76
5	Combined Swl:	7	Swl	dB	+	90	86	84	80	74	69	66	81
6	Plant Area Screening, Path difference:	1	-	dB	-	11	12	14	18	20	23	25	12
7	Total Combined Swl	-	-	dB	+	79	74	70	62	54	46	41	65
8	Distance to reference point Metres:	10	-	dB	-	20	20	20	20	20	20	20	20
9	Spherical radiation	-	-	dB	-	11	11	11	11	11	11	11	11
10	Intermittant characteristic correction	-	-	dB	+	5	5	5	5	5	5	5	5
11	Facade correction	3.0	-	dB	+	3	3	3	3	3	3	3	3
12	Direct Lp at reference point	-	-	dB	+	56	51	47	39	31	23	18	42
13	Night Time Shift	Minus	-	dB	-	4	4	4	4	4	4	4	4
14	Modified direct Lp at reference point		Spl	dB	+	52	47	43	35	27	19	14	38
15	VES Weathermaster Extract Units:	-	-	dB									
16	VES FLO 327-WH	-	Swl	dB	+	75	68	72	74	73	70	65	77
17	VES WEB 327	-	Swl	dB	+	75	68	72	74	73	70	65	77
18	Combined Swl:	-	Swl	dB	+	78	71	75	77	76	73	68	80
19	Breakout correction	-	-	dB	-	13	9	6	5	5	5	5	5
20	Plant Area Screening, Path difference:	2	-	dB	-	14	15	18	20	24	27	29	22
21	Revised Combined Swl (Fans)	-	Swl	dB	+	51	47	51	52	47	41	34	52
22	Spherical radiation	-	-	dB	-	11	11	11	11	11	11	11	11
23	Distance to reference point Metres:	7	-	dB	-	17	17	17	17	17	17	17	17
24	Facade reflection:	-	-	dB	+	3	3	3	3	3	3	3	3
25	Resultant plant noise level: (Fans)	-	Spl	dB	+	26	22	26	27	22	16	9	27
26	Combined specific noise level: (7th floor level, existing lightwell)	-	Spl	dB	+	52	47	43	36	28	21	15	39
27	Lowest Corrected Background Noise Level: LA90	-	Spl	dB									51
28	Difference: (Assessment level)	Minus	-	dB	-								-12
	E&OE												

The calculation indicates that the proposed new air conditioning plant will be 10dB below the lowest recorded night time background outside the open able windows in the adjoining light well.

The levels are within the requirements of Camden Council.

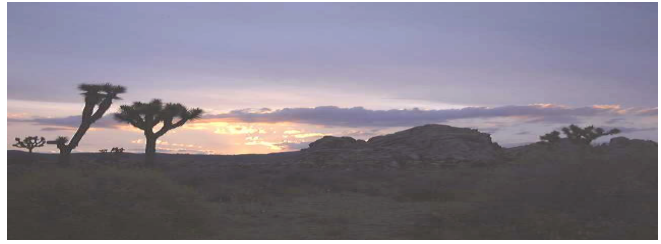




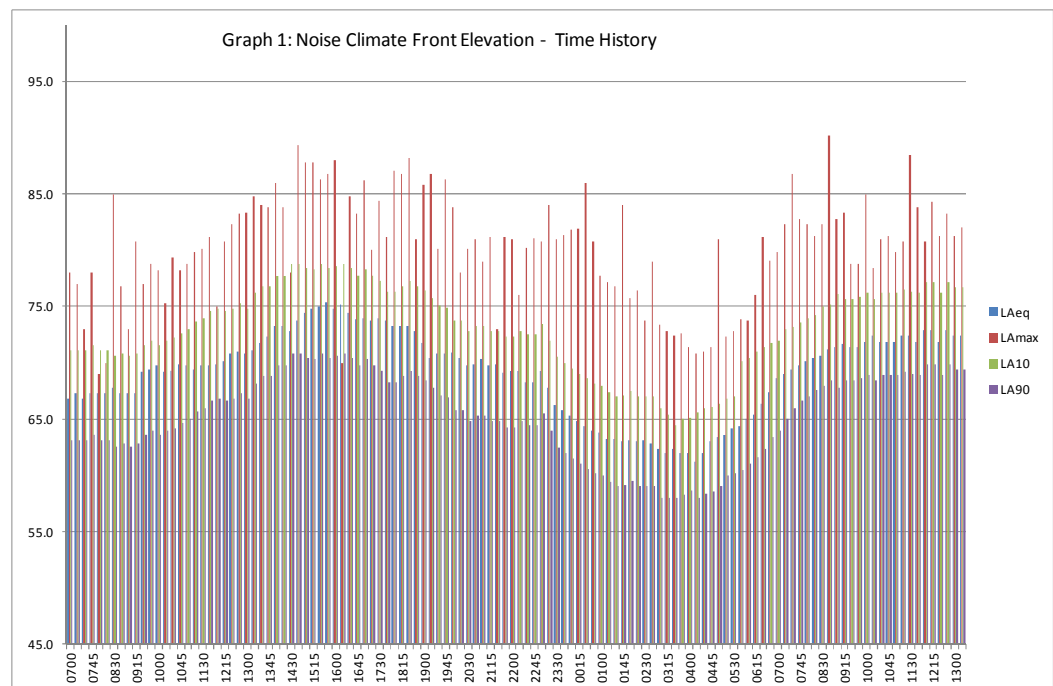
## APPENDIX

**Table 1 Ambient Noise Climate.  
Front Elevation.**

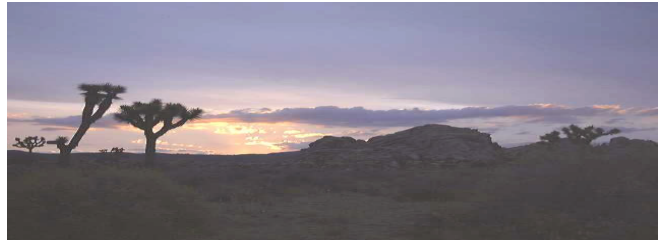
Table 1																			
Time	LAeq	LAmaz	LA10	LA90	Time	LAeq	LAmaz	LA10	LA90	Time	LAeq	LAmaz	LA10	LA90	Time	LAeq	LAmaz	LA10	LA90
0700	66.8	78.0	71.1	63.1	1500	74.4	87.8	78.4	70.4	2245	68.3	81.1	72.5	64.5	0645	67.4	79.1	71.8	63.4
0715	67.3	77.0	71.1	63.1	1515	74.8	87.8	78.3	70.3	2300	69.3	80.8	73.5	65.5	0700	68.6	79.8	72.0	64.0
0730	66.8	73.0	71.1	63.1	1530	75.0	86.3	78.8	70.8	2315	67.8	84.0	72.0	64.0	0715	69.0	82.3	73.0	65.0
0745	67.3	78.0	71.6	63.6	1545	75.4	86.8	78.4	70.4	2330	66.3	81.0	70.5	62.5	0730	69.4	86.8	73.2	66.0
0800	67.3	69.0	71.1	63.1	1600	74.8	88.0	78.6	70.6	2345	65.8	81.4	70.0	62.0	0745	69.8	82.8	73.6	66.6
0815	67.3	70.0	71.1	63.1	1615	75.2	70.0	78.8	70.8	0000	65.3	81.8	69.5	61.5	0800	70.2	82.3	74.0	67.0
0830	67.8	85.0	70.6	62.6	1630	74.4	84.8	78.4	70.4	0015	64.8	81.9	69.0	61.0	0815	70.4	81.3	74.2	67.6
0845	67.3	76.8	70.8	62.8	1645	73.9	83.3	77.8	69.8	0030	64.4	86.0	68.6	60.6	0830	70.6	82.3	75.0	68.0
0900	67.3	73.0	70.6	62.6	1700	74.0	86.2	78.3	70.3	0045	64.0	80.8	68.2	60.2	0845	71.2	90.2	75.2	68.4
0915	67.3	80.8	70.8	62.8	1715	73.8	80.0	77.8	69.8	0100	63.8	77.8	68.0	60.0	0900	71.4	82.8	76.1	67.8
0930	69.2	77.0	71.6	63.6	1730	74.0	84.4	77.3	69.3	0115	63.2	77.2	67.4	59.4	0915	71.7	83.4	75.7	68.4
0945	69.4	78.8	72.0	64.0	1745	73.8	81.2	76.3	68.3	0130	63.2	76.8	67.0	59.0	0930	71.4	78.8	75.7	68.4
1000	69.8	78.2	71.6	63.6	1800	73.3	87.1	76.3	68.3	0145	63.0	84.0	67.1	59.1	0945	71.4	78.8	75.9	68.6
1015	69.2	75.3	72.0	64.0	1815	73.3	86.8	76.8	68.8	0200	63.1	75.8	67.5	59.5	1000	71.9	85.0	76.2	68.9
1030	69.3	79.4	72.2	64.2	1830	73.3	88.2	77.3	69.3	0215	63.0	76.4	67.0	59.0	1015	72.4	78.4	75.7	68.4
1045	69.9	78.2	72.6	64.6	1845	72.8	81.0	76.8	68.8	0230	63.1	73.8	67.0	59.0	1030	71.9	81.0	76.2	68.9
1100	69.8	78.8	73.0	65.0	1900	71.8	85.8	76.4	68.4	0245	62.8	79.0	67.0	59.0	1045	71.9	81.3	76.2	68.9
1115	69.4	79.8	73.7	65.7	1915	70.4	86.8	75.8	67.8	0300	62.4	73.4	66.0	58.0	1100	71.9	79.8	76.2	68.9
1130	69.8	80.1	74.0	66.0	1930	70.8	80.1	75.1	67.1	0315	62.0	72.8	65.4	58.0	1115	72.4	80.8	76.5	69.2
1145	69.8	81.2	74.6	66.6	1930	70.8	80.1	75.1	67.1	0330	62.4	72.4	64.5	58.0	1130	72.4	88.5	76.3	69.0
1200	69.9	75.0	74.8	66.8	1945	70.8	86.3	74.9	66.9	0345	62.0	72.6	65.0	58.3	1145	71.9	83.8	76.2	68.9
1215	70.2	80.8	74.6	66.6	2000	70.9	83.8	73.8	65.8	0400	62.0	71.4	65.1	58.7	1200	72.9	80.8	77.2	69.9
1230	70.8	82.3	74.8	66.8	2015	70.4	78.0	73.8	65.8	0415	61.2	70.8	65.6	58.0	1215	72.9	84.3	77.2	69.9
1245	71.0	83.3	75.3	67.3	2030	69.8	80.1	72.8	64.8	0430	62.0	71.0	66.0	58.4	1230	71.9	81.3	76.2	68.9
1300	70.8	83.4	74.8	66.8	2045	69.9	81.0	73.3	65.3	0445	63.0	71.4	66.1	58.6	1245	72.9	83.3	77.2	69.9
1315	71.1	84.8	76.2	68.2	2100	70.3	79.0	73.3	65.3	0500	63.4	81.0	66.4	59.0	1300	72.4	81.3	76.7	69.4
1330	71.8	84.0	76.8	68.8	2115	69.8	81.2	72.8	64.8	0515	63.6	72.3	66.8	60.0	1315	72.4	82.0	76.7	69.4
1345	72.3	83.8	76.8	68.8	2130	69.9	73.0	72.8	64.8	0530	64.2	72.8	67.0	60.2	0845	71.2	90.2	75.2	68.4
1400	73.3	86.0	77.8	69.8	2145	69.1	81.2	72.3	64.3	0545	64.4	73.9	70.2	60.5	0900	71.4	82.8	76.1	67.8
1415	73.3	83.8	77.8	69.8	2200	69.3	81.0	72.3	64.3	0600	65.0	73.8	70.4	61.0	0915	71.7	83.4	75.7	68.4
1430	72.8	78.0	78.8	70.8	2215	69.3	76.0	72.8	64.8	0615	65.4	76.0	71.0	61.6	0930	71.4	78.8	75.7	68.4
1445	73.8	89.3	78.8	70.8	2230	68.3	80.2	72.5	64.5	0630	66.4	81.2	71.4	62.4	0945	71.4	78.8	75.9	68.6



**Graph 1. Time History. Ambient Noise Climate. Front Elevation.**



# Deane Austin Associates LLP



**Table 2 Background Noise Measurements:**

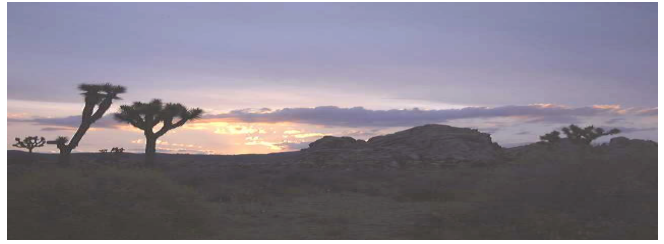
<b>Table 2</b>															
TIME	LAEQ	LAMAX	LA10	LA90	TIME	LAEQ	LAMAX	LA10	LA90	TIME	LAEQ	LAMAX	LA10	LA90	
2300	63.3	75.6	66.5	57.1	0200	59.2	73.1	61.0	54.1	0500	61.2	74.1	63.5	56.1	
2305	66.2	78.1	70.5	57.1	0205	62.1	81.1	64.0	54.1	0505	61.7	74.6	64.5	56.1	
2310	67.7	81.1	71.5	60.1	0210	60.2	74.1	63.0	54.6	0510	64.3	83.1	66.5	59.6	
2315	65.2	82.1	68.5	59.1	0215	58.8	71.6	60.5	54.6	0515	60.9	73.1	63.5	56.6	
2320	61.6	76.1	64.0	56.6	0220	57.2	69.1	58.5	54.6	0520	64.6	90.1	64.5	56.1	
2325	63.4	79.1	66.5	57.6	0225	57.7	71.1	58.5	54.1	0525	64.0	77.6	67.0	56.6	
2330	62.9	77.6	65.5	56.6	0230	60.0	74.6	63.0	54.6	0530	62.2	74.1	65.0	57.1	
2335	63.8	80.6	66.5	57.1	0235	58.6	74.6	60.0	54.6	0535	62.4	78.6	65.0	56.6	
2340	64.8	75.6	65.0	56.6	0240	59.6	73.1	61.5	54.6	0540	63.6	82.6	66.0	56.6	
2345	62.9	80.1	65.5	56.1	0245	65.2	80.6	70.0	54.6	0545	63.9	78.1	67.0	56.6	
2350	61.7	76.1	64.5	56.6	0250	62.4	76.6	65.5	55.6	0550	65.0	80.6	68.0	57.1	
2355	62.8	77.1	66.0	57.1	0255	60.6	73.1	63.0	54.6	0555	64.1	77.6	67.5	57.6	
0000	61.9	77.1	64.5	55.6	0300	58.0	70.1	59.5	54.6	0600	64.4	74.6	68.0	58.1	
0005	61.7	73.6	64.5	56.6	0305	58.1	72.1	69.5	55.1	0605	62.9	77.1	66.0	57.6	
0010	60.9	72.1	63.0	56.1	0310	61.1	76.1	64.0	55.1	0610	64.3	78.6	67.0	57.6	
0015	58.9	71.1	60.5	54.6	0315	60.9	81.1	62.5	54.6	0615	63.7	75.1	67.0	57.6	
0020	60.1	75.1	62.0	55.1	0320	59.9	72.6	62.5	54.6	0620	63.1	76.1	64.0	57.6	
0025	60.1	72.6	62.0	55.6	0325	59.2	77.1	58.0	54.1	0625	65.4	76.1	69.0	59.1	
0030	59.0	73.1	61.0	54.6	0330	59.5	72.6	62.0	54.6	0630	64.7	80.1	68.0	58.6	
0035	63.6	79.1	67.5	56.1	0335	59.8	74.6	62.0	54.6	0635	67.2	81.6	70.5	59.1	
0040	61.4	74.1	64.5	55.6	0340	60.4	76.6	62.0	54.6	0640	66.1	80.1	69.0	59.6	
0045	61.4	77.1	63.5	55.1	0345	58.3	73.1	58.5	54.1	0645	65.6	75.1	68.5	60.1	
0050	59.7	71.6	63.0	54.6	0350	58.6	70.1	61.0	54.6	0650	67.3	77.6	71.0	60.6	
0055	60.4	73.1	63.5	55.1	0355	59.1	72.6	61.0	54.6	0655	65.1	77.1	68.0	59.6	
0100	60.3	74.6	62.0	55.1	0400	58.8	71.6	61.0	55.1						
0105	57.7	68.6	59.5	54.6	0405	59.2	74.1	60.5	55.1						
0110	60.1	78.6	60.5	54.6	0410	62.1	79.1	64.0	55.6						
0115	58.6	72.6	60.0	54.6	0415	61.1	79.6	72.5	55.6						
0120	60.1	75.1	63.0	54.6	0420	66.1	83.1	68.5	55.6						
0125	58.9	69.6	61.0	55.1	0425	59.7	70.1	62.5	55.6						
0130	59.8	74.1	62.0	54.6	0430	61.1	72.1	64.0	55.6						
0135	58.2	69.1	60.0	54.6	0435	61.3	74.6	64.0	55.6						
0140	57.7	68.6	58.5	54.6	0440	62.1	75.6	64.5	56.1						
0145	58.2	73.6	59.5	54.6	0445	63.4	76.1	66.5	56.6						
0150	60.0	72.6	62.5	54.6	0450	64.7	78.1	67.0	57.6						
0155	59.6	71.6	63.0	54.6	0455	64.1	81.6	66.0	56.6						

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**Graph 2. Time History. Background Noise.  
Rear Roof.**

