



PREPARED: Friday, 10 September 2021

ProPG STAGE 1 RISK ASSESSMENT & BS4142 ASSESSMENT;
Burndell Road, Yapton

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LIST OF ATTACHMENTS

AS12213/SP1	Indicative Site Plan
AS12213/PROPG	ProPG Stage 1 Risk Assessment
AS12213/AVOG	AVOG Level 1 Risk Assessment
AS12213/TH1-TH15	Environmental Noise Time Histories

APPENDIX A	Acoustic Terminology
APPENDIX B	Acoustic Calculations

Project Ref:	AS12213	Title:	Burndell Road, Yapton
Report Ref:	AS12213.210910.RA	Title:	ProPG Stage 1 Risk Assessment & BS4142 Assessment
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Clarke Saunders Acoustics Winchester SO22 5BE		This report has been prepared in response to the instructions of our client. It is not intended for and should not be relied upon by any other party or for any other purpose.	

1.0 EXECUTIVE SUMMARY

- 1.1 Clarke Saunders Acoustics (CSA) has been commissioned by Driftstone Developments Limited, to undertake an assessment of the current environmental noise levels at the land west of Burndell Road, Yapton, BN18 0GB (the Site), to assess its suitability for residential development.
- 1.2 Noise will be assessed in accordance with the National Planning Policy Framework, ProPG: Planning and Noise¹ for new residential developments (ProPG) and with reference made to the relevant guidance set out in BS8233:2014 *Guidance on sound insulation and noise reduction for buildings* and the recently published guidance presented in the ANC *Acoustics Ventilation and Overheating Residential Design Guide, Jan 2020*² (AVOG).
- 1.3 A survey of the prevailing noise climate and subsequent risk assessment following the ProPG has shown there to be a negligible risk in terms of noise impact and a negligible risk in terms of overheating.
- 1.4 Commercial sound has also been assessed following procedures in BS4142:2014 +A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS4142:2014). The initial impact estimate indicates that there could be an adverse impact, depending on context at the worst affected plots. For the remainder of the development, as well as other developments to the north (i.e. Abbots Field), it is believed that these will benefit from self-screening / screening provided by the new development. Impact is therefore expected to be of less significance at these receptors.
- 1.5 It should be noted that there is existing residential development lying to the east directly adjacent to the Site which is likely already experiencing a higher level of impact than predicted at the most affected of the proposed dwellings. To CSA's knowledge, there are no outstanding noise complaints from these dwellings regarding the recycling facility, therefore any indication of risk can be further reduced.
- 1.6 This report also presents the results of the ProPG Stage 1 Risk Assessment and Level 1 AVOG Assessment which will be used to inform the suitability of the site for residential use.

2.0 SITE DESCRIPTION

- 2.1 The Site is undeveloped land west of Burndell Road directly behind Paynters Croft, a residential dwelling. The development is proposed to provide a total of 23 residential units. The Site is bounded by residential housing to the east, a commercial waste facility to the south, and various agricultural developments to the west and north as shown in the attached risk assessment summary sheet ASI2213/PROPG.

3.0 ENVIRONMENTAL NOISE SURVEY

- 3.1 A survey of the existing background noise levels was undertaken at the locations shown in the attached risk assessment summary sheet ASI2213/PROPG. Measurements of consecutive L_{Aeq} , L_{Amax} , L_{A10} , L_{A90} sound pressure levels were taken between 12:00 hours on Thursday 12 August and 12:00 hours on Tuesday 17 August 2021.

¹ <http://ioa.org.uk/publications/propg>

² <https://www.association-of-noise-consultants.co.uk/avo-guide/>

3.2 The following equipment was used during the survey:

- 1 no. Rion type NL52 sound level meter;
- 1 no. Nti type XL2 sound level meter;
- 1 no. Rion type NA28 sound level meter; and
- 1 no. Rion type NC74 sound level calibrator.

3.3 The calibration of the sound level meters was verified before and after use. No significant calibration drift was detected. All equipment has current laboratory calibration and certification is available upon request.

3.4 The weather during the five-day survey period was dry with occasional light winds, providing suitable conditions for environmental noise monitoring.

3.5 Measurements were made following procedures in BS7445:1991 (ISO:1996-2:1987) *Description and measurement of environmental noise Part 2 – Acquisition of data pertinent to land use* as well as procedures in BS4142:2014 +A1:2019 *Methods for rating and assessing industrial and commercial sound*. Please refer to Appendix A for details of the acoustic terminology used throughout this report.

4.0 RESULTS

4.1 Figures ASI2213/TH1-TH15 show the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories at the measurement positions. The underlying ambient sound climate is determined by road traffic from the local road network, commercial noise from the nearby TJ Waste Recycling Site, and noise from various agricultural plant in the surrounding farms.

4.2 The average noise levels at the monitoring positions for the daytime and night-time periods are shown in Table 1, along with the typical night-time maximum levels, defined as the 90th percentile of the night-time $L_{AF,max}$ dataset.

Measurement Position	Daytime average sound pressure level (07:00 – 23:00) $L_{Aeq,1hour}$	Night-time average sound pressure level (23:00 – 07:00) $L_{Aeq,1hour}$	Typical maximum sound pressure level $L_{AF,max,5min}$	NNE* maximum sound pressure level $L_{AF,max,5min}$
P1 (Southern Boundary)	48 dB	37 dB	58 dB	70 dB
P2 (Western Boundary)	47 dB	38 dB	58 dB	69 dB
P3 (Northern Boundary)	48 dB	37 dB	55 dB	76 dB

Table 1: Results of environmental noise survey

[dB ref. 20µPa]

*NNE: Not normally exceeded maximum sound pressure level

4.3 A Stage 1 Risk Assessment Summary for ProPG: Planning and Noise (ASI2213/PROPG) and AVOG Level 1 Site Risk Assessment Summary relating to overheating conditions (ASI1999/AVOG) are attached. In all cases, the results demonstrate a negligible risk of adverse impact. Regarding events of maximum noise levels, the documents state the following with respect to free-field noise levels:

- ProPG: "An indication that there may be more than 10 noise events at night (23:00-07:00) with $L_{Amax,F} > 60$ dB means the site should not be regarded as a negligible risk"; and
- AVOC: "Where 78 dB LAFmax is normally exceeded during the night-time period (23:00-07:00), a Level 2 assessment is recommended."

5.0 COMMERCIAL SOUND IMPACT ASSESSMENT

- 5.1 The Site is situated due north of a TJ Waste recycling facility, as well as east of agricultural use land. During the course of the survey, no agricultural processes associated with the adjacent farmland were observed.
- 5.2 However, with reference to paragraph 2.14 of the ProPG, measured commercial sound levels from the TJ Waste recycling facility could be dominant at the new site, potentially resulting in an adverse impact, at residences, subject to context.
- 5.3 As required by the ProPG therefore, sound impact from the TJ Waste recycling facility will be assessed following procedures in BS4142:2014.
- 5.4 British Standard BS4142:2014 is designed to allow contextual assessment of impact from commercial, or industrial sound on sensitive receptors. Examples of sources covered by the Standard include:
 - Sound from industrial and manufacturing processes;
 - Sound from fixed installations which comprise mechanical and electrical plant and equipment;
 - Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and
 - Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from a premises or processes.

5.5 The standard is therefore suited to this assessment

5.6 This standard compares the Specific Sound Level, L_{Aeq} , with the existing Background Sound Level in terms of an L_{A90} measured when the sound source is not operating.

5.7 The Specific Sound Level can be determined by various means, depending upon the relative level, of the otherwise-occurring sound, i.e. the Residual Sound Level.

5.8 As part of the assessment, consideration is given to the character of the sound. The Standard provides the following advice:

Tonality

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

Impulsivity

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

Other sound characteristics

Where the specific sound contains characteristics that are neither tonal nor impulsive, but are otherwise startling, disturbing or incongruous with the residual acoustic environment, a penalty of +3 dB can be applied.

Intermittency

When the specific sound has identifiable on/off conditions, if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.

5.9 The resultant Background Sound Level is subtracted from the Rating Level to obtain an initial estimate of the impact.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB could be an indication of an adverse impact, depending on the context.
- The lower the Rating Level is relative to the measured Background Sound Level, the less likely it is that there will be an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context.

5.10 The initial estimate of the impact may then be modified by taking consideration of the context in which the sound occurs.

5.11 Initial Estimate of Sound Impact

- 5.11.1 Attended measurements at the southern site boundary have been collected to characterise specific processes believed to originate from the recycling facility. These activities include banging onto metal (likely impact onto metal tips), waste lorry offloading and white noise, as well as beeping reversing alarms.
- 5.11.2 The most affected receptors have been identified as the rear garden of Plot E4B7P. As required by the Standard, sound emissions to the garden area have been assessed at 3.5 metres from the rear ground floor façade.
- 5.11.3 A 2.5 metre tall continuous imperforate barrier is proposed to enclose the southern and eastern boundary of the Site as shown on indicative site plan ASI2213/SP1. To predict the insertion loss provided by the barrier, the location of each of the processes must be taken

into account, relative to the receptors at the Site. However, due to a large hedge separating the waste facility and the Site as well as access arrangements, the exact location of these processes in the TJ Waste site could not be determined. Two scenarios have therefore been assessed for each specific process, placing each process at the nearest likely / practicable location and at the farthest likely / practicable location within the TJ Waste site to account for each possibility scenario. These assumed locations are presented in the attached indicative site plan ASI2213/SP1.

5.11.4 Detailed calculations are shown in Appendix B.

BS4142:2014+A1:2019 Initial Estimate of Sound Impact: Summary			Comments
	Source at 50m from Assessment Location	Source at 160m from Assessment Location	
Specific Sound Level	47 dB		
Predicted Insertion Loss of Proposed Barrier	-9 dB	-8 dB	Barrier performance generally benefits from source and receiver positions being nearer to the barrier
Predicted Specific Sound Level	38 dB	39 dB	Measured level corrected for insertion loss of proposed barrier
Total Acoustic Character Corrections	+9 dB	+9 dB	+6 dB correction for clearly perceptible impulse; +3 dB correction for intermittency
Rating Level	47 dB	48 dB	
Background Sound Level (L _{A90})	44 dB		Derived from taking the modal value of all L _{A90} measurement during working hours (08:00 – 17:00)
Assessment Level	+3 dB	+4 dB	Assessment could indicate adverse impact depending on context

Table 2: BS4142 Assessment Estimate Summary

5.12 Context

5.12.1 BS4142 is primarily a context-based assessment method, which recognises the importance of the environment and circumstances in which the specific sound occurs.

5.12.2 The above summary assessment could indicate adverse impact from the TJ Waste recycling facility, depending on the context.

5.12.3 It should be noted that the specific sound levels cited above are predicted for the most affected gardens, along the southern boundary of the Site. The screening provided by the proposed dwellings is expected to provide a progressive reduction in the Specific Sound Level in amenity spaces further north.

5.12.4 Impact is further contextualised by comparing the predicted noise impact of the recycling facility on the new dwellings with the impact on the existing dwellings immediately adjacent to the eastern boundary of the site, Paynters Croft. The specific noise level is similar at both, however with the proposed barrier implemented, the impact on the proposed is likely to be less than that already experienced at the existing

community nearby. The proposed development may provide the added benefit of significantly reducing the impact of recycling noise on the existing or currently under-construction residential dwellings surrounding the development site. To CSA's knowledge, there are no outstanding noise complaints from these dwellings regarding the recycling facility, therefore any indication of risk can be further reduced.

- 5.12.5 Further mitigation measures such as the implementation of increased boundary fence heights could further reduce noise levels at the assessment location, however this could incur further planning issues, as well as impacting aesthetics and light. It is worth bearing in mind that the site is already host to the rear garden of a residential property, suggesting that an acceptable level of external amenity is already enjoyed in this area.

5.13 Uncertainty

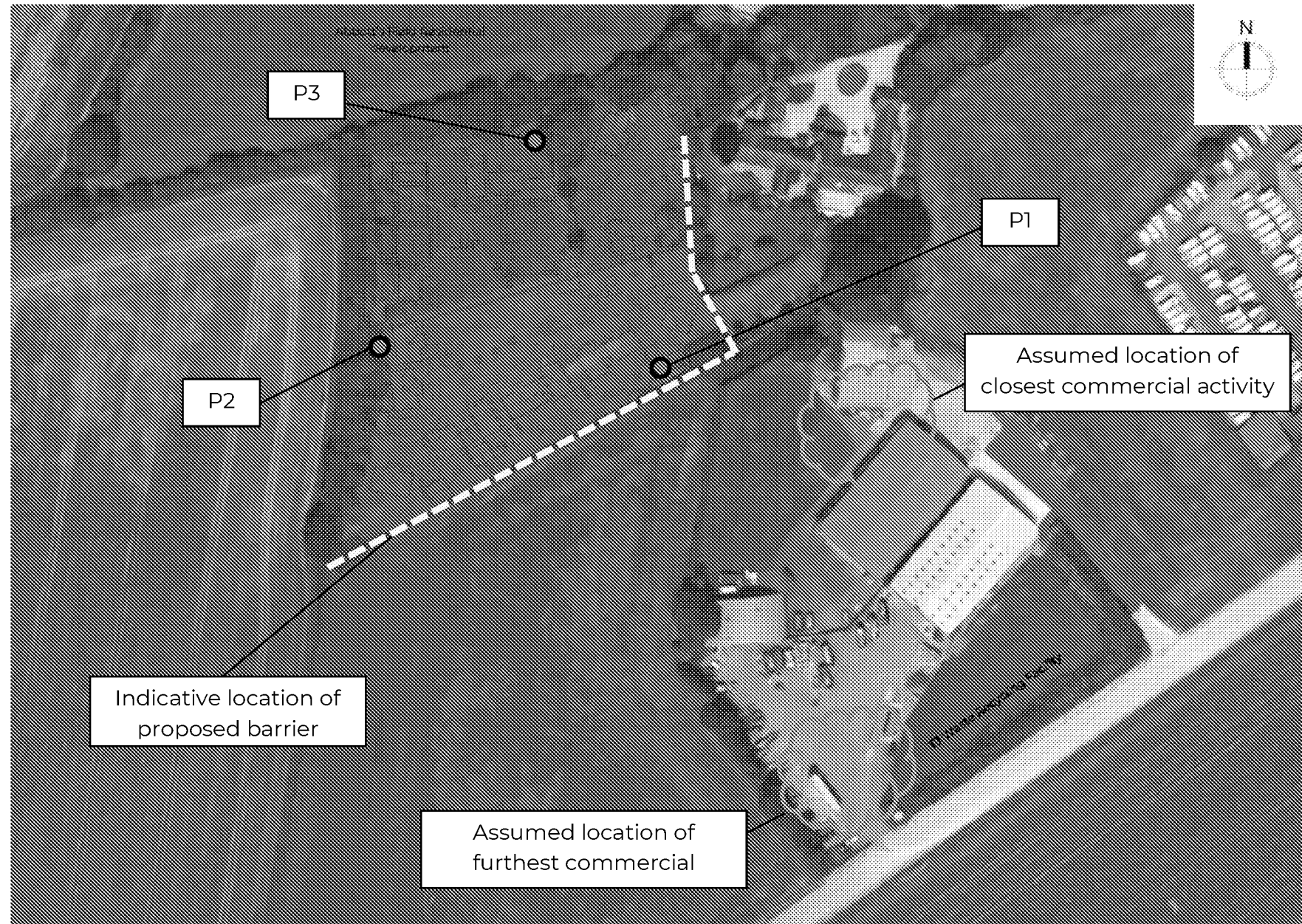
- 5.13.1 As per the requirements of BS4142:2014, the uncertainty in the assessment is considered and reported. This is not an indication of error but an acknowledgement of possible variability of the factors contributing to the assessment.
- 5.13.2 Use of calibrated type 1 sound level meters is considered to reduce measurement instrument error to insignificant levels as compared with environmental variations.
- 5.13.3 Measurements were taken at the assessment position, however the proposed 3-metre-high fence has not yet been installed. A correction for the screening provided by the boundary fence has been allowed in the calculations.
- 5.13.4 Location of the specific noise sources could not be determined to fully inform barrier calculations. Parallel assessment of what is assumed to be the closest and furthest practicable locations of the processes have demonstrated little variation in the predicted performance of the barrier, regardless of location of the sources.

6.0 CONCLUSION

- 6.1 The ProPG Stage 1 Risk Assessment and AVOG Level 1 Assessment has identified the development site as negligible risk in terms of noise impact and negligible to low risk in terms of overheating. A Stage 2 Risk Assessment for ProPG as well as a Level 2 AVOG Assessment is therefore not required. However, noise associated with the TJ Waste recycling facility adjacent to the site, has been identified as a constraint on site due to the impulsive and intermittent characters of the various processes used. This industrial / commercial source is not covered under the scope of ProPG, and therefore an assessment following procedures in BS4142:2014 has been adopted as the relevant methodology.
- 6.2 The initial commercial noise impact assessment of the recycling facility indicates that there could be an adverse impact, depending on context at the worst affected plots. Contextually, the screening provided by the noise barrier and built form of the proposed development controls recycling noise such that its impact on the proposed external amenity areas is lower than that in existing external amenity areas of the residential dwellings adjacent to the eastern boundary of the site.



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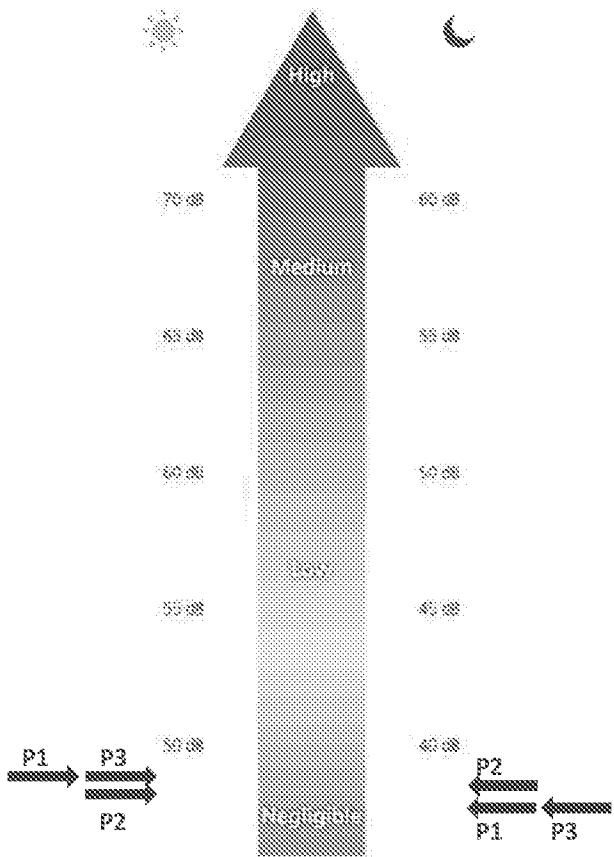


ProPG: Planning & Noise – Stage 1 Risk Assessment Summary



Project:	Burndell Road, Yapton
Figure:	AS12213/PROPG
Date:	20 August 2021

Daytime:	P1: 48 dB $L_{Aeq,16hour}$ P2: 47 dB $L_{Aeq,16hour}$ P3: 48 dB $L_{Aeq,16hour}$
Night-time:	P1: 37 dB $L_{Aeq,8hour}$; 58 dB $L_{AFmax,5min}$ P2: 38 dB $L_{Aeq,8hour}$; 58 dB $L_{AFmax,5min}$ P3: 37 dB $L_{Aeq,8hour}$; 55 dB $L_{AFmax,5min}$



Executive Summary

A survey of the existing noise climate was undertaken at the monitoring positions between Thursday 12 August and Tuesday 17 August 2021.

Noise levels are considered to represent a negligible risk in terms of impact.

AVOG – Level 1 Site Risk Assessment for Overheating Condition Summary

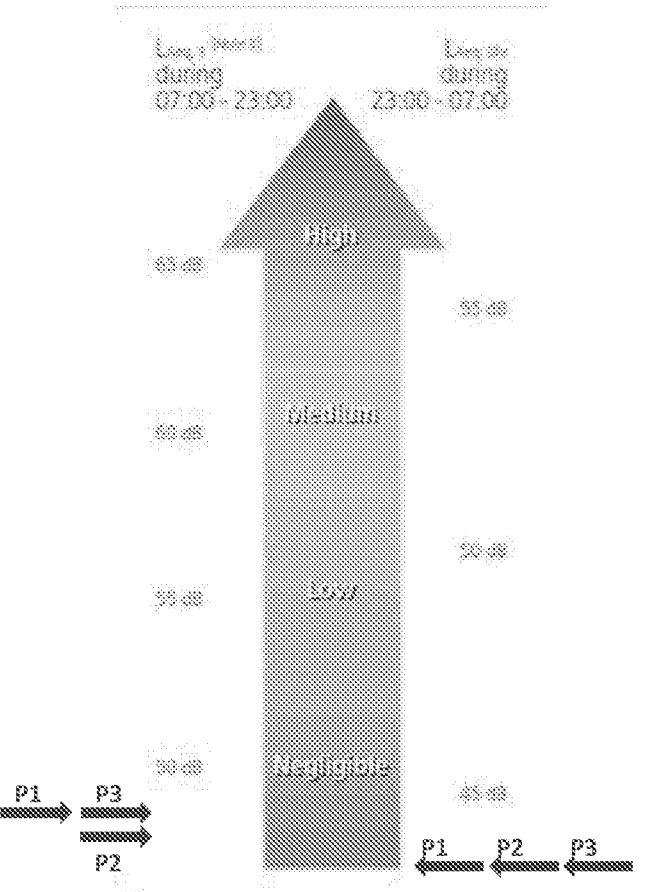


Project: Burndell Road, Yapton

Figure: AS12213/AVOG

Date: 20 August 2021

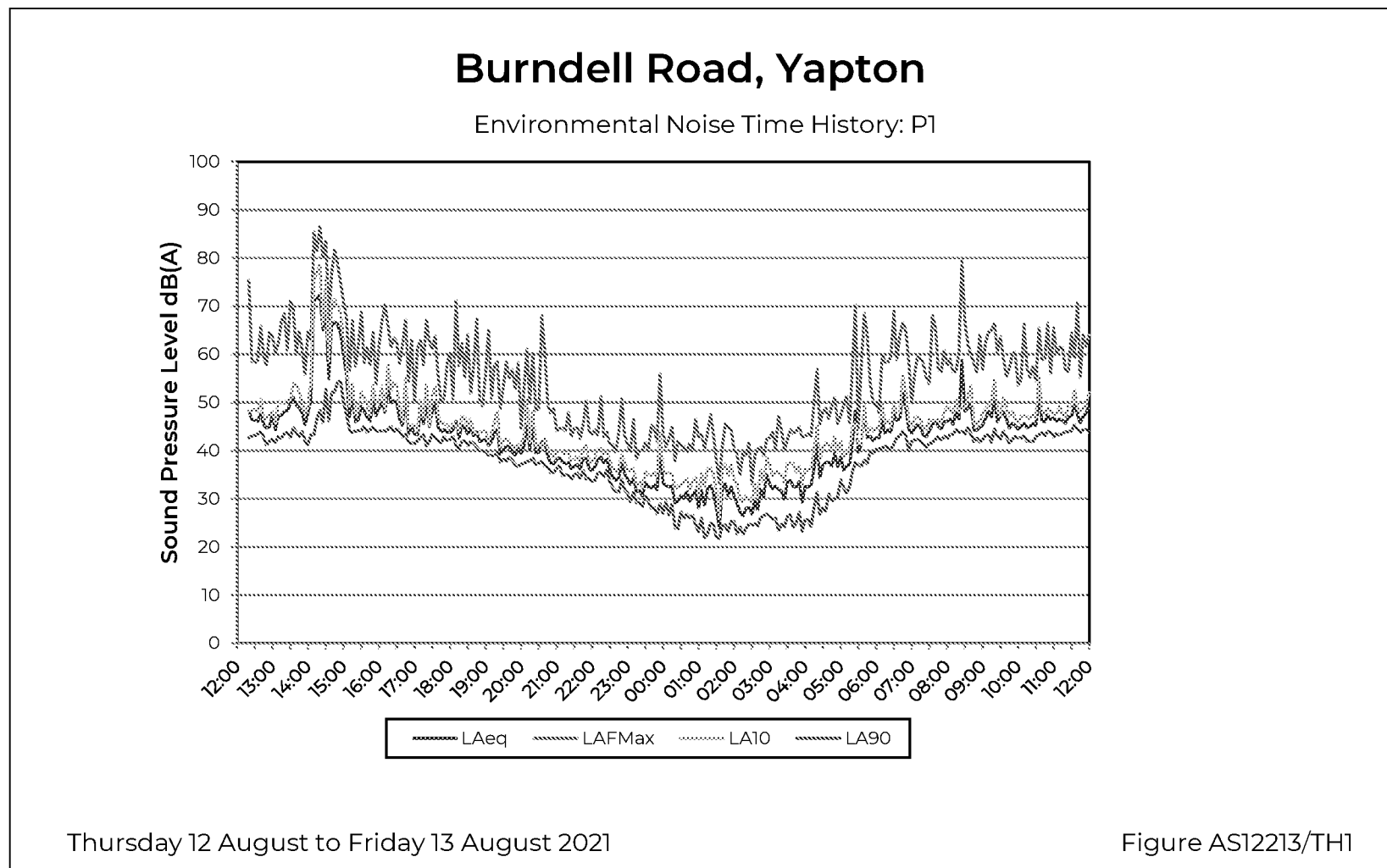
Daytime:	P1: 48 dB $L_{Aeq,16hour}$ P2: 47 dB $L_{Aeq,16hour}$ P3: 48 dB $L_{Aeq,16hour}$
Night-time:	P1: 37 dB $L_{Aeq,8hour}$; 70 dB $L_{AFmax,5min}$ P2: 38 dB $L_{Aeq,8hour}$; 69 dB $L_{AFmax,5min}$ P3: 37 dB $L_{Aeq,8hour}$; 76 dB $L_{AFmax,5min}$

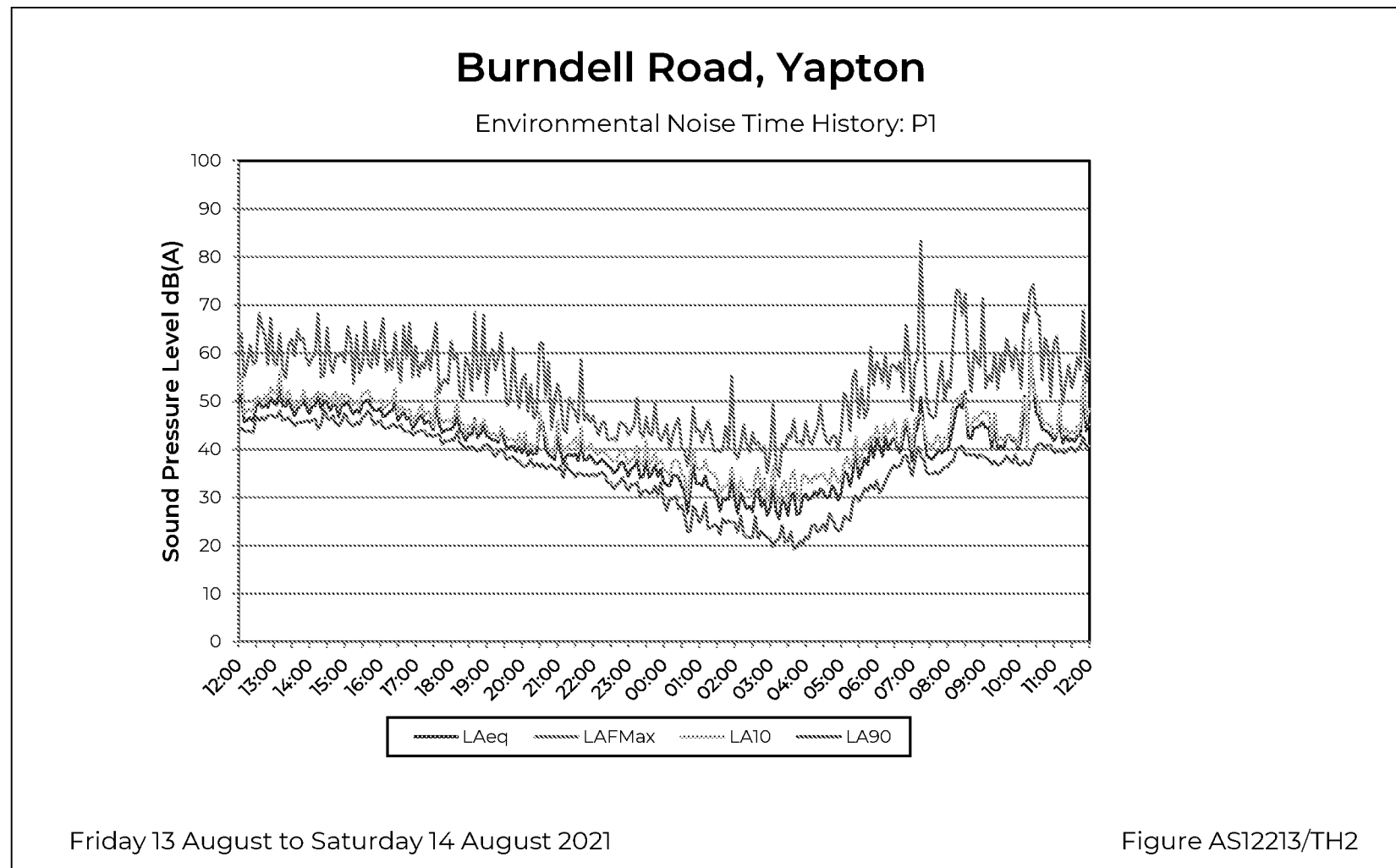


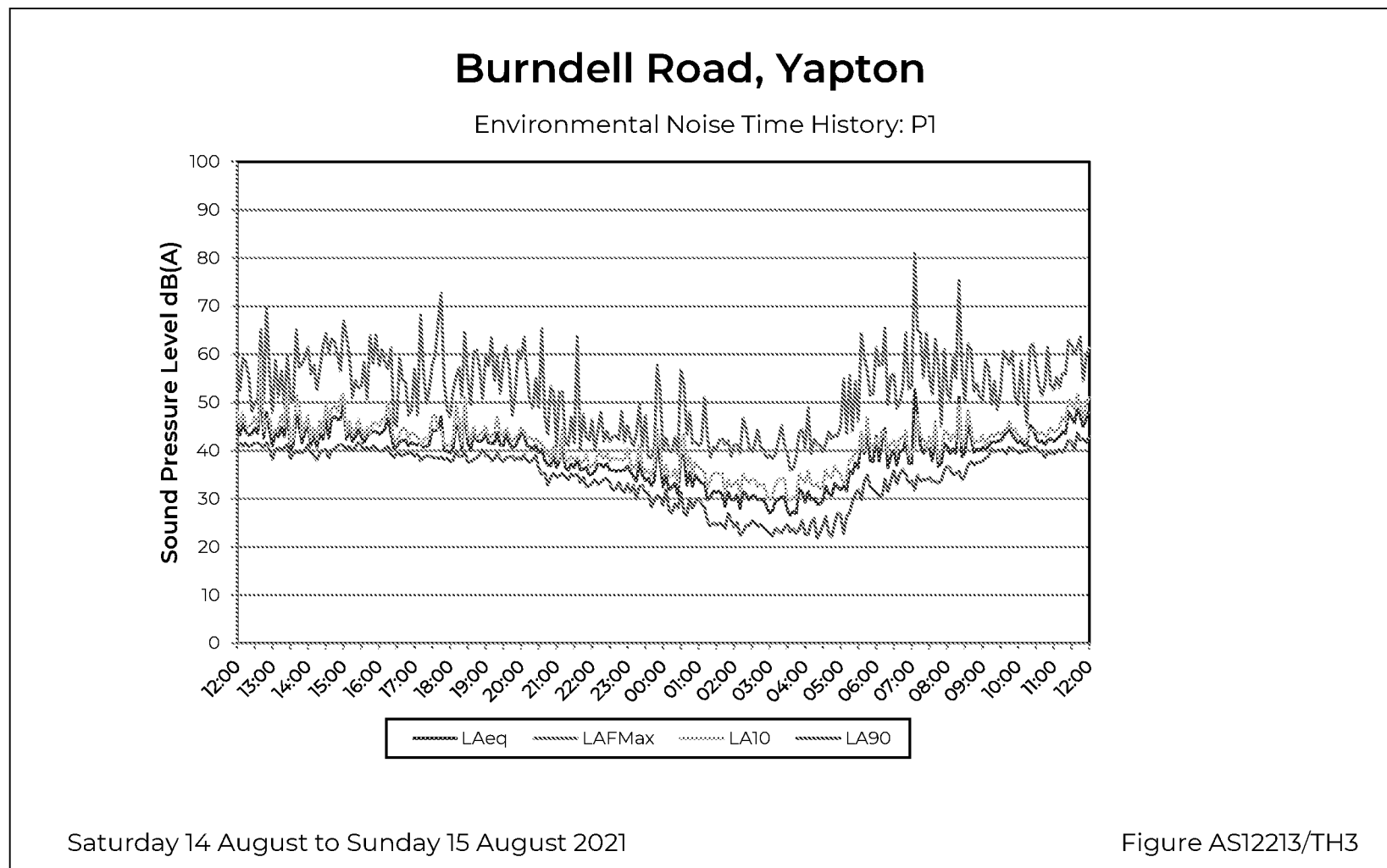
Executive Summary

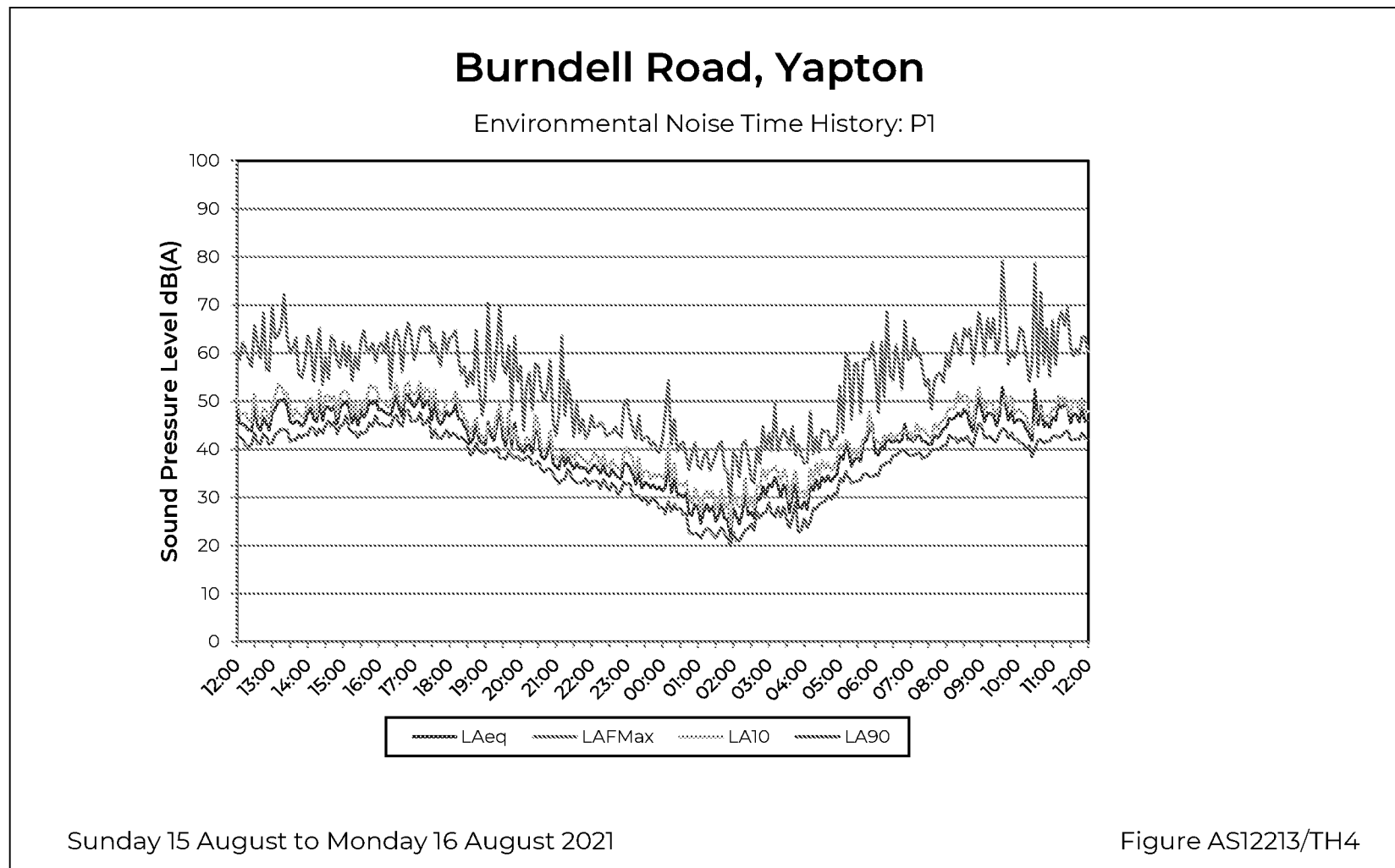
A survey of the existing noise climate was undertaken at the monitoring positions between Thursday 12 August and Tuesday 17 August 2021.

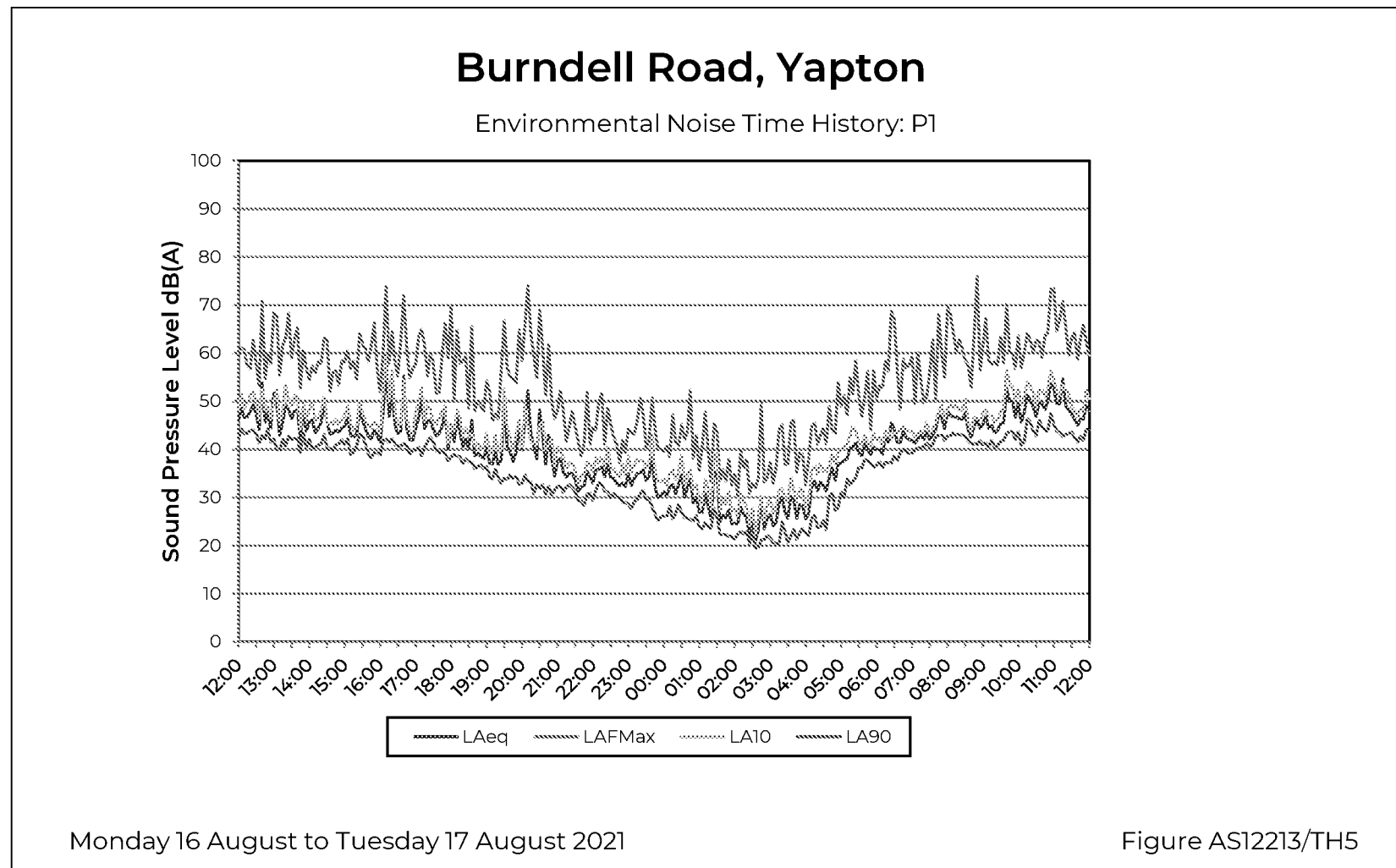
Noise levels are considered to represent a negligible risk of adverse effect in respect of overheating without mitigation.

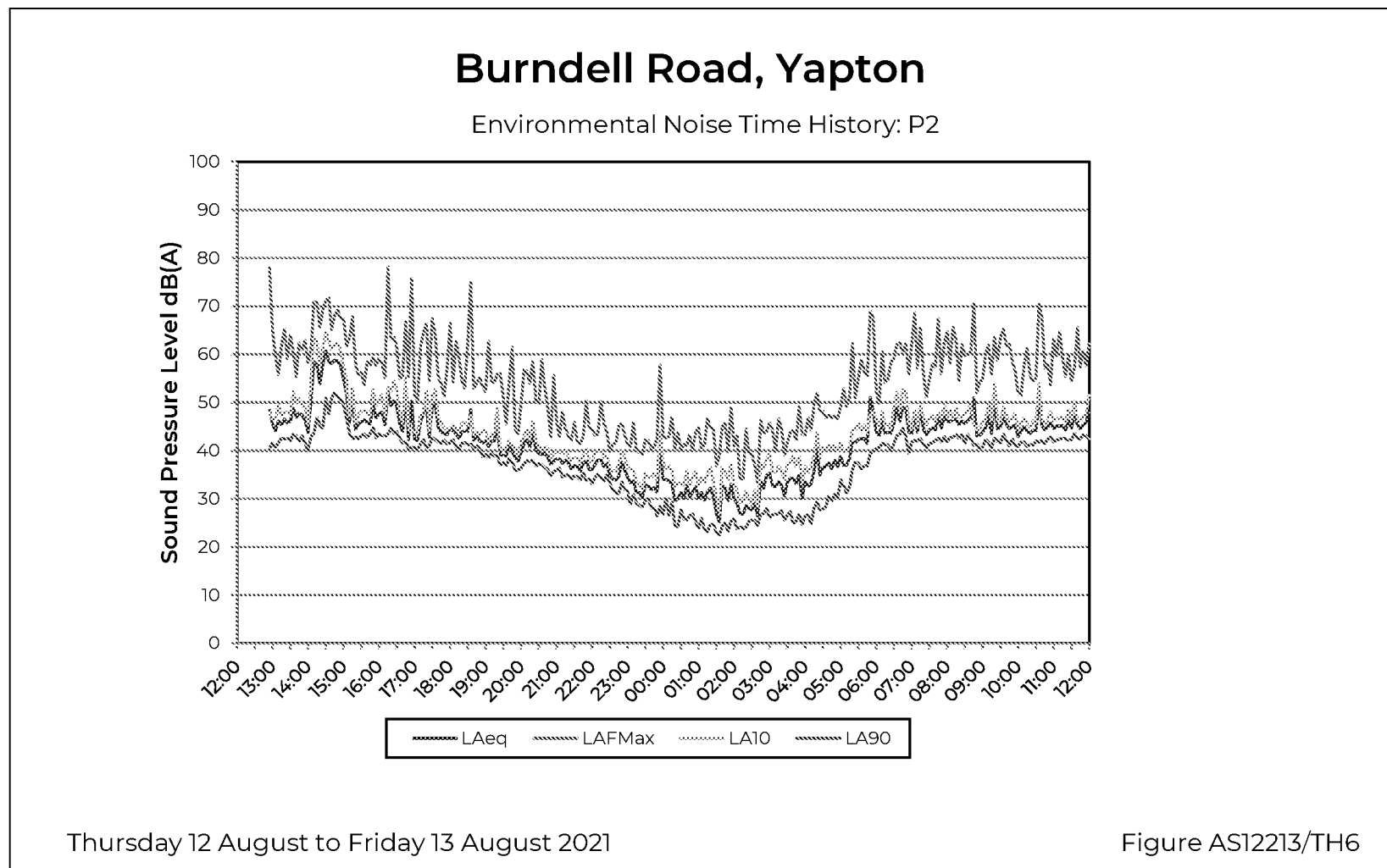


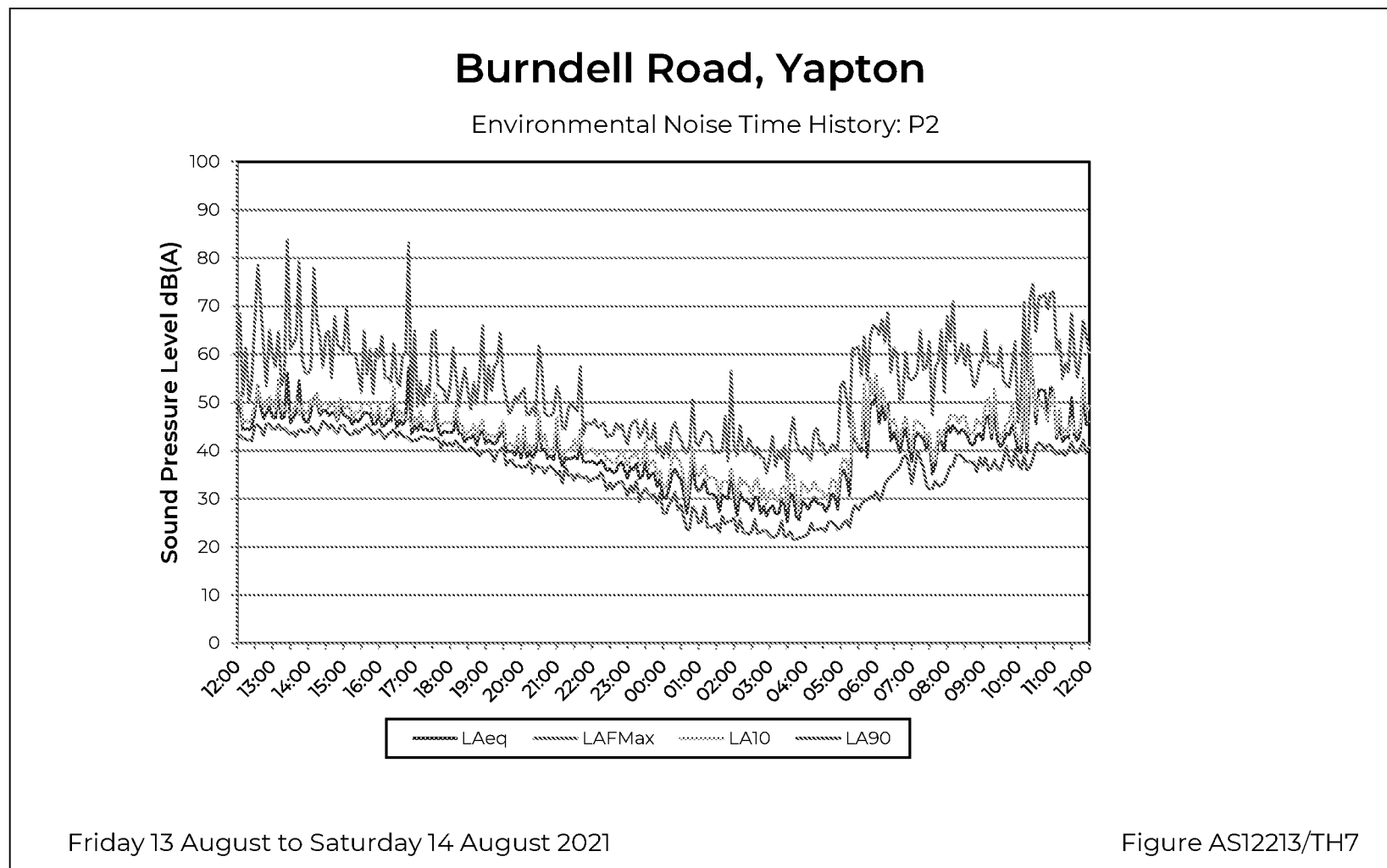


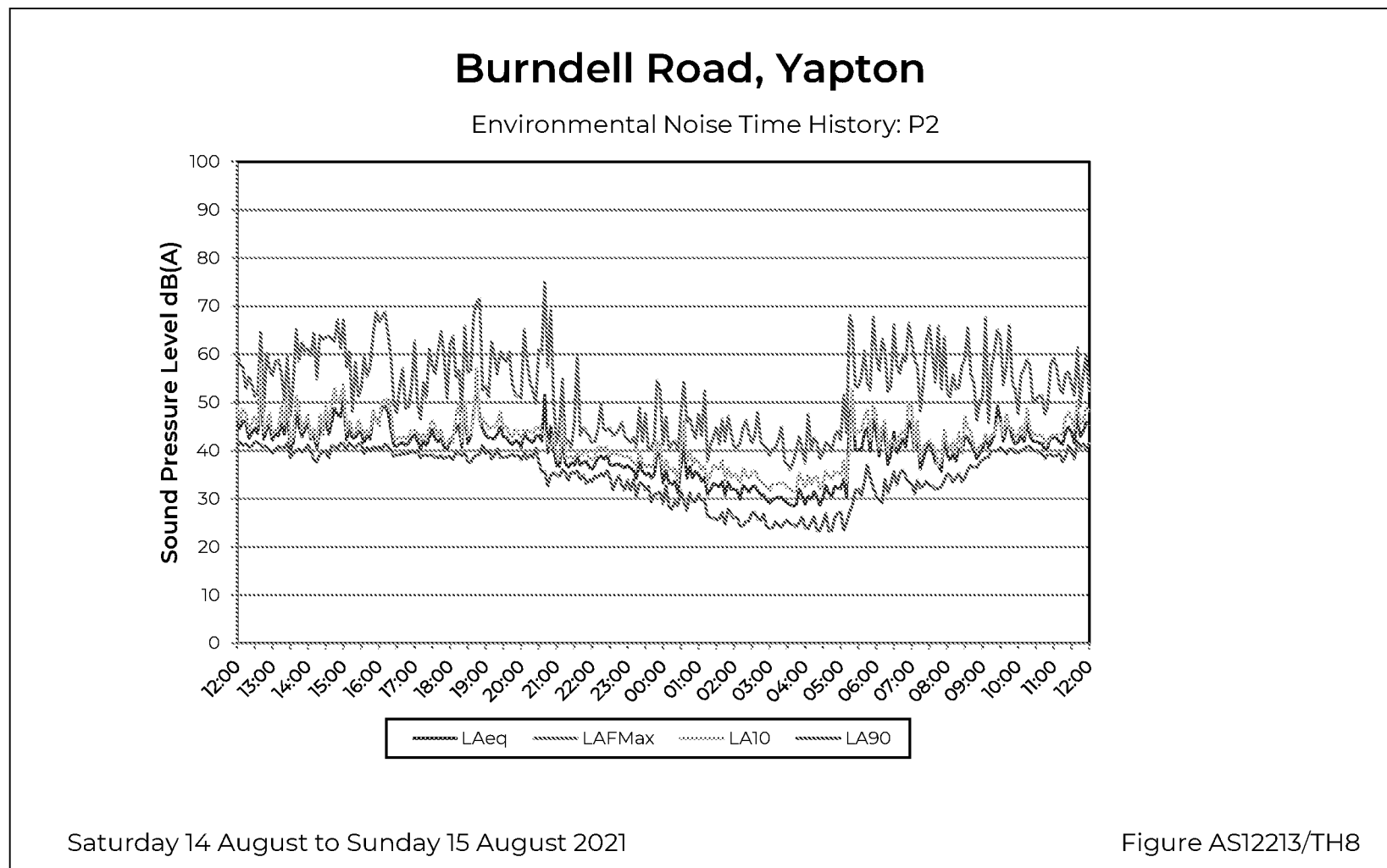


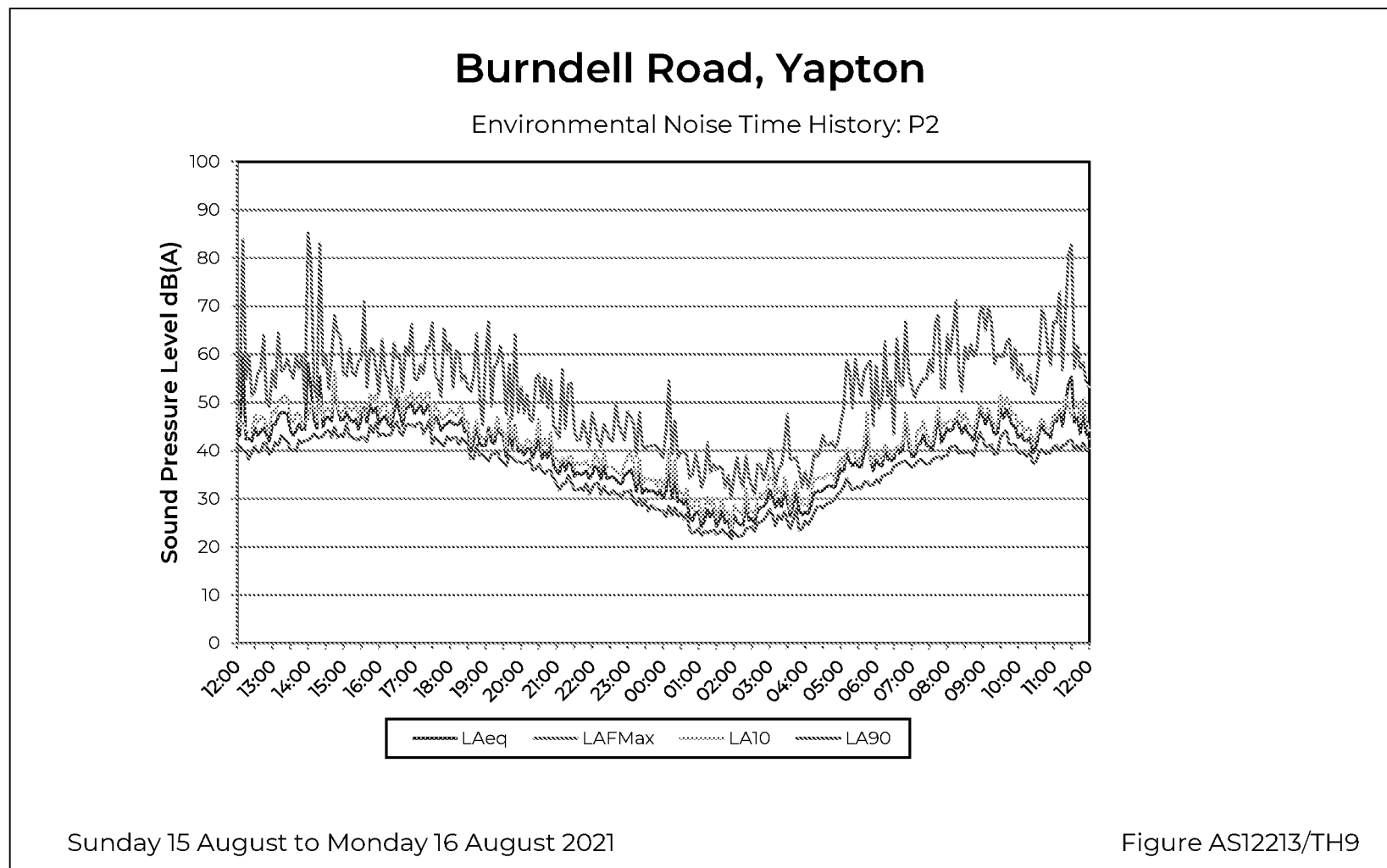


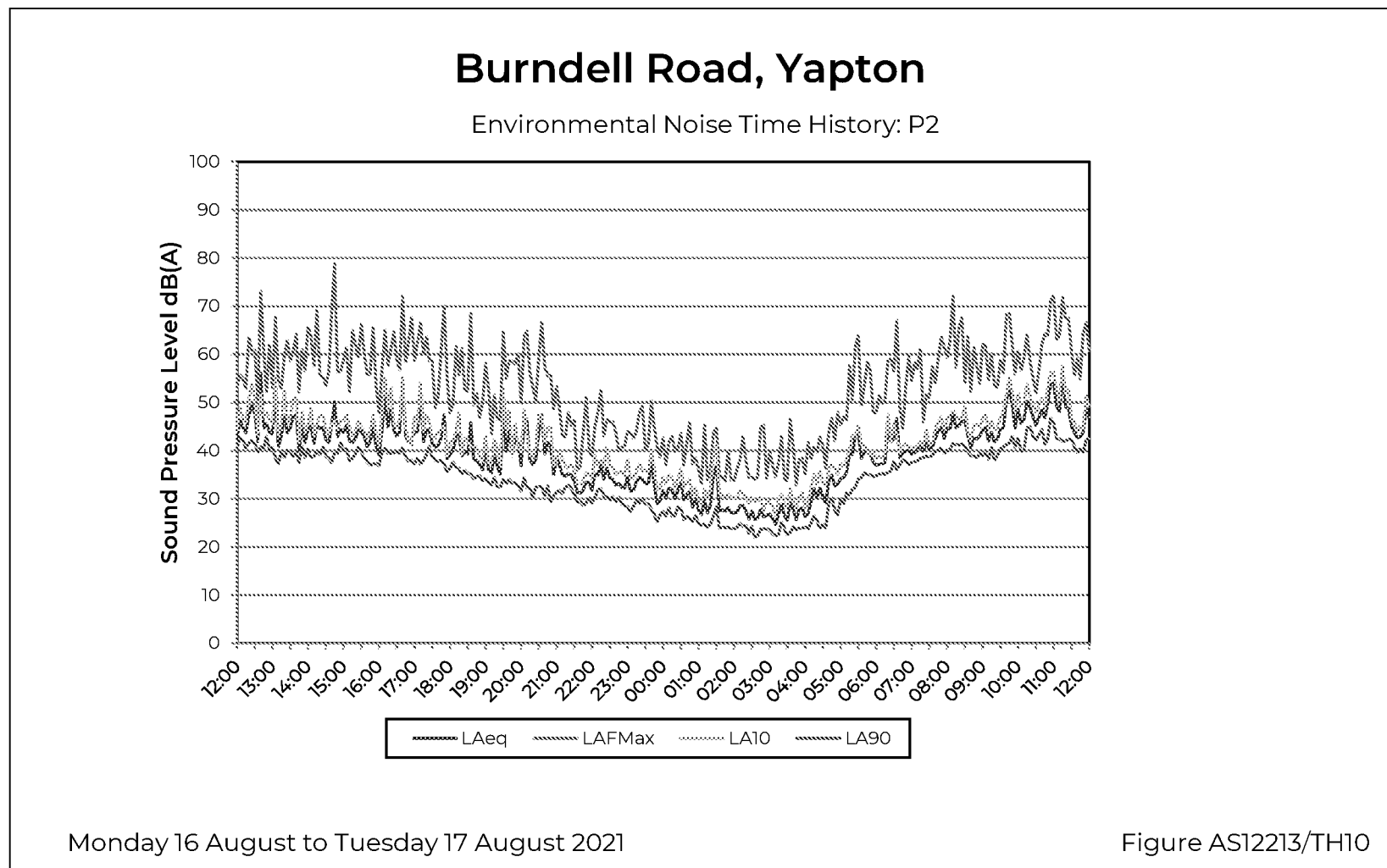


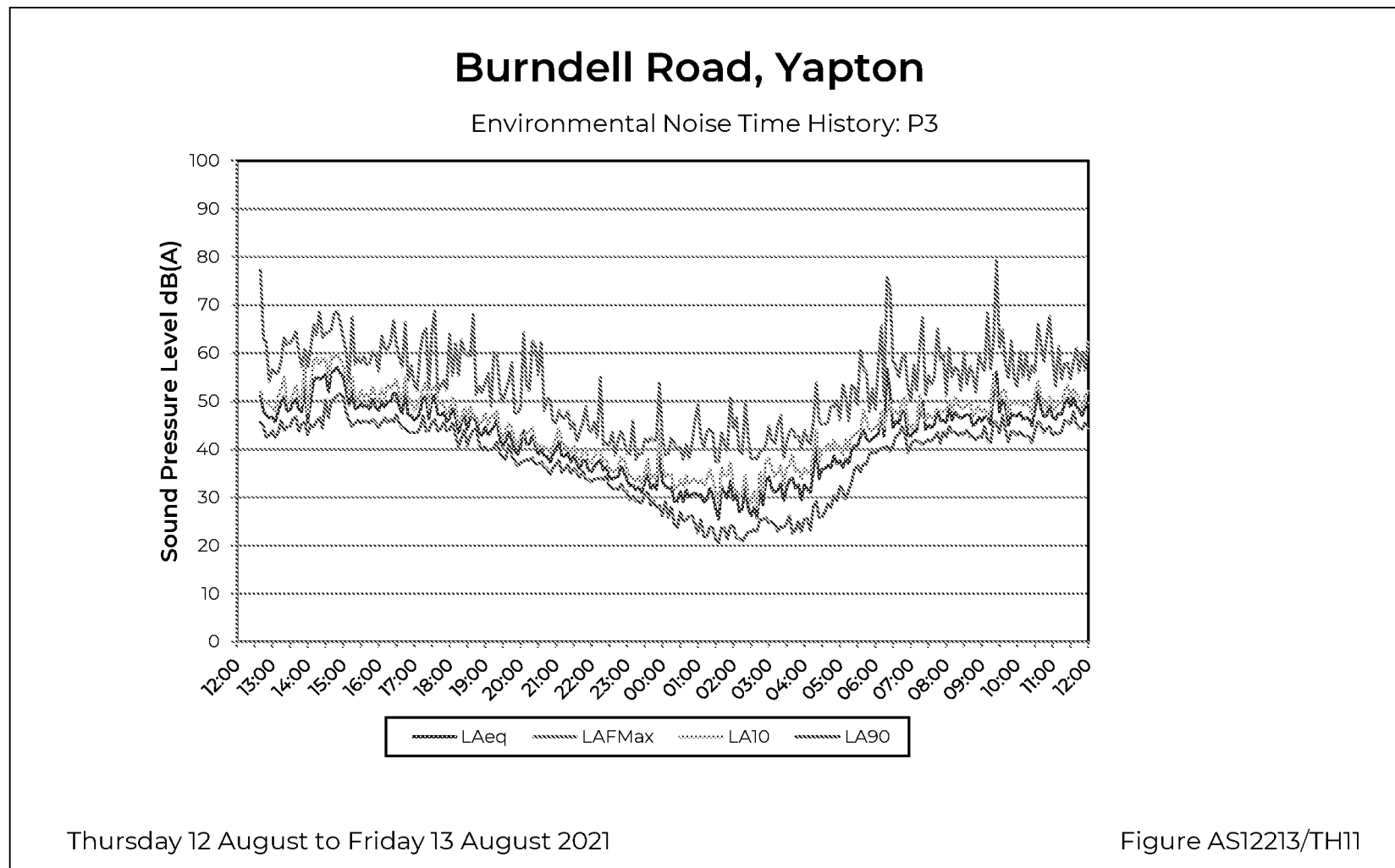


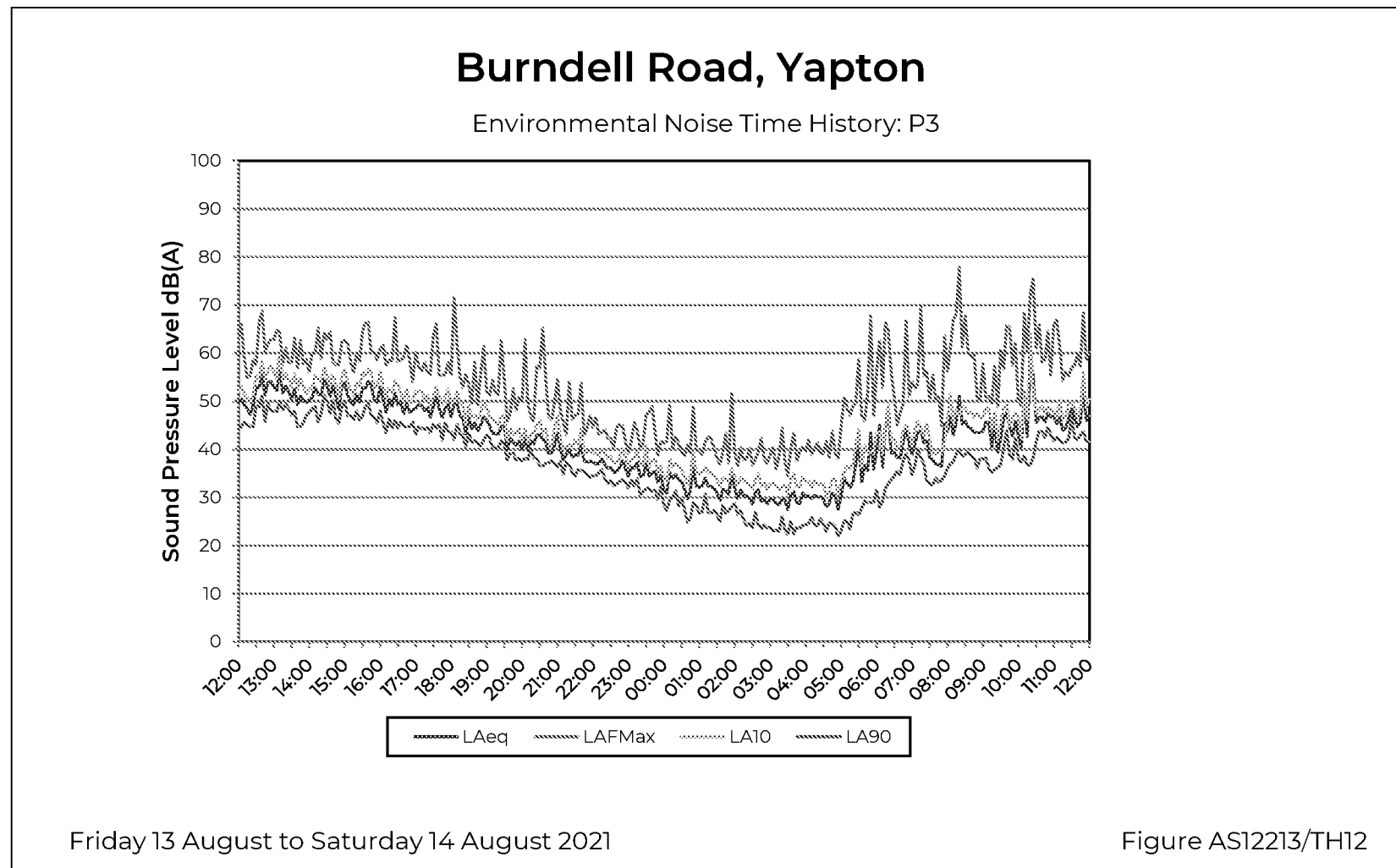


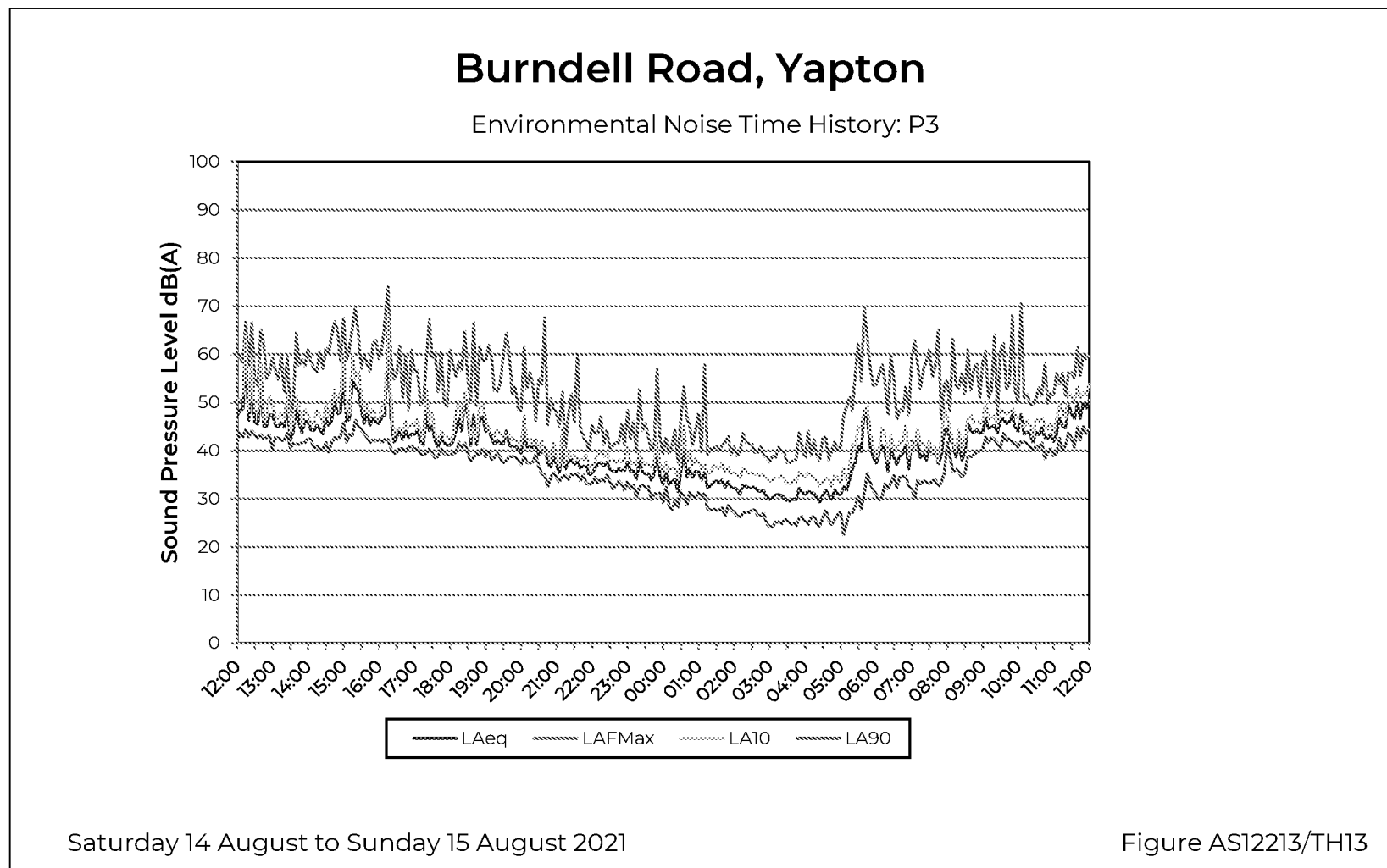


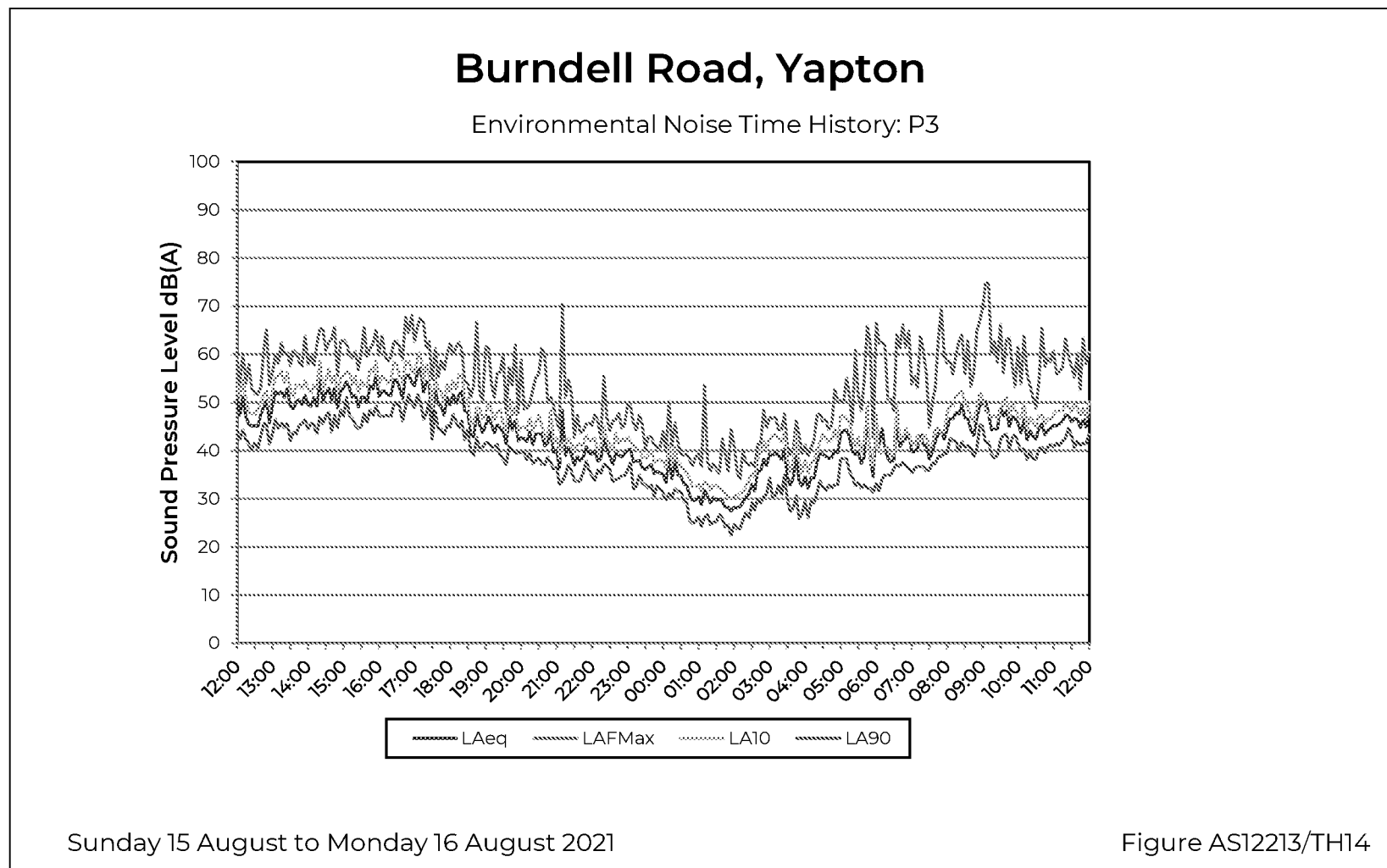


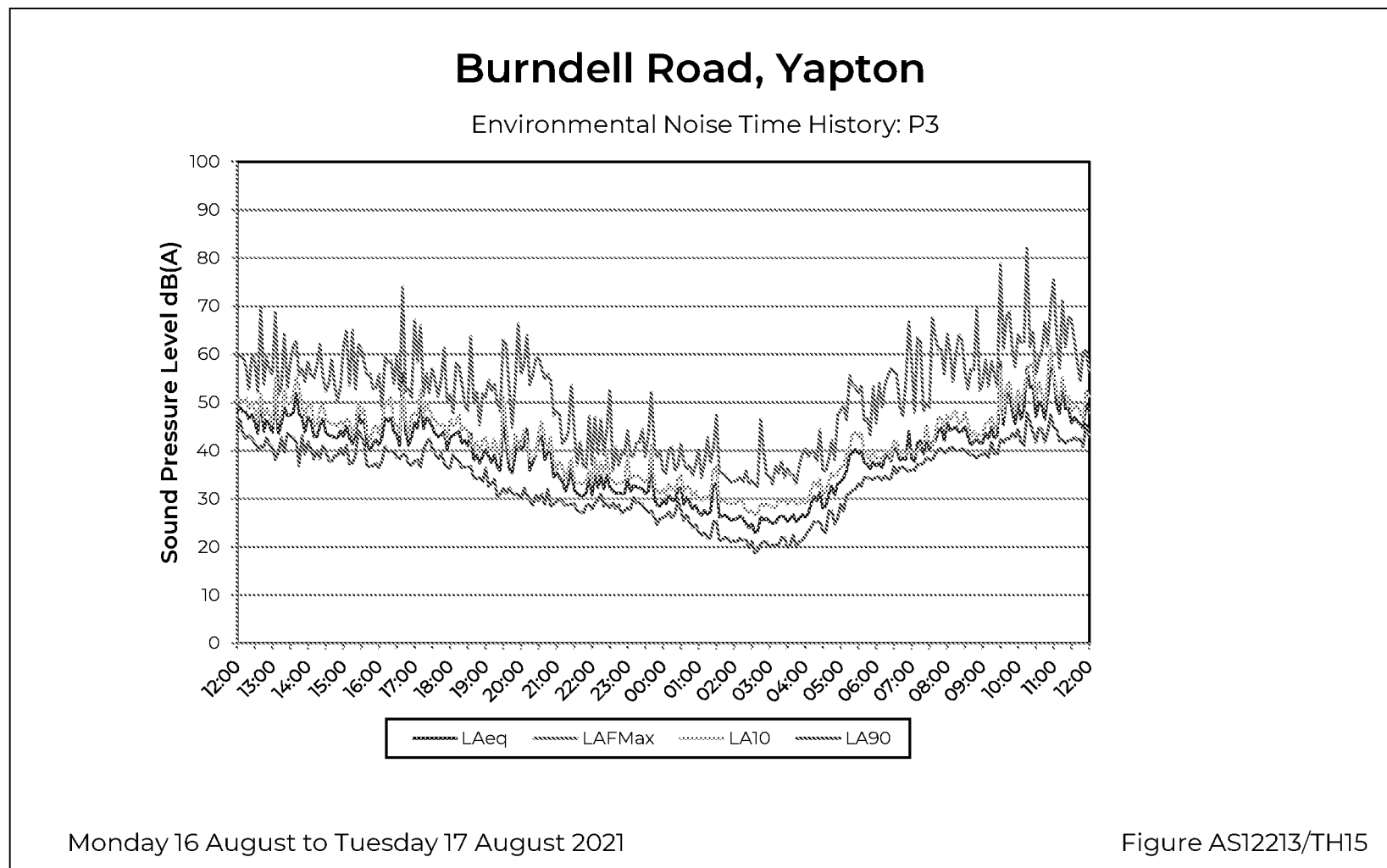












1.1 Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A .
L_{eq}:	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90}:	Statistical L_A indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max}:	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.

1.2 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000
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1.3 Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

INTERPRETATION

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

APPENDIX B

ACOUSTIC CALCULATIONS

COMMERCIAL IMPACT ON THE PROPOSED DEVELOPMENT AT LAND WEST OF BURNDILL ROAD, YAPTON	FREQUENCY, Hz								dB(A)
	63	125	250	500	1K	2K	4K	8K	
Specific Sound Level	58	54	45	42	41	39	35	27	47
Screening effect, where source is 50m from assessment location	-5	-6	-6	-8	-9	-11	-14	-17	
Predicted Specific Sound Level, dB	53	48	39	34	32	28	21	10	38

BS4142:2014 +A1:2019 ASSESSMENT SUMMARY		COMMENTS
Predicted specific Sound Level	38 dB	Measured level corrected for insertion loss of proposed barrier
Total Acoustic Character Corrections	+9 dB	+6 dB correction for clearly perceptible impulse; +3 B correction for intermittency
Rating Level	47 dB	
Background Sound Level	44 dB	Derived from taking the model value of all LA90 measurement during working hours (08:00 – 17:00)
Assessment Level	+ 3 dB	Assessment could indicate adverse impact depending on context

COMMERCIAL IMPACT ON THE PROPOSED DEVELOPMENT AT LAND WEST OF BURNDILL ROAD, YAPTON	FREQUENCY, Hz								dB(A)
	63	125	250	500	1K	2K	4K	8K	
Specific Sound Level	58	54	45	42	41	39	35	27	47
Screening effect, where source is 160m from assessment location	-5	-6	-6	-7	-9	-11	-13	-16	
Predicted Specific Sound Level	53	49	39	35	32	28	22	11	39

BS4142:2014 +A1:2019 ASSESSMENT SUMMARY		COMMENTS
Predicted Specific Sound Level	39 dB	Measured level corrected for insertion loss of proposed barrier
Total Acoustic Character Corrections	+9 dB	+6 dB correction for clearly perceptible impulse; +3 B correction for intermittency
Rating Level	48 dB	
Background Sound Level	44 dB	Derived from taking the model value of all LA90 measurement during working hours (08:00 – 17:00)
Assessment Level	+ 4 dB	Assessment could indicate adverse impact depending on context