

## **Construction noise and vibration Monthly Report – October 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 October 2021.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in the vicinity of School End worksite (ref.: SE) where vegetation clearance, fencing works, installation of drainage and attenuation pond, demolition surveys, stone deliveries, and construction of access road and tie-in with highway were undertaken.
- Noise monitoring was undertaken in the vicinity of Rosehill Farm worksite (ref.: RF) where vegetation clearance, fencing works, installation of drainage and attenuation pond, demolition surveys, stone deliveries, and construction of access roads were undertaken.
- Noise monitoring was undertaken in the vicinity of West Street Overbridge worksite (ref.: WSO) where extension of car park, material stockpiling, and construction of access road and drainage were undertaken.
- Noise monitoring was undertaken in the vicinity of School Hill Compound worksite (ref.: SHC) where construction of civil structures within the site compound, underground utility works, and testing of batching plant were underway.
- Noise monitoring was undertaken in the vicinity of the School Hill UTX worksite (ref.: SHU) where horizontal drilling and utility diversion works were underway.
- Noise monitoring was undertaken in the vicinity of the FCC Sidings worksite reference (ref: FCC) where construction of stone causeway, fencing, and stockpiling were underway.
- Noise monitoring was undertaken in the vicinity of Quainton Access Road (ref: QAR), where construction of drainage, laying of topsoil, installation of verges, road surfacing works, and installation of handrails were underway.
- Noise monitoring was undertaken in the vicinity of Hall Farm worksite (ref: HF) where excavation, concrete pours, landscaping, installation of drainage, ducting and grass laying were undertaken.
- Noise monitoring was undertaken in the vicinity of Medoway, Aylesbury worksite (ref: MW) where construction of the A418 Oxford Road Main Compound was undertaken.

- Noise monitoring was undertaken in the vicinity of Rocky Lane Embankment worksite (ref: RLE) where formworks, steel fixing, pouring of concrete, and construction of accessway were undertaken.
- Noise monitoring was undertaken in the vicinity of Leather Lane worksite (ref: LL) where construction of haul road, installation of attenuation pond and vegetation clearance were undertaken.
- Noise monitoring was undertaken in the vicinity of South Heath Cutting worksite (ref: SHCW) where construction of haul road, demolition, site and vegetation clearance, installation of ducts, drainage works, installation of cabin and generators, installation of high voltage protection slabs, installation of attenuation pond, and road surfacing works were undertaken.
- Noise monitoring was undertaken in the vicinity of Little Missenden Vent Shaft worksite (ref.: LM) where operation of general plant at site, earthworks, stockpile management, construction of diaphragm wall, water treatment, and A413 roadworks were underway.
- Noise monitoring was undertaken in the vicinity of Amersham Vent Shaft worksite (ref.: AM), where operation of general plant at site, earthworks, stockpile management, diaphragm wall works, shaft excavation works, ground treatment works, concrete pouring, cast in-situ slab construction; and water treatment works were underway.
- Noise and vibration monitoring were undertaken in the vicinity of Bottom House Farm Lane worksite (ref.: BHFL), where landscaping works, earthworks and asphaltting works for widening Bottom House Farm Lane, stockpiling, fencing works, vegetation clearance, and installation of road signage were underway.
- Noise monitoring was undertaken in the vicinity of Chalfont St Giles Vent Shaft worksite (ref.: CSG) where operation of general plant at site, earthworks, ground post treatment, water treatment, temporary capping of beams, and secant piling works were underway.
- Noise monitoring was undertaken in the vicinity of Chalfont St Peter Vent Shaft worksite (ref.: CSP), where operation of general and auxiliary plant at site, construction of shaft base slab, stockpile management, basement secant piling works, shaft dewatering and excavation, post treatment injection works, and road maintenance works were underway.
- Noise monitoring was undertaken in the vicinity of Load Test Pile 1 worksite (ref.: LTP #1), where piling for the construction of the jetty, construction of a cofferdam, main piling works, construction of retaining wall, compound operation and de-sanding, civil works, construction of north abutment pile wall, general compound work, core drilling, ground investigation works, realignment of River Colne, and water utility diversions were underway.



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

- Amersham and Aylesbury, as part of water utility works.
- East West Rail overbridge, Calvert where concrete pouring and formworks for pile caps were underway.
- Charndon Lodge underbridge, Calvert where concrete pouring and formworks for foundation of wingwalls and abutments were underway.
- Perry Hill overbridge, Calvert where piling works were undertaken.
- Calvert North site access road expansion of the Site Access Road from Perry Hill to West Street were undertaken.
- Oxford railway line, Calvert where removal of ballast, vegetation clearance, stockpile preparation, temporary drainage installation, removal of the embankment and creation of earthwork screening bunds were underway.
- Calvert Cutting, where vegetation clearance works were undertaken.
- Calvert South Access Road, where replacement of existing culverts, topsoil stripping, laying and compacting of the South Access Road surface were underway.
- Small Dean Viaduct, Aylesbury, where completion of the test pile load testing, compound foundations, ducting for compounds, protesters waste removal, sheet piling preparation, track monitoring installation were underway.
- North of Ellesborough Road where vegetation clearance and fencing works were undertaken.
- Three Bridge Mill Twyford where boundary fencing, ecology surveys, Historic Environment Research & Delivery Strategy mitigation, compound setup and demobilisation works were undertaken.
- Bowood Lane where installation of security cabins for badger sett protection was undertaken.
- Waddesdon where installation of boundary fencing, historic environment research & delivery strategy mitigation, archaeological investigations, vegetation clearance and ecological works in connection with reptile habitat were undertaken.
- Mixbury Area where ecological works in connection with bats was underway.
- Twyford & Padbury where bat mitigation, vegetation clearance, installation of badger and ditch crossing were undertaken.
- A422 south where topsoil stripping, cutting excavation, ditch excavations, stone delivery, ponds excavation and stockpiling works were underway.

- A422 north where stockpiling, utilities works, construction of farm access track, drainage works, sheet piling, excavation, stone deliveries were undertaken.
- Aylesbury South Cutting, where earthworks for the cutting were undertaken.
- Princess Risborough to Aylesbury Rail Line, where topsoil stripping, vegetation clearance and aggregate base were undertaken.
- A41 Bicester Road where construction of batch plant, main compound and roundabout were undertaken.
- Ground investigation works including rotary borehole drilling and trial pits were undertaken at various locations along the HS2 route (Westbury, Twyford, Turweston and A422).

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.

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

Six (6) complaints were received within the Buckinghamshire area 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 1<sup>st</sup> to 31<sup>st</sup> October 2021.

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

- School End worksite reference SE (see Plan 1 in Appendix A), where works activities included:
  - vegetation clearance;
  - fencing works;
  - installation of drainage and attenuation pond;
  - demolition surveys;
  - stone deliveries; and
  - construction of access road and tie-in with highway.
- Rosehill Farm (see Plan 1 in Appendix A), where works activities included:
  - vegetation clearance;
  - fencing works;
  - installation of drainage and attenuation pond;

- demolition surveys;
- stone deliveries; and
- construction of access road.
- West Street Overbridge (see Plan 1 in Appendix A), where works activities included:
  - extension of car park;
  - material stockpiling; and
  - construction of access road and drainage;
- School Hill Compound worksite reference SHC (see plan 2 in Appendix A), where works activities included:
  - construction of civil structures within site compound;
  - underground utility works; and
  - testing of batching plant.
- School Hill UTX worksite reference - SHU (see plan 2 in Appendix A), where works activities included:
  - horizontal drilling; and
  - utility diversion works.
- FCC Sidings, near Calvert, reference - FCC (see plan 2 in Appendix A), where works activities included:
  - construction of stone causeway;
  - fencing; and
  - stockpiling.
- Quanton Access Road Worksite, reference - QAR (see plan 3 in Appendix A), where works activities included:
  - construction of drainage at Station Road satellite compound;
  - laying of topsoil;
  - installation of verges;
  - road surfacing works; and
  - installation of handrails.
- Hall Farm, Bicester Road Worksite, reference – HF (see plan 4 in Appendix A), where works activities included:
  - excavation and installation of drainage;

- installation of ducting and grass;
- installation of lean mix concrete over the Thames Water protection slabs;
- installation of binder; and
- landscaping works;
- Medoway, Aylesbury Worksite, reference – MW (see plan 5 in Appendix A), where works activities included:
  - construction of the A418 Oxford Road Main Compound;
  - movement of construction vehicles;
- Rocky Lane Embankment Worksite, reference – RLE (see plan 6 in Appendix A), where works activities included:
  - form works;
  - steel fixing;
  - pouring concrete; and
  - construction of access route.
- Leather Lane Worksite, reference – LL (see plan 7 in Appendix A), where works activities included:
  - construction of haul road and attenuation pond; and
  - vegetation clearance.
- South Heath Cutting Worksite, reference – SHCW (see plan 7 in Appendix A), where works activities included:
  - construction of haul road;
  - demolition of mulberry park;
  - site clearance;
  - vegetation clearance;
  - installation of ducts;
  - drainage works;
  - installation of cabin and generators at security plaza;
  - installation of high voltage protection slabs;
  - installation of attenuation pond; and
  - tarmac at the security gatehouse.

- Little Missenden Vent Shaft worksite reference LM (see plan 8 in Appendix A), where works activities included:
  - operation of general plant at site;
  - earthworks including stockpile management;
  - diaphragm wall construction, which include civil works, construction of guide walls, excavation, concreting, de-sanding, mud treatment, delivery, and assembly;
  - water treatment; and
  - A413 road closure, which include traffic management, road planning, earthworks, ducting, concreting, surfacing, line marking and installing site access traffic light schemes.
- Amersham Vent Shaft Worksite, reference -AM (see plan 9 in Appendix A), where works activities included:
  - operation of general plant at site;
  - earthworks including stockpile management;
  - diaphragm wall works, which includes excavation, concreting, de-sanding, mud treatment, cleaning and inspection;
  - shaft excavation works;
  - ground post treatment (drilling and grouting);
  - concrete pouring;
  - cast in-situ slab construction; and
  - water treatment.
- Bottom House Farm Lane Worksite, reference - BHFL (see plan 10 in Appendix A), where work activities included:
  - landscaping works along temporary access route;
  - earthworks and asphaltting works for widening Bottom House Farm Lane;
  - stockpiling;
  - fencing works;
  - vegetation clearance; and
  - installation of road signage.
- Chalfont St Giles Vent Shaft Worksite, reference - CSG (see plan 10 in Appendix A), where works activities included:
  - operation of general plant at site;

- earthworks (stockpile management);
  - ground post treatment (drilling and grouting);
  - water treatment;
  - temporary capping of beams (breakout and formation); and
  - secant piling works.
- Chalfont St Peter Vent Shaft Worksite, reference –CSP (see plan 11 in Appendix A), where works activities included:
    - operation of general and auxiliary plant at site;
    - construction of shaft base slab (preparation works);
    - stockpile management;
    - basement secant piling works (including construction of guide wall and shallow box retaining wall, contiguous and secant piles, excavation, cutting of contiguous and secant piles)
    - preparatory works for shaft base slab;
    - shaft dewatering and excavation;
    - post treatment injection works; and
    - road maintenance works;
  - Colne Valley Viaduct - Load Test Pile 1 Worksite, reference – CVV-LTP #1 (see plan 12 in Appendix A), where works activities included:
    - piling for the construction of the jetty;
    - construction of a cofferdam (including piling, operation of support plant, excavation, dewatering, waling beams and concrete plugs);
    - 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;
    - construction of retaining wall;
    - Denham Water Ski Club and North Embankment compound operation and de-sanding;
    - civil works on haul road;
    - construction of north abutment pile wall;
    - yard support for north abutment works;
    - core drilling for integrity test of concrete piles;



- north embankment compound operation;
- ground investigation works;
- 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 Aylesbury, as part of water utility works.
- Claydon Junction where recovery of track assets was underway.
- East West Rail overbridge, Calvert where concrete pouring and formworks for pile caps were underway.
- Charndon Lodge underbridge, Calvert where concrete pouring and formworks for foundation of wingwalls and abutments were underway.
- Perry Hill overbridge, Calvert where piling works were undertaken.
- Calvert North site access road expansion of the Site Access Road from Perry Hill to West Street were undertaken.
- Oxford railway line, Calvert where removal of ballast, vegetation clearance, stockpile preparation, temporary drainage installation, removal of the embankment and creation of earthwork screening bunds were underway.
- Calvert Cutting, where vegetation clearance works were undertaken.
- Calvert South Access Road, where replacement of existing culverts, topsoil stripping, laying and compacting of the South Access Road surface were underway.
- Small Dean Viaduct, Aylesbury, where completion of the test pile load testing, compound foundations, ducting for compounds, protesters waste removal, sheet piling preparation, track monitoring installation were underway.
- North of Ellesborough Road where vegetation clearance and fencing works were undertaken.
- Three Bridge Mill Twyford where boundary fencing, ecology surveys, Historic Environment Research & Delivery Strategy mitigation, compound setup and demobilisation works were undertaken.
- Bowood Lane where installation of security cabins for badger sett protection was undertaken.
- Waddesdon where installation of boundary fencing, Historic Environment Research & Delivery Strategy mitigation, archaeological investigations, vegetation clearance and ecological works in connection with reptile habitat were undertaken.

- Mixbury Area where ecological works in connection with bats and was underway.
- Twyford & Padbury where bat mitigation, vegetation clearance, installation of badger and ditch crossing were undertaken.
- A422 south where topsoil stripping, cutting excavation, ditch excavations, stone delivery, ponds excavation and stockpiling works were underway.
- A422 north where stockpiling, utilities works, construction of farm access track, drainage works, sheet piling, excavation, stone deliveries were undertaken.
- Aylesbury South Cutting, where earthworks for the cutting were undertaken.
- Princess Risborough to Aylesbury Rail Line, where topsoil stripping, vegetation clearance and aggregate base were undertaken.
- A41 Bicester Road where construction of batch plant, main compound and roundabout were undertaken.
- Ground investigation works including rotary borehole drilling and trial pits were undertaken at various locations along the HS2 route (Westbury, Twyford, Turweston and A422).

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 Thirty (30) noise and three (3) vibration monitoring installations were active in October in the BS area. Table 2 summarises the positions of noise and vibration monitoring installations within the BS area in October 2021.
- 1.2.2 The noise monitor (ref.: CH-NMP1) was uninstalled from Chetwode Hermitage Worksite and is not reported for the month of October.
- 1.2.3 An additional noise monitor (ref.: WSO-NMP1) was installed at West Street, Twyford, in proximity to the West Street Overbridge worksite, ref.: WSO, on the 14<sup>th</sup> of October.
- 1.2.4 Worksite CALS and the noise monitor CALS-NMP1 have been renamed as FCC and FCC-NMP1 to better represent the location and works they represent.

- 1.2.5 Noise monitor, ref.: LM-NMP1, was moved to a new location, ref.: PWC-NMP1, within the proximity of Little Missenden Vent Shaft Worksite, ref.: LM, on 29<sup>th</sup> of October.
- 1.2.6 Noise monitor, ref.: CVV-CSP-NMP1, was re-located five meters closer to the worksite, on 29<sup>th</sup> of October.
- 1.2.7 An additional noise monitor (ref.: CVV-SVF-NMP1) was installed at Savay Farm, Denham, in proximity to the Colne Valley Viaduct Moorhall Road worksite, ref.: CVV-MR, on the 5<sup>th</sup> of October.
- 1.2.8 Maps showing the positions of noise and vibration monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
SE	SE-NMP1	School End, Chetwode
	SE-Vib1	School End, Chetwode
RF	RF-NMP1	Old Stable Cottage, Rosehill Farm, Chetwode
	RF-Vib1	Old Stable Cottage, Rosehill Farm, Chetwode
WSO	WSO-NMP1	West Street, Twyford
SHC	SHC-NMP1	School Hill Compound, Calvert
SHU	SHU-NMP1	70 Cotswold Way, Calvert
FCC	FCC-NMP1	Site boundary adjacent to Red Kite View, Calvert
QAR	QAR-NMP1	Woodlands Barn, Quainton
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon
MW	MW-NMP1	Aylesbury, Buckinghamshire
RLE	SDVC-NMP1	Rocky Lane, Wendover
	NCAS6-NMP1	Chesham Lane, The Lee, Wendover
	NCAS5-NMP1	Chesham Lane, The Lee, Wendover
LL	HG-NMP1	Hunts Green, Leather Lane, The Lee, South Heath
	GD-NMP1	Grimms Ditch, The Lee, South Heath
SHCW	PR-NMP1	Potters Row, South Heath
	SH-NMP1	Bury Farm, South Heath
AM	AM-NMP1	Amersham Vent Shaft Worksite, Whielden Lane, Amersham
LM	LM-NMP1	Little Missenden Vent Shaft Worksite, Amersham
	PWC-NMP1	Patricia Holmes, Little Missenden Vent Shaft Worksite, Amersham

Worksite Reference	Measurement Reference	Address
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane
	BHFL-Vib 1	The Granary, Bottom House Farm Lane
CSG	CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane
	CSG-NMP2	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane
CSP	CSP-NMP1-Old	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
	CSP-NMP1-New	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
	CSP-NMP2	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
	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
	CVV-DFS-NMP1	Denham Film Studio, Uxbridge
CVV-MR*	CVV-SVF-NMP1	Savay Farm, Denham Garden Village, Denham, Buckinghamshire

\* This worksite is within the London Borough of Hillingdon, for more details on the works taking place please refer to the London Borough of Hillingdon Noise and Vibration Report available at: <https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2>

## 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<sub>Aeq</sub> Data over the Monitoring Period

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average L <sub>Aeq,T</sub> (Highest Day L <sub>Aeq,T</sub> )					Saturday Average L <sub>Aeq,T</sub> (highest day L <sub>Aeq,T</sub> )					Sunday / Public Holiday Average L <sub>Aeq,T</sub> (highest day L <sub>Aeq,T</sub> )	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
SE	SE-NMP1	School End, Chetwode	Free-field	46.6 (52.8)	50.7 (58.8)	43.6 (50.4)	41.7 (54.5)	41.8 (57.4)	43.2 (51.0)	45.4 (48.8)	43.8 (50.8)	44.2 (51.8)	37.7 (49.3)	47.0 (61.7)	40.3 (47.0)
RF	RF-NMP1	Old Stable Cottage, Rosehill Farm, Chetwode	Free-field	48.3 (50.9)	49.7 (54.8)	46.7 (60.2)	44.1 (51.1)	44.2 (56.1)	48.1 (51.4)	47.7 (48.3)	49.1 (52.3)	46.5 (52.7)	43.1 (51.2)	49.3 (59.8)	45.2 (50.8)
WSO	WSO-NMP1	West Street, Twyford	Free-field	49.1 (52.7)	57.0 (66.1)	49.2 (51.3)	44.9 (50.2)	40.8 (53.6)	46.8 (48.9)	48.4 (49.3)	47.0 (48.6)	46.7 (49.1)	40.1 (47.2)	49.8 (65.9)	41.6 (48.5)
SHC	SHC-NMP1	School Hill Compound, Calvert	Free-field	50.4 (55.1)	57.6 (70.5)	44.6 (48.6)	43.2 (52.8)	41.8 (58.4)	43.2 (45.4)	47.1 (50.7)	47.0 (51.3)	46.1 (53.2)	40.1 (44.1)	47.9 (64.2)	41.3 (46.9)
SHU	SHU-NMP1	70 Cotswold Way, Calvert	Free-field	52.4 (55.7)	56.0 (59.8)	49.4 (53.1)	45.2 (52.6)	42.0 (53.3)	51.7 (52.9)	54.6 (60.1)	56.3 (71.9)	51.9 (67.7)	39.6 (48.2)	49.7 (54.1)	41.8 (51.7)
FCC	FCC-NMP1	Site boundary adjacent to Red Kite View, Calvert	Free-field	59.3 (63.0)	58.7 (63.1)	45.4 (53.5)	42.4 (49.2)	44.8 (55.7)	55.3 (57.2)	62.1 (69.1)	53.9 (57.9)	50.5 (56.4)	37.6 (45.6)	51.6 (57.1)	38.6 (46.6)
QAR	QAR-NMP1	1 Woodlands Farm Cottages, Quainton	Free-field	45.2 (49.3)	49.4 (61.3)	40.6 (47.4)	39.3 (44.5)	40.4 (55.6)	46.4 (48.4)	46.7 (47.8)	46.5 (49.9)	47.0 (69.3)	40.9 (45.2)	45.8 (54.9)	42.2 (48.2)
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon	Free-field	60.5 (62.2)	63.7 (70.0)	61.2 (62.7)	58.2 (64.5)	54.1 (60.0)	56.9 (57.4)	60.2 (60.9)	60.6 (61.5)	59.6 (62.2)	52.9 (57.5)	59.3 (67.5)	54.7 (59.1)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$ )					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
MW	MW-NMP1	Aylesbury, Buckinghamshire	Free-field	62.8 (64.0)	62.1 (69.6)	62.4 (63.5)	60.1 (62.5)	56.1 (62.1)	59.6 (60.3)	62.0 (62.7)	63.1 (63.7)	61.7 (64.5)	54.6 (58.7)	61.2 (64.7)	55.9 (61.3)
RLE	SDVC-NMP1	Rocky Lane, Wendover	Free-field	61.5 (63.0)	60.8 (62.9)	60.5 (61.9)	57.8 (60.3)	54.9 (62.2)	58.9 (60.1)	59.8 (61.4)	59.2 (61.2)	58.9 (61.4)	53.4 (60.2)	58.6 (65.0)	54.6 (62.9)
	NCAS6-NMP1	Chesham Lane, The Lee, Wendover	Free-field	54.3 (57.5)	57.4 (69.7)	53.8 (62.9)	50.2 (54.7)	47.7 (56.3)	52.1 (53.5)	54.4 (56.9)	54.1 (57.2)	53.7 (58.3)	47.8 (53.1)	53.9 (60.8)	48.9 (55.5)
	NCAS5-NMP1	Chesham Lane, The Lee, Wendover	Free-field	50.9 (59.5)	52.5 (63.5)	50.1 (53.9)	47.3 (52.5)	44.7 (55.9)	48.0 (50.1)	49.5 (52.0)	50.1 (53.5)	49.6 (55.2)	43.2 (53.5)	50.4 (66.2)	43.8 (50.3)
LL	HG-NMP1	Hunts Green, Leather Lane, The Lee, South Heath	Free-field	49.7 (57.3)	51.5 (56.0)	48.4 (55.2)	47.5 (57.6)	47.9 (61.5)	50.8 (58.0)	52.6 (56.0)	50.1 (60.0)	49.4 (60.5)	47.3 (57.8)	50.7 (63.6)	46.7 (59.8)
	GD-NMP1	Grimms Ditch, The Lee, South Heath	Free-field	48.8 (54.3)	51.8 (63.4)	47.7 (53.6)	46.2 (54.7)	46.6 (56.1)	47.4 (48.2)	48.8 (49.8)	48.9 (51.2)	48.6 (56.4)	45.2 (49.2)	48.7 (58.0)	45.7 (48.6)
SHCW	PR-NMP1	Potters Row, South Heath	Free-field	54.1 (65.5)	60.6 (72.1)	50.6 (57.7)	47.9 (55.9)	47.5 (59.3)	50.5 (56.3)	50.4 (52.1)	49.2 (52.2)	48.0 (53.6)	45.6 (48.5)	50.0 (59.6)	47.7 (55.0)
	SH-NMP1	Bury Farm, South Heath	Free-field	47.2 (56.5)	52.3 (54.8)	47.7 (53.9)	43.8 (51.6)	43.4 (58.8)	45.6 (47.6)	48.8 (49.8)	48.1 (52.4)	47.2 (53.5)	42.0 (48.6)	48.4 (57.8)	44.0 (56.3)
AM	AM-NMP1	Whielden Lane, Amersham	Free-field	65.3 (69.4)	68.9 (72.5)	65.7 (74.8)	64.2 (74.1)	52.7 (60.1)	63.2 (66.5)	66.5 (70.4)	60.3 (63.8)	58.2 (61.8)	51.4 (55.8)	57.8 (61.1)	52.4 (59.0)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$ )					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
LM	LM-NMP1 (Until 29/10/21)	Little Missenden Vent Shaft Worksite	Free-field	63.9 (65.0)	63.0 (64.5)	62.9 (63.9)	59.7 (66.4)	55.8 (67.0)	59.0 (59.4)	62.0 (62.7)	62.4 (64.1)	61.0 (64.2)	56.3 (72.2)	60.0 (62.7)	54.7 (61.7)
	PWC-NMP1 (From 29/10/21)	Patricia Holmes, Little Missenden Vent Shaft Worksite, Amersham	Free-field	N/A* (N/A)*	N/A* (N/A)*	N/A* (N/A)*	55.7 (57.2)	50.4 (53.8)	57.1 (57.1)	61.3 (61.3)	58.7 (58.7)	58.6 (62.4)	51.1 (54.3)	58.9 (61.4)	52.6 (53.4)
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	Free-field	56.3 (62.8)	58.3 (66.4)	54.5 (63.0)	50.9 (55.1)	47.2 (55.0)	51.8 (53.0)	56.1 (57.7)	55.0 (58.2)	54.8 (66.4)	45.9 (51.4)	55.0 (66.2)	46.5 (52.9)
CSG	CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	53.1 (58.0)	59.1 (71.8)	46.7 (60.7)	43.0 (61.7)	42.8 (58.3)	48.9 (53.0)	49.4 (50.3)	48.8 (50.2)	46.7 (53.8)	40.0 (48.5)	48.2 (56.8)	41.2 (54.3)
	CSG-NMP2	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	57.6 (63.5)	63.3 (67.7)	48.8 (60.2)	44.6 (57.5)	46.6 (54.5)	50.3 (55.0)	49.5 (50.6)	48.2 (51.3)	47.1 (52.6)	44.9 (52.4)	48.0 (56.4)	45.4 (61.1)



Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$ )					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
CSP	NMP1-Old (Until 29/10/21)	Chalfont St Peter Vent Shaft Worksite	Free-field	53.1 (58.0)	59.4 (71.8)	46.8 (60.7)	43.1 (61.7)	43.0 (58.3)	47.9 (49.7)	49.4 (50.3)	48.5 (49.6)	46.4 (53.8)	46.9 (61.1)	47.5 (55.0)	42.0 (54.3)
	NMP1-New (From 29/10/21)	Chalfont St Peter Vent Shaft Worksite	Free-field	n/a* (n/a)*	73.1 (73.1)	48.8 (48.8)	47.5 (48.9)	46.7 (51.3)	50.3 (50.3)	52.1 (52.1)	51.4 (51.4)	50.2 (52.6)	52.5 (57.7)	53.4 (57.5)	n/a* (n/a)*
	NMP2	Chalfont St Peter Vent Shaft Worksite	Free-field	47.2 (52.9)	51.9 (68.4)	48.6 (55.7)	45.6 (49.5)	42.4 (52.7)	44.9 (47.5)	49.5 (50.4)	49.1 (50.2)	47.7 (51.7)	42.6 (52.0)	49.6 (59.2)	41.5 (46.2)
	NMP3	Chalfont St Peter Vent Shaft Worksite	Free-field	57.8 (60.5)	57.6 (59.0)	57.0 (59.1)	54.2 (56.8)	50.0 (58.8)	54.1 (55.1)	57.1 (57.4)	57.1 (58.1)	55.8 (58.2)	48.6 (53.7)	55.8 (58.3)	49.4 (55.8)
CVV-LTP #1	CVV-LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite	Free-field	61.8 (64.2)	61.5 (63.6)	60.5 (66.3)	57.3 (62.5)	54.4 (62.4)	58.6 (59.6)	61.4 (62.9)	60.6 (61.6)	59.1 (62.6)	52.8 (57.6)	58.6 (63.9)	54.1 (62.0)
	CVV-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham	Free-field	57.3 (62.1)	58.3 (61.1)	56.7 (65.1)	52.5 (60.0)	50.0 (60.3)	56.7 (61.4)	57.7 (59.2)	56.9 (60.5)	55.9 (60.5)	48.7 (63.2)	56.8 (65.5)	50.0 (59.4)
	CVV-DFS-NMP1	Denham Film Studio, Uxbridge	Free-field	49.6 (55.3)	51.2 (54.3)	51.1 (63.2)	51.1 (64.3)	45.0 (61.7)	50.1 (54.6)	50.4 (54.8)	46.8 (51.6)	50.2 (59.1)	42.3 (47.2)	50.1 (64.5)	45.0 (59.6)
CVV-MR	CVV-SVF-NMP1	Savay Farm, Denham Garden Village, Denham, Buckinghamshire	Free-field	49.1 (53.0)	51.0 (55.3)	47.0 (49.2)	45.9 (56.7)	43.3 (52.4)	49.5 (52.6)	49.6 (51.8)	45.7 (48.1)	45.8 (49.7)	43.1 (48.4)	47.9 (57.1)	43.8 (51.3)

\* No data available for this period due to monitor relocation.

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
SE	SE-Vib 1	School End, Chetwode	0.94 (X-axis)
RF	RF-Vib 1	Old Stable Cottage, Rosehill Farm, Chetwode	0.98 (Z-axis)
BHFL	BHFL-Vib 1	Pine Cottage, Bottom House Farm Lane	8.51* (Y-axis)

\*High vibration levels are due to the proximity of the construction activities to the vibration monitor. The nearest residential receptors are further away from the works and vibration levels at the receptor will therefore be lower.

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
SE	SE-NMP1	School End, Chetwode	All days	All periods	No exceedance	No exceedance
RF	RF-NMP1	Old Stable Cottage, Rosehill Farm, Chetwode	All days	All periods	No exceedance	No exceedance
WSO	WSO-NMP1	West Street, Twyford	Weekday	08:00-18:00	3	No exceedance
SHC	SHC-NMP1*	School Hill Compound, Calvert	Weekday	08:00-18:00	2	No exceedance
SHU	SHU-NMP1	70 Cotswold Way, Calvert	All days	All periods	No exceedance	No exceedance
FCC	FCC-NMP1	Site boundary adjacent to Red Kite View, Calvert	Weekday	08:00-18:00	2	No exceedance
QAR	QAR-NMP1	Woodlands Barn, Quainton	All days	All periods	No exceedance	No exceedance
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon	Weekday	08:00-18:00	2	No exceedance
MW	MW-NMP1	Aylesbury, Buckinghamshire	Weekday	08:00-18:00	6	No exceedance
			Saturday	08:00-13:00	3	
RLE	SDVC-NMP1	Rocky Lane, Wendover	Weekday	08:00-18:00	4	No exceedance
	NCAS6-NMP1	Chesham Lane, The Lee, Wendover	Weekday	08:00-18:00	2	No exceedance

Worksite Reference	Measurement Reference	Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
	NCAS5-NMP1	Chesham Lane, The Lee, Wendover	Weekday	08:00-18:00	1	No exceedance
LL	HG-NMP1	Hunts Green, Leather Lane, The Lee, South Heath	All days	All periods	No exceedance	No exceedance
	GD-NMP1	Grimms Ditch, The Lee, South Heath	Weekday	08:00-18:00	1	No exceedance
SHCW	PR-NMP1	Potters Row, South Heath	Weekday	08:00-18:00	9	No exceedance
	SH-NMP1	Bury Farm, South Heath	All days	All periods	No exceedance	No exceedance
AM	AM-NMP1*	Whielden Lane, Amersham	All days	All periods	No exceedance	No exceedance
LM	LM-NMP1*	Little Missenden Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
	PWC-NMP1	Patricia Holmes, Little Missenden Vent Shaft Worksite, Amersham	All days	All periods	No exceedance	No exceedance
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	Weekday	08:00-18:00	1	No exceedance
CSG	CSG-NMP1*	Chalfont St Giles Vent Shaft	All days	All periods	No exceedance	No exceedance
	CSG-NMP2*	Chalfont St Giles Vent Shaft	All days	All periods	No exceedance	No exceedance
CSP	CSP-NMP1-Old*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
	CSP-NMP1-New*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
	CSP-NMP2*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	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
	CSP-NMP3*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	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	All days	All periods	No exceedance	No exceedance
	CVV-DFS-NMP1	Denham Film Studio, Uxbridge	All days	All periods	No exceedance	No exceedance
CVV-MR	CVV-SVF-NMP1	Savay Farm, Denham Garden Village, Denham, Buckinghamshire	All days	All periods	No exceedance	No exceedance

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

2.2.6 No exceedance of the SOAEL were recorded due to HS2 construction during October 2021. Exceedances of the LOAEL were recorded at 10 monitoring locations.

## 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.

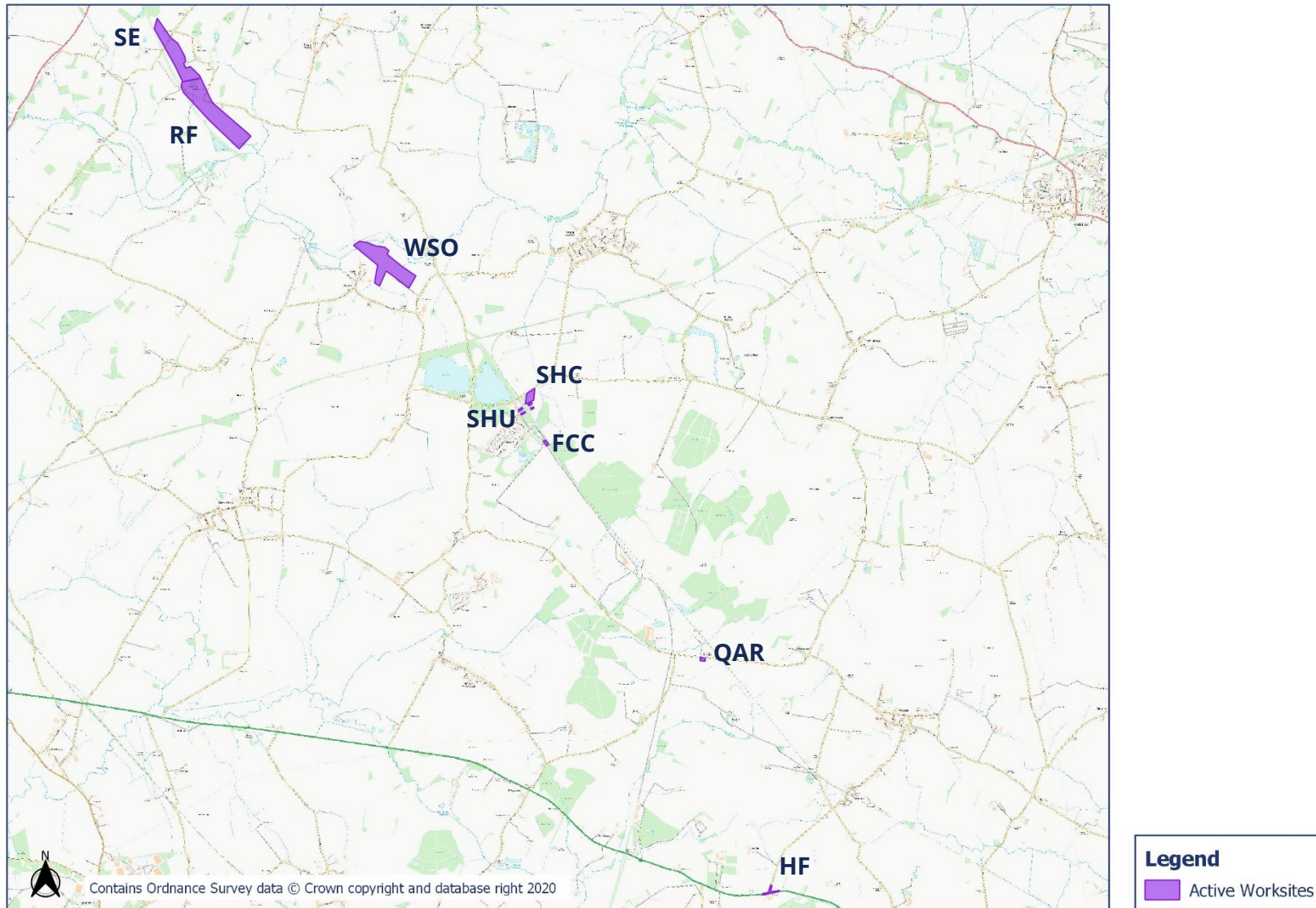
Table 7: Summary of Complaints

Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-42632-C	MW	Complaint regarding noise disturbance from late night drainage works in Aylesbury.	The noise was confirmed to be from ongoing HS2 related night works. Notification of the works was published but was not updated when the works were changed to night-time works.	Apology has been provided by contractor. It will be ensured that issue on lack of notifications does not happen again in future.
HS2-21-42640-C	CVV-LTP #1	Complaint regarding noise levels from works repeatedly breaching levels dictated by Bucks Council.	Recorded noise levels at monitoring locations show continued compliance with prescribed construction noise levels as agreed with the local authority.	Results of investigation explained to stakeholder. Information given that first and noisiest stage of piling works has been completed, further works will follow and ongoing monitoring will remain in place.
HS2-21-42673-C	SHC	Complaint regarding noise disturbance from weekend works outside of contracted hours.	The noise was confirmed to be from HS2 related emergency drainage works. Due to emergency nature of works, no advance notification could be provided to residents.	Explanation and apology provided to the stakeholder.
HS2-21-42717-C	BHFL	Complaint regarding noise and vibration disturbance at night for several days.	Currently, no HS2 related night works are being undertaken.	Stakeholder provided update on investigation outcome and advised that noise may be from night-time road resurfacing works undertaken by Buckinghamshire Council in the Chalfont St Peters Area.
HS2-21-42785-C	LM	Complaint regarding noise disturbance at night due to works outside stakeholder property.	The noise was confirmed to be from HS2 related works on A413 undertaken with consent of Local Authority.	Apology and explanation provided to the stakeholder and confirmed works were finishing that night.
HS2-21-42813-C	SHC	Complaint regarding constant noise disturbance 12 hours a day from works not in original plans.	Noise monitors checked and levels remain within prescribed limits.	Confirmed findings and offered to fit noise monitor at stakeholder's property to monitor further and more closely. Awaiting agreement from stakeholder.

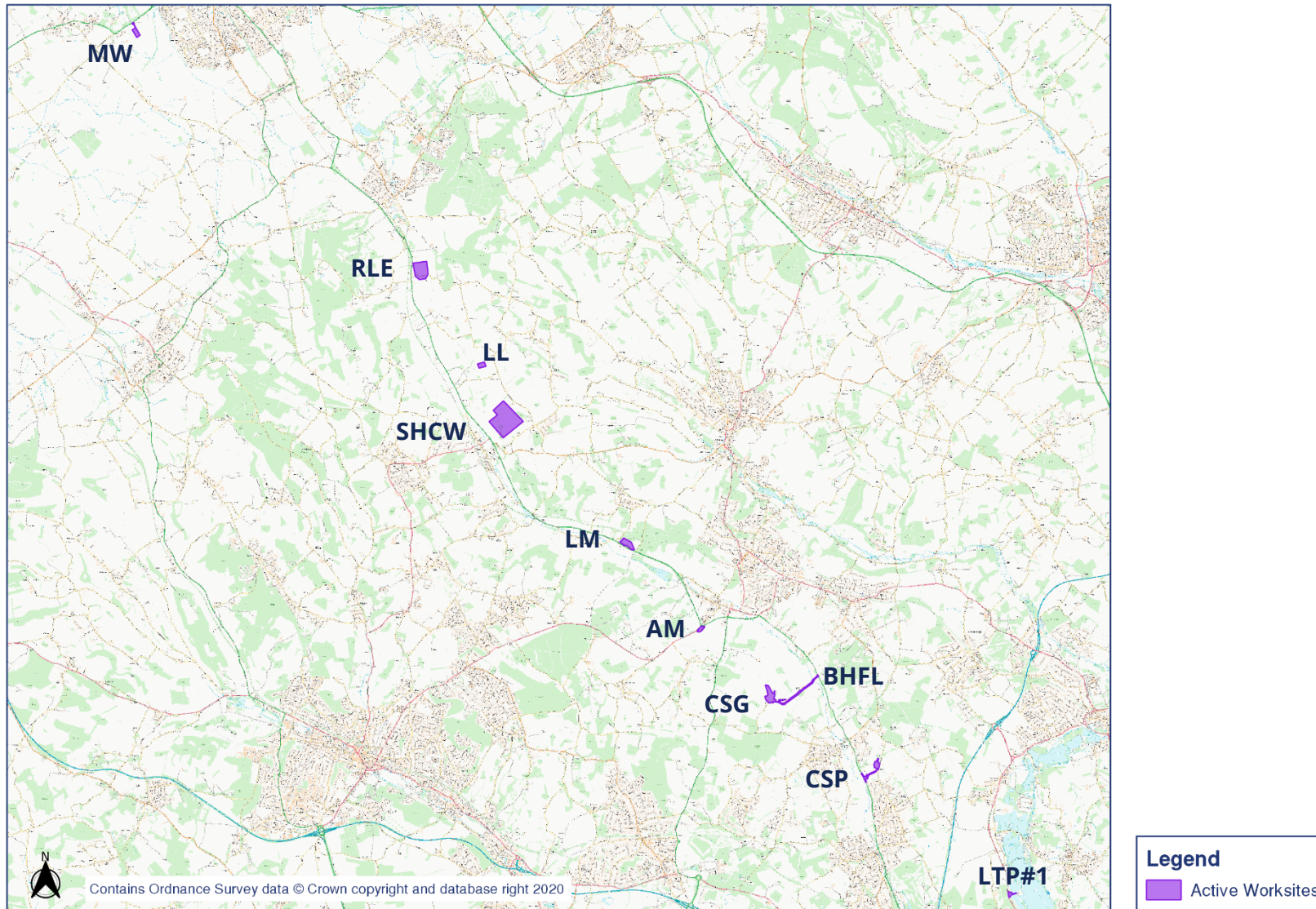
# Appendix A Site Locations



# HS2 Worksite Identification Plan - Overview 1

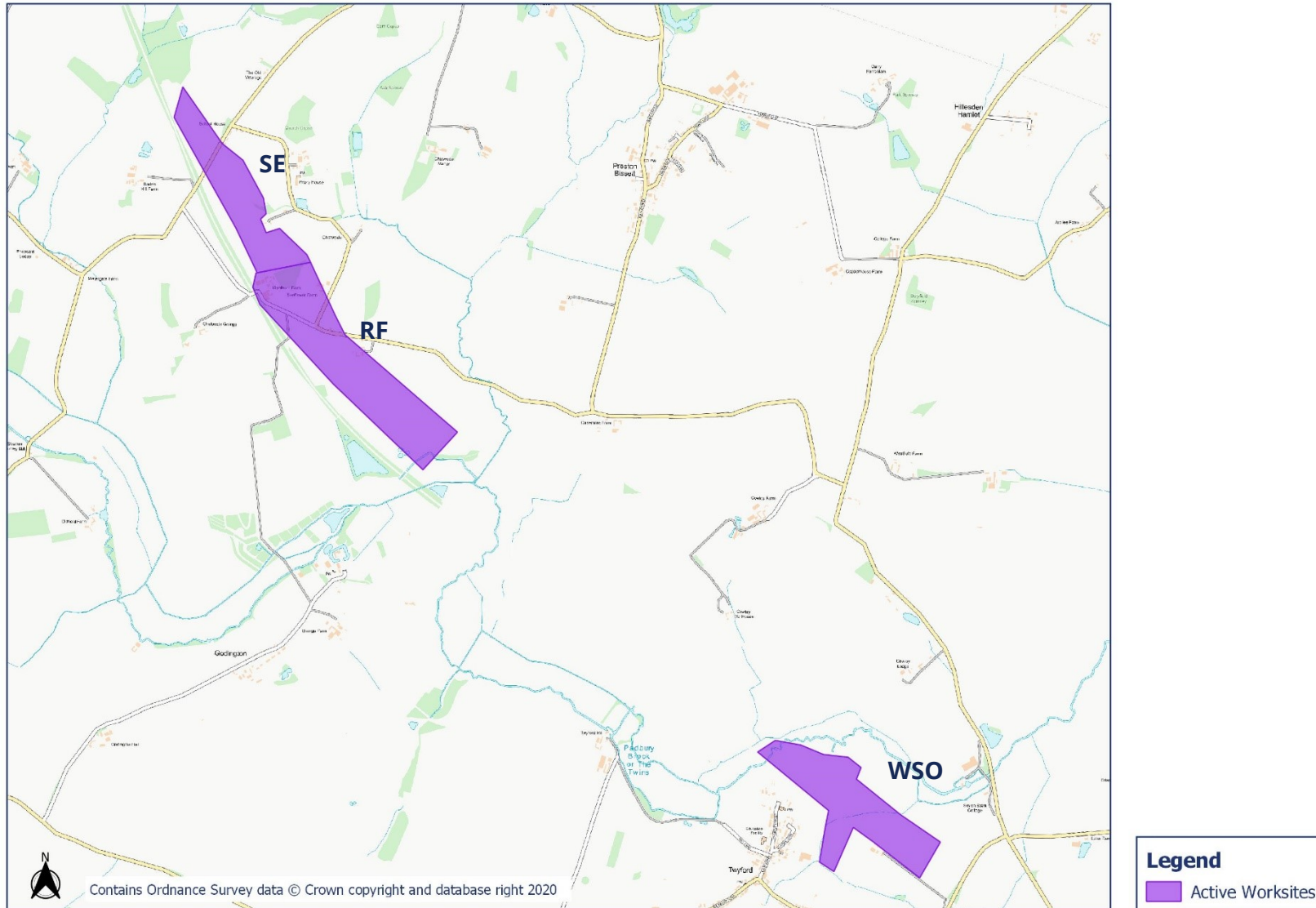




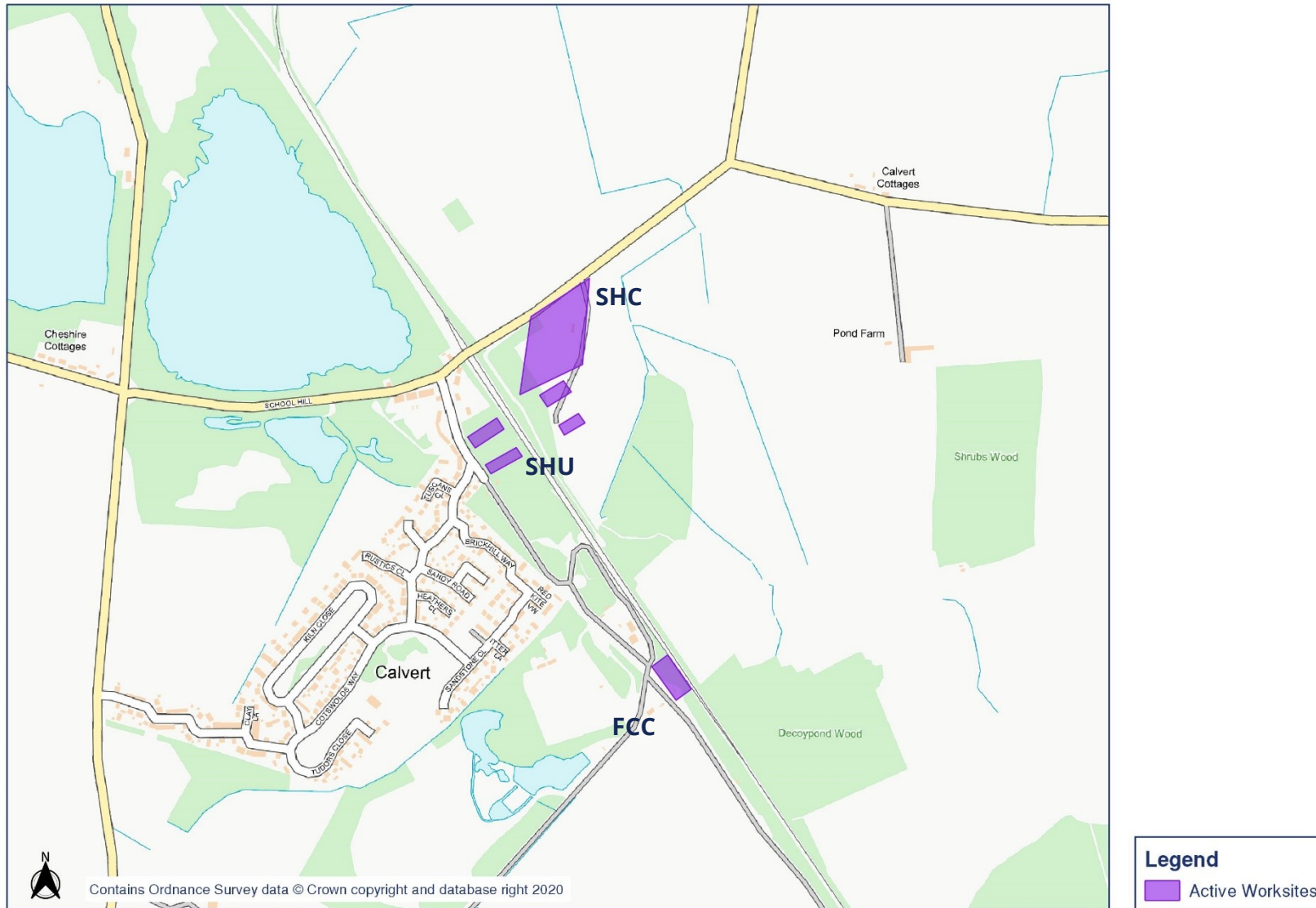


# HS2

## Worksite Identification Plan - 1

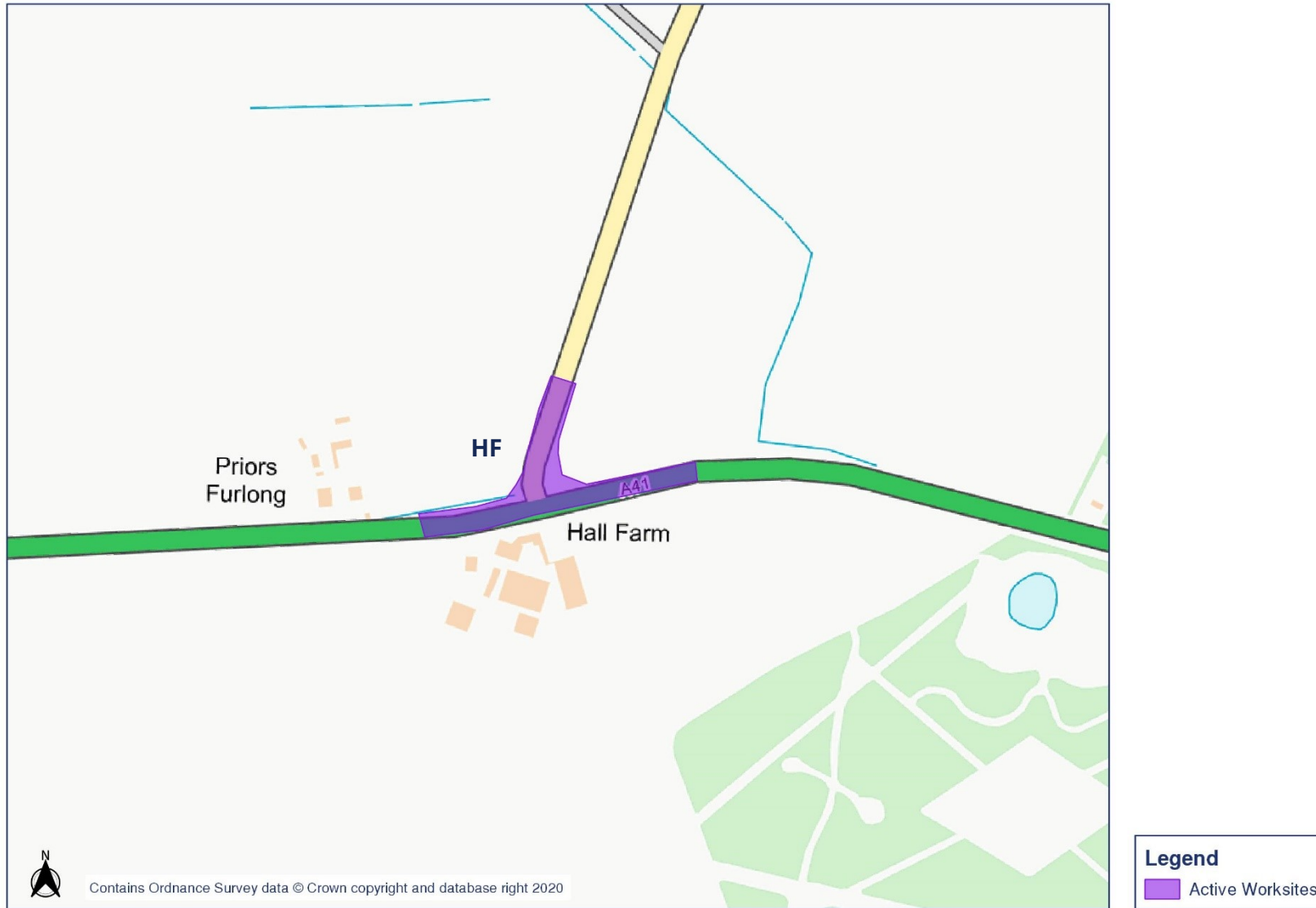


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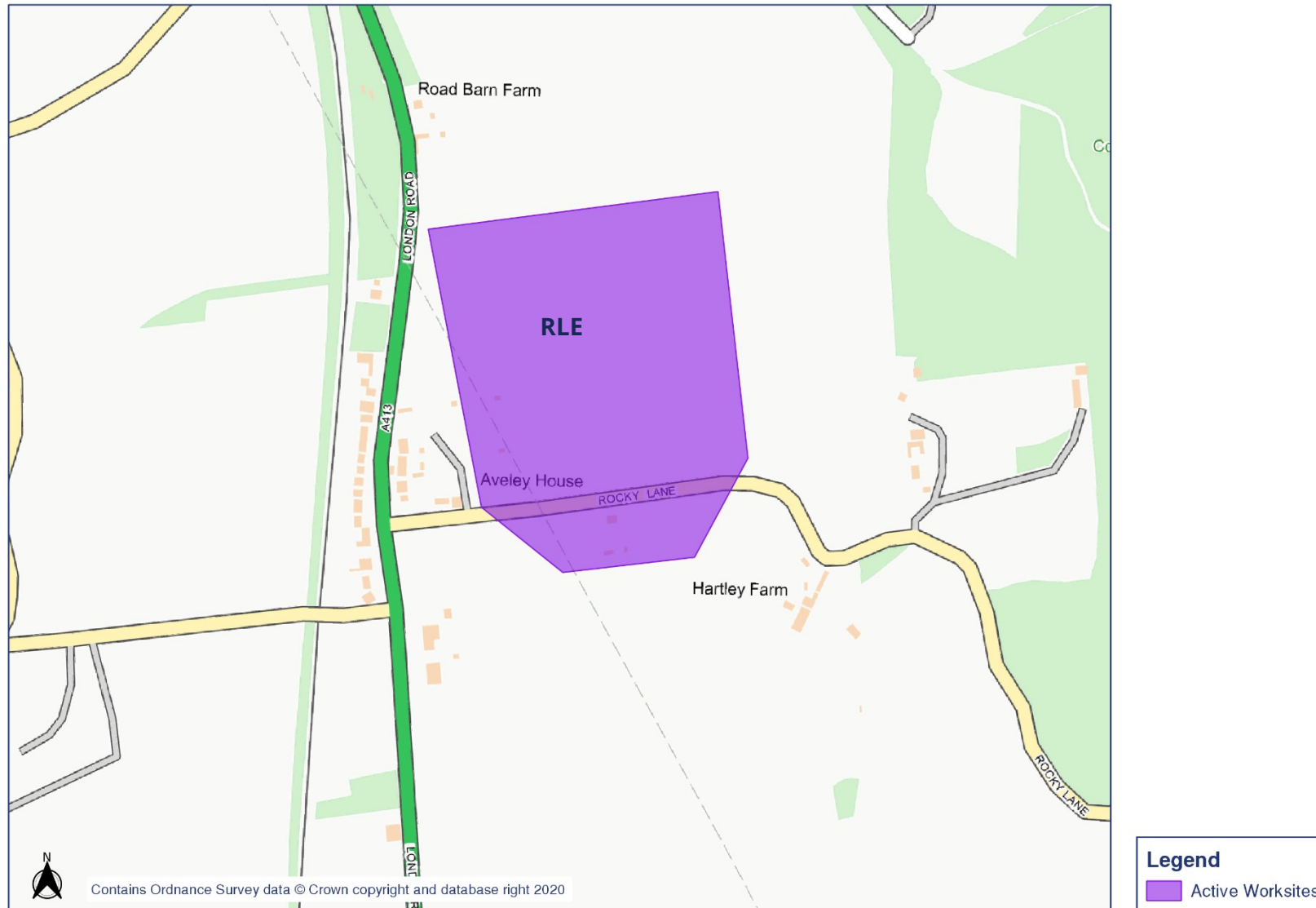


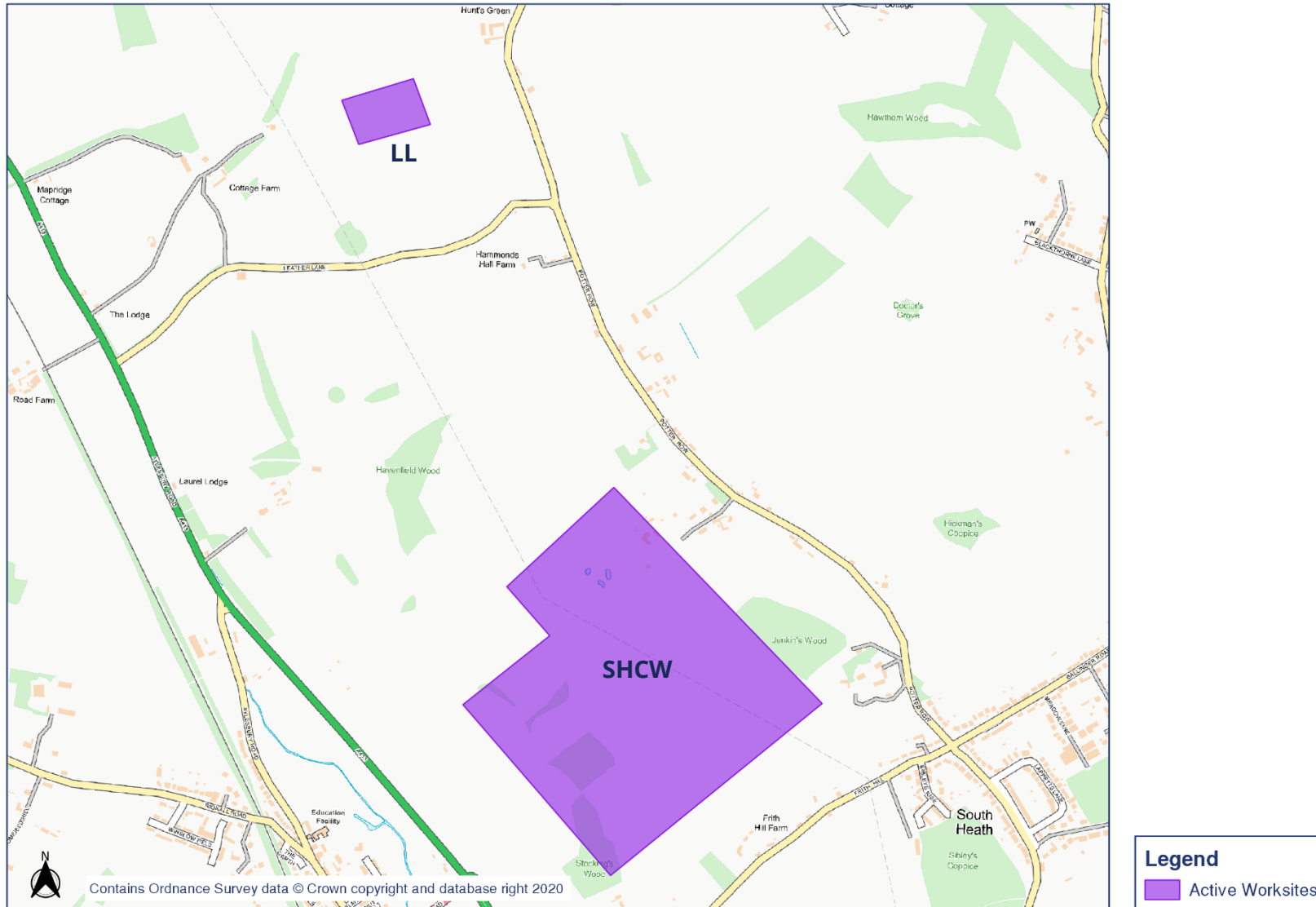






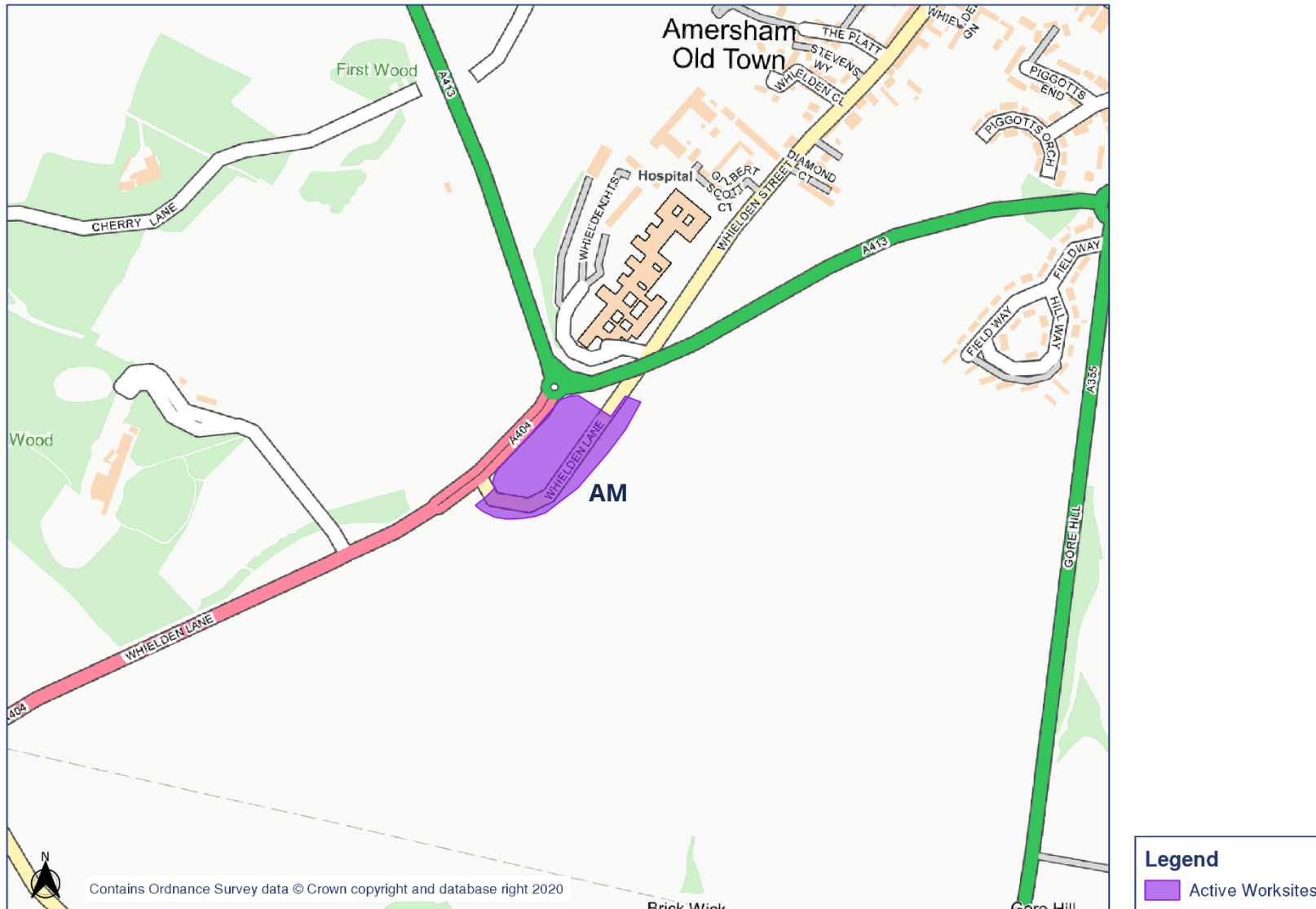


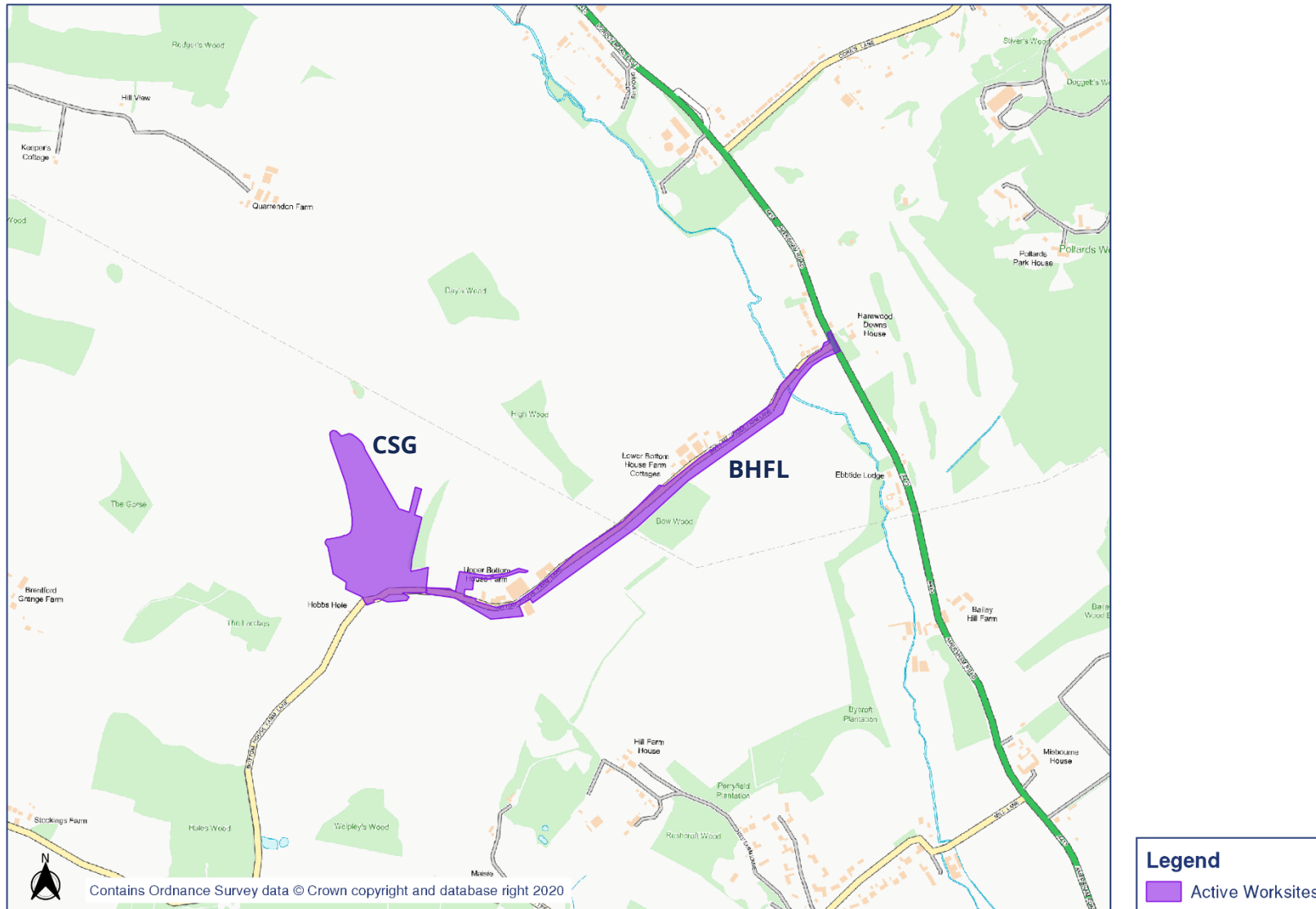


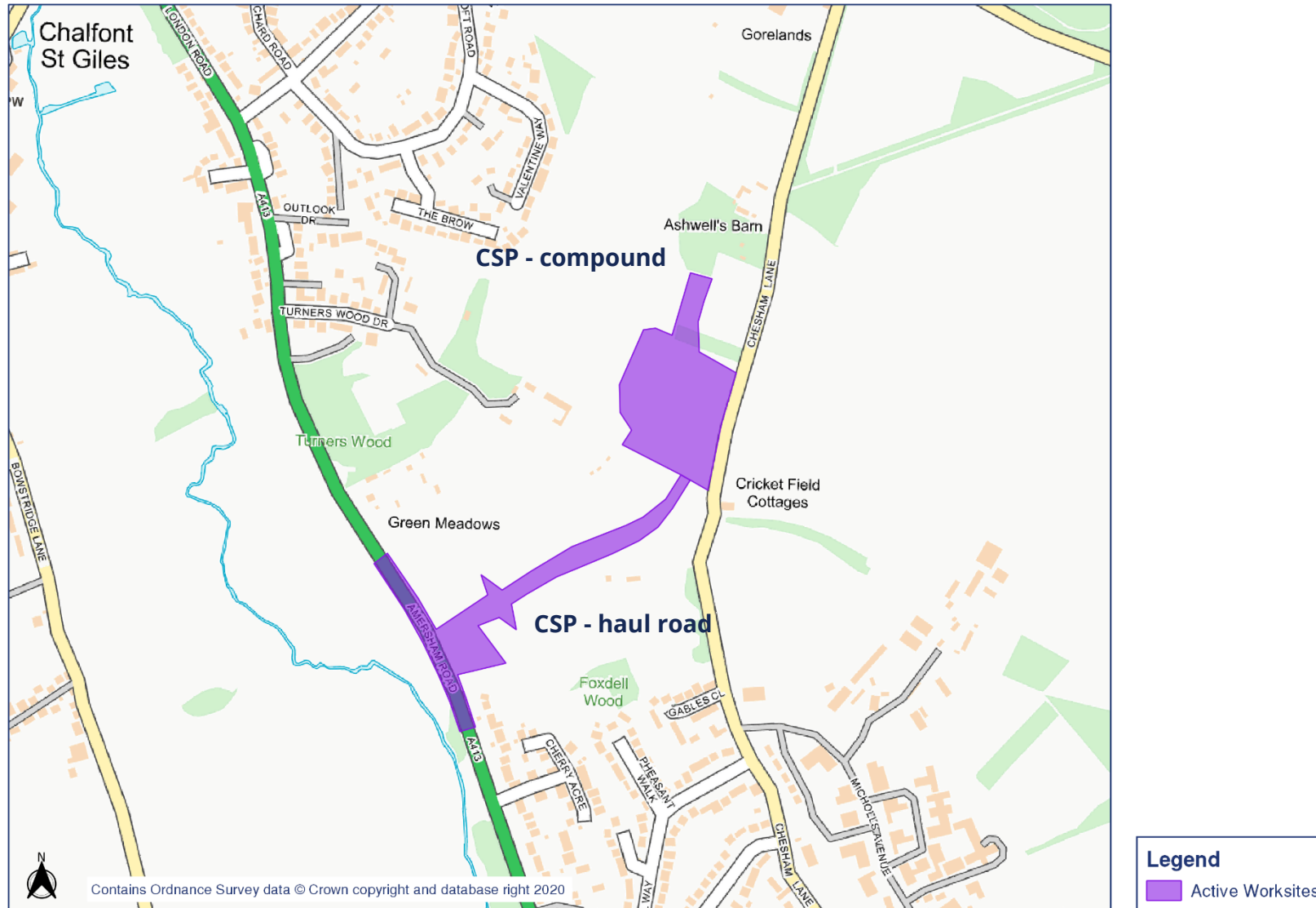


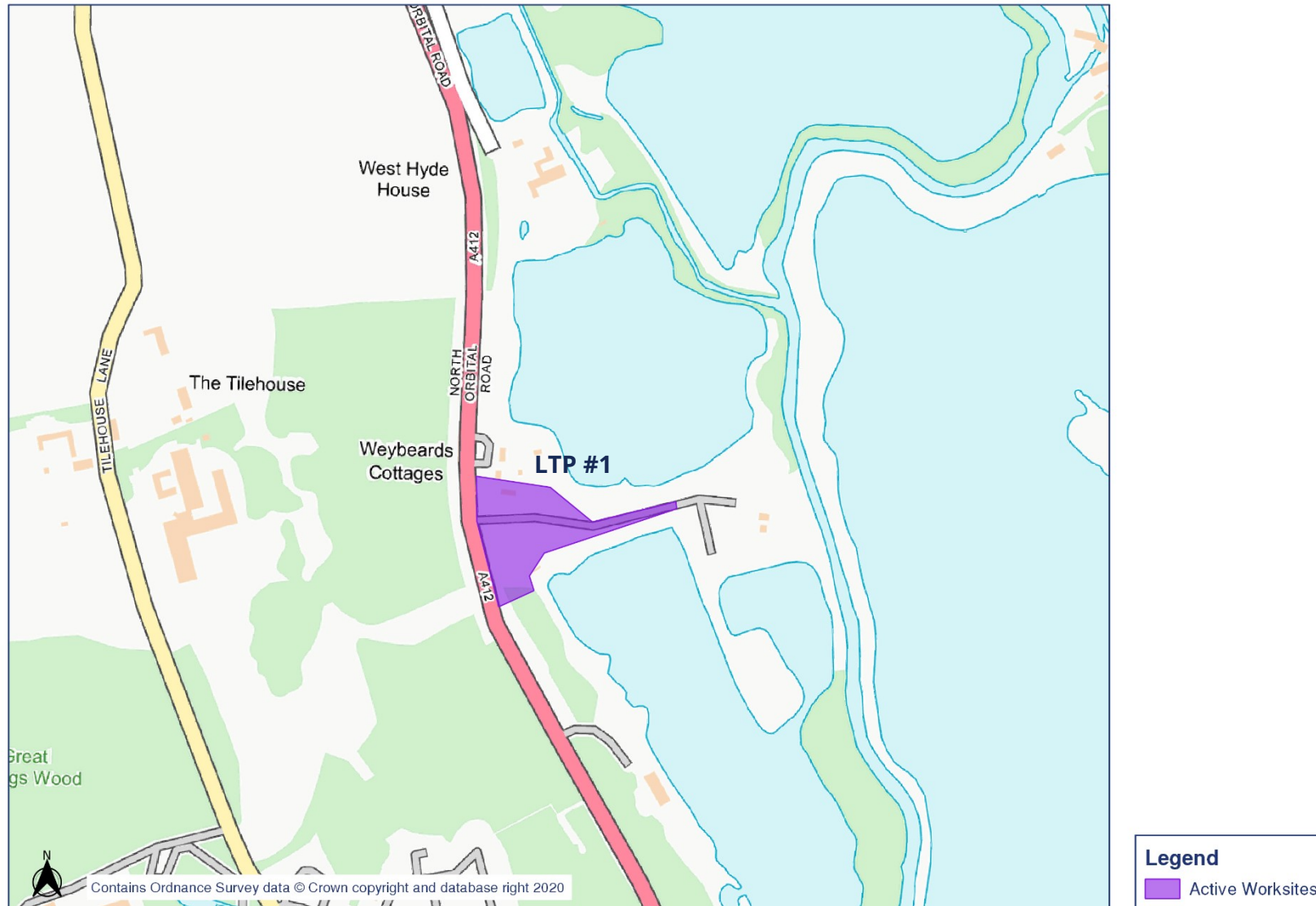






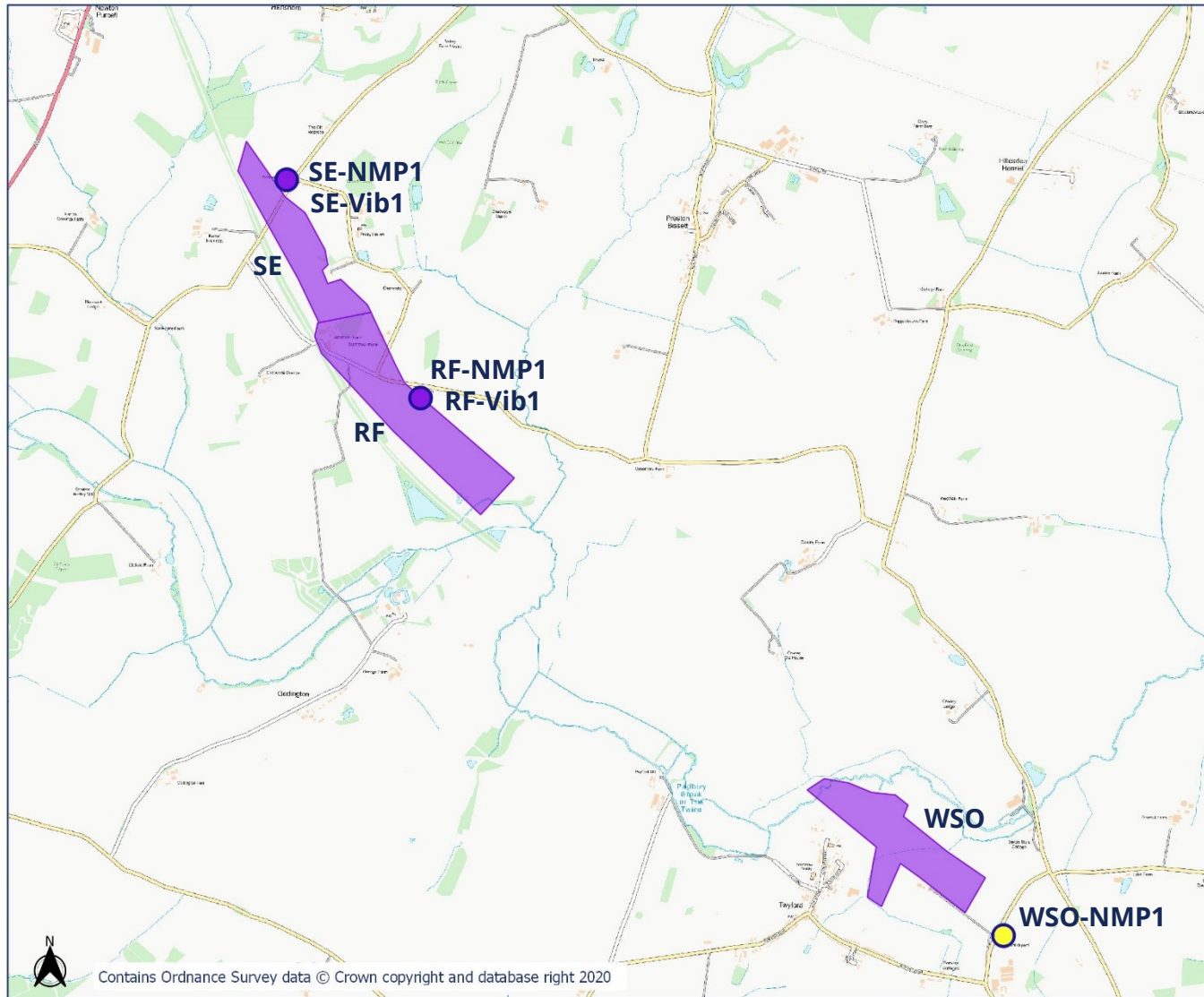


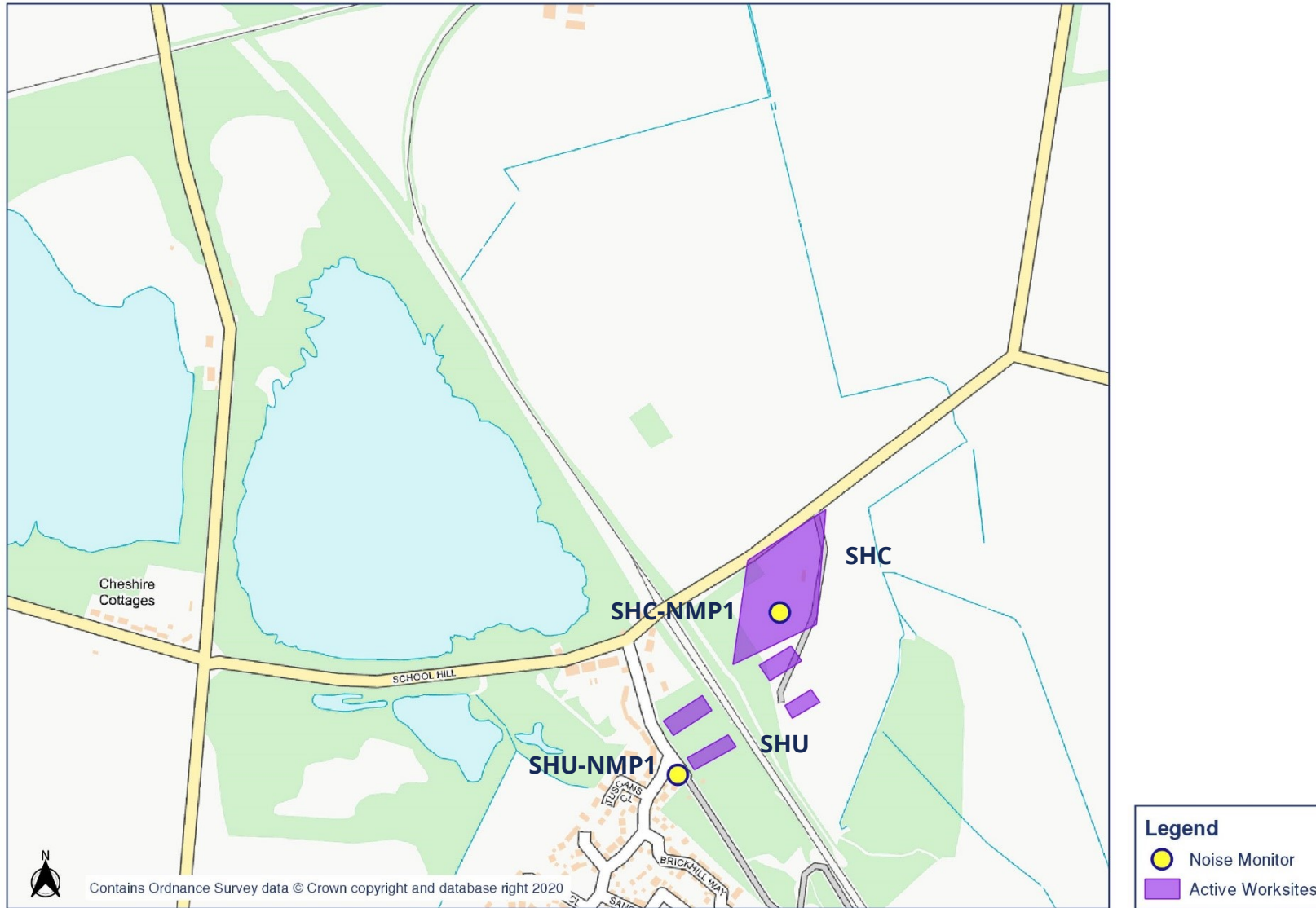




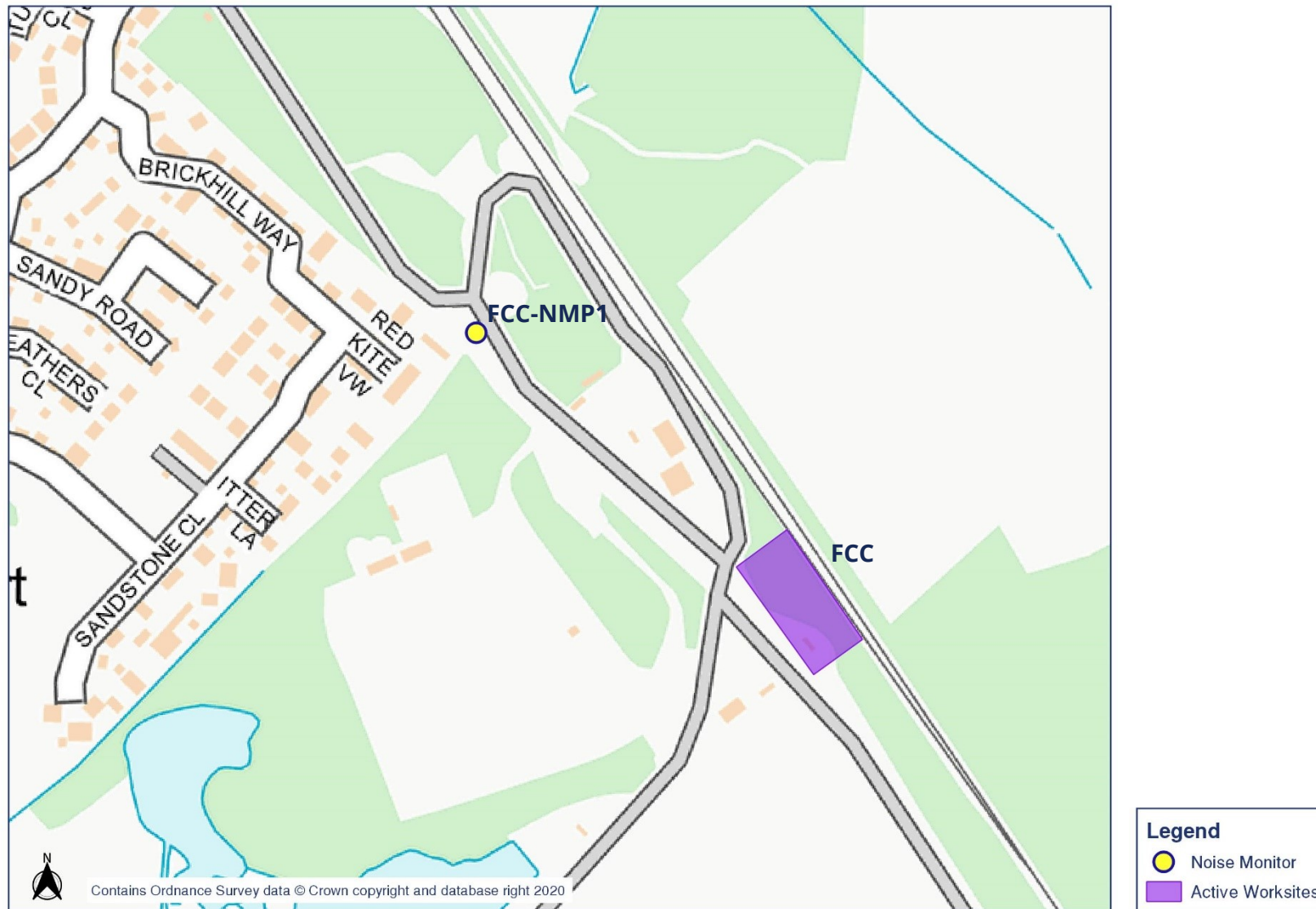
# Appendix B Monitoring Locations











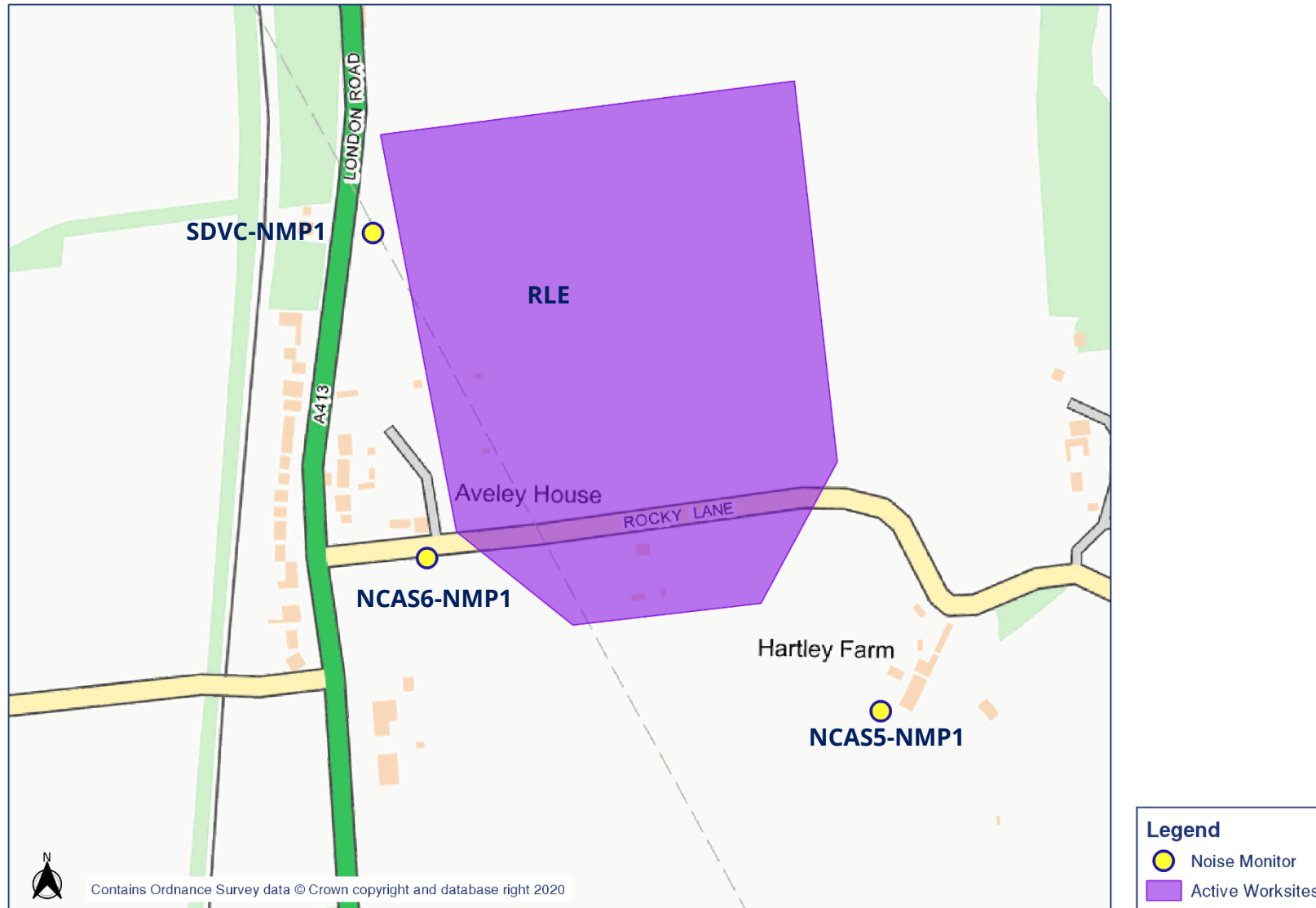


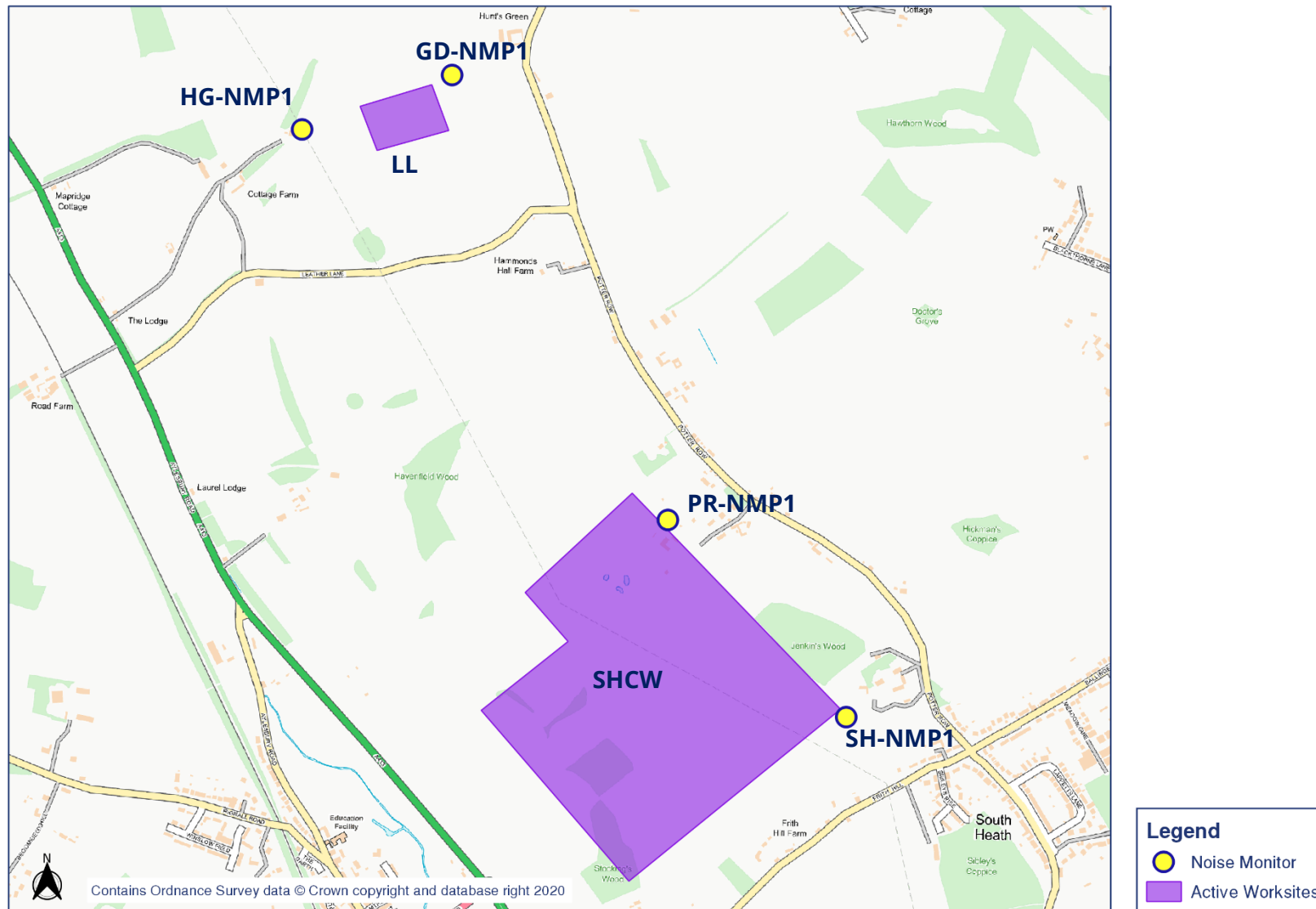




**Legend**

- Noise Monitor
- Active Worksites



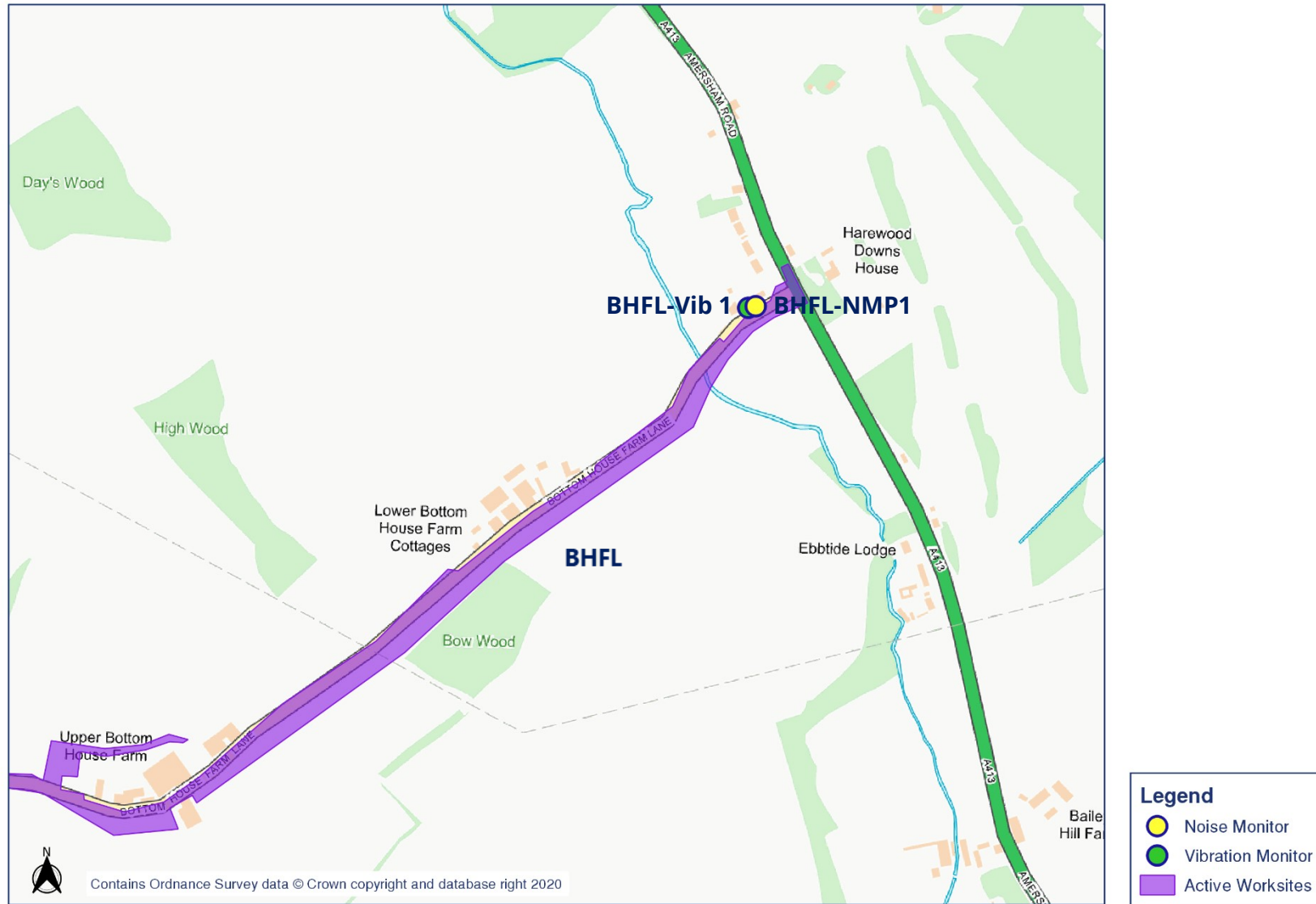


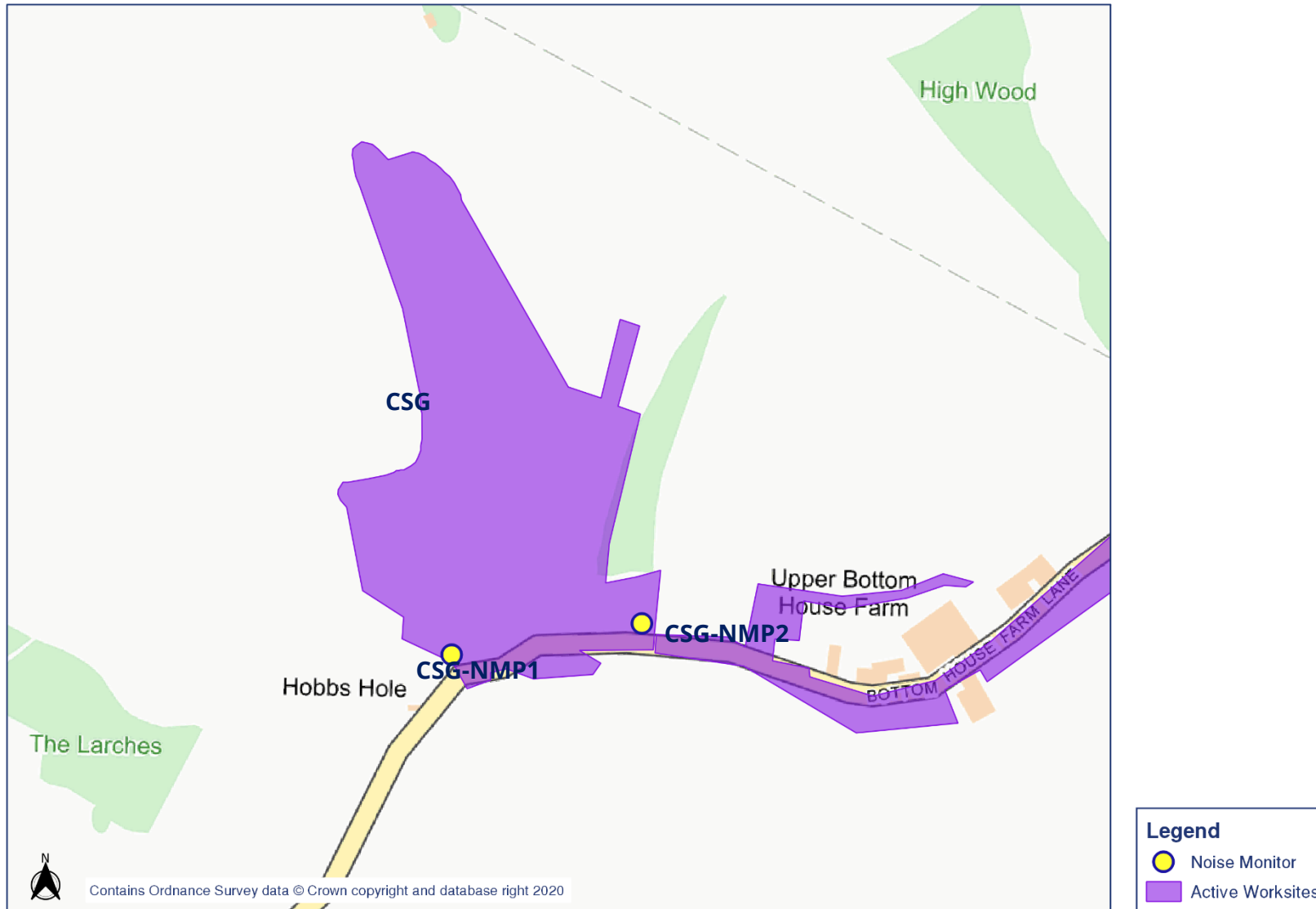




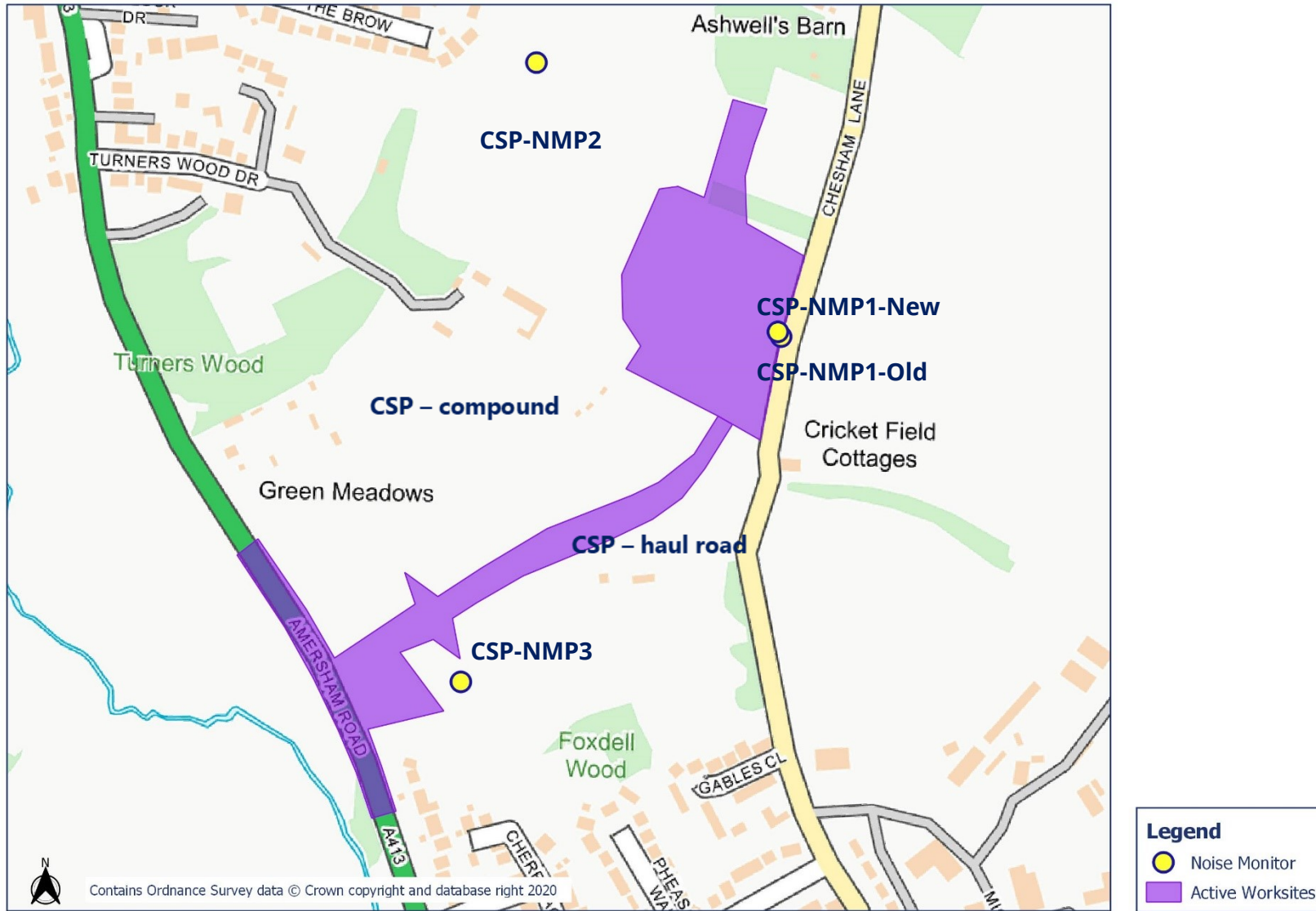








# HS2 Noise and Vibration Monitoring Plan - 13







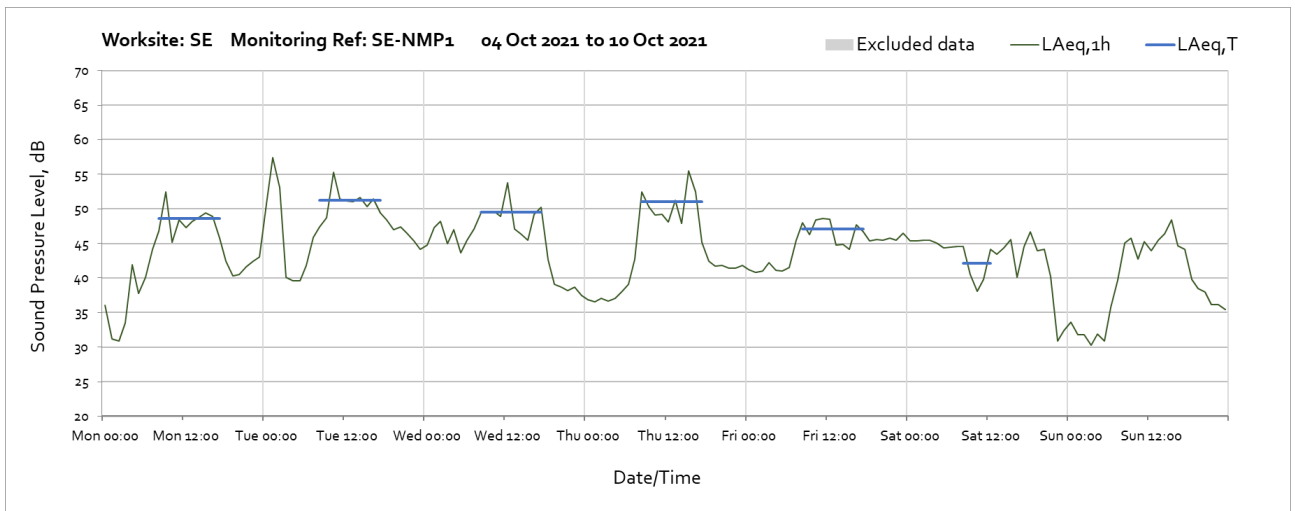
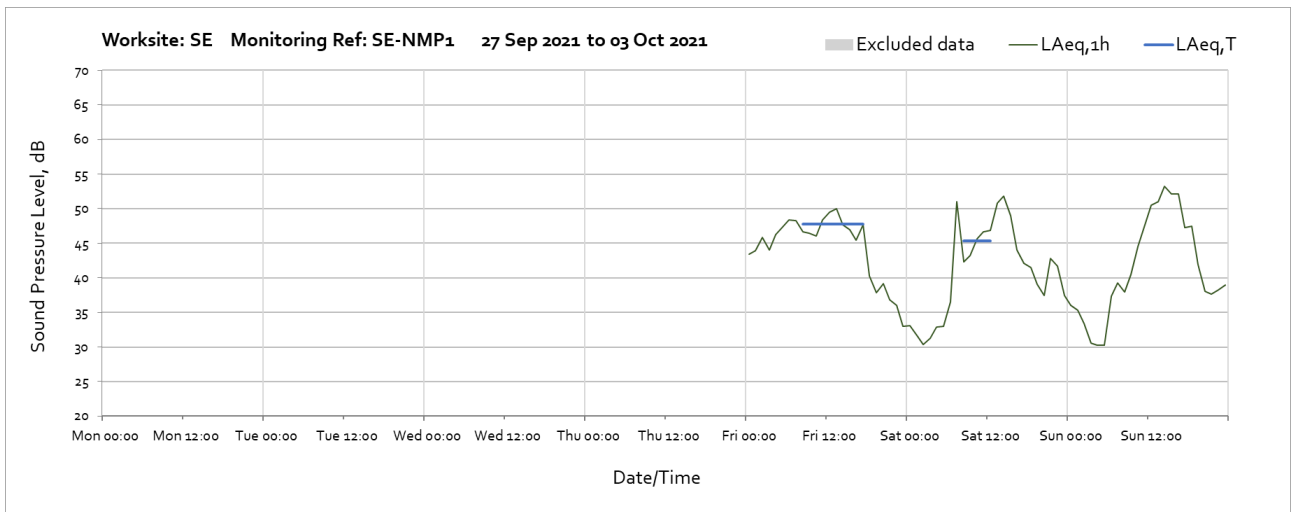


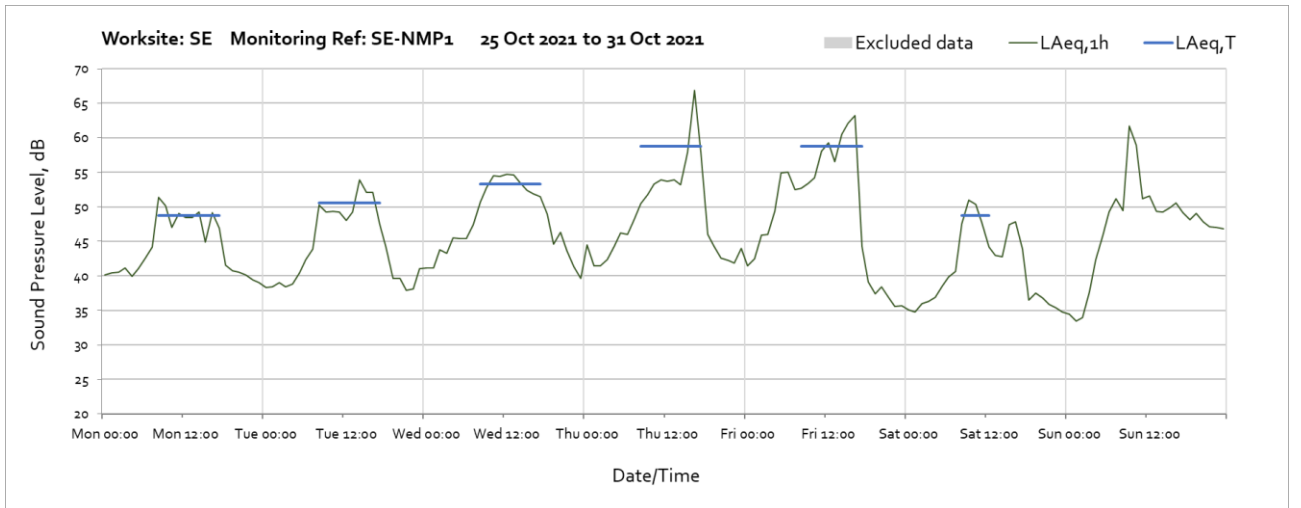
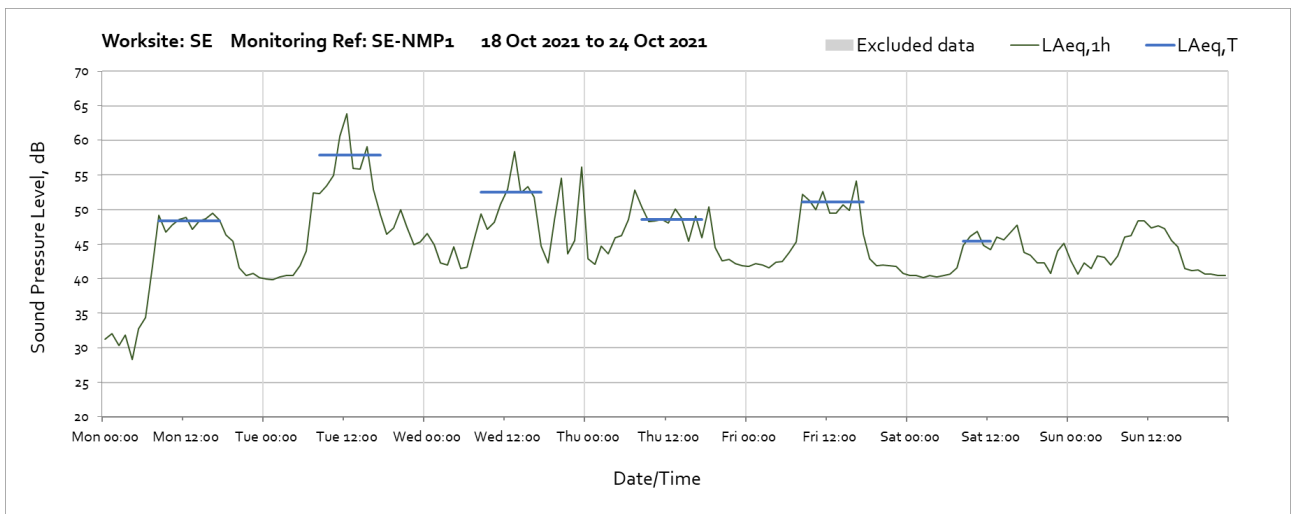
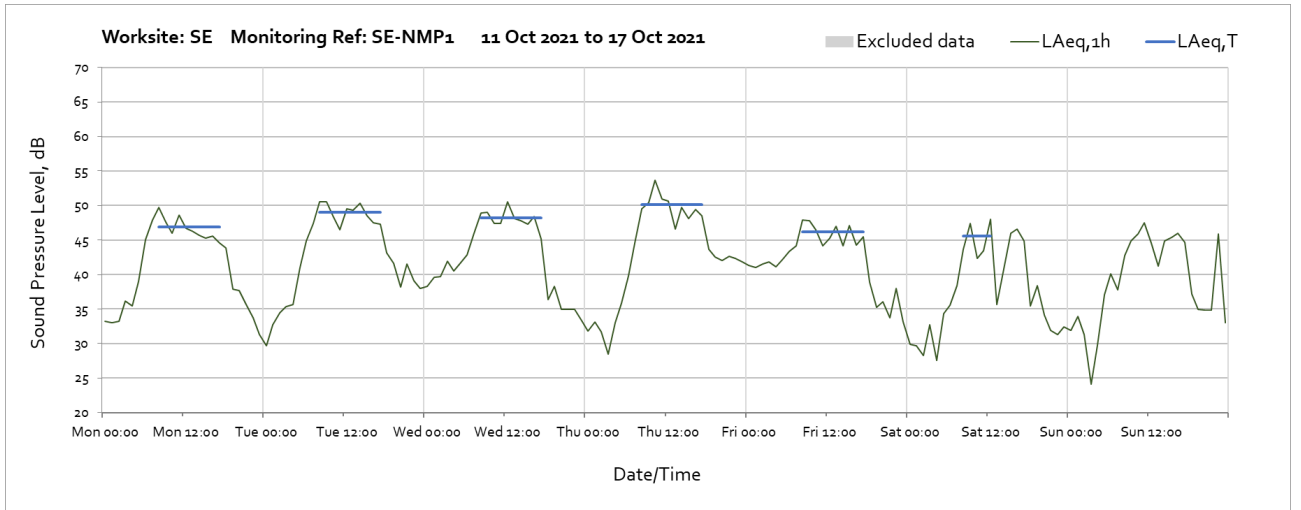
# Appendix C Data

## Noise

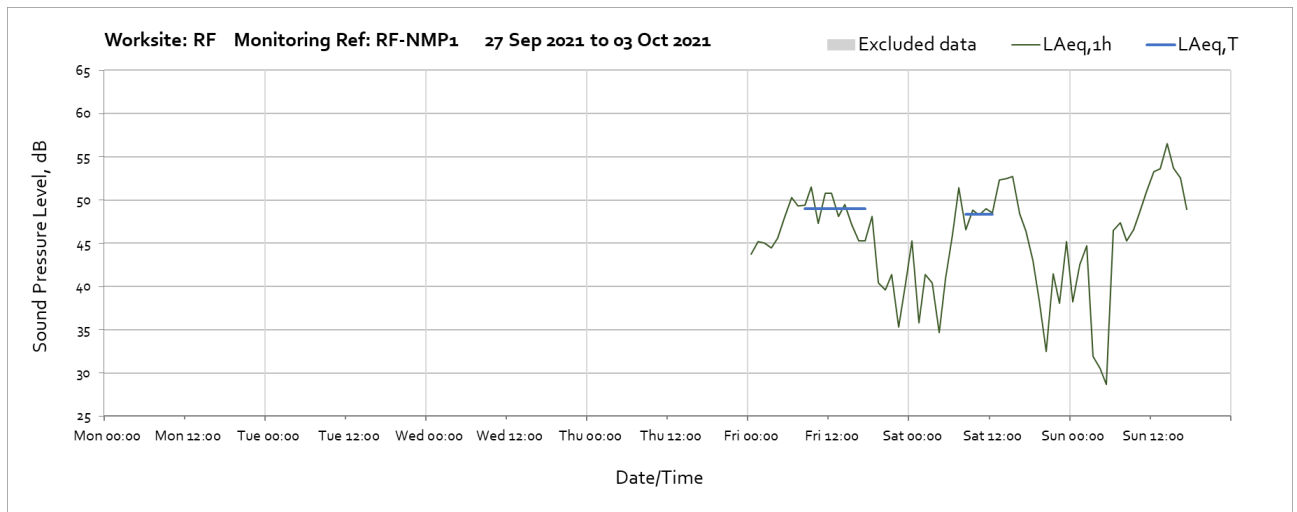
The following graphs show the hourly measured ambient noise level  $L_{Aeq,1h}$  and, where relevant, the averaged noise level  $L_{Aeq,T}$  values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have been excluded from the calculation of the  $L_{Aeq,T}$  values in **Error! Reference source not found.** of the main report.

### Worksite: SE – Monitoring Ref: SE-NMP1

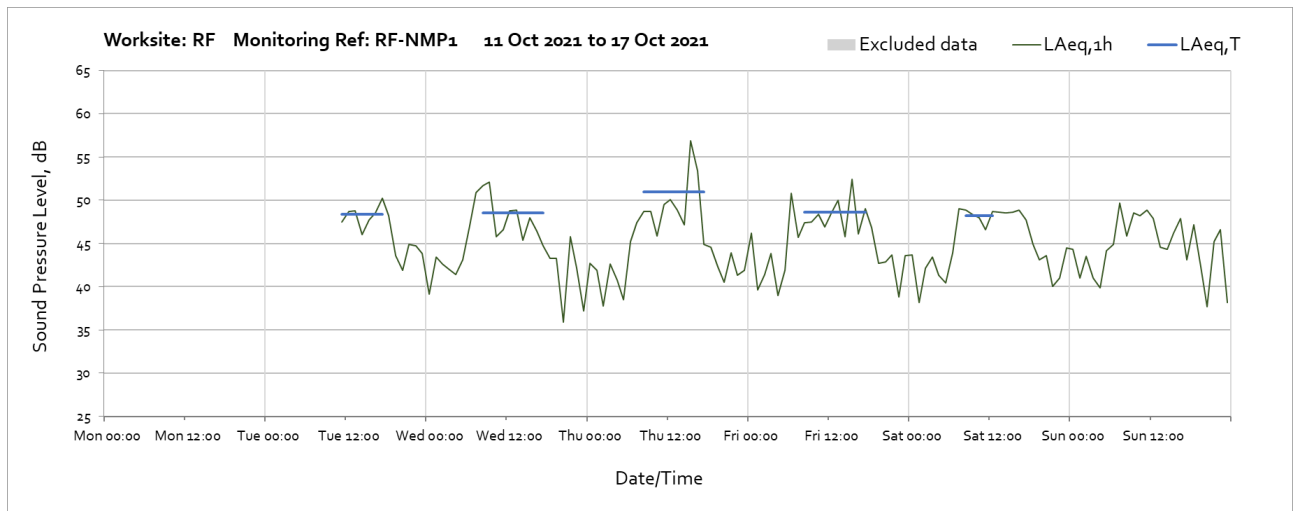




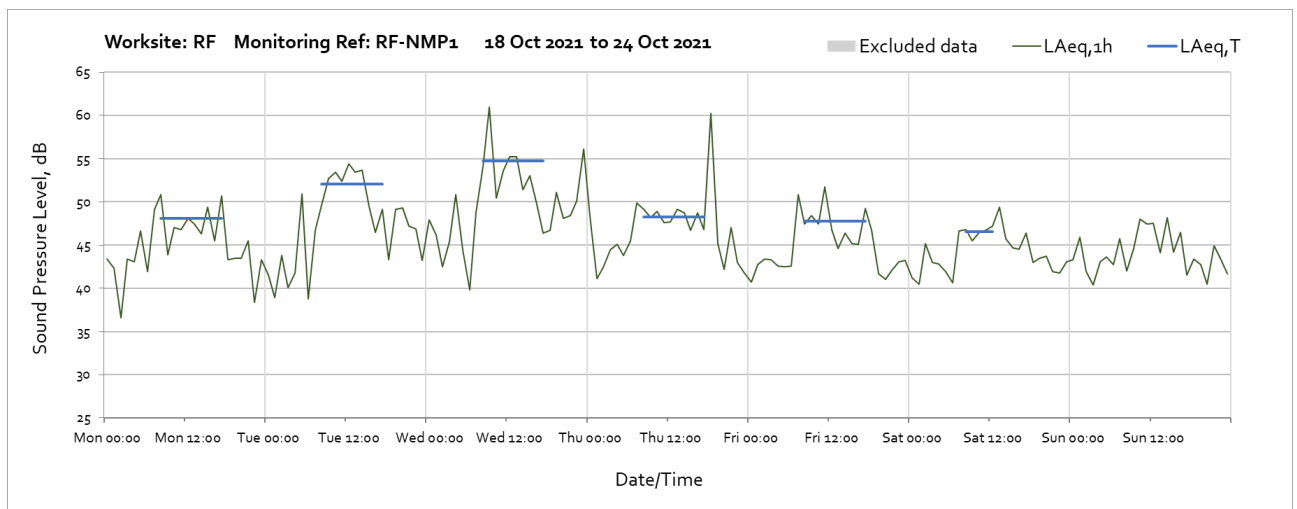
## Worksite: RF – Monitoring Ref: RF-NMP1



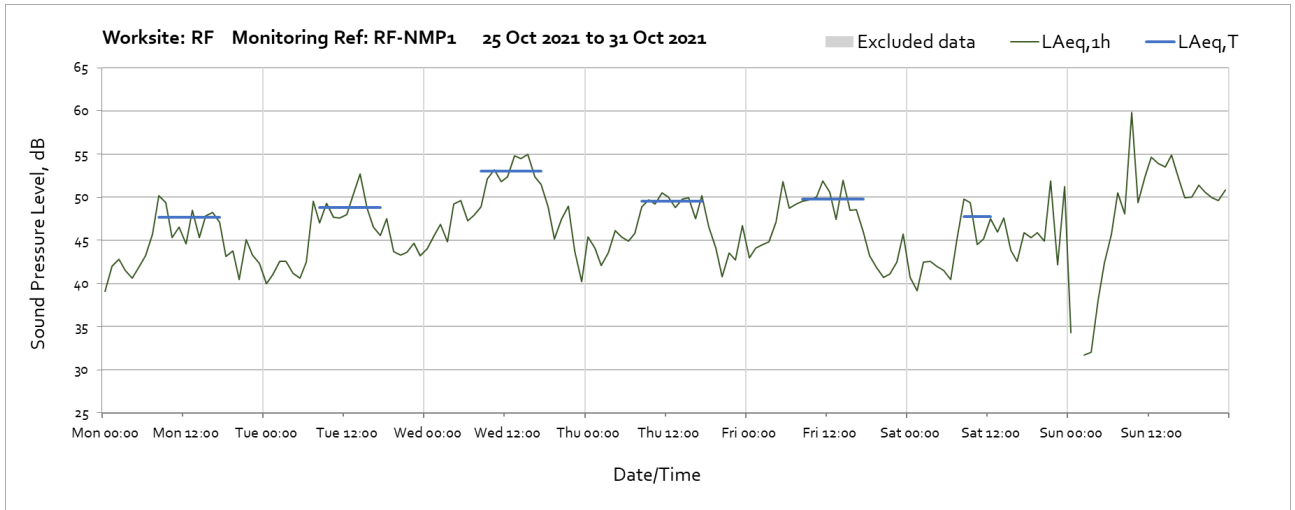
Note: Missing data between 18:00 on Sunday 3<sup>rd</sup> October and 11:00 on Tuesday 12<sup>th</sup> October was due to loss of continuous site power from the hydrogen generator.



Note: Missing data between 18:00 on Sunday 3<sup>rd</sup> October and 11:00 on Tuesday 12<sup>th</sup> October was due to loss of continuous site power from the hydrogen generator.

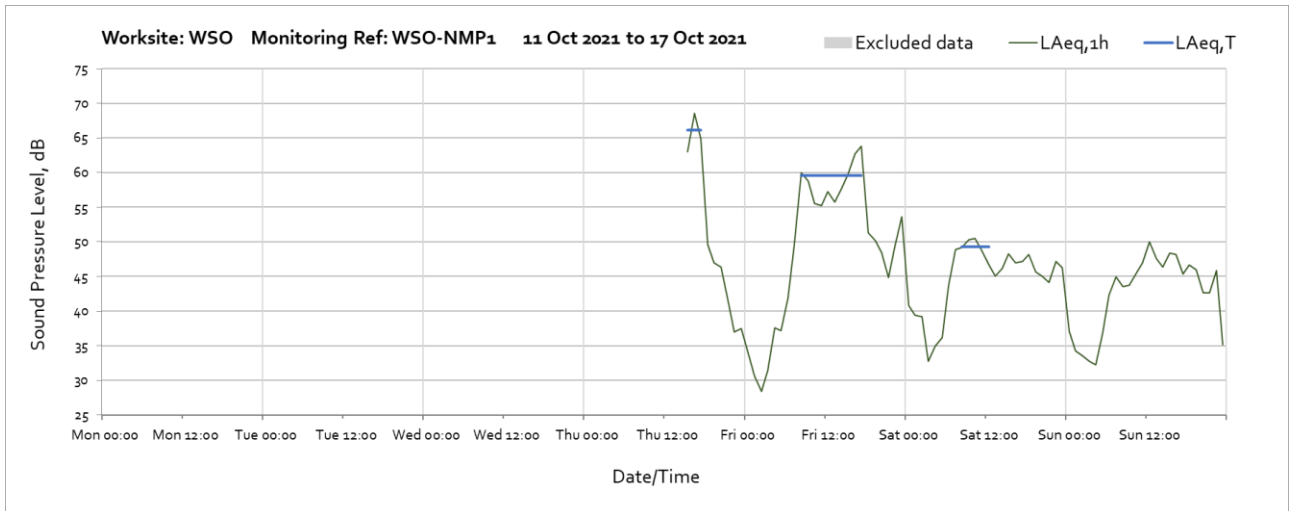




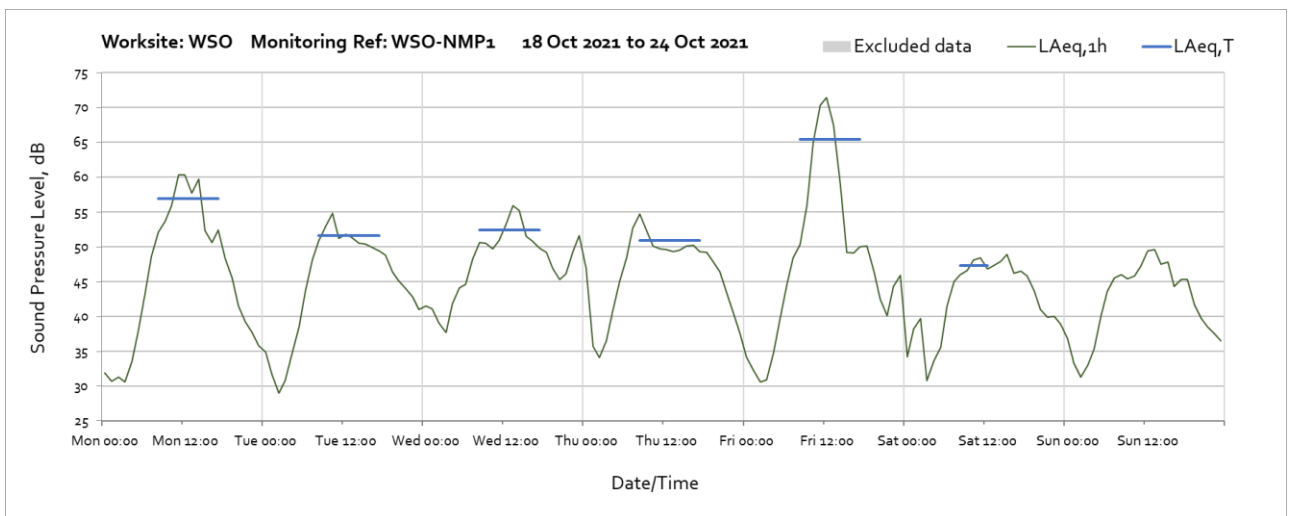


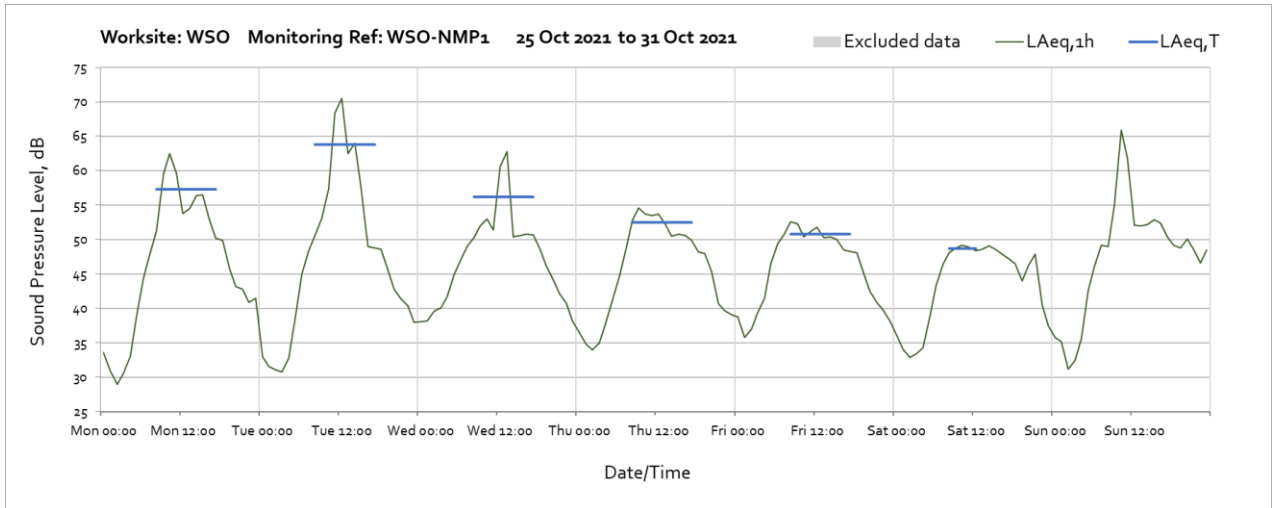
Note: Missing data between 01:00 and 02:00 on Sunday 31<sup>st</sup> October was due to a daylight saving adjustment.

**Worksite: WSO – Monitoring Ref: WSO-NMP1**

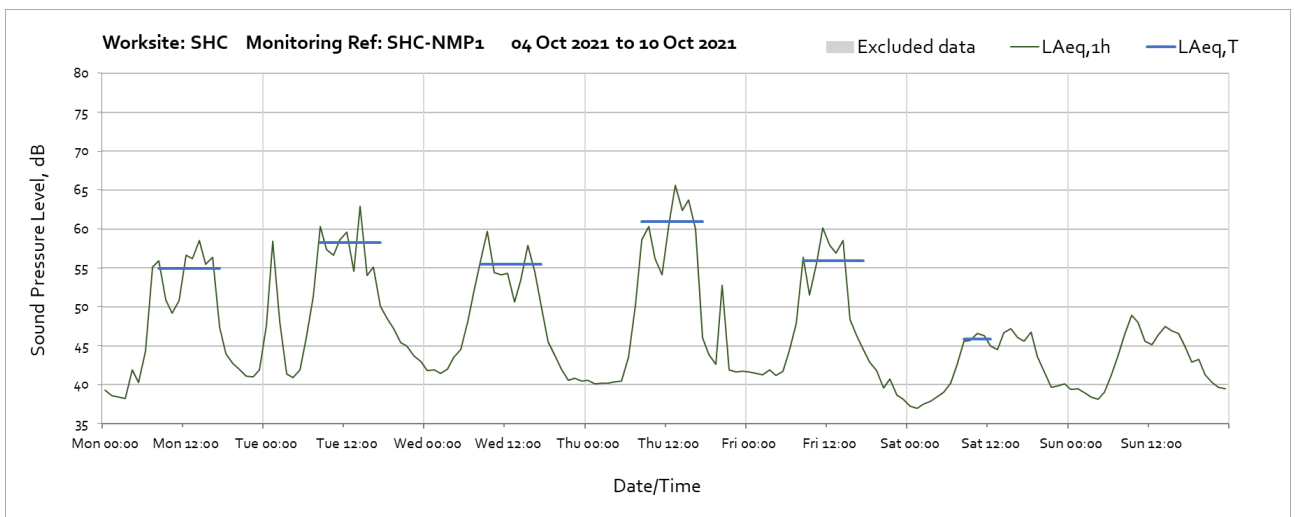
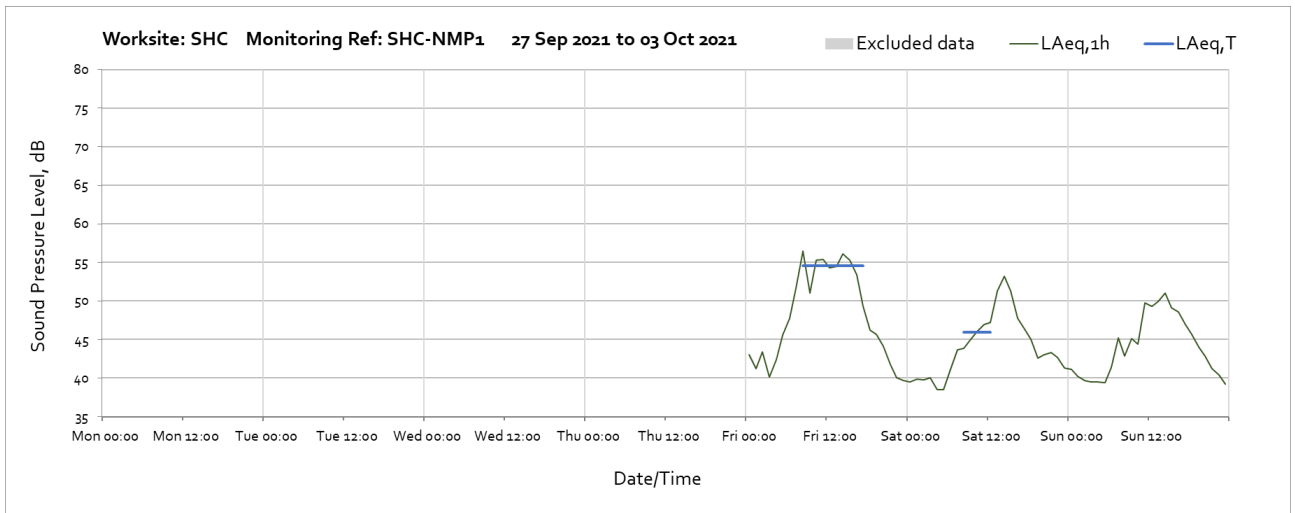


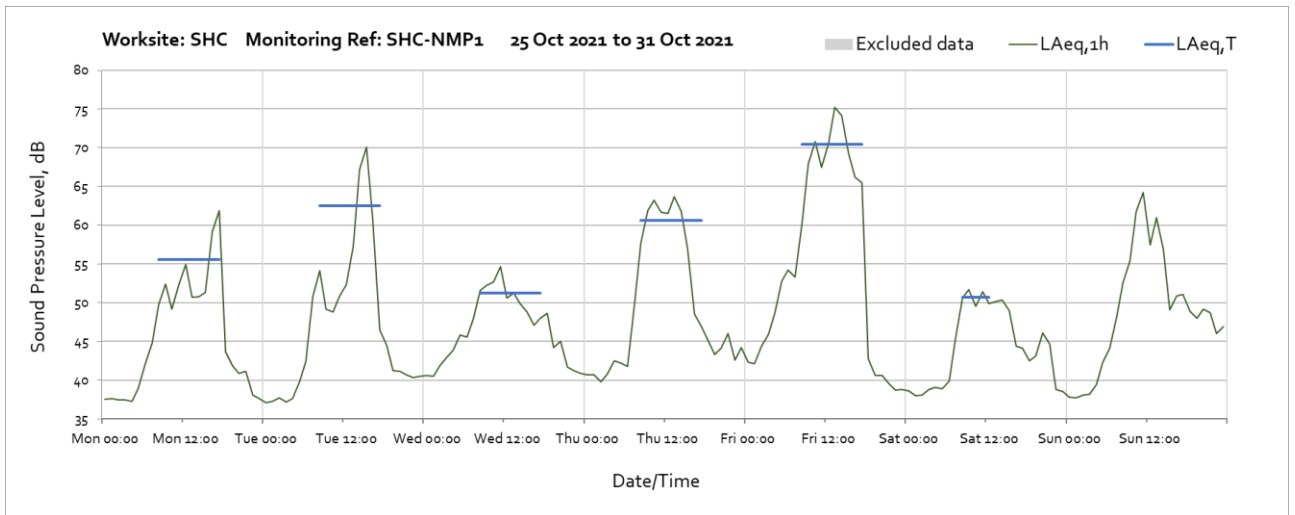
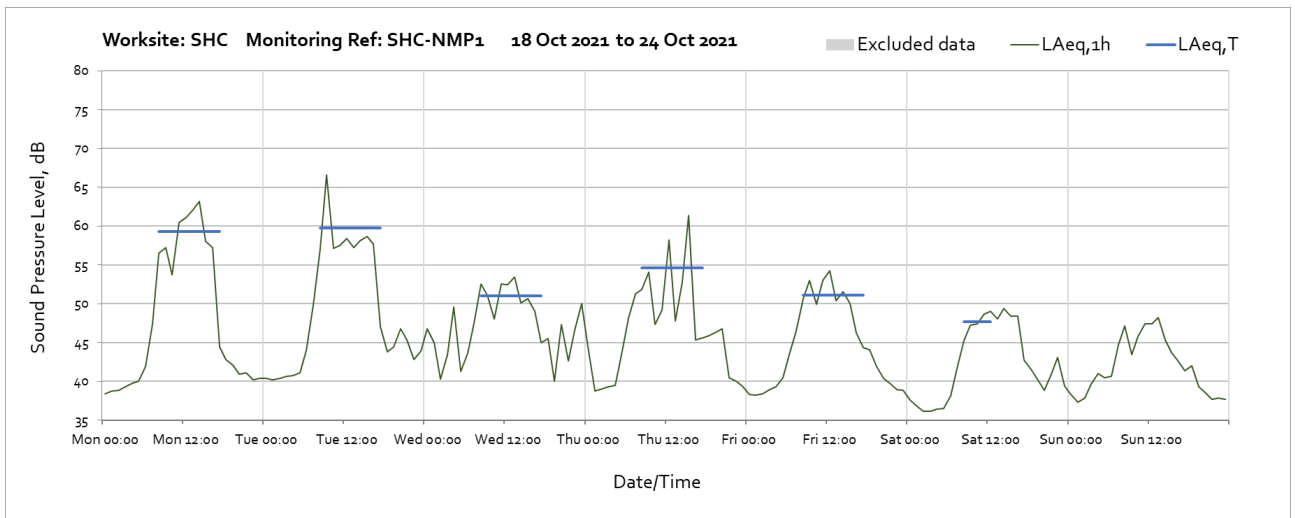
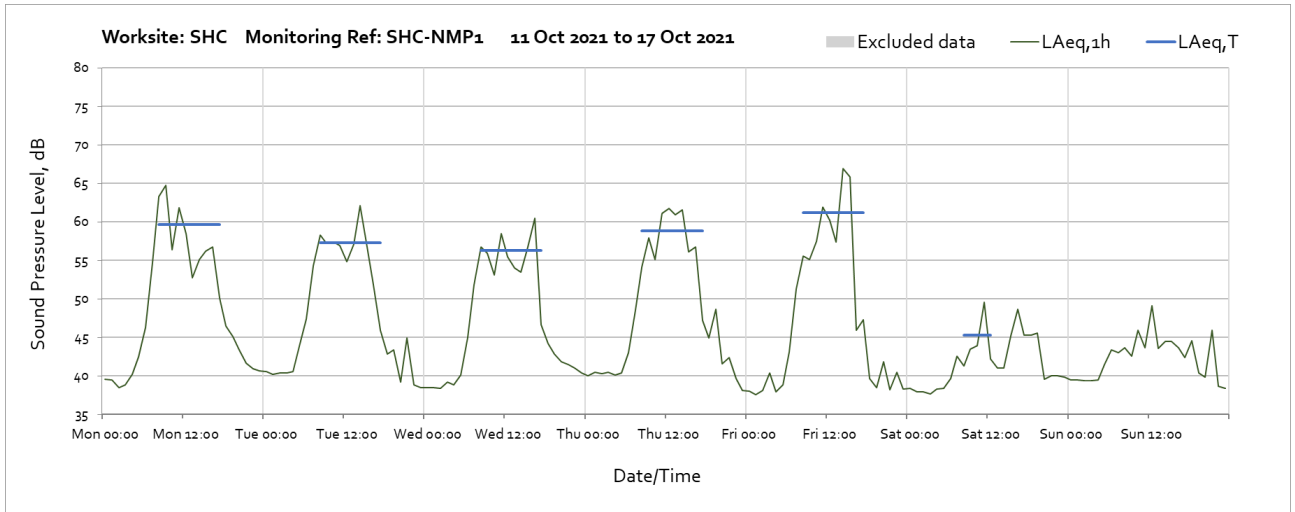
Note: Noise Monitor was installed on 14<sup>th</sup> October 2021.



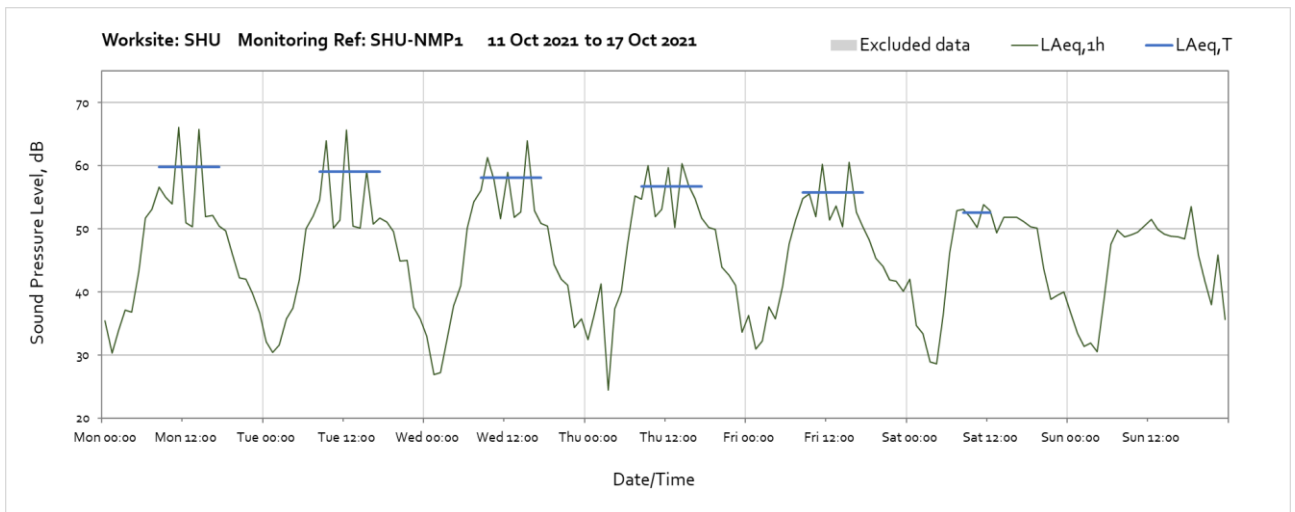
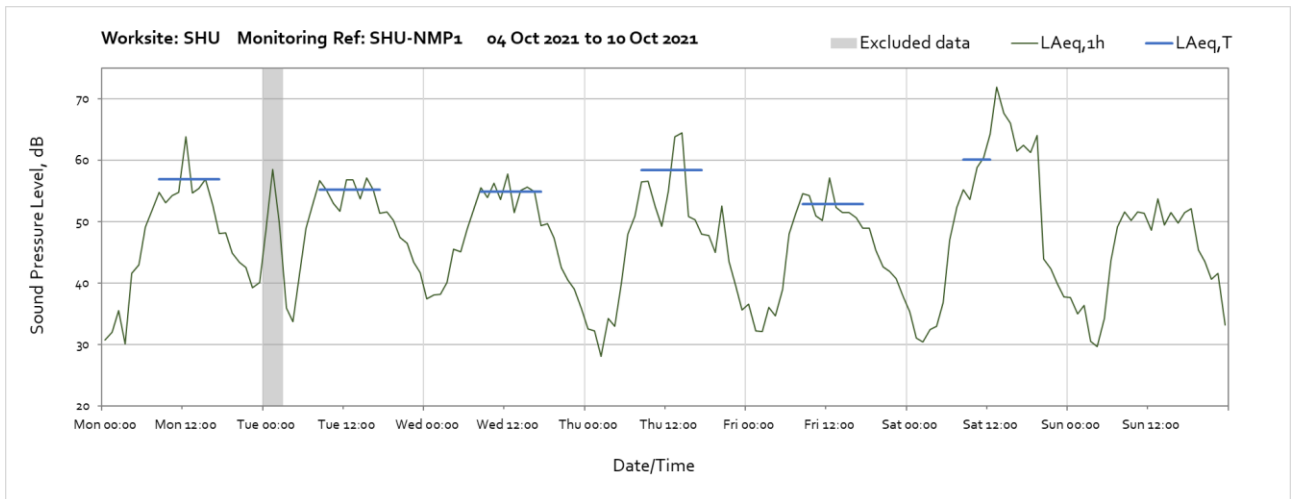
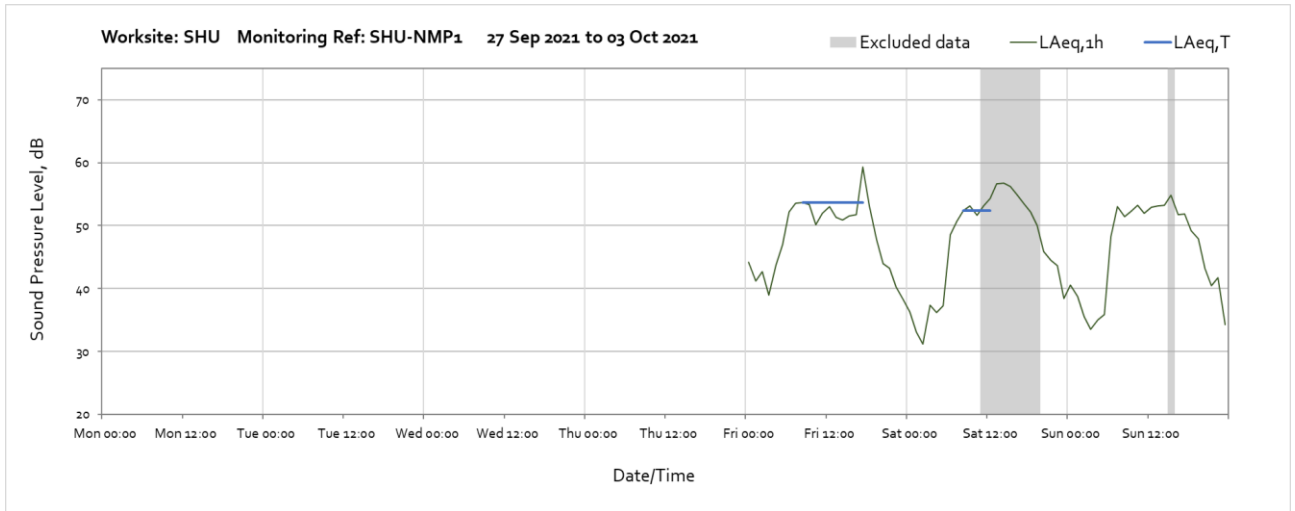


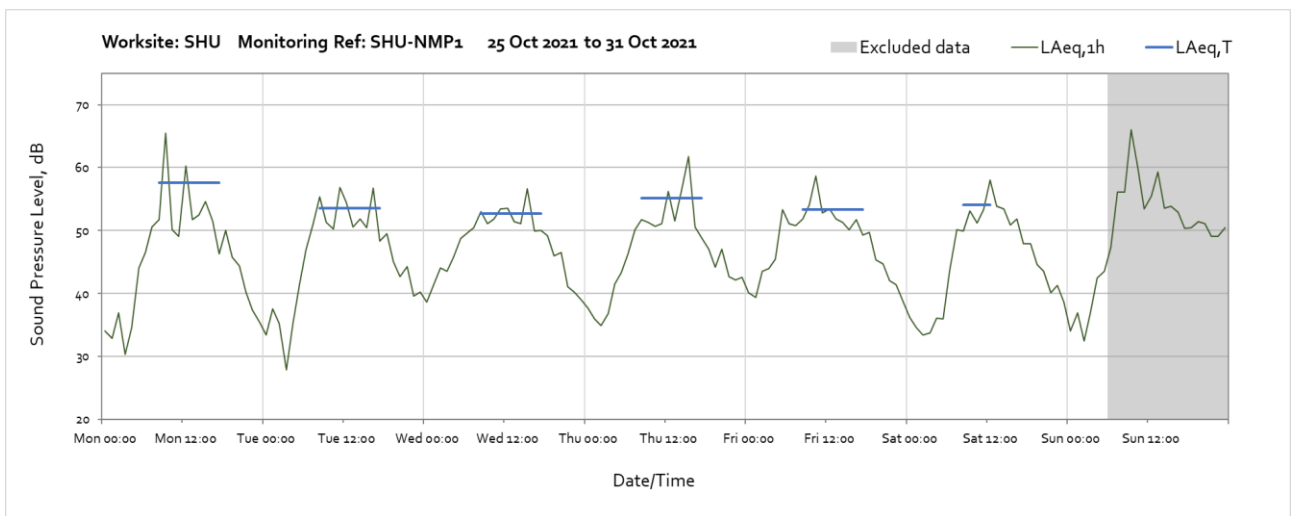
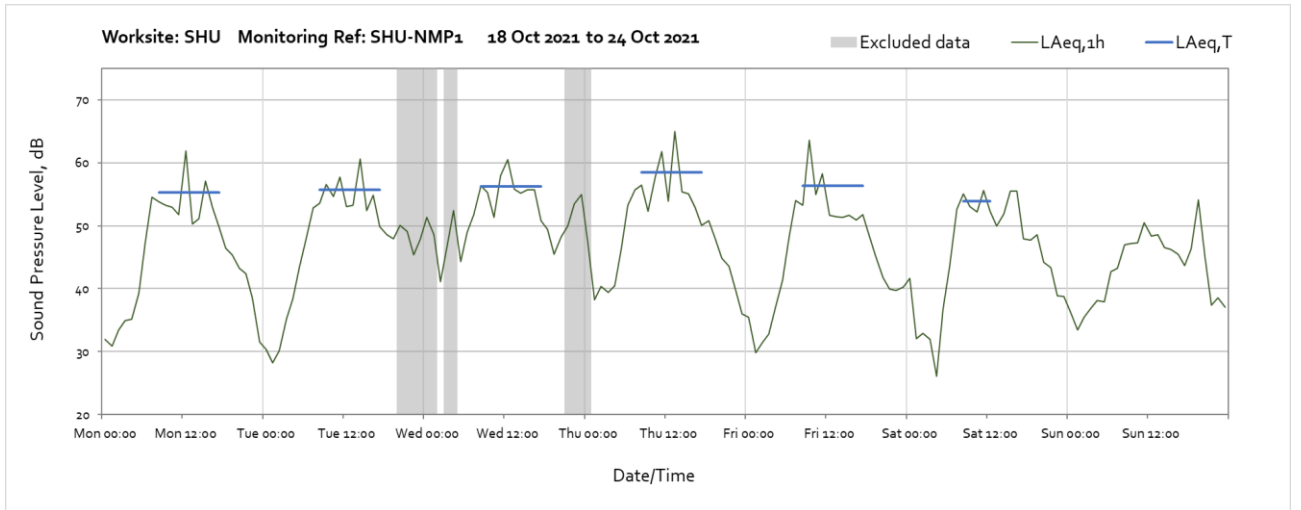
**Worksite: SHC - Monitoring Ref: SHC-NMP1**



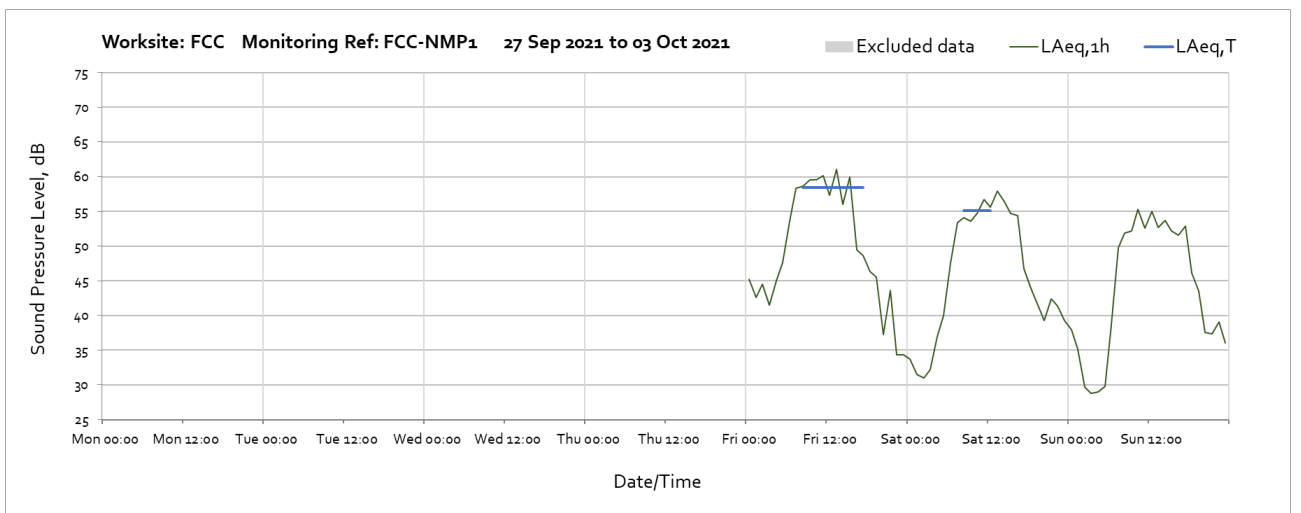


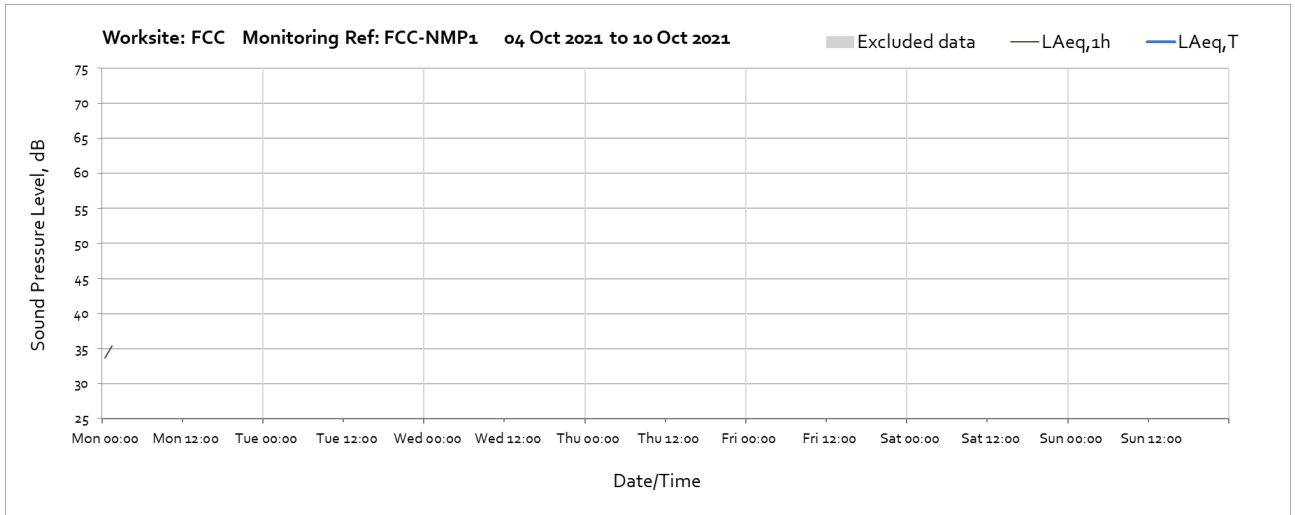
## Worksite: SHU – Monitoring Ref: SHU-NMP1



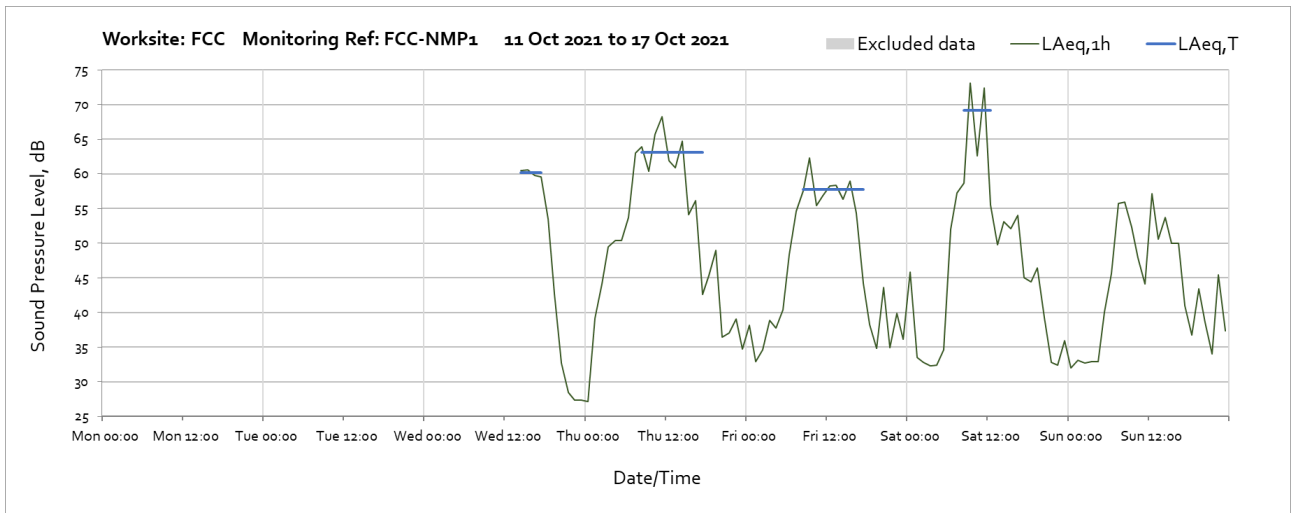


**Worksite: FCC - Monitoring Ref: FCC-NMP1**

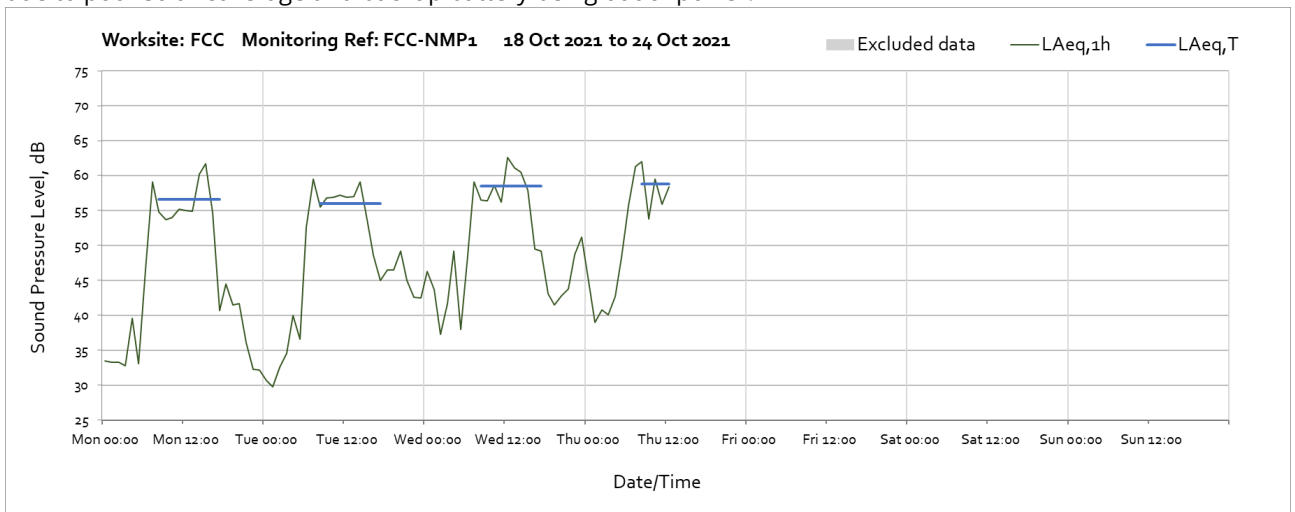




Note: Missing data between 01:00 on Monday 4<sup>th</sup> October and 14:00 on Wednesday 13<sup>th</sup> of October was due to poor solar coverage and backup battery being out of power.



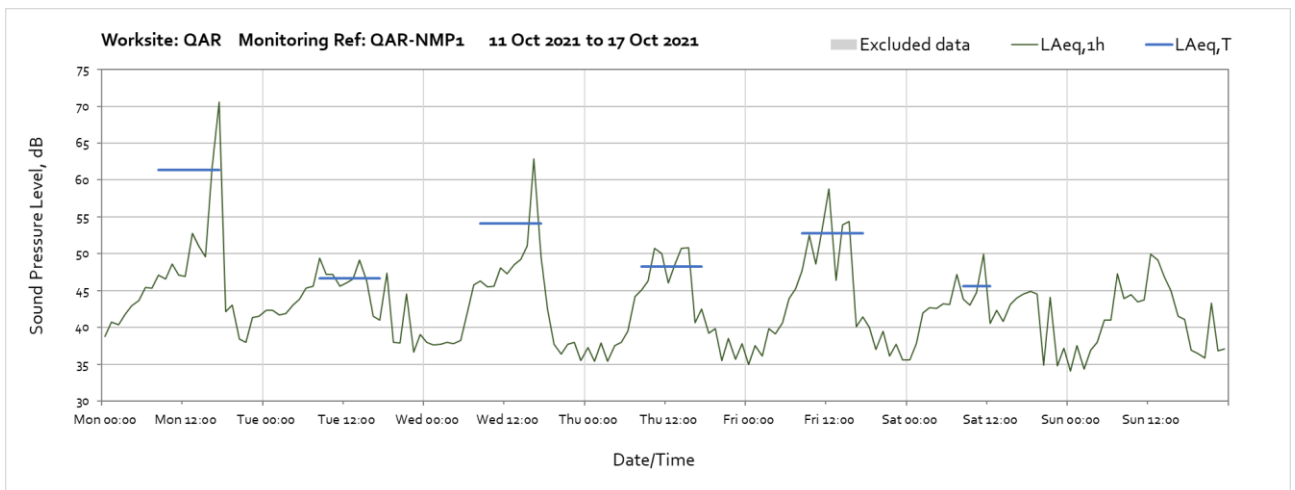
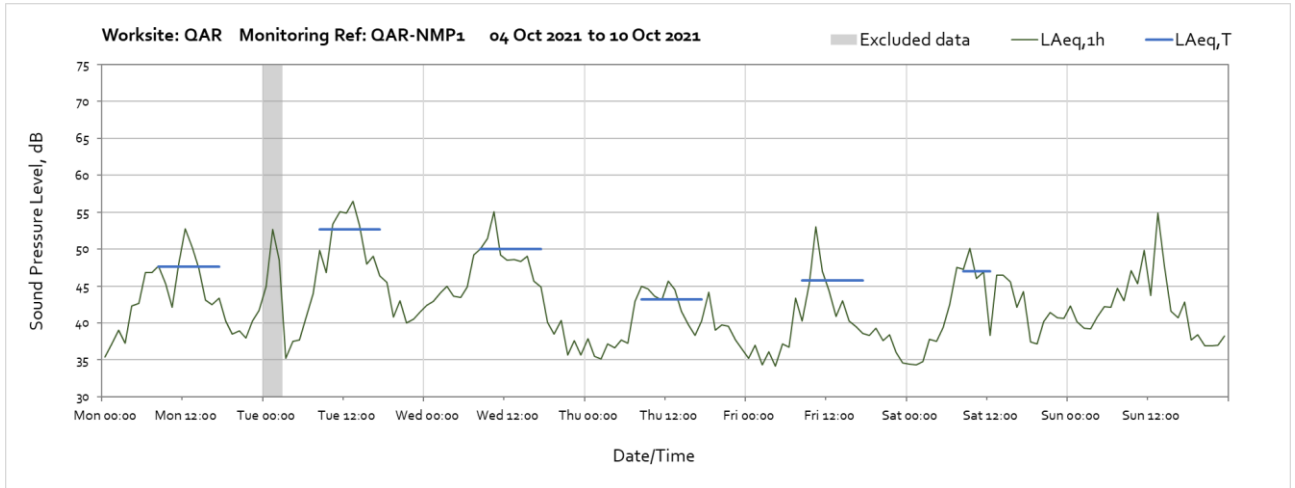
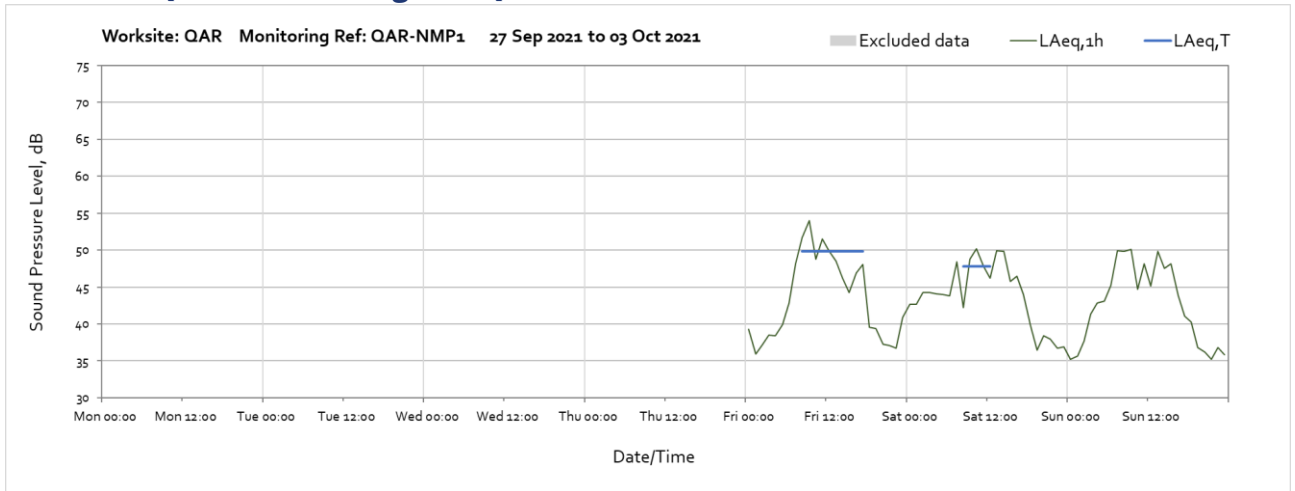
Note: Missing data between 01:00 on Monday 4<sup>th</sup> October and 14:00 on Wednesday 13<sup>th</sup> of October was due to poor solar coverage and backup battery being out of power.

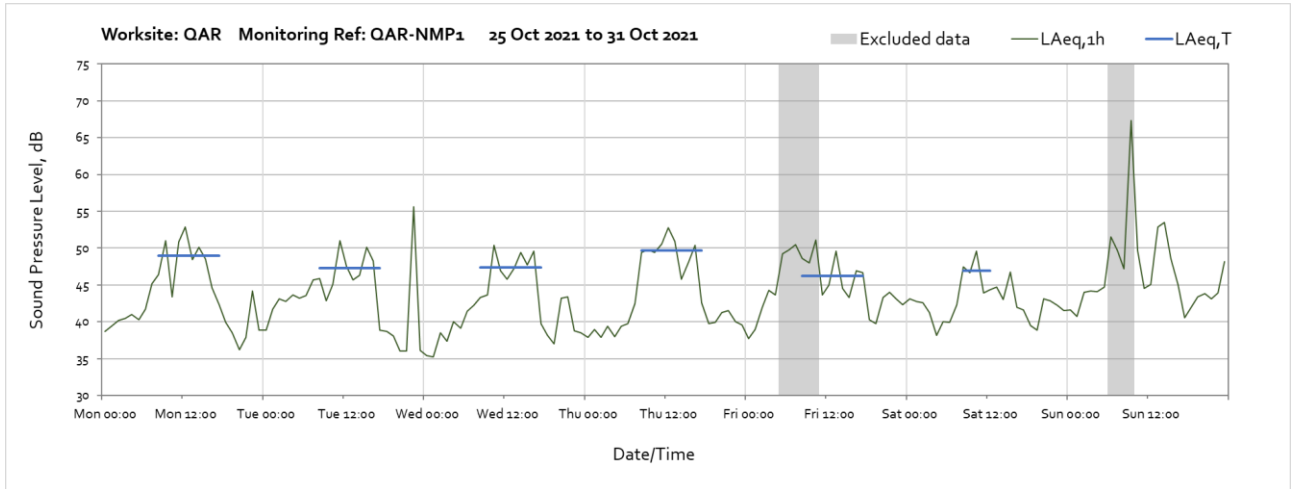
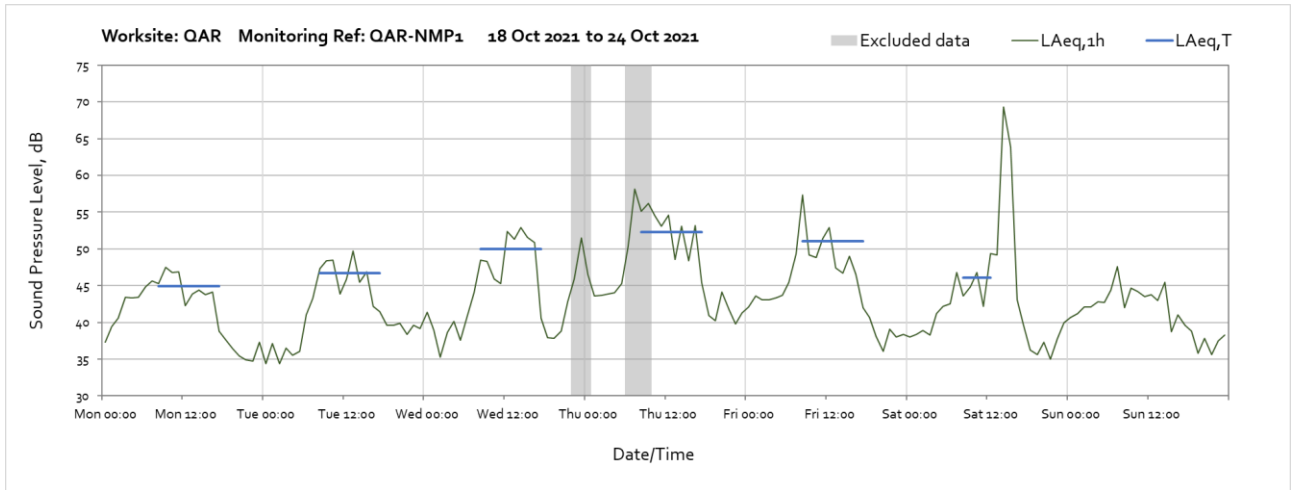


Note: Missing data between 13:00 on Thursday 21<sup>st</sup> October and the end of the month was due to poor solar coverage and backup battery being out of power.

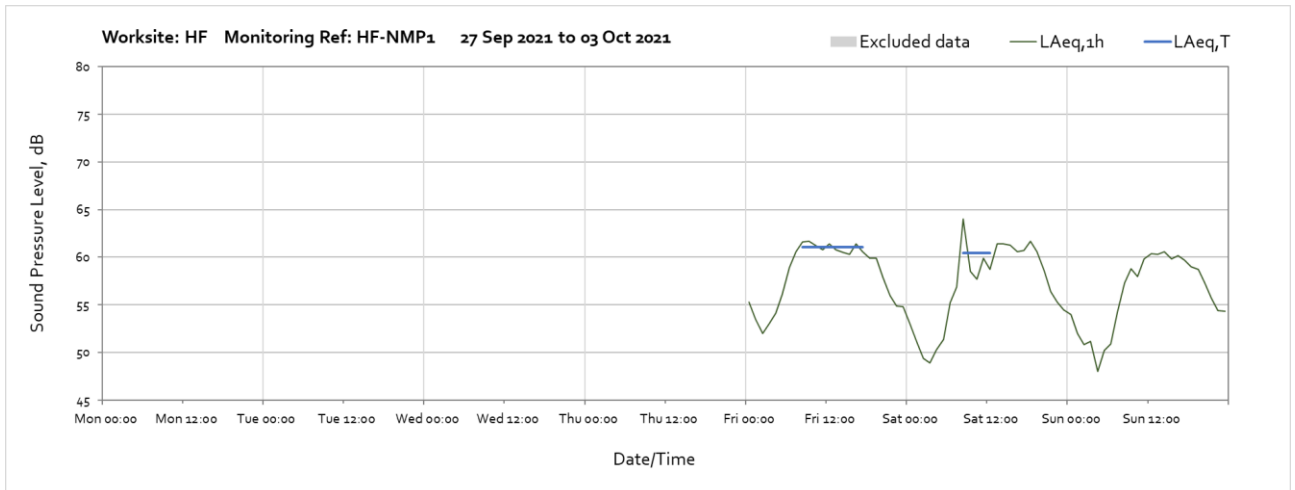
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## Worksite: QAR – Monitoring Ref: QAR-NMP1

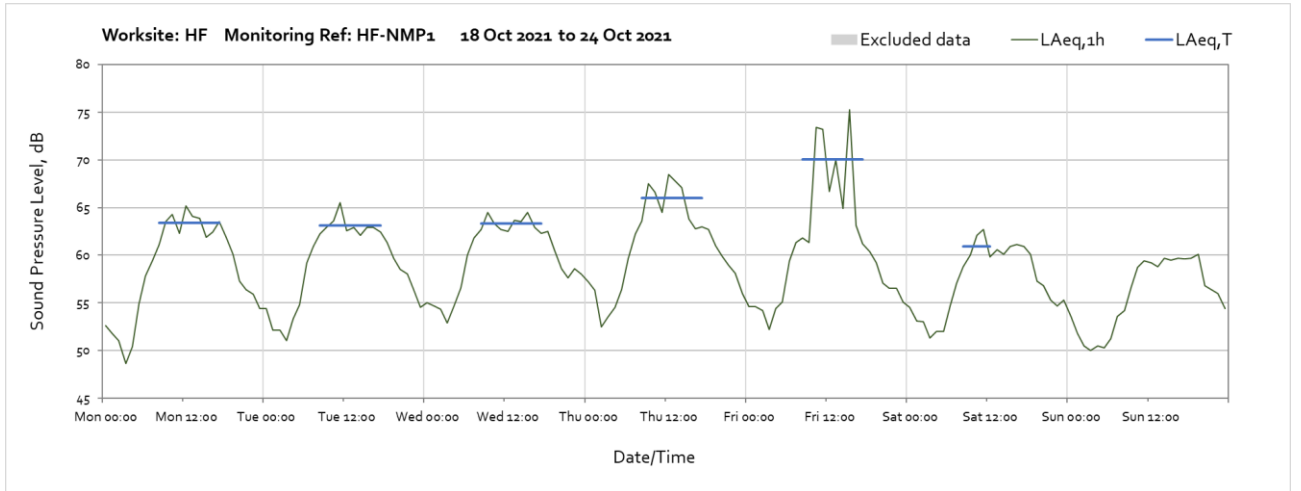
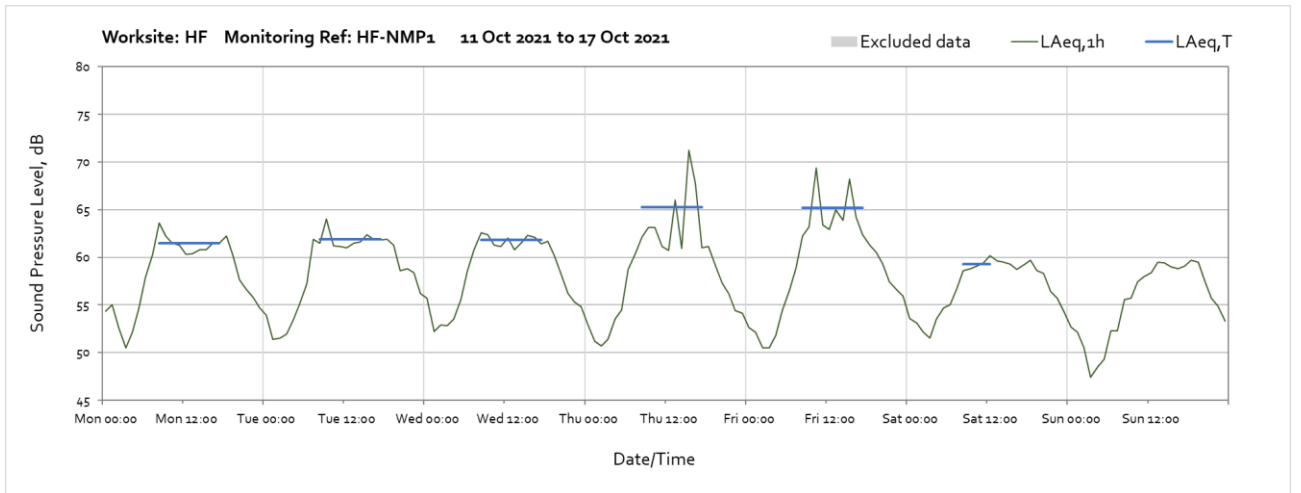
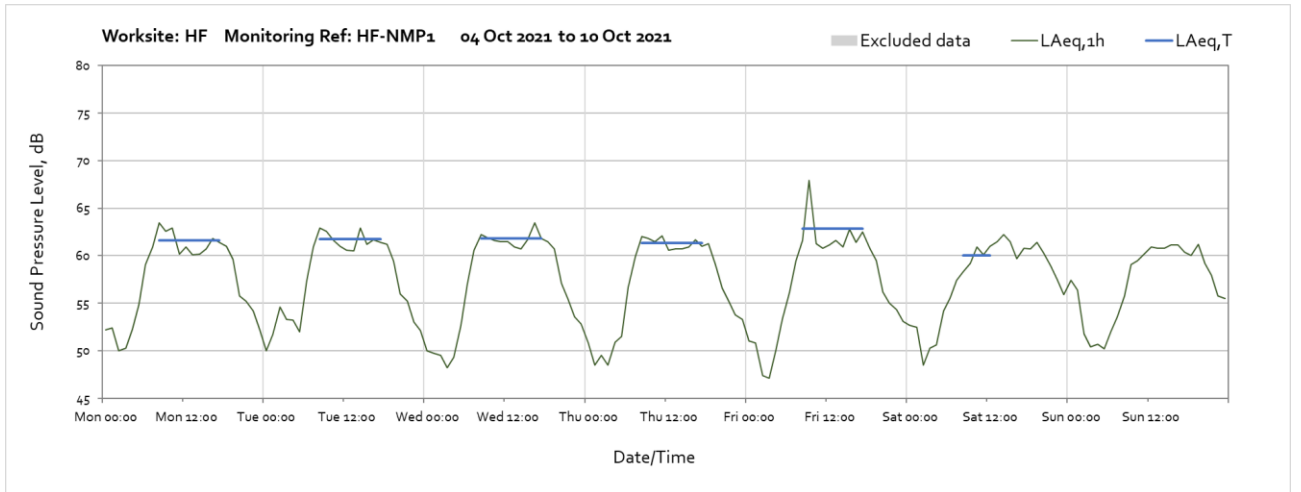


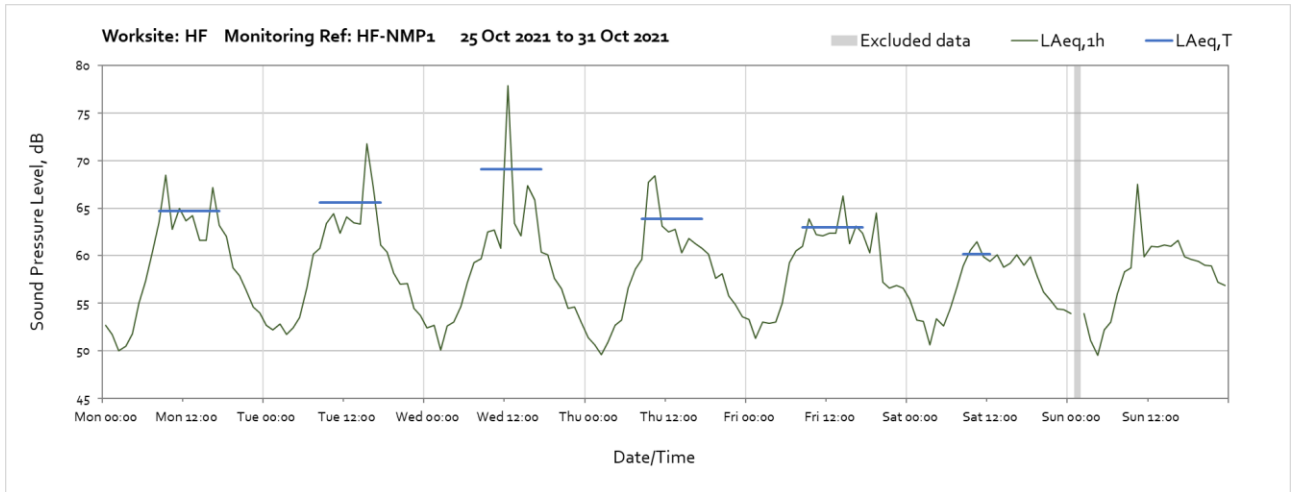


**Worksite: HF - Monitoring Ref: HF-NMP1**



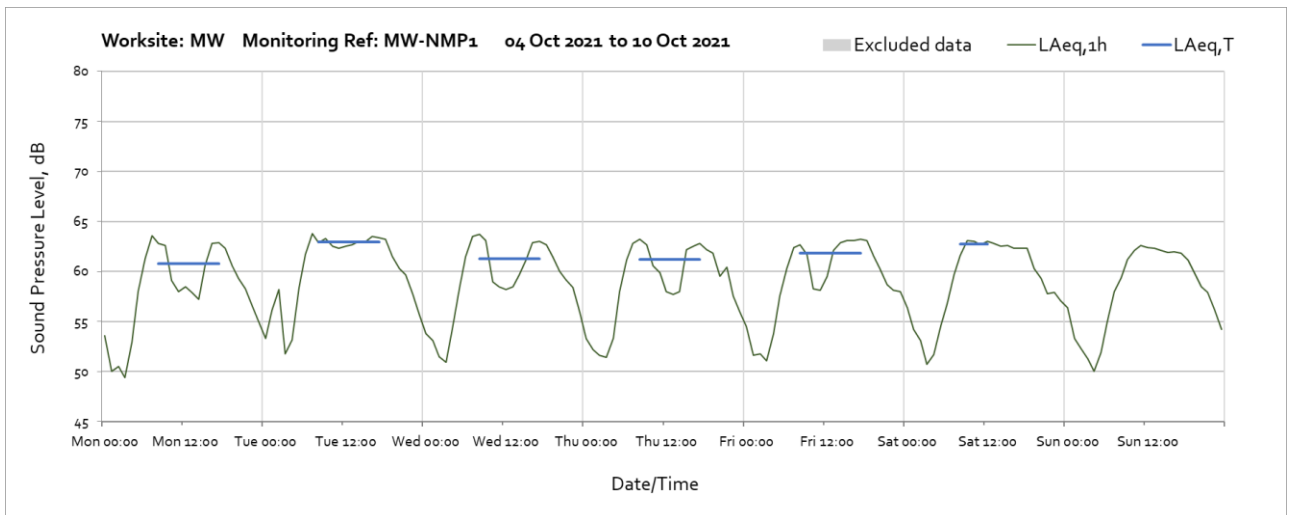
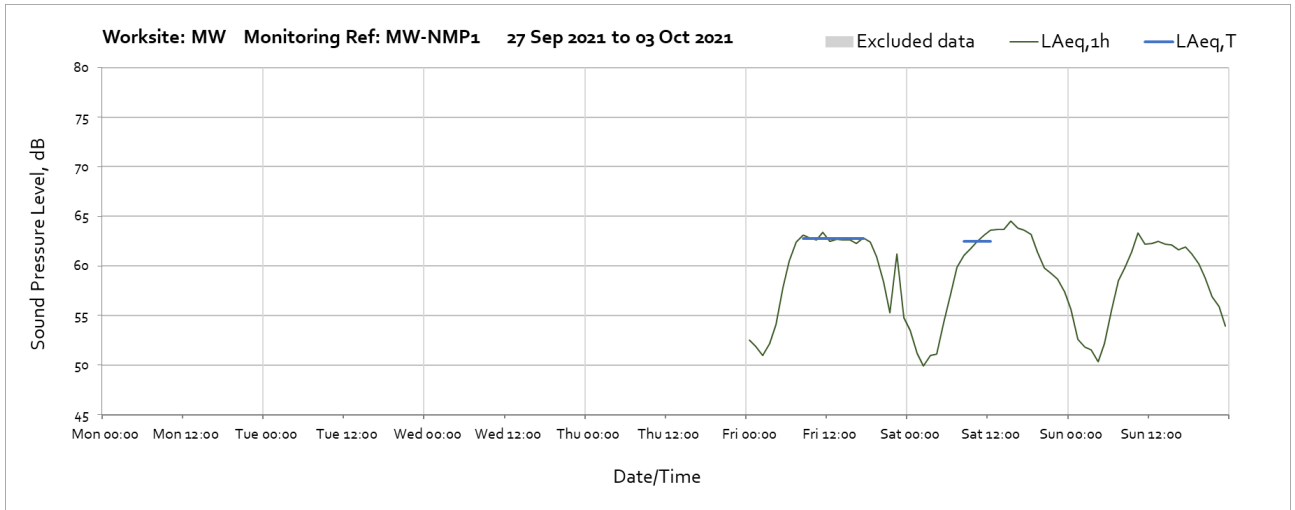


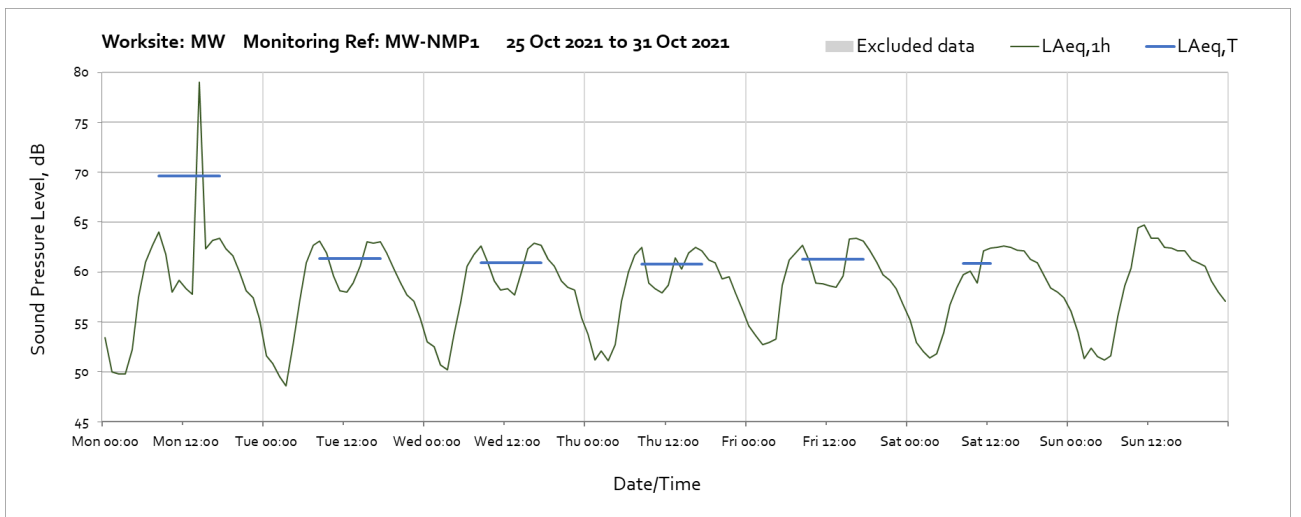
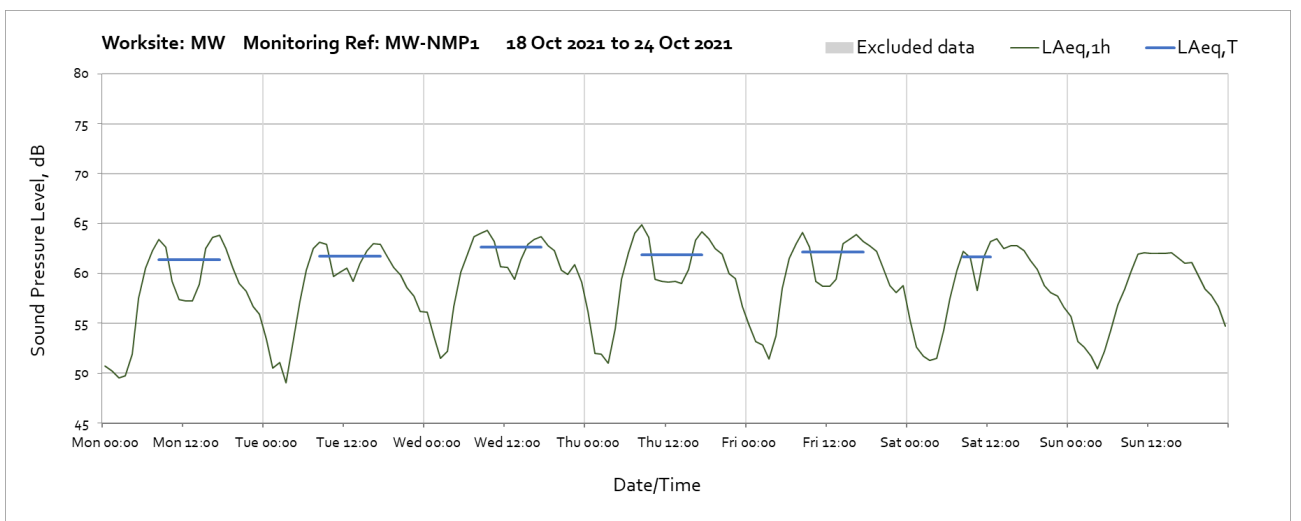
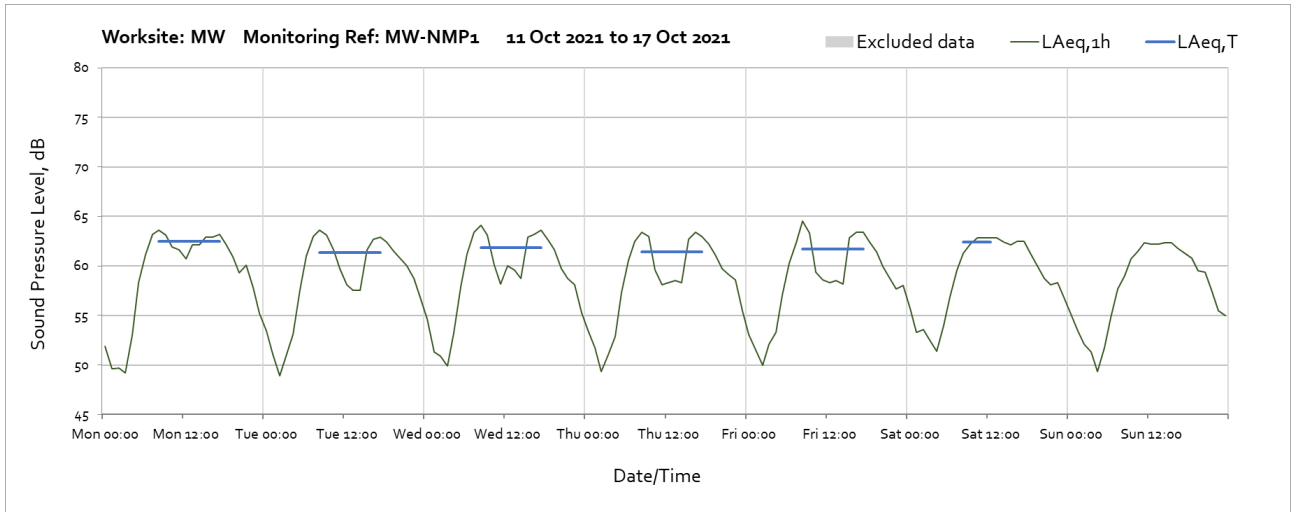




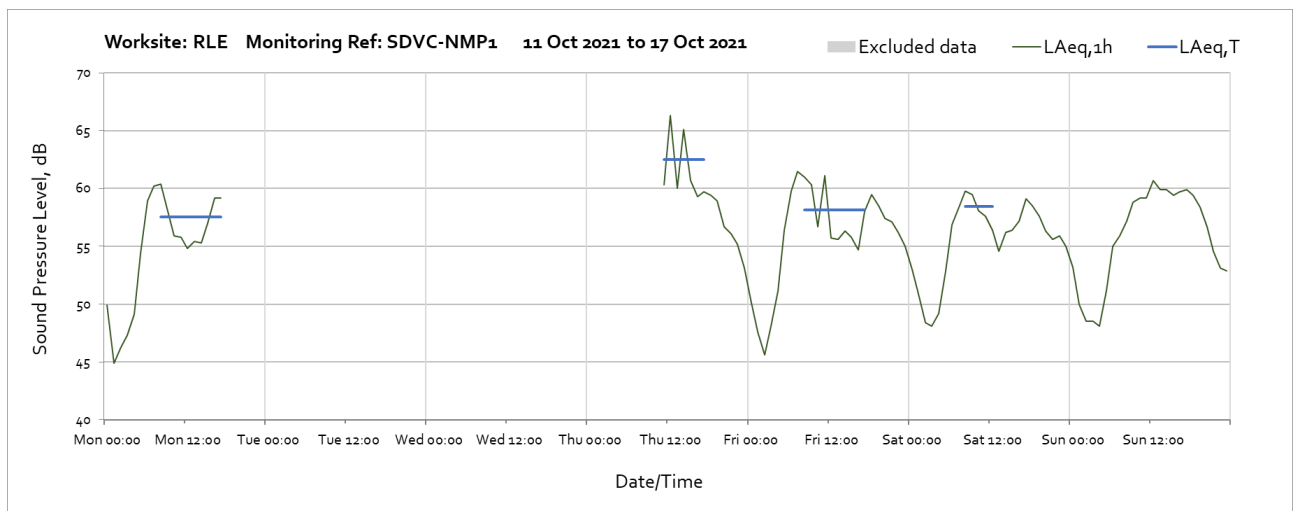
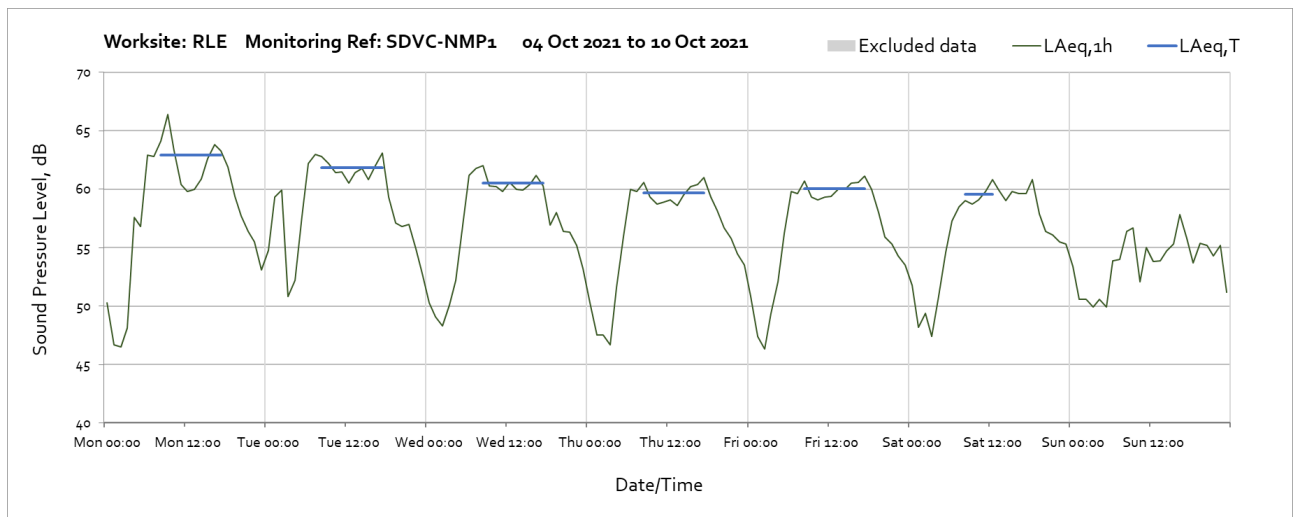
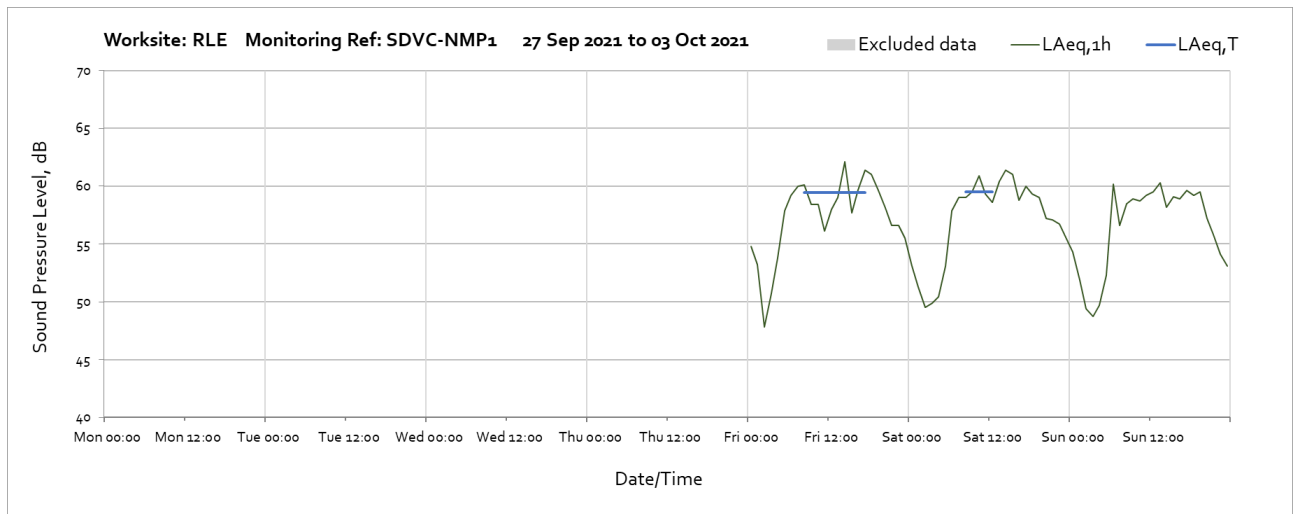
Note: Missing data between 01:00 and 02:00 on Sunday 31<sup>st</sup> October was due to change to daylight saving.

**Worksite: MW – Monitoring Ref: MW-NMP1**



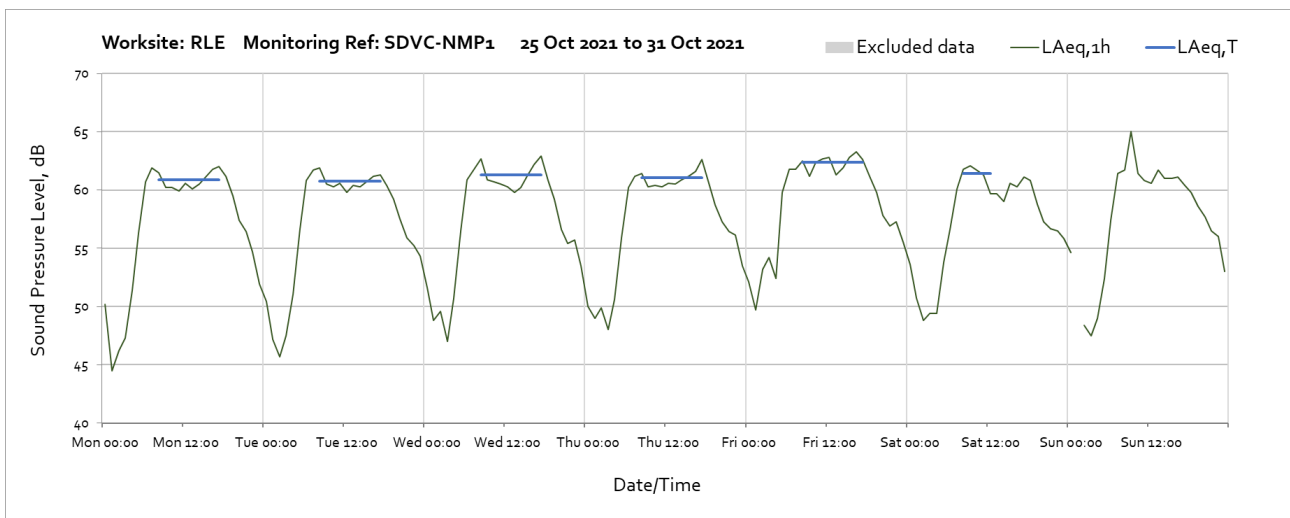
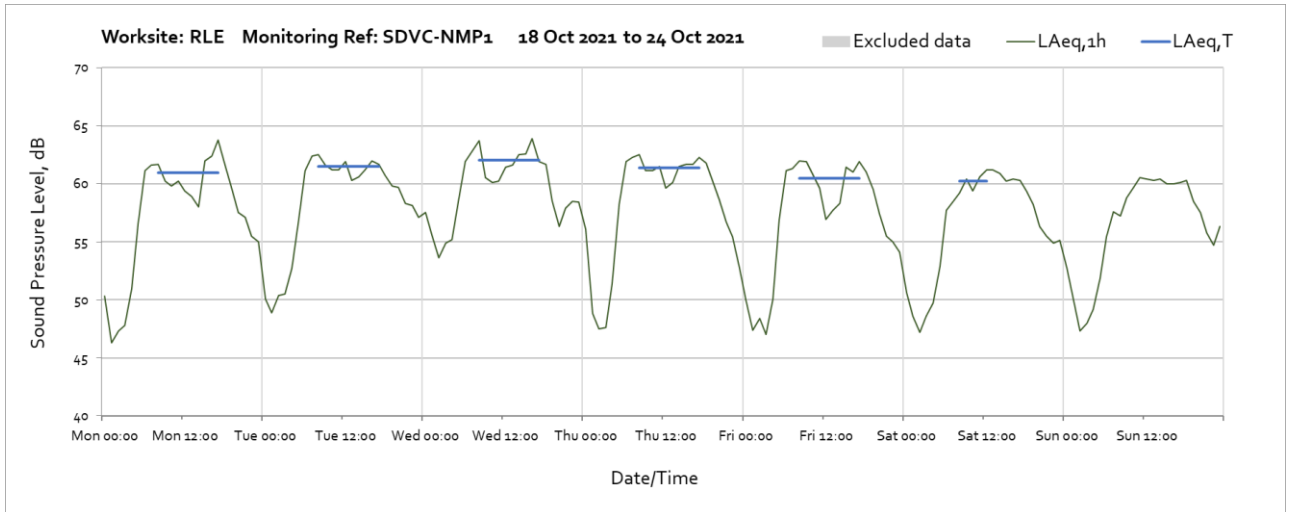


## Worksite: RLE – Monitoring Ref: SDVC-NMP1



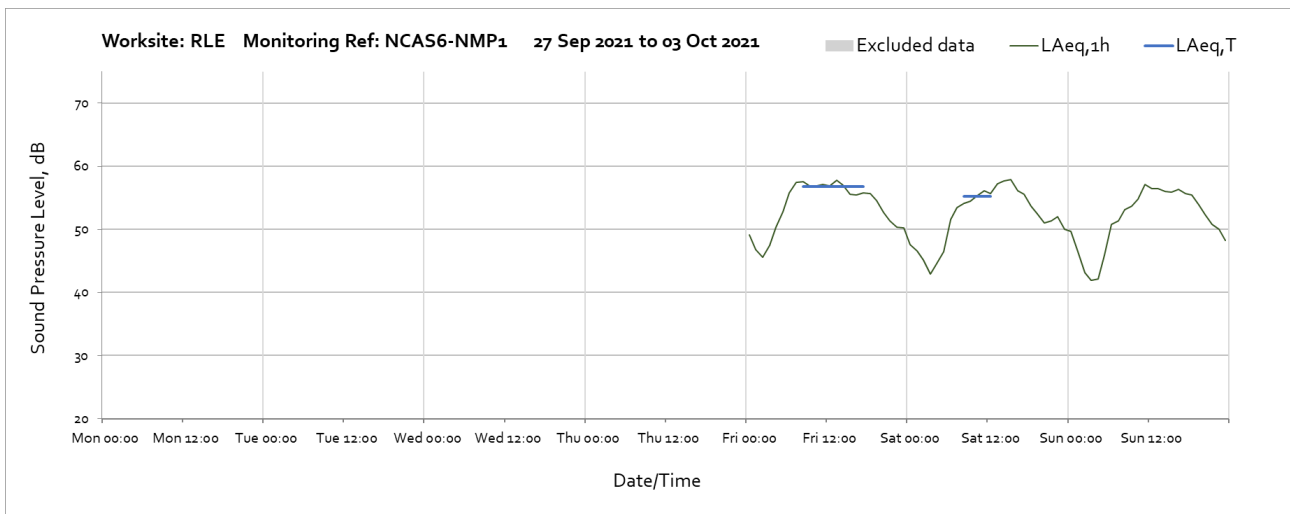
Note: Missing data between 18:00 on Monday 11<sup>th</sup> October and 11:00 on Thursday 14<sup>th</sup> October was due to poor solar coverage and backup battery being out of power.

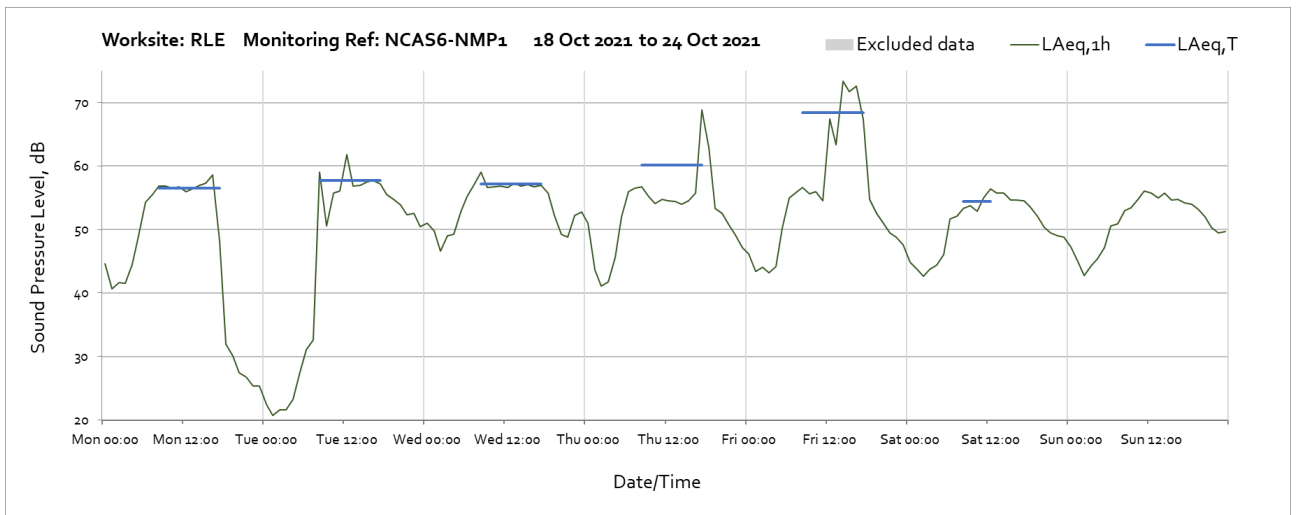
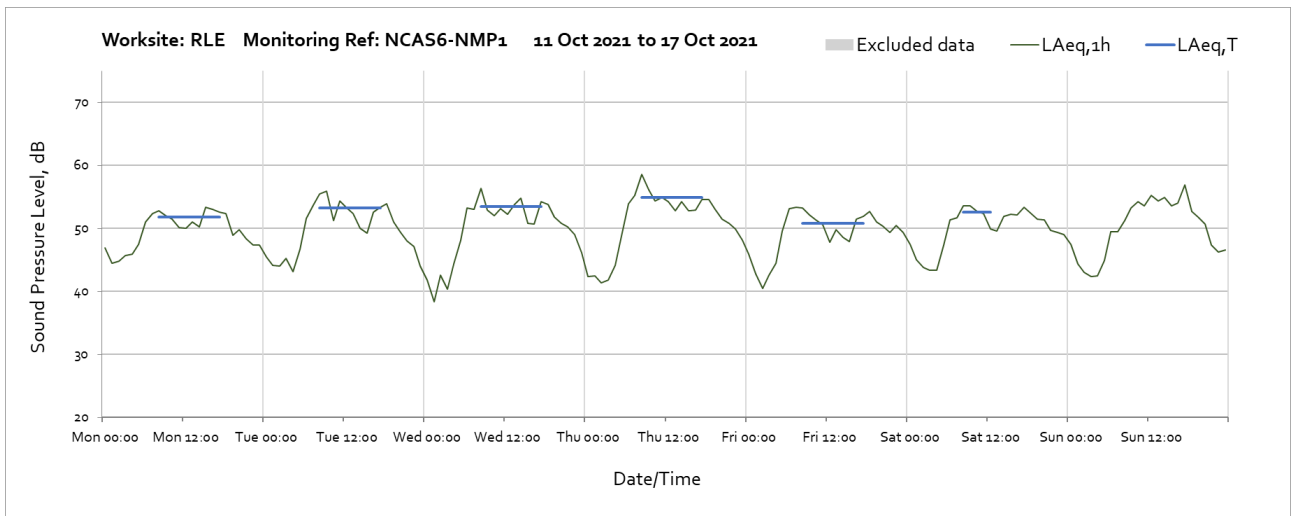
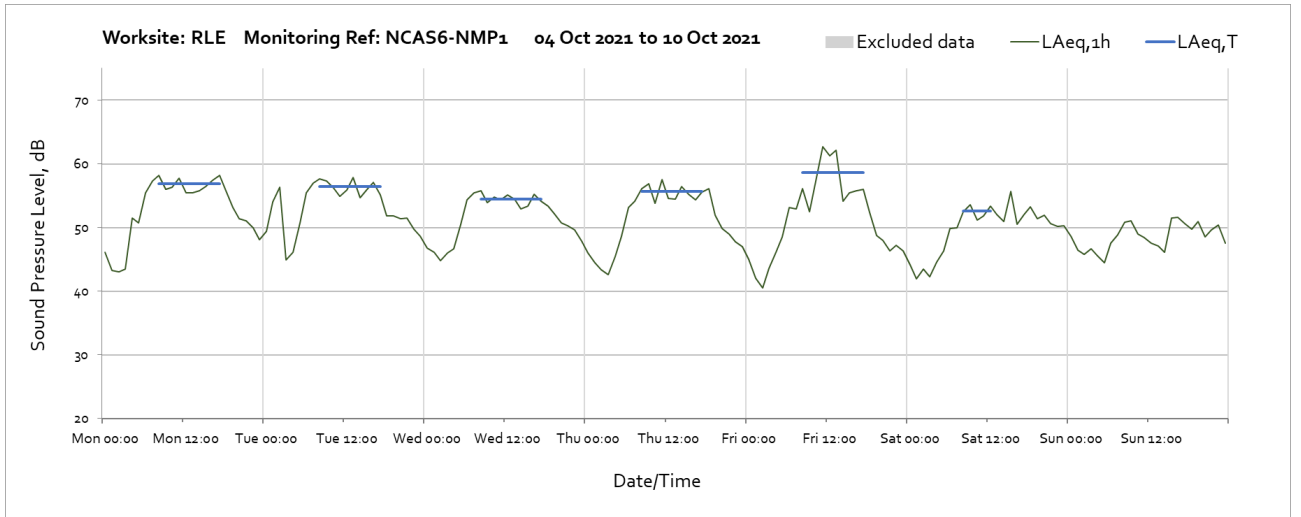
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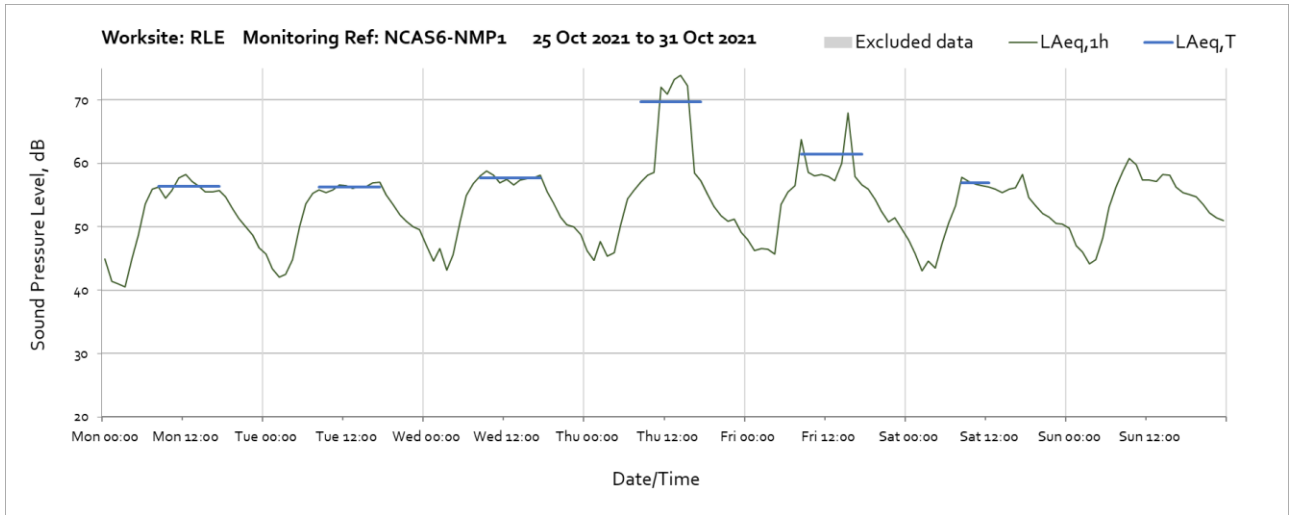


Note: Missing data between 01:00 and 02:00 on Sunday 31<sup>st</sup> October was due to a daylight saving adjustment.

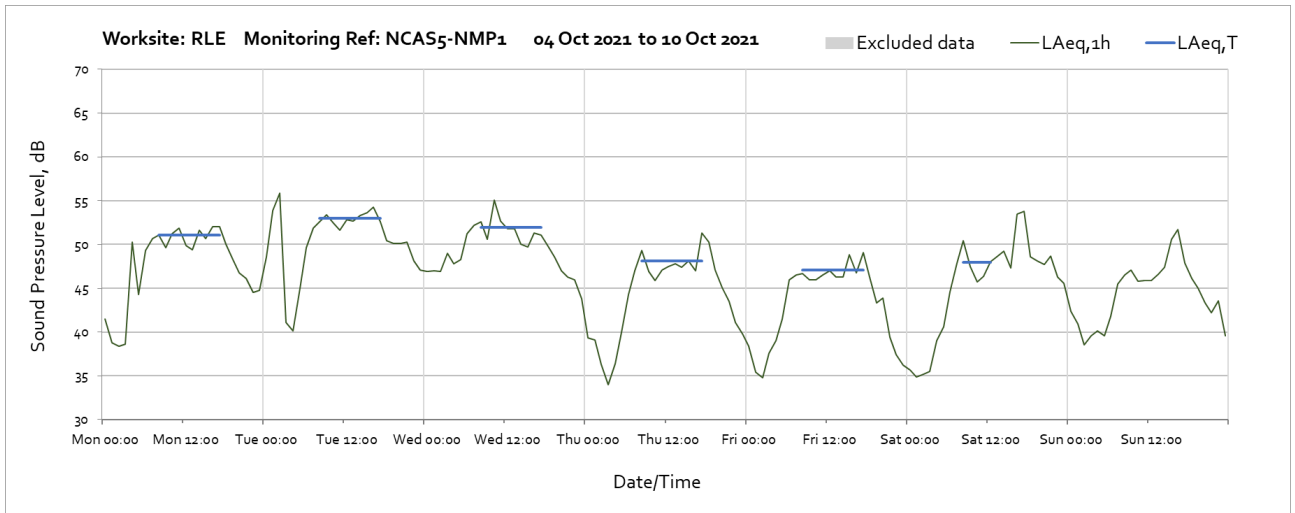
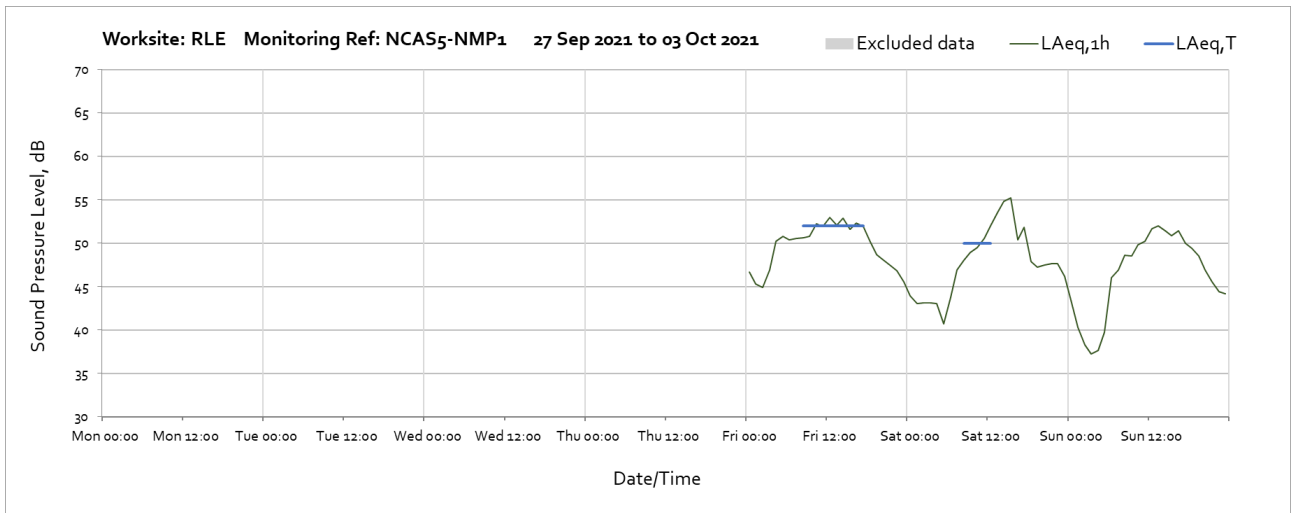
### Worksite: RLE – Monitoring Ref: NCAS6-NMP1



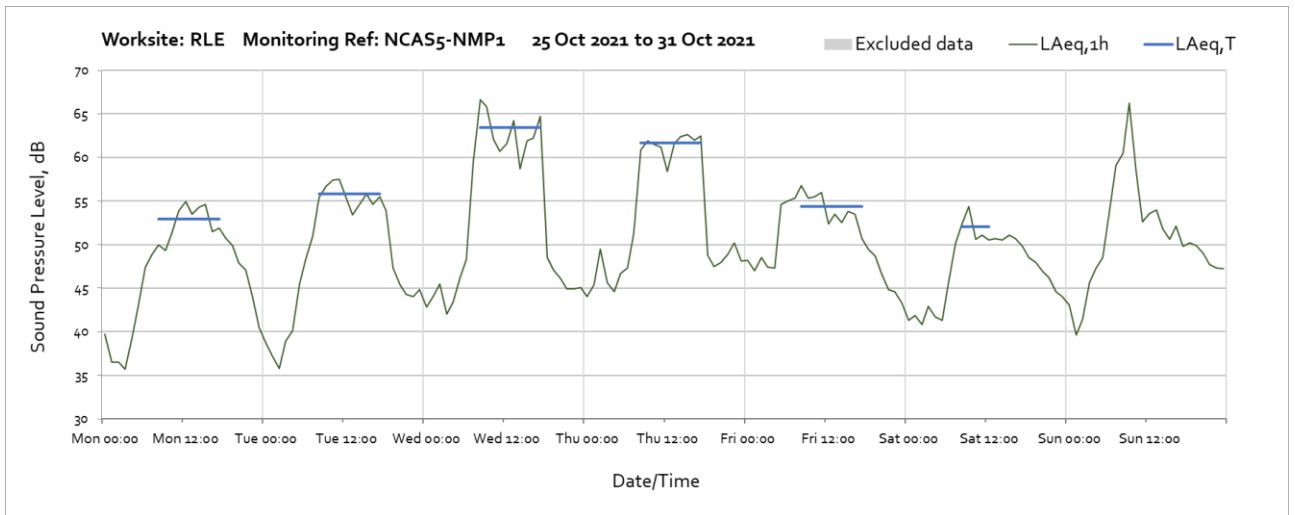
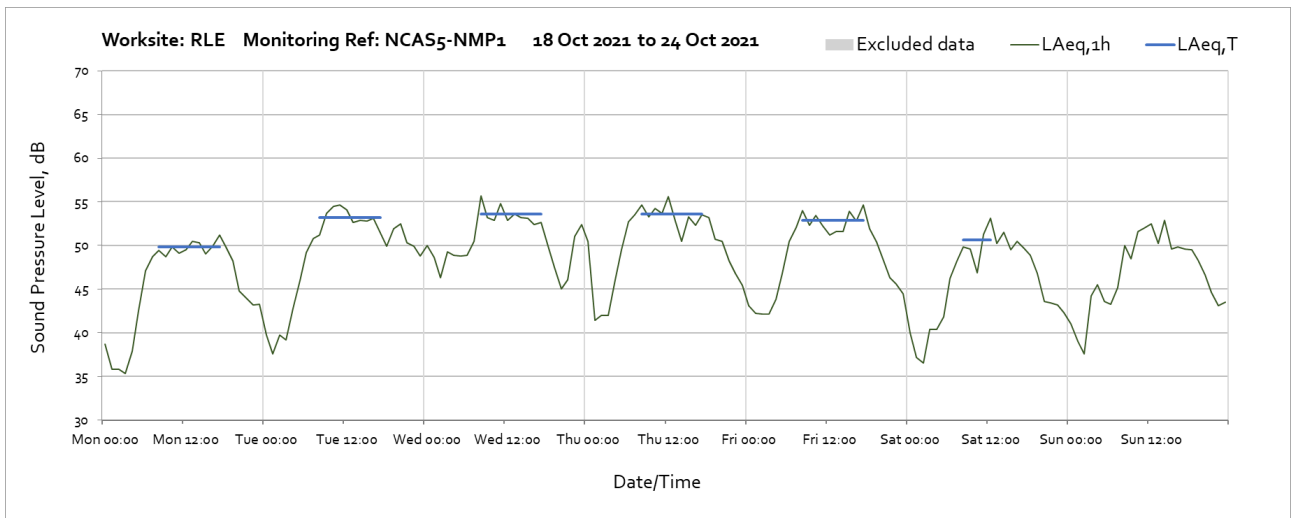
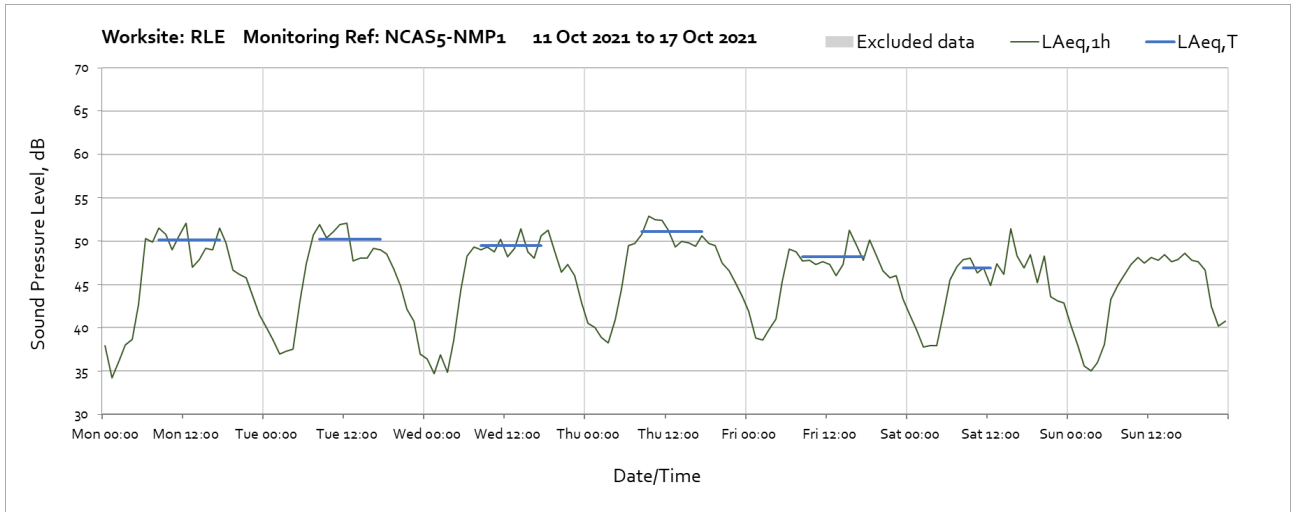




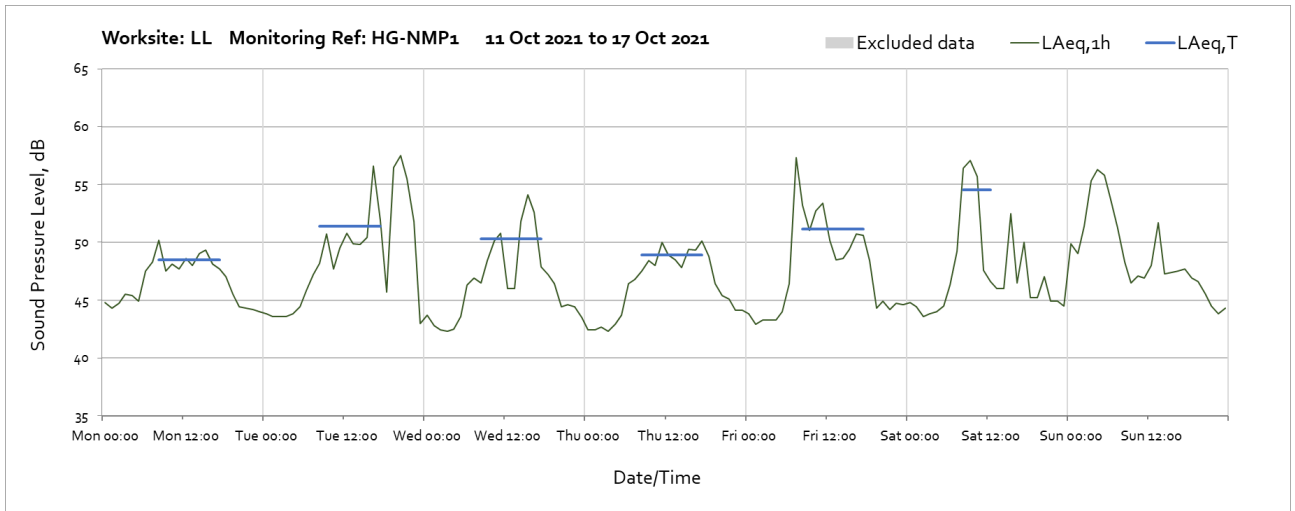
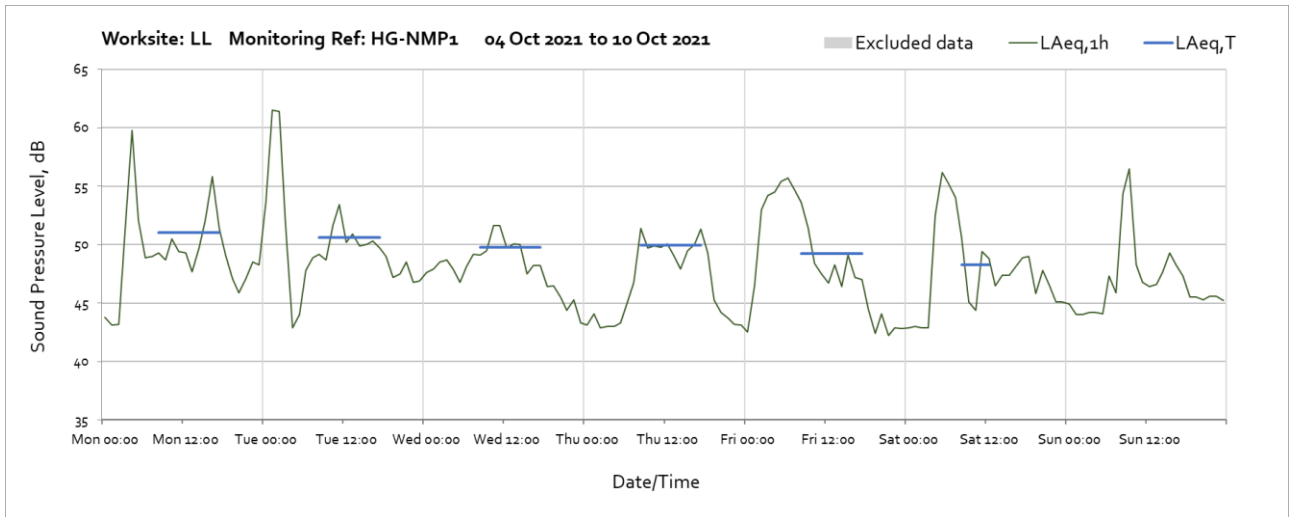
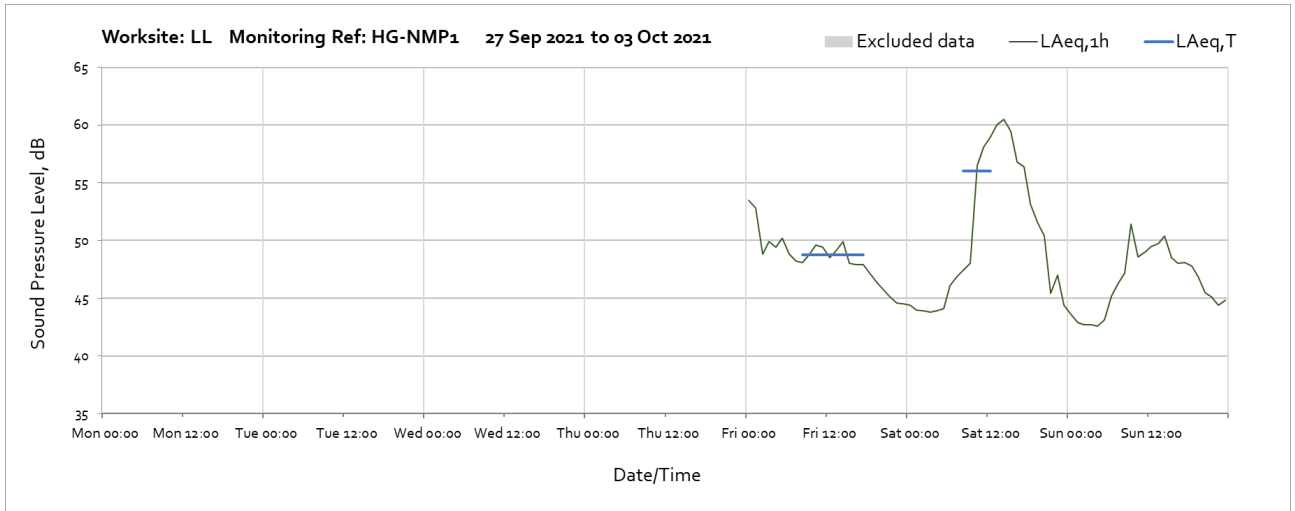
### Worksite: RLE – Monitoring Ref: NCAS5-NMP1

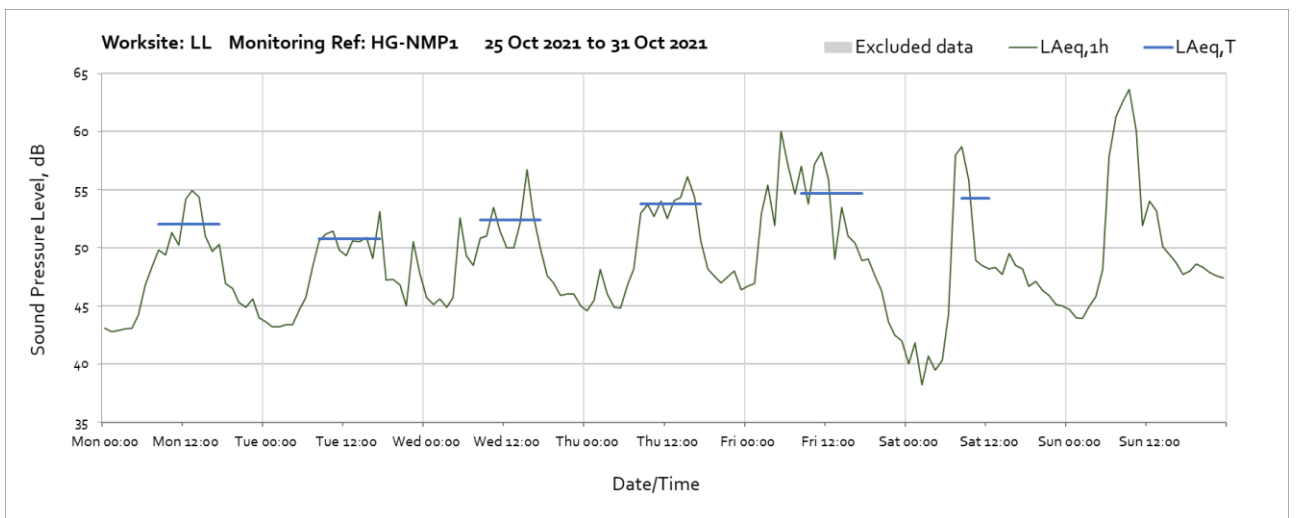
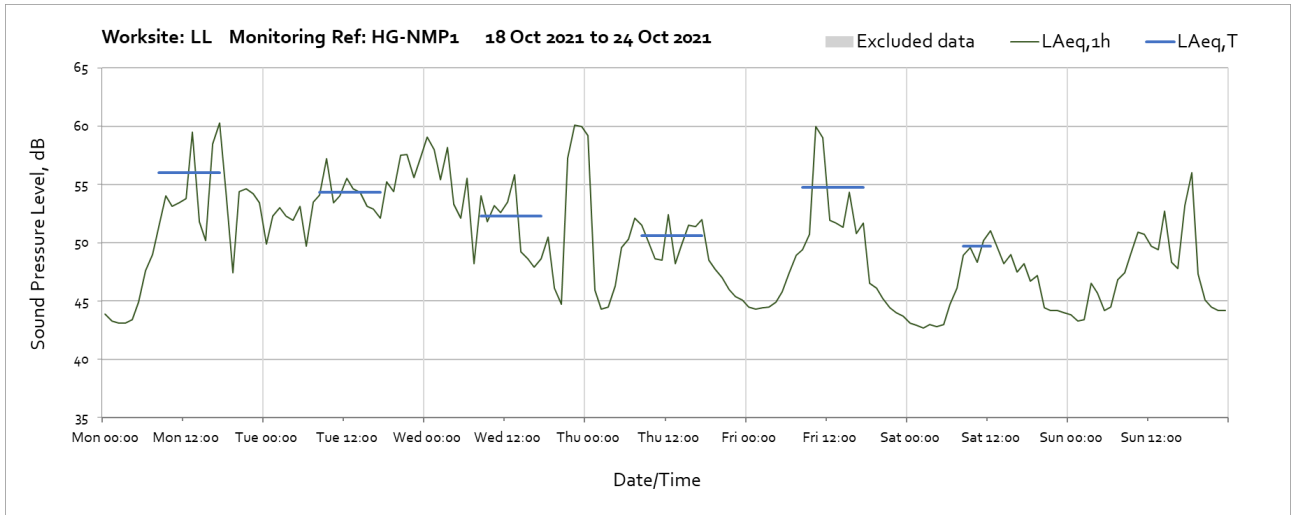




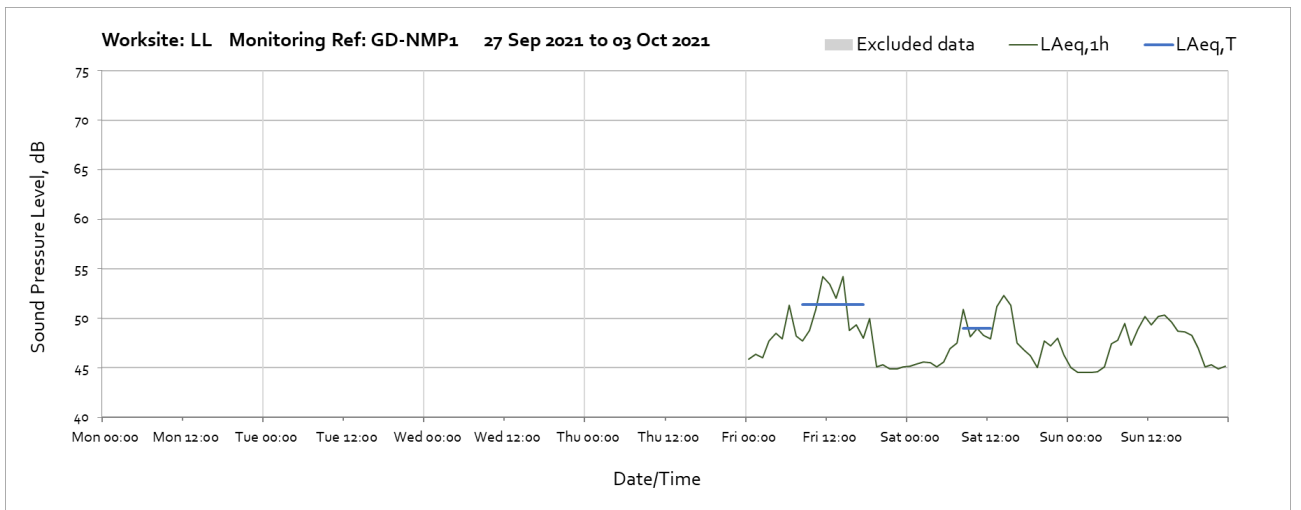


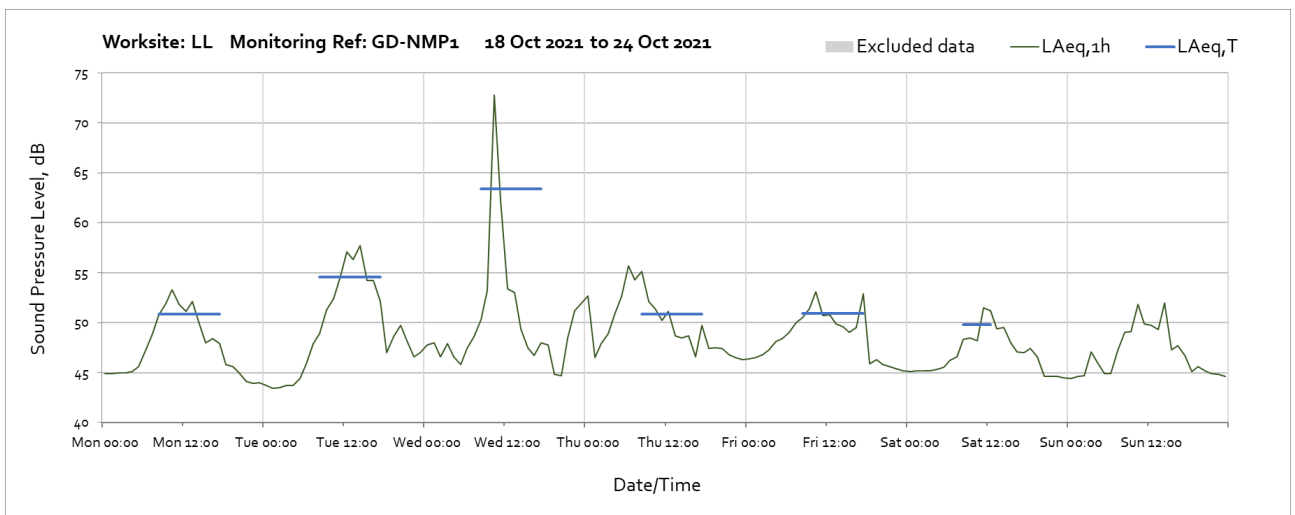
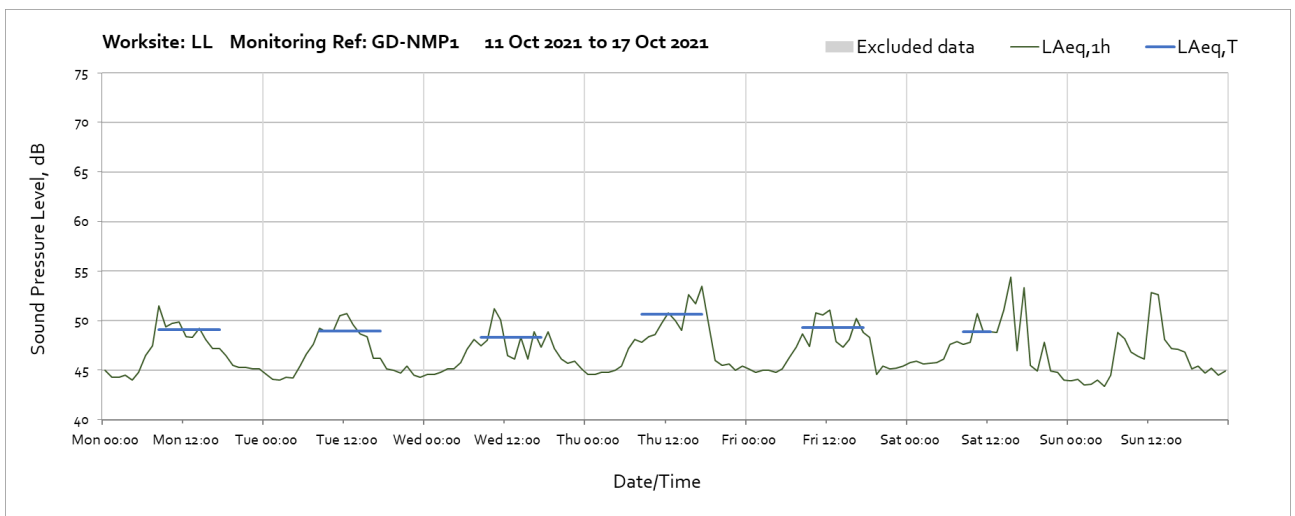
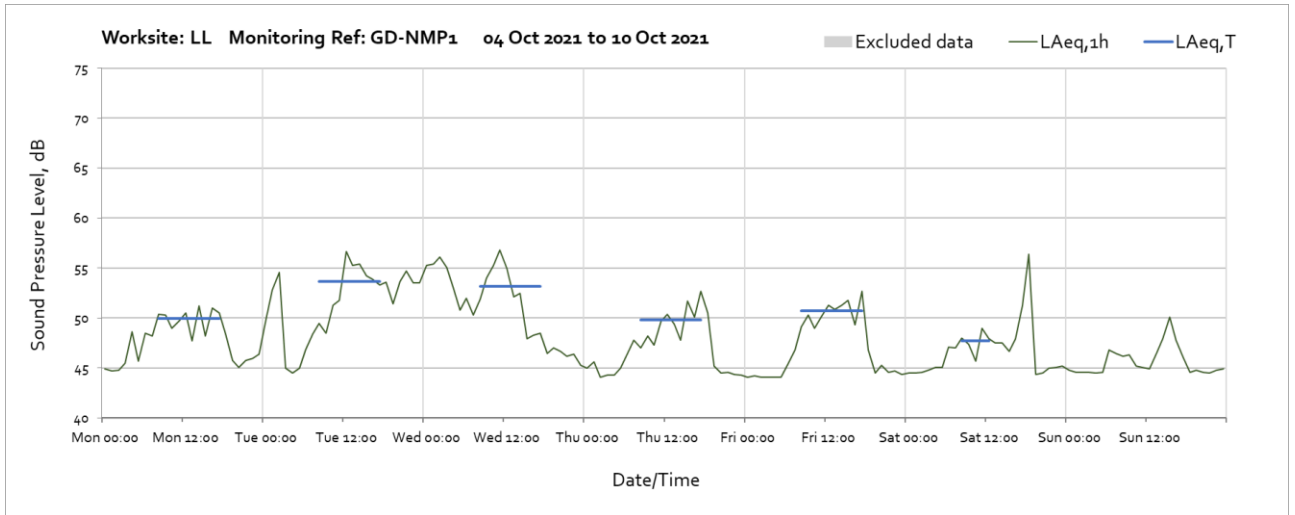
## Worksite: LL – Monitoring Ref: HG -NMP1

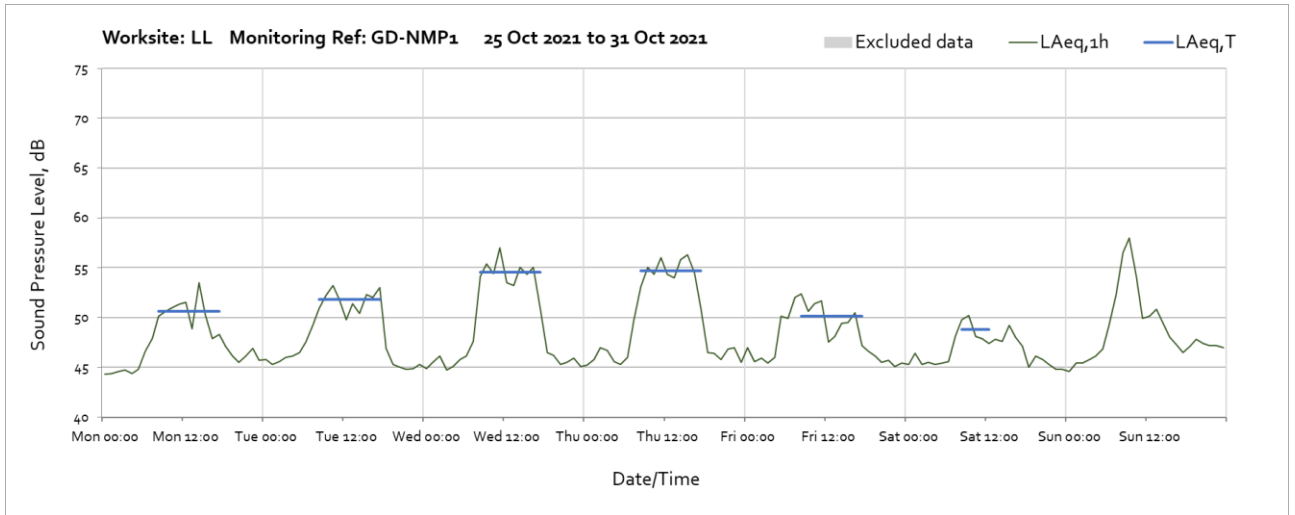




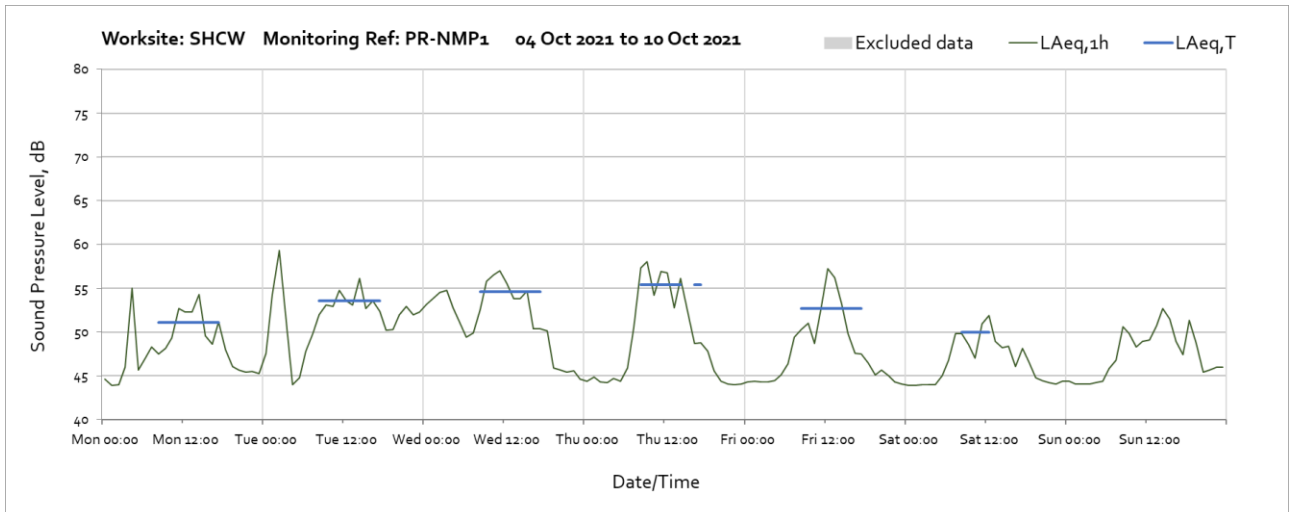
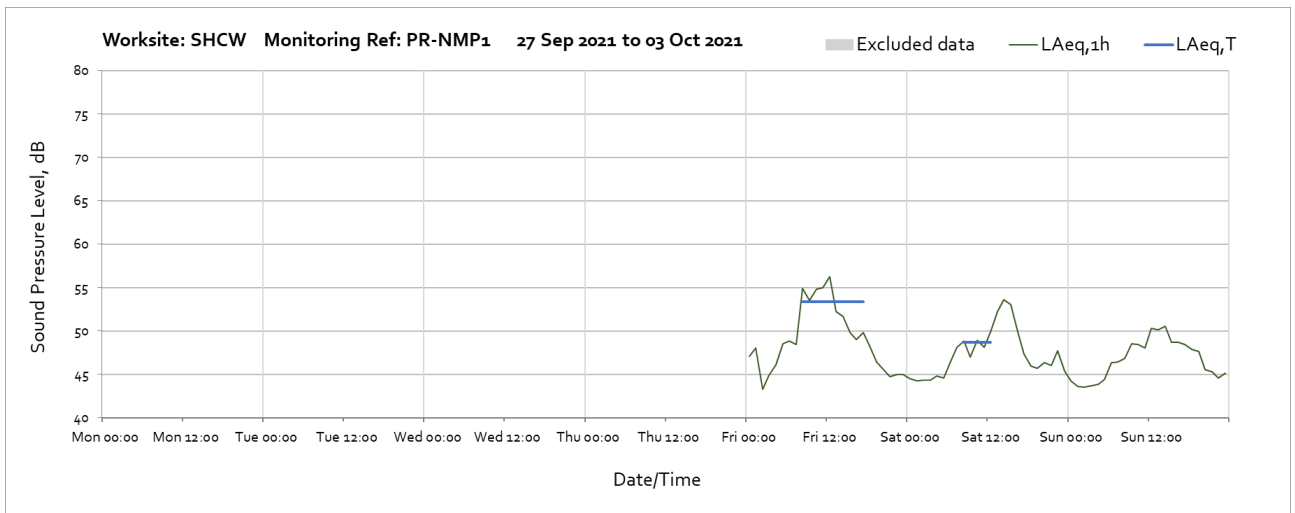
**Worksite: LL - Monitoring Ref: GD-NMP1**

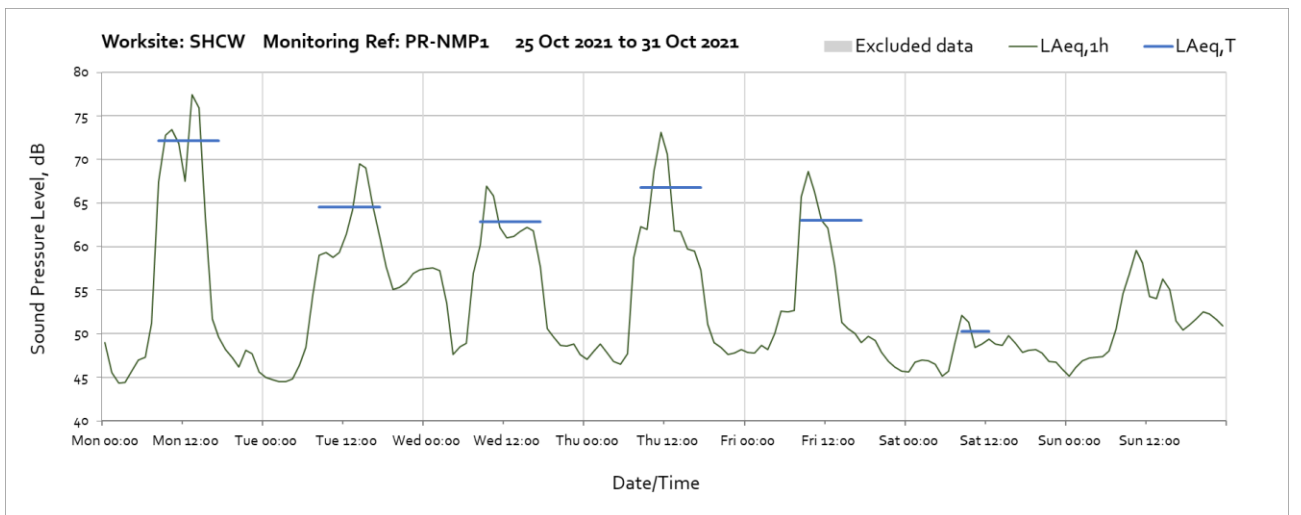
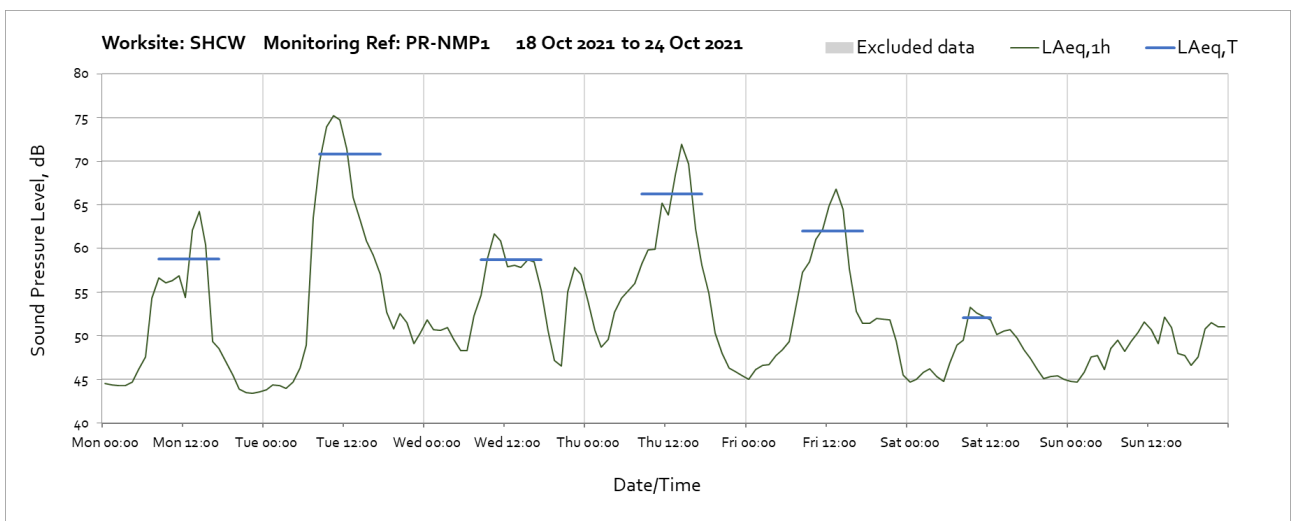
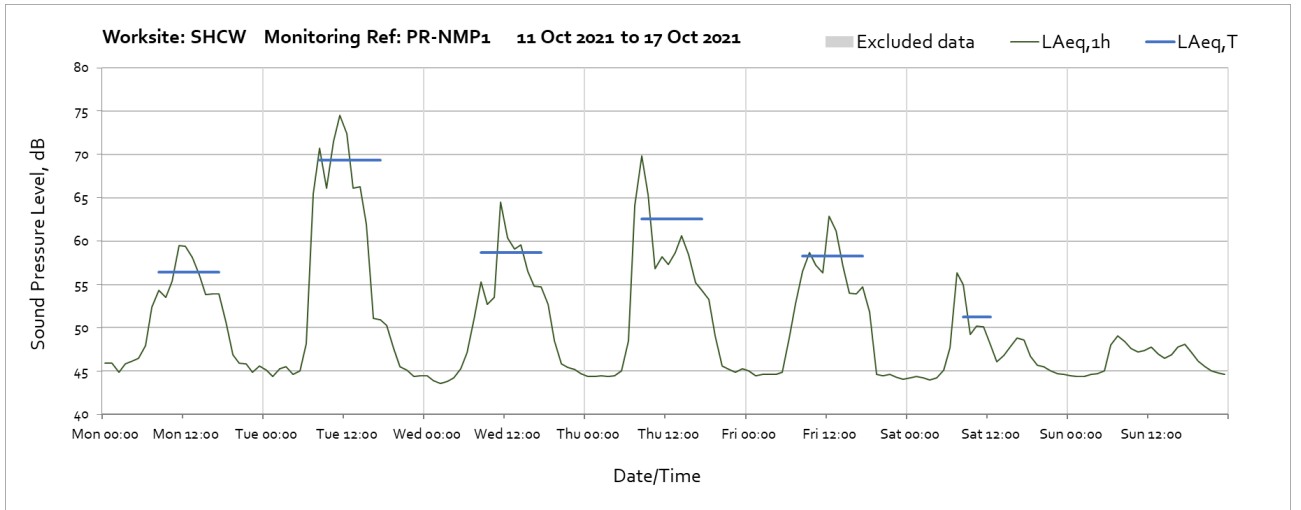




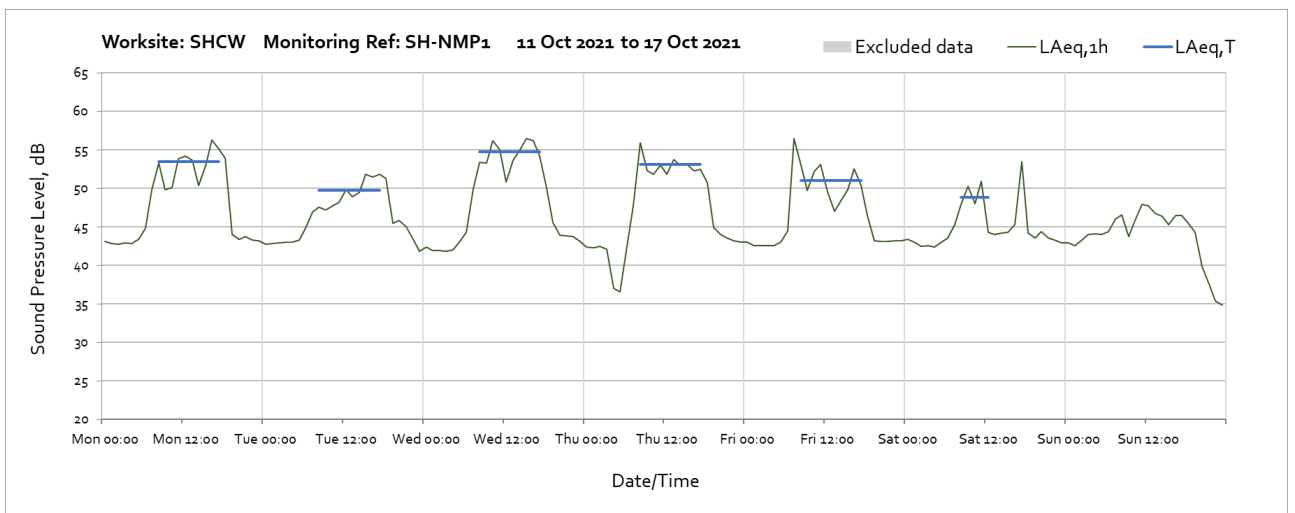
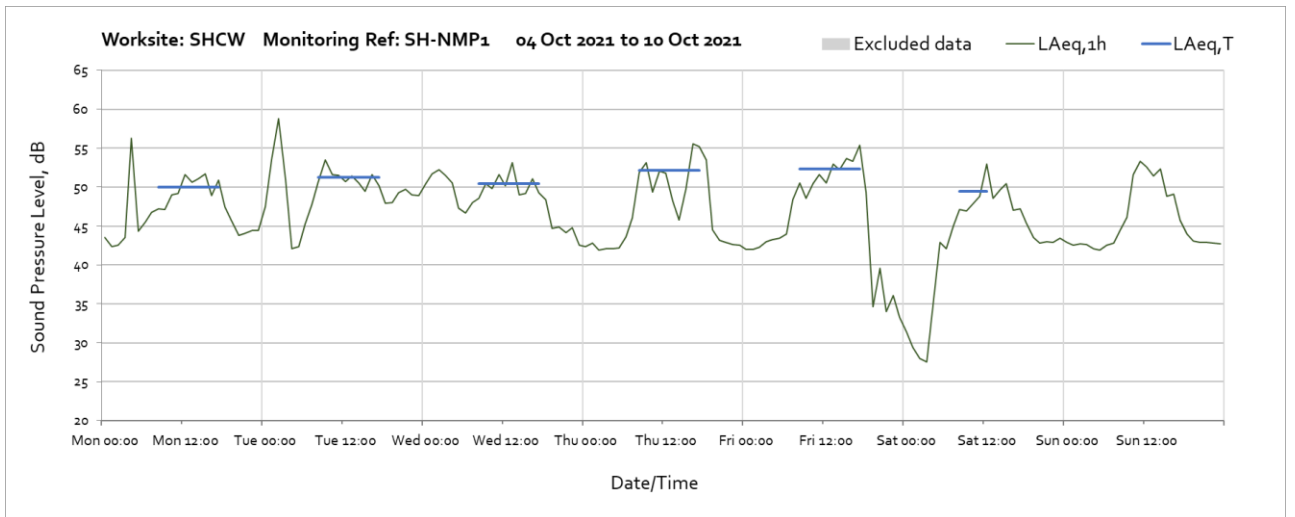
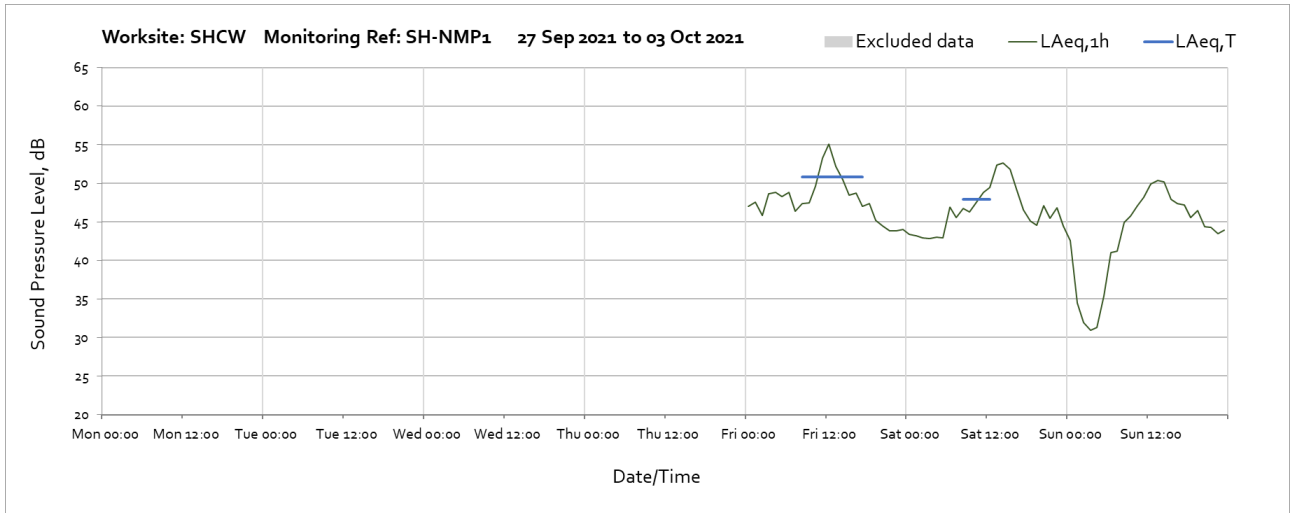


**Worksite: SHCW – Monitoring Ref: PR-NMP1**

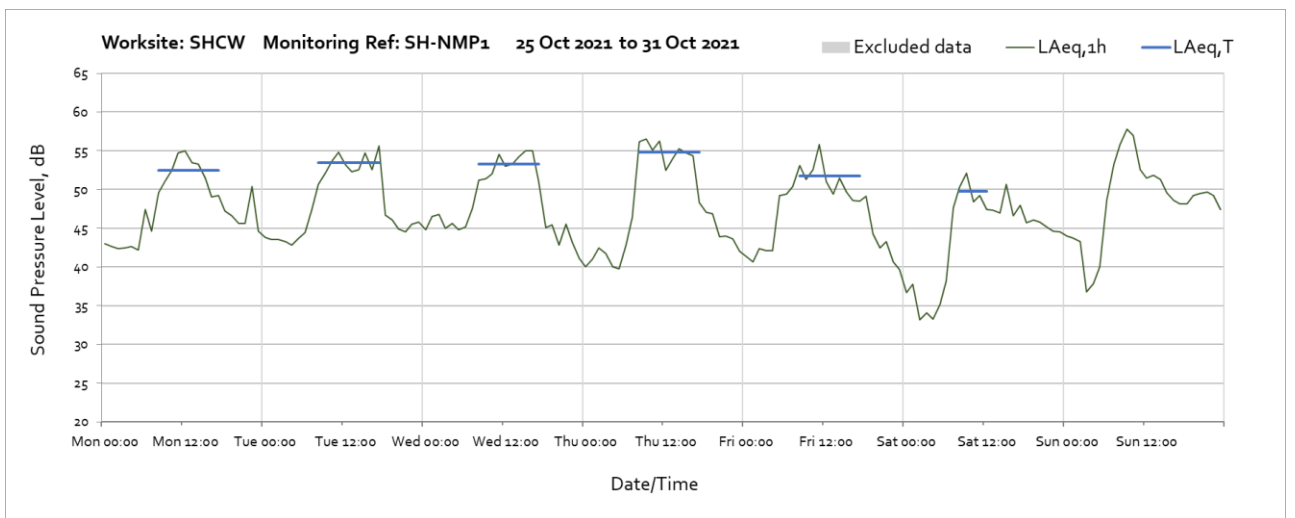
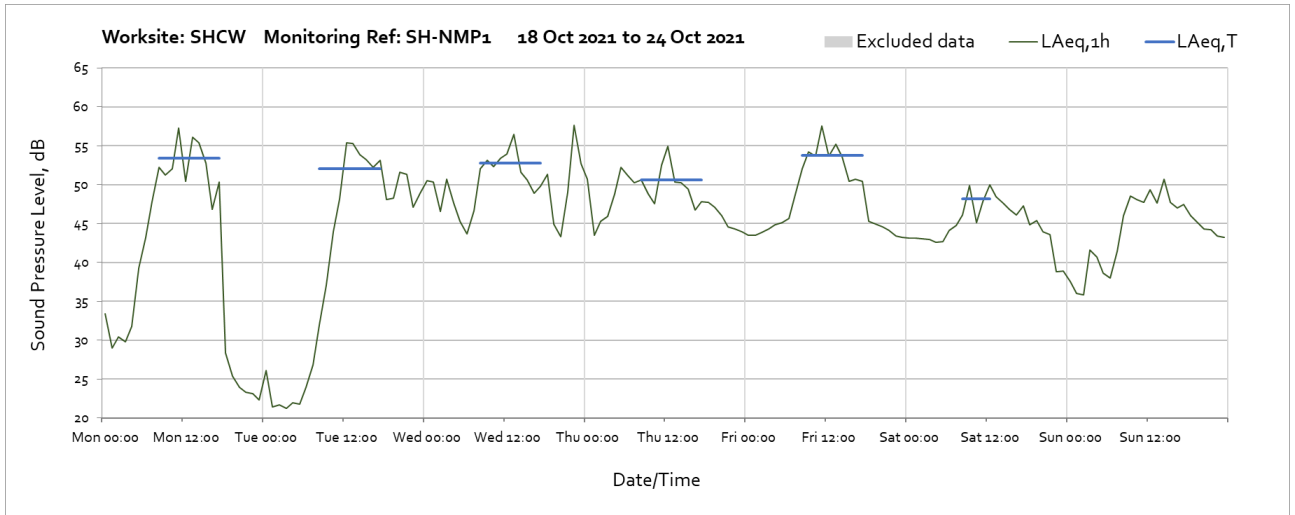




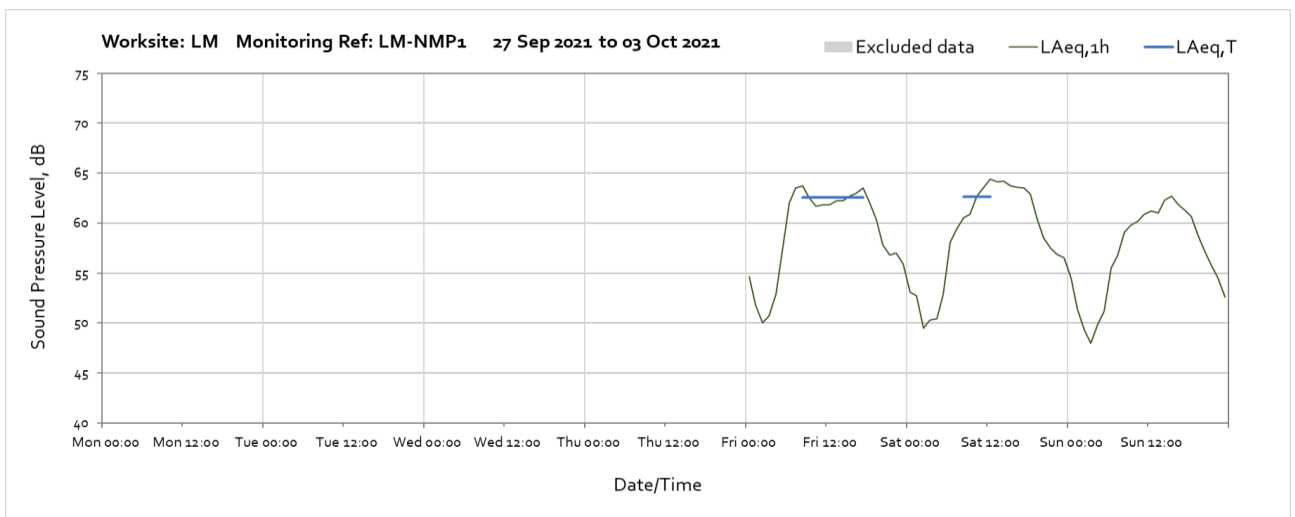
## Worksite: SHCW – Monitoring Ref: SH-NMP1

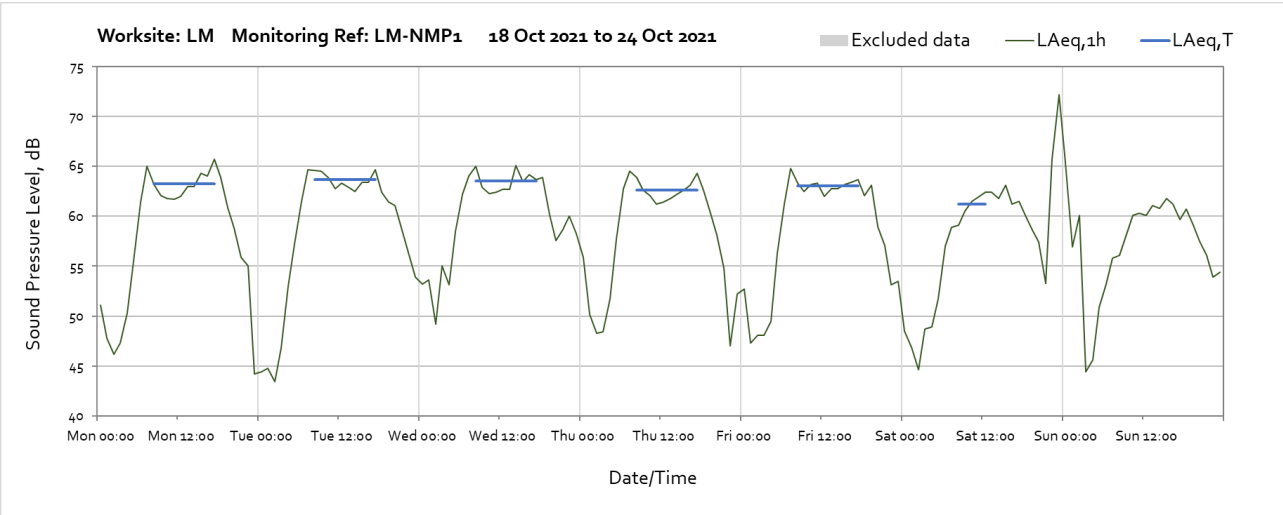
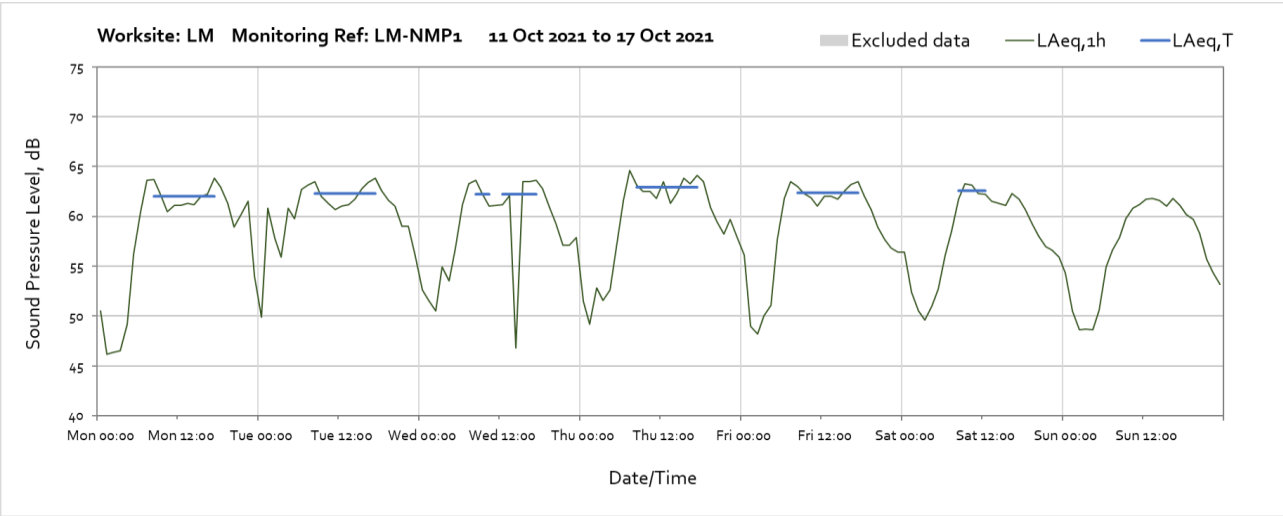
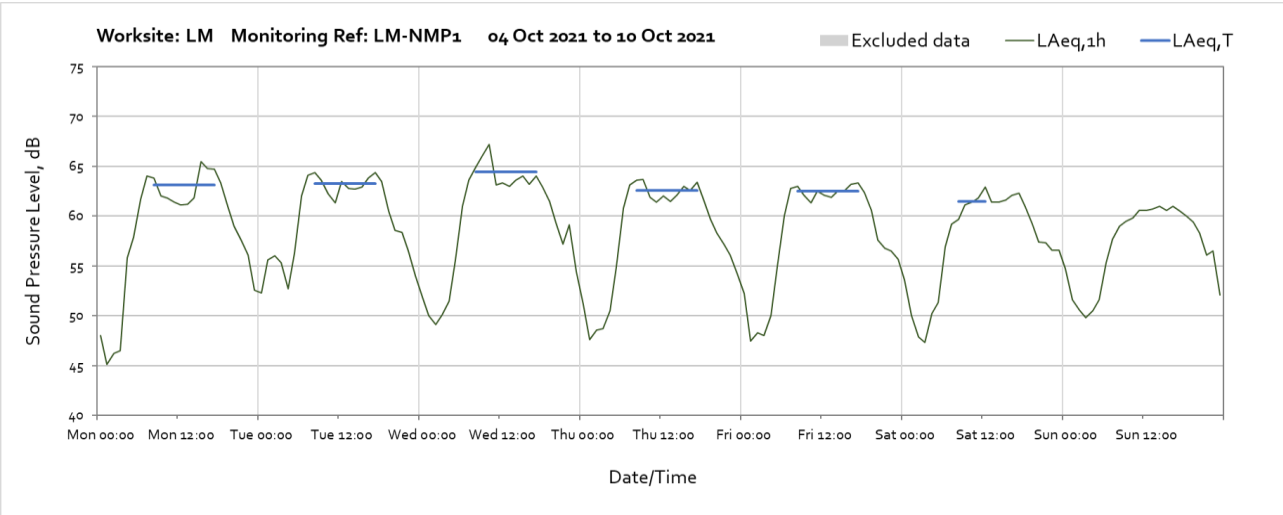


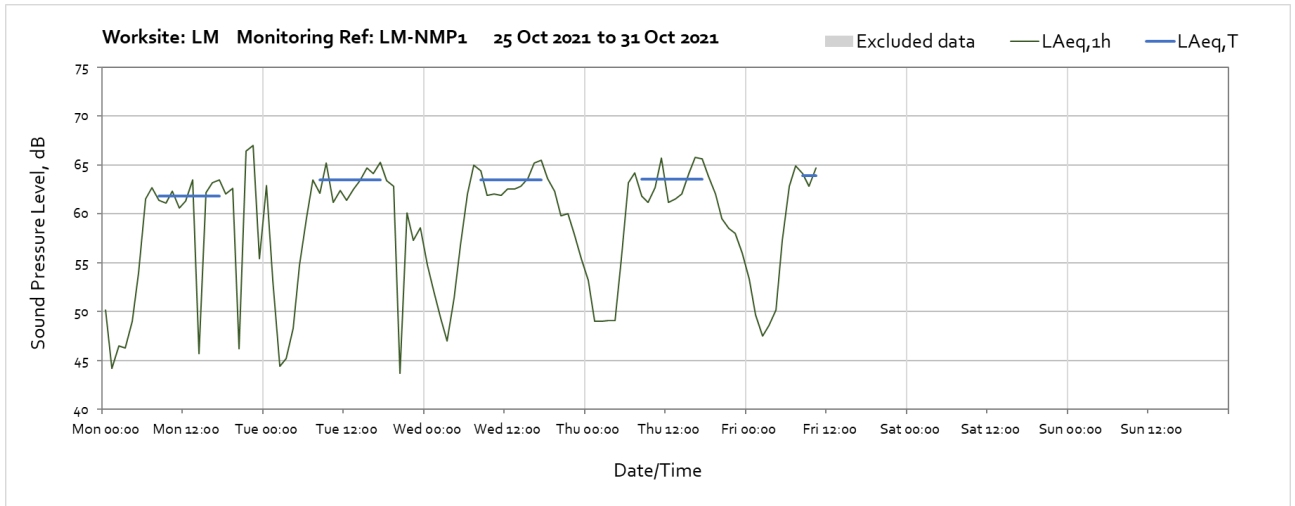




**Worksite: LM – Monitoring Ref: LM-NMP1**

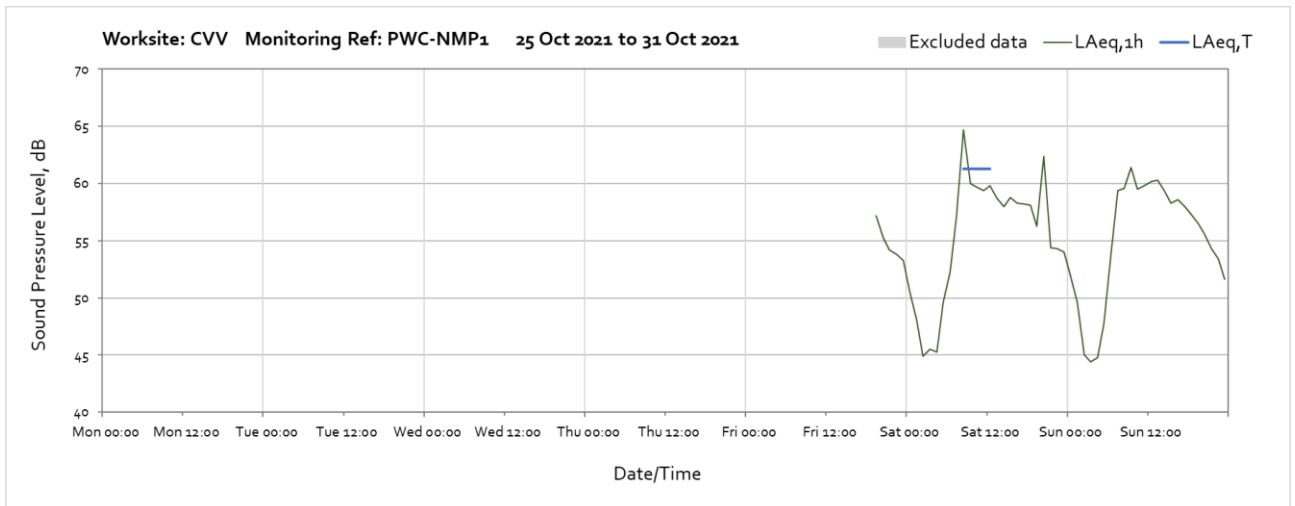






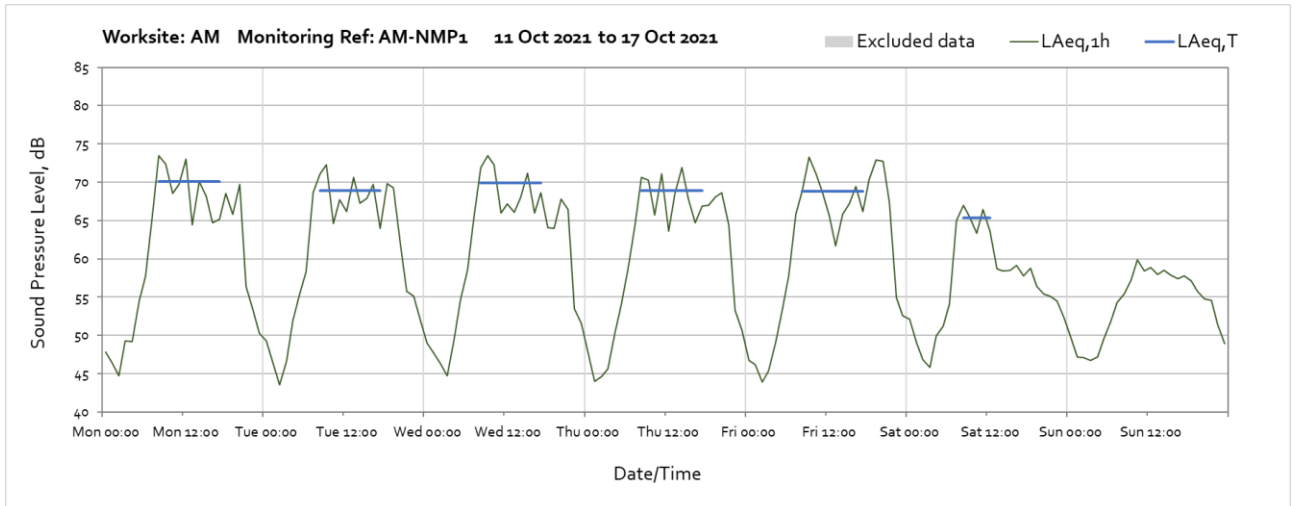
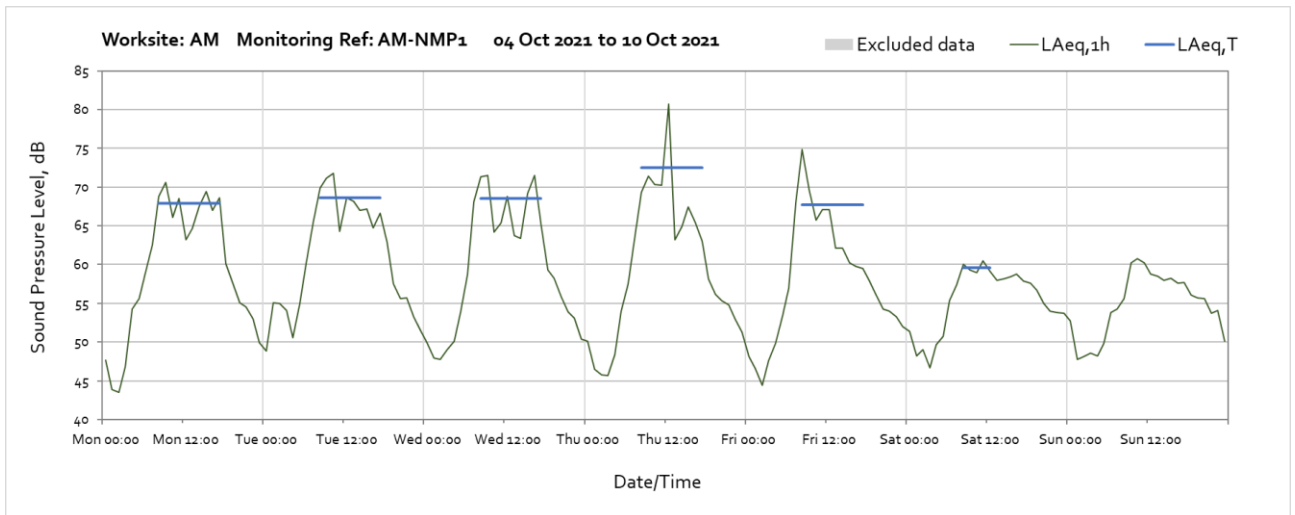
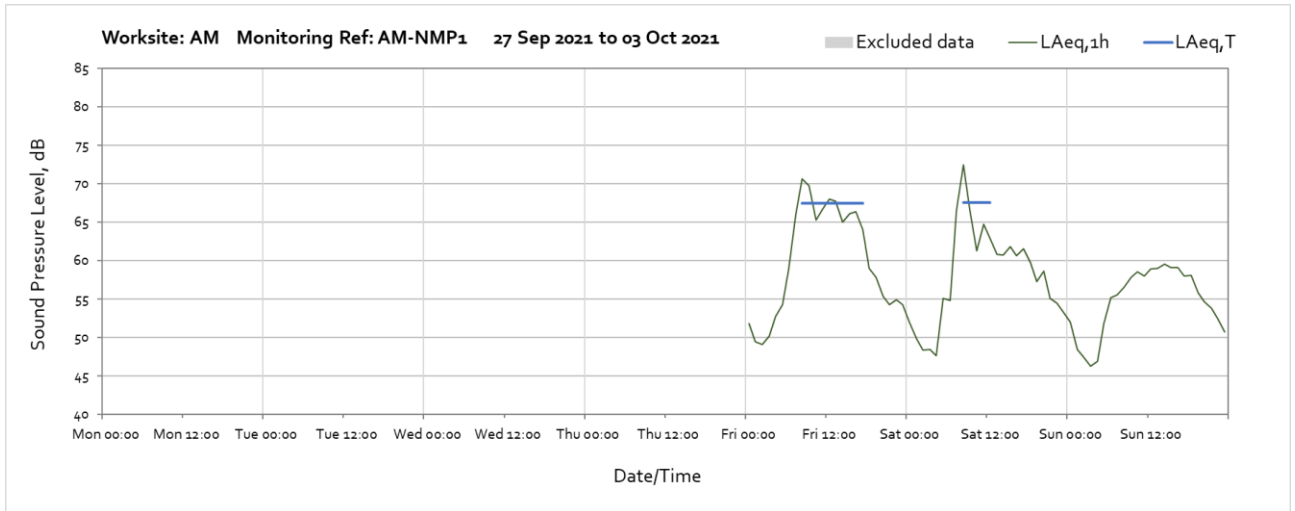
Note: Noise monitor was relocated to PWC-NMP1 on 29th October 2021.

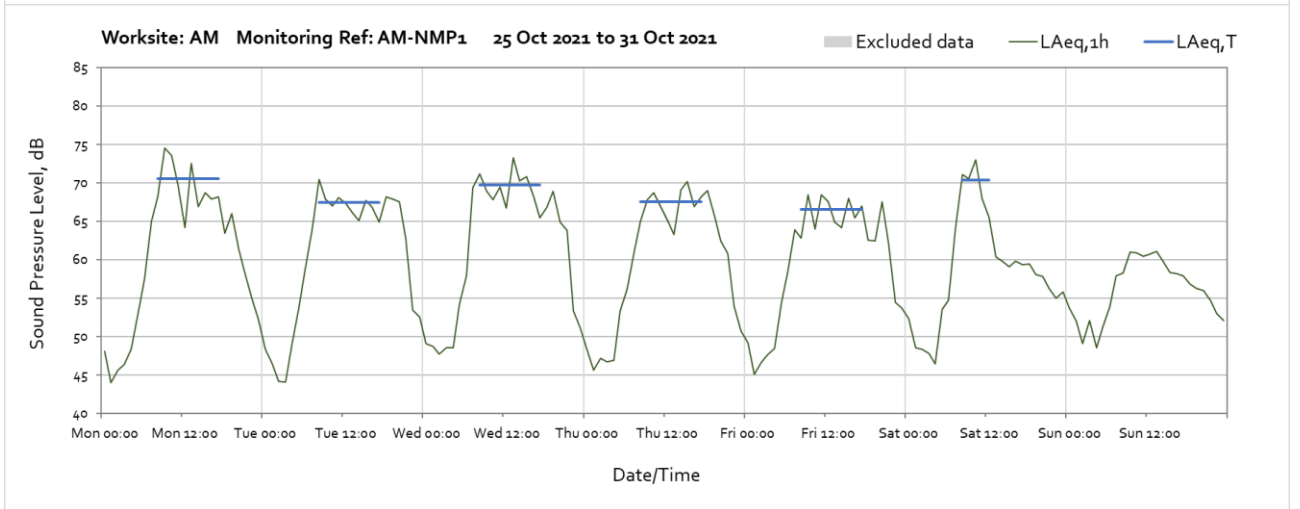
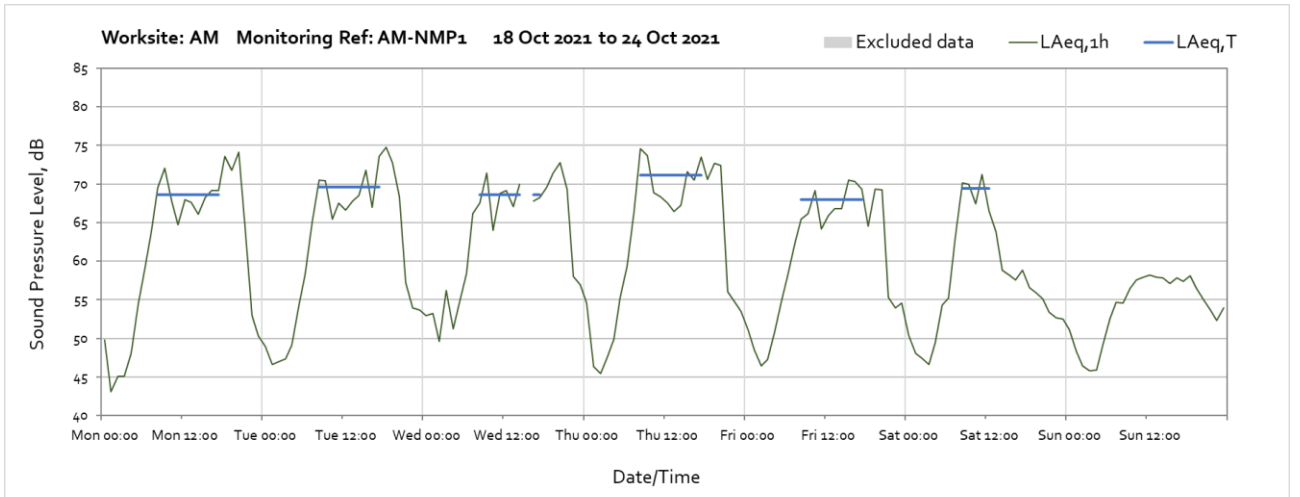
### Worksite: LM - Monitoring Ref: PWC-NMP1



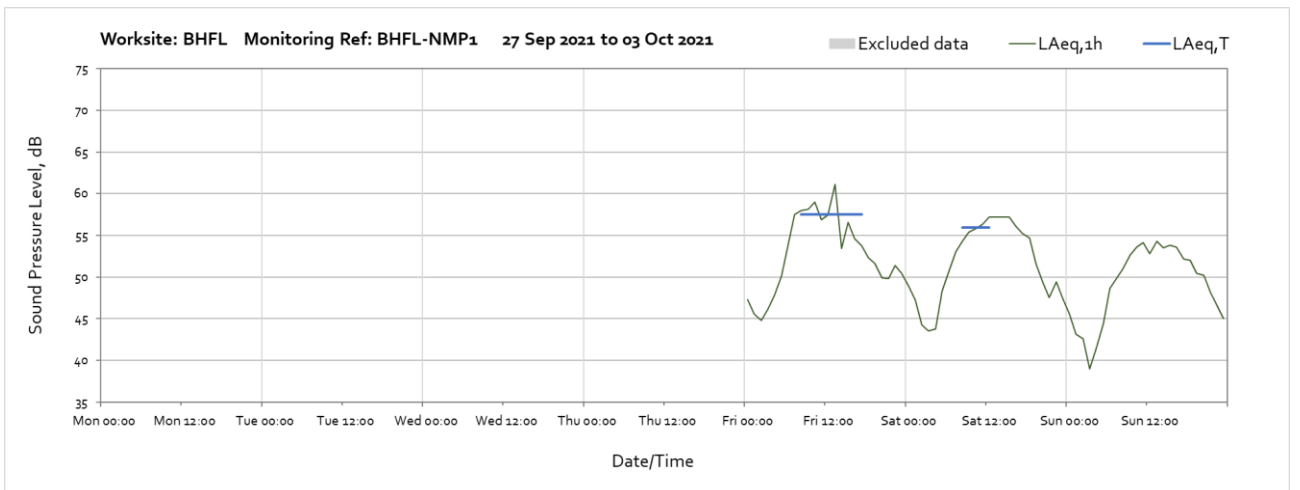
Note: Noise monitor was relocated from LM-NMP1 on 29th October 2021.

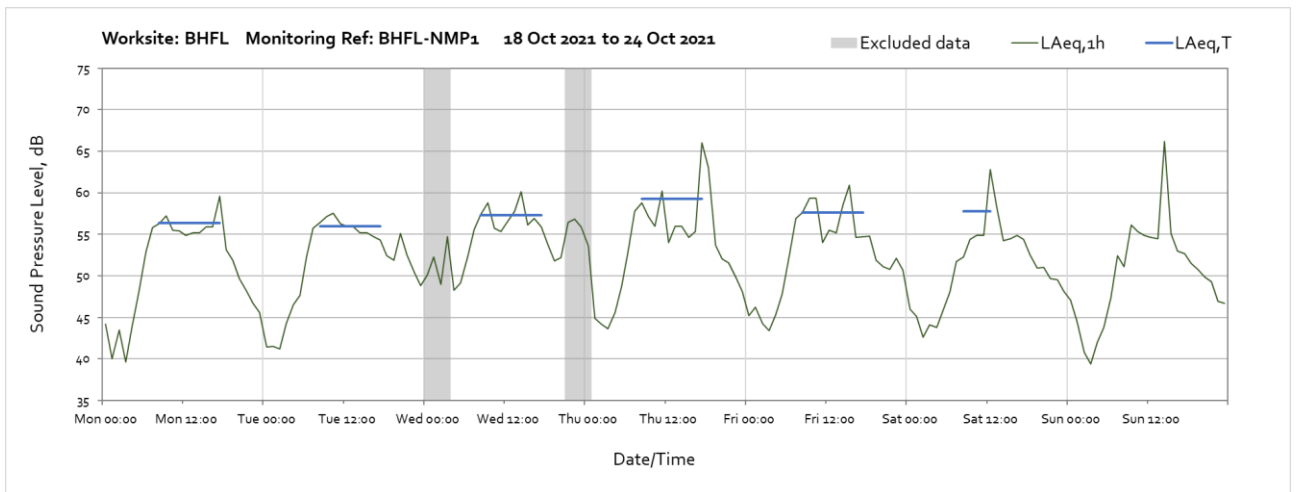
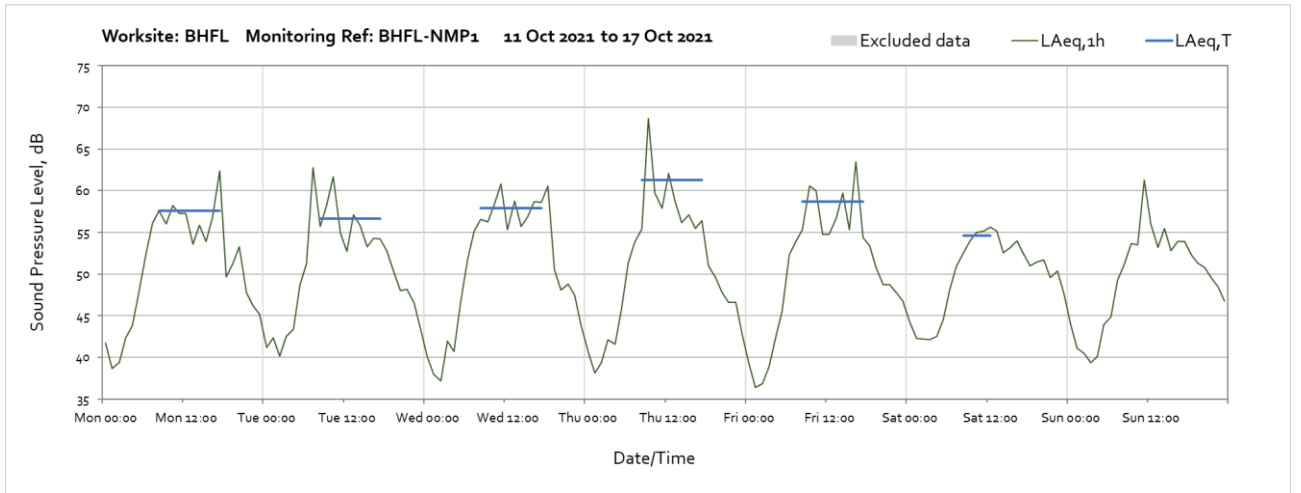
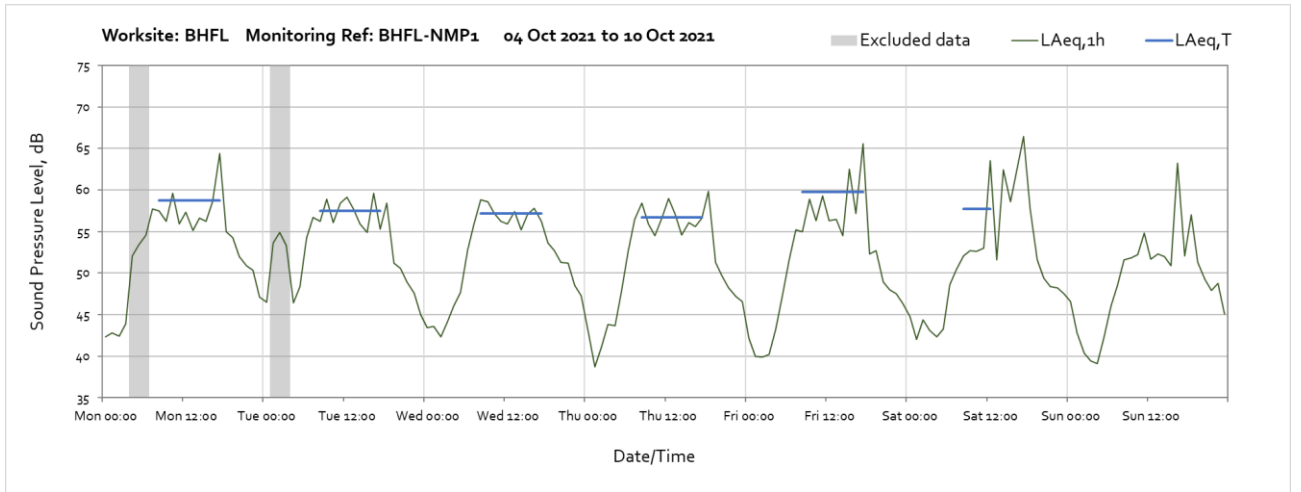
## Worksite: AM – Monitoring Ref: AM-NMP1

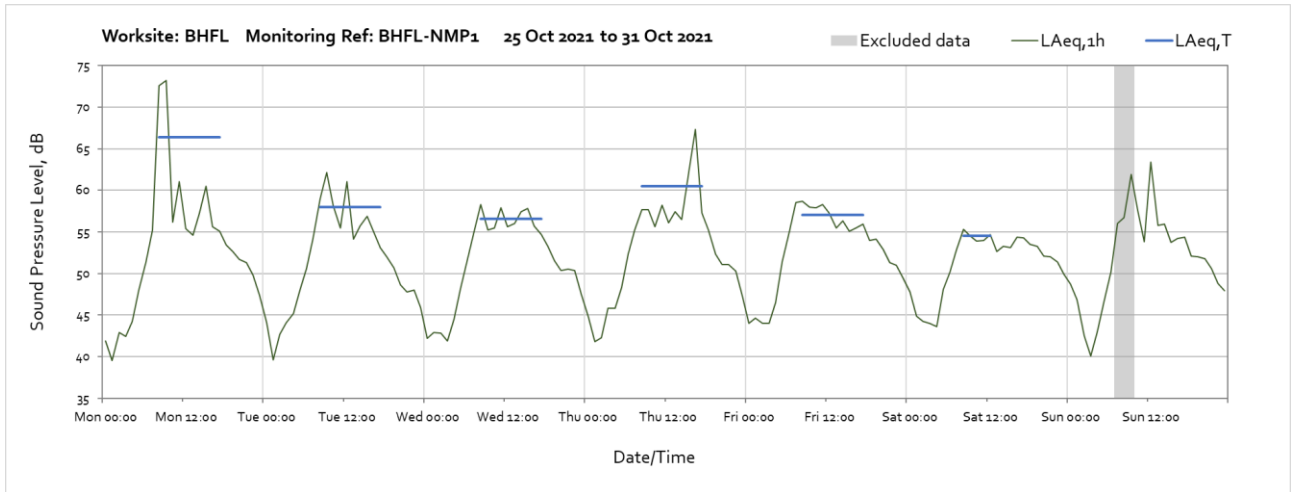




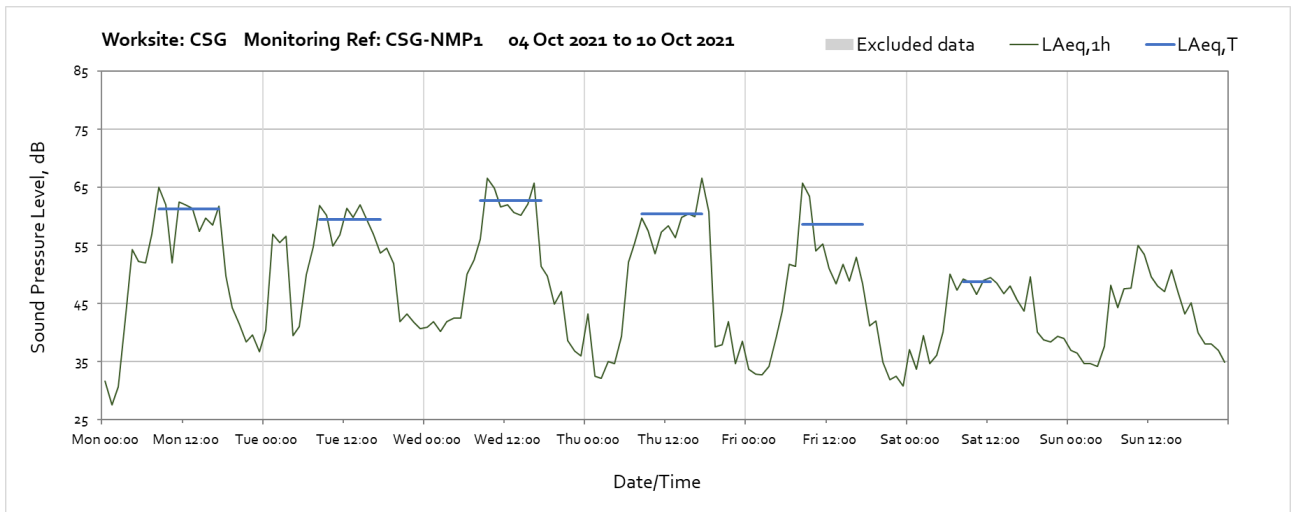
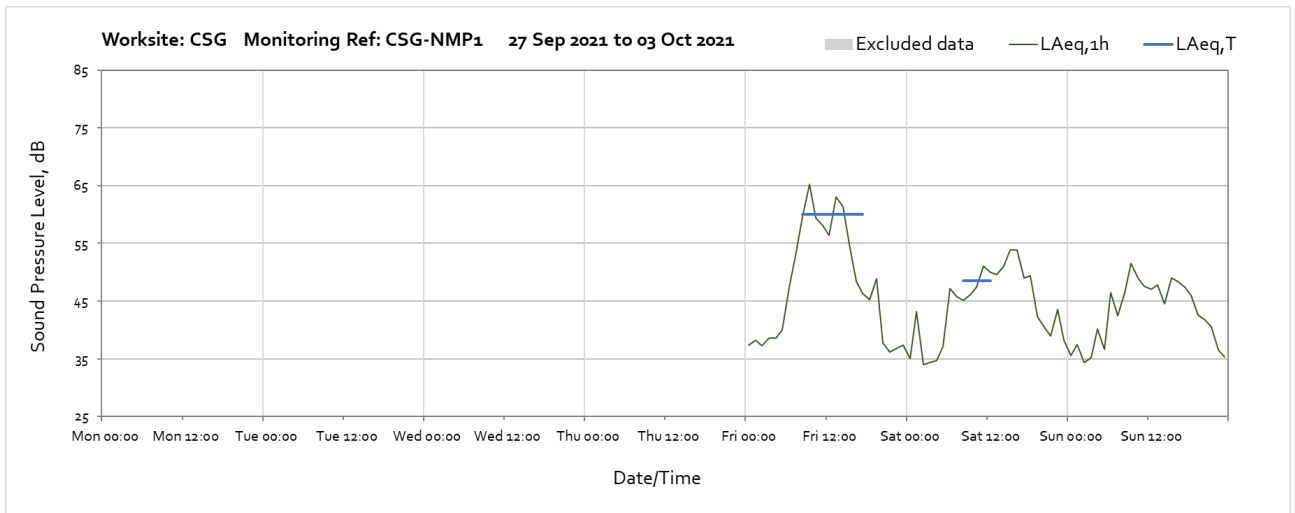
**Worksite: BHFL – Monitoring Ref: BHFL-NMP1**



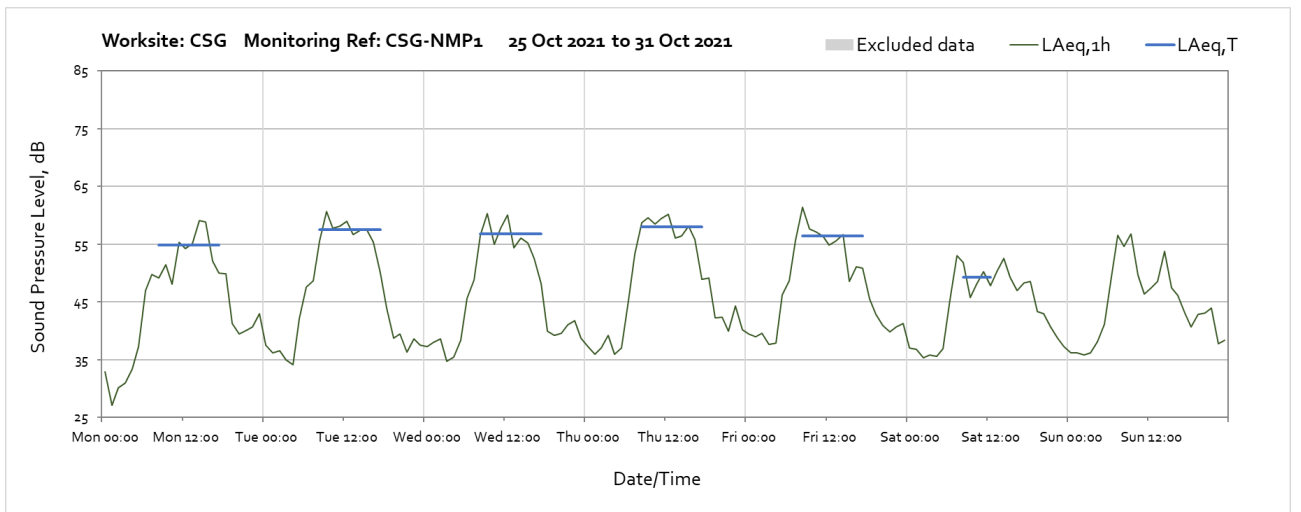
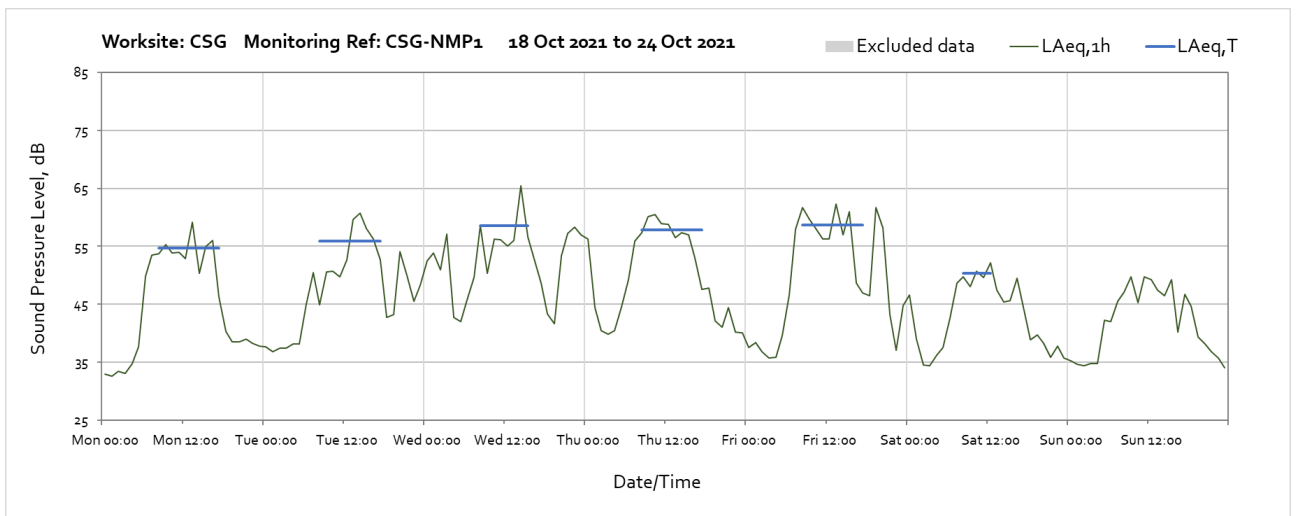
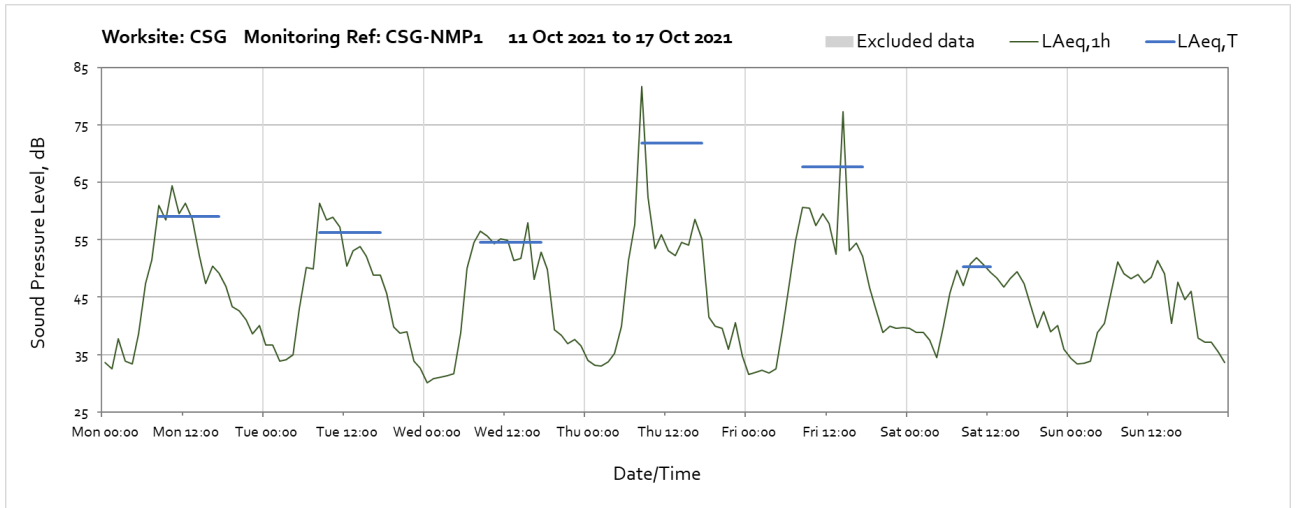




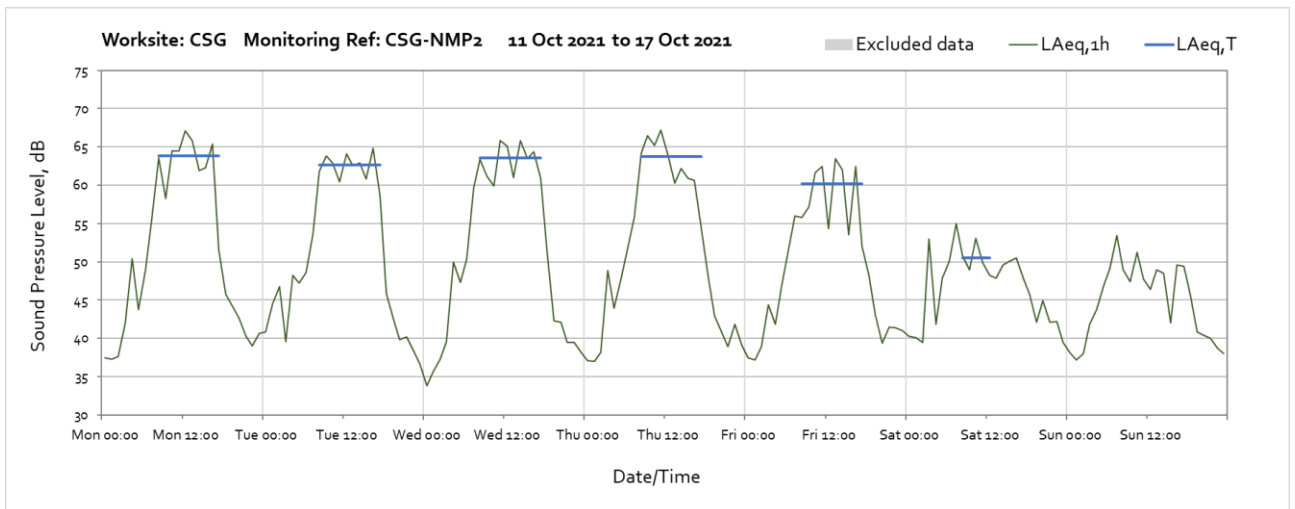
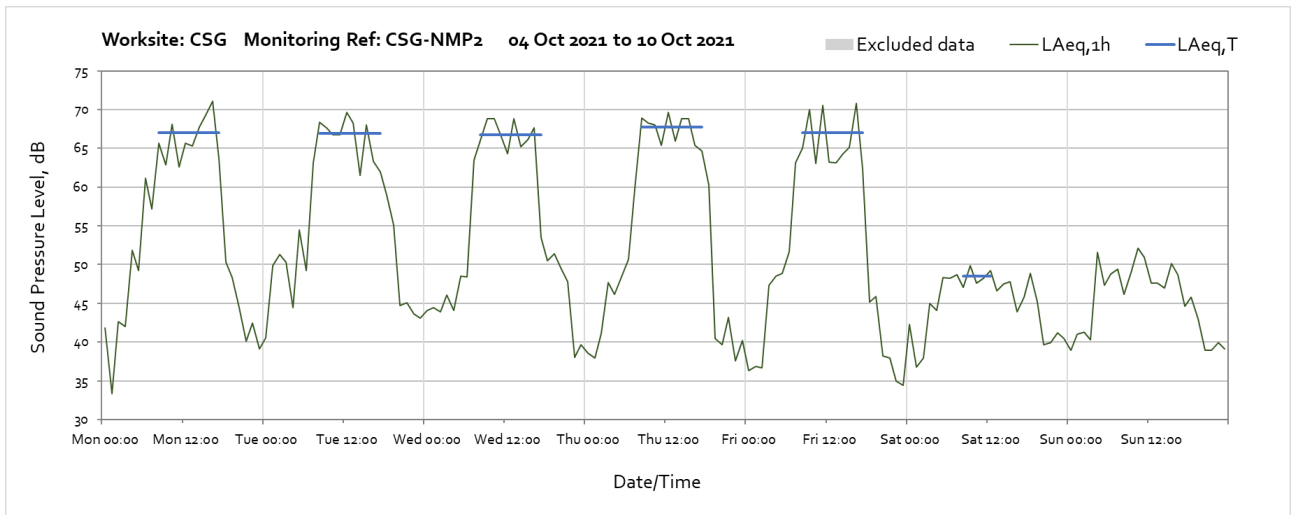
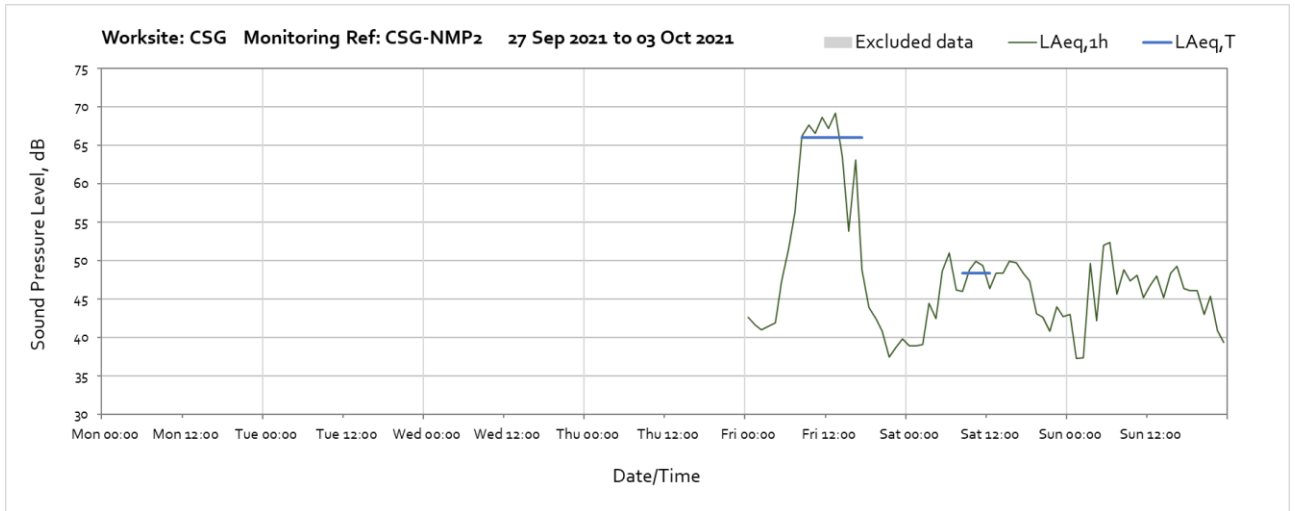
**Worksite: CSG - Monitoring Ref: CSG-NMP1**

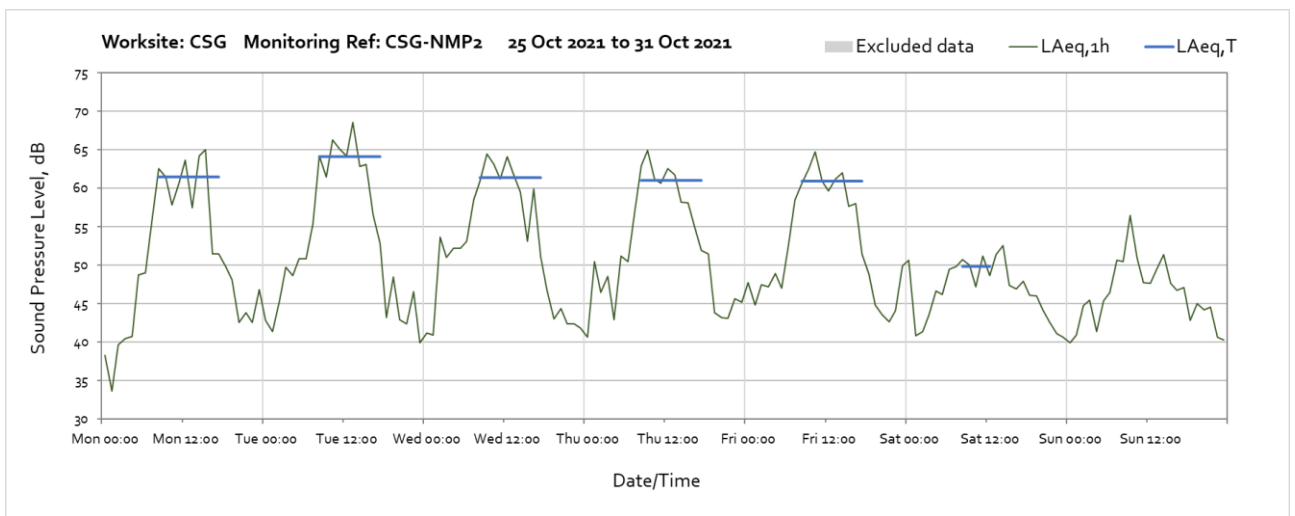
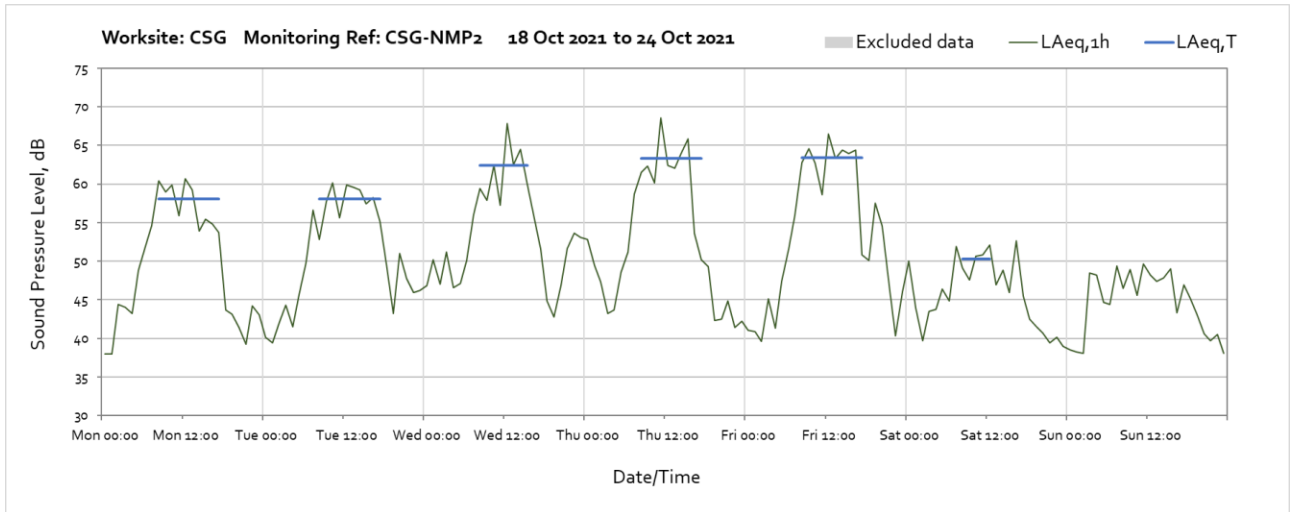




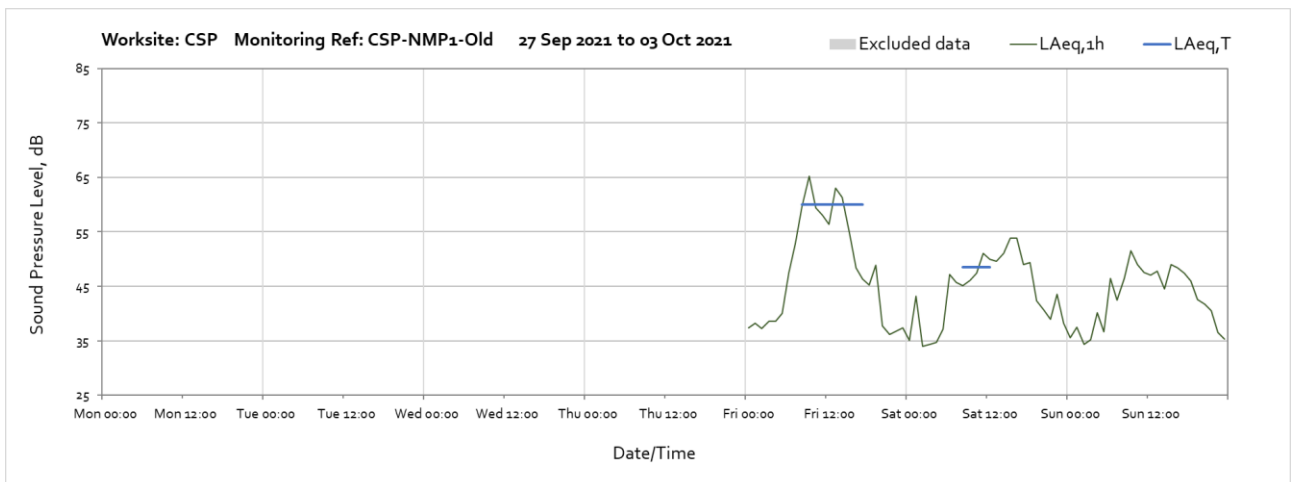


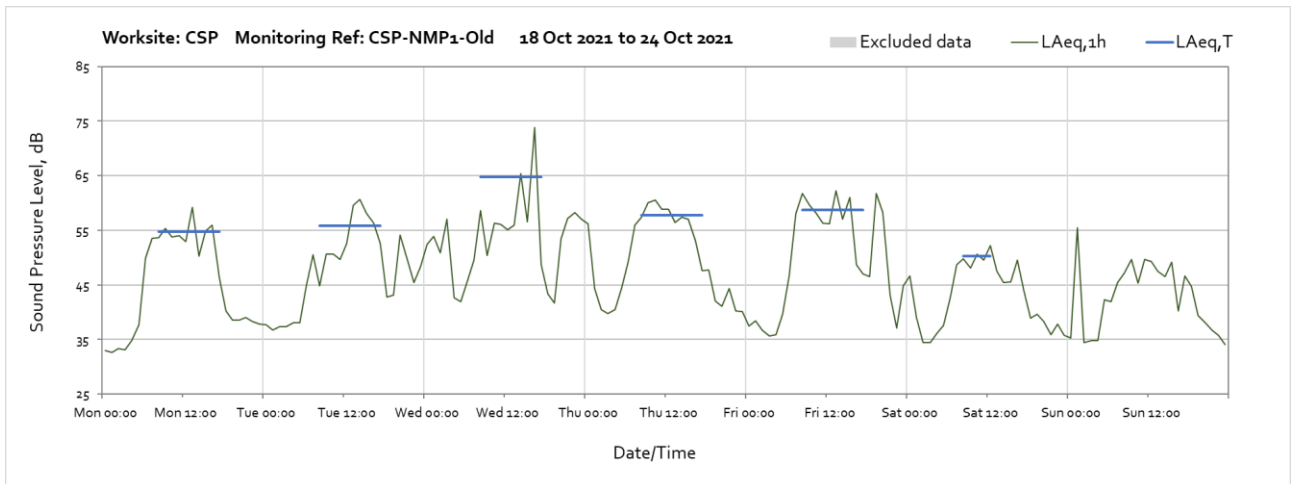
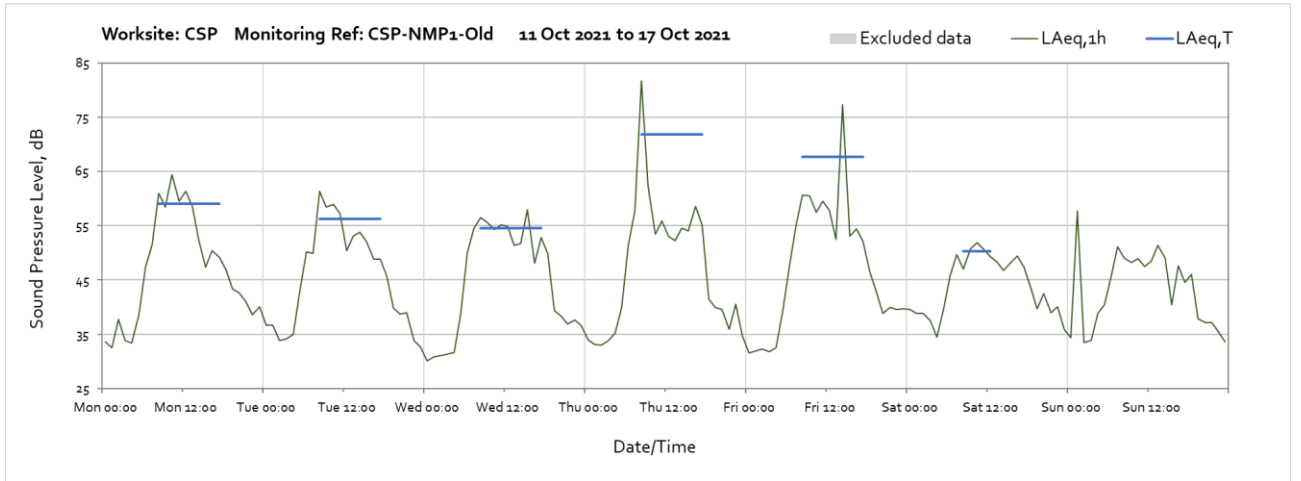
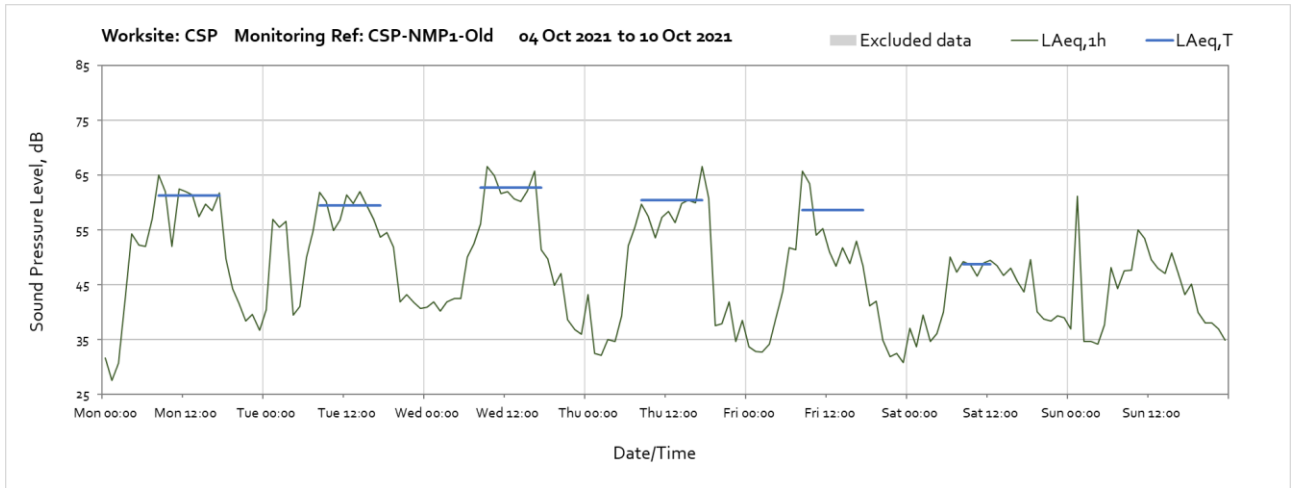
## Worksite: CSG – Monitoring Ref: CSG-NMP2

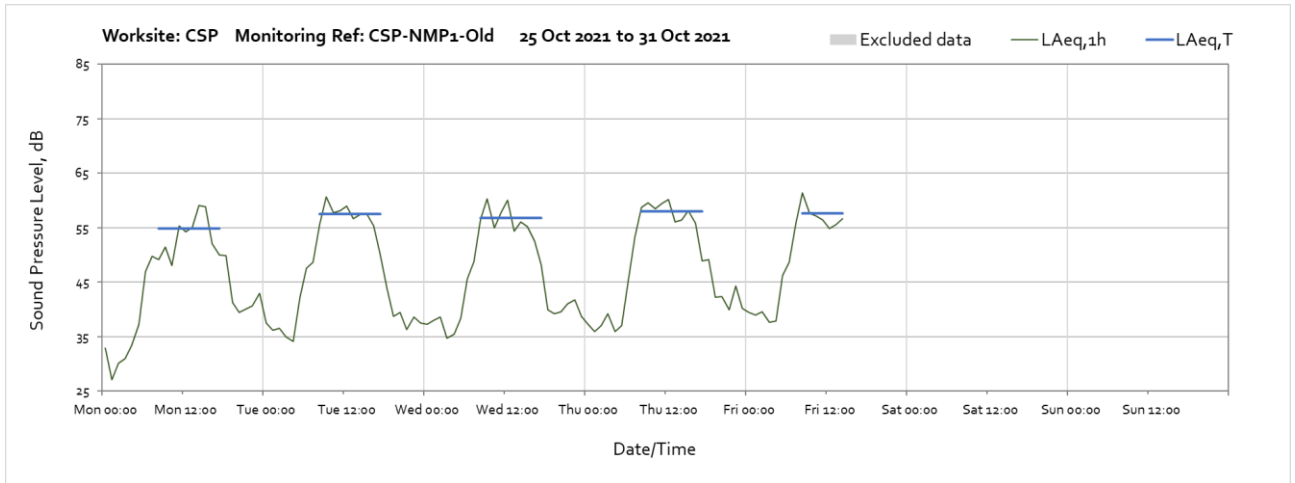




**Worksite: CSP – Monitoring Ref: CSP-NMP1-Old**

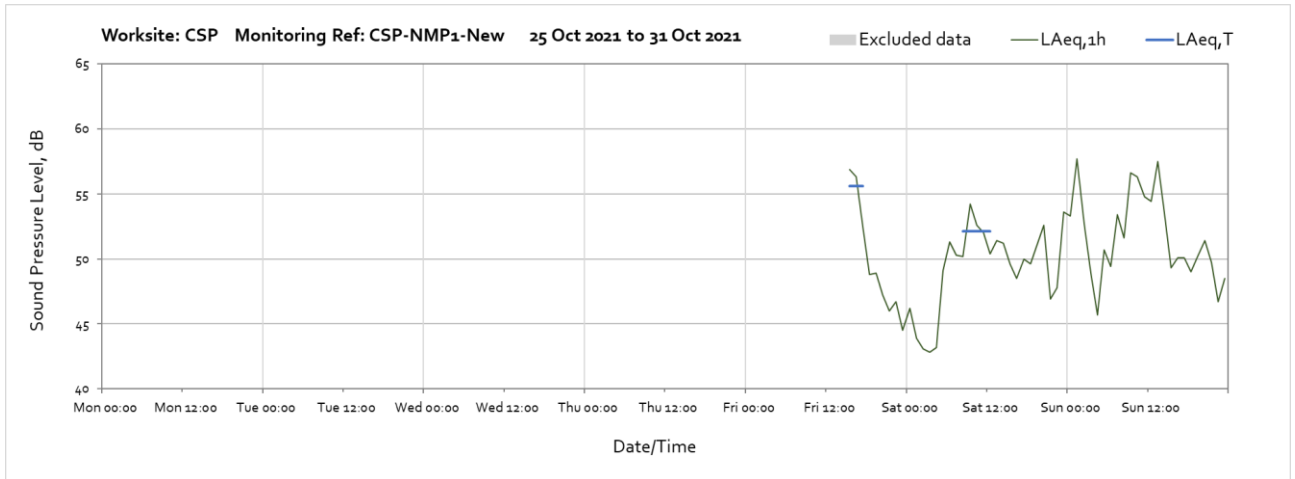






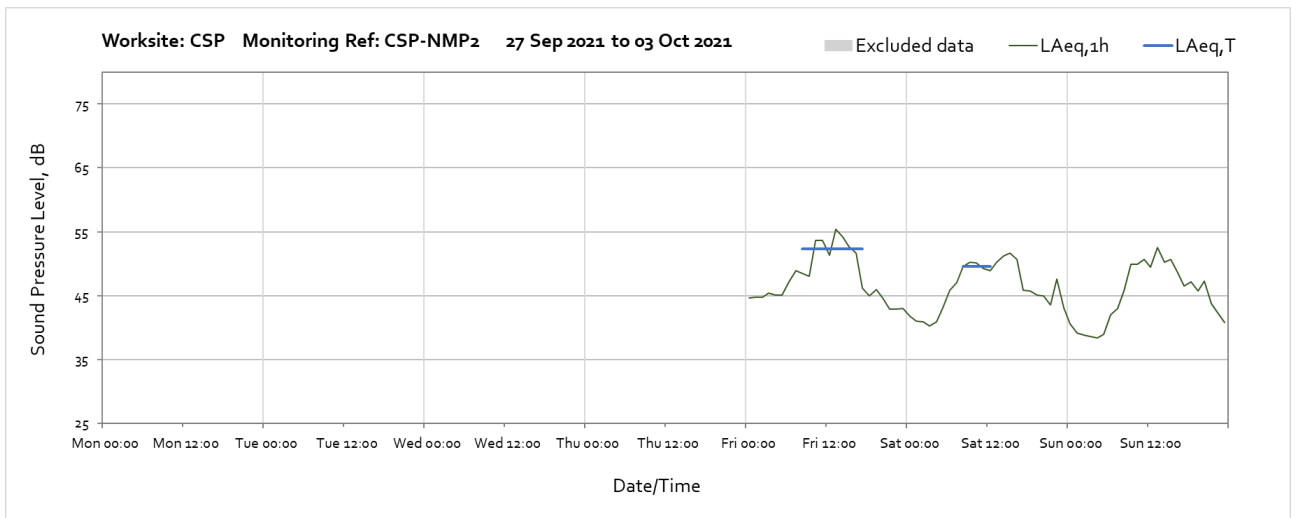
Note: The noise monitor was relocated to a new location on 29<sup>th</sup> October 2021.

**Worksite: CSP – Monitoring Ref: CSP-NMP1-New**

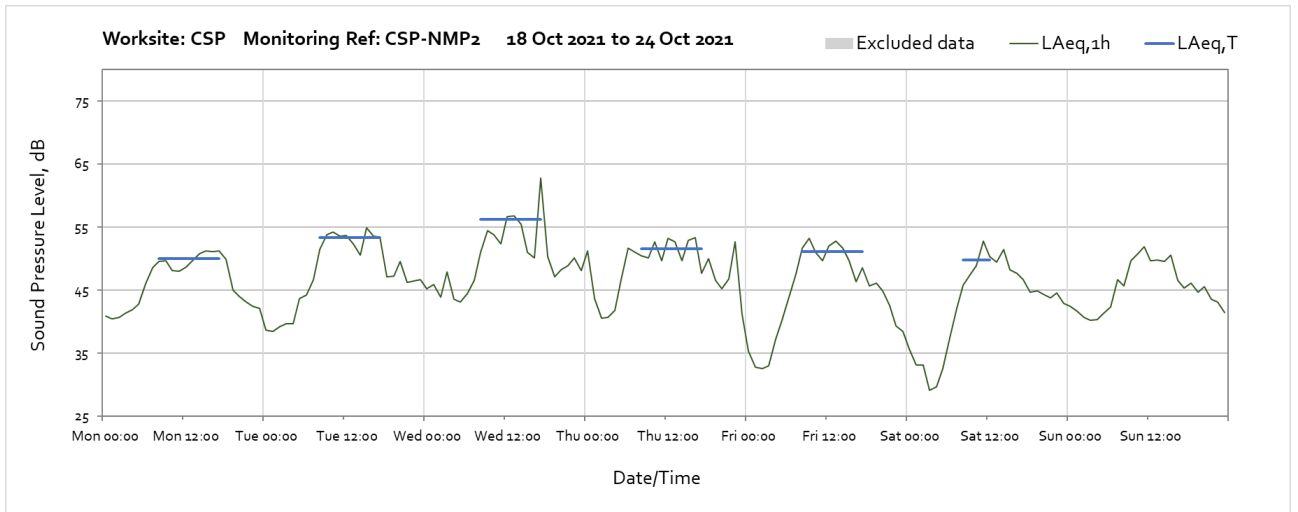
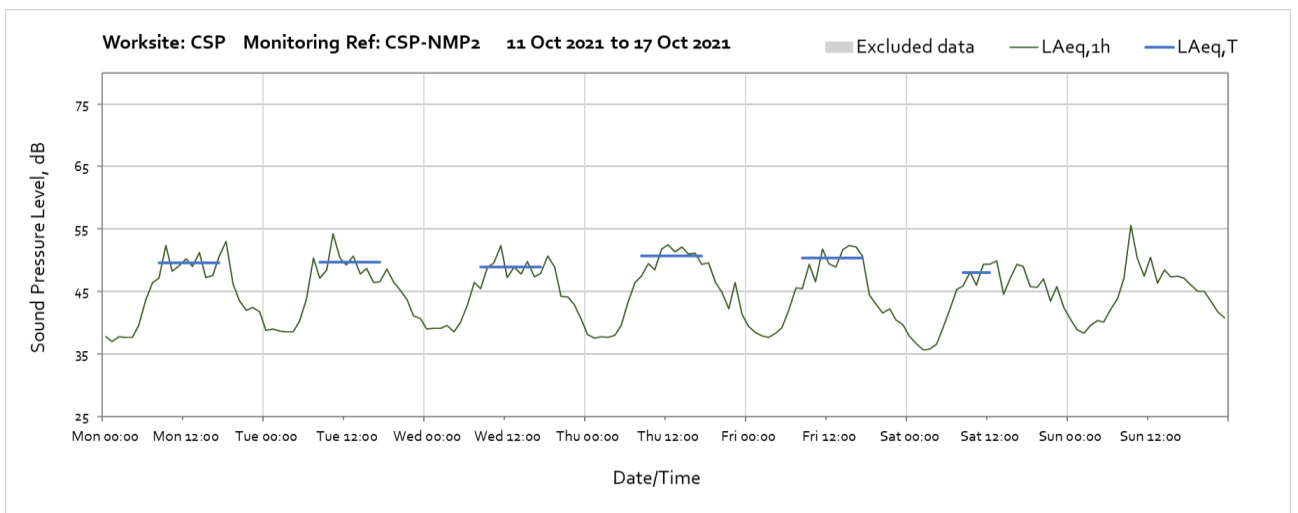
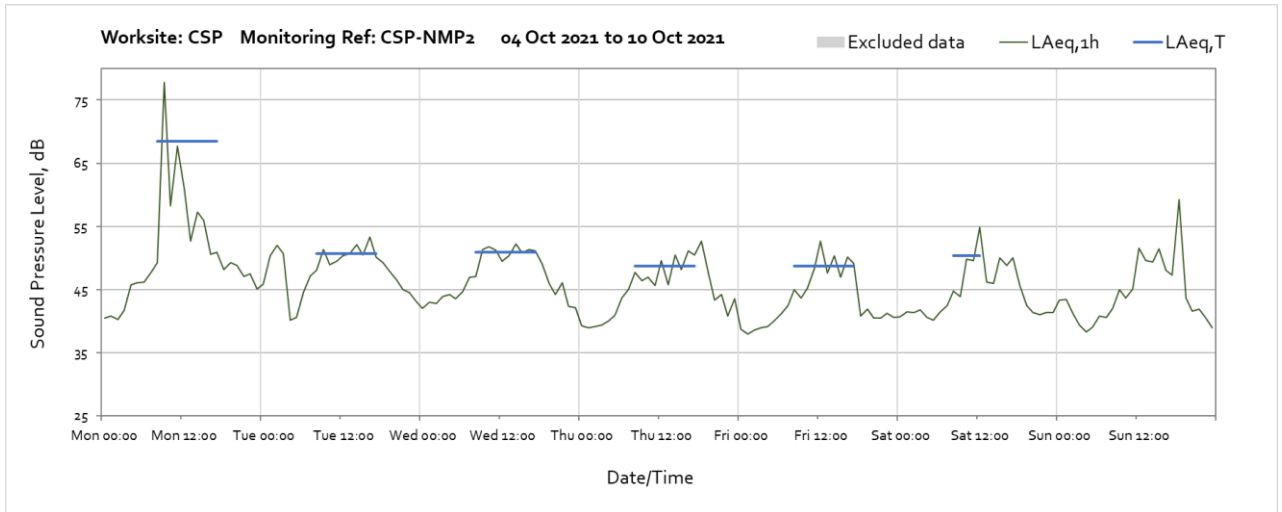


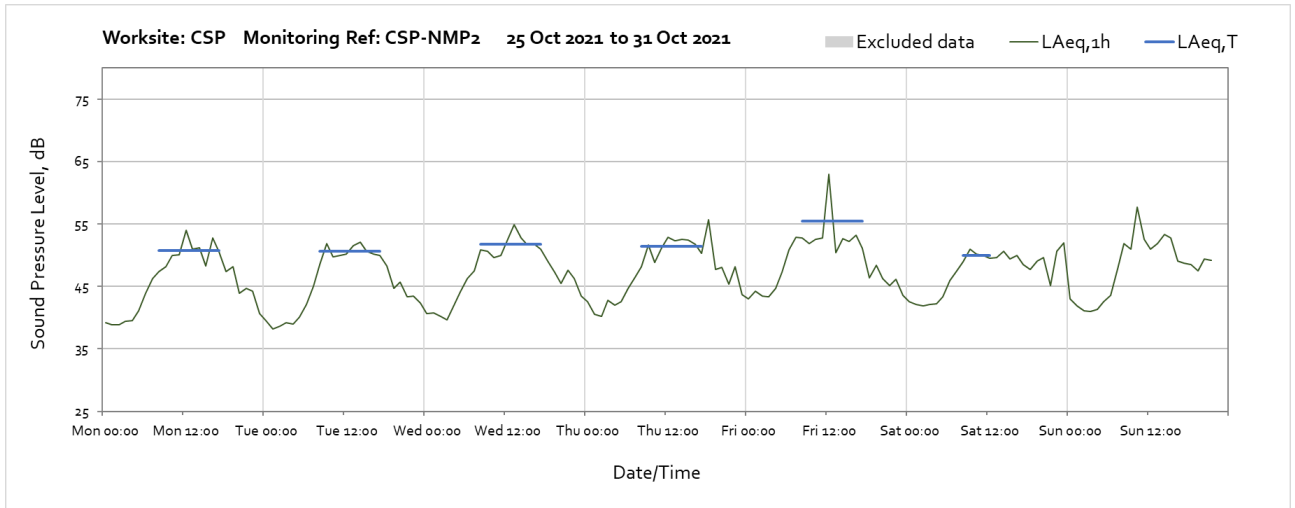
Note: CSP-NMP1 was relocated to its new location on 29<sup>th</sup> October 2021.

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

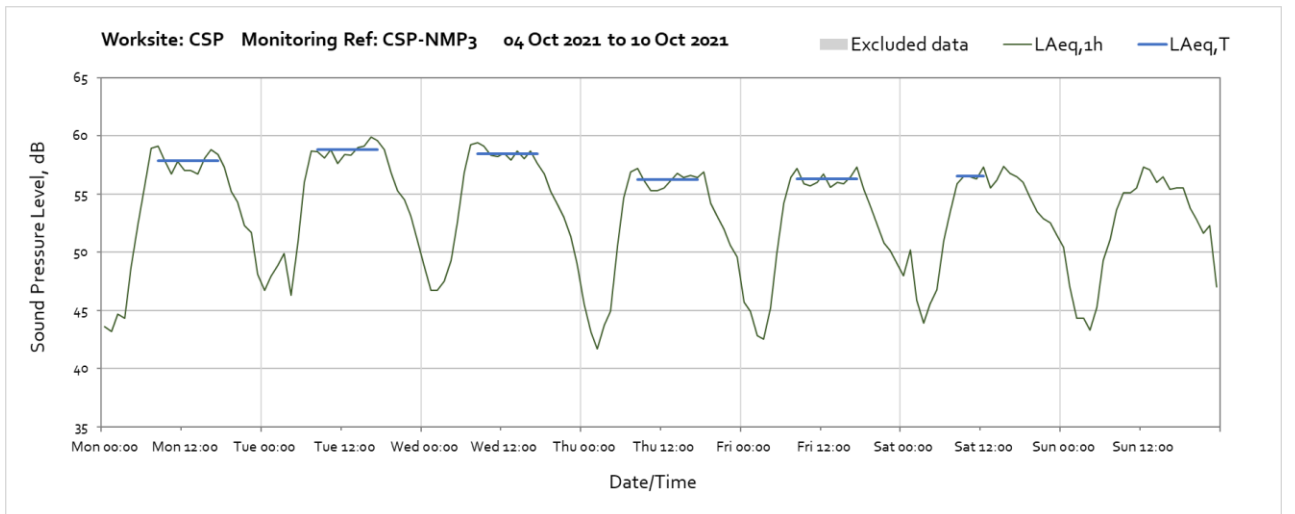
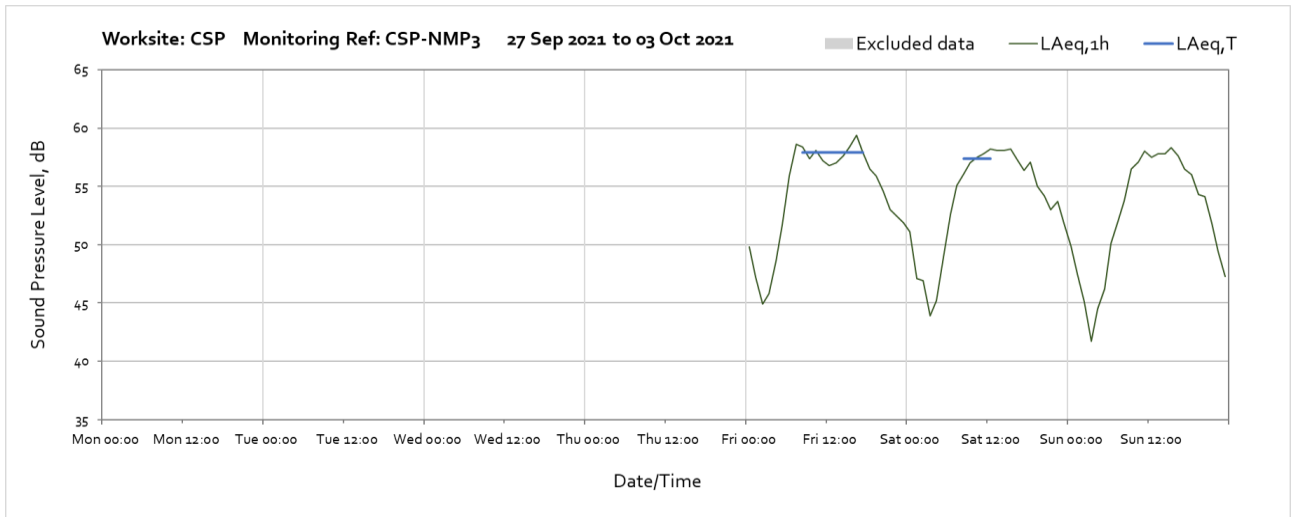


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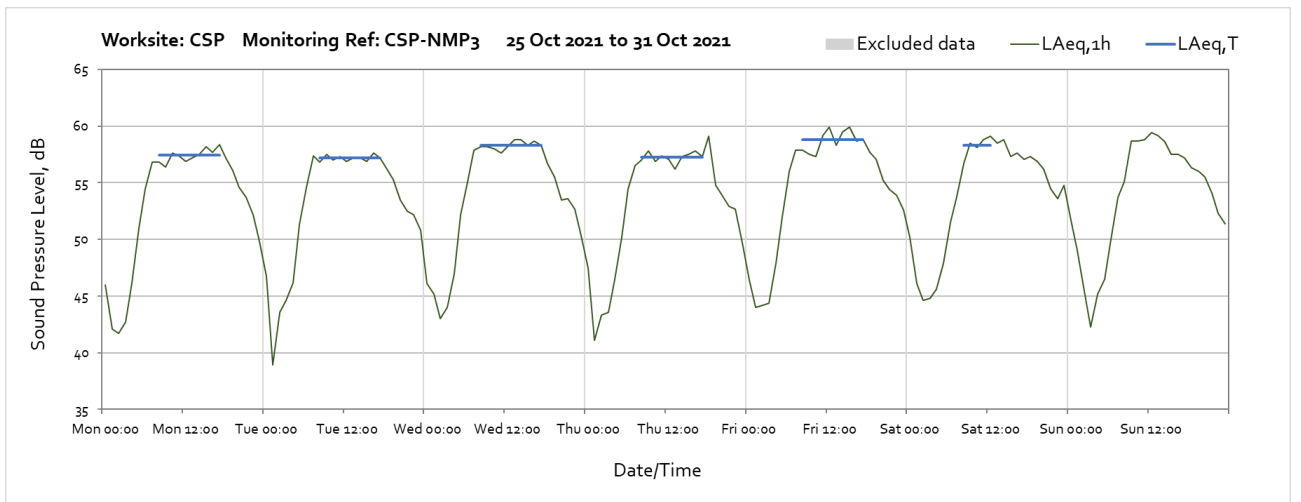
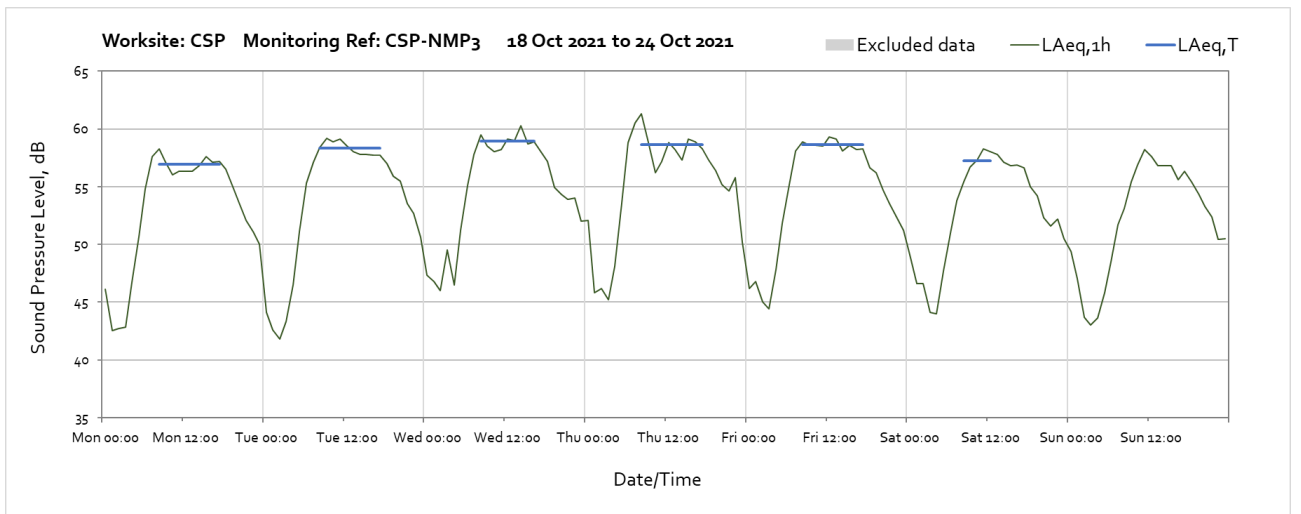
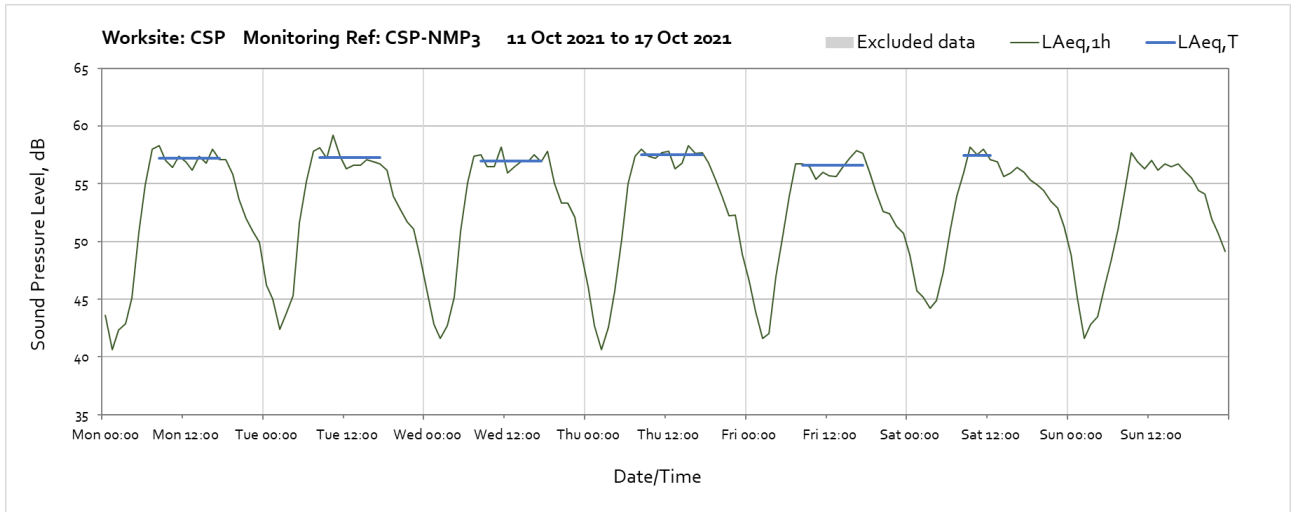




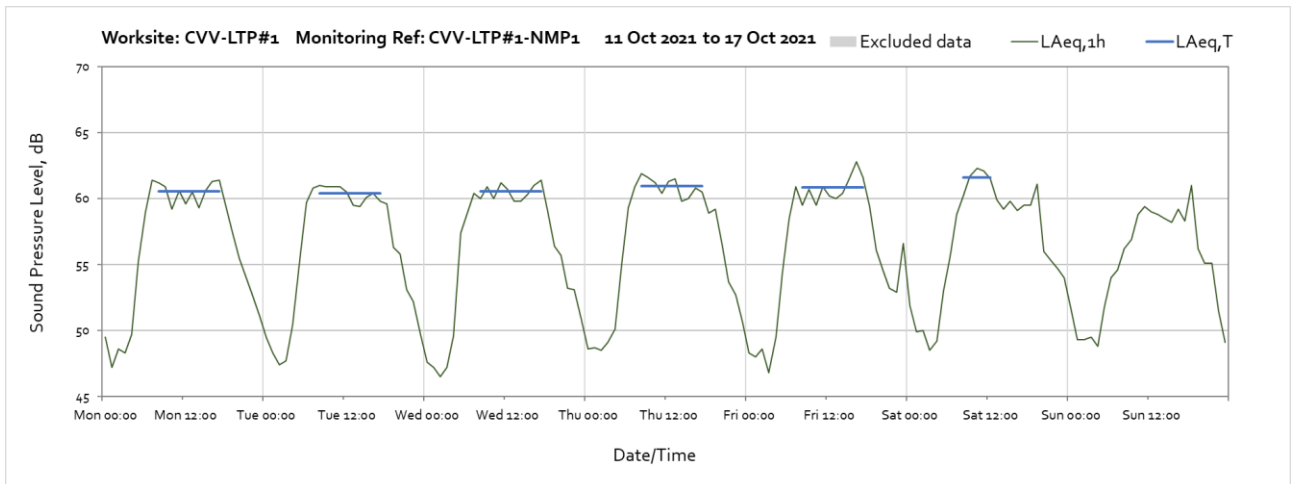
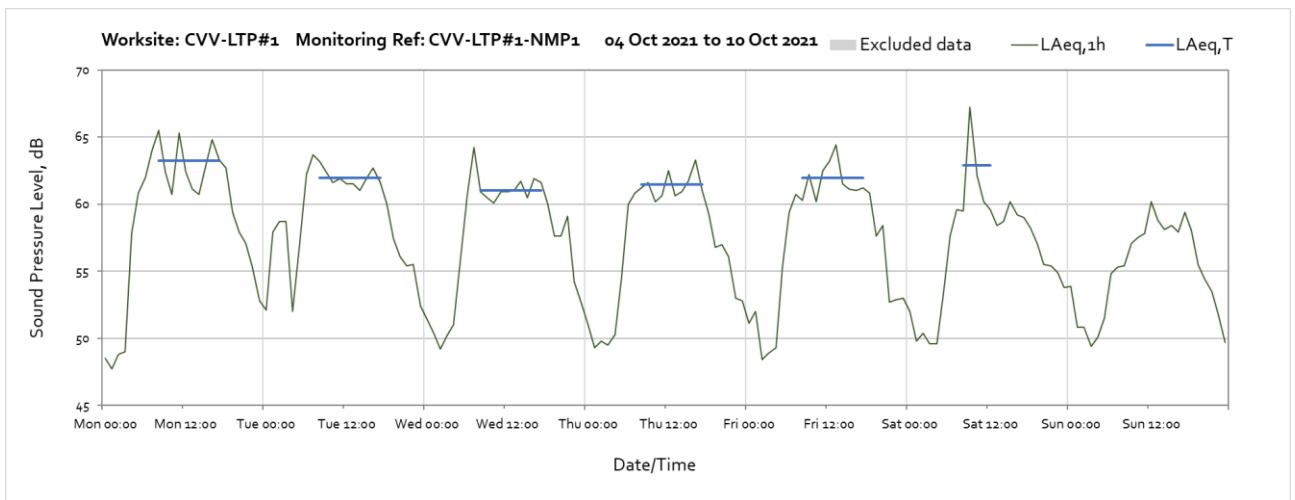
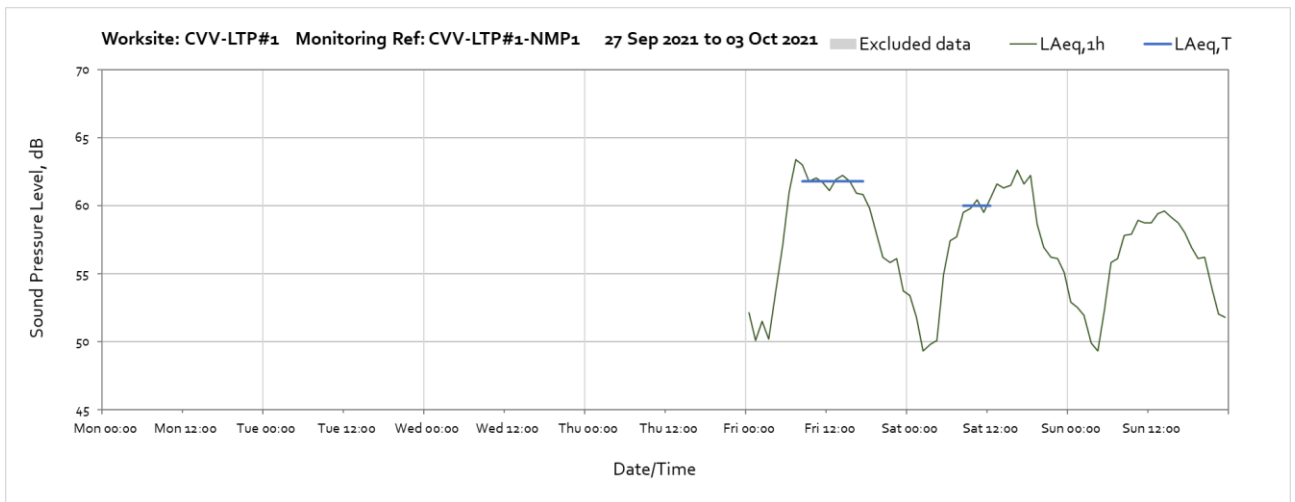
**Worksite: CSP - Monitoring Ref: CSP-NMP3**



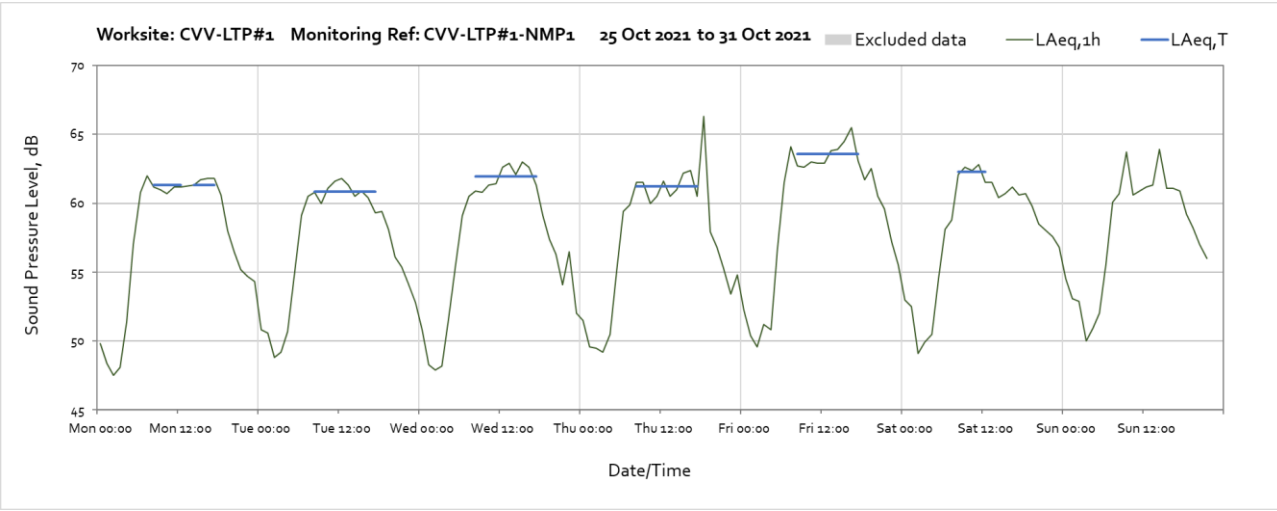
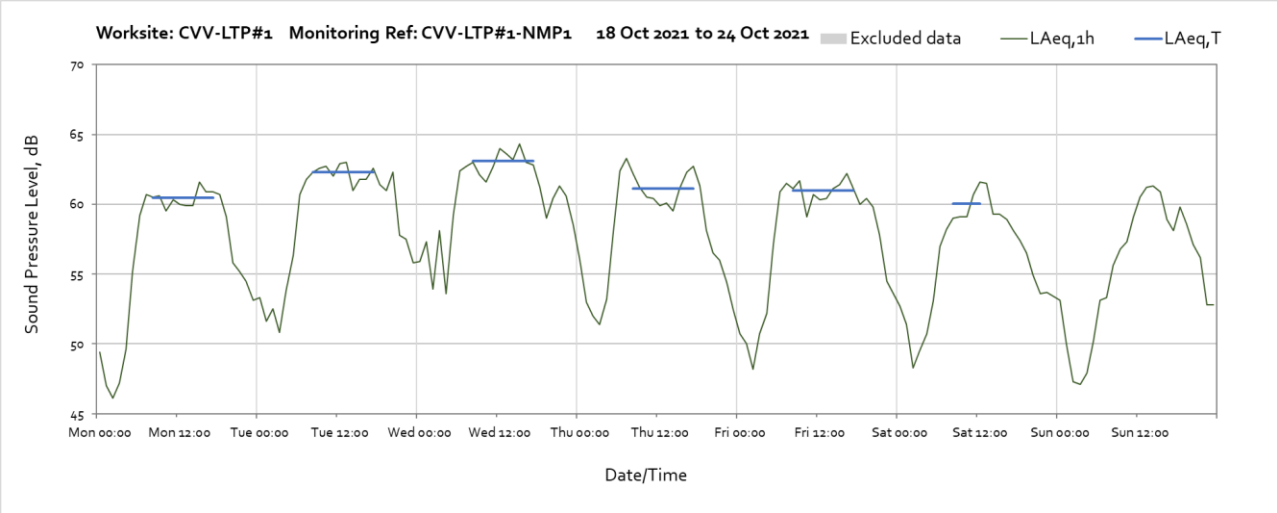




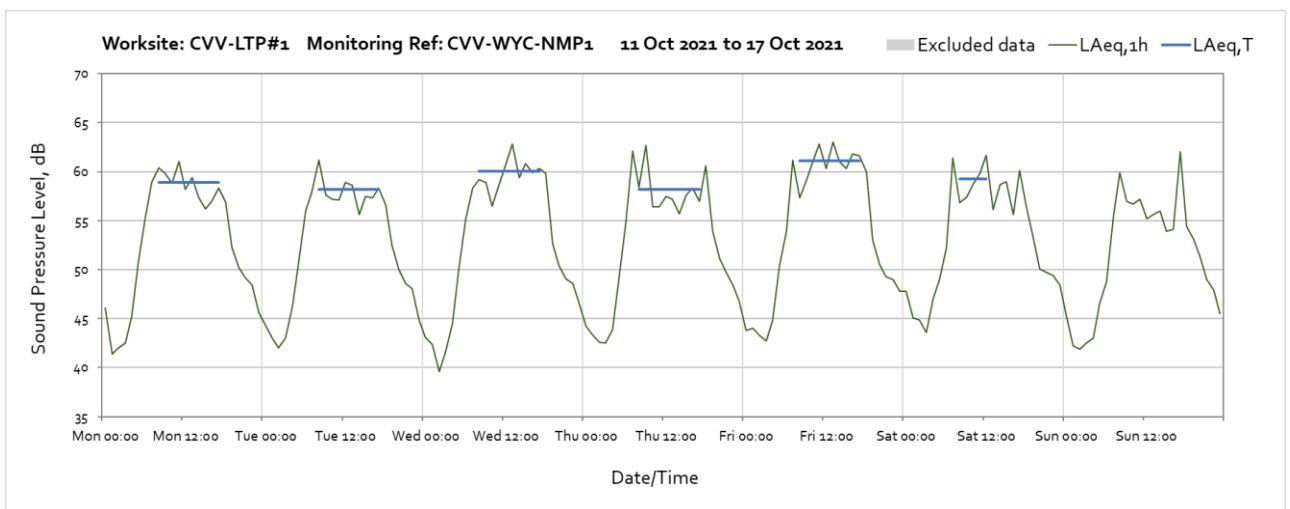
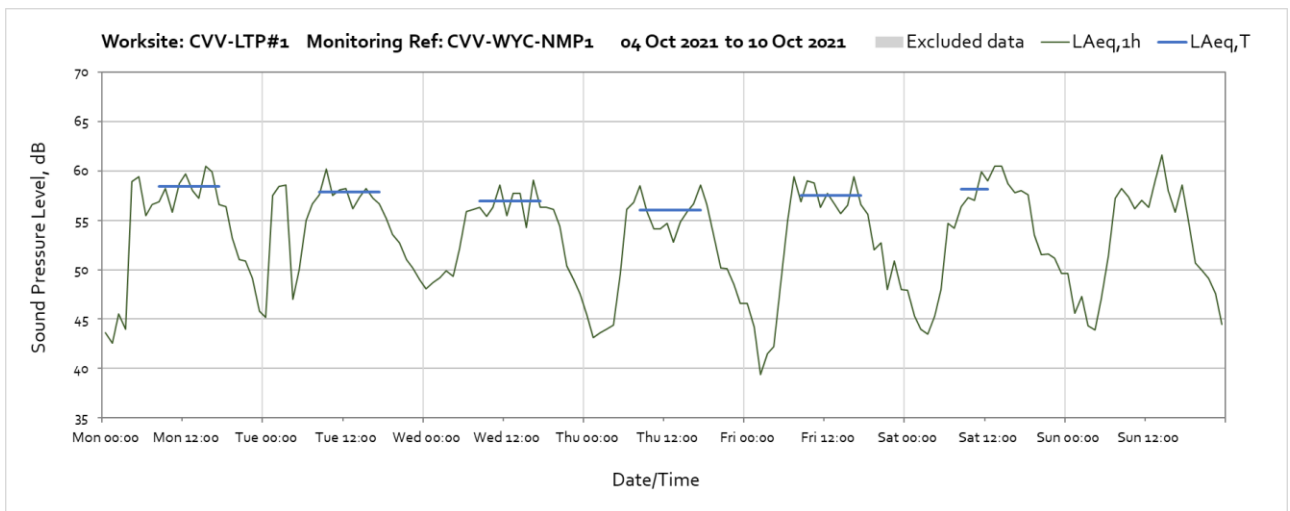
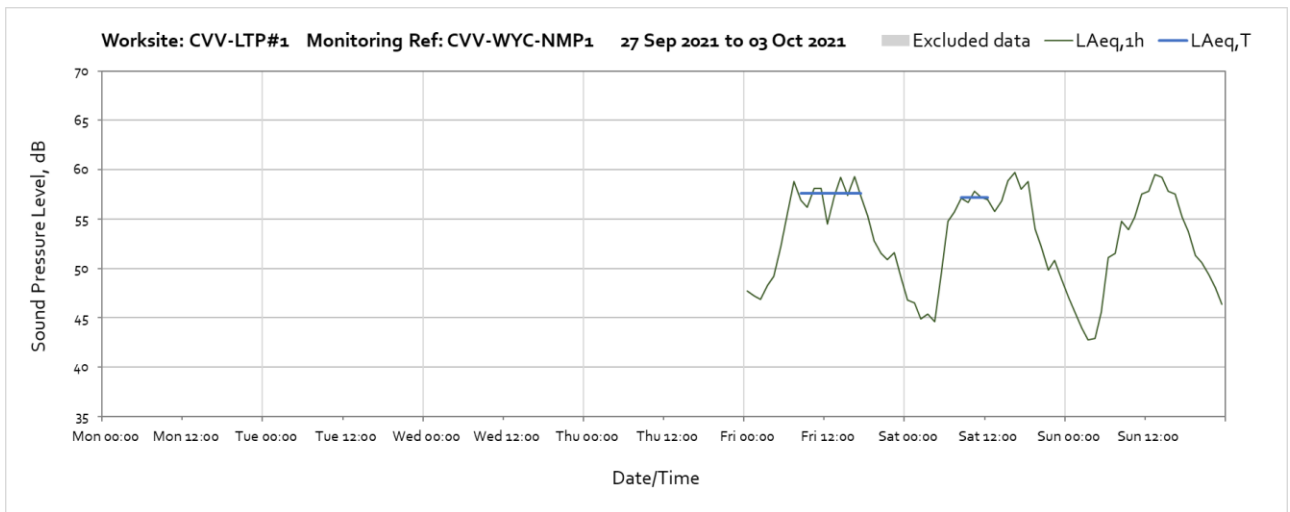
## Worksite: CVV-LTP#1 – Monitoring Ref: CVV-LTP#1-NMP1

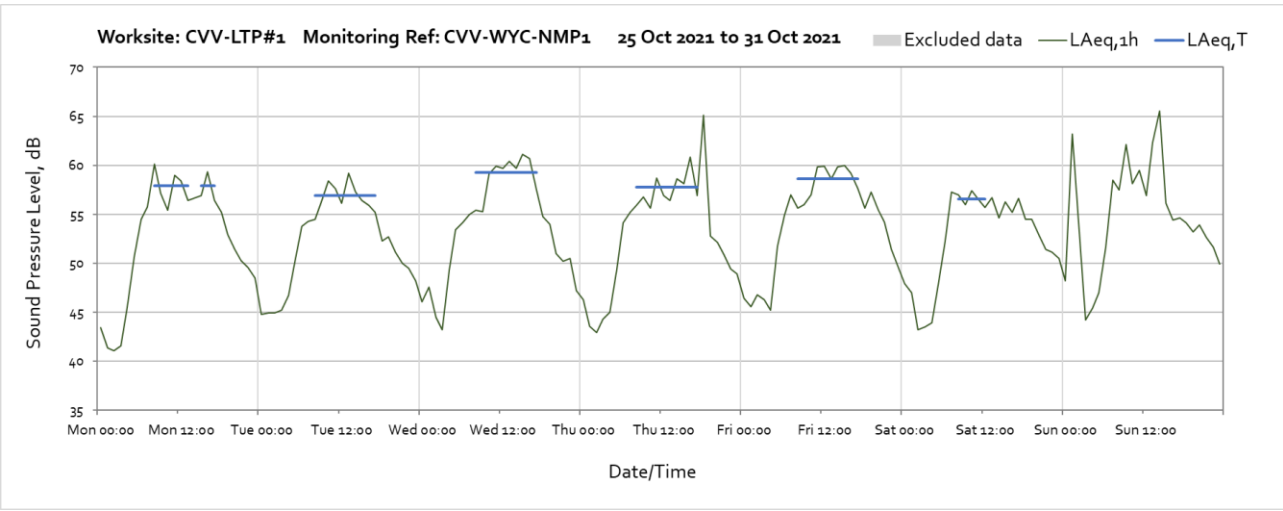
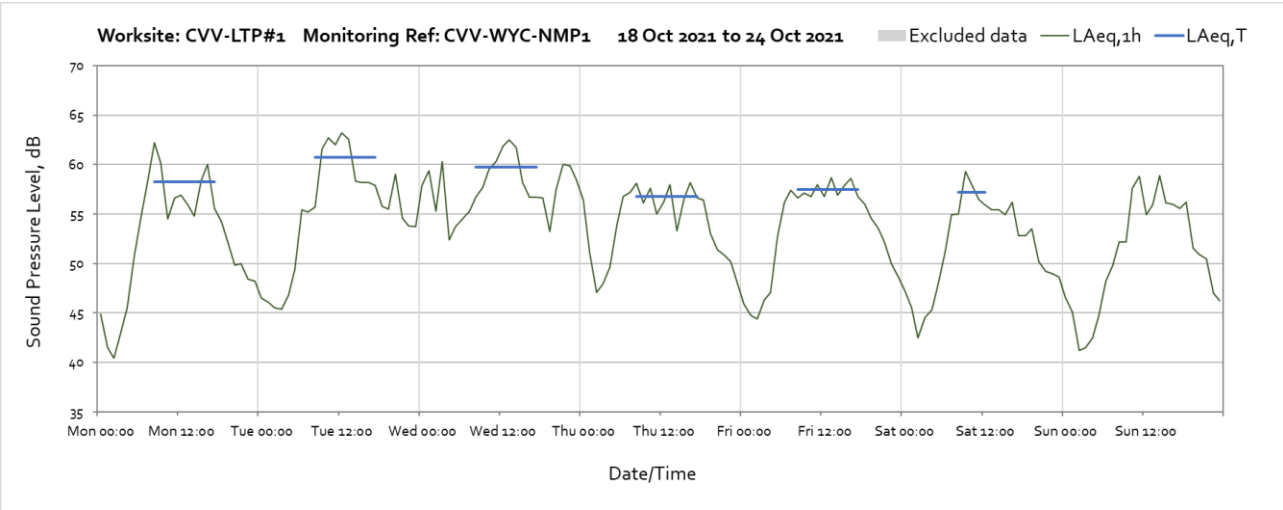


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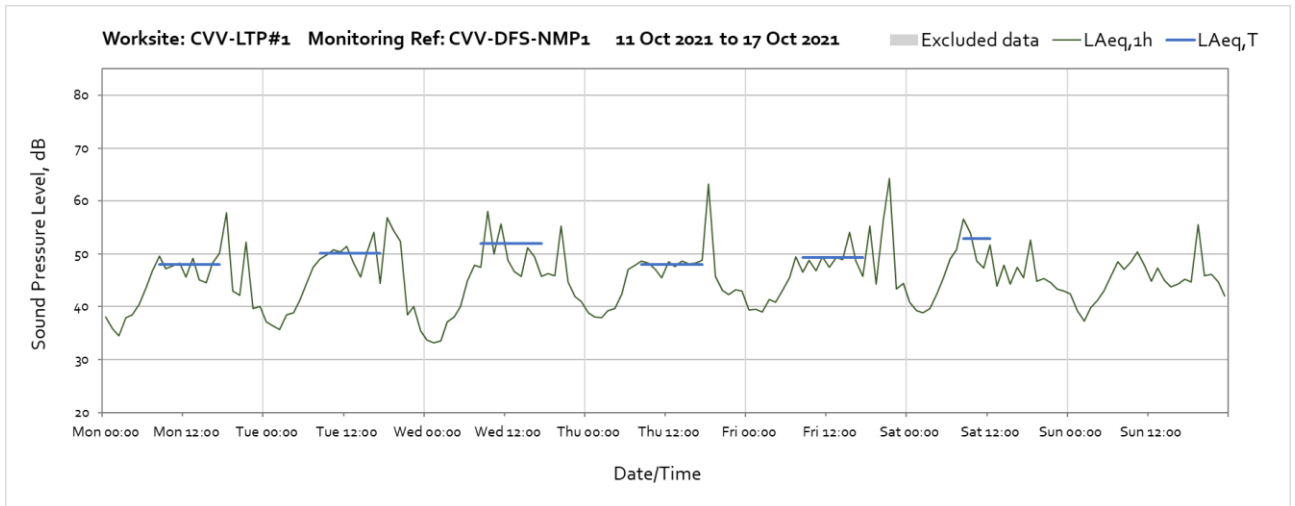
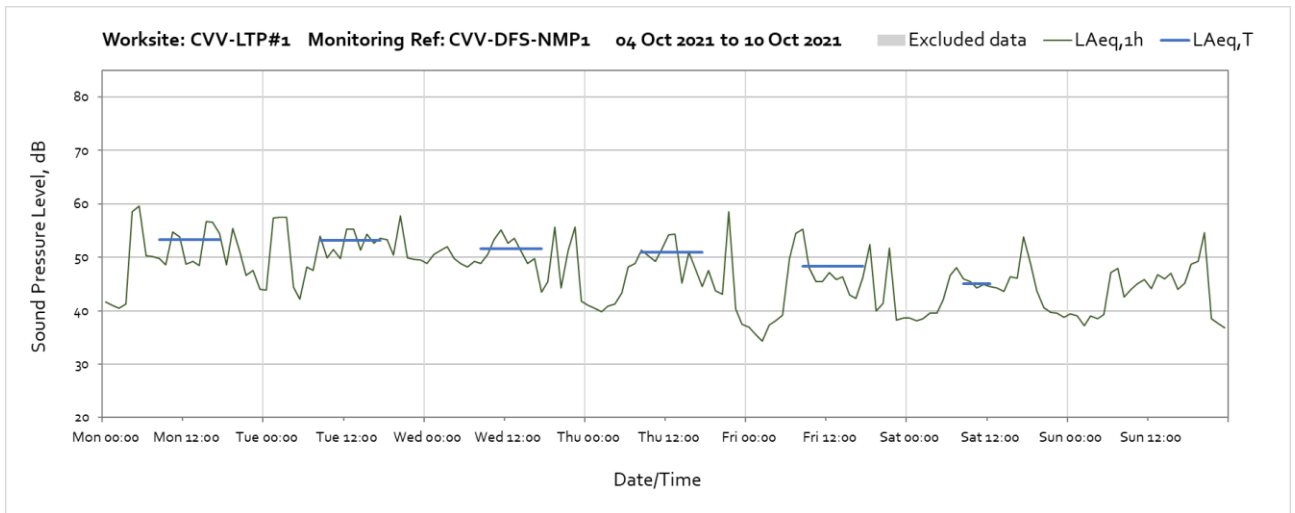
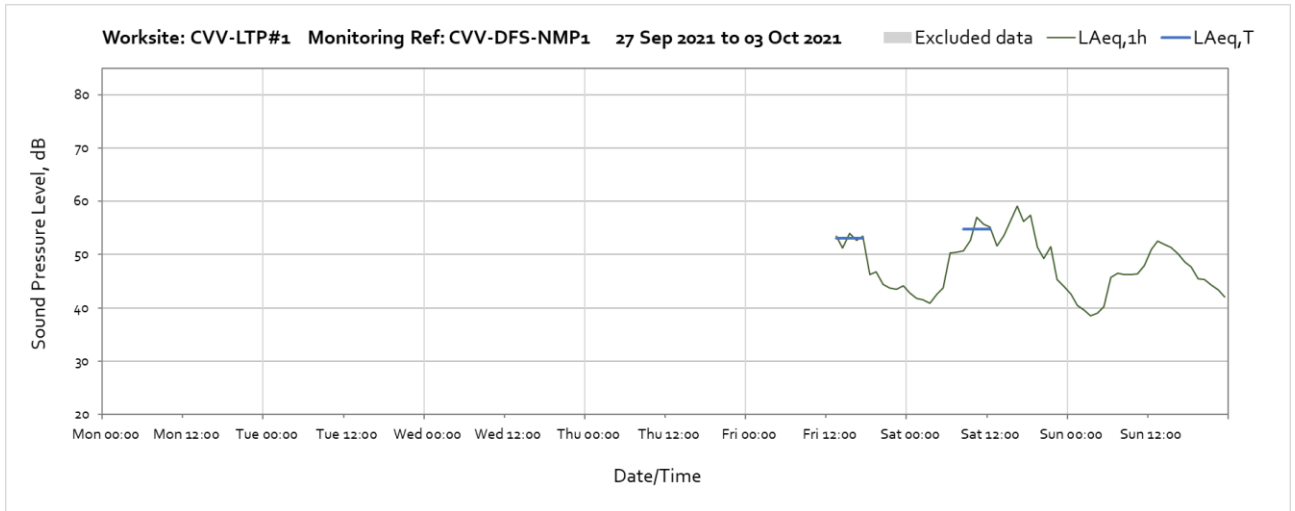


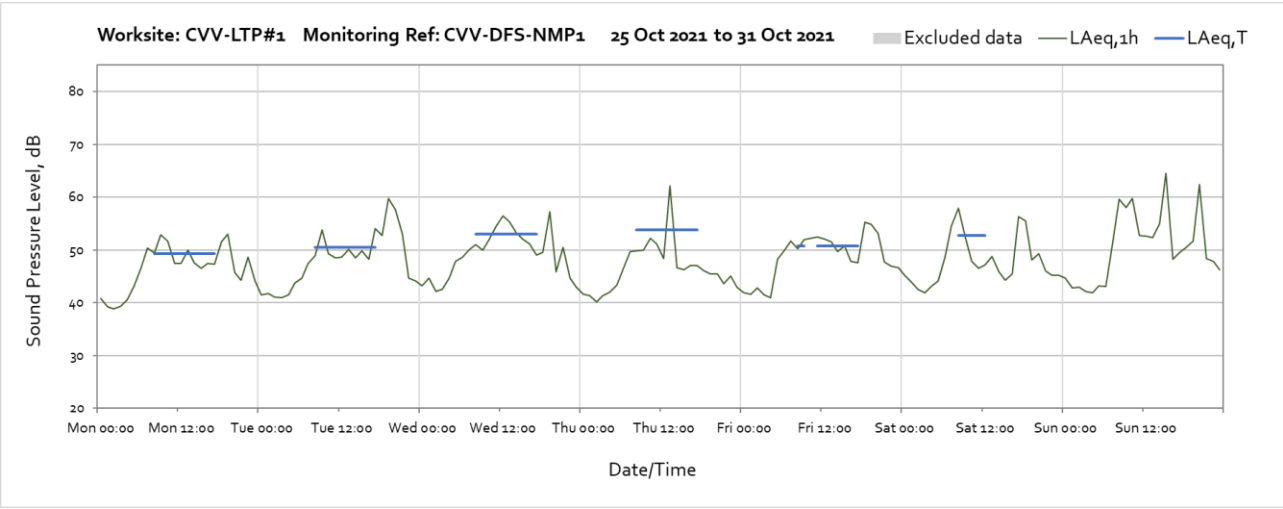
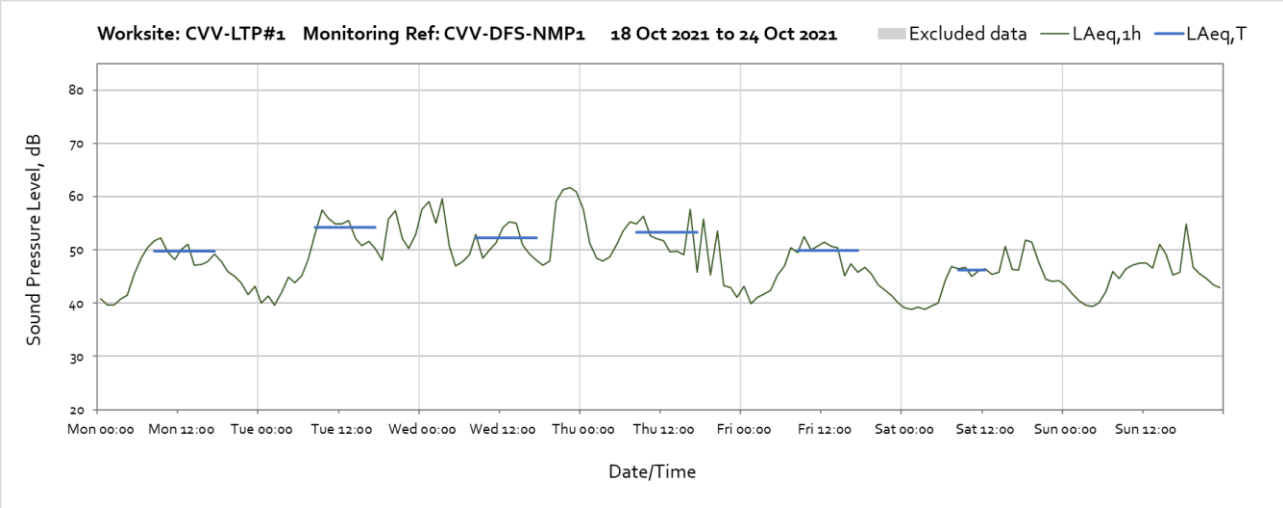
## Worksite: CVV-LPT#1 – Monitoring Ref: CVV-WYC-NMP1



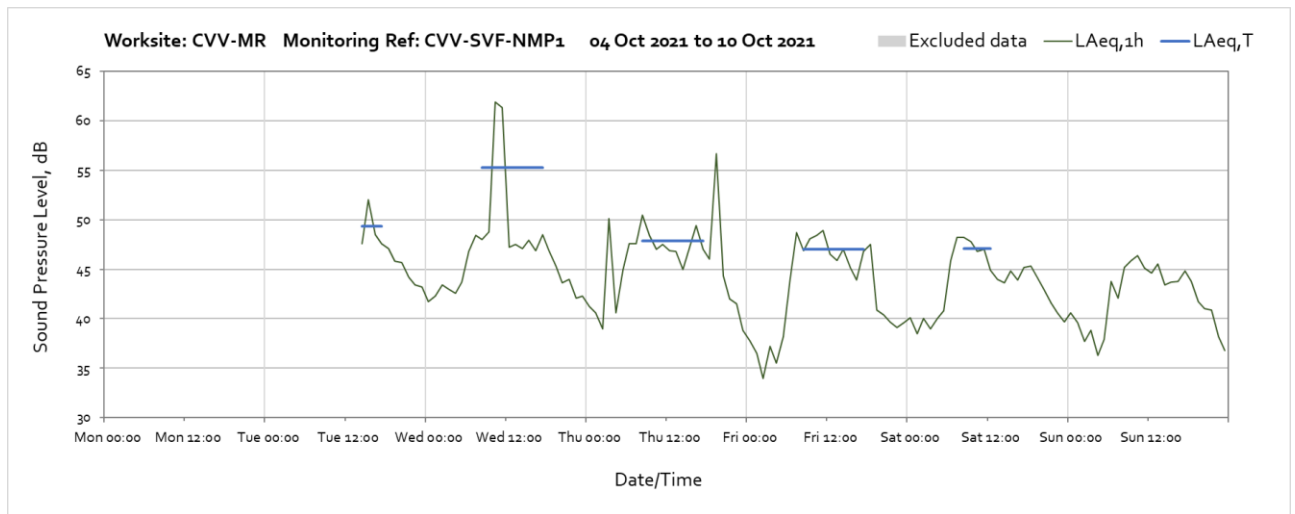


# Worksite: CVV-LTP#1 – Monitoring Ref: CVV-DFS-NMP1

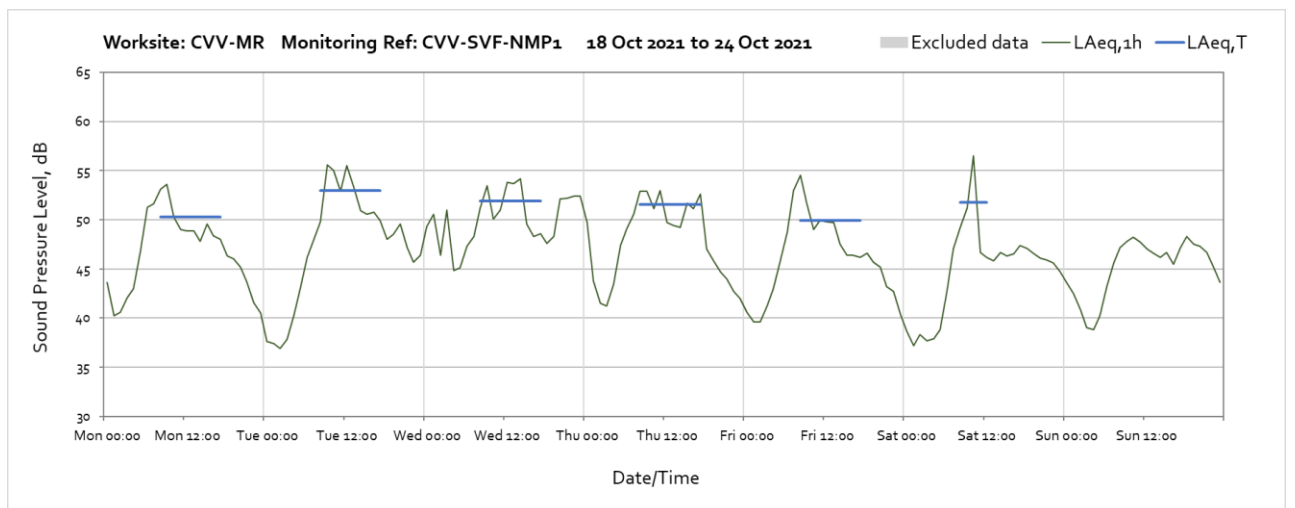
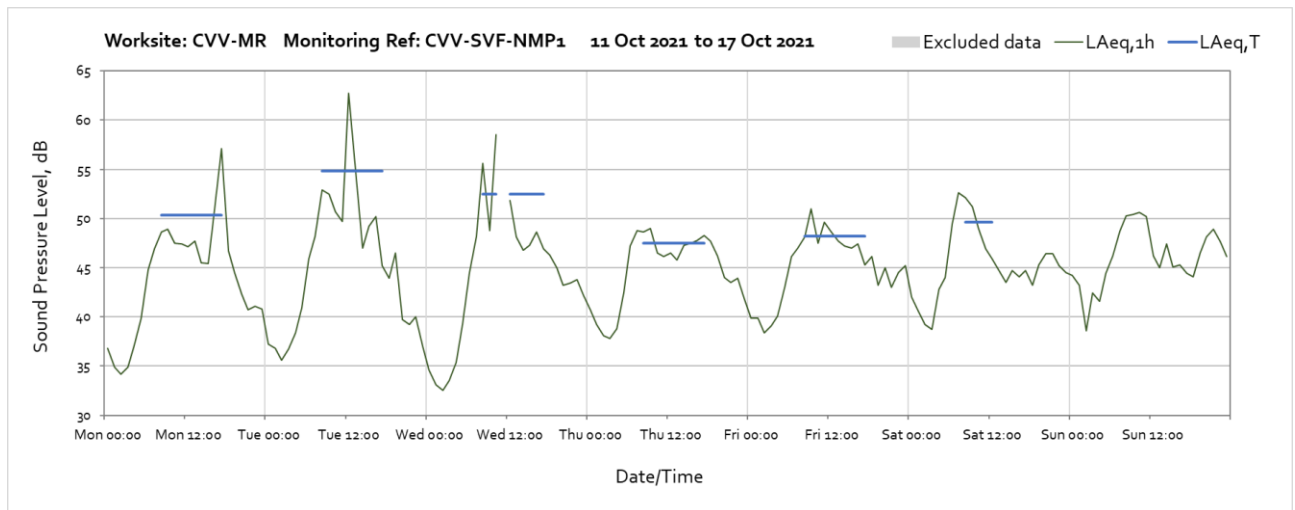




## Worksite: CVV-MR – Monitoring Ref: CVV-SVF-NMP1

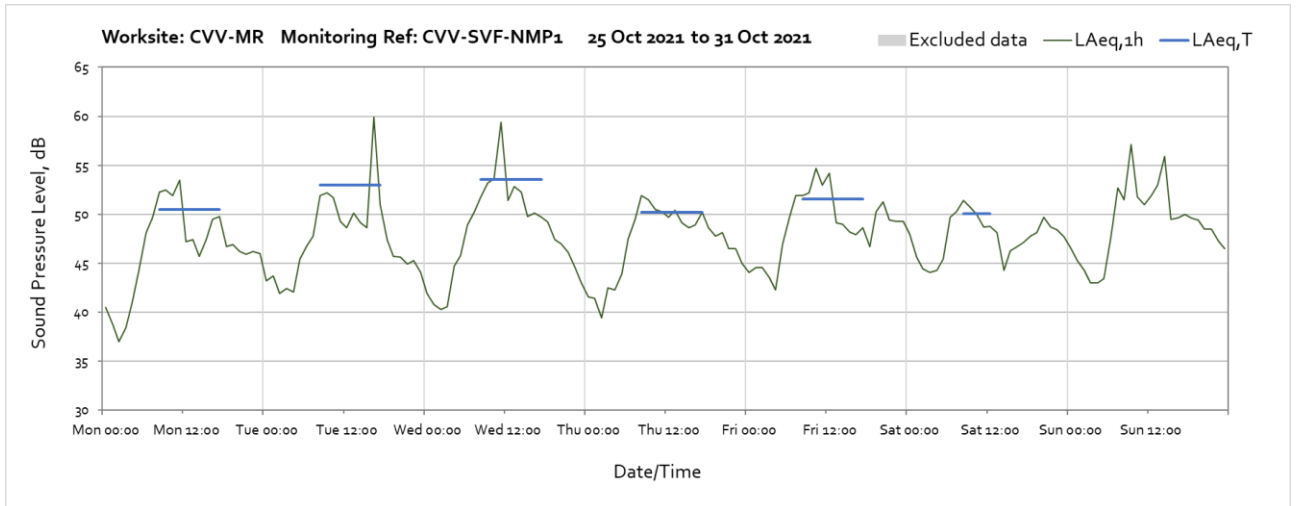


Note: The monitor was installed on 5<sup>th</sup> October 2021.



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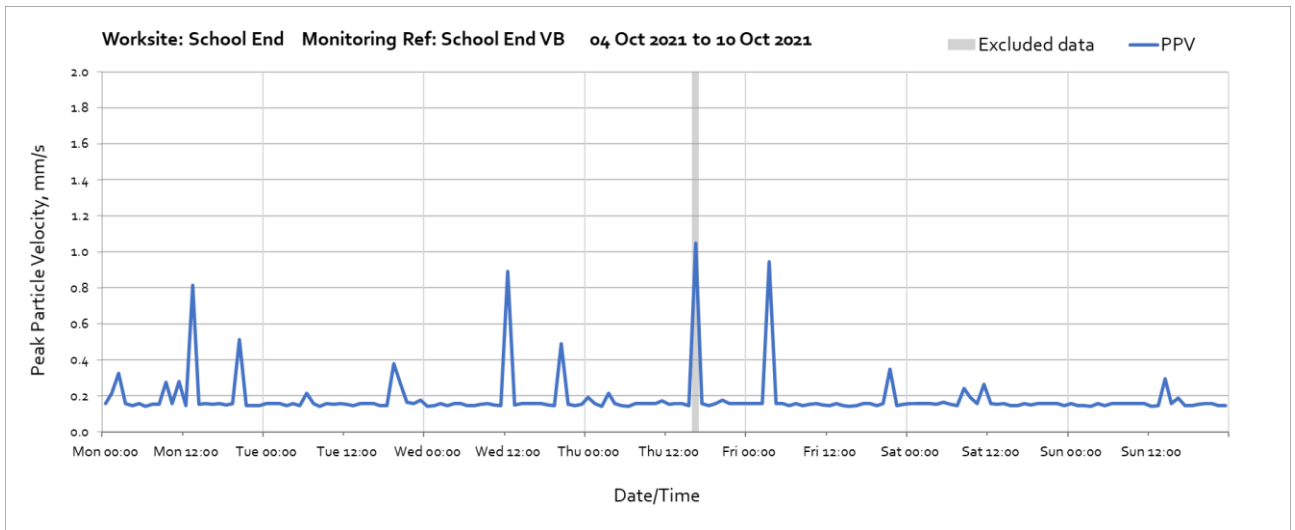
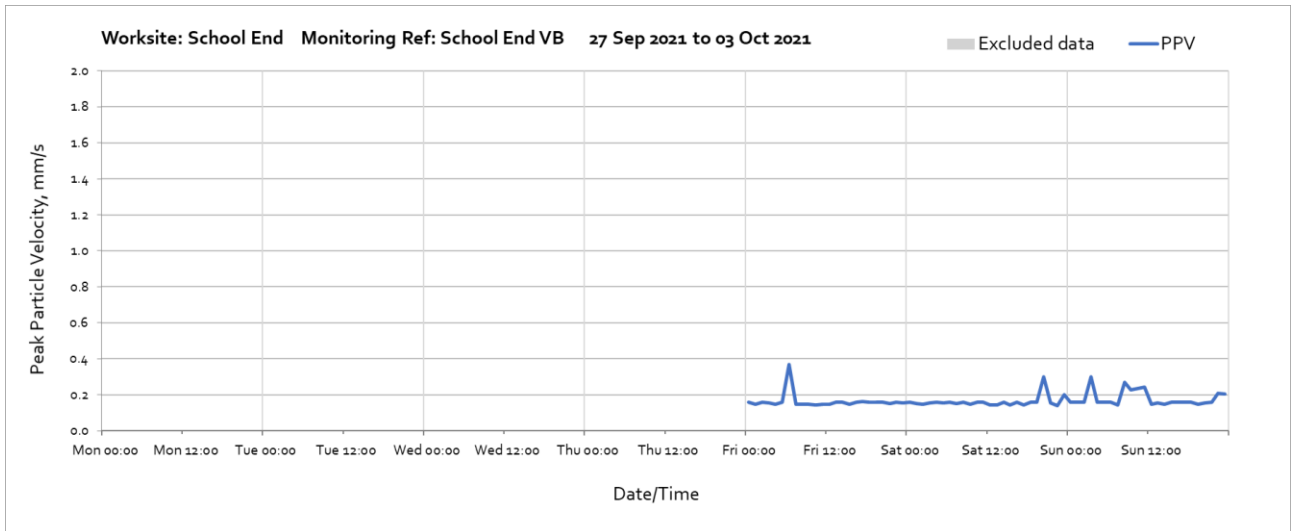


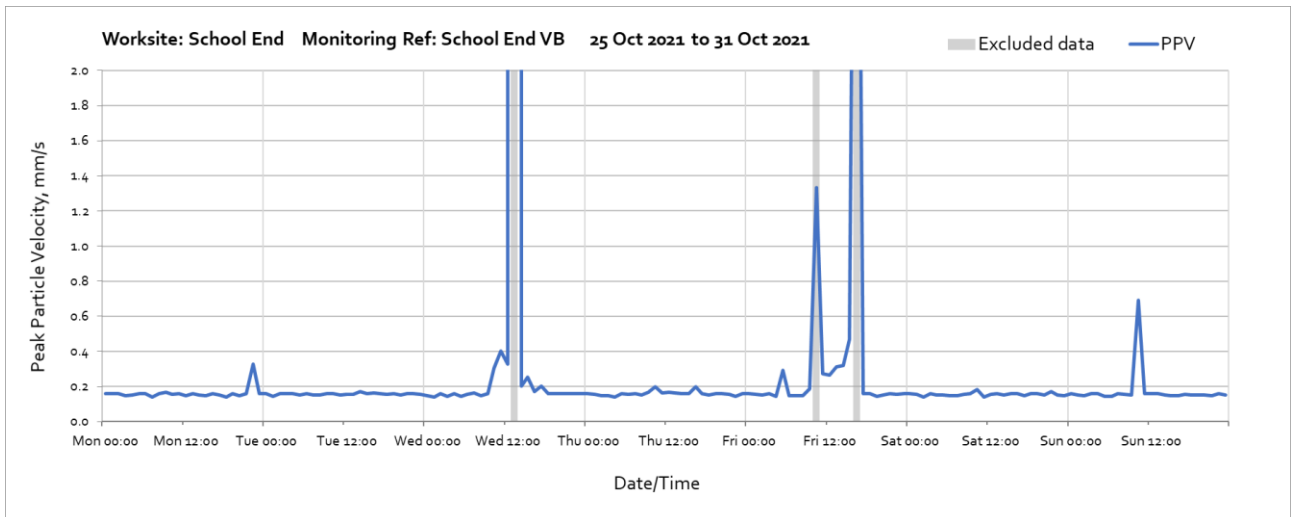
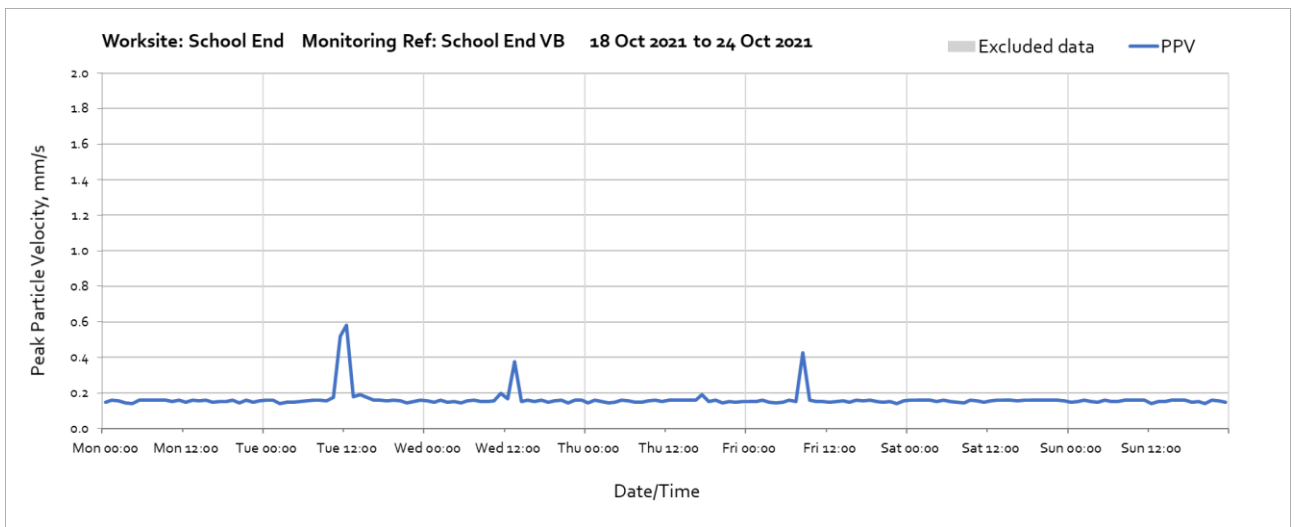
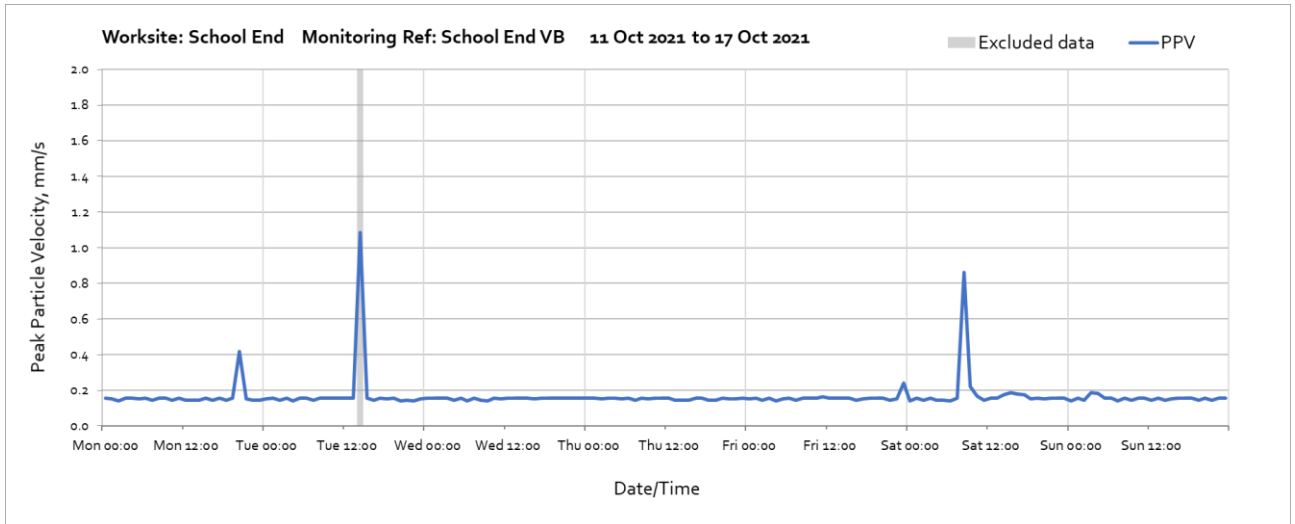


# Vibration

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.

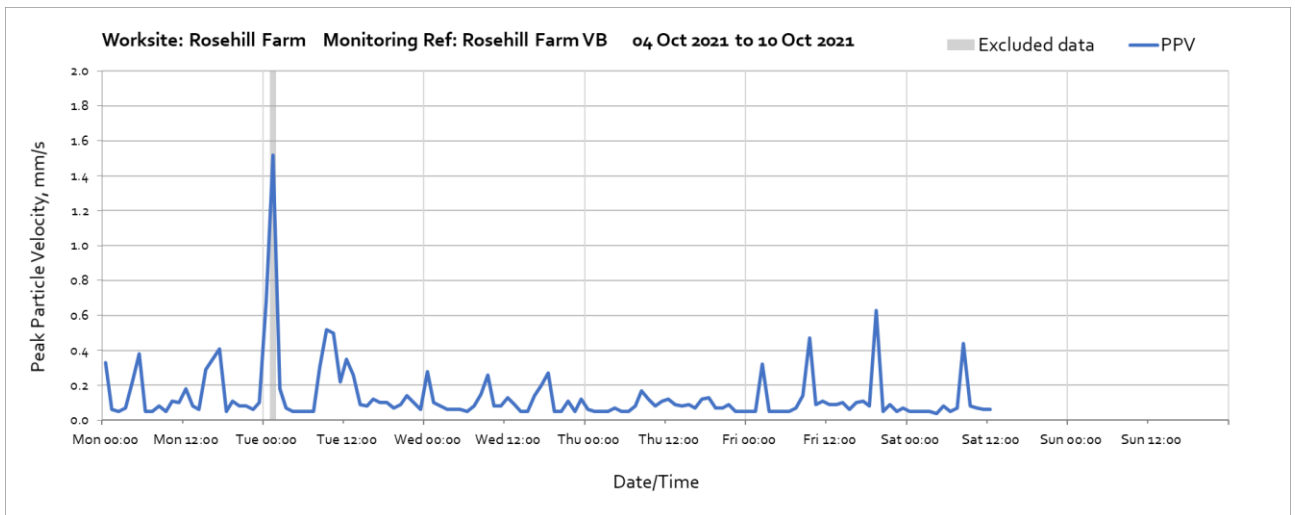
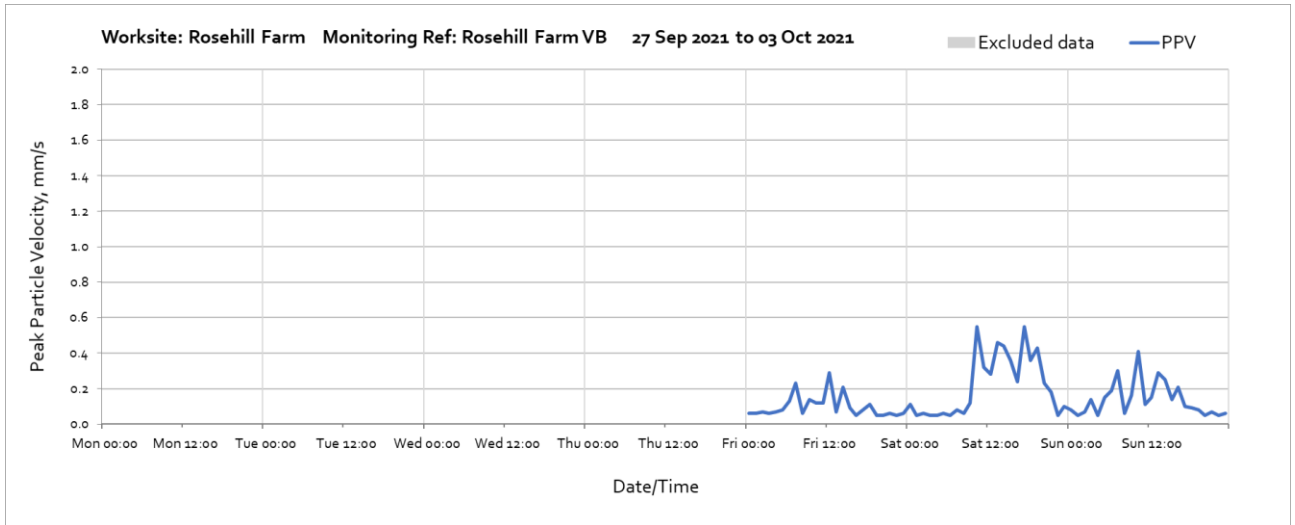
## Worksite: SE – Monitoring Ref: SE-Vib 1



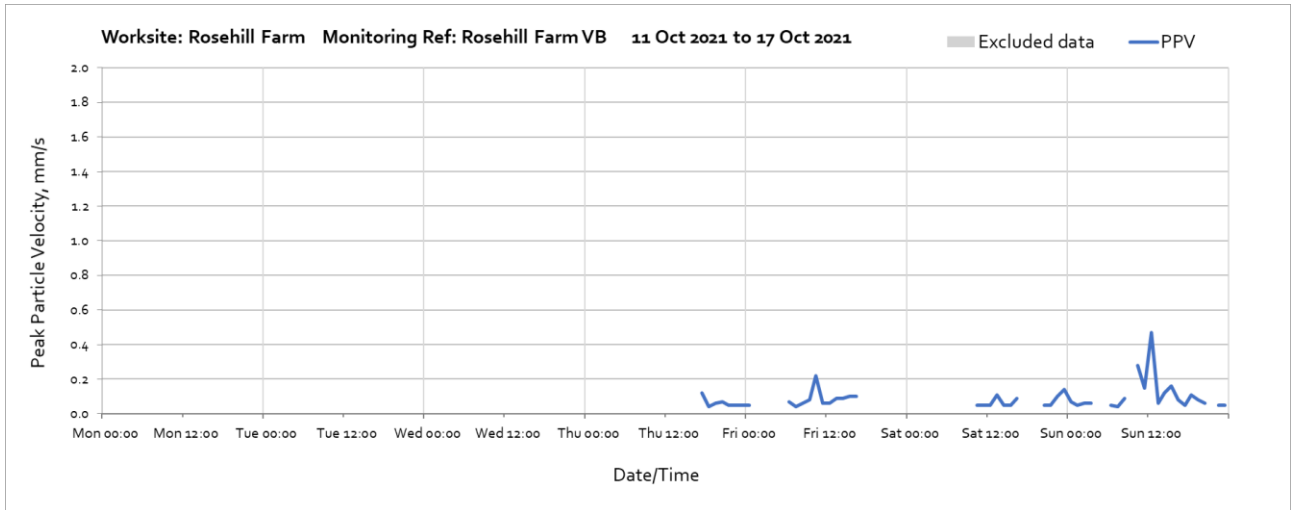


Note: High levels of vibration measured through out the week were due to local disturbance of the monitor and are not representative of HS2 construction vibration levels at the nearest receptors.

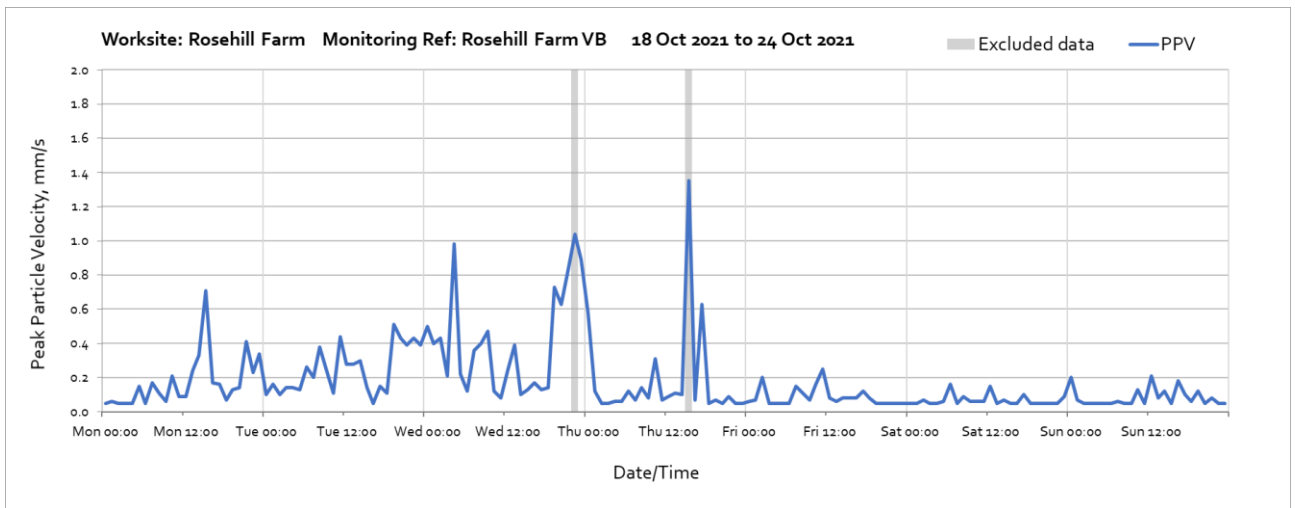
## Worksite: RF – Monitoring Ref: RF-Vib 1



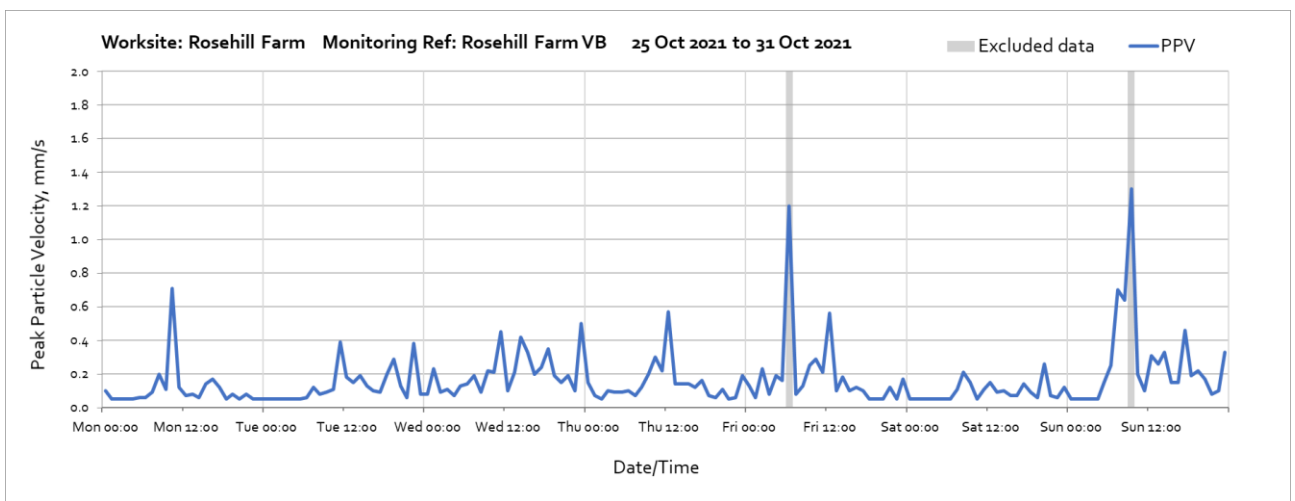
Note: High levels of vibration measured at 01:00 on Tuesday 5<sup>th</sup> of October was due to local disturbance of the monitor and are not representative of HS2 construction vibration levels at the nearest receptors. Missing data between 13:00 on Tuesday 9<sup>th</sup> of October and 17:00 on Thursday 14<sup>th</sup> of October were due to loss of power to the monitor.



Note: Missing data between 13:00 on Tuesday 9<sup>th</sup> of October and 17:00 on Thursday 14<sup>th</sup> of October were due to loss of power to the monitor. Other intermittent loss of data through out the week were due to poor signal at monitoring location.



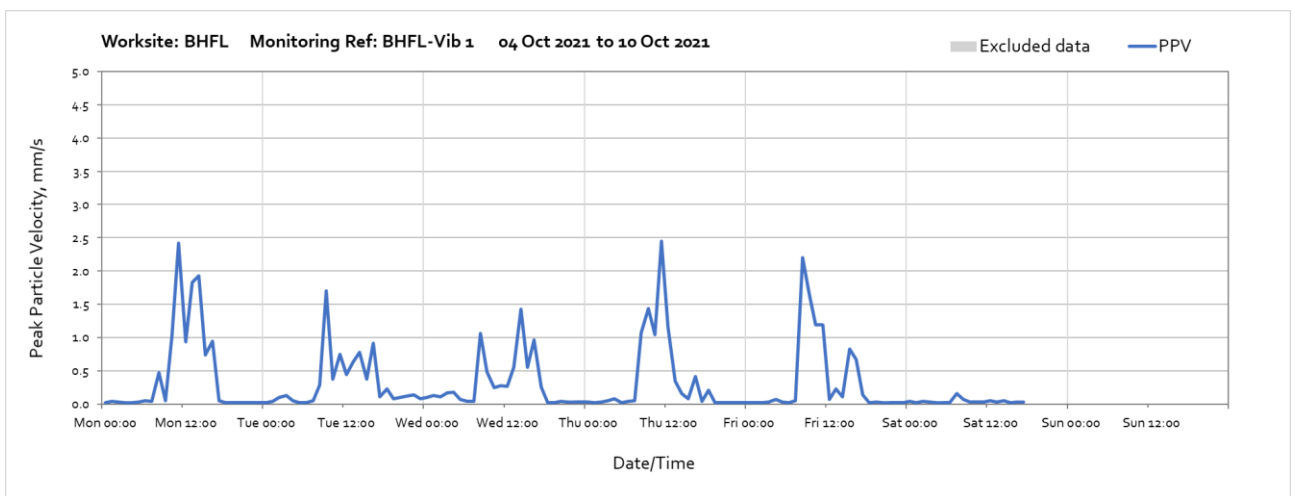
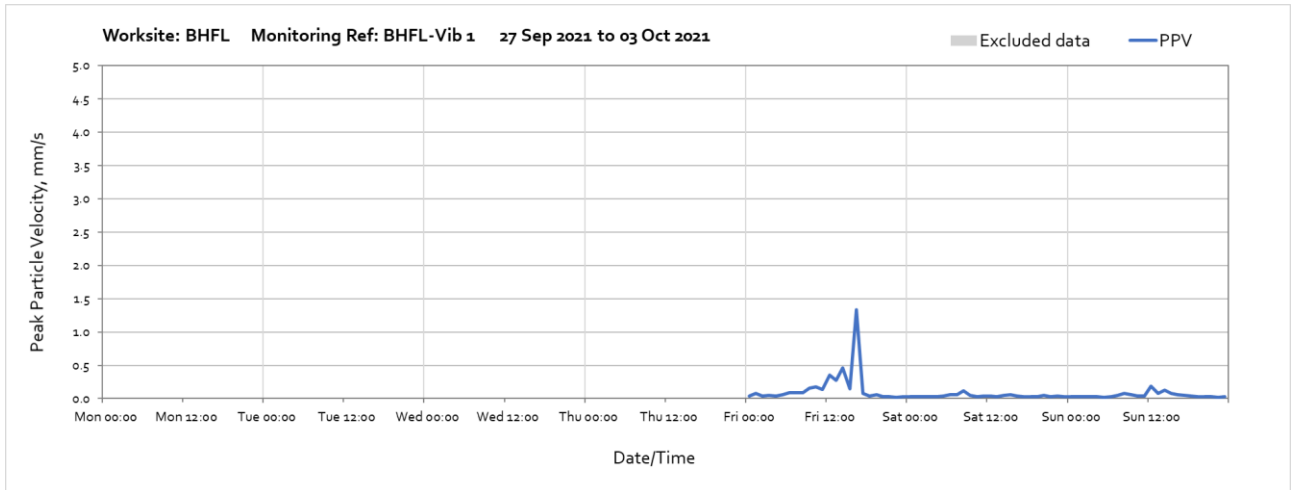
Note: High levels of vibration measured throughout the week were due to local disturbance of the monitor and are not representative of HS2 construction vibration levels at the nearest receptors.



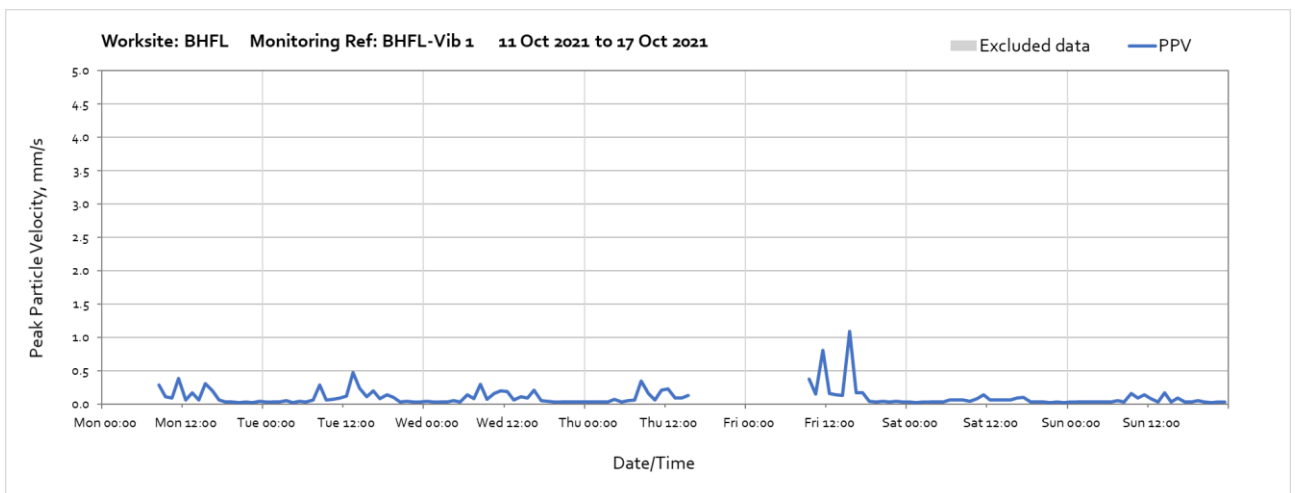
Note: High levels of vibration measured throughout the week were due to local disturbance of the monitor and are not representative of HS2 construction vibration levels at the nearest receptors.

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## Worksite: BHFL – Monitoring Ref: BHFL-Vib 1

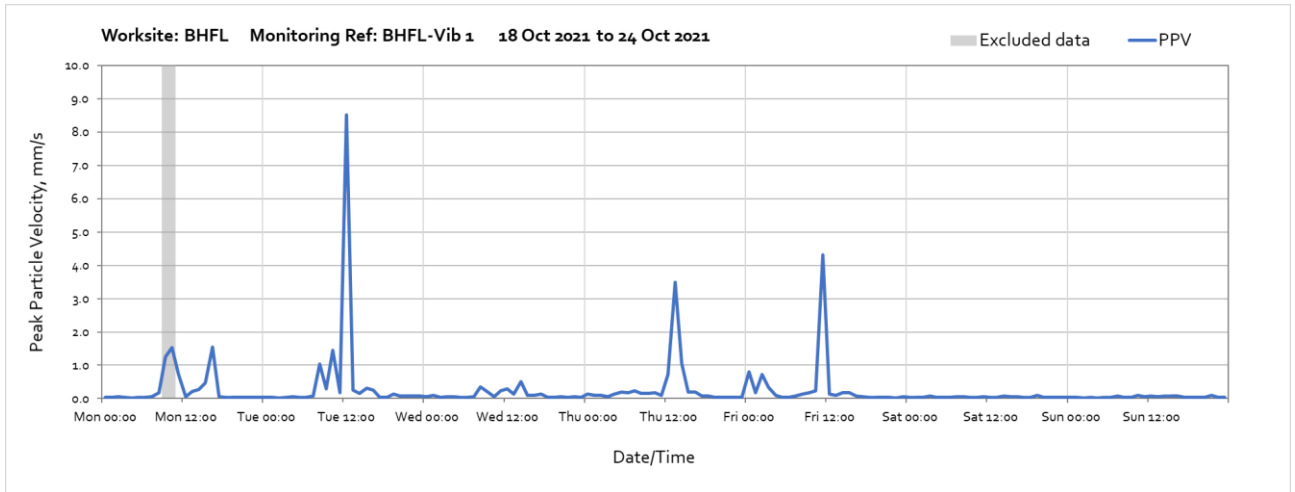


Note: Missing data between 18:00 on Saturday 9<sup>th</sup> and 07:00 on Monday 11<sup>th</sup> October was due to equipment synchronize error. High levels of vibration measured throughout the week were due to HS2 related road widening works.

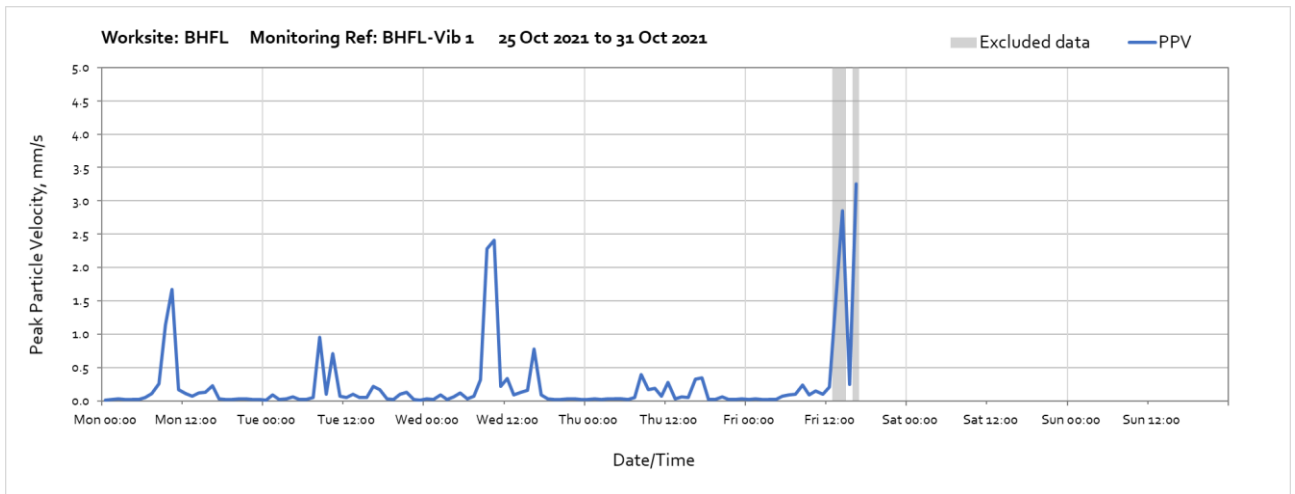


Note: Missing data between 16:00 on Thursday 14<sup>th</sup> and 09:00 on Friday 15<sup>th</sup> October was due to equipment synchronize error.

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Note: High levels of vibration measured throughout the week were due to HS2 related road widening works.



Note: The vibration monitor was uninstalled on 29<sup>th</sup> October 2021. High levels of vibration measured throughout the week were due to HS2 related road widening works. High levels of vibration measured on 29<sup>th</sup> October were due to disturbance of equipment during uninstallation.