

# **A14 Cambridge to Huntingdon improvement scheme**

## **Environmental Statement**

### **Appendices**

#### **Appendix 14.4: Construction noise and vibration assumptions and assessment outputs**

Date: December 2014

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# 1 Introduction

- 1.1.1 This appendix provides further and more detailed information in support of the construction noise and vibration assessment for the scheme as reported in *Environmental Statement (ES), Chapter 14*. The information is provided under the following headings:
- Assumptions and limitations; and
  - Impacts and effects during construction: full tabulated results for the construction noise and vibration quantitative assessments of impacts and effects as well as more detailed setting out of the assessment of likely significant effects as reported in the *Chapter 14 of the ES*.
- 1.1.2 The assumptions form the basis of the assessment and should be read in conjunction with the methodology in *Section 14.2 in Chapter 14 of the ES* and the significance criteria set out in detail in *Appendix 14.3 of the ES*.
- 1.1.3 The tabulated results of the assessment for noise and groundborne vibration should be read in conjunction with *Figure 14.3 of the ES*.

## 2 Assumptions and limitations

### 2.1 General assumptions and limitations

2.1.1 Construction works information and assumptions forming the basis of the assessment are presented in *Appendix 3.2 of the ES*, which includes:

- plant assumptions;
- material haulage along the route;
- programme; and
- site plans illustrating borrow pit, soil storage, compound and flood compensation area locations.

2.1.2 Construction plant assumptions relevant to the noise and vibration assessment are, in outline:

- type of equipment;
- number of equipment; and
- average daily (working hours) percentage on-times.

2.1.3 Noise levels for individual plant items are typically taken from *BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – noise* (British Standards Institute, 2014a) supplemented by relevant measured data where necessary.

2.1.4 The assessment assumes the implementation of the principles, management processes and mitigation set out in the *code of construction practice (CoCP)* which forms *Appendix 20.2 of the ES*. In summary the principal mitigation is:

- Best Practicable Means (BPM)<sup>1</sup>, will be applied during construction activities to minimise noise (including vibration) at neighbouring residential properties;
- as part of BPM, mitigation measures will be applied in the following order:
  - noise and vibration control at source: for example the selection of quiet or low vibration equipment, review of construction methodology to consider quieter methods, location of equipment on site, control of working hours, the provision of acoustic enclosures and the use of less intrusive alarms, such as broadband vehicle reversing warnings; and then
  - screening: for example local screening of equipment or perimeter hoarding; and
  - perimeter hoarding around soil storage and borrow pits;

<sup>1</sup> Best Practicable Means are defined in Section 72 of the *Control of Pollution Act 1974* and Section 79 of the *Environmental Protection Act 1990* as those measures which are “reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to financial implications”.

- where, despite the implementation of BPM, the noise exposure exceeds the criteria defined in the *CoCP*, noise insulation or ultimately temporary re-housing will be offered in accordance with the noise insulation and temporary re-housing policy set out in the *CoCP*;
- Main contractors will seek to obtain prior consent from the relevant local authority under *Section 61 of the Control of Pollution Act 1974 (CoPA)* for the proposed construction works. The consent application will set out the final BPM measures to minimise construction noise, including control of working hours, and provide a further assessment of construction noise and vibration including confirmation of noise insulation/temporary re-housing provision;
- contractors will undertake and report such monitoring as is necessary to assure and demonstrate compliance with all noise and vibration commitments. Monitoring data will be provided regularly to and be reviewed by the nominated undertaker and will be made available to the local authorities; and
- contractors will be required to comply with the terms of the *CoCP* and appropriate action will be taken by the nominated undertaker as required to ensure compliance.

## 2.2 Airborne noise

2.2.1 To ensure a reasonable worst case has been assessed for construction noise impacts, the following assumptions have been made which are in line with the information provided within *Appendix 3.2 of the ES*.

### **Borrow pits, soil storage, flood compensation areas and haulage routes**

2.2.2 The locations of borrow pits, soil storage, floodplain compensation areas and haul routes are shown in *Figure 14.3 of the ES*.

2.2.3 Numbers of vehicle movements on haul routes between borrow pits, soil storage, floodplain compensation areas and construction areas have been estimated from a phased construction programme.

2.2.4 Haul routes are generally within the construction site and off the existing strategic road network, with the exception of the Cambridge Northern Bypass, access to some floodplain compensation areas and access to borrow pit 5, that have dedicated haul routes on the existing road network to reach the construction area.

2.2.5 The assessment of noise and vibration from vehicles movements on haul routes within the site boundary and haul routes that provide access to all floodplain compensation areas and borrow pit 5 is included in the direct effects sections of this appendix.

2.2.6 The assessment of noise and vibration from vehicles movements on haul routes outside the site boundary on the Cambridge Northern Bypass is included in the indirect effects sections of this appendix.

- 2.2.7 As a worst case, it is assumed that 20 tonne articulated dump trucks will be used on-site and 12 tonne tipper trucks will be used for movements on the road network. Material movements could also be provided by tipper truck.
- 2.2.8 Noise from haul routes has been predicted from the average monthly vehicle movements for a construction section. In addition worst case predictions have been made from the peak monthly vehicle movements.
- 2.2.9 Concrete and blacktop batching plant have been assumed at each end of the scheme. Assumed locations are at the existing Lafarge batching plant at the Cambridge railhead<sup>2</sup> and within the site boundary for borrow pits 1 or 2.
- 2.2.10 Typical excavation, loading and unloading activities are also expected within the borrow pit and soil storage compound areas.

### **Mainline works**

- 2.2.11 New road and online up-grade works will include earthworks, pavement construction and drainage. It has been assumed that these works move progressively, in line with the timescales of the construction programme. The resultant noise level at receptors from these moving sources has been calculated as a monthly average to reflect the typical noise level during the worst case month during the entire construction programme. Highest daily levels may sometimes be around 5dB higher than the monthly level but could also be substantially lower on other days. Construction noise levels will be lower during other phases and months of the programme.
- 2.2.12 The online sections of the new alignment (sections 1, 4 and 5) would require some night time working for traffic management, installation of signs and traffic management technology and surface tie-ins. The offline sections (2 and 3) are expected to run with majority daytime working.

### **Bridges and viaducts**

- 2.2.13 There are 30 new bridges within the scheme. In addition, 14 existing bridges would be adapted and 4 would be demolished (including the Huntingdon Viaduct).
- 2.2.14 A general pattern of work is assumed for each bridge, which includes piling; pouring foundations; formwork and pouring of piers; laying down bridge beams by crane; building the bridge deck; waterproofing; and dressing the bridge with parapets, barriers and blacktop. Bored piling is anticipated for all bridges and viaducts. It is assumed that the majority of bridge beams will be precast or prefabricated offsite and brought in on the strategic road network.
- 2.2.15 The East Coast mainline bridge is likely to include no more than 20 nights of night time working during a possession of the rail line to install a prefabricated bridge structure over the rail line.

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<sup>2</sup> The noise associated with this existing facility and therefore not assessed under this scheme.

### Huntingdon Viaduct demolition

- 2.2.16 The demolition of Huntingdon Viaduct would include night time working to erect and subsequently dismantle a temporary protection deck over the rail line. It is anticipated that this would be carried out during two Christmas possessions of the railway, which would each last for two to three nights.
- 2.2.17 Demolition, including breaking and excavating activities, would be carried out during core working hours.

### 2.3 Groundborne vibration

- 2.3.1 This section describes the few construction activities that have the potential to cause appreciable groundborne vibration and how they have been assessed.
- 2.3.2 To ensure a reasonable worst case has been assessed for construction vibration impacts, assumptions within the following section have been made which are in line with the information provided within *Appendix 3.2 of the ES*.

#### Vibro-compaction

- 2.3.3 Vibration will occur from rollers used for compaction of earthworks and pavement construction. Vibration predictions are based on typical manufacturers' data for vibratory rollers appropriate for these applications.
- 2.3.4 The prediction method in *BS5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – vibration* (British Standards Institute, 2014b) for start-up and run-down has been used to predict the worst case peak particle velocity (PPV) to assess the risk of building damage and identify mitigation to avoid it.
- 2.3.5 Risk of annoyance has used the steady state prediction method in *BS5228-2: (British Standards Institute, 2014b)*.
- 2.3.6 Vibration levels inside properties have been calculated assuming that dwellings and non-residential properties have a suspended ground floor.
- 2.3.7 Vibro-compaction operations are only expected during daytime.
- 2.3.8 The *CoCP (Appendix 20.2 of the ES)* requires vibration from vibro-compaction above significant observed adverse effects levels (refer to *Appendix 14.3 of the ES*) to be avoided through the use alternative compaction methods such as lower vibration compaction plant or static rollers.

#### Piling

- 2.3.9 Bored piling is not a significant source of vibration. Sheet piling is likely to be necessary for some utilities diversions and may require vibratory driving. However the actual need for vibratory driving and locations for this activity will only be known at the time of the contractor develops its detailed proposals.
- 2.3.10 A detailed assessment and confirmation of any specific noise and vibration mitigation required will be provided as needed in the relevant application to the local authority for prior consent under *section 61 of the Control of Pollution Act 1974* as required by the *CoCP (Appendix 20.2 of the ES)*.



### **Pneumatic breakers**

- 2.3.11 Pneumatic breakers will be required to demolish the Huntingdon Viaduct. The use of such equipment can generate perceptible vibration. It has been assumed that the duration of activities involving breakers will be relatively short (a number of days). A qualitative assessment of the likely effects has been completed. A more detailed assessment and confirmation of any specific noise and vibration mitigation required will be provided as needed in the relevant application to the local authority for prior consent under *section 61 of the Control of Pollution Act 1974* as required by the *CoCP (Appendix 20.2 of the ES)*.

### **Vibration from road traffic**

- 2.3.12 It is assumed that the surface of temporary and permanent access roads and temporary haul routes will be well maintained. A qualitative assessment of the likely effects of groundborne and airborne vibration has been completed. A more detailed assessment and confirmation of any specific noise and vibration mitigation required will be provided as needed in the relevant application to the local authority for prior consent under *section 61 of the Control of Pollution Act 1974* as required by the *CoCP (Appendix 20.2 of the ES)*.

## **2.4 Baseline noise levels**

- 2.4.1 Construction noise assessment requires a baseline noise level against which to assess the significance of effects. The baseline year is 2016, which represents the period prior to the start of construction. Derivation of baseline noise levels is described in *Chapter 4 of Appendix 14.2 of the ES*.

## **2.5 Working hours**

- 2.5.1 The majority of offline works would be undertaken during core working hours as defined in the *CoCP (Appendix 20.2 of the ES)*. Apart from some notable exceptions listed in the following paragraphs, online works would be conducted during core hours where practicable.
- 2.5.2 The following longer term activities are likely to be required to be undertaken during extended working hours, i.e. outside of core working hours, for a period of greater than one month and have been included in the quantitative assessment of construction noise and vibration impacts:
- pavement laying works along the following online sections of road to reduce the impact on existing transport:
    - A1 from Alconbury to Brampton Hut.
    - A1 from Brampton Hut to ECML.
    - A14 Swavesey to Girton.
    - A14 Cambridge Northern Bypass.
  - seasonal earthworks to take advantage of daylight hours during the summer months.

2.5.3 The following short term activities will be required to be undertaken during extended, night-time and weekend working hours for a period of typically less than one week, but in all cases less than one month:

- closure of the East Coast mainline railway to facilitate the installation of safety measures to enable the majority of the demolition of Huntingdon A14 Viaduct during core working hours;
- implementation of temporary road traffic management systems (diversions, temporary traffic lights, etc.);
- some utilities diversions as requested by the statutory undertaker;
- deliveries of oversized loads, as required by the police or Highways Agency; and
- other activities, as required, including extended hours due to engineering practicability, for example extended concrete pours and large piling or diaphragm wall works.

2.5.4 Any noise or vibration from these short term activities will occur for only a short duration and would not result in a likely significant effect. They have therefore not been considered further within the assessment. Any noise or vibration arising from these activities will be controlled and minimised by complying with the *CoCP (Appendix 20.2 of the ES)* with a more detailed assessment and confirmation of any specific noise and vibration mitigation required provided in the relevant application to the local authority for prior consent under *section 61 of the Control of Pollution Act 1974* before works on site commence.

## 3 Impacts and effects during construction

### 3.1 Introduction

3.1.1 The assessment is reported first for groundborne vibration and then for airborne noise. Under each of these headings, the results of the quantitative identification of impacts and effects are presented, followed by the identification of significant effects and the evidence used to support these conclusions.

3.1.2 The structure of this section of *Appendix 14.4* is as follows:

- avoidance and mitigation measures;
- quantitative identification of impact and effects;
- groundborne vibration:
  - residential; and
  - non-residential.
- airborne noise:
  - residential; and
  - non-residential.
- assessment of impacts and effects:
  - residential receptors: direct effects – dwellings;
  - residential receptors: direct effects – communities;
  - residential receptors: indirect effects;
  - non-residential receptors: direct effects;
  - non-residential receptors: indirect effects; and
  - cumulative effects from the proposed scheme and other committed development.

3.1.3 The assessment of construction noise and vibration on Quiet Areas is reported in *Chapter 14 of the ES*.







### 3.2 Quantitative identification of impacts and effects - groundborne vibration

3.2.1 The assessment results, impact criteria and significance criteria for the assessment of the scheme at residential and non-residential receptors are presented in *Table 3.1* and *Table 3.2*. The tables present:

- the peak particle velocity on the foundation used to assess the risk of building damage due to vibration; and
- the calculated vibration dose value used to assess the impact of vibration on building occupants.

3.2.2 *Table 3.1* and *Table 3.2* should be read in conjunction with the assessment in *Chapter 14 of the ES* and *Figure 14.3 of the ES*.

**Key for Tables 3.1 and 3.2**

	Where a vibration dose value (VDV) is highlighted in yellow the levels result in an minor impact and potentially an effect on receptors
	Where a VDV is highlighted in orange the levels result in an moderate impact and potentially an effect on receptors
	Where a VDV is highlighted in red the levels result in a major impact and potentially an effect on receptors
	Where a VDV is highlighted in green the levels are above the impact criterion specified for the non-residential building use
	Where a PPV value is highlighted in blue the level is greater than the vibration impact criteria for structurally sound buildings as a result of continuous vibration
	Where the significant effect column is highlighted in pink, then a likely significant effect is identified at the referenced community, or individual residential or non-residential receptor.

R Type of receptor: residential

V Type of receptor:

V1 vibration sensitive research and manufacturing, hospital, and university equipment;

V2 hotels, hospital wards and education dormitories;

V3 offices, schools and places of worship;

V4 workshops.

~ Significant effect column - impacted dwellings where the vibration exposure is not significant in terms of government policy and which are either spatially remote from larger defined residential areas, or a small number of dwellings whose impact is not considered to represent the larger defined residential area, or the duration is short and as such the adverse effects are not considered to represent a likely significant effect within the *ES*.

B Beneficial effect

NA Generally no adverse effect

A Adverse effect

S Significant adverse effect

**Table 3.1: Assessment of construction induced groundborne vibration at residential receptors**

Assessment location		Impact criteria			Significance criteria				Significant effect
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Highest monthly daily vibration dose value (VDV) [m/s <sup>1.75</sup> ] (07:00-19:00)	Construction activity resulting in highest forecast noise levels	Type of effect	Number of Impacts represented	Type of receptor	Combined effect	
<b>A1 Alconbury to Brampton Hut</b>									
209	Brooklands Lane, Alconbury	0.4	0.16	Vibratory roller compaction	NA	2	R	--	
211	Great North Road, Alconbury, Huntingdon	0.3	0.12	Vibratory roller compaction	NA	1	R	--	
<b>A1 A14 Brampton Hut to ECML</b>									
209	Brooklands Lane, Alconbury	0.4	0.16	Vibratory roller compaction	NA	2	R	--	
211	Great North Road, Alconbury, Huntingdon	0.3	0.12	Vibratory roller compaction	NA	1	R	--	
253	Thrapston Road, Ellington	1.3	0.43	Vibratory roller compaction	NA	2	R	--	~
257	Great North Road, Brampton	0.5	0.2	Vibratory roller compaction	NA	1	R	--	~
525	Buckden Road, Brampton	1.3	0.43	Vibratory roller compaction	NA	2	R	--	~
528	Brampton Road, Buckden, St. Neots	< 2.5	< 0.8	Vibratory roller compaction	NA	2	R	--	~
<b>ECML to Swavesey</b>									
539	Offord Road, Godmanchester	< 2.5	< 0.8	Vibratory roller compaction	NA	1	R	--	~
560	Fenstanton Road, Hilton	0.5	0.18	Vibratory roller compaction	NA	4	R	--	
564	Hilton Road, Fenstanton	1.7	0.53	Vibratory roller compaction	NA	1	R	Yes	~
656	Elsworth Road, Conington	0.3	0.12	Vibratory roller compaction	NA	2	R	--	

Assessment location		Impact criteria			Significance criteria				Significant effect
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Highest monthly daily vibration dose value (VDV) [m/s <sup>1.75</sup> ] (07:00-19:00)	Construction activity resulting in highest forecast noise levels	Type of effect	Number of Impacts represented	Type of receptor	Combined effect	
<b>Swavesey to Girton</b>									
678	Anderson Road, Swavesey	0.4	0.15	Vibratory roller compaction	NA	1	R	--	
686	Huntingdon Road, Lolworth	< 2.5	< 0.8	Vibratory roller compaction	NA	4	R	--	~
707	Almond Grove, Bar Hill, Cambridge	0.3	0.12	Vibratory roller compaction	NA	34	R	--	
752	Huntingdon Road, Girton	< 2.5	< 0.8	Vibratory roller compaction	NA	6	R	Yes	~
753	Huntingdon Road, Girton	0.5	0.19	Vibratory roller compaction	NA	3	R	--	
754	Huntingdon Road, Girton	< 2.5	< 0.8	Vibratory roller compaction	NA	3	R	--	~
757	Huntingdon Road, Lolworth	< 2.5	< 0.8	Vibratory roller compaction	NA	2	R	--	~
15935	Huntingdon Road, Lolworth	0.7	0.25	Vibratory roller compaction	NA	7	R	--	~
<b>A14 Cambridge Northern Bypass</b>									
760	Huntingdon Road, Girton	1.8	0.56	Vibratory roller compaction	NA	2	R	Yes	~
763	Huntingdon Road, Girton	0.3	0.14	Vibratory roller compaction	NA	6	R	--	
788	Cambridge Road, Impington	2	0.61	Vibratory roller compaction	NA	12	R	Yes	~
797	Chieftain Way, Cambridge	0.4	0.16	Vibratory roller compaction	NA	82	R	--	~
798	Engledow Drive, Cambridge	0.7	0.26	Vibratory roller compaction	NA	30	R	--	~
799	Flack End, Cambridge	1.0	0.35	Vibratory roller compaction	NA	43	R	--	~
868	Cambridge Road, Impington	0.7	0.26	Vibratory roller compaction	NA	3	R	--	~
922	Cambridge Road, Impington	0.4	0.15	Vibratory roller compaction	NA	1	R	--	

Assessment location		Impact criteria			Significance criteria				Significant effect
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Highest monthly daily vibration dose value (VDV) [m/s <sup>1.75</sup> ] (07:00-19:00)	Construction activity resulting in highest forecast noise levels	Type of effect	Number of Impacts represented	Type of receptor	Combined effect	
8001	Girton Road, Girton, Cambridge	0.3	0.11	Vibratory roller compaction	NA	8	R	--	
8004	Girton Road, Girton, Cambridge	0.7	0.27	Vibratory roller compaction	NA	3	R	--	~
8007	Wellbrook Court, Girton, Cambridge	0.3	0.13	Vibratory roller compaction	NA	4	R	--	
8010	Huntingdon Road, Girton	0.3	0.14	Vibratory roller compaction	NA	1	R	--	
8014	Weavers Field, Girton, Cambridge	0.6	0.22	Vibratory roller compaction	NA	19	R	--	~
8017	Weavers Field, Girton, Cambridge	0.3	0.12	Vibratory roller compaction	NA	44	R	--	
10020	Kings Hedges Road, Cambridge	0.4	0.16	Vibratory roller compaction	NA	1	R	--	
10042	Chieftain Way, Cambridge	0.4	0.15	Vibratory roller compaction	NA	31	R	--	
10072	Neal Drive, Cambridge	0.3	0.14	Vibratory roller compaction	NA	23	R	--	
18001	Orchard Park, Cambridge	0.7	0.26	Vibratory roller compaction	NA	180	R	--	~
<b>Huntingdon improvements</b>									
944	The Walks North, Huntingdon	0.5	0.19	Vibratory roller compaction	NA	3	R	--	
5121	St. Marys Street, Huntingdon	0.4	0.15	Vibratory roller compaction	NA	39	R	--	
5221	Brampton Road, Huntingdon	0.3	0.13	Vibratory roller compaction	NA	22	R	--	
5222	Brampton Road, Huntingdon	0.3	0.12	Vibratory roller compaction	NA	6	R	--	
5223	Brampton Road, Huntingdon	0.4	0.17	Vibratory roller compaction	NA	82	R	--	
5231	The Walks North, Huntingdon	0.5	0.19	Vibratory roller compaction	NA	2	R	--	
5395	Percy Green Place, Huntingdon	0.3	0.11	Vibratory roller compaction	NA	114	R	--	

Assessment location		Impact criteria			Significance criteria				Significant effect
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Highest monthly daily vibration dose value (VDV) [m/s <sup>1.75</sup> ] (07:00-19:00)	Construction activity resulting in highest forecast noise levels	Type of effect	Number of Impacts represented	Type of receptor	Combined effect	
5407	Scholars Avenue, Huntingdon	0.3	0.14	Vibratory roller compaction	NA	50	R	--	
5414	Station Approach, Huntingdon	0.8	0.28	Vibratory roller compaction	NA	6	R	--	~
5417	Mill Common, Huntingdon	1.6	0.51	Vibratory roller compaction	NA	6	R	--	~
5419	Mill Common, Huntingdon	1.1	0.36	Vibratory roller compaction	NA	6	R	--	~
5419	Mill Common, Huntingdon	1.1	0.18	Vibratory roller compaction	NA	10	R	--	
5420	Mill Common, Huntingdon	1.1	0.38	Vibratory roller compaction	NA	3	R	--	~
5422	Waters Meet, Huntingdon	0.3	0.13	Vibratory roller compaction	NA	24	R	--	
5426	Mill Common, Huntingdon	0.3	0.14	Vibratory roller compaction	NA	8	R	--	
5430	Brampton Road, Huntingdon	0.4	0.15	Vibratory roller compaction	NA	1	R	--	
5431	Brampton Road, Huntingdon	0.4	0.17	Vibratory roller compaction	NA	1	R	--	



**Table 3.2 Assessment of construction induced groundborne vibration at non-residential receptors**

Assessment location		Impact criteria			Significance criteria				Significant effect
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Highest monthly daily vibration dose value (VDV) [m/s <sup>1.75</sup> ] (07:00-19:00)	Construction activity resulting in highest forecast noise levels	Type of effect	Number of Impacts represented	Type of receptor	Combined effect	
<b>A1 Alconbury to Brampton Hut</b>									
215	Research Centre, Woolley Lane	0.1	0.07	Vibratory roller compaction	S	2	V1	--	CV_N01
227	Research Centre, Woolley Lane	0.1	0.08	Vibratory roller compaction	S	1	V1	--	CV_N01
<b>A1 A14 Brampton Hut to ECML</b>									
258	Premier Inn Hotel, Brampton Hut	0.3	0.19	Vibratory roller compaction	NA	3	V2	--	
<b>ECML to Swavesey</b>									
<i>There are no non-residential assessment locations with predicted appreciable levels of vibration within this section</i>									
<b>Swavesey to Girton</b>									
671	Days Inn Hotel, Cambridge Services	0.2	0.12	Vibratory roller compaction	NA	12	V3	--	
676	Commercial Units, Anderson Road, Swavesey	< 1.0	< 0.4	Vibratory roller compaction	NA	18	V3	--	
678	Commercial Units, Anderson Road, Swavesey	0.2	0.15	Vibratory roller compaction	NA	30	V3	--	
698	Travel Lodge Hotel, Bar Hill	0.2	0.11	Vibratory roller compaction	NA	3	V3	--	
709	Menzies Cambridge Hotel and Golf Course, Bar Hill	0.5	0.3	Vibratory roller compaction	NA	1	V3	--	
747	Crematorium, Girton	0.2	0.13	Vibratory roller compaction	NA	3	V3	--	

Assessment location		Impact criteria			Significance criteria				Significant effect
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Highest monthly daily vibration dose value (VDV) [ $\text{m/s}^{1.75}$ ] (07:00-19:00)	Construction activity resulting in highest forecast noise levels	Type of effect	Number of Impacts represented	Type of receptor	Combined effect	
755	Catch Hall, Girton	0.7	0.41	Vibratory roller compaction	NA	1	V5	--	
<b>A14 Cambridge Northern Bypass</b>									
761	Biotechnology Centre, Huntingdon Road, Cambridge	0.6	0.32	Vibratory roller compaction	NA	1	V4	--	
763	Cambridge University Farm, Girton	0.2	0.14	Vibratory roller compaction	NA	2	V3	--	
10002	Commercial Offices, Milton Road, Cambridge	0.2	0.11	Vibratory roller compaction	NA	1	V3	--	
10017	Travelodge Hotel, Impington	< 1.0	< 0.4	Vibratory roller compaction	NA	2	V3	--	
10020	Cambridge Regional College, Kings Hedges Road, Cambridge	0.2	0.16	Vibratory roller compaction	NA	2	V3	--	
10028	Premier Inn Hotel, Impington	< 1.0	< 0.4	Vibratory roller compaction	NA	2	V2	--	
10035	Commercial Offices, Milton Road, Cambridge	0.2	0.13	Vibratory roller compaction	NA	6	V3	--	
10035	Commercial Offices, Milton Road, Cambridge	0.2	0.13	Vibratory roller compaction	NA	6	V3	--	
10048	Commercial Offices, Milton Road, Cambridge	0.1	0.08	Vibratory roller compaction	NA	2	V3	--	
10055	Commercial Offices and Research Centre, Milton Road, Cambridge	0.1	0.04	Vibratory roller compaction	S	11	V1	--	CV_N02

Assessment location		Impact criteria			Significance criteria				Significant effect
ID	Area represented	Peak particle velocity (PPV) [mm/s] on foundation	Highest monthly daily vibration dose value (VDV) [ $\text{m/s}^{1.75}$ ] (07:00-19:00)	Construction activity resulting in highest forecast noise levels	Type of effect	Number of Impacts represented	Type of receptor	Combined effect	
<b>Huntingdon improvements</b>									
5222	Dental Surgery, Brampton Road, Huntingdon	0.2	0.12	Vibratory roller compaction	NA	1	V2	--	
5403	Cambridgeshire Constabulary HQ, Huntingdon	0.6	0.35	Vibratory roller compaction	NA	2	V3	--	
5414	Huntingdon Railway Station, Huntingdon	0.5	0.28	Vibratory roller compaction	NA	3	V3	--	
5430	Hinchingbrooke School, Brampton Road, Huntingdon	0.2	0.15	Vibratory roller compaction	NA	4	V2	--	

*Residential receptors: direct effects*

- 3.2.3 A number of minor and moderate construction vibration impacts are predicted at residential properties during ground compaction works. These works will be undertaken over short durations, typically less than one week at any location. The impact would have no risk of damage to any property. The vibration is likely to be perceptible to people for short periods but would not be disruptive particularly given the forewarning liaison requirement of the CoCP. Therefore when considering the duration, the further mitigation identified in the CoCP and the impact classification we do not consider this to result in a likely significant effect.
- 3.2.4 Future detailed assessment will be carried out during the preparation of the relevant section 61 consent applications to determine the appropriate compaction methods to avoid major impacts and hence avoid the likely significant effects.

*Residential receptors: indirect effects*

- 3.2.5 Construction traffic is expected on the local road network on the Cambridge Northern Bypass. Baseline traffic flows on these roads are such that the addition of construction traffic will cause negligible increases in airborne vibration.
- 3.2.6 As required by the CoCP (*Appendix 20.2 of the ES*), the surface of temporary and permanent access roads and temporary haul routes will be well maintained. Therefore significant effects due to groundborne vibration from construction traffic on haulage routes are highly unlikely.
- 3.2.7 Consequently no indirect significant effects are expected at residential receptors.

*Non-residential: direct effects*

- 3.2.8 Construction vibration levels are not predicted to be greater than the groundborne vibration impact screening criteria for the relevant non-residential building use due to vibratory compaction works.
- 3.2.9 Potentially vibration-sensitive facilities have been identified at the research centre between Alconbury and Brampton Hut and advanced technologies and bioscience research centre in Cambridge Science Park. Significant adverse vibration effects (CV-N01 and CV-N02) have been identified on a worst case basis<sup>3</sup> at these receptors. Before construction commences in consultation with the property owners and occupants, the Highways Agency will refine the assessment and bring forward any additional mitigation measures that may be required at these locations. The magnitude and duration of any significant effect and the mitigation to avoid it would be included in the relevant final Local Environmental Management Plan following further engagement with the owners and operators as noted above.

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<sup>3</sup> With regard to the assumed design and sensitivity of the receptor

- 3.2.10 Any additional mitigation will be confirmed in the relevant *Local Environmental Management Plan (LEMP)*, as described in *Chapter 20 of the ES*, and then the relevant section 61 consents in accordance with the *CoCP (Appendix 20.2 of the ES)*. Mitigation will be selected using the guidance provided in the *CoCP* and considering engineering practicability and implications for other environmental disciplines.
- 3.2.11 The predicted vibration levels do not exceed the building damage criterion at any non-residential properties.
- Non-residential: indirect effect*
- 3.2.12 For the reasons discussed above, significant indirect vibration effects on non-residential receptors arising from construction traffic are unlikely.

### **3.3 Airborne noise**

The assessment results, impact criteria and significance criteria for the assessment of the scheme at residential and non-residential receptors are presented in *Table 3.3* and *Table 3.4*. These tables should be read in conjunction with the assessment in *Chapter 14 of the ES* and *construction noise and vibration Figure 14.3 of the ES*.

- 3.3.1 The construction activity resulting in highest forecast noise levels is tabulated for each assessment location and time period. The tabulated noise levels are typical for the worst month or months during that construction activity. Construction noise levels will be lower during other activities and at other times.

**Key for Tables 3.3 and 3.4**

	Where a value is highlighted in yellow the levels result in an impact and potential adverse effect on receptors (consistent with BS5228 Part 1)
	Where the significant effect column is highlighted in pink, then a likely significant effect is identified at the referenced community, or individual residential or non-residential receptor.
R	Type of receptor: residential
G	Type of receptor:
3.2	G3 places of meeting for religious worship, cinemas, courts, lecture theatres, museums and auditoria or halls;
3.3	G4 schools colleges, hospitals, hotels and libraries;
3.4	G5 offices and general commercial premises.
NI	Mitigation effect: identified as likely to qualify for noise insulation as set out in the <i>CoCP (Appendix 20.2 of the ES)</i> . Noise insulation packages will substantially reduce internal noise levels so that they are not disruptive and significant effects inside the dwellings will therefore be avoided.
H	Existing environment: high existing ambient noise levels: daytime level more than $75\text{dB}_{\text{pAeq},12\text{hr}}$ , evening levels more than $65\text{dB}_{\text{pAeq},4\text{hr}}$ or night-time level more than $55\text{dB}_{\text{pAeq},1\text{hr}}$ at the façade.
~	Impacted dwellings which are either spatially remote from larger defined residential areas, or a small number of dwellings whose impact is not considered to represent the larger defined residential area and as such are not considered to be part of a community significant effect.
BA	Beneficial effect
NA	Generally no adverse effect
A	Adverse effect
S	Significant adverse effect

**Table 3.3: Assessment of construction noise at residential receptors**

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
<b>A1 Alconbury to Brampton Hut</b>													
209	Brooklands Lane, Alconbury, Huntingdon	53 / 65 [C]	57 / 57 [C+]	55 / 56 [C+]	Site Clearance	NA	2	-	R	H	--		
211	Great North Road, Alconbury, Huntingdon	55 / 63 [B]	56 / 56 [C]	- / - [C+]	Earthworks	NA	1	-	R	--	--		
230	Thrapston Road, Ellington, Huntingdon	<45/<45 [A]	- / - [B]	- / - [C]	Haul route	NA	1	-	R	--	--		
231	Thrapston Road, Ellington, Huntingdon	<45/<45 [A]	- / - [B]	- / - [C]	Haul route	NA	2	-	R	--	--		
<b>A1 A14 Brampton Hut to ECML</b>													
253	Thrapston Road, Ellington, Huntingdon	64 / 72 [C]	49 / 62 [C+]	- / - [C+]	Earthworks	NA	2	-	R	H	--		
257	Great North Road, Brampton, Huntingdon	67 / 70 [A]	54 / 64 [C]	43 / 45 [C]	Earthworks	A	1	42	R	--	--		~
516	Elizabethan Way, Brampton, Huntingdon	55 / 63 [A]	49 / 59 [C]	- / - [C]	Earthworks	NA	103	-	R	--	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
520	Grafham Road, Huntingdon	63 / 64 [A]	48 / 53 [B]	- / - [C]	Soil storage	NA	1	-	R	--	--		
522	Sokemans Way, Brampton, Huntingdon	67 / 67 [A]	47 / 51 [A]	- / - [C]	Soil storage	A	10	42	R	--	--		CN_C01
523	Acheson Road, Brampton, Huntingdon	56 / 56 [A]	40 / 40 [A]	- / - [B]	Soil storage	NA	23	-	R	--	--		
525	Buckden Road, Brampton, Huntingdon	64 / 64 [B]	47 / 50 [C]	- / - [C+]	Soil storage	NA	2	-	R	H	--		
528	Brampton Road, Buckden, St. Neots	70 / 72 [C]	54 / 63 [C+]	- / - [C+]	Soil storage	NA	2	-	R	H	--		
533	Brampton Road, Buckden, St. Neots	58 / 63 [A]	50 / 58 [A]	- / - [B]	Earthworks	A	1	1	R	--	--		~
1060	Throckmorton Drive, Brampton, Huntingdon	61 / 61 [A]	47 / 50 [A]	- / - [C]	Soil storage	NA	20	-	R	--	--		
1062	Sparrow Close, Brampton, Huntingdon	60 / 61 [A]	45 / 47 [A]	- / - [C]	Soil storage	NA	20	-	R	--	--		



Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor L <sub>pAeq</sub> [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
1063	Acheson Road, Brampton, Huntingdon	58 / 58 [A]	41 / 42 [A]	- / - [B]	Soil storage	NA	26	-	R	--	--		
1064	Buckden Road, Brampton, Huntingdon	59 / 59 [B]	- / - [C]	- / - [C+]	Soil storage	NA	1	-	R	H	--		
1074	Sparrow Close, Brampton, Huntingdon	61 / 61 [A]	44 / 46 [A]	- / - [B]	Borrow pits	NA	8	-	R	--	--		
1077	Montagu Road, Brampton, Huntingdon	61 / 61 [A]	- / - [A]	- / - [C]	Soil storage	NA	7	-	R	--	--		
1078	Montagu Road, Brampton, Huntingdon	58 / 58 [A]	- / - [A]	- / - [B]	Soil storage	NA	11	-	R	--	--		
1080	Gloucester Road, Brampton, Huntingdon	56 / 56 [A]	- / - [A]	- / - [B]	Soil storage	NA	2	-	R	--	--		
1118	Hansell Road, Brampton, Huntingdon	56 / 62 [A]	52 / 58 [C]	- / - [C]	Earthworks	NA	46	-	R	--	--		
18002	Mill Road, East of Buckden	55 / 62 [A]	- / - [A]	/ - [A]	Earthworks	NA	9	-	R	--	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
<b>ECML to Swavesey</b>													
537	High Street, Offord Cluny, St. Neots	50 / 53 [A]	42 / 48 [C]	- / - [C]	Offord Bridge	NA	26	-	R	--	--		
539	Offord Road, Godmanchester, Huntingdon	62 / 64 [C]	51 / 57 [C+]	- / - [C+]	Soil storage	NA	1	-	R	H	--		
540	Offord Road, Godmanchester, Huntingdon	55 / 57 [B]	47 / 49 [C]	- / - [C+]	Soil storage	NA	1	-	R	H	--		
546	Lattenbury Hill, Huntingdon	56 / 58 [A]	45 / 50 [A]	- / - [B]	Site Clearance	NA	1	-	R	--	--		
547	London Road, Godmanchester, Huntingdon	63 / 66 [A]	54 / 60 [A]	- / - [B]	Soil storage	A	1	2	R	--	--		~
548	London Road, Godmanchester, Huntingdon	60 / 64 [A]	54 / 59 [B]	- / - [C]	Soil storage	NA	1	-	R	--	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
549	Offord Road, Godmanchester, Huntingdon	55 / 56 [A]	44 / 46 [B]	- / - [C]	Soil storage	NA	1	-	R	--	--		
560	Fenstanton Road, Hilton, Huntingdon	63 / 67 [A]	57 / 63 [B]	- / - [C]	Hilton Road Bridge	A	1	3	R	--	--		~
564	Hilton Road, Fenstanton, Huntingdon	64 / 69 [A]	55 / 65 [A]	- / - [B]	Hilton Road Bridge	A	1	5	R	--	Yes		~
565	Pear Tree Close, Fenstanton, Huntingdon	59 / 61 [A]	44 / 51 [A]	- / - [B]	Soil storage	NA	33	-	R	--	--		
571	West End Road, Fenstanton, Huntingdon	52 / 55 [A]	46 / 49 [A]	- / - [C]	Hilton Road Bridge	NA	3	-	R	--	--		
656	Elsworth Road, Conington, Cambridge	66 / 68 [A]	53 / 56 [B]	- / - [C]	Soil storage	A	2	39	R	--	--		~

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
<b>Swavesey to Girton</b>													
663	Huntingdon Road, Conington, Cambridge	55 / 59 [B]	46 / 54 [C]	46 / 55 [C+]	Pavement / Surfacing	NA	1	-	R	H	--		
685	Huntingdon Road, Lolworth, Cambridge	58 / 62 [A]	51 / 56 [C]	52 / 56 [C]	Pavement / Surfacing	A	1	1	R	H	--		~
686	Huntingdon Road, Lolworth, Cambridge	62 / 70 [C+]	60 / 65 [C+]	59 / 67 [C+]	Pavement / Surfacing	NA	4	-	R	H	--		
691	Robins Lane, Lolworth, Cambridge	60 / 61 [A]	42 / 49 [B]	44 / 49 [C]	Soil storage	NA	10	-	R	--	--		
693	Robins Lane, Lolworth, Cambridge	58 / 61 [A]	46 / 51 [B]	46 / 51 [C]	Soil storage	NA	4	-	R	--	--		
694	Bar Road, Lolworth, Cambridge	57 / 60 [A]	46 / 54 [B]	44 / 50 [C]	Soil storage	NA	2	-	R	--	--		
703	Trafalgar Way, Bar Hill, Cambridge	47 / 54 [A]	45 / 49 [B]	42 / 47 [C]	Pavement / Surfacing	NA	2	-	R	--	--		
707	Almond Grove, Bar Hill, Cambridge	54 / 61 [B]	50 / 57 [C]	47 / 54 [C+]	Earthworks	NA	34	-	R	H	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
717	Foxhollow, Bar Hill, Cambridge	50 / 61 [B]	48 / 55 [C]	46 / 56 [C+]	Pavement / Surfacing	NA	45	-	R	H	--		
720	High Street, Boxworth, Cambridge	55 / 55 [A]	- / - [B]	- / - [C]	Soil storage	NA	9	-	R	--	--		
725	Gladeside, Bar Hill, Cambridge	48 / 53 [A]	44 / 47 [B]	42 / 46 [C]	Bar Hill Junction Bridge No.3	NA	18	-	R	--	--		
727	Gladeside, Bar Hill, Cambridge	44 / 54 [A]	43 / 49 [A]	42 / 45 [B]	Earthworks	NA	46	-	R	--	--		
728	Foxhollow, Bar Hill, Cambridge	47 / 54 [A]	43 / 46 [A]	42 / 46 [B]	Earthworks	NA	41	-	R	--	--		
729	Foxhollow, Bar Hill, Cambridge	49 / 58 [A]	47 / 51 [B]	45 / 52 [C]	Pavement / Surfacing	NA	44	-	R	--	--		
732	The Brambles, Bar Hill, Cambridge	50 / 56 [A]	45 / 51 [C]	46 / 50 [C]	Earthworks	NA	46	-	R	--	--		
736	Hollytrees, Bar Hill, Cambridge	47 / 55 [A]	44 / 49 [A]	42 / 48 [B]	Earthworks	NA	26	-	R	--	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
737	The Brambles, Bar Hill, Cambridge	49 / 54 [A]	44 / 50 [B]	44 / 51 [C]	Pavement / Surfacing	NA	12	-	R	--	--		
746	Huntingdon Road, Bar Hill, Cambridge	49 / 58 [A]	50 / 55 [C]	- / - [C]	Earthworks	NA	1	-	R	--	--		
752	Huntingdon Road, Girton, Cambridge	58 / 73 [C+]	51 / 69 [C+]	52 / 70 [C+]	Pavement / Surfacing	A	6	1	R	H	Yes		CN_C02
753	Huntingdon Road, Girton, Cambridge	54 / 60 [C]	51 / 57 [C+]	47 / 55 [C+]	Earthworks	NA	3	-	R	H	--		
754	Huntingdon Road, Girton, Cambridge	54 / 60 [C+]	50 / 55 [C+]	46 / 53 [C+]	Girton Junction Bridge No.3	NA	3	-	R	H	--		
756	The Avenue, Madingley, Cambridge	57 / 58 [A]	44 / 46 [B]	- / - [C]	Soil storage	NA	1	-	R	--	--		
757	Huntingdon Road, Lolworth, Cambridge	64 / 73 [C+]	56 / 68 [C+]	54 / 70 [C+]	Pavement / Surfacing	NA	2	-	R	H	--		
759	Bar Road, Lolworth, Cambridge	64 / 65 [A]	47 / 56 [B]	45 / 52 [C]	Soil storage	NA	3	-	R	--	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
15935	Huntingdon Road, Lolworth, Cambridge	50 / 58 [B]	48 / 53 [C]	47 / 55 [C+]	Pavement / Surfacing	NA	7	-	R	--	--		
<b>A14 Cambridge Northern Bypass</b>													
760	Huntingdon Road, Girton, Cambridge	53 / 73 [C]	48 / 69 [C+]	51 / 70 [C+]	Pavement / Surfacing	S	2	2	R	H	Yes	NI	
763	Huntingdon Road, Girton, Cambridge	47 / 59 [C]	43 / 55 [C+]	42 / 56 [C+]	Pavement / Surfacing	NA	6	-	R	H	--		
764	Huntingdon Road, Girton, Cambridge	46 / 49 [A]	41 / 44 [C]	46 / 46 [C+]	Pavement / Surfacing	NA	9	-	R	H	--		
785	Cambridge Road, Impington, Cambridge	55 / 60 [C]	52 / 59 [C+]	42 / 50 [C+]	Site Clearance	NA	1	-	R	--	--		
788	Cambridge Road, Impington, Cambridge	53 / 62 [B]	50 / 57 [C]	49 / 56 [C]	Pavement / Surfacing	A	12	1	R	H	Yes		CN_C04
789	Lone Tree Avenue, Impington, Cambridge	55 / 63 [B]	51 / 59 [C]	50 / 58 [C+]	Pavement / Surfacing	A	13	1	R	--	--		CN_C04
796	Cambridge Road, Impington, Cambridge	52 / 59 [A]	50 / 53 [B]	49 / 53 [C]	Site Clearance	NA	23	-	R	--	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
797	Chieftain Way, Cambridge	53 / 60 [A]	50 / 56 [B]	49 / 55 [C]	Earthworks	NA	72	-	R	--	--		
798	Engledow Drive, Cambridge	62 / 69 [B]	61 / 65 [C]	60 / 64 [C+]	Pavement / Surfacing	S	30	3	R	H	--	NI	CN_C06
799	Flack End, Cambridge	58 / 65 [B]	53 / 62 [C]	52 / 61 [C]	Pavement / Surfacing	S	37	1	R	H	--	NI	CN_C06
801	Chieftain Way, Cambridge	49 / 56 [A]	46 / 51 [C]	43 / 51 [C]	Site Clearance	NA	19	-	R	--	--		
802	Central Avenue, Cambridge	48 / 55 [A]	46 / 50 [A]	42 / 49 [B]	Site Clearance	NA	11	-	R	--	--		
803	Central Avenue, Cambridge	49 / 56 [B]	47 / 51 [C]	43 / 50 [C+]	Site Clearance	NA	12	-	R	--	--		
804	Topper Street, Cambridge	54 / 62 [A]	50 / 56 [B]	46 / 55 [C]	Earthworks	NA	29	-	R	--	--		
805	Topper Street, Cambridge	53 / 61 [A]	46 / 56 [B]	45 / 55 [C]	Site Clearance	NA	30	-	R	--	--		



Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
807	Central Avenue, Cambridge	50 / 58 [A]	48 / 53 [A]	43 / 52 [B]	Pavement / Surfacing	A	21	1	R	--	--		CN_C05
811	Chieftain Way, Cambridge	46 / 52 [A]	46 / 51 [B]	38 / 46 [C]	Site Clearance	NA	88	-	R	--	--		
843	Caravere Close, Cambridge	50 / 56 [B]	46 / 53 [C]	42 / 52 [C+]	Earthworks	NA	76	-	R	--	--		
848	Armitage Way, Cambridge	48 / 52 [A]	44 / 48 [A]	41 / 47 [B]	Site Clearance	NA	167	-	R	--	--		
851	Lone Tree Grove, Impington, Cambridge	50 / 55 [A]	48 / 50 [B]	47 / 49 [C]	Site Clearance	NA	22	-	R	H	--		
853	Cambridge Road, Impington, Cambridge	49 / 54 [A]	47 / 48 [C]	45 / 47 [C]	Site Clearance	NA	5	-	R	H	--		
858	Highfield Road, Impington, Cambridge	49 / 53 [A]	44 / 50 [B]	43 / 49 [C]	Earthworks	NA	8	-	R	--	--		
863	The Coppice, Impington, Cambridge	47 / 52 [C]	45 / 48 [C+]	44 / 47 [C+]	Site Clearance	NA	29	-	R	H	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
868	Cambridge Road, Impington, Cambridge	54 / 73 [C+]	60 / 70 [C+]	59 / 69 [C+]	Site Clearance	A	3	1	R	H	--		~
869	St. Vincents Close, Girton, Cambridge	47 / 53 [A]	44 / 46 [A]	42 / 45 [B]	Site Clearance	NA	14	-	R	--	--		
871	St. Vincents Close, Girton, Cambridge	46 / 51 [A]	44 / 46 [B]	43 / 46 [C]	Earthworks	NA	14	-	R	--	--		
873	St. Vincents Close, Girton, Cambridge	47 / 52 [A]	44 / 46 [B]	42 / 46 [C]	Pavement / Surfacing	NA	22	-	R	--	--		
922	Cambridge Road, Impington, Cambridge	54 / 70 [C]	54 / 67 [C+]	53 / 66 [C+]	Pavement / Surfacing	S	1	-	R	H	--		~
5632	Cambridge Road, Milton, Cambridge	47 / 48 [B]	44 / 44 [C]	43 / 43 [C+]	Site Clearance	NA	6	-	R	--	--		
8001	Girton Road, Girton, Cambridge	51 / 67 [C]	48 / 61 [C]	44 / 60 [C+]	Site Clearance	NA	8	-	R	H	--		
8004	Girton Road, Girton, Cambridge	56 / 75 [C]	55 / 68 [C+]	48 / 67 [C+]	Site Clearance	A	3	1	R	H	--		CN_C03

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
8007	Wellbrook Court, Girton, Cambridge	51 / 66 [B]	48 / 60 [C]	44 / 59 [C+]	Site Clearance	NA	4	-	R	H	--		
8010	Huntingdon Road, Girton, Cambridge	49 / 57 [B]	47 / 54 [C]	46 / 54 [C+]	Pavement / Surfacing	NA	1	-	R	H	--		
8014	Weavers Field, Girton, Cambridge	49 / 65 [B]	47 / 59 [C]	46 / 58 [C+]	Site Clearance	NA	19	-	R	H	--		
8017	Weavers Field, Girton, Cambridge	48 / 58 [A]	43 / 52 [B]	42 / 51 [C]	Site Clearance	NA	44	-	R	--	--		
8019	Girton Road, Girton, Cambridge	51 / 61 [B]	45 / 54 [C]	42 / 53 [C+]	Site Clearance	NA	16	-	R	--	--		
8021	Girton Road, Girton, Cambridge	53 / 60 [B]	46 / 52 [C]	42 / 52 [C+]	Site Clearance	NA	12	-	R	--	--		
8023	Pepys Way, Girton, Cambridge	48 / 57 [A]	42 / 50 [B]	41 / 49 [C]	Site Clearance	NA	21	-	R	--	--		
8026	St. Vincents Close, Girton, Cambridge	47 / 53 [A]	44 / 46 [B]	42 / 45 [C]	Site Clearance	NA	11	-	R	--	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
8032	St. Vincents Close, Girton, Cambridge	48 / 53 [A]	46 / 49 [C]	45 / 50 [C+]	Pavement / Surfacing	NA	33	-	R	H	--		
8034	St. Vincents Close, Girton, Cambridge	48 / 55 [A]	45 / 49 [B]	44 / 49 [C]	Earthworks	NA	14	-	R	--	--		
8039	Pepys Way, Girton, Cambridge	48 / 56 [A]	42 / 49 [B]	41 / 48 [C]	Site Clearance	NA	24	-	R	--	--		
8052	Girton Road, Girton, Cambridge	50 / 57 [B]	45 / 50 [C]	41 / 49 [C+]	Site Clearance	NA	27	-	R	H	--		
8053	Wellbrook Way, Girton, Cambridge	56 / 65 [A]	49 / 57 [C]	43 / 56 [C]	Site Clearance	A	17	1	R	H	--		CN_C03
8055	Girton Road, Girton, Cambridge	48 / 55 [B]	44 / 48 [C]	40 / 47 [C+]	Site Clearance	NA	2	-	R	--	--		
10013	Chieftain Way, Cambridge	48 / 55 [A]	46 / 50 [C]	43 / 49 [C]	Site Clearance	NA	53	-	R	--	--		
10016	Chieftain Way, Cambridge	57 / 65 [A]	51 / 61 [C]	46 / 60 [C]	Earthworks	S	42	1	R	--	--	NI	CN_C05

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
10021	Bayford Place, Cambridge	50 / 54 [B]	46 / 51 [C]	42 / 50 [C+]	Earthworks	NA	6	-	R	H	--		
10027	Cowley Road, Cambridge	49 / 50 [B]	46 / 46 [C]	45 / 45 [C+]	Site Clearance	NA	3	-	R	H	--		
10029	Augustus Close, Cambridge	47 / 53 [C]	44 / 48 [C]	42 / 47 [C+]	Site Clearance	NA	134	-	R	--	--		
10041	Ring Fort Road, Cambridge	49 / 56 [A]	47 / 51 [B]	43 / 50 [C]	Site Clearance	NA	1	-	R	--	--		
10042	Chieftain Way, Cambridge	57 / 65 [A]	46 / 56 [C]	41 / 56 [C]	Pavement / Surfacing	A	31	1	R	--	--		CN_C05
10072	Neal Drive, Cambridge	53 / 63 [A]	51 / 59 [B]	50 / 58 [C]	Pavement / Surfacing	S	23	1	R	--	--	NI	CN_C06
10077	Milton Road, Cambridge	52 / 60 [A]	48 / 56 [B]	47 / 55 [C]	Site Clearance	NA	3	-	R	--	--		
10085	Graham Road, Cambridge	51 / 55 [B]	47 / 51 [C]	44 / 51 [C]	Site Clearance	NA	33	-	R	--	--		
18001	Orchard Park	62 / 69 [B]	53 / 62 [C]	60 / 64 [C+]	Earthworks	S	180	2	R	--	--	NI	CN_C05

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
<b>Huntingdon improvements</b>													
944	The Walks North, Huntingdon	53 / 67 [B]	53 / 64 [C]	- / - [C+]	Earthworks	NA	3	-	R	H	--		
5115	Princes Street, Huntingdon	48 / 53 [A]	45 / 48 [A]	- / - [B]	Site Clearance	NA	1	-	R	--	--		
5118	George Street, Huntingdon	50 / 56 [C]	47 / 53 [C+]	- / - [C+]	Earthworks	NA	133	-	R	H	--		
5121	St. Marys Street, Huntingdon	49 / 59 [A]	47 / 56 [C]	- / - [C]	Earthworks	NA	39	-	R	--	--		
5130	Castle Hill, Huntingdon	55 / 59 [B]	53 / 56 [C]	- / - [C+]	Earthworks	NA	3	-	R	H	--		
5135	Castle Hill, Huntingdon	52 / 65 [C]	50 / 62 [C+]	- / - [C+]	Earthworks	NA	8	-	R	H	--		
5210	St. Johns Street, Huntingdon	51 / 56 [C]	45 / 49 [C+]	- / - [C+]	Viaduct Demolition	NA	64	-	R	H	--		
5218	Walden Road, Huntingdon	51 / 57 [B]	47 / 54 [C]	- / - [C+]	Earthworks	NA	66	-	R	H	--		
5221	Brampton Road, Huntingdon	61 / 73 [B]	49 / 67 [C]	- / - [C+]	Viaduct Demolition	A	22	1	R	H	--		CN_C07

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
5222	Brampton Road, Huntingdon	57 / 71 [C]	50 / 66 [C+]	- / - [C+]	Earthworks	A	6	1	R	H	--		CN_C07
5223	Brampton Road, Huntingdon	62 / 74 [C]	52 / 67 [C+]	- / - [C+]	Viaduct Demolition	NA	82	-	R	H	--		
5225	Brampton Road, Huntingdon	55 / 68 [C]	52 / 62 [C+]	- / - [C+]	Earthworks	NA	5	-	R	H	--		
5231	The Walks North, Huntingdon	52 / 66 [C]	50 / 63 [C+]	- / - [C+]	Earthworks	NA	2	-	R	H	--		
5388	Levers Water, Huntingdon	56 / 68 [C]	45 / 55 [C+]	- / - [C+]	Viaduct Demolition	NA	68	-	R	H	--		
5395	Percy Green Place, Huntingdon	63 / 70 [B]	46 / 56 [C]	- / - [C+]	Viaduct Demolition	NA	114	-	R	H	--		
5399	Crummock Water, Huntingdon	57 / 66 [B]	43 / 50 [C]	- / - [C+]	Viaduct Demolition	NA	20	-	R	--	--		
5401	Hinchingbrooke Road, Brampton, Huntingdon	55 / 65 [B]	48 / 54 [C]	- / - [C+]	Viaduct Demolition	NA	58	-	R	--	--		

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
5407	Scholars Avenue, Huntingdon	58 / 69 [B]	52 / 62 [C]	- / - [C+]	Viaduct Demolition	NA	50	-	R	H	--		
5413	Scholars Avenue, Huntingdon	53 / 61 [A]	48 / 52 [C]	- / - [C]	Viaduct Demolition	NA	29	-	R	--	--		
5414	Station Approach, Huntingdon	60 / 75 [C+]	50 / 65 [C+]	- / - [C+]	Viaduct Demolition	NA	6	-	R	H	--		
5417	Mill Common, Huntingdon	55 / 69 [C]	49 / 65 [C+]	- / - [C+]	Earthworks	NA	8	-	R	H	--		
5419	Mill Common, Huntingdon	59 / 69 [C]	52 / 66 [C+]	- / - [C+]	Earthworks	NA	10	-	R	H	--		
5420	Mill Common, Huntingdon	58 / 66 [A]	58 / 72 [B]	- / - [C]	Earthworks	A	2	1	R	--	--		~
5422	Waters Meet, Huntingdon	52 / 62 [A]	48 / 59 [B]	- / - [C]	Earthworks	NA	24	-	R	--	--		
5426	Mill Common, Huntingdon	54 / 67 [C]	49 / 64 [C+]	- / - [C+]	Earthworks	NA	8	-	R	H	--		



Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receiver	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
5430	Brampton Road, Huntingdon	53 / 66 [A]	52 / 61 [B]	- / - [C]	Earthworks	A	1	1	R	--	--		~
5431	Brampton Road, Huntingdon	50 / 57 [A]	46 / 53 [C]	- / - [C]	Earthworks	NA	1	-	R	--	--		

**Table 3.4: Assessment of daytime construction noise at non-residential receptors**

Assessment location		Impact criteria			Significance criteria						Mitigation effect	Significant effect	
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the facade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receptor	Existing environment			Combined impact
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
<b>A1 Alconbury to Brampton Hut</b>													
215	Research Centre, Woolley Lane	59 / 65	51 / 57	49 / 55	Site Clearance	NA	2	-	G5		--	--	
227	Research Centre, Woolley Lane	58 / 66	54 / 58	53 / 56	Site Clearance	NA	1	1	G5		--	--	
<b>A1 A14 Brampton Hut to ECML</b>													
258	Premier Inn Hotel, Brampton Hut	60 / 67	51 / 56	51 / 52	Earthworks	NA	3	-	G4		--	--	
524	Hunts Refuse Disposals, Brampton Road (Office)	64 / 64	50 / 57	- / -	Soil storage	NA	1	-	G5		--	--	
885	Landmans Ltd, Brampton Road, Buckden (Office)	65 / 70	54 / 65	- / -	Buckden Road Bridge	S	1	13	G5		--	--	CN_N01
887	Brampton Hut Services, Huntingdon	62 / 65	52 / 60	47 / 47	Earthworks	NA	2	-	G5		--	--	

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the facade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receptor	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
1059	RAF Brampton, Throckmorton Drive (Office)	62 / 62	46 / 49	- / -	Soil storage	NA	1	-	G5		--	--	
<b>ECML to Swavesey</b>													
553	Topfield Farm, Huntingdon	56 / 64	54 / 60	- / -	Mere Way Bridge	NA	2	-	G5		--	--	
1156	Kings Bush Farm, Godmanchester, Huntingdon	61 / 62	51 / 55	- / -	Soil storage	NA	2	-	G5		--	--	
<b>Swavesey to Girton</b>													
671	Days Inn Hotel, Cambridge Services	53 / 62	51 / 56	51 / 57	Pavement / Surfacing	NA	1	1	G5		--	--	
676	Commercial Units, Anderson Road, Swavesey	51 / 68	55 / 63	53 / 64	Pavement / Surfacing	NA	18	-	G5		--	--	
678	Commercial Units, Anderson Road, Swavesey	50 / 65	52 / 61	49 / 57	Swavesey NMU Bridge	NA	30	-	G5		--	--	

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the facade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receptor	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
698	Travel Lodge Hotel, Bar Hill	54 / 66	50 / 59	46 / 60	Pavement / Surfacing	S	1	1	G5		--	--	CN_N05
701	Commercial Offices, Trafalgar Way, Bar Hill	51 / 62	47 / 55	45 / 56	Pavement / Surfacing	NA	19	-	G5		--	--	
703	Commercial Offices and Factory, Saxon Way, Bar Hill	47 / 54	45 / 49	42 / 47	Pavement / Surfacing	NA	38	-	G5		--	--	
709	Menzies Cambridge Hotel and Golf Course, Bar Hill	58 / 67	55 / 62	53 / 62	Bar Hill Junction Bridge No.3	NA	1	-	G5		--	--	
714	Commercial Office, Huntingdon Road, Bar Hill	51 / 75	53 / 71	55 / 72	Pavement / Surfacing	NA	1	-	G5	H	--	--	
747	Crematorium, Girton	61 / 66	51 / 61	49 / 61	Pavement / Surfacing	NA	3	-	G3		--	--	
755	Catch Hall, Girton	55 / 72	50 / 67	50 / 69	Pavement / Surfacing	NA	1	-	G3		--	--	

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the facade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receptor	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
<b>A14 Cambridge Northern Bypass</b>													
761	Biotechnology Centre, Huntingdon Road, Cambridge	52 / 72	48 / 68	48 / 69	Pavement / Surfacing	NA	1	-	G4		--	--	
763	Cambridge University Farm, Girton	47 / 59	43 / 55	42 / 56	Pavement / Surfacing	NA	2	-	G5		--	--	
794	Holiday Inn Hotel, Impington	51 / 60	47 / 55	46 / 54	Site Clearance	NA	1	-	G4		--	--	
802	The Orchard Community Centre, Central Avenue, Cambridge	48 / 55	46 / 50	42 / 49	Site Clearance	NA	1	-	G3		--	--	
8025	Community Hall, St. Vincents Close, Girton, Cambridge	47 / 52	45 / 46	43 / 47	Pavement / Surfacing	NA	1	-	G3		--	--	
8057	Girton College, Girton Road, Girton, Cambridge	47 / 53	43 / 48	40 / 48	Pavement / Surfacing	NA	1	-	G3		--	--	

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the facade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receptor	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
10002	Commercial Offices, Milton Road, Cambridge	53 / 59	49 / 56	47 / 55	Site Clearance	NA	1	-	G5		--	--	
10017	Travelodge Hotel, Impington	60 / 70	54 / 67	53 / 66	Earthworks	S	2	1	G5		--	--	CN_N06
10020	Cambridge Regional College, Kings Hedges Road, Cambridge	53 / 64	49 / 59	48 / 58	Site Clearance	NA	2	-	G5		--	--	
10028	Premier Inn Hotel, Impington	62 / 70	58 / 66	57 / 65	Earthworks	NA	2	1	G4		--	--	
10035	Commercial Offices, Milton Road, Cambridge	56 / 65	52 / 61	51 / 60	Site Clearance	NA	6	-	G5		--	--	
10041	Orchard Park Community School, Cambridge	49 / 56	47 / 51	50 / 43	Site Clearance	NA	1	-	G4		--	--	
10048	Commercial Offices, Milton Road, Cambridge	57 / 63	50 / 58	49 / 57	Site Clearance	NA	2	-	G5		--	--	

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the facade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receptor	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
10054	Commercial Offices, Milton Road, Cambridge	48 / 54	45 / 48	44 / 47	Site Clearance	NA	2	-	G5		--	--	
10055	Commercial Offices and Research Centre, Milton Road, Cambridge	52 / 56	49 / 52	48 / 51	Site Clearance	NA	11	-	G5		--	--	
10075	Commercial Offices, Milton Road, Cambridge	55 / 63	51 / 59	50 / 58	Site Clearance	NA	2	-	G5		--	--	
10078	Commercial Offices, Milton Road, Cambridge	53 / 61	49 / 55	48 / 55	Site Clearance	NA	1	-	G5		--	--	
<b>Huntingdon improvements</b>													
891	Hinchingbrooke Hospital, Huntingdon	57 / 65	52 / 60	- / -	Earthworks	S	2	5	G4		--	--	CN_N02
5102	All Saints Church, High Street, Huntingdon	48 / 52	44 / 46	- / -	Viaduct Demolition	NA	1	2	G3		--	--	

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the facade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receptor	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
5117	Commercial Offices and Drugs Clinic, Market Hill, Huntingdon	49 / 54	46 / 50	- / -	Earthworks	NA	1	-	G4		--	--	
5130	Huntingdon Spiritualist Church, Castle Hill, Huntingdon	55 / 59	53 / 56	- / -	Earthworks	NA	1	-	G3		--	--	
5147	Commemoration Hall, High Street, Huntingdon	49 / 57	48 / 53	- / -	Earthworks	NA	1	-	G4		--	--	
5176	Commercial Office and Retail, High Street, Huntingdon	48 / 54	45 / 50	- / -	Earthworks	NA	3	-	G5		--	--	
5207	Health Centre, High Street, Huntingdon	48 / 53	46 / 50	- / -	Earthworks	NA	4	-	G5		--	--	
5208	St Mary's Church, High Street, Huntingdon	50 / 55	48 / 52	- / -	Earthworks	NA	1	-	G3		--	--	
5214	Cromwell Museum, High Street, Huntingdon	47 / 52	44 / 46	- / -	Viaduct Demolition	NA	1	-	G3		--	--	



Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the facade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receptor	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
5222	Dental Surgery, Brampton Road, Huntingdon	57 / 71	50 / 66	- / -	Earthworks	NA	1	1	G4		--	--	
5226	Commercial Offices, Brampton Road, Huntingdon	51 / 56	47 / 49	- / -	Viaduct Demolition	NA	1	-	G4		--	--	
5234	Federation of Women's Institute, Walden Grove, Huntingdon	52 / 58	49 / 55	- / -	Earthworks	NA	1	-	G4		--	--	
5403	Cambridgeshire Constabulary HQ, Huntingdon	60 / 76	55 / 73	- / -	Earthworks	S	2	3	G5		--	--	CN_N03
5404	Cambridgeshire Constabulary HQ, Huntingdon	57 / 64	51 / 60	- / -	Earthworks	NA	2	-	G5		--	--	
5405	Fire Station, Brampton Road, Huntingdon	59 / 69	50 / 61	- / -	Viaduct Demolition	NA	1	-	G5		--	--	
5414	Huntingdon Railway Station, Huntingdon	60 / 75	50 / 65	- / -	Viaduct Demolition	NA	3	-	G5		--	--	

Assessment location		Impact criteria				Significance criteria						Mitigation effect	Significant effect
ID	Area represented	Typical/highest monthly outdoor $L_{pAeq}$ [dB] at the facade			Construction activity resulting in highest forecast noise levels	Type of Effect	Number of impacts represented	Impact duration [months]	Type of receptor	Existing environment	Combined impact		
		Day 07:00-19:00	Evening 19:00-23:00	Night 23:00-07:00									
5430	Hinchingbrooke School, Brampton Road, Huntingdon	53 / 66	52 / 66	- / -	Pavement / Surfacing	S	4	4	G4		--	--	CN_N04

## Assessment of significant effects of construction noise

### *Residential receptors: direct effects – individual dwellings*

- 3.3.5 The calculated construction noise impacts are presented in the tables in this appendix and *Figure 14.3 of the ES*.
- 3.3.6 Taking account of the avoidance and mitigation measures integrated into the base scheme, the following dwellings are predicted to experience construction noise levels higher than the noise insulation trigger levels defined in the Code of construction practice (refer to *Appendix 20.2 of the ES*):
- two dwellings on Huntingdon Road to the south of Girton Interchange;
  - approximately 220 dwellings on Chieftain Way to the south of the Cambridge Northern Bypass;
  - approximately 25 dwellings on Neal Drive to the south of the Cambridge Northern Bypass;
  - approximately 30 dwellings on Engledow Drive to the south of the Cambridge Northern Bypass; and
  - approximately 45 dwellings on Flack End to the south of the Cambridge Northern Bypass.
- 3.3.7 These dwellings are likely to qualify for noise insulation (which includes as necessary additional ventilation to enable windows to be kept closed) as set out in the *CoCP (Appendix 20.2 of the ES)*. Where noise insulation packages are accepted by the owner/occupier, internal noise levels will be substantially reduced so they are not disruptive and the significant observed adverse effects inside the dwellings will therefore be avoided.
- 3.3.8 Designated external spaces (private or shared gardens and balconies) of the 30 dwellings on Engledow Drive are screened from the construction noise such that external construction noise levels, in all or some areas of the open spaces, will be substantially lower than the levels predicted at the most exposed facade. Consequently, likely temporary significant effects outside these dwellings are partially or fully avoided.
- 3.3.9 Temporary significant effects due to noise exposure at the private open space (gardens) of dwellings on Chieftain Way and Neal Drive are partially offset<sup>4</sup> by access to the nearby public park on Central Avenue, which is less affected by construction noise from the scheme.
- 3.3.10 Temporary significant effects due to noise exposure at the private external spaces (gardens) of dwellings on Flack End are partially offset by access to the nearby shared public amenity space between Flack End and Starr End which is screened and therefore less affected by construction noise from the scheme.

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<sup>4</sup> Consistent with PPG-Noise

3.3.11 Temporary significant effects due to noise exposure at the private open space (gardens) are avoided by noise screening (from hoarding or buildings), or partially offset<sup>5</sup> by access to shared open space that is less affected by construction noise from the scheme.

*Residential receptors: direct effects – communities*

3.3.12 Significant observed adverse effects (refer to *Appendix 14.3*) are avoided by the combination of envisaged mitigation integrated into the scheme that has been maximised as far as sustainable and, where required, noise insulation.

3.3.13 The assessment takes into consideration the time of day that noise will be generated: noise from the limited night working proposed is assessed against a more stringent criterion than in the evening; and the evening against a more stringent criterion than during the day.

3.3.14 With regard to noise outside dwellings, the assessment of temporary effects takes account of construction noise relative to existing sound levels.

3.3.15 Changes in noise levels may be considered by the local community as an effect on the acoustic character of the area and hence be perceived as a change in the quality of life.

3.3.16 Significant construction noise effects are identified at the communities identified in *Table 3.5*.

**Table 3.5: Direct adverse effects on residential communities and shared open areas that are considered to be significant on a community basis**

Significant effect reference (see <i>Figure 14.3</i> and <i>table 3.3</i> )	Type of significant effect	Time of day	Location	Cause (construction activities)	Assumed approximate duration of impact and details
<b>A1 Alconbury to Brampton Hut</b>					
No community significant effects					
<b>A1/A4 Brampton Hut to East Coast mainline railway</b>					
CN_C01	Noise (temporary increased annoyance)	Daytime	Approx. 10 dwellings at the south west corner of RAF Brampton base	Operation of borrow pits and soil storage compounds with monthly noise levels of approximately 67dB <sub>LpAeq,12hr</sub>	42 months
<b>A14 East Coast mainline railway to Swavesey</b>					
No community significant effects					

<sup>5</sup> Consistent with PPG-noise.

Significant effect reference (see Figure 14.3 and table 3.3)	Type of significant effect	Time of day	Location	Cause (construction activities)	Assumed approximate duration of impact and details
<b>A14 Swavesey to Girton</b>					
CN_C02	Noise (temporary increased annoyance)	Night time	Six dwellings on the A14 between Bar Hill and Girton	Online pavement laying works on the existing A14 with monthly noise levels of approximately 70dB <sub>LpAeq,1hr</sub>	1 month
<b>Cambridge Northern Bypass</b>					
CN_C03	Noise (temporary increased annoyance)	Night time	Approx. 25 dwellings on Girton Road and Wellbrook Court, Girton	Online pavement laying works on the existing A14 with monthly noise levels of up to 67dB <sub>LpAeq,1hr</sub>	1 month
CN_C04	Noise (temporary increased annoyance)	Night time	Approx. 25 dwellings on Lone Tree Avenue and Cambridge Road, Impington	Online pavement laying works on the existing A14 with a monthly noise level of approximately 58dB <sub>LpAeq,1hr</sub>	1 month
CN_C05	Noise (temporary increased annoyance)	Daytime, night time and evening	Approx. 250 dwellings on Chieftain way, Cambridge	Online pavement laying works on the existing A14 with a monthly night time noise level of approximately 64dB <sub>LpAeq,1hr</sub>	1 month
CN_C06	Noise (temporary increased annoyance)	Daytime, night time and evening	Approx. 90 dwellings to the north east of Kings Hedges and open playground/park on Topper Street	Earthworks with monthly evening noise levels of up to 62dB <sub>LpAeq,4hr</sub> . Online pavement laying works on the existing A14 with monthly noise levels of up to 64dB <sub>LpAeq,1hr</sub>	1-2 months

Significant effect reference (see Figure 14.3 and table 3.3)	Type of significant effect	Time of day	Location	Cause (construction activities)	Assumed approximate duration of impact and details
<b>Huntingdon improvements</b>					
CN_C07	Noise (temporary increased annoyance)	Daytime	Approx. 30 dwellings on St George Street Huntingdon	Viaduct demolition with a monthly noise level of up to 73dB <sub>L<sub>pAeq,12hr</sub></sub> and evening earthworks with noise levels up to 67dB <sub>L<sub>pAeq,4hr</sub></sub>	1 month

*Residential receptors: indirect effects*

- 3.3.17 The majority of construction traffic will use dedicated temporary haul routes within the site boundary, the noise impact from which has been included in the direct construction effects assessment.
- 3.3.18 Construction traffic is expected on the local road network on the Cambridge Northern Bypass. Baseline traffic flows on these roads are such that the addition of construction traffic will cause negligible increases in noise levels.
- 3.3.19 Consequently no indirect significant effects are expected at residential receptors.

*Non-residential receptors: direct effects*

- 3.3.20 Significant construction noise effects have been identified on the following non-residential receptors on a worst case basis using the screening criteria presented in *Appendix 14.3 of the ES*:
- Landsmans Ltd, Brampton Rd (CN\_N01). Significant temporary noise effects have been identified on a worst case basis during the daytime with noise levels of 65–70dB<sub>L<sub>pAeq,12hr</sub></sub> over a period of approximately 13 months commencing, in 2016 during the soil storage works and construction of Buckden Bridge.
  - Hinchingsbrooke Hospital (CN\_N02). Significant temporary noise effects have been identified on a worst case basis during the daytime with noise levels of 57–65dB<sub>L<sub>pAeq,12hr</sub></sub> over a period of approximately 5 months commencing in 2020 during earthwork activities and during the evening with noise levels of 60dB<sub>L<sub>pAeq,4hr</sub></sub> over a period of approximately 1 month commencing in 2020 during earthwork activities.

- Cambridge Constabulary HQ, Huntingdon (CN\_N03). Significant temporary noise effects have been identified on a worst case basis during the daytime with noise levels between 70dB<sub>L<sub>pAeq,12hr</sub></sub> and 76dB<sub>L<sub>pAeq,12hr</sub></sub> over a period of approximately 3 months commencing in 2020 during the earthwork activities for surrounding new and altered roads.
- Hinchingsbrooke School (CN\_N04). Significant temporary noise effects have been identified on a worst case basis during the daytime with noise levels between 61–72dB<sub>L<sub>pAeq,12hr</sub></sub> over a period of approximately 5 months commencing in 2020 during earthwork activities for surrounding new and altered roads.
- Travel Lodge Hotel, Bar Hill (CN\_N05). Significant temporary noise effects have been identified on a worst case basis during the night time with noise levels of 60 dB<sub>L<sub>pAeq,1hr</sub></sub> over a period of 1 month.
- Travel Lodge Hotel, Impington (CN\_N06). Significant temporary noise effects have been identified on a worst case basis during the night time with noise levels of 66dB<sub>L<sub>pAeq,1hr</sub></sub> over a period of 1 month commencing in 2017 during pavement/surfacing activities, and during the evening with noise levels of 67dB<sub>L<sub>pAeq,4hr</sub></sub> over a period of 1 month commencing in 2017 during earthworks activities.

3.3.21 The above assessments are on a worst case basis with regard to the assumed design and sensitivity of the receptors. Further work will be carried out by the HA before construction commences in consultation with the property owners and occupants to refine the assessment and bring forward any additional mitigation measures are required at these locations. Any additional mitigation will be confirmed in the relevant *Local Environmental Management Plan (LEMP)*, as described in *Chapter 20 of the ES*, and relevant s.61 consents in accordance with the *CoCP (Appendix 20.2 of the ES)*.

*Non-residential receptors: indirect effects*

3.3.22 For the reasons discussed above, significant indirect noise effects on non-residential receptors arising from construction traffic are unlikely to occur.

*Quiet Areas*

3.3.23 There are no known Quiet Areas within the scheme study area.

### **3.4 Cumulative effects from the scheme and other committed development.**

3.4.1 This assessment has considered the potential cumulative construction noise effects of the proposed scheme and other committed developments. Committed developments that have been considered that would be built at the same time as the scheme are shown in *Figure 14.1 of the ES* and based on information from *Chapter 18 of the ES*.

3.4.2 Committed developments CD7 in Girton and CD15 at RAF Brampton have been identified as large developments where significant prolonged construction activities are likely to take place.

- 3.4.3 Receptors in close proximity to CD7 on Huntingdon Road may experience additional significant cumulative construction noise effects from the scheme and construction activities at CD7 depending on the construction programmes.
- 3.4.4 Receptors directly to the south of CD15 in RAF Brampton may experience additional significant cumulative construction noise effects from the scheme and construction activities at CD15 depending on the construction programmes. These receptors include 10 dwellings where likely significant community construction noise effects are predicted due to the scheme alone (CN\_C01 – refer to *Tables in this Appendix* and *Figure 14.2 of the ES*).
- 3.4.5 All other considered committed developments are sufficiently small scale that construction noise or vibration from the scheme is unlikely to result in any significant cumulative effects.



## 4 Bibliography

Control of Pollution Act 1974.

Environmental Protection Act 1990.

British Standards Institute (2014a). BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – noise.

British Standards Institute (2014b). BS5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – vibration.