White Bear Yard

External Noise Survey

BB

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White Bear Yard
External Noise Survey

Rev No	Comments	Checked	Approved	Date
1	**Initial Issue**	**RA**	**AM**	**19/12/14**

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Job No 60337194 Reference 60337194/Rp1v1 Date Created December 2014

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1 Introduction

1.1 Refurbishment works are proposed for White Bear Yard (144a Clerkenwell Road). As part of these works it is understood that a new outdoor condenser unit will be installed to the roof of the building.

1.2 An external noise survey has been undertaken at the site over a 24 hour period to establish the prevailing ambient and background noise levels. Based on these measured noise levels, along with guidance provided by the London Borough of Camden Council, noise emission limits have been determined.

1.3 A glossary of acoustic terminology used in this report is presented in Appendix A. The full noise measurement results are included in Appendix B.

2 External Noise Survey

2.1 Site Description

2.1.1 The existing building is located on an enclosed site with one street facing façade on Back Hill. Several commercial and residential buildings surround White Bear Yard. A plan showing the location of the site and surrounding buildings is shown in Figure 2.1 below.

2.1.2 The nearest noise sensitive premises (NNSP) are considered to be the residential properties bordering the site to the north on Summers Street, some 15m away from the proposed external plant location. It is thought that all other buildings overlooking the roof of White Bear Yard are commercial premises and so would not be considered to be noise sensitive.

2.2 Measurement Methodology

2.2.1 Unattended noise measurements were undertaken between 12:10 on Monday 1st and 13:45 on Tuesday 2nd December 2014 at two locations on the roof of the existing building. The measurement location, location of proposed condenser unit and location of the NNSP are shown in Figure 2.1.

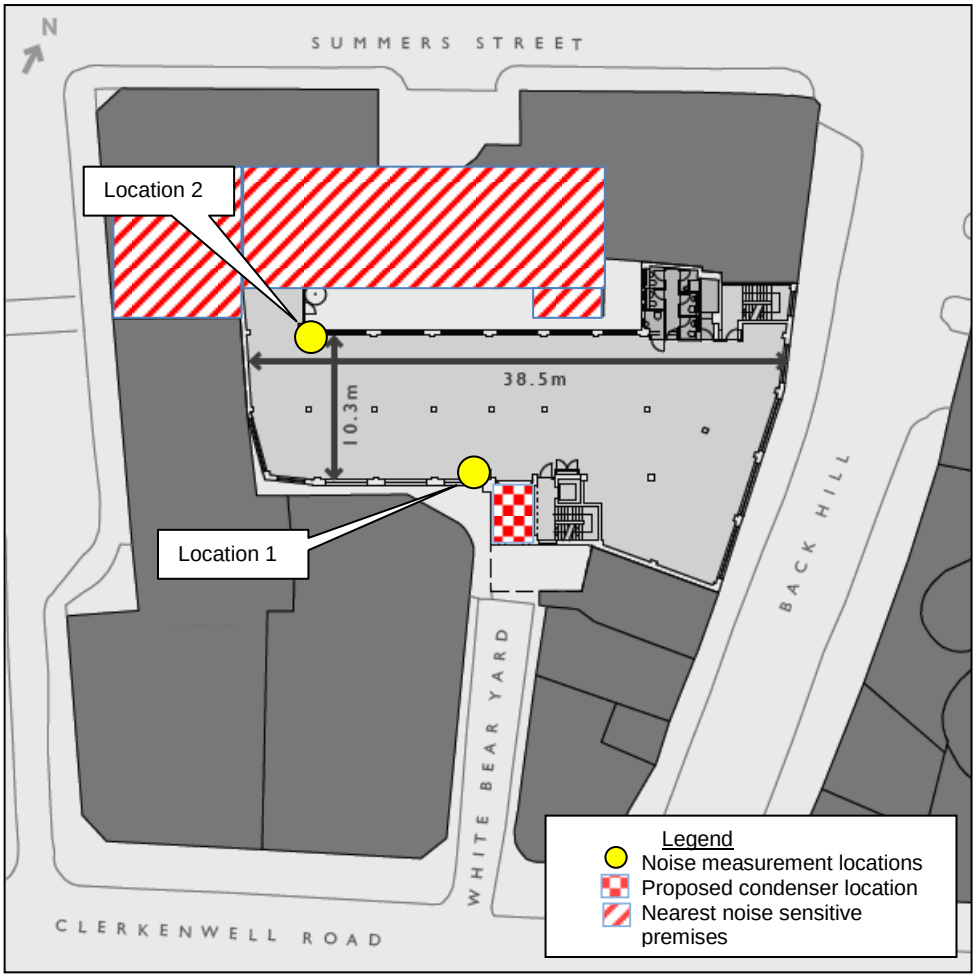

Figure 2.1 Site Plan Showing Location of Measurement Microphones, NNSP and Proposed Plant Item

2.2.2 The measurement microphones were each installed on a tripod and extended approximately 1.8m above relative ground height. The noise levels measured at Location 2 are considered suitable to establish the prevailing background and ambient noise levels at the nearest noise sensitive premises.

2.2.3 The measurement equipment was set to continually monitor noise levels over 15 minute sample periods. During each measurement period a number of statistical noise indices were recorded, including the L_{Aeq} (commonly associated with ambient noise levels) and the L_{A90} (typically used to represent the background noise).

2.2.4 The following equipment was used to undertake the noise measurements:

Location	Equipment	Type	Serial No.
1	Norsonic 118	Integrating averaging sound level meter	28136
	Norsonic 1212	Weatherproof microphone enclosure	N/A
2	Norsonic 118	Integrating averaging sound level meter	30667
	Norsonic 1212	Weatherproof microphone enclosure	N/A
All	Norsonic 1251	Calibrator	30896

Table 2.1 Noise Measurement Equipment

2.2.5 Field calibration checks of the sound level meters and associated microphones were performed prior to and on completion of the measurements, in accordance with recommended practice. No significant drift in calibration occurred during the measurement period. The accuracy of the calibrator can be traced to National Physical Laboratory Standards.

2.2.6 The weather conditions during the periods of attendance were dry and calm. The conditions were considered suitable for external noise measurements and are not anticipated to have had any detrimental influence on the survey results.

2.3 Commentary

2.3.1 The dominant noise source at the measurement location was considered to be noise from road traffic travelling along the A5201 (Clerkenwell Road). Building services noise from surrounding buildings was also audible however was not considered to be dominant above the prevailing ambient noise climate.

2.4 Measurement Results

2.4.1 Statistical measurement data are presented in full in Appendix B.

2.4.2 In summary, the representative background noise levels measured at each location are presented in Table 2.2 below.

Location	Time Period	Representative Background Noise Level (dB $L_{A90, 15min}$)
1	Daytime (07:00 – 23:00)	49
	Night-Time (23:00 – 07:00)	48
2	Daytime (07:00 – 23:00)	44
	Night-Time (23:00 – 07:00)	40

All values are sound pressure levels measured in dB re 20 µPa

Table 2.2: Measured External Background Noise Levels

3 Plant Noise Emission

3.1 Criteria

3.1.1 *BS 4142: 2014*

3.1.1.1 British Standard BS 4142: 2014 *'Methods for rating and assessing industrial and commercial sound'* provides a methodology for assessing whether noise from industrial and commercial activities is likely to give rise to complaints from nearby noise-sensitive premises. This method compares the noise level from the source in question (called the 'specific noise level') with the background noise level in the absence of the noise source, taking into account the character and type of noise. Unusual acoustic features, such as a whine, hiss or irregular noise, where present, are accounted for under BS 4142 by the addition of a single 5 dB correction to the specific noise level. The corrected specific noise level is the 'rating level'.

3.1.1.2 The Standard notes that the lower the rating noise level is relative to the measured background 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. A difference of around +5 dB is likely to be an indication of an adverse impact whilst a difference of around +10 dB is likely to be an indication of a significant adverse impact.

3.1.2 *Environmental Protection Act 1990*

3.1.2.1 Under the provisions of the Environmental Protection Act, occupants of neighbouring properties could take direct action if they believe they have been subjected to a noise nuisance.

3.1.2.2 Achievement of a BS 4142 rating noise level of between 5 and 10 dB below the lowest background noise level at the façade of the nearest neighbouring noise sensitive development is considered a robust approach to minimising the risk of such action being upheld.

3.1.3 *Local Authority's Guidelines*

3.1.3.1 Development Policy 28 (DP28) of the Camden Local Development Framework (2010) provides guidance on noise emission from new developments.

3.1.3.2 Based upon guidance contained within DP28 and previous planning conditions set down by the London Borough of Camden the following requirements relating to plant noise emission are understood to apply to the development:

- noise levels at a point 1 metre external to sensitive facades to be at least 5 dBA less than the existing background measurement (L_{90}) expressed in dBA when all plant/equipment are in operation;
- where it is anticipated that any plant/equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps) special attention to be given to reducing the noise levels from the piece of plant/equipment at any sensitive façade to at least 10 dBA below the L_{90}, expressed in dBA.

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3.2 Noise Emission Limits

3.2.1 Based on the background noise levels measured and Local Authority guidance, it is recommended that the following noise emission limits be considered in the first instance, to be achieved at 1m from the façade of the nearest noise sensitive premises. These are based on achieving a level of 5 dB below the existing background noise level.

Noise Emission Limit @ 1m from the Façade of the Nearest Noise Sensitive Premises	
Time Period	**Plant Noise Limit (dB L_{pA})**
Daytime (07:00 – 23:00)	39
Night-Time (23:00 – 07:00)	35

All values are sound pressure levels in dB re 20 µPa

Table 3.1: Noise Emission Limits

3.2.2 The above limits should be met with all plant operating simultaneously. In line with guidance contained within BS 4142 and the Local Authority's requirements, if sources produce any "*distinguishable, discrete or continuous note (whine, hiss, screech, hum, etc) or distinct impulses (bangs, clicks, clatters, or thumps)*" a +5 dB correction should be applied to the 'specific noise level' of the offending item.

3.3 Commentary

3.3.1 The nearest noise sensitive premises (NNSP) are considered to be the residential properties on Summers Street, overlooking White Bear Yard. These are in the region of 15m away from the proposed location of the outdoor condenser unit. Attenuation owing to distance propagation (assuming point source propagation) is therefore expected to be around 24 dB.

3.3.2 In order to achieve the noise emission limits at the NNSP, during both day and night-time periods, it is recommended that a noise emission limit of **59 dB L_{pA}** at 1m from the unit be considered in the first instance.

3.3.3 If this limit cannot be achieved consideration may need to be given to the use of noise reduction measures such as plant screens/louvres.

3.3.4 A review of this limit should be carried out as the design develops and more details of the installation are made available.

4 Conclusions

4.1 As part of the refurbishment works planned to be carried out at White Bear Yard it is understood that a new outdoor condenser unit is to be installed at roof level.

4.2 An external noise survey has been undertaken out at the site over a period of 24 hours to establish the prevailing ambient and background noise levels, the results of which have been used in the consideration of plant noise emission limits.

4.3 A plant noise emission limit of 5 dB below the prevailing background noise level has been selected, to be achieved at the façade of the nearest noise sensitive premises (NNSP), and is considered appropriate for satisfying the expectations of the Local Authority and to reduce the risk of noise disturbance to residential neighbours.

4.4 Based on the noise emission limits, proposed location of the outdoor condenser unit at roof level and the location of the NNSP it is expected that noise from the unit will need to be of a level no more than 59 dB L_{pA} when measured at 1m from the unit. If this limit cannot be achieved consideration may need to be given to the use of noise reduction measures such as plant screens/louvres. This limit may need to be reviewed as the design develops and more details regarding the installation are known.

Appendix A: Acoustic Terminology

This appendix provides a layperson's explanation of the acoustics terms that commonly appear in reports. It is not intended to give full scientific definitions and explanations or go into detail on how and why things are as they are. Some obsolete terms and abbreviations have been included as they still appear in documents from time to time.

Many words have more specific meanings when used in acoustics than in every-day language.	
sound	is used to describe the physical phenomenon of the transmission of energy through gaseous or liquid media via rapid fluctuations in pressure.
level	used solely to describe values measured in decibels
loudness	is the human perception of the level of sound
noise	has no strict definition and is often used interchangeably with sound however it is usually taken to mean unwanted sound
index	a value based on the mathematical processing of raw data
indicator	a value used to indicate the likelihood of a particular response of effect eg. $L_{10,18hr}$ is an index based on statistical processing of sound pressure data that is used as an indicator for road traffic noise response.
weighted	values modified to reflect sensitivities at particular frequencies.
apparent	measured in situ
standardised	a generalised value based on an in-situ measurement with a correction based on a space with standard reverberation
normalised	a generalised value based on an in-situ measurement with a correction based on space with standard absorption area
insulation	resistance to the passage of airborne sound
attenuation	amount by which sound or vibration is reduced when passing through a structure or system

decibels dB	The decibel is not a true measurement unit nor is it exclusive to acoustics. The decibel is a logarithmic ratio of two values of a variable. Decibels are used because they can represent very wide ranges of ratios (from trillionths and billionths to billions and trillions) with a small range of decibel values. Decibels can be used to represent measured values by using a known reference value in the ratio. When using decibels to measure something it is therefore important to specify what variable is actually being measured and what reference level has been used. This is done by adding a reference value statement in the form "dB re x units", where the units indicate the variable being measured and x is the reference value. Decibels are used in acoustics because the human ear responds to sound in a logarithmic way and the quantities measured in acoustics vary over wide ranges. However, decibels are used in acoustics to measure several different things which it is important not to confuse with each other. To avoid confusion there is a notation system that identifies what a decibel value is for. The notations take the form of an italic capital letter and some subscript characters. The capital identifies the general type of value and the subscripts give specific details of what is being represented. L_{xxx} denotes a level (ie a value measured in dB by comparison with a reference value); D_{xxx} denotes a difference between two levels; R_{xxx} denotes a rating (or index), which is measure of the generalised acoustic performance of a material or construction based on a difference between two levels; C_{xxx} denotes a correction (or constant) Of these only those with *L* notations require a reference value statement. Those with *D* or *R* notations are effectively ratios of two measured values not one measured value and a reference value and those with *C* notations are not based on reference values at all. A reference value statement therefore has no meaning when describing *D*, *R* and *C* decibels. Because decibels are logarithmic they have to be added, subtracted, multiplied, divided and averaged using different techniques from normal numbers.
Sound Pressure Level L_p obsolete – SPL	This is the basic measure of how much sound there is at a given location. It is a measure of the size of the pressure fluctuations in the air that we perceive as sound. Sound Pressure Level is expressed in decibels with a reference level of 20 μPa (L_p in dB re 20 μPa)

Pitch, frequency	The sound we perceive can have different characteristics. These can range from low-pitched hums to high-pitched squeals and impulsive sounds. In engineering acoustics the word frequency rather than pitch tends to be used when describing the characteristics of a sound. The unit of frequency is the Hertz (Hz), which is the number of pressure fluctuations per second.
tonal sound broadband sound impulsive sound	Any sound can be defined by its frequency content. Some sounds comprise just one discrete frequency (tonal sounds). Others are distributed over wide frequency ranges (broad band sound). Impulsive sounds are made up short pulses of high frequency components. Sources often produce all of these types of sound at the same time.
frequency analysis	There are different ways of analysing and displaying the frequency content of a sound: Octave Band Analysis – is the simplest method. The audible range of frequencies is divided into 10 bands. Third-Octave Band Analysis – more detailed with 30 bands Narrow Band Analysis – 12^{th} Octave (120 bands), 24^{th} Octave (240), Fast Fourier (FFT) Analysis – a high resolution technique that can give extremely detailed information on frequency content
A-weighting L_A or L_{pA}, L_{WA},	The human ear does not sense all frequencies of sound equally. Our sensitivity is at a maximum at around 2 kHz and steadily decreases above and below. Below 20 Hz and above about 20 kHz we can't hear at all. Within its operating limits a precision measurement microphone measures all frequencies the same so the output it produces does not reflect what we would actually hear. The A-weighting is an electronic filter that matches the response of a sound level meter to that of the human ear. When A-weighted the Sound Pressure Level L_p becomes L_{pA} (or L_A) and the Sound Power Level L_W becomes L_{WA}.
obsolete – dBA, dBA	It used to be common to identify that a level was A-weighted by writing dBA or dBA instead of dB. These terms are now obsolete and should not be used as they conflict with other, non-acoustic, uses of decibels
similar – C-weighting L_C or L_{pC}, L_{WC}	The response of the human ear varies depending on how loud the sound is. A-weighting matches the response of a sound level meter to human hearing at low levels (~ 40-90 dB). For higher levels there are other weightings the most common of which is the C-weighting.

Different types of decibels commonly used in acoustics

L_p	*The instantaneous sound pressure level* (L_p)
L_{pA} (or L_A)	*The A-weighted instantaneous sound pressure level* (L_{pA} or L_A) This is the root mean square size of the pressure fluctuations in the air. This level can fluctuate wildly even for seemingly steady sounds. To make sound level meters easier to read the values on the display are smoothed or damped out. This is effectively done by taking a rolling average of the previous 0.125 s (FAST time constant) or the previous 1 s (SLOW time constant).
L_{AF}, L_{AS}	The letters F or S are added to the subscripts in the notation to indicate when the FAST or SLOW time constant has been used. These are often omitted but it is good practice to include them.

L_{max} L_{Amax} L_{AFmax} L_{min} , L_{Fmin}	*The maximum instantaneous sound pressure level* (L_{max}), *The A-weighted maximum instantaneous sound pressure level* (L_{Amax}) *The A-weighted maximum instantaneous sound pressure level with a FAST time constant* (L_{AFmax}). This is the highest instantaneous sound pressure level reached during a measurement period. The opposite of the L_{max} is the *minimum instantaneous sound pressure level* or L_{min} etc. It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.
$L_{N,T}$ $L_{AN,T}$ $L_{AFN,T}$ N = %age value, 0-100 T = measurement time eg. L_{A90}, L_{A10}, $L_{AF90,\ 5\ min}$	*The percentage exceedence sound pressure level* ($L_{N,T}$), *The A-weighted percentage exceedence sound pressure level* ($L_{AN,T}$), *the A-weighted percentage exceedence sound pressure level with a FAST time constant* ($L_{AFN,T}$). This is the sound pressure level exceeded for *N*% of time period *T*. eg. If an A-weighted level of x dB is exceeded for a total of 6 minutes within one hour, the level will have been above x dB for 10% of the measurement period. This is written as $L_{A10,1hr}$ = x dB. L_{A0} (the level exceeded for 0 % of the time) is equivalent to the L_{Amax} and L_{A100} (the level exceeded for 100 % of the time) is equivalent to the L_{Amin}. It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.
$L_{eq,T}$ $L_{Aeq,T}$ T = measurement time eg. $L_{Aeq,5min}$	The *equivalent continuous sound pressure level over period T* ($L_{eq,T}$), *The A-weighted equivalent continuous sound pressure level over period T* ($L_{Aeq,T}$). This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the L_{eq} is not a simple arithmetic mean value. The L_{eq} is calculated from the raw sound pressure data. It is not appropriate to include a reference to the FAST and SLOW time constants in the notation
D	*The level difference* The difference between two measured sound pressure levels. In building acoustics this is usually the difference between the levels in two adjacent rooms measured to determine the sound insulation performance of the partition between them. In this context *D* values are usually quoted in third-octave bands between ?? and ?? Hz.
R	*The sound reduction index* This a measure of the sound insulation performance a material or construction measured under laboratory conditions in accordance with BS EN ISO 140-3. *R* differs from *D* in that it takes account of the area of the construction under test as well as the absorption in the receiving room, both of these factors influence the measured *D*. Taking into account these factors allows the *R* for different constructions to be compared on a like for like basis. *R* values are quoted in third-octaves between ?? Hz and ?? Hz

Appendix B: Noise Measurement Results

Full results of the statistical data measured during the survey are presented below. All of the data are sound pressure levels in dB re 20 µPa. All measurements were for durations of 15 minutes.

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Measurement Results

Project:	**White Bear Yard**		
Section:	**External Noise Level Measurements**	Job No:	**60337194**
	Location 1	Date:	**19/12/2014**
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Time	L_{Aeq}	$L_{A\ max}$	$L_{A\ 90}$
12:30 - 12:45	56	69	53
12:45 - 13:00	60	81	53
13:00 - 13:15	56	69	53
13:15 - 13:30	61	86	53
13:30 - 13:45	57	77	52
13:45 - 14:00	56	70	52
14:00 - 14:15	56	66	53
14:15 - 14:30	56	68	52
14:30 - 14:45	56	85	51
14:45 - 15:00	57	71	52
15:00 - 15:15	56	78	52
15:15 - 15:30	55	68	51
15:30 - 15:45	56	77	51
15:45 - 16:00	55	72	53
16:00 - 16:15	57	77	52
16:15 - 16:30	56	66	53
16:30 - 16:45	57	71	53
16:45 - 17:00	58	71	53
17:00 - 17:15	56	68	53
17:15 - 17:30	57	74	53
17:30 - 17:45	55	64	52
17:45 - 18:00	57	72	52
18:00 - 18:15	55	70	52
18:15 - 18:30	58	76	52
18:30 - 18:45	55	70	51
18:45 - 19:00	55	68	51
19:00 - 19:15	56	73	51
19:15 - 19:30	55	65	51
19:30 - 19:45	54	65	50
19:45 - 20:00	55	73	51
20:00 - 20:15	55	67	51
20:15 - 20:30	54	68	49
20:30 - 20:45	58	85	50
20:45 - 21:00	54	66	50
21:00 - 21:15	54	67	50
21:15 - 21:30	54	67	50
21:30 - 21:45	54	71	50
21:45 - 22:00	54	67	49
22:00 - 22:15	54	71	49
22:15 - 22:30	55	80	50
22:30 - 22:45	54	69	48
22:45 - 23:00	54	67	48
23:00 - 23:15	54	64	49
23:15 - 23:30	54	75	49
23:30 - 23:45	54	73	49
23:45 - 00:00	54	78	49
00:00 - 00:15	56	78	49
00:15 - 00:30	52	62	47
00:30 - 00:45	53	68	48

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Measurement Results

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Time	L_{Aeq}	$L_{A\ max}$	$L_{A\ 90}$
00:45 - 01:00	53	66	48
01:00 - 01:15	53	65	48
01:15 - 01:30	52	67	47
01:30 - 01:45	52	64	48
01:45 - 02:00	52	66	48
02:00 - 02:15	52	65	47
02:15 - 02:30	53	65	47
02:30 - 02:45	51	64	47
02:45 - 03:00	52	64	48
03:00 - 03:15	54	75	48
03:15 - 03:30	55	72	48
03:30 - 03:45	52	65	47
03:45 - 04:00	52	67	47
04:00 - 04:15	51	63	47
04:15 - 04:30	51	65	47
04:30 - 04:45	52	64	47
04:45 - 05:00	52	67	48
05:00 - 05:15	53	68	47
05:15 - 05:30	53	68	47
05:30 - 05:45	56	78	49
05:45 - 06:00	55	71	50
06:00 - 06:15	55	68	50
06:15 - 06:30	55	71	50
06:30 - 06:45	55	70	49
06:45 - 07:00	55	68	49
07:00 - 07:15	55	66	50
07:15 - 07:30	56	75	50
07:30 - 07:45	56	71	50
07:45 - 08:00	56	67	51
08:00 - 08:15	56	72	51
08:15 - 08:30	56	68	51
08:30 - 08:45	57	74	52
08:45 - 09:00	56	70	52
09:00 - 09:15	57	76	52
09:15 - 09:30	56	69	52
09:30 - 09:45	57	75	53
09:45 - 10:00	56	69	52
10:00 - 10:15	55	66	52
10:15 - 10:30	56	70	52
10:30 - 10:45	56	72	53
10:45 - 11:00	59	80	54
11:00 - 11:15	59	85	53
11:15 - 11:30	56	66	53
11:30 - 11:45	56	72	53
11:45 - 12:00	61	85	54
12:00 - 12:15	60	84	54
12:15 - 12:30	57	73	54
12:30 - 12:45	56	68	54
12:45 - 13:00	56	72	54
13:00 - 13:15	56	72	53
13:15 - 13:30	56	70	54
13:30 - 13:45	57	76	54
13:45 - 14:00	61	72	57

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Measurement Results

Project:	**White Bear Yard**		
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	Location 2	Date:	**19/12/2014**
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Time	L_{Aeq}	$L_{A\ max}$	$L_{A\ 90}$
12:15 - 12:30	49	63	47
12:30 - 12:45	51	69	47
12:45 - 13:00	53	71	47
13:00 - 13:15	49	60	47
13:15 - 13:30	52	72	47
13:30 - 13:45	50	68	47
13:45 - 14:00	50	65	47
14:00 - 14:15	48	56	47
14:15 - 14:30	50	67	46
14:30 - 14:45	52	72	46
14:45 - 15:00	49	61	47
15:00 - 15:15	50	73	46
15:15 - 15:30	48	58	45
15:30 - 15:45	49	65	46
15:45 - 16:00	48	58	46
16:00 - 16:15	49	66	46
16:15 - 16:30	49	65	46
16:30 - 16:45	51	67	47
16:45 - 17:00	53	70	47
17:00 - 17:15	50	61	47
17:15 - 17:30	51	70	47
17:30 - 17:45	49	74	46
17:45 - 18:00	53	74	47
18:00 - 18:15	50	66	46
18:15 - 18:30	55	76	46
18:30 - 18:45	48	61	46
18:45 - 19:00	50	63	45
19:00 - 19:15	49	64	45
19:15 - 19:30	48	60	45
19:30 - 19:45	47	57	45
19:45 - 20:00	48	63	45
20:00 - 20:15	48	63	45
20:15 - 20:30	48	67	44
20:30 - 20:45	50	70	44
20:45 - 21:00	46	55	44
21:00 - 21:15	47	63	44
21:15 - 21:30	47	59	44
21:30 - 21:45	47	61	44
21:45 - 22:00	46	60	43
22:00 - 22:15	45	59	42
22:15 - 22:30	46	64	43
22:30 - 22:45	46	60	41
22:45 - 23:00	45	55	41
23:00 - 23:15	45	55	42
23:15 - 23:30	46	65	42
23:30 - 23:45	45	66	41
23:45 - 00:00	45	56	41
00:00 - 00:15	47	68	40
00:15 - 00:30	44	54	40

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Measurement Results

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Time	L_{Aeq}	$L_{A\ max}$	$L_{A\ 90}$
00:30 - 00:45	45	57	41
00:45 - 01:00	44	53	40
01:00 - 01:15	44	53	40
01:15 - 01:30	44	54	40
01:30 - 01:45	44	55	41
01:45 - 02:00	44	56	39
02:00 - 02:15	44	53	40
02:15 - 02:30	44	53	39
02:30 - 02:45	43	53	39
02:45 - 03:00	43	53	40
03:00 - 03:15	49	71	40
03:15 - 03:30	45	60	40
03:30 - 03:45	43	52	39
03:45 - 04:00	44	56	39
04:00 - 04:15	43	53	39
04:15 - 04:30	44	56	41
04:30 - 04:45	44	53	41
04:45 - 05:00	44	54	42
05:00 - 05:15	45	57	41
05:15 - 05:30	45	57	41
05:30 - 05:45	51	70	42
05:45 - 06:00	47	59	43
06:00 - 06:15	46	56	43
06:15 - 06:30	47	61	43
06:30 - 06:45	46	57	42
06:45 - 07:00	47	60	43
07:00 - 07:15	48	56	44
07:15 - 07:30	48	64	45
07:30 - 07:45	49	70	44
07:45 - 08:00	48	58	45
08:00 - 08:15	48	58	45
08:15 - 08:30	48	59	45
08:30 - 08:45	49	59	46
08:45 - 09:00	49	60	46
09:00 - 09:15	49	66	46
09:15 - 09:30	49	60	46
09:30 - 09:45	49	67	47
09:45 - 10:00	49	63	47
10:00 - 10:15	49	64	47
10:15 - 10:30	50	65	47
10:30 - 10:45	50	63	47
10:45 - 11:00	50	68	48
11:00 - 11:15	53	77	48
11:15 - 11:30	49	57	47
11:30 - 11:45	51	68	47
11:45 - 12:00	53	72	48
12:00 - 12:15	52	71	48
12:15 - 12:30	50	63	48
12:30 - 12:45	50	61	48
12:45 - 13:00	50	62	48
13:00 - 13:15	50	61	48
13:15 - 13:30	50	66	48
13:30 - 13:45	51	71	48
13:45 - 14:00	55	79	48