

Construction noise and vibration Monthly Report – January 2018

London Borough of Camden

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Non-technical summary

This Noise and Vibration Monitoring Report fulfils HS2 Limited's commitment detailed in the Environmental Minimum Requirements (EMRs), Annex 1, Code of Construction Practice, to present the results of noise and vibration monitoring carried out within the London Borough of Camden (LBC) during the month of January 2018.

A number of worksites were active during the reporting month in the LBC area. Deliveries, movement of plant and materials, investigative surveys, under track crossing (UTX) works and positioning of signalling and telecom equipment were underway at Network Rail worksite B. Movement of plant, dismantling of building, cable percussion drilling and rotary drilling were underway at Network Rail worksite C, D and E. Piling, inert muck away, earthing and drainage works were underway at Network Rail worksite F. Pre-demolition surveys, removal of fixtures and fittings from buildings and asbestos removal were undertaken at the DB Cargo and former Addison Lee worksite (ref. S001-WS01). Site establishment and archaeological surveys were underway at St James's Gardens worksite (ref. S003-WS01). Pre-demolition surveys were underway at the former National Temperance Hospital, 110 Insull Wing worksite (ref. S003-WS02). Details of works undertaken at each worksite is presented in the report.

Noise monitoring was undertaken in the vicinity of Network Rail worksites B, C, D, E and F and the DB Cargo worksite (ref.: S001-WS01). Further noise monitoring installation in the LBC area will follow in advance of significant demolition or construction activities.

Exceedances of the SOAELs were measured at some monitoring positions surrounding worksites B, D, E and F, which were caused by activities at Network Rail HS2 construction sites mainly outside core working hours. No exceedance of S61 trigger levels was measured during the monitoring period. Three complaints were received during the monitoring period. Description of the complaints, results of investigations and any actions taken are detailed in the report.

Abbreviations and descriptions

The abbreviations, descriptions and project terminology used within this report can be found in the Project Dictionary (HS2-HS2-PM-GDE-000-000002).

Table 1: Table of abbreviations

| Acronym | Meaning |
|---|--|
| $L_{Aeq,T}$ | See equivalent continuous sound pressure level |
| Ambient sound | A description of the all-encompassing sound at a given location and time which will include sound from many sources near and far. Ambient sound can be quantified in terms of the equivalent continuous sound pressure level, $L_{pAeq,T}$ |
| Decibel(s), or dB | Between the quietest audible sound and the loudest tolerable sound there is a million to one ratio in sound pressure (measured in Pascal (Pa)). Because of this wide range, a level scale called the decibel (dB) scale, based on a logarithmic ratio, is used in sound measurement. Audibility of sound covers a range of approximately 0-140dB. |
| Decibel(s) A-weighted, or dB(A) | The human ear system does not respond uniformly to sound across the detectable frequency range and consequently instrumentation used to measure sound is weighted to represent the performance of the ear. This is known as the 'A weighting' and is written as 'dB(A)'. |
| Equivalent continuous sound pressure level, or $L_{Aeq,T}$ | An index used internationally for the assessment of environmental sound impacts. It is defined as the notional unchanging level that would, over a given period of time (T), deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating sound levels can be described in terms of an equivalent single figure value, typically expressed as a decibel level. |
| Exclusion of data | Measurement of noise levels can be affected by weather conditions such as prolonged periods of rain, winds speeds higher than 5m/s and snow/ice ground cover. Noise levels measured during these periods are considered not representative of normal noise conditions at the site and, for the purposes of this report, are excluded from the assessment of exceedances and calculation of typical noise levels and are also greyed out in charts. Identifiable incongruous noise and vibration events not attributable to HS2 construction noise are also excluded. |
| Façade | A facade noise level is the noise level 1m in front of a large reflecting surface. The effect of reflection, is to produce a slightly higher (typically +2.5 to +3 dB) sound level than it would be if the reflecting surface was not there. |
| Free-field | A free-field noise level is the noise level measured at a location where no reflective surfaces, other than the ground, lies within 3.5 metres of the microphone position. |
| Equivalent continuous sound pressure level, or $L_{pAeq,T}$ | An index used internationally for the assessment of environmental sound impacts. It is defined as the notional unchanging level that would, over a given period of time (T), deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating sound levels can be described in terms of an equivalent single figure value, typically expressed as a decibel level. |
| Peak particle velocity, or PPV | Instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position. The PPV is a simple indicator of perceptibility and risk of damage to structures due to vibration. It is usually measured in mm/s. |
| Sound pressure level | The parameter by which sound levels are measured in air. It is measured in decibels. The threshold of hearing has been set at 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dB at a distance of 1 metre and a change of 3dB in a time varying sound signal is commonly regarded as being just detectable. A change of 10dB is subjectively twice, or half, as loud. |
| Vibration dose value, or VDV | An index used to evaluate human exposure to vibration in buildings. While the PPV provides information regarding the magnitude of single vibration events, the VDV provides a measure of the total vibration experienced over a specified period of time (typically 16h daytime and 8h night-time). It takes into account the magnitude, the number and the duration of vibration events and can be used to quantify exposure to continuous, impulsive, occasional and intermittent vibration. The vibration dose value is measured in $m/s^{1.75}$. |

1 Introduction

1.1.1 The nominated undertaker is required to undertake noise (and vibration) monitoring as necessary to comply with the requirements of the High Speed Rail (London-West Midlands) Environmental Minimum Requirements, including specifically Annex 1: Code of Construction Practice, in addition to any monitoring requirements arising from conditions imposed through consents under section 61 of the Control of Pollution Act, 1974 or through Undertakings & Assurances given to third parties. Such monitoring may be undertaken for the following purposes:

- monitoring the impact of construction works;
- to investigate complaints, incidents and exceedance of trigger levels; or
- monitoring the effectiveness of noise and vibration control measures.

Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the London Borough of Camden (LBC) for the period 1st to 31st January 2018.

1.1.2 Active construction sites in the local authority area during this period include:

- Network Rail on-networks HS2 preparatory works: worksite ref. B (see plan 1 in Appendix A)
 - Works activities include deliveries, movement of plant, material recovery, removal of spoil, general surveys (including trial holes, ground investigations and cone penetration testing), under track crossing (UTX) works (including monitoring, compaction and installation of chamber) positioning of signalling and telecom equipment.
- Network Rail on-networks HS2 preparatory works: worksite ref. C, D and E (see plan 2 in Appendix A)
 - Works activities include movement of plant, removal and dismantling of pre-fabricated relay room building in Up Sidings, trial pitting, removal of redundant cable and transformer, cable percussion drilling at track known as Backing Out Road, removal of walkway board and rotary core drilling at the DB Schenker sidings.

- Network Rail on-networks HS2 preparatory works: worksite ref. F (see plan 2 in Appendix A)
 - Works activities include piling, muck away of inert, earthing and installation of deep drainage.
- DB Cargo shed and former Addison Lee, worksite ref. S001-WS01 (see plan 2 in Appendix A)
 - Works activities include pre-demolition surveys, removal of fixtures and fittings from buildings and asbestos removal.
- St James’s Gardens, worksite ref. S003-WS01 (see plan 3 in Appendix A)
 - Works activities include site establishment and archaeological surveys.
- Former National Temperance Hospital, Insull Wing, worksite ref. S003-WS02 (see 3 in Appendix A)
 - Works activities include pre-demolition surveys.

The applicable standards, guidance, and monitoring methodology is outlined in the construction noise and vibration monitoring methodology report which can be found at the following location <https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2>. Noise and vibration monitoring reports for previous months can also be found at this location. Noise and vibration reports prior to 2018 can be found at the following location www.gov.uk/government/publications/monitoring-noise-and-vibration-on-the-hs2-phase-one-route.

1.2 Measurement locations

1.2.1 Table 2 summarises the position of noise and vibration monitoring installations within the LBC area in January 2018.

1.2.2 Maps showing the position of noise monitoring installations are presented in Appendix B.

Table 2: Monitoring locations.

| Worksite Reference | Measurement Reference | Address |
|--------------------|-----------------------|--|
| B | JC | Juniper Crescent, London, NW1 8HA |
| D | MT | 13 Mornington Terrace, Kings Cross, London, NW1 7RR |
| | N004 | Mornington Terrace lamppost #7 (junction of Mornington Terrace, Mornington Place and Clarkson Row) |
| E | GT | 5A Granby Terrace, Kings Cross, London, NW1 3SA |
| F | BS | Roof of Stockbeck House, Barnby Street, Kings Cross, London, NW1 2RS |

| Worksite Reference | Measurement Reference | Address |
|--------------------|-----------------------|---|
| S001-WS01 | N001 | Park Village East lamppost #1 (external to Cubitt Court, 100 Park Village East) |
| | N002 | Park Village East lamppost #2 (external to Richmond Court) |
| | N003 | Park Village East lamppost #9 (external to Silsoe House) |

2 Summary of results

2.1 Exceedances of SOAEL

2.1.1 The significant observed adverse effect levels (SOAEL) is defined in the Planning Practice Guidance – Noise as the level above which "noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."

2.1.2 Where construction noise levels exceed the SOAEL, relevant periods will be identified and summary statistics provided in order to evaluate ongoing qualification for noise insulation and temporary rehousing.

2.1.3 Table 3 presents a summary of recorded exceedances of the SOAEL due to HS2 related construction noise at each measurement location over the reporting period, including the number of exceedances during each time period.

Table 3: Summary of exceedances of LOAEL and SOAEL.

| Worksite Reference | Measurement Reference | Site Address | Day (Weekday, Saturday, Sunday, Night) | Time period | Number of exceedances of SOAEL |
|--------------------|-----------------------|---|--|-------------|--------------------------------|
| B | JC ⁽¹⁾ | Juniper Crescent | Saturday | 1400-2200 | 1 |
| | | | Sunday | 0700-2200 | 1 |
| | | | Night | 2200-0700 | 8 |
| D | MT | Mornington Terrace | Night | 2200-0700 | 3 |
| | N004 | Mornington Terrace lamppost #7 | Night | 2200-0700 | 5 |
| E | GT | Granby Terrace | Sunday | 0700-2200 | 4 |
| | | | Night | 2200-0700 | 4 |
| | N001 | DB Cargo shed and adjacent land on Granby Terrace | Night | 2200-0700 | 6 |

| Worksite Reference | Measurement Reference | Site Address | Day (Weekday, Saturday, Sunday, Night) | Time period | Number of exceedances of SOAEL |
|--------------------|-----------------------|---|--|-------------|--------------------------------|
| | N002 | DB Cargo shed and adjacent land on Granby Terrace | Night | 2200-0700 | 5 |
| | N003 | DB Cargo shed and adjacent land on Granby Terrace | Night | 2200-0700 | 5 |
| F | BS | Barnby Street | Night | 2200-0700 | 4 |
| S001-WS01 | N001 | DB Cargo shed and adjacent land on Granby Terrace | All days | All periods | No exceedance |
| | N002 | DB Cargo shed and adjacent land on Granby Terrace | All days | All periods | No exceedance |
| | N003 | DB Cargo shed and adjacent land on Granby Terrace | All days | All periods | No exceedance |

⁽¹⁾ This monitor is located within the worksite and the measured noise levels and exceedances of the SOAEL are not representative of noise at the surrounding residential properties. Alternative locations for repositioning of this monitor are being considered in discussion with the Local Council.

2.1.4 Over the reporting period the SOAEL was exceeded at a number of measurement locations in the vicinity of worksites B, D, E and F. These were caused by activities at Network Rail HS2 construction sites during night-time periods and weekend days. Outside of these times any exceedances of the SOAEL were caused by the underlying ambient noise levels or other construction activities not related to HS2, rather than being attributable to HS2 construction noise.

2.1.5 For the purpose of assessing eligibility for noise insulation or temporary rehousing, multiple exceedances of the SOAEL in a 24-hour period would be counted as a single exceedance during that day. Over the reporting period, the overall number of SOAEL exceedances at each measurement location is shown in Table 4 and may be lower than the total sum of individual exceedances reported in Table 3 for each location.

Table 4: Summary of total exceedances of SOAEL.

| Worksite Reference | Measurement Reference | Site Address | Total of SOAEL exceedances in the month |
|--------------------|-----------------------|---|---|
| B | JC ⁽¹⁾ | Juniper Crescent | 8 |
| D | MT | Mornington Terrace | 3 |
| | N004 | Mornington Terrace lamppost #7 | 5 |
| E | GT | Granby Terrace | 6 |
| | N001 | DB Cargo shed and adjacent land on Granby Terrace | 6 |
| | N002 | DB Cargo shed and adjacent land on Granby Terrace | 5 |

| Worksite Reference | Measurement Reference | Site Address | Total of SOAEL exceedances in the month |
|--------------------|-----------------------|---|---|
| | N003 | DB Cargo shed and adjacent land on Granby Terrace | 5 |
| F | BS | Barnby Street | 4 |

⁽¹⁾ This monitor is located within the worksite and the measured noise levels and exceedances of the SOAEL are not representative of noise at the surrounding residential properties. Alternative locations for repositioning of this monitor are being considered in discussion with the Local Council.

2.2 Summary of measured noise levels

2.2.1 Table 5 presents a summary of the measured noise levels at each monitoring location over the reporting period. The $L_{Aeq,T}$ is presented for each of the relevant time periods averaged over the calendar month, along with the highest single period $L_{Aeq,T}$ that was found to occur within the month.

2.2.2 Given the limited nature of works currently being undertaken at HS2 worksites in LBC the measured noise levels are largely dominated by the underlying ambient noise levels, rather than being attributable to HS2 construction noise, acknowledging that intermittent HS2 works may on occasion be taking place within the area.

Table 5: Summary of measured dB L_{Aeq} data over the monitoring period.

| Worksite Reference | Measurement Reference | Site Address | Free-field or Façade measurement | Weekly Average L _{Aeq,T} (highest day L _{Aeq,T}) | | | | | Saturday Average L _{Aeq,T} (highest day L _{Aeq,T}) | | | | | Sunday / Public Holiday Average L _{Aeq,T} (highest day L _{Aeq,T}) | |
|--------------------|-----------------------|---|----------------------------------|--|----------------|----------------|----------------|----------------|--|----------------|----------------|----------------|----------------|--|----------------|
| | | | | 0700 - 0800 | 0800 - 1800 | 1800 - 1900 | 1900 - 2200 | 2200 - 0700 | 0700 - 0800 | 0800 - 1300 | 1300 - 1400 | 1400 - 2200 | 2200 - 0700 | 0700 - 2200 | 2200 - 0700 |
| B | JC ⁽¹⁾ | Juniper Crescent, London, NW1 8HA | Free-field | 67.1 (69.4) | 68.3 (69.9) | 67.9 (70.3) | 66.8 (69.0) | 62.8 (71.8) | 65.7 (67.0) | 67.3 (69.0) | 66.2 (67.1) | 66.2 (69.8) | 62.5 (72.9) | 64.9 (68.3) | 61.8 (66.7) |
| D | MT | 13 Mornington Terrace, Kings Cross, London, NW1 7RR | Free-field | 57.4 (60.5) | 59.1 (61.6) | 59.4 (68.8) | 56.7 (59.5) | 53.6 (71.3) | 55.8 (57.2) | 56.8 (58.2) | 57.1 (58.7) | 56.3 (58.4) | 53.0 (57.9) | 56.0 (59.4) | 51.9 (57.9) |
| | N004 | Mornington Terrace lamppost #7 | Free-field | 63.6 (65.6) | 65.1 (66.7) | 64.8 (68.5) | 63.8 (70.3) | 59.6 (66.1) | 63.3 (64.1) | 63.7 (64.3) | 63.1 (63.7) | 62.8 (65.9) | 57.2 (63.7) | 62.2 (65.7) | 59.5 (70.4) |
| E | GT | 5A Granby Terrace, Kings Cross, London, NW1 3SA | Free-field | 68.0 (70.6) | 68.9 (71.1) | 68.5 (70.0) | 66.9 (70.4) | 63.6 (69.4) | 68.8 (72.3) | 68.7 (72.4) | 68.0 (68.8) | 66.6 (68.2) | 62.0 (70.2) | 66.2 (68.4) | 62.8 (67.7) |
| F | BS | Roof of Stockbeck House, Barnby Street | Free-field | 57.8 (61.4) | 63.2 (70.7) | 59.0 (63.0) | 58.2 (63.8) | 54.6 (62.4) | 56.6 (59.6) | 58.1 (61.8) | 58.4 (62.0) | 57.3 (60.4) | 52.7 (58.7) | 57.4 (62.7) | 54.5 (62.3) |
| S001-WS01 | N001 | External to Cubitt Court, 100 Park Village East | Free-field | 61.7 (66.2) | 63.2 (66.0) | 61.8 (63.3) | 60.0 (62.9) | 56.0 (63.5) | 56.8 (57.8) | 60.7 (61.8) | 60.6 (62.4) | 61.1 (63.1) | 55.8 (60.2) | 59.7 (64.0) | 55.7 (64.4) |
| | N002 | Richmond Court, Park Village East | Free-field | 62.4 (65.1) | 63.7 (69.6) | 63.2 (64.6) | 61.3 (65.7) | 57.2 (64.4) | 58.8 (61.0) | 61.8 (63.9) | 62.6 (64.9) | 62.5 (65.3) | 57.4 (62.1) | 61.0 (65.1) | 56.8 (63.2) |
| | N003 | Silsoe House, Park Village East | Free-field | 63.1 (66.3) | 64.6 (69.2) | 63.7 (65.8) | 61.8 (66.1) | 57.7 (65.0) | 59.3 (60.9) | 62.2 (64.5) | 63.1 (65.3) | 62.8 (65.6) | 57.3 (60.5) | 61.5 (65.4) | 57.6 (64.5) |

⁽¹⁾ This monitor is located within the worksite and the measured noise levels and exceedances of the SOAEL are not representative of noise at the surrounding residential properties. Alternative locations for repositioning of this monitor are being considered in discussion with the Local Council.

2.2.3 Appendix C presents graphs of noise monitoring data over the month for each of the measurement locations. Noise data presented consist of the hourly L_{Aeq} values and, where relevant, the $L_{Aeq,T}$ values (where the time period T has been taken to be the averaging period as specified in Table 1 of HS2 Information Paper E23). The full data set for the monitoring equipment can be found at the following location:
<https://data.gov.uk/dataset/24542ae7-dd44-444f-b259-871c4cc43b5e/environmental-monitoring-data>.

2.3 Exceedances of trigger level

2.3.1 Table 6 provides a summary of exceedances of the S61 trigger noise levels determined to be due to HS2 related construction measured during the reporting period, along with the findings of any investigation.

Table 6: Summary of exceedances of trigger levels.

| Complaint reference number (if applicable) | Worksite reference | Date and time period | Identified Source | Results of investigation (including noise monitoring results) | Actions taken |
|--|--------------------|----------------------|-------------------|---|---------------|
| - | - | - | - | - | - |

2.3.2 There were no exceedances of trigger levels as defined in section 61 consents during the reporting period at any monitoring position.

2.4 Complaints

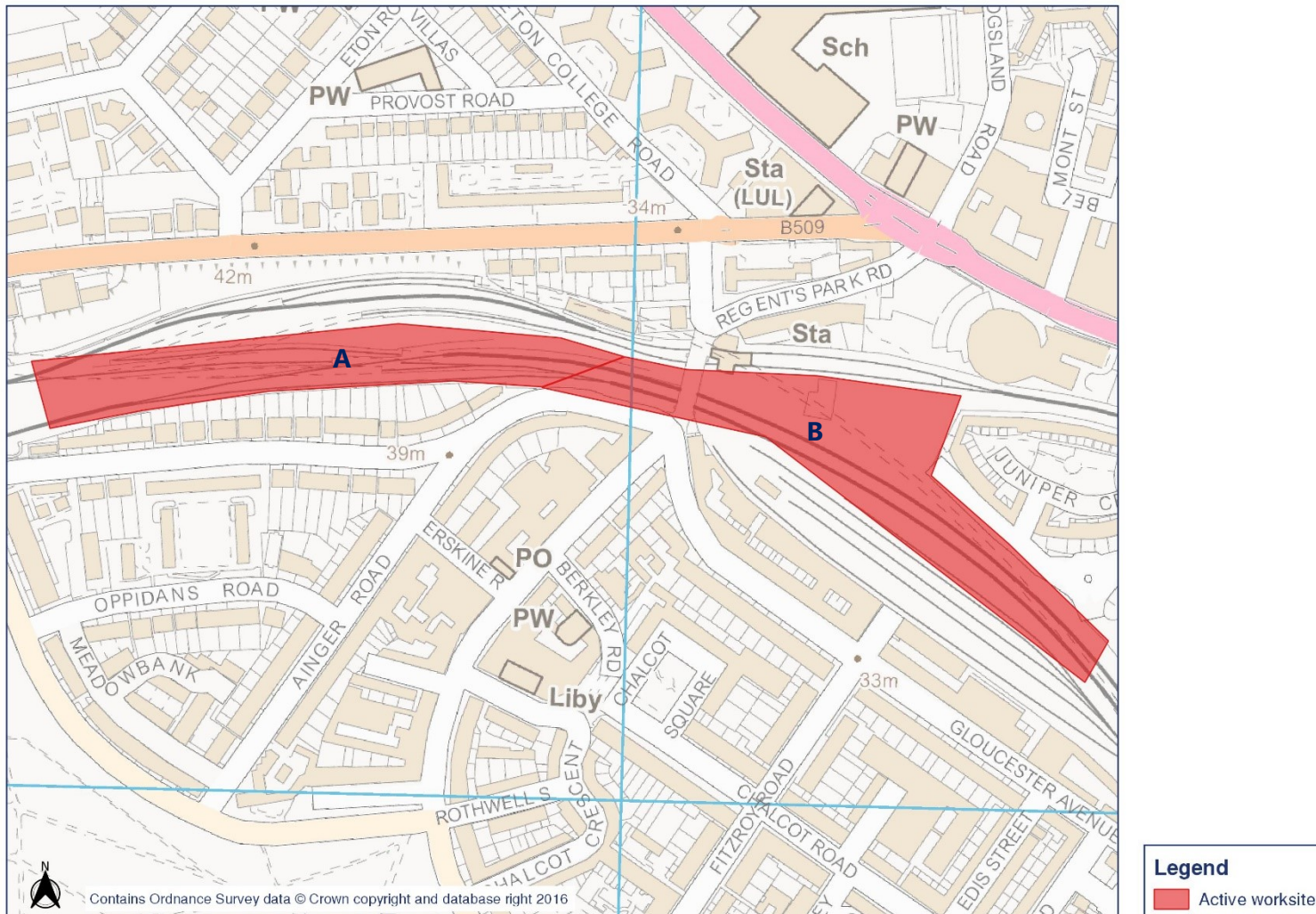
2.4.1 Table 7 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

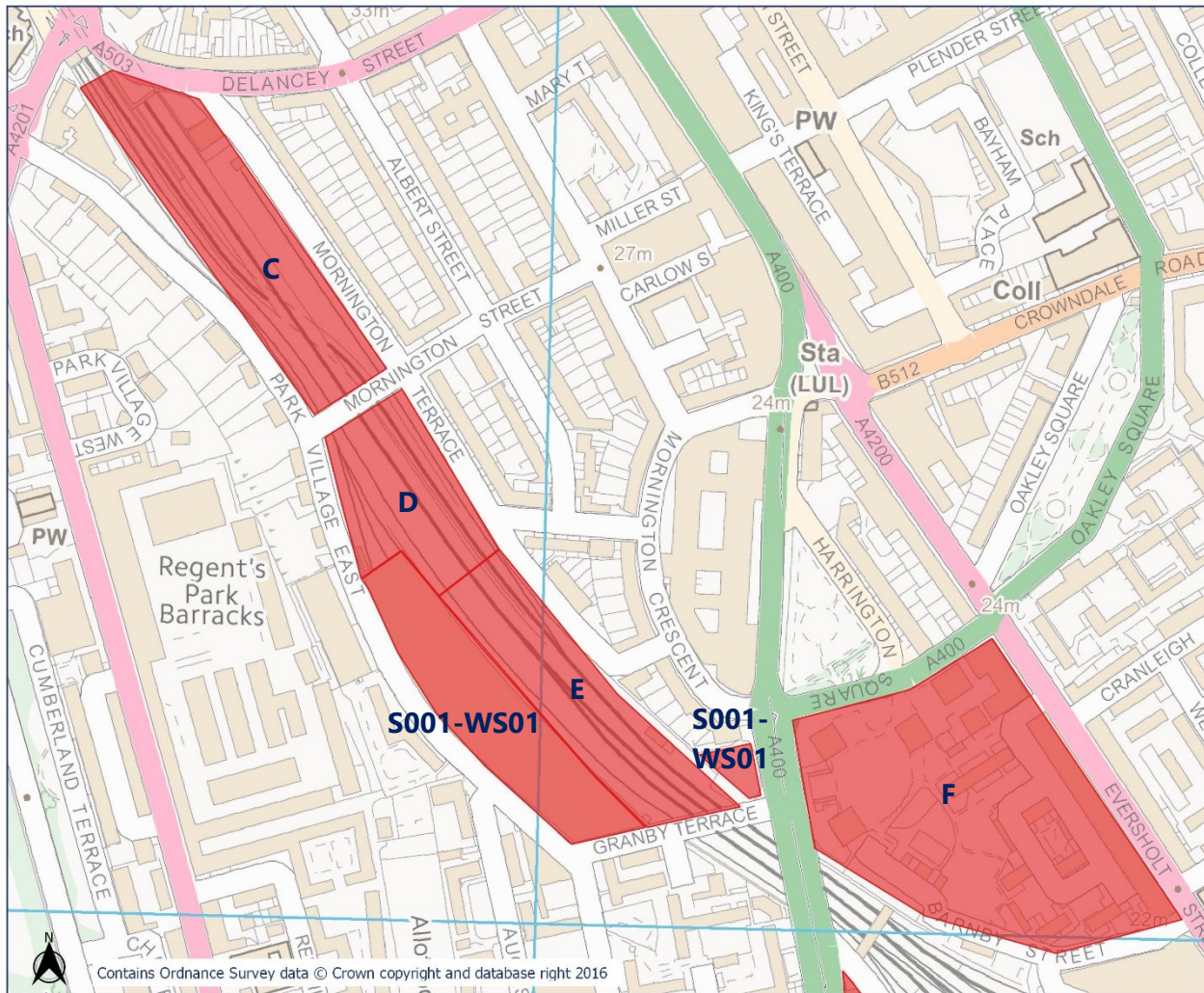
Table 7: Summary of complaints.

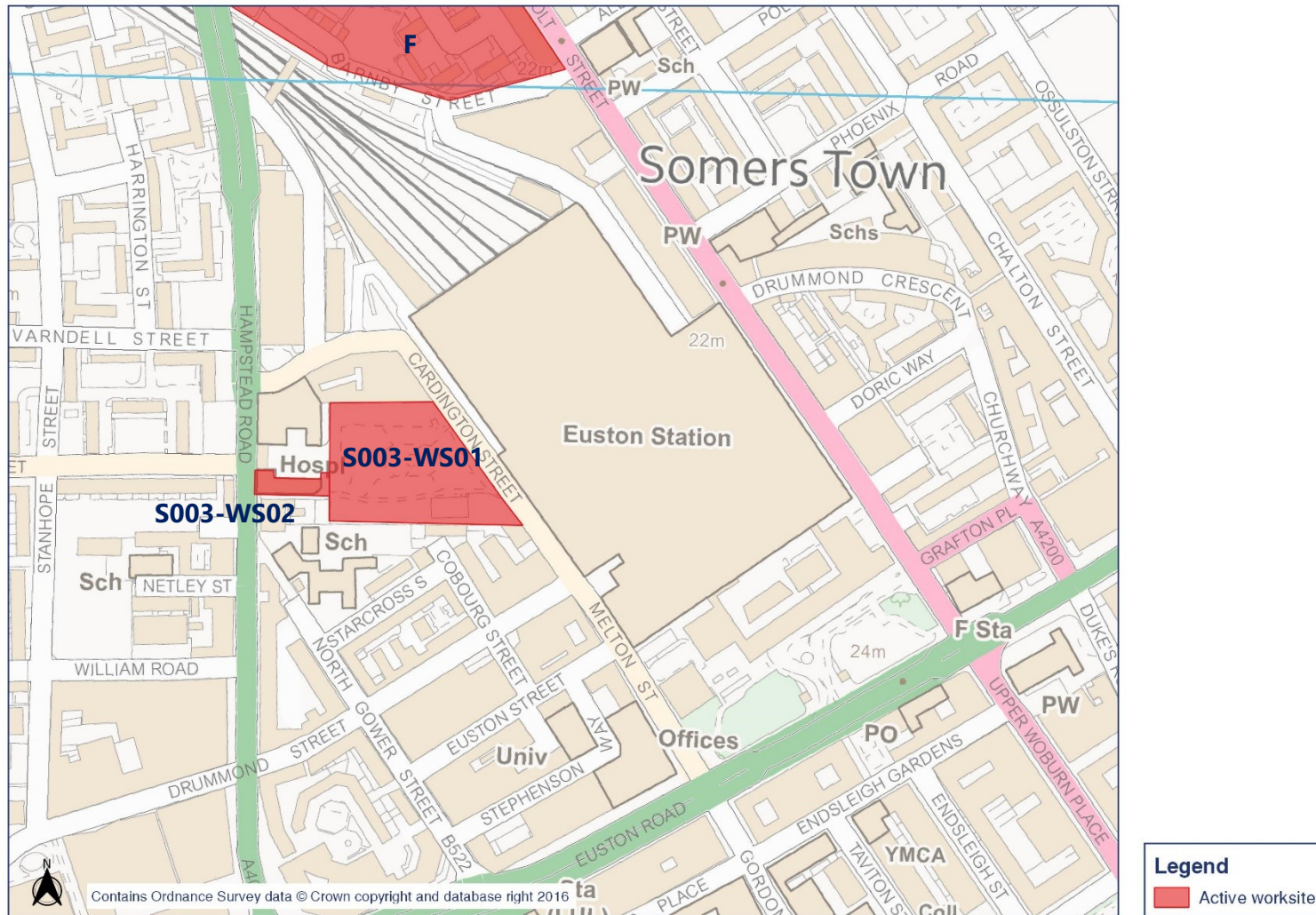
| Complaint reference number | Worksite reference | Description of complaint | Results of investigation | Actions taken |
|----------------------------|--------------------|---|---|---|
| CPA-000198 | C | General complaint from a resident of Mornington Terrace about excessive construction noise. | Works carried out to dismantle and remove lineside relay room were rescheduled from the previous week due to unforeseen circumstances. Night time possessions required to undertake this work. All works were undertaken in | Workforce briefed on generator use and on raised voices being used during night time possessions. Resident advised accordingly. |

| Complaint reference number | Worksite reference | Description of complaint | Results of investigation | Actions taken |
|----------------------------|--------------------|--|---|--|
| | | | accordance with S61 consent. In addition a generator was found to be left running. | |
| CPA-000199 | C | Complaint from a resident of Mornington Terrace about noise disturbance from removal of a modular building without the use of acoustic barriers. | Works taking place close to the retaining wall of the cutting where noise barriers would be ineffective in reducing noise above the retaining wall. | Resident contacted and informed of work package and reasoning behind scheduling of works and why acoustic barriers were not practicable. |
| CPA-000205 | C/D/E | Complaint from a resident of Mornington Terrace about perceptible vibration at the property. | Investigation found that routine track maintenance and not HS2 works were being undertaken. | Resident advised accordingly. |

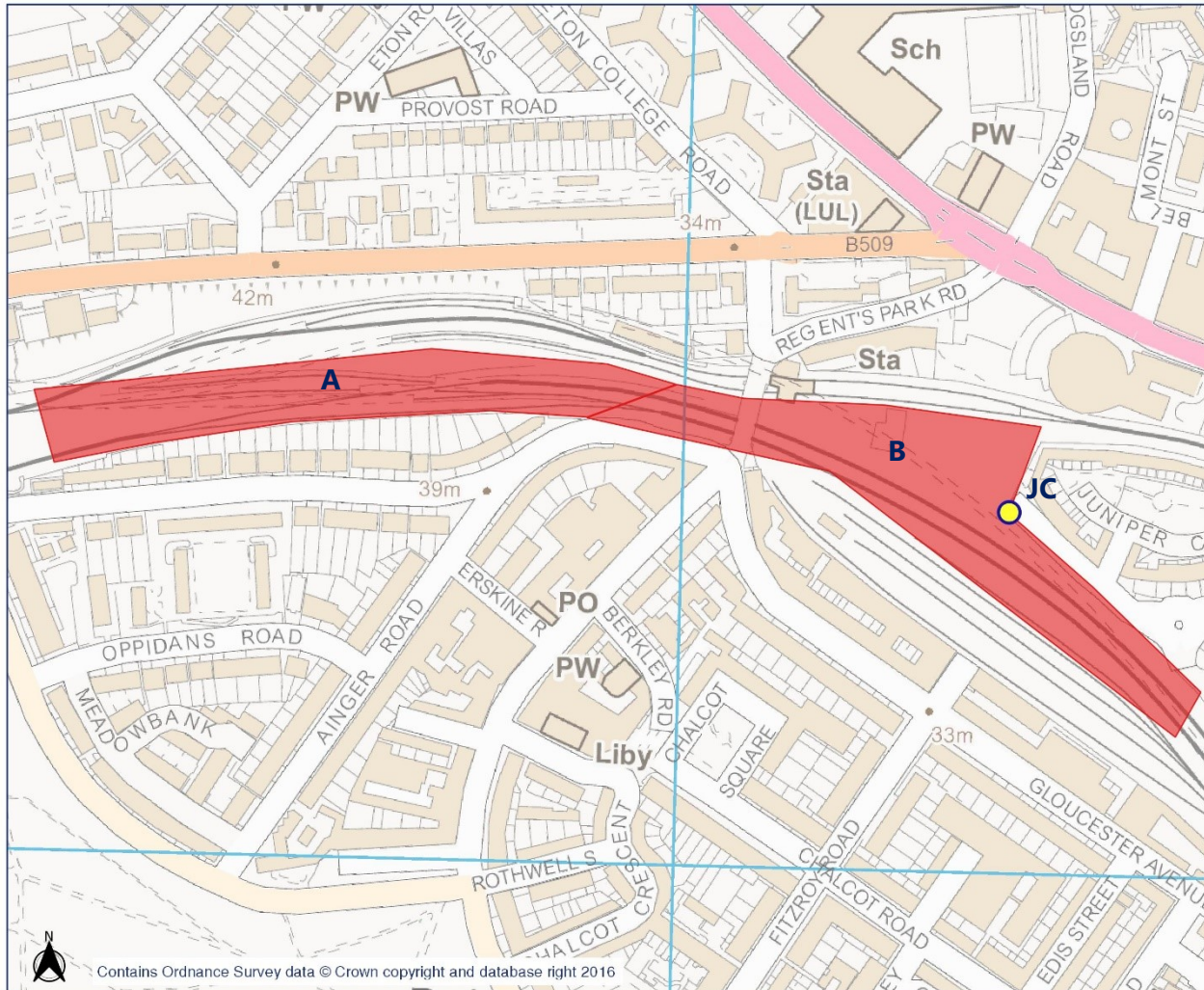
Appendix A Site Locations

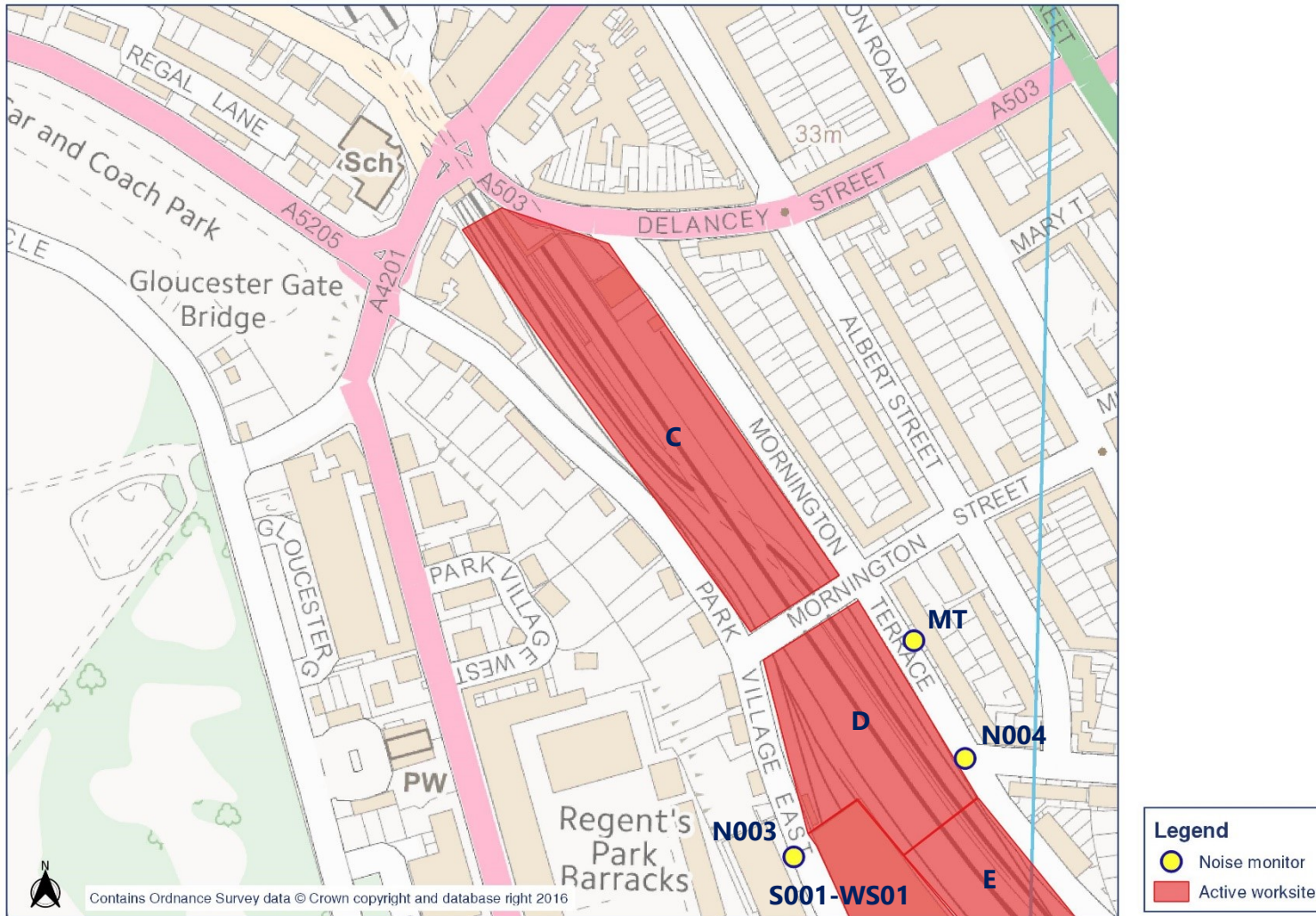


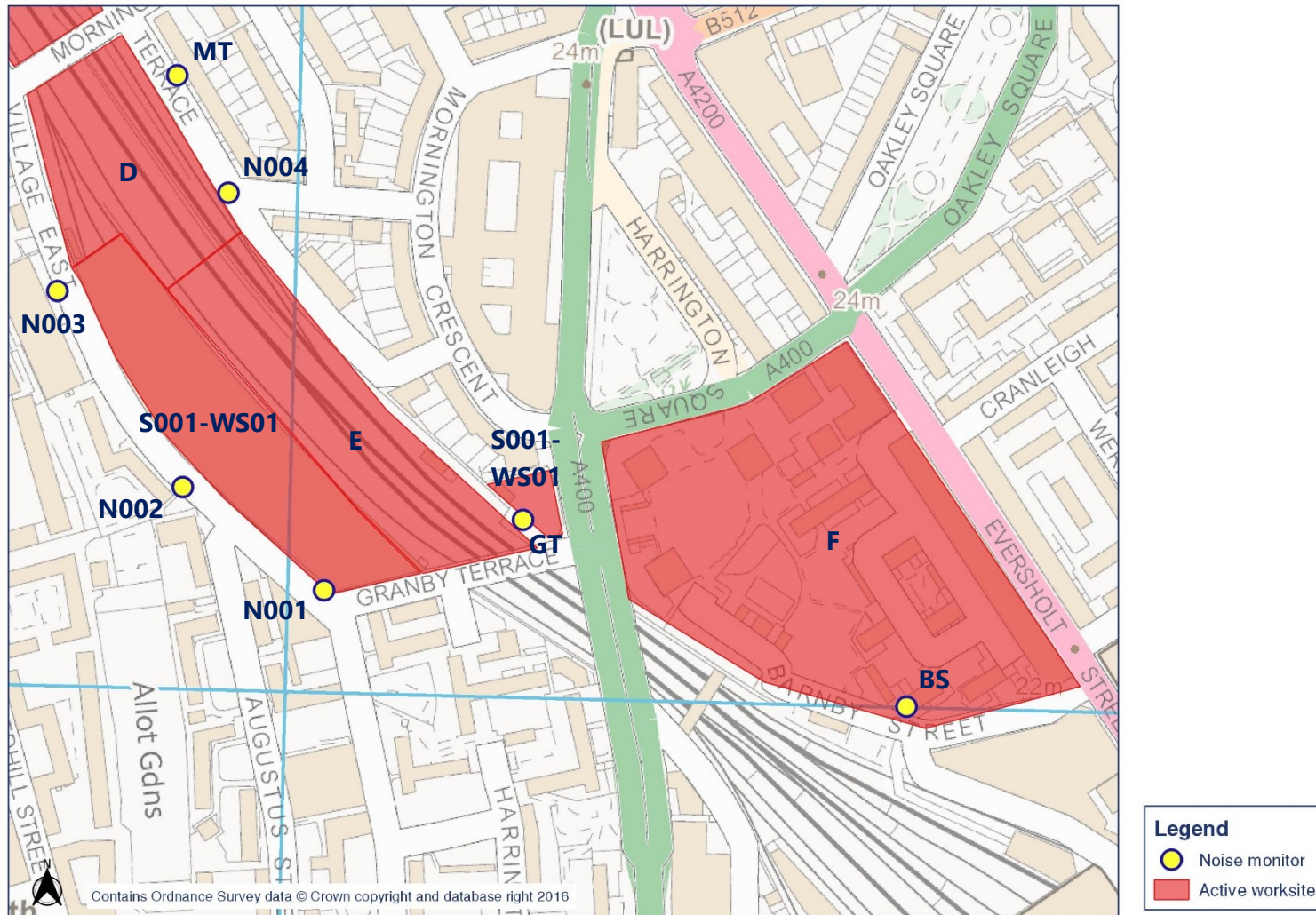


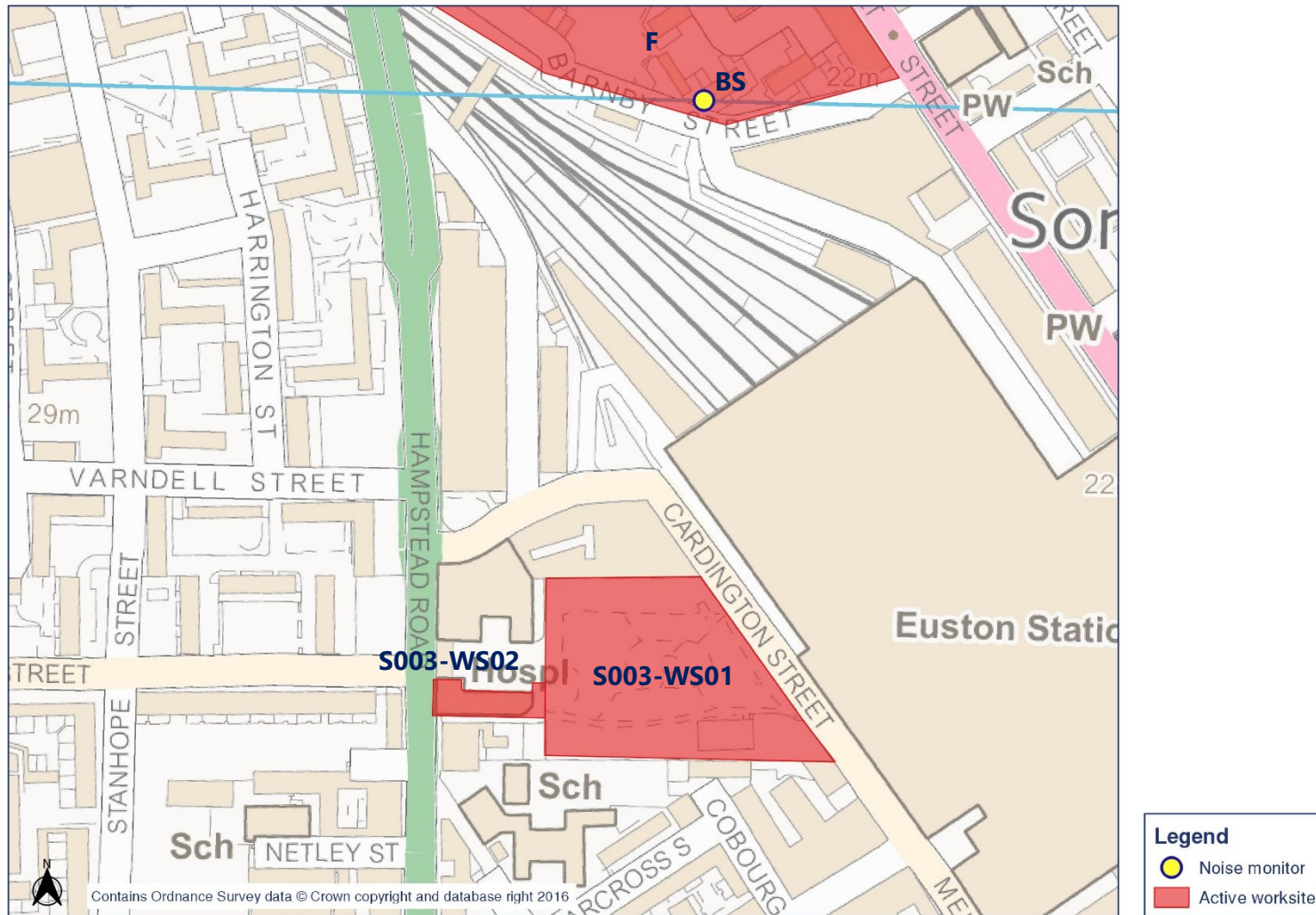


Appendix B Monitoring Locations







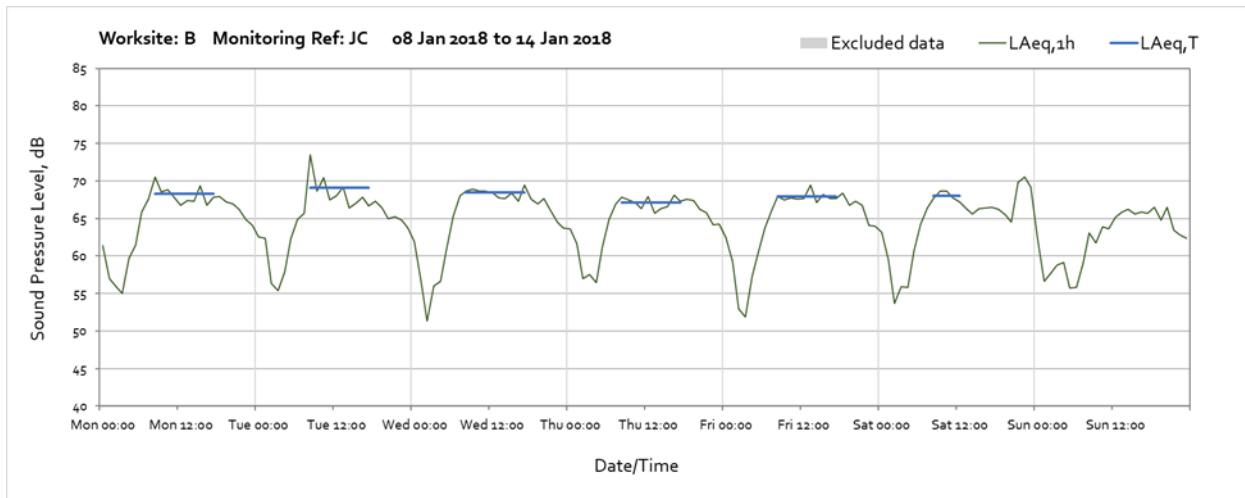
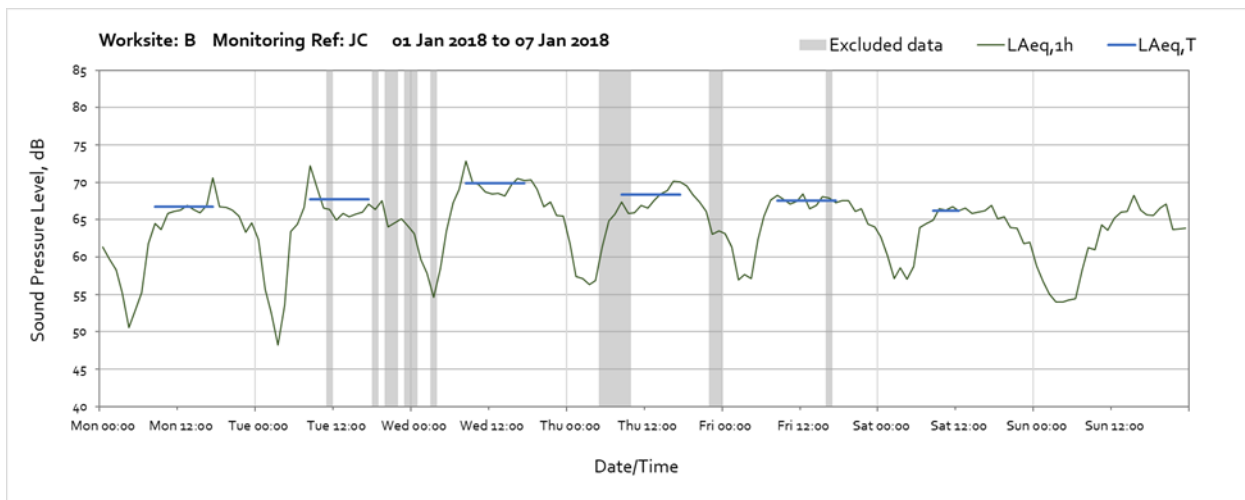


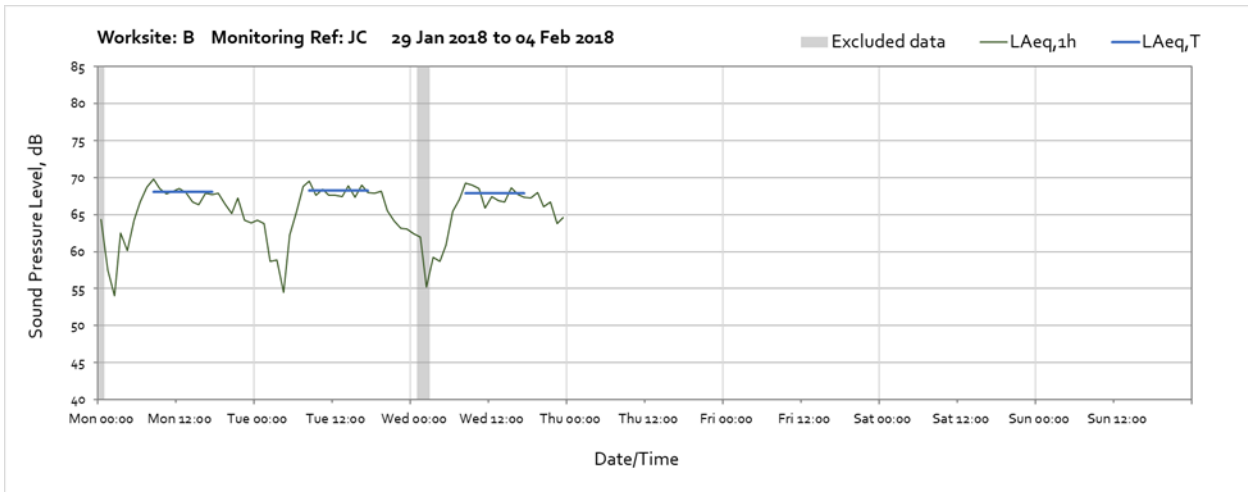
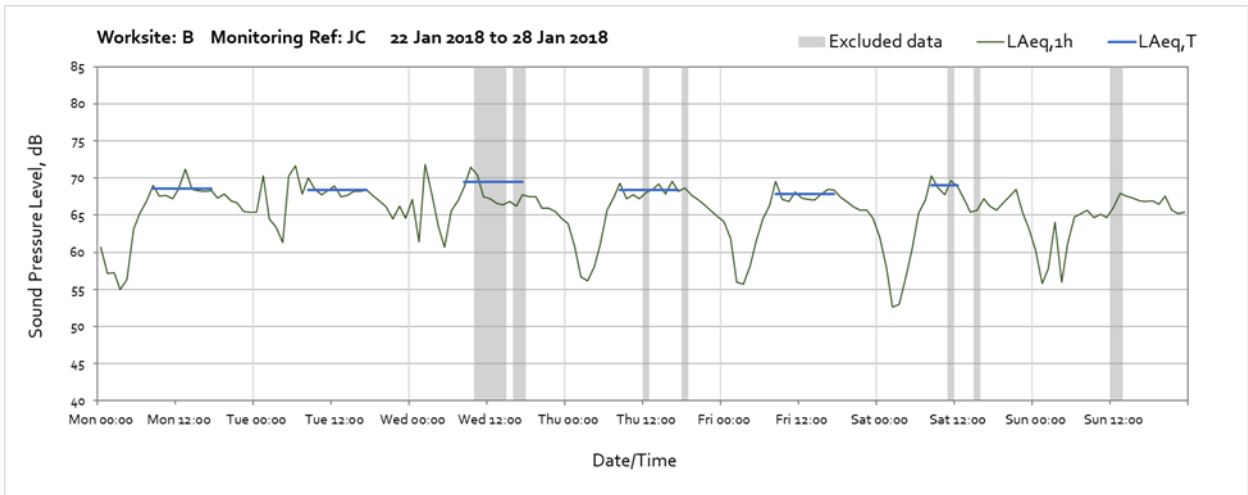
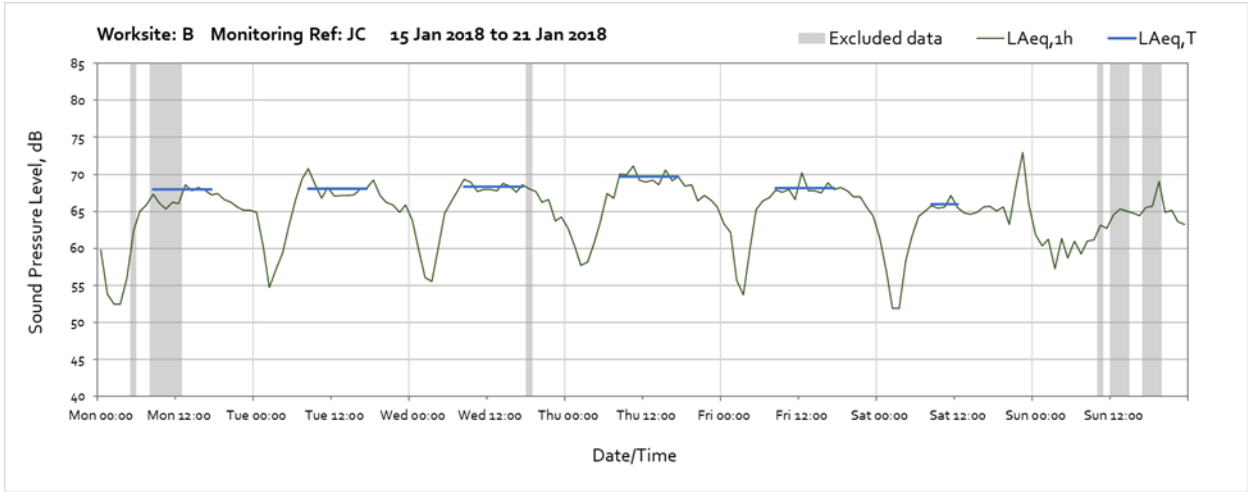
Appendix C Data

Noise

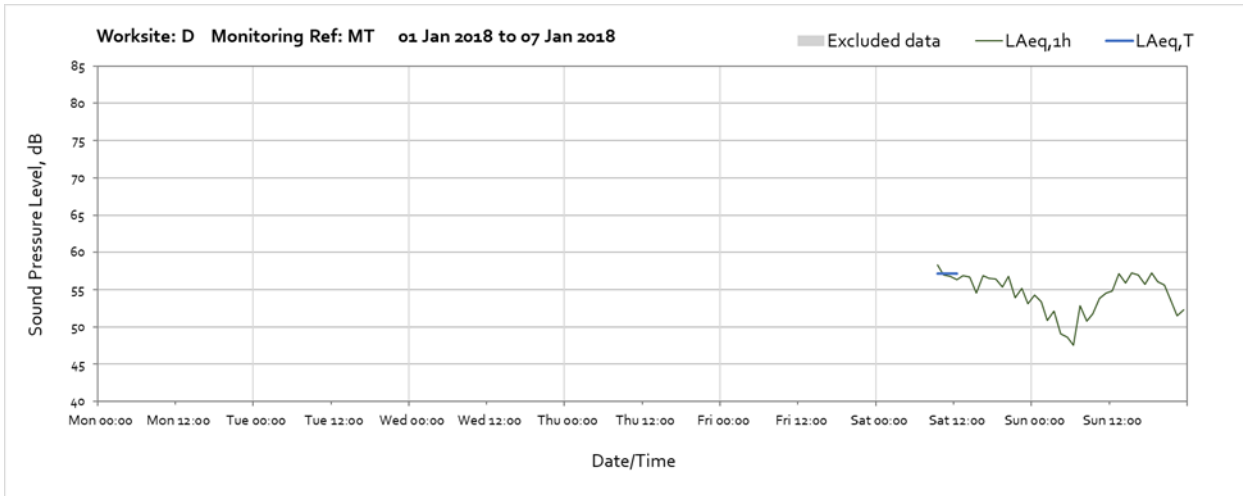
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have been excluded from the calculation of the $L_{Aeq,T}$ values in Table 5.

Worksite: B – Monitoring Ref: JC

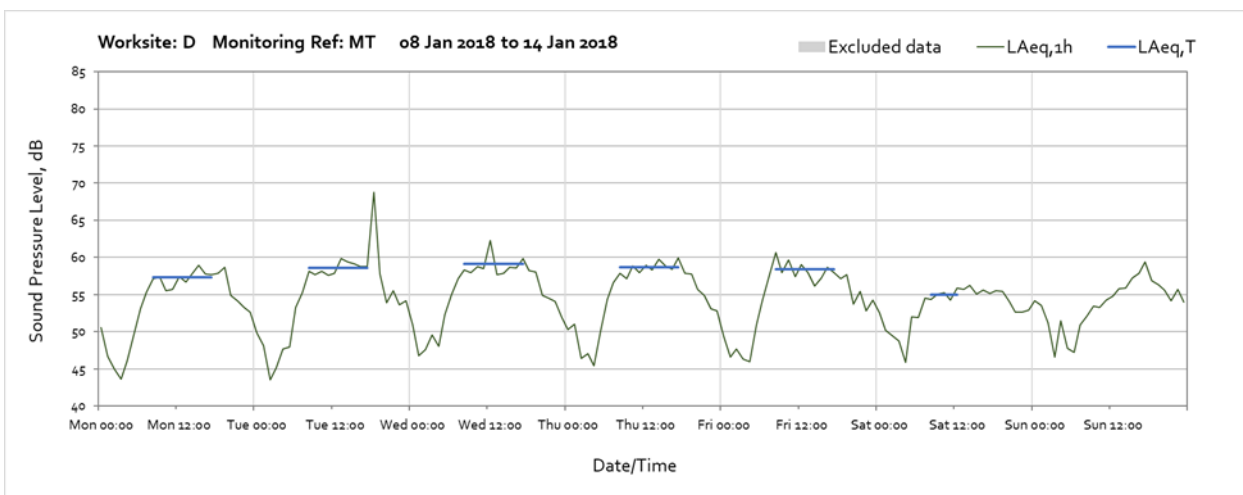
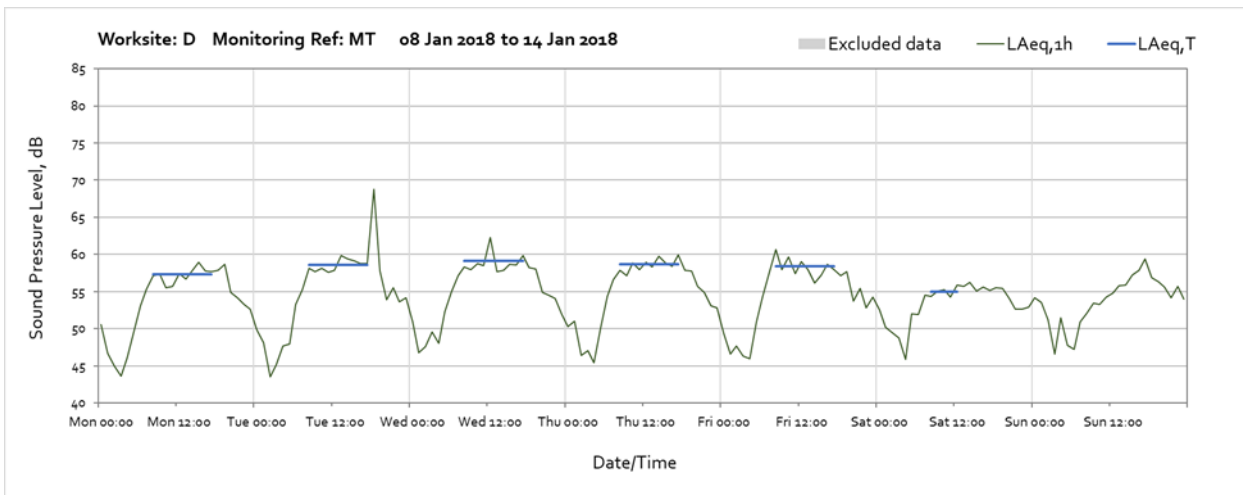


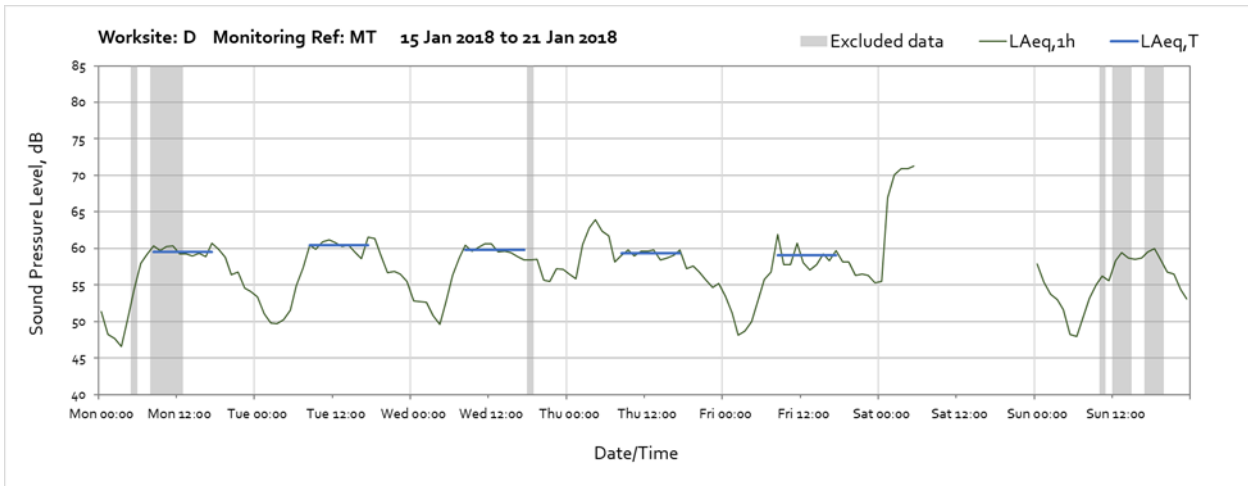


Worksite: D – Monitoring Ref: MT

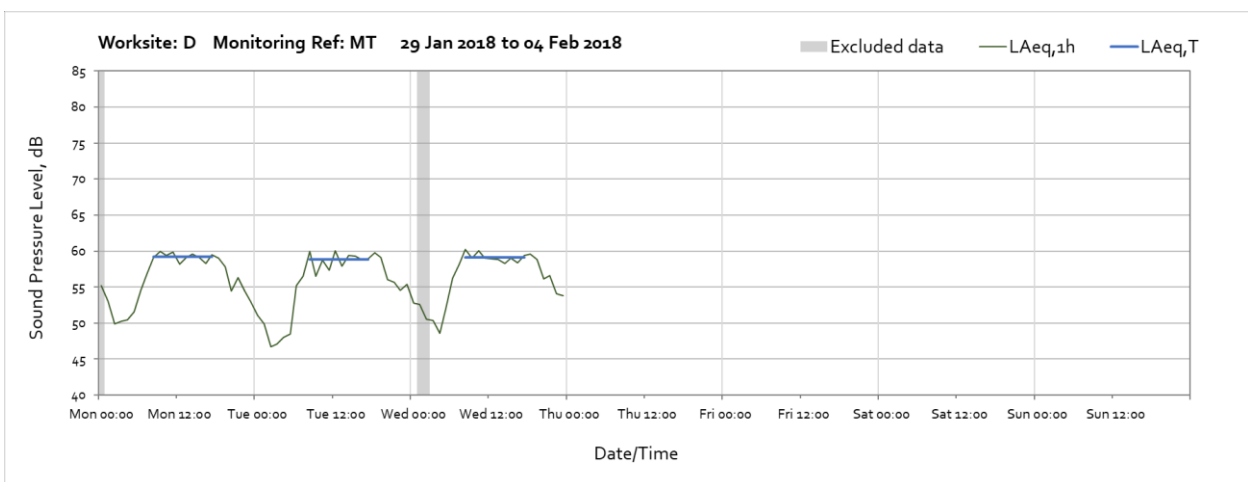
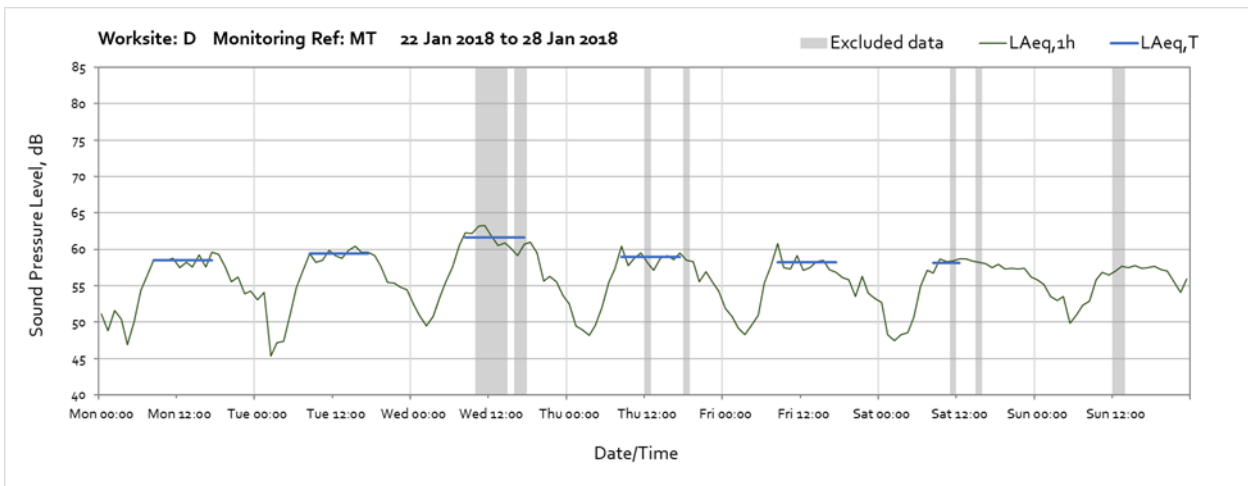


Note – Missing data between the beginning of the month and 09:00 on Saturday 6th were due to loss of power at the monitoring station.

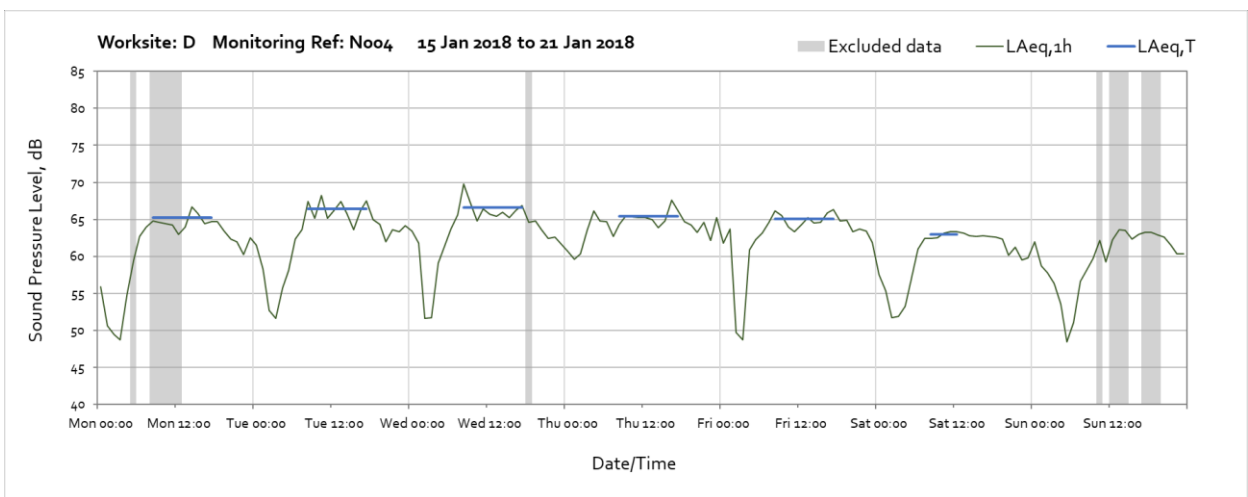
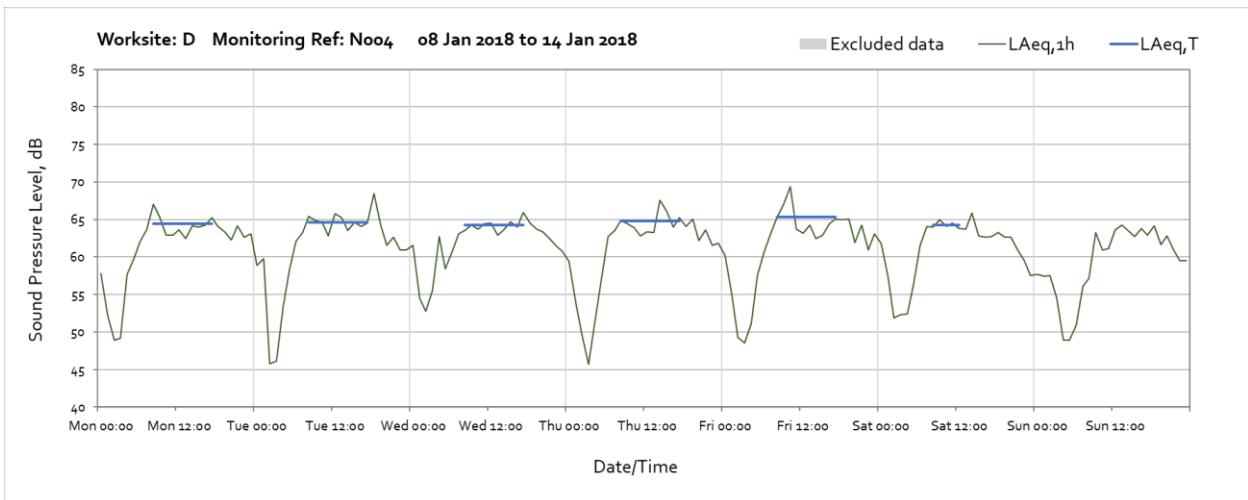
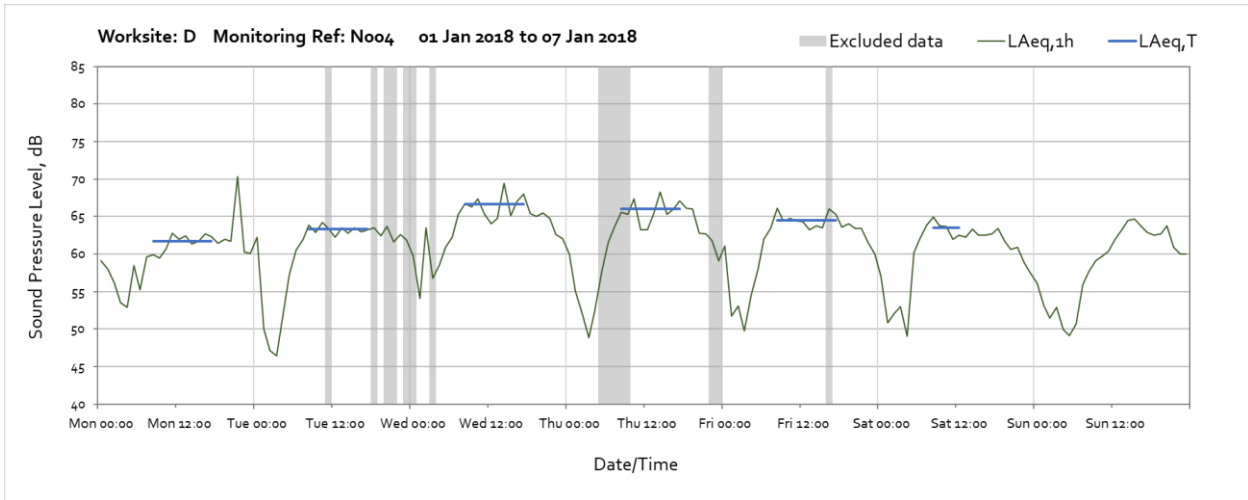


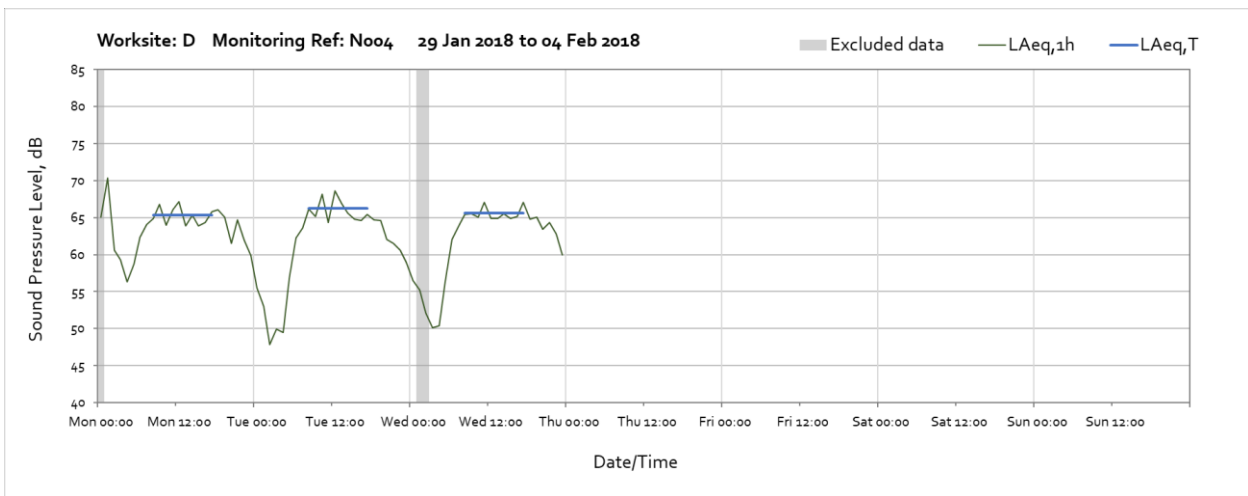
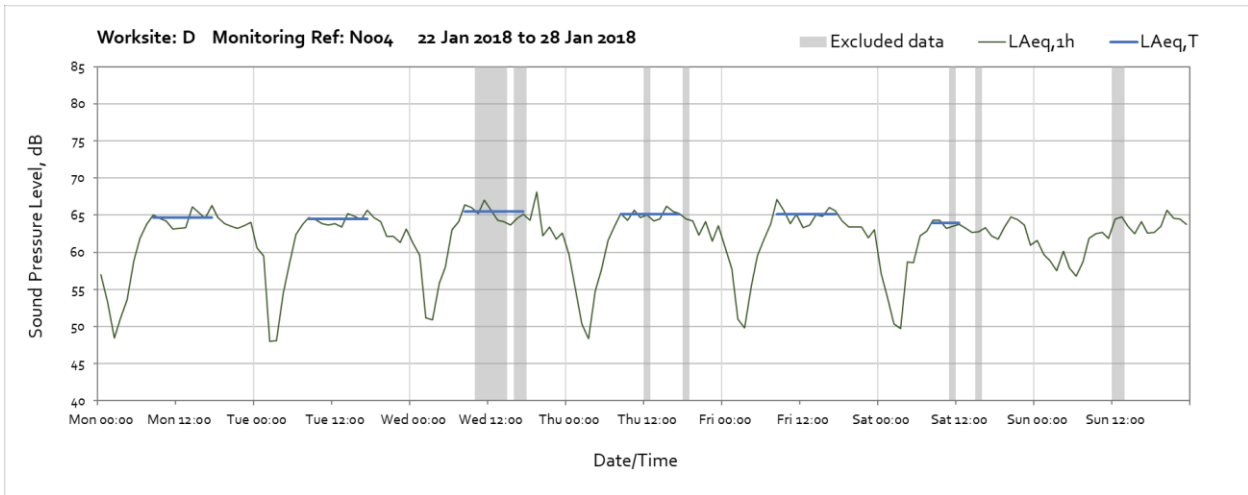


Note – Missing data between 05:00 on Saturday 20th and 00:00 on Sunday 21st were due to loss of power at the monitoring station.

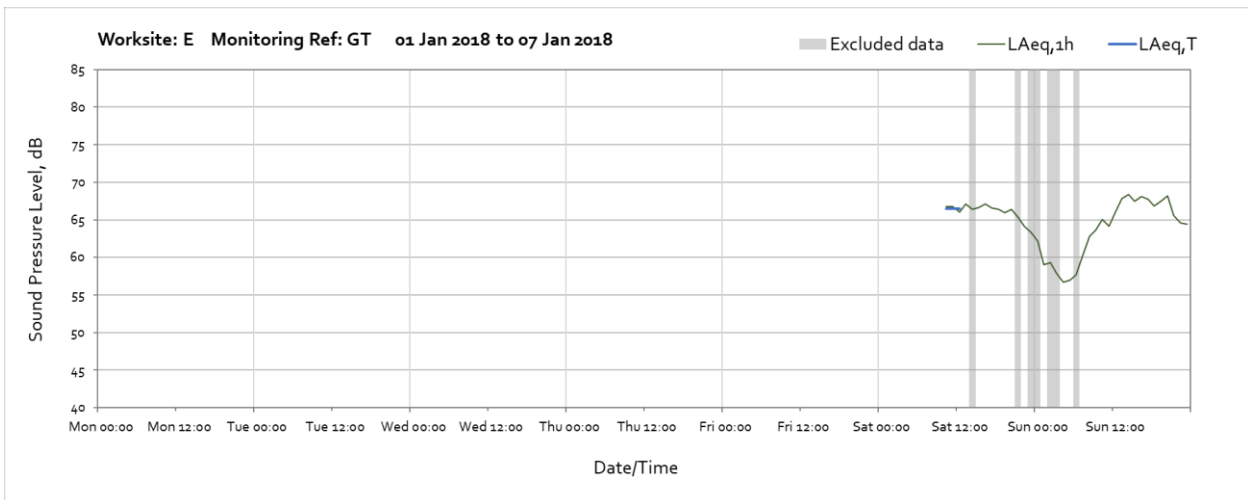


Worksite: D – Monitoring Ref: N004

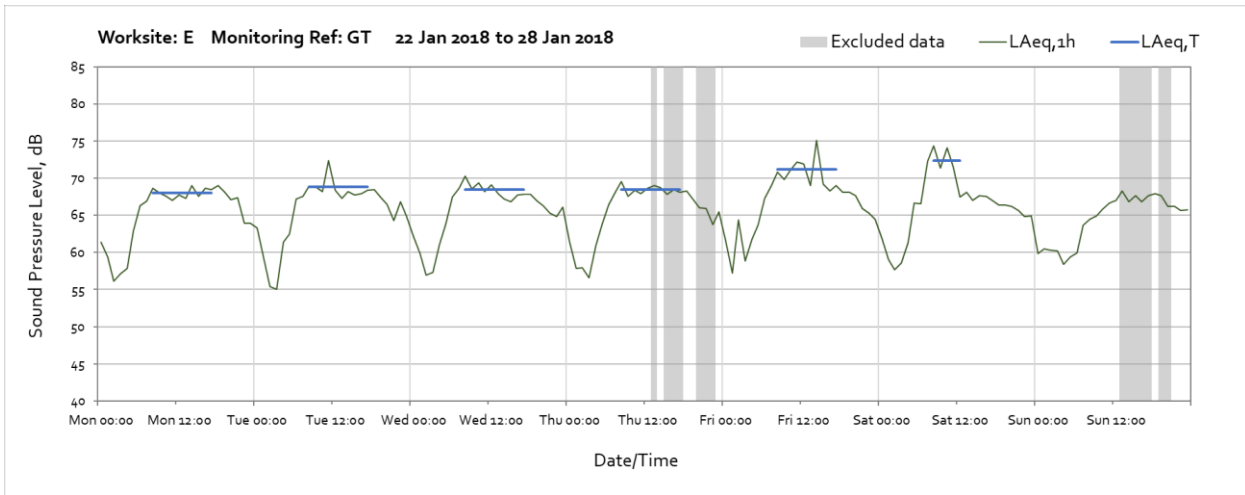
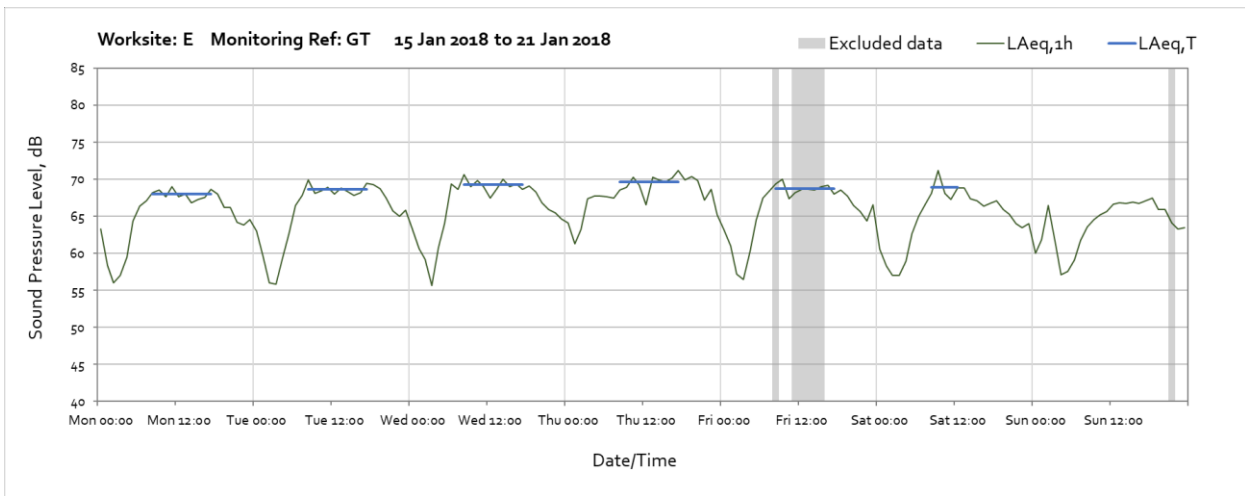
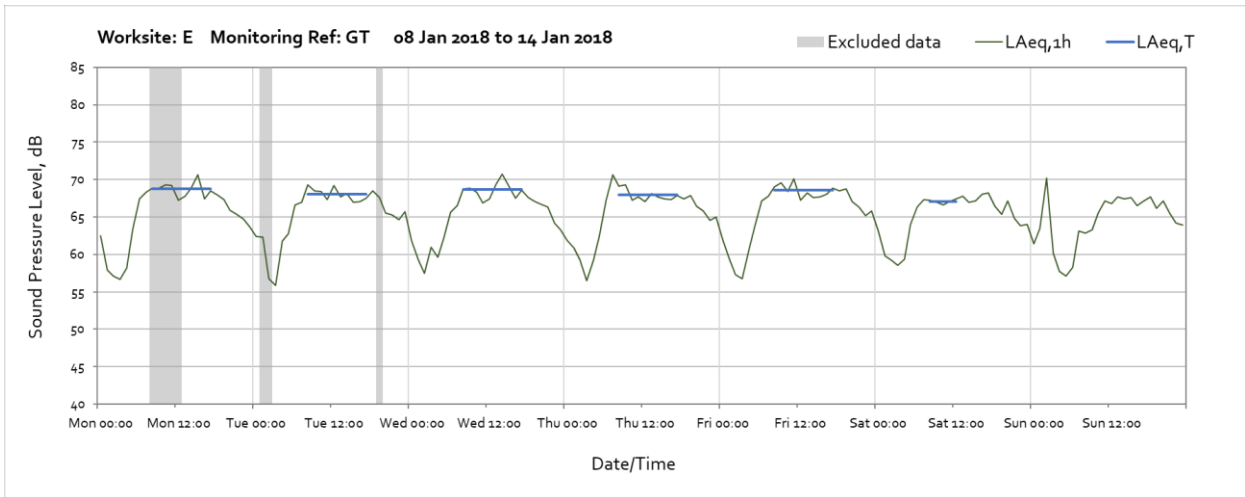


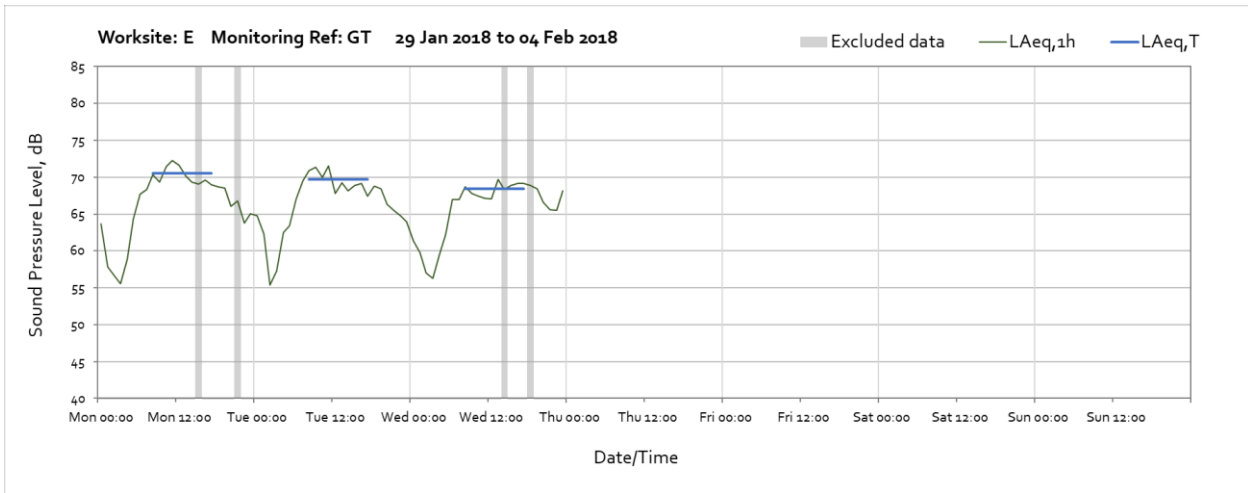


Worksite: E – Monitoring Ref: GT

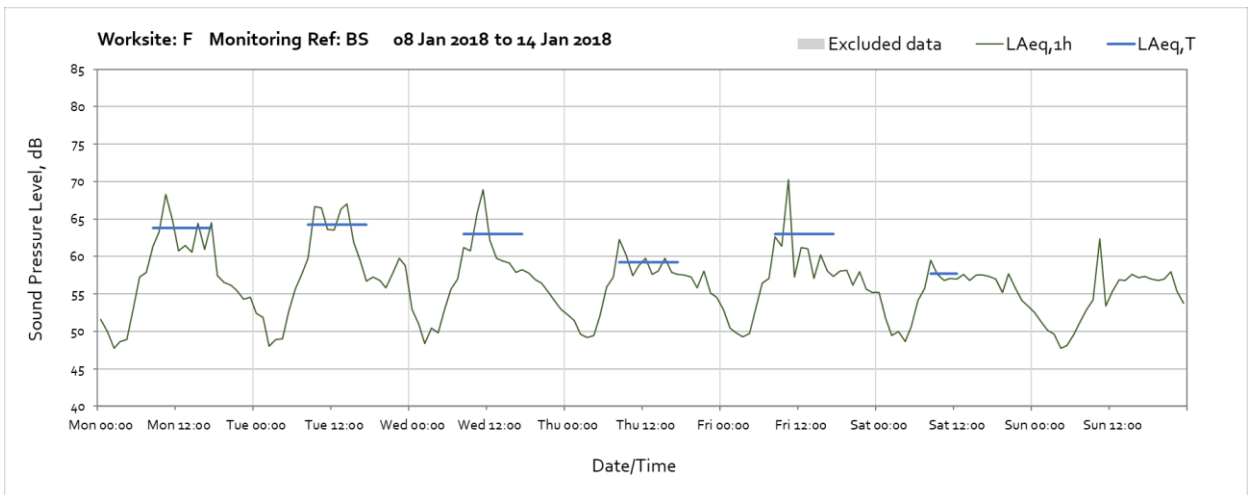
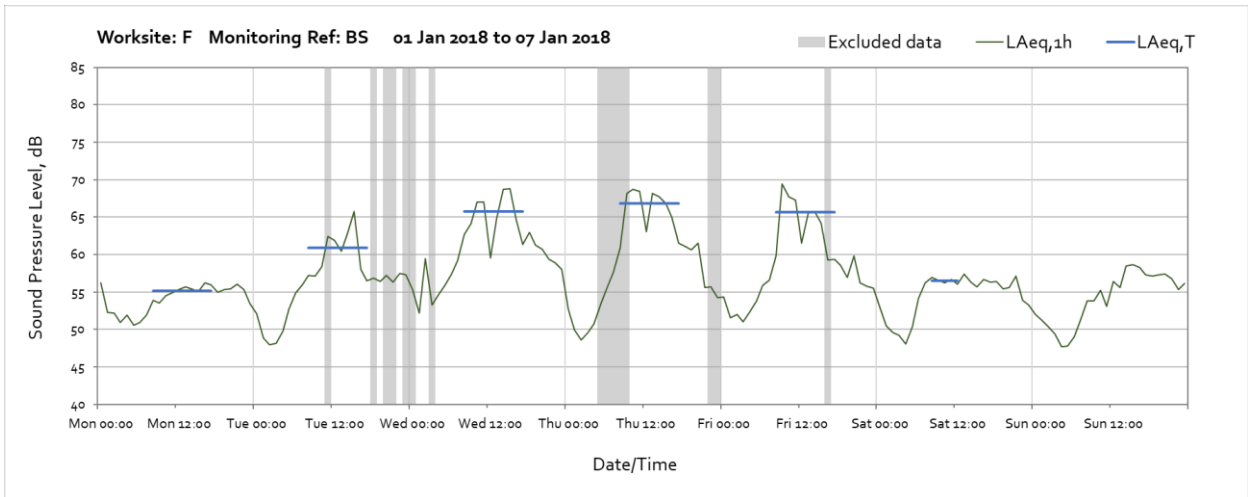


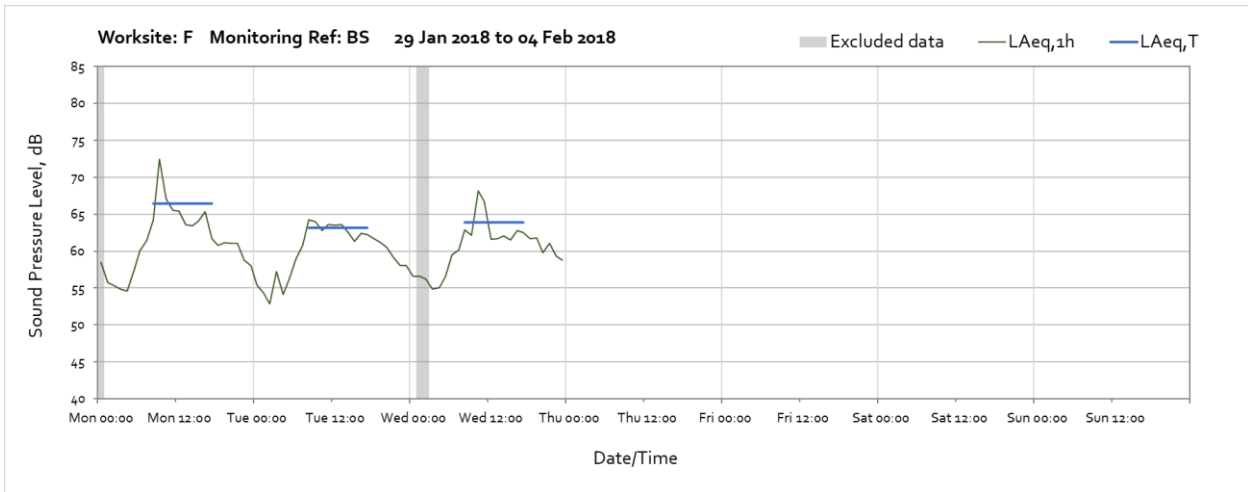
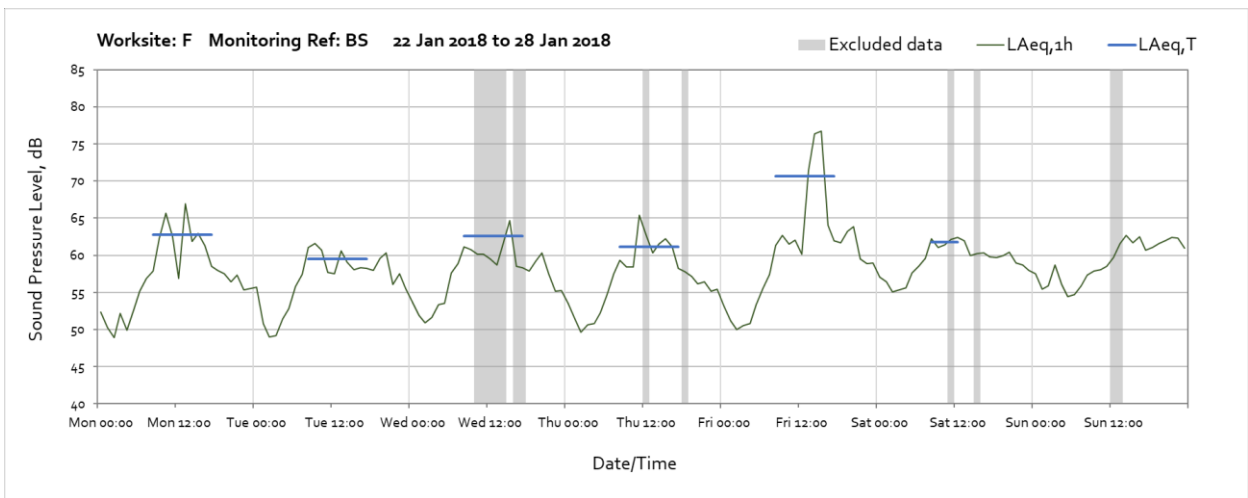
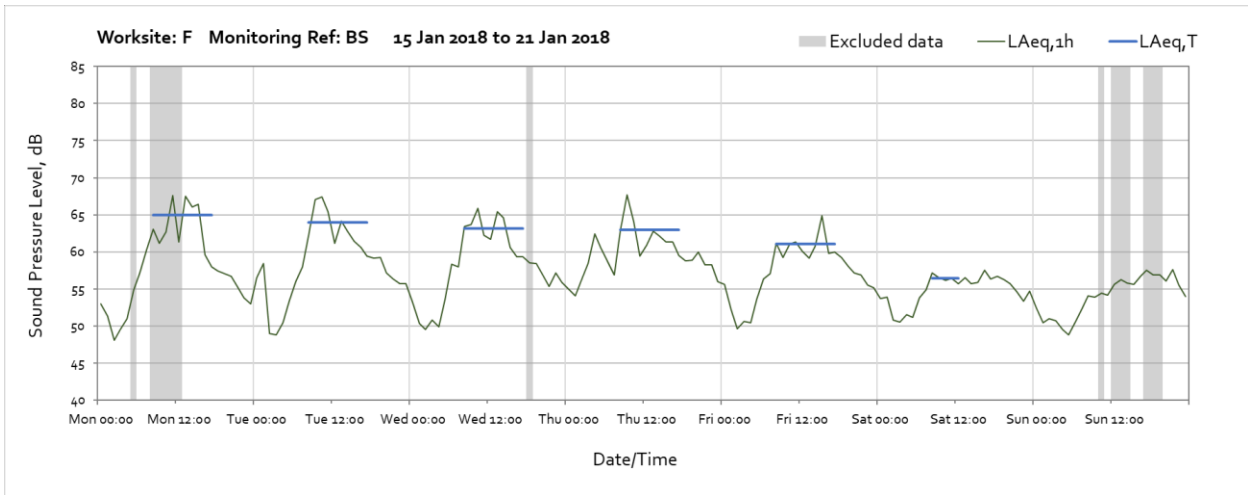
Note – Missing data between the beginning of the month and 10:00 on Saturday 6th were due to loss of power at the monitoring station.



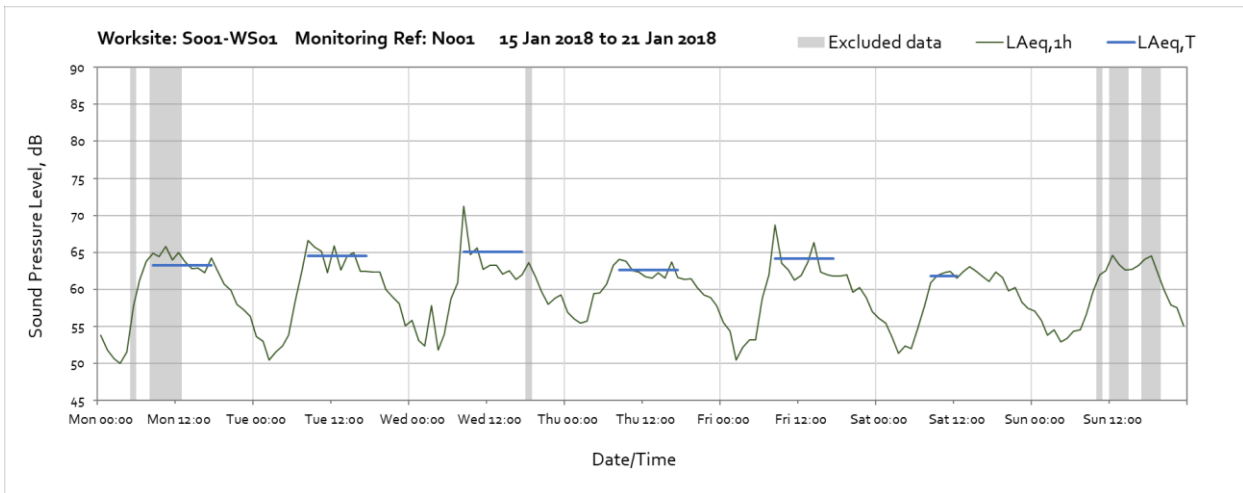
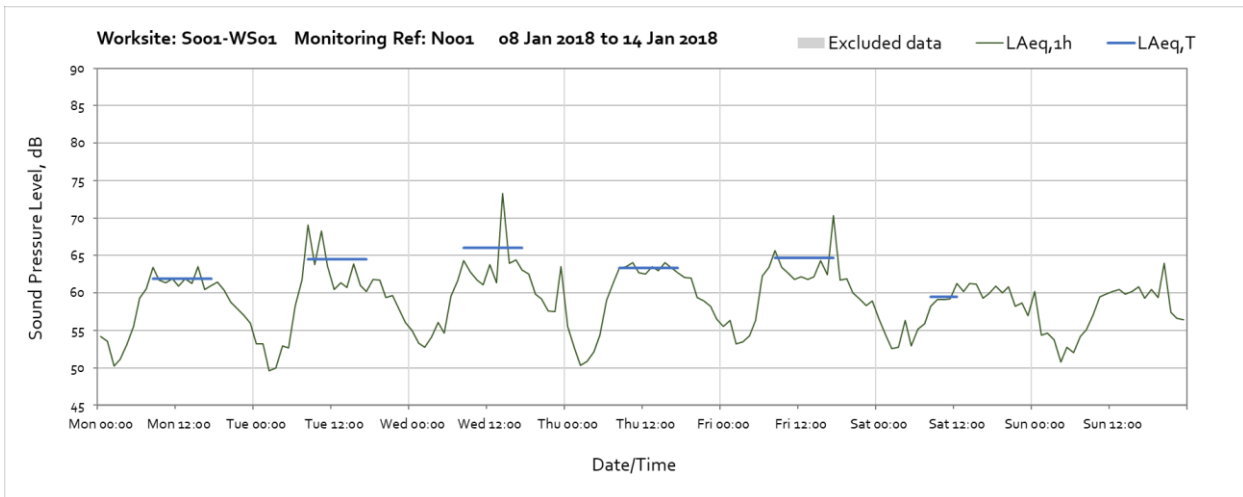
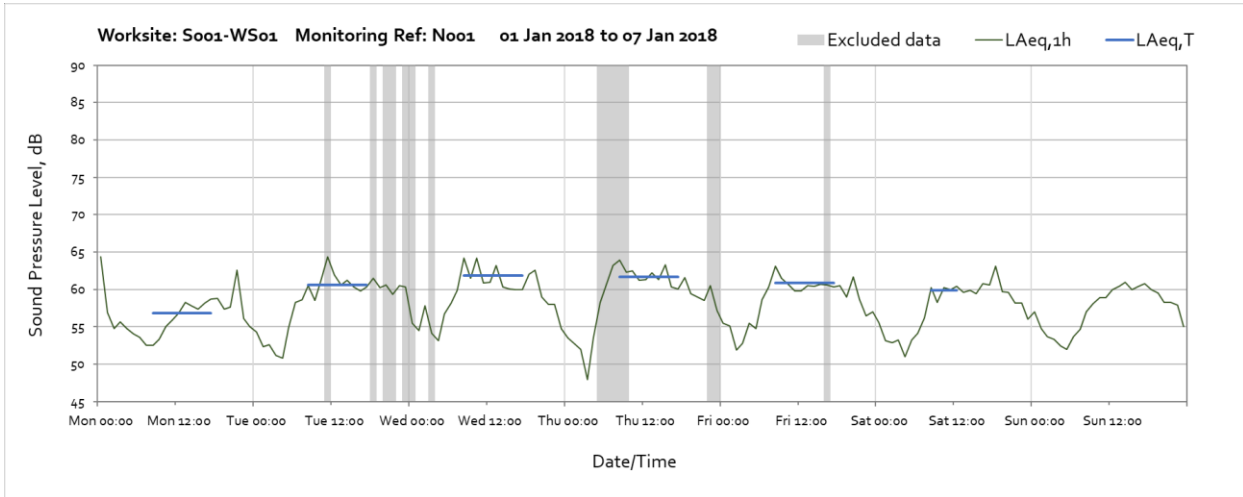


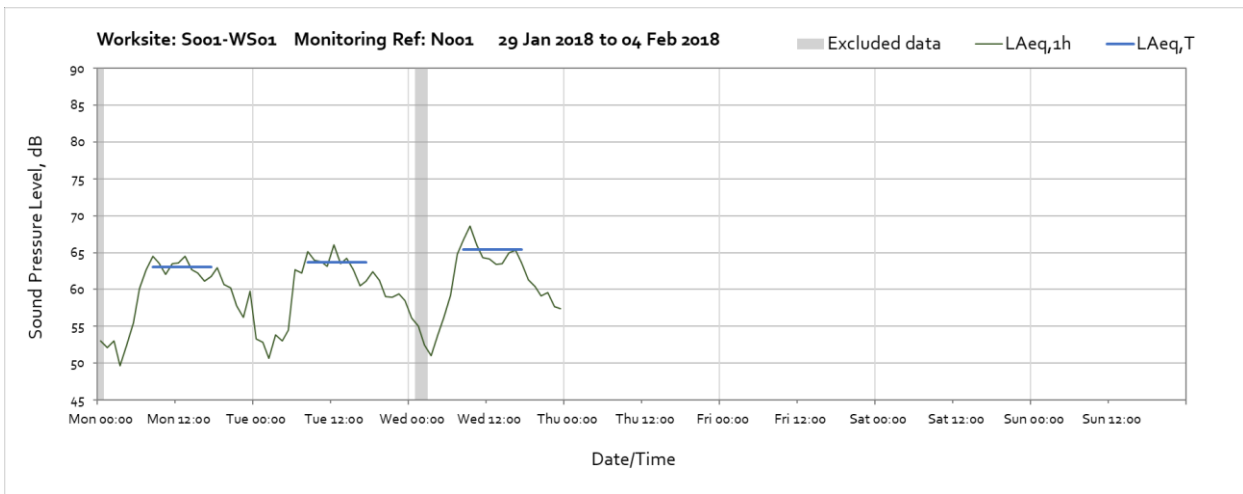
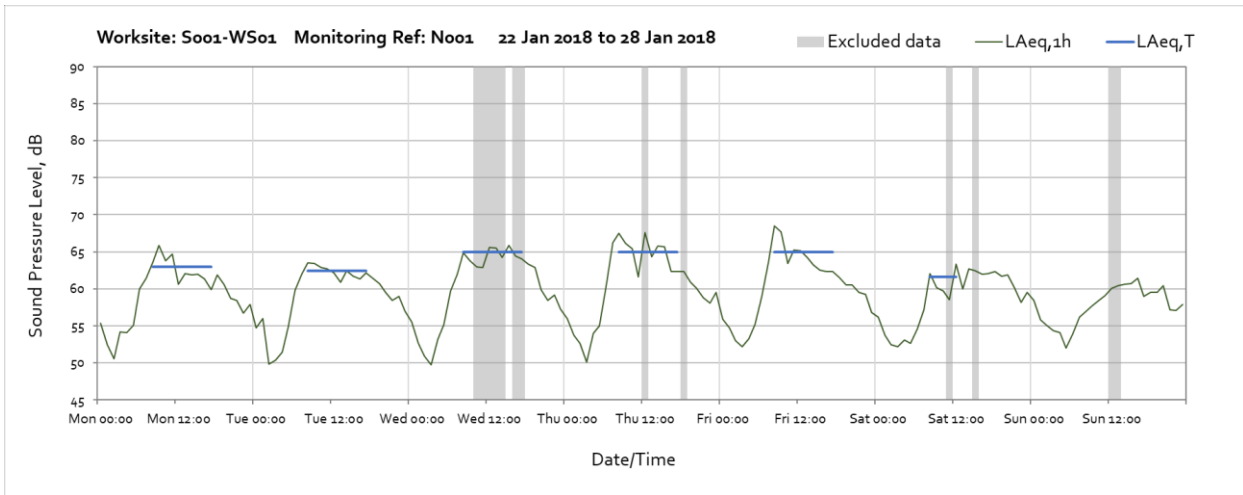
Worksite: F – Monitoring Ref: BS





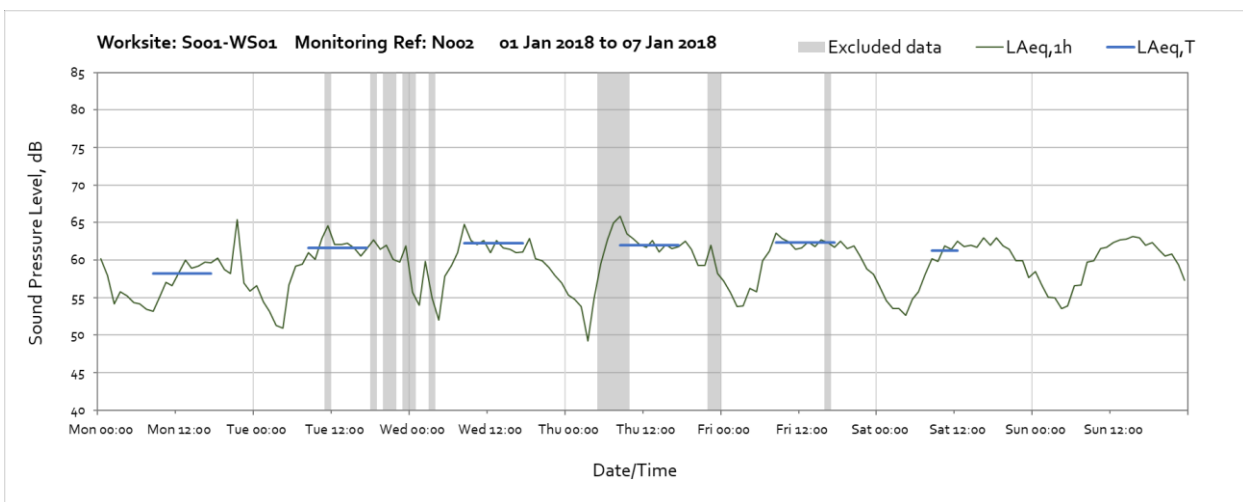
Worksite: S001-WS01 – Monitoring Ref: N001

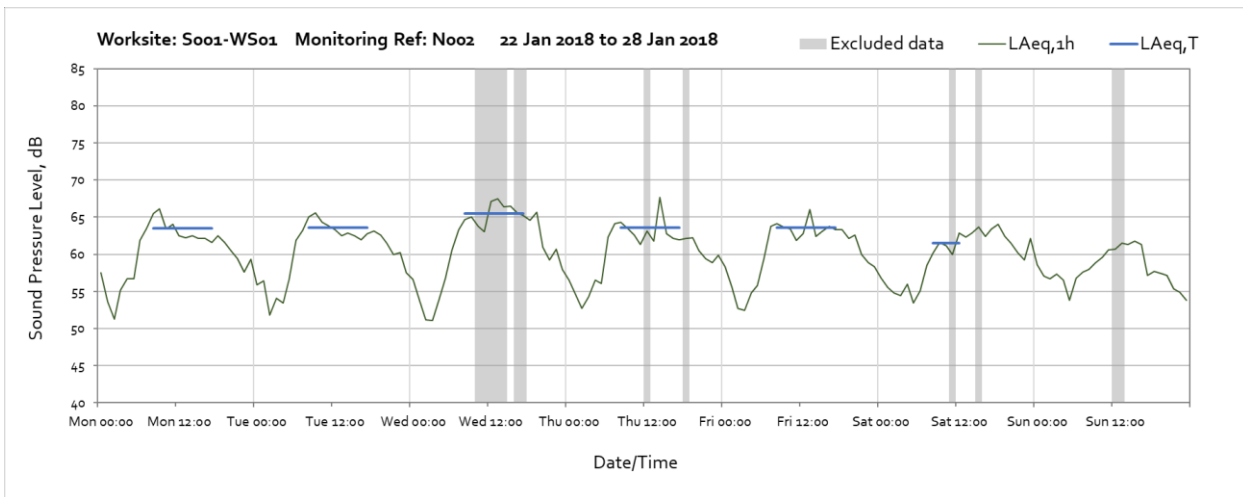
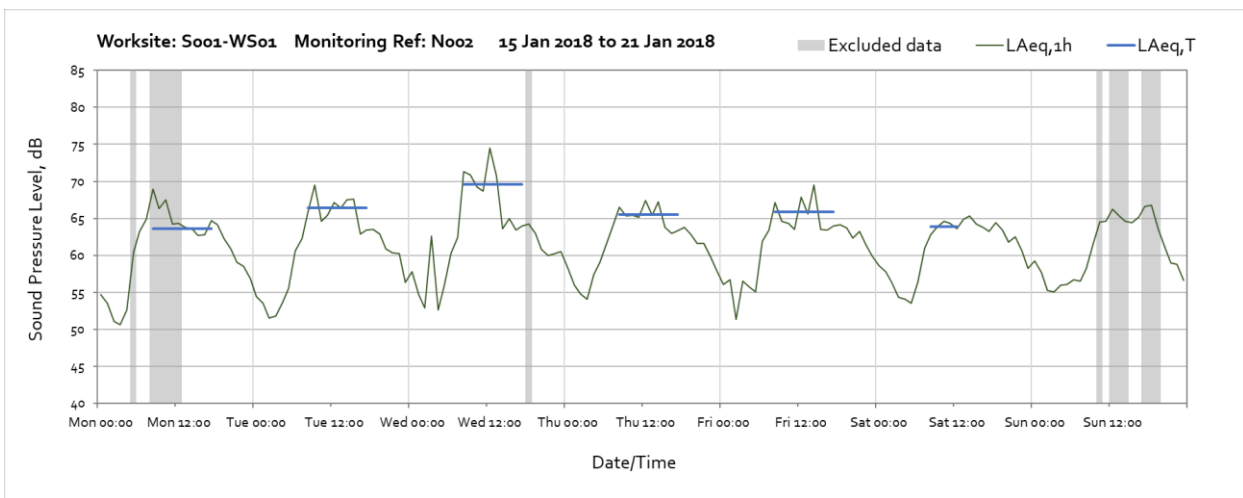
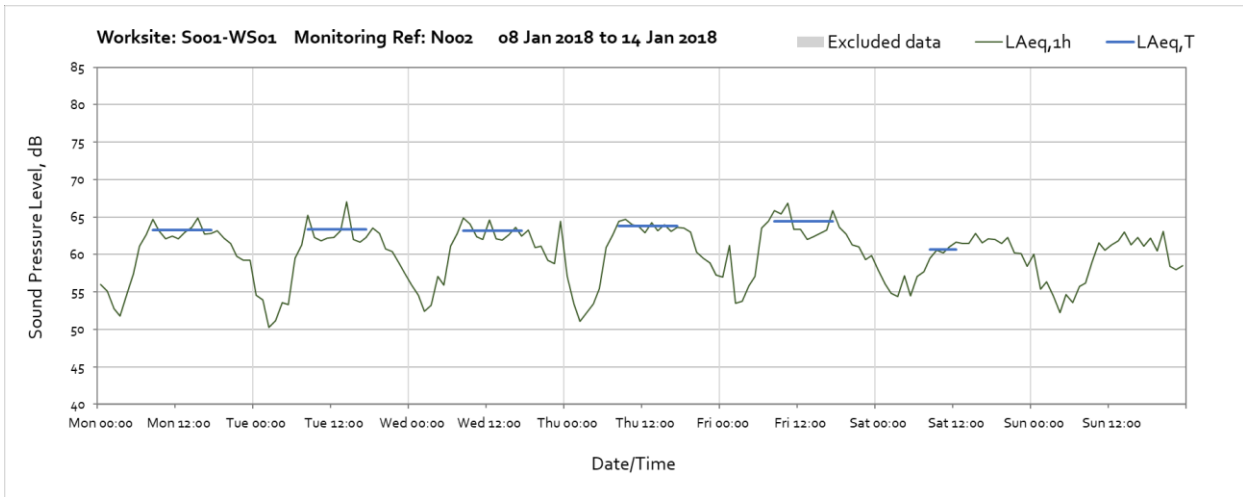


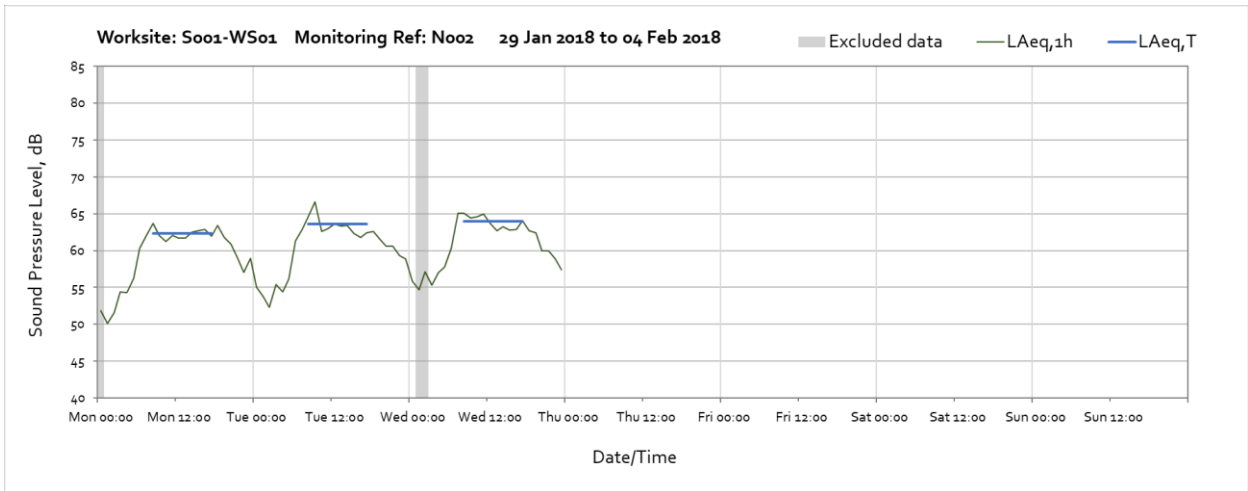


Note – High noise levels on the night of the 31st December were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

Worksite: S001-WS01 – Monitoring Ref: N002







Worksite: S001-WS01 – Monitoring Ref: N003

