Document 6.2

ES - Vol 1 - Chapter 13A - Addendum

Noise and Vibration

Regulation 5(2)(a)

The West Midlands Rail Freight Interchange Order 201X

Resound: April 2019

Four Ashes Limited

West Midlands Interchange

Four Ashes Ltd

13A Noise and Vibration

Introduction

13A.1 Chapter 13 of the July 2018 Environmental Statement (ES) set out an assessment of the potential noise and vibration effects associated with the Proposed Development.

13A.2 This document comprises an addendum to Chapter 13 of the July 2018 ES. The terminology used in this addendum is as outlined in the July 2018 ES, including the defined terms 'Site' and 'Proposed Development'.

13A.3 Since the production of the July 2018 ES, further baseline noise measurements have been undertaken at the Site, as was anticipated in paragraphs 13.101, 13.114 to 13.119, 13.147 and 13.151 of the July 2018 ES.

13A.4 The noise and vibration chapter of the July 2018 ES is therefore supplemented by this ES Addendum, which provides updated baseline noise survey results, and updates those elements of the noise assessment that are affected by the baseline noise survey results.

13A.5 This ES Addendum is accompanied by an updated technical appendix, titled *Technical Appendix 13A.3: Full Survey Results*, which effectively updates Technical Appendix 13.3, which accompanied the July 2018 ES. Figures 13.1 and 13.2 of the July 2018 ES have also been updated, taking account of the updated information in this ES Addendum, and are renumbered Figure 13A.1 and Figure 13A.2.

13A.6 Tables in this ES Addendum are numbered based on the order that they appear, with the equivalent table from the July 2018 ES in brackets. For example, the first table of this ES Addendum, which updates Table 13.8 of the July 2018 ES, is referred to as *Table 13A.1 (Table 13.8).* Where a table is new in this ES Addendum, it is referred to as *Table 13A.X (N/A)*.

Legislation and Policy Context

13A.7 There has been no change in relevant legislation, policy or guidance since the July 2018 ES, except for the National Planning Policy Framework (NPPF) which was revised on 24th July 2018 and again on 19th February 2019.

13A.8 The changes to the NPPF do not affect the assessment presented in Chapter 13 of the July 2018 ES, however, a summary of the current document is set out here.

13A.9 Although the Noise Policy Statement for England (NPSE) has not been updated, paragraph 13.36 in the July 2018 ES referred to a particular paragraph in the previous version of the NPPF. That cross-reference should now be to paragraph 180 of the NPPF, not paragraph 123 as was stated in the July 2018 ES.

National Planning Policy Framework, 2019

13A.10 The Ministry of Housing, Communities and Local Government's (formerly the Department of Communities and Local Government) published the revised NPPF[1] on 19th February 2019, with the earlier 2018 version being superseded.

13A.11 The general guiding principle in the NPPF is contained in Section 15 under the heading *Conserving and enhancing the natural environment*. Paragraph 170 states:

[1] *National Planning Policy Framework* (2019), MHCLG

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;"

13A.12 The noise planning policy is contained in paragraph 180, which also appears in Section 15 of the NPPF:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;"

13A.13 A footnote to the point paragraph 180(a) refers to the *Explanatory Note of the Noise Policy Statement for England*, which defines both *"significant adverse impacts on health and quality of life"* and *"adverse impacts on health and quality of life"*.

Assessment Methodology

13A.14 The assessment methodology remains unchanged since the July 2018 ES, except for the baseline characterisation, which has been updated to take account of a new baseline noise survey undertaken in June and July 2018.

13A.15 The need for an updated baseline noise survey was anticipated in paragraphs 13.101, 13.114 to 13.119, 13.147 and 13.151 of the July 2018 ES. The prevailing conditions during the previous baseline measurements, principally in relation to school holidays and roadworks, were considered to have affected the baseline noise climate to such a degree that the gathered data may not have been representative of typical conditions.

Baseline Characterisation

13A.16 The study area remains the same as set out in the July 2018 ES.

13A.17 The baseline vibration climate is considered to remain the same as set out in the July 2018 ES.

13A.18 The baseline noise climate has been updated through direct measurements at a number of locations on and around the Site. These baseline noise measurement updates were carried out at eleven locations between 28th June 2018 and 10th July 2018.

13A.19 The noise climate in June and July 2018 was dominated by road traffic noise, with the dominant road depending on the exact location. The M6 motorway dominated the eastern side of the Site and its surroundings, the A5 was a significant source at the northern end of the Site, the A449 was a significant source along the western

side, with more local roads such as Vicarage Road and Straight Mile being significant to the south of the Site.

13A.20 Trains on the West Coast Mainline Line (WCML) were audible noise at locations within a few hundred metres of the railway line, particularly where there was a clear line of sight.

13A.21 Other sources of sound that were significant included natural sounds such as birdsong and rustling trees all at locations less affected by road or rail traffic noise or in lulls between cars or trains. At the northern end of the Site, noise from Calf Heath Quarry was intermittently audible.

Baseline Conditions

Current Baseline

13A.22 This section summarises the characteristics of the existing noise and vibration conditions of the Site and the surrounding area.

13A.23 The baseline vibration climate is considered to remain the same as set out in the July 2018 ES.

13A.24 Updated baseline noise surveys were undertaken between Thursday 28th June 2018 and Tuesday 10th July 2018.

13A.25 The provision for updated baseline noise measurements was set out in the July 2018 ES in paragraphs 13.101, 13.114 to 13.119, 13.147 and 13.151, as the baseline noise surveys that informed that document were affected by either school holidays or by roadworks in the area.

13A.26 The measurements in June and July 2018 were undertaken after all roadworks around the Site and in the wider area were complete.

Baseline Noise Surveys

13A.27 Baseline noise measurements were undertaken at eleven locations, as shown in Figure 13A.1, which effectively updates Figure 13.1 of the July 2018 ES:

- Position N1: close to the western boundary of the Site, opposite the properties along the A449;
- Position N2: adjacent to Vicarage Road, close to the junction with Straight Mile;
- Position N4: close to the rear of Avenue Cottages to the north of the Site;
- Position N5: at the southern end of Croft Lane;
- Position N6: to the north of the properties on Station Drive;
- Position N7: at the north-western corner of the Site, towards the junction between the A5 and A449;
- Position N8: close to the junction between Stable Lane and Woodlands Lane;
- Position N9: close to the junction between Woodlands Lane and Straight Mile;
- Position N10: to the south of Crateford Lane opposite a static caravan park;
- Position N11: to the north-west of properties on Harrisons Lane; and
- Position N12: adjacent to the Staffordshire and Worcestershire Canal.

13A.28 The monitoring locations were agreed with the Environmental Health Officer at South Staffordshire District Council (SSDC).

13A.29 Positions N10, N11 and N12 are additional locations to those considered in the July 2018 ES. Measurements at Positions N10 and N11 have been undertaken to establish the baseline noise climate across a wider area, enabling a larger number

of properties to be assessed in this ES Addendum. The data could also inform the proposed bespoke noise insulation scheme.

13A.30 Measurements at Position N12 were undertaken at the request of the Canal & River Trust.

13A.31 Measurements were undertaken at Position N3 in August 2016 and reported in the July 2018 ES. However, changes to the Site boundary after August 2016 removed the need for Position N3, and measurements were not repeated at this location in June and July 2018.

13A.32 The measurements at Positions N2 and N11 were compromised by disturbance to the sound level meters during parts of the survey. The causes of these disturbances are not known, however, circumstantial evidence suggested that the meter at Position N2 was moved by someone cutting the grass in the field, and the meter at Position N11 was knocked over, possibly by an animal.

13A.33 When the sound level meters were reset into their correct positions they were recalibrated, so the measurements are considered valid, except for the period when the meters were not vertical. Data from the period where the meters were disturbed has not been used in the assessment, although it is reported, and the valid data is considered to be representative of the noise climate at the monitoring locations.

13A.34 The equipment used during the surveys is summarised in Technical Appendix 13A.3. All of the sound level meters were calibrated prior to the start of the surveys using the listed acoustic calibrators. The calibrations were checked upon completion of the surveys, and no significant calibration drifts were found to have occurred. The calibrations were additionally checked at Positions N2 and N11 during the survey, as described above.

13A.35 The measurements at all positions were taken at a height of 1.5 metres above ground level, with the microphone in free-field conditions, i.e. at least 3.5 metres away from any reflecting surfaces other than the ground.

13A.36 A meteorological monitoring station was installed with the sound level meter at Position N4, measuring wind speed and direction, precipitation, temperature and humidity. A second meteorological monitoring station was installed with the sound level meter at Position N6, measuring wind speed and direction.

13A.37 The weather during the June and July 2018 baseline noise survey was generally suitable for noise measurement, it being mainly dry with mainly light winds of less than 5 metres/second. There were a few short periods of very light rain or gusts of wind that may have unduly influenced the measurements, and data gathered during these periods has been excluded from the background sound level and ambient sound level analyses described later in this ES Addendum.

13A.38 There were a range of wind directions during the survey, from broadly north to east at the start, moving round to a north-westerly or westerly on 5th July 2018, before returning to a north-easterly direction on the 9th and 10th July 2018.

13A.39 The principal noise sources encountered at each position are listed in Table 13A.1, which effectively updates Table 13.8 of the July 2018 ES.

Table 13A.1 (Table 13.8): Summary of Principal Noise Sources	
Monitoring Position	**Noise Sources**
Position N1	Road traffic noise, principally from the A449, although more distant roads were audible when traffic on the A449 'dropped'. Passing trains just audible. Rustling trees audible when traffic on the A449 'dropped'.
Position N2	Road traffic noise from Vicarage Road and more distant roads. Rustling trees.
Position N4	Road traffic noise on A5 dominant with traffic on M6 audible on occasion in distance. Lorries accessing quarry were intermittently audible.
Position N5	Distant road traffic noise and passing trains. Rustling trees. Occasional tonal alarm at 1 Croft Lane.
Position N6	Distant road traffic noise from M6, A5 and A449. Very occasional industrial noise from premises to east audible. Birdsong and livestock. Passing trains.
Position N7	Road traffic noise from A5 and A449. Passing trains.
Position N8	Road traffic noise from M6. Rustling trees. Birdsong.
Position N9	Road traffic noise from M6. Rustling trees. Birdsong.
Position N10	Distant road traffic noise from A449. Rustling trees. Birdsong. Occasional noise from residents at nearby static caravan park.
Position N11	Distant road traffic noise from A5. Occasional distant barges on canal. Birdsong.
Position N12	Distant road traffic noise. Distant passing trains. Occasional barges on canal. Rustling Trees. Birdsong.

13A.40 The noise survey results are summarised in graphical form in Figures A13A.3.1 to A13A.3.11 in Technical Appendix 13A.3 and are summarised in the tables below. In all cases, the daytime is the 16 hour period from 07:00 to 23:00 hours and the night-time the eight hour period from 23:00 to 0700 hours, unless stated otherwise.

13A.41 Figures A13A.3.56 to A13A.3.71 contain the equivalent time history graphs from the surveys reported in the July 2018 ES for the purposes of comparison.

13A.42 The survey results for Position N1 are summarised in Table 13A.2, which effectively updates Table 13.9 of the July 2018 ES.

Table 13A.2 (Table 13.9): Summary of measured noise levels, Position N1, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Thursday 28th June 2018	Day(2)	60.3	47.7	63.6	67.5 to 85.3
	Night	56.4	41.9	57.5	66.9 to 75.7
Friday 29th June 2018	Day	60.2	49.3	63.4	67.6 to 83.6
	Night	54.4	40.4	57.5	65.6 to 75.8
Saturday 30th June 2018	Day	58.5	46.9	62.1	67.6 to 88.4
	Night	53.5	38.8	56.1	66.2 to 83.6
Sunday 1st July 2018	Day	58.5	44.6	62.0	68.1 to 90.0
	Night	55.9	41.6	54.8	66.3 to 78.5
Monday 2nd July 2018	Day	60.0	49.2	63.1	67.1 to 85.4
	Night	57.5	44.4	60.8	66.5 to 76.8
Tuesday 3rd July 2018	Day	59.8	48.4	62.9	66.3 to 82.3
	Night	55.7	41.2	56.0	63.5 to 80.5
Wednesday 4th July 2018	Day	60.8	47.2	64.1	67.7 to 80.6
	Night	57.4	40.4	56.8	66.7 to 86.3
Thursday 5th July 2018	Day	62.4	51.6	65.5	69.1 to 82.3
	Night	56.9	40.7	57.2	66.1 to 76.9
Friday 6th July 2018	Day	61.9	49.3	65.1	69.2 to 81.6
	Night	56.0	41.8	59.3	67.2 to 83.6
Saturday 7th July 2018	Day	60.3	47.2	63.9	68.8 to 86.1
	Night	55.0	39.0	57.6	65.8 to 76.5
Sunday 8th July 2018	Day	59.8	47.1	63.4	67.9 to 87.8
	Night	56.6	38.5	54.8	63.0 to 78.2
Monday 9th July 2018	Day	61.9	50.0	64.8	66.8 to 81.8
	Night	56.9	38.1	54.5	64.8 to 95.4
Tuesday 10th July 2018	Day(3)	63.9	56.2	66.8	70.1 to 73.9

Notes:

(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.

(2) Daytime period was 12.5 hours in duration after meter installation.

(3) Daytime period was 2.5 hours in duration prior to meter removal.

13A.43 The survey results for Position N2 are summarised in Table 13A.3, which effectively updates Table 13.10 of the July 2018 ES.

Table 13A.3 (Table 13.10): Summary of measured noise levels, Position N2, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Thursday 28th June 2018	Day (2)	67.2	49.4	70.9	77.8 to 104.4
	Night	62.4	45.3	65.5	74.3 to 87.7
Friday 29th June 2018	Day	67.8	51.6	71.7	78.7 to 100.1
	Night	60.5	42.8	60.6	75.5 to 89.6
Saturday 30th June 2018	Day	65.1	47.4	68.9	78.2 to 97.6
	Night	56.8	40.6	55.2	52.2 to 83.9
Sunday 1st July 2018	Day	63.7	45.1	67.6	76.8 to 92.3
	Night	62.0	45.4	65.5	69.5 to 87.6
Monday 2nd July 2018	Day	67.7	52.9	71.7	78.5 to 96.9
	Night	62.5	47.2	66.0	50.9 to 87.6
Tuesday 3rd July 2018	Day (3)	74.7	55.4	78.7	79.8 to 109.2
	Night (4)	69.0	46.2	71.7	83.9 to 96.8
Wednesday 4th July 2018	Day (4)	74.8	53.3	78.7	87.5 to 111.3
	Night (4)	69.2	45.5	72.1	81.6 to 97.1
Thursday 5th July 2018	Day (4)	74.4	52.9	78.5	87.8 to 111.2
	Night (4)	69.0	44.7	71.4	81.3 to 96.2
Friday 6th July 2018	Day (5)	74.1	49.7	78.3	84.2 to 109.8
	Night	62.3	43.7	59.6	51.2 to 89.4
Saturday 7th July 2018	Day	68.0	42.4	71.3	83.7 to 99.2
	Night	59.6	41.3	54.9	55.7 to 90.6
Sunday 8th July 2018	Day	67.4	42.2	70.0	83.3 to 108.0
	Night	65.0	44.6	68.1	42.4 to 92.5
Monday 9th July 2018	Day	71.1	50.5	75.3	84.6 to 106.5
	Night	65.1	43.3	68.2	47.4 to 91.3
Tuesday 10th July 2018	Day (6)	73.3	56.1	77.6	86.4 to 102.1

Notes:

(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.

Table 13A.3 (Table 13.10): Summary of measured noise levels, Position N2, free-field dB					
Date	**Period**	**$L_{Aeq,T}$**	**L_{A90}(1)**	**L_{A10}(1)**	**L_{AFmax}**
(2) Daytime period was 13.5 hours in duration after meter installation.					
(3) Data from 07:15 hours excluded from assessment due to meter disturbance.					
(4) Data excluded from assessment due to meter disturbance.					
(5) Data between 07:00 and 18:00 hours excluded from assessment due to meter disturbance.					
(6) Daytime period was 3 hours in duration prior to meter removal.					

13A.44 The survey results for Position N4 are summarised in Table 13A.4, which effectively updates Table 13.12 of the July 2018 ES.

Table 13A.4 (Table 13.12): Summary of measured noise levels, Position N4, free-field dB					
Date	**Period**	**$L_{Aeq,T}$**	**L_{A90}(1)**	**L_{A10}(1)**	**L_{AFmax}**
Thursday 28th June 2018	Day(2)	56.0	52.6	57.3	59.3 to 88.9
	Night	54.5	50.8	55.5	59.4 to 67.8
Friday 29th June 2018	Day	57.7	55.4	59.1	60.4 to 73.0
	Night	57.5	51.3	58.1	57.9 to 80.9
Saturday 30th June 2018	Day	56.1	53.9	57.1	58.9 to 86.2
	Night	49.6	46.6	51.2	53.1 to 70.2
Sunday 1st July 2018	Day	54.8	52.5	56.0	58.4 to 82.3
	Night	53.0	49.6	53.6	57.8 to 73.8
Monday 2nd July 2018	Day	57.0	54.7	58.1	60.8 to 79.3
	Night	54.6	51.8	55.9	59.9 to 68.7
Tuesday 3rd July 2018	Day	57.8	55.4	59.0	61.7 to 75.0
	Night	54.4	50.7	55.5	59.1 to 71.7
Wednesday 4th July 2018	Day	53.9	49.1	55.2	57.7 to 72.3
	Night	51.0	45.6	52.1	54.3 to 72.1
Thursday 5th July 2018	Day	53.7	49.8	55.7	59.1 to 78.1
	Night	50.9	46.0	52.1	56.4 to 76.8
Friday 6th July 2018	Day	51.8	46.9	54.0	56.8 to 73.0
	Night	49.8	45.3	52.1	58.7 to 64.3
Saturday 7th July 2018	Day	51.5	47.0	53.7	58.0 to 79.3
	Night	48.5	43.8	50.5	54.4 to 70.2

Table 13A.4 (Table 13.12): Summary of measured noise levels, Position N4, free-field dB					
Date	**Period**	**$L_{Aeq,T}$**	**L_{A90}(1)**	**L_{A10}(1)**	**L_{AFmax}**
Sunday 8th July 2018	Day	53.0	48.9	54.8	58.2 to 80.9
	Night	51.0	46.5	52.1	56.5 to 74.1
Monday 9th July 2018	Day	54.8	51.0	56.7	59.5 to 83.1
	Night	53.2	49.3	54.6	58.4 to 67.3
Tuesday 10th July 2018	Day(3)	56.8	53.4	58.3	62.4 to 77.1

Notes:

(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.

(2) Daytime period was 14.75 hours in duration after meter installation.

(3) Daytime period was 3.25 hours in duration prior to meter removal.

13A.45 The survey results for Position N5 are summarised in Table 13A.5, which effectively updates Table 13.13 of the July 2018 ES.

Table 13A.5 (Table 13.13): Summary of measured noise levels, Position N5, free-field dB					
Date	**Period**	**$L_{Aeq,T}$**	**L_{A90}(1)**	**L_{A10}(1)**	**L_{AFmax}**
Thursday 28th June 2018	Day(2)	48.6	44.1	48.8	52.7 to 79.2
	Night	47.6	45.2	48.5	48.1 to 66.3
Friday 29th June 2018	Day	49.0	46.6	50.2	51.4 to 70.4
	Night	46.4	43.7	47.8	50.6 to 64.7
Saturday 30th June 2018	Day	48.8	45.8	50.3	50.2 to 72.5
	Night	43.7	41.2	44.7	47.0 to 71.1
Sunday 1st July 2018	Day	46.4	43.9	47.5	51.8 to 73.1
	Night	47.5	44.4	47.7	50.2 to 67.4
Monday 2nd July 2018	Day	50.7	46.9	51.6	52.7 to 72.5
	Night	48.9	46.7	49.8	51.8 to 60.8
Tuesday 3rd July 2018	Day	49.5	46.9	50.4	51.4 to 71.1
	Night	46.1	43.7	46.8	48.9 to 61.7
Wednesday 4th July 2018	Day	47.3	40.3	45.8	50.4 to 80.4
	Night	46.8	42.4	47.6	48.7 to 67.0
Thursday 5th July 2018	Day	47.6	43.5	48.6	53.7 to 72.8
	Night	45.9	41.5	47.0	48.6 to 78.1

Table 13A.5 (Table 13.13): Summary of measured noise levels, Position N5, free-field dB					
Date	**Period**	**$L_{Aeq,T}$**	**L_{A90} (1)**	**L_{A10} (1)**	**L_{AFmax}**
Friday 6th July 2018	Day	45.9	39.9	46.2	51.1 to 76.9
	Night	46.7	42.7	47.6	50.0 to 74.4
Saturday 7th July 2018	Day	45.5	41.0	46.7	50.6 to 72.6
	Night	43.9	40.1	45.3	48.5 to 77.3
Sunday 8th July 2018	Day	45.8	42.2	47.3	50.4 to 72.9
	Night	45.2	41.1	45.7	48.1 to 69.5
Monday 9th July 2018	Day	48.1	43.3	48.4	50.3 to 80.6
	Night	43.3	40.8	44.4	47.1 to 60.9
Tuesday 10th July 2018	Day(3)	47.9	42.4	48.0	54.6 to 76.0
Notes: (1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period. (2) Daytime period was 11.75 hours in duration after meter installation. (3) Daytime period was 4.75 hours in duration prior to meter removal.					

13A.46 The survey results for Position N6 are summarised in Table 13A.6, which effectively updates Table 13.14 of the July 2018 ES.

Table 13A.6 (Table 13.14): Summary of measured noise levels, Position N6, free-field dB					
Date	**Period**	**$L_{Aeq,T}$**	**L_{A90} (1)**	**L_{A10} (1)**	**L_{AFmax}**
Thursday 28th June 2018	Day(2)	51.7	44.0	50.2	63.7 to 79.5
	Night	49.0	40.6	45.2	46.1 to 74.8
Friday 29th June 2018	Day	51.7	43.1	49.7	58.0 to 76.9
	Night	44.2	39.9	43.6	45.2 to 72.1
Saturday 30th June 2018	Day	48.5	40.9	47.0	53.2 to 73.9
	Night	48.3	41.6	45.4	45.8 to 72.3
Sunday 1st July 2018	Day	52.4	45.2	50.9	64.1 to 81.8
	Night	50.1	43.9	47.4	46.6 to 76.3
Monday 2nd July 2018	Day	52.1	44.9	50.2	64.2 to 87.1
	Night	48.4	41.4	45.2	45.4 to 74.6
Tuesday 3rd July 2018	Day	49.2	41.6	48.6	58.2 to 82.5
	Night	49.3	40.2	48.0	49.6 to 82.7

Table 13A.6 (Table 13.14): Summary of measured noise levels, Position N6, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Wednesday 4th July 2018	Day	51.3	45.5	52.3	59.7 to 94.0
	Night	48.4	40.9	47.7	48.9 to 73.8
Thursday 5th July 2018	Day	49.1	43.8	49.8	58.9 to 73.0
	Night	47.9	41.4	48.0	52.1 to 72.1
Friday 6th July 2018	Day	49.7	43.6	50.6	53.9 to 83.1
	Night	44.1	39.8	46.1	49.6 to 63.7
Saturday 7th July 2018	Day	48.9	43.1	50.0	53.8 to 77.4
	Night	48.3	40.1	46.2	47.1 to 76.5
Sunday 8th July 2018	Day	50.7	44.2	50.7	59.3 to 85.2
	Night	47.9	38.3	42.0	46.2 to 78.2
Monday 9th July 2018	Day	53.0	43.9	51.2	60.4 to 84.0
	Night	51.7	44.0	50.2	63.7 to 79.5
Tuesday 10th July 2018	Day(3)	49.0	40.6	45.2	46.1 to 74.8

Notes:

(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.

(2) Daytime period was 14 hours in duration after meter installation.

(3) Daytime period was 4 hours in duration prior to meter removal.

13A.47 The survey results for Position N7 are summarised in Table 13A.7, which effectively updates Table 13.15 of the July 2018 ES.

Table 13A.7 (Table 13.15): Summary of measured noise levels, Position N7, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Thursday 28th June 2018	Day(2)	50.2	43.3	49.7	55.8 to 93.9
	Night	47.6	41.5	48.2	53.0 to 83.9
Friday 29th June 2018	Day	49.4	44.1	50.6	54.4 to 85.8
	Night	43.9	38.0	46.6	53.0 to 66.9
Saturday 30th June 2018	Day	46.5	42.1	48.1	52.4 to 85.9
	Night	42.4	36.4	44.2	49.4 to 80.3
Sunday 1st July 2018	Day	45.6	40.7	47.3	53.3 to 80.8
	Night	46.3	38.0	45.7	49.0 to 79.6

Table 13A.7 (Table 13.15): Summary of measured noise levels, Position N7, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Monday 2nd July 2018	Day	50.0	44.5	51.1	54.6 to 86.5
	Night	48.3	42.9	49.3	55.6 to 81.0
Tuesday 3rd July 2018	Day	49.1	43.7	49.9	52.8 to 86.6
	Night	45.7	38.1	45.4	49.4 to 75.3
Wednesday 4th July 2018	Day	48.8	42.8	49.6	50.9 to 86.9
	Night	48.9	38.8	50.7	55.0 to 74.8
Thursday 5th July 2018	Day	51.5	47.3	52.9	56.3 to 83.8
	Night	47.7	38.8	49.3	53.5 to 78.3
Friday 6th July 2018	Day	50.6	45.3	51.9	55.4 to 85.4
	Night	47.7	40.8	50.0	53.0 to 74.0
Saturday 7th July 2018	Day	48.4	44.1	50.3	53.9 to 79.9
	Night	45.4	37.8	47.9	51.5 to 66.0
Sunday 8th July 2018	Day	49.1	44.4	50.8	53.2 to 75.3
	Night	47.1	36.5	47.9	52.5 to 72.4
Monday 9th July 2018	Day	50.8	45.6	52.0	52.4 to 79.1
	Night	45.0	35.2	44.4	49.0 to 78.1
Tuesday 10th July 2018	Day(3)	49.7	43.2	49.9	56.5 to 76.0

Notes:

(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.

(2) Daytime period was 12 hours in duration after meter installation.

(3) Daytime period was 4.5 hours in duration prior to meter removal.

13A.48 The survey results for Position N8 are summarised in Table 13A.8, which effectively updates Table 13.16 of the July 2018 ES.

Table 13A.8 (Table 13.16): Summary of measured noise levels, Position N8, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Thursday 28th June 2018	Day(2)	55.9	53.2	57.1	59.1 to 89.5
	Night	54.9	51.6	55.9	54.7 to 76.7
Friday 29th June 2018	Day	57.4	55.5	58.6	61.1 to 74.9
	Night	54.4	51.3	56.0	56.0 to 68.9

Table 13A.8 (Table 13.16): Summary of measured noise levels, Position N8, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Saturday 30th June 2018	Day	56.5	54.3	57.8	59.0 to 72.3
	Night	51.5	47.3	53.2	55.4 to 69.8
Sunday 1st July 2018	Day	55.7	53.3	57.0	57.4 to 83.0
	Night	53.8	50.3	54.4	50.5 to 76.1
Monday 2nd July 2018	Day	57.5	55.5	58.6	60.2 to 71.9
	Night	55.3	52.3	56.8	59.6 to 76.2
Tuesday 3rd July 2018	Day	57.5	55.3	58.7	58.7 to 81.8
	Night	54.5	51.3	55.8	57.5 to 71.1
Wednesday 4th July 2018	Day	52.4	47.1	51.4	51.6 to 90.6
	Night	49.6	46.6	50.4	50.4 to 66.7
Thursday 5th July 2018	Day	50.3	47.8	51.4	54.9 to 73.7
	Night	47.7	45.3	48.6	48.8 to 62.2
Friday 6th July 2018	Day	47.8	44.8	48.7	53.4 to 82.4
	Night	47.3	44.9	48.4	49.7 to 67.0
Saturday 7th July 2018	Day	47.8	45.2	49.0	50.3 to 74.2
	Night	47.6	44.2	49.3	51.6 to 71.4
Sunday 8th July 2018	Day	49.2	46.8	50.3	52.4 to 79.0
	Night	48.4	45.8	49.6	51.6 to 62.8
Monday 9th July 2018	Day	52.4	49.3	53.1	53.5 to 72.4
	Night	52.5	49.4	54.3	55.5 to 63.2
Tuesday 10th July 2018	Day(3)	57.1	48.4	53.3	54.1 to 89.5

Notes:

(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.

(2) Daytime period was 9.5 hours in duration after meter installation.

(3) Daytime period was 5 hours in duration prior to meter removal.

13A.49 The survey results for Position N9 are summarised in Table 13A.9, which effectively updates Table 13.17 of the July 2018 ES.

Table 13A.9 (Table 13.17): Summary of measured noise levels, Position N9, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Thursday 28th June 2018	Day(2)	55.5	52.9	56.8	61.8 to 79.6
	Night	54.5	51.9	55.3	54.0 to 71.6
Friday 29th June 2018	Day	56.5	54.4	57.7	61.3 to 75.6
	Night	53.2	50.9	54.4	56.1 to 68.9
Saturday 30th June 2018	Day	55.7	53.2	56.8	59.5 to 85.0
	Night	50.2	47.3	51.6	53.9 to 67.1
Sunday 1st July 2018	Day	54.6	52.5	55.6	57.2 to 76.1
	Night	53.9	51.0	54.3	53.9 to 81.0
Monday 2nd July 2018	Day	56.7	54.6	58.0	61.1 to 75.5
	Night	54.9	52.6	55.8	57.4 to 72.5
Tuesday 3rd July 2018	Day	56.6	54.2	57.8	60.8 to 81.6
	Night	53.4	50.5	54.3	56.4 to 69.6
Wednesday 4th July 2018	Day	52.5	45.8	53.7	59.9 to 82.2
	Night	50.7	47.3	51.5	50.4 to 68.8
Thursday 5th July 2018	Day	53.6	49.1	55.2	60.6 to 85.1
	Night	49.9	46.9	50.7	51.1 to 69.7
Friday 6th July 2018	Day	50.9	44.2	53.4	59.5 to 84.4
	Night	48.6	46.0	49.7	52.1 to 69.0
Saturday 7th July 2018	Day	50.5	46.4	52.3	56.8 to 77.9
	Night	47.9	45.0	49.1	52.3 to 65.3
Sunday 8th July 2018	Day	51.7	48.1	52.8	55.8 to 88.3
	Night	49.9	47.3	50.8	52.3 to 66.0
Monday 9th July 2018	Day	53.8	50.2	55.5	59.8 to 73.3
	Night	52.2	49.1	53.4	54.9 to 67.6
Tuesday 10th July 2018	Day(3)	54.7	49.5	56.3	62.1 to 77.6

Notes:

(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.

(2) Daytime period was 9.25 hours in duration after meter installation.

(3) Daytime period was 5.25 hours in duration prior to meter removal.

13A.50 The survey results for Position N10 are summarised in Table 13A.10. There is no equivalent table in the July 2018 ES.

Table 13A.10 (N/A): Summary of measured noise levels, Position N10, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Thursday 28th June 2018	Day (2)	47.7	39.3	46.9	51.6 to 88.2
	Night	45.1	40.1	45.5	47.2 to 69.3
Friday 29th June 2018	Day	48.0	43.5	49.9	55.9 to 72.7
	Night	44.0	37.9	45.0	46.2 to 70.4
Saturday 30th June 2018	Day	48.0	43.2	49.8	53.6 to 71.0
	Night	42.2	37.7	43.4	48.5 to 66.9
Sunday 1st July 2018	Day	45.4	39.9	47.3	53.6 to 82.0
	Night	44.0	39.5	43.5	43.3 to 68.1
Monday 2nd July 2018	Day	50.0	44.1	51.1	54.6 to 75.8
	Night	46.7	42.9	48.2	51.4 to 65.7
Tuesday 3rd July 2018	Day	49.2	44.1	50.7	53.8 to 79.7
	Night	44.6	39.2	45.3	48.3 to 65.5
Wednesday 4th July 2018	Day	44.9	36.4	44.4	44.8 to 72.8
	Night	40.3	33.9	40.1	41.4 to 67.9
Thursday 5th July 2018	Day	42.9	35.7	43.6	44.2 to 69.6
	Night	41.5	34.0	40.6	40.8 to 66.0
Friday 6th July 2018	Day	42.3	34.3	43.1	50.6 to 68.9
	Night	39.5	34.6	40.2	41.3 to 67.7
Saturday 7th July 2018	Day	41.1	33.5	41.7	46.6 to 70.5
	Night	40.2	34.6	41.3	41.3 to 72.8
Sunday 8th July 2018	Day	42.9	35.0	44.3	45.6 to 71.3
	Night	39.9	33.2	40.2	42.2 to 64.5
Monday 9th July 2018	Day	44.0	37.0	45.2	50.7 to 67.9
	Night	43.1	34.2	43.0	45.5 to 74.1
Tuesday 10th July 2018	Day (3)	49.7	39.8	50.0	60.2 to 77.2

Notes:
(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.
(2) Daytime period was 13.25 hours in duration after meter installation.
(3) Daytime period was 3 hours in duration prior to meter removal.

13A.51 The survey results for Position N11 are summarised in Table 13A.11. There is no equivalent table in the July 2018 ES.

Table 13A.11 (N/A): Summary of measured noise levels, Position N11 free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Thursday 28th June 2018	Day(2)	49.6	47.2	50.3	51.7 to 81.9
	Night	50.4	48.7	51.6	53.4 to 74.0
Friday 29th June 2018	Day	51.3	49.6	52.4	54.5 to 74.5
	Night	49.2	47.2	50.5	54.0 to 66.3
Saturday 30th June 2018	Day	50.8	49.1	51.9	54.0 to 73.0
	Night	46.0	43.8	47.4	49.8 to 70.1
Sunday 1st July 2018	Day	49.3	47.6	50.4	51.4 to 71.2
	Night(3)	60.8	46.9	50.5	51.8 to 113.2
Monday 2nd July 2018	Day(4)	47.0	44.8	48.5	48.1 to 71.6
	Night(4)	46.0	44.4	47.1	49.5 to 70.0
Tuesday 3rd July 2018	Day(4)	47.3	45.3	48.5	50.7 to 68.6
	Night(4)	44.5	42.4	45.8	46.1 to 72.2
Wednesday 4th July 2018	Day(4)	45.2	39.3	46.2	44.7 to 79.4
	Night(4)	41.0	38.3	42.6	42.1 to 57.6
Thursday 5th July 2018	Day(4)	42.1	38.3	43.8	47.1 to 73.6
	Night(4)	39.7	36.9	41.2	42.5 to 58.9
Friday 6th July 2018	Day(5)	45.1	40.7	46.3	48.2 to 85.7
	Night	46.8	44.2	48.3	49.1 to 64.7
Saturday 7th July 2018	Day	44.4	42.1	45.8	51.2 to 68.1
	Night	44.8	42.5	46.4	47.7 to 64.6
Sunday 8th July 2018	Day	45.4	43.1	46.9	48.0 to 67.9
	Night	46.8	44.8	48.1	49.7 to 64.9
Monday 9th July 2018	Day	47.0	44.6	48.3	49.1 to 82.2
	Night	47.2	45.1	48.7	52.0 to 62.7
Tuesday 10th July 2018	Day(6)	48.6	46.6	50.1	53.8 to 68.0

Notes:

(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.

(2) Daytime period was 14 hours in duration after meter installation.

Table 13A.11 (N/A): Summary of measured noise levels, Position N11 free-field dB					
Date	**Period**	**$L_{Aeq,T}$**	**L_{A90}(1)**	**L_{A10}(1)**	**L_{AFmax}**
(3) Data between 06:15 and 07:00 hours excluded from assessment due to meter disturbance.					
(4) Data excluded from assessment due to meter disturbance.					
(5) Data between 07:00 and 18:00 hours excluded from assessment due to meter disturbance.					
(6) Daytime period was 2.25 hours in duration prior to meter removal.					

13A.52 The survey results for Position N12 are summarised in Table 13A.12. There is no equivalent table in the July 2018 ES.

Table 13A.12 (N/A): Summary of measured noise levels, Position N12, free-field dB					
Date	**Period**	**$L_{Aeq,T}$**	**L_{A90}(1)**	**L_{A10}(1)**	**L_{AFmax}**
Thursday 28th June 2018	Day(2)	46.8	42.0	46.5	48.8 to 79.6
	Night	45.4	43.2	46.2	47.1 to 68.0
Friday 29th June 2018	Day	46.8	43.7	47.6	46.4 to 73.4
	Night	45.7	41.6	45.9	47.4 to 72.6
Saturday 30th June 2018	Day	47.5	43.0	47.8	49.1 to 83.7
	Night	44.3	39.6	44.4	44.3 to 81.1
Sunday 1st July 2018	Day	44.7	41.1	45.4	46.5 to 78.8
	Night	45.6	42.7	45.8	47.2 to 64.6
Monday 2nd July 2018	Day	49.4	44.6	49.3	50.2 to 81.9
	Night	47.6	45.3	47.9	48.8 to 75.9
Tuesday 3rd July 2018	Day	48.3	44.5	48.3	47.9 to 78.4
	Night	45.3	42.4	45.5	48.2 to 74.1
Wednesday 4th July 2018	Day	47.5	39.4	46.0	52.0 to 83.4
	Night	46.6	42.4	47.1	47.4 to 67.5
Thursday 5th July 2018	Day	47.0	41.6	47.5	50.0 to 75.7
	Night	46.0	41.5	46.4	46.6 to 74.0
Friday 6th July 2018	Day	46.2	39.3	46.3	52.1 to 84.6
	Night	47.8	42.5	48.0	48.5 to 77.7
Saturday 7th July 2018	Day	44.5	38.7	45.3	50.9 to 79.5
	Night	44.9	39.7	46.1	45.7 to 67.1

Table 13A.12 (N/A): Summary of measured noise levels, Position N12, free-field dB

Date	Period	$L_{Aeq,T}$	L_{A90} (1)	L_{A10} (1)	L_{AFmax}
Sunday 8th July 2018	Day	44.7	39.9	46.0	50.8 to 75.4
	Night	45.1	40.5	45.3	44.5 to 63.3
Monday 9th July 2018	Day	46.6	41.3	46.5	46.3 to 87.3
	Night	51.1	39.2	44.9	44.8 to 82.9
Tuesday 10th July 2018	Day(3)	52.1	41.3	50.4	52.1 to 79.7

Notes:

(1) The L_{A90} and L_{A10} values presented were calculated from the arithmetic mean of the $L_{A90,15min}$ and $L_{A10,15min}$ measurements for each period.

(2) Daytime period was 11 hours in duration after meter installation.

(3) Daytime period was 4.75 hours in duration prior to meter removal.

13A.53 It is noted that the survey results, in terms of the L_{Aeq} noise index, were generally marginally higher than those set out in the July 2018 ES, although it is not universally the case. It is likely that the more typical traffic patterns during the June/July 2018 survey raised the ambient sound levels relative to the earlier surveys, where road works had altered the acoustic environment.

13A.54 British Standard 4142: 2014 indicates that a representative background sound level should be adopted for use in an assessment, which should not automatically be assumed to be the lowest or most common value. For this assessment, the distribution of L_{A90} values in the measurement data has been analysed and representative values determined.

13A.55 To aid the determination of the representative values, the cumulative percentage of each dataset set has also been analysed, and the 25% point has been identified, i.e. the value above which 75% of the data lies. This is considered a reasonable starting point in identifying the representative level, although not necessarily directly equivalent to it.

13A.56 Data gathered during periods where weather conditions were considered to have unduly affected the measured sound levels, or where the sound level meters at Positions N2 and N11 had been disturbed, have not been included in the analysis.

13A.57 The representative L_{A90} values are shown in Table 13A.13, which effectively updates Table 13.18 in the July 2018 ES. The representative values have been rounded to the nearest whole number as required by BS4142: 2014. Figures A13A.3.12 to A13A.3.33 in Technical Appendix 13A.3 of this ES Addendum contain the distribution analyses of the daytime and night-time background sound levels.

Table 13A.13 (Table 13.18): Representative background sound levels used in assessment, free-field dB

Position	Period	Range	Representative Values
N1	Day	36 to 59	44
	Night	29 to 53	36

Table 13A.13 (Table 13.18): Representative background sound levels used in assessment, free-field dB			
Position	**Period**	**Range**	**Representative Values**
N2	Day	37 to 62	42
	Night	37 to 53	39
N4	Day	41 to 58	47
	Night	40 to 57	44
N5	Day	35 to 50	41
	Night	35 to 51	39
N6	Day	38 to 51	41
	Night	35 to 49	37
N7	Day	37 to 51	41
	Night	28 to 51	33
N8	Day	41 to 58	46
	Night	42 to 57	44
N9	Day	38 to 57	46
	Night	42 to 57	45
N10	Day	30 to 48	34
	Night	27 to 48	33
N11	Day	38 to 51	42
	Night	39 to 52	42
N12	Day	34 to 48	39
	Night	33 to 50	38

13A.58 Although BS4142: 2014 does not require representative L_{Aeq} values to be established, they have been included here as they have been used to assist in determining the likely audibility of acoustic characteristics in the subsequent assessment of operational noise. The representative L_{Aeq} values are set out in Table 13A.14, which effectively updates Table 13.19 in the July 2018 ES. Figures A13A.3.34 to A13A.3.55 in Technical Appendix 13A.3 of this ES Addendum contain the distribution analyses of the daytime and night-time L_{Aeq} sound levels.

Table 13A.14 (Table 13.19): Representative ambient sound levels used in assessment, free-field dB			
Position	**Period**	**Range**	**Representative Values**
N1	Day	54 to 66	58
	Night	46 to 66	49
N2	Day	57 to 77	64
	Night	39 to 72	54

Table 13A.14 (Table 13.19): Representative ambient sound levels used in assessment, free-field dB

Position	Period	Range	Representative Values
N4	Day	48 to 61	52
	Night	44 to 64	48
N5	Day	40 to 60	45
	Night	38 to 53	43
N6	Day	43 to 61	48
	Night	37 to 60	41
N7	Day	42 to 60	46
	Night	37 to 56	41
N8	Day	44 to 69	48
	Night	44 to 59	47
N9	Day	47 to 62	51
	Night	46 to 58	48
N10	Day	35 to 58	41
	Night	32 to 53	36
N11	Day	42 to 57	45
	Night	42 to 53	45
N12	Day	39 to 61	43
	Night	36 to 63	41

13A.59 As noted above, the June/July 2018 sound survey suggested that the acoustic environment was marginally noisier than had been the case during the earlier baseline noise surveys, at least in terms of the L_{Aeq} noise index.

13A.60 Table 13A.13 suggests that the representative night-time background sound levels were higher than those set out in the July 2018 ES, whereas the daytime values were a mix of higher and lower values. Table 13A.14 suggests that the representative ambient sound levels have generally increased relative to those in the July 2018 ES.

13A.61 The complex consequences of the roadworks, in terms of how the traffic patterns altered in the area around the Site, are likely to be the cause of the changes.

Baseline Vibration Surveys

13A.62 It was not considered necessary to undertake updated vibration measurements, since the school holidays and roadworks that affected the previous surveys did not affect the baseline vibration climate. The baseline vibration climate is therefore considered to remain the same as the July 2018 ES.

Operational Noise Survey

13A.63 It was not necessary to undertake updated operational noise measurements, as the data gathered during that survey is considered to still be representative and robust.

Therefore the operational source noise data used in the assessment is the same as set out in the July 2018 ES.

Sensitive Receptors

Existing Sensitive Receptors

13A.64 The baseline section confirms the following sensitive receptors that may be affected by the Proposed Development include:

- Existing local residents:
  - Along the A5 to the north of the Site;
  - On and around Croft Lane to the north of the Site;
  - To the west of the A449, to the west of the Site;
  - On Station Drive, to the south of the Site;
  - In Calf Heath, to the south-east of the Site;
  - On Crateford Lane, to the west of the Site; and
  - On and around Harrisons Lane to the north of the Site.
- Canal users that moor along the Staffordshire and Worcestershire Canal, close to the Croft Lane;
- Transient users of the canal towpath.

13A.65 Receptors to the west of the Site on Crateford Lane, and to the north of the Site on and around Harrisons Lane have been added to the list that appeared in the July 2018 ES. The additional monitoring locations included in the June/July 2018 background sound survey has allowed the geographical extent of the assessment to be extended.

New Sensitive Receptors

13A.66 No noise-sensitive receptors will be introduced as a result of the Proposed Development, so these have not been considered.

Potential Effects

Demolition and Construction

Construction Noise

13A.67 The assessment of construction noise is based on the same methodology as set out in the July 2018 ES, using the same assumptions with respect to the proposed works.

13A.68 The only differences are where the assessment criteria may change, as the representative baseline noise levels may have changed as a result of the updated baseline noise survey, and where five additional receptors have been considered, also as a result of the updated baseline noise survey. These are described in paragraph 13A.74 of this ES Addendum.

13A.69 The assessment criteria for each of the receptor groups are as determined in accordance with Table A13.2.1 in Technical Appendix 13.2 of the July 2018 ES, whereby the existing ambient noise level, rounded to the nearest 5dB, defines the assessment criteria. This approach is as set out in BS5228: 2009+A1: 2014. The existing noise levels at each of these assessment positions are taken to be as measured during the daytime noise measurements, as the construction works will

be limited to this period. The representative ambient sound levels used in the assessment are those shown in Table 13A.14 of this ES Addendum.

13A.70 In this instance, the existing ambient daytime noise levels were all below 65dB(A) when rounded to the nearest 5dB, except at Position N2, where the existing ambient daytime noise level is equal to 65dB(A), when rounded to the nearest 5dB.

13A.71 In accordance with the guidance in BS5228: 2009+A1: 2014, as summarised in Table A13.2.1 in Technical Appendix 13.2 of the July 2018 ES, where the existing ambient noise level rounded to the nearest 5dB is below 65dB(A), a daytime criterion of 65dB(A) applies. This was the case for all of the receptors considered in the July 2018 ES and remains the case at all but one of the receptors in this ES Addendum.

13A.72 The exception is the receptor Wood View, where the existing ambient noise level at the closest monitoring location, Position N2, is now equal to 65dB(A) when rounded to the nearest 5dB, rather than below 65dB(A), as was previously the case. A daytime criterion of 70dB(A) now applies.

13A.73 Table 13A.15 sets out the distances between key elements of the Proposed Development and the receptors around the site. The receptors are shown in Figure 13A.2.

13A.74 The information in Table 13A.15 is the same as Table 13.23 of the July 2018 ES, except for the additional receptors included to the west and north of the site, which are included as a result of the updated baseline noise survey. The additional receptors are the last five listed in Table 13A.15 and their locations are shown on Figure 13A.2.

Table 13A.15 (Table 13.23): Receptors for construction noise assessment

Receptor	Distance to Site boundary (metres)	Distance to closest proposed building (metres)	Distance to centre of site (metres)	Distance to bridge abutment (metres)
1 Kings Road	70	500	1,455	2,025
181 Station Drive	230	430	1,410	1,285
182 Station Drive	125	370	1,275	1,230
4 Croft Lane	25	260	700	620
Allspan	200	465	1,520	2,140
Avenue Cottages	5	80	860	1,175
Avery Bungalow	170	470	1,510	2,100
Chase View	50	285	1,335	990
Cobweb Cottage	110	315	1,430	2,030
Craigmore	125	385	1,175	1,205
Denson House	5	165	1,180	390
Elmhurst	150	380	1,475	2,075
Evergreen	70	180	1,110	400

Table 13A.15 (Table 13.23): Receptors for construction noise assessment				
Gailey House	15	115	775	590
Hamerton House	30	230	1,020	890
High Clere	10	250	1,185	1,750
Hollybyre	55	165	1,110	410
Homestead	70	180	1,090	400
Longacre	50	200	990	1,270
Longfield	35	210	1,110	930
Marsh Farm	140	225	1,260	600
Meadow View	35	240	1,150	1,700
Oak View	30	255	770	730
Roundabout Cottages	20	320	1,420	1,000
School House	30	340	1,395	1,015
Silverthorne	115	370	1,230	1,220
St Clare	115	370	1,205	1,215
Straight Mile Farm	25	130	1,020	1,570
Sylvestris	25	435	1,340	1,950
The Cottage	25	240	810	785
The Villa	35	155	925	1,080
Wharf Cottage	60	245	940	925
Wharf House	35	250	895	860
Wood View	20	90	845	1,125
Woodland Farm	50	215	1,365	1,965
Calf Heath Reservoir West	25	80	825	1,210
Calf Heath Reservoir East	30	100	975	1,460
Canal Moorings North	60	220	840	820
Canal Moorings South	45	210	545	530
Canal Towpath Gravelly Way	30	215	420	245

Table 13A.15 (Table 13.23): Receptors for construction noise assessment				
221i Crateford Lane	235	350	1,295	580
219 Crateford Lane	350	450	1,540	625
Comox	260	375	1,070	1,240
The Poultry Farm House	145	255	950	1,150
The Poplars	185	295	1,000	1,270

13A.75 Table 13A.16 sets out the predicted construction noise levels for each assessment location, effectively updating Table 13.24 of the July 2018 ES. Where the construction noise levels are predicted to exceed the relevant 65dB or 70dB criteria, the cells are highlighted blue.

Table 13A.16 (Table 13.24): Predicted construction noise levels, free-field dB						
Receptor	**Phase of Construction Works(1)**					
	1	**2**	**3**	**4**	**5**	**6**
1 Kings Road	47 to 73	45 to 55	30	42 to 51	41 to 47	47 to 73
181 Station Drive	47 to 63	46 to 56	34	42 to 53	41 to 43	47 to 63
182 Station Drive	48 to 68	47 to 57	34	43 to 54	42 to 43	48 to 68
4 Croft Lane	53 to 82	52 to 60	40	48 to 57	47 to 62	53 to 82
Allspan	47 to 64	45 to 55	29	42 to 52	41 to 47	46 to 64
Avenue Cottages	52 to 96	50 to 71	35	47 to 67	46 to 53	51 to 96
Avery Bungalow	47 to 66	45 to 55	30	42 to 52	41 to 47	46 to 65
Chase View	48 to 76	46 to 60	36	43 to 56	42 to 46	47 to 76
Cobweb Cottage	47 to 70	46 to 59	30	42 to 55	41 to 50	47 to 69
Craigmore	49 to 68	47 to 57	34	44 to 53	43 to 43	49 to 68
Denson House	49 to 96	47 to 64	44	44 to 61	43 to 48	49 to 96
Elmhurst	47 to 67	45 to 57	30	42 to 54	41 to 49	47 to 66
Evergreen	49 to 73	48 to 64	44	44 to 60	43 to 58	49 to 73
Gailey House	53 to 87	51 to 67	41	47 to 64	46 to 55	52 to 86

Table 13A.16 (Table 13.24): Predicted construction noise levels, free-field dB						
Hamerton House	50 to 81	49 to 61	37	45 to 58	44 to 53	50 to 80
High Clere	49 to 90	47 to 61	31	44 to 57	43 to 57	49 to 90
Hollybyre	49 to 76	48 to 64	44	44 to 61	43 to 57	49 to 75
Homestead	50 to 73	48 to 64	44	44 to 60	43 to 62	49 to 73
Longacre	50 to 76	49 to 63	34	45 to 59	44 to 52	50 to 76
Longfield	49 to 80	48 to 62	37	44 to 59	43 to 51	49 to 79
Marsh Farm	48 to 67	47 to 62	40	43 to 58	42 to 50	48 to 67
Meadow View	49 to 80	47 to 61	31	44 to 58	43 to 51	49 to 79
Oak View	53 to 81	51 to 61	39	47 to 57	46 to 60	52 to 80
Roundabout Cottages	47 to 84	46 to 59	36	42 to 55	41 to 45	47 to 84
School House	48 to 81	46 to 58	36	42 to 55	41 to 45	47 to 80
Silverthorne	49 to 69	47 to 57	34	43 to 54	42 to 43	48 to 69
St Clare	49 to 69	47 to 57	34	44 to 54	43 to 43	48 to 69
Straight Mile Farm	50 to 82	49 to 66	32	45 to 63	44 to 63	50 to 82
Sylvestris	48 to 82	46 to 56	30	43 to 52	42 to 52	47 to 82
The Cottage	52 to 82	51 to 61	38	47 to 58	46 to 61	52 to 82
The Villa	51 to 80	49 to 65	35	46 to 61	45 to 60	51 to 79
Wharf Cottage	51 to 75	49 to 61	37	46 to 57	45 to 60	51 to 74
Wharf House	51 to 80	50 to 61	37	46 to 57	45 to 59	51 to 79
Wood View	52 to 84	50 to 70	35	47 to 66	46 to 51	51 to 84
Woodland Farm	48 to 76	46 to 62	30	42 to 59	41 to 50	47 to 76
Calf Heath Reservoir West	52 to 82	50 to 71	34	47 to 67	46 to 51	52 to 82
Calf Heath Reservoir East	51 to 81	49 to 69	33	45 to 65	44 to 49	50 to 80
Canal Moorings North	52 to 75	50 to 62	38	47 to 58	46 to 61	52 to 74

Table 13A.16 (Table 13.24): Predicted construction noise levels, free-field dB						
Canal Moorings South	56 to 77	54 to 62	42	50 to 59	49 to 66	55 to 77
Canal Towpath Gravelly Way	58 to 81	45 to 55	48	53 to 59	52 to 66	58 to 80
221i Crateford Lane	48 to 63	46 to 58	41	43 to 54	42 to 61	48 to 63
219 Crateford Lane	47 to 60	45 to 56	40	41 to 52	40 to 56	46 to 59
Comox	50 to 62	48 to 57	34	45 to 54	44 to 57	49 to 62
The Poultry Farm House	51 to 67	49 to 61	35	46 to 57	45 to 63	50 to 67
The Poplars	50 to 65	49 to 59	34	45 to 56	44 to 58	50 to 65

Note:

Cells shaded blue show where predicted levels exceed the 65dB or 70dB criterion.

(1) Phases of work as follows: Phase 1 = Site preparation works; Phase 2 = Foundation works; Phase 3 = Piling; Phase 4 = Building erection works; Phase 5 = Road construction works; and Phase 6 = Landscaping works

13A.76 It can be seen from Table 13A.16 that at the location where the 70dB criterion applies, Wood View, the criterion is likely to be exceeded when works are closest to the Site boundary during the site preparation and landscaping phases of work. As the construction noise levels exceed the 70dB criterion by more than 10dB, there is considered to be a high adverse impact.

13A.77 Where the construction works are away from the receptor, towards the centre of the Site, which is considered to be more representative of the majority of the construction works, the construction noise levels are predicted to be below the 70dB criterion, which would constitute a negligible impact, which even with high sensitivity receptors, would be considered to have no effect.

13A.78 The construction noise levels at the five additional properties are predicted to fall below the 65dB(A) assessment criterion at four of them for all phases of the works. At the fifth receptor, The Poultry Farm House, the 65dB(A) criterion is predicted to be exceeded by 2dB for the site preparation works and landscaping works, where the plant are at their closest to the receptor. Exceeding the criterion by 2dB would be considered a low or moderate impact, depending on the duration of the exceedance. This outcome is not considered to alter the overall conclusions of the assessment of construction noise.

13A.79 For the remaining receptors that were considered in the July 2018 ES, the assessment outcome is the same as set out in the July 2018 ES.

13A.80 Details relating to the inclusion of construction noise in the bespoke noise insulation scheme are the same as set out in the July 2018 ES.

Construction Vibration

13A.81 The assessment of construction vibration is the same as that set out in the July 2018 ES.

Construction Traffic

13A.82 The assessment of construction traffic is the same as that set out in the July 2018 ES.

Operational Development

13A.83 The Proposed Development is expected to generate a range of potential significant direct and indirect noise and vibration impacts, with likely permanent effects.

Operational Noise Emissions

13A.84 The methodology used to calculate the likely operational noise levels from the Proposed Development is the same as set out in the July 2018 ES. The calculated specific sound levels for the receptors listed in the July 2018 ES are the same. Five additional receptors have been considered as a result of the updated baseline noise survey.

13A.85 Since the derivation of the acoustic character corrections relies on the baseline ambient sound levels and the baseline sound levels have been updated, the derived acoustic character corrections have also been updated.

13A.86 The revised total corrections applied to the calculated specific sound levels for each receptor are shown in Table 13A.17, which effectively updates Table 13.28 of the July 2018 ES. The updated baseline survey information has allowed five additional receptor locations to be included in the operational noise assessment. The additional receptors are the last five listed in Table 13A.17 and their locations are shown on Figure 13A.2.

Table 13A.17 (Table 13.28): Derived Acoustic Character Corrections, dB

Receptor	Period	Correction
1 Kings Road	Day	3
	Night	6
181 Station Drive	Day	6
	Night	9
182 Station Drive	Day	6
	Night	9
4 Croft Lane	Day	9
	Night	9
Allspan	Day	6
	Night	6
Avenue Cottages	Day	9
	Night	11

Table 13A.17 (Table 13.28): Derived Acoustic Character Corrections, dB		
Receptor	**Period**	**Correction**
Avery Bungalow	Day	6
	Night	6
Chase View	Day	9
	Night	9
Cobweb Cottage	Day	6
	Night	6
Craigmore	Day	6
	Night	9
Denson House	Day	9
	Night	11
Elmhurst	Day	6
	Night	6
Evergreen	Day	6
	Night	6
Gailey House	Day	11
	Night	13
Hamerton House	Day	9
	Night	9
High Clere	Day	6
	Night	6
Hollybyre	Day	6
	Night	6
Homestead	Day	6
	Night	9
Longacre	Day	6
	Night	6
Longfield	Day	9
	Night	9
Marsh Farm	Day	3
	Night	6

Table 13A.17 (Table 13.28): Derived Acoustic Character Corrections, dB		
Receptor	**Period**	**Correction**
Meadow View	Day	6
	Night	6
Oak View	Day	9
	Night	9
Roundabout Cottages	Day	6
	Night	9
School House	Day	9
	Night	9
Silverthorne	Day	6
	Night	9
St Clare	Day	6
	Night	9
Straight Mile Farm	Day	6
	Night	9
Sylvestris	Day	3
	Night	6
The Cottage	Day	9
	Night	9
The Villa	Day	6
	Night	9
Wharf Cottage	Day	9
	Night	9
Wharf House	Day	9
	Night	9
Wood View	Day	6
	Night	9
Woodland Farm	Day	9
	Night	9
Calf Heath Reservoir West	Day	9
	Night	11

Table 13A.17 (Table 13.28): Derived Acoustic Character Corrections, dB		
Receptor	**Period**	**Correction**
Calf Heath Reservoir East	Day	11
	Night	13
Canal Moorings North	Day	9
	Night	11
Canal Moorings South	Day	9
	Night	9
Canal Towpath Gravelly Way	Day	9
	Night	11
221i Crateford lane	Day	11
	Night	13
219 Crateford Lane	Day	9
	Night	11
Comox	Day	6
	Night	6
The Poultry Farm House	Day	9
	Night	9
The Poplars	Day	6
	Night	6

13A.87 The background sound data for each assessment location has been determined by reference to the monitoring position situated closest to each location. The correlations between measurement positions and assessment locations are shown in Table 13A.18, which effectively updates Table 13.29 of the July 2018 ES. The only difference from the July 2018 ES is the representative measurement position for the Canal Towpath Gravelly Way receptor, where the additional measurements at Position N12 have been used, and the five additional receptor locations that have been included as a result of the wider baseline noise survey.

Table 13A.18 (Table 13.29): Representative background sound survey position	
Receptor	**Representative Position**
1 Kings Road	N9
181 Station Drive	N6
182 Station Drive	N6
4 Croft Lane	N5
Allspan	N8

Table 13A.18 (Table 13.29): Representative background sound survey position	
Receptor	**Representative Position**
Avenue Cottages	N4
Avery Bungalow	N8
Chase View	N7
Cobweb Cottage	N8
Craigmore	N6
Denson House	N7
Elmhurst	N8
Evergreen	N1
Gailey House	N5
Hamerton House	N5
High Clere	N9
Hollybyre	N1
Homestead	N1
Longacre	N4
Longfield	N5
Marsh Farm	N1
Meadow View	N9
Oak View	N5
Roundabout Cottages	N7
School House	N7
Silverthorne	N6
St Clare	N6
Straight Mile Farm	N9
Sylvestris	N9
The Cottage	N5
The Villa	N4
Wharf Cottage	N5
Wharf House	N5
Wood View	N2
Woodland Farm	N8
Calf Heath Reservoir West	N4

Table 13A.18 (Table 13.29): Representative background sound survey position	
Receptor	**Representative Position**
Calf Heath Reservoir East	N4
Canal Moorings North	N5
Canal Moorings South	N5
Canal Towpath Gravelly Way	N12
221i Crateford Lane	N10
219 Crateford Lane	N10
Comox	N11
The Poultry Farm House	N11
The Poplars	N11

13A.88 The predicted rating levels, which combine the calculated specific sound levels with the derived acoustic character corrections, have been compared with the background sound levels, as shown in Table 13A.19, which effectively updates Table 13.30 in the July 2018 ES. The background sound levels are the representative values for each position, as set out in Table 13A.13 of this ES Addendum.

13A.89 The calculations are based on what is considered to be a reasonable worst-case interpretation of the Parameters Plans, as described in the July 2018 ES.

Table 13A.19 (Table 13.30): BS4142 Assessment				
Receptor	**Period**	**Background Sound Level, L_{A90}**	**Rating Level, $L_{Ar,T}$**	**Difference**
1 Kings Road	Day	46	39	-7
	Night	45	41	-4
181 Station Drive	Day	41	46	+5
	Night	37	49	+12
182 Station Drive	Day	41	48	+7
	Night	37	50	+13
4 Croft Lane	Day	41	52	+11
	Night	39	51	+12
Allspan	Day	46	41	-5
	Night	44	40	-4
Avenue Cottages	Day	47	54	+7
	Night	44	55	+11

Table 13A.19 (Table 13.30): BS4142 Assessment				
Receptor	**Period**	**Background Sound Level, L_{A90}**	**Rating Level, $L_{Ar,T}$**	**Difference**
Avery Bungalow	Day	46	40	-6
	Night	44	39	-5
Chase View	Day	41	53	+12
	Night	33	52	+19
Cobweb Cottage	Day	46	42	-4
	Night	44	41	-3
Craigmore	Day	41	48	+7
	Night	37	51	+14
Denson House	Day	41	50	+9
	Night	33	51	+18
Elmhurst	Day	46	41	-5
	Night	44	40	-4
Evergreen	Day	44	50	+6
	Night	36	49	+13
Gailey House	Day	41	53	+12
	Night	39	54	+15
Hamerton House	Day	41	50	+9
	Night	39	49	+10
High Clere	Day	46	44	-2
	Night	45	43	-2
Hollybyre	Day	44	50	+6
	Night	36	49	+13
Homestead	Day	44	50	+6
	Night	36	52	+16
Longacre	Day	47	46	-1
	Night	44	44	0
Longfield	Day	41	51	+10
	Night	39	50	+11
Marsh Farm	Day	44	44	0
	Night	36	46	+10

Table 13A.19 (Table 13.30): BS4142 Assessment				
Receptor	**Period**	**Background Sound Level, L_{A90}**	**Rating Level, $L_{Ar,T}$**	**Difference**
Meadow View	Day	46	45	-1
	Night	45	44	-1
Oak View	Day	41	52	+11
	Night	39	51	+12
Roundabout Cottages	Day	41	49	+8
	Night	33	51	+18
School House	Day	41	52	+11
	Night	33	51	+18
Silverthorne	Day	41	49	+8
	Night	37	51	+14
St Clare	Day	41	49	+8
	Night	37	52	+15
Straight Mile Farm	Day	46	45	-1
	Night	45	48	+3
Sylvestris	Day	46	39	-7
	Night	45	40	-5
The Cottage	Day	41	49	+8
	Night	39	48	+9
The Villa	Day	47	47	0
	Night	44	49	+5
Wharf Cottage	Day	41	49	+8
	Night	39	48	+9
Wharf House	Day	41	51	+10
	Night	39	50	+11
Wood View	Day	42	50	+8
	Night	39	51	+12
Woodland Farm	Day	46	46	0
	Night	44	46	+2
Calf Heath Reservoir West	Day	47	49	+2
	Night	44	50	+6

Table 13A.19 (Table 13.30): BS4142 Assessment				
Receptor	**Period**	**Background Sound Level, L_{A90}**	**Rating Level, $L_{Ar,T}$**	**Difference**
Calf Heath Reservoir East	Day	47	54	+7
	Night	44	55	+11
Canal Moorings North	Day	41	50	+9
	Night	39	51	+12
Canal Moorings South	Day	41	53	+12
	Night	39	53	+14
Canal Towpath Gravelly Way	Day	39	56	+17
	Night	38	58	+20
221i Crateford Lane	Day	34	52	+18
	Night	33	53	+20
219 Crateford Lane	Day	34	50	+16
	Night	33	51	+18
Comox	Day	42	45	+3
	Night	42	44	+2
The Poultry Farm House	Day	42	48	+6
	Night	42	47	+5
The Poplars	Day	42	44	+2
	Night	42	43	+1

13A.90 It can be seen from Table 13A.19 that a range of outcomes is predicted. In a number of cases, the rating levels are below the background sound levels, which would be regarded as negligible impacts.

13A.91 At the other end of the scale, rating levels up to 20dB above the background sound levels are predicted, which would be regarded as high adverse impacts. Locations where the rating levels are between 5dB and 10dB above the background sound levels would be regarded as having moderate adverse impacts.

13A.92 The outcomes generally indicate lesser impacts during the night-time than was the case in the July 2018 ES, but in most instances, marginally greater impacts during the daytime. These differences are linked to the changes in the background sound levels in June/July 2018, where it was found that, in general terms, the daytime background sound levels had marginally decreased and the night-time values had marginally increased.

13A.93 However, BS4142: 2014 is clear that contextual matters should be taken into account when determining the overall magnitude of potential impacts, and that the numerical analysis should not alone dictate the outcome.

13A.94 BS4142: 2014 notes that some of the relevant contextual factors that should be taken into account include:

"The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

- *facade insulation treatment;*
- *ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
- *acoustic screening."*

13A.95 Consideration has been given to protecting the internal environment of the affected properties through the provision of a bespoke noise insulation scheme, as described below.

Bespoke Noise Insulation Scheme

13A.96 Following consultation with SSDC, the bespoke noise insulation scheme has been updated from that described in the July 2018 ES, and the eligibility of residential properties under the scheme shall be determined on the following basis:

- that the property legally exists or has been granted planning permission on the date of the DCO approval, without regard to proximity to the Proposed Development, and
- in terms of absolute external criteria (all three criteria are required to be met):
  - noise levels from the Proposed Development exceed façade noise levels of 66dB $L_{Aeq,16hrs}$ during the daytime, or 62dB $L_{Aeq,8hrs}$ during the night-time; and
  - noise levels increase by at least 1dB as a result of the Proposed Development; and
  - the contribution from the Proposed Development to the overall noise level is at least 1dB.
- or, in terms of relative criteria:
  - where the rating level at an eligible façade, including any appropriate character corrections, exceeds the background sound level in the absence of any sound from the Proposed Development, by 8dB or more, during either the daytime and/or the night-time, calculated in accordance with BS4142: 2014.
- or, in terms of internal criteria in habitable rooms:
  - where the internal rating level within a habitable room exceeds 40dB $L_{Aeq,16hrs}$ during the daytime, or 35dB $L_{Aeq,8hrs}$ during the night-time.

13A.97 Based on the updated calculations, as set out in Table 13A.19 of this ES Addendum, the following properties would be eligible for noise insulation, either as a result of a rating level exceeding the background sound level by 8dB or more, or as a result of the internal sound levels exceeding the internal criteria: 181 Station Drive, 182 Station Drive, 4 Croft Lane, Avenue Cottages, Chase View, Craigmore, Denson House, Evergreen, Gailey House, Hamerton House, Hollybyre, Homestead, Longfield, Marsh Farm, Oak View, Roundabout Cottages, School House, Silverthorne, St Clare, Straight Mile Farm, The Cottage, The Villa, Wharf Cottage, Wharf House, Wood View, Woodland Farm, 221i Crateford Lane, 219 Crateford Lane, and The Poultry Farm House.

13A.98 In addition, a further 75 properties may also be eligible for sound insulation, based on their proximity to the assessed properties and likely exposure to noise from the Proposed Development. Paragraph 13.288 of the July 2018 ES indicated that a

further 39 properties were also likely to be eligible for sound insulation, based on their proximity to the assessed properties. The number of additional properties has increased as a result of the additional receptor locations as a result of the expanded baseline noise survey, particularly those on Crateford Lane, and the effect of the amended bespoke noise insulation scheme criteria.

13A.99 Taking account of the bespoke noise insulation scheme, the internal noise criteria will be met at all residential properties, even if the acoustic character corrections are included.

13A.100 The properties within the Order Limits that might remain occupied during some part of the operation of the Proposed Development (Heath Farm, Woodside Farm and residential properties at the intersection of Vicarage Road / Straight Mile) could be as adversely affected as the worst-affected properties. It is not possible to quantify the likely impact as their proximity to any particular element of the operational site is not known due to the uncertainty as to the duration of their occupancy. However, for the purposes of this assessment, it is assumed that the three properties may also be eligible for noise insulation under the bespoke noise insulation scheme.

13A.101 As well as achieving the internal criteria, the daytime external noise levels, even including the penalties for acoustic character, would meet the upper 55dB threshold set out in BS8233: 2014 and the WHO Guidelines at all of the residential locations assessed as a result of noise from the Proposed Development. The daytime sound levels along the towpath may marginally exceed the 55dB criterion, with the receptor at Canal Towpath Gravelly Way predicted to have a rating level of 56dB as a result of noise from the Proposed Development.

13A.102 It should be noted that the properties identified above have been considered as part of the initial assessment presented in the July 2018 ES and ES Addendum, taking account of the latest background sound level data, and calculation and operational parameters that generate worst-case noise levels from the Proposed Development. Further assessments will be required as part of the bespoke noise insulation scheme that will take account of the proposed arrangement of buildings and specific operations as may be proposed at that time.

13A.103 It is noted that the two canal mooring assessment locations are predicted to have rating levels more than 8dB above the background sound levels at night.

13A.104 As was stated in paragraphs 13.294 to 13.298 of the July 2018 ES, the canal mooring locations are considered as quasi-residential receptors, but the affected occupants will not be exposed to noise for prolonged periods as the moorings are time-limited.

13A.105 It would not be practicable to install bespoke noise insulation for transitory visiting craft. However, the impacts on the moorings will be temporary impacts for users given the restrictions on mooring duration. The Proposed Development includes significant embedded mitigation in the form of mounding to reduce noise levels at the canal mooring locations.

13A.106 The overall assessment outcomes according to BS4142: 2014 should take into account relevant contextual matters, which the standard states may include absolute sound levels, and internal sound levels. These contextual matters may be used to alter the initial assessment outcomes based on the numerical analysis alone. On the basis of the internal noise levels within residential properties meeting the only available guidelines on acceptable acoustic environments for residential occupation, it is suggested that the BS4142: 2014 outcomes are less adverse than the numerical analysis set out in Table 13A.19 alone suggests.

Summary of Operational BS4142 Noise Assessment

13A.107 It is considered that operational noise from the Proposed Development is likely to result in high adverse impacts at the worst-affected locations, but that these locations will benefit from the bespoke noise insulation scheme, thereby reducing the significance of the impacts.

13A.108 Overall, the impacts at these properties are considered to be moderate adverse, which when combined with high sensitivity receptors, results in moderate adverse effects, which are significant in EIA terms. This is the same outcome as was identified in the July 2018 ES.

13A.109 As noted above, the bespoke noise insulation scheme cannot practically be applied to the canal moorings, so the identified high impacts will remain, although they will be temporary given the restrictions on mooring duration. While moored canal boats are quasi-residential receptors, they are by their very nature transient, so their sensitivity is medium rather than high. A high adverse impact combined with a medium sensitivity would result in a moderate adverse effect, which is significant in EIA terms.

13A.110 For the canal towpaths and Calf Heath Reservoir, the assessment suggests high adverse impacts. The canal towpaths, as part of the Staffordshire and Worcestershire Canal Conservation Area, are considered to be of medium sensitivity, resulting in moderate adverse effects, which are significant in EIA terms.

13A.111 The high adverse impacts at Calf Heath Reservoir results in minor adverse effects, which are not significant in EIA terms, when taking account of its low sensitivity.

13A.112 All of the identified impacts and effects from operational noise are anticipated to be long-term, permanent effects, which is the same as was set out in the July 2018 ES.

13A.113 The scope for additional mitigation to address these potential impacts was covered in the July 2018 ES.

13A.114 BS4142: 2014 requires any uncertainties that are inherent in the measurement, calculation and assessment process to be considered. In this instance, the uncertainty has been reduced as far as considered practicable through the implementation of high quality source data and a robust calculation process.

13A.115 Uncertainty has also been reduced by undertaking the baseline sound measurements in accordance with recommended good practice, for example, measuring in suitable weather conditions and using laboratory-calibrated measurement equipment.

13A.116 The measurements covered both a weekday and weekend, and include measurements made over the typically quietest periods, i.e. in the middle of the night-time. This should result in measurements that capture the lowest typical background sound levels in the areas, enabling a more robust assessment.

13A.117 Any uncertainties inherent in the BS4142: 2014 assessment are likely to be small compared with the magnitude of impacts set out in this chapter, and are therefore unlikely to affect the stated outcomes.

13A.118 The assessment set out above only considers the representative sample of receptor locations shown in Figure 13A.2 of this ES Addendum. When undertaking the assessment of eligibility for the bespoke noise insulation scheme, it will be necessary to include all residential receptors that may be adversely affected by the Proposed Development.

Assessment of Operational Maximum Noise Levels

13A.119 The assessment of operational maximum noise levels is the same as set out in the July 2018 ES for the receptors considered at that time.

13A.120 For the additional five receptors considered in this ES Addendum as a result of the updated baseline survey results, maximum noise levels from the Proposed Development are predicted to be below the 60dB L_{AFmax} external criterion at all of them except 221i Crateford Lane, where a level of 61dB L_{AFmax} is predicted.

13A.121 However, since 221i Crateford Lane has been identified as qualifying for insulation under the bespoke noise insulation scheme, the internal maximum noise level will be below the 45dB L_{AFmax} internal criterion that the 60dB L_{AFmax} criterion is designed to achieve and no adverse effects are likely to result.

Implications of Phased Construction/Operations

13A.122 The implications of phased construction and operational noise levels is the same as set out in the July 2018 ES.

Operational Vibration Emissions

13A.123 Operational vibration emissions are the same as set out in the July 2018 ES.

Off-Site Road Traffic Noise Impacts

13A.124 The assessment of off-site road traffic noise remains the same as set out in the July 2018 ES.

Off-Site Road Traffic Vibration

13A.125 The assessment of off-site road traffic vibration remains the same as set out in the July 2018 ES

Noise Insulation Regulations for Roads

13A.126 The assessment of the eligibility of all properties within 300 metres of any new or altered road for noise insulation, under the Noise Insulation Regulations 1975 (as amended 1988), remains the same as set out in the July 2018 ES.

Off-site Railway Noise

13A.127 The likely change in railway noise levels at locations away from the Site remains the same as set out in the July 2018 ES.

Off-Site Railway Vibration

13A.128 The assessment of off-site railway vibration remains the same as set out in the July 2018 ES.

Noise Insulation Regulations for Railways

13A.129 The assessment of the eligibility of all properties within 300 metres of any new or altered railway line for noise insulation, under the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996, remains the same as set out in the July 2018 ES.

Fixed Plant Noise

13A.130 The Proposed Development may include plant to control the climate within the building, although at this stage no details are available as to what plant is to be included, if any. Requirement 21(1) of the draft DCO requires the details of all mechanical and ventilation plant to be submitted to and approved by the local planning authority.

13A.131 Suggested plant noise limits are shown in Table 13A.20, which effectively updates Table 13.37 of the July 2018 ES. It is suggested that, where possible, the plant be designed to a lower limit to ensure that there is 'headroom' for the other noise sources at the Site. The background sound levels are the representative values for each position, as set out in Table 13A.13 of this ES Addendum.

Table 13A.20 (Table 13.37): Suggested noise limits for fixed plant, free-field dB

Receptors Close to Position:	Period	Background Sound Level, L_{A90}	Recommended Limit, $L_{Ar,T}$[(1)]
N1	Day	44	44
	Night	36	36
N2	Day	42	42
	Night	39	39
N4	Day	47	47
	Night	44	44
N5	Day	41	41
	Night	39	39
N6	Day	41	41
	Night	37	37
N7	Day	41	41
	Night	33	33
N8	Day	46	46
	Night	44	44
N9	Day	46	46
	Night	45	45
N10	Day	34	34
	Night	33	33
N11	Day	42	42
	Night	42	42
N12	Day	39	39
	Night	38	38

Note: (1) The proposed noise limits are applicable at a point close to, but at least 4 metres in front of, the relevant façade

13A.132 Note that the limits suggested above are rating levels and as such any design should take into account the acoustic characteristics of the plant. The limits are deemed to apply to the total fixed plant noise emission level from the whole Site, so individual plant items may need to be designed to a lower limit to take into account the cumulative effects of noise.

13A.133 As was the case in the July 2018 ES, designing fixed plant at the Site to comply with the stated limits is considered likely to result in a minor to no adverse effect, which for receptors for high sensitivity would be classed as a minor effect. These effects are anticipated to be long term. This is not considered significant in EIA terms.

Mitigation and Residual Effects

13A.134 Mitigation is as set out in the July 2018 ES.

Summary of Residual Effects

13A.135 Table 13.39 of the July 2018 ES, which set out a summary of the outcomes of the noise and vibration assessment is unchanged by the information set out in this ES Addendum.

Likely Significant Environmental Effects

13A.136 The likely environmental effects from the Proposed Development are materially the same as set out in the July 2018 ES.

Decommissioning

13A.137 The potential effects on noise and vibration for decommissioning are as set out in the July 2018 ES.

Cumulative Effects

13A.138 The assessment of cumulative effects is the same as set out in the July 2018 ES.

Figure 13A.1: Baseline noise and vibration survey locations

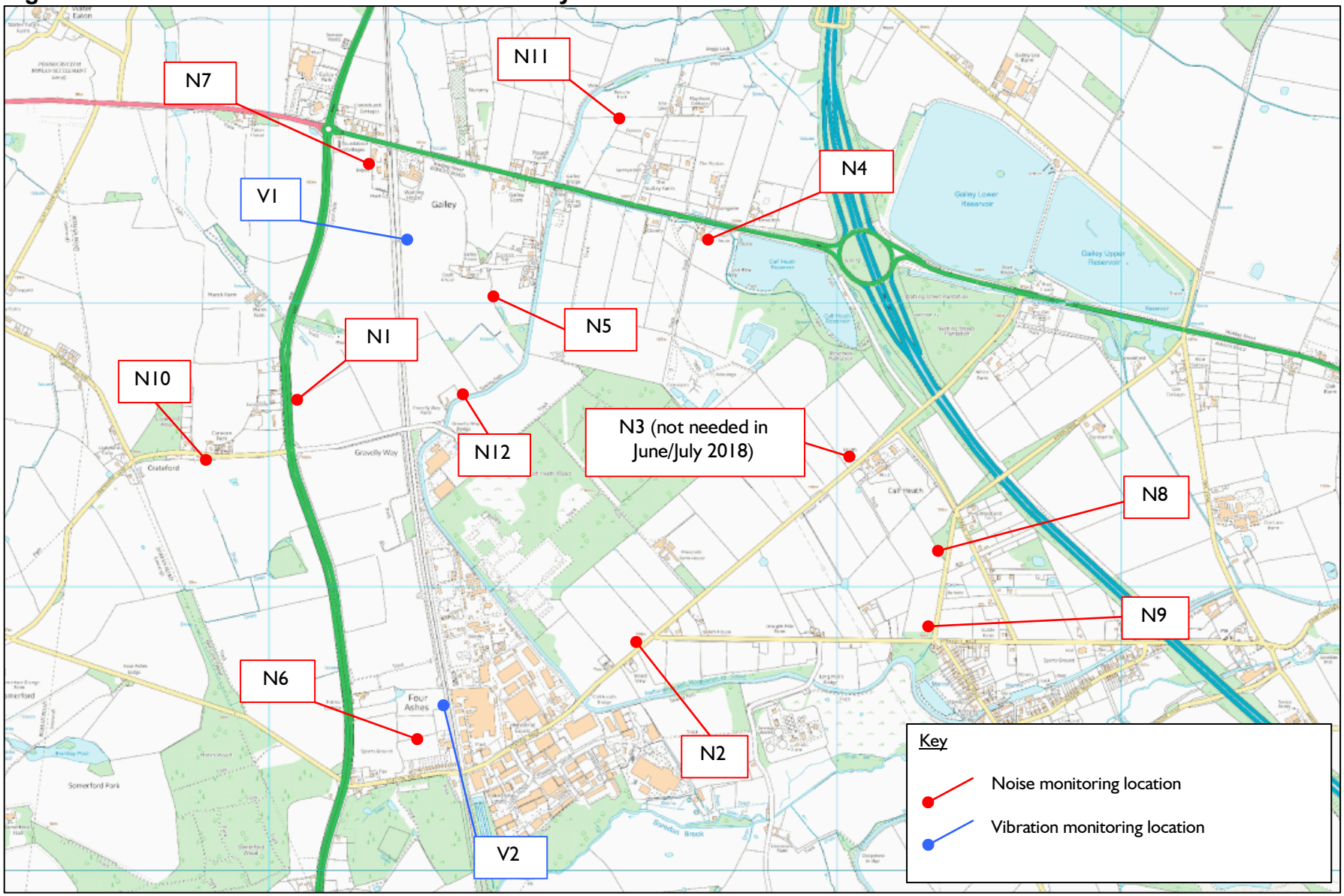

Figure 13A.2: Receptor Locations