

Construction noise and vibration Monthly Report – May 2020

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 and vibration monitoring carried out within the London Borough of Hillingdon (LBH) during the month of May 2020.

This report presents data from noise monitor installations at, and in the vicinity of, the Load Test Pile LTP #2 worksite located south of Dews Farm and the West Ruislip Portal worksite. During the monitoring period works at the LTP #2 worksite included piling platform construction and testing, and earthworks. No data was captured at the NMP1 noise monitor installed at the Hillingdon Outdoor Activity Centre between 1st and 29th May due to power loss at the monitor and Covid-19 access restrictions to the site for monitor maintenance.

Further activities were also undertaken at the West Ruislip Portal worksite and at Cophall/Harvil Road, including site setup.

The measured noise levels in May did not exceed guideline criteria for significant adverse effects due to HS2 related works at any receptor location. No exceedances of Section 61 trigger levels were measured due to HS2 related works during the monitoring period. There were also no complaints reported to HS2 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 $L_{pAeq,T}$	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.
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.
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.
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.
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 The nominated undertaker is required to undertake noise (and vibration) monitoring as necessary to comply with the requirements of the High Speed Rail (London-West Midlands) Environmental Minimum Requirements, including specifically Annex 1: Code of Construction Practice, in addition to any monitoring requirements arising from conditions imposed through consents under Section 61 of the Control of Pollution Act, 1974 or through Undertakings & Assurances given to third parties. Such monitoring may be undertaken for the following purposes:

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

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

1.1.2 Active construction sites potentially contributing to noise in the local authority area during this period include the Load Test Pile LPT #2 worksite, where activities included:

- 1st– 15th May: piling platform construction; material imported and exported from site; excavator, dozer and vibratory roller in use;
- 18th – 19th May: platform testing;
- 20th – 29th May: construction of additional water monitoring holes and additional cable percussion rigs and cone penetration testing plant.

Further works were undertaken at the West Ruislip Portal worksite including hoarding and fencing installation, site security, and aggregate deliveries via freight train activities; and at Copthall/Harvil Road, including hoarding and fencing installation and site security. Utility works were also undertaken on West of Breakspear Toad South, Uxbridge (water main); on Harvil Road (gas line Fulmer to Haste Hill and overhead power lines); and Ickenham Road (the Greenway sewer).

1.1.3 The applicable standards, guidance, and monitoring methodology is outlined in the construction noise and vibration monitoring methodology report which can be found at the following location <https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2>. Noise and vibration monitoring reports for previous months can also be found at this location.

1.2 Measurement Locations

- 1.2.1 Noise monitoring was undertaken adjacent to the Load Test Pile (LTP #2) worksite, at the boundary to the worksite (ref: NMP2) and at the Hillingdon Outdoor Activities Centre (ref: NMP1).
- 1.2.2 Table 2 presents the position of the noise monitoring installation within the LBH area in May 2020. A map showing the position of the noise monitoring installation is presented in Appendix B.

Table 2: Monitoring locations

Worksite Reference	Measurement Reference	Address
LTP #2	NMP1	Hillingdon Outdoor Activity Centre, Dews Lane, Harefield, Uxbridge
	NMP2	LTP #2 Worksite, Harvil Road, Harefield, Uxbridge

2 Summary of results

2.1 Exceedances LOAEL of SOAEL

- 2.1.1 The lowest observed adverse effect level (LOAEL) is defined in the Planning Practice Guidance – Noise 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".
- 2.1.2 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."
- 2.1.3 Table 3 presents a summary of recorded exceedances of the LOAEL and SOAEL due to HS2 related construction noise at each measurement location over the reporting period, including the number of exceedances during each time period.

Table 3: 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
LTP #2	NMP1	Hillingdon Outdoor Activity Centre, Dews Lane, Harefield, Uxbridge	All days	All periods	No exceedance	No exceedance
	NMP2	LTP #2 Worksite, Harvil Road, Harefield, Uxbridge	Weekday	All periods	11	4*

* Exceedance of the SOAEL was due to earthworks being undertaken in close proximity to the monitor. In consideration of the large separation distance noise levels at the nearest receptor (approximately 200m away) are calculated to be lower and below the SOAEL.

2.1.4 Noise levels above the SOAEL were measured at NMP2 during four weekday working periods due to earthworks being undertaken in proximity to the noise monitor. However due to the large separation distance, noise levels at any receptor location would be below the SOAEL. The LOAEL was exceeded on eleven occasions during periods of works at monitoring location NMP2.

2.2 Summary of measured noise levels

2.2.1 Table 4 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.

2.2.2 Ambient noise levels for monitoring location NMP1 in the locality of Hillingdon Outdoor Activity Centre are dominated by noise emanating from the activity centre and the use of the car park. Ambient noise levels for monitoring location NMP2 in the locality of LTP #2 are dominated by noise emanating from local road traffic on Harvil Road to the east.

Table 4: Summary of measured dB L_{Aeq} data over the monitoring period

Worksite Reference	Measurement Reference	Monitor 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
LTP #2	NMP1	Hillingdon Outdoor Activity Centre	Free-field	-(1)	50.4	47.1	47.0	46.8	47.9	47.6	46.6	45.9	45.0	47.4	41.6
				-(1)	(50.4)	(47.1)	(48.2)	(52.4)	(47.9)	(47.6)	(46.6)	(46.9)	(49.4)	(50.1)	(41.8)
	NMP2	LTP #2 Worksite	Free-field	55.0	63.2	48.2	47.8	46.4	49.3	48.1	47.6	48.5	45.8	47.5	44.7
				(64.9)	(74.6)	(57.7)	(52.8)	(53.8)	(51.3)	(52.7)	(54.2)	(56.8)	(52.3)	(53.4)	(51.1)

(1) No data was recorded at monitor NMP1 during these periods due to loss of power at the noise monitor.

2.2.3 Appendix C presents graphs of the noise monitoring data over the month for the measurement location. Data presented includes 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>.

2.3 Exceedances of trigger level

2.3.1 Table 5 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
-	-	-	-	-	-

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

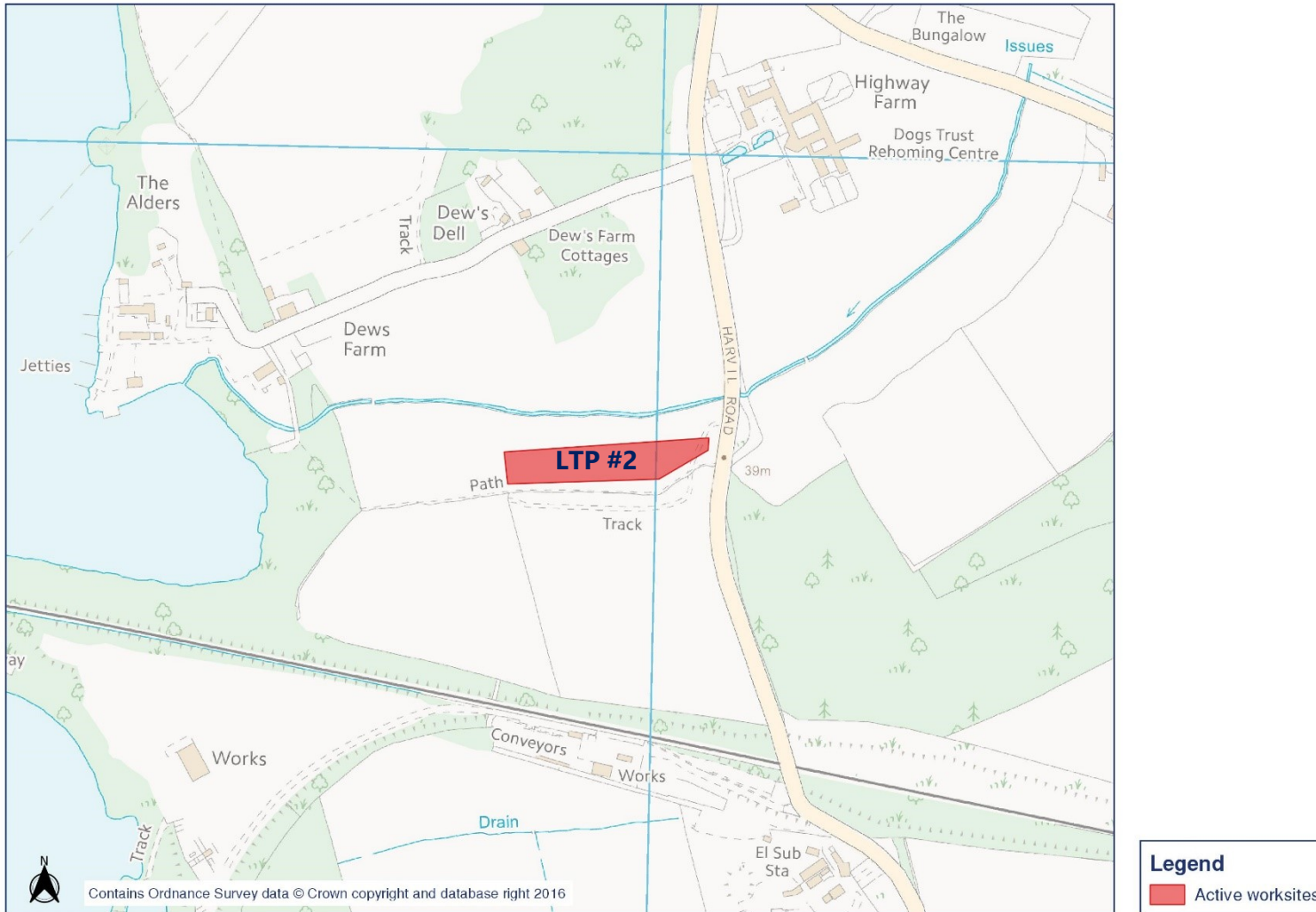
2.4 Complaints

2.4.1 Table 6 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation. No complaints were reported to HS2 for the LBH region during the May monitoring period.

Table 6: Summary of complaints

Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
-	-	-	-	-

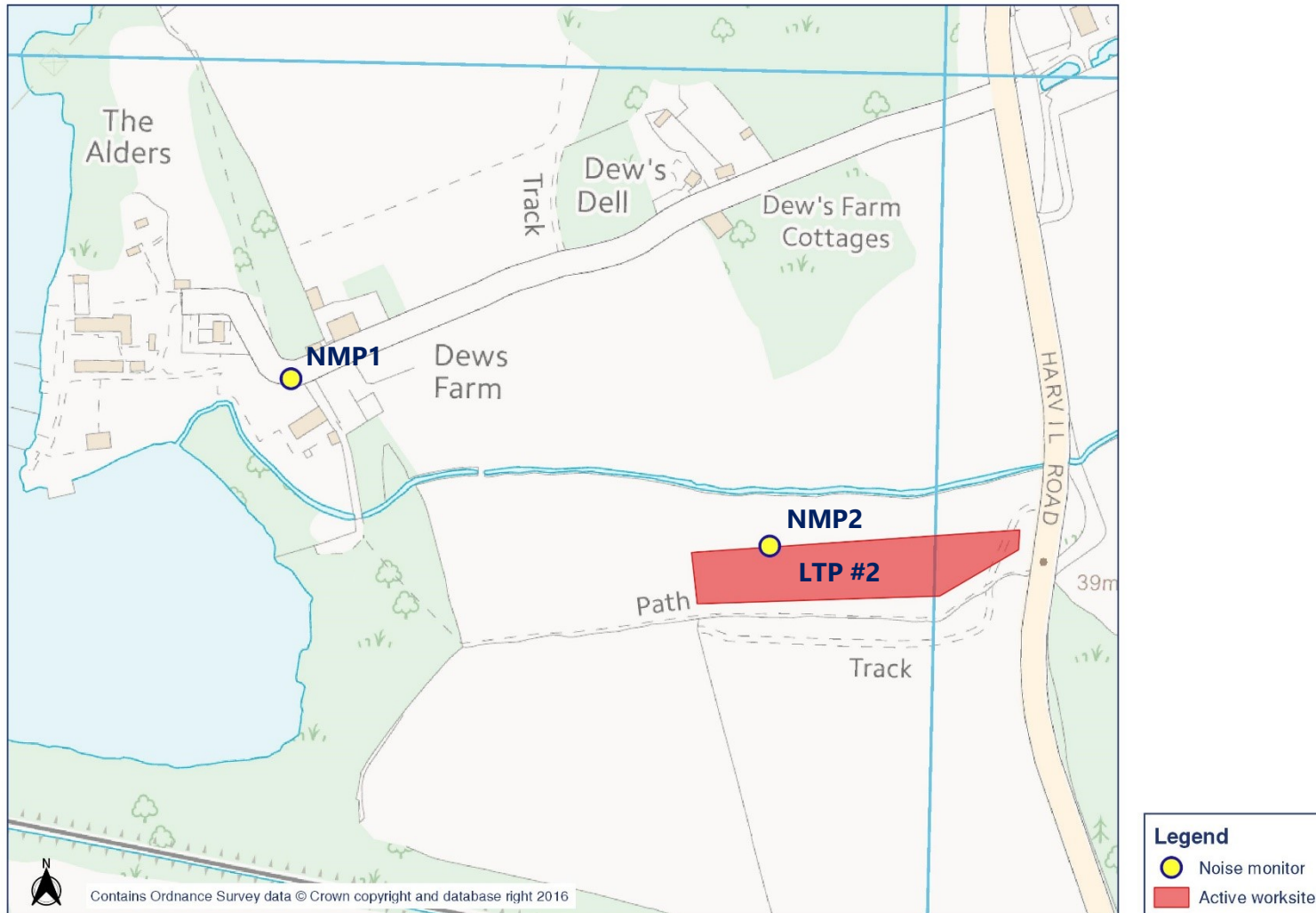
Appendix A Site Locations



Appendix B Monitoring Locations

HS2

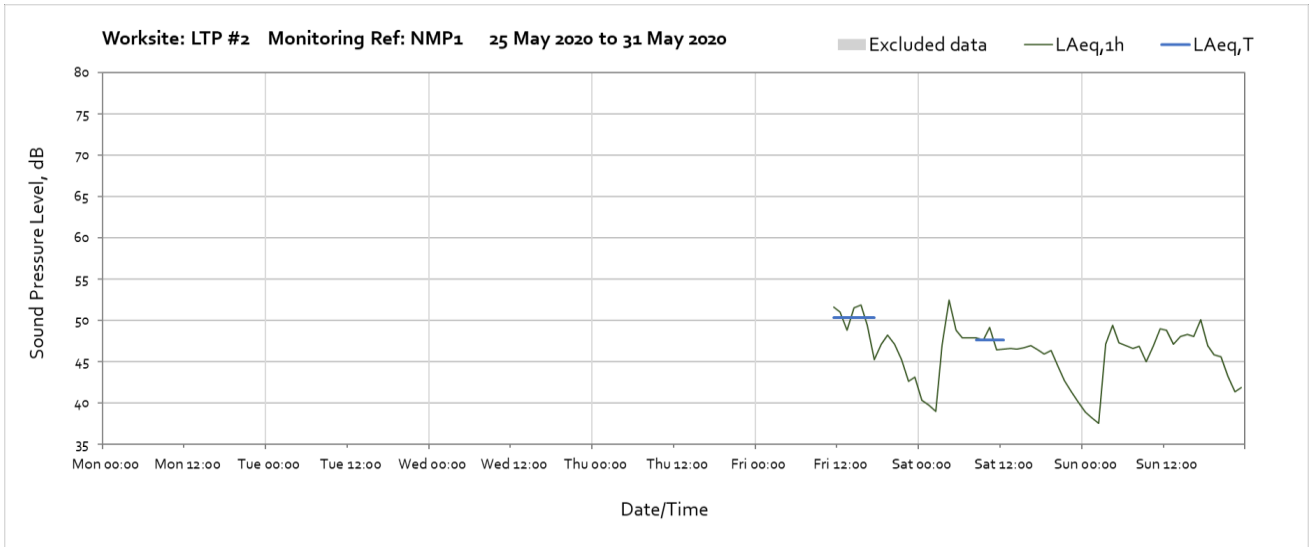
Noise monitoring plan - 1



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.

Worksite: LTP #2 – Monitoring Ref: NMP1



Note: Missing data from start of the month until Friday 29th May due to a loss of power at the monitoring station.

Worksite: LTP #2 – Monitoring Ref: NMP2

