HS2

August 2021

Construction noise and vibration Monthly Report – June 2021

Buckinghamshire

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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 monitoring carried out within Buckinghamshire (BS) during the month of June 2021.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in the vicinity of Shepherds Furze Farm worksite (ref.: SFF) where excavation works, removal of decommissioned pipeline, site mobilisation works, construction of embankments, walls and at-grade crossing were undertaken.
- Noise monitoring was undertaken in the vicinity of School Hill Compound worksite (ref.: SHC) where batching plant compound mobilisation was underway.
- Noise monitoring was undertaken in the vicinity of the School Hill UTX worksite (ref.: SHU) where site setup was underway.
- Noise monitoring was undertaken in the vicinity of the Calvert South worksite reference (ref: CALS) where mobilisation of the rail offloading platform was underway.
- Noise monitoring was undertaken in the vicinity of Quainton Access Road (ref: QAR), where construction of drainage and hardstanding at the Station Road satellite compound, installation of geogrid and aggregates, ground investigations, bearing testing, installation of culvert and construction of concrete slabs were underway.
- Noise monitoring was undertaken in the vicinity of Hall Farm, Bicester Road worksite (ref: HF) where saw cutting of the existing asphalt, breakout of existing kerbs and concrete backing, excavation works, installation of drainage and kerbs and relocation of utilities were underway.
- Noise monitoring was undertaken in the vicinity of Little Missenden Vent Shaft worksite (ref.: CVV-LM) where general plant operation, earthworks, ground treatment, installation of structural wall and water treatment were underway.
- Noise monitoring was undertaken in the vicinity of Amersham Vent Shaft worksite (ref.: CVV-AM), where general plant operation, site establishment works, earthworks, installation of vehicle restraint system, civil works, installation of structural wall, storage, water treatment, deliveries, concrete work, installation of crane bases and workshops, and excavation works were underway.
- Noise and vibration monitoring were undertaken in the vicinity of Bottom House Farm Lane worksite (ref.: BHFL), where general site activity, installation of drainage,

earthworks, ducting works, landscaping, installation of gates and fences were underway.

- Noise monitoring was undertaken in the vicinity of Chalfont St Giles Vent Shaft worksite (ref.: CSG) where operation of general plant, earthworks, ground and water treatment works, and structural wall installation works were underway.
- Noise monitoring was undertaken in the vicinity of Chalfont St Peter Vent Shaft worksite (ref.: CSP), where stockpile management, shaft dewatering and excavation, commissioning of auxiliary plant and post-treatment injection works were in progress.
- Noise monitoring was undertaken in the vicinity of Load Test Pile 1 worksite (ref.: LTP #1), where construction of access roads, compound operation, civil works, earthworks, drainage works, ground investigation works, piling, River Colne realignment and diversion of Thames water utilities were underway.

Further works, where monitoring did not take place, were also undertaken at the following locations:

- Amersham and field west of Aylesbury, as part of water utility works.
- Calvert and Turweston, as part of power utility works.
- Chetwode where de-vegetation, fencing, trial trenching and bore holes were underway.
- Wendover Dean where archaeological works, site clearance, clearance of woodlands, installation of fencing and tree plantation works were undertaken.
- Quainton where trial pitting and repair of trial pit on topside of structure, localised concrete breakouts and coring works were underway
- Hartwell where trial archaeological works were undertaken.
- Aylesbury Park Golf Course where archaeological works and installation of boundary fencing were undertaken.
- Turweston where construction of bat houses and ground works were undertaken.
- Great Moor Sailing Club where construction of new access route, installation of slipways and concrete bases for shipping containers were undertaken.
- Putlowes Drive where site clearance and preparation work for herds mitigation were undertaken.
- Great Missenden where expansion of permanent pond, chalk trial, building of temporary chalk embankment, construction of compound and security plaza, soil stripping and vegetation clearance were underway.

- Bowood Lane to Leather Lane where grass cutting was undertaken.
- Road Barn Farm where demolition works were undertaken.
- Chiltern Area where ground investigation and trial holes where undertaken.
- Small Dean Lane where de-vegetation and installation of compound were underway.
- Twyford - West Street where stone deliveries were made.
- Chetwode where de-vegetation were underway.
- A422 Compound where top soil stripping, stockpiling, construction of pond, boreholes, survey, construction of access roads, deliveries, and installation of cabins were undertaken;
- School End - Barton Hill Farm where placing of aggregates and construction of silos were undertaken;
- A41 Bicester Road Main Compound and Roundabout where construction of the main compound area and roundabout were underway.
- A41 Bicester Road Batch Plant where batch plant setup were undertaken.
- Site access road to A418 Oxford Road Compound where installation of culvert and utility crossing slabs, top soil stripping and stockpiling were undertaken.
- A418 Oxford Road Main Compound where construction of main compound were undertaken.
- Site access road to A41 Bicester Road Compound where installation of culvert and utility crossing slabs, top soil stripping and stockpiling were undertaken.
- Ground investigation works including rotary borehole drilling and trial pits were undertaken at various location along the HS2 route.
- Vegetation clearance at various location along the HS2 route was undertaken.

There were no exceedances of 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), during the reporting period at any monitoring position.

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

Ten complaints were received within Buckinghamshire during the monitoring period. A description of complaints, the results of investigations and any action taken are detailed in Table 7 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.

1.1.2 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 Buckinghamshire (BS) Local Authority area for the period 1st to 30th June 2021.

1.1.3 Active construction sites in the local authority area where monitoring was undertaken during this period include:

- Shepherds Furze Farm worksite reference SFF (see plan 1 in Appendix A), where works activities included:
  - excavation works at Charndon Lodge underbridge;
  - dig and replace works at East West Rail overbridge;
  - removal of the decommissioned pipeline between Gawcott Road and Addison Road;
  - West Street Compound mobilisation works (including civils works, utilities installation and car park expansion);
  - Perry Hill overbridge works (including topsoil stripping and excavating to formation level);
  - Construction of temporary bridge over Gawcott Road (including construction of both the eastern and western embankments and walls) and
  - construction of at-grade crossing.

- School Hill Compound worksite reference SHC (see plan 1 in Appendix A), where works activities included:
  - batching plant compound mobilisation including laying of protection slabs, protection of verge along highway plaza, installation of underground utilities and ducting, pouring concrete, expansion of carpark, and erection of batching plant and fit out;
- School Hill UTX worksite reference - SHU (see plan 1 in Appendix A), where works activities included:
  - site setup including vacuum excavation, levelling of ground, ground compaction, and installation of drainage and cabin;
- Calvert South Worksite, near Calvert, reference - CALS (see plan 1 in Appendix A), where works activities included:
  - Mobilisation of the rail offloading platform including decommissioning of lighting columns, delivery of plant and site set-up;
- Quainton Access Road Worksite, reference - QAR (see plan 2 in Appendix A), where works activities included:
  - construction of drainage and hardstanding at Station Road satellite compound;
  - installation of geogrid and aggregates;
  - ground investigation;
  - bearing testing;
  - installation of culvert; and
  - construction of concrete slabs.
- Hall Farm, Bicester Road Worksite, reference – HF (see plan 3 in Appendix A), where works activities included:
  - saw cutting of the existing asphalt;
  - breakout of existing kerbs and concrete backing;
  - excavation works;
  - installation of drainage and kerbs; and
  - relocating utilities.
- Colne Valley Viaduct - Little Missenden Vent Shaft worksite reference – CVV-LM (see plan 4 in Appendix A), where works activities included:
  - operation of general plant at site;
  - earthworks including stockpile management;

- ground pre and post treatment (drilling and grouting);
- structural wall installation works including civil works; and
- water treatment.

- Colne Valley Viaduct - Amersham Vent Shaft Worksite, reference – CVV - AM (see plan 5 in Appendix A), where works activities included:
  - operation of general plant at site;
  - site establishment works including installation works;
  - earthworks including stockpile management;
  - installation of vehicle restraint system;
  - installation of structural wall including civil works, construction of guide walls, excavation, de-sanding, mud treatment, delivery and assembly, and concreting;
  - installation of storage, installation of crane bases and workshops; and
  - water treatment.
- Bottom House Farm Lane Worksite, reference - BHFL (see plan 6 in Appendix A), where work activities included:
  - general site activity including as-built surveys, deliveries, relocating fencing and site footpaths, dust suppression and road sweeping;
  - drainage installation including trenches excavation, placing geotextile membrane, laying of bedding materials and pipes, backfill trench, close membrane, placing gravel and construction of manhole;
  - earthworks including compaction, stockpile management, batter finishing works and topsoiling, installation of fences and gates;
  - ducting works including trenches excavation, placing duct and backfill trench;
  - landscaping works including rotavating soil, raking stones, seeding verges, tree plantation and hedge planting; and
  - construction of fences and erecting gates.
- Colne Valley Viaduct - Chalfont St Giles Vent Shaft Worksite, reference - CVV-CSG (see plan 6 in Appendix A), where works activities included:
  - operation of general plant at site;
  - earthworks (stockpile management);
  - ground post treatment (drilling and grouting) and water treatment; and

- structural wall installation works (including excavation, desanding, mud treatment and concreting).

- Colne Valley Viaduct - Chalfont St Peter Vent Shaft Worksite, reference – CVV-CSP (see plan 7 in Appendix A), where works activities included:
  - stockpile management;
  - shaft dewatering and excavation including excavations;
  - commissioning of auxiliary plant; and
  - post-treatment injection works including dewatering.
- Colne Valley Viaduct - Load Test Pile 1 Worksite, reference – CVV-LTP #1 (see plan 8 in Appendix A), where works activities included:
  - piling for the construction of the jetty;
  - sheet piling for the construction of a cofferdam;
  - main piling works including boring pile, de-sanding, installation of reinforcement cage and concrete pile, break-out of bored pile to prepare pile cap and installation of grout curtain around viaduct pile;
  - Denham Water Ski Club and North Embankment compound operation and de-sanding;
  - civil works, earthworks and drainage works on haul road;
  - ground investigation works;
  - construction of access road to affinity waters;
  - realignment of River Colne; and
  - diversion of Thames water.

1.1.4 Further works, where monitoring did not take place, were also undertaken at:

- Amersham and field west of Aylesbury, as part of water utility works.
- Calvert and Turweston, as part of power utility works.
- Chetwode where de-vegetation, fencing, trial trenching and bore holes were underway.
- Wendover Dean where archaeological works, site clearance, clearance of woodlands, installation of fencing and tree plantation works were undertaken.
- Quainton where trial pitting and repair of trial pit on topside of structure, localised concrete breakouts and coring works were underway
- Hartwell where trial archaeological works were undertaken.

- Aylesbury Park Golf Course where archaeological works and installation of boundary fencing were undertaken.
- Turweston where construction of bat houses and ground works were undertaken.
- Great Moor Sailing Club where construction of new access route, installation of slipways and concrete bases for shipping containers were undertaken.
- Putlowes Drive where site clearance and preparation work for herds mitigation were undertaken.
- Great Missenden where expansion of permanent pond, chalk trial, building of temporary chalk embankment, construction of compound and security plaza, soil stripping and vegetation clearance were underway.
- Bowood Lane to Leather Lane where grass cutting was undertaken.
- Road Barn Farm where demolition works were undertaken.
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- Small Dean Lane where de-vegetation and installation of compound were underway.
- Twyford - West Street where stone deliveries were made.
- Chetwode where de-vegetation were underway.
- A422 Compound where top soil stripping, stockpiling, construction of pond, boreholes, survey, construction of access roads, deliveries, and installation of cabins were undertaken;
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- A418 Oxford Road Main Compound where construction of main compound were undertaken.
- Site access road to A41 Bicester Road Compound where installation of culvert and utility crossing slabs, top soil stripping and stockpiling were undertaken.
- Ground investigation works including rotary borehole drilling and trial pits were undertaken at various location along the HS2 route.

- Vegetation clearance at various location along the HS2 route was undertaken.

1.1.5 The applicable standards, guidance, and monitoring methodology are 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 Sixteen noise and one vibration monitoring installations were active in June in the BS area. Table 2 summarises the positions of noise and vibration monitoring installations within the BS area in June 2021.

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

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
SFF	SFF-NMP1	Shepherds Furze Farm, Calvert
SHC	SHC-NMP1	School Hill Compound, Calvert
SHU	SHU-NMP1	70 Cotswold Way, Calvert
CALS	CALS-NMP1	Site boundary adjacent to Red Kite View, Calvert
QAR	QAR-NMP1	1 Woodlands Farm Cottages, Quainton
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon
CVV-AM	CVV-AM-NMP1	Amersham Vent Shaft Worksite, Whielden Lane, Amersham
CVV-LM	CVV-LM-NMP1	Little Missenden Vent Shaft Worksite, Amersham
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane
	BHFL-Vib1	Pine Cottage, Bottom House Farm Lane
CVV-CSG	CVV-CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane
	CVV-CSG-NMP2	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane
CVV-CSP	CVV-CSP-NMP1	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
	CVV-CSP-NMP2	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
	CVV-CSP-NMP3	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
CVV-LTP #1	CVV-LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite, Denham Water Ski Club
	CVV-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham, Denham Garden Village

2 Summary of Results

2.1 Summary of Measured Noise 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 L_{Aeq} Data over the Monitoring Period

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
SFF	SFF-NMP1	Shepherds Furze Farm, Calvert	Free-field	68.4	69.9	69.7	61.2	43.3	64.3	67.8	45.7	44.9	37.4	NA*	NA*
				(74.2)	(72.8)	(76.2)	(72.9)	(62.7)	(68.0)	(77.8)	(47.0)	(48.5)	(41.4)	NA*	NA*
SHC	SHC-NMP1	School Hill Compound, Calvert	Free-field	50.9	57.2	46.5	43.8	42.1	44.7	46.7	46.8	45.2	42.3	45.3	43.3
				(63.7)	(65.1)	(50.3)	(48.2)	(49.9)	(46.1)	(47.6)	(48.1)	(50.6)	(46.3)	(52.3)	(54.5)
SHU	SHU-NMP1	70 Cotswold Way, Calvert	Free-field	51.6	55.1	50.6	49.9	47.1	50.2	52.2	50.3	55.1	46.7	52.2	47.2
				(57.0)	(58.8)	(55.7)	(61.8)	(59.3)	(51.3)	(57.4)	(51.3)	(77.6)	(53.0)	(64.1)	(54.3)
CALS	CALS-NMP1	Site boundary adjacent to Red Kite View, Calvert	Free-field	58.6	56.4	46.2	44.8	46.6	48.4	48.5	47.8	45.1	41.2	44.8	49.0
				(61.6)	(58.9)	(51.5)	(51.9)	(59.7)	(51.9)	(49.7)	(49.0)	(51.5)	(50.4)	(52.3)	(59.7)
QAR	QAR-NMP1	1 Woodlands Farm Cottages, Quainton	Free-field	53.0	51.9	51.3	47.8	44.8	49.5	52.1	52.5	51.2	43.3	49.7	45.8
				(55.9)	(55.0)	(62.0)	(58.7)	(52.6)	(52.5)	(53.8)	(56.4)	(57.5)	(50.1)	(55.6)	(52.8)
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon	Free-field	63.1	64.3	63.0	61.0	57.6	59.5	62.2	63.9	62.1	55.9	61.5	57.4
				(66.9)	(66.6)	(65.8)	(65.8)	(65.8)	(60.5)	(62.6)	(66.0)	(66.2)	(60.9)	(64.8)	(64.4)
CVV-AM	CVV-AM-NMP1	Whielden Lane, Amersham	Free-field	70.1	71.1	69.7	68.3	64.0	66.2	69.1	68.7	68.2	60.5	67.2	61.7
				(73.4)	(77.7)	(72.2)	(72.5)	(72.2)	(66.8)	(70.1)	(70.2)	(71.7)	(68.0)	(71.3)	(68.8)
CVV-LM	CVV-LM-NMP1	Little Missenden Vent Shaft Worksite	Free-field	65.5	64.9	64.8	61.7	57.0	57.6	60.1	59.4	58.3	52.3	60.6	56.5
				(66.8)	(66.8)	(66.1)	(64.3)	(64.0)	(62.3)	(64.4)	(64.3)	(64.8)	(61.2)	(64.7)	(63.4)

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
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	Free-field	53.1 (58.1)	55.6 (62.2)	53.9 (65.8)	52.7 (62.0)	49.8 (61.0)	51.0 (53.8)	54.2 (57.6)	52.8 (55.6)	56.3 (66.4)	50.0 (59.5)	52.0 (60.1)	50.4 (60.5)
CVV-CSG	CVV-CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	54.4 (64.3)	57.4 (67.1)	49.0 (54.5)	48.0 (54.8)	46.0 (56.1)	47.3 (50.3)	48.9 (52.4)	46.5 (50.6)	45.9 (50.5)	43.0 (51.3)	47.8 (53.7)	46.4 (52.5)
	CVV-CSG-NMP2	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	53.5 (61.9)	61.3 (65.4)	49.8 (59.1)	47.6 (54.3)	45.6 (59.5)	51.0 (56.2)	52.6 (54.5)	47.2 (50.1)	47.2 (58.0)	42.7 (51.5)	49.6 (61.2)	45.0 (58.1)
CVV-CSP	CVV-CSP-NMP1	Chalfont St Peter Vent Shaft Worksite	Free-field	66.6 (81.8)	68.1 (70.4)	63.0 (68.2)	59.3 (64.5)	55.6 (81.2)	58.0 (60.0)	64.1 (65.6)	60.0 (62.1)	59.4 (68.6)	53.6 (62.3)	58.0 (63.0)	54.2 (63.5)
	CVV-CSP-NMP2	Chalfont St Peter Vent Shaft Worksite	Free-field	47.1 (50.9)	50.6 (52.5)	46.7 (55.8)	43.7 (49.9)	41.8 (54.5)	43.6 (48.5)	47.5 (49.4)	46.5 (51.5)	45.3 (50.2)	41.0 (52.5)	45.7 (51.2)	41.8 (48.6)
	CVV-CSP-NMP3	Chalfont St Peter Vent Shaft Worksite	Free-field	56.1 (58.2)	56.0 (57.8)	55.7 (57.9)	53.3 (56.3)	53.1 (69.2)	53.1 (53.5)	55.6 (56.3)	55.8 (57.1)	54.6 (56.8)	51.5 (61.6)	54.1 (57.9)	51.6 (65.2)
CVV-LTP #1	CVV-LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite	Free-field	61.4 (63.8)	61.9 (68.8)	59.8 (62.3)	57.8 (61.8)	54.9 (61.8)	59.3 (61.0)	61.4 (63.5)	59.1 (59.3)	58.3 (60.9)	52.8 (56.3)	58.1 (64.9)	54.5 (61.0)
	CVV-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham	Free-field	55.3 (58.9)	57.2 (59.9)	55.6 (58.2)	53.0 (60.7)	50.0 (59.9)	55.5 (57.5)	57.0 (58.3)	54.4 (56.1)	53.8 (62.0)	49.2 (60.2)	53.7 (61.4)	49.8 (57.7)

* Noise measurement data not available for Sunday.

2.1.2 Table 4 presents a summary of the measured vibration levels at the 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
BHFL	BHFL-Vib 1	Pine Cottage, Bottom House Farm Lane	0.91 (Z-axis)

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 LOAEL and SOAEL

2.2.1 The lowest observed adverse effect level (LOAEL) is defined in the Planning Practice Guidance – Noise (PPG) as the level above which "noise starts to cause small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life".

2.2.2 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."

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

2.2.4 Where reported construction noise levels exceed the LOAEL and SOAEL at nearby receptors, relevant periods will be identified. Summary statistics to evaluate ongoing qualification for noise insulation and temporary rehousing are also presented where relevant.

2.2.5 Table 5 presents a summary of recorded exceedances of the LOAEL and SOAEL over the reporting period, including the number of exceedances during each time period.

Table 5: Summary of Exceedances of LOAEL and SOAEL

Worksite Reference	Measurement Reference	Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
SFF	SFF-NMP1*	Shepherds Furze Farm, Calvert	All days	All periods	No exceedance	No exceedance
SHC	SHC-NMP1*	School Hill Compound, Calvert	All days	All periods	No exceedance	No exceedance
SHU	SHU-NMP1	70 Cotswold Way, Calvert	All days	All periods	No exceedance	No exceedance
CALS	CALS-NMP1	Site boundary adjacent to Red Kite View, Calvert	All days	All periods	No exceedance	No exceedance
QAR	QAR-NMP1	1 Woodlands Farm Cottages, Quainton	All days	All periods	No exceedance	No exceedance
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon	All days	All periods	No exceedance	No exceedance
CVV-AM	CVV-AM-NMP1*	Whielden Lane, Amersham	All days	All periods	No exceedance	No exceedance
CVV-LM	CVV-LM-NMP1*	Little Missenden Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	Weekday Weekday Saturday Sunday Night	1800-1900 1900-2200 1400-2200 0700-2200 2200-0700	1 5 3 3 47	No exceedance No exceedance No exceedance No exceedance No exceedance

Worksite Reference	Measurement Reference	Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
CVV-CSG	CVV-CSG-NMP1*	Chalfont St Giles Vent Shaft	All days	All periods	No exceedance	No exceedance
	CVV-CSG-NMP2*	Chalfont St Giles Vent Shaft	Night	2200-0700	7	No exceedance
CVV-CSP	CVV-CSP-NMP1*	Chalfont St Peter Vent Shaft Worksite	Night	2200-0700	3	No exceedance
	CVV-CSP-NMP2*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
	CVV-CSP-NMP3*	Chalfont St Peter Vent Shaft Worksite	Night	2200-0700	52	No exceedance
CVV-LTP #1	CVV-LTP #1-NMP1*	Northern boundary, Load Test Pile 1 Worksite	All days	All periods	No exceedance	No exceedance
	CVV-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham	Weekday Weekday Weekday Saturday Sunday Night	0700-0800 1800-1900 1900-2200 1400-2200 0700-2200 2200-0700	1 2 8 6 13 133	No exceedance No exceedance No exceedance No exceedance No exceedance No exceedance

* A distance correction has been applied when calculating exceedances of the LOAEL and SOAEL.

2.2.6 No exceedances of the SOAEL were recorded due to HS2 construction works during June 2021. Exceedances of the LOAEL were recorded at BHFL-NMP1, CVV-CSG-NMP2, CVV-CSP-NMP1, CVV-CSP-NMP3 and CVV-WYC-NMP1.

2.3 Exceedances of Trigger Level

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

Table 6: Summary of Exceedances of Trigger Levels

Complaint Reference Number (if applicable)	Worksite Reference	Date and Time Period	Identified Source	Results of Investigation (including noise monitoring results)	Actions Taken
-	-	-	-	-	-

2.4 Complaints

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

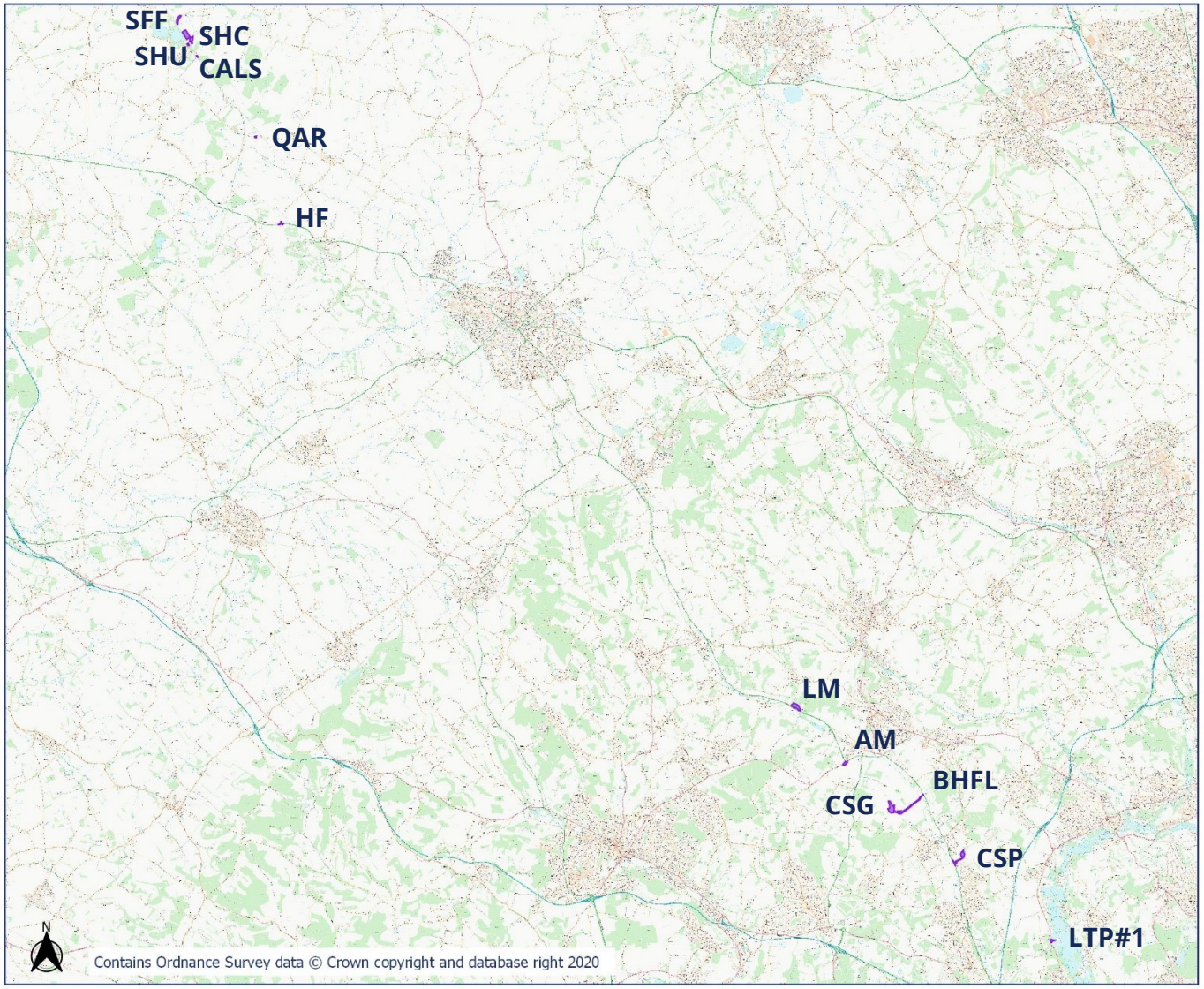
Table 7: Summary of Complaints

Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-42095-C	CVV-LTP #1	Complaint regarding high level of construction noise	The noise was confirmed to be from piling and concrete pouring activity.	Information was provided to the Stakeholder confirming that works and noise levels are being monitored. Noisiest works were conducted only during standard working hours.
HS2-21-42127-C	CVV-LTP #1	Complaint regarding construction noise occurring throughout the day	The noise was confirmed to be from ongoing HS2 related construction works.	Contractor held face to face meeting with stakeholder. Stakeholder not eligible for noise insulation but the stakeholder was informed about the options available in E23 special cases.
HS2-21-61590-E-C	CVV-LTP #1	Complaint regarding noise and vibrations felt in 900 years old grade 1 listed heritage property	The noise and vibration was confirmed to be from ongoing HS2 related construction works.	Contractor has requested to install a vibration monitor on stakeholder's home. Stakeholder to respond directly to contractor to take the proposal forward.

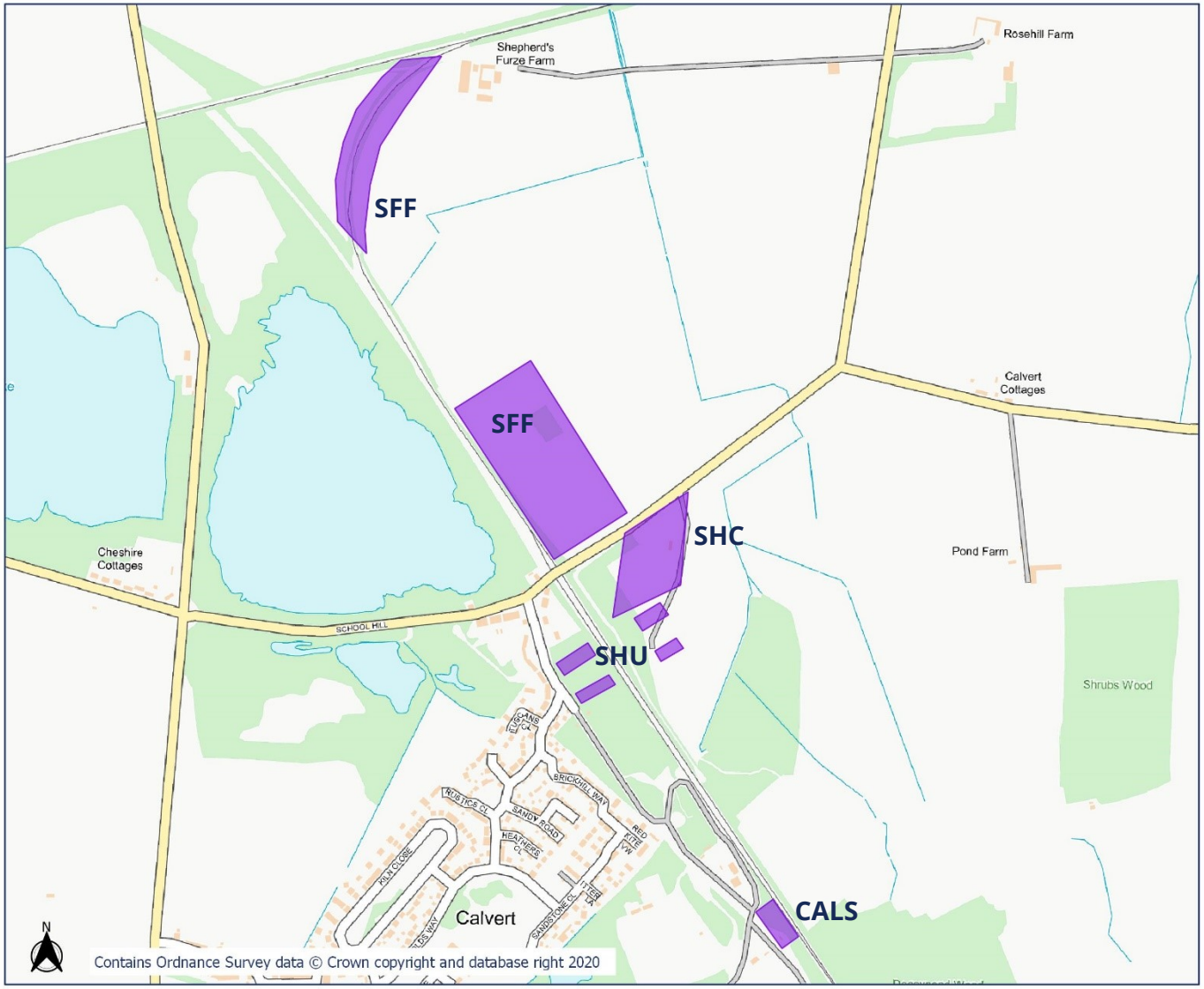
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-42139-C	HF	Complaint regarding construction noise occurring throughout the day and extending to evening time. Stakeholder is a shift worker	No works were undertaken outside of core working hours.	Information was provided to the Stakeholder confirming that no works took place outside of core working hours.
HS2-21-42152-C	CVV-LTP #1	Complaint regarding increased level of construction noise	The noise was confirmed to be from piling activity	The works are being monitored and managed in line with the Section 61 consent and Best Practicable Means (BPM) were applied.
HS2-21-42167-C HS2-21-42172-C	CVV-LTP #1	Complaint regarding increased level of construction noise	The noise was confirmed to be from piling activity	The works are being monitored and managed in line with the Section 61 consent and Best Practicable Means (BPM) were applied.
HS2-21-42169-C	CVV-LTP #1	Complaint regarding increased daytime noise	Investigation ongoing to pinpoint the source of noise.	Attended monitoring undertaken around the area.
HS2-21-42191-C	CVV-LTP #1	Complainant unhappy about the noise over recent weeks	Investigation reveals that noise were within prescribed levels.	The complainant has been contacted and a face-to-face meeting to follow. Contractor exploring the possibility of installing a permanent monitor at the receptor.
HS2-21-42097-C	CVV-LTP #1	Complaint regarding loud droning coming from direction of Chilterns site.	No immediate reasons for this found. Some deliveries take place during night but are via M25 slip road and so the sound very unlikely to reach the stakeholder.	Additional monitoring undertaken in early hours, but no noises found that correlate with that reported by stakeholder.

Appendix A Site Locations

HS2 Worksite Identification Plan - Overview

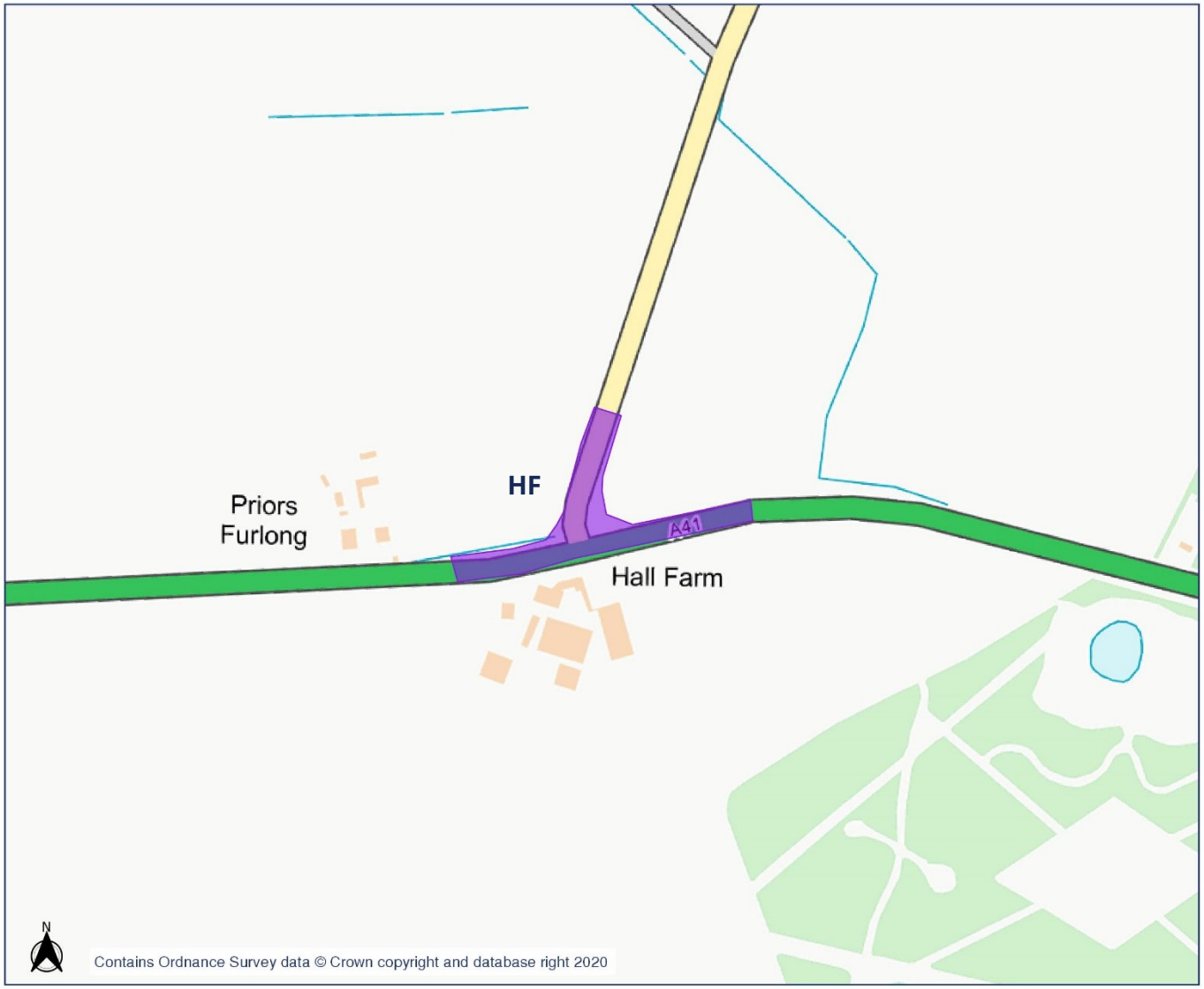


Worksite Identification Plan - 1



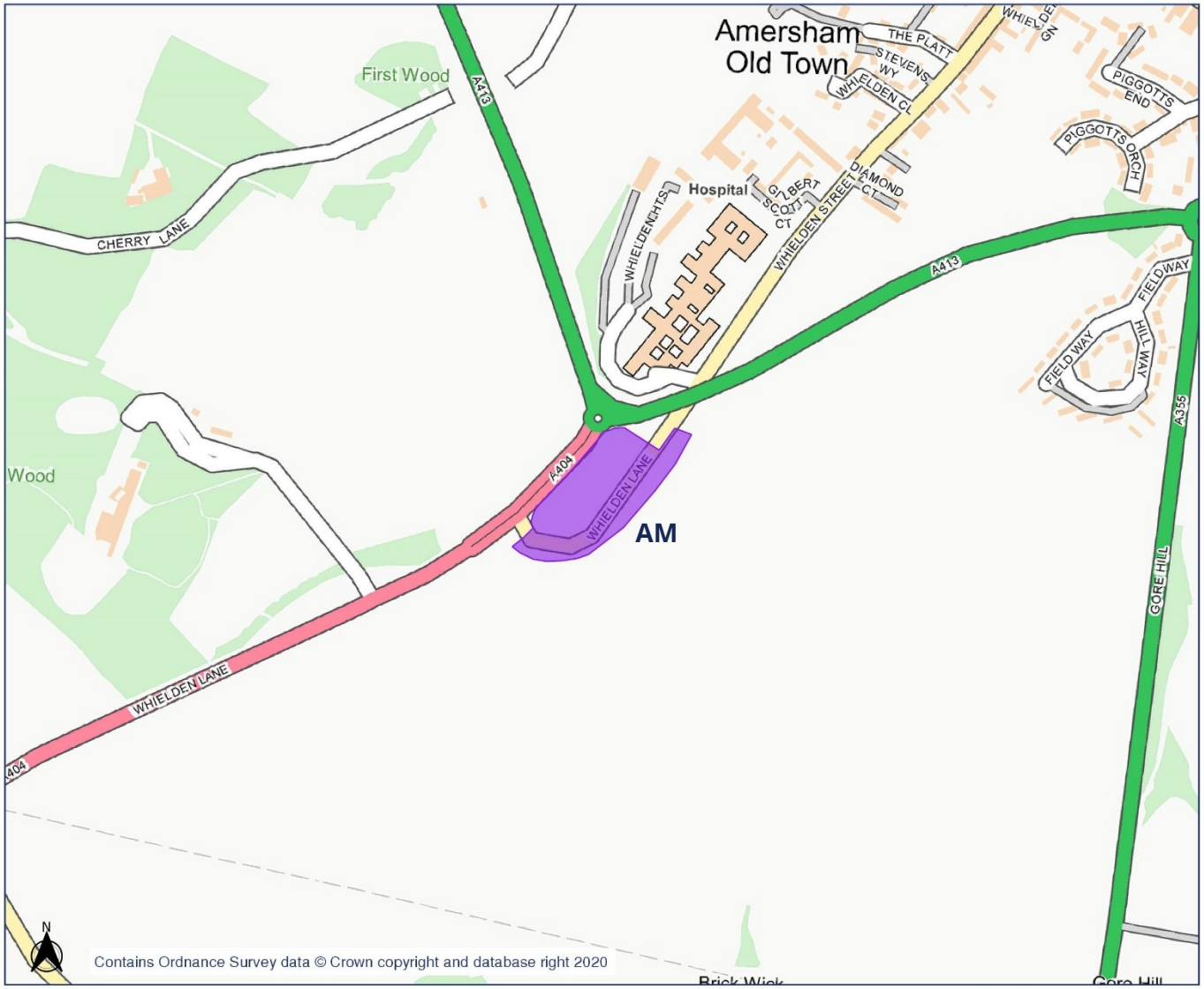
Worksite Identification Plan - 2

Worksite Identification Plan - 3

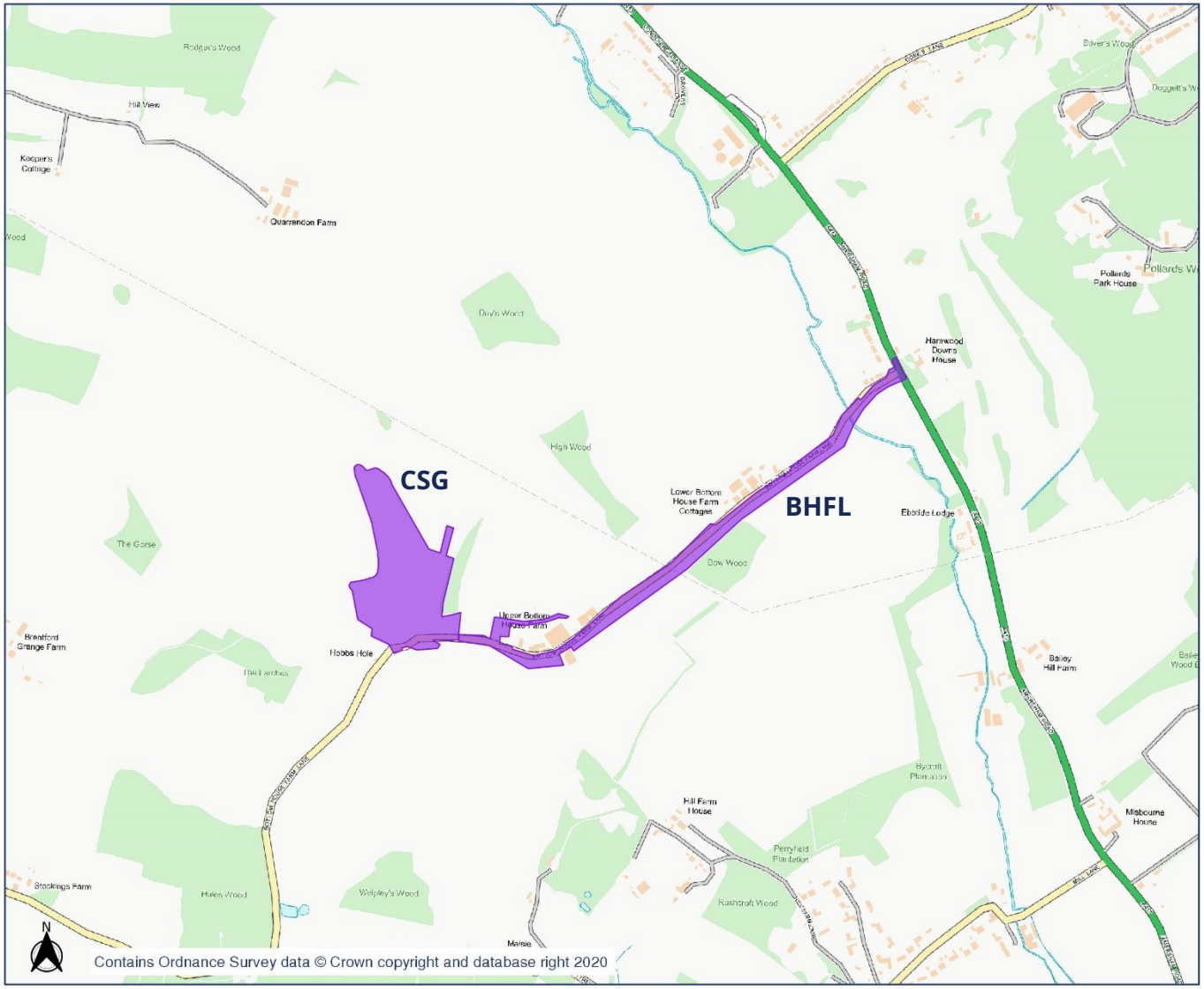


Worksite Identification Plan - 4

Worksite Identification Plan - 5



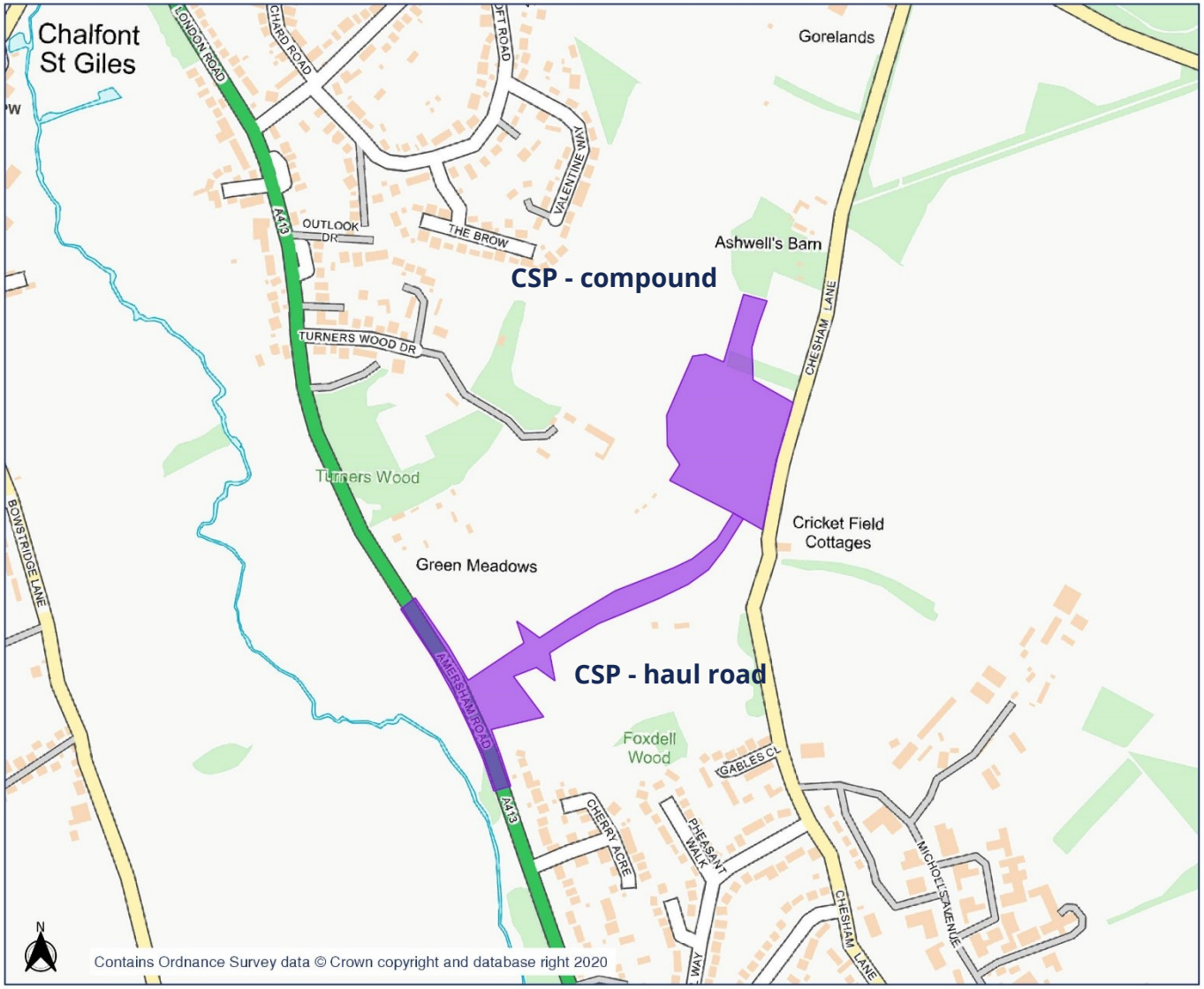
Worksite Identification Plan - 6



Legend

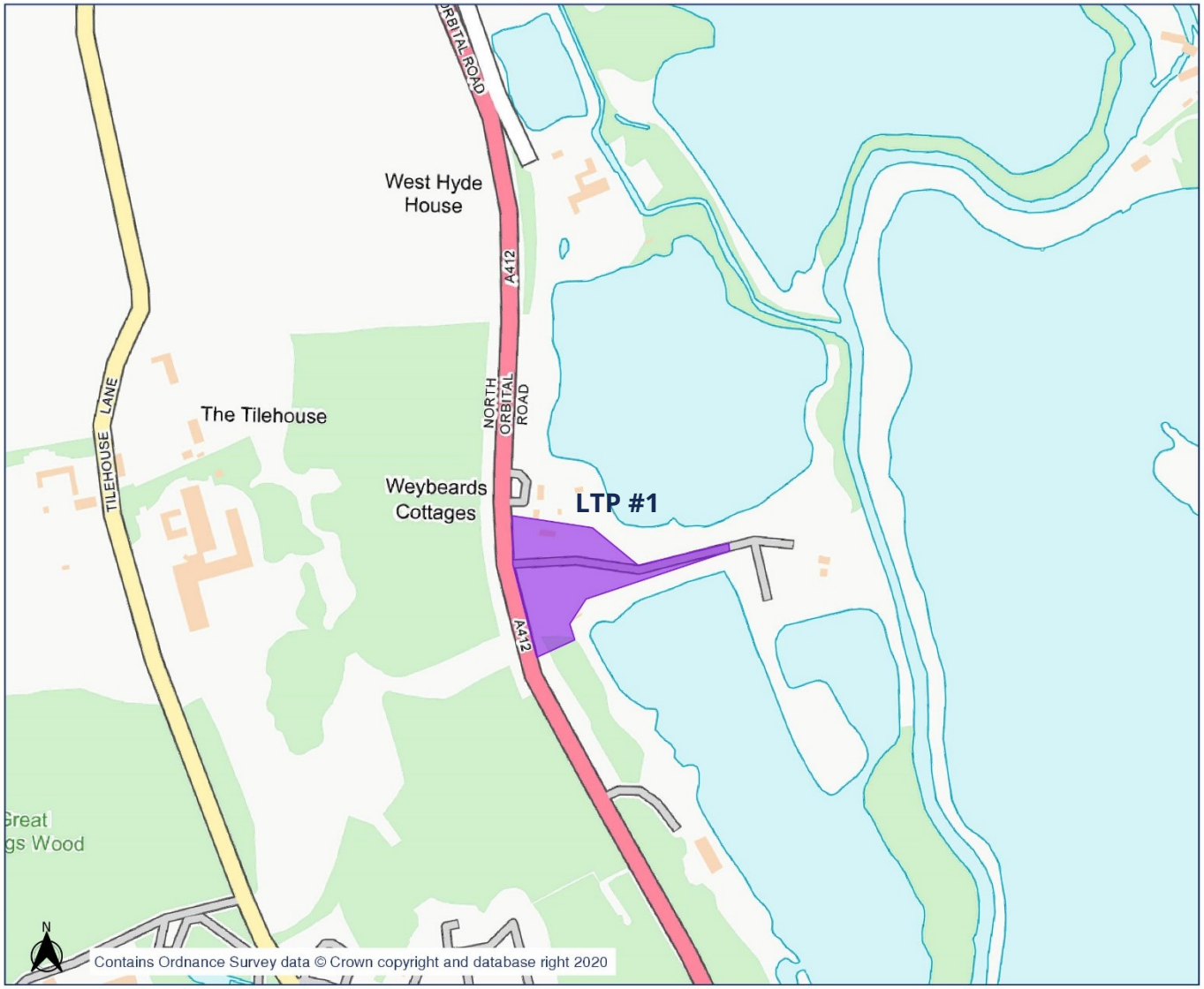
Active worksites

Worksite Identification Plan - 7



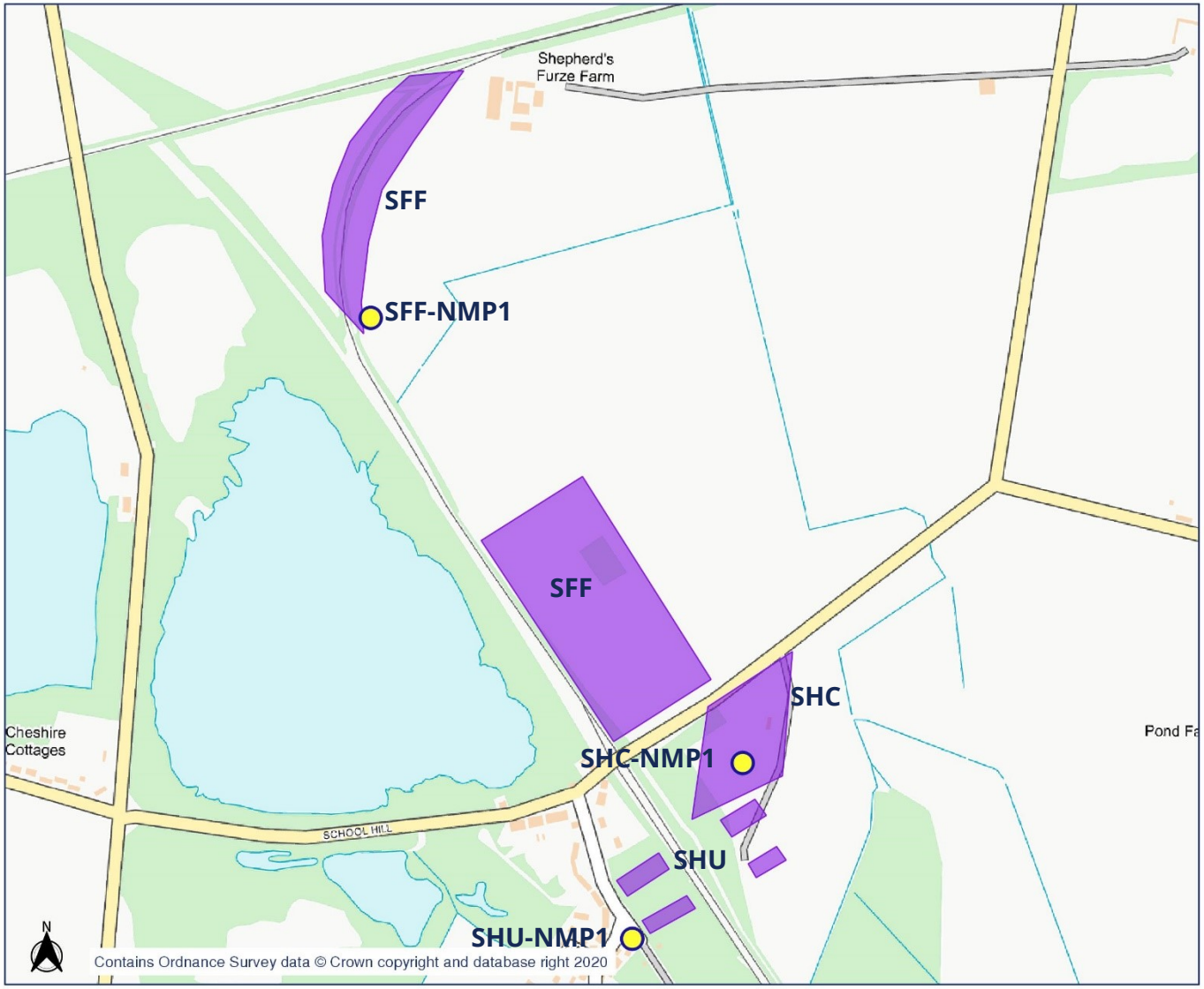
OFFICIAL

Worksite Identification Plan - 8



Appendix B Monitoring Locations

HS2 Noise and Vibration Monitoring Plan - 1



HS2 Noise and Vibration Monitoring Plan - 2

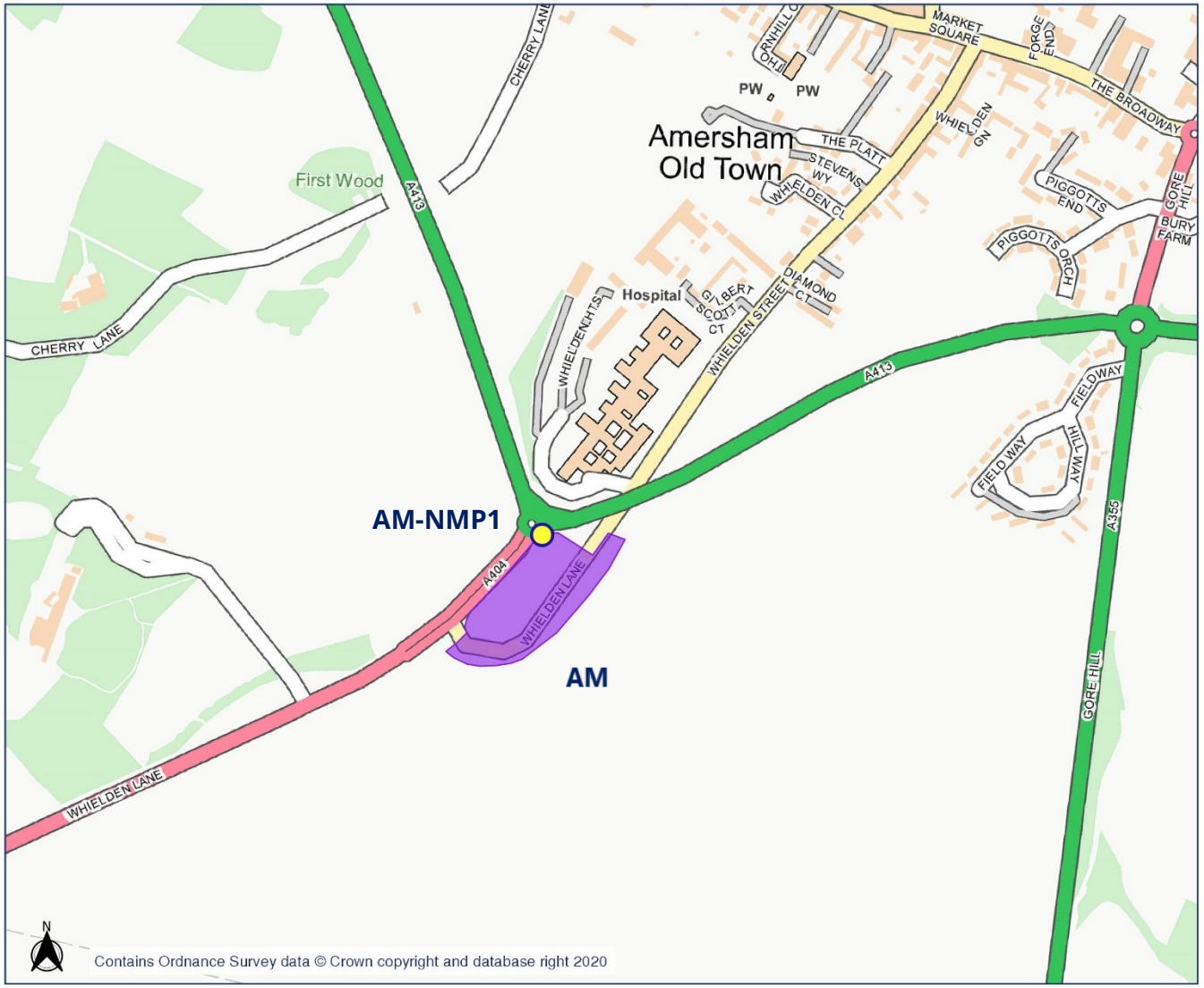
Noise and Vibration Monitoring Plan - 3

OFFICIAL

Noise and Vibration Monitoring Plan - 4

Noise and Vibration Monitoring Plan - 5

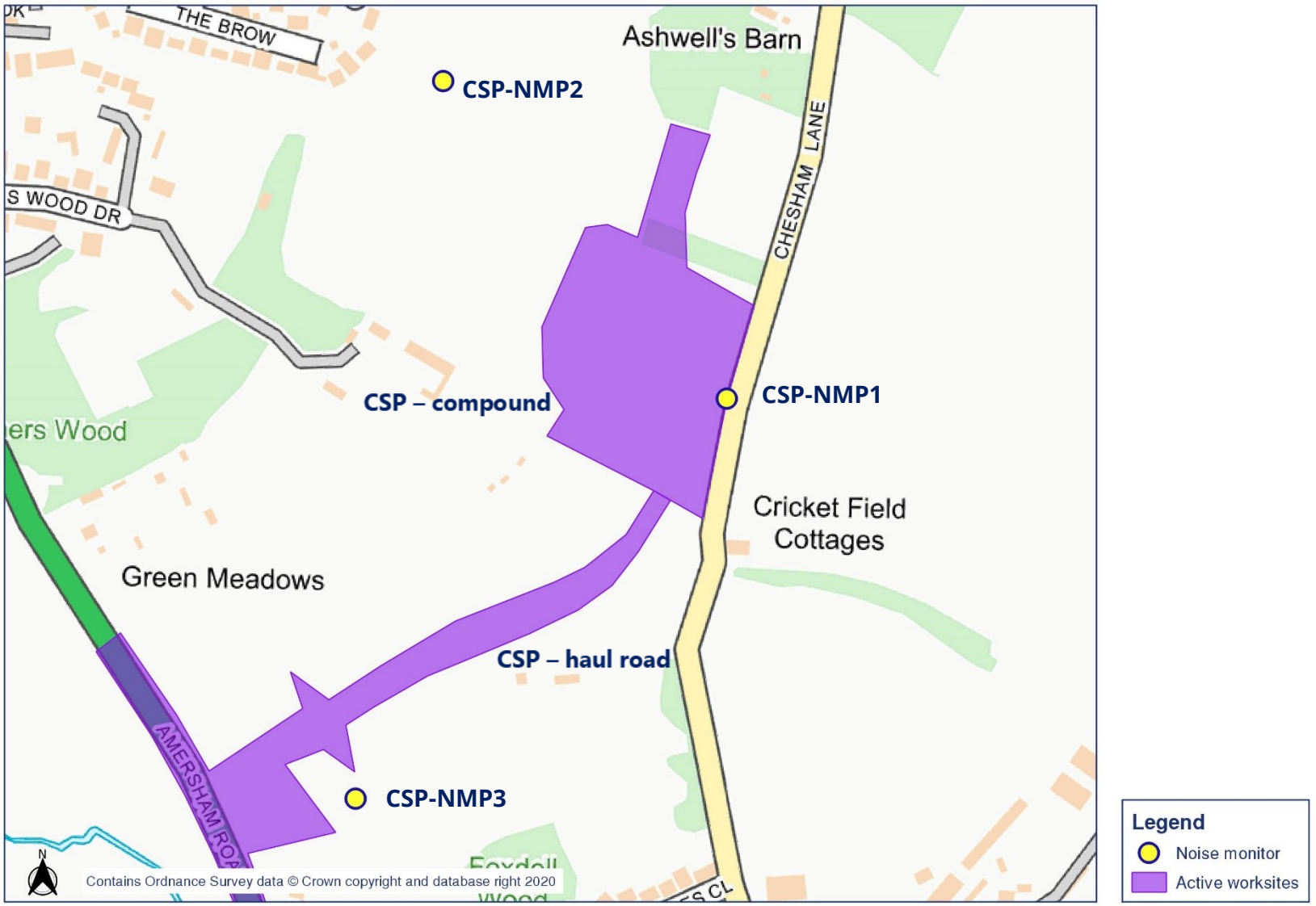
HS2 Noise and Vibration Monitoring Plan - 6



Noise and Vibration Monitoring Plan - 7

Noise and Vibration Monitoring Plan - 8

HS2 Noise and Vibration Monitoring Plan - 9



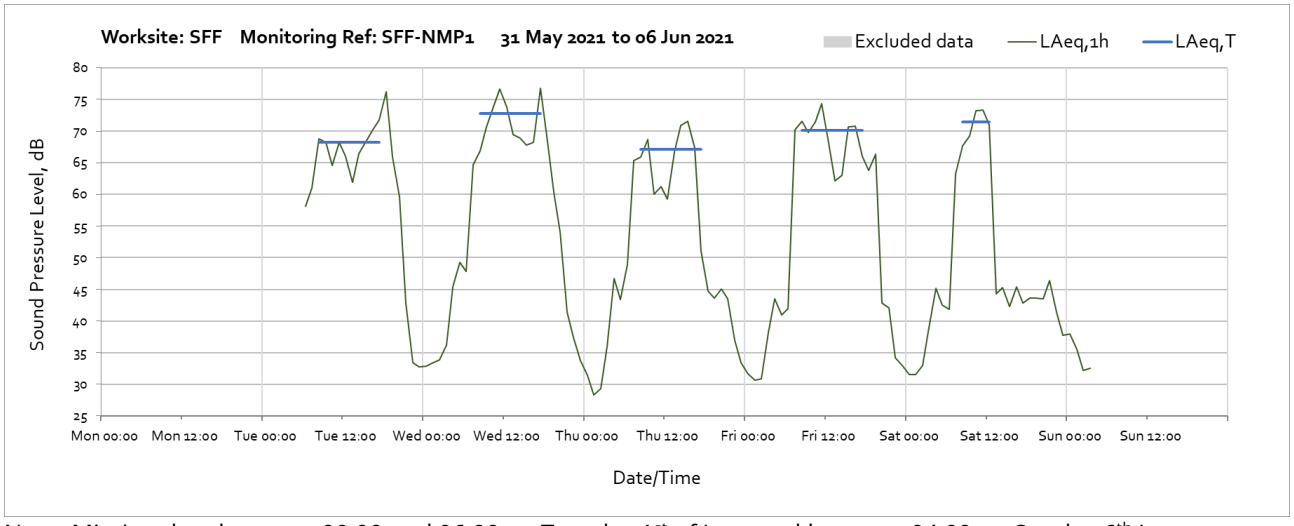
Noise and Vibration Monitoring Plan - 10

Appendix C Data

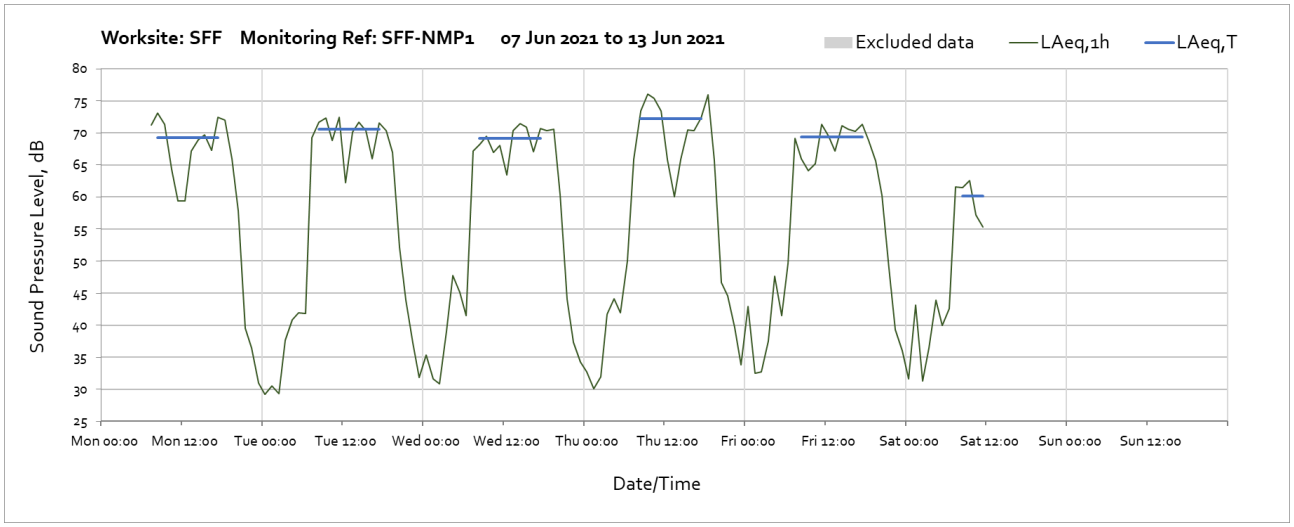
Noise

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 **Error! Reference source not found.** of the main report.

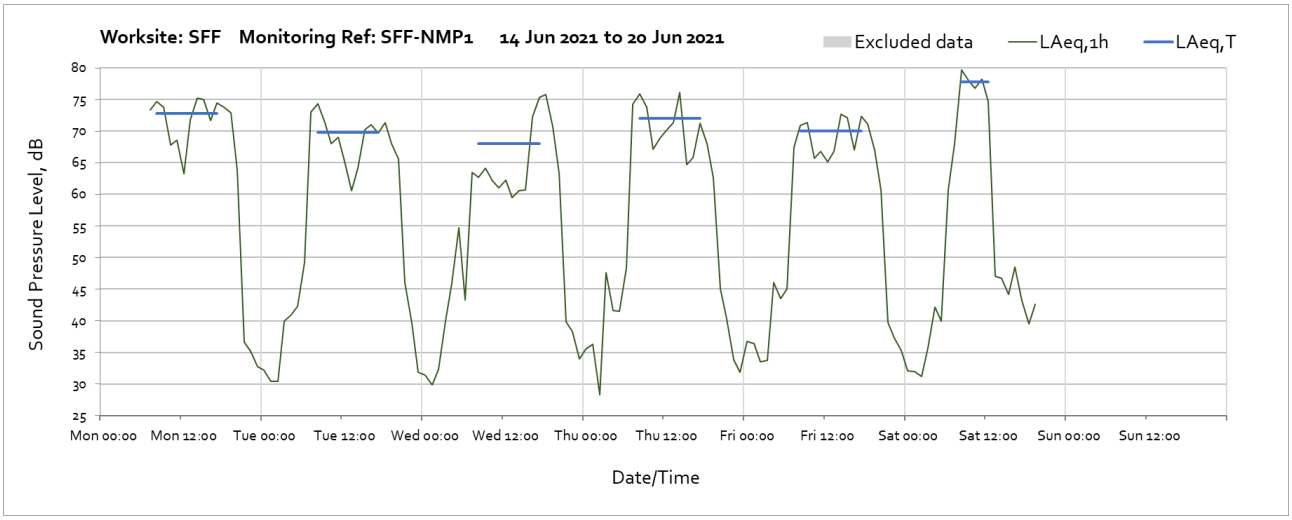
Worksite: SFF – Monitoring Ref: SFF-NMP1



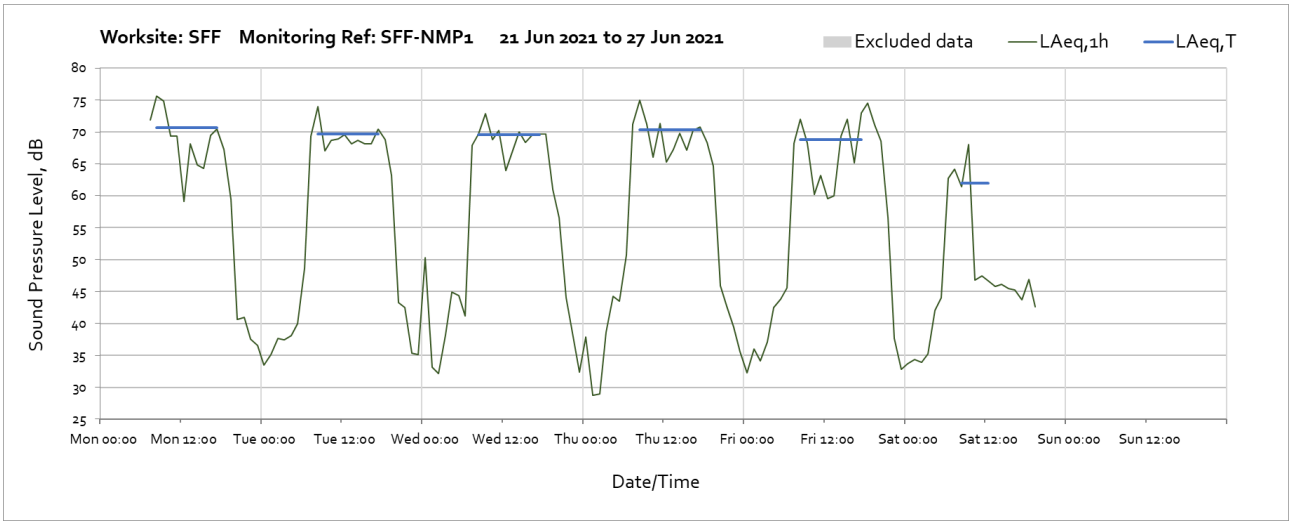
Note: Missing data between 00:00 and 06:00 on Tuesday 1st of June and between 04:00 on Sunday 6th June of June and 07:00 on Monday 7th June was due to loss of continious site power to the equipment.



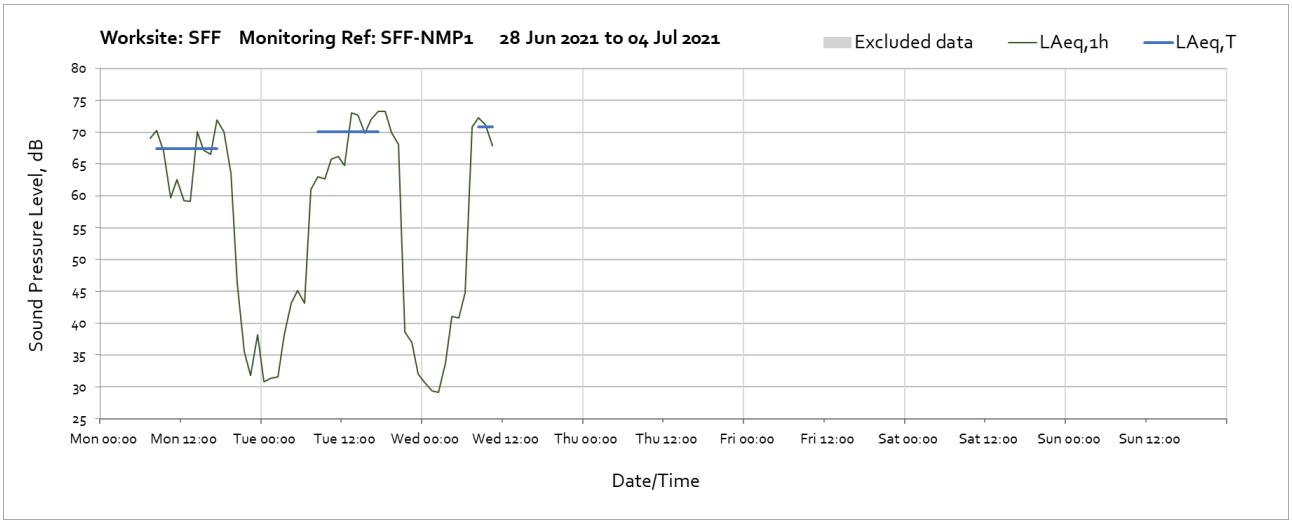
Note: Missing data between 04:00 on Sunday 6th June of June and 07:00 on Monday 7th June and between 12:00 on Saturday 12th of June and 07:00 on Monday 14th of June was due to loss of continious site power to the equipment.



Note: Missing data between 12:00 on Saturday 12th of June and 07:00 on Monday 14th of June and between 20:00 on Saturday 19th of June and 07:00 on Monday 21st of June was due to loss of continious site power to the equipment.

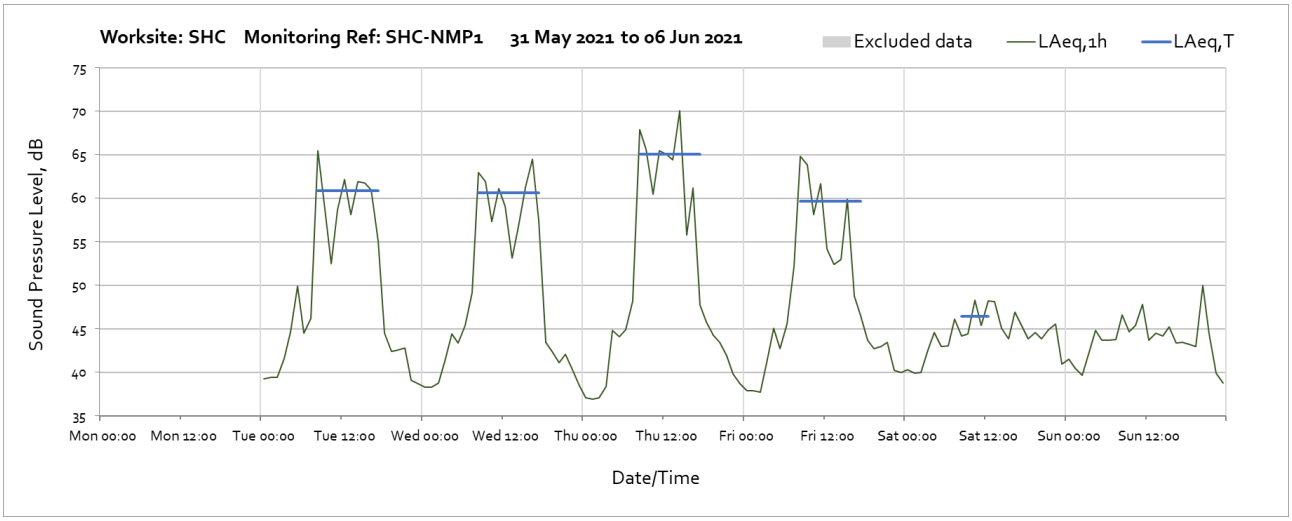


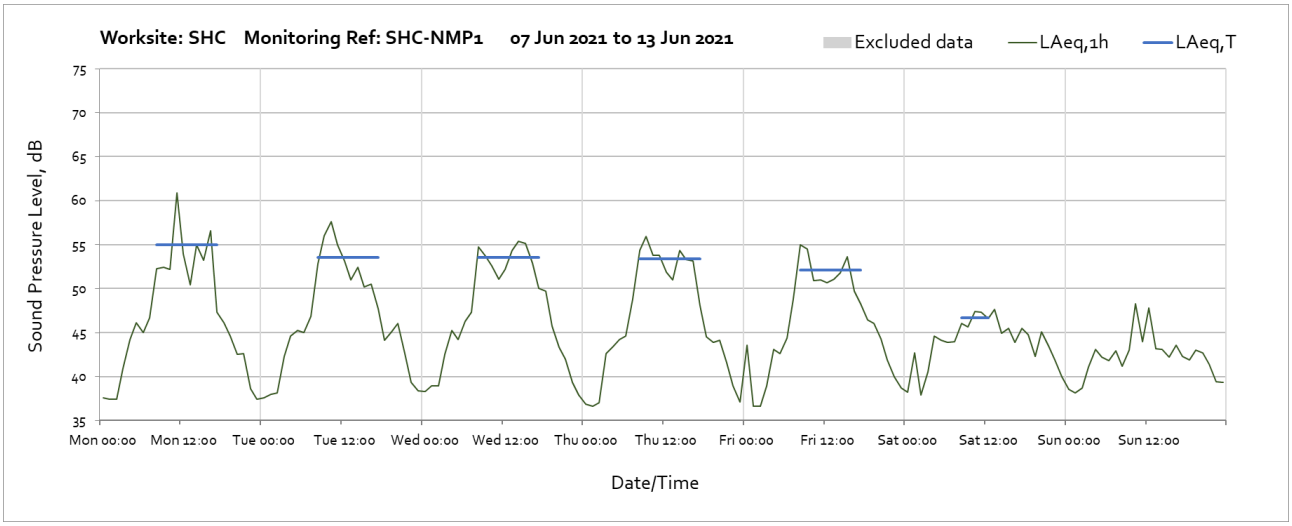
Note: Missing data between 20:00 on Saturday 19th of June and 07:00 on Monday 21st of June and between 20:00 on Saturday 26th of June and 07:00 on Monday 28th of June was due to loss of continious site power to the equipment.

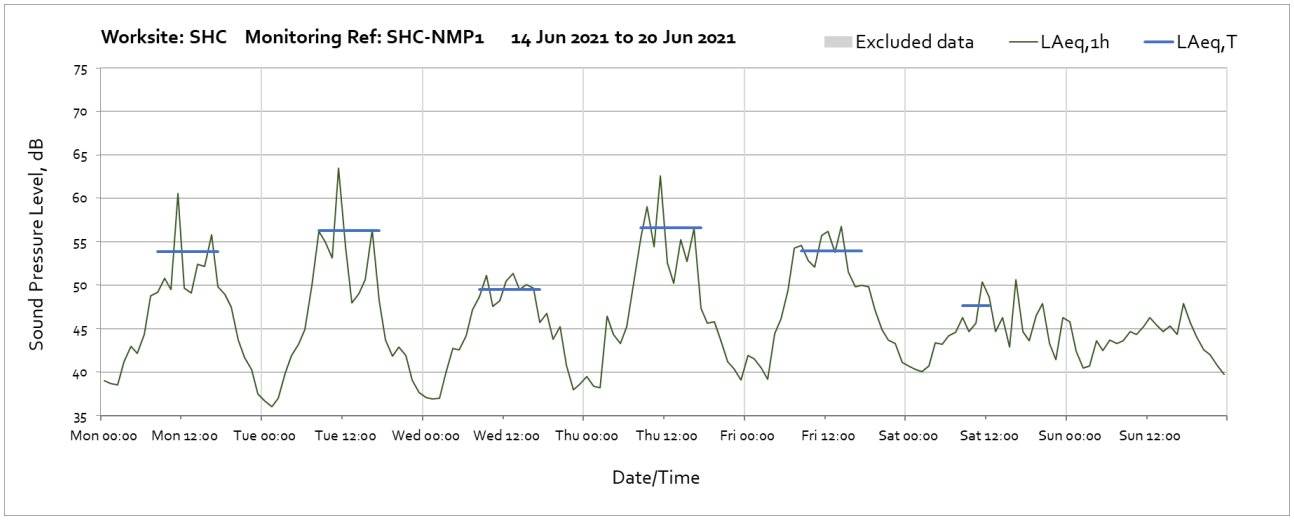


Note: Missing data between 20:00 on Saturday 26th of June and 07:00 on Monday 28th of June and between 11:00 on Wednesday 30th of June and 00:00 on Thursday 1st of July was due to loss of continious site power to the equipment.

Worksite: SHC – Monitoring Ref: SHC-NMP1






Worksite: SHC Monitoring Ref: SHC-NMP1 14 Jun 2021 to 20 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
60
55
50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
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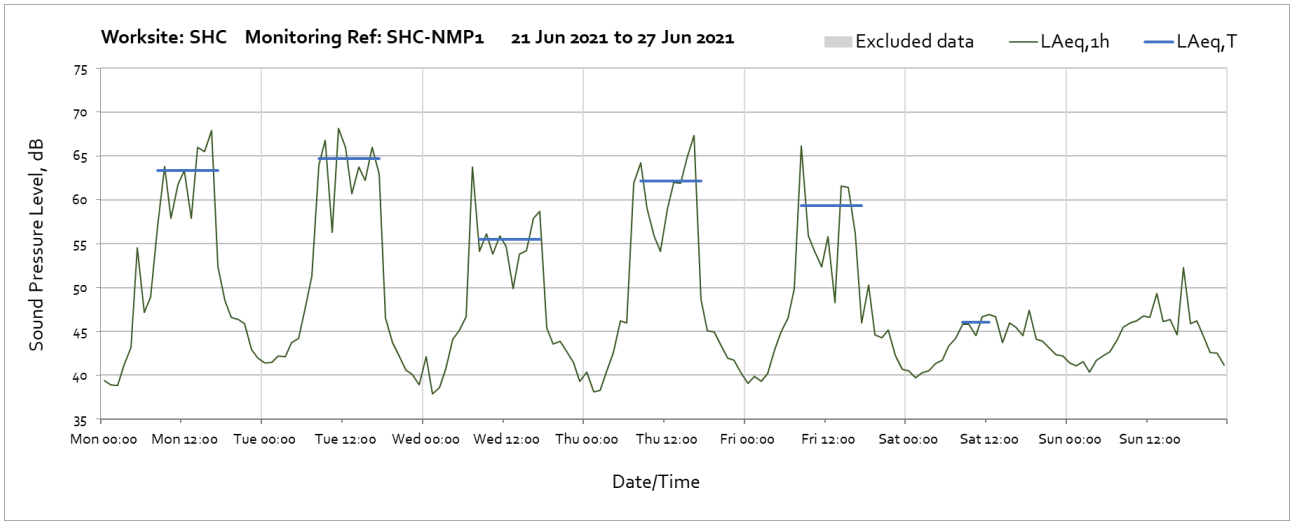
Sun 00:00
Sun 12:00
Date/Time


Worksite: SHC Monitoring Ref: SHC-NMP1 21 Jun 2021 to 27 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
60
55
50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
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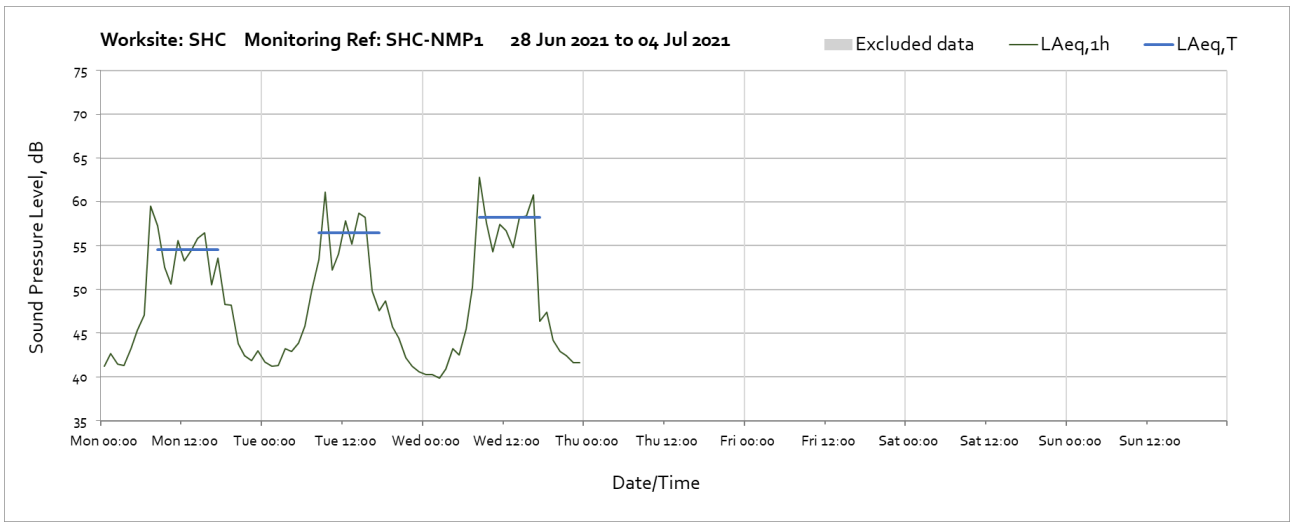
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time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LAeq,T
Sound Pressure Level, dB
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65
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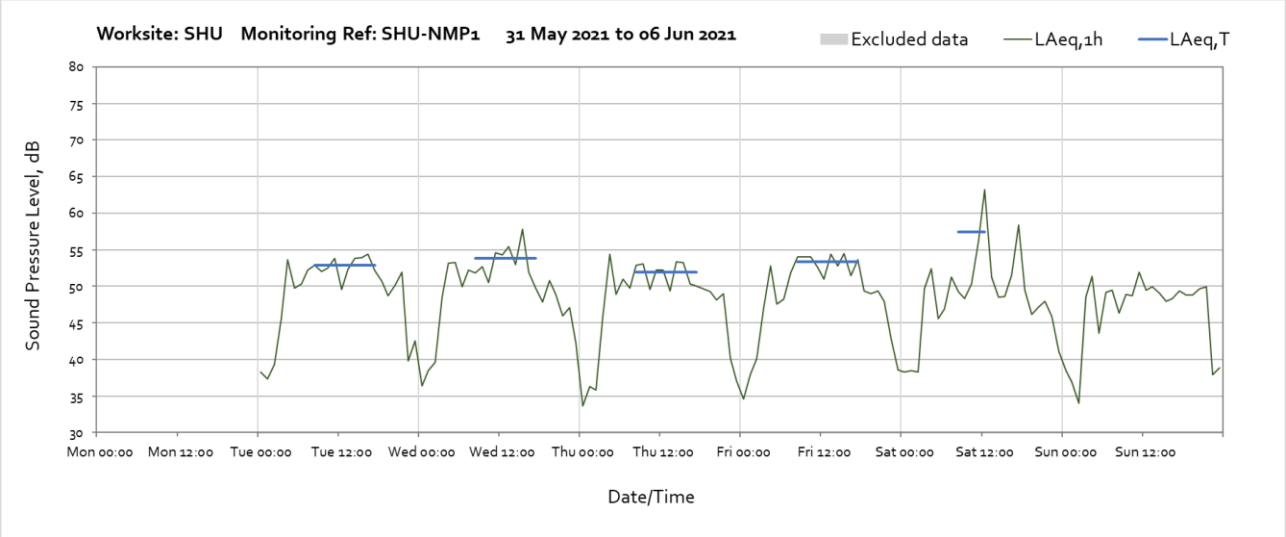
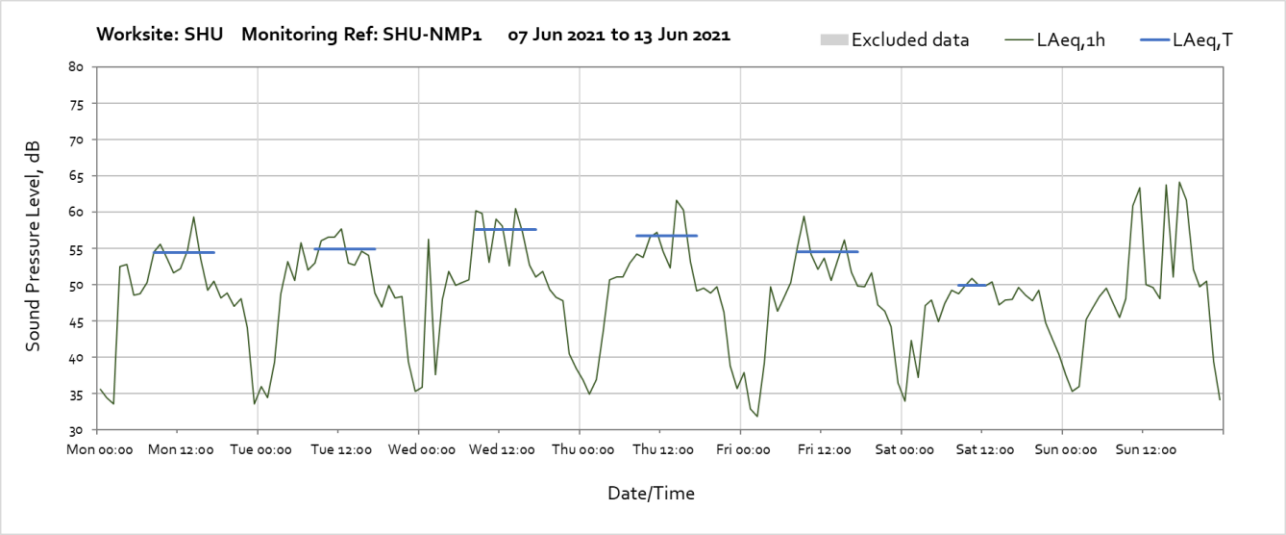
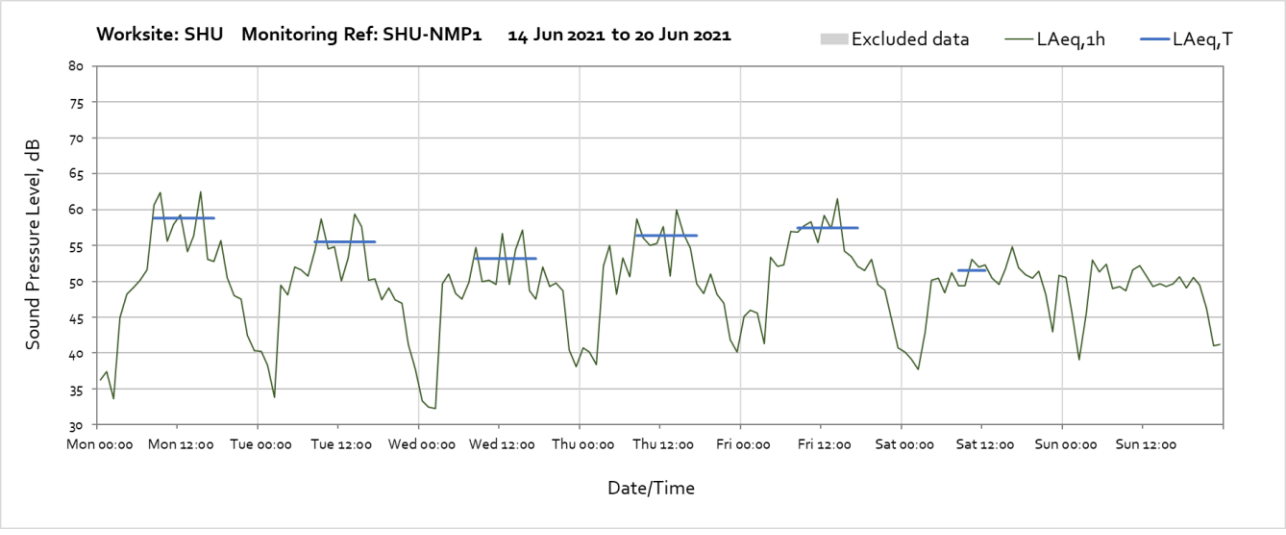
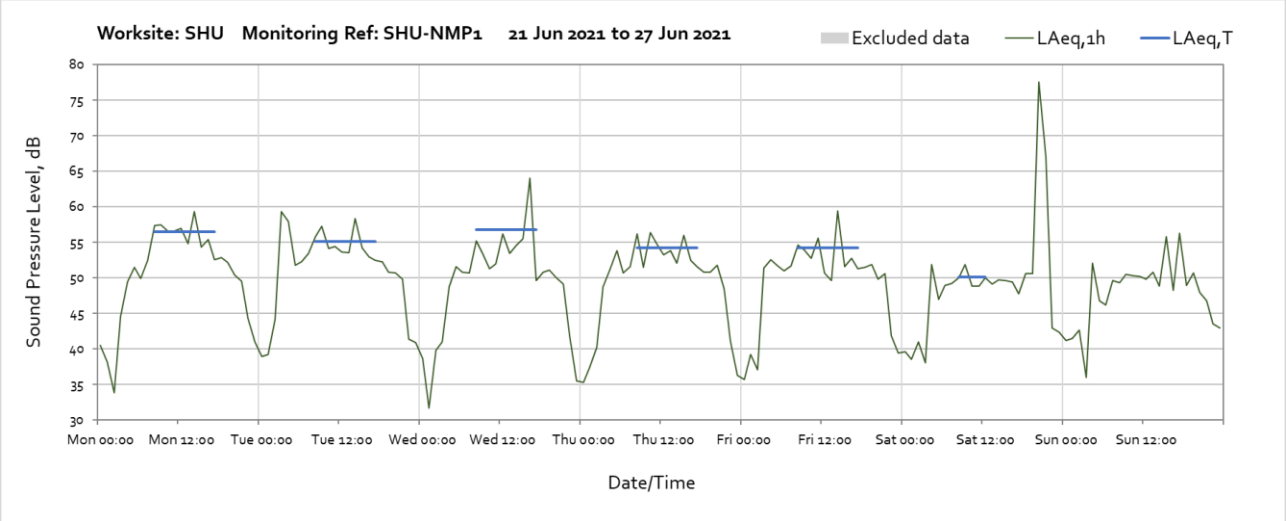
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

Worksite: SHU – Monitoring Ref: SHU-NMP1





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Excluded data
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LAeq,T
Sound Pressure Level, dB
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75
70
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Tue 00:00
Tue 12:00
Wed 00:00
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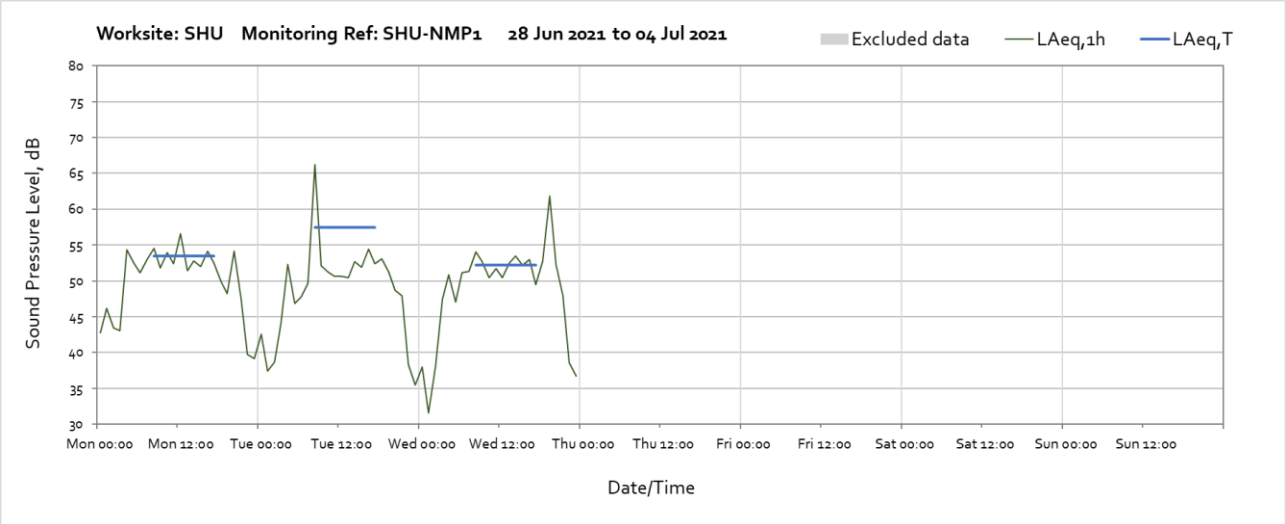
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: SHU Monitoring Ref: SHU-NMP1 28 Jun 2021 to 04 Jul 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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75
70
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35
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Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
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Sat 12:00
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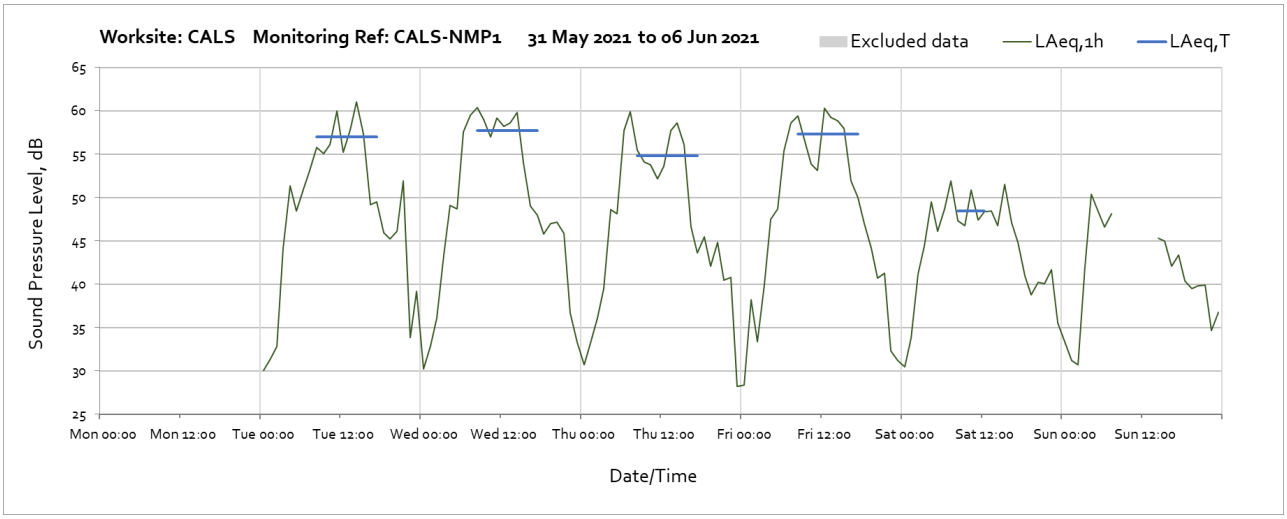
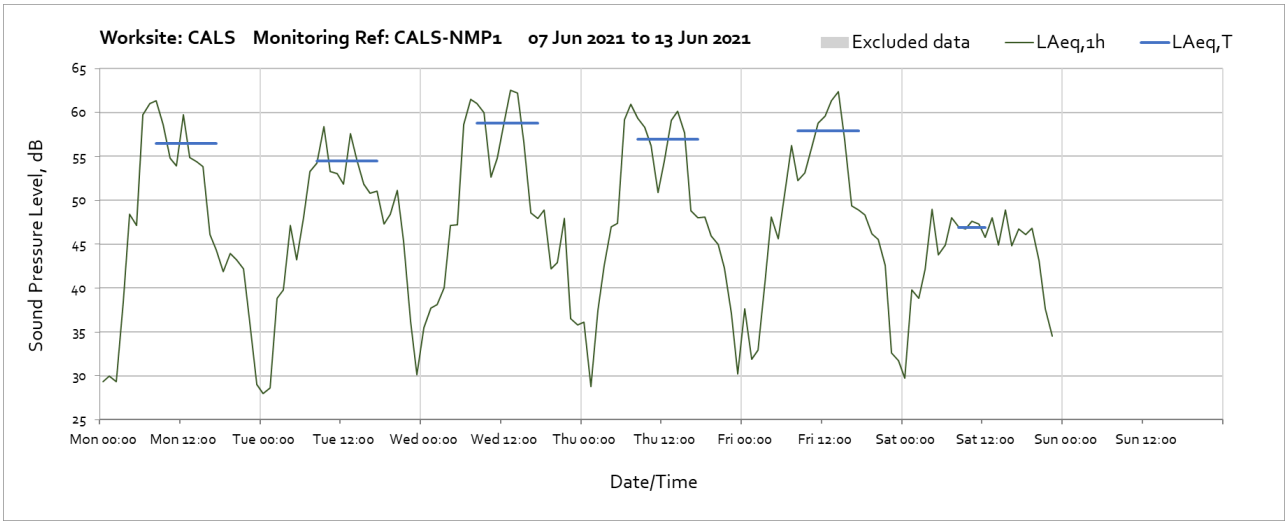
Sun 12:00
Date/Time

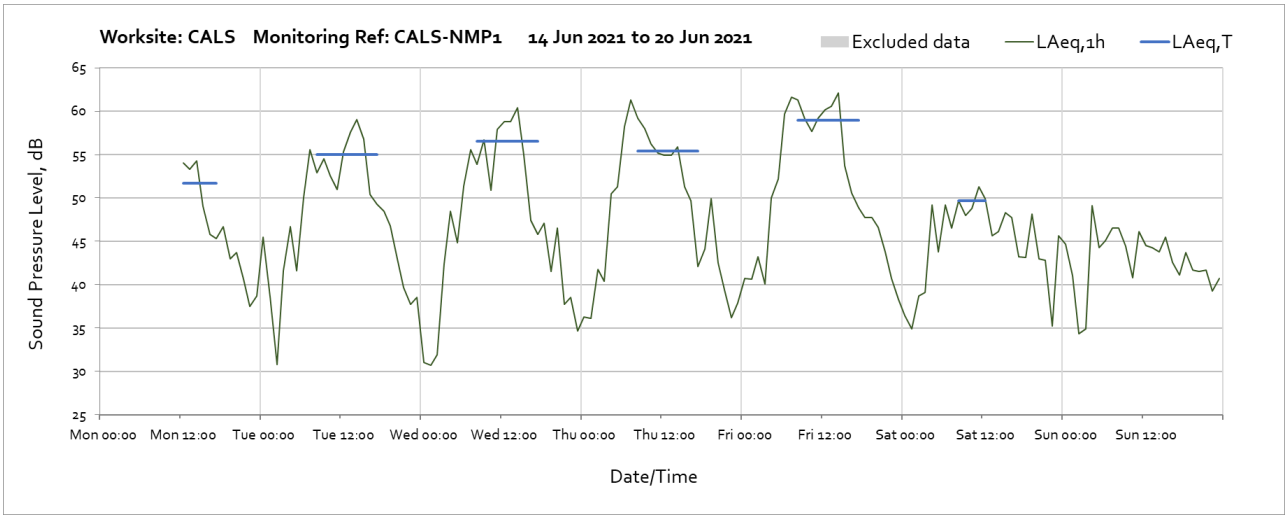
Worksite: CALS – Monitoring Ref: CALS-NMP1



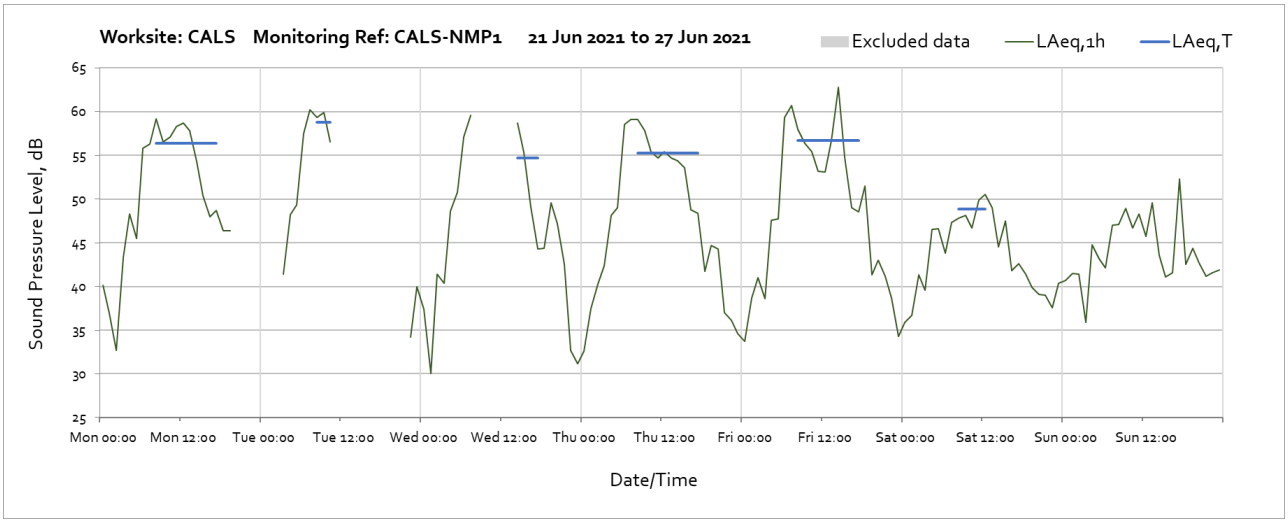
Note: Missing data between 08:00 and 14:00 on Sunday 6th June was due to loss of remote connection to the equipment.



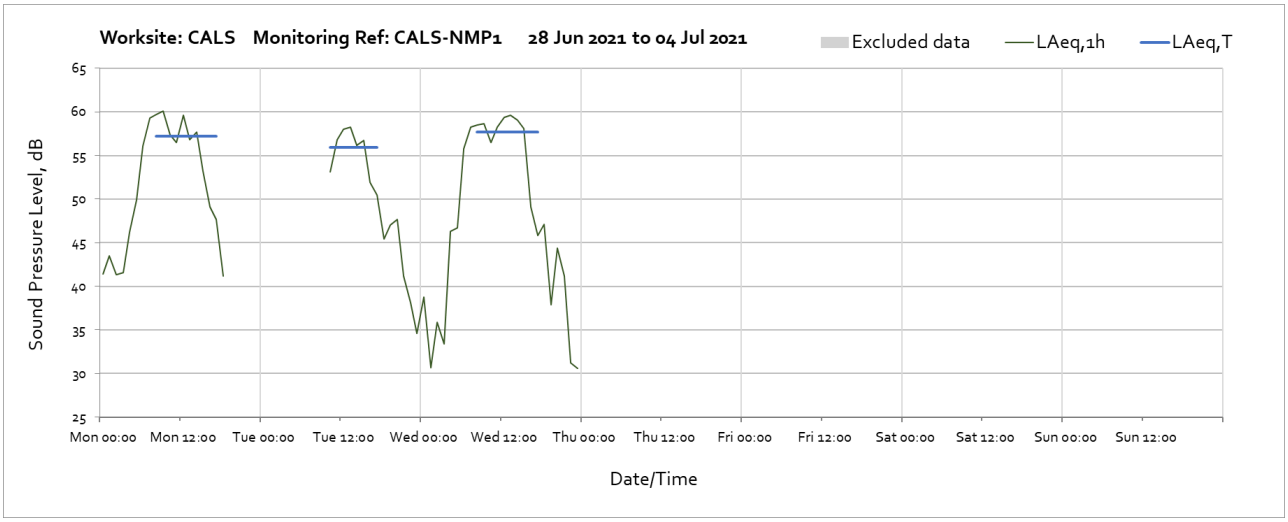
Note: Missing data between 23:00 on Saturday 12th June and 00:00 on Monday 14th June was due to loss of remote connection to the equipment.



Note: Missing data between 00:00 and 12:00 on Monday 14th June was due to loss of remote connection to the equipment.

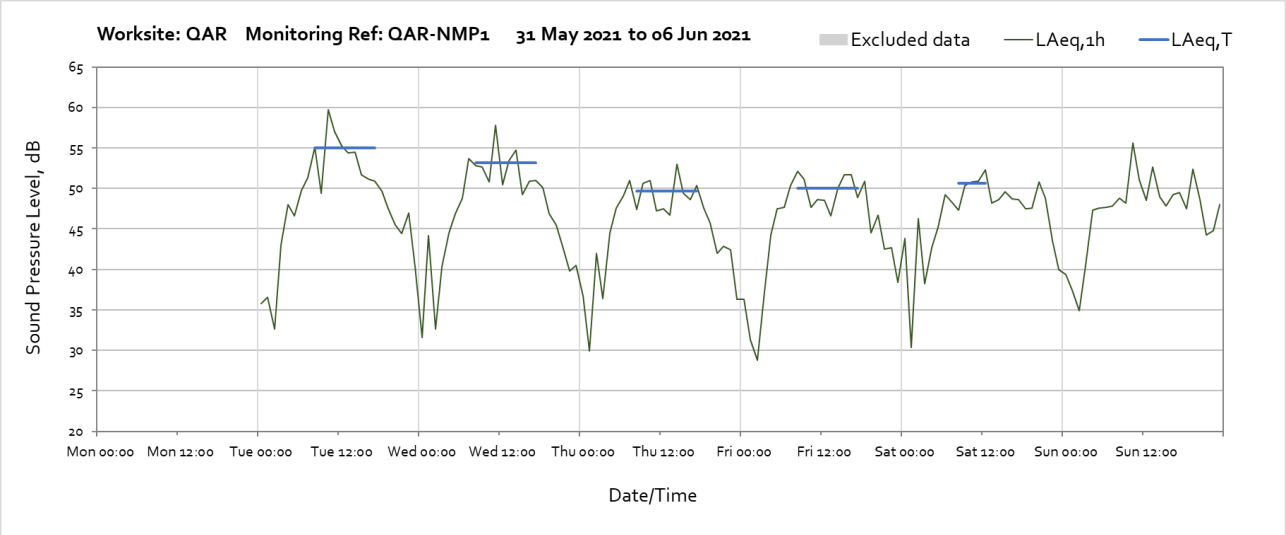


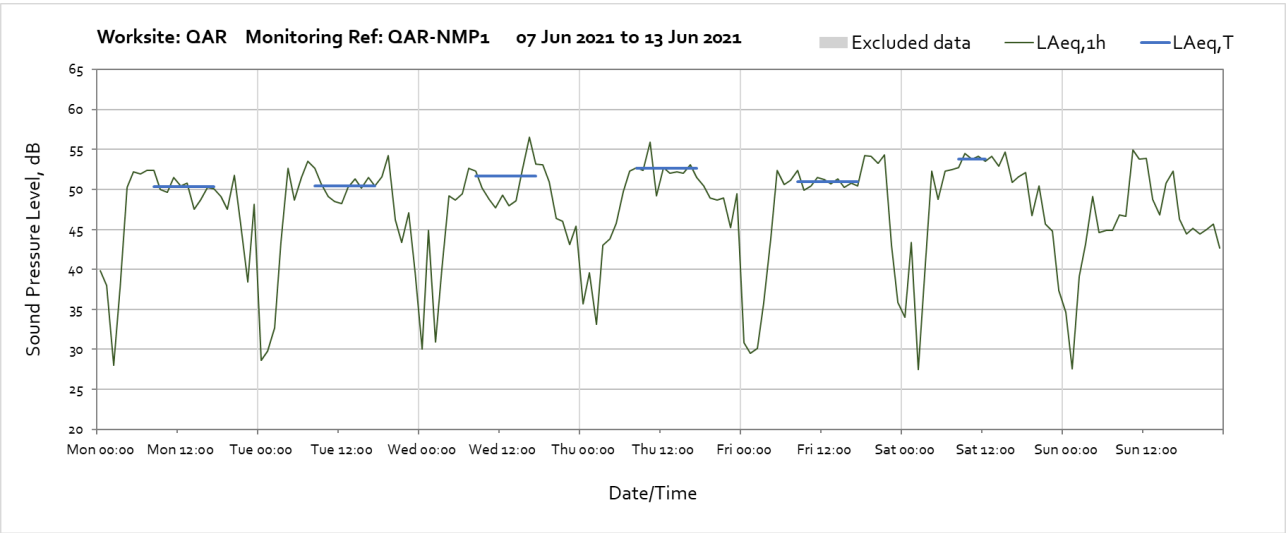
Note: Missing data between 20:00 on Monday 21st June and 03:00 on Tuesday 22nd June, between 11:00 and 20:00 on Tuesday 22nd June, and between 08:00 and 14:00 on Wednesday 23rd June was due to loss of remote connection to the equipment.

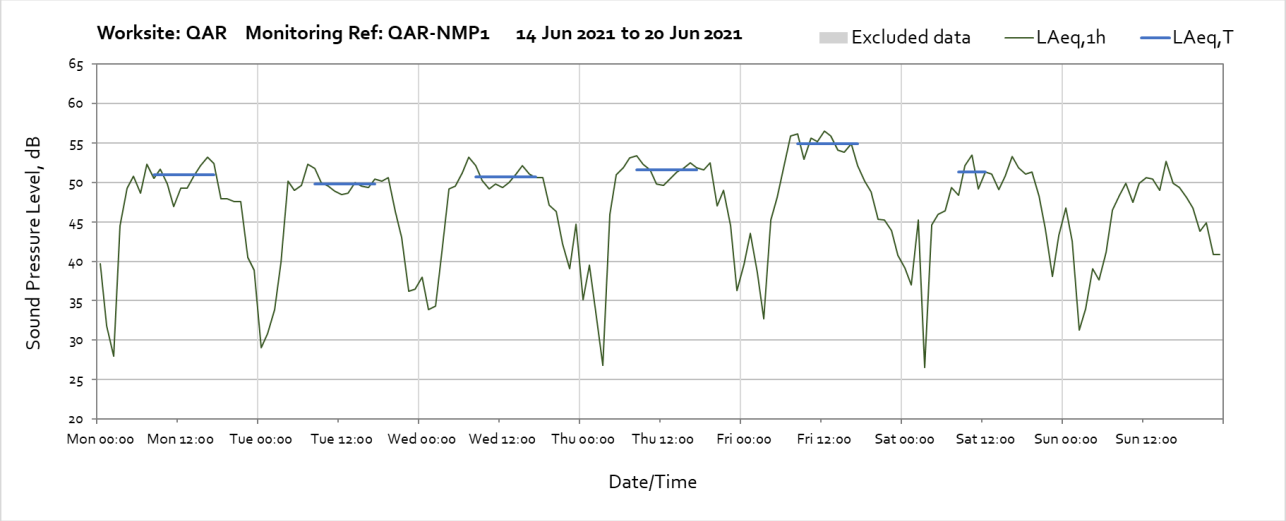


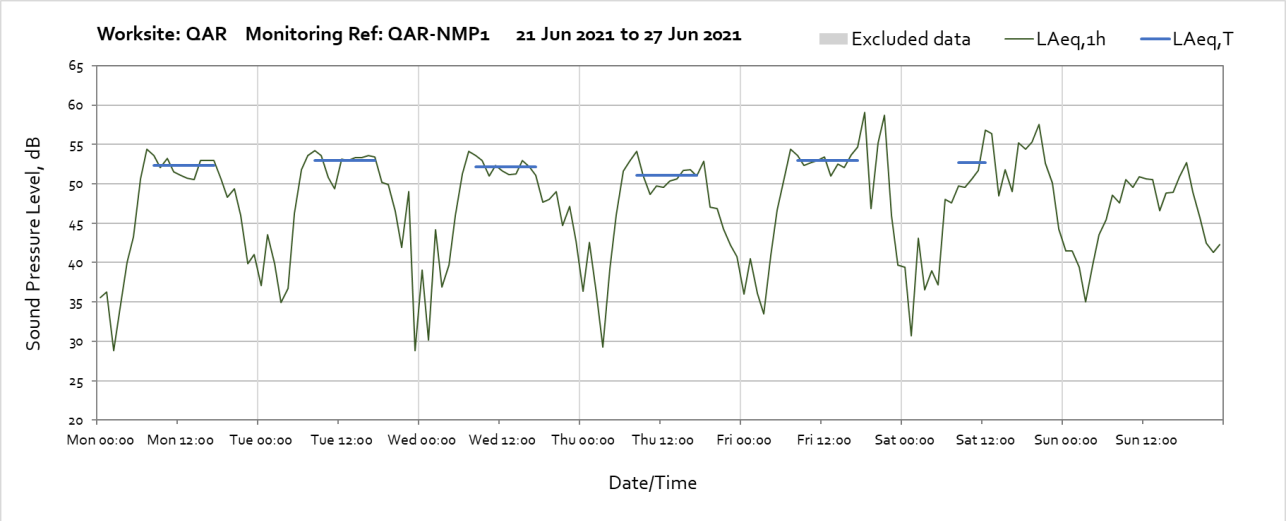
Note: Missing data between 19:00 on Monday 28th June and 10:00 on Tuesday 29th June was due to loss of remote connection to the equipment.

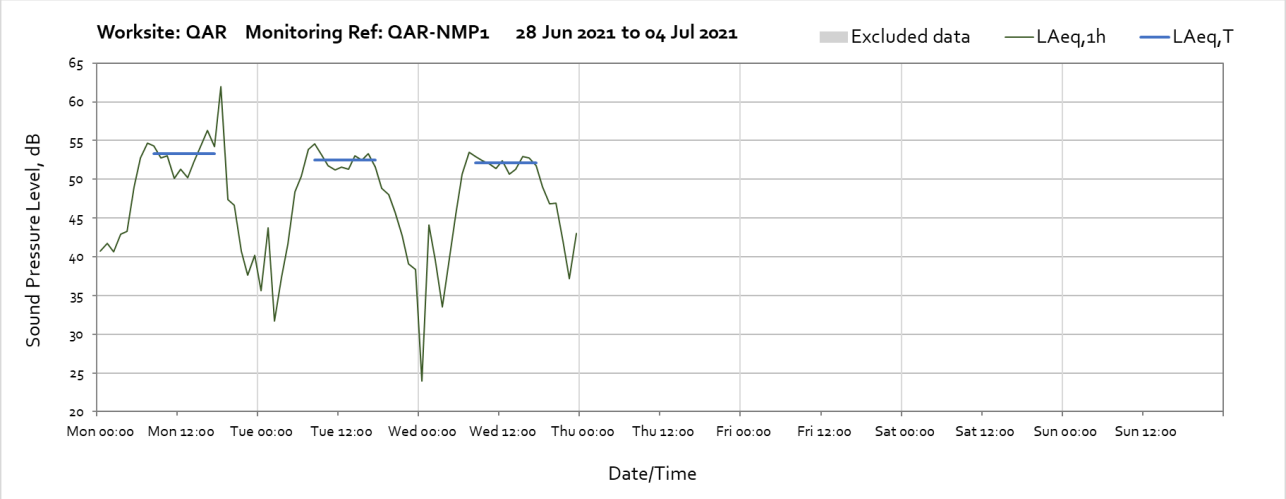
Worksite: QAR – Monitoring Ref: QAR-NMP1



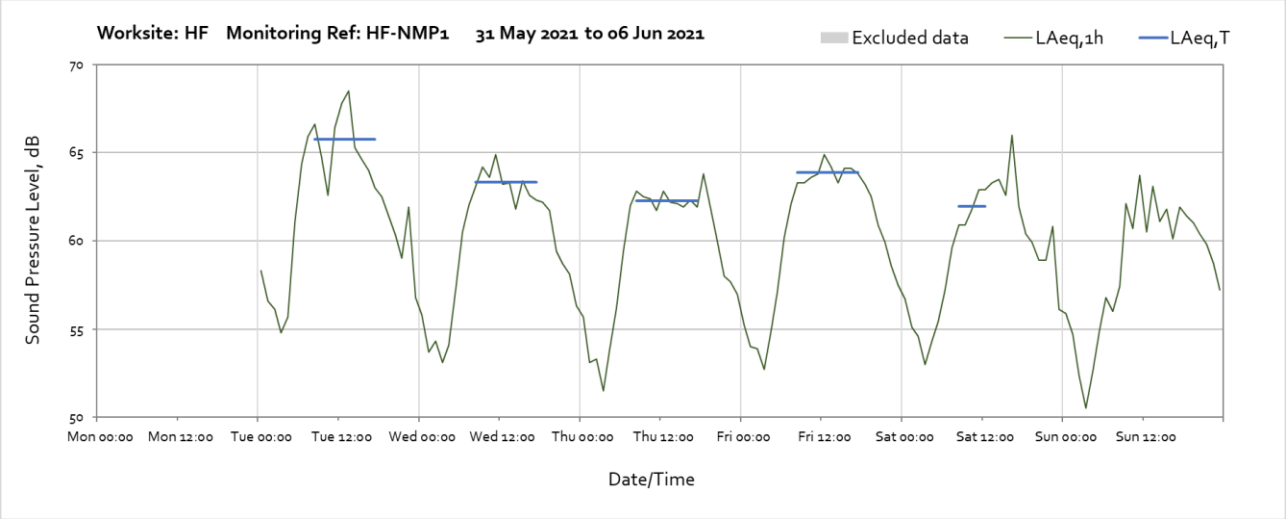


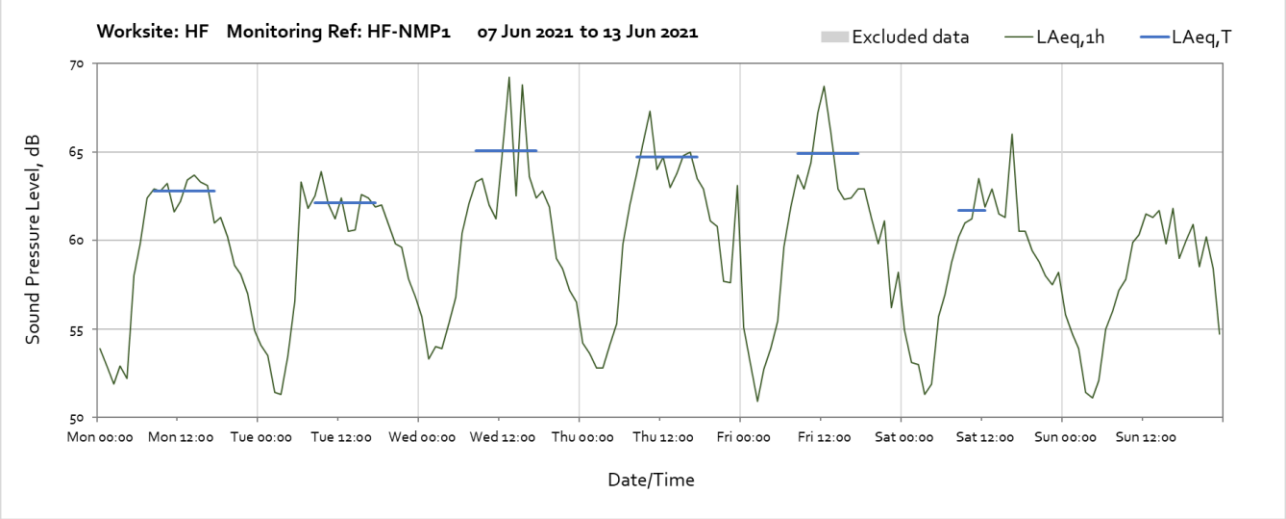

Worksite: QAR Monitoring Ref: QAR-NMP1 14 Jun 2021 to 20 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
65
60
55
50
45
40
35
30
25
20
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

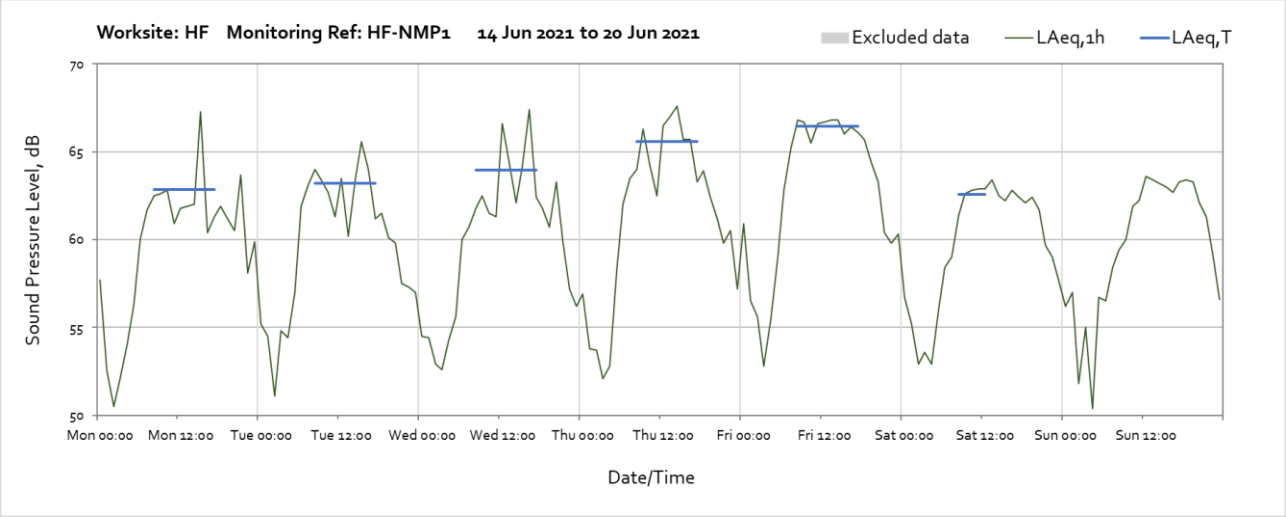

Worksite: QAR Monitoring Ref: QAR-NMP1 21 Jun 2021 to 27 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
65
60
55
50
45
40
35
30
25
20
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

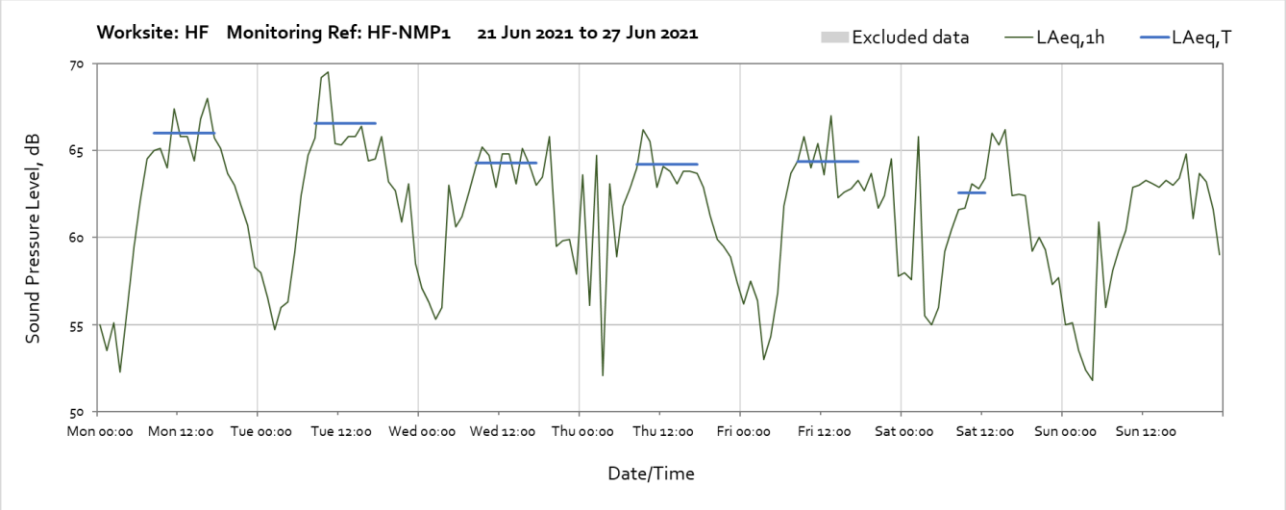

Worksite: QAR Monitoring Ref: QAR-NMP1 28 Jun 2021 to 04 Jul 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
65
60
55
50
45
40
35
30
25
20
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

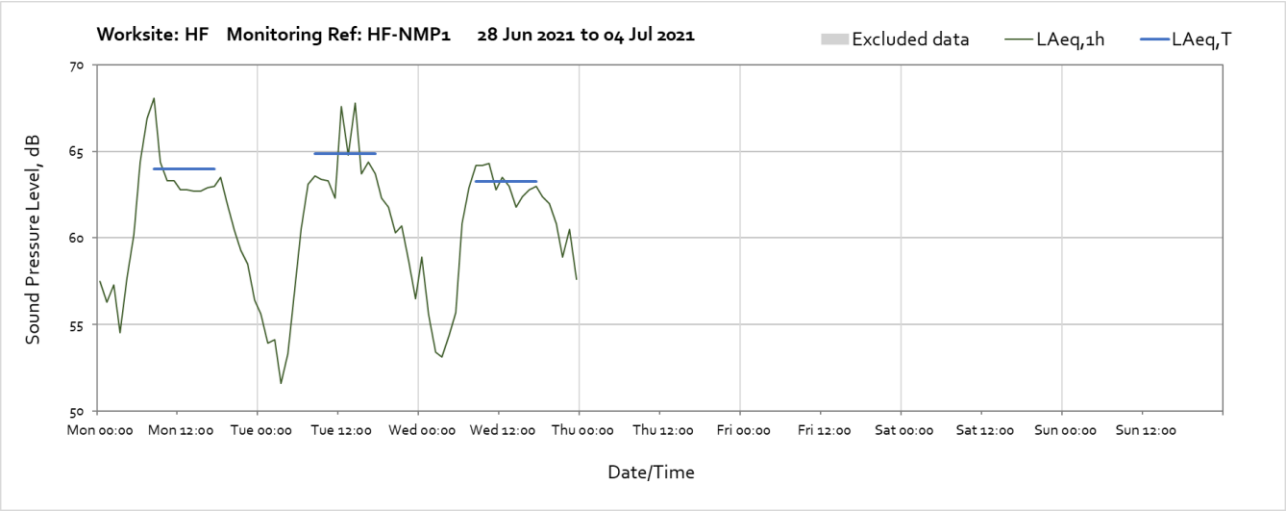
Worksite: HF – Monitoring Ref: HF-NMP1



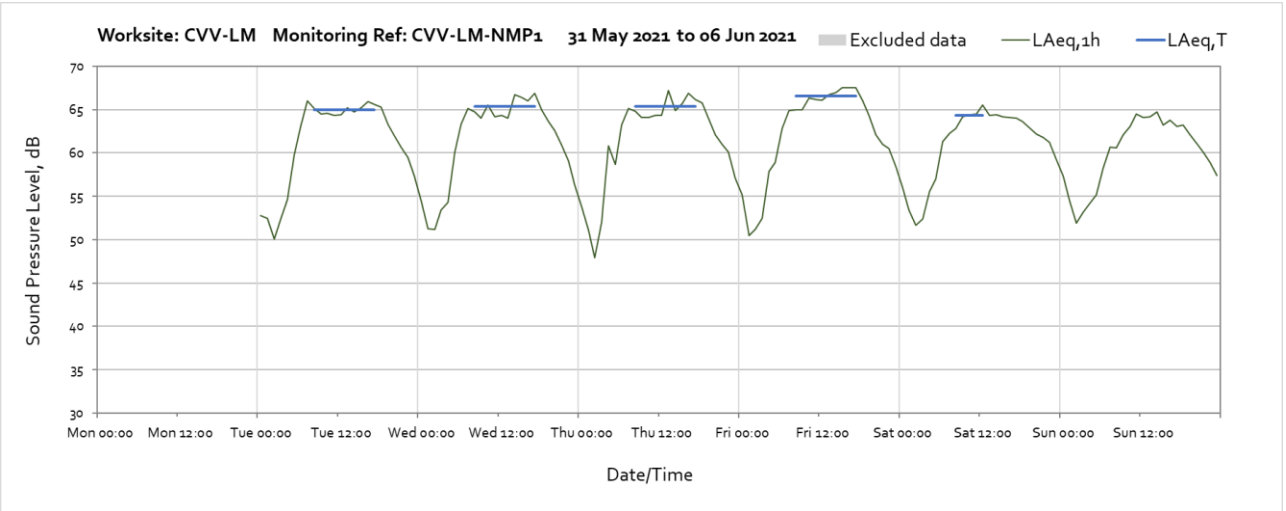


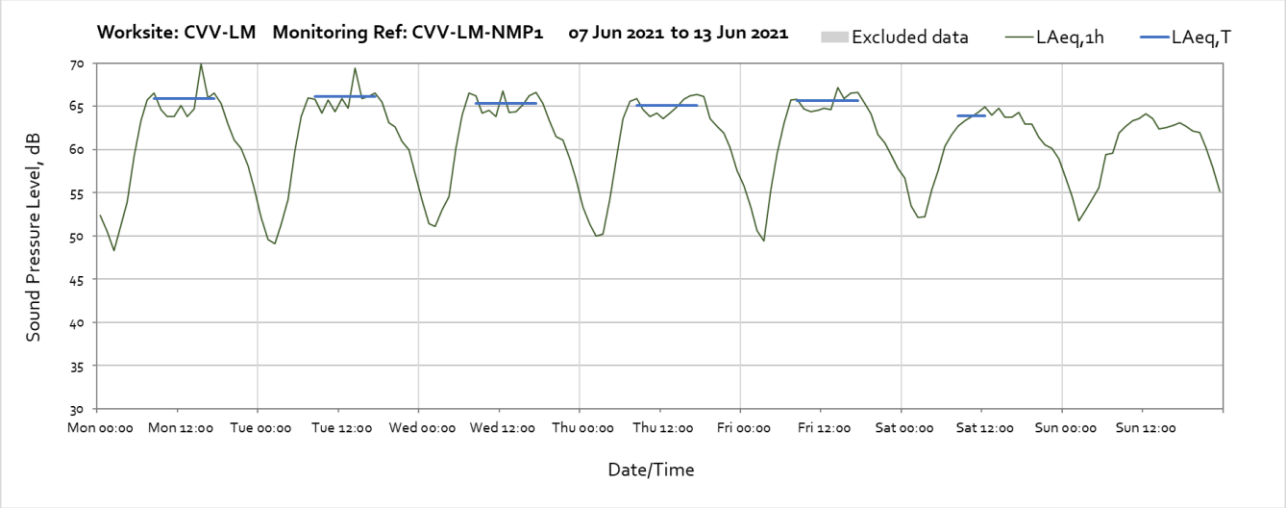


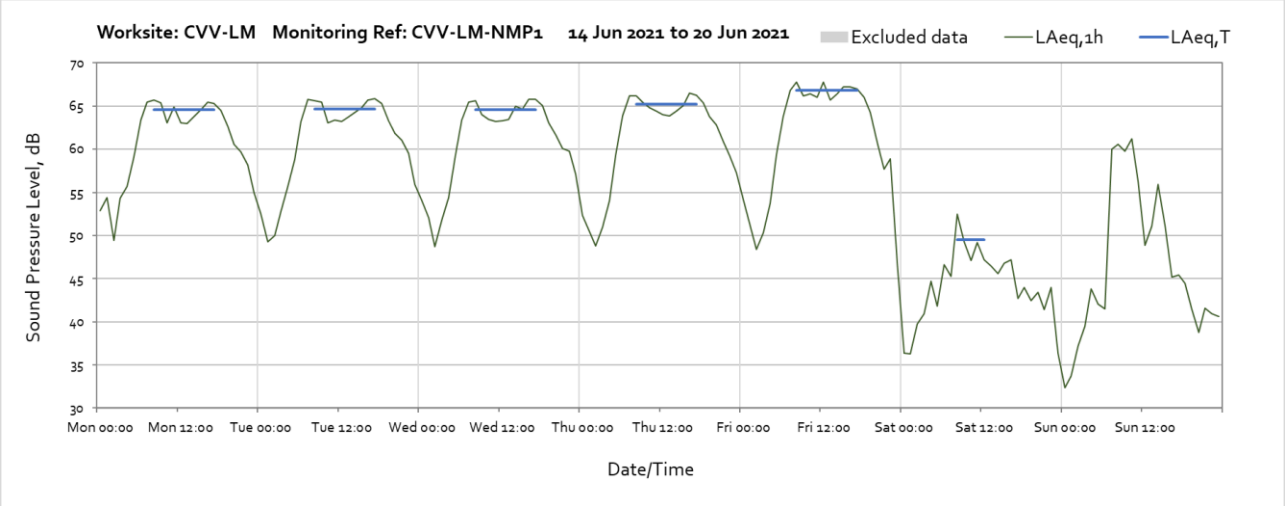


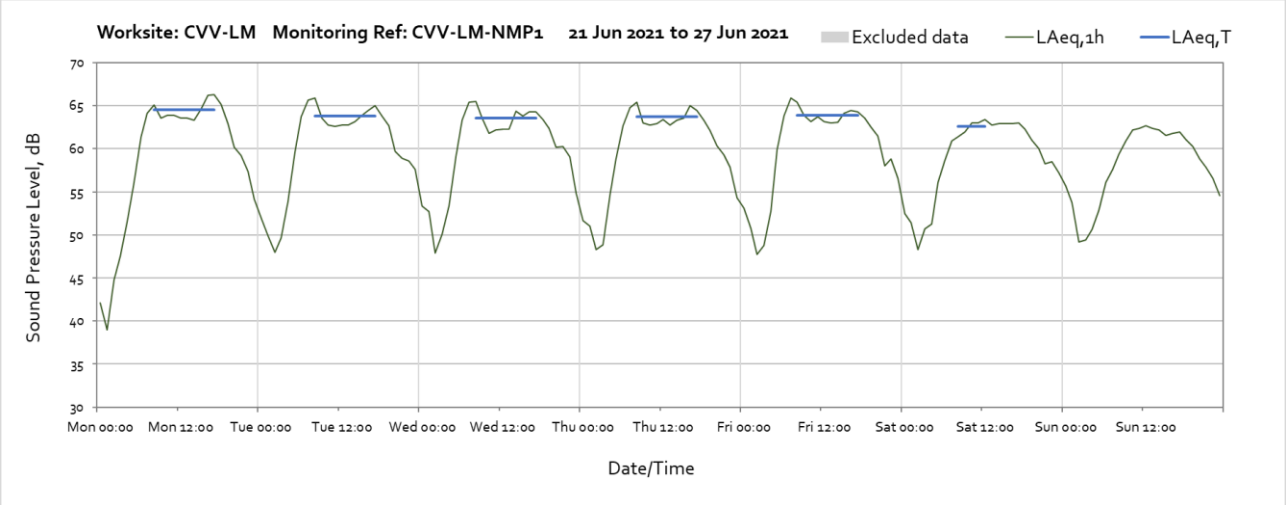


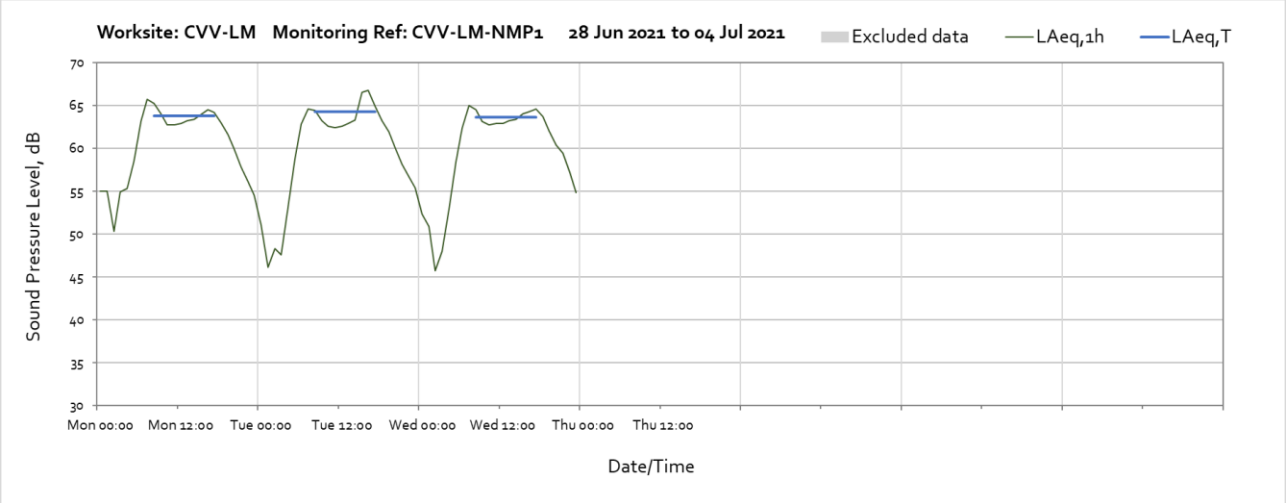
Worksite: CVV-LM – Monitoring Ref: CVV-LM-NMP1



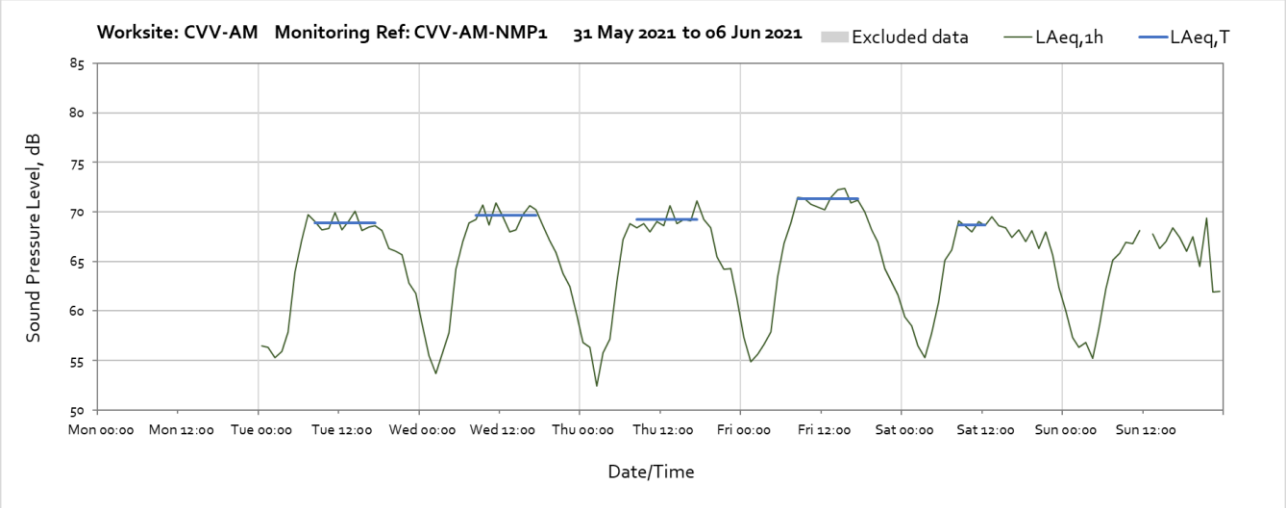

Worksite: CVV-LM Monitoring Ref: CVV-LM-NMP1 07 Jun 2021 to 13 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
65
60
55
50
45
40
35
30
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: CVV-LM Monitoring Ref: CVV-LM-NMP1 14 Jun 2021 to 20 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
65
60
55
50
45
40
35
30
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

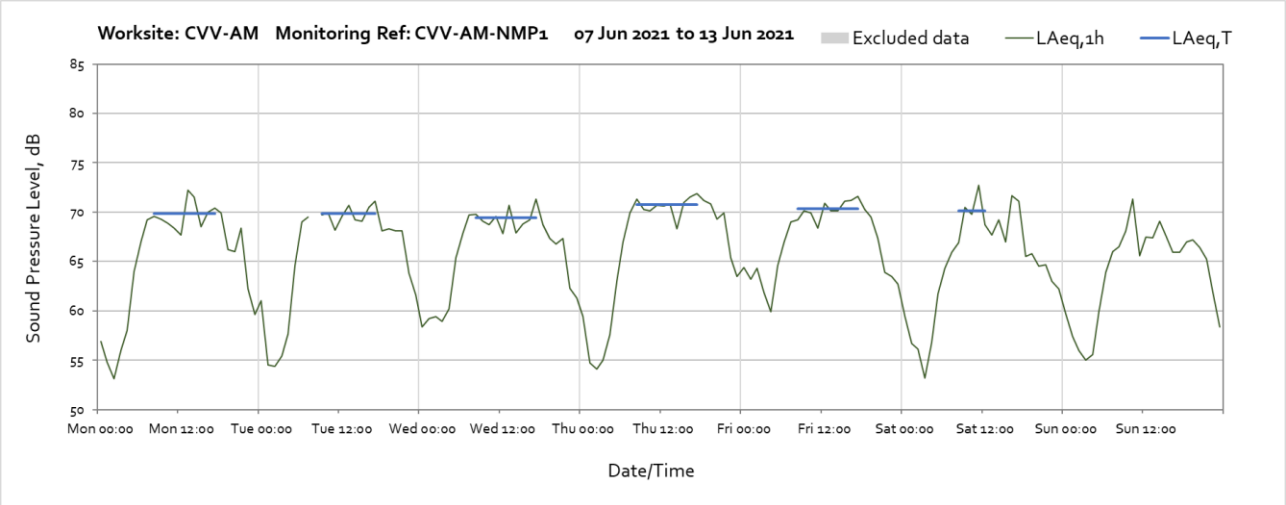

Worksite: CVV-LM Monitoring Ref: CVV-LM-NMP1 21 Jun 2021 to 27 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
65
60
55
50
45
40
35
30
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time



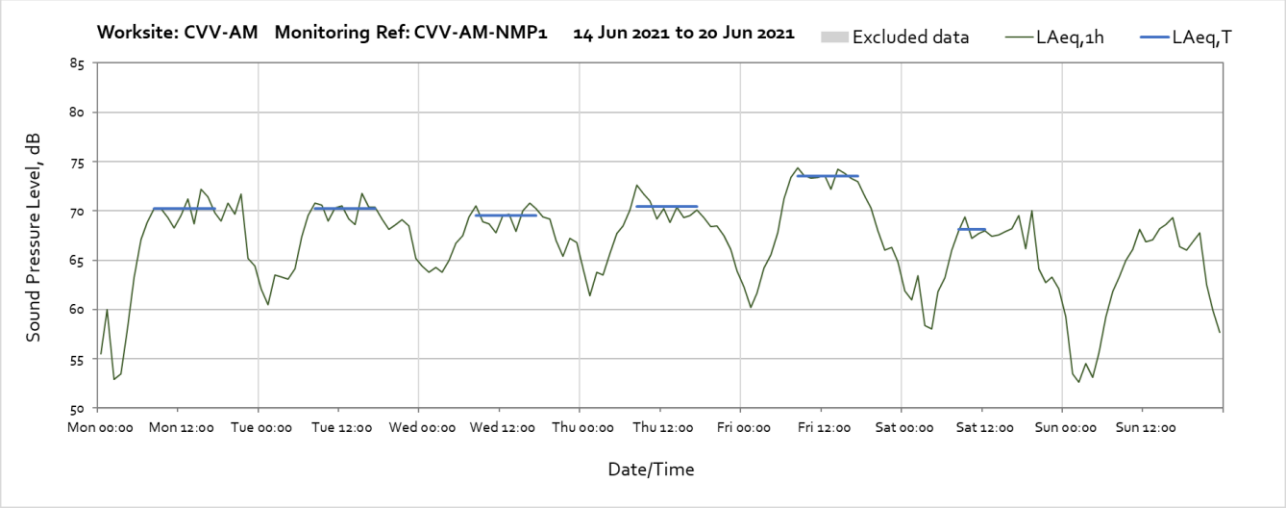
Worksite: AM – Monitoring Ref: AM-NMP1



Note: Missing data between 12:00 and 13:00 on Sunday 6th June is due to monitor connection issues



Note: Missing data between 08:00 and 09:00 on Tuesday 8th June is due to the monitoring being paused for setting updates.


Worksite: CVV-AM Monitoring Ref: CVV-AM-NMP1 14 Jun 2021 to 20 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
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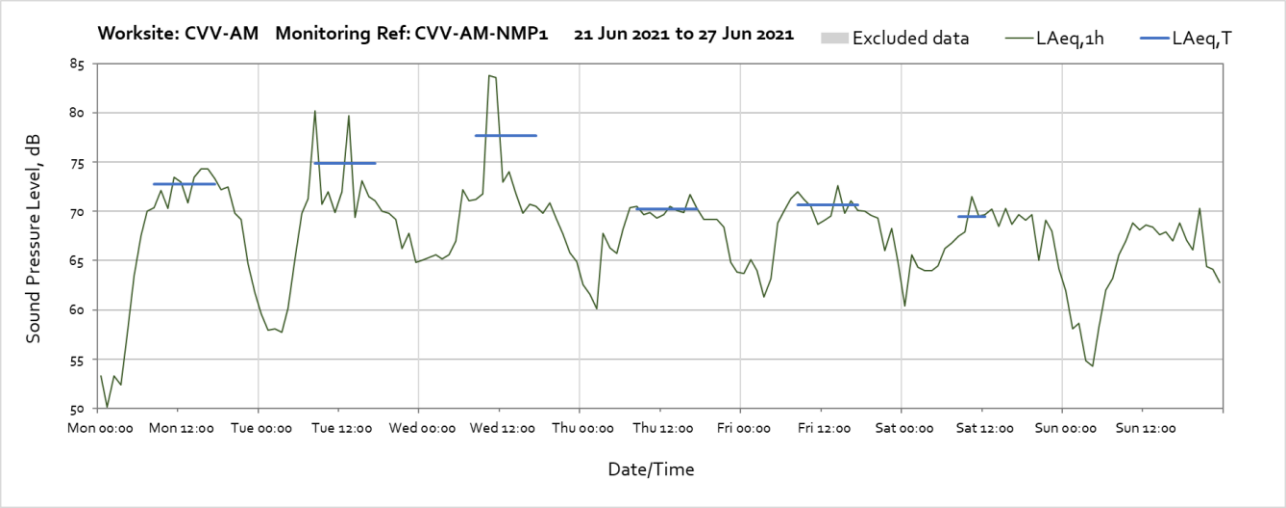
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: CVV-AM Monitoring Ref: CVV-AM-NMP1 21 Jun 2021 to 27 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
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
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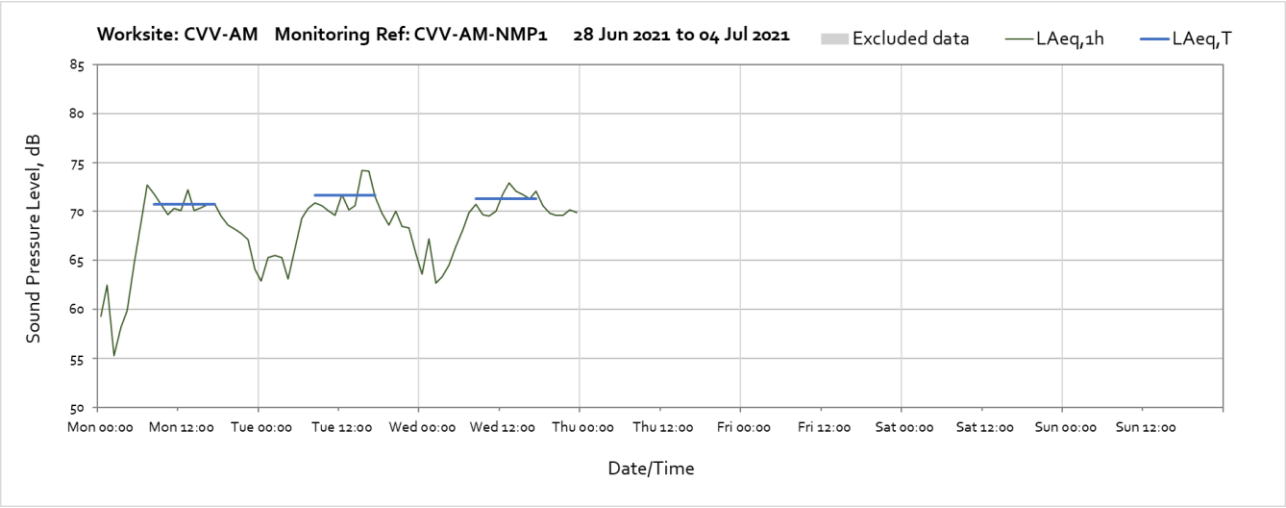
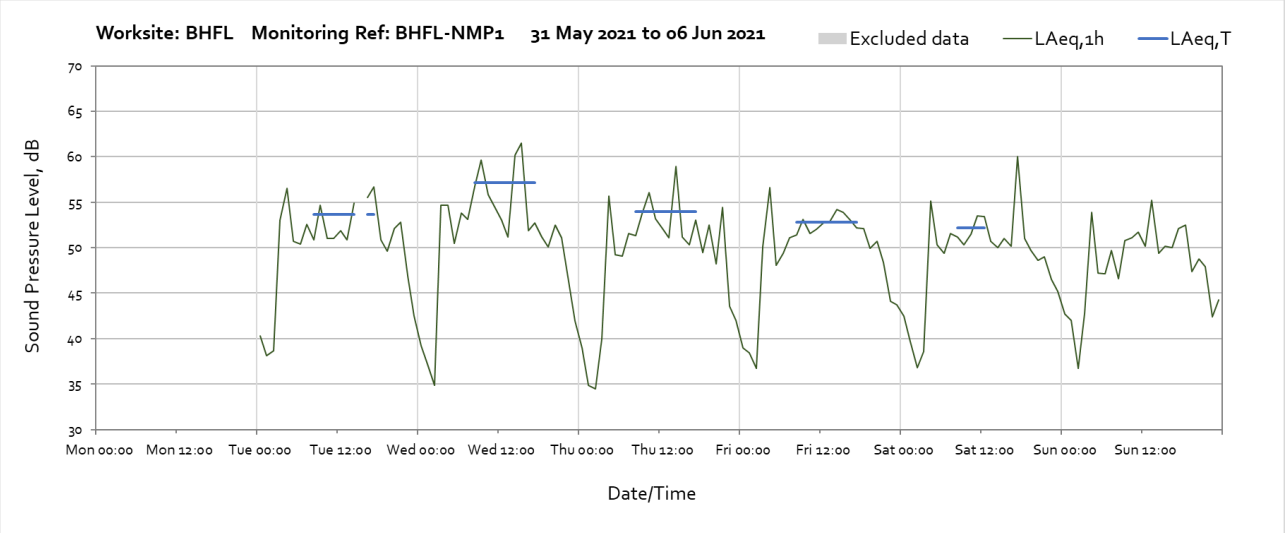
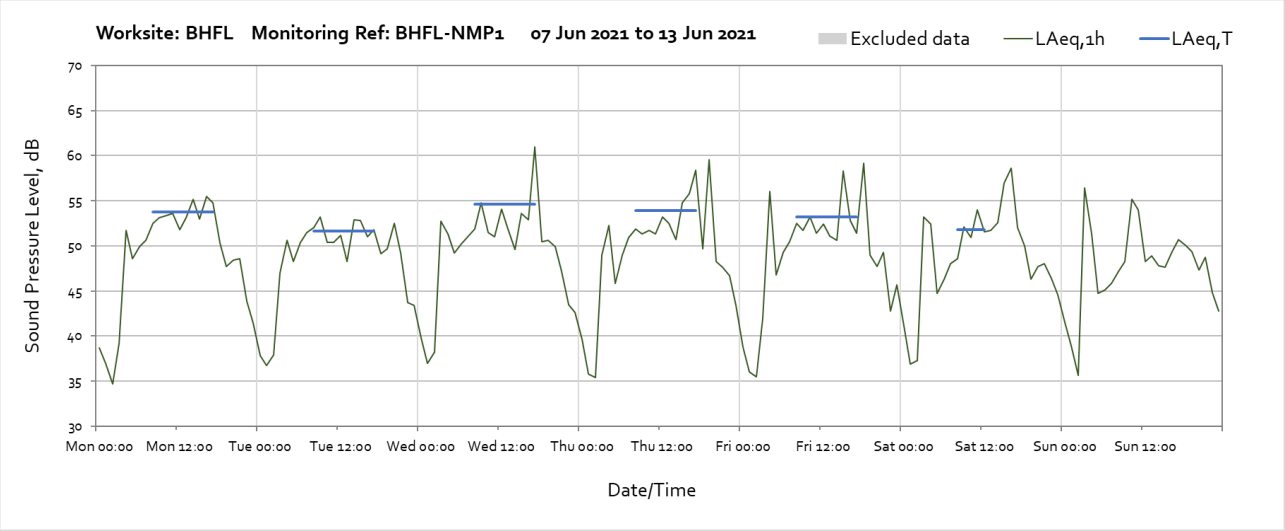
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

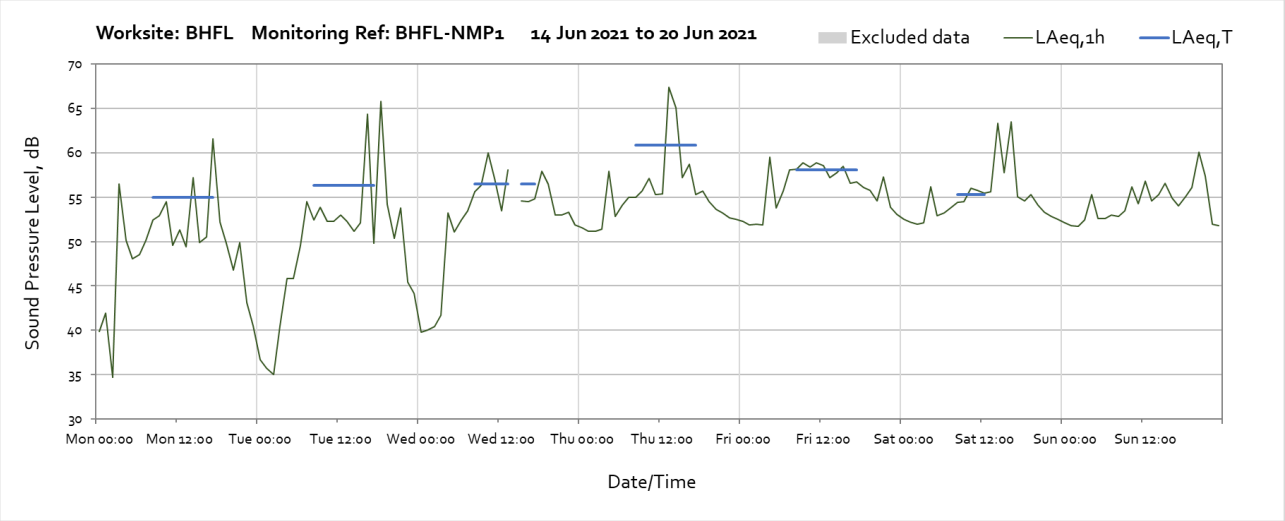

Worksite: CVV-AM Monitoring Ref: CVV-AM-NMP1 28 Jun 2021 to 04 Jul 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

Worksite: BHFL – Monitoring Ref: BHFL-NMP1

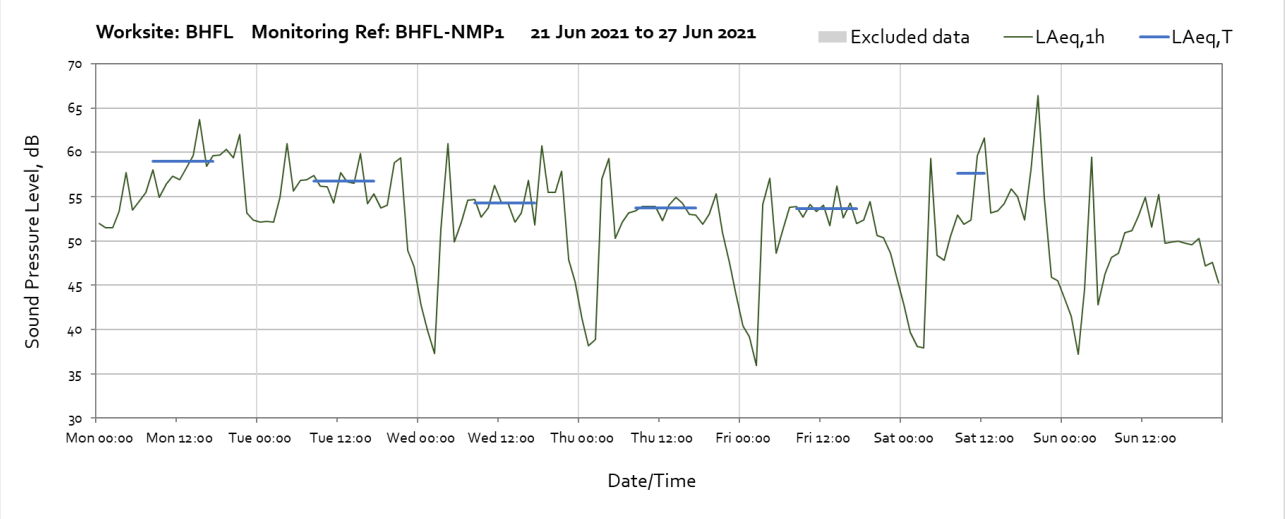


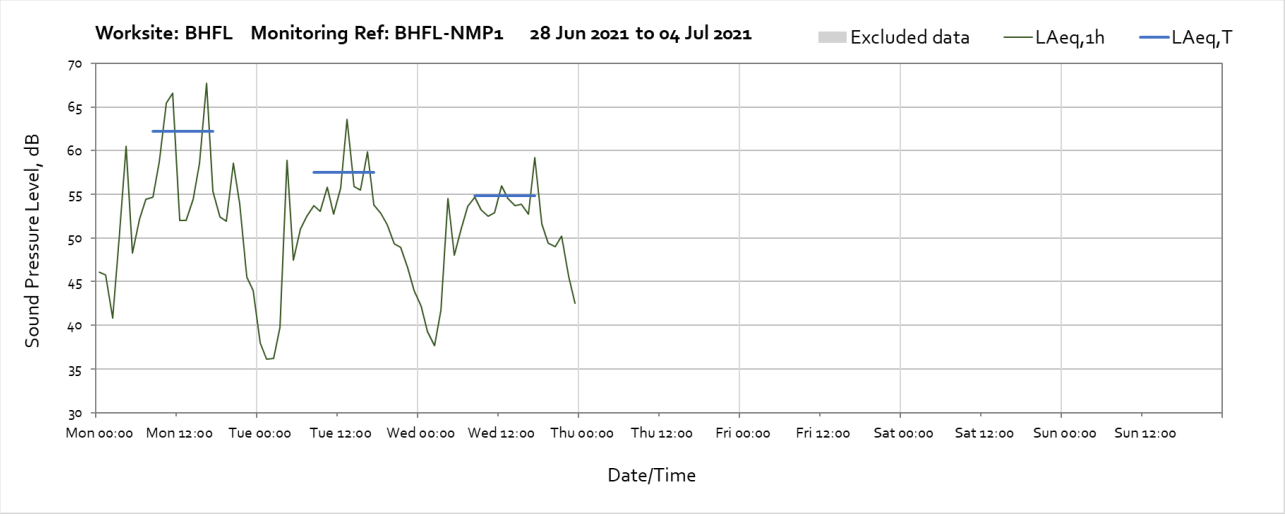
Note: Missing data between 15:00 and 16:00 on Tuesday 1st June is due to monitoring equipment changeover.



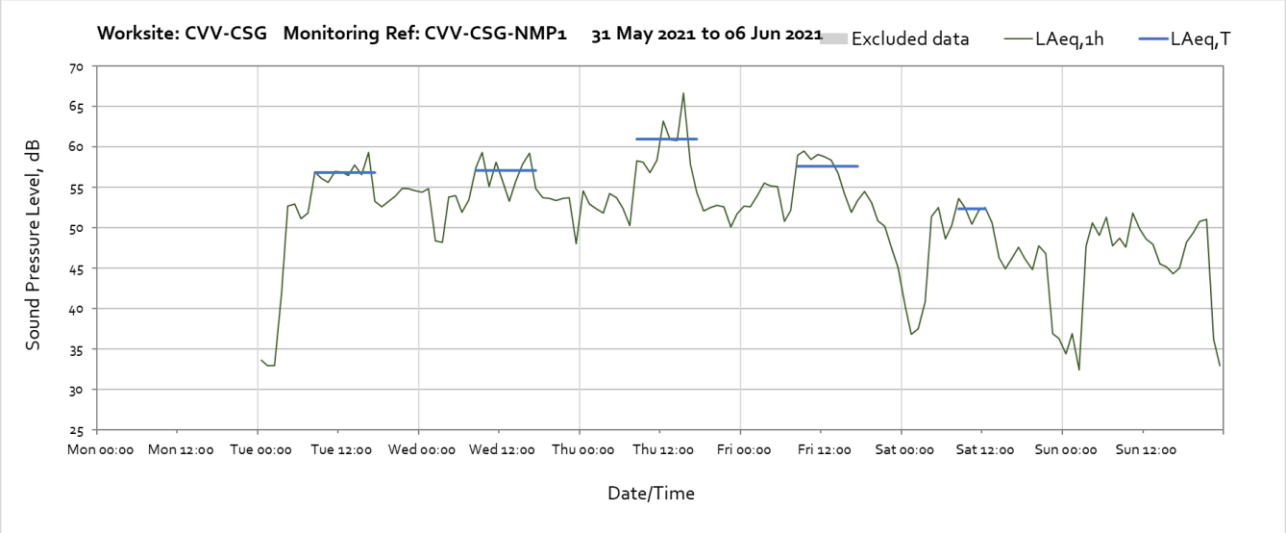


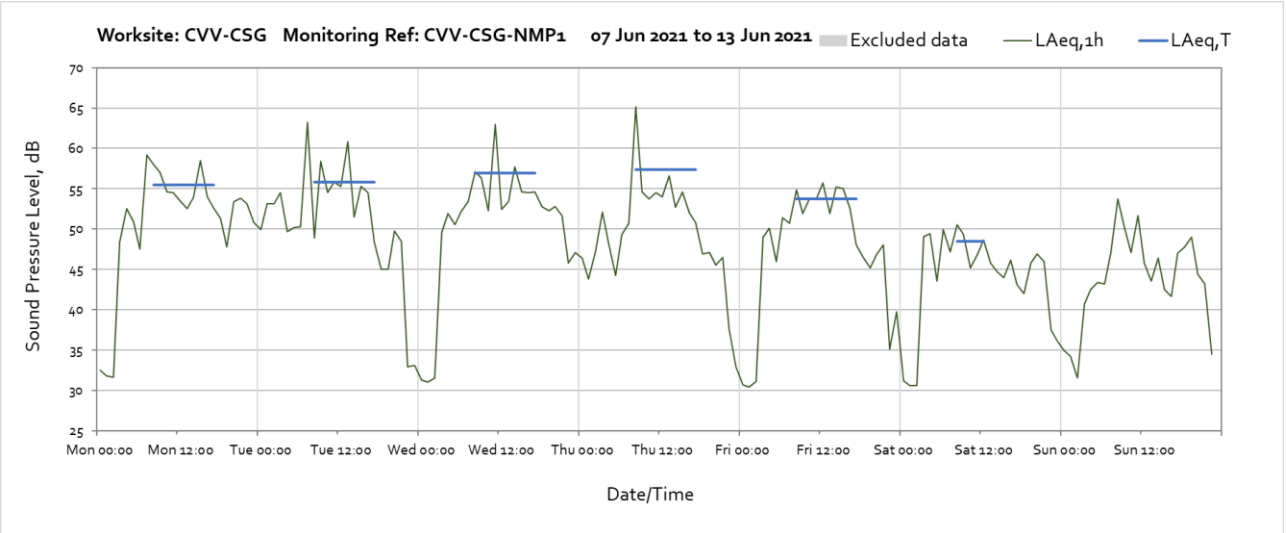
Note: Missing data between 14:00 and 15:00 on Wednesday 16th June is due to monitoring equipment changeover.



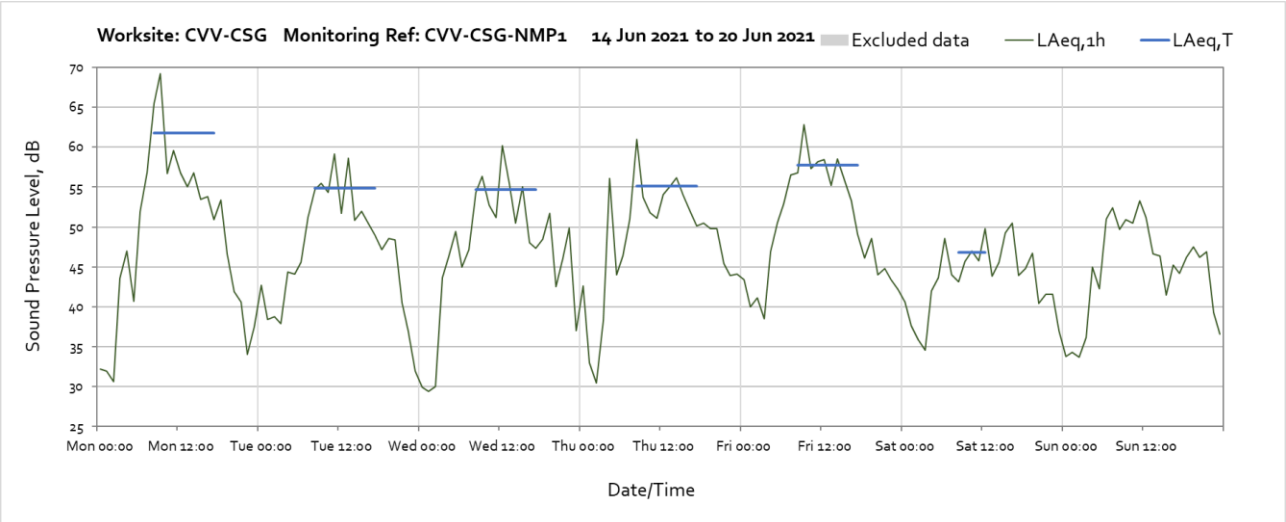


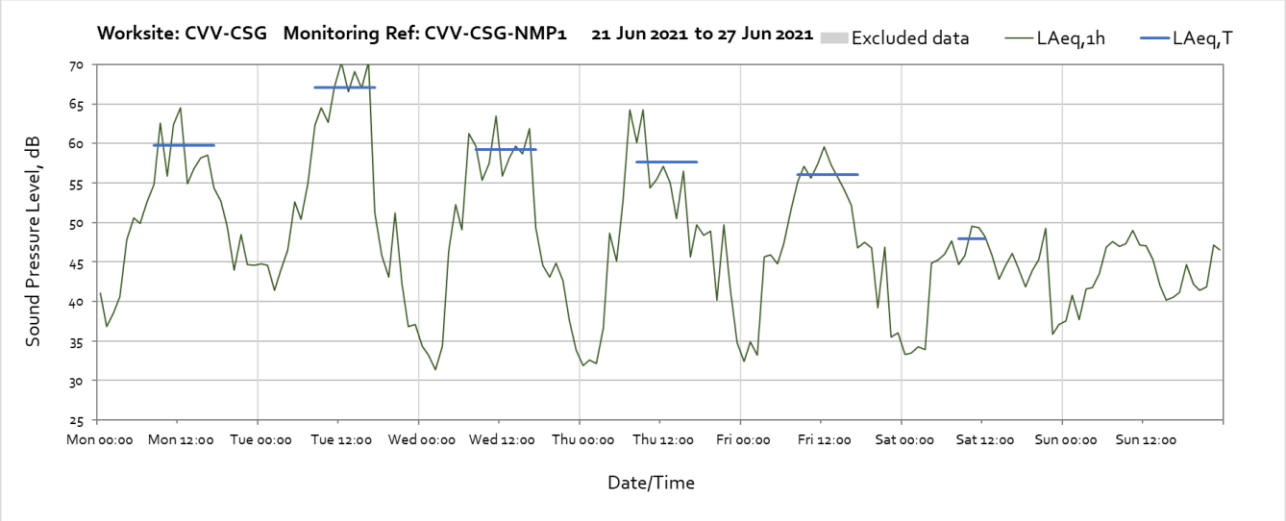
Worksite: CVV-CSG – Monitoring Ref: CVV-CSG-NMP1

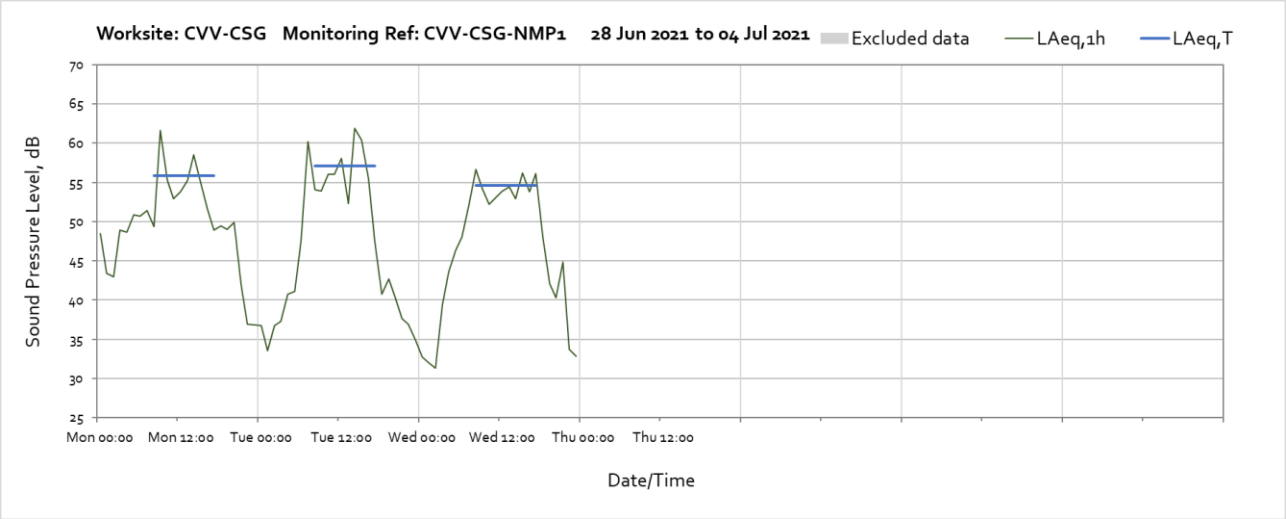




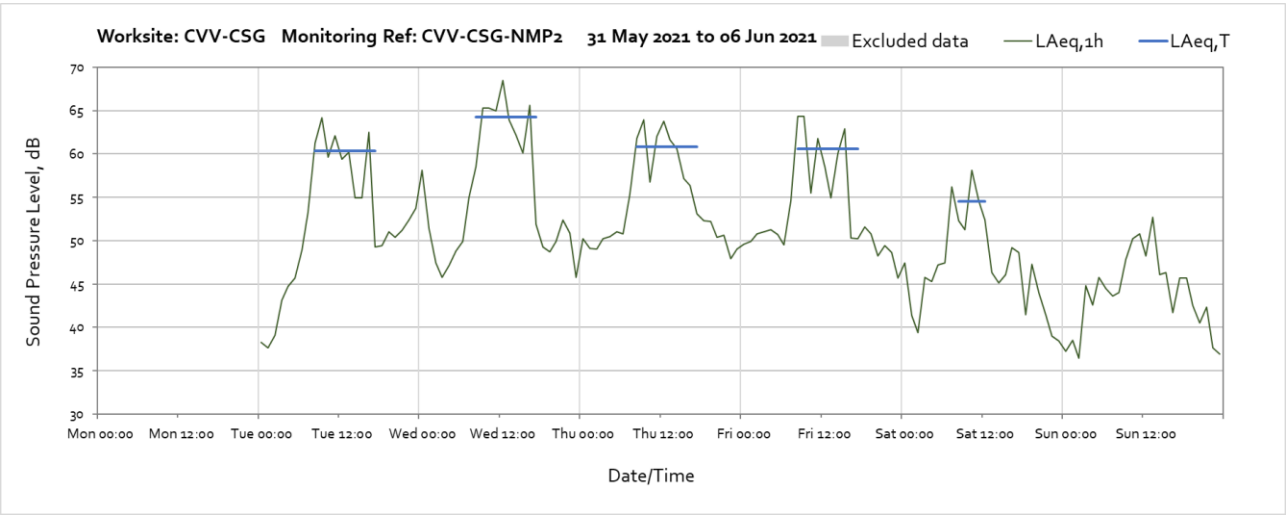
Note: Missing data between 23:00 on Sunday 13th June and 00:00 on Monday 14th June was due to issues with monitor connection.

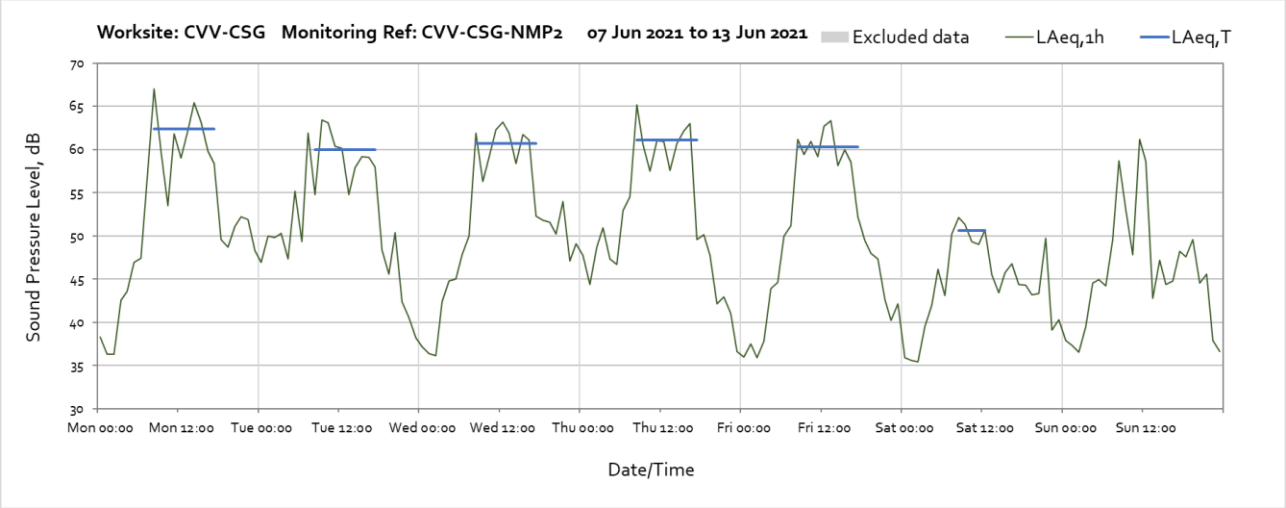


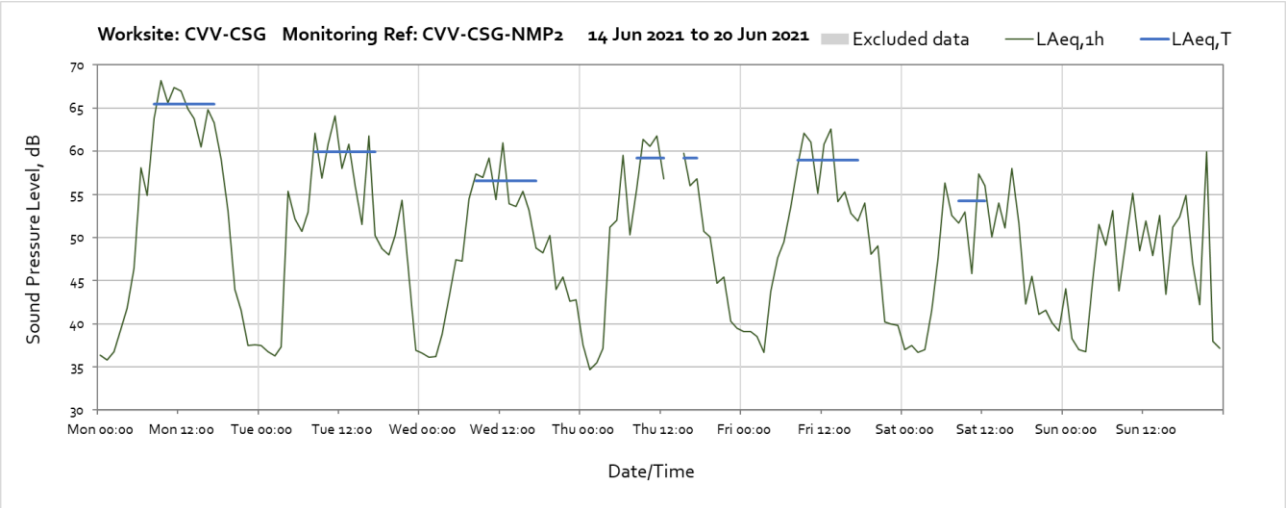




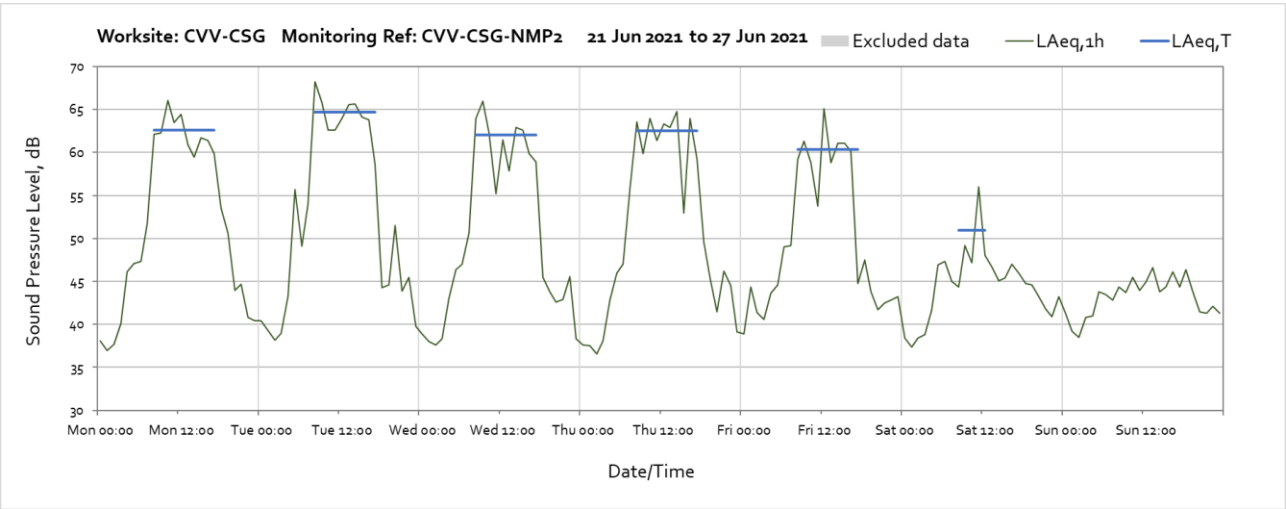
Worksite: CVV-CSG – Monitoring Ref: CVV-CSG-NMP2

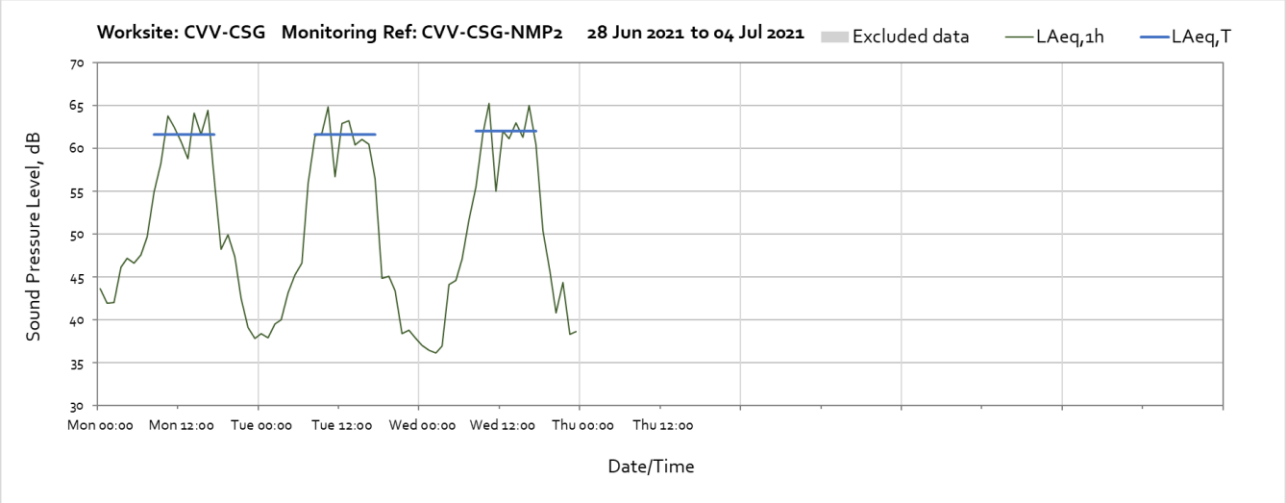




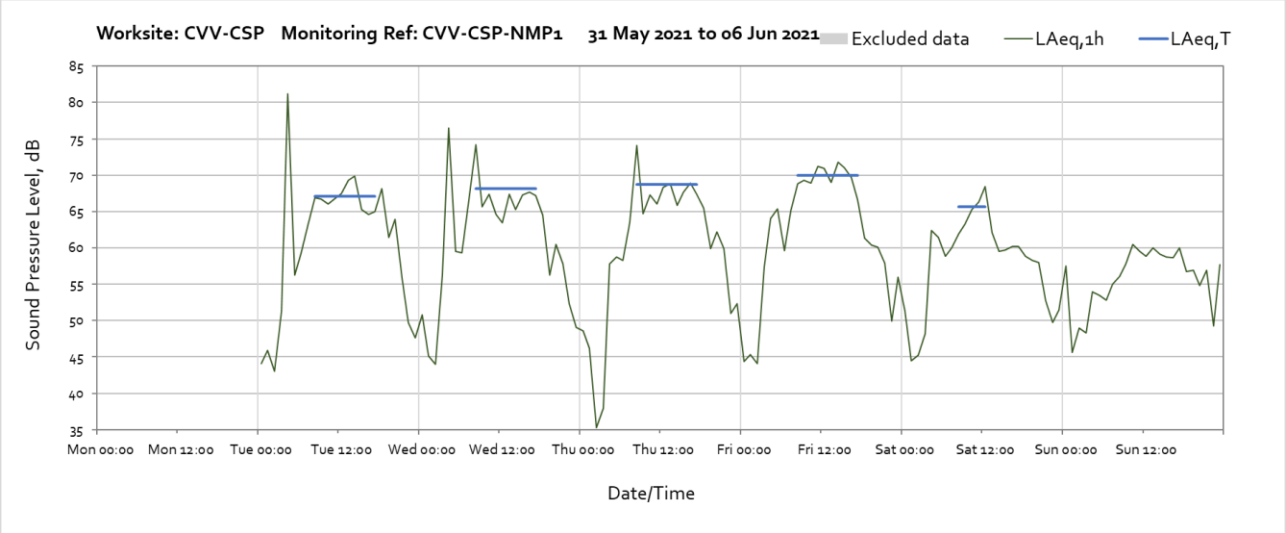


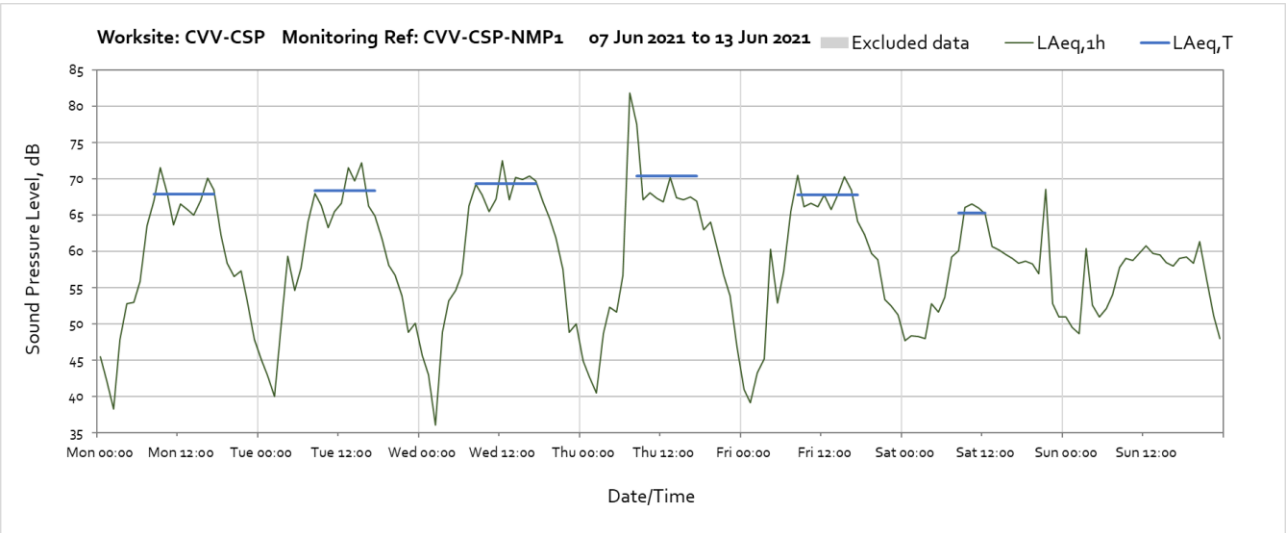
Note: Missing data between 13:00 and 15:00 on Tursday 17th June was due to equipment being paused for setting updates.

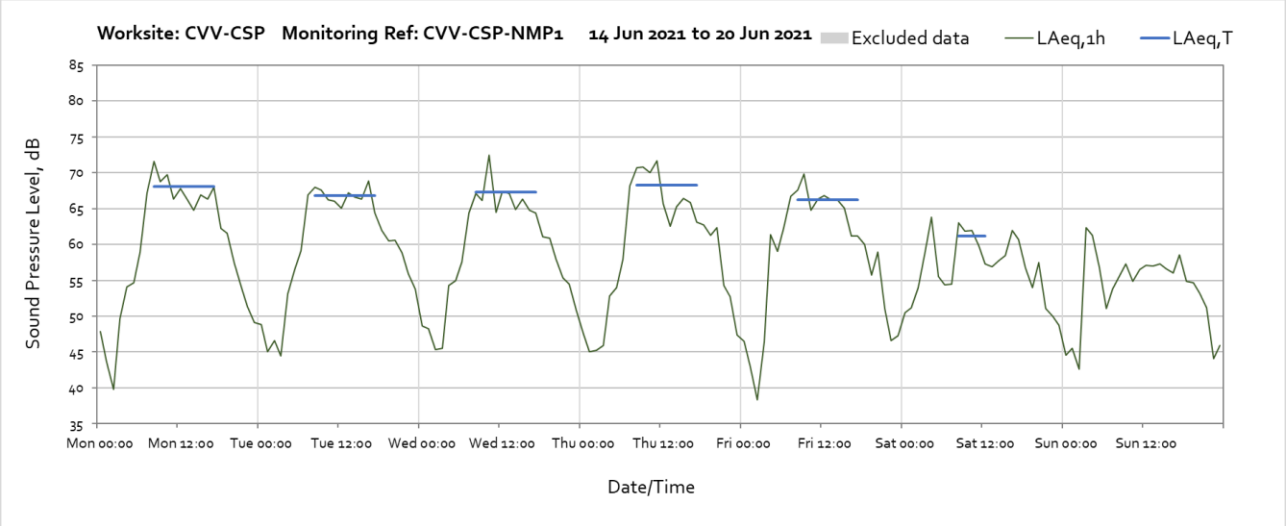


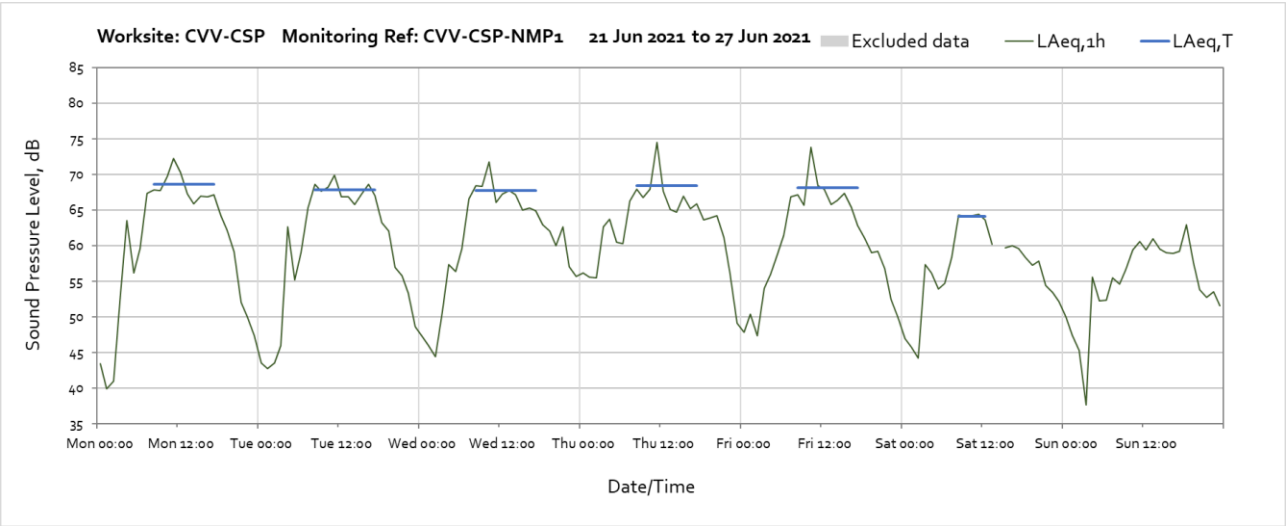


Worksite: CVV-CSP – Monitoring Ref: CVV-CSP-NMP1

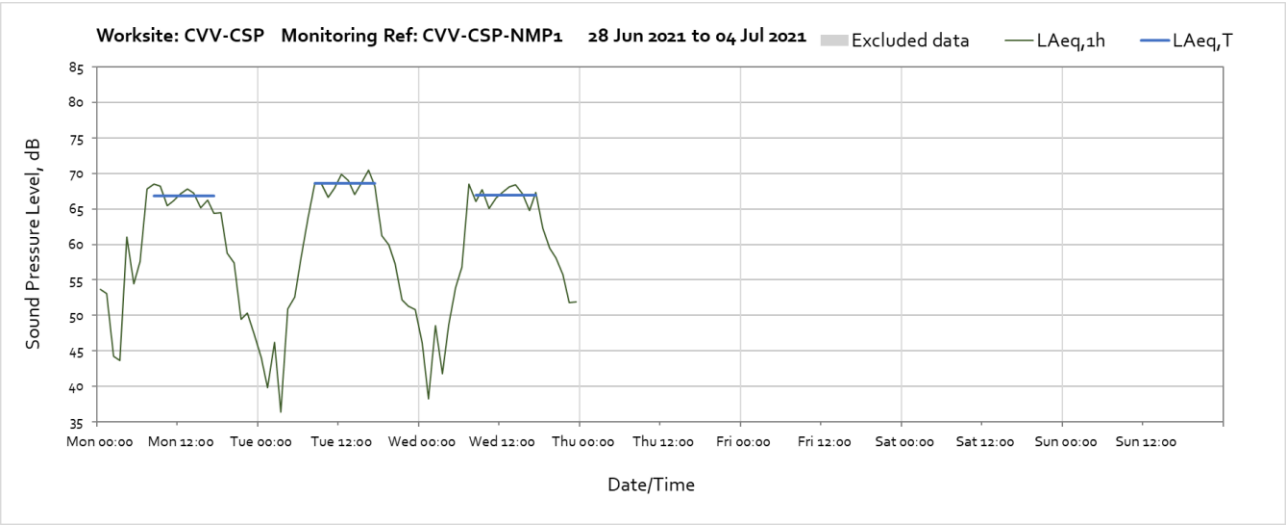




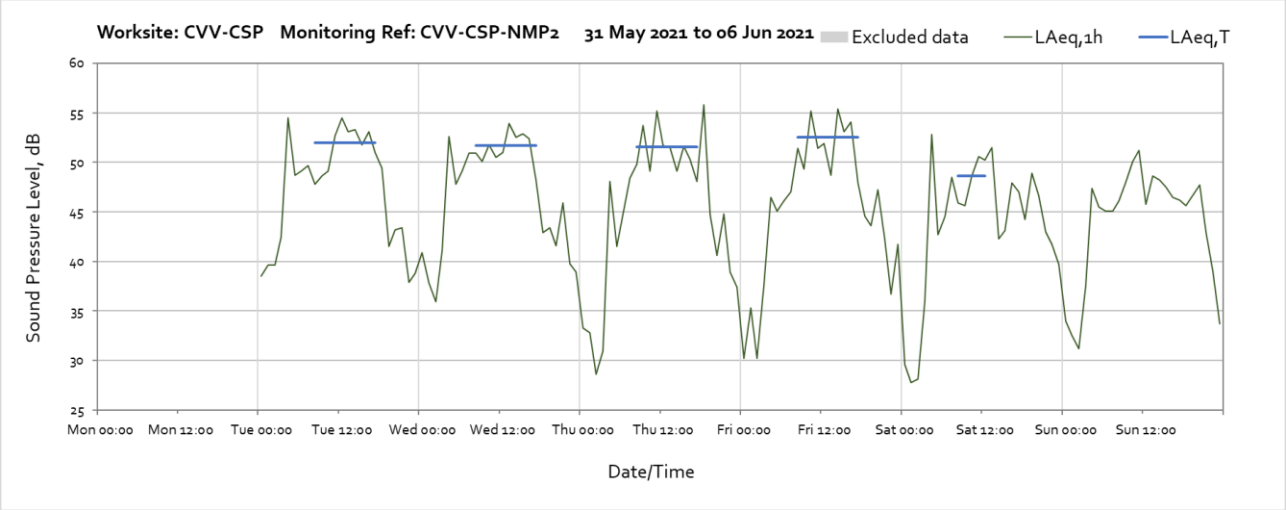


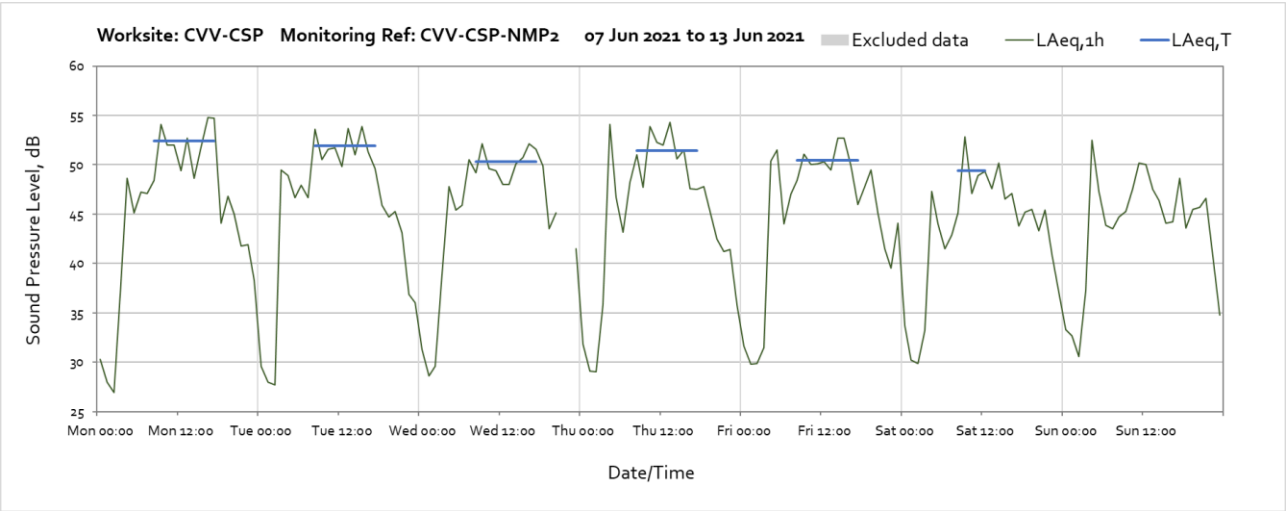


Note: Missing data between 14:00 and 15:00 on Saturday 26th June was due to issues with monitor connection.

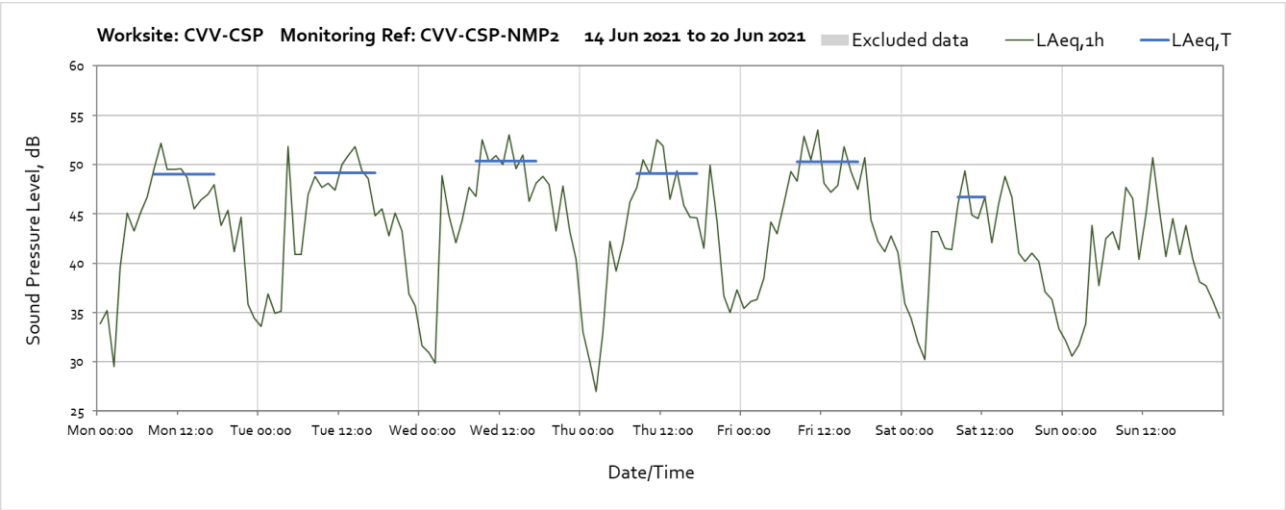


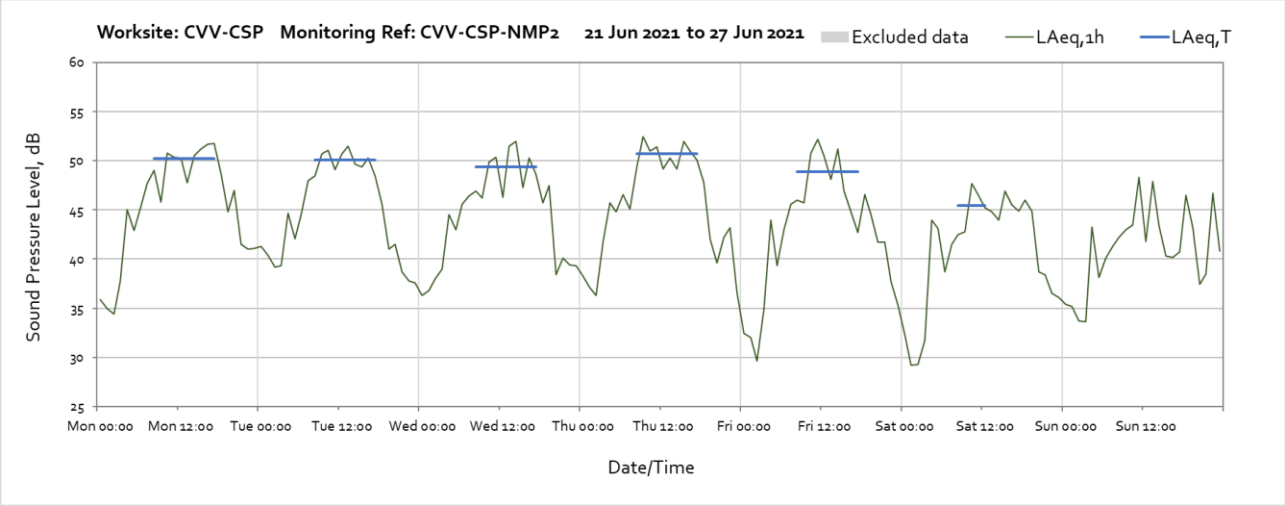
Worksite: CVV-CSP – Monitoring Ref: CVV-CSP-NMP2

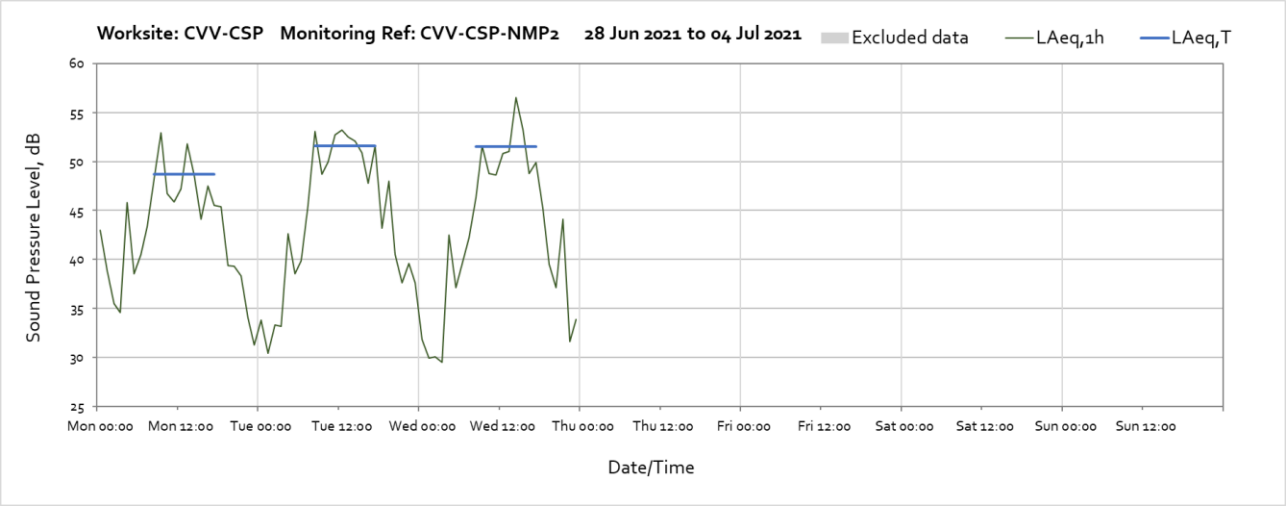




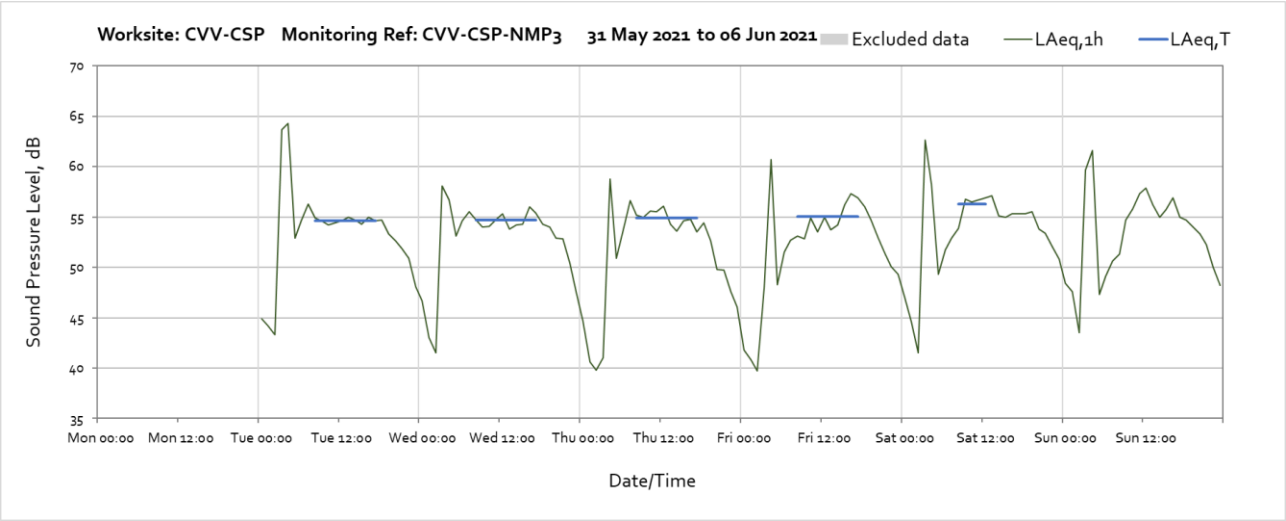
Note: Missing data between 21:00 and 23:00 on Wednesday 9th June was due to issues with monitor connection.

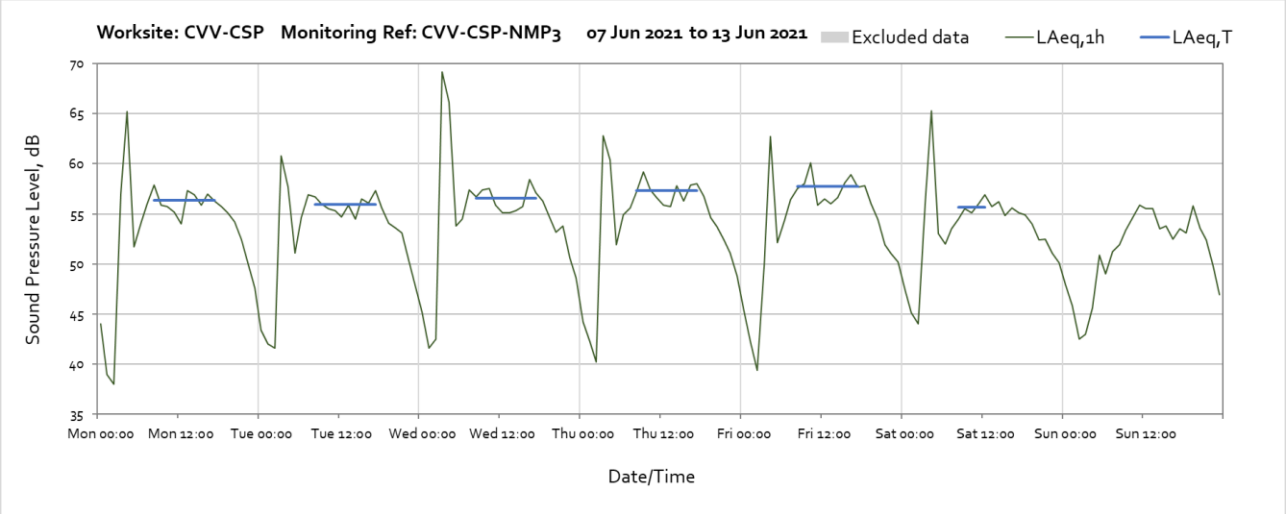


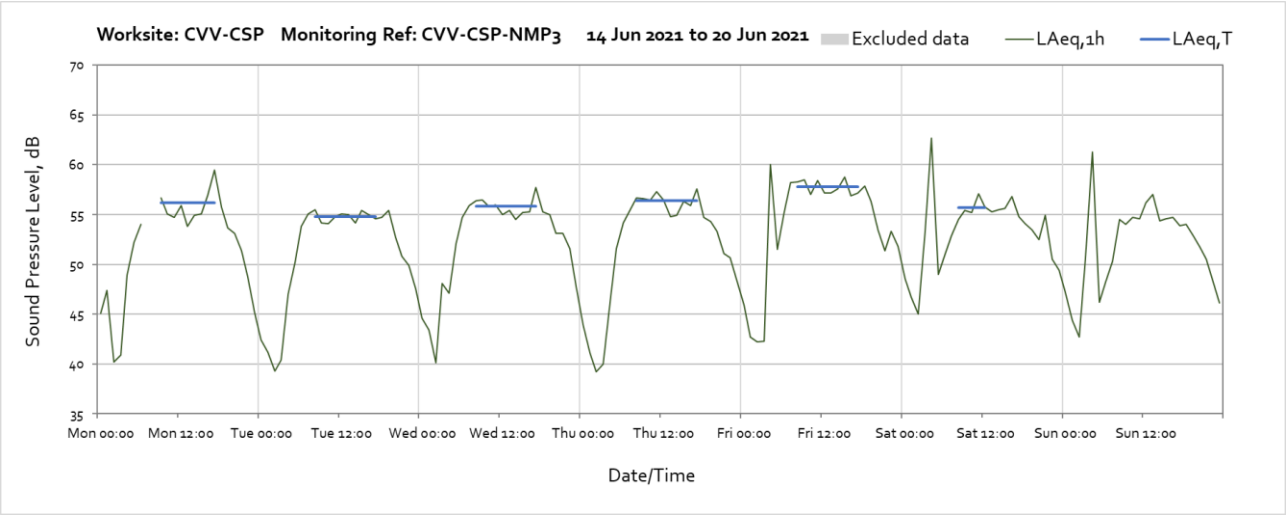




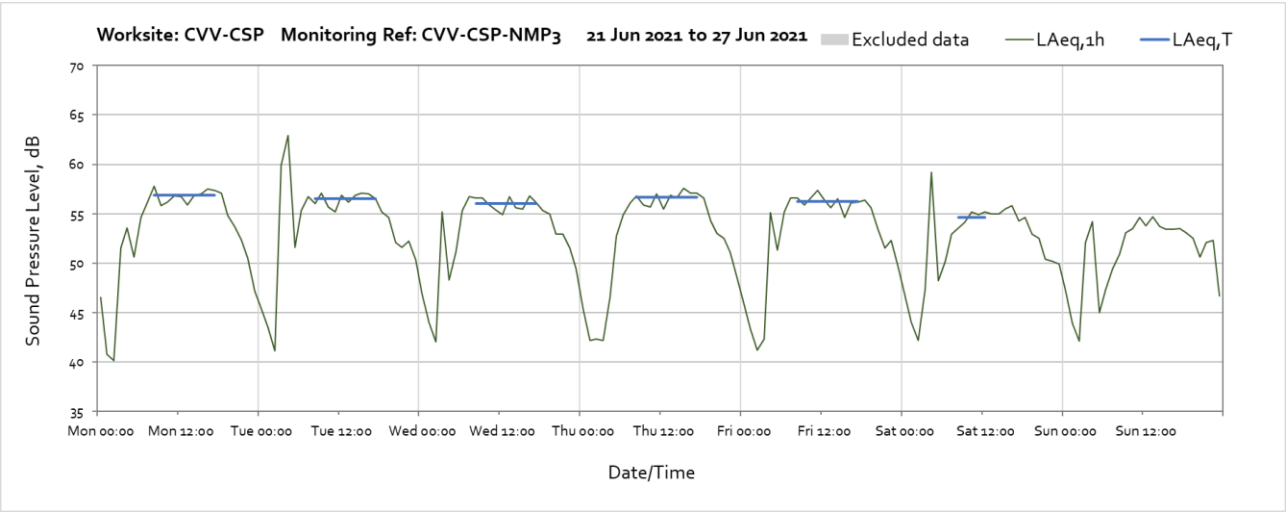
Worksite: CVV-CSP – Monitoring Ref: CVV-CSP-NMP3

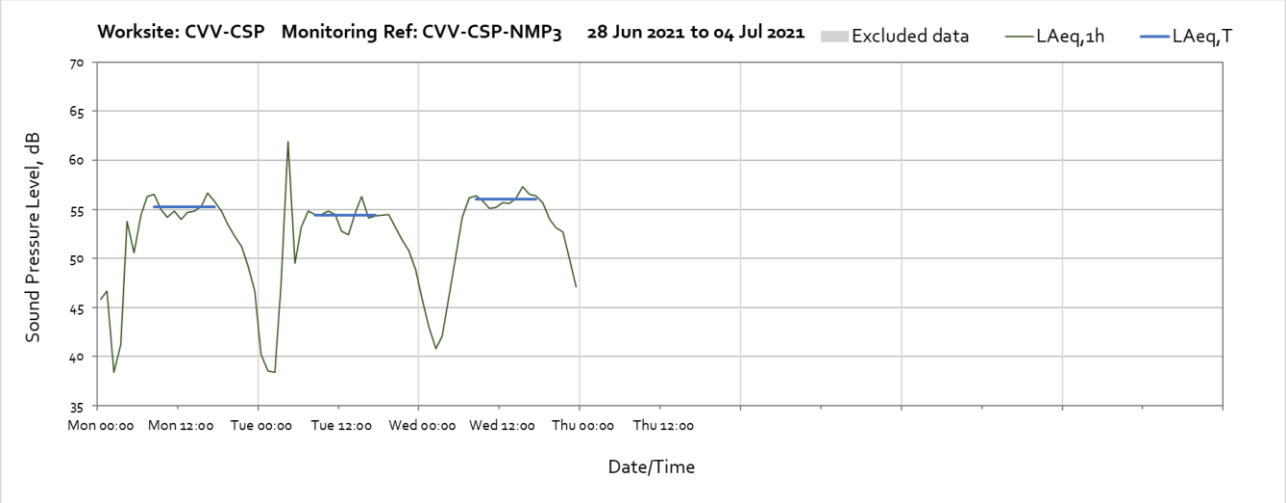




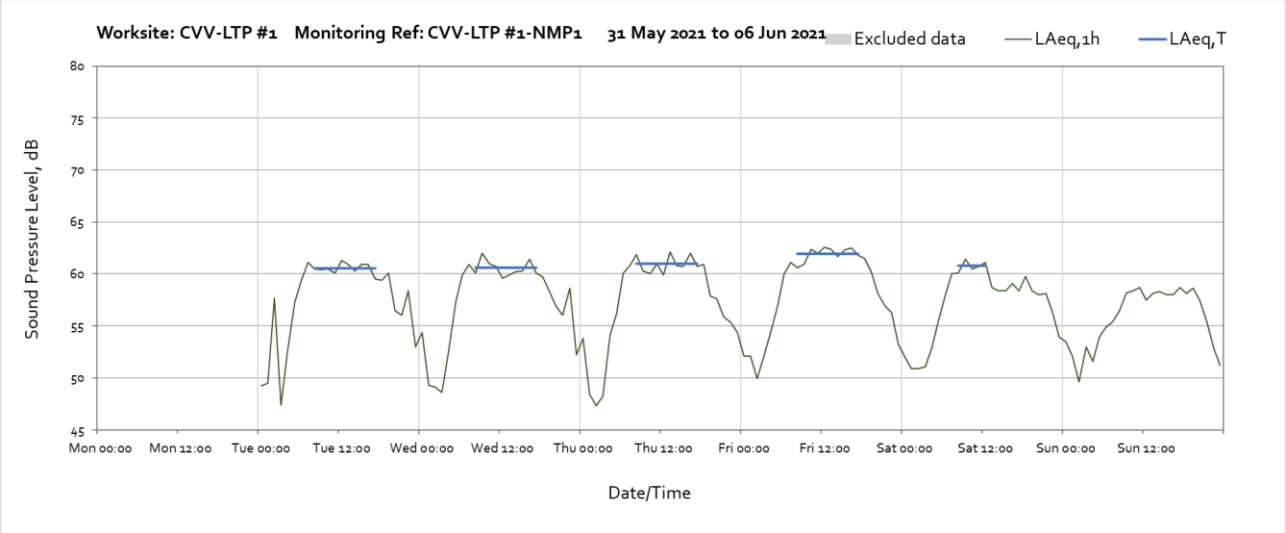


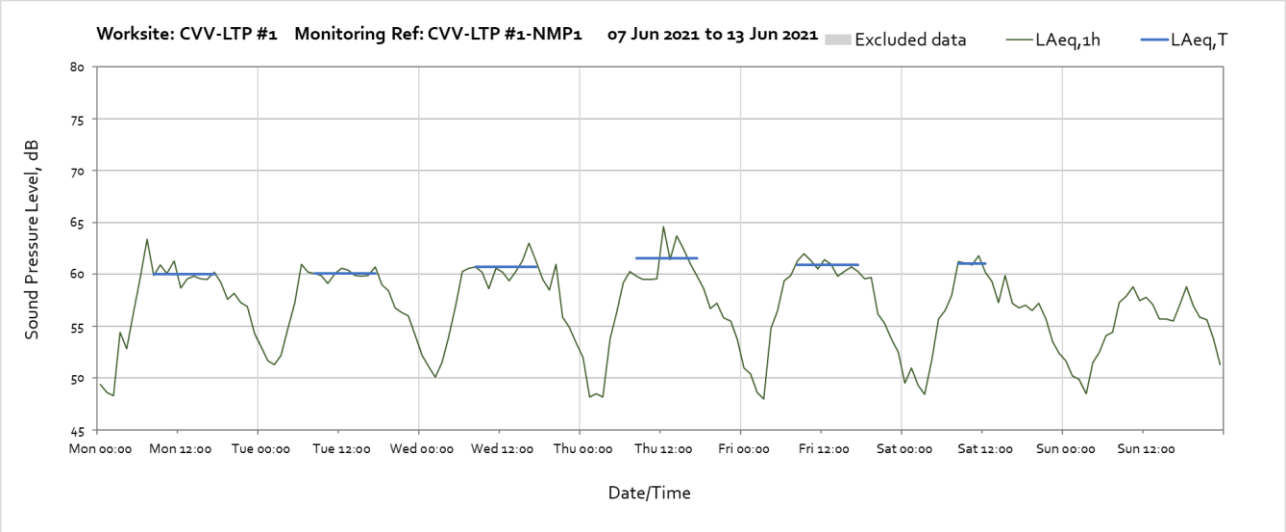
Note: Missing data between 07:00 and 09:00 on Monday 14th June was due to monitor being paused for setting updates.

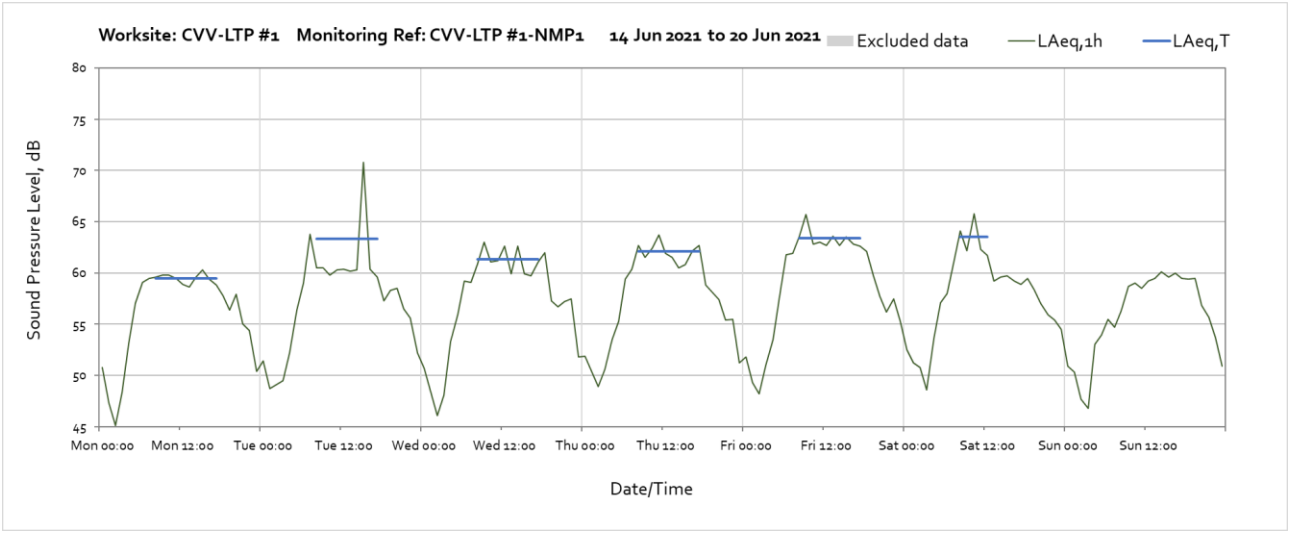


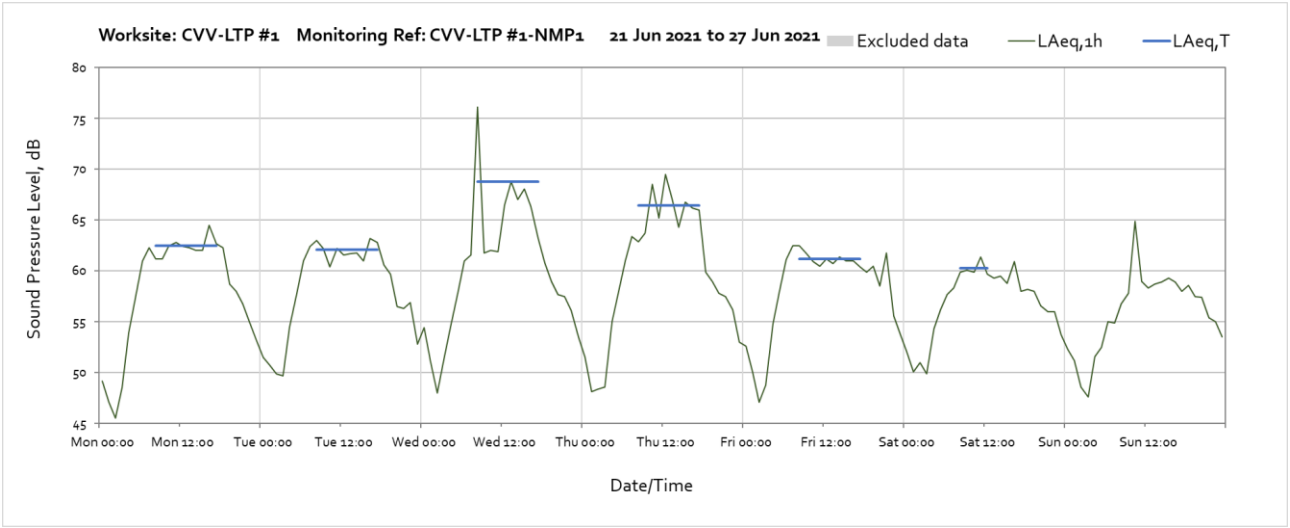


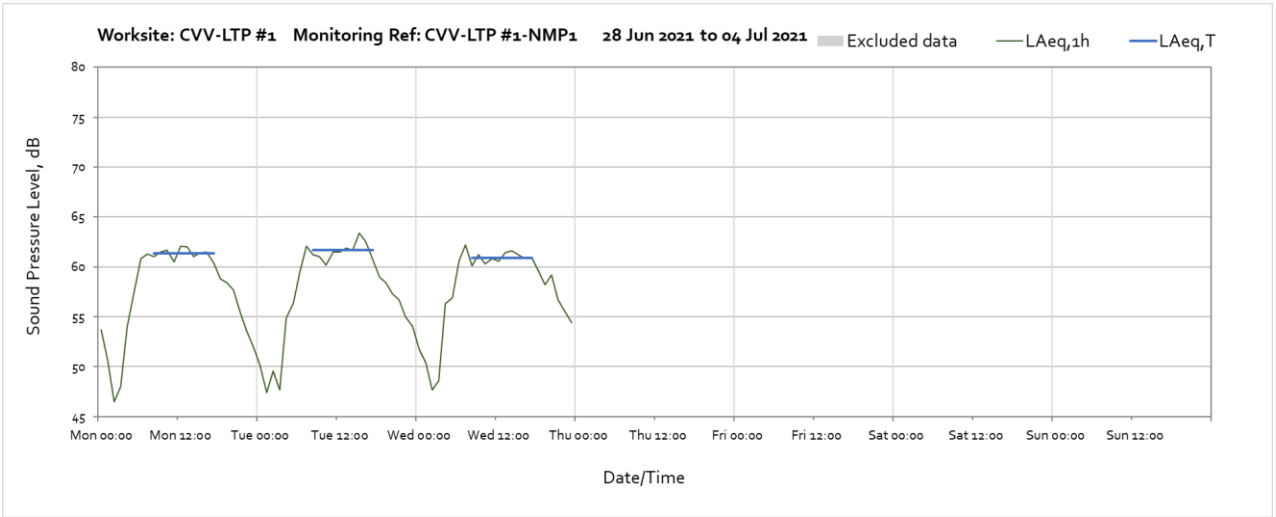
Worksite: CVV-LPT#1 – Monitoring Ref: CVV-LPT#1-NMP1



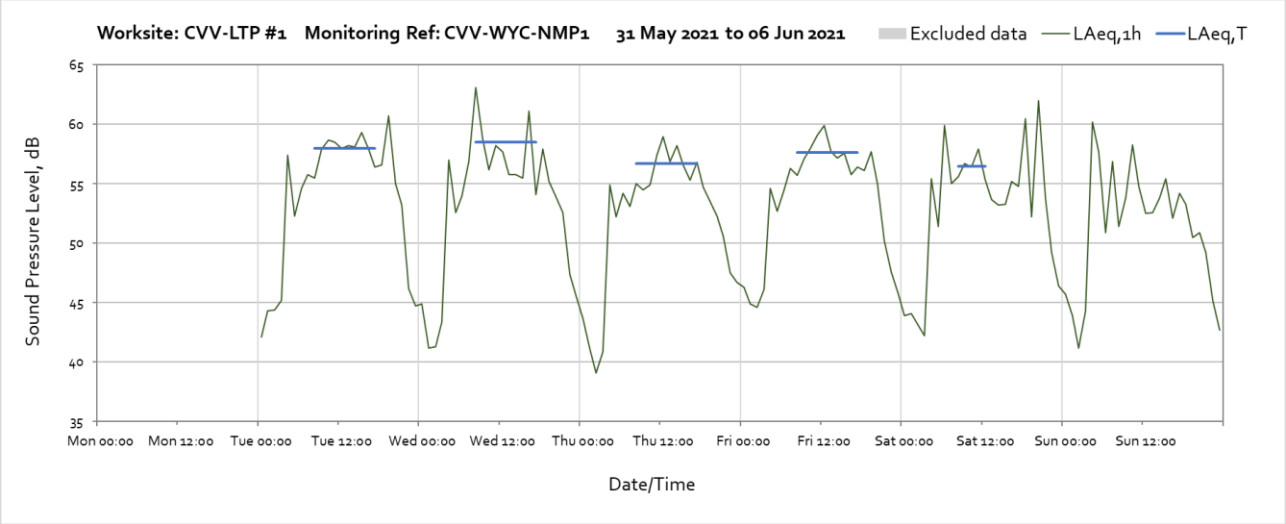


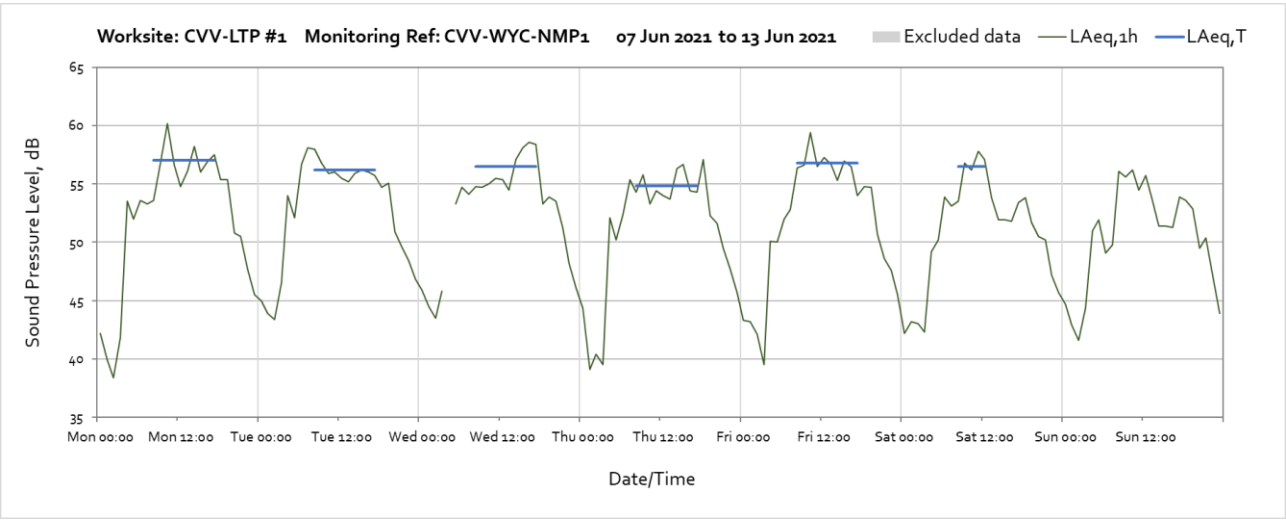

Worksite: CVV-LTP #1 Monitoring Ref: CVV-LTP #1-NMP1 14 Jun 2021 to 20 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: CVV-LTP #1 Monitoring Ref: CVV-LTP #1-NMP1 21 Jun 2021 to 27 Jun 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
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

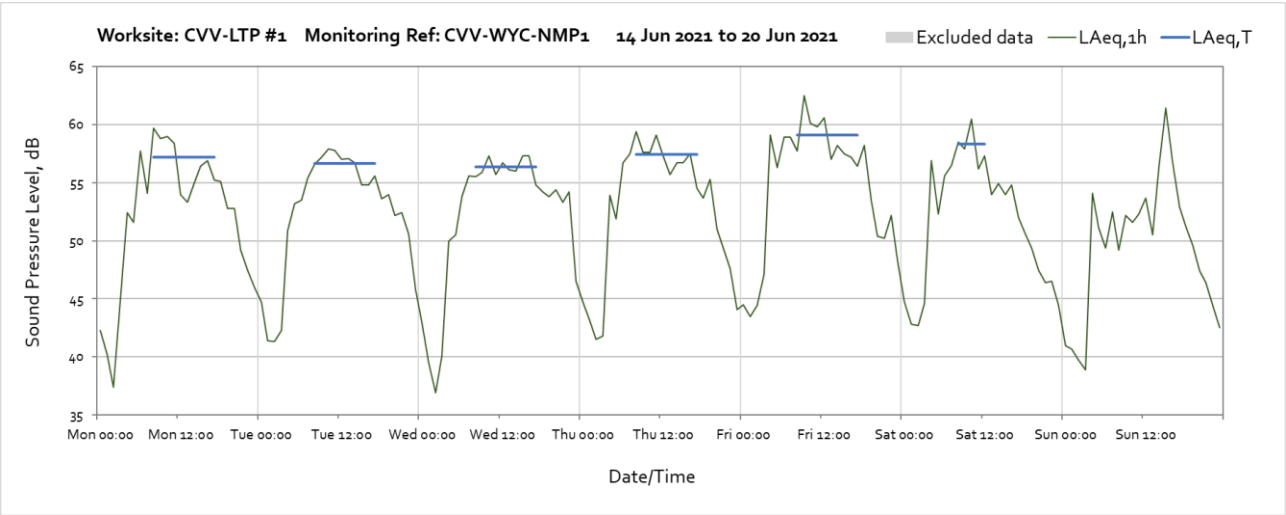

Worksite: CVV-LTP #1 Monitoring Ref: CVV-LTP #1-NMP1 28 Jun 2021 to 04 Jul 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

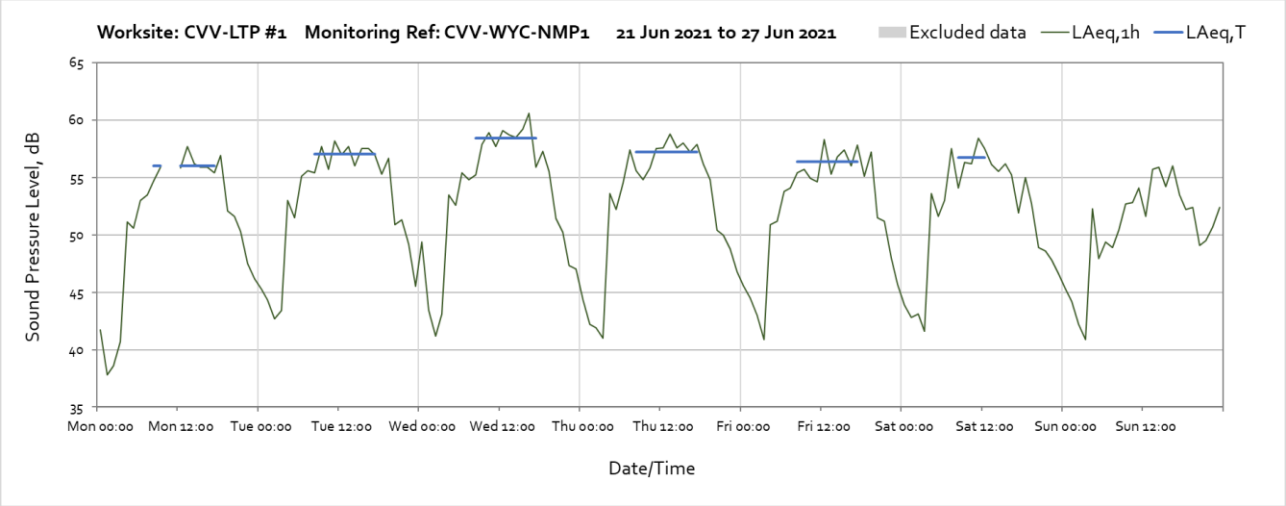
Worksite: CVV-LPT#1 – Monitoring Ref: CVV-WYC-NMP1



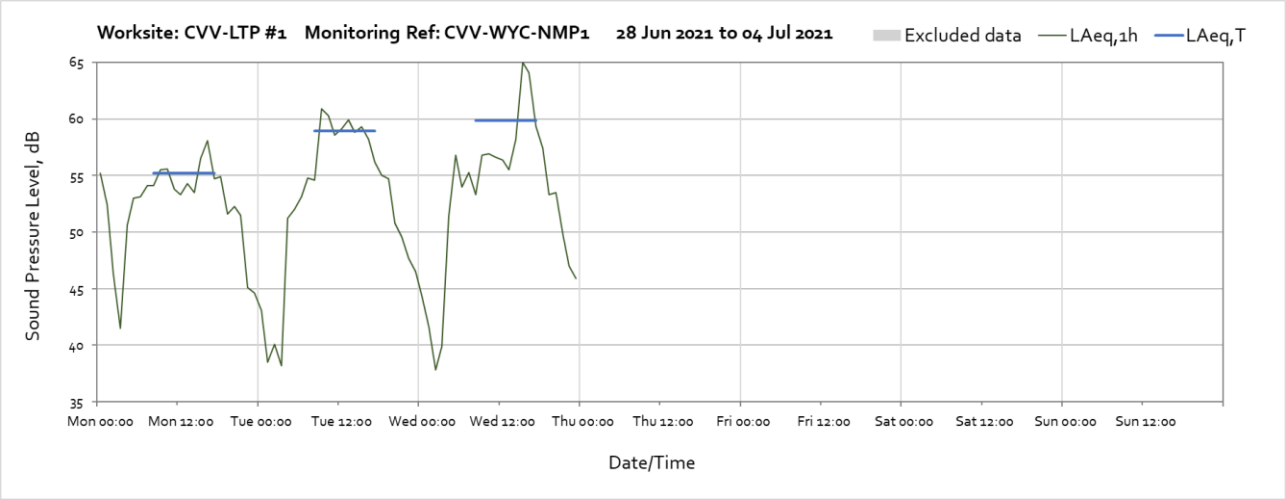


Note: Missing data between 04:00 and 05:00 on Wednesday 9th June was due to issues with monitor connection.





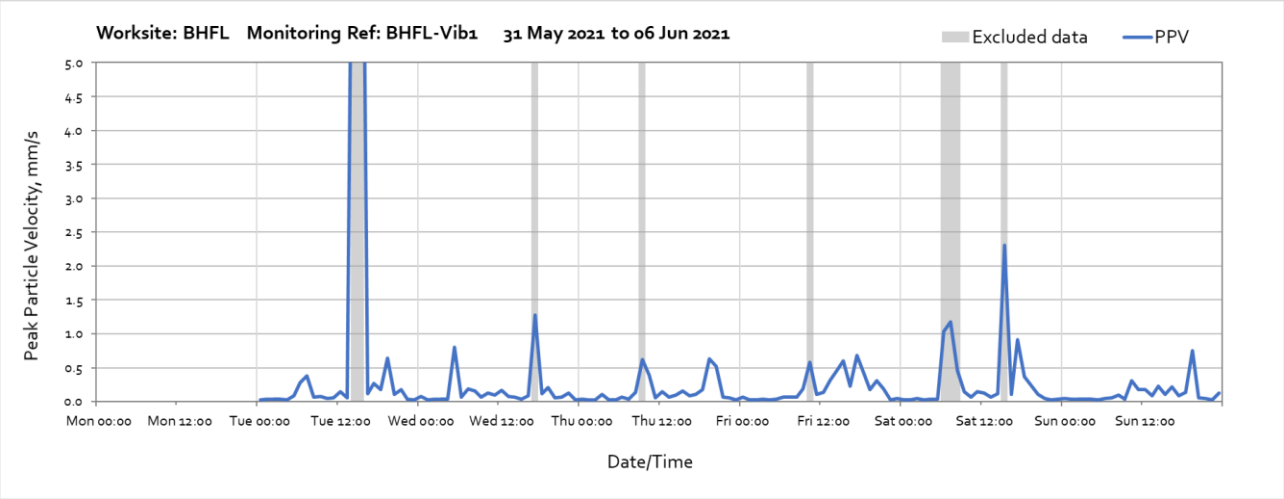
Note: Missing data between 10:00 and 12:00 on Monday 21st June was due to monitor being paused for field calibration.



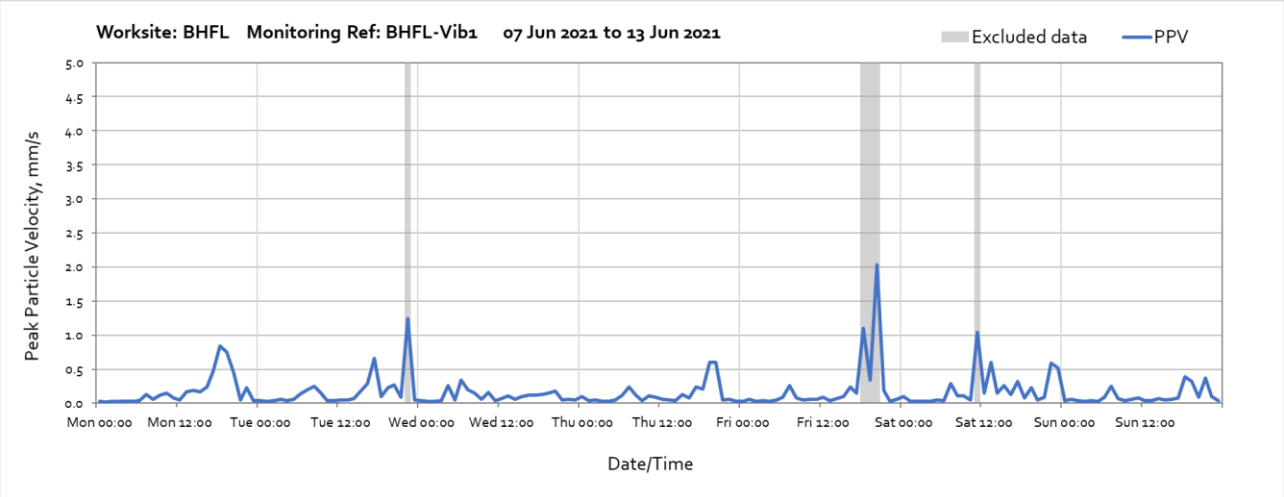
Vibration

The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axes 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.

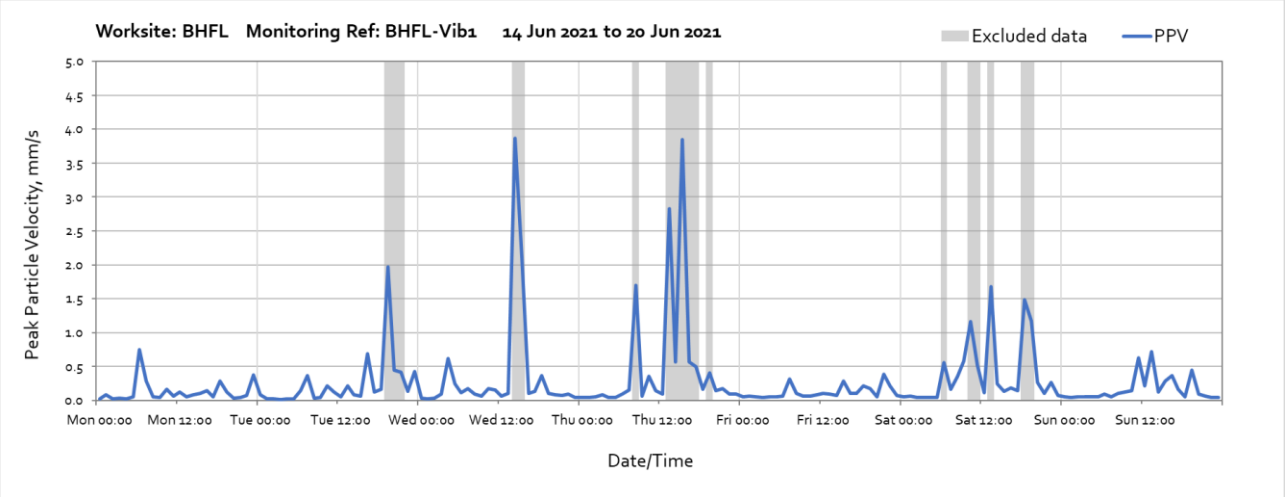
Worksite: BHFL – Monitoring Ref: BHFL-Vib 1



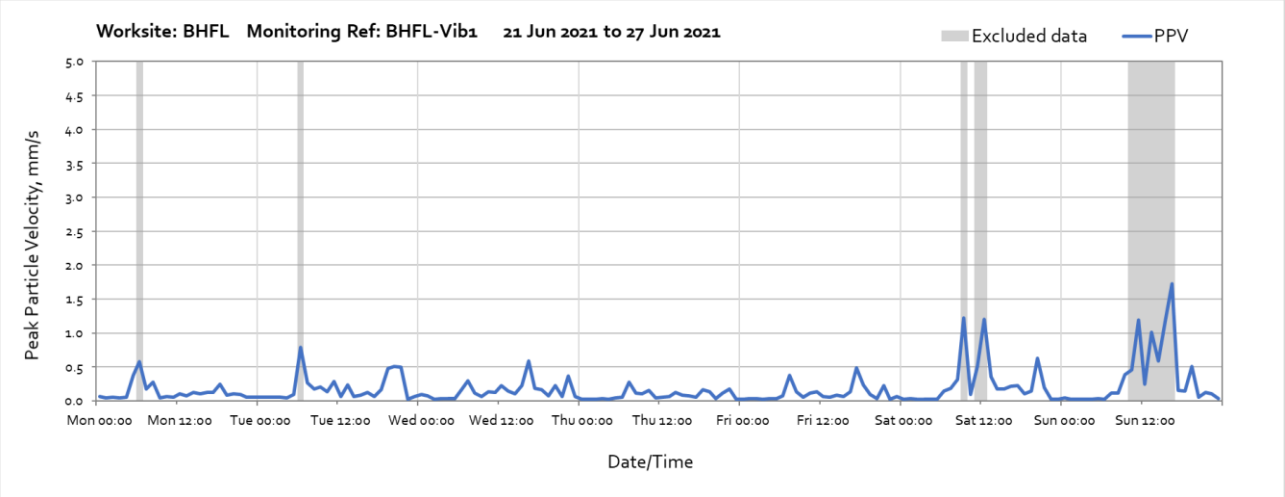
Note: High levels of vibration measured between 14:00 and 16:00 on Tuesday 1st June was due to physical disturbance to the monitor during maintenance. High levels of vibration measured throughout the week were due to local disturbance of the monitor and are not representative of HS2 construction vibration levels.levels.



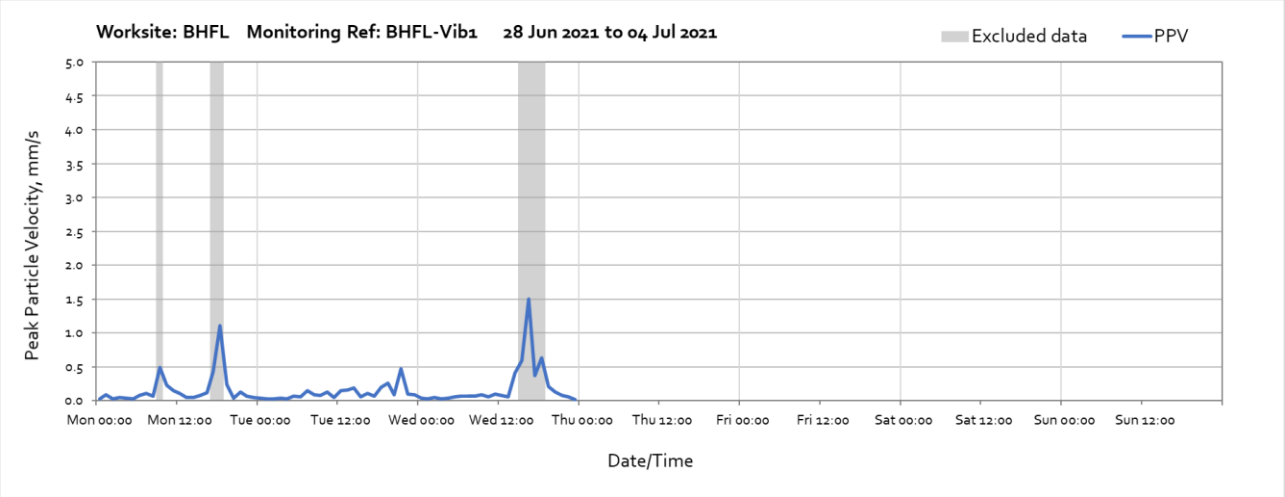
Note: High levels of vibration measured throughout the week were due to local disturbance of the monitor and are not representative of HS2 construction vibration levels.levels.



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



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



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