

Construction noise and vibration Monthly Report – March 2018

Three Rivers District

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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 Three Rivers District (TRD) during the month of March 2018.

This report presents data from a vibration monitoring installation near to the M25 Junction 16/17 slip road worksite. Works were undertaken along Chalfont Lane as part of road widening and along the caravan park diversion and Shire Lane consisting of bulk earthworks to include cut & fill and creating environmental bunds, the creation and installation of the drainage and service ducts and laying the sub base for road pavements.

Given the limited nature of works undertaken at the worksite, the measured vibration levels are largely attributable to underlying, residual levels of vibration; rather than being attributable to construction activities.

No exceedances of the SOAEL and no exceedances of S61 trigger levels due to HS2 related works were measured during the monitoring period. There were no complaints reported during the measurement period.

Abbreviations and descriptions

The abbreviations, descriptions and project terminology used within this report can be found in the Project Dictionary (HS2-HS2-PM-GDE-000-000002).

Table 1: Table of abbreviations

Acronym	Meaning
$L_{Aeq,T}$	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.
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.
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.
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 Three Rivers District (TRD) for the period 1st to 31st March 2018.

1.1.2 Active construction sites in the local authority area during this period include:

- Along Chalfont Lane as part of widening (see plan 1 in Appendix A)
 - Earthworks – cut & fill and creation of bunds;
 - Creation and installation of drainage & service ducts; and
 - Installation of road pavement – laying sub base.
- Along Caravan Park diversion & Shire Lane realignment (Part 1 - construction of new whilst running on existing) (see plan 1 in Appendix A)
 - Creation and installation of drainage & service ducts;
 - Earthworks – cut & fill and creation of bunds;
 - Installation of road pavement – laying sub base.

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 www.gov.uk/government/publications/monitoring-noise-and-vibration-on-the-hs2-phase-one-route.

1.2 Measurement Locations

- 1.2.1 The following table summarises the locations of vibration monitoring installations during the period of reporting. No long-term noise monitoring was required during the period of reporting.
- 1.2.2 A location plan showing the position of the vibration monitoring installation is presented in Appendix B.

Table 2: Monitoring locations

Worksite Reference	Measurement Reference	Address
M25 J16/17 Slip Road	V1	Gellibrands, Shire Lane, Chalfont St Peter, Maple Cross, Bucks, SL9

2 Summary of results

2.1 Exceedances of LOAEL and SOAEL

- 2.1.1 Vibration measurements reporting PPV are a simple indicator of perceptibility and risk of damage to structures due to vibration. This measure does not relate to HS2 impact assessment criteria where the exceedances of LOAELs and SOAELs are considered.

2.2 Summary of Measured Vibration Levels

- 2.2.1 Table 3 presents a summary of the measured vibration levels at the measurement location over the reporting period where the highest measured PPV in any orthogonal axis is reported over the measurement period.
- 2.2.2 An isolated event was noted to have occurred over a 30 second period at 13:23 on the 20th March which, given that the velocity vector is predominantly in the X-axis, is taken to reflect an instance of local interference. This event has been excluded from the calculation of the highest PPV in any axis.

Table 3: Summary of Measured PPV Data Over the Monitoring Period.

Worksite Reference	Measurement Reference	Site Address	Highest PPV measured in any axis, mm/s
M25 J16/17 Slip Road	V1	Inside Gellibrands, Shire Lane	0.38 (Z axis)

2.2.3 Graphs showing hourly values of PPV measured during the monitoring period are presented in Appendix C. The full data set from the monitoring equipment can be found at the following location www.DATA.gov.uk.

2.2.4 No significant vibration generating activities has been undertaken at the worksite during the monitoring period, and the measured vibration levels are largely attributable to underlying, residual levels of vibration rather than being attributable to construction activities.

2.3 Exceedances of Trigger Level

2.3.1 Table 4 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.

2.3.2 No exceedance of trigger levels has been recorded during the monitoring period.

Table 4: Summary of Exceedances of Trigger Levels.

Complaint Reference	Worksite Reference	Date and Time Period	Identified Source	Results of Investigation	Actions Taken
-	-	-	-	-	-

2.4 Complaints

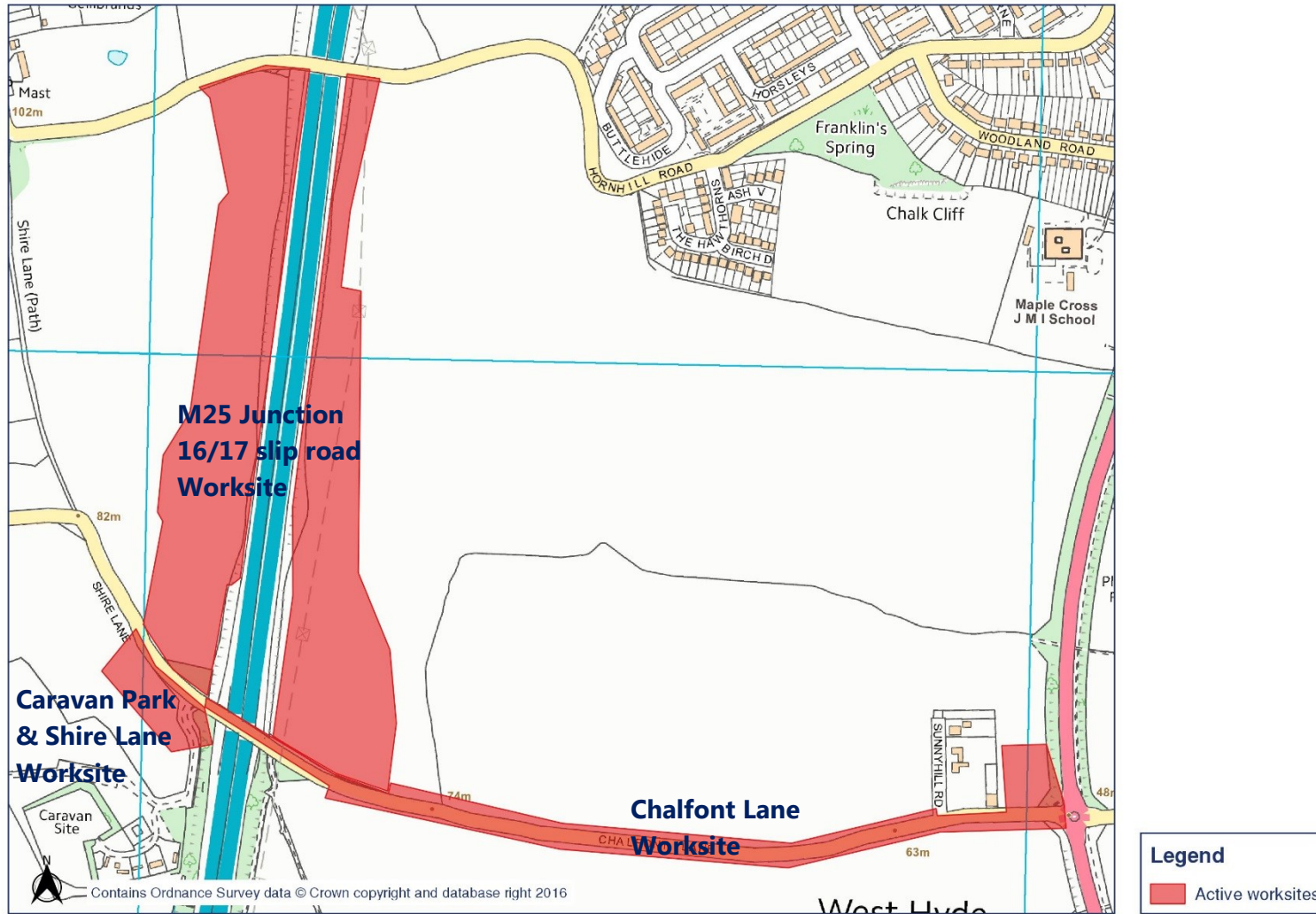
2.4.1 Table 5 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

2.4.2 There were no complaints reported during the monitoring period.

Table 5: Summary of Complaints.

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

Appendix A Site Locations



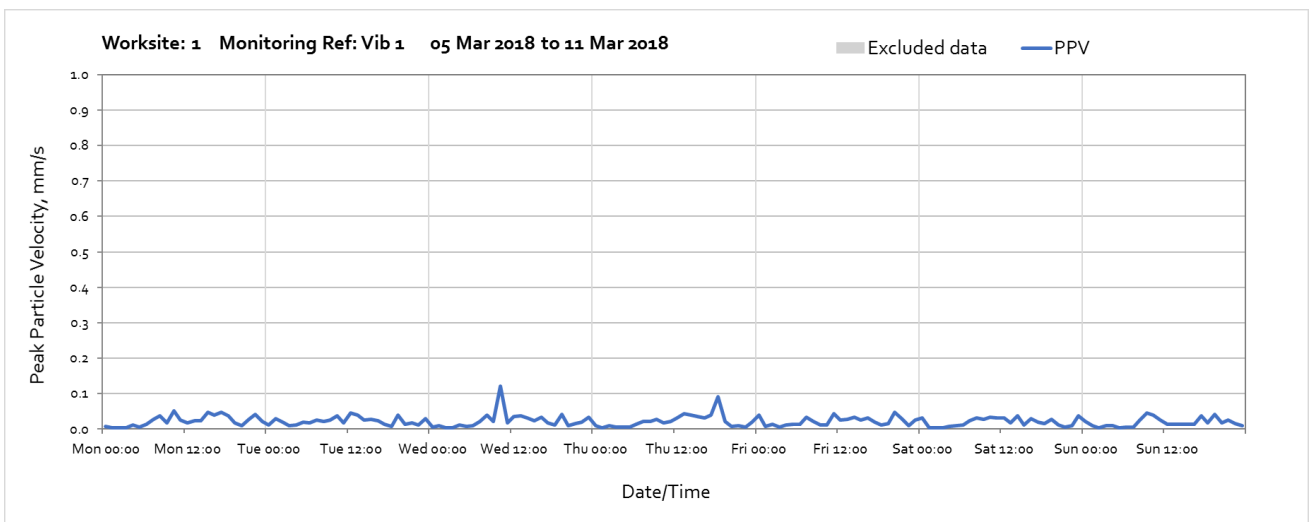
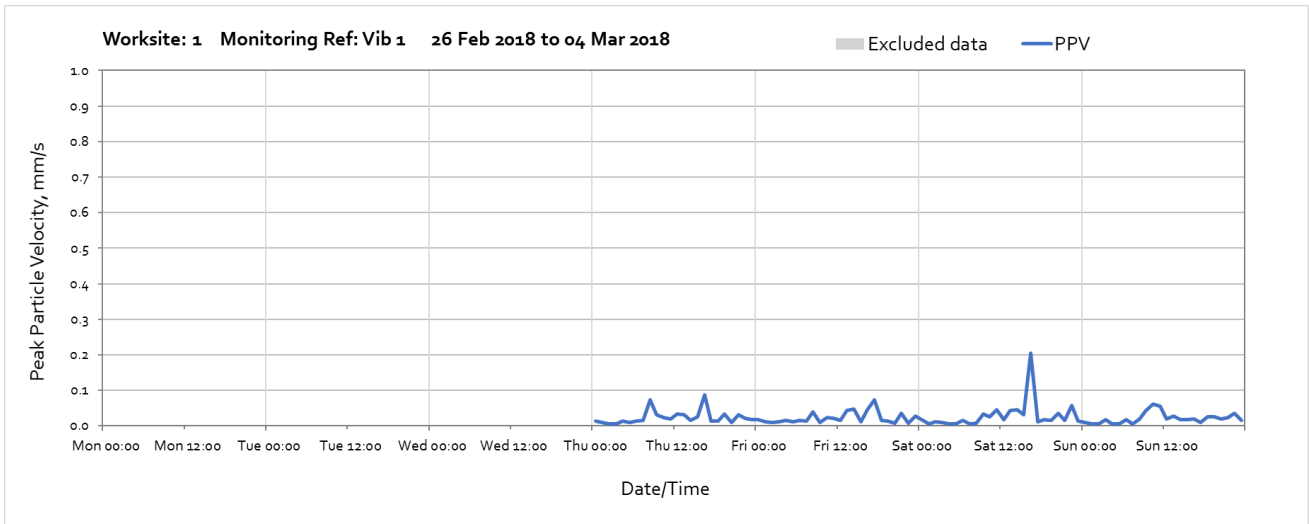
Appendix B Monitoring Locations

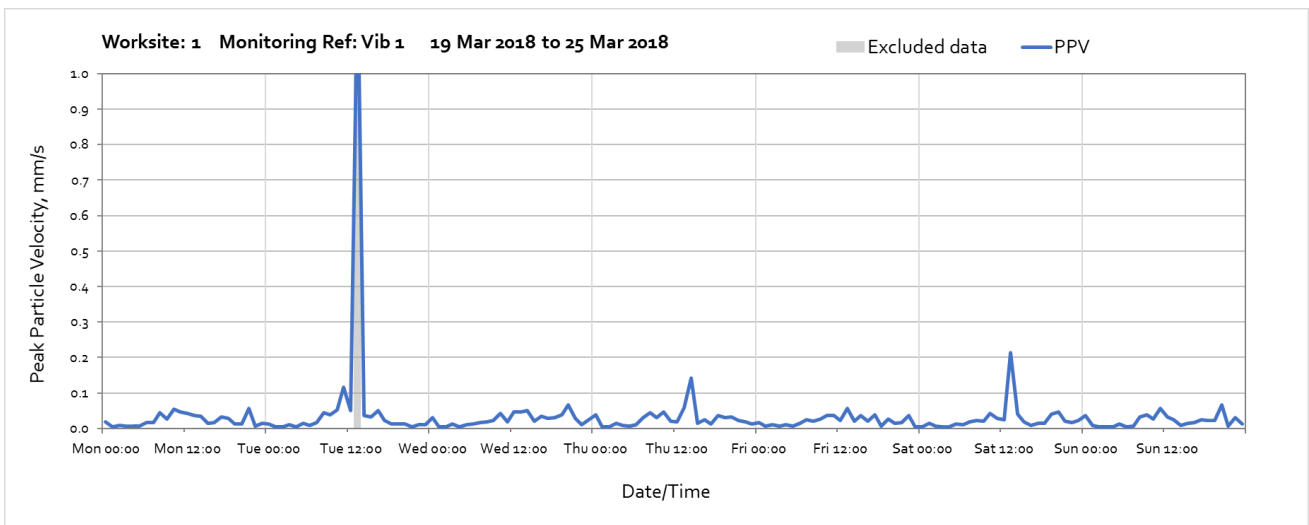
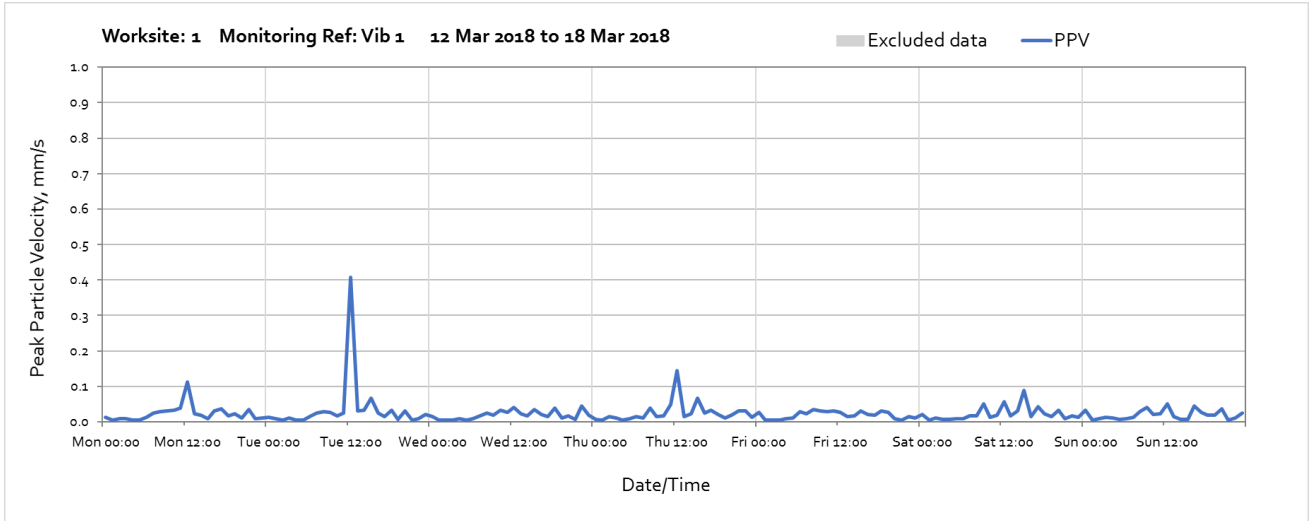
Appendix C Data

Vibration

The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the resultant PPV due to vibration components on three orthogonal axis x, y and z. Exceptionally high vibration levels were measured at 13:00 on Tuesday 20th, which were not related to HS2 construction activities. This data entry has been greyed out and excluded to calculate values in Table 3.

Worksite: M25 J16/17 Slip Road – Monitoring Ref: V1





Note – Exceptional vibration event at 13:00 on Tuesday 20th was not due to HS2 related works and has been excluded to calculate values in Table 3.

