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ASSESSMENT OF NOISE IMPACT FROM PROPOSED NEW PADEL COURTS AT ST GEORGE'S HILL LAWN TENNIS CLUB

On behalf of:

St George's Hill Lawn Tennis Club Ltd

Report No: P22-158-R03v2
July 2022

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by St George's Hill Lawn Tennis Club Ltd to carry out a noise assessment in connection with a proposed development of three new Padel courts at St George's Hill Lawn Tennis Club in Weybridge.

1.2 St George's Hill Lawn Tennis Club propose to build three new Padel tennis courts. An aerial view of the area is shown in Figure 1 along with the illustrative position of the proposed development.

1.3 Figure 1 also shows the locations of the nearby residential properties to the proposed development, the closest of which are located to the south, north-east and north off East Road.

1.4 The purpose of this noise assessment and our recommendations for noise mitigation measures, is twofold: to ensure that the local residents are protected from any unreasonable noise impact resulting from use of the new Padel courts; and in doing so ensure that the long established tennis club is not unreasonably restricted with respect to noise emissions, in the natural progression of their premises and services.

1.5 The noise assessment has included:

An inspection of the development site and surrounding area;

A comprehensive background noise survey covering both weekday and weekend periods;

Measurement of high intensity Padel match activity noise levels at another club's Padel court;

Preparation of a computerised noise model of worst-case use of the Padel courts;

Assessment of the potential Padel court noise impact; and,

Recommendations to ensure suitable noise mitigation of the Padel courts.

1.6 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

1.7 All of the comments, advice and recommendations in this report have been provided with respect to noise only. All other aspects of the development, such as structural, fire, ventilation etc. need to be checked by others.

Development Proposals

1.8 The proposals are for three Padel tennis courts, which will be positioned towards the east side of the premises in place of one of the existing tennis courts, as shown in Figure 2.

1.9 Padel tennis (referred hereafter as 'Padel') is a form of tennis that is generally played in doubles on a semi-enclosed court which has rebound screens at the ends to allow the ball to bounce off them. Unlike tennis, Padel is played with a solid perforated racquet that has no strings.

1.10 From the outset St George's Hill Lawn Tennis Club have put significant emphasis on ensuring that noise from the proposed Padel courts is kept as low as possible, in consideration of their neighbours. In keeping with this, the proposals have evolved through the design process to include an acoustic enclosure and a canopy for the Padel courts. The proposals also include a new Groundskeeper's Shed.

1.11 The proposed development layout in Figure 2 also shows separate proposals for a new Fitness Building which is also currently being applied for, however it is the subject of a separate application and is not covered in this report.

1.12 Nevertheless, the noise contour plots shown in Figures 4 to 7 show the effect of the Fitness Building on the propagation of noise from the Padel courts. Whilst it has no significant effect on the resulting noise levels at the nearest neighbouring dwellings, it is included in the noise model to provide a more realistic view of the noise propagation within the context of the wider site proposals which are anticipated to go ahead.

2.0 GUIDANCE & POLICY

National Planning Policy Framework (NPPF) July 2021

2.1 The National Planning Policy Framework (NPPF) July 2021 states the following relevant paragraphs with respect to noise and planning:

Paragraph 174

> "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. …"

Paragraph 185

> "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[65];

Noise Policy Statement for England (NPSE) March 2010

2.2 The Noise Policy Statement for England (NPSE) March 2010, which is referred to in the NPPF, includes the three following aims:

The first aim of the Noise Policy Statement for England

> "Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

The second aim of the Noise Policy Statement for England

> "Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

The third aim of the Noise Policy Statement for England

> "Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

2.3 Terms "significant adverse" and "adverse" used in these aims are discussed in the NPSE as follows:

NOEL: No Observed Effect Level

> "This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise."

LOAEL: Lowest Observed Adverse Effect Level

> "This is the level above which adverse effects on health and quality of life can be detected."

SOAEL: Significant Observed Adverse Effect Level

> "This is the level above which significant adverse effects on health and quality of life occur."

2.4 It should be understood that there is no single objective noise-based measure that defines these terms (NOEL, LOAEL and SOAEL), as the effects of noise are likely to be different for different noise sources, different receptors and at different times etc.

Elmbridge Local Plan: Development Management Plan April 2015

2.5 The Elmbridge Local Plan: Development Management Plan April 2015, provides the following relevant noise related policy:

DM5: Pollution

> "a. Noise, odour and light

> All development that may result in noise or odour emissions or light pollution will be expected to incorporate appropriate attenuation measures to mitigate the effect on existing and future residents. New development located near to existing noise, odour or light generating uses will be expected to demonstrate that the proposal is compatible and will not result in unacceptable living standards, for example through the mitigation measures, the design of the building and its orientation and layout[7].”

British Standard 4142:2014+A1:2019

2.6 British Standard 4142:2014+A1:2019, ‘Methods for rating and assessing industrial and commercial sound’ (referred to hereafter as BS 4142) specifically states that “The standard is not intended to be applied to the rating and assessment of sound from: a) recreational activities, …”. Therefore, BS 4142 guidance is not applicable to noise from Padel court activity.

3.0 EXISTING AMBIENT NOISE CLIMATE

3.1 Figure 1 shows the location of the development proposals within the context of the immediate local area. The existing noise climate in the area is comprised of contributions from distant road traffic noise, bird noise, noise from motorised and electrical gardening equipment, as well as some distant noise from use of the existing tennis courts.

3.2 A noise survey was carried out to establish the existing ambient and background noise levels in the area during weekday and weekend periods.

3.3 The noise survey was carried out using automated noise monitoring equipment at two locations representative of the nearest existing residential properties to the north and south of the proposed development. The noise survey locations are shown in Figure 1.

3.4 Location A is positioned at the north-east site boundary with the nearest neighbouring residential property to the north. Location A is considered representative of the noise climate in the area to the north and north-east of the tennis club.

3.5 Location B is positioned to the south of the development site next to the eastern elevation of the tennis club. Location B is representative of the ambient noise climate at the north-west part of the neighbouring residential property to the south of the proposed development.

3.6 The noise monitoring at Location A was carried out between 15:30 and 19:30 on Friday 22 April 2022, as well as between 11:30 on Tuesday 26 April 2022 and 22:00 on Monday 2 May 2022. The initial monitoring on Friday 22 April was cut short due to a power supply interruption, resulting in the monitoring being re-started on Tuesday 26 April. At Location B the noise monitoring was carried out between 12:15 on Friday 29 April 2022 and 06:00 on Tuesday 3 May 2022.

3.7 A significant scheme of noise monitoring was carried out to capture the existing noise climate during both weekday and weekend periods, to provide a robust basis for the assessment.

3.8 Fully calibrated 'Class 1' sound analysers were used for the noise monitoring with associated outdoor noise monitoring kits. Full details of the measurement equipment used for the monitoring is provided in Appendix II.

3.9 The noise measurements were taken in 15-minute periods at a microphone height of approximately 1.4m above the ground. Calibration checks were carried out both before and after the noise surveys with no variance in calibration level.

3.10 Weather conditions during the noise surveys were suitable for sound level measurements, being dry with low wind speeds. Full details of the weather conditions during the noise monitoring are provided in Appendix II.

3.11 The noise activity in the area during the noise monitoring is considered typical of the general noise climate during these periods, although it should be noted that several existing tennis courts, indicated in Figurer 1, were not in use over the course of the noise monitoring. This is likely to have resulted in slightly lower ambient noise levels than could be expected with the existing tennis courts in full use. To be clear, this therefore provides a more robust basis for the assessment.

3.12 The full results of the noise monitoring are shown in Appendix II and a summary showing the range of measured noise levels during different periods, as well as the corresponding arithmetic (L_{Amax} and $L_{A90,T}$) and logarithmic ($L_{Aeq,T}$) means is shown in Table 1.

Table 1: Summary of Noise Survey Results - Minimum-Maximum (Mean) [dB]

Location	Period	Times	L_{Amax}	$L_{Aeq,T}$	$L_{A90,T}$
A	Weekdays	Daytime (07:00-19:00)	55-82 (65)	44-60 (51)	38-52 (43)
		Evening (19:00-23:00)	48-82 (62)	38-56 (47)	33-43 (38)
		Night (23:00-07:00)	36-82 (51)	27-66 (51)	25-44 (32)
	Weekends	Daytime (07:00-19:00)	57-79 (66)	45-56 (50)	37-44 (41)
		Evening (19:00-23:00)	58-81 (66)	42-54 (50)	37-43 (40)
		Night (23:00-07:00)	42-78 (55)	34-56 (45)	31-44 (36)
B	Weekdays	Daytime (07:00-19:00)	61-88 (71)	47-61 (53)	39-46 (43)
		Evening (19:00-23:00)	57-89 (67)	43-56 (51)	36-42 (39)
		Night (23:00-07:00)	34-70 (52)	25-55 (45)	23-44 (32)
	Weekends	Daytime (07:00-19:00)	58-84 (68)	47-57 (52)	38-46 (41)
		Evening (19:00-23:00)	57-73 (66)	43-55 (51)	36-44 (39)
		Night (23:00-07:00)	32-82 (55)	25-56 (48)	23-43 (32)

3.13 The results of the noise surveys have been analysed and used to assess the potential noise impact from the development proposals within the context of the level and character of the existing ambient noise climate, as detailed in Section 4.

4.0 ASSESSMENT OF PADEL COURT NOISE

4.1 The proposals for the three Padel courts are shown in Figure 2.

4.2 We understand that the proposed hours of use for the Padel courts is as follows:

Weekdays: 07:00-22:00

Weekends: 07:30-21:30

4.3 A summary showing the range of measured noise levels during the proposed hours of use for the Padel courts, as well as the corresponding arithmetic (L_{Amax} and $L_{A90,T}$) and logarithmic ($L_{Aeq,T}$) means is shown in Table 2.

Table 2: Summary of Noise Survey Results During Proposed Padel Court Hours of Use [dB]

Location	Period	Times	L_{Amax}	$L_{Aeq,T}$	$L_{A90,T}$
A	Weekdays	Daytime (07:00-19:00)	55-82 (65)	44-60 (51)	38-52 (43)
		Evening (19:00-22:00)	48-82 (63)	38-56 (48)	34-43 (38)
	Weekends	Daytime (07:30-19:00)	57-79 (66)	45-56 (50)	37-44 (41)
		Evening (19:00-21:30)	59-80 (65)	43-54 (49)	38-43 (40)
B	Weekdays	Daytime (07:00-19:00)	61-88 (71)	47-61 (53)	39-46 (43)
		Evening (19:00-22:00)	58-89 (68)	43-56 (51)	37-42 (39)
	Weekends	Daytime (07:30-19:00)	60-84 (68)	47-57 (52)	38-46 (41)
		Evening (19:00-21:30)	57-73 (66)	43-55 (50)	38-44 (40)

Padel Court Match Source Noise Measurements

4.4 A visit was made to another nearby tennis club, the Roehampton Club, on Friday 22 April 2022, to measure source noise levels of an existing Padel court in full use.

4.5 Sound analysers were set up to measure noise levels during a Padel court match at two positions, one positioned at a reference distance to the side of the court and one positioned at a reference distance to the end of the court. The Padel court match was measured over 57 minutes of activity.

4.6 The Padel court match was played with four Roehampton Club Members that we understand often play together. As a result the match was high intensity, including enthusiastic vocal noise from the players such as shouting when points were won/lost and laughing/talking in keeping with what we understand is the more social aspect of Padel. Some extraneous noise was excluded from the measurements from talking passers-by towards the end of the match.

4.7 The results of the Padel court source noise measurements have been corrected to a common reference distance of 15m from the centre of the court for comparison. The Padel court noise levels were 57 dB $L_{Aeq,T}$ from the centre of the court as measured at the side of the court and 52 dB $L_{Aeq,T}$ at 15m from the centre of the court as measured at the end of the court.

Character of Padel Court Match Noise

4.8 As can be seen by the results above, the noise levels from the Padel court match are slightly higher to the side of the court compared to the ends.

4.9 Some brief measurements were also taken of a doubles tennis match at St George's Hill Lawn Tennis Club. The measurements of the tennis match were taken at a reference distance to the side of the tennis court, over 22 minutes of typical match play.

4.10 The results of the tennis match noise levels were 47 dB $L_{Aeq,T}$ at 15m (corrected to 15m for direct comparison) from the centre of the court as measured at the side of the court.

4.11 The results of the measurements show that the Padel court match noise levels (dB $L_{Aeq,T}$) were 10dB higher than the tennis court match noise levels at a common reference distance of 15m from the centre of the court.

4.12 Graph 1 shows the 1/3 octave band (frequency distribution) noise levels (dB $L_{Aeq,T}$) of the Padel court match and the tennis court match.

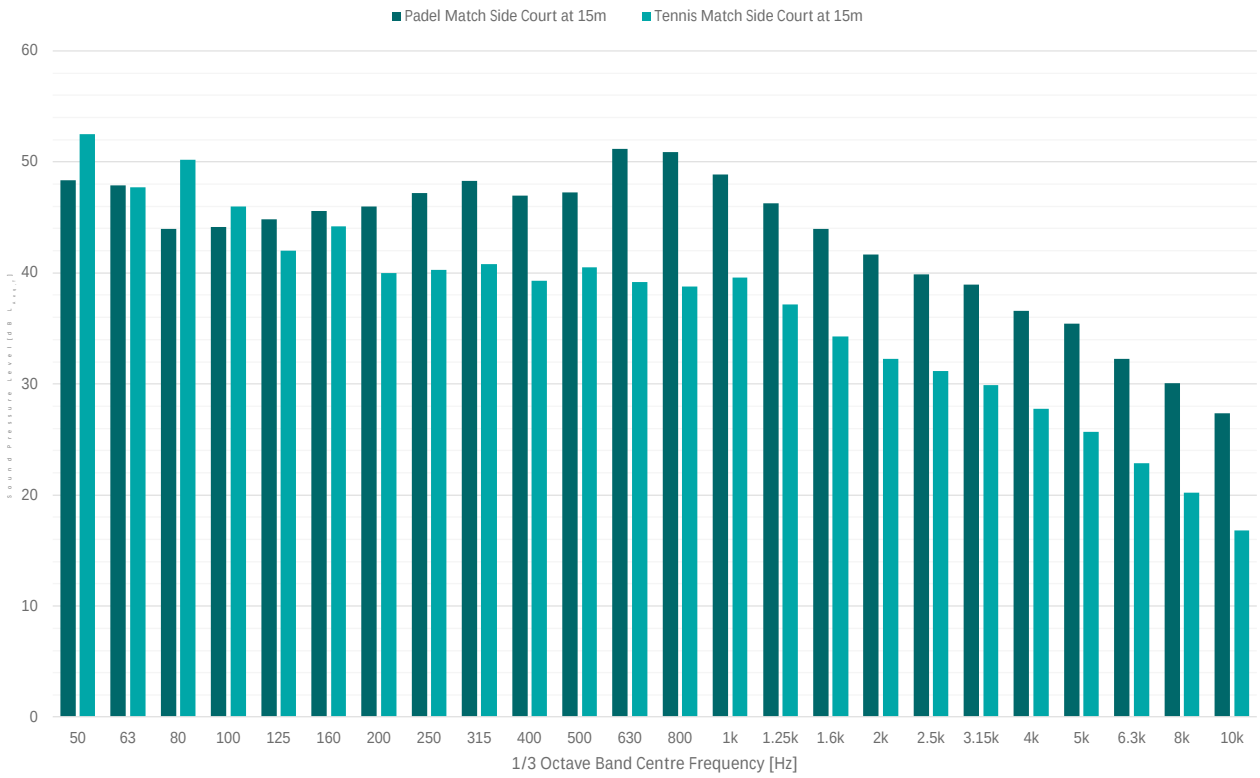
4.13 As can been seen in Graph 1, the Padel court match noise levels are generally higher in the mid to higher frequency range compared to tennis, more so around the 630 Hz and 800 Hz 1/3 octave bands.

4.14 Graph 2 shows the maximum (dB L_{Amax}) 1/3 octave band noise levels measured at a reference distance of 1m from a Padel serve, which is an underhand serve for the game of Padel.

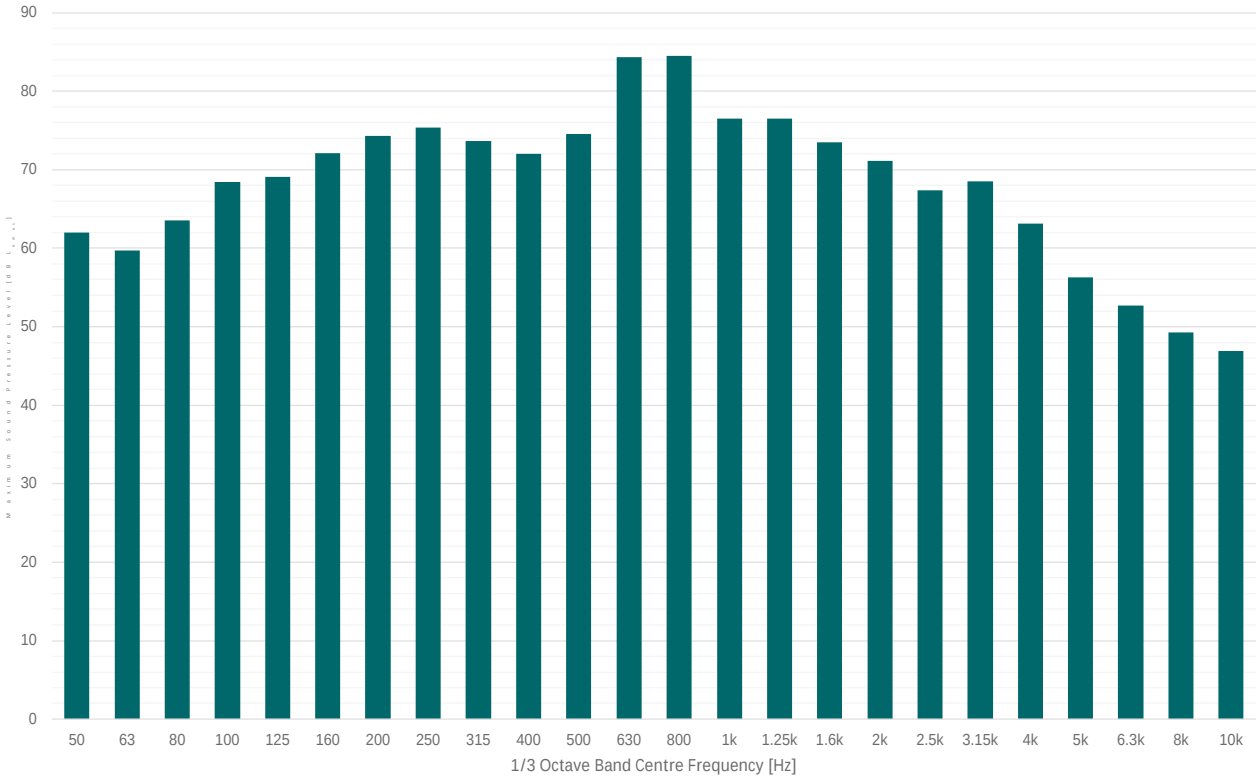
4.15 As can be seen in Graph 2, the noise levels are slightly higher in 630 Hz and 800 Hz 1/3 octave bands from the serve with the solid perforated racquet.

4.16 Whilst the character of Padel court match noise is not generally significantly different to a tennis match, the overall noise levels are higher and the sound of solid perforated racquet hitting the ball is slightly different. However, the spectrum of the overall match noise levels is not significantly different.

Graph 1: Padel & Tennis Match Noise Levels



Graph 2: Padel Serve at 1m



Computerised Padel Court Noise Model

4.17 We have developed a computerised noise model using DataKustik CadnaA 3D noise modelling software to calculate the Padel court noise levels at the neighbouring dwellings.

4.18 The noise model is based on 'OS Terrain 5' and 'OS VectorMap Local' data for the local area, along with the proposals for the three new Padel courts, Groundskeeper's Shed and Fitness Building.

4.19 Noise from the proposed Padel courts have been modelled using four point sources on each court and the noise levels in the model have been calibrated with the Padel court match noise levels measured at the Roehampton Club, providing a robust empirical basis for the noise model.

4.20 The model is based on a worst-case scenario with all three proposed new Padel courts being used for high intensity matches simultaneously.

4.21 The noise model calculates the propagation of noise taking into account the attenuation of sound over distance, ground reflections, reflections off buildings (calculated up to 3 orders of reflections) and acoustic screening provided by existing and proposed buildings.

4.22 The results of the noise model without any acoustic screens are shown in Figures 4 and 5 at ground floor and first floor levels respectively in the form of noise contour plots, which show areas of different noise levels using colour coding.

4.23 The ground floor noise contour plot can be used to see the potential worst-cast Padel court match noise levels at the property boundaries, in the neighbouring gardens and at the ground floor elevations of the neighbouring dwellings.

4.24 The first floor noise contour plot can be used to see the potential worst-cast Padel court match noise levels at the first floor elevations of the neighbouring dwellings.

4.25 The surrounding dwellings have been assigned arbitrary numerical references to aid in discussion of the potential worst-case noise levels at these neighbouring properties, as shown in Figures 4 and 5.

4.26 The results of the Padel court match noise model not including any acoustic screens at the surrounding properties are summarised in Table 3. The summary includes the highest levels without acoustic screens at the property boundaries, ground floor and first floor elevations.

Table 3: Summary of Worst-Case Padel Court Match Noise Levels - Without Acoustic Screens [dB]

Location Reference	Noise Levels $L_{Aeq,1h}$		
	Property Boundary	Ground Floor Elevation	First Floor Elevation
1	51	40	43
2	44	44	44
3	26	25	26
4	42	23	25
5	43	35	39
6	38	32	38
7	34	29	37
8	31	31	37
9	35	29	35
10	35	35	36
11	28	27	31
12	36	40	39
13	36	37	41

4.27 The highest noise levels in the gardens are generally less than the highest levels at the boundaries.

4.28 Whilst the noise levels are not high in absolute terms, the results in Table 3 show that the highest noise levels would be experienced at the neighbouring property to the south (1) and to the east (2).

4.29 As discussed briefly in Section 1, the development proposals include acoustic screens to mitigate the spread of noise from the Padel courts.

4.30 The proposed elevation plans for the Padel court enclosure are shown in Figure 3. The proposals are for acoustic screens to the southern, eastern and northern elevations of the Padel court enclosure with an acoustic screen height of 4.2m.

4.31 The proposals also include a fabric canopy over the Padel courts. Although this will have some acoustic benefit in terms of absorbing some acoustic energy, the sound insulating effects of the fabric canopy on the noise will be minimal. Thus, as a robust assumption we have not included for any effect of the canopy in our noise model.

4.32 The results of the noise model, including the effects of the proposed acoustic screens, are shown in Figures 6 and 7 at ground floor and first floor levels respectively.

4.33 The results of the Padel court match noise model at the surrounding properties, including the effects of the proposed acoustic screens, are summarised in Table 4. The summary includes the highest levels at the property boundaries, ground floor and first floor elevations.

Table 4: Summary of Worst-Case Padel Court Match Noise Levels with Acoustic Screens [dB]

Location Reference	Noise Levels $L_{Aeq,1h}$		
	Property Boundary	Ground Floor Elevation	First Floor Elevation
1	35	26	27
2	28	28	30
3	26	25	26
4	42	23	25
5	43	35	39
6	38	32	38
7	34	29	37
8	31	31	37
9	35	29	35
10	35	35	36
11	28	27	31
12	26	23	24
13	26	26	28

4.34 As can be seen by the results in Table 4 compared to Table 3, the noise levels at the most exposed neighbouring properties are significantly reduced by the acoustic screens.

Assessment of Potential Padel Court Match Noise Impact

4.35 The potential noise impact of the proposed Padel courts is considered by comparison to the existing prevailing noise climate.

4.36 The predicted Padel court match noise levels with the proposed acoustic screens are shown in Table 5 along with the corresponding representative existing prevailing noise levels for the different Padel court hours of use from Table 2.

Table 5: Assessment of Padel Court Match Noise Levels [dB]

Ref	Predicted Noise Levels $L_{Aeq,1h}$			Existing Prevailing Noise Levels $L_{Aeq,T}$ - Range (Log-mean)			
	Property Boundary	Ground Floor Elevation	First Floor Elevation	Weekdays		Weekends	
				Daytime (07:00-19:00)	Evening (19:00-22:00)	Daytime (07:30-19:00)	Evening (19:00-21:30)
1	35	26	27	47-61 (53)	43-56 (51)	47-57 (52)	43-55 (50)
2	28	28	30	44-60 (51)	38-56 (48)	45-56 (50)	43-54 (49)
3	26	25	26	44-60 (51)	38-56 (48)	45-56 (50)	43-54 (49)
4	42	23	25	44-60 (51)	38-56 (48)	45-56 (50)	43-54 (49)
5	43	35	39	44-60 (51)	38-56 (48)	45-56 (50)	43-54 (49)
6	38	32	38	44-60 (51)	38-56 (48)	45-56 (50)	43-54 (49)
7	34	29	37	44-60 (51)	38-56 (48)	45-56 (50)	43-54 (49)
8	31	31	37	44-60 (51)	38-56 (48)	45-56 (50)	43-54 (49)
9	35	29	35	44-60 (51)	38-56 (48)	45-56 (50)	43-54 (49)
10	35	35	36	44-60 (51)	38-56 (48)	45-56 (50)	43-54 (49)
11	28	27	31	47-61 (53)	43-56 (51)	47-57 (52)	43-55 (50)
12	26	23	24	47-61 (53)	43-56 (51)	47-57 (52)	43-55 (50)
13	26	26	28	47-61 (53)	43-56 (51)	47-57 (52)	43-55 (50)

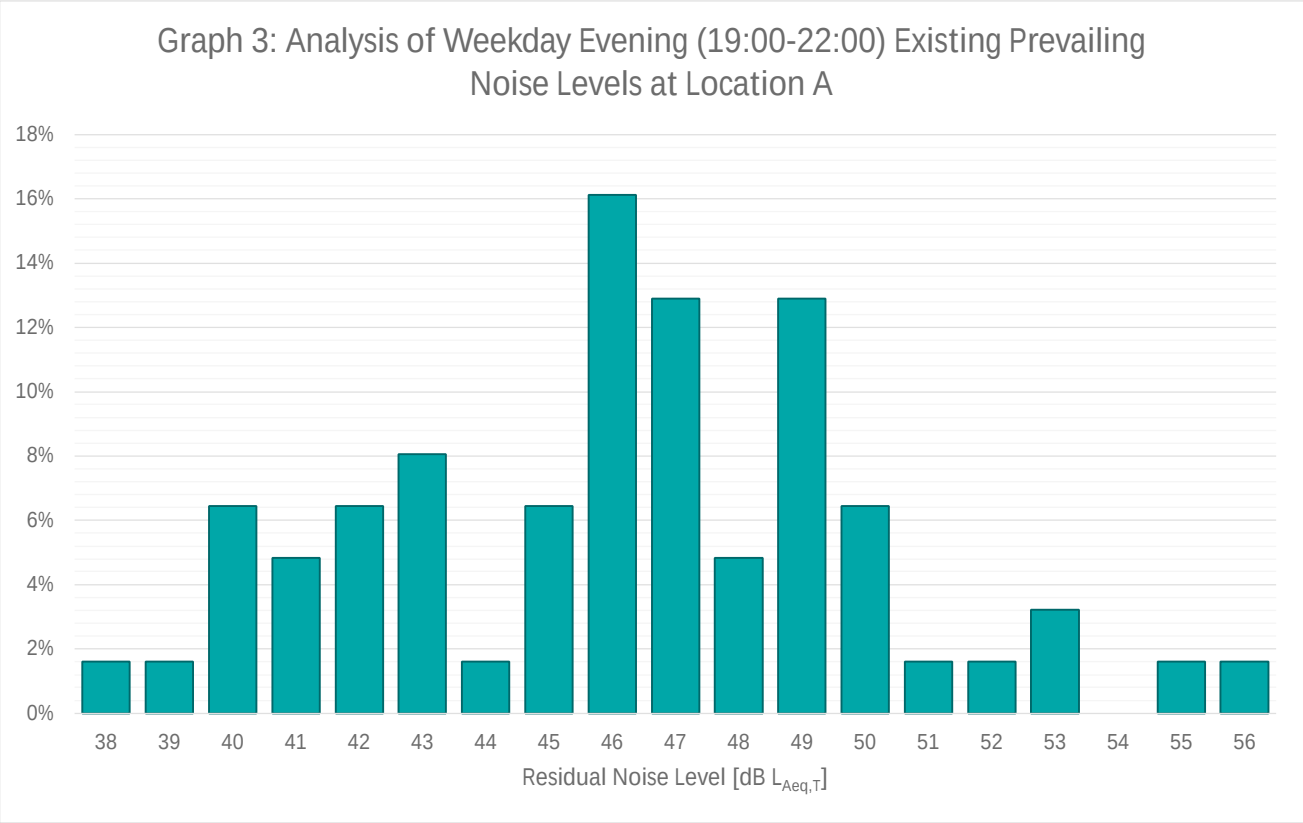
4.39 The results in Table 5 show that the predicted noise levels are lower than even the lowest measured existing prevailing noise levels at most locations for the vast majority of the time during the Padel court hours of use.

4.40 At reference locations 4 and 5, the predicted noise levels are still lower than the lowest measured prevailing noise levels during the weekday daytime periods and the weekend daytime and evening periods. The predicted noise levels are also well within the range of existing prevailing weekday evening noise levels.

4.41 Graph 3 shows analysis of the Weekday evening noise levels relevant to locations 4 and 5, which is the period with the lowest prevailing noise levels.

4.42 The highest predicted Padel court match noise level is 43 dB $L_{Aeq,1h}$ at the boundary of the property to the north-west (5).

4.43 Graph 3 demonstrates that even during the quietest periods when the Padel courts could be used (Weekday evenings) the worst-case Padel court match noise levels (based on all three courts being used simultaneously with high intensity matches) would still be lower than the existing prevailing ambient noise levels around 79% of the time on weekday evenings.



4.44 On Weekday daytime periods and weekend daytime and evening periods, the highest predicted Padel court match noise levels would be below even the lowest measured existing prevailing noise levels.

4.45 Given that the character of Padel match noise is not significantly different to tennis match noise, which is an existing part of the prevailing noise climate, and the worst-case predicted noise levels from use of the proposed new Padel courts is lower than the prevailing noise climate the vast majority of the time, no adverse noise impact is anticipated form use of the proposed new Padel courts, taking into account the effects of the Acoustic screens.

Recommendations

4.46 The computerised noise model on which the assessment of Padel court match noise is based, incorporates the acoustic effects of the proposed 4.2m high acoustic screens. The proposals for the acoustic screens are currently for Kingspan Multi-Groove Panels and single glazed areas.

4.47 We have provided the following recommendations for the construction of the acoustic screens, in order to ensure their effectiveness:

We recommend that the acoustic screens are constructed with a material with a minimum rated sound insulation performance of 22 dB R_w. The proposed Kingspan multi-grove wall panels have a sound insulation performance of 24 dB R_w which is suitable. For the single glazed areas we recommend 6mm glazing as a minimum.

The screens should be a solid sealed construction, with no holes or gaps. All joints and junctions should be properly fitted and sealed. The base of the screens should be built down to and sealed against the ground, so that there is no gap along the bottom on the screens.

Conclusion

4.48 The potential noise impact upon the neighbouring residents from the proposed new Padel courts has been assessed. This has been carried out by comparing predicted Padel Court match noise levels to the existing prevailing noise levels at the nearest residential properties, taking into account both the character of the noise as well as the highest worst-case predicted noise levels.

4.49 Taking into account the noise mitigation provided by the proposed acoustic screens, the Padel court match noise is not anticipated to result in any adverse noise impact on the local residents and would be within the Lowest Observed Adverse Effect Level (LOAEL).

4.50 The assessment findings demonstrate that the proposals for the Padel courts, along with the acoustic screens, satisfy paragraphs 174 and 185 of the NPPF (2021), the first and second aims of the NPSE (2010) and Policy DM5: Pollution of the Elmbridge Local Plan (2015) with respect to noise.

Uncertainty

4.51 Whilst all reasonable care has been taken to ensure that all of the data used in the assessment is as robust and representative as possible by using fully calibrated 'Class 1' equipment and taking measurements during suitable weather conditions, carrying out long term noise monitoring etc, uncertainty is an inherent aspect of any noise assessment.

4.52 The players using a Padel court will introduce some variability as different players and groups will play with a different level of intensity, nevertheless the Padel match which was used as the basis for the noise model was considered a fairly high intensity match.

4.53 The potential noise impact from use of the courts will also be lower than presented in the findings of the assessment when only one or two of the courts are being used, instead of all three simultaneously as we have assessed.

4.54 Meteorological effects may also have some influence on the potential noise impact, as different wind speeds and directions may result in changes to the noise propagation.

5.0 SUMMARY & CONCLUSION

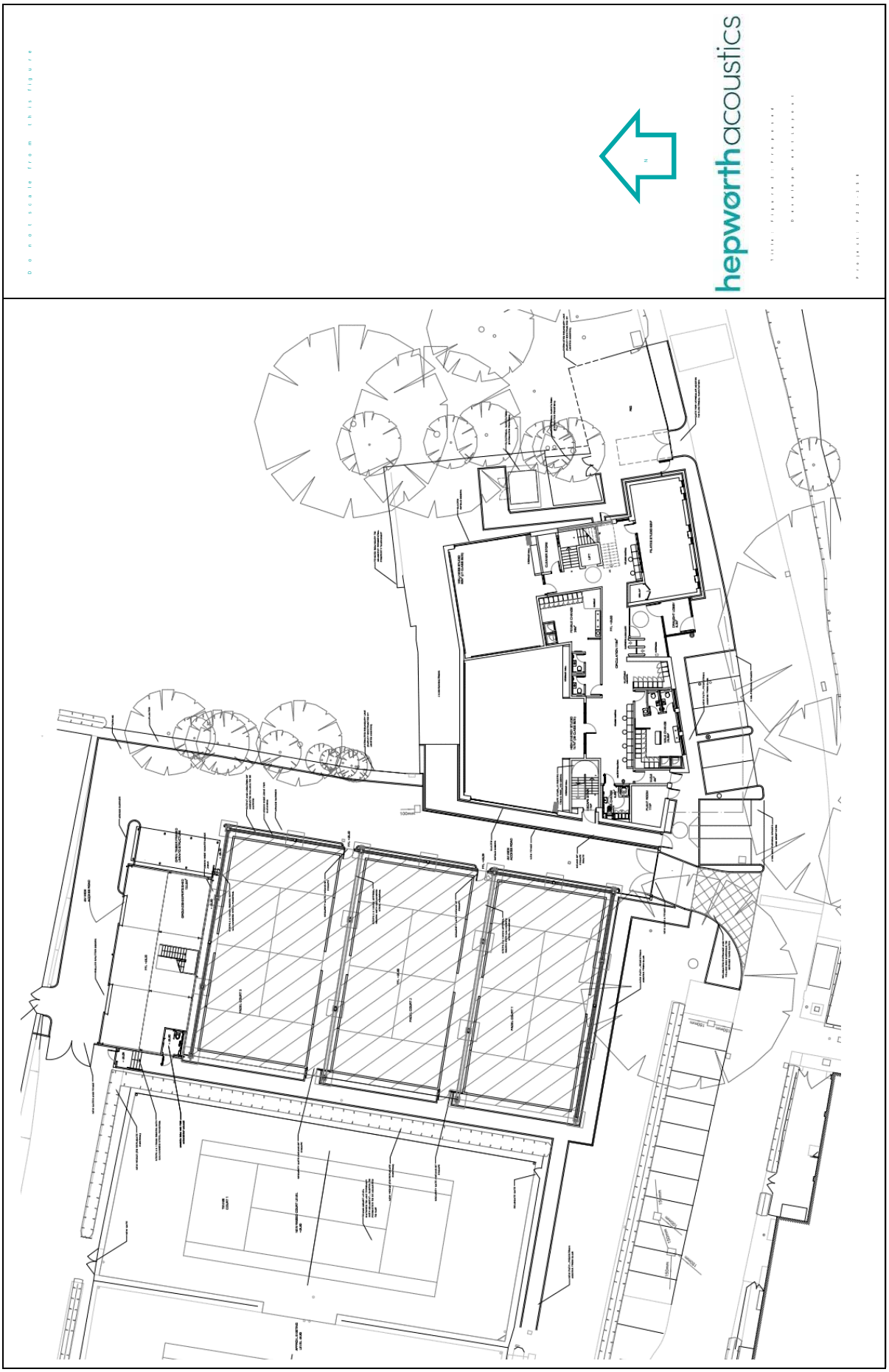
5.1 Hepworth Acoustics Ltd was commissioned by St George's Hill Lawn Tennis Club Ltd to carry out a noise assessment in connection with a proposed development of three new Padel courts at St George's Hill Lawn Tennis Club in Weybridge.

5.2 A comprehensive noise survey has been carried out to robustly quantify the existing prevailing noise climate in the area.

5.3 The potential noise impact from use of the proposed Padel courts has been assessed based on real world empirical data from a Padel court match at another tennis club. The assessment has used a computerised noise model to predict the likely Padel court match noise levels at the neighbouring residential properties.

5.4 The findings of the assessment show that the proposed acoustic screens will ensure that noise levels from use of the Padel courts will be within suitably low levels within the context of the prevailing noise climate and no adverse noise impact is anticipated.


hepworthacoustics
East Road
East Road
East Road
Warreners Lane
Google Earth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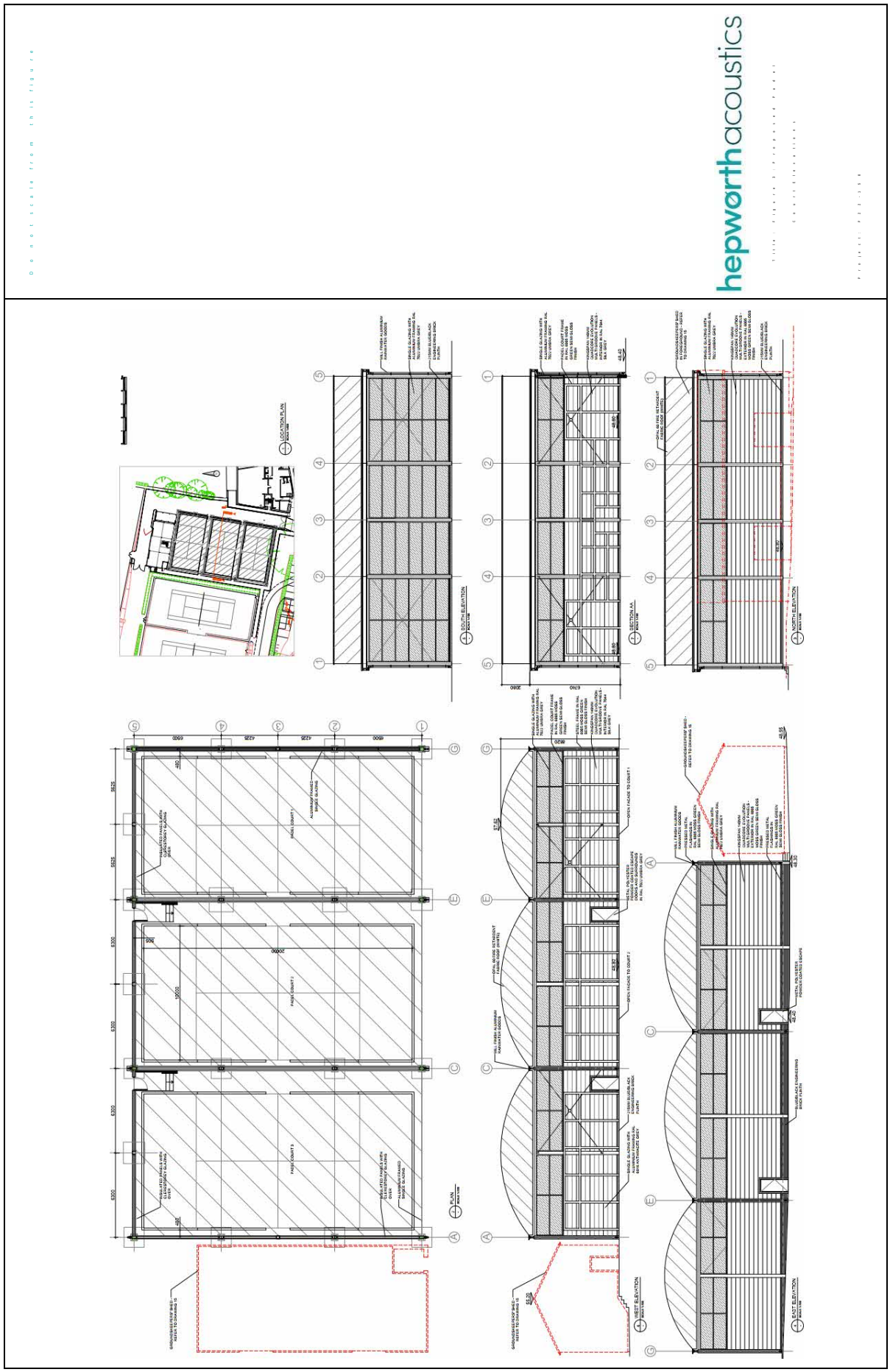
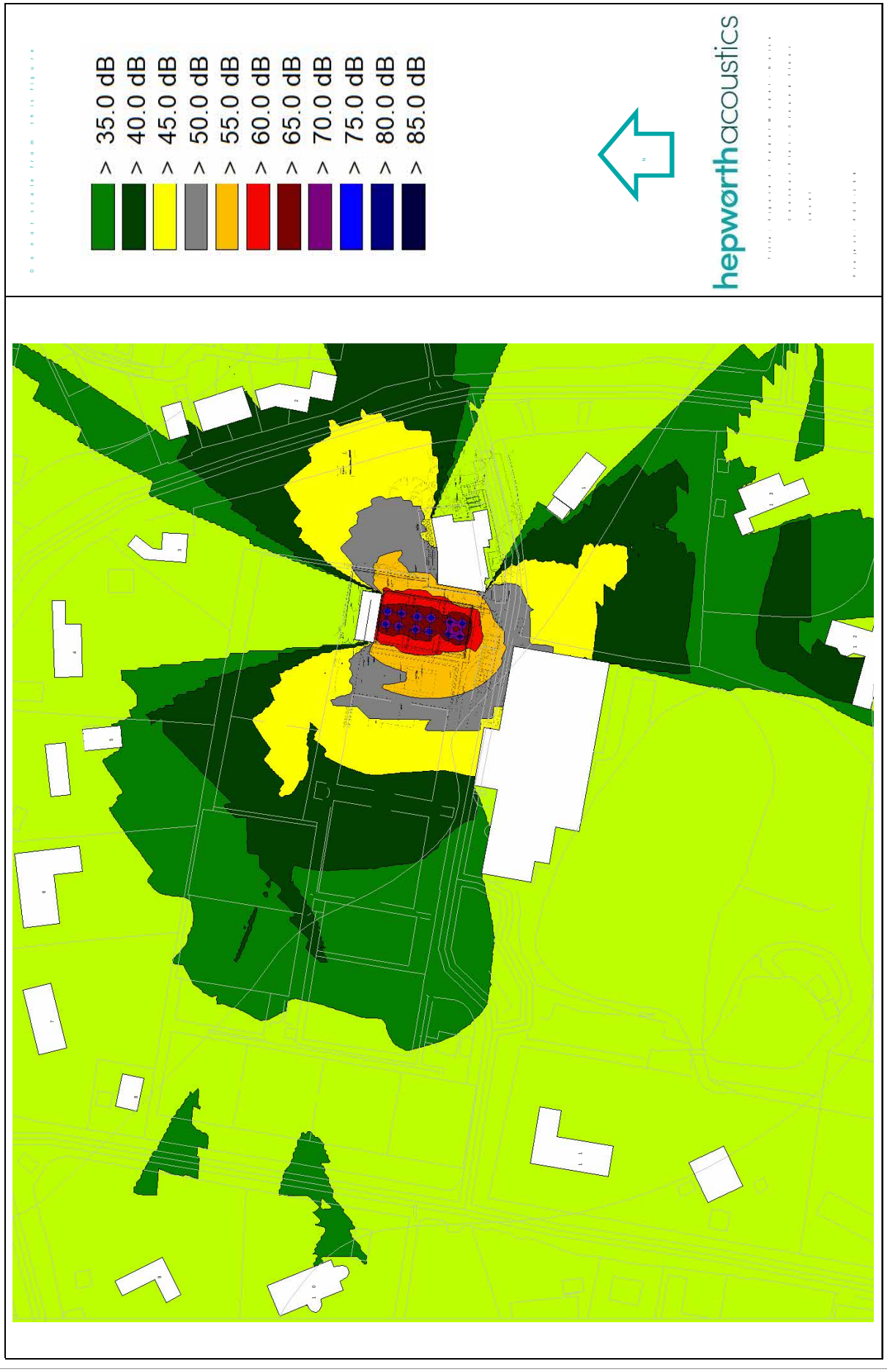
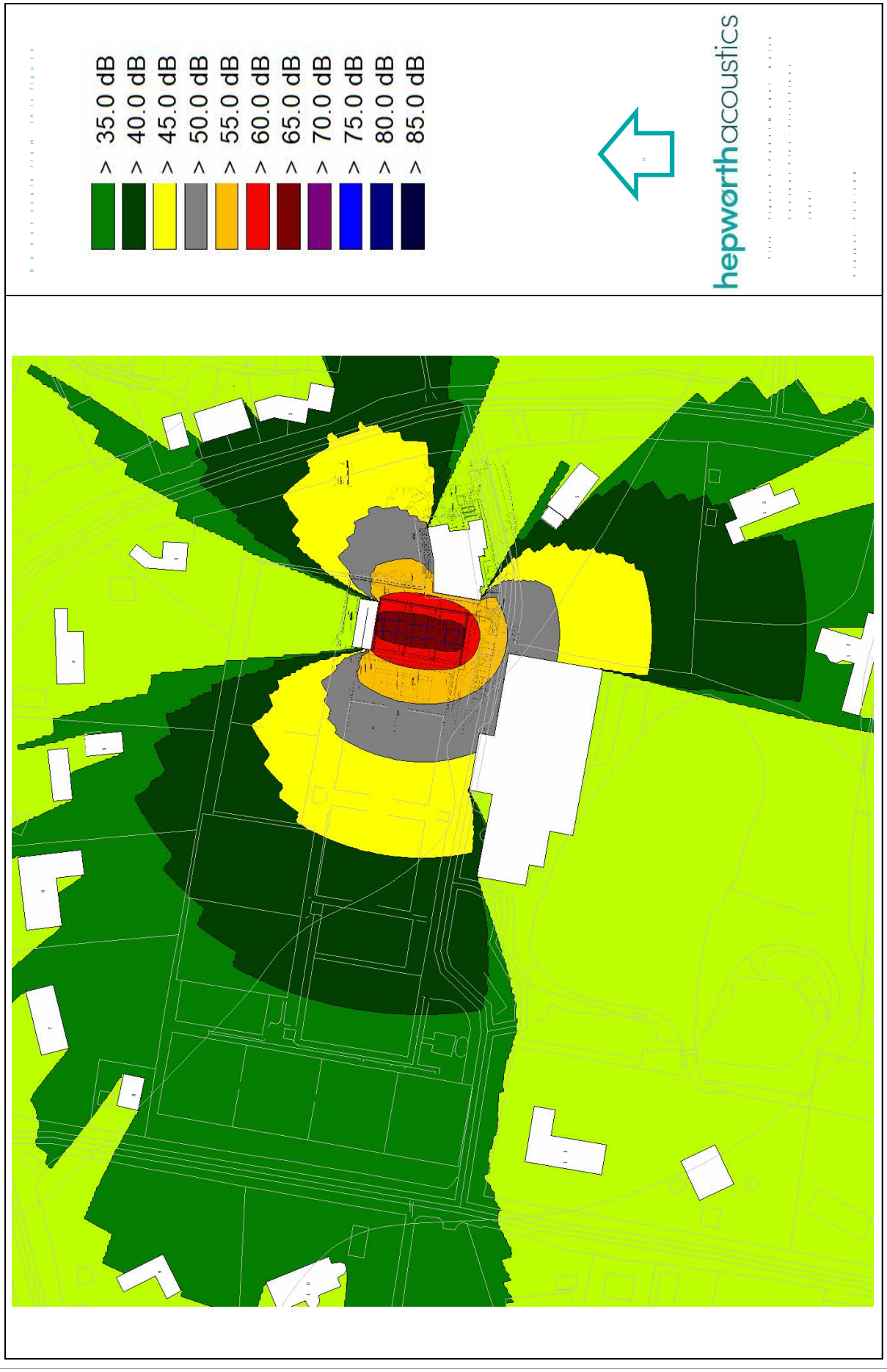
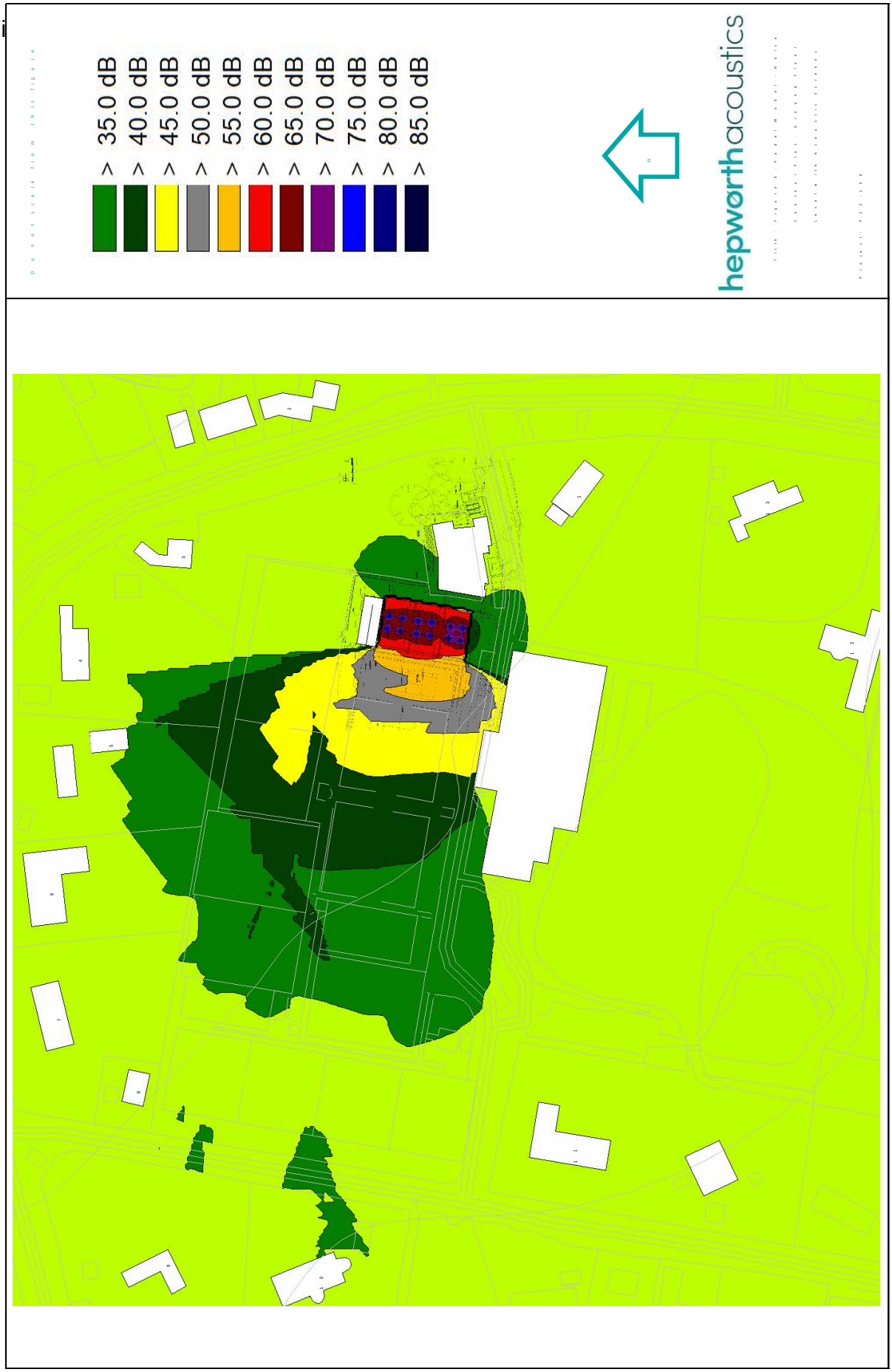
hepworthacoustics

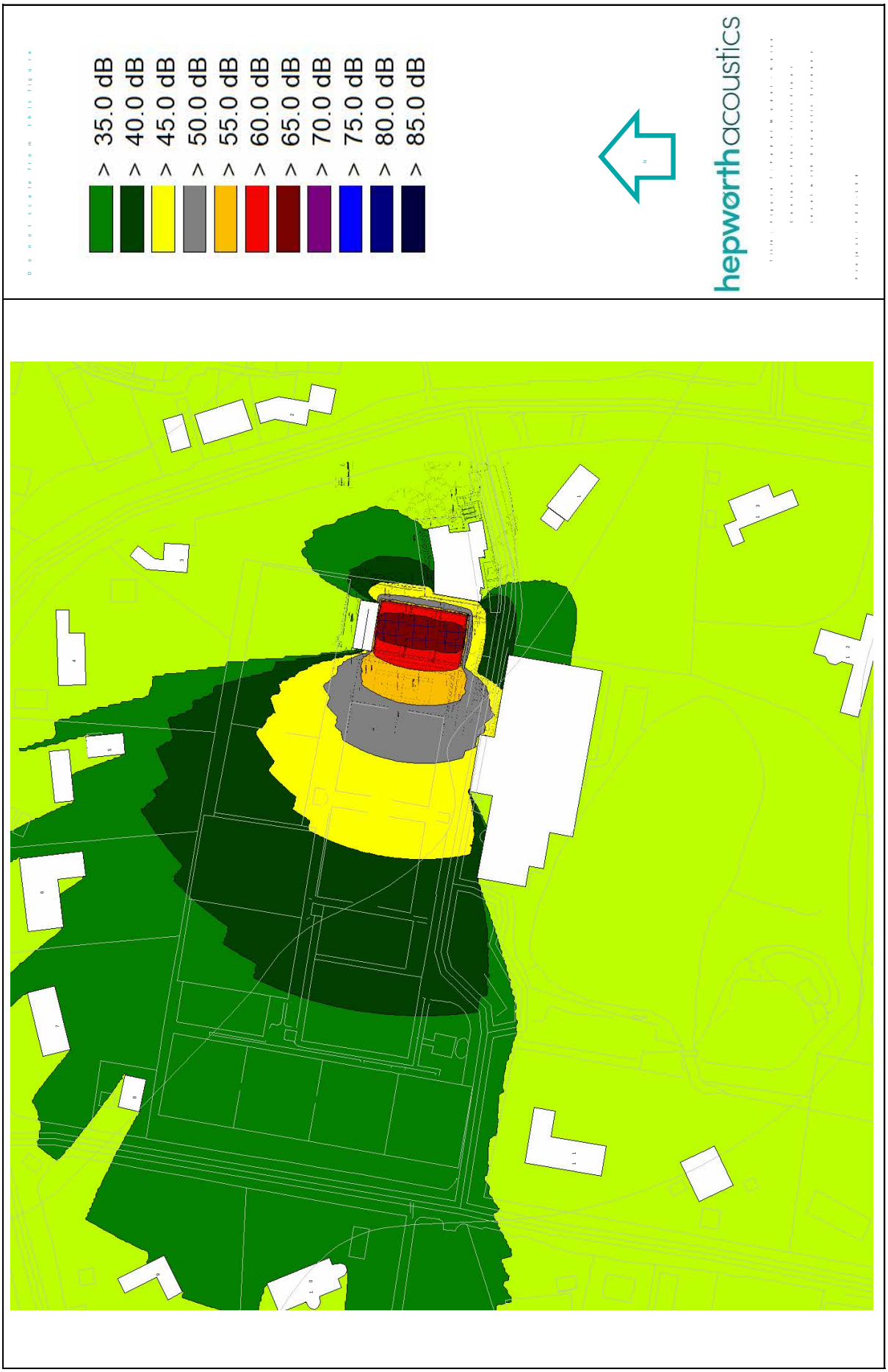

hepworthacoustics
LOCATION PLAN
SOUTH ELEVATION
SECTION AA
NORTH ELEVATION
PLAN
WEST ELEVATION
EAST ELEVATION


> 35.0 dB
> 40.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB
> 75.0 dB
> 80.0 dB
> 85.0 dB
hepworthacoustics


> 35.0 dB
> 40.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB
> 75.0 dB
> 80.0 dB
> 85.0 dB
hepworthacoustics

Fi


> 35.0 dB
> 40.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB
> 75.0 dB
> 80.0 dB
> 85.0 dB
hepworthacoustics


> 35.0 dB
> 40.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB
> 75.0 dB
> 80.0 dB
> 85.0 dB
hepworthacoustics

Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the pressure values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that the human response to sound most closely follows a logarithmic relationship. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (at the threshold of hearing) to 120 dB (at the threshold of pain).

Due to the logarithmic nature of decibels, when two sounds of the same level are combined together, the total sound level is (under normal circumstances) 3 dB higher than each of the individual sound levels e.g. 60 dB plus 60 dB = 63 dB. In terms of perceived 'loudness', a 3 dB(A) variation in sound level is a relatively small (but nevertheless just noticeable) change. An increase in sound level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in sound level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' the frequency spectrum appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using a mathematical filter called the 'A' weighting, which is built into sound level meters. Sound levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or Hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Relevant Sound & Vibration Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case, it is therefore not possible to represent the noise with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The various indices used in this report, along with other relevant terms are described below.

L_p This is the 'Sound Pressure Level' which is a logarithmic ratio between a squared sound pressure quantity and the squared human threshold of hearing.

L_{pA} This is the A-weighted 'Sound Pressure Level', which is the Sound Pressure Level (L_p) adjusted to account for the average human hearing response at difference frequencies for a given sound pressure range.

$L_{Aeq,T}$ This is the A-weighted 'Equivalent Continuous Sound Level' which is an average of the total sound pressure measured over a specified time period. In other words, $L_{Aeq,T}$ is the level of a steady sound which has the same total (A-weighted) sound pressure as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for most forms of environmental noise.

L_{Amax} This is the 'Maximum A-weighted Sound Level' that was measured during the monitoring period. L_{Amax} used in this report refers throughout to L_{Amax} measured using the fast time weighting of the sound level meter, $L_{Amax,f}$.

$L_{A90,T}$ This is the A-weighted sound level exceeded for 90% of a measurement time period. $L_{A90,T}$ is used as a measure of background sound level.

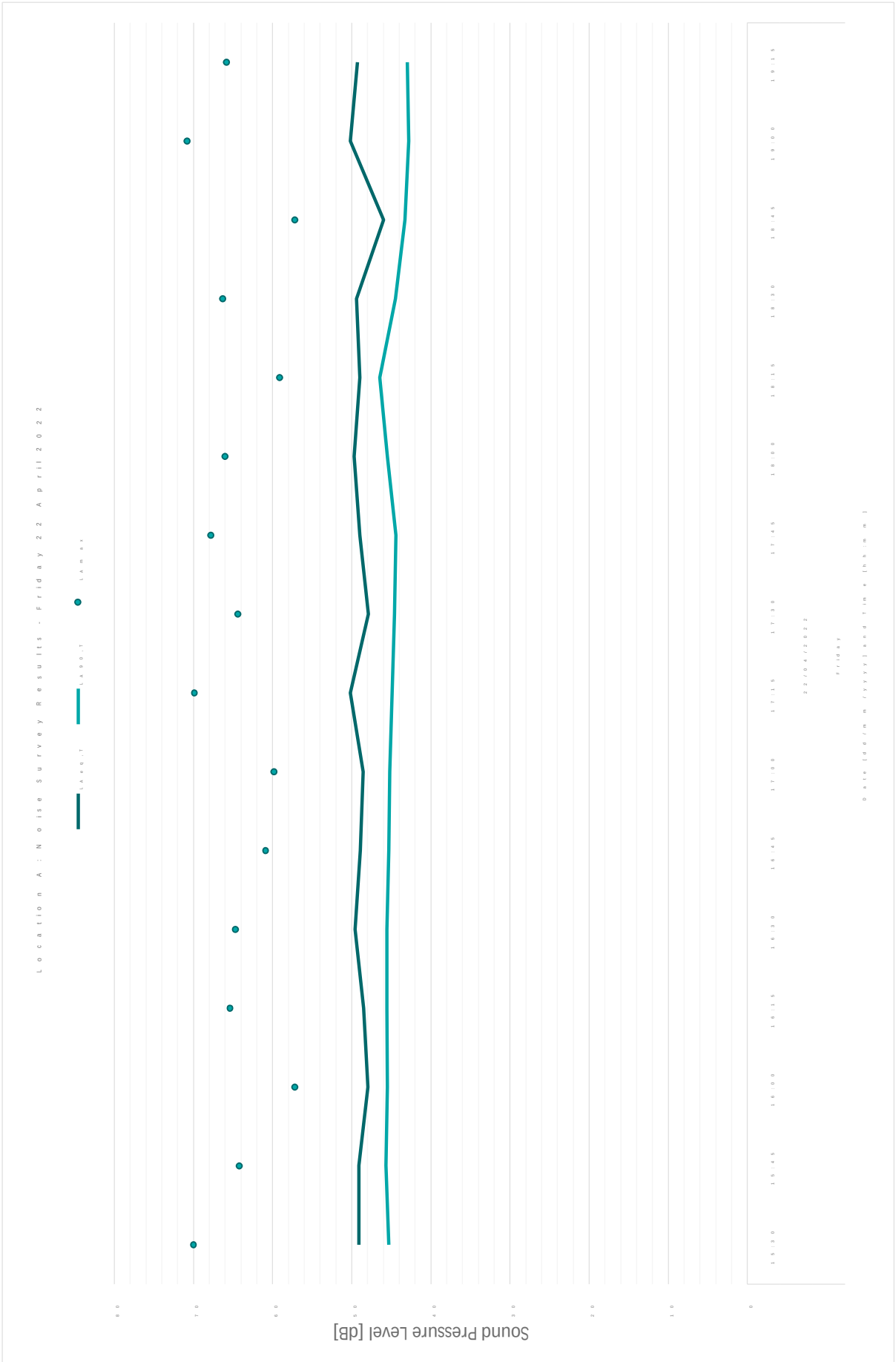
R This is the 'Sound Reduction Index' as measured in a laboratory, which is a measure of the sound insulation properties of a building element (e.g. a wall) in a stated frequency band.

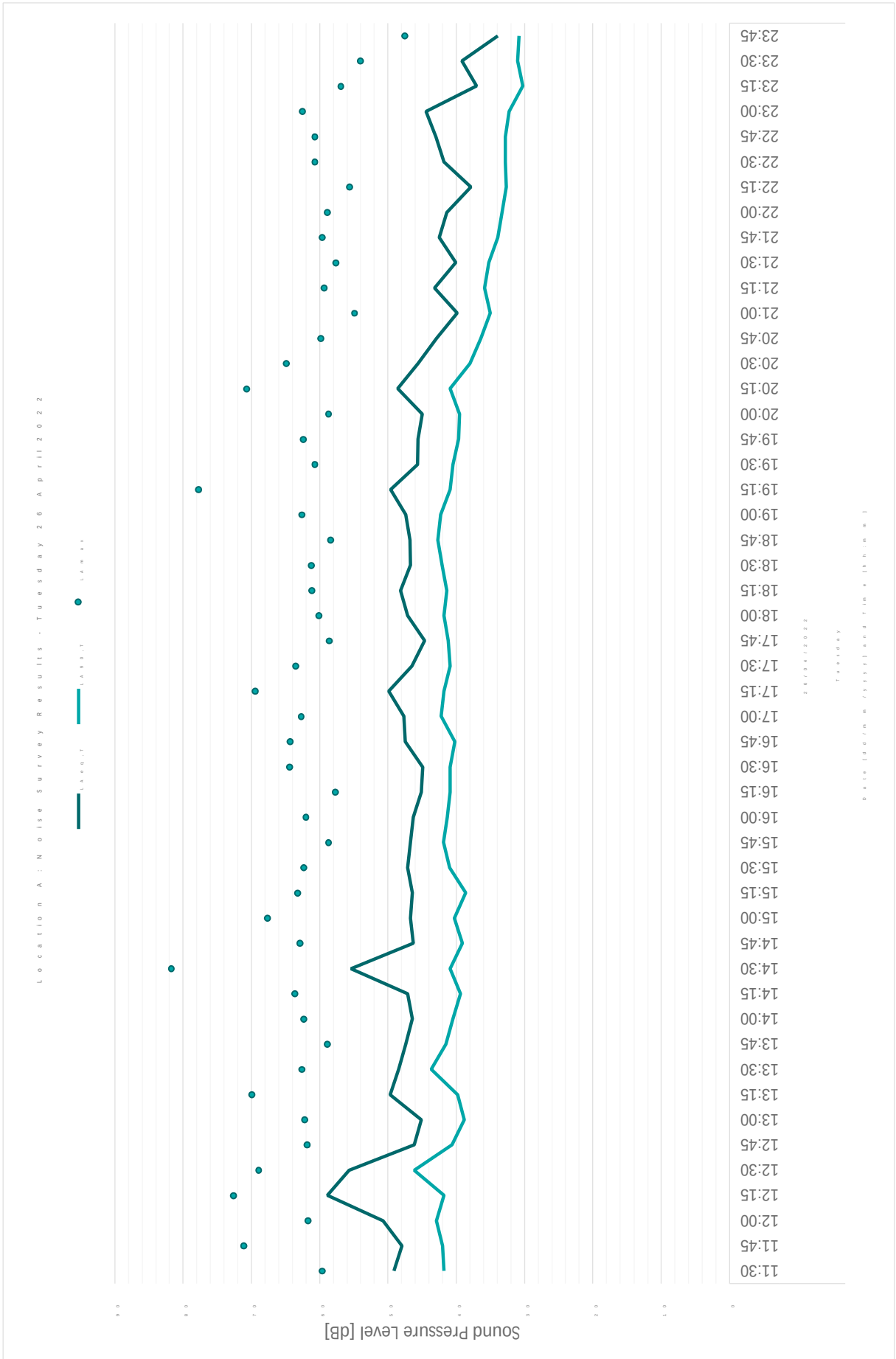
R_w This is the 'Weighted Sound Reduction Index' (R_w), which is a single figure quantity of R, the laboratory measured Sound Reduction Index.

Appendix II: Noise Survey Results

Dates	Friday 22 April 2022 and Tuesday 26 April 2022 to Tuesday 3 May 2022
Equipment	NTi Audio XL2-TA 'Class 1' sound analyser (S/N: A2A-20259-E0) NTi Audio XL2-TA 'Class 1' sound analyser (S/N: A2A-08116-E0) Rion NA-28 'Class 1' sound analyser (S/N: 00960036) NTi Audio CAL200 'Class 1' sound calibrator (S/N: 19360) Rion NC-74 'Class 1' sound calibrator (S/N: 00430648) Kestrel 2500 portable weather meter (S/N: 2556870) Associated environmental outdoor monitoring kits and tripods
Weather	Friday 22: Dry, 11-13°C with low winds <4 $m.s^{-1}$ and heavy cloud coverage Tuesday 26: Dry, 4-14°C with low winds <2 $m.s^{-1}$ and moderate cloud coverage Wednesday 27: Dry, 4-13°C with low winds <2 $m.s^{-1}$ and moderate cloud coverage Thursday 28: Dry, 5-14°C with low winds <2 $m.s^{-1}$ and moderate cloud coverage Friday 29: Dry, 4-14°C with low winds <3 $m.s^{-1}$ and moderate/heavy cloud coverage Saturday 30: Dry, 4-17°C with low winds <1 $m.s^{-1}$ and light cloud coverage Sunday 01: Dry, 7-14°C with low winds <2 $m.s^{-1}$ and heavy cloud coverage Monday 02: Dry, 7-17°C with low winds <1 $m.s^{-1}$ and heavy cloud coverage Tuesday 03: Dry, 4-15°C with low winds <3 $m.s^{-1}$ and moderate cloud coverage

Please see the results of the noise surveys in the graphs overleaf.


Location A : Noise Survey Results - Friday 22 April 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
80
70
60
50
40
30
20
10
0
15:30
15:45
16:00
16:15
16:30
16:45
17:00
17:15
17:30
17:45
18:00
18:15
18:30
18:45
19:00
19:15
22/04/2022
Friday
Date [dd/mm/yyyy] and Time [hh:mm]


Location A: Noise Survey Results - Tuesday 26 April 2022
LAeq,T
LAeq,T
LAmax
Sound Pressure Level [dB]
Date [dd/mm/yyyy] and Time [hh:mm]
26/04/2022
Tuesday
11:30
11:45
12:00
12:15
12:30
12:45
13:00
13:15
13:30
13:45
14:00
14:15
14:30
14:45
15:00
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16:00
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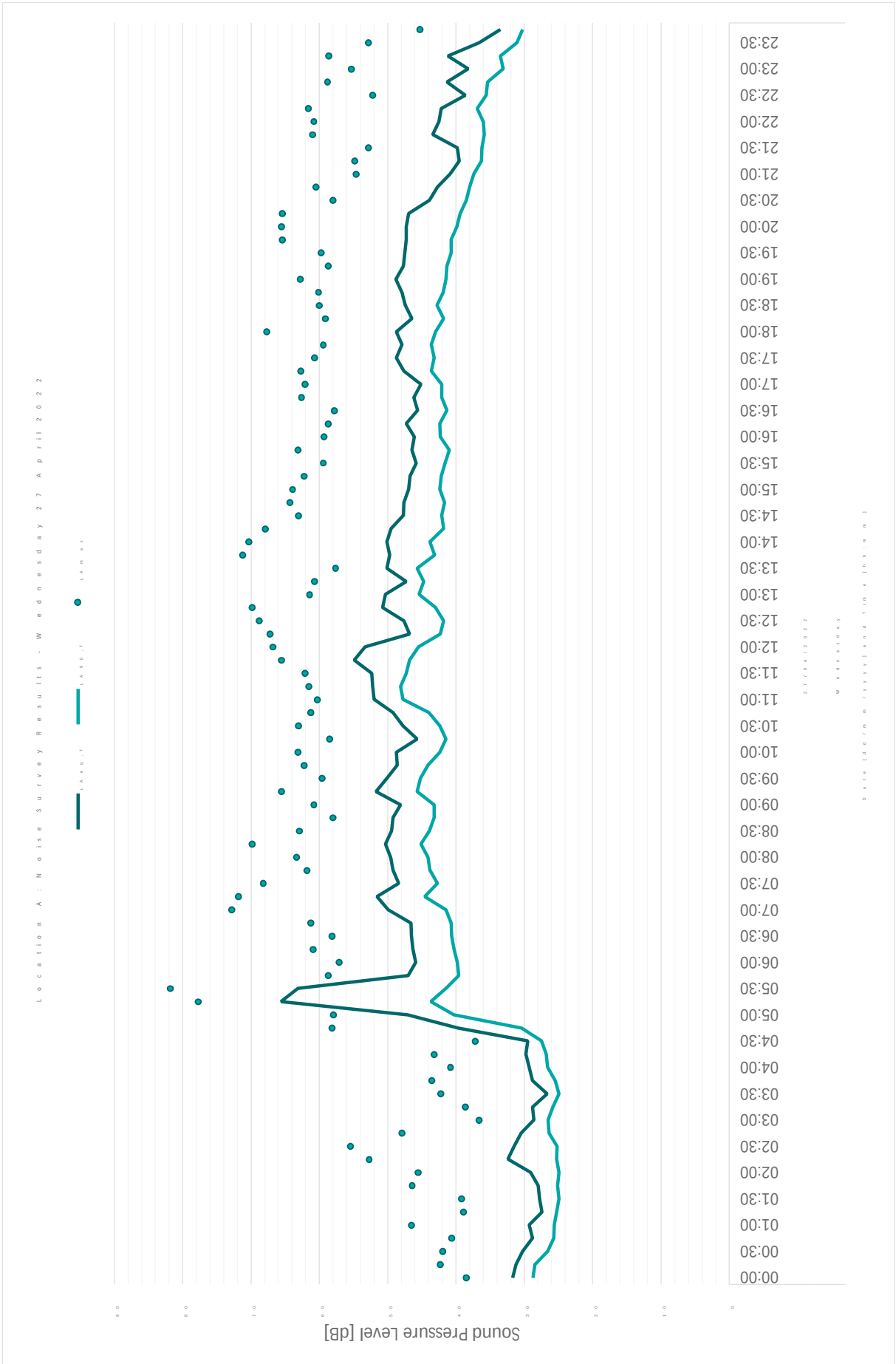
22:30
22:45
23:00
23:15
23:30
23:45


Location A: Noise Survey Results - Wednesday 27 April 2022
LAeqT
LA90T
LAmax
Sound Pressure Level [dB]
Wednesday
00:00
00:30
01:00
01:30
02:00
02:30
03:00
03:30
04:00
04:30
05:00
05:30
06:00
06:30
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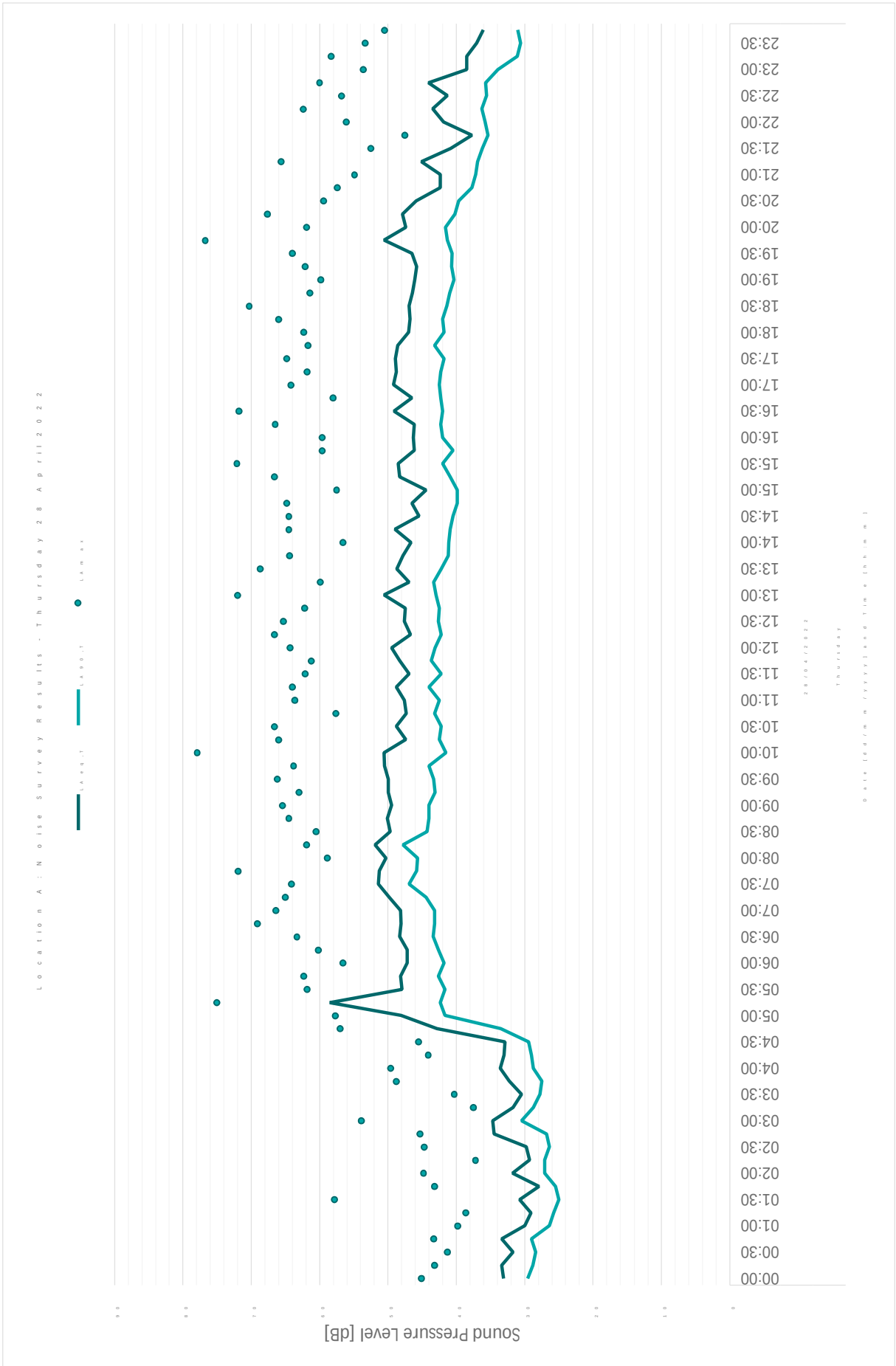
23:30


Location A : Noise Survey Results - Thursday 28 April 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
Date [dd/mm/yyyy]and Time [hh:mm]
28/04/2022
Thursday
00:00
00:30
01:00
01:30
02:00
02:30
03:00
03:30
04:00
04:30
05:00
05:30
06:00
06:30
07:00
07:30
08:00
08:30
09:00
09:30
10:00
10:30
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22:30
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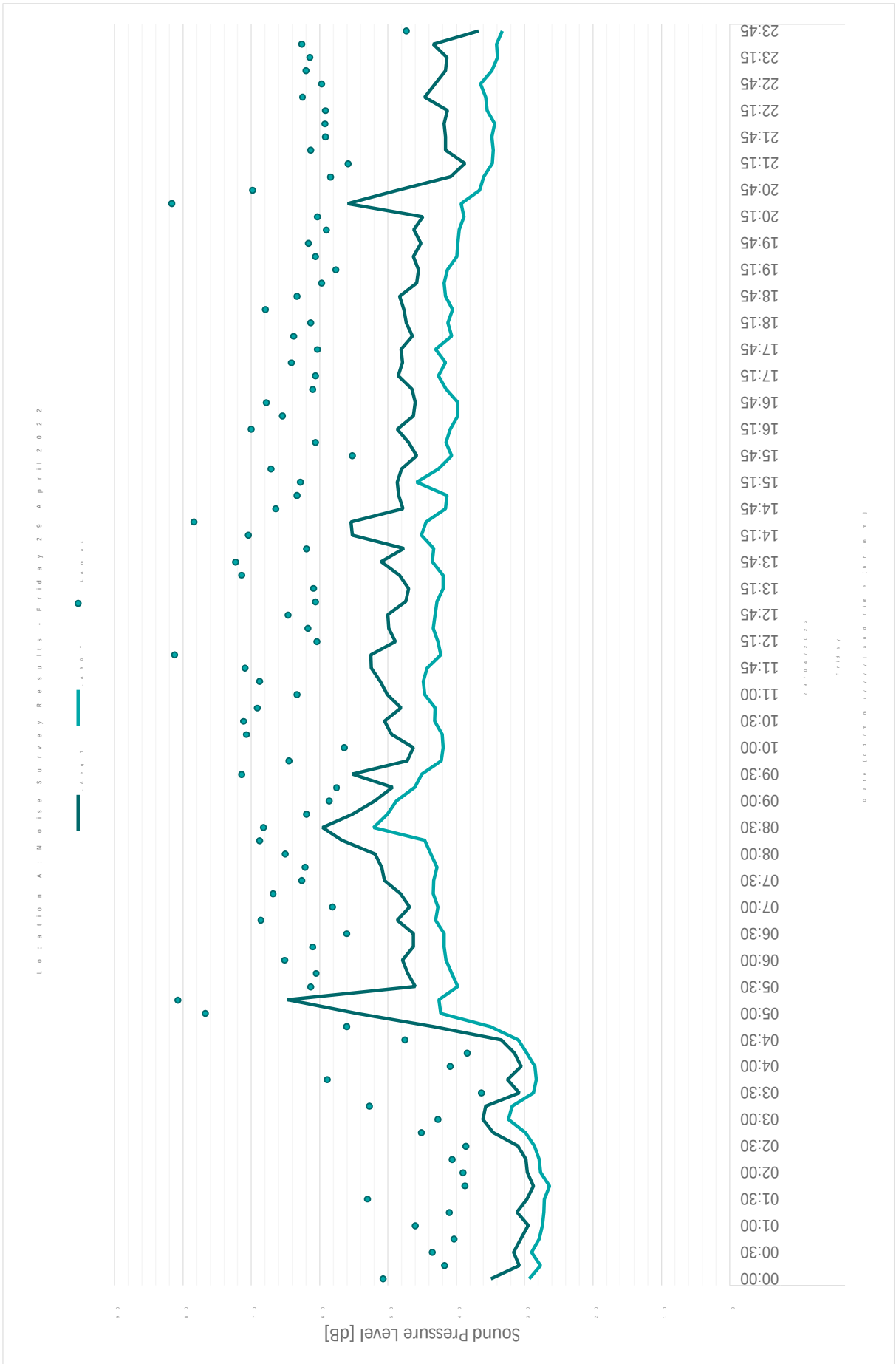
23:30


Location A: Noise Survey Results - Friday 29 April 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
0
10
20
30
40
50
60
70
80
90
00:00
00:30
01:00
01:30
02:00
02:30
03:00
03:30
04:00
04:30
05:00
05:30
06:00
06:30
07:00
07:30
08:00
08:30
09:00
09:30
10:00
10:30
11:00
11:45
12:15
12:45
13:15
13:45
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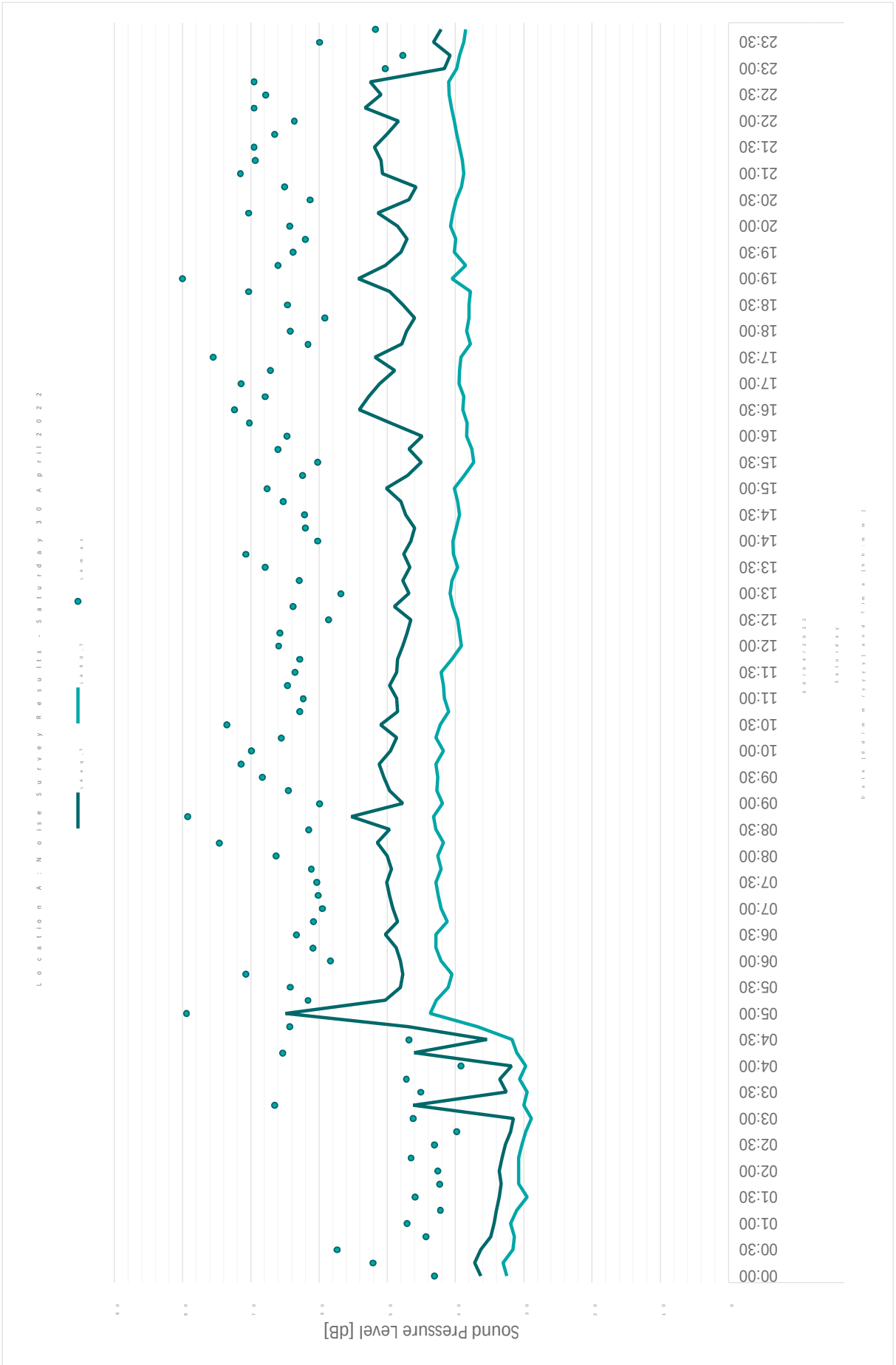
15:15
15:45
16:15
16:45
17:15
17:45
18:15
18:45
19:15
19:45
20:15
20:45
21:15
21:45
22:15
22:45
23:15
23:45
Date [dd/mm/yyyy] and Time [hh:mm]
29/04/2022
Friday


Location A: Noise Survey Results - Saturday 30 April 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
0
10
20
30
40
50
60
70
80
90
00:00
00:30
01:00
01:30
02:00
02:30
03:00
03:30
04:00
04:30
05:00
05:30
06:00
06:30
07:00
07:30
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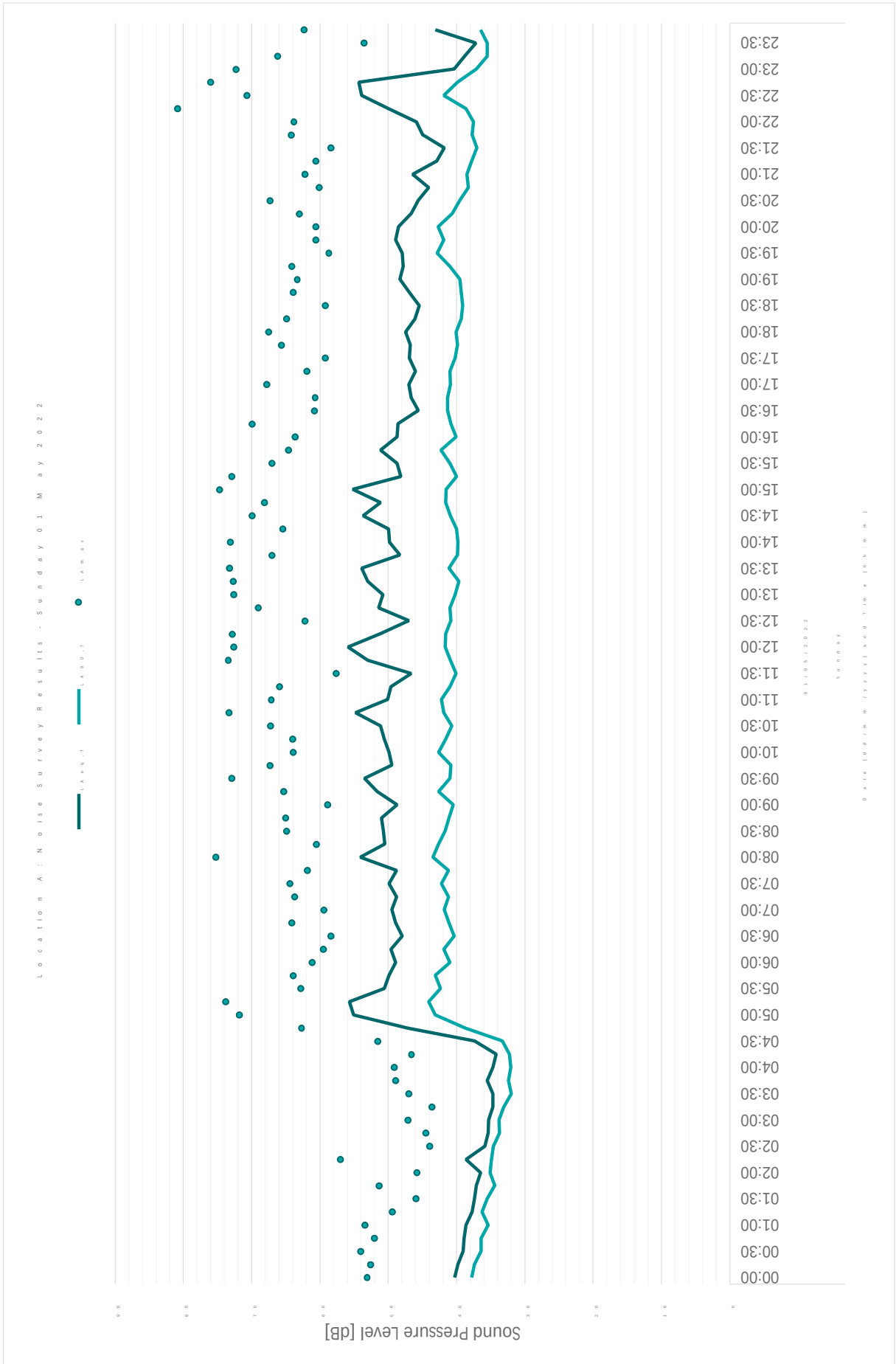
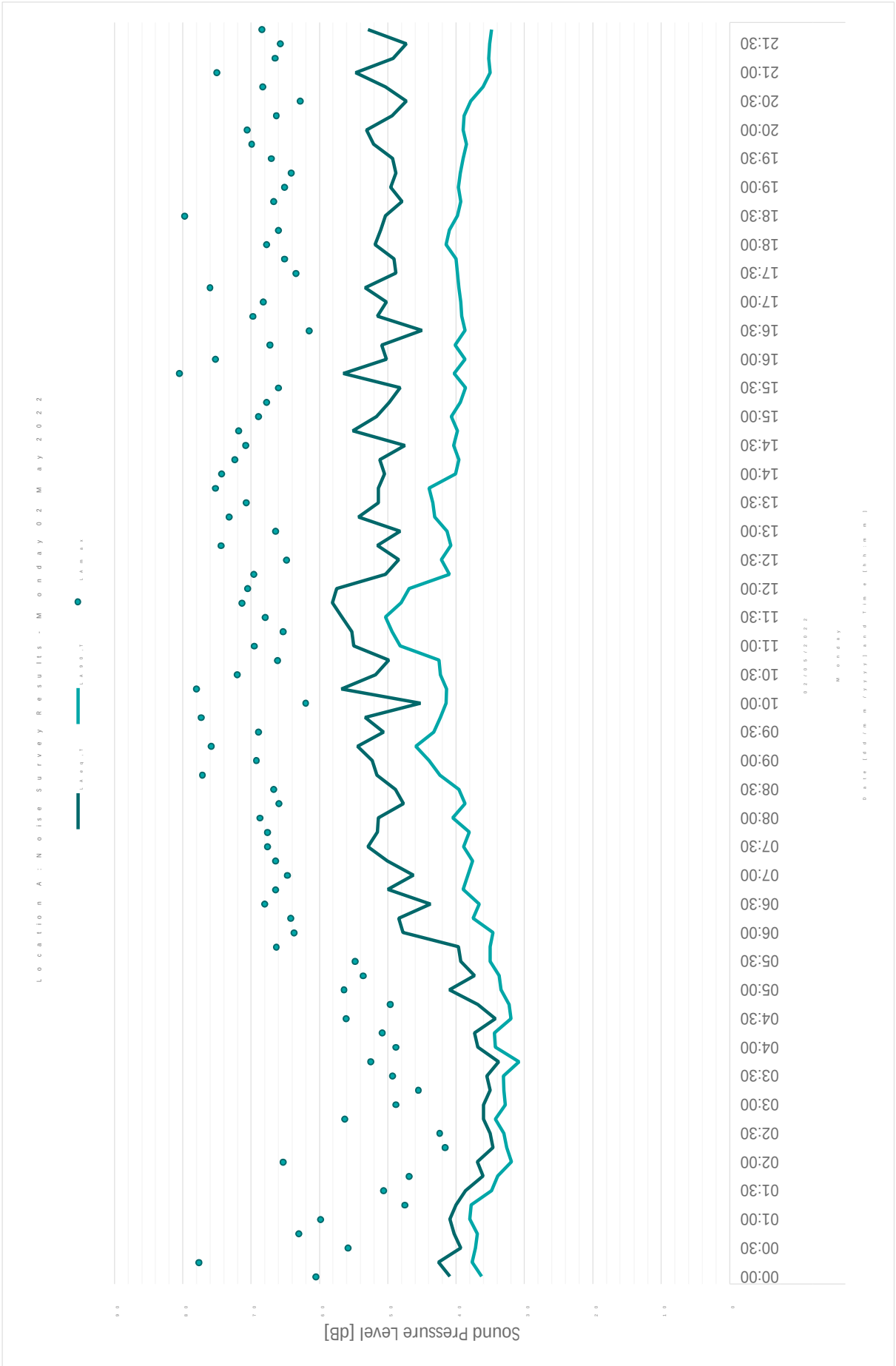
22:00
22:30
23:00
23:30
30/04/2022
Saturday
Date [dd/mm/yyyy] and Time [hh:mm]


Location A: Noise Survey Results - Sunday 01 May 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
Date [dd/mm/yyyy] and Time [hh:mm]
01/05/2022
Sunday


Location A: Noise Survey Results - Monday 02 May 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
Date [dd/mm/yyyy] and Time [hh:mm]
02/05/2022
Monday
00:00
00:30
01:00
01:30
02:00
02:30
03:00
03:30
04:00
04:30
05:00
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06:00
06:30
07:00
07:30
08:00
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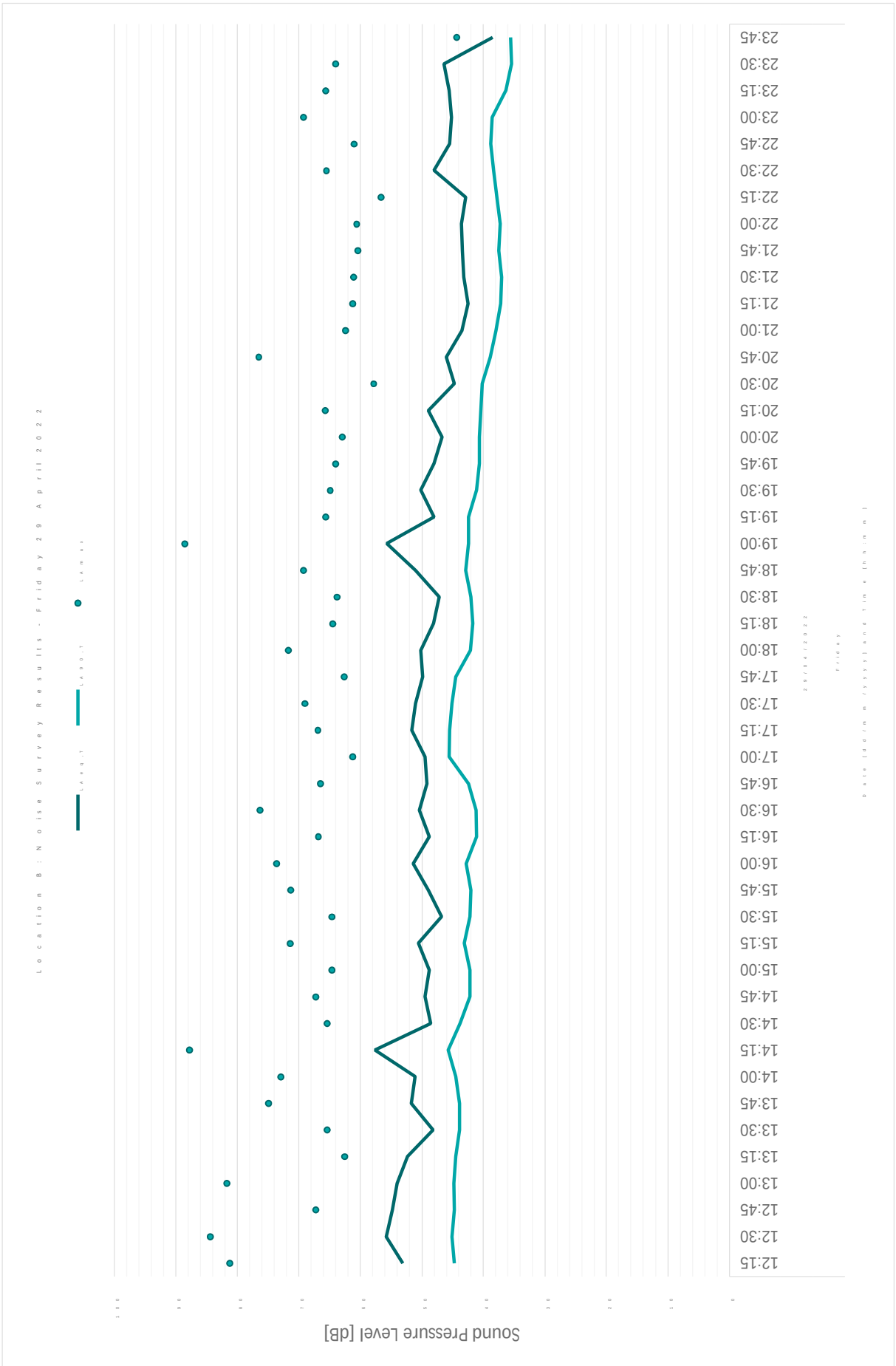
20:00
20:30
21:00
21:30


Location B: Noise Survey Results - Friday 29 April 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
100
90
80
70
60
50
40
30
20
10
0
12:15
12:30
12:45
13:00
13:15
13:30
13:45
14:00
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14:30
14:45
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15:15
15:30
15:45
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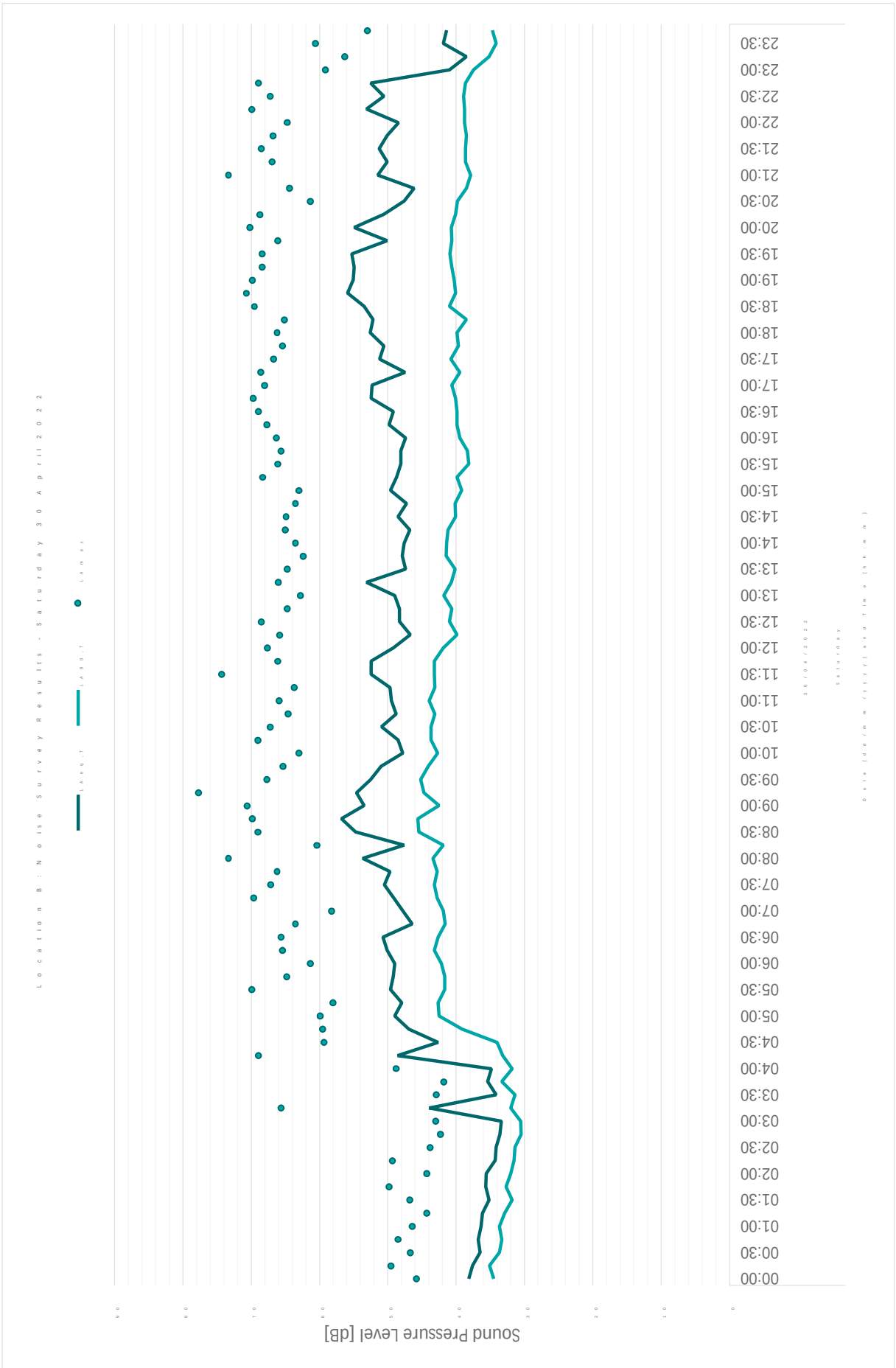
20:45
21:00
21:15
21:30
21:45
22:00
22:15
22:30
22:45
23:00
23:15
23:30
23:45
Date [dd/mm/yyyy]
29/04/2022
Friday
Time [hh:mm]


Location B: Noise Survey Results - Saturday 30 April 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
00:00
00:30
01:00
01:30
02:00
02:30
03:00
03:30
04:00
04:30
05:00
05:30
06:00
06:30
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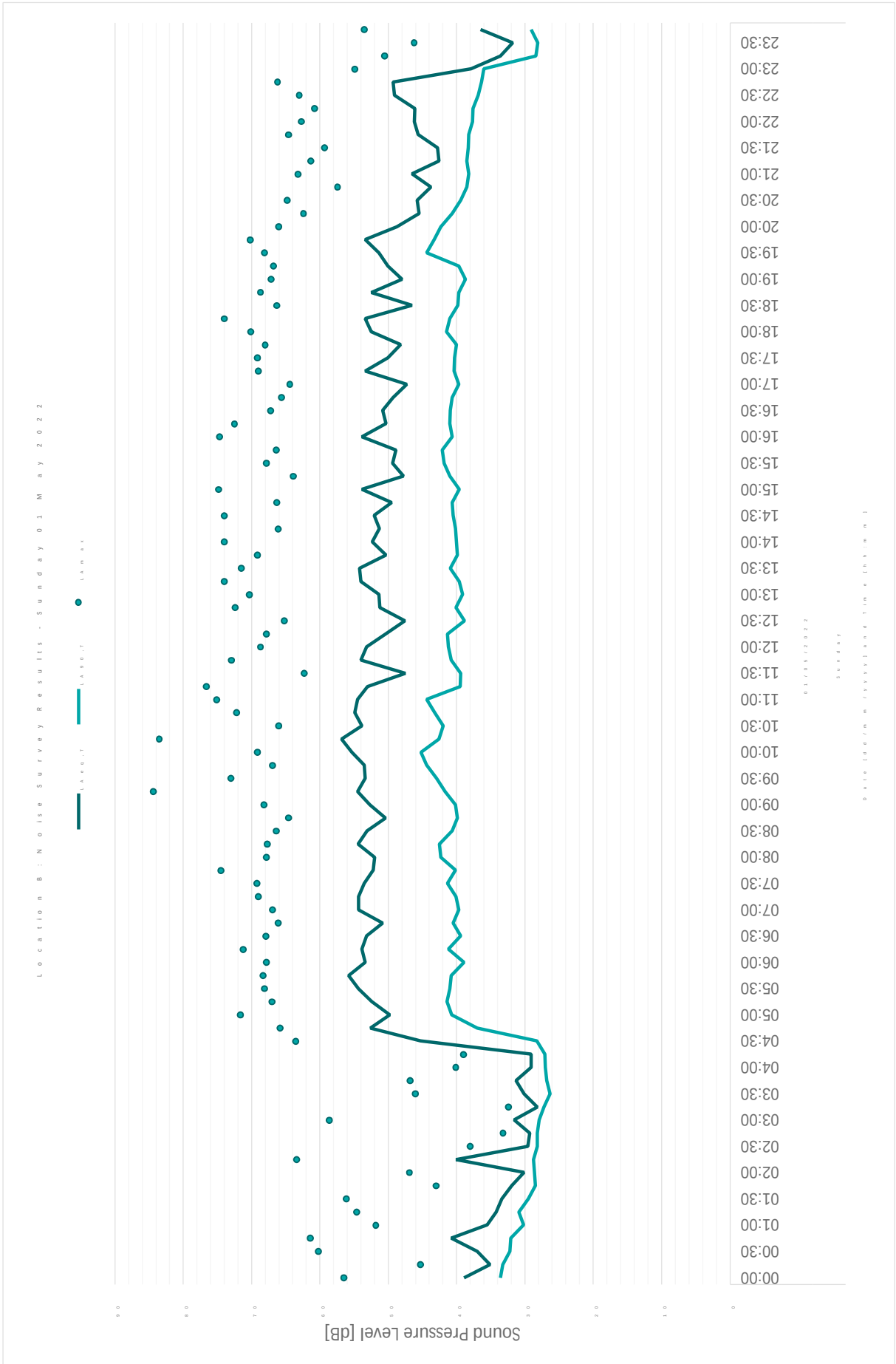
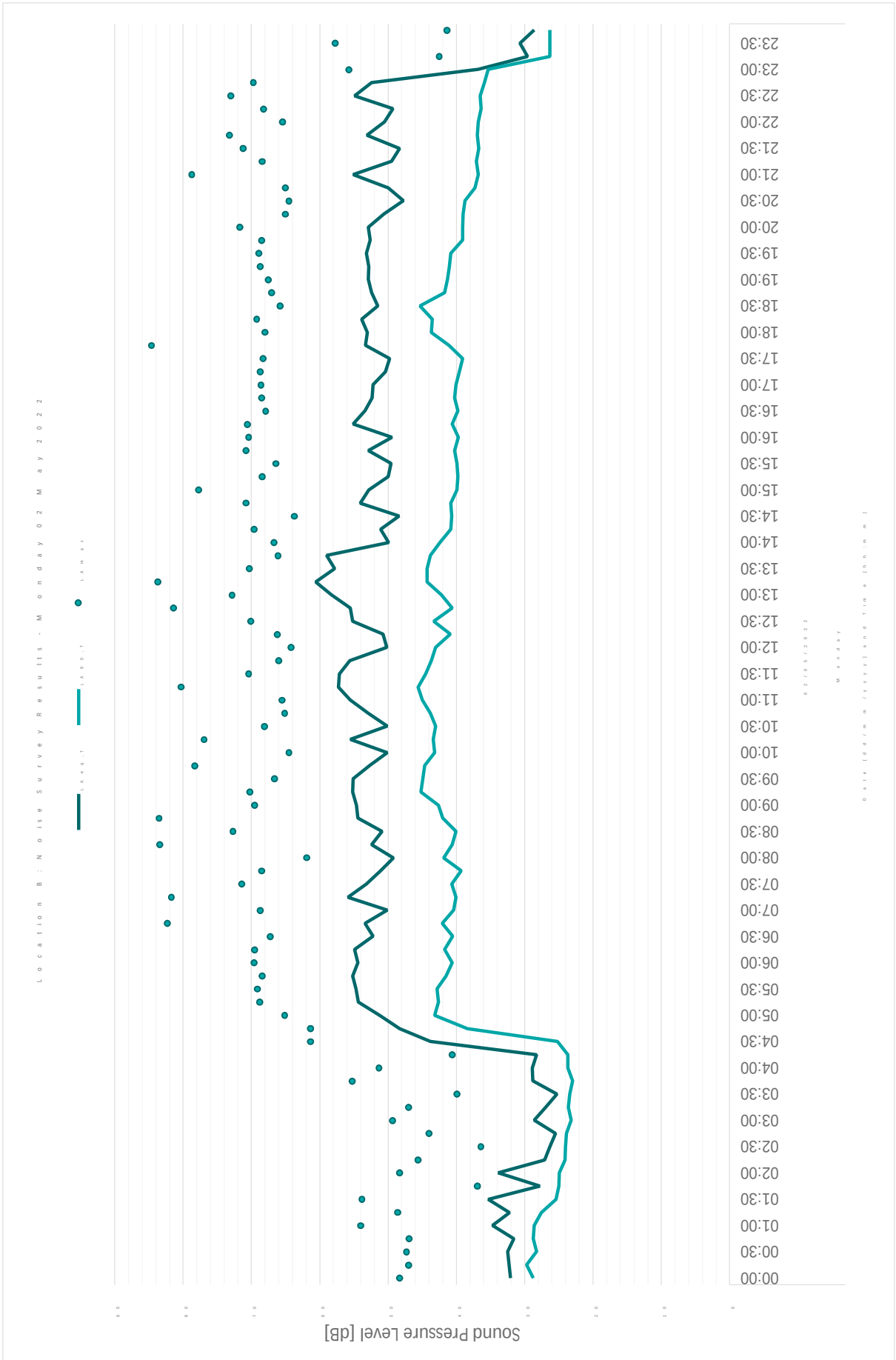

Location B: Noise Survey Results - Sunday 01 May 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
Date [dd/mm/yyyy]and Time [hh:mm]
01/05/2022
Sunday


Location B: Noise Survey Results - Monday 02 May 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
Monday
02/05/2022
Date [dd/mm/yyyy] and Time [hh:mm]
00:00
00:30
01:00
01:30
02:00
02:30
03:00
03:30
04:00
04:30
05:00
05:30
06:00
06:30
07:00
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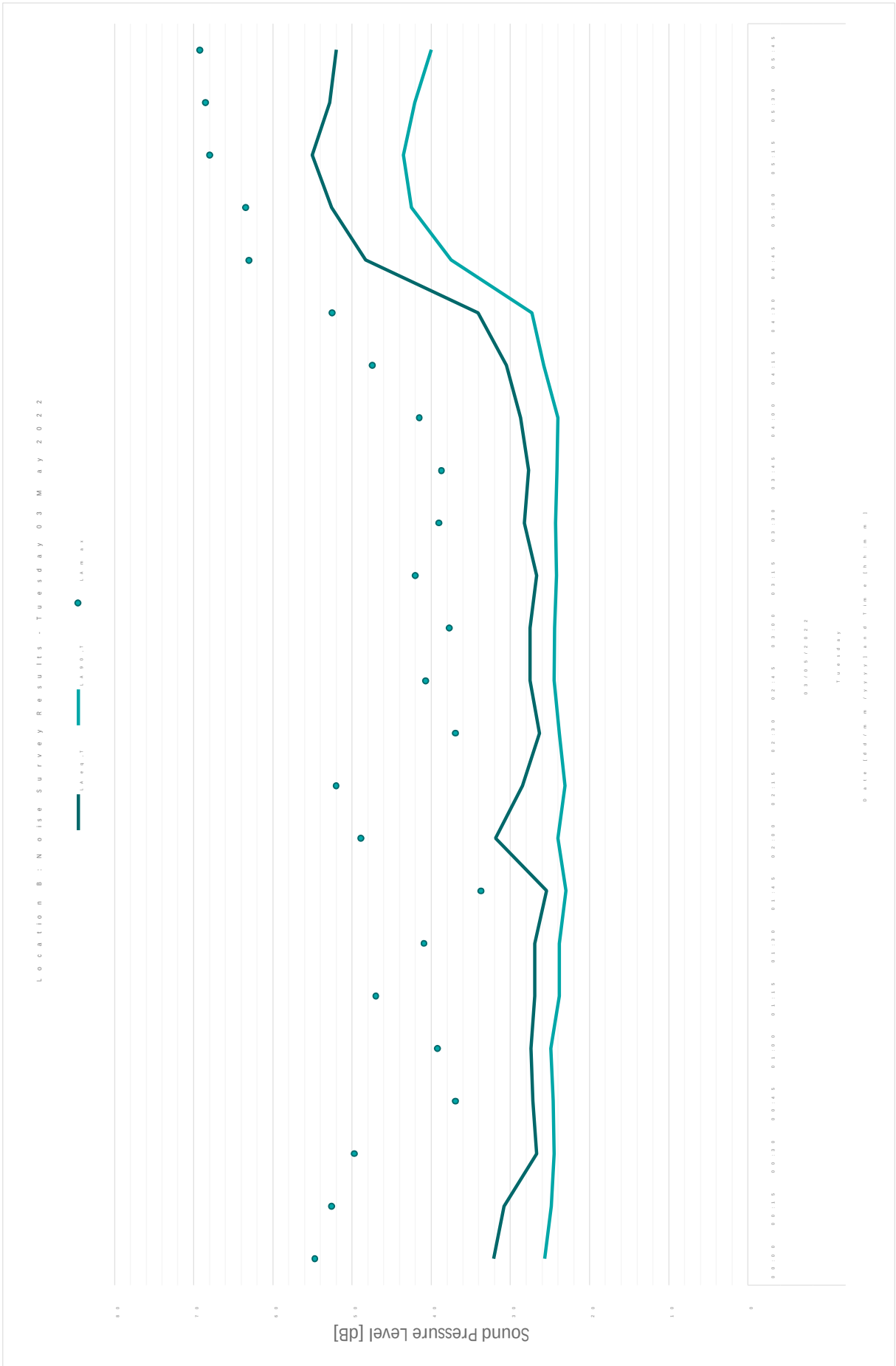
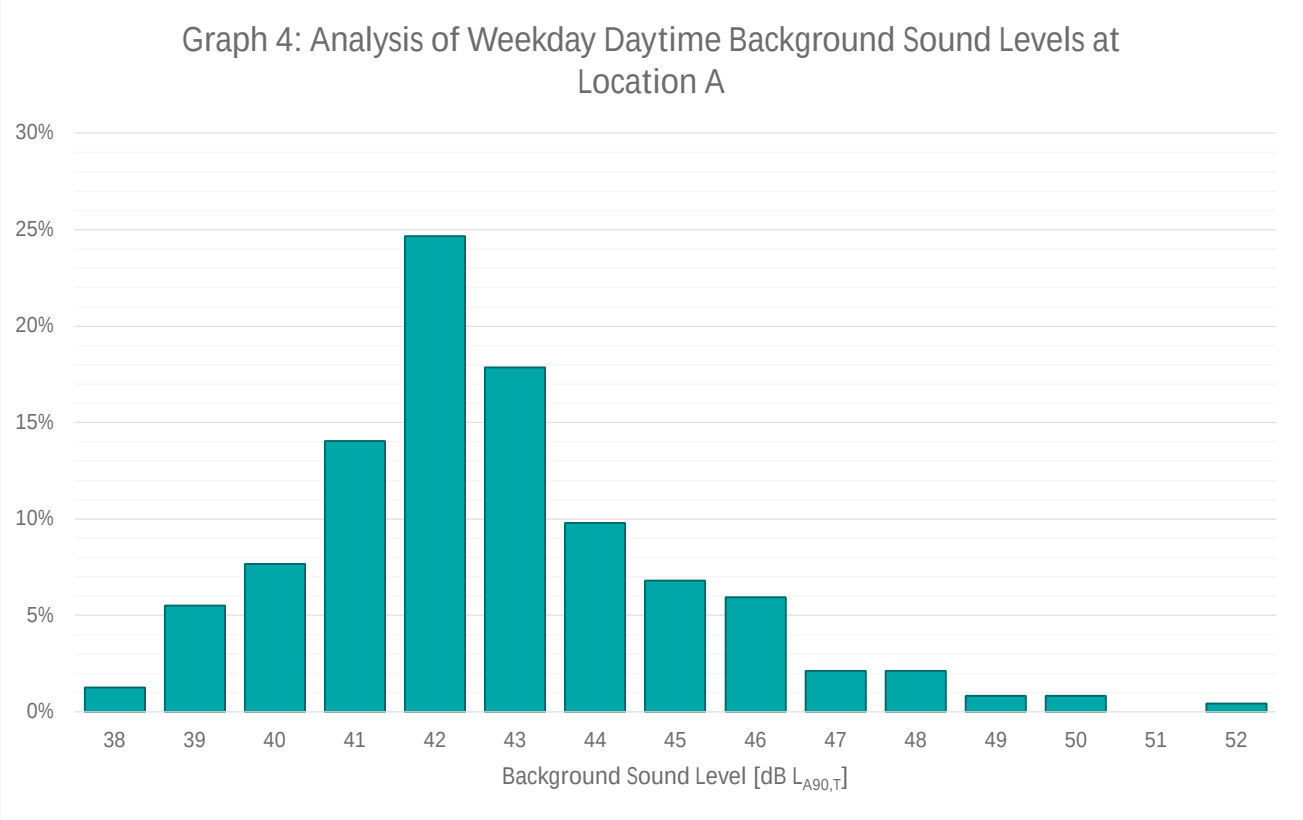
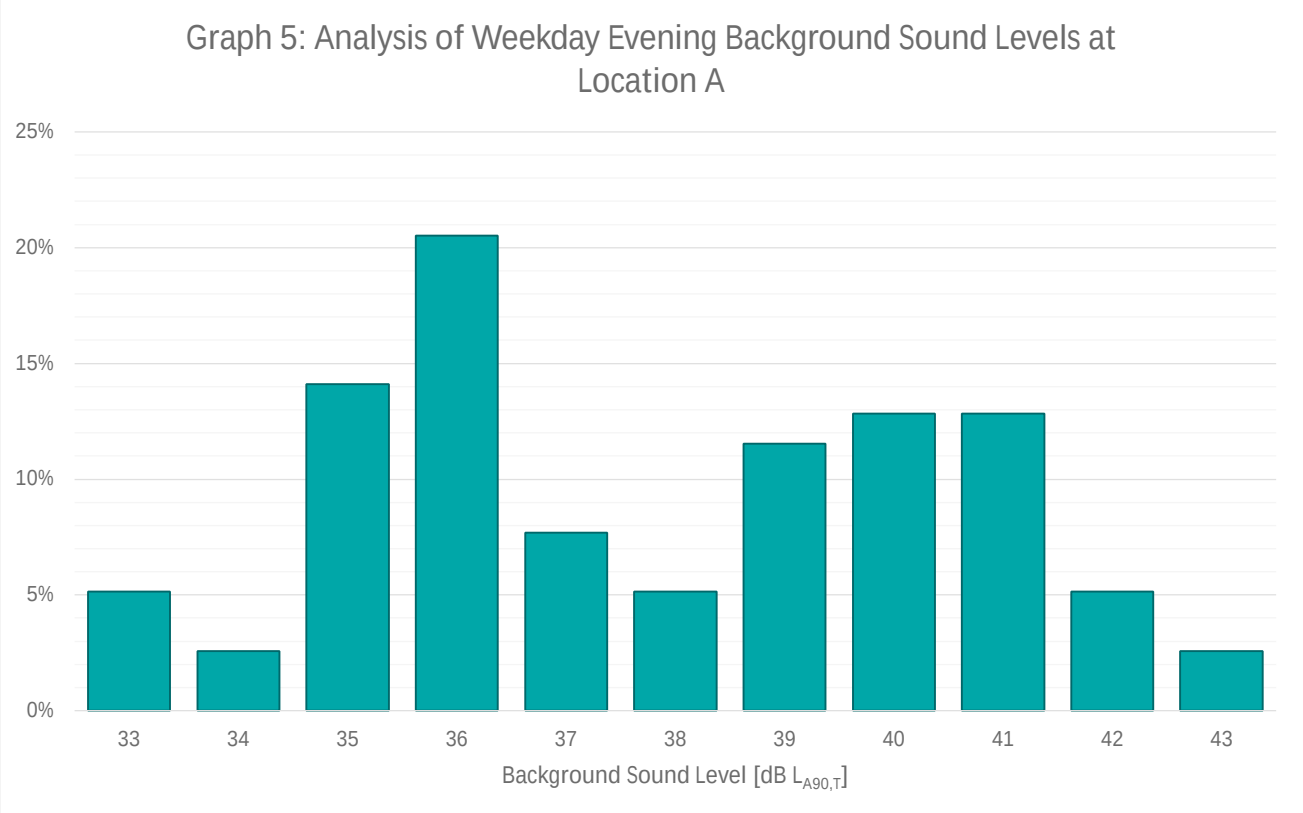
23:30

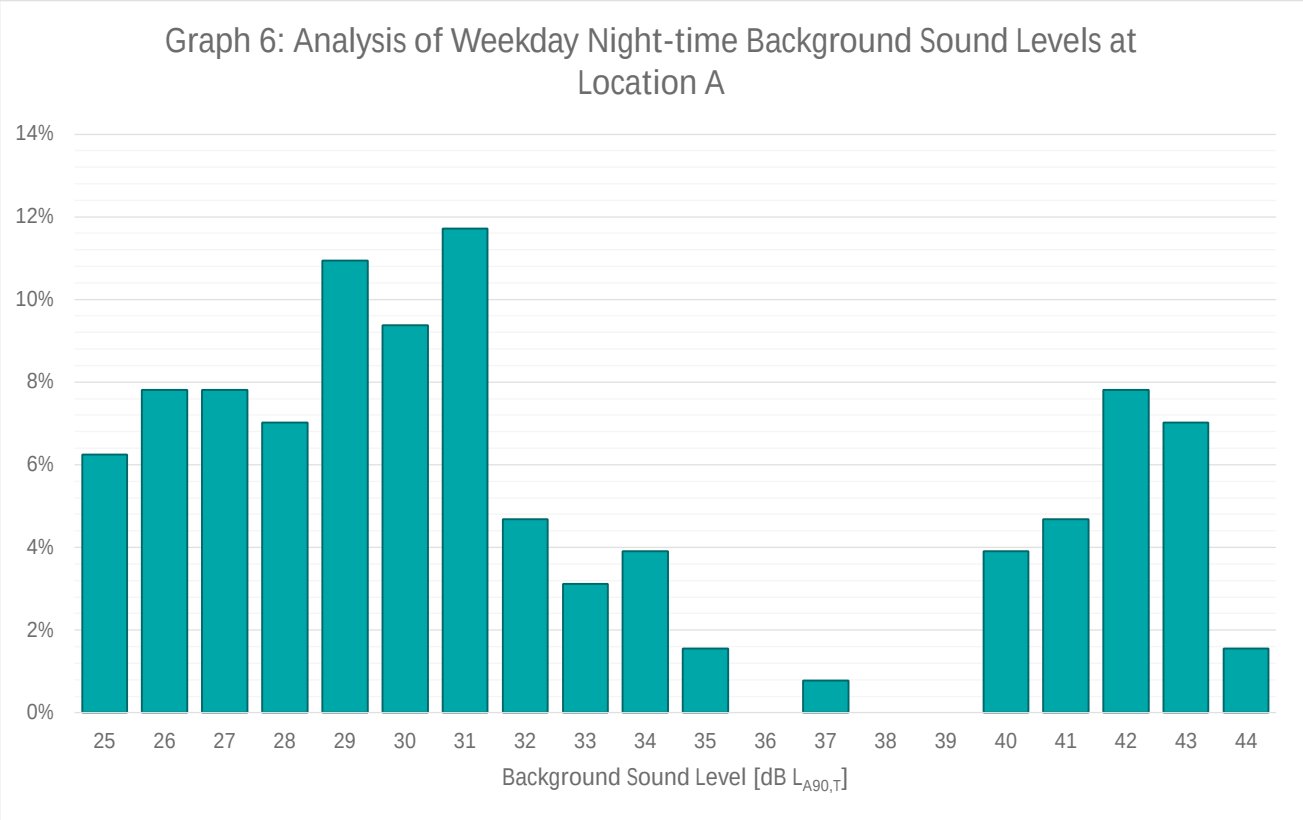

Location B: Noise Survey Results - Tuesday 03 May 2022
LAeq,T
LA90,T
LAmax
Sound Pressure Level [dB]
Date [dd/mm/yyyy] and Time [hh:mm]
03/05/2022
Tuesday

Appendix III: Analysis of Background Sound Levels

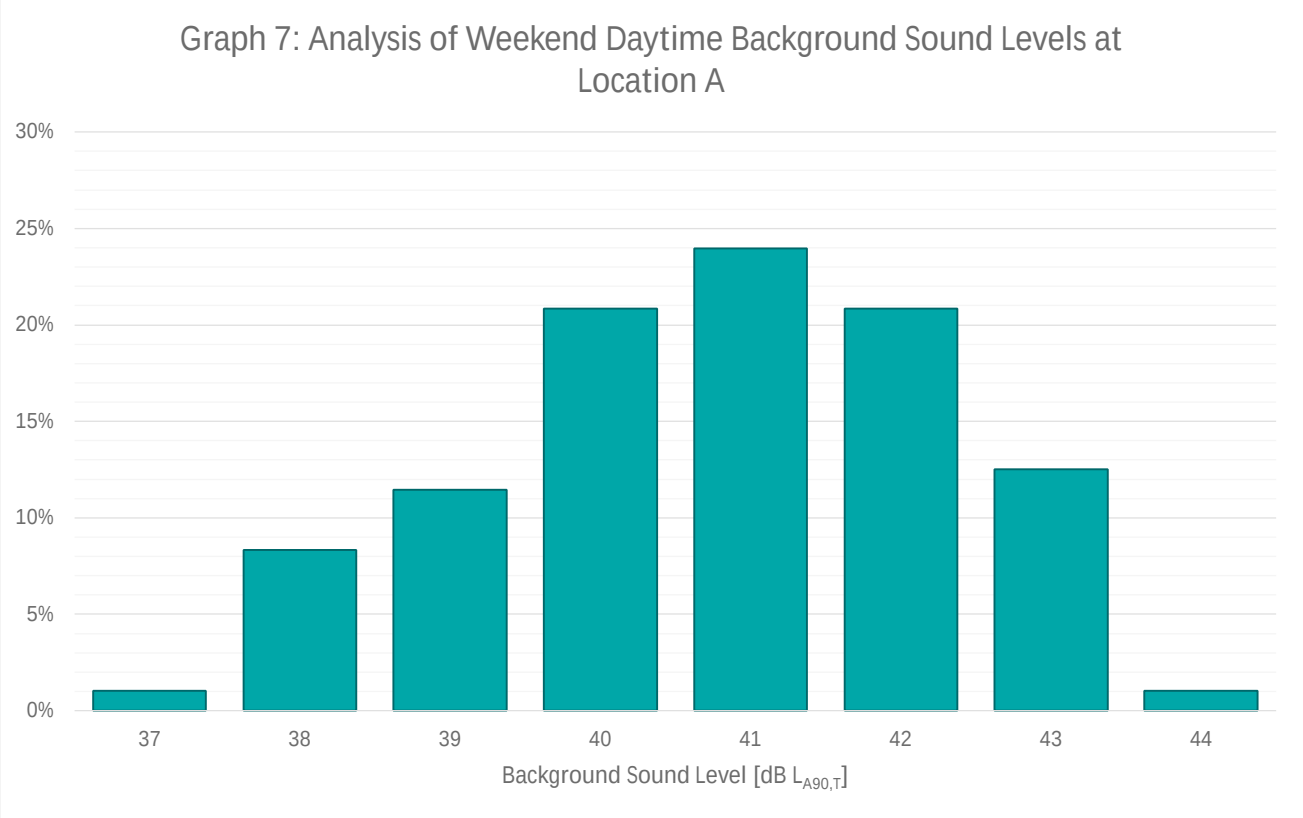
Graph 4, 5 and 6 show an analysis of the weekday daytime, evening and night-time background sound levels at Location A.



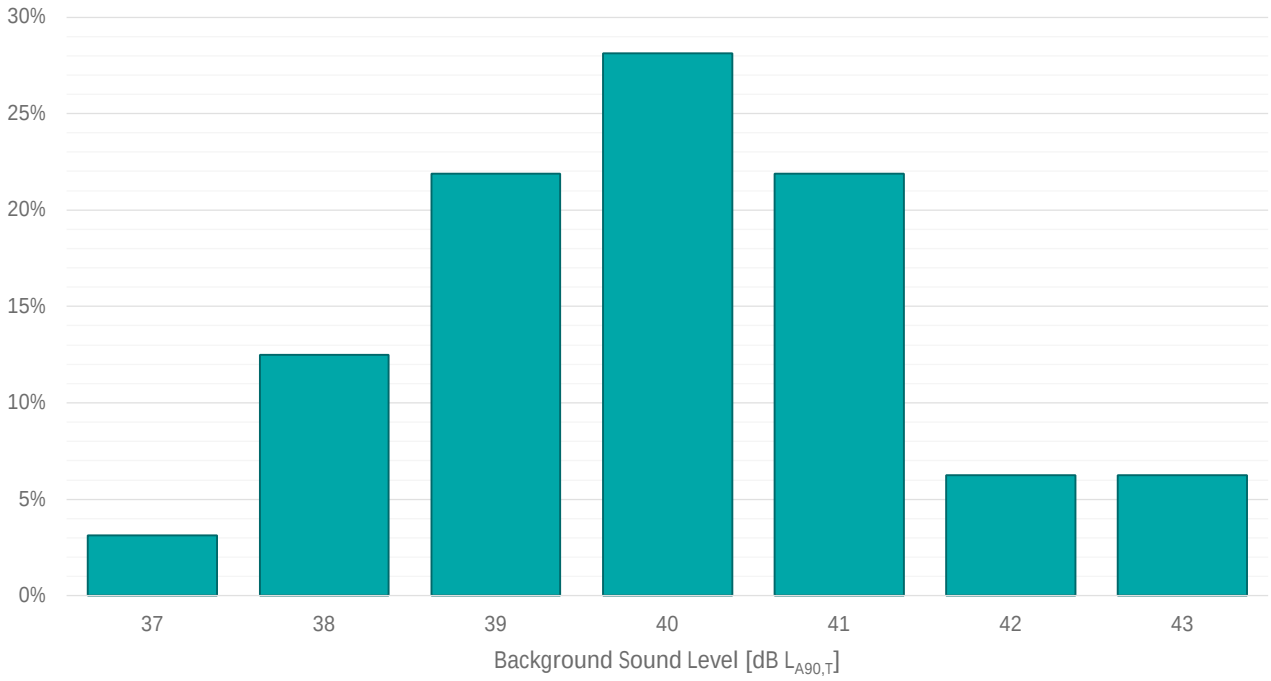




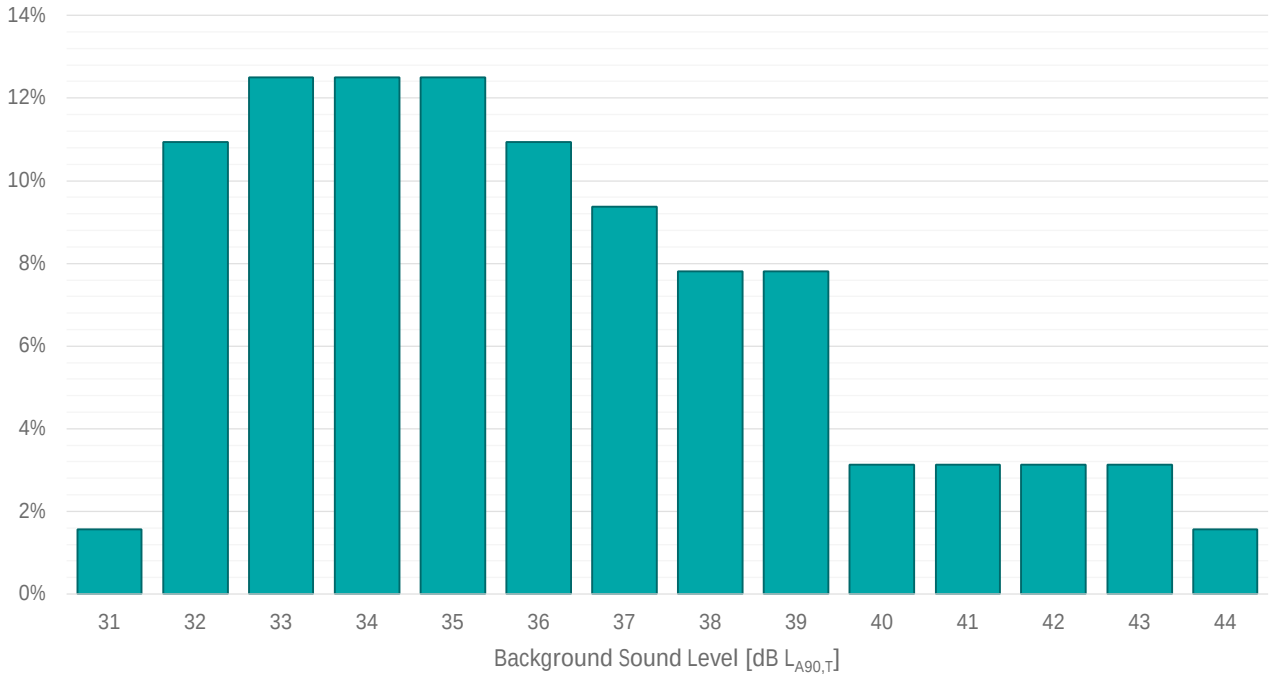
Graph 7, 8 and 9 show an analysis of the weekend daytime, evening and night-time background sound levels at Location A.



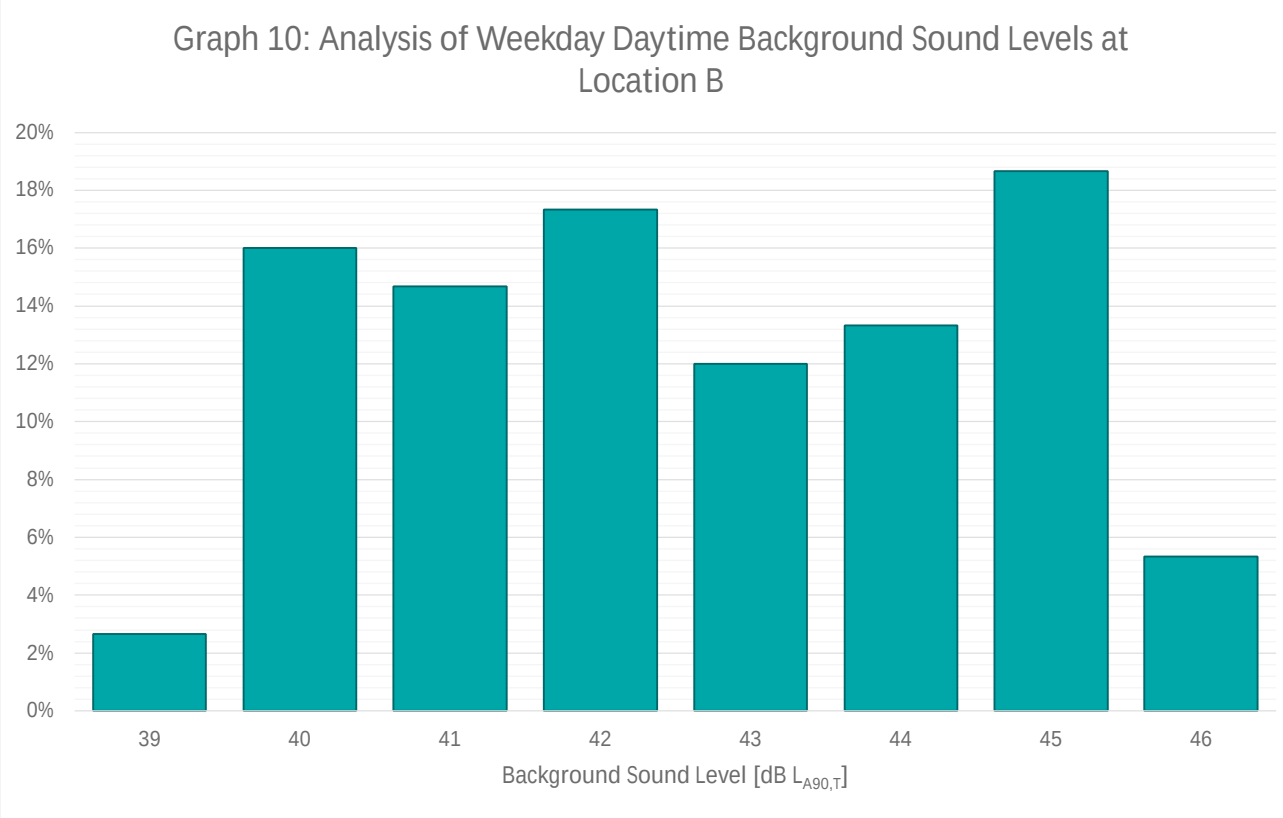
Graph 8: Analysis of Weekend Evening Background Sound Levels at Location A

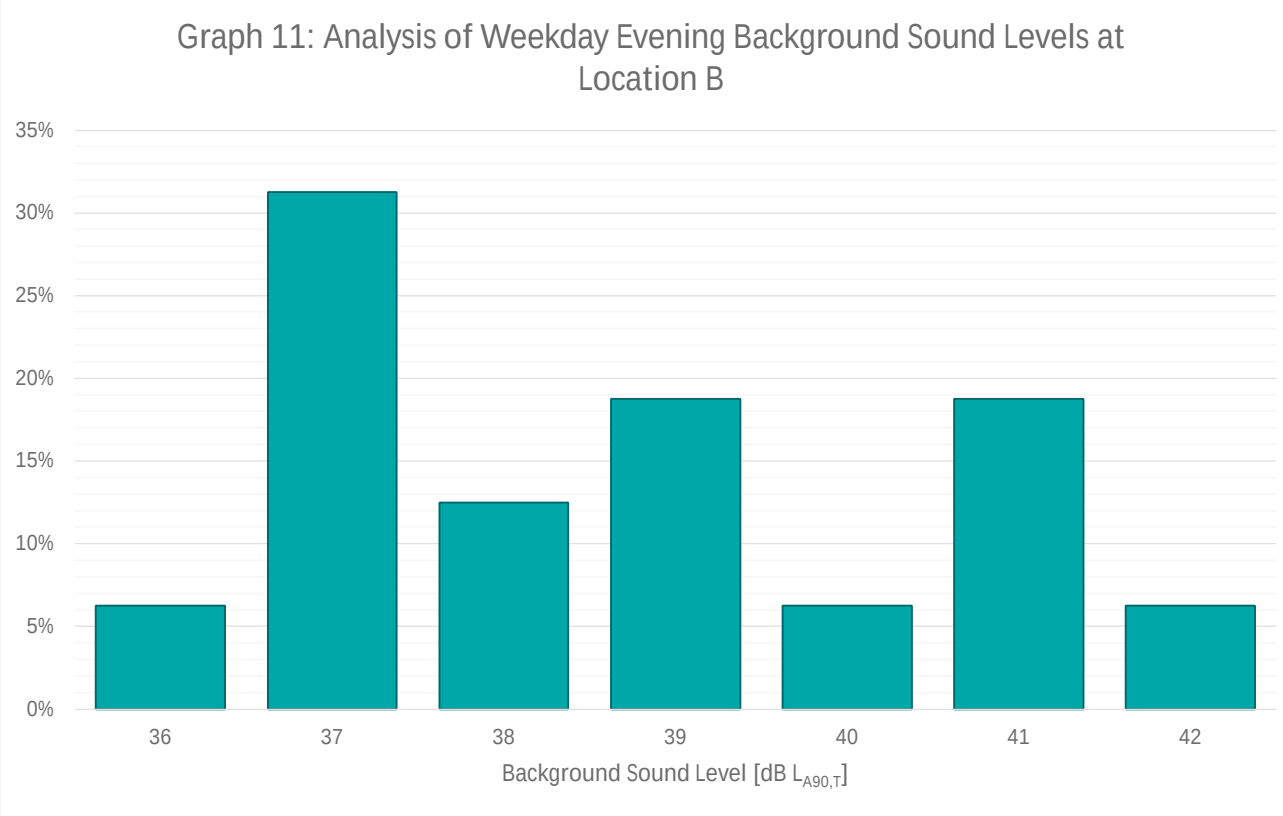


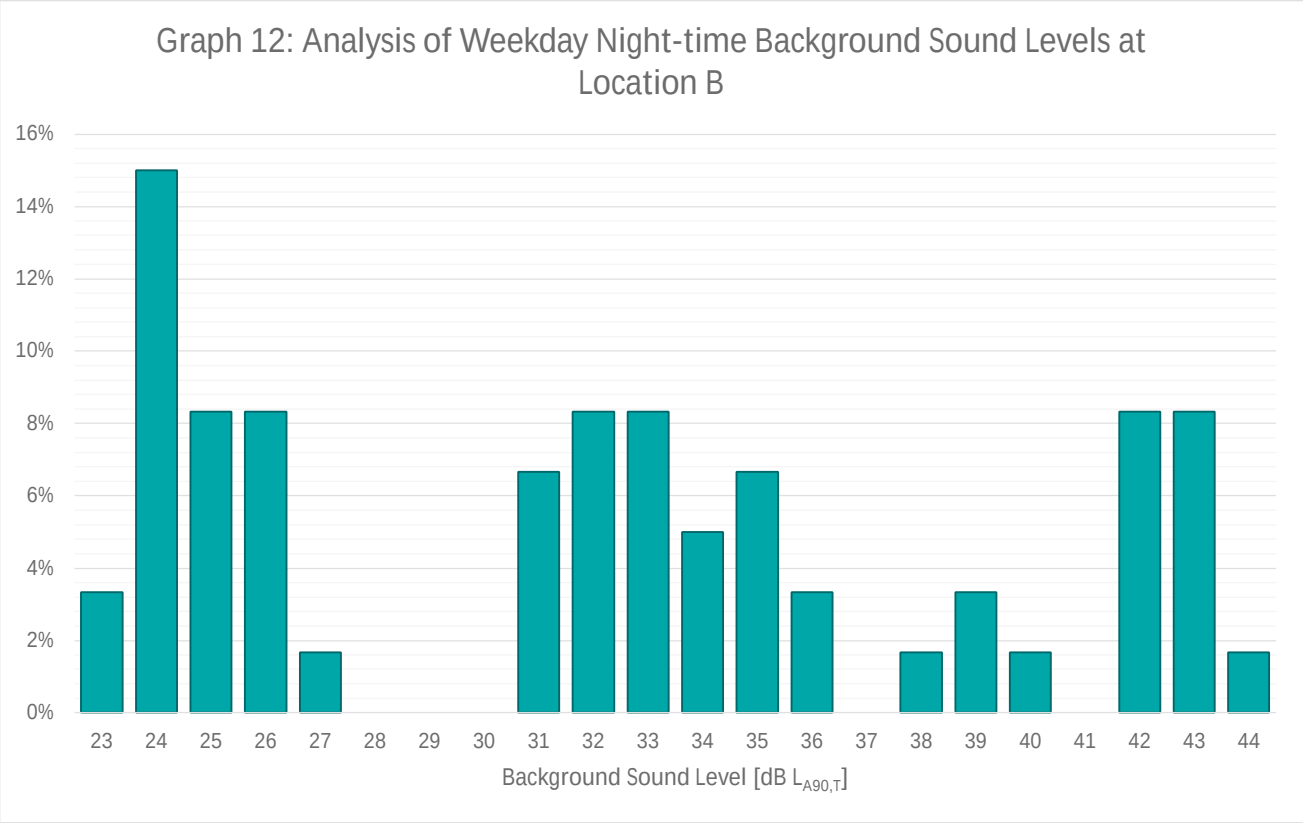
Graph 9: Analysis of Weekend Night-time Background Sound Levels at Location A



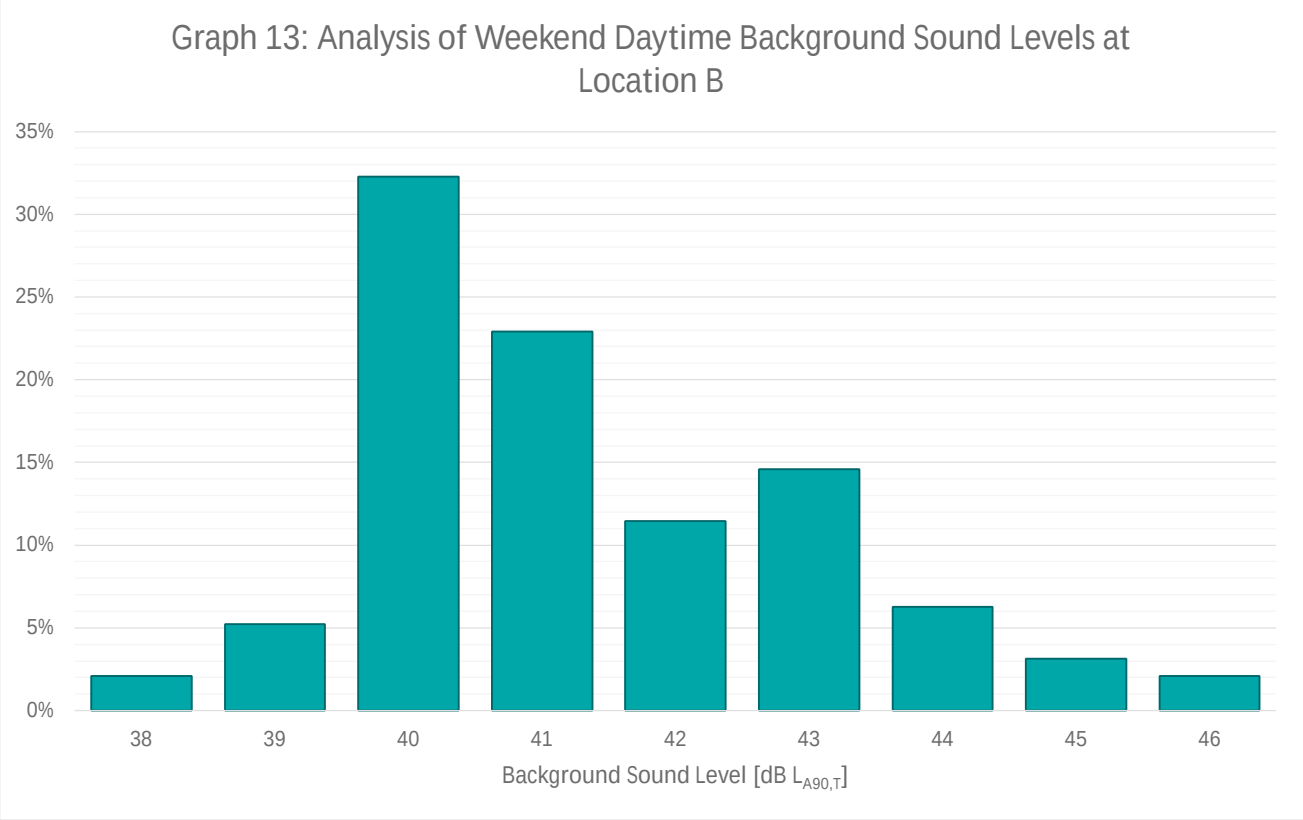
Graph 10, 11 and 12 show an analysis of the weekday daytime, evening and night-time background sound levels at Location B.



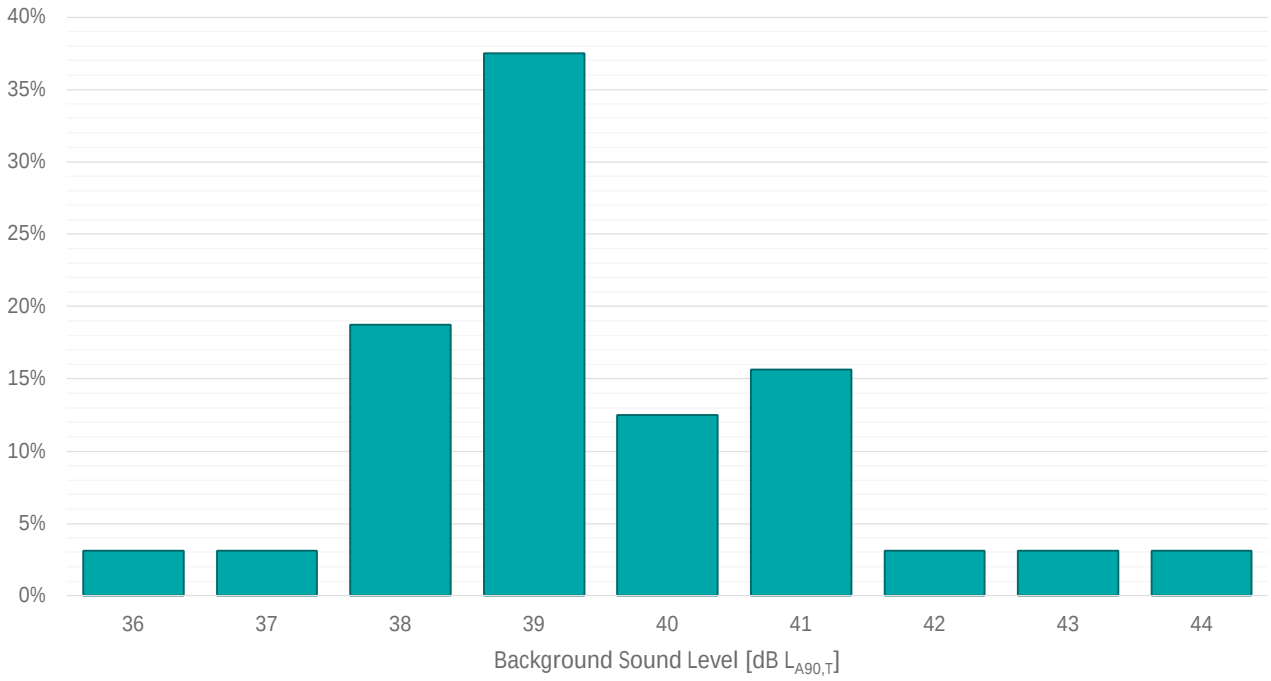




Graph 13, 14 and 15 show an analysis of the weekend daytime, evening and night-time background sound levels at Location B.



Graph 14: Analysis of Weekend Evening Background Sound Levels at Location B



Graph 15: Analysis of Weekend Night-time Background Sound Levels at Location B