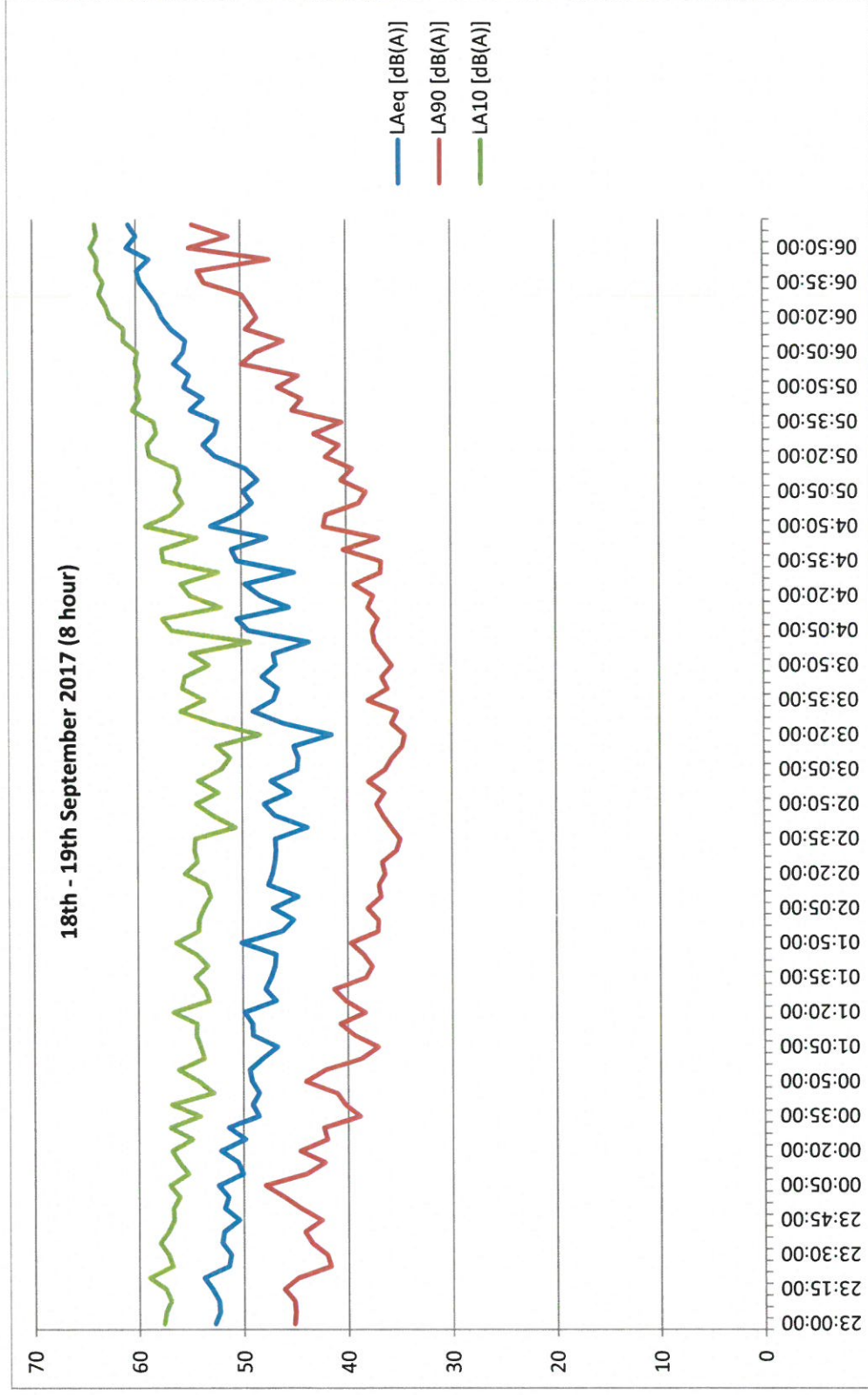
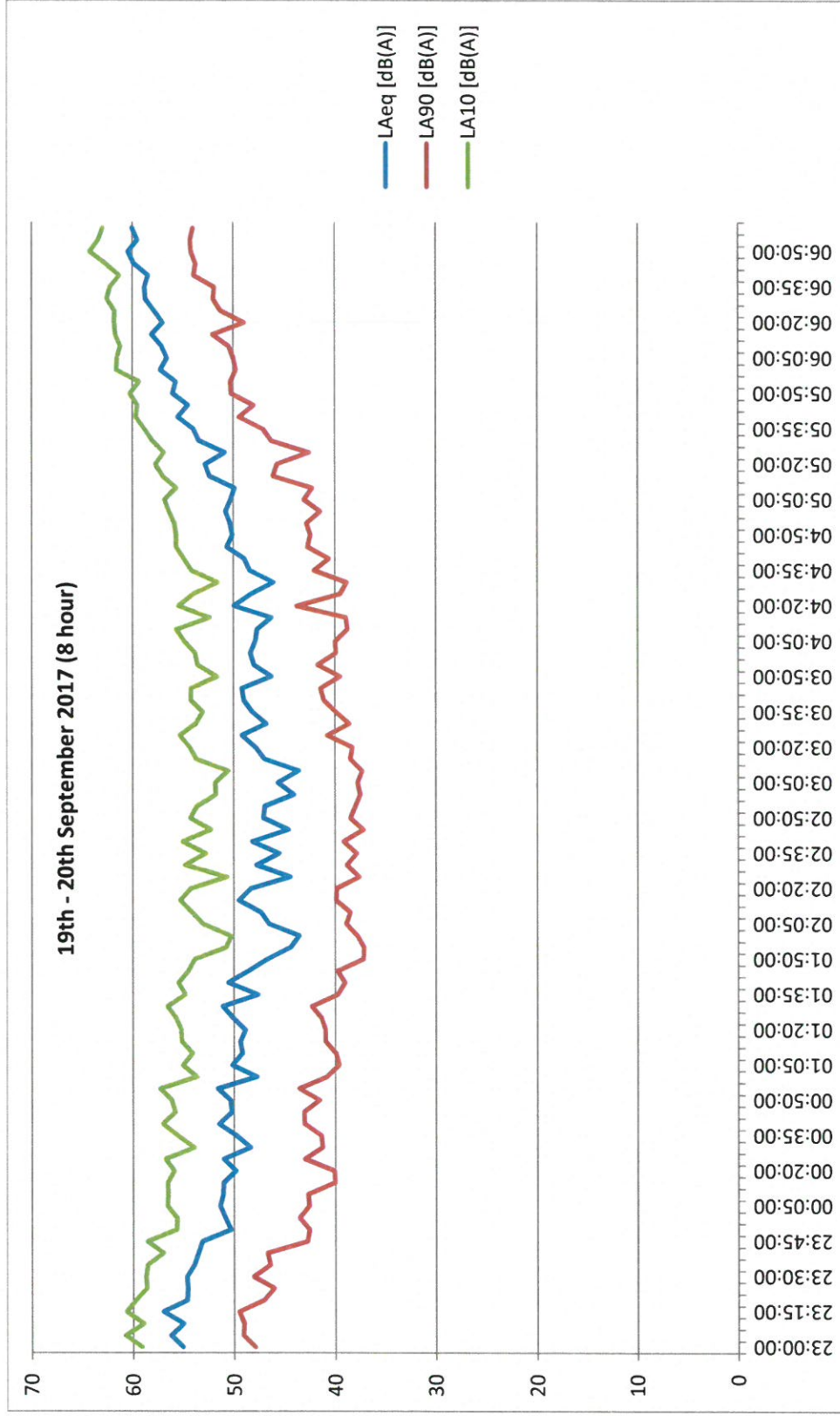


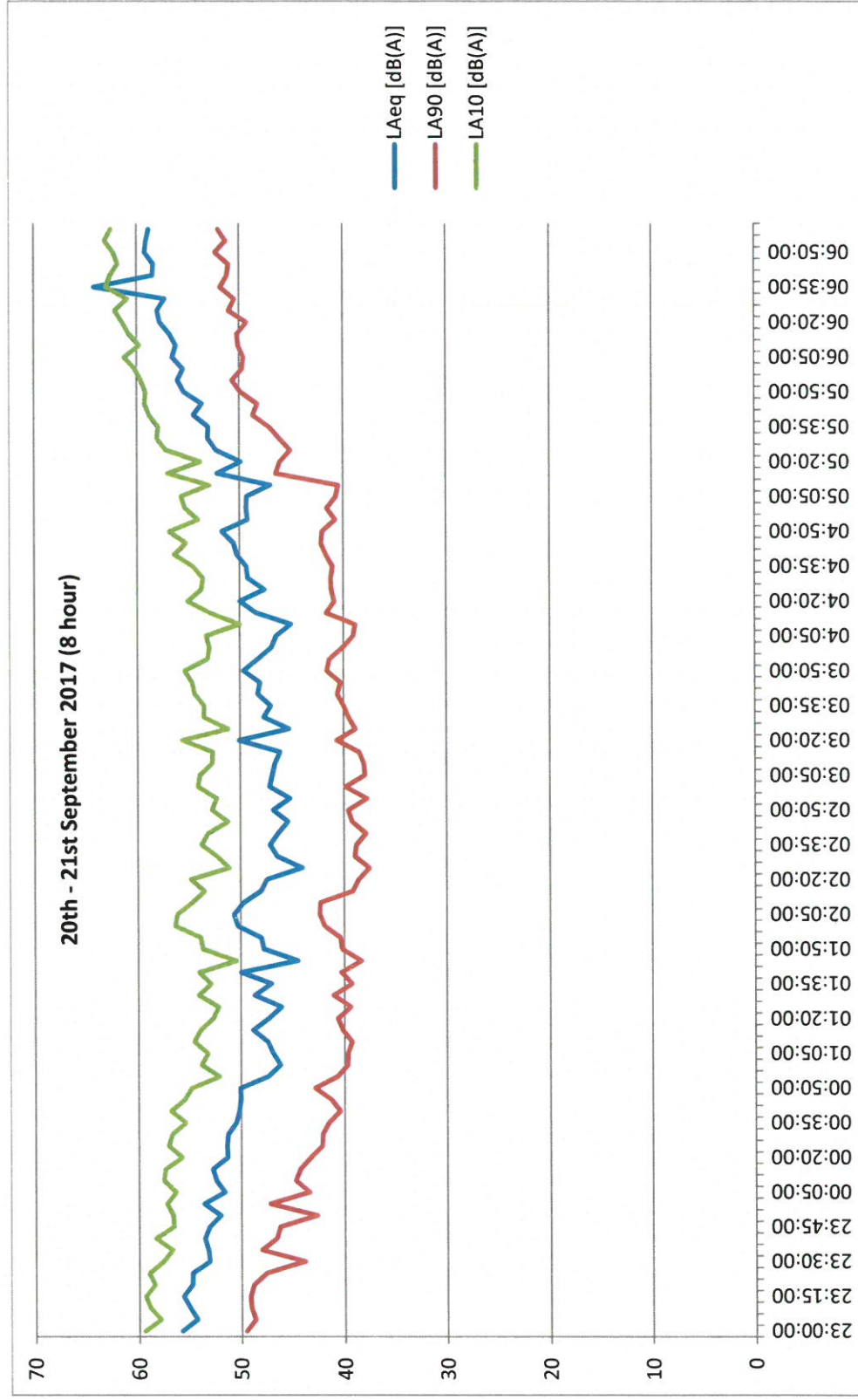
Graph 11: Graphical representation of the 8 hour noise monitoring period, 18th-19th September 2017



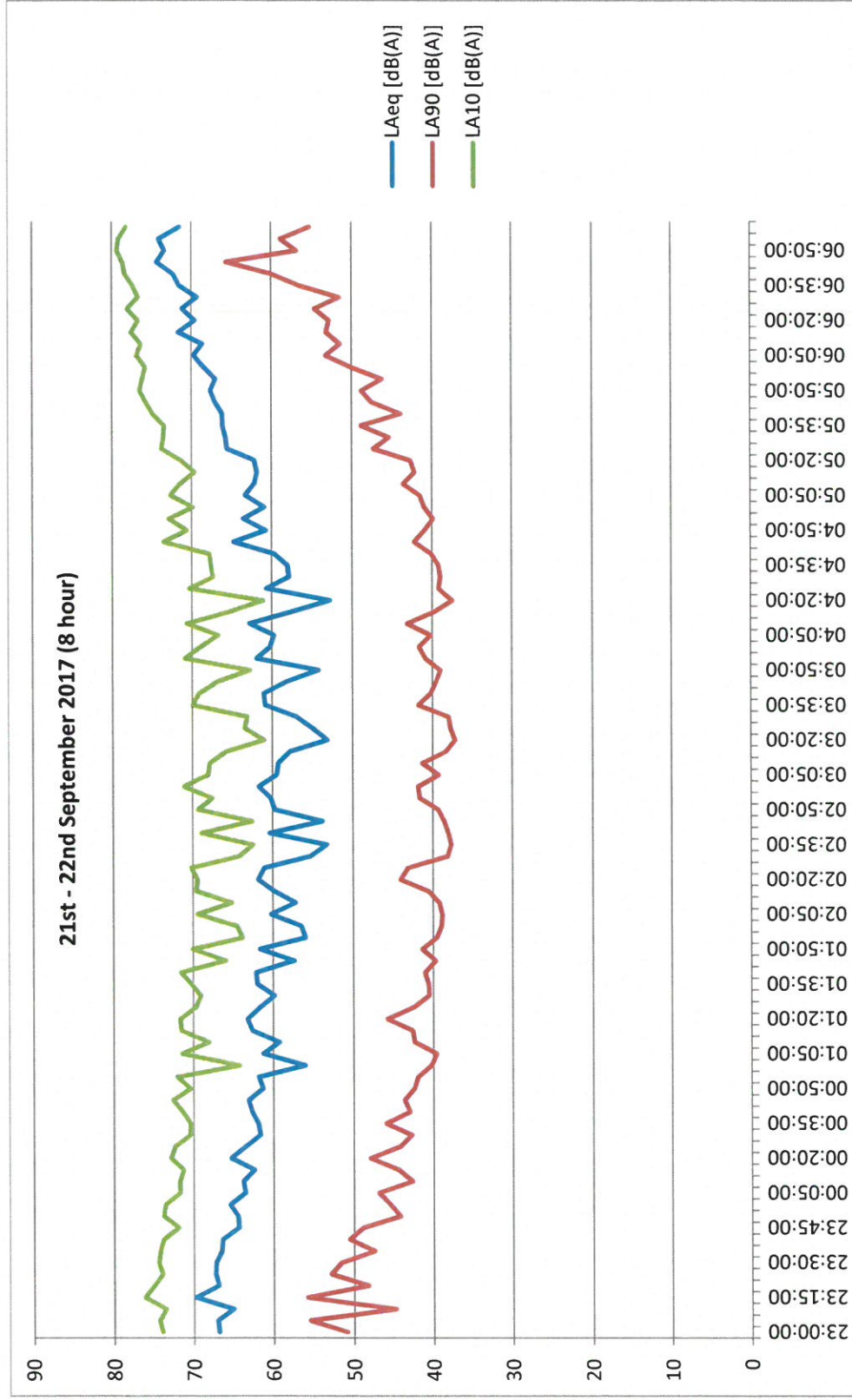
Graph 12: Graphical representation of the 8 hour noise monitoring period, 19th-20th September 2017



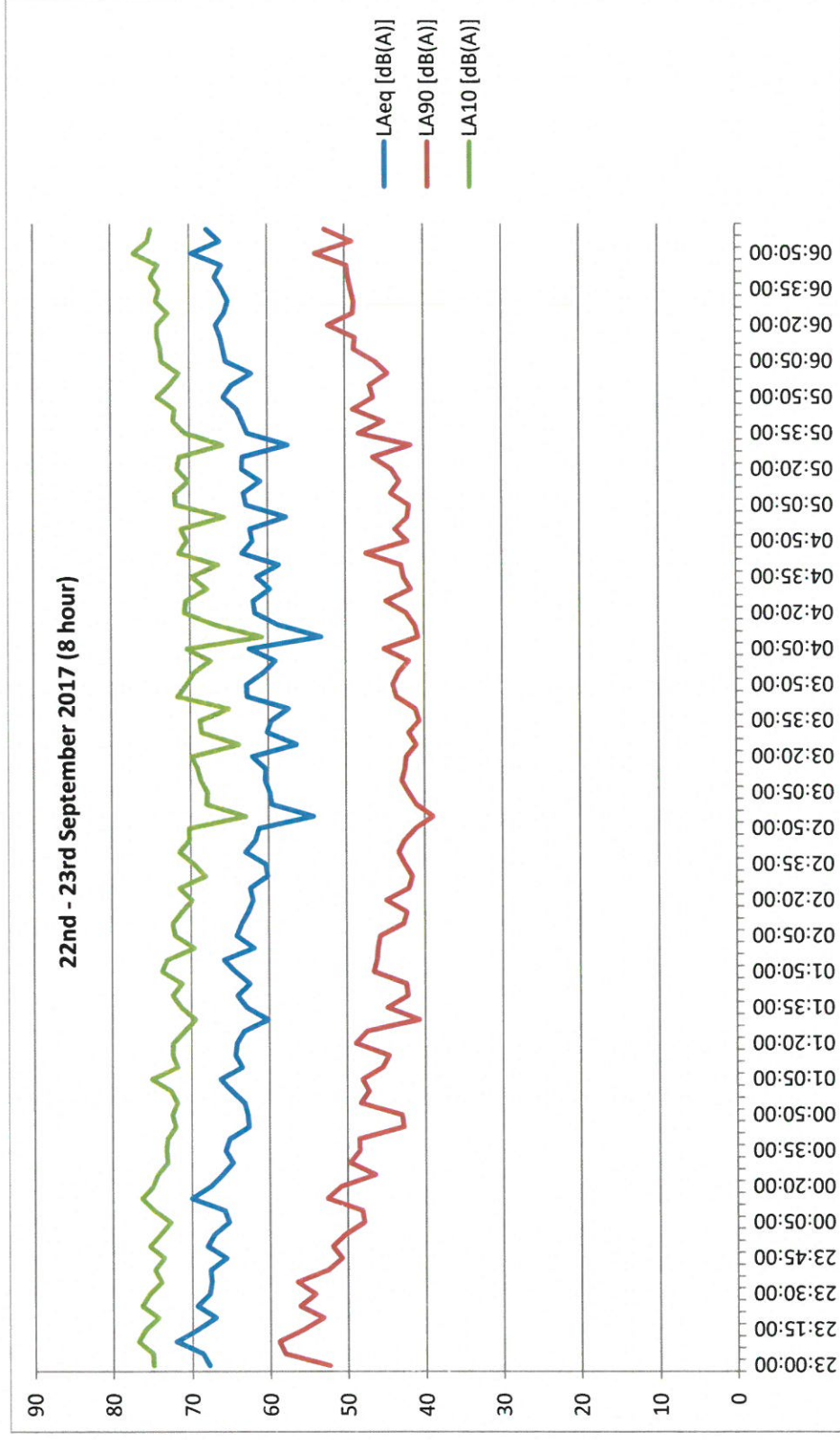
Graph 13: Graphical representation of the 8 hour noise monitoring period, 20th-21st September 2017



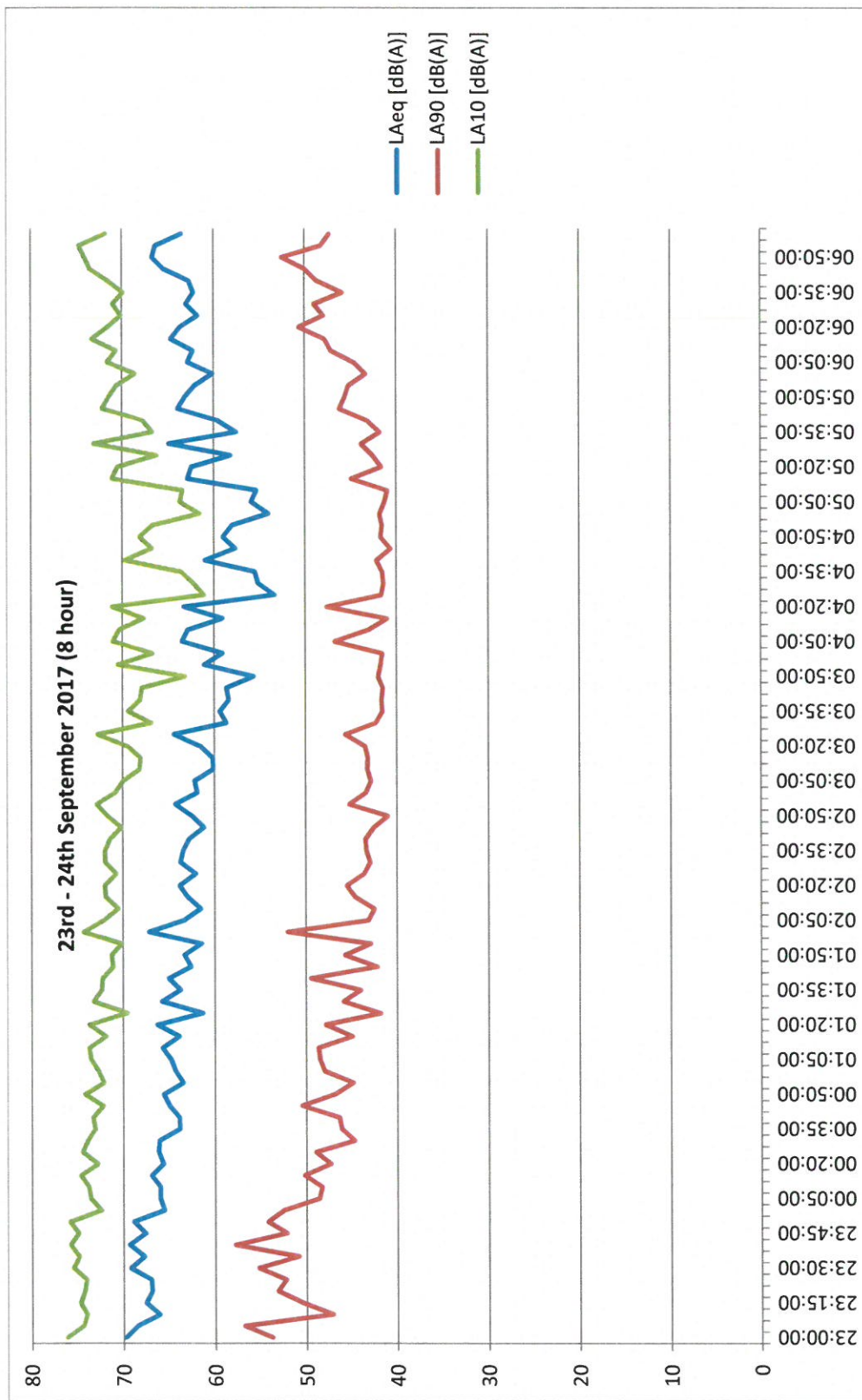
Graph 14: Graphical representation of the 8 hour noise monitoring period, 21st-22nd September 2017



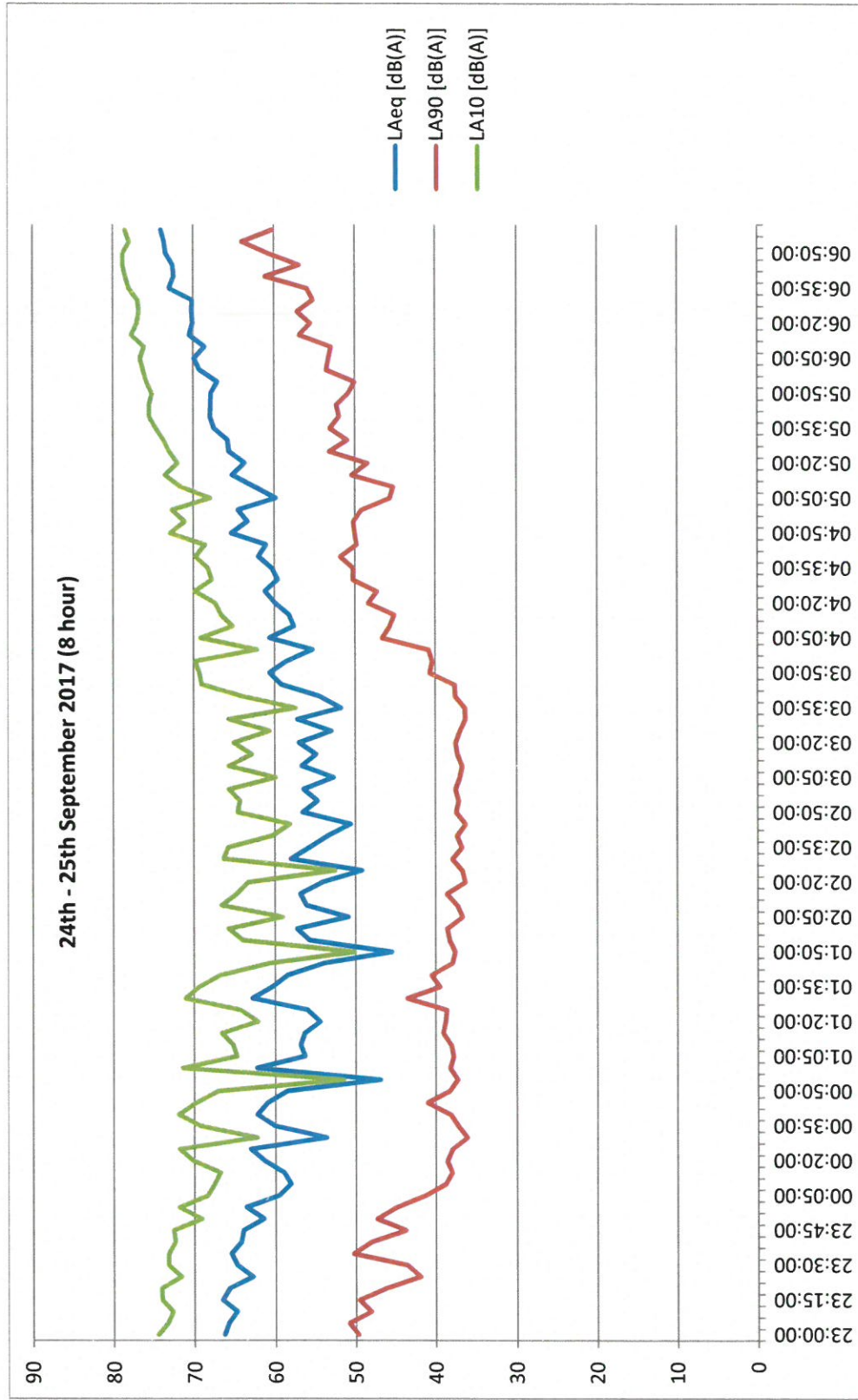
Graph 15: Graphical representation of the 8 hour noise monitoring period, 22nd -23rd September 2017



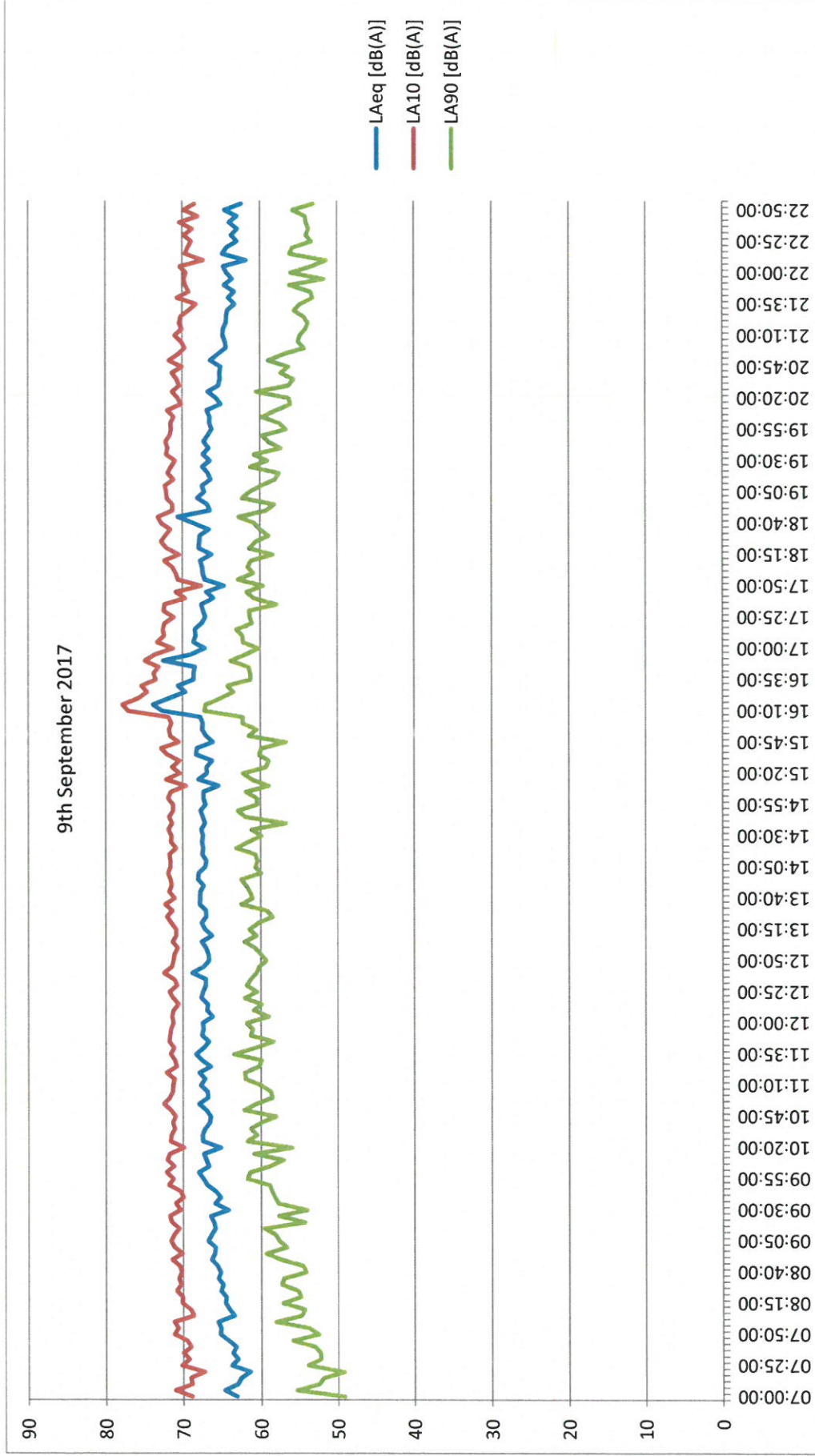
Graph 16: Graphical representation of the 8 hour noise monitoring period, 23rd-24th September 2017



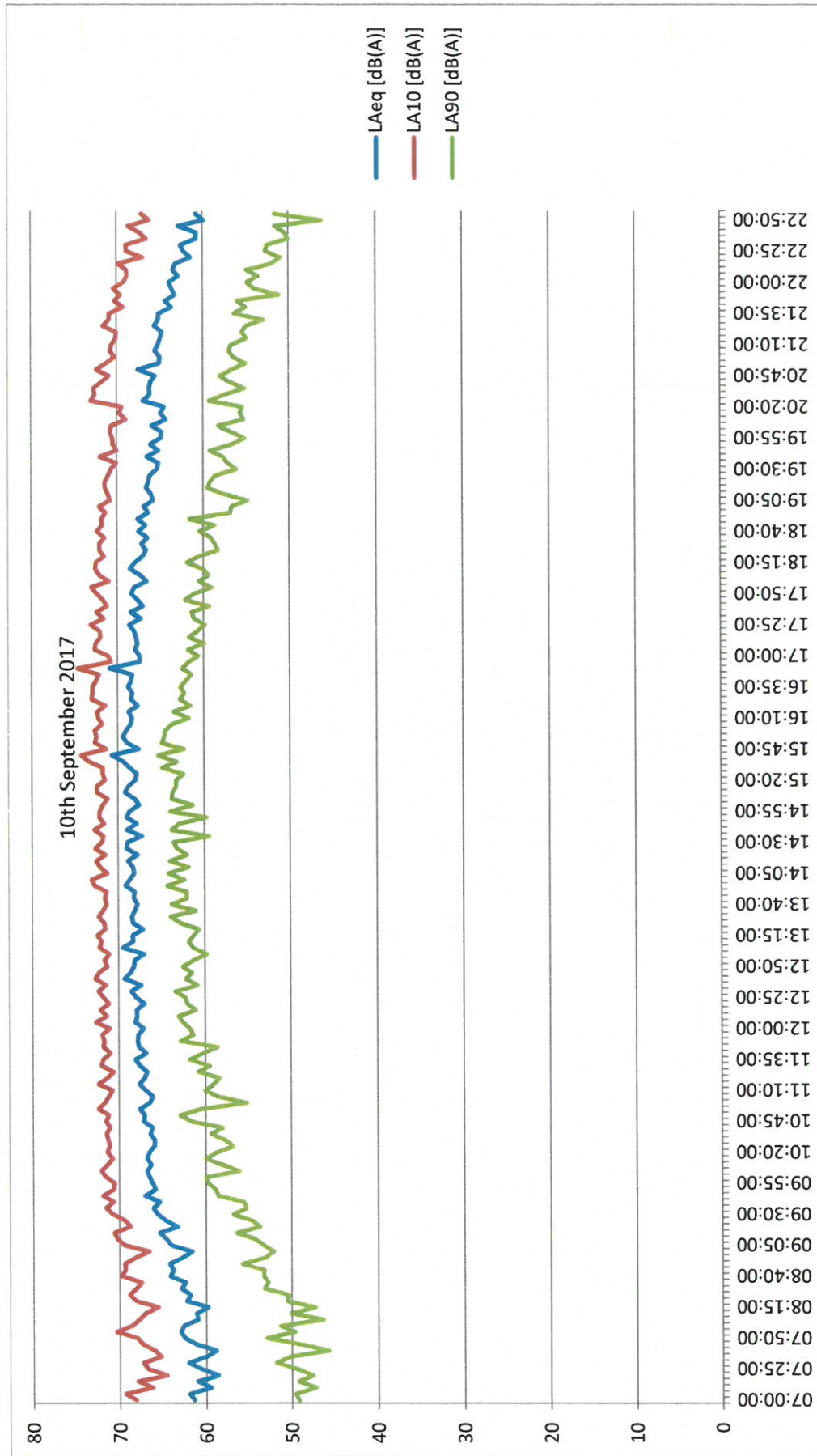
Graph 17: Graphical representation of the 8 hour noise monitoring period, 24th-25th September 2017



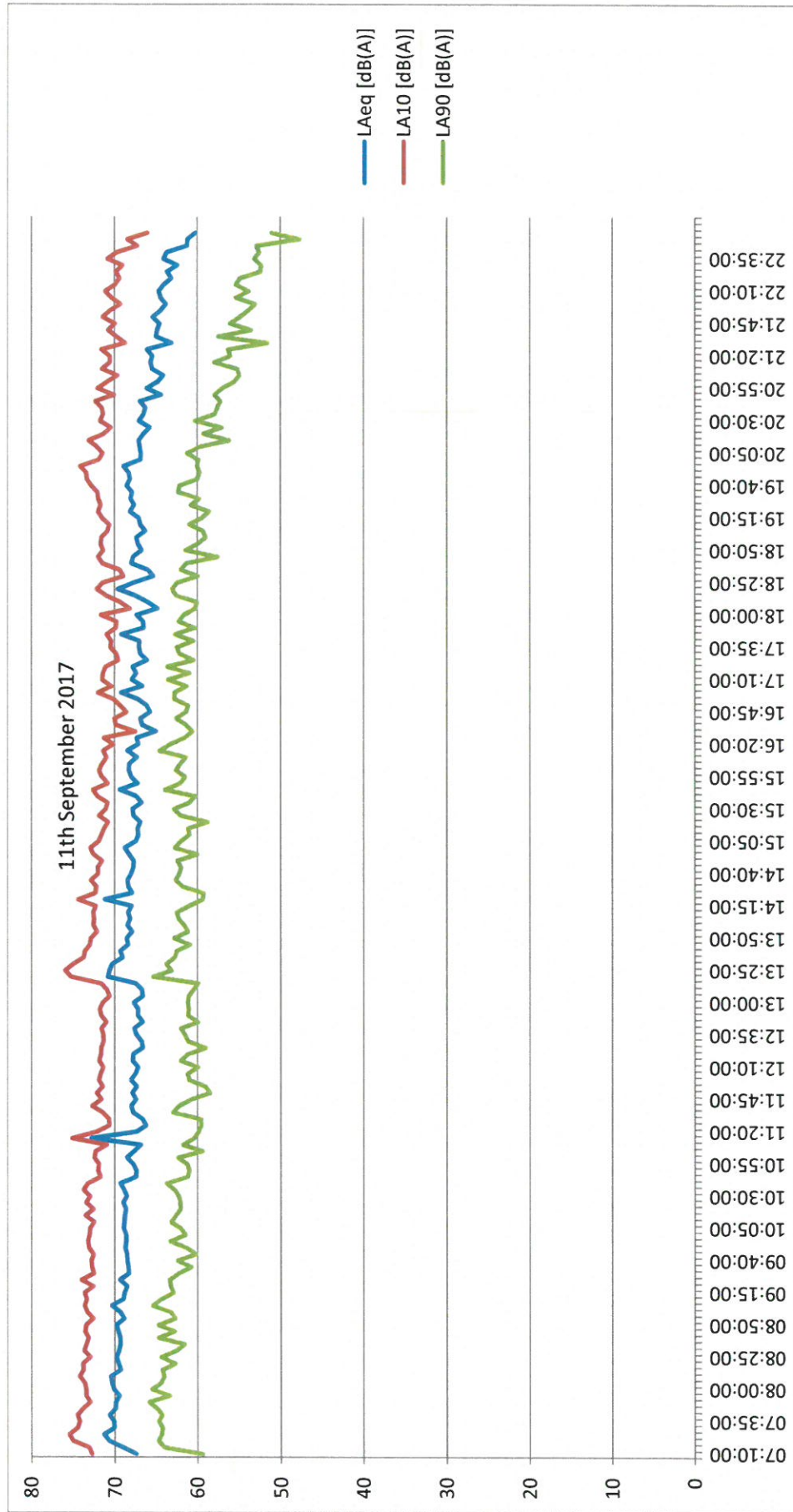
Graph 18: Graphical representation of the 16 hour noise monitoring period, 9th September 2017



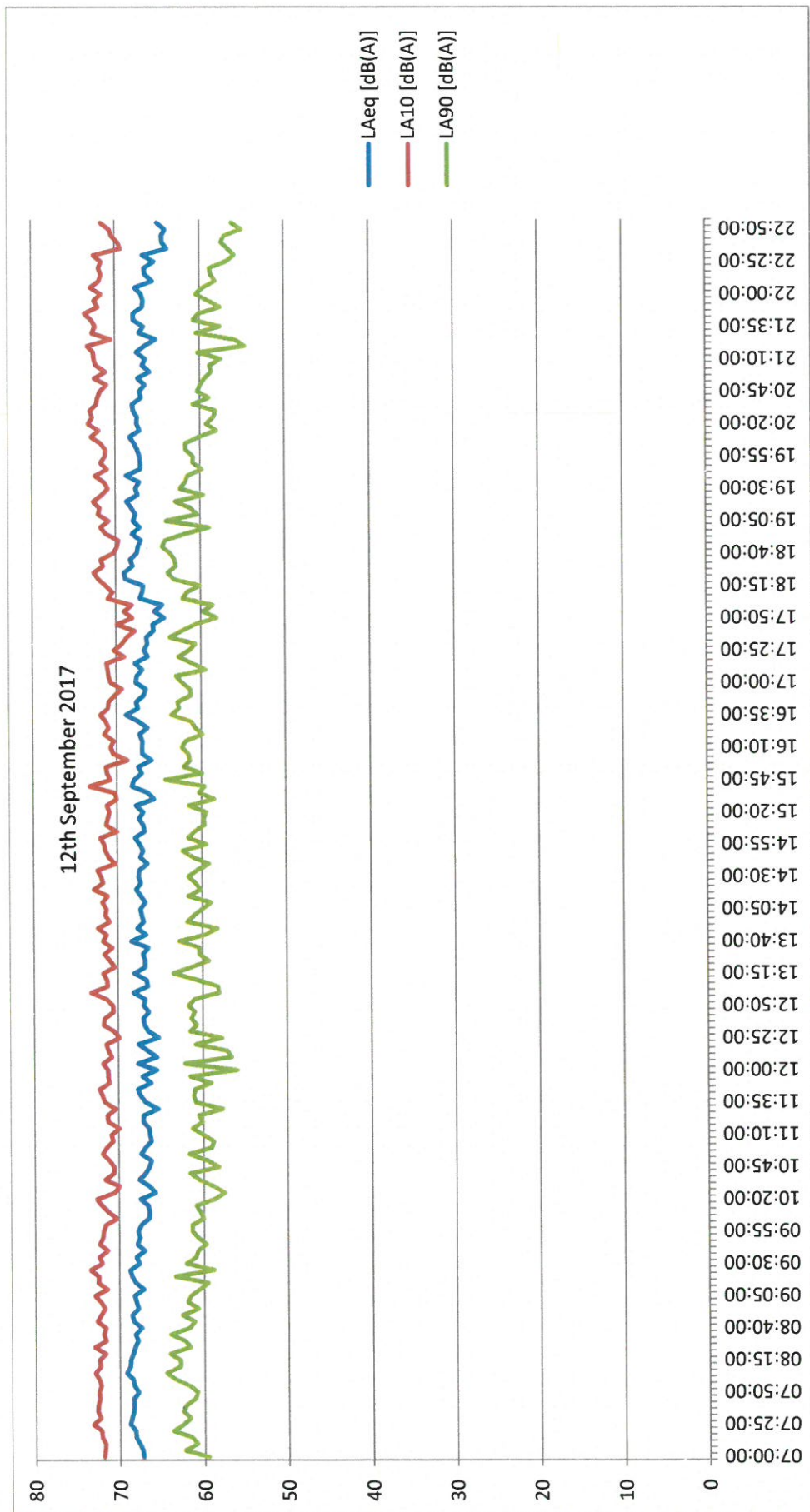
Graph 19: Graphical representation of the 16 hour noise monitoring period, 10th September 2017



Graph 20: Graphical representation of the 16 hour noise monitoring period, 11th September 2017



Graph 21: Graphical representation of the 16 hour noise monitoring period, 12th September 2017



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5. Design Criteria

Potential for Habitable Rooms

The site is located adjacent to the A33 which is a busy dual carriageway and joins the M4 motorway. As such, the A33 constitutes a significant noise source impacting on the proposed development site.

This was confirmed by the visiting consultant during set up of the fixed monitoring stations and during the spot measurement exercise.

Due to construction works being carried out on the development site during the daytime period (land drilling operations), the calculations within this assessment and subsequent mitigation measures, have been based on the measured night time noise which is when the potential for noise disturbance and loss of amenity is at its highest. However, daytime figures retrieved from Fixed monitoring location 1 have been used as drilling works hadn't commenced during this period.

When reviewing environmental noise and residential properties, it is important to assess how external noise can enter premises and potentially cause a noise nuisance

The weakest element of any structure is the openings made within it, i.e. for windows, doors or pipe-work (boiler flues, SVP's, etc.).

Approved Document L1A of the Building Regulations requires that air tightness testing is carried out to ensure that 'heat loss' is minimised thus reducing the carbon impact of a dwelling.

This has assisted greatly with reducing potential noise intrusion, as air gaps/penetrations are sealed so as to reduce air loss.

The thermal requirements of windows have also been increased so as to assist compliance with Approved Document L1A and consequently the acoustic performance of double glazed units has improved.

Table 7: Required sound insulation performance

Noise monitoring Position	Noise Level (dB)	Target Noise Levels L_{Aeq} (dB)	Standards Exceeded by
Position 1 $L_{Aeq,8hour}$	60	30	30dB
Position 1 $L_{Aeq,16hour}$	67	35	32dB
Position 2 $L_{Aeq,8hour}$	52.4	30	23dB
Position 3 $L_{Aeq,8hour}$	53	30	23dB
Position 4 $L_{Aeq,8hour}$	65	30	35dB

For Position 1, Table 7 identifies that to achieve the required internal noise levels as stated within BS8233, windows with an acoustic reduction value of 32dB will be required.

For Positions 2 & 3, Table 7 identifies that to achieve the required internal noise levels as stated within BS8233, windows with an acoustic reduction value of 23dB will be required.

For Position 4, Table 7 identifies that to achieve the required internal noise levels as stated within BS8233, windows with an acoustic reduction value of 35dB will be required.

It should be noted that all of the above reduction values will have to include a Ctr correction.

A copy of the Pilkington Optiphon specification brochure is attached as Appendix 8.

The brochure includes a table detailing the sound insulation for standard products and their Optiphon™ range, which have been reproduced below.

Table 8: Sound Insulation Data for Standard Products

Glass	Sound Reduction Index (dB)									
	Octave Centre Frequency (Hz)						R _w (C;C _{tr})	R _w	R _w +C	R _w +C _{tr}
	125	250	500	1000	2000	4000				
Single glazing										
4mm Float Glass	17	20	26	32	33	26	29 (-2;-3)	29	27	26
6mm Float Glass	18	23	30	35	27	32	31 (-2;-3)	31	29	28
8mm Float Glass	20	24	29	34	29	37	32 (-2;-3)	32	30	29
10mm Float Glass	23	26	32	31	32	39	33 (-2;-3)	33	31	30
12mm Float Glass	27	29	31	32	38	47	33 (0;-2)	34	34	32
6mm Laminated Glass	20	23	29	34	32	38	32 (-1;-3)	32	31	29
8mm Laminated Glass	20	25	32	35	34	42	33 (-1;-3)	33	32	30
10mm Laminated Glass	24	26	33	33	35	44	34 (-1;-3)	34	33	31
12mm Laminated Glass	24	27	33	32	37	46	35 (-1;-3)	35	34	32
16mm Laminated Glass	26	31	30	35	43	51	36 (-1; -3)	36	35	33
Insulating glass units										
4mm/(6-16mm)/4mm	21	17	25	35	37	31	29 (-1;-4)	29	28	25
6mm/(6-16mm)/4mm	21	20	26	38	37	39	32 (-2;-4)	32	30	28
6mm/(6-16mm)/6mm	20	18	28	38	34	38	31 (-1;-4)	31	30	27
8mm/(6-16mm)/4mm	22	21	28	38	40	47	33 (-1;-4)	33	32	29
8mm/(6-16mm)/6mm	20	21	33	40	36	48	35 (-2;-6)	35	33	29
10mm/(6-16mm)/4mm	24	21	32	37	42	43	35 (-2;-5)	35	33	30
10mm/(6-16mm)/6mm	24	24	32	37	37	44	35 (-1;-3)	35	34	32
6mm/(6-16mm)/6mm Laminated	20	19	30	39	37	46	33 (-2;-5)	33	31	28
6mm/(6-16mm)/10mm Laminated	24	25	33	39	40	49	37 (-1;-5)	37	36	32

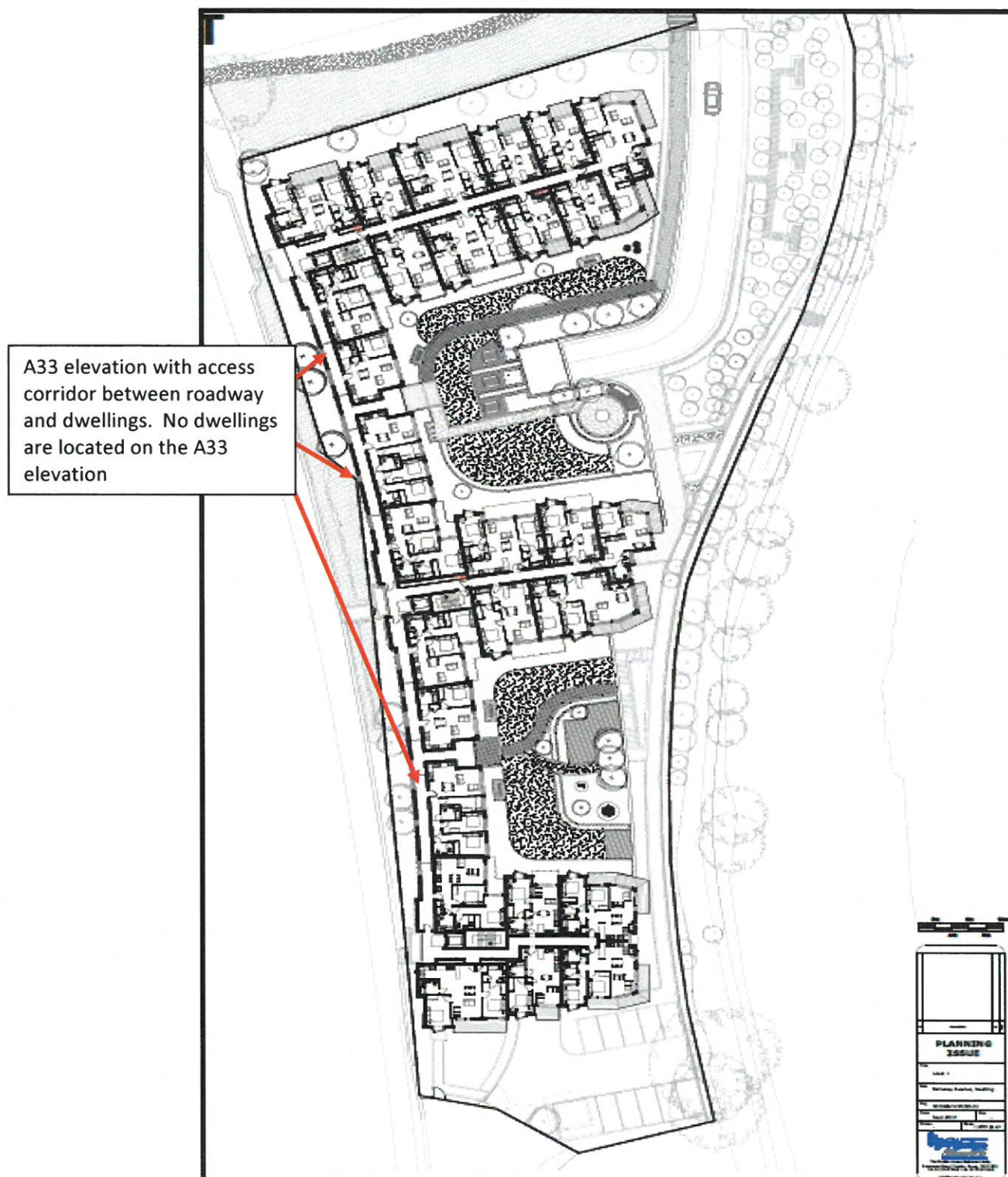
With reference to the above table, it can be seen that a 32dB R_w+C_{tr} reduction value can be achieved with double glazing using a configuration of 10mm/6-16mm/6mm which will address the requirements for windows across the entire development site.

With respect to Position 4, this was located on the A33 elevation of the proposed development.

The scheme has been designed to address noise impact from the A33, with the primary design control on the A33 elevation being to eliminate dwellings along this facade.

This has been achieved by having only access corridors on this elevation to address the potential of noise disturbance. There are also limited windows along this elevation which are provided mainly for natural light purposes in the access corridors. This is shown in Figure 3.

Figure 3 – Block layout plan



As such, no concerns remain with respect to internal noise levels on this facade.

Ventilation

Part F of the Building Regulations specifies required rates of background ventilation to domestic properties. These requirements must be achieved without compromising internal noise levels. When a window is opened for ventilation, it will only give 10-15dB reduction in noise.

Given the recorded measurements when a window is open the BS8233 standards will not be achieved for night-time periods across the development site.

To overcome the need to open windows for fresh air, the dwellings will need to incorporate acoustic trickle vents with a $D_{new}+C_{tr}$ reduction of at least 30dB to habitable rooms. Vents such as the DN Vent Acoustic window ventilator (or similar) can provide a reduction value of $D_{n,e,w} (C_{tr}) = 34dB$.

Copies of the specification sheet for the above vent is attached as Appendix 7.

Outdoor Amenity Areas

The development does not have provisions for private garden spaces. There are however terraced amenity areas and private balconies in place for the proposed dwellings.

The recommended upper limit for steady noise in outdoor areas stated in BS8233 is $L_{Aeq,T} 55dB$.

The spot noise measurements carried out provided a daytime $L_{Aeq,30min}$ level of 60dB with no 'shielding' in place as the site is currently flat and open.

The amenity areas are primarily on the rear elevation of the building and as such will be provided with a significant level of shielding from the building itself.

As such the upper limit for steady noise should easily be achieved for the rear amenity and private balcony areas.

6. Conclusions

Stansted Environmental Services Ltd has undertaken a noise assessment at the Weston Homes Plc development site at 5-9 Berkeley Avenue, Reading, Berkshire, RG1 6EL.

The purpose of the assessment was to re-evaluate the noise environment that the site is located within and to potentially rationalise the glazing treatment for the proposed dwellings on the development.

Planning Condition 14 (Noise Attenuation) has previously been discharged on the basis that windows are installed as per the specification detailed within the Hepworth Acoustics report dated 13th September 2010.

The Hepworth Acoustics report grouped the site into 6 acoustic zones which were based on baseline noise levels measured by Bird Acoustics in 2006.

Daytime noise levels were recorded as being 77dB $L_{Aeq, 16hrs}$ and night-time noise levels as being 70dB $L_{Aeq, 8hrs}$.

Noise was measured continuously from four separate locations across the site between the 8th September to the 25th September 2017, together with two 30min spot monitoring measurements on the 8th September 2017.

The results from the noise monitoring have demonstrated that noise levels both during the daytime period and the night-time period have reduced significantly since the assessment that was carried out by Bird Acoustics in 2006.

The monitoring period carried out by SES is for a much longer period than the previous assessment and is clearly representative of the current noise climate that is present on the subject site.

Due to the lower noise levels recorded during the SES survey, the previously agreed glazing specification can be seen to be over onerous and is not required to achieve the desired internal noise levels as stated within BS8233:2014.

As such, a glazing specification has been proposed for the development to ensure that the desired internal noise levels as stated within BS8233:2014 are achieved.

All windows across the development can be standard double glazed units with a reduction value of $R_w + C_{tr}$ of 32dB. Typically, this can be achieved with a glazing configuration of 10mm/(6-16mm)/6mm.

To meet the required rates of background ventilation without the need for windows to be opened, the inclusion of trickle vents will be required to the habitable rooms, to allow for suitable air changes in the dwellings.

Trickle vents will need to have acoustic properties that afford a minimum 32dB reduction in noise for all habitable rooms across the development.