

Construction Noise and Vibration Monthly Report – June 2023

Buckinghamshire

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Non-Technical Summary

This Noise and Vibration Monitoring Report fulfils HS2 Limited's commitment detailed in the Environmental Minimum Requirements (EMRs), Annex 1, Code of Construction Practice, to present the results of noise monitoring carried out within Buckinghamshire (BS) during the month of June 2023.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in the vicinity of the A422 Turweston North worksite (ref.: A422 TN) where stockpiling, slab reinforcement, temporary ridge construction, haul road maintenance and road diversion works were underway.
- Noise monitoring was undertaken in the vicinity of the School End (ref.: SE) and Hermitage Chetwode (ref.: HC) worksites where compound development, haul road maintenance, bulk excavation, topsoil stripping, fencing, drainage, stockpiling and vehicle movements were underway.
- Noise monitoring was undertaken in the vicinity of the Twyford worksite (ref.: TW) where access and haul road maintenance, vehicle movements, drainage, topsoil stripping and stockpiling were underway.
- Noise monitoring was undertaken in the vicinity of the West Street Overbridge worksite (ref.: WSO), where commissioning, formwork reinforced concrete, embankment earthworks, backfilling and road diversion works were underway.
- Noise monitoring was undertaken in the vicinity of the Addison Road worksite (ref.: AR) where ballast installation, embankment earthworks and parapet installation were underway.
- Noise monitoring was undertaken in the vicinity of the Calvert worksite (ref.: CAL) where operation of concrete batching plant, material movements earthworks and installation of pre-cast units were underway.
- Noise monitoring was undertaken in the vicinity of the Woodlands worksite (ref.: WDL) where installation of pre-cast units, shelf construction, backfilling, material movements, piling platform construction and sheet piling were underway.
- Noise monitoring was undertaken in the vicinity of the Quanton worksite (ref.: QAR) where de-vegetation and fencing works were underway.
- Noise monitoring was undertaken in the vicinity of the Meadoway and Glebe House worksite (ref: MW&GH) where earthworks, utility, overbridge and diversion works were underway.

- Noise monitoring was undertaken in the vicinity of Oat Close worksite (ref: OC) where topsoil stripping, stockpiling, excavation, overbridge, Culvert and underpass and embankment works were underway.
- Noise monitoring was undertaken in the vicinity of Nash Lee Lane worksite (ref.: NLL) where road diversion, site access road construction, bridge construction, drainage, construction of laydown area, relocation of wheel wash and ramp construction works were underway.
- Noise monitoring was undertaken in the vicinity of Wendover Green Tunnel worksite (ref.: WGT) where ground investigation works, temporary road diversion, construction of plant crossing, stockpiling, installation of kerbs, ducting and handrails, soil stripping, haul road extension, concrete pours and wall construction works were underway.
- Noise monitoring was undertaken in the vicinity of Grove Farm worksite (ref.: GF) where construction of plant crossing, construction of site access road entrance and construction of haul roads were underway.
- Noise monitoring was undertaken in the vicinity of South Dean Viaduct Compound worksite (ref.: SDVC) where fencing, topsoiling, excavation, pipe installation and drainage works were underway.
- Noise monitoring was undertaken in the vicinity of Rocky Lane Embankment worksite (ref.: RLE) where construction of eastern landscape was underway.
- Noise monitoring was undertaken in the vicinity of Wendover Dean Viaduct worksite (ref.: WDV) where pier construction, haul road construction and launch platform construction works were underway.
- Noise monitoring was undertaken in the vicinity of Leather Lane worksite (ref.: LL) where stockpile movements and haul road construction works were underway.
- Noise monitoring was undertaken in the vicinity of South Heath Cutting worksite (ref.: SHCW) where haul road construction was underway.
- Noise monitoring was undertaken in the vicinity of North Portal worksite (ref.: NP) where site access road, plant operations, piling platform, track platform, headwall capping-beam, porous portal structure and drainage works were undertaken.
- Noise monitoring was undertaken in the vicinity of Chesham Road worksite (ref.: CHSM), where site operation, concrete and internal structure works were undertaken.
- Noise monitoring was undertaken in the vicinity of Little Missenden Vent Shaft worksite (ref.: LM) where site operation, internal structures construction and basement construction works were undertaken.

- Noise monitoring was undertaken in the vicinity of Amersham Vent Shaft worksite (ref.: AM), where site operation, internal structure construction, tunnel connection and basement construction works were undertaken.
- Noise monitoring was undertaken in the vicinity of Chalfont St Giles Vent Shaft worksite (ref.: CSG) where site operation, road maintenance, tunnel connection and basement construction works were undertaken.
- Noise monitoring was undertaken in the vicinity of Chalfont St Peter Vent Shaft worksite (ref.: CSP), where site operation, basement construction, road maintenance and tunnel connection works were underway.
- Noise monitoring was undertaken in the vicinity of the Colne Valley Viaduct worksite, which is partly located in the London Borough of Hillingdon (LBH), (ref.: CVV), where pile trimming, jetty and haul road maintenance and operation, compound operation, auto transformed feeder station works, ground investigation, pier construction, pumping water management, satellite compound welfare, generator farm operation, concrete drilling, gas crossing emergency dismantling works, Grand Union canal operation and maintenance, fencing, environmental maintenance, cofferdam excavation, River Colne crossing, girder, deck and landscaping works were underway.

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

- Godington where construction of the site access road, topsoil stripping and vegetation clearance were underway.
- Grovill Embankment – Westbury where excavations were underway.
- North of School End where bulk excavations, vegetation clearance, stockpiling, drainage, pond excavation and maintenance, fencing and vehicle movements were underway.
- Turweston along the A422 where compound development and temporary bridge and road diversion works were underway.
- East West Rail (EWR) interfaces where formwork reinforced concrete works were underway.
- Charndon Lodge where technical backfilling and drainage works were underway.
- Infrastructure Maintenance Depot (IMD) where technical backfilling and earthworks were underway.
- Shepherds Furze Culvert where installation of pre-cast units was underway.
- MCJ where earthworks including excavation and filling and overbridge bulk excavation were underway.

- Greatmoor Culvert where waterproofing was underway.
- GUN28 overbridge where formwork reinforced concrete and technical backfill were underway.
- Doddershall Culvert where technical backfill was underway.
- Calvert, along the bat mitigation structure where earthworks including excavation and filling was underway.
- Thame Valley Viaduct Causeway where piling, drainage, installation of reinforced cement concrete, pile cropping, formwork installation and lifting beams were underway.
- Along A41 where concrete batching works, earthworks, drainage, kerbing, pavement, vehicle restraint systems operation and signage installation were underway.
- Fleet Marston where earthworks, culvert and overbridge works were underway.
- Hills Farm Earthworks where stockpiling and maintenance was underway.
- Bowood Lane where construction of haul road was underway.
- Nash Lee Road Diversion where street lighting installation, tarmac laying, archaeological works, fencing, footway installation and utility works were underway.
- Aylesbury Golf Course where utility diversion works were underway.

There was ten (10) exceedance 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.

Four (4) complaints were received within the Buckinghamshire area during the monitoring period.

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 +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 June be undertaken for the following purposes:

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

1.1.2 Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the Buckinghamshire (BS) Local Authority area for the period 1st to 30th June 2023.

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

- A422 Turweston North worksite, ref.: A422 TN (see Plan 1 in Appendix A), where works activities included:
 - Stockpiling.
 - Slab reinforcement.
 - Temporary bridge construction.
 - Haul road maintenance.
 - Road diversion works.
- School End worksite, ref.: SE (see Plan 2 in Appendix A) and Hermitage Chetwode Worksite ref.: HC (see plan 2 in Appendix A), where works activities included:
 - Compound development.
 - Haul road maintenance.
 - Bulk excavation works.

- Topsoil stripping.
- Removal of badger fencing.
- Drainage, including pond maintenance.
- Fencing.
- Stockpiling.
- Vehicle movements.
- Twyford worksite, ref.: TW (see Plan 2 in Appendix A), where works activities included:
 - Access and haul road maintenance.
 - Vehicle movements.
 - Drainage, including culvert installation.
 - Topsoil stripping.
 - Stockpiling.
- West Street Overbridge worksite, ref.: WSO (see Plan 2 in Appendix A), where works activities included:
 - Commissioning.
 - Formwork reinforced concrete works.
 - Embankment earthworks.
 - Backfilling.
 - Road diversion works.
- Addison Road worksite, ref.: AR (see Plan 3 in Appendix A), where works activities included:
 - Ballast installation.
 - Embankment earthworks.
 - Parapet installation.
- Calvert worksite, ref.: CAL (see Plan 3 in Appendix A) where works activities included:
 - Operation of concrete batching plant.
 - Material movements.

- Earthworks, including digging, excavation and filling.
- Installation of pre-cast units.
- Woodlands worksite, ref.: WDL (see Plan 4 in Appendix A) where works activities included:
 - Installation of pre-cast units.
 - Shelf construction.
 - Backfilling.
 - Material movements.
 - Piling platform construction.
 - Sheet piling.
- Quanton worksite, ref.: QAR (see Plan 4 in Appendix A) where works activities included:
 - De-vegetation.
 - Fencing.
- Meadoway and Glebe House worksite, ref.: MW&GH (see Plan 5 in Appendix A), where works activities included:
 - Earthworks.
 - Utility works.
 - Overbridge works, including construction of abutments, piers and formwork reinforced concrete works.
 - Diversion works.
- Oat Close worksite, ref.: OC (see Plan 5 in Appendix A), where works activities included:
 - Topsoil stripping.
 - Stockpiling.
 - Excavation.
 - Overbridge works, including construction of abutments, deck and steel superstructures.
 - Culvert and underpass works, including steel fixing and shuttering.
 - Embankment works, including topsoil stripping, excavation and stockpiling.

- Nash Lee Lane worksite, ref.: NLL (see Plan 6 in Appendix A), where works activities included:
 - Road diversion works.
 - Site access road construction.
 - Bridge construction.
 - Drainage.
 - Construction of laydown area.
 - Relocation of wheel wash.
 - Ramp construction between slap platform and welding area.
- Wendover Green Tunnel worksite, ref.: WGT (see Plan 6 in Appendix A), where works activities included:
 - Ground investigation works.
 - Temporary road diversion.
 - Construction of plant crossing and platform.
 - Stockpiling.
 - Installation of kerbs, ducting and handrails.
 - Wall construction, including concrete pours and backfilling.
 - Soil stripping.
 - Haul road extension.
 - Concrete pours.
- Grove Farm worksite, ref.: GF (see Plan 7 in Appendix A), where works activities included:
 - Construction of plant crossing.
 - Construction of site access road entrance.
 - Construction of haul roads.
- South Dead Viaduct Compound worksite, ref.: SDVC (see Plan 7 in Appendix A), where works activities included:
 - Fencing.
 - Topsoiling.

- Excavation.
- Pipe installation, including tarmac breaking and installation of steel sheets.
- Drainage works.
- Rocky Lane Embankment worksite, ref.: RLE (see Plan 7 in Appendix A), where works activities included:
 - Construction of eastern landscape.
- Wendover Dean Viaduct worksite, ref.: WDV (see Plan 7 in Appendix A), where works activities included:
 - Pier construction including installation of reinforcement, pre-cast lifting and concrete pours.
 - Haul road construction.
 - Launch platform construction, including material deliveries, welding and scaffolding installation.
- Leather Lane worksite, ref.: LL (see Plan 8 in Appendix A), where works activities included:
 - Stockpile movements.
 - Haul road construction.
- South Heath Cutting worksite, ref.: SHCW (see Plan 8 in Appendix A), where works activities included:
 - Haul road construction.
- North Portal worksite, ref.: NP (see Plan 8 in Appendix A), where works activities included:
 - Site access road works including scrape formation, installation of hardstanding and kerbing, drainage and service works, installation of signage and asphaltting.
 - General site operation of plant.
 - Piling platform works including temporary access, traffic management and dismantling works.
 - Track platform works including scraping and installation of hardstanding, surfacing, services and drainage.
 - Headwall capping-beam works including excavation, reinforced concrete works and temporary propping.

- Drainage works including excavation, drainage installation and backfilling.
- Porous portal structure works including reinforced concrete works and concrete pours.
- Chesham Road worksite, ref.: CHSM (see Plan 8 in Appendix A), where works activities included:
 - General site activities.
 - Internal structure works including installation of walls, slabs and staircases.
 - Concrete works.
- Little Missenden Vent Shaft worksite ref.: LM (see Plan 9 in Appendix A), where works activities included:
 - General site activities including operation of plant.
 - Internal structures construction works, including installation of wall and slabs.
 - Basement construction.
- Amersham Vent Shaft worksite, ref.: AM (see Plan 10 in Appendix A), where works activities included:
 - General site activities including operation of plant.
 - Internal structure construction including concrete walls and floors.
 - Tunnel connection works.
 - Basement construction including excavation and demolition works.
- Chalfont St Giles Vent Shaft worksite, ref.: CSG (see Plan 11 in Appendix A), where works activities included:
 - General site activities including operation of plant.
 - Road maintenance.
 - Tunnel connection works, including pouring of concrete floors.
 - Basement construction including excavation and concrete works.
- Chalfont St Peter Vent Shaft worksite, ref.: CSP (see Plan 12 in Appendix A), where works activities included:
 - General site activities including operation of plant.
 - Road maintenance.
 - Tunnel connection works, including pouring of concrete floors.

- Basement construction, including excavation to formation of basement internal and headhouse concrete works.
- Colne Valley Viaduct - Load Test Pile 1 worksite, which is partly located in the London Borough of Hillingdon (LBH), ref.: CVV (see Plan 13 in Appendix A), where works activities included:
 - Pile trimming.
 - Jetty and haul road operation and maintenance.
 - Compound operations.
 - Auto transformed feeder station works, including site preparation, bulk earthworks filling and drainage works.
 - Ground investigation works.
 - Pier construction, including tower crane mobilisation and demobilisation, fibre-reinforced concrete works and post-tensioning.
 - Pumping water management.
 - Satellite compound welfare and generator farm operation.
 - Concrete drilling.
 - Gas crossing emergency dismantling works.
 - Grand Union canal works, including pontoon operation and maintenance.
 - Fencing works.
 - Environmental maintenance.
 - Cofferdam excavation, including excavation, dewatering and installation of waling beams and concrete plugs.
 - River Colne crossing including emergency removal of obstruction to reinforced concrete crossing.
 - Girder and deck erection and installation, including span segmental erection, grouting, internal post-tensioning and steel structure erection, and dismantling.
 - Deck finishes including preparation and operation of storage yards, installation of below deck access provision, traffic management on deck surface, installation of parapets, noise barriers, troughs, pipes, steel works and other minor materials to the storage yards and deck, installation of access to top of deck, foundation works, construction of robust kerbs,

construction of concrete stitch, filling of voids and top openings, diaphragm walls construction, concrete works (within deck), drainage and steel works.

- Landscaping works including removal of cofferdams, earthworks, profiling and cutting, manhole chamber construction and soil placement.

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

- Godington where construction of the site access road, topsoil stripping and vegetation clearance were underway.
- Grovill Embankment – Westbury where excavations were underway.
- North of School End where bulk excavations, vegetation clearance, stockpiling, drainage, pond excavation and maintenance, fencing and vehicle movements were underway.
- Turweston along the A422 where compound development and temporary bridge and road diversion works were underway.
- East West Rail (EWR) interfaces where formwork reinforced concrete works were underway.
- Charndon Lodge where technical backfilling and drainage works were underway.
- Infrastructure Maintenance Depot (IMD) where technical backfilling and earthworks were underway.
- Shepherds Furze Culvert where installation of pre-cast units was underway.
- MCJ where earthworks including excavation and filling and overbridge bulk excavation were underway.
- Greatmoor Culvert where waterproofing was underway.
- GUN28 overbridge where formwork reinforced concrete and technical backfill were underway.
- Doddershall Culvert where technical backfill was underway.
- Calvert, along the bat mitigation structure where earthworks including excavation and filling was underway.
- Thame Valley Viaduct Causeway where piling, drainage, installation of reinforced cement concrete, pile cropping, formwork installation and lifting beams were underway.
- Along A41 where concrete batching works, earthworks, drainage, kerbing, pavement, vehicle restraint systems operation and signage installation were underway.
- Fleet Marston where earthworks, culvert and overbridge works were underway.

- Hills Farm Earthworks where stockpiling and maintenance was underway.
- Bowood Lane where construction of haul road was underway.
- Nash Lee Road Diversion where street lighting installation, tarmac laying, archaeological works, fencing, footway installation and utility works were underway.
- Aylesbury Golf Course where utility diversion works were underway.

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 Forty-five (45) noise and nine (9) vibration monitoring installations were active in June in the BS area. Table 2 summarises the positions of noise and vibration monitoring installations within the BS area in June 2023.
- 1.2.2 Vibration monitor WDL-Vib1, within the vicinity of Woodlands worksite, ref.: WDL, was reinstalled on 1st June.
- 1.2.3 Noise monitor GH-NMP1, within the vicinity of Meadow Way and Glebe House worksite, ref.: MW&GH, was re-installed on 30th June.
- 1.2.4 Noise monitors OC-NMP1 and MF-NMP1, within the vicinity of Meadow Way and Glebe House worksite, ref.: MW&GH, were retrieved for the month of June.
- 1.2.5 Noise monitor GF-NMP1, within the vicinity of Grove Farm, ref.: GF, was retrieved for the month of June.
- 1.2.6 Noise monitor SDVC-NMP1, within the vicinity of Rocky Lane Embankment, ref.: RLE is now within the vicinity of South Dean Viaduct Compound worksite, ref.: SDVC.
- 1.2.7 Noise monitor CSG-NMP2, within the vicinity of Chalfont St Giles Vent Shaft worksite, ref.: CSG, was retrieved on 15th June.
- 1.2.8 Noise monitor PIC-NMP1, within the vicinity of Chalfont St Giles Vent Shaft worksite, ref.: CSG was, retrieved on 15th June.
- 1.2.9 Maps showing the positions of noise and vibration monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
A422 TN	TN-NMP1	Turweston, Brackley
SE	SE-NMP1	School End, Chetwode
	SE-Vib1	School End, Chetwode
HC	HC-NMP1	Hermitage, Chetwode
TW	TW-NMP1	Twyford, Buckinghamshire
WSO	WSO-NMP1	West Street, Twyford
AR	AR-NMP1	Addison Road, Rosehill Farm
CAL	SHC-NMP1	School Hill Compound, Calvert
	SHC-Vib1	School Hill Compound, Calvert
	FCC-NMP1	Calvert South
WDL	WDL-NMP1	Woodlands Farmhouse, Station Rd, Quainton
	WDL-Vib1	Station Road, Quainton
QAR	QAR-NMP2	Station Rd, Quainton
MW&GH	GH-NMP1	Glebe House, A418, Aylesbury
	MW-NMP1	Aylesbury, Buckinghamshire
OC	WES-NMP1	Westfield, Stoke Mandeville, Aylesbury
NLL	NLL-NMP1	Nash Lee Lane, Nash Lee
	NLL-NMP2	Nash Lee Lane, Nash Lee
WGT	ER-NMP1	Ellesborough Rd, Wendover
	ER-Vib1	Ellesborough Rd, Wendover
	BL-NMP1	Bacombe Lane, Wendover
	WT-NMP1	A413, Wendover
GF	GF-Vib1	Grove Farm, Wendover
SDVC	SDVC-NMP1	Rocky Lane, Wendover
RLE	NCAS6-NMP1	Chesham Lane, The Lee, Wendover
	NCAS5-NMP1	Chesham Lane, The Lee, Wendover
WDV	WDV-NMP1	Upper Wendover Dean Farm, A413, Wendover
	WDV-Vib1	Upper Wendover Dean Farm, A413, Wendover
	WVD-Vib2	Upper Wendover Dean Farm, A413, Wendover
	SHF-Vib1	Strawberry Hill Farmhouse, Wendover Dean
	SH-Vib1	Strawberry Hill Cottage, Wendover Dean
	SC-Vib1	Sainfoin Cottage, Wendover Dean
LL	HG-NMP1	Hunts Green, Leather Lane, The Lee, South Heath

Worksite Reference	Measurement Reference	Address
	GD-NMP1	Grimms Ditch, The Lee, South Heath
SHCW	PR-NMP1	Potters Row, South Heath
NP	BFH-NMP1	Bury Farm, Great Missenden
	ORC-NMP1	Orchard Cottage, Ballinger Road, South Heath
	BLH-NMP1	Bayleys Hatch, South Heat, Great Missenden
CHSM	MDL-NMP1	Meadow Leigh Cottage, Firth Hill, South Heath
AM	AM-NMP1	Amersham Vent Shaft Worksite, Whielden Lane, Amersham
LM	LM-NMP1	Little Missenden, A413, Amersham
	PWC-NMP1	Patricia Holmes, Little Missenden Vent Shaft Worksite, Amersham
CSG	CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane
CSP	CFC-NMP1	Cricket Field Cottages, 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*	CVV-NMP1	Northern boundary, Load Test Pile 1 Worksite, Denham Water Ski Club
	WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham, Denham Garden Village
	DFS-NMP1	Denham Film Studio, Uxbridge
	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_{Aeq} Data over the Monitoring Period

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
A422 TN	TN-NMP1	Turweston, Brackley	Free-field	48.5 (57.2)	49.2 (55.0)	46.1 (49.0)	46.0 (51.5)	47.1 (56.0)	47.6 (49.5)	47.0 (48.3)	46.6 (47.1)	46.0 (52.6)	46.2 (51.2)	47.1 (55.0)	46.1 (51.5)
SE	SE-NMP1	School End, Chetwode	Free-field	48.9 (56.7)	60.2 (62.3)	43.3 (47.3)	41.6 (45.1)	41.1 (46.8)	42.4 (42.5)	45.2 (45.8)	47.0 (49.4)	42.1 (45.7)	40.1 (45.0)	46.9 (53.3)	41.1 (43.4)
HC	HC-NMP1	Hermitage, Chetwode	Free-field	48.9 (59.3)	57.9 (60.1)	45.1 (49.7)	43.5 (47.7)	43.2 (54.4)	44.2 (45.0)	46.4 (47.8)	47.5 (49.7)	44.9 (50.6)	42.0 (50.1)	49.7 (62.4)	42.4 (47.6)
TW	TW-NMP1	Twyford	Free-field	47.1 (56.9)	64.2 (70.2)	46.1 (48.2)	44.8 (51.8)	41.6 (55.0)	44.4 (45.4)	48.2 (53.4)	44.8 (45.7)	47.4 (61.0)	41.8 (50.0)	48.3 (60.6)	40.8 (47.1)
WSO	WSO-NMP1	West Street, Twyford	Free-field	49.3 (60.4)	55.3 (62.8)	52.1 (61.6)	49.3 (61.8)	45.7 (57.5)	50.0 (53.8)	51.2 (59.6)	48.5 (52.9)	47.2 (57.6)	41.8 (50.1)	54.6 (67.6)	40.5 (61.8)
AR	AR-NMP1	Addison Road, Rosehill Farm	Free-field	50.8 (61.9)	56.6 (69.2)	50.2 (63.5)	41.7 (64.7)	41.3 (59.4)	51.4 (64.3)	51.7 (57.4)	48.2 (48.8)	44.6 (50.2)	40.1 (52.1)	47.1 (59.6)	41.4 (51.4)

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
CAL	SHC-NMP1	School Hill Compound, Calvert	Free-field	53.2 (61.0)	56.0 (62.2)	50.3 (62.2)	45.1 (60.2)	41.7 (63.2)	46.7 (56.5)	50.8 (56.5)	51.0 (55.1)	50.1 (59.6)	38.4 (44.2)	49.8 (64.0)	40.2 (50.7)
	FCC-NMP1	Calvert South	Free-field	53.2 (56.7)	54.5 (56.6)	49.6 (52.8)	47.3 (58.5)	46.5 (53.7)	47.7 (49.9)	48.1 (51.8)	46.9 (50.5)	47.0 (50.0)	46.0 (52.6)	48.9 (60.4)	47.4 (55.1)
WDL	WDL-NMP1	Woodlands Farmhouse, Station Rd, Quainton	Free-field	67.3 (72.5)	69.8 (73.9)	49.0 (67.4)	44.3 (51.6)	43.4 (52.6)	48.1 (52.1)	55.4 (60.5)	50.2 (56.3)	47.8 (60.7)	41.8 (46.6)	47.4 (58.4)	43.2 (48.4)
QAR	QAR-NMP2	Station Rd, Quainton	Free-field	50.5 (57.0)	57.1 (69.7)	51.7 (60.7)	49.1 (61.6)	45.7 (60.2)	47.3 (55.9)	50.1 (56.4)	50.4 (57.5)	49.0 (59.1)	43.0 (51.1)	55.8 (69.8)	45.3 (58.2)
MW&GH	GH-NMP1	Glebe House, A418, Aylesbury	Free-field	-* -*	-* -*	53.8 (53.8)	51.8 (53.1)	49.2 (49.6)	-* -*	-* -*	-* -*	-* -*	-* -*	-* -*	-* -*
	MW-NMP1	Aylesbury, Buckinghamshire	Free-field	62.8 (64.7)	61.7 (63.0)	61.6 (63.0)	59.9 (66.4)	56.1 (62.8)	59.8 (61.0)	61.3 (62.2)	60.7 (61.8)	60.1 (61.8)	54.2 (57.8)	59.5 (61.8)	55.7 (62.4)
	WES-NMP1	Westfield, Stoke Mandeville, Aylesbury	Free-field	46.4 (50.3)	49.7 (59.7)	46.2 (50.6)	44.0 (55.2)	41.2 (57.7)	45.2 (46.9)	46.6 (48.7)	49.4 (52.4)	43.7 (48.9)	40.0 (49.8)	45.2 (53.3)	39.3 (48.3)
NLL	NLL-NMP1	Nash Lee Lane, Nash Lee	Free-field	53.6 (66.5)	60.2 (75.5)	51.3 (53.5)	50.2 (52.4)	49.4 (54.0)	51.7 (54.3)	54.0 (64.5)	50.4 (50.9)	49.7 (51.3)	48.9 (51.5)	50.8 (55.4)	49.1 (52.3)
	NLL-NMP2	Nash Lee Lane, Nash Lee	Free-field	51.5 (57.4)	55.8 (60.7)	50.7 (53.1)	49.3 (55.2)	47.3 (55.0)	49.0 (49.5)	50.7 (52.1)	50.5 (52.4)	49.2 (52.7)	47.3 (51.2)	50.1 (53.6)	47.1 (53.8)

OFFICIAL

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
WGT	ER-NMP1	Ellesborough Rd, Wendover	Free-field	53.2 (60.6)	56.9 (60.6)	52.8 (56.1)	51.7 (54.9)	49.2 (60.0)	51.9 (53.2)	52.0 (53.8)	51.5 (53.4)	52.0 (58.8)	48.1 (51.1)	51.3 (54.0)	48.8 (54.0)
	BL-NMP1	Bacombe Lane, Wendover	Free-field	48.9 (59.6)	50.7 (60.0)	47.1 (54.9)	46.8 (56.2)	46.4 (58.0)	49.2 (55.2)	49.2 (52.9)	47.5 (50.4)	47.7 (60.0)	45.8 (53.7)	46.2 (49.3)	47.2 (59.9)
	WT-NMP1	A413, Wendover	Free-field	65.4 (66.6)	65.3 (66.0)	65.4 (67.7)	63.3 (69.9)	59.2 (68.0)	62.4 (63.2)	63.7 (64.5)	64.0 (64.8)	63.8 (67.7)	56.6 (62.2)	62.8 (66.3)	59.0 (66.8)
SDVC	SDVC-NMP1	Rocky Lane, Wendover	Free-field	63.0 (65.6)	63.2 (67.0)	61.1 (64.0)	58.9 (61.9)	56.2 (66.5)	59.9 (61.6)	60.7 (61.9)	60.2 (61.6)	59.5 (62.0)	54.6 (58.3)	59.9 (62.0)	56.6 (63.1)
RLE	NCAS6-NMP1	Chesham Lane, The Lee, Wendover	Free-field	46.8 (52.5)	52.3 (66.2)	48.1 (59.2)	45.2 (55.4)	42.6 (61.2)	45.0 (46.0)	46.5 (47.5)	45.4 (48.2)	45.3 (50.6)	41.9 (48.0)	49.6 (62.1)	43.5 (49.6)
	NCAS5-NMP1	Chesham Lane, The Lee, Wendover	Free-field	54.6 (58.7)	54.9 (56.9)	52.6 (55.3)	51.0 (56.3)	47.9 (54.9)	51.0 (51.5)	52.3 (53.8)	51.3 (52.7)	51.4 (53.9)	48.4 (55.2)	52.6 (59.6)	49.1 (55.2)
WDV	WDV-NMP1	Upper Wendover Dean Farm, A413, Wendover	Free-field	47.5 (49.5)	53.9 (57.8)	46.6 (54.8)	43.4 (50.9)	42.5 (48.1)	45.9 (46.9)	47.8 (48.3)	45.3 (46.2)	44.1 (46.1)	44.2 (54.1)	47.0 (53.4)	43.3 (48.4)
LL	HG-NMP1	Hunts Green, Leather Lane, The Lee	Free-field	48.6 (51.1)	51.6 (53.5)	47.2 (50.9)	45.9 (51.1)	46.1 (60.3)	46.7 (46.7)	46.6 (46.6)	48.5 (48.5)	48.5 (52.3)	48.6 (57.0)	50.7 (56.8)	46.3 (49.8)
	GD-NMP1	Grimms Ditch, The Lee, South Heath	Free-field	49.1 (60.6)	53.1 (62.8)	50.9 (64.0)	48.2 (63.1)	46.4 (63.9)	47.5 (54.4)	49.5 (55.9)	50.7 (57.3)	50.6 (58.5)	42.8 (49.4)	56.3 (69.9)	44.9 (50.9)

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
SHCW	PR-NMP1	Potters Row, South Heath	Free-field	47.0	52.5	45.5	44.5	41.9	44.5	47.0	44.0	44.9	44.0	47.4	43.7
				(55.6)	(76.8)	(54.6)	(55.2)	(52.7)	(46.2)	(48.5)	(45.3)	(49.8)	(55.3)	(57.4)	(50.0)
NP	BFH-NMP1	Bury Farm, Great Missenden	Free-field	43.1	48.6	44.9	43.2	39.9	41.8	46.6	43.9	44.7	40.0	45.3	41.0
				(58.1)	(54.8)	(51.8)	(49.1)	(52.3)	(42.9)	(48.8)	(45.9)	(50.1)	(51.0)	(50.8)	(48.5)
	ORC-NMP1	Orchard Cottage, Ballinger Road, South Heath	Free-field	53.0	54.8	50.0	49.0	47.9	53.5	55.6	51.9	50.8	45.7	50.8	46.2
				(62.4)	(61.7)	(57.5)	(57.5)	(60.5)	(57.0)	(59.3)	(58.0)	(59.8)	(52.2)	(56.7)	(55.1)
	BLH-NMP1	Bayleys Hatch, South Heath, Great Missenden	Free-field	47.2	50.5	49.0	45.5	41.4	44.9	50.0	45.8	46.4	40.4	47.8	42.0
				(57.3)	(55.0)	(58.1)	(51.9)	(54.0)	(46.3)	(54.7)	(47.7)	(51.4)	(46.1)	(53.9)	(49.8)
CHSM	MDL-NMP1	Meadow Leigh Cottage, Firth Hill, South Heath	Free-field	56.4	55.3	54.5	51.7	48.3	52.3	56.9	53.3	56.0	46.3	54.5	48.3
				(61.0)	(58.0)	(57.1)	(55.3)	(57.1)	(53.6)	(60.6)	(55.2)	(61.4)	(53.0)	(64.2)	(60.6)
AM	AM-NMP1	Whielden Lane, Amersham	Free-field	61.1	60.9	59.5	57.0	53.8	57.8	60.0	59.3	57.7	52.5	57.5	53.2
				(64.5)	(64.3)	(62.1)	(59.9)	(65.9)	(58.4)	(61.0)	(59.8)	(61.9)	(58.3)	(60.4)	(59.8)
LM	LM-NMP1	Little Missenden, A413, Amersham	Free-field	58.3	57.6	57.9	55.0	50.8	53.8	56.0	58.0	55.7	49.5	55.7	50.5
				(61.2)	(59.5)	(60.2)	(58.9)	(59.1)	(54.8)	(56.7)	(60.4)	(57.2)	(54.5)	(58.6)	(57.6)
	PWC-NMP1	Patricia Holmes, LM Worksite, Amersham	Free-field	58.8	58.5	58.5	55.8	54.2	54.3	57.2	58.8	56.8	54.4	56.5	54.7
				(62.4)	(62.3)	(60.5)	(60.4)	(64.4)	(54.9)	(58.0)	(61.0)	(61.4)	(61.1)	(60.1)	(62.7)

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
CSG	CSG-NMP1	CSG Worksite, Bottom House Farm Lane	Free-field	48.3 (66.5)	49.3 (51.9)	47.2 (53.3)	45.5 (58.6)	46.8 (72.0)	49.0 (54.1)	49.7 (51.6)	48.9 (51.4)	47.0 (51.9)	49.2 (62.7)	51.8 (73.2)	47.0 (57.7)
	CSG-NMP2	CSG Worksite, Bottom House Farm Lane	Free-field	47.8 (50.6)	52.6 (60.1)	49.2 (55.0)	43.2 (52.2)	42.7 (53.3)	46.5 (47.0)	46.6 (47.2)	48.9 (51.1)	45.6 (48.5)	41.8 (46.9)	46.8 (51.8)	47.3 (60.7)
	PIC-NMP1	Bottom House Farm Lane, Chalfont St Giles, Buckinghamshire	Free-field	55.1 (60.6)	55.0 (63.8)	53.9 (58.9)	52.9 (58.5)	49.3 (56.7)	51.9 (52.0)	52.8 (53.0)	53.6 (54.2)	53.0 (56.9)	47.9 (55.3)	53.2 (59.8)	48.7 (54.0)
CSP	CFC-NMP1	Cricket Field Cottages, Chesham Lane, Chalfont St. Peter	Free-field	61.6 (68.2)	58.2 (59.7)	57.5 (67.1)	53.7 (59.4)	59.0 (68.2)	59.3 (63.8)	57.4 (57.8)	56.1 (57.4)	55.2 (60.7)	60.1 (68.8)	56.8 (65.6)	59.2 (67.6)
	CSP-NMP2	Chalfont St Peter Vent Shaft Worksite	Free-field	46.0 (59.6)	49.3 (51.6)	47.8 (53.5)	44.5 (52.1)	41.9 (49.7)	46.7 (49.2)	49.1 (51.1)	49.1 (50.4)	47.0 (53.6)	42.2 (46.9)	48.4 (55.2)	42.5 (49.1)
	CSP-NMP3	Chalfont St Peter Vent Shaft Worksite	Free-field	56.6 (60.5)	55.6 (57.3)	55.7 (57.0)	53.4 (55.9)	50.1 (58.2)	53.8 (53.9)	55.1 (56.5)	55.2 (55.8)	53.8 (55.9)	49.0 (52.5)	54.1 (56.2)	51.2 (60.8)

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
CVV	CVV-NMP1	Northern boundary, Load Test Pile 1 Worksite	Free-field	62.8 (66.1)	61.5 (62.6)	61.0 (63.1)	57.9 (61.3)	58.1 (68.3)	62.6 (65.8)	61.4 (62.1)	61.3 (62.7)	58.9 (61.4)	55.0 (60.6)	59.3 (62.5)	56.6 (63.6)
	WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham	Free-field	57.8 (62.0)	57.9 (61.5)	56.3 (58.2)	52.9 (56.0)	52.2 (58.0)	54.9 (57.7)	57.6 (58.6)	57.4 (58.5)	54.7 (58.2)	48.7 (53.4)	55.5 (59.8)	51.2 (57.5)
	DFS-NMP1	Denham Film Studio, Uxbridge	Free-field	48.0 (77.9)	49.2 (52.9)	49.1 (53.8)	46.7 (53.4)	42.7 (57.0)	45.9 (47.1)	48.5 (51.1)	46.4 (47.5)	51.0 (65.2)	43.0 (48.6)	49.0 (56.0)	43.1 (48.5)
	SVF-NMP1	Savay Farm, Denham Garden Village, Denham, Buckinghamshire	Free-field	48.0 (56.6)	48.9 (55.6)	46.2 (52.4)	45.3 (51.0)	45.6 (58.5)	47.9 (49.7)	48.4 (49.2)	47.2 (50.9)	45.7 (52.6)	46.9 (58.6)	46.9 (55.0)	46.4 (55.3)

* Monitor GH-NMP1 was re-installed on 30th June.

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-Vib1	School End, Chetwode	2.95 (X-axis)
WGT	ER-Vib 1	46, Ellesborough Rd, Wendover	4.32 (Z-axis)*
WDV	WDV-Vib1	Upper Wendover Dean Farm, A413, Wendover	1.25 (Y-axis)
	WDV-Vib2	Upper Wendover Dean Farm, A413, Wendover	1.31 (Y-axis)
	SHF-Vib1	Strawberry Hill Farmhouse, Wendover Dean	2.74 (Y-axis)
	SH-Vib1	Strawberry Hill Cottage, Wendover Dean	2.19 (X-axis)
	SC-Vib1	Sainfoin Cottage, Wendover Dean	1.40 (X-axis)
GF	GF-Vib1	Grove Farm, Wendover	0.69 (X-axis)
WDL	WDL-Vib1	Station Road, Quainton	3.09 (Y-axis)
SHC	SHC-Vib1	School Hill Compound, Calvert	1.94 (X-axis)

*High vibration levels at ER-Vib1 were due to stoning of road and installation of kerbs.

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
A422 TN	TN-NMP1	Turweston, Brackley	All days	All periods	No exceedance	No exceedance
SE	SE-NMP1	School End, Chetwode	All days	All periods	No exceedance	No exceedance
HC	HC-NMP1	Hermitage, Chetwode	All days	All periods	No exceedance	No exceedance
TW	TW-NMP1	Twyford	Weekdays	0800-1800	16	No exceedance
WSO	WSO-NMP1	West Street, Twyford	Weekdays	0800-1800	1	No exceedance
AR	AR-NMP1	Addison Road, Rosehill Farm	Weekdays	0700-0800 0800-1800 1800-1900	1 3 2	No exceedance No exceedance No exceedance
CAL	SHC-NMP1	School Hill Compound, Calvert	All days	All periods	No exceedance	No exceedance
	FCC-NMP1	Calvert South	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
WDL	WDL-NMP1	Woodlands Farmhouse, Station Rd, Quainton	Weekdays	0700-0800	19	9
				0800-1800	22	1
			Saturdays	1800-1900	3	No exceedance
				1400-2200	2	No exceedance
QAR	QAR-NMP2	Station Rd, Quainton	Weekdays	0800-1800	3	No exceedance
MW&GH	GH-NMP1	Glebe House, A418, Aylesbury	All days	All periods	No exceedance	No exceedance
	MW-NMP1	Aylesbury, Buckinghamshire	All days	All periods	No exceedance	No exceedance
OC	WES-NMP1	Westfield, Stoke Mandeville, Aylesbury	All days	All periods	No exceedance	No exceedance
NLL	NLL-NMP1	Nash Lee Lane, Nash Lee	Weekdays	0700-0800	1	No exceedance
				0800-1800	6	1
			Saturdays	0800-1300	1	No exceedance
	NLL-NMP2	Nash Lee Lane, Nash Lee	All days	All periods	No exceedance	No exceedance
WGT	ER-NMP1	Ellesborough Rd, Wendover	Saturdays	1400-2200	1	No exceedance
	BL-NMP1	Bacombe Lane, Wendover	Weekdays	0700-0800	2	No exceedance
			Saturdays	1400-2200	1	No exceedance
	WT-NMP1	A413, Wendover	Weekdays	0700-0800	19	No exceedance
				0800-1800	20	No exceedance
				1800-1900	22	No exceedance
			Saturdays	0700-0800	2	No exceedance
				1300-1400	4	No exceedance
				1400-2200	4	No exceedance
SDVC	SDVC-NMP1	Rocky Lane, Wendover	All days	All periods	No exceedance	No exceedance
RLE	NCAS6-NMP1	Chesham Lane, The Lee, Wendover	Weekdays	0800-1800	1	No exceedance
	NCAS5-NMP1	Chesham Lane, The Lee, Wendover	All days	All periods	No exceedance	No exceedance
WDV	WDV-NMP1	A413, Wendover	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
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	All days	All periods	No exceedance	No exceedance
SHCW	PR-NMP1	Potters Row, South Heath	All days	All periods	No exceedance	No exceedance
NP	BFH-NMP1	Bury Farm, Great Missenden	Weekdays	0700-0800	1	No exceedance
	ORC-NMP1	Orchard Cottage, Ballinger Road, South Heath	Weekdays Saturdays	0700-0800 1900-2200 1400-2200	3 3 1	No exceedance No exceedance No exceedance
	BLH-NMP1	Bayleys Hatch, South Heath, Great Missenden	All days	All periods	No exceedance	No exceedance
CHSM	MDL-NMP1	Meadow Leigh Cottage, Firth Hill, South Heath	Weekdays Saturdays	0700-0800 1400-2200	2 11	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	Not Applicable	Not Applicable	Not Applicable	Not Applicable
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
	PIC-NMP1	Bottom House Farm Lane, Chalfont St Giles	Weekdays	0800-1800	1	No exceedance
CSP	CFC-NMP1	Cricket Field Cottages, Chesham Lane	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-NMP2*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
	CSP-NMP3*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
CVV	CVV-NMP1*	Northern boundary, Load Test Pile 1 Worksite	All days	All periods	No exceedance	No exceedance
	WYC-NMP1*	Wyatt's Covert, Tilehouse Lane, Denham	All days	All periods	No exceedance	No exceedance
	DFS-NMP1*	Denham Film Studio, Uxbridge	All days	All periods	No exceedance	No exceedance
	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.

** Monitors GH-NMP1 and HG-NMP1 were retrieved for the month of June.

2.2.6 Exceedances of the LOAEL were recorded at fourteen (14) monitoring locations during the month of June 2023. LOAEL exceedances were recorded during weekdays, evenings and Saturday time periods.

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

Table 6: Summary of Total Exceedances of SOAEL

Worksite Reference	Measurement Reference	Monitor Address	Total of SOAEL exceedances in the month
WDL	WDL-NMP1	Woodlands Farmhouse, Station Rd, Quainton	10
NLL	NLL-NMP1	Nash Lee Lane, Nash Lee	1

2.2.8 Ten (10) SOAEL exceedance was recorded due to HS2 construction works during June 2023. The exceedance occurred at WDL-NMP1 and NLL-NMP1 during weekday hours.

2.3 Exceedances of Trigger Level

2.3.1 Table 7 provides a summary of exceedances of the S61 trigger noise levels determined to be due to HS2 related construction noise measured during the reporting period, along with the findings of any investigation.

Table 7: Summary of Exceedances of Trigger Levels

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

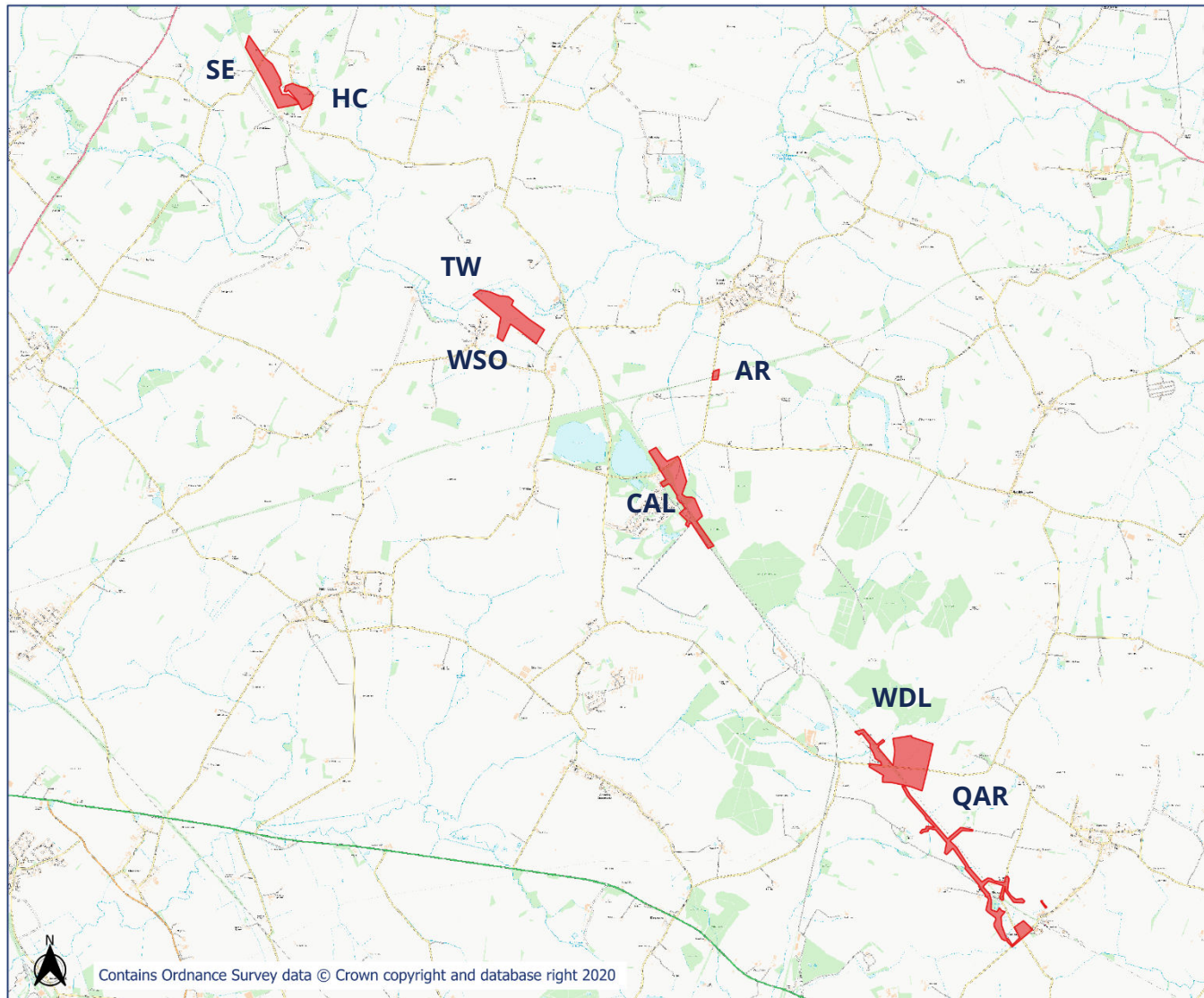
2.4 Complaints

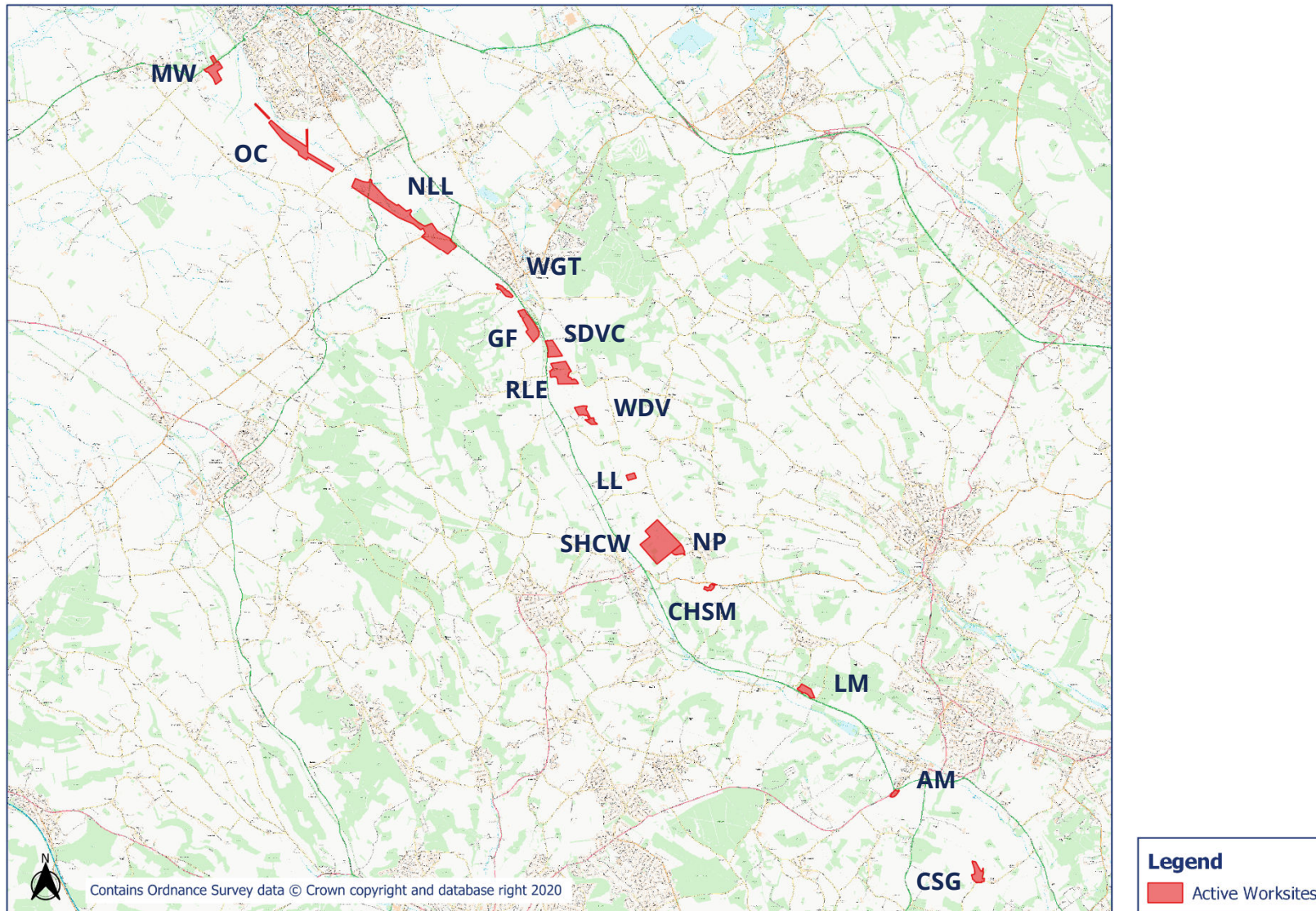
2.4.1 Table 8 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

Table 8: Summary of Complaints

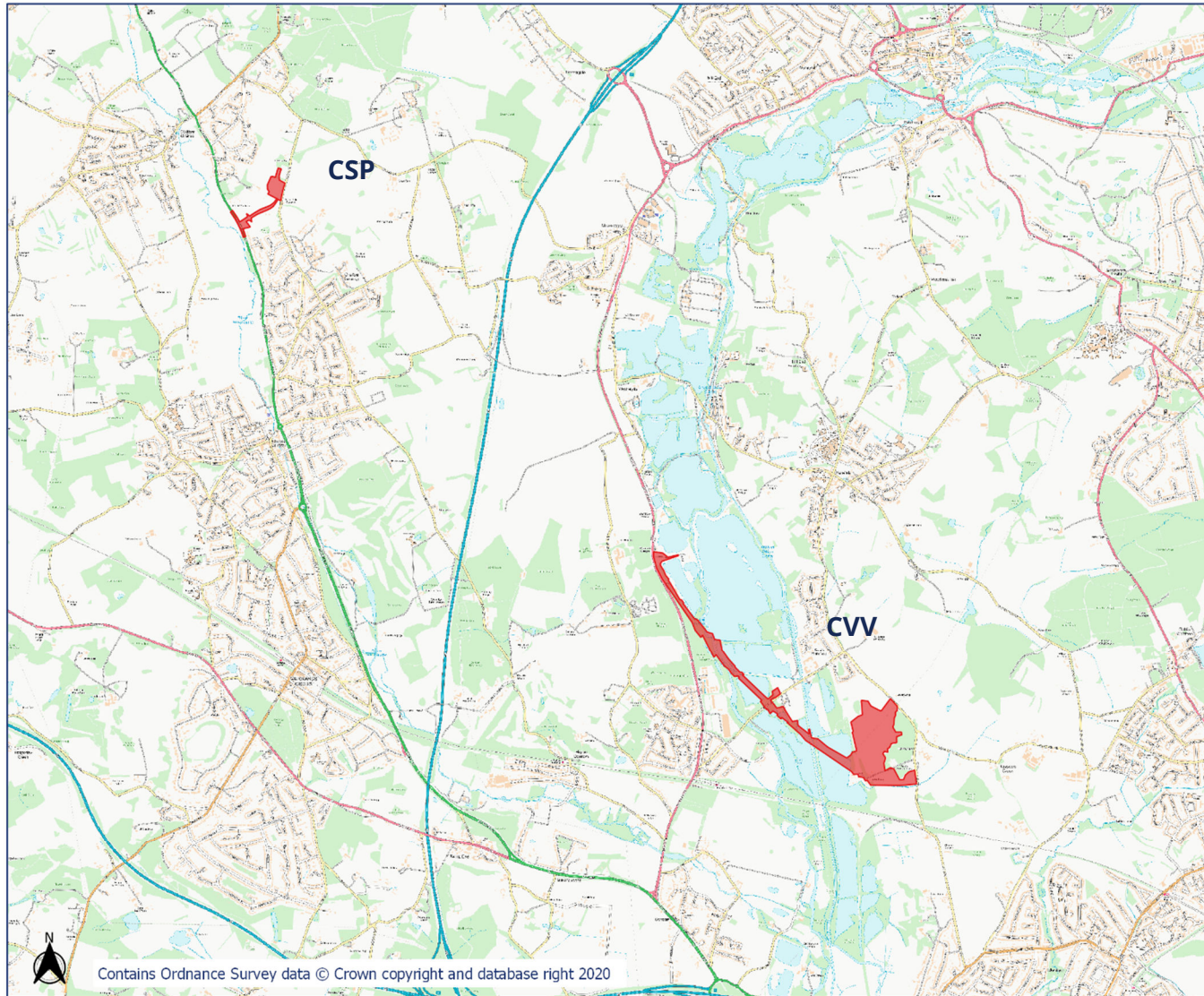
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-23-96448-E-C	RLE	Complaint due to noise at night.	Noise due to overnight road excavation works which were conducted with consents in place.	Stakeholder has been informed of the results of the investigation.
HS2-23-96517-E-C HS2-23-96579-E-C	NLL	Disturbance from generator noise at night.	Investigation showed a generator was running at time of disturbance for a welfare unit.	The generator now only operates up to 6pm. Stakeholder has been informed of the results of the investigation.
HS2-23-44765-C	GF	Complaint due to presumed vibratory roller.	Noise was due to vibratory roller operating.	The roller has been replaced to reduce noise impact and ongoing communication is occurring between contractor and resident to ensure the disturbance does not continue.

Appendix A Site Locations

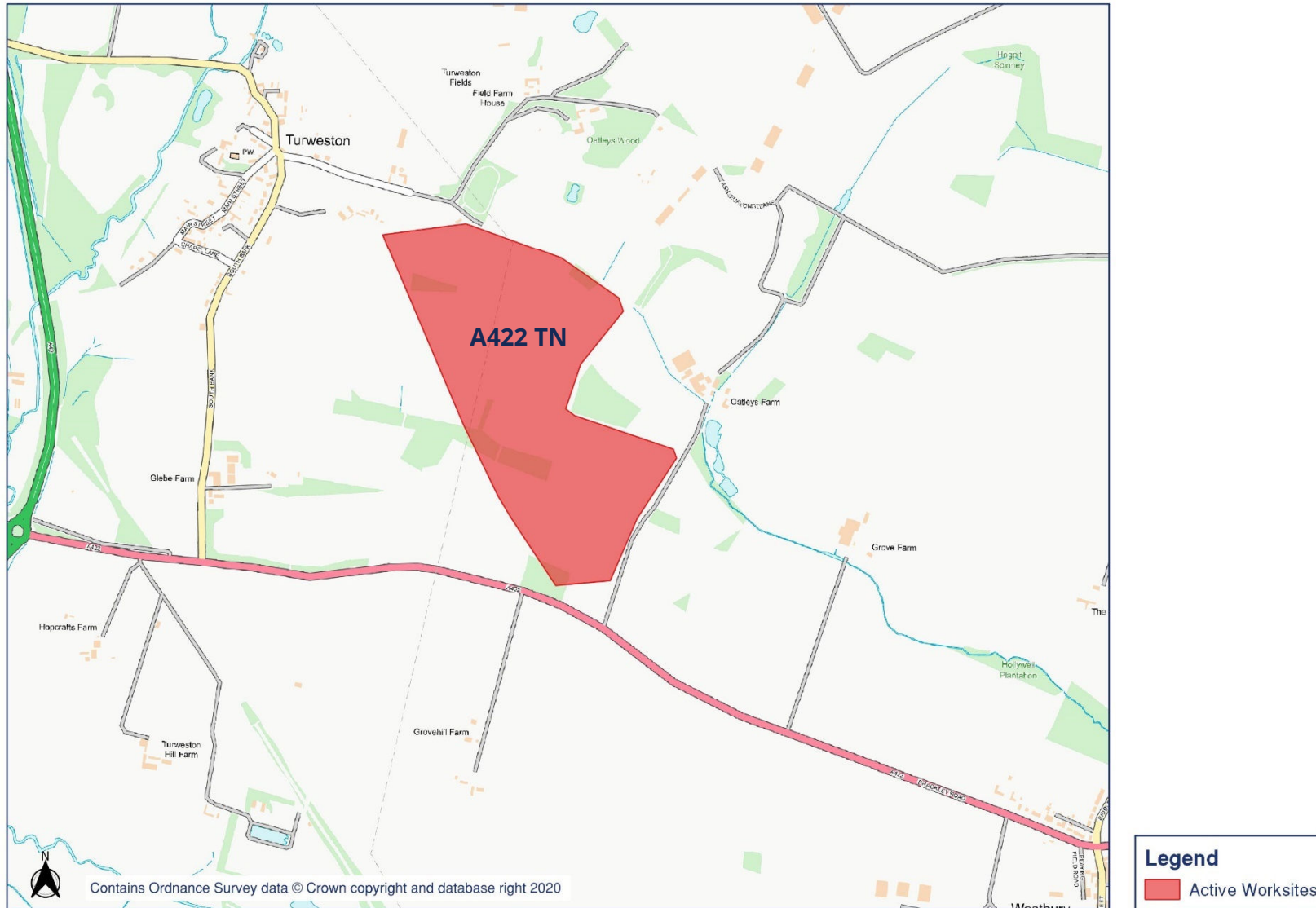


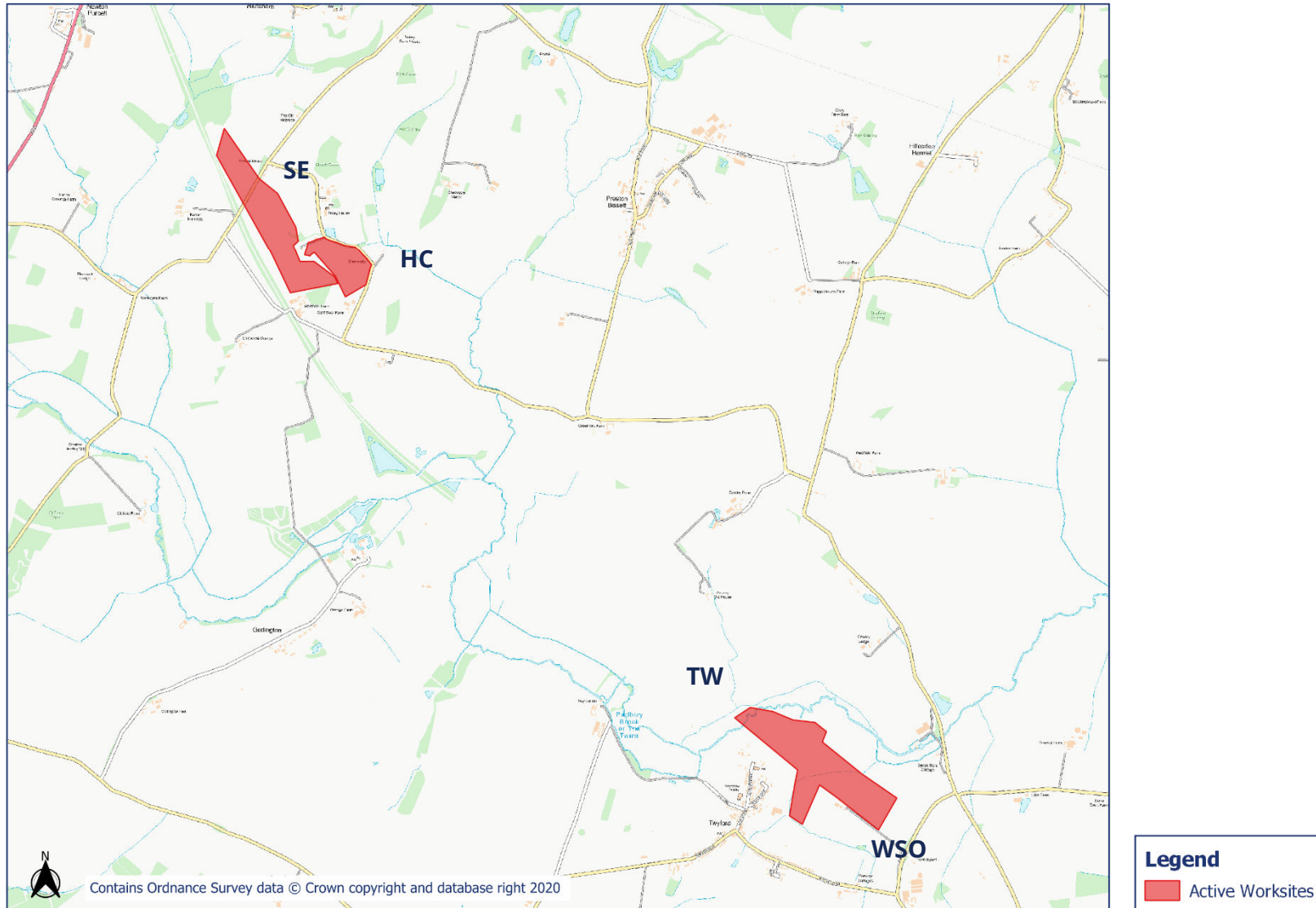


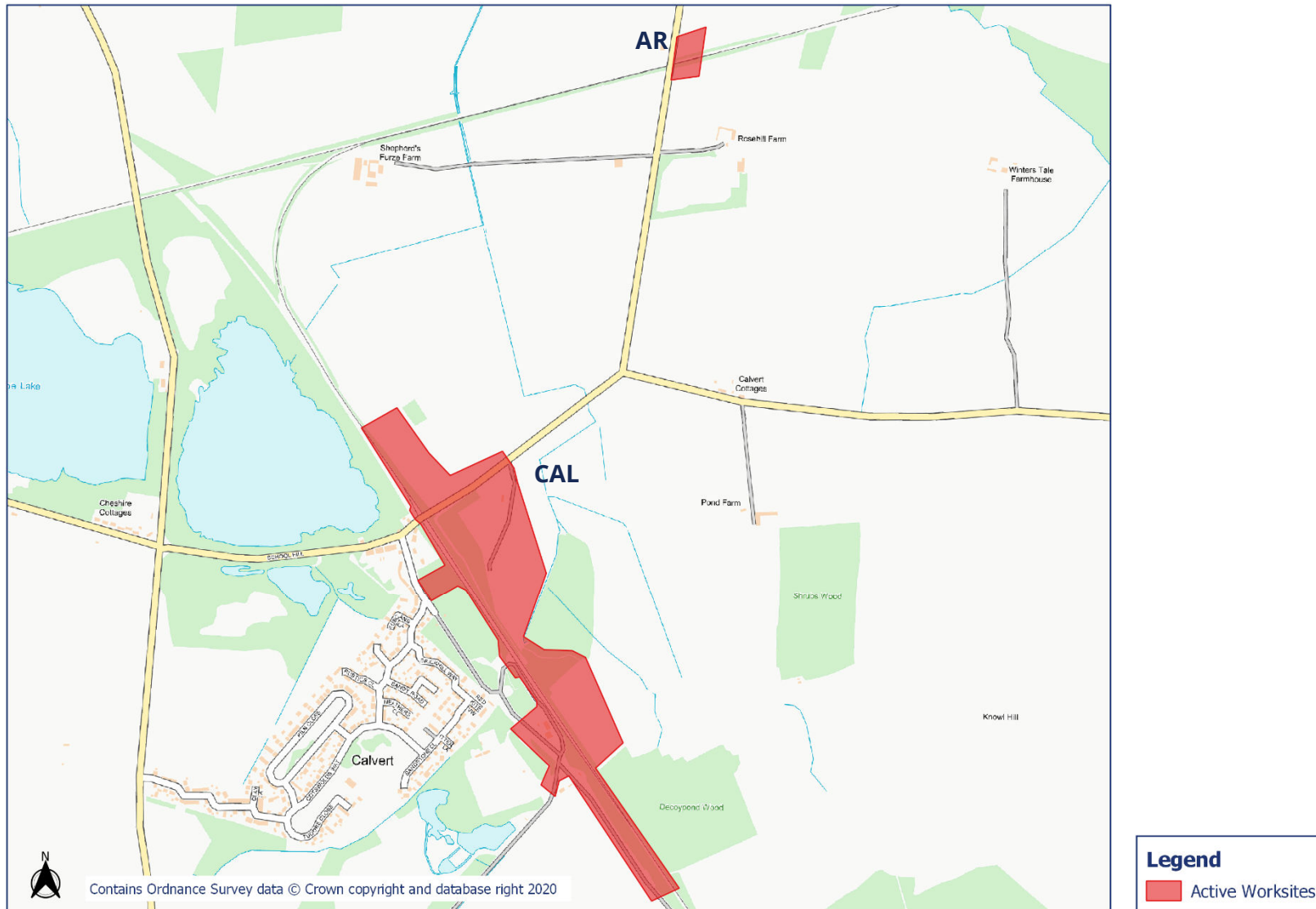
HS2 Worksite Identification Plan - Overview 3

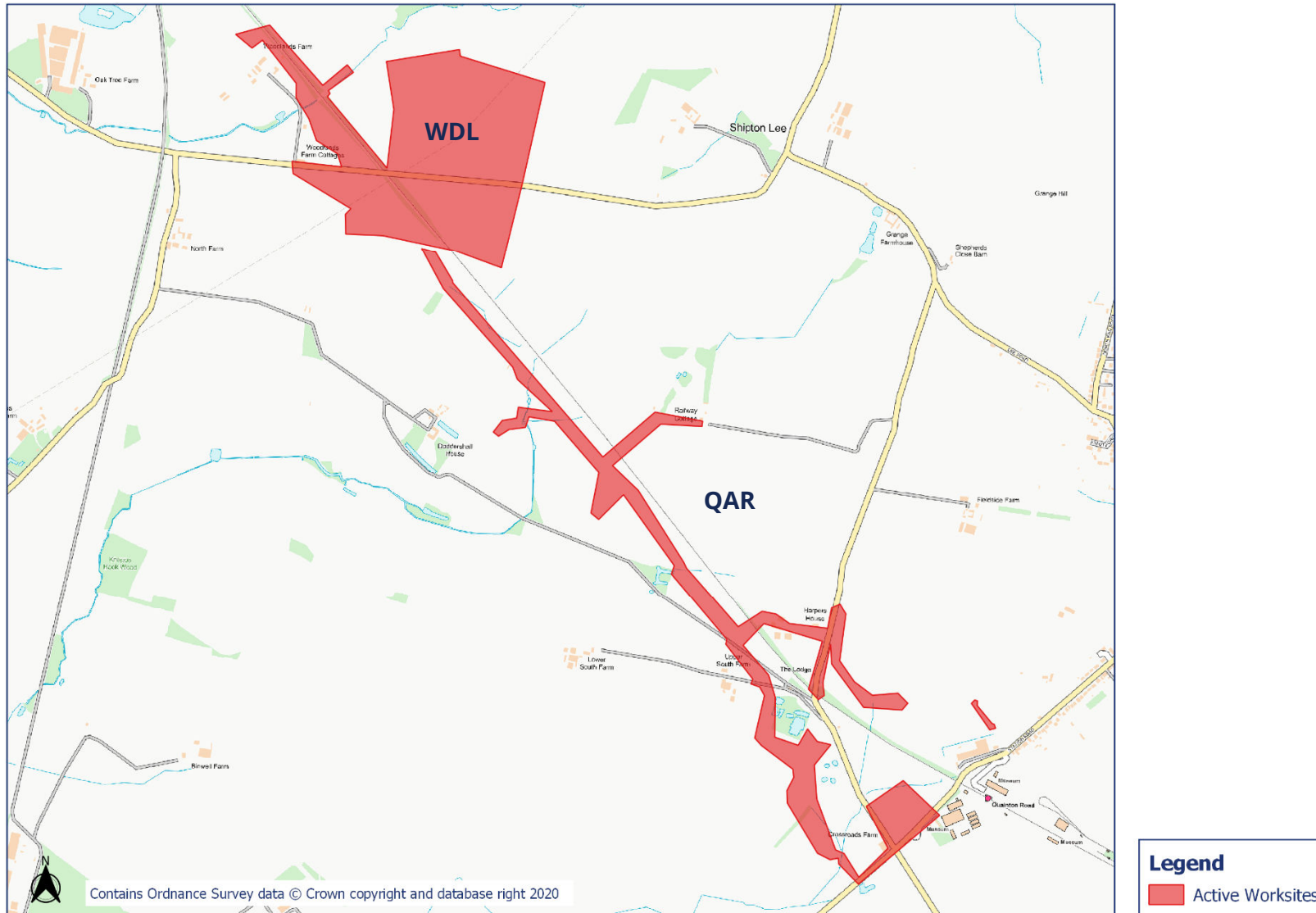


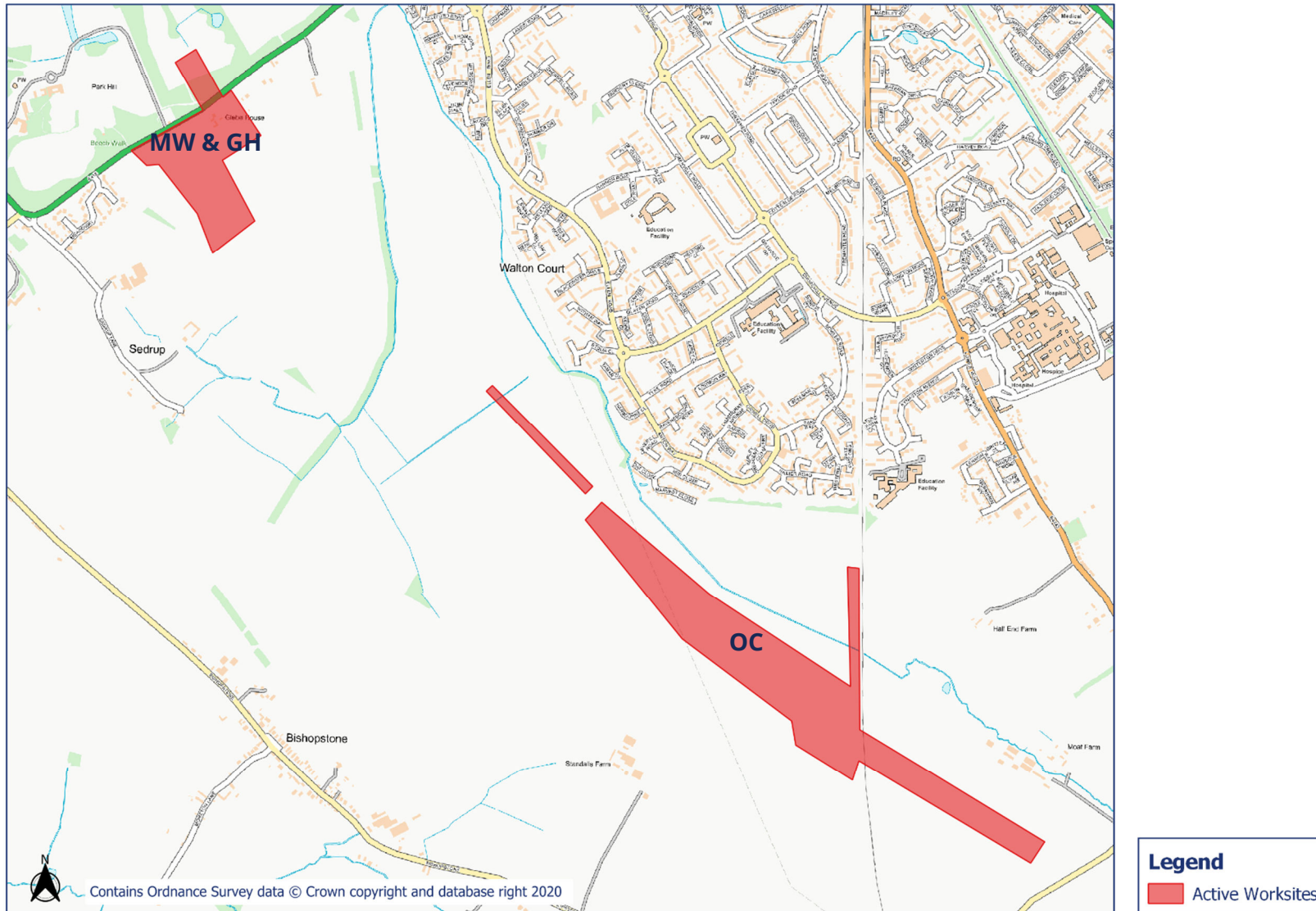
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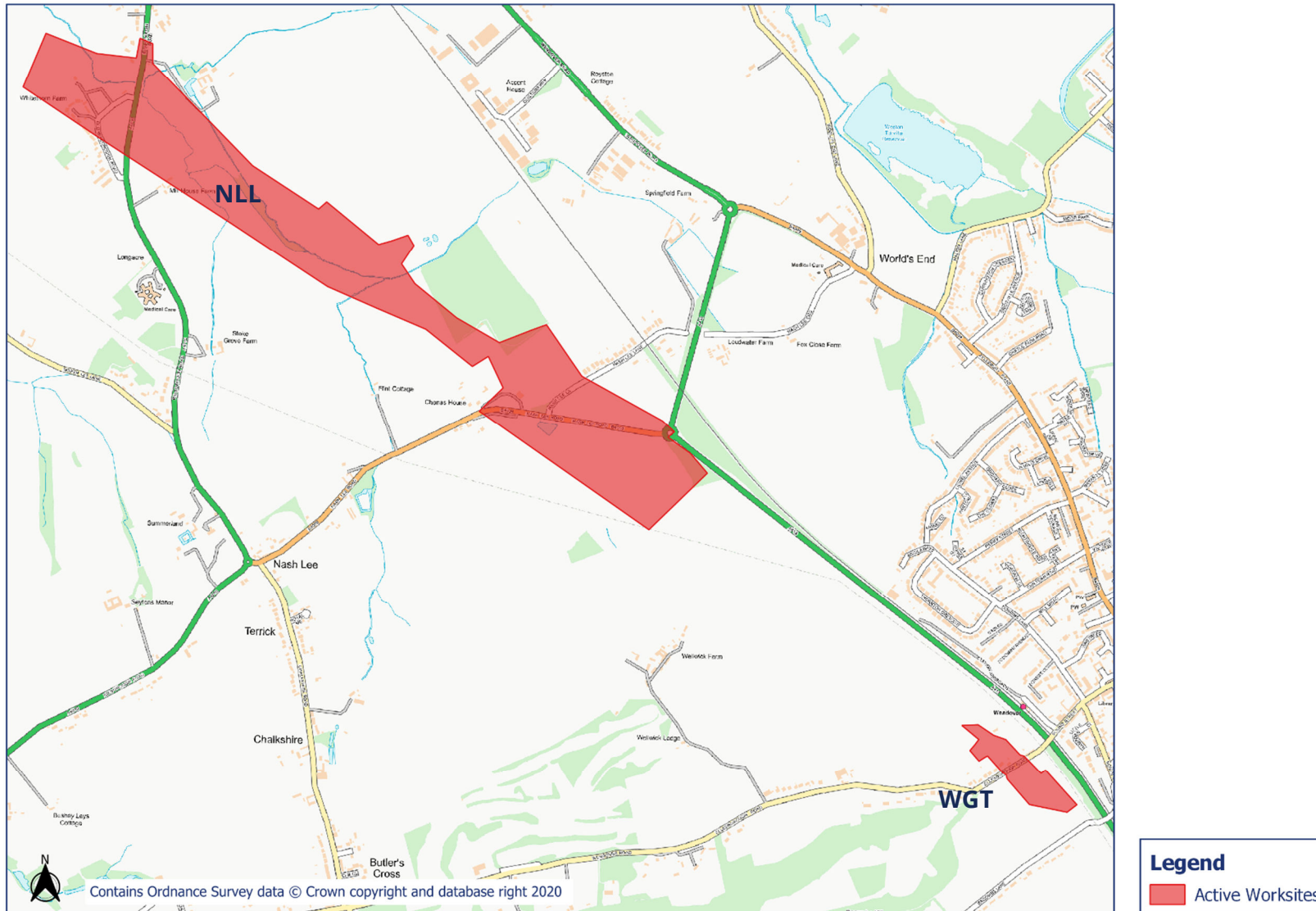


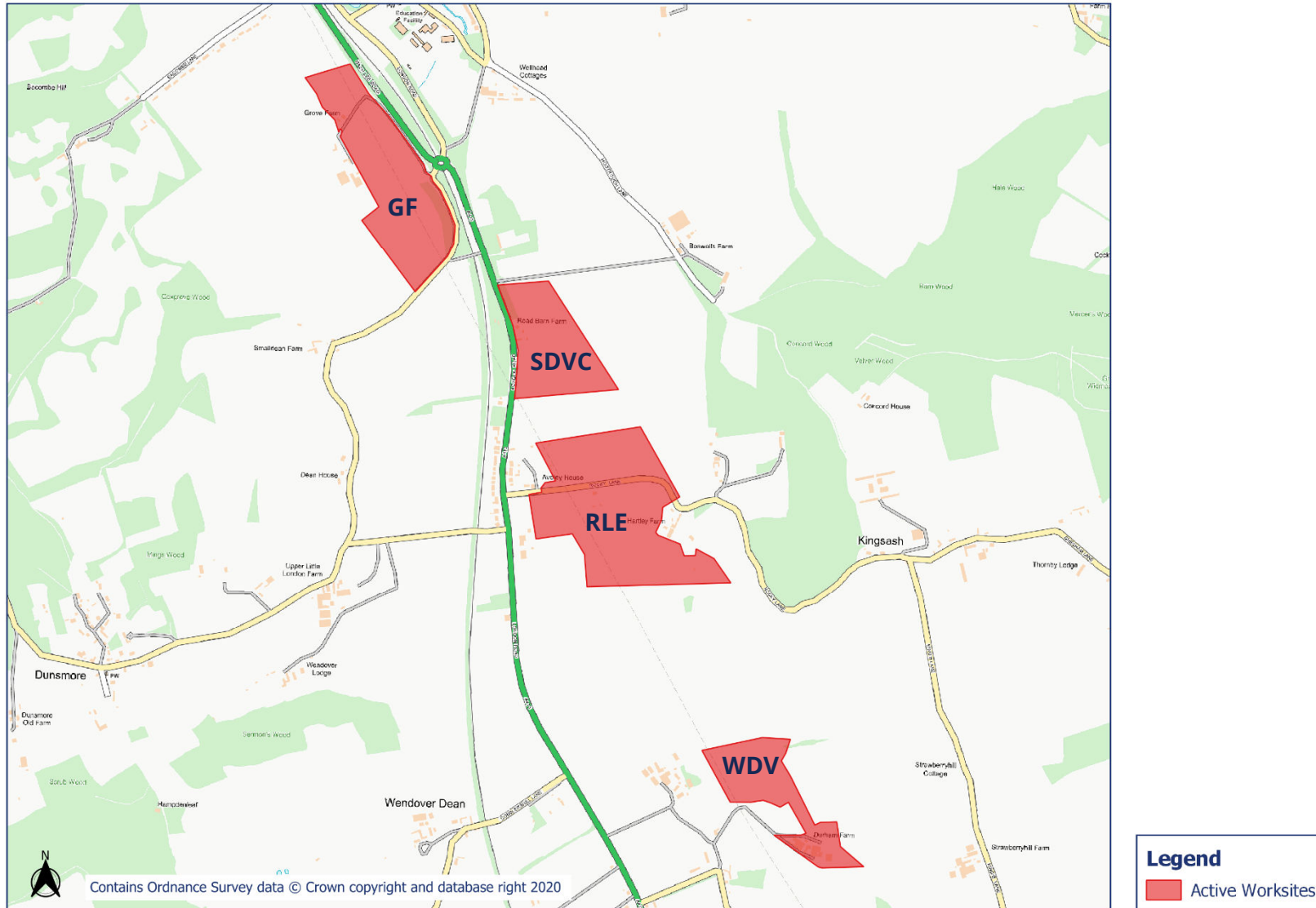


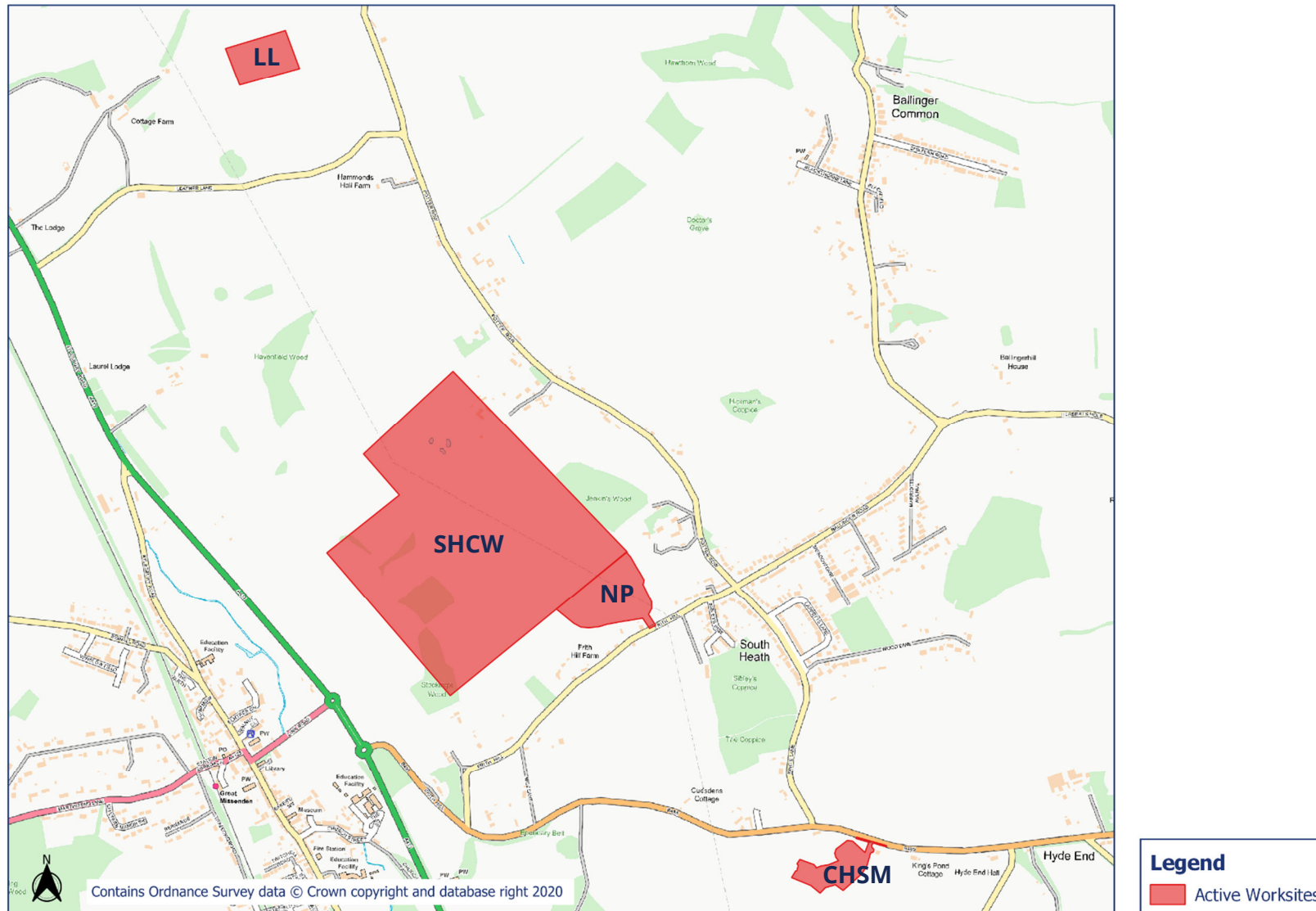




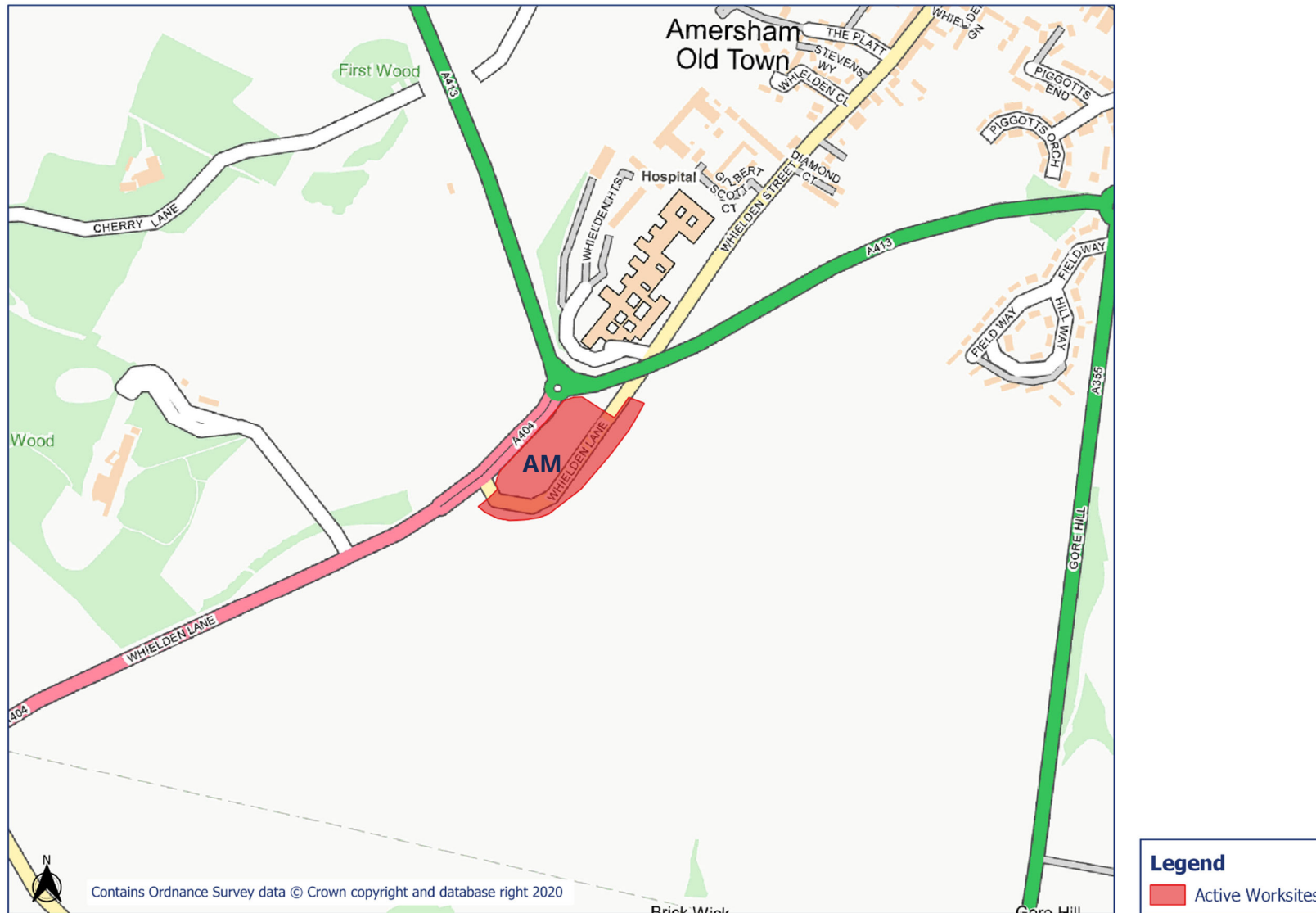


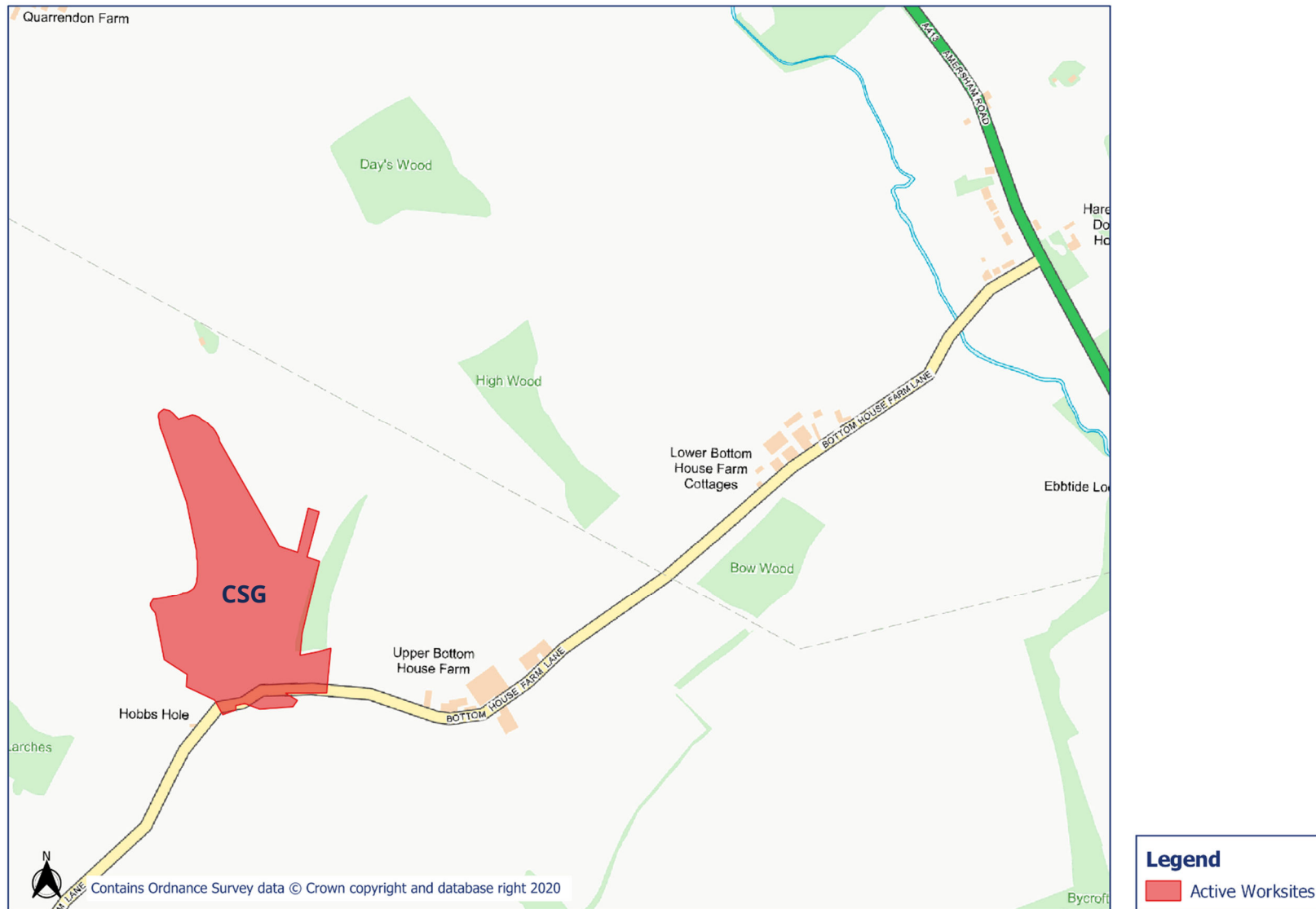




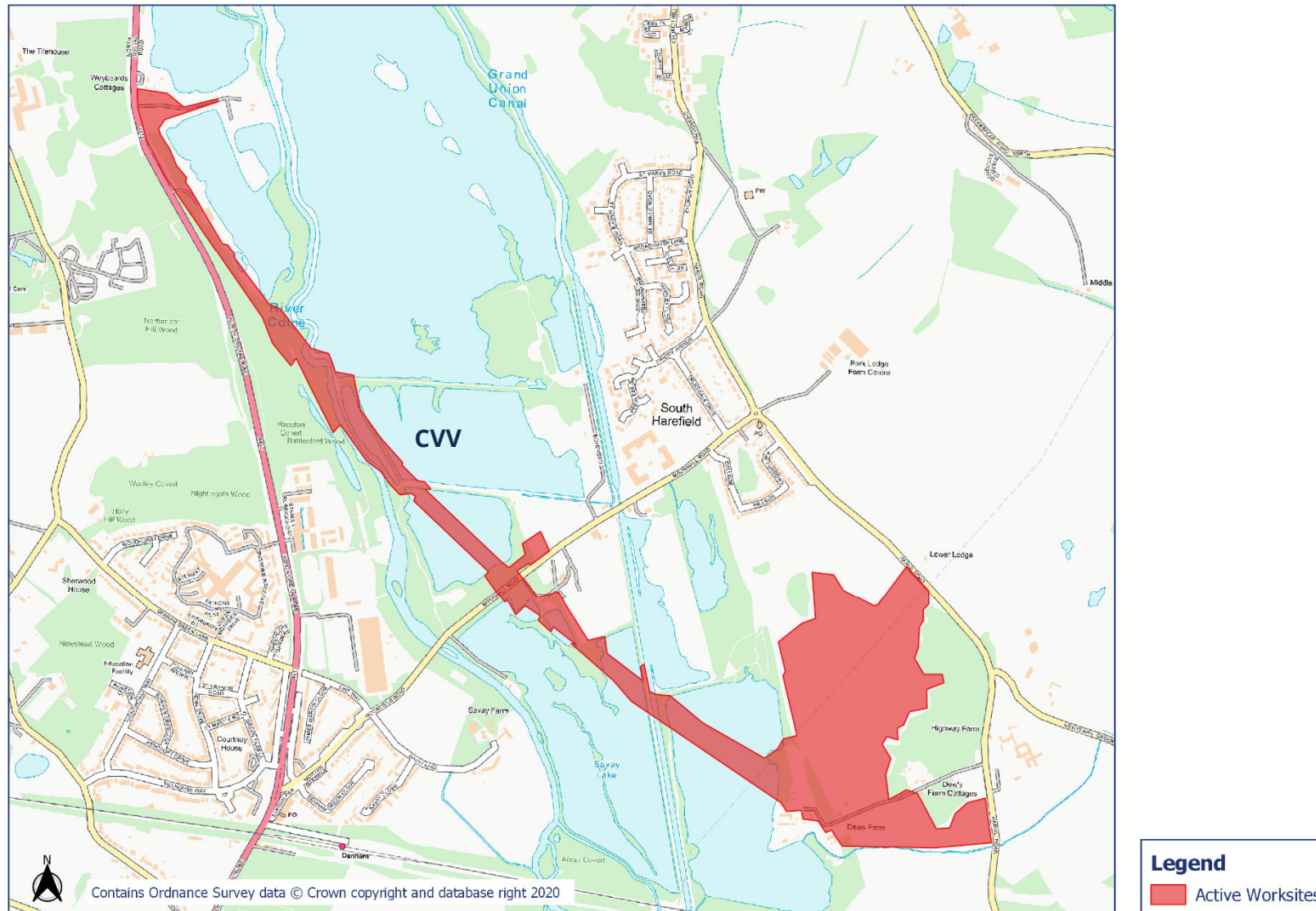




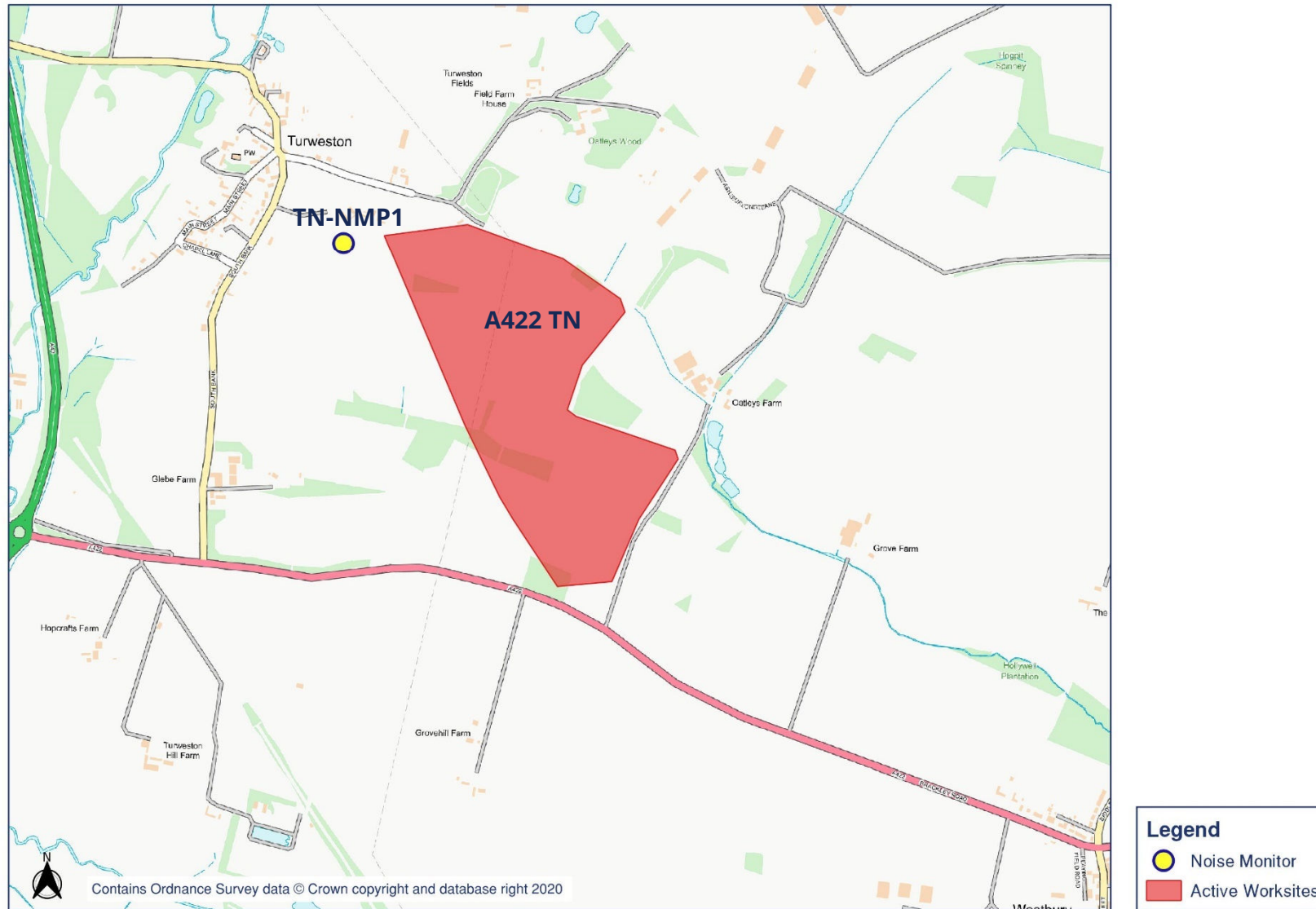






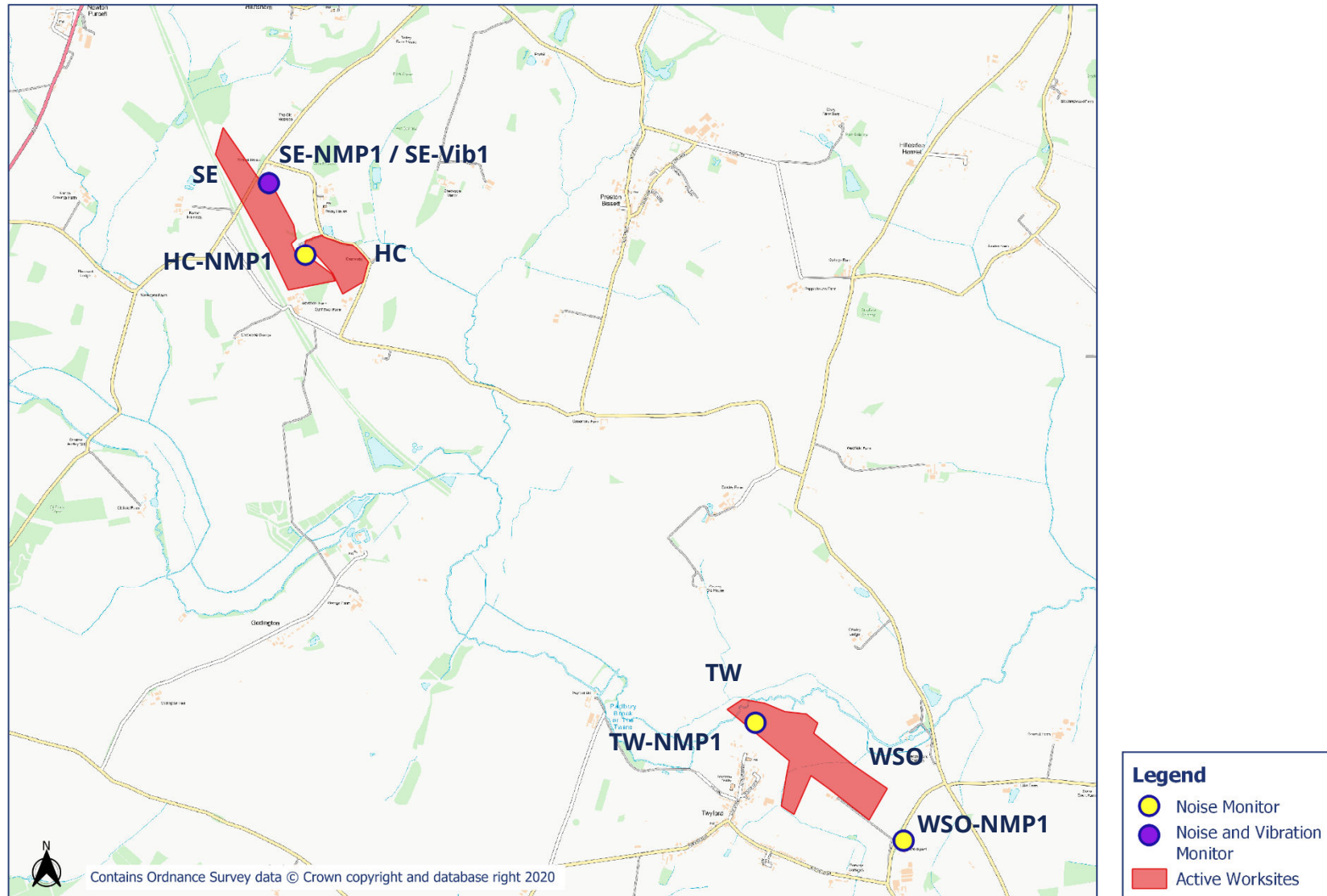


Appendix B Monitoring Locations

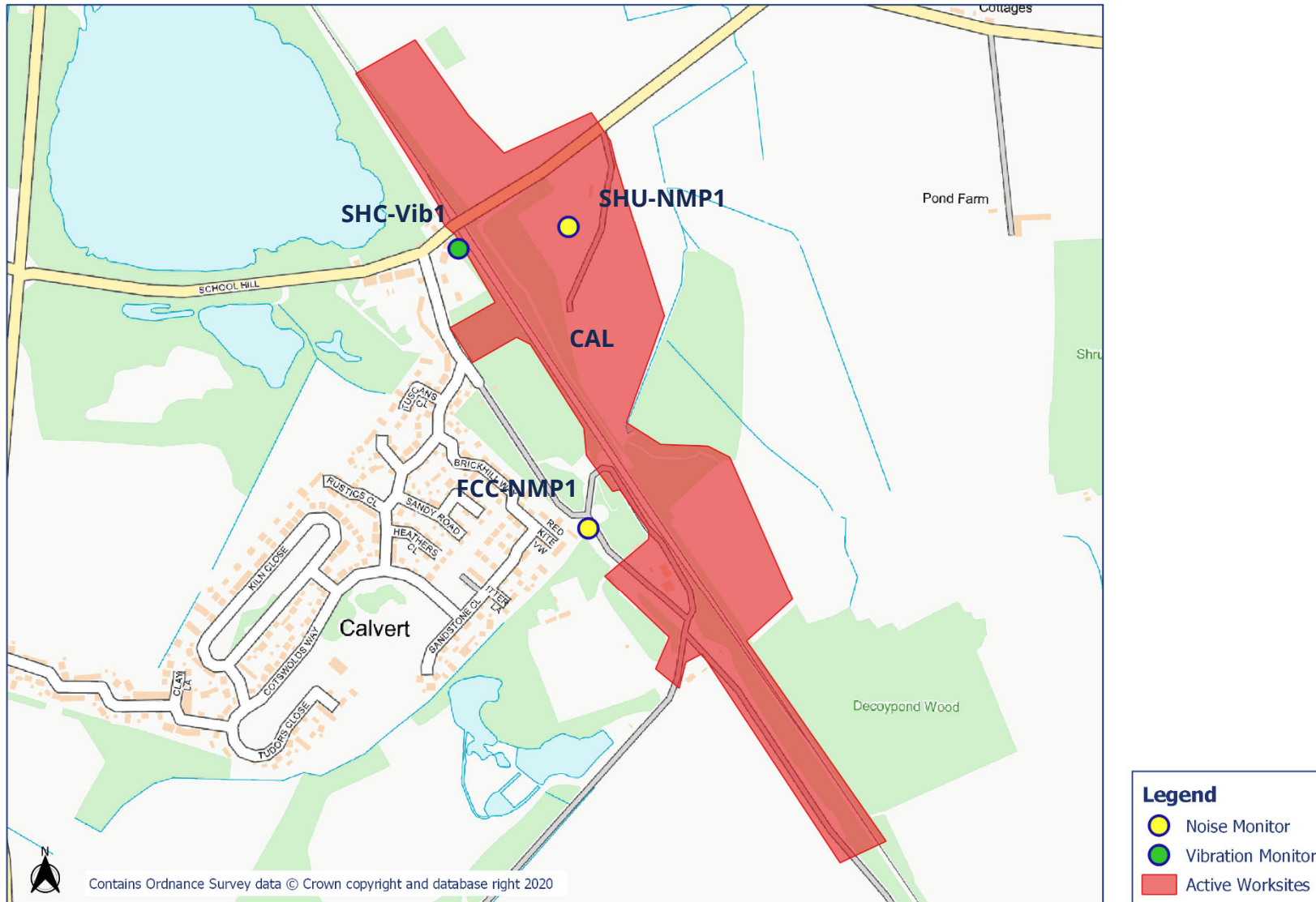


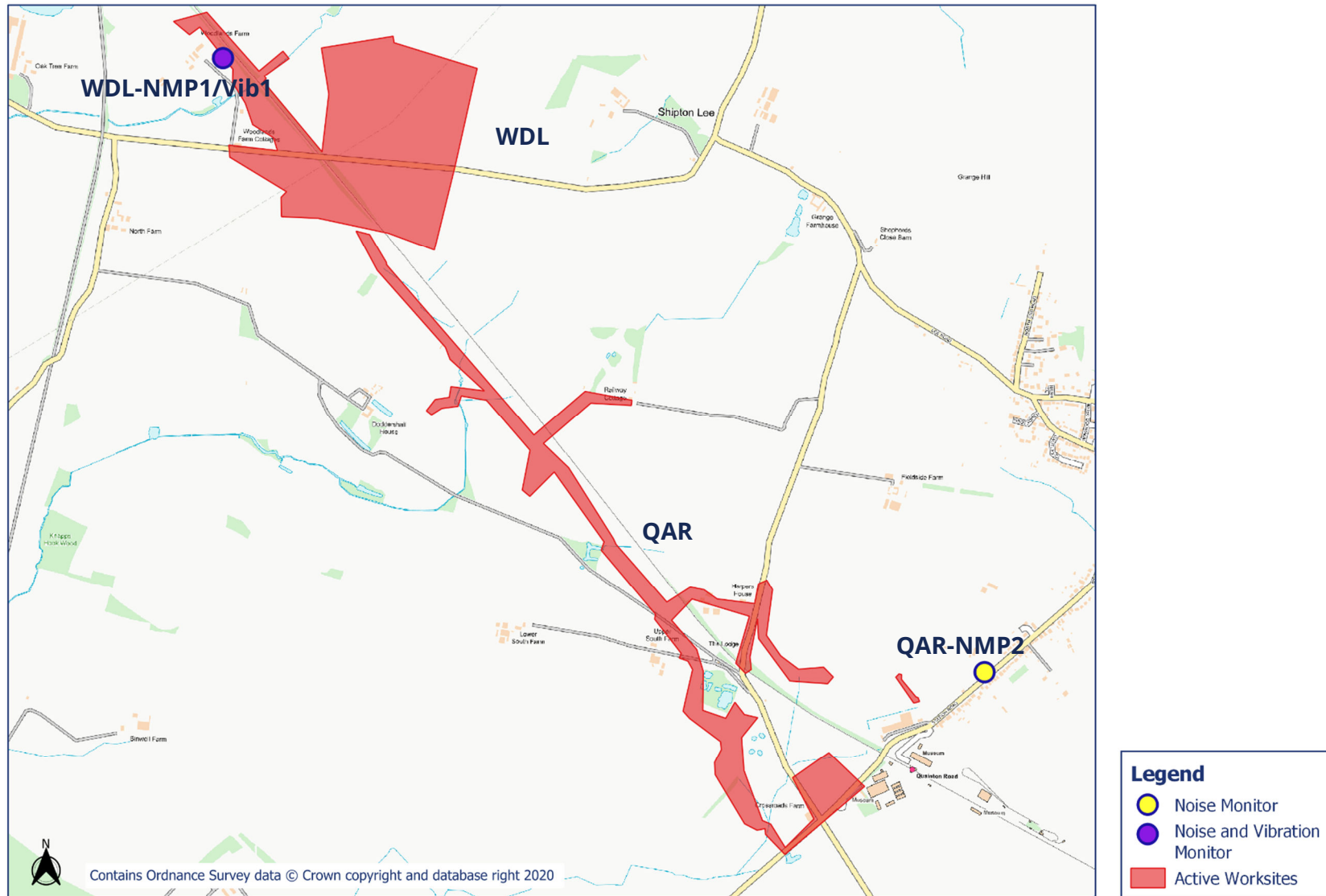
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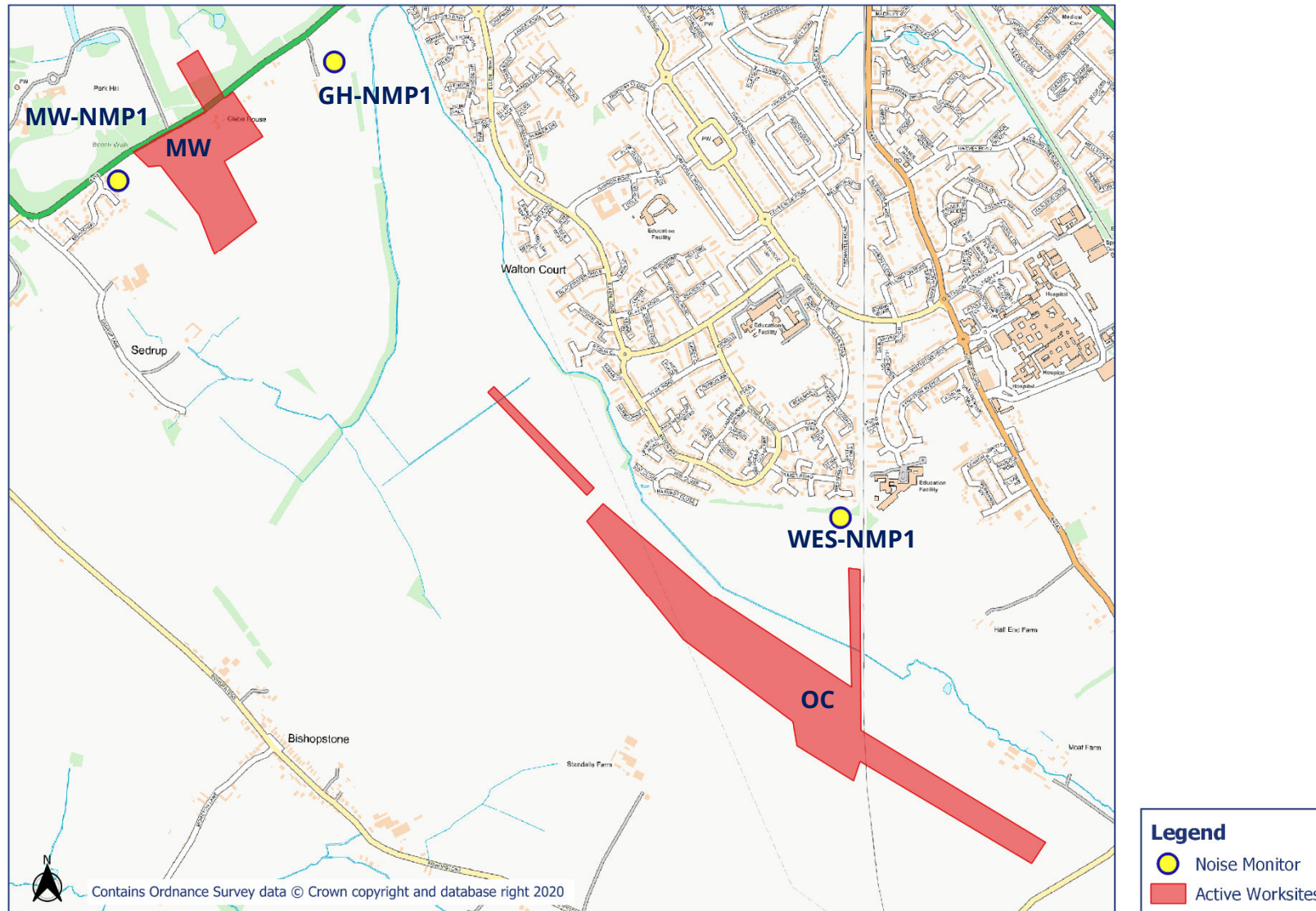
Noise and Vibration Monitoring Plan - 2

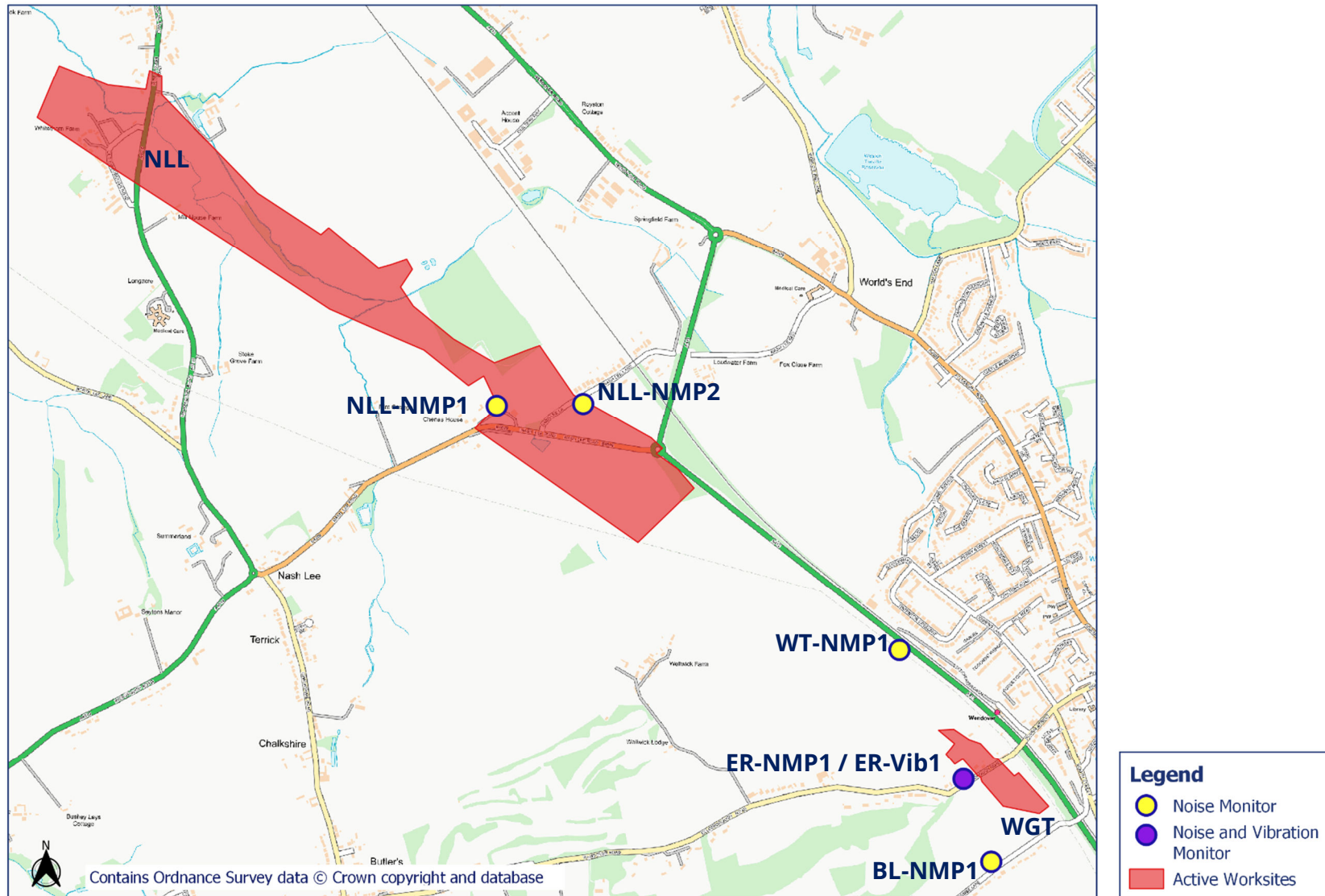


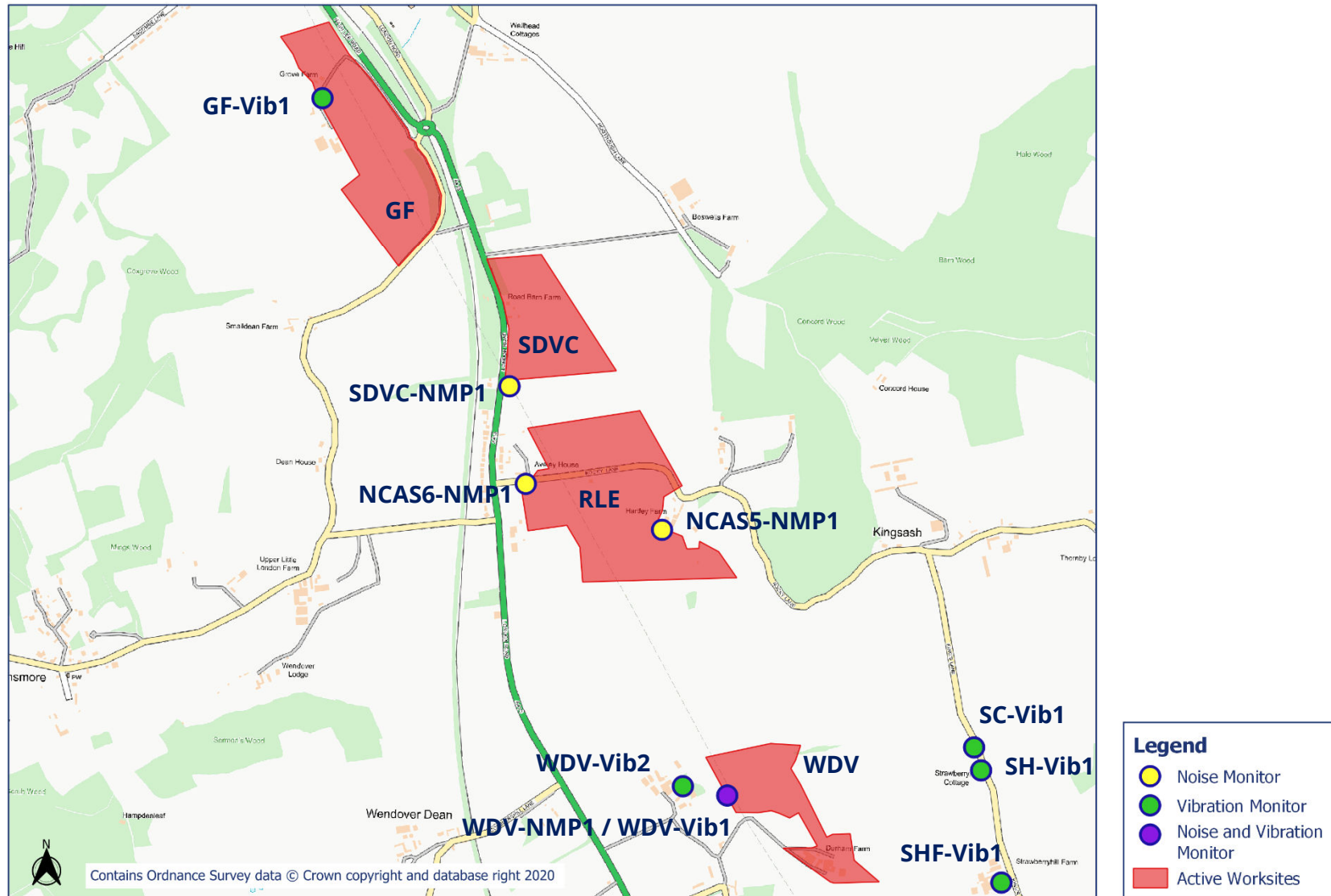


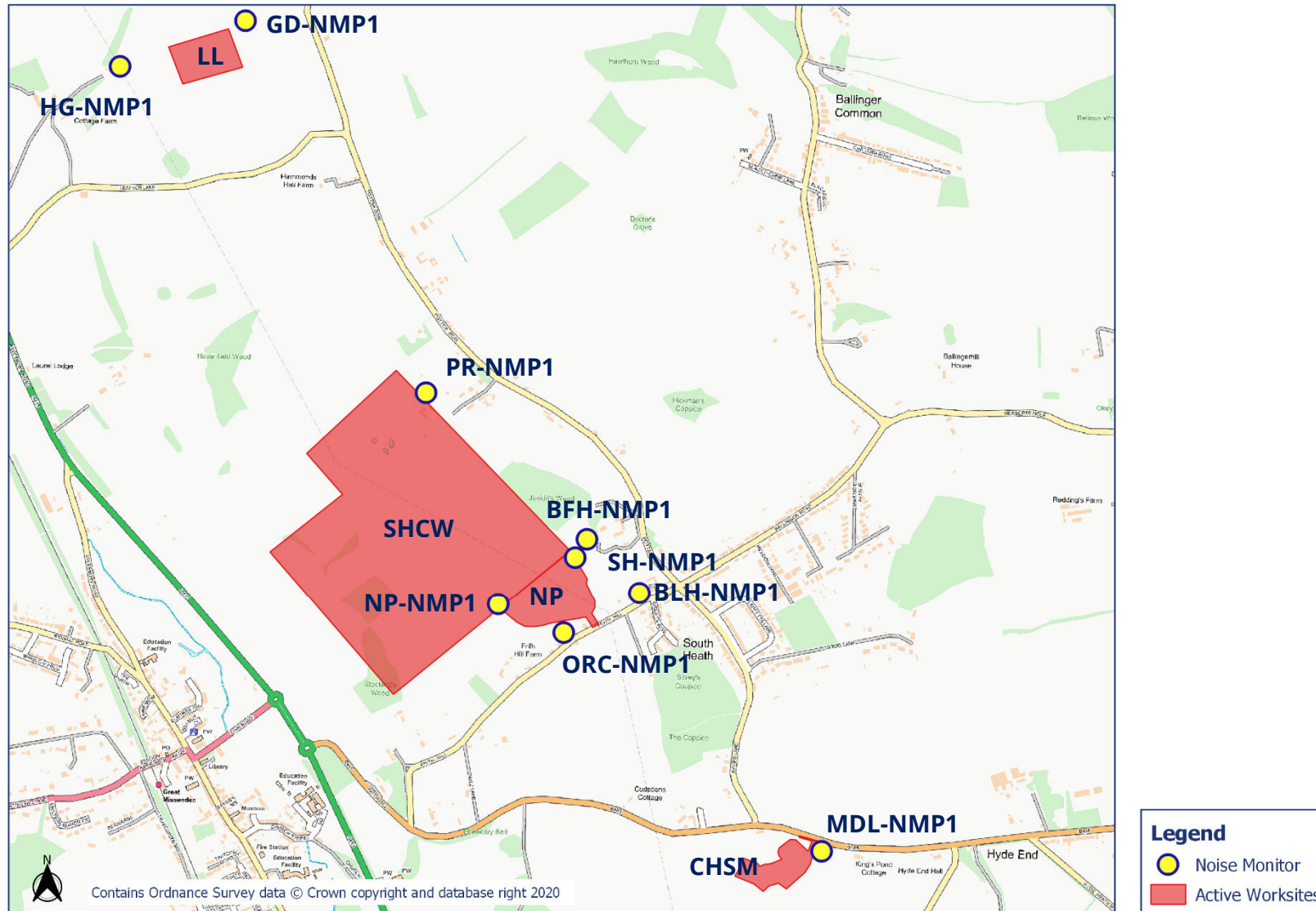






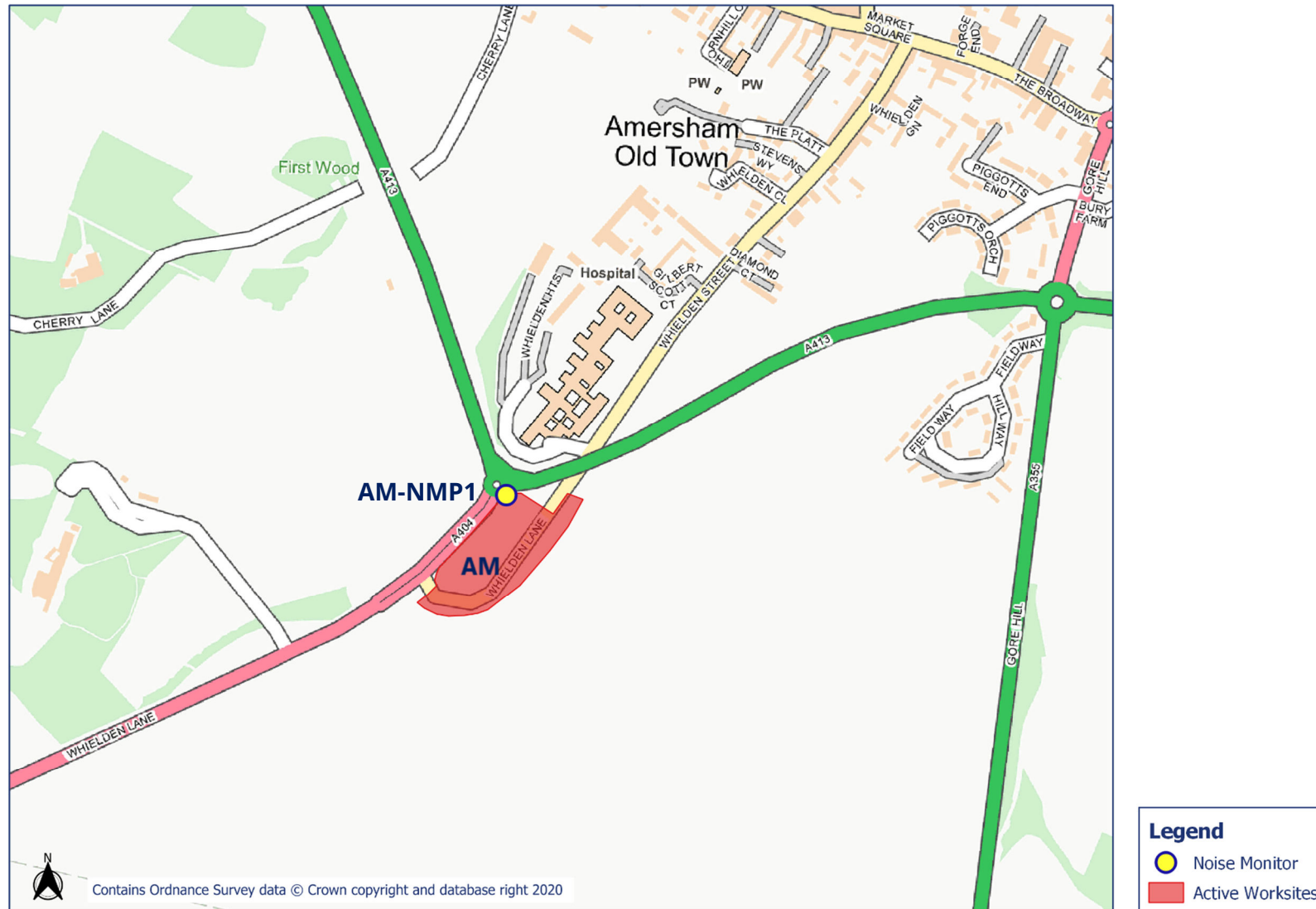




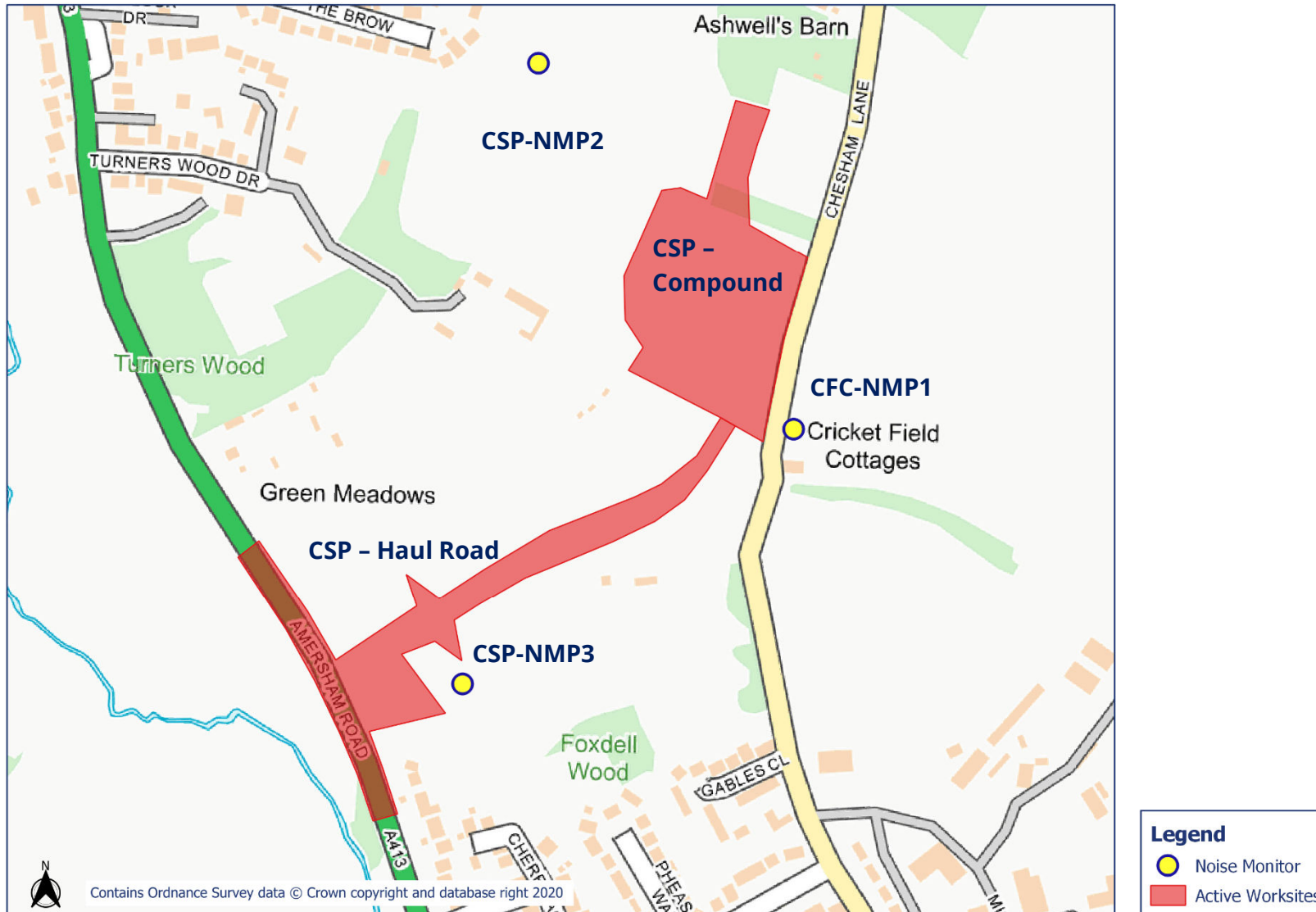


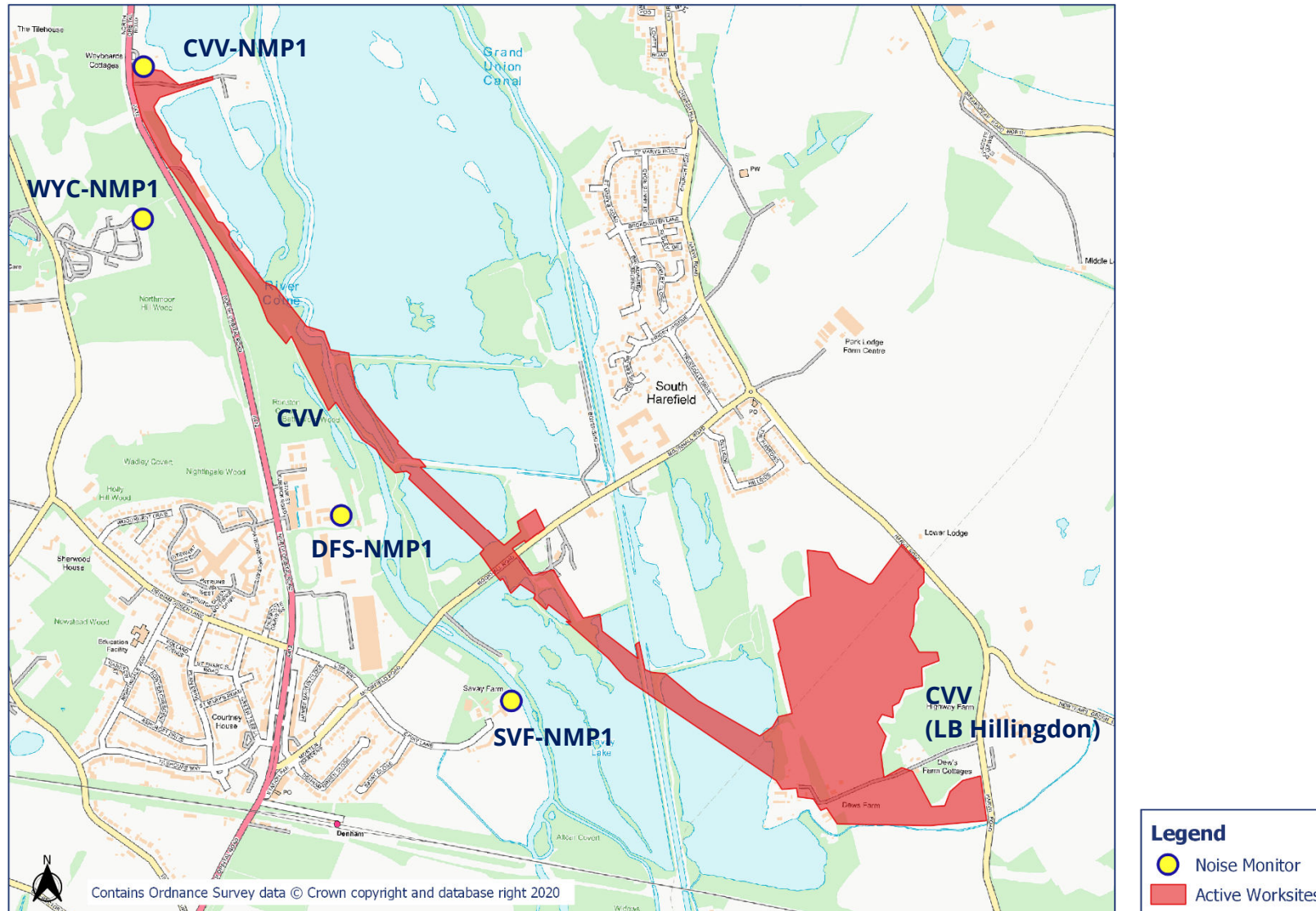


HS2 Noise and Vibration Monitoring Plan - 11







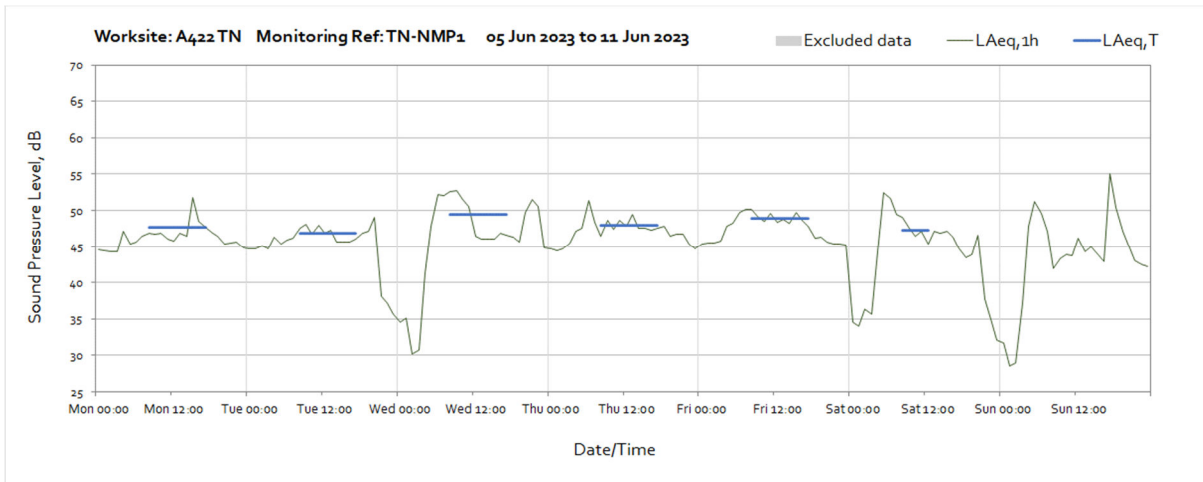
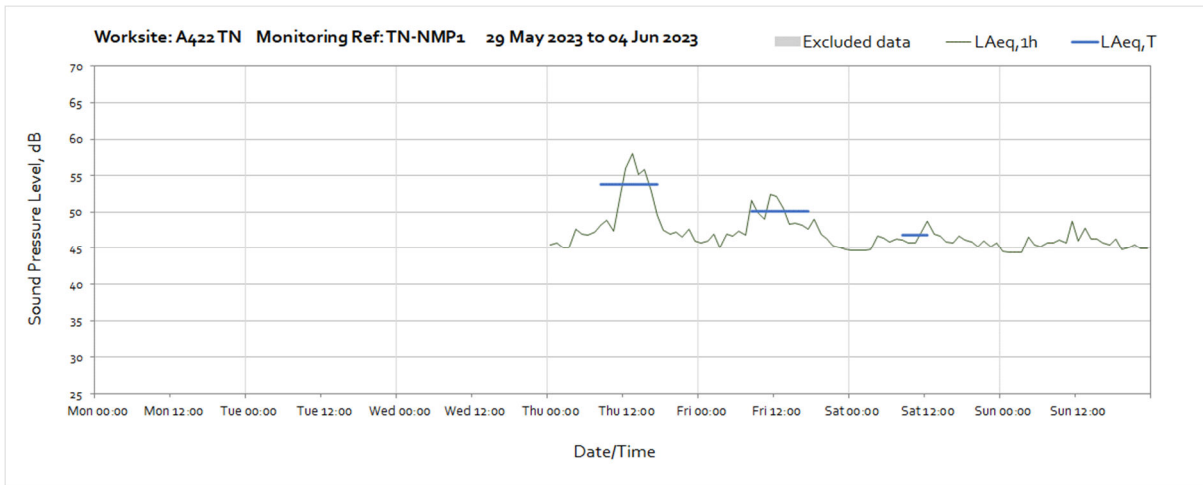


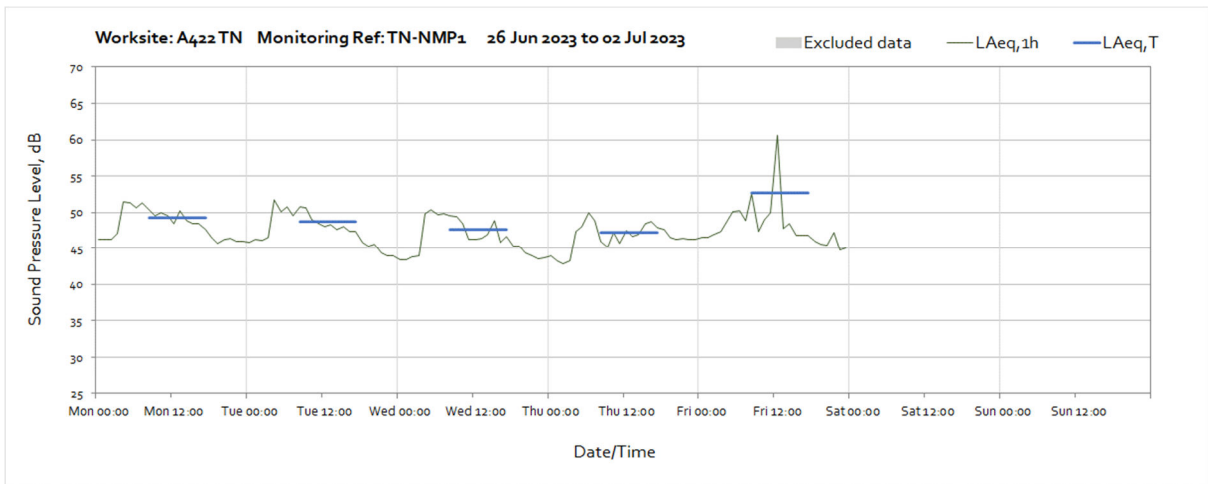
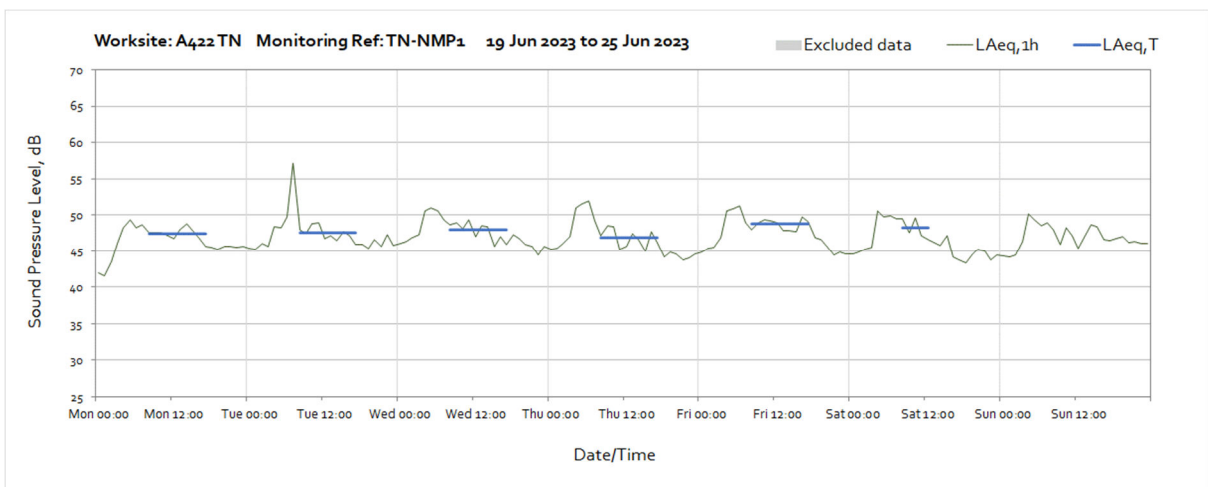
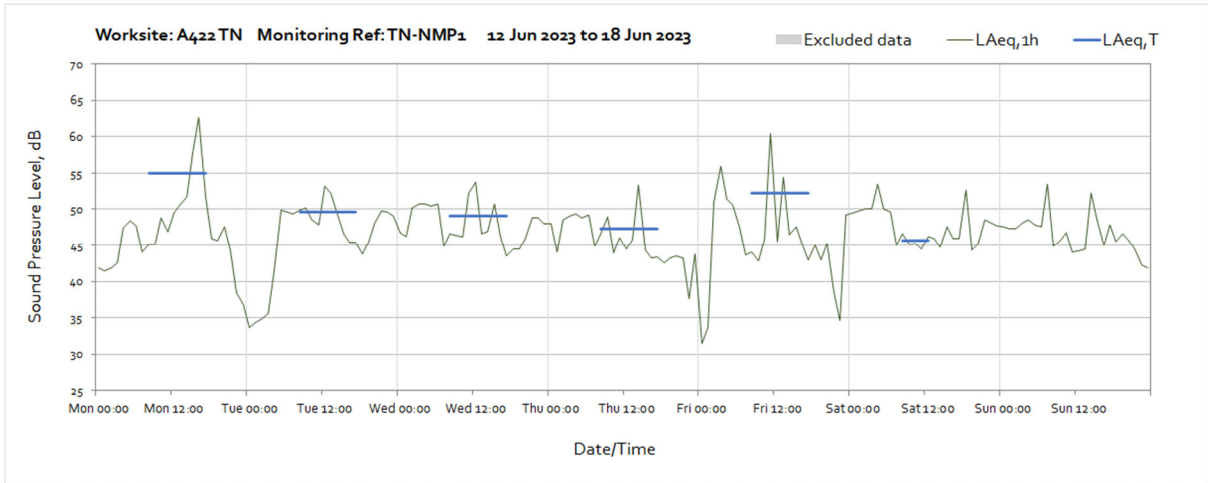
Appendix C Data

Noise

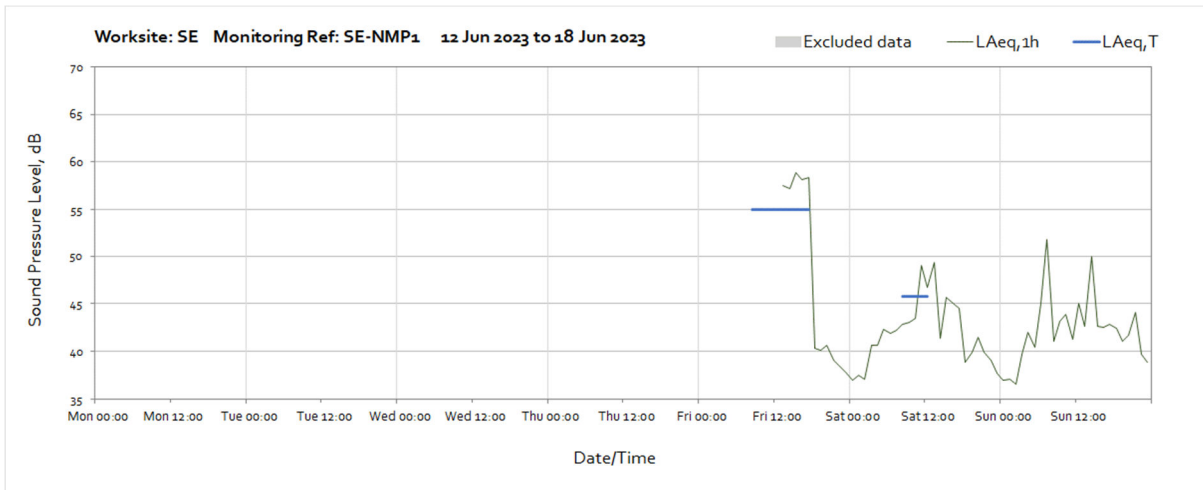
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have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

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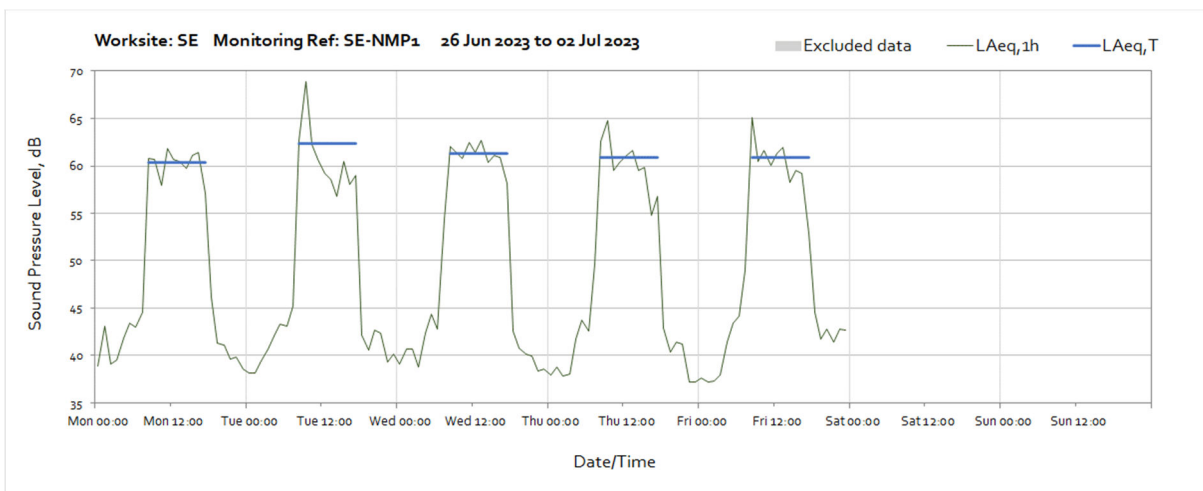
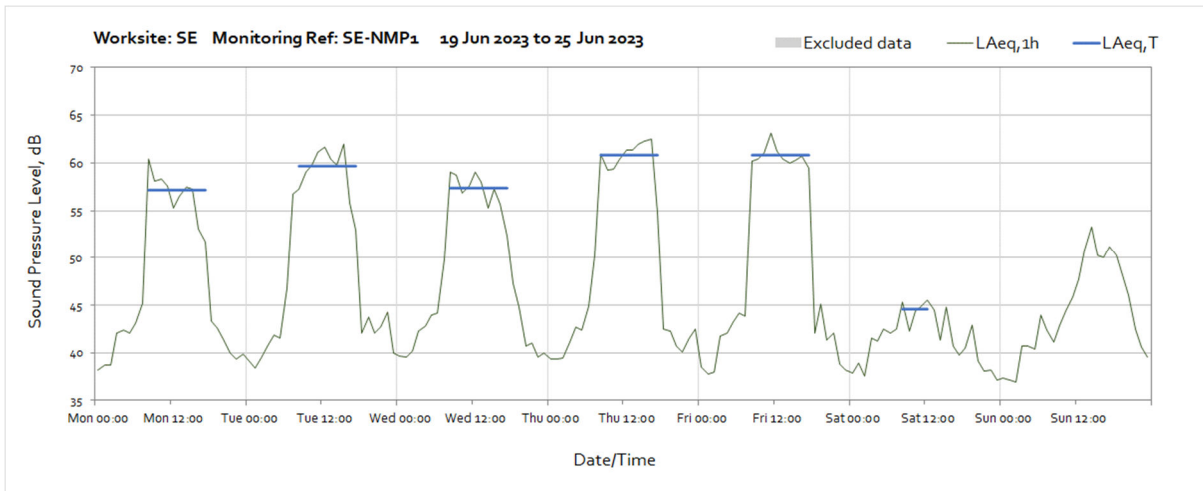




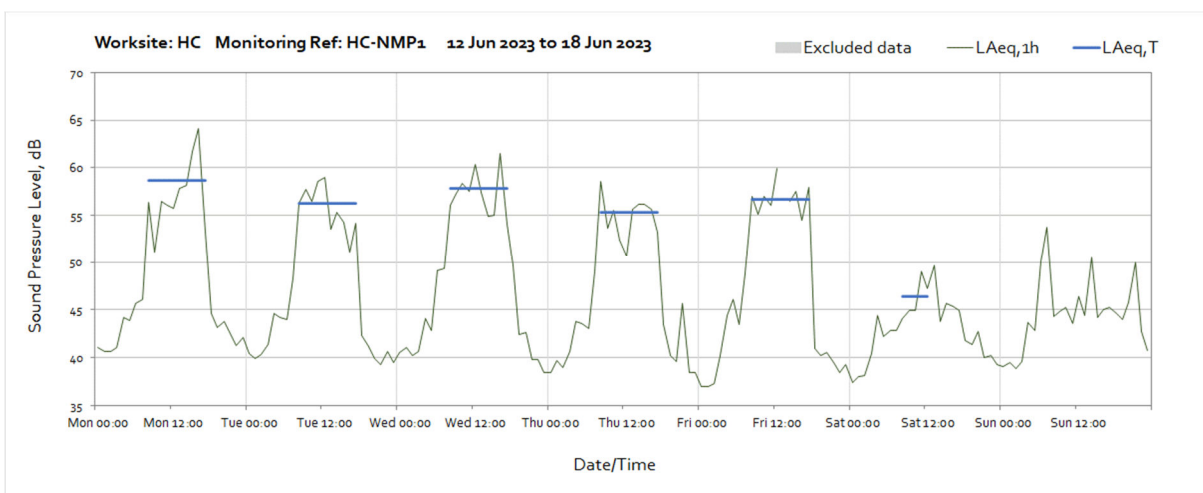
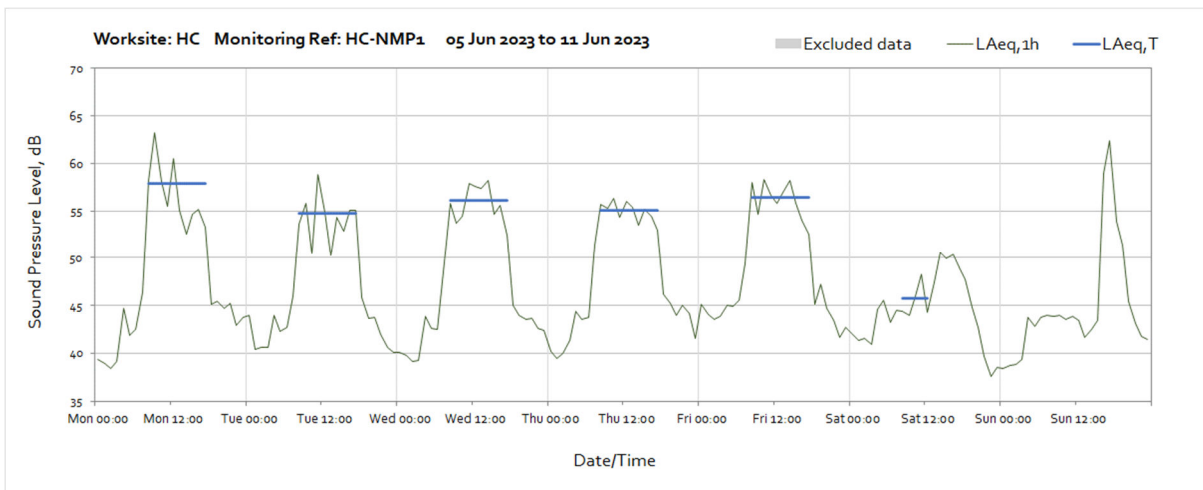
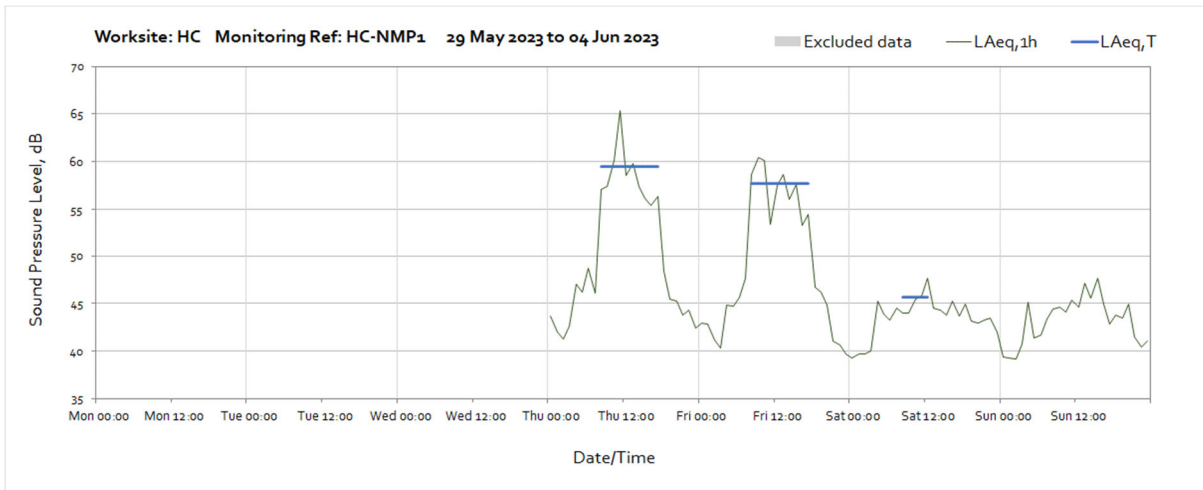
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Note: Missing data from the start of the month until 13:00 on Friday 15th June was due to a damaged power cable which has now been replaced.

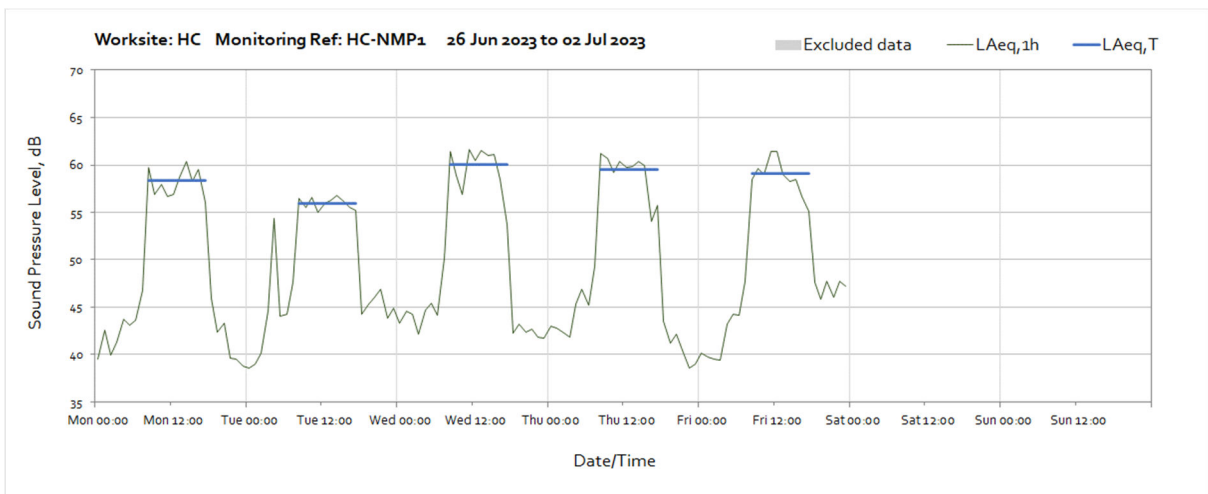
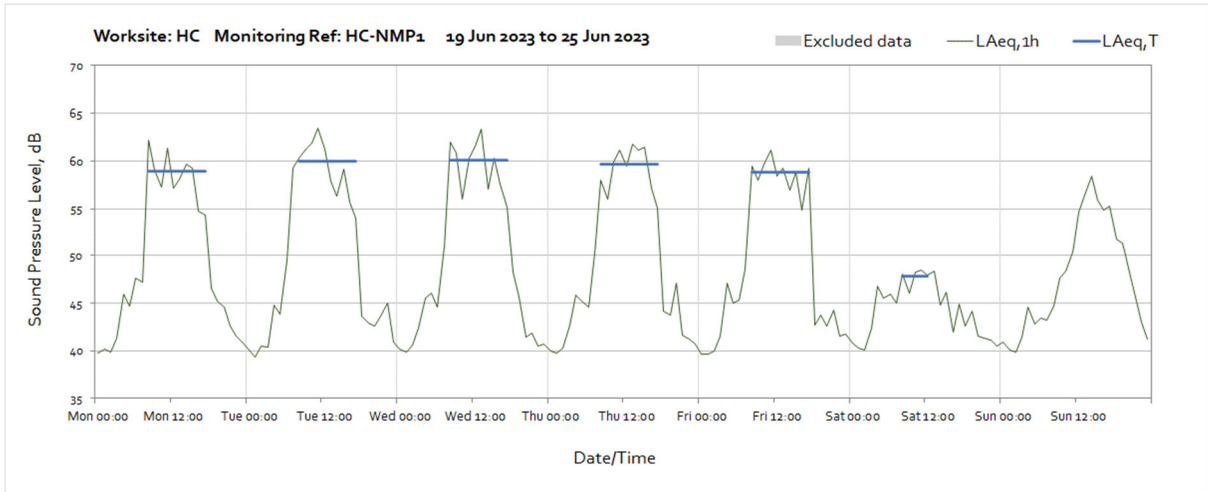


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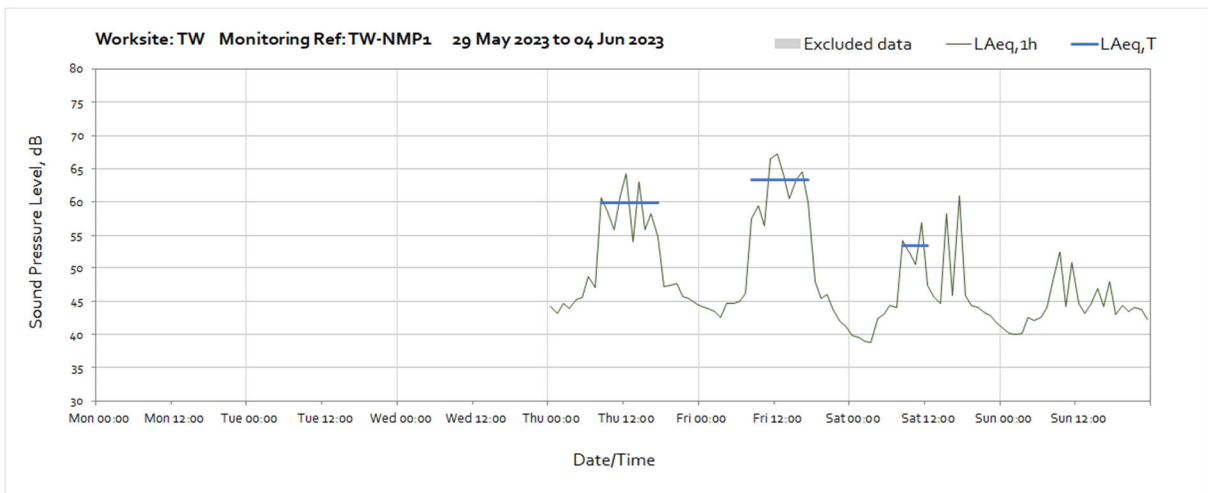


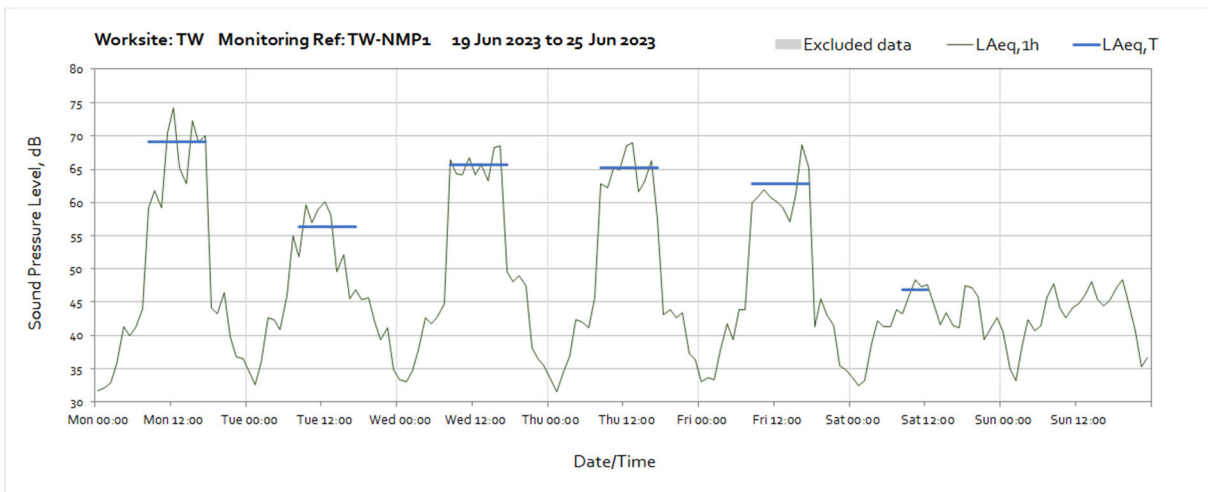
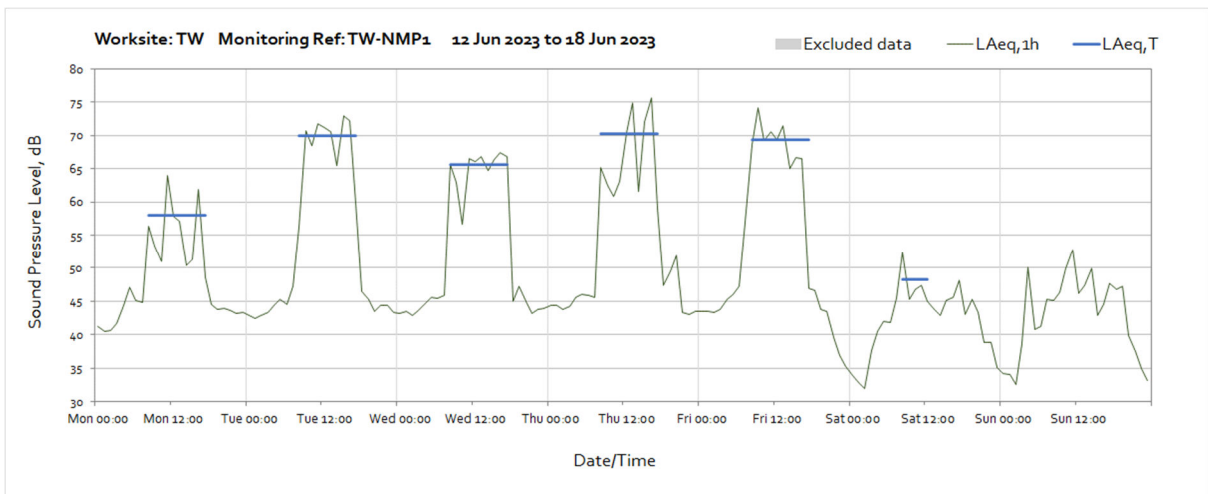
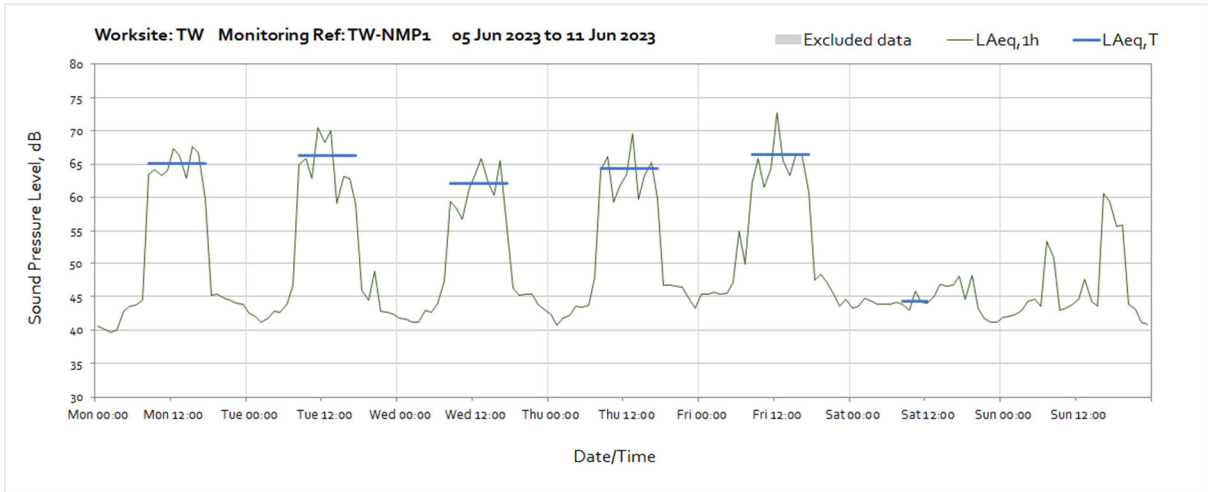
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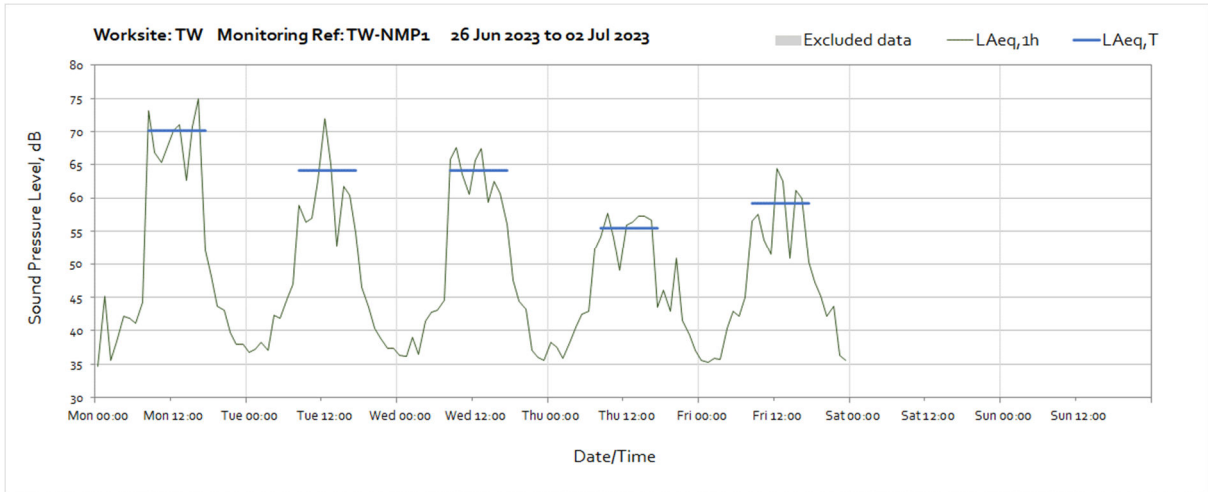
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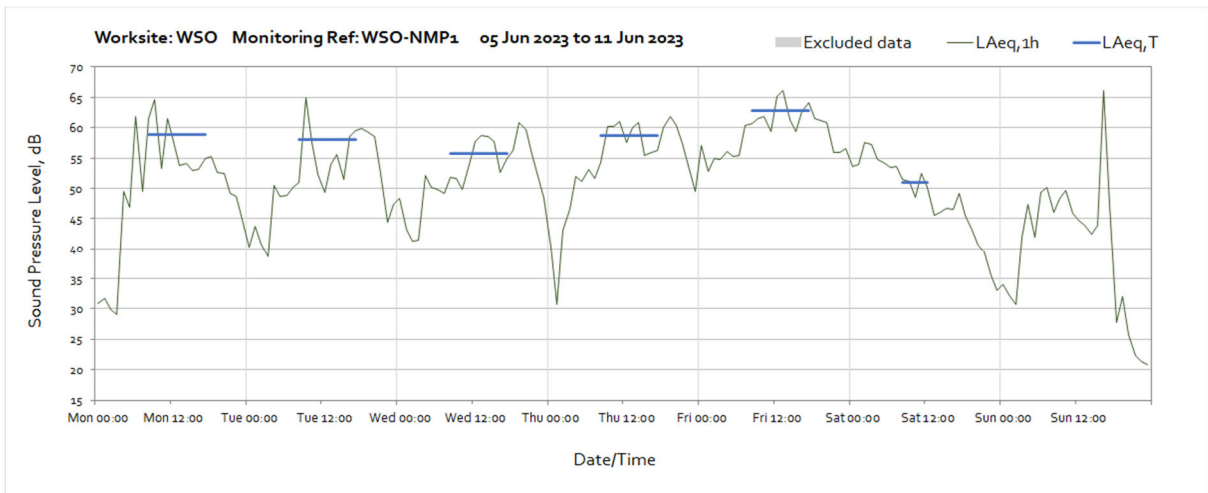
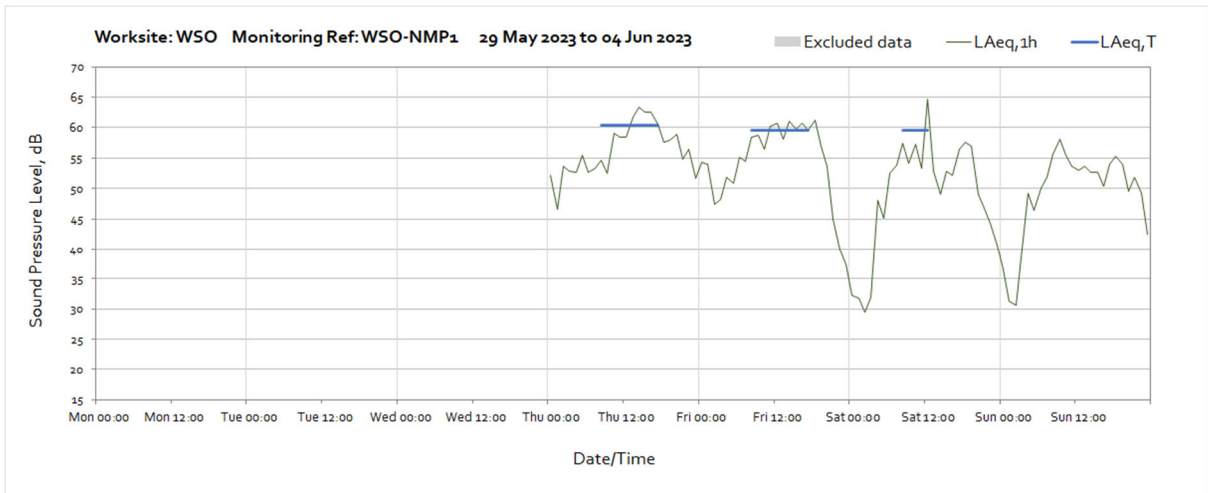
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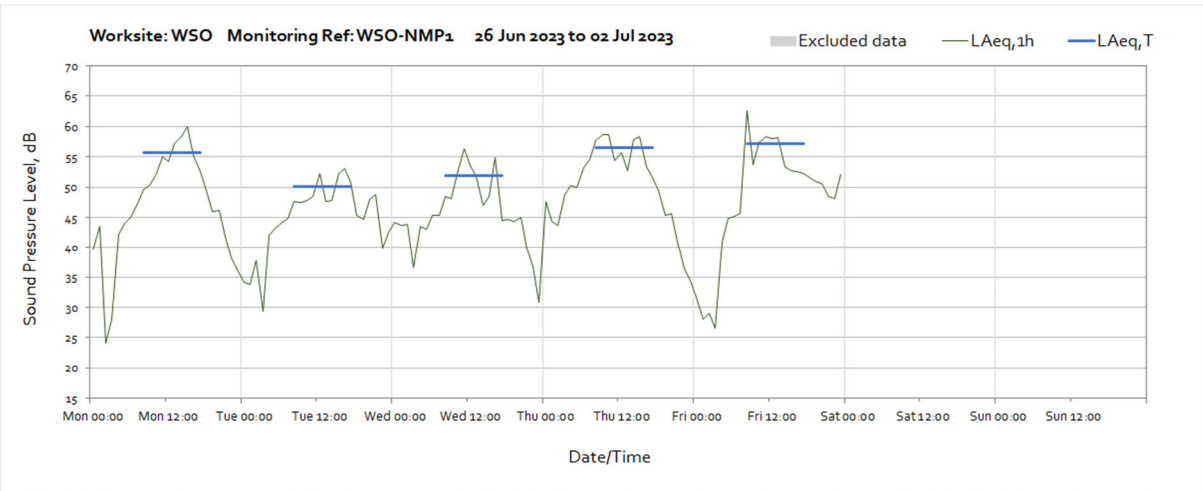
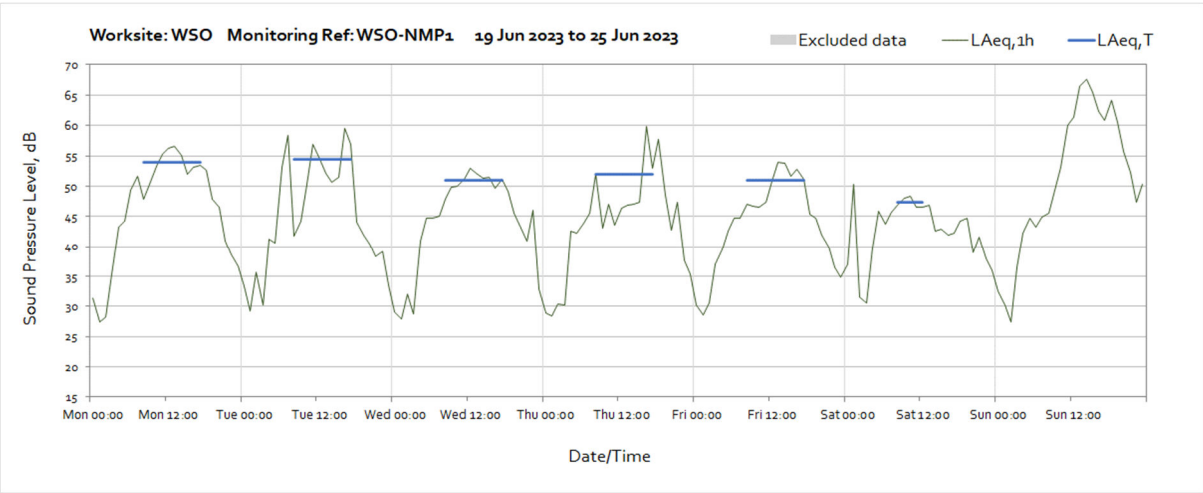
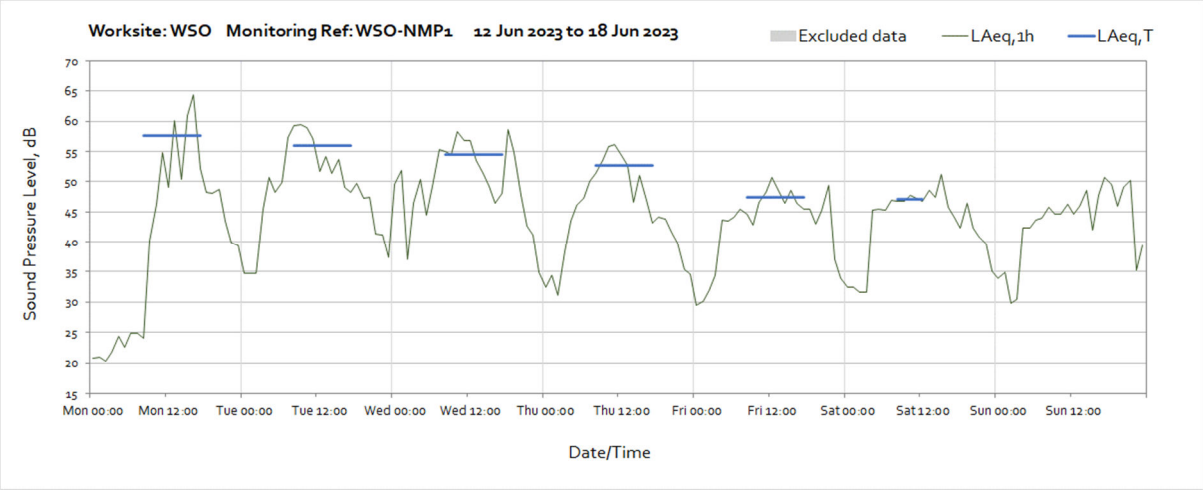




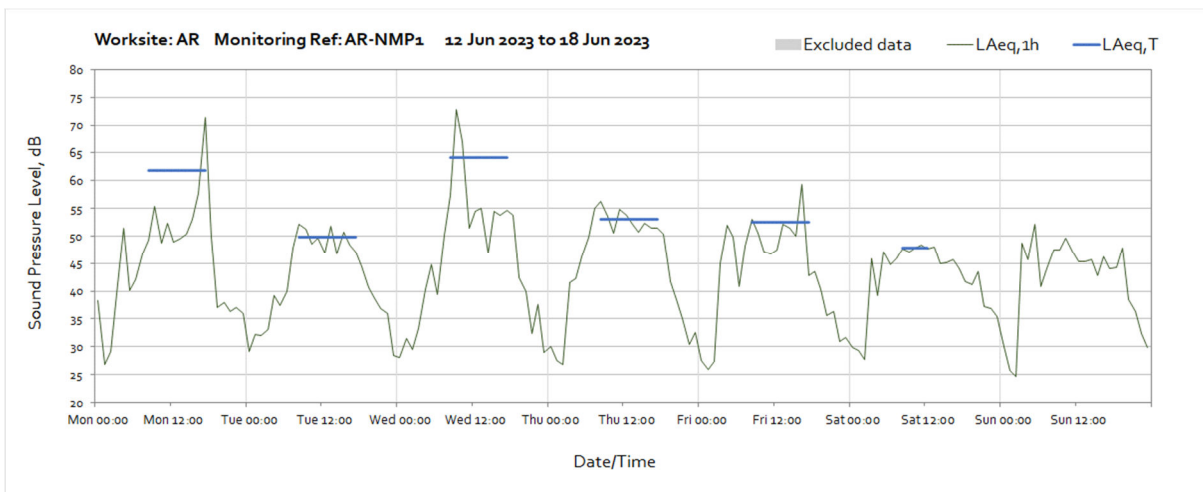
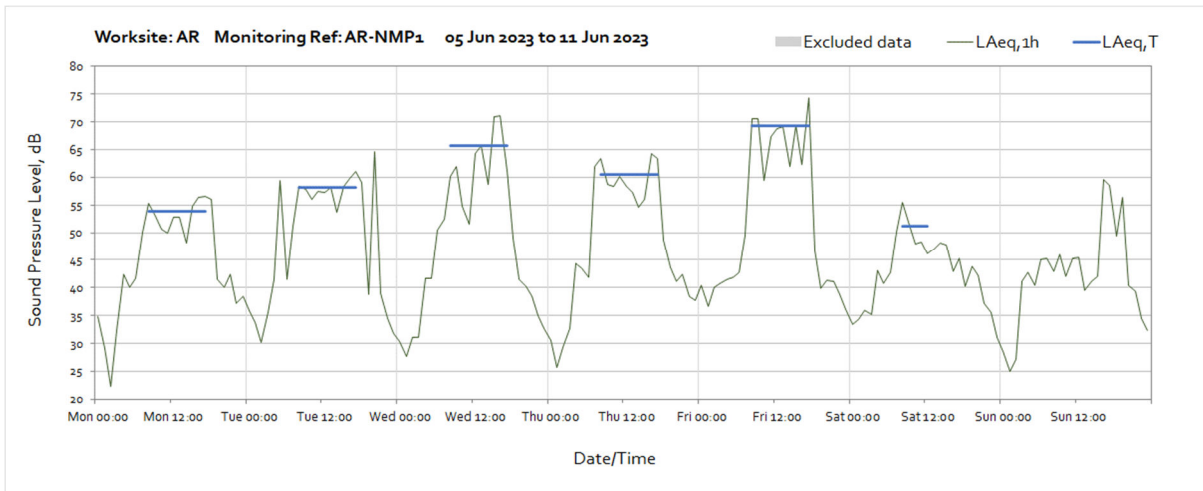
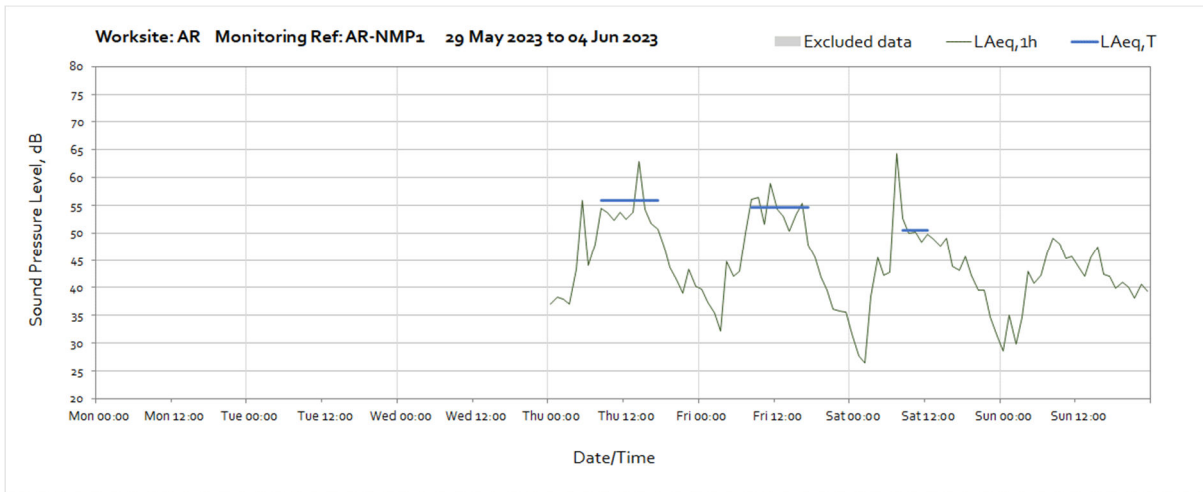


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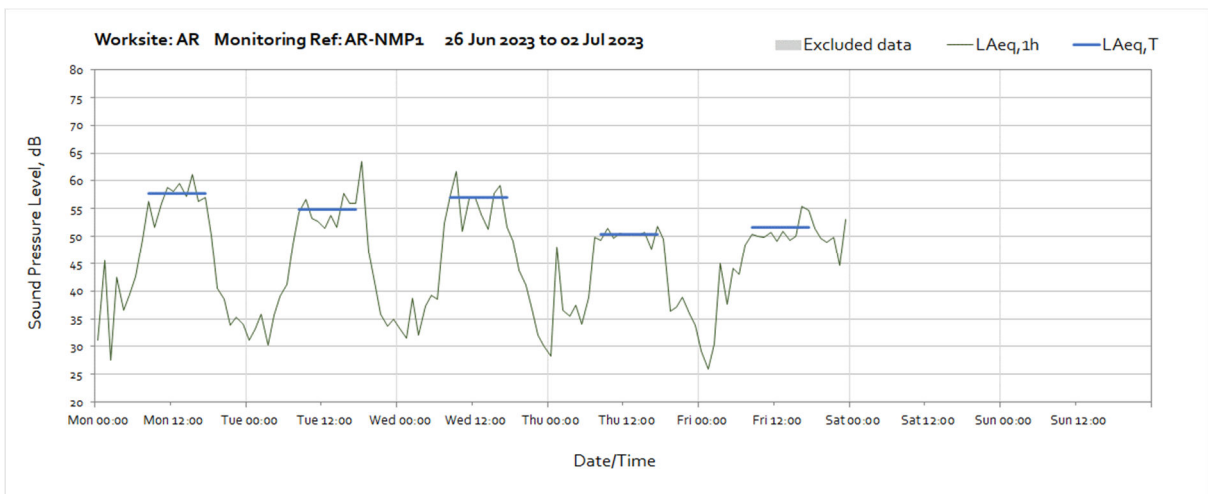
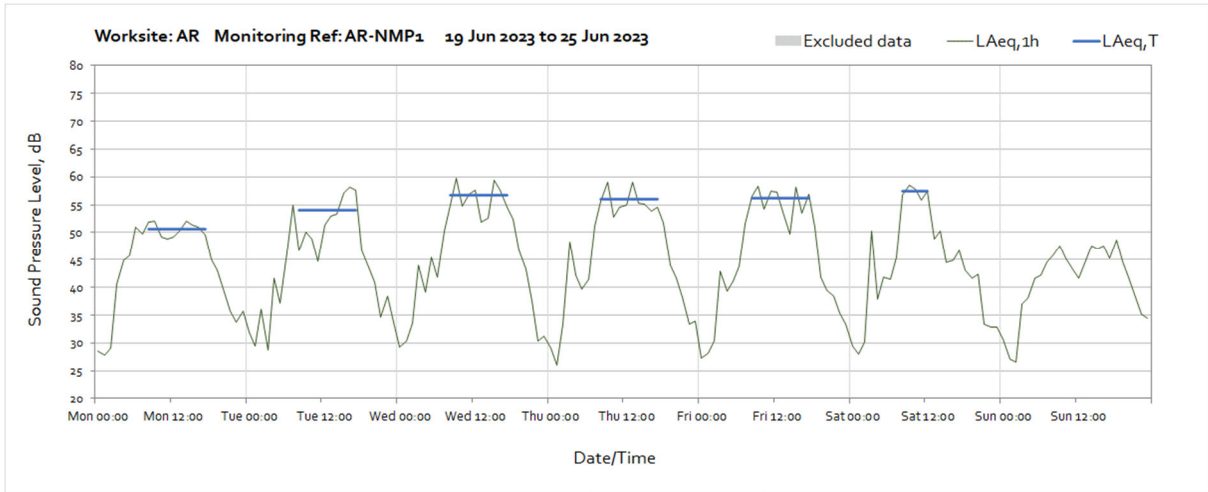




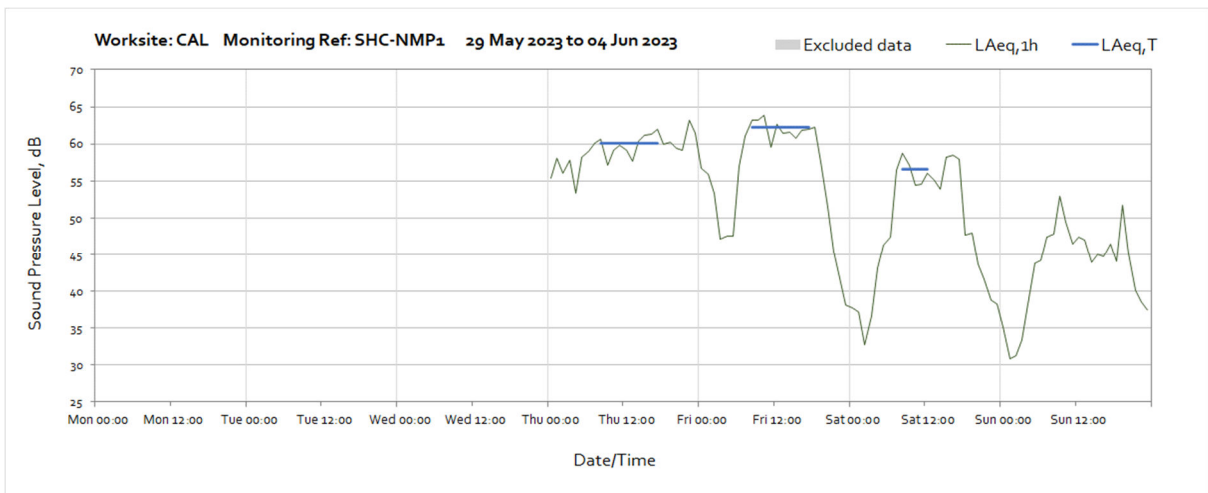
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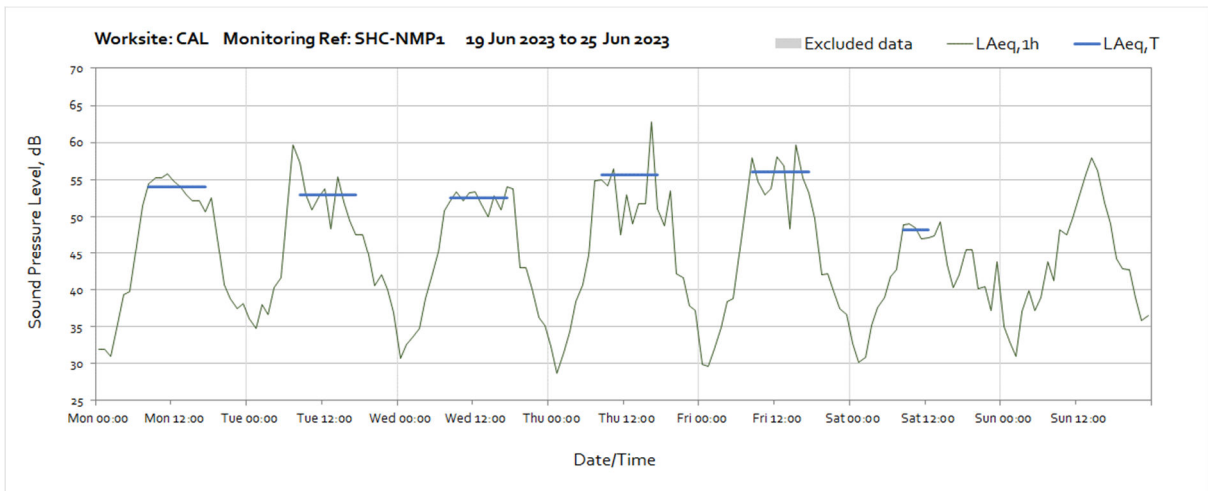
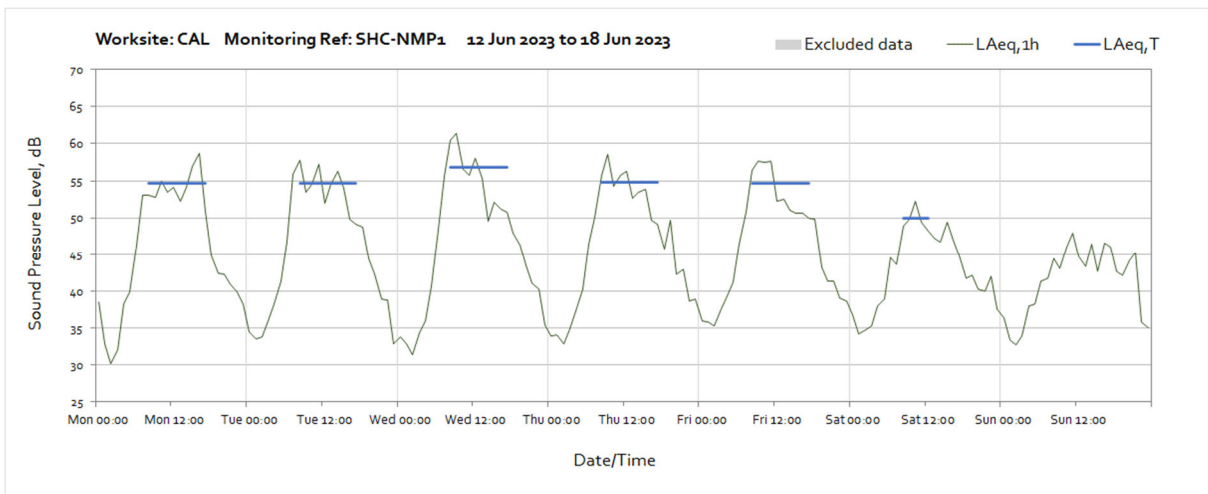
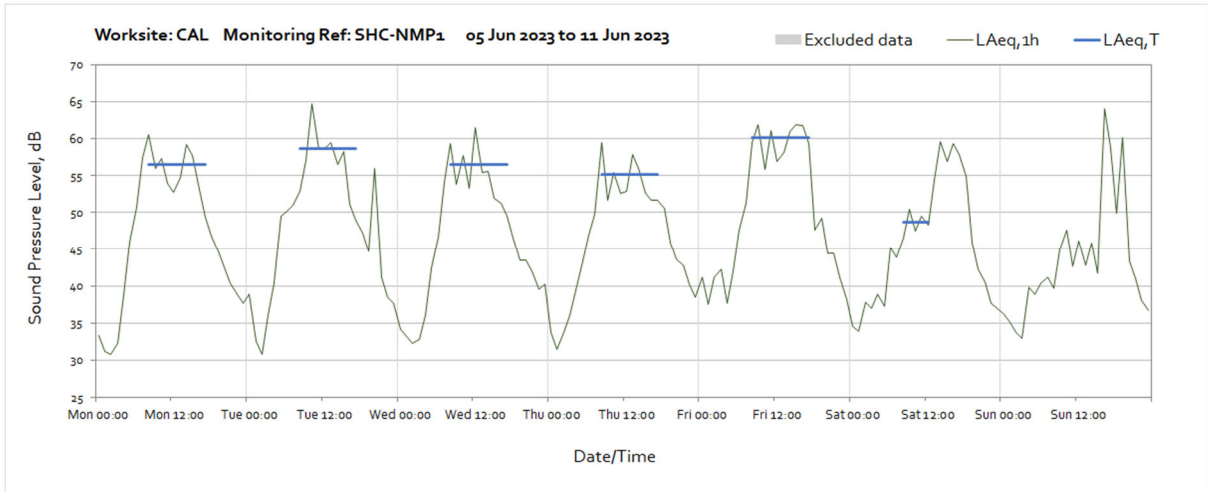


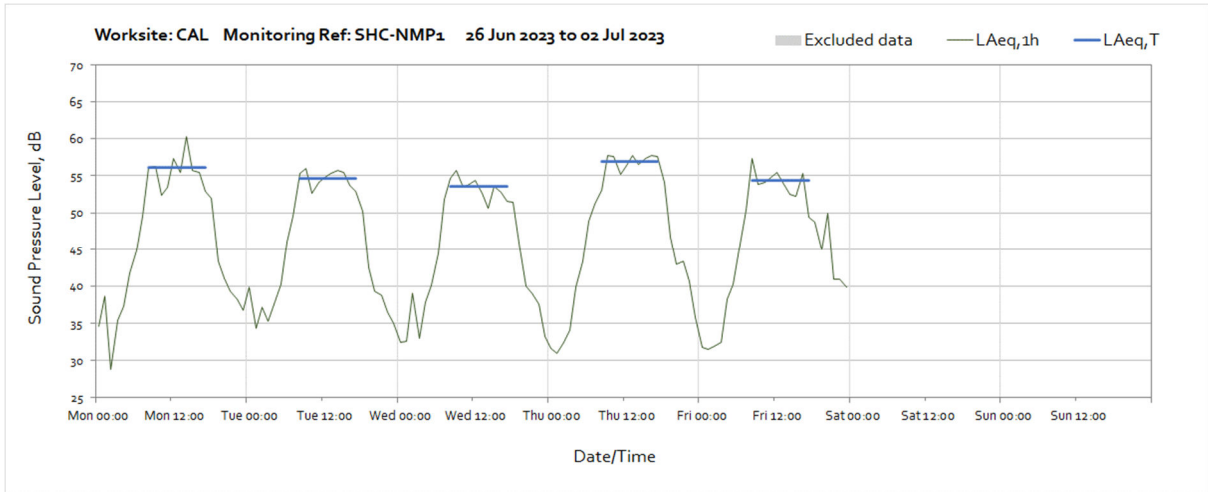
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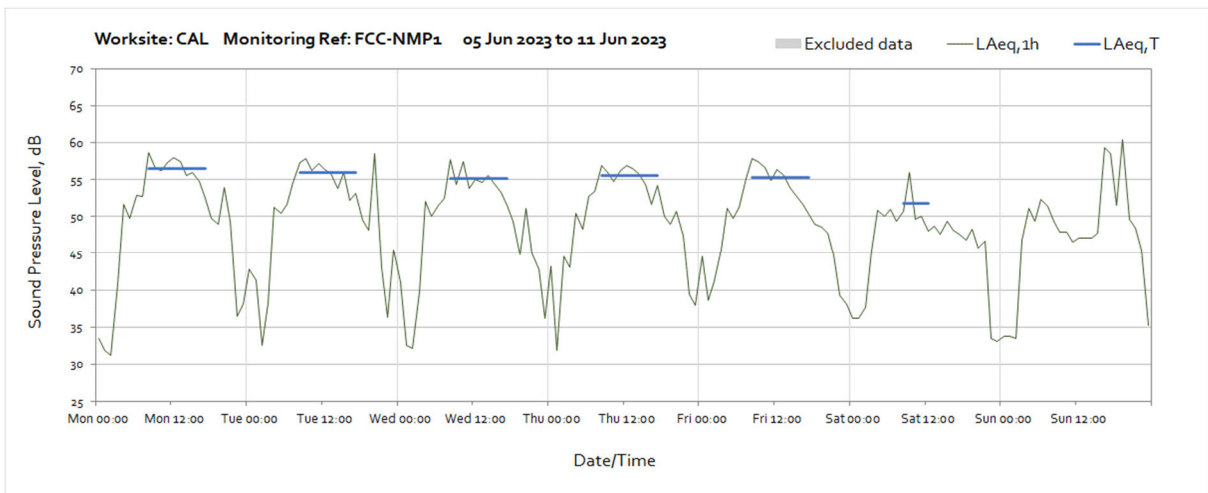
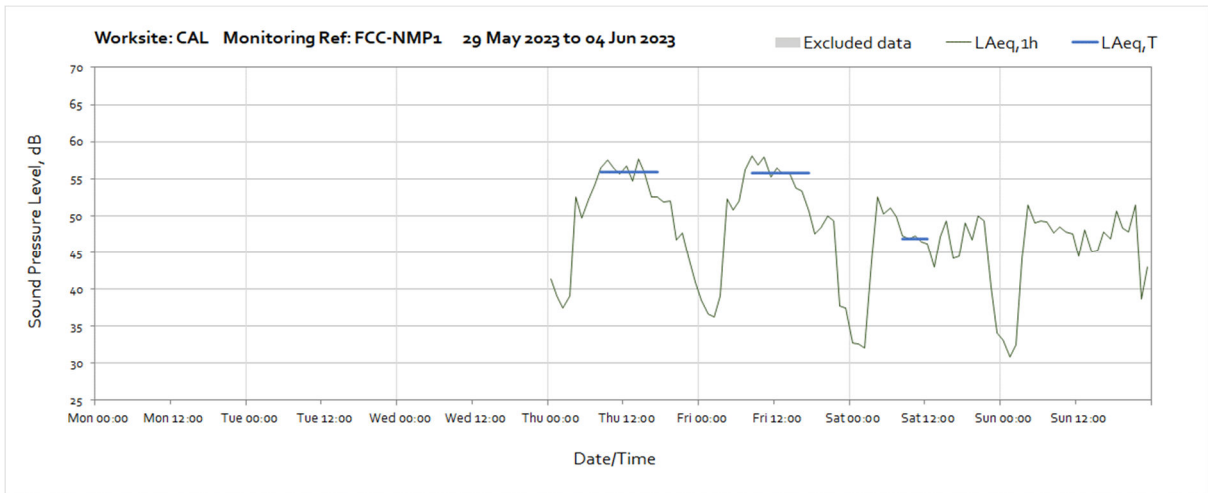
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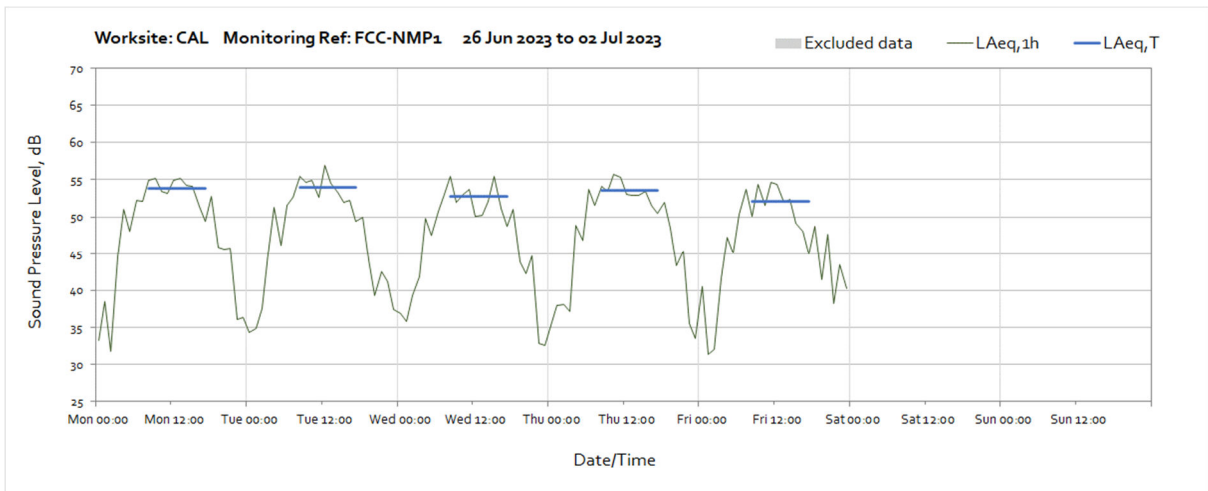
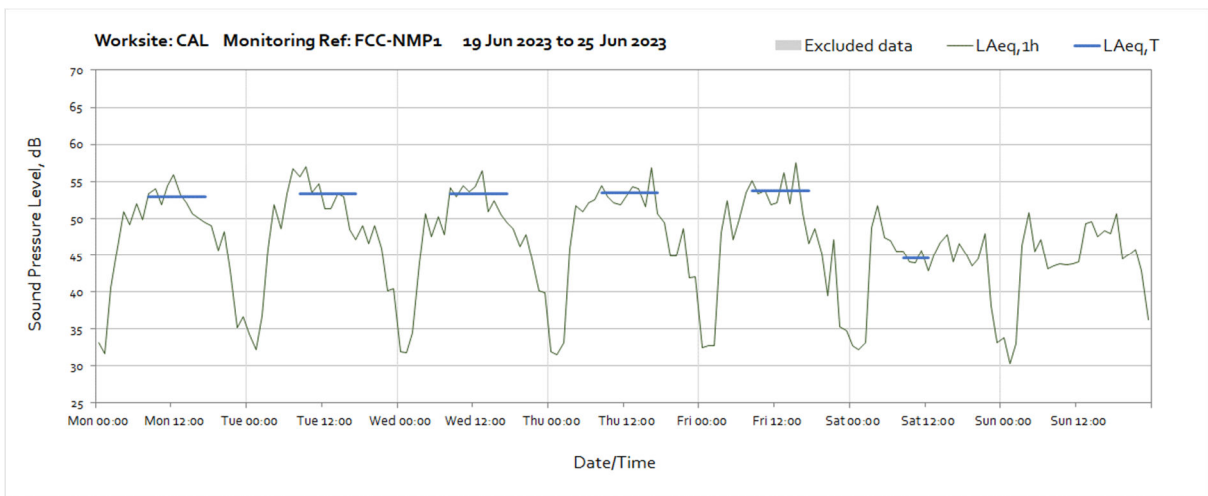
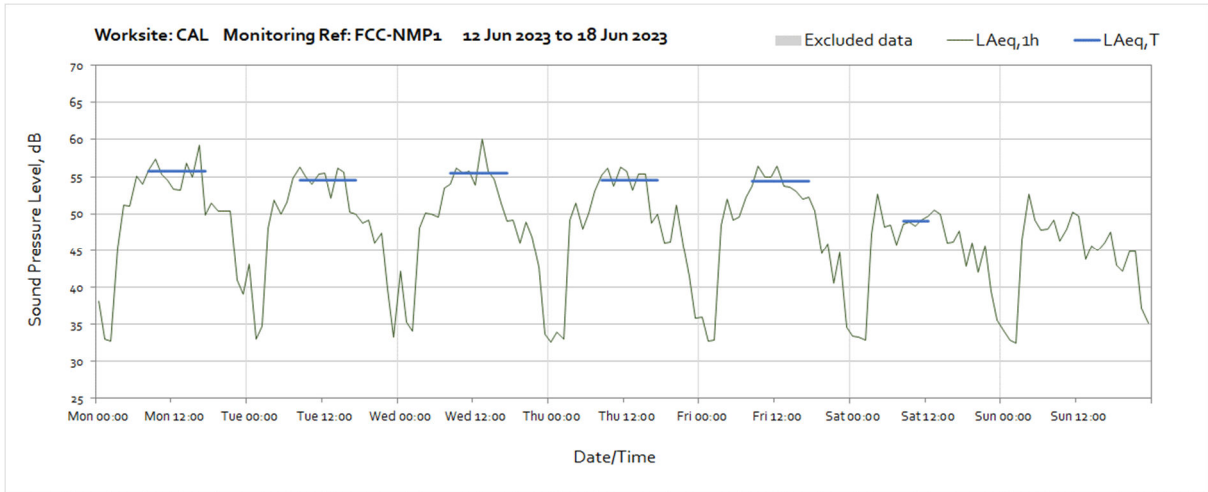




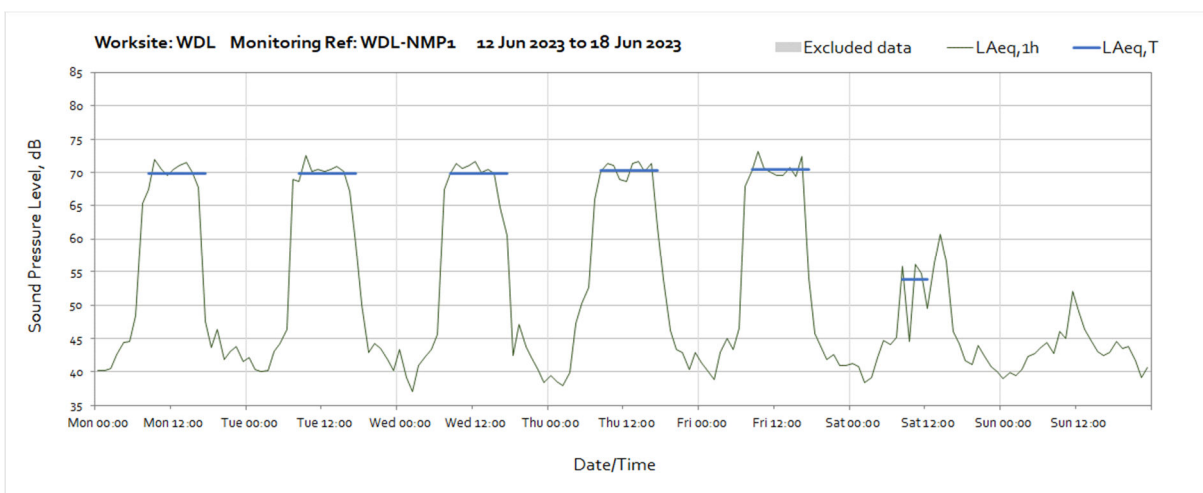
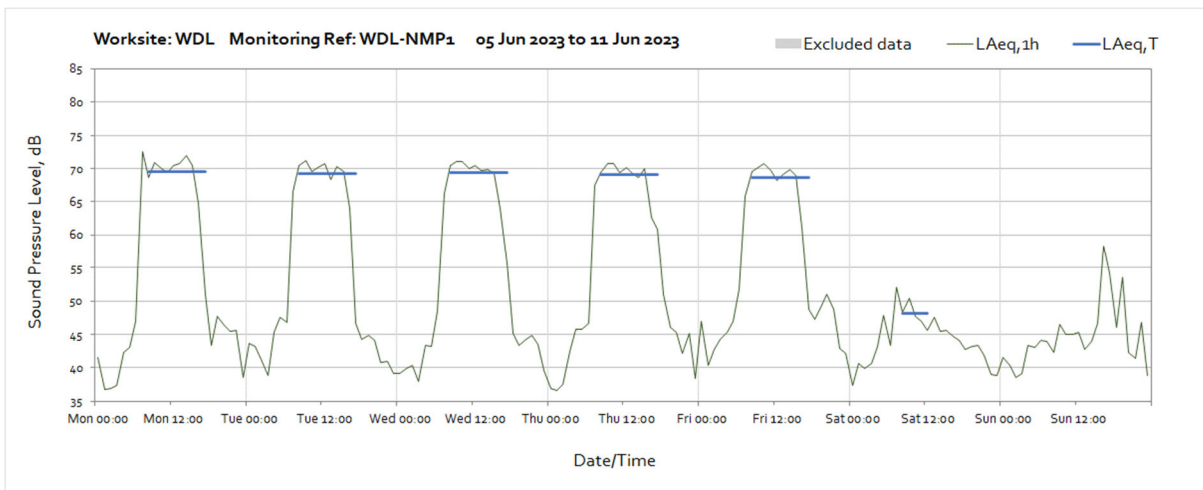
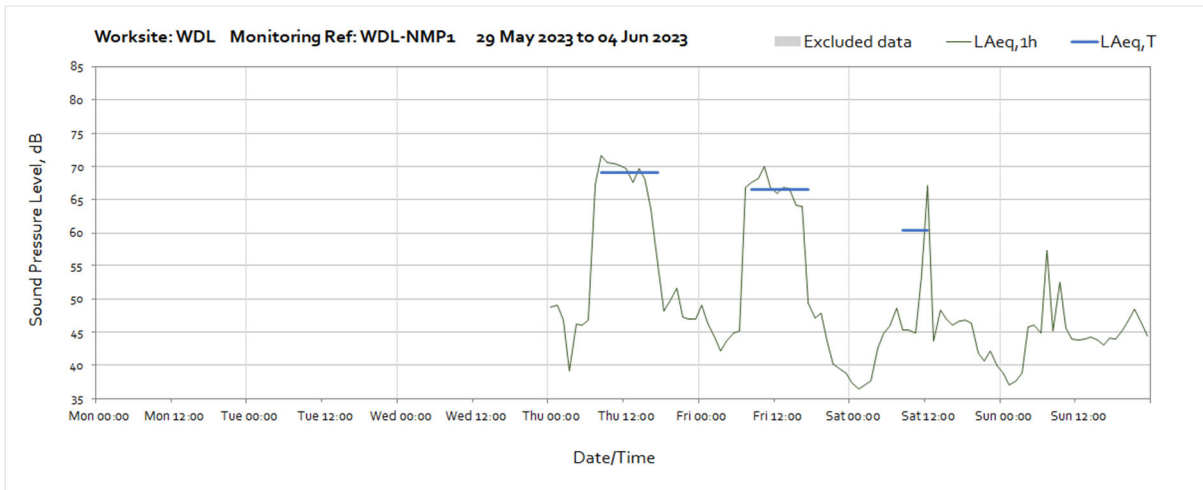


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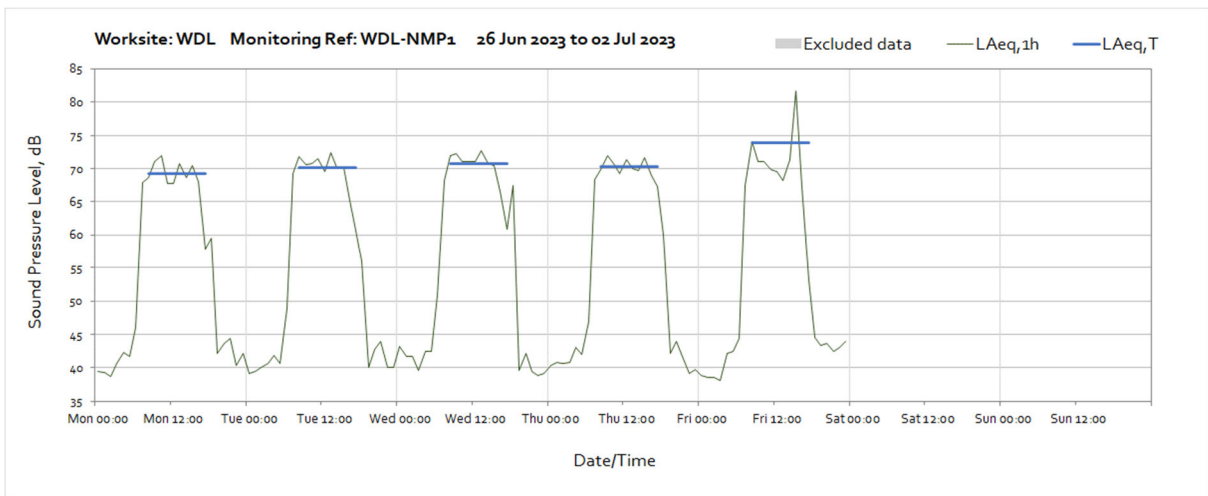
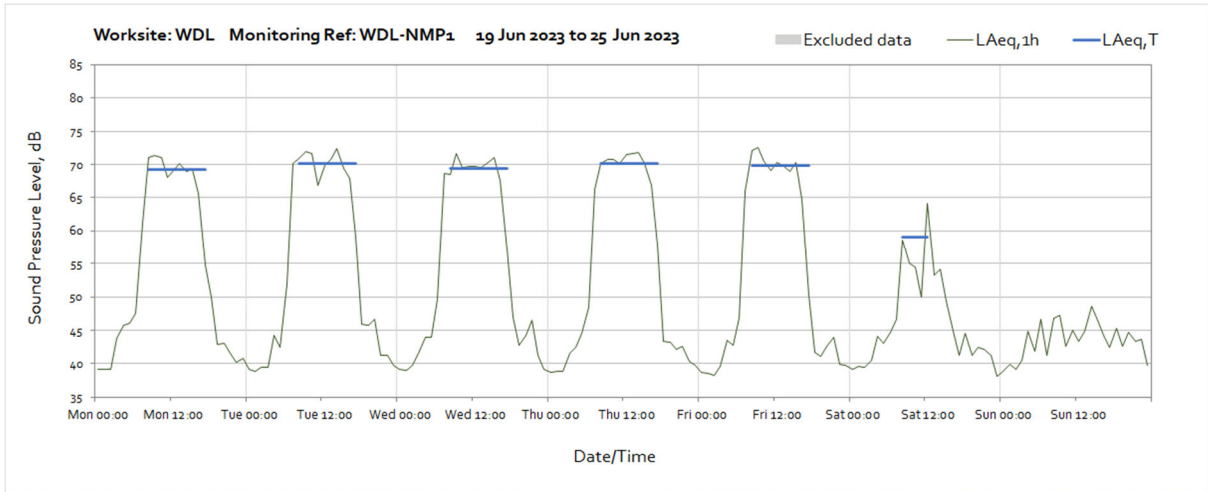




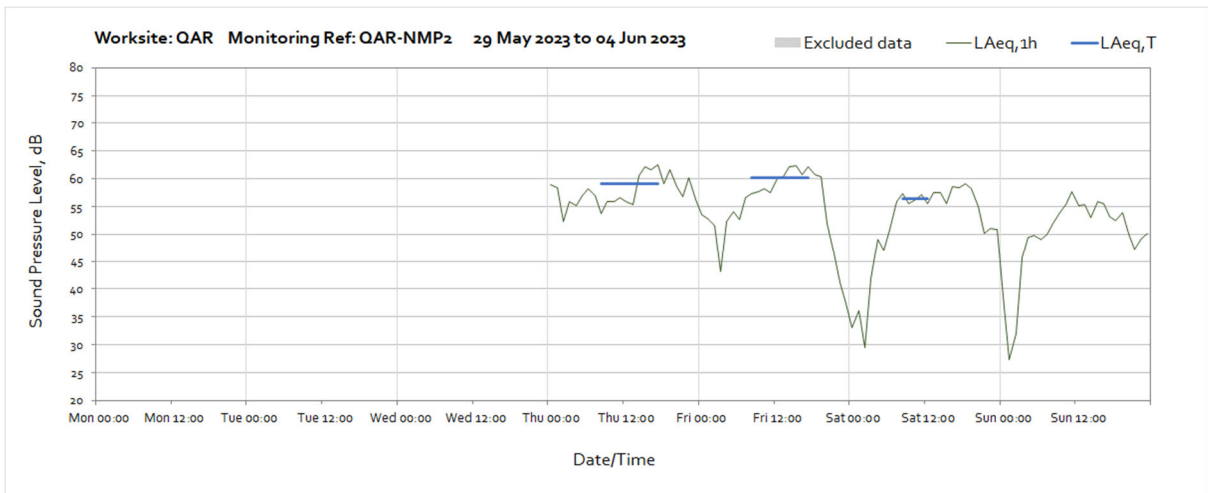
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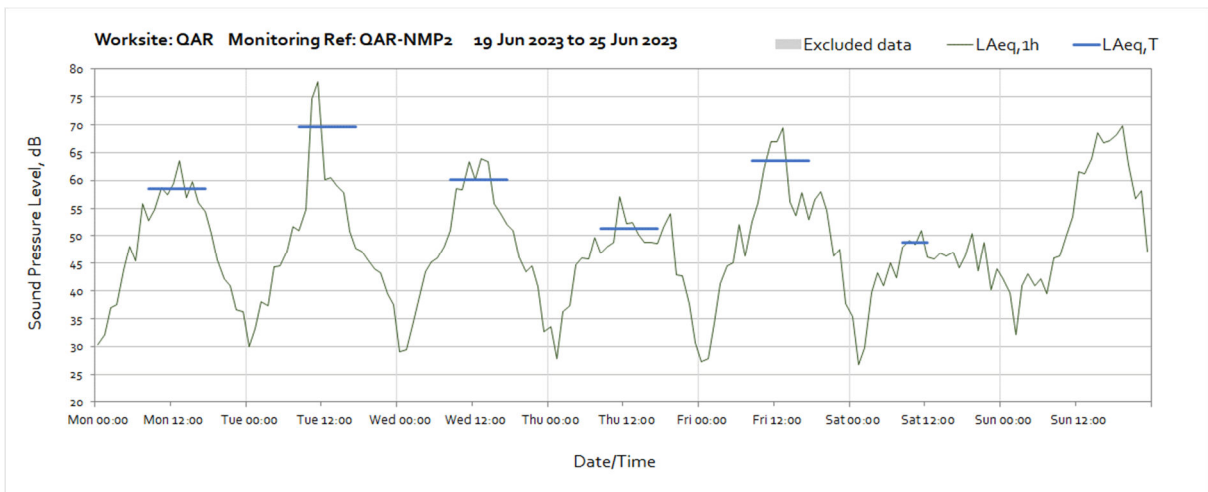
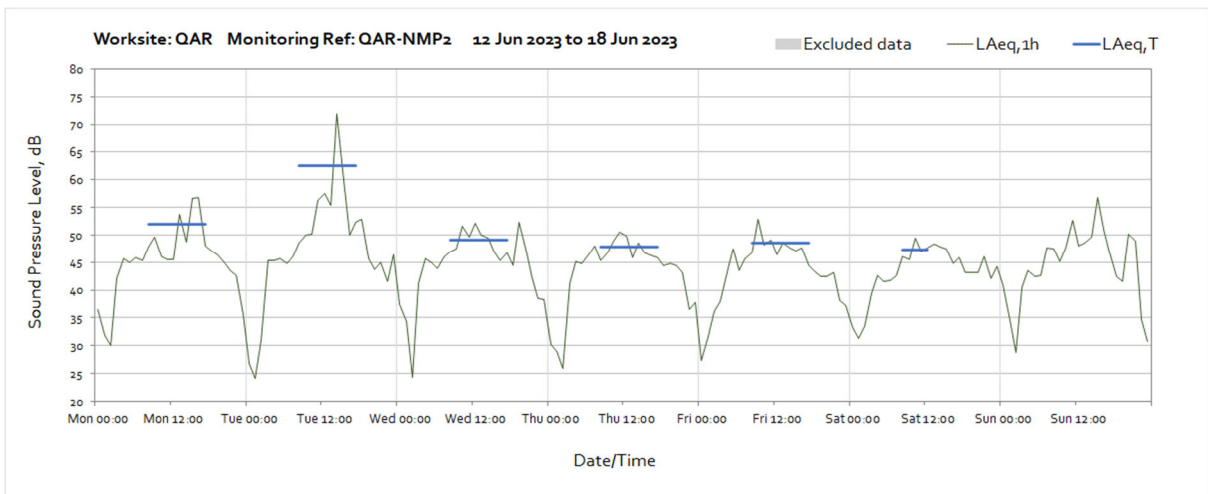
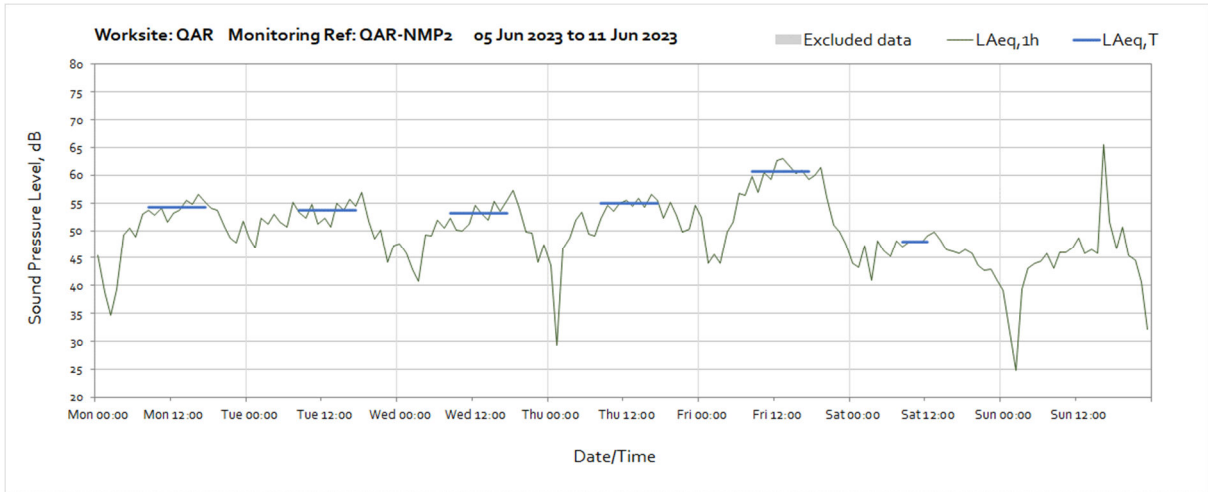


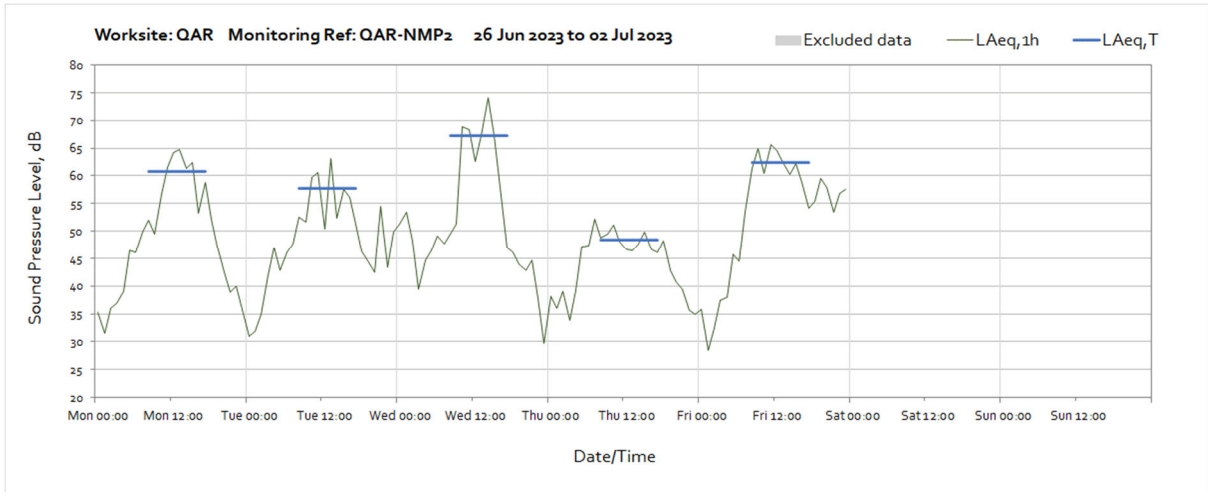
OFFICIAL



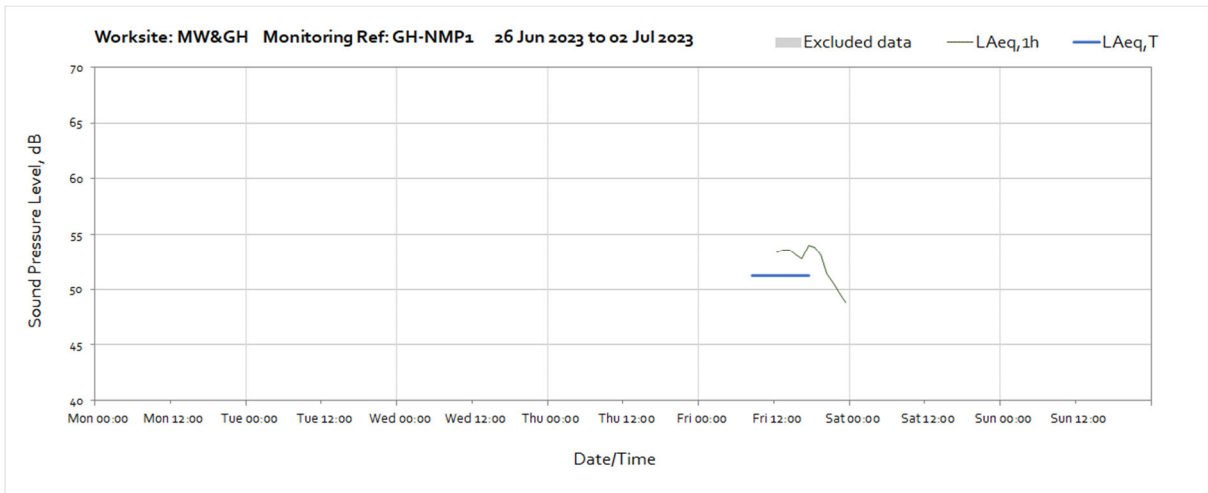
Worksite: QAR – Monitoring Ref: QAR-NMP2





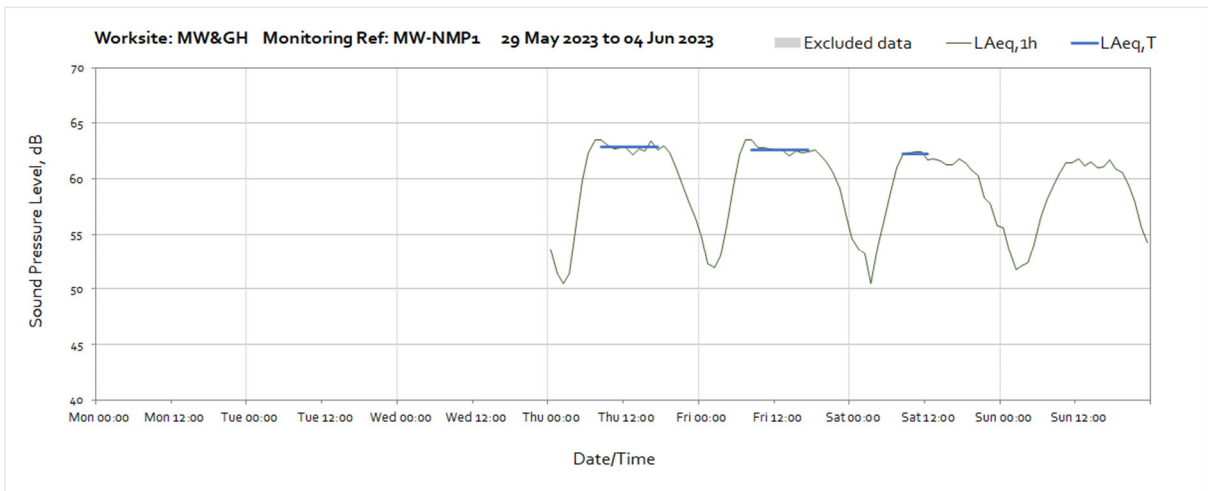


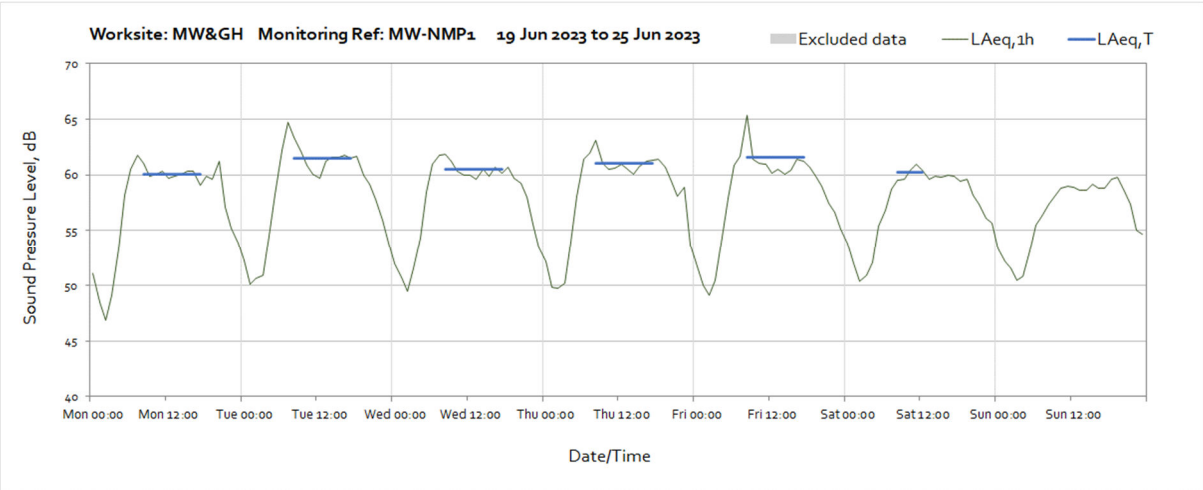
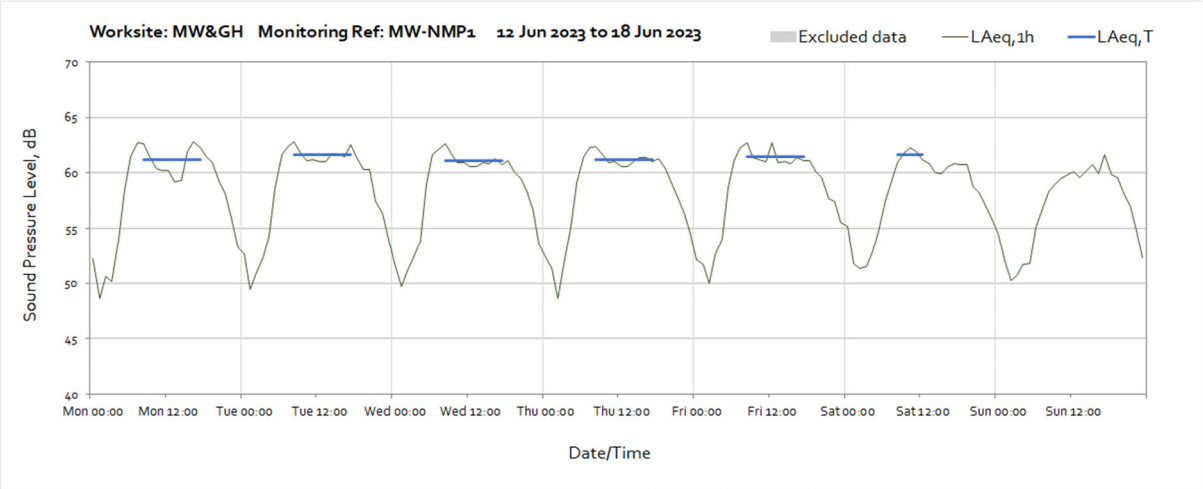
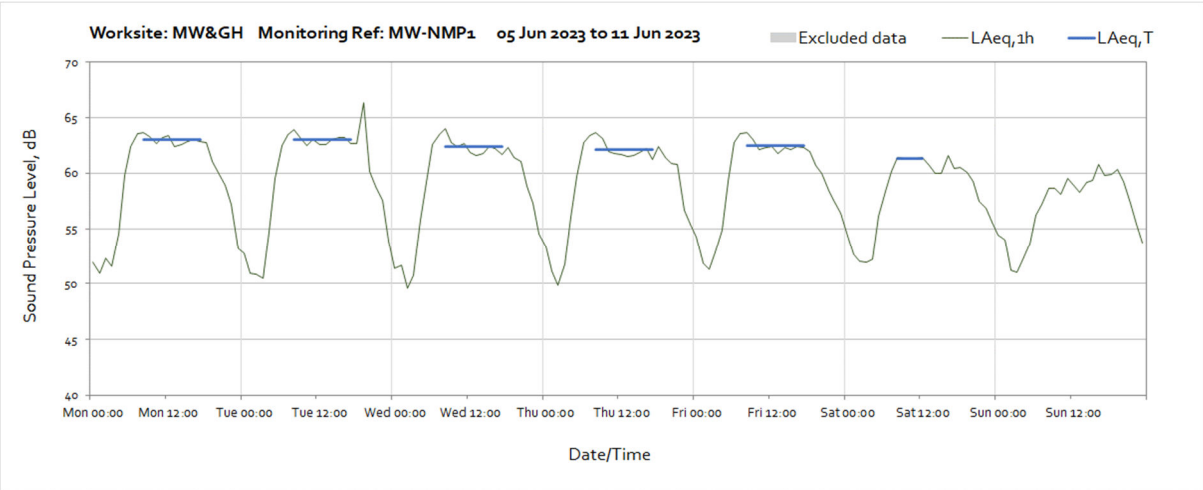
Worksite: MW&GH - Monitoring Ref: GH-NMP1

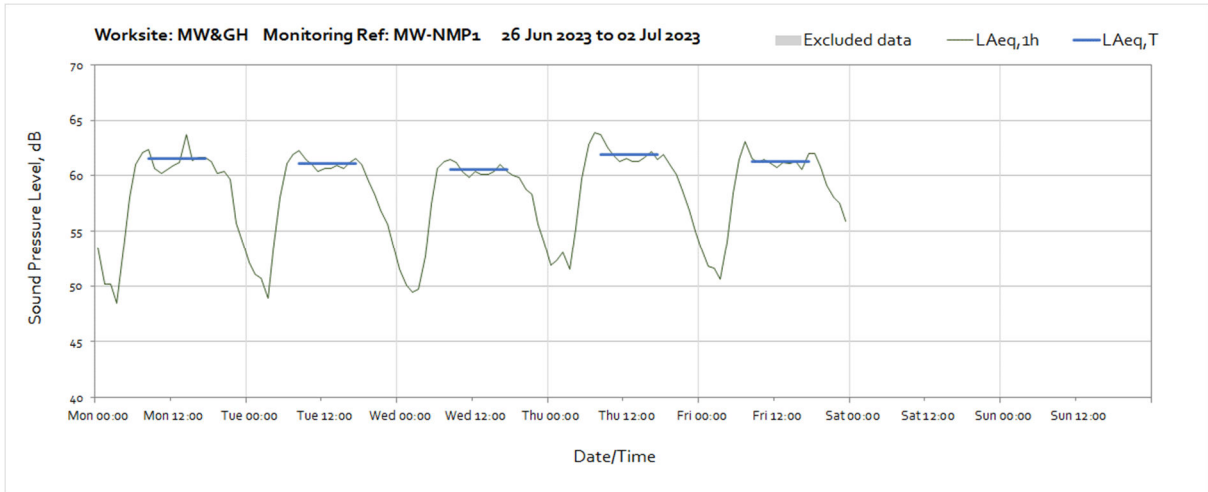


Note: Monitor was reinstalled at 12:00 on Friday 30th June.

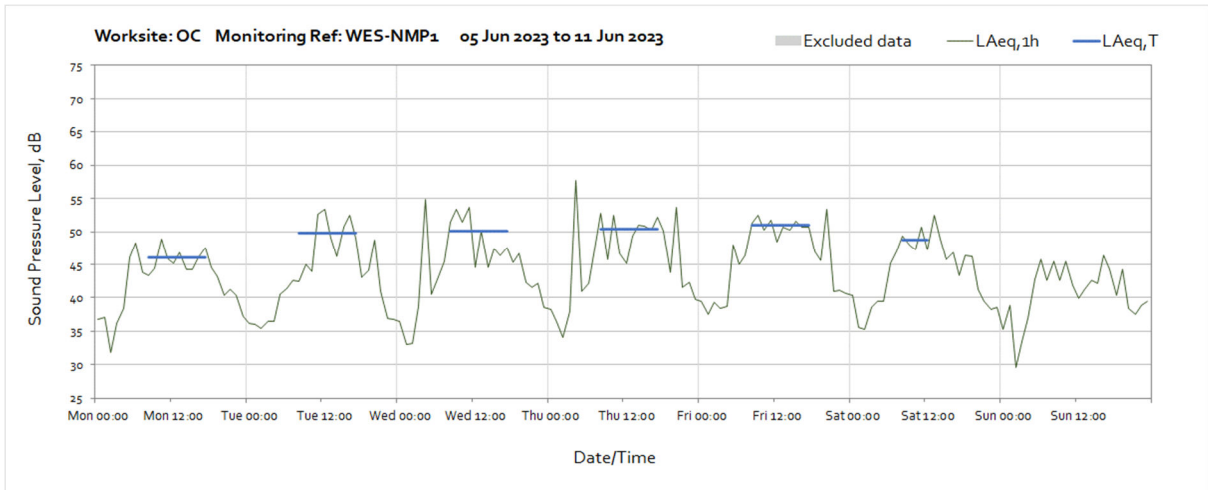
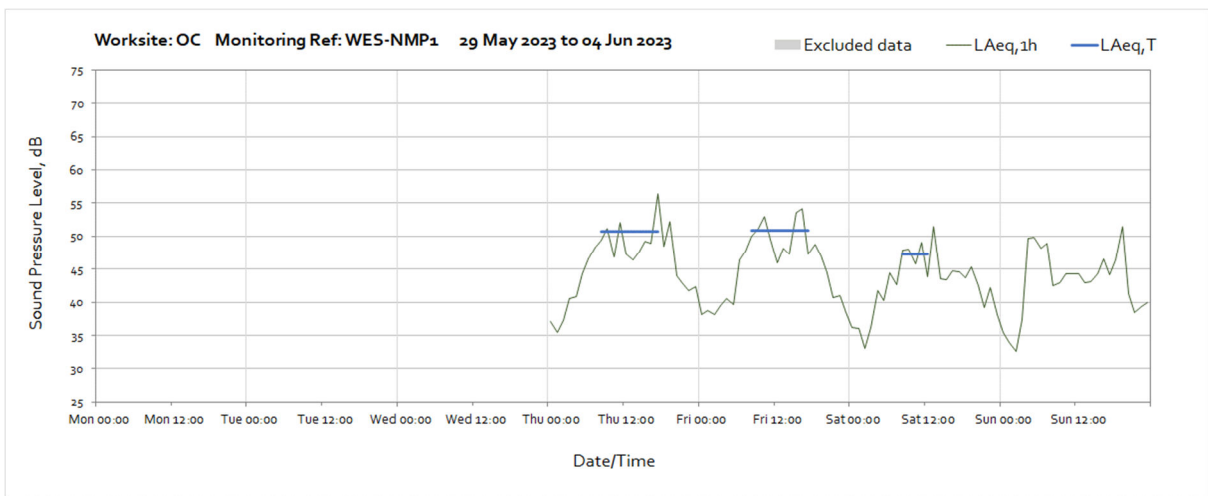
Worksite: MW&GH - Monitoring Ref: MW-NMP1

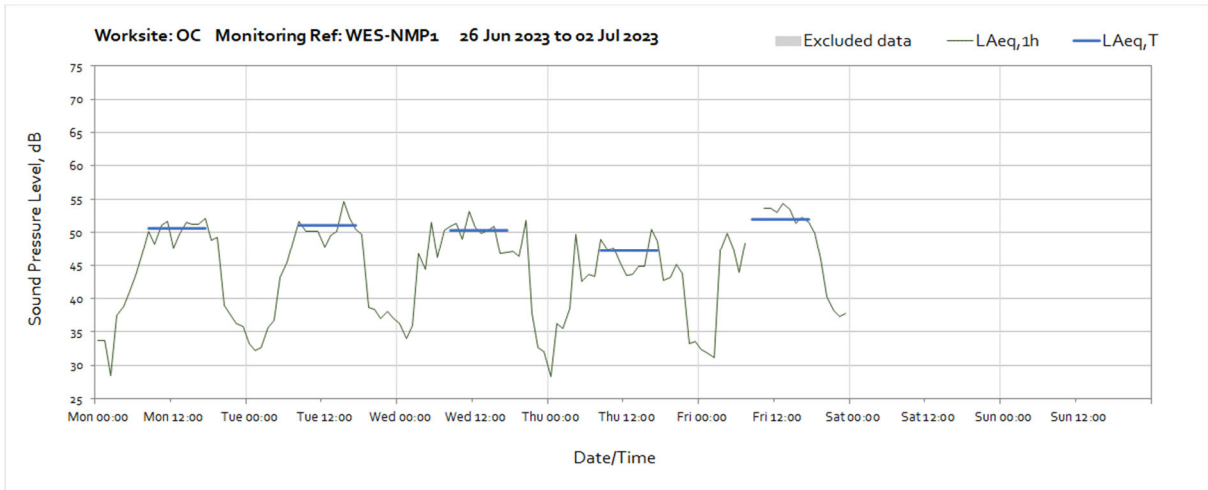
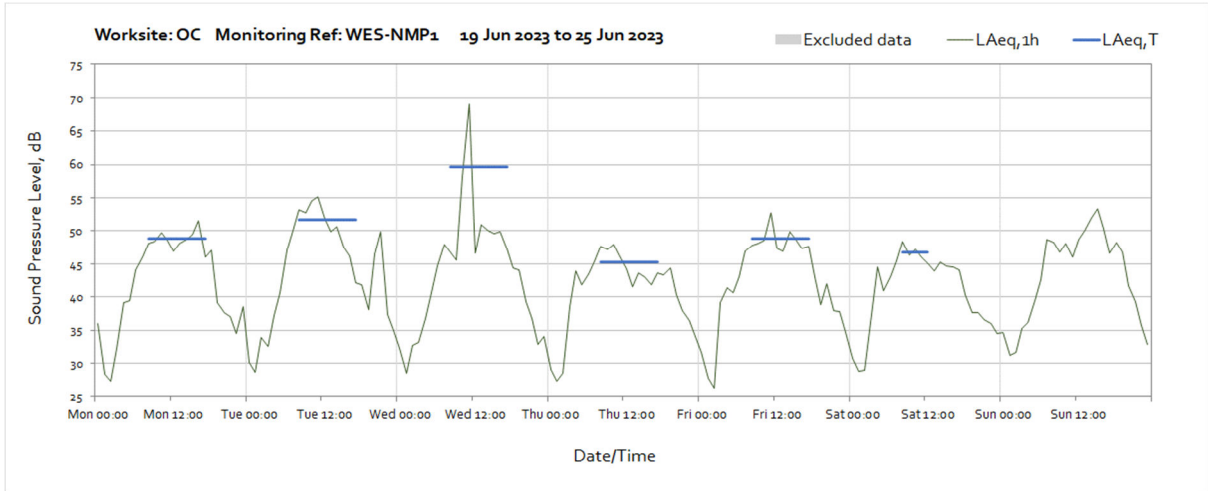
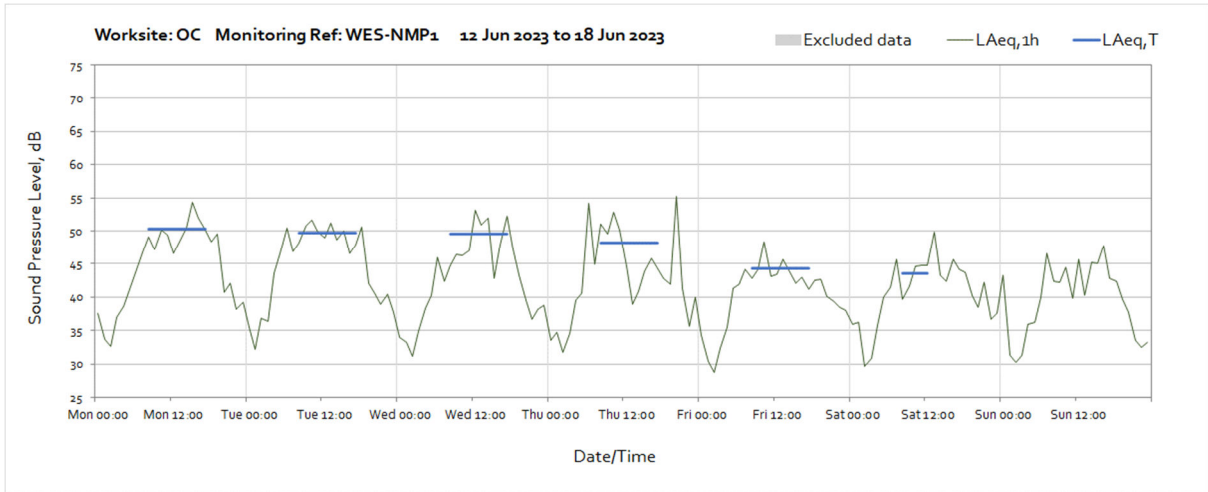






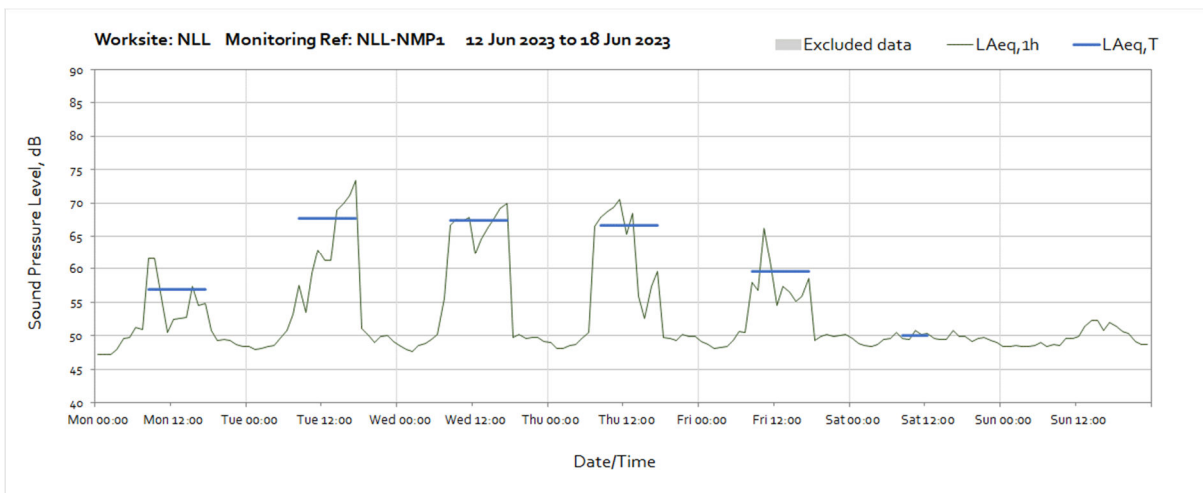
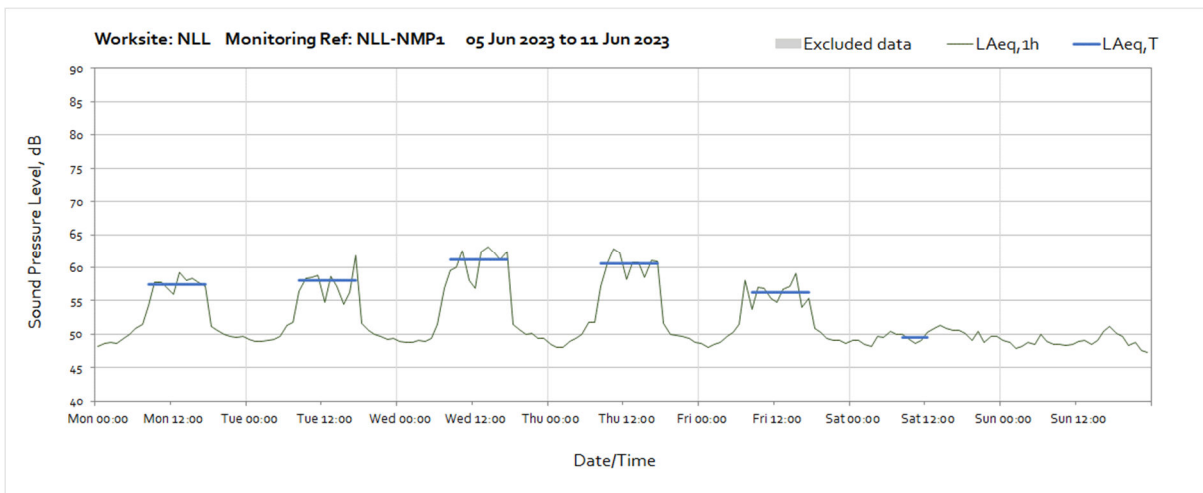
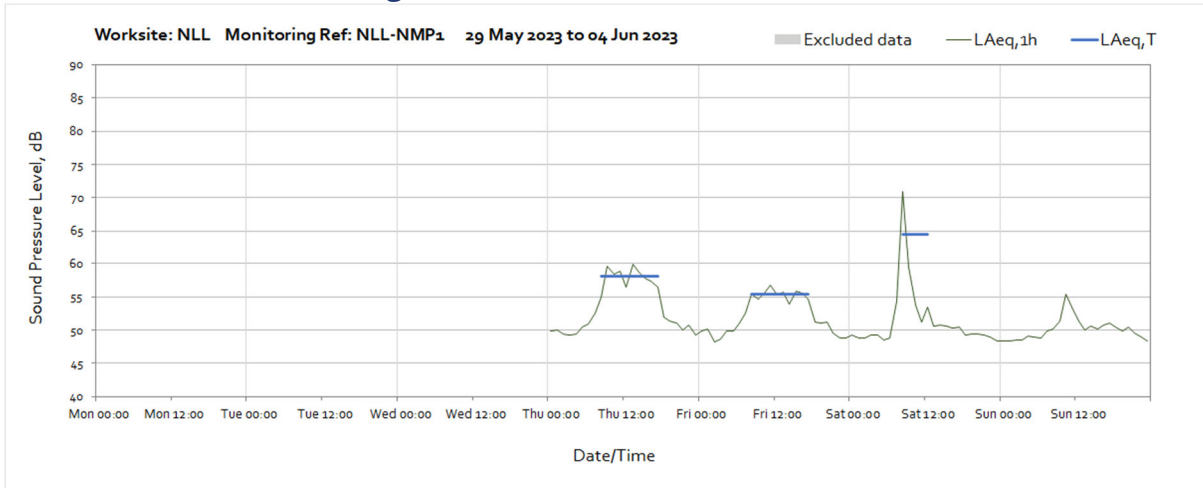
Worksite: OC - Monitoring Ref: WES-NMP1



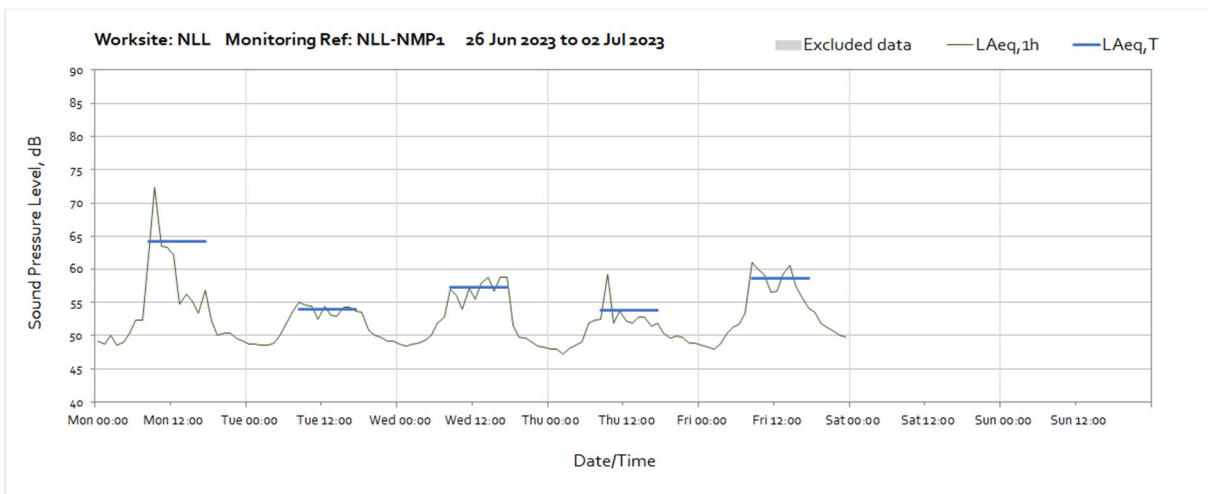
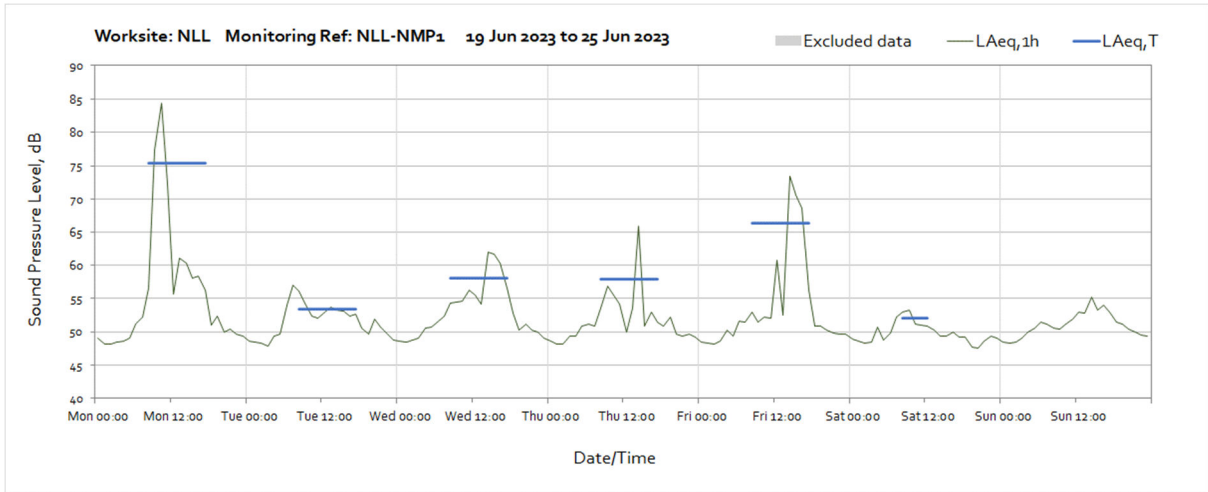


Note: Missing data between 08:00 and 10:00 on Friday 30th June was due to monitor maintenance.

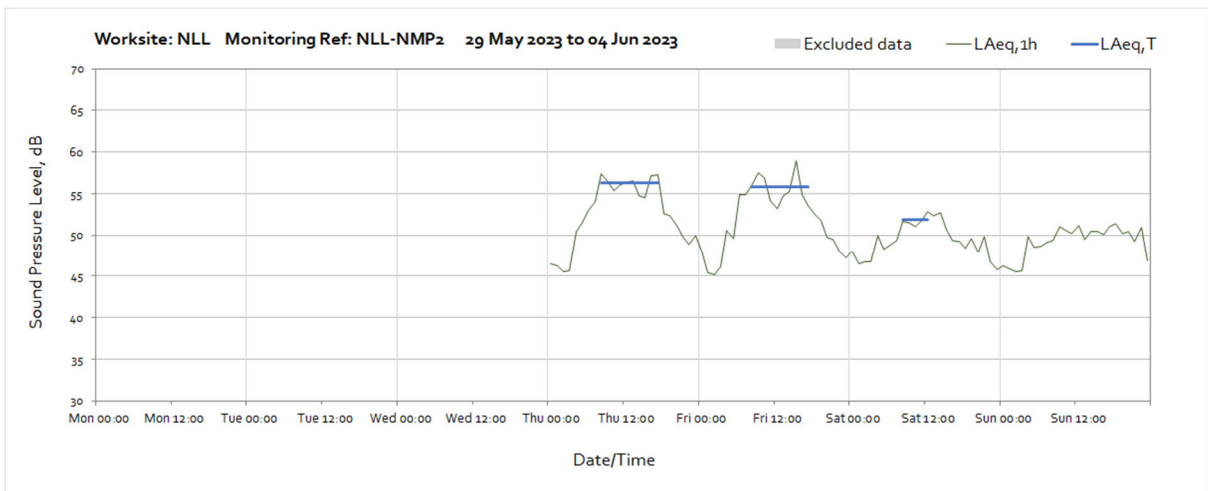
Worksite: NLL – Monitoring Ref: NLL-NMP1

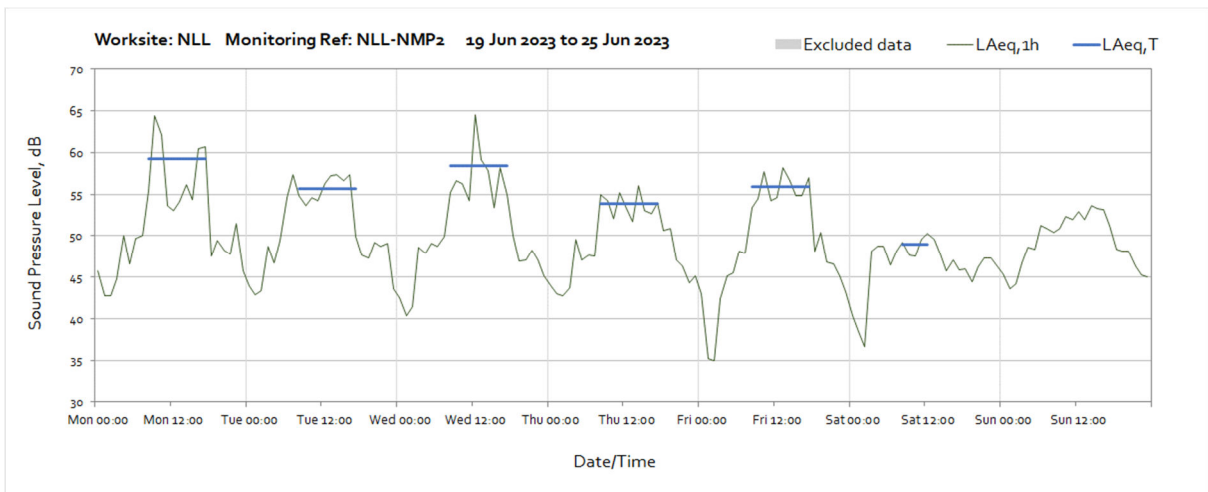
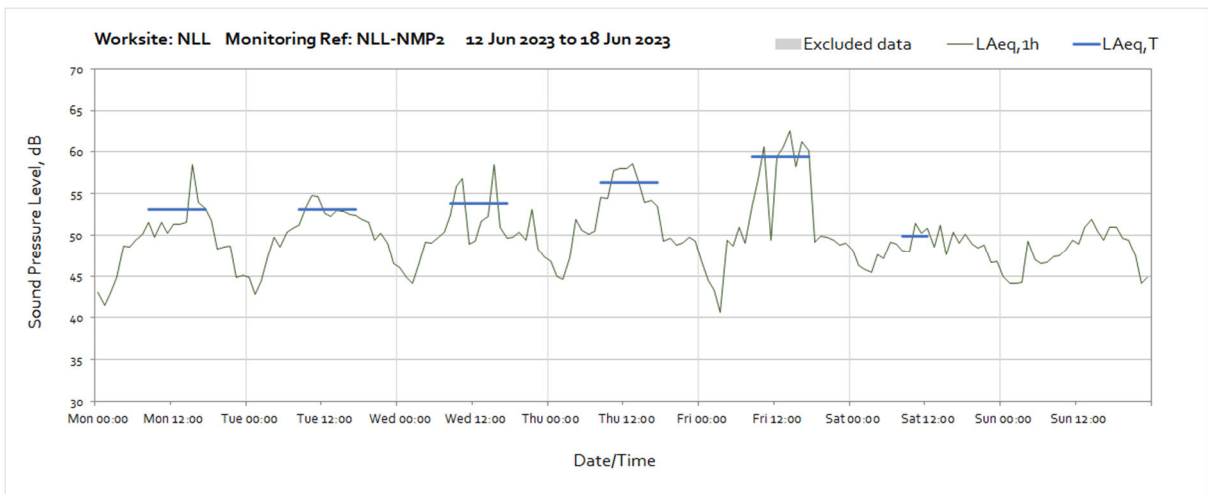
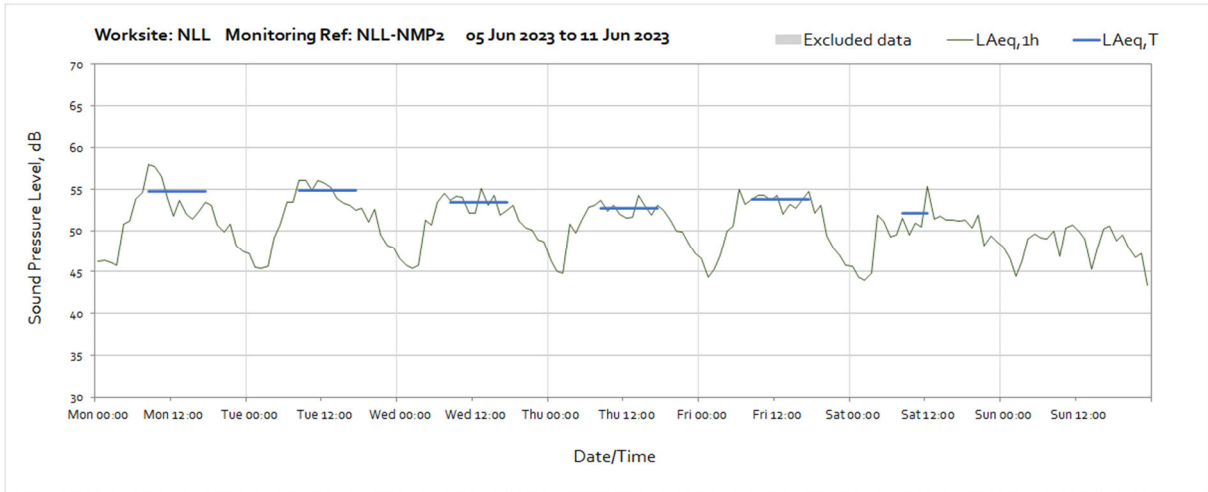


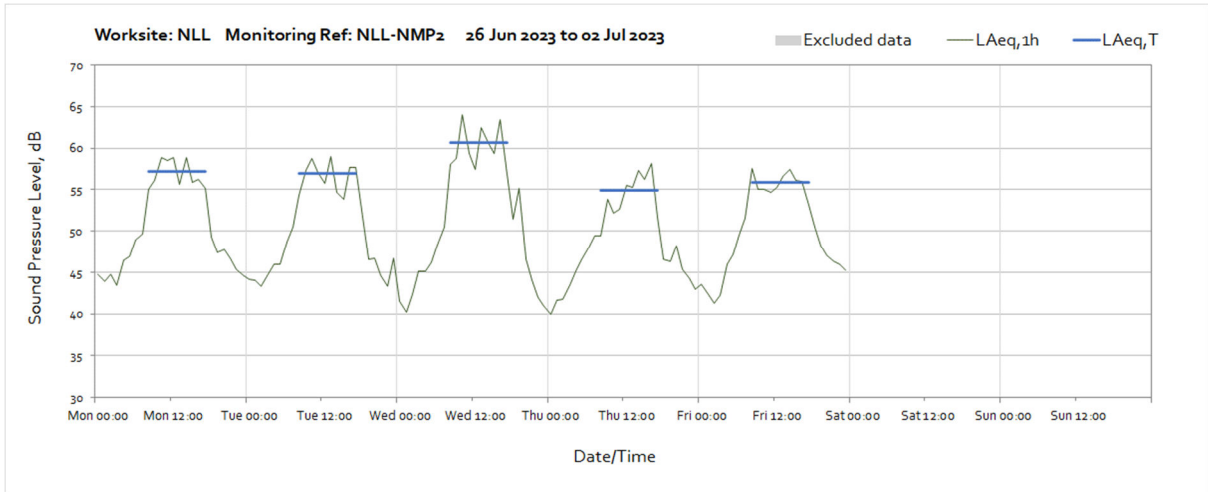
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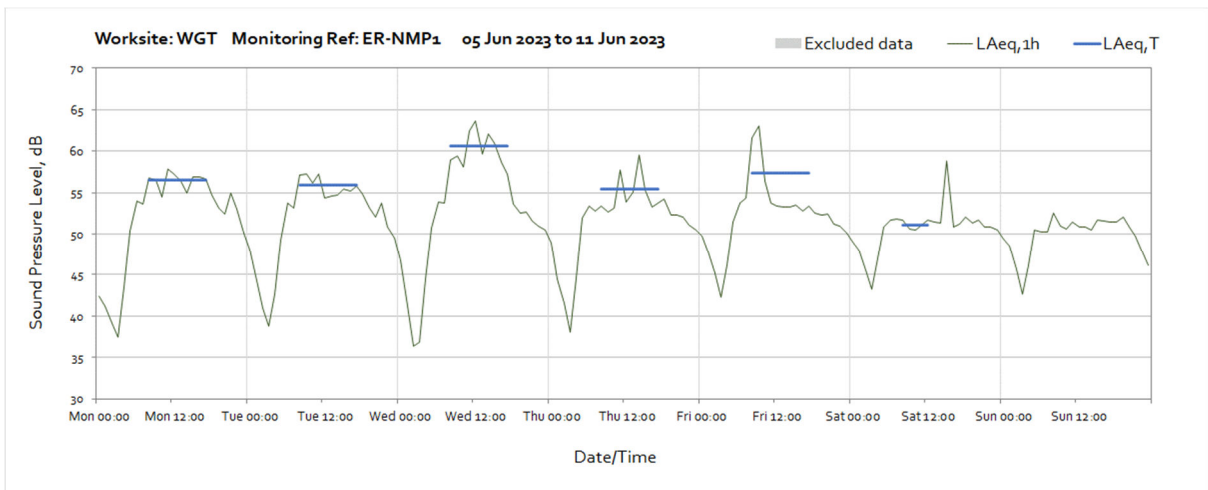
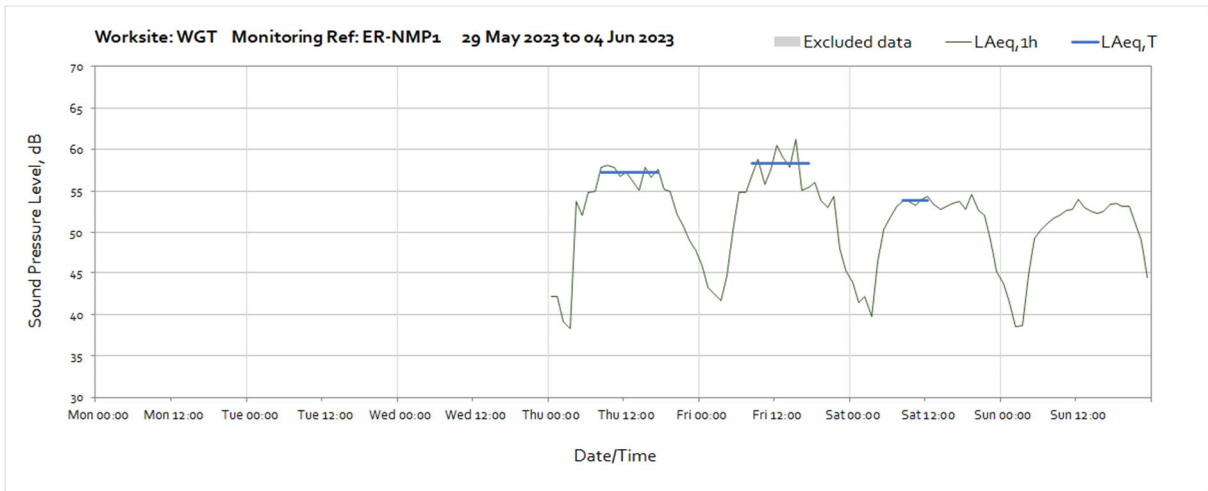
Worksite: NLL - Monitoring Ref: NLL-NMP2

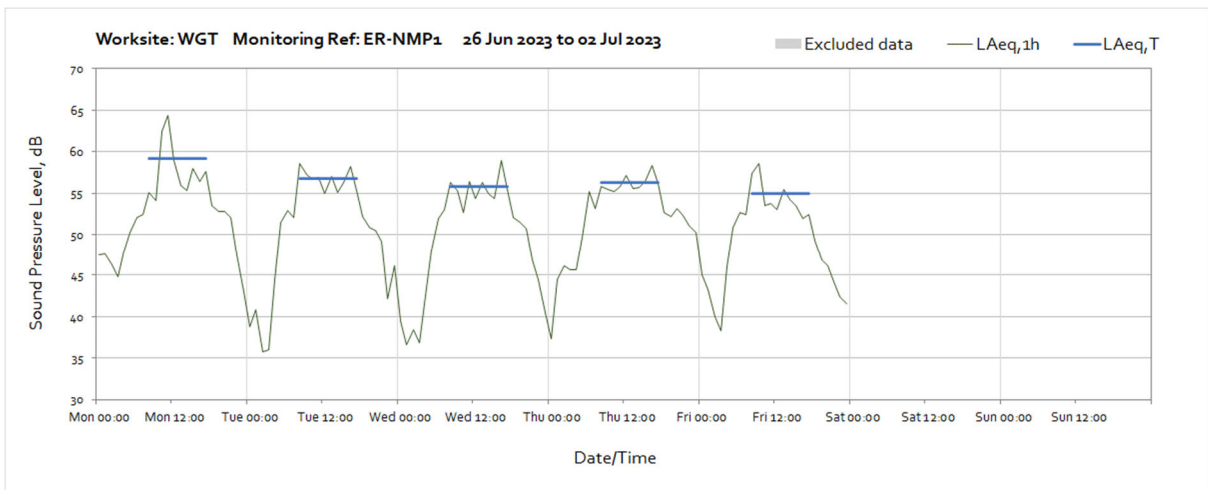
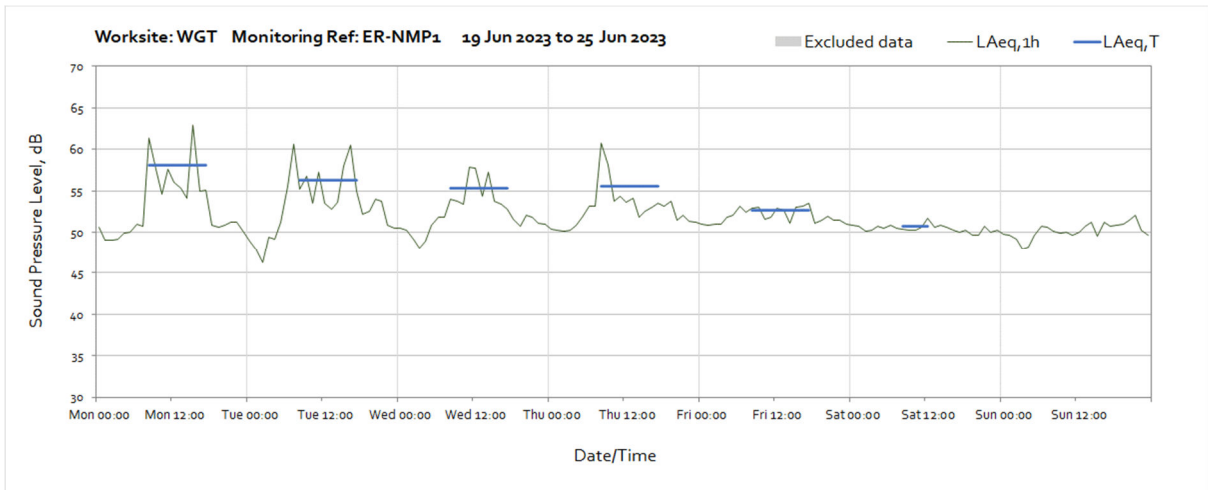
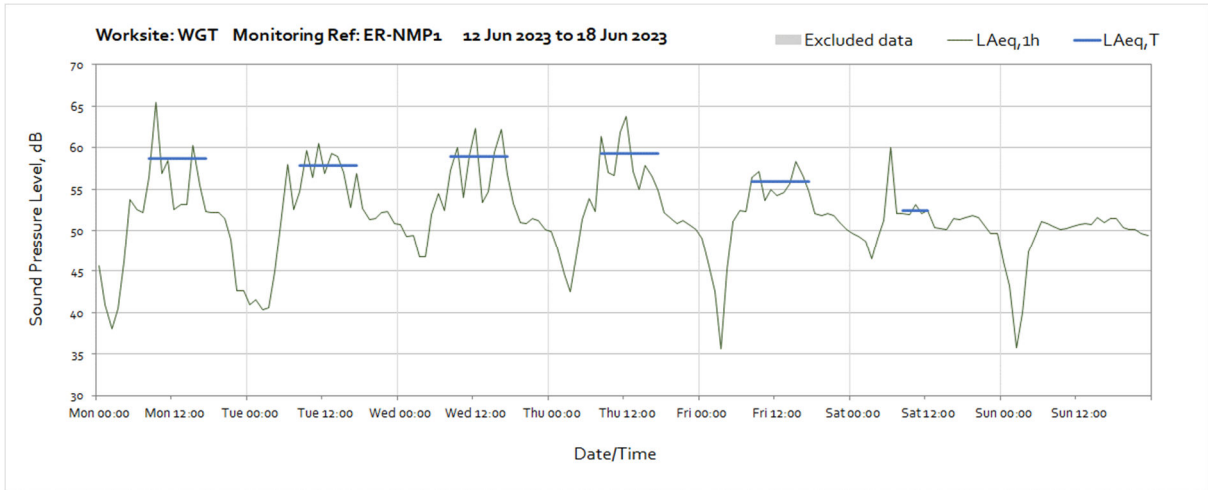




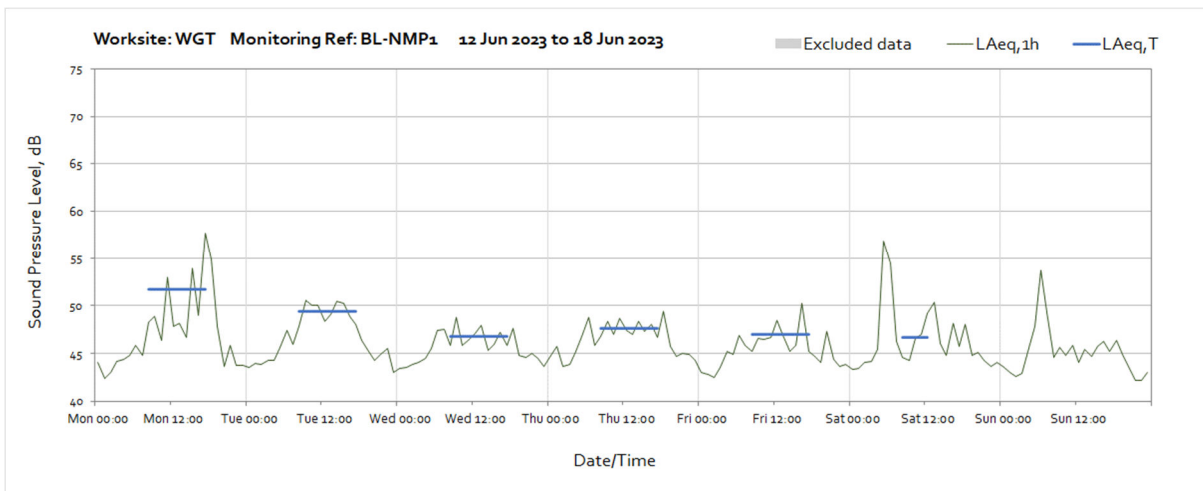
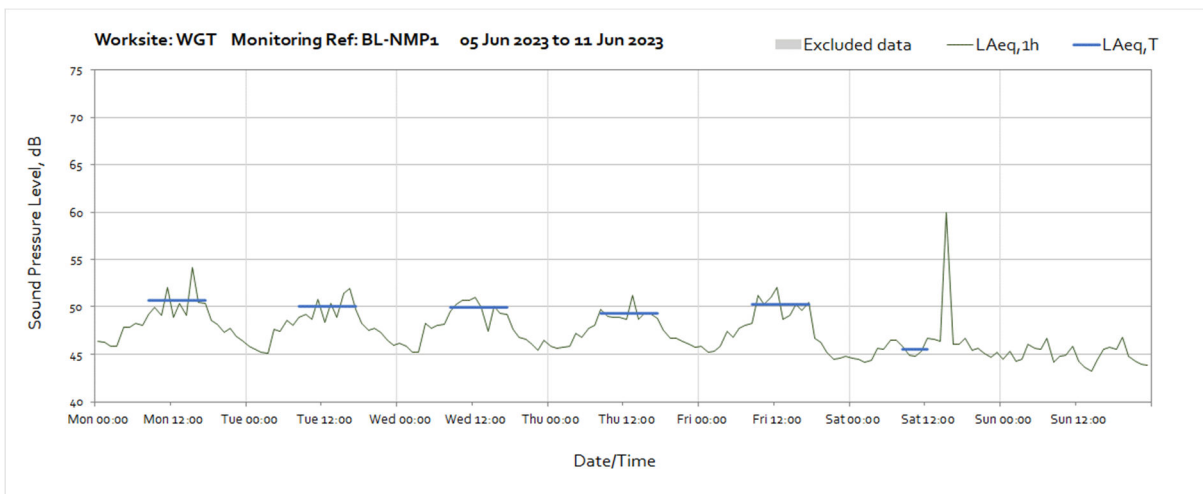
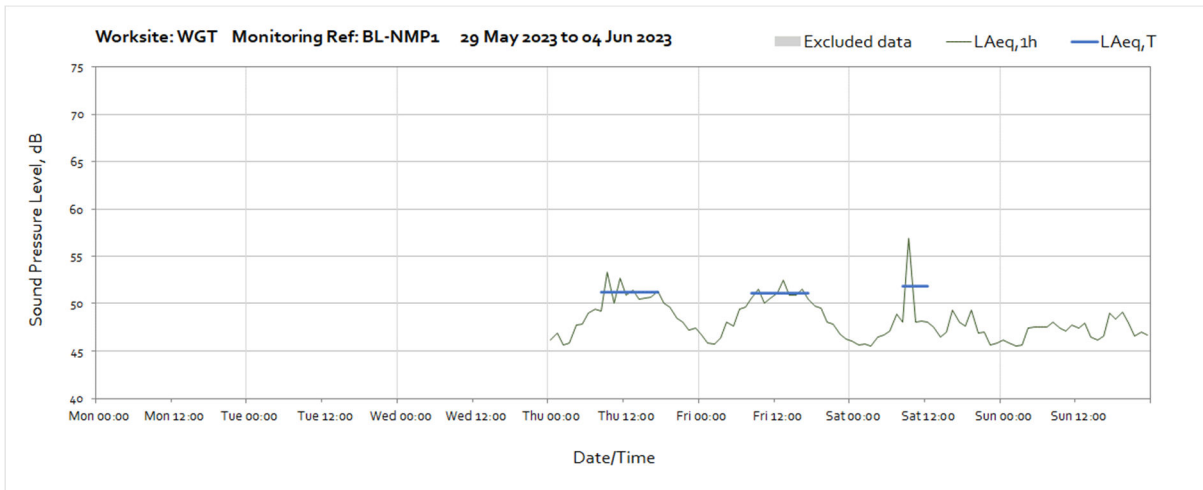


Worksite: WGT – Monitoring Ref: ER-NMP1

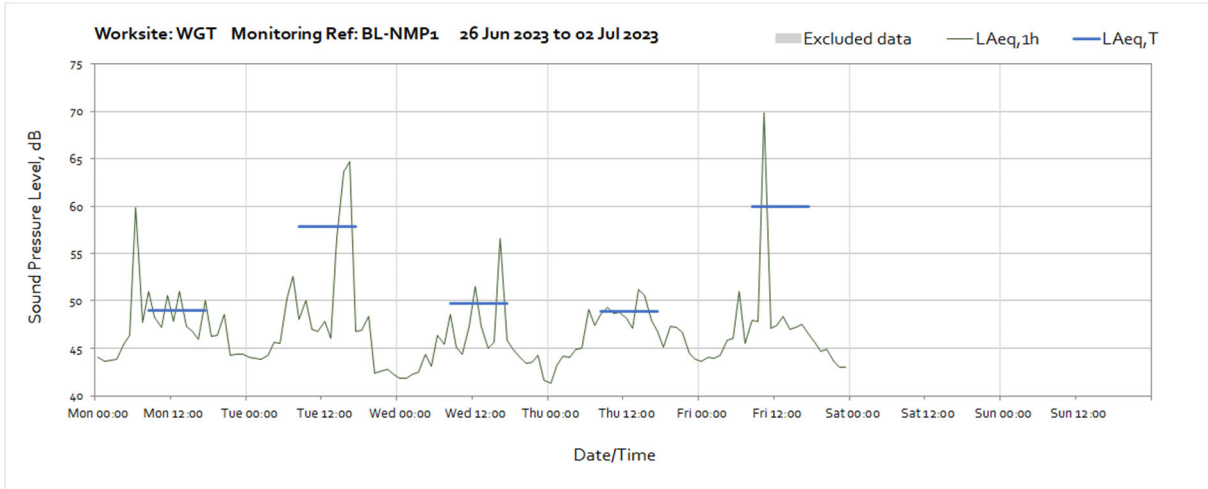
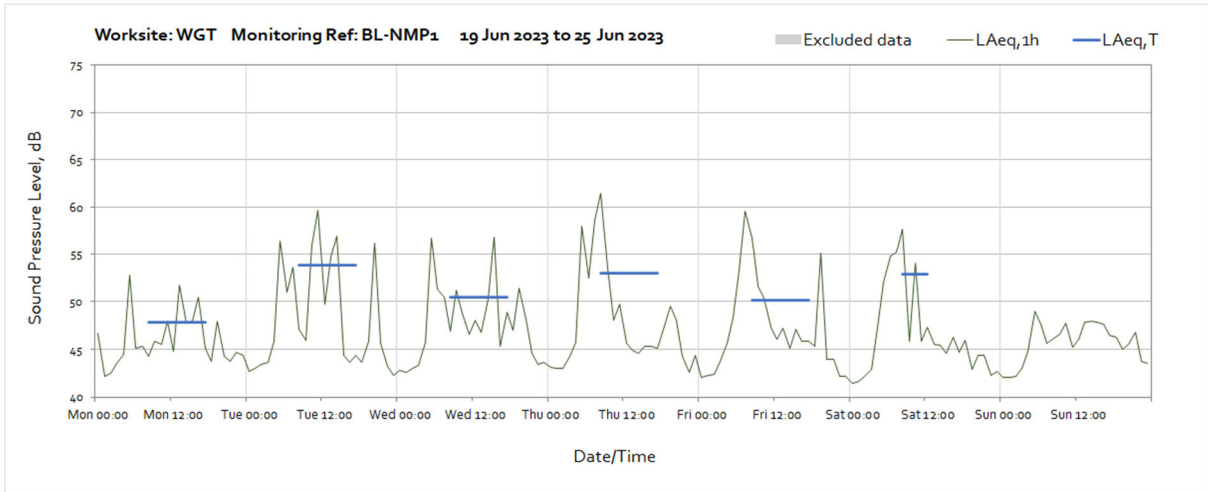




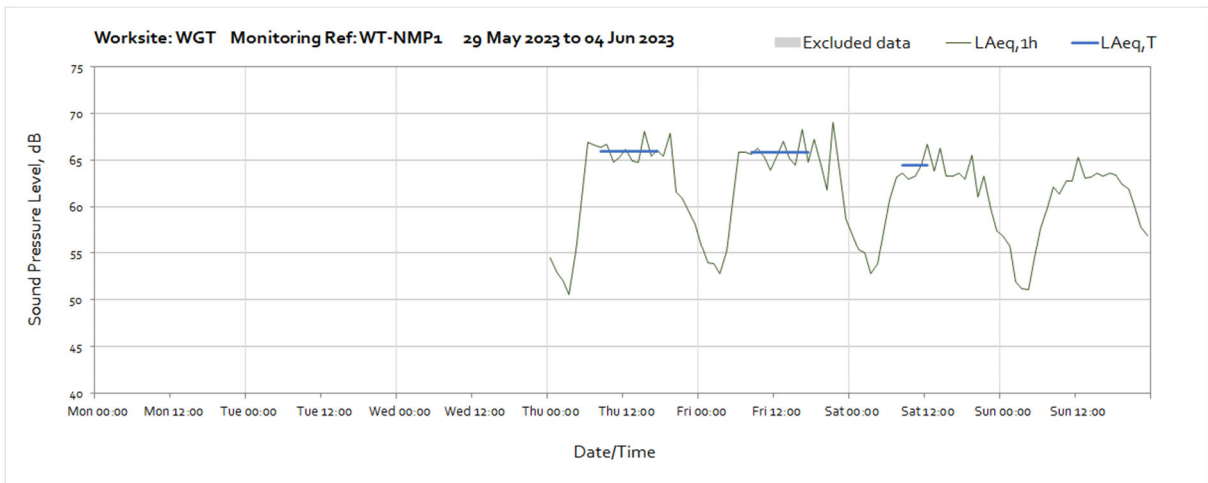
Worksite: WGT – Monitoring Ref: BL-NMP1

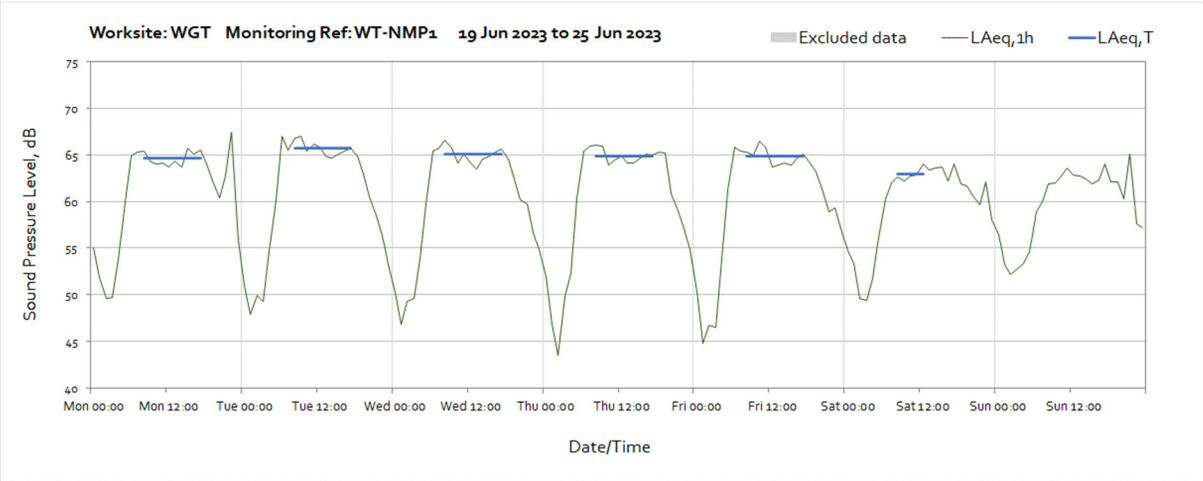
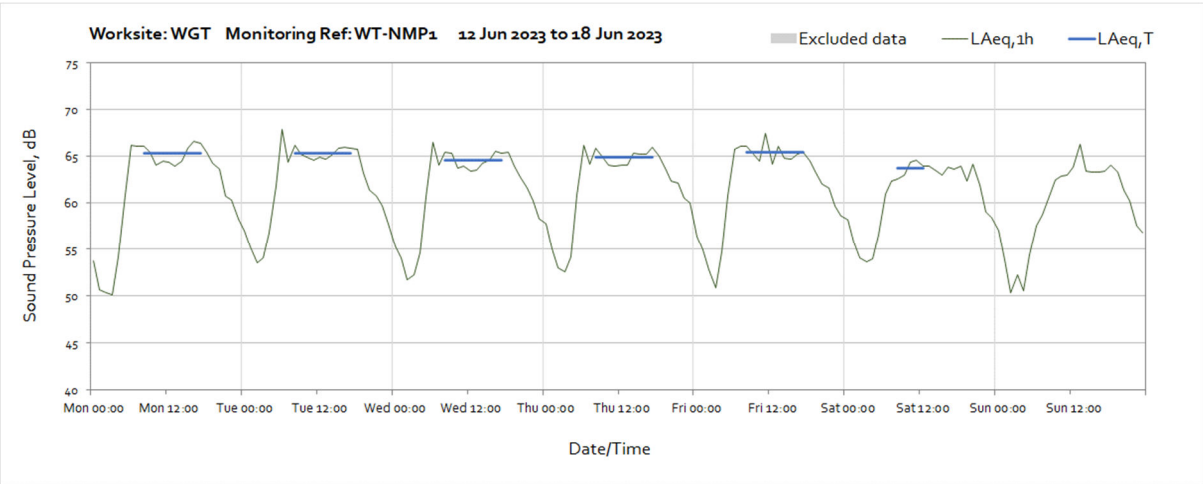
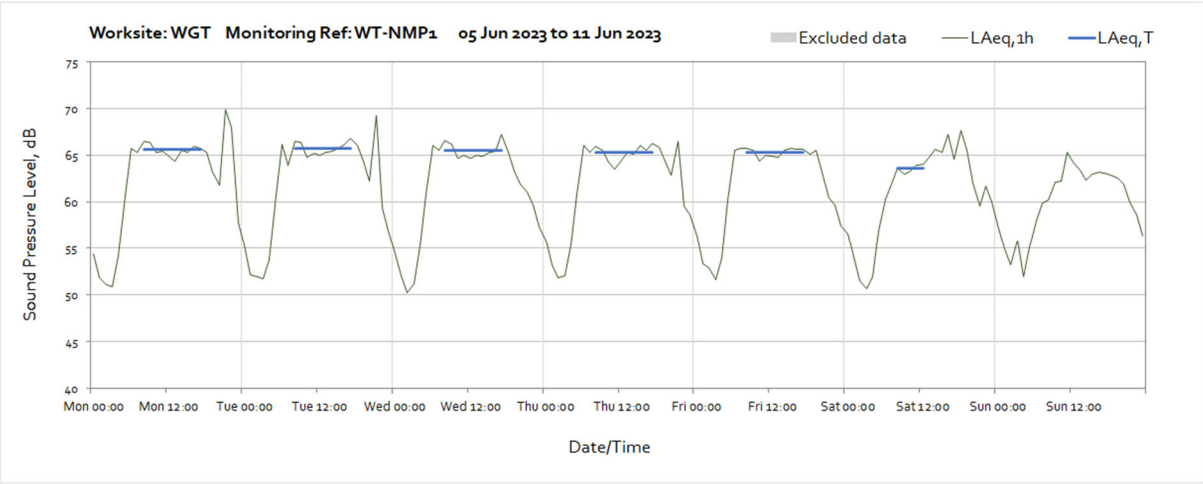


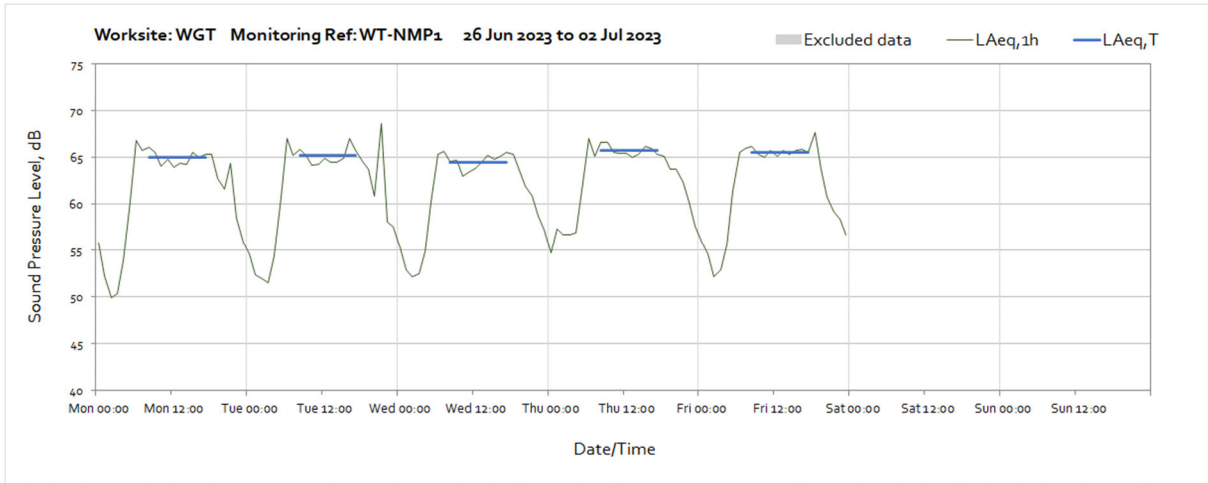
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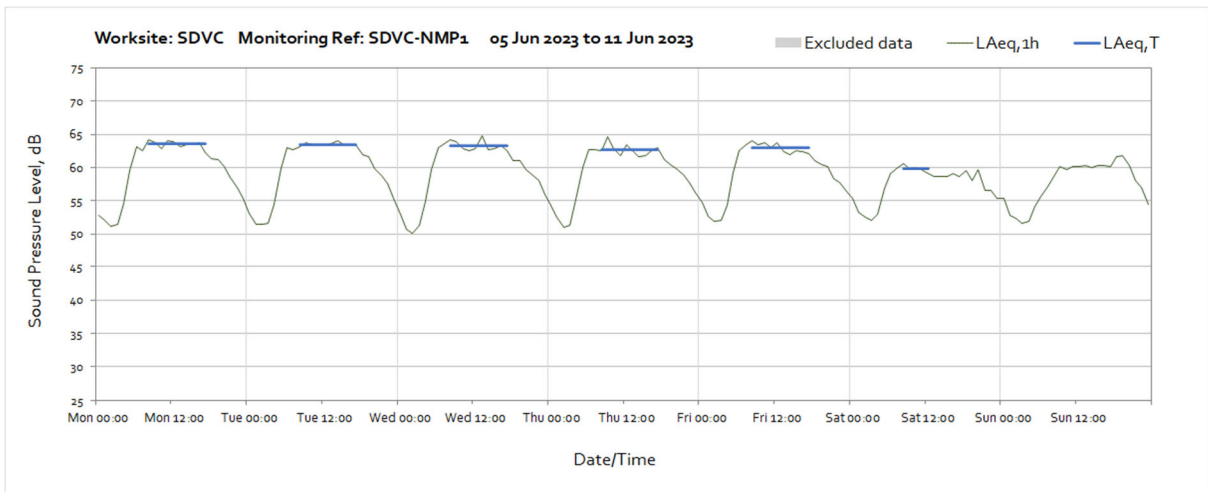
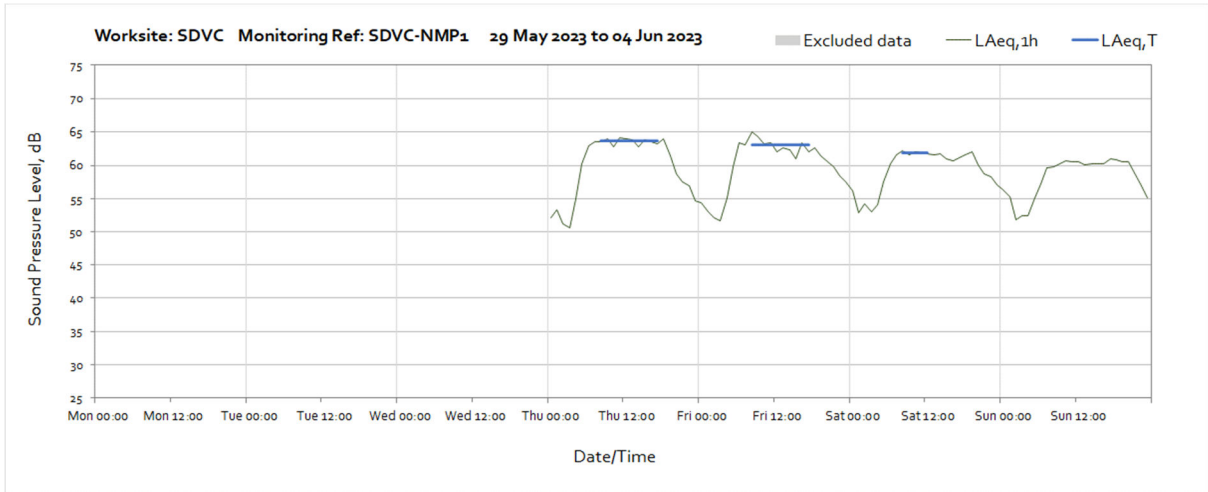
Worksite: WGT - Monitoring Ref: WT-NMP1

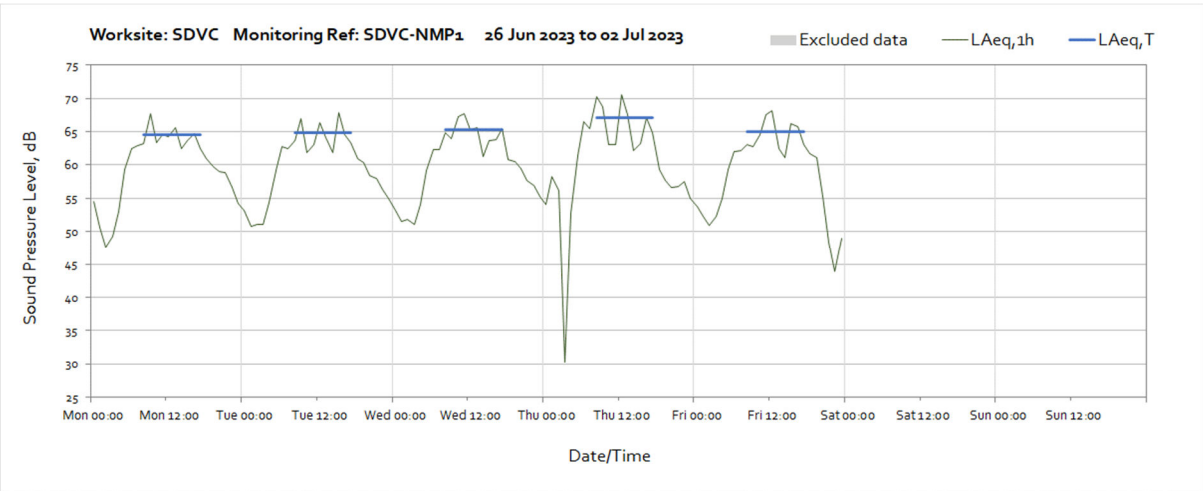
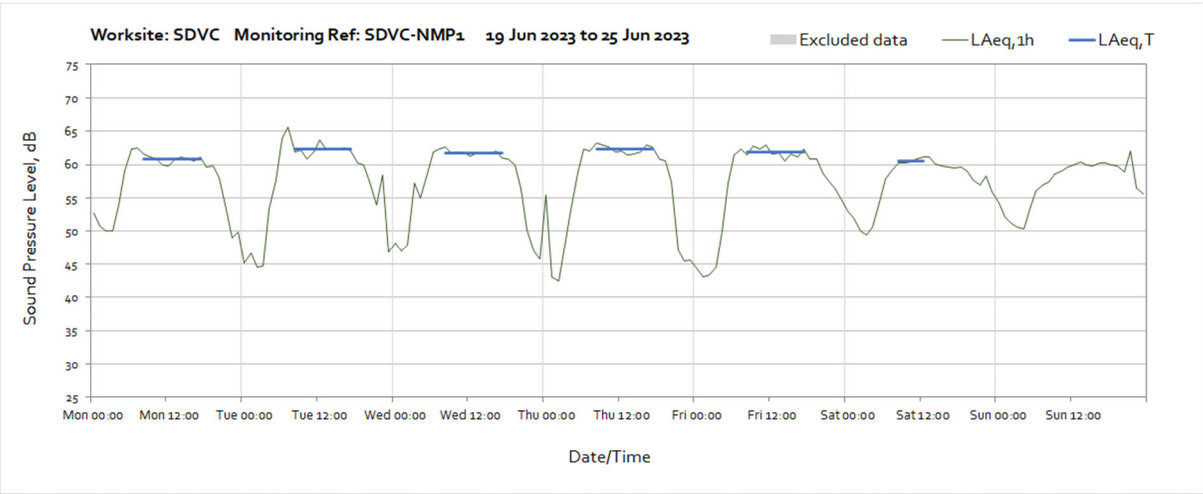
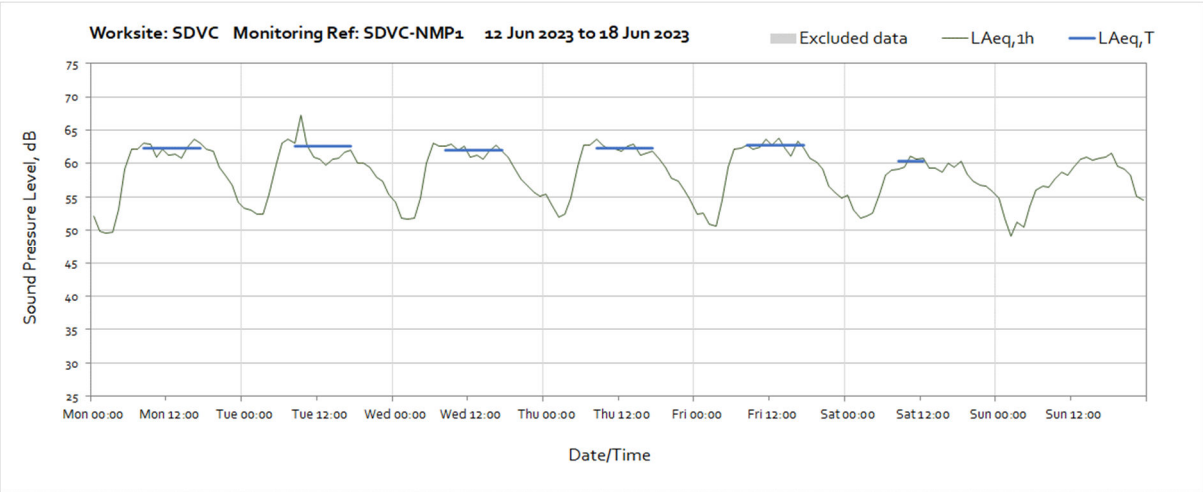




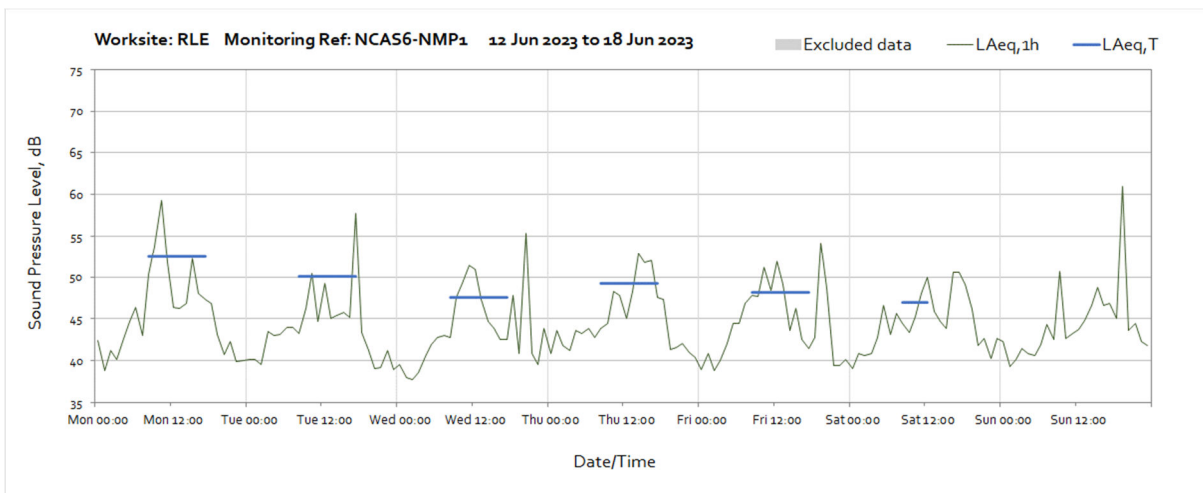
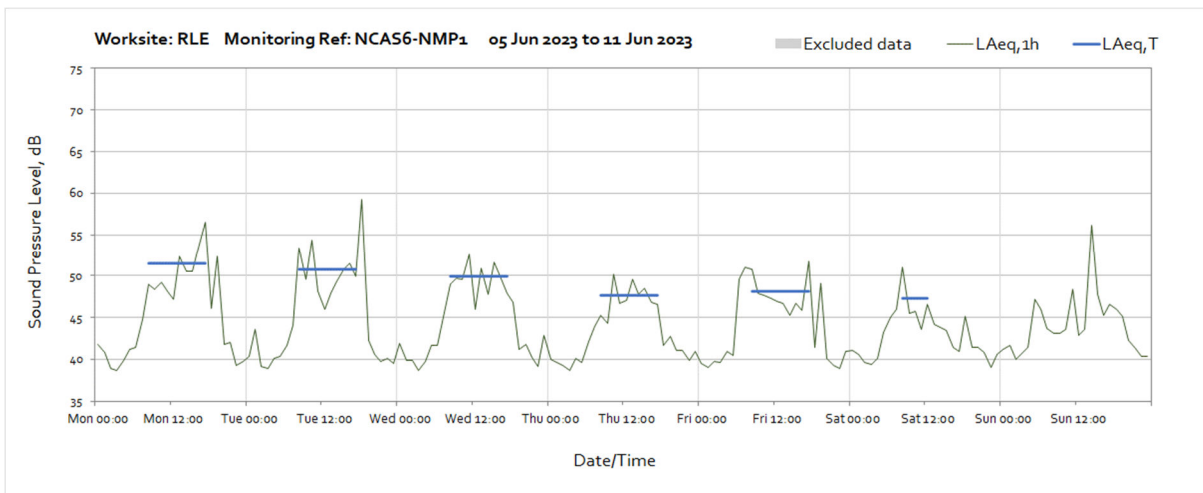
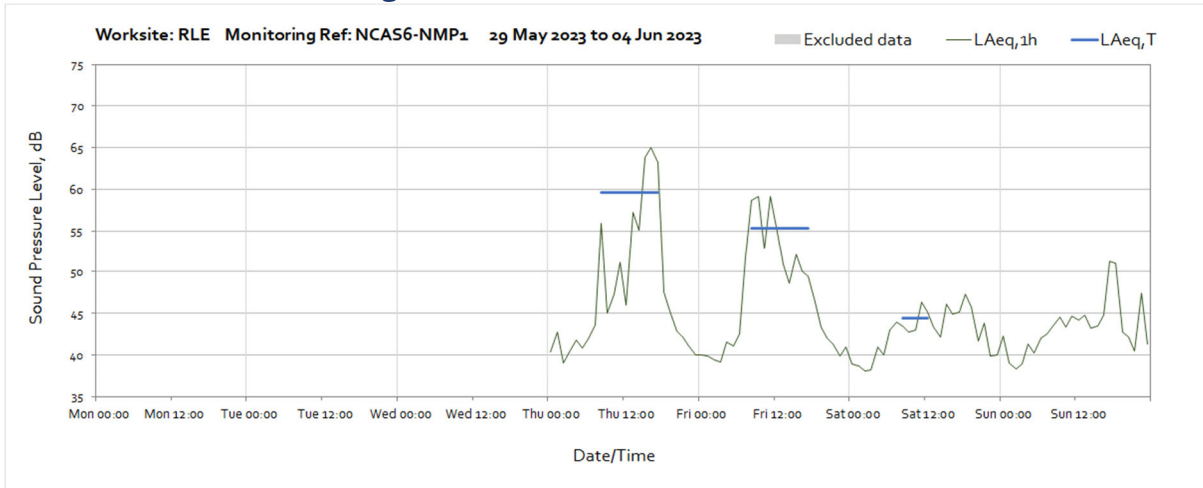


Worksite: SDVC – Monitoring Ref: SDVC-NMP1

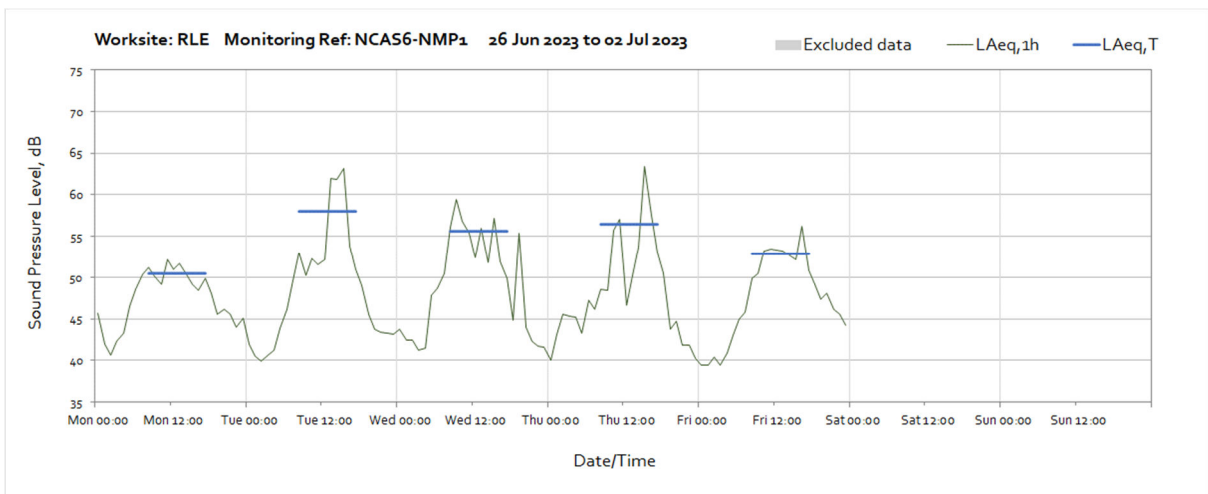
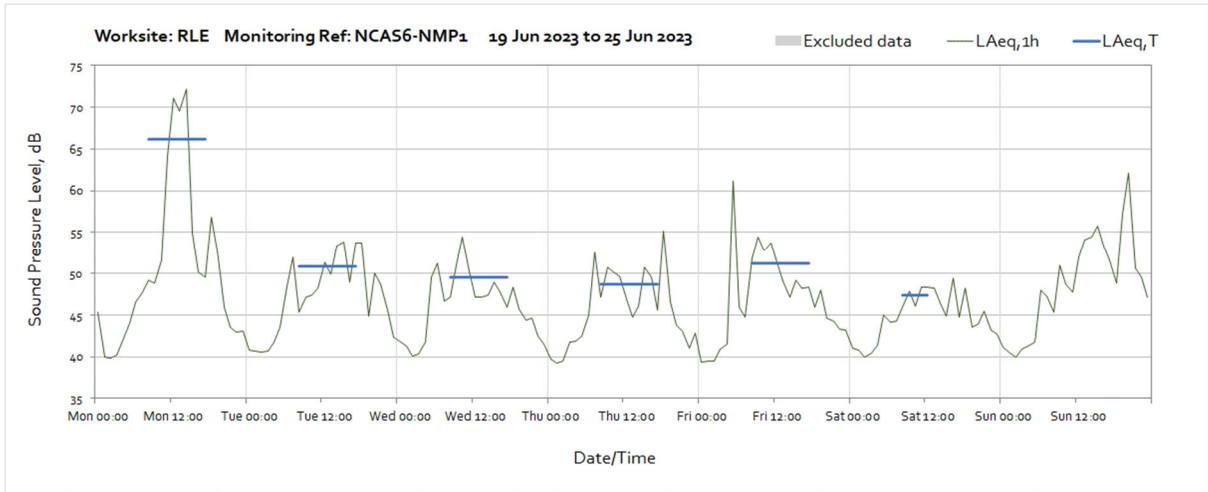




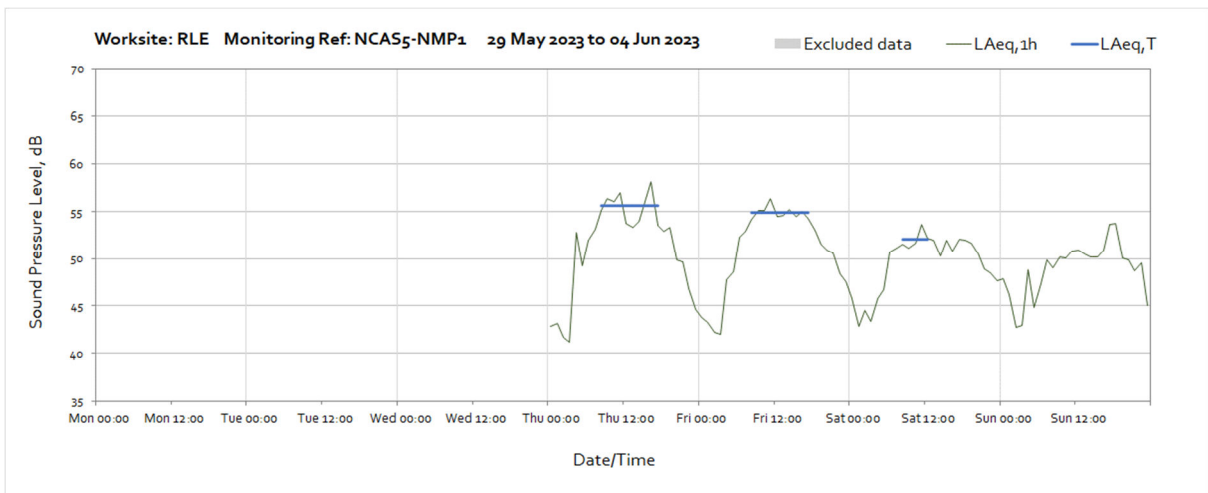
Worksite: RLE – Monitoring Ref: NCAS6-NMP1

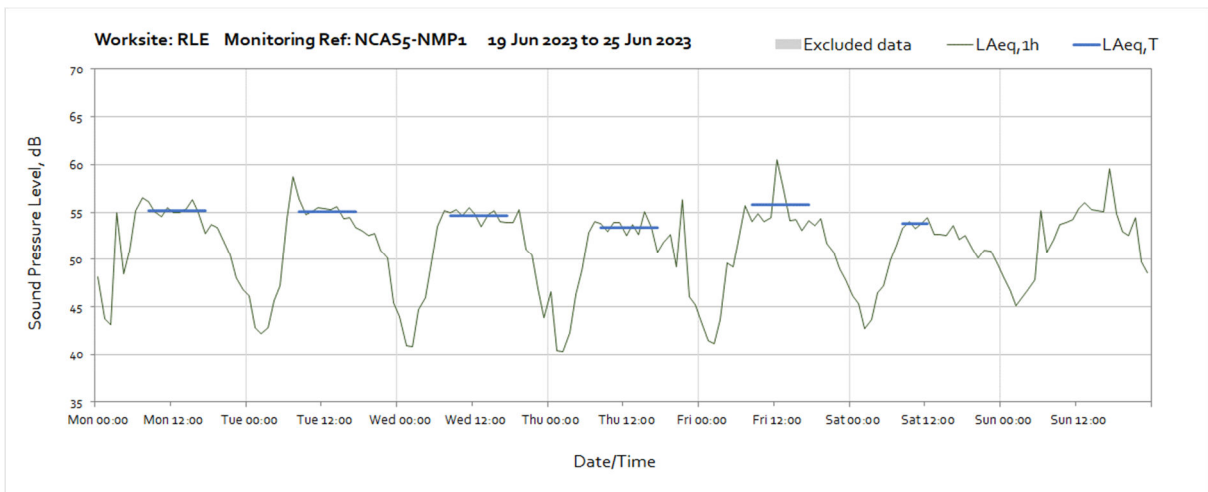
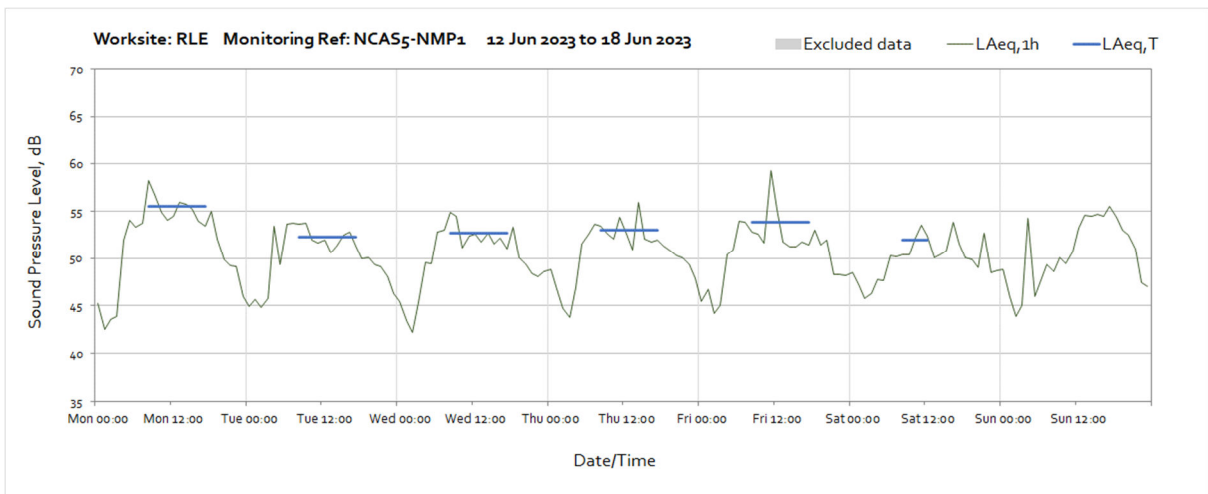
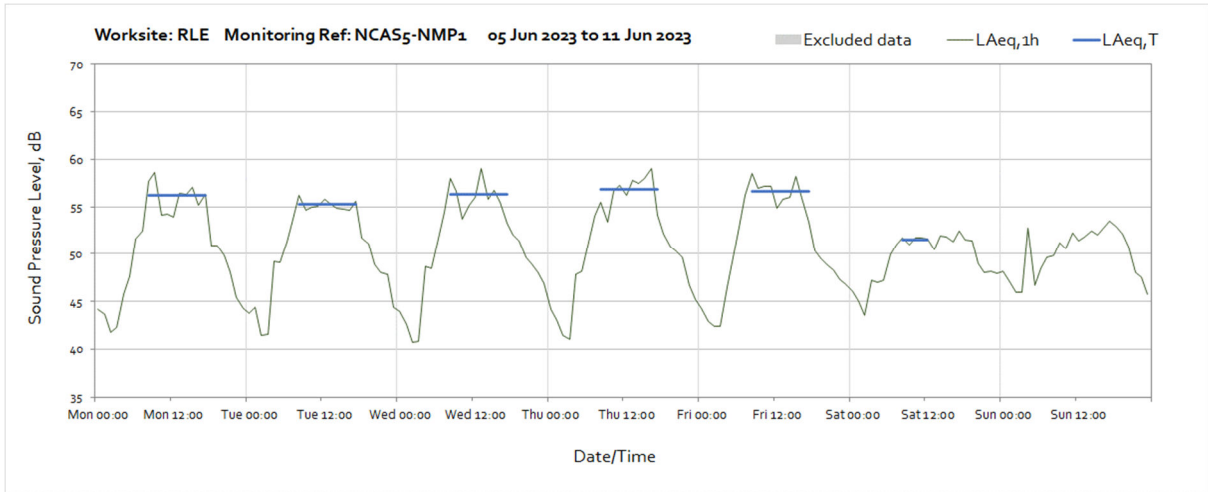


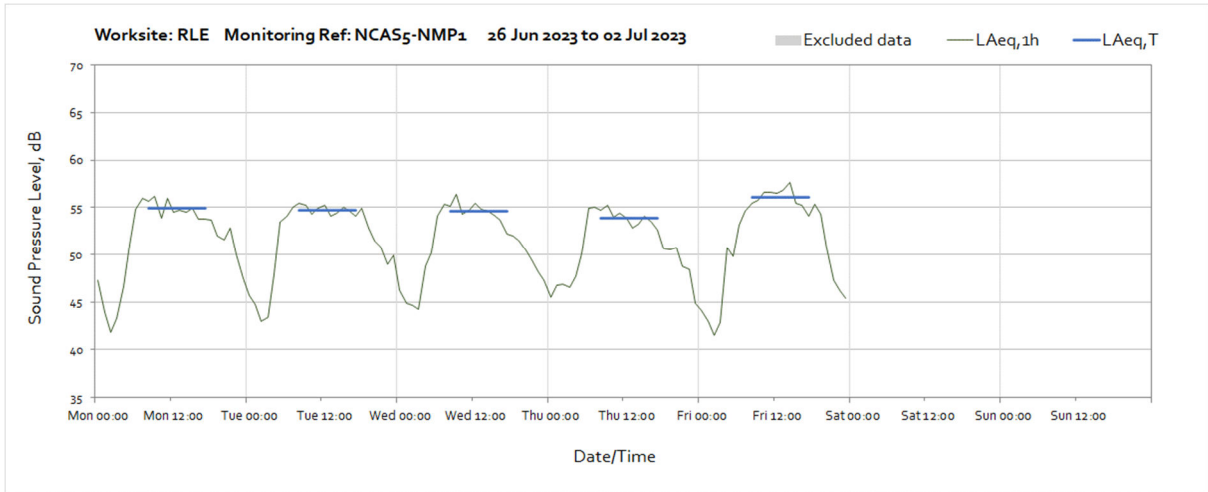
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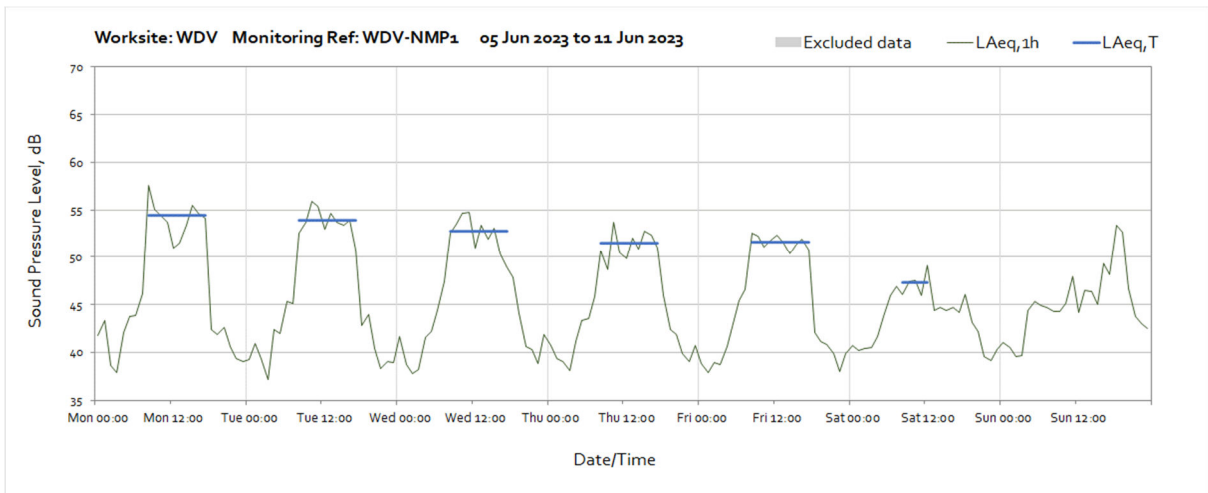
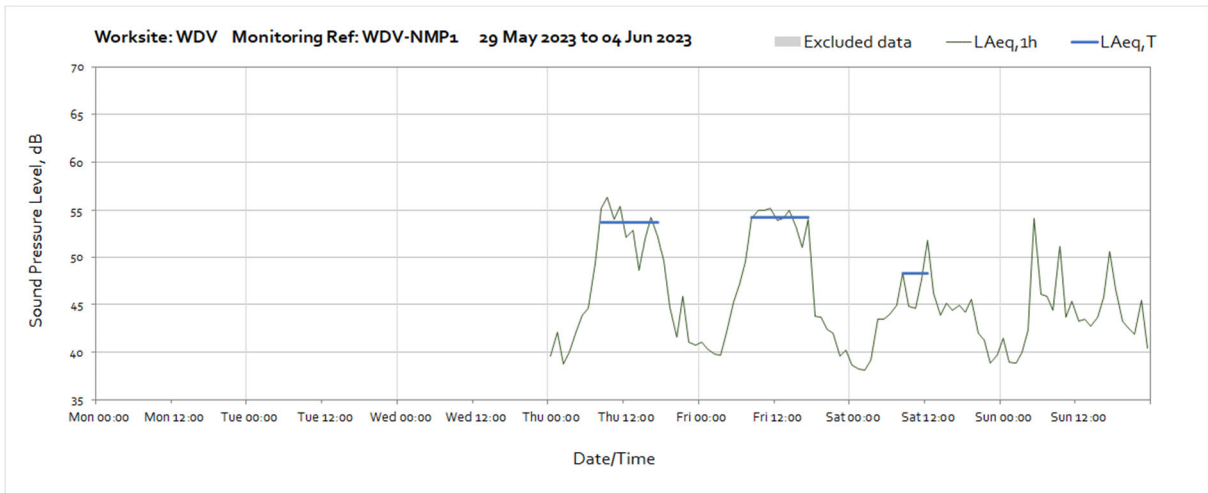
Worksite: RLE - Monitoring Ref: NCAS5-NMP1

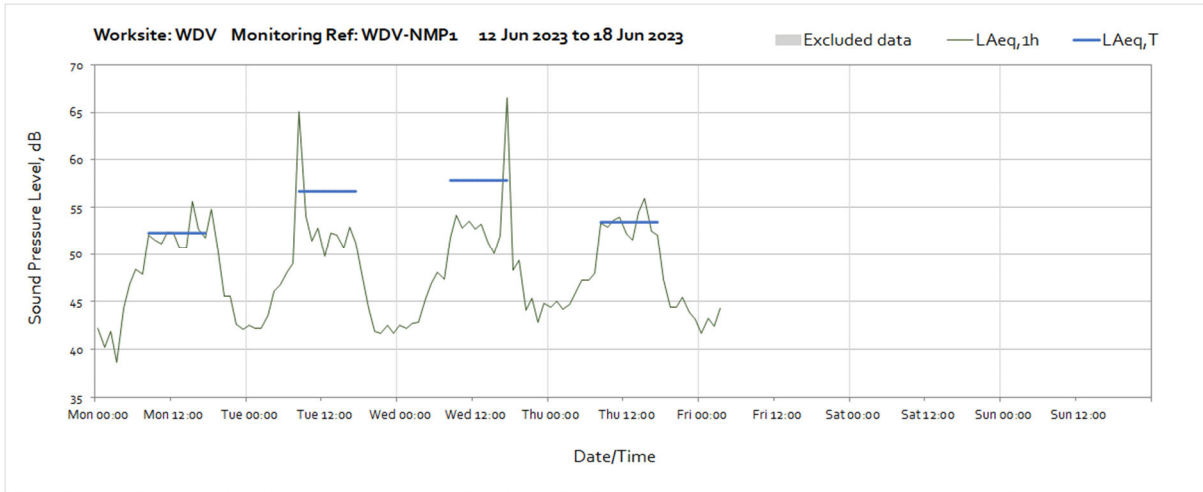






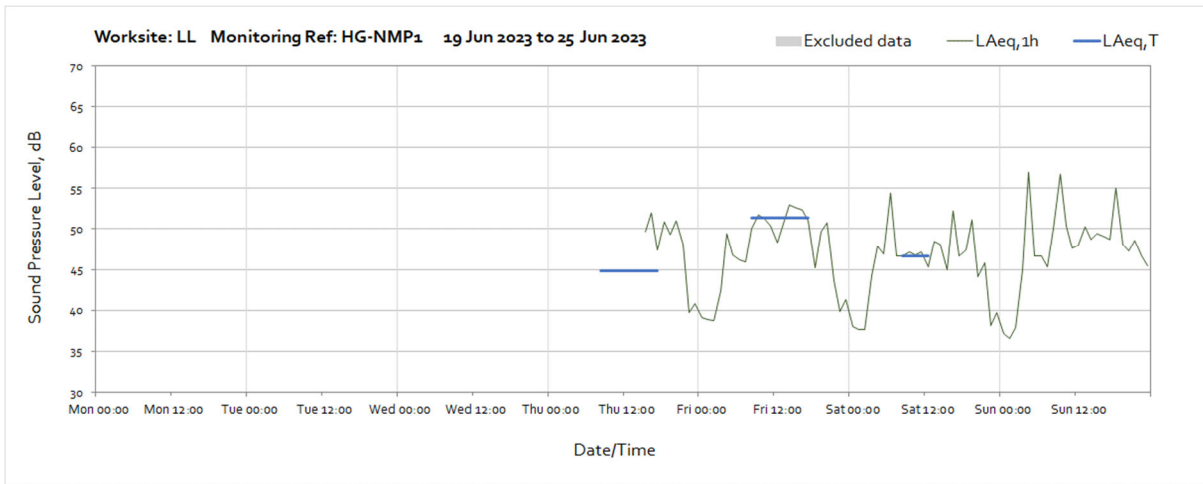
Worksite: WDV – Monitoring Ref: WDV-NMP1



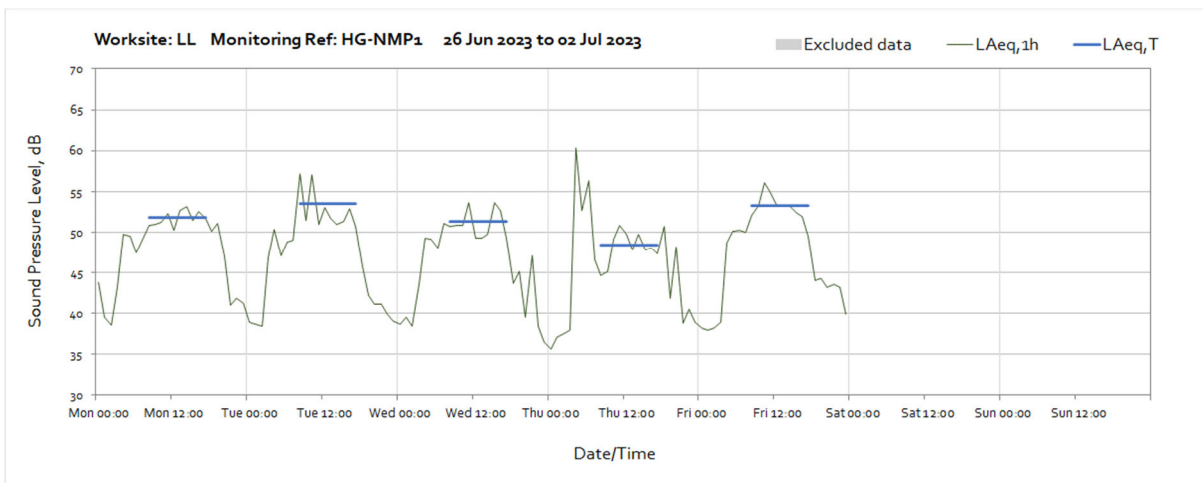


Note: Missing data from 04:00 on Friday 16th June until the end of the month was due to a damaged power cable.

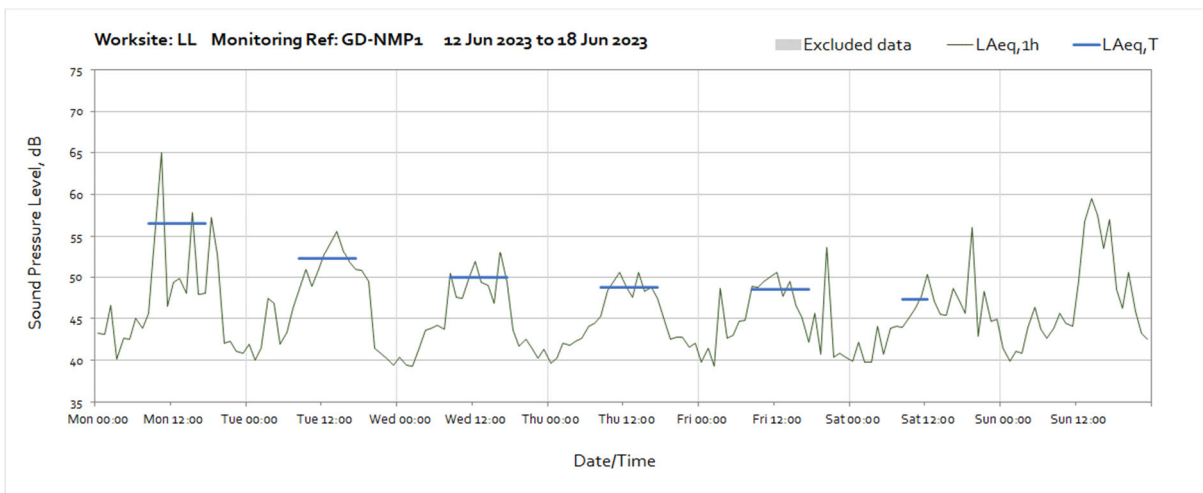
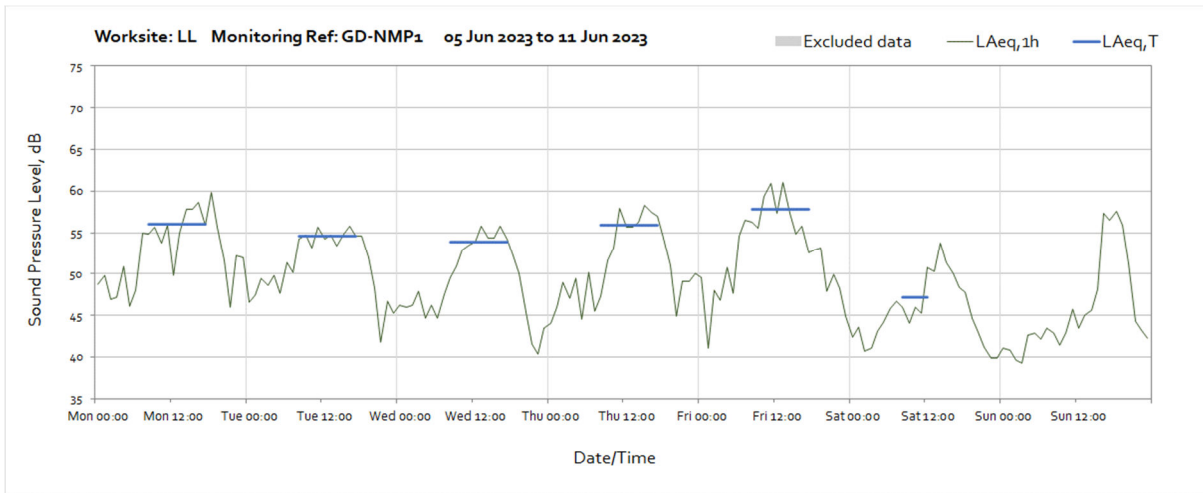
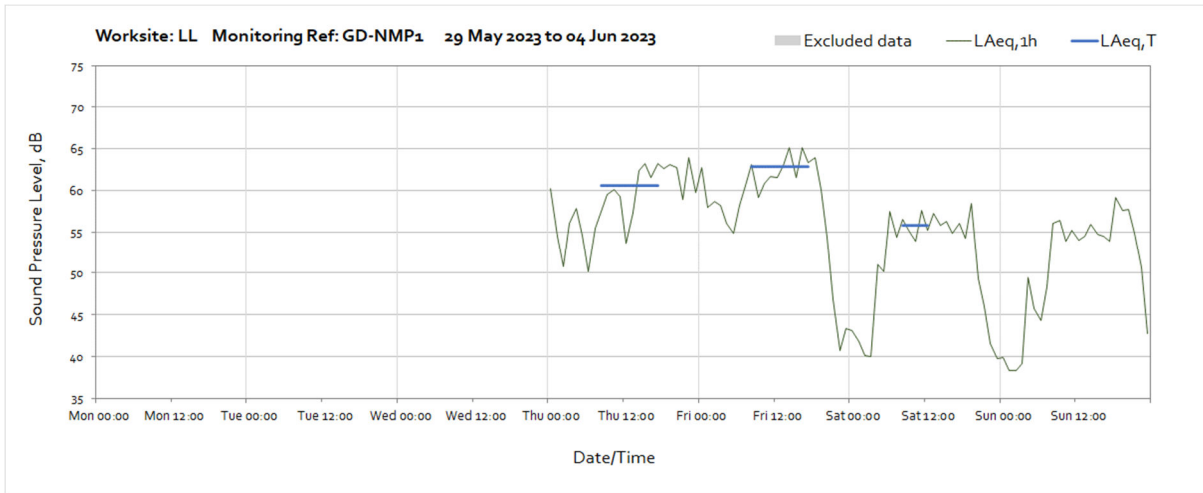
Worksite: LL – Monitoring Ref: HG-NMP1



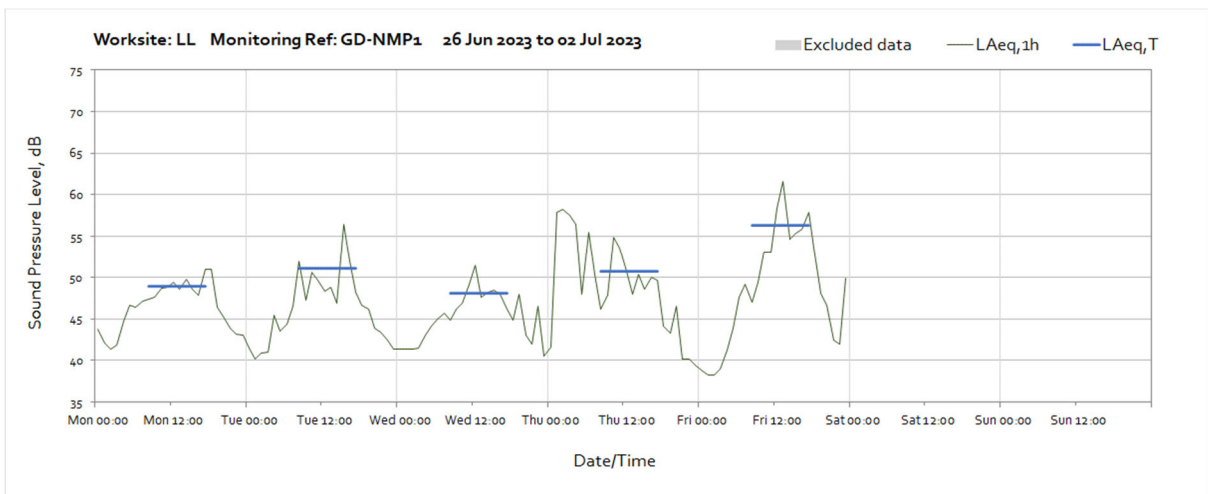
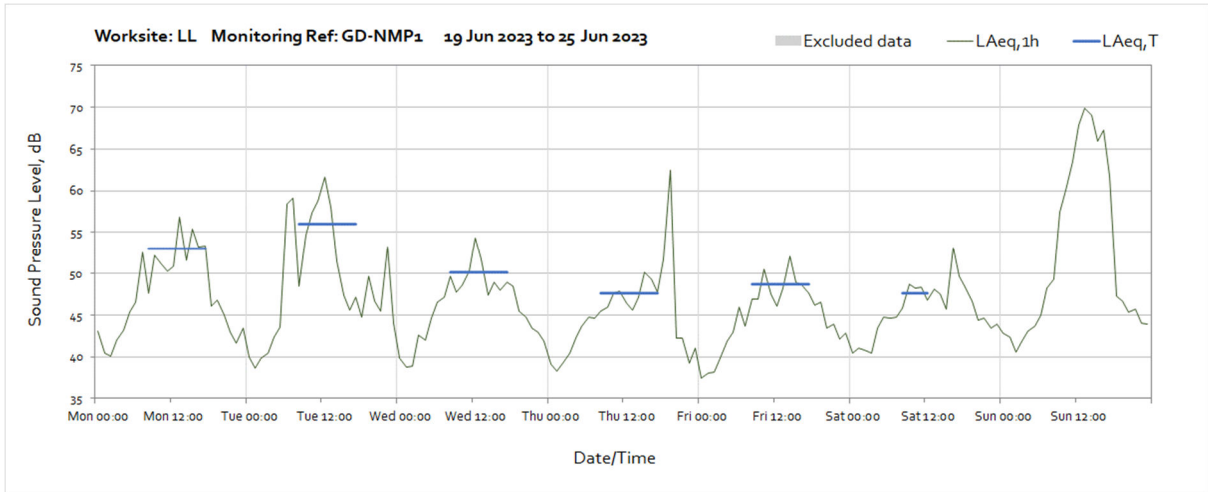
Note: Monitor was reinstalled at 15:00 on Thursday 22nd June.



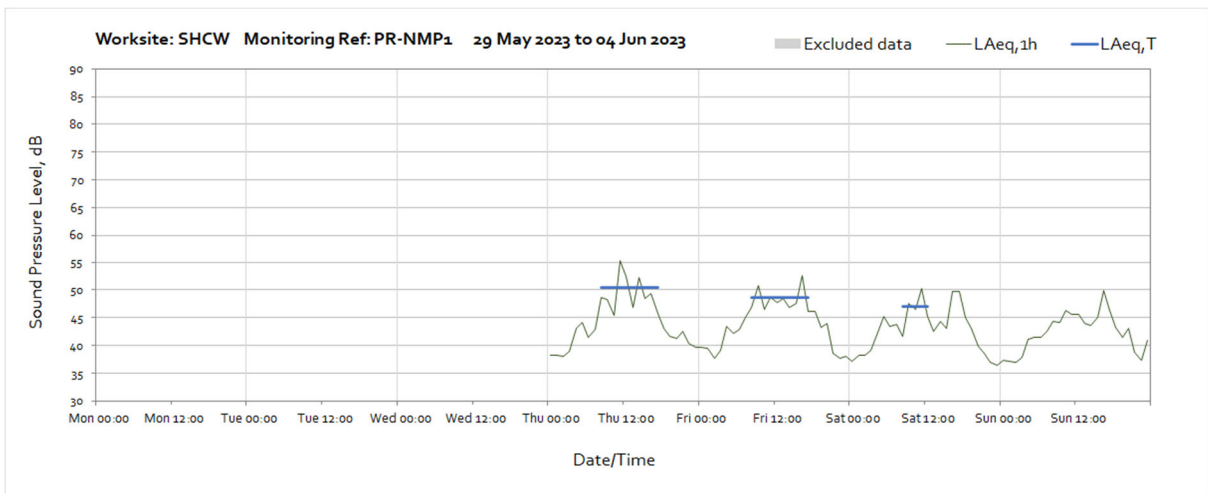
Worksite: LL – Monitoring Ref: GD-NMP1

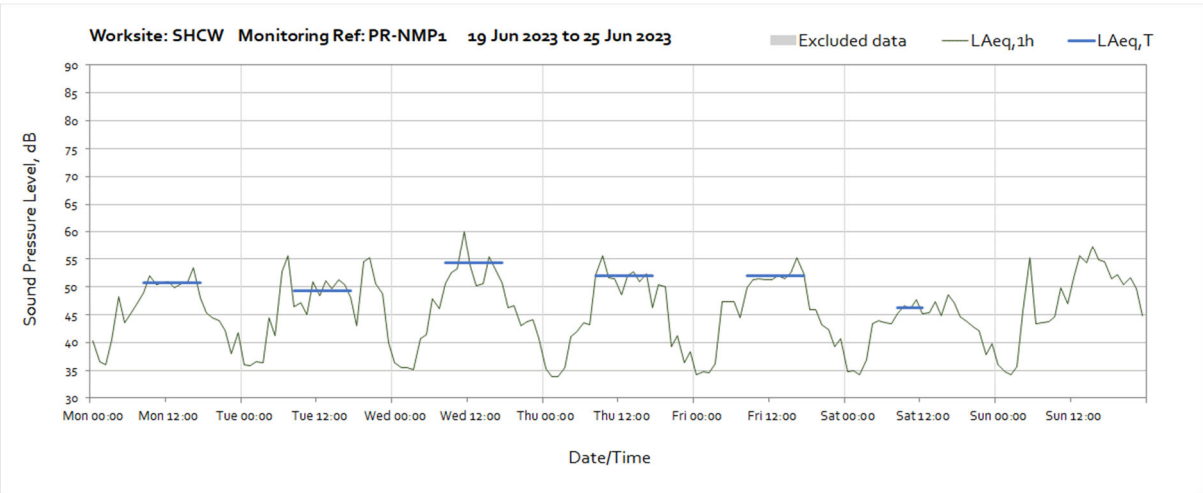
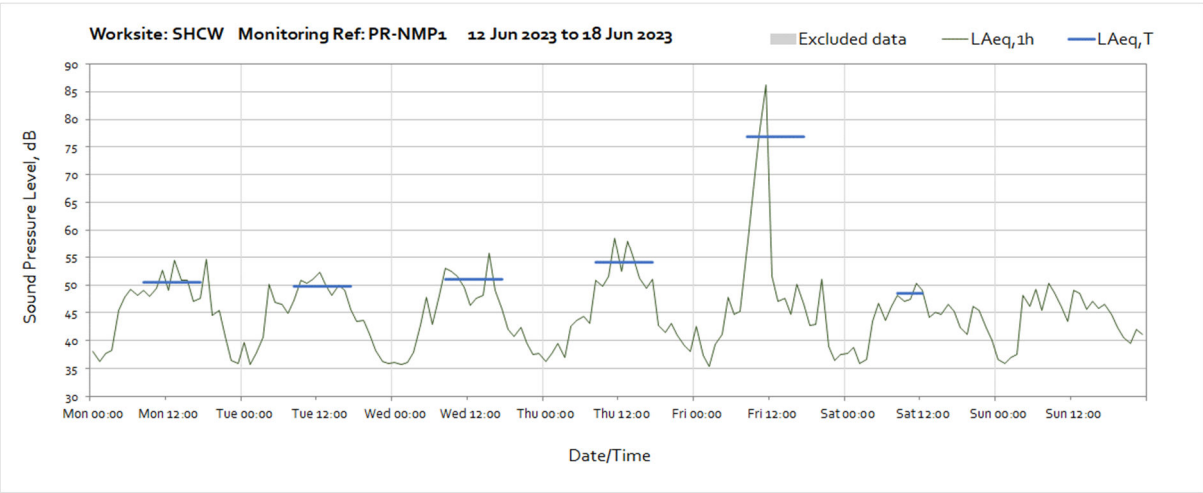
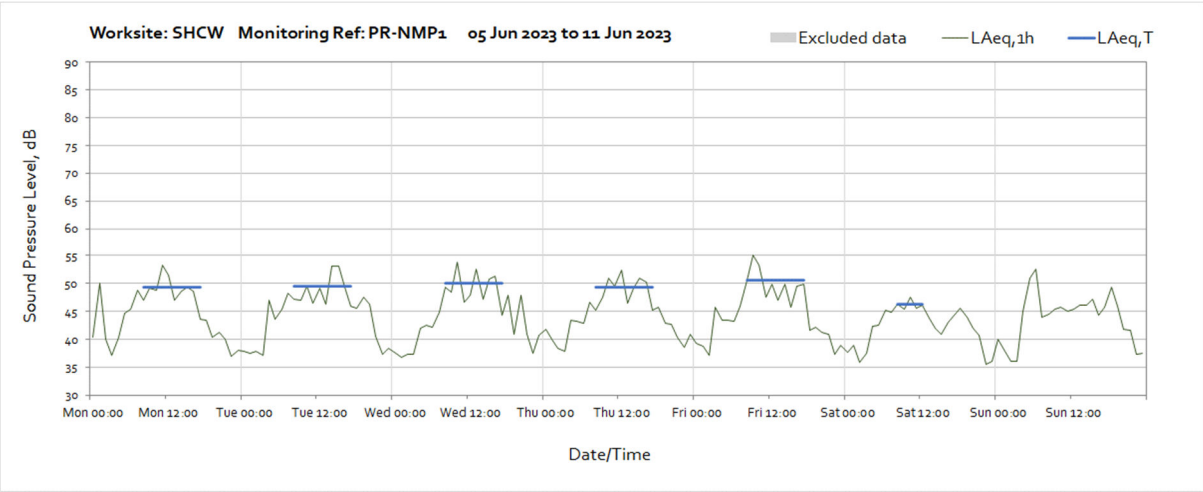


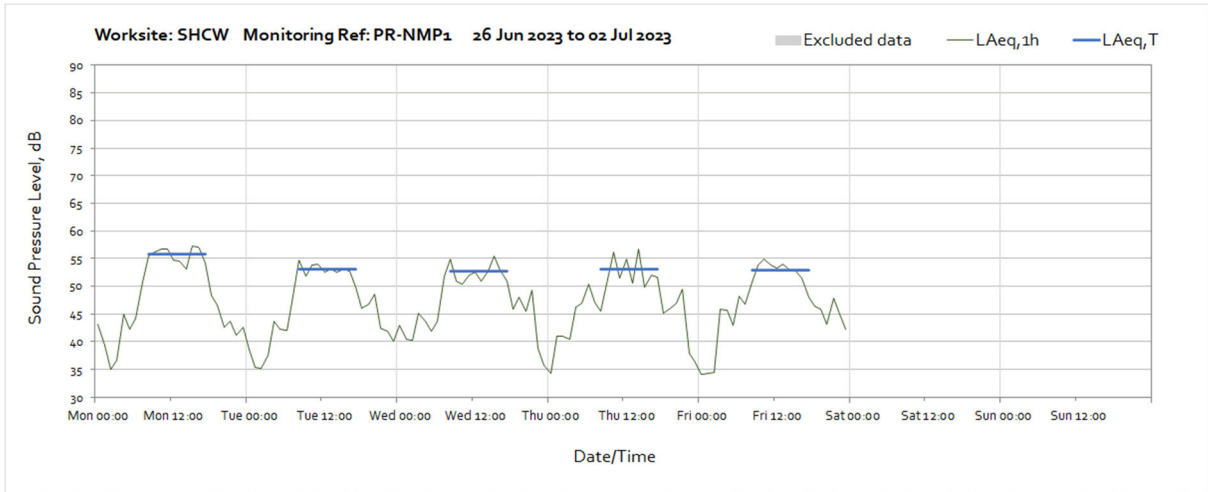
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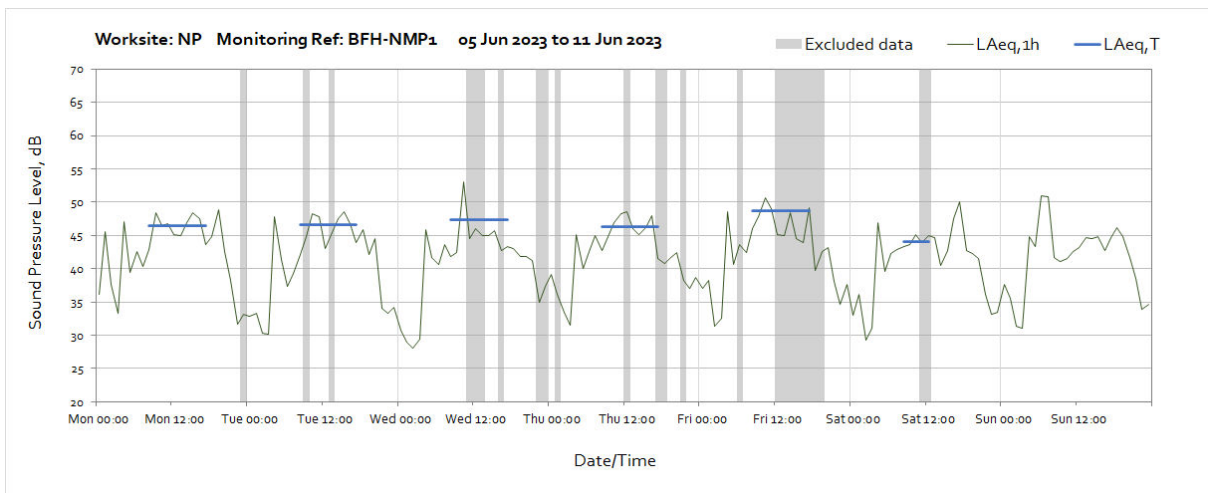
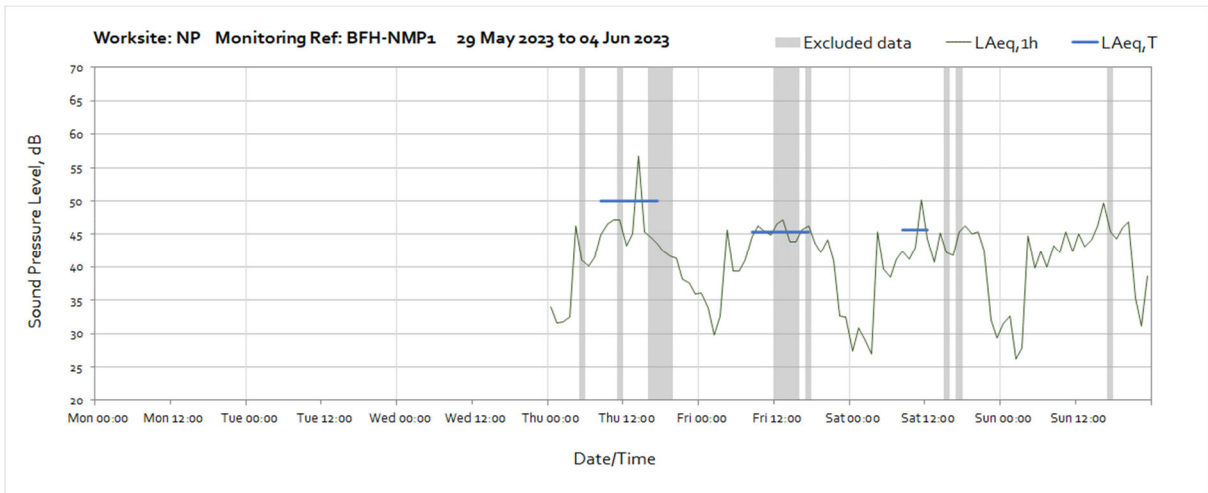
Worksite: SHCW – Monitoring Ref: PR-NMP1

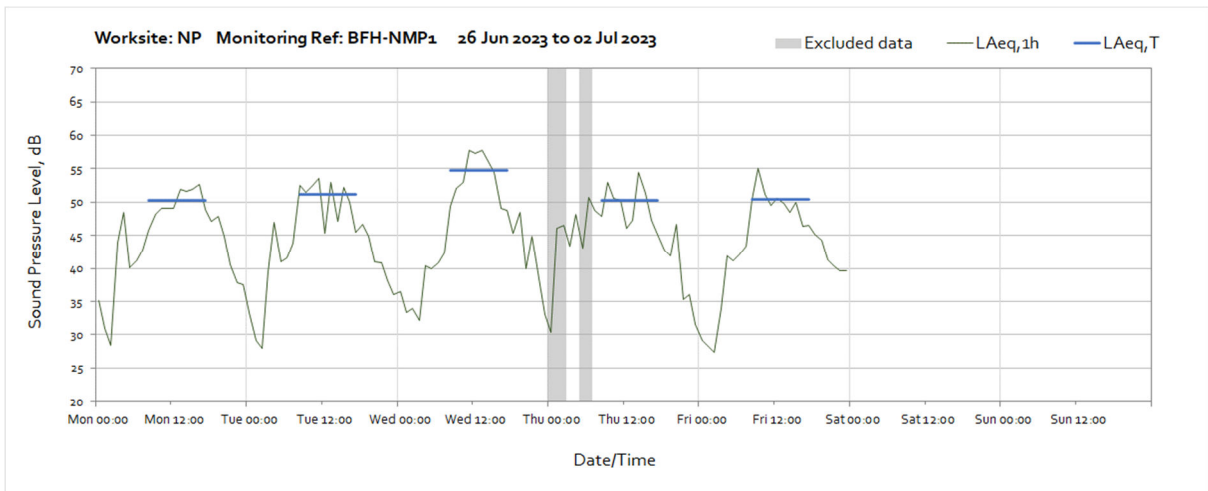
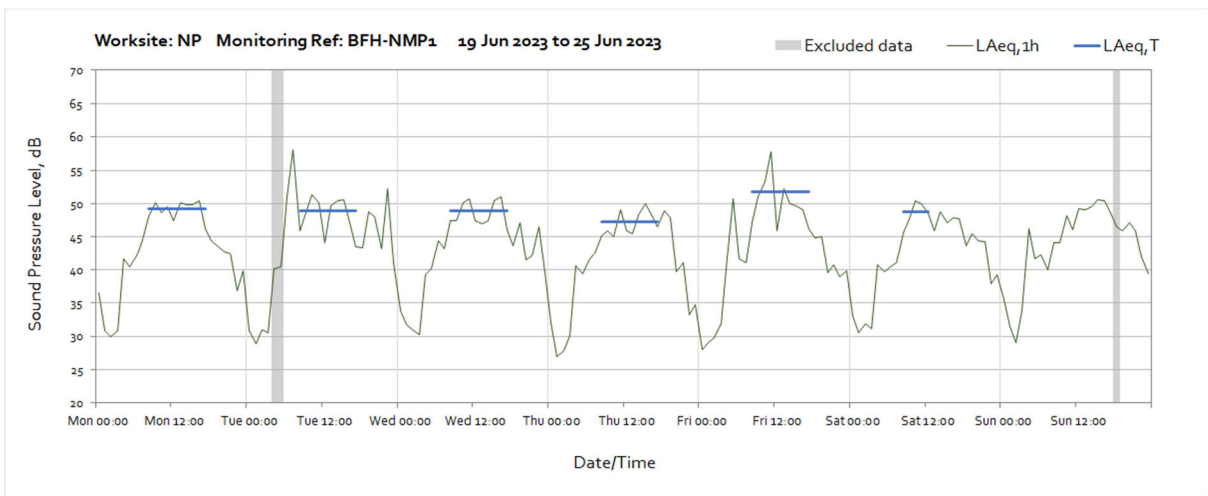
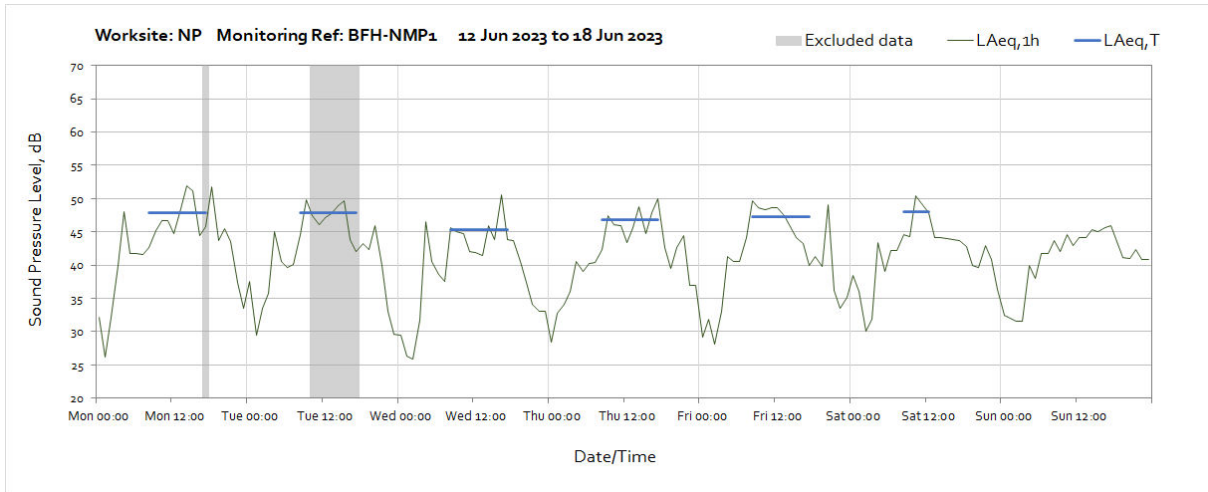




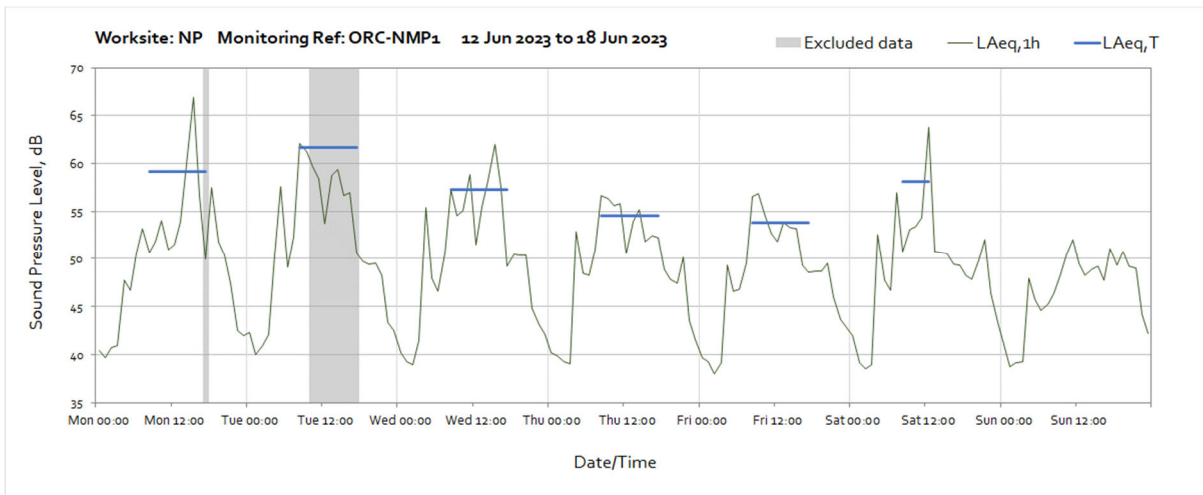
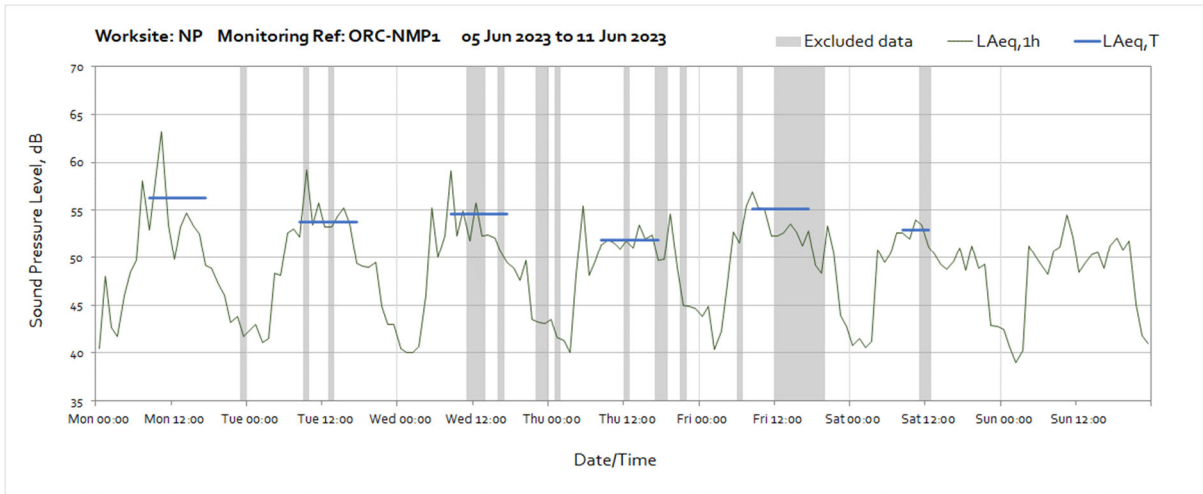
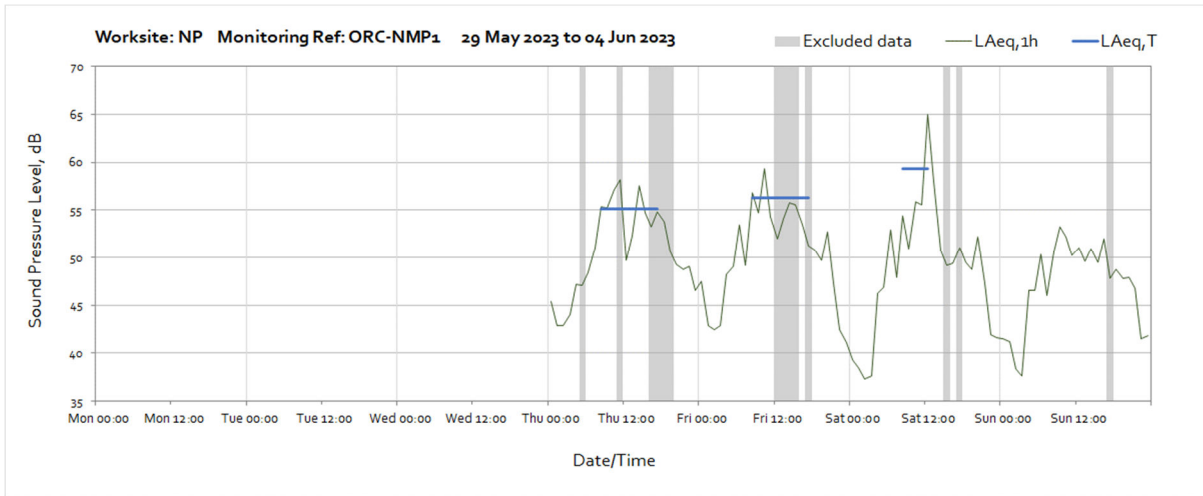


Worksite: NP - Monitoring Ref: BFH-NMP1

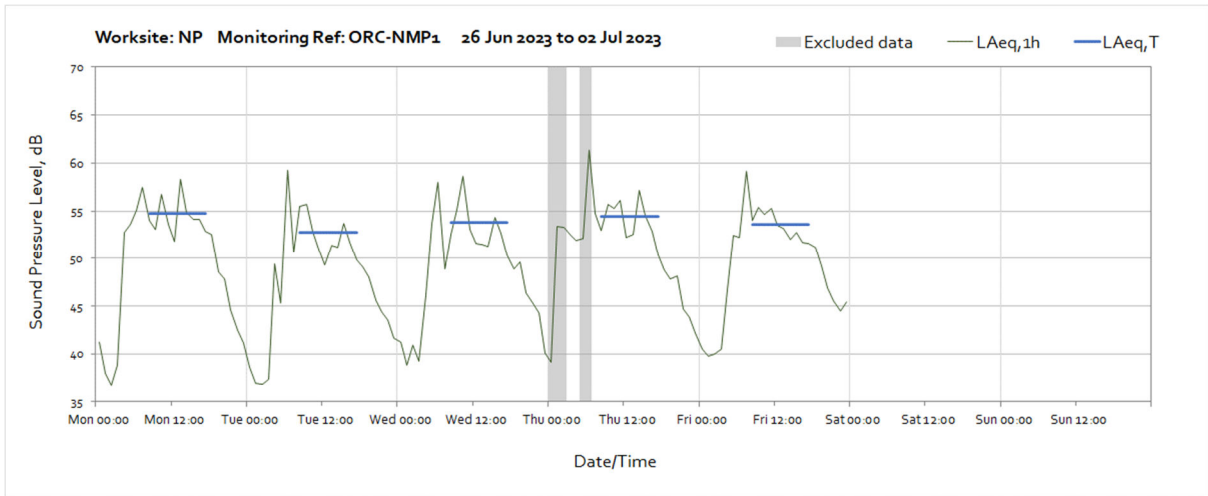
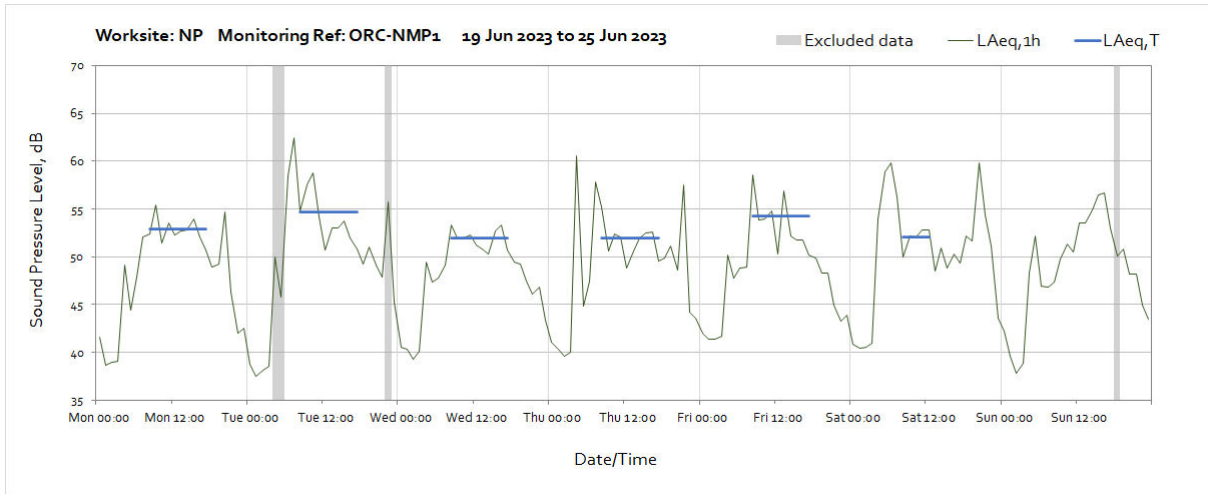




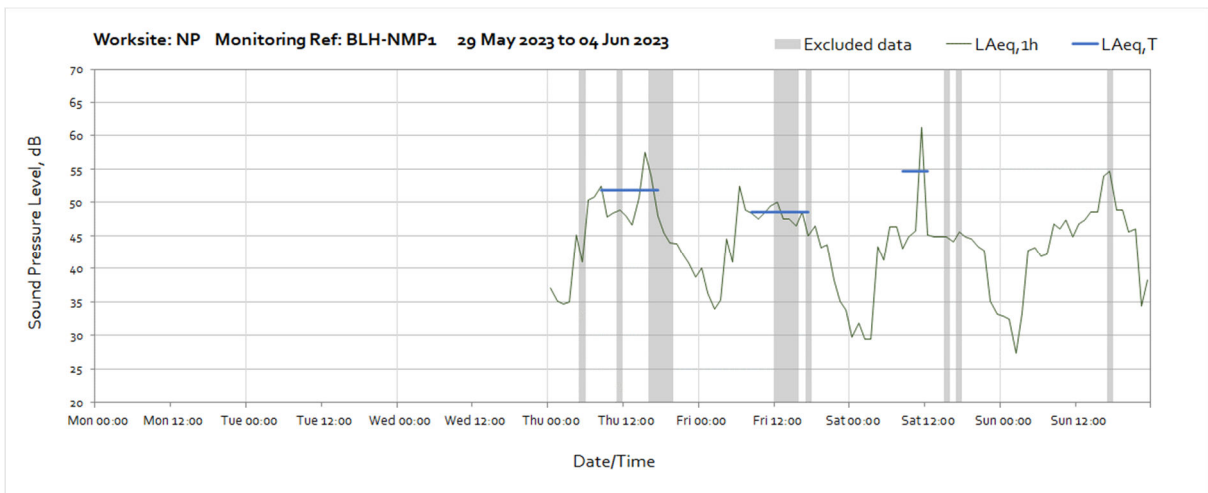
Worksite: NP – Monitoring Ref: ORC-NMP1

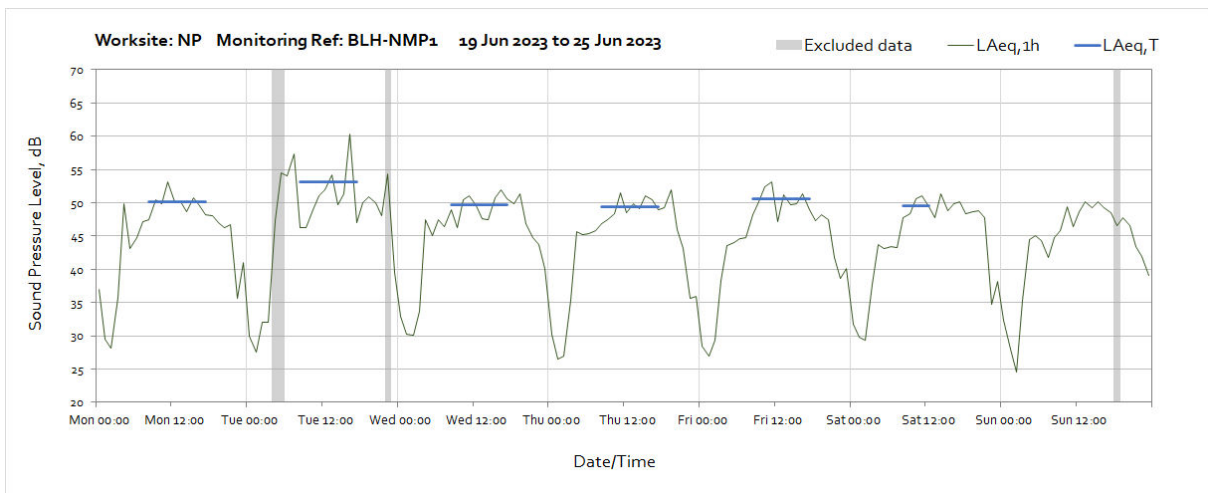
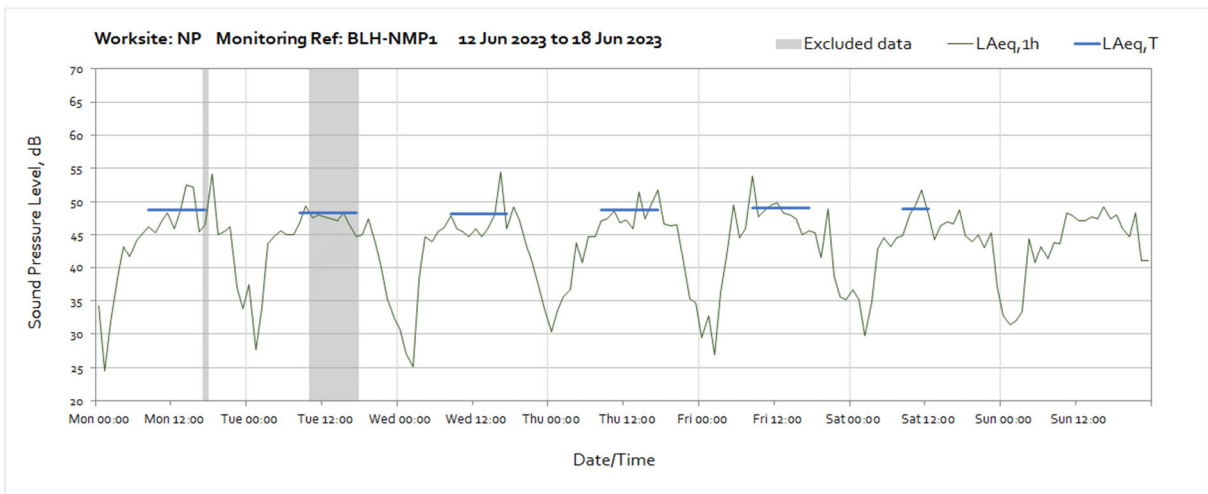
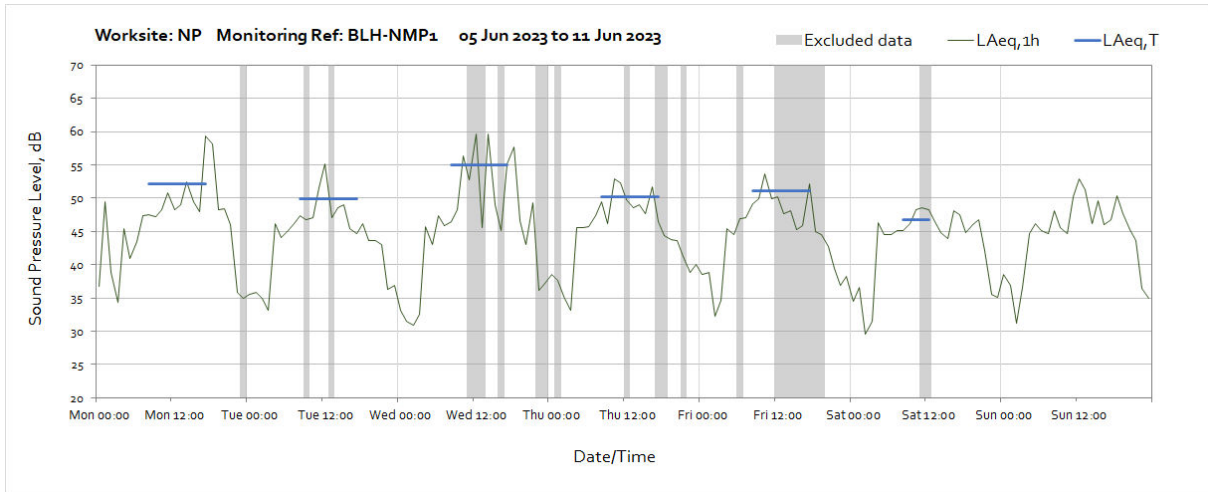


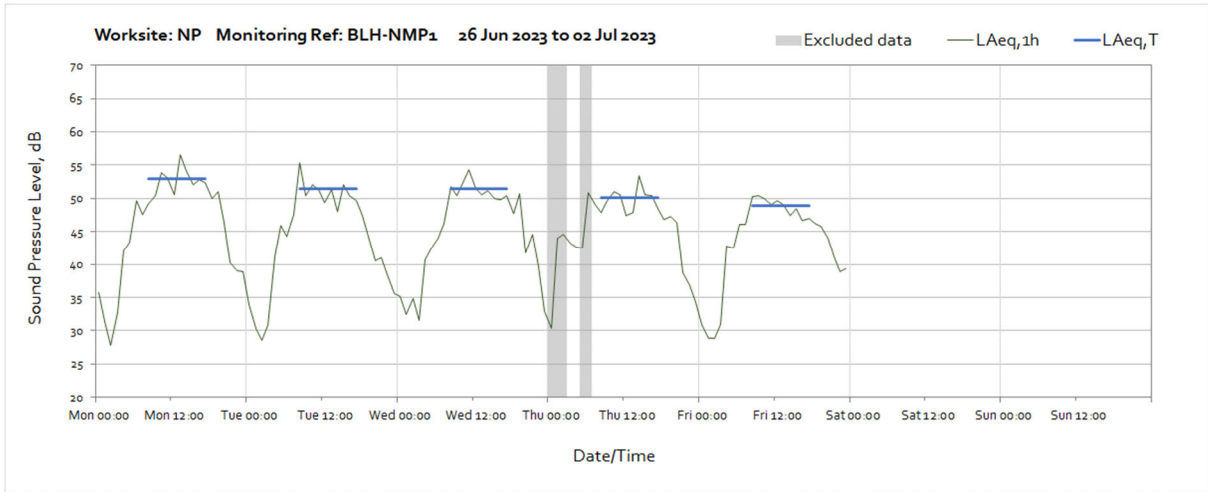
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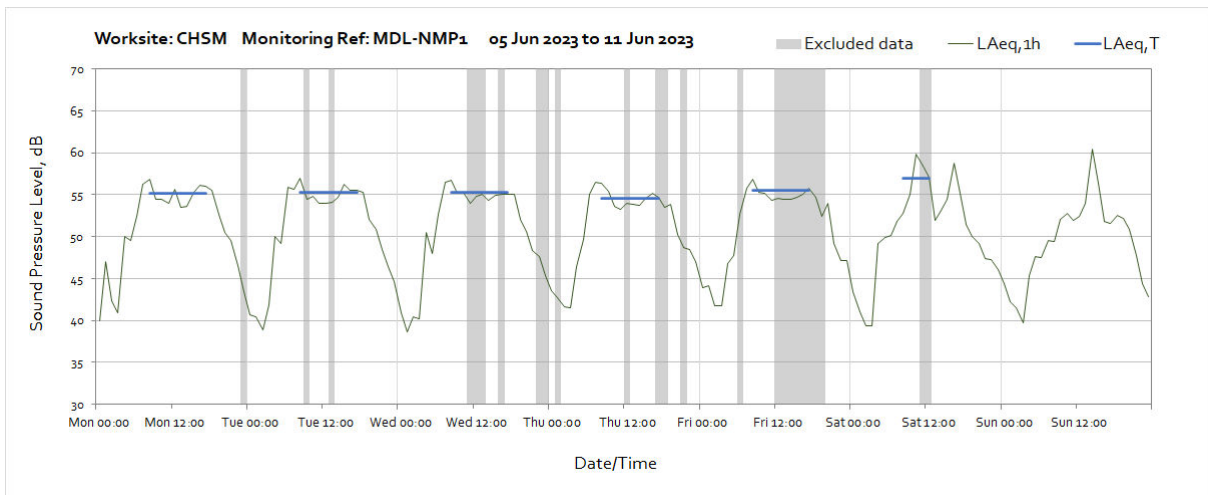
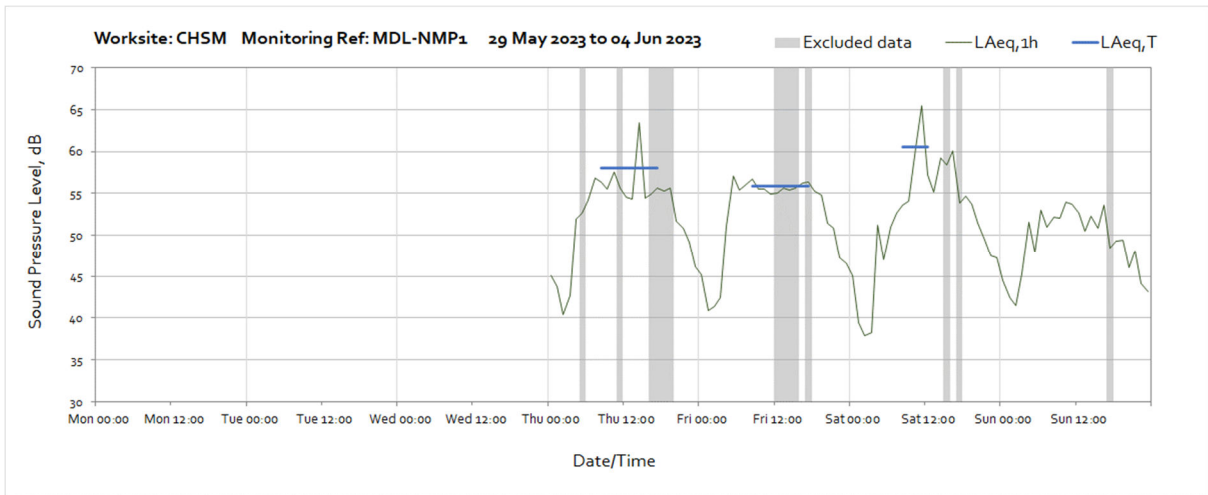
Worksite: NP - Monitoring Ref: BLH-NMP1

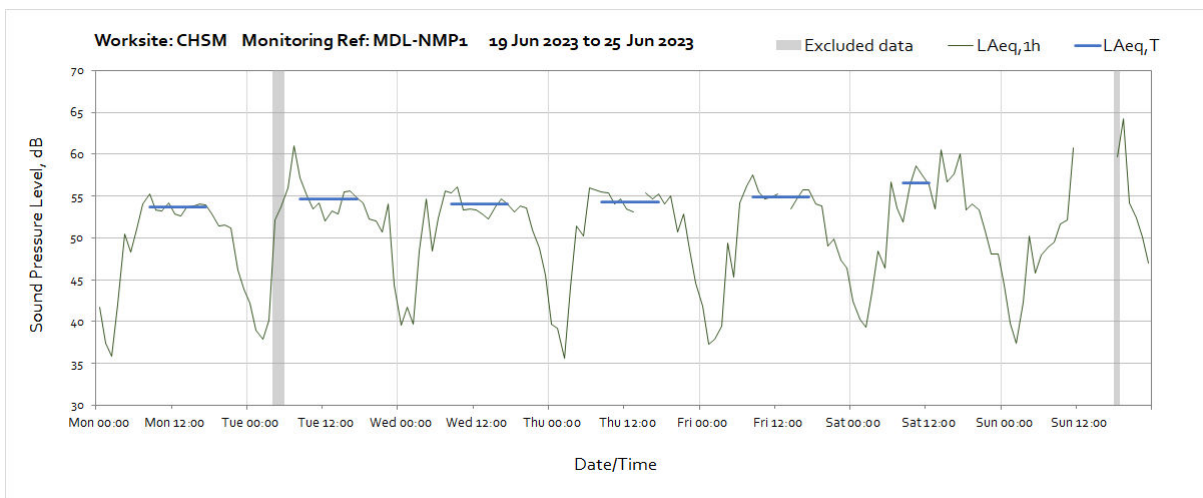
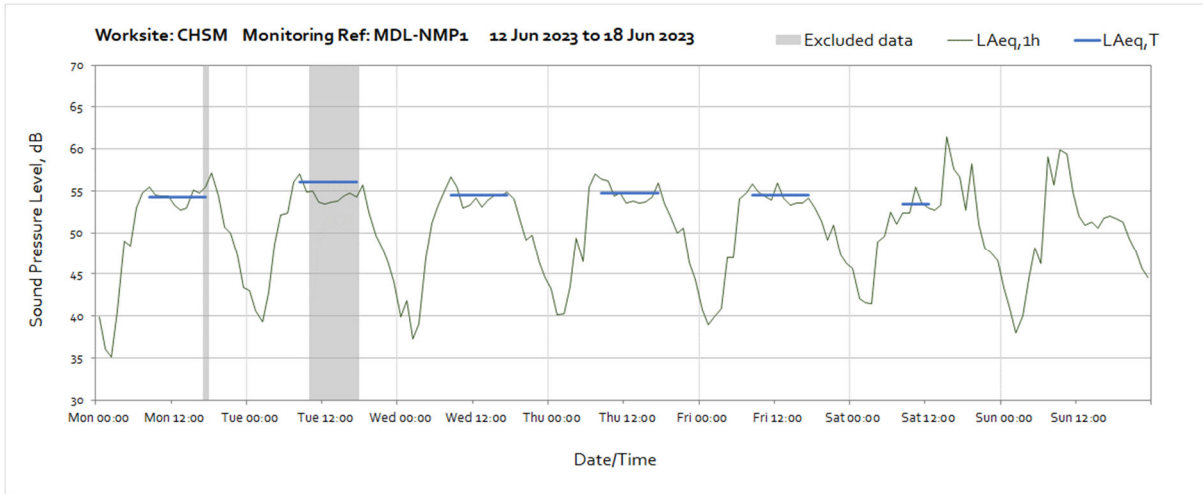




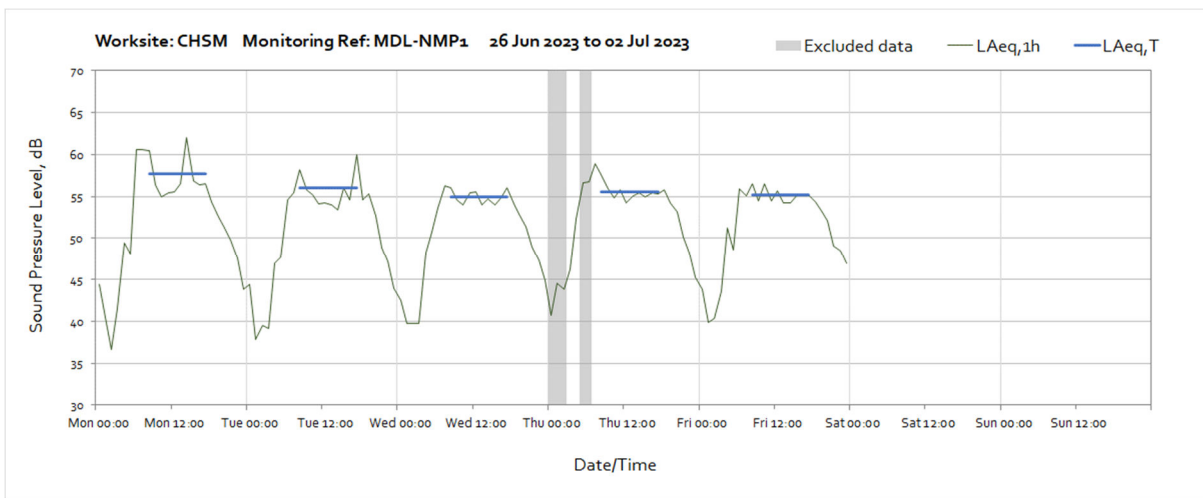


Worksite: CHSM – Monitoring Ref: MDL-NMP1

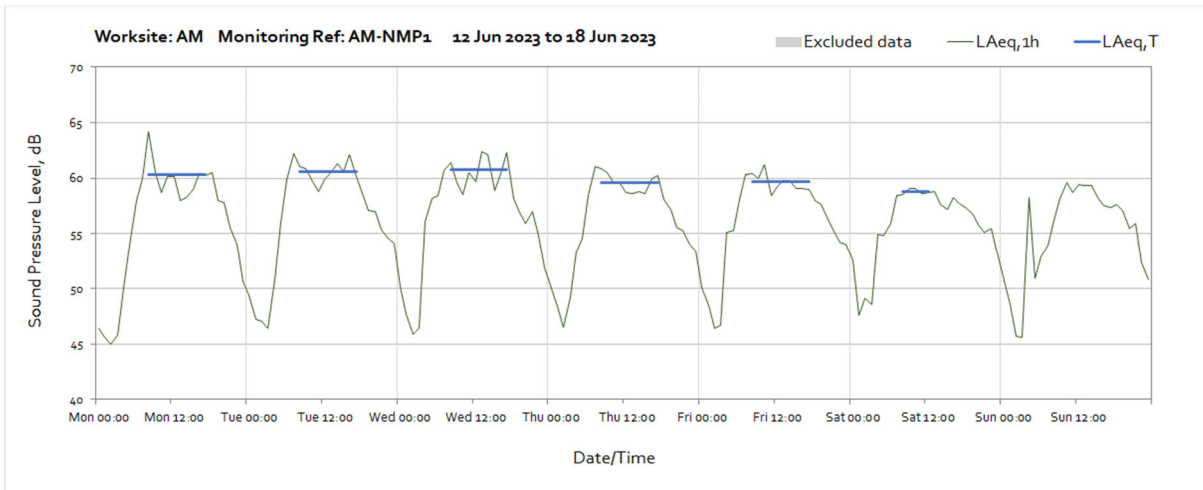
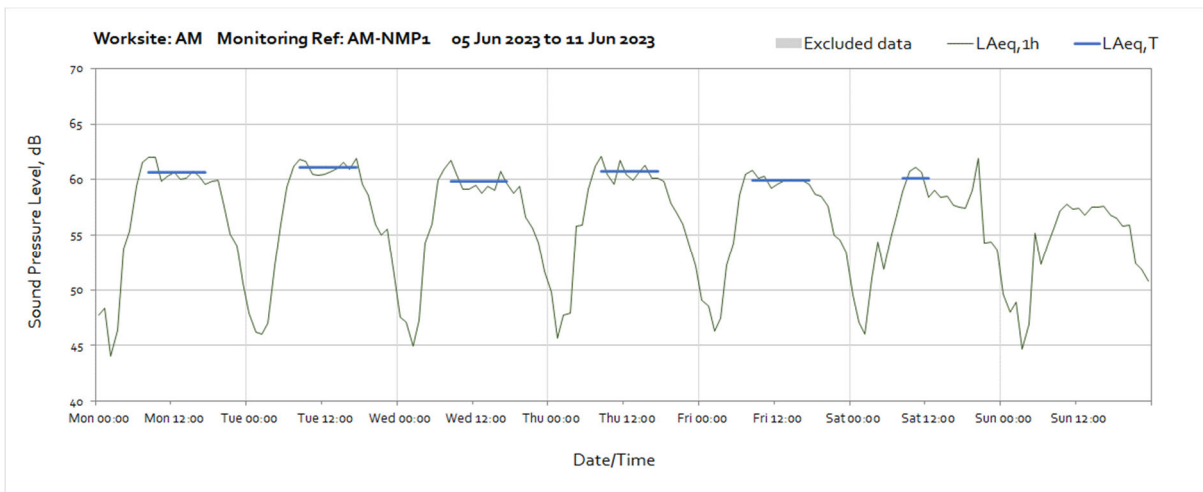
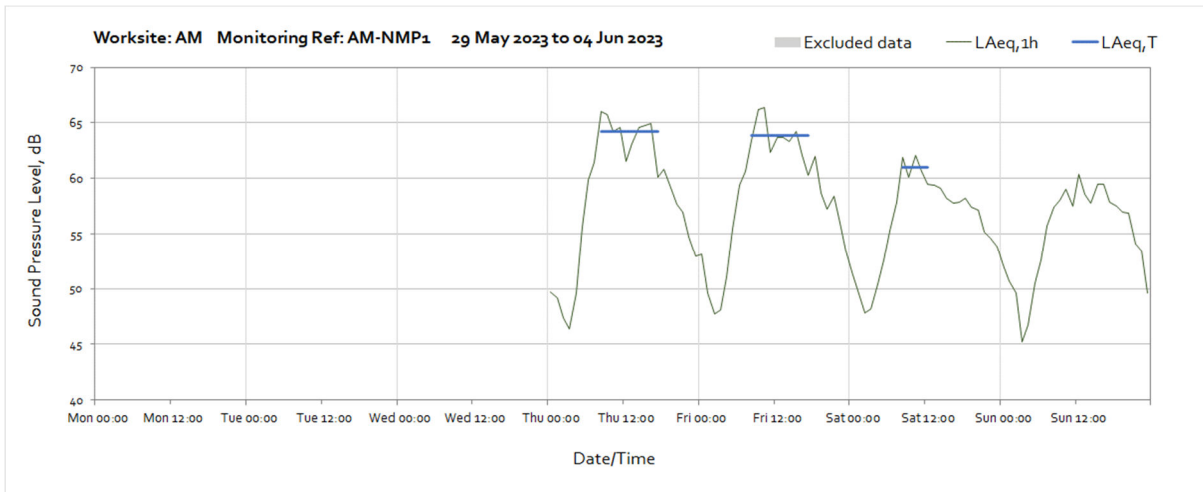


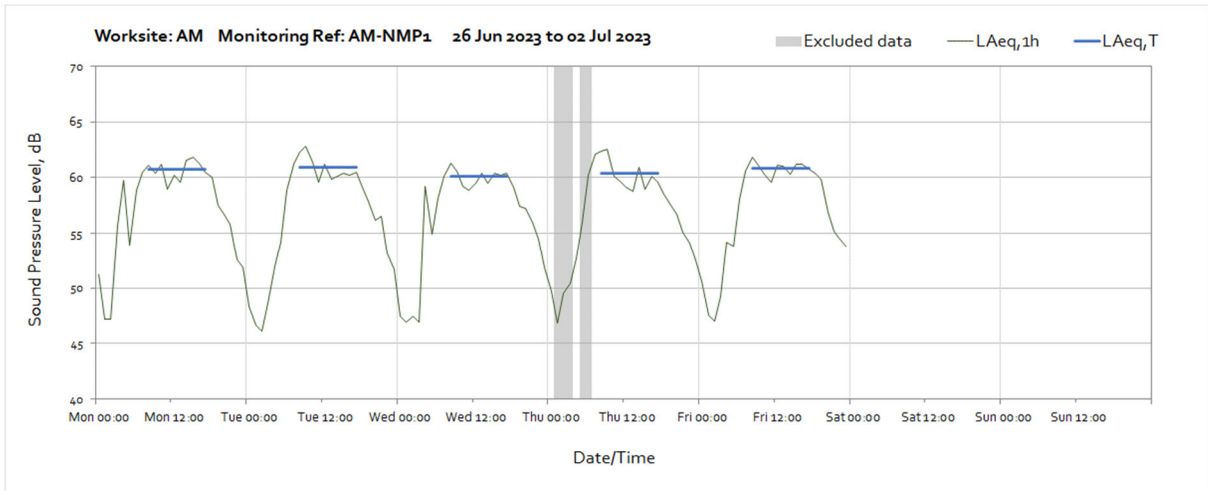
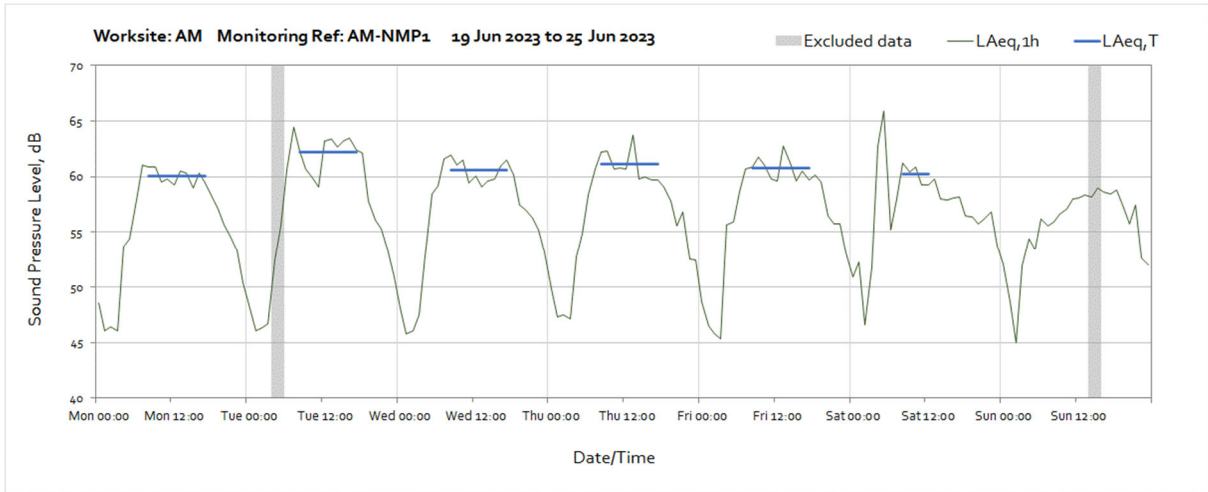


Note: Missing data between 14:00 and 15:00 on Thursday 22nd June was due to monitor field calibration. Missing data between 13:00 and 14:00 on Friday 23rd June was due to monitor maintenance. Missing data between 12:00 and 18:00 on Sunday 25th June was due to a communication error between the server and the monitoring system.

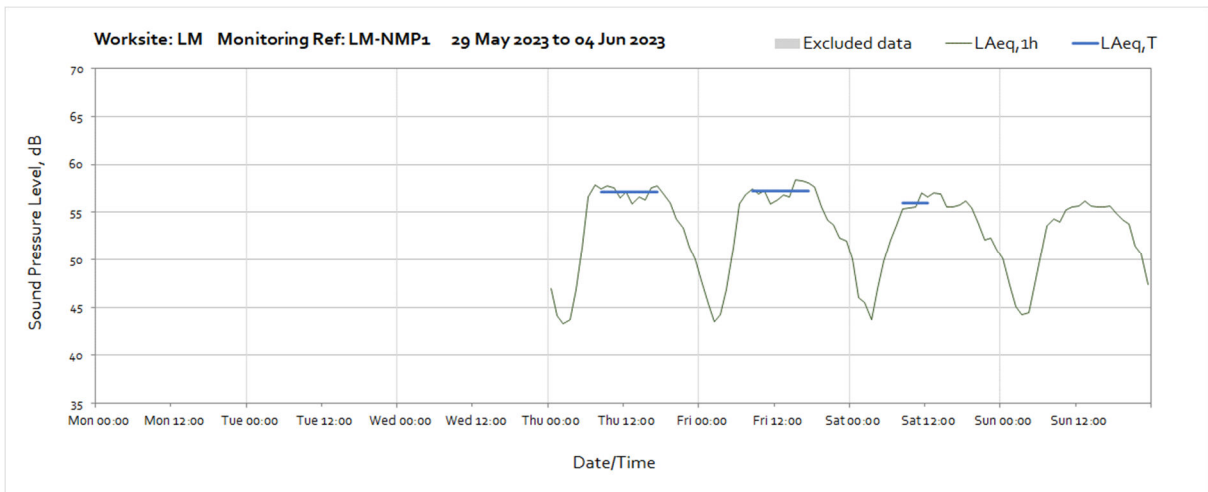


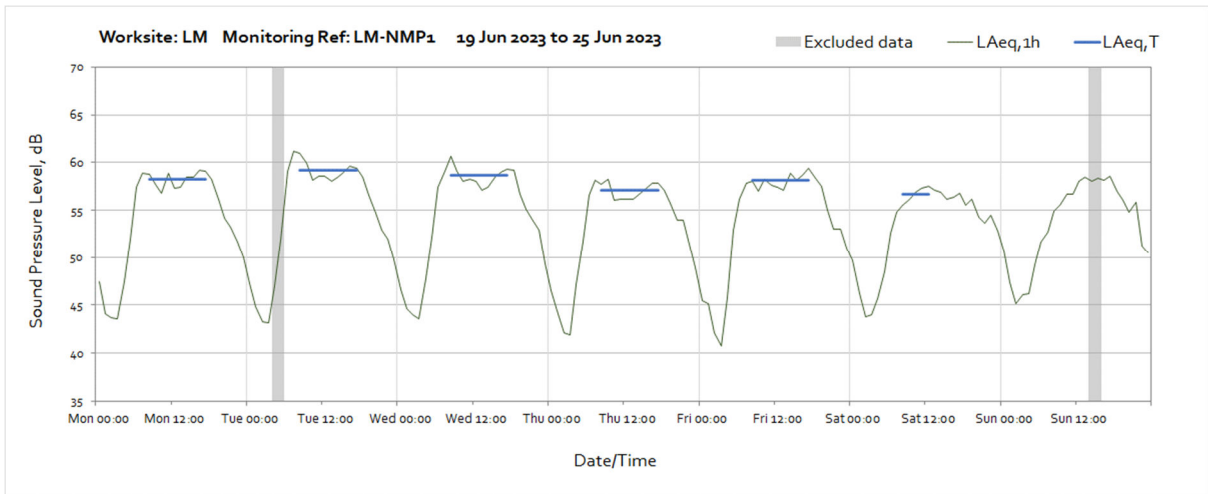
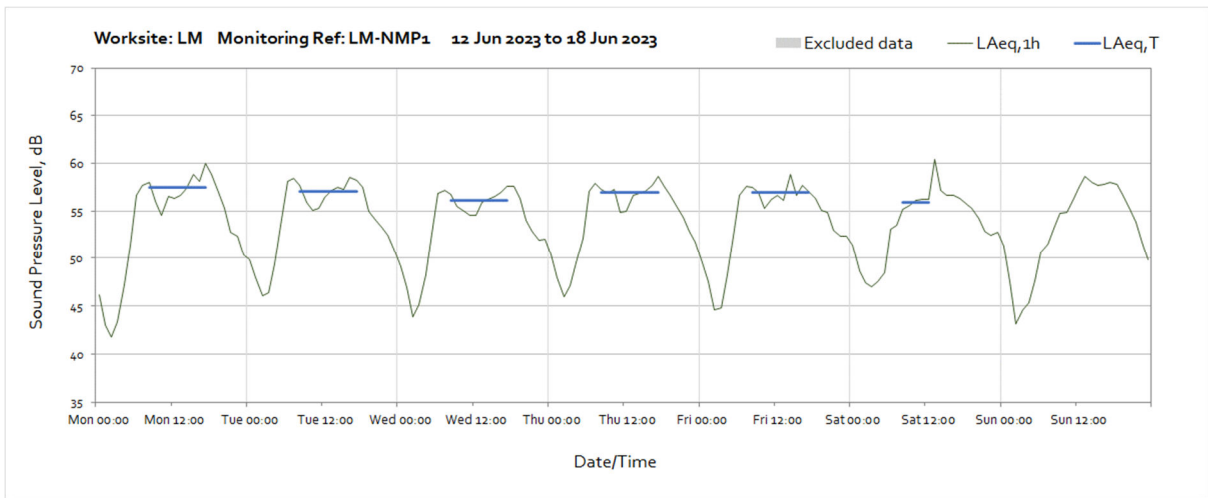
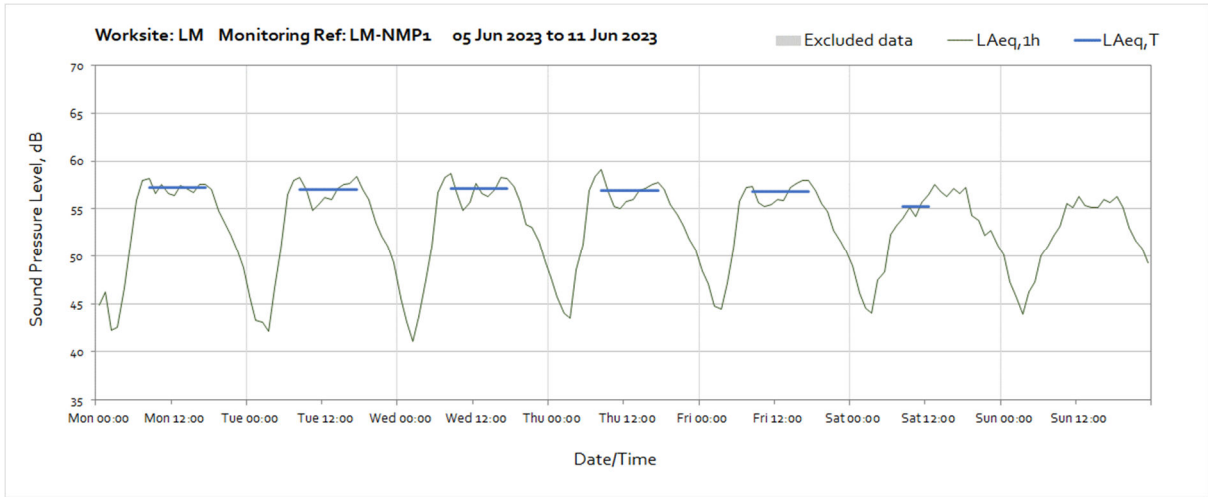
Worksite: AM - Monitoring Ref: AM-NMP1

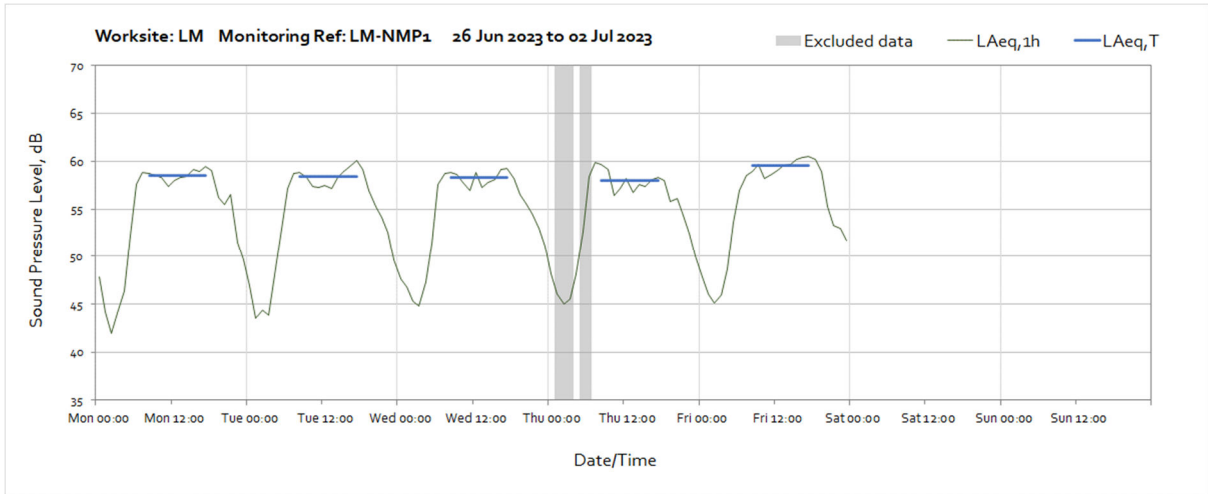




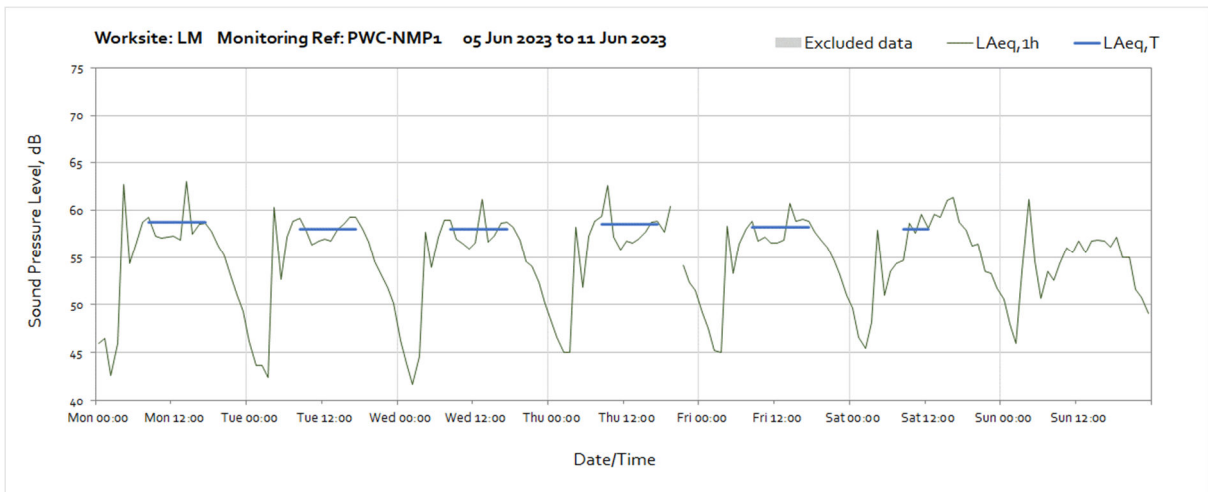
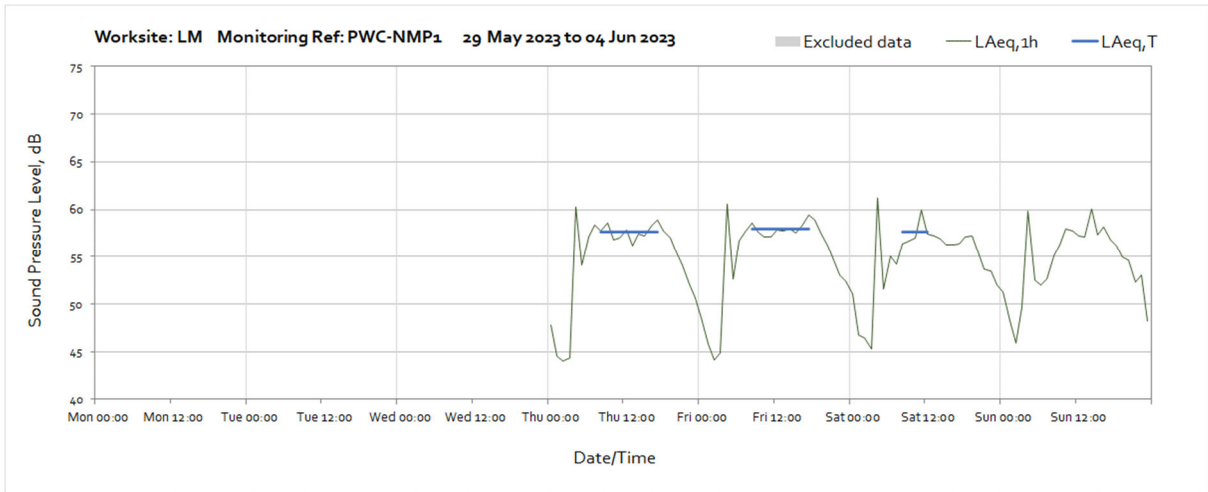
Worksite: LM - Monitoring Ref: LM-NMP1

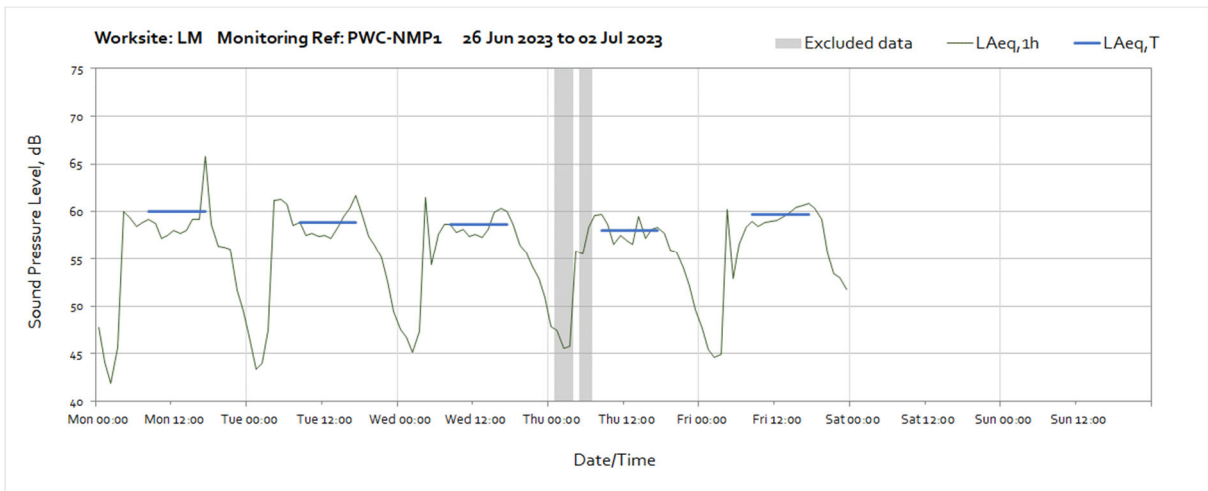
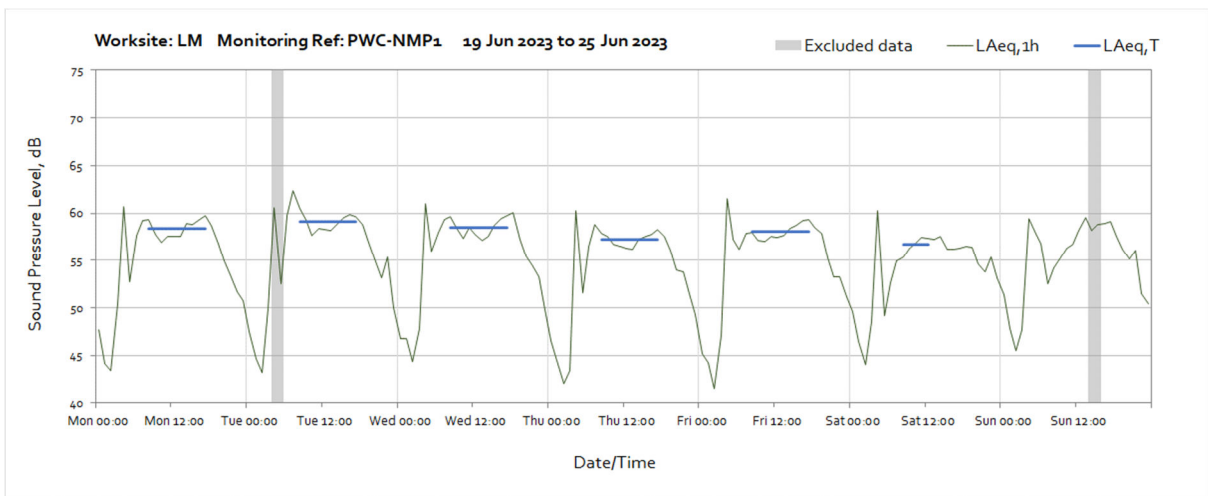
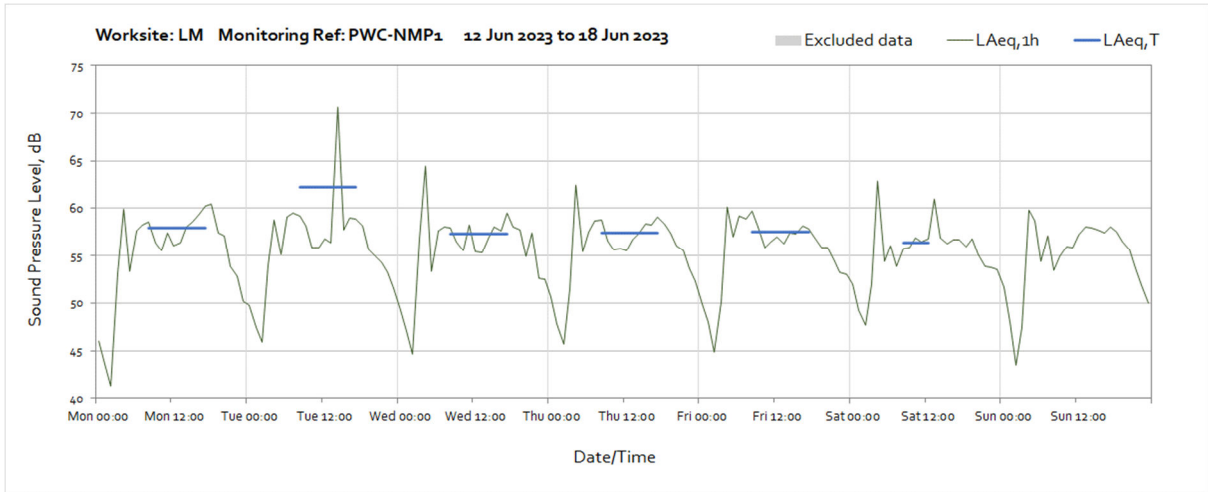




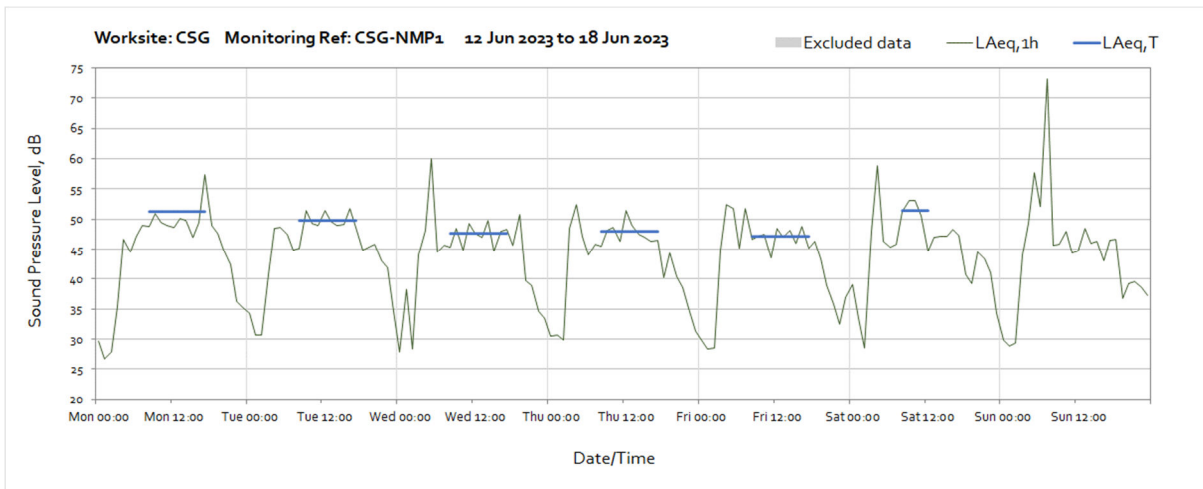
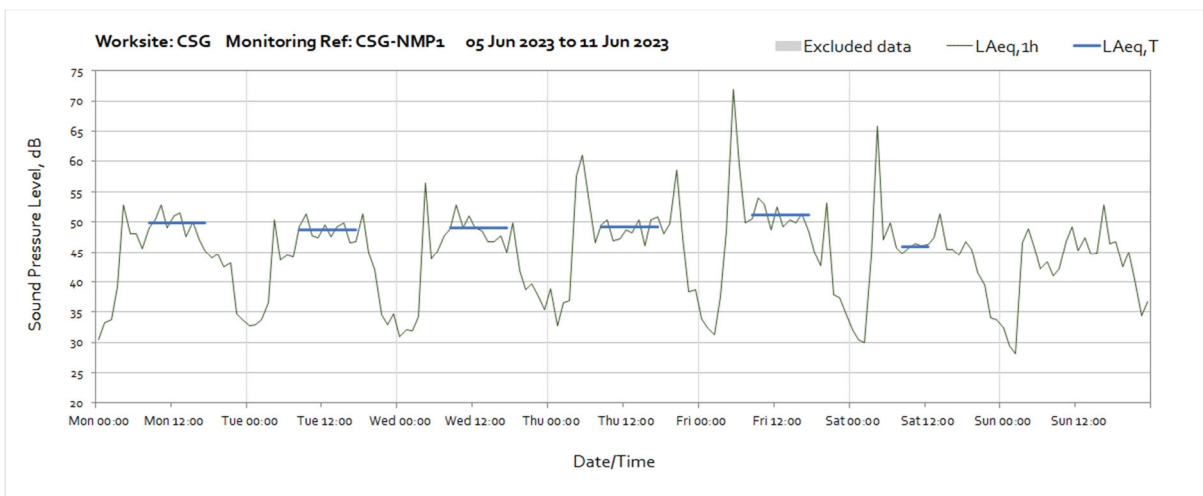
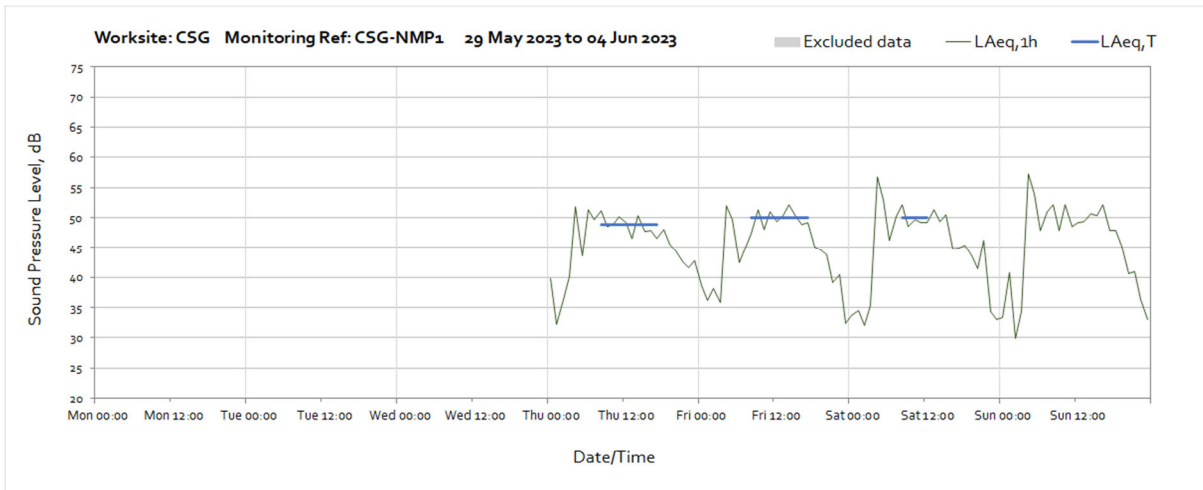


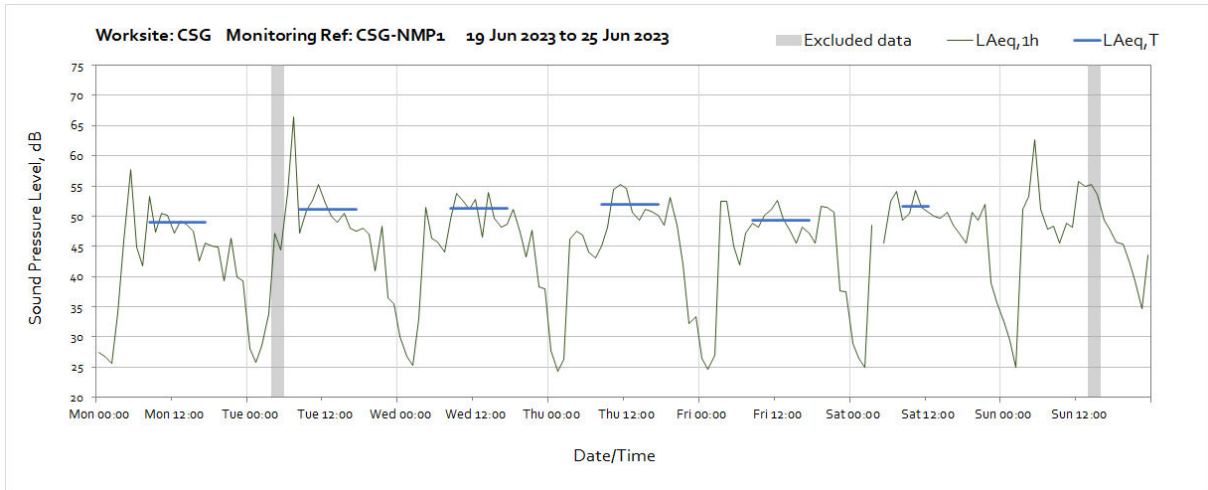
Worksite: LM – Monitoring Ref: PWC-NMP1



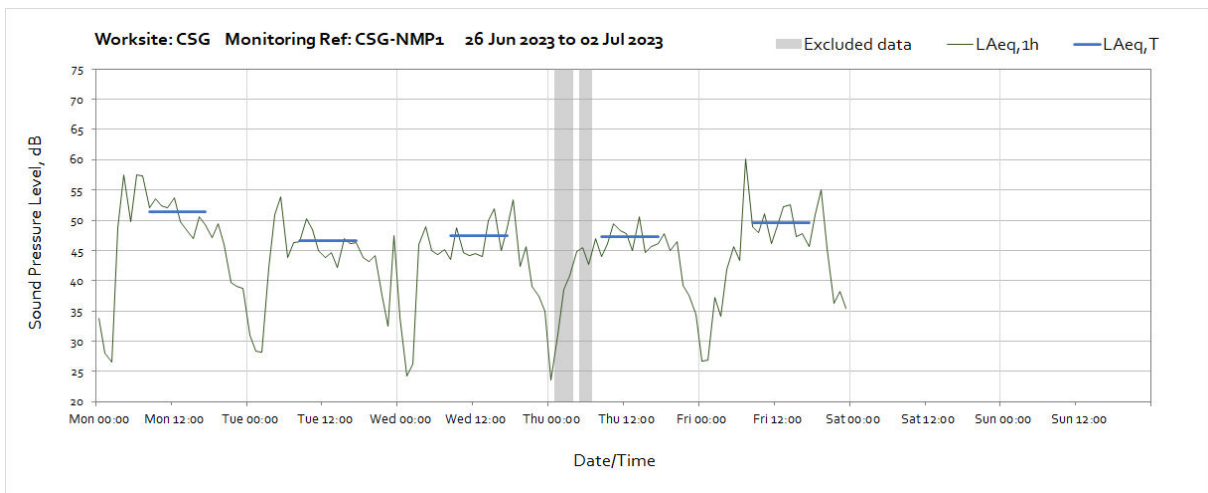


Worksite: CSG – Monitoring Ref: CSG-NMP1

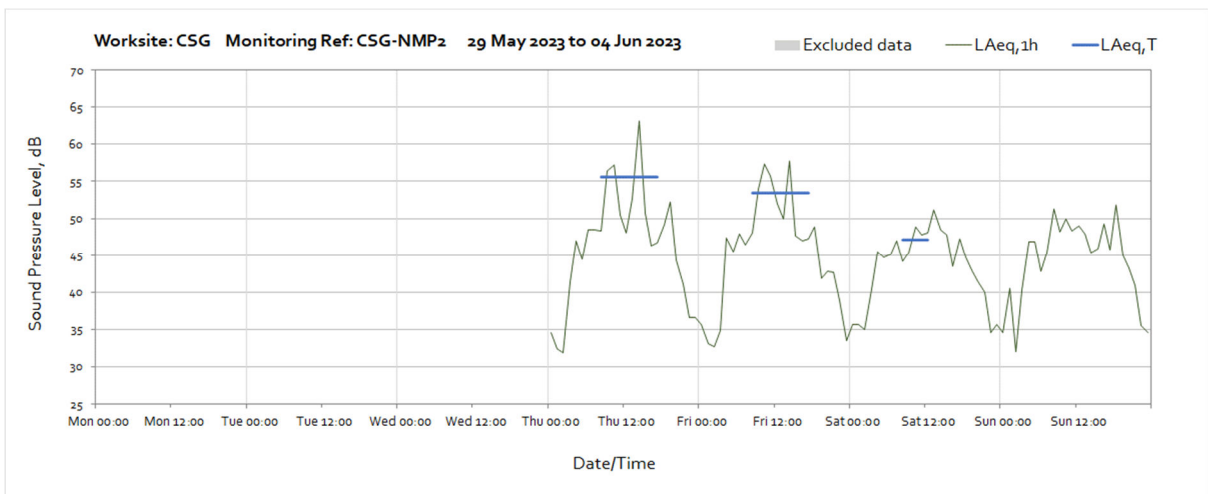


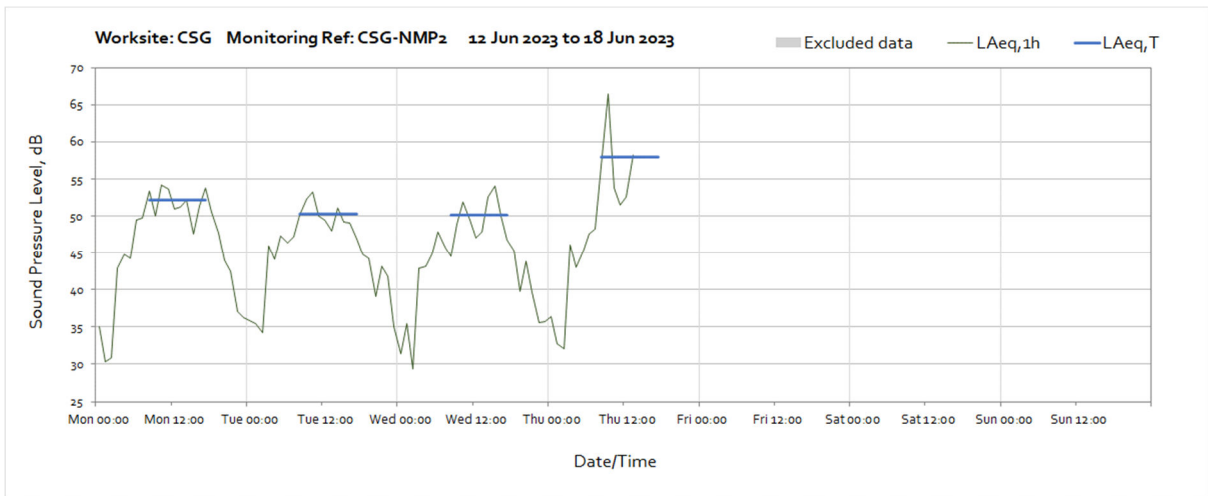
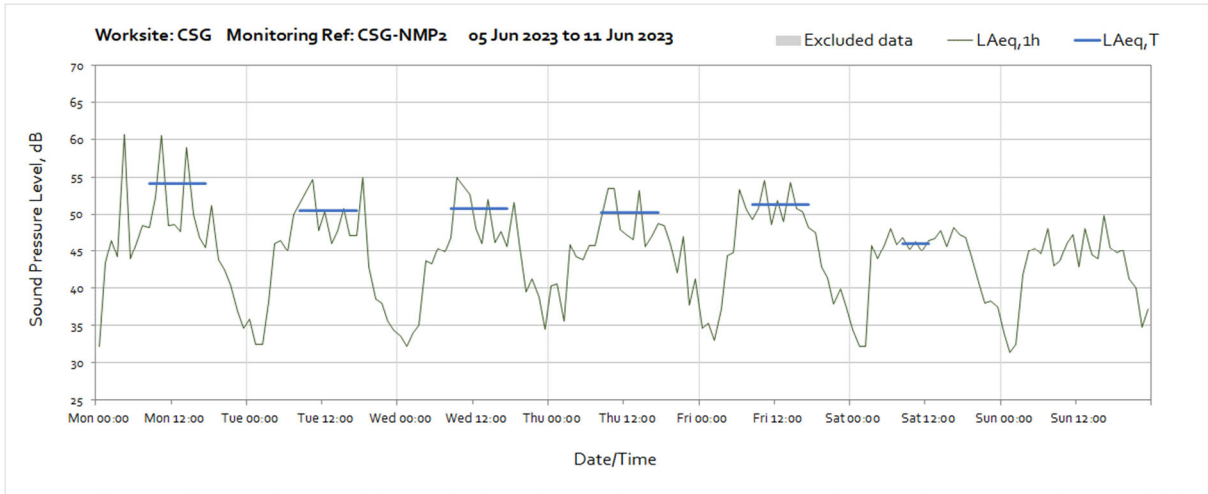


Note: Missing data between 04:00 and 05:00 on Saturday 24th June was due to a monitor system update.



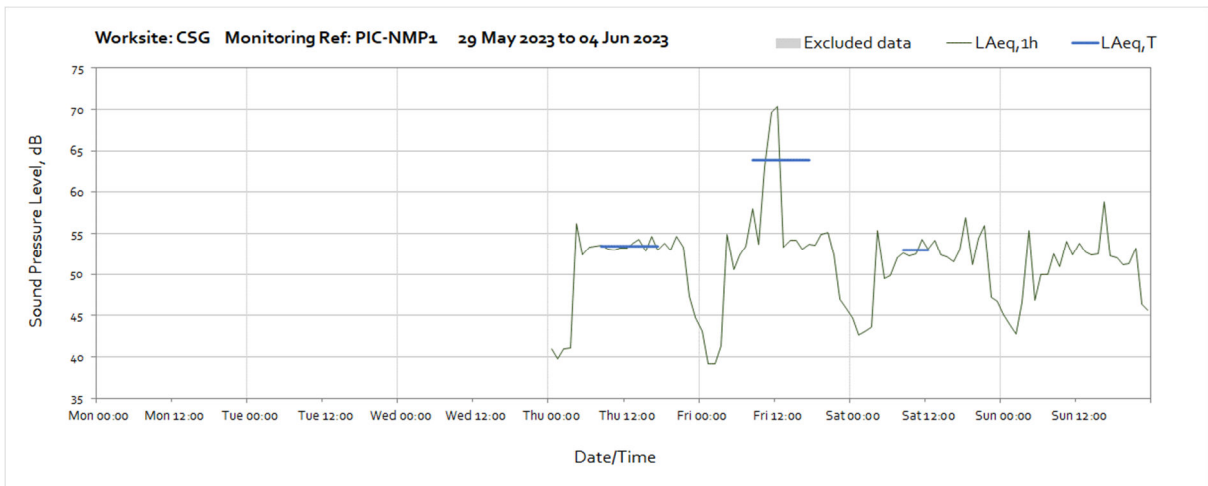
Worksite: CSG - Monitoring Ref: CSG-NMP2

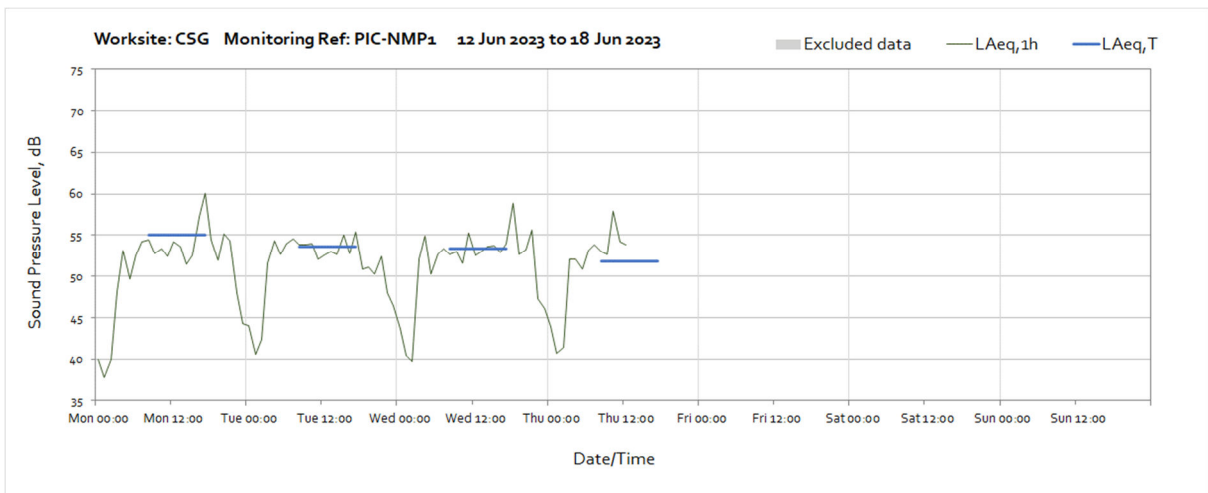
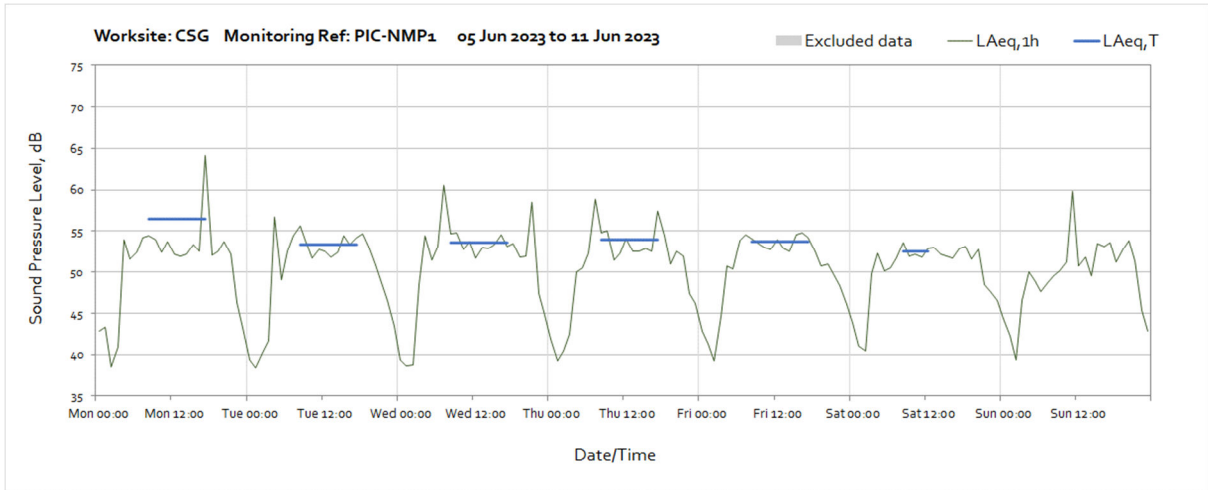




Note: Missing data from 14:00 on Thursday 15th June was due to monitor retrieval.

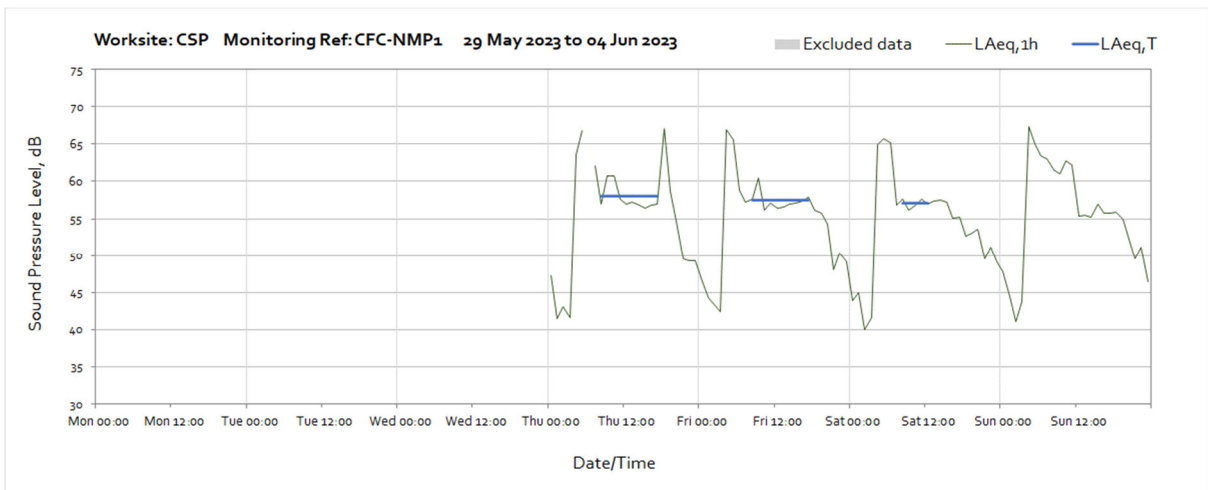
Worksite: CSG – Monitoring Ref: PIC-NMP1





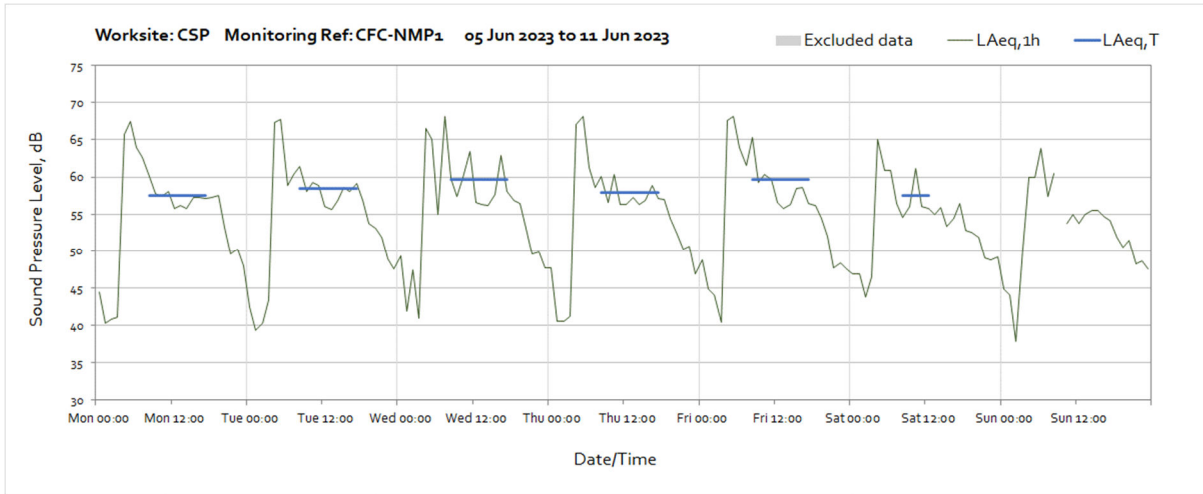
Note: Missing data from 13:00 on Thursday 15th June was due to monitor retrieval.

Worksite: CSP - Monitoring Ref: CFC-NMP1

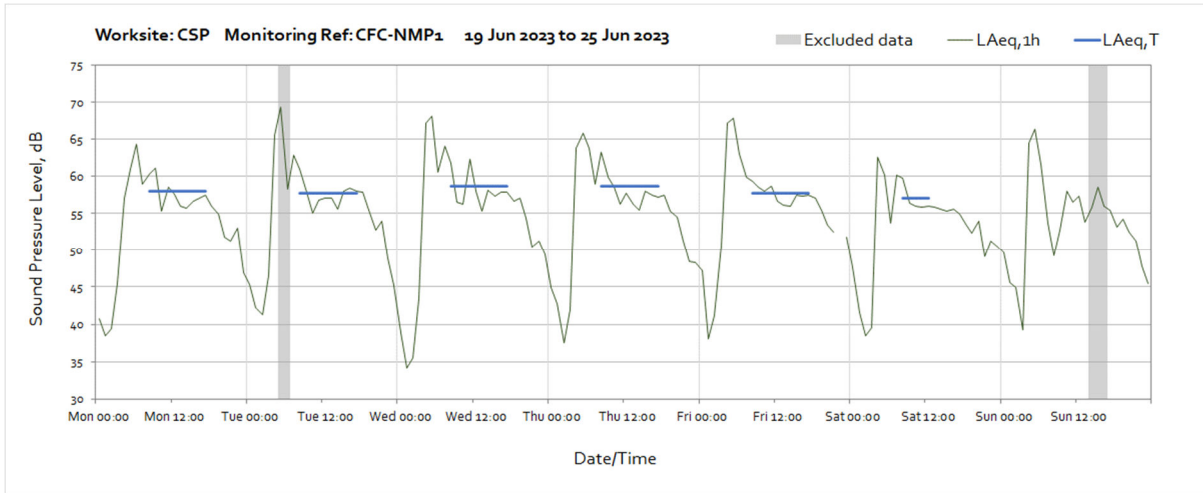
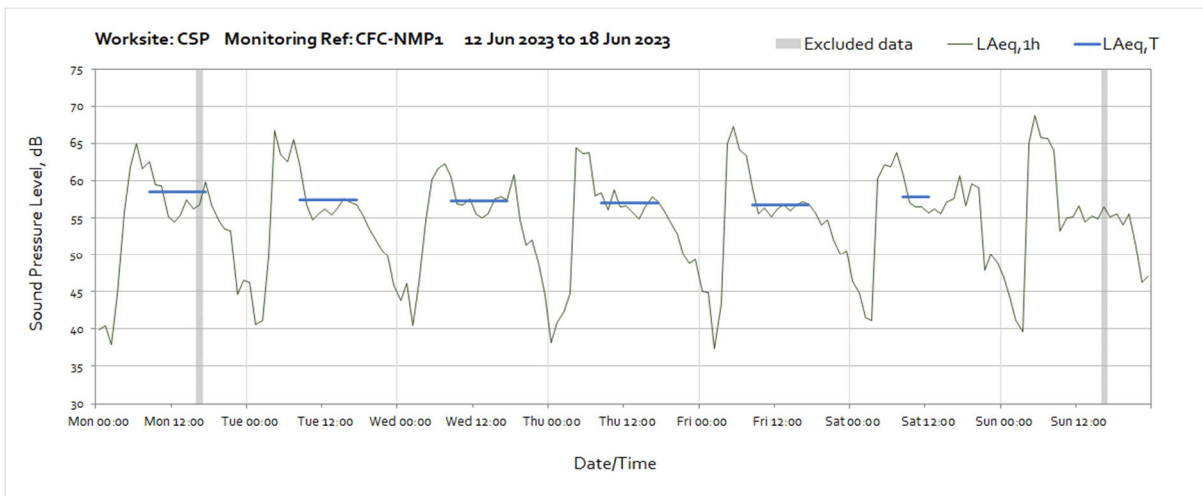


Note: Missing data between 06:00 and 07:00 on Thursday 1st June was due to a communication error between the server and the monitoring system.

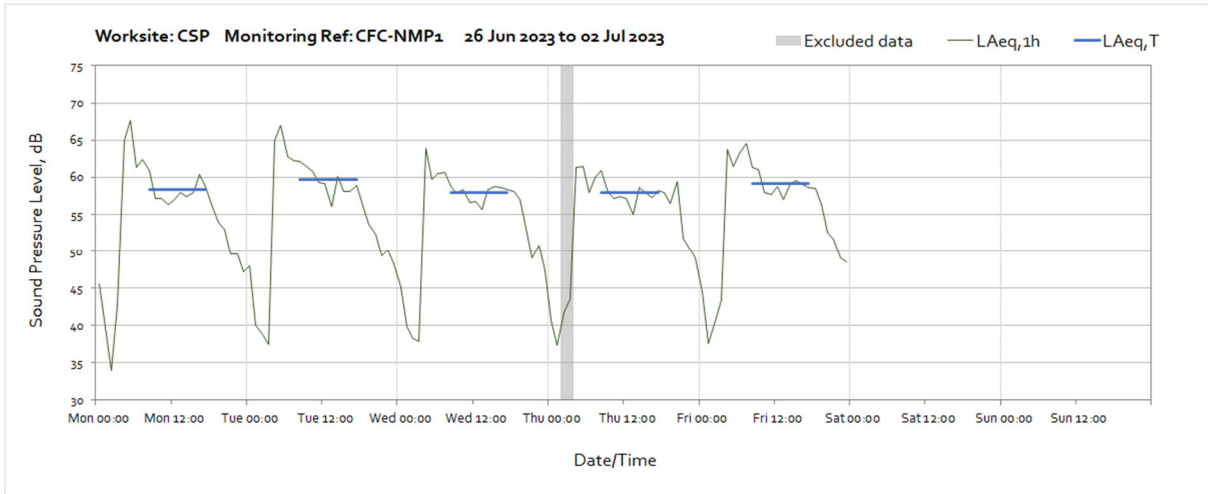
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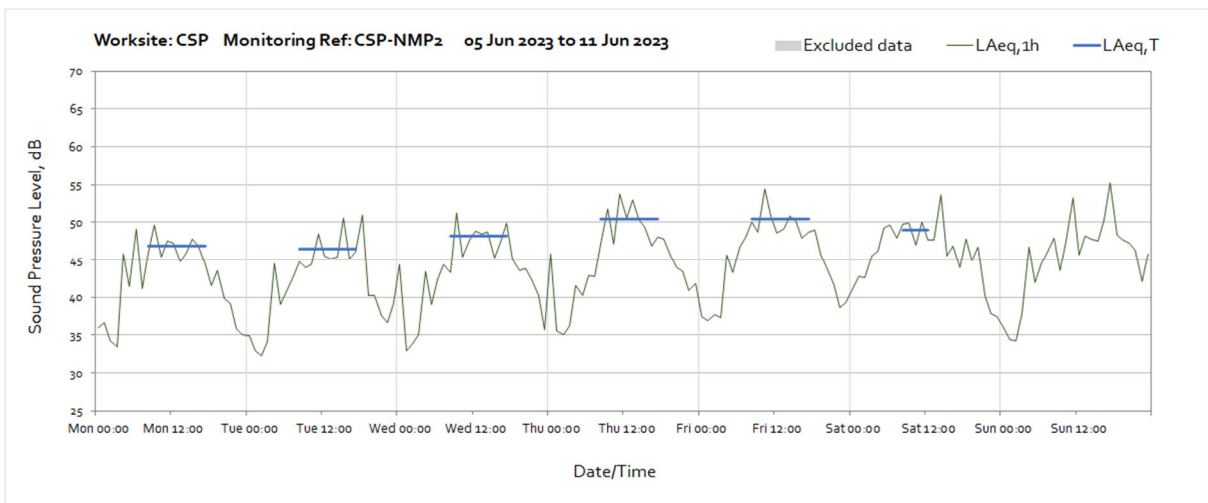
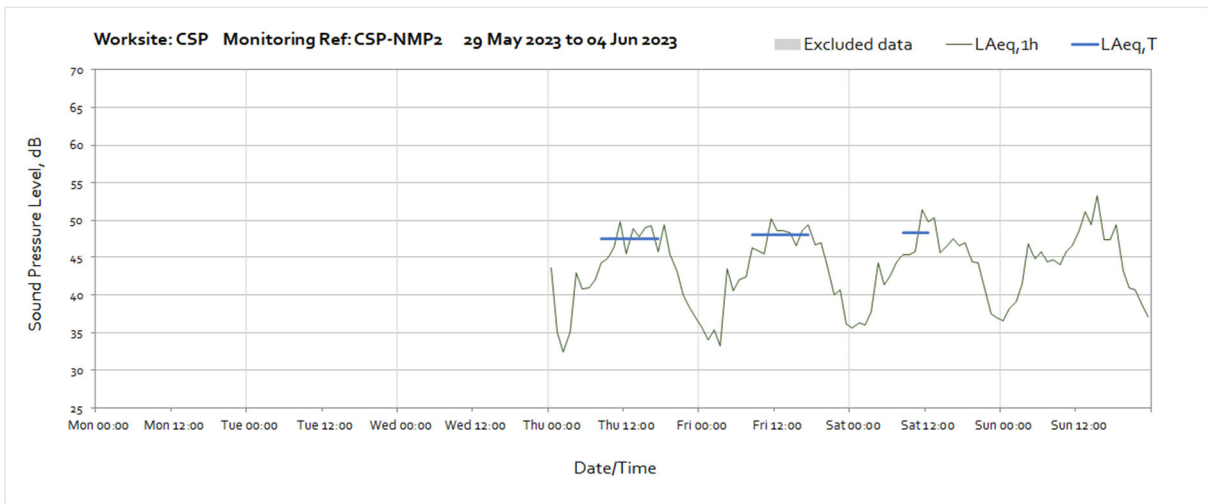
Note: Missing data between 09:00 and 10:00 on Sunday 11th June was due to a monitor system update.

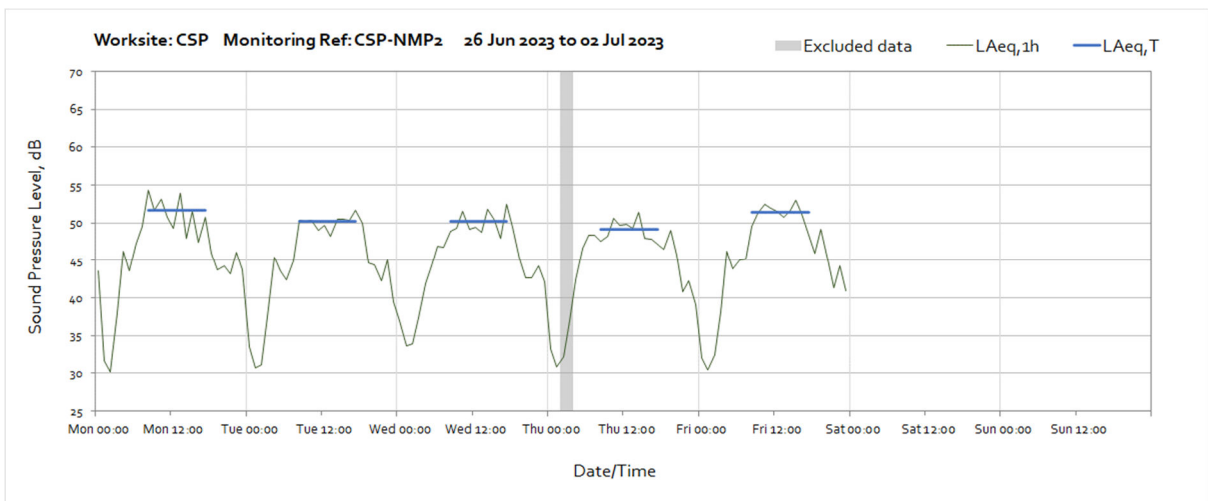
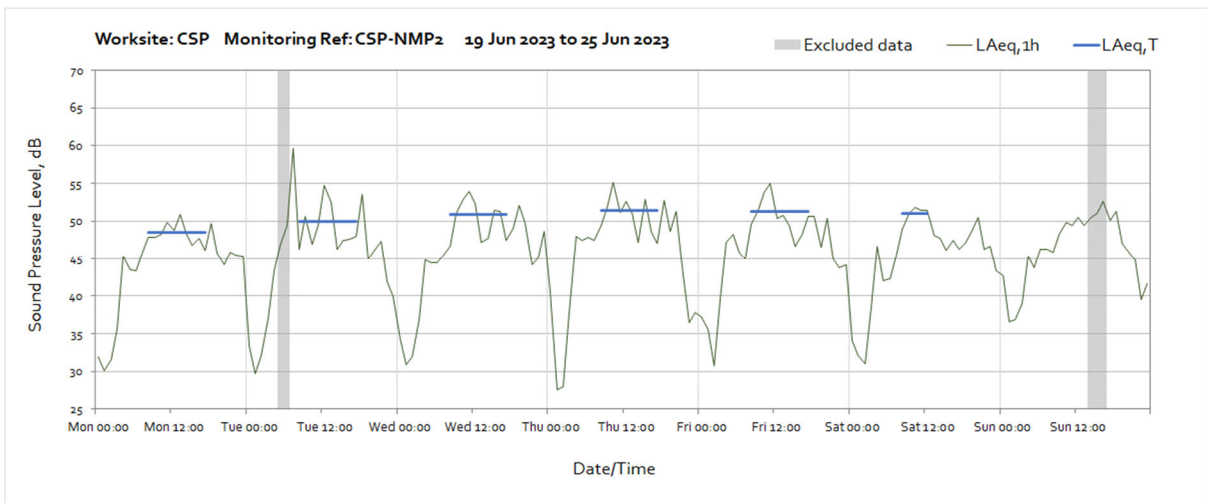
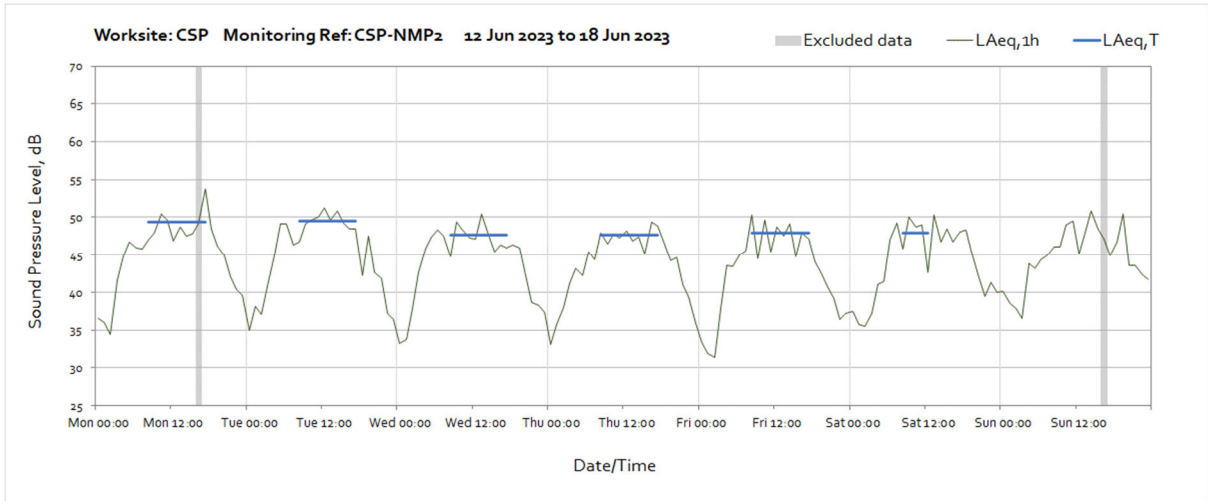


Note: Missing data between 22:00 and 23:00 on Friday 23th June was due to a communication error between the server and the monitoring system.

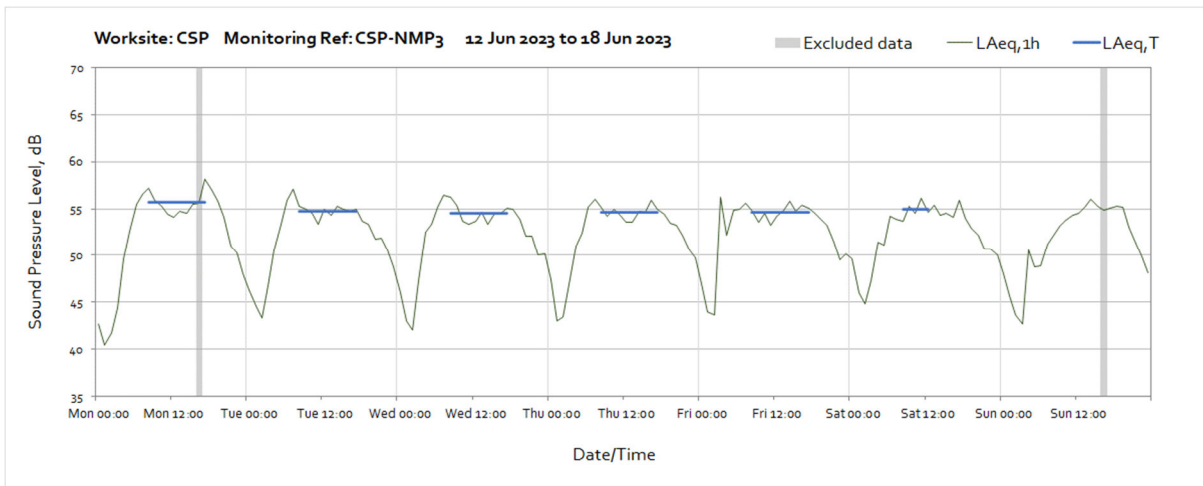
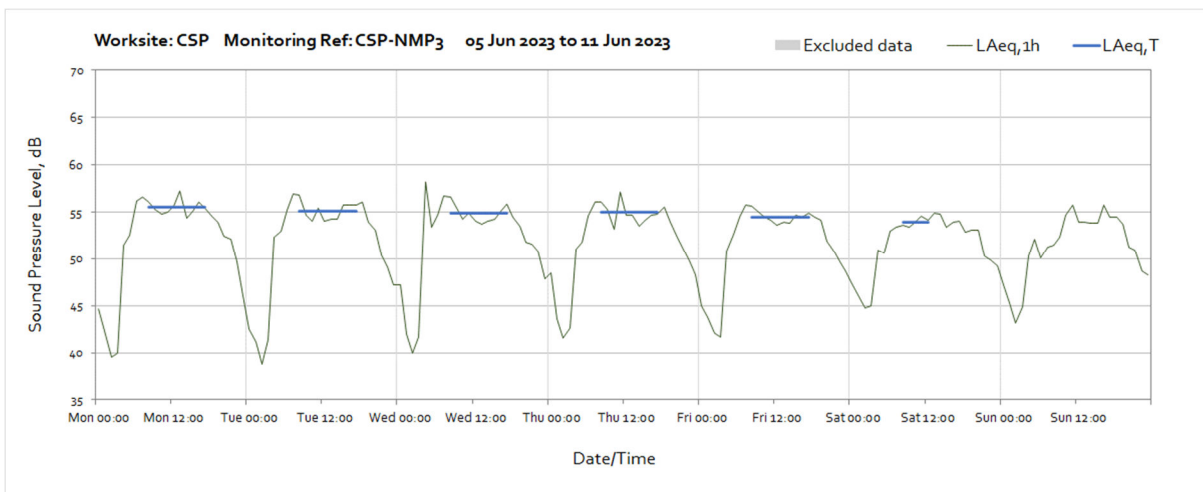
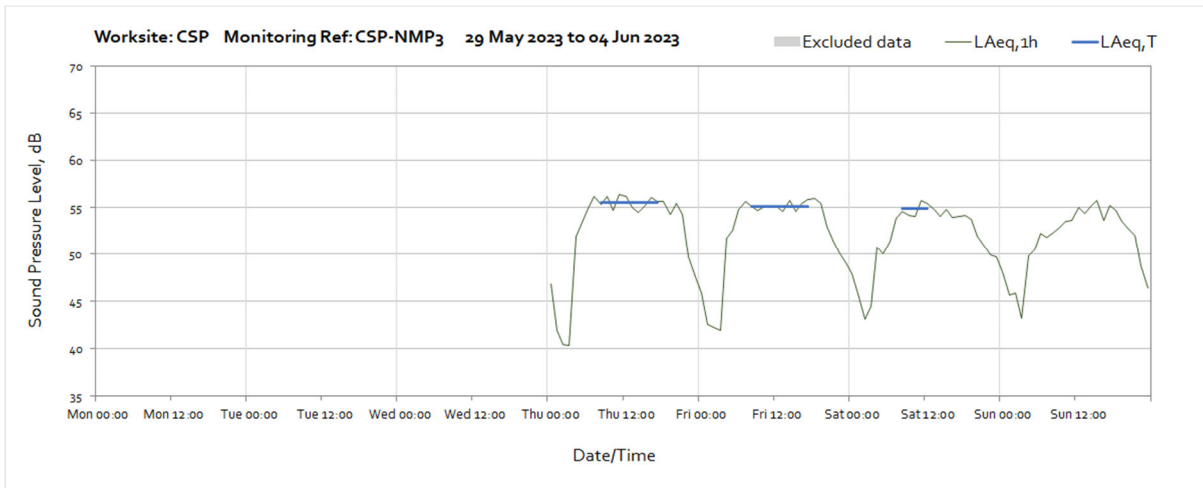


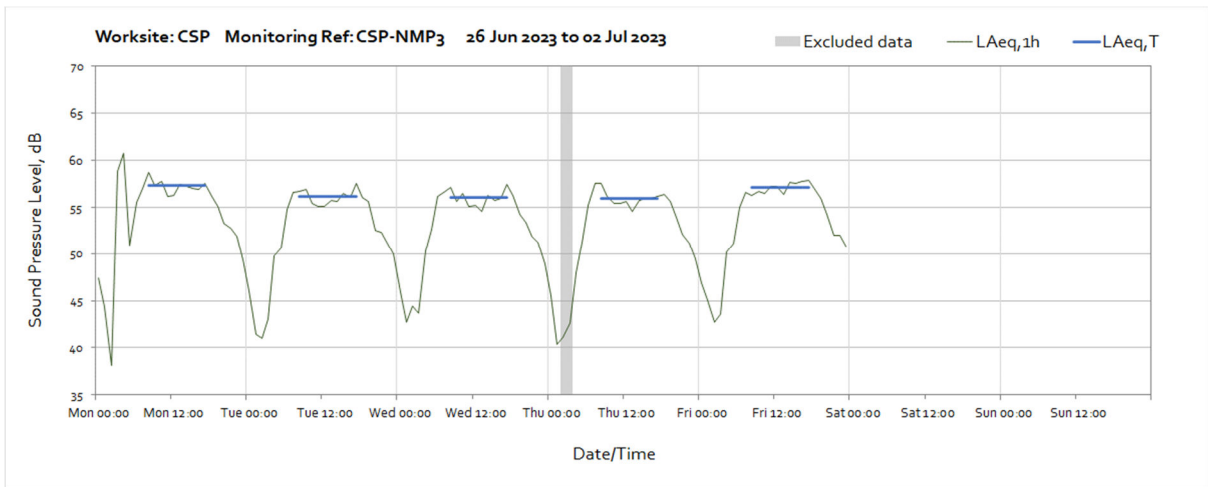
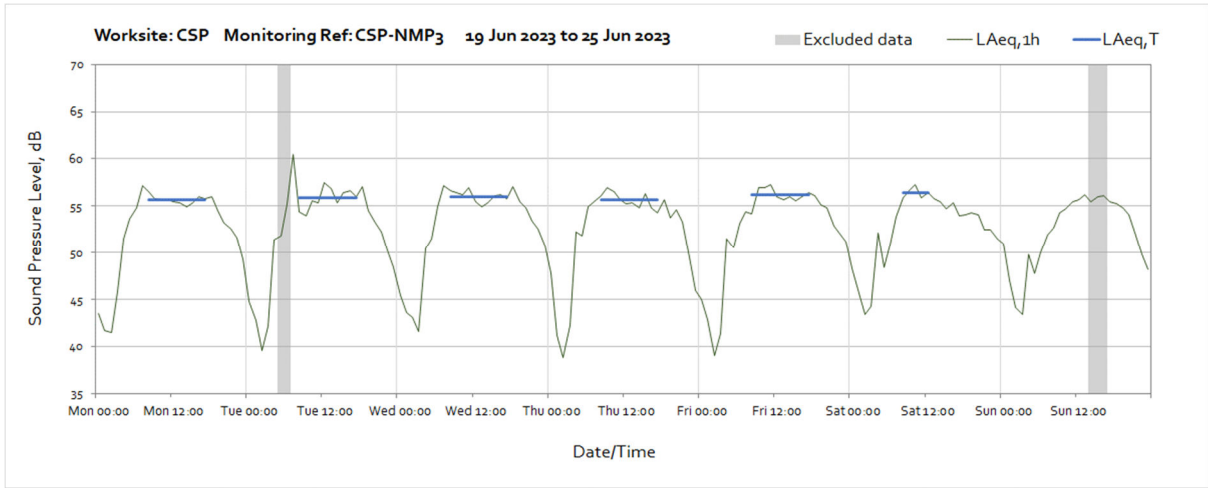
Worksite: CSP - Monitoring Ref: CSP-NMP2



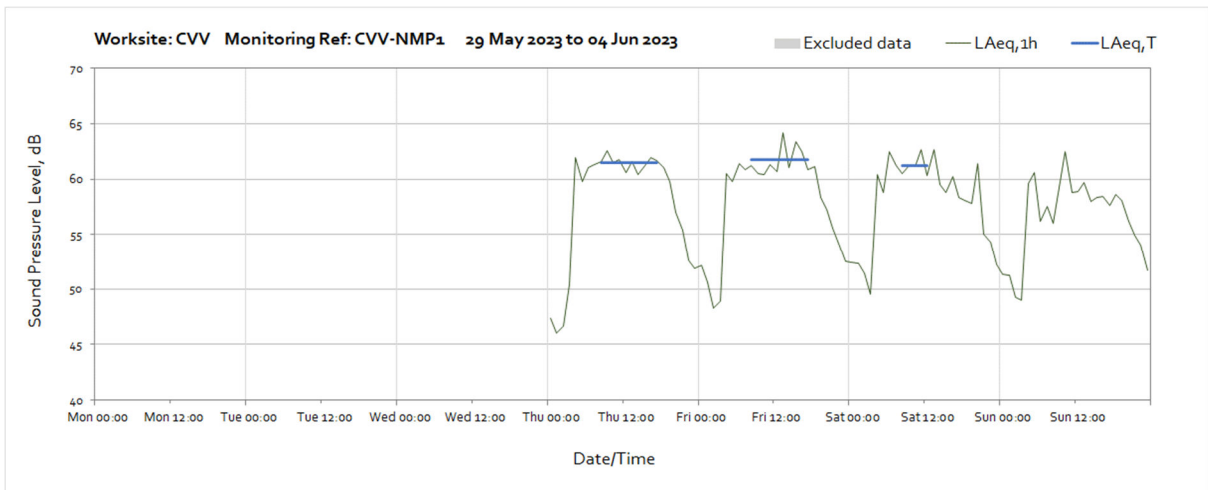


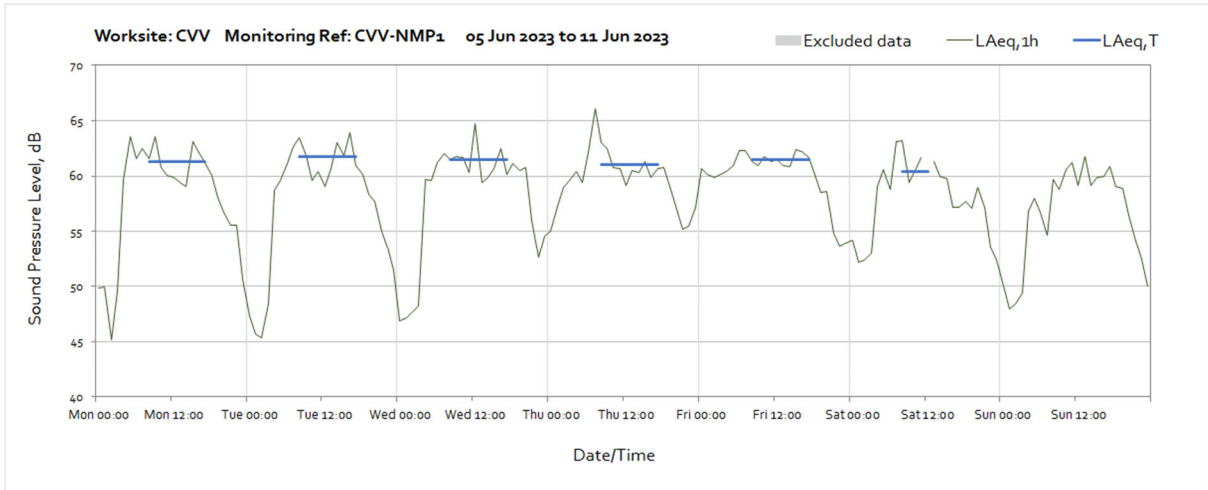
Worksite: CSP – Monitoring Ref: CSP-NMP3



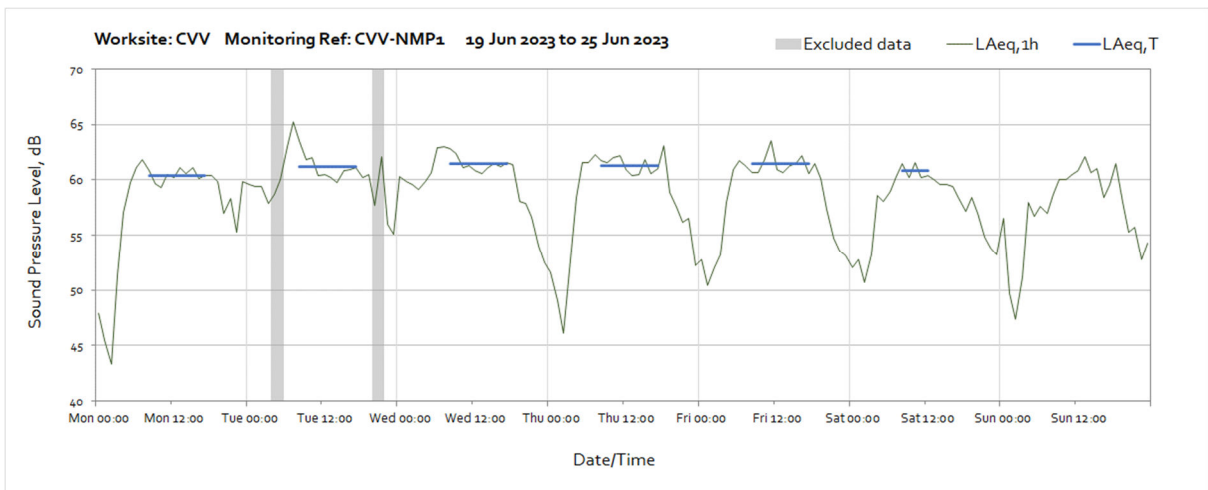
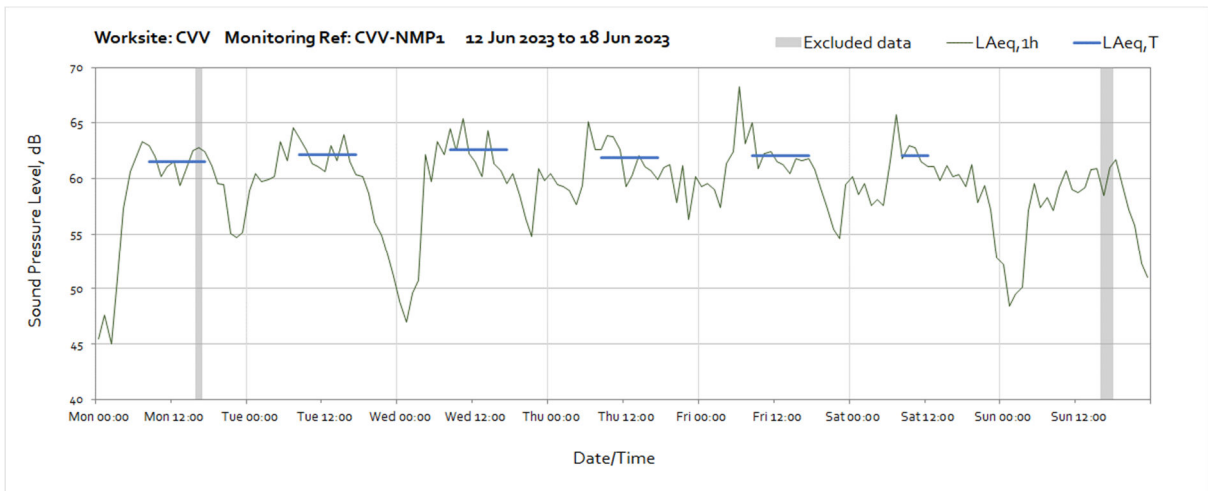


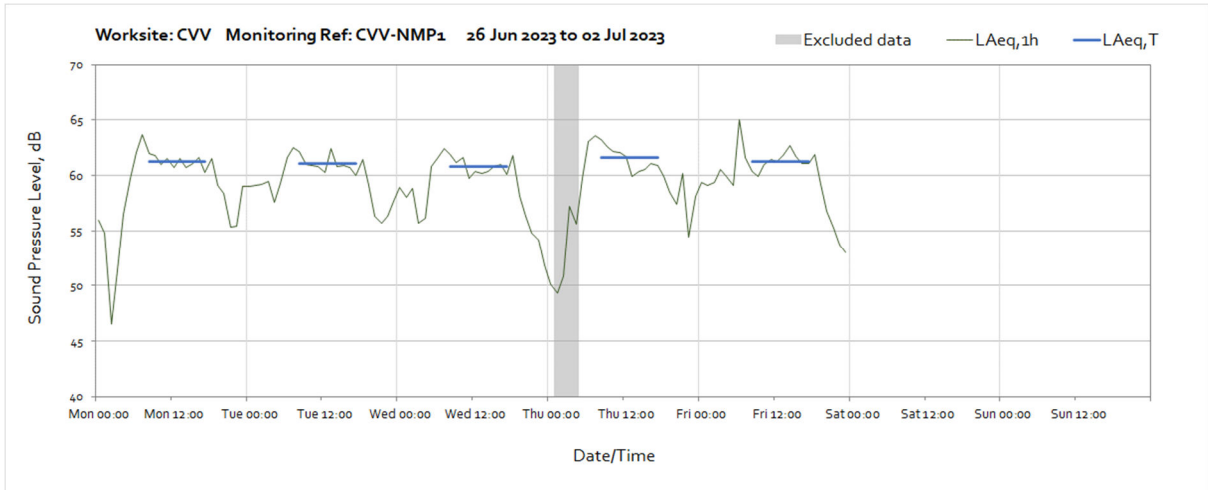
Worksite: CVV- Monitoring Ref: CVV-NMP1



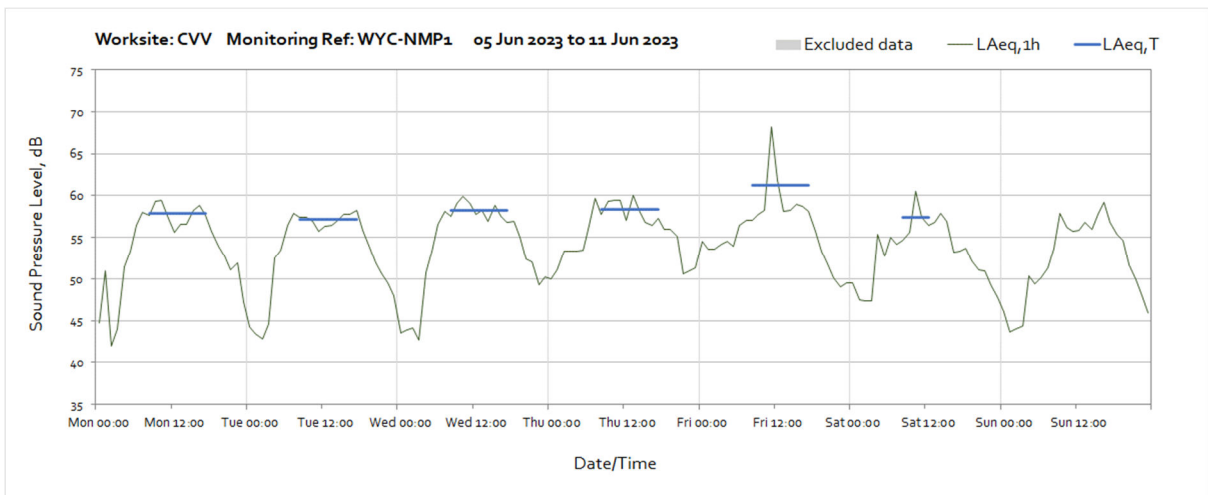
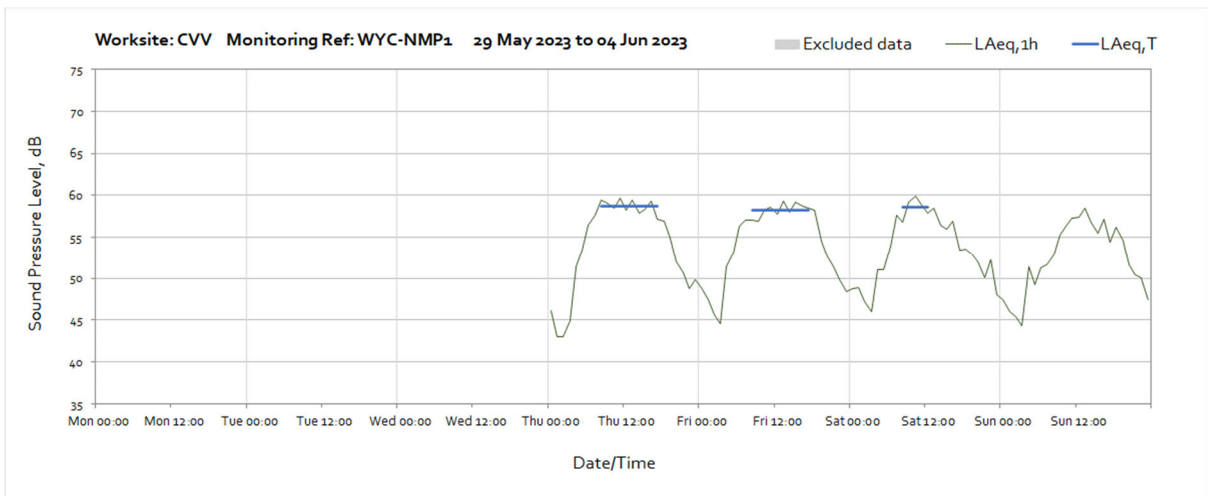


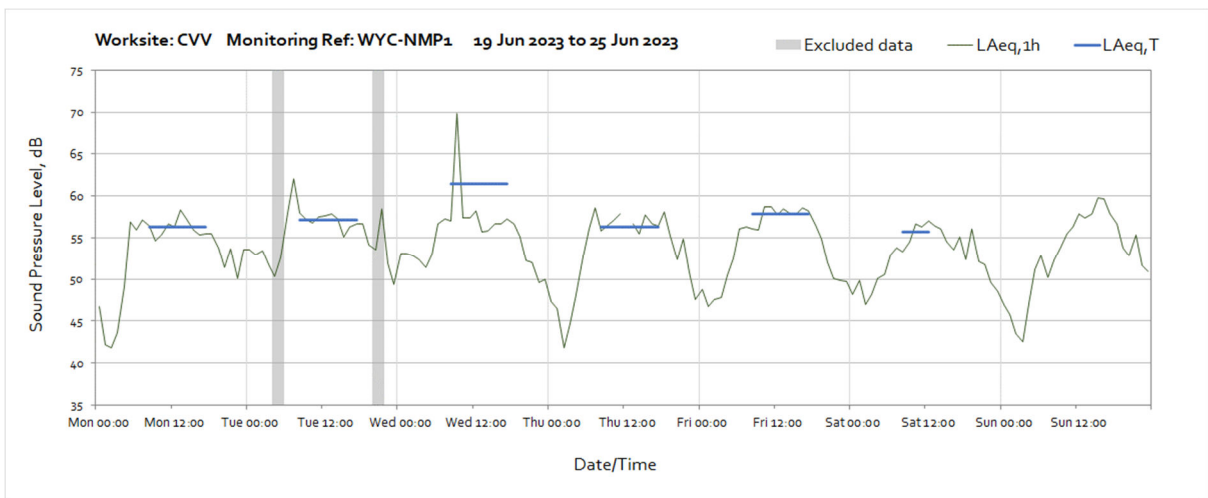
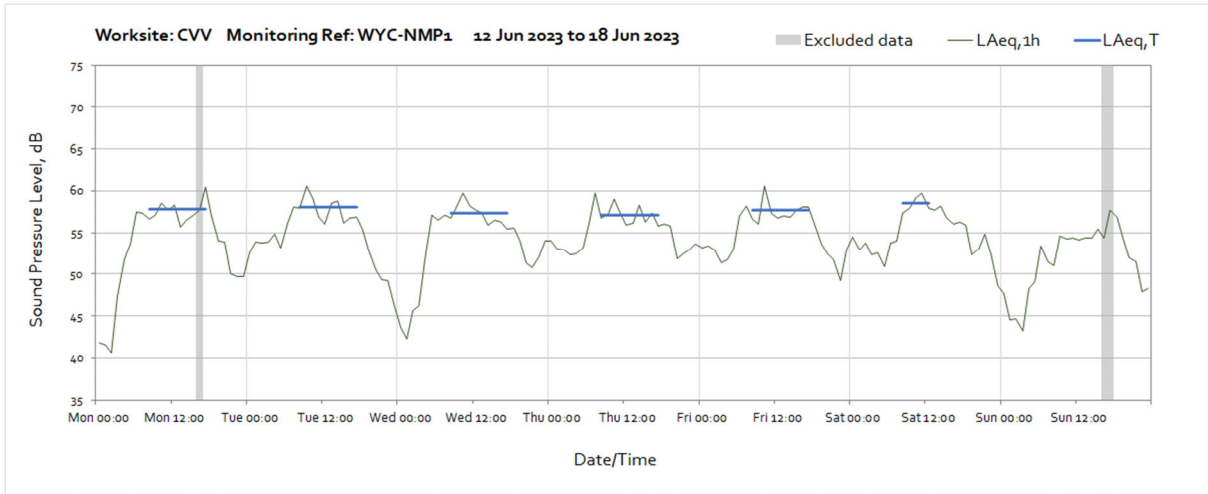
Note: Missing data between 12:00 and 13:00 on Saturday 10th June was due to a communication error between the server and the monitoring system.



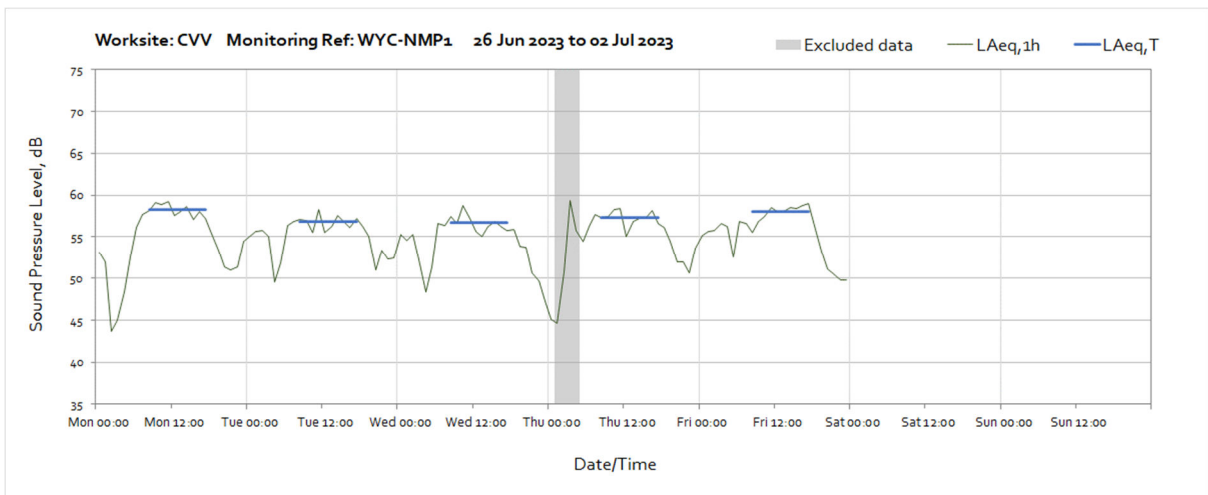


Worksite: CVV - Monitoring Ref: WYC-NMP1

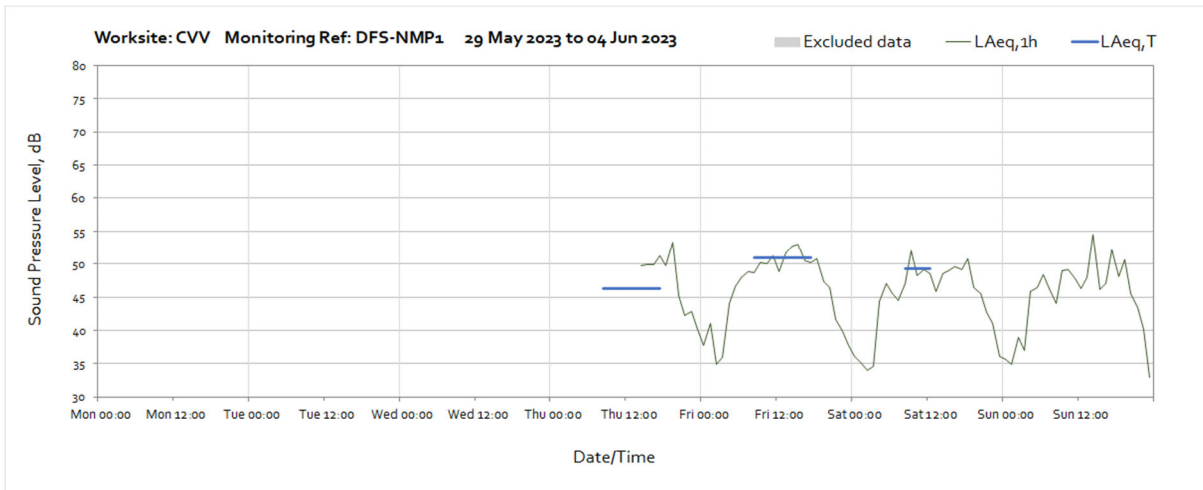




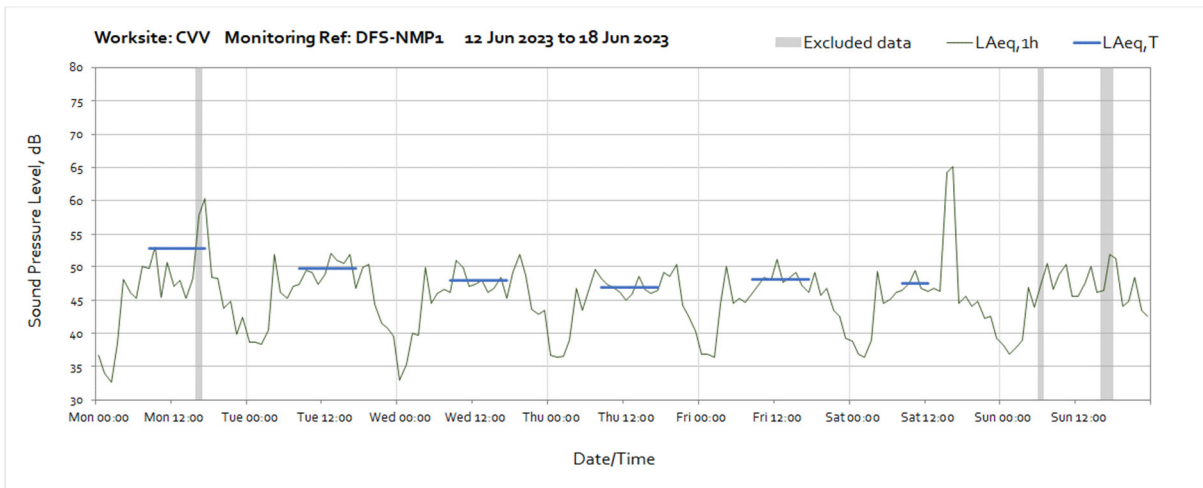
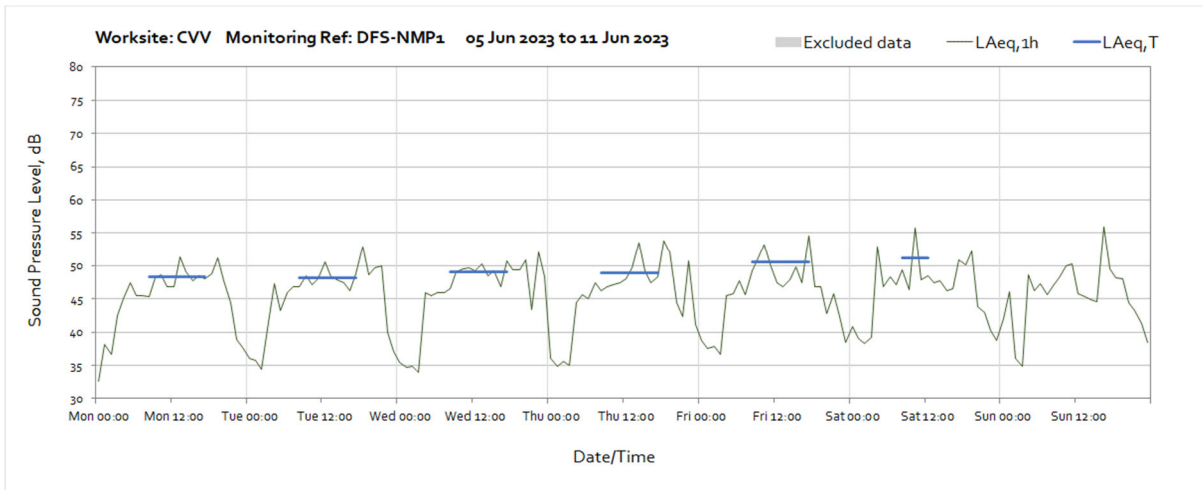
Note: Missing data between 12:00 and 13:00 on Thursday 22nd June was due to monitor field calibration.



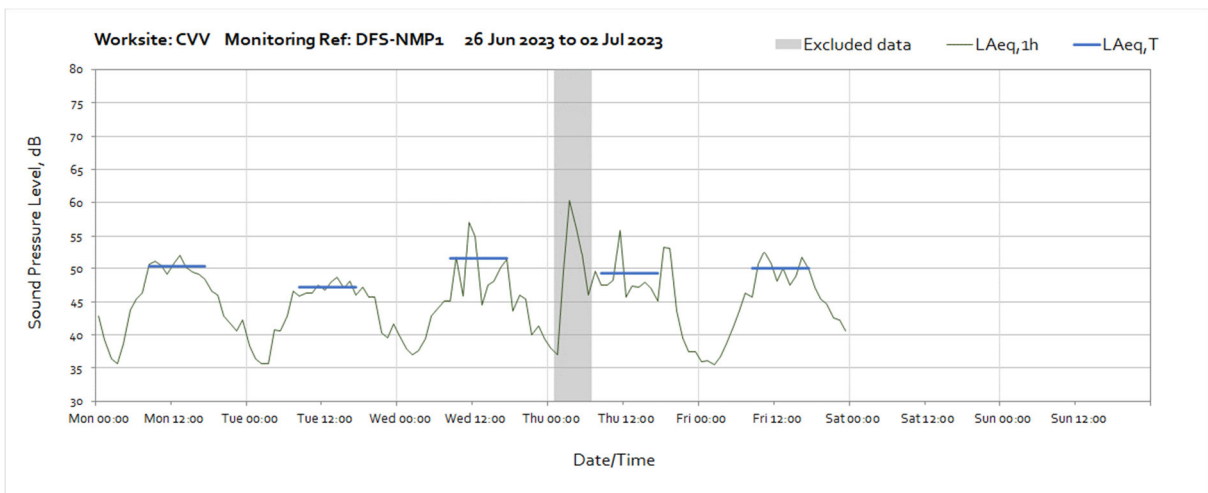
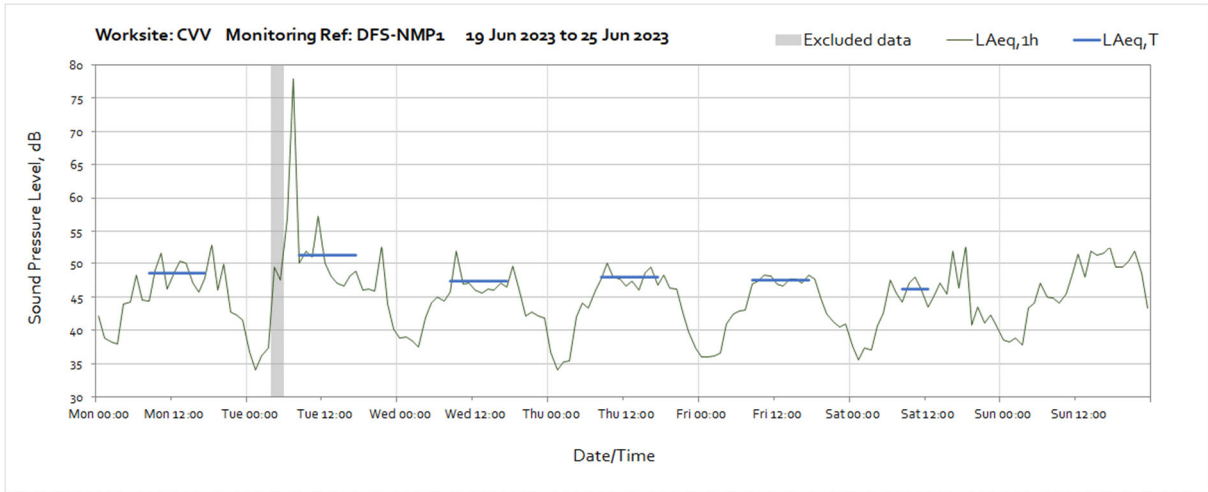
Worksite: CVV – Monitoring Ref: DFS-NMP1



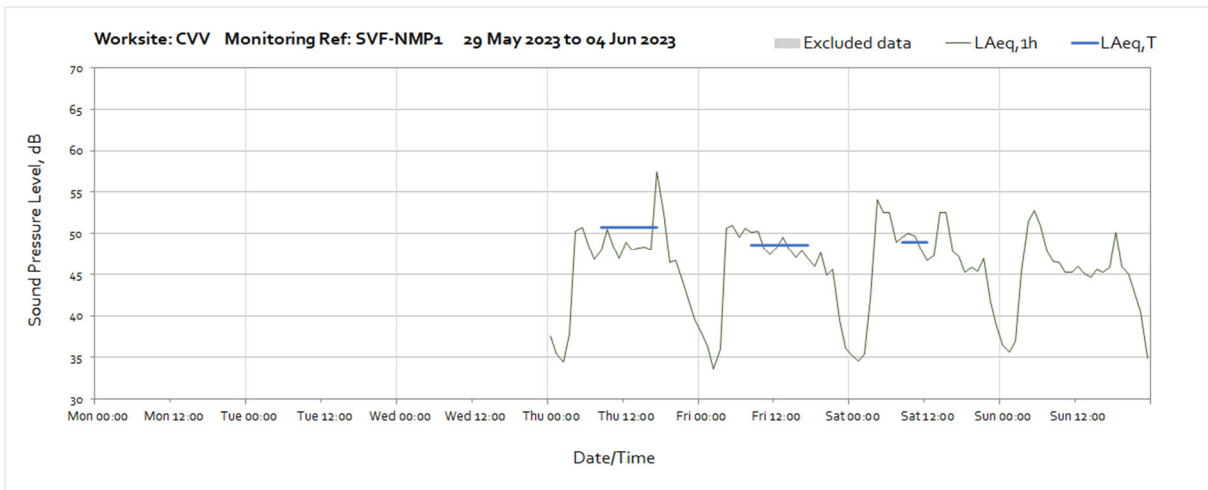
Note: Missing data between 00:00 and 14:00 on Thursday 1st June was due to depleted monitor battery.

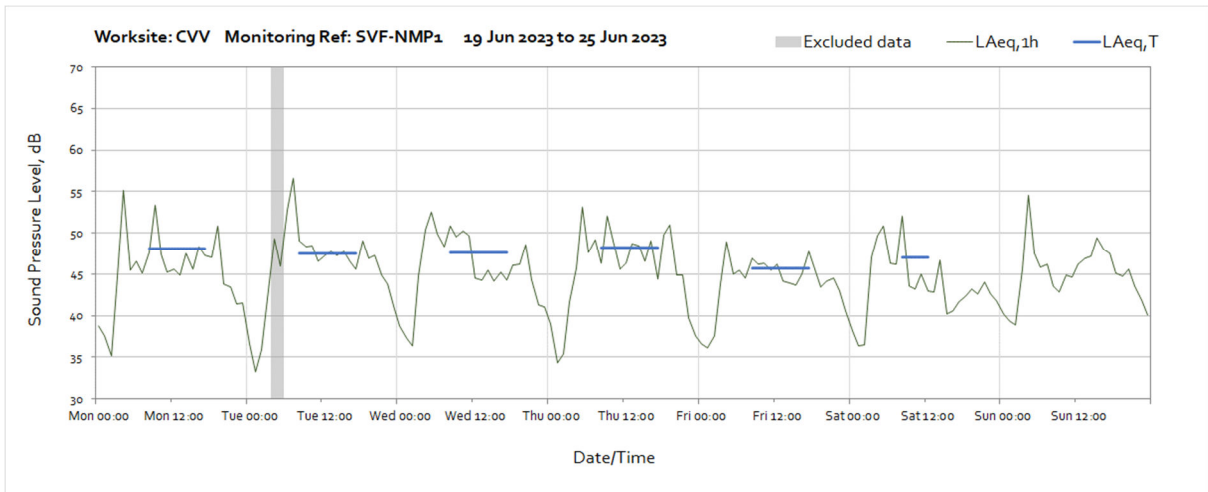
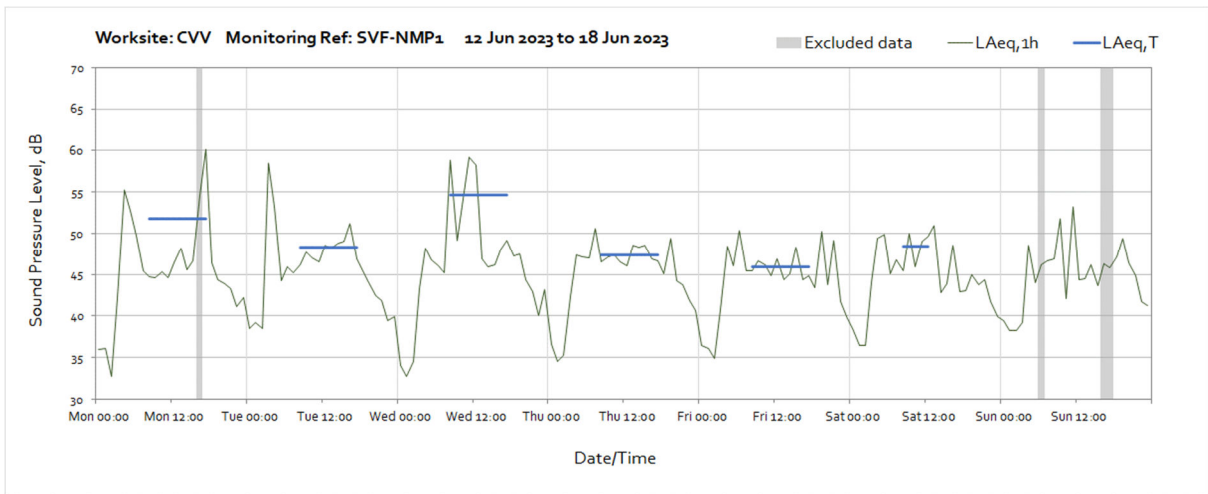
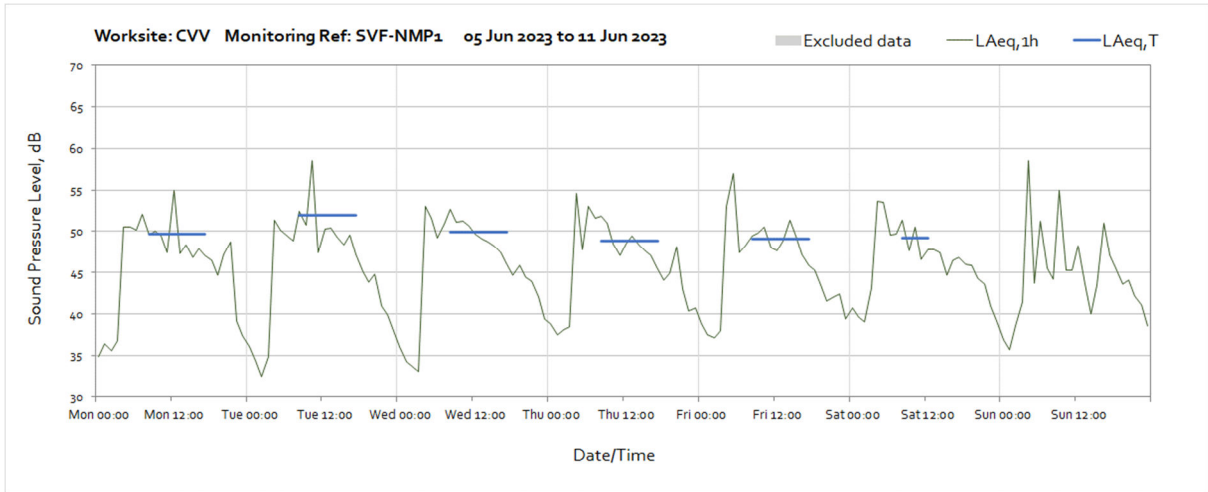


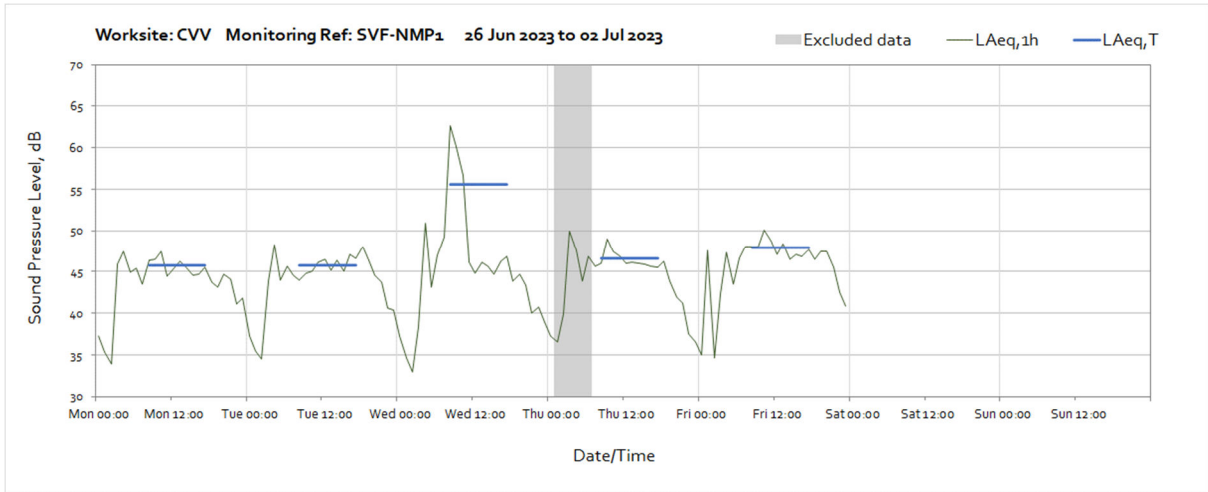
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Worksite: CVV – Monitoring Ref: SVF-NMP1



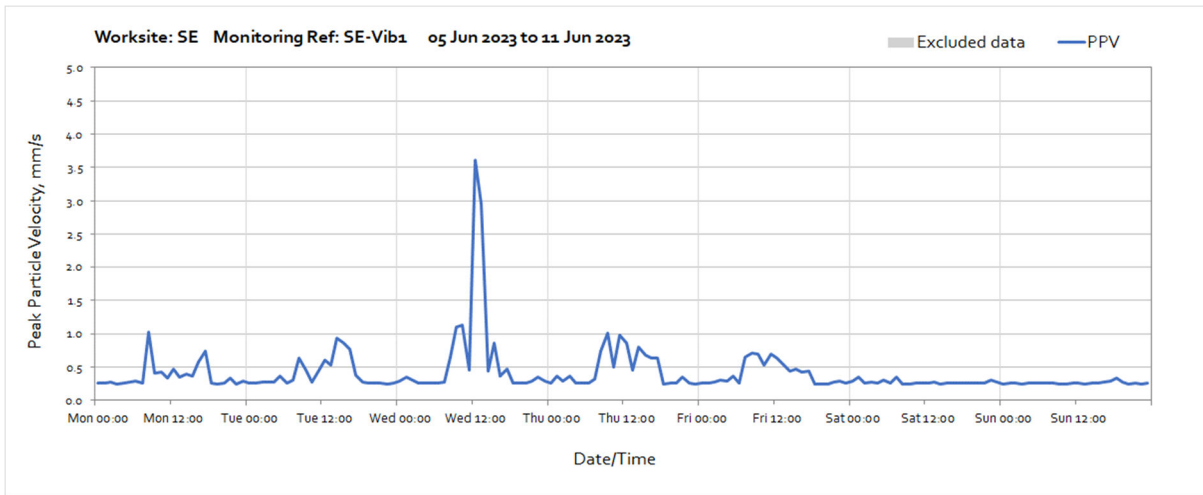
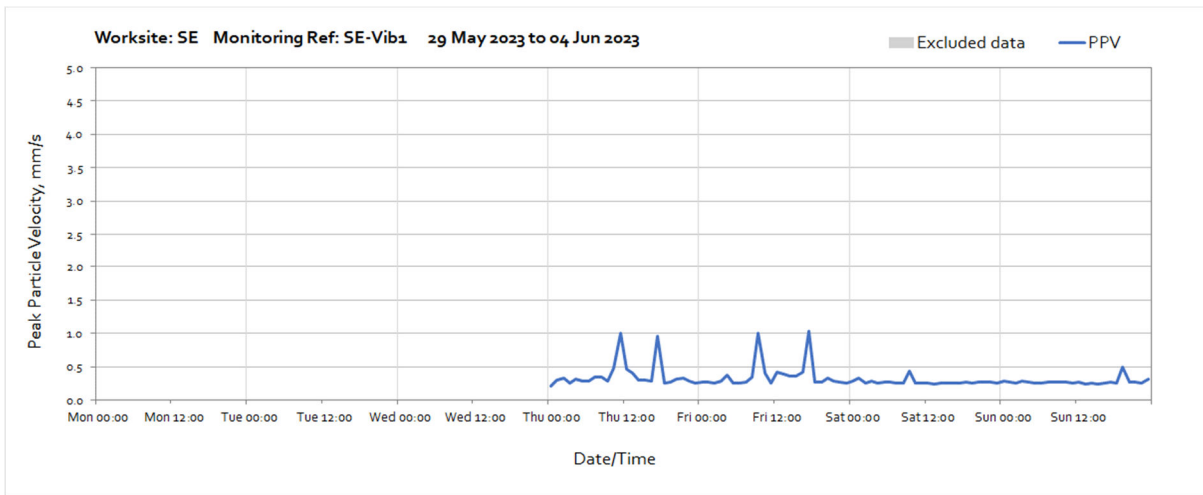


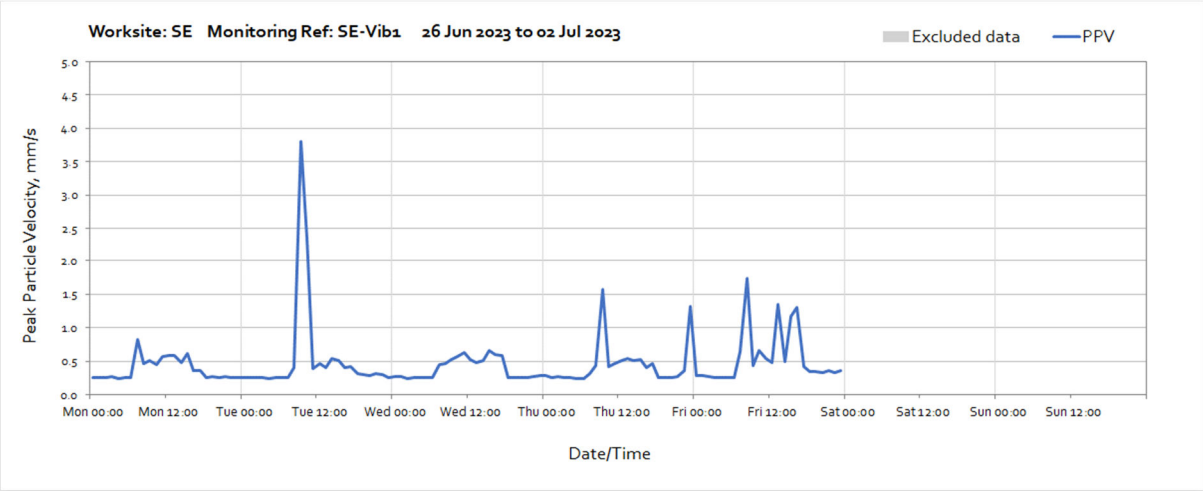
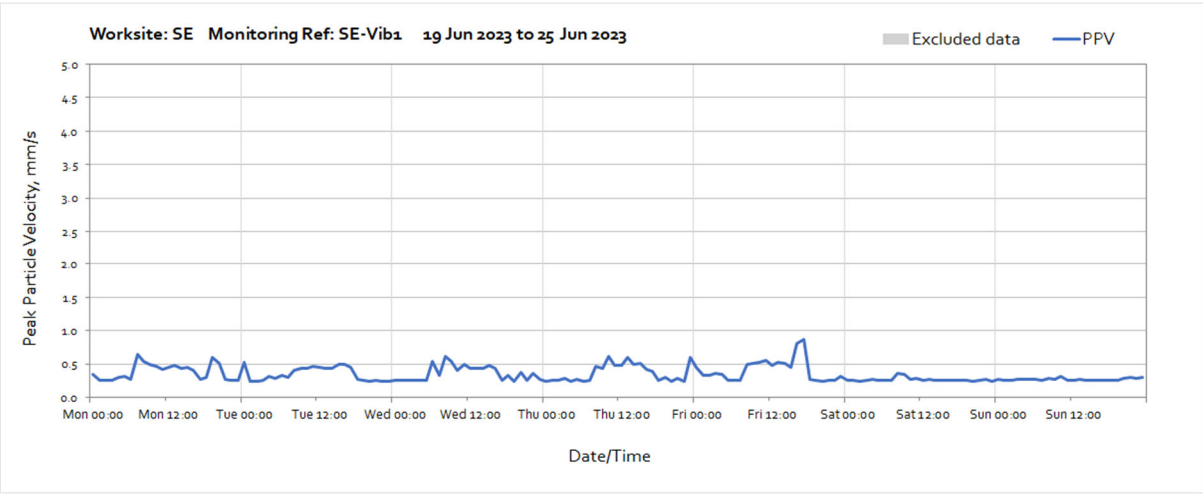
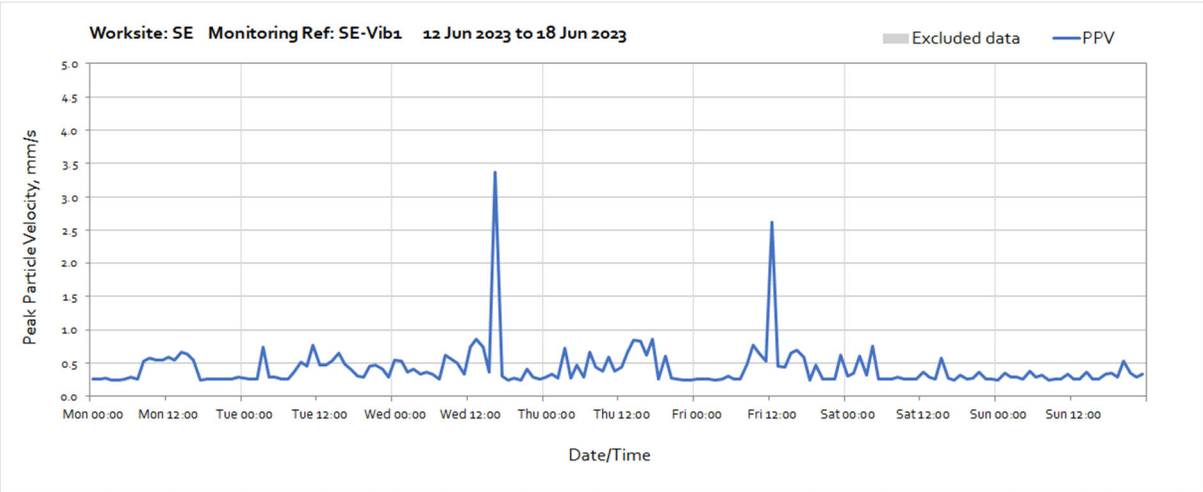


Vibration

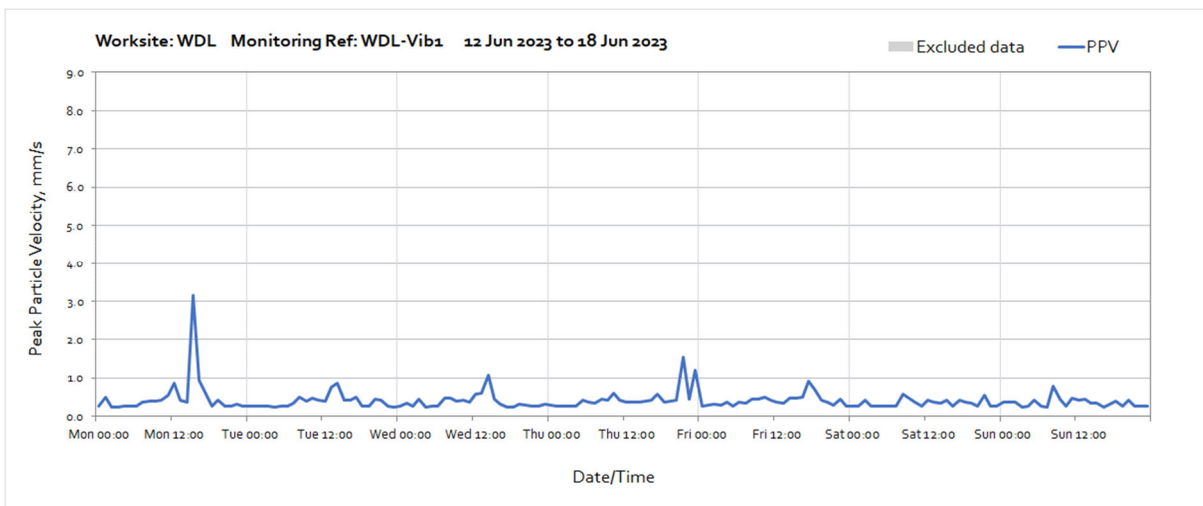
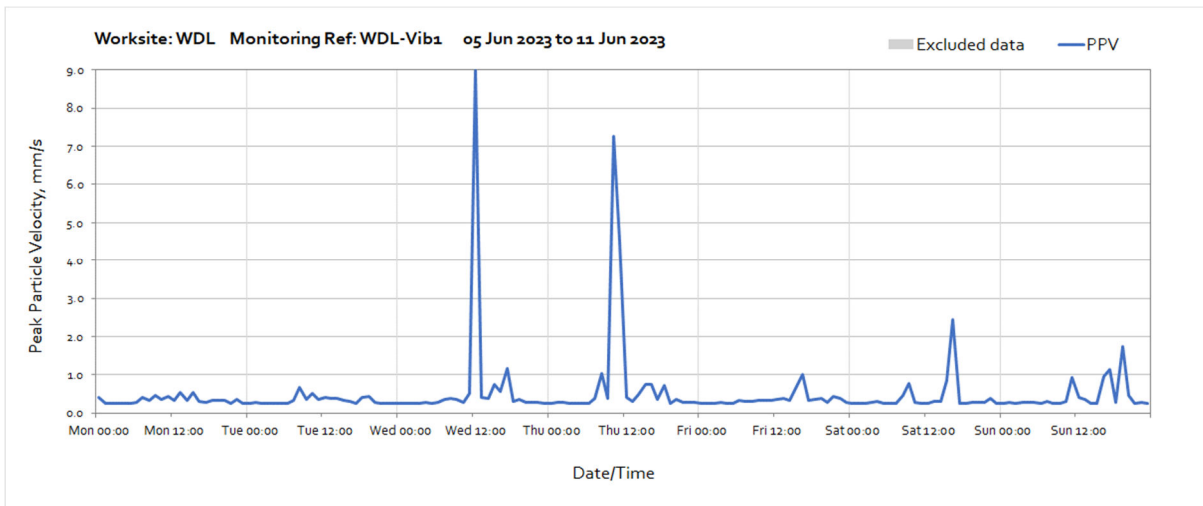
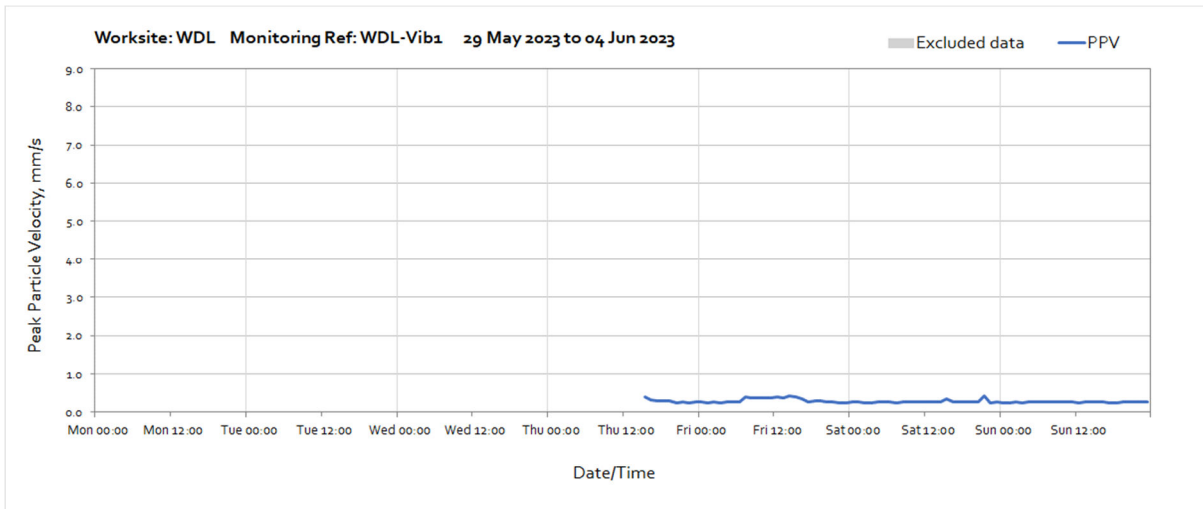
The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axes x, y and z. Where high values of PPV were caused by local interference with the vibration monitor, which are not representative 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

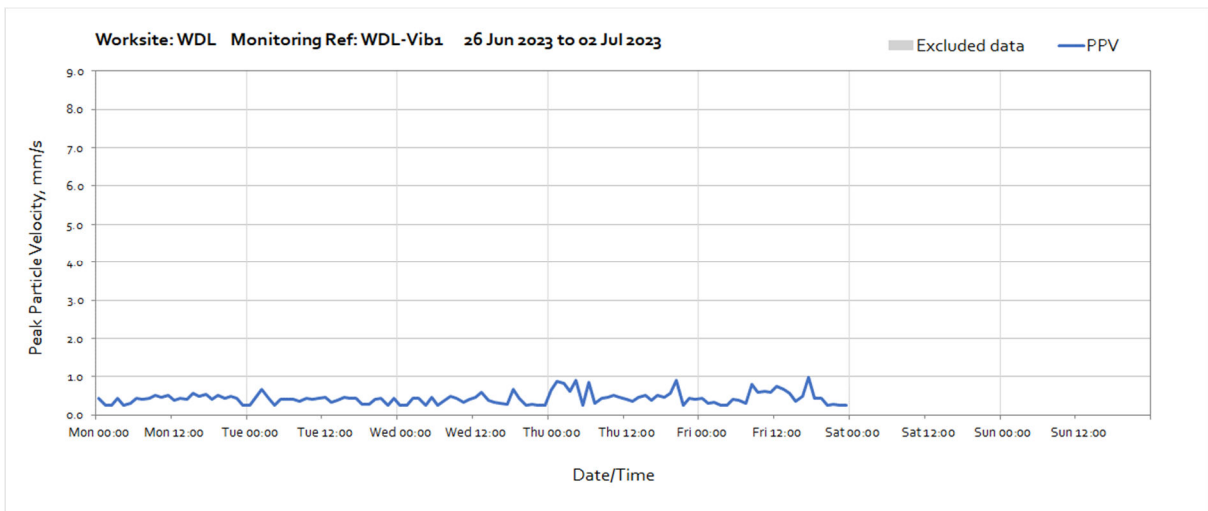
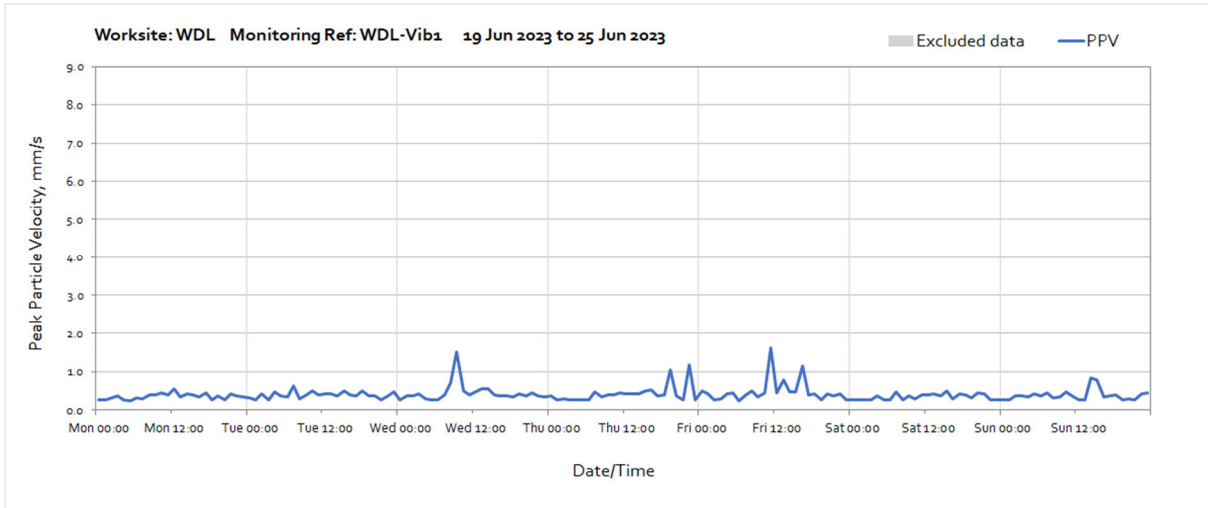




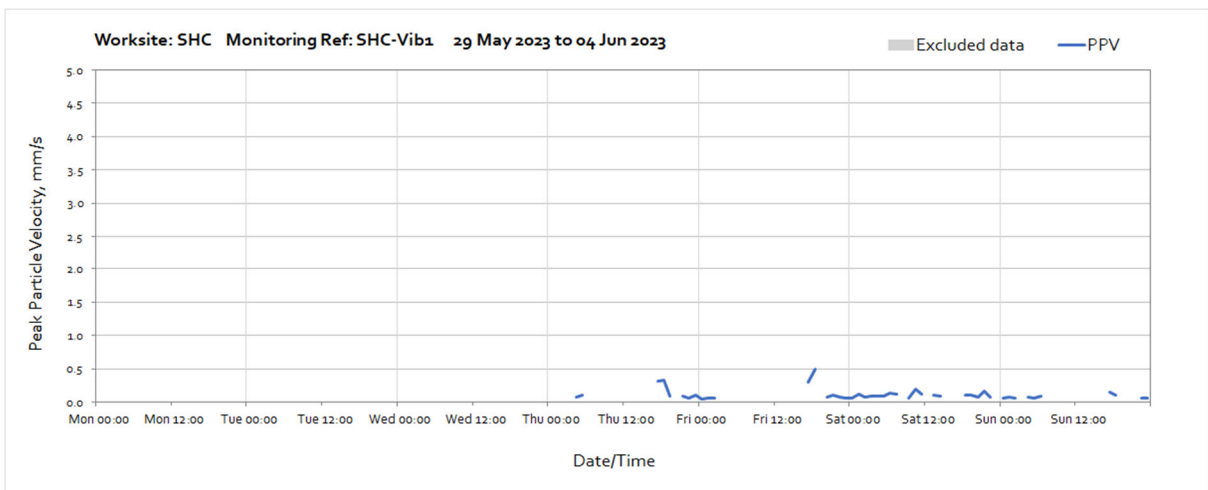
Worksite: WDL - Monitoring Ref: WDL-Vib 1



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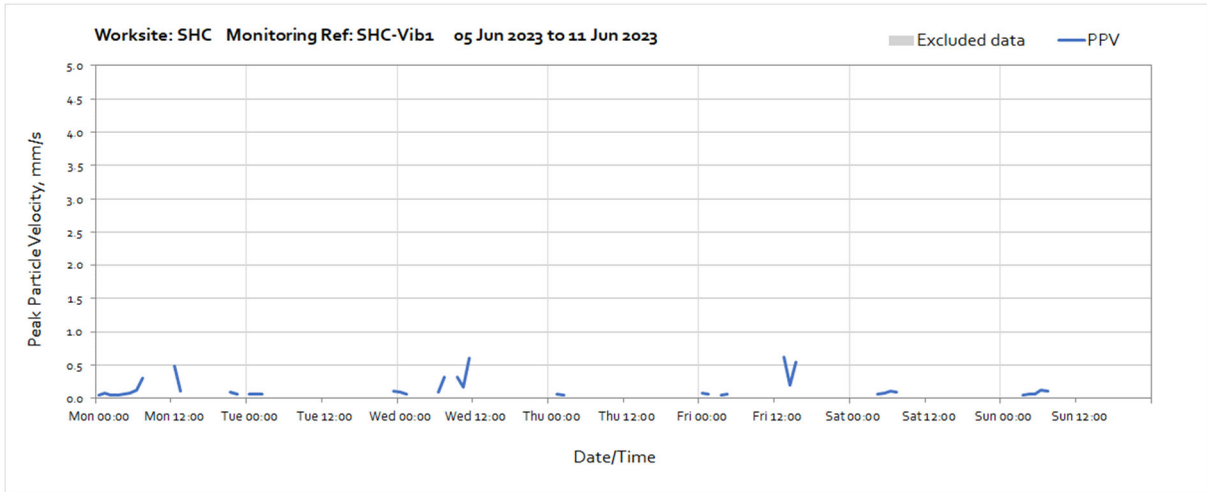


Worksite: SHC - Monitoring Ref: SHC-Vib1

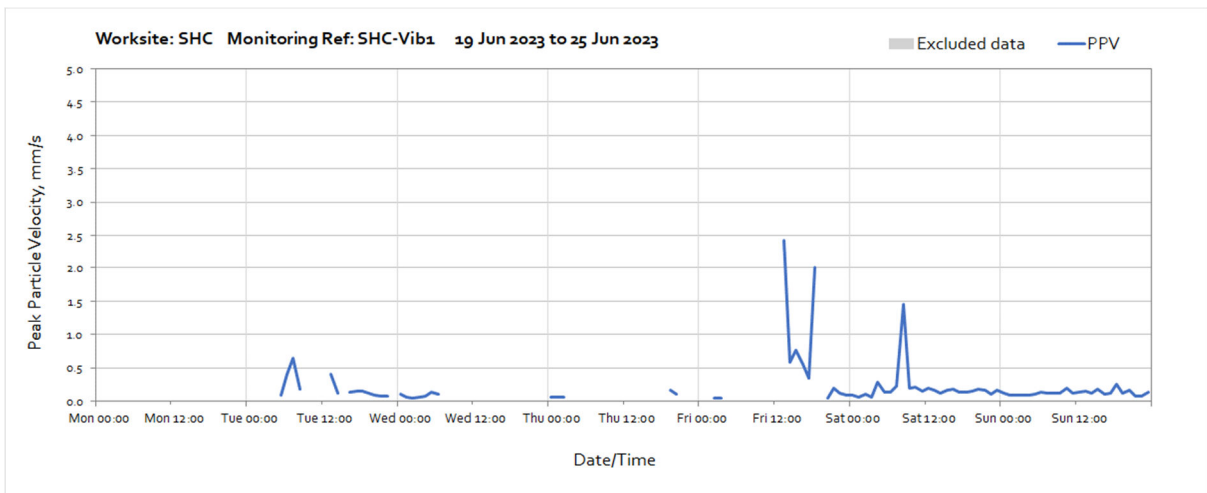


Note: Missing data throughout this week was due to a communication error between the server and the monitoring system.

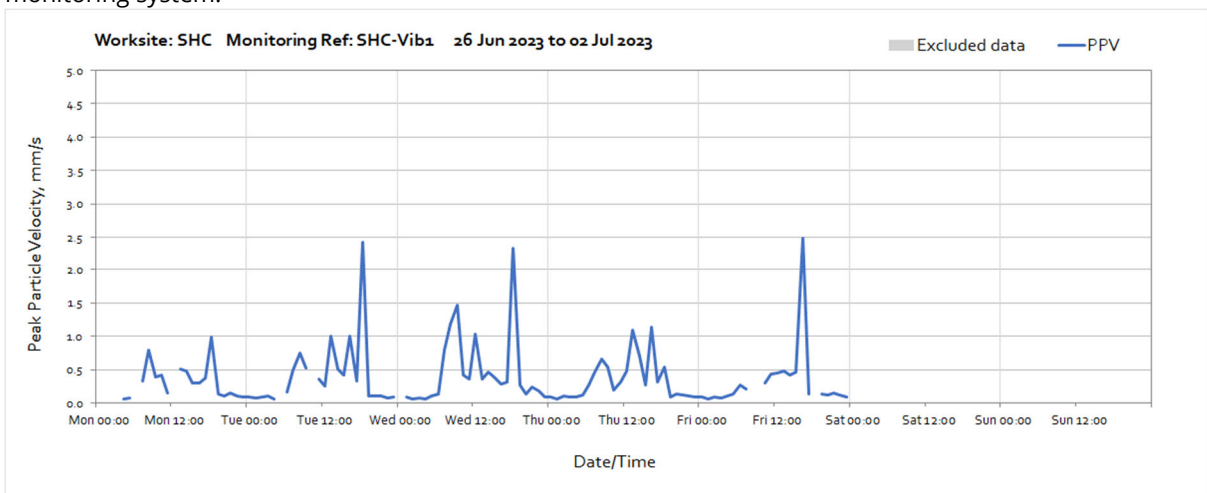
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Note: Missing data throughout this week was due to a communication error between the server and the monitoring system.



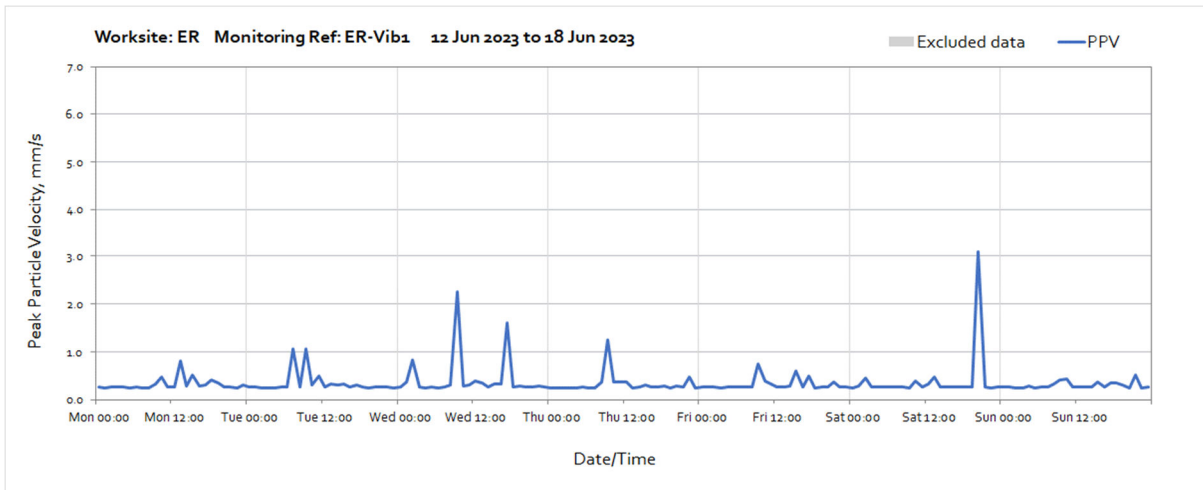
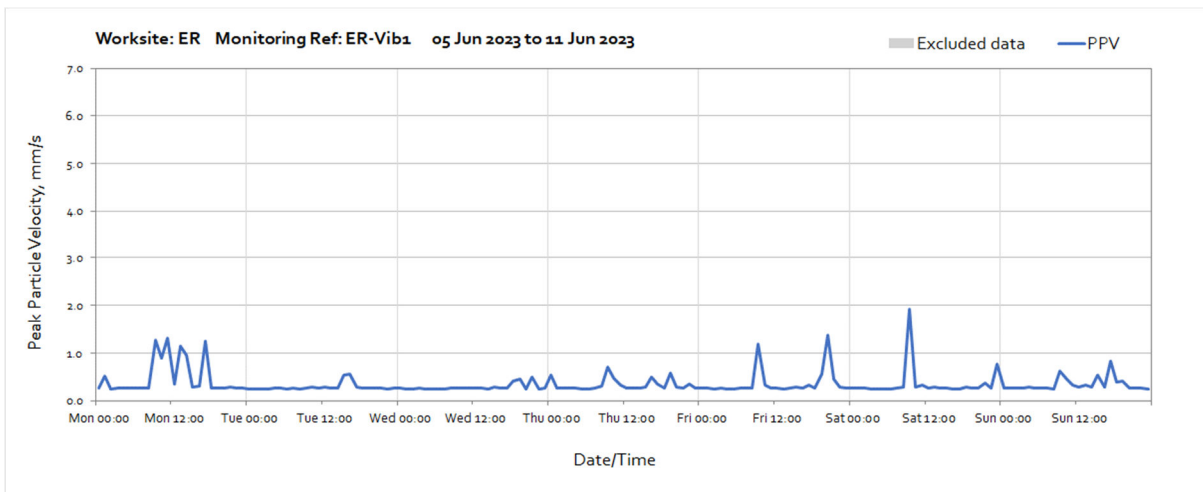
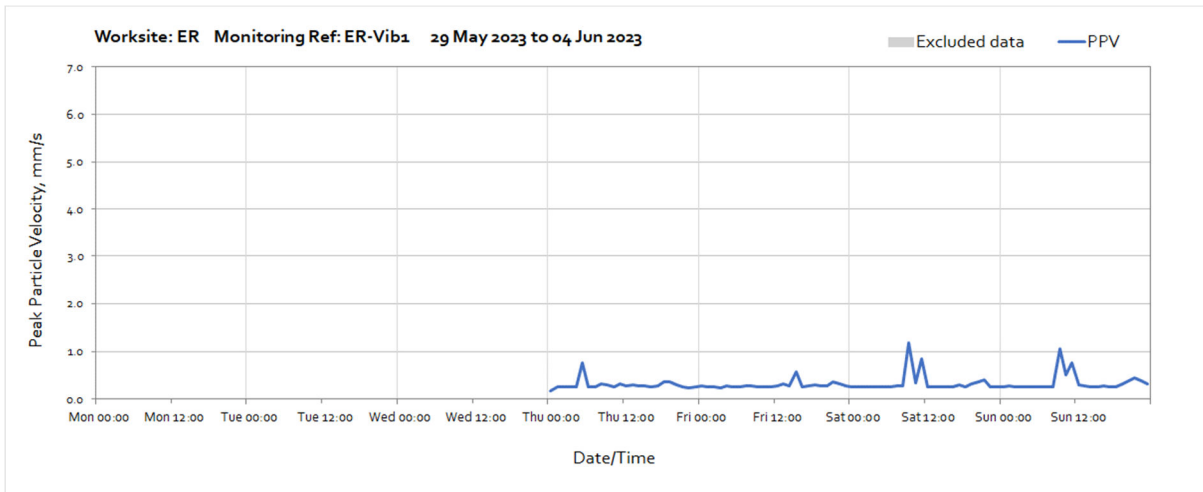
Note: Missing data throughout this week was due to a communication error between the server and the monitoring system.



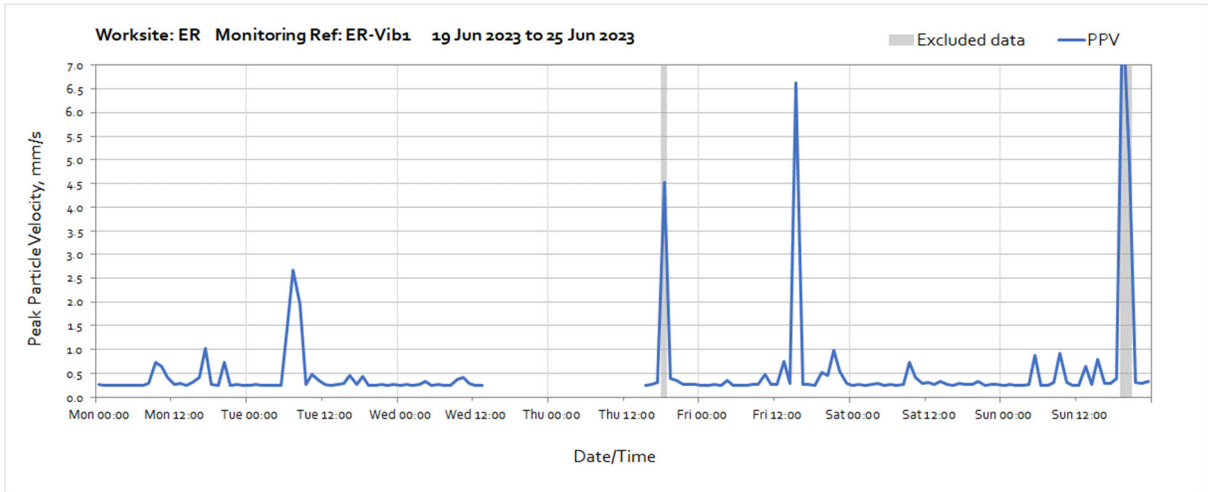
Note: Missing data throughout this week was due to a communication error between the server and the monitoring system.

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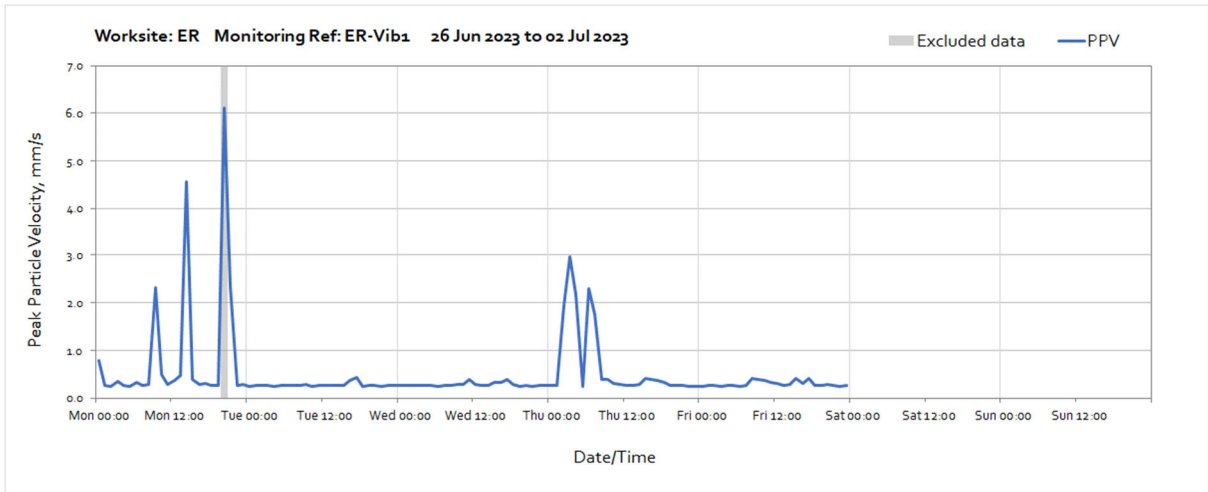
Worksite: WGT – Monitoring Ref: ER-Vib 1



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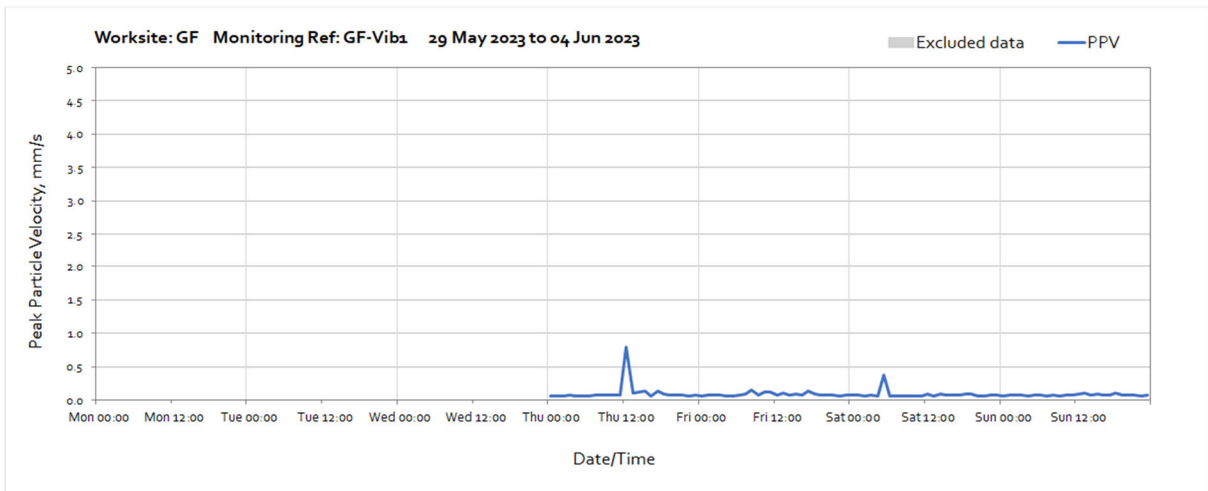


Note: Missing data between 14:00 on Wednesday 21st June and 15:00 on Thursday 22nd June was due to depleted monitor battery. High vibration level at 15:00 on Friday 23rd June was due to stoning of road and installation of kerbs.

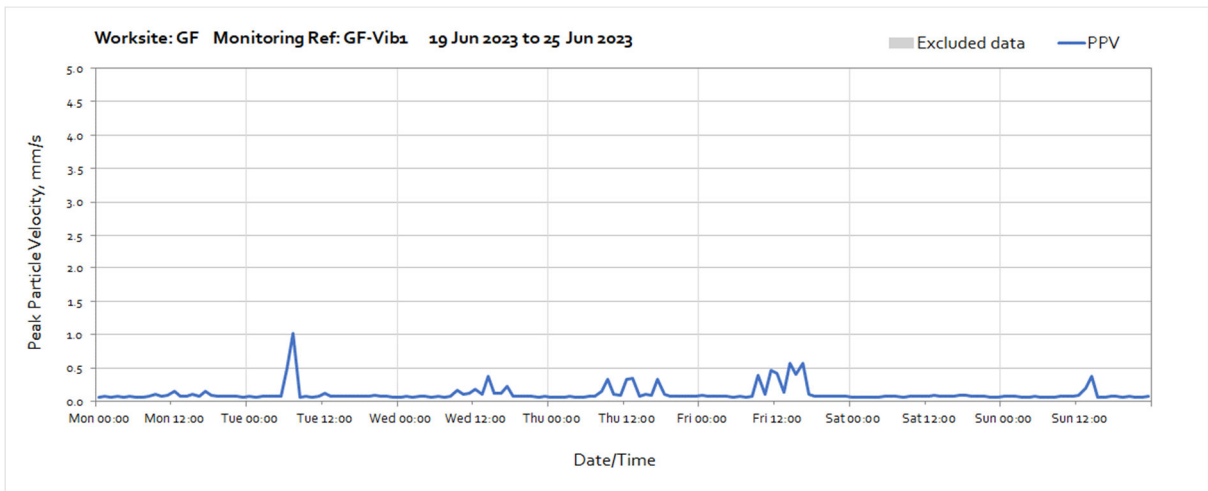
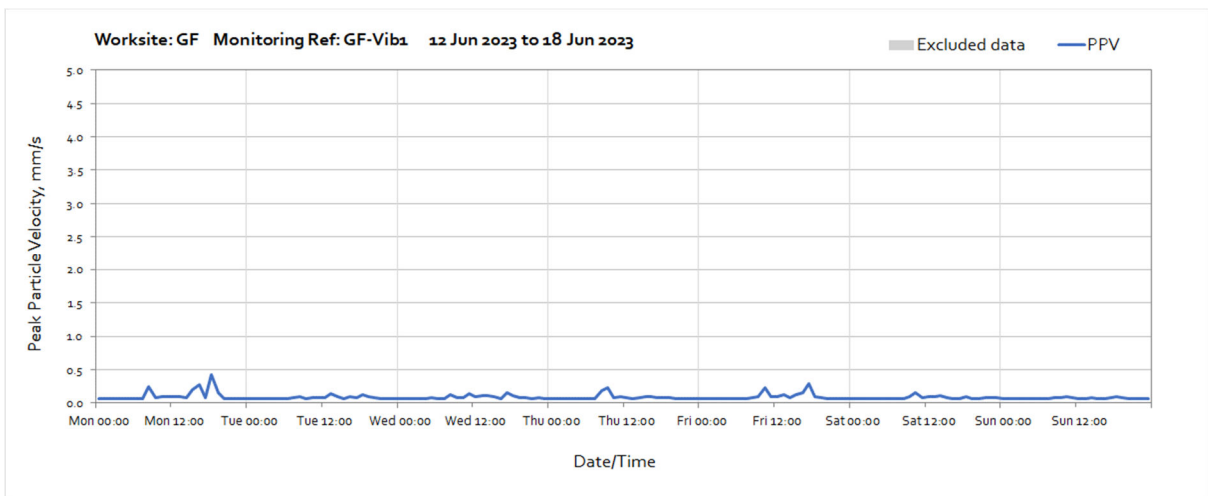
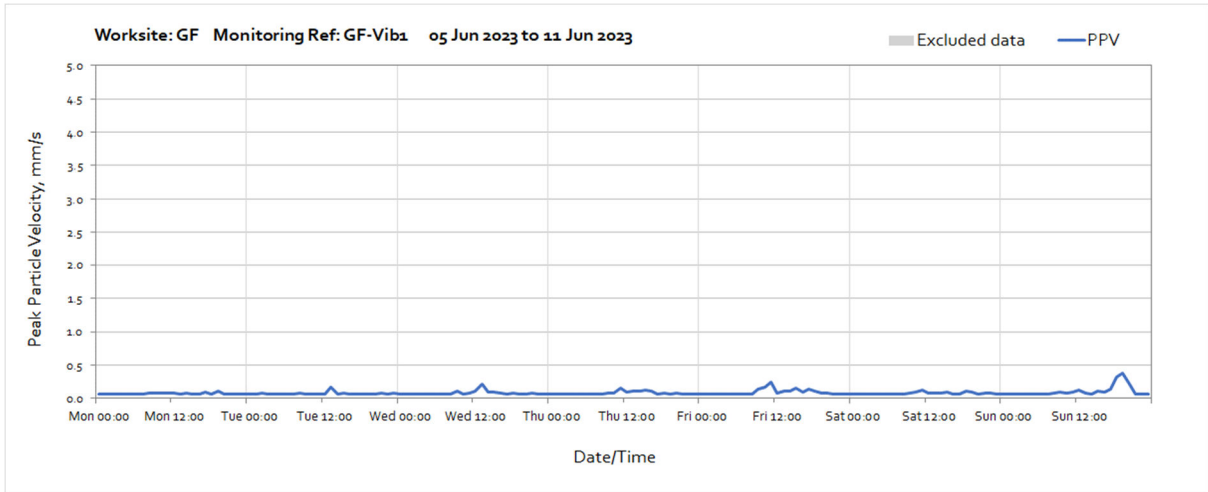


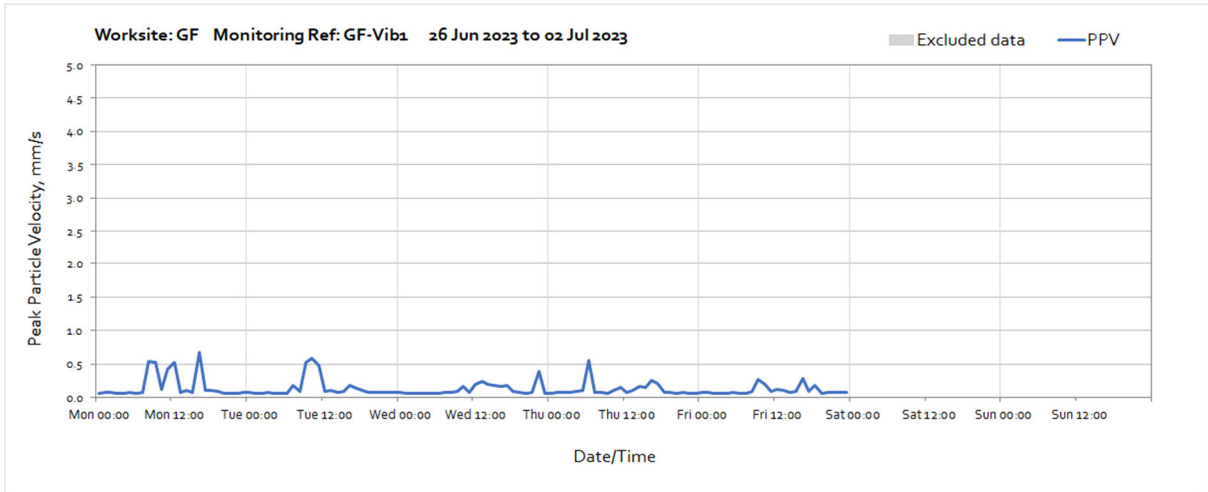
Note: High vibration level at 14:00 on Monday 26th June was due to stoning of road and installation of kerbs.

Worksite: GF – Monitoring Ref: GF-Vib1

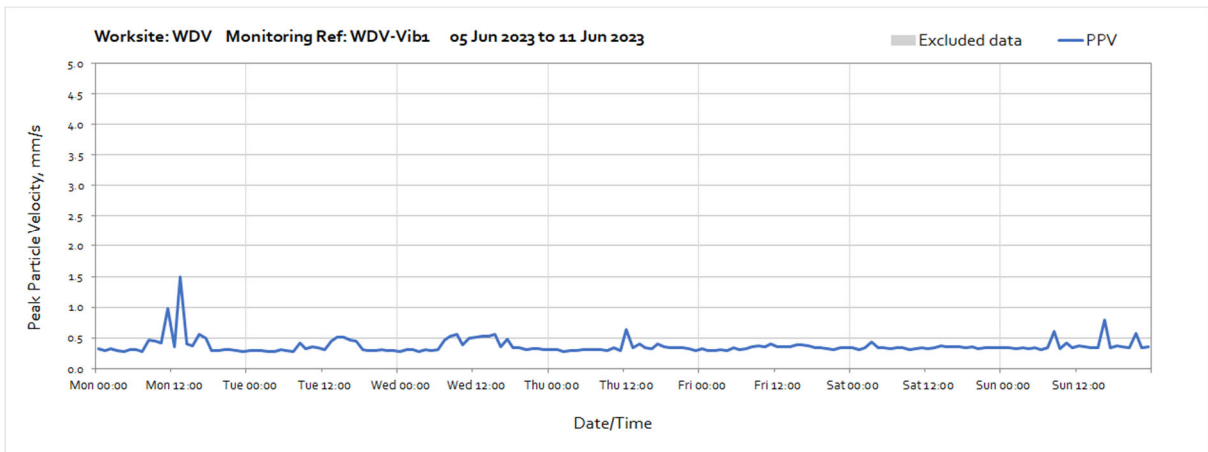
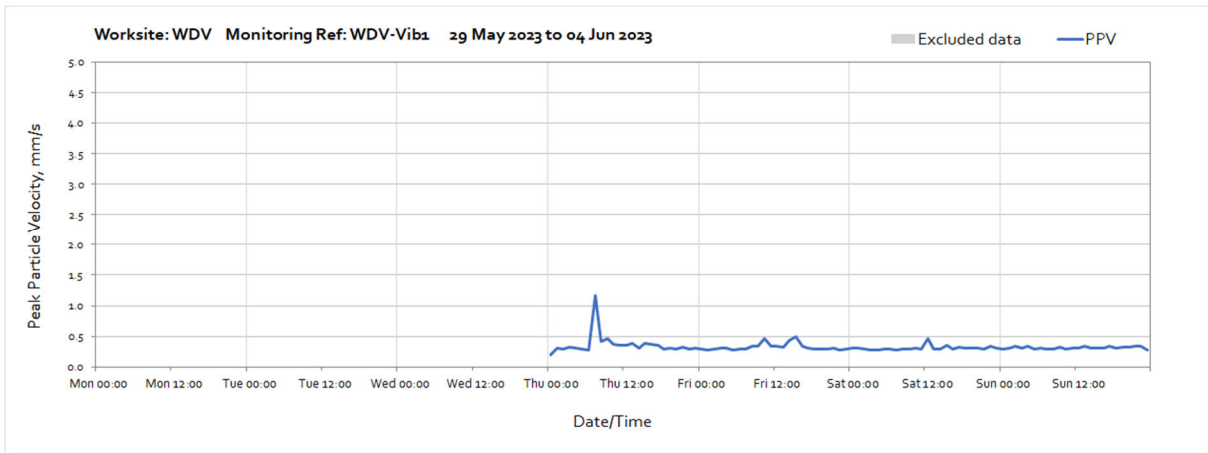


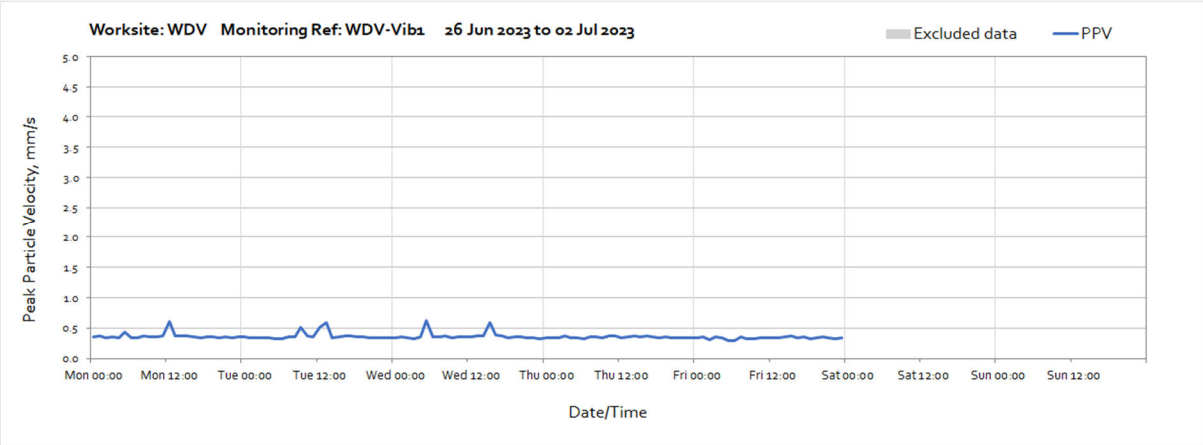
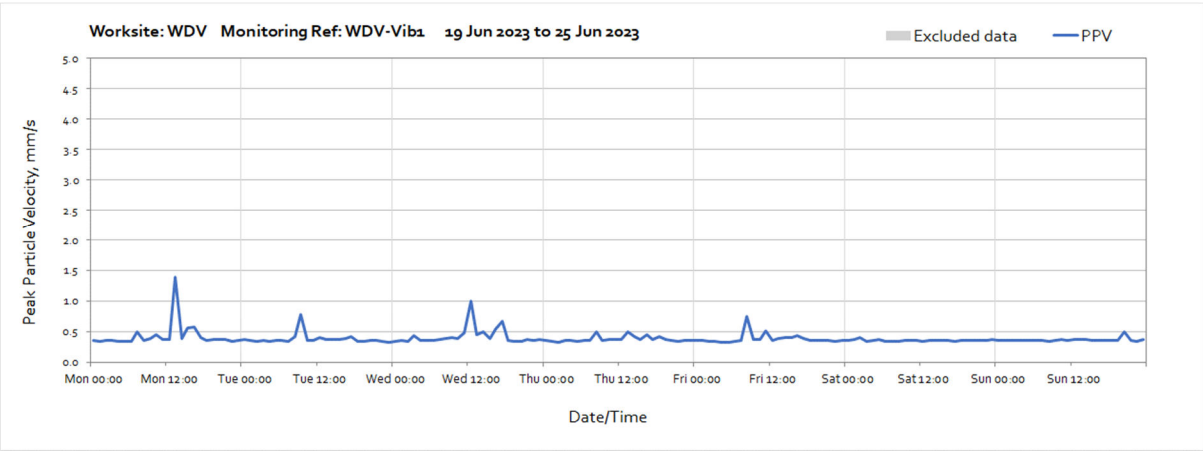
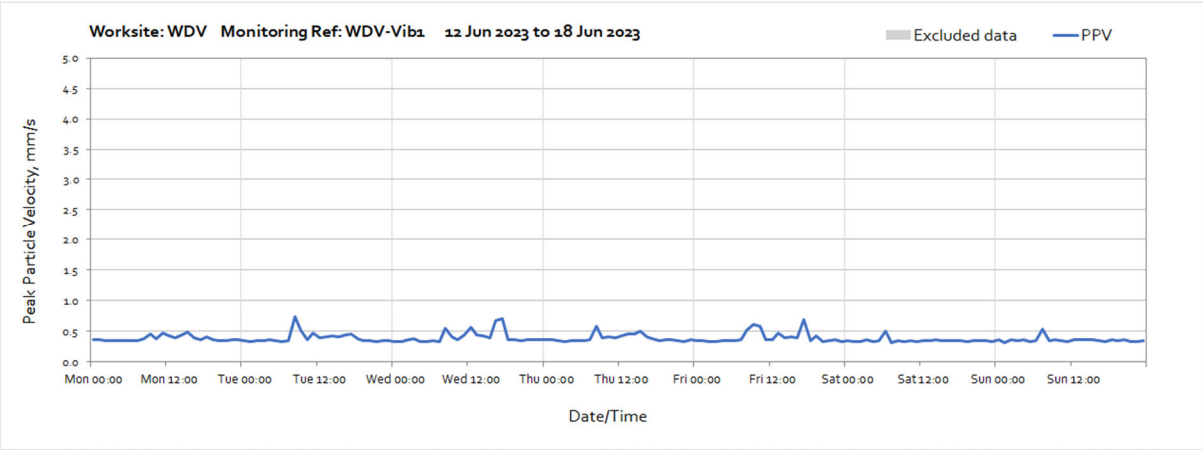
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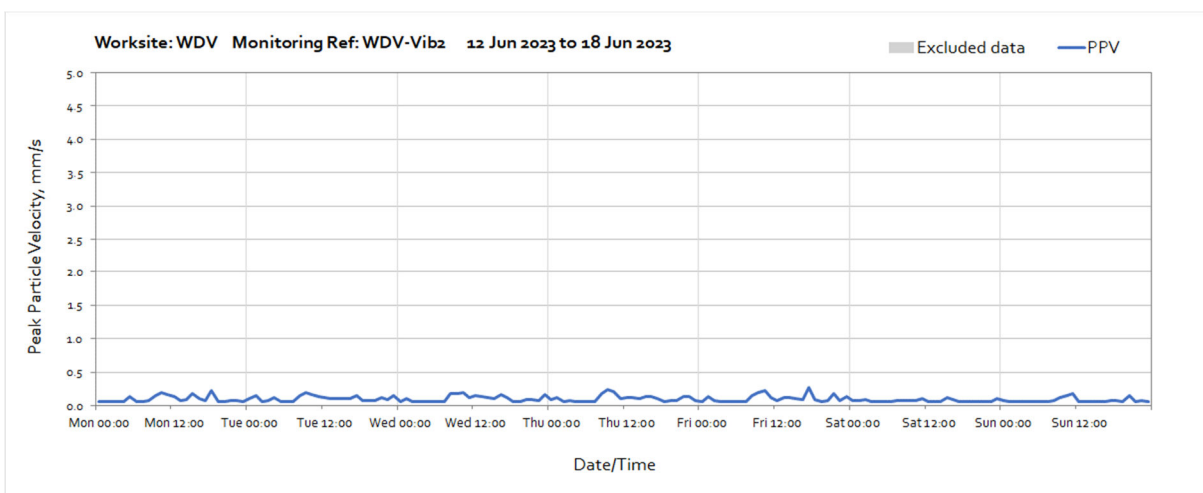
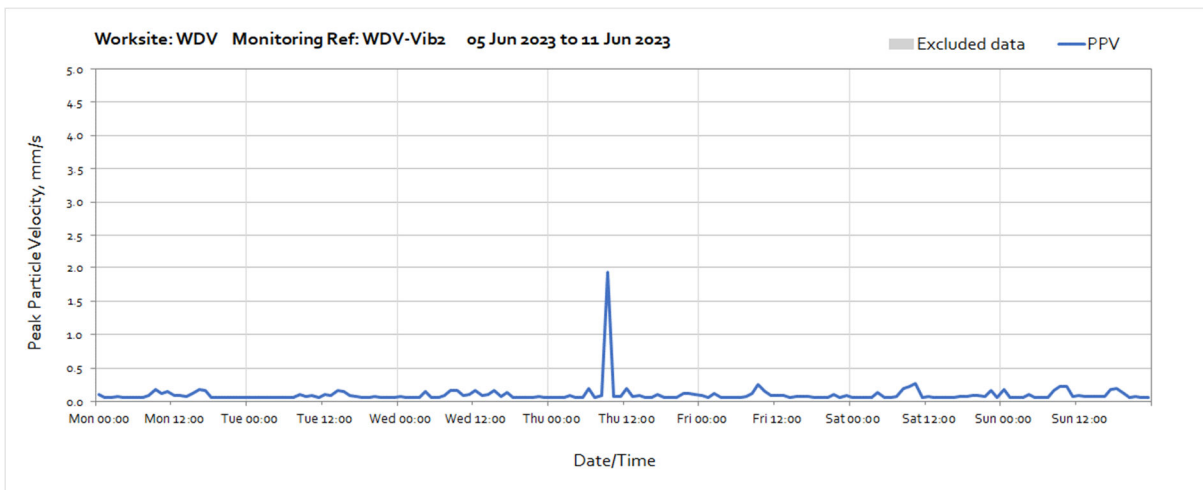
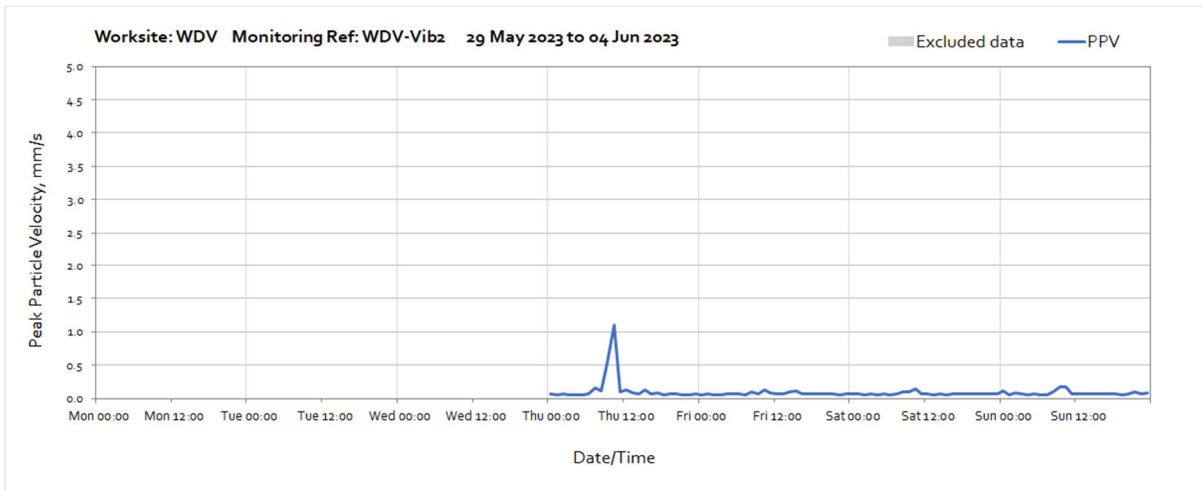


Worksite: WDV – Monitoring Ref: WDV-Vib 1

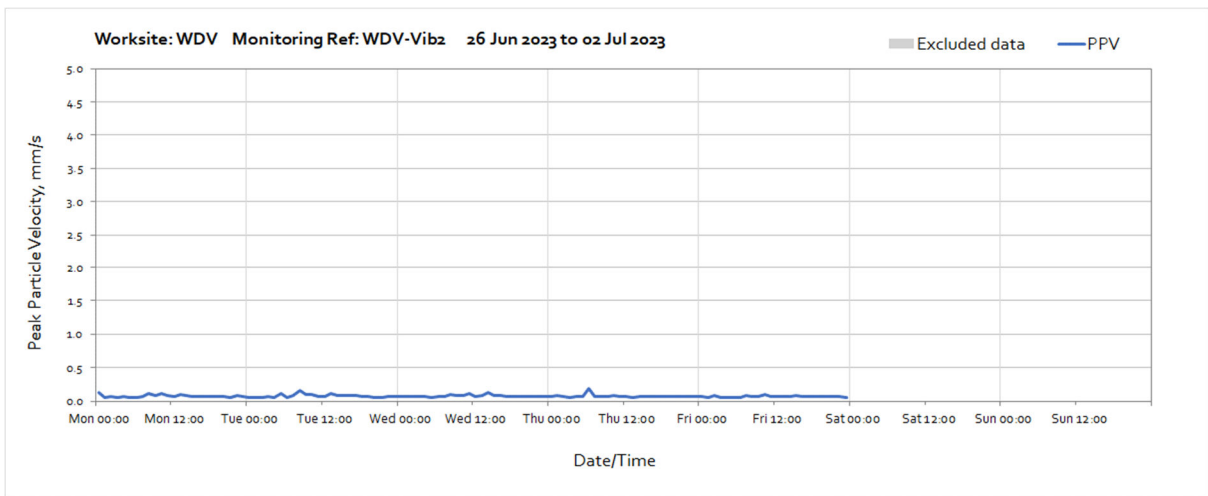
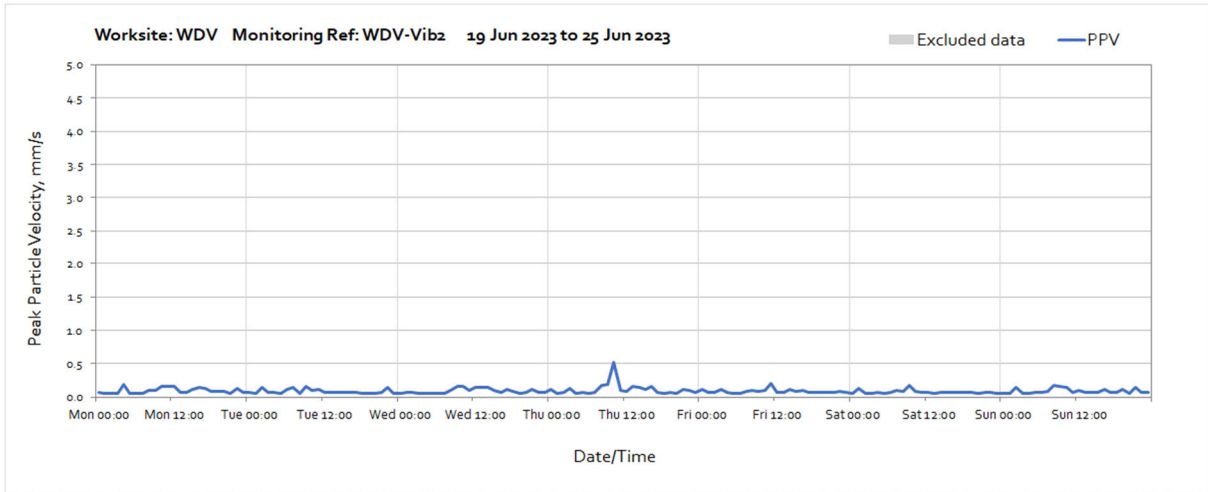




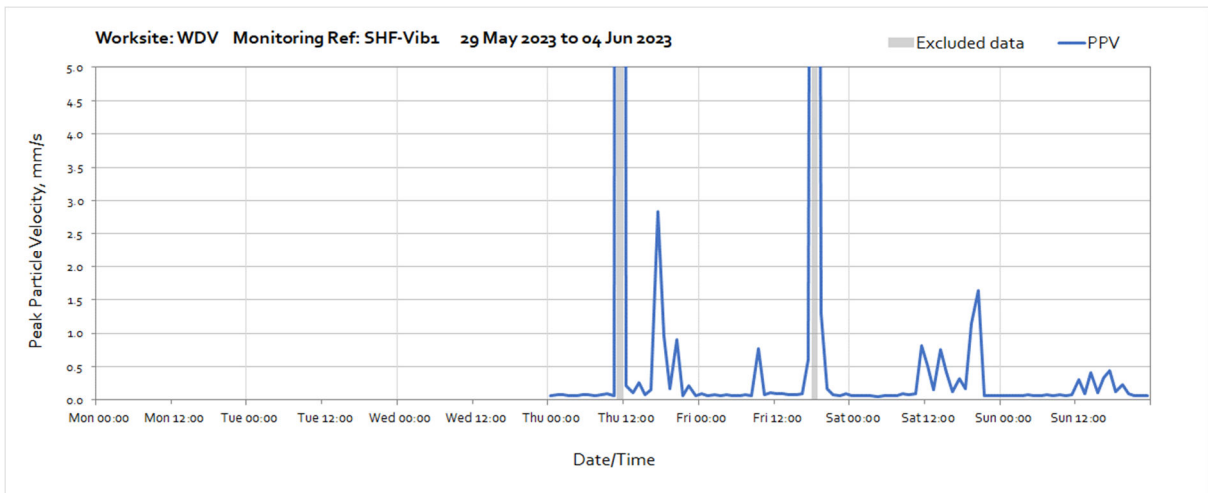
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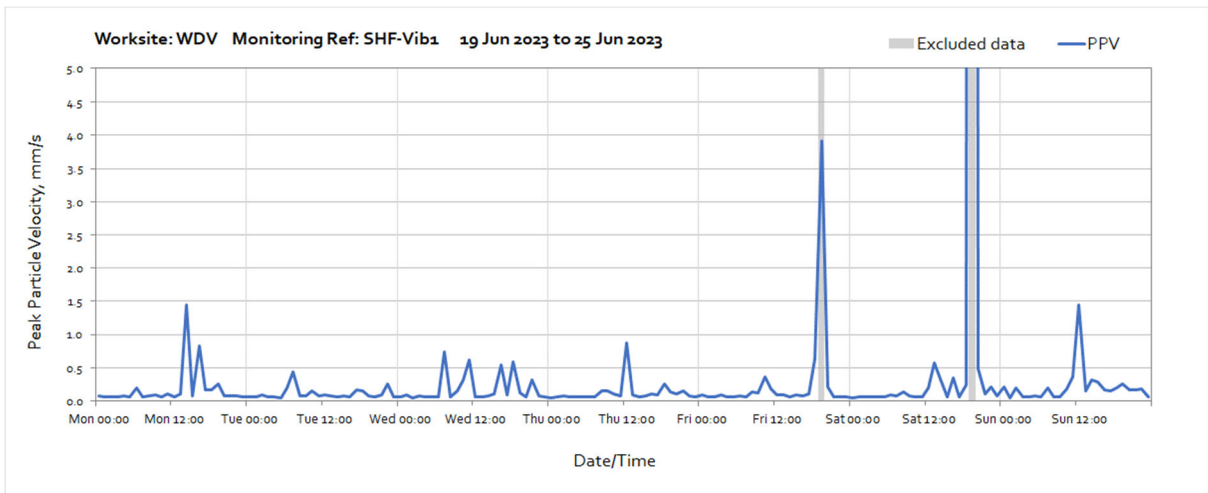
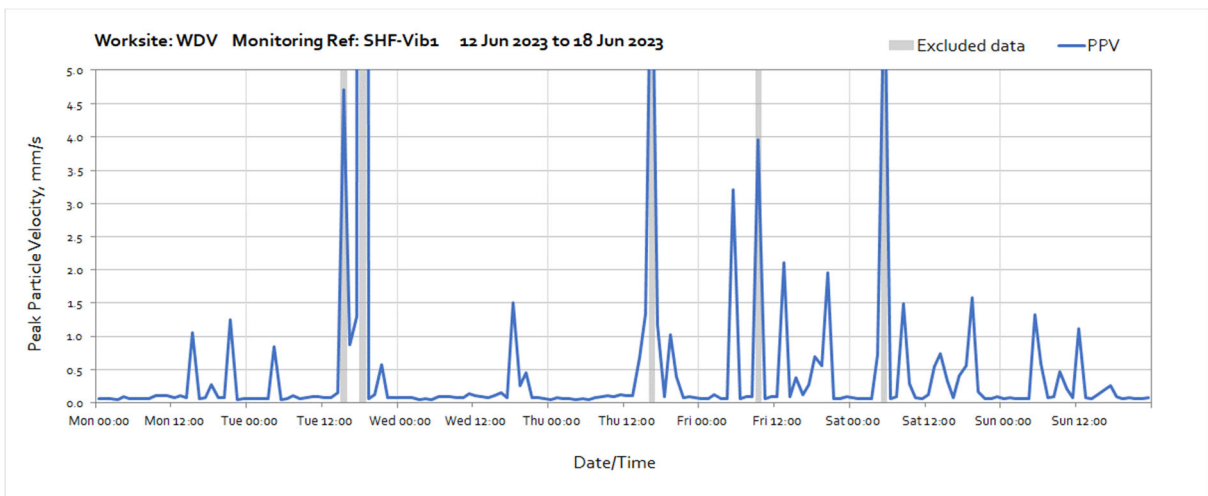
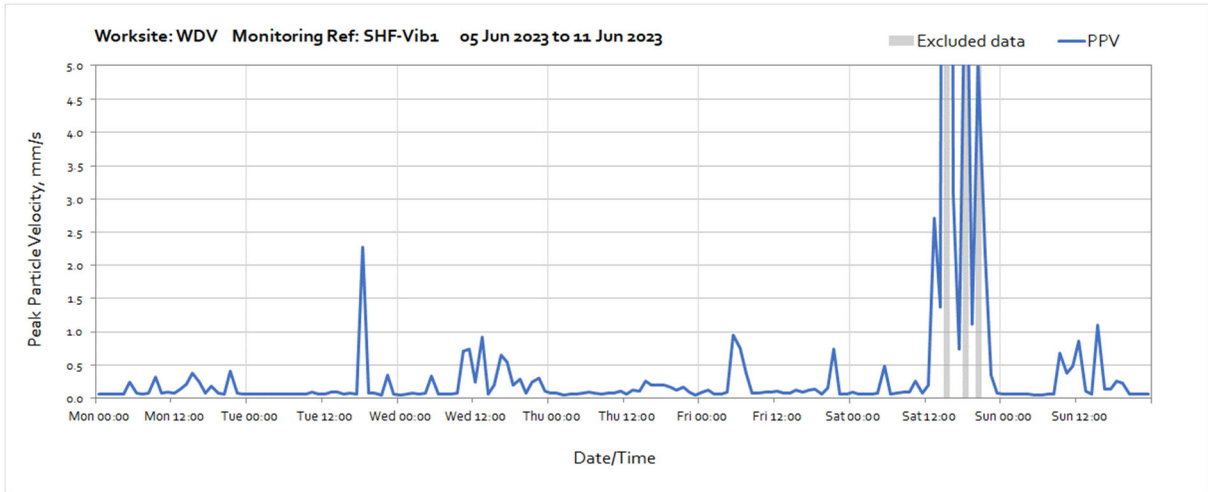


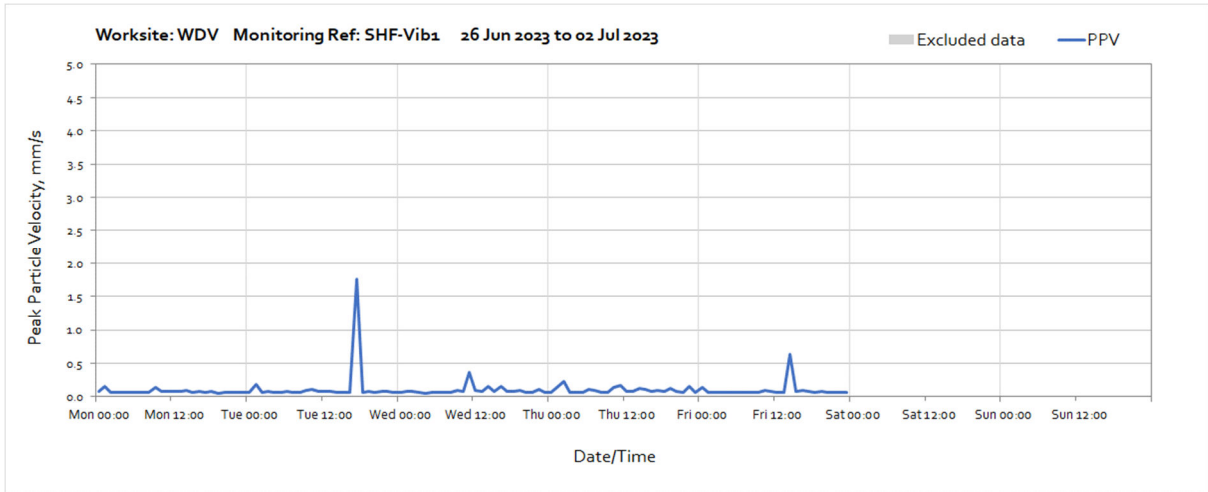
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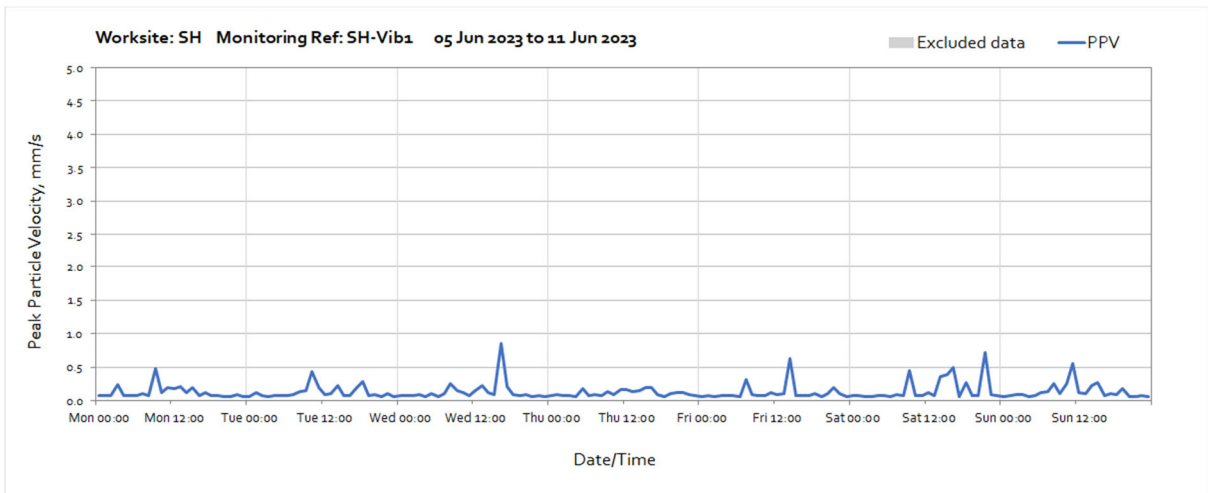
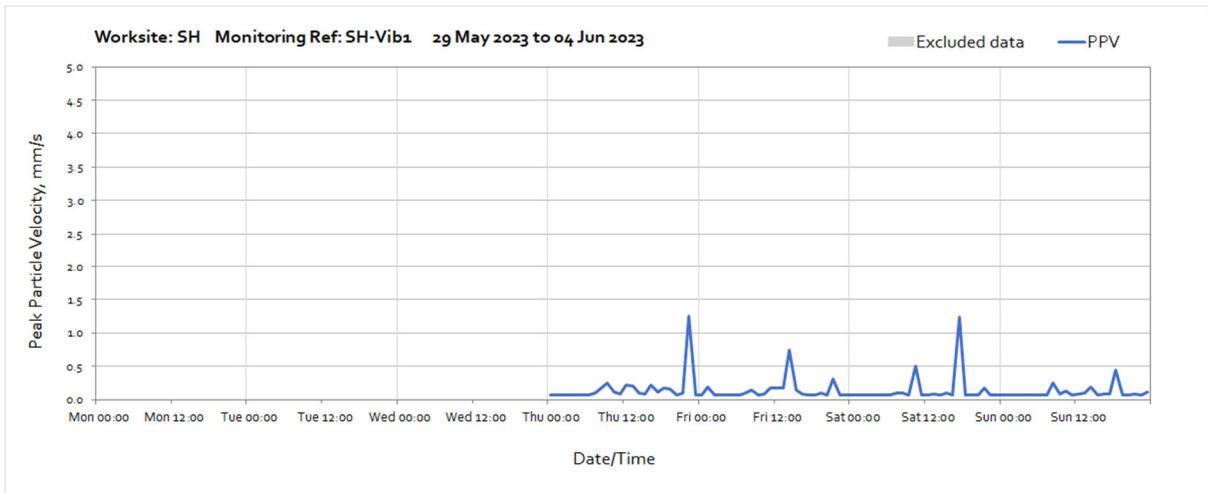
Worksite: WDV – Monitoring Ref: SHF-Vib1

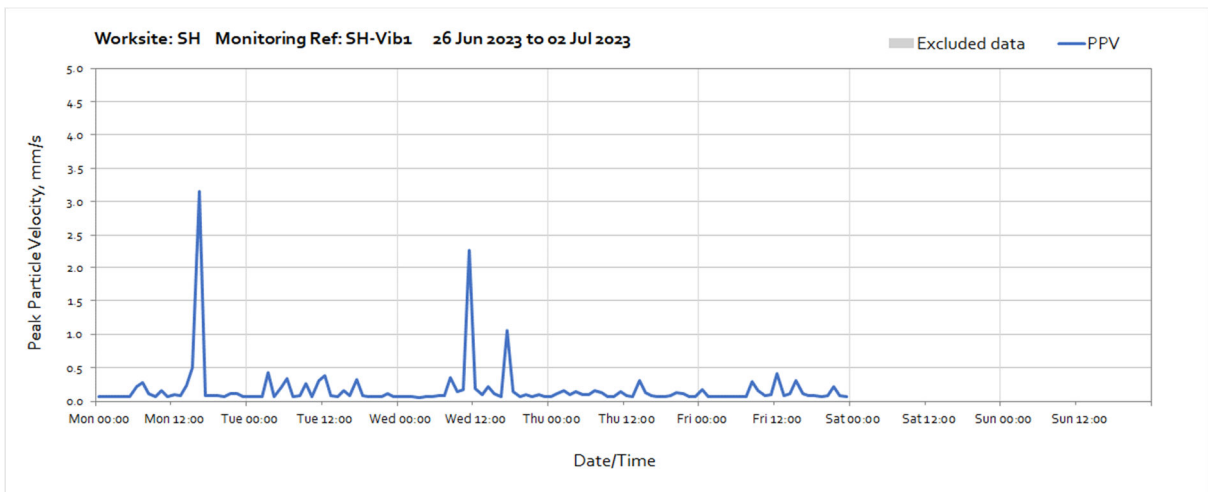
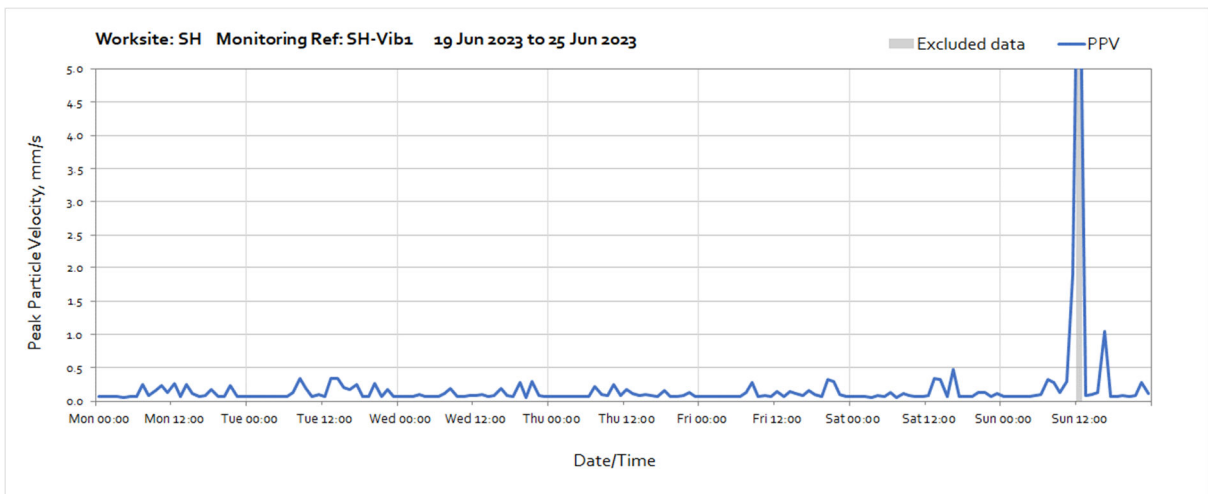
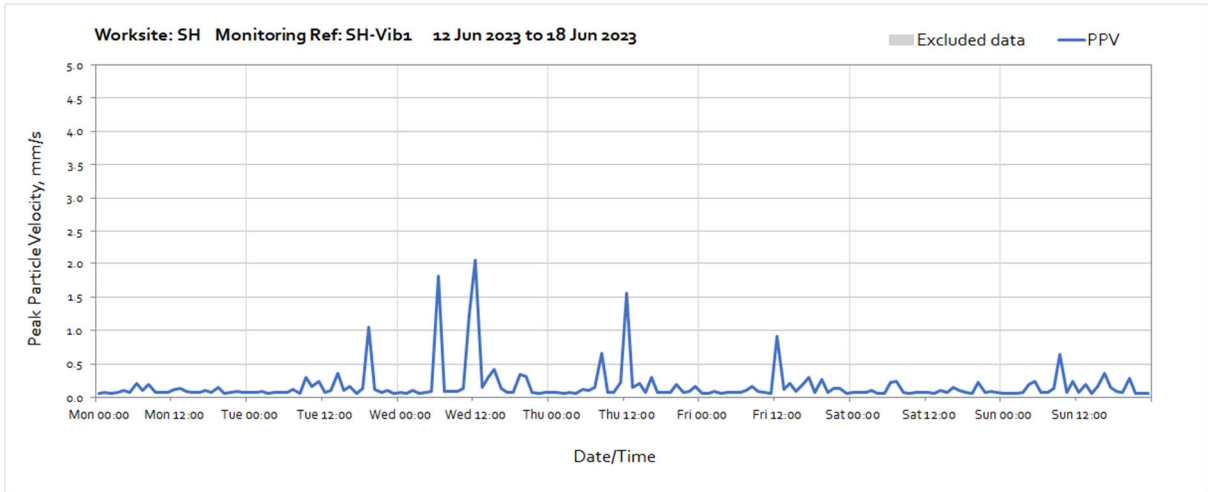




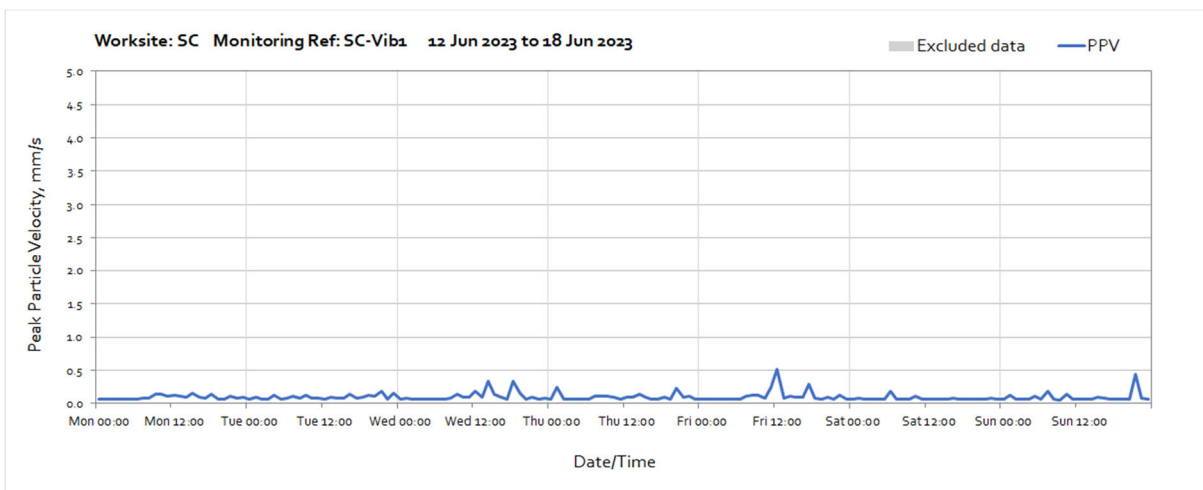
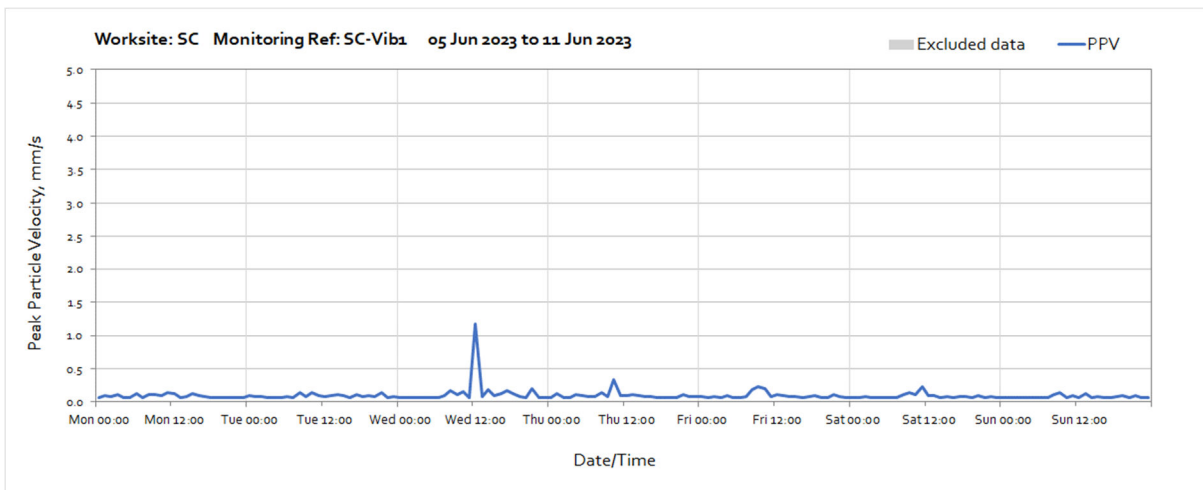
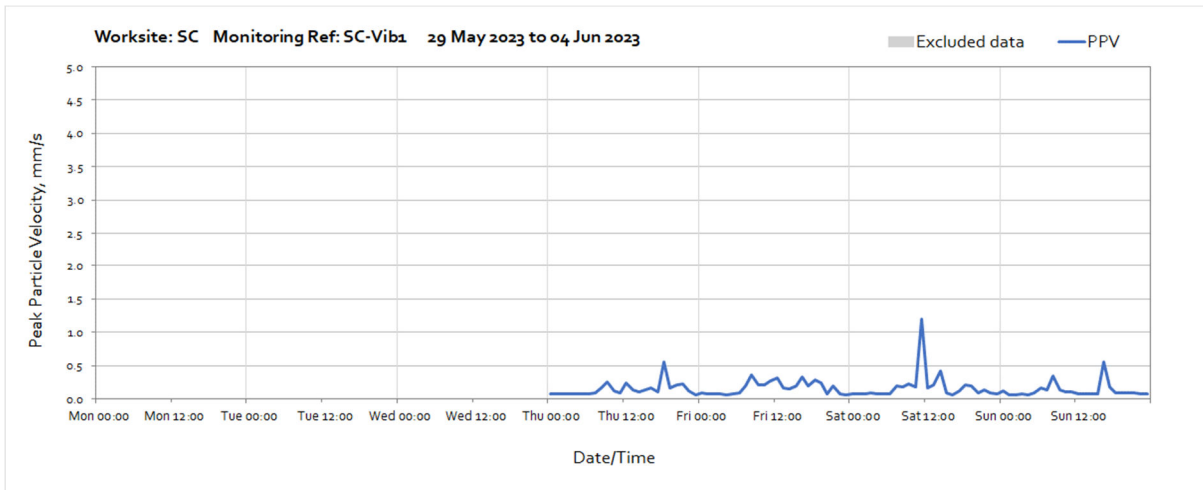


Worksite: WDV – Monitoring Ref: SH-Vib1





Worksite: WDV – Monitoring Ref: SC-Vib1



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