

Construction noise and vibration Monthly Report – July 2021

London Borough of Hillingdon

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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 the London Borough of Hillingdon during the month of July 2021.

Within this period noise monitoring was undertaken at the following worksites:

- Harvil Road, Ickenham Road and Ruislip Golf Course where power utility works were underway.
- Colne Valley Viaduct Dews Lane site (ref.: CVV-DL), where piling works, ground investigation, compound operation, civil works, earthworks and drainage works were underway;
- Colne Valley Viaduct Moorhall Road site (ref.: CVV-MR), where compound operations, ground investigation, earthworks and civil works, piling works and drainage works were underway;
- West Ruislip Portal worksite (ref.: West Ruislip Portal), where site management and security, bored and sheet piling, pile trimming, concreting works and dewatering were underway;
- West Ruislip Retained Embankment worksite (ref.:WRRE), where site setup; site management and security, hoarding and fencing, stone column installation, footpath construction, drainage works and dewatering were underway;
- South Ruislip Ventilation Shaft worksite (ref.: SRVS), where continued site preparation works for future start of the diaphragm walling works were underway;
- Harvil Road worksite (ref.: HR), where site setup, site management and security, bored and sheet piling, pile trimming, concreting works and dewatering were underway.

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

- Harvil Road embankment, where compound setup, site management and security, hoarding and fencing installation, temporary road diversion, haul road installation, bulk excavation, installation and use of conveyor system, culvert surveys, utility connections, track drainage surveys were underway;
- Copthall Retained Embankment / Trough, where compound setup, site management and security, hoarding and fencing installation, haul road installation, bulk excavation, sheet piling, culvert surveys, utility connections, track drainage surveys and permanent rotary piling were underway;
- Northern Sustainable Placement Area, where compound setup, site management and security, hoarding and fencing installation, haul road installation, traffic

management, installation and use of conveyor system, stockpiling, culvert surveys, utility connections, track drainage surveys were underway.

- Southern Sustainable Placement Area, where compound setup, site management and security, hoarding and fencing installation, haul road installation were underway.

There were no exceedances of the HS2 threshold levels for significant noise impacts, which are defined in Information Paper E23 (<https://www.gov.uk/government/publications/hs2-information-papers-environment>), during the reporting period.

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

Eight complaints were received during the monitoring period. A description of the complaints, the results of investigations and any actions taken are detailed in Table 6 of this report.

Abbreviations and Descriptions

The abbreviations, descriptions and project terminology used within this report can be found in Table 1.

Table 1: Table of Abbreviations

Acronym/Term	Definition
$L_{Aeq,T}$	See equivalent continuous sound pressure level
Ambient sound	A description of the all-encompassing sound at a given location and time which will include sound from many sources near and far. Ambient sound can be quantified in terms of the equivalent continuous sound pressure level, $L_{pAeq,T}$
Decibel(s), or dB	Between the quietest audible sound and the loudest tolerable sound there is a million to one ratio in sound pressure (measured in Pascal (Pa)). Because of this wide range, a level scale called the decibel (dB) scale, based on a logarithmic ratio, is used in sound measurement. Audibility of sound covers a range of approximately 0-140dB.
Decibel(s) A-weighted, or dB(A)	The human ear system does not respond uniformly to sound across the detectable frequency range and consequently instrumentation used to measure sound is weighted to represent the performance of the ear. This is known as the 'A weighting' and is written as 'dB(A)'.
Equivalent continuous sound pressure level, or $L_{Aeq,T}$	An index used internationally for the assessment of environmental sound impacts. It is defined as the notional unchanging level that would, over a given period of time (T), deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating sound levels can be described in terms of an equivalent single figure value, typically expressed as a decibel level.
Exclusion of data	Measurement of noise levels can be affected by weather conditions such as prolonged periods of rain, winds speeds higher than 5m/s and snow/ice ground cover. Noise levels measured during these periods are considered not representative of normal noise conditions at the site and, for the purposes of this report, are excluded from the assessment of exceedances and calculation of typical noise levels and are also greyed out in charts. Identifiable incongruous noise and vibration events not attributable to HS2 construction noise are also excluded.
Façade	A facade noise level is the noise level 1m in front of a large reflecting surface. The effect of reflection, is to produce a slightly higher (typically +2.5 to +3 dB) sound level than it would be if the reflecting surface was not there.
Free-field	A free-field noise level is the noise level measured at a location where no reflective surfaces, other than the ground, lies within 3.5 metres of the microphone position.
LOAEL	Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.
Peak particle velocity, or PPV	Instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position. The PPV is a simple indicator of perceptibility and risk of damage to structures due to vibration. It is usually measured in mm/s.
SOAEL	Significant Observed Adverse Effect Level - the level above which significant adverse effects on health and quality of life occur.
Sound pressure level	The parameter by which sound levels are measured in air. It is measured in decibels. The threshold of hearing has been set at 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dB at a distance of 1 metre and a change of 3dB in a time varying sound signal is commonly regarded as being just detectable. A change of 10dB is subjectively twice, or half, as loud.
Vibration dose value, or VDV	An index used to evaluate human exposure to vibration in buildings. While the PPV provides information regarding the magnitude of single vibration events, the VDV provides a measure of the total vibration experienced over a specified period of time (typically 16h daytime and 8h night-time). It takes into account the magnitude, the number and the duration of vibration events and can be used to quantify exposure to continuous, impulsive, occasional and intermittent vibration. The vibration dose value is measured in $m/s^{1.75}$.

1 Introduction

1.1.1 HS2 is required to undertake noise (and vibration) monitoring as necessary to comply with the requirements of the High Speed Rail (London-West Midlands) Environmental Minimum Requirements, including specifically Annex 1: Code of Construction Practice, in addition to any monitoring requirements arising from conditions imposed through consents under Section 61 of the Control of Pollution Act, 1974 or through Undertakings & Assurances given to third parties. Such monitoring may be undertaken for the following purposes:

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

1.1.2 Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the London Borough of Hillingdon (LBH) for the period 1st to 31st July 2021.

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

- Colne Valley Viaduct Dews Lane site, ref.: CVV-DL (see Plan 1 in Appendix A), where work activities included:
 - compound operations (including de-sanding works);
 - installation of sheet pile, piling works, including concrete works, installation of reinforcement cage and bored pile breaking out works;
 - ground investigation works;
 - civil works;
 - earthworks; and
 - drainage works.
- Colne Valley Viaduct Moorhall Road site, ref.: CVV-MR (see Plan 1 in Appendix A), where work activities included:
 - compound operations (including de-sanding works);

- earthworks;
 - civil works;
 - drainage works;
 - sheet piling installation;
 - ground investigation works;
 - roadworks and piling works including concrete works, installation of reinforcement cage and bored pile breaking out works.
- West Ruislip Portal Worksite, ref.: WRP (see Plan 3 in Appendix A), where work activities included:
 - site management and security;
 - rotary bored piling;
 - sheet piling;
 - pile trimming;
 - formwork, reinforcement and concreting works;
 - dewatering.
- South Ruislip Ventilation Shaft worksite, ref.: SRVS (see Plan 4 in Appendix A), where work activities included:
 - erection of hoardings;
 - construction of piling / working platforms and areas of hard standing;
 - continued mobilisation of diaphragm walling plant and setting up of the bentonite plant.
- West Ruislip Retained Embankment Worksite, ref.: WRRE, where work activities included:
 - site setup;
 - site management and security;
 - hoarding and fencing;
 - tone column installation;
 - footpath construction;
 - drainage works;
 - dewatering.

- Harvil Road worksite, ref.: HR (see Plan 2 in Appendix A), where work activities included:
 - site setup;
 - site management and security;
 - rotary bored piling;
 - sheet piling;
 - pile trimming;
 - formwork, reinforcement and concreting works;
 - dewatering.

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

- Harvil Road, Ickenham Road and Ruislip Golf Course where power utility works were underway.
- Harvil Road embankment, where compound setup, site management and security, hoarding and fencing installation, temporary road diversion, haul road installation, bulk excavation, installation and use of conveyor system, culvert surveys, utility connections, track drainage surveys were underway.
- Copthall Retained Embankment / Trough, where compound setup, site management and security, hoarding and fencing installation, haul road installation, bulk excavation, sheet piling, culvert surveys, utility connections, track drainage surveys and permanent rotary piling were underway.
- Northern Sustainable Placement Area, where compound setup, site management and security, hoarding and fencing installation, haul road installation, traffic management, installation and use of conveyor system, stockpiling, culvert surveys, utility connections, track drainage surveys were underway.
- Southern Sustainable Placement Area, where compound setup, site management and security, hoarding and fencing installation, haul road installation 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 Thirteen noise monitoring installations were active in July in the LBH area. Table 2 summarises the position of noise monitoring installations within the LBH area in July 2021.
- 1.2.2 One additional noise monitor (ref.: HR-N002) was installed at Harvil Road (worksite ref.: HR) in response to a complaint.
- 1.2.3 One additional noise monitor (ref.: CVV-MR-NMP3) was installed at Colne Valley Viaduct Moorhall Road (worksite ref.: CVV-MR) on the 1st of July 2021.
- 1.2.4 Maps showing the position of noise monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
Colne Valley Viaduct Dews Lane (CVV-DL)	CVV-DL-NMP2	Highway Farm House, Harvil Rd, Harefield, Uxbridge
	CVV-DL-NMP3	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge
Colne Valley Viaduct Moorhall Road (CVV-MR)	CVV-MR-NMP1	Moorhall Road South Compund, London, Greater London
	CVV-MR-NMP2	Harefield Marina, Moorhall Road, London Borough of Hillingdon, London, Greater London
	CVV-MR-NMP3	Peerless Drive, Harefield, Uxbridge
West Ruislip Portal (WRP)	N048	West Ruislip Golf Club, Ickenham Rd, Ruislip
	N056	83 The Greenway, Ickenham, Ruislip
	N057	123 The Greenway, Ickenham, Ruislip
West Ruislip Retained Embankment (WRRE)	N065	Breakspear Road South, Harefield, Uxbridge
	N066	Hoylake Crescent, Ickenham, Uxbridge
South Ruislip Ventilation Shaft (SRVS)	N061	Cineworld South Ruislip car park, Ruislip
Harvil Road (HR)	N067	Harvil Road worksite south boundary
	HR-N002	Certas Energy Bunker Site - Harefield

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 LAeq Data over the Monitoring Period

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average LAeq,T (highest day LAeq,T)					Saturday Average LAeq,T (highest day LAeq,T)					Sunday / Public Holiday Average LAeq,T (highest day LAeq,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-DL	CVV-DL-NMP2	Highway Farm House, Harvil Rd, Harefield, Uxbridge	Free-field	55.7 (57.3)	57.3 (65.4)	54.6 (56.8)	54.5 (56.0)	54.3 (56.9)	54.5 (55.2)	55.1 (55.9)	55.3 (56.5)	55.0 (65.5)	54.2 (55.3)	54.7 (57.7)	54.3 (56.6)
	CVV-DL-NMP3	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge,	Free-field	53.5 (61.7)	59.2 (66.6)	49.8 (53.5)	48.7 (58.2)	45.1 (54.2)	53.7 (61.1)	56.2 (62.5)	49.6 (51.9)	46.4 (50.1)	43.3 (52.0)	49.5 (59.0)	44.8 (51.5)
CVV-MR	CVV-DL-NMP1	Moorhall Road South Compound, London, Greater London	Free-field	57.7 (69.8)	60.9 (69.7)	52.4 (73.5)	48.6 (60.5)	47.3 (64.9)	53.6 (70.9)	56.8 (71.8)	48.7 (50.9)	47.7 (53.2)	50.7 (63.9)	49.3 (55.6)	47.6 (56.4)
	CVV-MR-NMP2	Harefield Marina, Moorhall Road, London, Greater London	Free-field	47.6 (50.9)	52.6 (58.7)	48.4 (59.9)	45.5 (52.2)	43.5 (54.9)	45.5 (47.3)	46.6 (49.6)	46.6 (47.6)	45.7 (51.4)	42.4 (50.5)	49.3 (61.8)	41.7 (48.0)
	CVV-MR-NMP3	Peerless Drive, Harefield, Uxbridge	Free-field	50.0 (53.7)	59.1 (69.7)	48.6 (56.1)	46.1 (53.4)	43.5 (54.3)	46.4 (48.6)	50.3 (60.8)	47.5 (51.9)	46.0 (50.0)	43.5 (60.4)	49.7 (63.6)	42.6 (49.6)
WRP	N048	West Ruislip Golf Club, Ickenham Rd, Ruislip	Free-field	60.2 (63.1)	64.6 (68.3)	57.7 (59.1)	56.9 (59.3)	52.5 (59.8)	57.0 (58.3)	60.3 (64.6)	56.6 (57.9)	56.7 (60.5)	50.8 (57.0)	56.1 (59.3)	52.9 (58.2)
	N056	83 The Greenway, Ickenham, Ruislip	Free-field	59.3 (61.2)	62.6 (71.7)	58.4 (60.5)	57.7 (61.3)	53.4 (65.1)	56.4 (58.6)	57.6 (59.9)	57.4 (59.3)	57.1 (60.3)	51.9 (58.8)	57.7 (66.6)	54.1 (61.1)

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Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
	N057	123 The Greenway, Ickenham, Ruislip	Free-field	55.9 (57.4)	57.6 (60.0)	56.2 (58.0)	55.4 (59.1)	50.7 (60.0)	54.4 (55.1)	56.0 (58.0)	55.0 (56.5)	57.5 (75.5)	49.4 (57.0)	54.3 (57.2)	51.4 (58.4)
WRRE	N065	Breakspear Road South, Harefield, Uxbridge	Free-field	63.8 (67.6)	64.2 (76.3)	63.3 (64.7)	61.1 (65.5)	55.7 (64.4)	60.7 (61.3)	62.4 (63.1)	63.3 (63.7)	62.1 (66.7)	56.0 (59.8)	61.4 (64.5)	56.8 (63.2)
	N066	Hoylake Crescent, Ickenham, Uxbridge	Free-field	55.9 (57.9)	56.6 (60.7)	55.5 (60.0)	53.9 (58.7)	51.4 (59.3)	52.6 (53.8)	54.2 (55.6)	54.4 (56.2)	53.7 (56.2)	49.0 (53.7)	53.8 (58.3)	51.3 (58.1)
SRVS	N061	Cineworld South Ruislip car park, Ruislip	Free-field	59.7 (63.5)	62.5 (64.6)	61.4 (64.2)	62.1 (67.1)	55.2 (67.0)	61.6 (73.1)	63.1 (64.2)	63.3 (67.1)	61.8 (68.4)	55.8 (65.0)	60.1 (67.6)	52.8 (57.5)
HR	N067	Harvil Road worksite south boundary	Free-field	55.1 (58.0)	60.5 (63.8)	56.3 (68.0)	57.5 (65.6)	52.2 (68.3)	53.7 (56.4)	58.4 (61.5)	54.5 (56.3)	55.8 (61.5)	51.7 (62.5)	55.0 (64.8)	52.7 (60.2)
	HR-N002	Certas Energy Bunker Site – Harefield	Free-field	63.6 (65.9)	62.9 (63.9)	61.2 (63.3)	59.5 (63.2)	56.9 (65.6)	61.5 (62.7)	62.3 (62.7)	62.3 (63.8)	60.3 (63.3)	54.3 (58.1)	61.3 (68.6)	58.3 (65.5)

2.1.2 Appendix C presents graphs of the noise 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). 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, 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 4 presents a summary of recorded exceedances of the LOAEL and SOAEL at each measurement location over the reporting period, including the number of exceedances during each time period.

Table 4: Summary of Exceedances of LOAEL and SOAEL

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
CVV-DL	CVV-DL-NMP2	Highway Farm House, Harvil Rd, Harefield, Uxbridge	All days	All periods	No exceedance	No exceedance
	CVV-DL-NMP3*	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge	All days	All periods	No exceedance	No exceedance
CVV-MR	CVV-DL-NMP1*	Moorhall Road South Compound, London, Greater London	All days	All periods	No exceedance	No exceedance
	CVV-MR-NMP2	Harefield Marina, Moorhall Road, London, Greater London	All days	All periods	No exceedance	No exceedance
	CVV-MR-NMP3	Peerless Drive, Harefield, Uxbridge	Weekdays	0800-1800	1	No exceedance
WRP	N048	West Ruislip Golf Club, Ickenham Rd, Ruislip	Weekdays	0800-1800	7	No exceedance
	N056	83 The Greenway, Ickenham, Ruislip	Weekdays	0800-1800	2	No exceedance
	N057	123 The Greenway, Ickenham, Ruislip	All days	All periods	No exceedance	No exceedance
WRRE	N065*	Breakspear Road South, Harefield, Uxbridge	Weekdays	0800-1800	13	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
	N066	Hoylake Crescent, Ickenham, Uxbridge	All days	All period	No exceedance	No exceedance
SRVS	N061	Hoylake Crescent, Ickenham, Uxbridge	All days	All period	Not applicable**	Not applicable**
HR	N067	Harvil Road worksite south boundary	All days	All period	No exceedance	No exceedance
	HR-N002	Certas Energy Bunker Site – Harefield	All days	All period	No exceedance	No exceedance

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

** The defined LOAEL and SOAEL criteria are not applicable to non-residential receptors

2.2.6 No exceedance of the SOAEL was recorded due to HS2 construction works during July 2021. One exceedance of the LOAEL was recorded near the Colne Valley Viaduct Moorhall Road worksite during weekday working periods. 9 no. exceedance of the LOAEL was recorded near the West Ruislip Portal worksite during weekday working periods. 13 no. exceedance of the LOAEL was recorded near the West Ruislip Retained Embankment worksite during weekday working periods.

2.3 Exceedances of Trigger Level

2.3.1 Table 6 provides a summary of exceedances of the Section 61 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 5: Summary of Exceedances of Trigger Levels

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

2.4 Complaints

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

Table 6: Summary of Complaints

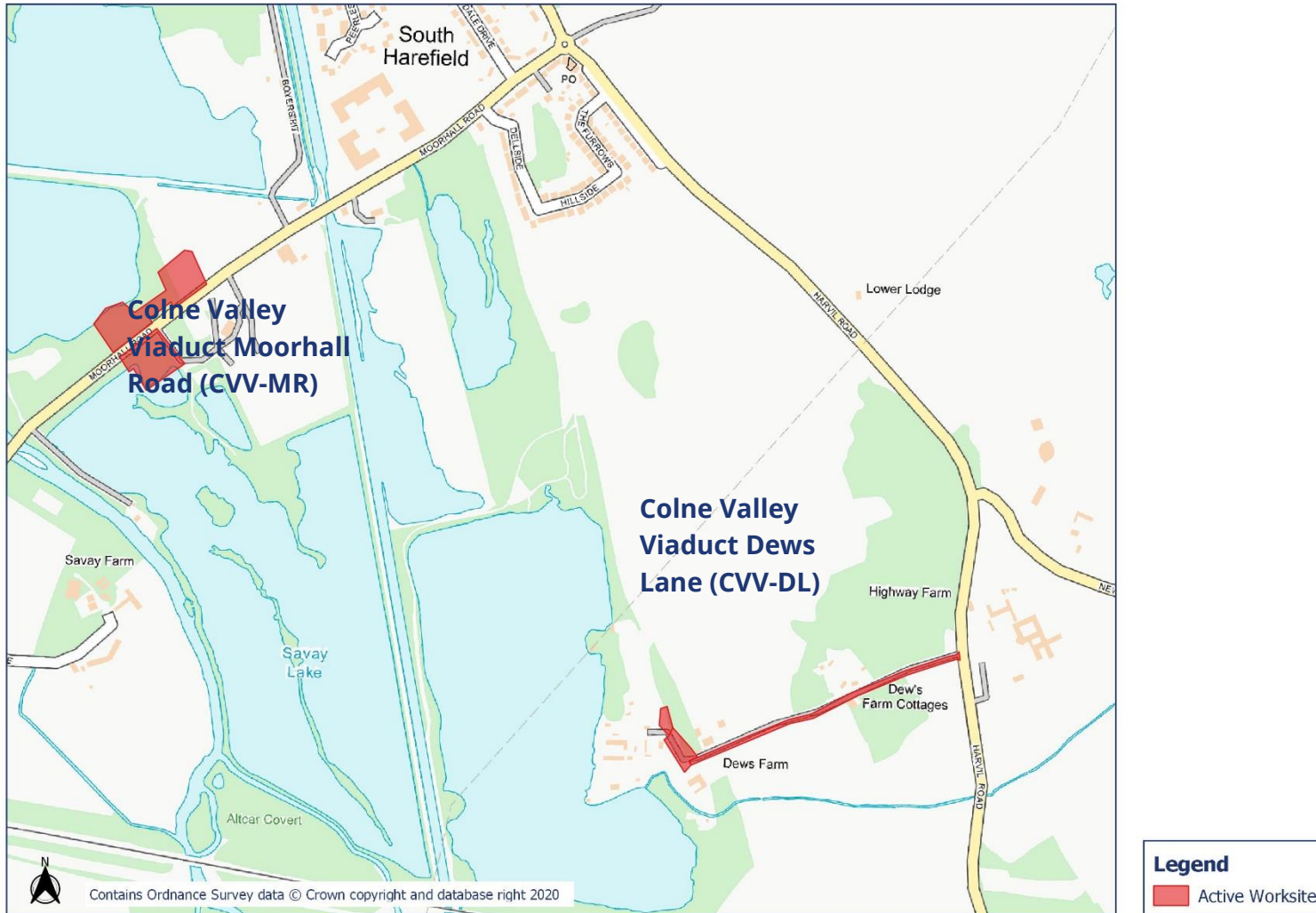
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-42216-C	WRP	Complaint due to vibration felt in property on Hoylake Crescent during daytime working period.	Site inspection confirmed that works (sheet piling) were carried out in accordance with Section 61 consent and Best Practicable Means (BPMs) were used to reduce noise and vibration as far as practicable. In consideration of the separating distance between the works and the property it is believed that vibration could be occasionally perceptible within the property but well within levels typically considered acceptable for human comfort and to avoid structural damage.	Resident was contacted to explain the works and mitigation measures in place. A site inspection was carried out to audit the works and ensure the agreed BPMs were being implemented on site. Additional attended vibration monitoring was undertaken in the area to provide further reassurance.
HS2-21-62784-E	WRP	Complaint due to construction noise on Greenway.	Investigation confirmed that noise was within consented levels in accordance with current Section 61 consent	Resident has been contacted and the programme of works and mitigation measures

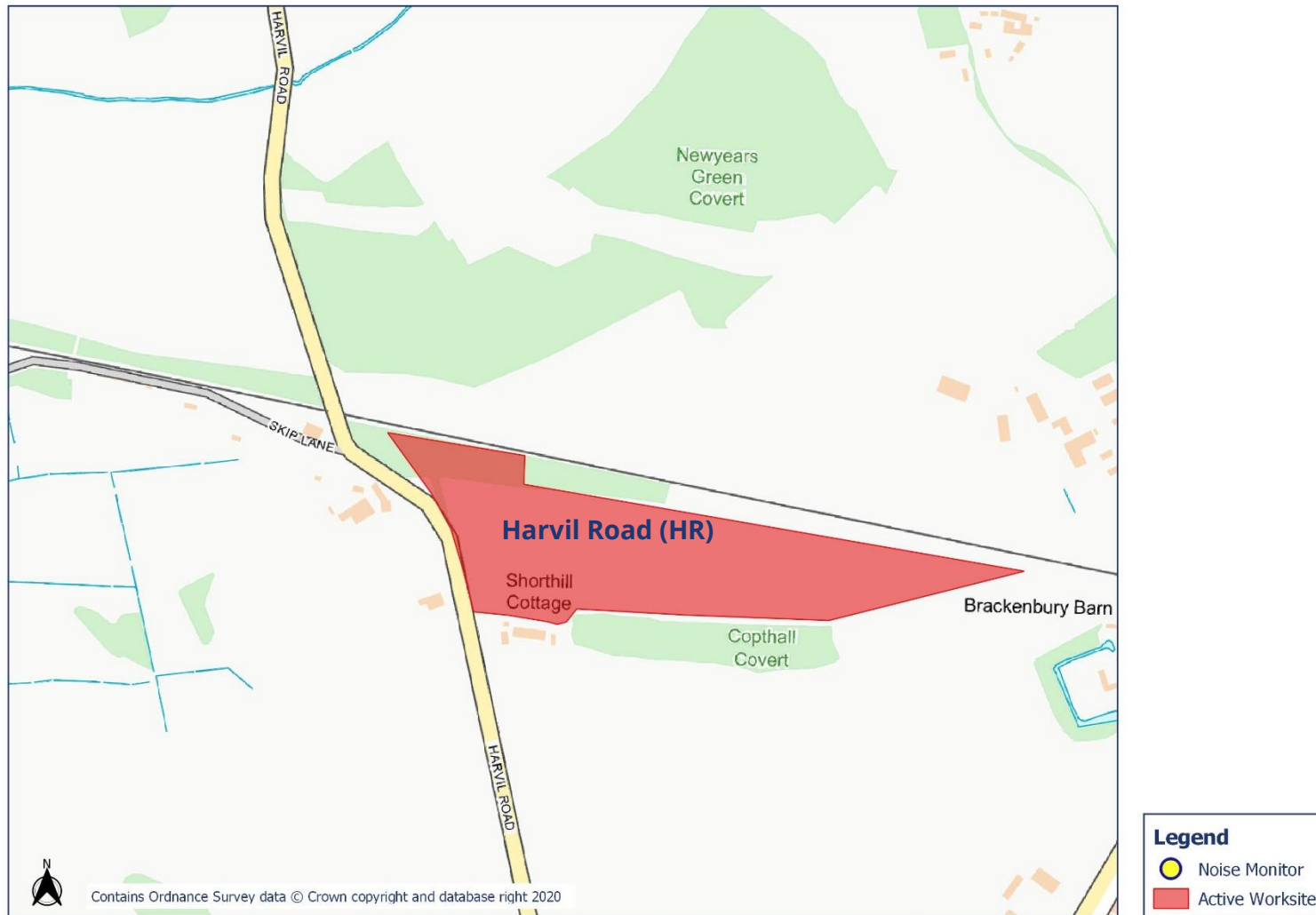
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
			and mitigation measures were in place.	in place have been provided.
HS2-21-42283-C	WRP	Complaint due to vibration felt in property on the Greenway during daytime working period.	Works were carried out in accordance with Section 61 consent and BPM were used to reduce noise and vibration as far as practicable. In consideration of the separating distance between the works and the property it is believed that vibration could be occasionally perceptible within the property but well within levels typically considered acceptable for human comfort and to avoid structural damage.	Resident was contacted to explain the works and mitigation measures in place.
HS2-21-42286-C	N/A	Complaint from a resident on Breakspear Road regarding a high-pitch whistle-like sound from the direction of the compound.	Investigations could not detect the high-pitch sound.	Resident was advised to get back in touch should the sound be audible again.
HS2-21-42213-C	CVV-MR	Complaint due to raised voices coming from the site during night-time.	Investigations confirmed that works/activities were undertaken at the time of the complaints.	Site staff has been re-briefed to minimise the verbal noise on site. The complainant has been contacted and information provided.
HS2-21-42366-C	CVV-DL	Complaint due to noise disturbance for the last few weeks.	Investigation confirmed that noise was due to 24/7 works for river diversion.	The complainant was contacted by the contractor to inform that the 24/7 works finished and that now should be quieter.
HS2-21-42299-C	CVV-DL	Complaint due to loud trucks driving in the early mornings.	Investigation confirmed that the property is next to a busy road that contains high proportion of non-contractor's HGVs. The nearest noise monitor was reviewed, and no exceedances were found.	The contractor apologised to the complainant and explained that the property is close to a busy road that also contains a high proportion of non-contractor's HGVs. The times mentioned by the complainant are outside

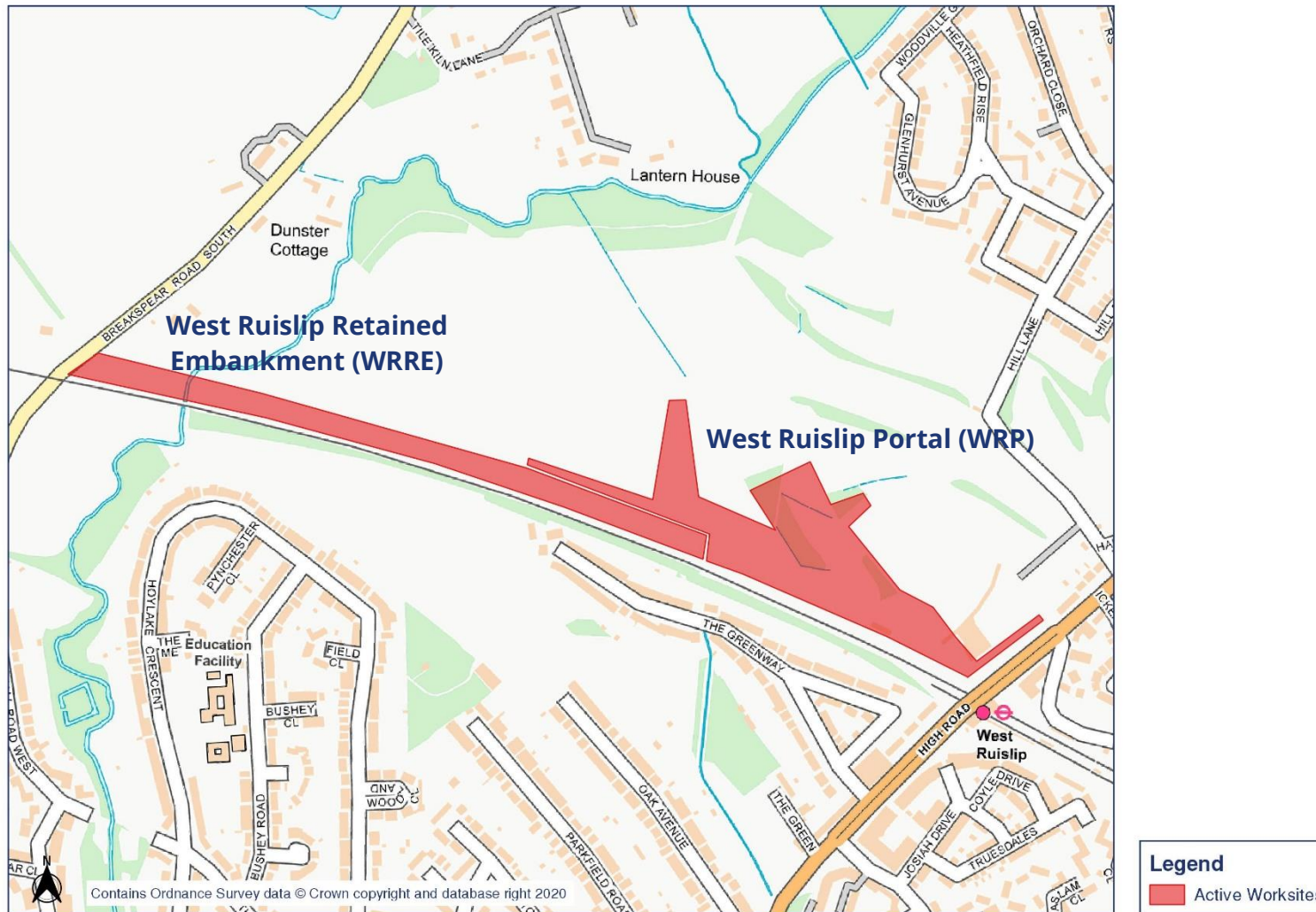
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
				of the contractor's HGV contracted hours.
HS2-21-42216-C	CVV-DL	Complaint due to vibration disturbance for few weeks.	Investigations confirmed that vibration was causing the complainant windows to vibrate.	The complainant was contacted, and an unattended vibration monitoring has been temporarily carried out near to the complainant property. In early September, the complainant will be contacted, and the conversation will be rearranged when he will be back from leave, then the unattended noise monitor will be moved to the complainant house to check that the vibration levels are in line with Section 61 consent.

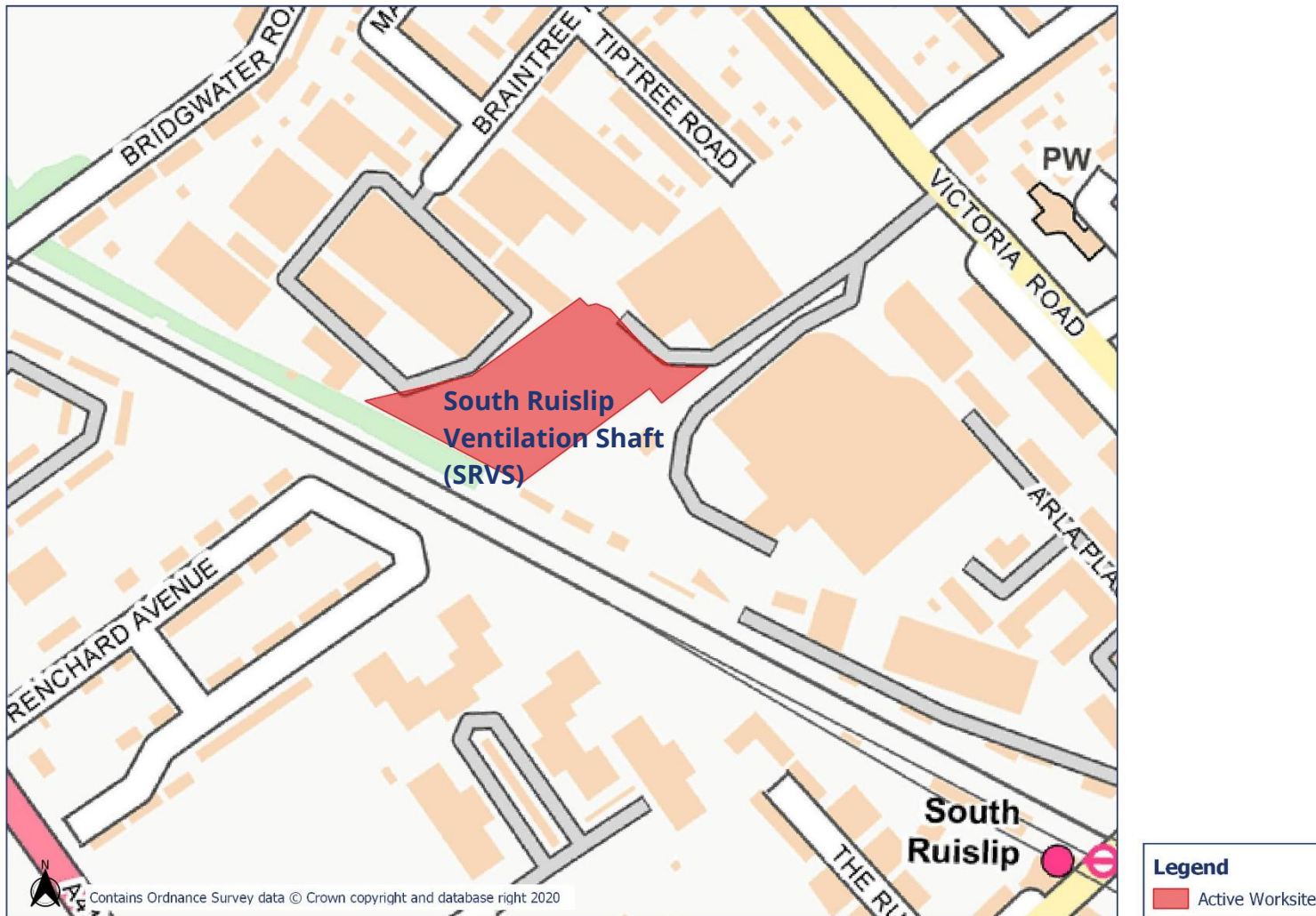
Appendix A Site Locations







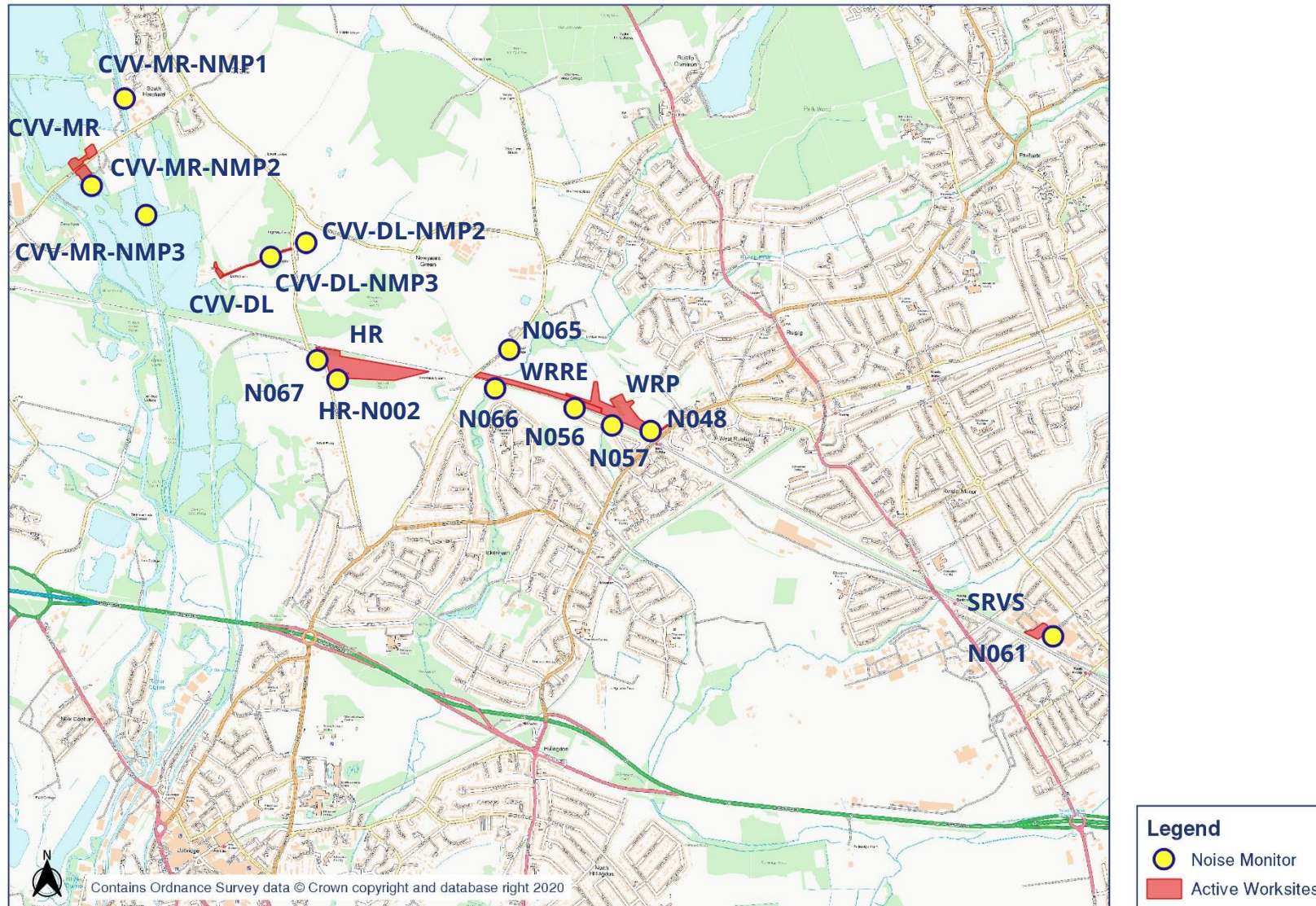


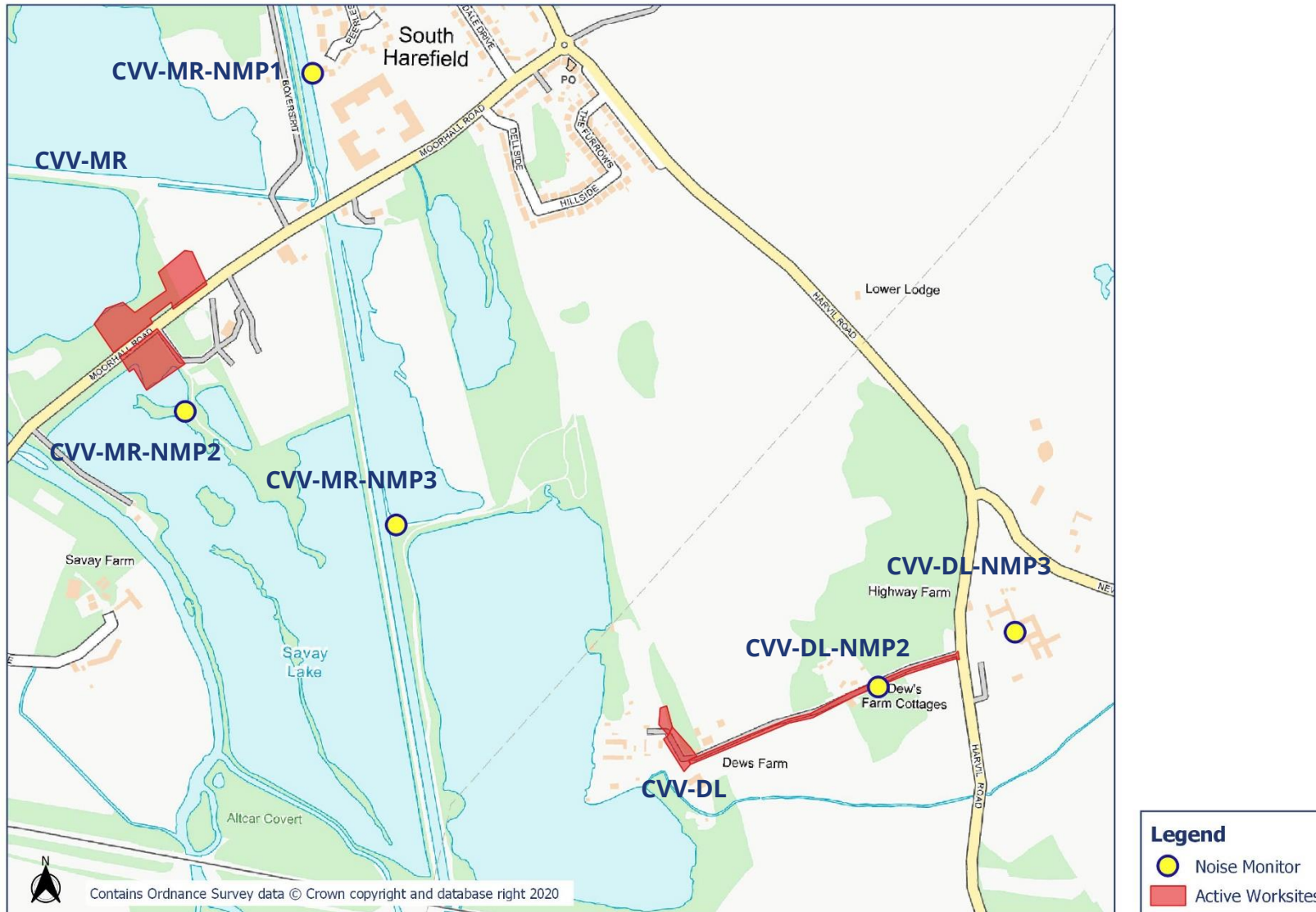


Appendix B Monitoring Locations

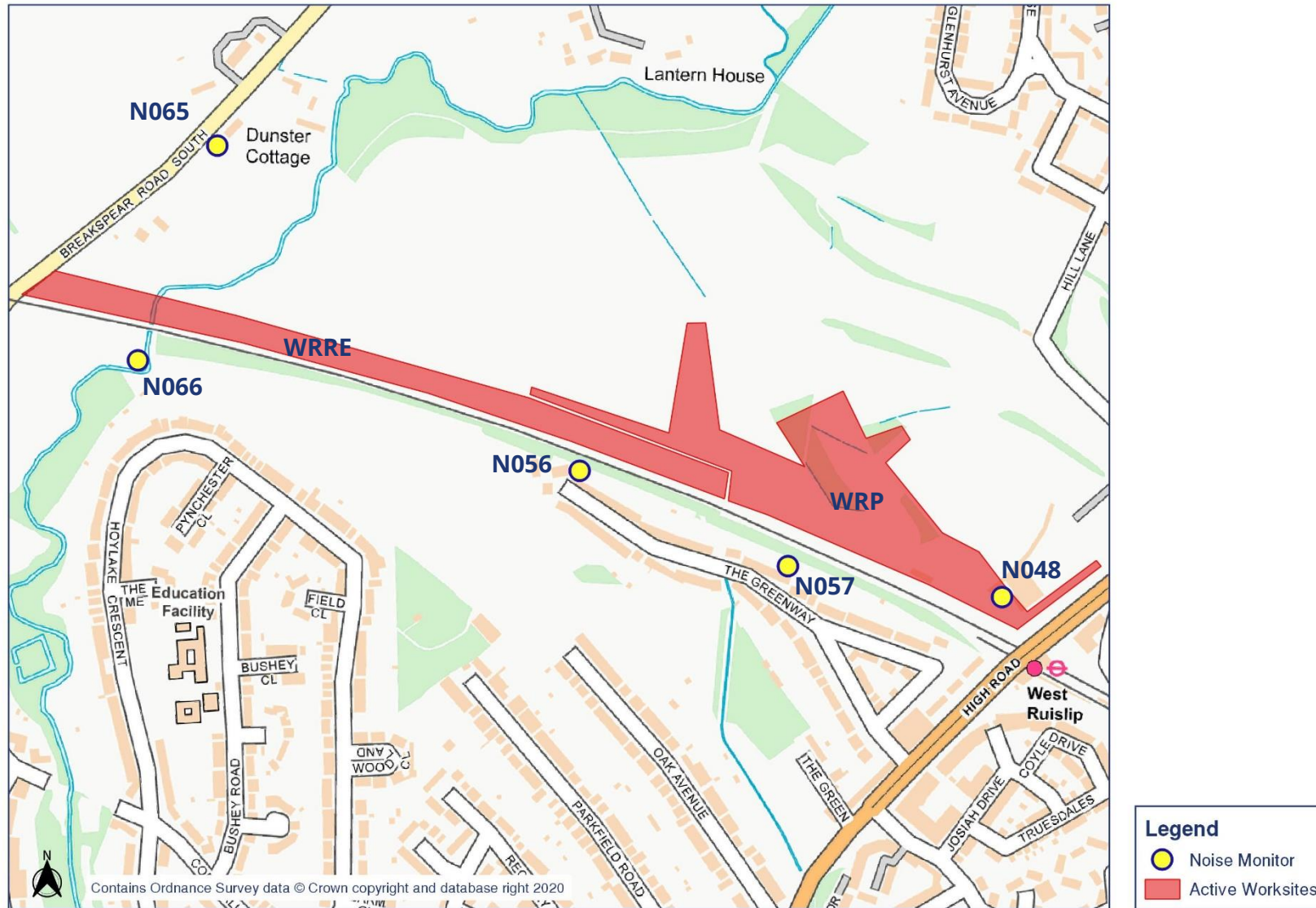
HS2

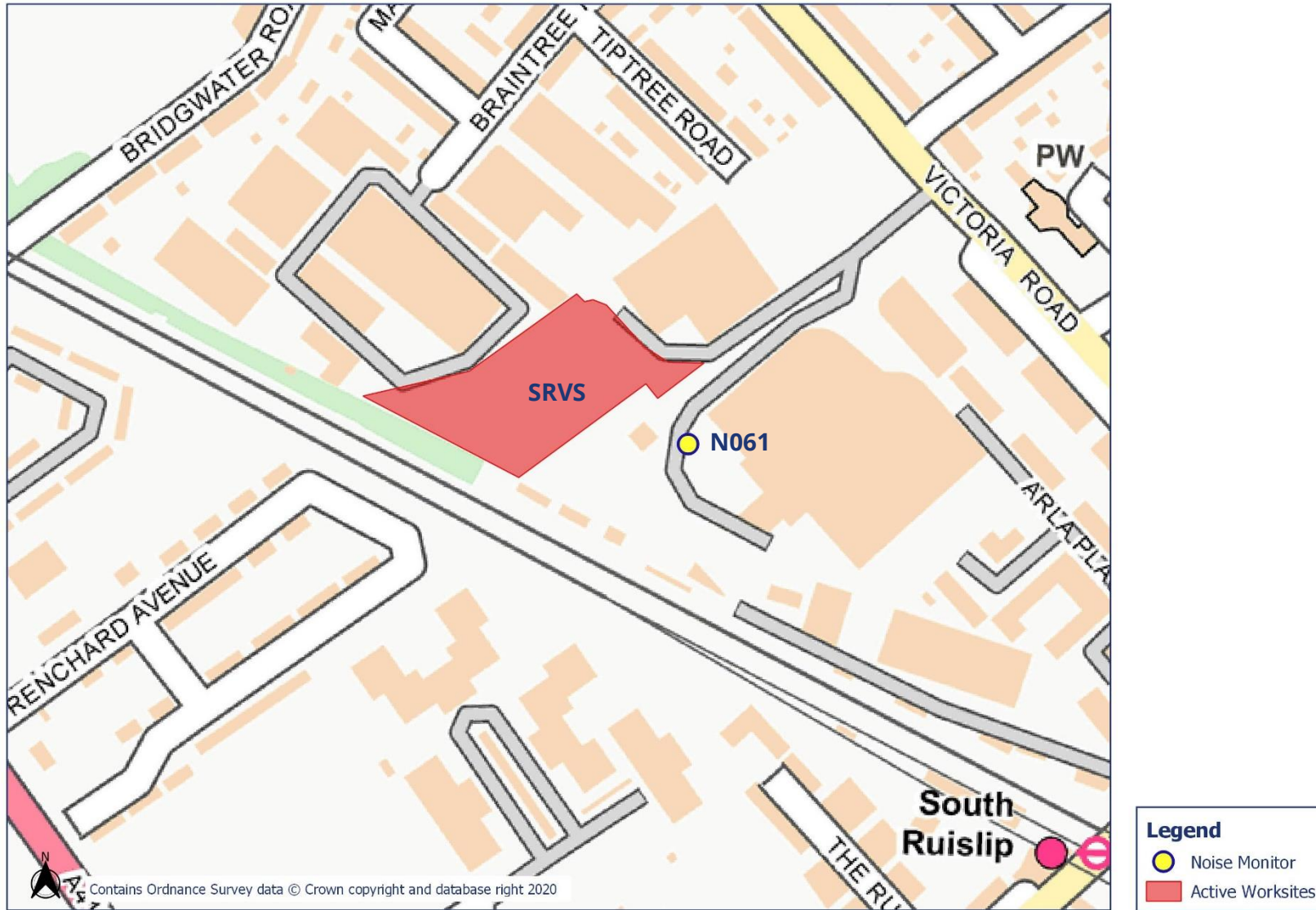
Noise monitoring plan - Overview









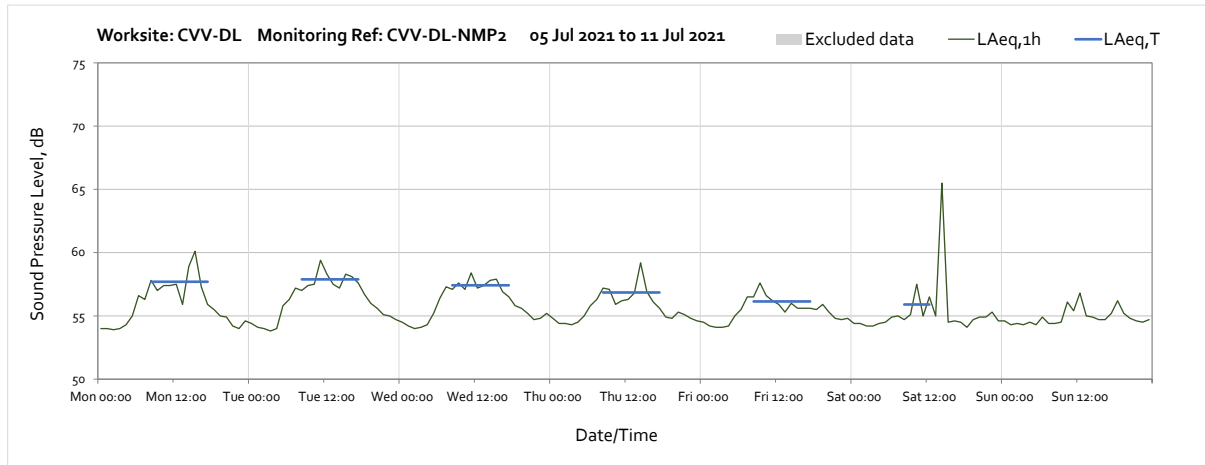
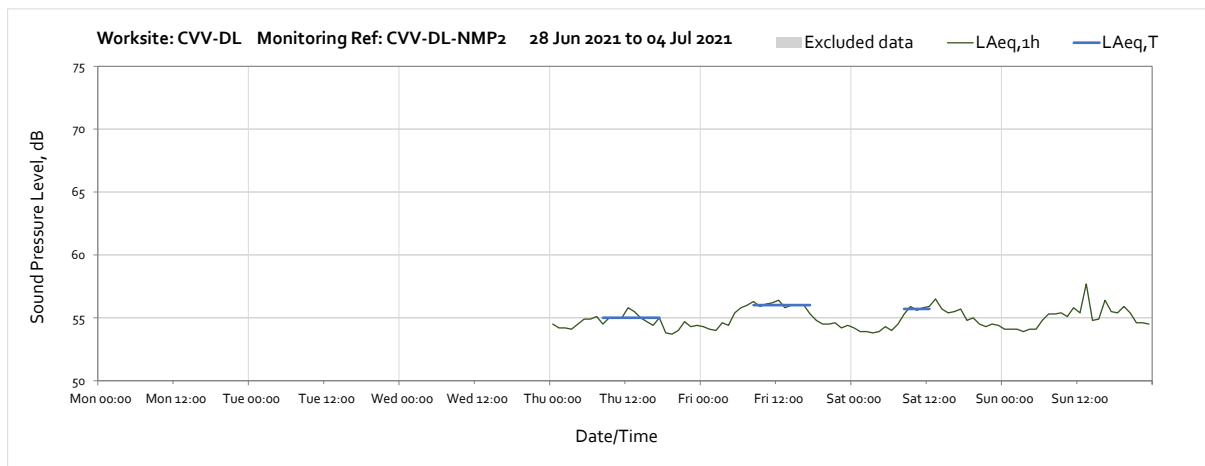


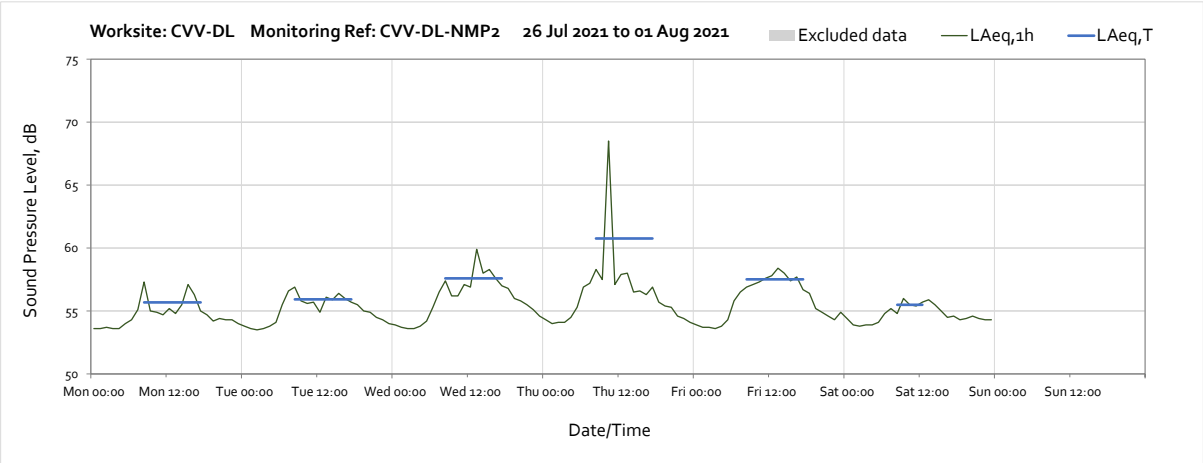
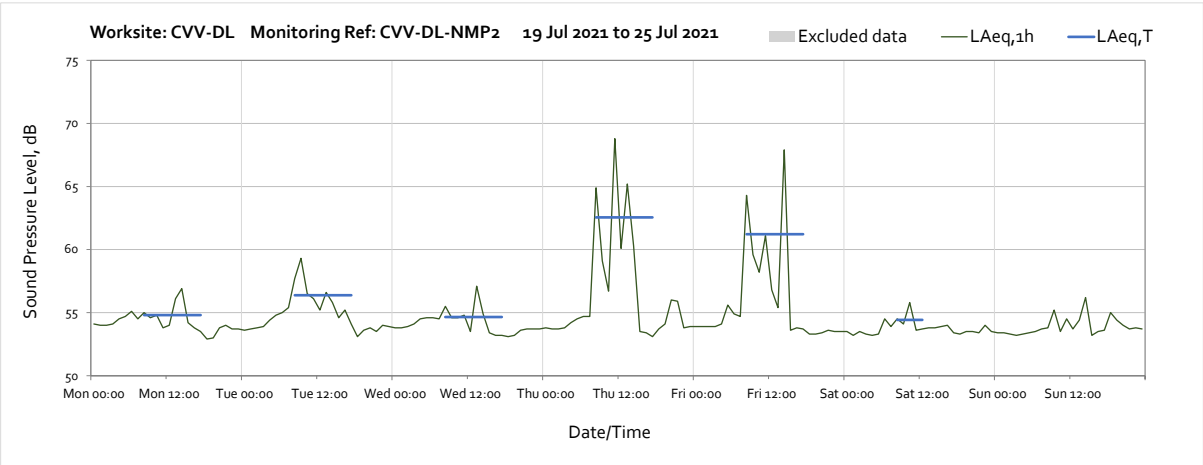
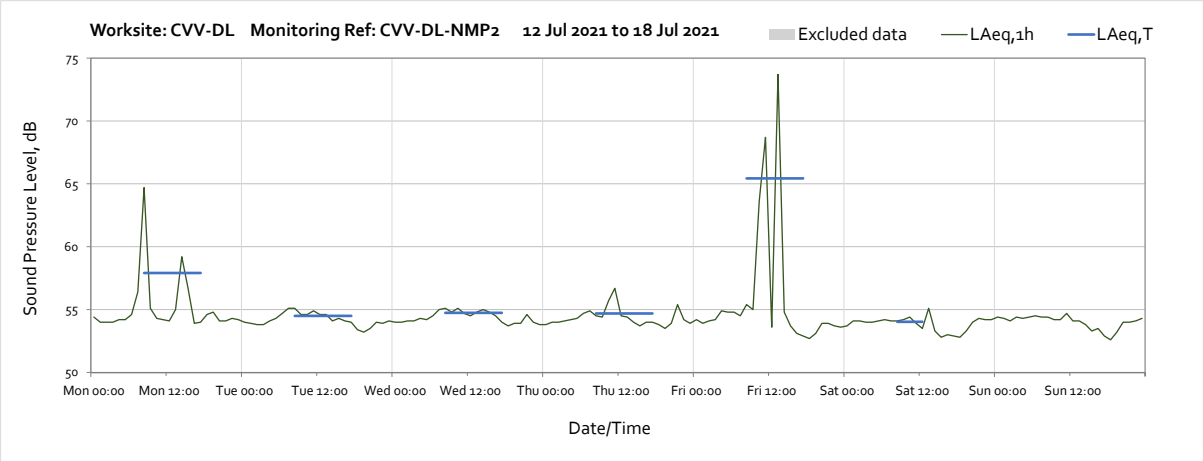
Appendix C Data

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

Worksite: Colne Valley Viaduct Dews Lane (CVV-DL)

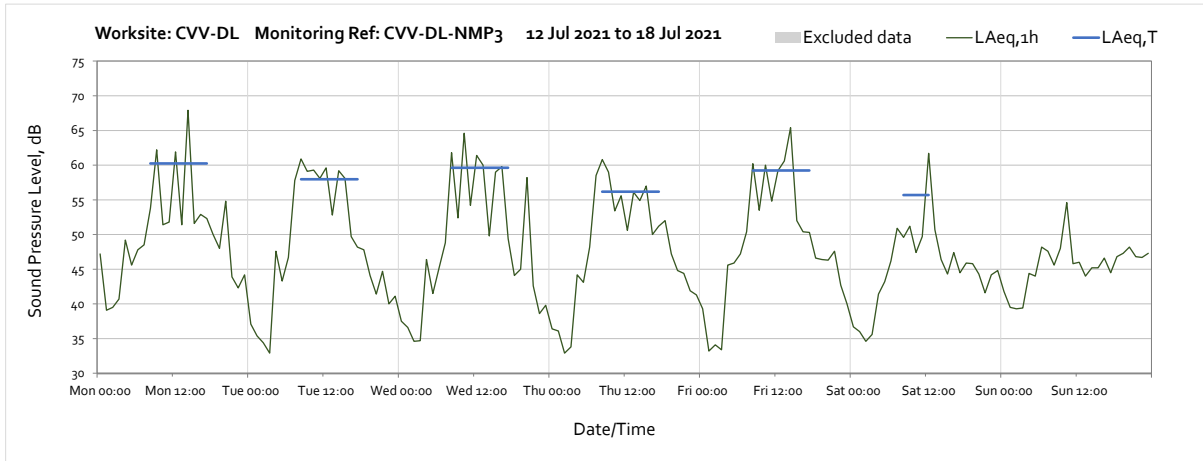
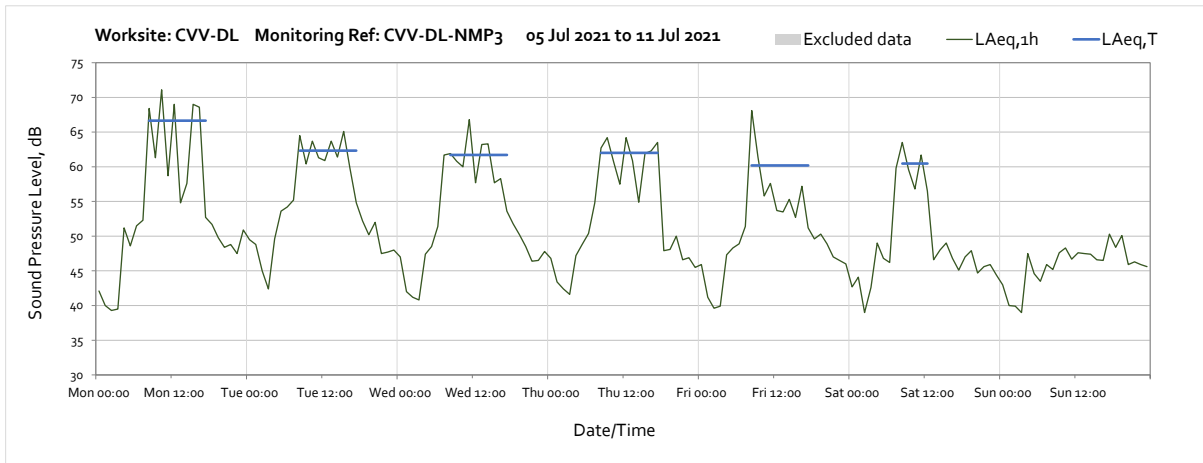
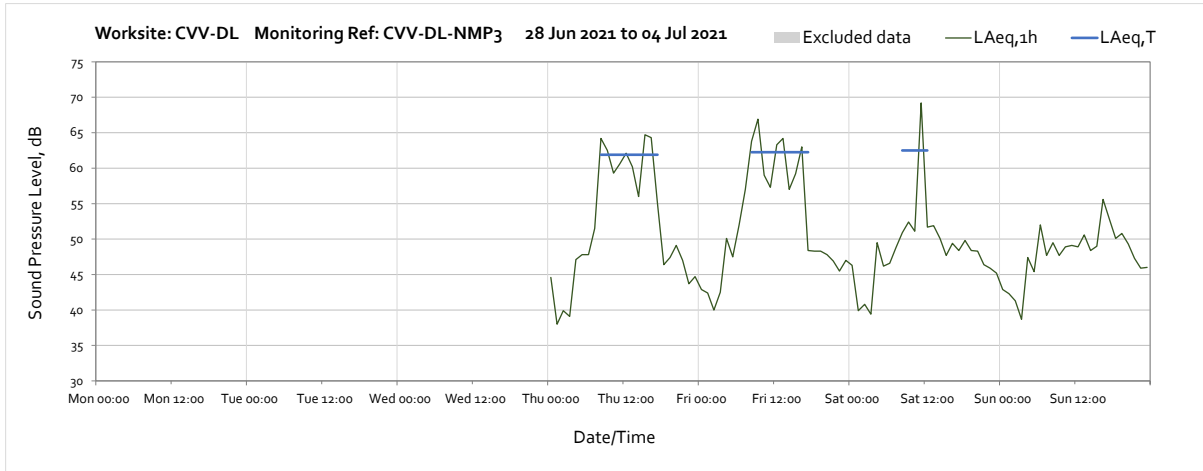
Monitoring Ref: CVV-DL-NMP2

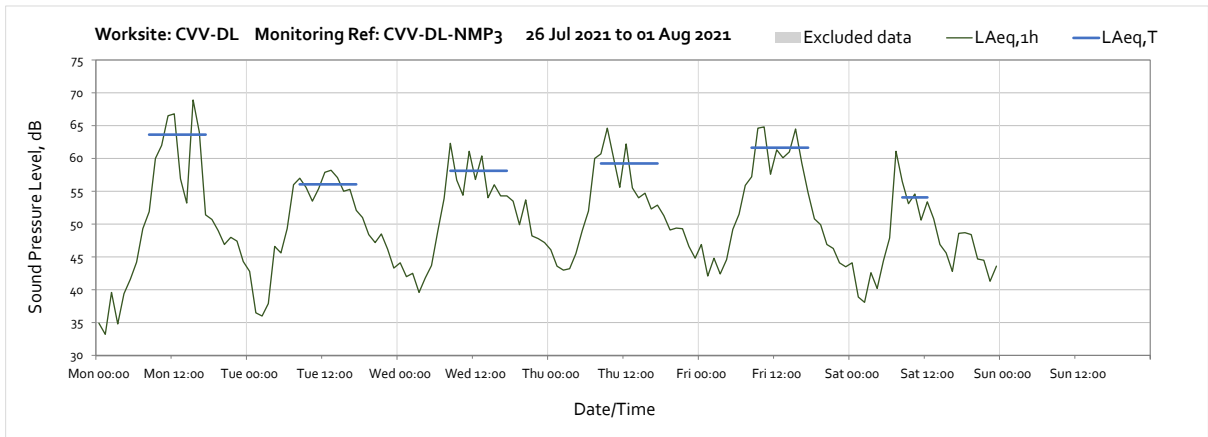
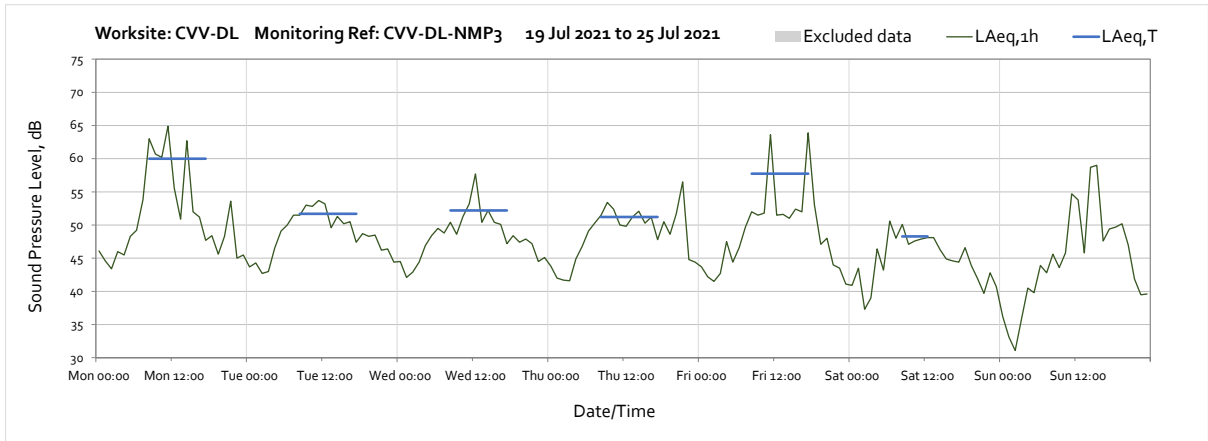




Worksite: Colne Valley Viaduct Dews Lane (CVV-DL)

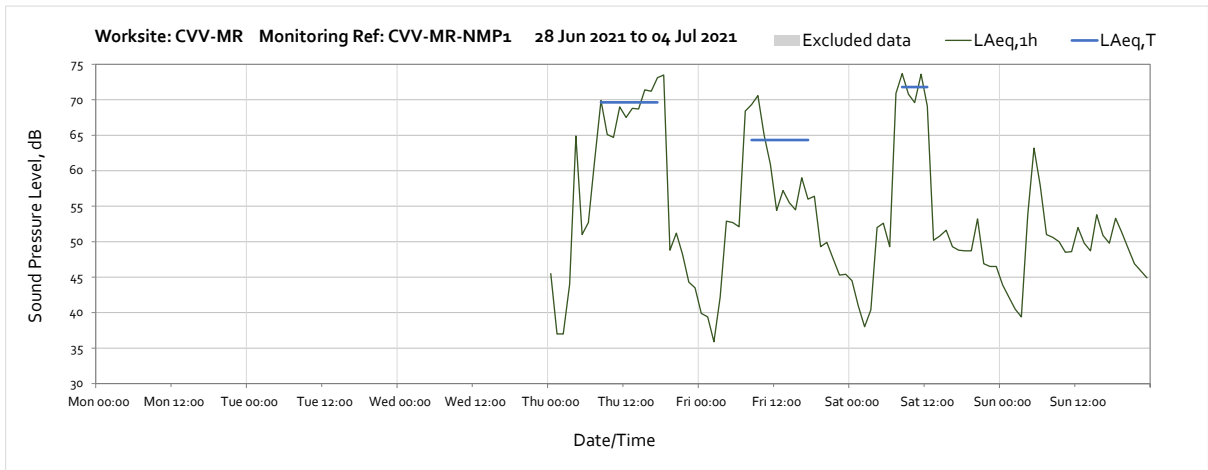
Monitoring Ref: CVV-DL-NMP3

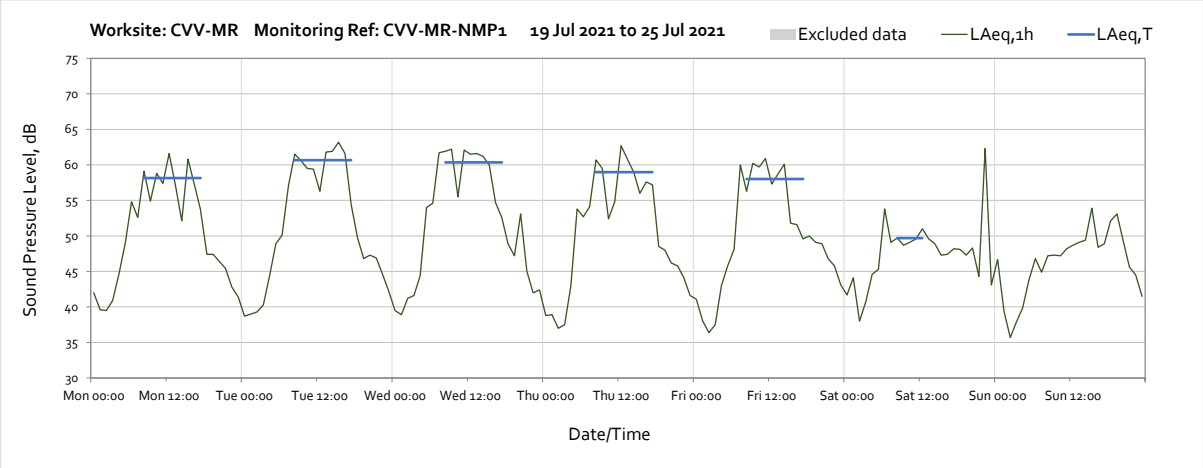
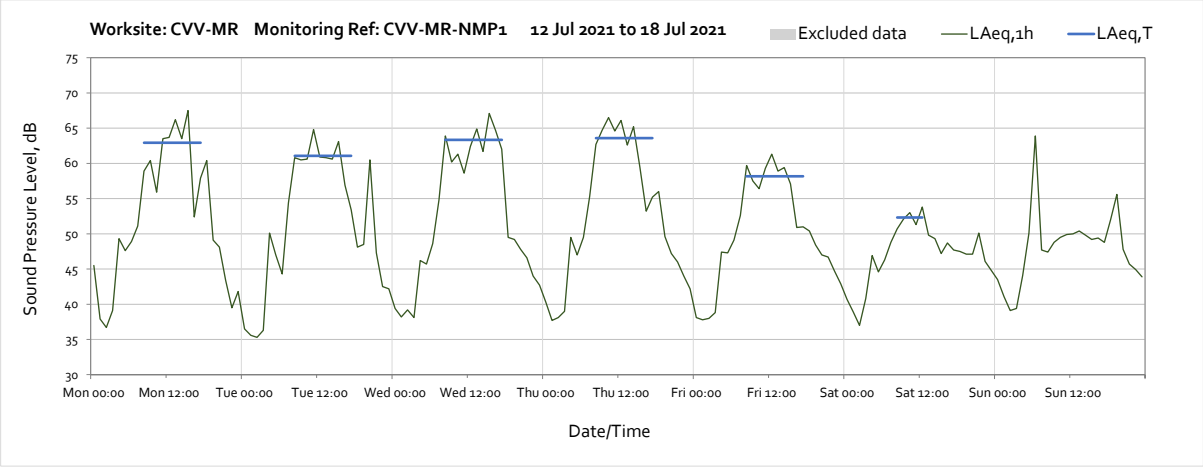
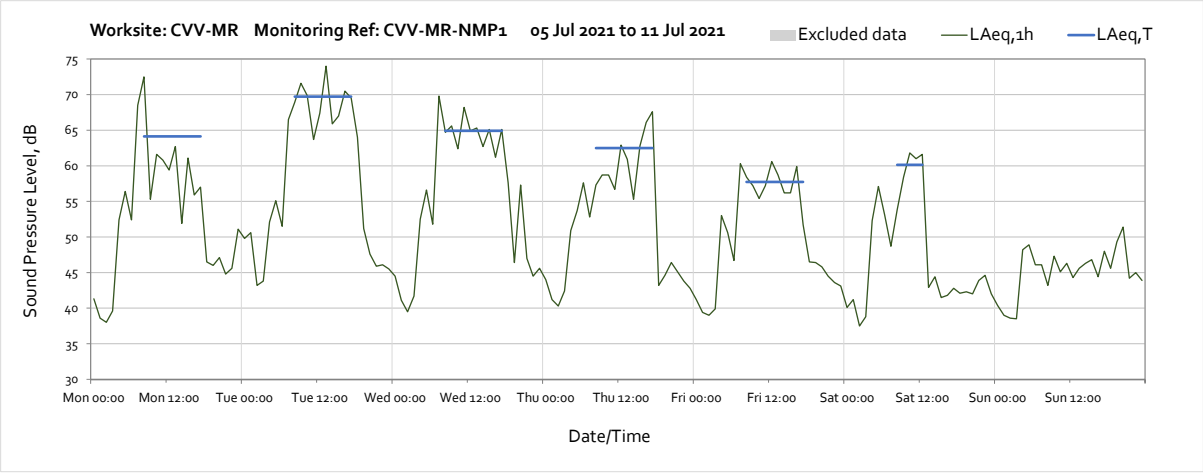


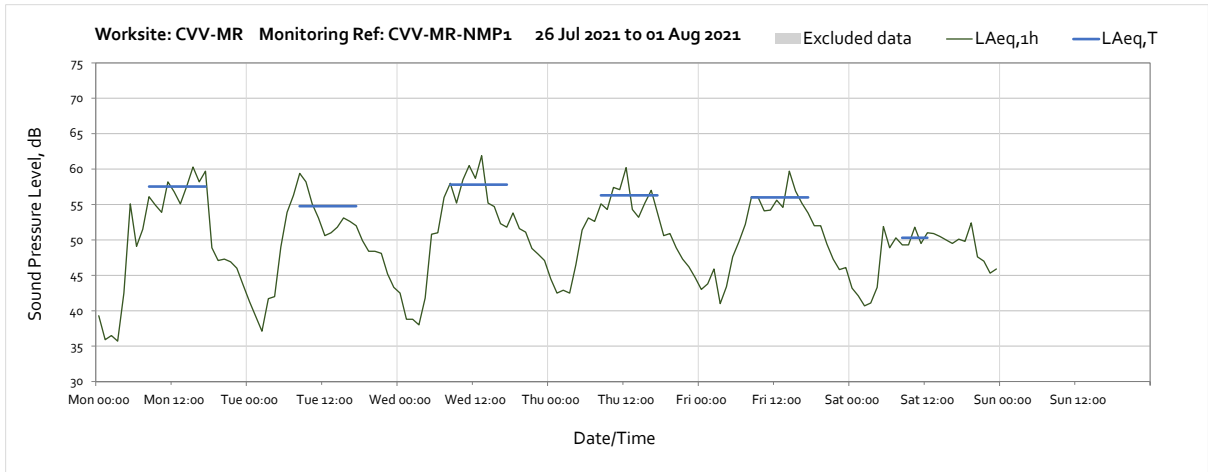


Worksite: Colne Valley Viaduct Dews Lane (CVV-DL)

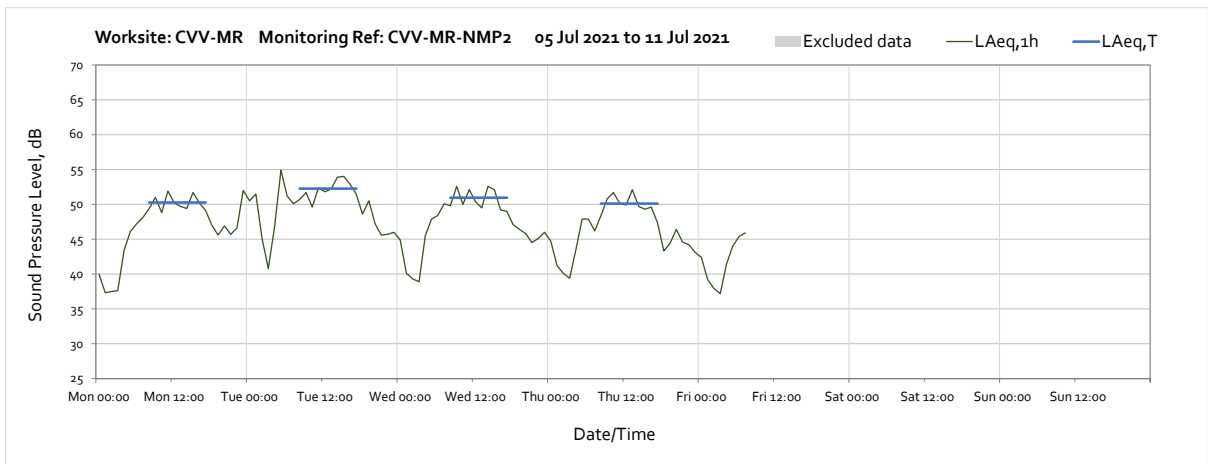
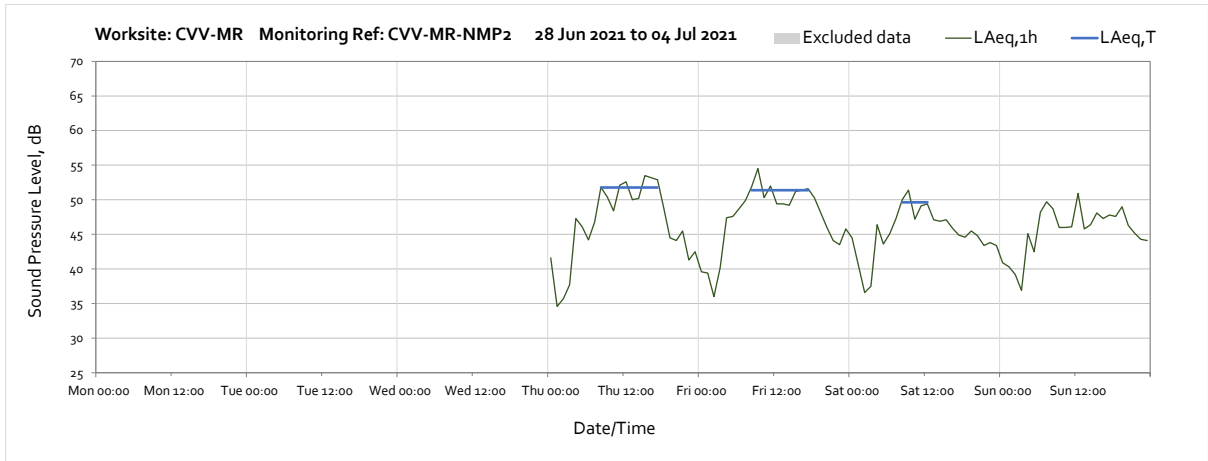
Monitoring Ref: CVV-MR-NMP1



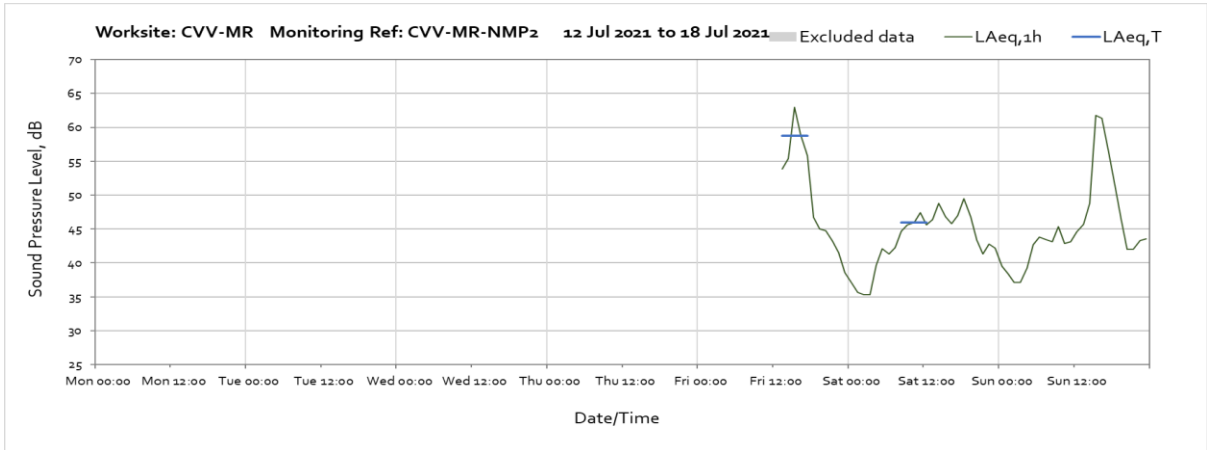




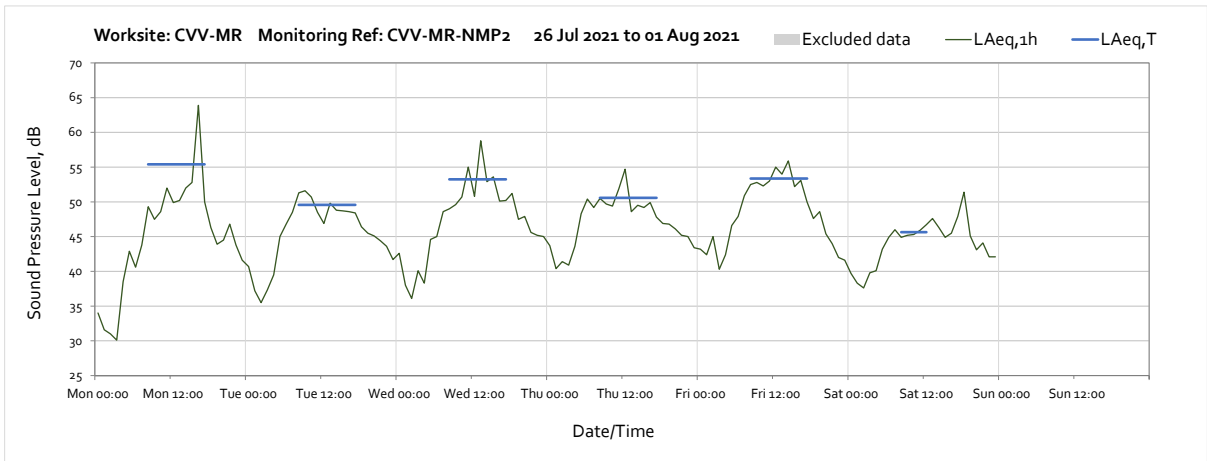
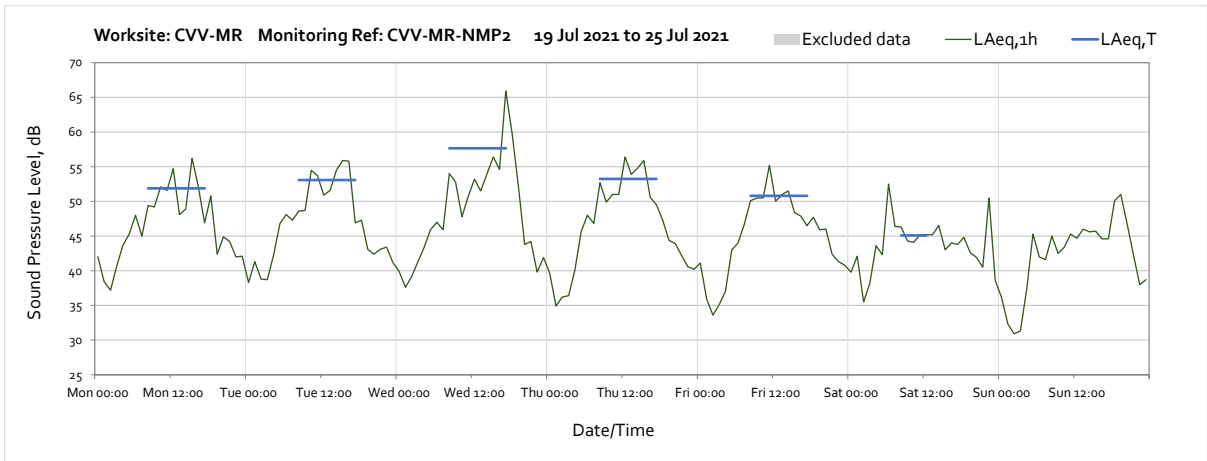
Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)
Monitoring Ref: CVV-MR-NMP2



Note: Missing data between Friday 9th of July 8:00 and Friday 16th of July 12:00 was due to the noise monitor being temporarily removed.

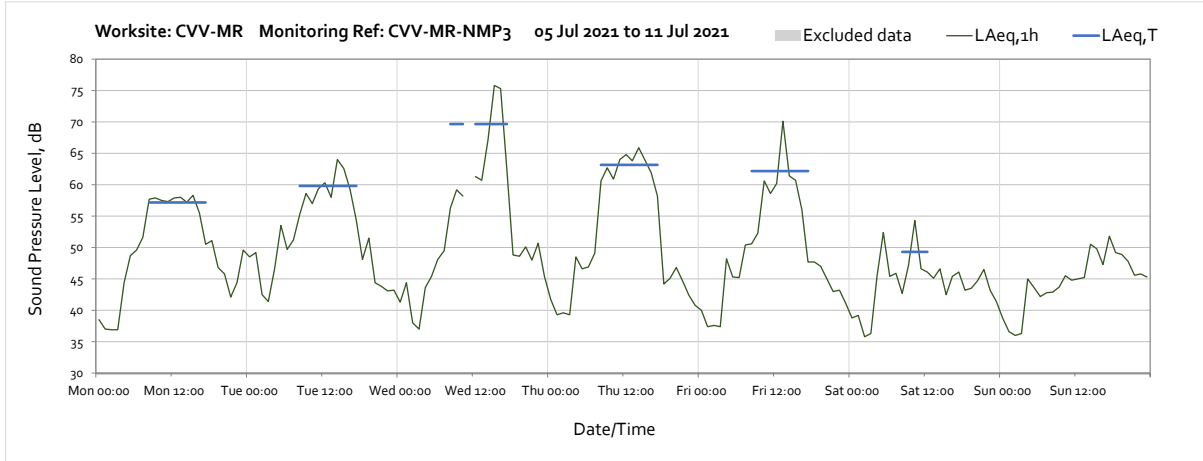
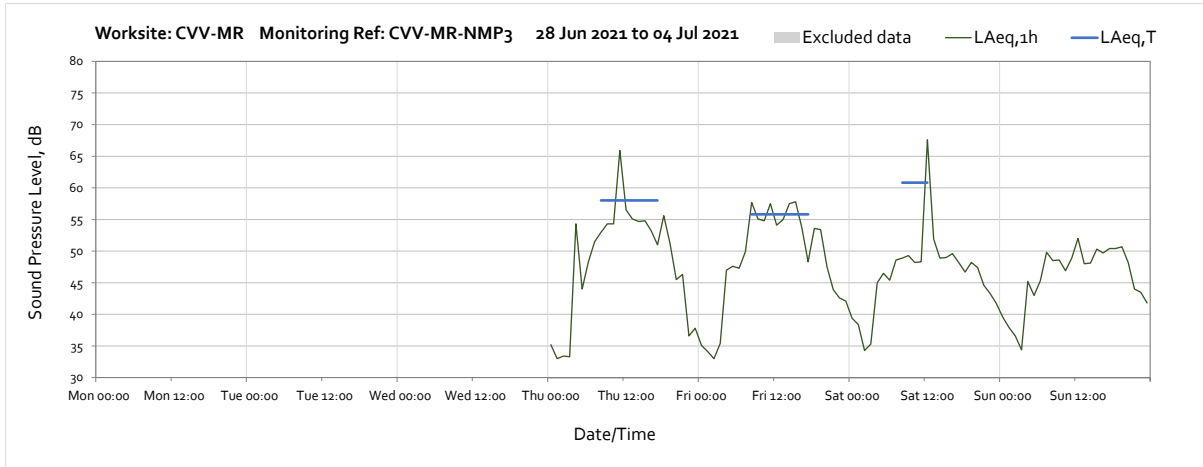


Note: Missing data between Friday 9th of July 8:00 and Friday 16th of July 12:00 was due to the noise monitor being temporarily removed.

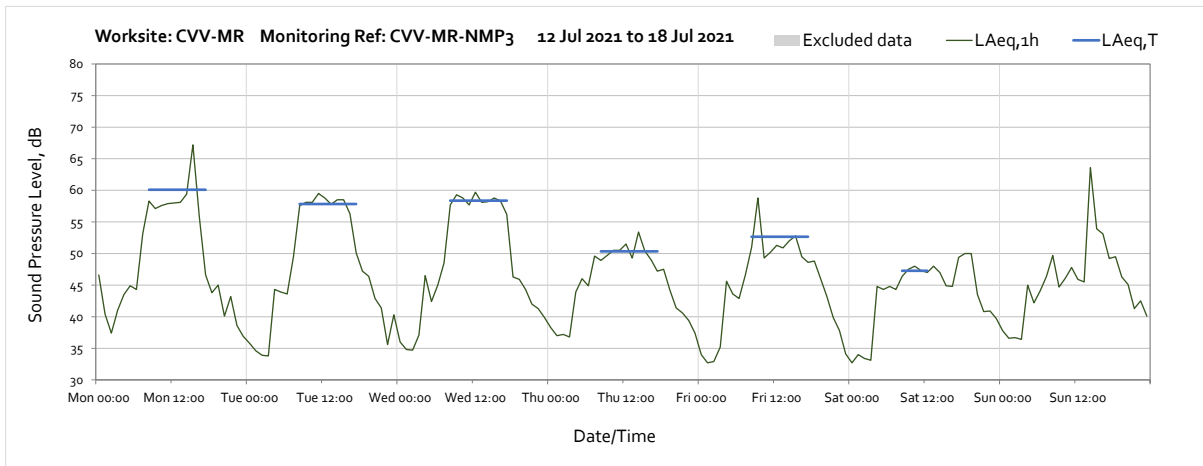


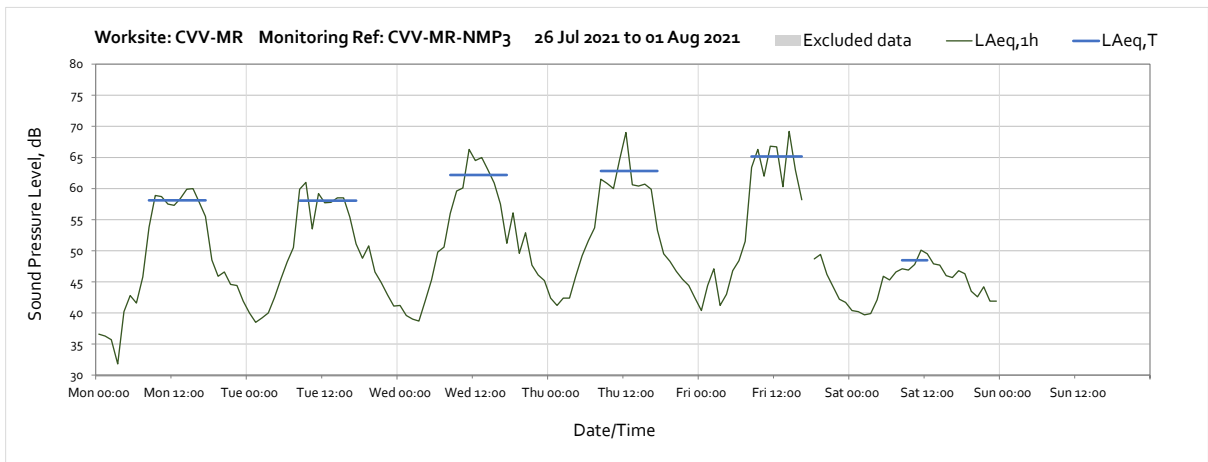
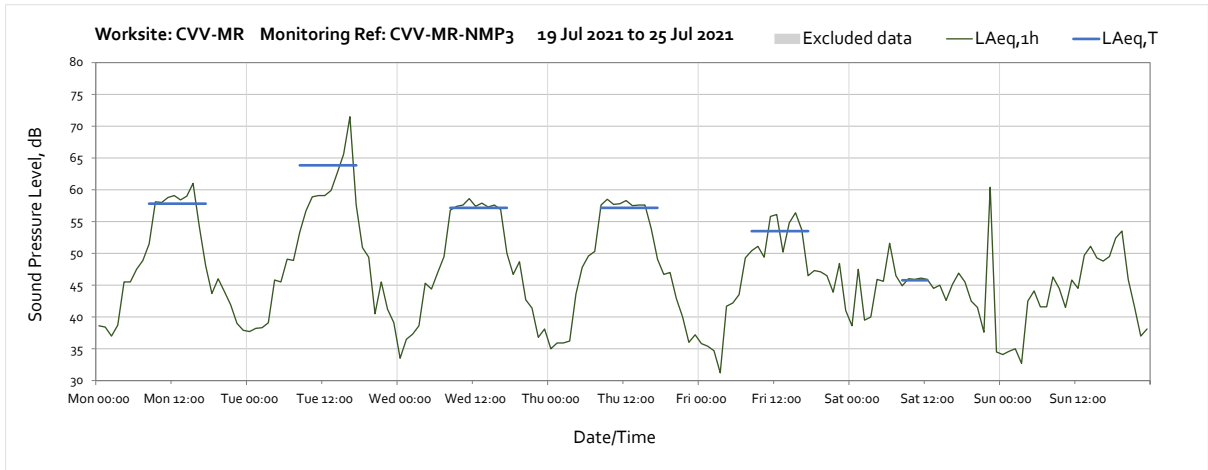
Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)

Monitoring Ref: CVV-MR-NMP3



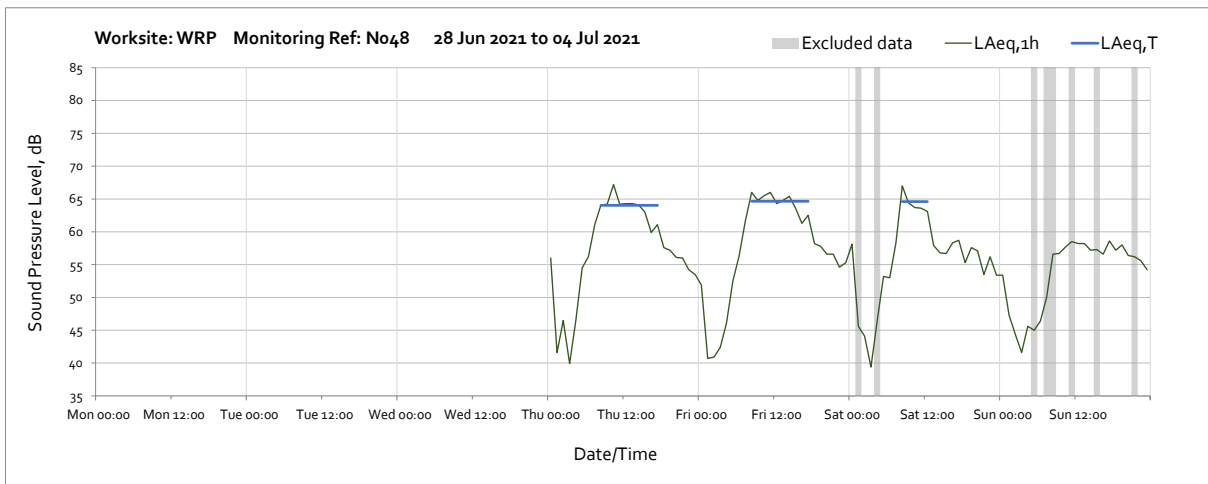
Note: Missing data between 11:00 and 12:00 on Wednesday 7th July 2021 was due to calibration of the noise monitor.

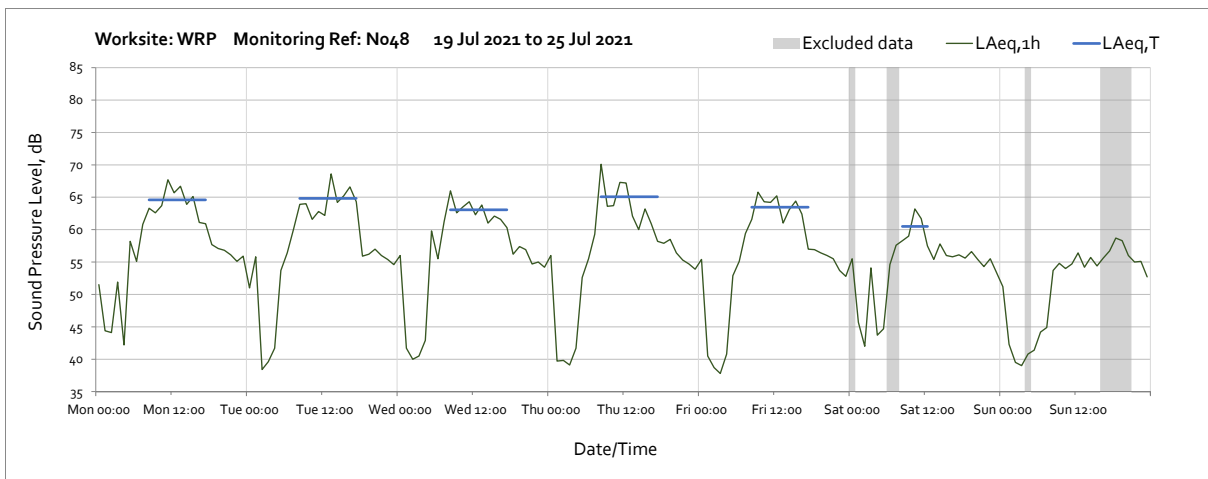
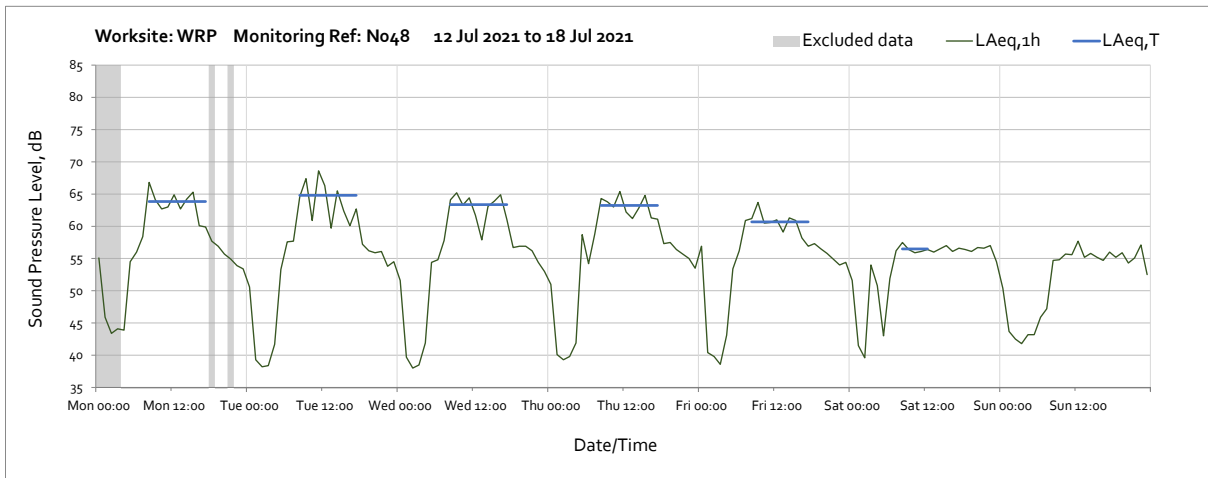
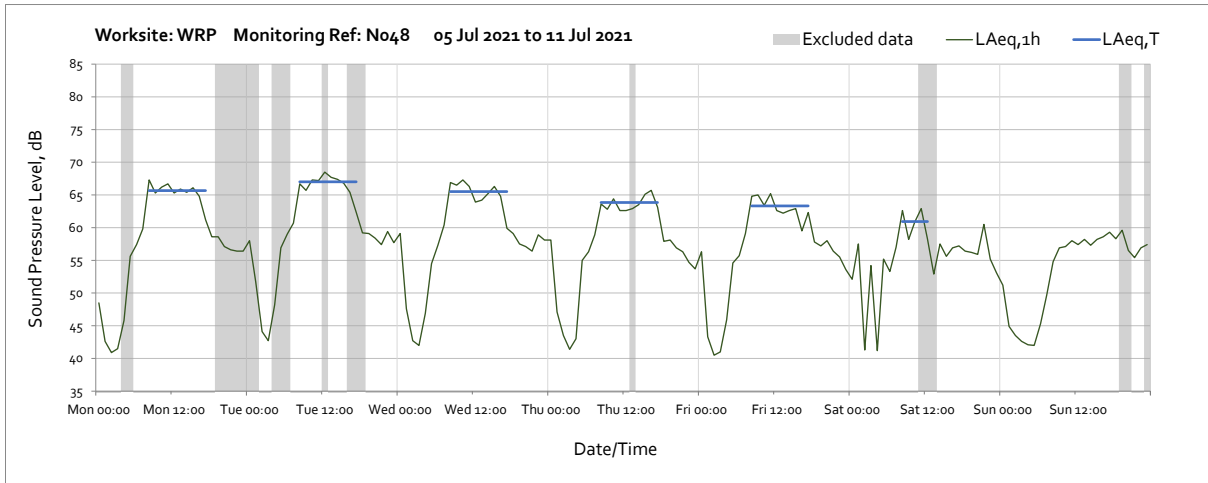


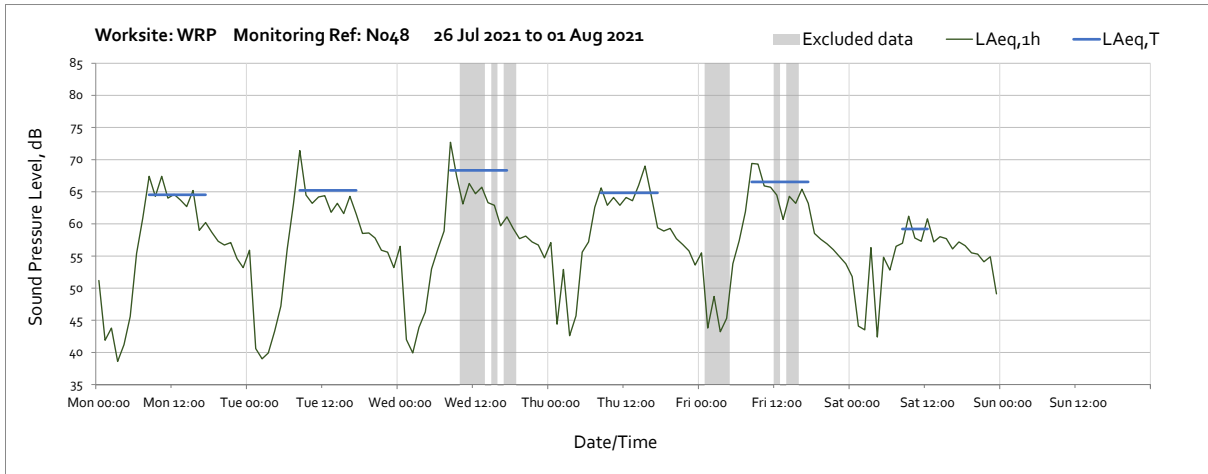


Note: Missing data between 16:00 and 17:00 on Friday 30th July 2021 was due to calibration of the noise monitor.

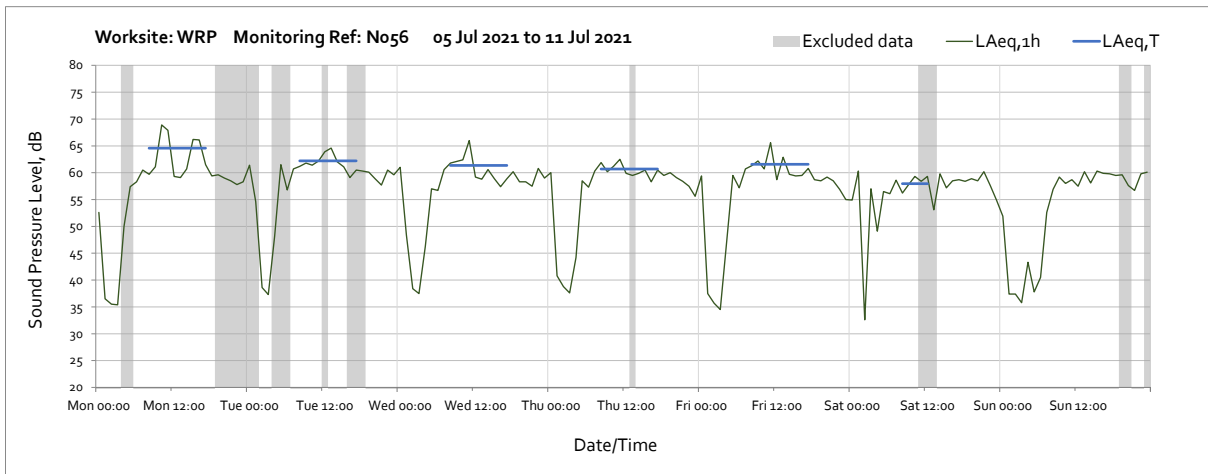
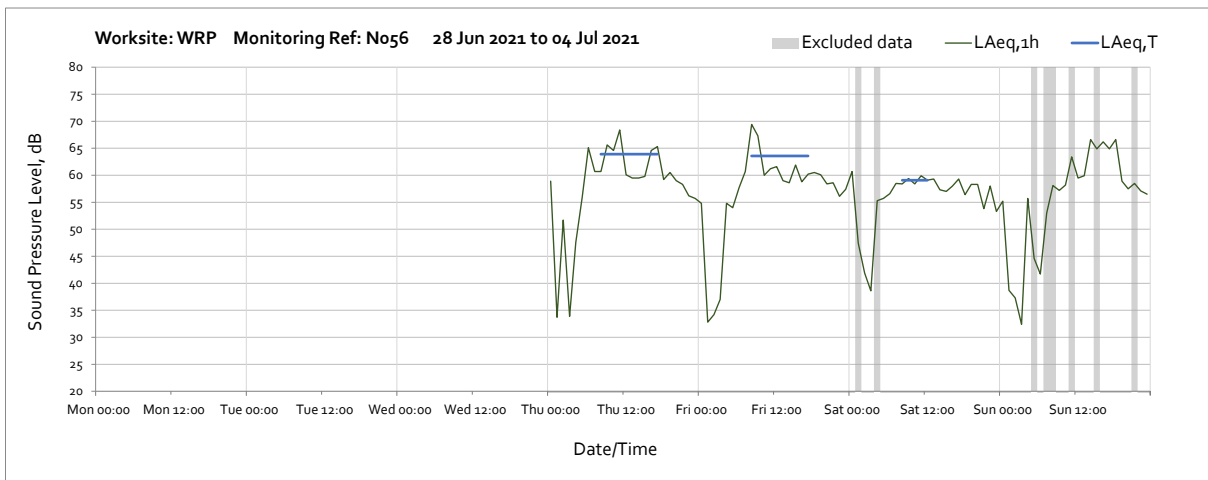
Worksite: West Ruislip Portal (WRP) - Monitoring Ref: N048

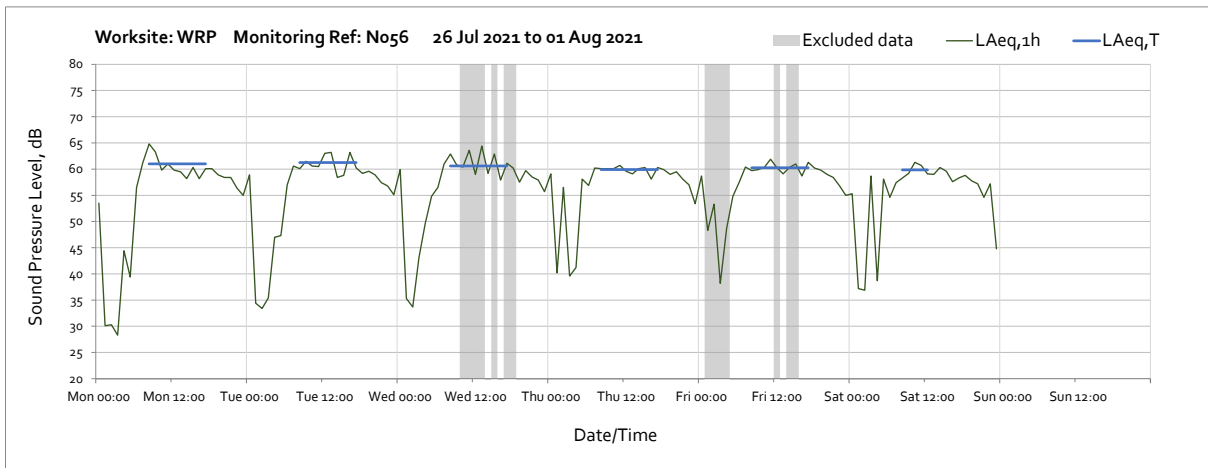
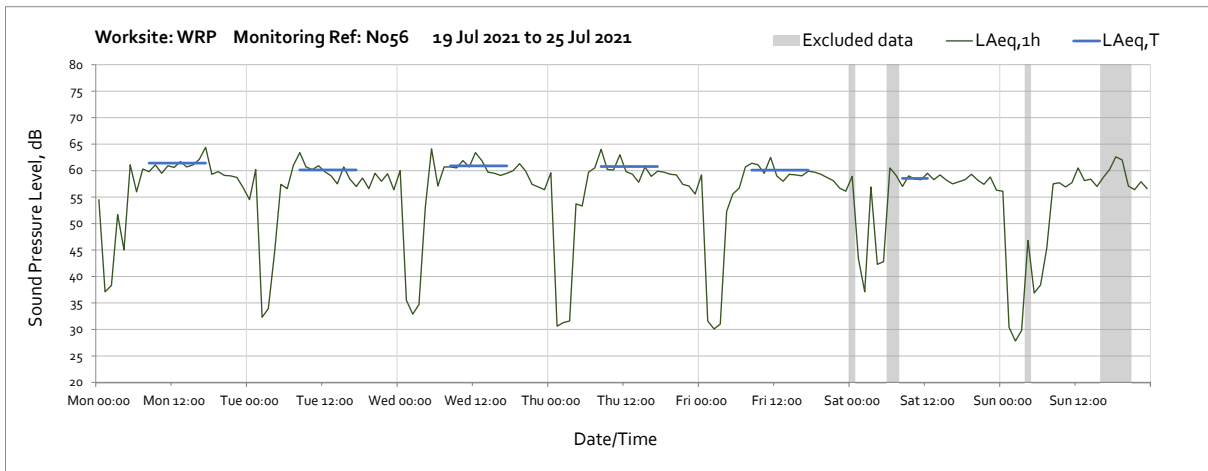
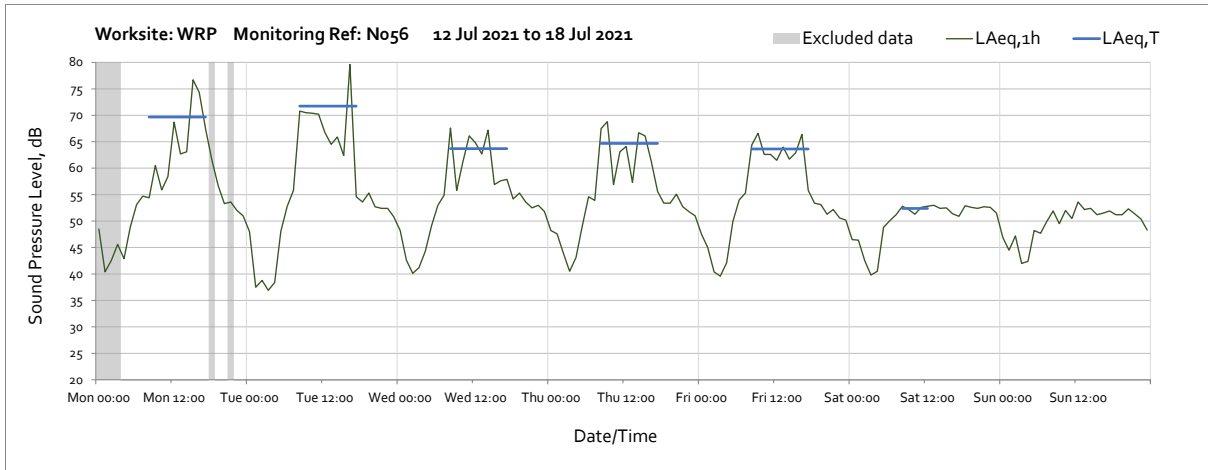




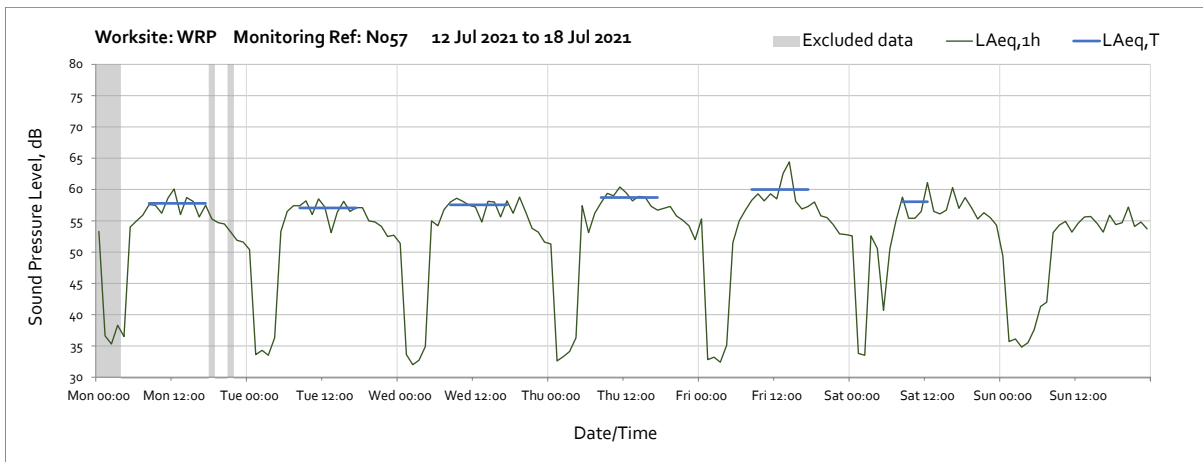
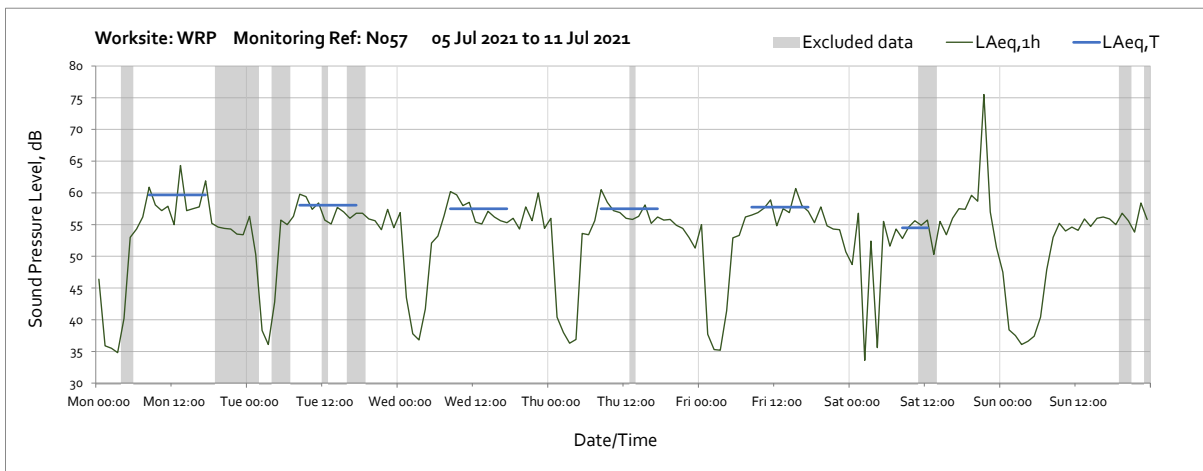
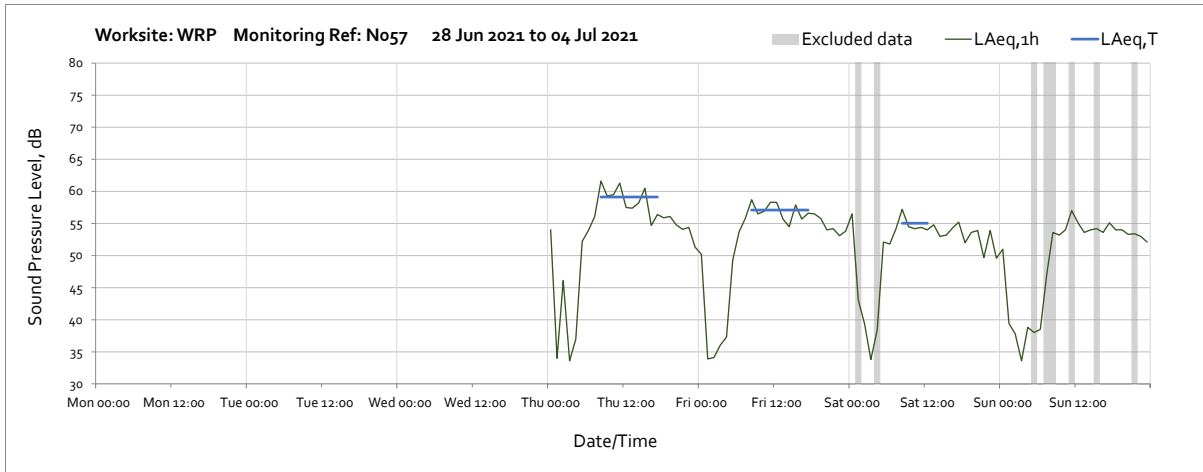


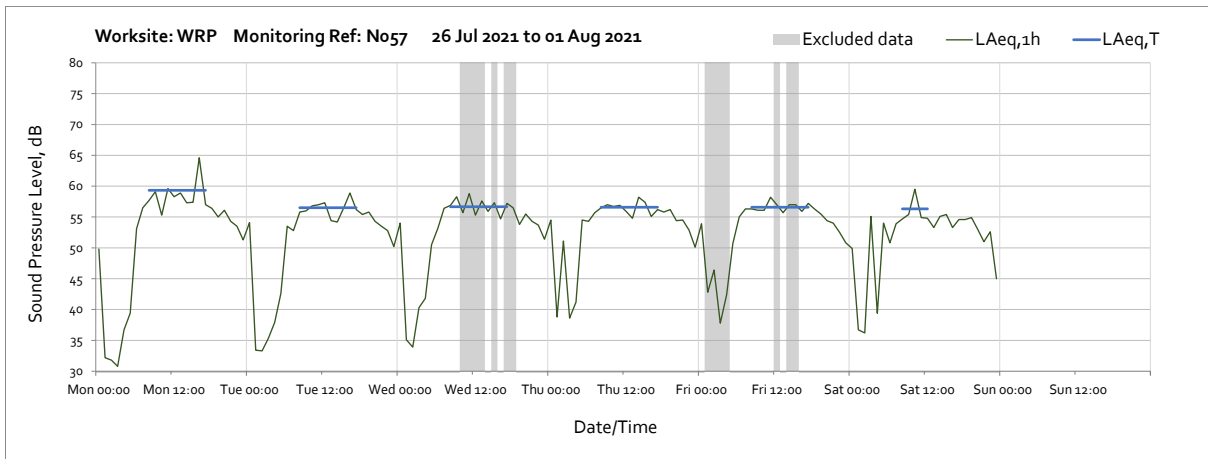
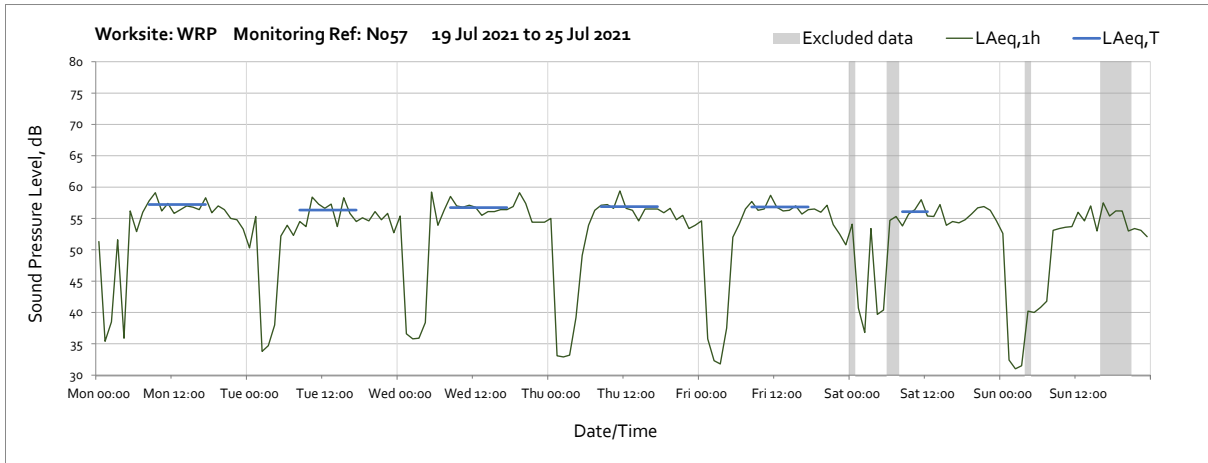
Worksite: West Ruislip Portal (WRP) - Monitoring Ref: N056



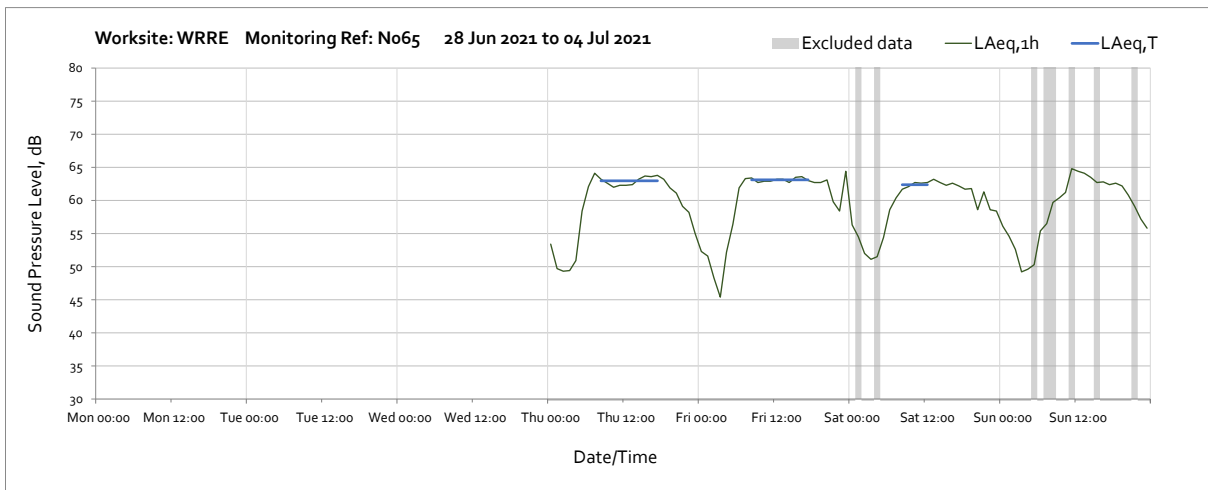


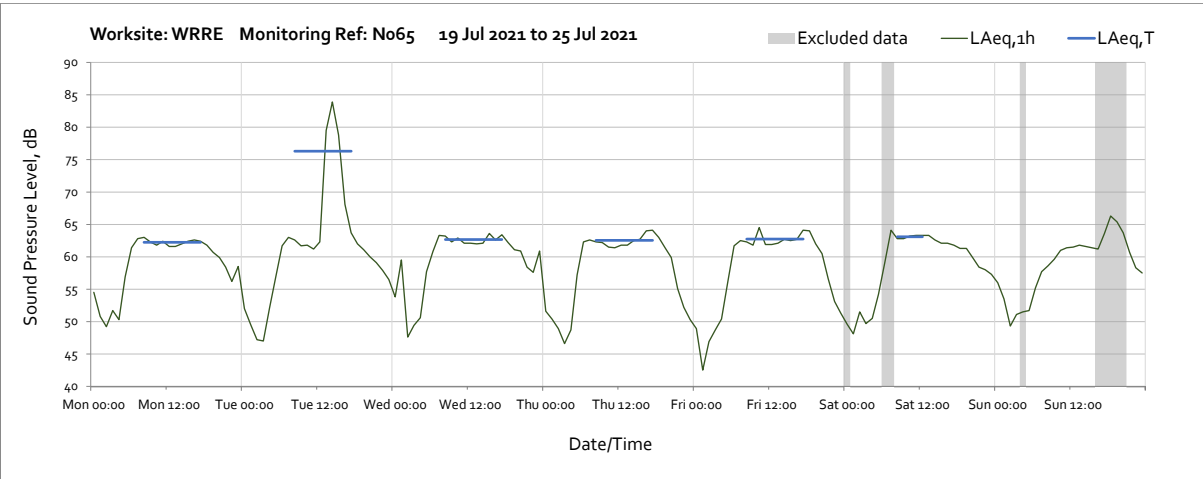
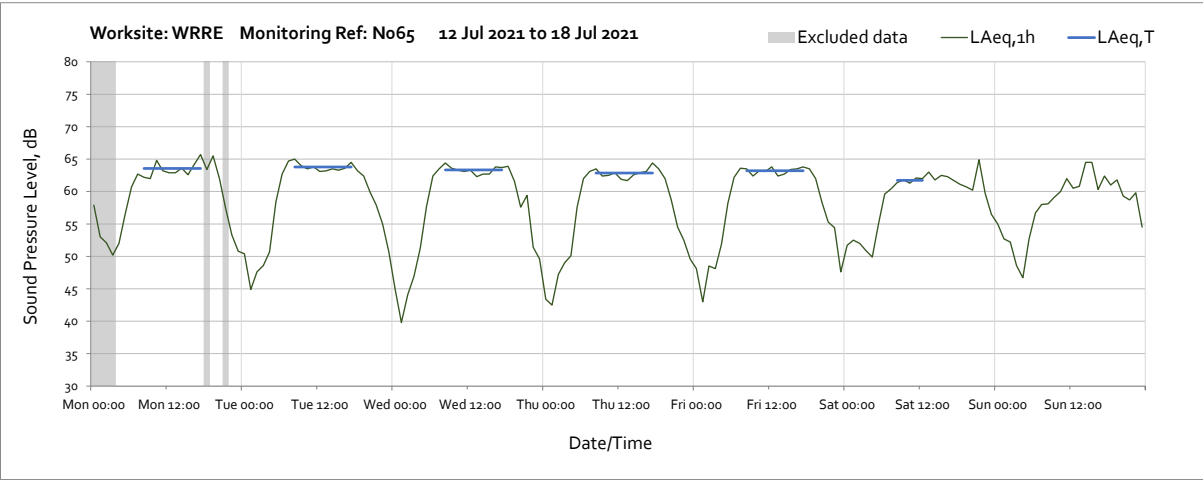
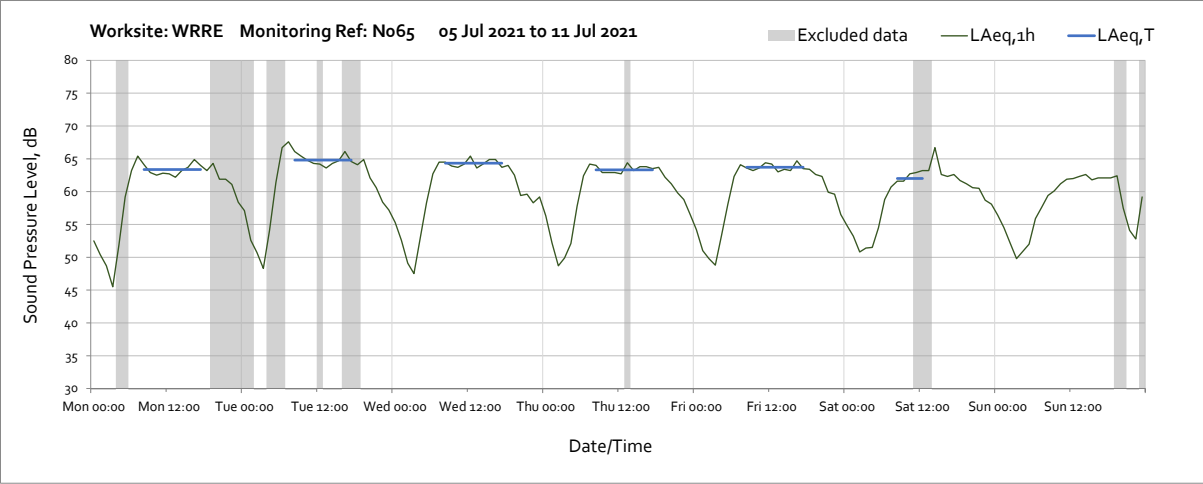
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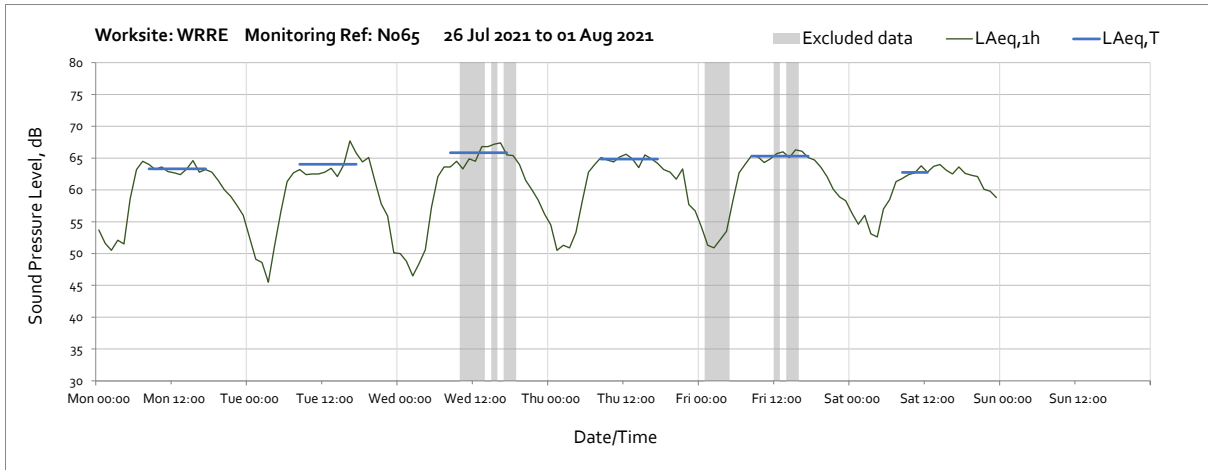




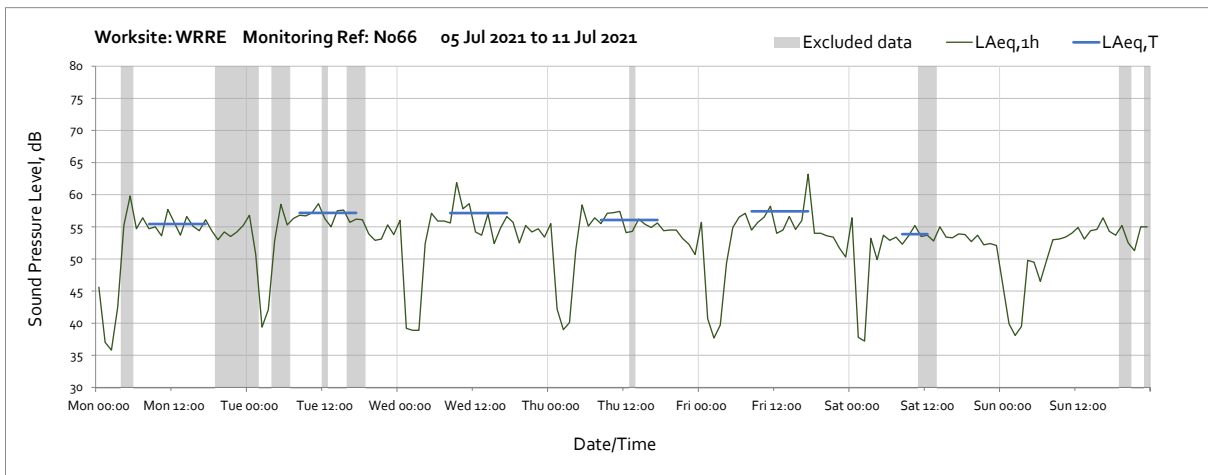
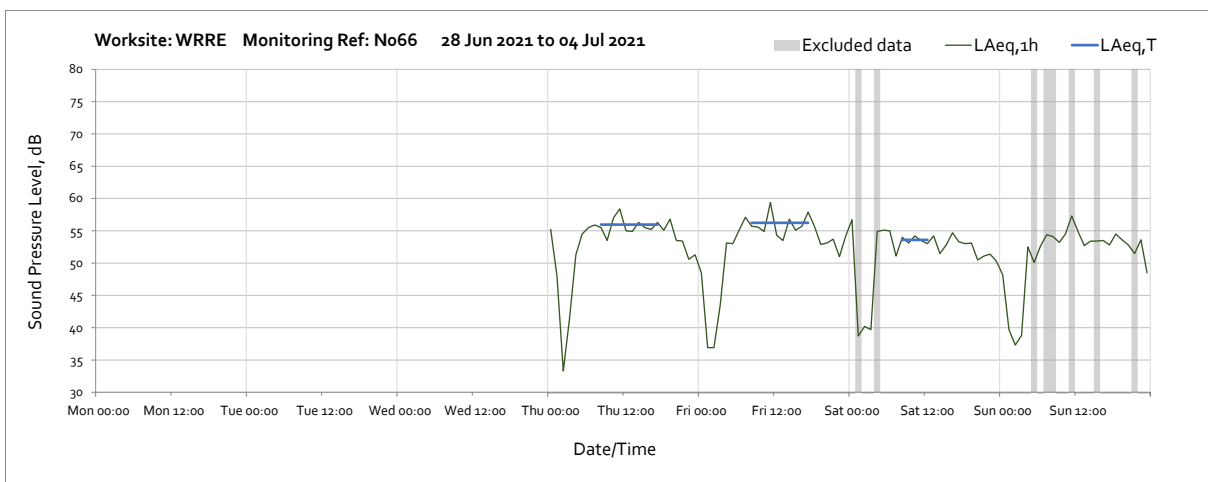
Worksite: West Ruislip Portal (WRRE) – Monitoring Ref: N065

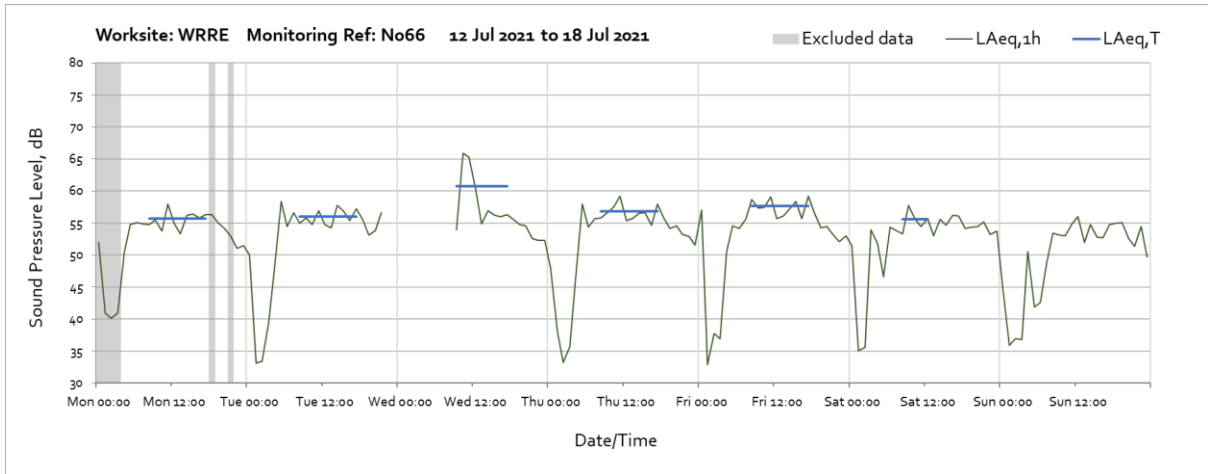




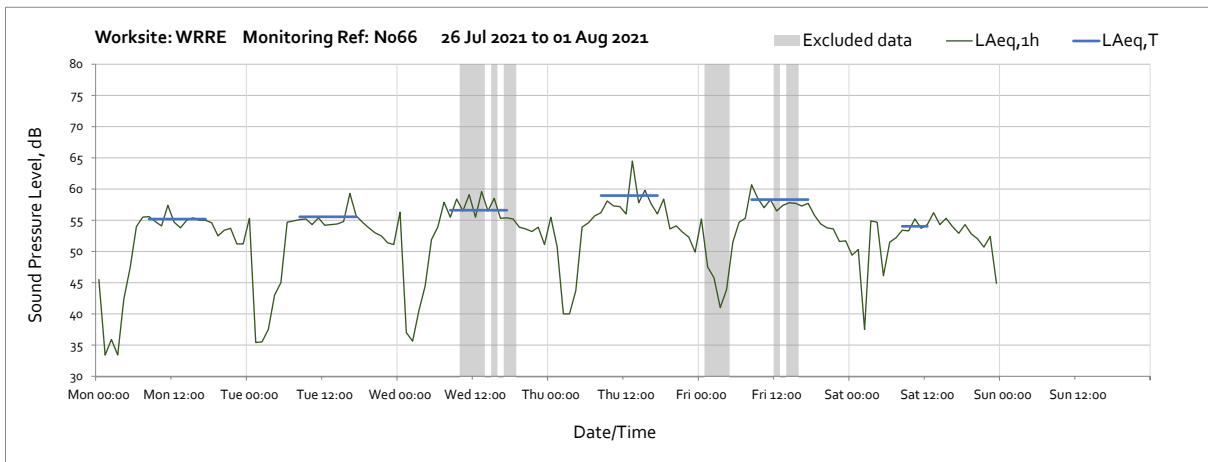
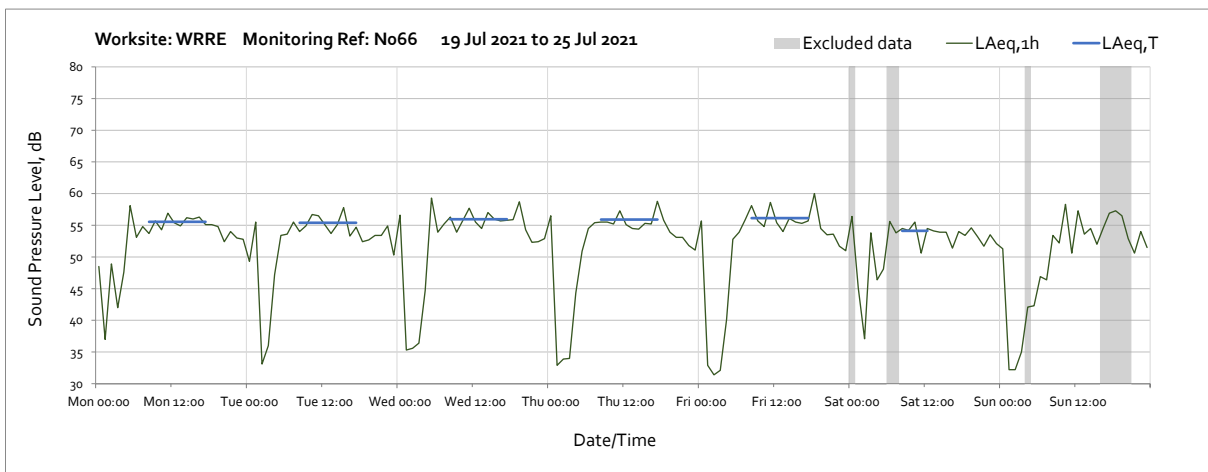


Worksite: West Ruislip Portal (WRRE) – Monitoring Ref: N066

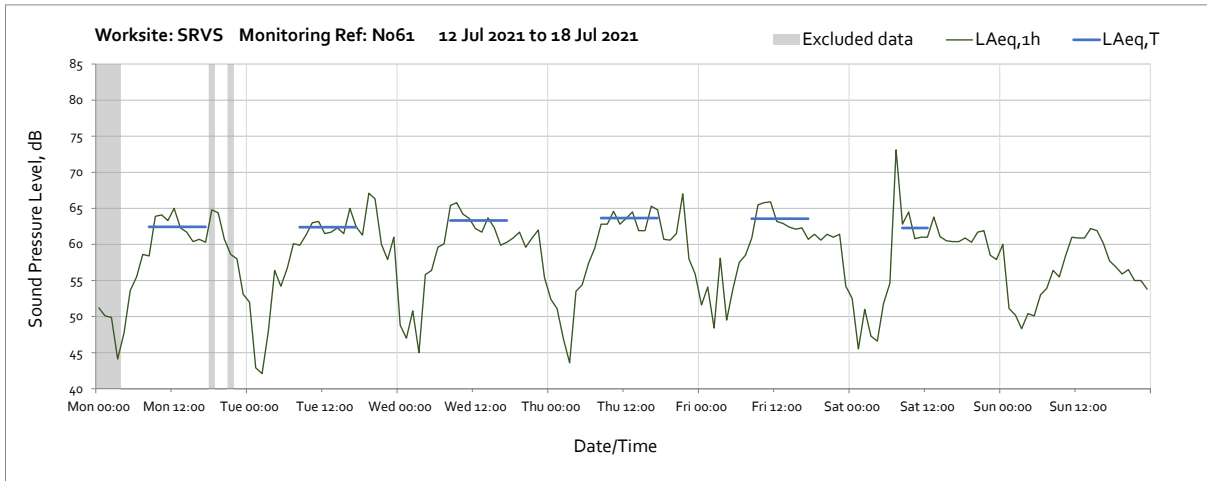
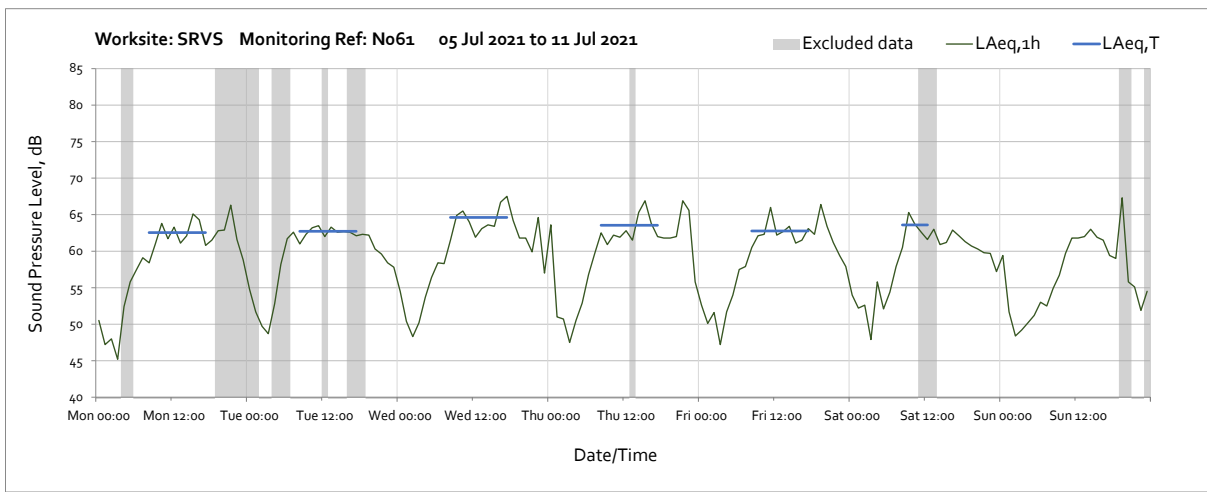
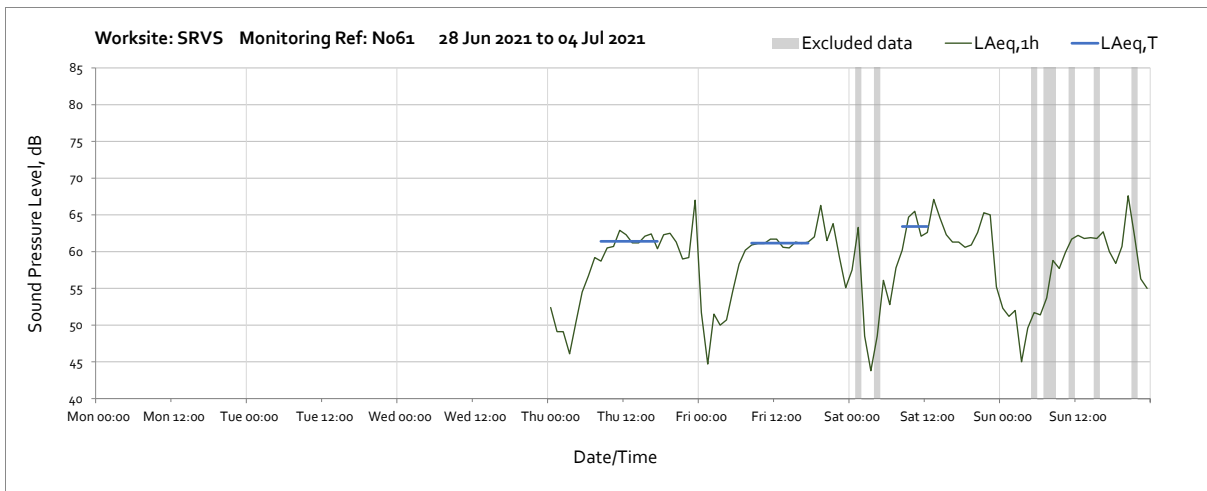


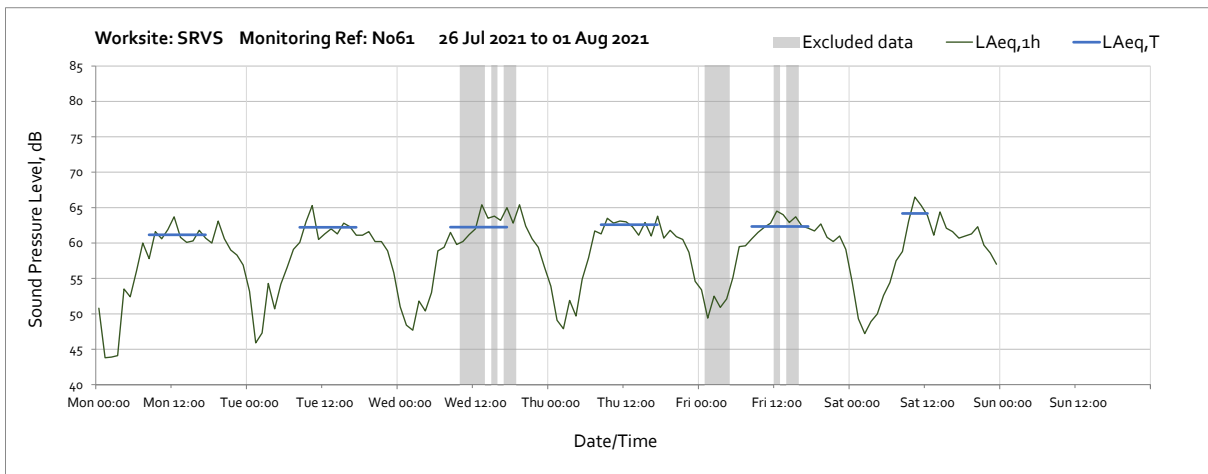
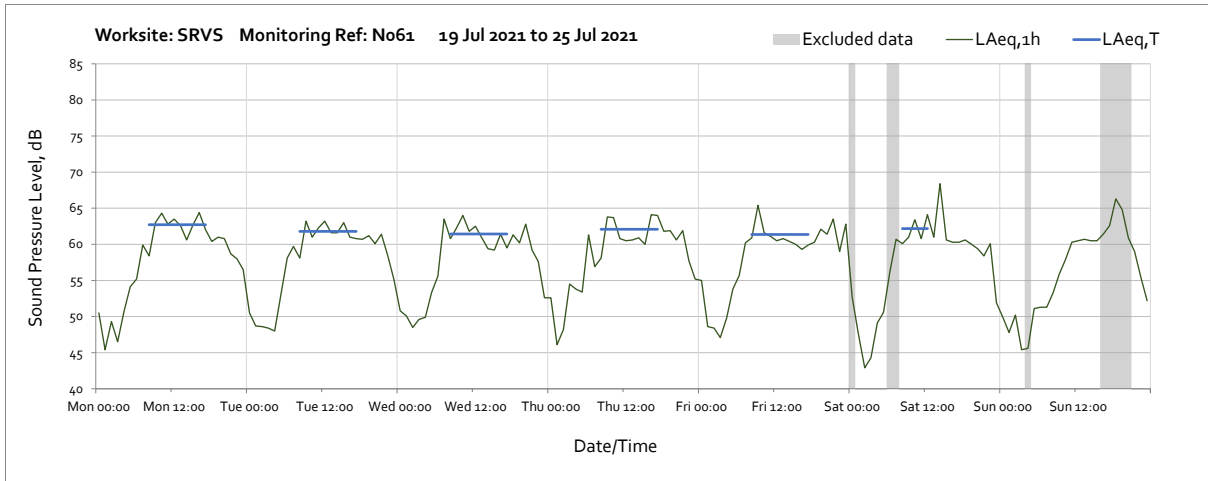


Note: missing data between 22:00 on Tuesday 13th July 2021 and 08:00 on Wednesday 14th July was due to configuration issue for the noise monitor.

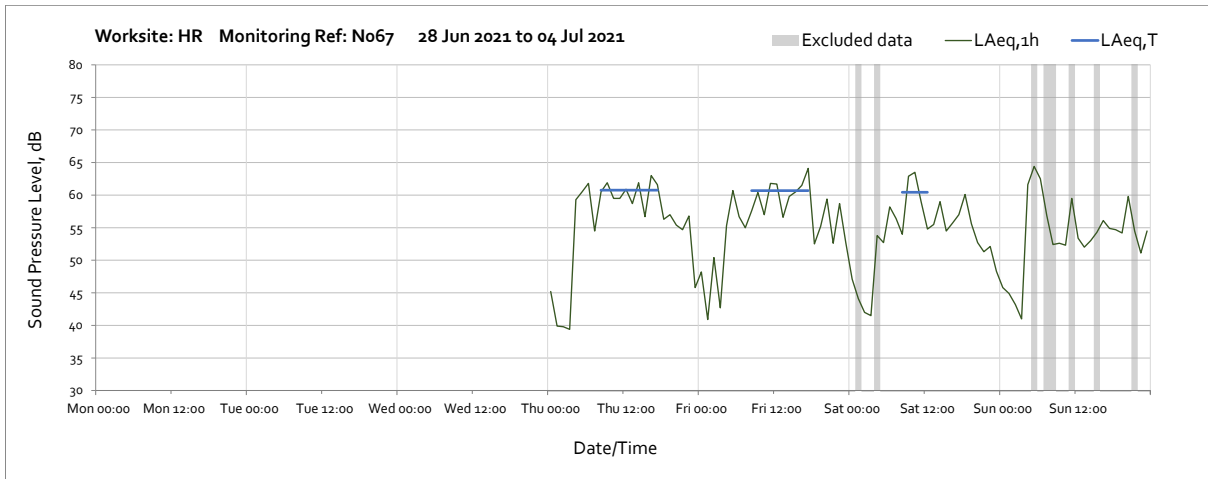


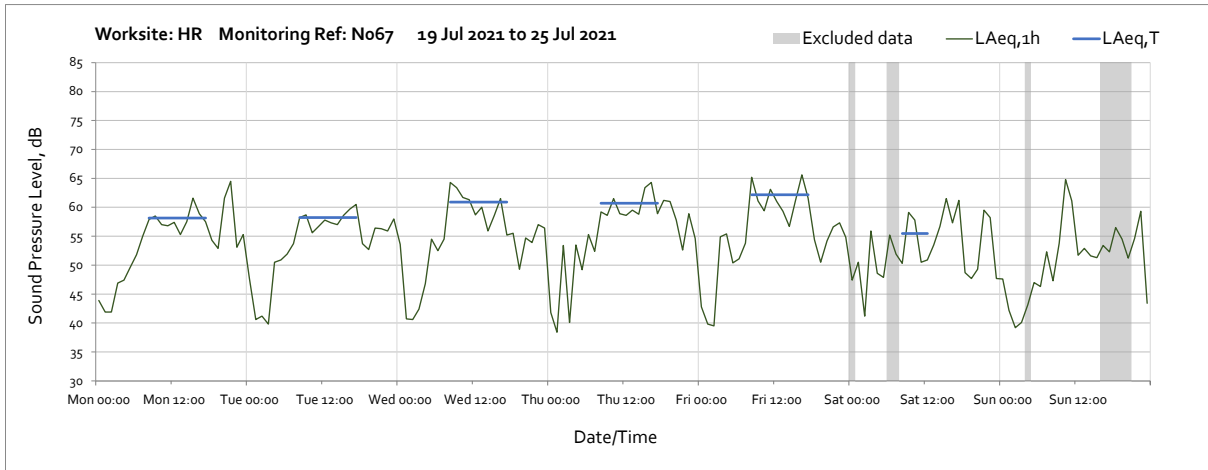
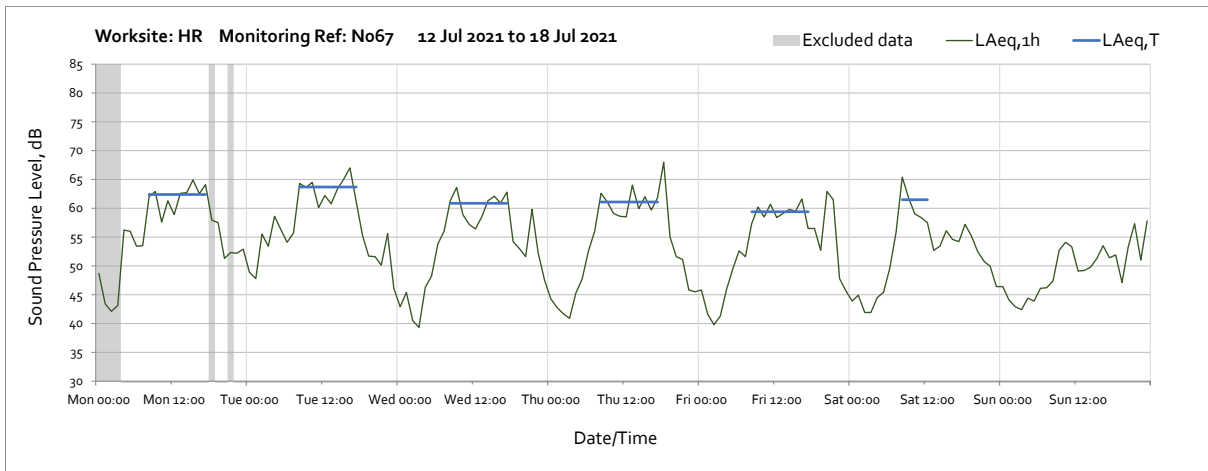
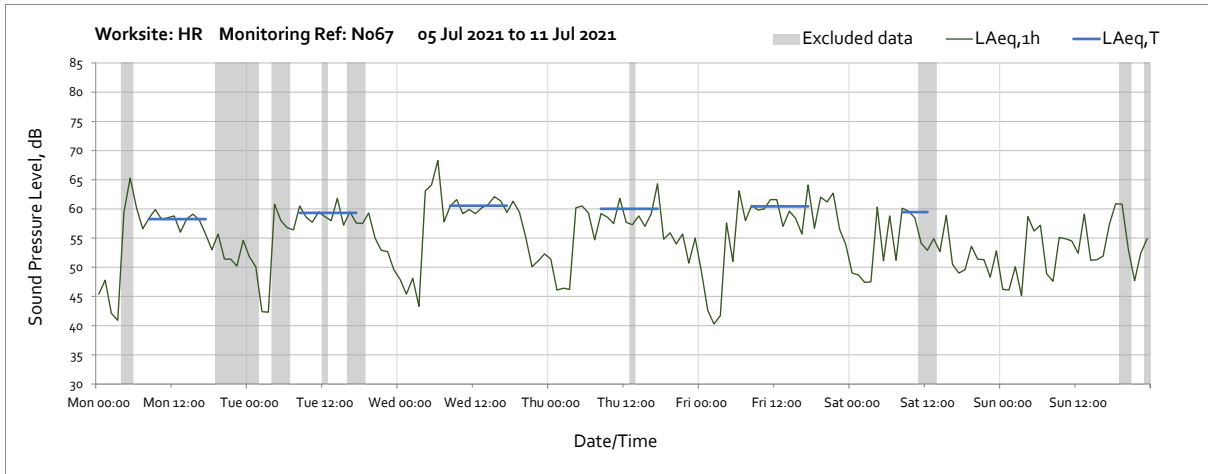
Worksite: South Ruislip Ventilation Shaft (SRVS) – Monitoring Ref: N061

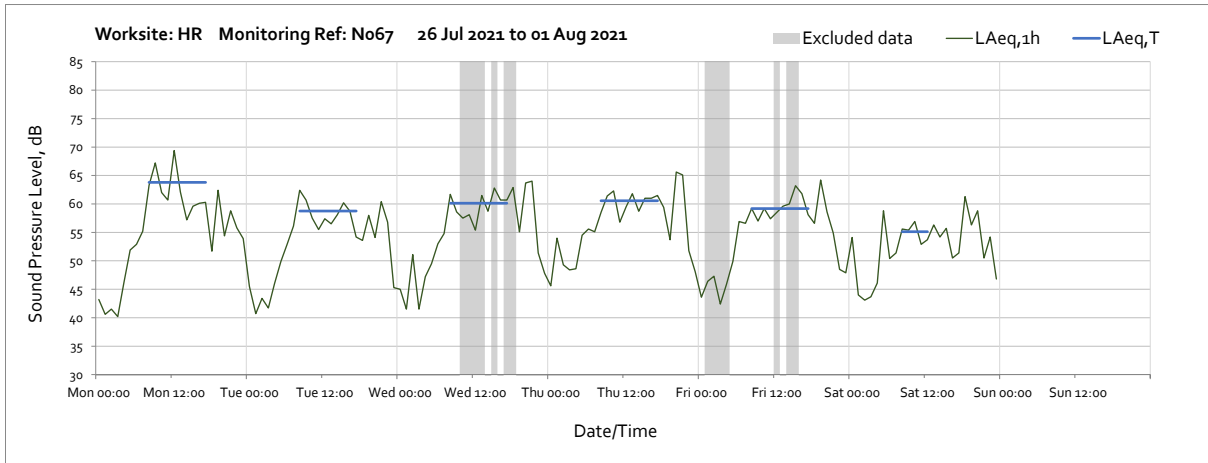




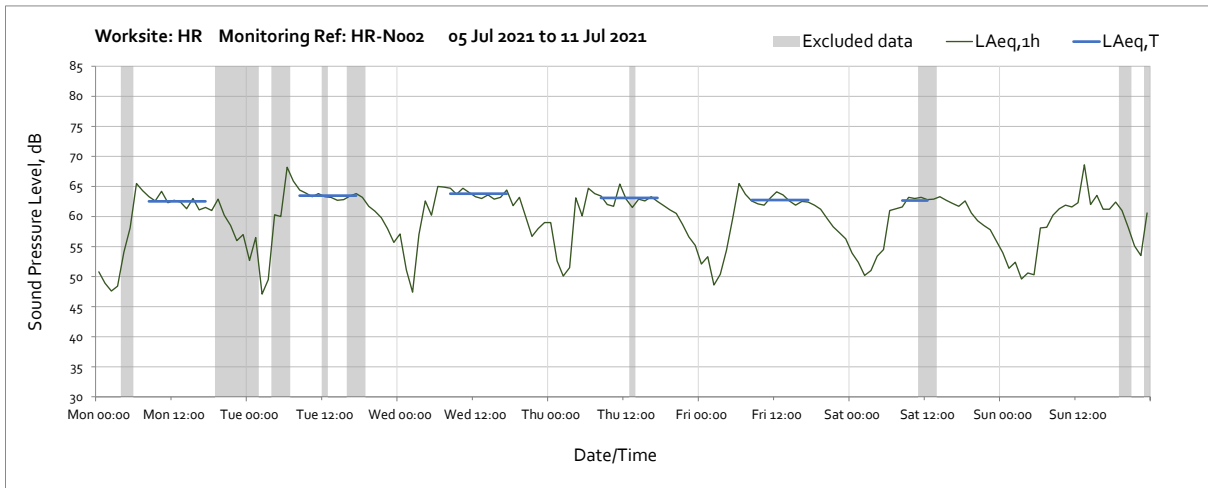
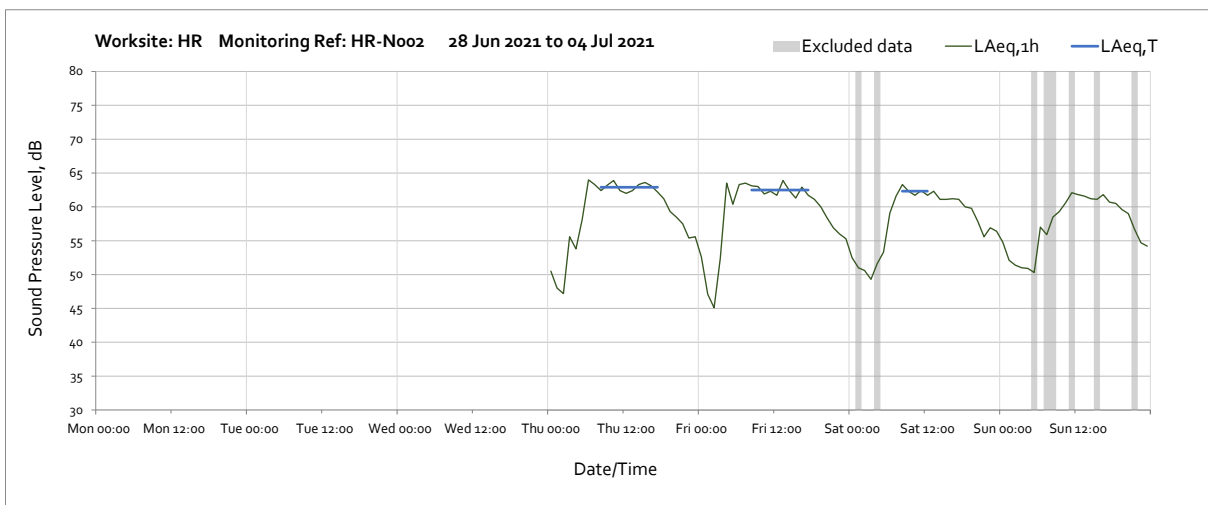
Worksite: Harvil Road (HR) - Monitoring Ref: N067

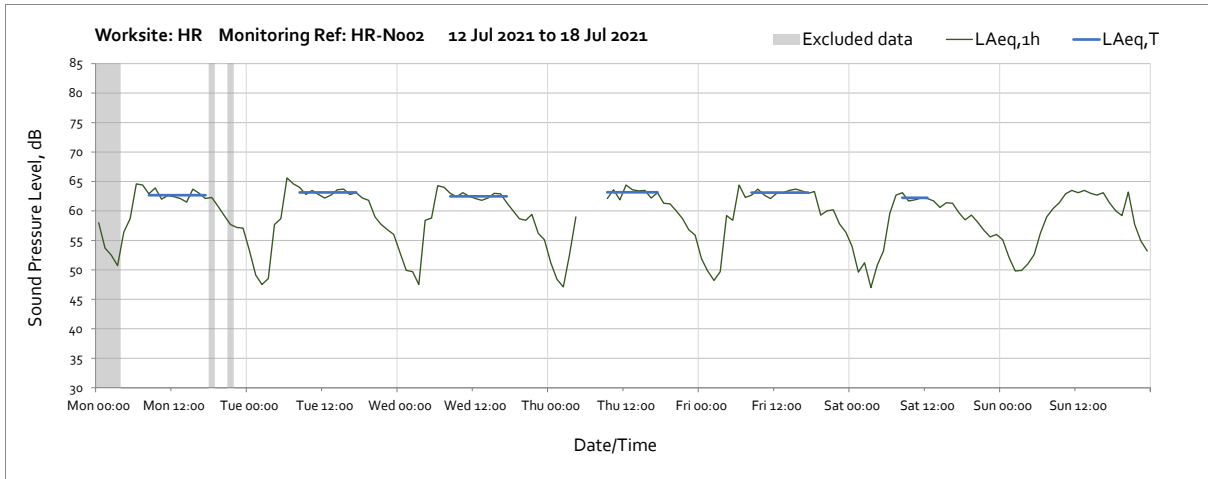






Worksite: Harvil Road (HR) - Monitoring Ref: HR-N002





Note: Missing data between 16:00 and 17:00 on Thursday 25th July 2021 was due to depleted noise monitor's battery power.

