



Mr R Thandi

**Erection of extension over shop to create 2 flats
347 – 349 Wakefield Road, Denby Dale
Huddersfield, HD8 8RT**

Application Number: 2018/62/92266/E

Noise impact assessment

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1.0 Introduction

- 1.1 Spire Environmental Consultants Ltd have been appointed by Farrar Bamforth Associates to conduct a noise assessment to be submitted in support of a planning application for the erection of 2 flats over an existing shop at 347 - 349 Wakefield Road, Denby Dale, Huddersfield, HD8 8RT.
- 1.2 A number of existing air conditioning and condensing units are currently located on the existing flat roof area. In order to facilitate the construction of these apartments, these units will be re-located into the car port area on the ground floor of the existing building.
- 1.3 Short-term noise measurements have been undertaken during the operation of the air conditioning units operating on the first floor flat roof area and ground floor car port area. The cumulative level of the operation of these units can then be determined.
- 1.4 Background noise monitoring was conducted in the rear garden area of the closest residential receptor on Sunny Bank.
- 1.5 A BS 4142: 2014 assessment has been conducted in order to determine whether complaints will be likely in the proposed apartments and existing residential properties on Sunny Bank during the daytime and night-time operational periods of the condensing and air conditioning fans.
- 1.6 Internal noise levels inside the proposed apartments and closest residential properties on Sunny Bank have been predicted and assessed in accordance with BS 8233:2014 and World Health Organisation (WHO) Guidance.
- 1.7 The noise level in the external garden area at the closest residential receptors on Sunny Bank during the daytime operation of the condensing units and air conditioning fans has been predicted and assessed in accordance with BS 8233:2014 and World Health Organisation (WHO) Guidance. There is no external garden or amenity area associated with the proposed apartments.

2.0 Site Description

- 2.1 The proposals are to erect 2 flats (apartments 2 & 3) on an existing first floor flat roof area to the rear of 347 – 349 Wakefield Road, Denby Dale.
- 2.2 The north of proposed apartments 2 & 3 is an existing (apartment 1) which will be retained. To the east is a site access road and parking area, to the south are the closest existing residential properties on Sunny Bank. To the west is the site access road, beyond which there are further residential properties.
- 2.3 The proposals are for each apartment to be developed as follows:

First floor – Apartment 2

- **Living room– 12.8m²**
Room volume 12.8 x 2.4 = 30.7 m³)
Window (0.7 x 0.5 = 0.35 m²)
- **Bedroom– 10.4m²**
Room volume 10.4 x 2.4 = 25.0 m³)
Window (0.7 x 0.5 = 0.35 m²)

First floor – Apartment 3

- **Living room– 15.0m²**
Room volume 15.0 x 2.4 = 36.0 m³)
Window (0.7 x 0.5 = 0.35 m²)
- **Bedroom– 10.3m²**
Room volume 10.3 x 2.4 = 24.7 m³)
Window (0.7 x 0.5 = 0.35 m²)

3.0 Noise Criteria

3.1 Introduction

- 3.1.1 The ambient environmental noise at any location will vary according to the activities in progress around that location. In the vicinity of a busy motorway, for example, the noise level will remain fairly constant due to the relatively steady noise input from road traffic, whereas the noise level close to a source of high noise over short periods, such as an airport, will vary over a much wider range. It is therefore necessary to consider how to quantify the existing noise levels in an area in order to accurately assess the acceptability of the introduction of a new noise source.
- 3.1.2 The background noise level, defined as the L_{A90} parameter, represents the noise level exceeded for 90% of a measurement period. It generally represents the lower noise levels between noise events and tends to ignore the effects of short term higher noise level events.
- 3.1.3 The L_{A10} represents the noise level exceeded for 10% of the measurement period and is commonly used to describe and quantify noise from road traffic.
- 3.1.4 The equivalent continuous sound pressure level, or L_{Aeq} parameter, is a measure of the average sound energy over a given measurement period or time period. It will include noise from all contributing sources. Unless the noise level at the receiving point is perfectly steady for the duration of the measurement period, the L_{Aeq} will always be higher than the L_{A90} .

3.2 BS 4142 Assessment

- 3.2.1 The guidance set out within BS 4142 is related to the likelihood of complaints from local residents in response to noise resulting from either the introduction of a new industrial or commercial facility or the operation/alteration of an existing one.
- 3.2.2 The likelihood of complaint is assessed by direct comparison of the rating level of the source (the specific noise level of the source, adjusted for individual characteristics of the noise, if necessary), to the existing background noise level measured in its absence.

Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

- 3.2.3 The comparison can be undertaken by the use of either direct measurement on site of both background and specific noise levels, or where this is not possible due to practical reasons; the expected rating level can be calculated and then compared with the measured background noise level.
- 3.2.4 In order to obtain the significance of the sound of an industrial or commercial nature, the measured background level should be subtracted from the rating level and then the following should be considered.
- a) *Typically, the greater this difference, the greater the magnitude of the impact.*
 - b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
 - c) *A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.*
 - d) *The lower the rating level is relative to the measured background sound level; the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

3.3 BS 8233:2014

- 3.3.1 The criteria in BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings” has been chosen as a suitable method for determining an adequate level of noise control to ensure that noise levels within the closest residential properties, meet the following noise guidance values specified in the standard:

Activity	Location	07:00 – 2300	23:00 – 0700
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 1 Ambient indoor noise levels for dwellings

- 3.3.2 In section 7.7.3.2 Design criteria for external noise, the following guidance is contained within this standard:

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guidance value of 55 dB $L_{Aeq,T}$, which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development may be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited”.

3.4 Guidelines for Community Noise

- 3.4.1 This document published by the World Health Organisation in 1999 and gives guidance on noise levels within community settings.
- 3.4.2 For dwellings, indoor guidance values are specified as 30 dB L_{Aeq} for continuous noise and 45 $L_{Amax,f}$ for single source events. These refer to indoor noise levels.
- 3.4.3 During the night-time period (i.e. 23.00 – 07.00 hours), outside sound levels about 1 metre from facades of living spaces should not exceed 45 L_{Aeq} , so that people may sleep with the windows open. This document assumes the noise reduction from outside to inside with a window open is 15 dB.

3.5 Local authority criteria

3.5.1 The conditions specified by the Local Authority with respect to noise are detailed below.

5. *Before development commences, a report specifying the measures to be taken to protect the development from noise from commercial premises shall be submitted to and approved in writing by the Local Planning Authority.*

The report shall:

- (i) Determine the existing noise climate*
- (ii) Predict the noise climate in gardens (daytime), bedrooms (night-time) and other habitable rooms of the development.*
- (iii) Detail the proposed attenuation/design necessary to protect the amenity of the occupants of the new residences (including ventilation if required).*

The development shall not be occupied until all works specified within the approved report have been carried out in full and such works shall be thereafter retained.

Reason: *In the interests of amenity of the occupiers of these properties and to accord with the requirements of Policy EP4 of the Kirklees Unitary Development Plan, Policy PLP 52 of the Kirklees Publication Draft Local Plan as well as Chapter 15 of the National Planning Policy Framework.*

4.0 Noise Surveys

4.1 Introduction

- 4.1.1 Background noise monitoring has also been conducted in the rear garden area of the closest residential properties on Sunny Bank for a continuous period between 2300 on Thursday 10th January – 0700 hours on Thursday 17th January 2019. The noise monitoring location is shown in Figure 1.
- 4.1.2 Prior to the start of the background survey period, short-term noise measurements were undertaken of the existing condensing and air conditioning fans operating on the first and ground floor levels of the existing building. These levels were used to predict the level of these units to the closest noise sensitive receptors.
- 4.1.3 The noise measurements were undertaken using a Cirrus 1710 Type 1 sound level meter (serial number G061905). The sound level meter was calibrated with a Cirrus CR 515 calibrator (serial number 64316) at the start and end of the survey periods. There was no variation in the calibration level. The measurements were obtained with the sound level meter on a tripod at a height of 1.2m above the ground.

4.2 Weather conditions

Date	Minimum temperature °C	Maximum temperature °C	Average Wind speed (m/s)	Wind direction	Precipitation
Thursday 10 th January	-1	8.9	1.8	W	Light rain
Friday 11 th January	2.2	7.8	2.7	NW	None
Saturday 12 th January	7.8	11.1	5.8	W	None
Sunday 13 th January	7.2	12.2	7.6	W	None
Monday 14 th January	5.0	7.2	3.1	W	None
Tuesday 15 th January	7.8	10.0	6.3	W	None
Wednesday 16 th January	2.8	8.9	4.5	SW	Light rain
Thursday 17 th January	-1	3.9	5.8	NW	None

Table 2 – Weather conditions during the survey periods

- 4.2.1 The weather conditions table (above), show the average temperature, wind speed, direction and precipitation during the survey period (10 – 17th January 2019).
- 4.2.2 The average wind speeds were above 5 m/s on 12th, 13th, 15th and 17th January 2019. These periods will therefore be excluded from this assessment.

4.3 Plant Noise Survey - Introduction

- 4.3.1 The proposed flats are to be constructed on the existing flat roof area at the rear of the existing shop at 347 – 349 Wakefield Road. A number of air conditioning and condensing fans are currently operating on the existing flat roof area. In order to facilitate the construction of the proposed flats, these fans will need to be re-located adjacent to the existing fans located in the car port area at the ground floor of the premises. The noise levels of fans recorded on the first floor and ground floor levels are detailed below.

4.4 Plant Noise Survey – First floor flat roof area

- 4.4.1 Two Daikin air conditioning fans, a J & E Hull freezer condensing unit and a drinks fridge condensing unit were existing operating on the first-floor flat roof area. Table 3 (below) shows a summary of the measured noise levels of each operational fan. The full octave band levels are shown in Appendix 3. Noise measurements were undertaken at 1m from each source using a type 1 sound level meter, tripod mounted at a height of 1.2 m above the ground. The drinks fridge condensing unit was not monitoring during the survey period.

Plant description	Measurement time (hours:minutes)	Operational period	L _{Aeq}
Daikin air conditioning fan 1	01:32	Daytime only	60.1
Daikin air conditioning fan 2	01:35	Daytime only	59.4
J & E Hull freezer condensing unit	01:42	Day & night	55.9

Table 3 – First floor flat roof area plant noise summary

4.5 Plant Noise Survey – Ground floor car port/loading area

- 4.5.1 Inside the ground floor car port area, a drinks fridge condenser and a main fridge condensing unit are currently operating. Table 4 (below) shows a summary of the measured noise levels of each operational fan. The full octave band levels are shown in Appendix 3. Noise measurements were undertaken at 1m from each source using a type 1 sound level meter, tripod mounted at a height of 1.2 m

Plant description	Measurement time (hours:minutes)	Operational period	L _{Aeq}
Drinks fridge condenser	01:22	Daytime only	69.1
Main fridge condensing unit	01:25	Day & night	57.1

Table 4 – Ground floor car port plant noise summary

4.6 Background Noise Survey

- 4.6.1 Background noise monitoring was conducted in the rear garden of the closest noise sensitive receptors on Sunny Bank. The background survey was conducted between 2300 hours on Thursday 10th January and 0700 hours on Thursday 17th January 2019. The monitoring location is shown in Figure 1.
- 4.6.2 A summary of the background noise monitoring results obtained at the background noise monitoring location during the daytime (0700 – 2300) and night-time periods (2300 – 0700) are shown in Tables 5 and 6.

Date	dB L _{Aeq,1h}	dB L _{A10,1h}	dB L _{A90,1h}	dB L _{Amax,f 1h}
Friday 11 th January	46 – 52	49 – 54	38 – 48	60 – 84
Saturday 12 th January	47 – 53	50 – 55	43 – 50	60 – 76
Sunday 13 th January	46 – 54	49 – 56	40 – 52	60 – 73
Monday 14 th January	45 – 53	47 – 55	38 – 48	61 – 77
Tuesday 15 th January	45 – 53	48 – 56	39 – 50	62 – 82
Wednesday 16 th January	46 – 61	49 – 59	37 – 50	60 – 95

Table 5 – Sunny Bank daytime noise survey results

- 4.6.3 The background noise survey during the daytime period at Sunny Bank was conducted between Friday 11th and Wednesday 16th January 2019. These are shown in Table 5 (above).
- 4.6.4 The noise climate at this location was influenced by the operation of condensing fans, road traffic noise and bird song. The lowest background sound level of 37 L_{A90,1h} occurred on Wednesday 16th January 2019.

Date	dB L _{Aeq,1h}	dB L _{A10,1h}	dB L _{A90,1h}	dB L _{Amax,f 1h}
Thursday 10 th – Friday 11 th January	39 – 50	42 – 53	30 – 42	57 – 64
Friday 11 th – Saturday 12 th January	41 – 48	43 – 50	36 – 42	57 – 72
Saturday 12 th – Sunday 13 th January	47 – 53	49 – 55	41 – 49	59 – 74
Sunday 13 th – Monday 14 th January	42 – 51	44 – 54	34 – 46	61 – 67
Monday 14 th – Tuesday 15 th January	41 – 52	43 – 55	36 – 45	56 – 69
Tuesday 15 th – Wednesday 16 th January	38 – 50	40 – 53	34 – 45	54 – 65
Wednesday 16 th – Thursday 17 th January	41 – 51	44 – 54	29 – 43	59 – 67

Table 6 – Sunny Bank night-time noise survey results

- 4.6.5 The background noise survey during the night-time period at Sunny Bank was conducted between Thursday 10th and Thursday 17th January 2019. These are shown in Table 6 (above).
- 4.6.6 The noise climate at this location was influenced by the operation of condensing fans. The lowest background sound level of 29 L_{A90,1h} occurred between Wednesday 16th and Thursday 17th January 2019.

5.0 BS 4142 Assessment

5.1 Introduction

- 5.1.1 Two new apartments are proposed on an existing flat roof area at the rear of 347 – 349 Wakefield Road, Denby Dale. The existing condensing and air conditioning units which are currently located on this flat roof area will be re-located adjacent to the existing units currently operating in the ground floor carport area.
- 5.1.2 The cumulative impact of the units operating in the ground floor car port area has been assessed during the daytime and night-time operational periods. These are discussed below.

5.2 Daytime BS 4142 Assessment

- 5.2.1 During the daytime period, in order to present a worst case scenario, the simultaneous operation of 2x Daikin air conditioning fans, 1x J & E Hull freezer condensing unit, 2x drinks fridge condensers and a main fridge condensing unit have been considered. The cumulative noise level during the operation of these units is shown in Appendix 3.
- 5.2.2 The proposed and existing condensing and air conditioning units will be located on the internal walls of the ground floor car port area. Timber acoustic enclosures lined with 2cm mineral wool have been specified. The insertion loss for the mineral wool is shown in Appendix 6.
- 5.2.3 The sound exposure level table for the daytime operations is shown in Appendix 4.1. An additional + 3dB correction has been added as the Daikin air conditioning units and J & E Hull freezer condensing unit were measured at the building façade on the existing flat roof area, and they will be moved to be inside a building (car port). A 100% on time has been assumed. The relevant distance corrections to the proposed apartments and closest residential receptor at Sunny Bank have been applied.

	Proposed apartments	Sunny Bank
Specific noise level at receiver - dBL _{Aeq,1h}	23	19
Acoustic character correction – dB	+ 3	+ 3
Rating Level dB	26	22
Background Sound Level dBL _{A90,1h}	37	37
Difference dB, (rounded to nearest decibel)	- 11	- 15

Table 7 – Daytime BS 4142 Assessment

- 5.2.3 An intermittency correction of + 3dB has been applied to the specific noise level as the air conditioning and condensing fans are likely to turn on and off when required.
- 5.2.4 The rating levels at the proposed apartments and closest residential properties on Sunny Bank during the daytime period are well below the existing background sound level.

5.3 Night-time BS 4142 Assessment

- 5.3.1 During the night-time period, the shop will be closed, therefore the Daikin air conditioning units and drinks fridge condensing units will not be operating as they will be switched off. In order to present a worst case scenario, the simultaneous operation of the J & E Hull freezer condensing unit and main fridge condensing unit have been considered. The cumulative noise level during the operation of these units is shown in Appendix 3.
- 5.3.2 The proposed and existing condensing and air conditioning units will be located on the internal walls of the ground floor car port area. Timber acoustic enclosures lined with 2cm mineral wool have been specified. The insertion loss for the mineral wool is shown in Appendix 6.
- 5.3.3 The sound exposure level table for the night-time operations is shown in Appendix 4.2. An additional + 3dB correction has been added as the J & E Hull freezer condensing unit was measured at the building façade on the existing flat roof area and will be moved to be inside a building (car port). A 100% on time has been assumed. The relevant distance corrections to the proposed apartments and closest residential receptor at Sunny Bank have been applied.

	Proposed apartments	Sunny Bank
Specific noise level at receiver - dBL _{Aeq,15m}	13	9
Acoustic character correction – dB	+ 3	+ 3
Rating Level dB	16	12
Background Sound Level dBL _{A90,1h}	29	29
Difference dB, (rounded to nearest decibel)	- 13	- 17

Table 8 – Night-time BS 4142 Assessment

- 5.3.4 An intermittency correction of + 3dB has been applied to the specific noise level as the condensing fans are likely to turn on and off when required.
- 5.3.5 The rating levels at the proposed apartments and closest residential properties on Sunny Bank during the night-time period are well below the existing background sound level.

6.0 BS 8233/WHO Assessments

6.1 Introduction

6.1.1 The BS 8233:2014 standard provides internal and external amenity space values for residential dwellings. Internal levels are expressed as daytime 16-hour limits (0700 – 2300) and night-time 8-hour limits (2300 – 0700). These are between 35 and 40 $L_{Aeq,16hour}$ during the daytime period and 30 $L_{Aeq,8hour}$ during the night-time period. This night-time noise limit is also contained in WHO Guidelines for Community Noise, 1999. These tabulated values are shown in Table 1.

6.1.2 Noise criteria are also specified for outside gardens and amenity spaces, with a desirable level of 50 dB $L_{Aeq,T}$ and upper guidance level of 55 dB $L_{Aeq,T}$.

6.2 Daytime Internal levels

6.2.1 The daytime period in BS 8233 is a 16-hour period between 0700 and 2300 hours. As a worst-case, the condensing and air conditioning units have been assumed to be operating for 100% of the time during the daytime period.

Date	dB $L_{Aeq,16h}$
Friday 11 th January	50
Saturday 12 th January	51
Sunday 13 th January	51
Monday 14 th January	51
Tuesday 15 th January	51
Wednesday 16 th January	53

Table 9 – Summary of daytime noise levels

6.2.2 A summary of the measured daytime noise levels ($L_{Aeq,16h}$) obtained in the rear garden of the closest residential receptor on Sunny Bank are shown in Table 12 (above). The typical ambient noise level obtained during the survey period was 51 dB $L_{Aeq,16h}$.

6.2.3 External to internal noise levels have been calculated by subtracting 15 dB for a half-open window. This is specified in WHO Guidelines for Community Noise, 1999.

6.2.4 When taking account of the existing ambient noise level at this location, the predicted external noise levels (including the operation of the condensing and air conditioning fans are 36 $L_{Aeq,16h}$ at the proposed apartments and 36 $L_{Aeq,16h}$ at the closest residential receptors on Sunny Bank. This is marginally above the lower guidance value of 35 $L_{Aeq,16h}$, but well below the higher daytime guidance value of 40 $L_{Aeq,16h}$.

6.3 Night-time Internal levels

- 6.3.1 The night-time period in BS 8233 is an 8-hour period between 2300 and 0700 hours. As a worst-case, the condensing and air conditioning units has been assumed to be operating for 100% of the time during the night-time period.

Date	dB $L_{Aeq,8h}$
Thursday 10 th – Friday 11 th January	45
Friday 11 th – Saturday 12 th January	45
Saturday 12 th - Sunday 13 th January	50
Sunday 13 th - Monday 14 th January	46
Monday 14 th – Tuesday 15 th January	47
Tuesday 15 th - Wednesday 16 th January	45
Wednesday 16 th – Thursday 17 th January	46

Table 10 – Summary of night-time noise levels

- 6.3.2 A summary of the measured night-time noise levels ($L_{Aeq,8h}$) obtained in the rear garden of the closest residential receptor on Sunny Bank are shown in Table 13 (above). The typical ambient noise level obtained during the survey period was 45 dB $L_{Aeq,8h}$, which was obtained on three separate occasions.
- 6.3.3 External to internal noise levels have been calculated by subtracting 15 dB for a half-open window. This is specified in WHO Guidelines for Community Noise, 1999.
- 6.3.4 When taking account of the existing ambient noise level at this location, the predicted external noise levels (including the operation of the condensing and air conditioning fans are 30 $L_{Aeq,16h}$ at the proposed apartments and 30 $L_{Aeq,16h}$ at the closest residential receptors on Sunny Bank. The predicted internal noise levels meet the night-time guidance value of 30 $L_{Aeq,8h}$.

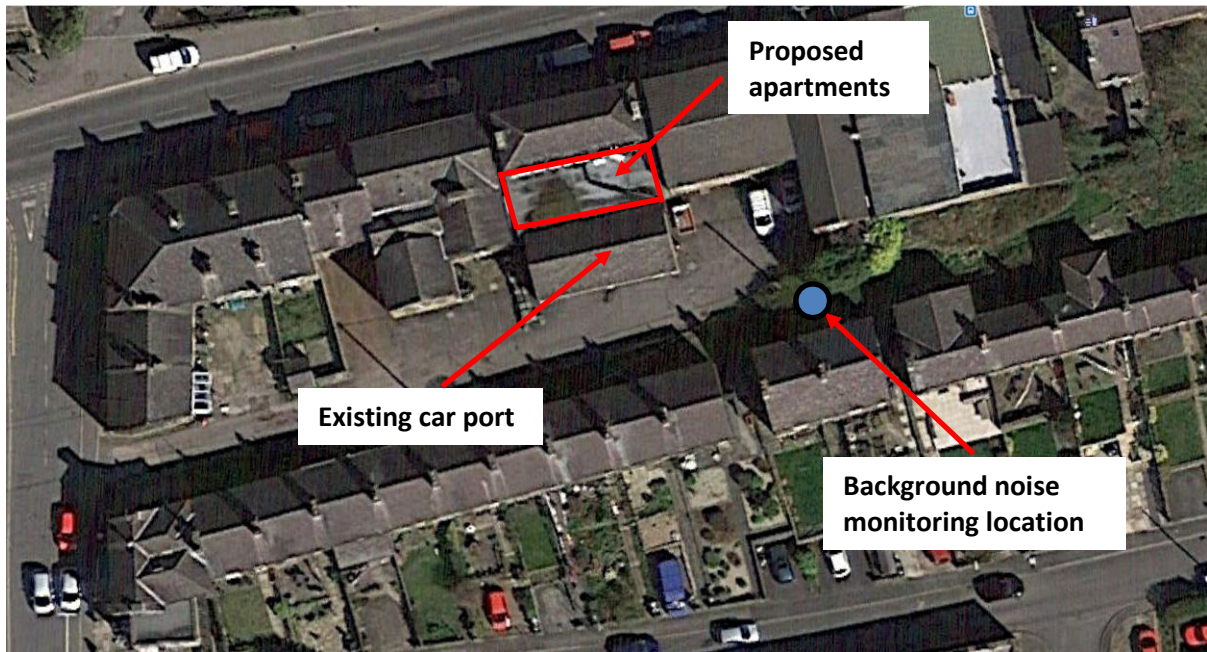
6.4 External Noise levels

- 6.4.1 External noise limits in outside amenity areas are specified for the daytime period only (0700 - 2300). According to BS 8233:2014, it is desirable that the external noise level does not exceed 50 $L_{Aeq,T}$, with an upper guideline value of 55 $L_{Aeq,T}$.
- 6.4.2 There is no balcony or external amenity space associated with the proposed apartments. External predicted noise levels (including the operation of the air conditioning and condensing units) are 51 $L_{Aeq,T}$ at the closest residential receptors on Sunny Bank. This is marginally above the lower guidance value of 50 $L_{Aeq,T}$, but is well below the upper guidance value of 55 $L_{Aeq,T}$.

7.0 Conclusions

- 7.1 This noise assessment has considered the operation of the existing and re-located condensing and air conditioning fans on the closest of the proposed apartments and residential receptors on Sunny Bank.
- 7.2 In order to determine the existing noise climate, background noise monitoring was conducted in the rear garden of one of the closest residential properties on Sunny Bank.
- 7.3 BS 4142:2014 assessments were conducted during the daytime and night-time operating periods of the condensing and air conditioning fans. The rating levels are below the existing background sound levels at the proposed apartments and closest residential receptors on Sunny Bank. Therefore, the BS 4142:2014 assessment indicates a low impact.
- 7.4 The internal noise levels were predicted inside the closest of the proposed apartments and residential receptor on Sunny Bank and assessed against BS 8233:2014. These predictions have assessed the cumulative impact of the existing ambient noise level and predicted noise level during the operation of the condensing and air conditioning units. Internal levels inside the proposed apartments were marginally above the lowest specified daytime value of 35 $L_{Aeq,16h}$, this value was met inside the closest residential receptors on Sunny Bank. The higher guidance value of 40 $L_{Aeq,16h}$, was not exceeded at both receptors. The night-time internal guidance value of 30 $L_{Aeq,8h}$ was not exceeded at both receptors.
- 7.5 There is no outside amenity space associated with the proposed apartments. At the closest residential properties on Sunny Bank, the rear garden area was assessed in accordance with BS 8233:2014. The predicted noise level was marginally above the lower guidance value of 51 $L_{Aeq,T}$, but well below the higher guidance value of 55 $L_{Aeq,T}$.
- 7.6 The noise calculations have assumed an acoustic enclosure is in place around the condensing and air conditioning units in the ground floor car port area. The only opening on the acoustic enclosures shall be on the north side i.e. in the direction of the rear wall of the existing shop building. The acoustic enclosure should be lined with mineral wool (such as Rock Wool) with a thickness of at least 2cm. It should be sealed against the ground at its base and constructed in such a way that gaps do not open up as the structure weathers. A timber acoustic enclosure constructed of weather treated timber or plywood with a minimum thickness of 21mm would be suitable.
- 7.7 As the attenuation provided by a half open window provides adequate attenuation, mechanical ventilation will not be required, and standard double glazed windows can be used in the proposed apartments.

Figure 1 – Background noise monitoring location



Appendix 1 Broadband background noise survey results

Appendix 1.1 – Thursday/Friday 10th/ 11th January 2019 (night-time period)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
2300 – 2315	46.2	49.4	34.8	62.5
2315 – 2330	44.4	47.0	34.5	62.7
2330 – 2345	45.0	48.0	35.2	61.9
2345 – 0000	42.2	44.1	31.4	64.3
Over 1.0-hour period	45	47	34	*64
0000 – 0015	40.6	42.8	32.8	58.8
0015 – 0030	41.6	43.9	32.8	59.7
0030 – 0045	40.3	43.3	30.3	57.9
0045 – 0100	39.5	43.6	31.6	52.9
Over 1.0-hour period	41	43	32	*60
0100 – 0115	40.0	43.4	31.9	56.2
0115 – 0130	38.5	42.5	29.4	56.9
0130 – 0145	38.7	42.9	32.0	49.7
0145 – 0200	38.5	42.5	29.7	56.5
Over 1.0-hour period	39	43	31	*57
0200 – 0215	38.9	42.3	29.9	47.5
0215 – 0230	38.1	41.9	30.1	55.5
0230 – 0245	39.8	42.8	30.3	58.7
0245 – 0300	39.7	42.2	30.5	62.8
Over 1.0-hour period	39	42	30	*63
0300 – 0315	38.6	42.5	29.3	56.7
0315 – 0330	40.3	42.9	31.7	60.5
0330 – 0345	37.5	41.8	29.6	54.2
0345 – 0400	37.9	41.4	31.8	54.9
Over 1.0-hour period	39	42	31	*61

*Maximum value obtained during the survey period

Appendix 1.1 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0400 – 0415	37.2	39.6	30.0	56.8
0415 – 0430	44.8	48.3	32.0	62.7
0430 – 0445	43.5	44.6	39.3	58.7
0445 – 0500	46.2	48.4	41.9	59.6
Over 1.0-hour period	44	45	36	*63
0500 – 0515	47.1	48.4	43.3	60.2
0515 – 0530	46.6	48.6	38.3	60.8
0530 – 0545	45.2	48.2	37.9	59.6
0545 – 0600	48.2	52.3	38.8	60.3
Over 1.0-hour period	47	49	40	*61
0600 – 0615	48.5	52.1	38.6	60.7
0615 – 0630	48.3	52.3	40.2	60.4
0630 – 0645	50.5	53.3	46.1	63.5
0645 – 0700	50.5	53.5	44.8	63.4
Over 1.0-hour period	50	53	42	*64
Over 8.0-hour period	45	46	35	*64

*Maximum value obtained during the survey period

Appendix 1.2 – Friday 11th January 2019 (daytime period)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0700 – 0715	50.8	53.3	45.5	62.9
0715 – 0730	52.3	54.1	46.9	73.9
0730 – 0745	51.3	53.4	47.7	72.5
0745 – 0800	52.3	53.9	47.2	69.0
Over 1.0-hour period	52	54	47	*74
0800 – 0815	54.9	58.5	47.2	75.8
0815 – 0830	51.3	53.2	47.9	60.8
0830 – 0845	50.8	52.8	47.3	64.7
0845 – 0900	51.2	53.3	47.9	70.1
Over 1.0-hour period	52	54	48	*76
0900 – 0915	51.8	53.5	48.2	70.6
0915 – 0930	52.2	52.5	46.7	84.4
0930 – 0945	49.5	51.5	45.1	75.1
0945 – 1000	50.8	52.4	46.9	73.3
Over 1.0-hour period	51	52	47	*84
1000 – 1015	51.5	53.7	47.0	64.0
1015 – 1030	50.3	52.4	45.4	63.8
1030 – 1045	49.7	52.1	45.4	62.1
1045 – 1100	49.9	51.8	46.3	62.3
Over 1.0-hour period	50	53	46	*64
1100 – 1115	51.8	53.1	47	68.3
1115 – 1130	50.6	52.5	47.6	66.0
1130 – 1145	49.5	51.8	45.1	67.8
1145 – 1200	49.5	51.6	45.2	65.5
Over 1.0-hour period	50	52	46	*68
1200 – 1215	49.1	51.5	44.8	65.3
1215 – 1230	50.7	52.3	47.2	63.3
1230 – 1245	49.9	51.9	46.0	69.0
1245 – 1300	50.2	52.8	45.7	63.7
Over 1.0-hour period	50	52	46	*69

*Maximum value obtained during the survey period

Appendix 1.2 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1300 – 1315	49.9	51.5	45.8	62.9
1315 – 1330	49.9	52.1	45.6	61.8
1330 – 1345	49.8	51.5	46.3	64.4
1345 – 1400	49.8	51.7	45.7	69.8
Over 1.0-hour period	50	52	46	*70
1400 – 1415	50.6	52.4	47.7	64.7
1415 – 1430	49.9	51.7	46.4	59.8
1430 – 1445	51.1	52.6	48.0	74.3
1445 – 1500	53.7	52.5	46.2	69.6
Over 1.0-hour period	52	52	47	*74
1500 – 1515	50.4	51.8	45.6	72.0
1515 – 1530	50.3	52.5	46.4	59.4
1530 – 1545	49.6	51.8	46.5	58.8
1545 – 1600	49.0	51.2	45.5	59.8
Over 1.0-hour period	50	52	46	*72
1600 – 1615	49.2	51.5	45.7	60.7
1615 – 1630	49.3	51.3	46.2	56.6
1630 – 1645	50.4	52.2	45.2	71.7
1645 – 1700	50.1	52.1	46.4	62.7
Over 1.0-hour period	50	52	46	*72
1700 – 1715	49.9	52.0	45.1	70.3
1715 – 1730	49.8	52.0	45.3	67.9
1730 – 1745	50.9	52.7	48.1	61.8
1745 – 1800	49.5	51.7	45.2	68.0
Over 1.0-hour period	50	52	46	*70
1800 – 1815	49.3	51.7	45.1	61.2
1815 – 1830	49.0	51.3	45.6	59.9
1830 – 1845	48.4	50.8	44.5	55.5
1845 – 1900	49.6	52.2	44.1	67.2
Over 1.0-hour period	49	52	45	*67

*Maximum value obtained during the survey period

Appendix 1.2 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1900 – 1915	48.6	51.6	43.4	64.9
1915 – 1930	50.6	53.9	43.0	72.0
1930 – 1945	47.9	50.6	42.6	58.3
1945 – 2000	48.3	51.3	42.9	58.9
Over 1.0-hour period	49	52	43	*72
2000 – 2015	47.8	50.6	41.9	61.8
2015 – 2030	48.2	50.9	42.7	57.8
2030 – 2045	48.1	51.2	40.5	57.9
2045 – 2100	46.6	49.7	41.5	58.0
Over 1.0-hour period	48	51	42	*62
2100 – 2115	46.2	49.4	39.1	64.5
2115 – 2130	46.5	50.0	40.3	58.6
2130 – 2145	46.7	50.0	39.7	60.1
2145 – 2200	45.4	49.4	38.2	57.2
Over 1.0-hour period	46	50	39	*65
2200 – 2215	46.3	50.4	38.5	59.5
2215 – 2230	46.3	49.8	38.8	58.5
2230 – 2245	46.7	49.9	39.3	58.9
2245 – 2300	44.2	46.9	36.4	59.8
Over 1.0-hour period	46	49	38	*60
Over 16.0-hour period	50	52	45	*84

*Maximum value obtained during the survey period

Appendix 1.3 – Friday/Saturday 11th/ 12th January 2019 (night-time period)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
2300 – 2315	44.7	48.1	37.5	57.7
2315 – 2330	43.8	47.1	37.8	59.3
2330 – 2345	46.2	48.8	38.1	62.8
2345 – 0000	45.6	48.1	39.5	59.0
Over 1.0-hour period	45	48	38	*63
0000 – 0015	43.6	45.9	39.9	56.3
0015 – 0030	46.1	48.8	40.9	68.2
0030 – 0045	44.9	47.6	39.9	56.4
0045 – 0100	42.5	45.4	36.2	55.7
Over 1.0-hour period	44	47	39	*68
0100 – 0115	41.3	43.7	35.3	56.9
0115 – 0130	42.9	46.2	36.7	54.6
0130 – 0145	44.2	47.7	37.3	57.4
0145 – 0200	41.1	43.6	35.8	54.7
Over 1.0-hour period	43	45	36	*57
0200 – 0215	41.3	42.3	35.2	64.2
0215 – 0230	40.9	42.8	35.3	60.2
0230 – 0245	39.5	41.4	35.7	56.8
0245 – 0300	41.3	43.8	36.9	58.3
Over 1.0-hour period	41	43	36	*64
0300 – 0315	41.2	43.4	36.5	56.0
0315 – 0330	42.0	43.8	38.4	54.4
0330 – 0345	44.6	46.9	38.7	62.6
0345 – 0400	42.1	44.6	37.5	58.8
Over 1.0-hour period	43	45	38	*63
0400 – 0415	40.5	42.4	37.3	57.1
0415 – 0430	46.2	48.3	39.1	61.5
0430 – 0445	43.6	44.8	41.7	58.9
0445 – 0500	45.3	48.1	38.5	58.7
Over 1.0-hour period	44	46	39	*62

*Maximum value obtained during the survey period

Appendix 1.3 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0500 – 0515	44.8	48.5	38.1	62.4
0515 – 0530	44.9	48.4	40.5	60.6
0530 – 0545	46.2	48.1	41.5	59.7
0545 – 0600	48	50.4	43.1	61.1
Over 1.0-hour period	46	49	41	*62
0600 – 0615	47.7	50.5	41.6	60.6
0615 – 0630	46.7	49	41.3	59.5
0630 – 0645	46.6	48.7	42.5	57.3
0645 – 0700	49.4	51.4	44.2	71.9
Over 1.0-hour period	48	50	42	*72
Over 8.0-hour period	45	47	39	*72

*Maximum value obtained during the survey period

Appendix 1.4 – Saturday 12th January 2019 (daytime period)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0700 – 0715	48.7	50.9	43.9	58.4
0715 – 0730	49.4	51.9	43.6	67.8
0730 – 0745	51.6	53.9	47.4	69.3
0745 – 0800	51.0	53.7	46.9	62.1
Over 1.0-hour period	50	53	45	*69
0800 – 0815	49.8	52.4	45.4	59.0
0815 – 0830	51.5	53.2	47.5	67.3
0830 – 0845	50.7	53.3	46.8	59.7
0845 – 0900	51.8	53.8	47.5	67.6
Over 1.0-hour period	51	53	47	*68
0900 – 0915	53.1	54.9	49.2	65.4
0915 – 0930	52.2	53.5	48.7	74.9
0930 – 0945	51.5	53.0	48.6	67.0
0945 – 1000	52.1	53.4	50.1	66.2
Over 1.0-hour period	52	54	49	*75
1000 – 1015	52.0	53.9	49.4	62.9
1015 – 1030	51.8	53.4	48.8	73.1
1030 – 1045	52.9	53.8	48.8	75.2
1045 – 1100	51.8	53.0	49.0	74.6
Over 1.0-hour period	52	54	49	*75
1100 – 1115	51.8	53.3	49.3	59.8
1115 – 1130	51.6	53.3	49.1	59.3
1130 – 1145	51.7	53.1	49.9	63.2
1145 – 1200	50.7	52.8	47.4	63.7
Over 1.0-hour period	51	53	49	*64
1200 – 1215	53.6	53.9	48.5	75.5
1215 – 1230	52.6	54.1	50.2	67.1
1230 – 1245	51.8	53.3	49.7	66.6
1245 – 1300	52.9	54.7	49.4	69.4
Over 1.0-hour period	53	54	49	*76

*Maximum value obtained during the survey period

Appendix 1.4 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1300 – 1315	50.9	52.6	48.8	63.4
1315 – 1330	50.8	52.9	47.7	63.3
1330 – 1345	52.0	53.8	49.1	62.3
1345 – 1400	52.0	53.8	48.9	65.6
Over 1.0-hour period	51	53	49	*66
1400 – 1415	51.8	53.7	48.9	72.4
1415 – 1430	51.7	53.7	49.0	61.0
1430 – 1445	52.0	53.6	49.7	63.2
1445 – 1500	52.3	54.1	49.6	65.2
Over 1.0-hour period	52	54	49	*72
1500 – 1515	52.6	54.4	49.6	62.7
1515 – 1530	53.4	55.0	50.5	67.5
1530 – 1545	52.7	54.3	50.2	62.2
1545 – 1600	52.9	54.0	50.5	68.1
Over 1.0-hour period	53	54	50	*68
1600 – 1615	53.3	54.8	50.3	71.4
1615 – 1630	52.2	53.9	49.5	64.6
1630 – 1645	52.1	53.9	49.4	62.3
1645 – 1700	50.8	52.6	47.1	68.7
Over 1.0-hour period	52	54	49	*71
1700 – 1715	51.6	53.4	48.6	70.6
1715 – 1730	53.4	55.5	49.9	63.8
1730 – 1745	52.6	54.6	50.0	60.7
1745 – 1800	52.8	54.7	50.1	64.2
Over 1.0-hour period	53	55	50	*71
1800 – 1815	52.4	54.7	49.4	70.7
1815 – 1830	52.6	54.7	49.4	61.5
1830 – 1845	51.5	53.6	48.7	60.5
1845 – 1900	50.6	53.1	47.2	61.0
Over 1.0-hour period	52	54	49	*71

*Maximum value obtained during the survey period

Appendix 1.4 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1900 – 1915	51.3	53.7	47.7	70.8
1915 – 1930	50.8	53.0	47.8	60.0
1930 – 1945	49.9	51.5	47.8	58.5
1945 – 2000	50.6	52.9	47.1	63.0
Over 1.0-hour period	51	53	48	*71
2000 – 2015	50.0	51.8	45.5	71.3
2015 – 2030	51.1	53.6	47.1	63.6
2030 – 2045	49.8	52.2	46.3	61.3
2045 – 2100	49.7	52.5	45.3	59.0
Over 1.0-hour period	50	53	46	*71
2100 – 2115	49.6	52.7	45.1	63.4
2115 – 2130	47.6	50.2	43.3	58.2
2130 – 2145	48.1	50.8	42.1	74.3
2145 – 2200	47.5	50.2	42.5	73.9
Over 1.0-hour period	48	51	43	*74
2200 – 2215	47.4	50.5	42.1	57.9
2215 – 2230	46.9	50.1	42.6	58.1
2230 – 2245	46.6	49.2	42.3	59.6
2245 – 2300	48.6	51.2	44.4	60.1
Over 1.0-hour period	47	50	43	*60
Over 16.0-hour period	51	53	48	*76

*Maximum value obtained during the survey period

**Appendix 1.5 – Saturday/Sunday 12th/ 13th January 2019
(night-time period)**

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
2300 – 2315	49.7	52.2	45.6	68.7
2315 – 2330	50.4	52.4	46.1	65.3
2330 – 2345	47.8	50.2	43.6	61.3
2345 – 0000	48.3	50.5	43.6	67.2
Over 1.0-hour period	49	51	45	*68
0000 – 0015	51.7	52.9	47.5	74.1
0015 – 0030	52.5	54.7	48.3	64.2
0030 – 0045	53.9	56.5	50.5	67.1
0045 – 0100	53.7	55.9	50.5	69.1
Over 1.0-hour period	53	55	49	*74
0100 – 0115	52.3	54.6	48.8	67.4
0115 – 0130	52.6	54.7	49.3	65.4
0130 – 0145	49.1	51.7	45	61.2
0145 – 0200	47.8	50.1	43.9	62.7
Over 1.0-hour period	51	53	47	*65
0200 – 0215	49.7	51.8	46.4	61.8
0215 – 0230	52.5	55.1	47.0	78.7
0230 – 0245	49.7	51.6	46.5	68.4
0245 – 0300	50.2	52.3	46.9	68.0
Over 1.0-hour period	51	53	47	*79
0300 – 0315	51.2	53.6	46.8	64.8
0315 – 0330	50.1	52.9	44.6	69.0
0330 – 0345	47.9	50.2	45.2	58.4
0345 – 0400	47.5	49.6	44.2	60.4
Over 1.0-hour period	49	52	45	*69
0400 – 0415	50.2	52.9	46.2	61.1
0415 – 0430	51.0	52.9	47.1	65.4
0430 – 0445	49.7	50.9	47.0	65.0
0445 – 0500	49.6	51.6	46.7	63.7
Over 1.0-hour period	50	52	47	*65

*Maximum value obtained during the survey period

Appendix 1.5 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0500 – 0515	50.2	51.8	47.7	60.1
0515 – 0530	47.8	49.1	45.0	61.3
0530 – 0545	45.4	48.4	39.6	59.2
0545 – 0600	45.7	48.4	39.8	65.2
Over 1.0-hour period	48	49	43	*65
0600 – 0615	47.2	49.7	42.3	58.8
0615 – 0630	46.6	48.8	42.2	59.4
0630 – 0645	46.1	48.8	40.6	57.4
0645 – 0700	46.2	49	40.4	59.1
Over 1.0-hour period	47	49	41	*59
Over 8.0-hour period	50	52	46	*79

*Maximum value obtained during the survey period

Appendix 1.6 – Sunday 13th January 2019 (daytime period)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0700 – 0715	44.0	46.6	38.6	58.5
0715 – 0730	47.4	49.9	41.9	59.9
0730 – 0745	46.2	49.1	41.4	58.2
0745 – 0800	46.9	50.0	41.4	57.0
Over 1.0-hour period	46	49	41	*60
0800 – 0815	49.0	51.5	44.0	65.3
0815 – 0830	49.0	51.3	44.0	70.3
0830 – 0845	49.9	52.3	44.9	63.6
0845 – 0900	51.0	53.1	46.3	73.3
Over 1.0-hour period	50	52	45	*73
0900 – 0915	50.6	53.3	46.6	62.8
0915 – 0930	52.5	54.4	48.3	68.4
0930 – 0945	52.3	54.7	48.9	67.3
0945 – 1000	51.3	53.5	48.1	60.7
Over 1.0-hour period	52	54	48	*68
1000 – 1015	52.2	54.5	48.6	61.0
1015 – 1030	52.4	54.5	48.9	62.2
1030 – 1045	51.9	54.1	49.0	61.5
1045 – 1100	52.5	54.6	48.9	61.4
Over 1.0-hour period	52	54	49	*62
1100 – 1115	52.9	55.0	50.0	63.7
1115 – 1130	52.8	54.7	50.1	60.7
1130 – 1145	53.5	55.3	50.7	66.8
1145 – 1200	54.4	56.2	51.6	65.2
Over 1.0-hour period	53	55	51	*67
1200 – 1215	53.6	55.0	50.5	71.7
1215 – 1230	54.6	56.4	51.7	64.8
1230 – 1245	54.2	56.0	51.5	66.6
1245 – 1300	55.1	56.8	52.4	66.0
Over 1.0-hour period	54	56	52	*72

*Maximum value obtained during the survey period

Appendix 1.6 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1300 – 1315	55.3	57.1	52.6	66.9
1315 – 1330	54.0	55.7	51.6	68.2
1330 – 1345	54.0	55.5	51.2	68.4
1345 – 1400	53.6	56.0	49.3	68.5
Over 1.0-hour period	54	56	51	*69
1400 – 1415	52.6	54.3	48.4	67.7
1415 – 1430	52.3	54.3	49.0	58.6
1430 – 1445	52.3	54.7	48.6	64.7
1445 – 1500	52.4	54.3	47.9	67.8
Over 1.0-hour period	52	54	48	*68
1500 – 1515	52.2	55.1	47.5	65.8
1515 – 1530	52.4	54.9	48.6	61.1
1530 – 1545	53.6	56.2	49.3	67.7
1545 – 1600	51.3	53.6	47.5	60.1
Over 1.0-hour period	52	55	48	*68
1600 – 1615	51.8	54.2	48.7	63.7
1615 – 1630	52.4	54.9	48.8	62.9
1630 – 1645	52.2	54.3	49.0	69.3
1645 – 1700	51.6	53.7	48.2	63.6
Over 1.0-hour period	52	54	49	*69
1700 – 1715	51.7	54.3	48.0	69.6
1715 – 1730	50.4	53.1	46.3	70.9
1730 – 1745	50.0	52.6	46.1	59.8
1745 – 1800	51.1	53.6	47.3	57.5
Over 1.0-hour period	51	53	47	*71
1800 – 1815	49.0	51.5	45.6	57.0
1815 – 1830	50.9	53.4	45.8	67.0
1830 – 1845	49.6	52.3	45.2	66.0
1845 – 1900	49.7	52.5	42.7	71.0
Over 1.0-hour period	50	52	44	*71

*Maximum value obtained during the survey period

Appendix 1.6 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1900 – 1915	50.5	53.0	45.0	58.5
1915 – 1930	49.9	53.2	43.5	67.1
1930 – 1945	49.3	52.2	44.0	63.4
1945 – 2000	49.1	52.3	43.0	60.2
Over 1.0-hour period	50	53	44	*67
2000 – 2015	47.6	50.8	41.3	63.7
2015 – 2030	47.9	51.0	41.8	59.2
2030 – 2045	48.9	51.5	44.0	62.7
2045 – 2100	48.5	51.7	40.7	60.2
Over 1.0-hour period	48	51	42	*64
2100 – 2115	46.8	50.3	40.5	61.8
2115 – 2130	47.6	51.2	40.3	61.8
2130 – 2145	47.3	50.0	41.2	66.1
2145 – 2200	48.1	51.7	41.7	61.7
Over 1.0-hour period	47	51	41	*66
2200 – 2215	46.4	49.0	40.1	63.0
2215 – 2230	45.5	48.2	39.2	60.6
2230 – 2245	45.2	47.6	39.7	56.8
2245 – 2300	46.6	49.7	39.9	58.5
Over 1.0-hour period	46	49	40	*63
Over 16.0-hour period	51	53	46	*73

*Maximum value obtained during the survey period

**Appendix 1.7 – Sunday/Monday 13th/ 14th January 2019
(night-time period)**

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
2300 – 2315	45.8	48.3	39.1	59.9
2315 – 2330	43.4	45.0	38.8	58.9
2330 – 2345	44.1	46.6	37.2	63.8
2345 – 0000	43.9	46.3	38.3	60.0
Over 1.0-hour period	44	47	38	*64
0000 – 0015	44.2	46.2	38.6	62.9
0015 – 0030	41.4	43.7	37.5	56.1
0030 – 0045	47.3	50.7	40.6	59.7
0045 – 0100	43.9	46.1	39.3	56.5
Over 1.0-hour period	45	47	39	*63
0100 – 0115	45.0	48.8	39.0	62.2
0115 – 0130	48.7	51.7	40.9	57.7
0130 – 0145	44.6	46.9	40.2	64.3
0145 – 0200	43.2	45.7	39.5	55.5
Over 1.0-hour period	46	48	40	*64
0200 – 0215	45.1	46.3	38.6	66.2
0215 – 0230	43.5	45.9	35.7	67.2
0230 – 0245	41.9	43.7	33.0	62.1
0245 – 0300	39.5	40.6	34.5	54.0
Over 1.0-hour period	43	44	35	*67
0300 – 0315	41.0	42.0	33.3	61.2
0315 – 0330	44.1	48.4	33.8	51.4
0330 – 0345	40.2	42.3	34.2	58.3
0345 – 0400	40	41.6	33.9	58.9
Over 1.0-hour period	42	44	34	*61
0400 – 0415	40.6	42.5	34.7	57.0
0415 – 0430	46.0	49.0	40.1	60.0
0430 – 0445	44.1	45.3	41.6	56.8
0445 – 0500	44.3	47.2	34.9	60.7
Over 1.0-hour period	44	46	38	*61

*Maximum value obtained during the survey period

Appendix 1.7 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0500 – 0515	45.7	48.2	37.4	61.5
0515 – 0530	49.2	52.4	41.1	61.0
0530 – 0545	48.9	52.2	41.7	62.3
0545 – 0600	49.3	52.3	43.9	67.2
Over 1.0-hour period	48	51	41	*67
0600 – 0615	49.2	52.1	44.6	62.2
0615 – 0630	50.8	54.2	45.1	62.2
0630 – 0645	52.0	55.1	46.5	61.9
0645 – 0700	52.0	55.0	46.4	61.7
Over 1.0-hour period	51	54	46	*62
Over 8.0-hour period	46	48	39	*67

*Maximum value obtained during the survey period

Appendix 1.8 – Monday 14th January 2019 (daytime period)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0700 – 0715	52.1	55.0	46.1	63.5
0715 – 0730	53.4	55.7	48.5	73.0
0730 – 0745	53.0	54.6	49.2	73.1
0745 – 0800	54.2	56.1	50.0	70.3
Over 1.0-hour period	53	55	48	*73
0800 – 0815	52.2	54.5	47.6	60.8
0815 – 0830	52.4	54.3	49.0	69.8
0830 – 0845	52.2	54.7	47.8	61.6
0845 – 0900	52.6	54.5	49.1	69.9
Over 1.0-hour period	52	55	48	*70
0900 – 0915	51.2	53.1	47.7	60.4
0915 – 0930	51.5	53.5	47.2	68.4
0930 – 0945	51.0	52.6	47.0	68.6
0945 – 1000	51.6	53.8	46.8	72.4
Over 1.0-hour period	51	53	47	*72
1000 – 1015	50.0	52.1	46.4	73.5
1015 – 1030	50.2	52.1	44.9	65.0
1030 – 1045	50.3	52.6	47.1	61.5
1045 – 1100	49.5	51.7	45.5	60.2
Over 1.0-hour period	50	52	46	*74
1100 – 1115	49.9	52.3	45.9	59.6
1115 – 1130	50.8	53.1	46.9	59.5
1130 – 1145	51.3	53.6	46.9	61.8
1145 – 1200	49.9	51.8	45.3	65.6
Over 1.0-hour period	51	53	46	*66
1200 – 1215	50.4	52.3	45.6	76.8
1215 – 1230	50.3	52.2	46.9	66.5
1230 – 1245	50.8	52.9	47.5	69.6
1245 – 1300	50.7	52.2	46.4	66.5
Over 1.0-hour period	51	52	47	*77

*Maximum value obtained during the survey period

Appendix 1.8 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1300 – 1315	49.7	52.1	45.5	65.5
1315 – 1330	50.1	52.3	46.6	61.0
1330 – 1345	50.6	52.3	47.2	68.7
1345 – 1400	51.9	53.8	48.7	64.1
Over 1.0-hour period	51	53	47	*69
1400 – 1415	50.9	52.7	48.1	60.1
1415 – 1430	51.2	52.7	48.1	59.1
1430 – 1445	49.1	51.4	44.4	63.8
1445 – 1500	50.7	52.3	48.6	59.8
Over 1.0-hour period	51	53	47	*64
1500 – 1515	51.6	53.0	47.9	71.2
1515 – 1530	49.7	52.3	45.1	67.9
1530 – 1545	49.7	51.7	46.5	59.0
1545 – 1600	51.4	52.5	47.1	72.7
Over 1.0-hour period	51	52	47	*73
1600 – 1615	50.0	51.8	46.2	62.0
1615 – 1630	50.8	52.8	47.1	60.8
1630 – 1645	51.3	53.1	47.0	67.3
1645 – 1700	50.1	52.0	46.7	60.1
Over 1.0-hour period	51	52	47	*67
1700 – 1715	51.8	53.8	47.8	69.0
1715 – 1730	50.2	52.4	46.5	58.8
1730 – 1745	51.3	53.7	47.5	61.9
1745 – 1800	50.6	52.9	46.6	67.4
Over 1.0-hour period	51	53	47	*69
1800 – 1815	50.7	53.0	47.0	59.5
1815 – 1830	51.6	54.4	47.2	61.5
1830 – 1845	51.0	53.8	46.0	59.2
1845 – 1900	49.5	52.5	44.0	60.0
Over 1.0-hour period	51	53	46	*62

*Maximum value obtained during the survey period

Appendix 1.8 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1900 – 1915	49.6	53.1	43.4	58.4
1915 – 1930	48.0	52.0	40.9	59.1
1930 – 1945	48.8	51.8	43.2	60.7
1945 – 2000	50.7	53.4	43.7	60.1
Over 1.0-hour period	49	53	43	*61
2000 – 2015	49.0	52.2	41.9	62.0
2015 – 2030	48.1	50.8	42.8	65.1
2030 – 2045	47.5	51.0	40.9	59.5
2045 – 2100	47.3	51.2	40.1	60.1
Over 1.0-hour period	48	51	41	*65
2100 – 2115	46.6	50.3	40.2	60.6
2115 – 2130	48.3	51.7	40.1	63.4
2130 – 2145	44.9	48.0	37.5	59.7
2145 – 2200	46.9	51.0	37.5	60.6
Over 1.0-hour period	47	50	39	*63
2200 – 2215	44.1	46.9	38.6	57.4
2215 – 2230	44.4	47.0	38.3	57.4
2230 – 2245	45.5	47.8	37.6	61.6
2245 – 2300	44.0	46.1	37.9	68.6
Over 1.0-hour period	45	47	38	*69
Over 16.0-hour period	51	52	45	*77

*Maximum value obtained during the survey period

**Appendix 1.9 – Monday/Tuesday 14th/ 15th January 2019
(night-time period)**

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
2300 – 2315	50.2	52.8	39.5	58.0
2315 – 2330	43.5	45.9	34.3	59.7
2330 – 2345	42.1	44.4	35.2	61.2
2345 – 0000	44.9	45.1	39.8	66.8
Over 1.0-hour period	46	47	37	*67
0000 – 0015	42.2	44.3	39.0	59.8
0015 – 0030	42.7	44.6	36.6	65.7
0030 – 0045	40.9	43.2	35.0	56.8
0045 – 0100	42.1	44.9	37.2	61.3
Over 1.0-hour period	42	44	37	*66
0100 – 0115	40.8	43.2	34.9	56.0
0115 – 0130	40.2	42.6	34.6	52.5
0130 – 0145	40.0	41.6	36.4	51.5
0145 – 0200	41.6	44.1	37.0	54.5
Over 1.0-hour period	41	43	36	*56
0200 – 0215	50.5	52.5	45.8	57.5
0215 – 0230	45.4	49.2	41.1	60.3
0230 – 0245	42.9	45.0	40.2	52.6
0245 – 0300	44.6	47.1	41.4	59.4
Over 1.0-hour period	47	48	42	*60
0300 – 0315	43.2	45.1	39.5	58.7
0315 – 0330	41.3	43.5	38.0	53.5
0330 – 0345	41.6	44.0	37.1	58.1
0345 – 0400	40.2	42.5	35.9	55.5
Over 1.0-hour period	42	44	38	*59
0400 – 0415	41.3	43.6	36.0	57.0
0415 – 0430	43.3	45.2	37.2	62.1
0430 – 0445	44.7	47.2	41.7	57.2
0445 – 0500	45.3	47.5	40.4	60.5
Over 1.0-hour period	44	46	39	*62

*Maximum value obtained during the survey period

Appendix 1.9 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0500 – 0515	46.1	49.0	36.7	60.6
0515 – 0530	47.3	50.1	39.2	62.9
0530 – 0545	47.2	50.2	39.8	59.2
0545 – 0600	50.4	52.5	40.3	68.7
Over 1.0-hour period	48	50	39	*69
0600 – 0615	51.4	54.6	41.7	62.7
0615 – 0630	51.4	54.4	45.3	61.6
0630 – 0645	51.4	54.3	46.5	65.0
0645 – 0700	52.8	55.4	47.6	67.6
Over 1.0-hour period	52	55	45	*68
Over 8.0-hour period	47	47	39	*69

*Maximum value obtained during the survey period

Appendix 1.10 – Tuesday 15th January 2019 (daytime period)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0700 – 0715	52.9	55.3	48.4	63.2
0715 – 0730	52.9	55.2	48.5	61.7
0730 – 0745	53.7	55.5	51.0	69.7
0745 – 0800	54.2	56.2	50.2	72.1
Over 1.0-hour period	53	56	50	*72
0800 – 0815	53.1	54.9	50.6	64.7
0815 – 0830	53.9	55.5	51.4	61.6
0830 – 0845	53.3	55.4	49.2	68.4
0845 – 0900	52.1	54.5	48.4	67.5
Over 1.0-hour period	53	55	50	*68
0900 – 0915	52.2	54.0	49.1	71.3
0915 – 0930	51.1	53.3	47.3	60.2
0930 – 0945	53.2	55.2	48.0	75.2
0945 – 1000	51.2	53.2	48.0	68.7
Over 1.0-hour period	52	54	48	*75
1000 – 1015	52.4	53.7	47.9	77.3
1015 – 1030	51.3	53.2	48.3	66.6
1030 – 1045	52.2	54.3	47.7	67.2
1045 – 1100	50.2	52.3	46.4	62.3
Over 1.0-hour period	52	53	48	*77
1100 – 1115	49.0	51.8	44.9	63.1
1115 – 1130	52.7	54.2	47.2	78.7
1130 – 1145	50.7	52.7	47.3	63.5
1145 – 1200	55.5	52.6	47.7	82.1
Over 1.0-hour period	53	53	47	*82
1200 – 1215	50.8	52.8	47.4	69.2
1215 – 1230	49.3	51.5	46.2	61.1
1230 – 1245	51.6	52.9	48.0	70.3
1245 – 1300	50.4	52.3	46.7	64.6
Over 1.0-hour period	51	52	47	*70

*Maximum value obtained during the survey period

Appendix 1.10 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1300 – 1315	50.8	52.7	47.8	63.0
1315 – 1330	50.9	52.6	48.1	59.0
1330 – 1345	50.6	52.8	46.5	63.5
1345 – 1400	51.6	53.4	48.6	64.7
Over 1.0-hour period	51	53	48	*65
1400 – 1415	51.3	53.3	48.4	61.7
1415 – 1430	51.0	52.7	48.2	65.4
1430 – 1445	52.7	53.8	50.7	63.0
1445 – 1500	52.5	54.0	50.2	60.5
Over 1.0-hour period	52	53	49	*65
1500 – 1515	53.0	55.2	48.6	71.4
1515 – 1530	51.3	53.2	47.9	68.1
1530 – 1545	51.0	53.2	47.6	68.6
1545 – 1600	50.9	52.5	48.3	59.0
Over 1.0-hour period	52	54	48	*71
1600 – 1615	50.8	52.7	47.7	60.4
1615 – 1630	51.6	53.4	48.4	63.7
1630 – 1645	51.0	53.2	47.6	65.3
1645 – 1700	50.3	52.3	46.7	61.7
Over 1.0-hour period	51	53	48	*65
1700 – 1715	50.5	52.3	47.3	66.9
1715 – 1730	50.1	52.1	46.2	61.8
1730 – 1745	50.8	52.7	47.6	64.9
1745 – 1800	50.1	52.5	46.2	62.0
Over 1.0-hour period	50	52	47	*67
1800 – 1815	51.9	54.1	46.8	68.3
1815 – 1830	50.4	52.6	45.8	65.3
1830 – 1845	50.5	53.3	46.2	61.8
1845 – 1900	54.4	54.3	44.6	76.1
Over 1.0-hour period	52	54	46	*76

*Maximum value obtained during the survey period

Appendix 1.10 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1900 – 1915	49.8	52.4	44.3	58.7
1915 – 1930	49.9	52.6	45.5	59.2
1930 – 1945	50.4	53.0	45.2	63.4
1945 – 2000	49.4	51.9	43.1	67.9
Over 1.0-hour period	50	52	45	*68
2000 – 2015	47.1	50.2	42.3	58.0
2015 – 2030	48.3	50.6	44.7	61.3
2030 – 2045	49.4	52.4	44.6	62.0
2045 – 2100	49.5	51.9	46.4	57.5
Over 1.0-hour period	49	51	45	*62
2100 – 2115	47.8	51.0	42.2	62.8
2115 – 2130	47.2	50.4	41.8	57.8
2130 – 2145	47.4	50.3	42.1	61.9
2145 – 2200	47.7	50.5	41.2	58.6
Over 1.0-hour period	48	51	42	*63
2200 – 2215	46.2	49.6	39.6	59.7
2215 – 2230	45.1	47.7	40.6	60.2
2230 – 2245	44.7	47.1	39.5	62.2
2245 – 2300	44.3	47.0	37.7	61.5
Over 1.0-hour period	45	48	39	*62
Over 16.0-hour period	51	53	47	*82

*Maximum value obtained during the survey period

**Appendix 1.11 – Tuesday/Wednesday 15th/ 16th January 2019
(night-time period)**

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
2300 – 2315	44.0	46.8	38.7	57.6
2315 – 2330	46.0	48.2	39.2	61.7
2330 – 2345	46.5	49.3	38.5	57.8
2345 – 0000	42.4	45.1	38.1	57.8
Over 1.0-hour period	45	47	39	*62
0000 – 0015	41.7	44.4	36.3	55.7
0015 – 0030	43.4	44.7	37.2	65.4
0030 – 0045	41.5	43.7	33.2	59.1
0045 – 0100	39.8	42.8	34.1	51.0
Over 1.0-hour period	42	44	35	*65
0100 – 0115	39.4	42.1	34.4	52.4
0115 – 0130	36.3	39.4	31.3	48.8
0130 – 0145	35.8	37.8	32.8	50.2
0145 – 0200	40.0	41.9	35.8	54.4
Over 1.0-hour period	38	40	34	*54
0200 – 0215	43.7	46.6	38.7	59.5
0215 – 0230	42.2	46.2	33.8	49.2
0230 – 0245	38.9	41.0	33.6	54.4
0245 – 0300	40.4	43.2	34.4	57.4
Over 1.0-hour period	42	44	35	*60
0300 – 0315	46.2	48.8	38.0	61.7
0315 – 0330	38.8	40.2	33.9	55.8
0330 – 0345	39.8	40.9	34.4	61.1
0345 – 0400	38.6	40.4	32.2	57.0
Over 1.0-hour period	42	43	35	*62
0400 – 0415	38.8	40.1	32.8	57.1
0415 – 0430	44.8	48.1	36.5	59.9
0430 – 0445	44.3	47.2	39.8	58.5
0445 – 0500	44.3	47.1	33.6	59.7
Over 1.0-hour period	44	46	36	*60

*Maximum value obtained during the survey period

Appendix 1.11 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0500 – 0515	44.7	47.6	35.5	58.6
0515 – 0530	46.1	49.3	38.5	60.2
0530 – 0545	48.0	51.7	35.4	61.5
0545 – 0600	46.9	50.4	37.7	62.5
Over 1.0-hour period	47	50	37	*63
0600 – 0615	48.0	51.3	43.4	62.1
0615 – 0630	50.9	53.8	44.7	59.4
0630 – 0645	50.4	53.5	45.2	61.7
0645 – 0700	51.3	54.2	46.7	64.3
Over 1.0-hour period	50	53	45	*64
Over 8.0-hour period	45	46	37	*65

*Maximum value obtained during the survey period

Appendix 1.12 – Wednesday 16th January 2019 (daytime period)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0700 – 0715	52.4	54.7	47.9	62.4
0715 – 0730	53.6	55.5	49.1	69.3
0730 – 0745	54.2	56.6	48.5	73.3
0745 – 0800	53.5	55.3	48.0	69.3
Over 1.0-hour period	53	56	48	*73
0800 – 0815	65.8	69.6	50.5	95.1
0815 – 0830	52.7	55.0	49.4	63.1
0830 – 0845	53.4	55.7	49.3	76.3
0845 – 0900	54.7	57.6	50.2	70.4
Over 1.0-hour period	61	59	50	*95
0900 – 0915	52.7	54.4	49.3	71.0
0915 – 0930	53.0	54.6	49.5	74.7
0930 – 0945	52.2	55.0	47.4	68.1
0945 – 1000	51.1	52.8	46.9	70.4
Over 1.0-hour period	52	54	48	*75
1000 – 1015	50.8	53.0	47.5	58.7
1015 – 1030	50.9	53.1	46.1	68.9
1030 – 1045	51.9	53.5	49.2	67.7
1045 – 1100	52.5	54.2	48.0	69.3
Over 1.0-hour period	52	53	48	*69
1100 – 1115	51.6	53.4	48.2	66.8
1115 – 1130	53.2	55.2	49.4	71.9
1130 – 1145	51.6	53.4	48.4	69.9
1145 – 1200	55.0	54.3	48.4	81.9
Over 1.0-hour period	53	54	49	*82
1200 – 1215	52.5	54.7	48.8	69.6
1215 – 1230	51.4	53.5	48.4	66.3
1230 – 1245	50.3	52.5	46.6	67.6
1245 – 1300	51.8	52.7	46.9	74.8
Over 1.0-hour period	52	53	48	*75

*Maximum value obtained during the survey period

Appendix 1.12 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1300 – 1315	50.9	52.7	47.4	68.4
1315 – 1330	51.1	53.1	48.0	61.5
1330 – 1345	52.1	54.2	48.5	65.2
1345 – 1400	52.7	54.7	48.9	61.3
Over 1.0-hour period	52	54	48	*68
1400 – 1415	53.7	54.9	51.7	60.2
1415 – 1430	54.4	55.9	49.2	70.0
1430 – 1445	50.3	52.8	46.0	59.0
1445 – 1500	51.5	53.2	48.6	60.4
Over 1.0-hour period	53	54	49	*70
1500 – 1515	50.6	52.2	47.7	71.0
1515 – 1530	51.4	53.4	47.1	67.6
1530 – 1545	53.5	55.1	50.5	67.3
1545 – 1600	51.4	53.2	48.5	61.5
Over 1.0-hour period	52	53	48	*71
1600 – 1615	54.7	57.0	50.5	79.1
1615 – 1630	51.3	53.5	47.6	62.1
1630 – 1645	51.3	53.7	47.6	61.2
1645 – 1700	52.4	54.1	48.9	67.2
Over 1.0-hour period	53	55	49	*79
1700 – 1715	52.1	54.2	48.7	63.6
1715 – 1730	52.4	53.9	48.8	70.1
1730 – 1745	52.2	54.2	48.2	67.4
1745 – 1800	53.9	55.7	49.2	68.9
Over 1.0-hour period	53	55	49	*70
1800 – 1815	51.9	54.3	48.6	60.0
1815 – 1830	51.2	53.8	46.7	61.9
1830 – 1845	51.6	54.2	47.1	65.1
1845 – 1900	51.2	53.5	47.2	69.1
Over 1.0-hour period	51	54	47	*69

*Maximum value obtained during the survey period

Appendix 1.12 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
1900 – 1915	51.1	53.8	46.2	61.7
1915 – 1930	49.3	52.4	45.1	57.7
1930 – 1945	51.7	54.4	48.0	69.5
1945 – 2000	51.2	53.8	45.6	75.1
Over 1.0-hour period	51	54	46	*75
2000 – 2015	49.7	53.0	44.0	64.1
2015 – 2030	49.1	52.3	43.1	62.0
2030 – 2045	51.1	53.2	42.8	72.6
2045 – 2100	50.2	51.2	42.5	76.8
Over 1.0-hour period	50	52	43	*77
2100 – 2115	48.8	52.7	41.1	60.1
2115 – 2130	47.1	51.0	40.4	60.0
2130 – 2145	47.9	51.5	41.6	59.4
2145 – 2200	50.1	52.6	42.0	61.2
Over 1.0-hour period	49	52	41	*61
2200 – 2215	45.6	48.7	38.1	59.1
2215 – 2230	45.2	47.8	37.3	60.1
2230 – 2245	46.0	49.3	37.6	60.1
2245 – 2300	45.6	49.1	36.3	59.2
Over 1.0-hour period	46	49	37	*60
Over 16.0-hour period	53	54	47	*95

*Maximum value obtained during the survey period

**Appendix 1.13 – Wednesday/Thursday 16th/ 17th January 2019
(night-time period)**

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
2300 – 2315	46.1	49.1	36.3	62.4
2315 – 2330	42.8	46.3	33.0	58.1
2330 – 2345	43.1	46.8	32.7	57.2
2345 – 0000	44.1	47.4	30.1	65.3
Over 1.0-hour period	44	47	33	*65
0000 – 0015	40.7	44.3	29.4	56.5
0015 – 0030	42.5	43.4	28.6	63.3
0030 – 0045	38.8	42.5	28.8	52.5
0045 – 0100	43.0	47.6	30.6	58.5
Over 1.0-hour period	42	44	29	*63
0100 – 0115	38.7	42.3	27.5	58.1
0115 – 0130	40.5	43.2	32.4	55.0
0130 – 0145	42.8	47.9	30.7	58.7
0145 – 0200	40.2	43.9	30.4	58.4
Over 1.0-hour period	41	44	30	*59
0200 – 0215	48.7	52.2	34.6	59.6
0215 – 0230	40.7	46.8	31.7	57.9
0230 – 0245	42.0	47.7	32.2	55.9
0245 – 0300	38.9	42.0	30.1	60.0
Over 1.0-hour period	44	47	32	*60
0300 – 0315	39.7	42.6	31.8	56.1
0315 – 0330	42.6	47.5	33.0	61.7
0330 – 0345	43.8	46.9	33.1	66.5
0345 – 0400	45.6	49.9	31.9	57.2
Over 1.0-hour period	43	47	32	*67
0400 – 0415	46.0	48.8	39.9	55.5
0415 – 0430	46.4	49.1	39.2	62.5
0430 – 0445	46.3	48.2	40.4	65.0
0445 – 0500	46.0	48.1	35.8	63.9
Over 1.0-hour period	46	49	39	*64

*Maximum value obtained during the survey period

Appendix 1.13 – (Continued)

Monitoring Period	Statistical Parameters (dB)			
	L _{Aeq}	L _{A10}	L _{A90}	L _{Amax,f}
0500 – 0515	46.4	48.6	36.6	63.8
0515 – 0530	46.7	49.3	35.6	63.1
0530 – 0545	48.7	52.0	38.4	65.0
0545 – 0600	49.2	52.5	37.5	63.6
Over 1.0-hour period	48	51	37	*64
0600 – 0615	48.5	51.9	42.0	61.7
0615 – 0630	50.5	54.3	41.6	62.6
0630 – 0645	52.2	55.4	44.6	64.1
0645 – 0700	52.1	55.4	45.5	61.2
Over 1.0-hour period	51	54	43	*64
Over 8.0-hour period	46	48	34	*67

*Maximum value obtained during the survey period

Appendix 2 Octave band background noise survey results

Appendix 2.1 – Thursday/Friday 10th/ 11th January 2019 (night-time period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
23:00	01:00:00	57.4	48.7	45.8	40.0	40.7	35.7	26.3	24.0
00:00	01:00:00	55.8	45.0	39.3	37.0	35.9	32.8	25.8	24.4
01:00	01:00:00	55.8	44.8	38.5	36.0	33.1	31.0	25.4	24.2
02:00	01:00:00	56.3	44.3	38.5	36.6	33.5	30.8	25.4	24.1
03:00	01:00:00	55.9	44.7	37.8	35.9	33.5	29.7	24.6	23.5
04:00	01:00:00	57.6	47.6	47.7	40.2	38.0	34.5	29.5	25.6
05:00	01:00:00	59.0	49.2	49.8	42.8	42.5	36.8	28.9	24.5
06:00	01:00:00	61.0	51.1	49.9	45.1	46.2	40.5	32.7	26.5
Over 8-hour period		58	48	46	40	40	35	28	25

Appendix 2.2 – Friday 11th January 2019 (daytime period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
07:00	01:00:00	62.6	54.2	51.2	47.0	48.0	42.6	39.2	35.2
08:00	01:00:00	62.7	53.0	50.6	47.2	47.6	42.1	43.9	43.9
09:00	01:00:00	61.5	53.0	51.0	47.4	46.8	43.2	37.9	31.1
10:00	01:00:00	61.8	54.5	51.6	46.8	46.1	41.1	34.5	28.8
11:00	01:00:00	63.8	55.2	52.0	46.8	45.3	40.7	36.6	32.5
12:00	01:00:00	63.0	54.0	50.3	46.6	45.4	41.5	34.8	29.3
13:00	01:00:00	63.4	54.6	50.5	46.3	45.1	40.8	34.1	31.5
14:00	01:00:00	63.0	54.9	52.0	47.8	47.8	42.1	34.8	29.6
15:00	01:00:00	63.3	53.1	51.0	46.0	45.7	40.4	32.6	27.7
16:00	01:00:00	62.7	53.1	50.5	45.6	45.6	40.4	36.3	32.0
17:00	01:00:00	63.0	54.0	51.0	46.2	45.9	40.8	33.3	28.1
18:00	01:00:00	62.2	52.7	50.1	45.2	45.2	39.5	31.4	26.5
19:00	01:00:00	60.7	51.2	48.6	45.1	45.6	39.8	30.6	25.2
20:00	01:00:00	59.1	51.5	48.2	43.7	43.8	38.9	30.7	27.3
21:00	01:00:00	58.5	47.7	44.6	41.7	43.2	37.6	27.7	24.8
22:00	01:00:00	57.9	46.9	45.2	41.1	42.9	37.3	27.5	25.0
Over 16-hour period		62	53	50	46	46	41	36	34

Appendix 2.3 Friday 11th – Saturday 12th January 2019 (night-time period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
23:00	01:00:00	56.5	47.8	46.8	40.6	41.1	36.2	28.2	26.2
00:00	01:00:00	57.8	48.0	43.1	41.0	40.2	36.0	30.7	29.1
01:00	01:00:00	56.8	46.1	45.6	38.2	37.2	32.9	27.1	25.1
02:00	01:00:00	56.3	44.9	40.2	37.8	36.1	32.1	26.5	24.6
03:00	01:00:00	56.3	45.9	45.1	39.2	37.1	33.2	28.2	26.0
04:00	01:00:00	55.8	47.4	47.2	40.6	38.9	35.4	32.2	27.9
05:00	01:00:00	56.6	47.7	49.4	41.5	41.0	37.1	33.7	29.5
06:00	01:00:00	57.7	50.4	49.1	44.0	43.5	38.7	32.6	28.5
Over 8-hour period		57	48	47	41	40	36	31	27

Appendix 2.4 – Saturday 12th January 2019 (daytime period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
07:00	01:00:00	60.1	52.8	50.5	46.2	46.2	42.0	35.9	31.3
08:00	01:00:00	60.8	53.2	50.6	47.0	47.3	42.4	35.8	30.9
09:00	01:00:00	61.7	55.2	53.0	48.3	48.2	43.2	35.9	31.4
10:00	01:00:00	61.8	53.3	51.9	48.3	48.4	43.3	36.7	33.0
11:00	01:00:00	62.4	53.6	51.0	47.6	48.0	42.3	34.2	29.9
12:00	01:00:00	61.5	54.6	52.1	48.8	48.9	44.4	38.3	34.0
13:00	01:00:00	61.1	52.9	51.4	47.7	48.0	42.2	34.4	32.3
14:00	01:00:00	60.8	52.4	51.3	48.2	48.5	42.7	37.8	33.7
15:00	01:00:00	61.1	53.9	52.6	49.9	49.0	43.6	36.9	35.2
16:00	01:00:00	60.7	53.3	52.2	49.1	48.3	42.7	36.0	33.9
17:00	01:00:00	60.1	54.0	52.5	49.8	48.8	43.1	36.1	34.1
18:00	01:00:00	60.0	52.8	51.9	48.5	48.0	42.6	35.8	33.8
19:00	01:00:00	59.2	51.8	51.1	47.4	46.7	41.4	34.9	33.0
20:00	01:00:00	58.0	51.2	50.5	47.1	45.7	41.3	36.3	35.1
21:00	01:00:00	57.7	49.5	47.4	44.6	44.4	39.6	34.0	32.0
22:00	01:00:00	56.8	48.7	46.8	43.9	43.5	38.6	32.7	31.7
Over 16-hour period		61	53	51	48	48	42	36	33

Appendix 2.5 Saturday 12th – Sunday 13th January 2019 (night-time period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
23:00	01:00:00	57.4	50.5	48.6	46.6	44.5	40.0	35.9	35.2
00:00	01:00:00	57.9	53.1	53.1	51.1	47.8	43.4	40.2	39.7
01:00	01:00:00	56.4	51.7	51.0	49.0	45.5	41.3	38.2	37.6
02:00	01:00:00	57.4	51.5	50.8	48.8	45.0	41.2	38.5	37.9
03:00	01:00:00	56.1	50.5	49.8	47.4	43.8	40.0	36.8	35.9
04:00	01:00:00	56.8	51.3	51.5	48.0	44.5	40.5	37.0	35.6
05:00	01:00:00	55.7	49.8	50.4	45.3	41.8	37.7	33.4	31.2
06:00	01:00:00	56.4	48.6	49.4	42.9	41.5	36.8	31.1	27.7
Over 8-hour period		57	51	51	48	45	41	37	36

Appendix 2.6 – Sunday 13th January 2019 (daytime period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
07:00	01:00:00	55.8	48.1	47.6	42.2	42.1	37.1	33.3	28.3
08:00	01:00:00	57.0	50.9	50.5	47.0	45.5	40.6	34.5	31.8
09:00	01:00:00	58.0	52.0	51.2	49.4	47.8	42.4	35.9	33.9
10:00	01:00:00	59.3	53.1	51.2	49.5	48.6	43.0	35.8	33.6
11:00	01:00:00	59.6	53.7	53.0	50.7	49.7	44.0	37.0	34.6
12:00	01:00:00	60.6	55.1	54.3	51.4	50.5	44.8	39.0	37.8
13:00	01:00:00	60.7	55.0	53.8	51.5	50.2	44.8	39.4	38.2
14:00	01:00:00	60.2	52.7	51.8	48.7	49.0	43.3	35.8	33.8
15:00	01:00:00	60.6	53.3	51.1	48.9	49.1	43.4	36.2	34.3
16:00	01:00:00	59.9	52.6	52.3	48.8	48.3	42.5	36.0	34.9
17:00	01:00:00	59.1	52.1	51.6	47.2	47.0	41.2	35.4	33.7
18:00	01:00:00	59.3	51.4	49.4	46.7	46.1	40.5	34.7	31.9
19:00	01:00:00	58.6	51.6	51.8	45.0	45.8	40.4	33.1	31.2
20:00	01:00:00	57.4	49.2	49.2	44.2	44.5	39.3	31.4	28.7
21:00	01:00:00	57.2	49.7	48.2	44.7	43.3	37.5	29.5	27.4
22:00	01:00:00	57.4	47.6	47.8	42.4	41.5	36.3	29.6	27.9
Over 16-hour period		59	52	51	48	48	42	36	34

Appendix 2.7 Sunday 13th – Monday 14th January 2019 (night-time period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
23:00	01:00:00	56.7	46.2	43.6	41.1	40.4	35.5	29.8	28.4
00:00	01:00:00	56.3	46.5	48.4	40.7	38.8	34.5	29.9	29.0
01:00	01:00:00	55.9	47.0	51.2	41.3	38.3	34.7	30.4	29.5
02:00	01:00:00	55.8	46.0	42.4	39.5	38.8	34.2	30.1	27.8
03:00	01:00:00	55.0	44.0	45.7	36.7	36.1	31.5	26.3	24.9
04:00	01:00:00	57.2	48.0	45.6	41.2	38.9	34.9	31.1	27.6
05:00	01:00:00	59.0	49.3	50.1	44.0	44.8	38.9	32.2	27.2
06:00	01:00:00	60.7	51.2	50.9	46.4	48.2	41.8	33.0	27.5
Over 8-hour period		57	48	48	42	43	37	31	28

Appendix 2.8 – Monday 14th January 2019 (daytime period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
07:00	01:00:00	62.7	55.1	54.3	48.2	49.8	43.9	36.2	29.6
08:00	01:00:00	62.0	54.2	51.3	48.2	49.0	43.8	35.0	29.3
09:00	01:00:00	61.2	53.7	51.2	47.7	47.6	41.8	36.0	30.9
10:00	01:00:00	60.9	53.2	50.8	46.3	46.0	40.4	33.3	27.9
11:00	01:00:00	61.2	54.8	51.3	47.3	46.3	41.0	33.9	28.4
12:00	01:00:00	60.6	54.1	52.1	46.8	46.5	40.6	33.6	28.4
13:00	01:00:00	61.4	53.9	52.7	46.8	46.1	41.1	34.1	29.6
14:00	01:00:00	62.0	54.2	54.2	46.1	45.2	40.0	33.0	29.2
15:00	01:00:00	61.5	53.6	51.9	46.8	46.5	41.5	34.5	29.4
16:00	01:00:00	62.0	53.4	50.6	46.6	46.9	41.3	34.4	29.3
17:00	01:00:00	61.8	53.4	51.3	47.0	47.7	41.6	32.8	27.6
18:00	01:00:00	61.0	52.2	51.7	46.2	47.6	41.2	30.8	25.6
19:00	01:00:00	59.2	50.5	51.7	45.0	45.7	39.4	29.8	25.5
20:00	01:00:00	59.2	49.7	49.7	43.8	44.4	38.3	28.7	24.9
21:00	01:00:00	58.7	49.6	45.2	43.1	43.6	37.7	27.9	24.4
22:00	01:00:00	56.3	45.6	42.3	40.8	41.3	35.6	28.6	26.5
Over 16-hour period		61	53	51	46	47	41	33	28

Appendix 2.9 Monday 14th – Tuesday 15th January (night-time period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
23:00	01:00:00	56.7	47.3	51.9	41.2	39.8	34.3	26.7	24.8
00:00	01:00:00	56.6	45.9	42.2	39.4	36.8	32.8	28.9	26.6
01:00	01:00:00	55.9	44.6	40.8	38.3	35.3	31.4	26.7	25.0
02:00	01:00:00	55.8	47.6	53.0	41.8	38.4	34.8	30.2	28.8
03:00	01:00:00	54.4	44.9	41.6	39.7	36.4	32.3	28.2	26.9
04:00	01:00:00	55.6	47.0	46.6	40.5	38.9	34.7	30.4	27.5
05:00	01:00:00	57.3	47.5	47.7	43.9	44.9	39.1	33.6	27.4
06:00	01:00:00	60.1	51.6	54.3	46.5	48.2	42.1	33.6	28.3
Over 8-hour period		57	48	50	42	42	37	31	27

Appendix 2.10 – Tuesday 15th January 2019 (daytime period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
07:00	01:00:00	62.3	54.9	53.6	48.7	50.3	44.4	36.2	31.2
08:00	01:00:00	62.7	54.5	53.8	49.0	49.5	43.8	35.5	29.3
09:00	01:00:00	61.7	54.7	52.6	48.4	47.8	43.0	37.2	34.8
10:00	01:00:00	61.7	55.0	52.4	48.5	47.1	42.3	37.0	29.3
11:00	01:00:00	60.8	54.6	51.5	47.8	46.5	41.2	44.4	46.2
12:00	01:00:00	60.4	53.2	50.7	47.1	46.6	41.9	33.6	28.8
13:00	01:00:00	62.2	54.6	52.5	47.1	46.7	41.5	34.6	30.1
14:00	01:00:00	61.9	54.9	54.9	47.9	47.2	41.3	34.1	29.4
15:00	01:00:00	62.1	53.7	52.8	47.8	47.5	42.2	35.2	30.6
16:00	01:00:00	61.8	54.0	51.5	47.1	47.1	41.4	34.6	28.5
17:00	01:00:00	61.6	52.7	50.6	46.5	46.7	41.2	33.3	28.3
18:00	01:00:00	63.1	59.1	52.9	47.9	47.8	42.8	35.5	30.0
19:00	01:00:00	60.3	52.5	49.7	46.1	46.5	40.2	31.4	27.0
20:00	01:00:00	58.7	51.5	50.8	44.7	44.7	38.7	30.6	27.6
21:00	01:00:00	57.9	50.4	47.3	43.5	44.1	38.1	29.6	26.5
22:00	01:00:00	56.3	46.8	45.0	41.2	41.7	35.7	27.7	26.2
Over 16-hour period		61	54	52	47	47	42	36	35

Appendix 2.11 Tuesday 15th – Wednesday 16th January 2019 (night-time period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
23:00	01:00:00	56.7	49.1	47.5	41.5	39.8	35.0	29.6	28.7
00:00	01:00:00	55.4	45.6	41.3	39.0	37.2	32.4	27.8	26.5
01:00	01:00:00	54.3	45.0	39.2	36.3	32.0	27.5	24.5	24.1
02:00	01:00:00	56.0	46.2	46.4	37.6	34.2	29.9	27.1	25.2
03:00	01:00:00	54.7	45.4	48.0	36.8	34.4	30.0	25.4	24.2
04:00	01:00:00	55.8	47.4	45.8	40.2	38.6	34.0	30.1	25.7
05:00	01:00:00	58.6	48.8	48.2	42.8	42.6	36.4	30.0	25.3
06:00	01:00:00	60.3	52.2	51.4	45.6	46.8	40.7	34.9	28.6
Over 8-hour period		57	48	47	41	41	35	30	26

Appendix 2.12 – Wednesday 16th January 2019 (daytime period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
07:00	01:00:00	65.3	57.0	52.9	48.7	50.0	44.4	37.1	30.5
08:00	01:00:00	65.3	61.8	58.8	57.6	56.7	52.6	46.0	38.7
09:00	01:00:00	61.6	55.7	52.9	48.5	48.1	43.4	37.2	32.1
10:00	01:00:00	61.4	54.6	53.0	47.7	47.0	42.5	36.6	31.3
11:00	01:00:00	62.2	54.7	51.8	48.5	49.0	45.7	40.0	34.6
12:00	01:00:00	61.6	52.9	52.0	47.4	47.4	43.5	36.2	32.2
13:00	01:00:00	62.5	54.2	53.9	47.7	47.4	42.4	33.6	29.0
14:00	01:00:00	61.1	53.8	56.6	47.6	47.6	43.6	34.1	29.6
15:00	01:00:00	62.0	53.1	53.5	47.4	47.8	43.2	32.9	27.7
16:00	01:00:00	63.0	55.0	53.3	48.6	48.9	43.3	35.9	32.3
17:00	01:00:00	62.6	55.5	52.4	48.0	49.4	43.9	33.7	29.2
18:00	01:00:00	60.8	53.7	50.8	47.0	48.5	42.5	30.9	27.1
19:00	01:00:00	59.9	52.0	51.0	45.8	47.4	42.5	34.9	31.5
20:00	01:00:00	58.9	55.3	48.1	45.9	46.5	41.4	32.4	28.4
21:00	01:00:00	57.9	51.7	51.7	43.2	44.4	38.9	28.9	25.4
22:00	01:00:00	56.7	47.6	41.7	41.1	42.7	37.5	26.6	24.6
Over 16-hour period		62	55	53	49	49	45	37	32

Appendix 2.13 Wednesday 16th – Thursday 17th January 2019 (night-time period)

Start time	Duration,T	Frequency/Hz							
		63	125	250	500	1000	2000	4000	8000
23:00	01:00:00	56.3	47.3	41.0	40.2	40.5	36.7	27.3	25.1
00:00	01:00:00	56.0	45.9	40.9	38.9	36.7	33.1	25.7	24.3
01:00	01:00:00	55.8	45.8	40.5	38.2	35.2	32.9	25.8	24.5
02:00	01:00:00	56.0	46.0	50.7	38.0	35.5	32.9	25.4	24.2
03:00	01:00:00	56.0	46.4	47.6	37.9	35.5	33.7	31.1	33.8
04:00	01:00:00	58.3	50.2	48.8	42.5	40.9	37.0	30.6	27.4
05:00	01:00:00	60.0	50.2	47.4	43.5	44.4	39.7	29.7	26.3
06:00	01:00:00	60.0	52.6	51.9	46.2	47.9	41.9	30.5	26.8
Over 8-hour period		58	49	48	42	42	37	29	28

Appendix 3 Octave band plant noise levels

Appendix 3.1 – Measured plant noise levels

Plant description	Frequency/Hz					
	125	250	500	1000	2000	4000
Daikin air conditioning fan 1	61.5	56.7	59.3	54.5	51.2	46.2
Daikin air conditioning fan 2	61.9	55.5	58.6	54.6	49.6	45.0
J & E hull freezer condensing unit	65.1	50.8	50.5	51.1	47.2	41.7
Drinks fridge condenser	66.0	73.8	67.0	63.3	56.5	51.7
Main fridge condensing unit	63.3	58.5	53.7	52.6	46.2	41.5

Appendix 3.2 – Combined daytime plant noise levels

Plant description	Frequency/Hz					
	125	250	500	1000	2000	4000
Daikin air conditioning fan 1	61.5	56.7	59.3	54.5	51.2	46.2
Daikin air conditioning fan 2	61.9	55.5	58.6	54.6	49.6	45.0
J & E hull freezer condensing unit	65.1	50.8	50.5	51.1	47.2	41.7
Drinks fridge condenser 1	66.0	73.8	67.0	63.3	56.5	51.7
Drinks fridge condenser 2	66.0	73.8	67.0	63.3	56.5	51.7
Main fridge condensing unit	63.3	58.5	53.7	52.6	46.2	41.5
Total	72.1	70.8	70.8	67.1	60.8	56.0

Appendix 3.3 – Combined night-time plant noise levels

Plant description	Frequency/Hz					
	125	250	500	1000	2000	4000
J & E hull freezer condensing unit	65.1	50.8	50.5	51.1	47.2	41.7
Main fridge condensing unit	63.3	58.5	53.7	52.6	46.2	41.5
Total	67.3	59.2	55.4	54.9	49.7	44.6

Appendix 3.4 – Daytime predicted levels outside enclosure

Plant description	Frequency/Hz					
	125	250	500	1000	2000	4000
Plant noise (daytime)	72.1	70.8	70.8	67.1	60.8	56.0
Mineral wool (2cm)	30	32	39	43	53	60
Predicted noise level	42.1	38.8	31.8	24.1	7.8	-4.0

Appendix 3.5 – Night-time predicted levels outside enclosure

Plant description	Frequency/Hz					
	125	250	500	1000	2000	4000
Plant noise (night-time)	67.3	59.2	55.4	54.9	49.7	44.6
Mineral wool (2cm)	30	32	39	43	53	60
Predicted noise level	37.3	27.2	16.4	11.9	-3.3	-15.4

Appendix 3.6 – Daytime predicted A weighted level

Plant description	Frequency/Hz					
	125	250	500	1000	2000	4000
Plant noise (daytime)	42.1	38.8	31.8	24.1	7.8	-4.0
A weighting conversion	-16.1	-8.6	-3.2	0	+ 1.2	+1.0
Predicted noise level	26.0	30.2	28.6	24.1	9.0	-3.0
A weighted level						33.9

Appendix 3.7 – Night-time predicted A weighted level

Plant description	Frequency/Hz					
	125	250	500	1000	2000	4000
Plant noise (night-time)	37.3	27.2	16.4	11.9	-3.3	-15.4
A weighting conversion	-16.1	-8.6	-3.2	0	+ 1.2	+1.0
Predicted noise level	21.2	18.6	13.2	11.9	-2.1	-14.4
A weighted level						23.8

Appendix 4 Sound Exposure Level Calculations

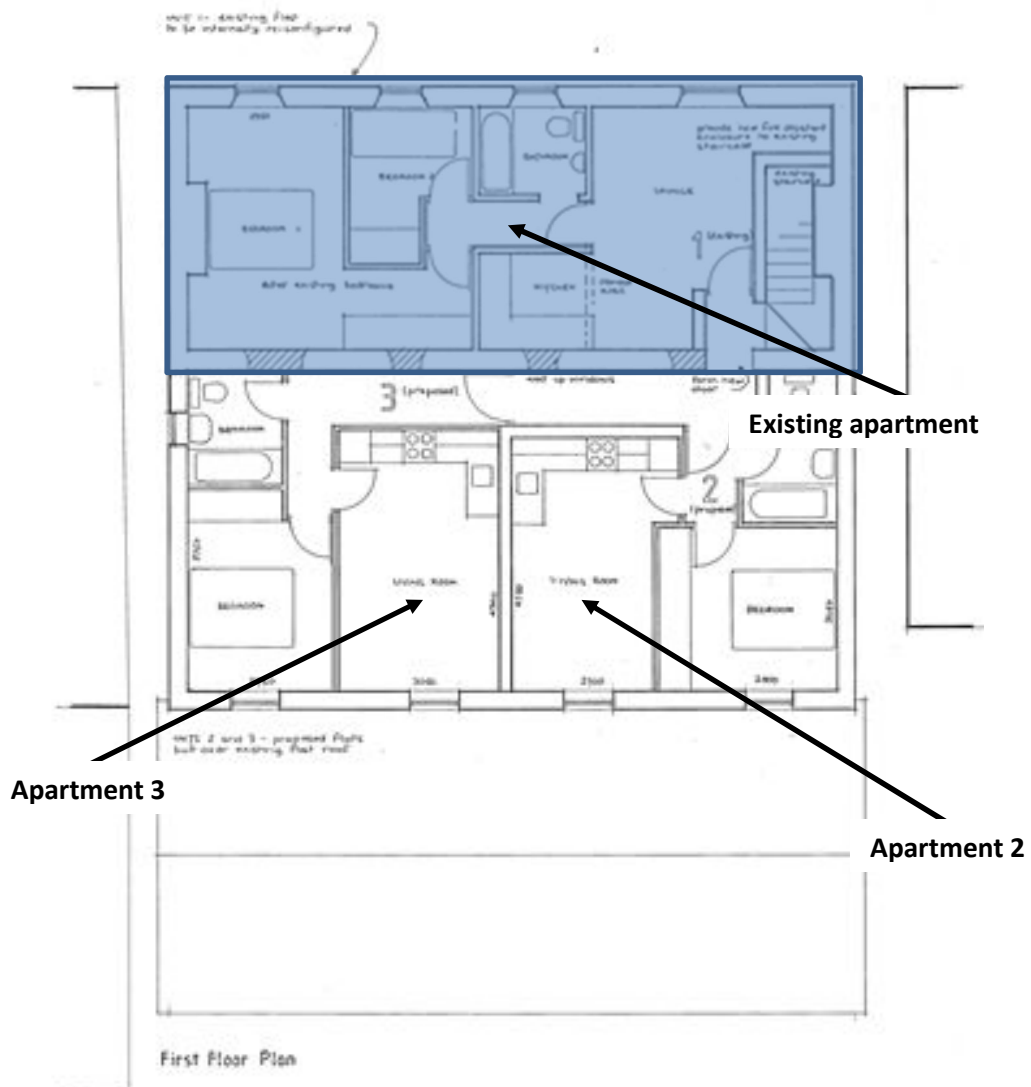
Appendix 4.1 (daytime period)

	Sound exposure level calculations $dBL_{Aeq,1h}$	
	Proposed apartments	Sunny Bank
SEL of daytime plant noise (outside acoustic enclosure)	33.9	33.9
Inside building correction	+ 3.0	+ 3.0
Cycle duration	60 minutes	60 minutes
Number of cycles	1	1
Correction for 1hr reference period – dB(A)	0.00	0.00
Distance, source to receiver (m)	6.0	9.0
Distance correction dB(A)	-14.0	-18.1
Sound exposure level $dBL_{Aeq,1h}$	22.9	18.8

Appendix 4.2 (night-time period)

	Sound exposure level calculations $dBL_{Aeq,15m}$	
	Proposed apartments	Sunny Bank
SEL of daytime plant noise (outside acoustic enclosure)	23.8	23.8
Inside building correction	+ 3.0	+ 3.0
Cycle duration	15 minutes	15 minutes
Number of cycles	1	1
Correction for 1hr reference period – dB(A)	0.00	0.00
Distance, source to receiver (m)	6.0	9.0
Distance correction dB(A)	-14.0	-18.1
Sound exposure level $dBL_{Aeq,15m}$	12.8	8.7

Appendix 5 Proposed first floor site plan



Appendix 6 Building material transmission loss values

Material	Frequency (Hz)					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Brick 4"	30	36	37	37	37	43
Block 7 5/8" hollow cinder	33	33	33	39	45	51
Block 6" concrete lightweight painted	38	36	40	45	50	56
Plywood 1/4"	17	15	20	24	28	27
Plywood 3/4"	24	22	27	28	25	27
Mineral fibre 5/8"	30	32	39	43	53	60