

Report VA5424.240808.NIA

18A-22A Station Road, Netley

Noise Impact Assessment

09 August 2024

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Attachments

VA5424/SP1	Indicative Site Plan
VA5424/GP1	Glazing Location Plan
VA5424/TH1-TH23	Environmental Noise Time Histories
Appendix A	Acoustic Terminology
Appendix B	BS4142 Specific Sound Level Predictions

1. Introduction

The existing first-floor office areas at 18A-22A Station Road, Netley, are to be converted into three residential apartments under Class MA of the General Permitted Development Order.

Venta Acoustics has been commissioned by Primer Olds BAS to undertake an assessment of the potential noise impact of the adjoining and neighbouring commercial premises on the site to address the prior approval requirements for the scheme.

An environmental noise survey was undertaken to determine the background noise levels at the site as well as the sound levels generated by nearby commercial operations. These levels will be used to undertake an assessment of the likely impact with reference to the methodology in BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*, with reference to the guidance of BS8233: 2014 *Guidance on sound insulation and noise reduction for buildings*. This report also compares the measured levels with the aims and intents of the National Planning Policy Framework (2023) and Noise Policy Statement for England (2010).

All staff at Venta Acoustics are fully qualified and members of the Institute of Acoustics, the recognised UK professional body for acoustics, noise and vibration professionals and are fully competent to undertake BS4142 assessments.

2. Site Description

The proposed development is at first floor level above an existing local store, located in an “L-shape” configuration on the corner of Station Road and New Road.

At ground floor beneath the office elements are a local retail store (Co-Op) which will be retained after the change of use. The landlord of the building owns both the ground floor and first floor areas and so retains overall control of the use of the spaces. It is understood that a covenant or similar will be sought as part of the proposals, which will limit the consented Class E usage to retail or equivalent low-impact uses and will exclude potentially prohibitive uses such as gymnasia, bars or child daycare facilities. This approach has been informally discussed with Eastleigh Borough Council Environmental Health and has been agreed in principle.

From discussion with Co-Op store management, there are 2-3 deliveries per day, which arrive to the store entrance on Station Road between 07:00 – 18:00 hours. Deliveries are via Bedford-size van. Goods are unloaded on metal roll cages. There are no deliveries to the rear of the site.

The building is of a traditional masonry construction, with pitched slate roofs. There is a large flat roof area at the rear, upon which is mounted a chiller table and several items of condensing plant which serve the ground floor retail use.

Windows at first floor overlook Station Road and New Road at the front of the building, as well as the flat roof and neighbouring social club to the rear.

The building neighbours the Netley Central Sports and Social Club to the immediate northeast, which is a licenced venue. Online listings indicate the venue has live music and bingo, although is currently understood to have low levels of patronage and does not often put on music acts. The building is of a masonry construction with tiled roof.

2.1 Proposals

The existing first floor office areas will be redeveloped as three apartments, layout as per the following figure.

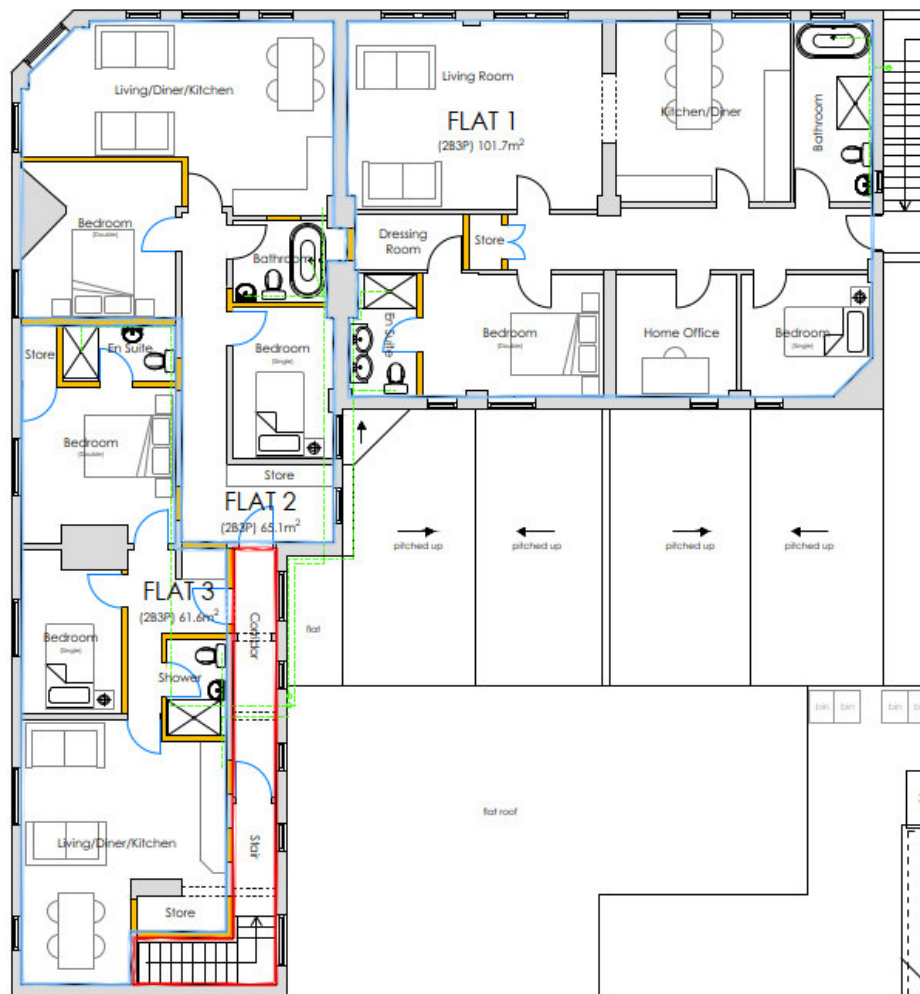


Figure 2.1 – Proposed layout of first floor flats

There are no external amenity areas proposed as part of the change of use.

3. Design Criterion and Assessment Methodology

3.1 Permitted Development

Class MA of the General Permitted Development Order provides the following requirements.

Conditions

MA.2. (1) Development under Class MA is permitted subject to the conditions

(2) Before beginning development under Class MA, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—

- (a) transport impacts of the development, particularly to ensure safe site access;
- (b) contamination risks in relation to the building;
- (c) flooding risks in relation to the building;
- (d) impacts of noise from commercial premises on the intended occupiers of the impacts of noise from commercial premises on the intended occupiers of the development;
- (e) (e)where—
 - (i) the building is located in a conservation area, and
 - (ii) the development involves a change of use of the whole or part of the ground floor,
 the impact of that change of use on the character or sustainability of the conservation area;
- (f) the provision of adequate natural light in all habitable rooms of the dwellinghouses;
- (g) the impact on intended occupiers of the development of the introduction of residential use in an area the authority considers to be important for general or heavy industry, waste management, storage and distribution, or a mix of such uses; and
- (h) where the development involves the loss of services provided by—
 - (i) a registered nursery, or
 - (ii) a health centre maintained under section 2 or 3 of the National Health Service Act 2006(4), the impact on the local provision of the type of services lost.

(3) An application for prior approval for development under Class MA may not be made before 1 August 2021.

(4) The provisions of paragraph W (prior approval) of this Part apply in relation to an application under this paragraph as if in the introductory words in sub-paragraph (5), for “and highways impacts of the development” there were substituted “impacts of the development, particularly to ensure safe site access”.

(5) Development must be completed within a period of 3 years starting with the prior approval date.

(6) Any building permitted to be used as a dwellinghouse by virtue of Class MA is to remain in use as a dwellinghouse within the meaning of Class C3 of Schedule 1 to the Use Classes Order and for no other purpose, except to the extent that the other purpose is ancillary to the use as a dwellinghouse.”.

Part 3, paragraph W(10)(b) of the GPDO states that the local planning authority must, when determining an application, have regard to the National Planning Policy Framework so far as relevant to the subject matter of the prior approval as if the application were a planning application.

3.2 The National Planning Policy Framework (2023)

The revised *National Planning Policy Framework* (NPPF), published in December 2023, sets out the Government’s planning policies for England, superseding all previous planning policy statements and guidance.

In respect of noise, the NPPF states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing developments from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution.

Hence, Paragraph 191 states that *planning policies and decisions should also ensure new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*

In regards to the term adverse impact, reference is made to the Noise Policy for England:

3.3 Noise Policy Statement for England (2010)

The Noise Policy Statement for England (NPSE) sets out the long term vision of Government noise policy: to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

This vision is supported by the following aims:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.*

The terms “significant adverse” and “adverse” are related to the following concepts:

- No Observed Effect Level (NOEL) - the level below which no effect on health and quality of life can be detected.
- Lowest Observed Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

The guidance acknowledges that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations, but will be different for different noise sources, receptors and times.

In order to enable assessment of impacts in line with these requirements, reference should be made to other currently available guidance.

3.4 BS4142:2014+A1:2019

British Standard BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- 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 premises or processes.

The Standard is therefore suited to assessment of commercial activities affecting the proposed apartments.

The assessment methodology considers the Specific Sound Level, as measured or calculated at a potential noise sensitive receptor, due to the source under investigation in terms of a L_{Aeq} value over a one-hour period during daytime operation (07:00-23:00 hours) and a fifteen-minute period during night-time operation (23:00-07:00 hours).

A correction factor is added to this level to account for the acoustic character of the sound. This is determined as follows when using the subjective assessment methodology:

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 noise 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.

An initial estimate of the impact of the source is then obtained by subtracting the typical background noise level, in terms of a LA90 value over the relevant period of operation, from the corrected Specific Sound Level.

- 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.

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

3.5 BS8233:2014

BS8233 *Guidance on sound insulation and noise reduction for buildings* provides guidance as to desirable internal ambient noise levels for different areas within residential buildings.

The relevant section of the standard is shown below in Table 3.1.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB LAeq, 16 hour	-
Dining	Dining Room	40 dB LAeq, 16 hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16 hour	30 dB LAeq, 8 hour

Table 3.1 – Excerpt from BS8233:2014 - Indoor ambient noise levels for dwellings

[dB ref. 20µPa]

4. Site Surveys

4.1 General & Equipment

The following equipment was used in the course of the survey:

Manufacturer	Model Type	Serial No	Calibration	
			Certificate No.	Date
NTi Class 1 Integrating SLM	XL2	A2A-11461-E0	1509201-1	19/7/24
NTi Class 1 Integrating SLM	XL2	A2A-11586-E0	1509201-2	19/7/24
NTi Class 1 Integrating SLM	XL2	A2A-12202-E0	UCRT23/1146	1/2/23
NTi Class 1 Integrating SLM	XL2	A2A-15892-E0	150497-1	28/3/23
Larson Davis calibrator	CAL200	13069	1509201-4	19/7/24
Electro Voice	ZLX-12P-EX	095208361761760076	-	-
Electro Voice	ZLX-12P-EX	095208361761760087	-	-
2 no. unbranded WAV player	-	-	-	-

Table 4.1 – Equipment used for the tests

The calibration of the sound level meters was verified before and after use with no significant calibration drift observed.

4.2 Environmental Noise Survey Procedure

In order to establish the existing external noise levels at the site, an environmental noise survey was carried out between Friday 26th July and Thursday 1st August 2024 at the external locations shown in site plan VA5424/SP1. These locations were chosen to be representative of the most noise-sensitive locations of the proposed new residential elements.

- Position 1 was installed outside a first floor window overlooking New Road.
- Position 2 was installed outside a first floor window Station Road and directly above the entrance to the Co-Op, where deliveries are unloaded.
- Position 3 was installed at first floor level on the side fire escape, directly opposite the side of Netley Central Sports and Social Club.
- Position 4 was installed outside the rear window most affected by chiller noise.

Continuous 5-minute samples of the LAeq, LAmax, LA10 and LA90 sound pressure levels were undertaken at each of the measurement locations.

The weather during the survey period was generally dry with light winds. The background noise data is not considered to have been compromised by these conditions.

Measurements were made generally in accordance with ISO 1996 2:2017 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels*.

4.3 Sound Insulation Test Procedure

Sound insulation tests of the floor separating the ground floor retail and proposed first floor residential areas were undertaken on Friday 2nd August 2024 with reference to procedures in BS EN ISO 140 *Acoustics – Measurement of sound insulation in buildings and of building elements Part 4: Field measurements of airborne sound insulation between rooms*.

High volume 'pink' noise from two similar, although uncorrelated sources was generated from two loudspeakers in the first floor office spaces positioned so as to obtain a diffuse sound field within the spaces. A spatial average of the resulting one-third octave band noise levels was obtained within both the source and the ground floor retail store.

Background noise levels were measured in the receive rooms in order to correct the received noise measurements for the influence of the prevailing noise climate as in accordance with BS EN 140 part 4.

The prevailing background noise in the building was due to traffic on the nearby roads.

5. Results

5.1 Environmental Noise Survey

The measured sound levels are shown as time-history plots on the attached charts VA5424/TH1-7 for Position 1 (New Road), VA5424/TH8-12 for Position 2 (Station Road), VA5424/TH13-16 for Position 3 (opposite the side of Netley Central Sports and Social Club) and VA5424/TH17-23 for Position 4 (rear flat roof).

The prevailing noise climate at the New Road and Station Road façades is determined by road traffic. At night, plant noise influences noise levels on the New Road façade. Night time plant noise is still somewhat present but is less apparent at the Station Road façade.

The prevailing noise climate at the side of the site is determined by a combination of plant noise (from the chiller table on the rear flat roof) and road traffic on Station Road. Patron and music/entertainment noise emissions from the neighbouring Netley Central Sports and Social Club were not present during the survey.

Noise levels at the rear of the site are determined by noise emissions from the chiller table. As can be seen from the time histories for Position 4, the plant occasionally turns off. During these times, measurements of the background noise climate are possible.

The noise levels measured were:

Monitoring Period, T	Minimum $L_{A90,5min}$				Average $L_{Aeq,T}$			
	Position 1	Position 2	Position 3	Position 4	Position 1	Position 2	Position 3	Position 4
07:00 – 23:00 hours	40 dB	36 dB	39 dB	36 dB	60 dB	65 dB	61 dB	65 dB
23:00 – 07:00 hours	36 dB	31 dB	36 dB	34 dB	51 dB	55 dB	56 dB	64 dB

Table 5.1 – Measured noise levels

The minimum background noise level at Position 2 during Co-Op delivery hours (07:00 – 18:00), was $L_{A90,5min}$ 39 dB.

Chiller noise levels at Position 4 were confirmed from manual measurements to be $L_{Aeq,T}$ 65 dB.

5.2 Sound Insulation Tests

The results of the airborne sound insulation tests are summarised in the table below.

Test Ref.	Source Room	Receive Room	Partition Type	Test Type	Measured Performance
AB1	1F office on New Rd façade	GF Retail	Floor	Airborne	D_w 53 dB
AB2	1F office on corner of New Rd and Station Rd		Floor	Airborne	D_w 45 dB
AB3	1F office on Station Rd façade		Floor	Airborne	D_w 44 dB

Table 5.2 – Measured sound insulation performances between 1F offices and GF Retail

6. Internal Sound Insulation Review

The current degree of sound insulation offered by the floor separating first floor and the ground floor retail use is variable across the footprint, with performance of floors along the New Road façade significantly better than offices on the Station Road façade.

Measurements of ambient sound in the ground floor retail demise indicate noise levels in the range of $L_{Aeq,T}$ 56 – 60 dB, depending on proximity to tills and freezer cabinets, (which may move if the store layout is changed).

This would result in levels of transmitted retail noise of around $L_{Aeq,T}$ 10 - 19 dB in rooms of Flat 3, which will occupy the New Road façade.

These predicted levels are well below the BS8233 guideline level for sleeping in bedrooms at night and would remain so even when allowing a substantial character penalty, for instance for tonality. Retail noise from below would be expected to be approaching inaudibility in Flat 3 for much of the

time. As such, it is offered that the floor on the New Road side of the demise is currently suitable without requirement for remedial work.

Levels of between $L_{Aeq,T}$ 16 - 26 dB would be expected in rooms of Flat 2 and Flat 1, which occupy the façade areas on the corner and along Station Road.

These predicted levels are below the BS8233 guideline level for sleeping in bedrooms at night.

However, allowing a moderate but not overly onerous correction for tonality would result in marginal exceedances. Particularly characterful sound would likely still be faintly audible. This is supported by onsite observations, indicating that checkout 'beeping' noise is faintly audible in some areas of the Station Road side of the footprint, albeit at a low level. Given the intermittent and unpredictable nature of goods being checked out however, this may still be annoying for future residents.

As such, it is recommended that the floor area to be occupied by Flat 1 and Flat 2 is remediated as follows:

- For a lightweight floor, floor deck removed and cavity investigated for the presence of insulation. Where this is absent, cavity filled to at least half depth with mineral wool, density: 10-33 kg/m³
- Floor deck replaced with Collecta Deckfon Quattro 39, direct-to-joist resilient floor system, or equivalent.
- Over-boarded with 18-22mm flooring grade tongue-and-groove timber

These remedial works would be expected to bring performance more in line with the floor at the New Road end of the footprint.

7. BS4142 Noise Impact Assessment

Initial estimates of noise impact have been undertaken at the most affected windows of habitable rooms on the rear, New Road and Station Road façades, following procedures in BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

In each case, the subjective method of allocating corrections to the sound source has been used following the methodology provided in BS4142:2014 and as summarised in section 3.4. These penalties are then applied to the specific noise level to obtain the rating level.

7.1 Initial Impact Estimate: Rear Façade

Rear windows of Flat 2 and Flat 1 will be affected by noise emissions from the adjacent chiller on the flat roof. Flat 3 does not have any windows overlooking the rear of the site.

Chiller noise levels at the affected windows were confirmed to be $L_{Aeq,T}$ 65 dB.

Acoustic feature corrections are as follows.

Noise Source	Subjective Description	Allocated Corrections
Plant Noise	Clearly tonal component to plant noise at receivers	Tonality: +4dB

Table 7.1 – Acoustic character corrections

Table 7.2 shows the assessment for chiller noise at Flat 2 and Flat 1 windows at the rear of the site.

Results		Relevant Clause	Commentary
Specific Sound Level	L_{Aeq} 65 dB		From monitoring data
Acoustic feature correction	+4 dB	9.2	+4dB tonality
Rating level	L_{Ar} 69 dB	9.2	
Night-time background sound level	L_{A90} 34 dB	8	
Excess of rating over background sound level	+35 dB	11	
Assessment indicates potential for Significant adverse impact		11	Depending on context

Table 7.2 – BS4142 daytime assessment of plant noise

7.2 Initial Impact Estimate: Station Road

Deliveries to the ground floor Co-Op are limited to the daytime (07:00 – 18:00 hours).

It was not possible to identify deliveries to the Co-Op from the measured survey data but noise library data for typical deliveries via roll cage movements indicate a Sound Exposure Level of around $L_{Aeq,1sec}$ 92 dB at 5 metres.

Levels of around and $L_{Aeq,15mins}$ 65 dB at 5 metres are indicated for a delivery vehicle chiller compressor.

Acoustic feature corrections for roll cage movements and chiller compressor are as follows

Noise Source	Subjective Description	Allocated Corrections
Roll cages	Clearly impulsive, with intermittent movements	Tonality: 0dB Impulsivity: +6dB Intermittency: +3dB
Chiller compressor	No identifiable tonal, impulsive or intermittent characteristics but nonetheless distinctive against the prevailing noise climate	Other characteristics: +3dB

Table 7.3 – Acoustic character corrections

Table 7.4 shows the assessment for roll cages at the most affected receptors on the Station Road façade during Co-Op delivery hours.

Results		Relevant Clause	Commentary
Specific Sound Level	L _{Aeq} 61 dB		As calculated in Appendix B
Acoustic feature Correction	+9 dB	9.2	+6dB impulsivity, +3dB intermittency
Rating level	L _{Ar} 70 dB	9.2	
Background sound level	L _{A90} 39 dB	8	Co-Op delivery hours, 07:00 – 18:00
Excess of rating over background sound level	+31 dB	11	
Assessment indicates potential Significant adverse impact		11	Depending on context

Table 7.4 – BS4142 assessment for roll cages

Table 7.5 shows the assessment for chiller compressor noise at the most affected receptors on the Station Road façade during Co-Op delivery hours.

Results		Relevant Clause	Commentary
Specific Sound Level	L _{Aeq} 64 dB		As calculated in Appendix B
Acoustic feature correction	+3 dB	9.2	+3dB for other acoustic characteristics
Rating level	L _{Ar} 67 dB	9.2	
Background sound level	L _{A90} 39 dB	8	Co-Op delivery hours, 07:00 – 18:00
Excess of rating over background sound level	+28dB	11	
Assessment indicates potential Significant adverse impact		11	Depending on context

Table 7.5 – BS4142 noise assessment for chiller compressor

7.3 Initial Impact Estimate: New Road

Receptor windows on New Road will be affected by noise from deliveries to the Co-Op entrance on Station Road (acoustically screened due to the corner of the building) between 07:00 – 18:00 hours, and low levels of plant noise during the night-time, when the residual noise climate drops in level sufficiently and no longer masks it.

Acoustic feature corrections for acoustically screened roll cage movements, chiller compressor operation and plant noise are as follows:

Noise Source	Subjective Description	Allocated Corrections
Roll cages	Just perceptibly impulsive, intermittent movements	Tonality: 0dB Impulsivity: +3dB Intermittency: +3dB
Chiller compressor	No identifiable tonal, impulsive or intermittent characteristics but nonetheless distinctive against the prevailing noise climate	Other characteristics: +3dB
Plant	Given the low levels of noise, may be barely perceptibly tonal at receivers	Tonality: +2dB

Table 7.6 – Acoustic character corrections

Table 7.7 shows the assessment for roll cages at the screened receptors on the New Road façade during Co-Op delivery hours.

Results		Relevant Clause	Commentary
Specific Sound Level	L_{Aeq} 61 dB		As calculated in Appendix B
Acoustic feature Correction	+9 dB	9.2	+6dB impulsivity, +3dB intermittency
Rating level	L_{Ar} 70 dB	9.2	
Background sound level	L_{A90} 39 dB	8	Co-Op delivery hours, 07:00 – 18:00
Excess of rating over background sound level	+31 dB	11	
Assessment indicates potential Significant adverse impact		11	Depending on context

Table 7.7 – BS4142 assessment for roll cages

Table 7.8 shows the assessment for chiller compressor noise at the screened receptors on the New Road façade during Co-Op delivery hours.

Results		Relevant Clause	Commentary
Specific Sound Level	L_{Aeq} 64 dB		As calculated in Appendix B
Acoustic feature correction	+3 dB	9.2	+3dB for other acoustic characteristics
Rating level	L_{Ar} 67 dB	9.2	
Background sound level	L_{A90} 39 dB	8	Co-Op delivery hours, 07:00 – 18:00
Excess of rating over background sound level	+28dB	11	
Assessment indicates potential Significant adverse impact		11	Depending on context

Table 7.8 – BS4142 noise assessment for chiller compressor

Plant noise levels at the New Road are approximately $L_{Aeq,T}$ 48 dB. Table 7.9 shows the Assessment for plant noise at New Road windows during the night-time.

Results		Relevant Clause	Commentary
Specific Sound Level	L_{Aeq} 48 dB		From monitoring data
Acoustic feature correction	+2 dB	9.2	+4dB tonality
Rating level	L_{Ar} 50 dB	9.2	
Night-time background sound level	L_{A90} 36 dB	8	
Excess of rating over background sound level	+14 dB	11	
Assessment indicates potential for Significant adverse impact		11	Depending on context

Table 7.9 – BS4142 night-time assessment of plant noise

7.4 Context

Initial impact estimates indicate the potential for significant adverse impact at all active façades of the proposed residential areas.

It is important to note that BS4142 is primarily a context-based assessment methodology, with the potential for initial estimates of impact to be modified by the context of the site and circumstances.

As there are no external amenities proposed, commercial noise would only be experienced internally within the new dwellings. As such, the introduction of a new residential use to an area with existing sources of commercial noise provides an opportunity to provide appropriate mitigation against the ingress of commercial noise into apartments via acoustic specification of façade elements.

Where suitable sound insulation performance is achieved for each façade, this would allow appropriate internal noise levels to be maintained such that commercial noise is controlled to a low impact.

This allows the impact to be significantly reduced for occupants of the dwellings and is considered in Section 8.

7.5 Uncertainty

This section considers the variable in the assessment that may cause variations within the final results and describes how these have been addressed.

- Use of Class 1 sound level meters is considered to reduce instrument error to insignificant levels as compared with environmental variations. The calibration of the instrumentation was confirmed before and after the noise surveys.
- The background measurements were undertaken under suitable weather conditions over a period designed to include reasonable temporal variations in background noise levels. Four monitoring locations were selected to minimise local acoustic phenomena that may only be representative at a single measurement position. These measurement locations were selected to be representative of the background noise levels expected to be experienced by the proposed dwellings without being unduly influenced by extraneous noise sources.
- Source data of particular noise sources was measured on site at the receiver, where possible. These measurements were undertaken in a manner that best represented noise emissions from the source to the assessment locations without being unduly influenced by extraneous noise sources. This methodology minimised the uncertainty introduced in sound propagation calculations.
- Where library data has been used, propagation calculations have been used to correct noise levels to the relevant distance at the receiver.

Overall, the uncertainty is considered to have been minimised to a suitable range so as not to risk significant variations in the impact assessment of typical operations.

8. External Building Fabric Review

Glazing to habitable rooms on the New Road, Station Road, and rear façades would need to be appropriately specified to control mechanical plant and delivery noise ingress.

During the survey, noise from the social club was not at a level which was identifiable above noise from plant associated with the Co-Op. As previously highlighted, the club is understood to have low levels of patronage, and rarely hosts events. The traditional construction of the building is expected to control internal noise breakout to a degree that with the proposed mitigation measures in the following section, noise from patrons or events is not expected to impact on the new dwellings.

There are also two duct terminations located on the south western façade of the social club. Noise from these ducts, when in use, would be expected to be controlled to the rear windows of the new dwellings by the mitigation measures recommended to control plant noise associated with the Co-Op.

The sound insulation performance of the building glazing will be specified to control the Rating Levels (including BS4142 penalties) to below the recommended values in BS8233. This hybrid approach of assessing commercial noise with a BS4142 penalty against the BS8233 criteria (over a shortened assessment period) is endorsed in the ProPG (Professional Practice Guidance on Planning and Noise prepared by the Institute of Acoustics, the Chartered Institute of Environmental Health and the Association of Noise Consultants).

A review of the drawings for the proposed scheme has been undertaken with the intent of achieving the internal noise levels from average noise levels stated in BS8233 Guidelines.

8.1 Sound Reduction Performances of Building Elements

It has been assumed that all the non-glazed elements, i.e. walls and roof systems, will be capable of providing the following minimum sound insulation performance, when tested in accordance with BS EN ISO 10140-2:2021 *Acoustics - Laboratory measurement of sound insulation of building elements – Part 2: Measurement of airborne sound insulation*.

Building Element	Single figure weighted sound reduction index, dB
Masonry	R _w 51

Table 8.1 – Assumed sound reductions performances of non-glazed elements

8.2 Sound Reduction Performance of Windowsets and Vents

Commercial noise levels identified in the BS4142 assessments, along with the survey monitoring data and architectural drawings have been used to calculate the required sound insulation performance for the windowsets (glazing and frame combination) and open ventilators for the building. These are summarised in Table 8.2 below.

Glazing Reference	Required Glazing SRI, dB	Ventilator Performance, dB
Type A	R _w 42	D _{n,e,w} 52
Type B	R _w 25	D _{n,e,w} 27

Table 8.2 – Required minimum sound reduction indices for glazing and ventilators

It is important that the glazing performance shown in Table 8.2 is achieved by the entire windowset including frames, seals, etc. Glass performance alone would not be likely to show compliance with the specification as the other elements typically provide the weakest noise transmission path.

The ventilator performance shown would need to be achieved with the vents open. Should this performance not be achievable, a mechanical ventilation solution may be required. The ventilator performance figure stated is for a single vent per room.

If multiple vents are required, then the performance requirement shown in Table 8.2 will increase by a value equal to $+10\log(N)$, with N being the total number of vents serving the room. It should be noted that there is no reason why windows could not be opened as a matter of personal preference or for purge ventilation.

Table 8.3 shows on which façades and levels of the building the glazing with the sound reduction performances shown in Table 8.2 should be installed. See the attached Glazing Location Plan, VA5424/GP1 for clarity.

Facade	Floor	Glazing Reference
Station Road + Rear	1 st floor – habitable rooms only	Type A
New Road	1 st floor – habitable rooms only	Type B

Table 8.3 – Glazing locations

8.3 Overheating

It is recommended that the likelihood of overheating occurring during warmer summer months should be evaluated by a qualified third party.

Where this is highlighted as a likely occurrence, commercial noise levels outside habitable rooms overlooking New Road and Station Road are low enough, or occur infrequently enough that occupants will be able to mitigate this by temporarily opening windows to remove excess heat build up, without unacceptable impact occurring, as per guidance detailed in the ANC AVO Guide.

Rooms overlooking the rear would need a strategy to avoid opening windows however, as resultant internal plant noise levels would likely result in a significant adverse impact. This could take the form of passive façade mitigations approaches such as reflective glazing treatments or brise soleil, or alternatively, mechanical cooling for these areas.

8.4 Internal Noise Assessment

Occupants should retain the option to keep windows closed to maintain suitable internal noise levels. However, windows should remain openable at occupant preference or to allow rapid dilution of pollutants under ‘purge ventilation’ circumstances.

With elements meeting the above performance specifications and windows closed, levels of commercial noise within the proposed dwellings would be expected to be in line with recommendations given in the BS8233:2014 guidance, when allowing for suitable character corrections.

Noise impact on occupants would therefore be low, commensurate with LOAEL.

9. Conclusion

A baseline noise survey has been undertaken by Venta Acoustics to establish the prevailing noise climate in the locality of 18A – 22A Station Road, Netley.

The measured noise levels have been assessed against BS4142:2014+A1 *Methods for rating and assessing industrial and commercial sound* and BS8233: 2014 *Guidance on sound insulation and noise reduction for buildings* to assess potential noise impacts on the new dwellings.

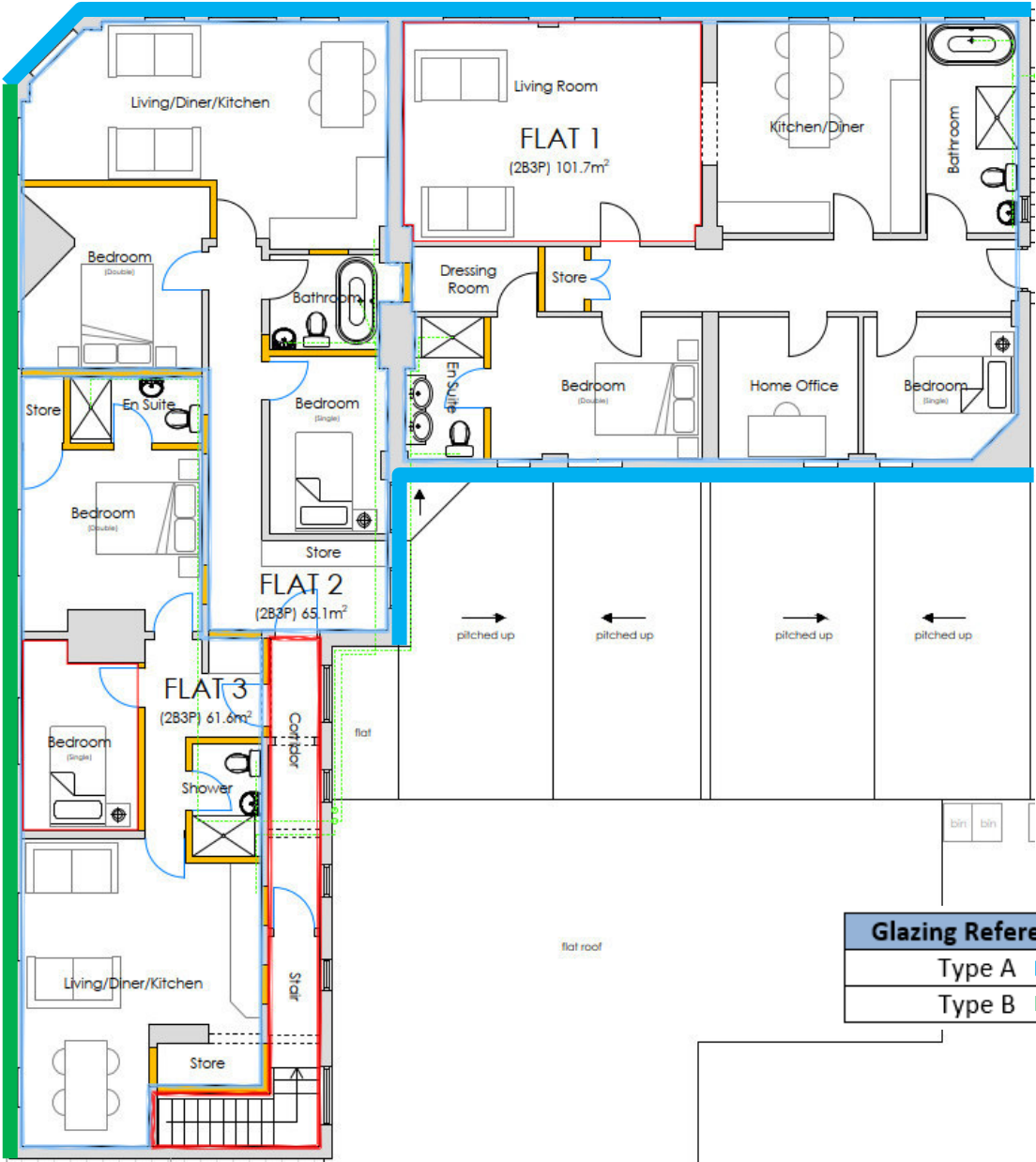
When initially appraised following procedures in BS4142, commercial noise at all active facades has the potential to result in adverse noise impact.

A discussion of potential mitigation in the form of building envelope performance has been included and with windows closed, it is considered that noise impact can be mitigated to acceptably low levels.

Remediation guidance has been provided to uprate the sound insulation performance of the floor of the areas to be occupied by Flat 1 and Flat 2, such that a degree of sound insulation performance is achieved which is suitable to mitigate noise arising from typical use of the adjoining commercial area.

Ben Alexander MIOA



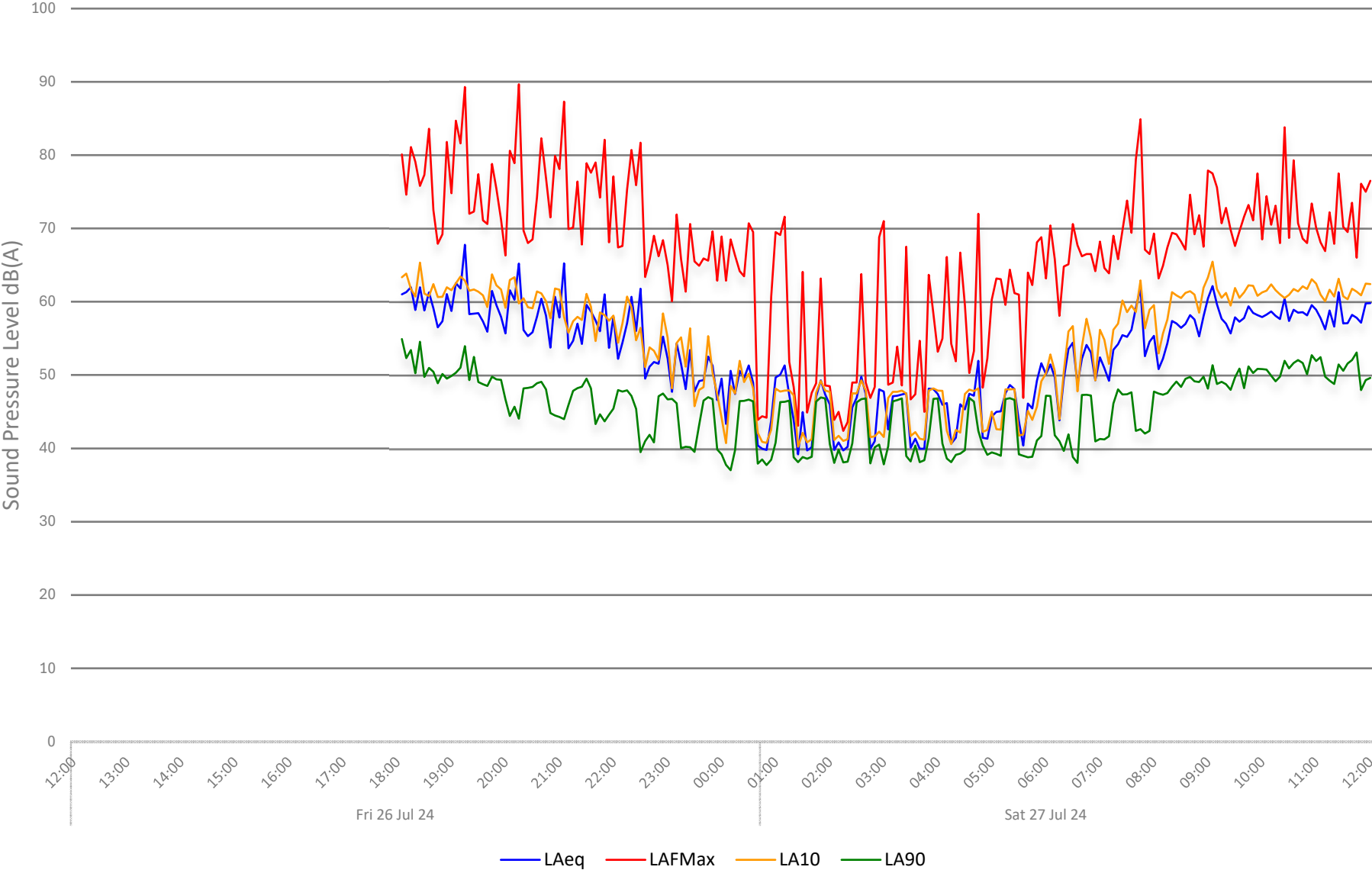


Glazing Reference	Required Glazing SRI, dB	Ventilator Performance, dB
Type A 	R_w 42	$D_{n,e,w}$ 52
Type B 	R_w 25	$D_{n,e,w}$ 27

18a-22a Station Road, Netley
Environmental Noise Time History: 1
Position 1



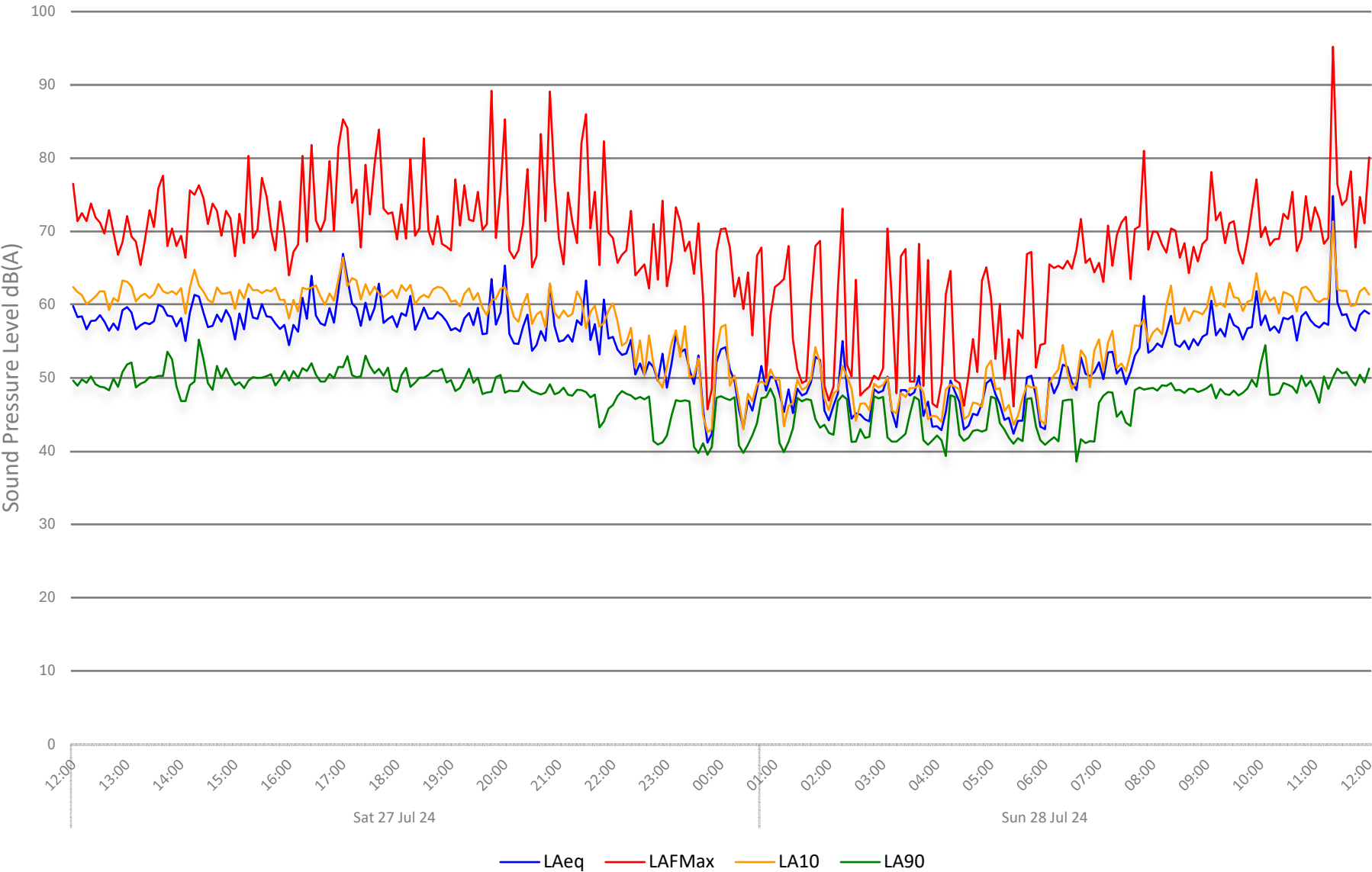
Figure VA5424/TH1



18a-22a Station Road, Netley
Environmental Noise Time History: 2

Position 1

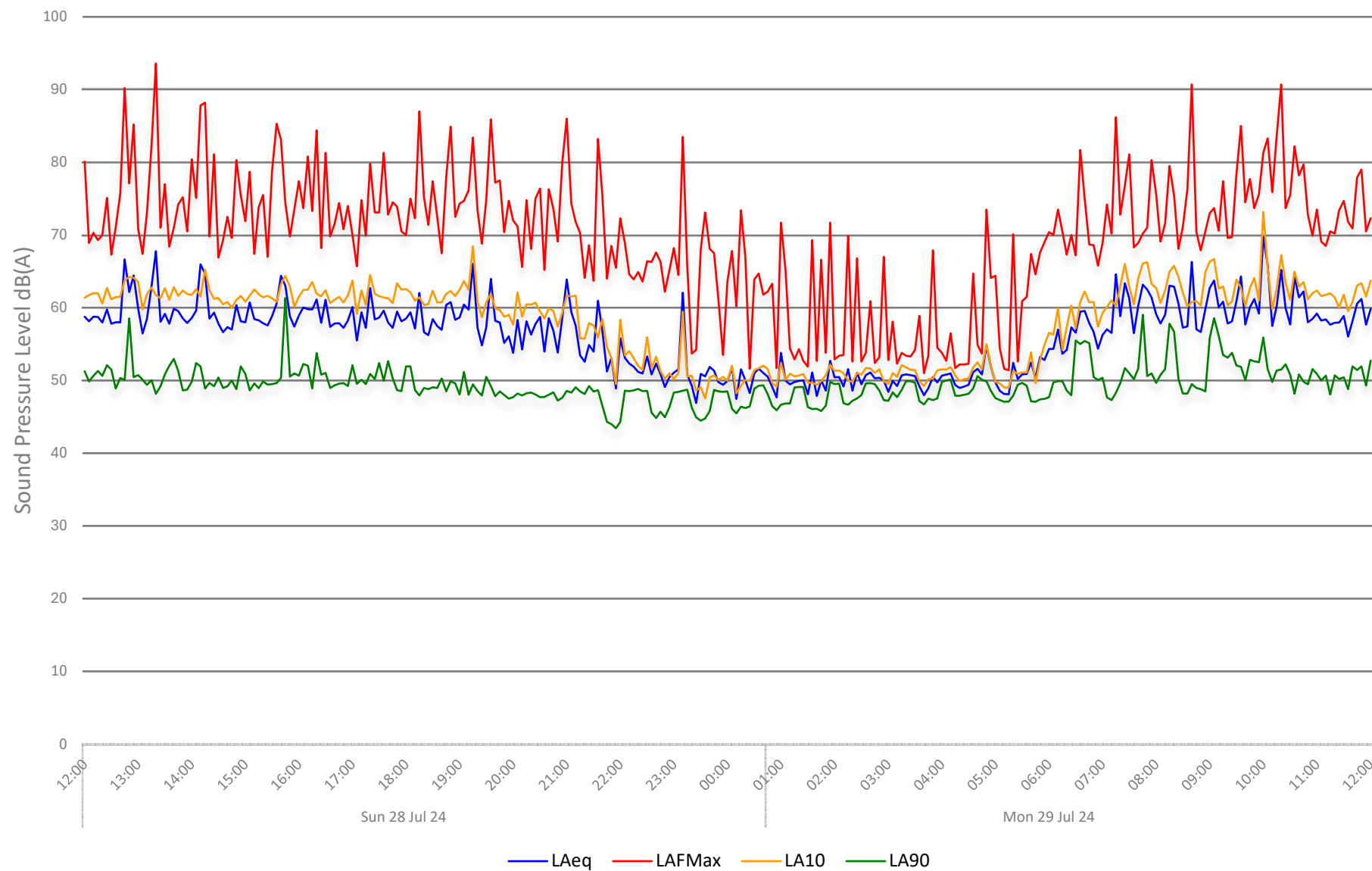
Figure VA5424/TH2



18a-22a Station Road, Netley
Environmental Noise Time History: 3
Position 1



Figure VA5424/TH3



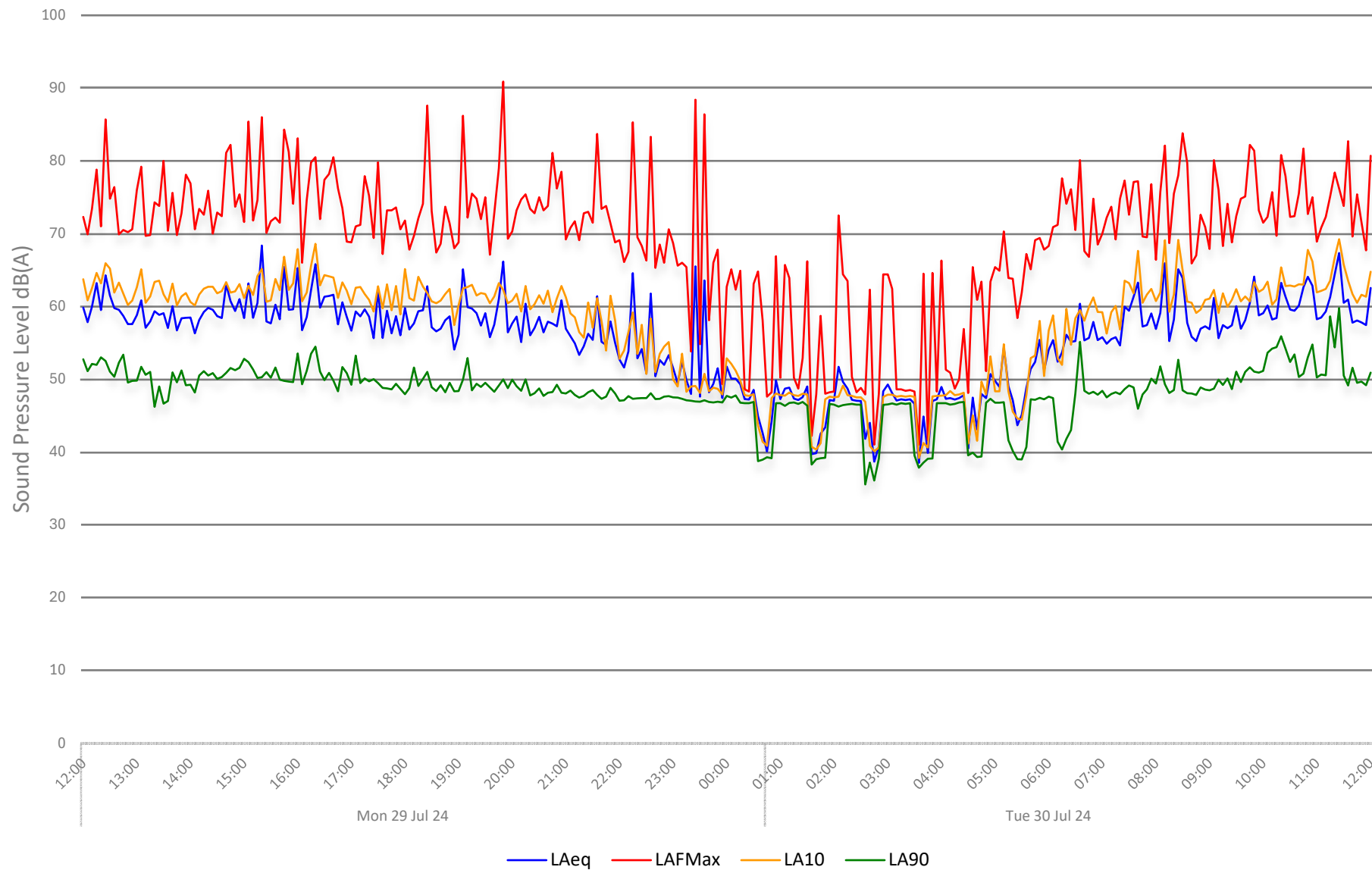
18a-22a Station Road, Netley

Environmental Noise Time History: 4

Position 1



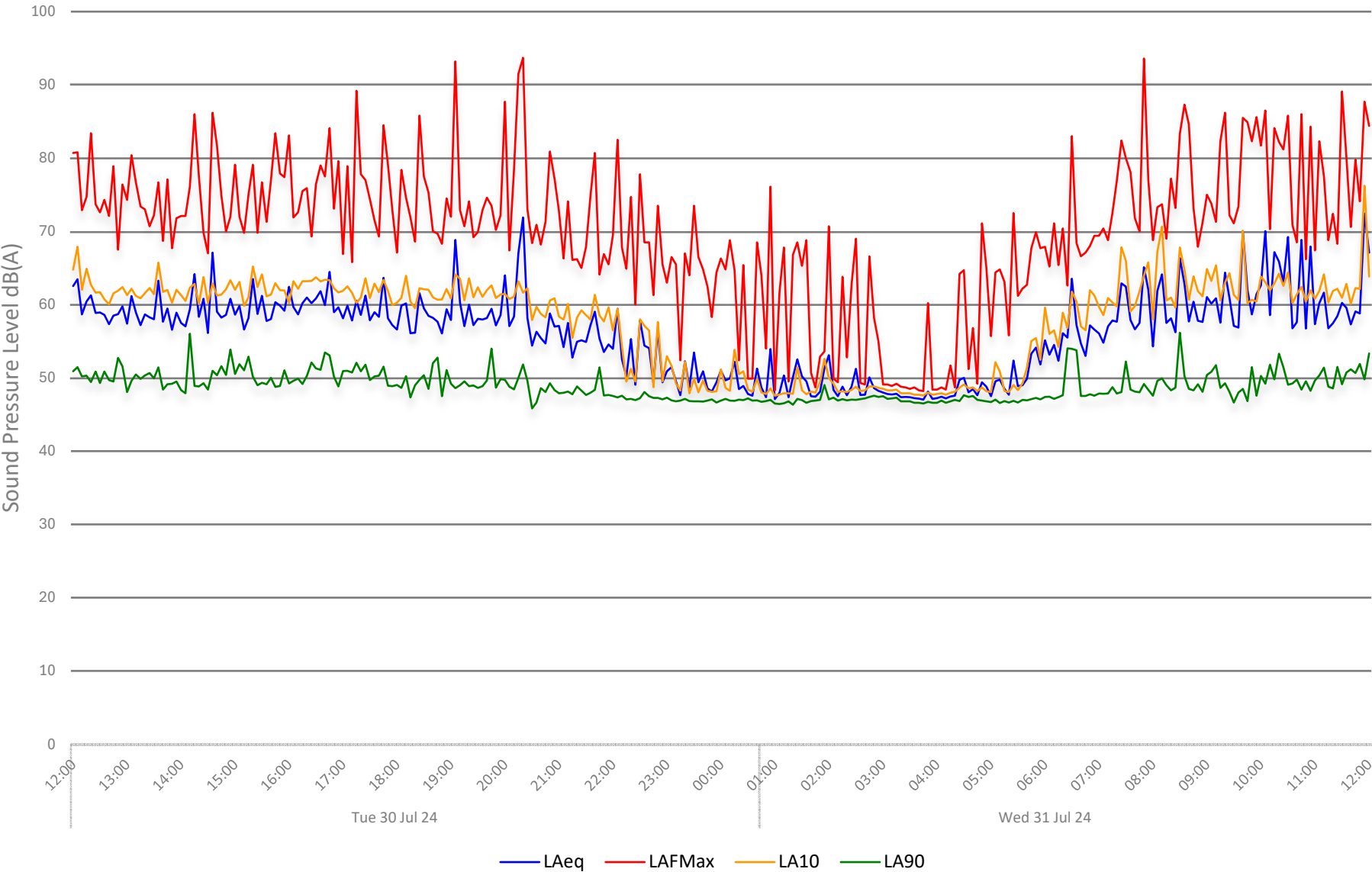
Figure VA5424/TH4



18a-22a Station Road, Netley
Environmental Noise Time History: 5

Position 1

Figure VA5424/TH5

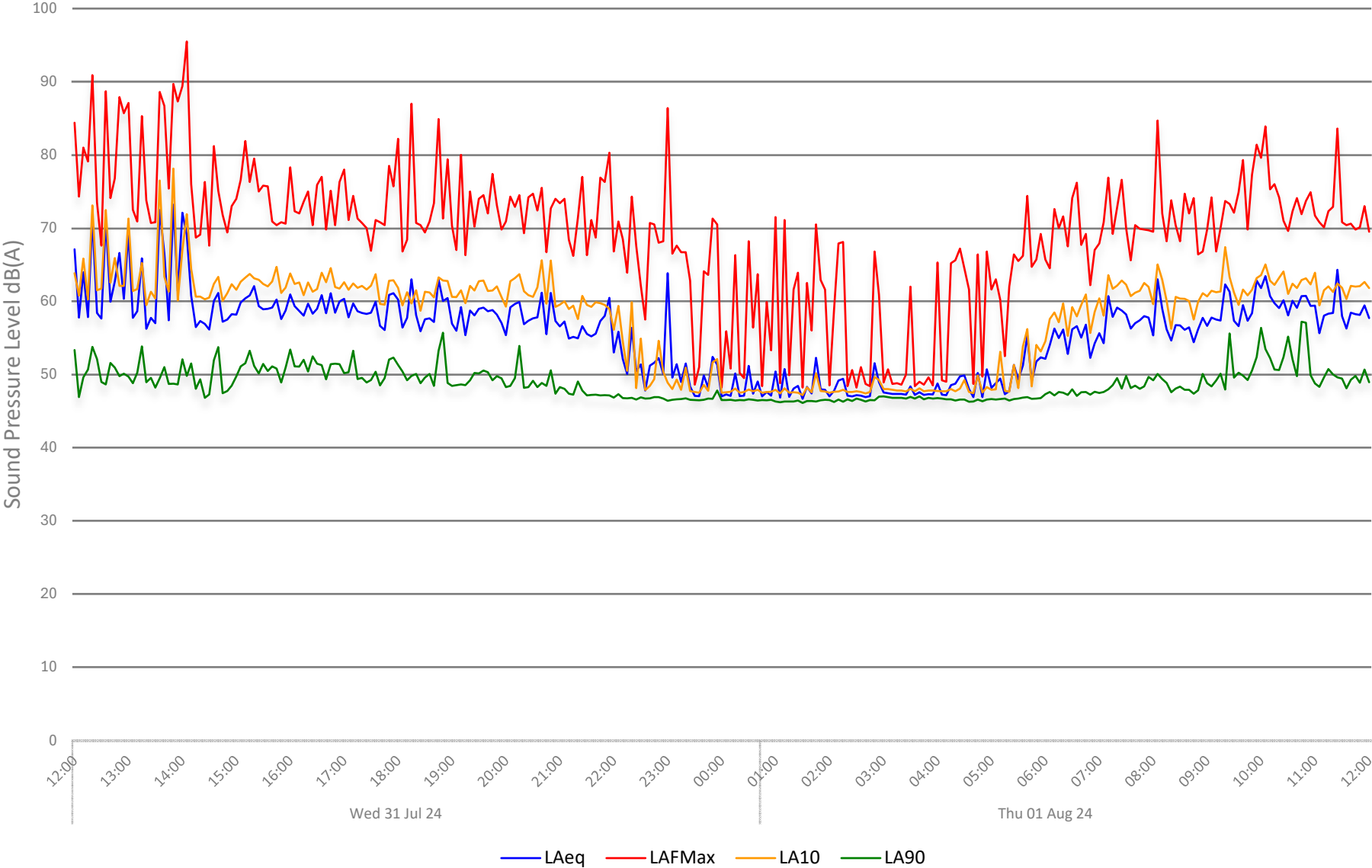


18a-22a Station Road, Netley
Environmental Noise Time History: 6



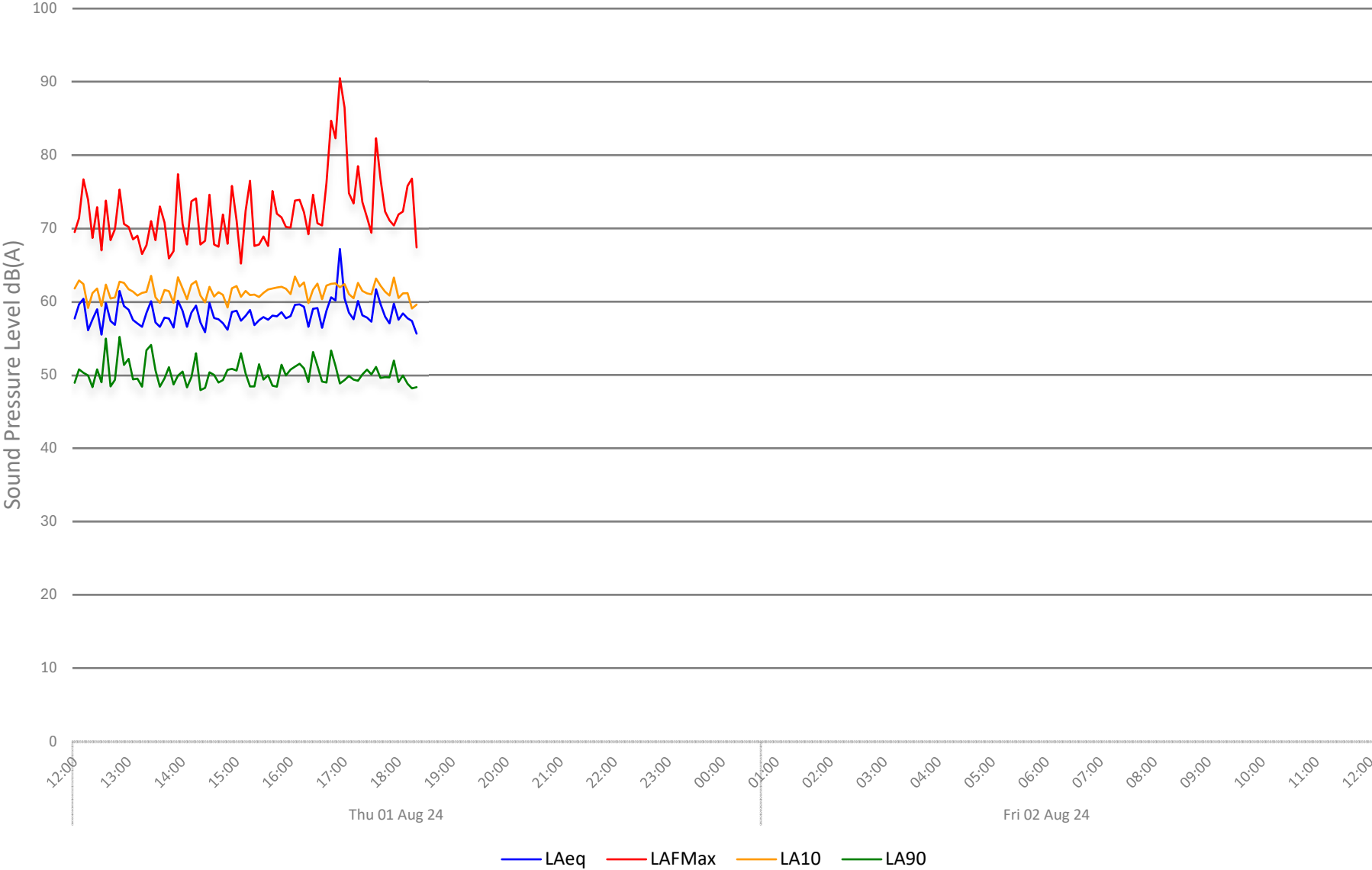
Position 1

Figure VA5424/TH6



18a-22a Station Road, Netley
Environmental Noise Time History: 7
Position 1

Figure VA5424/TH7



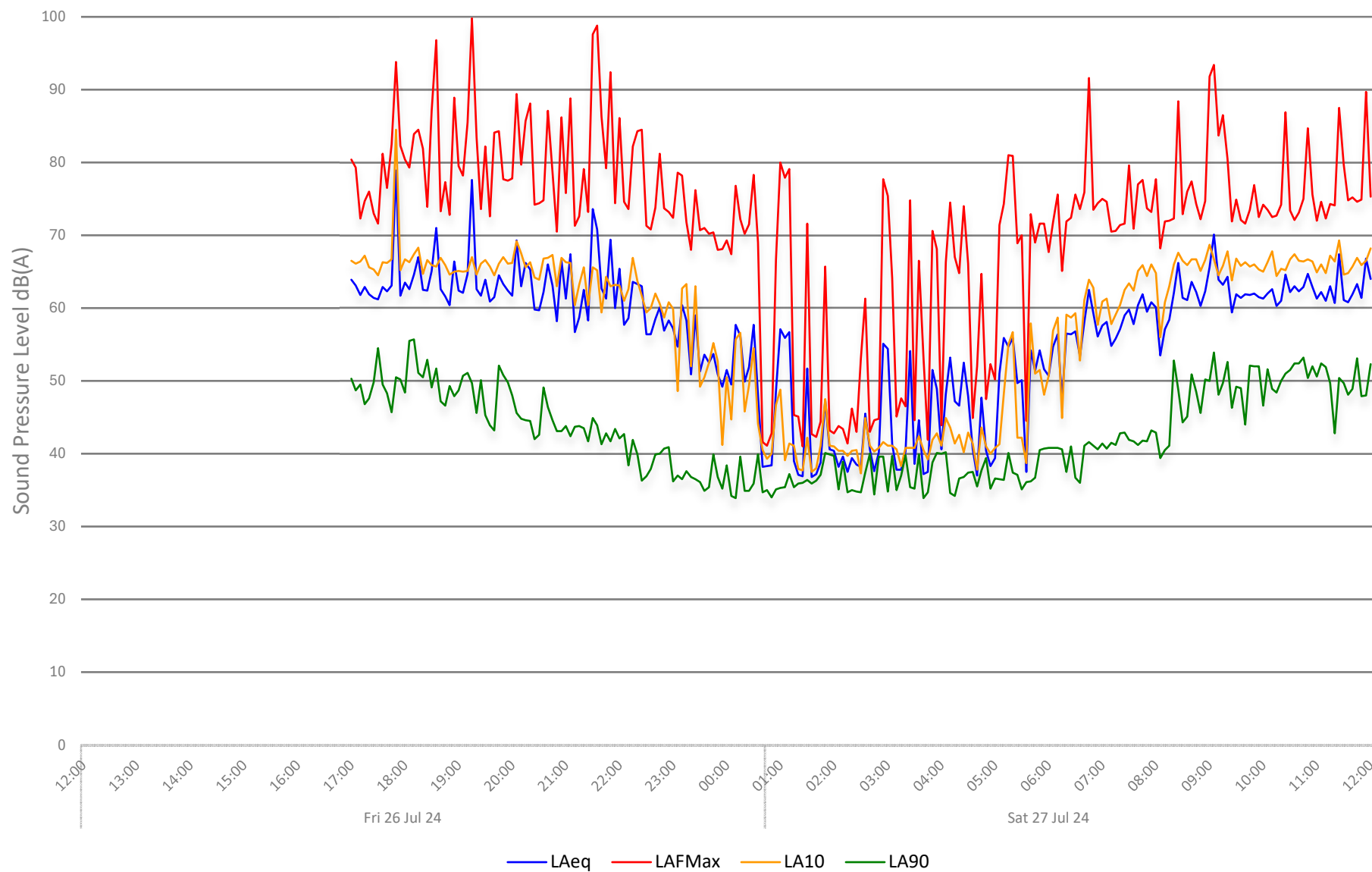
18a-22a Station Road, Netley

Environmental Noise Time History: 8

Position 2



Figure VA5424/TH8



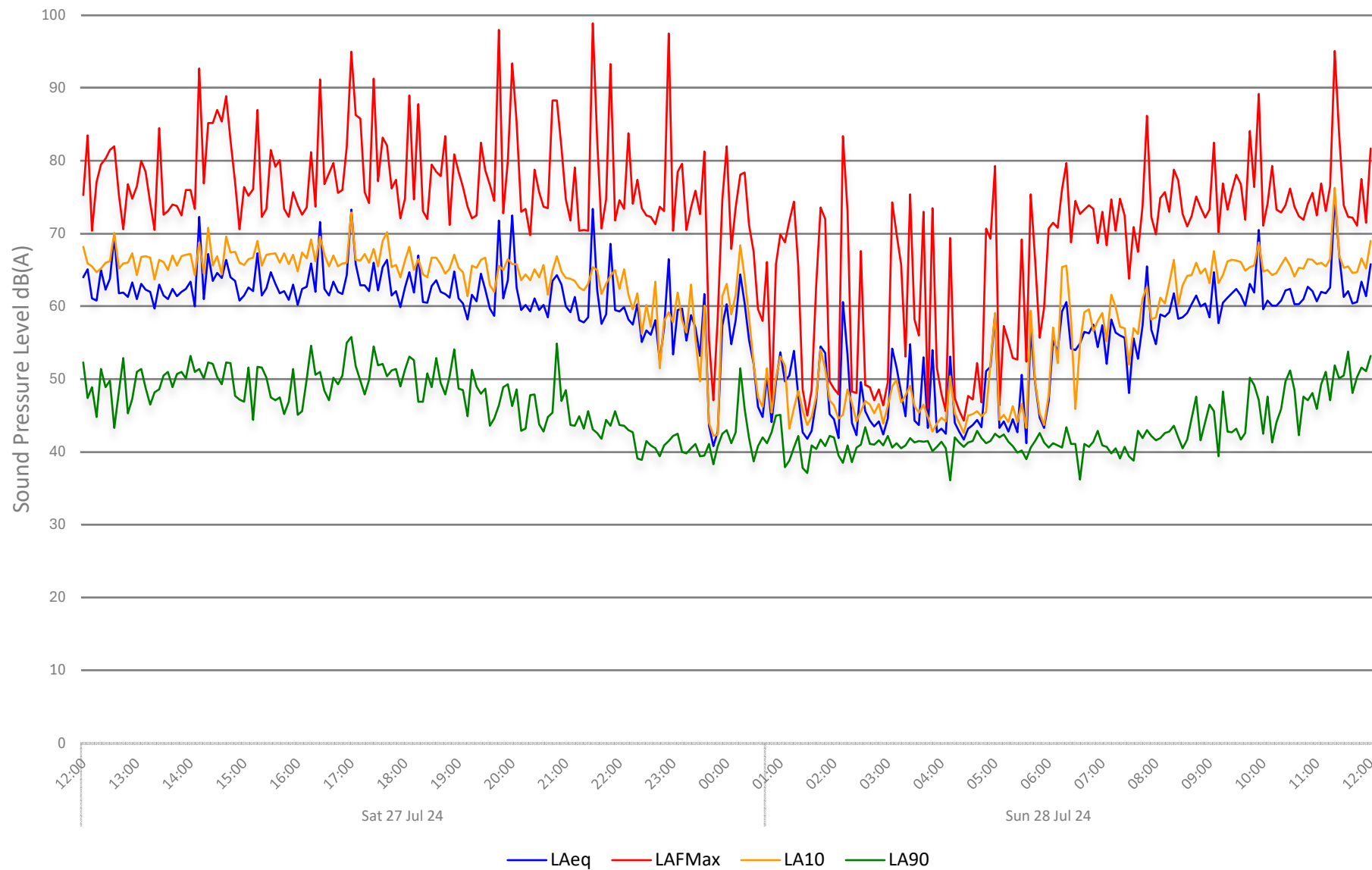
18a-22a Station Road, Netley

Environmental Noise Time History: 9

Position 2



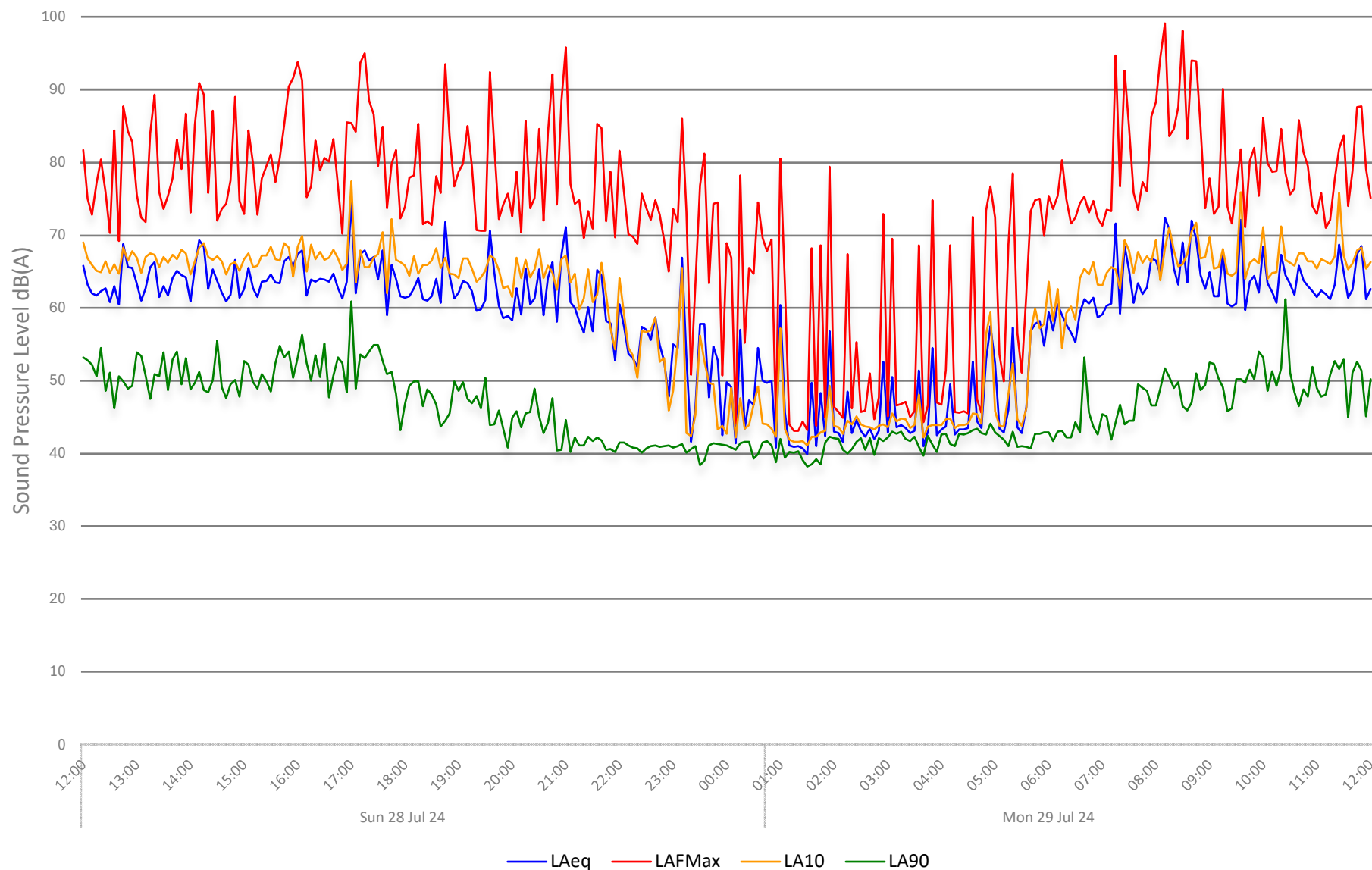
Figure VA5424/TH9



18a-22a Station Road, Netley
Environmental Noise Time History: 10

Position 2

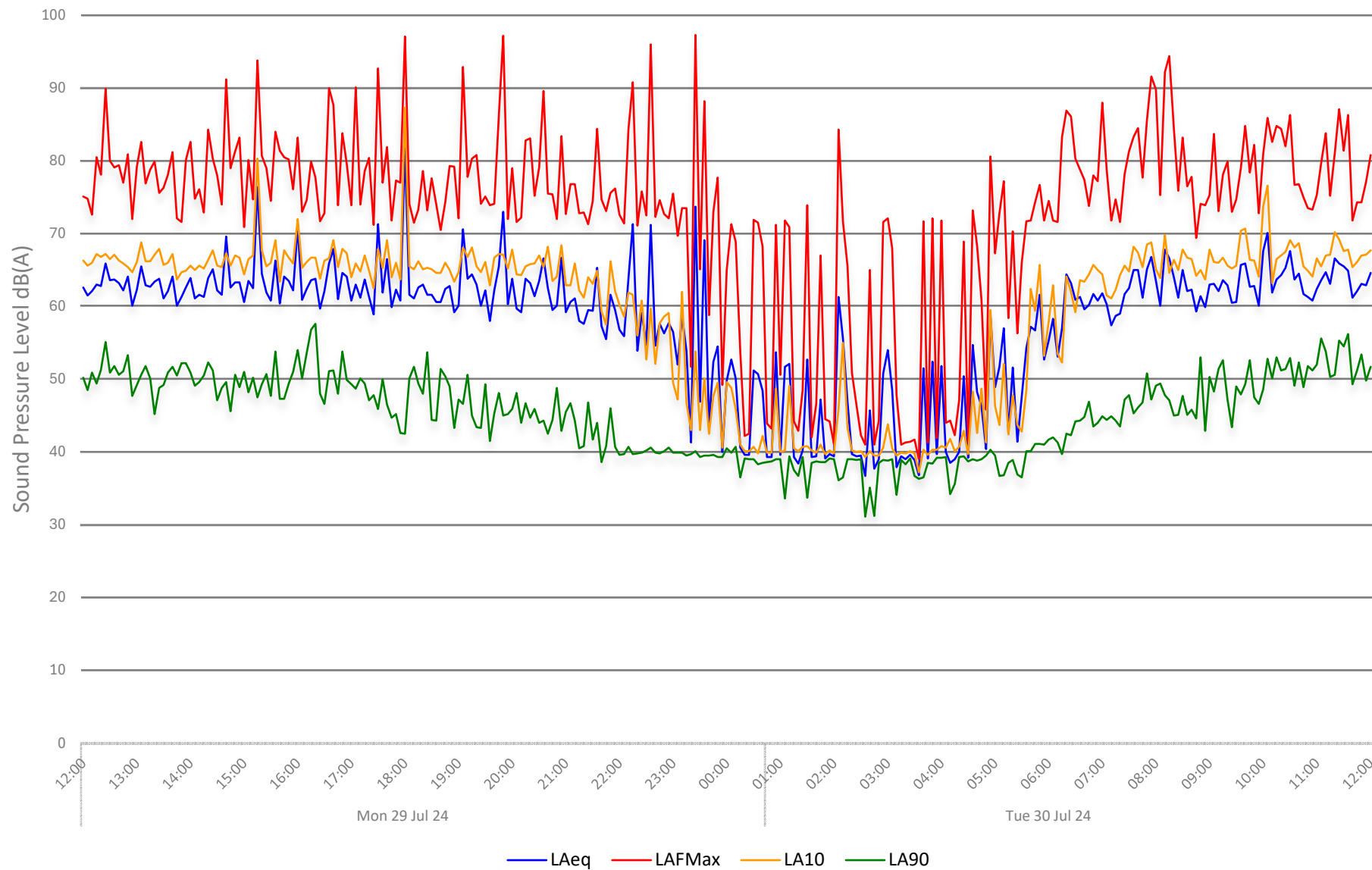
Figure VA5424/TH10



18a-22a Station Road, Netley
Environmental Noise Time History: 11

Position 2

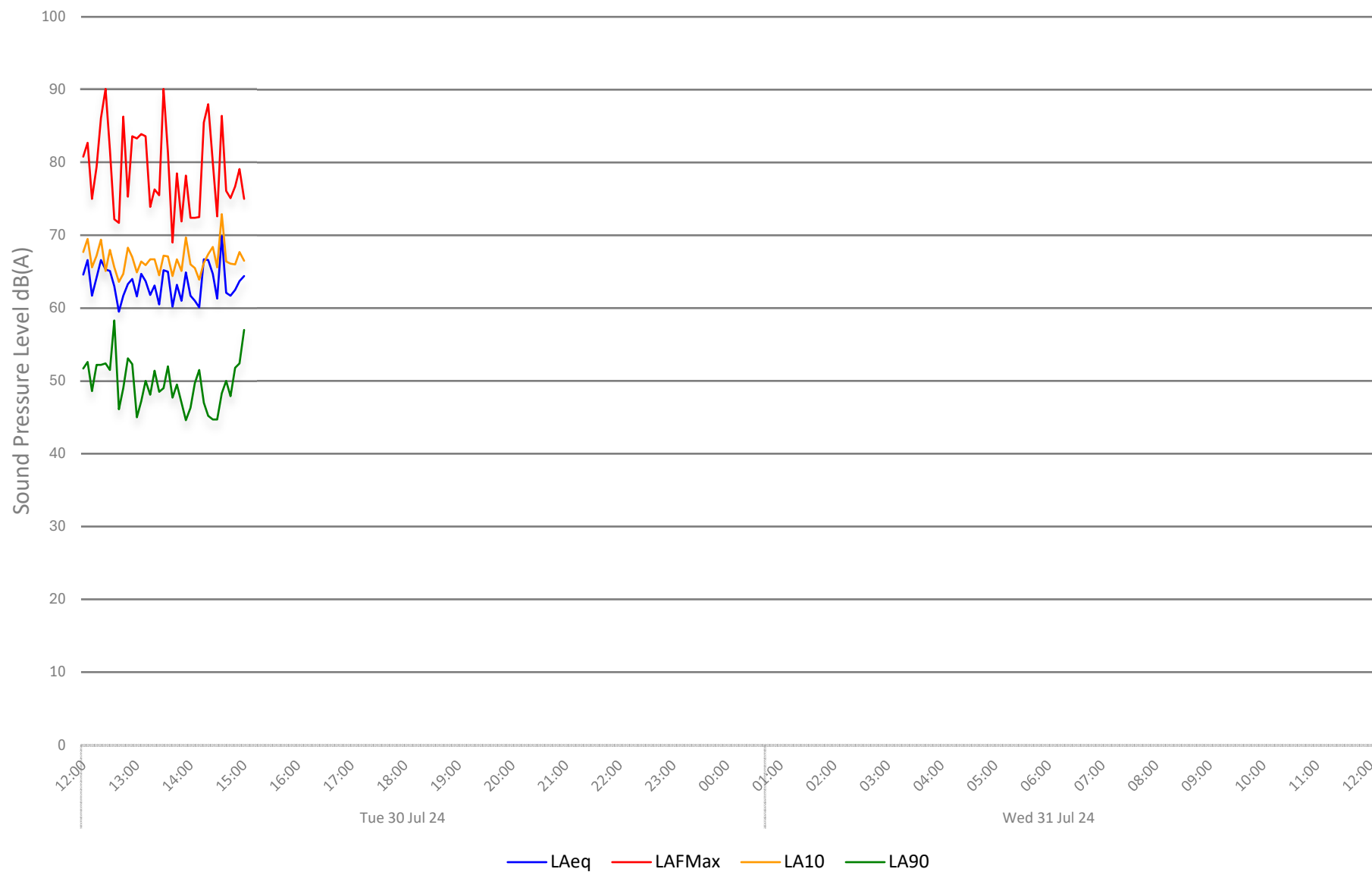
Figure VA5424/TH11



18a-22a Station Road, Netley
Environmental Noise Time History: 12
Position 2



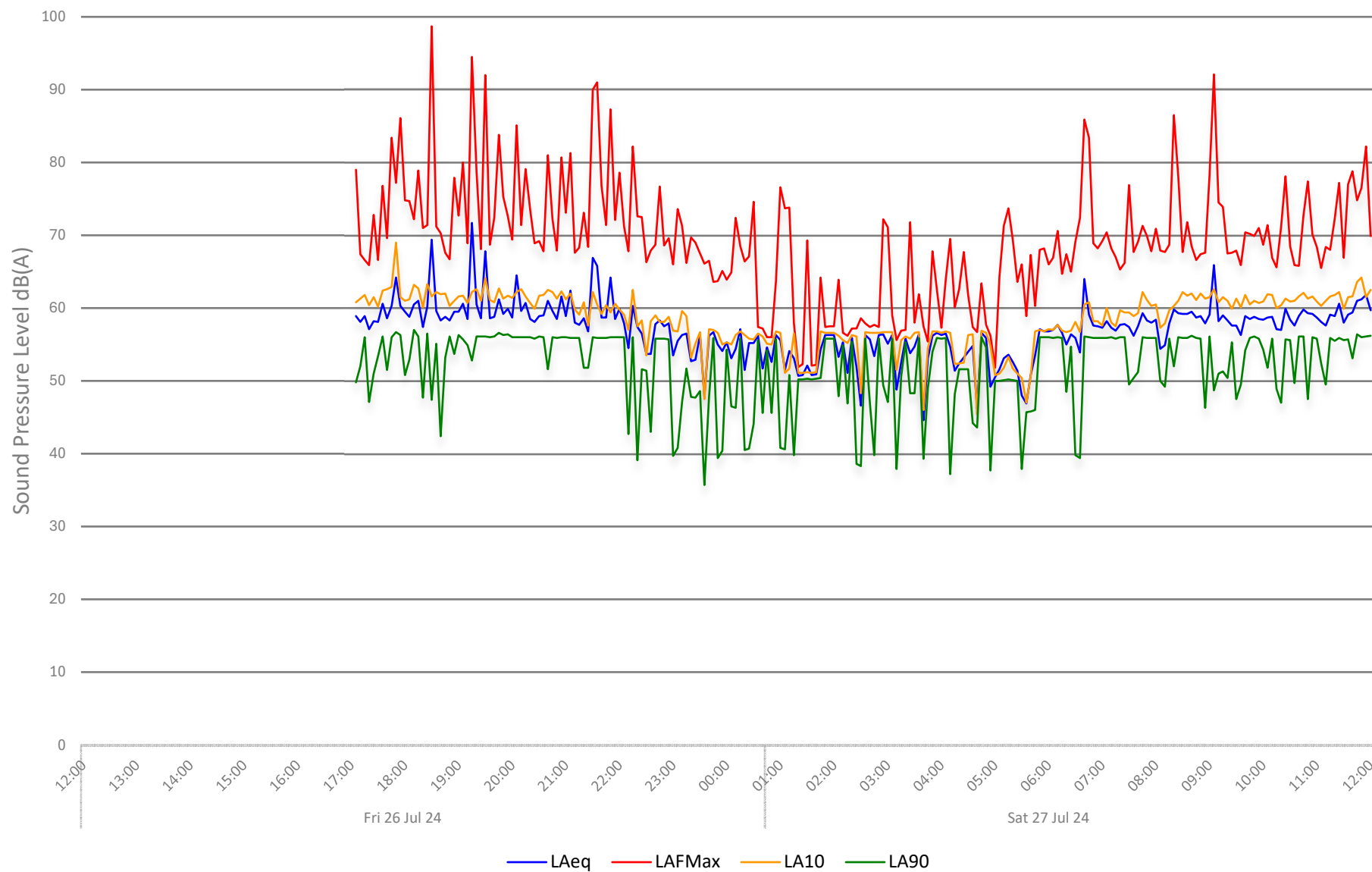
Figure VA5424/TH12



18a-22a Station Road, Netley
Environmental Noise Time History: 13
Position 3



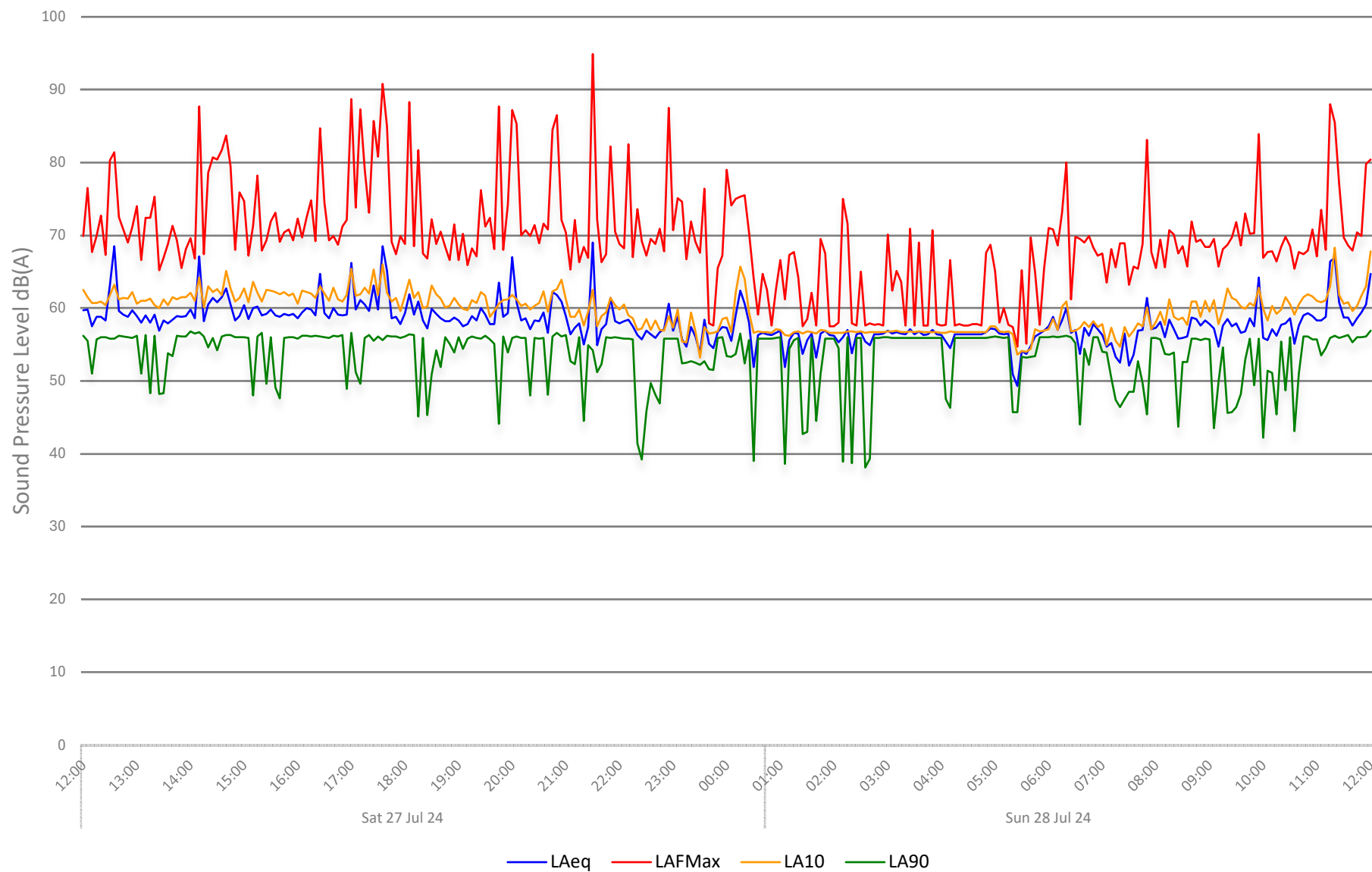
Figure VA5424/TH13



18a-22a Station Road, Netley
Environmental Noise Time History: 14
Position 3



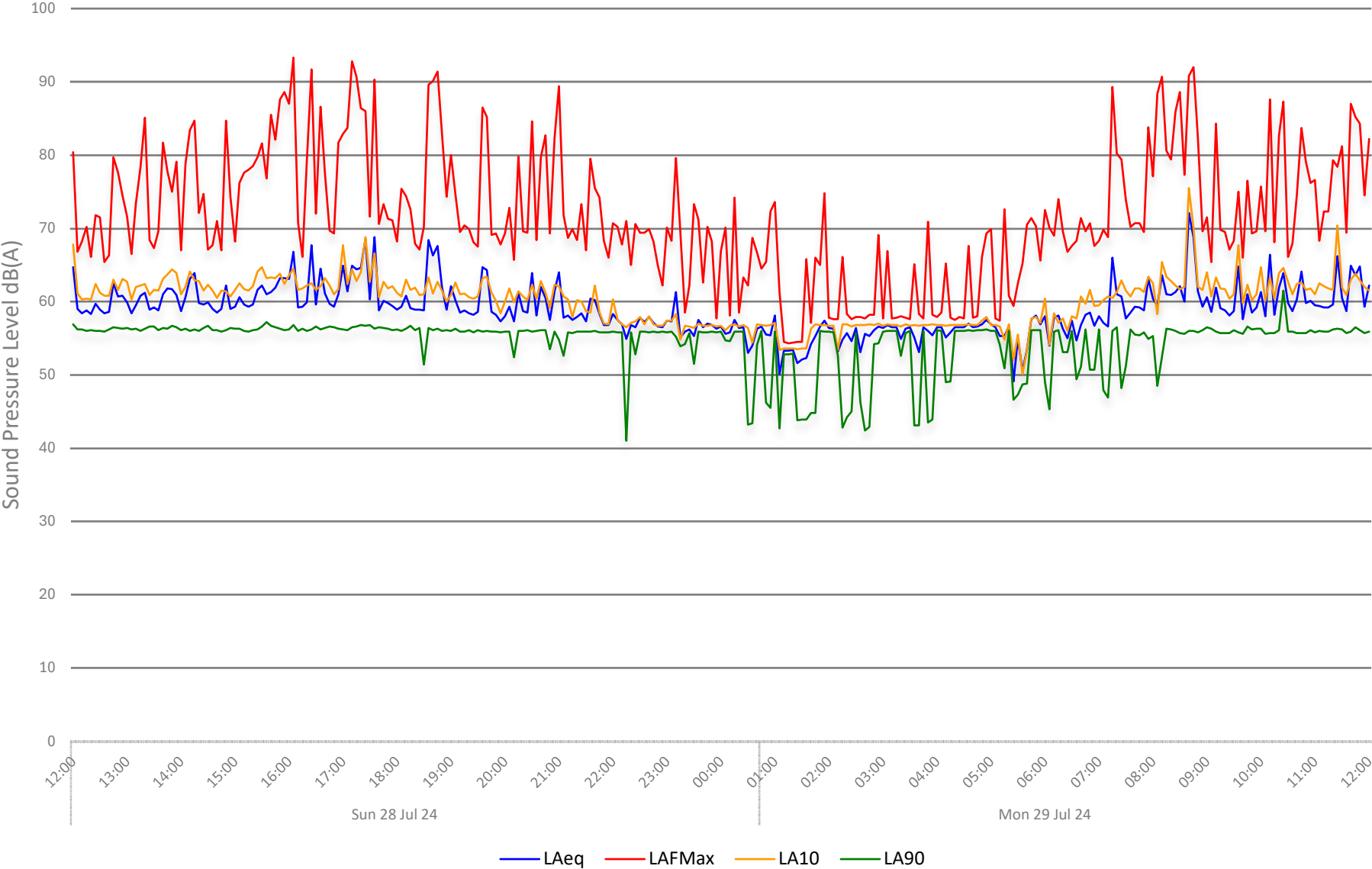
Figure VA5424/TH14



18a-22a Station Road, Netley
Environmental Noise Time History: 15
Position 3



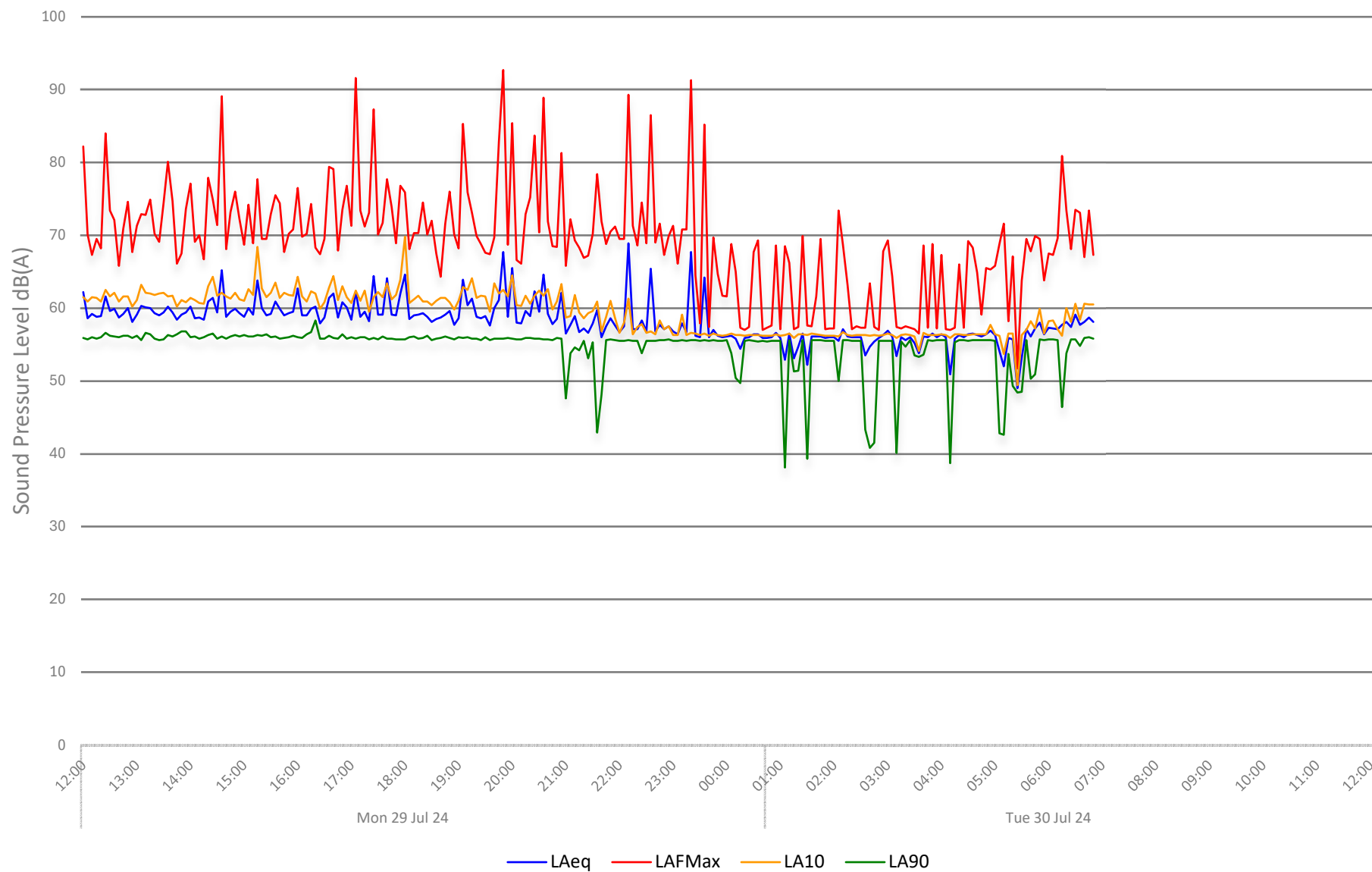
Figure VA5424/TH15



18a-22a Station Road, Netley
Environmental Noise Time History: 16
Position 3



Figure VA5424/TH16

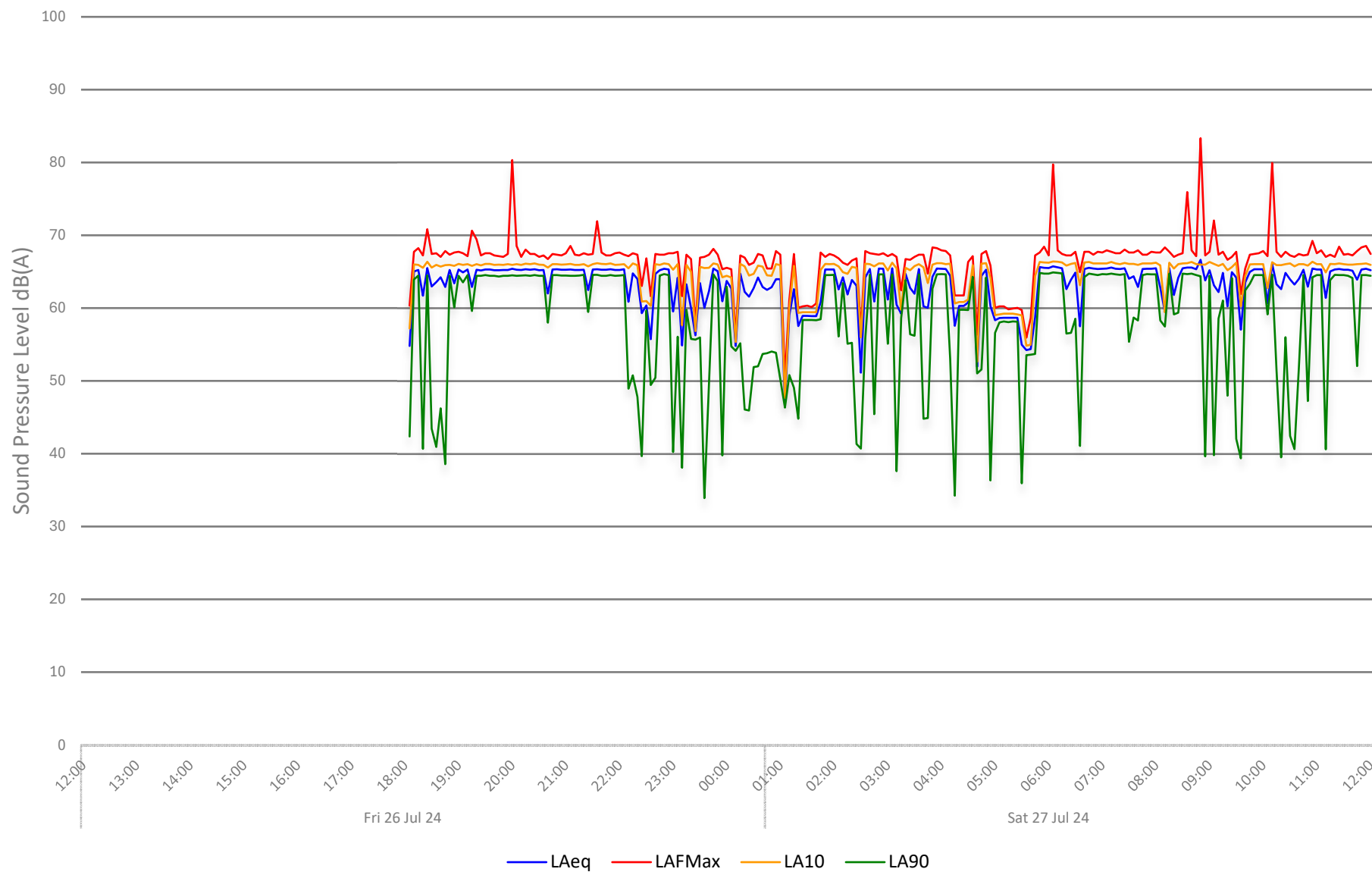


18a-22a Station Road, Netley
Environmental Noise Time History: 17



Position 4

Figure VA5424/TH17



18a-22a Station Road, Netley
Environmental Noise Time History: 18

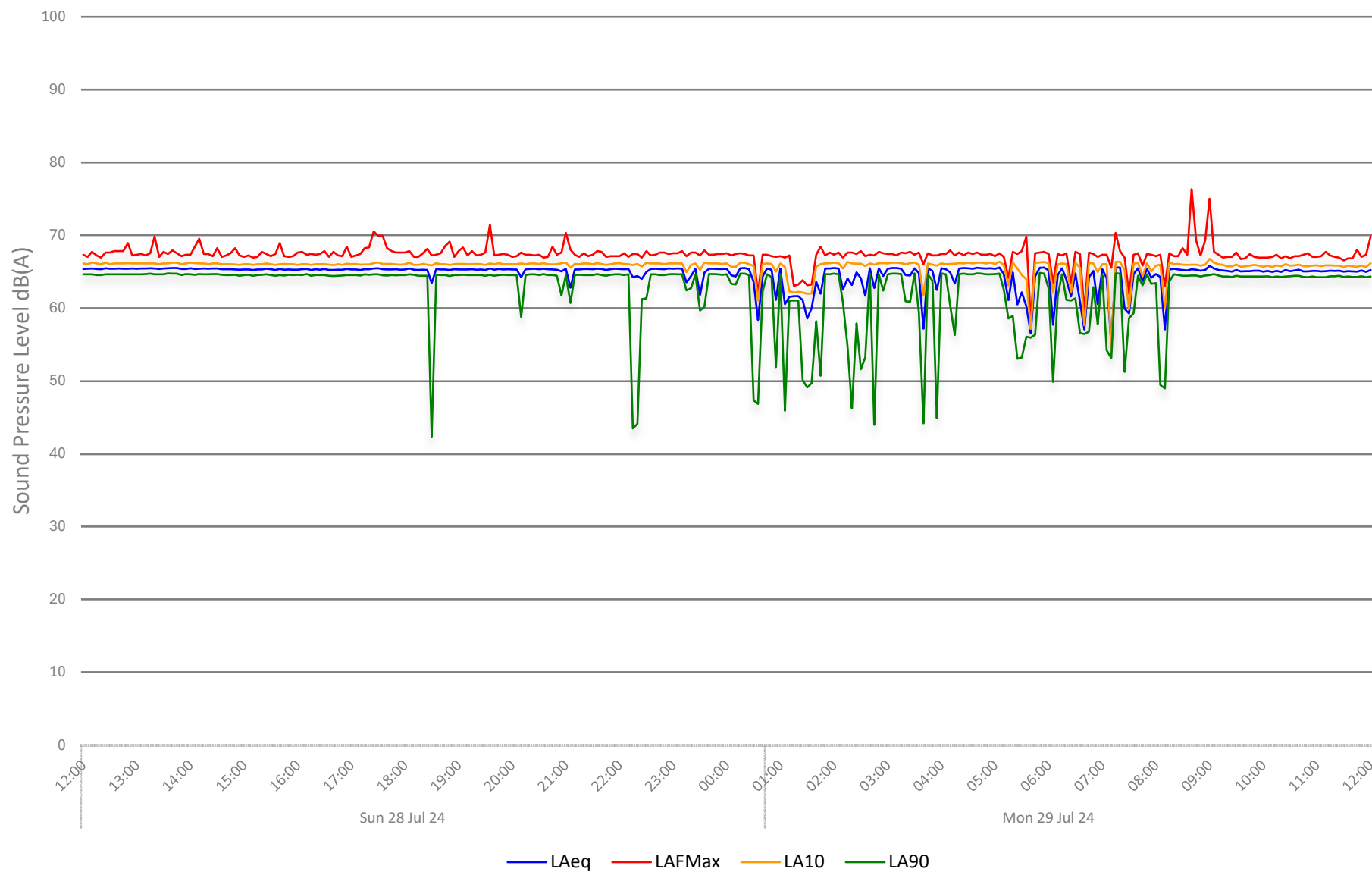
Position 4

Figure VA5424/TH18



18a-22a Station Road, Netley
Environmental Noise Time History: 19
Position 4

Figure VA5424/TH19

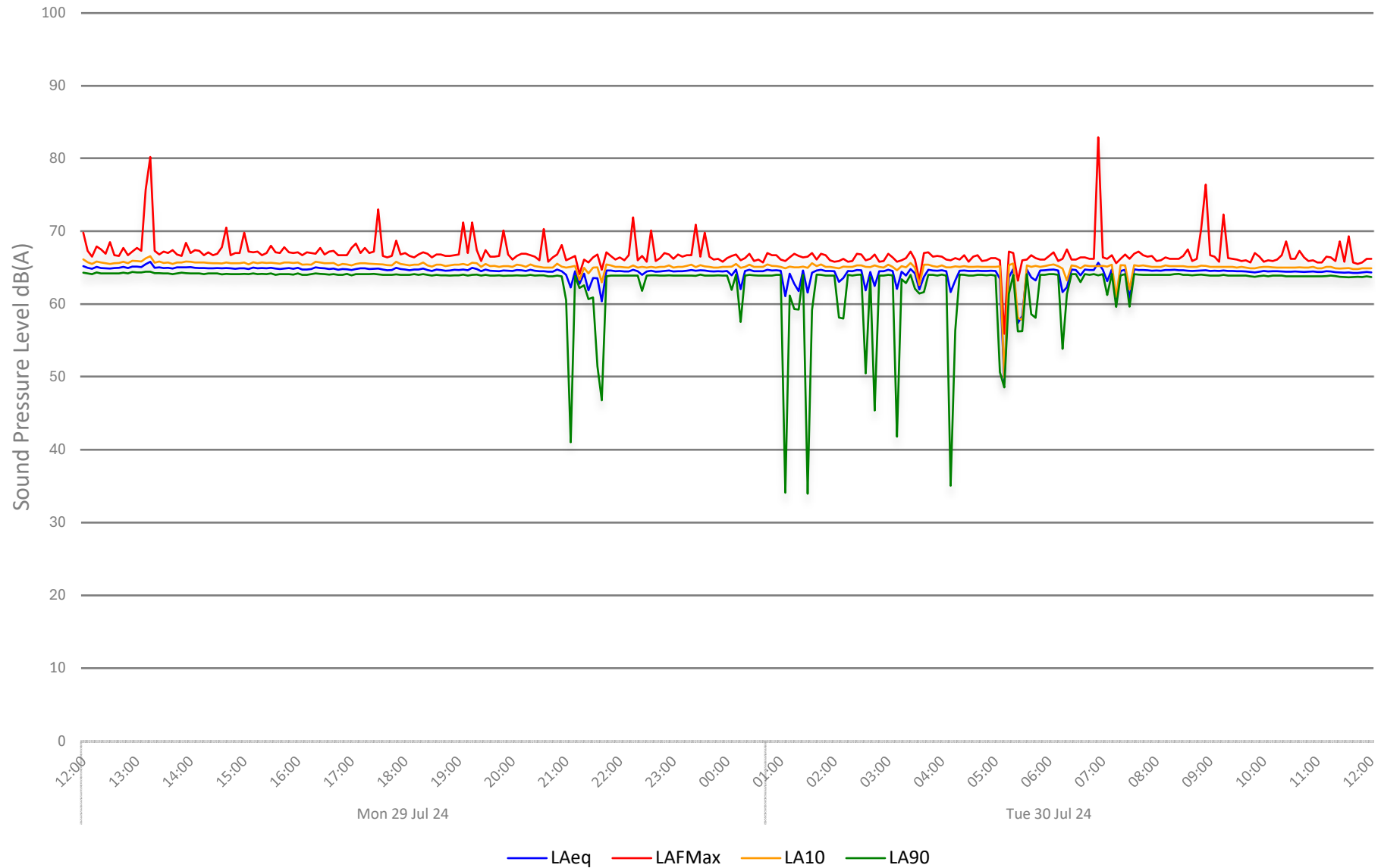


18a-22a Station Road, Netley
Environmental Noise Time History: 20



Position 4

Figure VA5424/TH20

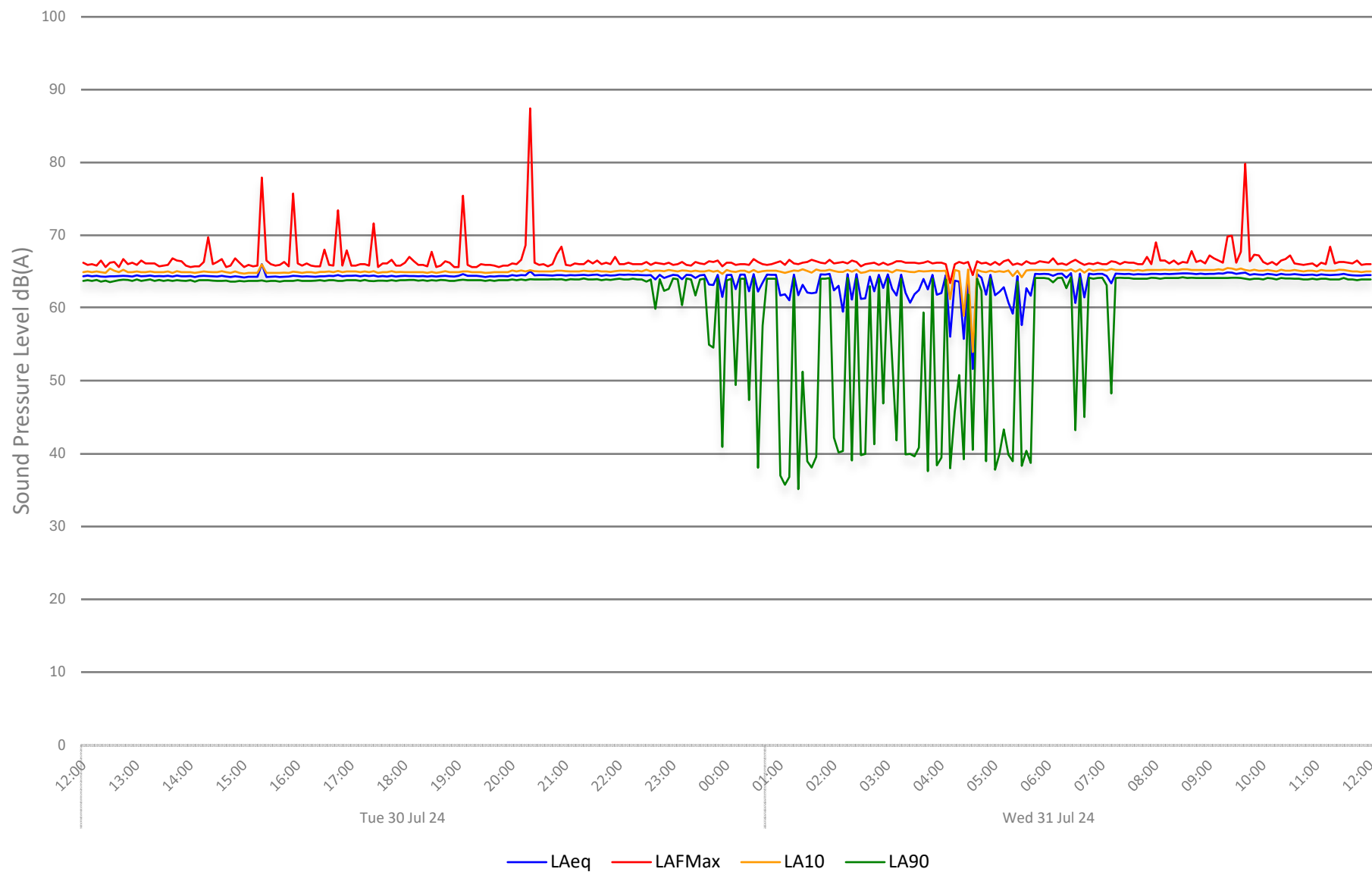


18a-22a Station Road, Netley
Environmental Noise Time History: 21



Position 4

Figure VA5424/TH21

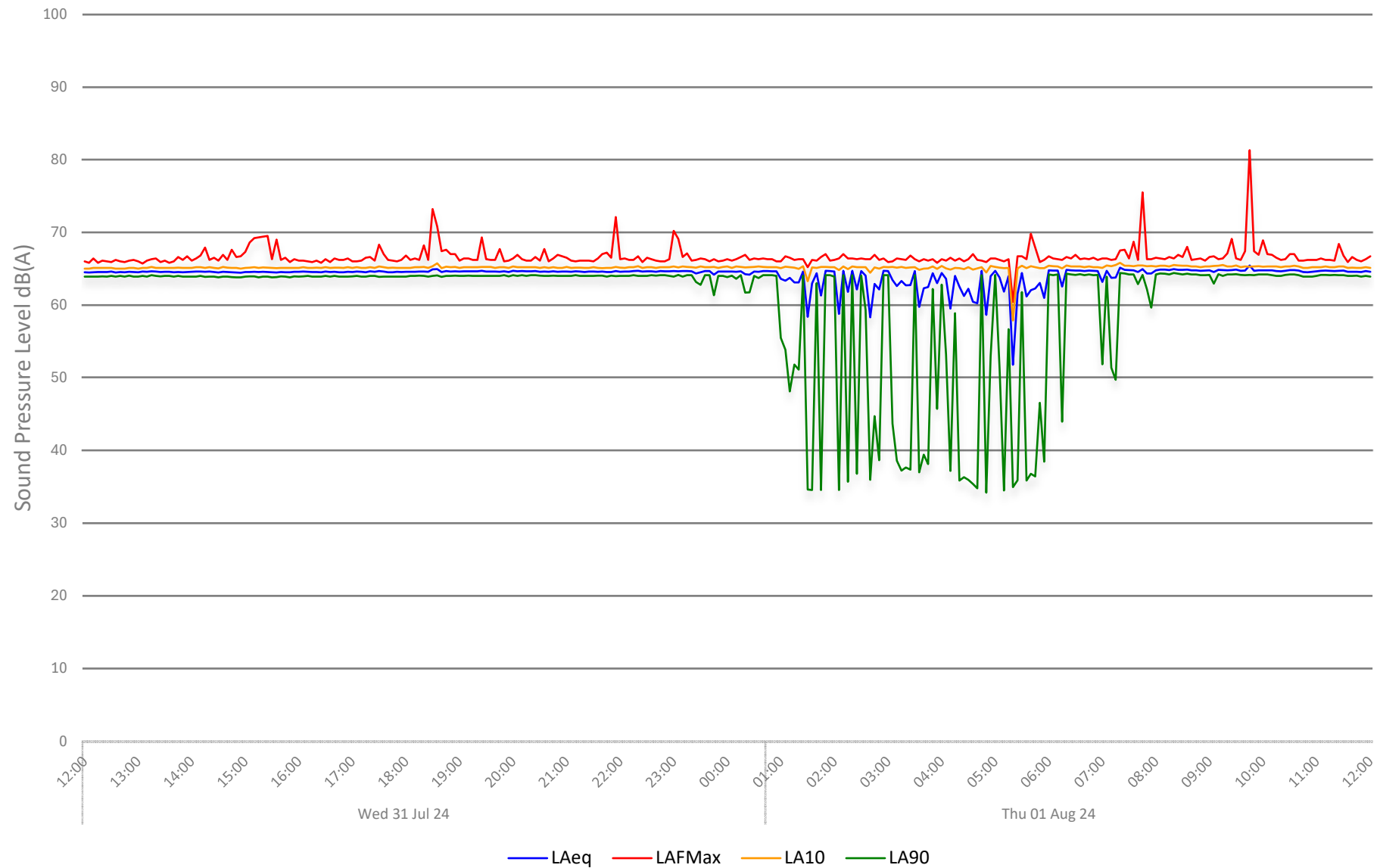


18a-22a Station Road, Netley
Environmental Noise Time History: 22



Position 4

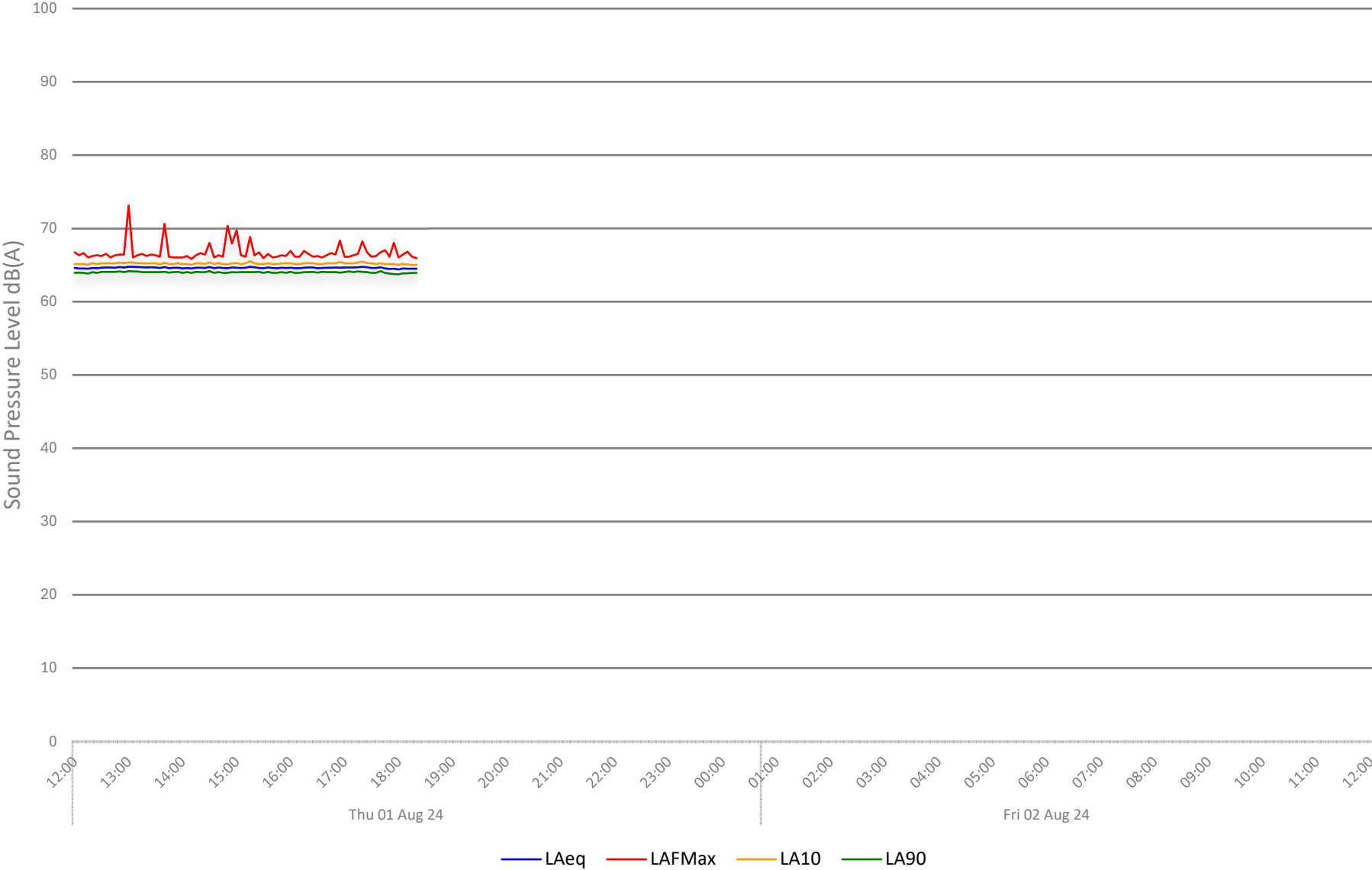
Figure VA5424/TH22



18a-22a Station Road, Netley
Environmental Noise Time History: 23
Position 4



Figure VA5424/TH23



APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

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. 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).
L_{eq} :	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_n 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.
R	<i>Sound Reduction Index.</i> Effectively the <i>Level Difference</i> of a building element when measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010 and corrected for its size and the reverberant characteristics of the receive room.
D	The sound insulation performance of a construction is described in terms of the difference in sound level on either side of the construction in the presence of a sound source on one side and the reverberant characteristics of the adjoining 'receive' space. <i>D</i> is the arithmetic <i>Level Difference</i> in decibels between the source and receive sound levels when filtered into frequency bands.
$D_{n,e}$	Normalised sound insulation of small building elements of fixed dimensions, such as vents, measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010.
R_w D_w $D_{nT,w}$ $D_{n,e,w}$ $D_{n,f,w}$	Value of parameter, determined as above, but weighted in accordance with the procedures laid down in BS EN ISO 717-1 to provide a single-figure value.

1.1 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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APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

1.2 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.

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

1.3 Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.

APPENDIX B

VA5424 - 18a-22a Station Road, Netley

Noise Impact Assessment

Assessment to Station Road Façade

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Delivery Rollcage	SEL @ 5m	85	80	76	80	84	87	86	80	92
D.T assessment period time cor	60 min	-36	-36	-36	-36	-36	-36	-36	-36	
Distance correction	To 3m	4	4	4	4	4	4	4	4	
Specific Sound Level at Receptc	Leq	54	49	45	49	53	56	54	49	61

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Chilled Food Compressor	LAeq,15min @ 5m	82	71	73	69	65	59	54	47	71
D.T assessment period time cor	60 min	-6	-6	-6	-6	-6	-6	-6	-6	
Distance correction	To 6m	-2	-2	-2	-2	-2	-2	-2	-2	
Specific Sound Level at Receptc	Leq	74	63	66	62	58	52	46	39	64

Assessment to New Road Façade

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Delivery Rollcage	SEL @ 5m	85	80	76	80	84	87	86	80	92
D.T assessment period time cor	60 min	-36	-36	-36	-36	-36	-36	-36	-36	
Building edge screening		-12	-15	-17	-18	-18	-18	-18	-18	
Distance correction	To 14m	-9	-9	-9	-9	-9	-9	-9	-9	30
Specific Sound Level at Receptc	Leq	28	21	14	18	22	25	23	18	

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Chilled Food Compressor	LAeq,15min @ 5m	82	71	73	69	65	59	54	47	71
D.T assessment period time cor	60 min	-6	-6	-6	-6	-6	-6	-6	-6	
Building edge screening		-11	-13	-16	-18	-18	-18	-18	-18	
Distance correction	To 17m	-11	-11	-11	-11	-11	-11	-11	-11	37
Specific Sound Level at Receptc	Leq	54	41	40	35	31	25	19	12	