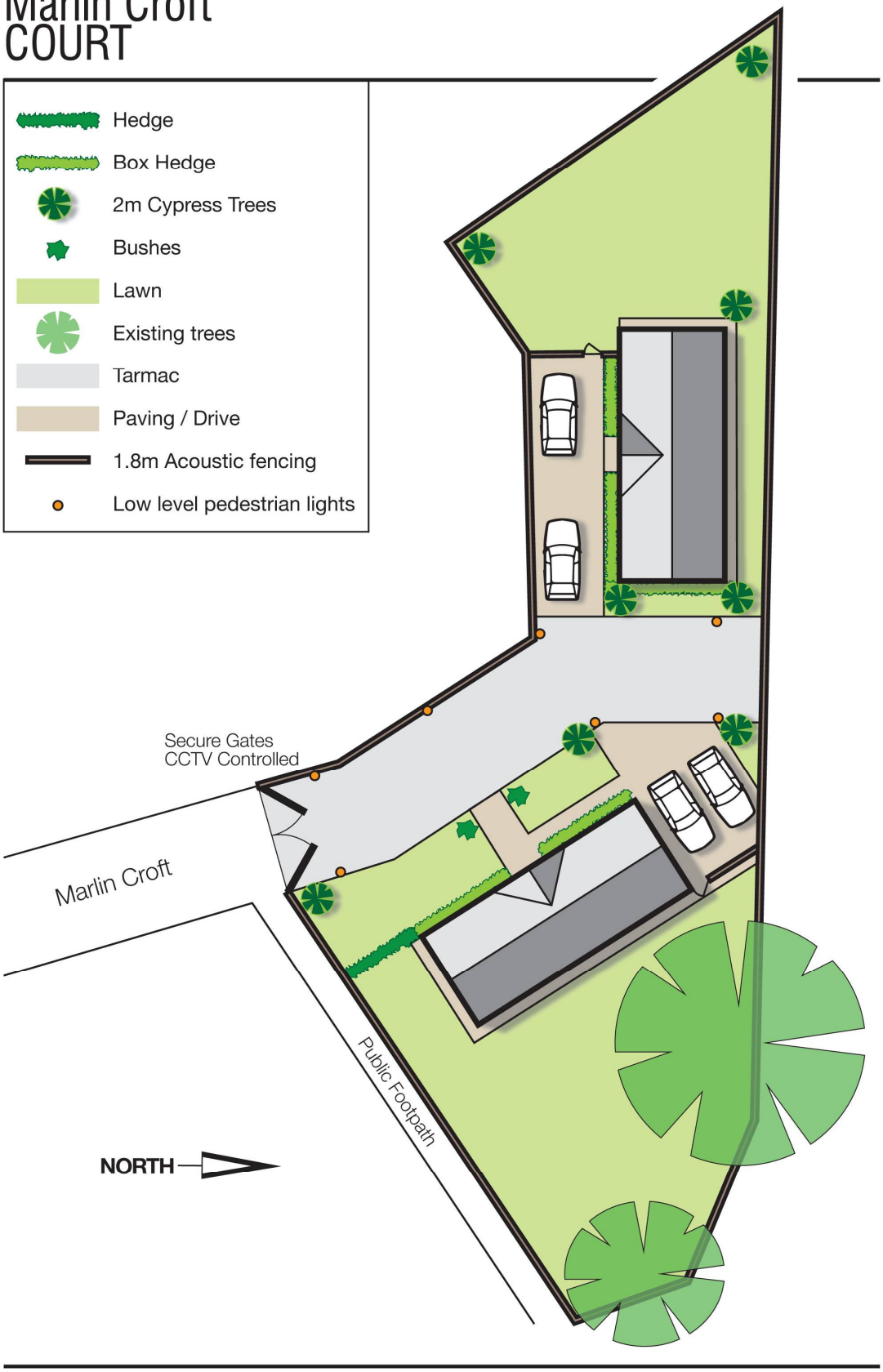
NOISE SURVEY LTD

Noise Assessment Report Mallin Croft Hoyland Barnsley

Report Ref:	268HOYLAND
Client:	Resilienti Limited
Site Location:	Mallin Croft Hoyland S74 9JQ
Date of Issue:	29th October 2019
Date of Assessment:	Tuesday 15th October 2019 (Day time) Tuesday 22nd October 2019 (Night time)
Assessment Conducted by:	Donald Angir MIOA **www.noisesurveyltd.co.uk**

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Picture 1: Proposed development layout

Executive Summary

The proposed development site has a daytime level of $L_{Aeq\ (16\ hour)}$ 50dB and a night time $L_{Aeq\ (8\ hour)}$ of 42dB. LAFmax night reached 67dB.

In relation to BS8233:2014 and WHO (2009) these levels are above the guideline levels and have to be actively reduced in order to ensure that internal noise levels for each dwelling does meet the required standard. Reduction of the external noise to acceptable levels internally is achievable. This can be done by using construction methods for walls, windows, doors and ventilation that has the $R_{,w}$ (C;Ctr) specified herein for the respective rooms. A suitable construction method for walls and roof should be used to achieve a minimum sound reduction of Rw+Ctr of 20dB or more. This is a low threshold and most methods of construction exceed this level.

It should be noted that this development relies on closed window ventilation to meet internal BS8233:2014 guideline noise levels for bedrooms, dining and living rooms.

The WHO (2009) recommendation for L_{AFmax} of 60dB and an L_{Aeq} of 45dB outside bedrooms has been achieved.

Application of the sound reduction recommendations in this report will meet the standards for internal noise levels required by the national planning policy framework guidelines. It is preferred that bedrooms are located furthest from the car park.

If users of the property keep external windows and doors closed, they will be at a low risk of adverse noise impact.

Uncertainty in the measurement is ± 5 dB

Objective

The Client proposes to build 2 park homes on the site known as Mallin Court Hoyland. This report is a BS8233:2014 assessment together with recommendations to meet the internal noise levels recommended in BS8233. The recommendations are based on day and night time measured noise levels at the site.

Source under Assessment

The site is located at the end of a quiet non through road known as Mallin Street. Adjacent to and bordering the site is B&M Retail and a car park for patrons of the store. Environmental noise includes;

- Stop Start of car engines and associated car parking noise
- Delivery noise from trucks, including reversing vehicle sirens
- Road traffic noise from the nearby West Street B6097



Picture 2: The proposed development site shares a border with B&M Store and its car park

Methodology

The first set of measurements were obtained on Tuesday 15th October 2019 (Day time). Measurements were stopped when it started to rain. The night time measurements were obtained a week later on Tuesday 22nd October 2019 (Night time).

On both occasions, the same Casella Cel 63X class 1 sound level meter set to take hourly logs of the LAeq, LAF90 and LAFmax. Measurements captured noise from cars parking, delivery wagons, pedestrian conversation and road traffic noise. Deliveries to the B&M Store occurred at 07:30AM Tuesday the 22nd and at 10:30AM Tuesday 15th of October.

Day time measurements totaled 12 hours 20min. This was combined into a single 13 hour LAeq and used to represent the 16 hour LAeq level. Night time measurements totaled 3 hours from 04:00AM – 07:00AM on Tuesday the 22nd of October. All night time measurements were combined into a single 3 hour LAeq and used as the equivalent night time 8 hour LAeq.

The site is in a noise environment that is fairly consistent with small variation in noise levels. On both occasions the sound level meter was field calibrated successfully before and after measurements successfully.

Editing of Measurement Data

The measurement data has been used in its entirety. The data has not been altered, deleted and were not paused or edited during any of the measurements. The sound level meter was turned on and set to measure. Measurements were only stopped when the measurement was finished on the day.

Façade Correction

Façade measurements occur when the meter is in front of a large reflective surface at a distance of less than 3.5m away from the reflective surface. In order to convert measurements to free field equivalents, a façade correction is required. This is done by reducing the measured levels by up to 3dB. All measurements were conducted 4 m from the nearest fence bordering the site. No façade correction is required and non has been applied to the data.

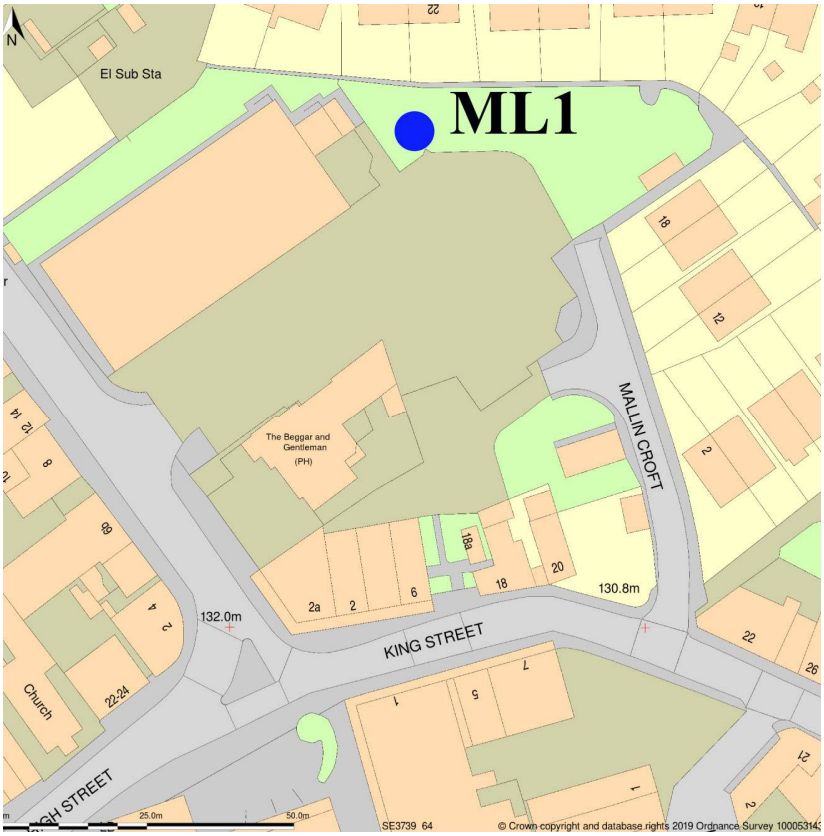


Picture 2A: Measurements captured delivery noise.



Picture 2B: Deliveries at B&M Store

Site and Measurement Locations



Site plan: This is a site location plan purchased and cropped from the website https://www.buyaplan.co.uk on 29th October 2019 at 12:00. The blue circle indicate the noise measurement location and is marked as ML1.

Date and Time of Measurements

Measurements were conducted

Tuesday 15th October 2019 (Day time) Measurements started at 09:38 and continued till 20:05. On Tuesday 22nd October 2019 (Night time) measurements started at 04:00AM and ended at 09:10AM.

Measured Noise Levels

ML1 Noise Levels

	LAeq dB	LAFmax dB
Night LAeq (3 hour)	42dB	67
Day LAeq(13 hour)	50	89

Table 1a: Night and day time levels

Night $L_{Aeq\ (8\ hour)}$ 42dB and LAFmax night reached 67dB

Day $L_{Aeq\ (16\ hour)}$ 50dB

(Measurement data is in the Appendix)

BS8233:2014 Criteria

Table 1 below is taken from BS8233:2014. It shows the guide lines for internal ambient noise levels. The guidelines in BS8233:2014 are also advised by WHO (2009).

Activity	Location	Day (07:00 -23:00)	Night (23:00 – 07:00)
Resting	**Living Room**	**35** $_{LAeq\ (16\ hour)}$	-
Dining	**Dining room/area**	**40** $_{LAeq\ (16\ hour)}$	-
Sleeping(daytime resting)	**Bedroom**	**35** $_{LAeq\ (16\ hour)}$	**30** $_{LAeq\ (16\ hour)}$

Table 1: BS8233:2014 noise level for internal habitable rooms.

In addition the WHO (2009) has guidance for outdoor living areas such as gardens for day time noise of 50 – 55dB $L_{Aeq\ (16\ hour)}$. It has a L_{AFmax} of 45dB inside bedrooms and a L_{AFmax} of 60dB outside bedrooms, (see table 2 below).

Specific Environment	LAeq dB	Time base (hours)	LAFmax dB
Outdoor living area (day)	55	16	
Outdoor living area	50	16	

(evening)			
Inside bedrooms (sleeping)	30	8	45
Outside bedrooms	45	8	60

Table 2: WHO (2009) guidelines

Recommendations

- **Living rooms** should have windows, external doors, external walling and ventilation with a sound reduction of R_w(c;ctr) 20dB. The sound reduction is set to account for some uncertainty ±5dB (see uncertainty section below).

Living Rooms				
Opening Type	**Type**	**Required Dn,e,w(ctr) dB**	**Required Rw + Ctr dB**	**Decription**
Glazing	Single glazing		26	Glazing to be 4mm single float glass Rw+Ctr =26dB
Ventilation	Acoustic wall ventilation	37		Greenwoods model AWV39 Dn,e,W + Ctr = 37dB
External doors	N/A		20	Standard external doors

Table 3: Living room sound insulation for glazing, acoustic ventilation, doors and walling

Dining rooms should have windows, external doors, external walling and ventilation with a sound reduction of R_w(c;ctr) 15dB. The sound reduction is set to account for some uncertainty ±5dB (see uncertainty section below).

Dining Room				
Opening Type	**Type**	**Required Dn,e,w(ctr) dB**	**Required Rw + Ctr dB**	**Decription**
Glazing	Single glazing		26	Glazing to be 4mm single float glass Rw+Ctr =26dB
Ventilation	Acoustic wall ventilation	37		Greenwoods model AWV39 Dn,e,W + Ctr = 37dB
External doors	N/A		20	Standard external doors

Table 3A: Dining room sound insulation for glazing, acoustic ventilation, doors and walling

Bedrooms, should have windows, external doors, external walling and ventilation with a sound reduction sufficiently high to reduce LAFmax (night) from 67dB to 45dB internally as recommended by WHO (2009). $R_{,w}$ + Ctr 27dB.

Bed Rooms				
Opening Type	**Type**	**Required Dn,e,w(ctr) dB**	**Required Rw + Ctr dB**	**Decription**
Glazing	Single glazing		28	Glazing to be 6mm single float glass Rw+Ctr =26dB
Ventilation	Acoustic wall ventilation	37		Greenwoods model AWV39 Dn,e,W + Ctr = 37dB
External doors	N/A			No external doors from a bedroom

Table 3: Bed room sound insulation for glazing, acoustic ventilation, doors and walling

It should be noted that the development relies on windows being closed to achieve internal noise level guidelines. As a result acoustic ventilation must be provided that does not require windows to be open. Acoustic ventilation in bedrooms, dining rooms and living rooms must achieve the minimum sound reduction stated for that room.

WHO (2009) has an external LAFmax of 60dB outside bedrooms at night. This is not achievable because LAFmax is 67dB at night.

A data sheet from Pilkington glass has been attached showing glazing that achieves the noise reductions as recommended in this report.

Pilkington provides suitable glazing. Huet provides acoustic doors that achieve the required $R_{,w}$(c;ctr). Greenwoods acoustic ventilation provides ventilation that would be suitable. Data sheets have been attached as part of this report to assist the Client in achieving the required sound insulation. The client does not have to source these products from the suppliers mentioned in this report. The suppliers mentioned herein are for example purposes only.

A suitable construction method for walls and roof should be used to achieve a sound reduction of Rw + Ctr of 20dB or more.

No special acoustic measures are required for hallways, bathrooms and kitchens unless they form part of a Dining room, Living room or bedroom.

Achieving the sound reduction as stated in this report will meet the standards for day and night time levels in the specified rooms.

Context of the Noise Environment

WHO (2009) provides guidance of night time $L_{Aeq\ (8\ hour)}$ of 45dB outside bedrooms. Adverse health effects arise from sleep disturbance when the window to the bedroom is left open. This means that persons sleeping with the window open are likely to have disturbed sleep if outside noise levels are greater than night time $L_{Aeq\ (8\ hour)}$ 45dB. For this reason the WHO (2009) guidelines recommend noise levels outside bedrooms to be $L_{Aeq\ (8\ hour)}$ 45dB or lower. **This requirement is achieved. LAeq(8 hour) night is 42dB.**

Should $L_{Aeq\ (8\ hour)}$ 45 dB outside bedrooms not be achievable BS8233:2014 (see below) provides for the approval of development if the planners deem the development as desirable.

National Planning Policy Framework (NPPF) as revised February 2019

The national policy framework states at paragraph 170 (e) new and existing developments should be prevented;

“Planning policies and decisions should contribute to and enhance the natural and local environment by:

(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and..”

At paragraph 180 the NPPF states;

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life ;
b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

LAFmax reached 67dB at night. The area has a daytime level of $L_{Aeq\ (16\ hour)}$ 50dB and a night time $L_{Aeq\ (8\ hour)}$ of 42dB. Achieving the sound reduction index for walls, windows, doors and ventilation as specified in this report will satisfy the main standards for internal habitable rooms and should fulfill the requirements of the national planning policy framework. It should be noted that users of the proposed dwellings are at risk of adverse noise impact when external doors and windows are left open.

BS8233:2014 accepts that external noise level guidelines may not be attainable but in certain circumstances development is acceptable, see section 7.7.2 and 7.7.3.2 of BS8233:2014 reproduced below.

Section 7.7.2 Internal Ambient Noise Levels for Dwellings of BS8233:2014 states

Note 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFMAX} depending on the character and number of events per night. Sporadic noise events could require separate values.

Note 5: If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.

Note 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Section 7.7.3.2 Design Criteria for External Noise of BS8233:2014 states

"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 50dB $L_{Aeq,T}$ with an upper guideline of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. **This requirement has been**

achieved, daytime LAeq(16hour) is 50dB. However, it is also recognized that these guideline values are not achievable in all circumstances where development might 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," (BS8233:2014).

Uncertainty

The noise levels were obtained by direct onsite measurements. The sound level meter was fitted with a wind shield and maintained on a tripod throughout the measurement period. Once readings were started, the sound level meter was free from human interference. This was done to minimize uncertainty in the readings.

In addition, the readings were taken during suitable weather conditions. Each measurement was conducted for a duration sufficient to provide a representation of $L_{Aeq,(8\ hour)}$ for night time and $L_{Aeq,\ (16\ hour)}$ for day time.

The sound level meter was calibrated successfully at the start and at the end of the measurements.

Laboratory calibration uncertainty of the sound level meter is ± 1 dB

The nature of the road traffic noise may vary from time to time depending on but not limited to the number of vehicles, type of vehicles and the speed at which they are traveling. Measurements also include noise from car park users. Car park noise will also rise or fall depending on the number of users and vehicle types. An uncertainty factor of ±5dB has been added to account for variations that can occur day to day.

$$u = \sqrt{a^2 + b^2 + c^2 ... etc}$$

U= $\sqrt{1}$ **+5²**

U = ± 5 dB

Uncertainty in the measurement is ± 5 dB

Signed:

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Noise Consultant

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BIBLIOGRAPHY

British Standards Institution (2014) BS EN 8233:2014 **Guidance on Sound Insulation and Noise Reduction for Buildings.** London. BSI

World Health Organization Europe (2009) **Night Noise Guidelines for Europe.** Copenhagen WHO

Department for Communities and Local Government (2019) **National Planning Policy Framework.** Crown London

APPENDIX A

Measuring Equipment & Calibration

- The sound level meter used at ML1 was a Casella Cel 63X, a class 1 meter laboratory calibrated traceable to UKAS standards serial number 2670932. Last laboratory calibrated by Pennine Instrument Services 18th April 2018 Certificate No. 037864-2
- Digitron Thermostat model TM-22 serial: 5304220955RC calibrated Dec 2018 by BSRIA certificate: UK_34558
- Kestrel 1000 serial 2140575 Anemometer.

At the beginning and at the end of measurements the meter was calibrated with an acoustic calibrator before and after the measurements with negligible deviation.

Weather Conditions

Weather					
	Tues 22	Tuesday 22	Tues 15th	Tues 15th	

	Oct 04:10	Oct 09:10	Oct 09:30	Oct 20:15	
Wind	1	1	1	0.5	
Cloud Cover	10	100	60	100	
Precipitation	none	none	none	none	
Temperature	6	5	11	11	

Table 3: Weather conditions at the start of the measurements. *The calibration reference level is 114dB at 1KHz.

Measurement Data

MallinStreet Hoyland Barnsle S74				
Tuesday 22 Oct 2019				
Start Time	**Duration min**	**LAeq dB**	**LAFmax dB**	**LAF90 dB**
04:05	60	39.1	62	34.5
05:05	60	40.7	63.2	37
06:05	55	44.4	66.6	39
07:00	60	55.4	85.3	42
08:00	57	50.5	74.7	42
Tuesday 15th Oct 2019				
Start	**Duration min**	**LAeq dB**	**LAFmax dB**	**LAF90 dB**
09:38	60	52.7	83.3	40.5
10:38	60	48	68.8	39.5
11:38	60	47.2	67.2	38.5
12:38	60	52.9	81	39
13:38	60	52	89.4	40
14:38	60	47.4	70.3	39.5
15:38	60	46	69.2	40
16:38	60	48.1	72.4	39
17:38	60	44.4	67.1	37.5
18:38	60	40.4	60.8	35
19:38	20	38.3	60.4	34

Table 3A: Measurements obtained at ML1, 4m from the boundary fence. The measurement location I swithin 10m of the B&M Retail building and 5m from the car park. The measurements show Day time LAeq(12 hours 20min) 50dB Night time LAeq(3hours) 42dB Lafmax night 67dB