

Construction noise and vibration Monthly Report – July 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 Local Authority Area London Borough of Camden during the month of July 2020.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in the vicinity of Euston Cavern worksite (worksite ref.: ECAV), where vegetation removal, surveying and site setup were underway.
- Noise monitoring was undertaken in the vicinity of Euston Scissor Box worksite (worksite ref.: ESC), where site setup, surveying, vegetation removal, piling preparations and concrete breaking were underway.
- Noise monitoring was undertaken in the vicinity of Euston Throat Retaining Cut (worksite ref.: ETRC), Hampstead Road Bridge (worksite ref.: HRB), Granby Terrace Bridge worksite (worksite ref.: GTB), where site setup and piling preparations were underway.
- Noise monitoring was undertaken in the vicinity of On-Network worksites (ref.: G and ref.: H), where cabling works, groundworks, staircase installation, cable testing and signal testing were underway.
- Noise monitoring was undertaken in the vicinity of the 132 and 140 Hampstead Road and Petrol Station worksite (ref.: S001-WS02), where material storage and laydown were underway.
- Noise and vibration monitoring were undertaken in the vicinity of the Regent's Park Estate worksite (ref.: S001-WS07), where demolition, groundworks and materials processing were underway.
- Noise and vibration monitoring were undertaken in the vicinity of the Wolfson House, Walkden House, 67-75 & 77-79 Euston Road worksite (ref.: S003-WS03), where demolition, groundworks and erection of temporary structural supports were underway.
- Noise and vibration monitoring were undertaken in the vicinity of the Ibis Hotel, 3 Cardington Street worksite (ref.: S003-WS05), where processing of arisings was underway.
- Noise monitoring was undertaken in the vicinity of the Former National Temperance Hospital, 110 Hampstead Road worksite (ref.: S003-WS06), where deliveries and site setup were underway.
- Noise monitoring was undertaken in the vicinity of the 93-103 Drummond Street, 11-15 Melton Street, 54-64 Euston Street and 69 Cobourg Street worksite (ref.: S003-WS07), where ground works and structural works were underway.

- Noise monitoring was undertaken in the vicinity of the One Euston Square, 40 Melton Street, Grant Thornton House, 22 Melton Street worksite (ref.: S003-WS09), where demolition and scaffolding works were underway.
- Noise monitoring was undertaken in the vicinity of the Vehicle Holding Area worksite (ref.: VHA), surveys, vegetation clearance and site setup were underway.

Vibration monitoring was also undertaken in the vicinity of Royal College of General Practitioners (RCGP) worksite (ref.: S003-WS08). Whilst works were not undertaken on worksite ref.: S003-WS08, vibration levels at the associated monitors may be influenced by work undertaken on other nearby worksites ref.: S003-WS03 and ref.: S003-WS09.

The HS2 threshold levels for significant noise impacts, which are defined in Information Paper E23 (<https://www.gov.uk/government/publications/hs2-information-papers-environment>) were exceeded on three occasions due to HS2 works in London Borough of Camden during July 2020.

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

Seven complaints were received during the monitoring period. A description of complaints, the 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 Table 1.

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.
LOAEL	Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.
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.
SOAEL	Significant Observed Adverse Effect Level - the level above which significant adverse effects on health and quality of life occur.
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 HS2 is required to undertake noise (and vibration) monitoring as necessary to comply with the requirements of the High Speed Rail (London-West Midlands) Environmental Minimum Requirements, including specifically Annex 1: Code of Construction Practice, in addition to any monitoring requirements arising from conditions imposed through consents under Section 61 of the Control of Pollution Act, 1974 or through Undertakings & Assurances given to third parties. Such monitoring may be undertaken for the following purposes:

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

Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the London Borough of Camden (LBC) for the period 1st to 31st July 2020.

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

- Worksite ref.: ECAV (see plan 2 in Appendix A), where work activities included:
 - Vegetation removal so structural assessment can be made for the Park Village East parapet wall;
 - General surveying including the use of a scissor lift;
 - Site setup, including track level hoarding during weekend possessions.
- Worksite ref.: ESC (see plan 2 in Appendix A), where work activities included:
 - Installation of site services, working platforms and scaffolding;
 - Surveying and monitoring of assets and surrounding structures;
 - Site clearance including vegetation clearance;
 - Installation, adaption and removal of hoarding;
 - Construction of drilling fluid slabs;
 - Preparation for main piling, including removal of cargo shed foundations and slab construction wall.

- Worksite ref.: ETRC-HRB-GTB (see plan 2 in Appendix A), where work activities included:
 - Setup of site offices;
 - Preparations for and undertaking of test piling including pile mat installation, plate bearing tests, test piling rig mobilisation, anchor pile installation and test pile installation;
 - Hoarding relocations.
- On-Network worksite ref.: G and ref.: H (see plan 3 in Appendix A), where work activities included:
 - Cable management system installation and high-level cabling;
 - Cutline installation works;
 - Installation of escape staircase;
 - Cable testing;
 - Signalling works.
- 132 and 140 Hampstead Road and Petrol Station worksite ref.: S001-WS02 (see plan 2 in Appendix A), where work activities included:
 - Work activities included material storage and laydown
- Regent's Park Estate worksite ref.: S001-WS07 (see plan 3 in Appendix A)
 - Substructure demolition;
 - Groundworks (backfilling);
 - Materials processing;
- Wolfson House, Walkden House, 67-75 & 77-79 Euston Road worksite ref.: S003-WS03 (see plan 3 in Appendix A), where work activities included:
 - Demolition;
 - Groundworks (backfilling);
 - Erection of temporary structural supports.
- Ibis Hotel, 3 Cardington Street worksite ref.: S003-WS05 (see plan 3 in Appendix A), where work activities included:
 - Processing of arisings.
- Former National Temperance Hospital, 110 Hampstead Road worksite ref.: S003-WS06 (see plan 3 in Appendix A), where work activities included:

- Deliveries;
- Site setup (pouring of concrete foundations, installation of barriers and groundworks).
- 93-103 Drummond Street, 11-15 Melton Street, 54-64 Euston Street and 69 Cobourg Street worksite ref.: S003-WS07 (see plan 3 in Appendix A), where work activities included:
 - Deliveries.
- One Euston Square, 40 Melton Street, Grant Thornton House, 22 Melton Street worksite ref.: S003-WS09 (see plan 3 in Appendix A) , where work activities included:
 - Demolition;
 - Scaffolding
- Vehicle Holding Area worksite ref.: VHA (see plan 1 in Appendix A), where work activities included:
 - Surveying and monitoring of assets and surrounding structures;
 - Site clearance including vegetation clearance;
 - Installation, adaption and removal of hoarding;
 - Installation of lighting systems.

1.1.3 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.

1.2 Measurement Locations

1.2.1 Twenty-seven (27) noise and seven vibration monitoring installations were active across fifteen (15) worksites in July in the LBC area. Table 2 summarises the position of noise and vibration monitoring installations within the LBC area in July 2020.

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

1.2.3 The noise monitor at measurement location N026, worksite ref.: Vehicle Holding Area was temporarily removed from site on the 21st of June to allow hoarding works to be undertaken within proximity of the monitoring location.

1.2.4 The noise monitor at measurement location N044, worksite ref.: S001-WS07 was temporarily removed from site on the 31st of July to allow hoarding works to be undertaken within proximity of the monitoring location. Installation of a temporary replacement monitor will follow at a later date due to ongoing works in the area.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
B	JC	Juniper Crescent
ESC	N022	External to 34 Mornington Terrace
	N024	External to Park Village Studios, Park Village East
	N046	Lamppost opposite to 49 Mornington Terrace
	N047	Park Village East/Mornington Street bridge, lamppost #13
ETRC-HRB-GTB	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)
	N004	Mornington Terrace, lamppost #7 (junction of Mornington Terrace, Mornington Place and Clarkson Row)
	N005	5A Granby Terrace
	N023	Lamppost #21 on Hampstead Road
	G	HH
BS		Roof of Stockbeck House, Barnby Street
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
	N044	Regents Park Estate west, near Langdale (temporarily removed from site on 31 st July)
	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)

Worksite Reference	Measurement Reference	Address
	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
Vehicle Holding Area (VHA)	N025	External to 3 Prince Albert Road
	N026	Thames Water Compound (temporarily removed from site on 21 st June)

2 Summary of Results

2.1 Summary of Measured Noise and Vibration Levels

2.1.1 Table 3 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.

Table 3: Summary of Measured dB LAeq Data over the Monitoring Period.

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average L _{Aeq,T} (Highest Day L _{Aeq,T})				Saturday Average L _{Aeq,T} (highest day L _{Aeq,T})						Sunday / Public Holiday Average L _{Aeq,T} (highest day L _{Aeq,T})	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
B	JC	Juniper Crescent	Free-field	61.0 (62.8)	60.8 (63.1)	60.3 (62.4)	61.2 (66.1)	57.0 (64.9)	61.3 (62.4)	61.3 (62.0)	61.3 (62.3)	59.7 (61.8)	55.0 (60.2)	58.2 (61.8)	56.9 (59.3)
ESC	N047	Park Village East/Mornington Street bridge, lampost #13	Free-field	59.8 (61.6)	61.9 (70.6)	61.5 (64.4)	59.8 (64.4)	53.5 (62.1)	56.4 (57.6)	58.1 (59.2)	60.8 (63.0)	60.0 (62.8)	53.8 (61.0)	57.8 (66.3)	55.0 (63.1)
	N046	Mornington Terrace near The Edinboro Castle pub, lamppost #18	Free-field	63.7 (65.1)	63.5 (64.4)	63.3 (65.6)	63.0 (65.7)	58.2 (64.6)	62.4 (63.1)	62.7 (63.0)	63.0 (64.0)	63.2 (71.8)	56.7 (61.8)	61.3 (63.9)	58.8 (63.3)
	N022	External to 34 Mornington Terrace	Free-field	60.4 (61.8)	60.6 (64.2)	59.9 (62.1)	59.5 (61.2)	54.5 (62.4)	59.1 (59.4)	59.4 (59.9)	60.0 (61.0)	59.6 (65.5)	53.3 (58.1)	57.9 (61.1)	55.3 (59.6)
	N024	External to Park Village Studios, Park Village East	Free-field	60.9 (64.4)	62.2 (65.7)	61.4 (64.7)	59.7 (67.6)	53.8 (64.2)	56.6 (58.5)	59.4 (63.7)	59.6 (60.2)	60.1 (64.8)	53.7 (58.6)	57.1 (60.1)	55.1 (65.3)
ETRC-HRB-GTB	N005	5A Granby Terrace	Free-field	65.8 (67.4)	67.1 (69.1)	65.4 (68.6)	65.0 (67.0)	62.9 (67.4)	64.2 (64.7)	65.3 (65.6)	65.4 (66.2)	64.7 (67.0)	62.6 (66.1)	64.6 (67.8)	63.2 (67.9)
	N023	Amphill Estate, Hampstead Road	Free-field	68.3 (70.7)	68.7 (73.0)	67.7 (69.8)	67.7 (73.3)	65.4 (71.3)	66.3 (68.9)	68.3 (69.2)	67.4 (69.0)	68.2 (71.2)	65.6 (70.3)	66.6 (69.1)	64.9 (70.6)
	N001		Façade	59.1	65.2	61.0	60.2	52.7	56.5	58.8	59.2	60.0	53.1	57.7	53.1

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average L _{Aeq,T} (Highest Day L _{Aeq,T})				Saturday Average L _{Aeq,T} (highest day L _{Aeq,T})					Sunday / Public Holiday Average L _{Aeq,T} (highest day L _{Aeq,T})		
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
		External to Cubitt Court, 100 Park Village East		(65.4)	(70.3)	(62.3)	(62.8)	(63.2)	(61.7)	(59.6)	(60.9)	(62.7)	(58.9)	(66.0)	(57.4)
	N002	Richmond Court, Park Village East	Free-field	59.1 (62.2)	61.6 (63.4)	61.8 (65.3)	59.6 (65.5)	53.3 (60.9)	55.3 (56.3)	57.6 (59.0)	59.7 (61.9)	59.0 (61.5)	53.8 (59.5)	57.5 (63.5)	54.9 (63.8)
	N003	Silsoe House, Park Village East	Free-field	59.3 (61.7)	61.3 (64.3)	61.5 (65.1)	59.6 (64.2)	53.3 (59.5)	55.9 (57.2)	57.5 (58.9)	59.6 (61.9)	59.3 (61.7)	53.9 (59.3)	57.1 (61.6)	54.7 (59.5)
	N004	Mornington Terrace, lamppost #7	Free-field	64.9 (67.9)	64.9 (67.4)	64.2 (67.2)	64.4 (71.5)	59.6 (70.3)	64.0 (64.6)	63.6 (64.5)	63.3 (64.3)	63.7 (71.1)	58.3 (70.3)	63.2 (71.4)	62.3 (71.4)
G	HH	Euston Station Parcel Deck, Barnby Street	Free-field	63.1 (66.7)	63.2 (64.5)	62.0 (65.9)	62.9 (69.1)	59.1 (69.9)	61.9 (64.1)	61.9 (62.8)	61.6 (62.6)	62.8 (66.5)	59.7 (66.3)	60.6 (66.2)	59.2 (67.0)
	BS	Roof of Stockbeck House, Barnby Street	Free-field	61.7 (63.8)	62.3 (63.9)	60.9 (63.0)	61.8 (64.5)	57.1 (62.2)	61.1 (61.9)	61.6 (61.8)	60.6 (61.7)	60.6 (63.2)	58.6 (63.9)	60.3 (64.3)	58.2 (61.8)
S001-WS02	N018	Outside replacement housing, Hampstead Road	Free-field	70.2 (72.1)	71.5 (76.1)	71.7 (76.2)	70.8 (78.4)	67.9 (73.6)	67.8 (69.7)	70.1 (71.1)	70.9 (71.2)	71.7 (75.6)	68.6 (76.8)	68.9 (71.7)	67.4 (72.5)
	N019	Outside Cartmel, Hampstead Road	Free-field	68.5 (71.4)	69.6 (71.1)	69.9 (73.5)	69.1 (76.1)	66.6 (72.0)	66.6 (68.8)	68.6 (70.1)	69.2 (70.4)	70.1 (74.7)	67.4 (75.0)	68.1 (75.0)	66.5 (72.9)
S001-WS07	N020	Mackworth Street	Free-field	51.0	59.6	52.7	51.6	48.0	48.6	50.8	51.2	51.6	48.3	51.3	48.7

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average L _{Aeq,T} (Highest Day L _{Aeq,T})				Saturday Average L _{Aeq,T} (highest day L _{Aeq,T})					Sunday / Public Holiday Average L _{Aeq,T} (highest day L _{Aeq,T})		
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
								(55.2)	(65.6)	(55.5)	(55.0)	(59.4)	(49.2)	(50.9)	(52.2)
	N021	Stanhope Street, lamppost #2	Free-field	57.6 (59.0)	65.0 (71.5)	58.5 (61.7)	56.8 (60.6)	51.4 (60.4)	52.4 (53.9)	56.5 (60.0)	57.0 (59.1)	56.6 (59.2)	52.3 (56.9)	55.2 (58.8)	51.7 (56.9)
	N044	Regents Park Estate west	Free-field	52.8 (58.0)	66.7 (75.9)	52.8 (54.9)	51.8 (55.2)	47.4 (59.6)	49.8 (51.4)	55.1 (65.1)	51.7 (52.2)	51.2 (54.0)	48.1 (51.9)	51.5 (57.3)	48.2 (53.6)
	N045	Regents Park Estate south, external to Coniston	Free-field	55.6 (57.2)	65.7 (74.3)	55.8 (57.5)	55.7 (60.4)	53.3 (58.3)	54.0 (55.5)	55.5 (56.4)	55.2 (55.9)	55.6 (59.7)	54.1 (59.9)	55.2 (59.5)	53.5 (57.2)
S003-WS03	N006	RCGP Roof level	Free-field	60.5 (67.1)	69.5 (76.2)	54.9 (56.9)	54.8 (57.4)	53.9 (57.0)	54.9 (56.3)	57.6 (63.6)	55.6 (56.5)	54.7 (57.0)	53.7 (55.8)	54.8 (57.1)	53.7 (59.0)
	N008	RCGP Stephenson Way	Façade	60.4 (68.7)	70.9 (75.1)	54.2 (55.4)	54.0 (55.8)	53.7 (57.7)	57.4 (62.3)	66.0 (74.0)	58.0 (67.4)	55.9 (68.3)	53.5 (55.5)	55.0 (59.1)	53.6 (59.5)
	N010	Wesley Hotel	Façade	65.2 (69.0)	73.3 (76.1)	60.6 (66.6)	57.5 (66.6)	54.0 (66.8)	63.9 (66.4)	68.3 (74.1)	66.4 (66.6)	60.6 (66.7)	51.5 (54.5)	64.9 (66.7)	52.8 (58.0)
	N011	Outside 82 Euston Street	Free-field	54.9 (63.9)	66.4 (76.4)	54.9 (62.6)	52.2 (60.5)	49.9 (61.0)	50.6 (51.7)	58.8 (67.2)	51.4 (52.0)	54.8 (67.8)	49.4 (54.7)	53.1 (64.4)	49.6 (58.6)
S003-WS05	N014	Starcross Street	Free-field	53.6 (58.3)	59.1 (61.9)	56.7 (61.5)	56.5 (64.7)	51.1 (64.5)	53.7 (55.8)	55.8 (56.6)	56.8 (59.2)	57.0 (61.6)	51.8 (59.8)	53.8 (59.4)	50.5 (58.4)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average L _{Aeq,T} (Highest Day L _{Aeq,T})				Saturday Average L _{Aeq,T} (highest day L _{Aeq,T})					Sunday / Public Holiday Average L _{Aeq,T} (highest day L _{Aeq,T})		
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
S003-WS01	N016	Margaret Centre roof	Free-field	54.6 (62.6)	60.0 (65.1)	53.9 (56.0)	53.6 (57.7)	51.4 (56.2)	53.5 (54.1)	56.9 (58.7)	57.1 (58.5)	54.9 (58.5)	52.6 (58.6)	53.2 (56.4)	51.9 (58.0)
S003-WS06	N017	Hampstead Road, lamppost #48	Free-field	69.9 (75.2)	70.7 (72.2)	70.9 (75.4)	69.9 (78.2)	67.2 (75.1)	66.8 (69.0)	69.1 (69.8)	69.4 (69.9)	70.4 (74.9)	67.4 (75.1)	68.2 (75.3)	66.4 (73.1)
S003-WS07	N012	Opposite 92-94 Drummond Street	Free-field	57.6 (62.0)	61.7 (64.3)	58.0 (61.0)	57.7 (60.6)	55.7 (59.1)	56.5 (57.6)	58.0 (59.0)	58.1 (59.3)	57.7 (59.3)	55.4 (57.6)	56.9 (60.5)	54.8 (60.3)
S003-WS08	N007	RCGP, Melton Street	Free-field	63.5 (65.9)	73.0 (79.9)	61.6 (63.7)	61.4 (65.1)	60.1 (66.8)	64.7 (68.5)	61.1 (62.1)	61.4 (62.3)	61.0 (62.2)	60.6 (66.0)	60.4 (63.4)	60.1 (67.3)
VHA	N025	External to 3 Prince Albert Road	Free-field	68.5 (73.7)	68.4 (70.0)	66.9 (71.3)	66.7 (71.4)	63.5 (68.8)	65.4 (65.8)	66.4 (67.4)	66.2 (67.5)	66.6 (69.4)	64.0 (69.1)	64.7 (67.5)	63.1 (67.5)
	N026 (Temporarily Removed)	Thames Water Compound	Free-field	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾	- ⁽¹⁾ (-) ⁽¹⁾

⁽¹⁾ The monitor temporarily removed in June and no noise data were collected for these periods at this monitor in July due to the completion of works on site.

2.1.2 Table 4 presents a summary of the measured vibration levels at each monitoring location over the reporting period. The highest PPV measured during the monitoring along any axis is presented in the table.

Table 4: 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	12.9* (Z-axis)
	V043	Cubitt Court, Park Village East	2.68 (Y-axis)
S003-WS03	V002	RCGP. basement boiler room. 305 Euston Road	3.04 (Z-axis)
	V037	Magic Circle, basement	3.18 (Z-axis)
	V038	Wesley Hotel, basement lightwell, Euston Street	3.50 (Z-axis)
S003-WS05	V021	42-44 Cobourg Street (floor)	1.04 (Z-axis)
S003-WS09	V003	RCGP. basement vaults, 305 Euston Road	0.55 (Z-axis)

* High levels of vibration are due to activities being undertaken in close proximity (1-2m) to the monitor and not representative of vibration levels at nearby receptors (approximately 10m from the works).

2.1.3 Appendix C presents graphs of the 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>.

2.2 Exceedances of the SOAEL

2.2.1 The significant observed adverse effect level (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."

2.2.2 HS2 Phase One Information Paper E23: Control of Construction Noise and Vibration sets out the SOAELs for construction noise.

2.2.3 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.

2.2.4 Table 5 presents a summary of recorded exceedances of the SOAEL at each measurement location over the reporting period, including the number of exceedances during each time period.

Table 5: Summary of Exceedances of SOAEL

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
B	JC	Juniper Crescent	All days	All periods	No exceedance
ESC	N022	External to 34 Mornington Terrace	All days	All periods	No exceedance
	N024	External to Park Village Studios, Park Village East	All days	All periods	No exceedance
	N046	Lamppost opposite to 49 Mornington Terrace	All days	All periods	No exceedance
	N047	Park Village East/Mornington Street bridge, lamppost #13	All days	All periods	No exceedance
ETRC-HRB-GTB	N001	Park Village East Lamppost #1	All days	All periods	No exceedance
	N002	Park Village East Lamppost #2	All days	All periods	No exceedance
	N003	Park Village East Lamppost #9	All days	All periods	No exceedance
	N004	Mornington Terrace, lamppost #7	All days	All periods	No exceedance
	N005	5A Granby Terrace	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
	BS	Barnby Street	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	All periods	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
	N044	Regents Park Estate West, near Langdale	Weekday	0800-1800	2 *
	N045	Regents Park Estate south, external to Coniston	Weekday	0800-1800	1
	N046	Mornington Terrace near The Edinboro Castle pub, lamppost #18	All days	All periods	No exceedance
	N047	Park Village East/Mornington Street bridge, lamppost #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	Weekday	0800-1800	2
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
VHA	N025	External to 3 Prince Albert Road	All days	All periods	No exceedance
	N026	Thames Water Compound	All days	All periods	No exceedance

* Exceedance of the SOAEL at monitoring position N044 are not considered as representative of HS2 works at nearby receptors. Considering the large distance between the works and the receptors the noise levels at the receptors are calculated to be below the SOAEL.

2.2.5 For the purpose of assessing eligibility for noise insulation or temporary rehousing, multiple exceedances of the SOAEL in a 24-hour period would be counted as a single exceedance during that day. Over the reporting period, the overall number of SOAEL exceedances at each measurement location is shown in Table 6 and may be lower than the total sum of individual exceedances reported in Table 5 for each location.

Table 6: Summary of Total Exceedances of SOAEL

Worksite Reference	Measurement Reference	Monitor Address	Total of SOAEL exceedances in the month
S003-WS03	N011	Outside #82 Euston Street lamppost	2
S001-WS07	N045	Regents Park Estate south, external to Coniston	1

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 noise 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
-	-	-	-	-	-

2.4 Complaints

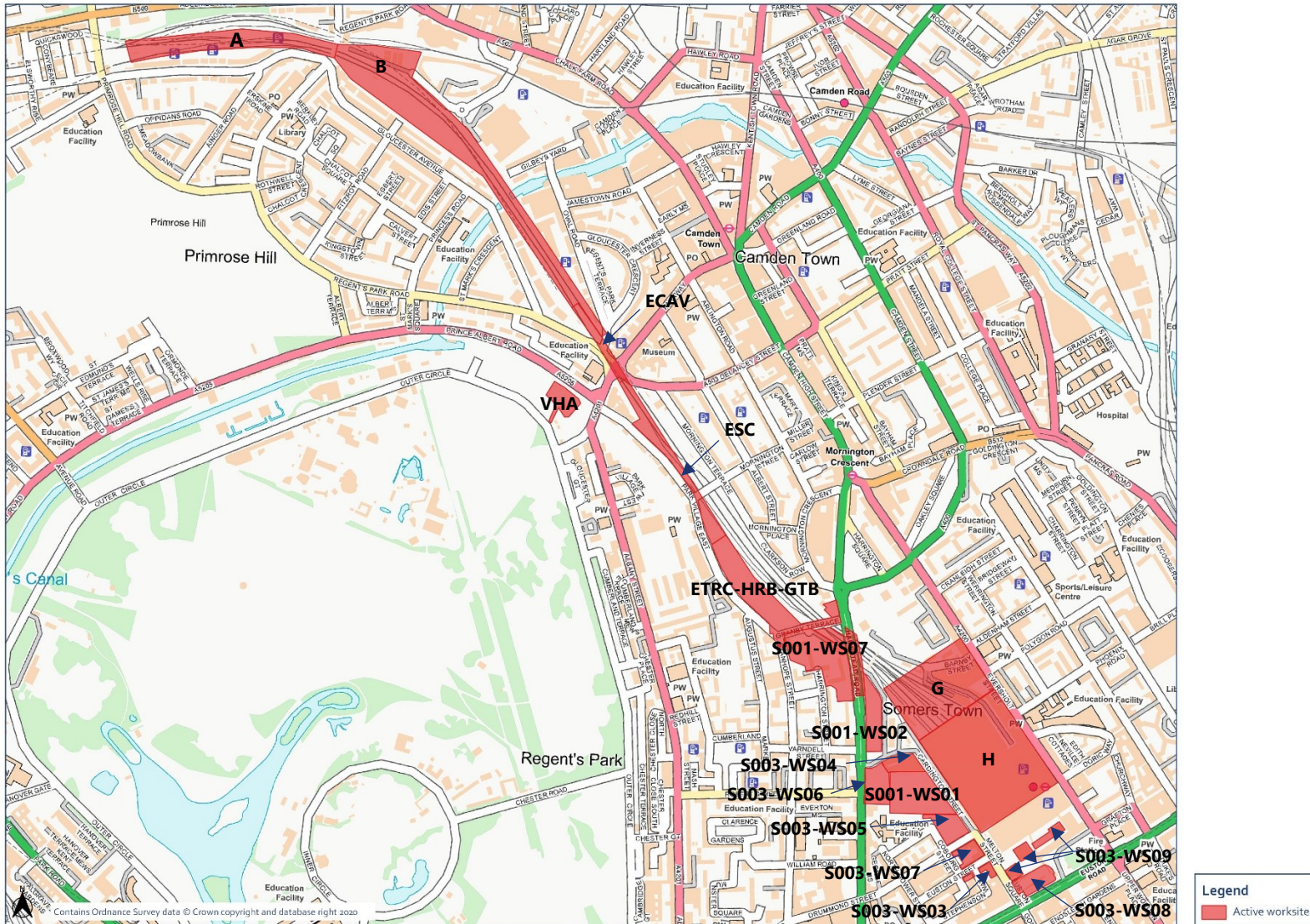
2.4.1 Table 8 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

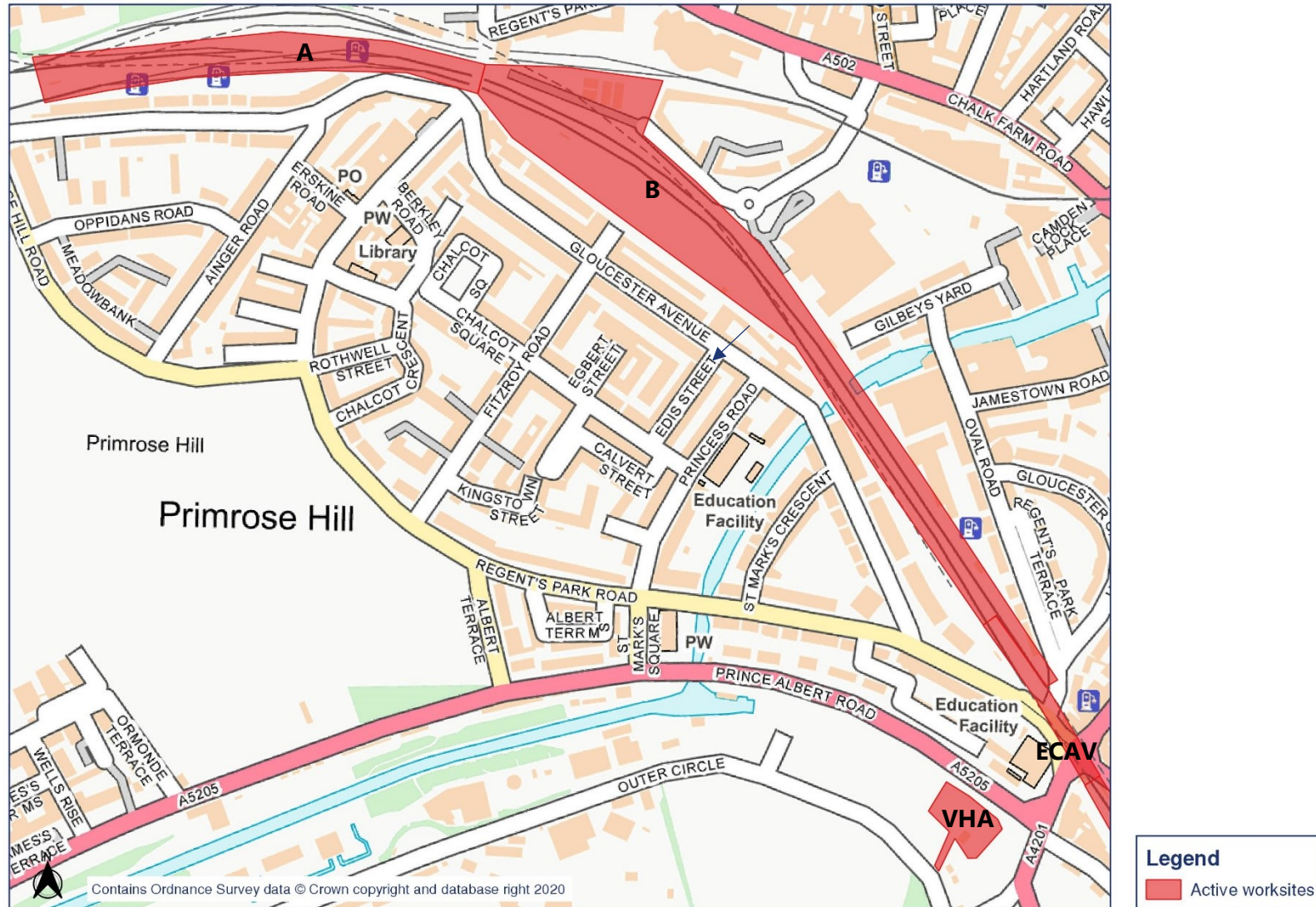
Table 8: Summary of Complaints.

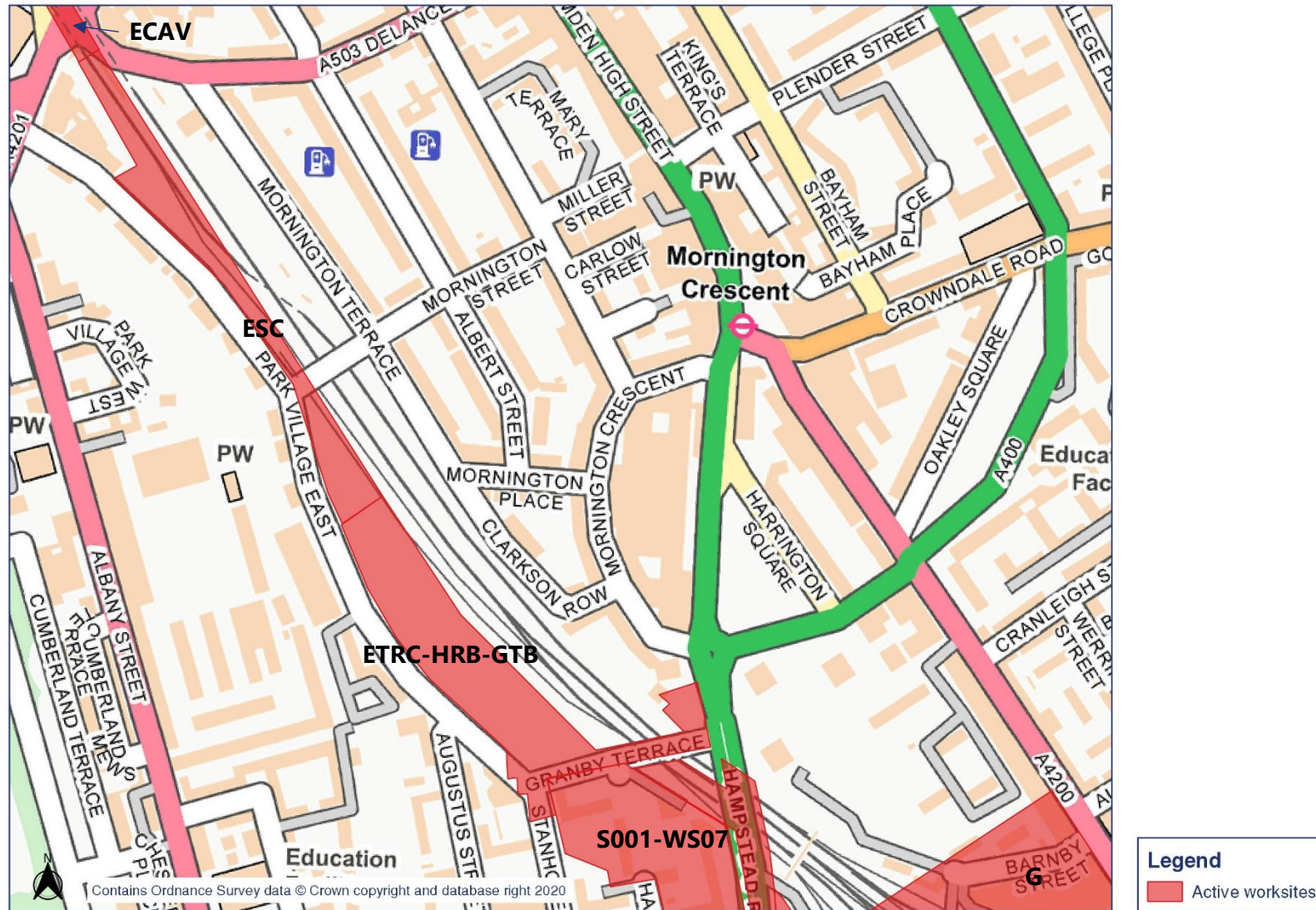
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-20-40227-C	S001-WS07	Complaint due to construction noise during the daytime.	Monitoring data demonstrates compliance with Section 61 and works were in line with best practical means.	Information was provided to the complainant.
HS2-20-40229-C	S001-WS07	Complaint due to noise and dust generated by construction activities.	Construction noise was associated with HS2 demolition works. Monitoring data demonstrates compliance with Section 61 and works were in line with best practical means.	Information on how the effects of construction are managed communicated to the complainant.
HS2-20-40218-C	S001-WS07	Complaint due to noise and dust generated by construction activities.	Construction noise was associated with HS2 demolition works. Monitoring data demonstrates compliance with Section 61 and works were in line with best practical means.	Information on how the effects of construction are managed communicated to the complainant.
HS2-20-40231-C	S001-WS07	Complaint due to noise and dust generated by construction activities.	Monitoring data demonstrates compliance with Section 61 and works were in line with best practical means.	Information on how the effects of construction are managed communicated to the complainant.
HS2-20-40301-C	S001-WS07	Complaint due to construction noise during the daytime.	Monitoring data demonstrates compliance with noise thresholds.	Information was provided to the complainant, including information on the special cases process and an update on noise insulation.

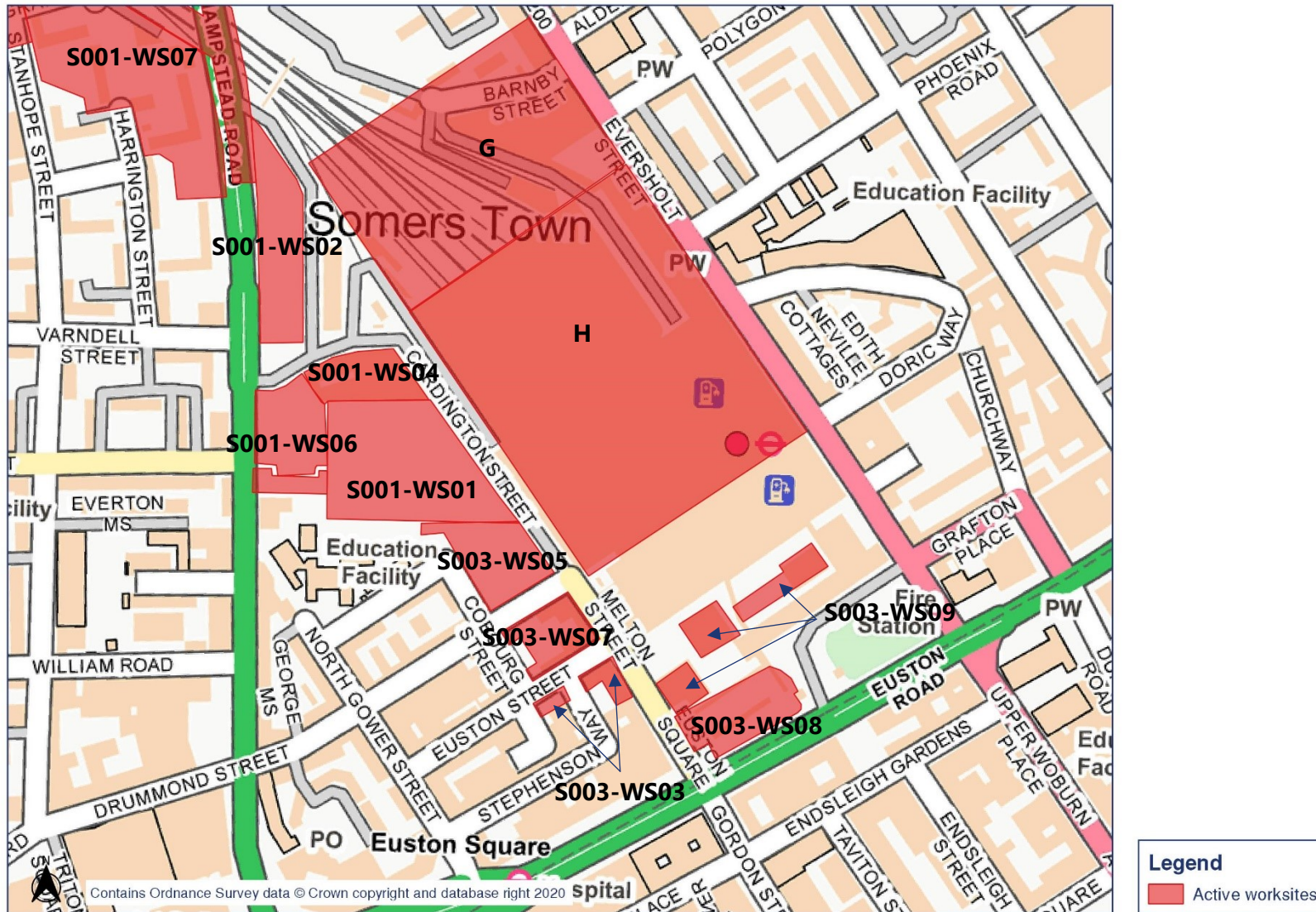
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-20-42093-E	S001-WS07	Complaint due to construction noise.	Noise was associated with ongoing substructure removal works and crushing. Works methodology was in line with Section 61, including use of breaker shroud and local screening. Monitoring data demonstrates compliance with Section 61 and works were in line with best practical means.	No additional measures practicable. Communication made with complainant regarding programme and ongoing monitoring.
HS2-20-42514-E	A/B	Complaint due to a generator running during night.	No generator was found to be running on the worksite, however the noise may have been associated with the brief operation of a generator which serves a welfare cabin and is utilised to charge batteries.	The welfare cabin generator will be kept under review.
HS2-20-40261-C	A/B	Complaint due to noise from traffic following temporary traffic lights and lane closures.	Investigation ongoing.	Investigation ongoing.
HS2-20-40289-C	N/A	Complaint due to construction noise from the early morning causing sleep disturbance.	Complaint location was not given therefore monitoring data and associated works could not be investigated.	Information on how the effects of construction are managed communicated to the complainant.

Appendix A Site Locations

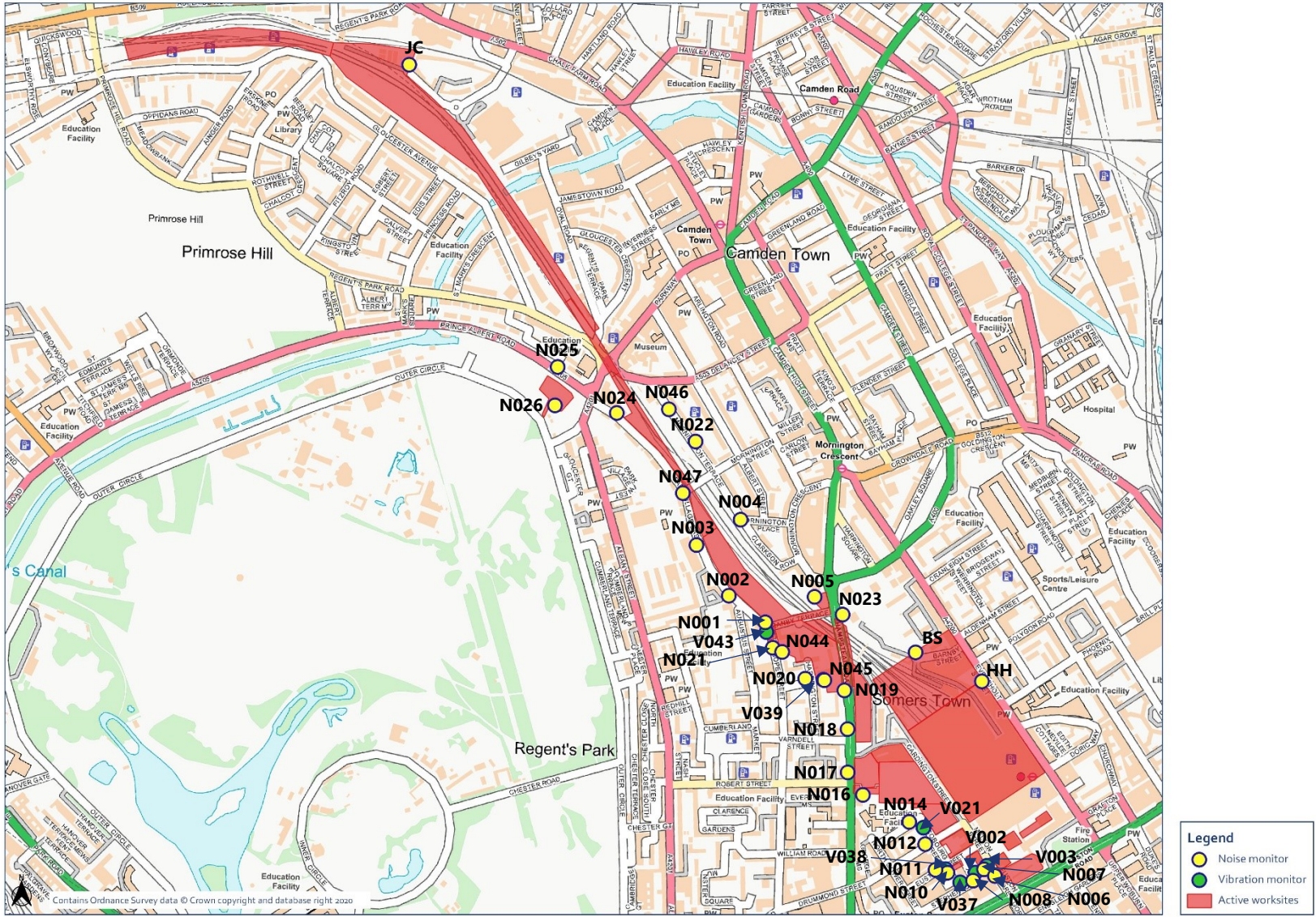


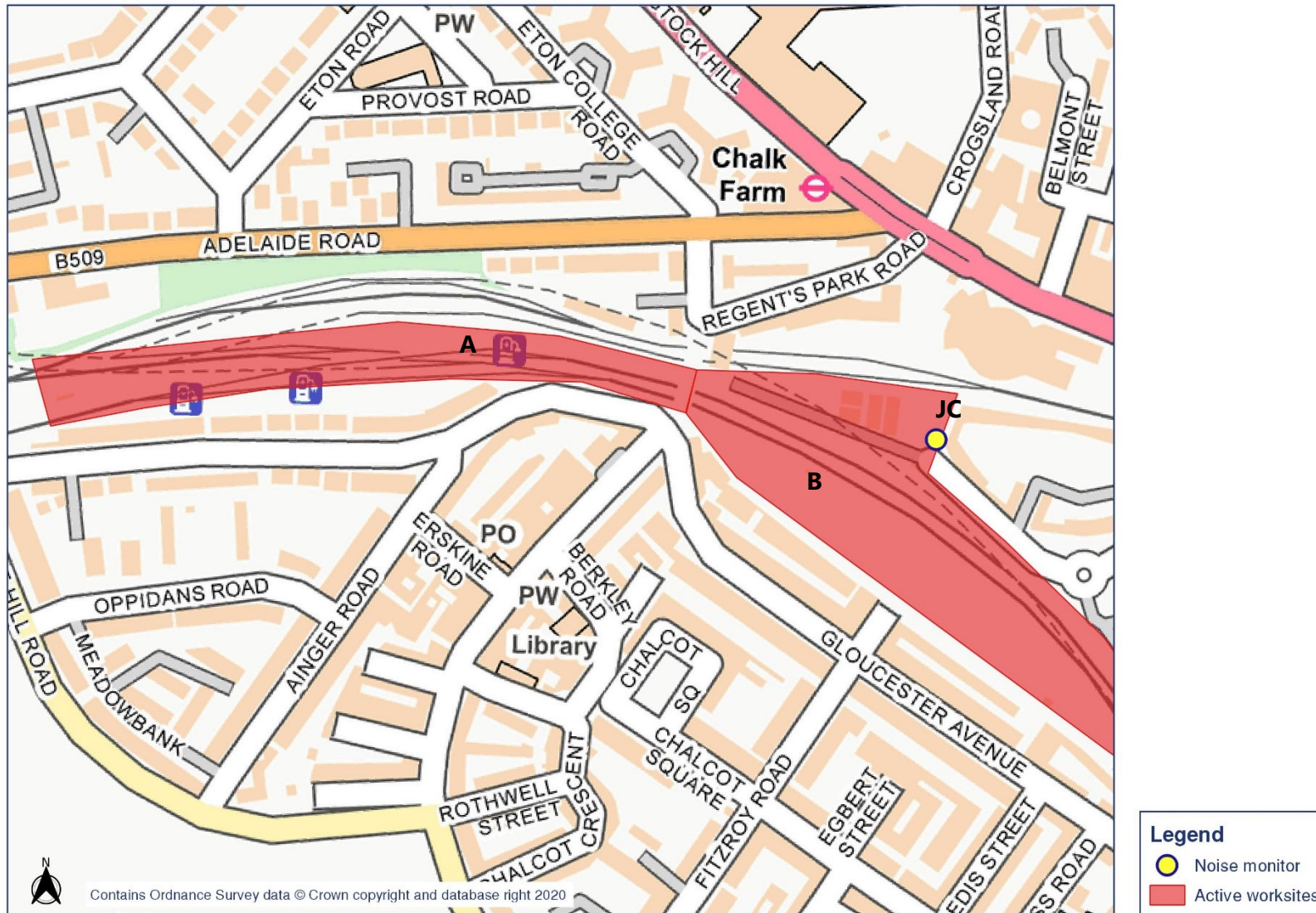


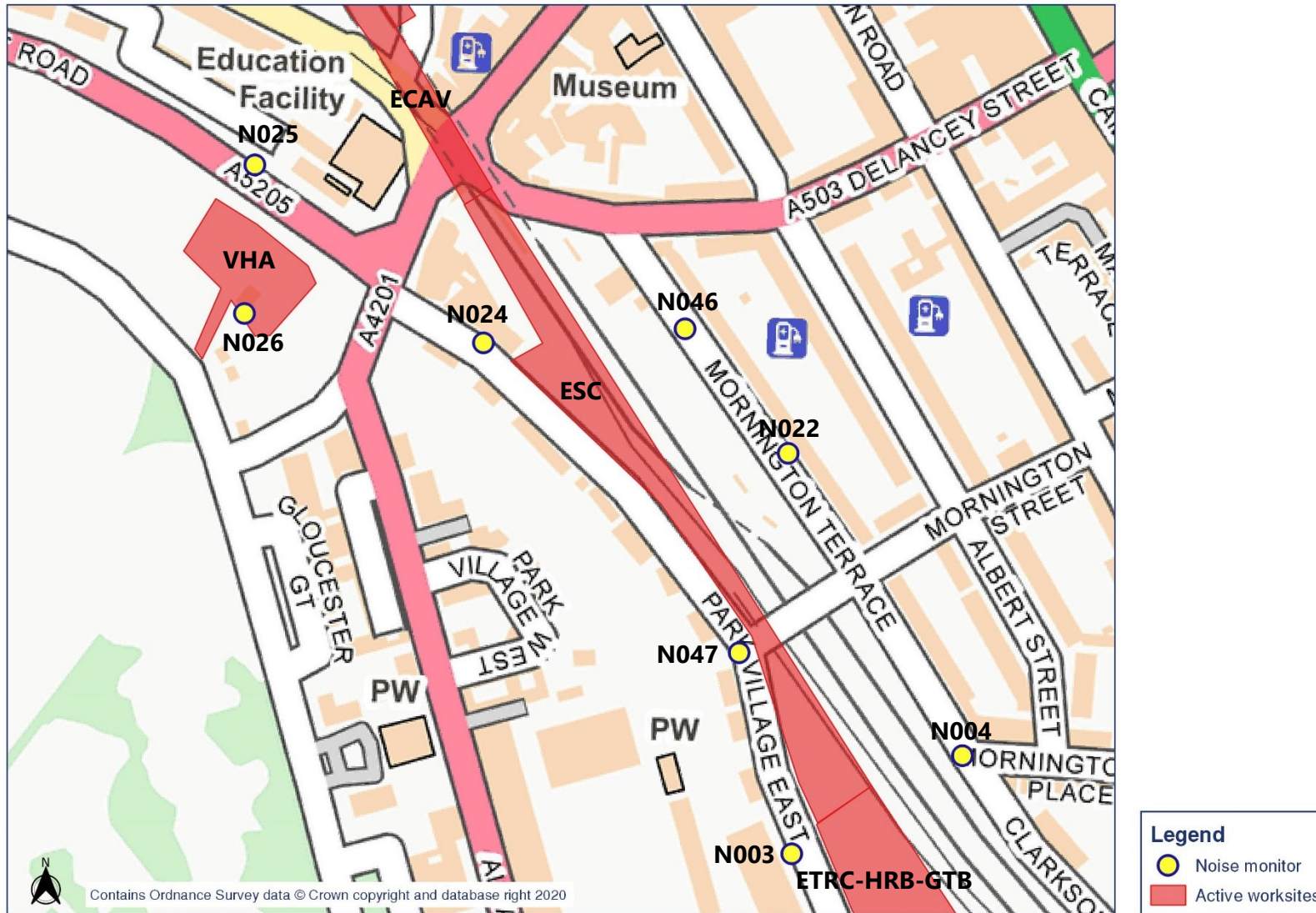


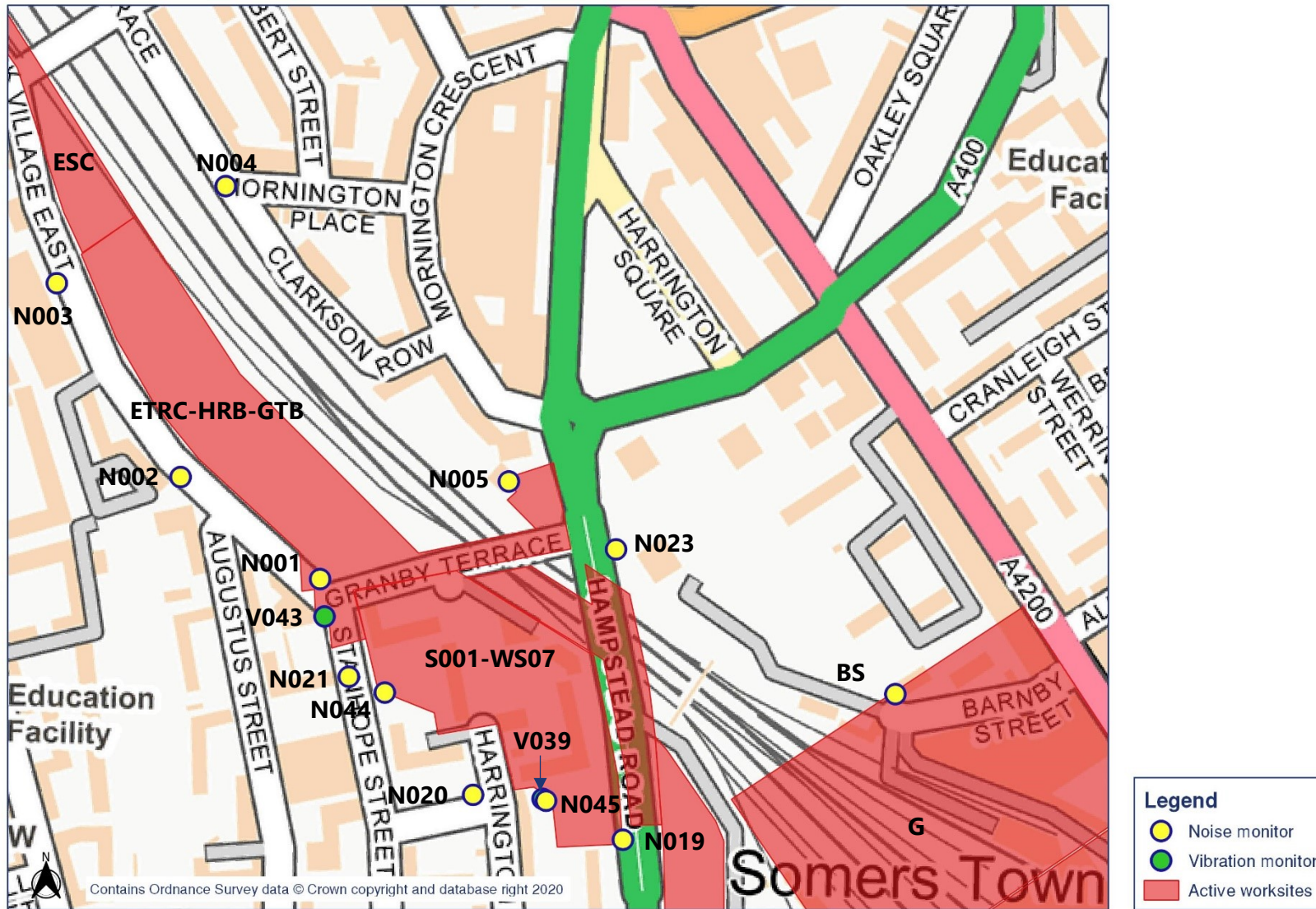


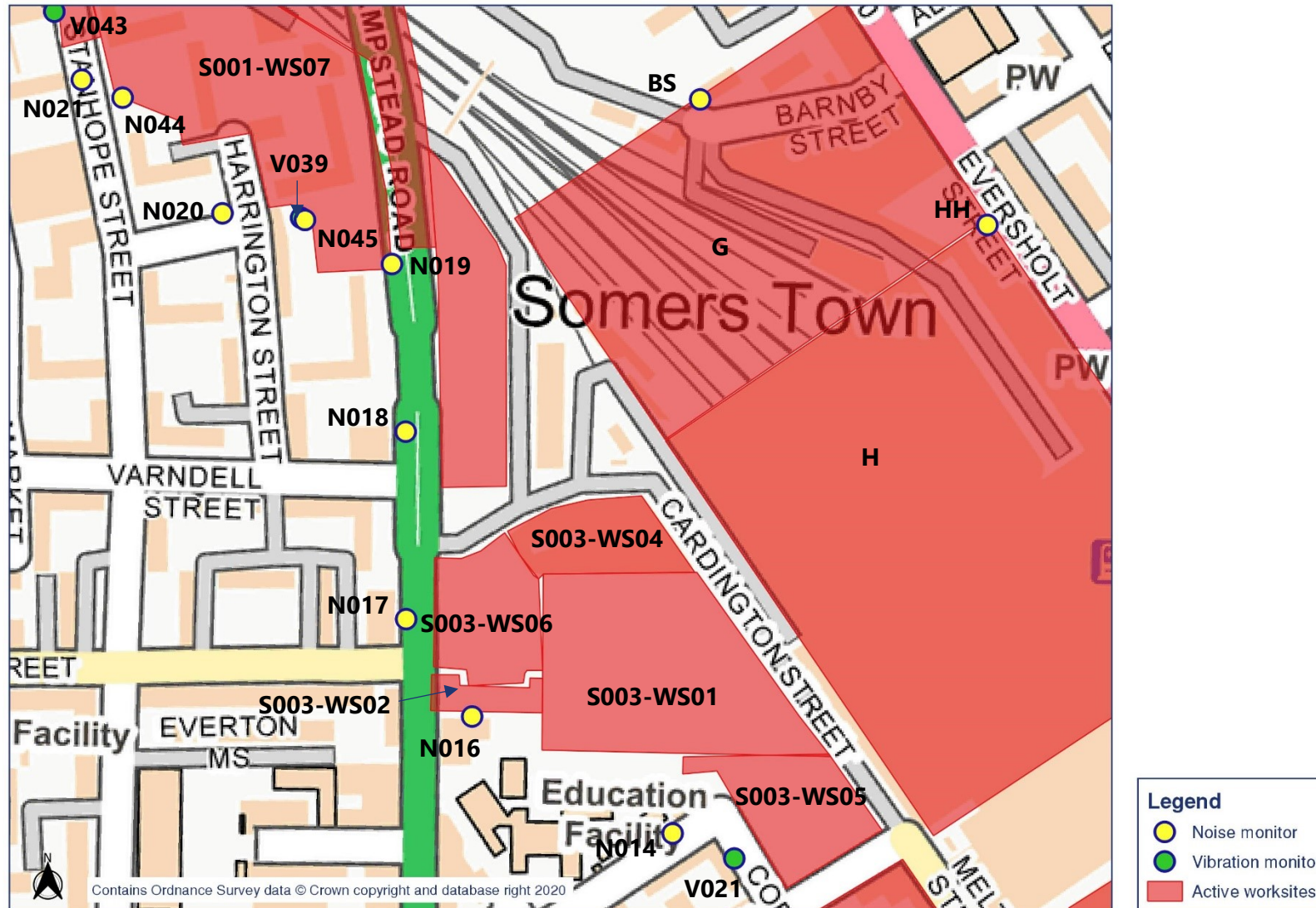
Appendix B Monitoring Locations

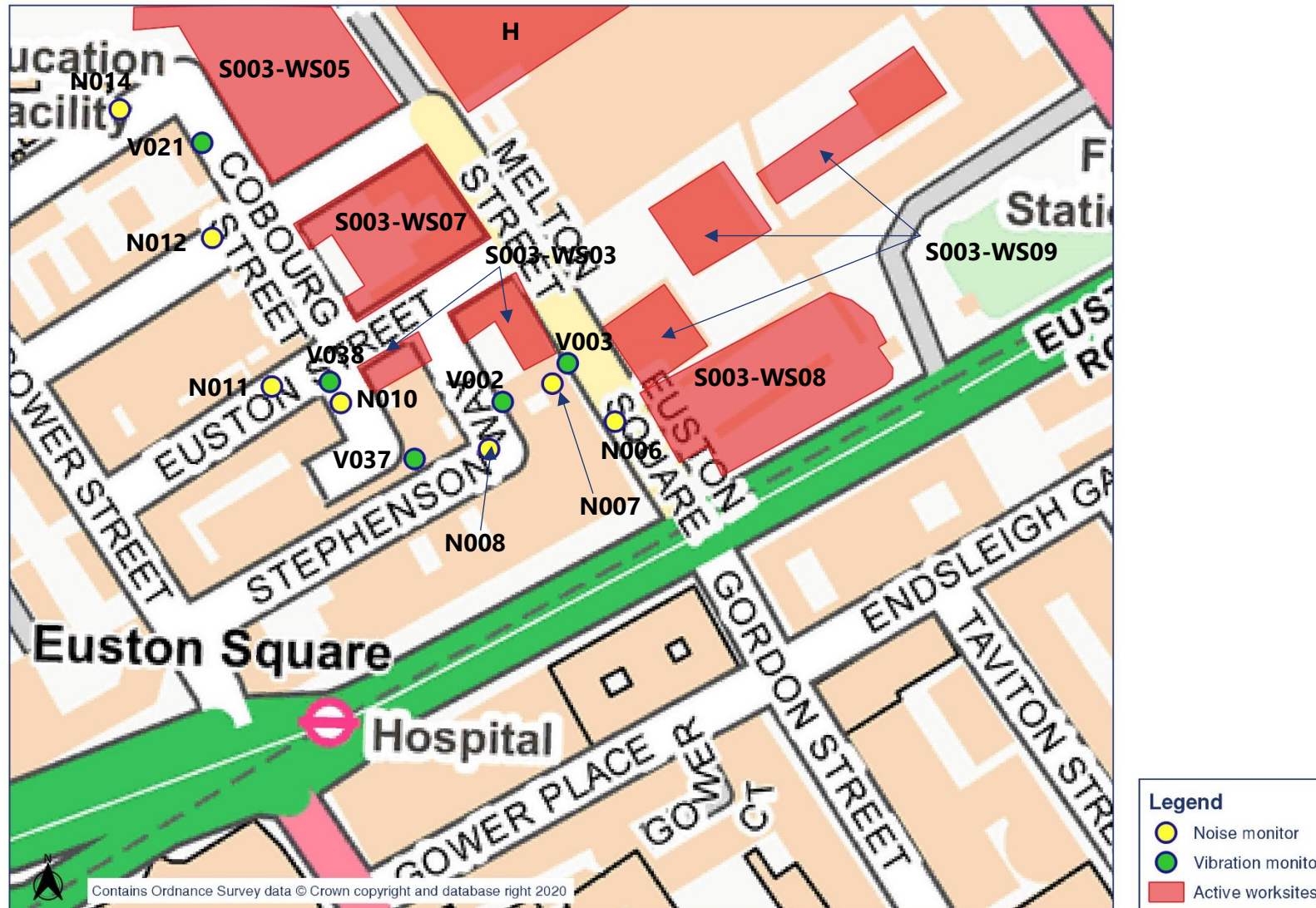










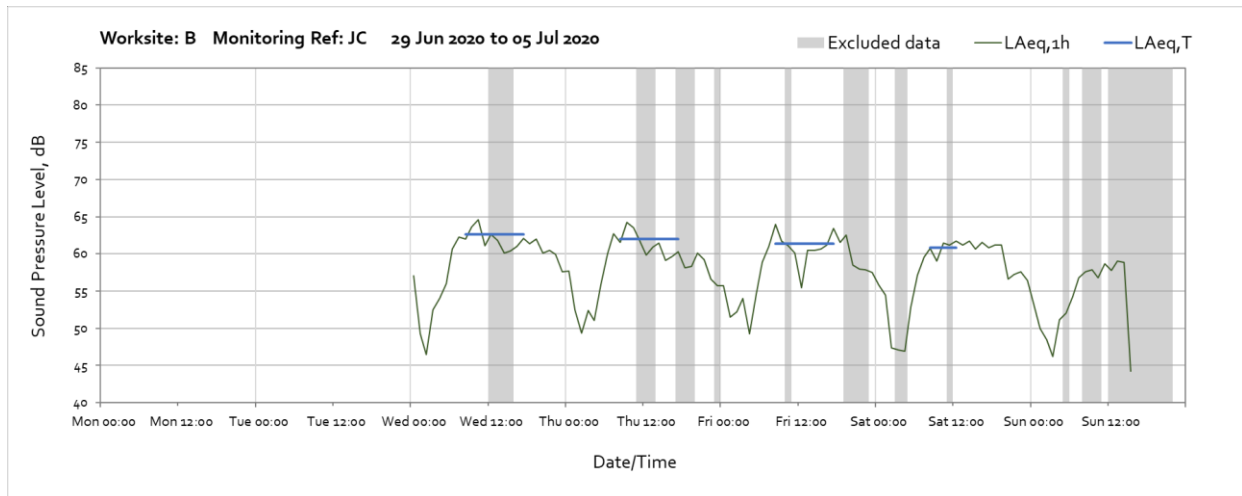


Appendix C Data

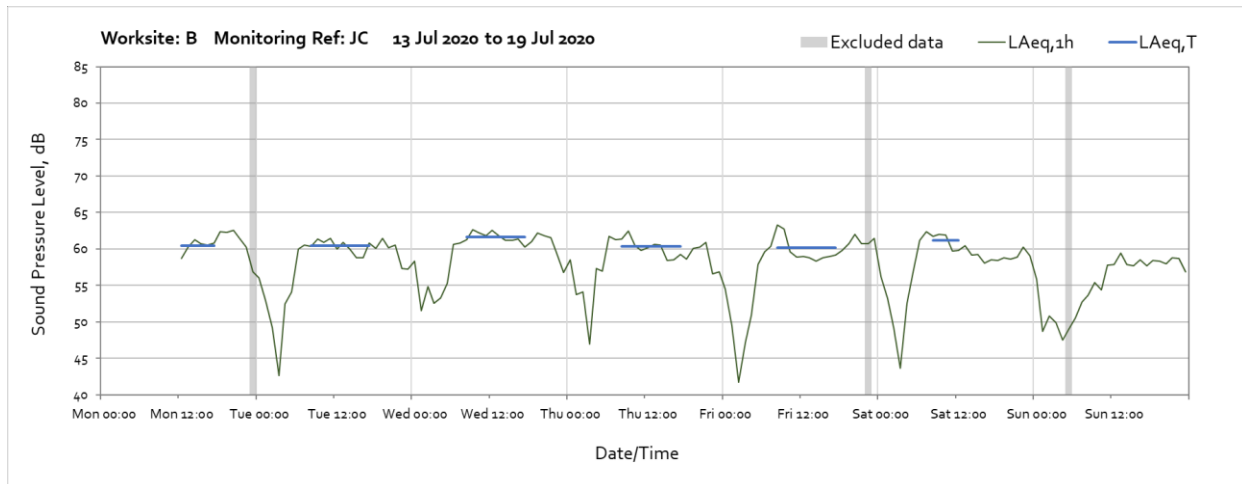
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have been excluded from the calculation of the $L_{Aeq,T}$ values in Table 3 of the main report.

Noise

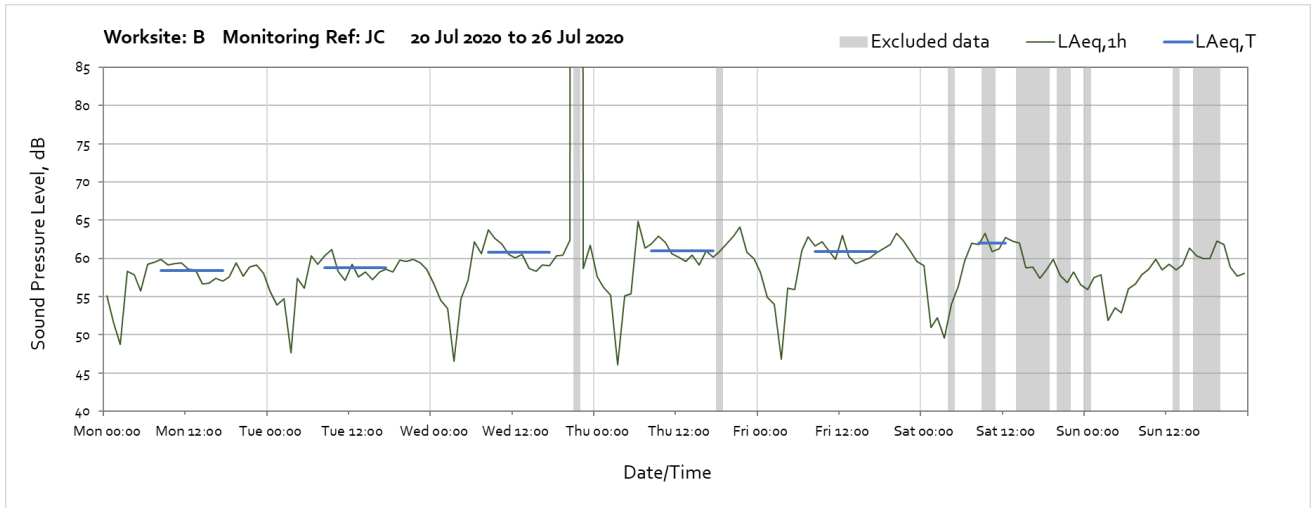
Worksite: B – Monitoring Ref: JC



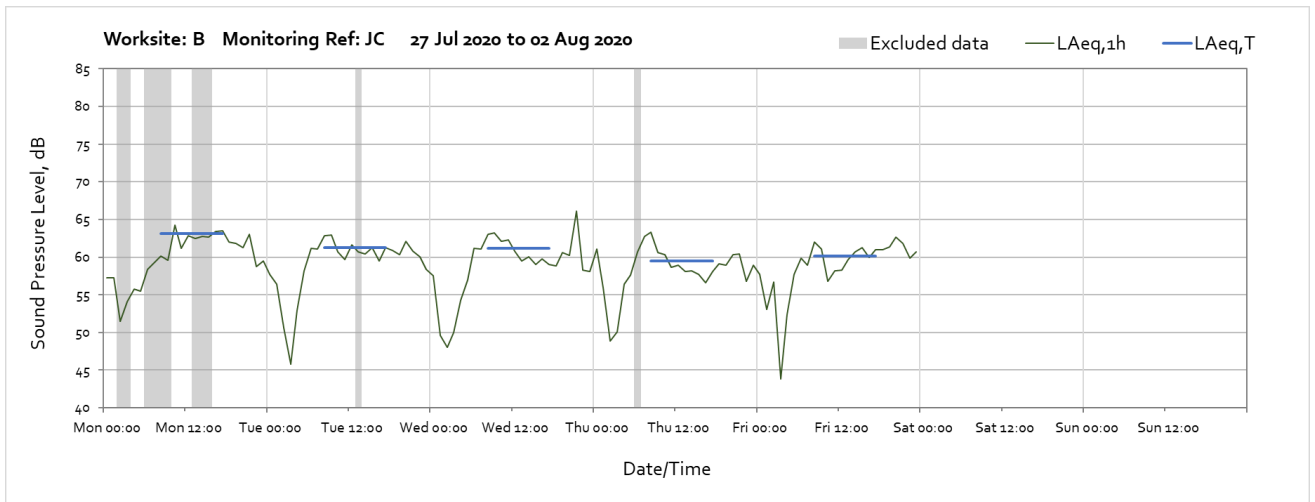
Note: Missing data between 16:00 on Sunday 5th July and 00:00 Monday 13th July was due to loss of power at the monitoring station.



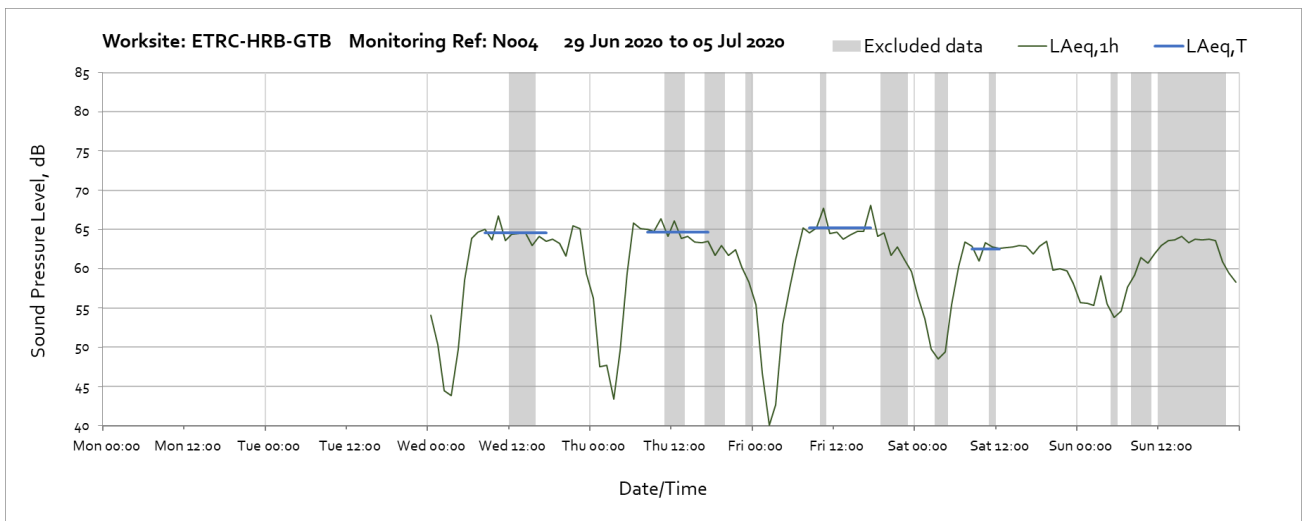
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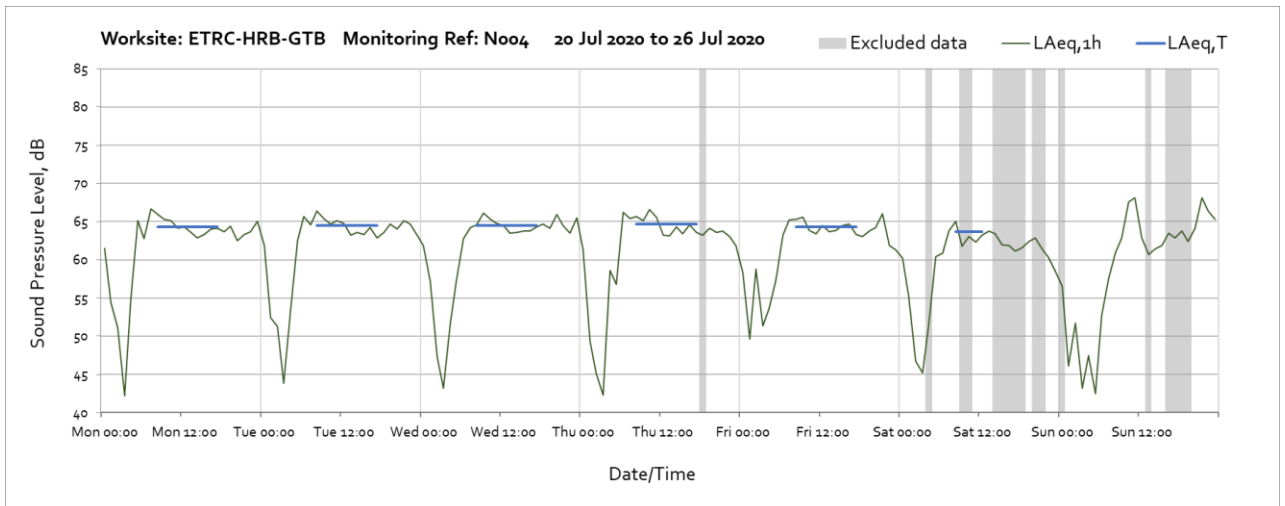
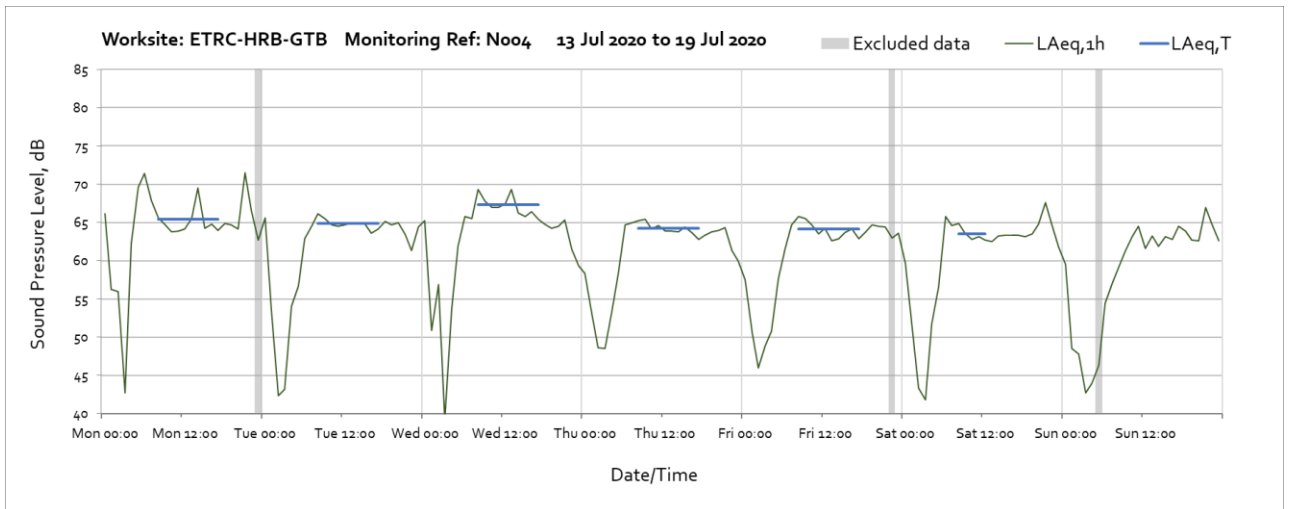
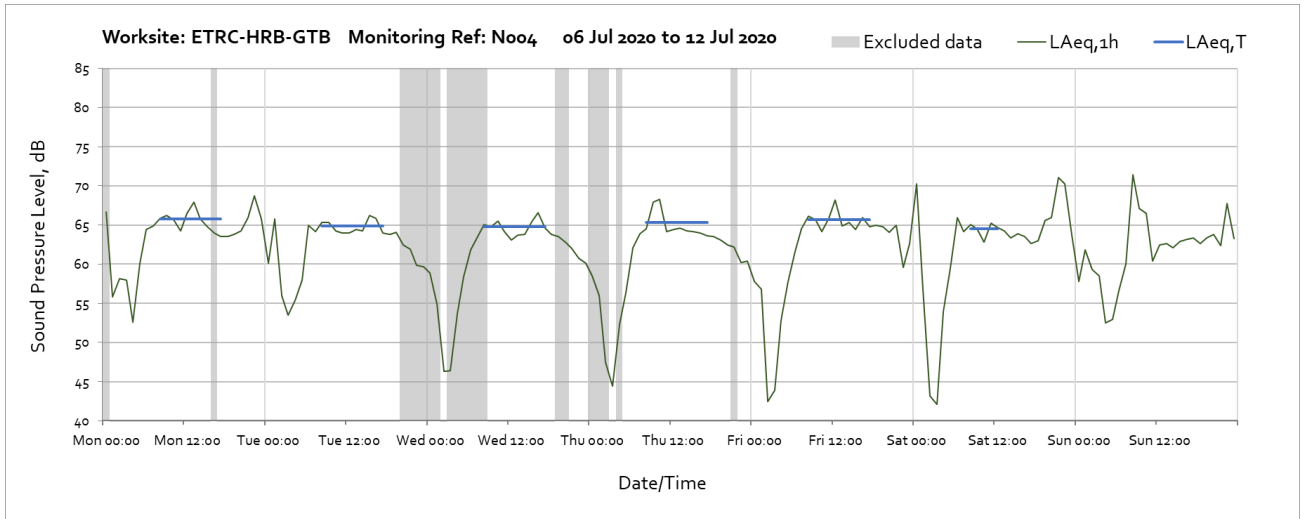


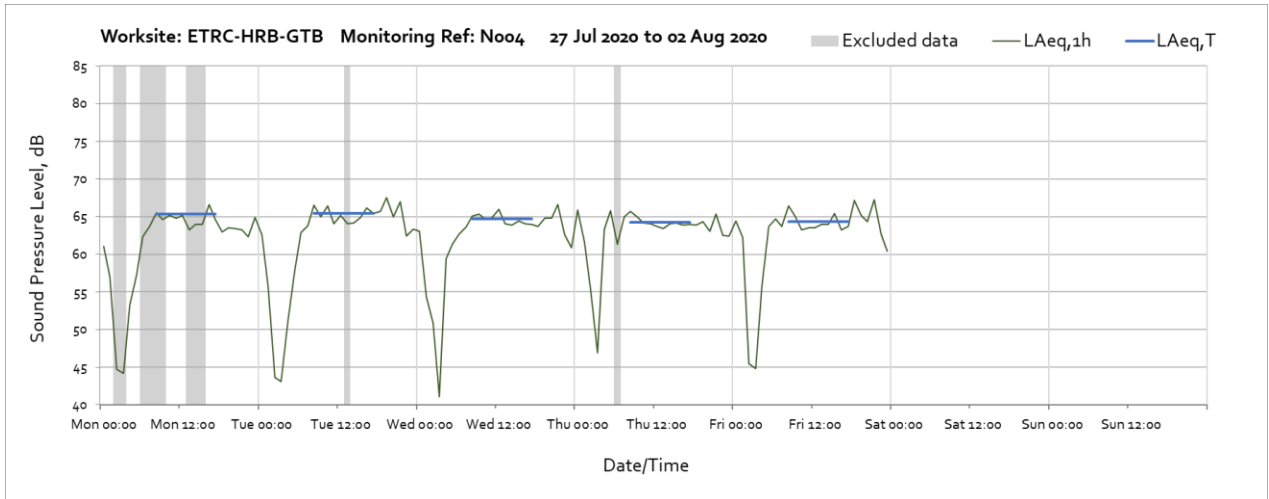
Note: Period between 21:00 and 22:00 on Wednesday 22nd was due excluded due to a meter malfunction causing a erroneous data log (98.2dB LAeq,1hr).



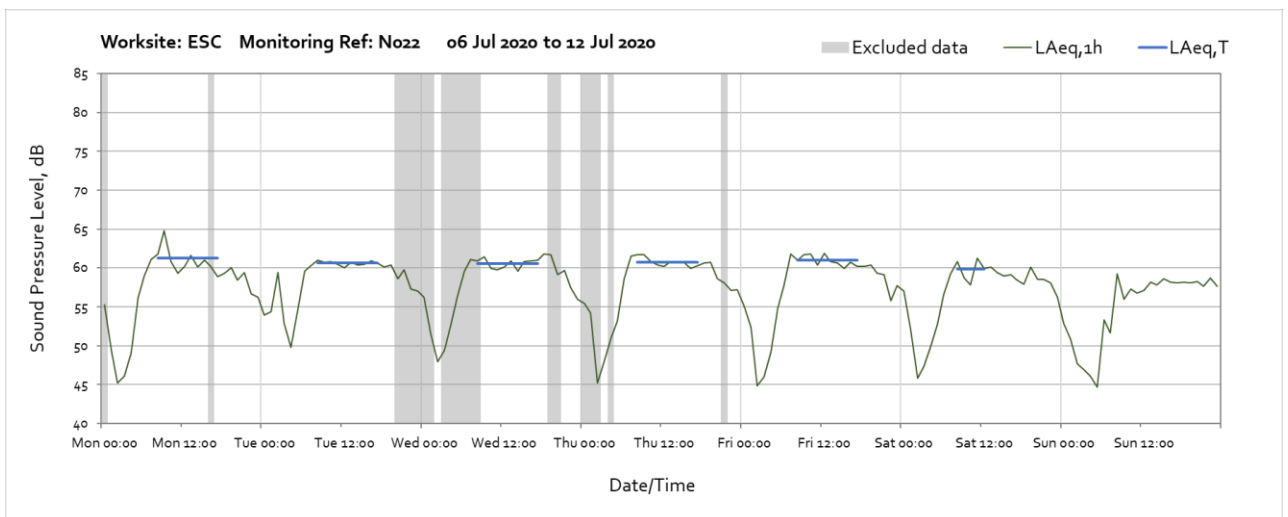
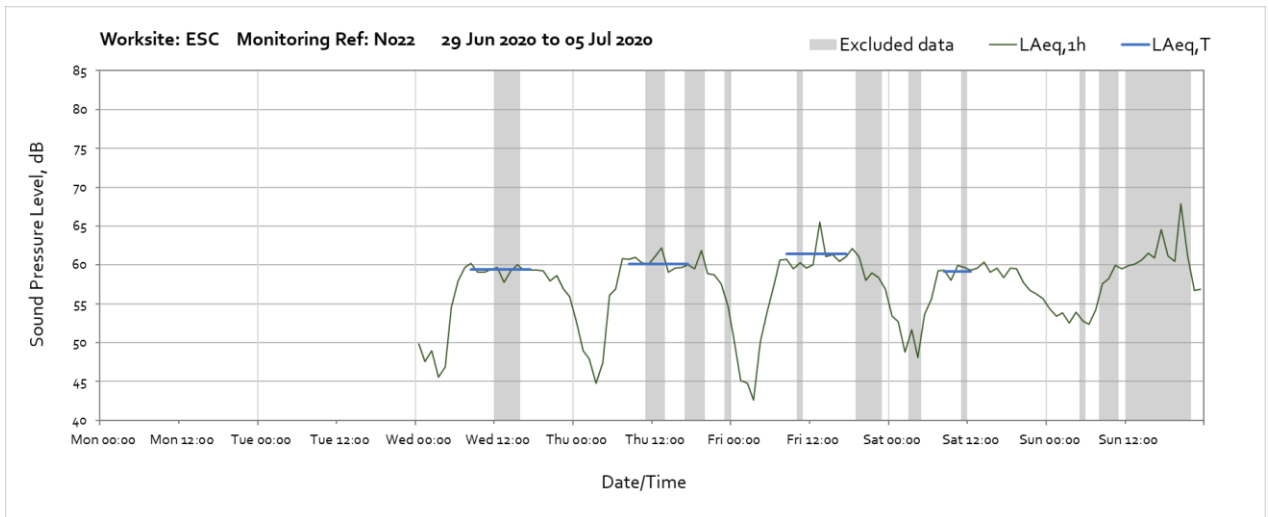
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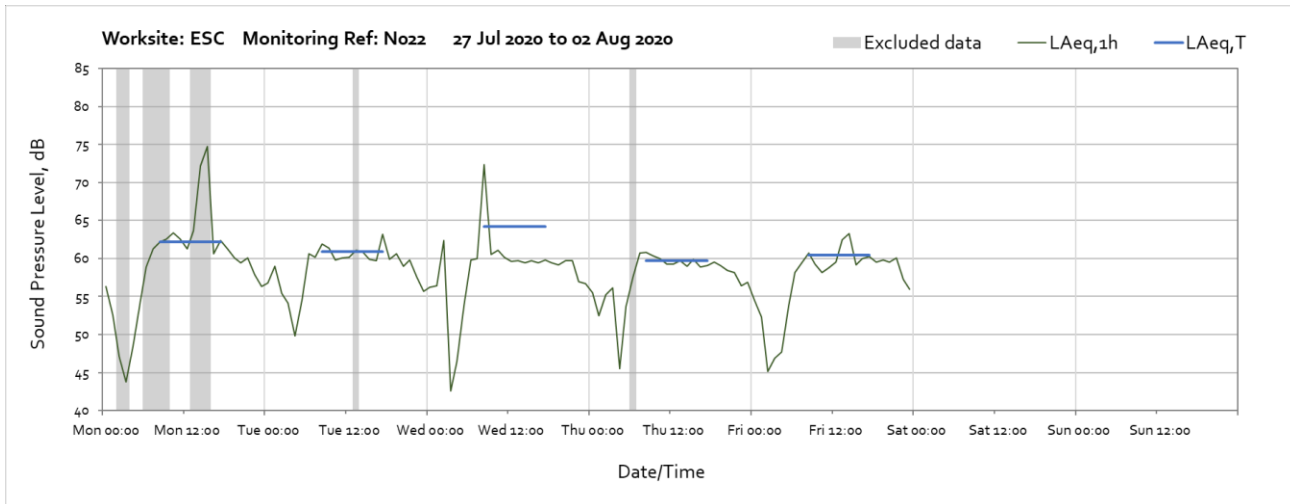
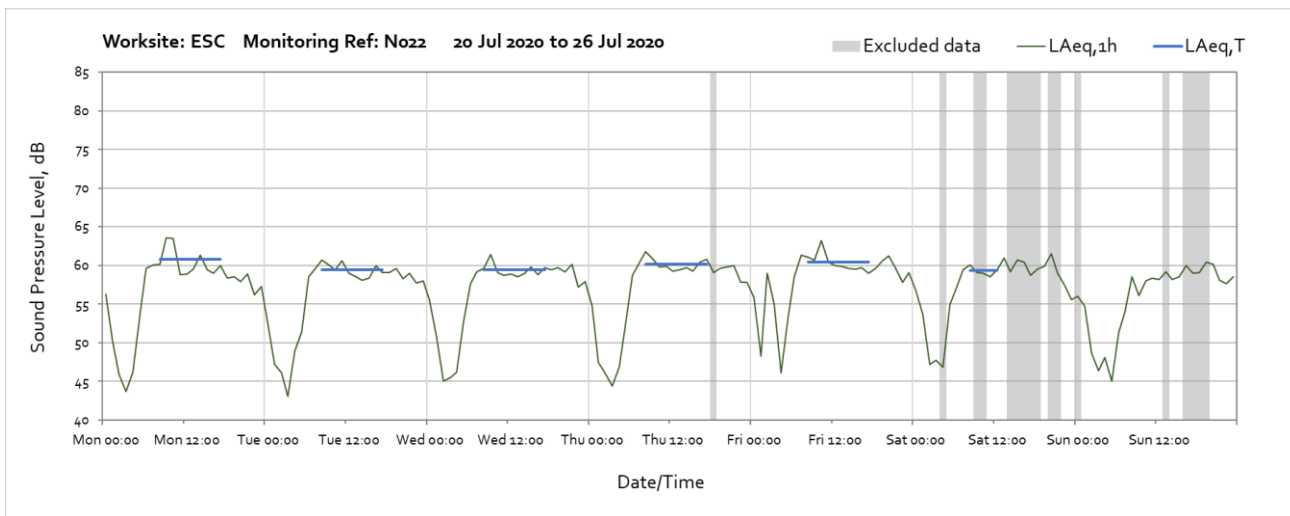
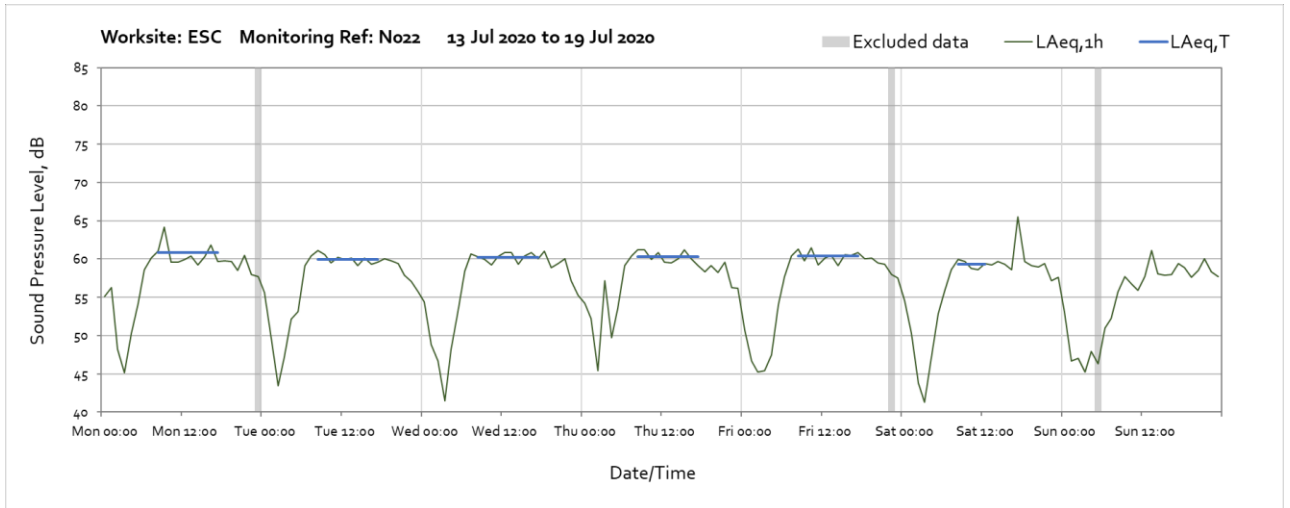




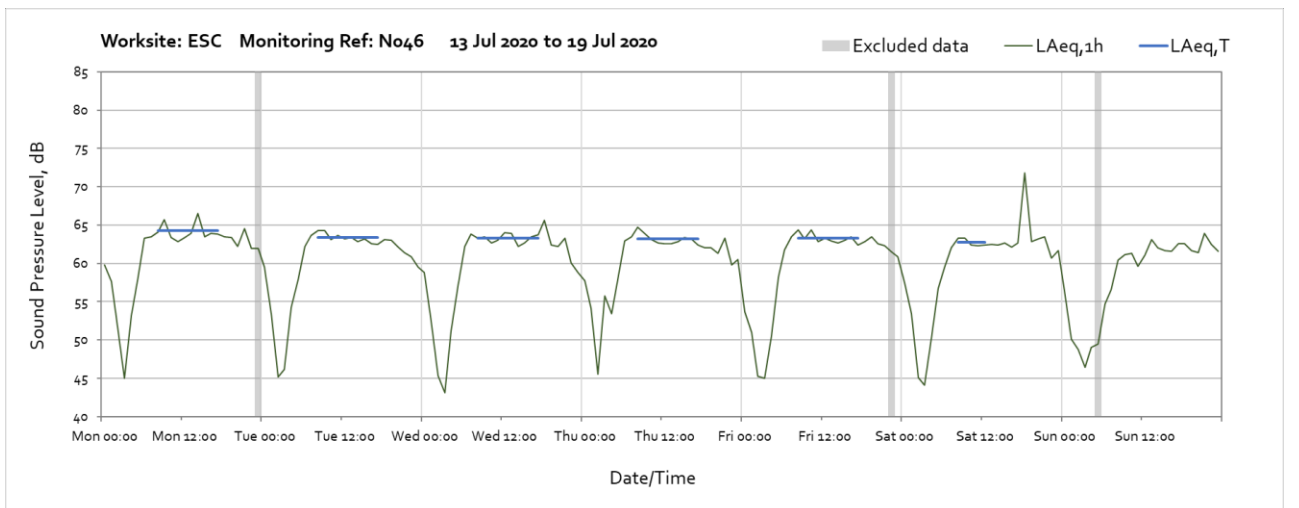
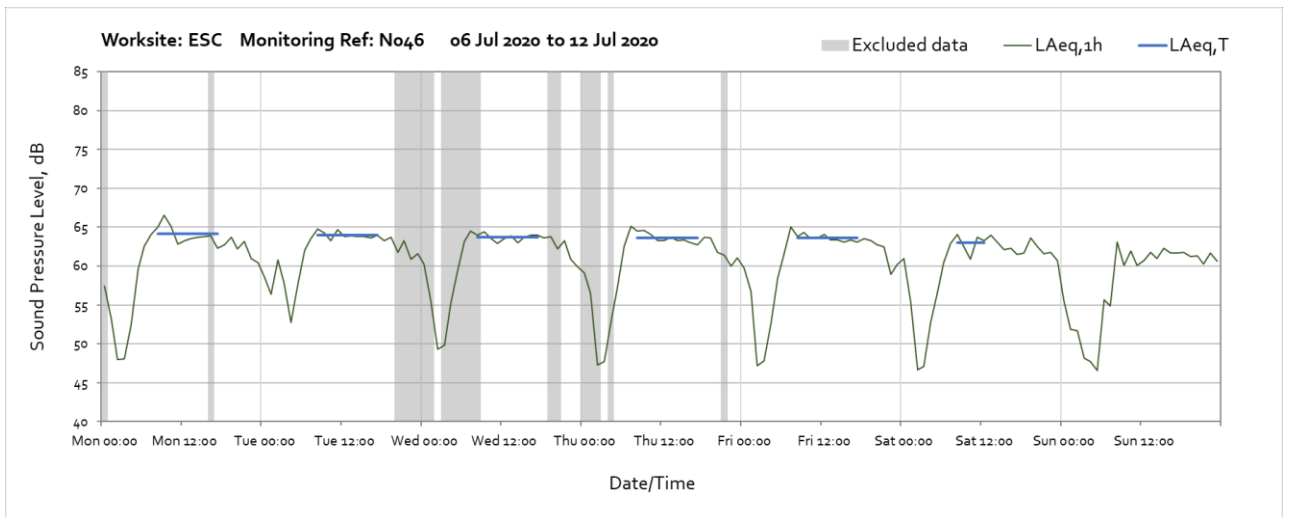
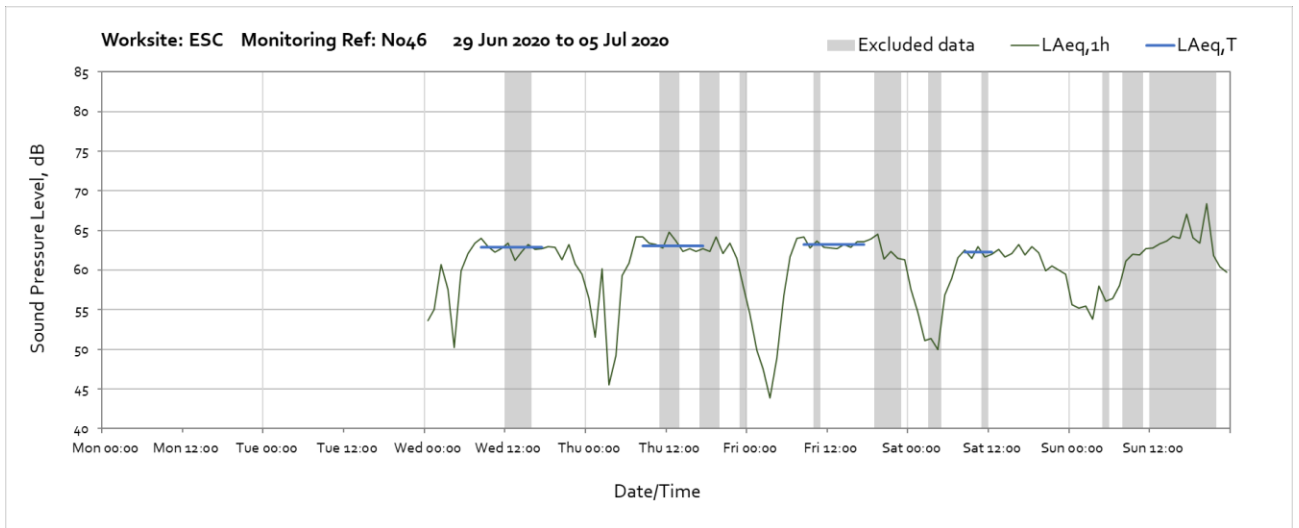


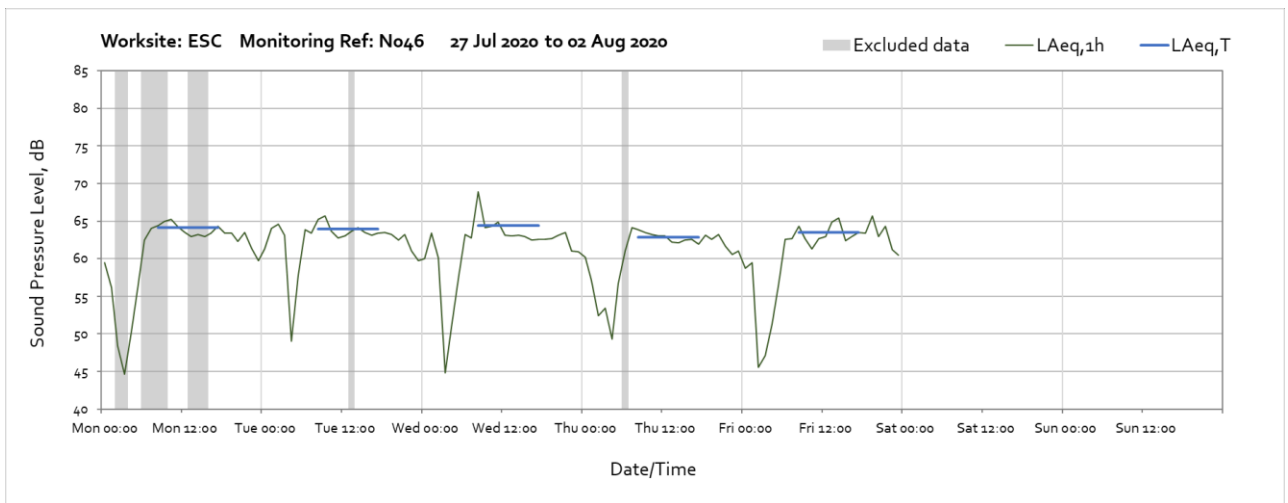
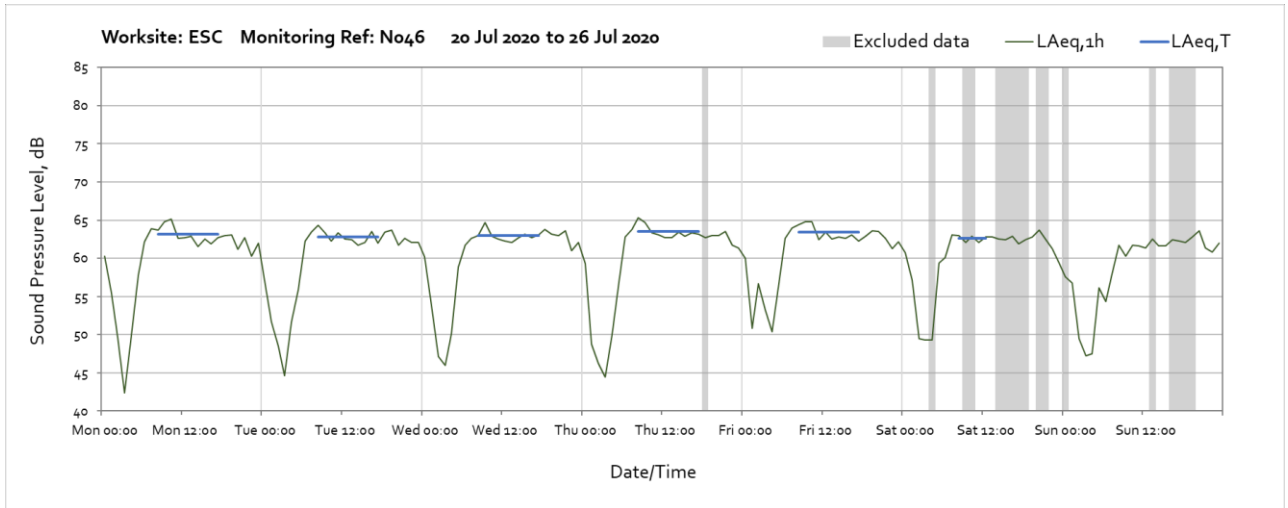
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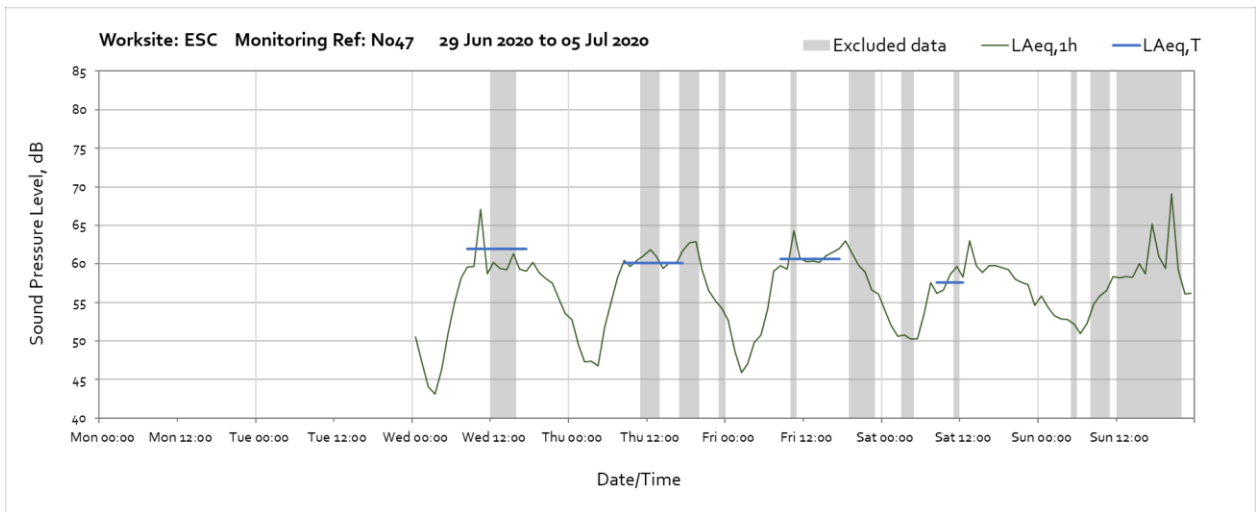


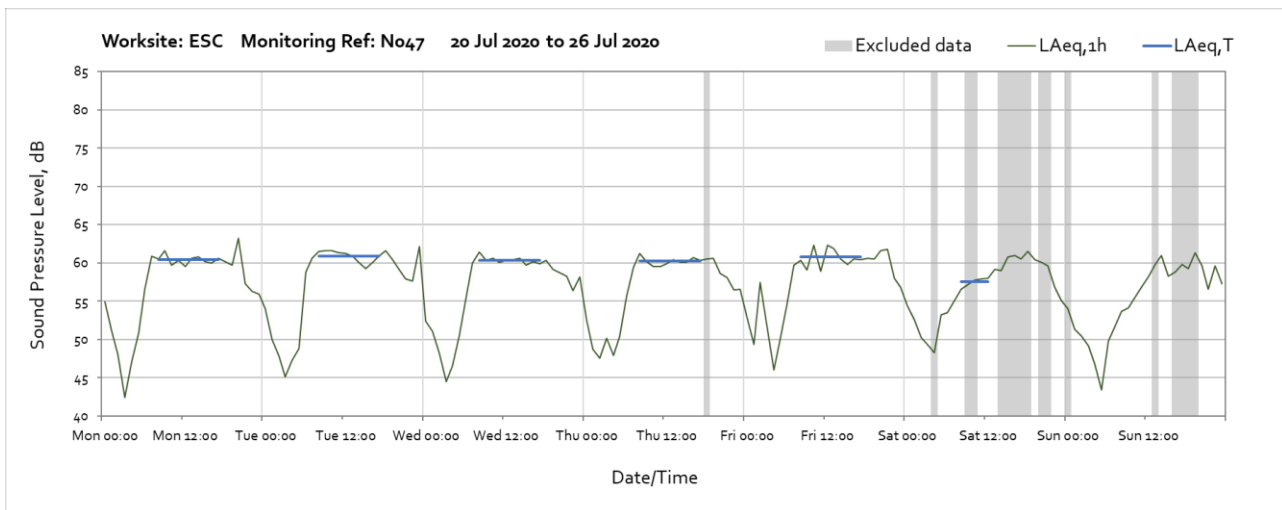
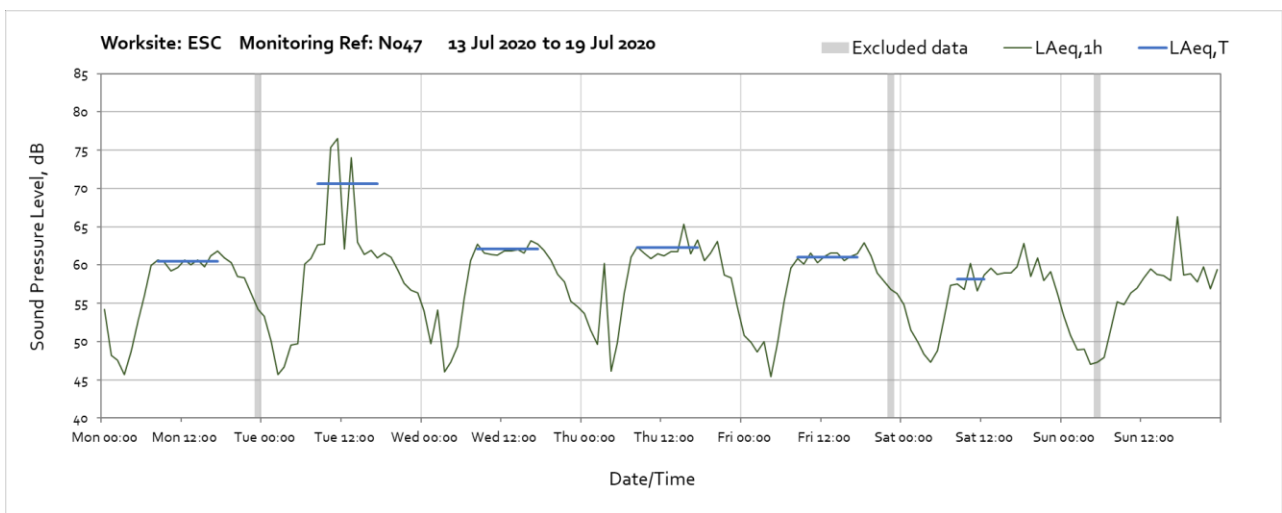
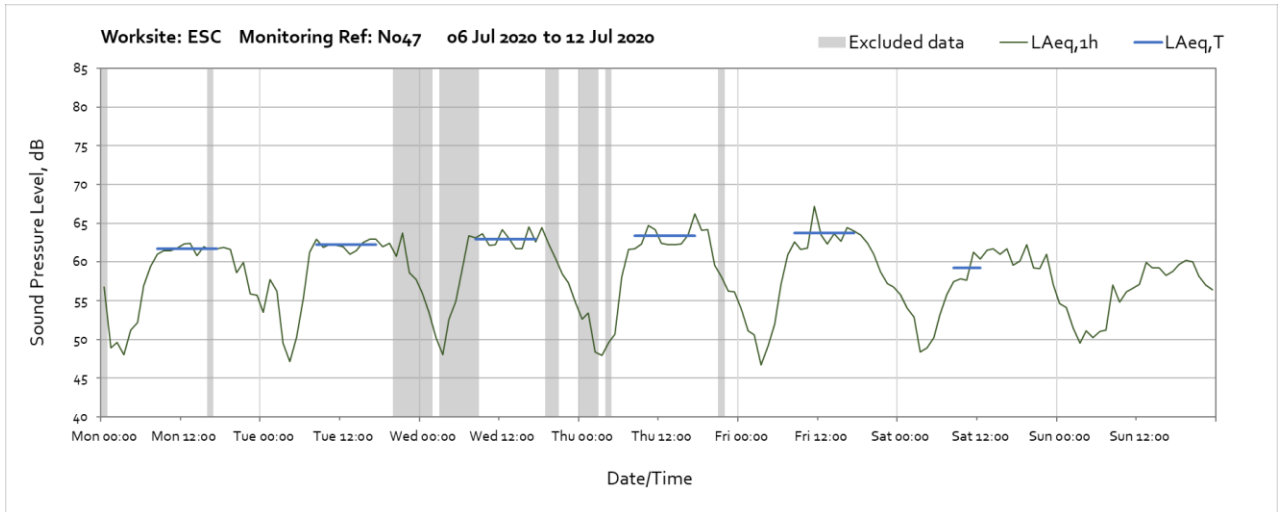
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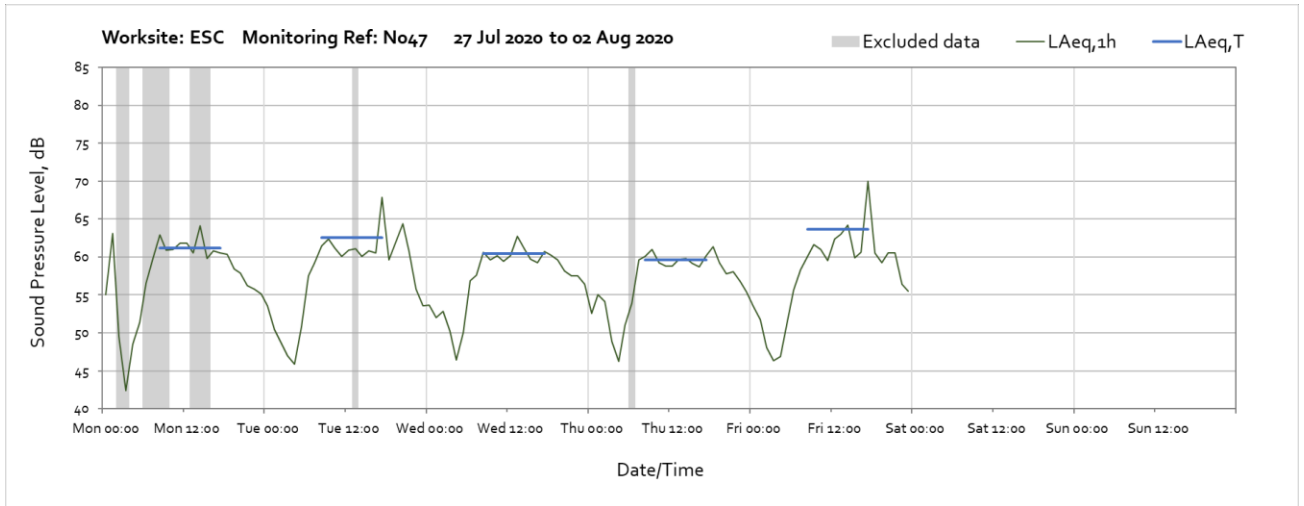




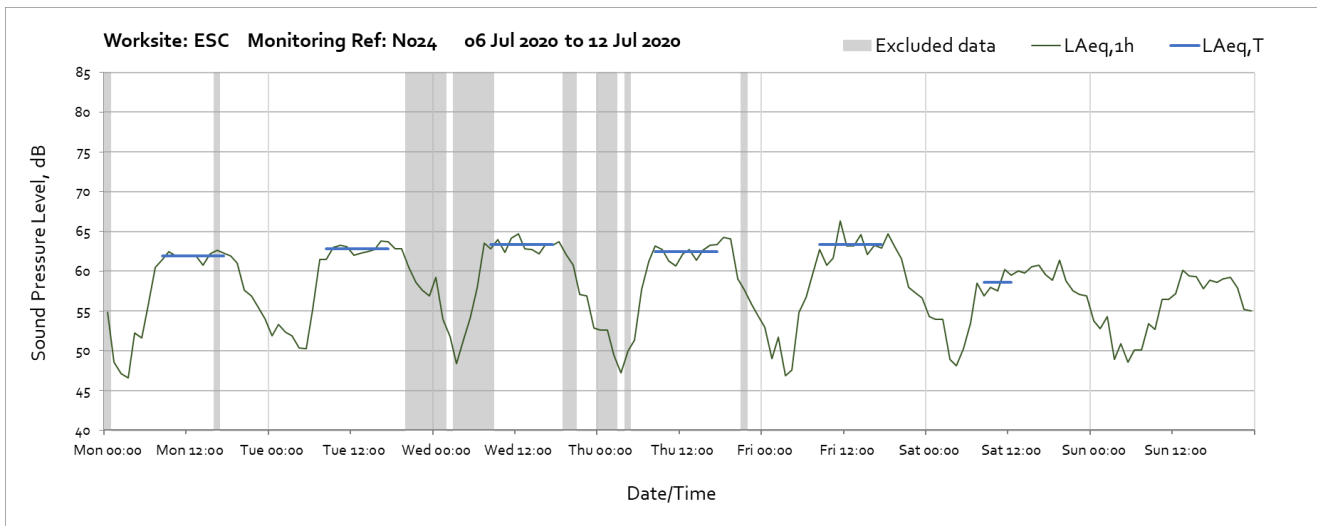
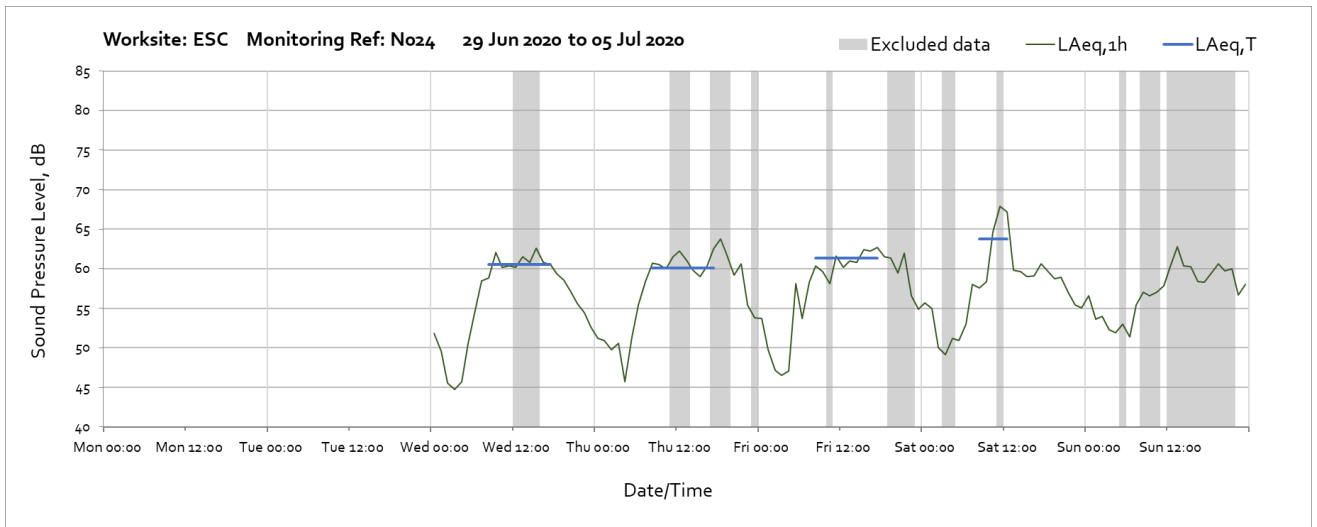
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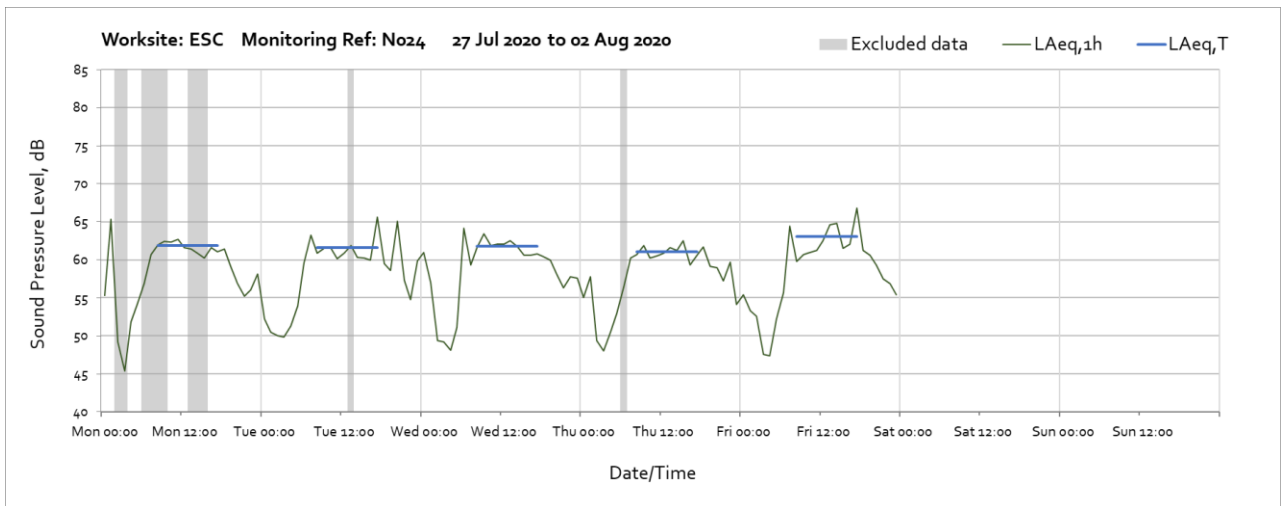
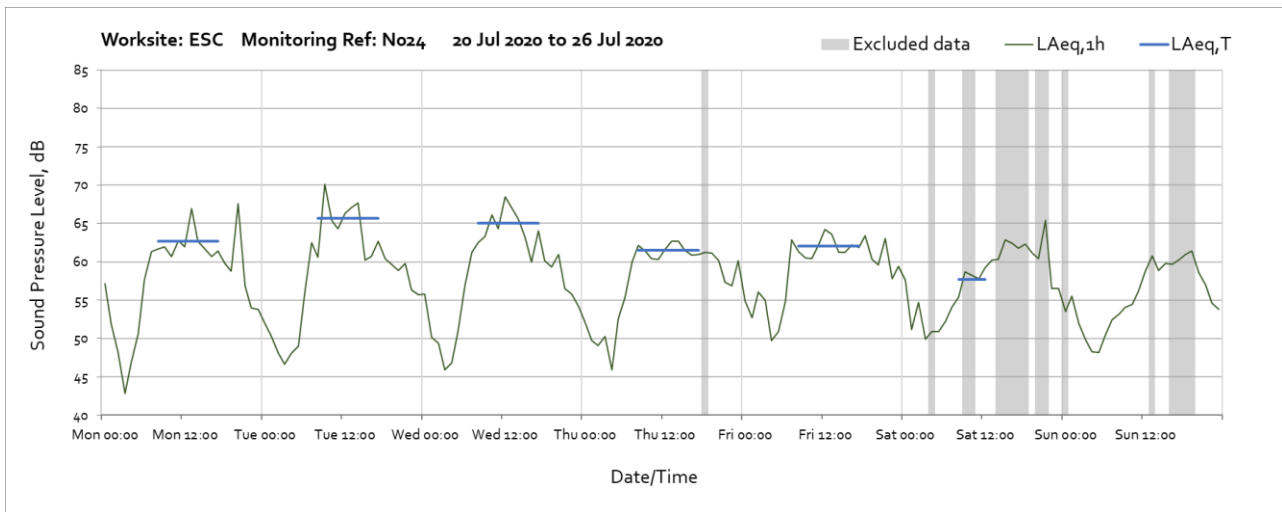
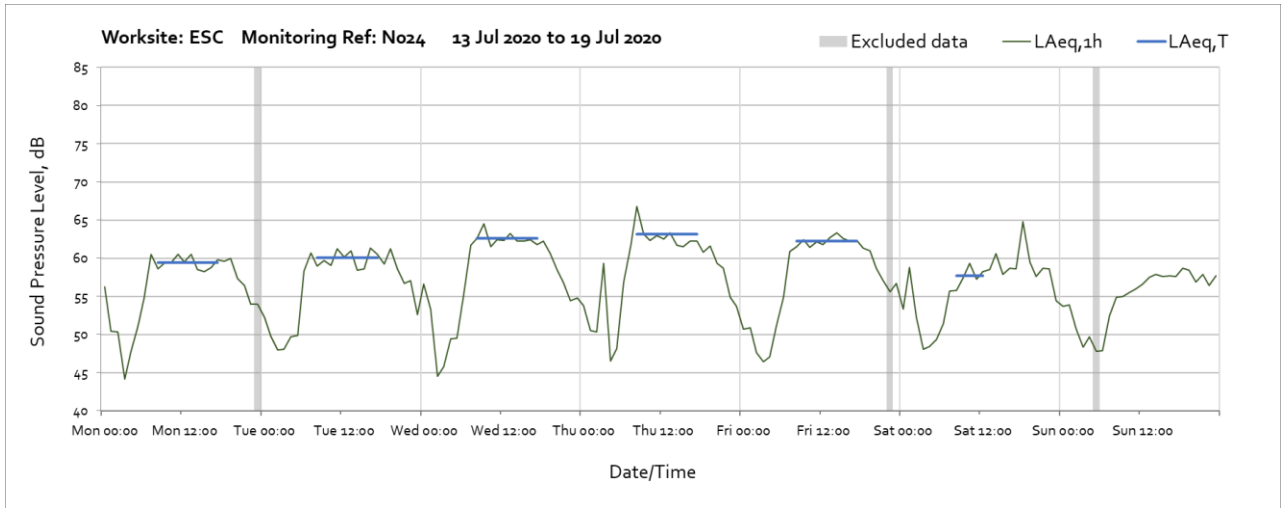




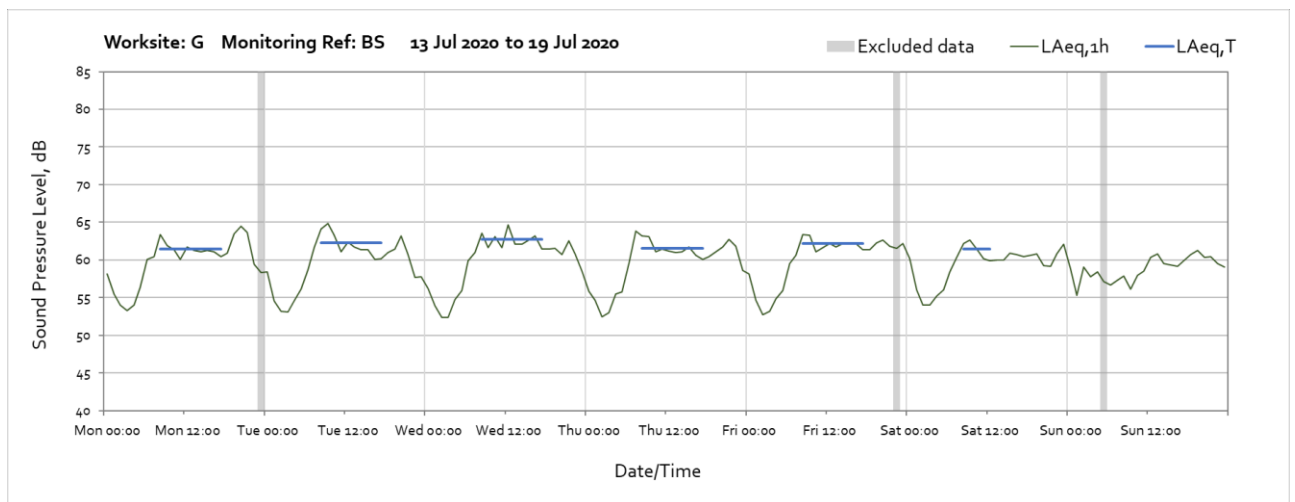
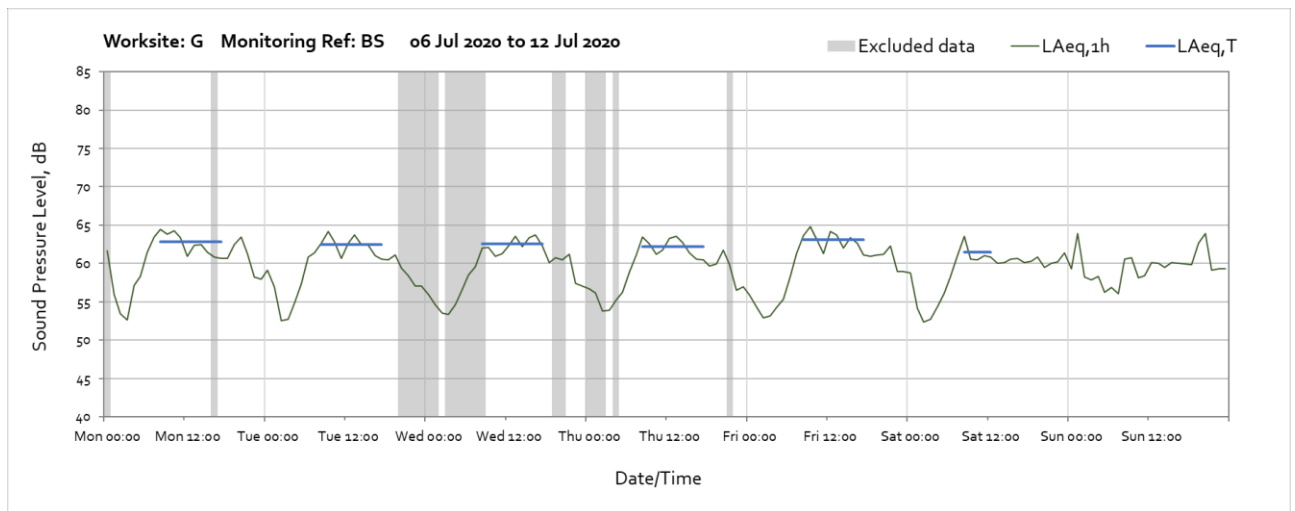
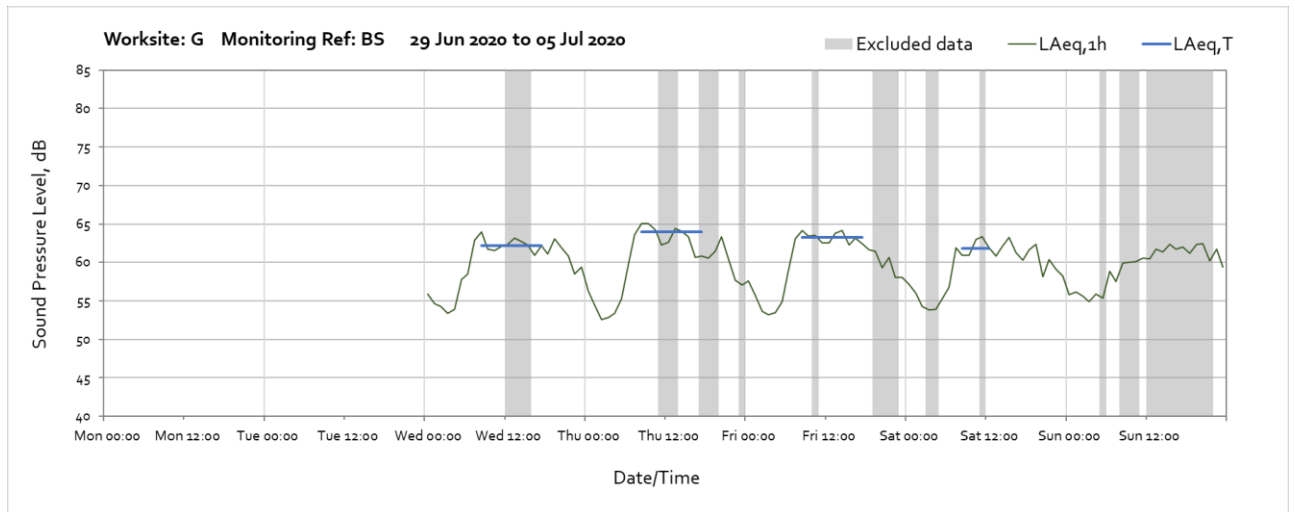


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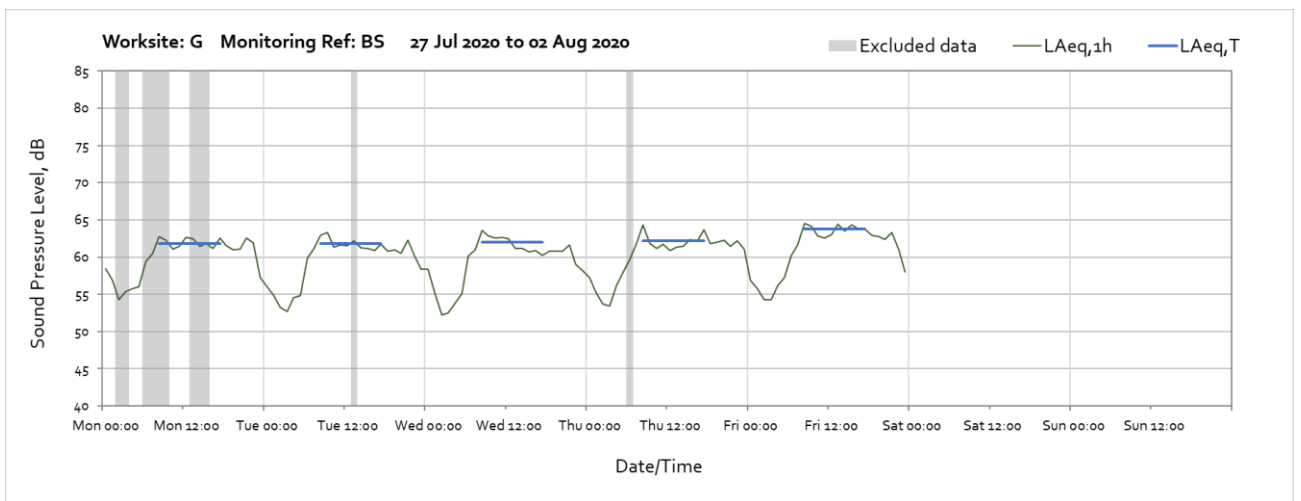
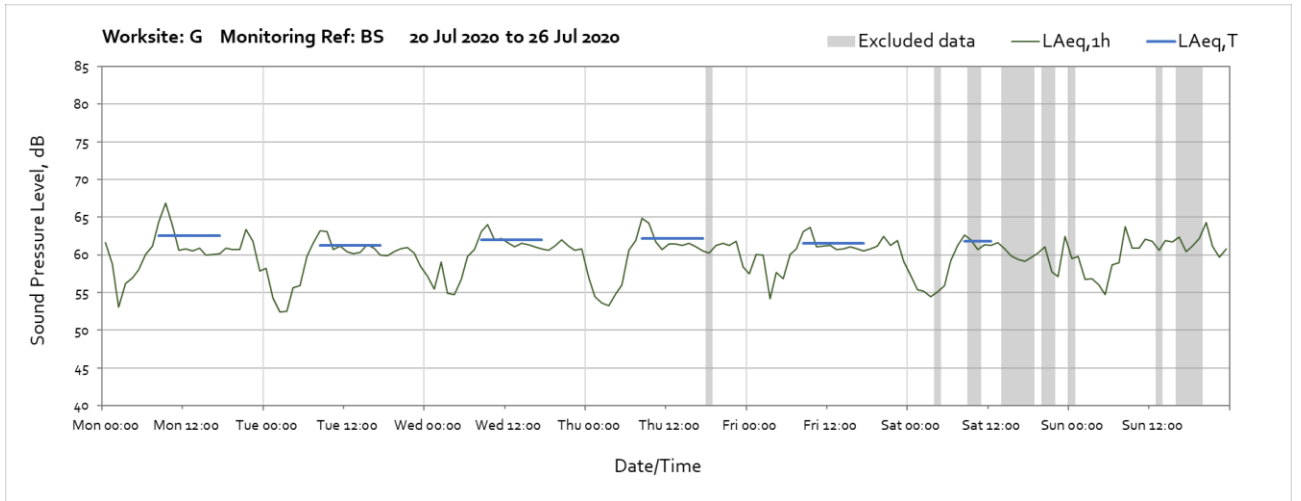




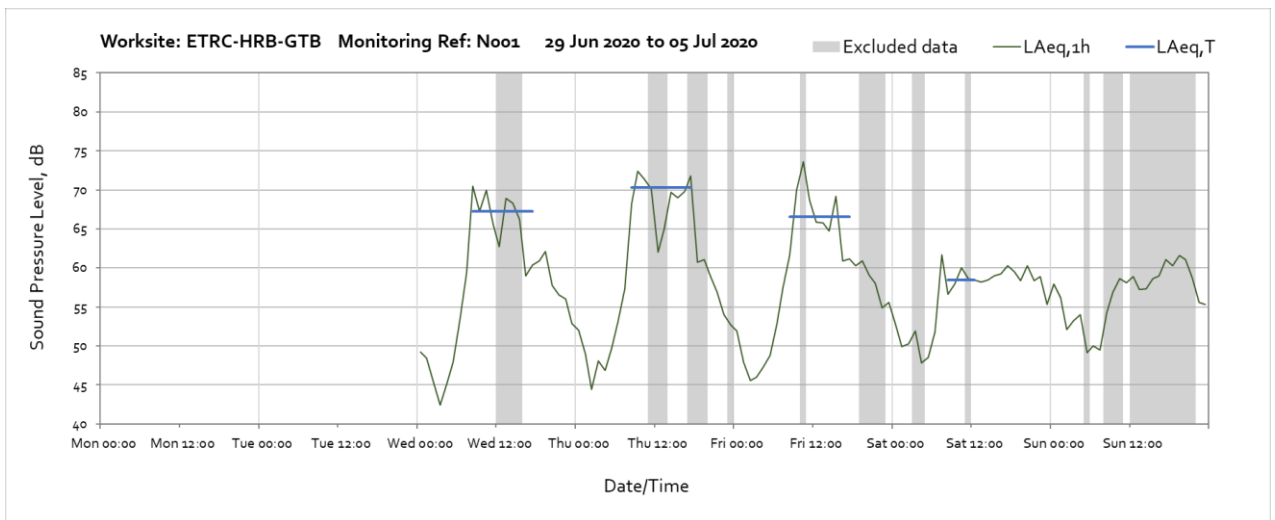
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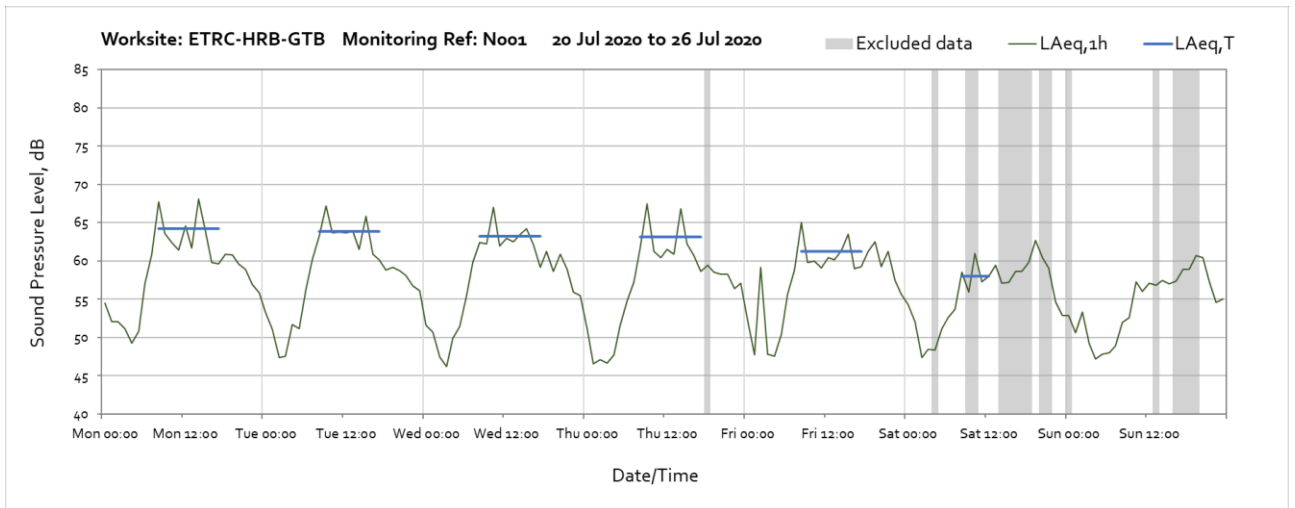
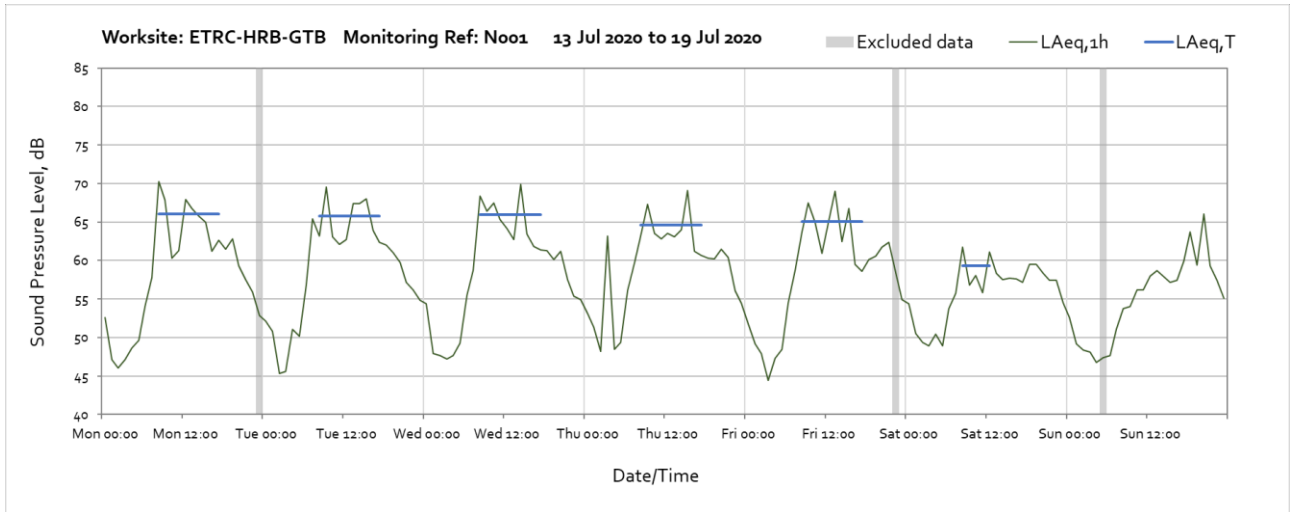
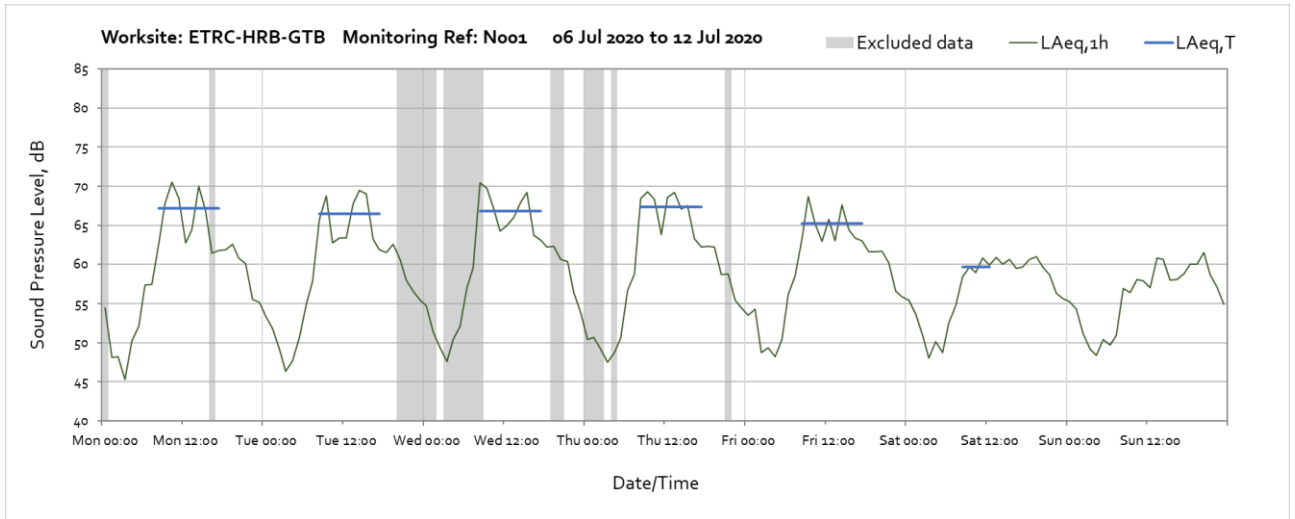


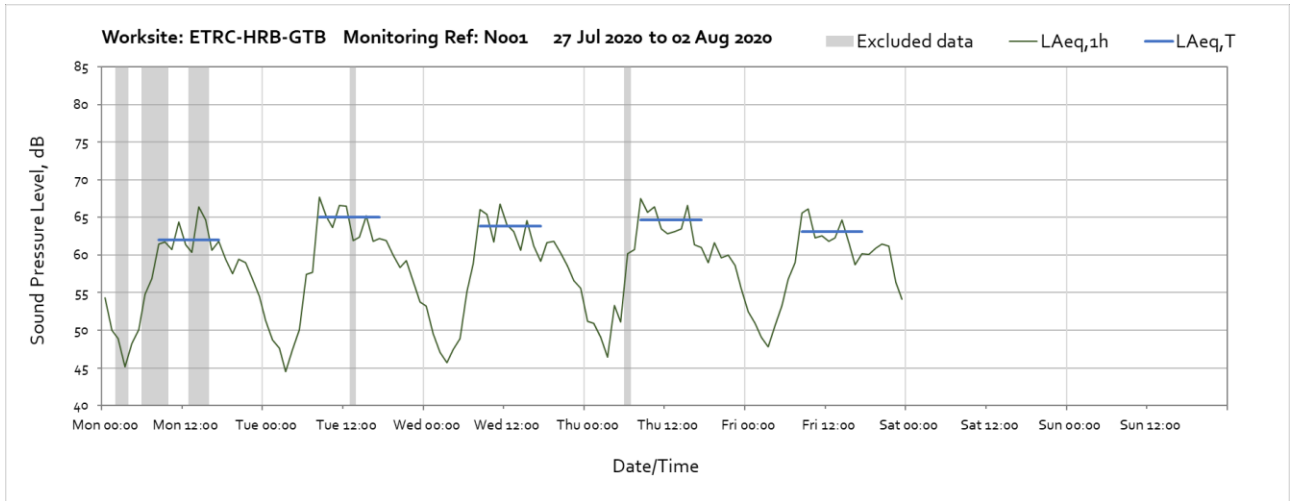
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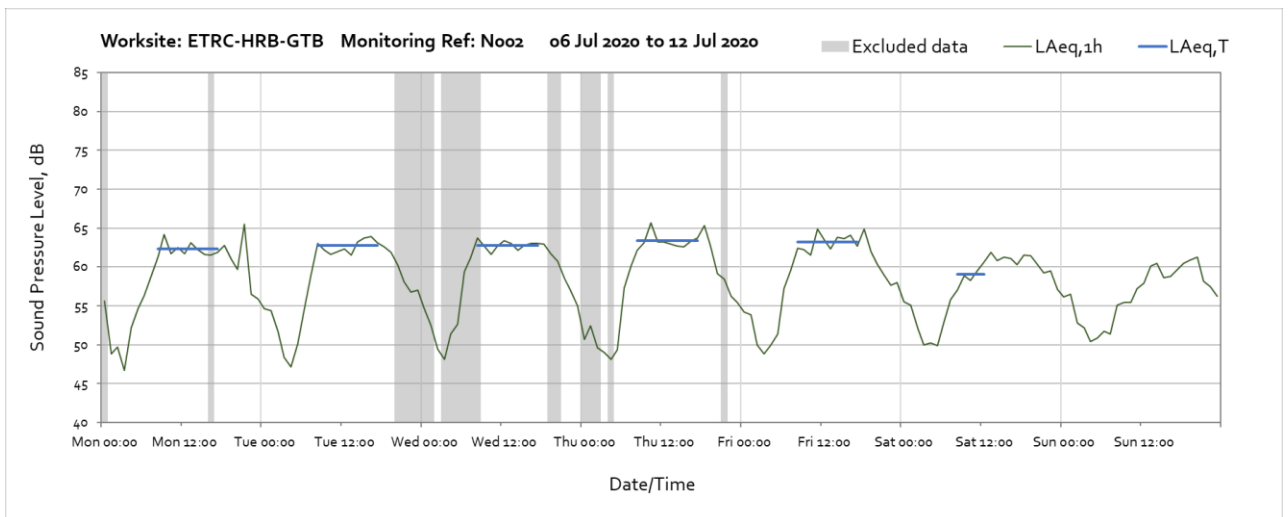
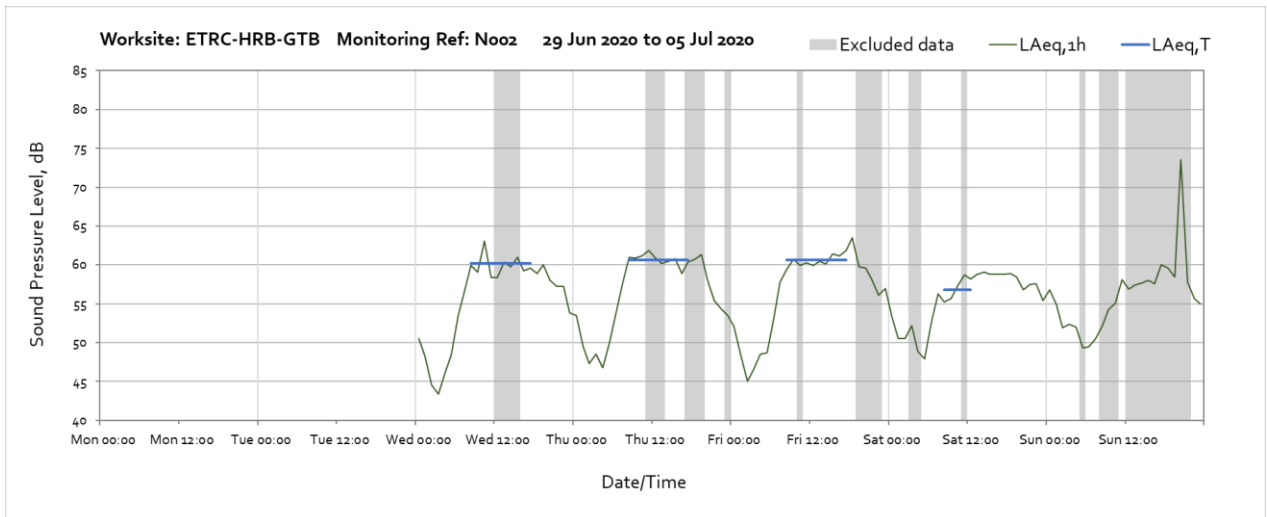
Worksite: ETRC-HRB-GTB – Monitoring Ref: N001

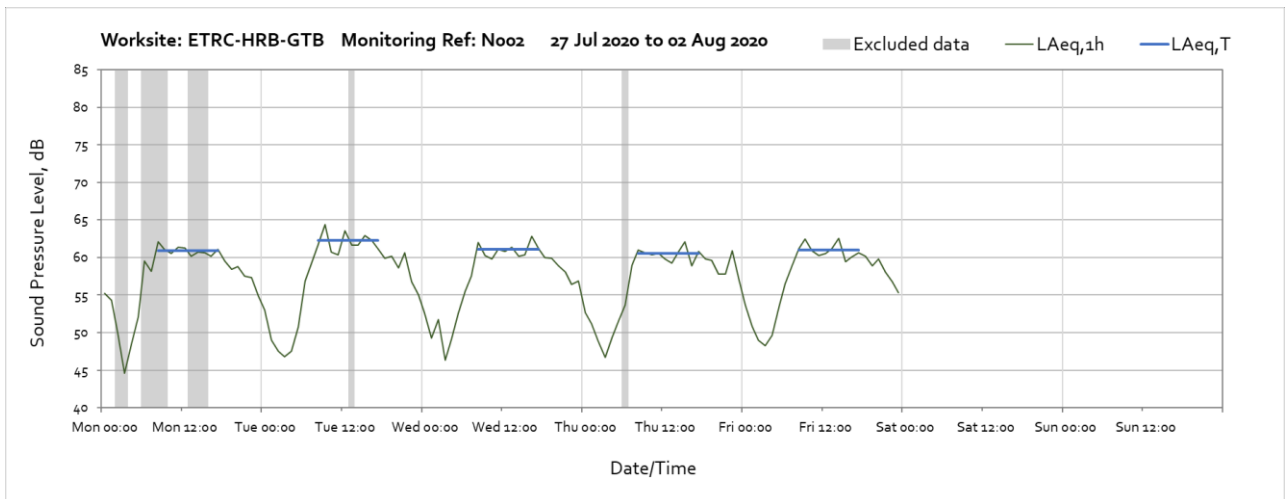
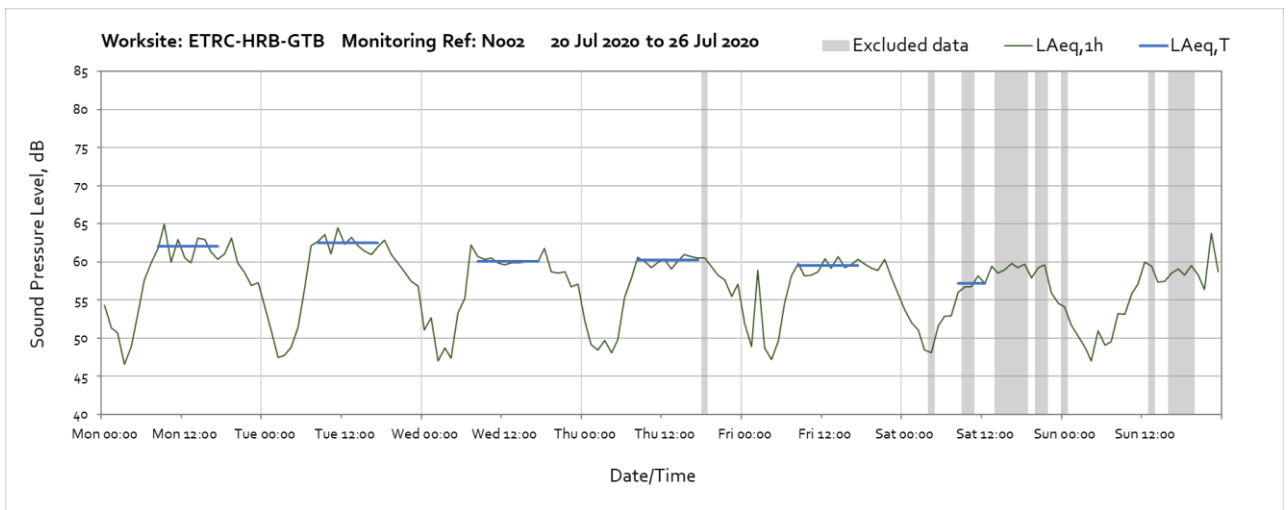
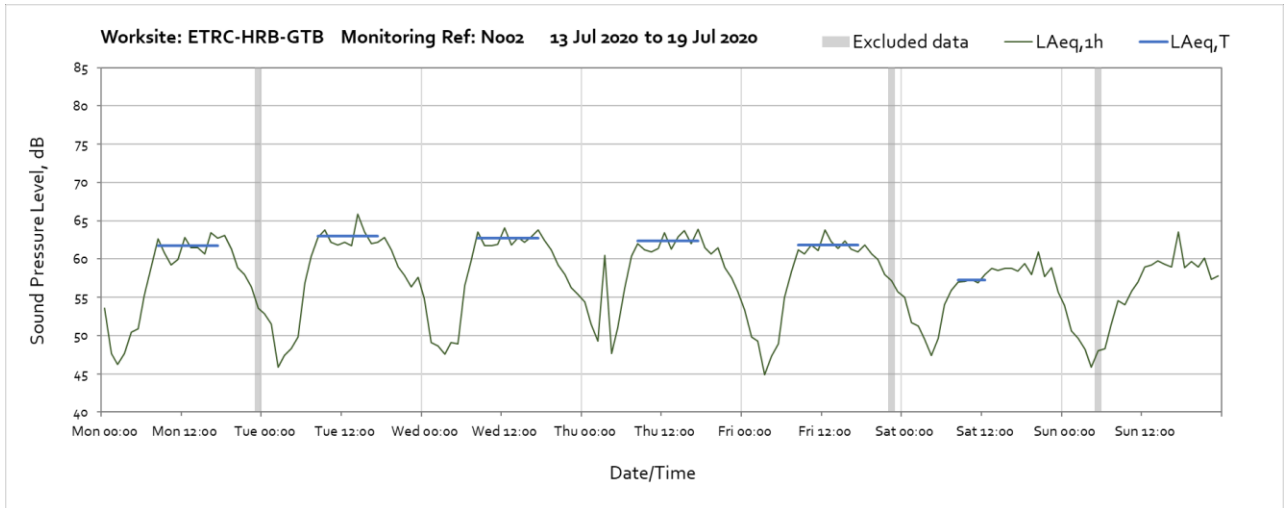




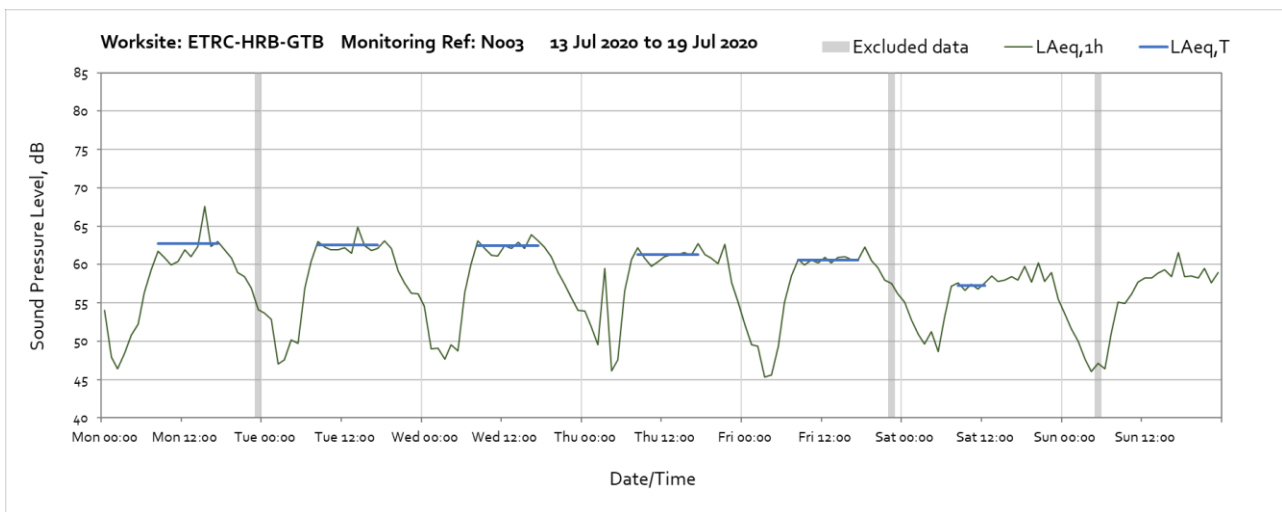
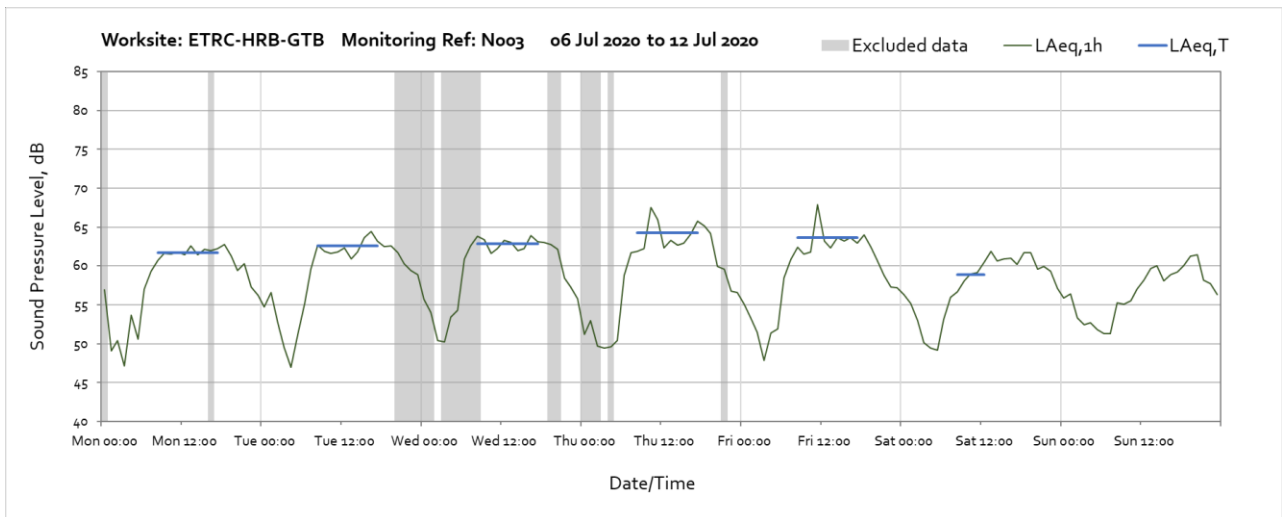
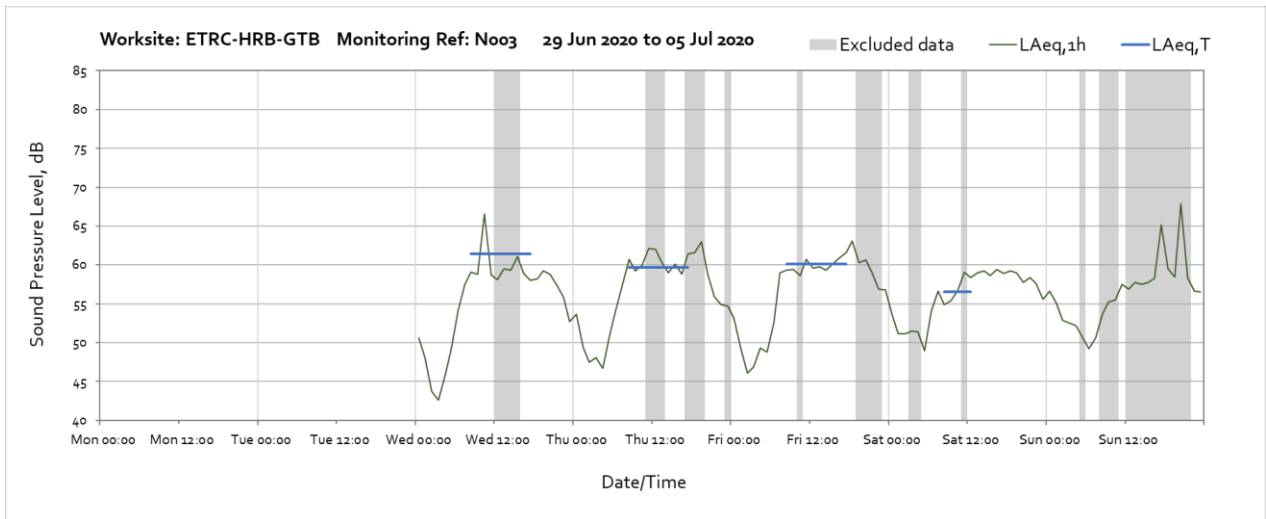


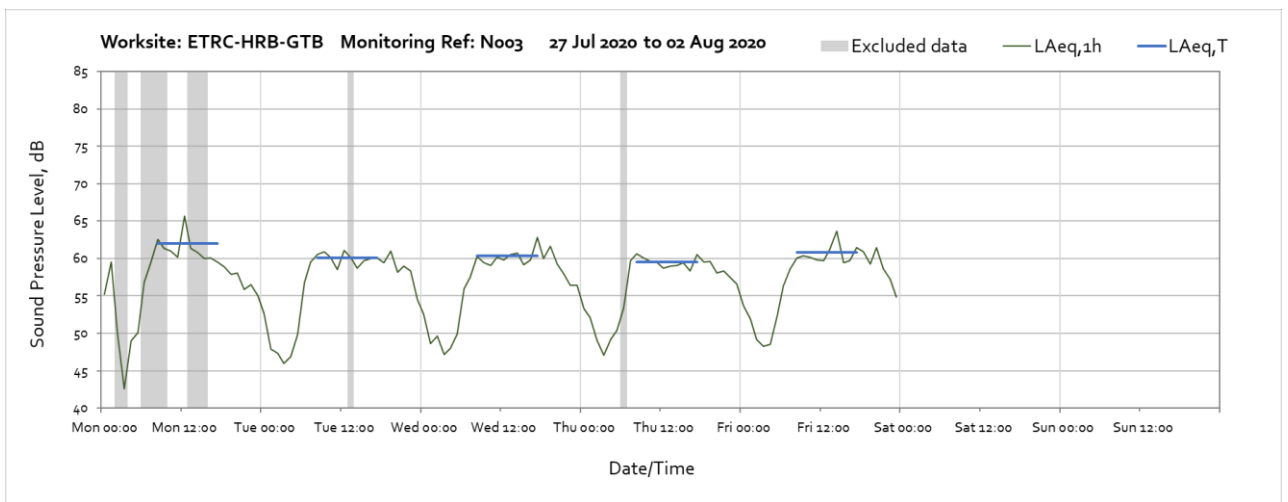
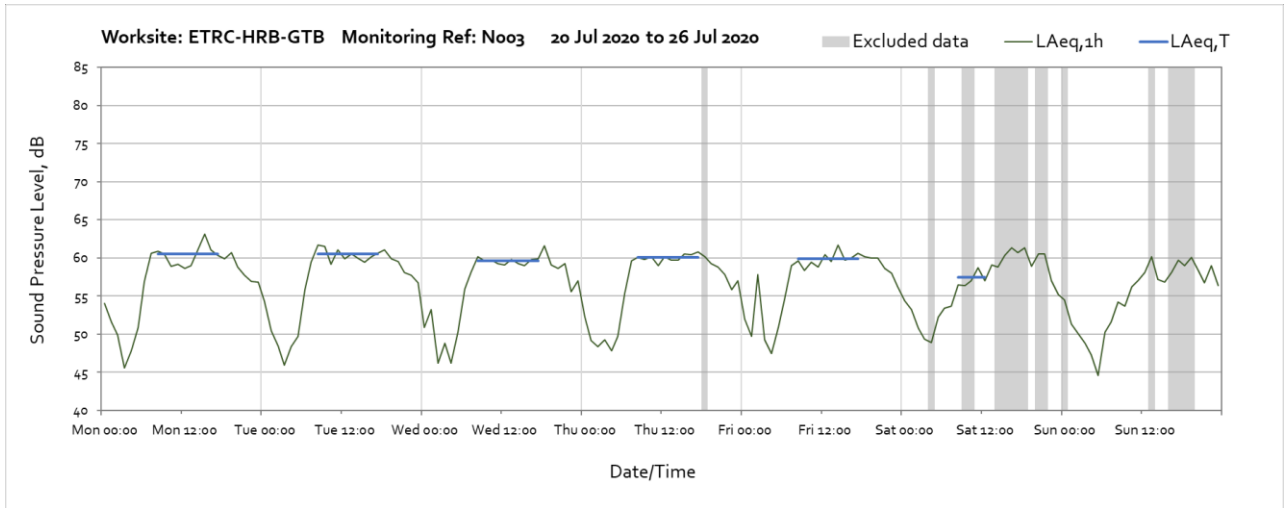
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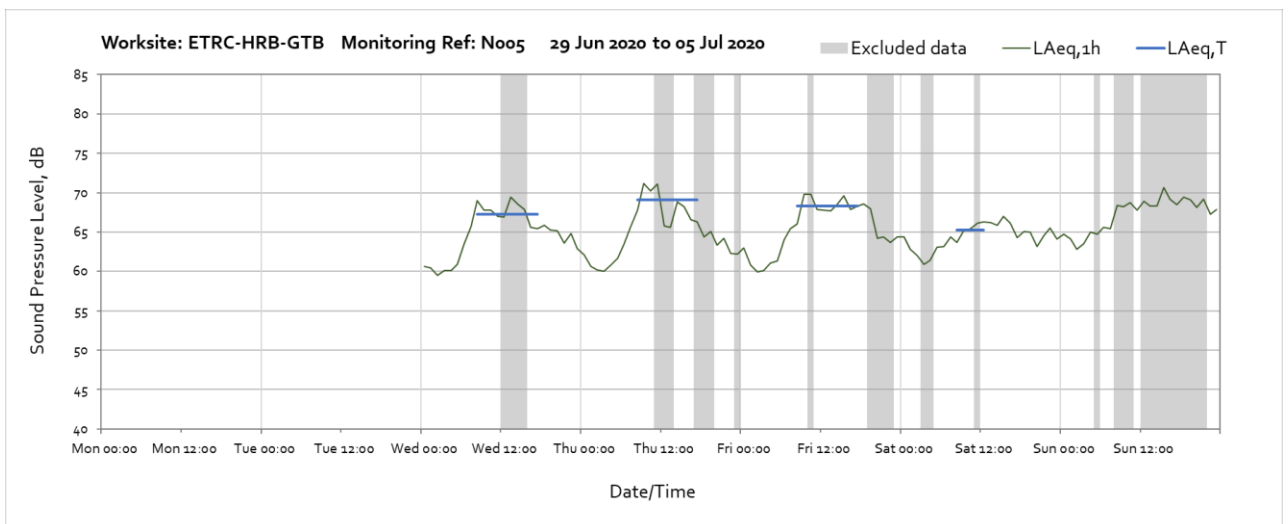


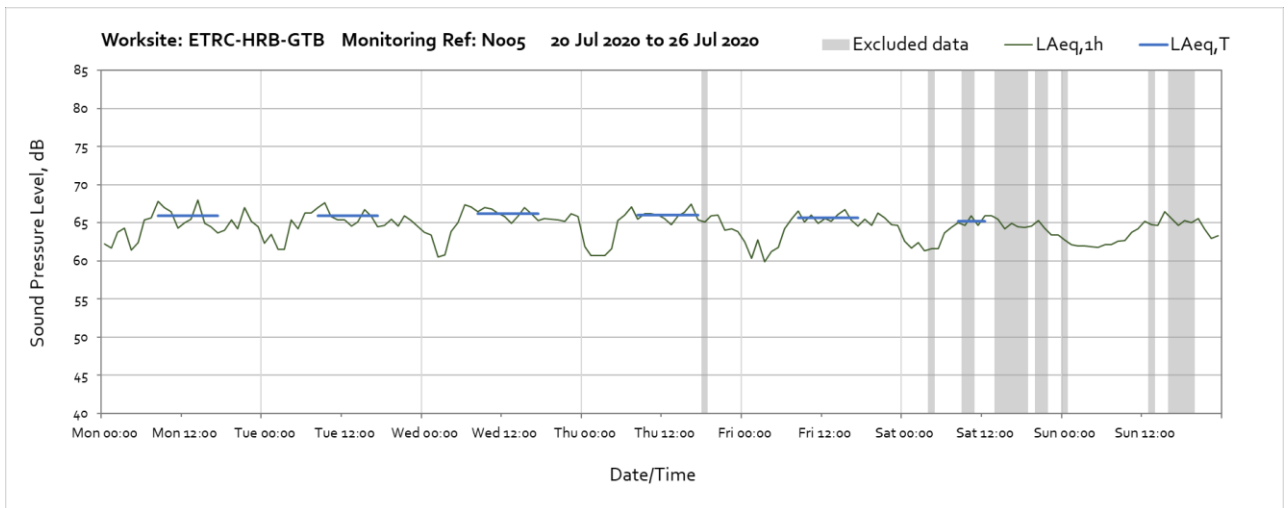
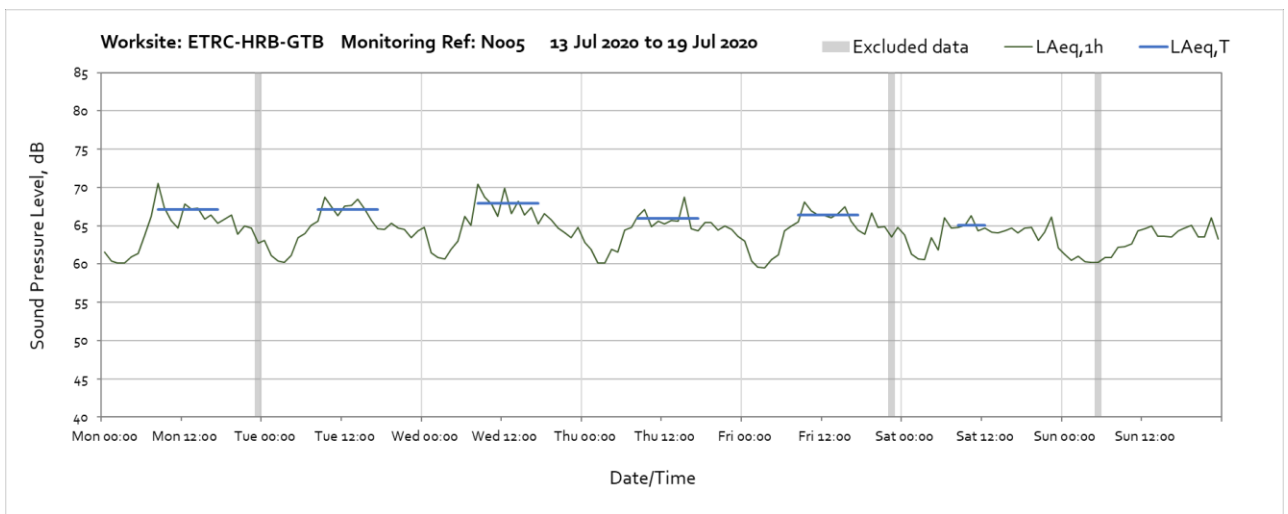
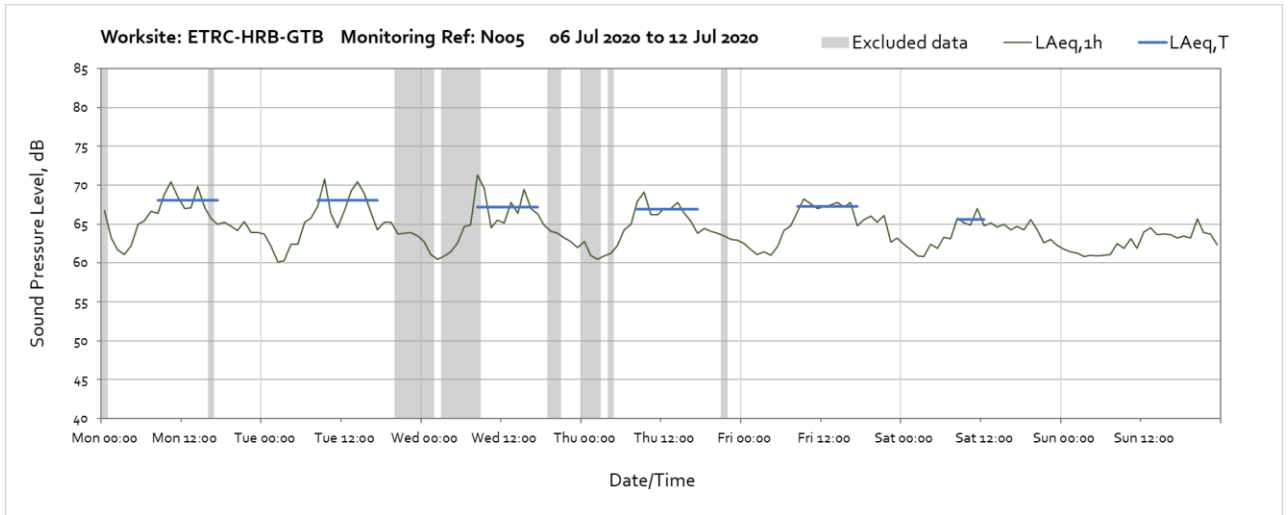
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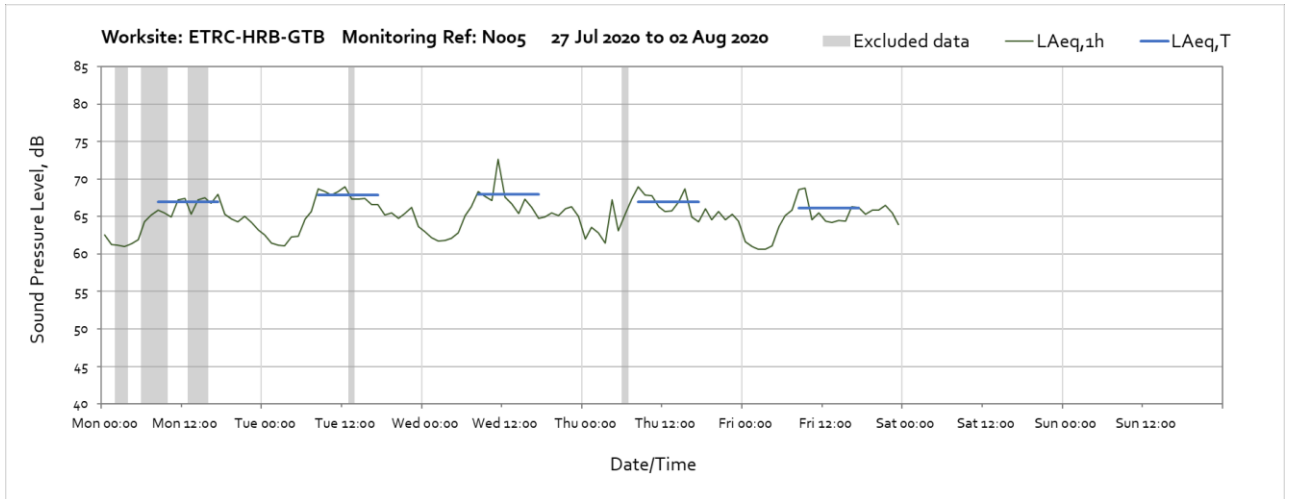




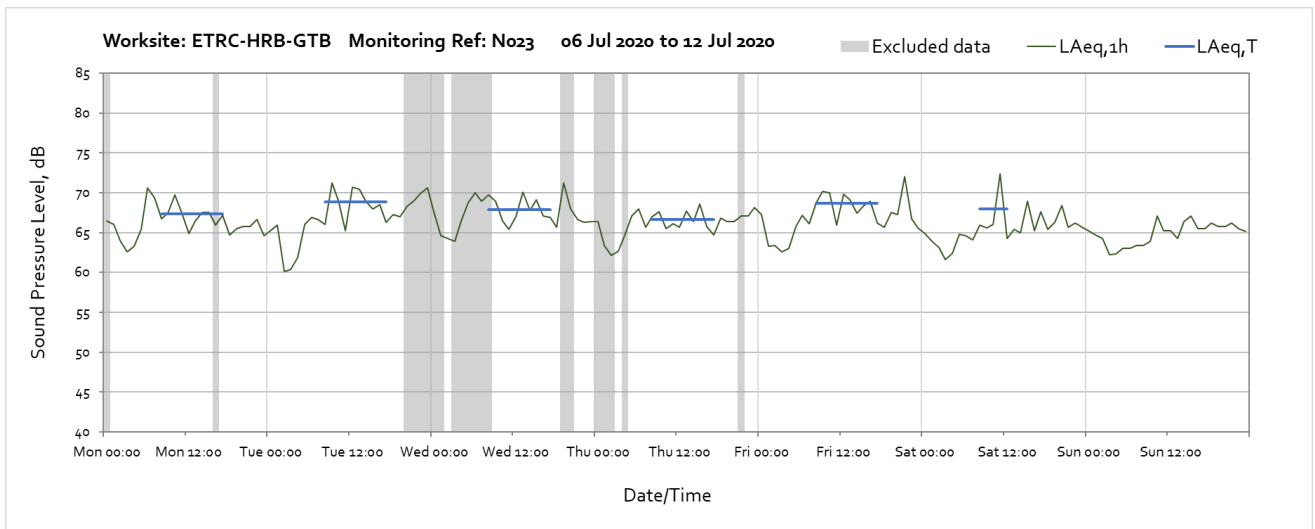
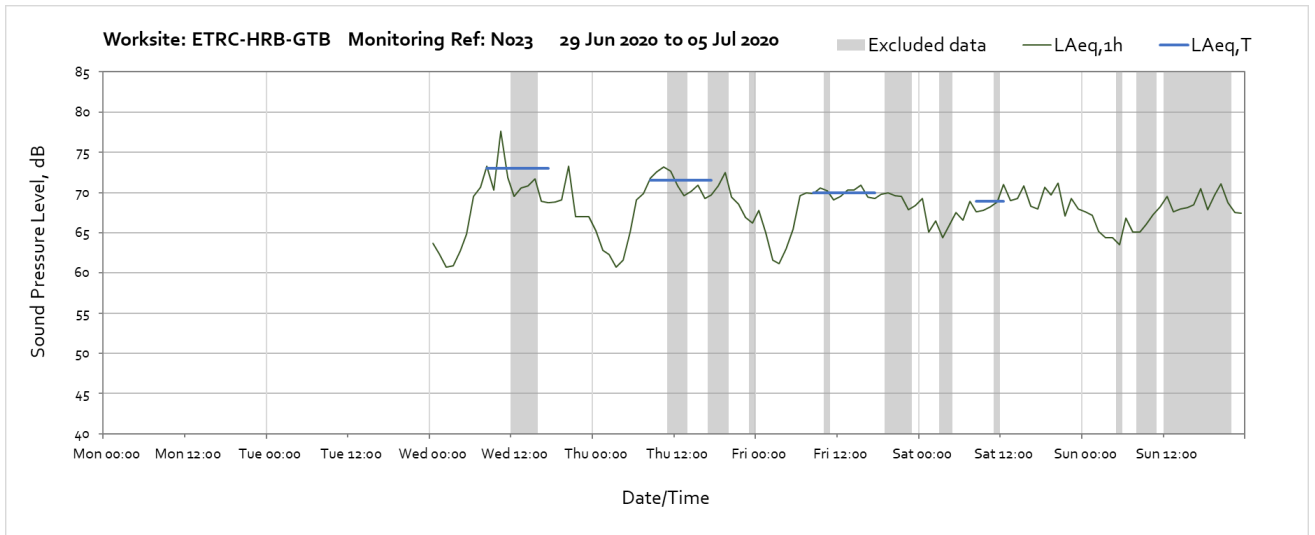
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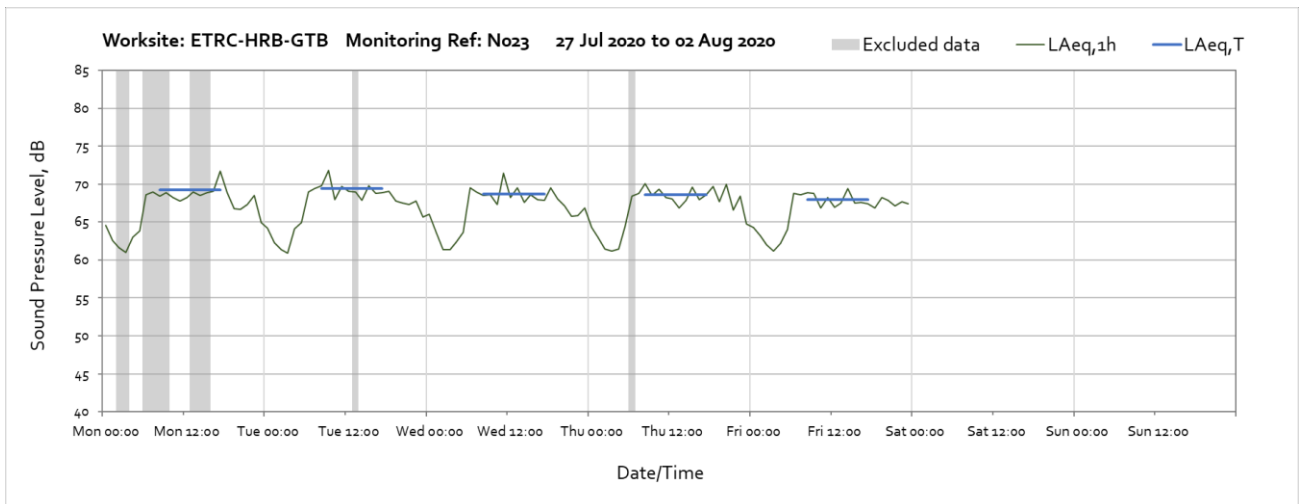
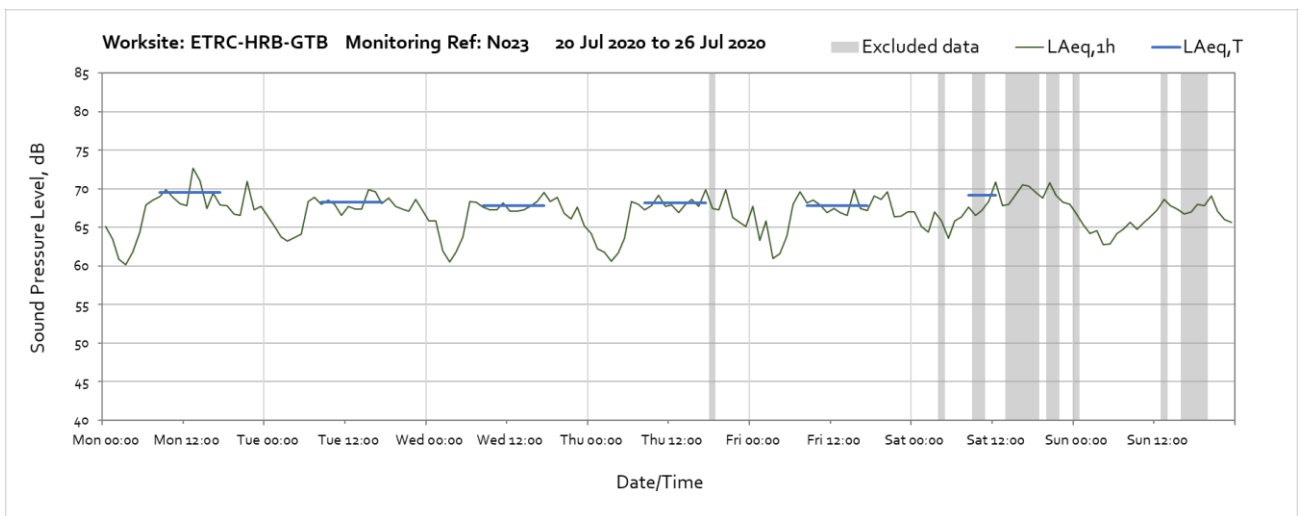
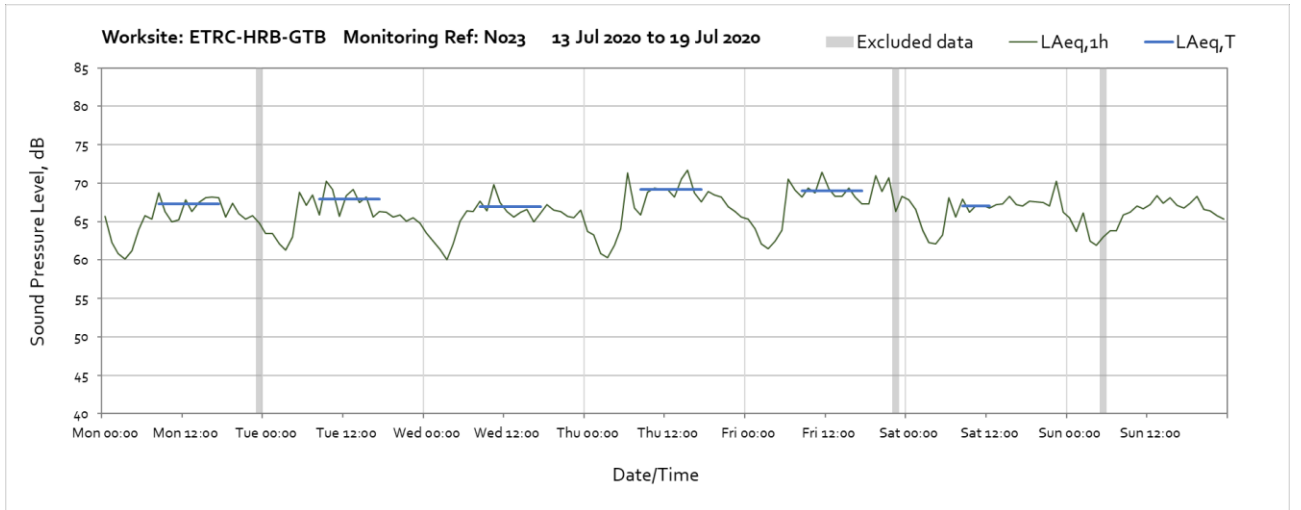




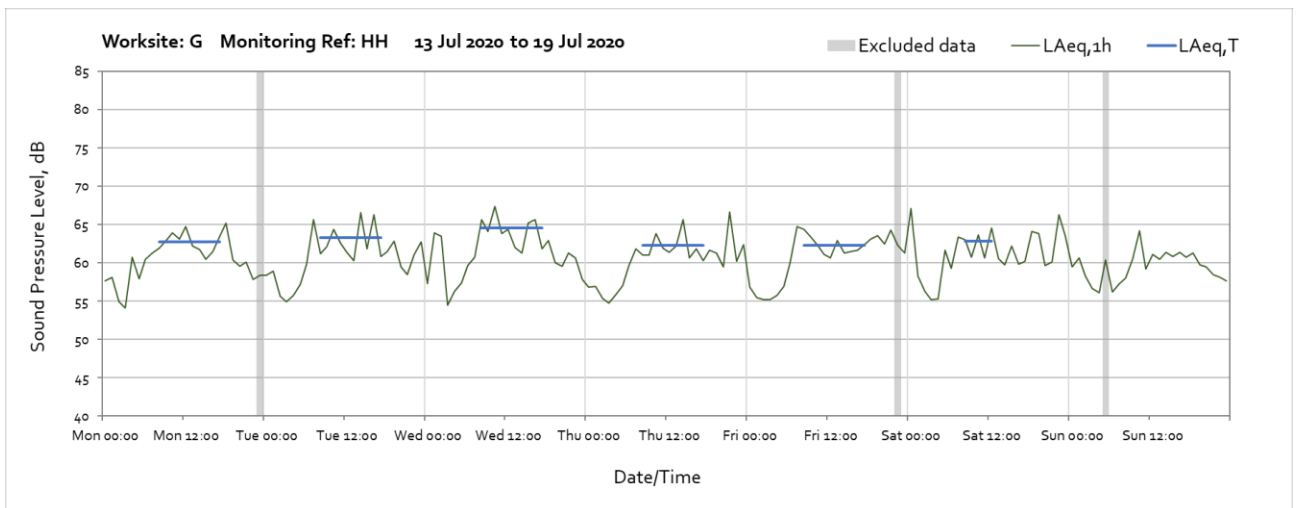
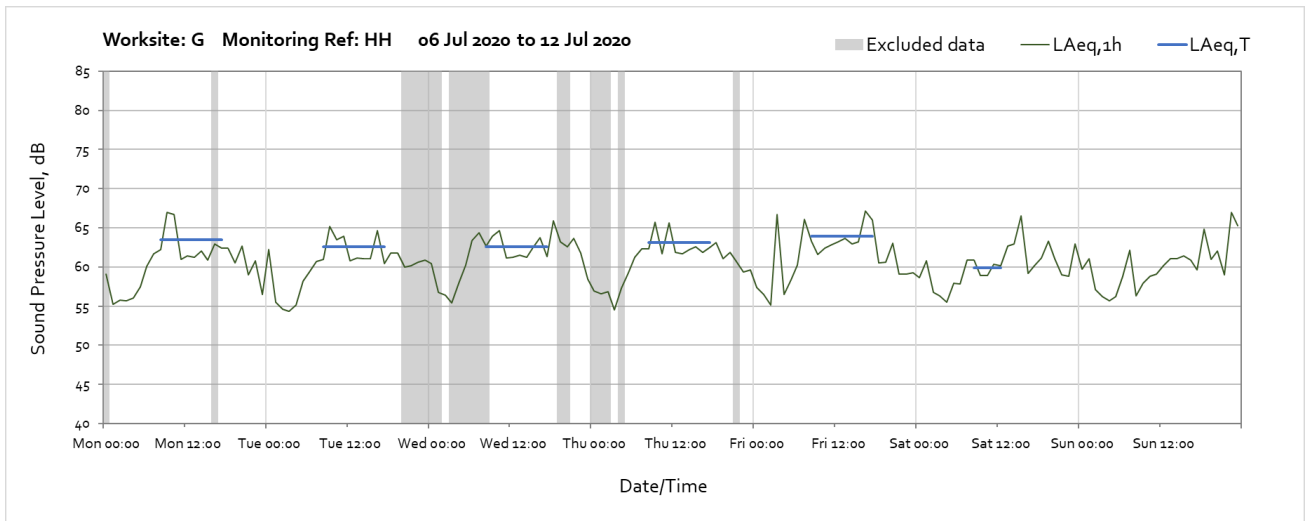
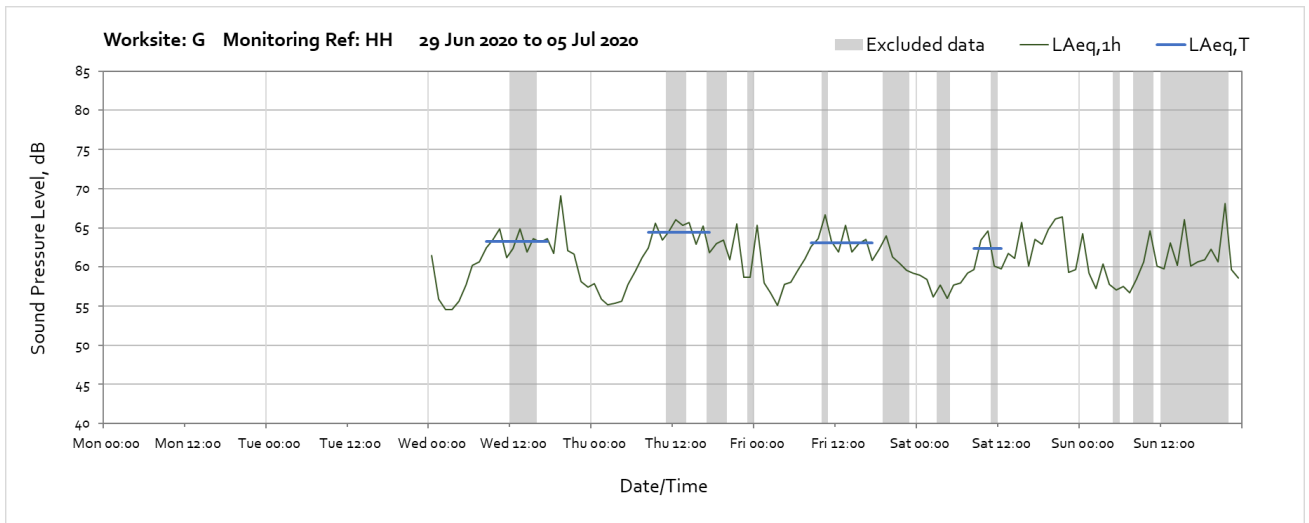


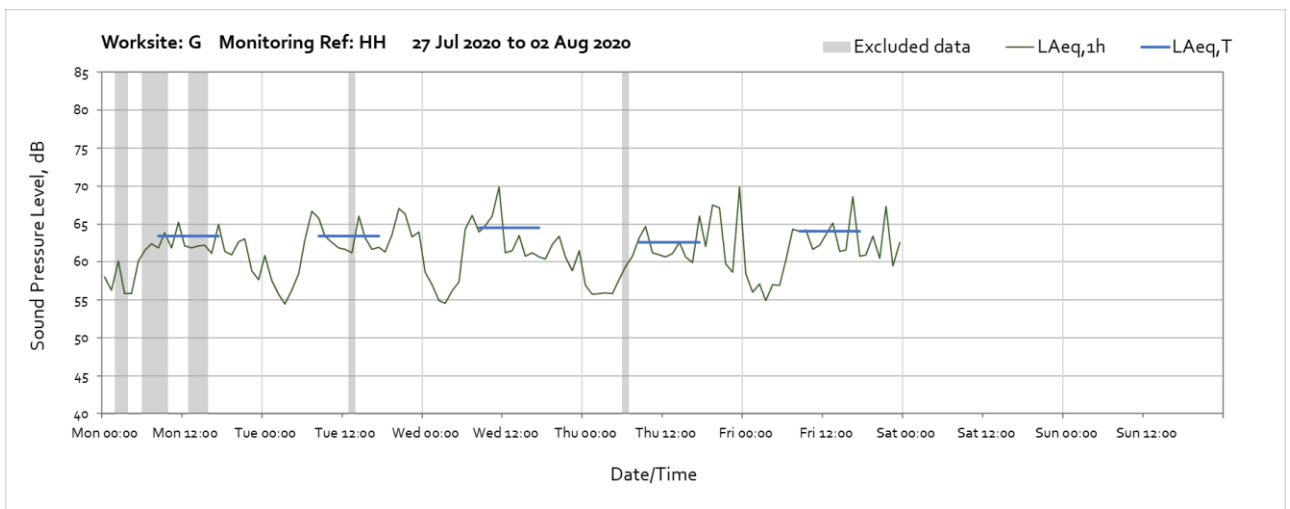
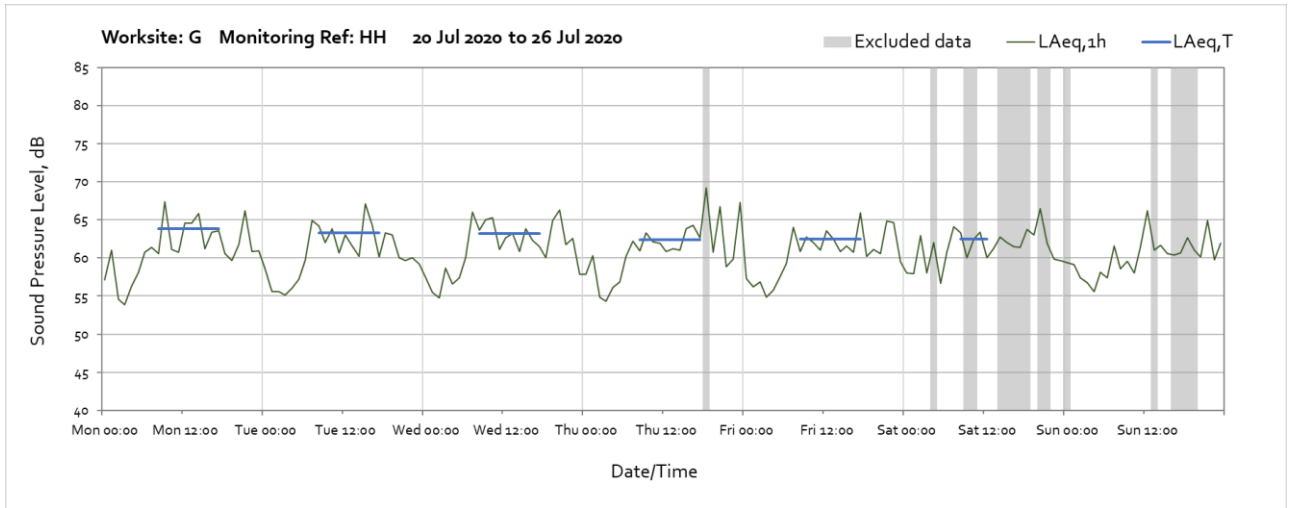
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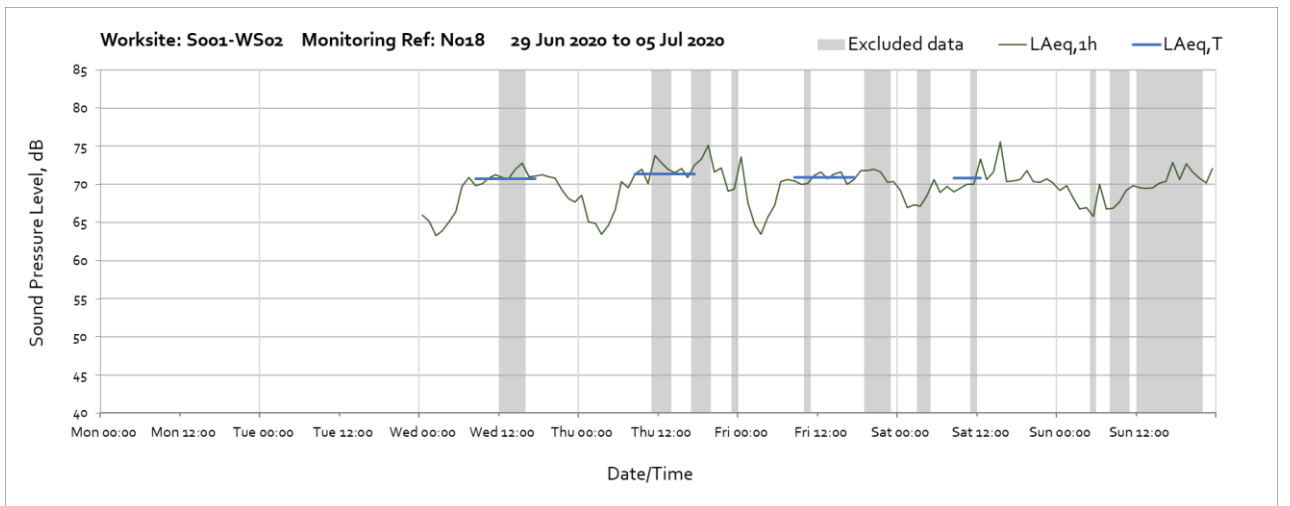


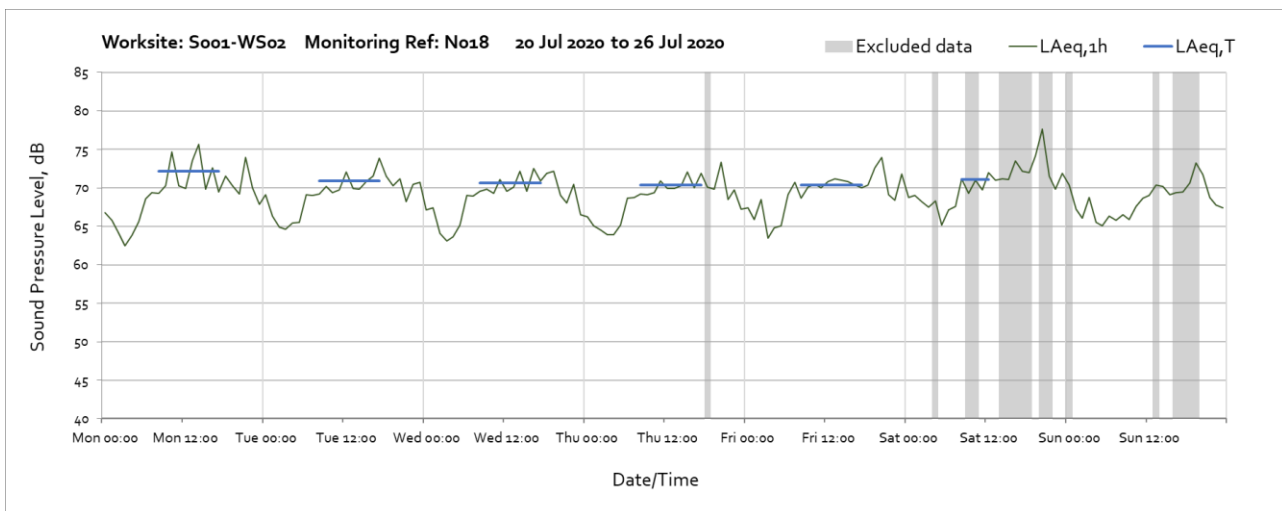
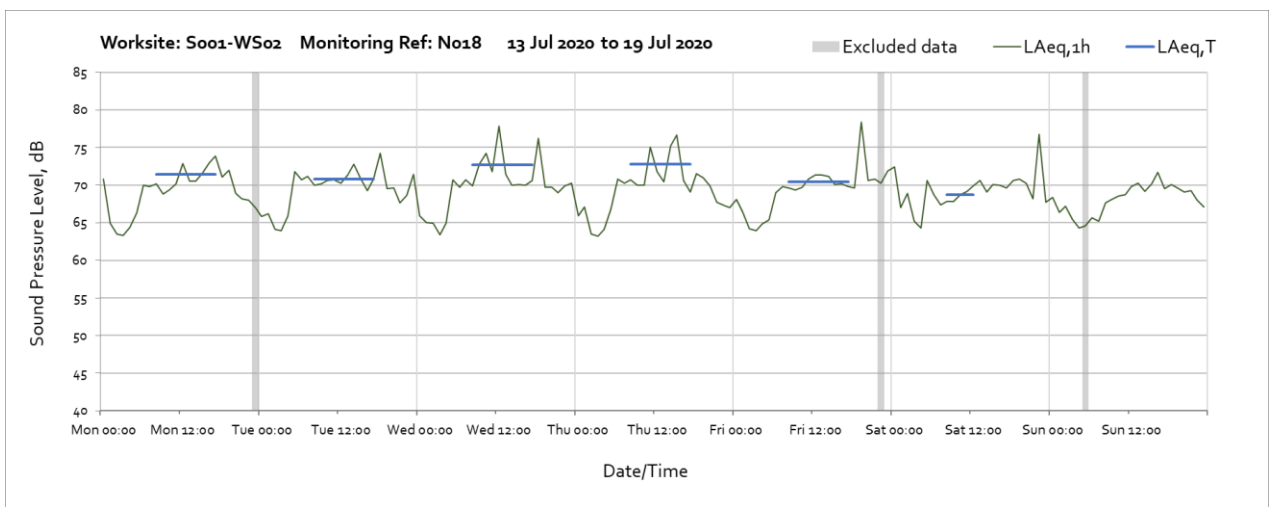
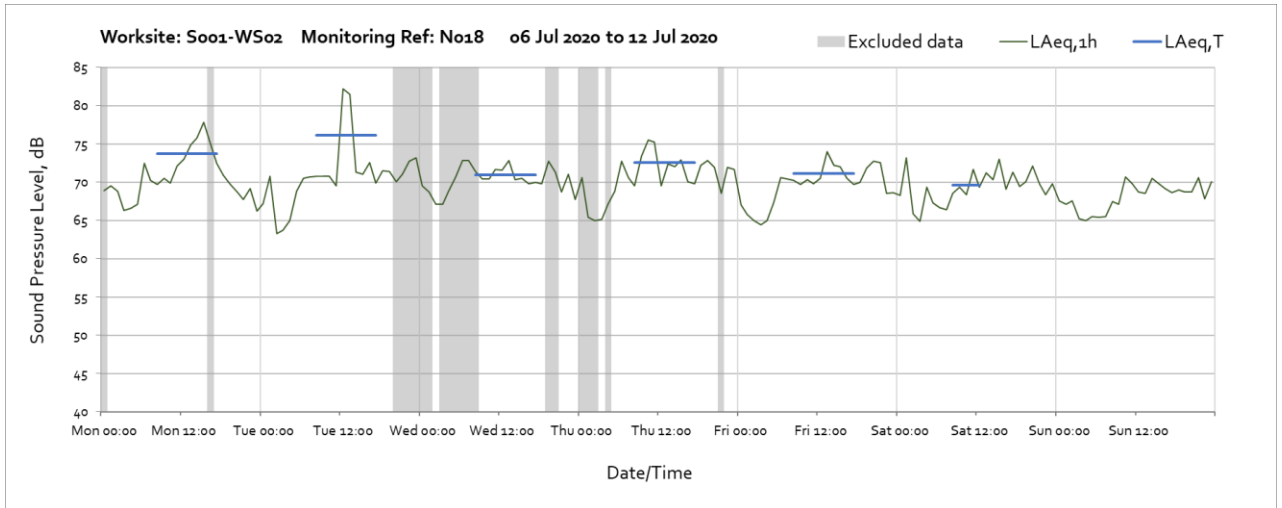
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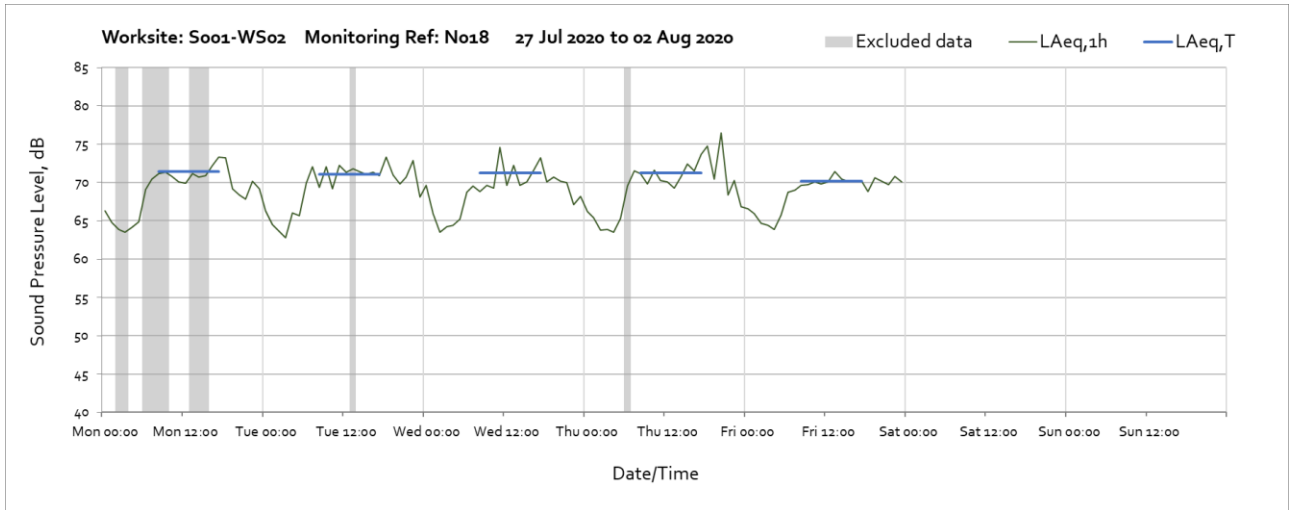




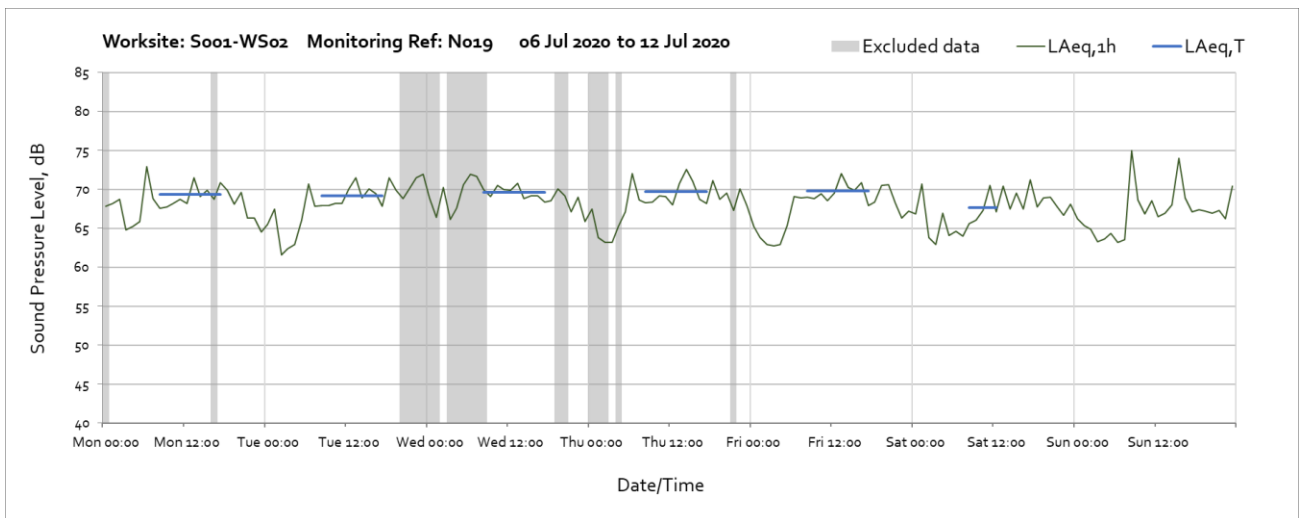
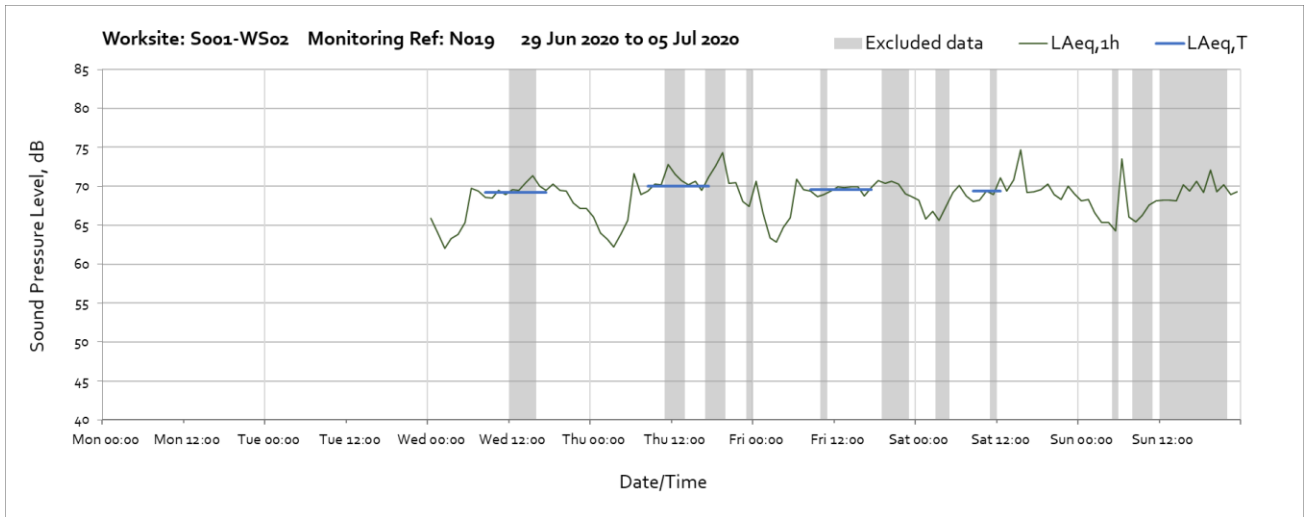
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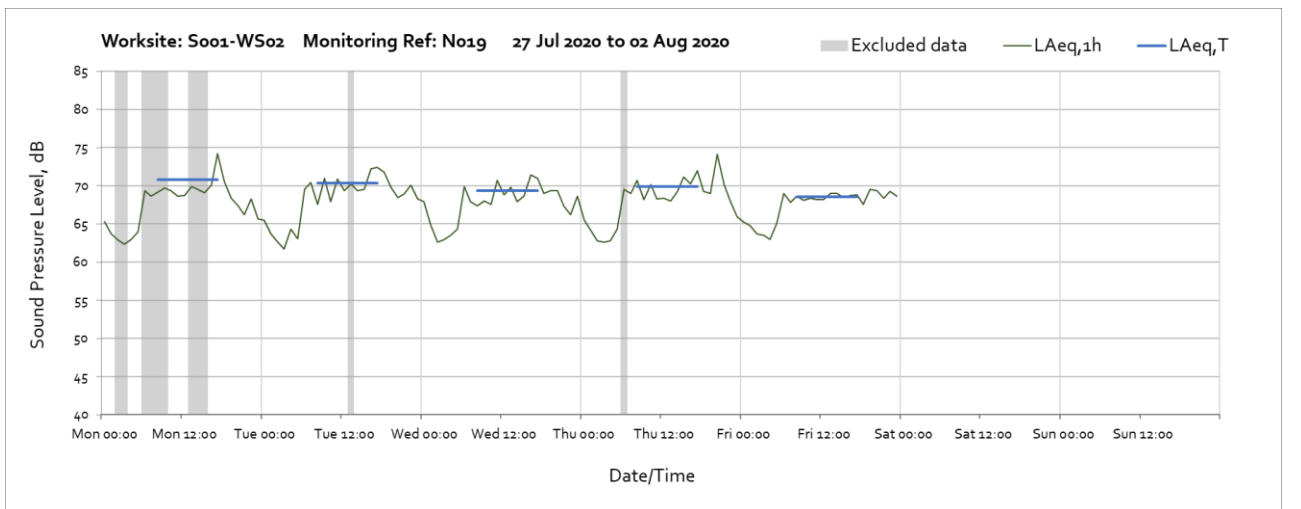
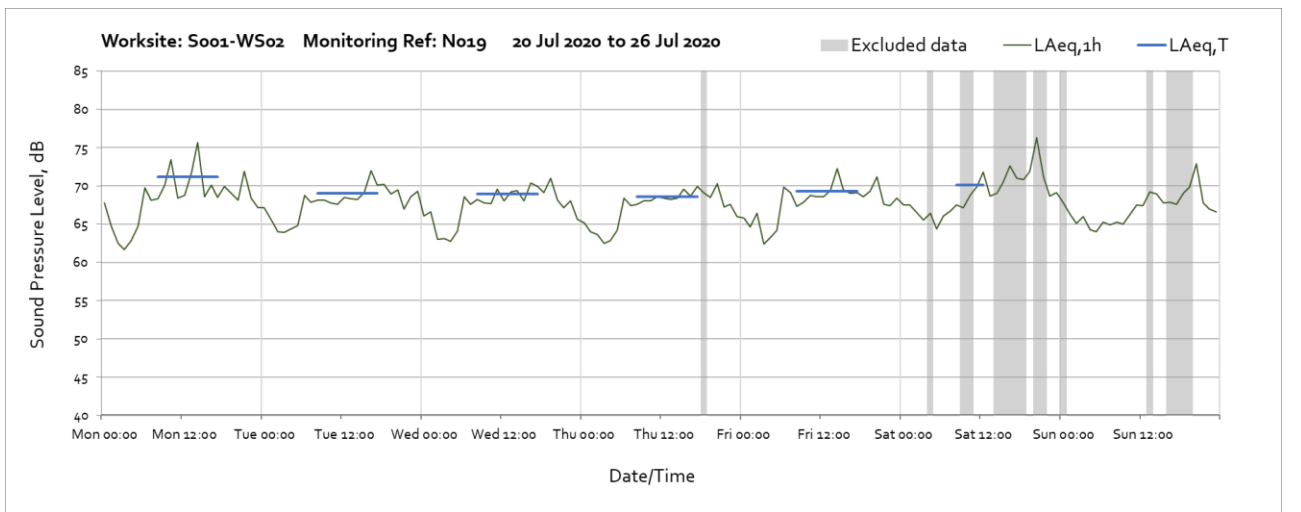
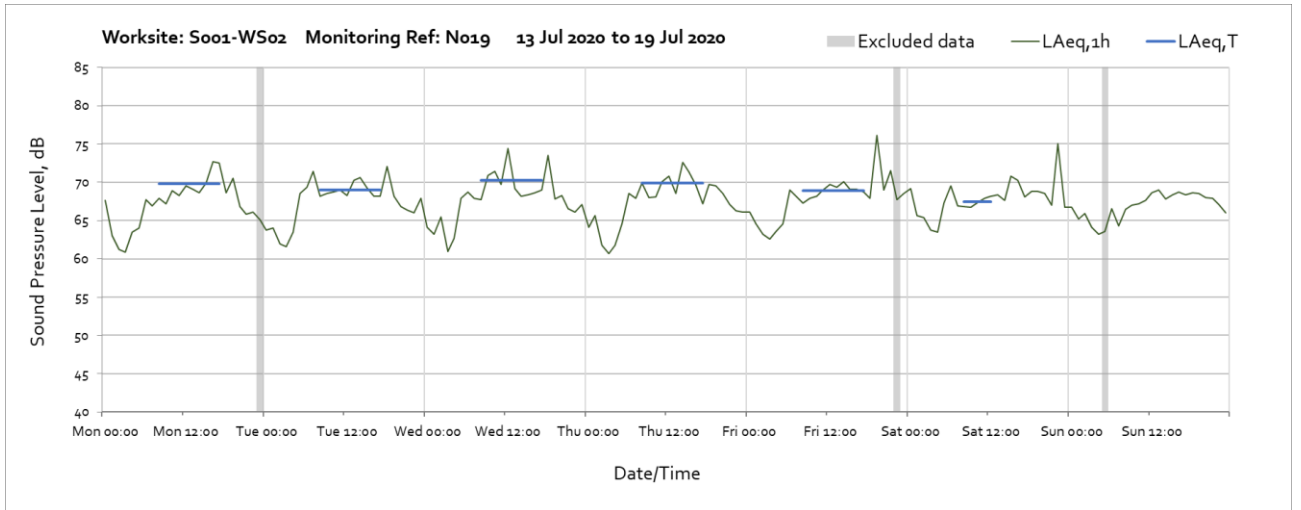




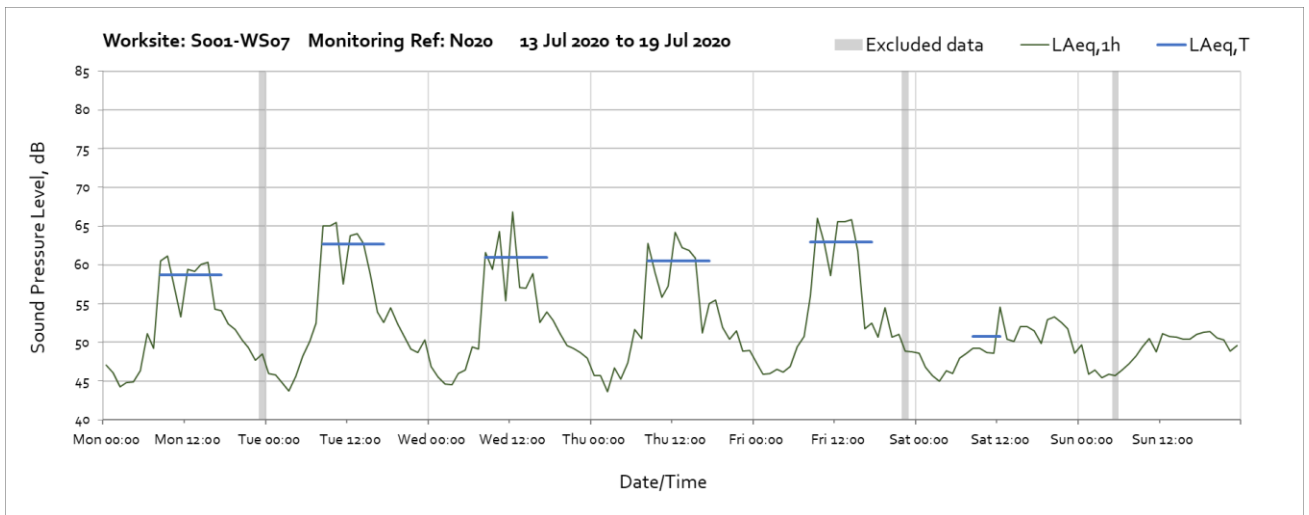
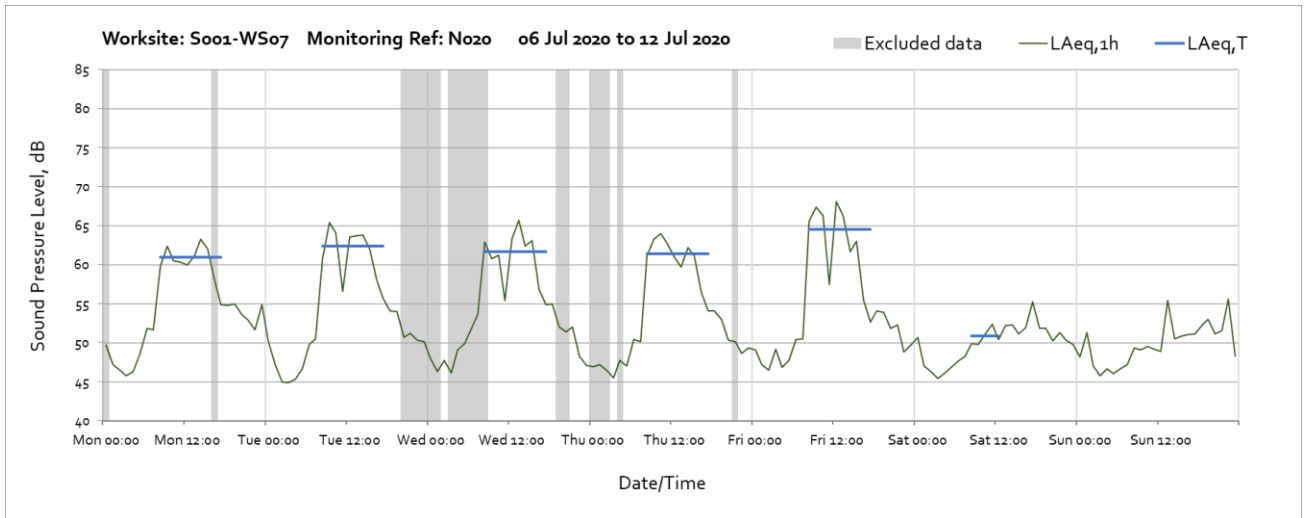
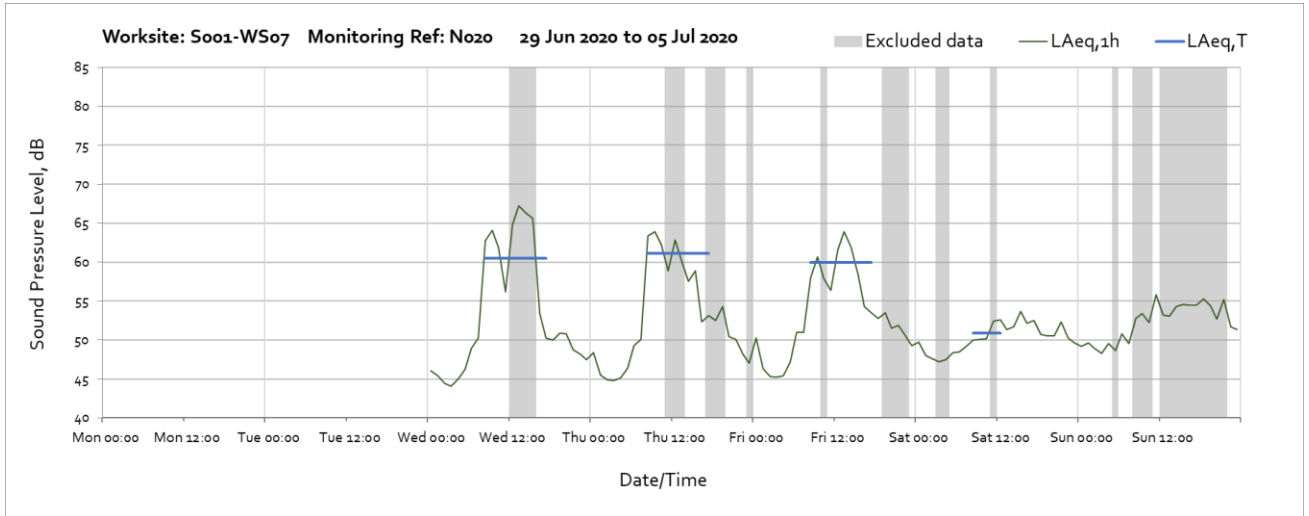


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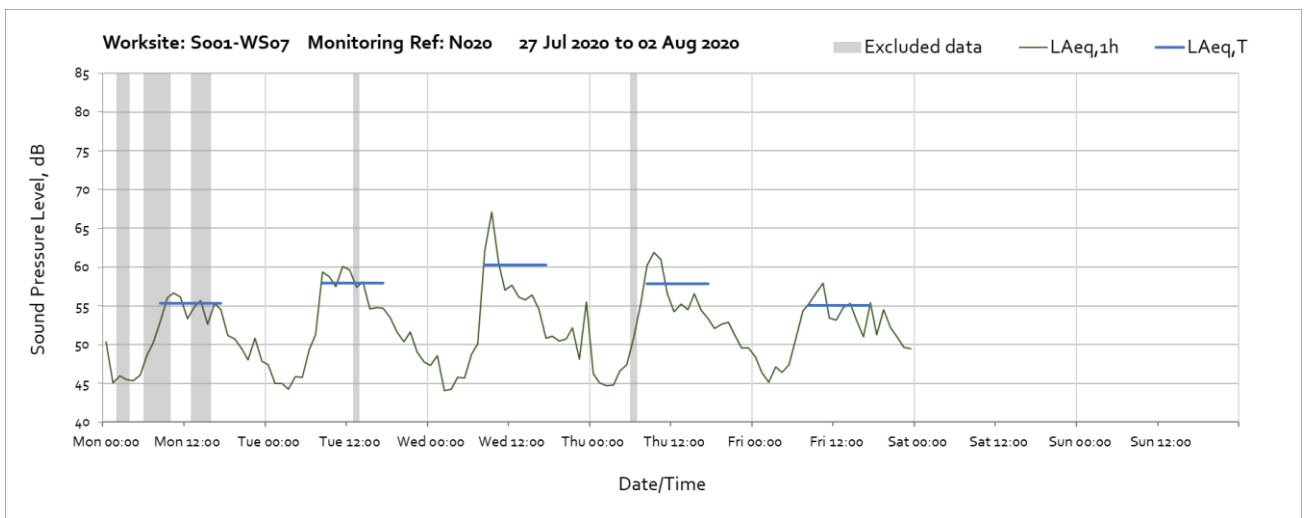
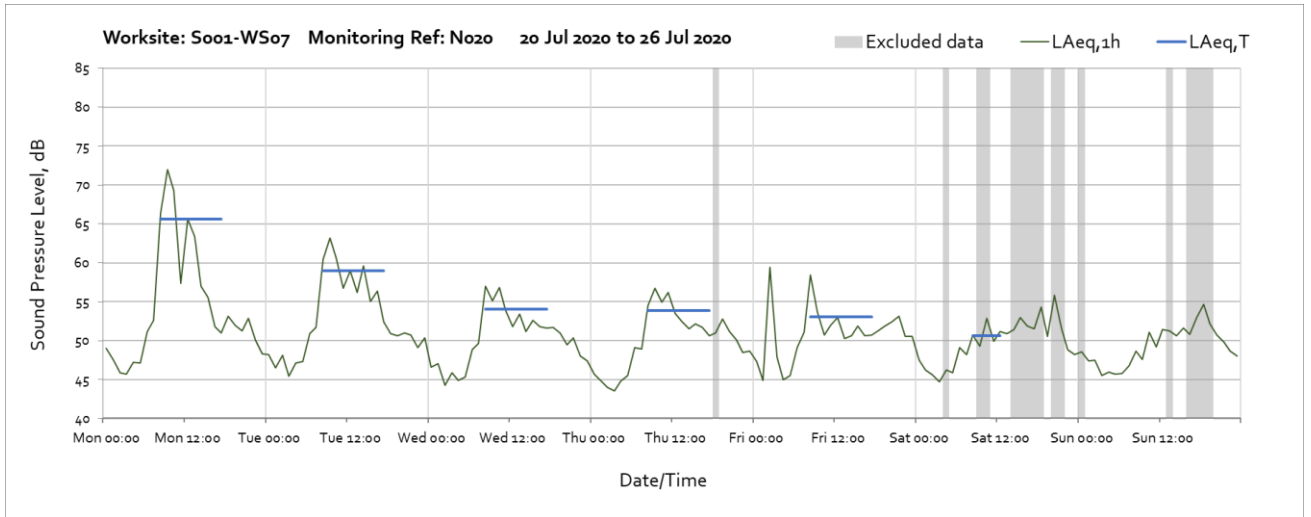




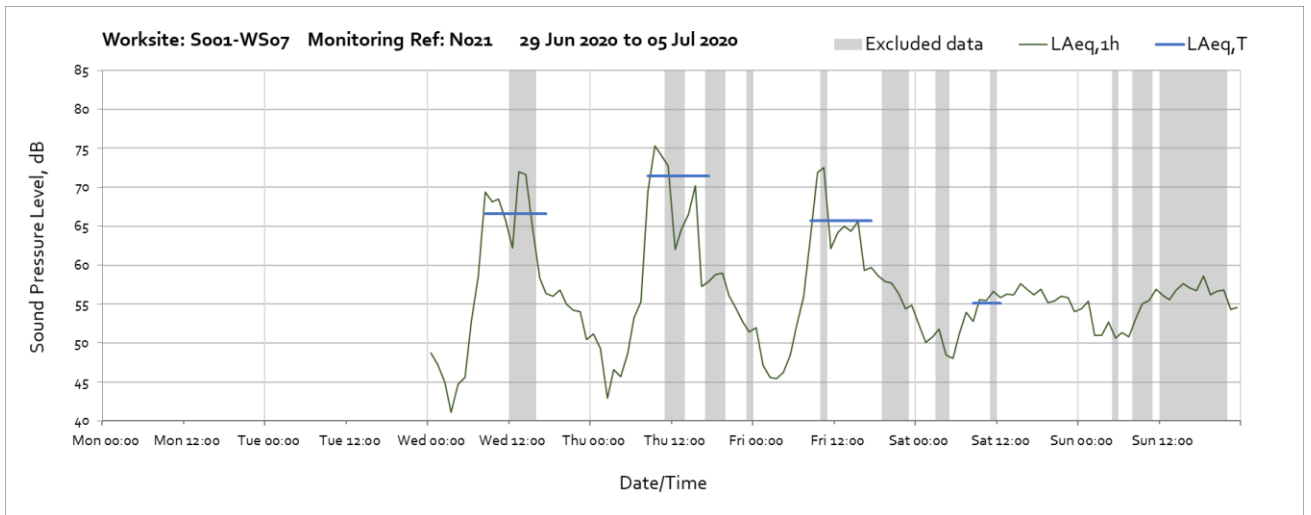
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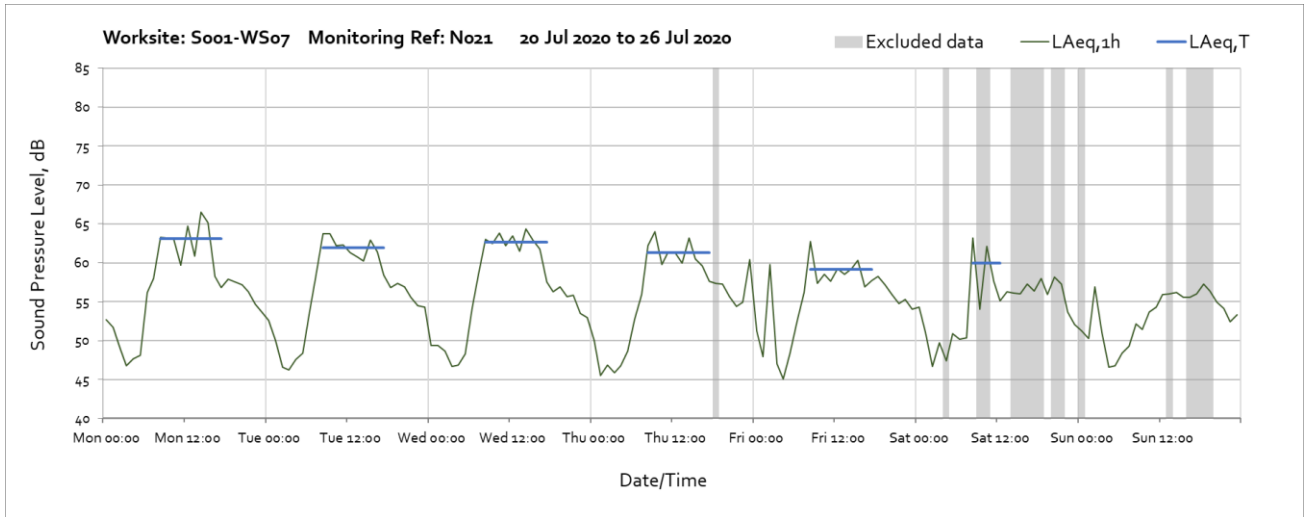
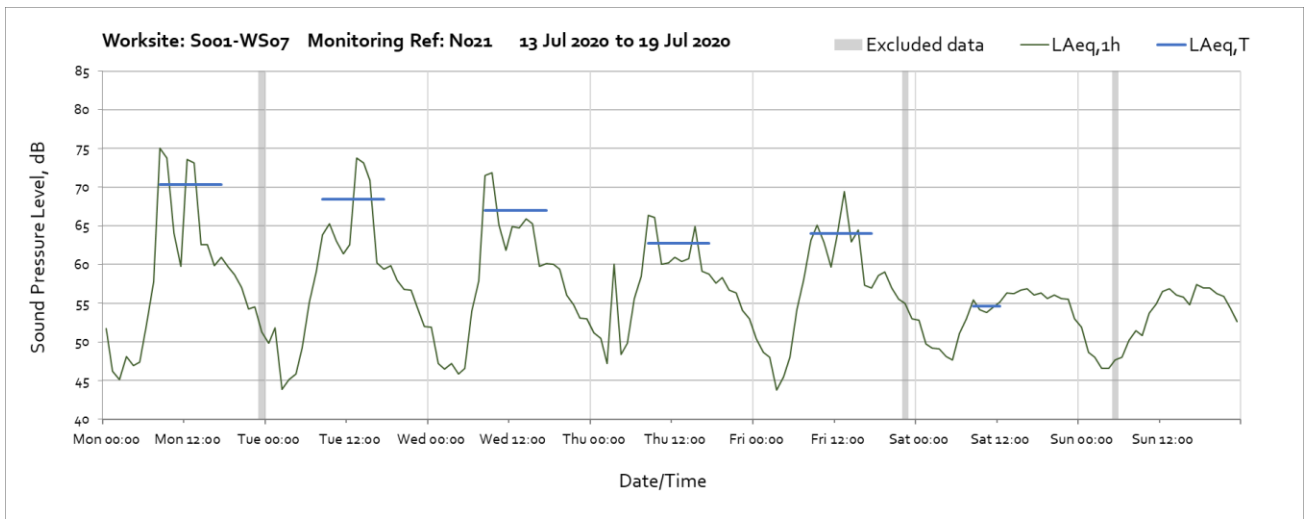
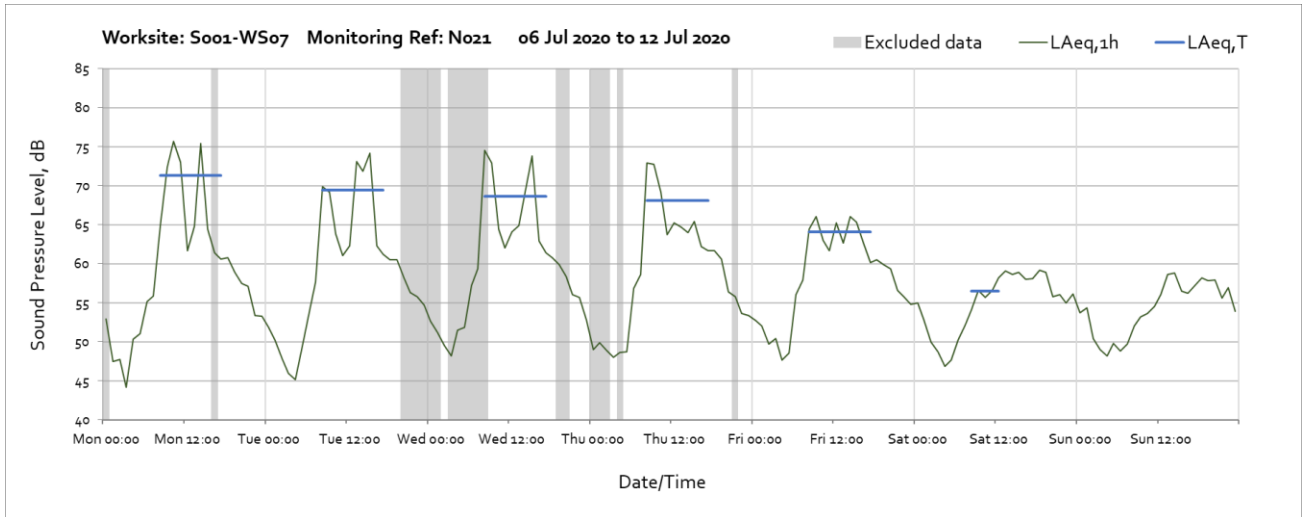


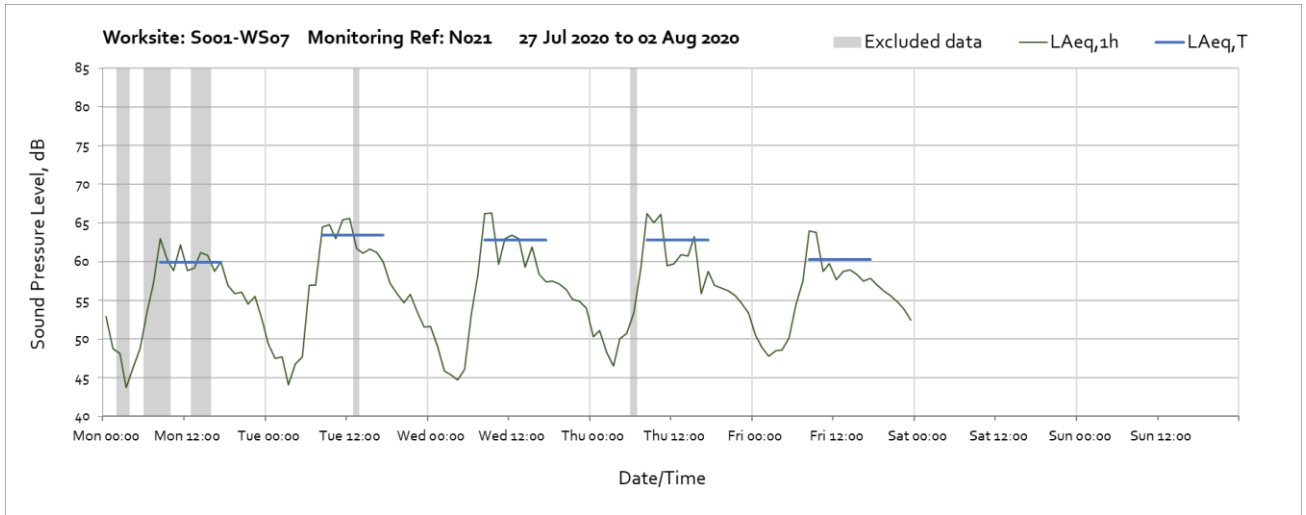
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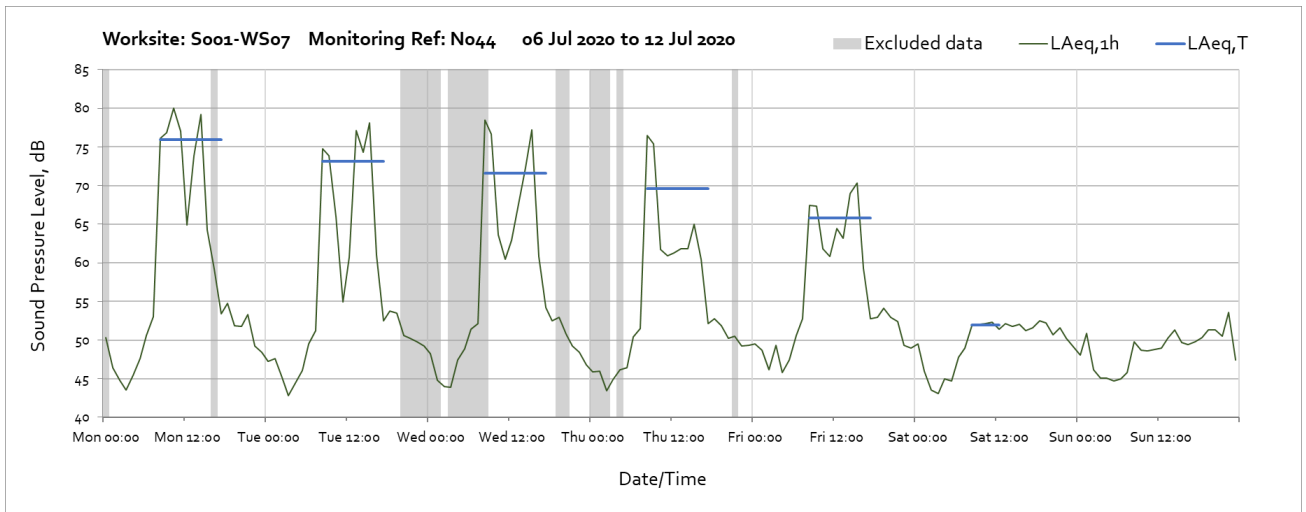
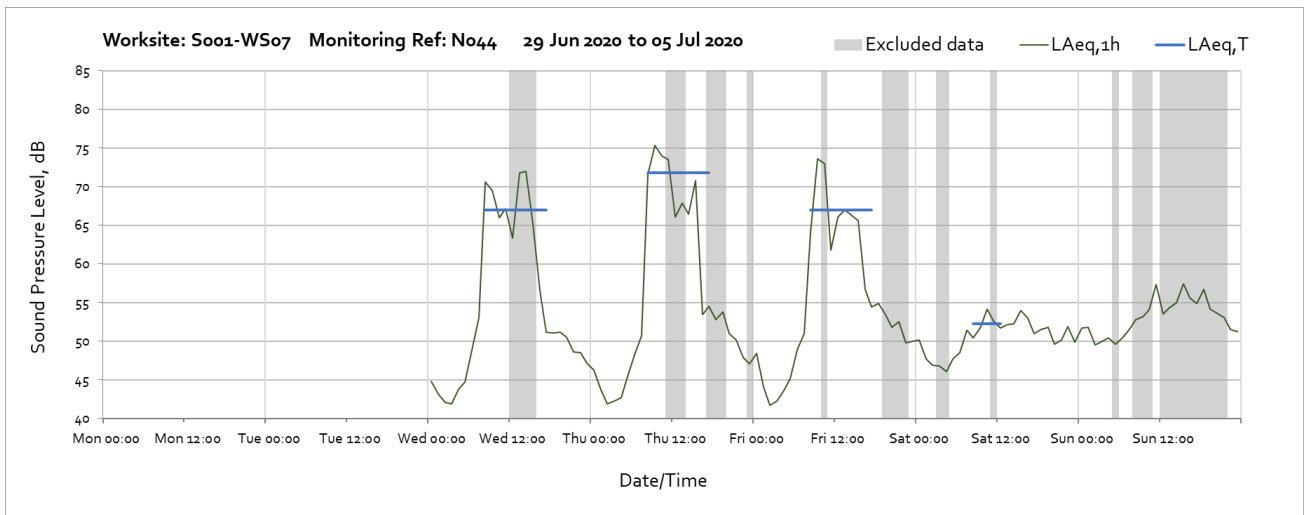
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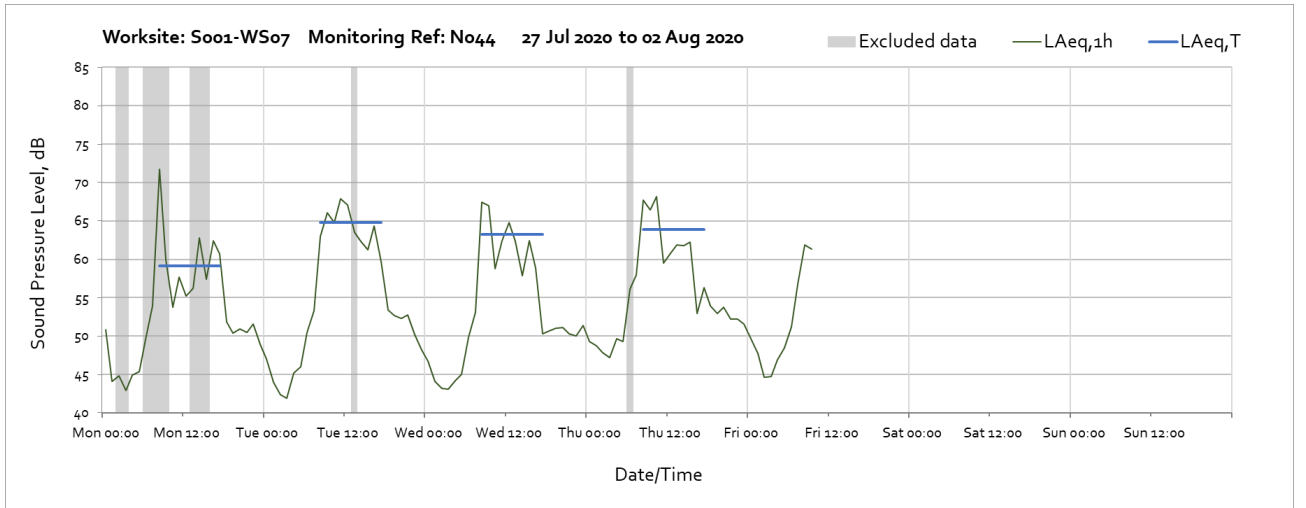
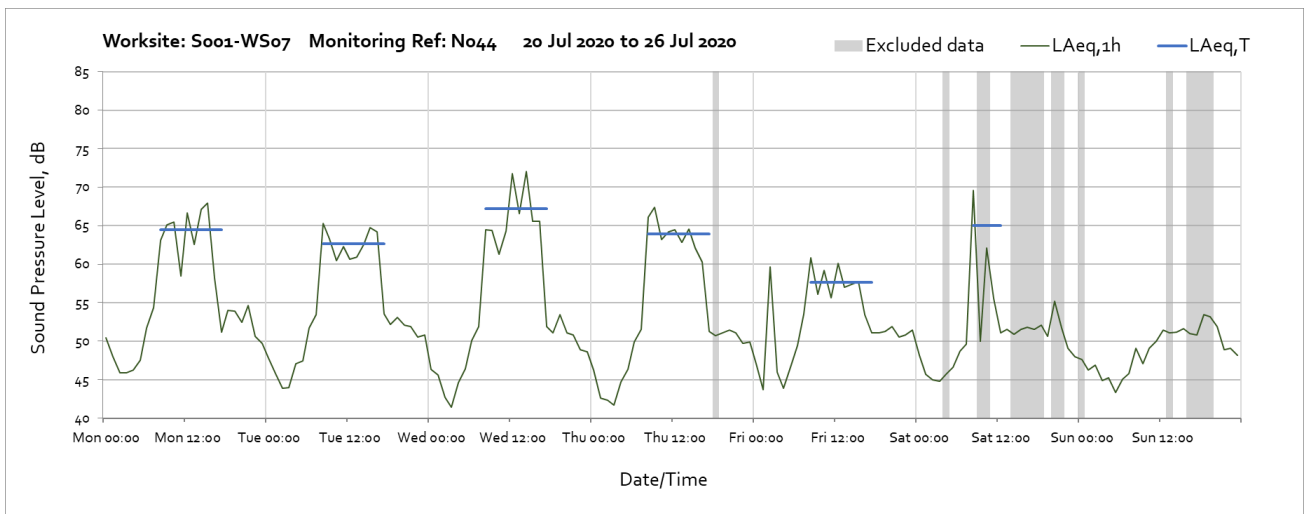
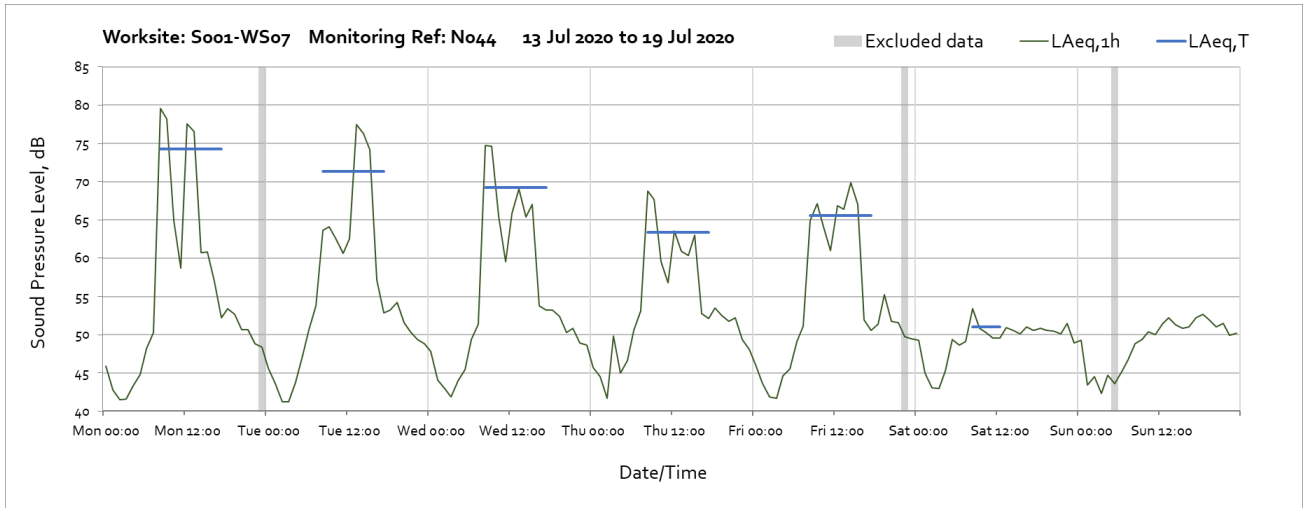






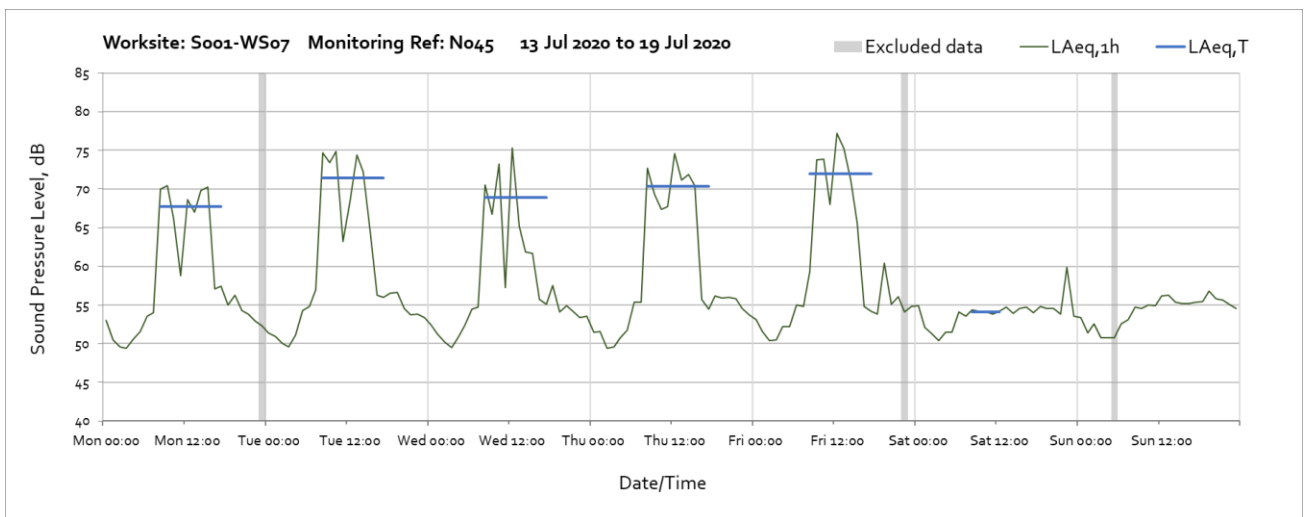
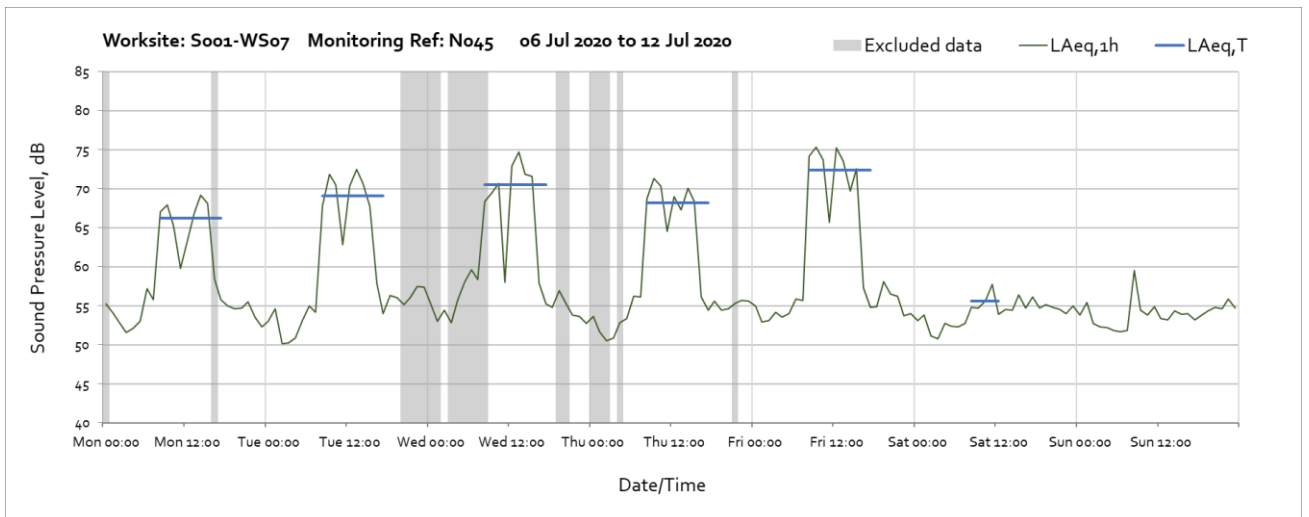
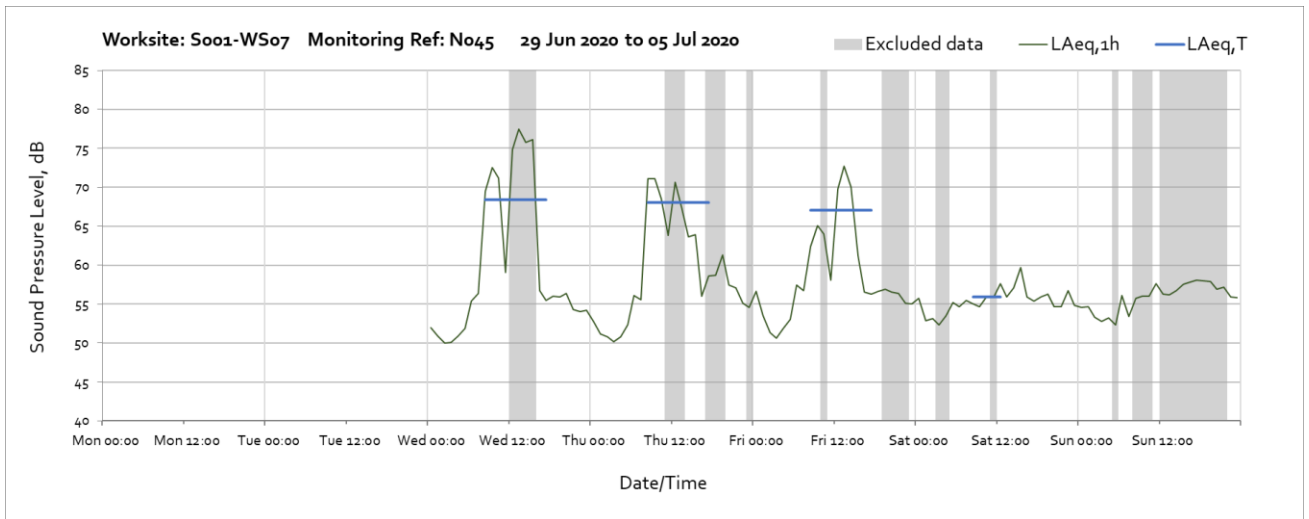
Worksite: S001-WS07 – Monitoring Ref: N044



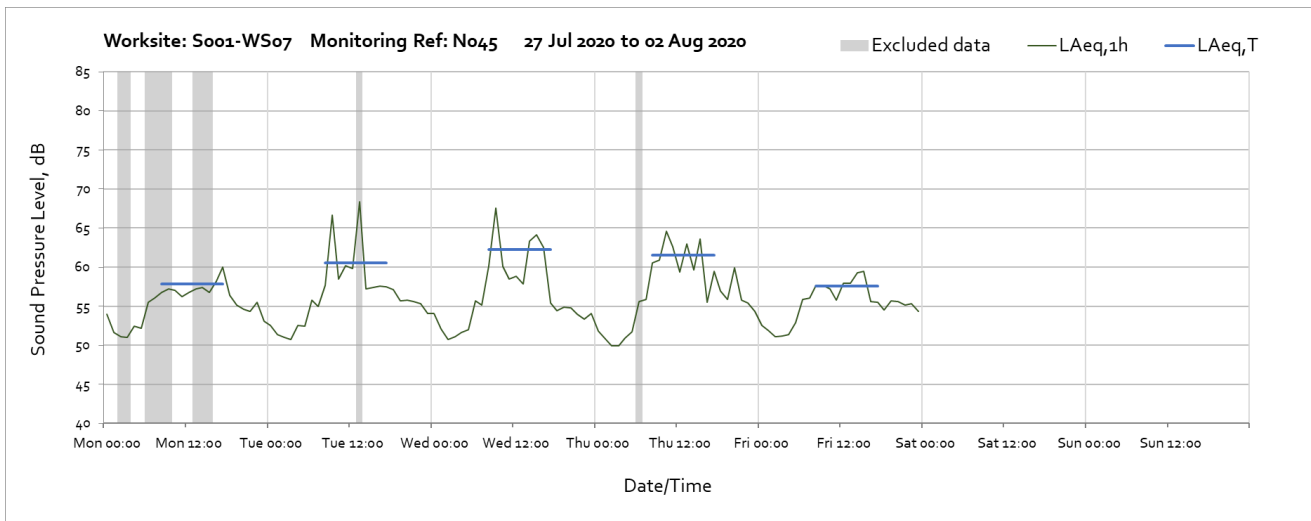
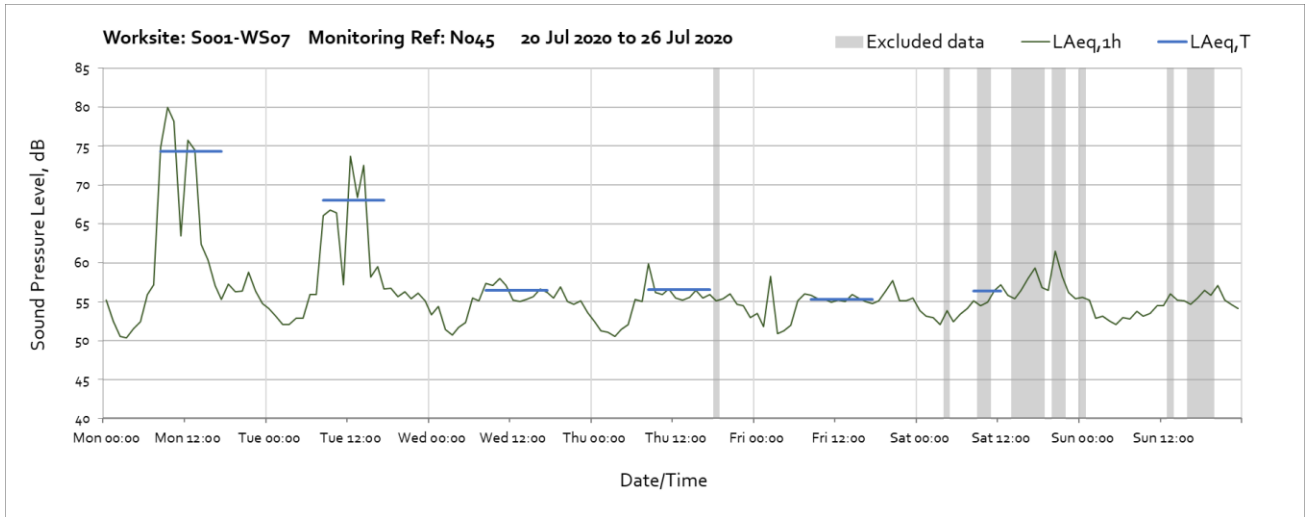


Note: Missing data between 10:00 on Sunday 31st July and 00:00 on Monday 1st August was due to the removal of the noise monitor to allow hoarding works to take place. Installation of a temporary replacement monitor will follow at a later date due to ongoing works in the area.

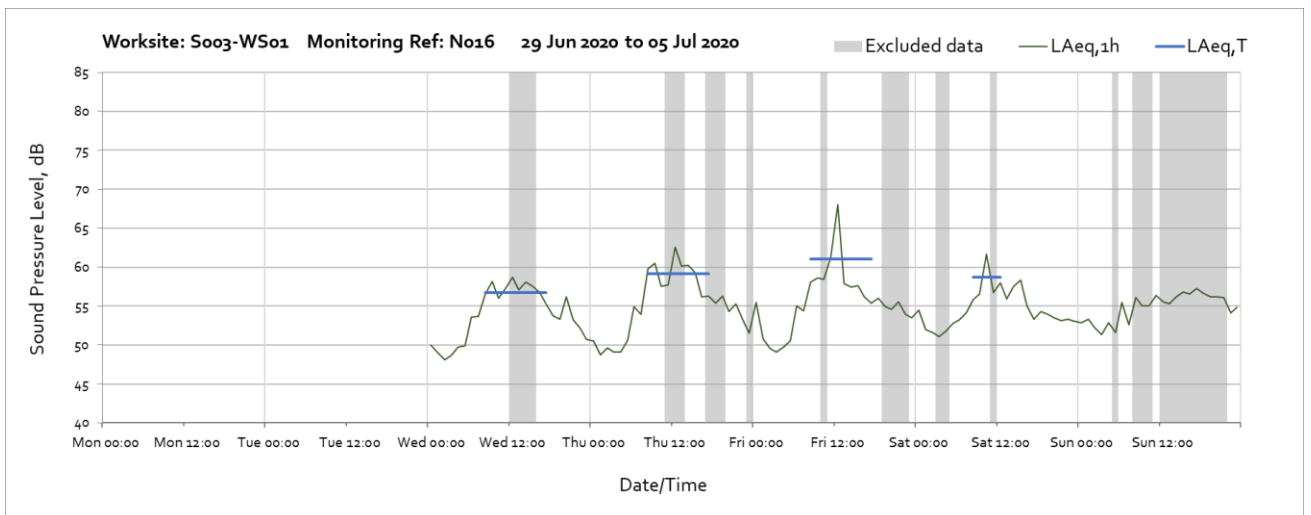
Worksite: S001-WS07 – Monitoring Ref: N045

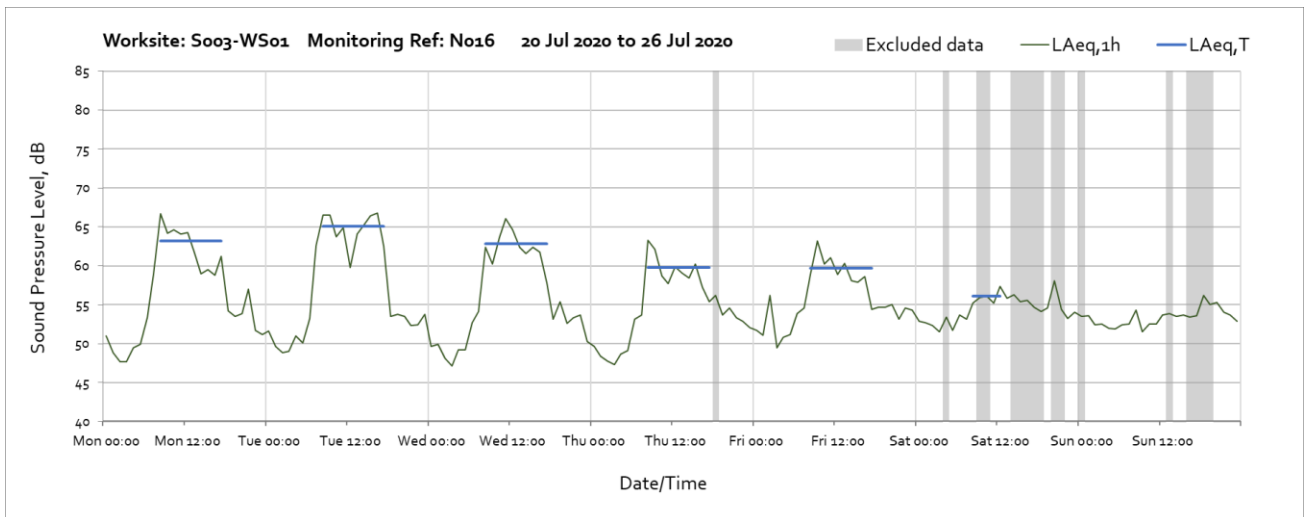
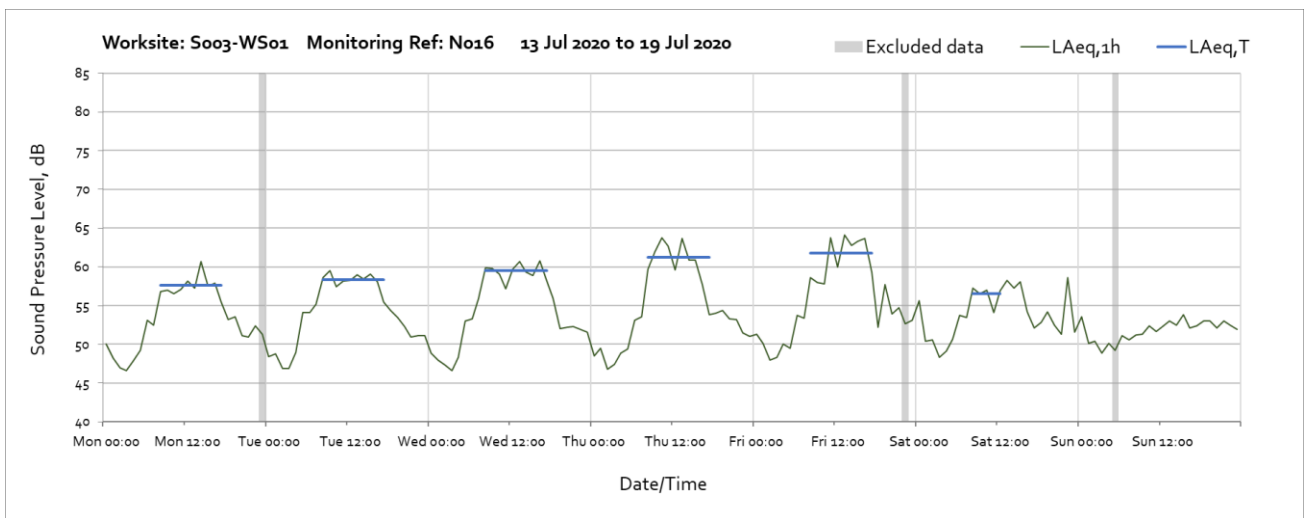
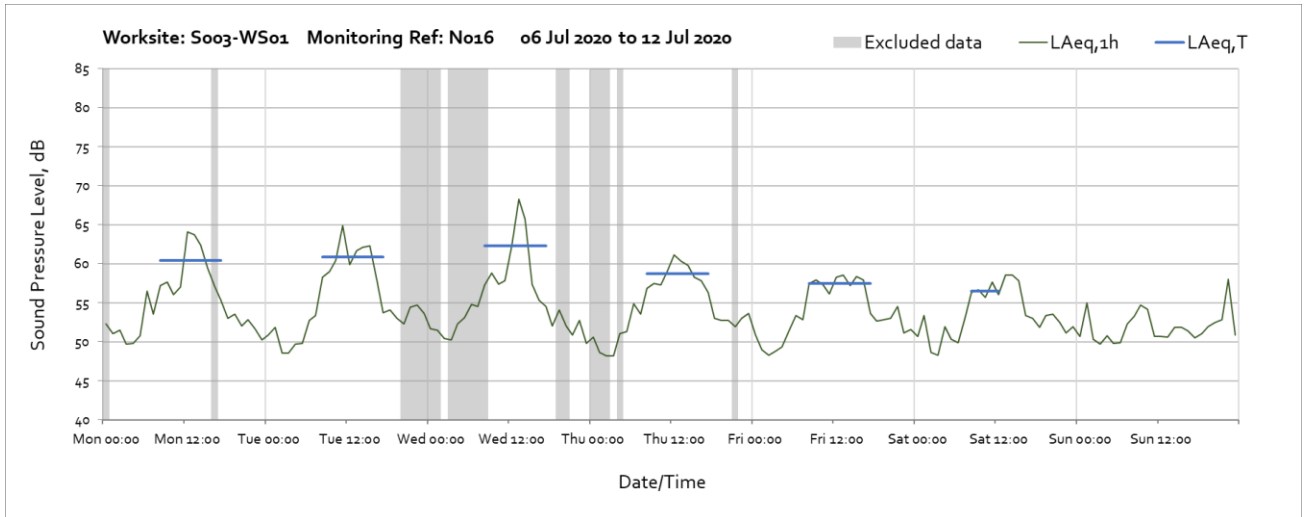


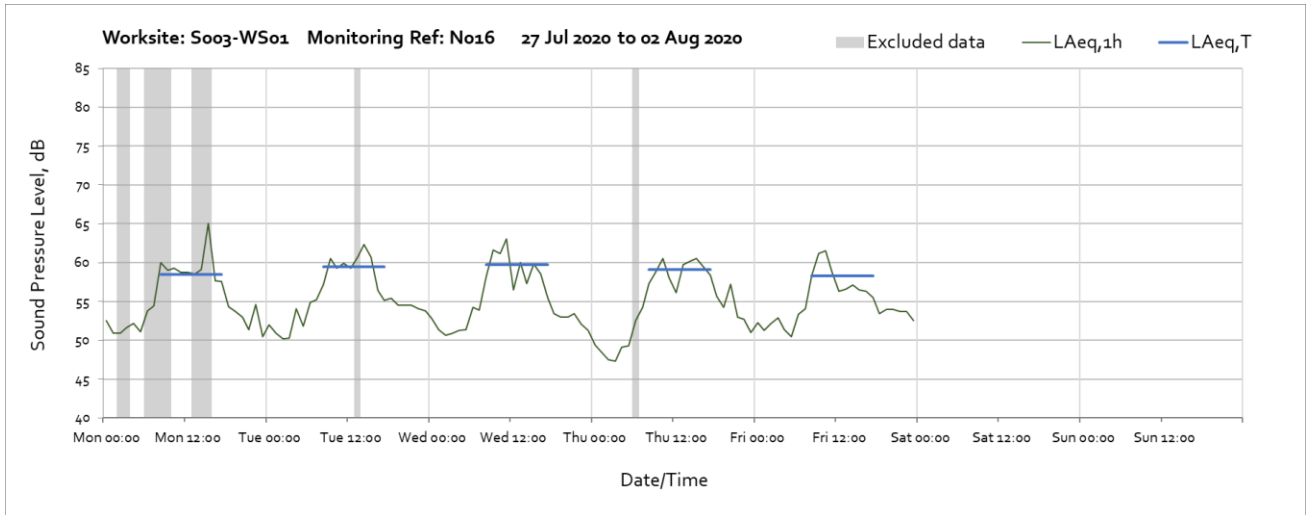
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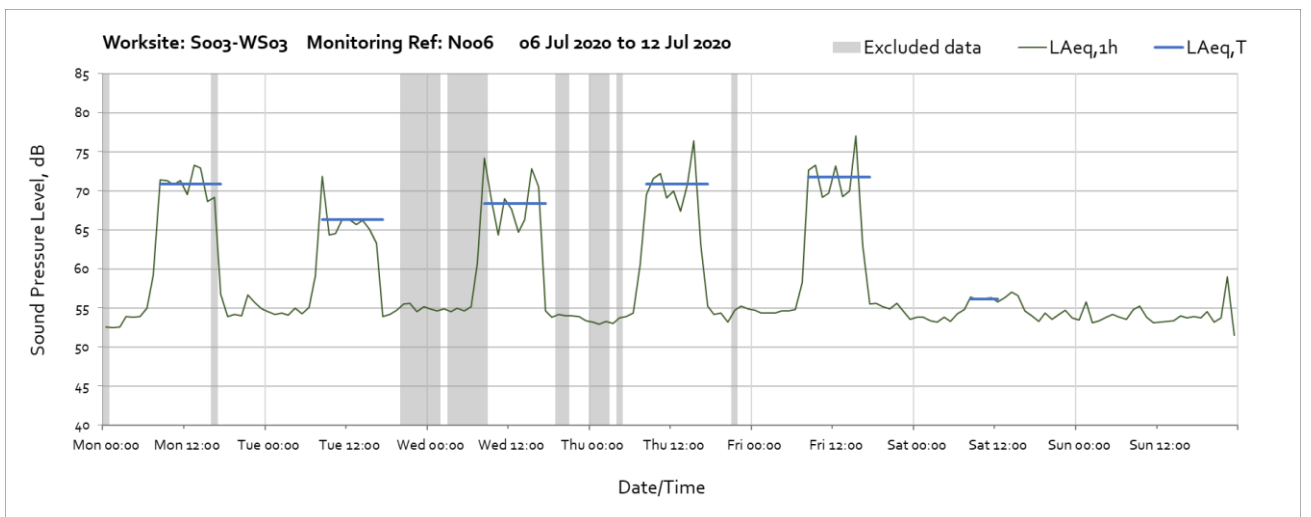
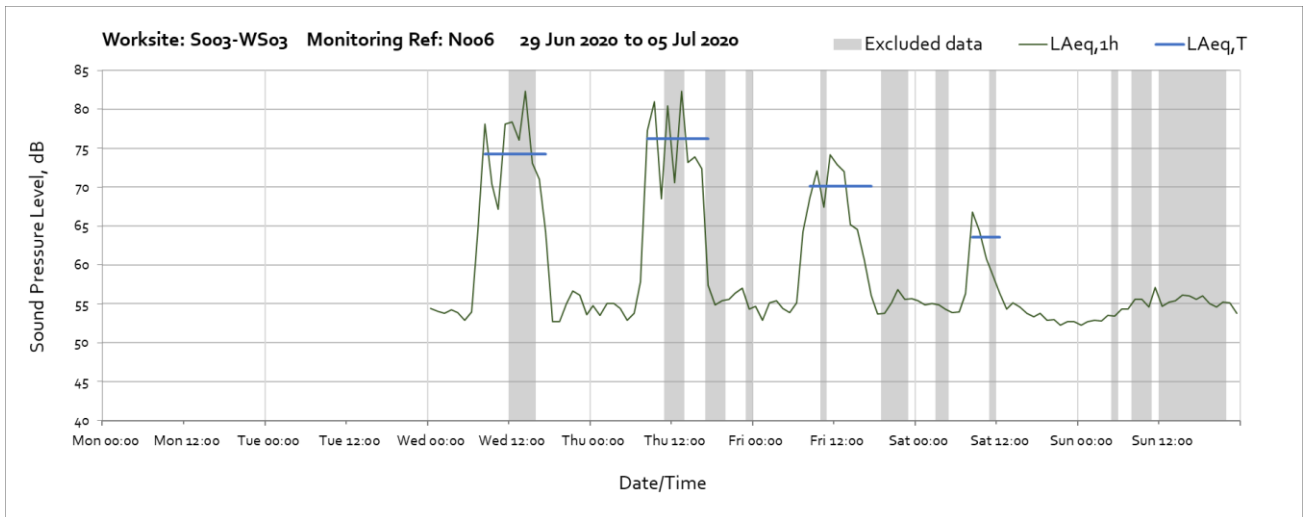
Worksite: S003-WS01 – Monitoring Ref: N016

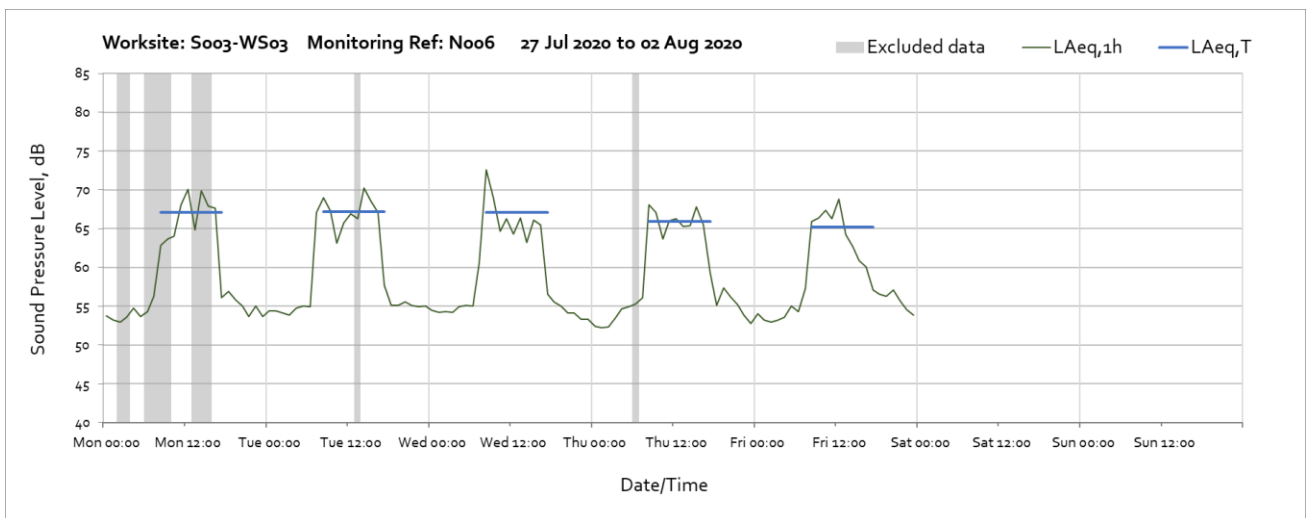
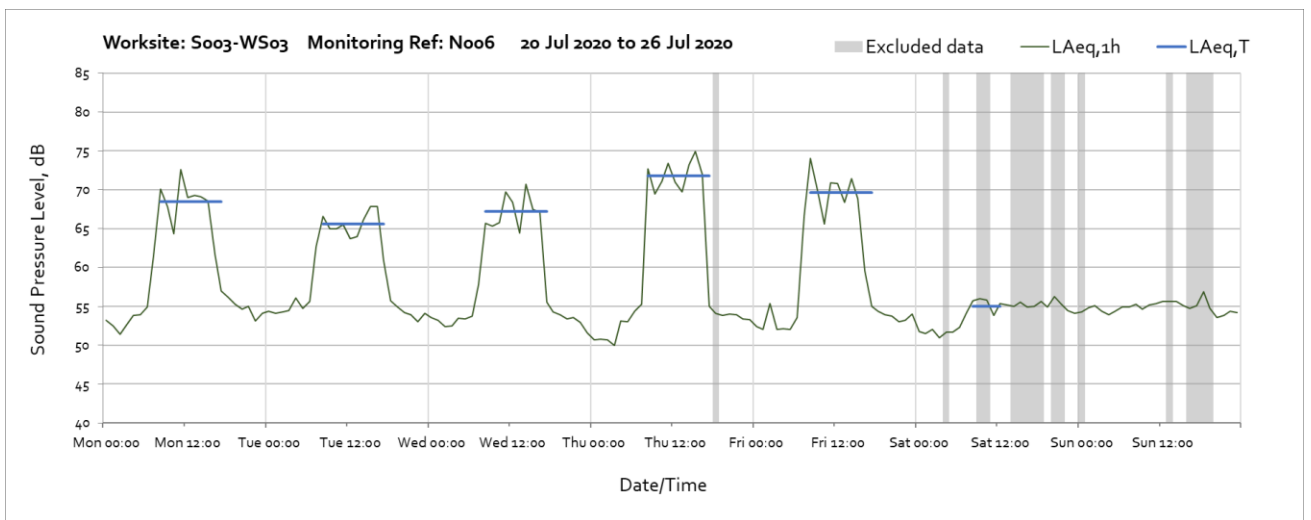
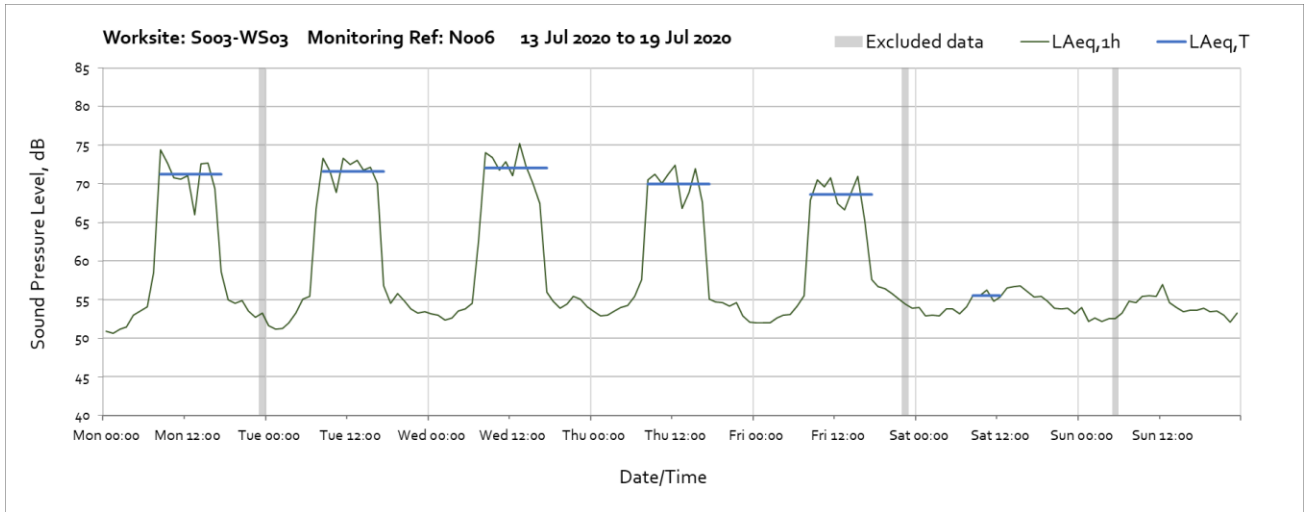




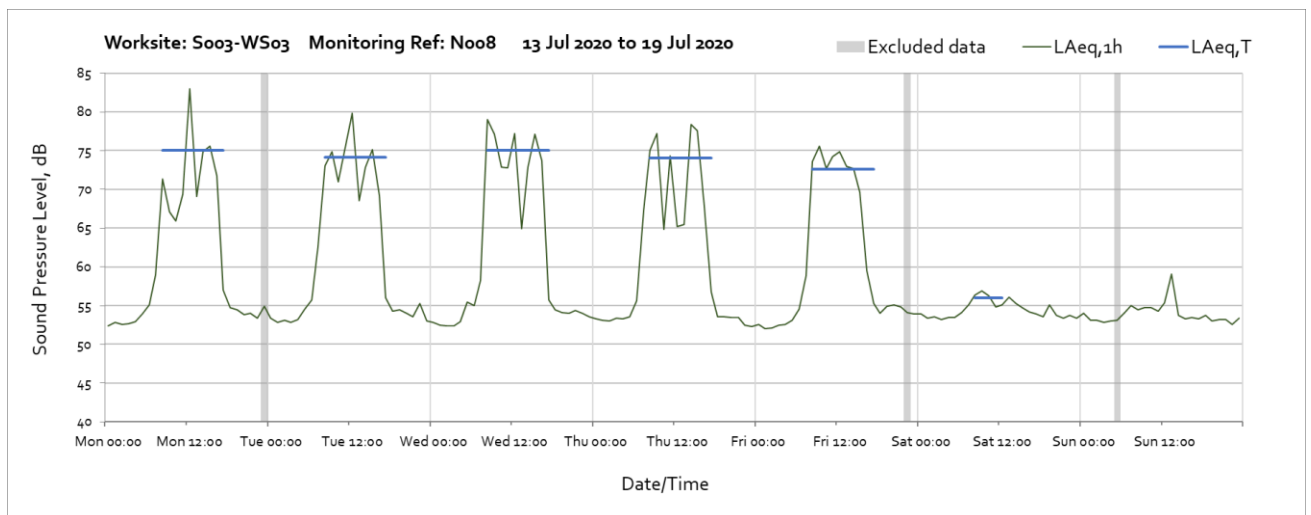
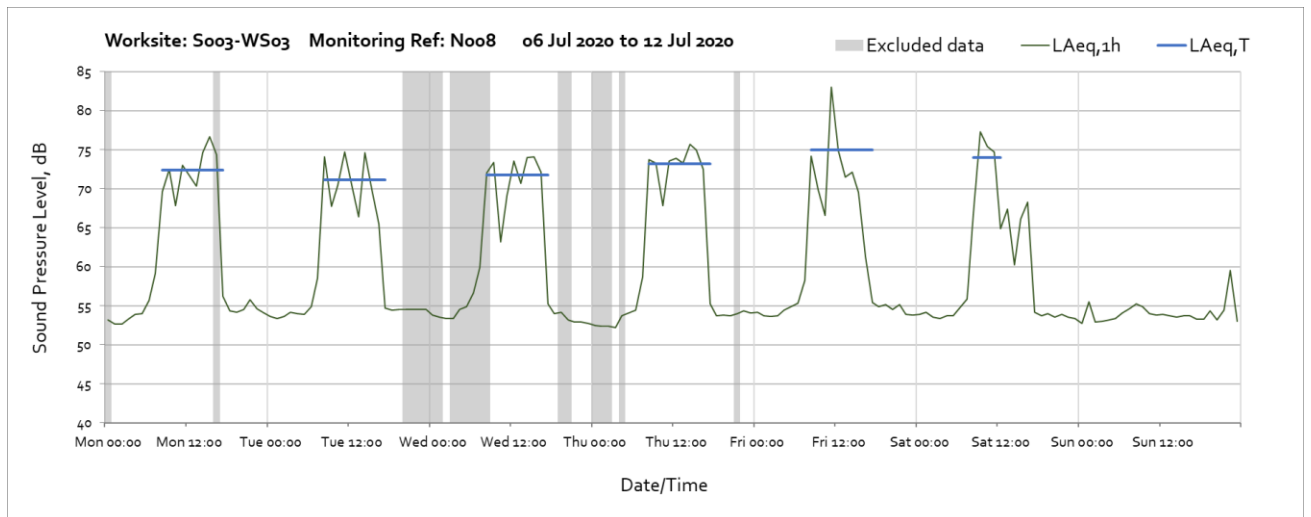
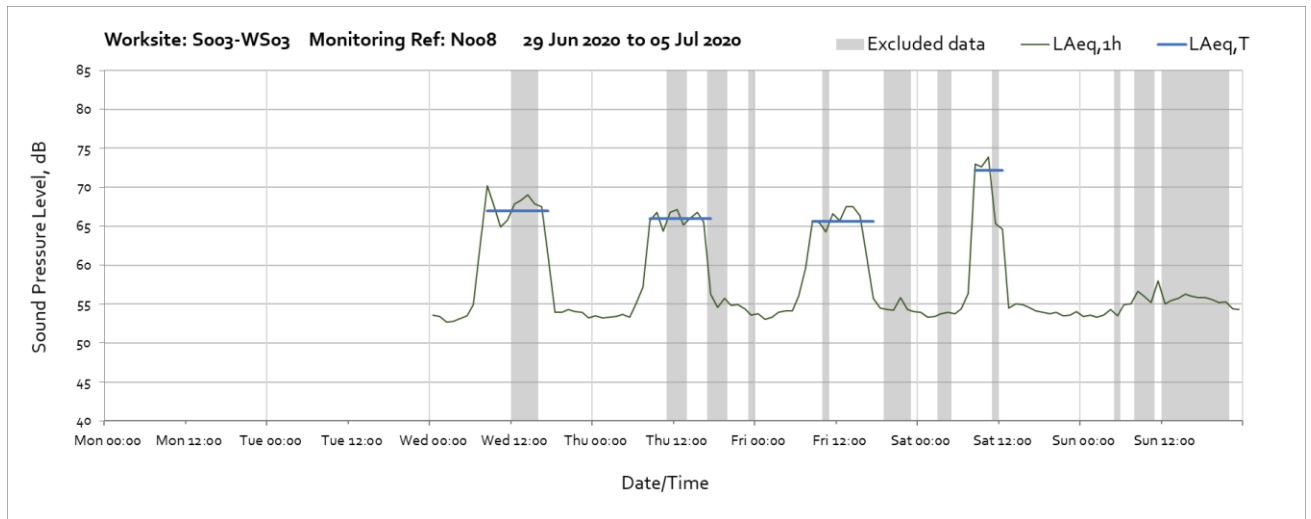


Worksite: S003-WS03 – Monitoring Ref: N006

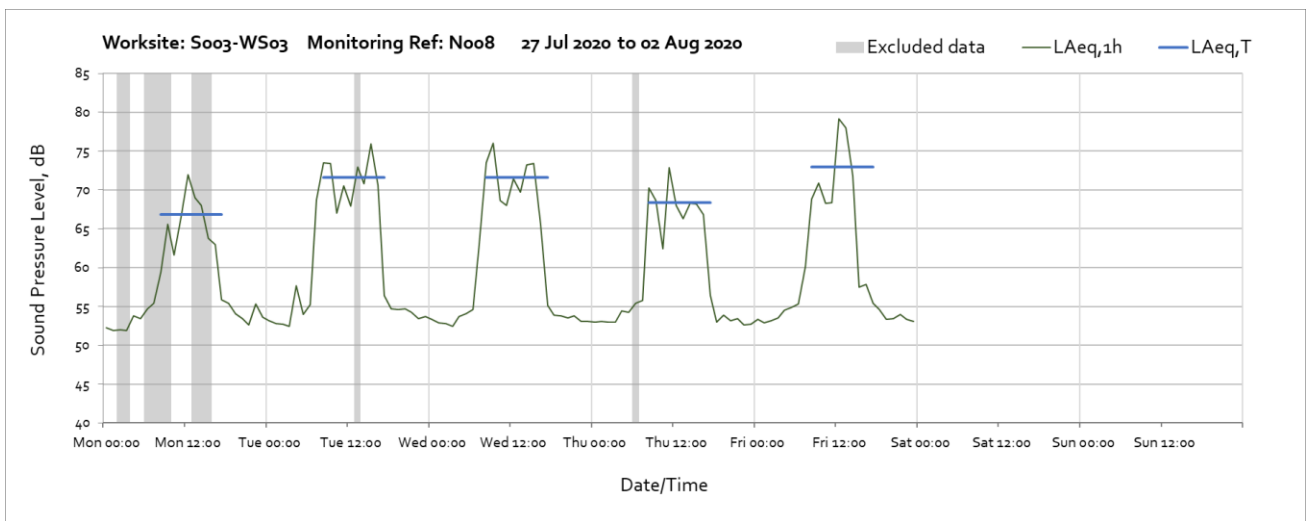
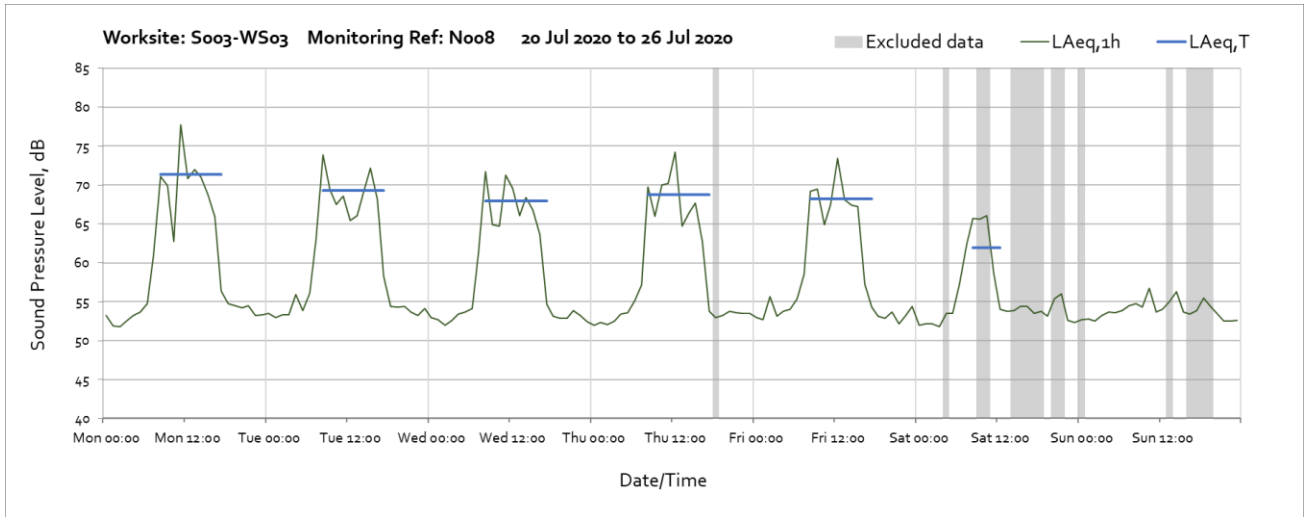




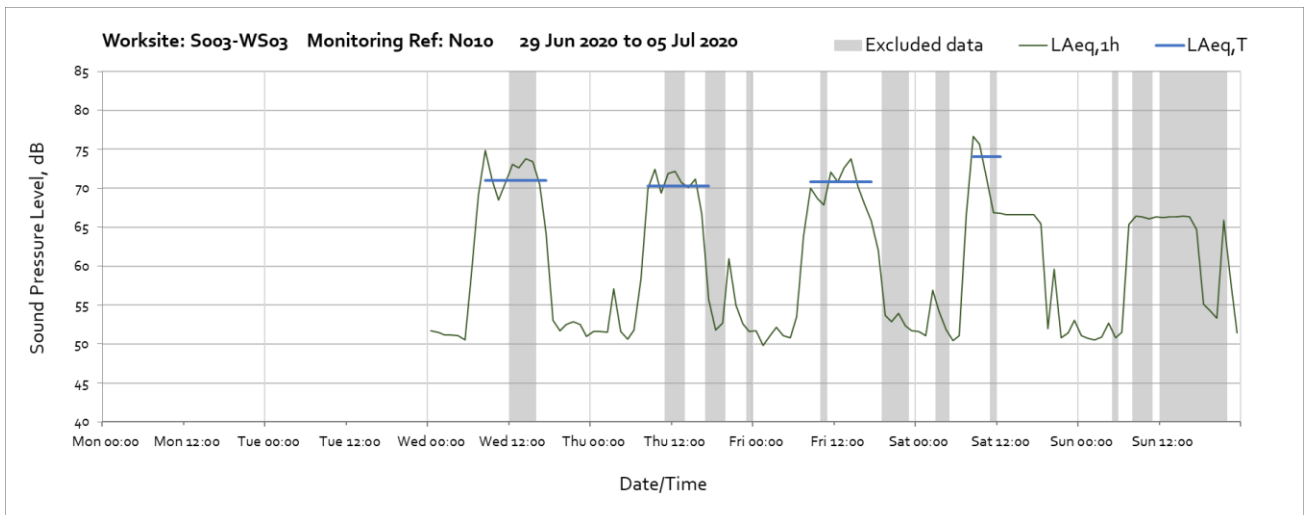
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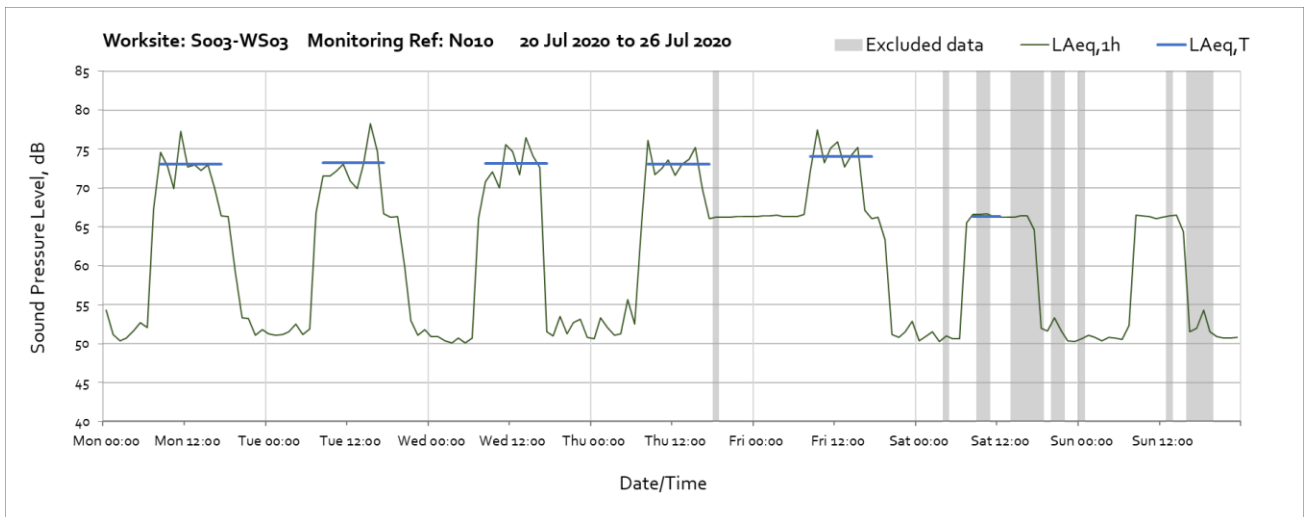
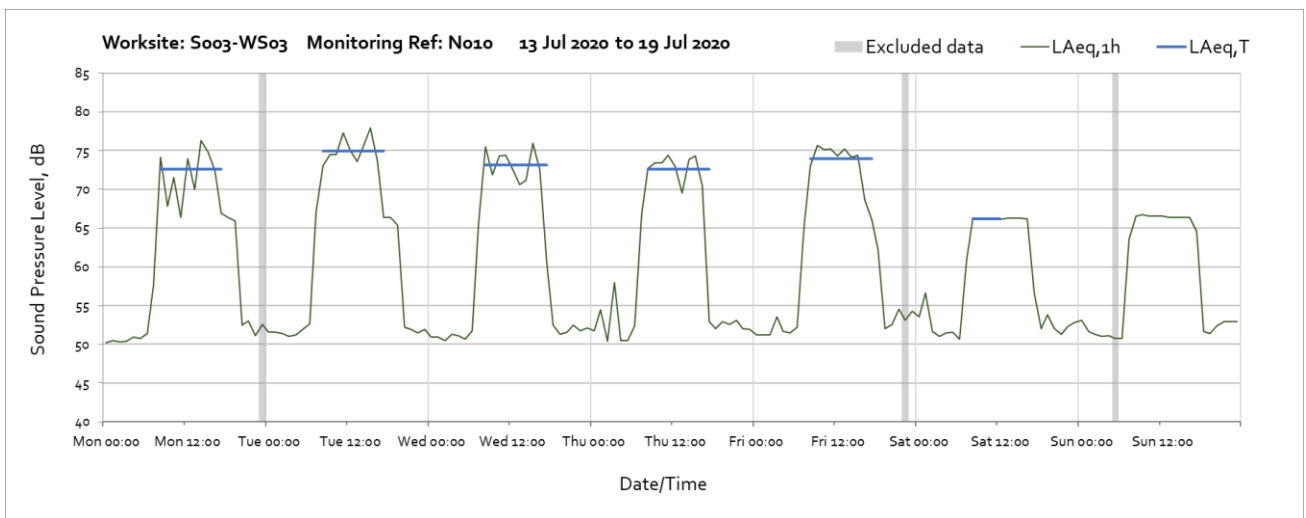
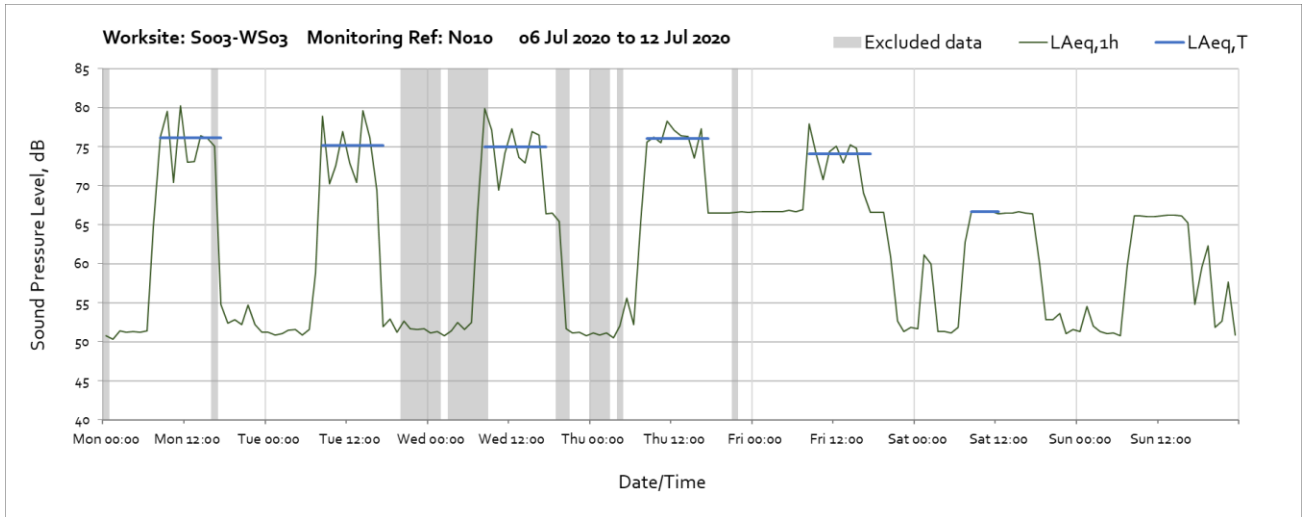


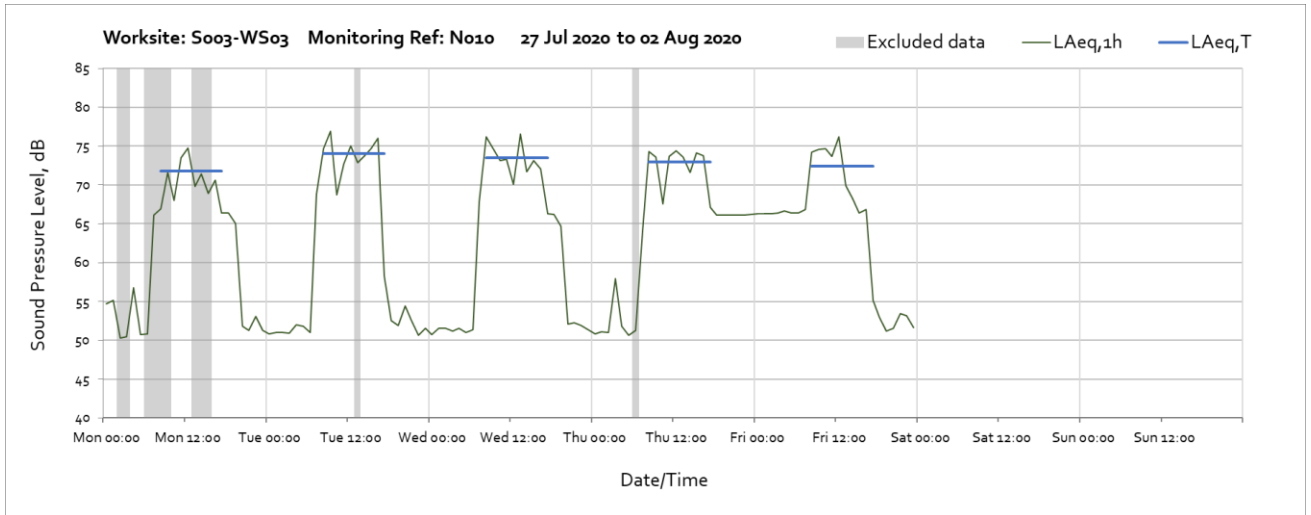
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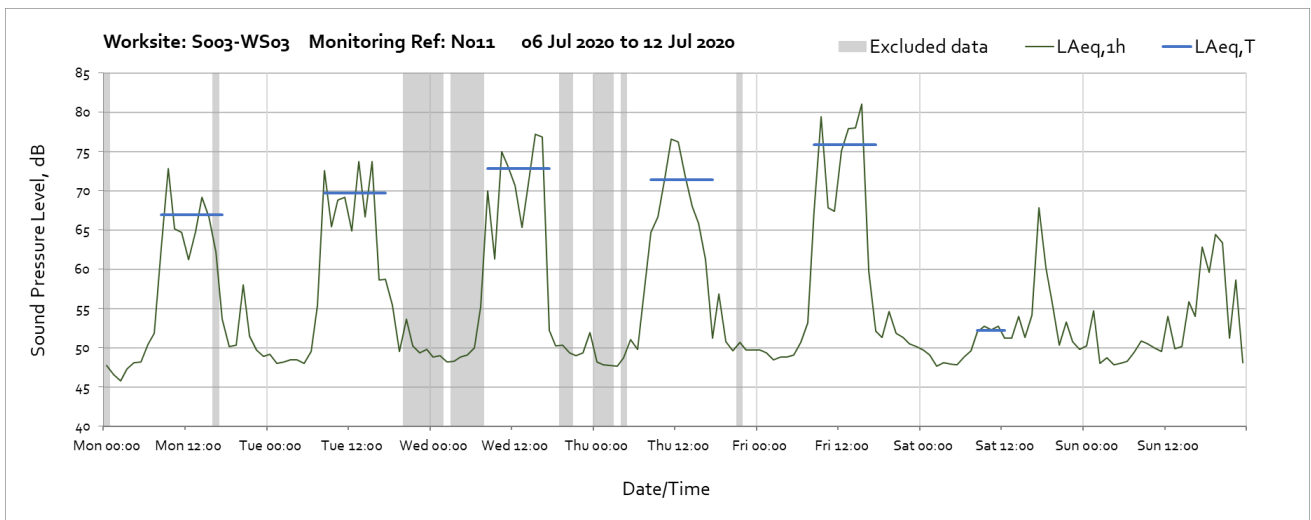
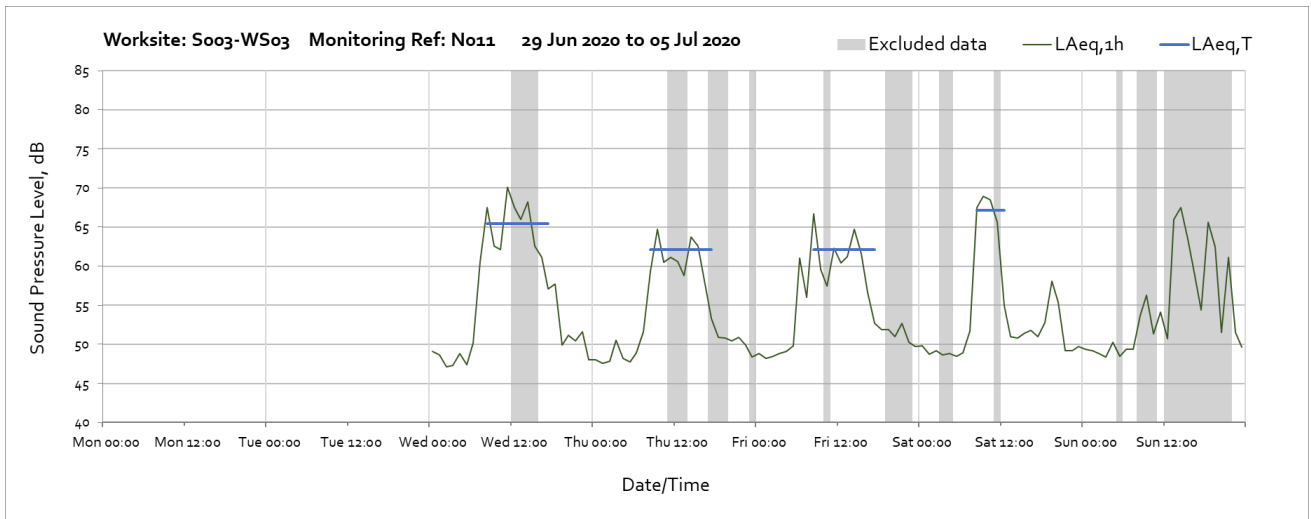
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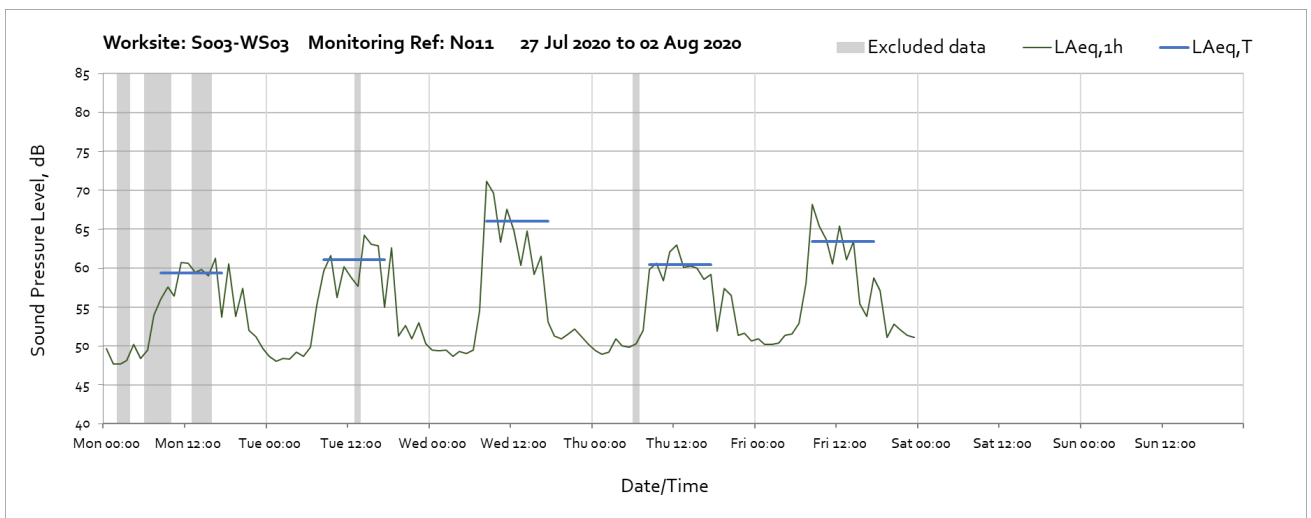
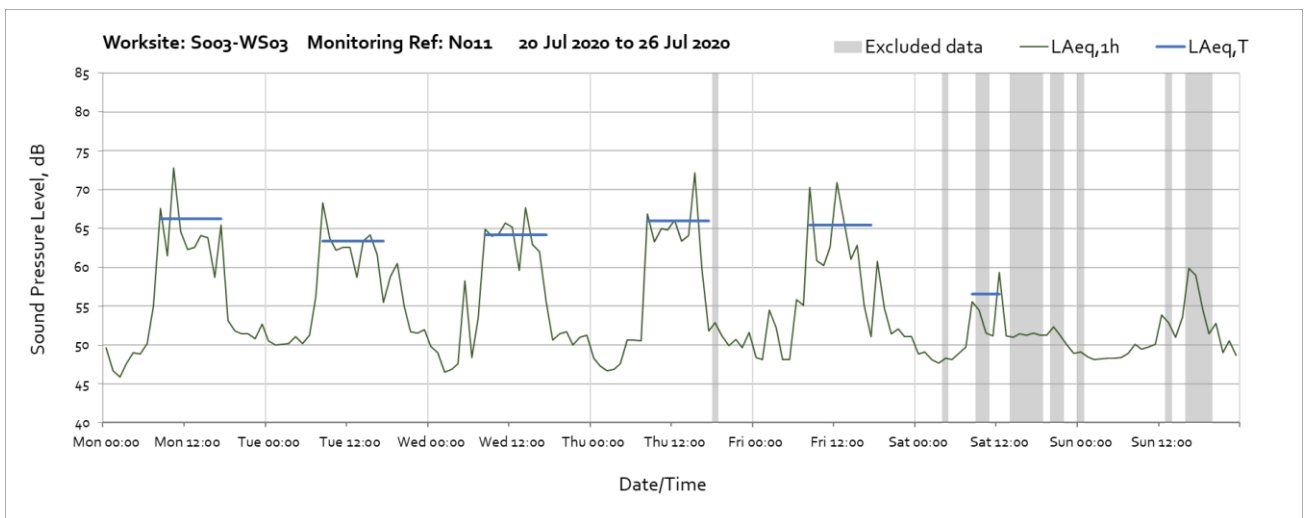
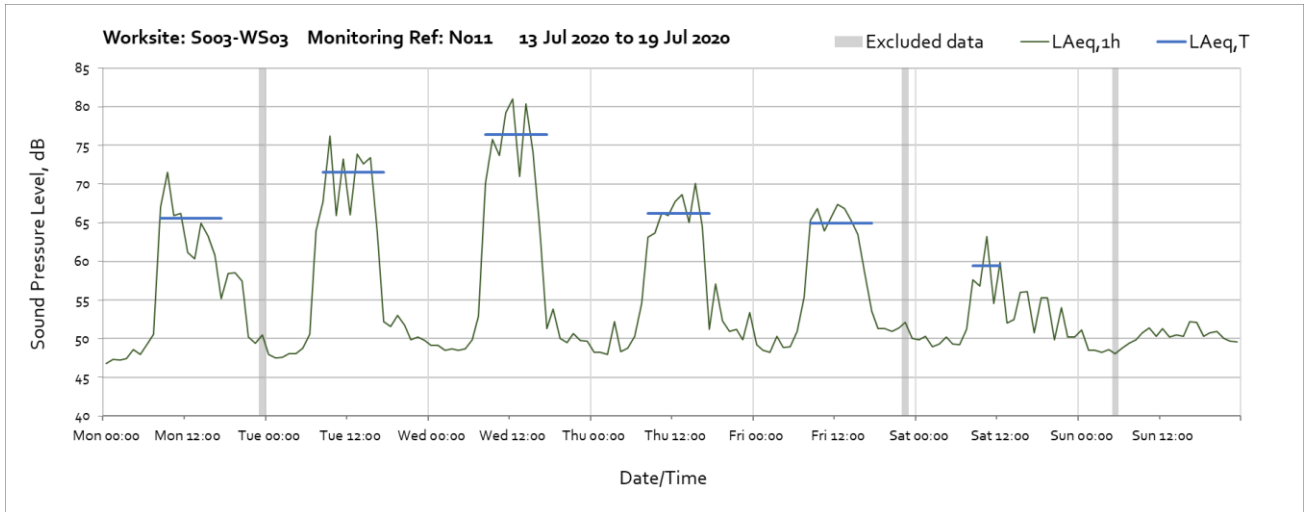




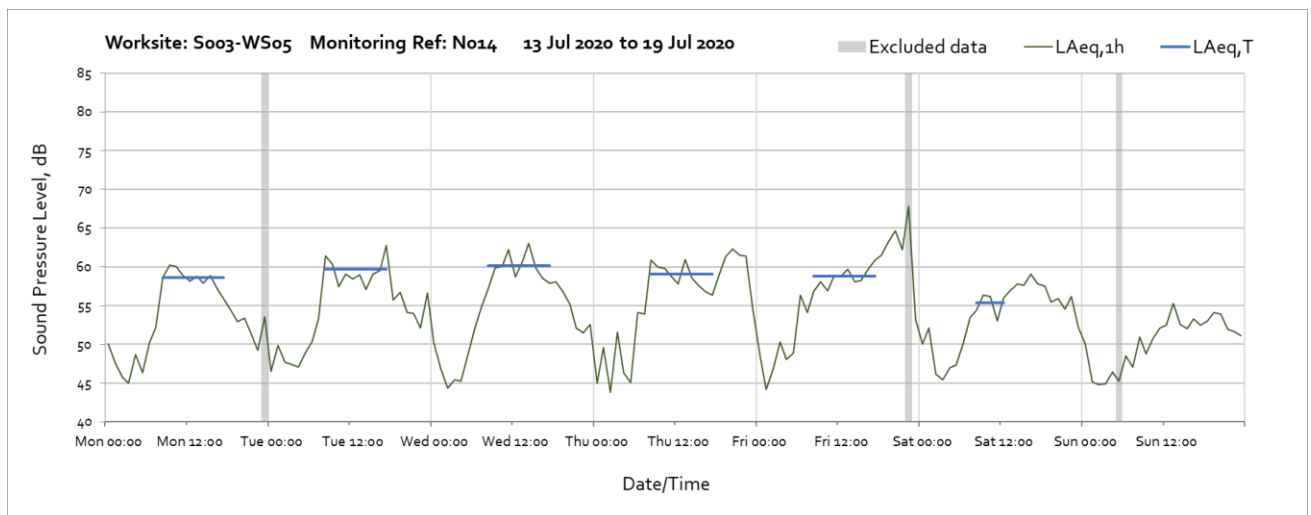
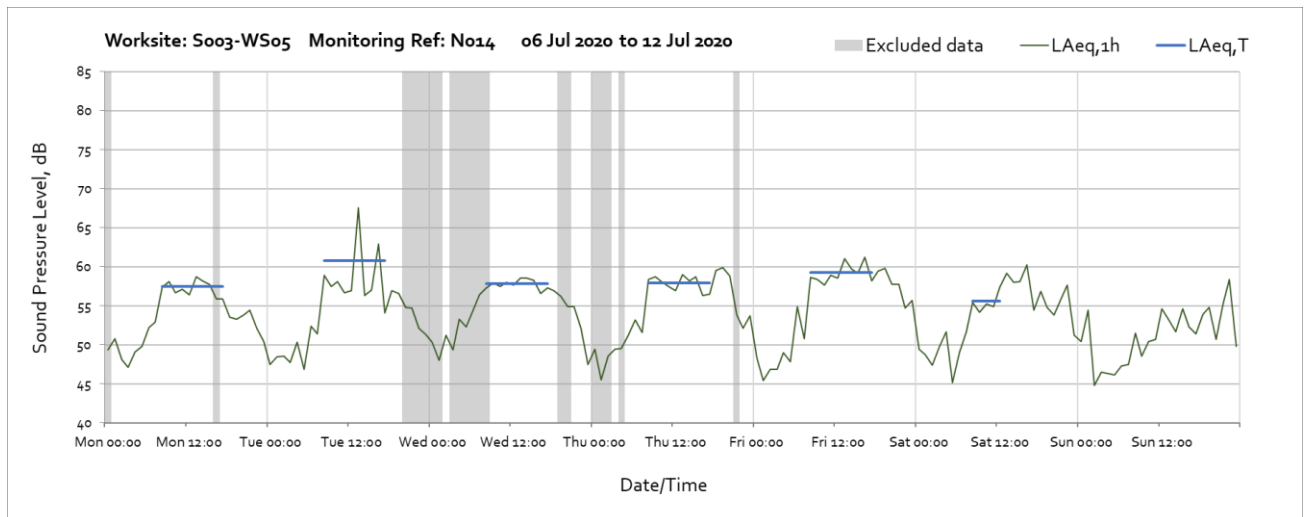
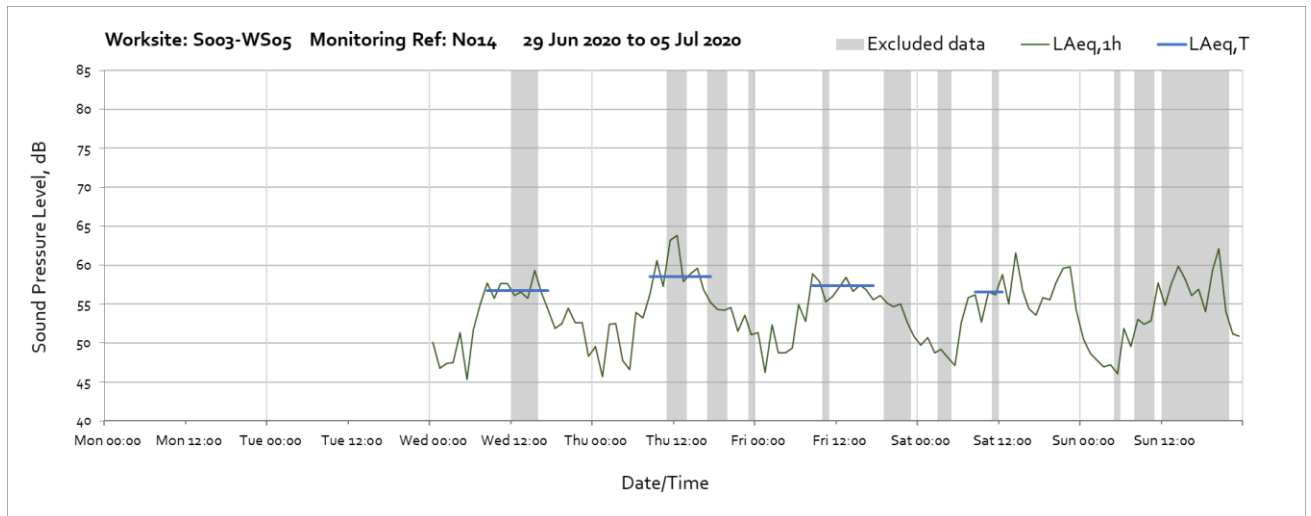


Worksite: S003-WS03 – Monitoring Ref: N011

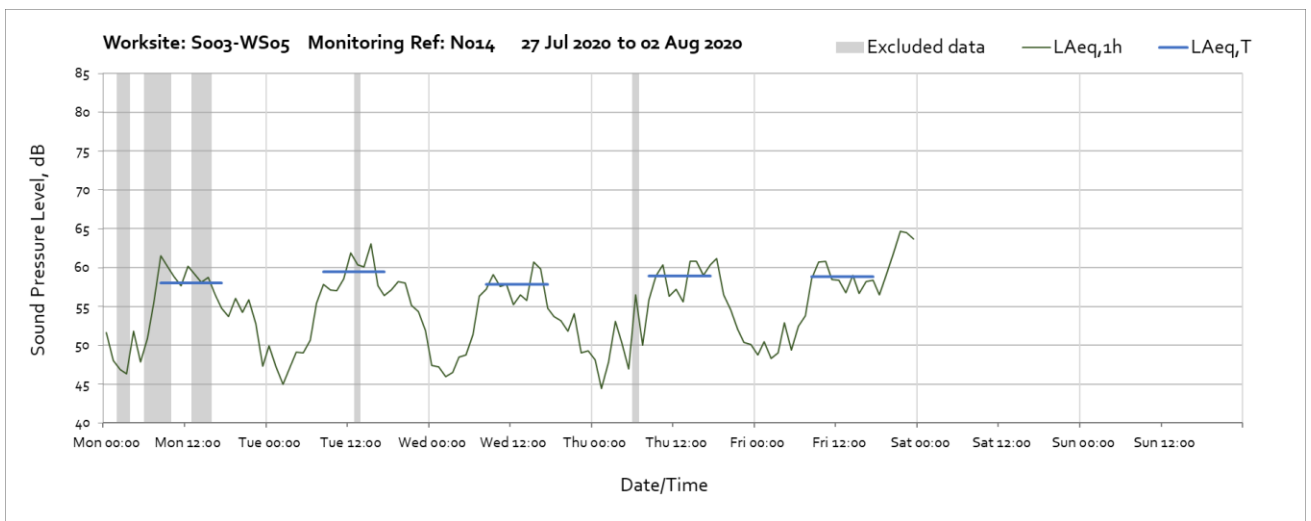
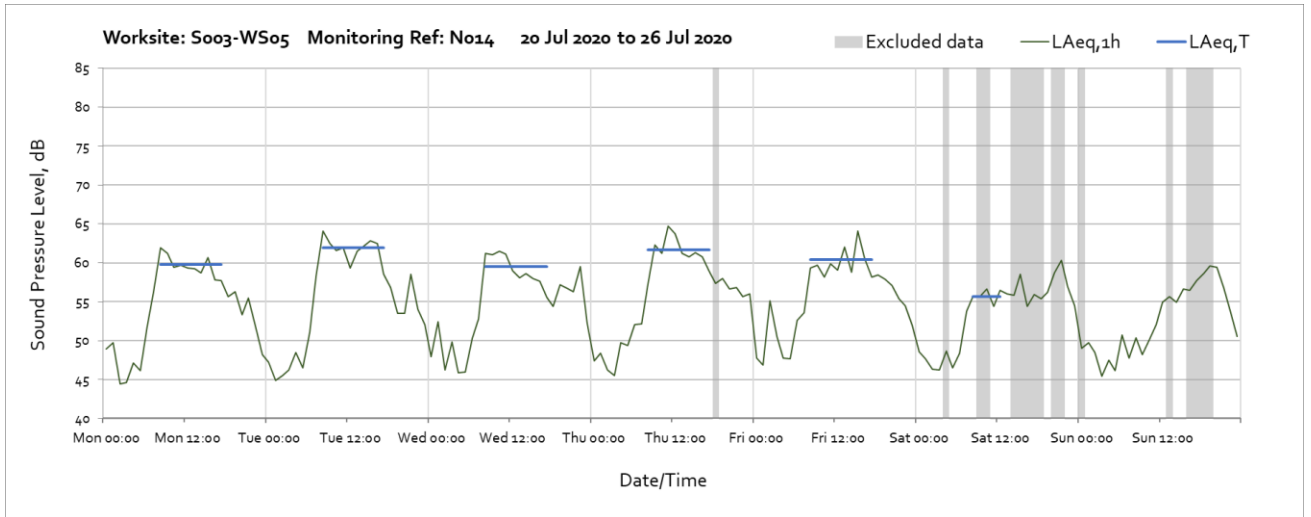




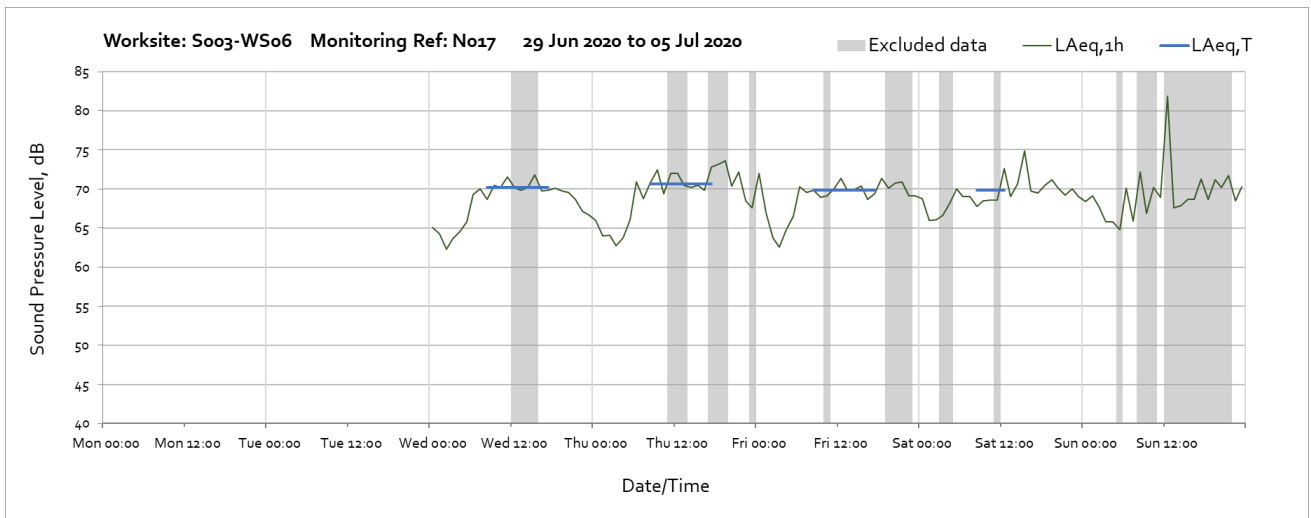
Worksite: S003-WS05 – Monitoring Ref: N014

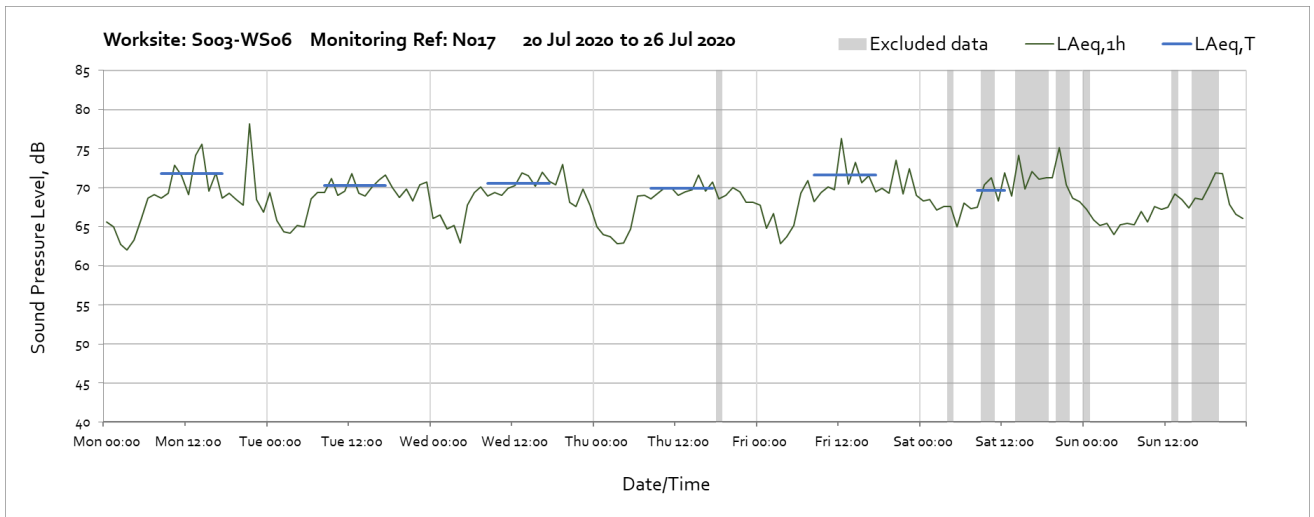
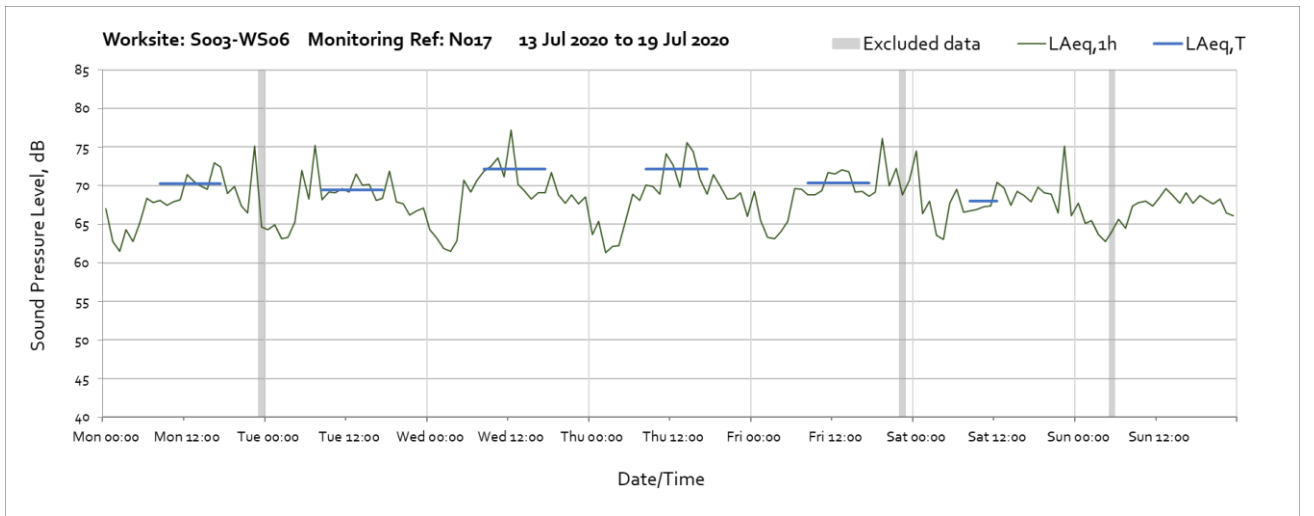
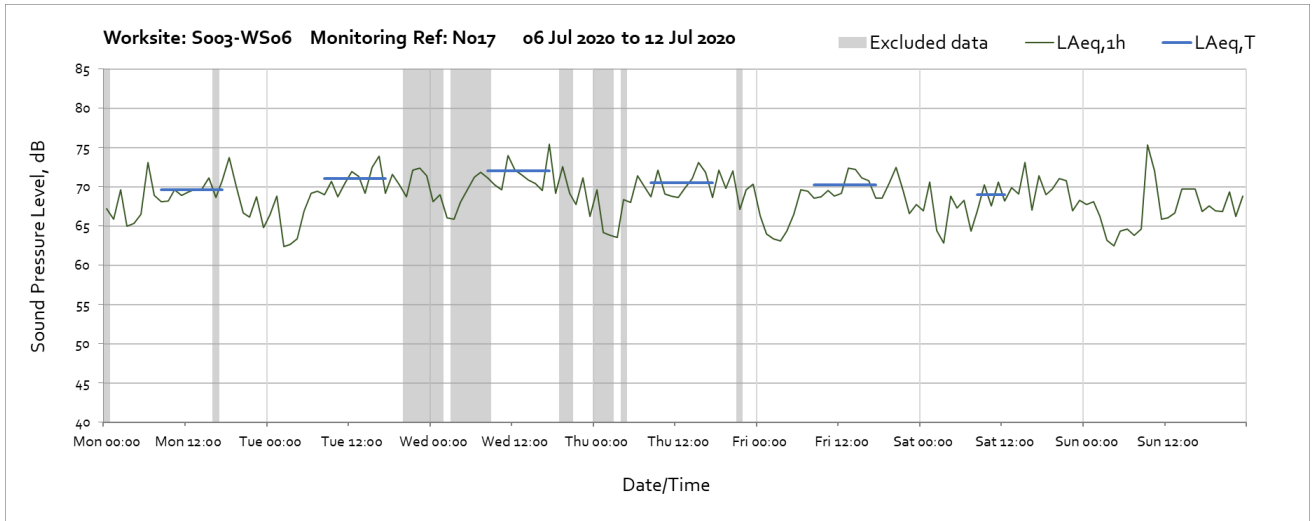


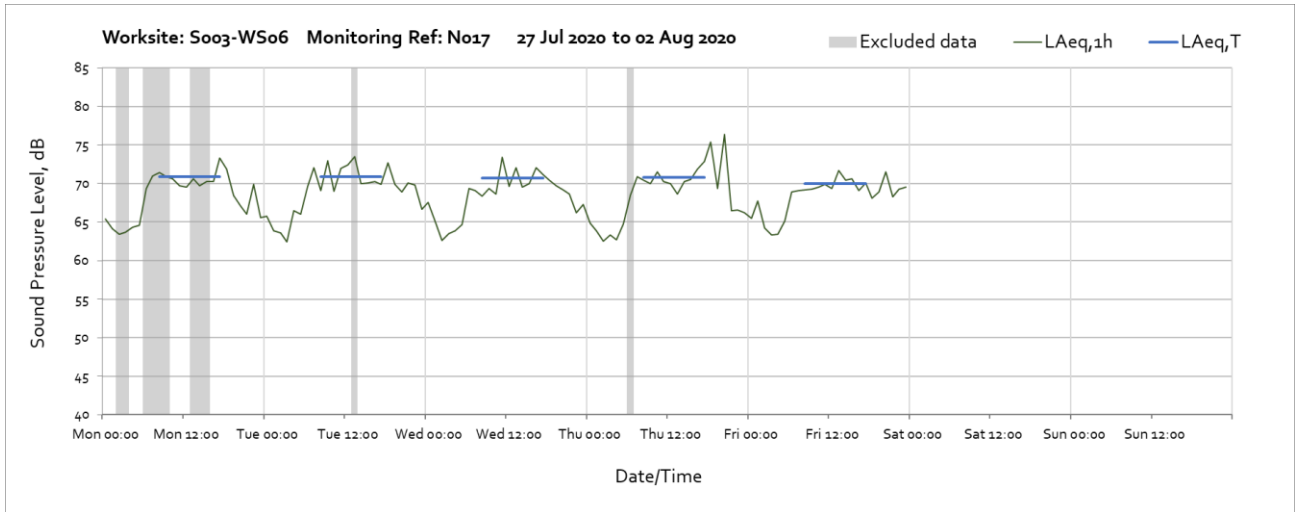
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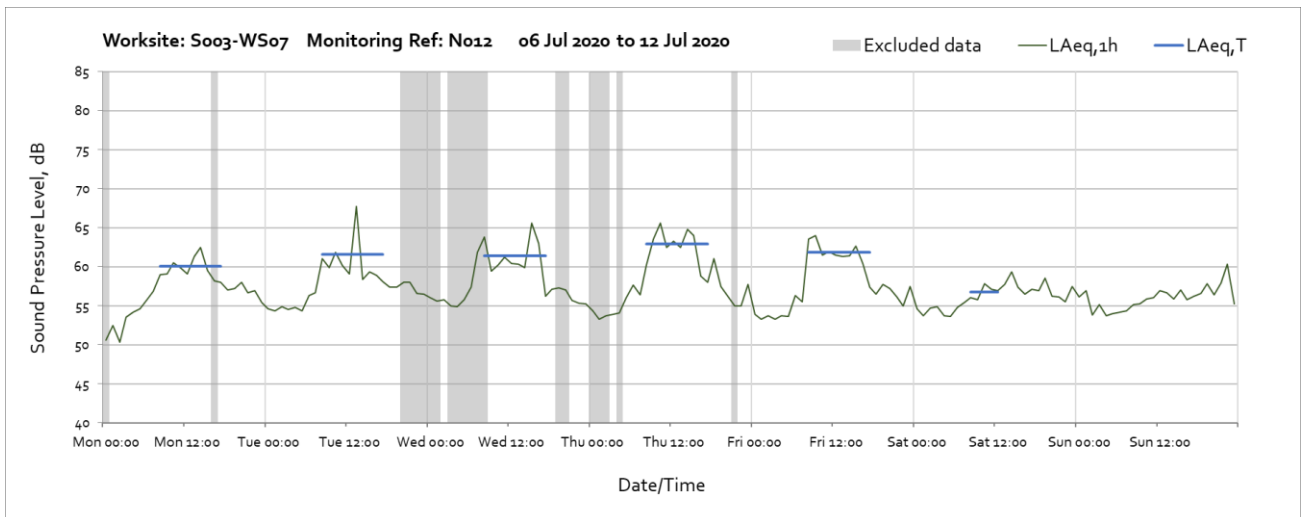
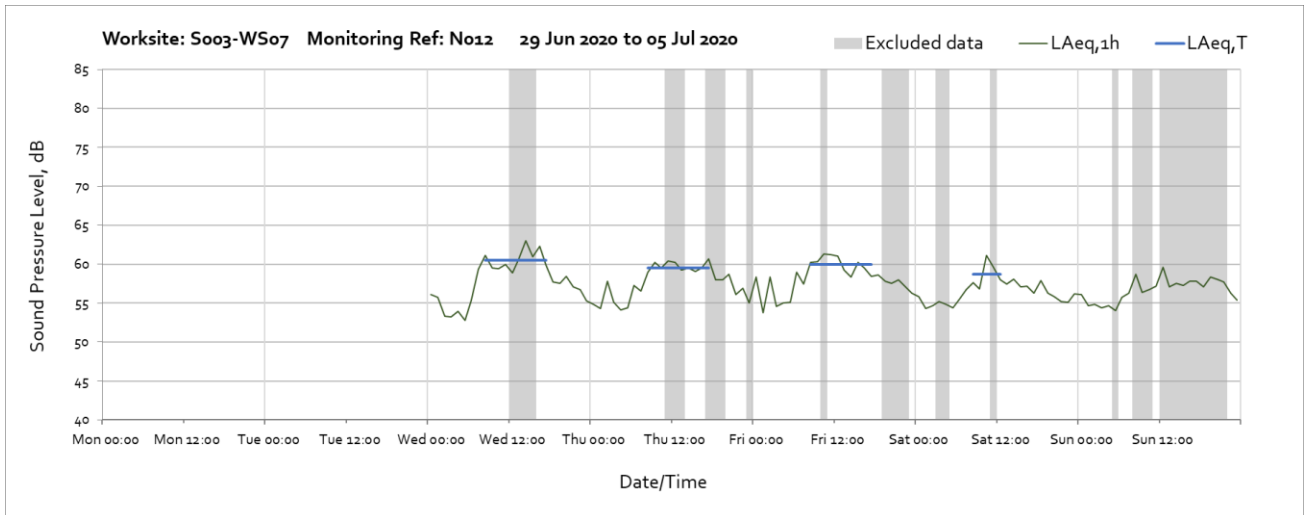
Worksite: S003-WS06 – Monitoring Ref: N017

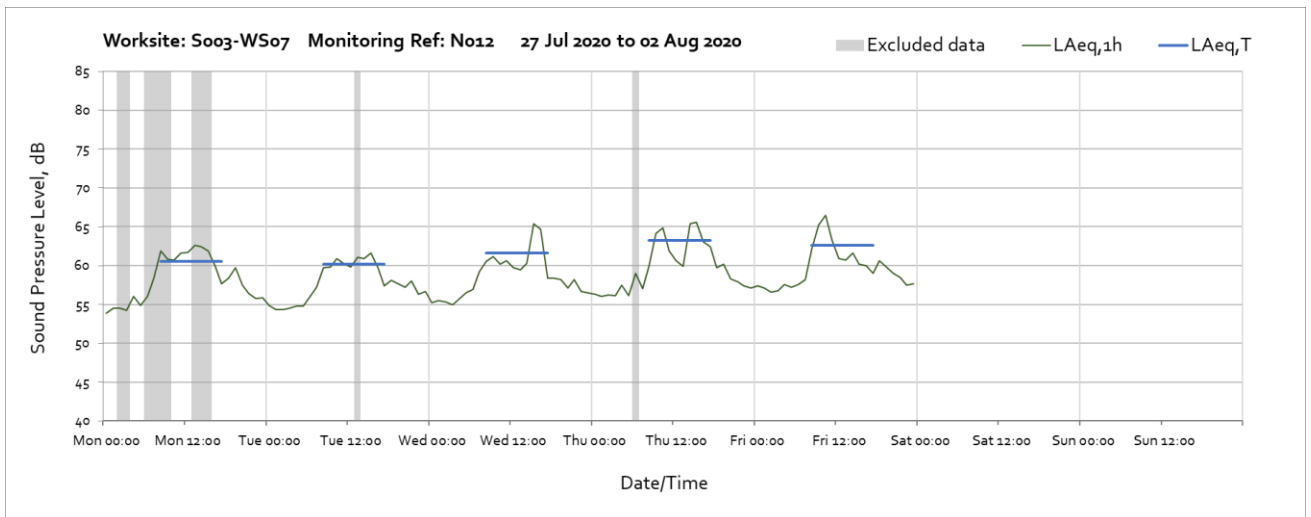
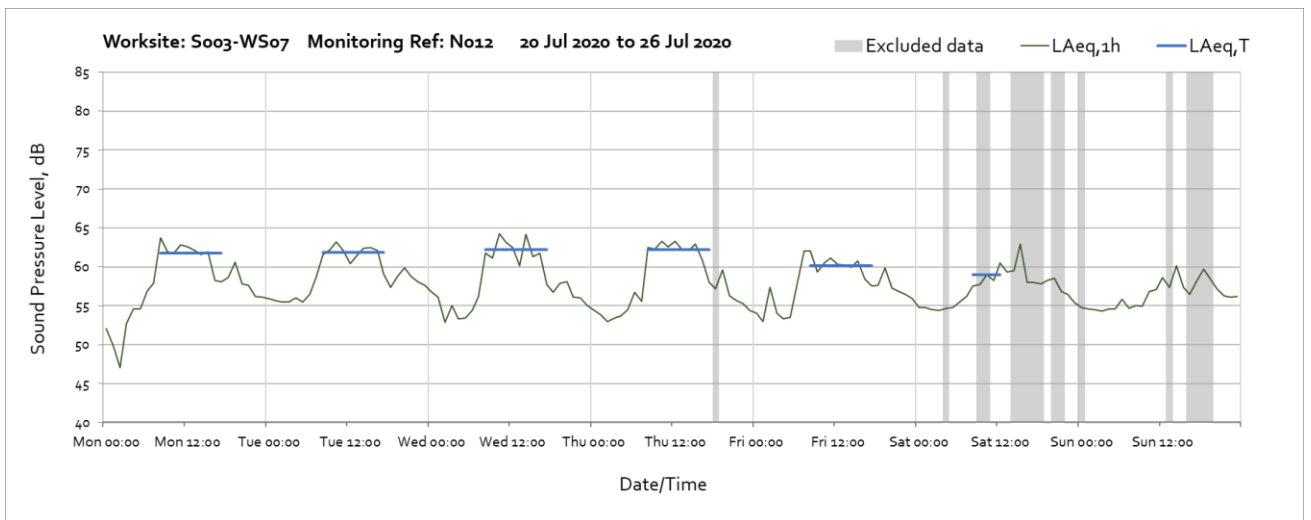
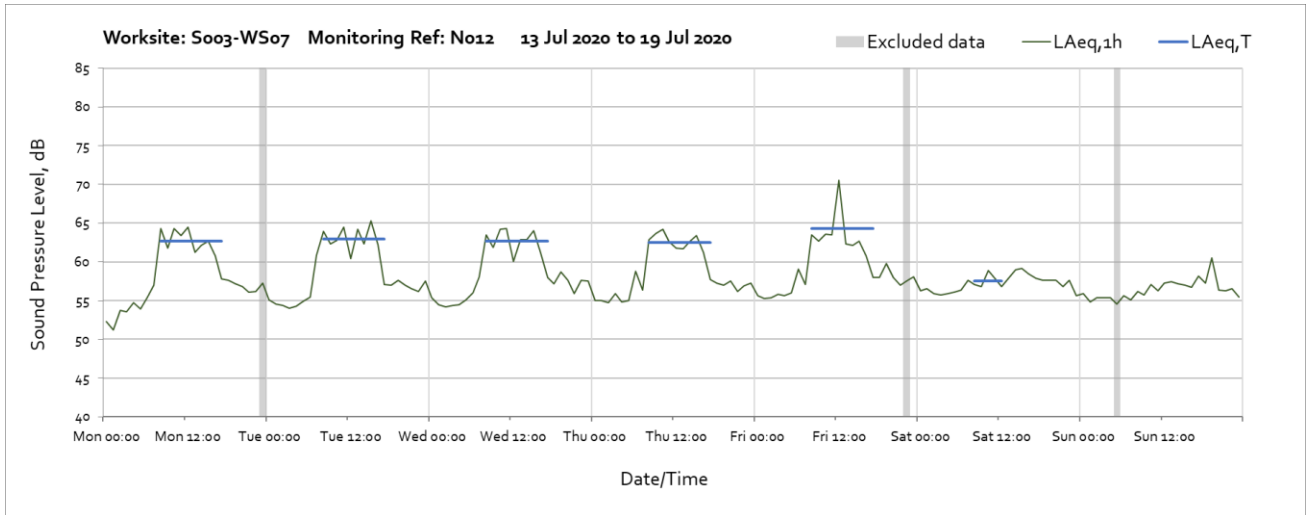




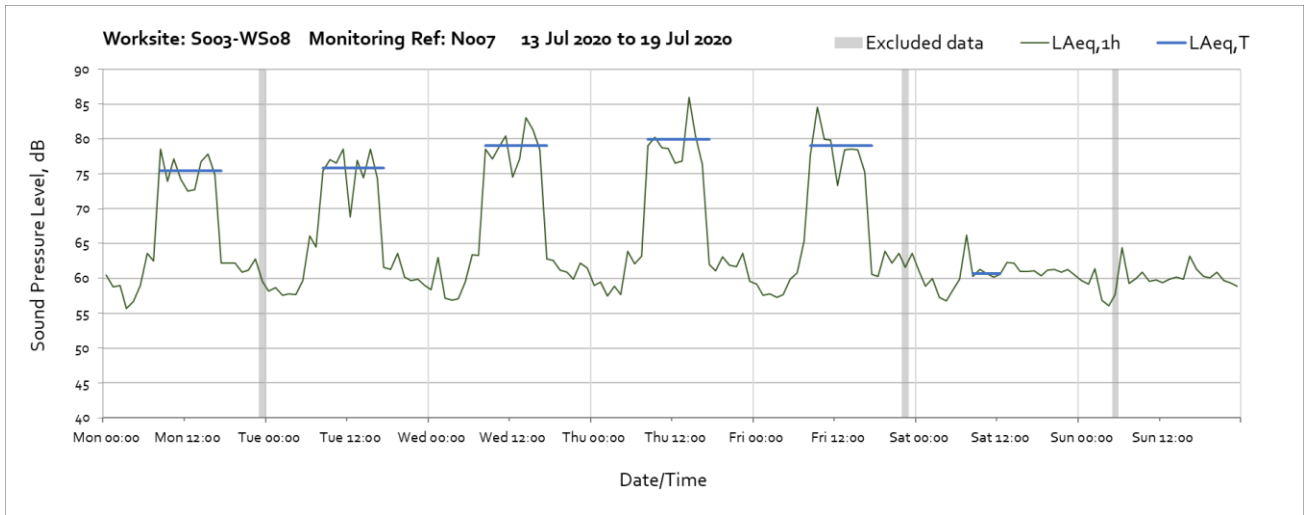
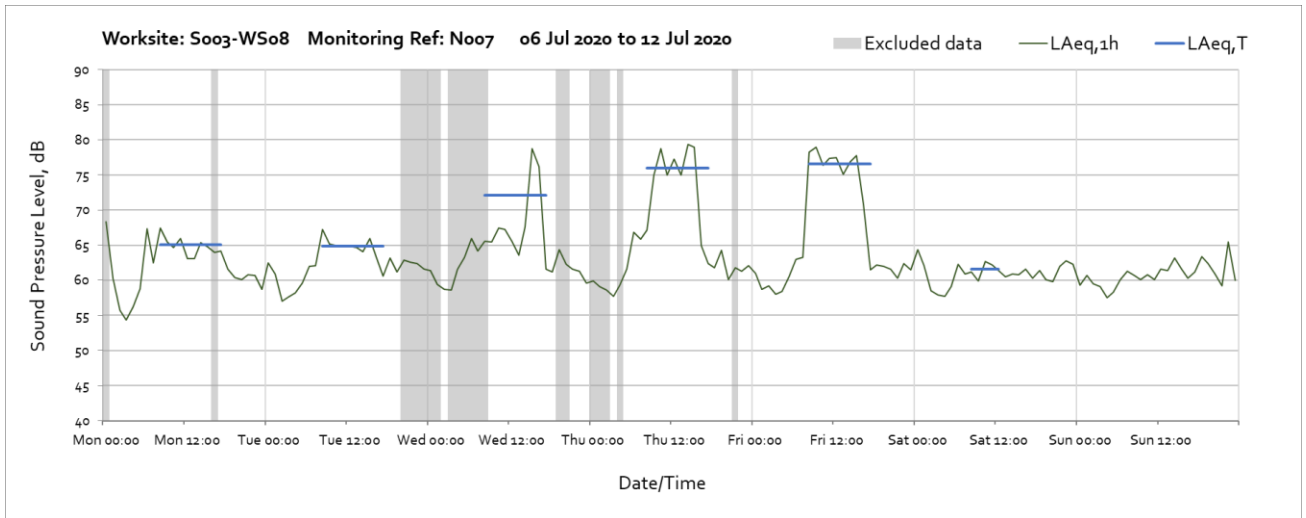
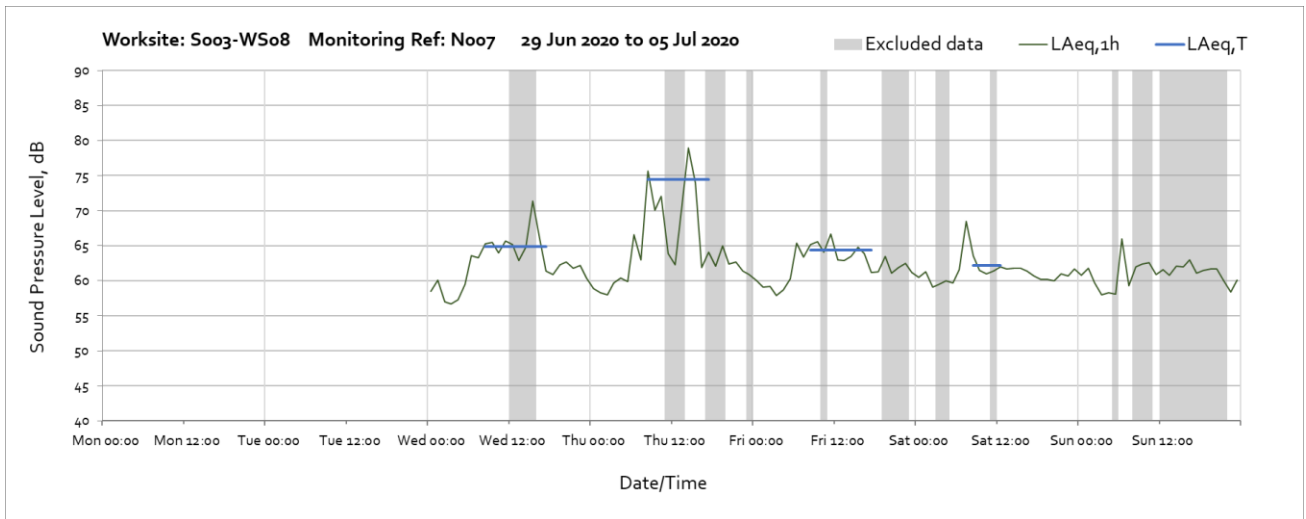


Worksite: S003-WS07 – Monitoring Ref: N012

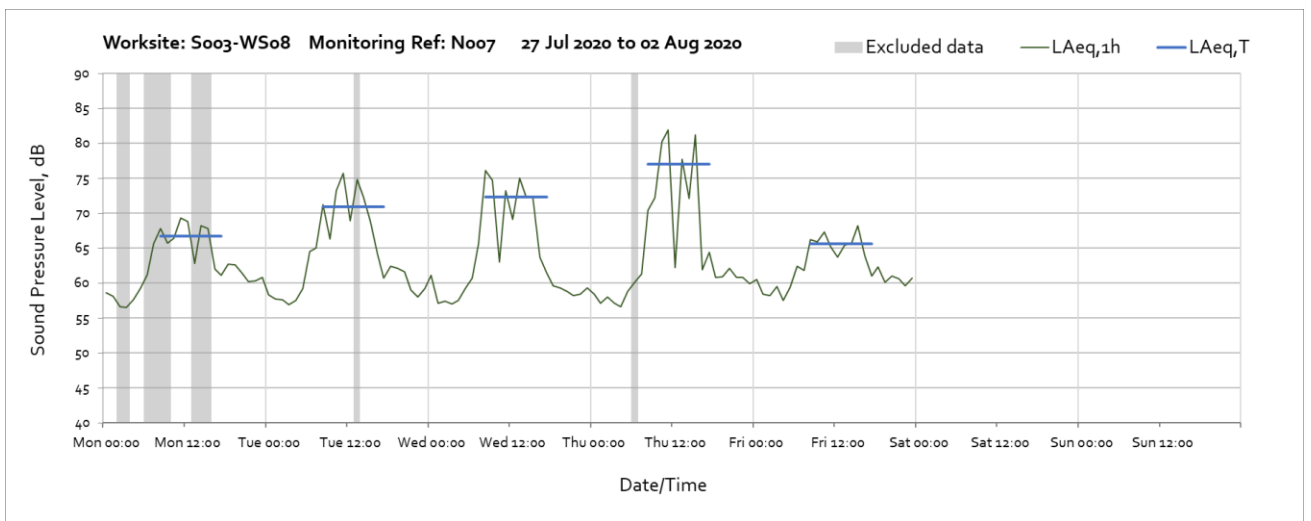
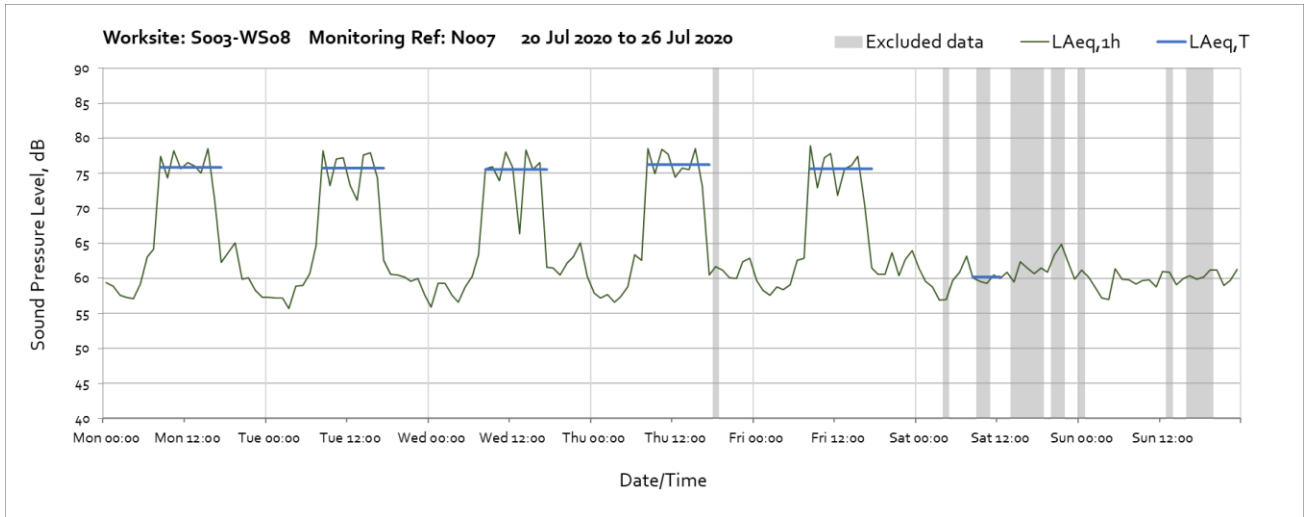




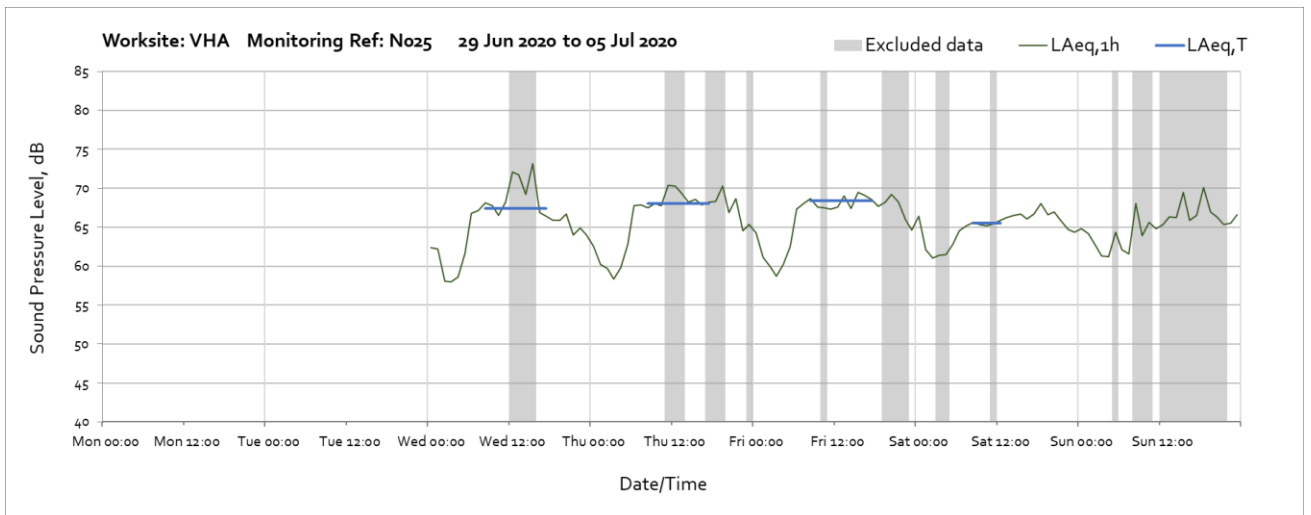
Worksite: S003-WS08 – Monitoring Ref: N007

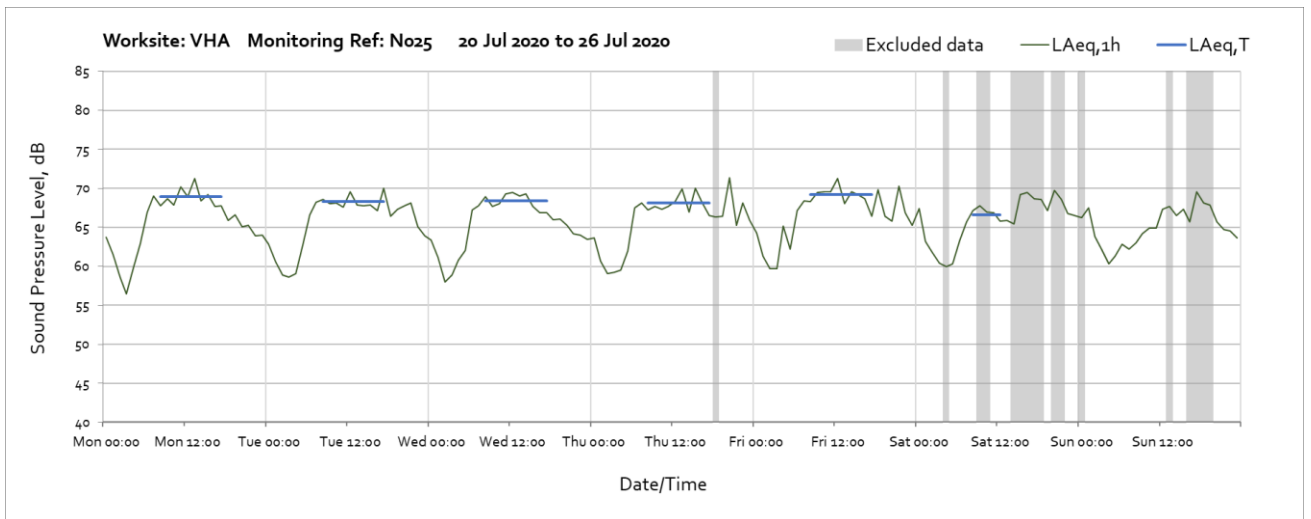
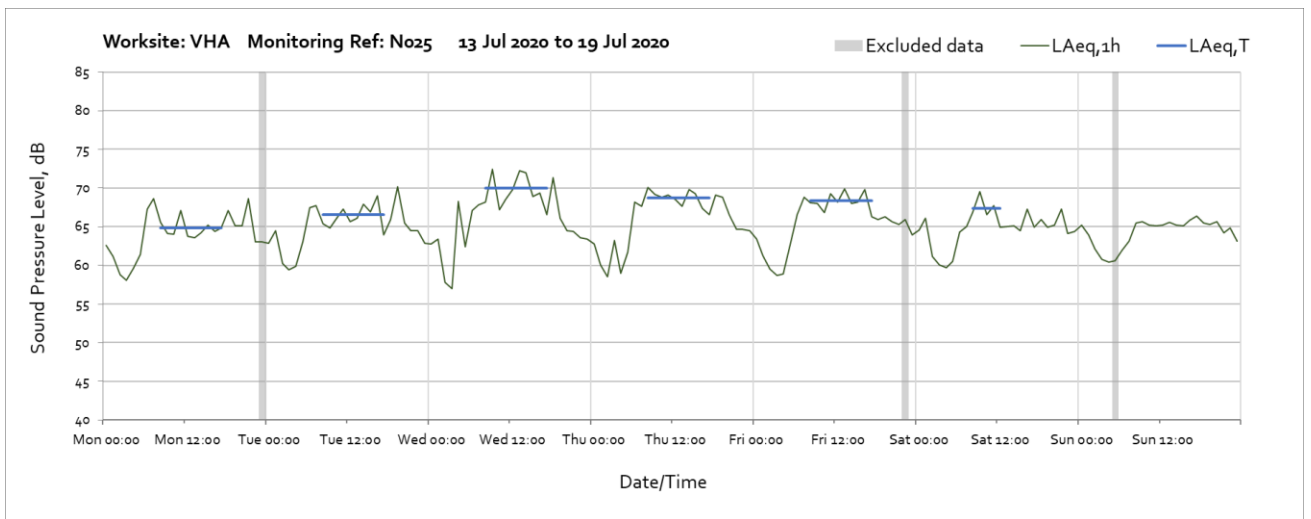
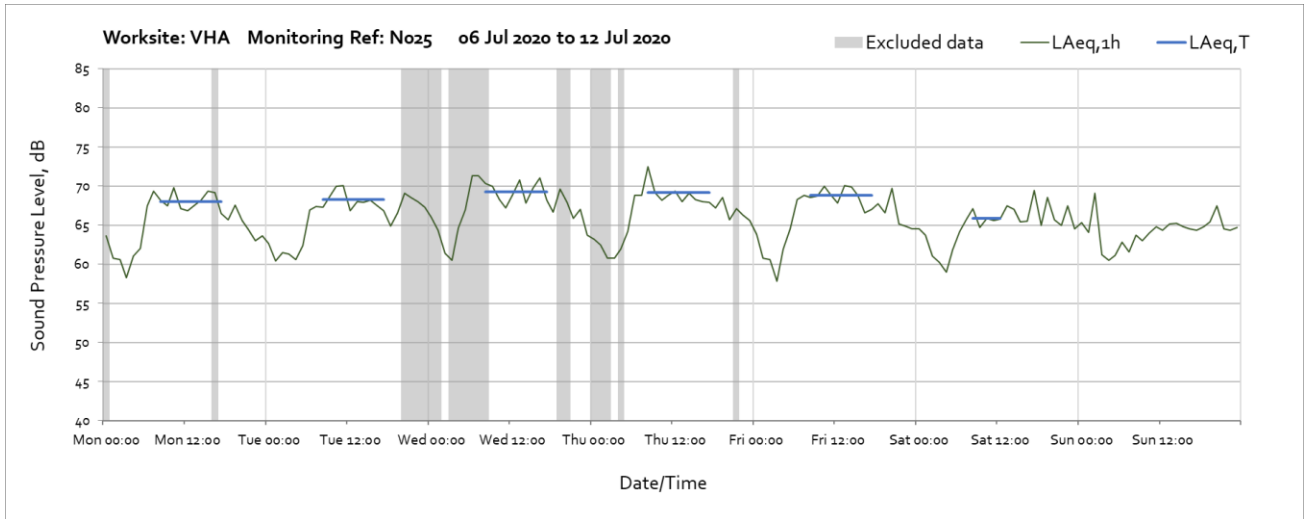


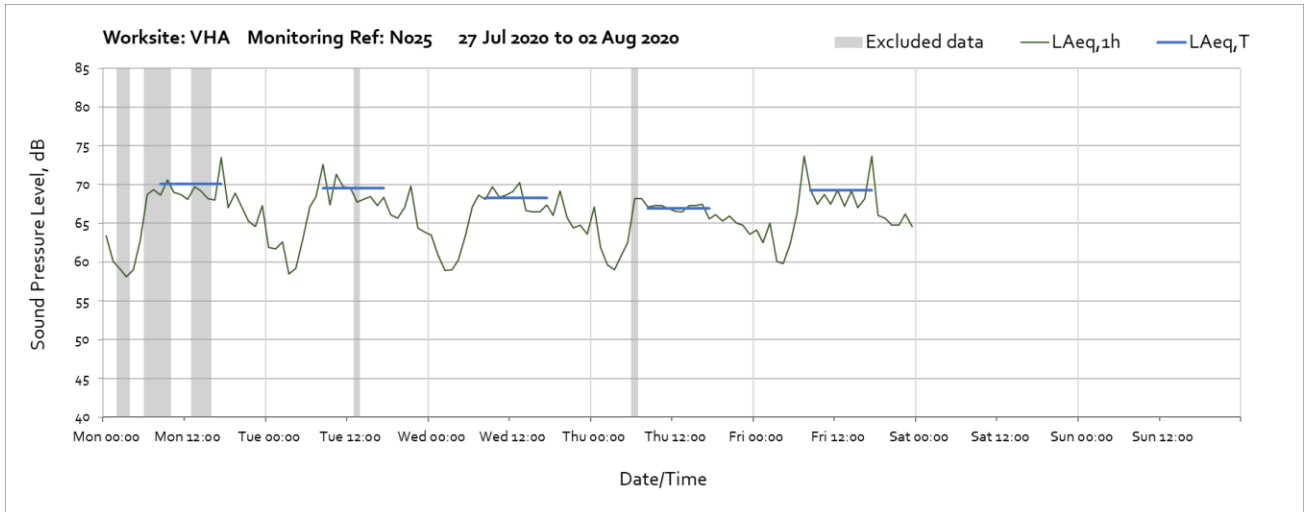
OFFICIAL



Vehicle Holding Area (VHA) – Monitoring Ref: N025







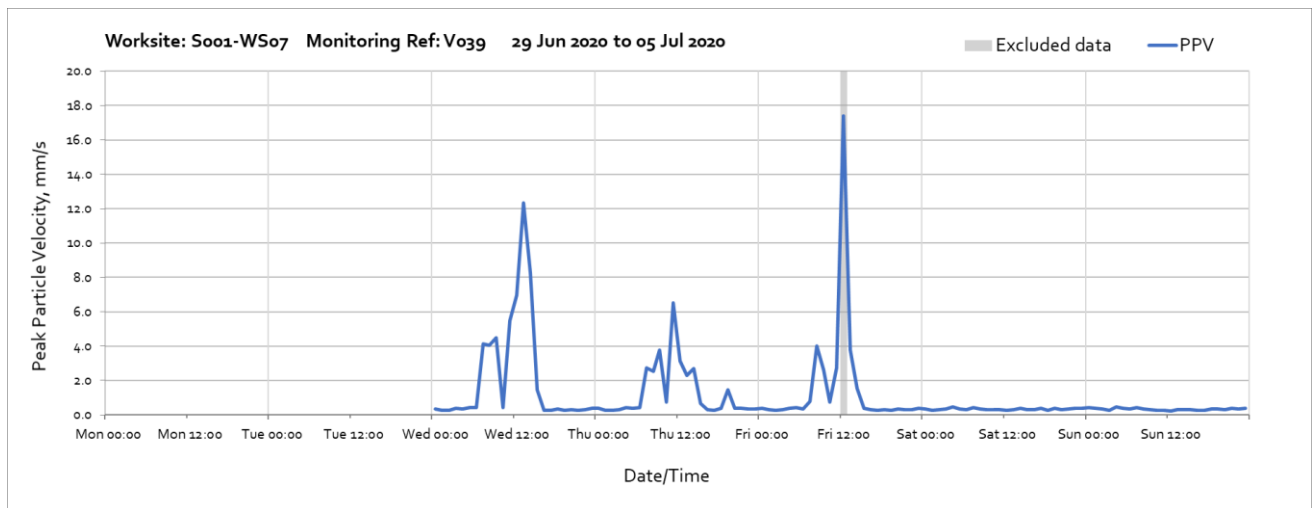
Vehicle Holding Area (VHA) – Monitoring Ref: N026

The noise monitor at measurement location N026, worksite ref.: Vehicle Holding Area was removed on the 21st of June to allow hoarding works to be undertaken within proximity of the monitoring location. The monitor will be reinstated when the hoarding works are complete.

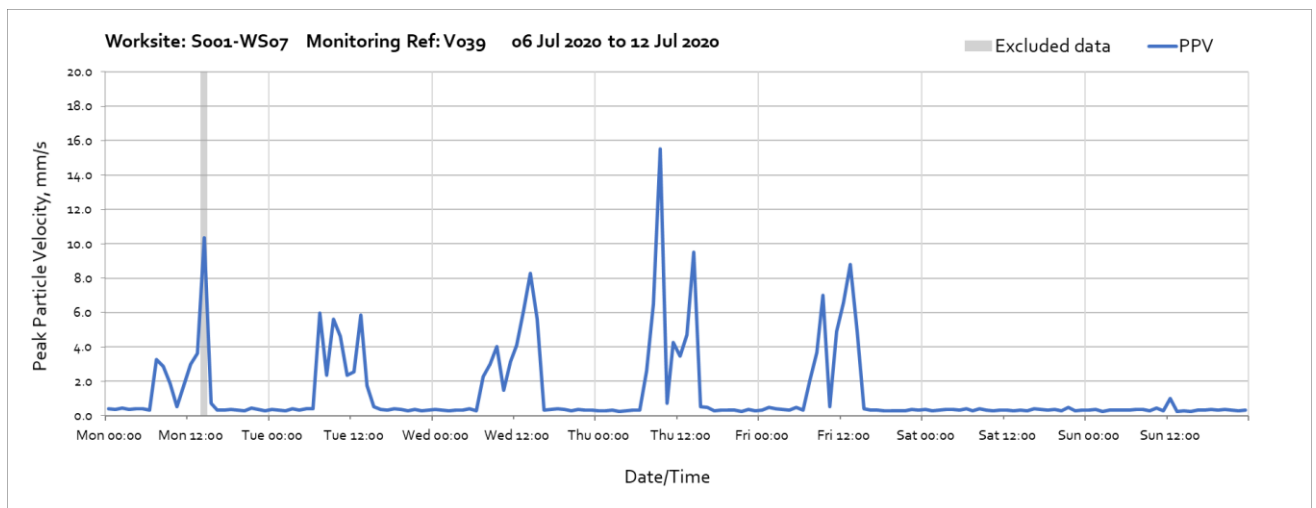
Vibration

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. Where high values of PPV were caused by local interference with the vibration monitor, which are not representative of HS2 construction works, these values have been greyed out in the following charts and have been excluded to calculate values in Table 4 of the main report.

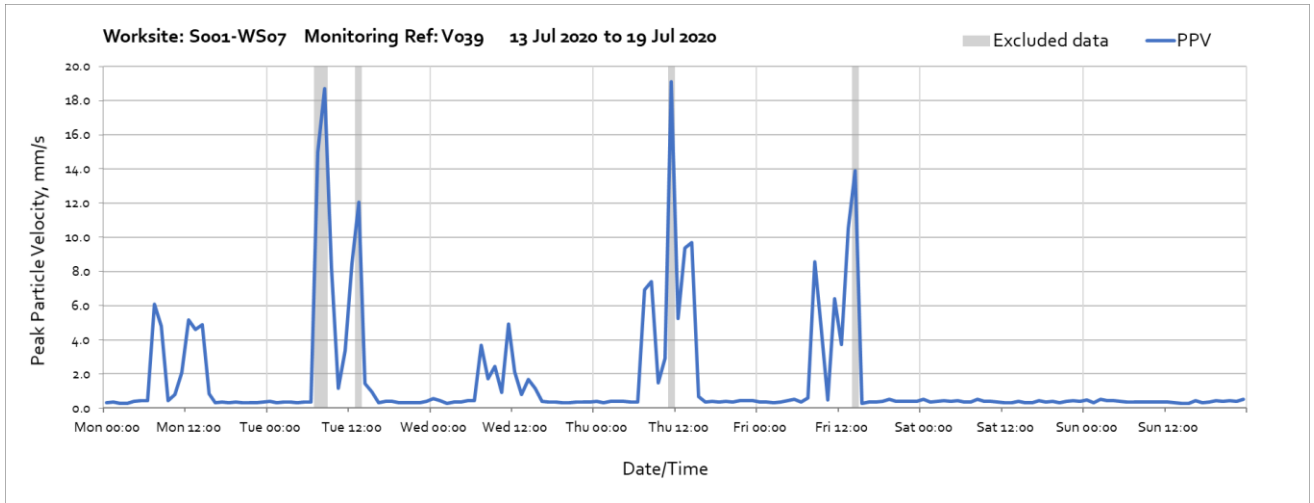
Worksite: S001-WS07 – Monitoring Ref: V039



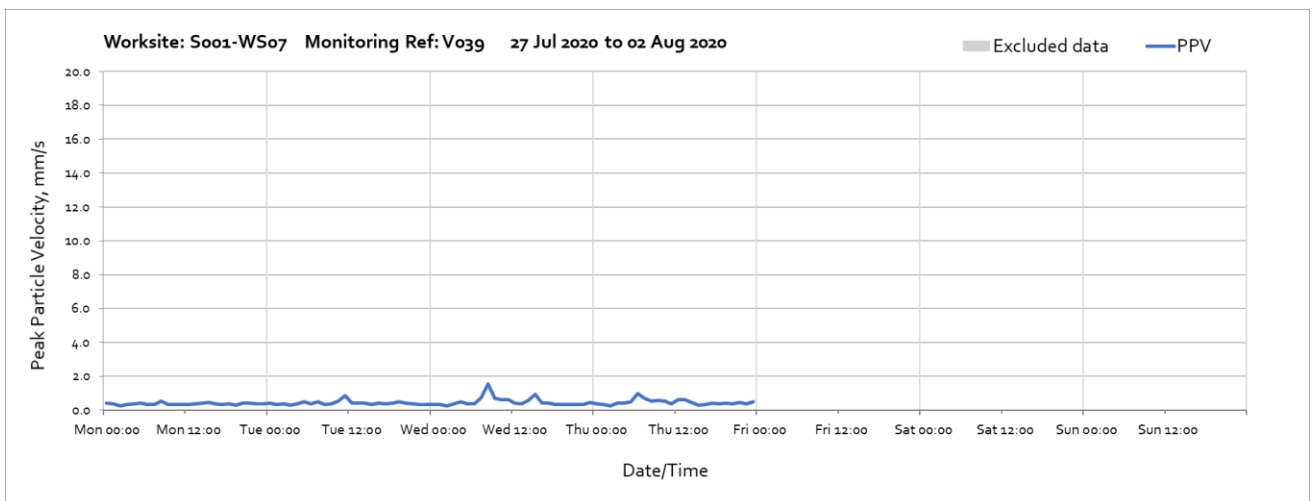
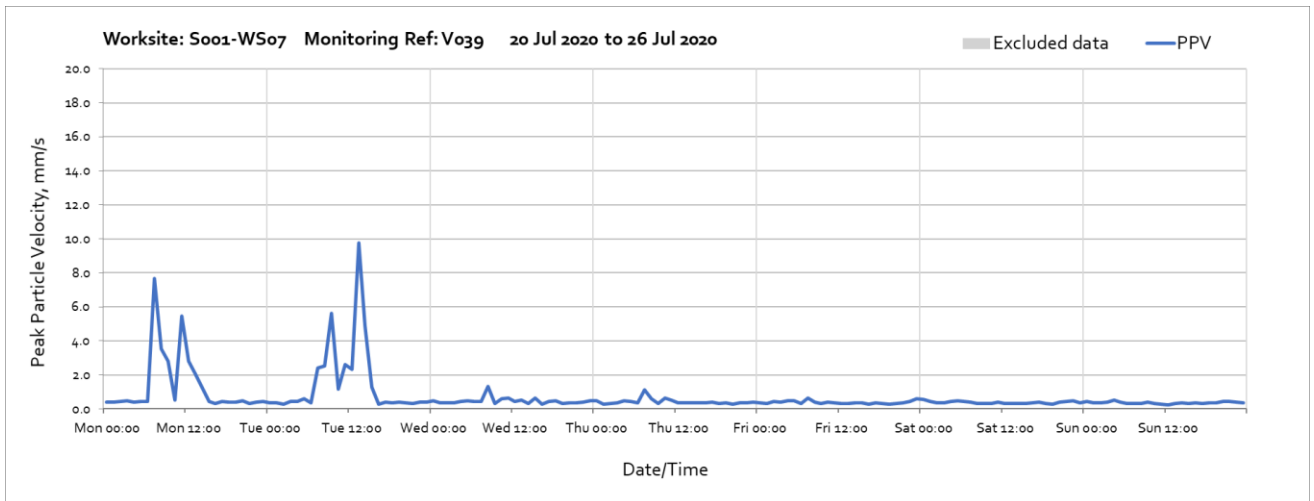
Note: High vibration levels measured between 12:00 and 13:00 on Friday 3rd July were due to local disturbance of the monitor and are not representative of HS2 vibration levels.



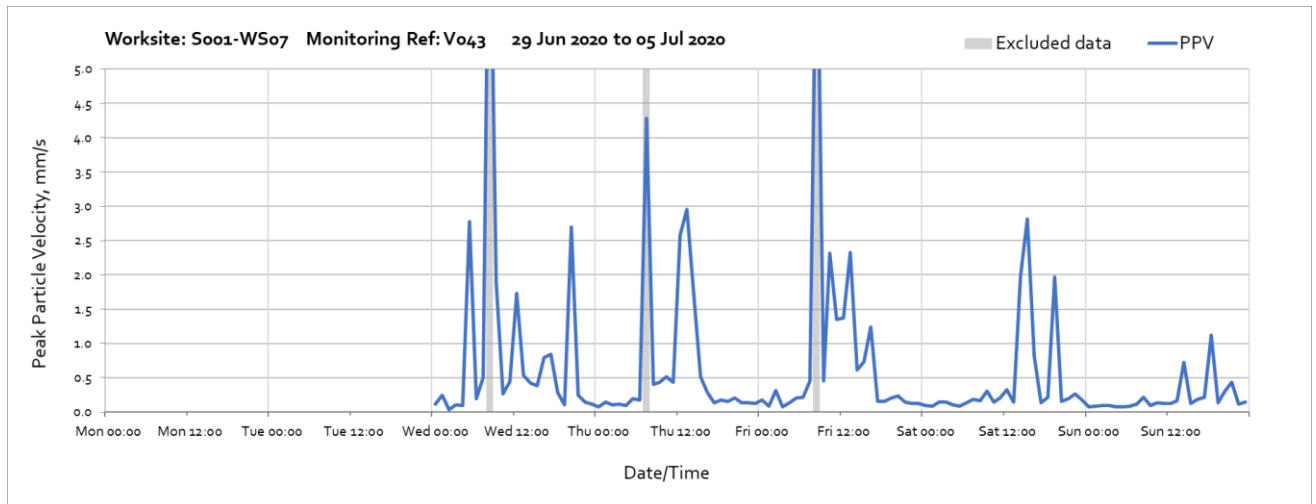
Note: High vibration levels measured between 13:00 and 14:00 on Monday 6th July were due to local disturbance of the monitor and are not representative of HS2 vibration levels.



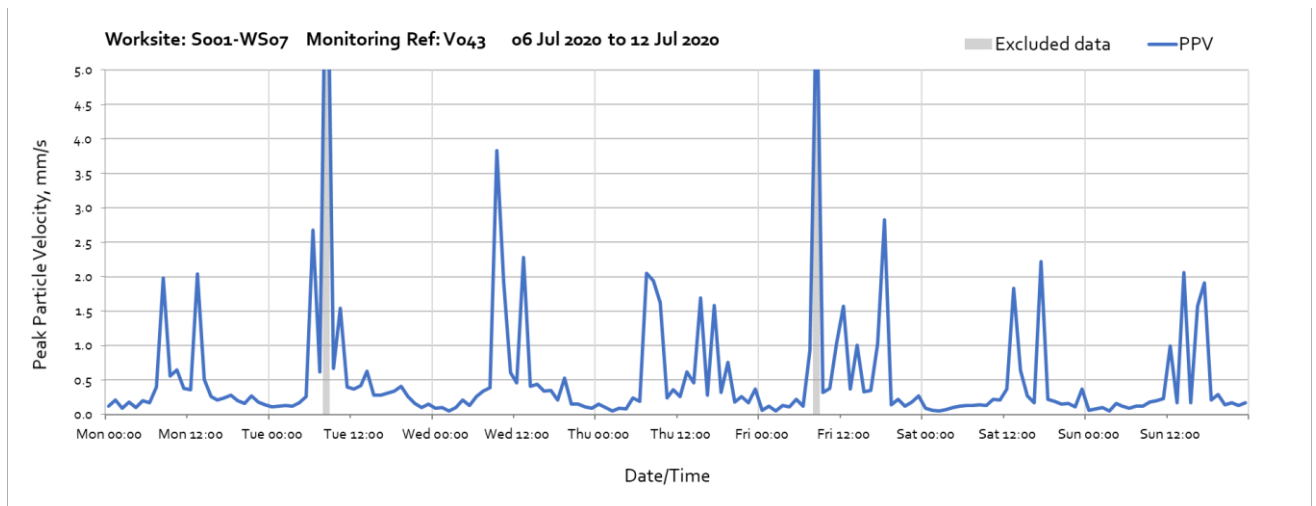
Note: High vibration levels measured throughout the week were due to local disturbance of the monitor and are not representative of HS2 vibration levels.



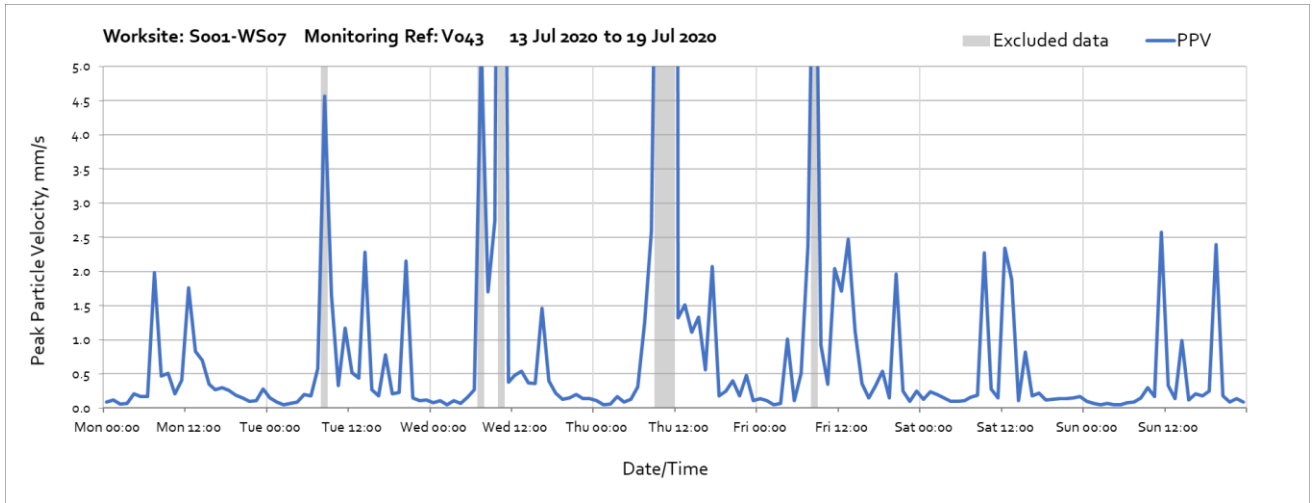
Worksite: S001-WS07 – Monitoring Ref: V043



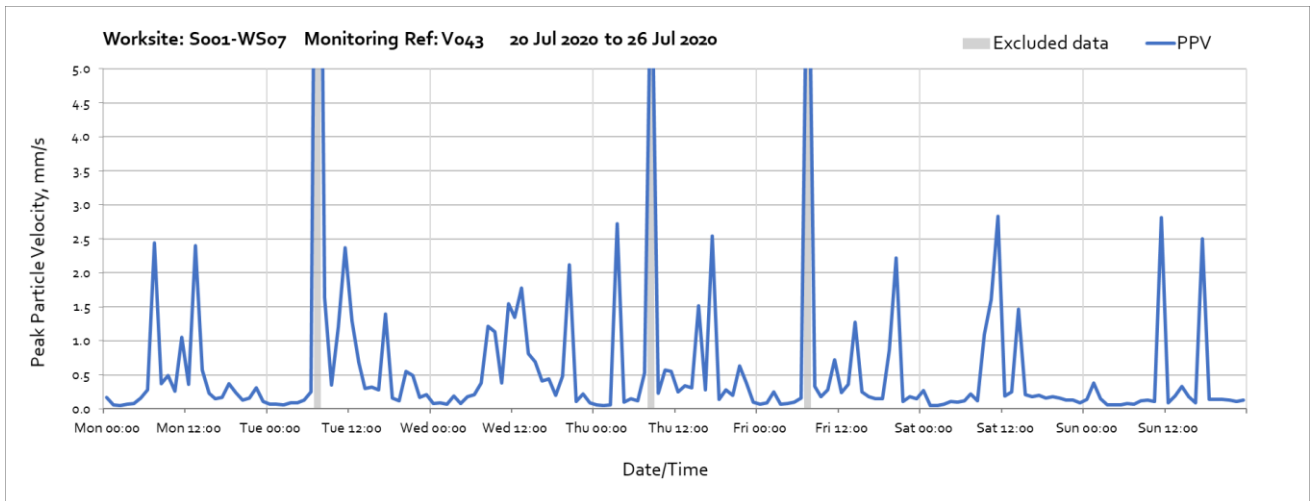
Note: High vibration levels measured throughout the week were due to local disturbance of the monitor and are not representative of HS2 vibration levels.



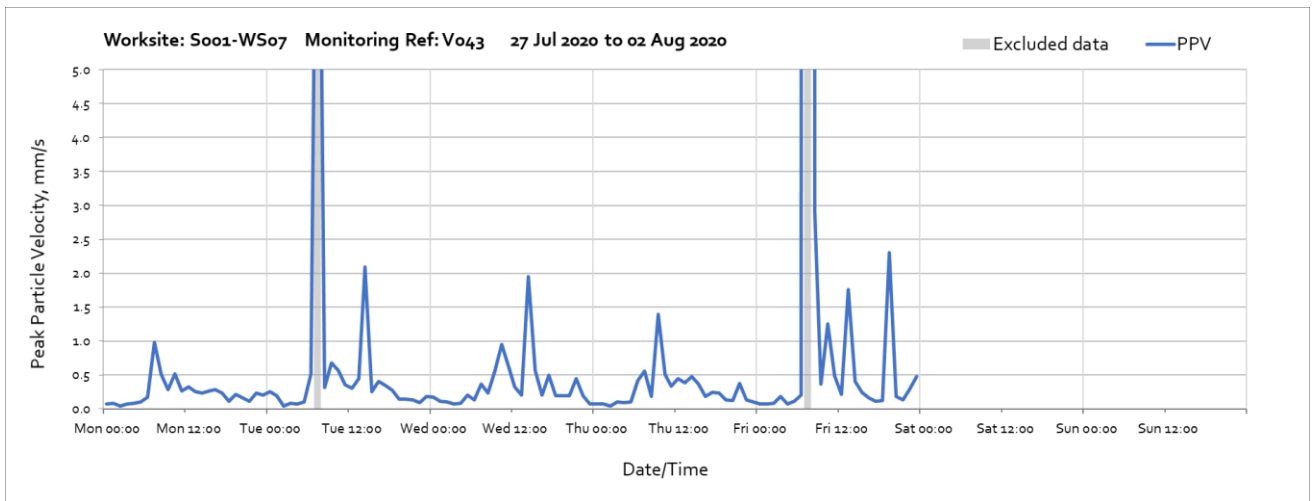
Note: High vibration levels measured throughout the week were due to local disturbance of the monitor and are not representative of HS2 vibration levels.



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

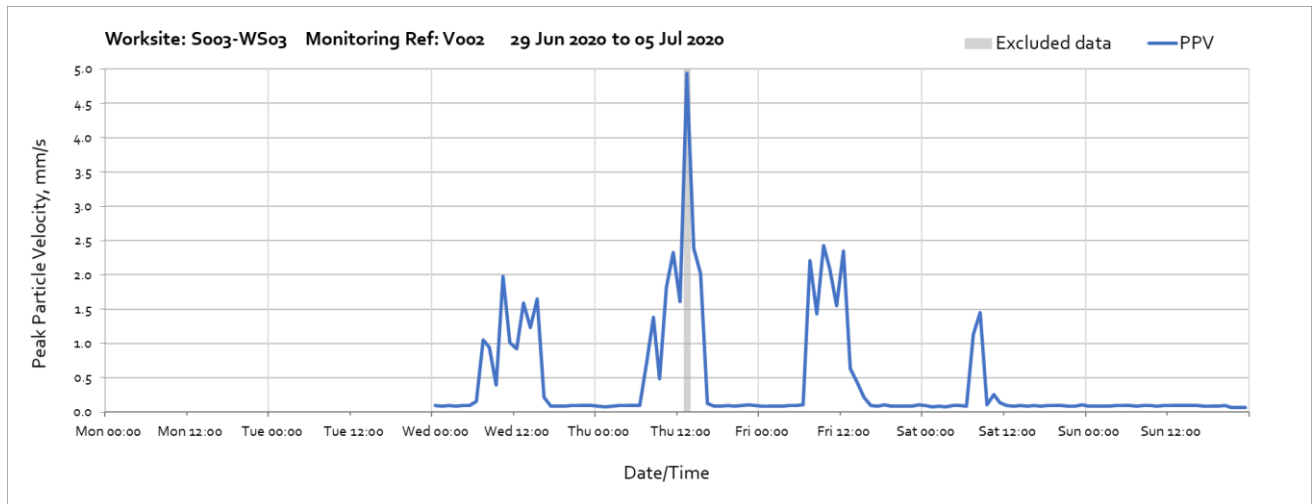


Note: High vibration levels measured throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.

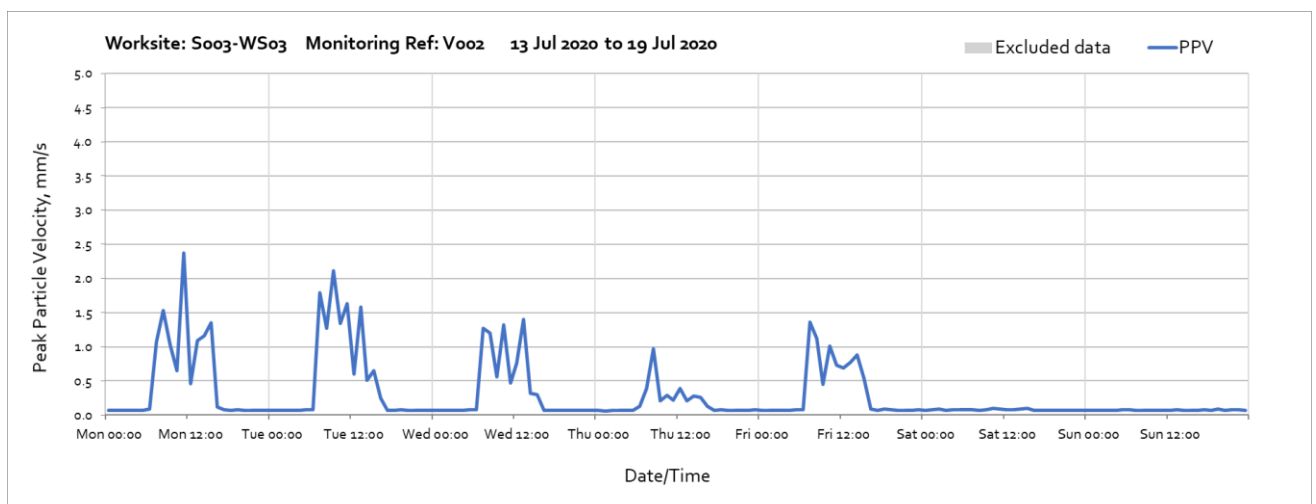
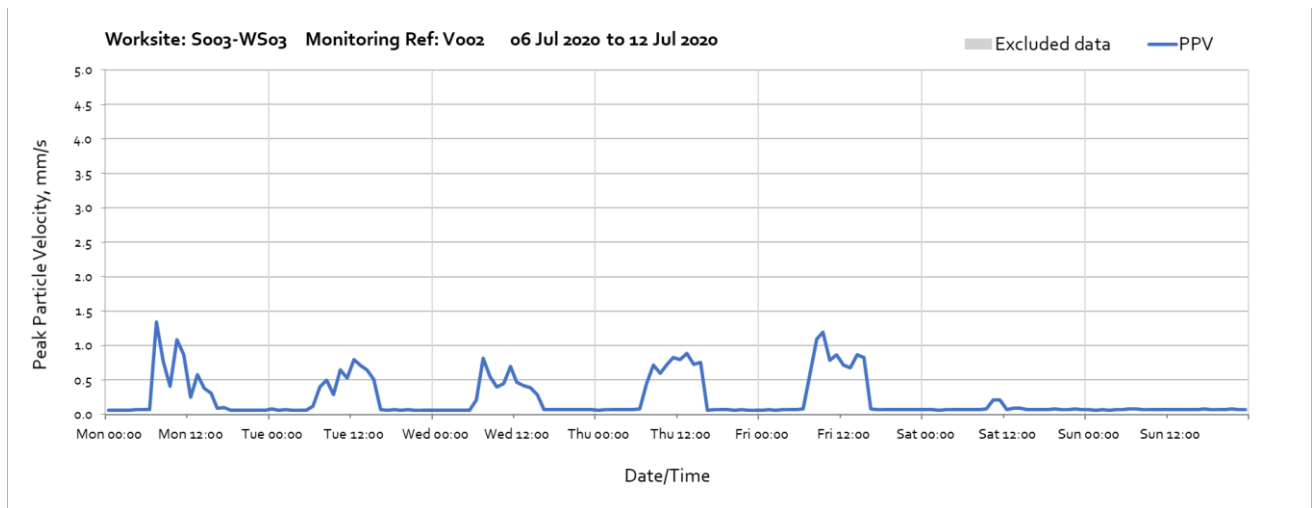


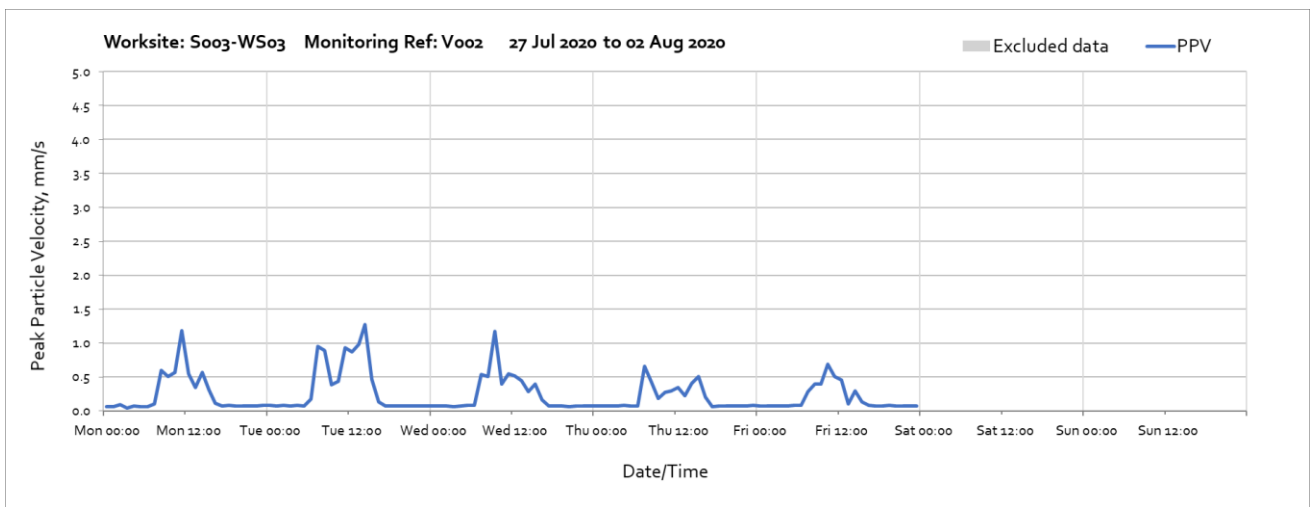
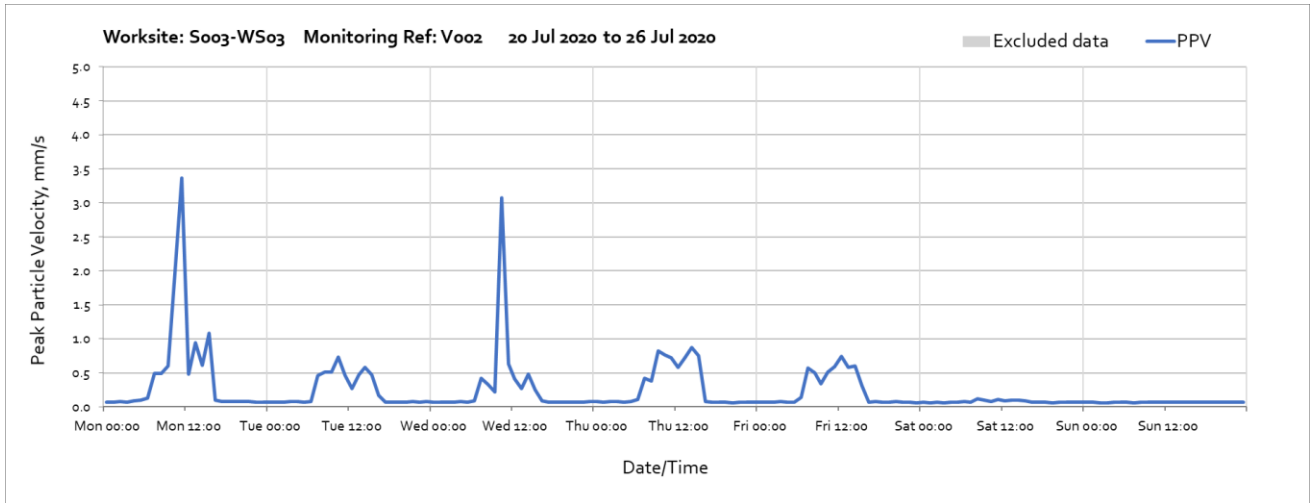
Note: High vibration levels measured throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.

Worksite: S003-WS03 – Monitoring Ref: V002

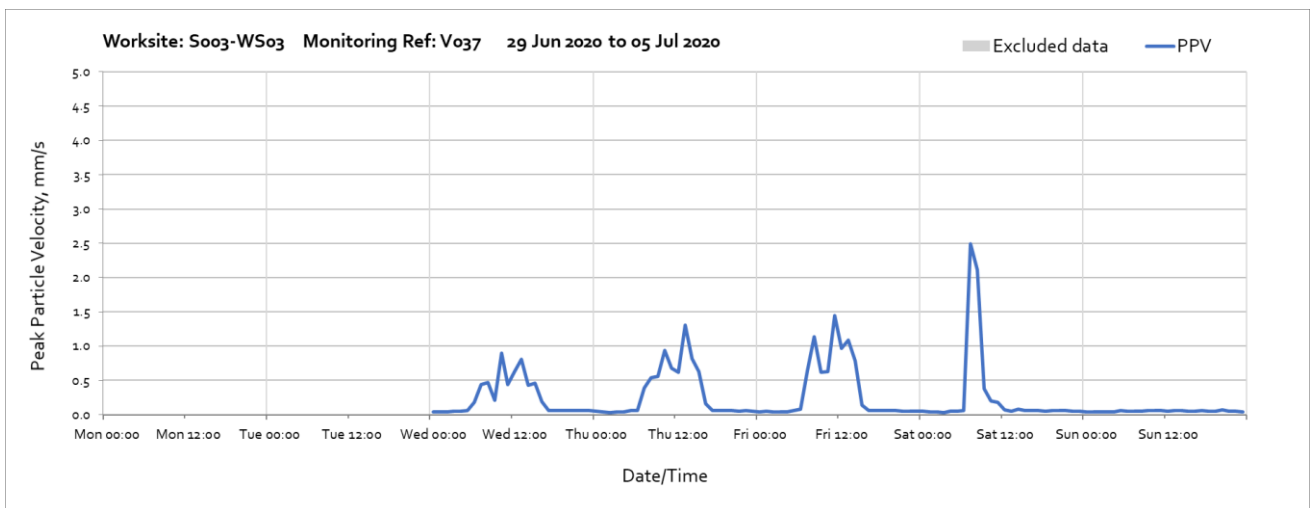


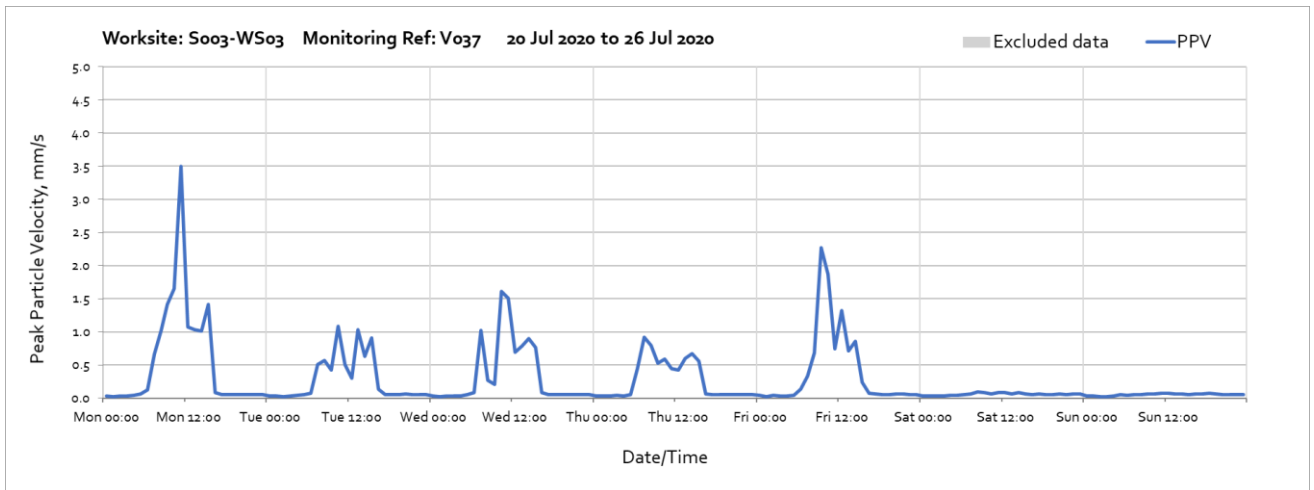
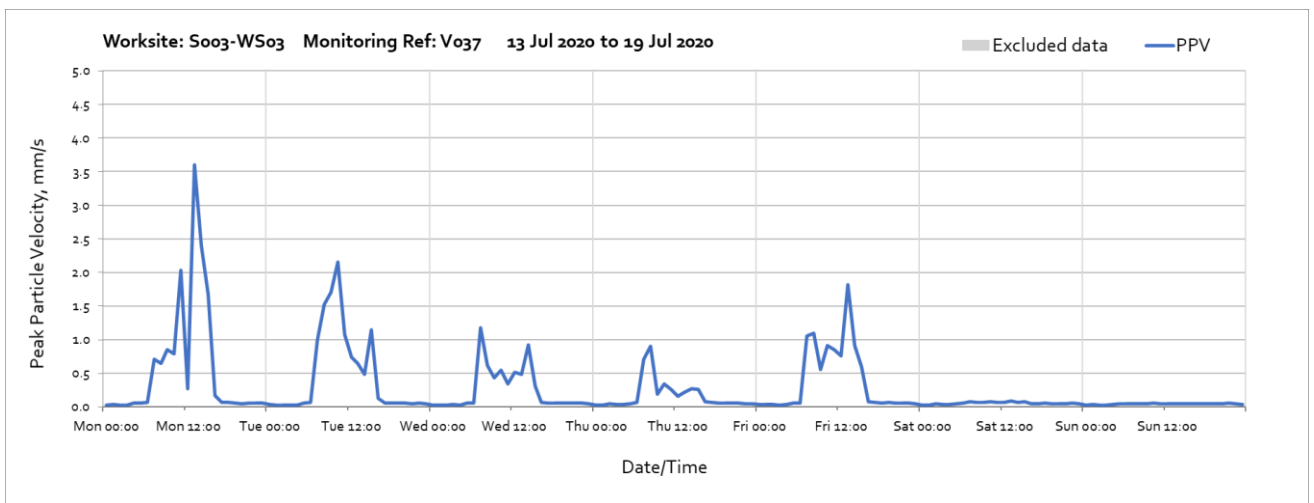
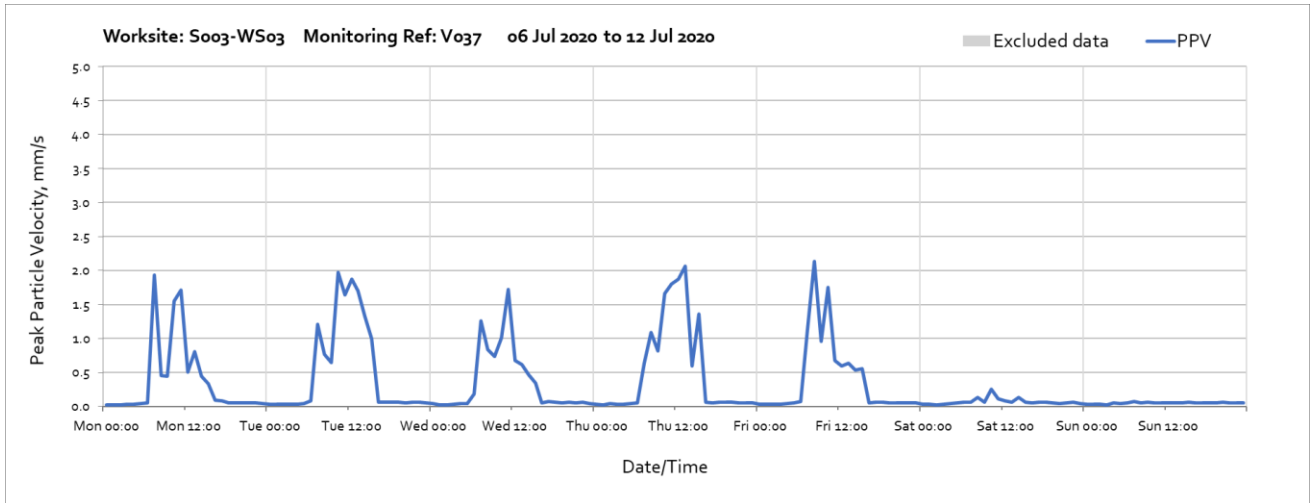
Note: High vibration levels measured between 13:00 and 14:00 on Thursday 2nd July were due to local disturbance of the monitor and are not representative of HS2 vibration levels.

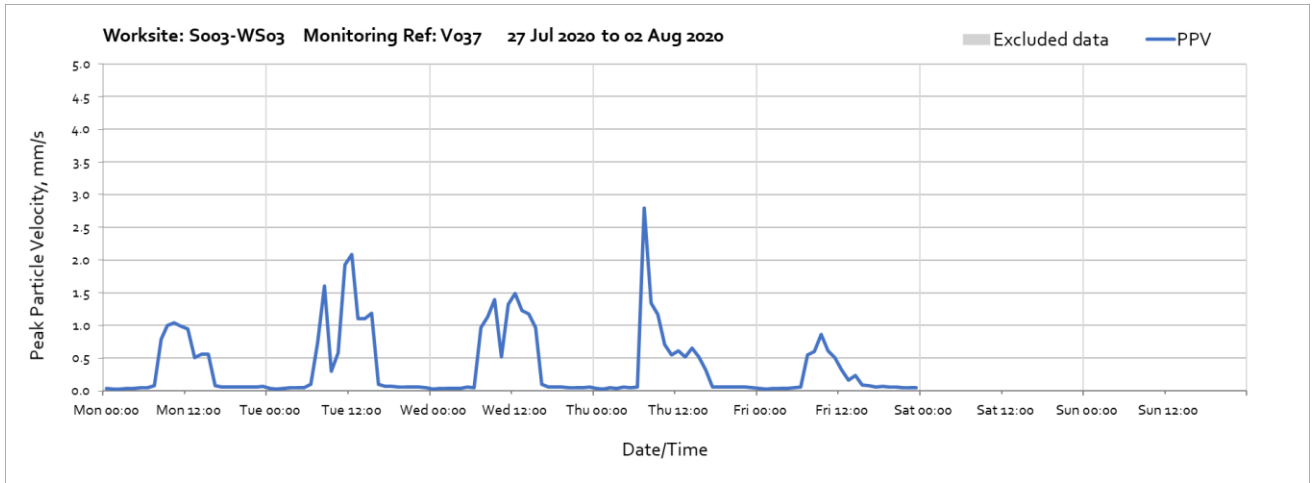




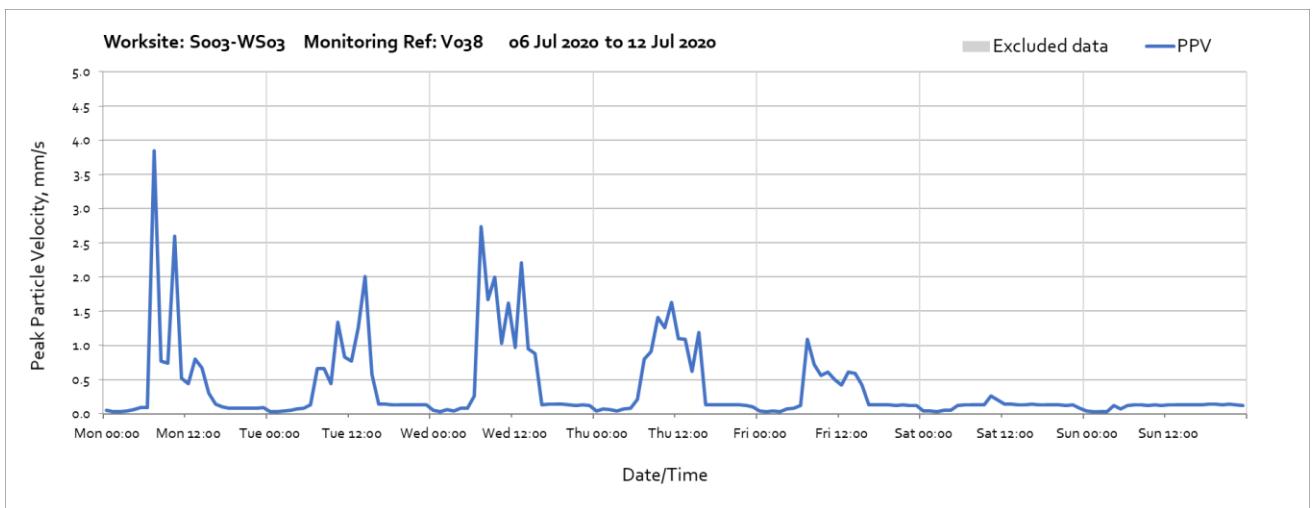
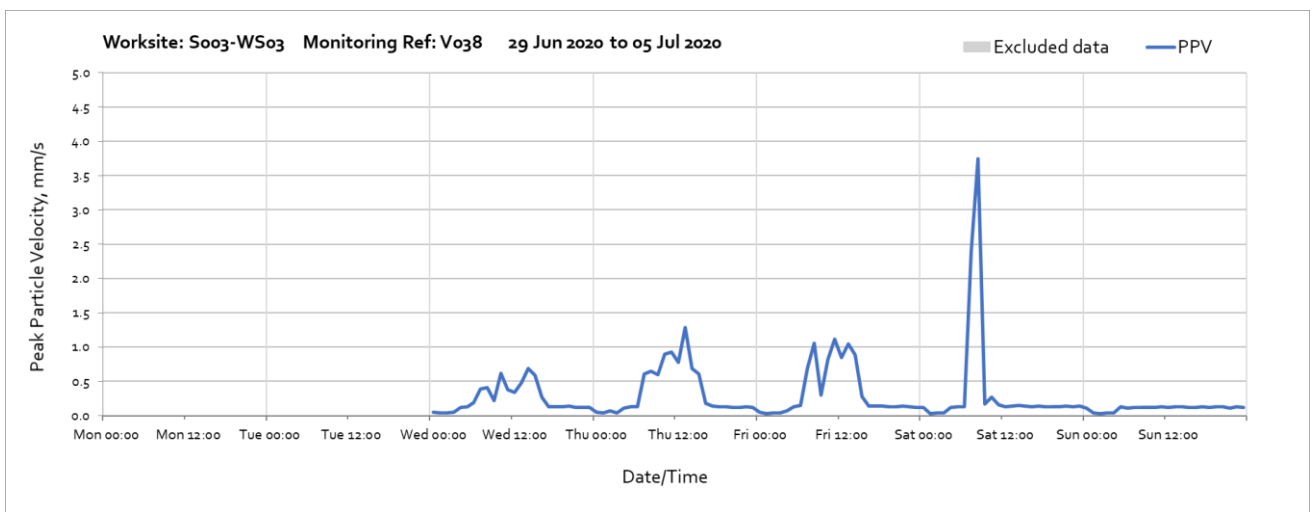
Worksite: S003-WS03 – Monitoring Ref: V037

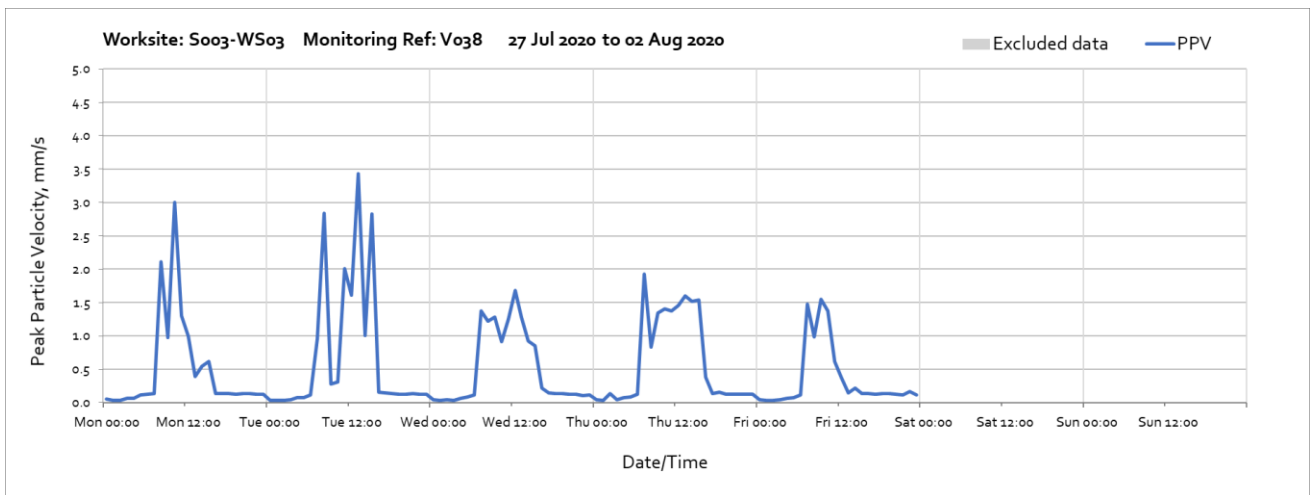
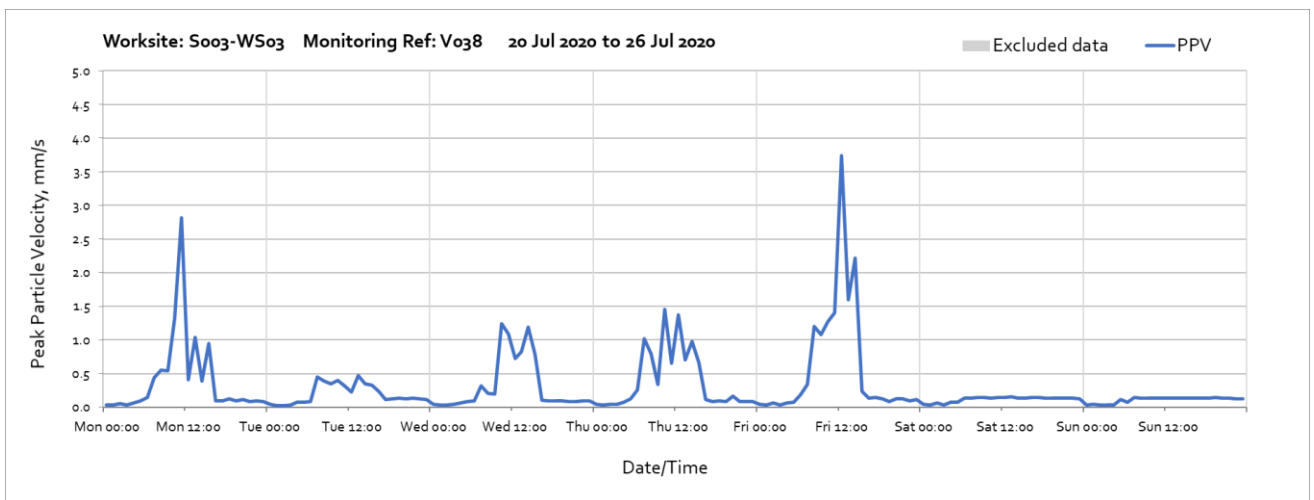
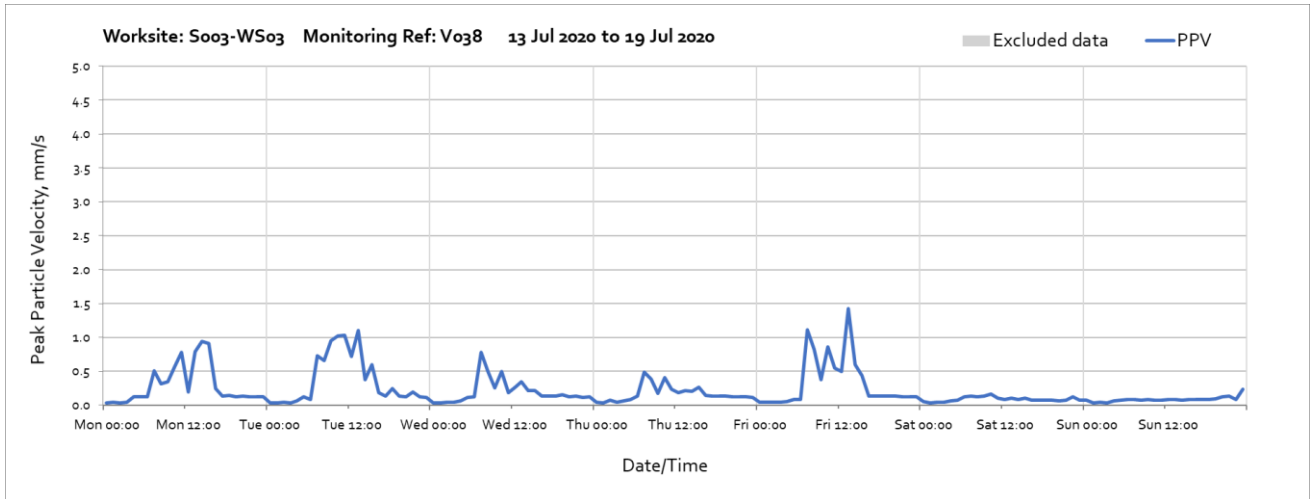




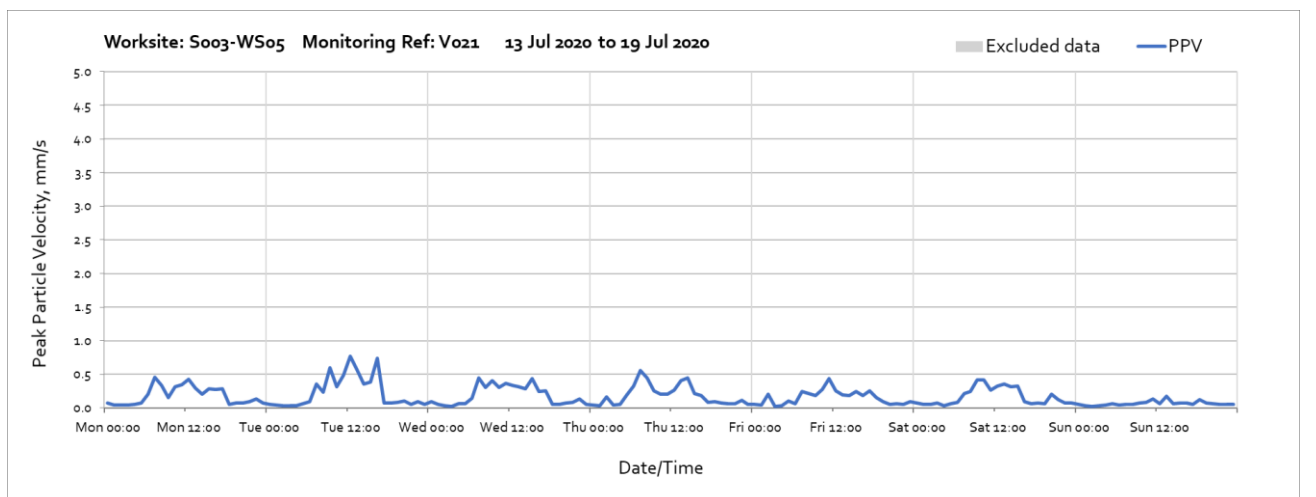
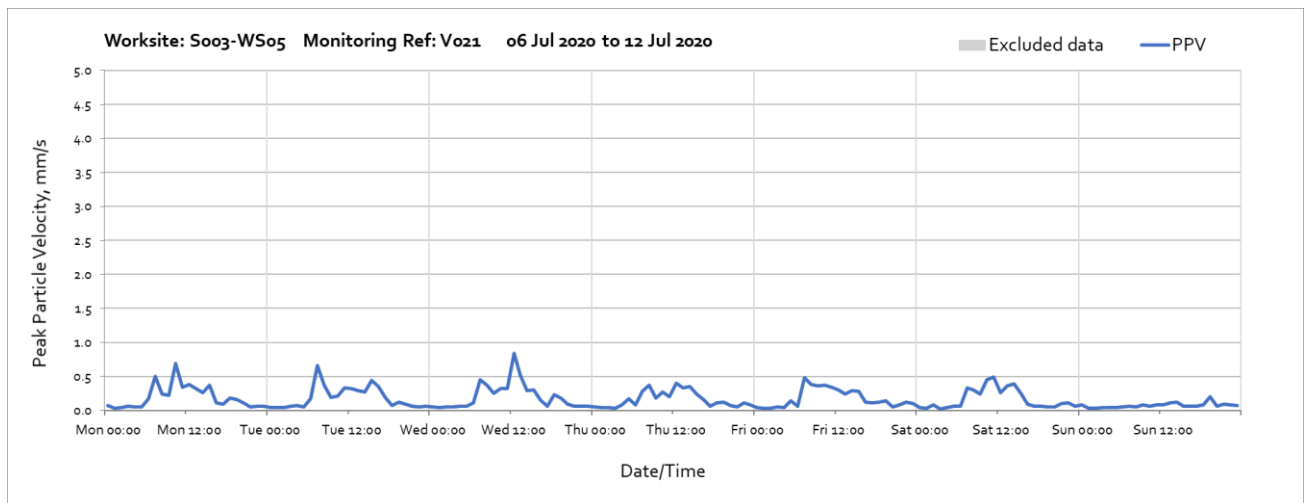
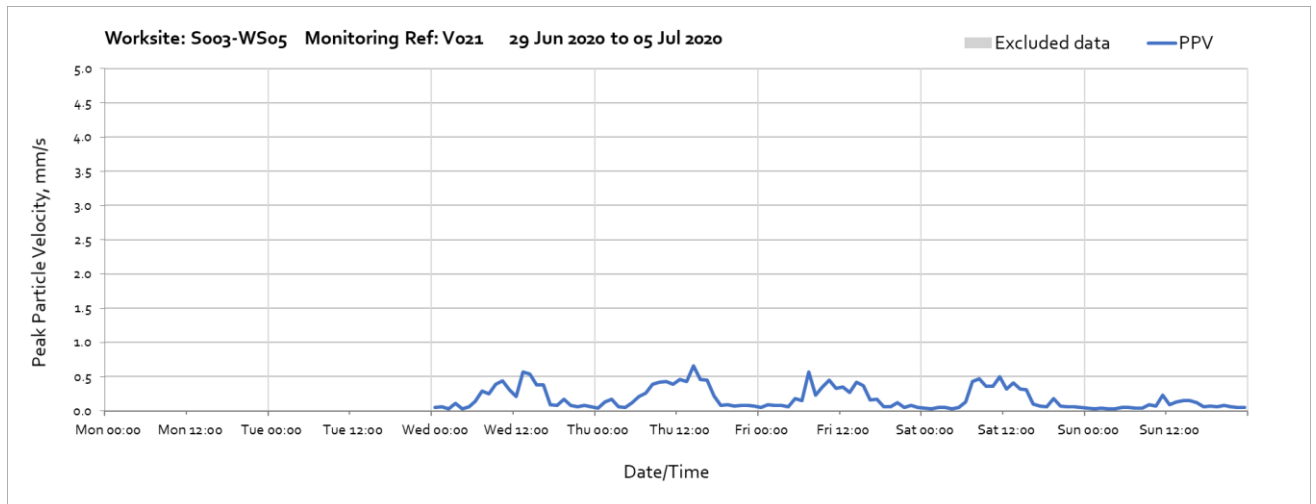


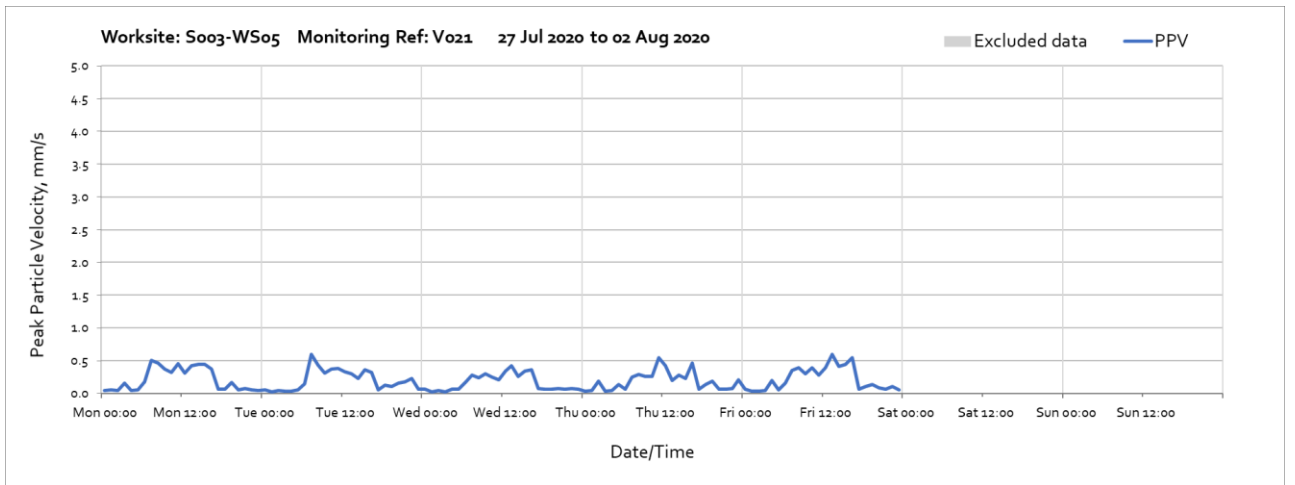
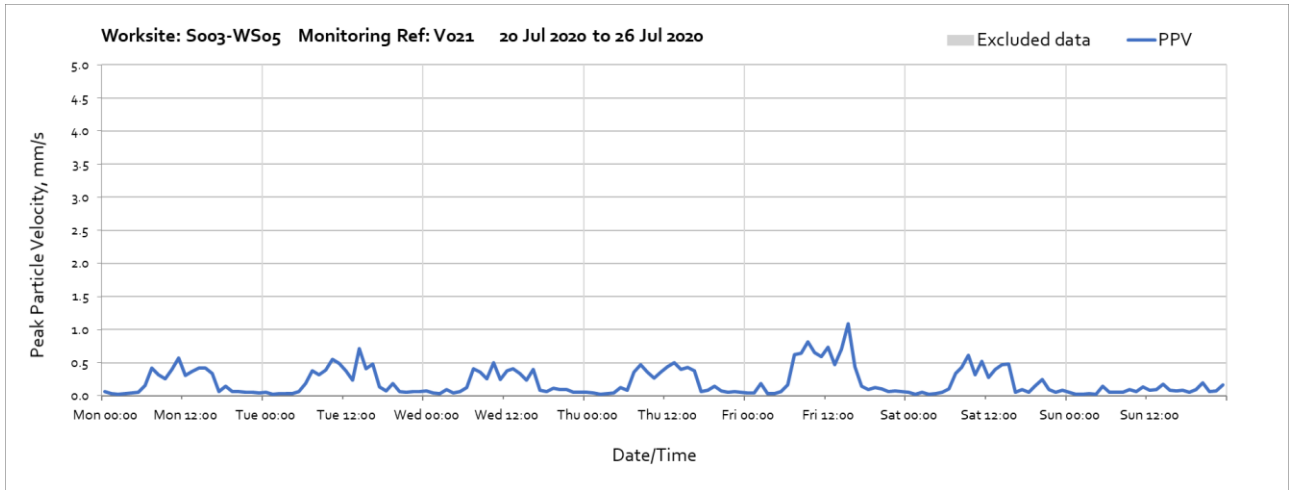
Worksite: S003-WS03 – Monitoring Ref: V038





Worksite: S003-WS05 – Monitoring Ref: V021





Worksite: S003-WS09 – Monitoring Ref: V003

