HS2

April 2020

Construction noise and vibration Monthly Report – February 2020

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 February 2020.

A number of worksites were active during the reporting month in the LBC area. Works at Network Rail worksites G and H included cable works, cutline installation, demolition works and brick work repair. Additional maintenance works were also undertaken within proximity to HS2 worksites which included clearing scrap, maintenance of equipment and tracks, redundant material recoveries, welding and weld inspections. Site setup, scaffolding, site clearance, surveys and materials processing and ancillary activities were undertaken at the DB Cargo and former Addison Lee worksite (ref. S001-WS01). Materials storage and laydown were underway at the 132 and 140 Hampstead road and Petrol Station worksite (ref. S001-WS02). Site setup, scaffolding, site clearance, surveys and demolition were underway at the Regent's Park Estate worksite (ref. S001-WS07). Demolition and propping were underway at the Wolfson House, Walkden House, 67-75 & 77-79 Euston Road worksite (ref. S003-WS03). Processing of arisings was underway at the Ibis Hotel, 3 Cardington Street worksite (ref. S003-WS05). Deliveries were made to the Former National Temperance Hospital, 110 Hampstead Road worksite (ref. S003-WS06). Propping and backfilling were underway at the 93-103 Drummond Street, 11-15 Melton Street, 54-64 Euston Street and 69 Cobourg Street worksite (ref. S003-WS07). Demolition and scaffolding were underway at the One Euston Square, 40 Melton Street, Grant Thornton House, 22 Melton Street worksite (ref. S003-WS09). Further works were also undertaken as part of the Granby Terrace Bridge utilities diversion (GTB Utilities) on Stanhope Street. Pipe laying was undertaken at Osnaburgh, excavations were underway at Park Village East; and excavations and manhole replacement was undertaken at Albany Street.

Noise monitoring was undertaken adjacent to all active worksites.

Vibration monitoring was undertaken in the vicinity of Regent's Park Estate (worksite ref. S001–WS07), the Walkden House, 67-75 & 77-79 Euston Road worksite (ref. S003-WS03), the Ibis Hotel, 3 Cardington Street & 1-3 Cobourg Street worksite (ref. S003-WS05), the Ibis Hotel, Euston Square Gardens (west) worksite (ref. S003-WS08) and Cubitt Court on Park Village East (V043) (worksite ref. S001–WS07).

Guideline criteria for significant adverse effects were exceeded on four occasions due to HS2 works in the LBC area during February 2020. These were due to plant installed in proximity to the monitor, however noise at the nearest receptors would not exceed the criteria. Seven complaints were received during the monitoring period. Description of complaints, results of investigations and any actions taken are detailed in Table 8 of this 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/Term	Definition
$L_{Aeq,T}$	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 29th February 2020.

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

- Network Rail on-networks HS2 preparatory works: worksites ref. G and H (see plans 1 to 3 in Appendix A)
  - Works included cable management system installation works for high level cabling, cutline installation, demolition works and brick work repair at Gloucester Avenue.
  - Additional maintenance works were also undertaken within proximity to HS2 worksites which included clearing scrap and ballast, inspection and maintenance of equipment, overhead line inspections, grinding points, cable tail testing, station lighting works, moving of rail, arc welding, preparation for rail drop train, track maintenance, emergency works, snagging and redundant material recoveries, ballast tamping up Primrose Hill Lane, re-rail points and weld inspections.
- DB Cargo shed and adjacent land on Granby Terrace, worksite ref. S001-WS01 (see plan 2 in Appendix A)
  - Works included installation of site temporary services, installation of working platforms, installation of scaffolding, surveying and monitoring of assets and surrounding structures, site clearance including vegetation clearance and scrub,

installation of hoarding, adaption/removal of hoarding and construction of drilling fluid slabs, materials processing and ancillary activities.

- 132 and 140 Hampstead Road and Petrol Station, worksite ref. S001-WS02 (see plan 2 in Appendix A)
  - Works included material storage and laydown.
- Regent's Park Estate, worksite ref. S001–WS07 (see plan 2 and 3 in Appendix A)
  - Works activities included installation of site temporary services, installation of working platforms, installation of scaffolding, surveying and monitoring of assets and surrounding structures, site clearance including vegetation clearance and scrub, installation of hoarding, adaption/removal of hoarding, construction of drilling fluid slabs and demolition.
- Wolfson House, Walkden House, 67-75 & 77-79 Euston Rd, worksite ref. S003-WS03 (see plan 3 in Appendix A)
  - Works activities included demolition and propping.
- Ibis Hotel, 3 Cardington Street, worksite ref. S003-WS05 (see plan 3 in Appendix A)
  - Work activities included processing of arisings.
- Former National Temperance Hospital, 110 Hampstead Road, worksite ref. S003-WS06 (see plan 3 in Appendix A)
  - Site activities included deliveries.
- 93-103 Drummond Street, 11-15 Melton Street, 54-64 Euston Street, 69 Cobourg Street, worksite ref. S003-WS07 (see plan 3 in Appendix A)
  - Works activities included propping and backfilling.
- One Euston Square, 40 Melton Street, Grant Thornton House, 22 Melton Street, worksite ref. S003-WS09 (see plan 3 in Appendix A)
  - Works activities included demolition and scaffolding.

1.1.3 Further works were also undertaken as part of the Granby Terrace Bridge utilities diversion (GTB Utilities) on Stanhope Street. Pipe laying was undertaken at Osnaburgh, excavations were underway at Park Village East; and excavations and manhole replacement was undertaken at Albany Street.

1.1.4 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 February 2020.

1.2.2 The noise logger at measurement MT2, worksite C, was retrieved from site on the 6th of February and replaced by monitor N046 at the same location. An additional noise monitor was also installed at Park Village East/Mornington Street bridge, lamppost #13, worksite S001-WS07, also on the 6th of February.

1.2.3 Logger ref. CC at worksite B was removed from site on the 26th of February as works have moved on from the worksite location.

1.2.4 Maps showing the position of noise and vibration monitoring installations are presented in Appendix B.

Table 2: Monitoring locations

Worksite Reference	Measurement Reference	Address
B	CC	Whittlebury Mews West
	JC	Juniper Crescent
C	MT2	Lamppost opposite to 49 Mornington Terrace
	N046	Lamppost opposite to 49 Mornington Terrace
	N022	External to 34 Mornington Terrace
	N024	External to Park Village Studios, Park Village East
	N047	Park Village East/Mornington Street bridge, lampost #13
D	N004	Mornington Terrace, lamppost #7 (junction of Mornington Terrace, Mornington Place and Clarkson Row)
E	N005	5A Granby Terrace
F	BS	Roof of Stockbeck House, Barnby Street
	N023	Lamppost #21 on Hampstead Road
G	HH	Euston Station Parcel Deck, Barnby Street
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)
S001-WS02	N018	Outside replacement housing, Hampstead Road
	N019	Outside Cartmel, Hampstead Road
S001-WS07	N020	Mackworth Street, lamppost #1
	N021	Stanhope Street, lamppost #2

Worksite Reference	Measurement Reference	Address
	N044	Regents Park Estate west, near Langdale
	N045	Regents Park Estate south, external to Coniston
	V039	Coniston, Regents Park Estate
	V043	Cubitt Court, Park Village East
S003-WS01	N016	Margaret Centre roof
S003-WS03	N006	Royal College of General Practitioners roof level
	N008	Stephenson's Way lamppost (external to RCGP)
	N010	Wesley Hotel
	N011	Euston Street, lamppost #4 (external to 82 Euston Street)
	V002	Royal College of General Practitioners basement boiler room by Stephenson Way
	V037	Magic Circle, basement
	V038	Wesley Hotel, basement lightwell, Euston Street
S003-WS05	N014	Starcross Street lamppost (external to Exmouth Arms)
	V021	42-44 Cobourg Street
S003-WS06	N017	Hampstead Road, lamppost #48
S003-WS07	N012	Drummond Street, lamppost #14 (opposite to 92-94 Drummond Street)
S003-WS08	N007	Royal College of General Practitioners, Melton Street
	V003	Royal College of General Practitioners basement vaults under Melton St
Not near worksite	N025	External to 3 Prince Albert Road
Not near worksite	N026	Thames Water Compound

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 SOAEL

Worksite Reference	Measurement Reference	Monitor Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
B	CC	Whittlebury Mews West	All days	All periods	No exceedance
	JC	Juniper Crescent	All days	All periods	No exceedance
C	MT2	Lamppost opposite to 49 Mornington Terrace	All days	All periods	No exceedance
	N046	Lamppost opposite to 49 Mornington Terrace	All days	All periods	No exceedance
	N022	External to 34 Mornington Terrace	Weekday	08:00 – 18:00	1
	N024	External to Park Village Studios, Park Village East	All days	All periods	No exceedance
	N047	Park Village East/Mornington Street bridge, lampost #13	All days	All periods	No exceedance
D	N004	Mornington Terrace, lamppost #7	All days	All periods	No exceedance
E	N005	5A Granby Terrace	All days	All periods	No exceedance
F	BS	Barnby Street	All days	All periods	No exceedance
	N023	Ampthill Estate, lamppost #21, Hampstead Road	All days	All periods	No exceedance
G	HH	Euston Station Parcel Deck, Barnby Street	All days	All periods	No exceedance
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
S001-WS02	N018	132 and 140 Hampstead Road and Petrol Station	All days	All periods	No exceedance
	N019	132 and 140 Hampstead Road and Petrol Station	All days	All periods	No exceedance
S001-WS07	N020	Mackworth Street, lamppost #1	All days	All periods	No exceedance
	N021	Stanhope Street, lamppost #2	All days	08:00 – 18:00	1
	N044	Regents Park Estate west, near Langdale	All days	All periods	No exceedance

Worksite Reference	Measurement Reference	Monitor Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
	N045	Regents Park Estate south, external to Coniston	Weekday	08:00 – 18:00	2
	N046	Mornington Terrace near The Edinboro Castle pub, lamppost #18	All days	All periods	No exceedance
	N047	Park Village East/Mornington Street bridge, lampost #13	All days	All periods	No exceedance
S003-WS01	N016	Margarete Centre roof	All days	All periods	No exceedance
S003-WS03	N006	Royal College of General Practitioners Roof level	All days	All periods	No exceedance
	N008	Walkden House, 67-75 & 77-79 Euston Rd	All days	All periods	No exceedance
	N010	Wesley Hotel	All days	All periods	No exceedance
	N011	Walkden House, 67-75 & 77-79 Euston Rd	All days	All periods	No exceedance
S003-WS05	N014	Ibis Hotel, 3 Cardington Street & 1-3 Cobourg Street	All days	All periods	No exceedance
S003-WS06	N017	Hampstead Road, lamppost #48	All days	All periods	No exceedance
S003-WS07	N012	93-103 Drummond Street, 11-15 Melton Street, 54-64 Euston Street, 69 Cobourg Street	All days	All periods	No exceedance
S003-WS08	N007	Euston Square Gardens (west)	All days	All periods	No exceedance
Not near worksite	N025	External to 3 Prince Albert Road	All days	All periods	No exceedance
Not near worksite	N026	Thames Water Compound	All days	All periods	No exceedance

2.1.4 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	Monitor Address	Total of SOAEL exceedances in the month
S001-WS07	N045	Regents Park Estate south, external to Coniston	2*
S001-WS07	N021	Stanhope Street, Lampost #2	1**
C	N022	52A Mornington Terrace	1**

* Exceedance of the SOAEL was due to an item of plant (dust suppression unit) installed in close proximity to the monitor. In consideration of the larger separation distance noise levels at the nearest receptor are estimated to be lower and below the SOAEL.

** Exceedance of the SOAEL was due to an item of plant installed in close proximity to the monitor. In consideration of the larger separation distance noise levels at the nearest receptor are estimated to be lower and below the SOAEL

2.1.5 Construction and demolition works taking place at worksites G, H, S001-WS01, S001-WS07 S003-WS03, S003-WS07, and S003-WS09, along with utility diversion works for Granby Terrace, were ongoing for the majority of the period and are likely to have given rise to noise which would have been audible beyond the site boundary and, at times, in excess of the LOAEL at sensitive receptors.

2.1.6 Activities taking place at other worksites were either intermittent or not considered to give rise to substantial levels of HS2 related construction noise during this period, with the measured noise levels largely dominated by the underlying ambient noise, acknowledging that intermittent HS2 works may on occasion be taking place within the area.

2.1.7 Monitoring of vibration peak particle velocity (PPV) was undertaken with the purpose of ensuring that construction generated vibration are not of such a magnitude to damage adjacent buildings, in accordance with Annex 1: Code of Construction Practice of the High Speed Rail (London-West Midlands) Environmental Minimum Requirements. No exceedances of the Code of Construction Practice criteria due to vibration caused by HS2 vibration were measured. There are no LOAEL and SOAEL criteria based on PPV applicable to HS2 construction vibration.

2.2 Summary of measured noise and vibration 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 Noise monitoring in the vicinity of worksites G, H, S001-WS07, S003-WS03, S003-WS04, S003-WS07 and S003-WS09 is considered representative of HS2 works in LBC during periods of construction works. Other worksites were not considered to be giving rise to substantial levels of HS2 related construction noise, with the measured noise levels largely dominated by the underlying ambient noise, acknowledging that intermittent HS2 works may on occasion be taking place within the area.

2.2.3 High noise levels in exceedance of the SOAEL were measured at measurement ref. N005, however significant works relating to HS2 were not undertaken near to the monitor throughout February. The high noise levels are likely to be attributable to wind noise and are not representative of HS2 construction noise levels. The SOAEL exceedances at N005 have been discounted from the assessment.

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

Worksite Reference	Measurement Reference	Monitor Address	Free-field or Façade measurement	Weekday 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	CC	Whittlebury Mews West	Free-field	60.8 (63.8)	60.0 (69.9)	62.2 (64.8)	60.7 (63.7)	54.2 (62.4)	55.6 (59.1)	56.7 (59.8)	56.9 (59.6)	57.0 (61.5)	52.0 (56.3)	57.5 (61.6)	54.8 (61.2)
	JC	Juniper Crescent	Free-field	61.5 (64.9)	62.5 (65.8)	61.9 (65.1)	61.1 (63.6)	58.1 (64.8)	60.8 (62.6)	61.6 (62.1)	61.7 (62.6)	61.5 (63.8)	60.4 (63.6)	60.8 (65.6)	58.2 (64.2)
C	MT2	Lamppost opposite to 49 Mornington Terrace	Free field	63.5 (64.5)	63.9 (67.7)	63.8 (64.9)	63.3 (69.5)	58.9 (64.4)	62.4 (64.6)	63.1 (64.4)	62.7 (64.4)	63.1 (68.8)	59.8 (63.5)	62.5 (65.9)	58.5 (62.5)
	N046	Mornington Terrace near The Edinboro Castle pub, lamppost #18	Free field	63.5 (64.5)	63.9 (67.7)	63.7 (64.9)	63.4 (69.5)	59.1 (64.4)	62.4 (64.6)	63.1 (64.4)	62.4 (64.4)	63.0 (68.8)	59.5 (62.9)	62.5 (65.9)	58.3 (62.5)
	N022	52A Mornington Terrace	Free-field	60.9 (62.0)	62.9 (77.6)	62.0 (63.4)	61.0 (64.3)	56.6 (62.0)	59.9 (60.9)	61.6 (63.0)	61.4 (62.6)	61.8 (68.8)	58.9 (62.3)	61.0 (65.6)	56.4 (59.7)
	N024	External to Park Village Studios, Park Village East	Free-field	56.5 (58.4)	66.8 (73.7)	56.4 (61.3)	55.9 (69.3)	52.8 (61.3)	53.4 (53.8)	56.3 (58.8)	56.2 (58.3)	56.0 (58.7)	55.6 (73.0)	55.8 (62.0)	51.9 (57.3)
	N047	Park Village East/Mornington Street bridge, lampost #13	Free field	58.6 (59.7)	61.4 (64.1)	60.3 (62.6)	59.9 (65.6)	54.9 (63.0)	57.1 (57.7)	58.6 (59.9)	60.8 (65.4)	59.4 (61.9)	57.8 (68.6)	59.0 (63.6)	53.5 (55.6)
D	N004	Mornington Terrace, lamppost #7	Free-field	64.2 (66.0)	66.6 (69.3)	65.6 (68.2)	64.4 (68.3)	60.1 (67.8)	63.8 (65.3)	65.0 (68.4)	65.2 (66.5)	64.5 (67.9)	61.0 (64.6)	63.6 (66.5)	59.7 (66.8)
E	N005	5A Granby Terrace	Free-field	68.6 (79.9)	71.9 (77.6)	69.5 (76.4)	69.0 (80.7)	67.3 (82.0)	71.9 (79.4)	74.5 (78.0)	74.2 (80.0)	75.1 (81.4)	74.9 (82.4)	75.8 (84.4)	71.4 (78.1)

Worksite Reference	Measurement Reference	Monitor Address	Free-field or Façade measurement	Weekday 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
F	BS	Roof of Stockbeck House, Barnby Street	Free-field	61.1 (63.2)	63.1 (63.9)	62.3 (64.2)	61.0 (63.3)	57.9 (62.6)	60.8 (61.6)	62.2 (63.1)	63.1 (64.0)	62.6 (65.2)	59.8 (63.3)	61.8 (65.9)	58.2 (61.9)
	N023	Ampthill Estate, Hampstead Road	Free-field	71.3 (72.5)	71.5 (72.6)	70.9 (73.0)	69.8 (72.4)	68.3 (72.7)	69.2 (70.1)	70.4 (70.7)	70.9 (71.6)	70.5 (73.9)	69.3 (72.0)	70.0 (73.1)	67.9 (71.4)
G	HH	Euston Station Parcel Deck, Barnby Street	Free-field	63.0 (65.0)	66.4 (72.7)	64.4 (70.3)	63.1 (72.3)	61.3 (68.5)	63.9 (67.5)	64.5 (67.5)	62.7 (64.7)	65.7 (79.6)	62.9 (72.6)	64.6 (76.5)	60.3 (63.4)
S001-WS01	N001	External to Cubitt Court, 100 Park Village East	Façade	57.8 (62.0)	69.3 (81.0)	58.3 (59.6)	57.4 (59.5)	53.4 (59.8)	56.1 (58.4)	67.6 (73.4)	58.1 (58.8)	58.4 (62.5)	54.2 (57.3)	56.7 (60.2)	52.9 (56.0)
	N002	Richmond Court, Park Village East	Free-field	58.6 (60.1)	63.5 (66.3)	61.4 (68.1)	59.8 (67.3)	54.2 (62.3)	56.6 (57.7)	61.0 (66.2)	60.5 (63.0)	60.0 (63.3)	56.3 (58.9)	58.7 (63.8)	52.8 (56.1)
	N003	Silsoe House, Park Village East	Free-field	59.4 (60.6)	62.4 (64.3)	61.9 (66.5)	60.2 (65.7)	54.7 (65.4)	56.5 (57.8)	59.4 (61.1)	60.0 (62.0)	60.0 (62.4)	56.3 (59.1)	58.8 (62.0)	53.4 (57.1)
S001-WS02	N018	Outside replacement housing, Hampstead Road	Free-field	72.5 (73.9)	73.6 (75.6)	74.2 (77.5)	73.3 (78.4)	71.8 (75.4)	71.2 (71.8)	72.2 (73.1)	72.4 (72.7)	73.4 (75.2)	72.6 (74.7)	72.9 (77.0)	70.7 (73.9)
	N019	Outside Cartmel, Hampstead Road	Free-field	71.2 (72.7)	72.0 (74.2)	72.4 (76.2)	71.5 (73.4)	70.3 (74.2)	69.9 (70.5)	71.0 (72.2)	70.9 (71.1)	71.8 (75.4)	70.9 (73.1)	72.3 (78.3)	69.5 (73.5)

Worksite Reference	Measurement Reference	Monitor Address	Free-field or Façade measurement	Weekday 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
S001-WS07	N020	Mackworth Street	Free-field	55.0 (59.1)	63.9 (73.9)	53.7 (58.0)	53.6 (60.4)	51.4 (57.0)	54.8 (58.1)	63.0 (64.9)	55.3 (56.1)	55.4 (61.1)	54.0 (59.3)	55.1 (62.7)	52.0 (54.6)
	N021	Stanhope Street, lamppost #2	Free-field	57.4 (60.5)	66.6 (75.3)	56.8 (62.9)	55.7 (59.0)	53.3 (58.8)	54.1 (56.2)	63.5 (67.8)	56.7 (58.1)	58.8 (65.9)	57.5 (67.8)	58.6 (70.4)	52.9 (56.6)
	N044	Regents Park Estate west	Free field	54.0 (58.7)	64.6 (70.5)	53.4 (56.5)	52.7 (58.9)	51.8 (58.9)	53.4 (56.9)	61.9 (69.7)	54.7 (58.0)	56.5 (63.0)	55.2 (63.9)	57.0 (67.2)	53.2 (58.5)
	N045	Regents Park Estate south, external to Coniston	Free field	57.8 (62.2)	68.8 (78.0)	57.6 (60.4)	57.0 (59.7)	55.9 (59.8)	56.8 (57.7)	63.3 (68.7)	58.0 (59.6)	58.1 (61.7)	57.4 (60.9)	59.1 (64.3)	56.2 (60.3)
S003-WS03	N006	RCGP Roof level	Free-field	56.9 (59.6)	70.0 (73.6)	55.2 (58.9)	54.9 (58.1)	54.2 (59.1)	55.7 (57.4)	58.3 (59.6)	58.4 (61.8)	56.8 (60.5)	55.7 (57.8)	57.4 (62.3)	55.1 (58.9)
	N008	RCGP Stephenson Way	Façade	58.3 (61.6)	70.2 (76.8)	55.8 (59.9)	55.0 (58.3)	54.9 (58.6)	57.7 (58.7)	69.0 (88.3)	56.3 (57.7)	56.0 (59.0)	55.3 (56.9)	57.1 (67.1)	55.3 (58.0)
	N010	Wesley Hotel	Façade	67.6 (68.6)	69.1 (72.0)	65.9 (68.1)	66.0 (68.1)	60.9 (68.2)	67.1 (68.4)	66.9 (68.2)	66.4 (67.5)	66.6 (68.4)	61.4 (68.4)	67.0 (68.6)	61.2 (67.6)
	N011	Outside 82 Euston Street	Free-field	61.1 (66.2)	64.4 (67.2)	59.5 (62.6)	59.2 (72.0)	57.2 (66.5)	58.9 (60.1)	60.9 (65.8)	58.8 (59.6)	58.1 (61.0)	56.6 (59.7)	58.9 (65.9)	56.6 (60.2)
S003-WS05	N014	Starcross Street	Free-field	57.5 (64.3)	61.0 (63.7)	58.0 (63.0)	57.3 (63.8)	52.8 (60.8)	55.8 (57.9)	56.5 (59.1)	56.3 (59.8)	56.9 (62.0)	54.3 (57.4)	55.7 (61.4)	53.1 (57.0)
S003-WS01	N016	Margaret Centre roof	Free-field	56.6 (60.9)	58.7 (60.0)	56.9 (59.8)	56.2 (60.1)	55.1 (66.5)	57.0 (58.8)	57.8 (58.6)	57.9 (58.9)	58.3 (63.1)	57.9 (62.6)	58.7 (66.0)	55.3 (58.3)
S003-WS06	N017	Hampstead Road, lamppost #48	Free-field	71.6 (73.4)	73.0 (76.6)	72.9 (76.9)	71.8 (75.3)	70.6 (74.4)	70.7 (71.6)	71.4 (72.2)	71.1 (72.1)	72.5 (75.8)	71.3 (74.1)	71.9 (75.9)	69.9 (73.5)

Worksite Reference	Measurement Reference	Monitor Address	Free-field or Façade measurement	Weekday 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
S003-WS07	N012	Opposite 92-94 Drummond Street	Free-field	60.0 (62.0)	64.0 (65.9)	59.9 (62.8)	59.6 (63.3)	57.4 (77.4)	58.7 (60.2)	60.2 (61.3)	60.1 (62.6)	60.1 (62.4)	58.1 (60.6)	60.0 (63.9)	56.9 (62.1)
S003-WS08	N007	RCGP, Melton Street	Free-field	65.6 (69.8)	71.1 (76.9)	64.6 (66.3)	65.0 (73.2)	63.8 (69.9)	63.7 (65.3)	64.8 (65.2)	64.9 (65.8)	64.7 (68.8)	63.7 (65.3)	64.5 (67.2)	62.9 (66.3)
Not near worksite	N025	External to 3 Prince Albert Road	Free-field	69.1 (72.0)	69.5 (71.5)	67.9 (71.3)	67.8 (71.7)	66.1 (70.0)	66.9 (67.6)	67.5 (68.3)	67.4 (68.8)	68.2 (73.6)	67.3 (70.0)	67.7 (71.1)	65.1 (70.5)
Not near worksite	N026	Thames Water Compound	Free-field	59.0 (60.3)	60.8 (63.9)	58.2 (59.7)	57.6 (62.9)	55.0 (62.7)	57.2 (58.6)	58.1 (58.8)	57.6 (58.5)	58.7 (61.4)	57.4 (59.3)	58.7 (65.6)	54.1 (58.5)

2.2.4 Table 6 presents a summary of the measured vibration levels at monitoring locations V002, V003, V021, V037, V038, V039 and V043 over the reporting period. During the monitoring high values of PPV were measured at V002, V003, V038 and V043which were due to local disturbance of the vibration monitors and are not representative of HS2 construction works. These have been greyed out in the charts alongside other periods of local disturbance of the monitor as shown in Appendix B, and have been excluded to calculate values in Table 6. The highest PPV measured during the monitoring along any axis is presented in the table.

Table 6: Summary of measured PPV data over the monitoring period

Worksite Reference	Measurement Reference	Monitor Address	Highest PPV measured in any axis, mm/s
S001-WS07	V039	Coniston, Regents Park Estate	3.29 (X-axis)
	V043	Cubitt Court, Park Village East	2.58 (X-axis)
S003-WS03	V002	RCGP. basement boiler room. 305 Euston Road	1.30 (X-axis)
	V037	Magic Circle, basement	4.10 (Z-axis)
	V038	Wesley Hotel, basement lightwell, Euston Street	1.71 (Z-axis)
S003-WS05	V021	42-44 Cobourg Street (floor)	1.61 (Z-axis)
S003-WS09	V003	RCGP. basement vaults, 305 Euston Road	0.88 (Y-axis)

2.2.5 Construction vibration during the month was mainly due to demolition activities and may on occasion be perceptible at receptors nearby but was well below levels that may cause structural damage to surrounding buildings.

2.2.6 Appendix C presents graphs of noise and vibration monitoring data over the month for each of the measurement locations. Noise data presented consists 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). Vibration data presented consist of hourly PPV values. 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 7 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 7: 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 8 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

Table 8: Summary of complaints

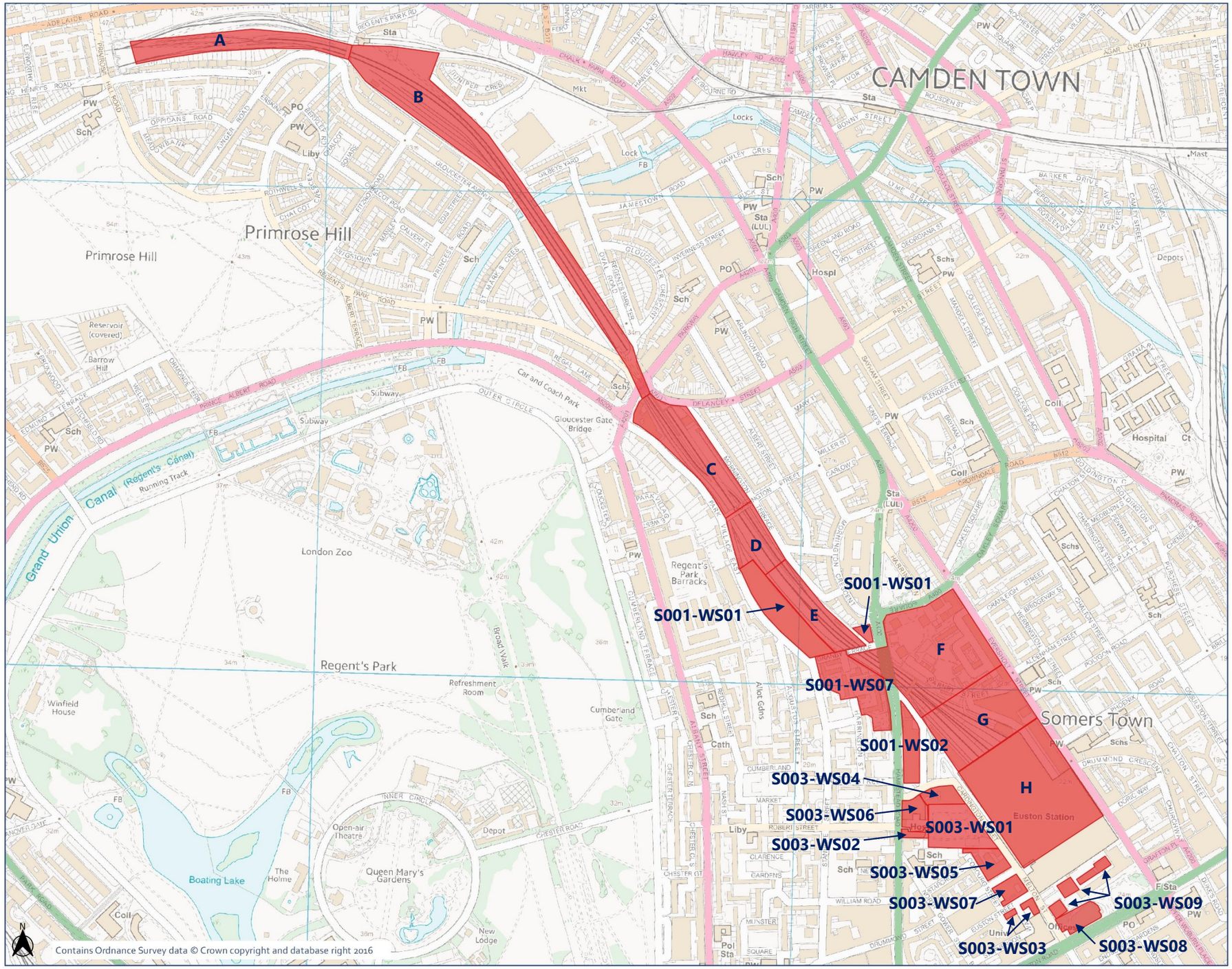
Complaint reference number	Worksite reference	Description of complaint	Results of investigation	Actions taken
HS2-20-15479-C	S001-WS07	Complaint from a resident who works night shifts and cannot sleep during the day due to construction noise. The resident would like to be considered for the E23 special case.	An independent panel makes the E23 special case decisions.	Information provided to the complainant.
HS2-20-16647-C	Worksite adjacent Euston Square (exact worksite not confirmed)	Complaint due to a loud noise on Stephenson Way at approximately 13:00.	A noise level trigger was identified at a similar time associated with breaking woks.	Works were ceased and a review of the methodology and mitigation prior to the works recommencing was undertaken.

Complaint reference number	Worksite reference	Description of complaint	Results of investigation	Actions taken
HS2-20-16822-C	S003-WS03	Complaint from a resident as a pneumatic drill was being used without acoustic blankets.	The use of the drill was associated with a HS2 subcontractor.	Use of acoustic blankets was included in the works method statement but not utilised on site. The site team have been re-briefed, and the use of acoustic blankets reinforced.
HS2-20-16889-C	Worksite adjacent Euston Train Station	Complaint from a resident due to audible construction noise at 02:30.	The noise was from routine maintenance works	Information provided to the complainant.
HS2-20-19252-C	Worksite adjacent Euston Square	Complaint due to construction noise on Stephenson Way	Noise was due to HS2 breaking works.	Complainant was contacted to advise on the programme of works and was also informed that noise did not exceed the trigger levels.
HS2-20-15913-C	Worksite adjacent Euston Train Station	Complaint from a resident due to generator noise. The complainant was unsure whether the generator was associated with HS2 works	The generator was not associated with HS2.	Information provided to the complainant.
HS2-20-16318-C	S003-WS03	Complaint from a non-residential property due to noise from a compactor.	The contractor was not associated with HS2.	Information provided to the complainant.

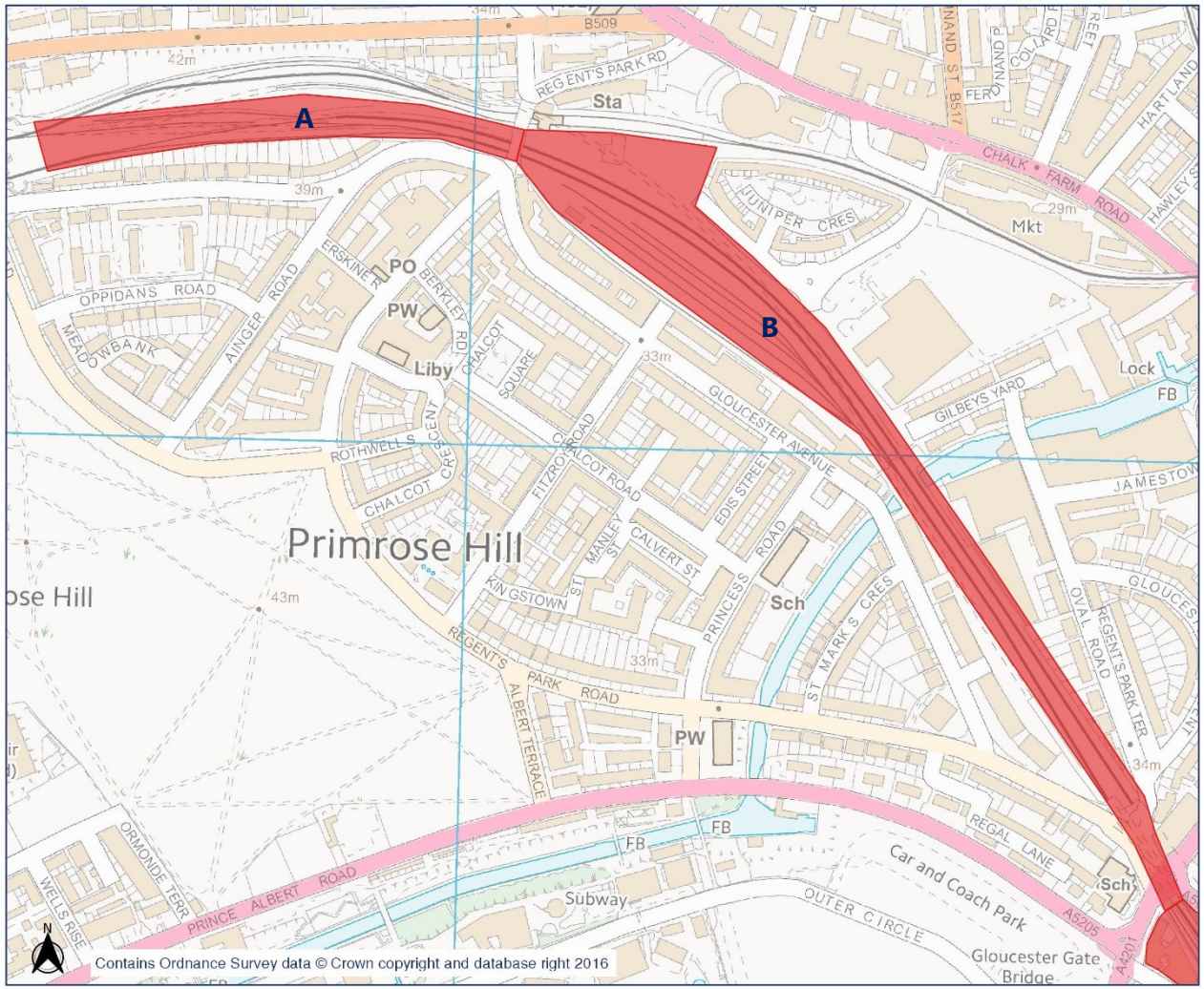
Appendix A Site Locations

HS2

Worksite identification plan - Overview

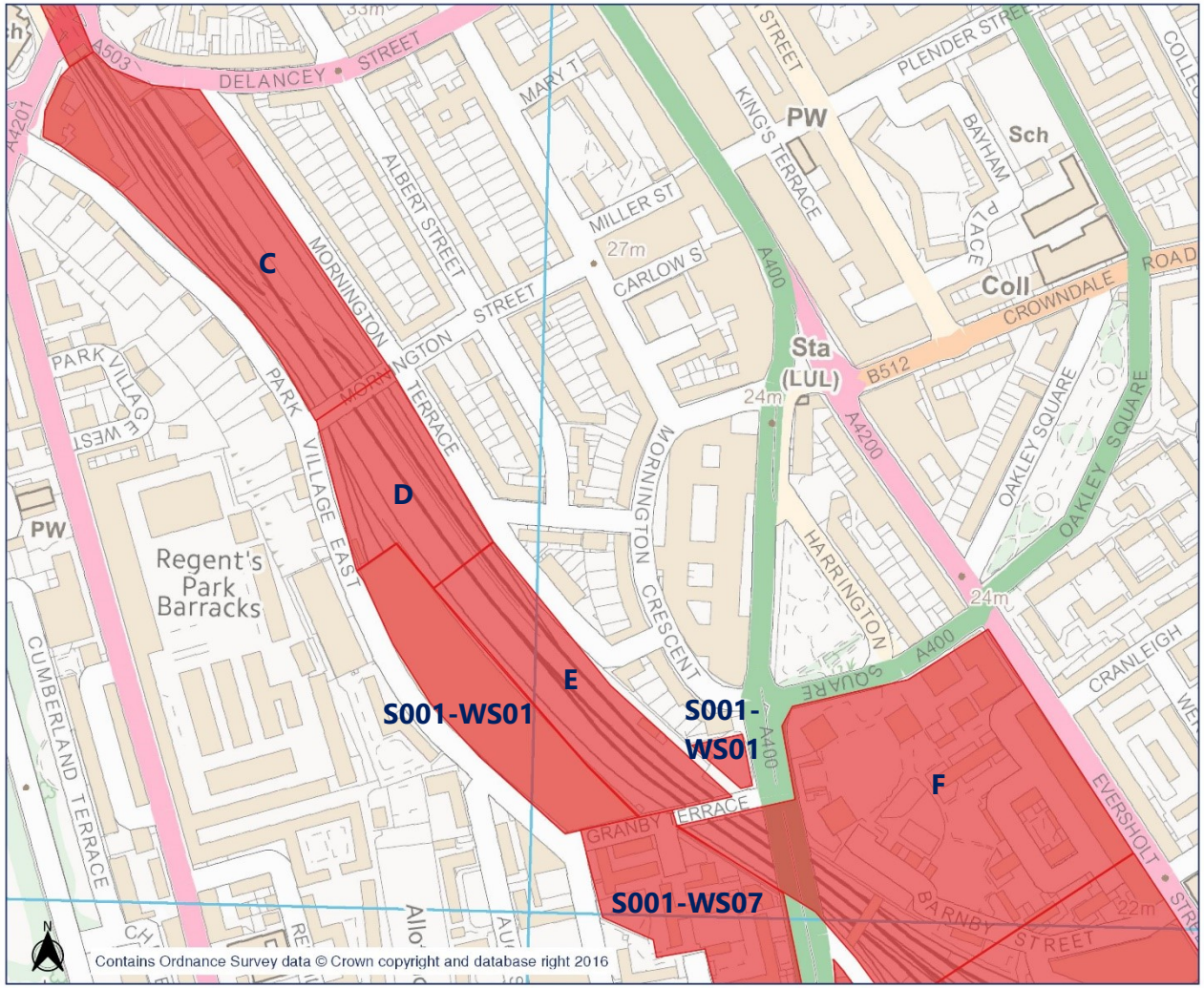


Worksite identification plan - 1



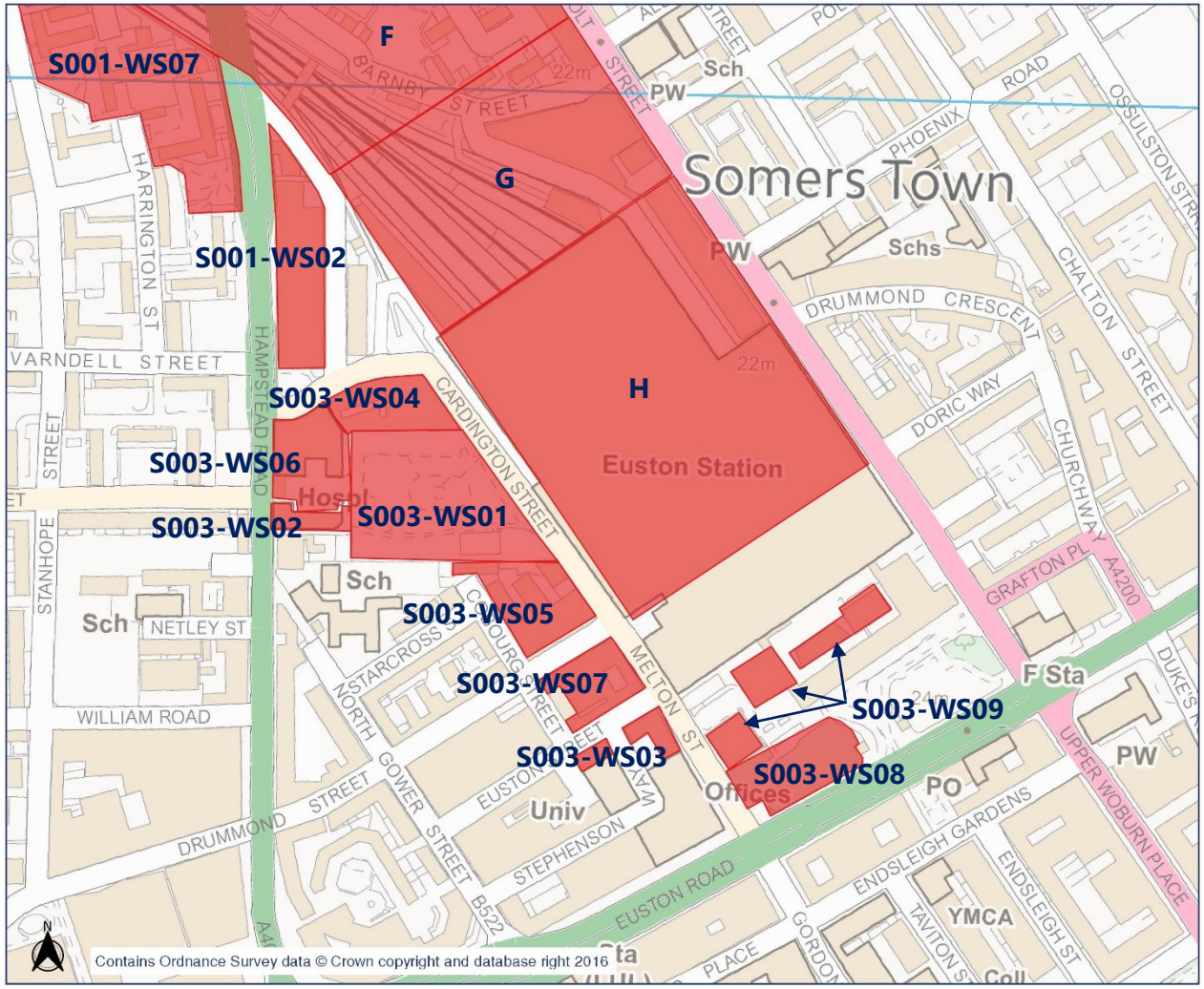
HS2

Worksite identification plan - 2



HS2

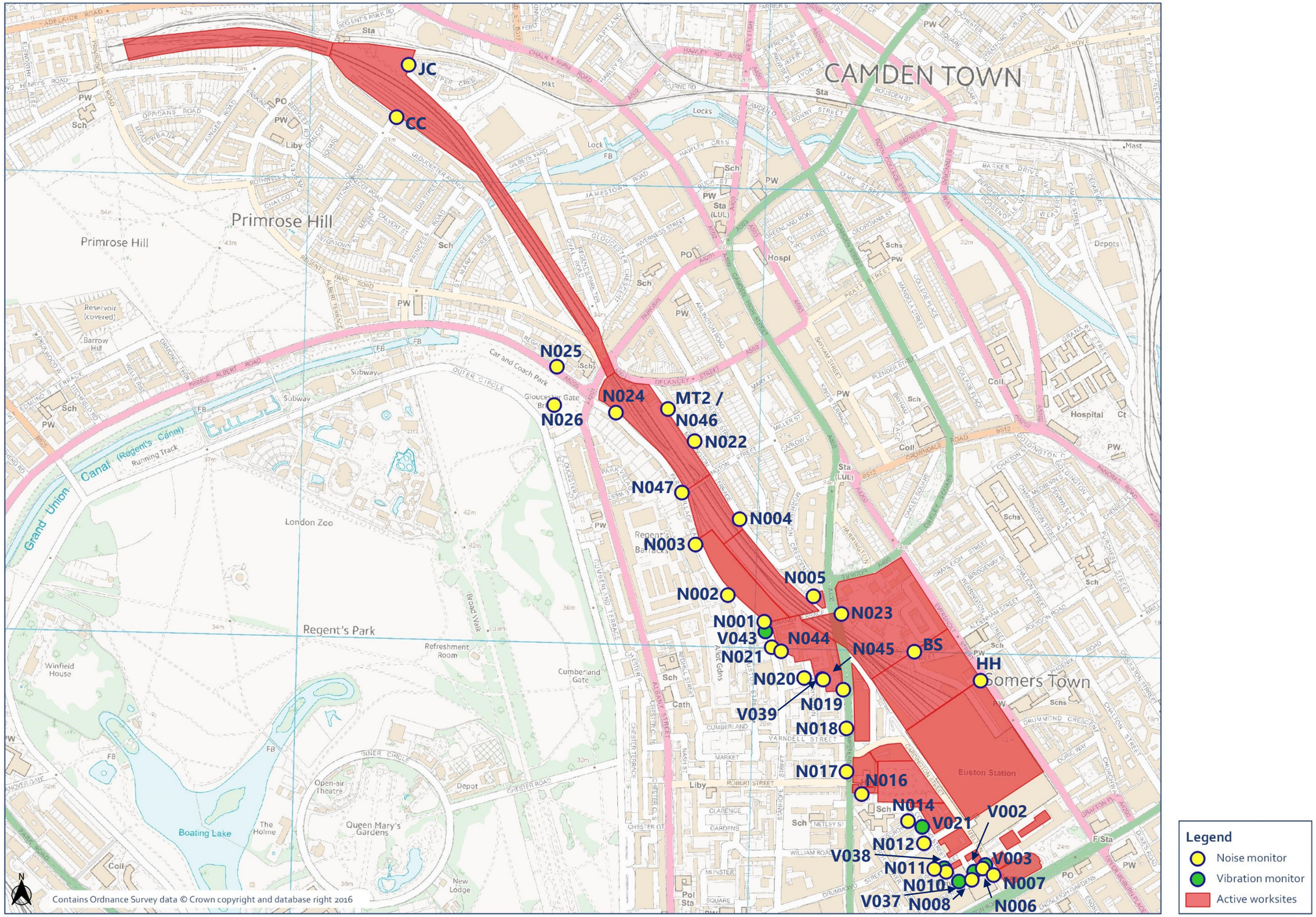
Worksite identification plan - 3



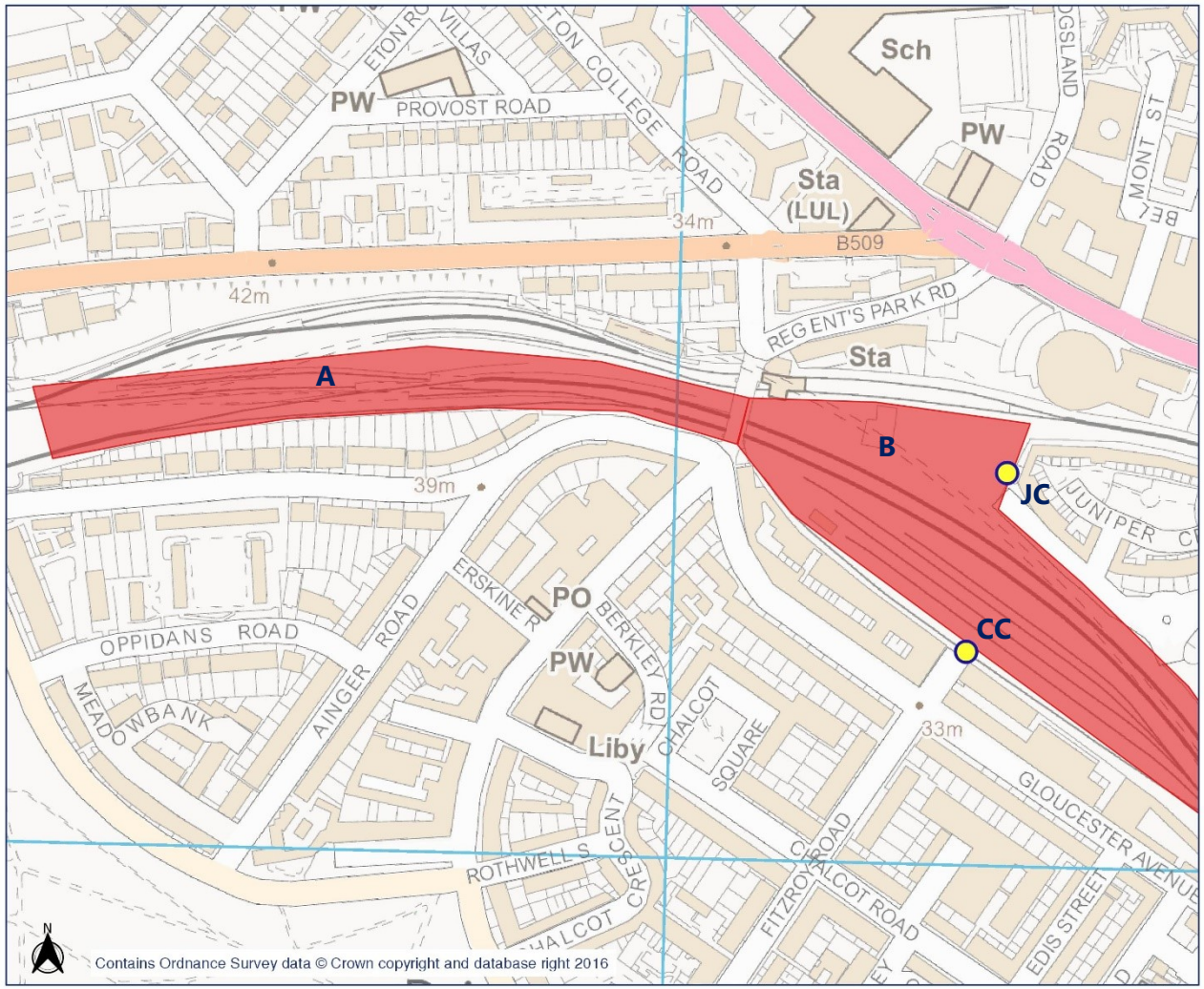
Appendix B Monitoring Locations

HS2

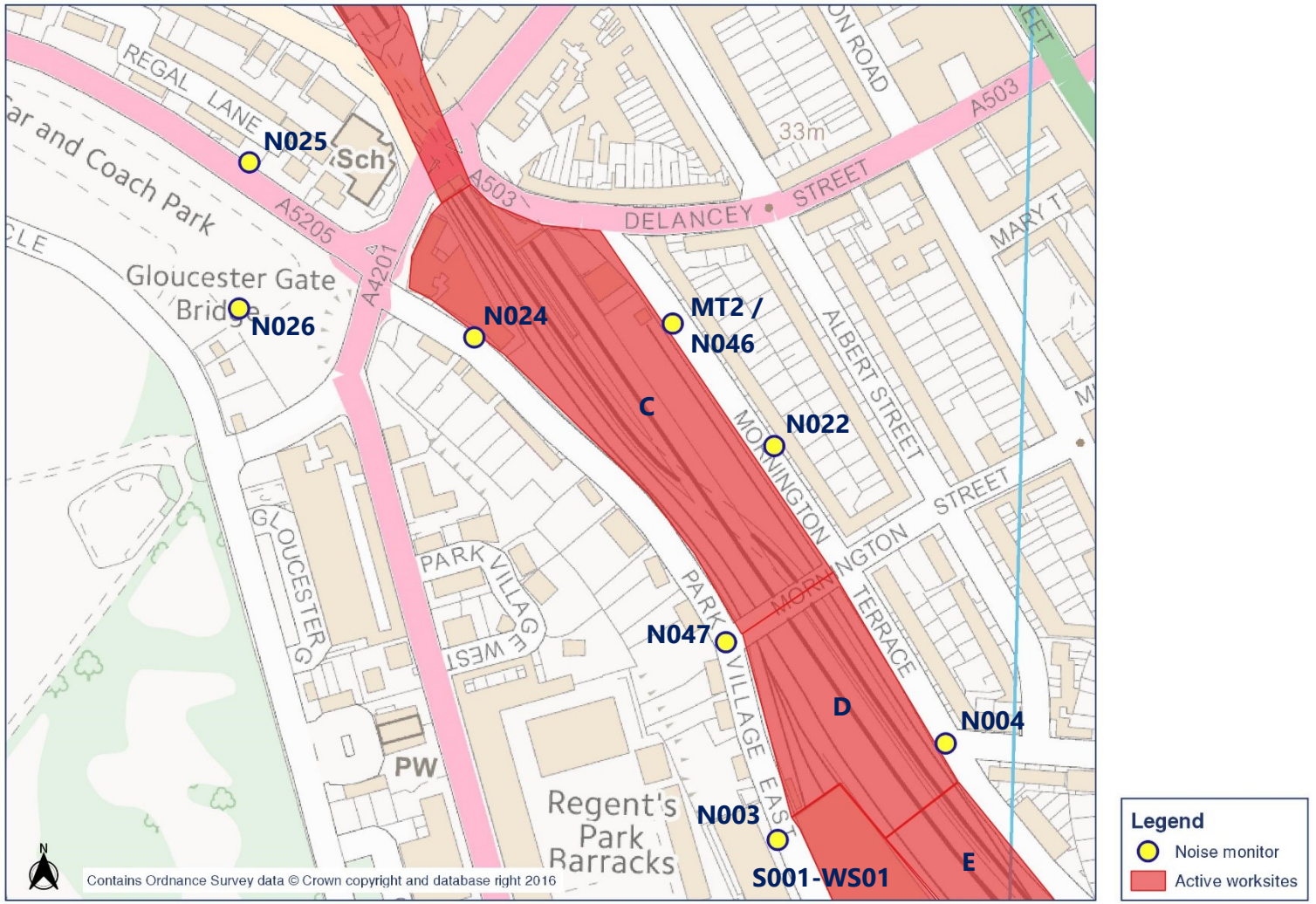
Noise monitoring plan - Overview



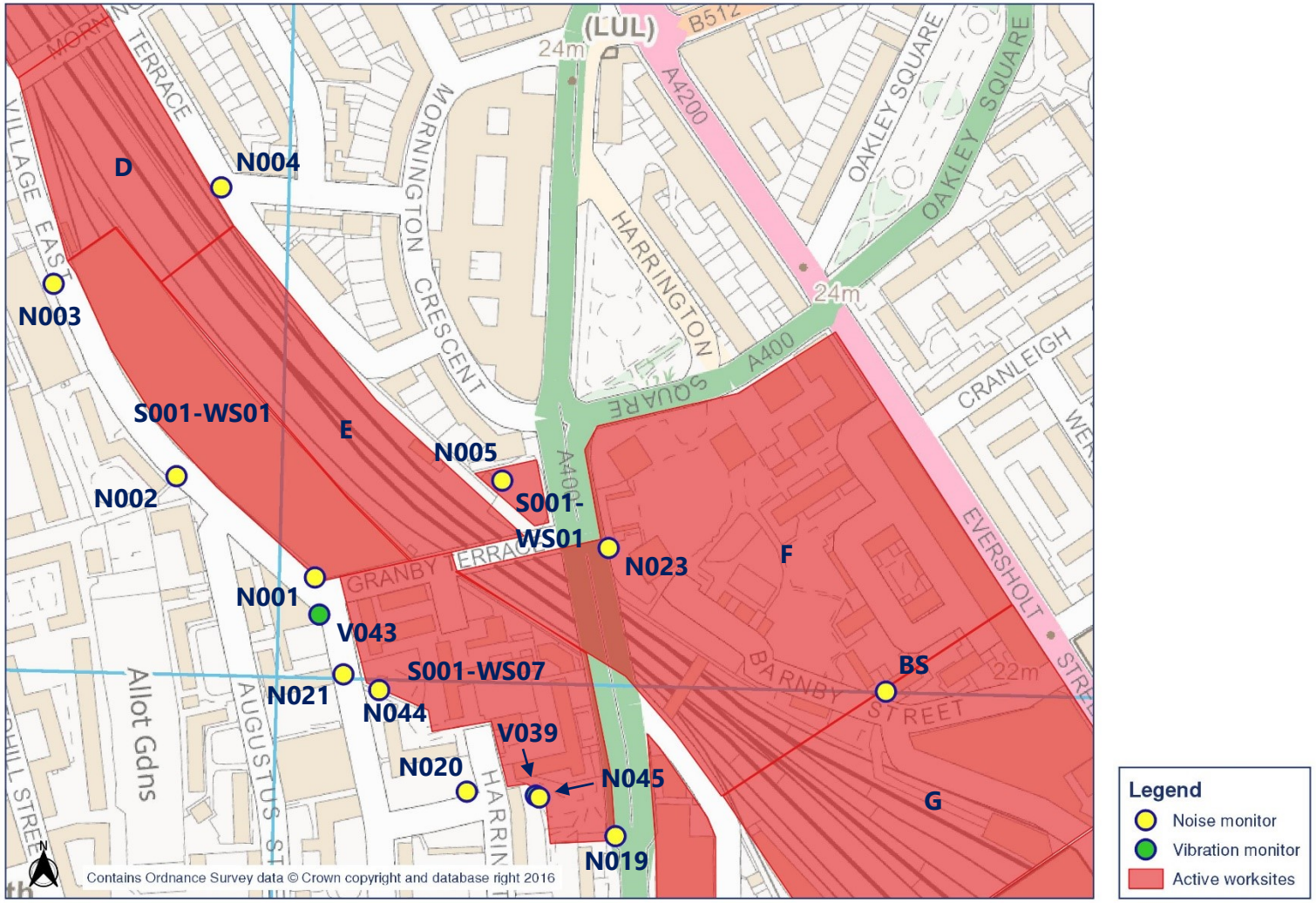
Noise monitoring plan - 1



Noise monitoring plan - 2

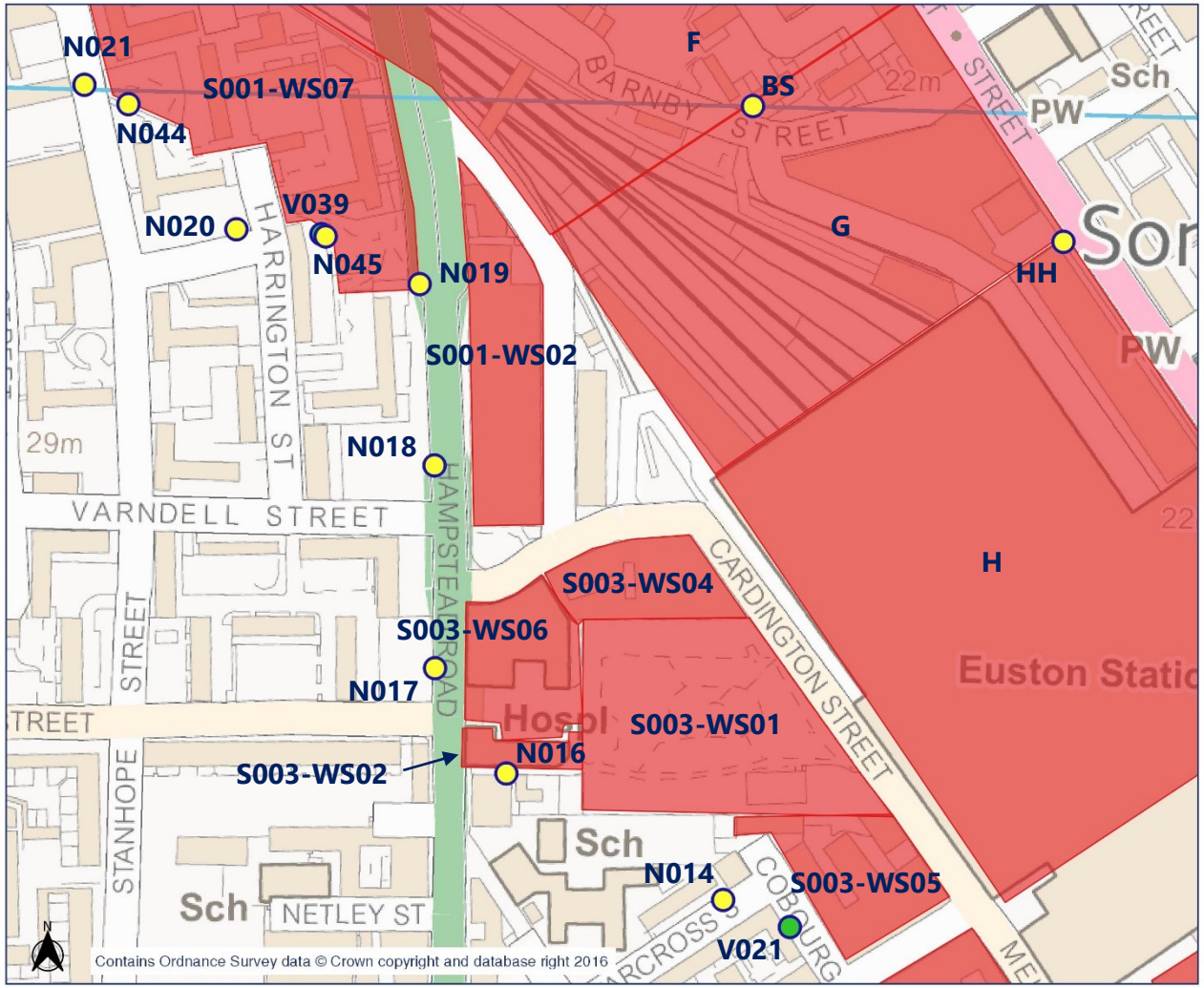


Noise monitoring plan - 3



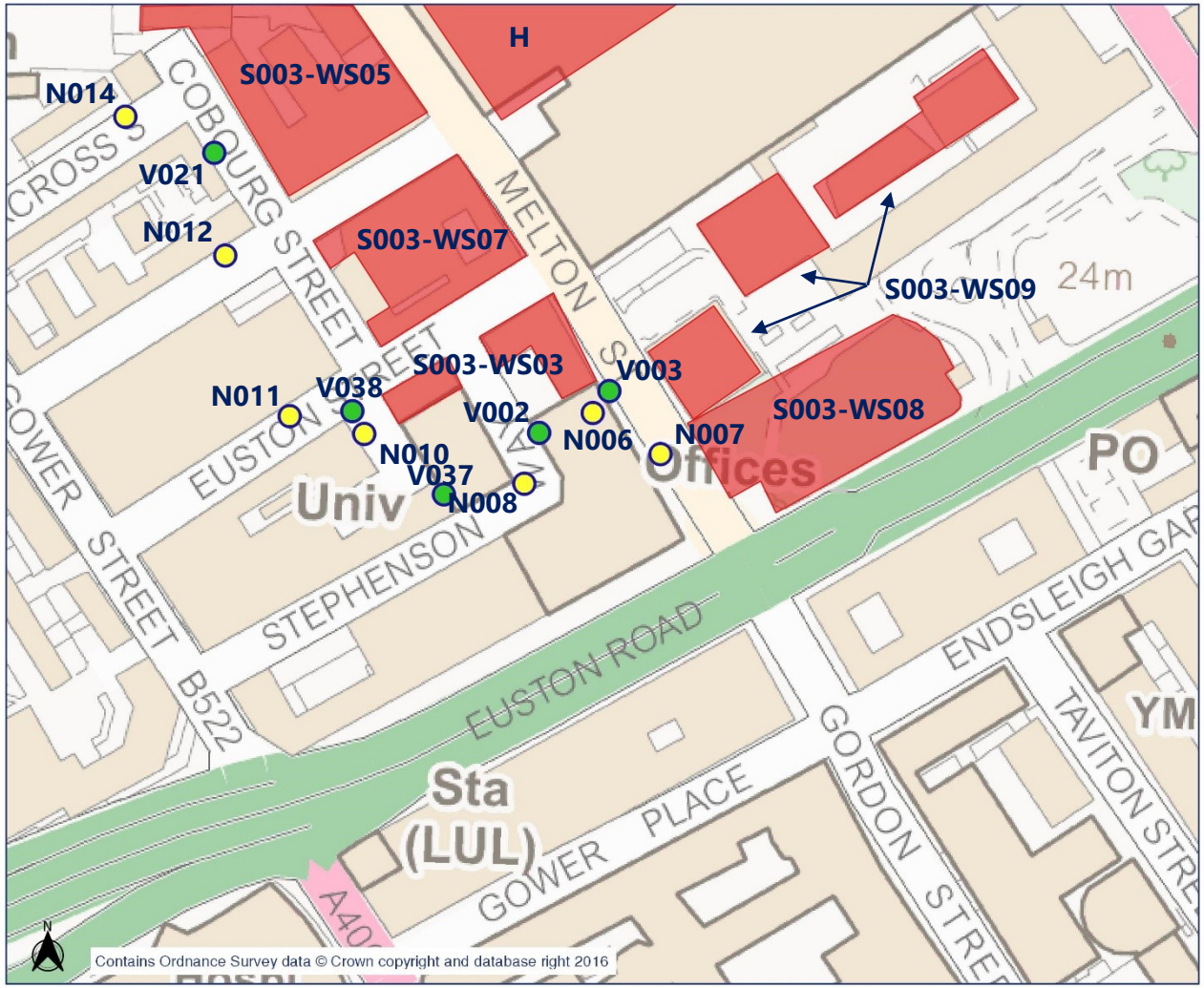
HS2

Noise monitoring plan - 4



HS2

Noise monitoring plan - 5

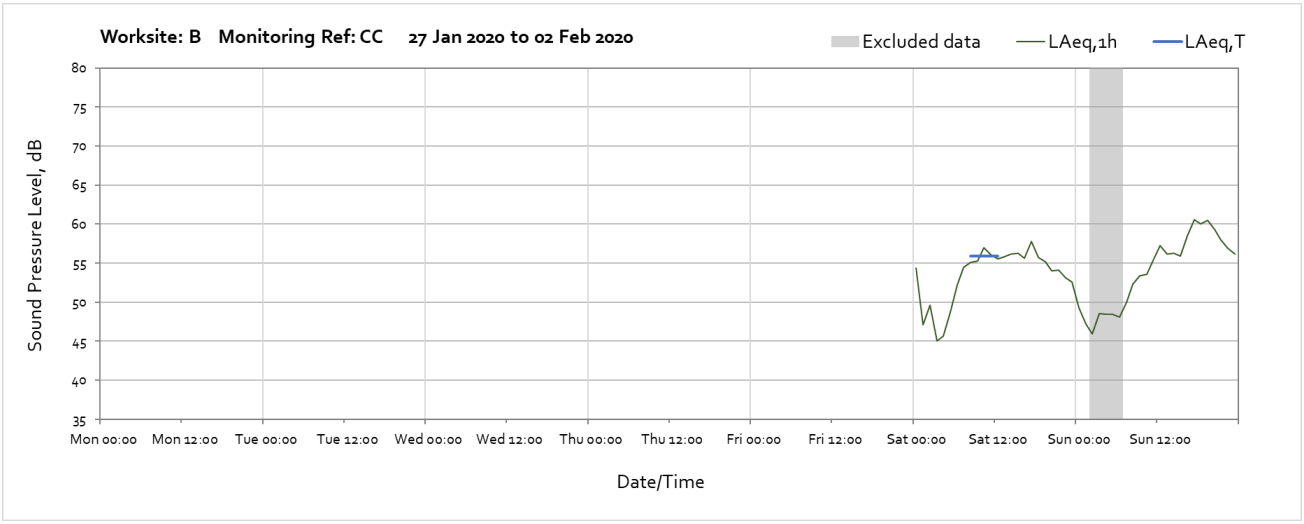


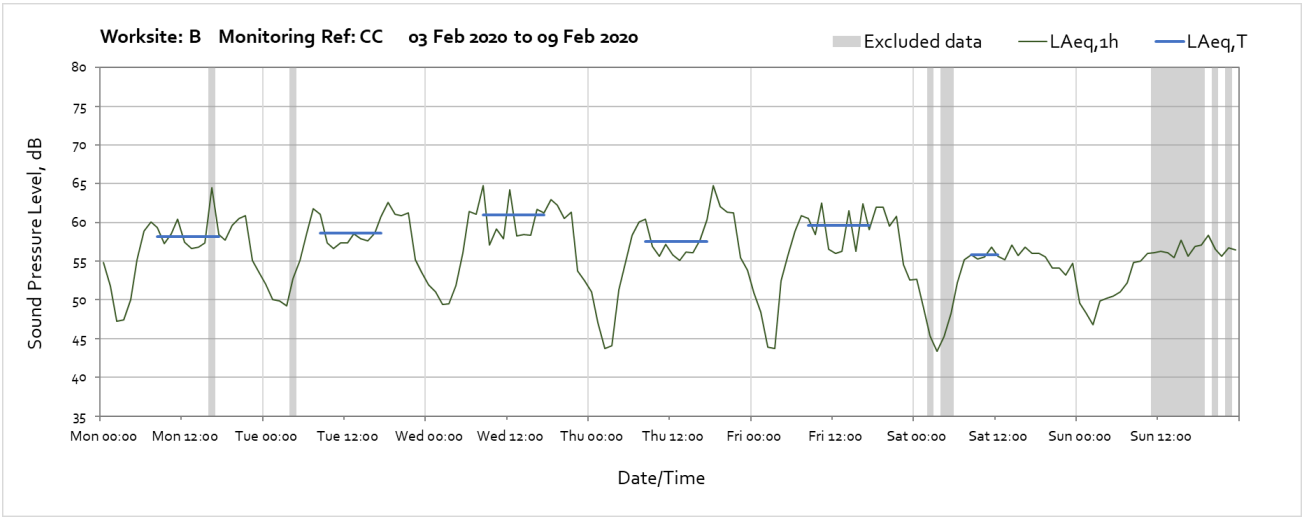
Appendix C Data

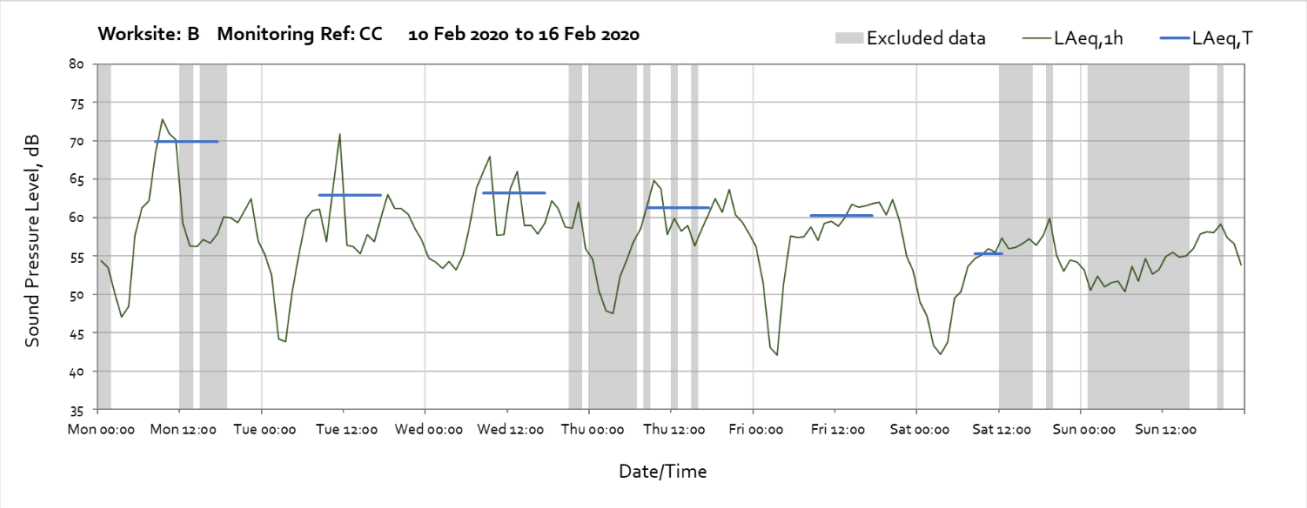
Noise

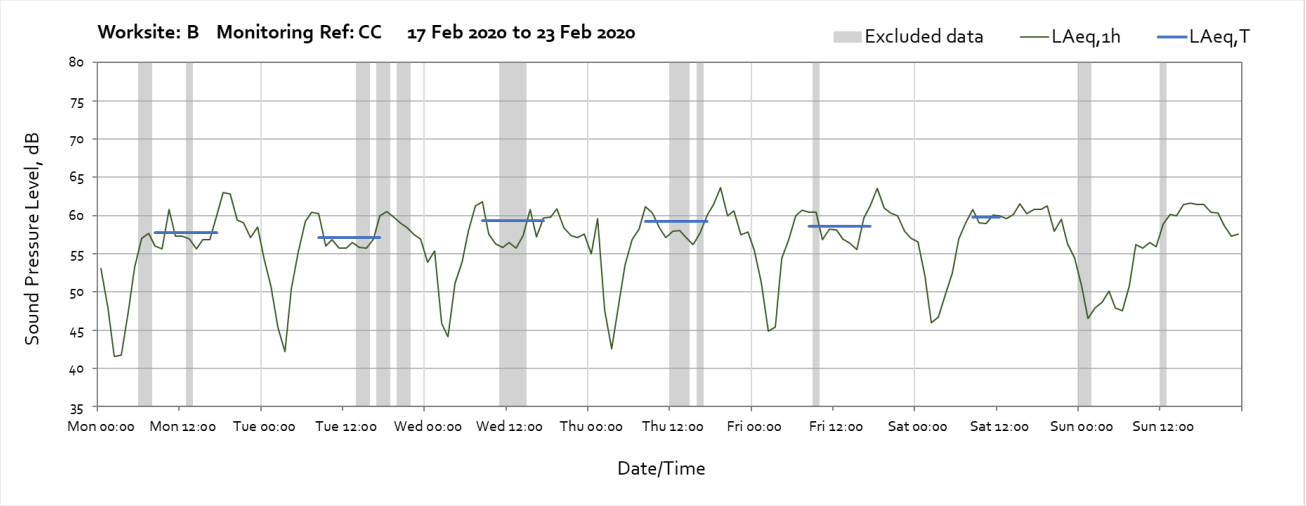
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have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

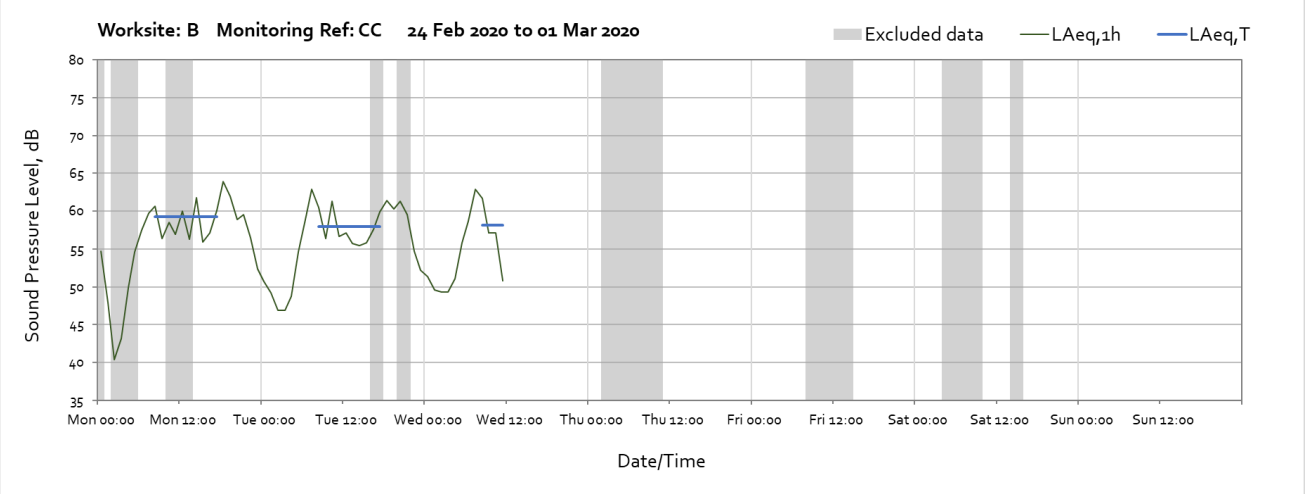
Worksite: B – Monitoring Ref: CC





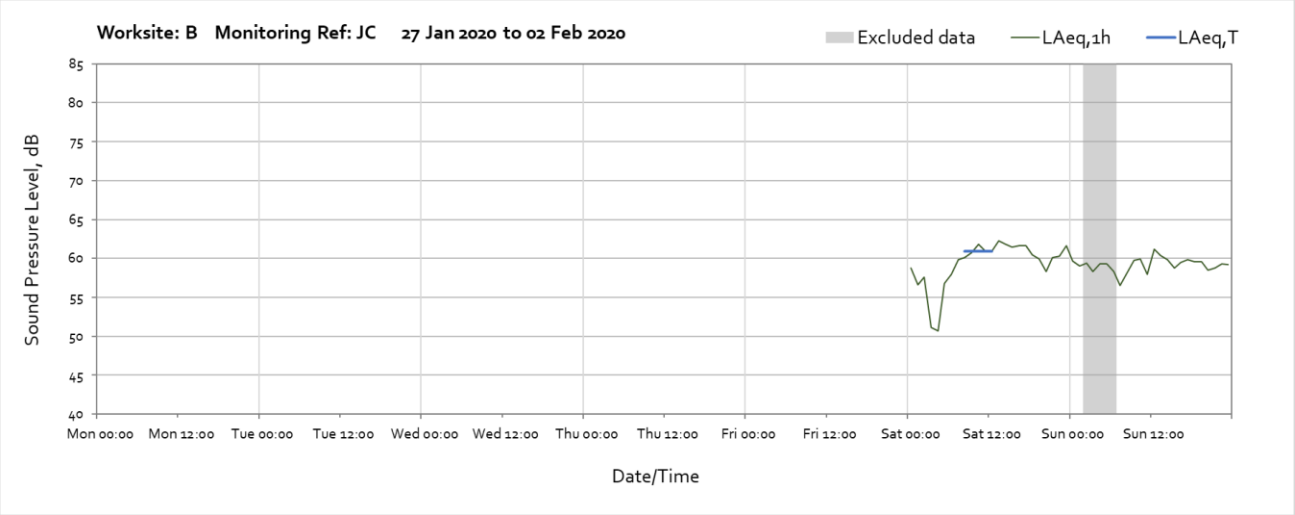


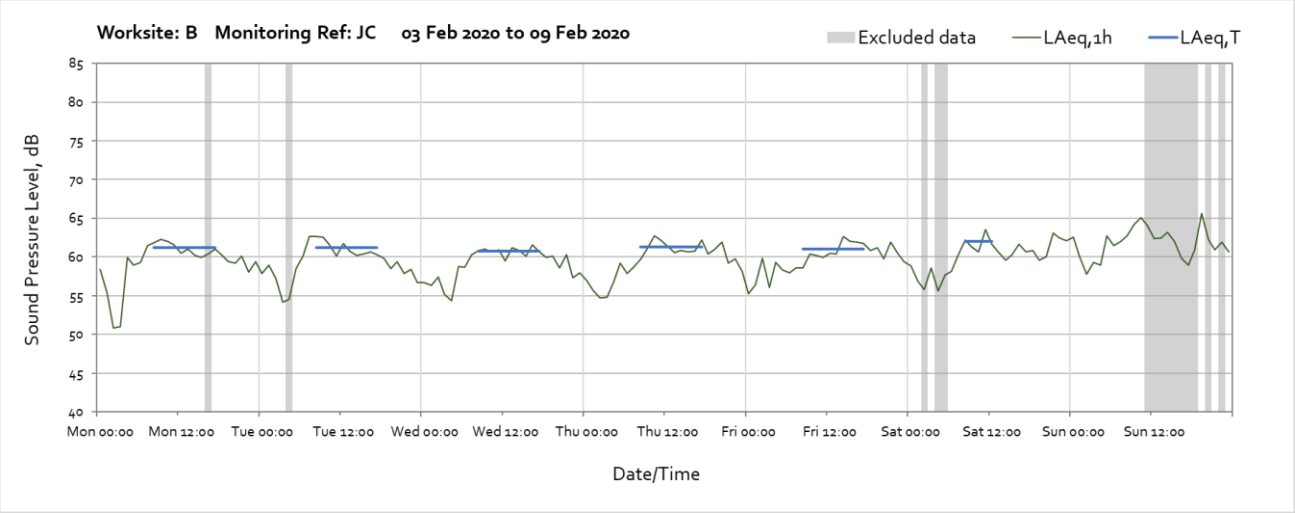


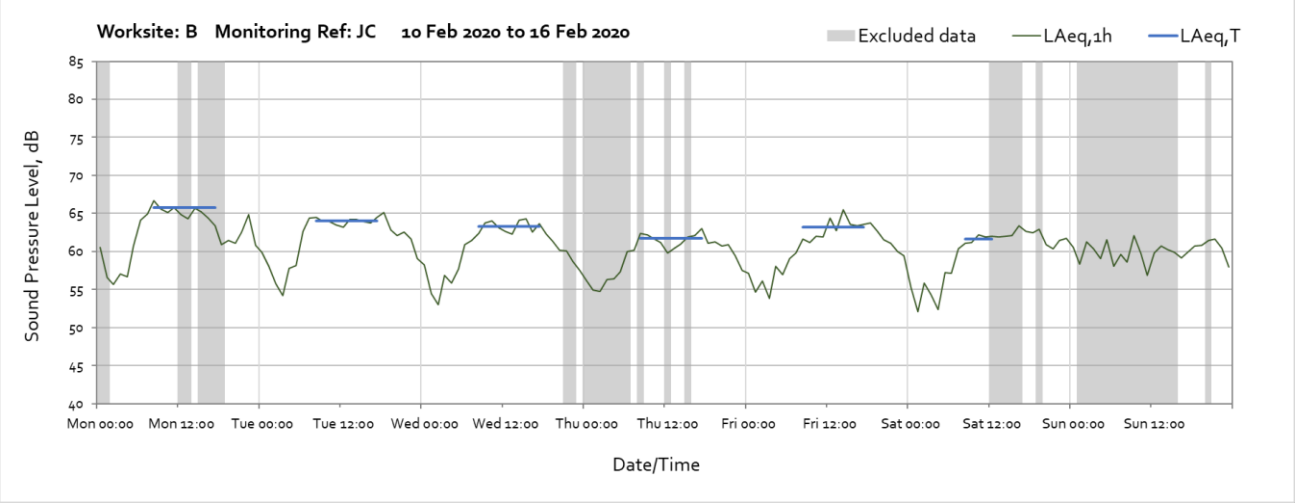


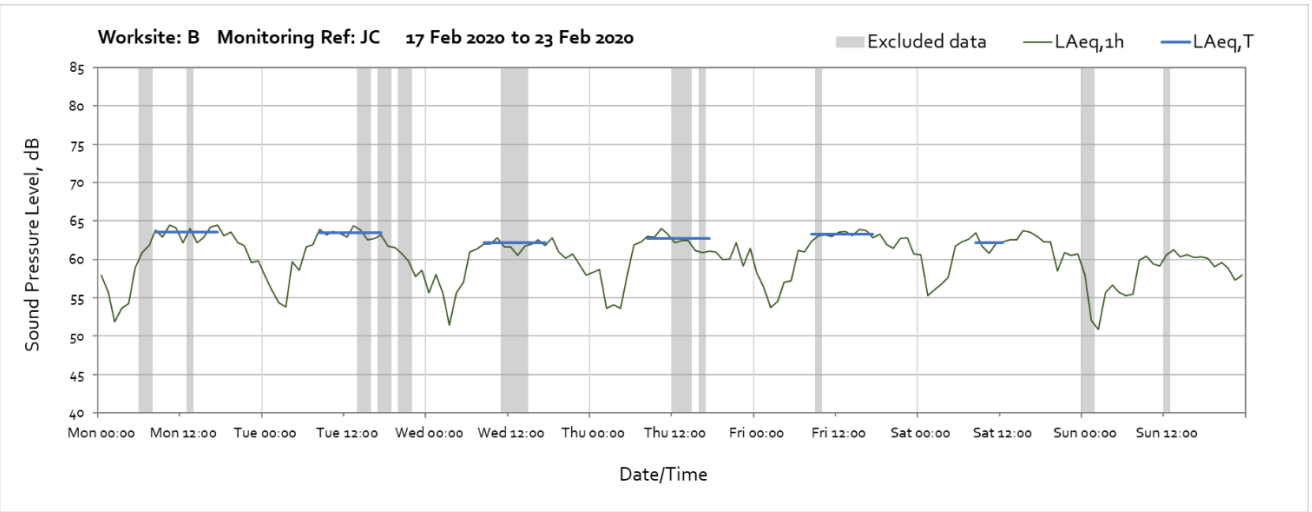
Note: The monitor was removed from site on the 26th of February.

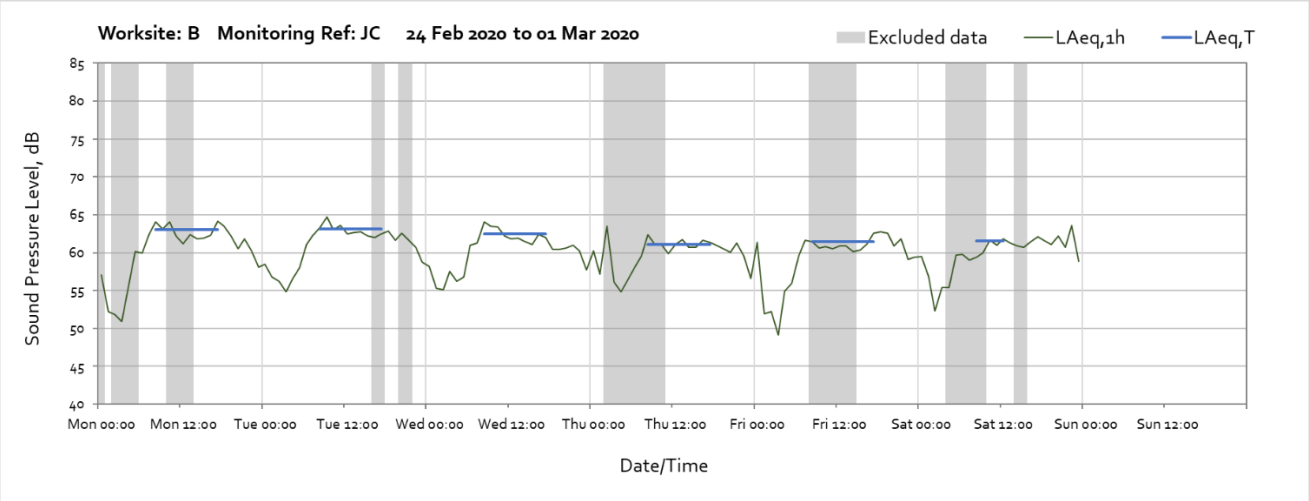
Worksite: B – Monitoring Ref: JC











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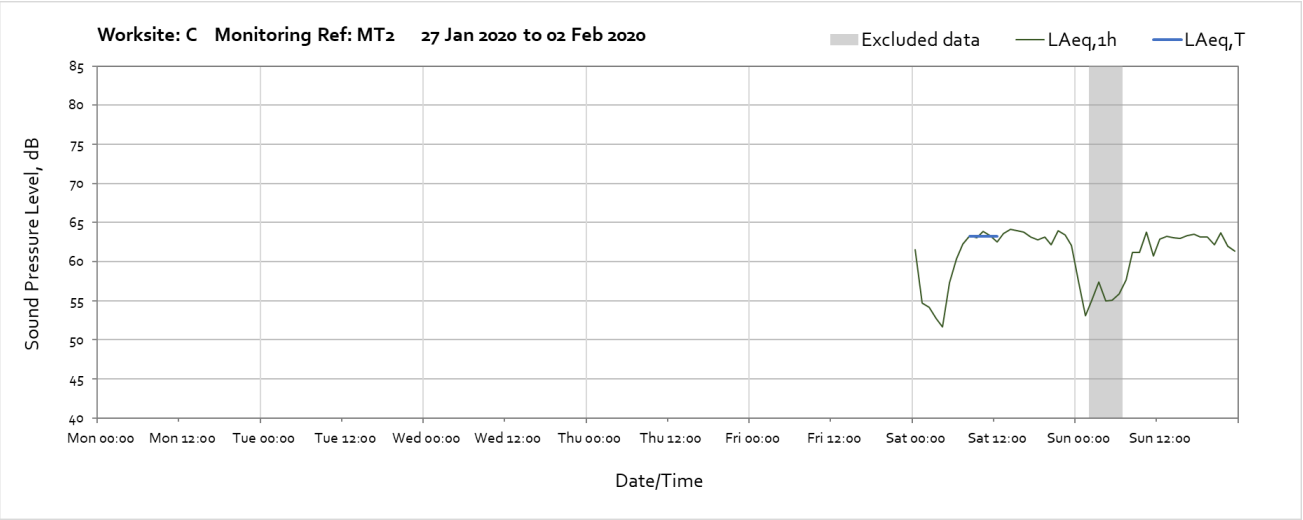

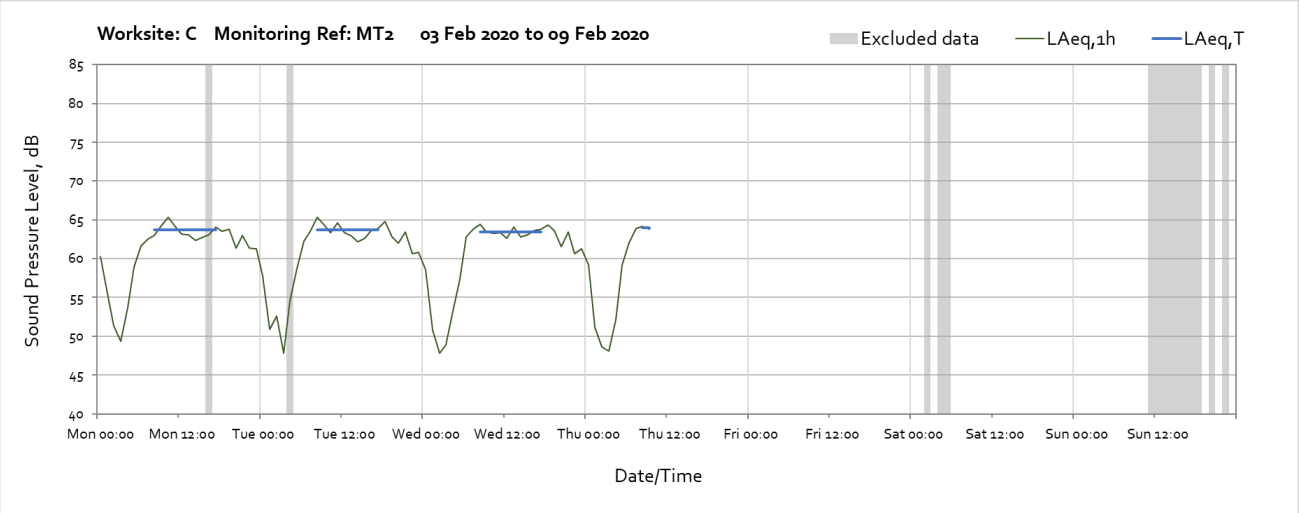

Note: The monitor was removed from site on Thursday 6th February

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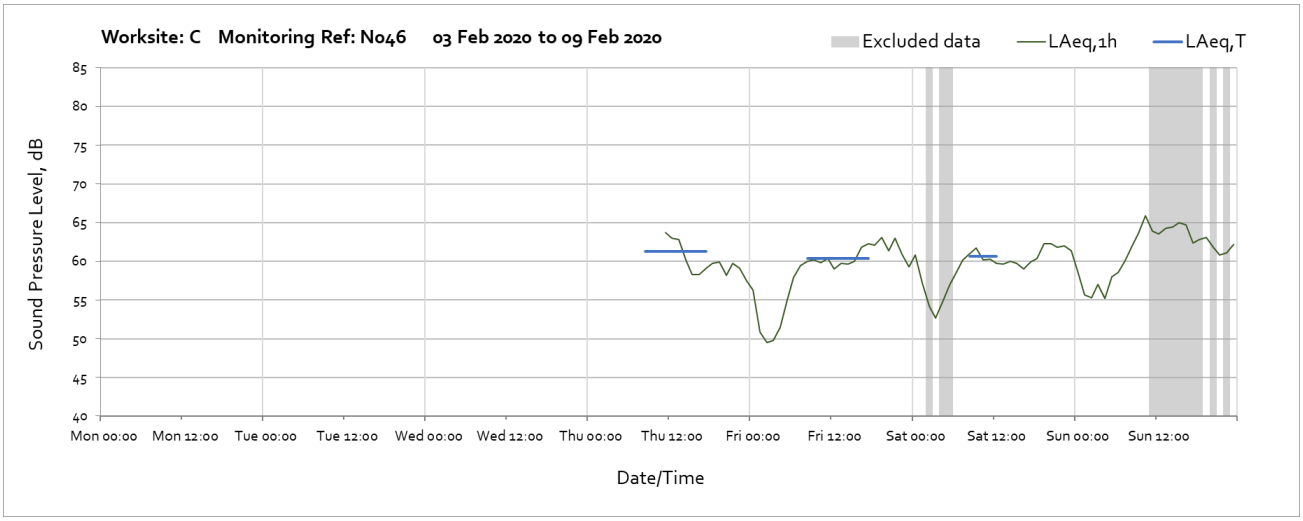
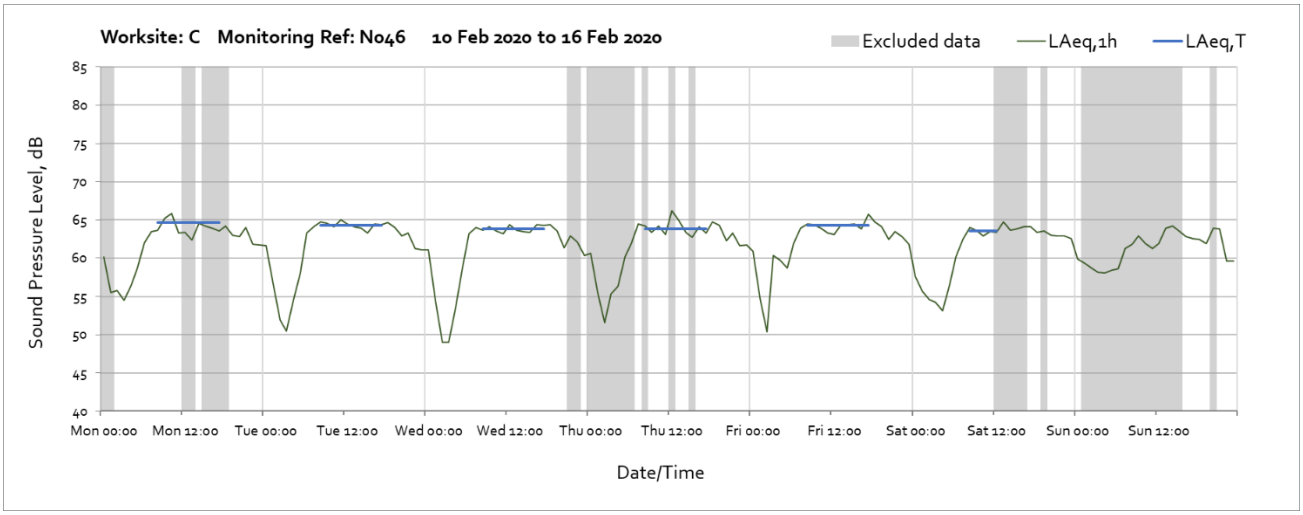
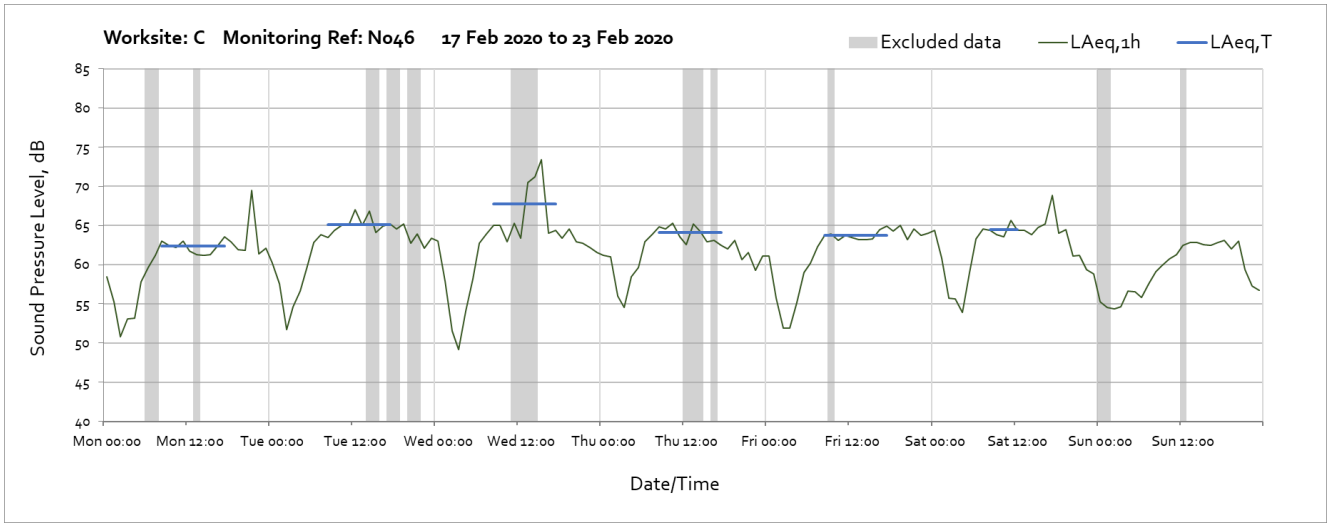
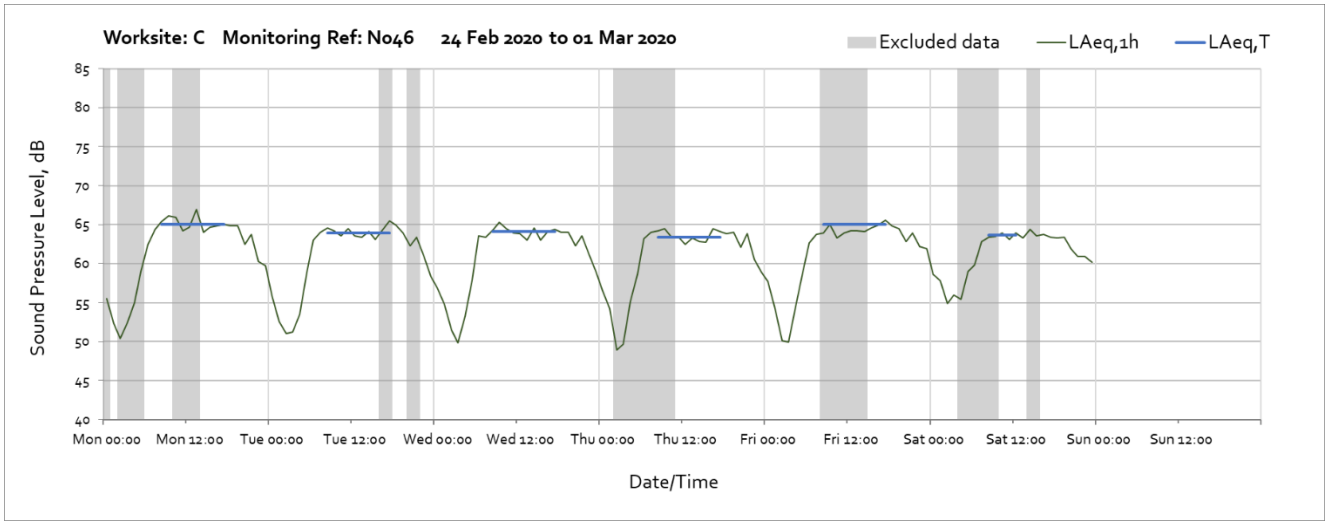


Note: The monitor was installed on Thursday 6th February. For previous periods see data from measurement location MT2.







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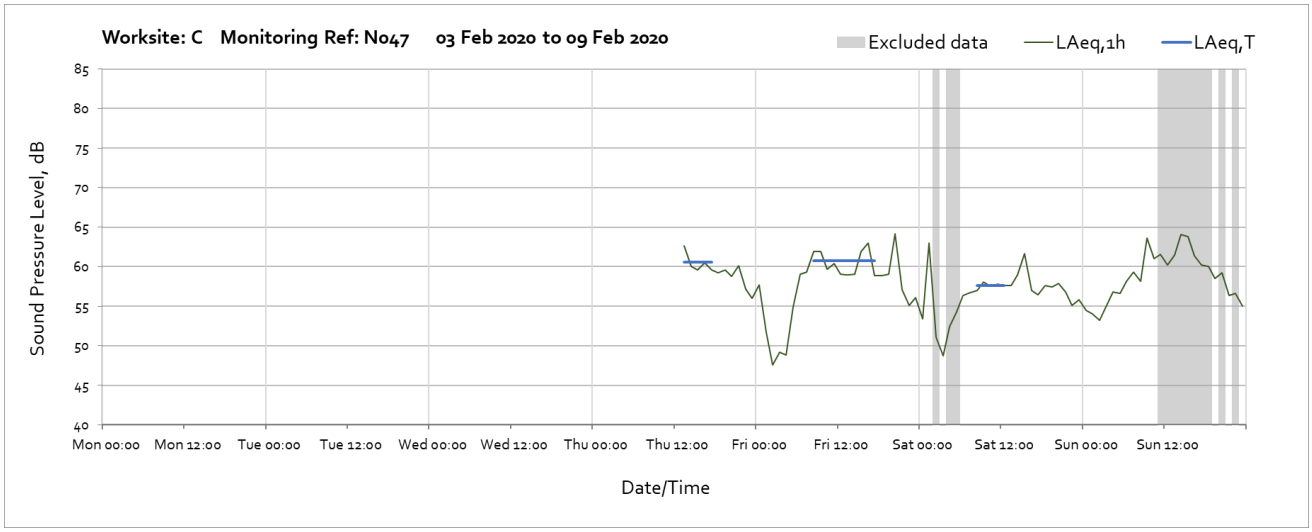
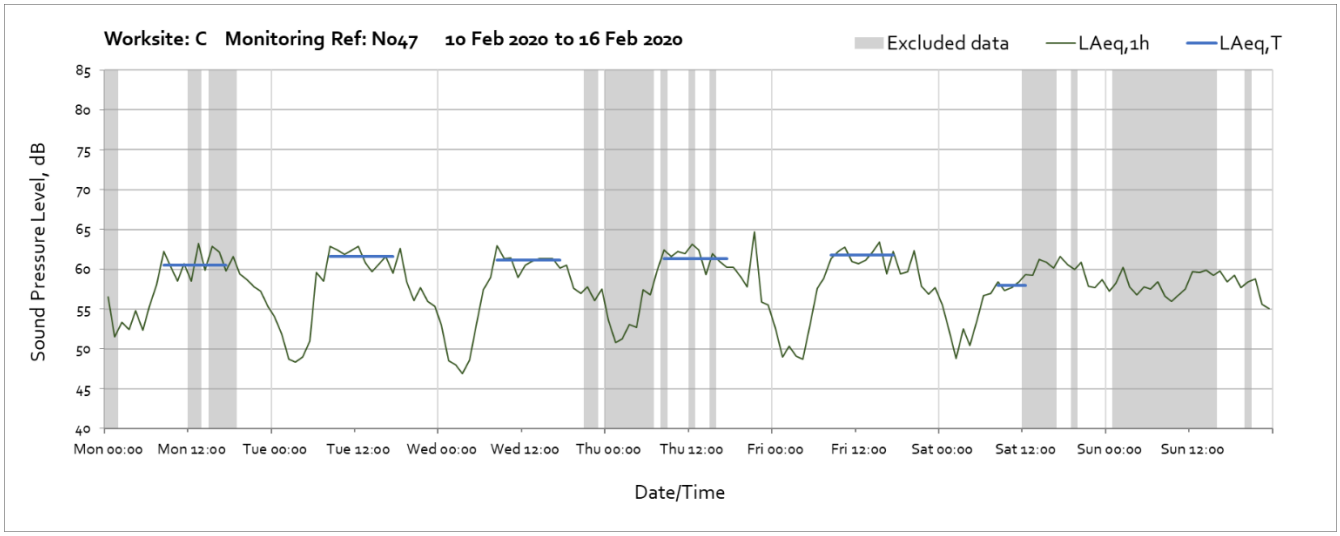


Note: The monitor was installed on Thursday 6th of February.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LAeq,T
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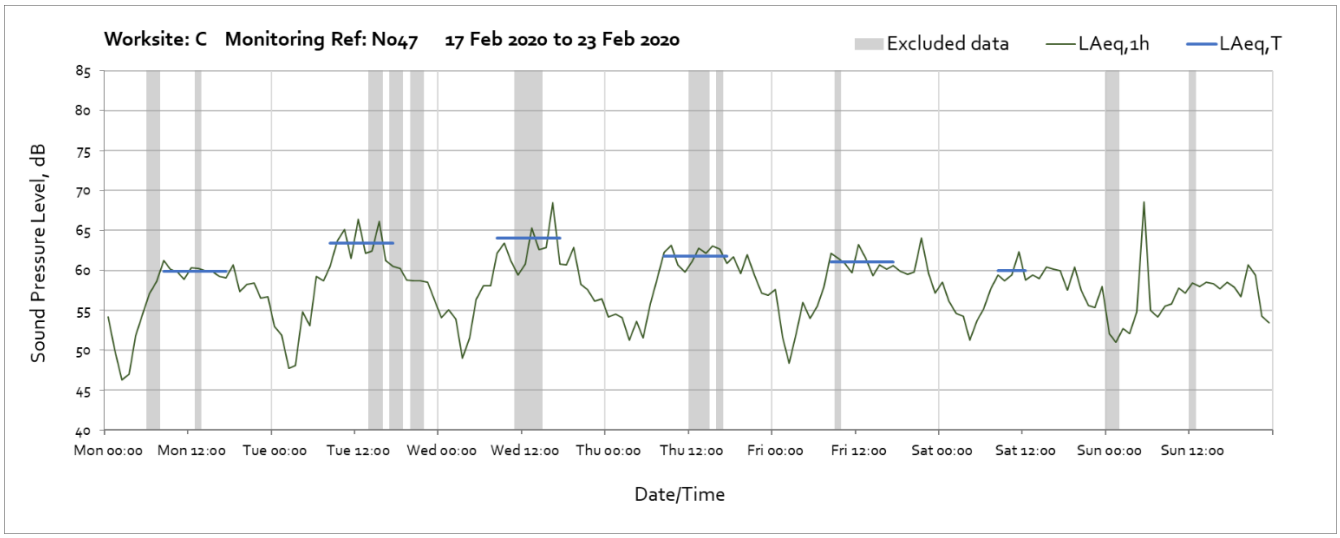
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: C Monitoring Ref: No47 17 Feb 2020 to 23 Feb 2020
Excluded data
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Sound Pressure Level, dB
85
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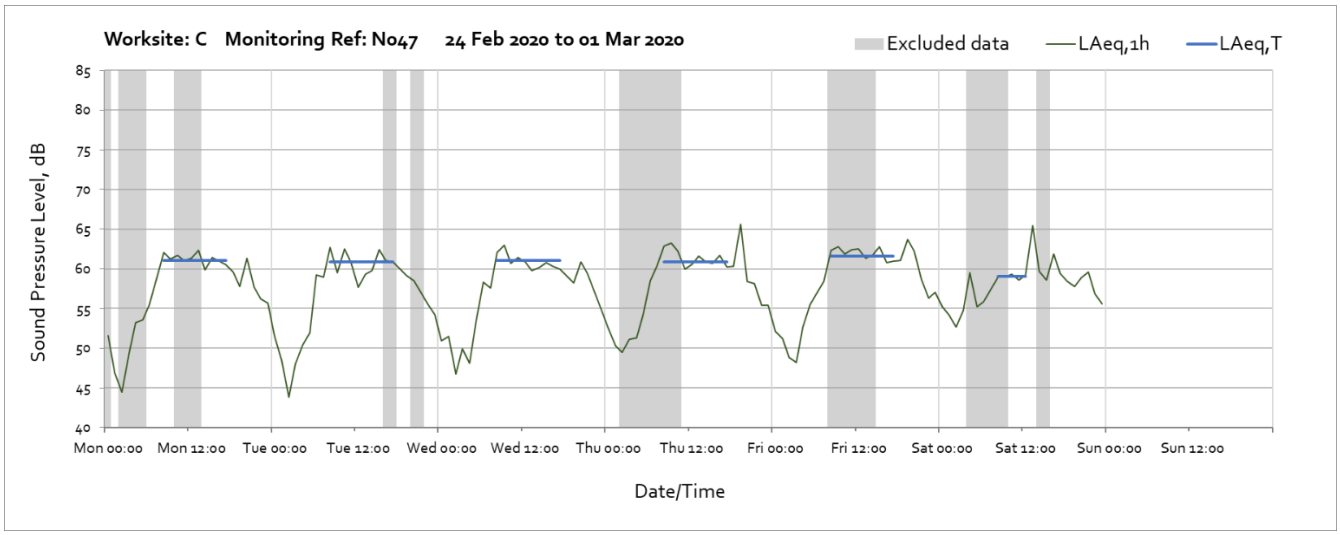
Date/Time


Worksite: C Monitoring Ref: No47 24 Feb 2020 to 01 Mar 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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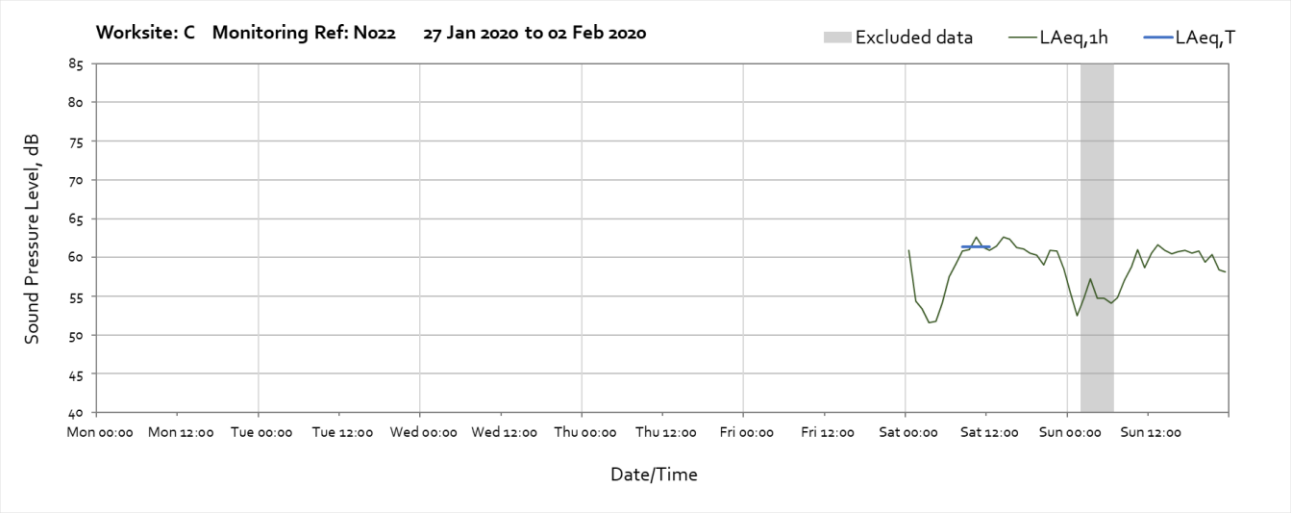
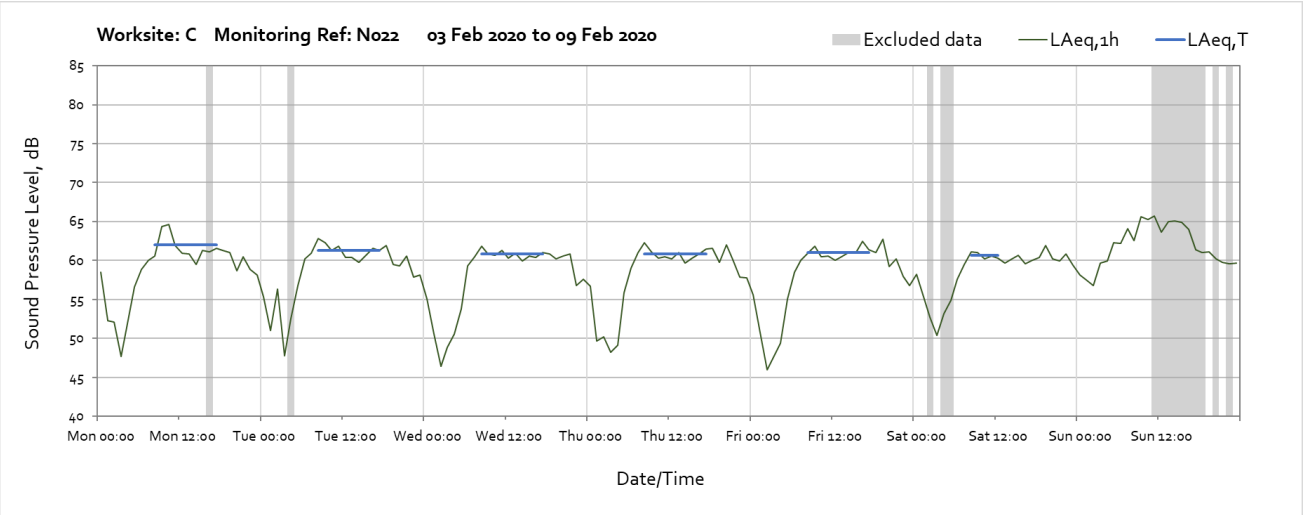
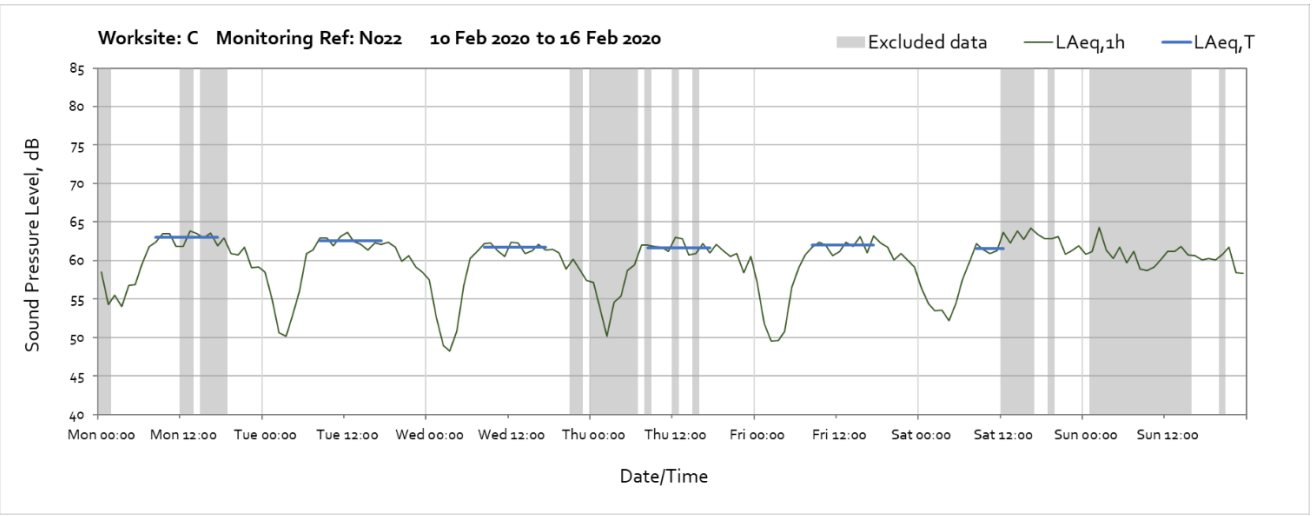
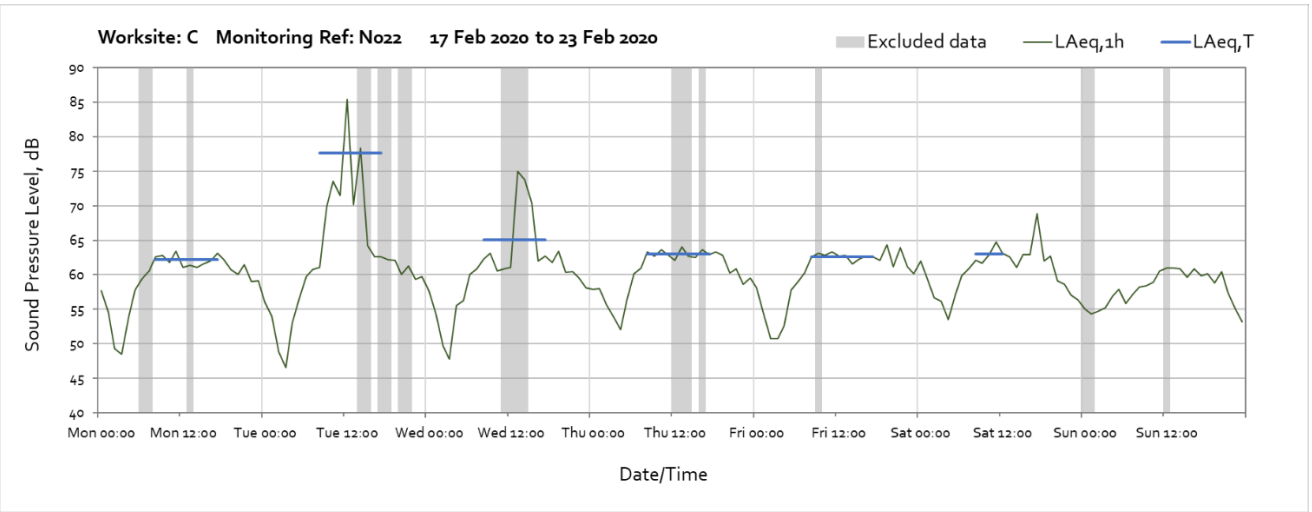
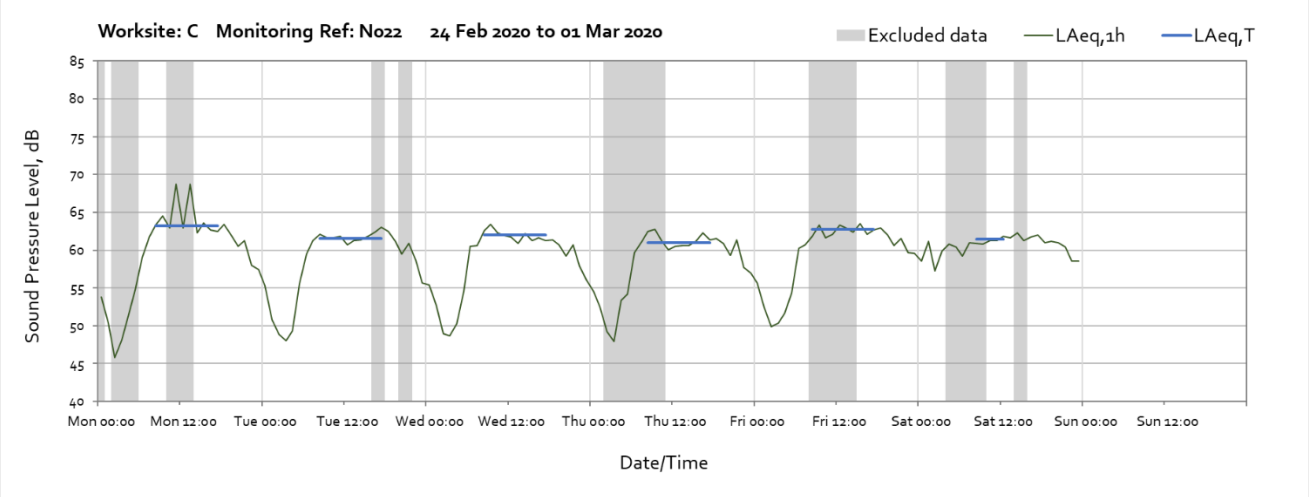
Worksite: C – Monitoring Ref: N022



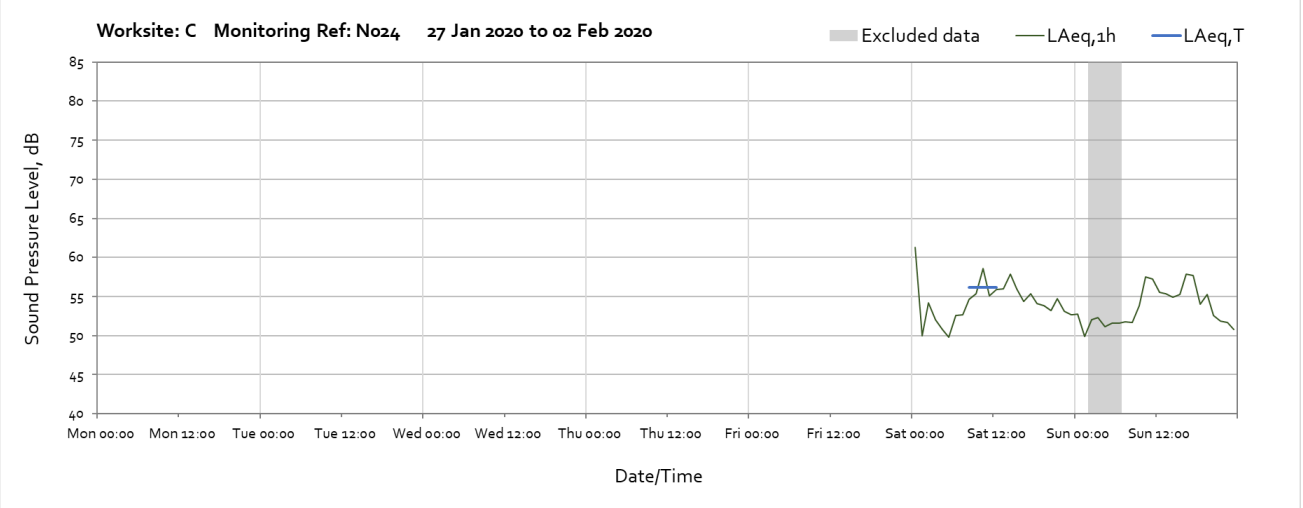


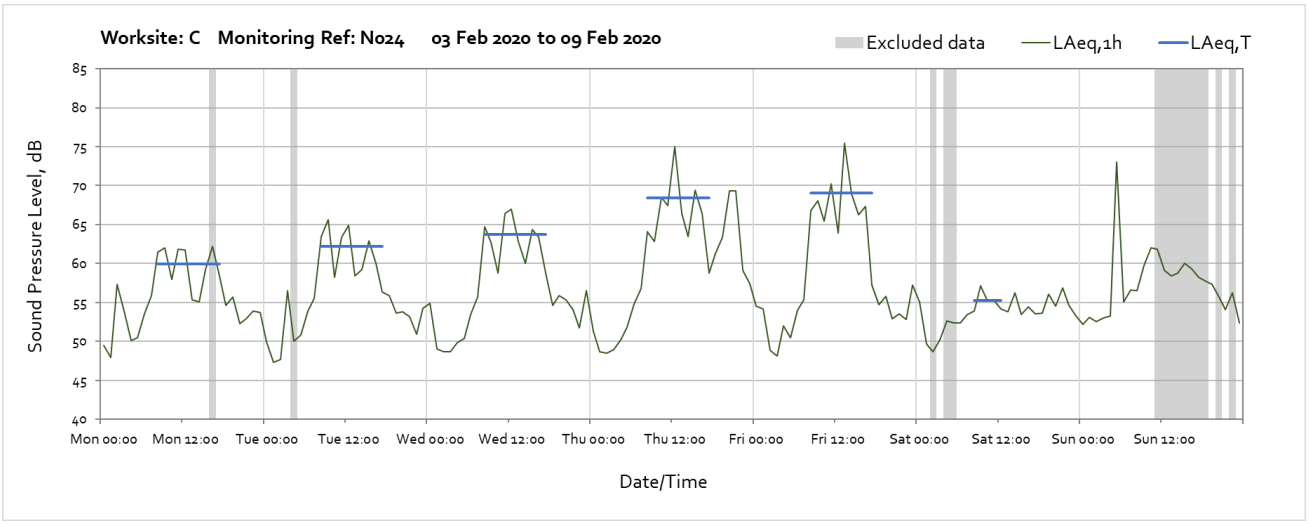






Worksite: C – Monitoring Ref: N024




Worksite: C Monitoring Ref: N024 03 Feb 2020 to 09 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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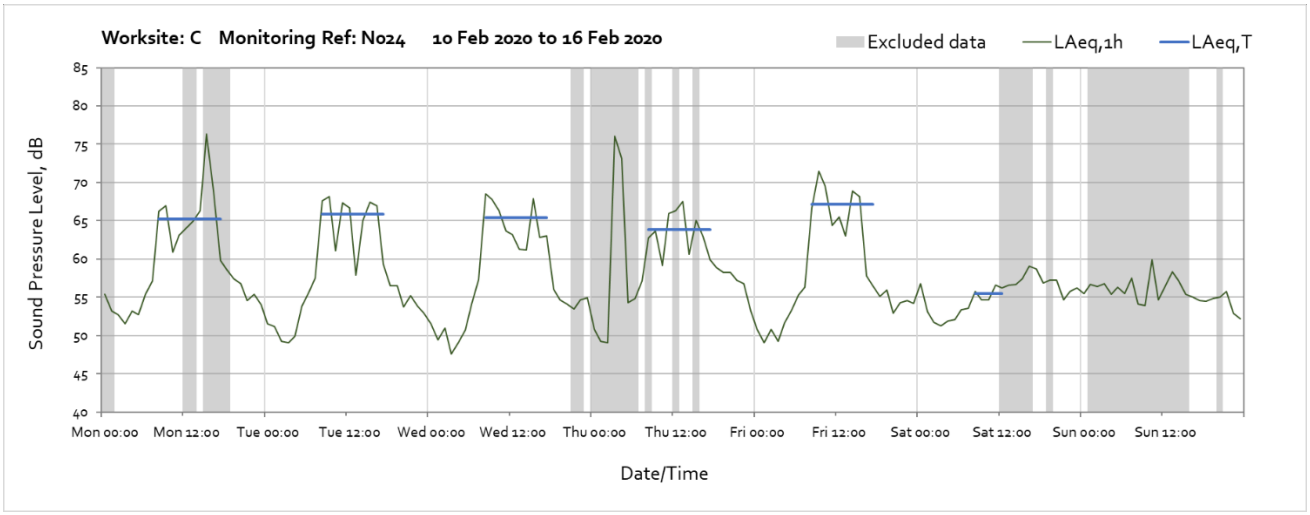
Date/Time


Worksite: C Monitoring Ref: N024 10 Feb 2020 to 16 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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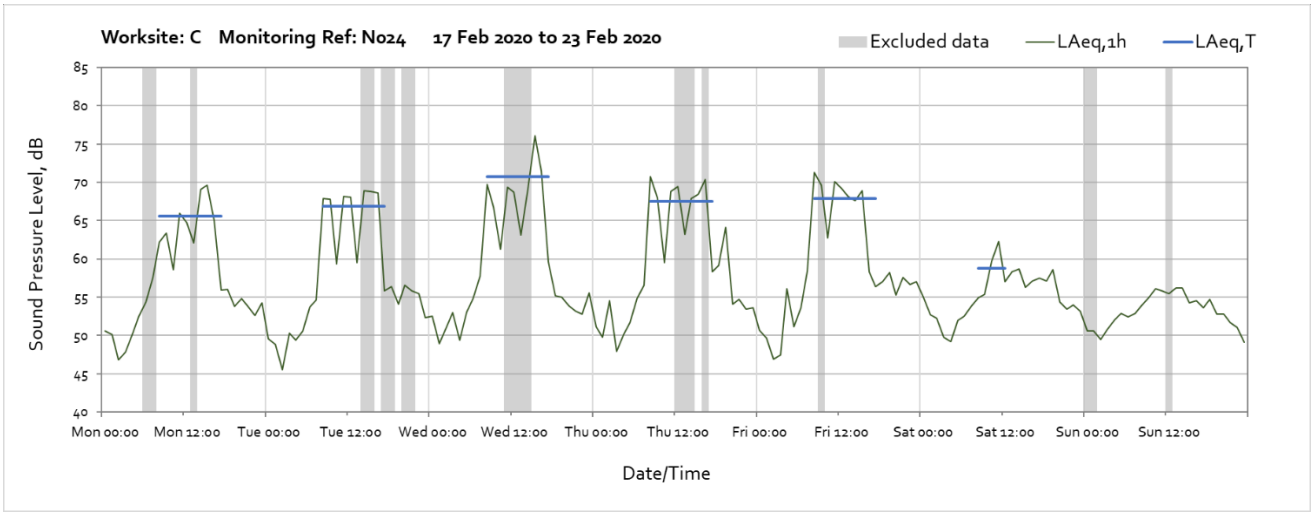
Date/Time


Worksite: C Monitoring Ref: N024 17 Feb 2020 to 23 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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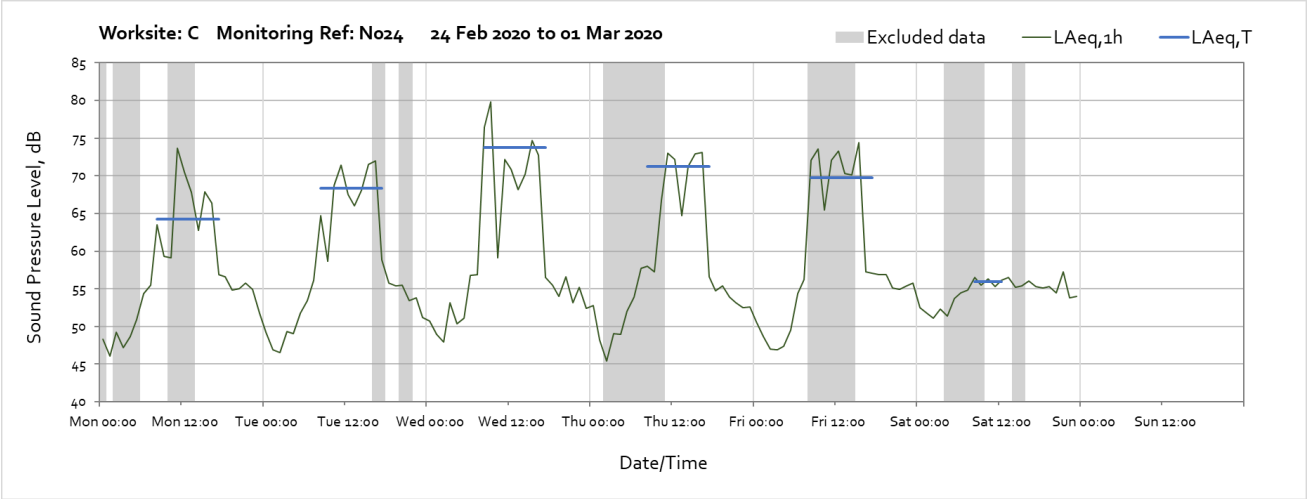
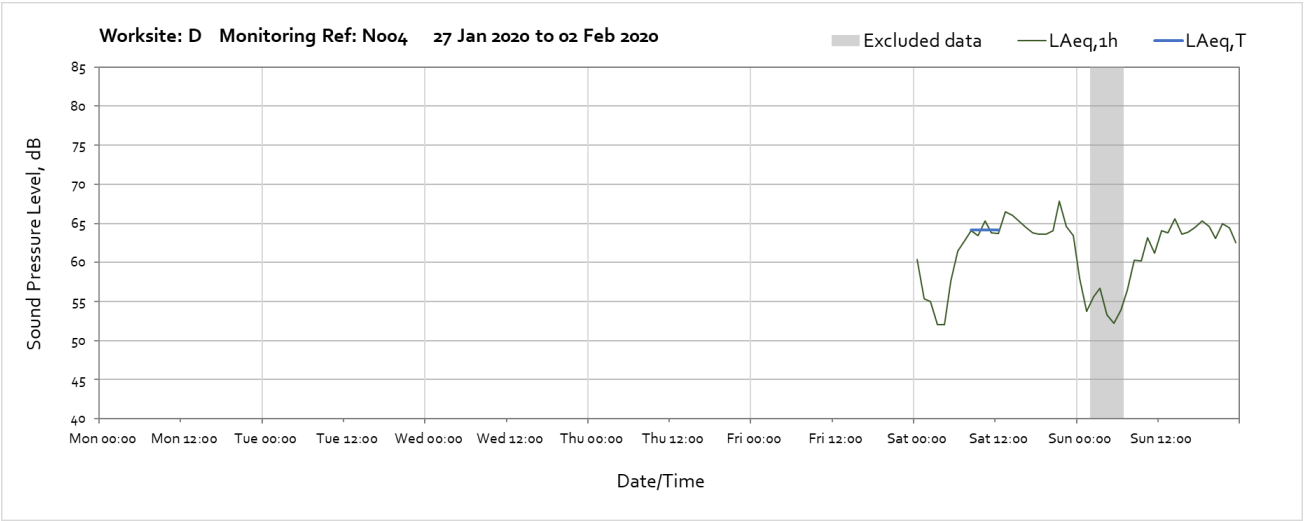
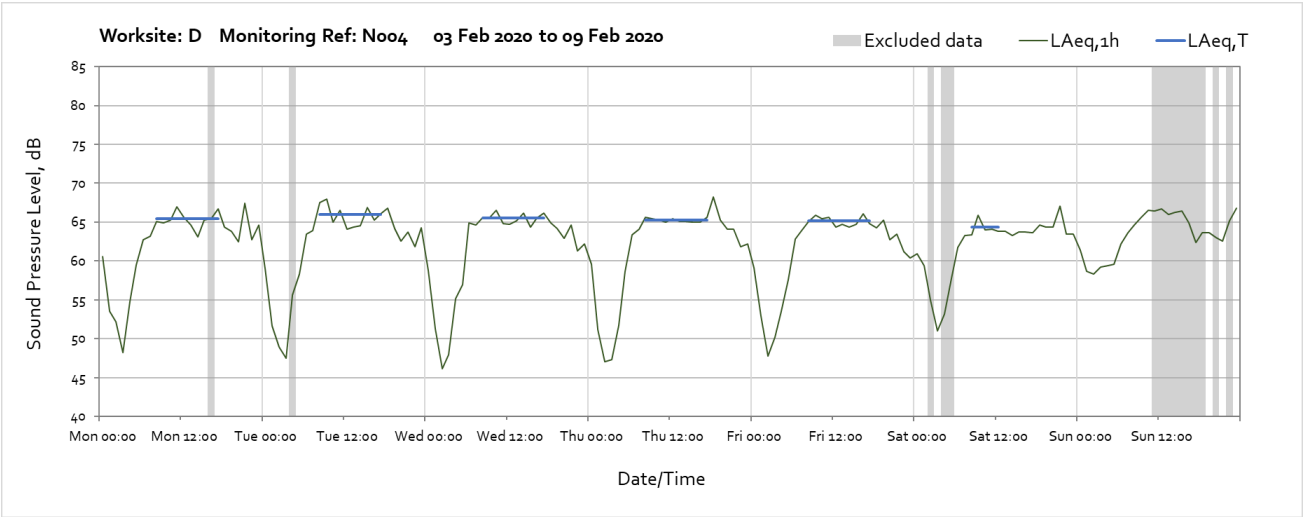
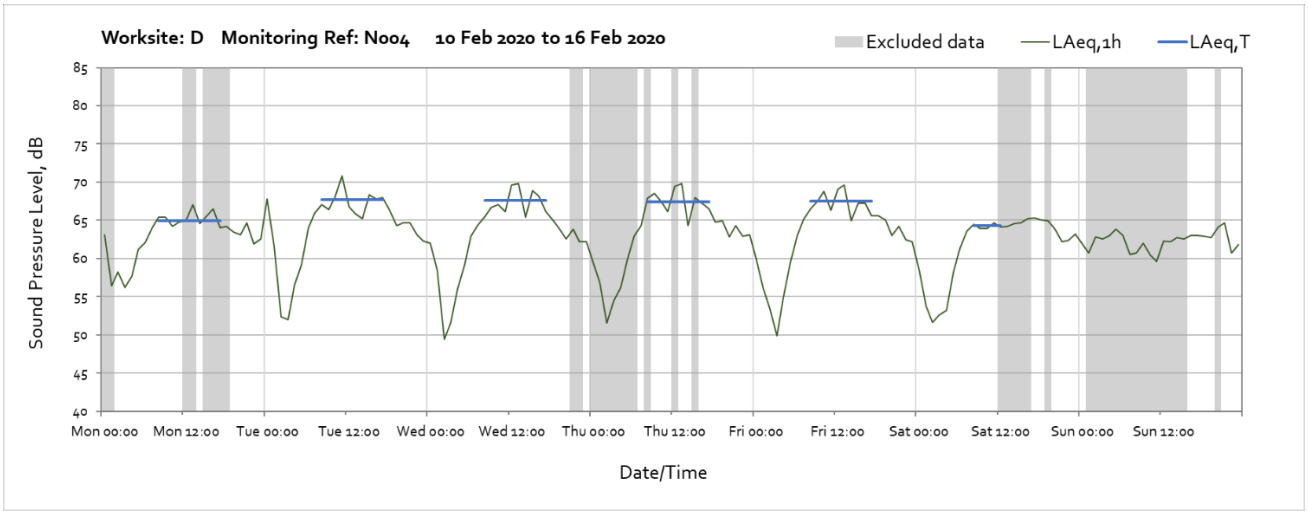
Date/Time



Worksite: D – Monitoring Ref: N004






Worksite: D Monitoring Ref: No04 10 Feb 2020 to 16 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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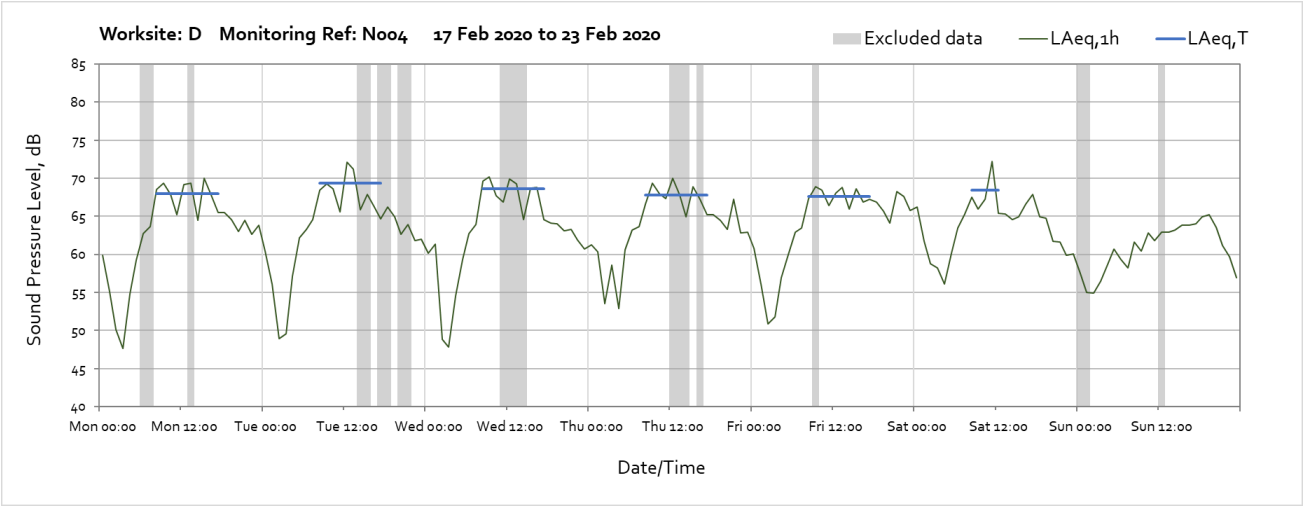
Worksite: D Monitoring Ref: No04 17 Feb 2020 to 23 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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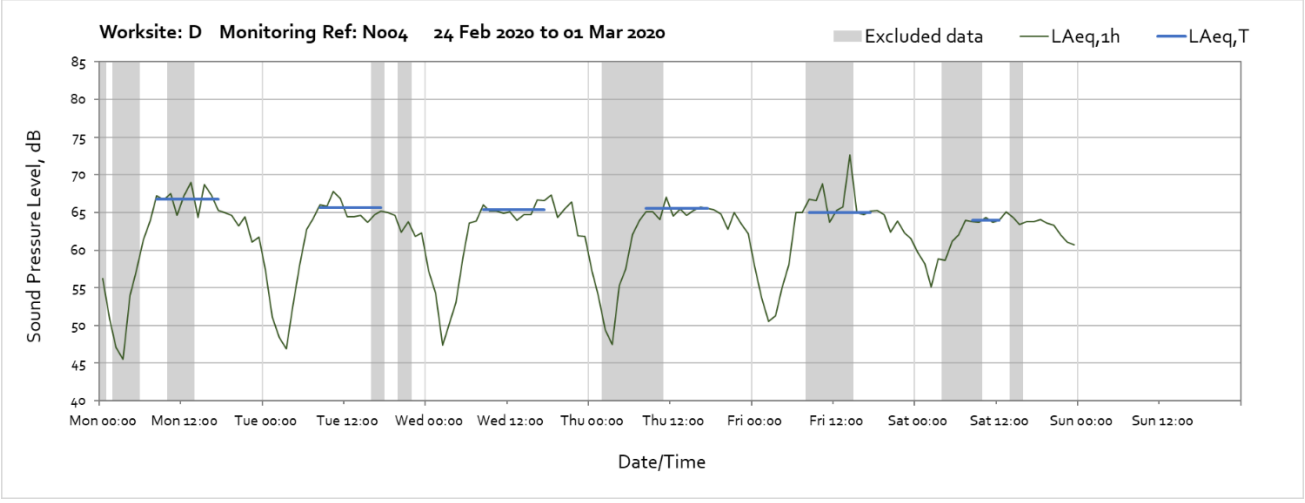
Worksite: D Monitoring Ref: No04 24 Feb 2020 to 01 Mar 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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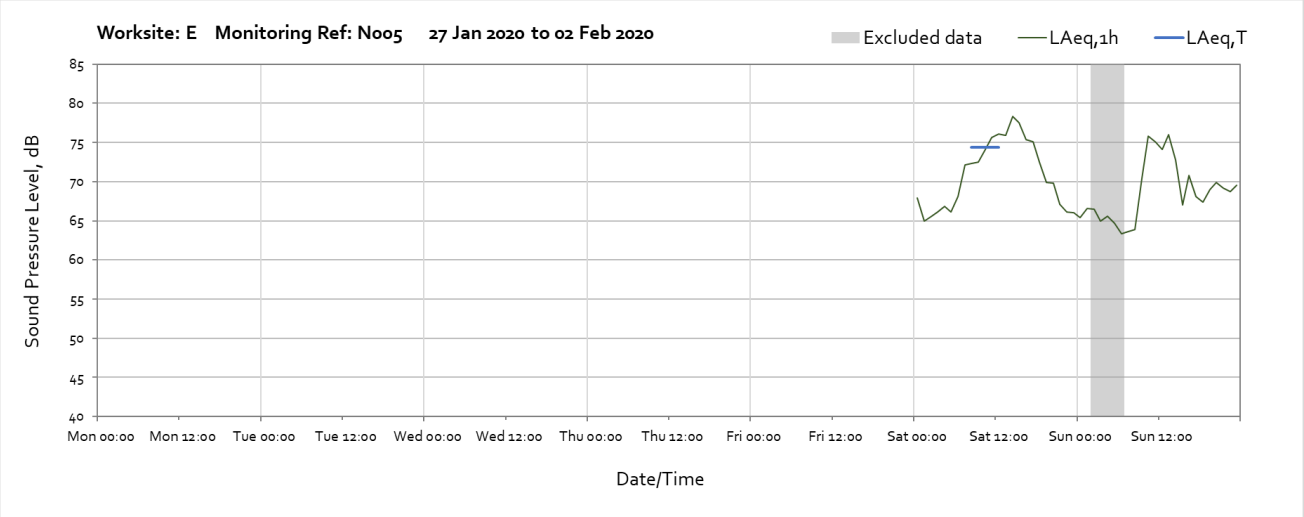
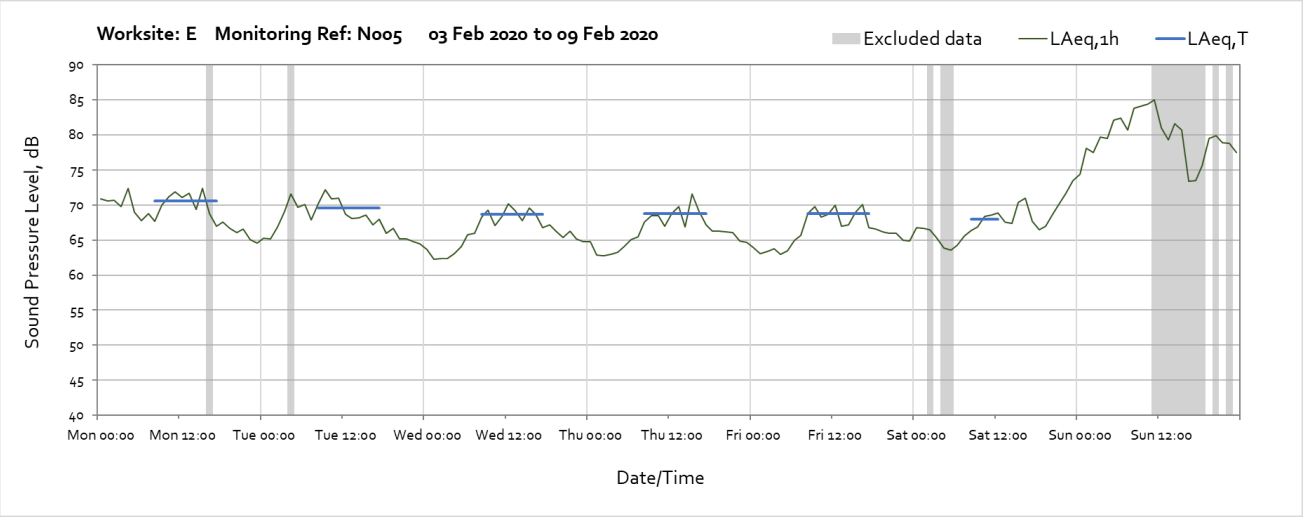
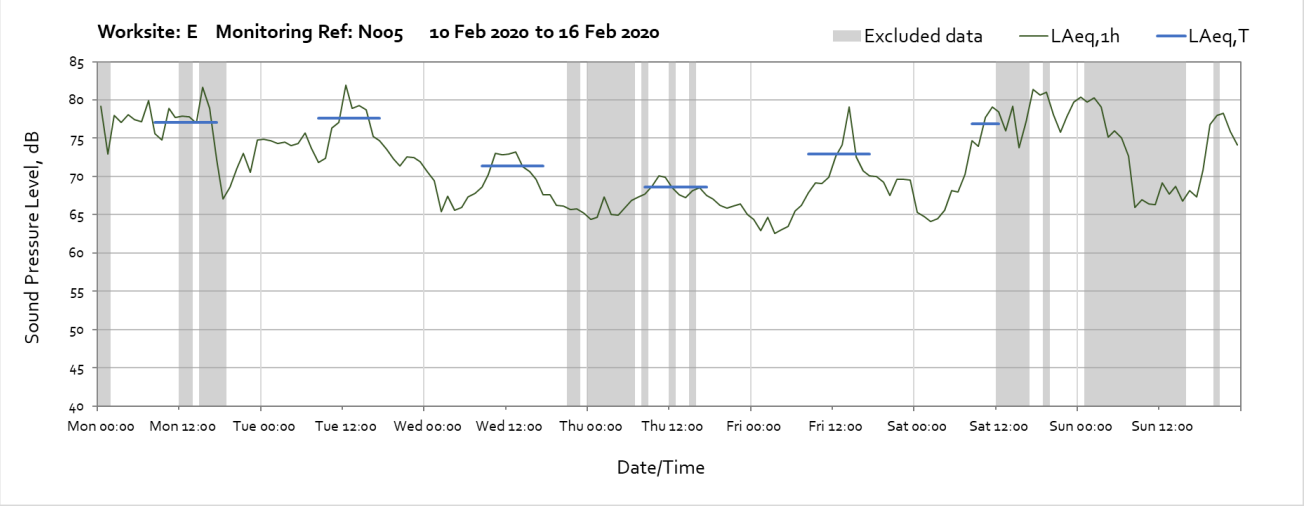
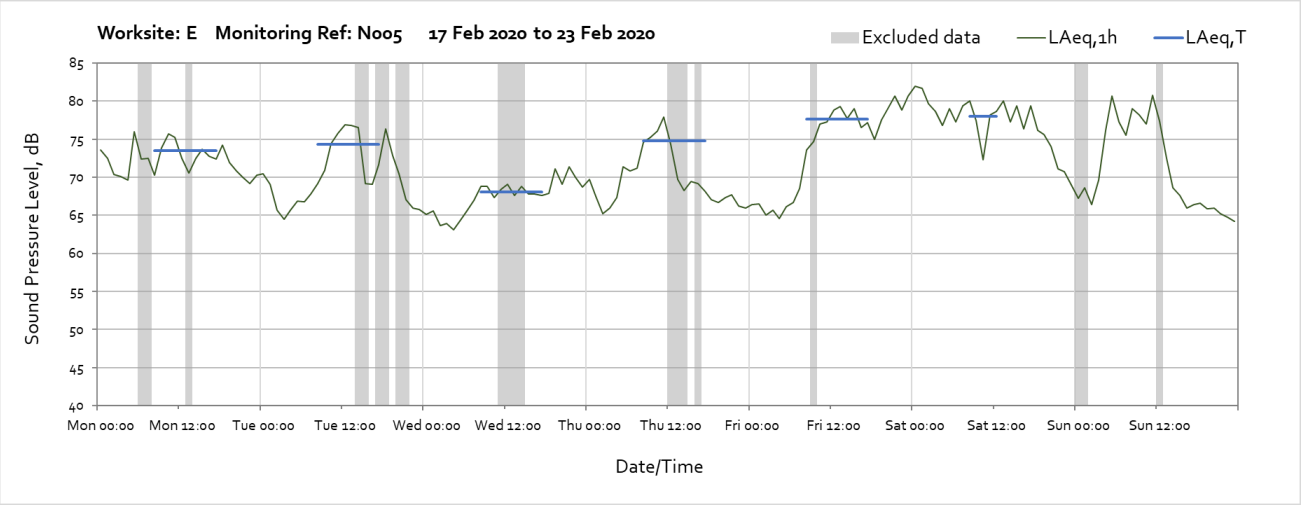
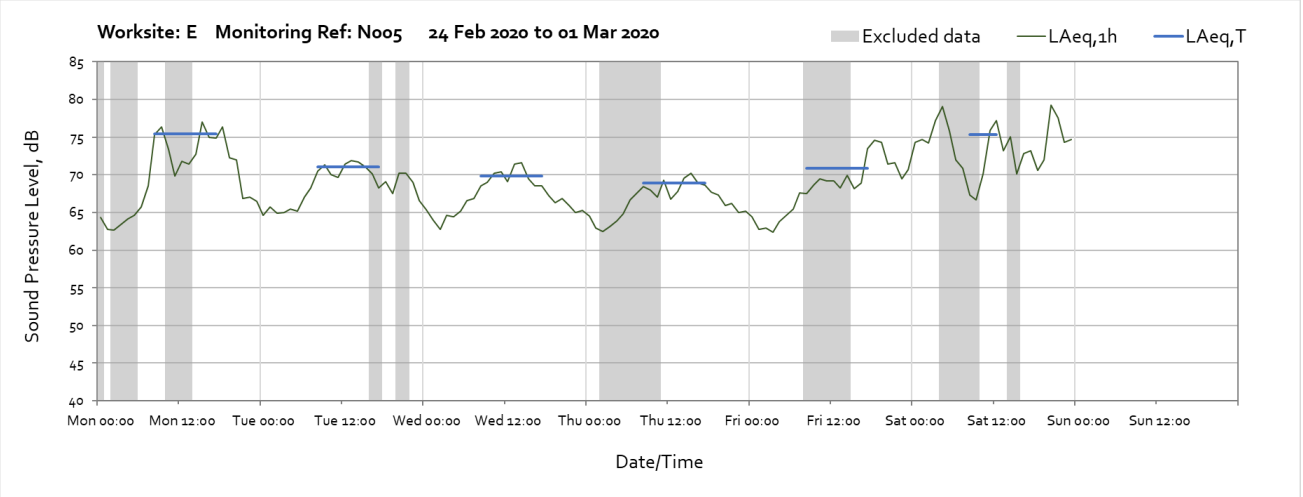
Worksite: E – Monitoring Ref: N005



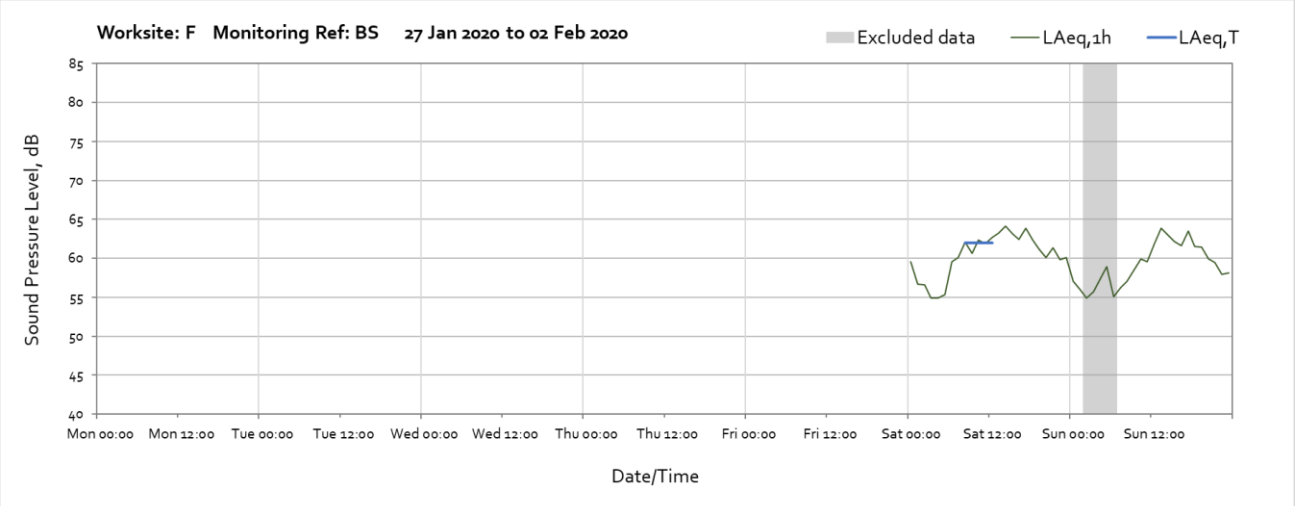


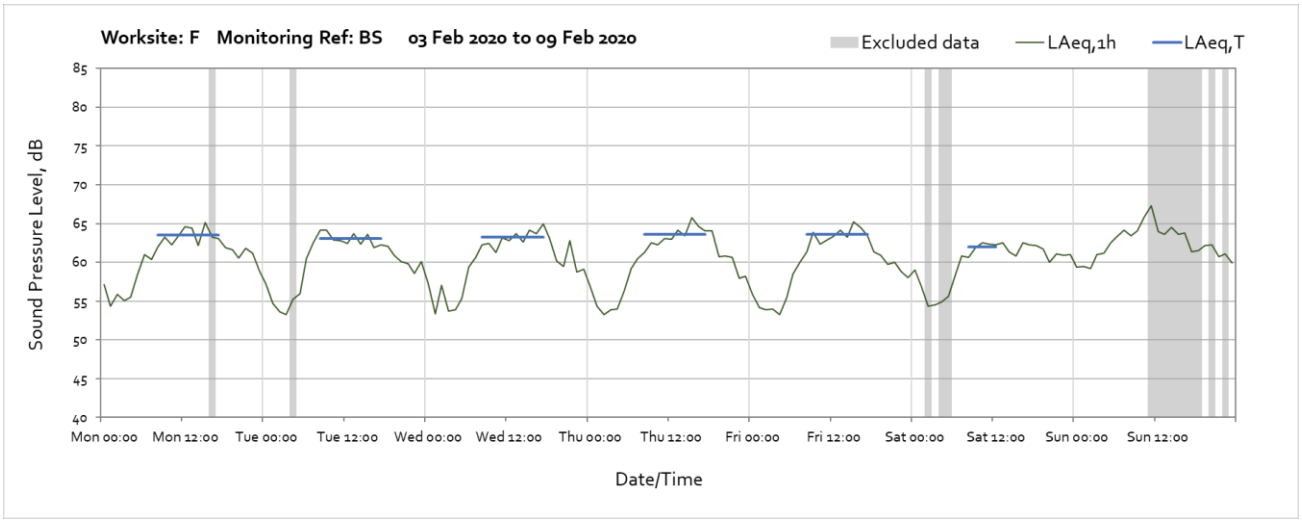






Worksite: F – Monitoring Ref: BS




Worksite: F Monitoring Ref: BS 03 Feb 2020 to 09 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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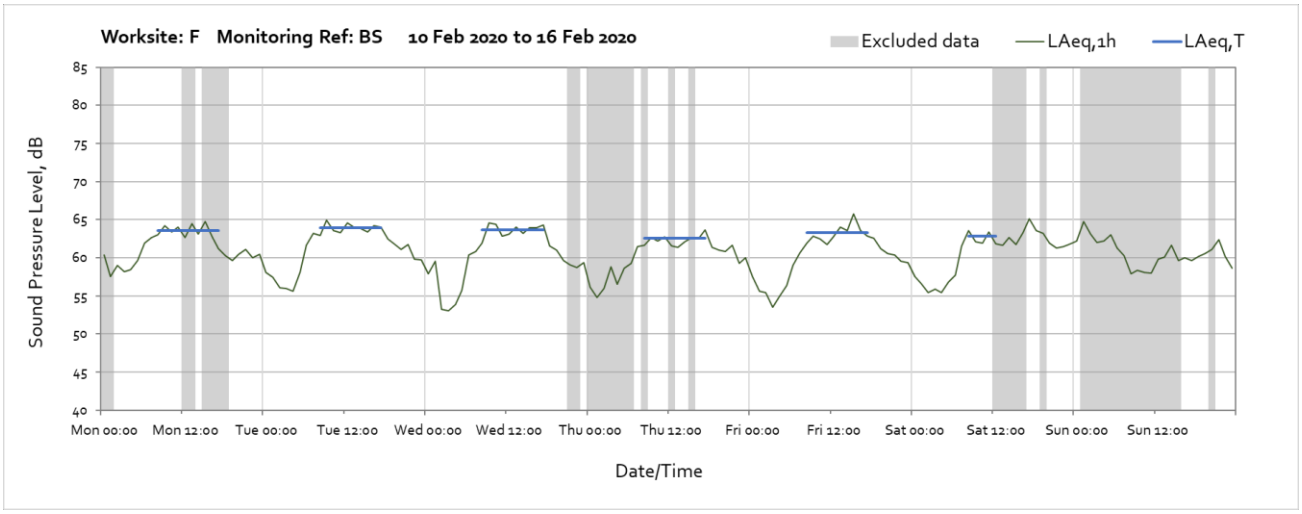
Date/Time


Worksite: F Monitoring Ref: BS 10 Feb 2020 to 16 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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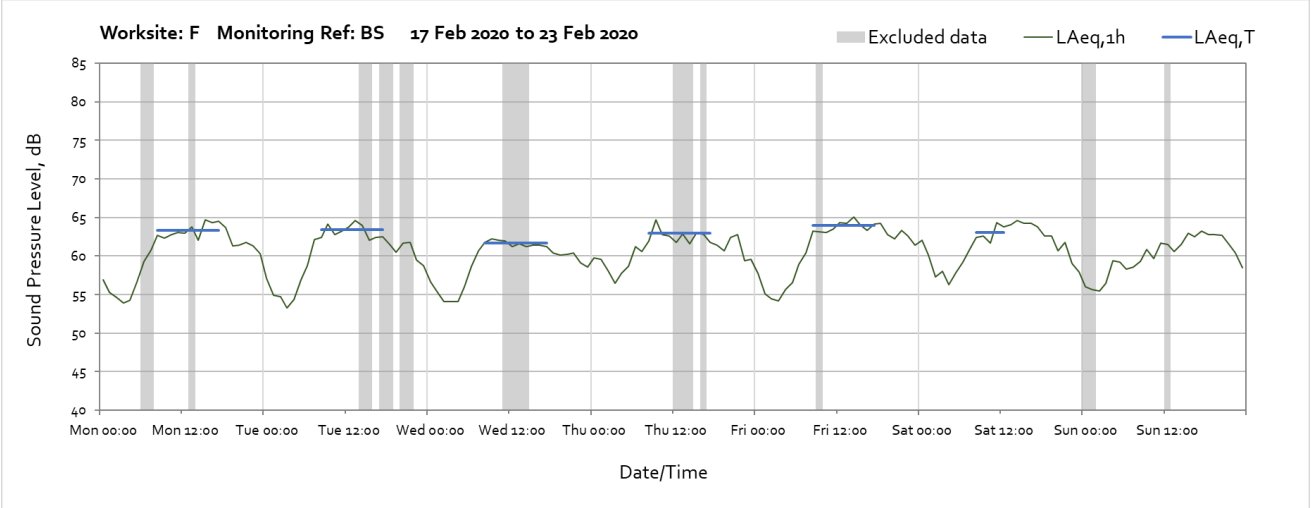
Date/Time


Worksite: F Monitoring Ref: BS 17 Feb 2020 to 23 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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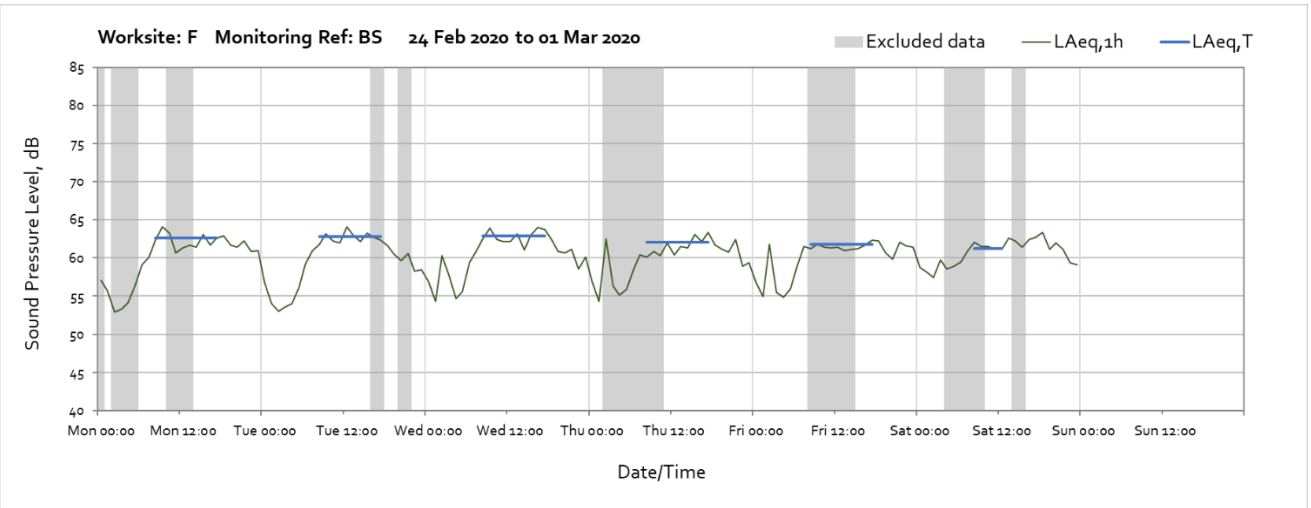
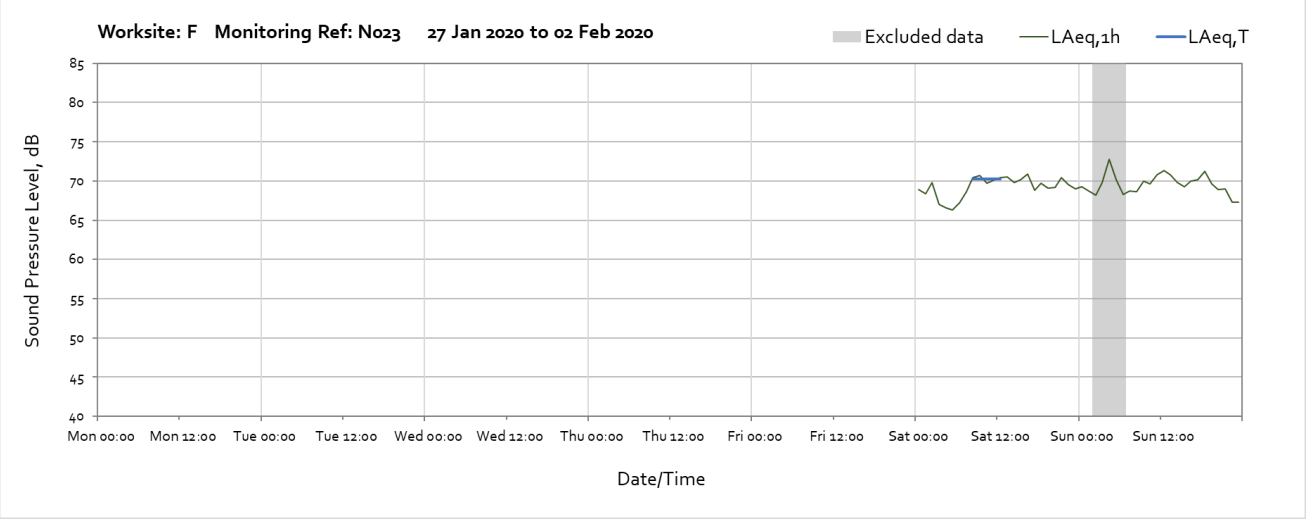
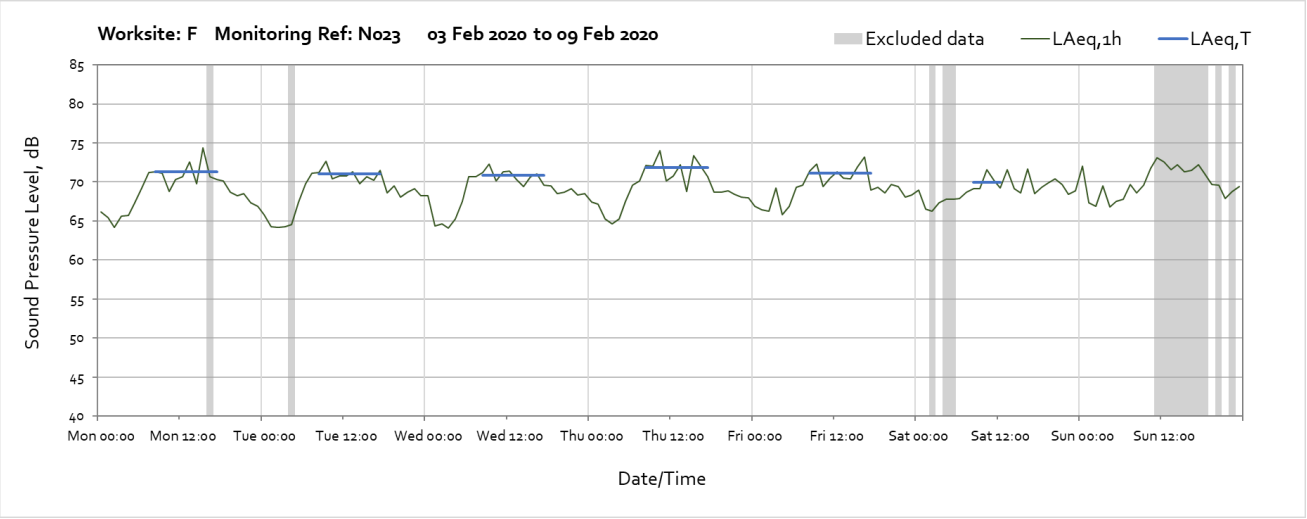
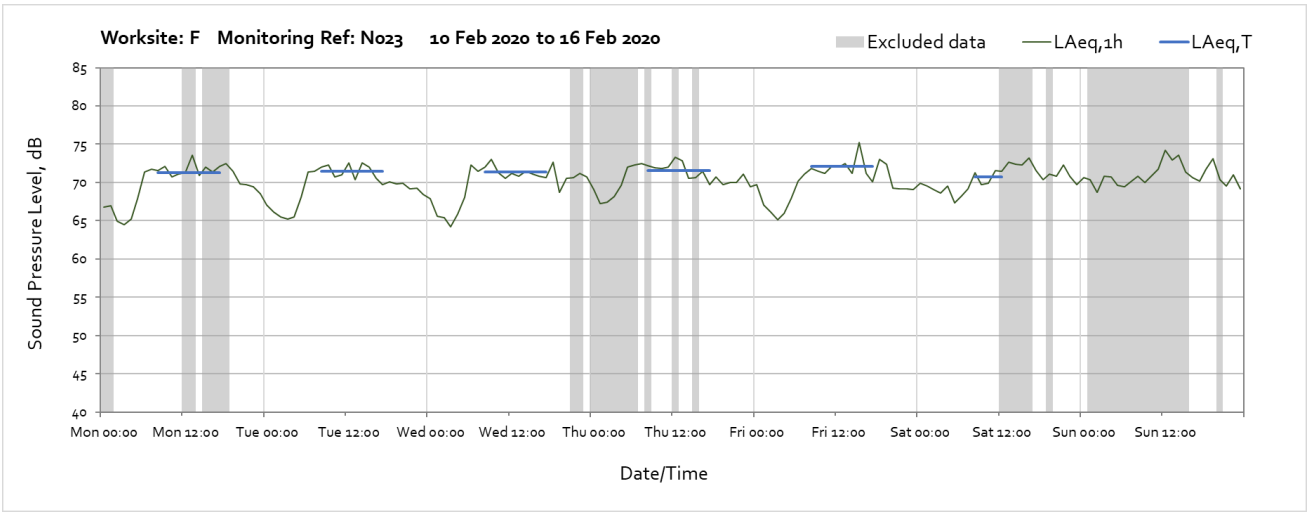
Date/Time



Worksite: F – Monitoring Ref: N023






Worksite: F Monitoring Ref: No23 10 Feb 2020 to 16 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
85
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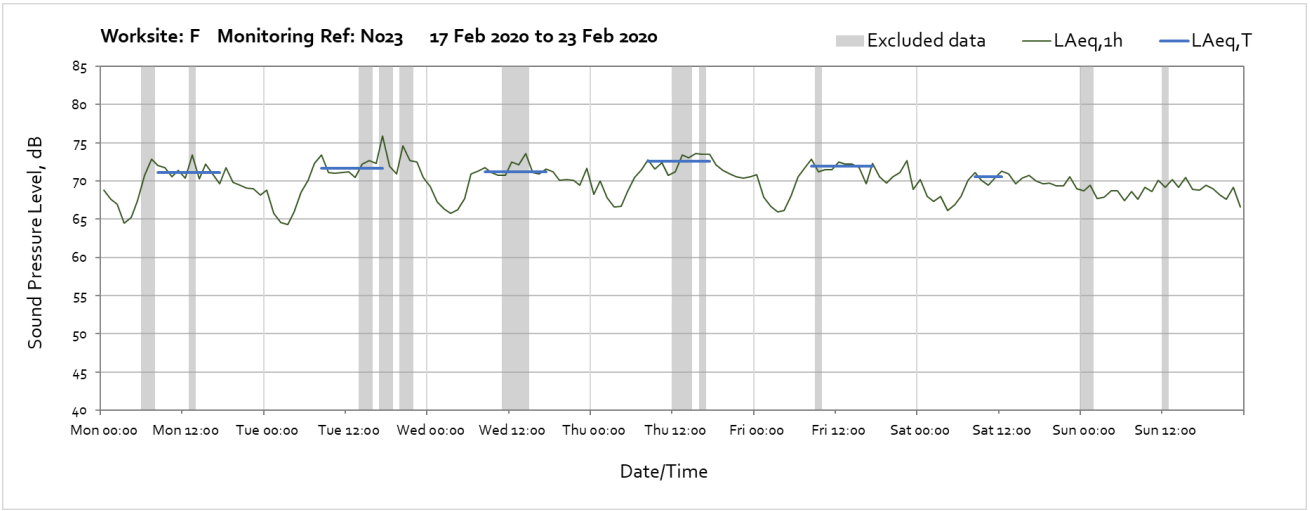
Date/Time


Worksite: F Monitoring Ref: No23 17 Feb 2020 to 23 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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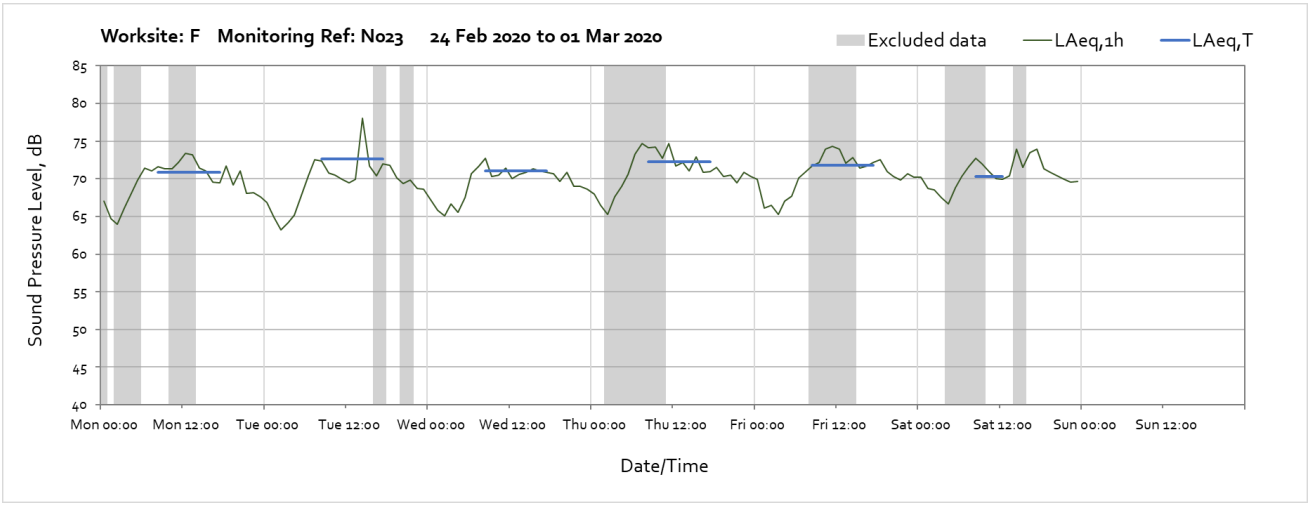
Date/Time


Worksite: F Monitoring Ref: No23 24 Feb 2020 to 01 Mar 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
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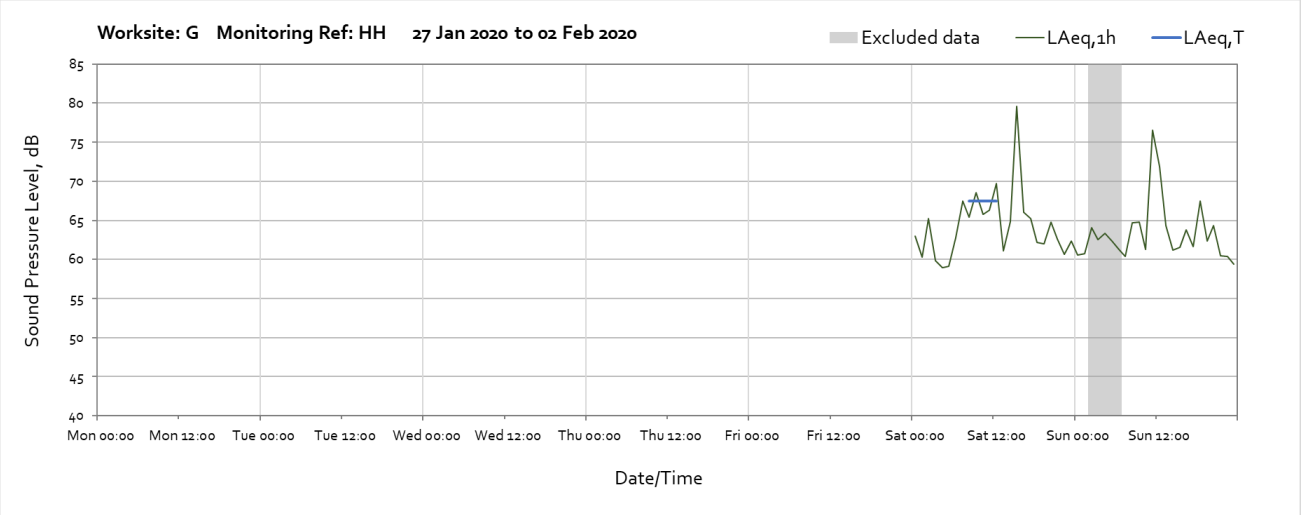
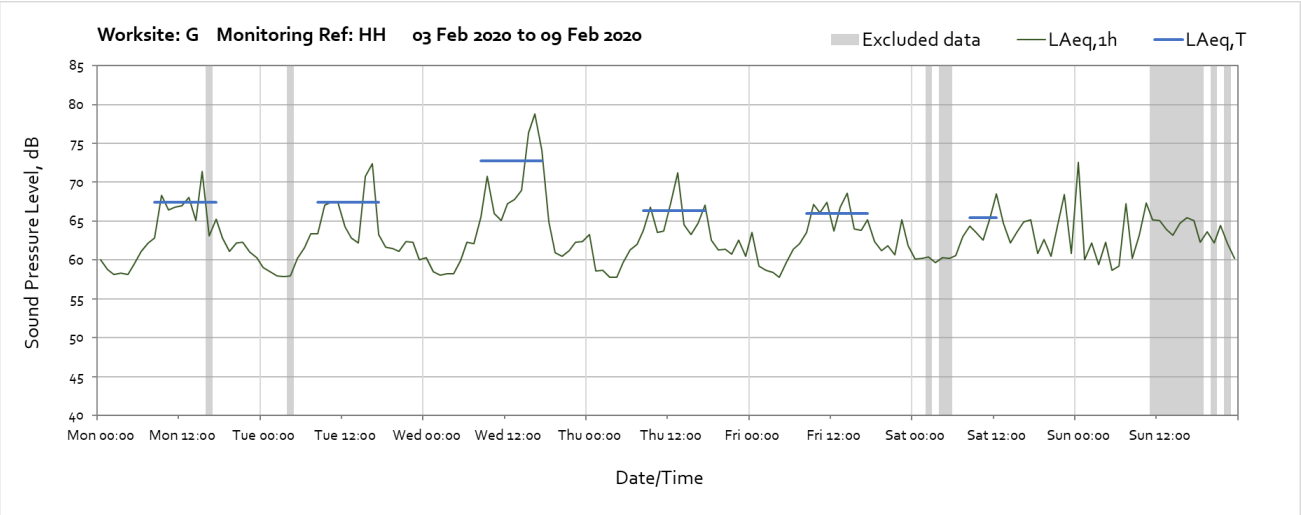
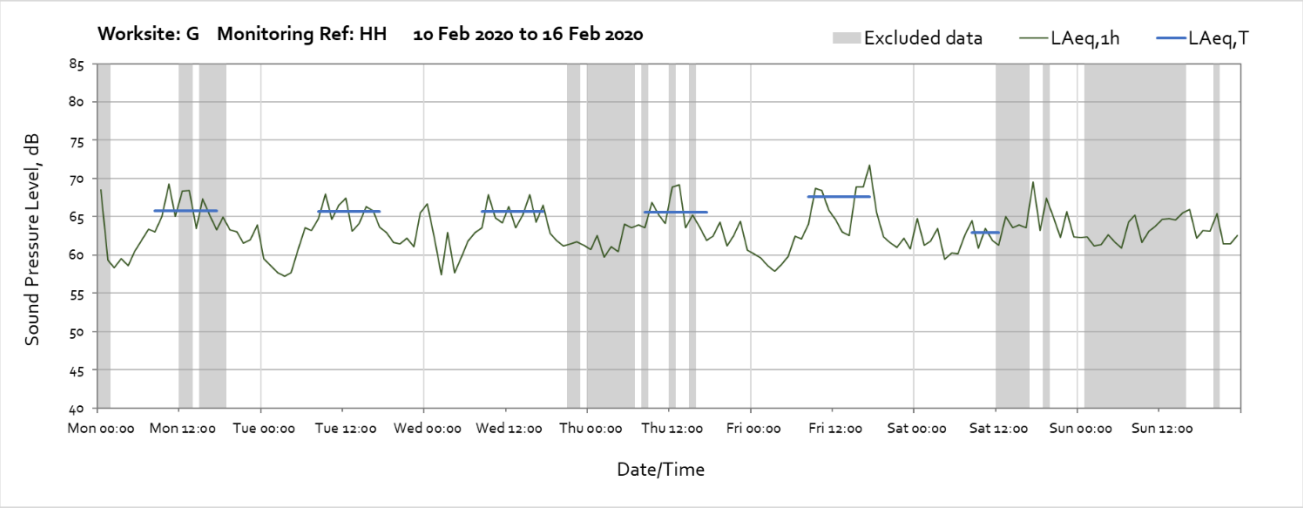
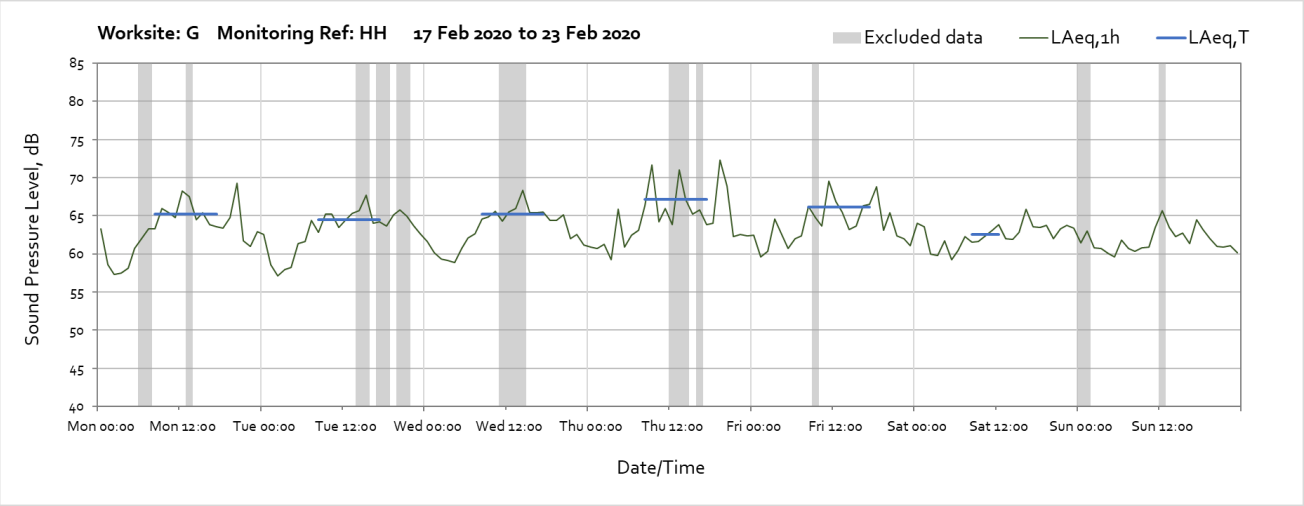
Date/Time

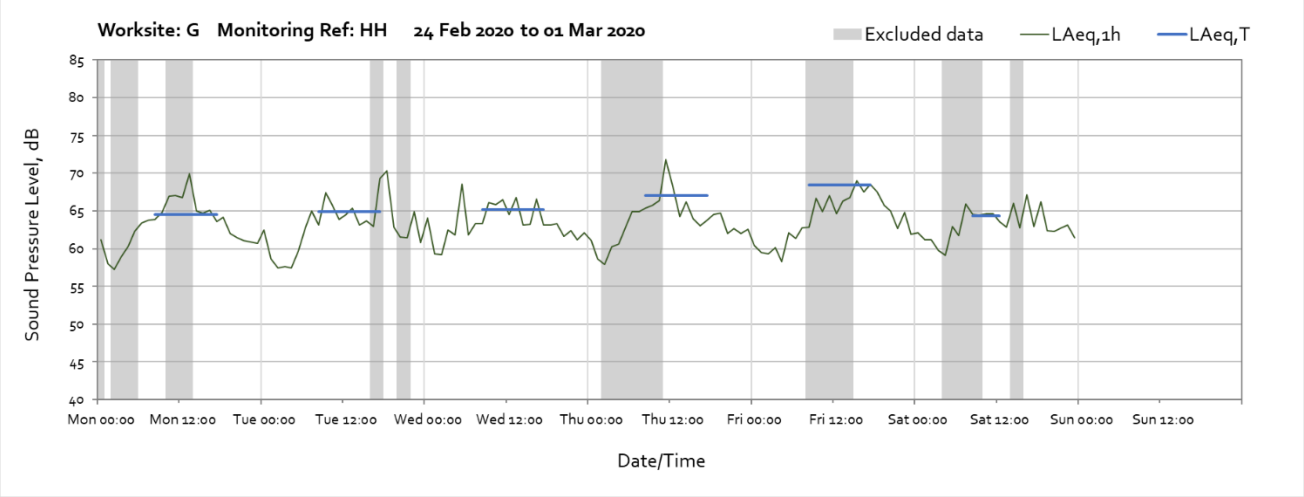
Worksite: G – Monitoring Ref: HH



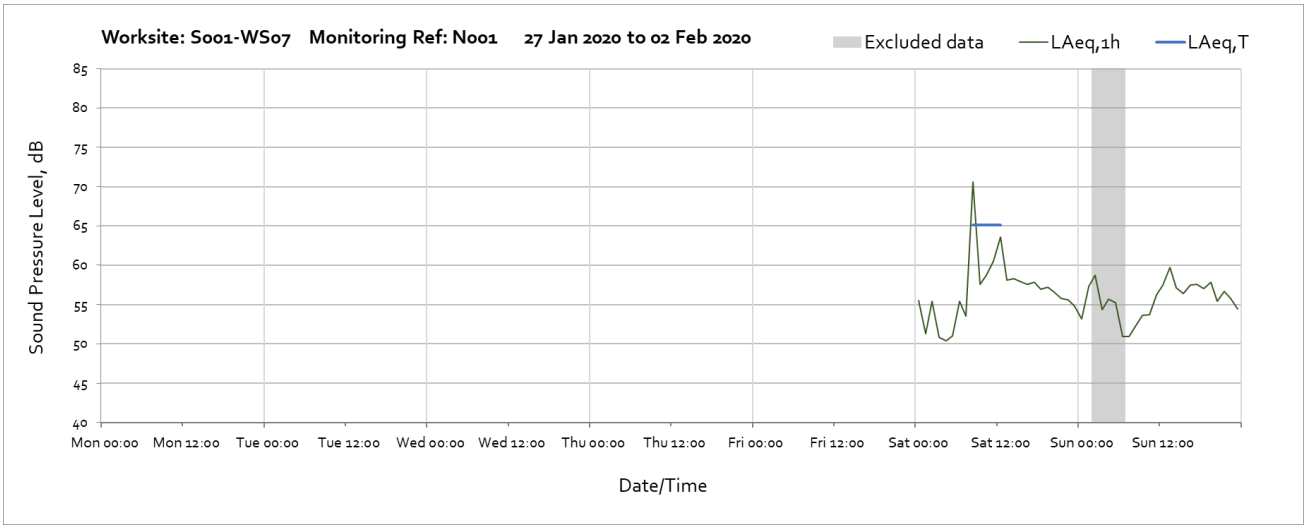


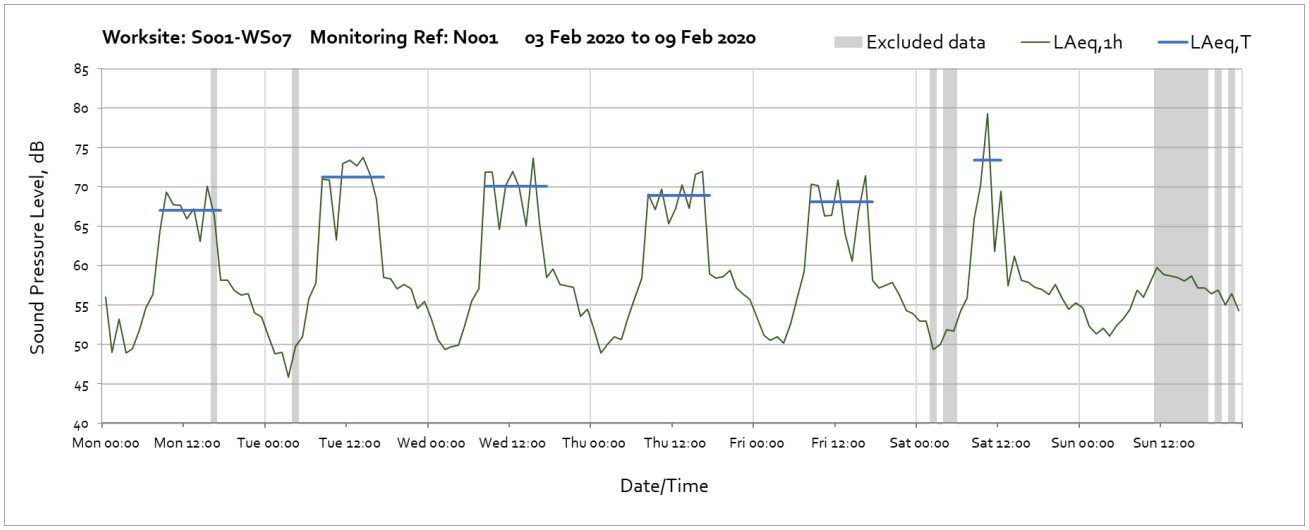






Worksite: S001-WS01 – Monitoring Ref: N001




Worksite: S001-WS07 Monitoring Ref: N001 03 Feb 2020 to 09 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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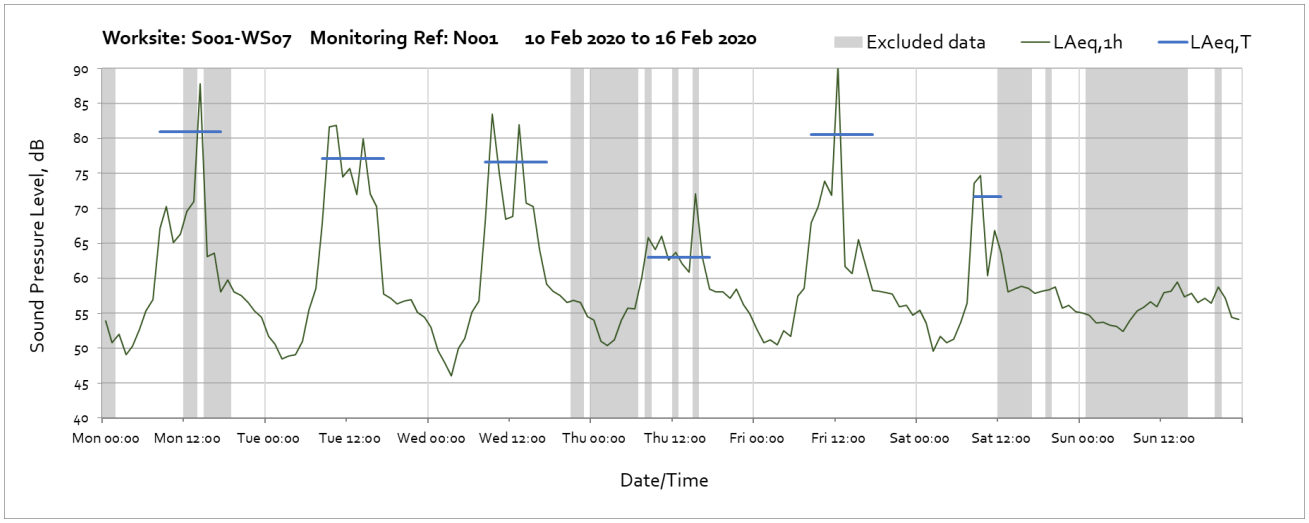
Date/Time


Worksite: S001-WS07 Monitoring Ref: N001 10 Feb 2020 to 16 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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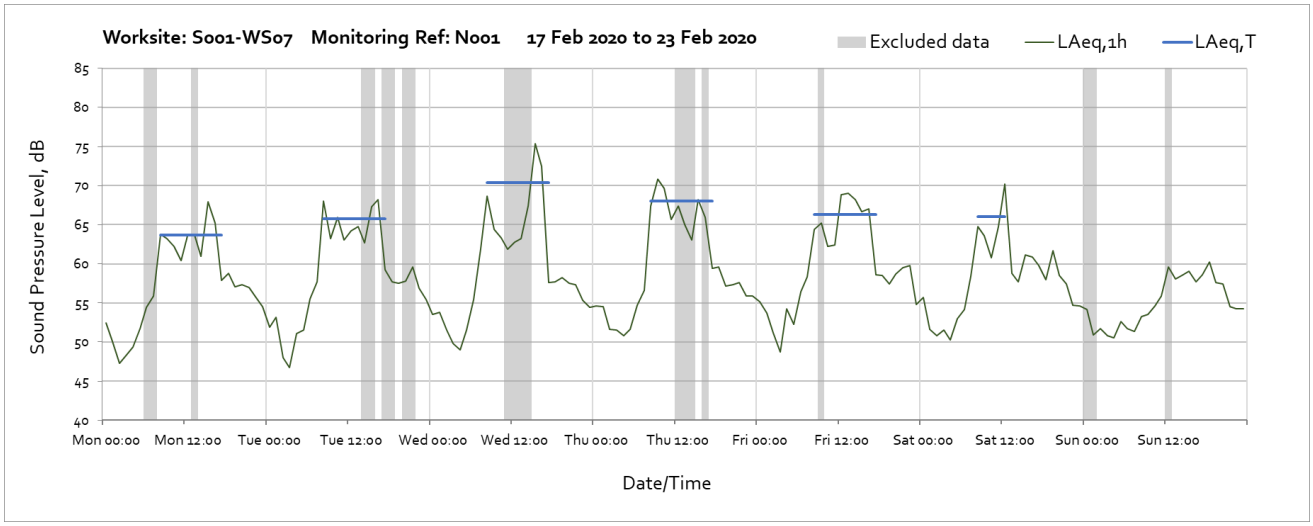
Date/Time


Worksite: S001-WS07 Monitoring Ref: N001 17 Feb 2020 to 23 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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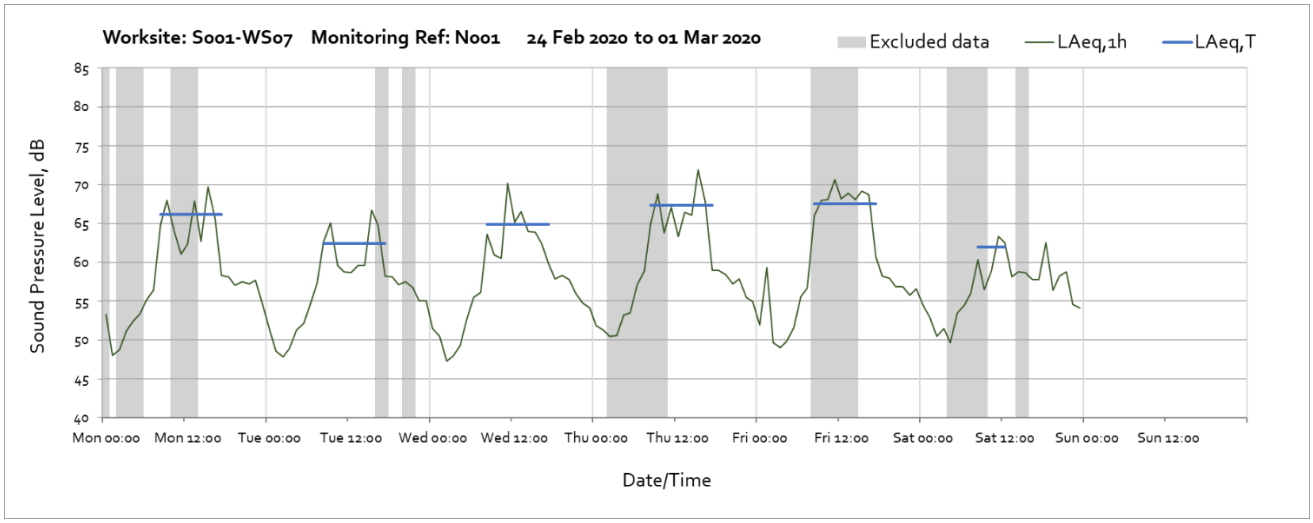
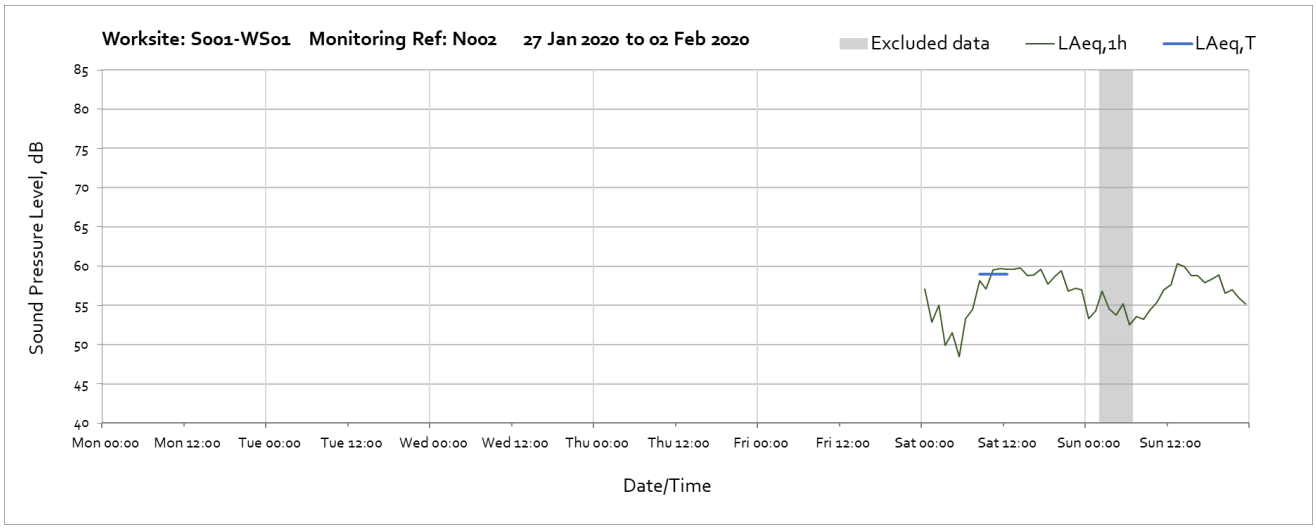
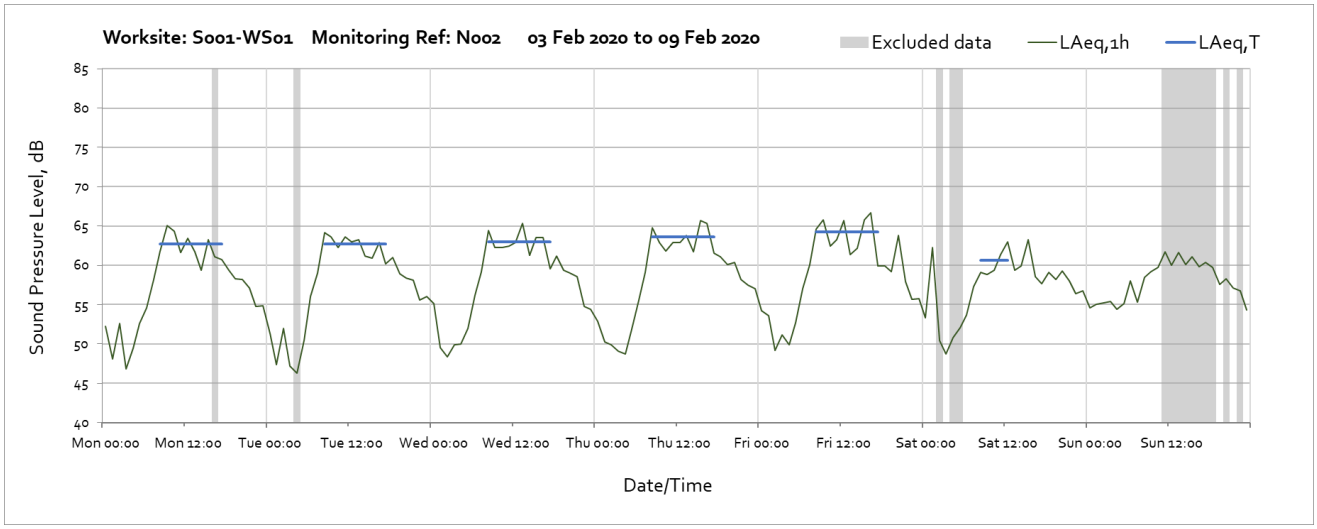
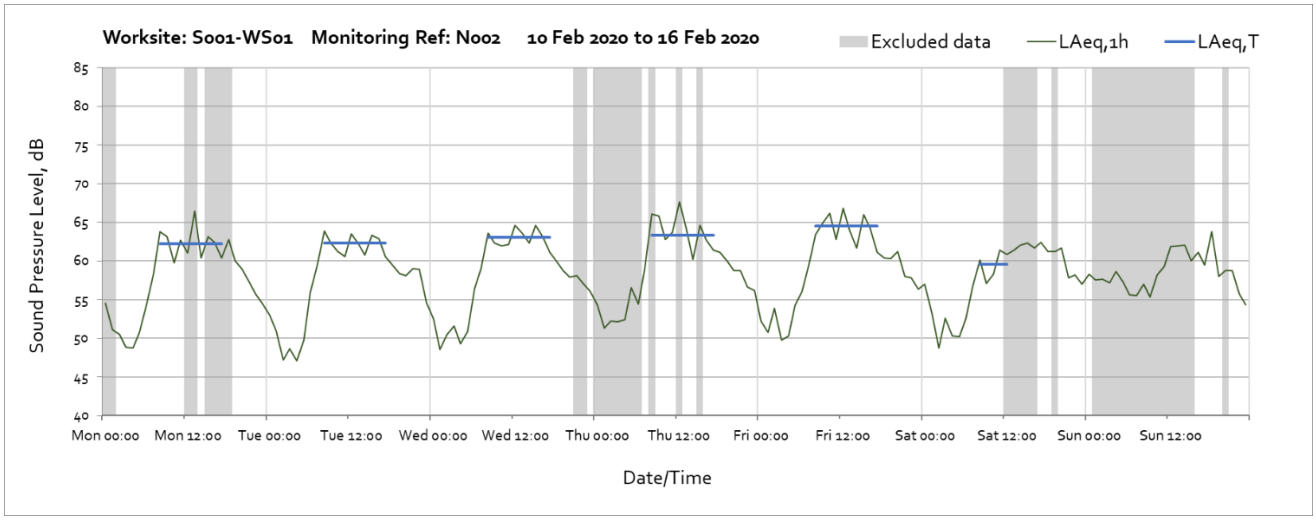
Date/Time



Worksite: S001-WS01 – Monitoring Ref: N002






Worksite: S001-WS01 Monitoring Ref: N002 10 Feb 2020 to 16 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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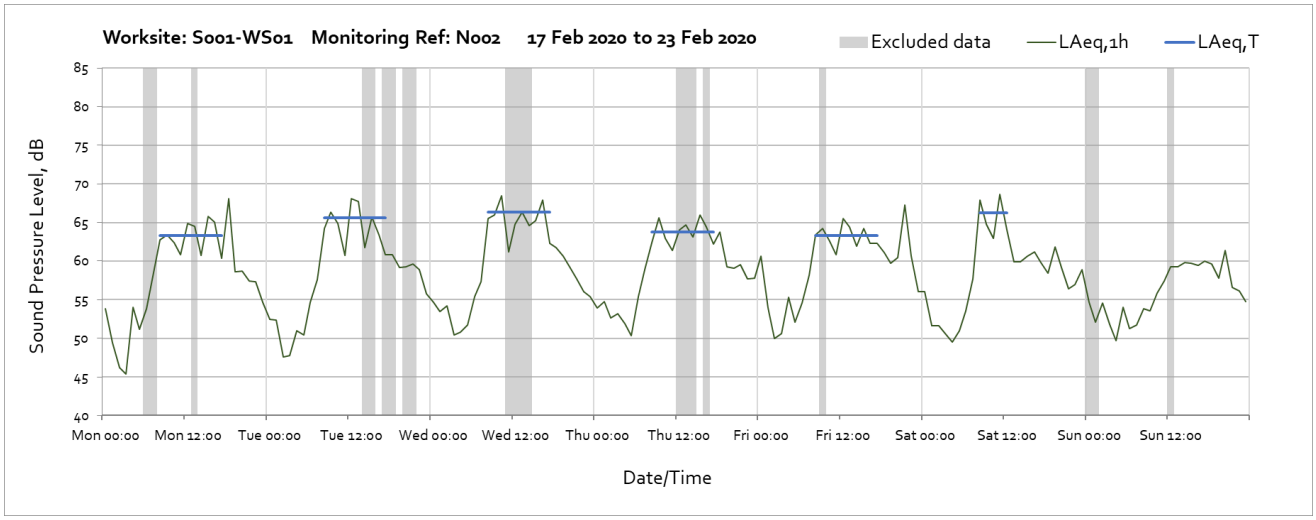
Date/Time


Worksite: S001-WS01 Monitoring Ref: N002 17 Feb 2020 to 23 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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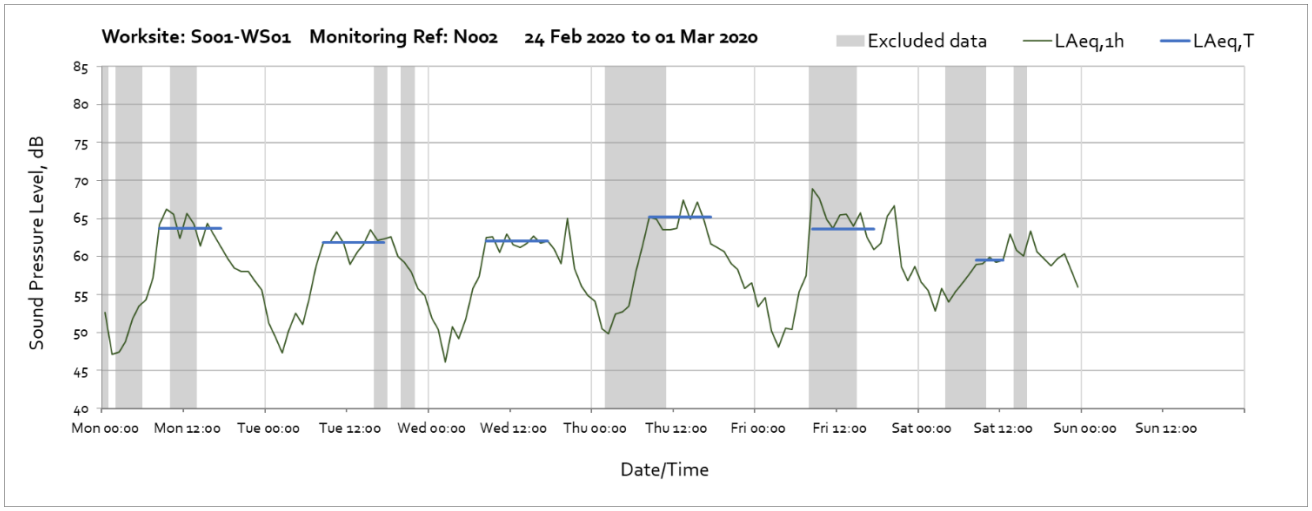
Date/Time


Worksite: S001-WS01 Monitoring Ref: N002 24 Feb 2020 to 01 Mar 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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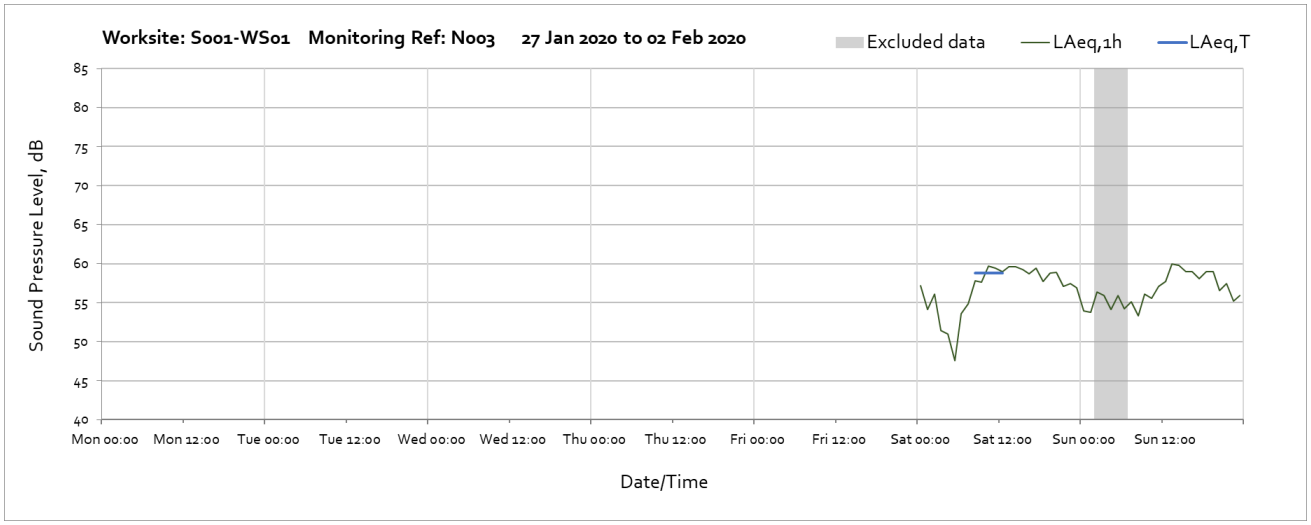
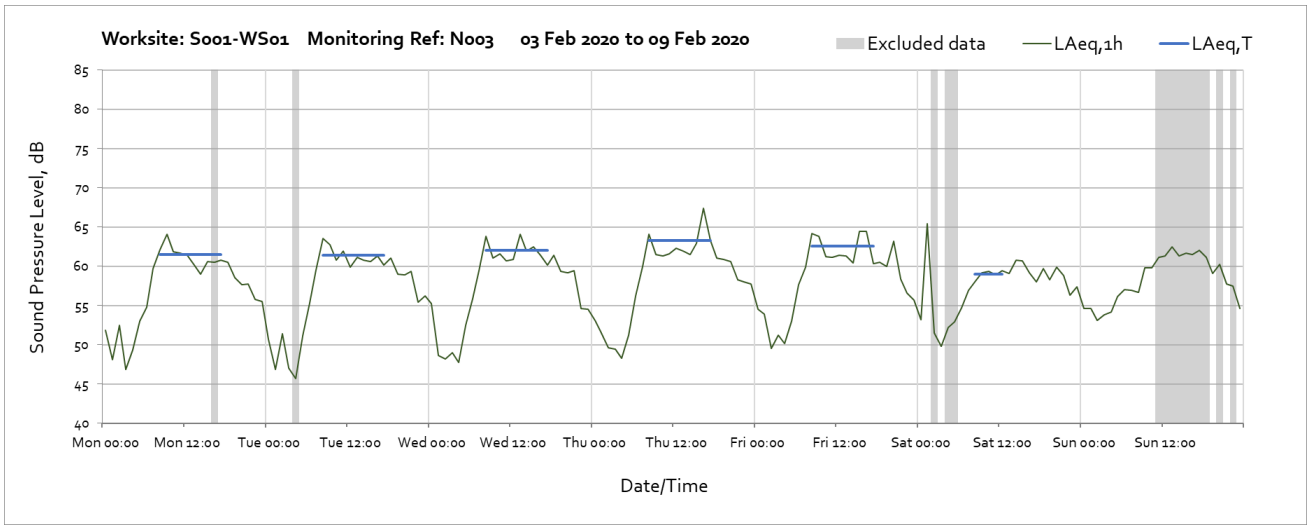
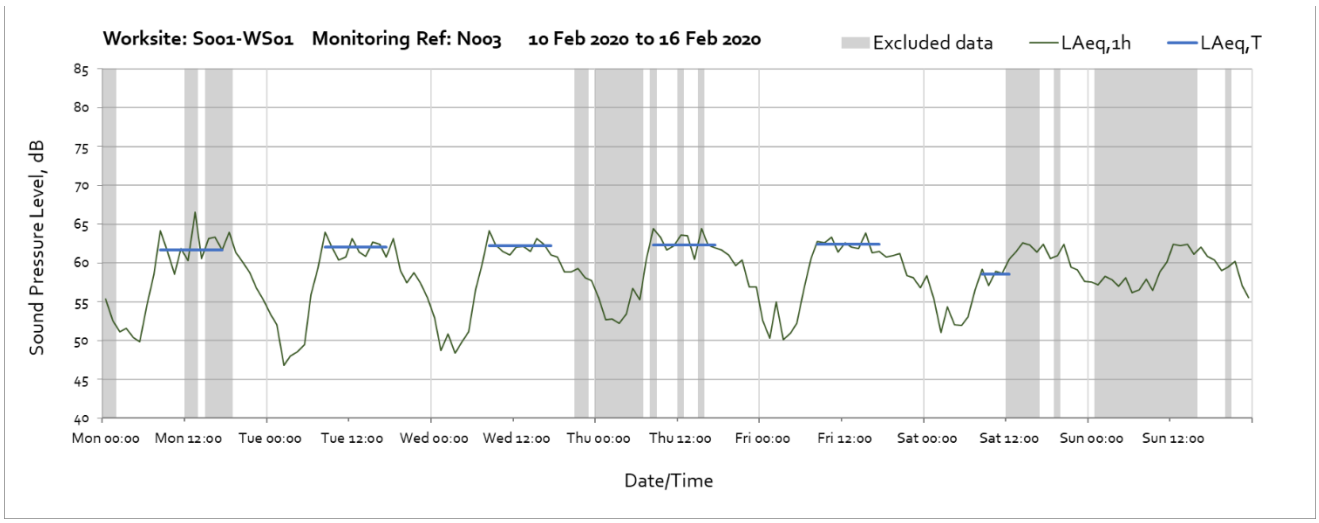
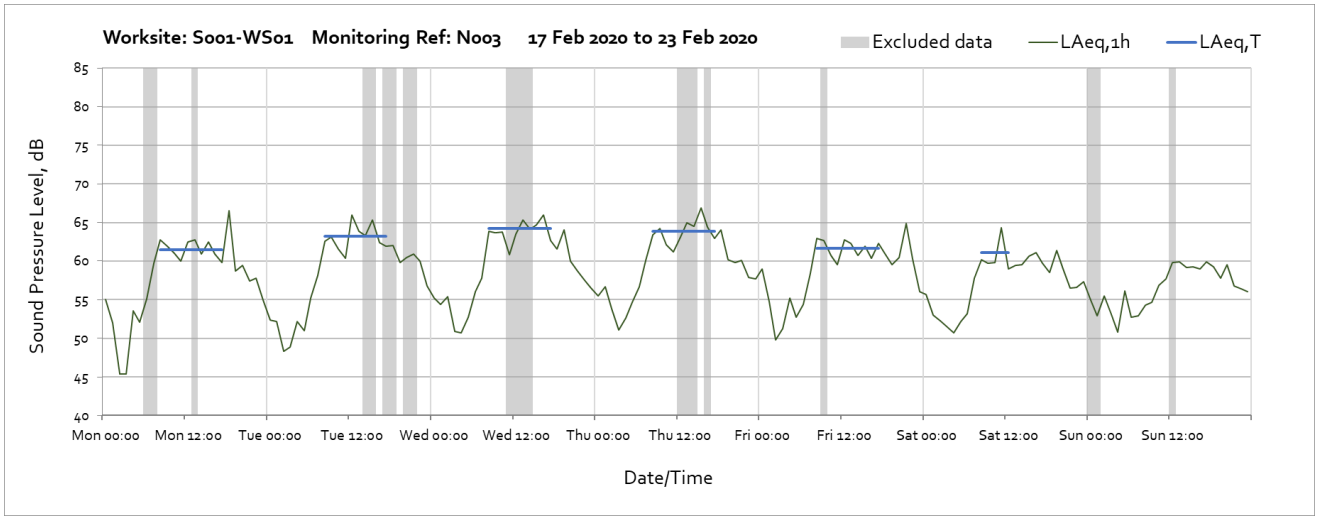
Date/Time

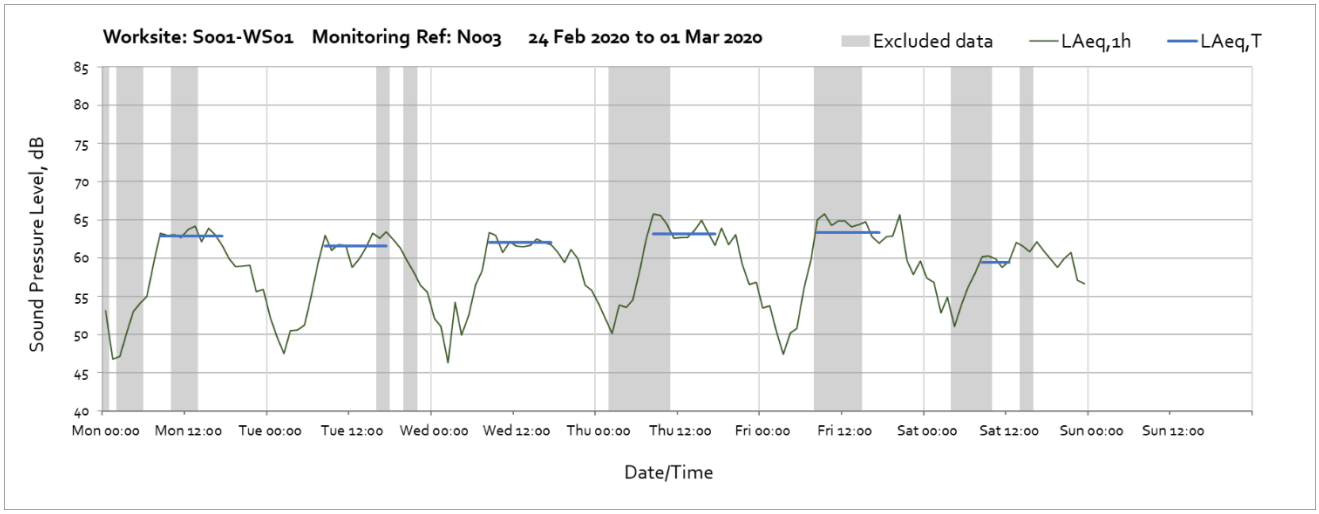
Worksite: S001-WS01 – Monitoring Ref: N003



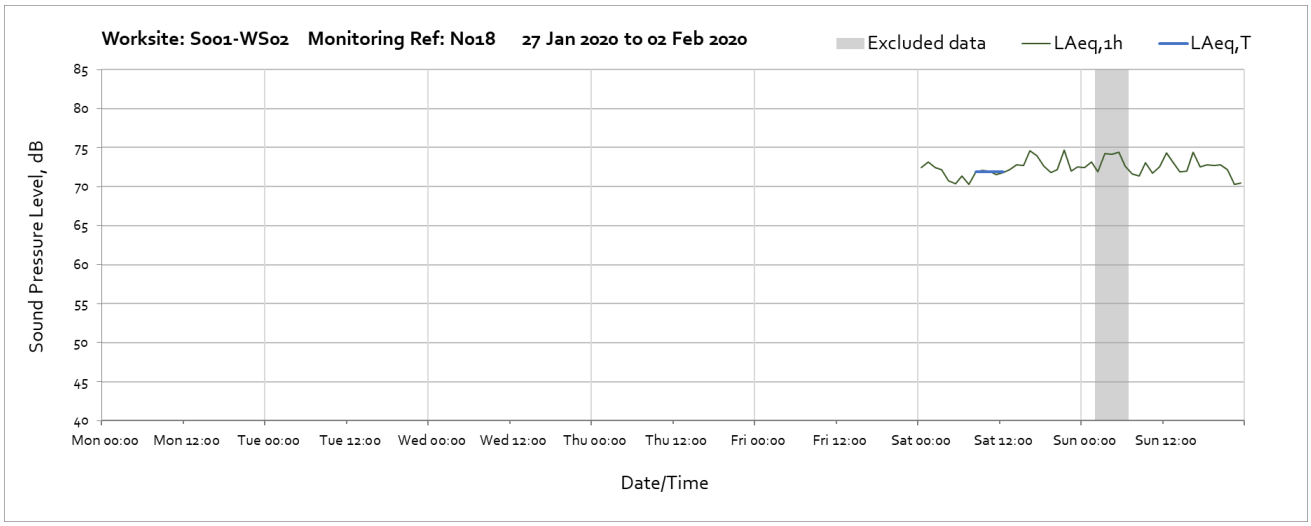


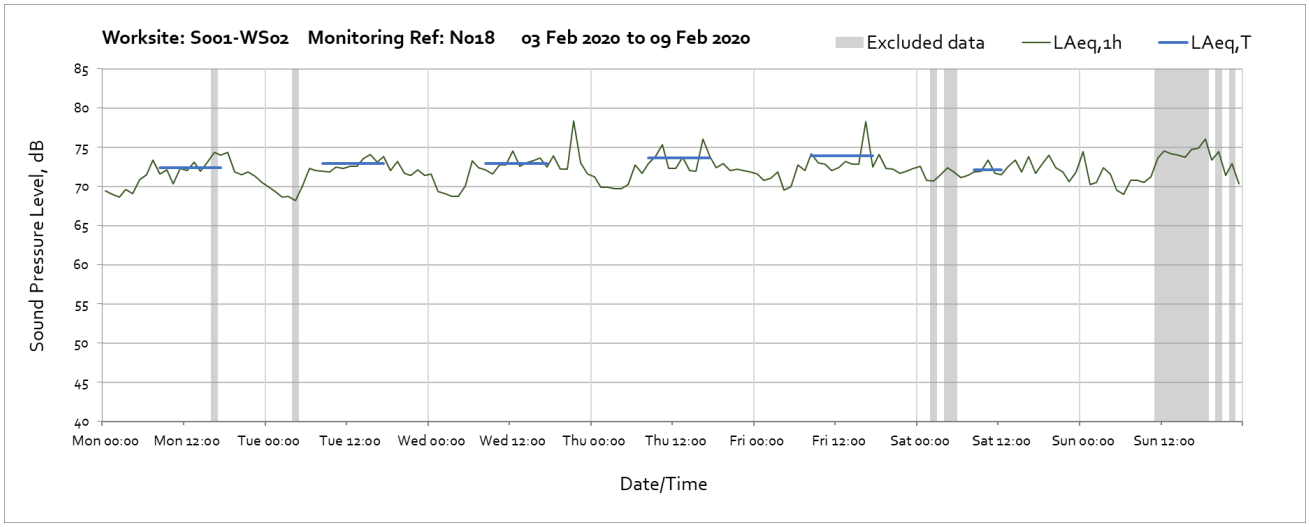






Worksite: S001-WS02 – Monitoring Ref: N018




Worksite: S001-WS02 Monitoring Ref: N018 03 Feb 2020 to 09 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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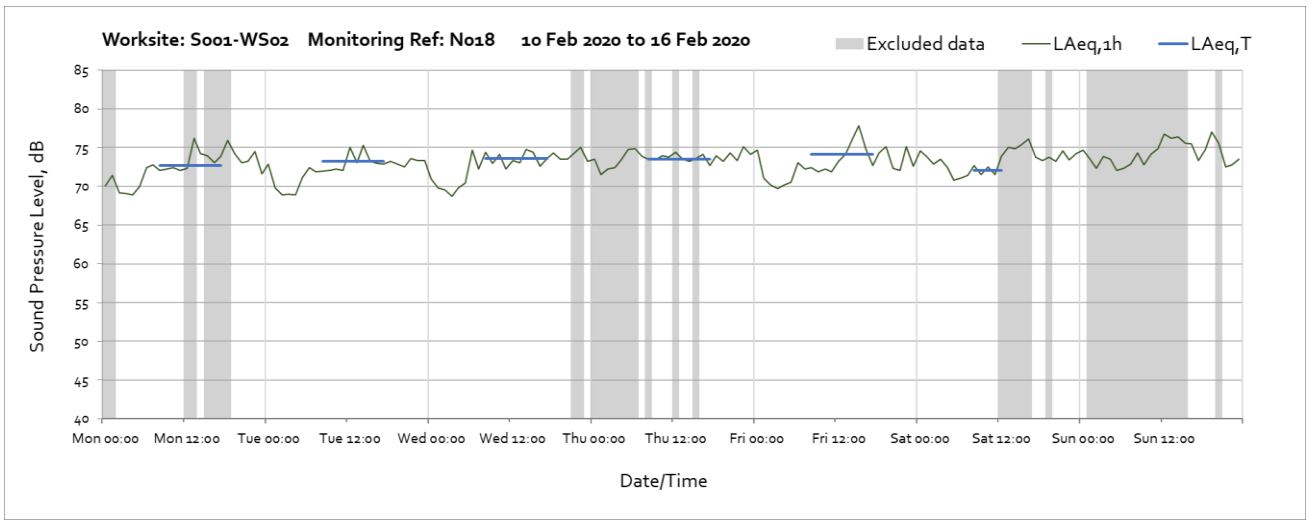
Date/Time


Worksite: S001-WS02 Monitoring Ref: N018 10 Feb 2020 to 16 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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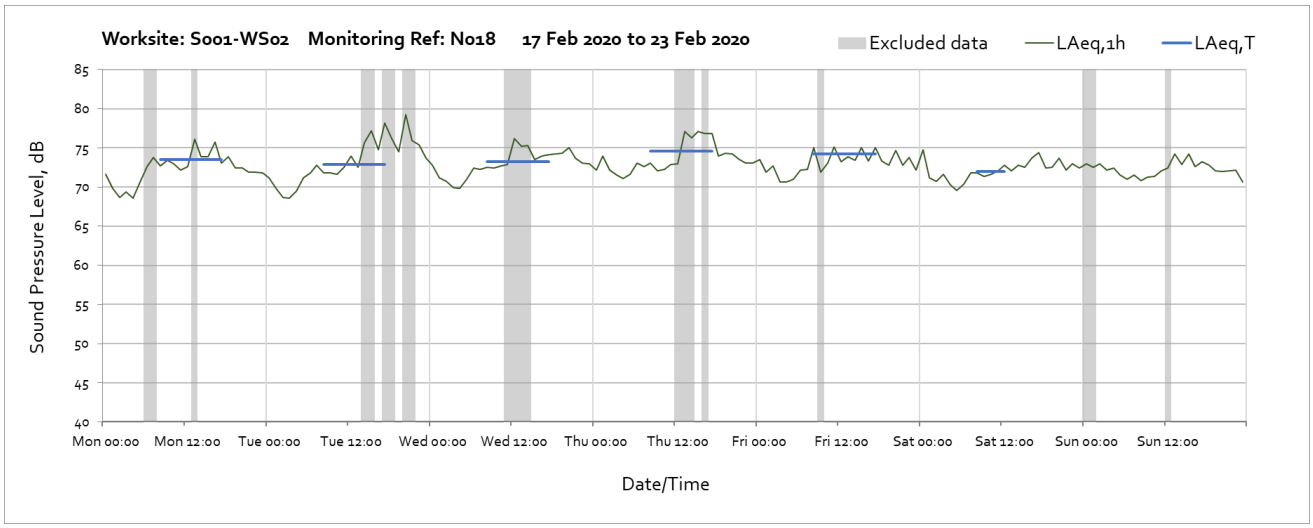
Date/Time


Worksite: S001-WS02 Monitoring Ref: N018 17 Feb 2020 to 23 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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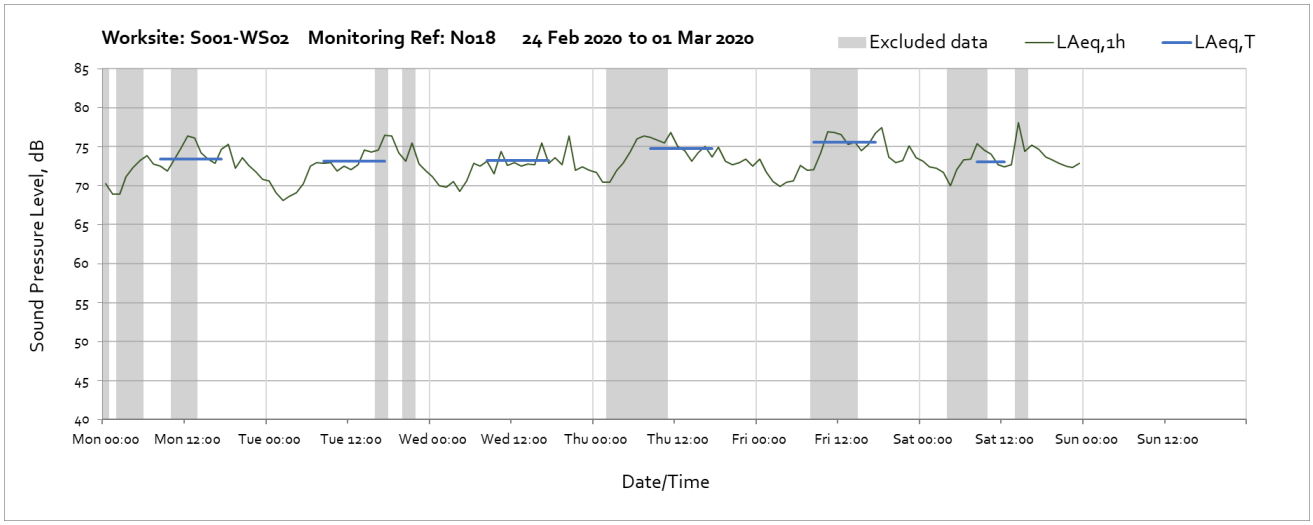
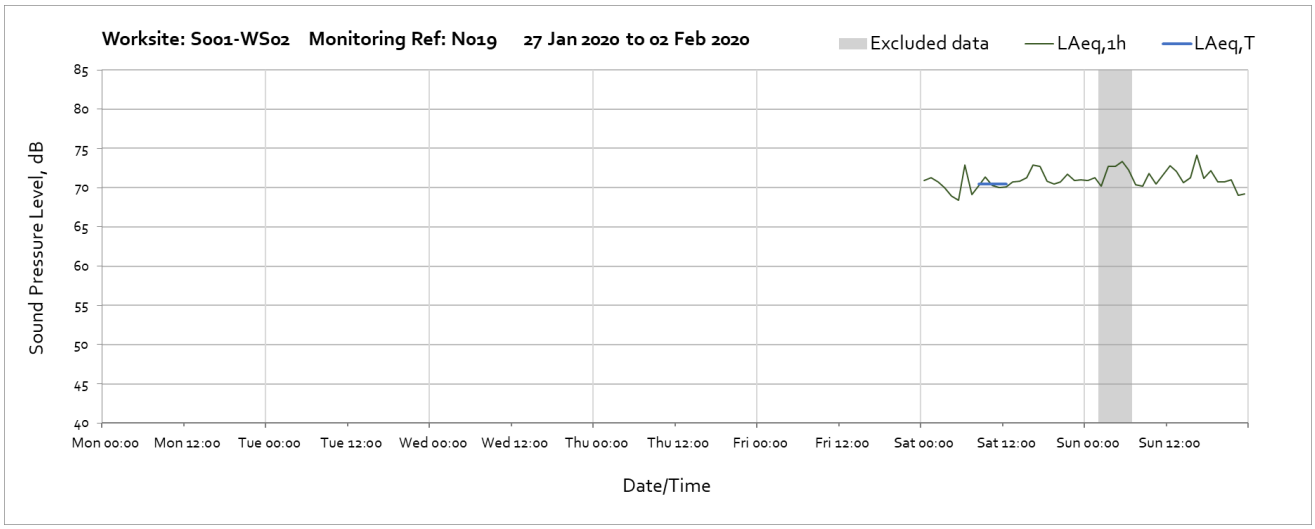
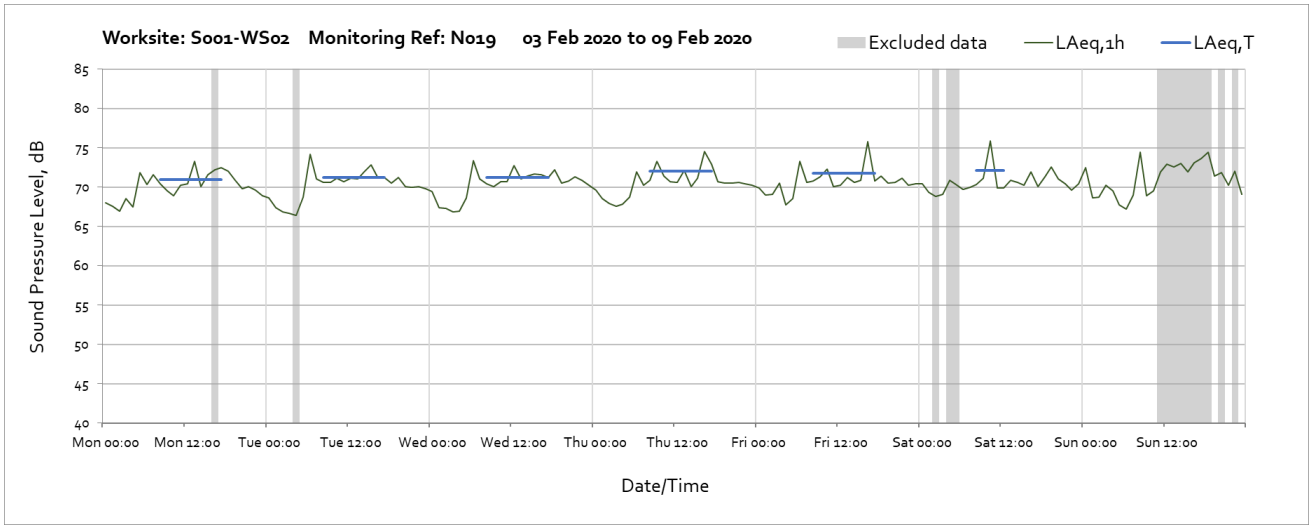
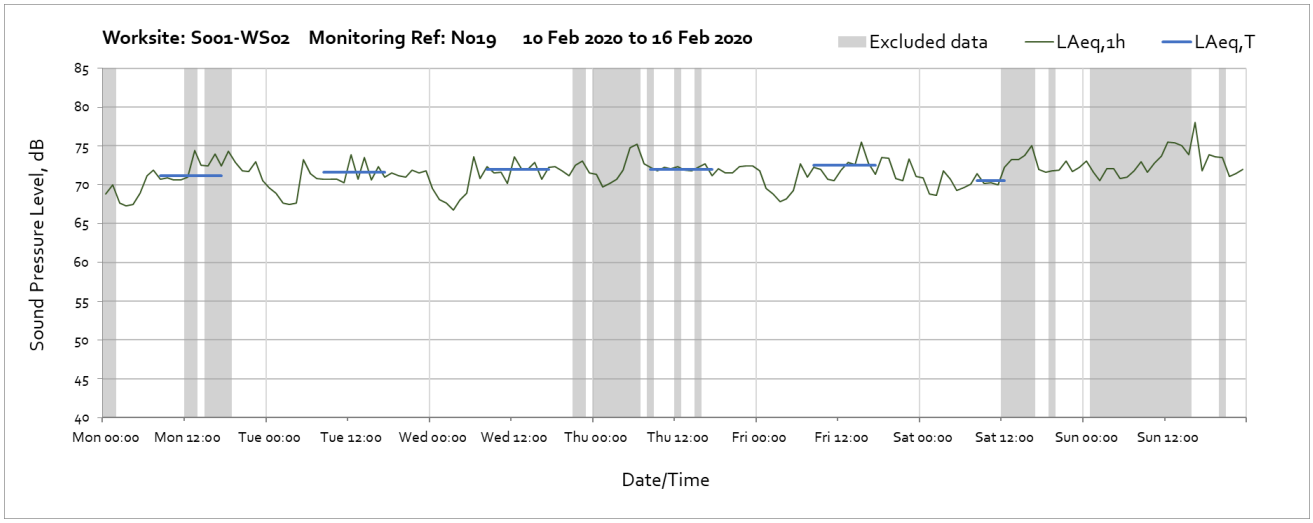
Date/Time



Worksite: S001-WS02 – Monitoring Ref: N019






Worksite: S001-WS02 Monitoring Ref: N019 10 Feb 2020 to 16 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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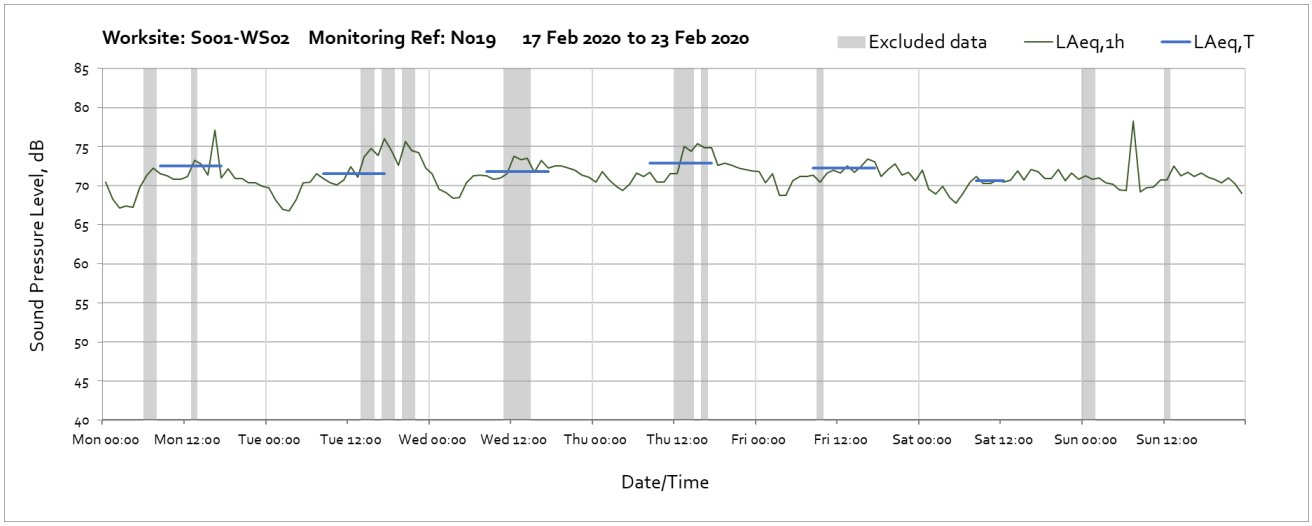
Date/Time


Worksite: S001-WS02 Monitoring Ref: N019 17 Feb 2020 to 23 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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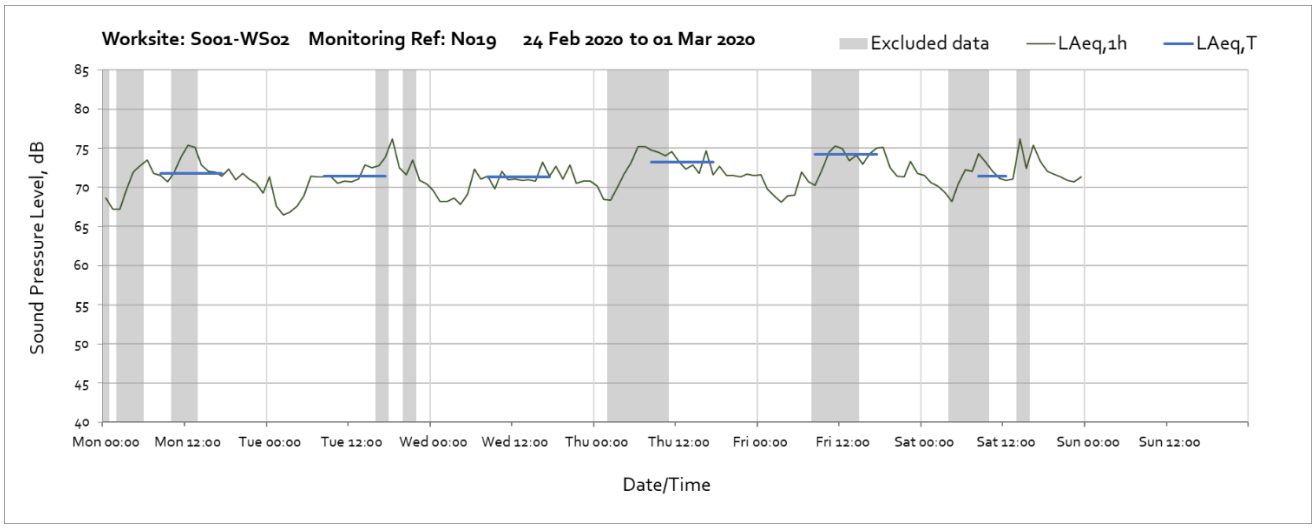
Date/Time


Worksite: S001-WS02 Monitoring Ref: N019 24 Feb 2020 to 01 Mar 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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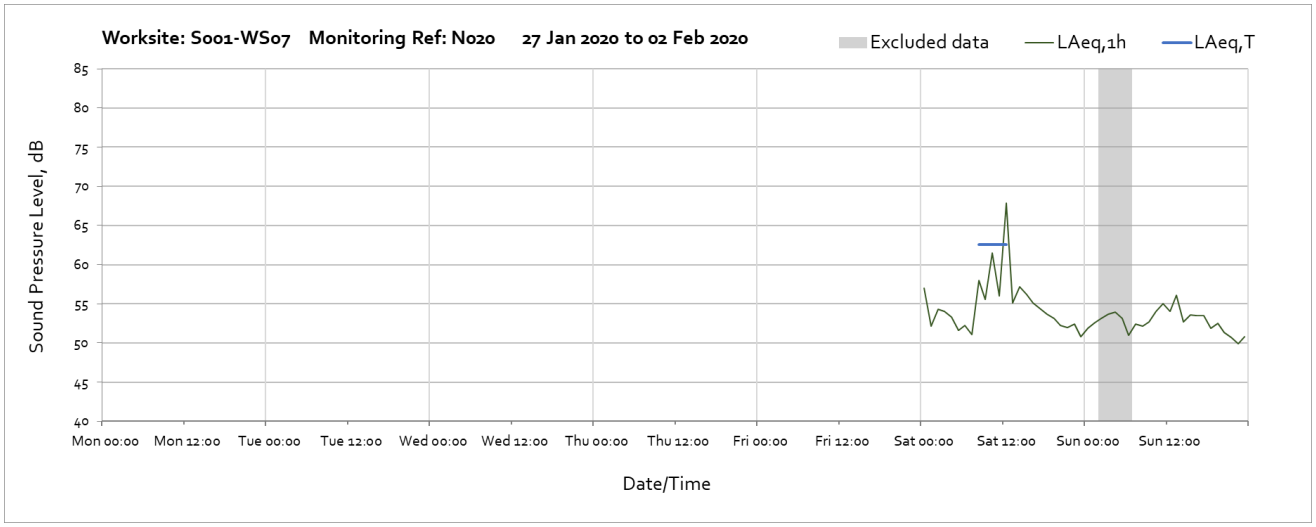
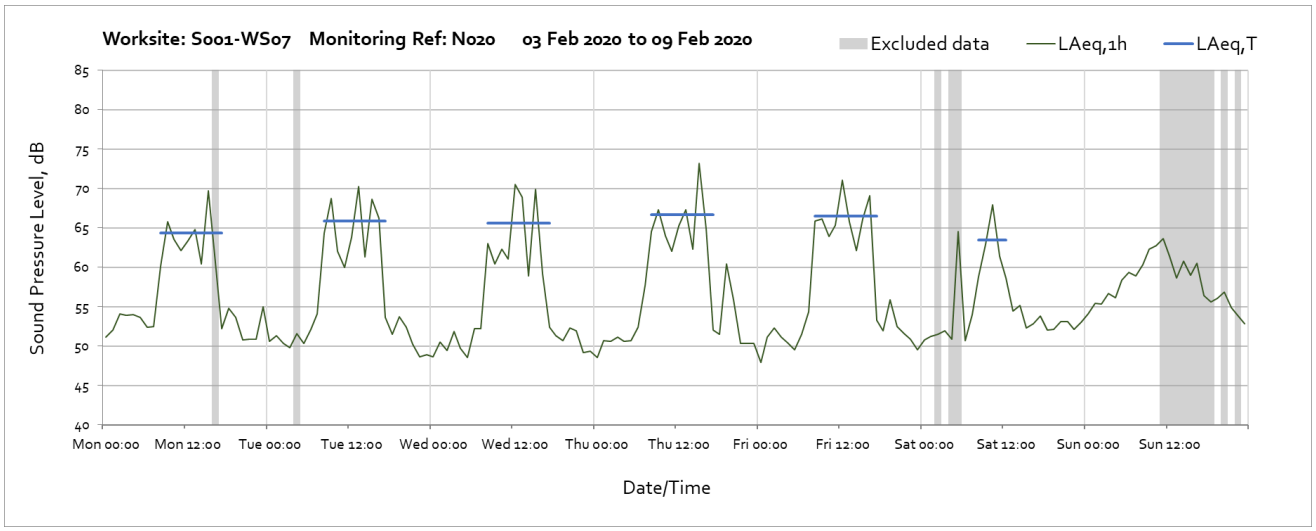
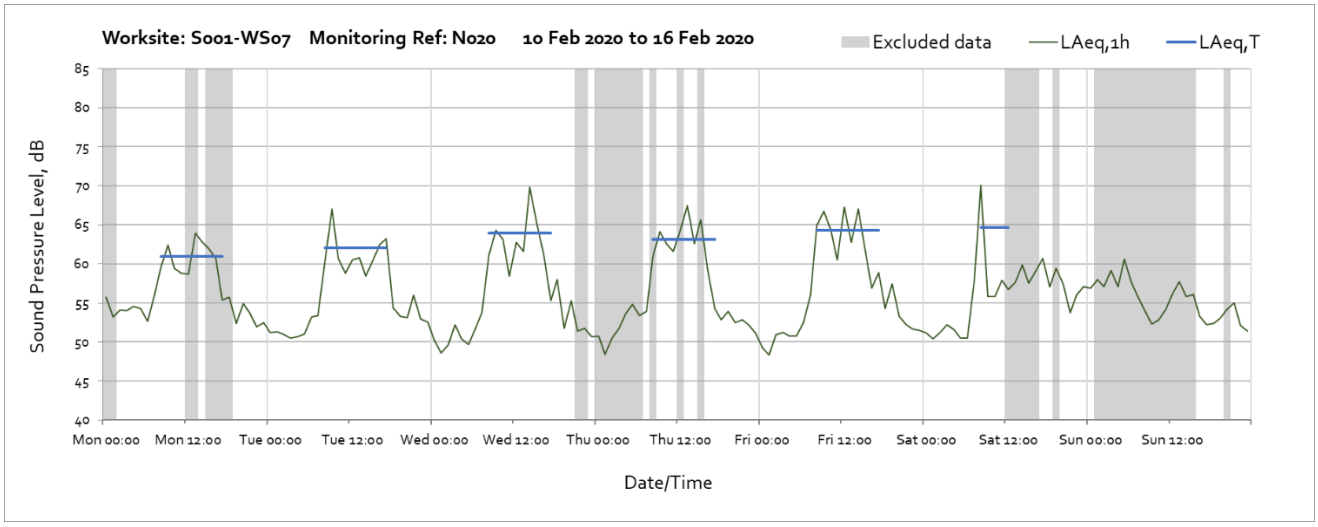
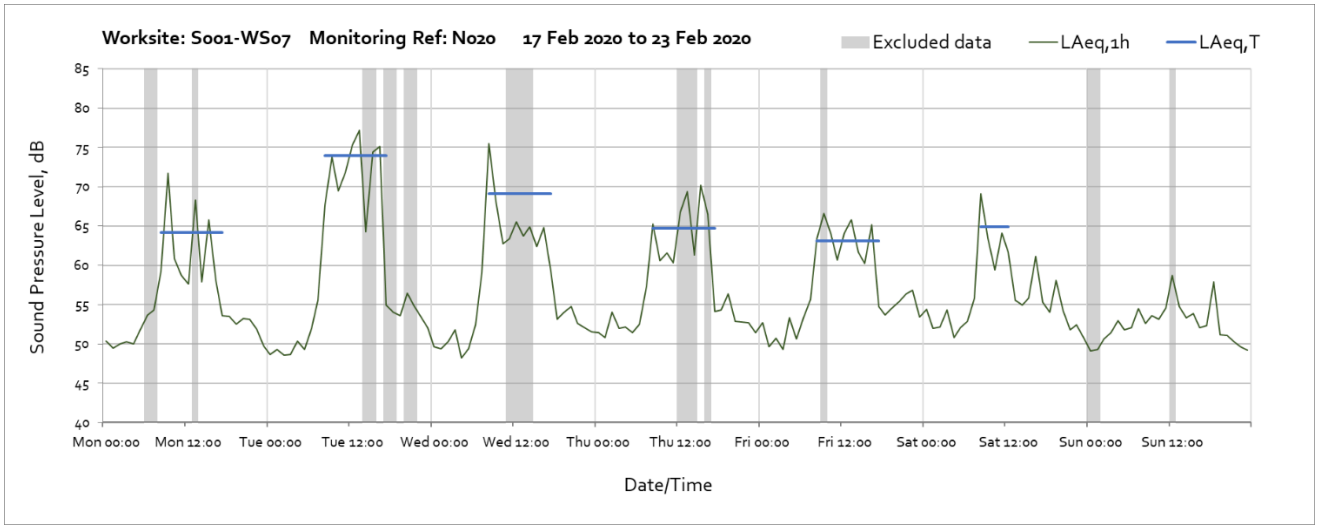
Date/Time

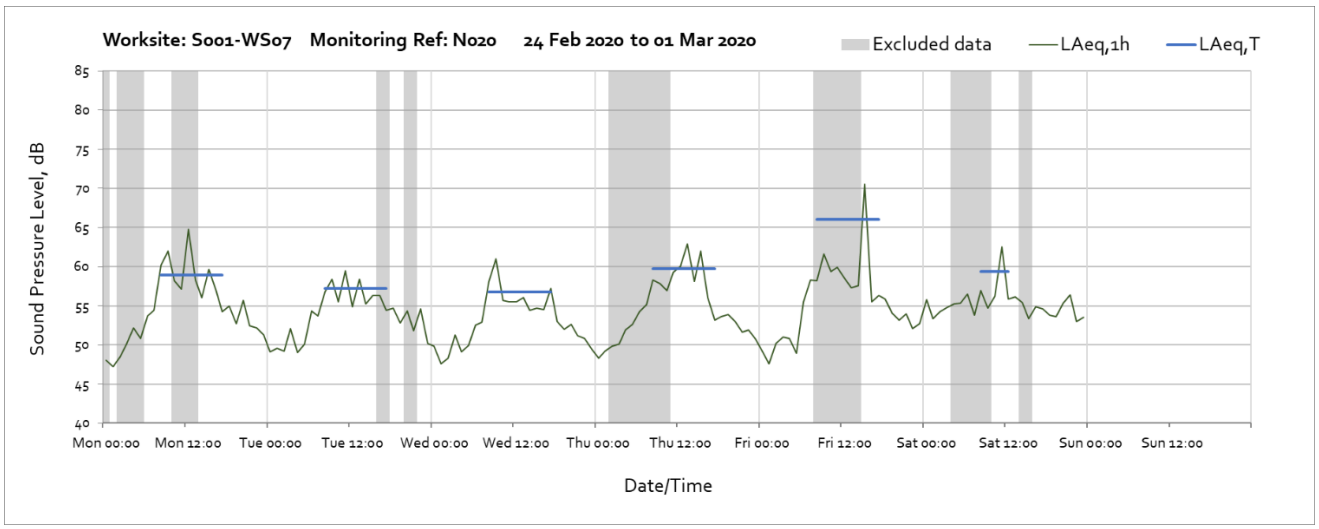
Worksite: S001-WS07 – Monitoring Ref: N020



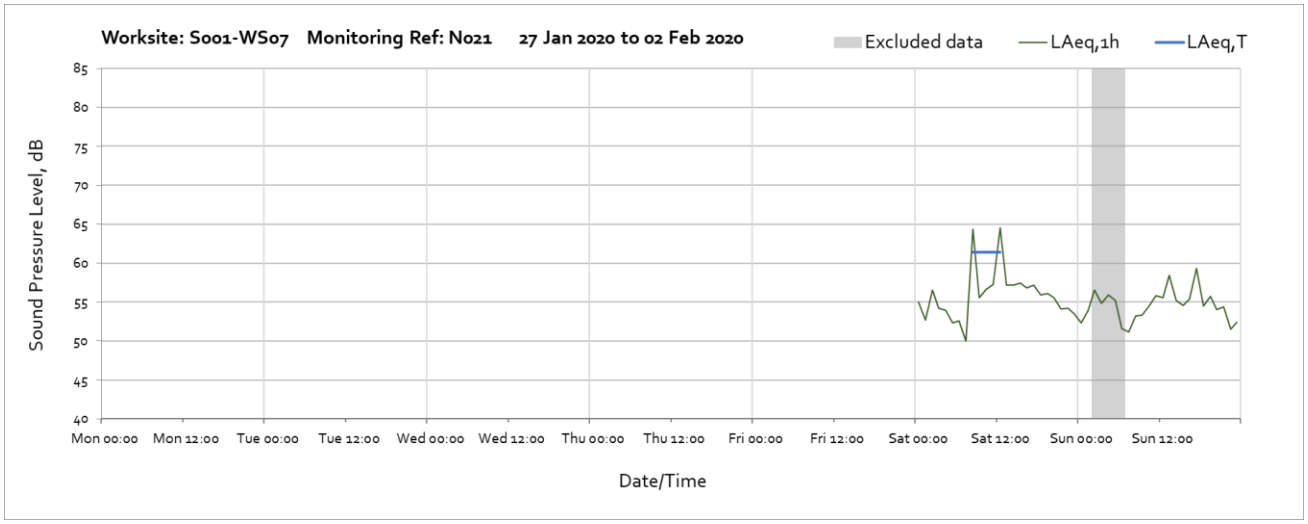


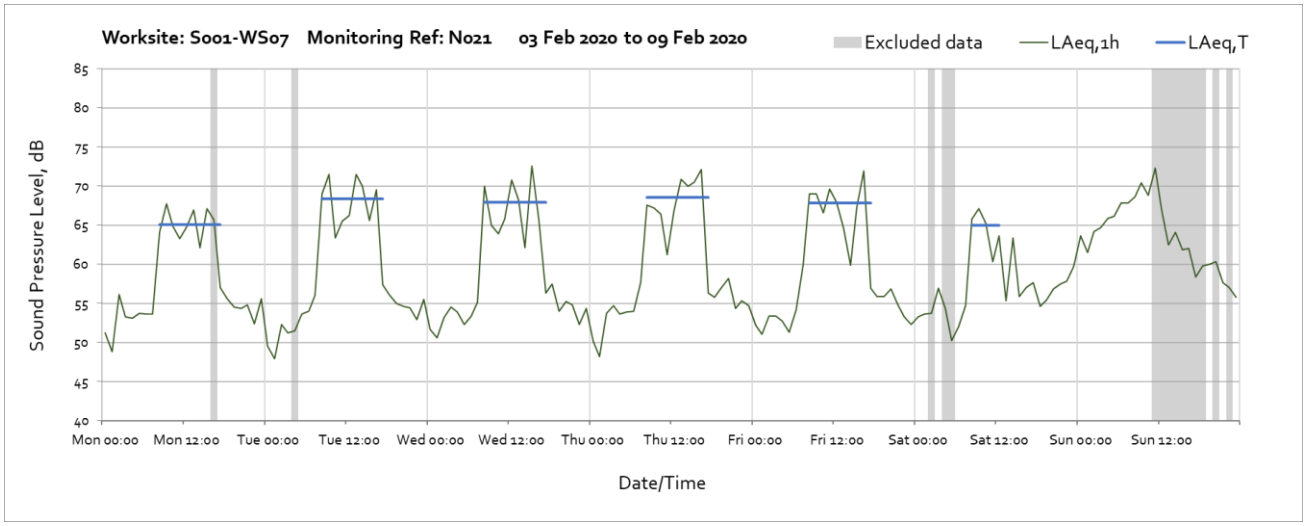






Worksite: S001-WS07 – Monitoring Ref: N021




Worksite: S001-WS07 Monitoring Ref: N021 03 Feb 2020 to 09 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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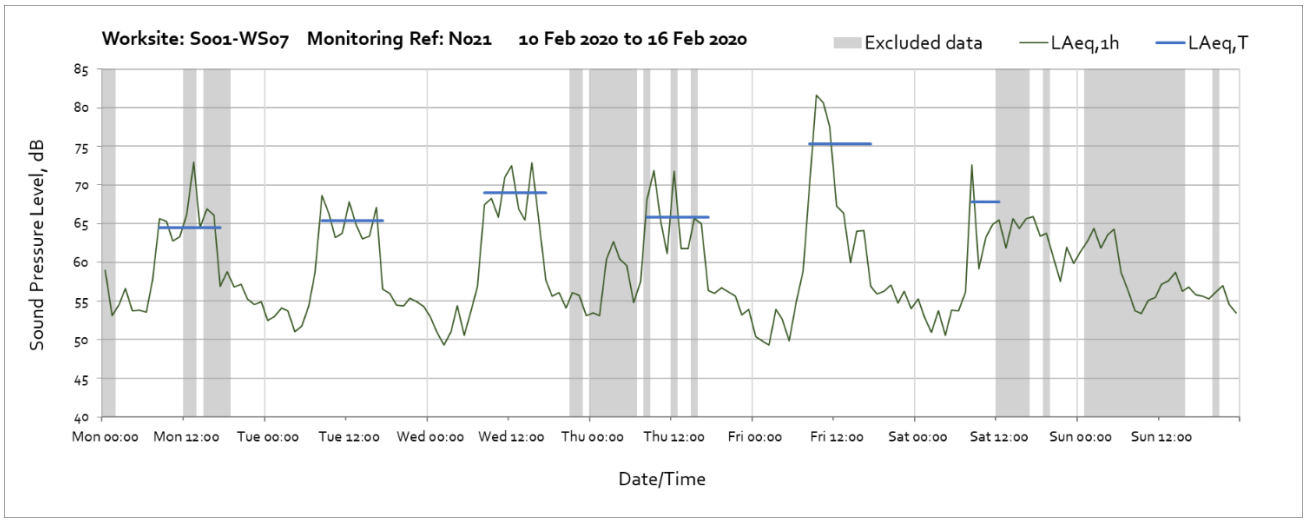
Date/Time


Worksite: S001-WS07 Monitoring Ref: N021 10 Feb 2020 to 16 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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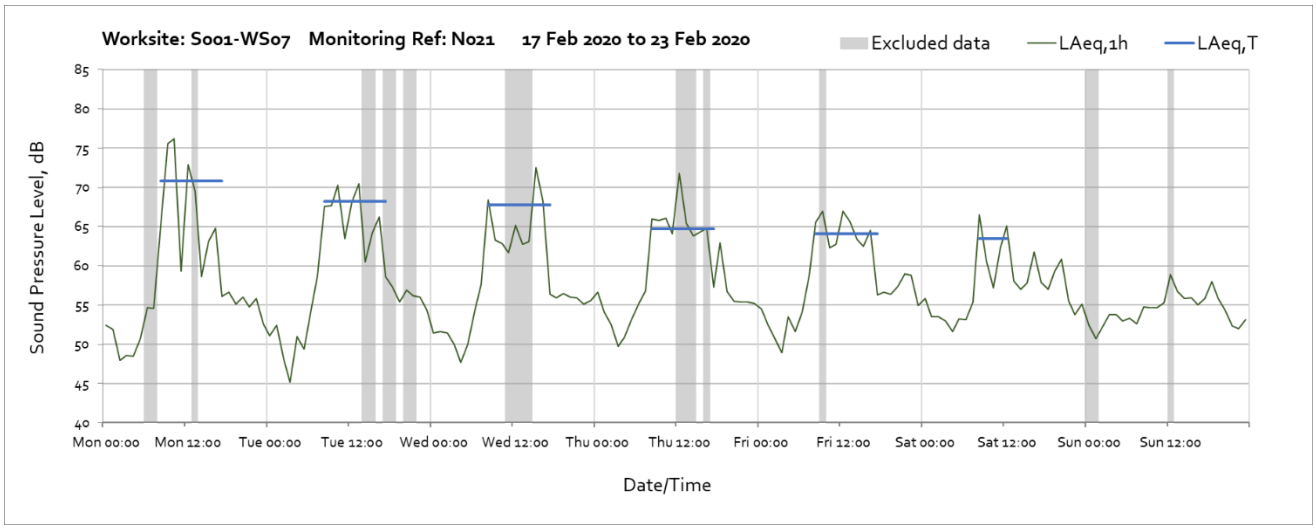
Date/Time


Worksite: S001-WS07 Monitoring Ref: N021 17 Feb 2020 to 23 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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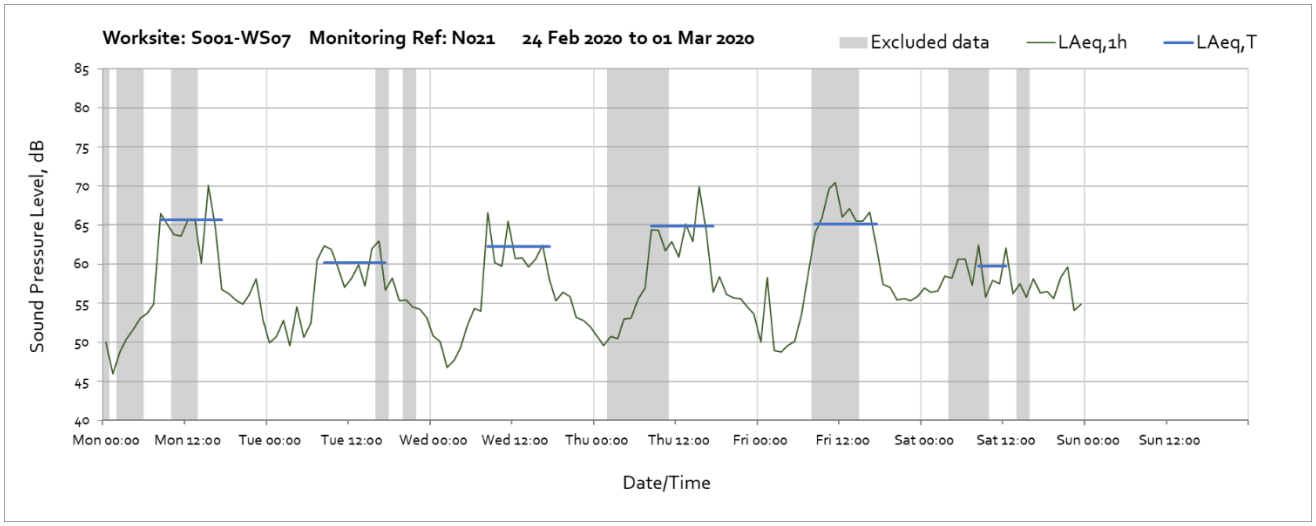
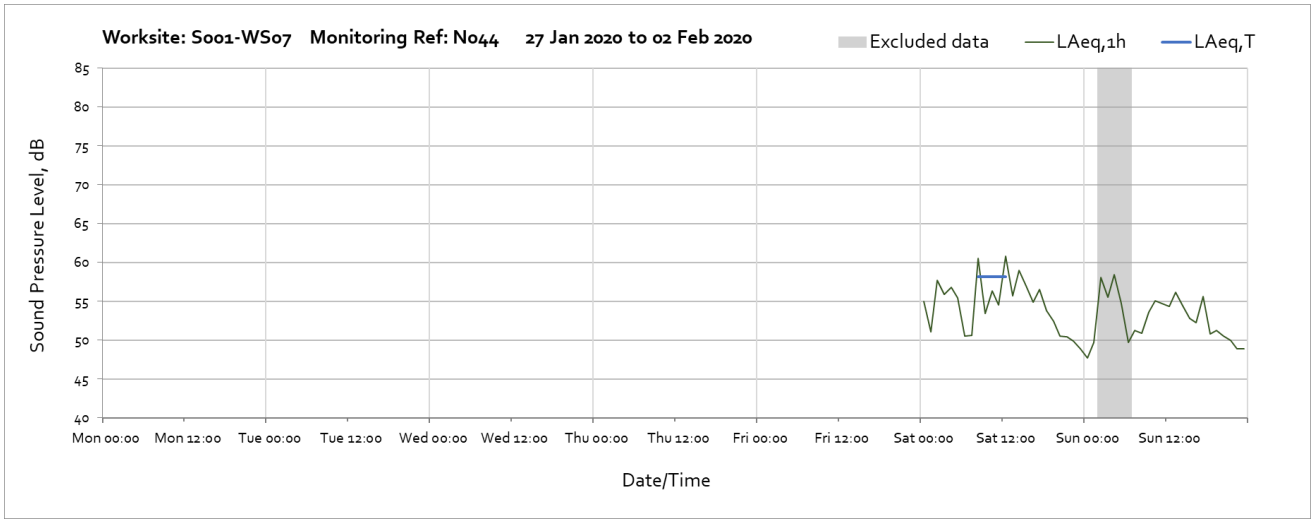
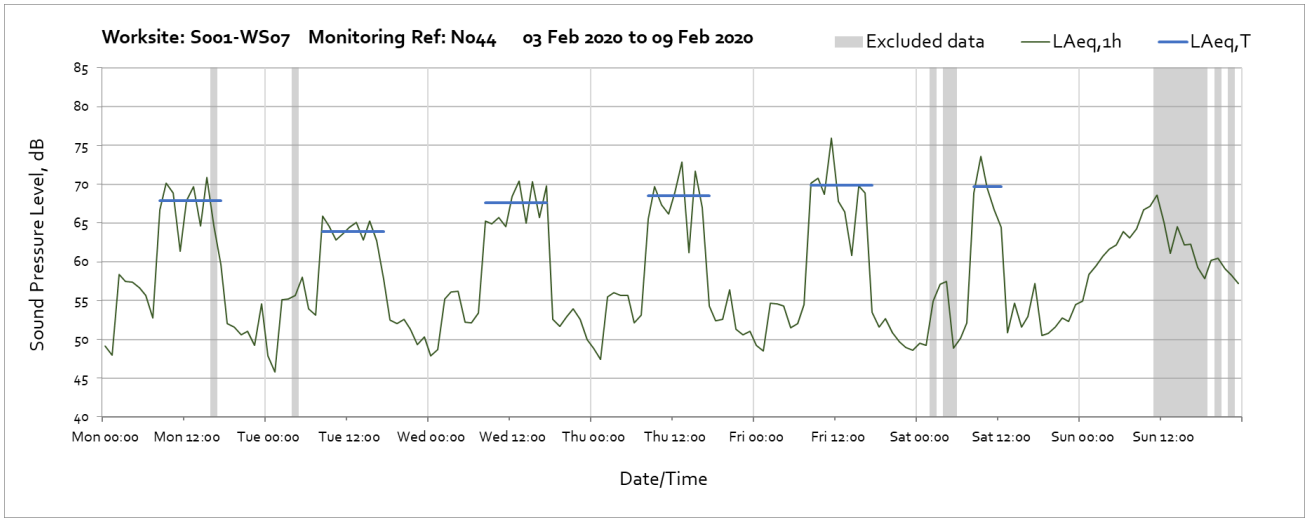
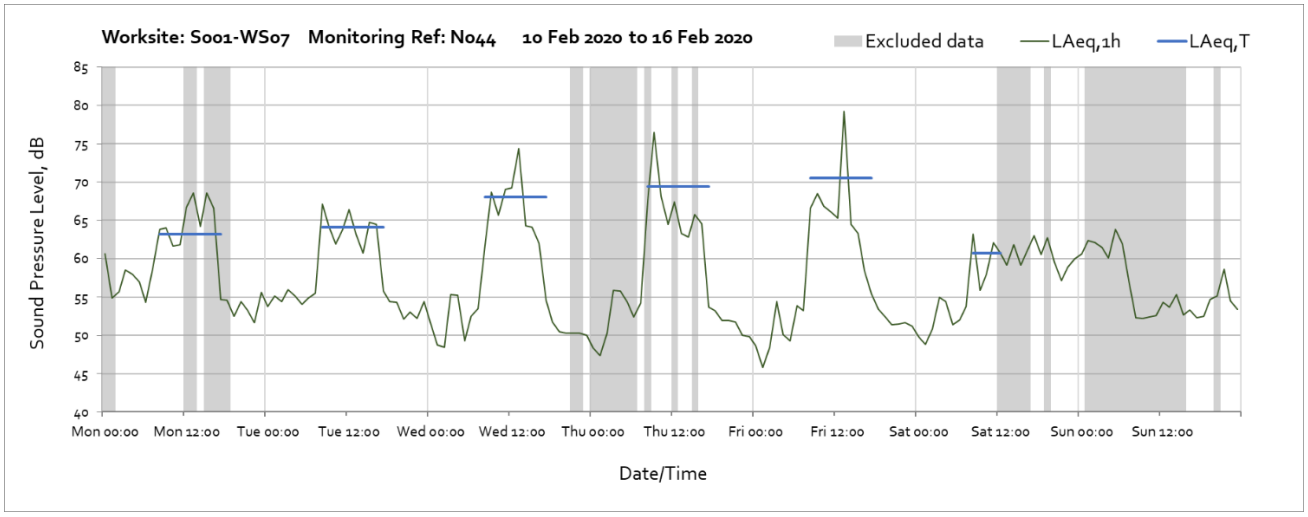
Date/Time



Worksite: S001-WS07 – Monitoring Ref: N044






Worksite: S001-WS07 Monitoring Ref: N044 10 Feb 2020 to 16 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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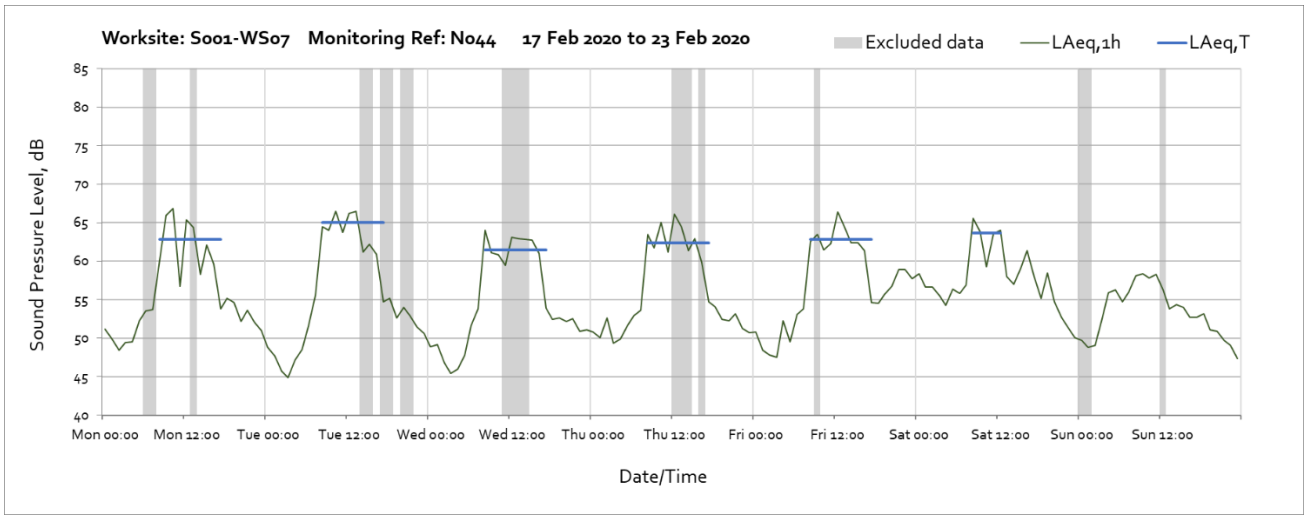
Date/Time


Worksite: S001-WS07 Monitoring Ref: N044 17 Feb 2020 to 23 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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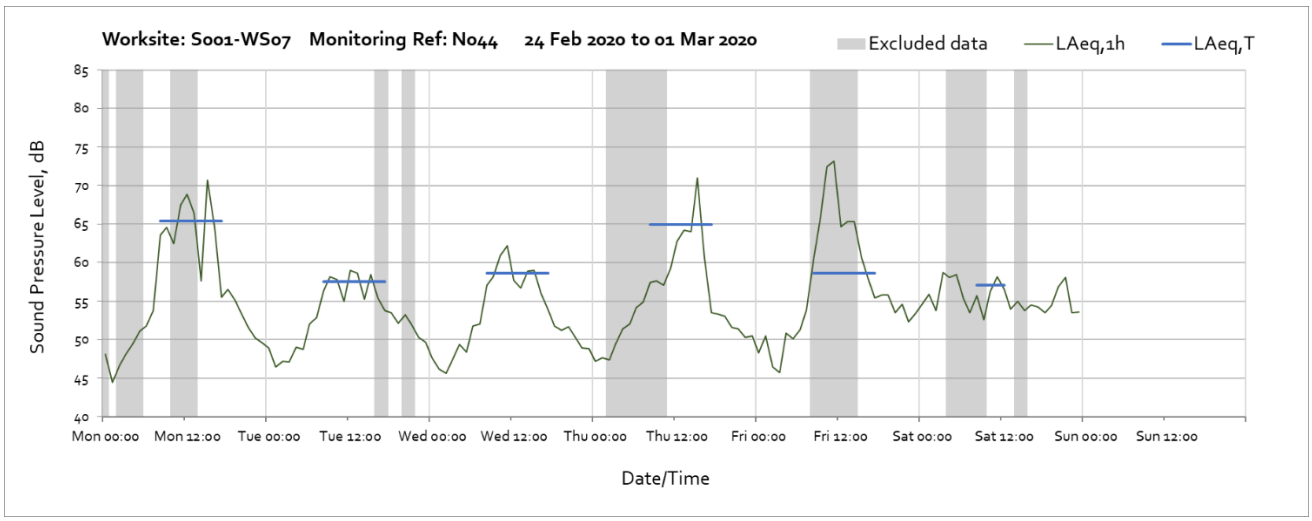
Date/Time


Worksite: S001-WS07 Monitoring Ref: N044 24 Feb 2020 to 01 Mar 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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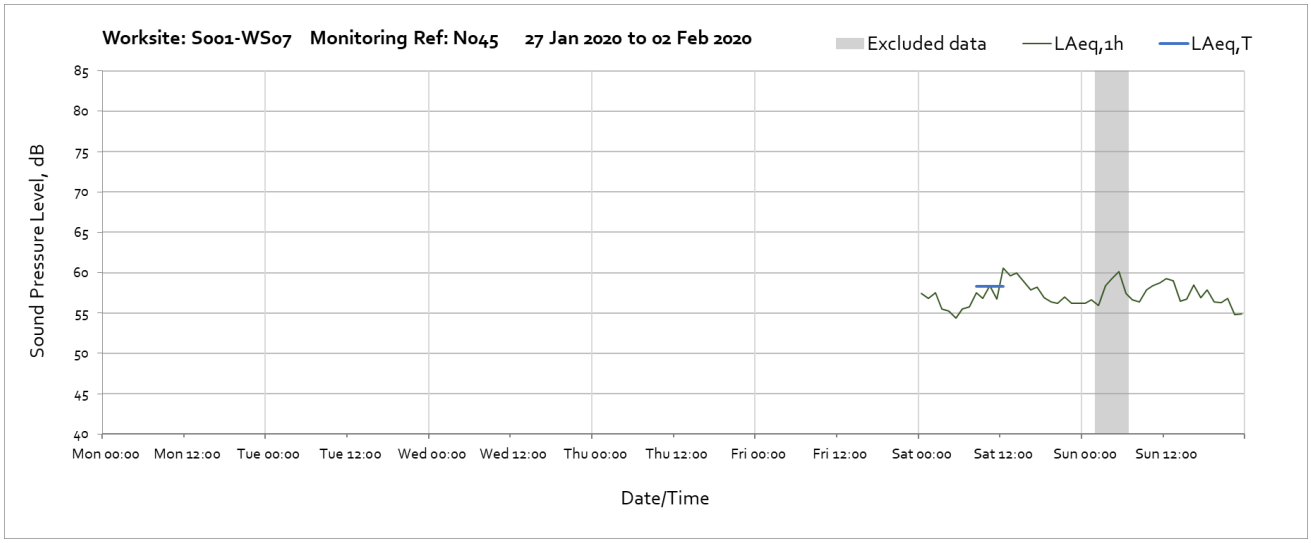
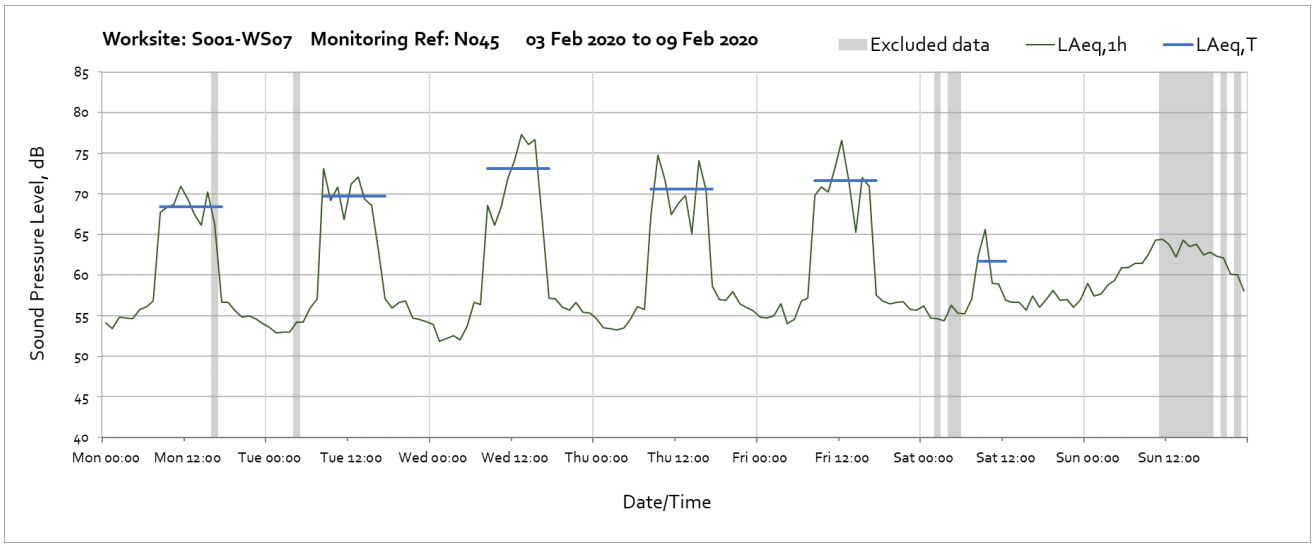
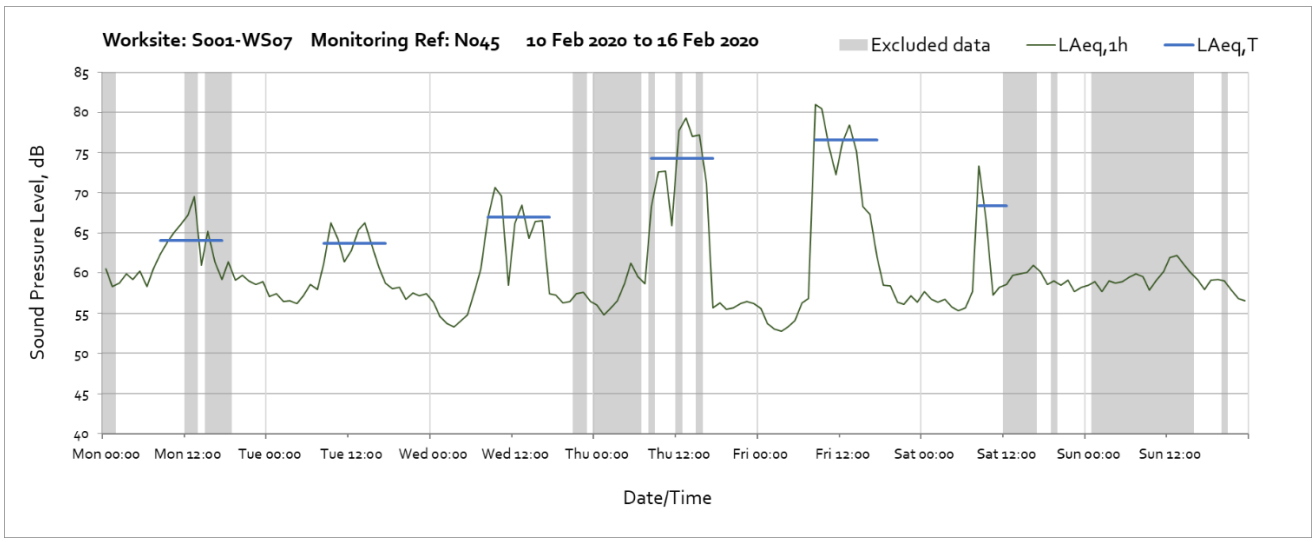
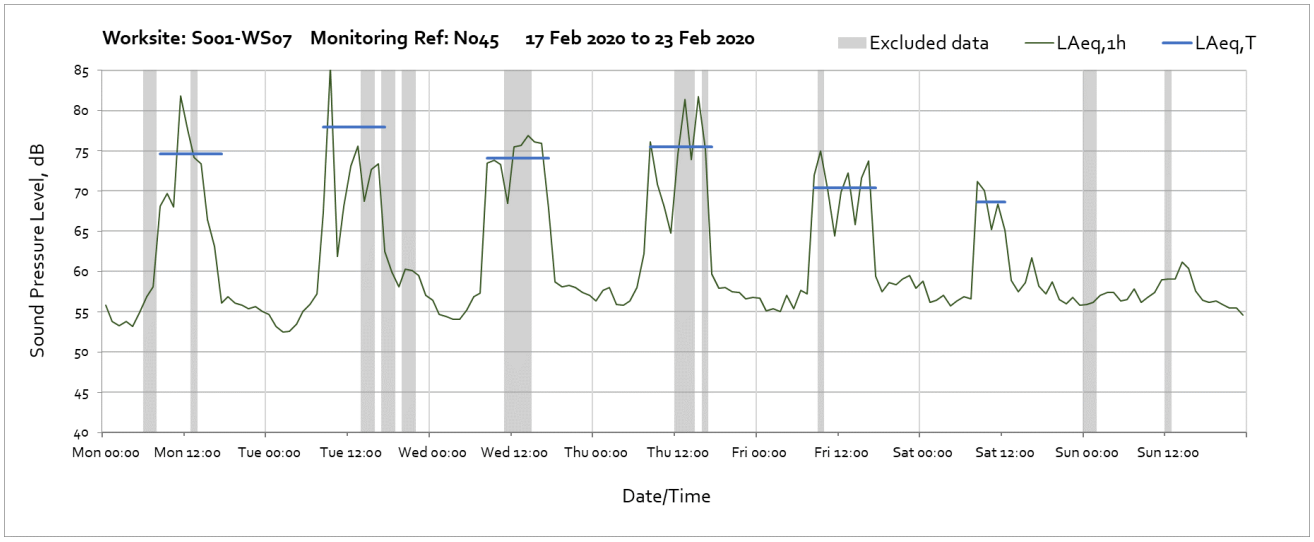
Date/Time

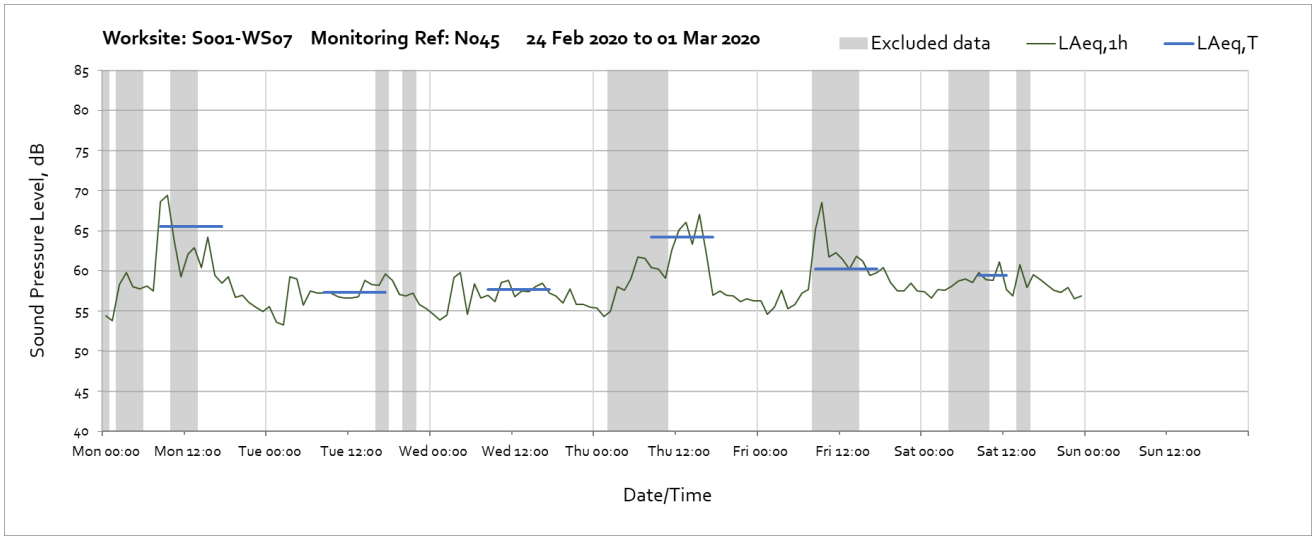
Worksite: S001-WS07 – Monitoring Ref: N045



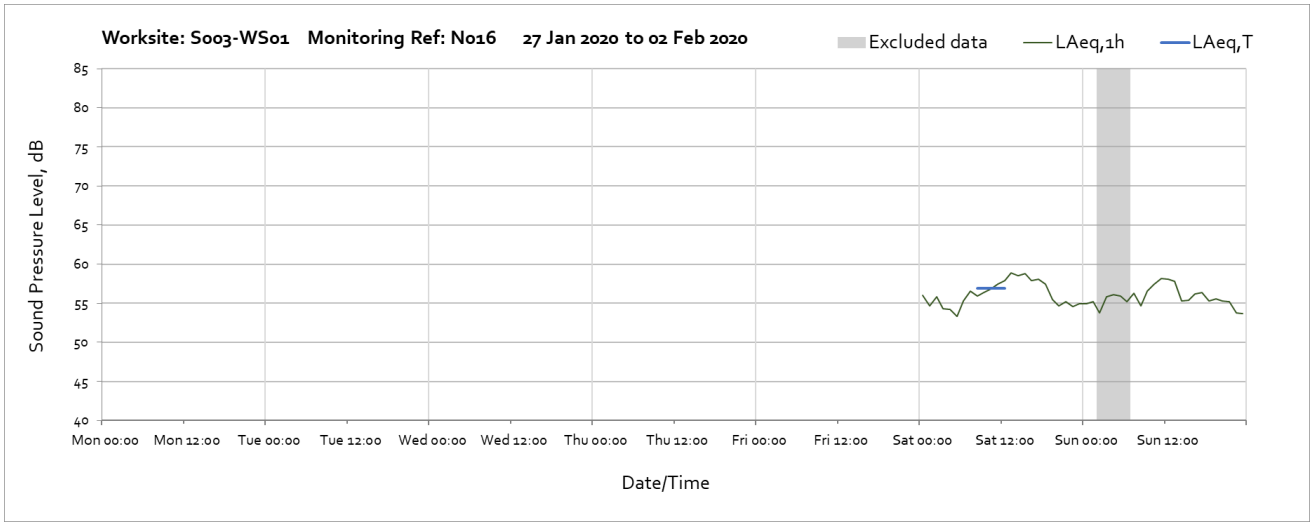


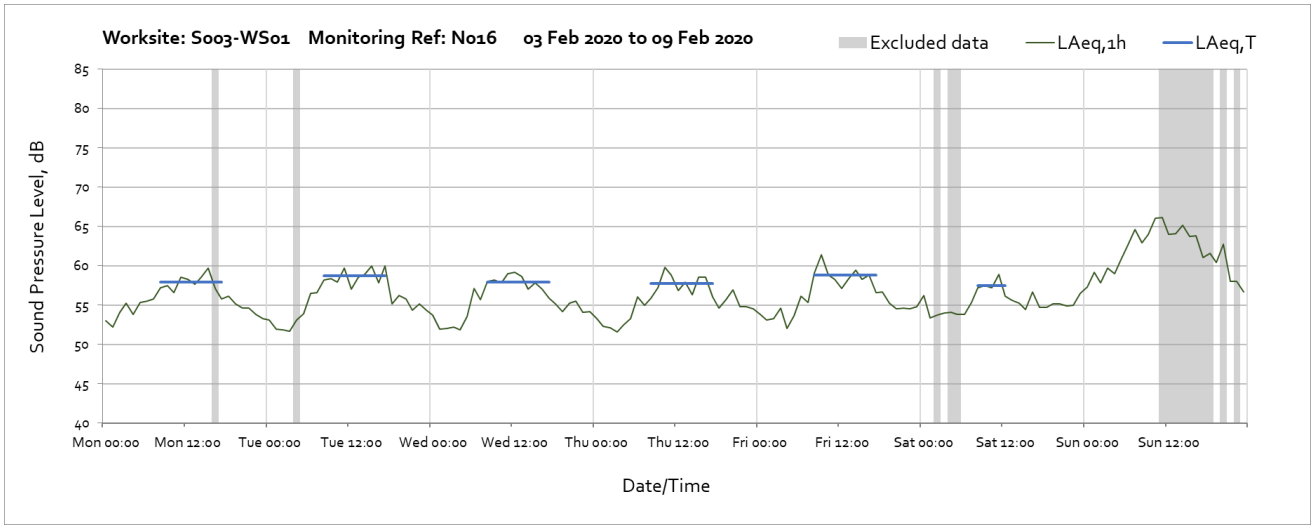






Worksite: S003-WS01 – Monitoring Ref: N016




Worksite: S003-WS01 Monitoring Ref: N016 03 Feb 2020 to 09 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
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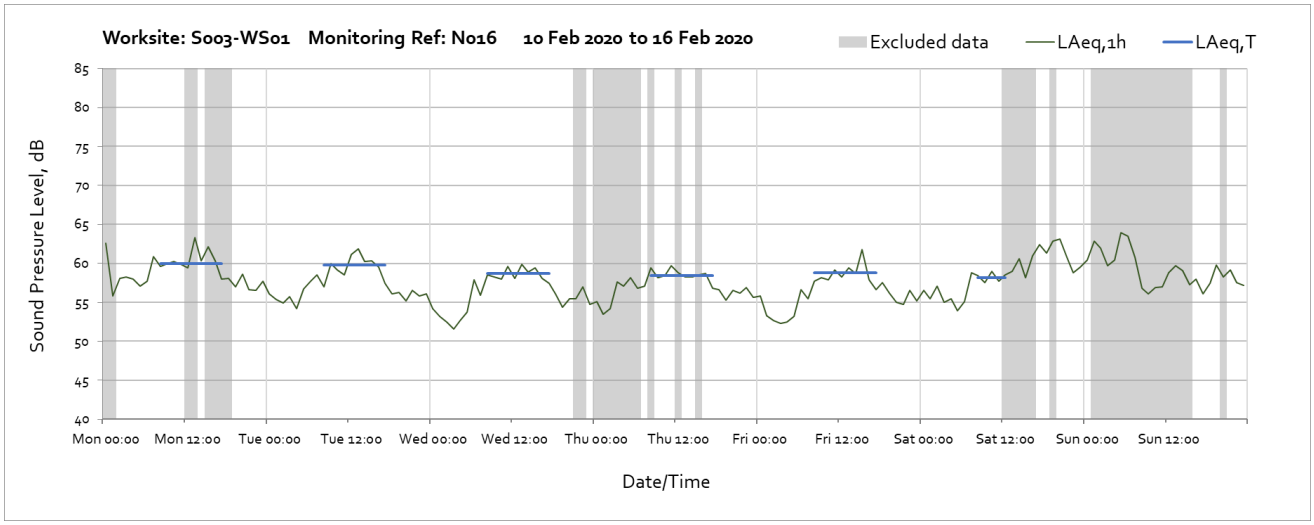
Date/Time


Worksite: S003-WS01 Monitoring Ref: N016 10 Feb 2020 to 16 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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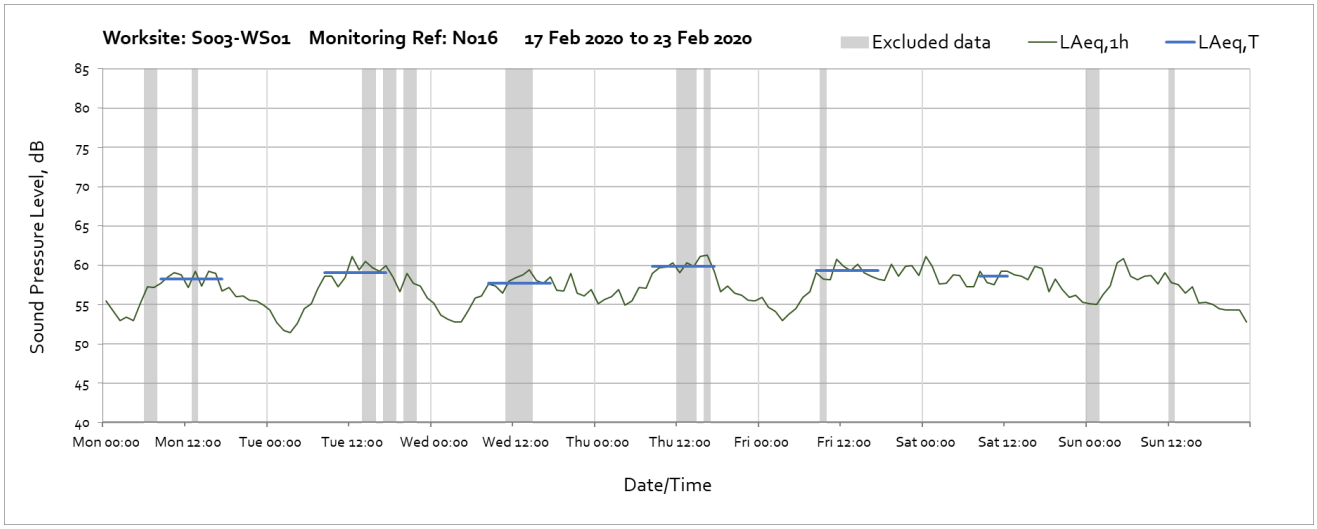
Date/Time


Worksite: S003-WS01 Monitoring Ref: N016 17 Feb 2020 to 23 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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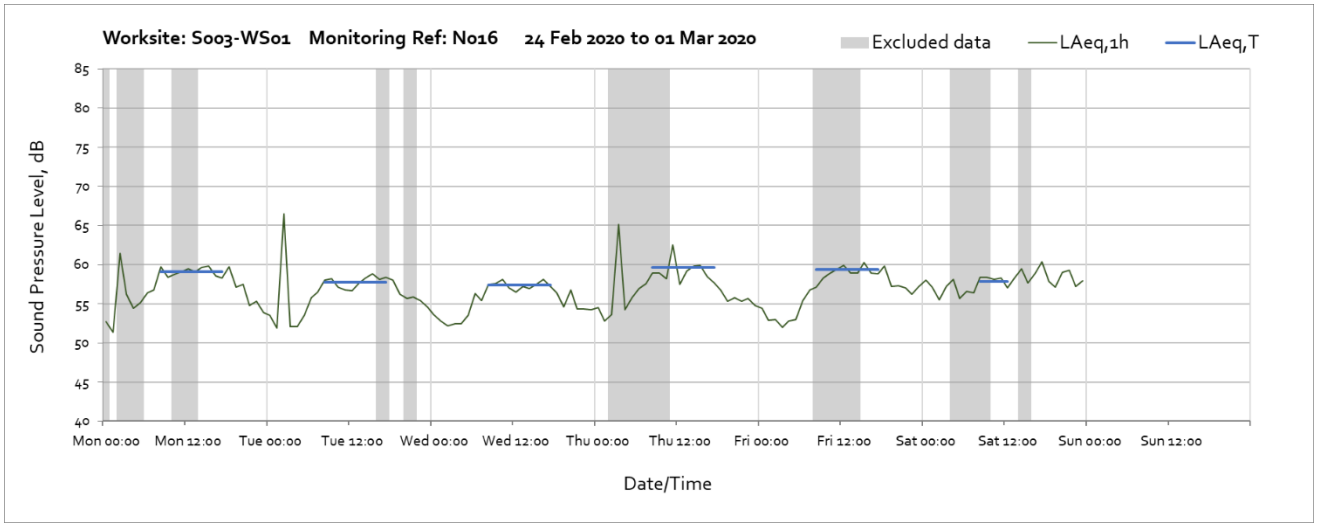
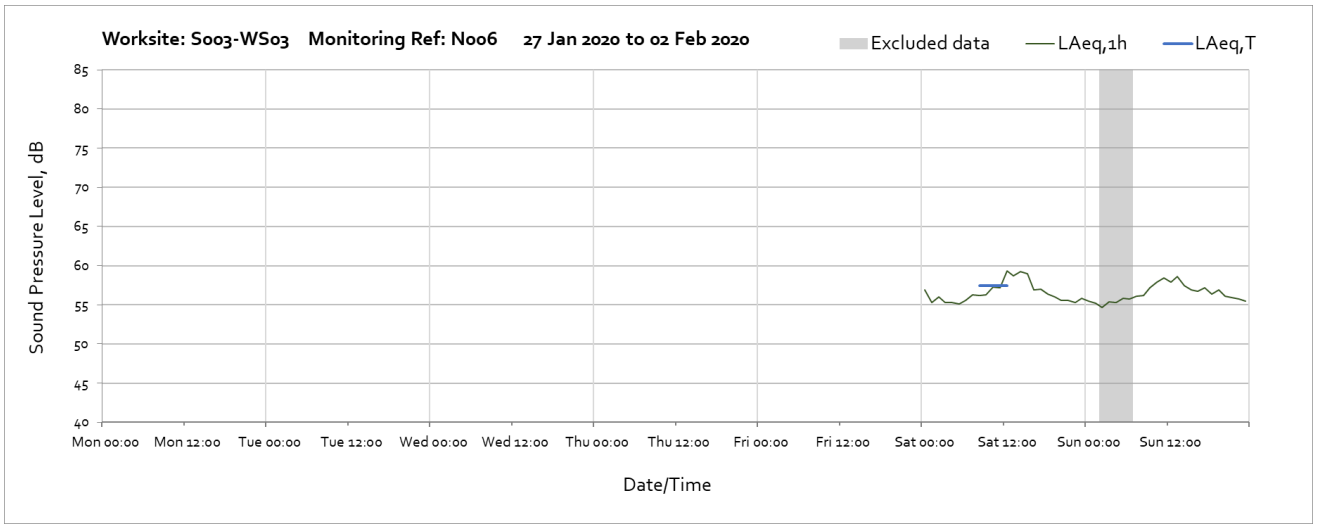
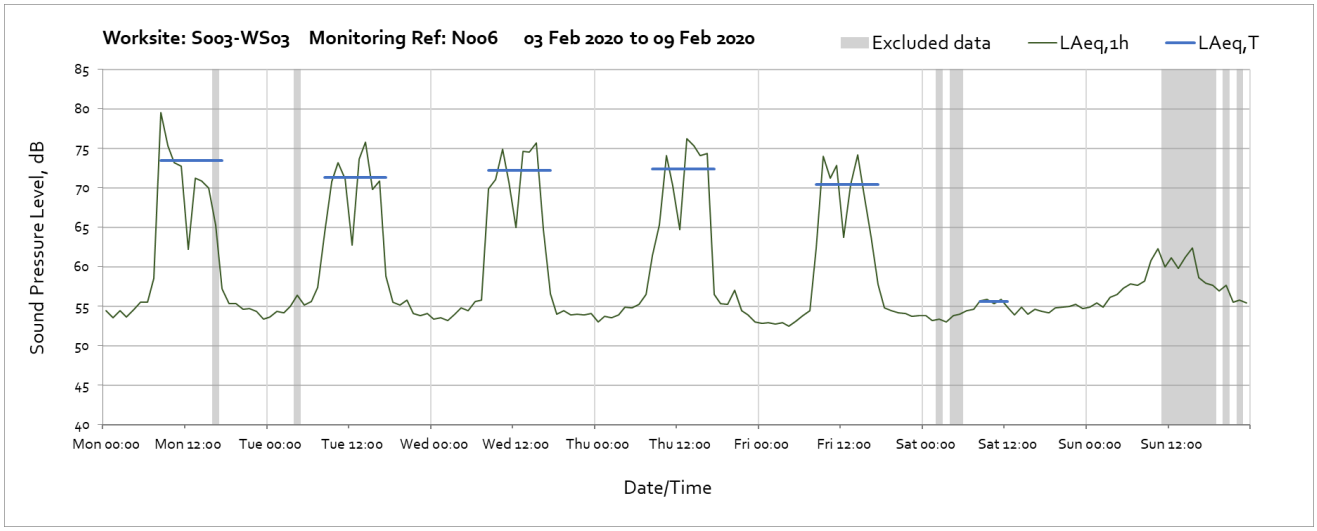
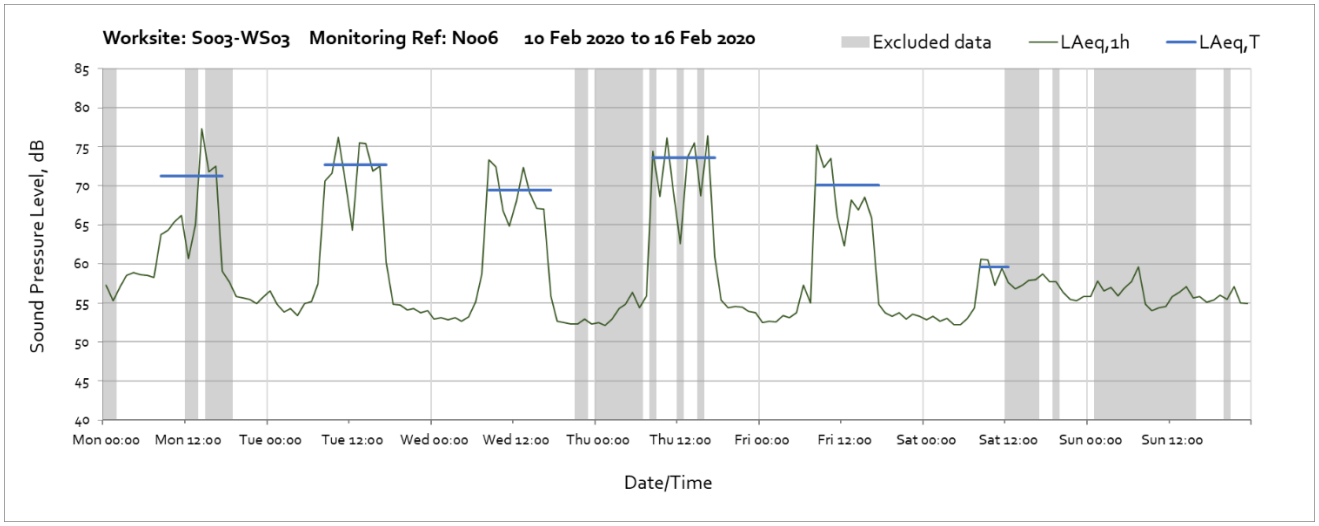
Date/Time



Worksite: S003-WS03 – Monitoring Ref: N006






Worksite: S003-WS03 Monitoring Ref: N006 10 Feb 2020 to 16 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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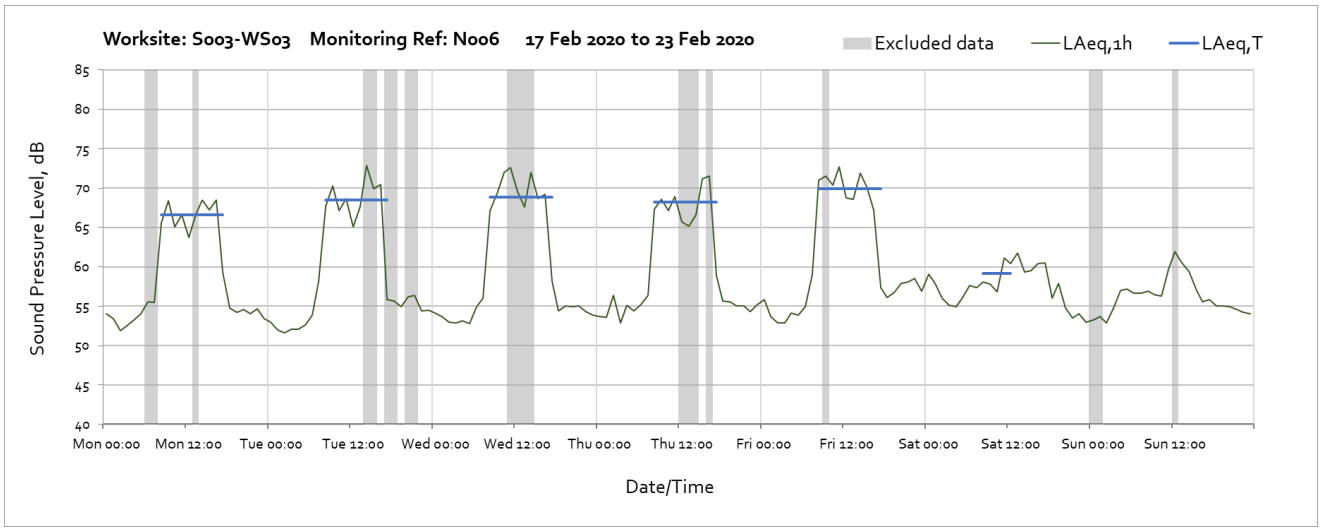
Date/Time


Worksite: S003-WS03 Monitoring Ref: N006 17 Feb 2020 to 23 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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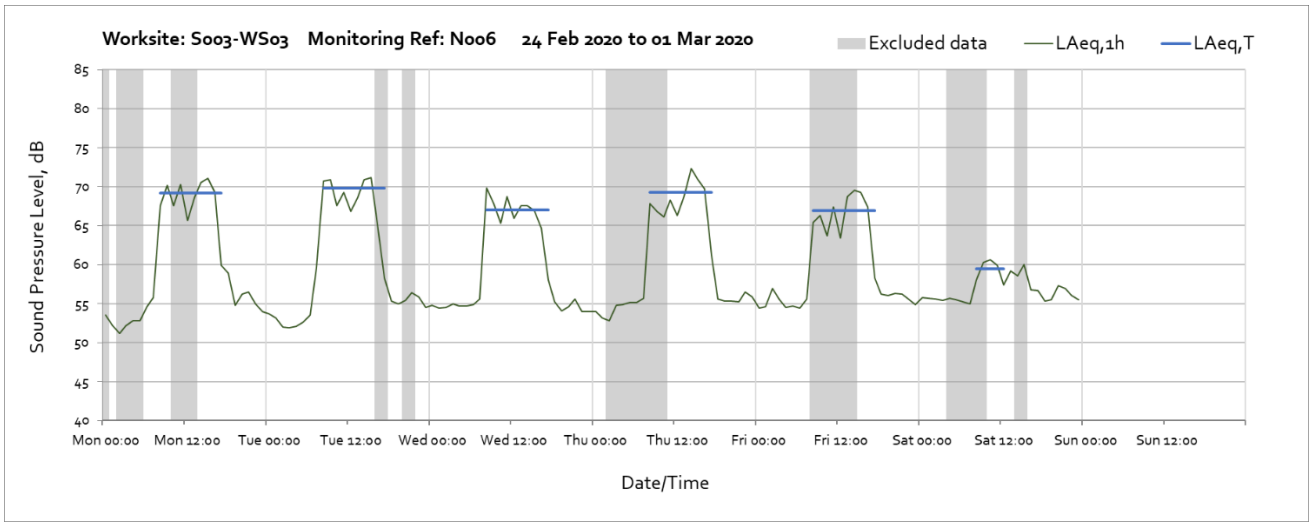
Worksite: S003-WS03 Monitoring Ref: N006 24 Feb 2020 to 01 Mar 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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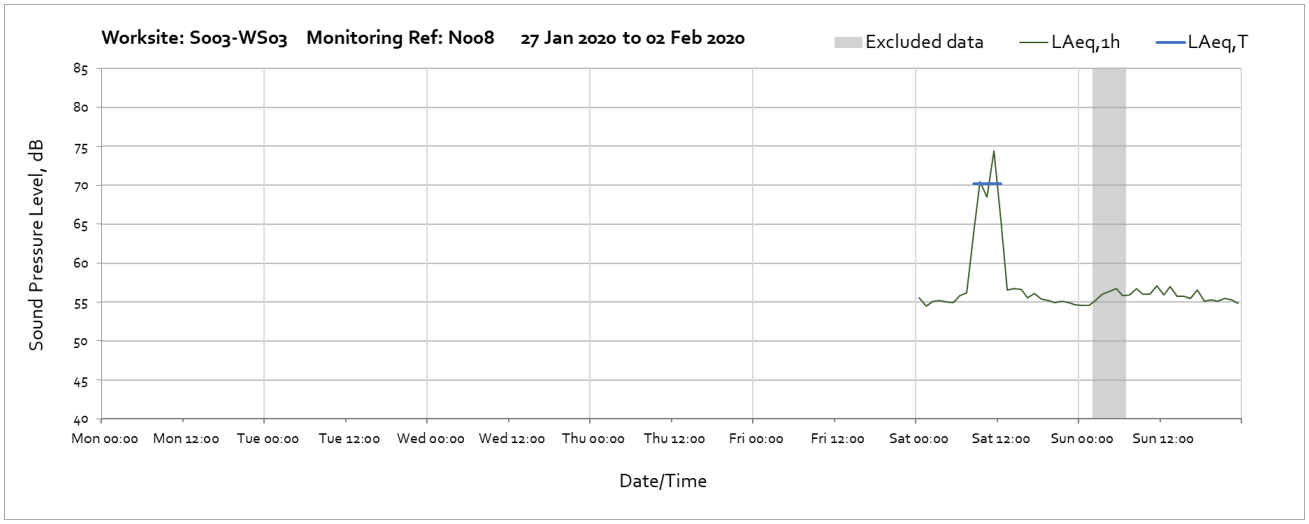
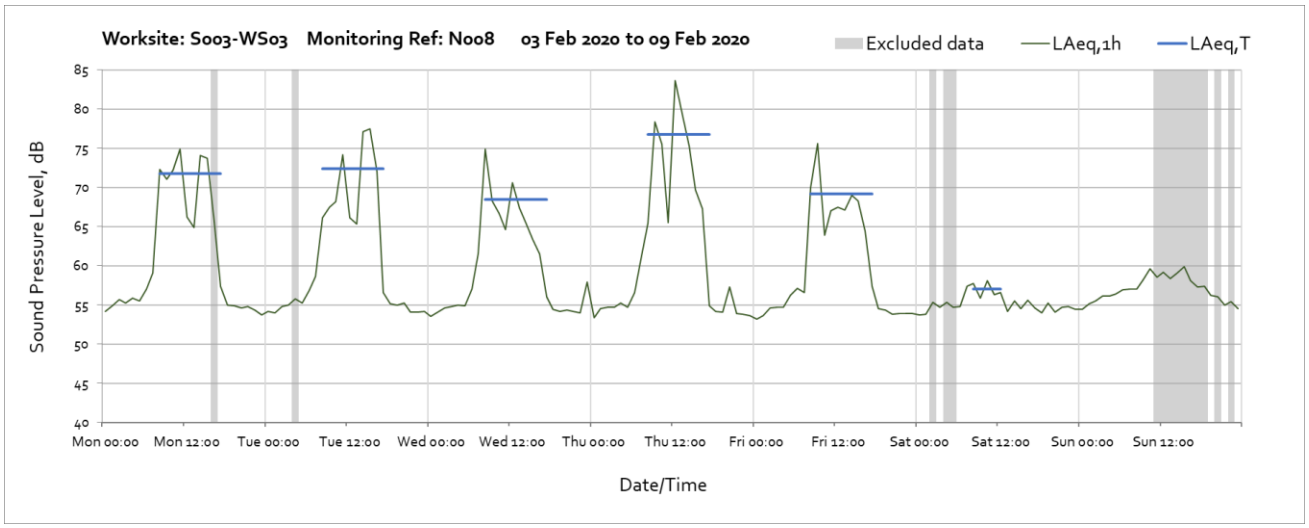
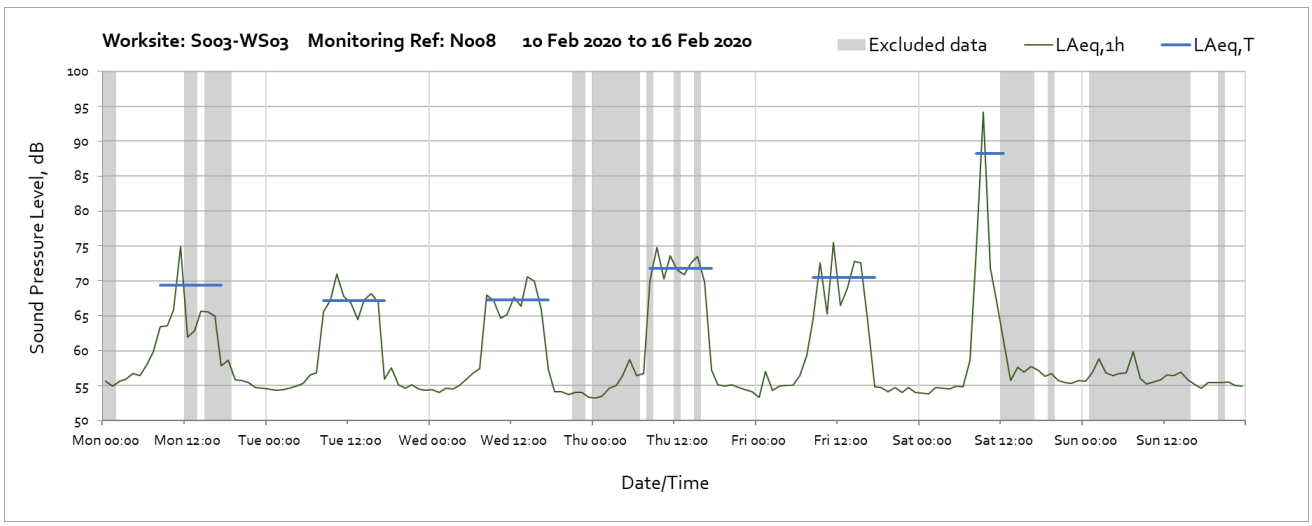
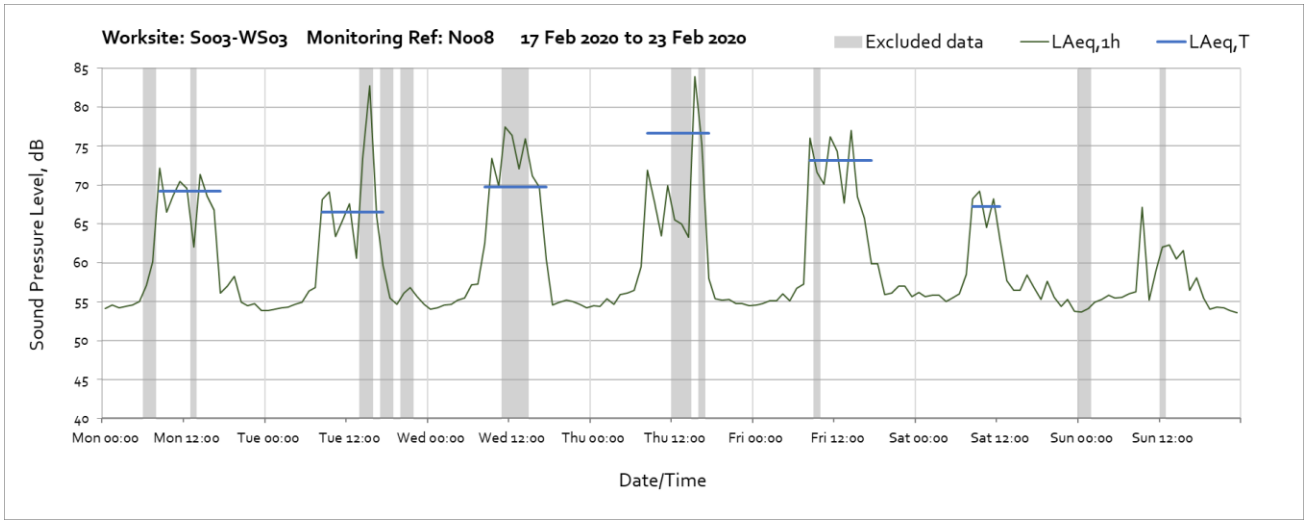
Date/Time

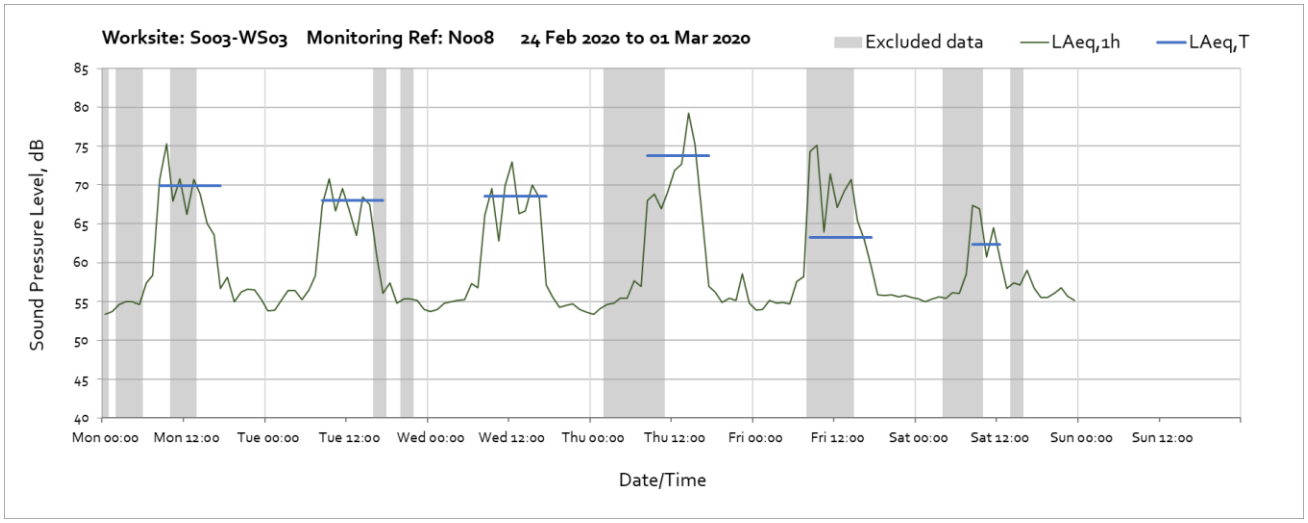
Worksite: S003-WS03 – Monitoring Ref: N008



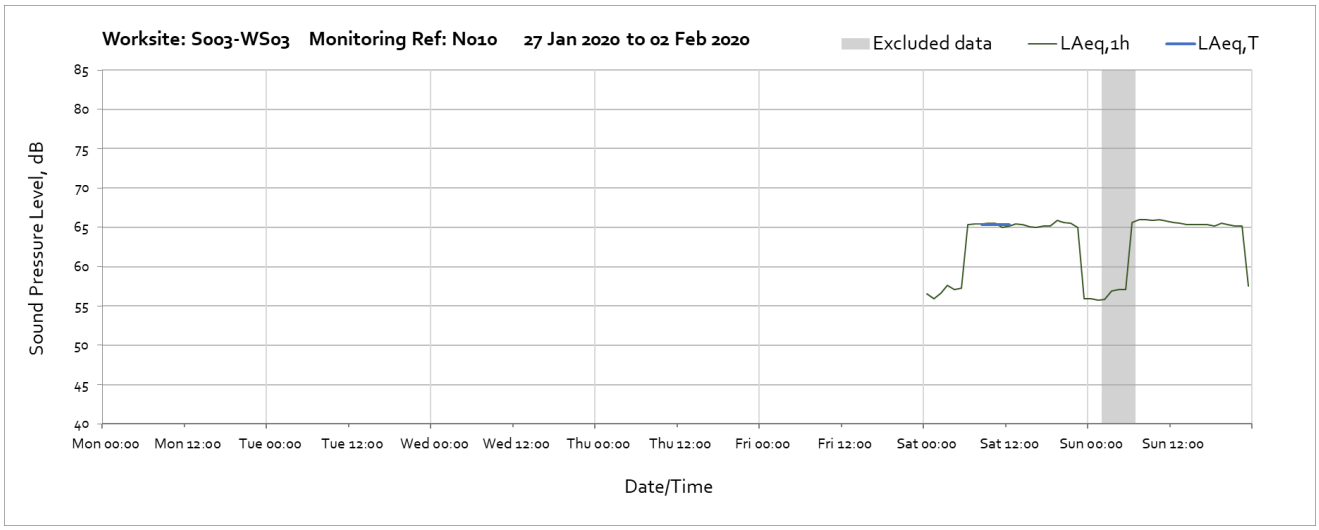


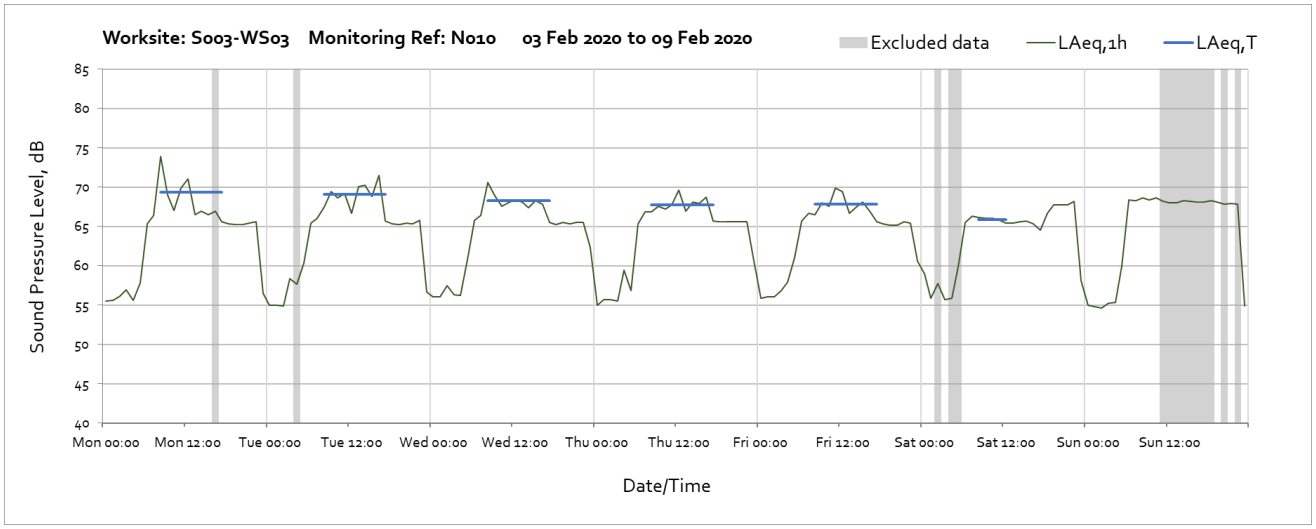






Worksite: S003-WS03 – Monitoring Ref: N010




Worksite: S003-WS03 Monitoring Ref: N010 03 Feb 2020 to 09 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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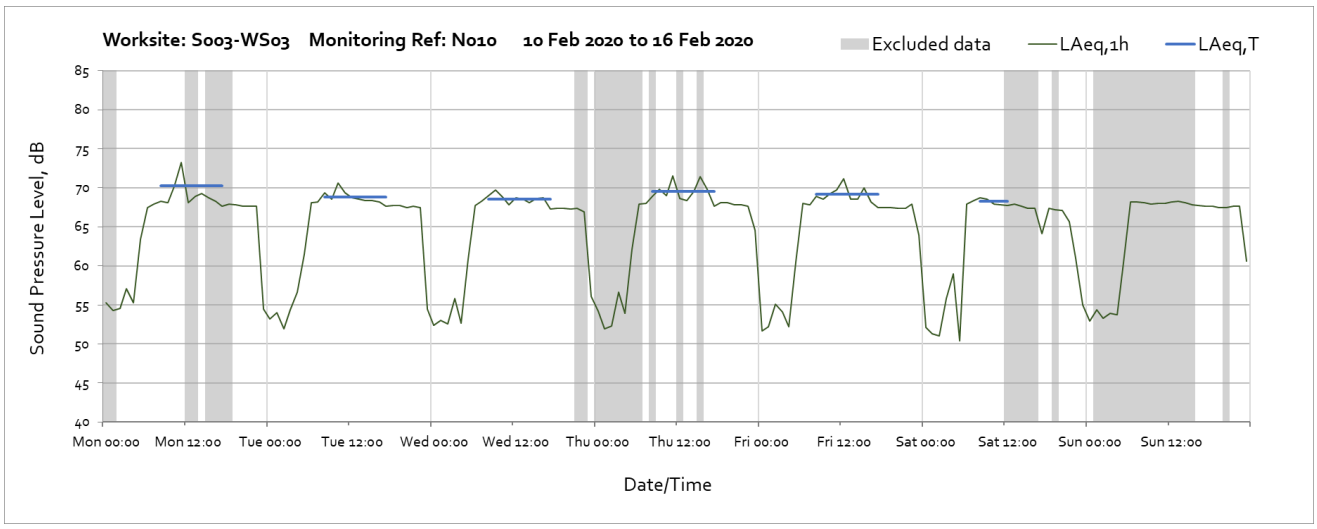
Date/Time


Worksite: S003-WS03 Monitoring Ref: N010 10 Feb 2020 to 16 Feb 2020
Excluded data
LAeq,1h
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Sound Pressure Level, dB
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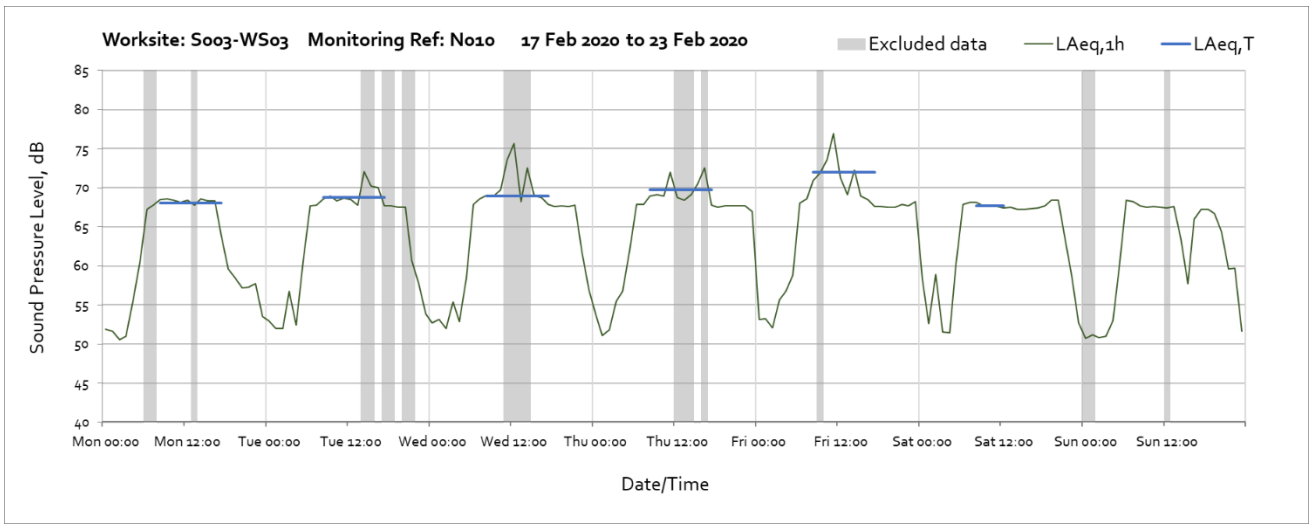
Date/Time


Worksite: S003-WS03 Monitoring Ref: N010 17 Feb 2020 to 23 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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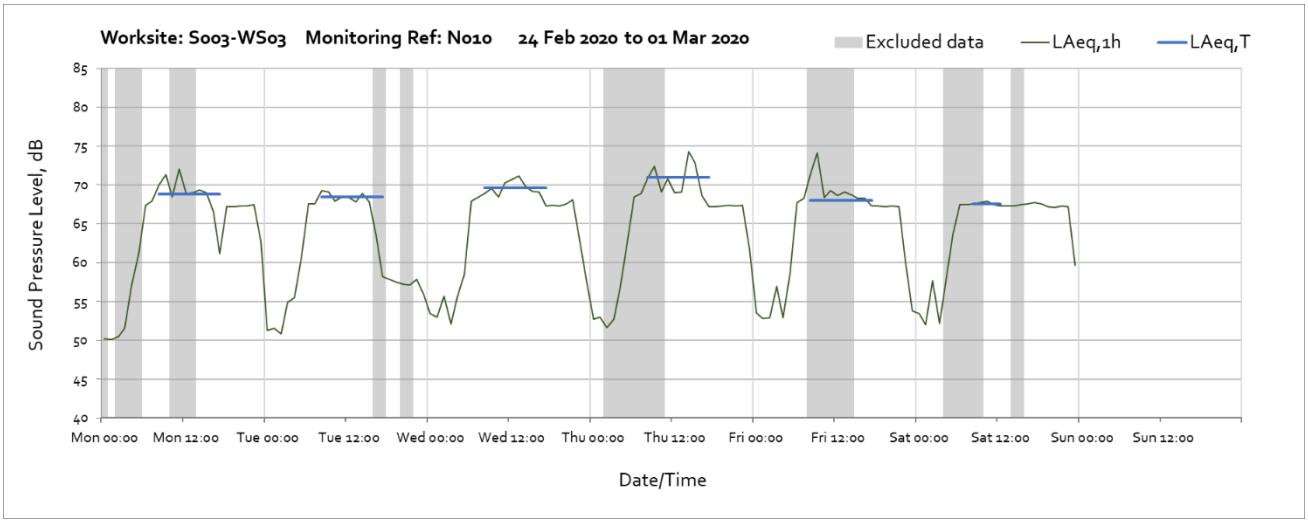
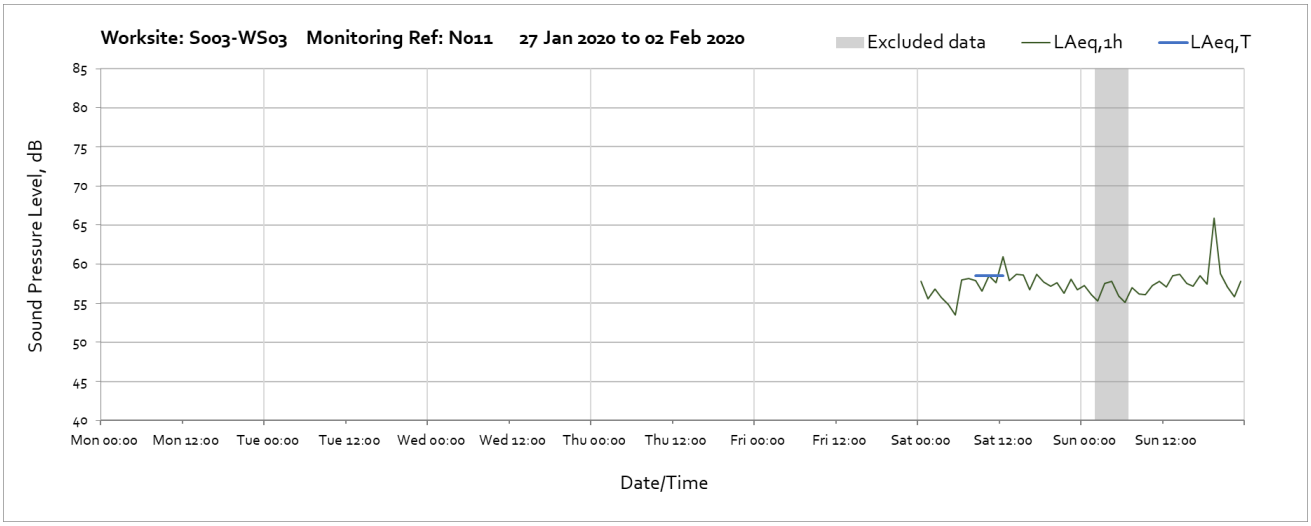
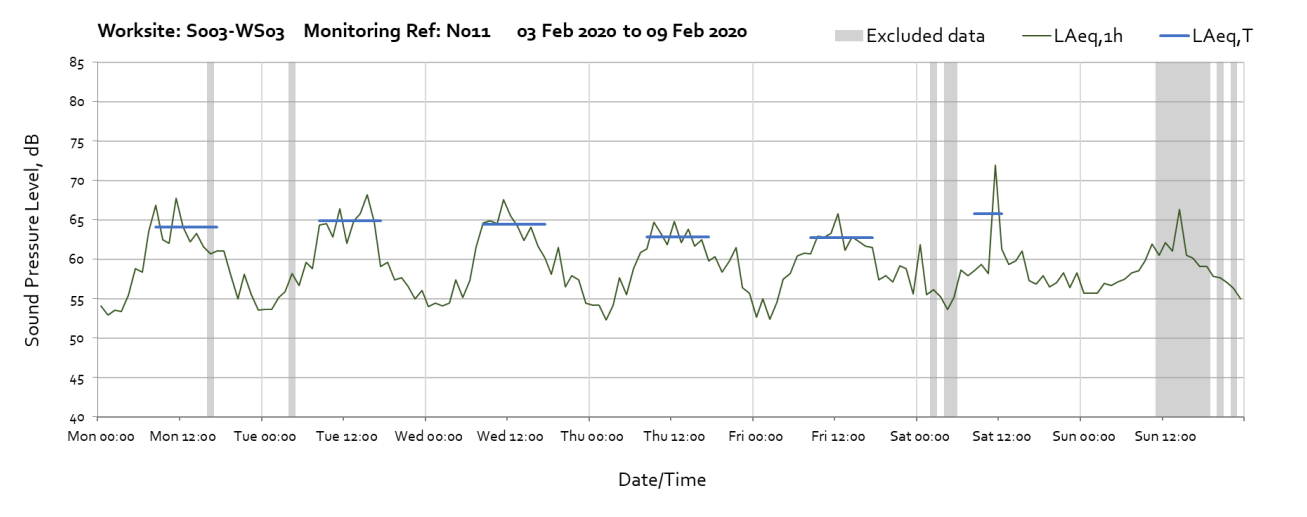
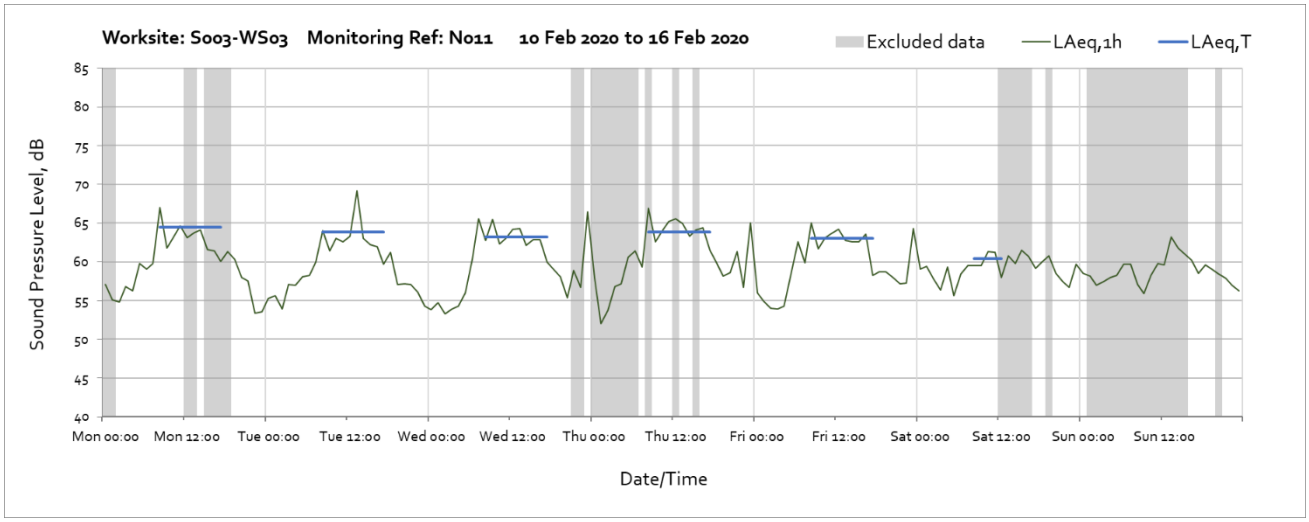


Worksite: S003-WS03 – Monitoring Ref: N011






Worksite: S003-WS03 Monitoring Ref: N011 10 Feb 2020 to 16 Feb 2020
Excluded data
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Sound Pressure Level, dB
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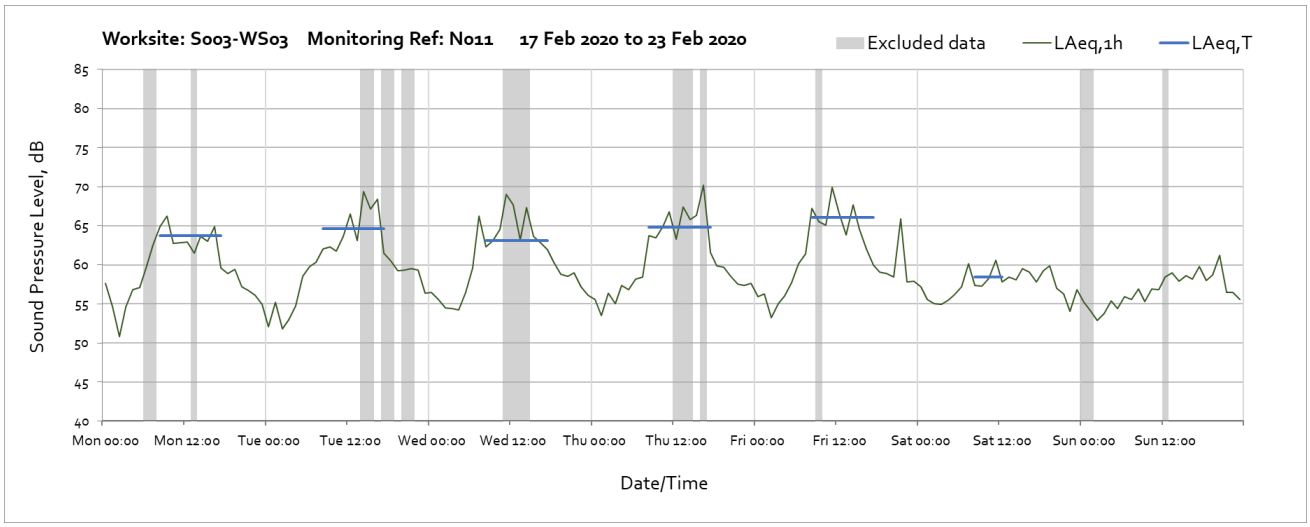
Worksite: S003-WS03 Monitoring Ref: N011 17 Feb 2020 to 23 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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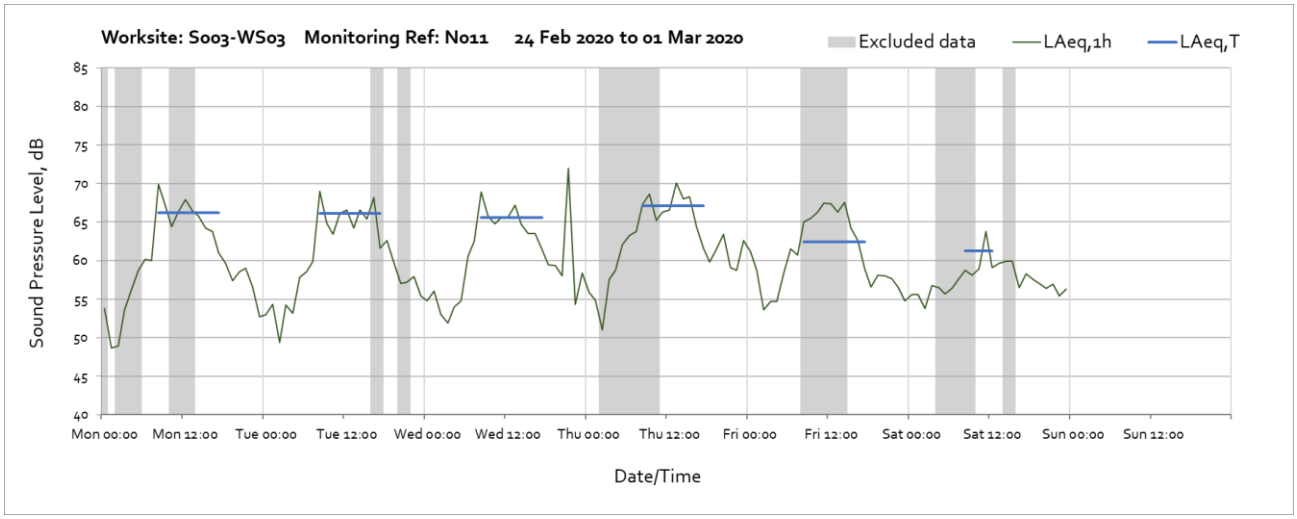
Date/Time


Worksite: S003-WS03 Monitoring Ref: N011 24 Feb 2020 to 01 Mar 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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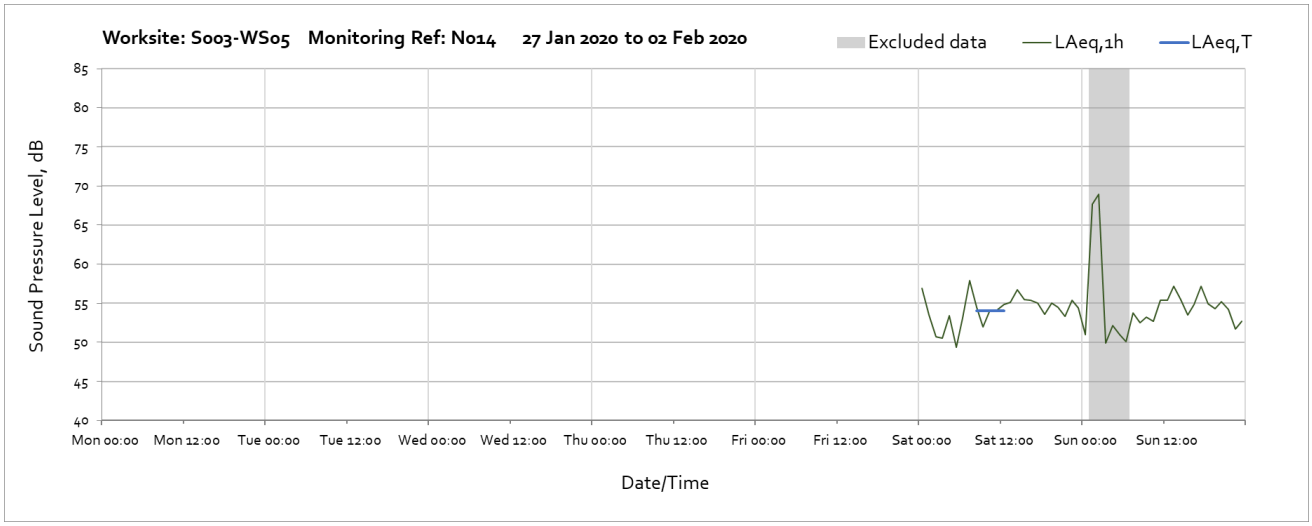
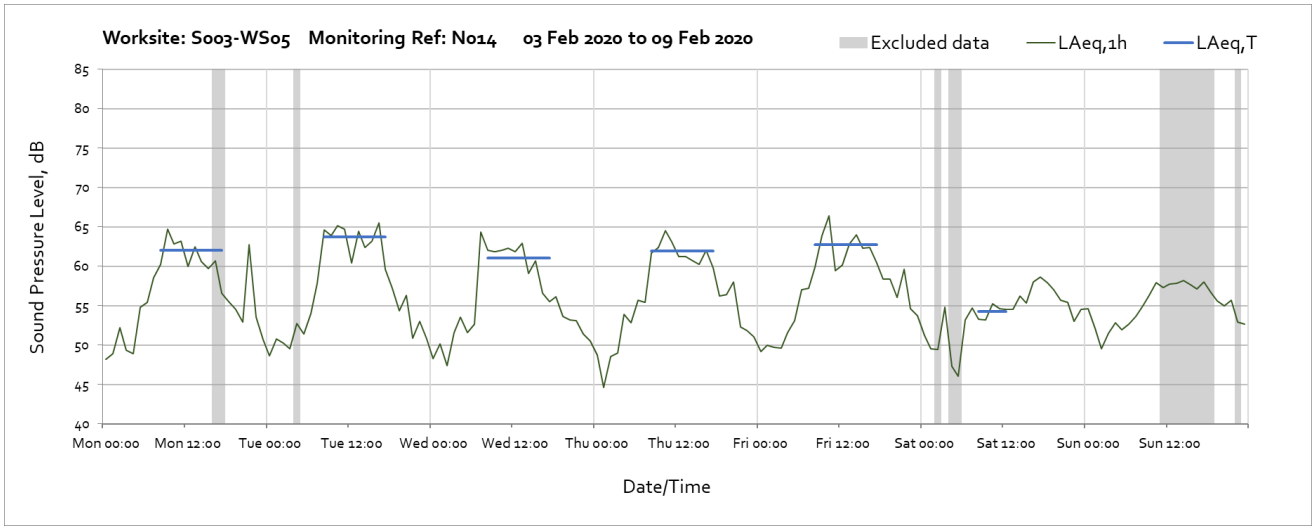
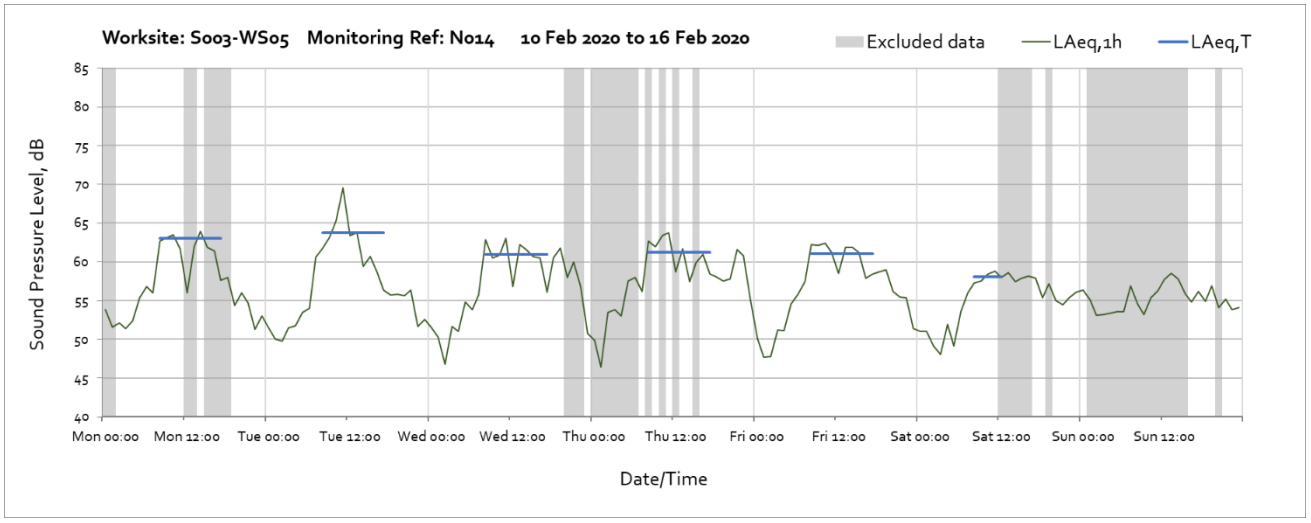
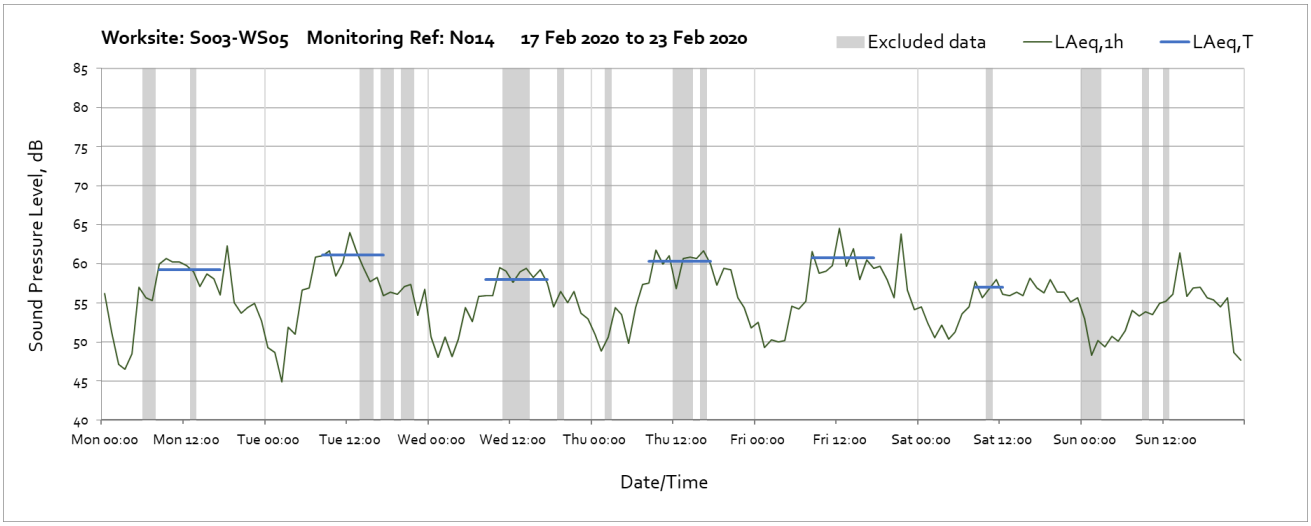
Date/Time

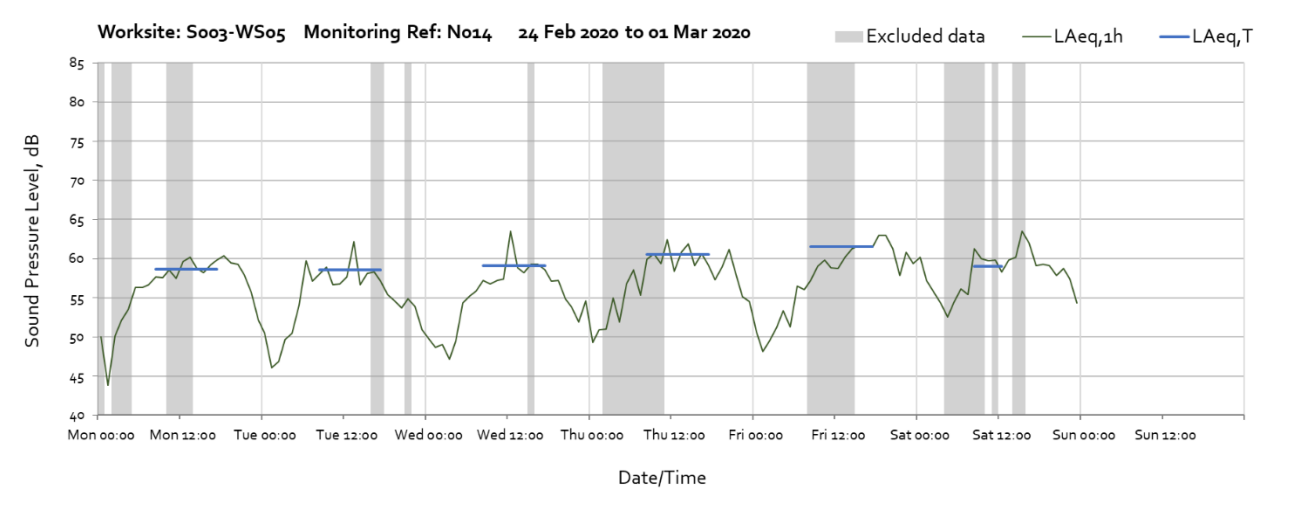
Worksite: S003-WS05 – Monitoring Ref: N014



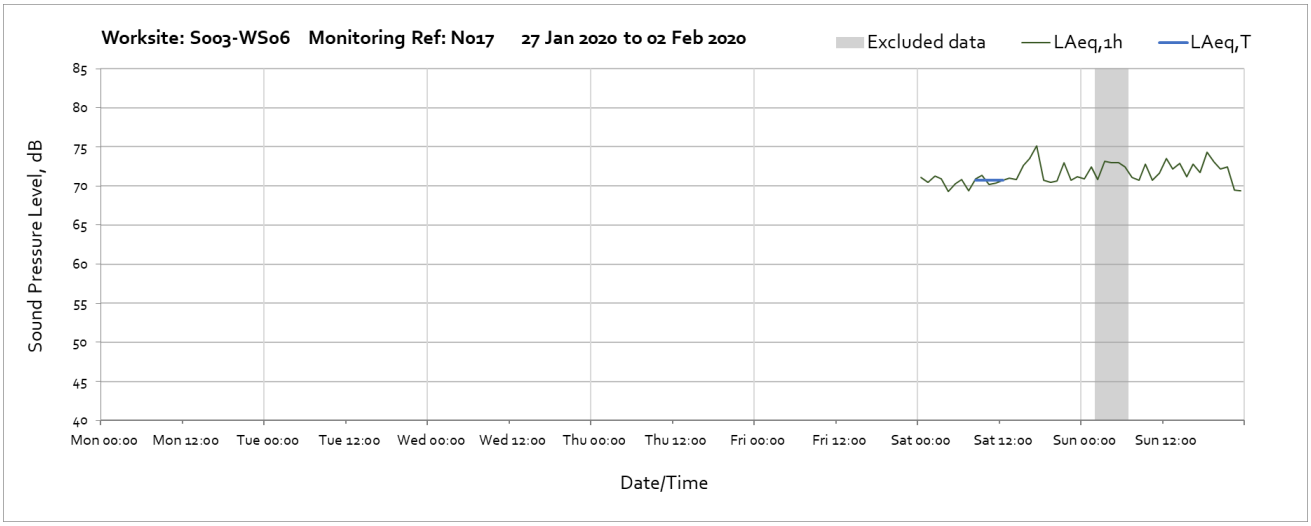


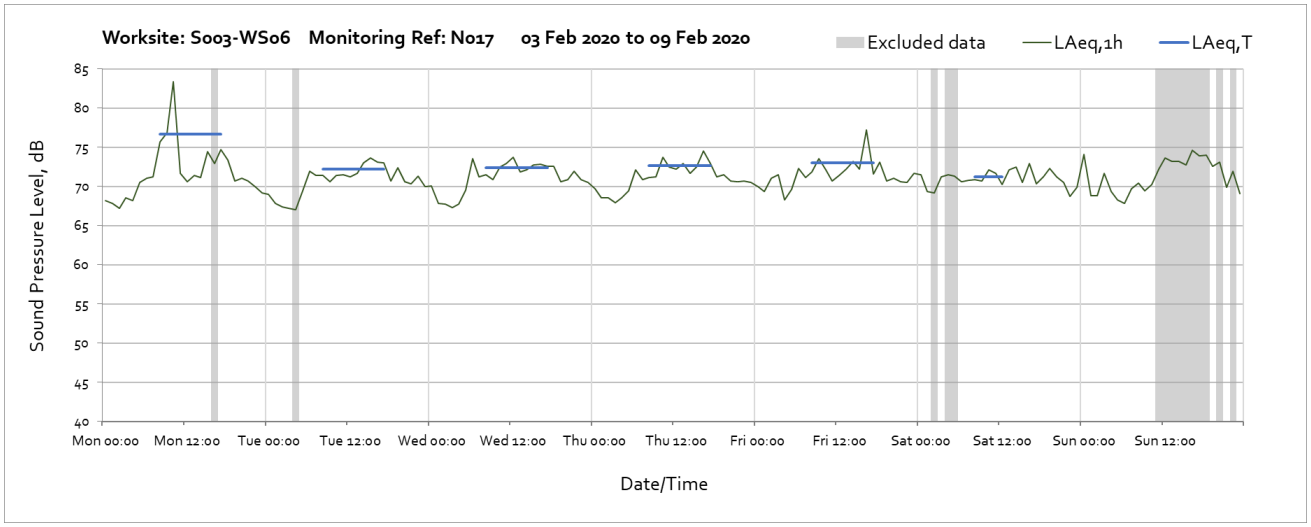






Worksite: S003-WS06 – Monitoring Ref: N017




Worksite: S003-WS06 Monitoring Ref: N017 03 Feb 2020 to 09 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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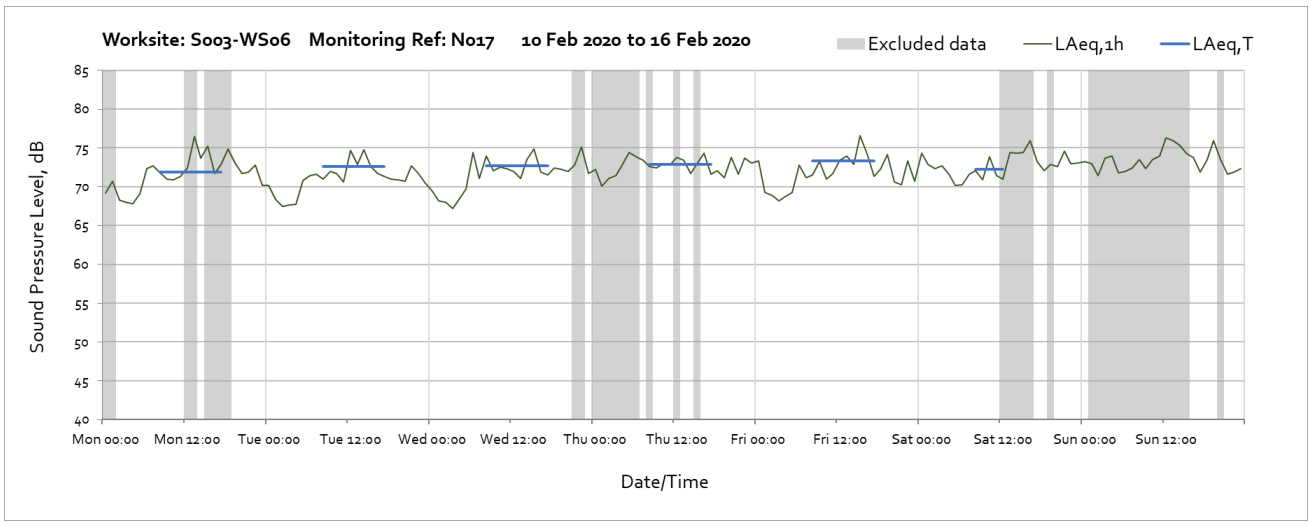
Date/Time


Worksite: S003-WS06 Monitoring Ref: N017 10 Feb 2020 to 16 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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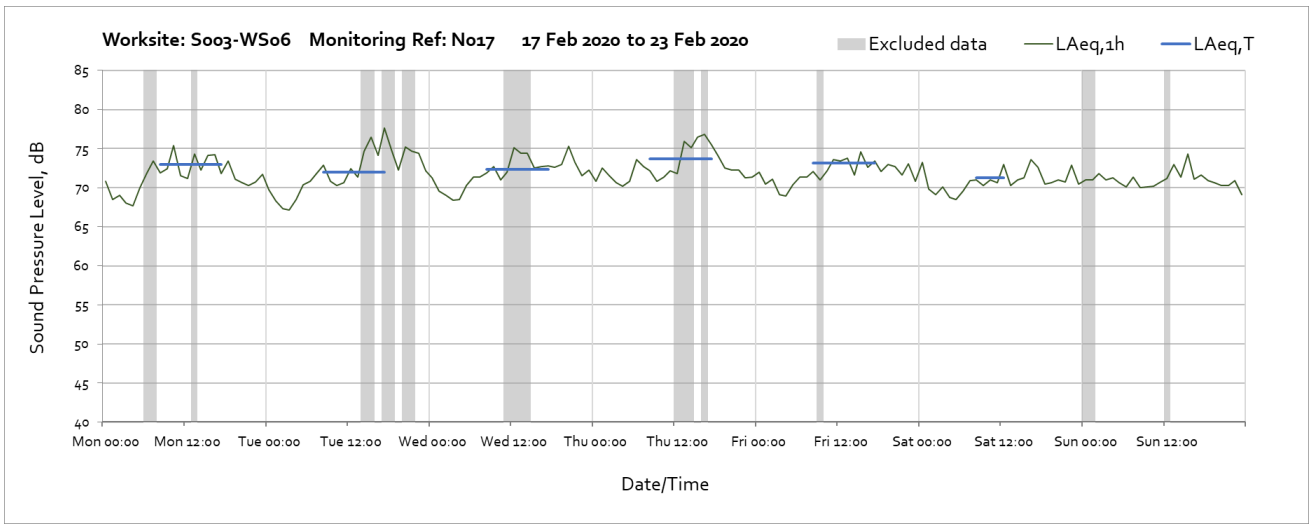
Date/Time


Worksite: S003-WS06 Monitoring Ref: N017 17 Feb 2020 to 23 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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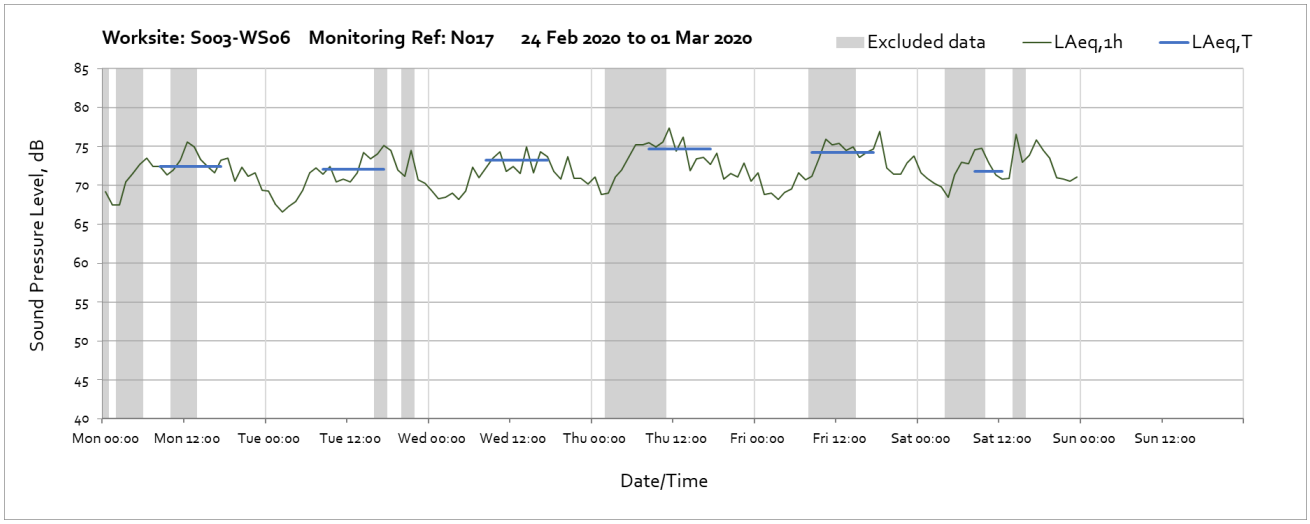
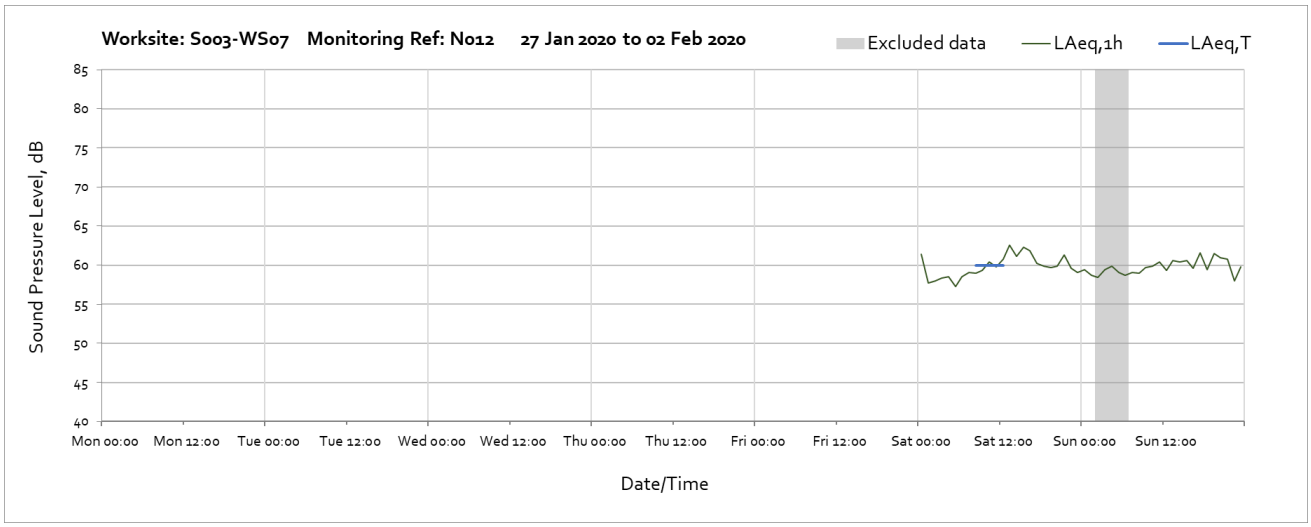
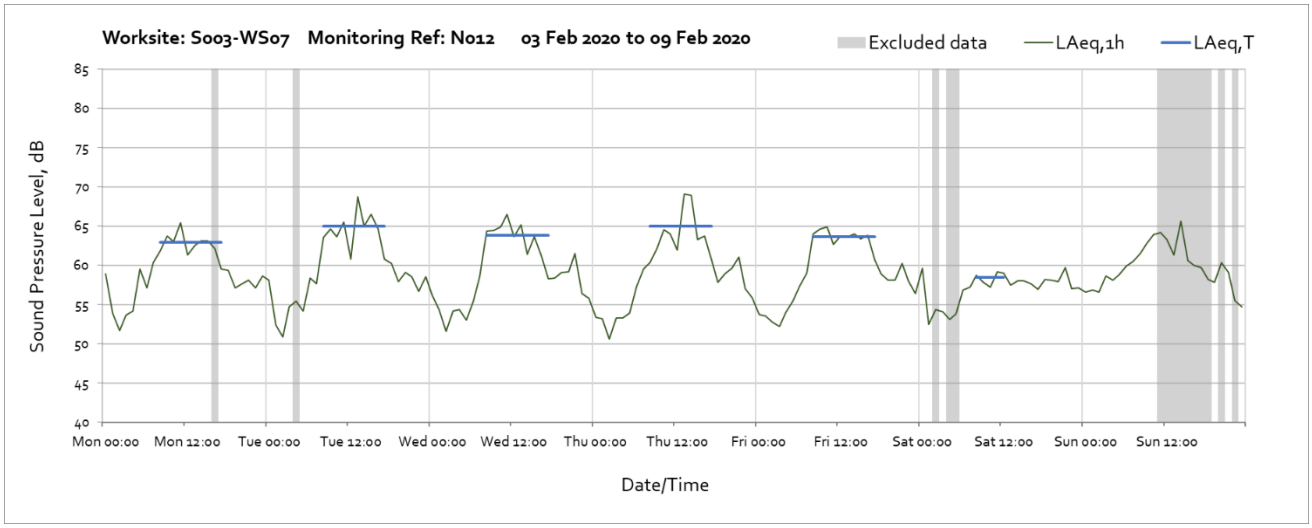
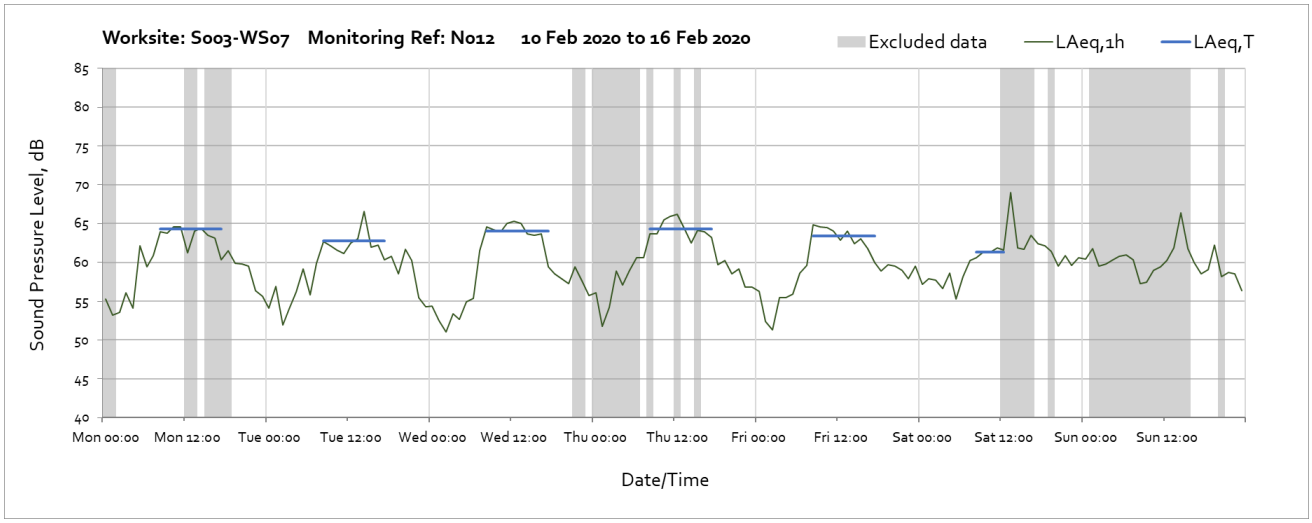
Date/Time



Worksite: S003-WS07 – Monitoring Ref: N012






Worksite: S003-WS07 Monitoring Ref: N012 10 Feb 2020 to 16 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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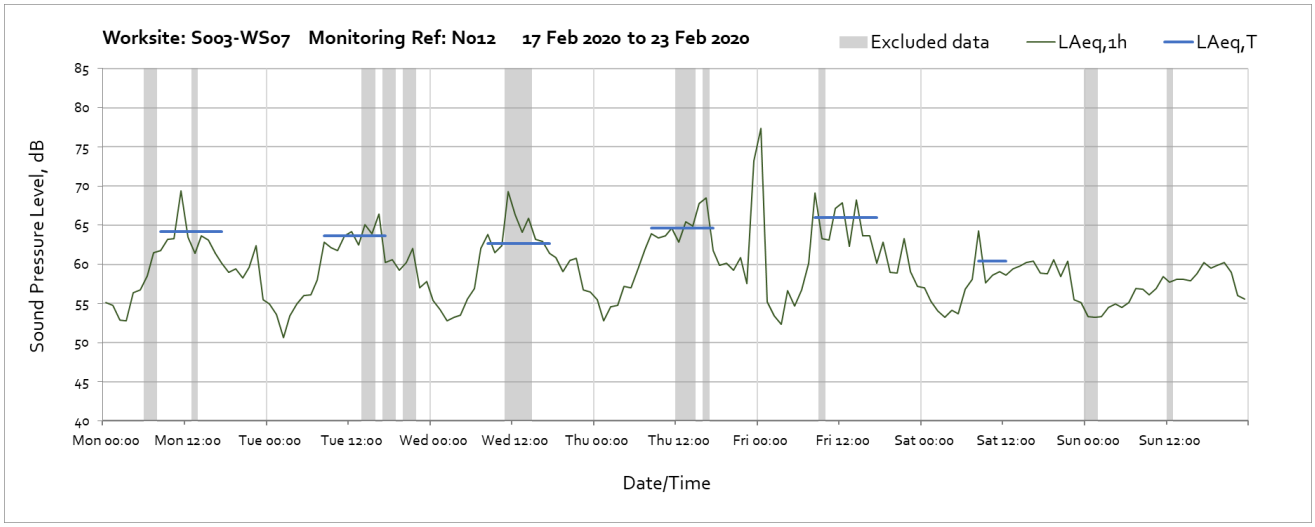
Date/Time


Worksite: S003-WS07 Monitoring Ref: N012 17 Feb 2020 to 23 Feb 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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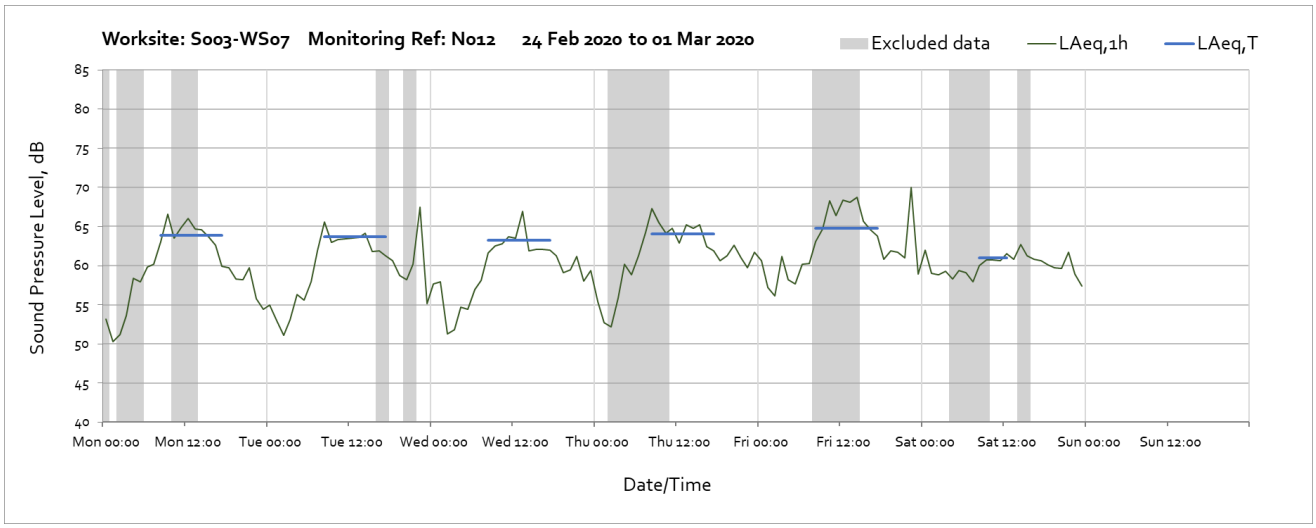
Date/Time


Worksite: S003-WS07 Monitoring Ref: N012 24 Feb 2020 to 01 Mar 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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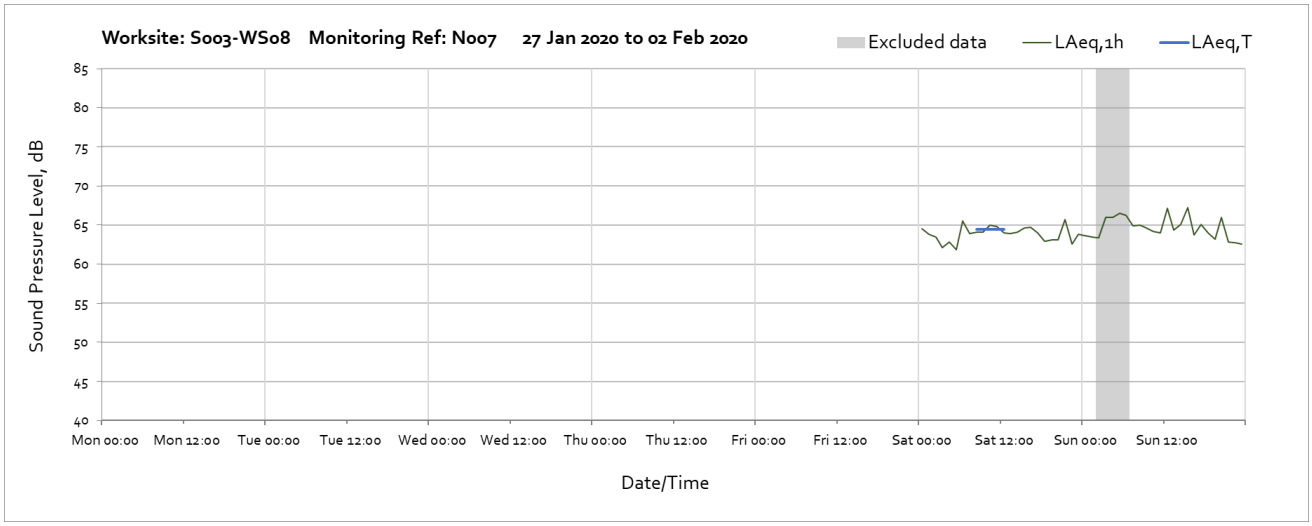
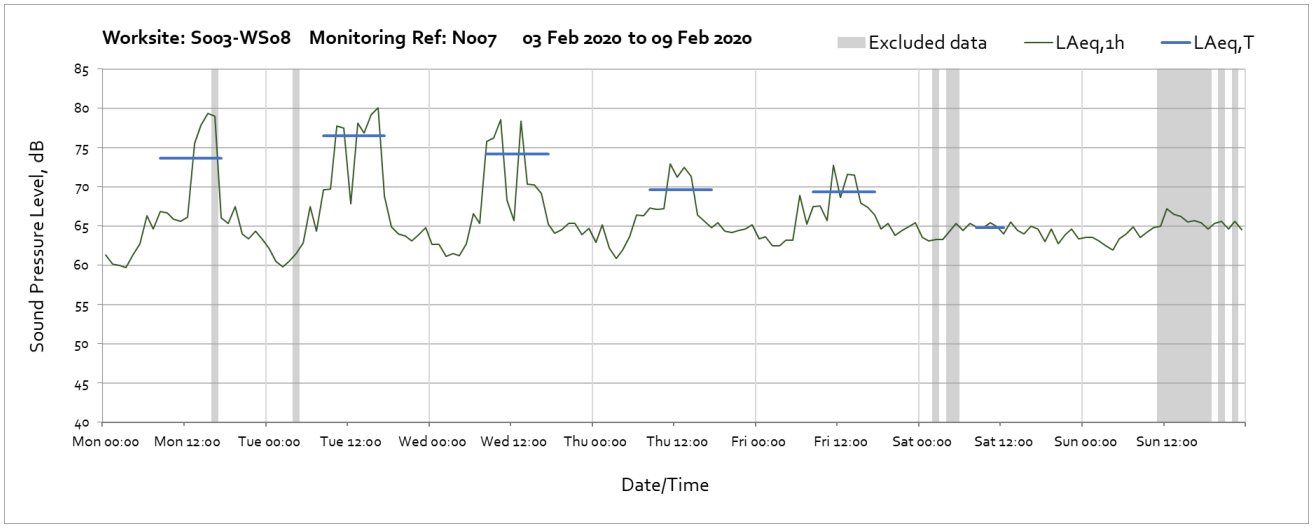
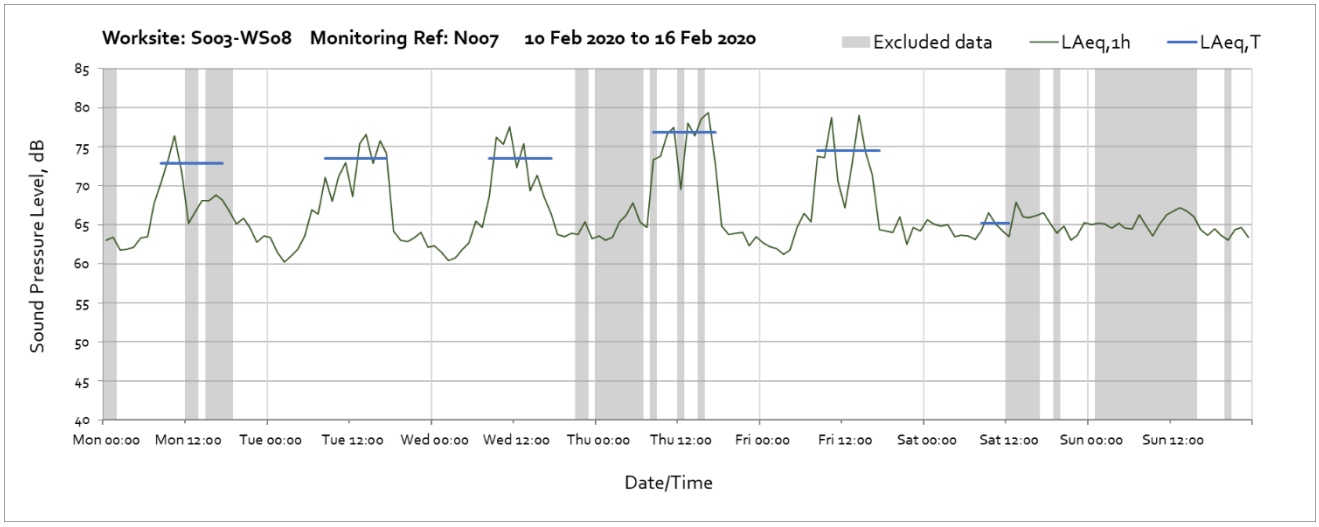
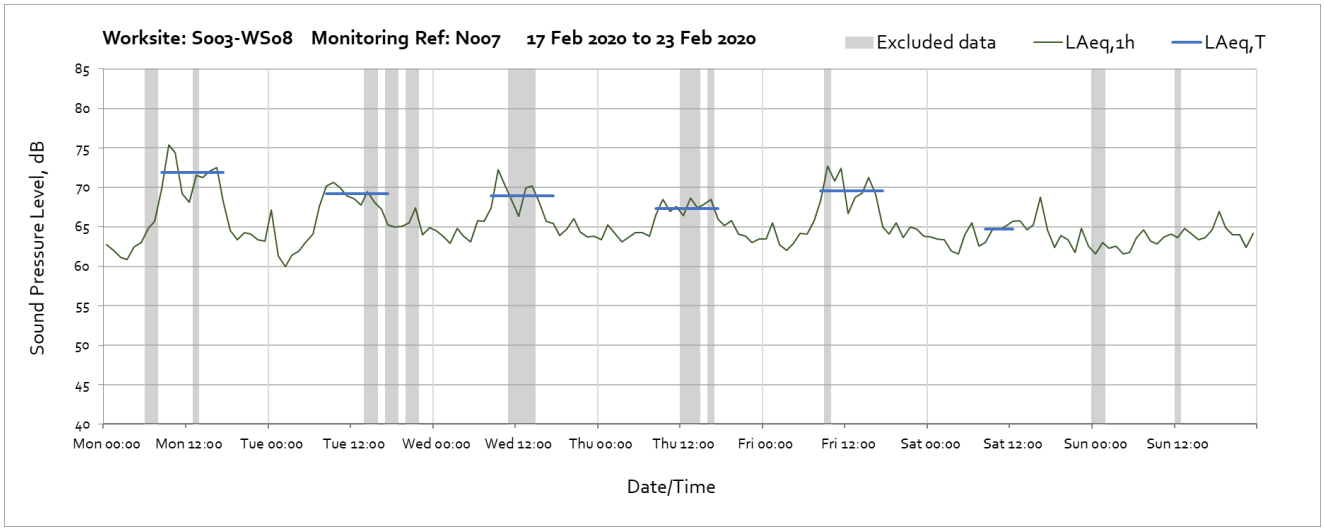
Date/Time

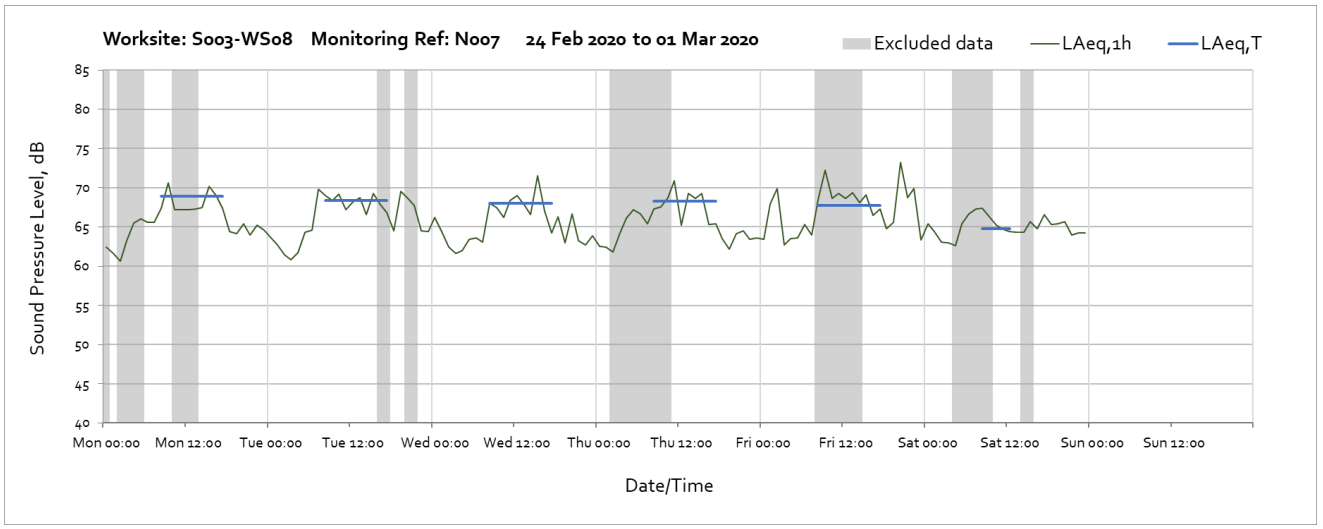
Worksite: S003-WS08 – Monitoring Ref: N007



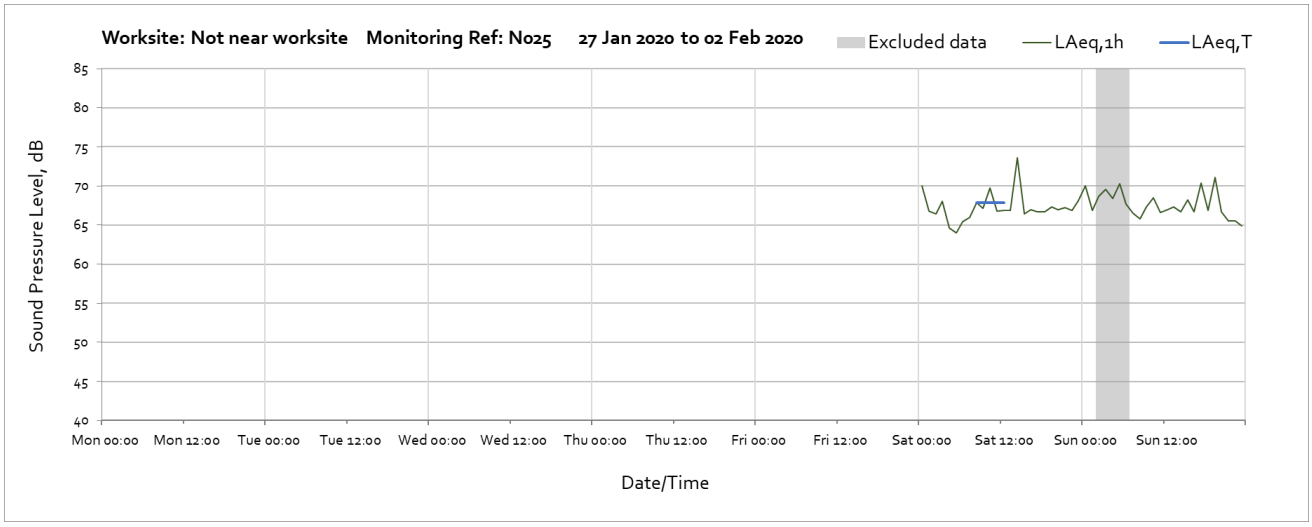


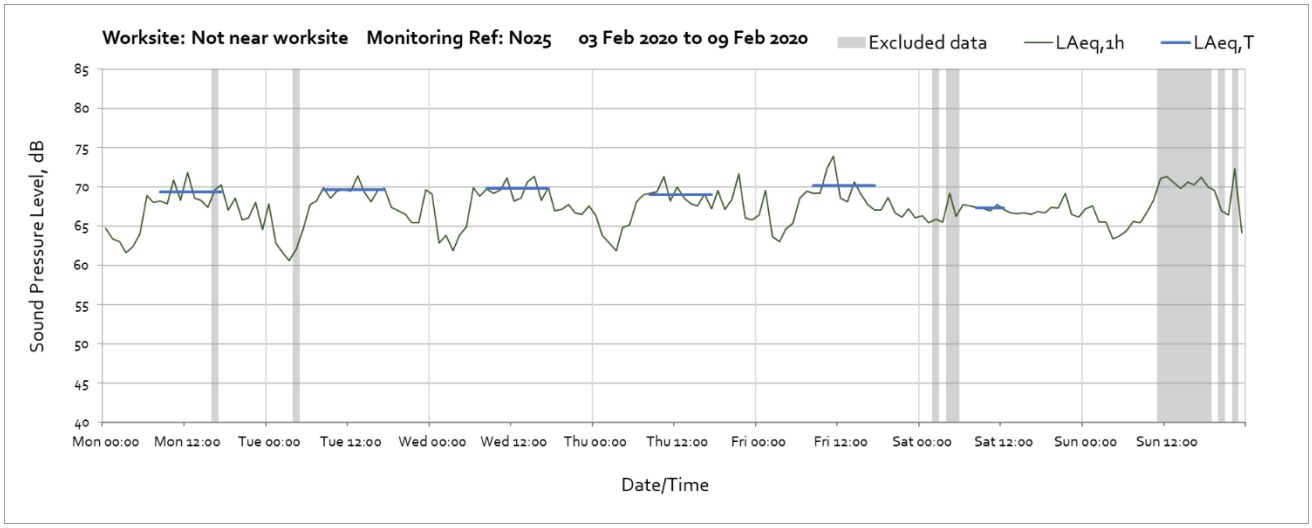






Monitoring Ref: N025




Worksite: Not near worksite Monitoring Ref: No25 03 Feb 2020 to 09 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
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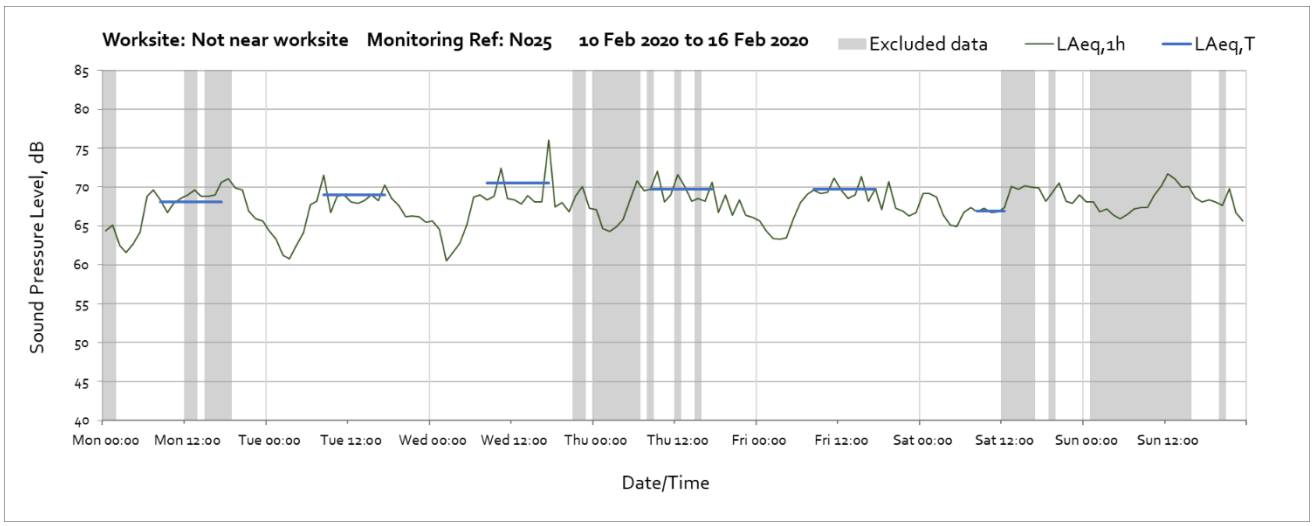
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: Not near worksite Monitoring Ref: No25 10 Feb 2020 to 16 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
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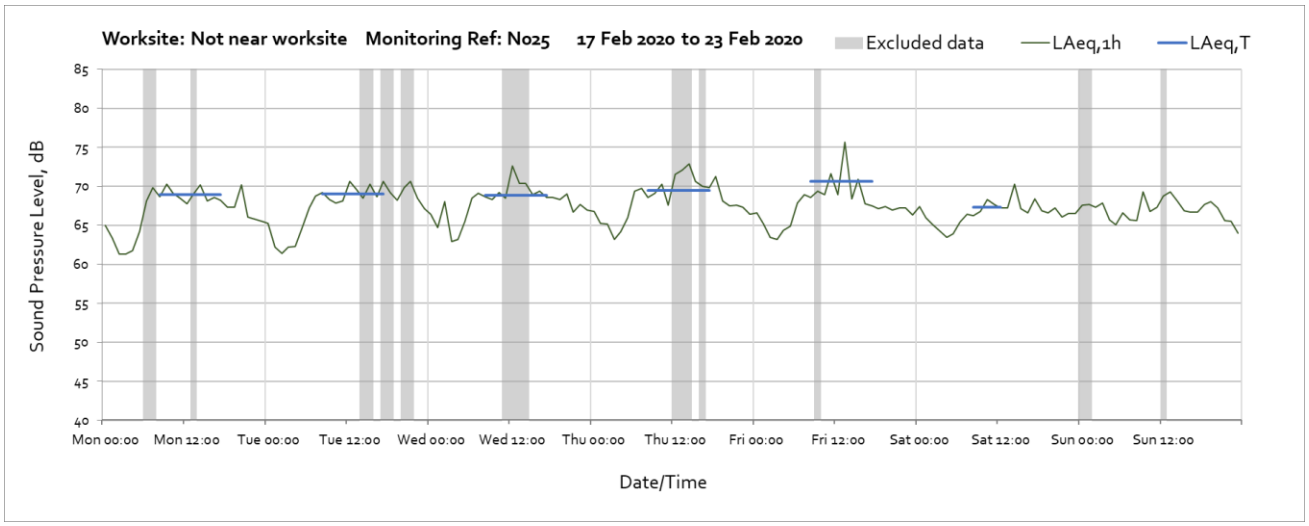
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: Not near worksite Monitoring Ref: No25 17 Feb 2020 to 23 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
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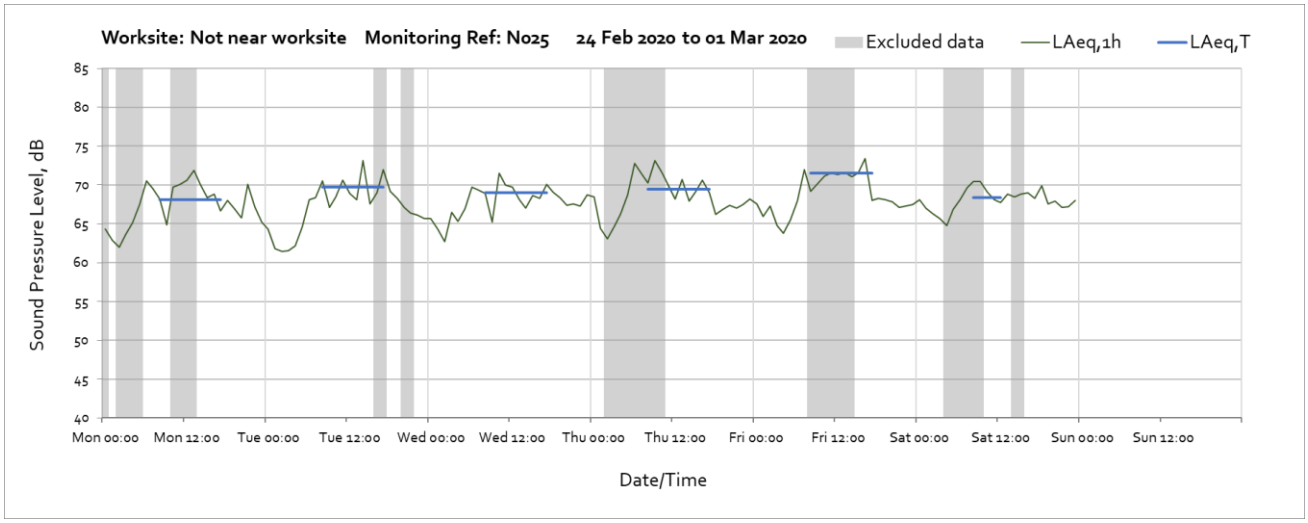
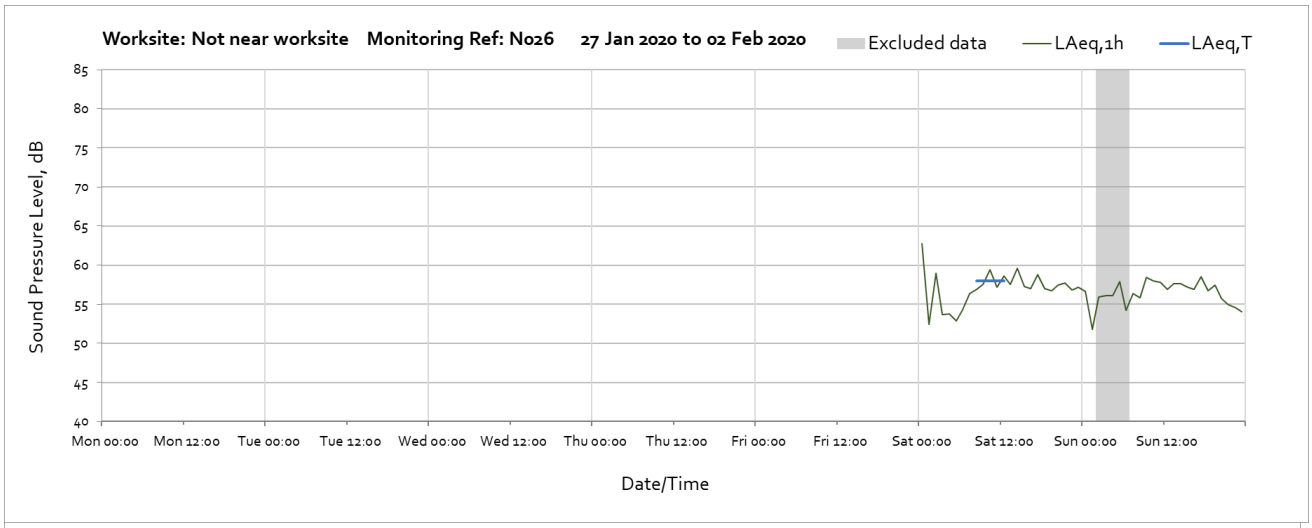
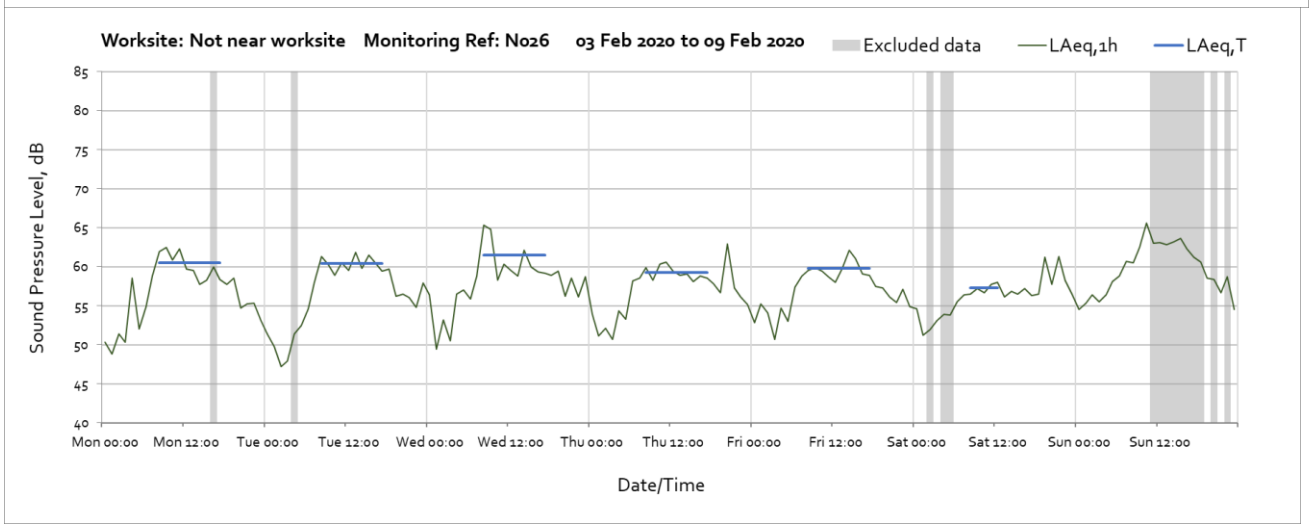
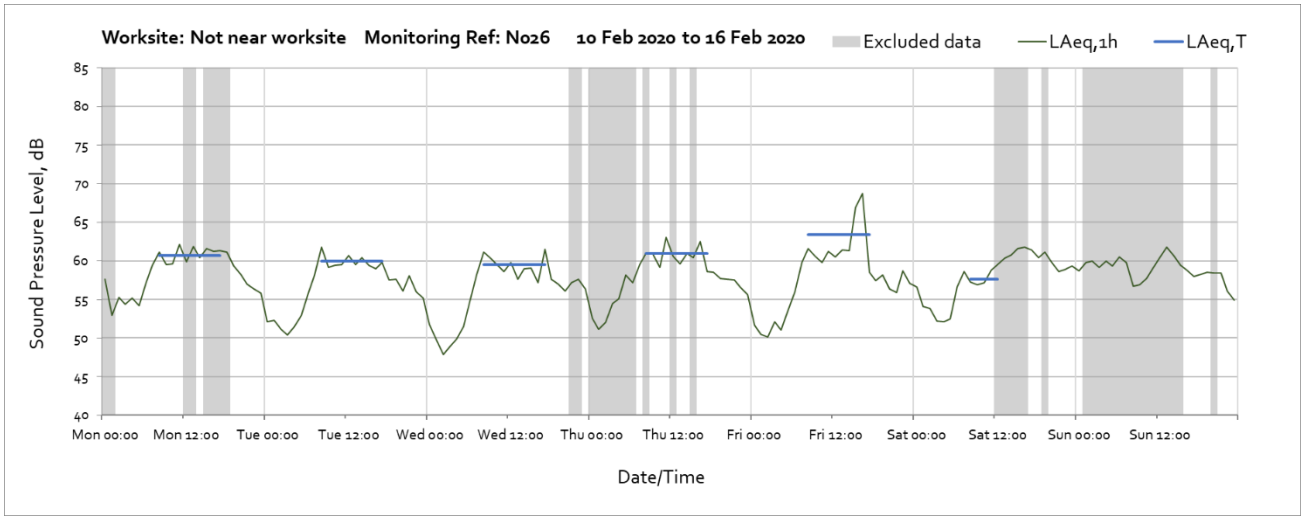
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

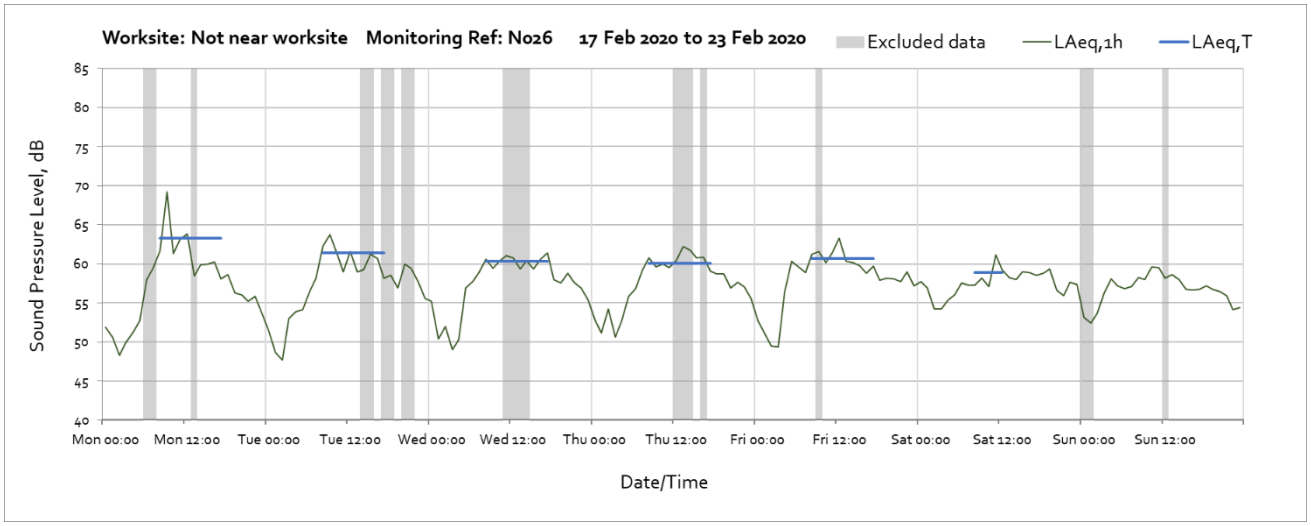


Monitoring Ref: N026






Worksite: Not near worksite Monitoring Ref: No26 10 Feb 2020 to 16 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: Not near worksite Monitoring Ref: No26 17 Feb 2020 to 23 Feb 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
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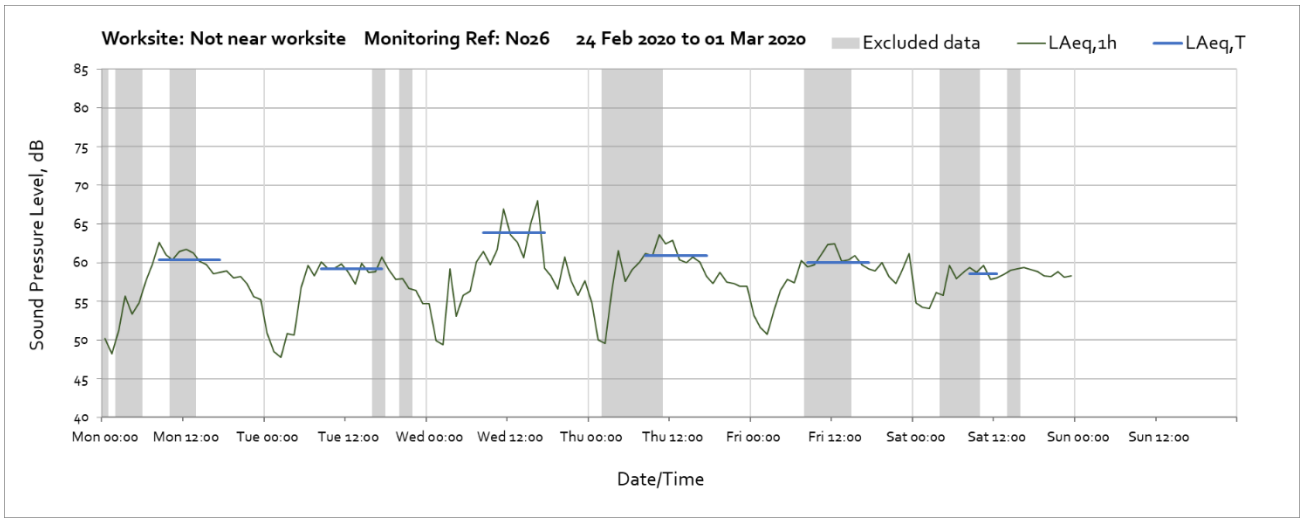
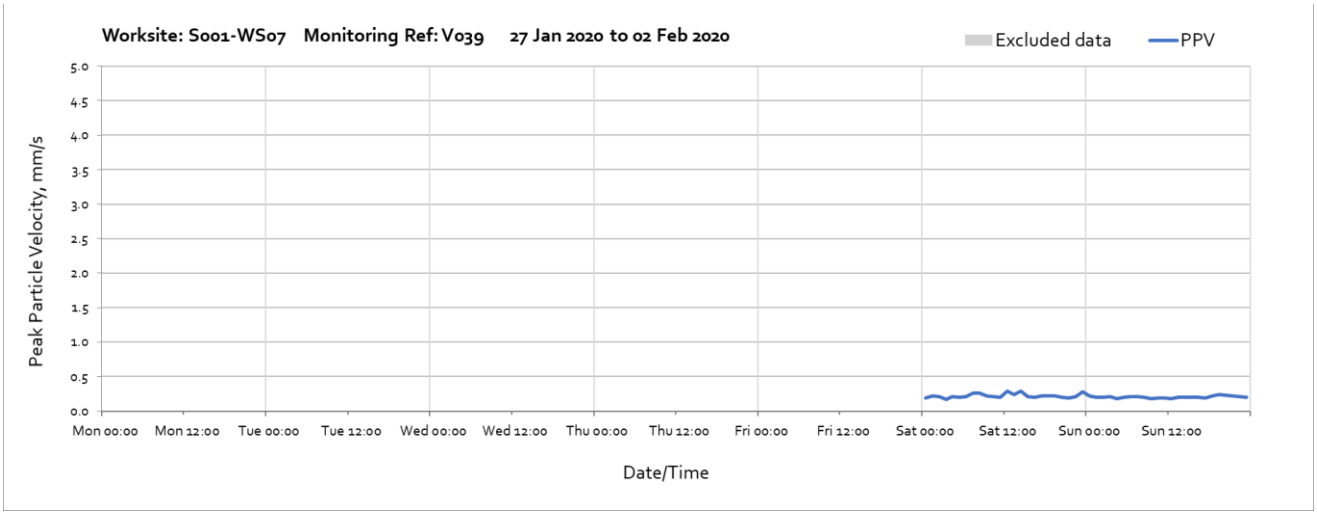
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

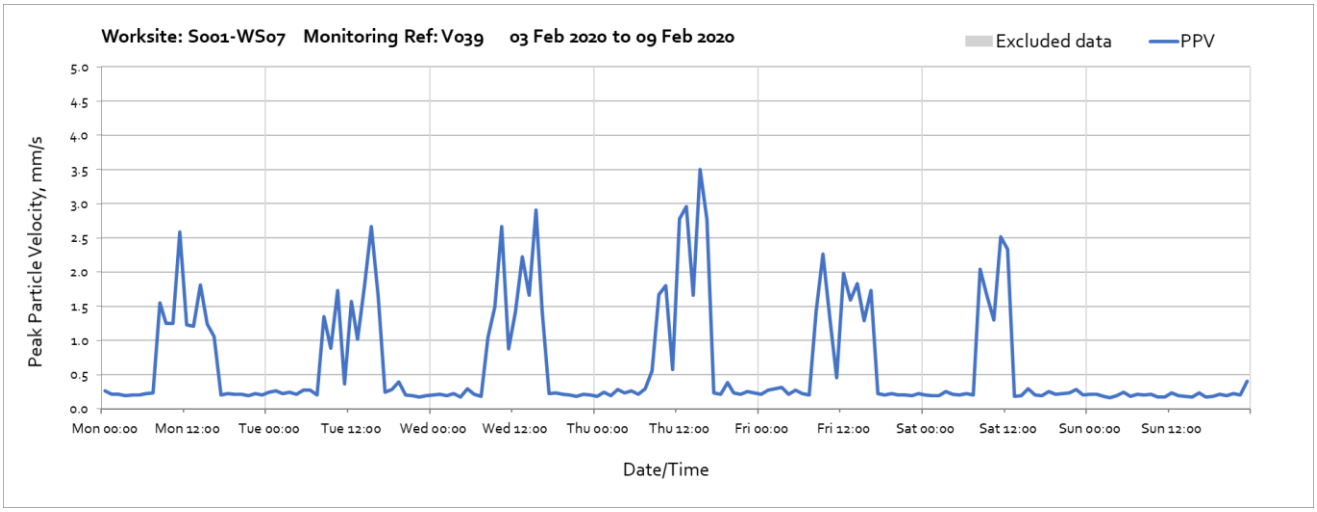

Worksite: Not near worksite Monitoring Ref: No26 24 Feb 2020 to 01 Mar 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

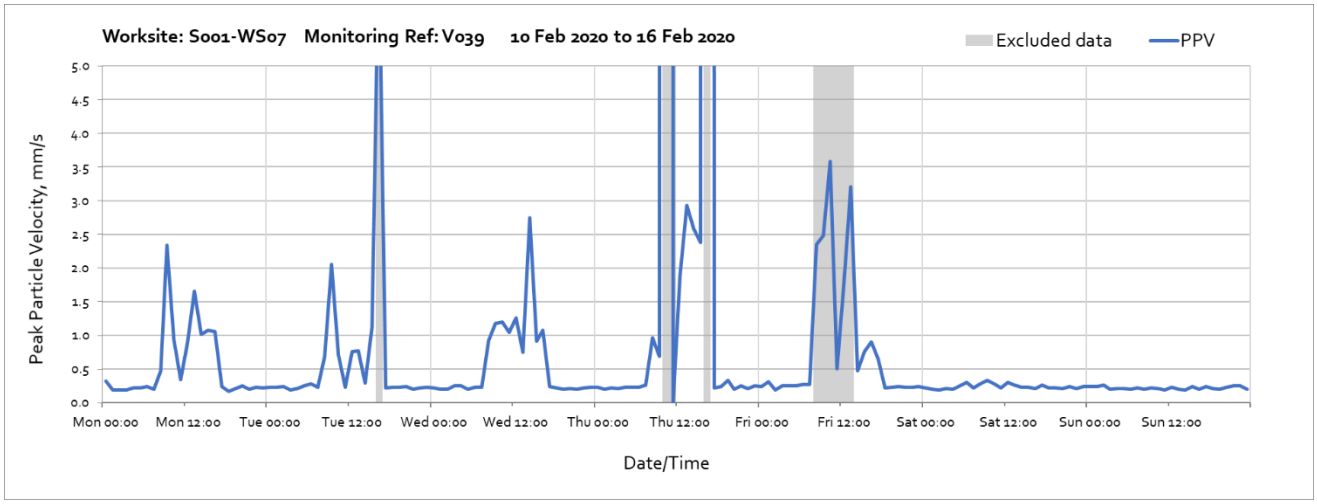
Vibration

The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the resultant PPV due to vibration components on three orthogonal axis x, y and z. High values of PPV were measured on occasions at locations V039 and V043. These were due to local interference with the vibration monitor and are not representative of HS2 construction works. These data entries have been greyed out in the following charts and have been excluded to calculate values in Table 6.

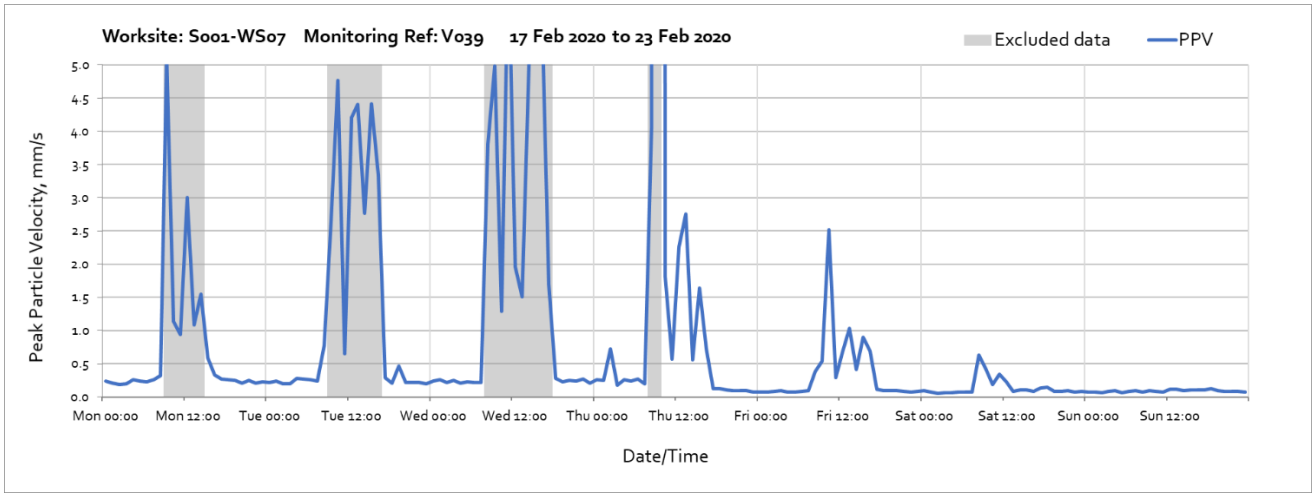
Worksite: S001-WS07 – Monitoring Ref: V039



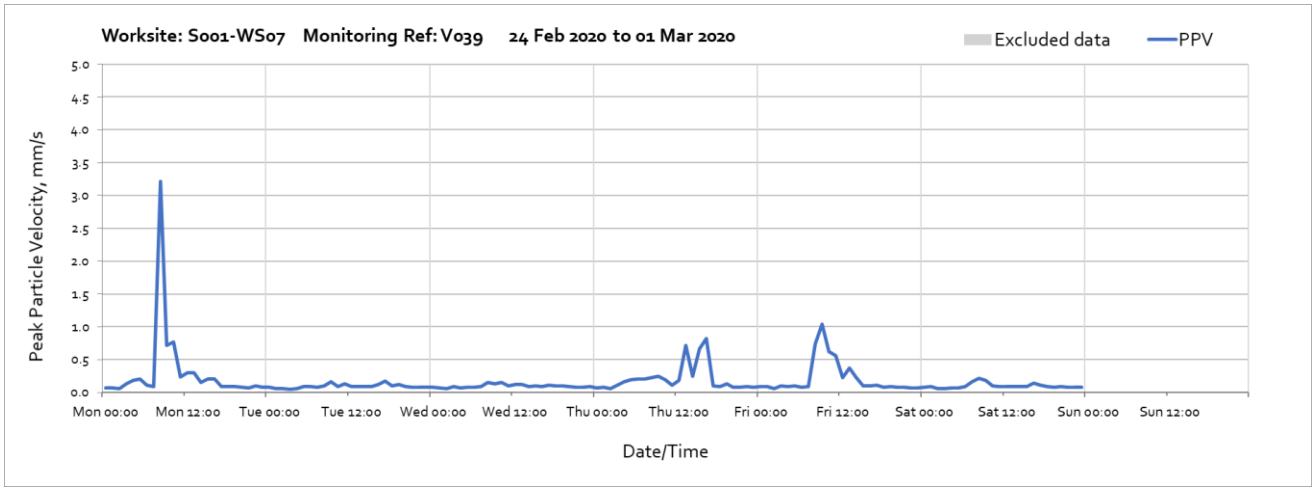




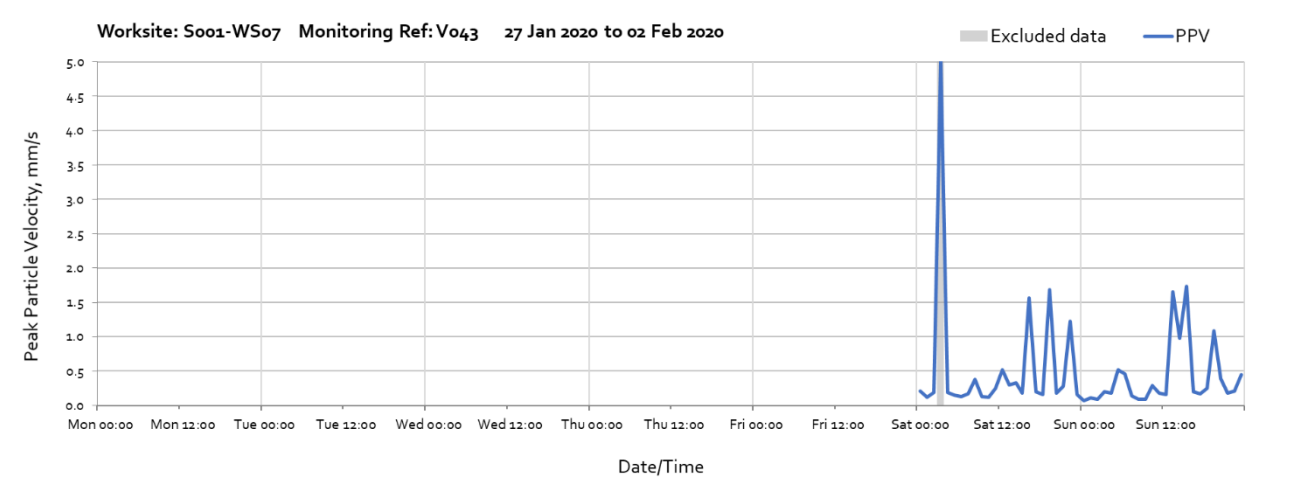
Note: High vibration levels measured at 16:00 on Tuesday 11th were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels. Logger maintenance was undertook between 09:00 and 16:00 on Thursday 13th which resulted in unrepresentative vibration levels. The logger was subseqeuntly temporarily moved to an unsuitable location, and resulted in unreliable vibration measurements until 09:00 on Thursday 20th.



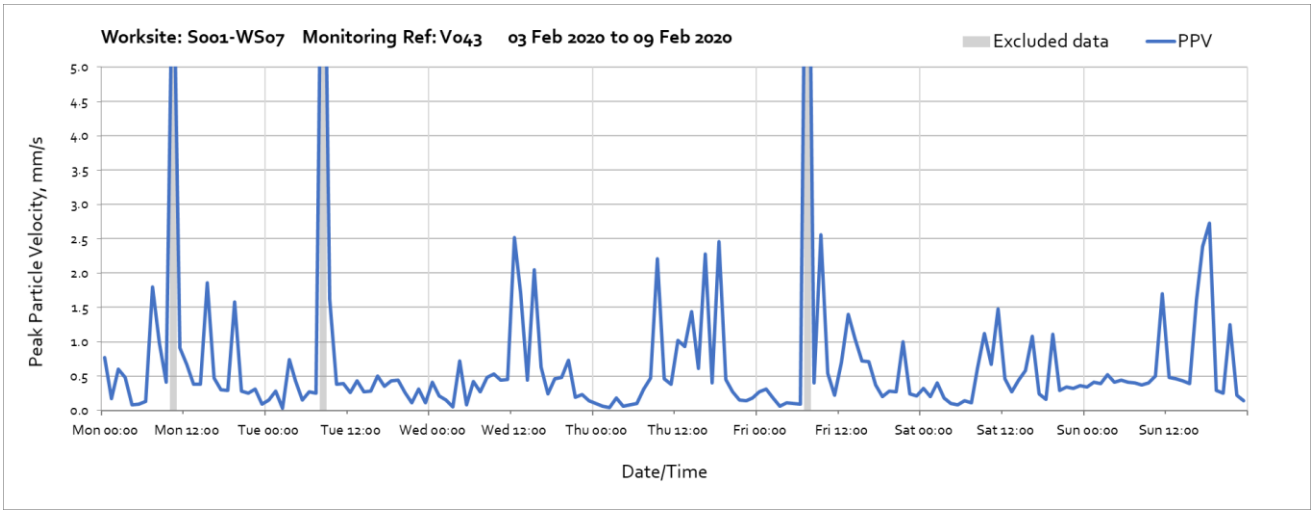
Note: The logger was temporarily moved to an unsuitable location and resulted in unreliable vibration measurements until 09:00 on Thursday 20th.



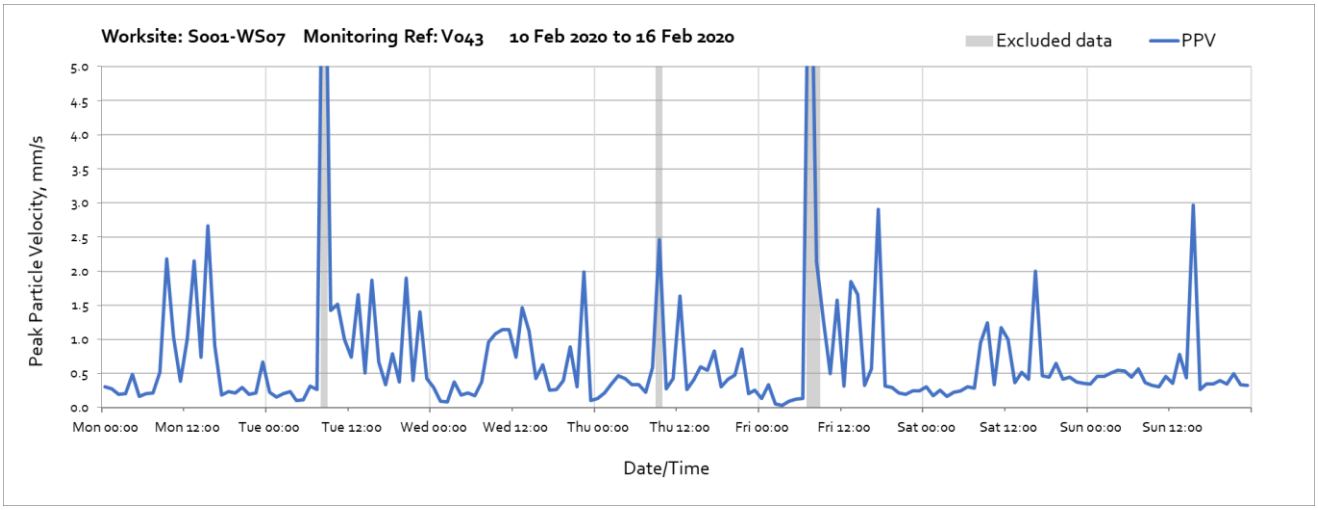
Worksite: S001-WS07 – Monitoring Ref: V043



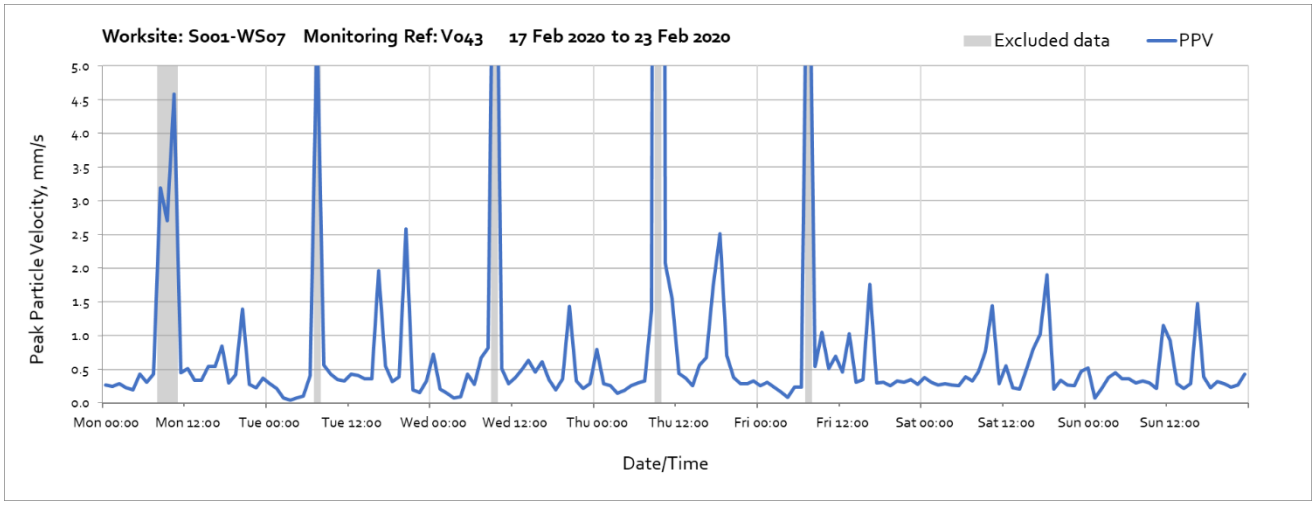
Note: High vibration levels measured at 03:00 on Saturday 1st were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.



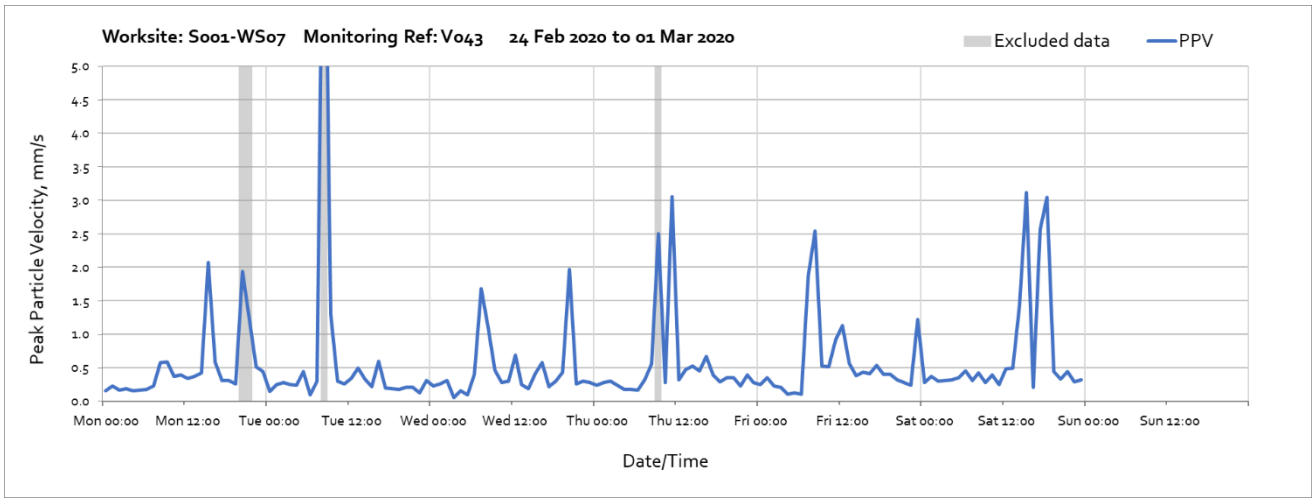
Note: High vibration levels throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.



Note: High vibration levels throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.

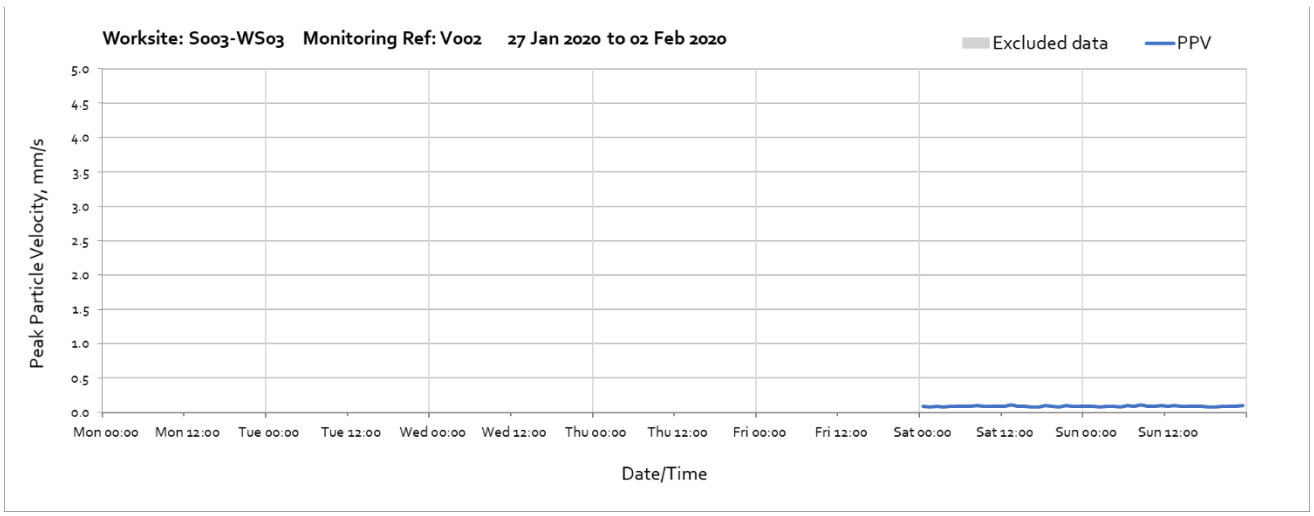


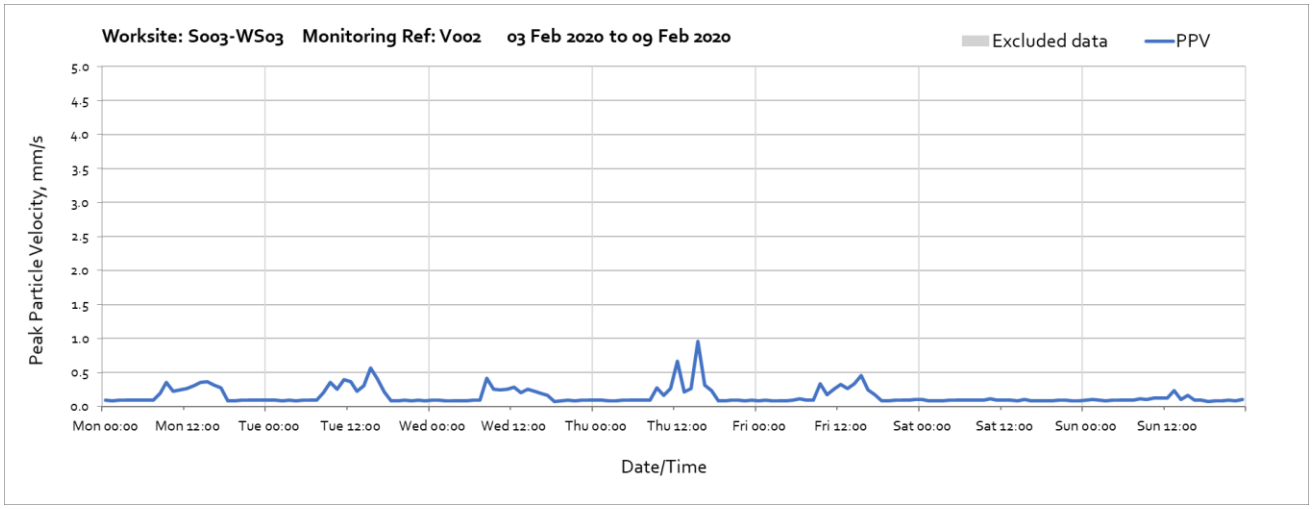
Note: High vibration levels throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.

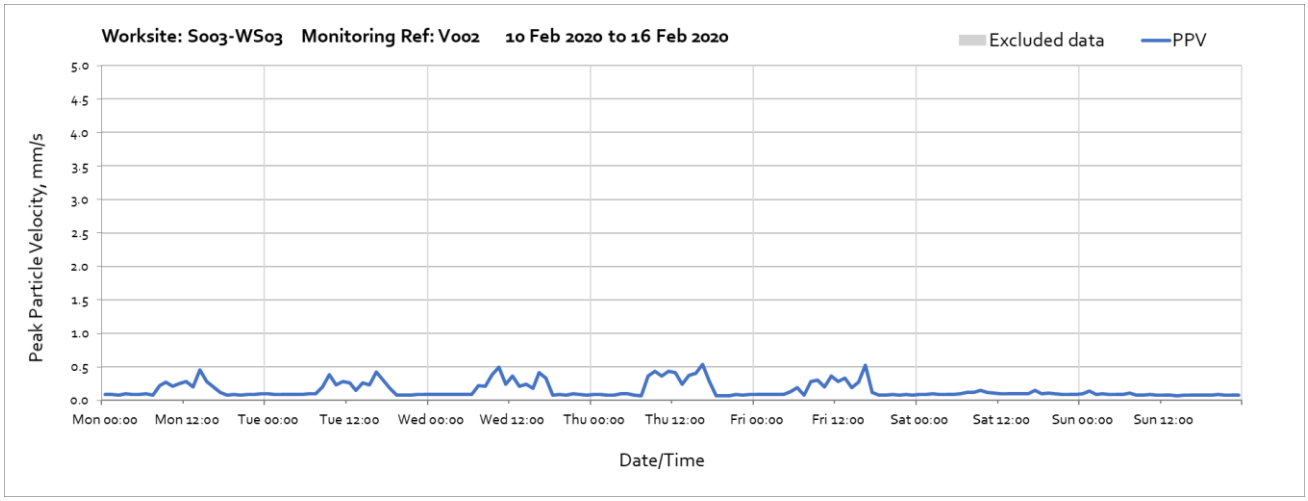


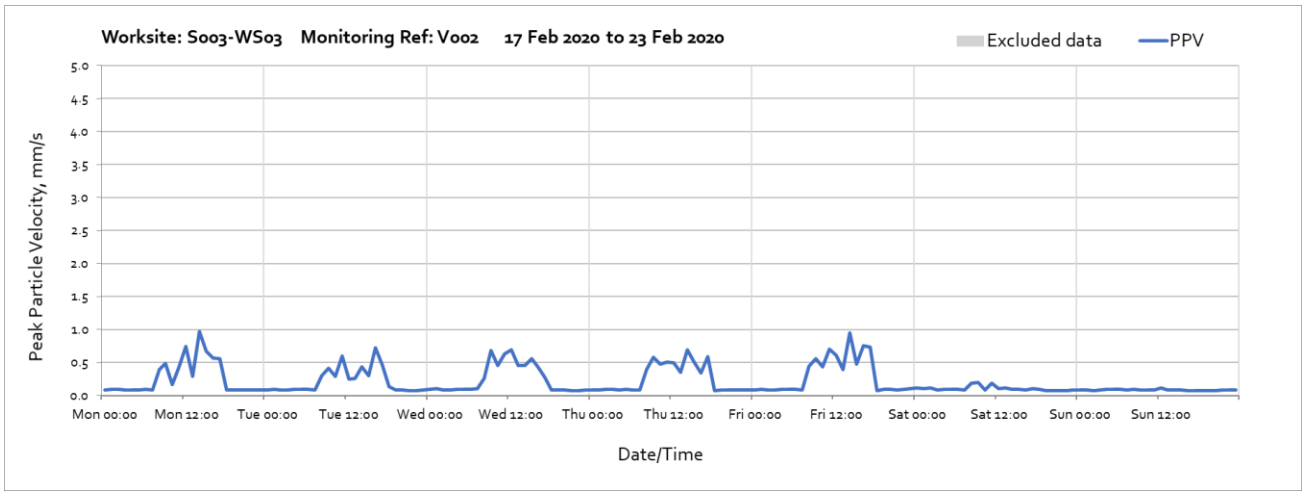
Note: High vibration levels throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.

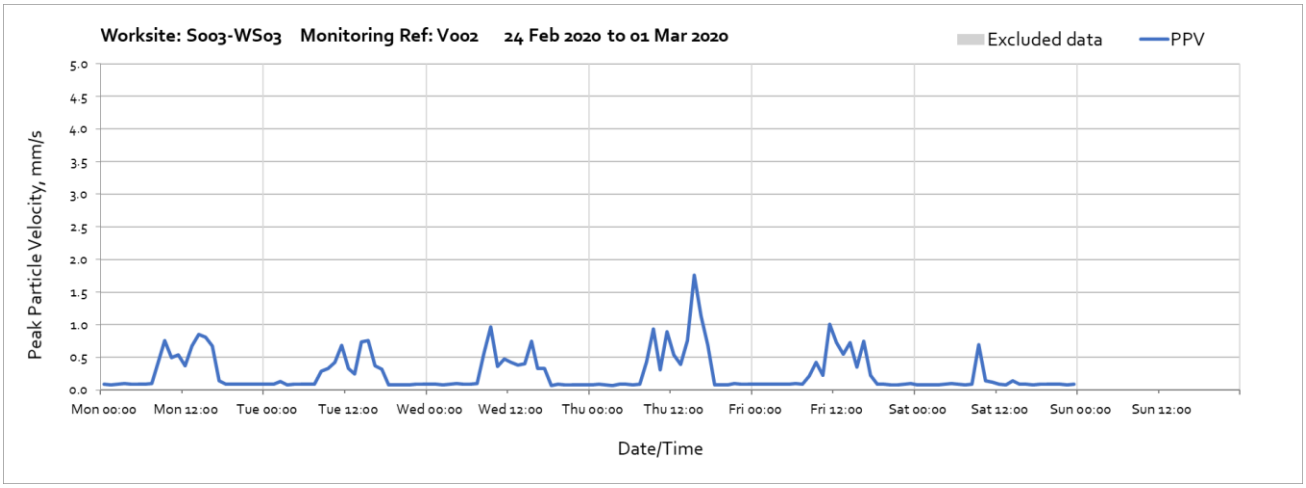
Worksite: S003-WS03 – Monitoring Ref: V002



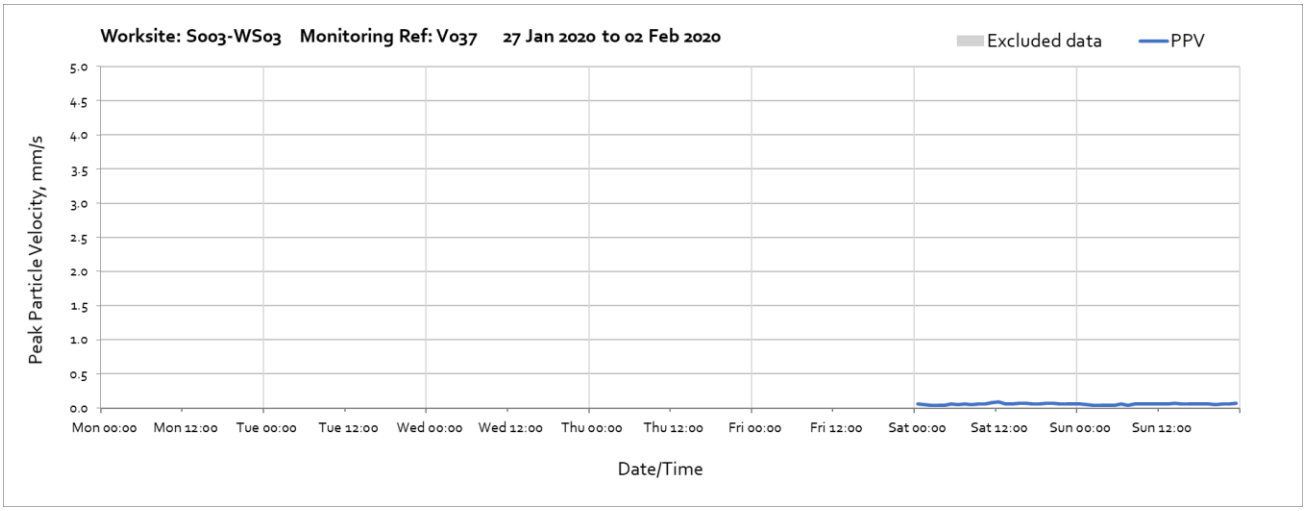

Worksite: S003-WS03 Monitoring Ref: V002 03 Feb 2020 to 09 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

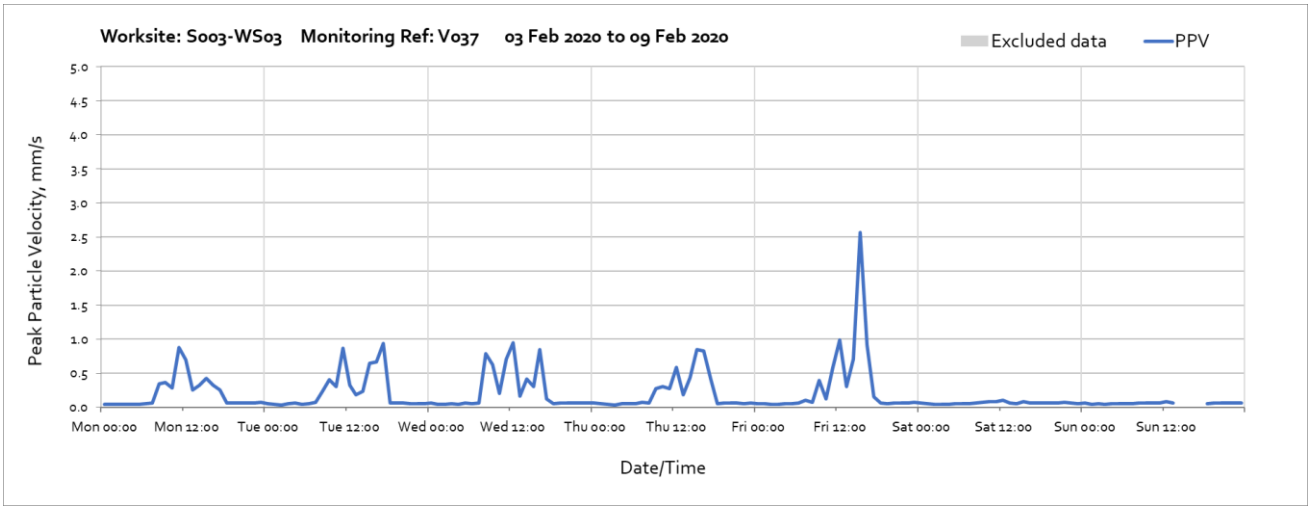

Worksite: S003-WS03 Monitoring Ref: V002 10 Feb 2020 to 16 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: S003-WS03 Monitoring Ref: V002 17 Feb 2020 to 23 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

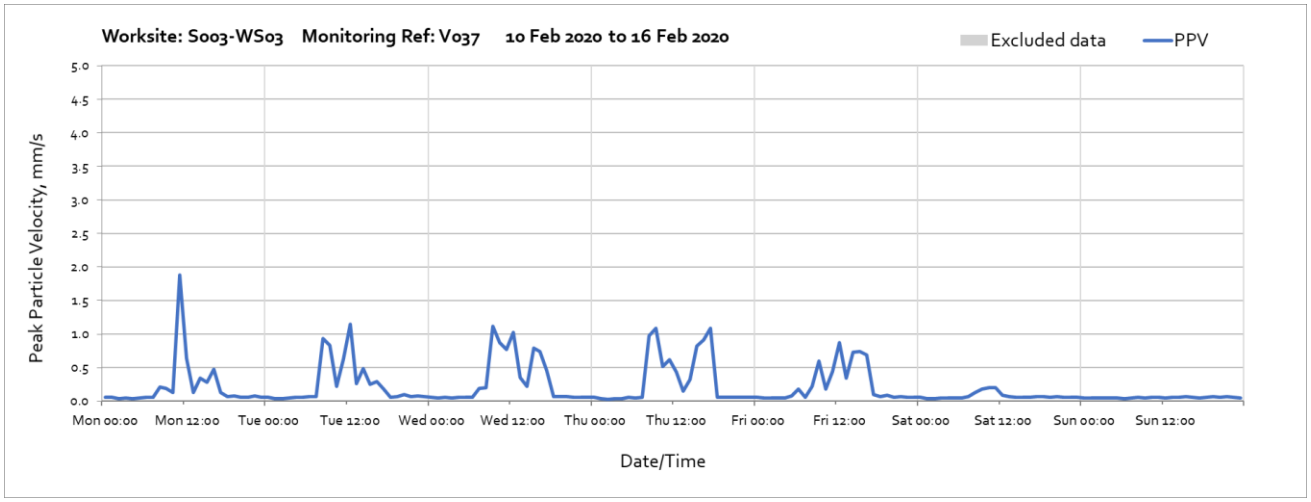


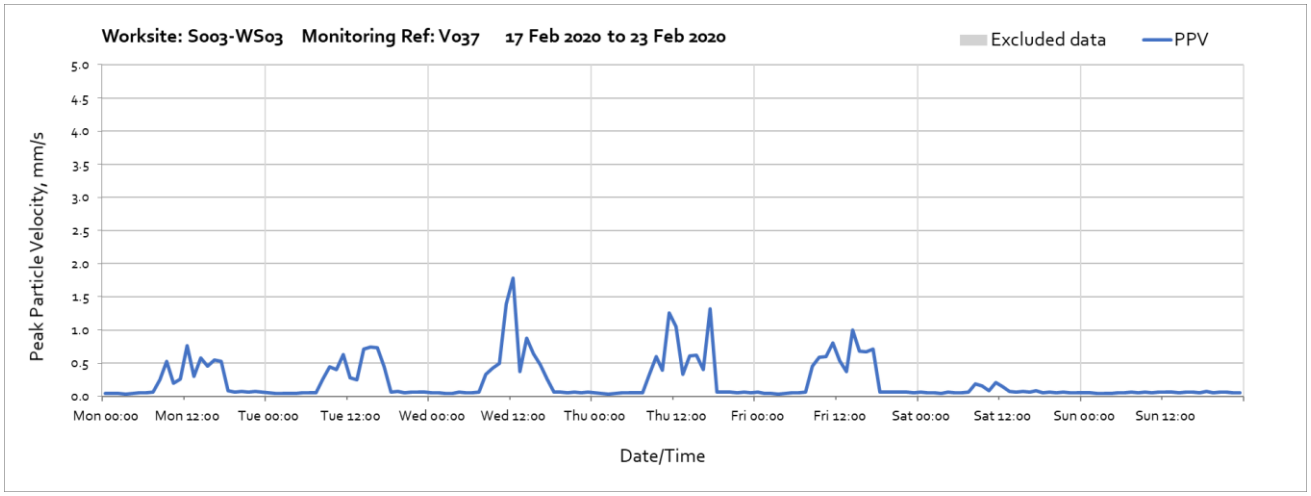
Worksite: S003-WS03 – Monitoring Ref: V037

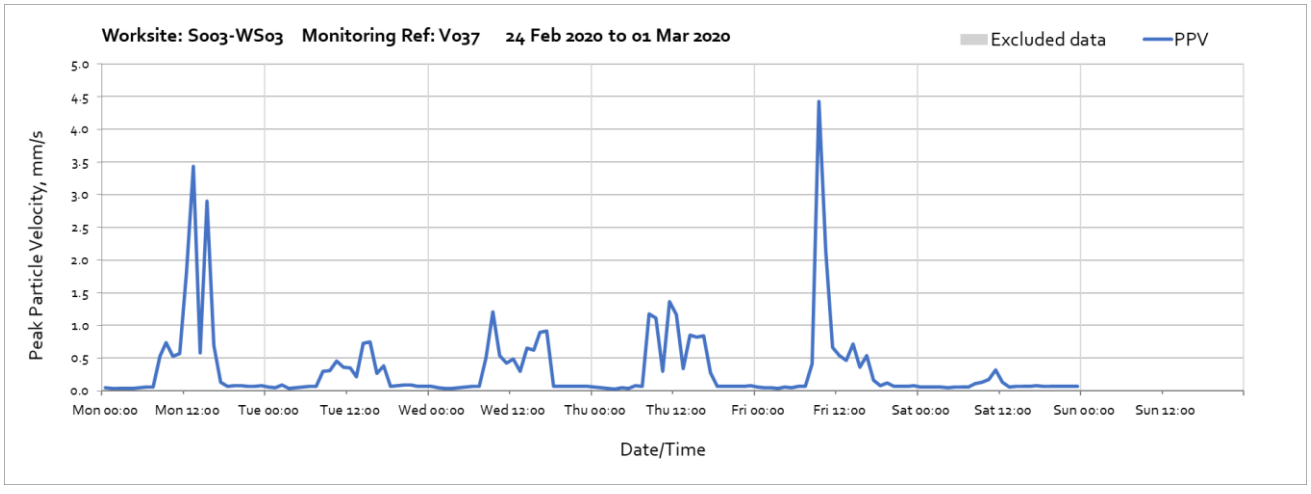




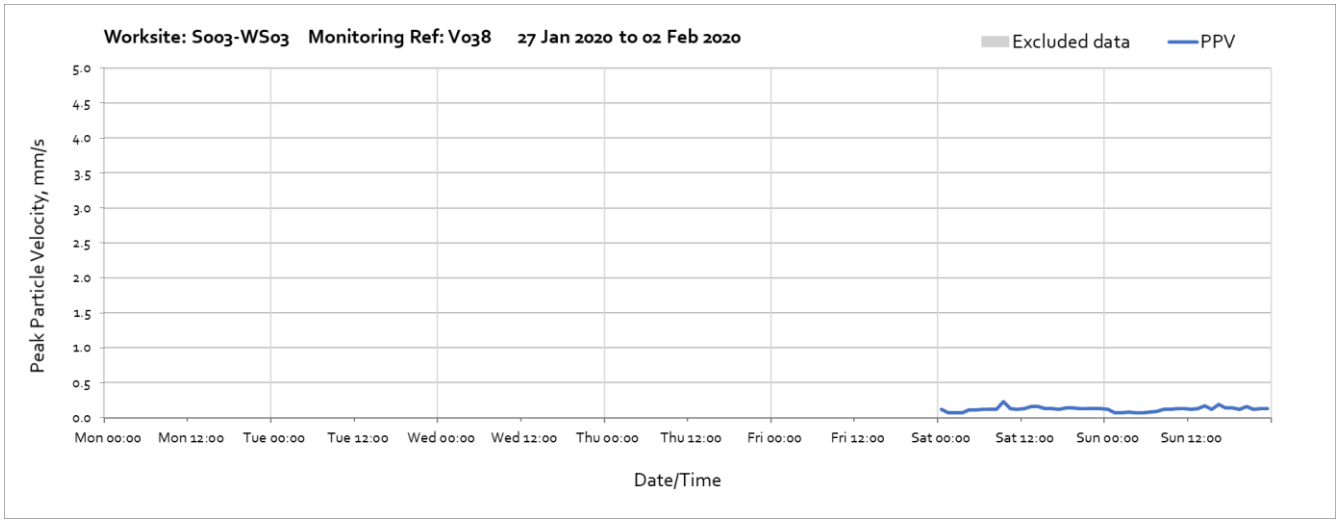
Note: Missing data from 14:00 until 18:00 on Sunday 9th was due to the maintenance and battery replacement of the vibration logger.

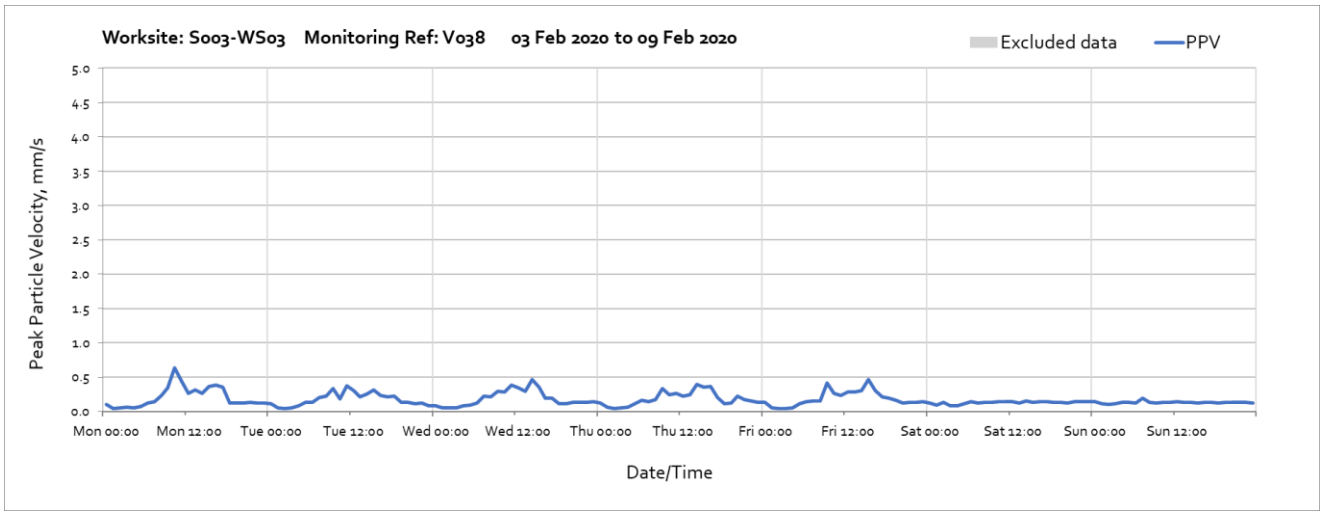

Worksite: S003-WS03 Monitoring Ref: V037 10 Feb 2020 to 16 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

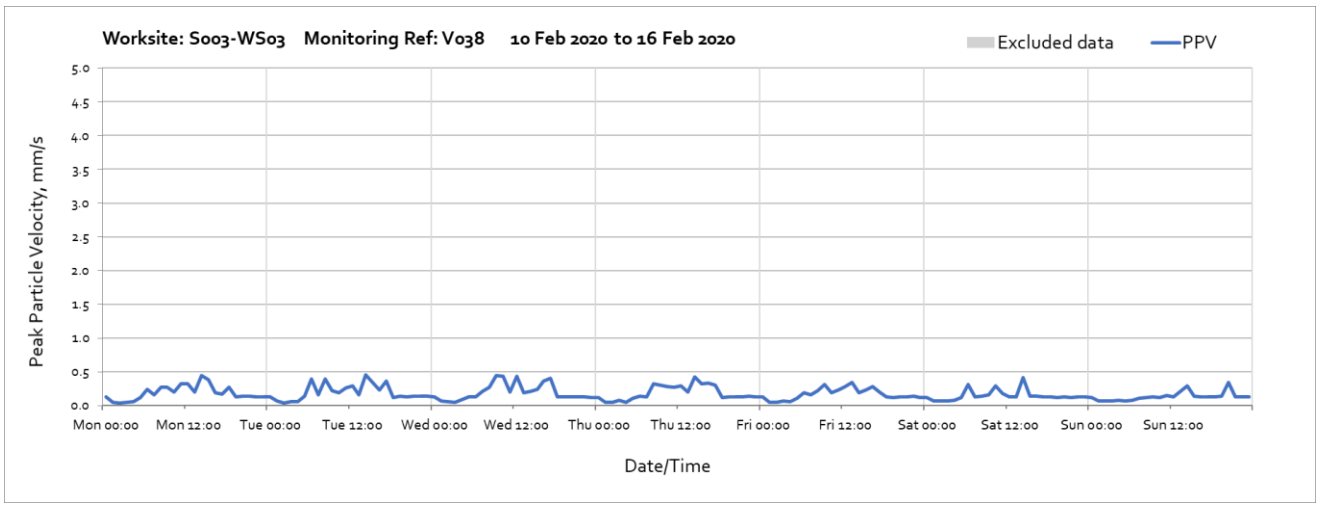

Worksite: S003-WS03 Monitoring Ref: V037 17 Feb 2020 to 23 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

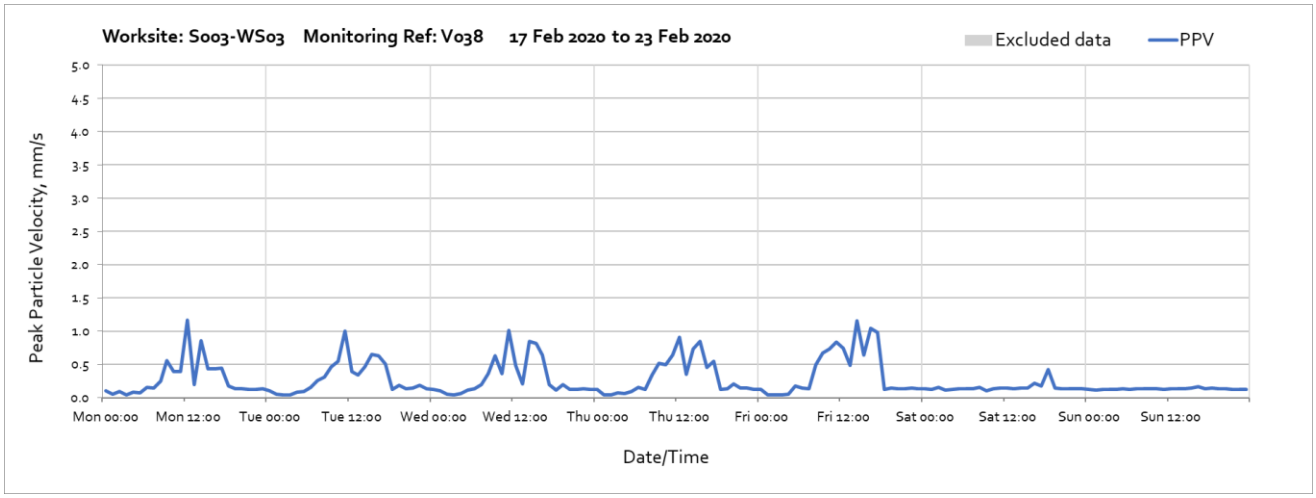

Worksite: S003-WS03 Monitoring Ref: V037 24 Feb 2020 to 01 Mar 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

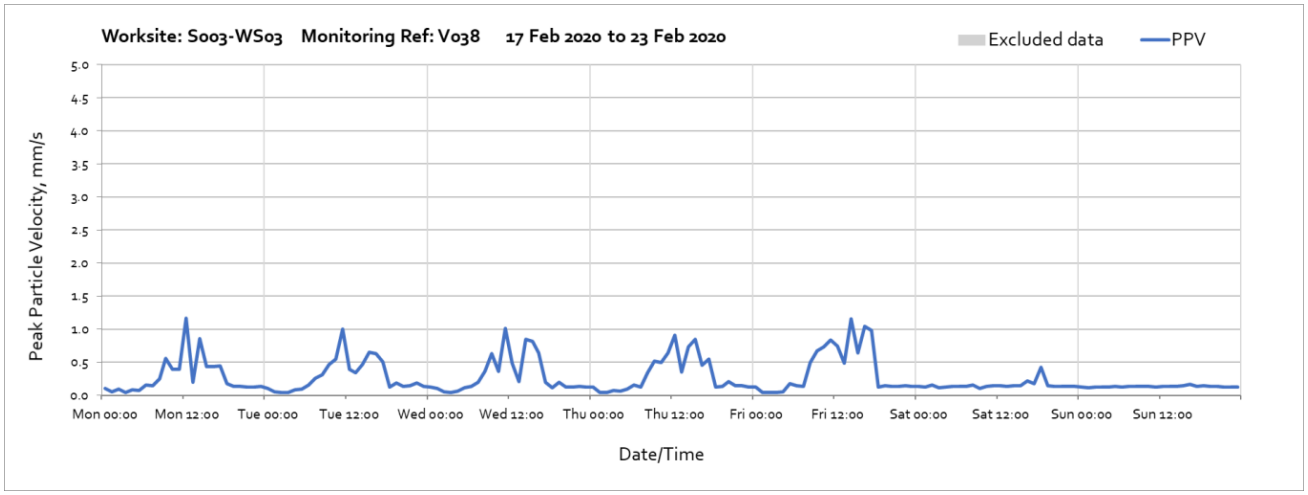
Worksite: S003-WS03 – Monitoring Ref: V038

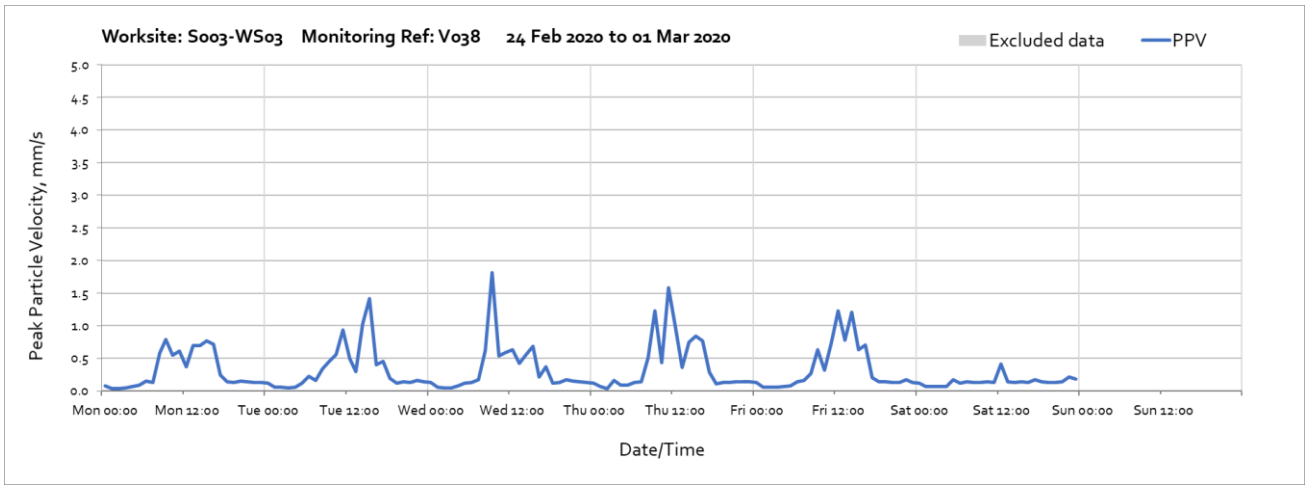




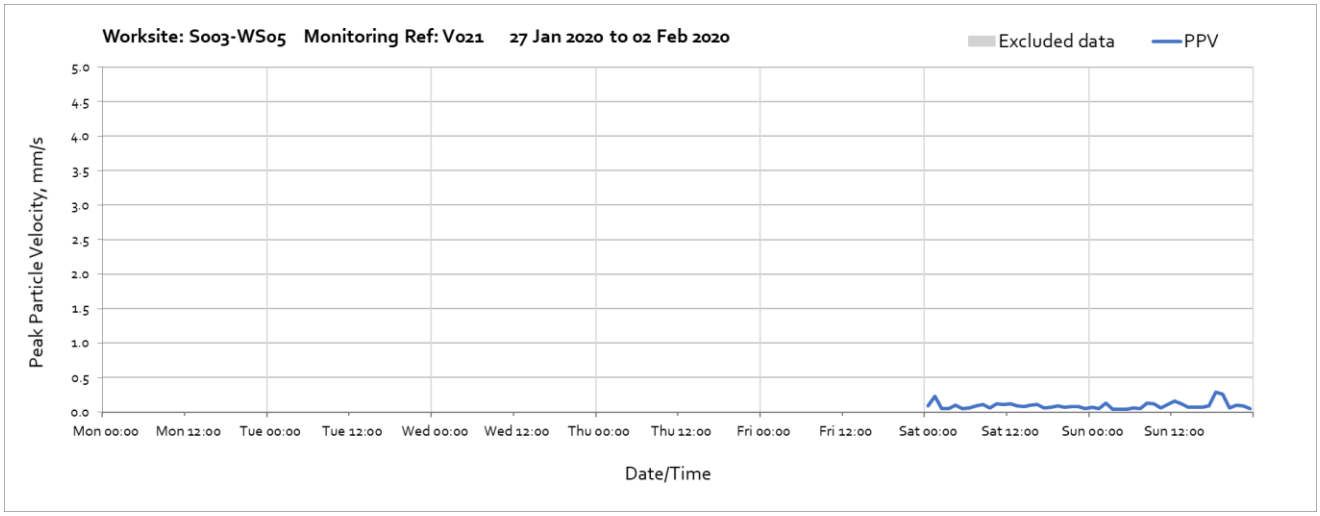


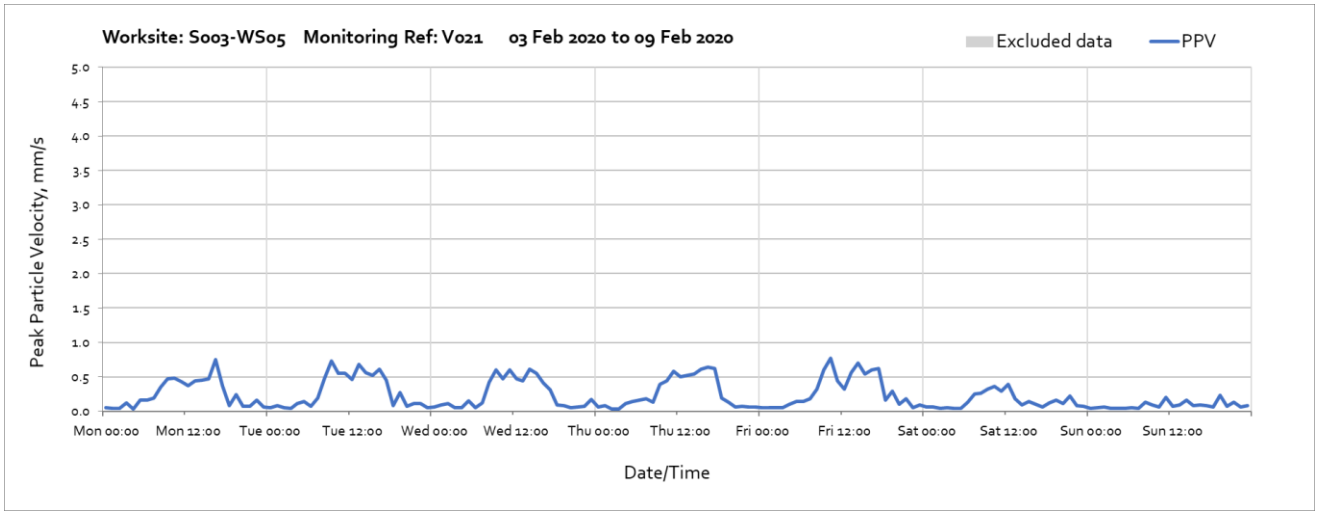

Worksite: S003-WS03 Monitoring Ref: V038 17 Feb 2020 to 23 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

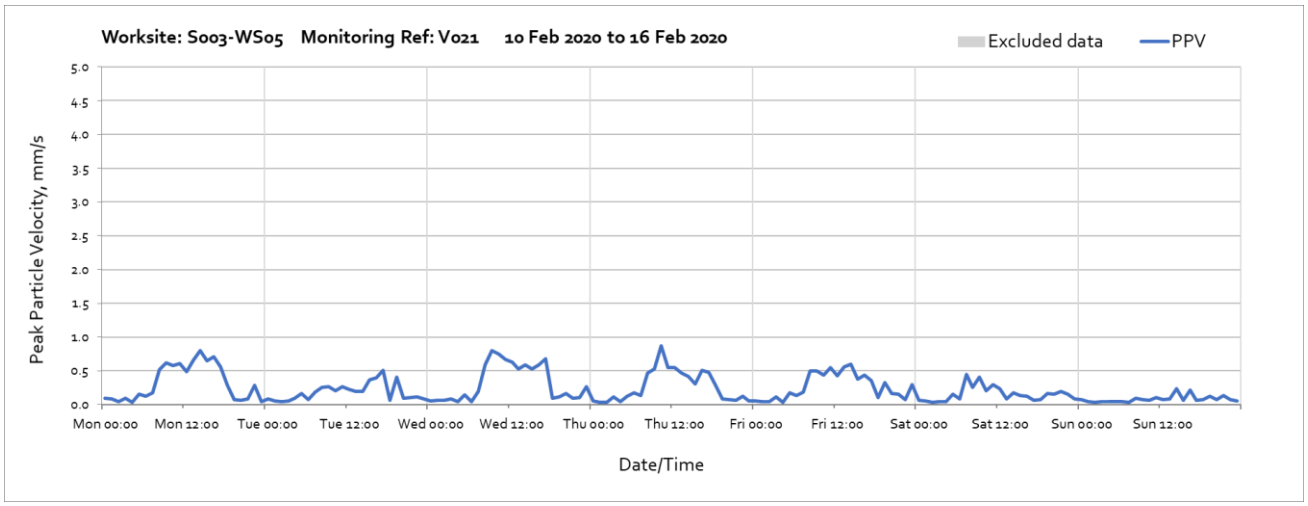

Worksite: S003-WS03 Monitoring Ref: V038 17 Feb 2020 to 23 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

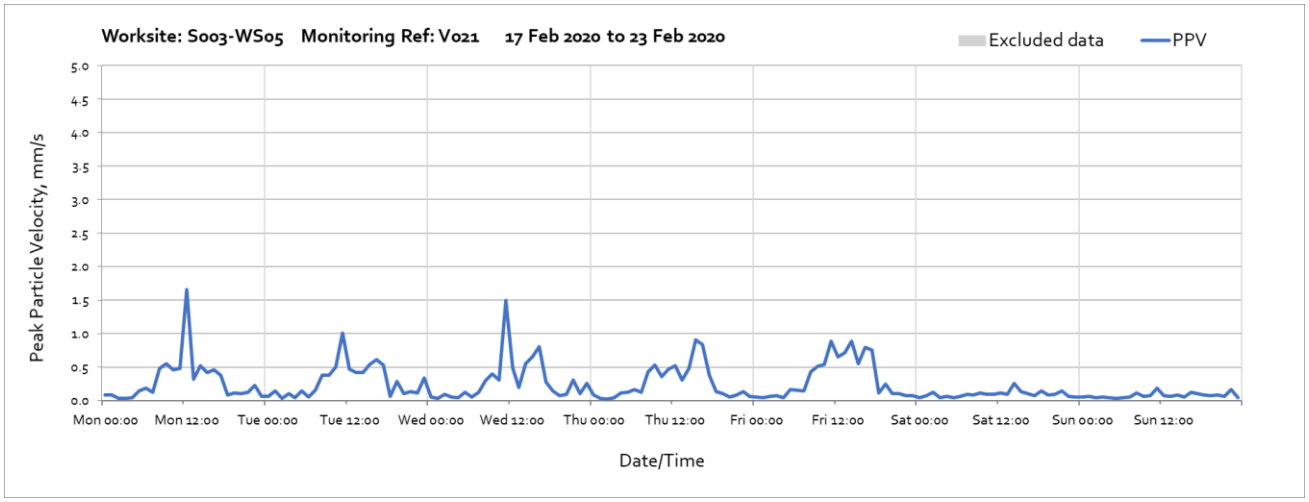

Worksite: S003-WS03 Monitoring Ref: V038 24 Feb 2020 to 01 Mar 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

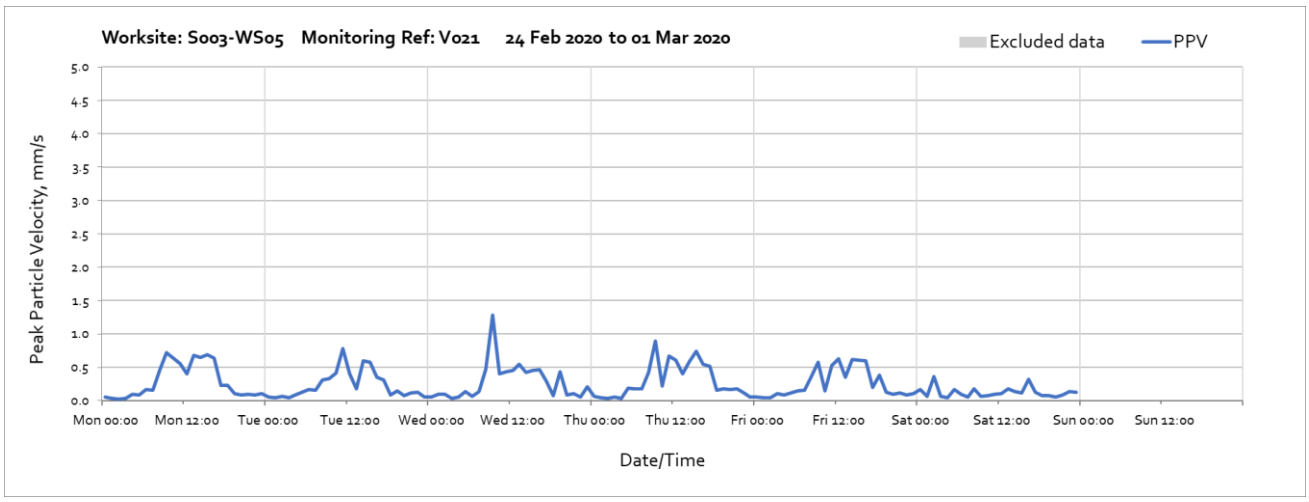
Worksite: S003-WS05 – Monitoring Ref: V021



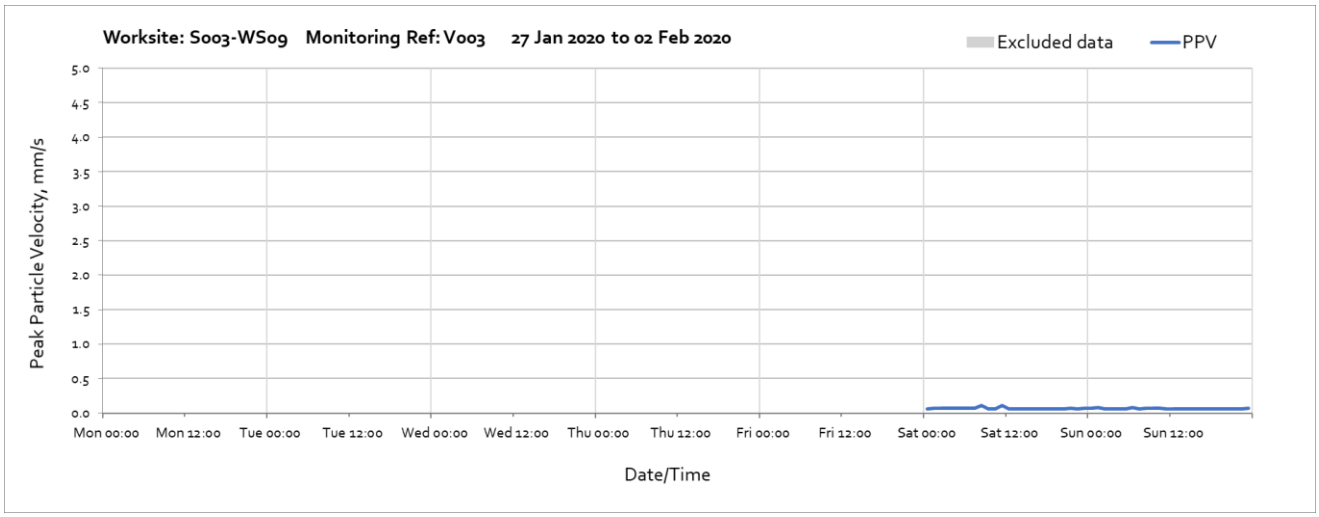


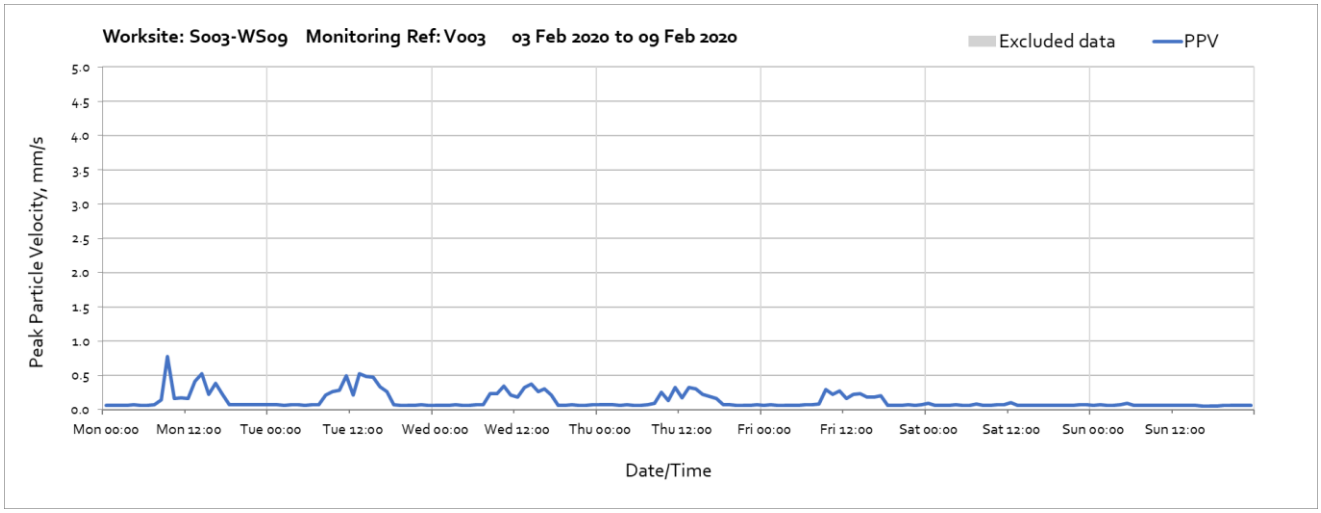


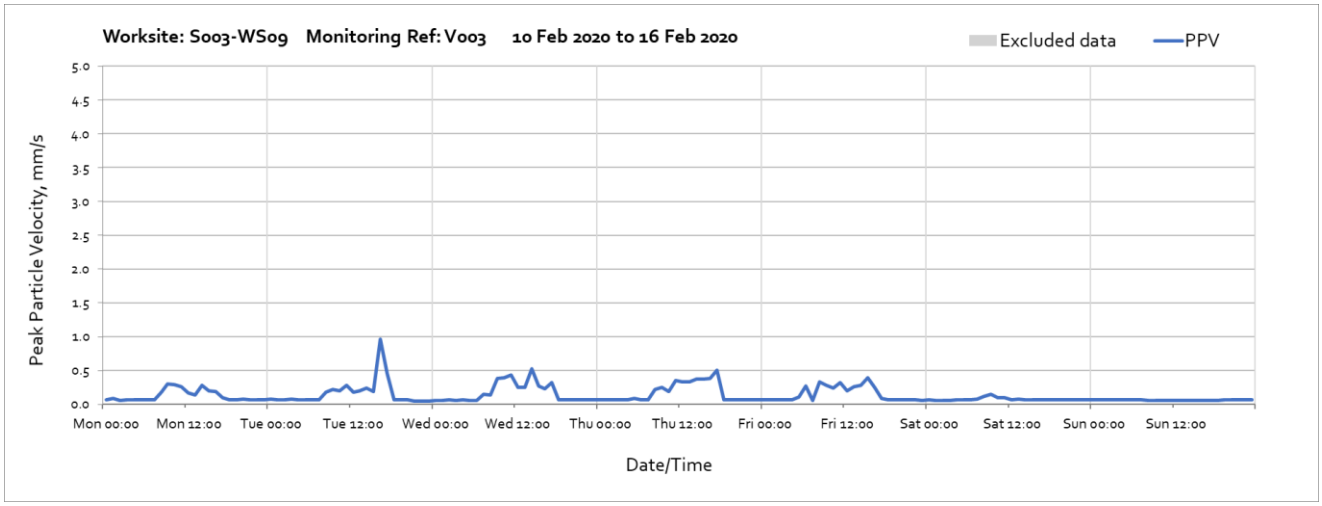


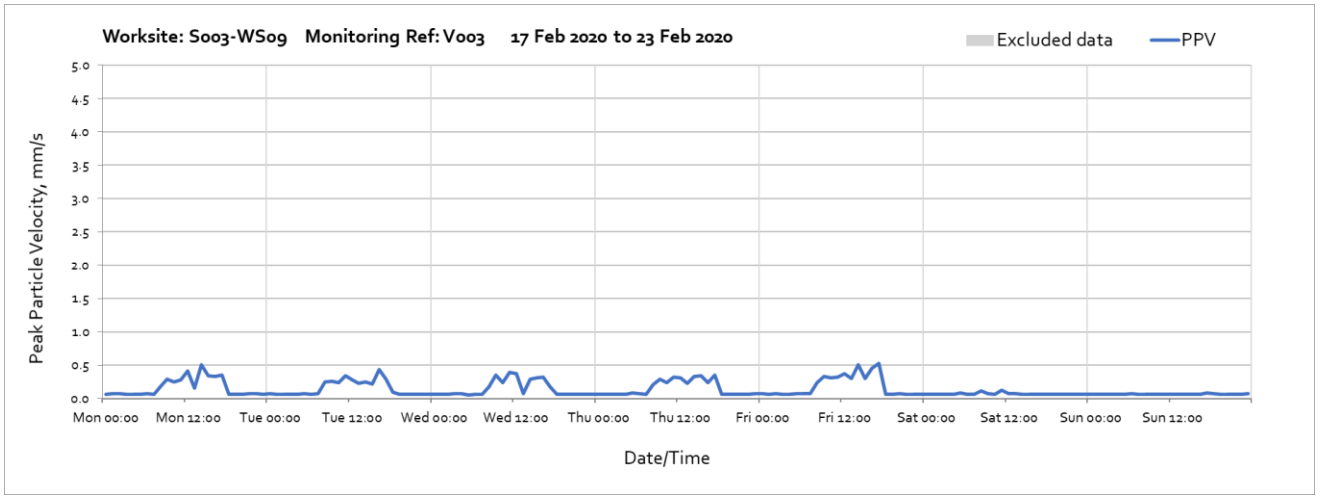


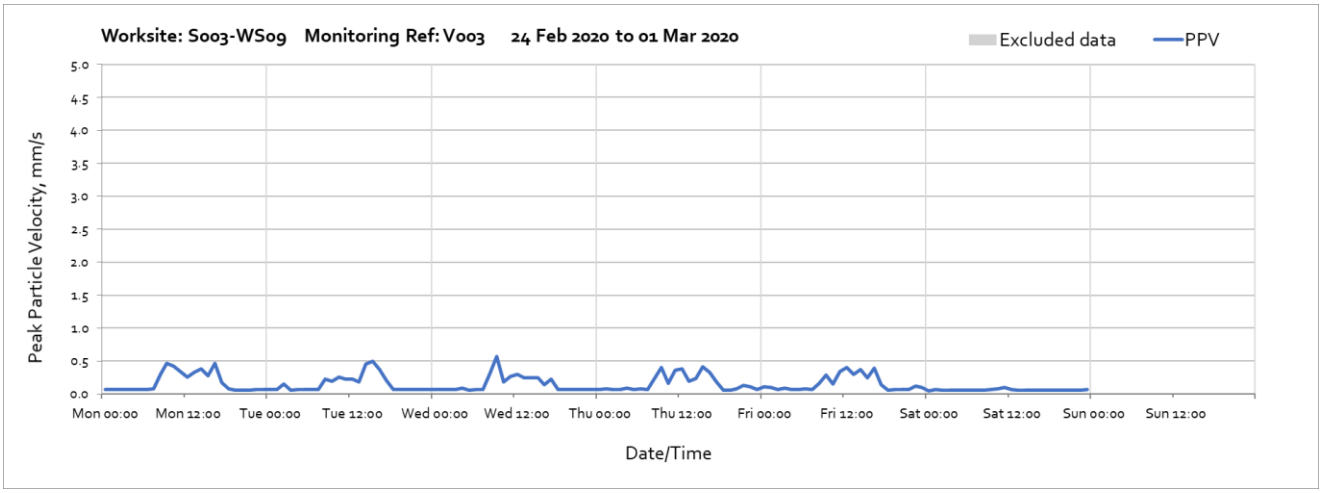
Worksite: S003-WS09 – Monitoring Ref: V003




Worksite: S003-WS09 Monitoring Ref: V003 03 Feb 2020 to 09 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: S003-WS09 Monitoring Ref: V003 10 Feb 2020 to 16 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: S003-WS09 Monitoring Ref: V003 17 Feb 2020 to 23 Feb 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: S003-WS09 Monitoring Ref: V003 24 Feb 2020 to 01 Mar 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time