

Construction noise and vibration Monthly Report – June 2021

Warwick District Council

| | |
|----------------------------------------------------|-----------|
| Non-Technical Summary | 1 |
| Abbreviations and Descriptions | 2 |
| 1 Introduction | 3 |
| 1.2 Measurement Locations | 4 |
| 2 Summary of Results | 6 |
| 2.1 Summary of Measured Noise and Vibration Levels | 6 |
| 2.2 Exceedances of the LOAEL and SOAEL | 9 |
| 2.3 Exceedances of Trigger Level | 12 |
| 2.4 Complaints | 12 |
| Appendix A Site Locations | 13 |
| Appendix B Monitoring Locations | 18 |
| Appendix C Data | 22 |

List of tables

| | |
|---------------------------------------------------------------------------|----|
| Table 1: Table of Abbreviations | 2 |
| Table 2: Monitoring Locations | 5 |
| Table 3: Summary of Measured dB L_{Aeq} Data over the Monitoring Period | 7 |
| Table 4: Summary of Measured PPV Data over the Monitoring Period | 9 |
| Table 5: Summary of Exceedances of LOAEL and SOAEL | 10 |
| Table 6: Summary of Exceedances of Trigger Levels | 12 |
| Table 7: Summary of Complaints | 12 |

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 Warwick District Council (WDC) area during the month of June 2021.

Within this period monitoring was undertaken at the following worksites:

- Noise and vibration monitoring were undertaken at the Burton Green Tunnel worksite (ref.: BGT), where work activities included demolition work at 404 Cromwell Lane, surfacing of the Burton Green compound car park, fencing of the utilities pipe through the South portal area, and excavation works.
- Noise monitoring was undertaken at Bockenden Cutting (ref.: BC), where work activities included topsoil stripping, temporary drainage works, and site clearance.
- Noise monitoring was undertaken at the A429 Kenilworth Road Overbridge (ref.: A429KRO), where work activities included topsoil stripping, temporary drainage works, and site clearance.
- Noise monitoring was undertaken at Fosseway Diversion (ref.: WP80), where work activities included the construction of two roundabouts and the diversion of the fosseway to facilitate the main works in this area.
- Noise monitoring were undertaken at Offchurch Cutting ref.: OC (formerly Welsh Road Underbridge worksite ref: WRU) where work activities included temporary drainage south of Welsh Road, excavation south of Welsh Road, temporary drainage north of Welsh road, and the use of a plant/drainage crossing.

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.

One complaint was received during the monitoring period. A description of the complaints, the results of investigations and any actions taken are detailed in Table 7 of this report.

Abbreviations and Descriptions

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

Table 1: Table of Abbreviations

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

1 Introduction

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

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

1.1.2 Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the Warwick District Council (WDC) area for the period 1st to 30th June 2021.

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

- Burton Green Tunnel worksite ref.: BGT (see plan 1 in Appendix A), where work activities included:
 - Demolition work at 404 Cromwell Lane;
 - Surfacing of the Burton Green compound car park;
 - Fencing of the utilities pipe through the South portal area; and
 - Excavation works for the formation level of the South Portal base slab.
- Bockenden Cutting ref.: BC (see plan 1 in Appendix A), where work activities included:
 - Topsoil stripping;
 - Temporary drainage works; and
 - Site clearance.

- A429 Kenilworth Road Overbridge ref.: A429KRO (see plan 2 in Appendix A), where work activities included:
 - Topsoil stripping;
 - Temporary drainage works; and
 - Site clearance.
- Fosseway Diversion ref.: FD (see plan 3 in Appendix A), where work activities included:
 - Construction of two roundabouts; and
 - The diversion of the fosseway to facilitate the main works in this area.
- Offchurch Cutting worksite ref.: OC (see plan 3 in Appendix A), (formerly Welsh Road Underbridge worksite ref: WRU), where work activities included:
 - Temporary drainage south of Welsh Road;
 - Permanent Excavation south of Welsh Road;
 - Temporary drainage north of Welsh road; and
 - Plant/drainage crossing.

1.1.4 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 Eleven noise monitoring installations and two vibration monitoring installation were active in June in the WDC area. Table 2 summarises the position of the noise monitoring installations within the WDC area in June 2021.
- 1.2.2 An additional noise monitor (ref.: A429KRO-N2) was installed north of Brookview, Milburn Grange, Coventry Road, Kenilworth CV8 2FE, worksite ref. A429KRO, on the 15th of June.
- 1.2.3 Two additional noise monitors (ref.: A429KRO-N1 and A429KRO-N3) were installed north of Millburn Grange, Coventry Road, Kenilworth, CV8 2FE and north-east of 16 Kenilworth Road, Kenilworth CV8 2FF, worksite ref. A429KRO, on the 17th of June.

- 1.2.4 An additional noise monitor (ref.: BC-N1) was installed east of The Thistle Estate, Red Lane, Burton Green, Warwick, Warwickshire, CV8 1TR, worksite ref. BC, on the 22nd of June.
- 1.2.5 An additional noise and vibration monitor (ref.: BGT-N3 and BGT-V1) were installed at 404 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG, worksite ref. BGT, on the 25th of June respectively.
- 1.2.6 Maps showing the position of the noise monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

| Worksite Reference | Measurement Reference | Address |
|-------------------------------------------|-----------------------|--------------------------------------------------------------------------------------|
| Burton Green Tunnel (BGT) | BGT-N1 | 301 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG |
| | BGT-N2 | Broadwell Woods Caravan Park, Red Lane, Burton Green, Warwick, Warwickshire, CV8 1QF |
| | BGT-N3 | 404 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG |
| | BGT-N4 | 307 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG |
| | BGT-V1 | 404 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG |
| | BGT-V2 | 307 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG |
| Bockenden Cutting (BC) | BC-N1 | Thistle Estate, Red Lane, Burton Green, Warwick, Warwickshire, CV8 1TR |
| A429 Kenilworth Road Overbridge (A429KRO) | A429KRO-N1 | Millburn Grange, Coventry Road, Kenilworth, CV8 2FE |
| | A429KRO-N2 | Brookview, Milburn Grange, Coventry Road, Kenilworth CV8 2FE |
| | A429KRO-N3 | 16 Kenilworth Road, Kenilworth CV8 2FF |
| Fosseway Diversion (FD) | FD-N1 | Burnt Heath Cottages Long Itchington Rd, Offchurch, Leamington Spa CV33 9AZ |
| | FD-N2 | Spring Hill Cottages Fosse Way, Offchurch, Leamington Spa CV33 9BD |
| Offchurch Cutting (OC) | OC-N1 | Welsh Road, Offchurch, Leamington, CV33 9BG |

2 Summary of Results

2.1 Summary of Measured Noise and Vibration 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 | 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 |
| BGT | BGT-N1 | 301 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG | Free-field | 48.5 (51.8) | 55.2 (68.8) | 45.4 (52.9) | 45.5 (51.0) | 45.4 (56.5) | 48.6 (51.2) | 46.3 (48.8) | 43.7 (44.9) | 43.4 (47.4) | 45.3 (53.6) | 45.4 (51.4) | 45.6 (54.7) |
| | BGT-N2 | Broadwell Woods Caravan Park, Red Lane, Burton Green, Warwick, Warwickshire, CV8 1QF | Free-field | 48.6 (54.1) | 51.3 (57.5) | 46.3 (54.2) | 44.6 (50.9) | 47.2 (64.9) | 47.6 (52.0) | 51.0 (55.5) | 45.9 (48.2) | 46.4 (51.6) | 49.0 (58.6) | 46.6 (53.6) | 46.8 (58.0) |
| | BGT-N3 | Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG | Free-field | 53.0 (73.4) | 64.9 (74.1) | 44.7 (50.4) | 42.5 (49.8) | 39.7 (48.6) | 48.5 (48.5) | 49.6 (49.6) | 49.4 (49.4) | 49.5 (52.3) | 43.7 (47.1) | 48.8 (51.3) | 44.2 (50.2) |
| | BGT-N4 | 307 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG | Free-field | 50.5 (59.5) | 52.6 (68.4) | 47.6 (50.9) | 46.4 (50.5) | 43.8 (52.4) | 45.3 (46.4) | 47.0 (47.4) | 46.5 (46.9) | 47.0 (49.5) | 44.3 (52.5) | 46.8 (53.7) | 43.3 (50.4) |
| BC | BC-N1 | Thistle Estate, Red Lane, Burton Green, Warwick, Warwickshire, CV8 1TR | Free-field | 45.8 (48.5) | 56.8 (60.5) | 52.7 (62.3) | 49.4 (61.7) | 48.6 (64.7) | 42.4 (42.4) | 45.6 (45.6) | 65.7 (65.7) | 44.4 (45.9) | 47.6 (55.0) | 45.3 (47.1) | 50.7 (59.3) |

| 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 |
| A429KRO | A429KRO -N1 | Millburn Grange, Coventry Road, Kenilworth, CV8 2FE | Free-field | 50.9 (51.8) | 55.9 (61.8) | 52.5 (55.9) | 53.5 (61.0) | 51.2 (70.4) | 51.9 (55.1) | 52.0 (53.5) | 52.4 (55.7) | 50.2 (52.0) | 40.3 (48.0) | 50.7 (54.9) | 46.3 (52.7) |
| | A429KRO -N2 | Brookview, Milburn Grange, Coventry Road, Kenilworth CV8 2FE | Free-field | 48.7 (49.7) | 52.0 (54.0) | 49.6 (52.7) | 49.5 (53.9) | 47.4 (54.4) | 49.1 (51.2) | 50.3 (50.9) | 49.0 (51.8) | 47.9 (50.1) | 41.4 (46.2) | 48.4 (52.1) | 43.8 (49.6) |
| | A429KRO -N3 | 16 Kenilworth Road, Kenilworth CV8 2FF | Free-field | 55.9 (56.8) | 56.6 (59.1) | 56.0 (58.6) | 53.8 (56.5) | 50.1 (61.7) | 53.0 (53.3) | 59.3 (62.7) | 56.1 (56.1) | 55.3 (57.2) | 53.2 (65.9) | 55.2 (57.8) | 52.7 (65.1) |
| FD | FD-N1 | Burnt Heath Cottages Long Itchington Rd, Offchurch, Leamington Spa CV33 9AZ | Free-field | 57.0 (59.8) | 57.4 (59.4) | 57.0 (61.4) | 55.6 (65.0) | 49.3 (60.3) | 50.8 (51.4) | 56.3 (57.1) | 56.9 (58.2) | 54.5 (56.7) | 48.8 (57.0) | 56.6 (59.9) | 48.9 (55.7) |
| | FD-N1 | Spring Hill Cottages Fosse Way, Offchurch, Leamington Spa CV33 9BD | Free-field | 65.4 (67.8) | 65.5 (67.8) | 64.6 (68.3) | 62.0 (64.9) | 57.0 (65.4) | 59.9 (61.1) | 65.2 (69.9) | 64.7 (67.0) | 64.1 (70.4) | 57.4 (65.7) | 64.8 (68.0) | 57.7 (64.9) |
| OC | OC-N1 | Welsh Road, Offchurch, Leamington, CV33 9BG | Free-field | 53.5 (69.3) | 57.4 (71.9) | 51.0 (55.4) | 48.8 (54.1) | 43.8 (61.3) | 48.2 (49.1) | 49.6 (52.1) | 48.4 (52.0) | 48.4 (54.8) | 43.6 (54.0) | 49.2 (57.2) | 44.3 (54.3) |

2.1.2 Table 4 presents a summary of the measured vibration levels at each monitoring location over the reporting period. The highest component PPV measured during periods of work 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 |
|--------------------|-----------------------|-----------------------------------------------------------------|----------------------------------------|
| BGT | BGT-V1 | Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG | 5.78 (y-axis) |
| | BGT-V2 | 307 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG | 0.94 (z-axis) |

2.1.3 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 5 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 5: 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 |
|--------------------|-----------------------|--------------------------------------------------------------------------------------|----------------------------------------|-------------|--------------------------------|--------------------------------|
| BGT | BGT-N1* | 301 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG | Weekdays | 0800-1800 | 9 | No exceedances |
| | BGT-N2* | Broadwell Woods Caravan Park, Red Lane, Burton Green, Warwick, Warwickshire, CV8 1QF | All days | All periods | No exceedances | No exceedances |
| | BGT-N3* | Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG | Weekday | 0800-1800 | 3 | No exceedances |
| | BGT-N4 | 307 Cromwell Lane, Burton Green, Warwick, Warwickshire, CV8 1PG | Weekday | 0800-1800 | 2 | No exceedances |
| BC | BC-N1* | Thistle Estate, Red Lane, Burton Green, Warwick, Warwickshire, CV8 1TR | All days | All periods | No exceedances | No exceedances |
| A429KRO | A429KRO-N1 | Millburn Grange, Coventry Road, | All days | All periods | No exceedances | No exceedances |

| Worksite Reference | Measurement Reference | Site Address | Day (Weekday, Saturday, Sunday, Night) | Time period | Number of exceedances of LOAEL | Number of exceedances of SOAEL |
|--------------------|-----------------------|-----------------------------------------------------------------------------|----------------------------------------|-------------|--------------------------------|--------------------------------|
| | | Kenilworth, CV8 2FE | | | | |
| | A429KRO-N2 | Brookview, Milburn Grange, Coventry Road, Kenilworth CV8 2FE | All days | All periods | No exceedances | No exceedances |
| | A429KRO-N3 | 16 Kenilworth Road, Kenilworth CV8 2FF | All days | All periods | No exceedances | No exceedances |
| FD | FD-N1 | Burnt Heath Cottages Long Itchington Rd, Offchurch, Leamington Spa CV33 9AZ | All days | All periods | No exceedances | No exceedances |
| | FD-N2 | Spring Hill Cottages Fosse Way, Offchurch, Leamington Spa CV33 9BD | Saturday | 0800-1300 | 1 | No exceedances |
| OC | OC-N1* | Welsh Road, Offchurch, Leamington, CV33 9BG | All days | All periods | No exceedances | No exceedances |

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

2.2.6 No exceedances of the SOAEL were recorded due to HS2 construction works during June 2021. 14no. exceedances of the LOAEL were recorded near the Burton Green Tunnel worksite during weekday working periods. One exceedance of the LOAEL was recorded near the WP80 worksite during the a Saturday working period.

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 6: Summary of Exceedances of Trigger Levels

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

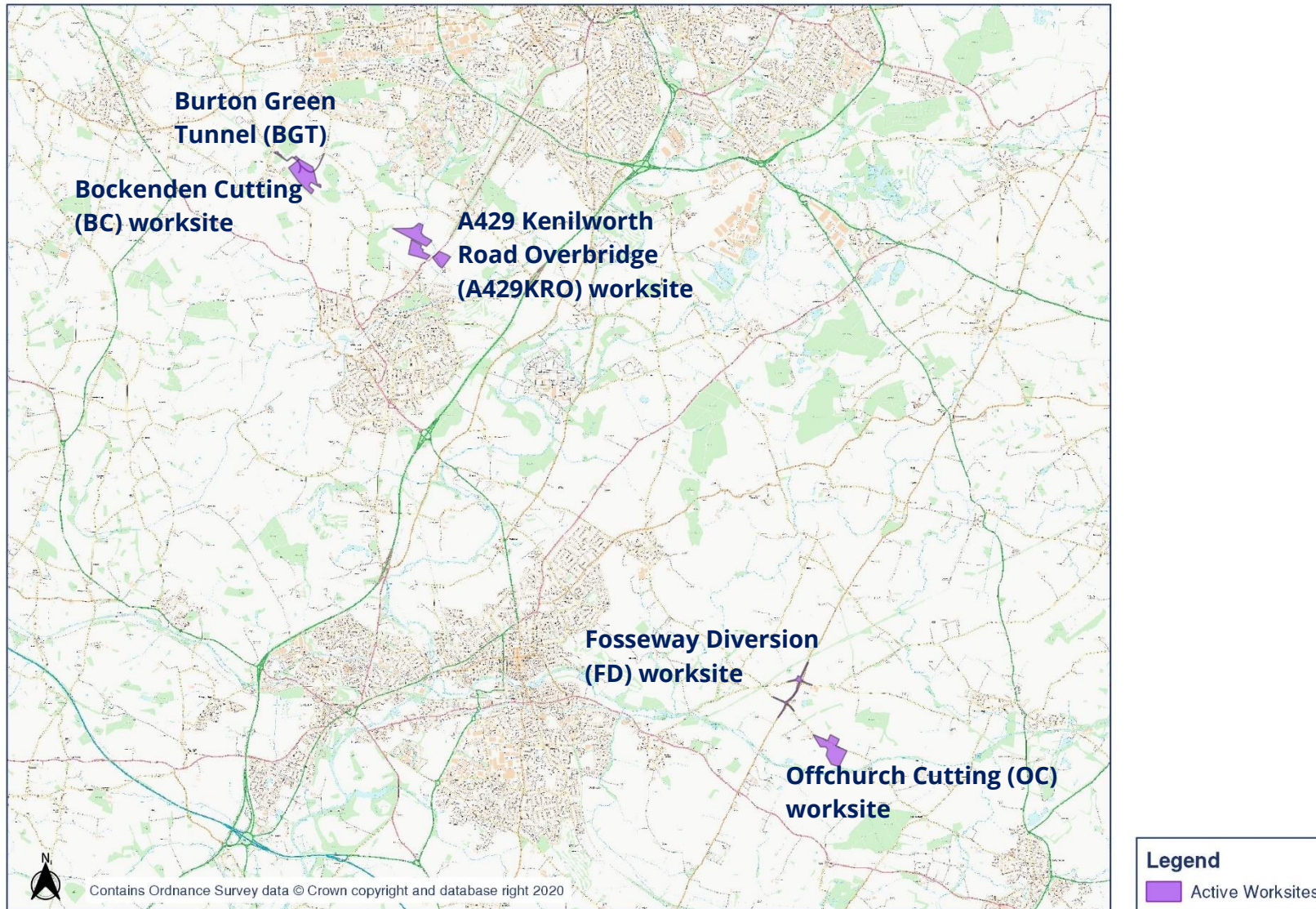
2.4 Complaints

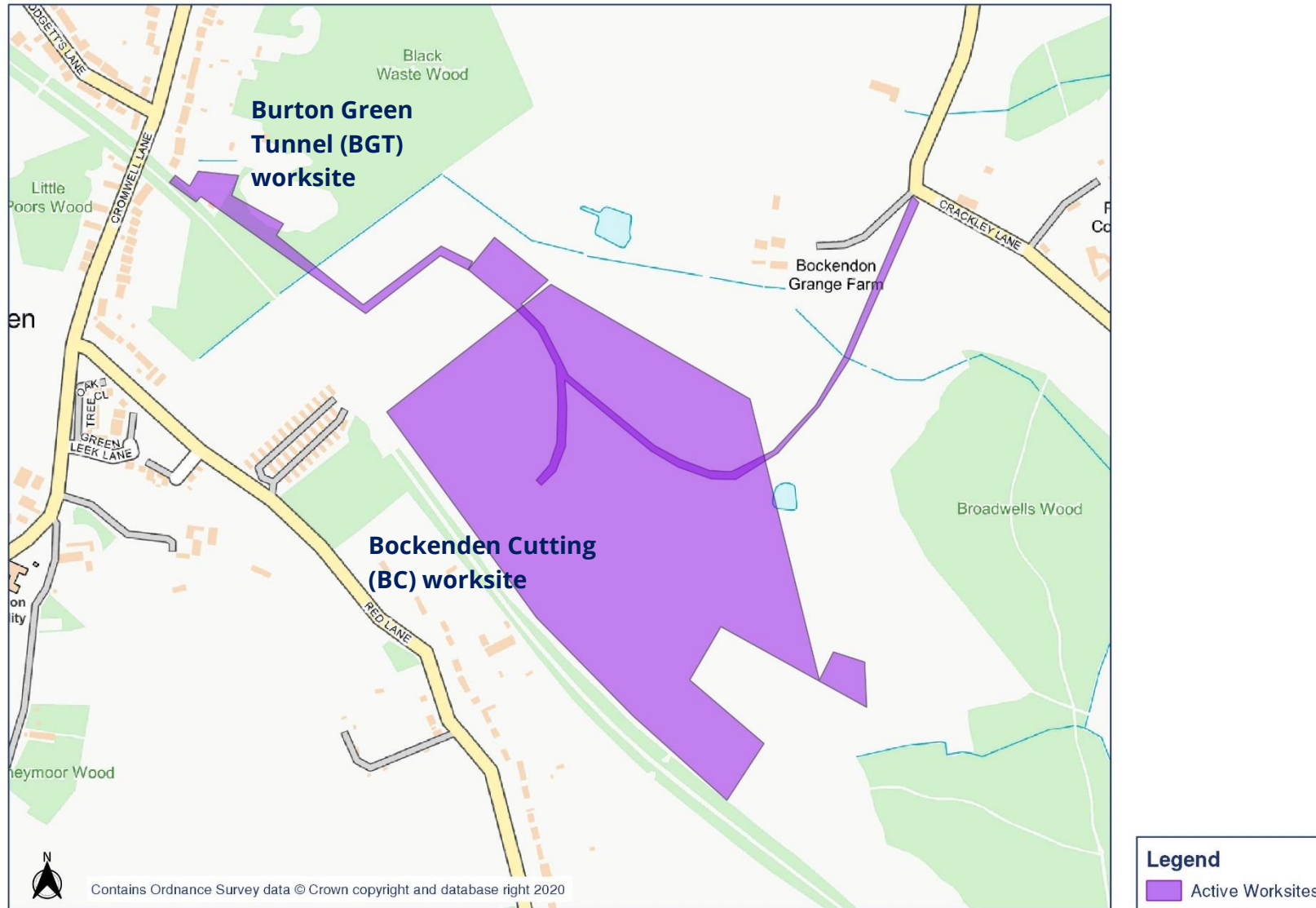
2.4.1 Table 7 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

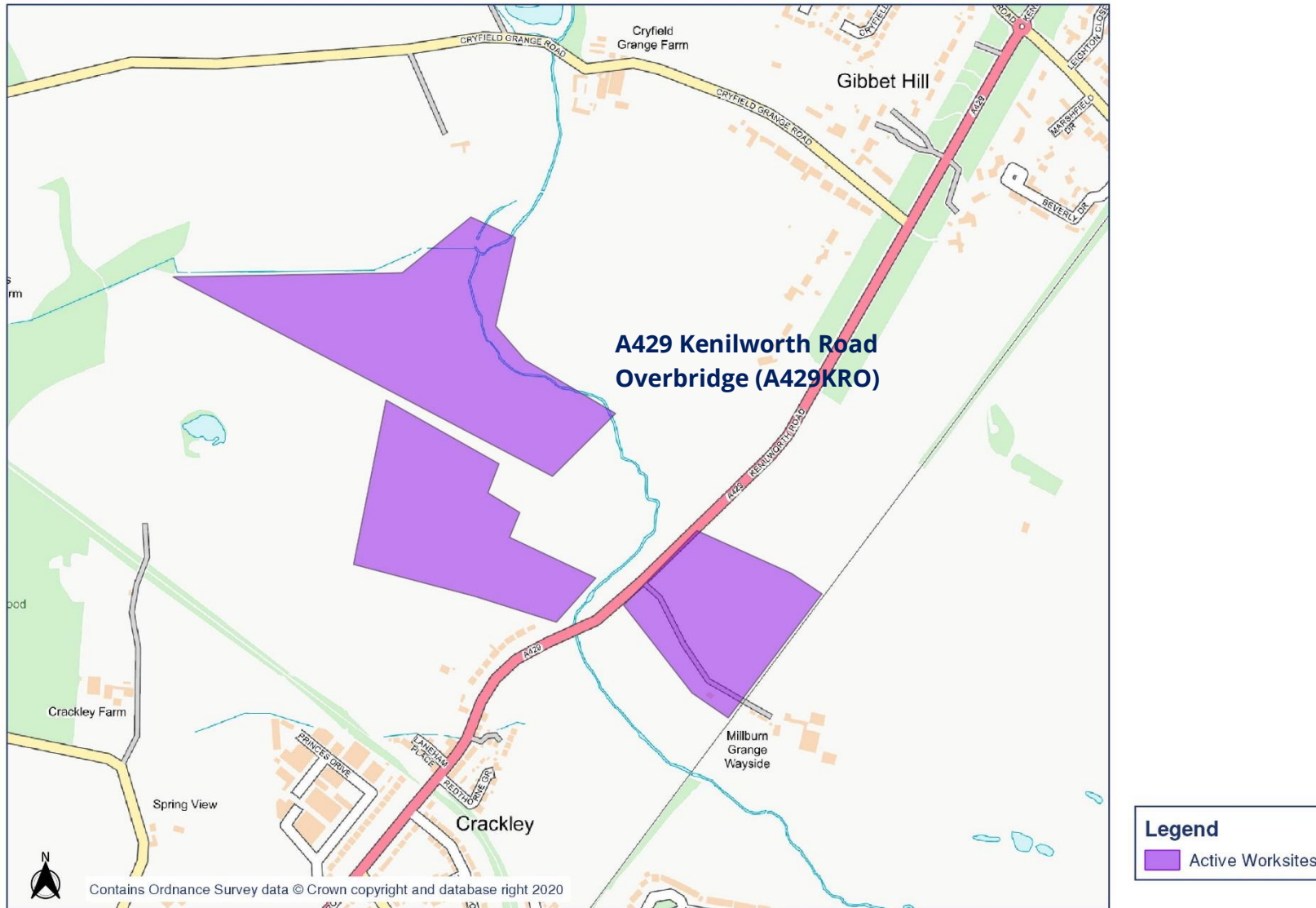
Table 7: Summary of Complaints

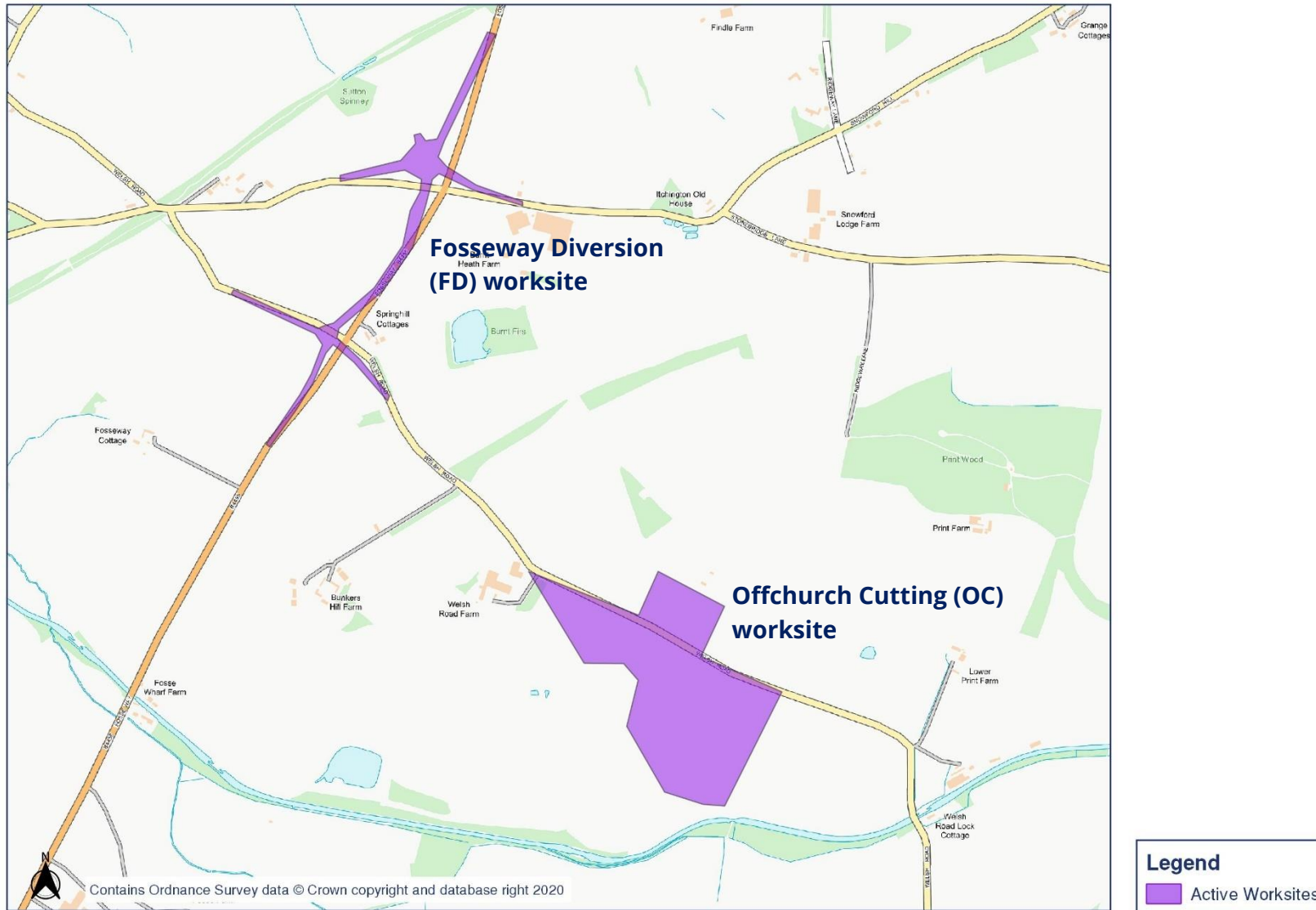
| Complaint Reference Number | Worksite Reference | Description of Complaint | Results of Investigation | Actions Taken |
|----------------------------|--------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| HS2-21-42203-C | A429KRO | Complaint due to noise from construction vehicles during a Saturday morning at Crackley Gap. | On-going | On-going |
| HS2-21-42077-C | A429KRO | Complaint due to reversing siren noise from compaction roller | The compaction roller reversing siren was associated with HS2 construction. Monitoring data demonstrates compliance with Section 61 requirements. | Information was provided to the stakeholder confirming that the reversing alarm has been replaced by the site team. |

Appendix A Site Locations

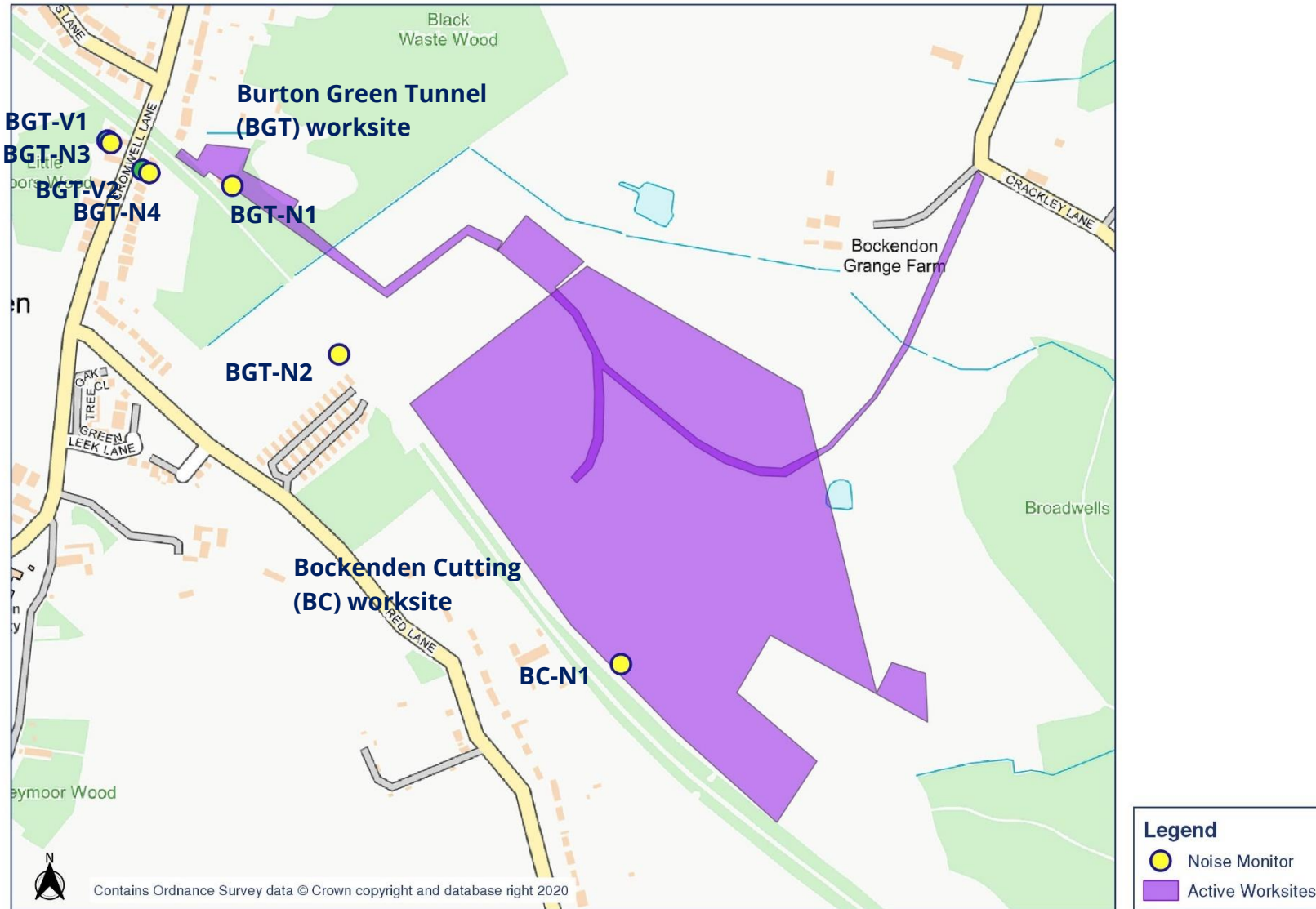


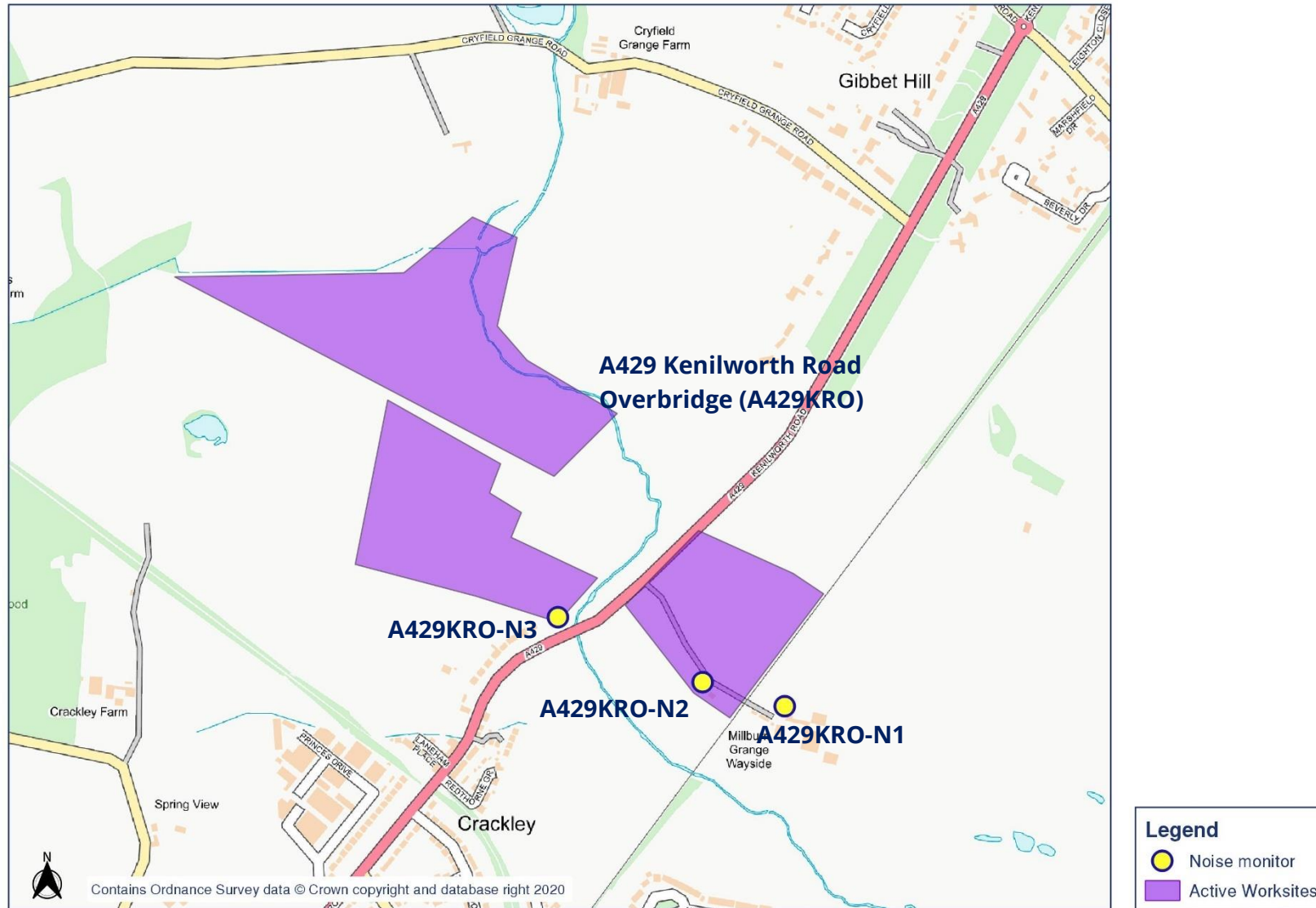


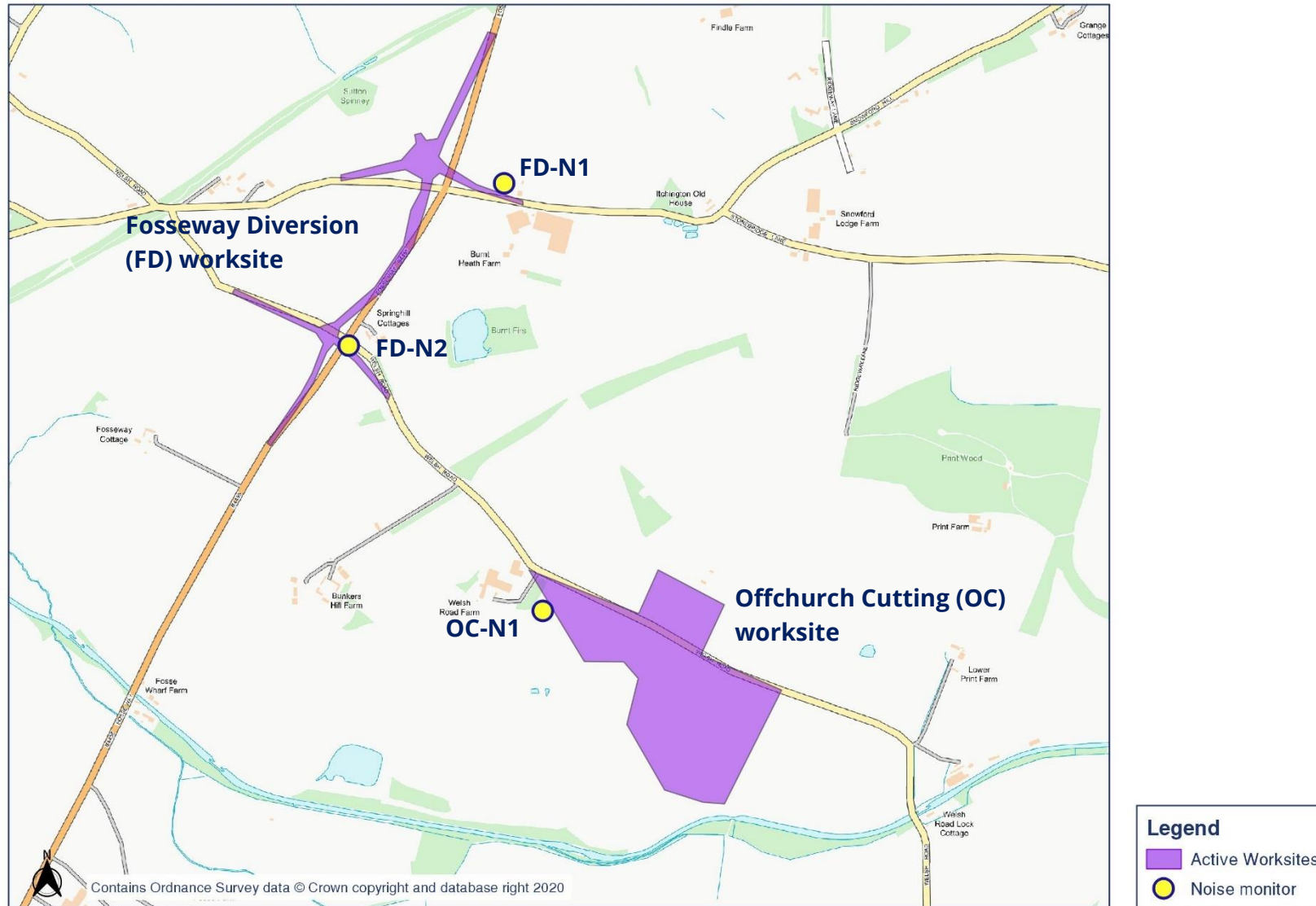




Appendix B Monitoring Locations





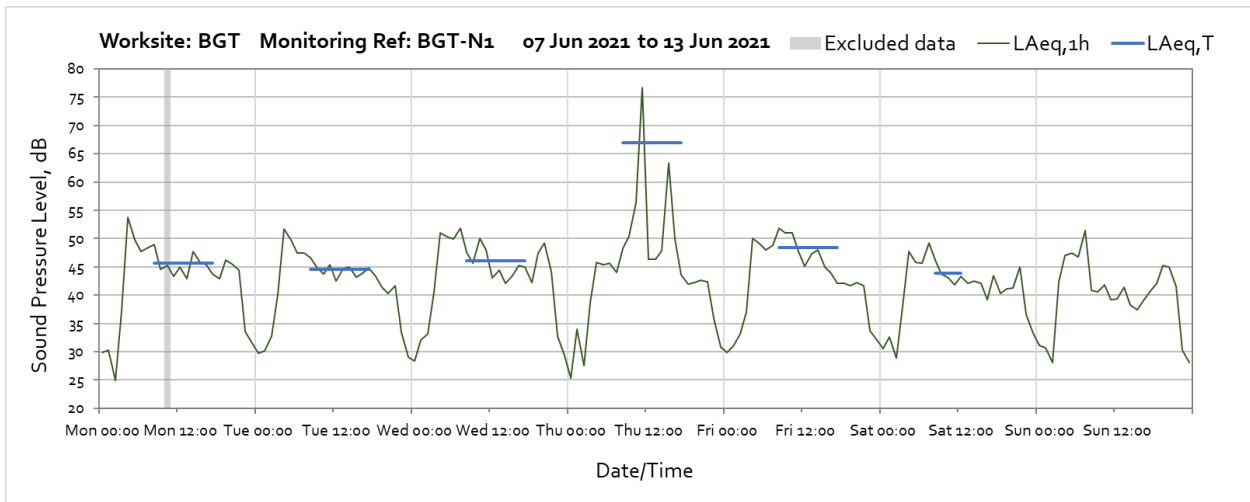
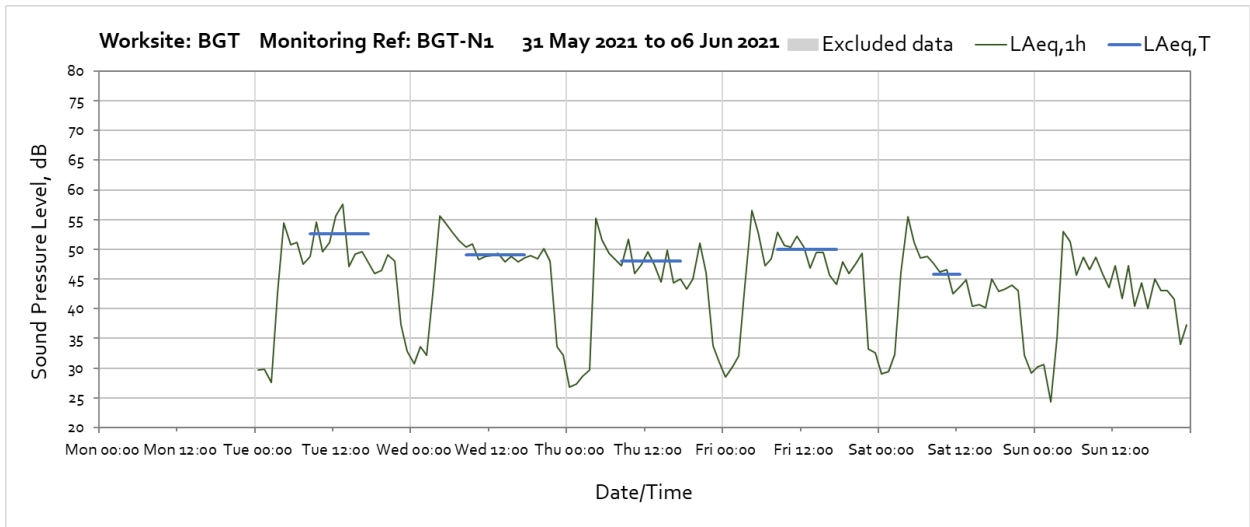


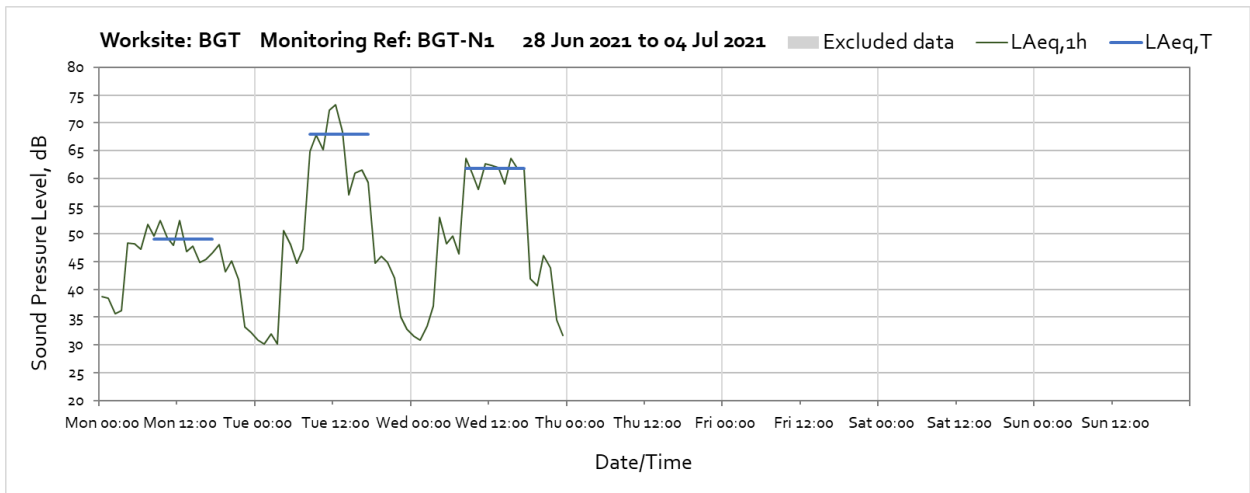
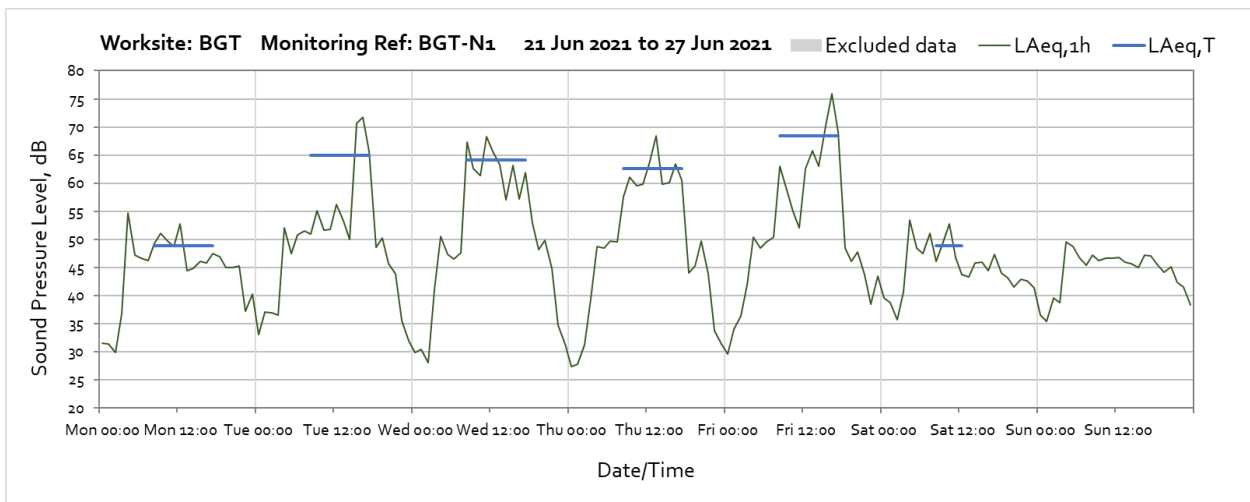
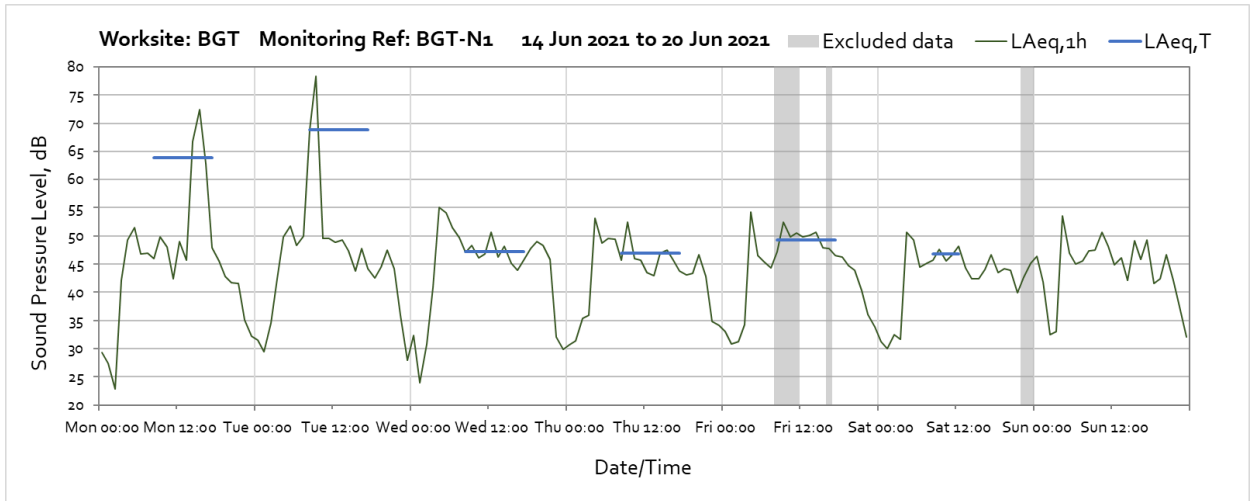
Appendix C Data

Noise

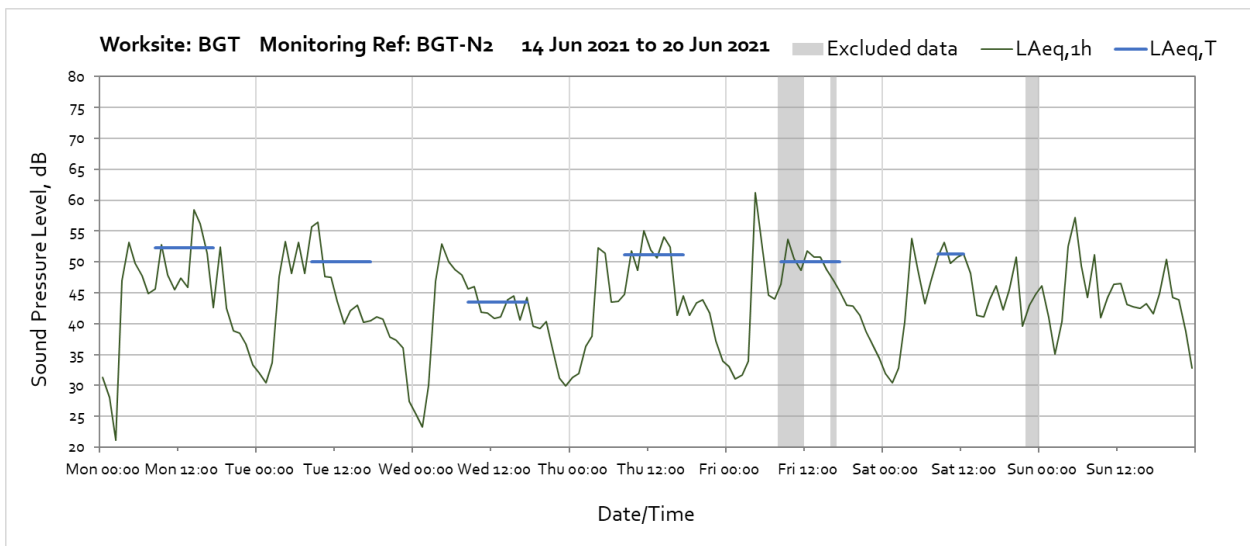
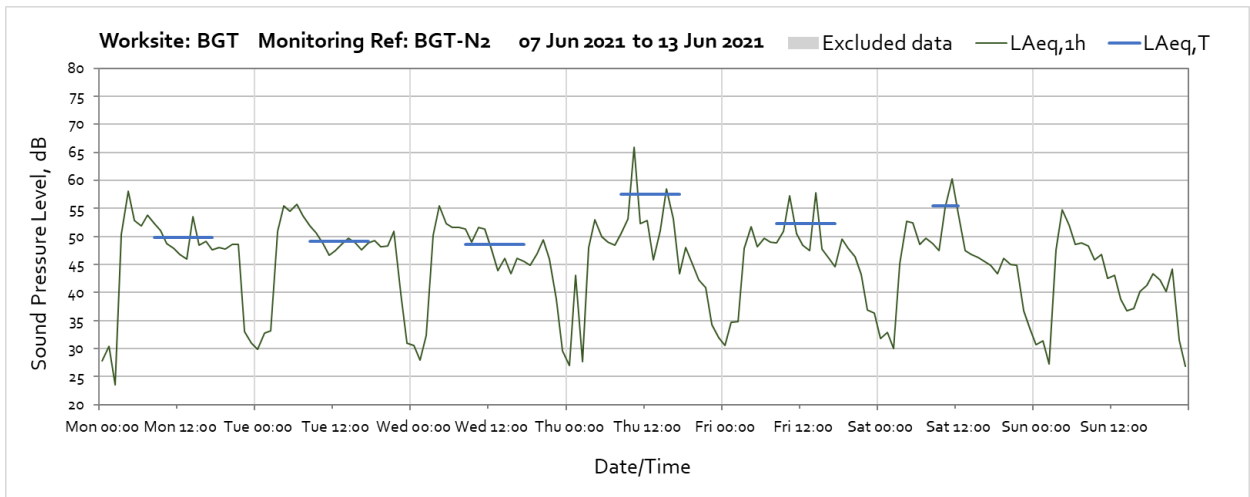
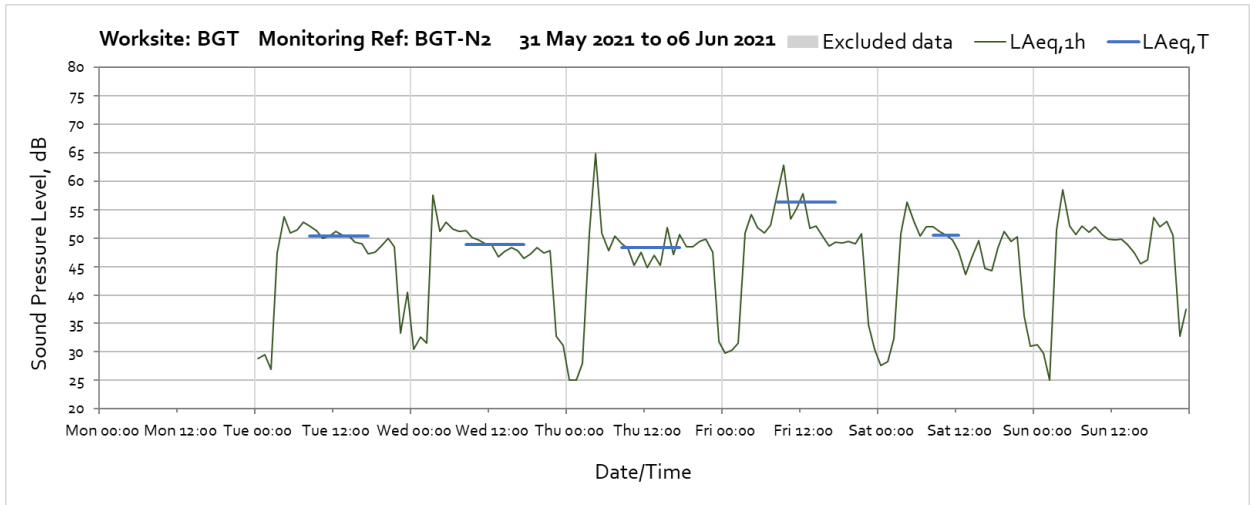
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have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

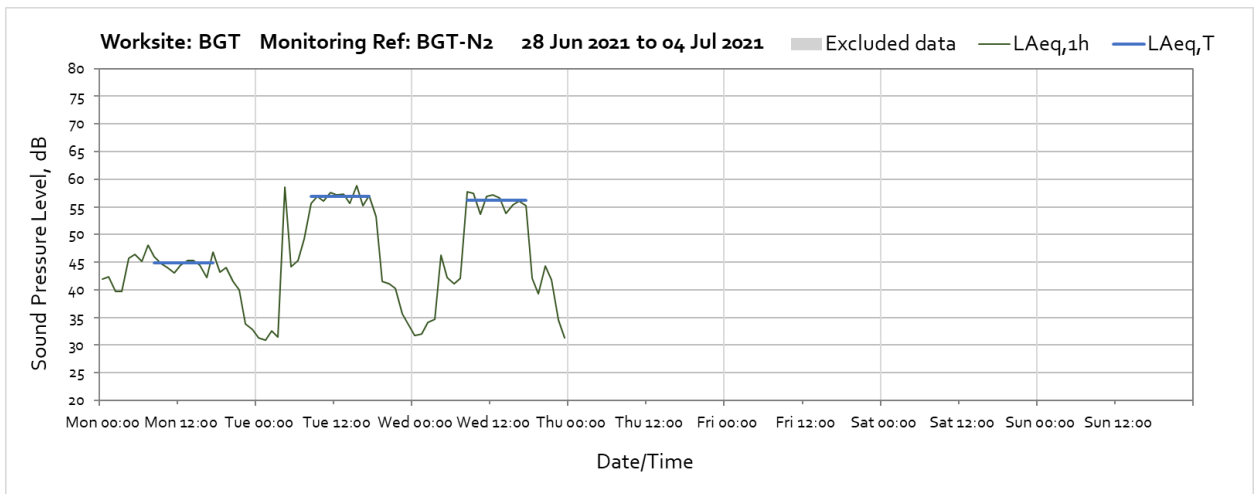
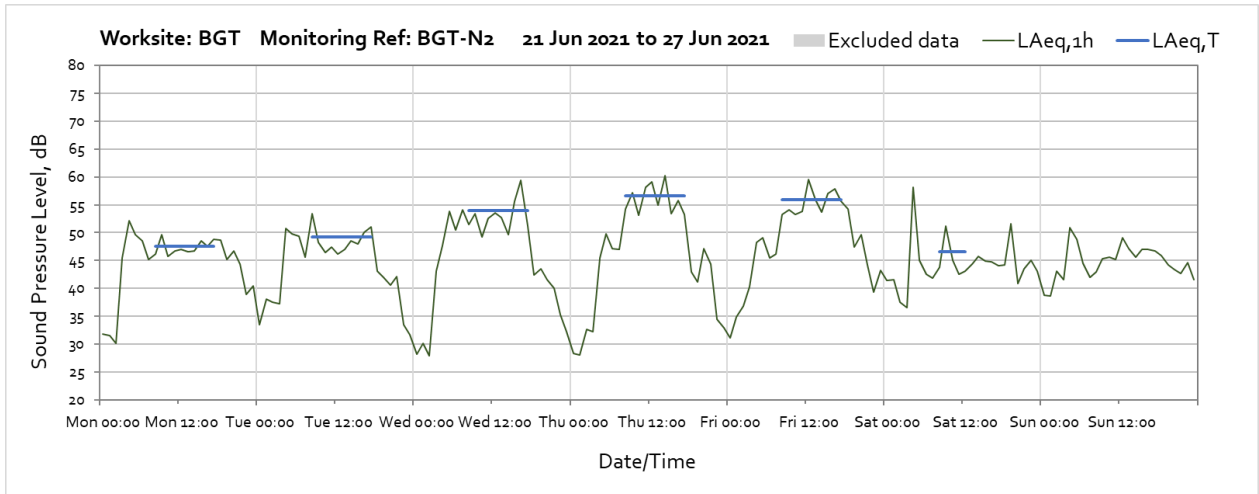
Worksite: BGT - Monitoring Ref: BGT-N1



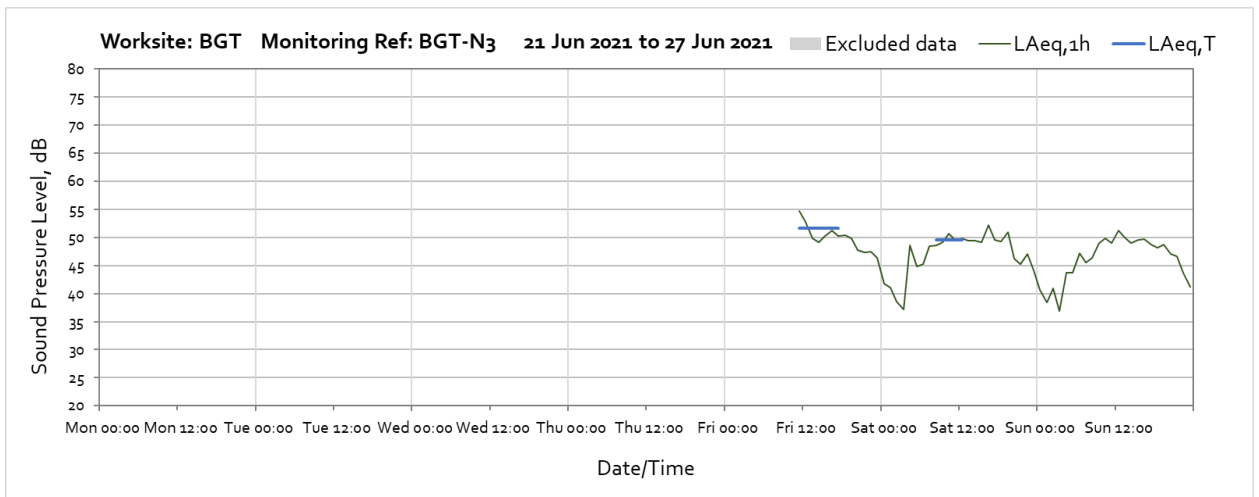


Worksite: BGT - Monitoring Ref: BGT-N2

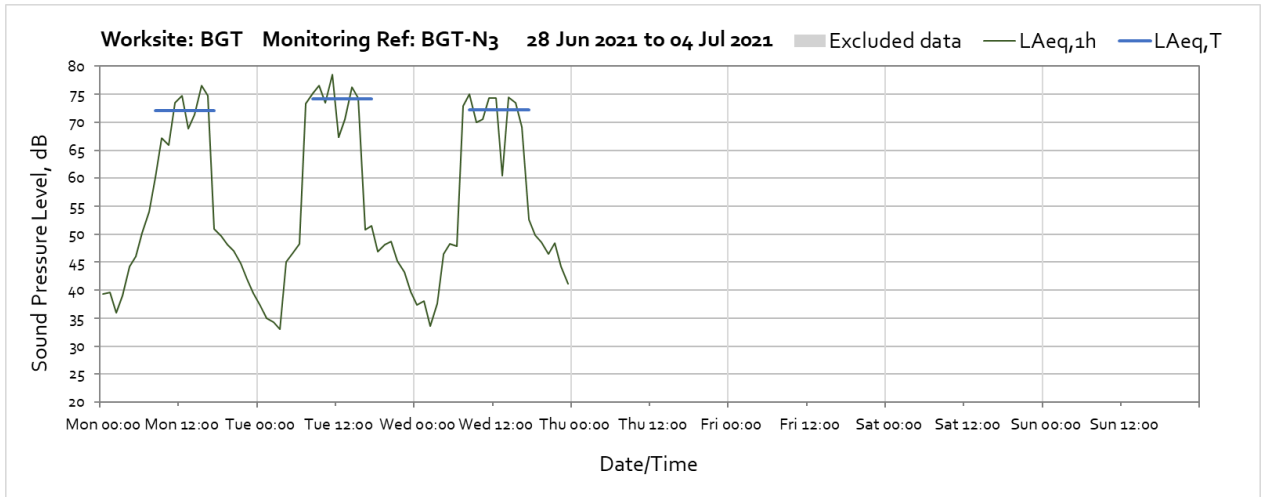




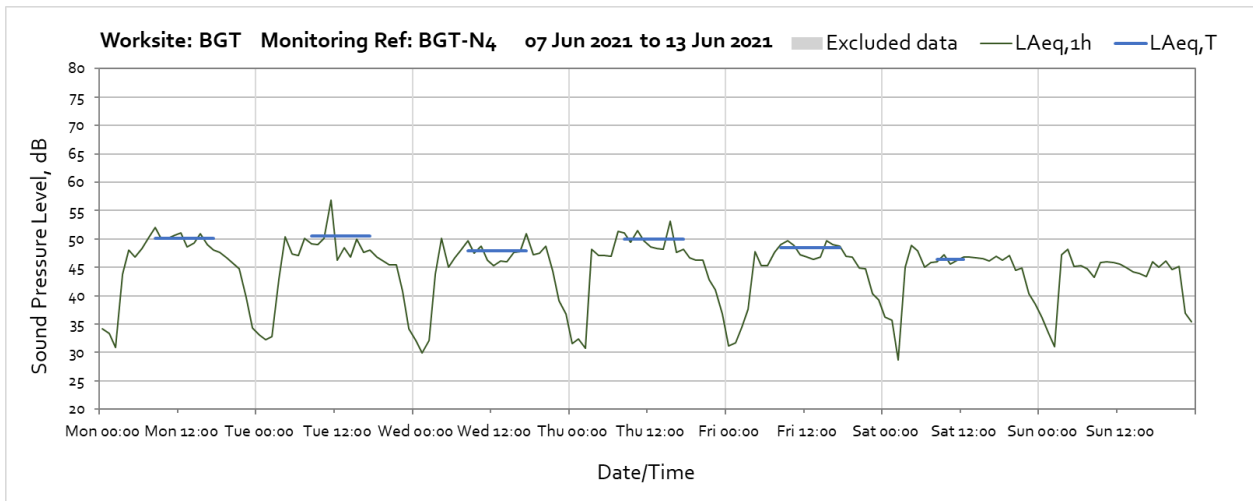
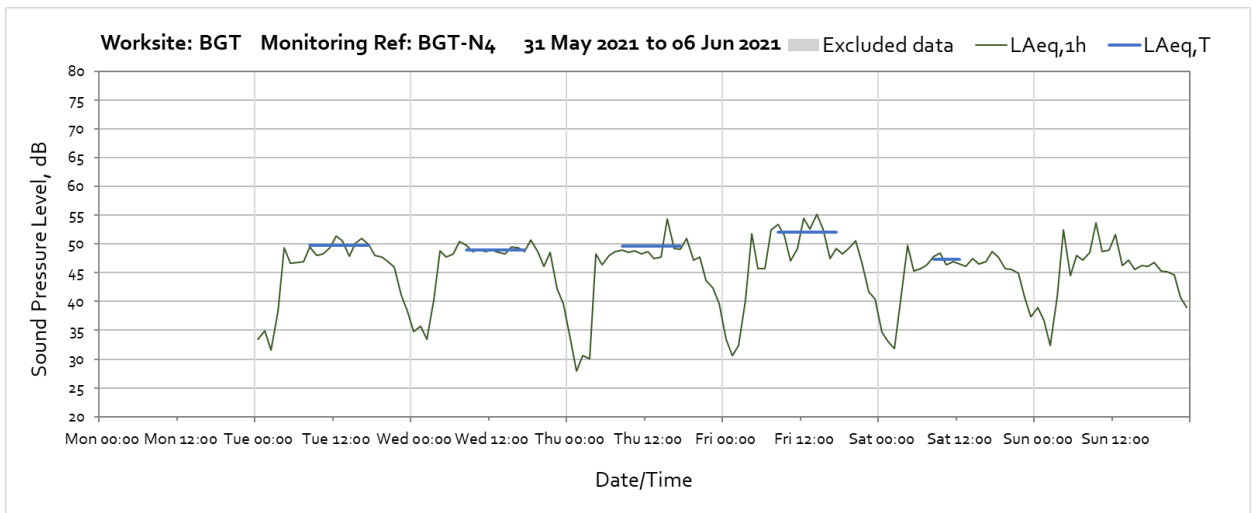
Worksite: BGT - Monitoring Ref: BGT-N3

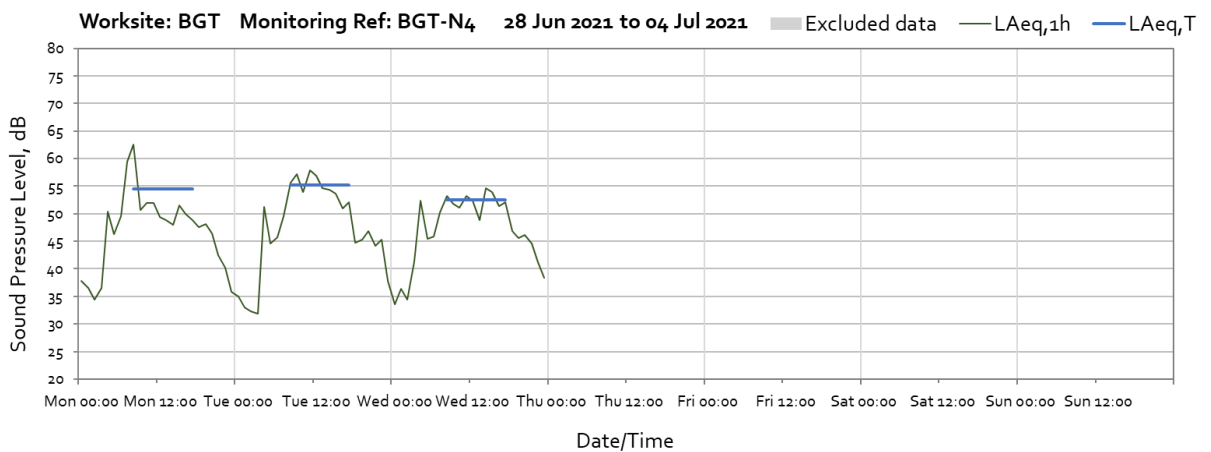
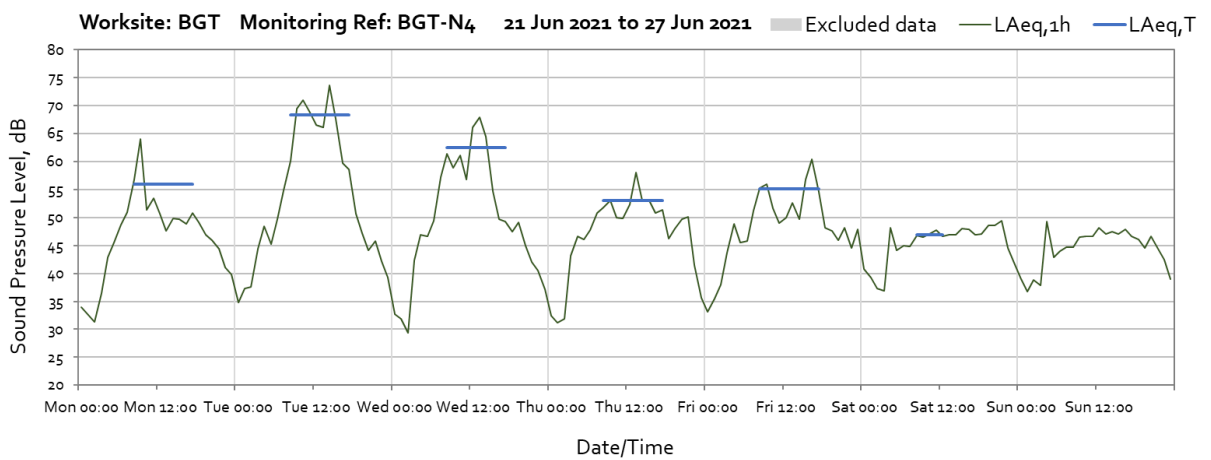
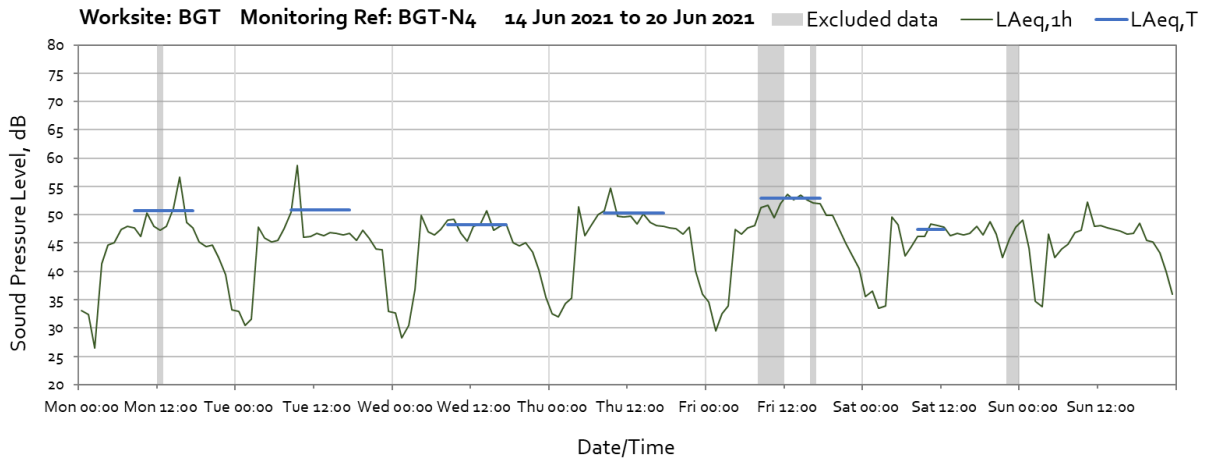


Note: Equipment was installed on 25th June

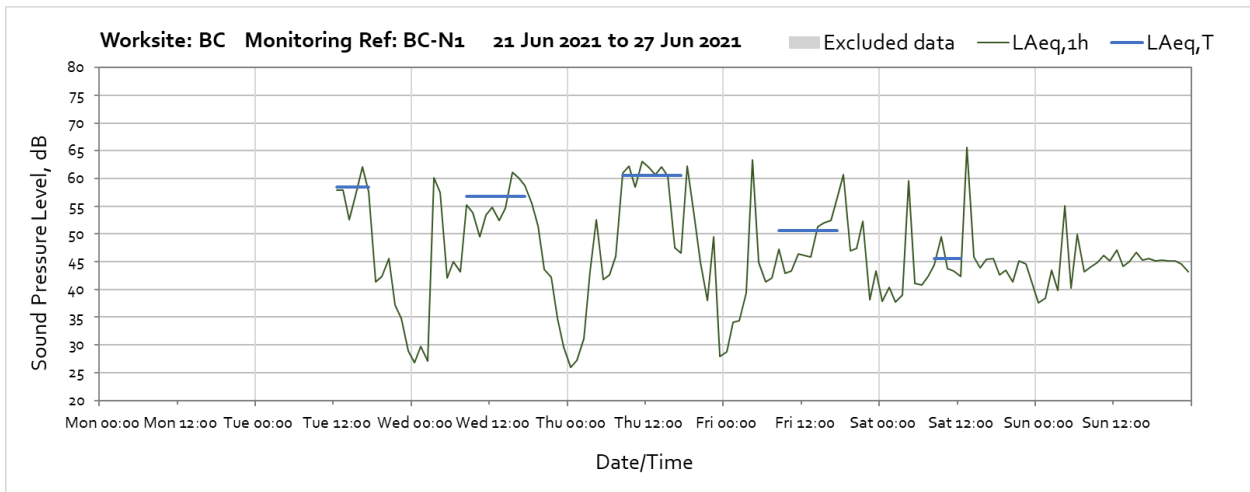


Worksite: BGT - Monitoring Ref: BGT-N₄

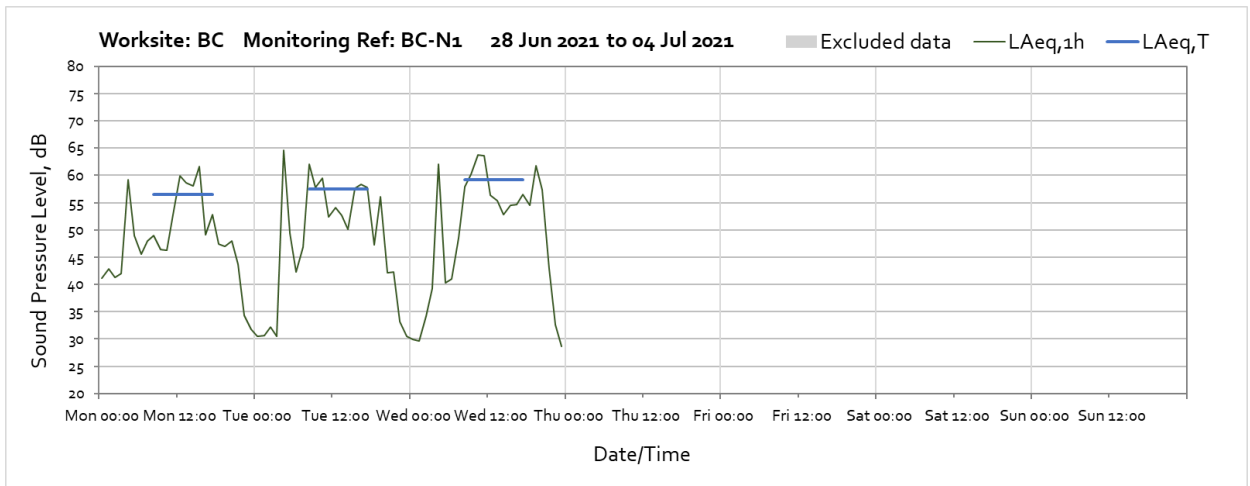




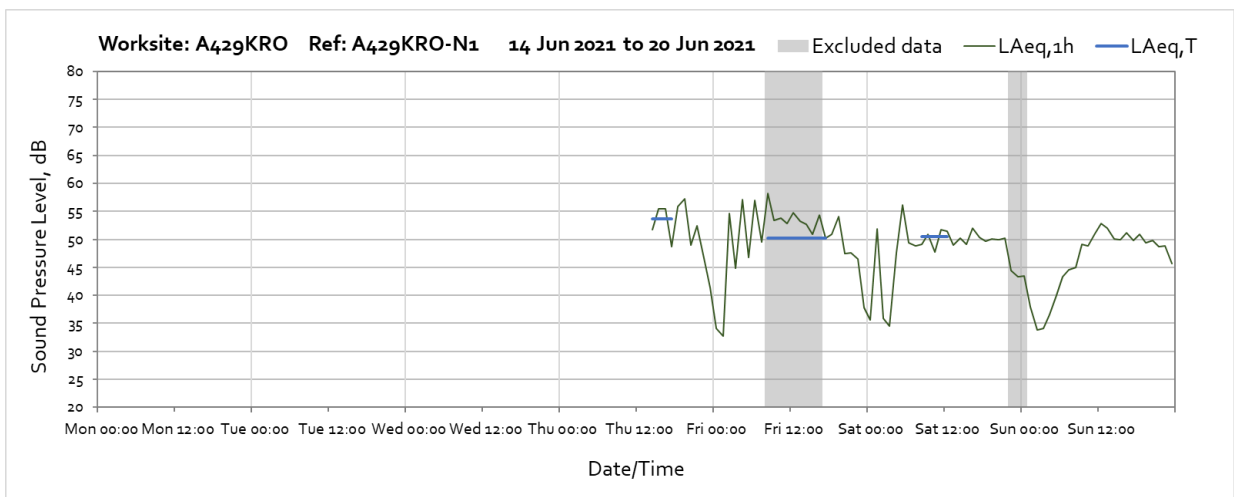
Worksite: BC – Monitoring Ref: BC-N1



Note: Equipment was installed on 22nd June.

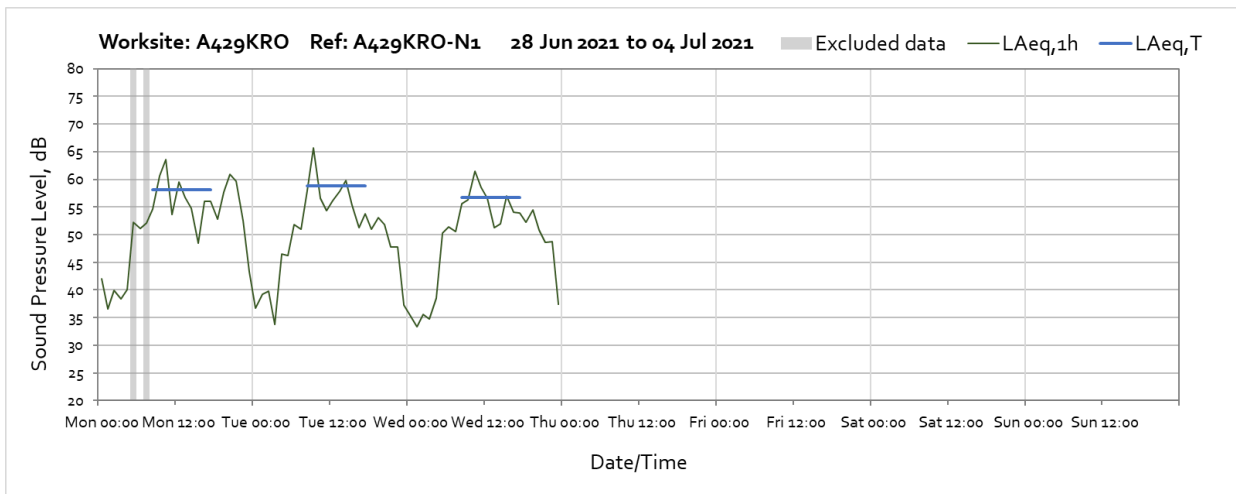
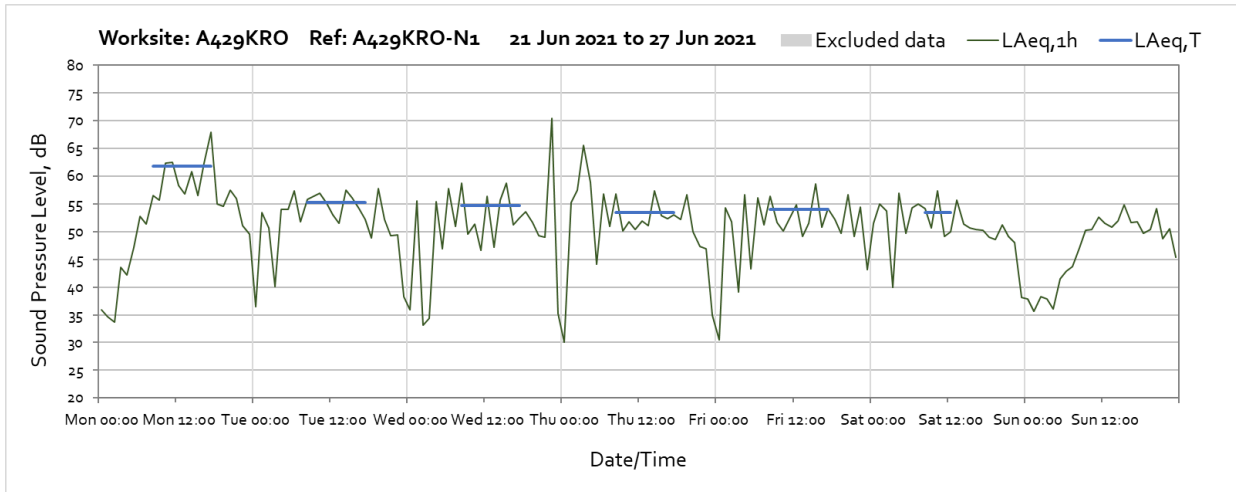


Worksite: A429KRO – Monitoring Ref: A429KRO-N1

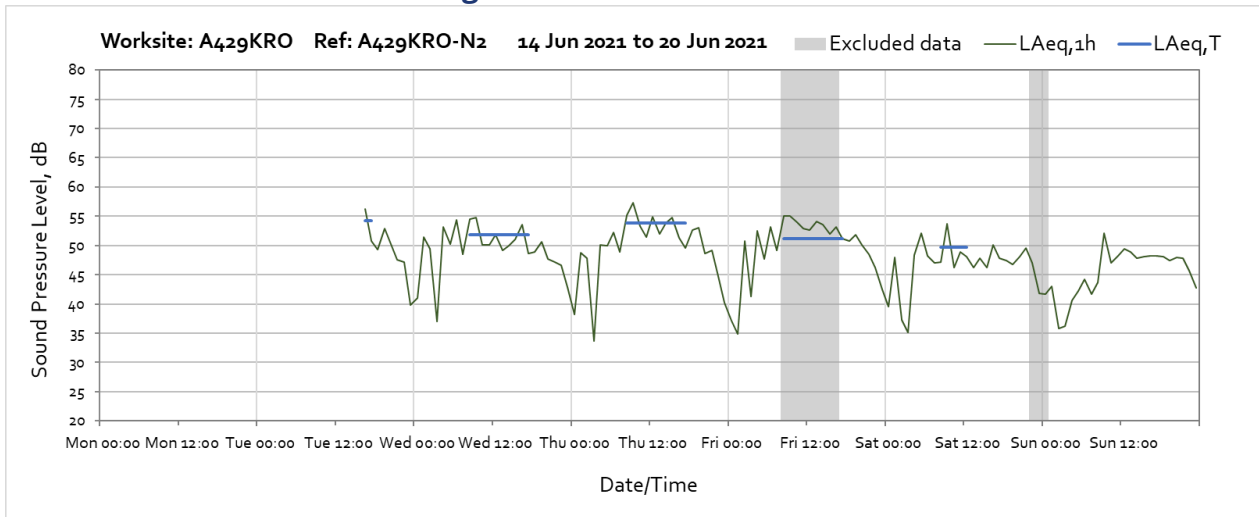


Note: Equipment was installed on 17th June.

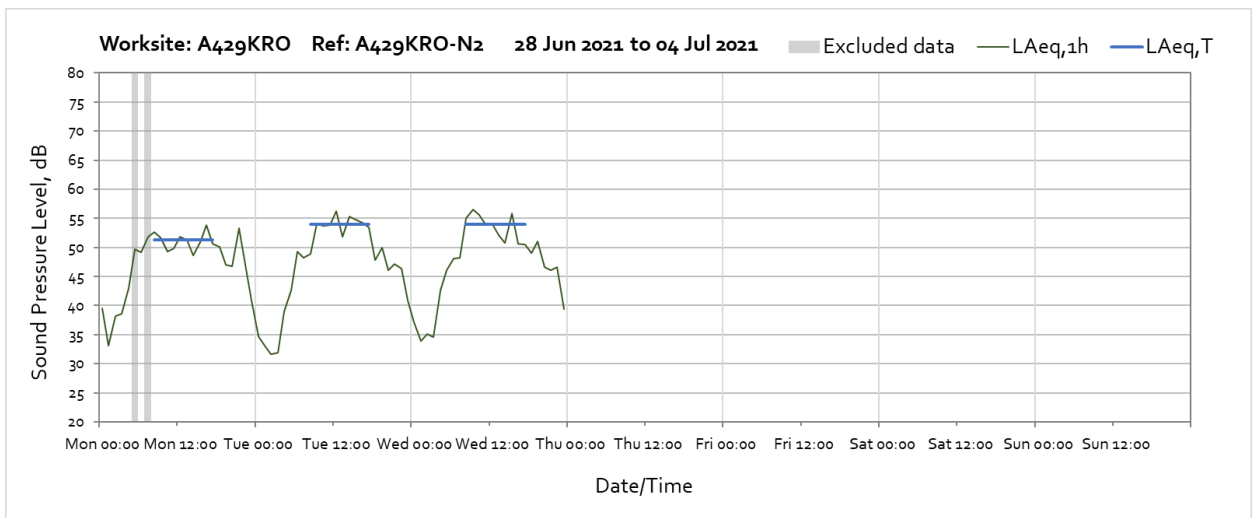
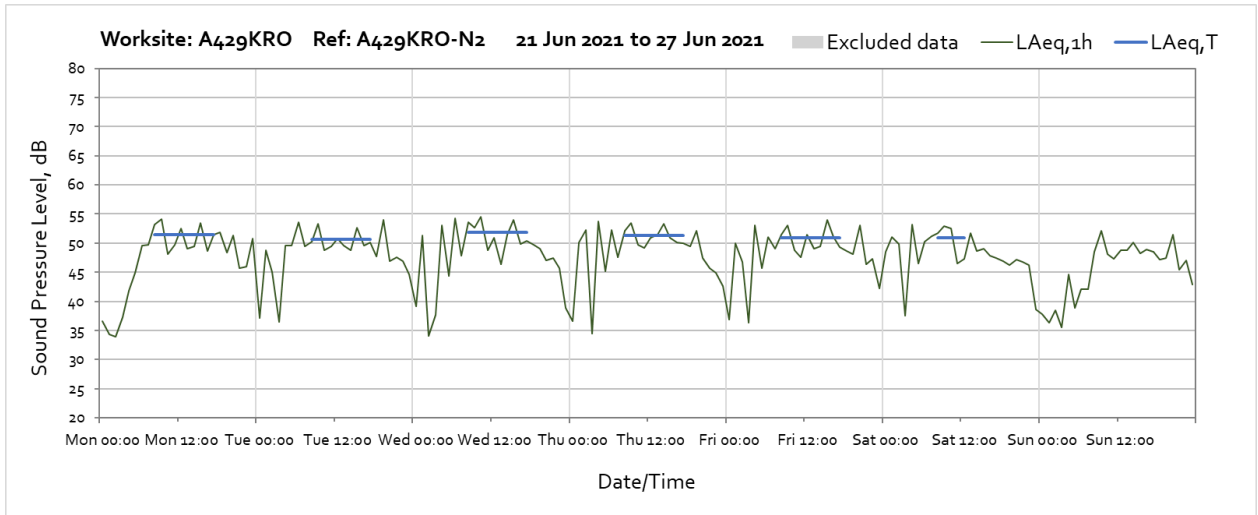
OFFICIAL



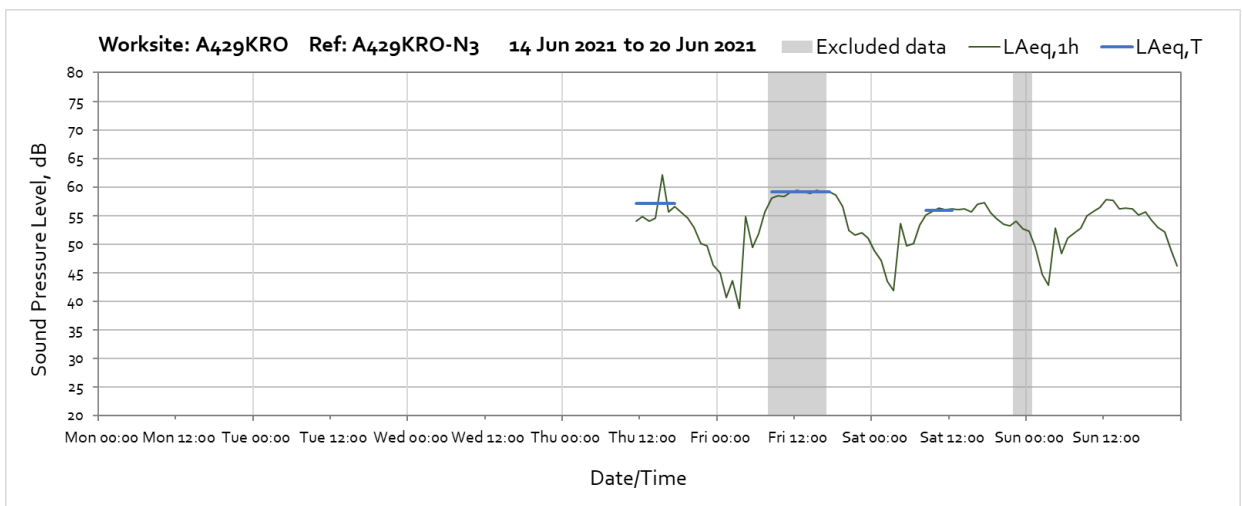
Worksite: A429KRO - Monitoring Ref: A429KRO-N2



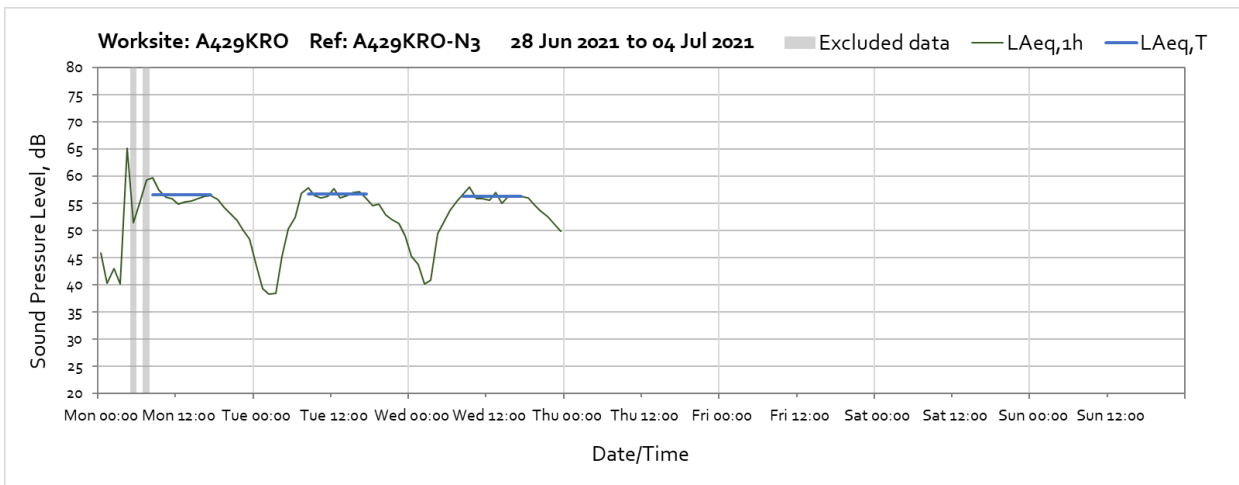
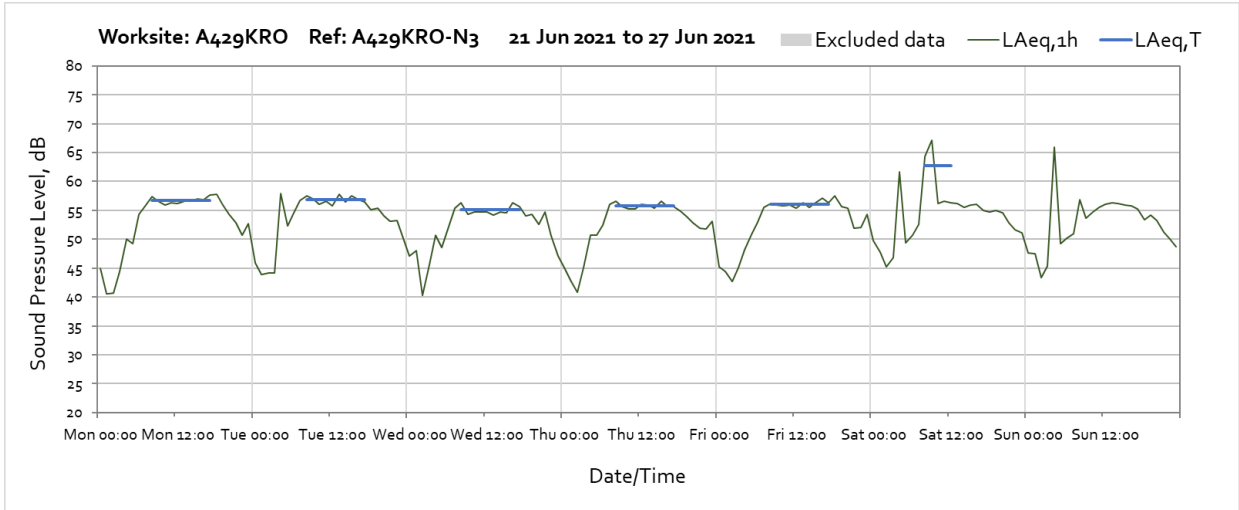
Note: Equipment was installed on 15th June.



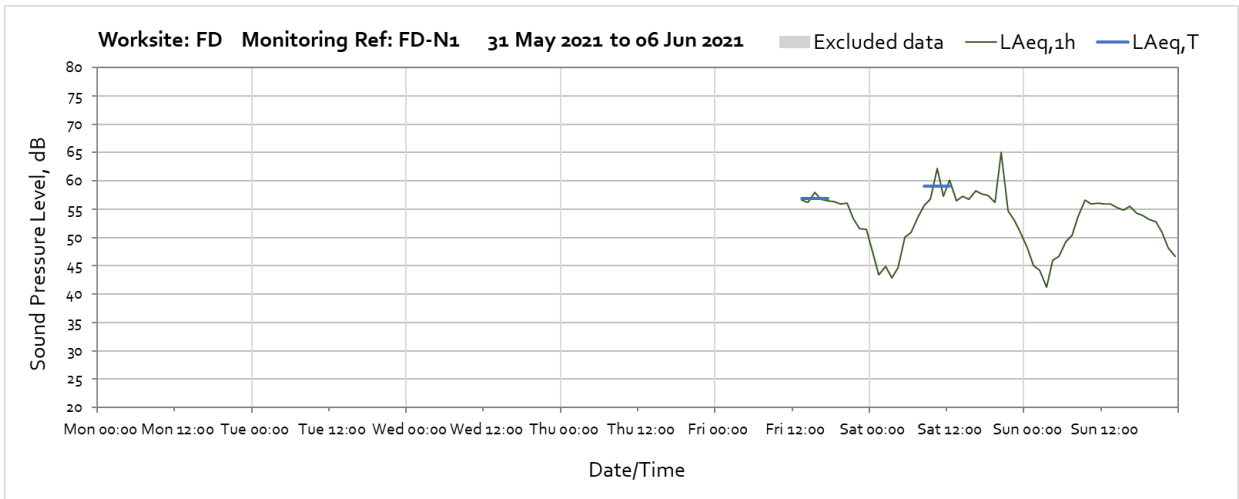
Worksite: A429KRO - Monitoring Ref: A429KRO-N3

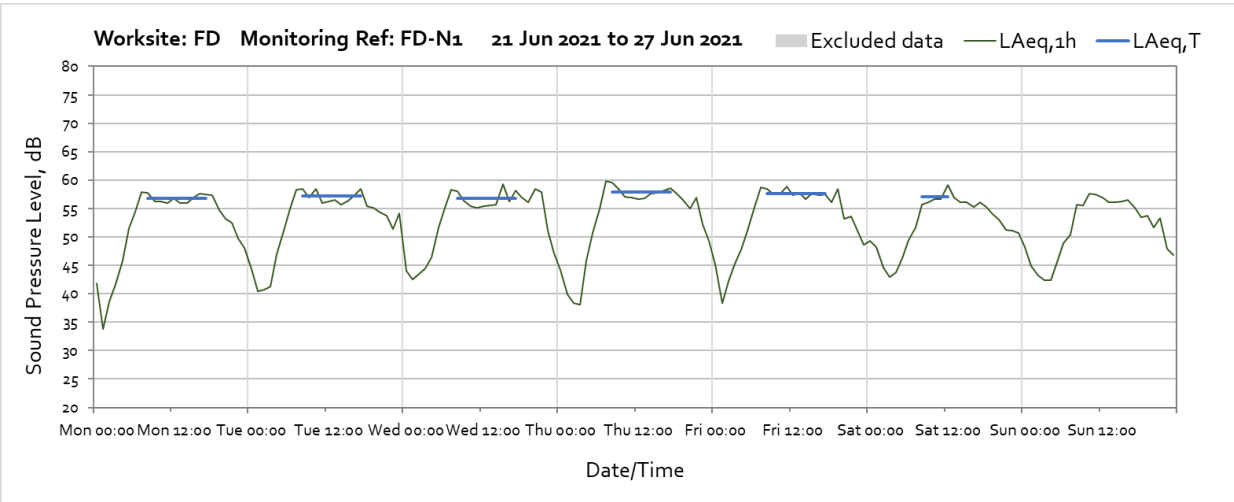
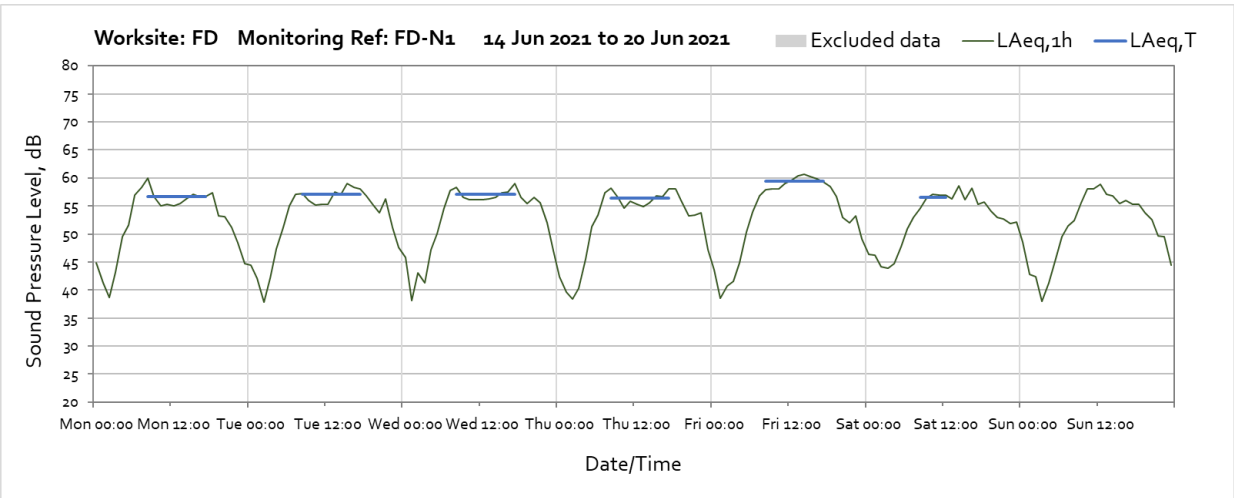
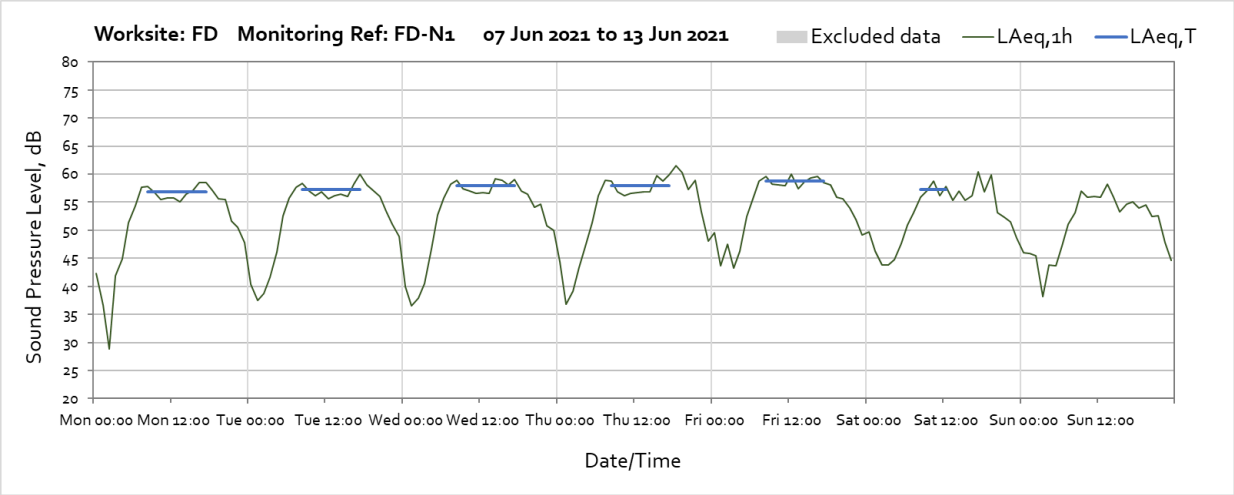


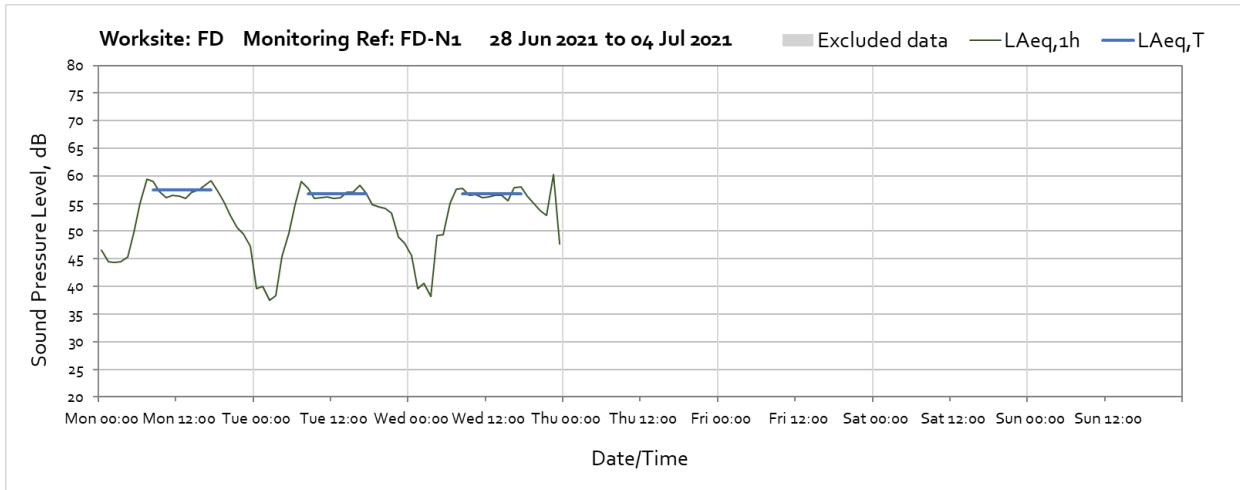
Note: Equipment was installed on 17th June.



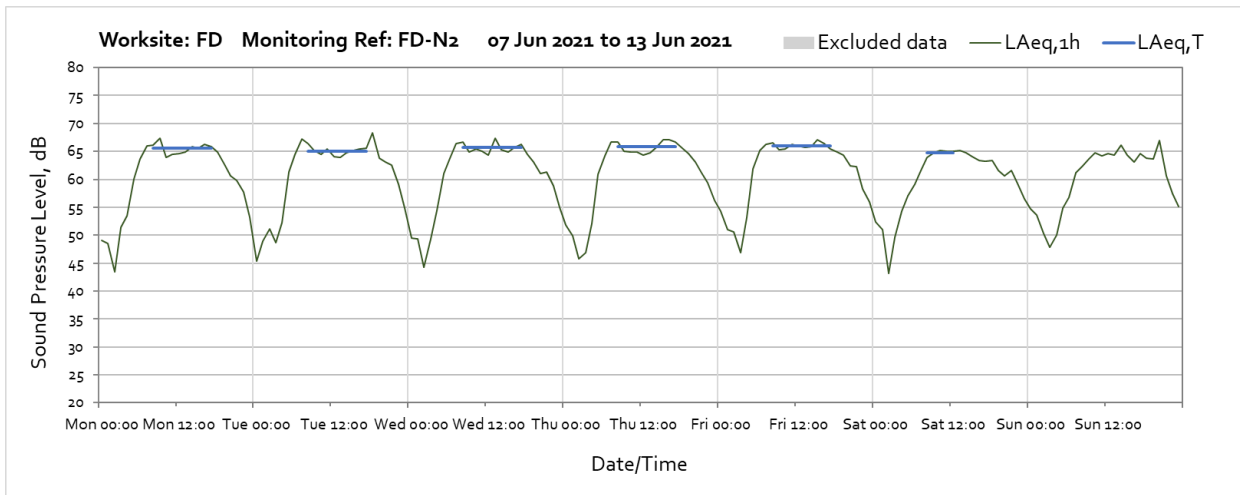
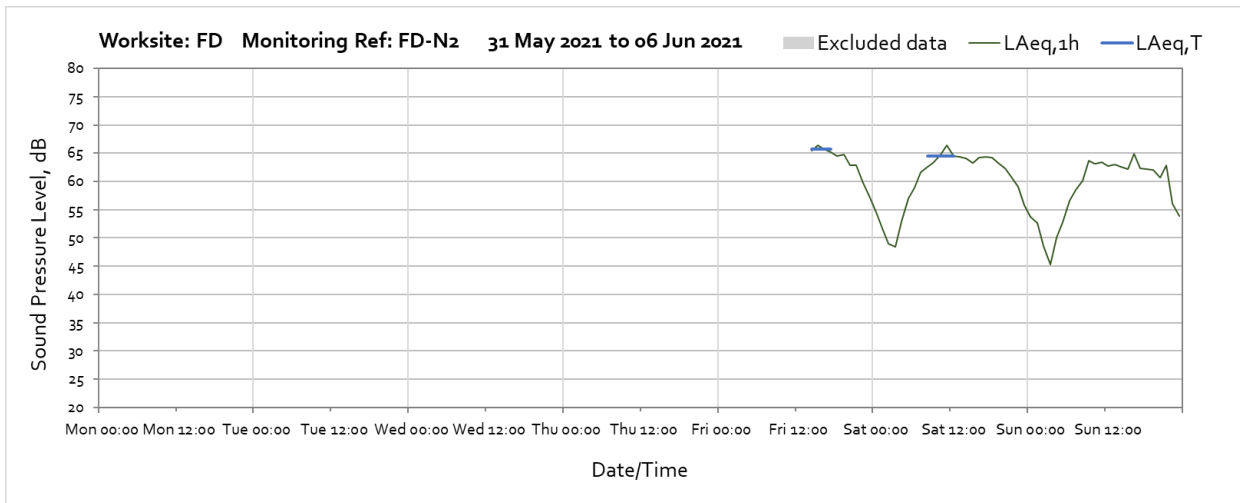
Worksite: FD - Monitoring Ref: FD-N1

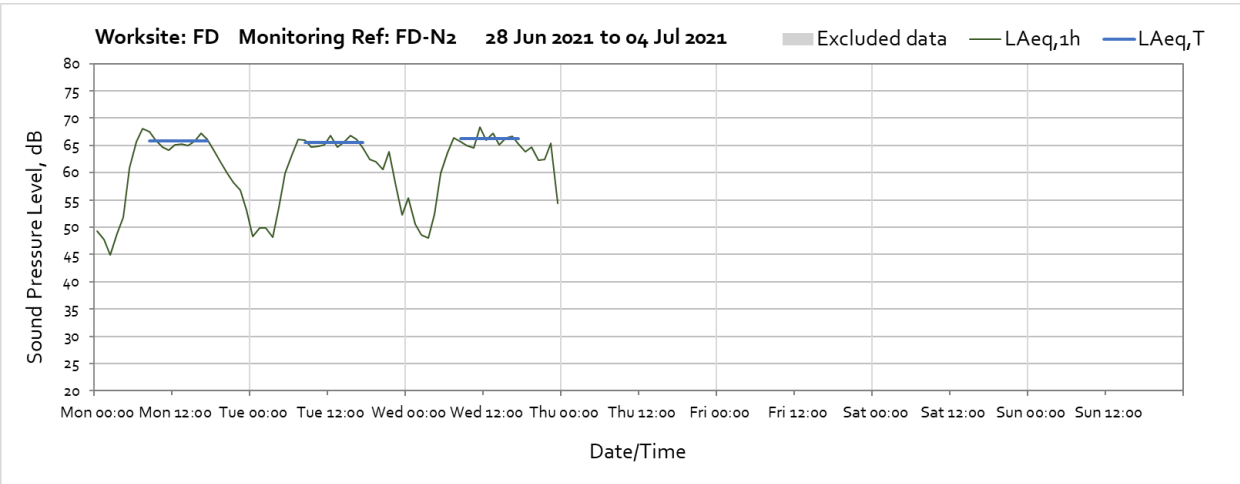
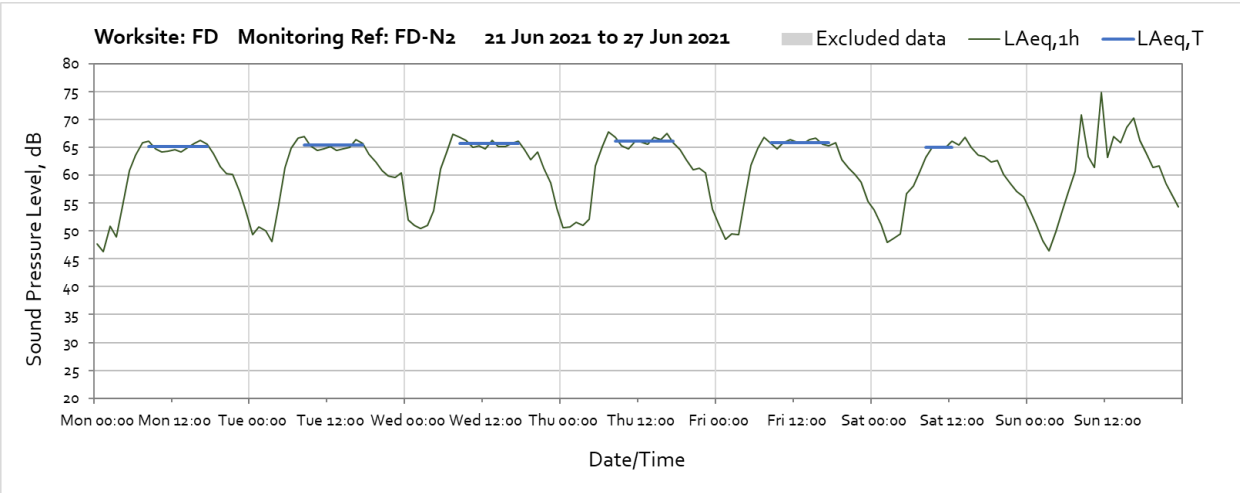
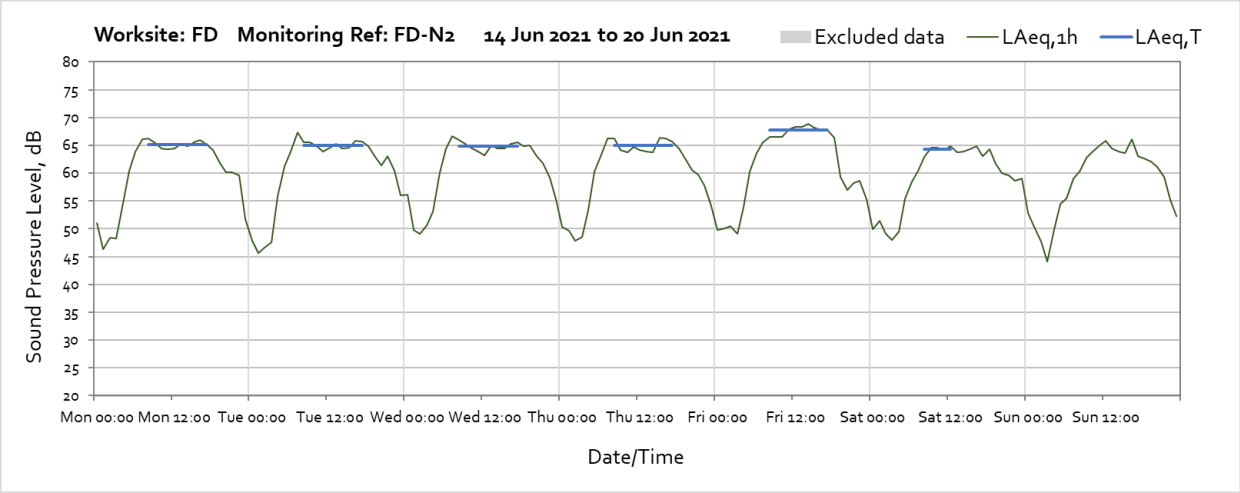




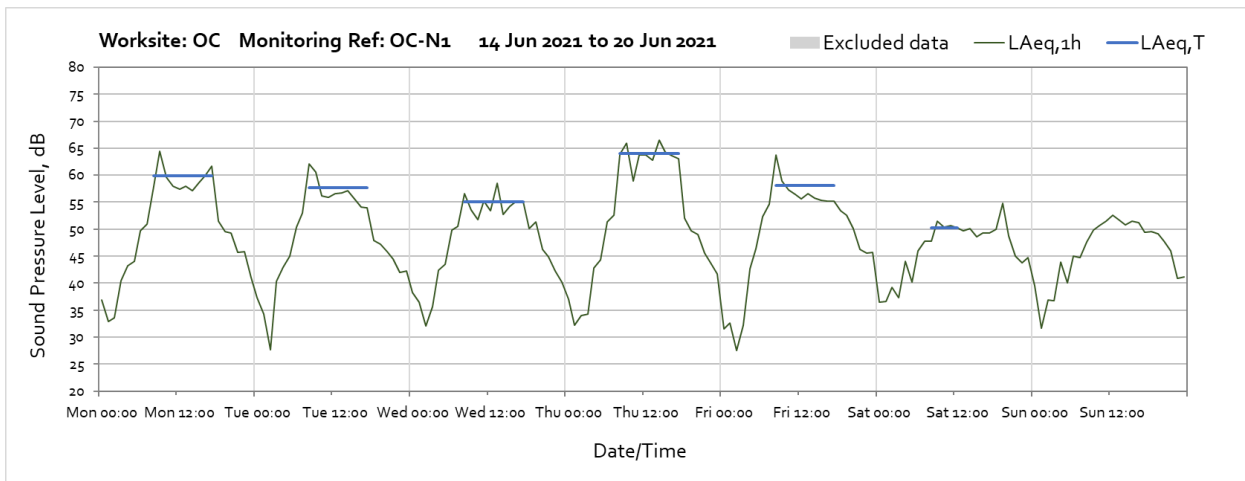
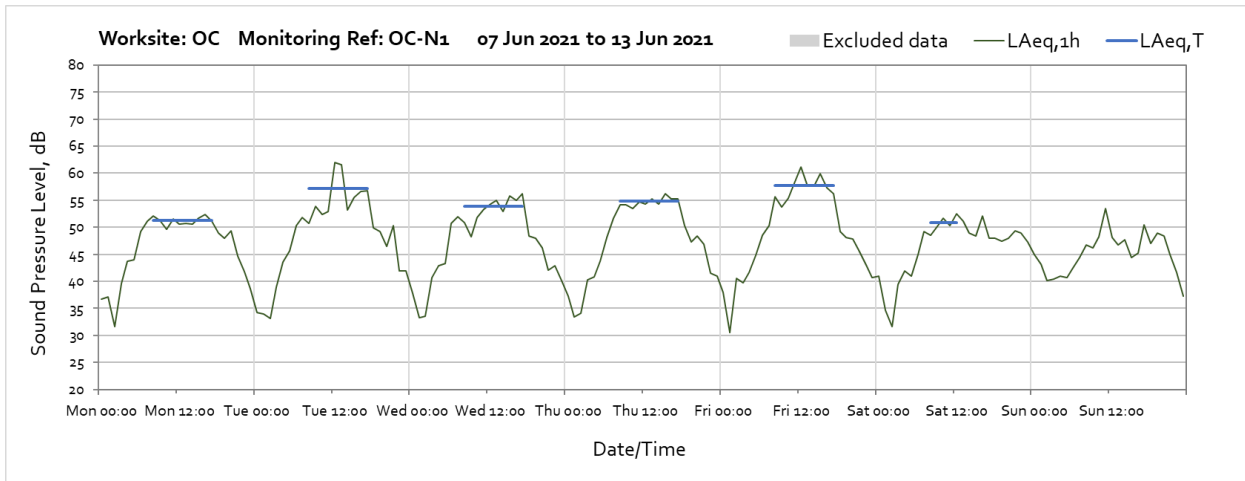
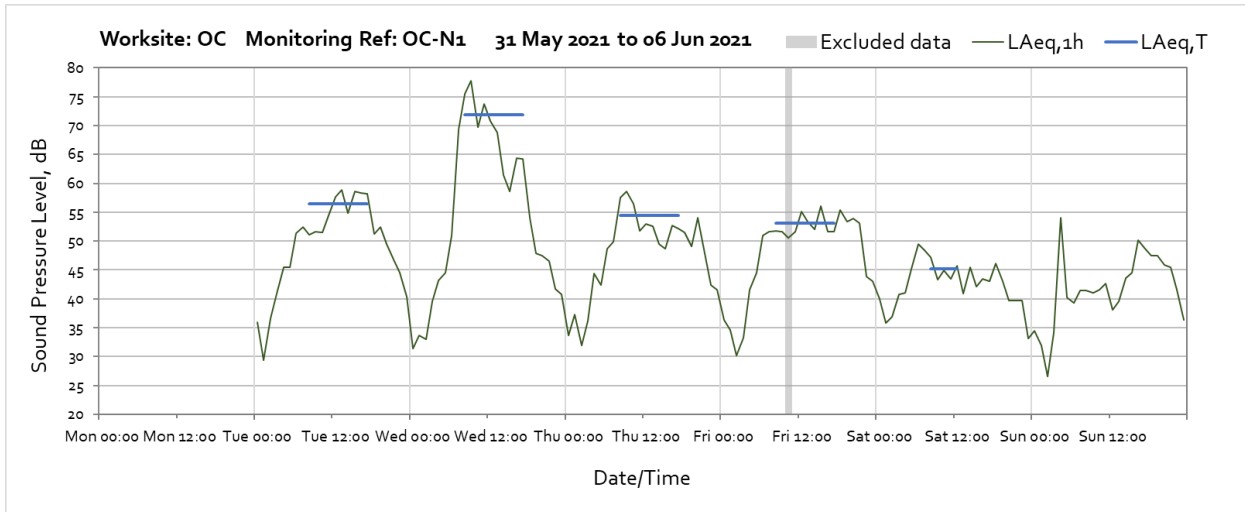


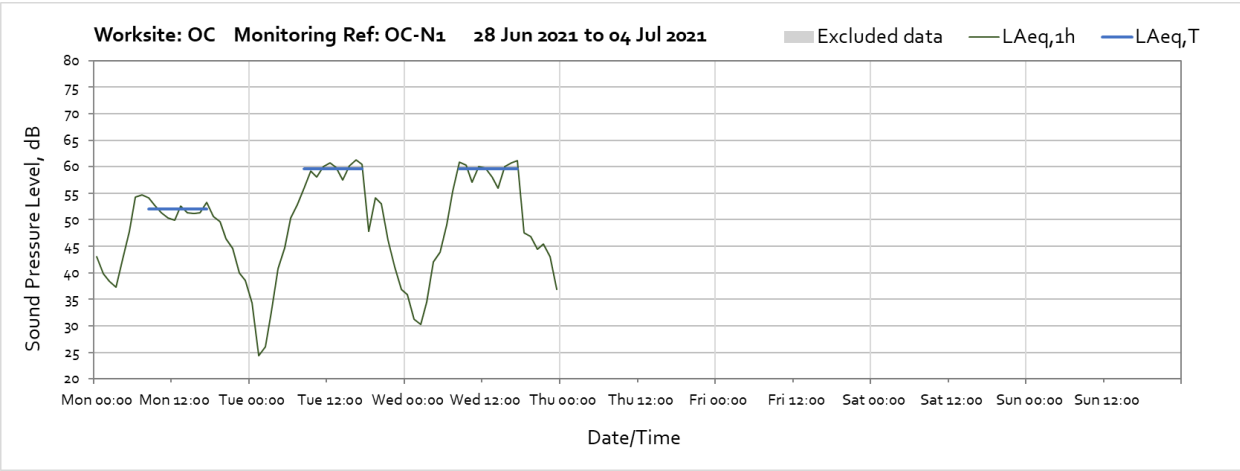
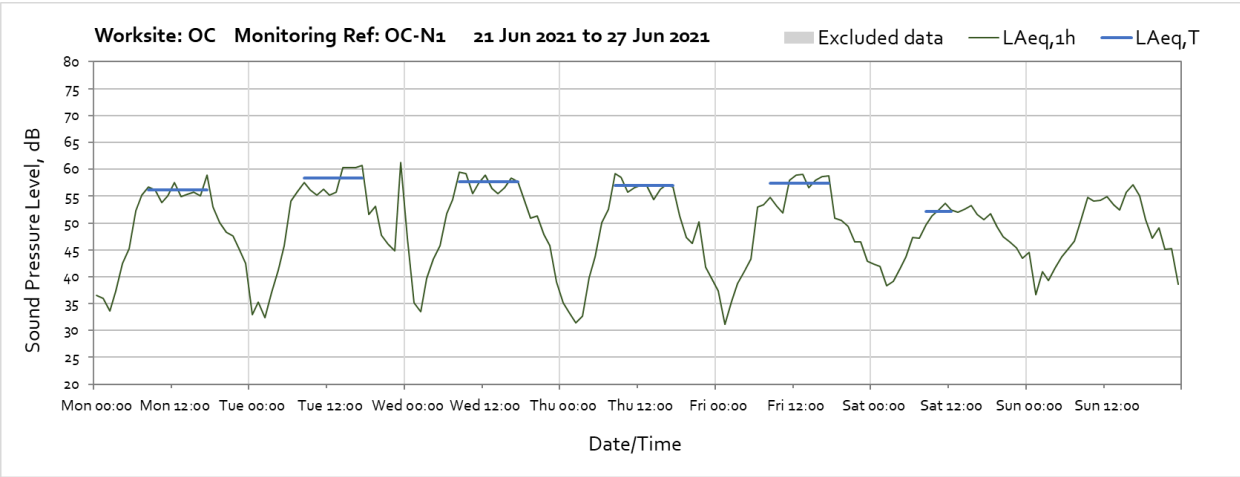
Worksite: FD - Monitoring Ref: FD-N2





Worksite: OC - Monitoring Ref: OC-N1

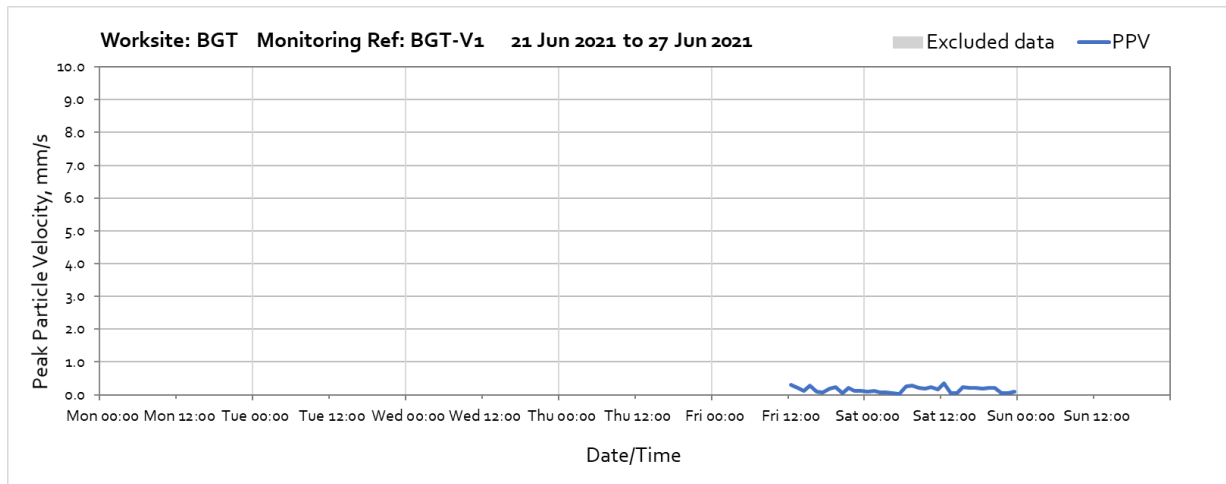




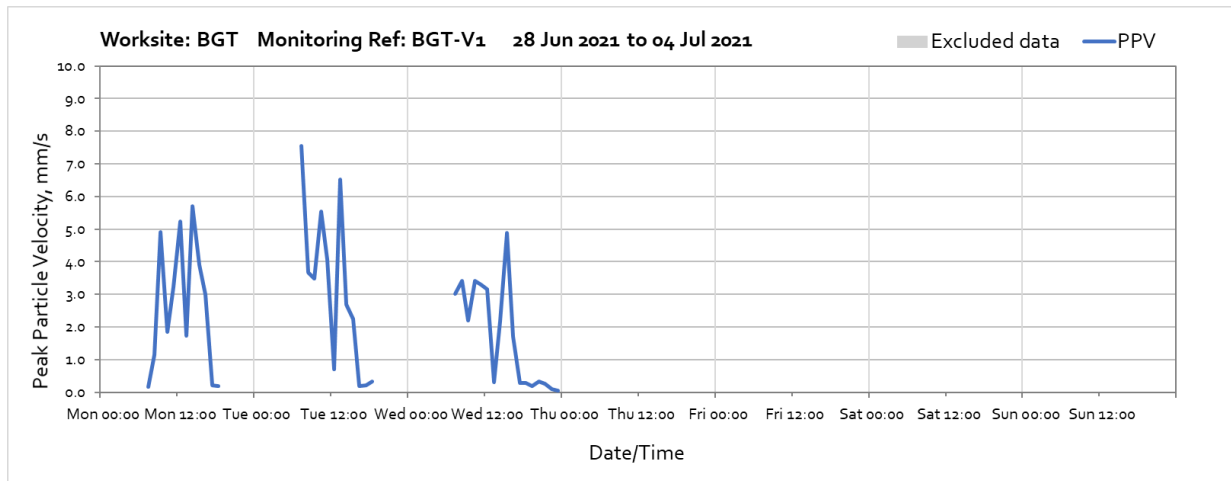
Vibration

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 axis 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: BGT - Monitoring Ref: BGT-V1

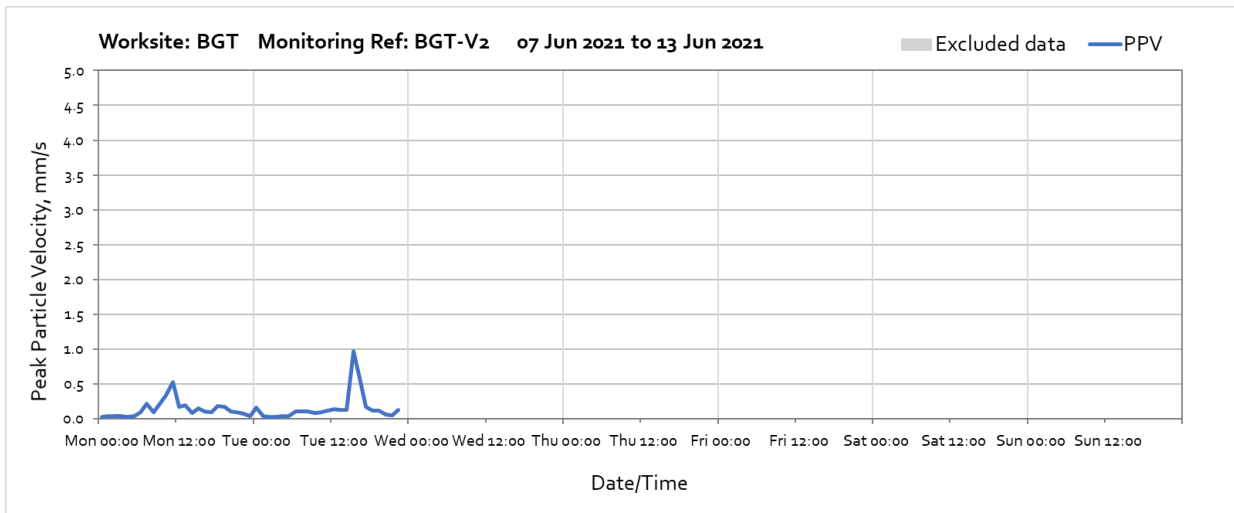
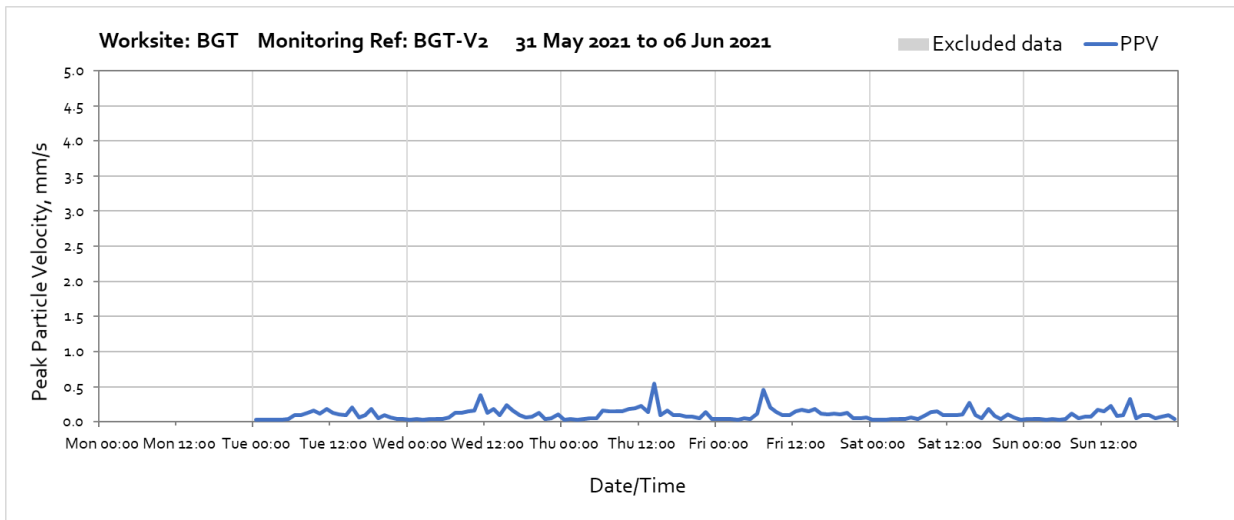


Note: Equipment was installed on 25th June. Missing data from 23:00 on Saturday 26th June until 07:00 on Monday 28th June was due to a memory card error. The memory card was replaced on Wednesday 30th June to minimise further loss of data.

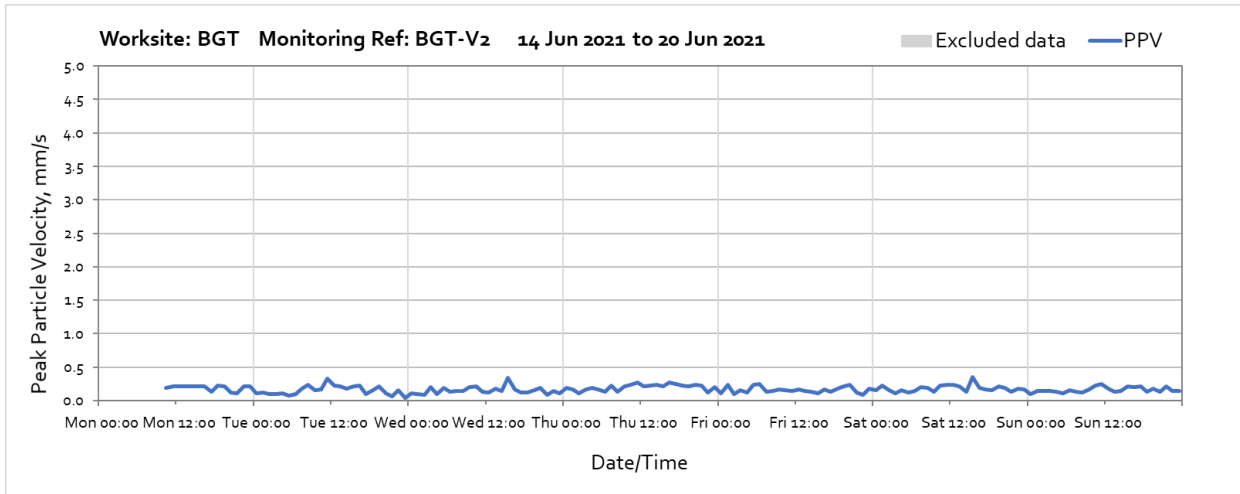


Note: Missing data throughout the week was due to a memory card error. The memory card was replaced on Wednesday 30th June to minimise further loss of data.

Worksite: BGT - Monitoring Ref: BGT-V2



Note: Missing data from 23:00 on Thursday 8th June until 10:00 on Monday 14th June was due to a modem error within the monitoring station. The modem was replaced on Monday 14th June to minimise further loss of data.



Note: Missing data from 23:00 on Thursday 8th June until 10:00 on Monday 14th June was due to a modem error within the monitoring station. The modem was replaced on Monday 14th June to minimise further loss of data.

