The Sizewell C Project

6.6 Volume 5 Two Village Bypass

Chapter 4 Noise and Vibration

Revision: 1.0

Applicable Regulation: Regulation 5(2)(a)

PINS Reference Number: EN010012

May 2020

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Contents

Tables

Plates

None Provided.

Figures

Appendices

4 Noise and Vibration

4.1 Introduction

4.1.1 This chapter of **Volume 5** of the **Environmental Statement** (**ES**)presents an assessment of the noise and vibration effects arising from the construction and operation of the two village bypass (referred to throughout this volume as the 'proposed development'). This includes an assessment of potential impacts, the significance of effects, the requirements for mitigation, and the residual effects.

4.1.2 Detailed descriptions of the two village bypass site (referred to throughout this volume as the 'site'), the proposed development and the different phases of development are provided in **Chapters 1** and **2** of this volume of the **ES**. A glossary of terms and list of abbreviations used in this chapter is provided in **Volume 1**, **Appendix 1A** of this **ES**.

4.1.3 This assessment has been informed by data presented in the following technical appendices:

- **Volume 2, Appendix 11A**: Baseline survey report;
- **Appendix 4A**: Road traffic flow data; and
- **Appendix 4B**: Construction assumptions and calculations.

4.1.4 The road traffic noise assessment has been informed by the **Transport Assessment** (Doc Ref. 8.5), in particular the road traffic data which has been modelled to assess the potential impacts from road traffic noise effects in the vicinity of the proposed development.

4.1.5 The assessment considers noise and vibration impacts from construction and operation of the proposed development on sensitive receptors around the site. Changes in noise levels on the wider road network are considered within **Volume 2, Chapter 11** of the **ES**.

4.2 Legislation, policy and guidance

4.2.1 **Volume 1, Appendix 6G** identifies and describes legislation, policy and guidance of relevance to the assessment of the potential noise and vibration impacts associated with the Sizewell C Project across all **ES** volumes.

4.2.2 This section provides an overview of the specific legislation, policy and guidance of relevance to the noise and vibration assessment of the proposed development.

a) International

4.2.3 There is no international legislation or policy that is relevant to the noise and vibration assessment of the proposed development.

b) National

4.2.4 The Overarching National Policy Statement (NPS) for Energy (NPS EN-1) (Ref. 4.1), and the National Policy Statement for Nuclear Power Generation (NPS EN-6) (Ref. 4.2) include requirements that are relevant to the noise and vibration assessment. A summary of the relevant NPS EN-1 and NPS EN-6 requirements, together with consideration of how these requirements have been taken into account are discussed in detail in **Volume 1, Appendix 6G**.

4.2.5 Part III of the Control of Pollution Act 1974 (Ref. 4.3) gives local authorities powers to control noise from construction sites and enable developers to apply for prior consent for construction works. Section 72 of that Act defines what is meant by *"best practicable means"* and requires that regard be had to relevant codes of practice, one of which is British Standard BS5228 (parts 1 and 2) (Ref. 4.4 and 4.5).

4.2.6 Other relevant policy, as described in **Volume 1, Appendix 6G**, comprise:

- National Planning Policy Framework 2019 (Ref. 4.6).
- Planning Practice Guidance (PPG) 2019 (Ref. 4.7).
- Noise Policy Statement for England (NPSE) 2010 (Ref. 4.8).
- Government's 25 Year Environment Plan 2018 (Ref. 4.9).

c) Regional

4.2.7 No regional policy is deemed relevant to the noise and vibration assessment for the proposed development.

d) Local

4.2.8 Local policy relating to noise and vibration assessment is found in:

- Suffolk Coastal District Council (SCDC) Local Plan Core Strategy and Development Management Polices (2013) (Ref. 4.10); and
- SCDC Final Draft Local Plan (2013) (Ref. 4.11).

4.2.9 The requirements of these, as relevant to the noise and vibration assessment, are set out in **Volume 1, Appendix 6G** of the ES.

e) Guidance

4.2.10 In addition to these policy requirements, this assessment has been undertaken in accordance with the following guidance documents:

- World Health Organisation Regional Office for Europe Environmental Noise Guidelines for the European Region 2018 (Ref. 4.12);
- Guidance in the Design Manual for Roads and Bridges (DMRB) LA111 (Ref. 4.13);
- Calculation of Road Traffic Noise (Ref. 4.14);
- British Standard BS8233:2014 – Guidance on sound insulation and noise reduction for buildings (Ref. 4.15);
- British Standard BS5228-1 Noise: 2009+A1: 2014 – Code of Practice for noise and vibration control at open construction sites – Noise (Ref. 4.4); and
- British Standard BS5228-2 Vibration: 2009+A1: 2014 – Code of Practice for noise and vibration control at open construction sites – Vibration (Ref. 4.5).

4.2.11 Further details on this guidance, as relevant to the noise and vibration for the assessment of the proposed development is contained in **Volume 1, Appendix 6G**.

4.3 Methodology

a) Scope of the assessment

4.3.1 The generic Environmental Impact Assessment (EIA) methodology is detailed in **Volume 1**, **Chapter 6**.

4.3.2 The full method of assessment for noise and vibration that has been applied for the Sizewell C Project is provided in **Volume 1**, **Appendix 6G**.

4.3.3 This section provides specific details of the noise and vibration methodology applied to the assessment of the proposed development.

4.3.4 The scope of this assessment has been established through a formal EIA scoping process undertaken with the Planning Inspectorate (PINS). A request for an EIA Scoping Opinion was initially issued to the PINS in 2014, with an updated request issued in 2019, see **Volume 1, Appendix 6A**.

4.3.5 Comments raised in the EIA Scoping Opinion received in 2014 and 2019 have been taken into account in the development of the assessment methodology. These are detailed in **Volume 1**, **Appendices 6A** to **6C**.

b) Consultation

4.3.6 The scope of the assessment has also been informed by ongoing consultation and engagement with statutory consultees throughout the design and assessment process. Consultation on the assessment methodology and conclusions has been undertaken with Suffolk County Council (SCC) and East Suffolk Council (ESC) as part of the engagement summarised in **Volume 1, Appendix 6G.**

4.3.7 The following matters have been developed in consultation with the local authorities:

- assessment criteria;
- noise source data; and
- assessment approach (both noise and vibration).

c) Study area

4.3.8 The study area includes all noise and vibration sensitive receptors within 300 metres (m) of the new road for construction works and within 600m of the new road or other affected roads for operational noise levels, in accordance with recommendations in DMRB, LA111 (Ref. 4.13).

4.3.9 **Figure 4.1** shows the site and surroundings with the receptors considered in the assessment. In many cases a receptor listed represents a single dwelling, however in some localities, the receptor assessed represents the

most affected receptor from a group of receptors, i.e. the receptor that is likely to experience the highest levels of noise or vibration.

d) Assessment scenarios

4.3.10 During construction, noise and vibration levels are considered for two phases: the site preparation phase and the main construction phase.

4.3.11 During operation of the road, noise levels are considered during the peak construction period (in 2028) when the road would be used for Sizewell C construction traffic as well as open to the public, and in 2034, when construction of the power station is complete and Sizewell C is operational.

4.3.12 The impact of traffic during construction, as well as operation on the wider road network, including the A12 adjoining the proposed development are considered and assessed in the main traffic assessment for the Sizewell C Project, as presented in **Volume 2 Chapter 11** of this **ES**. However, consideration of the potential for combined impacts from construction works and construction traffic is reported within the assessment presented in this chapter.

e) Assessment criteria

4.3.13 As described in **Volume 1**, **Chapter 6** of this **ES**, the EIA methodology considers whether impacts of the proposed development would have an effect on any resources or receptors. Assessments broadly consider the magnitude of impacts, and value/sensitivity of resources/receptors, that could be affected in order to classify effects.

4.3.14 A detailed description of the assessment methodology used to assess the potential effects on noise and vibration arising from the proposed development is provided in **Volume 1, Appendix 6G** of this **ES**. The effect of noise and vibration on a receptor or community is dependent on the magnitude of the impact, the sensitivity of the receptor and may also depend on other factors, such as the existing acoustic environment.

4.3.15 A summary of the assessment criteria used in this assessment is presented in the following sub-sections.

i. Sensitivity

4.3.16 The criteria used in noise and vibration assessment for determining the sensitivity of receptors are set out in **Table 4.1**.

Table 4.1: Assessment of the value or sensitivity of receptors for noise and vibration.

Sensitivity	Description
High	Receptors that are highly sensitive to noise or vibration such as theatres, auditoria, recording studios, concert halls and highly vibration sensitive structures or uses such as certain laboratories medical facilities or industrial processes.
Medium	Noise and vibration sensitive receptors such permanent residential buildings, hospitals and other buildings in health/community use, buildings in educational use, hotels and hostels.
Low	Receptors with limited sensitivity to noise and vibration such as offices, libraries buildings in religious use, and other workplaces with a degree of sensitivity due to the need to concentrate.
Very Low	Receptors of very low sensitivity to noise and vibration such as industrial or commercial buildings and transient or mobile receptors.

4.3.17 No high sensitivity receptors have been identified within the study area. The receptors assessed in this chapter are considered to be of medium sensitivity, or less.

ii. Magnitude

4.3.18 The approach taken to evaluate noise effects for all construction work associated with the Sizewell C Project on occupiers of dwellings and other permanent residential accommodation is that outlined in Part 1 of BS 5228. This recommends that, for dwellings, significant effects may occur when the site noise level, rounded to the nearest decibel, exceeds the value listed in **Table 4.2**. The table is used as follows: for the appropriate period (daytime, evening, night-time, weekends), the pre-construction ambient noise level is determined and rounded to the nearest 5dB. This rounded value is compared to the Category A criteria in **Table 4.2** and depending on whether the rounded values are below, equal to, or above the Category A values, the Category A, B or C criteria will apply to the construction works as an indicator of significant impacts.

Table 4.2: Thresholds of potential significant construction noise effects at dwellings, from Part 1 of BS 5228[1]

Period	Assessment Category		
	A	B	C
Day: Weekdays, 0700-1900 Saturday, 0700-1300	65 dB $L_{Aeq,T}$	70 dB $L_{Aeq,T}$	75 dB $L_{Aeq,T}$
Evenings and weekends: Weekdays 1900-2300 Saturdays 1300-2300 Sundays 0700 - 2300	55 dB $L_{Aeq,T}$	60 dB $L_{Aeq,T}$	65 dB $L_{Aeq,T}$
Every day 2300 - 0700	45 dB $L_{Aeq,T}$	50 dB $L_{Aeq,T}$	55 dB $L_{Aeq,T}$

Notes:

Assessment Category A: impact criteria to use when baseline ambient sound levels (rounded to the nearest 5 dB) are less than these values;

Assessment Category B: impact criteria to use when baseline ambient sound levels (rounded to the nearest 5 dB) are the same as category A values; and

Assessment Category C: impact criteria to use when baseline ambient sound levels (rounded to the nearest 5 dB) are higher than category A values.

If the ambient sound level exceeds the Assessment Category C threshold values given in the table (i.e. the ambient sound level is higher than the above values), then an impact is deemed to occur if the total $L_{Aeq,T}$ sound level for the period increases by more than 3 dB due to construction activity.

4.3.19 A significant effect is deemed to occur where the relevant criteria are exceeded for the following periods of time:

- 10 or more days or nights in any 15 consecutive days or nights; or
- a total number of days or nights exceeding 40 in any 6 consecutive months.

4.3.20 Where an assessment conclusion identifies a significant effect, it is on the basis that the effect is assumed to meet both the noise level criteria and the duration criteria, unless otherwise stated. Where there is uncertainty as to whether the duration criteria will be met, a precautionary approach has been

adopted and it is assumed that the works will continue for a sufficient period to meet the duration criteria.

4.3.21 The values to be used to assess the magnitude of impact for construction work from all construction work, other than the main development site are as shown in **Table 4.3** below.

Table 4.3: Values to assess the magnitude of noise impact for construction

Sensitivity of receptor	Period	Magnitude of impact				Parameter
		Very low	Low	Medium	High	
High	Any	Bespoke assessment method to be used				
Medium and low	Day	Below baseline values	Baseline noise levels	ABC[1] [2]	ABC[1] [2]+ 10	$L_{Aeq, 12h}$, dB
	Evening					$L_{Aeq, 4h}$, dB
	Night					$L_{Aeq, 8h}$, dB
Very low	Any	Bespoke assessment method to be used				

Notes:

*(1) ABC indicates the significance threshold from **Table 4.2** above, based on the "ABC method" from BS 5228-1*

(2) Where levels are predicted as free field values, the ABC criteria are reduced by 3dB, to account for the difference between free field and façade levels

4.3.22 For the assessment of magnitude of construction vibration, **Table 4.4** below will be used.

Table 4.4: Values to assess the magnitude of vibration impact from all construction sources (day or night)

Sensitivity of receptor	Magnitude of impact				Parameter
	Very low	Low	Medium	High	
High	Bespoke assessment method to be used				
Medium and low	<0.3	0.3	1	>10	PPV mm/s
Very low	No assessment normally required				

4.3.23 Construction vibration will be considered significant if the magnitude of impact is medium or high at a low or medium sensitive receptor, and occurs for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights; or
- a total number of days or nights exceeding 40 in any 6 consecutive months.

4.3.24 As with the assessment of construction noise, where an assessment conclusion identifies a significant effect, it is on the basis that the effect is assumed to meet both the vibration level criteria and the duration criteria, unless otherwise stated. Where there is uncertainty as to whether the duration criteria will be met, a precautionary approach has been adopted and it is assumed that the works will continue for a sufficient period to meet the duration criteria.

4.3.25 The magnitudes of noise changes for new road traffic noise are determined according to **Tables 4.5** and **4.6** for short term and long term effects respectively. As described in **Volume 1 Appendix 6G**, these terms are defined in accordance with the Design Manual for Roads and Bridges (DMRB) Document LA111 (Ref. 4.13), where short term effects are considered to be those experienced during the opening year of operation of a road and long term effects as those experienced in the future. As for both the Sizewell link road and Yoxford roundabout assessments, the opening year is considered to be 2028 and the future year is 2034.

Table 4.5: Short term magnitude of change in road traffic noise level

Short term magnitude	Short term noise change (dB $L_{A10,18hr}$ or L_{night})
Major or high	Greater than or equal to 5.0
Moderate or medium	3.0 to 4.9
Minor or low	1.0 to 2.9
Negligible or very low	less than 1.0

Table 4.6: Long term magnitude of change in road traffic noise level

Long term magnitude	Long term noise change (dB $L_{A10,18hr}$ or L_{night})
Major or high	Greater than or equal to 10.0
Moderate or medium	5.0 to 9.9
Minor or low	3.0 to 4.9
Negligible or very low	less than 3.0

4.3.26 For noise sensitive receptors where the magnitude of change in the short term is minor, moderate or major at noise sensitive buildings, local

circumstances must also be considered to determine the final significance, as required by LA111.

4.3.27 The assessment of the long term effects of changes in road traffic flows on the two village bypass during the operation of Sizewell C nuclear power station is assessed against the values for long term effects set out in **Table 4.6** above.

4.3.28 The criteria used for assessment of road traffic noise relate to medium sensitive receptors only. Where high sensitivity receptors exist, these would be considered on a case-by-case basis, dependent on the reason for the high sensitivity.

iii. Classification of effects

4.3.29 Following the classification of the magnitude of the impact and the value/ sensitivity of the receptor/feature, the effect is classified as shown in **Table** 4.**7**. Definitions of each of the different levels of effect, which can be adverse, beneficial or neutral are shown in **Table 4.8.**

Table 4.7: Classification of effects

		Value/Sensitivity of Receptor			
		Very Low	Low	Medium	High
Magnitude	Very low	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Minor	Minor	Moderate
	Medium	Minor	Minor	Moderate	Major
	High	Minor	Moderate	Major	Major

Table 4.8: Effect definitions

Effect	Description
Major	The noise causes a material change in behaviour attitude or other physiological response. Adverse change may result in the potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished or improved due to change in acoustic character of the area.
Moderate	Effects that may result in moderate changes in behaviour, attitude or other physiological response. Adverse effects may result in some reported sleep disturbance. Changes to the acoustic character of the area such that there is a perceived change in the quality of life.
Minor	Effects that may result in small changes in behaviour attitude or other physiological response. Adverse effects may result in some minor

Effect	Description
	reported sleep disturbance. Small changes to the acoustic character of the area such that there is a low perceived change in the quality of life.
Negligible	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.

4.3.30 Following the classification of an effect as detailed in **Tables 4.7** and **4.8**, a clear statement is made as to whether the effect is 'significant' or 'not significant'. As a general rule, major and moderate effects are considered to be significant and minor and negligible effects are considered to be not significant. However, professional judgement is also applied where appropriate. In addition to considering these tables, other Sizewell C Project-specific factors, such as the number of receptors affected and the duration and character of the impact need to be considered where these have a potential bearing on significance.

iv. Use of LOAEL and SOAEL values in the assessment

4.3.31 The NPSE, the NPSs and the PPG require the assessment of noise and vibration against the lowest observed adverse effect levels (LOAEL) and the significant observed adverse effect level (SOAEL). These will differ dependent on variables such as the level and character of the noise or vibration source, timings of when it would occur, its duration, existing sounds present and the frequency of the occurrence of the source.

4.3.32 Each different source type requires its own specific value for LOAEL and SOAEL, which depends on these factors. The methodology for assigning significance differs from the general methodology set out in **Volume 1 Chapter 6** of the **ES**, as it does not allow for these variables to be properly considered. Each source has therefore been considered separately and values for LOAEL and SOAEL defined for different sensitivities.

4.3.33 In line with the NPSE, the concepts of LOAEL and SOAEL have been established for the assessment of noise and vibration generating activities associated with the proposed development site. **Table 4.9** below sets out descriptions and actions recommended in relation to these categories.

Table 4.9: Generic effect descriptions and actions recommended.

Effect	Description	Action
Below LOAEL	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No specific measures required.
Between LOAEL and SOAEL	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Mitigate and reduce to a minimum.
Above SOAEL	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Avoid

4.3.34 Actual values for the noise and vibration sources assessed vary, dependent on the source of noise, as recommended in the various noise assessment standards and sources of guidance.

4.3.35 The descriptions and actions recommended in **Table 4.9** are based on the guidance in the NPSE and associated guidance in the PPG. This approach was discussed in meetings with the local authorities between 2015 and 2019.

4.3.36 For construction noise, the LOAEL is considered to be equal to the existing baseline ambient level. SOAEL values are as shown in **Table 4.10** below.

Table 4.10: SOAEL values for noise from all construction work associated with the development (all values are façade levels).

Day	Time (hours)	Averaging Period T	Significant Observed Adverse Effect Level[1] $L_{Aeq,T}$ (dB)
Mondays to Fridays	0700 – 0800	1 hour	70
	0800 – 1800	10 hours	75
	1800 – 1900	1 hour	70
	1900 – 2300	4 hours	65
Saturdays	0700 – 0800	1 hour	70
	0800 – 1300	5 hours	75
	1300 – 1400	1 hour	70
	1400 - 2300	1 hour	65
Sundays & Public Holiday	0700 – 2300	1 hour	65
Any night	2300 – 0700	1 hour	55

Note: (1) Duration of exceedance must occur for 10 or more days or nights in any 15 consecutive days or nights; or for a total number of days exceeding 40 days or nights in any 6 consecutive months.

4.3.37 **Table 4.11** sets outs the LOAEL and SOAEL values adopted for construction and vibration and the derivation of these values are detailed in **Volume 1, Appendix 6G** and **Annex 6G.1** of the **ES**.

Table 4.11: LOAEL and SOAEL values for construction vibration.

LOAEL	SOAEL	Parameter
0.3	10.0	PPV mm/s

4.3.38 **Table 4.12** sets outs the LOAEL and SOAEL values adopted for noise from new road schemes across the Sizewell C Project. The values are taken from LA111, which does not state whether the values should apply to existing roads as well as new or amended roads.

4.3.39 Adopting a precautionary approach, it is considered that the SOAELs and LOAELs could be applied, but it should be recognised that development-generated traffic would need to be a substantial cause of any exceedances, and that exceedances that pre-date the Sizewell C Project are not considered to result from the Sizewell C Project. To test whether the proposed development is a substantial cause of the exceedance, or to measure whether the proposed development is the cause of an existing exceedance becoming greater, a change in traffic noise of at least +1dB must occur as a result of the development-generated traffic.

4.3.40 The derivation of these values are detailed in **Volume 1, Appendix 6G** and **Annex 6G.1** of the **ES**.

Table 4.12: LOAEL and SOAEL values for road traffic noise from the new road schemes.

Time Period	LOAEL	SOAEL
Day (06:00-24:00)	55dB $L_{A10,18hr}$ facade	68dB $L_{A10,18hr}$ façade
Night (23:00-07:00)	40dB L_{night}, outside (free-field)	55dB L_{night}, outside (free-field)

f) Assessment methodology

i. Baseline

4.3.41 The existing baseline character and noise levels have been determined by monitoring as detailed in **section 4.4**. Baseline noise levels against which road traffic noise effects from the new road are assessed, have been calculated using 3D noise modelling software (SoundPLAN). Calculations of road traffic noise were carried out using the methodology specified in Calculation of Road Traffic Noise (Ref. 4.14), using a 3D model of the area and based on traffic flow data which is shown in **Appendix 4A** of this volume. The traffic composition and flow data has been derived from the **Transport Assessment** (Doc Ref. 8.5) for the baseline, construction and operation scenarios. This information is inherently cumulative as it includes traffic flows associated with consented developments.

ii. Construction

4.3.42 For the construction effects, key plant items and activities are identified which have the potential to give rise to off-site noise or vibration levels. Levels were then predicted by calculation for each noise sensitive receptor in the vicinity, and these levels compared to assessment criteria relevant to the noise or vibration source.

iii. Operation

4.3.43 In order to calculate noise effects during operation of the proposed development, the baseline flows which would occur if there were to be no Sizewell C development and no bypass are used to predict noise levels on the road network in 2028 and 2034 (referred to as the 'reference case' for each year). The predicted flows with the bypass in place and Sizewell C under construction or operational are used to predict noise levels in the same years. The level differences are then calculated and the significance in the change in level is determined.

4.3.44 As detailed in the **Transport Assessment** (Doc Ref. 8.5), on some days during the peak construction year, the number of heavy goods vehicle (HGV) deliveries would be higher than on a typical day, so two scenarios have been assessed for the peak construction phase, representing a 'typical day' and a 'busiest day' with the only difference being the number of Sizewell C HGVs. Therefore, for 2028 a change in the level for a 'typical' day and 'busiest' day have been assessed.

4.3.45 Calculations to predict noise levels during operation of the proposed development are made in accordance with the methodology set out in Calculation of Road Traffic Noise (Ref. 4.14). SoundPLAN 3D™ noise modelling software is used to create a 3D model of the proposed development and the surrounding environs. The differences between reference case, and with development noise levels, is calculated for the 'typical' day in the peak construction year (2028), and the 'busiest' day in the peak construction year (2028), and the year in which construction work on the main development site is predicted to be complete (2034).

g) Assumptions and limitations

4.3.46 The following assumptions are made in this assessment:

- Construction noise predictions have been undertaken using the activities and plant described in **Chapter 2** of this volume, with further detail provided in **Appendix 4B** of this volume. For the purposes of the assessment, it is assumed that construction works would only take place 07:00 to 19:00 Monday to Saturday. No evening or night-time works are proposed. However, if night-time working is required, for example for unplanned dewatering, ESC would be notified in advance and noise control measures agreed, as necessary.

- Traffic flows would be as set out in **Appendix 4A** of this volume.

- The temporary contractor compounds are assumed to require a hard-core base (not paved or concreted), and that construction of this would involve vibratory compaction of the area.

4.3.47 The following limitations have been identified:

- Further details of the construction methodology will be confirmed once contractors have been appointed. Calculations to predict noise and vibration during construction are therefore best estimates, given industry standard methodologies at present, based on the anticipated plant set out in **Appendix 4B** of this volume.

4.4 Baseline environment

4.4.1 This section presents a summary of the baseline environmental characteristics within the site, and in the surrounding area. Further detail can be found in **Volume 2, Appendix 11A** of the **ES.**

4.4.2 The site predominantly comprises rural fields, woodland and farms, except where it connects to the A12 at each end of the site. The villages of Stratford St Andrew and Farnham are located to the north and west of the site, and there are also isolated farmsteads which are adjacent to the site.

4.4.3 The sound environment is generally dominated by traffic close to the A12 but away from these areas, there is quite a high proportion of natural sounds as well as agricultural noises and occasional aircraft. The existing noise daytime noise levels close to the A12 are fairly high, however, noise levels reduce overnight.

a) Current baseline

4.4.4 Baseline noise levels were measured at a total of nine locations across the site to provide representative levels at nearby dwellings (and groups of dwellings). **Figure 4.2** shows the monitoring locations.

4.4.5 At these locations attended surveys were undertaken to capture samples of typical ambient and background sound levels during morning and afternoon periods. Seven of these locations were also visited during the night-time assessment period (2300 – 0700 hours) and a short sample measurement made of typical ambient and background sound levels. A summary of measured levels at each location is shown in **Table 4.13**.

Table 4.13: Summary of baseline survey data.

Monitoring location	Monitoring location reference	Typical measured level, day		Typical measured level, night	
		$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)
Main Road (A12) Stratford	TVB1	74	51-57	60	23
Parkgate Farm	TVB2	46-47	42-44	49	26
Farnham Church	TVB3	52-53	35	47	31
Farnham Hall	TVB4	49-51	37	46	29
Pond Barn Cottages	TVB5	43-46	31-32	-	-
Farnham Hall Farmhouse	TVB6	39-44	34	46	29
Mollett's Farm	TVB7	46-47	43	-	-
The Old Police House	TVB8	64-66	50-51	57	23
Friday Street	TVB9	59	48	44	27

4.4.6 **Figure 4.2** also includes spot check measurement positions (TSC1-TCS4) which are detailed in **Volume 2, Appendix 11A**.

4.4.7 The baseline noise levels used for the assessment of road traffic noise are those predicted by modelling. Measured levels do not always match modelled values as measurements were generally made close to receptors in publicly accessible locations rather than at the receptor itself, and measurements are highly dependent on prevailing conditions during the survey whereas modelled values are based on annually averaged traffic data.

b) Future baseline

4.4.8 Future baseline noise levels for the purposes of considering road traffic noise effects have been determined by modelling, using information about road surfaces, predicted road traffic flows, speeds, and heavy duty vehicles (HDV) percentages. The traffic composition and flow data, as presented in **Appendix 4A** of this volume, have been derived from the **Transport Assessment** (Doc Ref. 8.5) for the baseline, construction and operation scenarios. This information is inherently cumulative as it includes traffic flows associated with consented developments.

4.4.9 Without the proposed development in place, the future baseline noise (the 'reference case') from road traffic has been predicted for two different operating conditions:

- the year 2028, which is expected to have the peak construction traffic flows, and
- the year 2034, which is expected to be the first year after construction of Sizewell C is complete.

4.4.10 Two new dwellings are proposed at Pond Farm (application reference DC/17/1331/FUL). This committed development is in close proximity to an existing receptor (receptor 12), and the baseline conditions presented for receptor 12 (and monitoring location TVB5) are considered representative for this potential future receptor.

4.4.11 The Glemham Estate Reservoir proposed at Hill Farm Road, Farnham (application reference DC/18/0322/FUL) is also in close proximity to existing receptor (receptor 12), and the baseline conditions presented for receptor 12 (and monitoring location TVB5) unlikely to be changed as a result of this development (other than briefly during its construction).

4.4.12 There are no other committed developments which are likely to alter the existing baseline noise levels or introduce receptors closer to the site than the closest existing properties.

4.4.13 Future baseline ambient noise levels in the absence of Sizewell C construction traffic for each receptor considered are shown in **Table 4.14**. These are estimated from reference flows in 2028 and 2034. Daytime ambient levels have been predicted as $L_{A10,\ 18h}$ values, with 2dB subtracted to provide an estimate of daytime noise levels expressed as $L_{Aeq,\ 16h}$.

Table 4.14: Predicted ambient noise levels from road traffic without Sizewell C construction traffic (free field values)

Receptor	Receptor name	Day time ambient level, $L_{Aeq,\ 16h}$, dB		Night time level, L_{night}, dB	
		2028	2034	2028	2034
1	Chapel Cottages	49	50	43	43
2	Parkgate Farm	50	51	48	48
3	The Stables	69	69	61	61
4	The Red House	70	70	61	61
5	Stratford Grange	52	52	46	46
6	Unknown	62	63	57	57
7	Long Row 1	70	70	62	62

Receptor	Receptor name	Day time ambient level, $L_{Aeq, 16h}$, dB		Night time level, L_{night}, dB	
		2028	2034	2028	2034
8	Long Row 2	57	57	53	53
9	Long Row 3	66	66	60	60
10	Hill Farm	40	40	33	33
11	The Old Vicarage	46	46	39	39
12	Pond Barn Cottages	43	43	36	36
13	Farnham Hall	37	38	33	33
14	Farnham Hall Farmhouse	43	43	37	37
15	Mollett's Farm	48	48	42	42
16	Benhallstock Cottages	73	73	64	64
17	Friday Street Farm	43	43	44	44
18	51 Friday Street	45	45	39	39
19	Rosehill Cottages	47	48	41	41
20	Elm Tree Farm	72	72	63	63
21	Unknown	74	74	64	64
22	The Limes	64	65	59	59
23	Ash Tree Cottage	63	63	57	58
24	Church Hill Cottages	50	51	48	48
25	Church Bungalow	46	46	39	39
26	Rosemary	70	70	62	62
27	White House	61	62	56	56
28	Mill Lane Houses	46	46	40	40
29	Low Road Houses	42	42	37	37
30	Low Barn Farm	38	38	33	33
31	Ramblers	47	47	40	40
32	The Old Police House	67	67	61	61
33	Yew Tree Cottage	51	51	49	49
34	Mill Lane West	44	44	39	39
35	Walk Barn Farm	39	39	33	33

4.5 Environmental design and mitigation

4.5.1 As detailed in **Volume 1**, **Chapter 6** of this **ES**, a number of primary and tertiary mitigation measures have been identified through the iterative EIA process, and have been incorporated into the design and construction planning of the proposed development. Tertiary mitigation measures are legal requirements or are standard practices that would be implemented as part of the proposed development.

4.5.2 The assessment of likely significant effects of the proposed development assumes that primary and tertiary mitigation measures are in place. For the noise and vibration assessment, these measures are identified, with a summary provided on how the measures contribute to the mitigation and management of potentially significant environmental effects.

a) Primary mitigation

4.5.3 Primary mitigation is often referred to as 'embedded mitigation' and includes modifications to the location or design to mitigate impacts. These measures become an inherent part of the proposed development for which consent is sought, and do not require additional action to be taken.

4.5.4 Primary mitigation measures, which minimise the noise impact of the proposed development, include:

- The proposed alignment of the two village bypass would offer road users a more direct route than travelling through Stratford St Andrew and Farnham. This would reduce traffic flows, during both the peak construction of the Sizewell C Project and upon completion of the power station through the villages, and reduce associated traffic noise.
- The site boundary has been designed to maximise the separation distance of construction works and the proposed development from noise sensitive receptors where reasonably practicable.
- The proposed route of the two village bypass would be in an approximately 4.5m deep cutting, which would help to reduce the noise impact on Farnham Hall and its nearby neighbouring properties, compared to being at grade.

4.5.5 There are also primary measures to minimise and manage additional traffic on the roads associated with the construction and operation of the Sizewell C Project. These measures are set out in **Volume 2**, **Chapter 10** of this **ES**.

b) Tertiary mitigation

4.5.6 This will be required regardless of any EIA assessment, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices.

4.5.7 The standard of good practice outlined in BS 5228-1 (Ref. 4.4) will be followed. Primary mitigation for the control of noise and vibration will therefore include, but not be restricted to the following measures:

- selection of quiet plant and techniques in accordance with good practice in BS5228 for all construction, demolition and earth moving activities;
- switching off equipment when not required;
- use of reversing alarms that ensure proper warning whilst minimising noise impacts off-site; and
- provision of training and instruction to construction site staff on methods and techniques of working to minimise off-site noise and vibration impacts.

4.5.8 Where percussive piling is necessary, and where it is feasible to do so, a resilient dolly will be used between the hammer and driven head, or an acoustic shroud would will used to enclose the percussive elements.

4.5.9 BS 5228-2 (Ref. 4.5) gives detailed advice on standard good practice for minimising impacts from construction vibration, as set out in the **Code of Construction Practice** (**CoCP**) (Doc Ref. 8.11), and it will be a requirement of the contractors to adhere to this.

4.5.10 SZC Co. will have a system for the receipt and recording of any noise or vibration complaints from occupiers of noise sensitive receptors, and procedures for investigating and acting appropriately as necessary upon those complaints.

4.5.11 During construction, a **Construction Traffic Management Plan** (Doc Ref. 8.7) and a **Construction Worker Travel Plan** (Doc Ref. 8.8) will be implemented to help manage the effects of traffic generated by the Sizewell C Project – see **Volume 2**, **Chapter 10** for more detail.

c) Other Mitigation

4.5.12 A noise mitigation scheme, provided in **Volume 2, Appendix 11H** is proposed as part of the Development Consent Order (DCO) Section 106 obligations, so that noise insulation or temporary rehousing may be provided where specified noise criteria are exceeded.

4.5.13 NPS EN-1 indicates that noise insulation is a valid form of mitigation, as part of a package of noise mitigation measures, stating at paragraph 5.11.13:

> *"In certain situations, and only when all other forms of noise mitigation have been exhausted, it may be appropriate for the IPC to consider requiring noise mitigation through improved sound insulation to dwellings."*

4.5.14 Similarly, paragraph 010 of the PPG for noise refers to the use if insulation when seeking to address noise impacts:

> *"In general, for developments that are likely to generate noise, there are 4 broad types of mitigation:*
>
> - *engineering: reducing the noise generated at source and/or containing the noise generated;*
> - *layout: where possible, optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose built barriers, or other buildings;*
> - *using planning conditions/obligations to restrict activities allowed on the site at certain times and/or specifying permissible noise levels differentiating as appropriate between different times of day, such as evenings and late at night, and;*
> - *mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building."* (emphasis added)

4.5.15 Offering temporary rehousing where short term construction noise is forecast to exceed specified levels is also commonly regarded as best practice for projects involving significant construction activity.

4.6 Assessment

a) Introduction

4.6.1 This section presents the findings of the noise and vibration assessment for the construction and operation of the proposed development. This section identifies any likely significant effects that are predicted to occur, and **section 4.7** then identifies any secondary mitigation and monitoring measures that are proposed to minimise any adverse effects (if required).

4.6.2 The receptors assessed in this assessment are all considered to be medium sensitivity receptors. No high sensitivity receptors have been identified.

b) Construction

i. Noise

4.6.3 A description of the construction methods is provided in **Chapter 2** of this volume. The construction programme duration is expected to be approximately 24 months. Construction activity working hours would be 07:00 to 19:00 hours, Monday to Saturday. Construction activities outside of these hours will only be undertaken with prior advance notice to ESC.

4.6.4 The construction phase noise and vibration impacts are primarily considered to be associated with the following broad aspects of development:

- Preparatory works: site set up and clearance, including removal of trees and hedgerows, the erection of temporary fencing on land required for construction and the creation of alternative access arrangements and rights of way, setting up of the temporary contractor compounds including security, welfare facilities, and temporary utilities.

- Construction works: earthworks, road construction and surfacing, construction of bridges and civil structures (including piling), utility and drainage installation, construction of pavements, kerbs, footways and paved areas, installation of permanent fencing, road signs and marking, and road lighting, permanent connections to existing road networks, and landscaping.

4.6.5 During site preparation works, the clearance operations are anticipated to last for less than the 10 consecutive days in any 15 day consecutive period and less than 40 days in 6 months.

4.6.6 **Appendix 4B** contains details of construction noise calculations for both the preparatory and main phase of construction. Levels will vary between longer term noise from construction work along the road corridor and shorter periods of elevated levels when construction work is at its closest to a receptor boundary with the site. Predictions of both the longer term level and the level when noisiest activities are closest to the edge of the construction site are provided in **Appendix 4B**. Where the activities closest to the receptor may potentially last for more than 10 consecutive days in any 15 day period or where they may last more than 40 days in total in a 6 month period, these have been presented as representative. Where the work closest to the receptor lasts less than these periods, the representative level has been taken to be the longer term noise.

4.6.7 **Table 4.15** provide a summary of predicted levels for each period for each receptor within 300m of the proposed construction activity.

Table 4.15: Predicted noise levels from construction activities - free field values

Receptor		Range of predicted levels, $L_{Aeq, T}$, dB		Representative predicted levels, $L_{Aeq, T}$, dB	
		Preparatory works	Main construction phase	Preparatory works	Main construction phase
1	Chapel Cottages	33-55	59-63	33	63
2	Parkgate Farm	33-58	66-66	33	66
3	The Stables	35-80	68-71	35	71
4	The Red House	33-80	68-71	35	71
5	Stratford Grange	35-62	60-63	35	63
6	Unknown	39-63	60	39	60
7	Long Row 1	39-63	60	39	60
8	Long Row 2	39-63	60	39	60
9	Long Row 3	39-63	60	39	60
11	The Old Vicarage	45-61	58-60	45	60
12	Pond Barn Cottages	43-67	55-69	43	69
13	Farnham Hall	48-58	59-64	48	64
14	Farnham Hall Farmhouse	47-72	59-67	50	67
15	Mollett's Farm	54-58	60-63	55	63
16	Benhallstock Cottages	60-70	55-60	63	60
17	Friday Street Farm	49-65	53-72	51	72
18	51 Friday Street	47-62	53-72	50	72
19	Rosehill Cottages	44-54	49-72	46	72
25	Church Bungalow	45-53	54-58	45	54
26	Rosemary	40-52	55-56	40	55
27	White House	40-52	55-56	40	55
32	The Old Police House	59-65	55-60	62	60
33	Yew Tree Cottage	49-72	51-67	51	67

4.6.8 The effects of these levels when considered against assessment criteria for Monday to Friday 07:00 to 19:00 hours and Saturday 07:00 to 13:00 hours and between 13:00 and 19:00 hours on Saturday are as shown in **Table 4.16**, based on each receptor being of medium sensitivity.

Table 4.16: Summary of predicted construction noise effects at the nearest noise sensitive receptor locations around the site at different periods

Receptor		Mon-Fri 07:00 to 19:00 hours and Sat 07:00 to 13:00 hours		Saturday 13:00 to 19:00 hours	
		Preparatory works	Main construction	Preparatory works	Main construction
1	Chapel Cottages	Negligible	Moderate adverse, **significant**	Negligible	Major adverse, **significant**
2	Parkgate Farm	Negligible	Minor adverse, **not significant**	Negligible	Major adverse, **significant**
3	The Stables	Negligible	Minor adverse, **not significant**	Negligible	Moderate adverse, **significant**
4	The Red House	Negligible	Minor adverse, **not significant**	Negligible	Moderate adverse, **significant**
5	Stratford Grange	Negligible	Moderate adverse, **significant**	Negligible	Major adverse, **significant**
6	Unknown	Negligible	Negligible	Negligible	Negligible
7	Long Row 1	Negligible	Negligible	Negligible	Negligible
8	Long Row 2	Negligible	Minor adverse, **not significant**	Negligible	Moderate adverse, **significant**
9	Long Row 3	Negligible	Negligible	Negligible	Negligible
11	The Old Vicarage	Negligible	Minor adverse, **not significant**	Negligible	Moderate adverse, **significant**
12	Pond Barn Cottages	Minor adverse, **not significant**	Moderate adverse, **significant**	Minor adverse, **not significant**	Major adverse, **significant**
13	Farnham Hall	Minor adverse, **not significant**	Moderate adverse, **significant**	Minor adverse, **not significant**	Major adverse, **significant**
14	Farnham Hall Farmhouse	Minor adverse, **not significant**	Moderate adverse, **significant**	Minor adverse, **not significant**	Major adverse, **significant**
15	Mollett's Farm	Minor adverse, **not significant**	Moderate adverse, **significant**	Moderate adverse, **significant**	Major adverse, **significant**
16	Benhallstock Cottages	Negligible	Negligible	Negligible	Negligible

Receptor		Mon-Fri 07:00 to 19:00 hours and Sat 07:00 to 13:00 hours		Saturday 13:00 to 19:00 hours	
		Preparatory works	Main construction	Preparatory works	Main construction
17	Friday Street Farm	Minor adverse, **not significant**	Major adverse, **significant**	Minor adverse, **not significant**	Major adverse, **significant**
18	51 Friday Street	Minor adverse, **not significant**	Major adverse, **significant**	Minor adverse, **not significant**	Major adverse, **significant**
19	Rosehill Cottages	Negligible	Major adverse, **significant**	Negligible	Major adverse, **significant**
25	Church Bungalow	Negligible	Minor adverse, **not significant**	Negligible	Moderate adverse, **significant**
26	Rosemary	Negligible	Negligible	Negligible	Negligible
27	White House	Negligible	Negligible	Negligible	Negligible
32	The Old Police House	Negligible	Negligible	Negligible	Negligible
33	Yew Tree Cottage	Minor adverse, **not significant**	Moderate adverse, **significant**	Minor adverse, **not significant**	Major adverse, **significant**

4.6.9 The reason for the predicted increase in adverse effects between 13:00 and 19:00 hours on a Saturday is not due to any difference in activities which would occur in this period, but due to the reduction in thresholds for significance which occurs outside of Monday to Friday 07:00 to 19:00 hours and Saturday 07:00 to 13:00 hours.

4.6.10 There is the potential for combined effects where adverse effects predicted at some receptors during the construction work could combine with increases in construction-related road traffic noise on the A12 during the early years of construction, as detailed in **Volume 2, Chapter 11**. However, the two different noise source types (road traffic noise and construction noise) are experienced differently and the assessment methods are not compatible so there is no recognised way to combine these effects. In the circumstances, professional judgement must be used to determine where any combined effect might be experienced.

4.6.11 No significant residual effects are predicted from changes to road traffic on existing roads in the vicinity, their presence in early years would therefore be unlikely change the predicted effects from construction noise when the two sources are considered in combination.

4.6.12 It can be seen from **Table 4.15** that the construction SOAEL of 75dB for the weekday daytime period of 08:00 to 18:00 hours is predicted to be not

exceeded at any of the assessed receptors, when considering the representative values, even when the free-field values are adjusted by +3dB to obtain façade levels. The lower SOAELs that are adopted for the periods outside of the main weekday daytime works are predicted to be exceeded at 14 receptors, when considering the representative values and when the free-field values are adjusted by +3dB to obtain façade levels.

4.6.13 It is inevitable that construction noise will vary over the course of any given day, and the predicted levels in **Table 4.15** are considered to be a reasonable representation of the likely construction noise levels for time periods other than the 12 hour period used in the calculation.

4.6.14 Exceedances of the SOAEL will be avoided by managing the works in a way that avoids the noisiest activities at the most sensitive parts of the day, secured through the **CoCP** (Doc Ref. 8.11). Where such works cannot be managed in this manner, exceedances of the SOAEL will be avoided through the provision of noise insulation under the Noise Mitigation Scheme provided in **Volume 2**, **Appendix 6H** of the **ES**.

4.6.15 The LOAEL, which for construction noise is taken to be equal to the existing baseline sound levels, is likely to be exceeded at all of the receptor locations for at least some of the time during the construction works. This will be mitigated and minimised through the measures described in **section 4.5** of this chapter and through the implementation of the **CoCP** (Doc Ref. 8.11).

ii. Vibration

4.6.16 The approach taken for predicting vibration levels is described in **Volume 1, Chapter 6, Annex 6G.2** of the **ES**. Using Figures 1 and 2 from this, it can be seen, that for earthmoving, including bulldozers, breakers, crushers and small twin drum vibratory rollers, there would be a negligible vibration effect beyond a distance of 40m from the activity. For plant which produces higher vibration levels (such as piling and large single drum compactors), there would be a negligible vibration effect beyond a distance of 90m from the activity.

4.6.17 As a result of proposed construction work, vibration producing plant potentially affecting vibration sensitive premises within these distances would be as shown in **Table 4.17**. All other vibration levels would be below 0.3mm/s and would be a very low magnitude of impact.

Table 4.17: Predicted vibration levels and magnitudes

Receptor	Plant	Distance	Level	Magnitude
16	Large vibratory roller during temporary contractors compound construction baseworks.	40	1.5	Medium
32		70	0.5	Low

4.6.18 The use of a large vibratory roller to compact the ground for the temporary contractors compounds is expected to result in a medium magnitude impact at Receptor 16 Benhallstock Cottages, which when combined with its medium sensitivity as a receptor, would result in a moderate adverse effect. This would be considered a significant effect, however, the activity is expected to occur at the assessed distance for less than 10 days in a 15 consecutive day period and less than 40 days in a six month period. The short duration of the effect will modify its significance and it is considered to be **not significant**.

4.6.19 The predicted vibration level at Receptor 32 The Old Police House would be considered a low magnitude impact, which when combined with its medium sensitivity as a receptor, would result in a minor adverse effect. This is considered to be **not significant**, and the works are expected to last for less than 10 days in a 15 consecutive day period and less than 40 days in a six month period, which would reinforce this conclusion.

4.6.20 The anticipated vibration levels are predicted to be below the SOAEL but above the LOAEL at receptors when undertaken at their closest distance. This will be mitigated and minimised through the measures described later in this chapter, which will be secured through the **CoCP** (Doc Ref. 8.11).

iii. Inter-relationship effects

4.6.21 There is the potential for inter-relationship effects on amenity and recreation, ecological receptors and heritage receptors as a result of noise and vibration impacts. These are considered within **Chapters 7**, **8** and **9** of this volume respectively. Inter-relationship effects on human health receptors are considered further in **Volume 2, Chapter 28** of this volume, and in **Volume 10, Chapter 2**.

c) Operation

4.6.22 Road traffic noise levels are predicted using the calculation method described in Calculation of Road Traffic Noise (Ref. 4.14). Road traffic flow data have been used to predict levels at each receptor, or receptor group for reference cases occurring during peak construction, and once all

construction work at the main development site is complete (2028 and 2034, respectively). **Figure 4.1** shows the locations of all receptors. The road traffic flow data used is shown in **Tables 1.1** to **1.2** in **Appendix 4A**.

4.6.23 The recommended approach for the assessment of noise from a new road scheme is set out in Document LA111 (part of DMRB, Ref. 4.13). This document recommends that the noise level resulting from the use of a new road scheme is considered against the level which would exist in the absence of the scheme. It recommends that the opening year and a future year are considered, where the future year is generally taken to be 15 years after opening, but is intended to represent the year with the greatest increase after opening.

4.6.24 In the case of this proposed development, the highest flows are likely to occur soon after the road opens, in 2028, as the baseline flows along the road would be increased as a result of the additional construction traffic for Sizewell. In the future year 2034, approximately ten years after the opening year, traffic flows would be reduced as construction traffic would cease at this time. Therefore, for this assessment, these two years have been assessed using the criteria recommended in LA111 for short term and long term noise level changes for 2028 and 2034, respectively.

4.6.25 Noise level predictions have been made of the daytime and night time road traffic noise levels, in terms of the $L_{A10,18hours}$ and the L_{night} parameters respectively, with the development operational for the typical and busiest day in 2028, and for 2034. Predicted levels along with the effects of these levels are shown in **Tables 4.18, 4.19** and **4.20**.

Table 4.18: Predicted level differences and effects for the typical day in the peak construction year (in 2028).

Receptor		Baseline 2028		With development 2028		Difference, dB		Effect	
		Day, $L_{A10,18h}$, dB	Night, L_{night}, dB	Day, $L_{A10,18h}$, dB	Night, L_{night}, dB	Day	Night	Day	Night
1	Chapel Cottages	53.9	43.0	56.8	45.9	2.9	2.9	Minor adverse	Minor adverse
2	Parkgate Farm	54.8	47.9	59.8	49.6	5.0	1.7	Major adverse	Minor adverse
3	The Stables	73.0	60.9	63.4	53.7	-9.6	-7.2	Major beneficial	Major beneficial
4	The Red House	74.0	61.1	60.1	50.2	-13.9	-10.9	Major beneficial	Major beneficial
5	Stratford Grange	56.0	45.6	56.1	45.0	0.1	-0.6	Negligible	Negligible

Receptor		Baseline 2028		With development 2028		Difference, dB		Effect	
		Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day	Night	Day	Night
6	Unknown	66.8	57.2	56.0	46.5	-10.8	-10.7	Major beneficial	Major beneficial
7	Long Row 1	74.6	62.2	55.2	46.6	-19.4	-15.6	Major beneficial	Major beneficial
8	Long Row 2	61.6	53.2	54.3	45.6	-7.3	-7.6	Major beneficial	Major beneficial
9	Long Row 3	70.4	59.6	51.8	44.8	-18.6	-14.8	Major beneficial	Major beneficial
10	Hill Farm	44.4	33.0	52.4	46.4	8.0	13.4	Major adverse	Major adverse
11	The Old Vicarage	50.5	38.9	54.2	43.4	3.7	4.5	Moderate adverse	Moderate adverse
12	Pond Barn Cottages	47.1	35.8	63.1	55.7	16.0	19.9	Major adverse	Major adverse
13	Farnham Hall	41.8	33.3	55.2	44.6	13.4	11.3	Major adverse	Major adverse
14	Farnham Hall Farmhouse	47.4	36.9	59.6	52.8	12.2	15.9	Major adverse	Major adverse
15	Mollett's Farm	52.4	42.1	55.8	45.0	3.4	2.9	Moderate adverse	Minor adverse
16	Benhallstock Cottages	77.2	63.7	58.3	48.9	-18.9	-14.8	Major beneficial	Major beneficial
17	Friday Street Farm	47.5	43.7	51.4	46.2	3.9	2.5	Moderate adverse	Minor adverse
18	51 Friday Street	49.5	39.1	53.0	42.4	3.5	3.3	Moderate adverse	Moderate adverse
19	Rosehill Cottages	51.8	40.6	54.5	43.1	2.7	2.5	Minor adverse	Minor adverse
20	Elm Tree Farm	76.1	62.8	53.5	45.5	-22.6	-17.3	Major beneficial	Major beneficial
21	Unknown	78.5	64.0	54.6	46.6	-23.9	-17.4	Major beneficial	Major beneficial
22	The Limes	68.9	58.6	51.6	45.0	-17.3	-13.6	Major beneficial	Major beneficial
23	Ash Tree Cottage	67.2	57.4	48.7	43.6	-18.5	-13.8	Major beneficial	Major beneficial
24	Church Hill Cottages	54.9	47.6	51.8	41.5	-3.1	-6.1	Moderate beneficial	Major beneficial

Receptor		Baseline 2028		With development 2028		Difference, dB		Effect	
		Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day	Night	Day	Night
25	Church Bungalow	50.0	38.8	54.7	43.2	4.7	4.4	Moderate adverse	Moderate adverse
26	Rosemary	74.4	61.6	53.8	45.5	-20.6	-16.1	Major beneficial	Major beneficial
27	White House	65.9	56.2	51.7	44.0	-14.2	-12.2	Major beneficial	Major beneficial
28	Mill Lane Houses	50.4	39.9	49.9	39.9	-0.5	0.0	Negligible	Negligible
29	Low Road Houses	46.0	36.6	47.2	38.0	1.2	1.4	Minor adverse	Minor adverse
30	Low Barn Farm	42.3	32.7	44.2	34.5	1.9	1.8	Minor adverse	Minor adverse
31	Ramblers	51.5	40.1	49.5	38.1	-2.0	-2.0	Minor beneficial	Minor beneficial
32	The Old Police House	71.7	60.8	54.8	46.9	-16.9	-13.9	Major beneficial	Major beneficial
33	Yew Tree Cottage	55.2	48.5	57.7	51.4	2.5	2.9	Minor adverse	Minor adverse
34	Mill Lane West	48.0	39.3	50.6	39.2	2.6	-0.1	Minor adverse	Negligible
35	Walk Barn Farm	43.3	32.8	50.2	39.4	6.9	6.6	Major adverse	Major adverse

Table 4.19: Predicted level differences and effects for the busiest day in the peak construction year (in 2028)

Receptor		Baseline 2028		With development 2028		Difference, dB		Effect	
		Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day	Night	Day	Night
1	Chapel Cottages	53.9	43.0	57.2	46.0	3.3	3.0	Moderate adverse	Moderate adverse
2	Parkgate Farm	54.8	47.9	60.2	49.6	5.4	1.7	Major adverse	Minor adverse
3	The Stables	73.0	60.9	63.7	53.8	-9.3	-7.1	Major beneficial	Major beneficial
4	The Red House	74.0	61.1	60.4	50.1	-13.6	-11.0	Major beneficial	Major beneficial
5	Stratford Grange	56.0	45.6	56.5	45.1	0.5	-0.5	Negligible	Negligible

Receptor		Baseline 2028		With development 2028		Difference, dB		Effect	
		Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day	Night	Day	Night
6	Unknown	66.8	57.2	56.3	46.3	-10.5	-10.9	Major beneficial	Major beneficial
7	Long Row 1	74.6	62.2	55.1	46.3	-19.5	-15.9	Major beneficial	Major beneficial
8	Long Row 2	61.6	53.2	54.6	45.5	-7.0	-7.7	Major beneficial	Major beneficial
9	Long Row 3	70.4	59.6	51.6	44.5	-18.8	-15.1	Major beneficial	Major beneficial
10	Hill Farm	44.4	33.0	52.9	46.5	8.5	13.5	Major adverse	Major adverse
11	The Old Vicarage	50.5	38.9	54.6	43.5	4.1	4.6	Moderate adverse	Moderate adverse
12	Pond Barn Cottages	47.1	35.8	63.5	55.8	16.4	20.0	Major adverse	Major adverse
13	Farnham Hall	41.8	33.3	55.6	44.7	13.8	11.4	Major adverse	Major adverse
14	Farnham Hall Farmhouse	47.4	36.9	60.0	52.9	12.6	16.0	Major adverse	Major adverse
15	Mollett's Farm	52.4	42.1	56.3	45.1	3.9	3.0	Moderate adverse	Moderate adverse
16	Benhallstock Cottages	77.2	63.7	58.4	48.7	-18.8	-15.0	Major beneficial	Major beneficial
17	Friday Street Farm	47.5	43.7	51.8	46.3	4.3	2.6	Moderate adverse	Minor adverse
18	51 Friday Street	49.5	39.1	53.4	42.5	3.9	3.4	Moderate adverse	Moderate adverse
19	Rosehill Cottages	51.8	40.6	54.9	43.2	3.1	2.6	Moderate adverse	Minor adverse
20	Elm Tree Farm	76.1	62.8	53.2	45.1	-22.9	-17.7	Major beneficial	Major beneficial
21	Unknown	78.5	64.0	54.0	46.1	-24.5	-17.9	Major beneficial	Major beneficial
22	The Limes	68.9	58.6	51.4	44.7	-17.5	-13.9	Major beneficial	Major beneficial
23	Ash Tree Cottage	67.2	57.4	48.3	43.3	-18.9	-14.1	Major beneficial	Major beneficial
24	Church Hill Cottages	54.9	47.6	52.2	41.6	-2.7	-6.0	Minor beneficial	Major beneficial
25	Church Bungalow	50.0	38.8	55.1	43.3	5.1	4.5	Major adverse	Moderate adverse
26	Rosemary	74.4	61.6	53.6	45.1	-20.8	-16.5	Major beneficial	Major beneficial
27	White House	65.9	56.2	51.8	43.7	-14.1	-12.5	Major beneficial	Major beneficial

Receptor		Baseline 2028		With development 2028		Difference, dB		Effect	
		Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day	Night	Day	Night
28	Mill Lane Houses	50.4	39.9	50.3	40.0	-0.1	0.1	Negligible	Negligible
29	Low Road Houses	46.0	36.6	47.6	38.1	1.6	1.5	Minor adverse	Minor adverse
30	Low Barn Farm	42.3	32.7	44.6	34.6	2.3	1.9	Minor adverse	Minor adverse
31	Ramblers	51.5	40.1	49.9	38.2	-1.6	-1.9	Minor beneficial	Minor beneficial
32	The Old Police House	71.7	60.8	54.8	46.6	-16.9	-14.2	Major beneficial	Major beneficial
33	Yew Tree Cottage	55.2	48.5	58.1	51.4	2.9	2.9	Minor adverse	Minor adverse
34	Mill Lane West	48.0	39.3	51.0	39.2	3.0	-0.1	Moderate adverse	Negligible
35	Walk Barn Farm	43.3	32.8	50.7	39.5	7.4	6.7	Major adverse	Major adverse

Table 4.20: Predicted level differences and effects for the first year with no Sizewell construction traffic (in 2034)

Receptor		Baseline 2028		With development 2034		Difference, dB		Effect	
		Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day	Night	Day	Night
1	Chapel Cottages	53.9	43.0	56.3	45.2	2.4	2.2	Negligible	Negligible
2	Parkgate Farm	54.8	47.9	59.3	49.0	4.5	1.1	Minor adverse	Negligible
3	The Stables	73.0	60.9	62.8	53.2	-10.2	-7.7	Major beneficial	Moderate beneficial
4	The Red House	74.0	61.1	59.6	49.8	-14.4	-11.3	Major beneficial	Major beneficial
5	Stratford Grange	56.0	45.6	55.6	44.4	-0.4	-1.2	Negligible	Negligible
6	Unknown	66.8	57.2	55.6	46.1	-11.2	-11.1	Major beneficial	Major beneficial
7	Long Row 1	74.6	62.2	54.9	46.3	-19.7	-15.9	Major beneficial	Major beneficial
8	Long Row 2	61.6	53.2	53.8	45.2	-7.8	-8.0	Moderate beneficial	Moderate beneficial
9	Long Row 3	70.4	59.6	51.7	44.7	-18.7	-14.9	Major beneficial	Major beneficial

Receptor		Baseline 2028		With development 2034		Difference, dB		Effect	
		Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day	Night	Day	Night
10	Hill Farm	44.4	33.0	51.9	46.1	7.5	13.1	Moderate adverse	Major adverse
11	The Old Vicarage	50.5	38.9	53.7	42.7	3.2	3.8	Minor adverse	Minor adverse
12	Pond Barn Cottages	47.1	35.8	62.6	55.4	15.5	19.6	Major adverse	Major adverse
13	Farnham Hall	41.8	33.3	54.6	43.9	12.8	10.6	Major adverse	Major adverse
14	Farnham Hall Farmhouse	47.4	36.9	59.1	52.5	11.7	15.6	Major adverse	Major adverse
15	Mollett's Farm	52.4	42.1	55.3	44.4	2.9	2.3	Negligible	Negligible
16	Benhallstock Cottages	77.2	63.7	58.1	48.7	-19.1	-15.0	Major beneficial	Major beneficial
17	Friday Street Farm	47.5	43.7	50.9	46.0	3.4	2.3	Minor adverse	Negligible
18	51 Friday Street	49.5	39.1	52.5	41.8	3.0	2.7	Minor adverse	Negligible
19	Rosehill Cottages	51.8	40.6	54.0	42.5	2.2	1.9	Negligible	Negligible
20	Elm Tree Farm	76.1	62.8	53.5	45.5	-22.6	-17.3	Major beneficial	Major beneficial
21	Unknown	78.5	64.0	54.6	46.5	-23.9	-17.5	Major beneficial	Major beneficial
22	The Limes	68.9	58.6	51.5	44.9	-17.4	-13.7	Major beneficial	Major beneficial
23	Ash Tree Cottage	67.2	57.4	48.6	43.5	-18.6	-13.9	Major beneficial	Major beneficial
24	Church Hill Cottages	54.9	47.6	51.3	41.0	-3.6	-6.6	Minor beneficial	Moderate beneficial
25	Church Bungalow	50.0	38.8	54.1	42.5	4.1	3.7	Minor adverse	Minor adverse
26	Rosemary	74.4	61.6	53.7	45.4	-20.7	-16.2	Major beneficial	Major beneficial
27	White House	65.9	56.2	51.4	43.8	-14.5	-12.4	Major beneficial	Major beneficial
28	Mill Lane Houses	50.4	39.9	49.4	39.3	-1.0	-0.6	Negligible	Negligible
29	Low Road Houses	46.0	36.6	46.7	37.4	0.7	0.8	Negligible	Negligible

Receptor		Baseline 2028		With development 2034		Difference, dB		Effect	
		Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day, $L_{A10, 18h}$, dB	Night, L_{night}, dB	Day	Night	Day	Night
30	Low Barn Farm	42.3	32.7	43.6	33.8	1.3	1.1	Negligible	Negligible
31	Ramblers	51.5	40.1	49.0	37.5	-2.5	-2.6	Negligible	Negligible
32	The Old Police House	71.7	60.8	54.6	46.8	-17.1	-14.0	Major beneficial	Major beneficial
33	Yew Tree Cottage	55.2	48.5	57.2	51.1	2.0	2.6	Negligible	Negligible
34	Mill Lane West	48.0	39.3	50.1	38.5	2.1	-0.8	Negligible	Negligible
35	Walk Barn Farm	43.3	32.8	49.7	38.8	6.4	6.0	Moderate adverse	Moderate adverse

4.6.26 It can be seen from **Tables 4.18, 4.19** and **4.20** that a range of outcomes are expected, from major beneficial effects to major adverse effects.

4.6.27 In 2028, there would be significant adverse effects for some properties close to the new road in the short term. These effects would be significant partly due to the presence of the new road and partly due to the increase in road traffic noise resulting from the additional construction traffic on the road at that time. There would also be some significant beneficial effects for properties close to the A12 in Stratford St Andrew and Farnham which would be bypassed by the new road.

4.6.28 In 2034, when construction traffic is no longer present, there would be either a negligible effect or a beneficial effect as a result of the new road for the majority of receptors. However, at Hill Farm, Pond Barn Cottages, Farnham Hall, Farnham Hall Farmhouse and Walk Barn Farm there would remain a significant adverse effect in the long term.

4.6.29 The identification of locations where the SOAEL might be exceeded as a result of the proposed development has been approached in a proportionate manner, taking account of the effect of the scheme and existing conditions.

4.6.30 As noted previously, the assessment method for road schemes set out in LA111 is not clear as to whether the SOAELs and LOAELs for road traffic noise are to be applied to existing roads as well as new or amended roads. Adopting a precautionary approach, it is considered that the SOAELs and LOAELs could be applied to either, but it should be recognised that the proposed scheme or development-generated traffic would need to be a

substantial cause of any exceedances, and that exceedances of the SOAEL that pre-date the Sizewell C Project are not considered to result from the Sizewell C Project.

4.6.31 The road traffic noise levels set out in **Tables 4.18, 4.19** and **4.20** have been assessed against the daytime and night time SOAEL values, and for those receptors where the SOAEL is predicted to be exceeded, the change has been considered to determine whether the proposed development is the substantial cause, which is defined in this instance as causing a change of at least +1dB.

4.6.32 It can be seen from **Tables 4.18, 4.19** and **4.20** that the SOAEL is exceeded in at least one period at the following receptors, and the cause of that exceedance is considered to be the proposed development, i.e. the change in road traffic is at least 1dB:

- Pond Barn Cottages (all three scenarios).

4.6.33 This assessment will be repeated as part of the noise mitigation scheme, which forms part of the Section 106 agreement. Where exceedances of the SOAEL are confirmed, the provisions set out in the noise mitigation scheme will apply and exceedances of the SOAEL will be avoided.

4.6.34 The mitigation that has been incorporated into the overall Sizewell C Project strategy mitigates and minimises adverse effects on health and quality of life, including the use of rail to move substantial construction loads, and the construction of new roads to minimise the impacts along roads with significant residential population.

4.6.35 The assessment that will be carried under the noise mitigation scheme will have the benefit of more accurate information on vehicle numbers and vehicle routing strategies, once a contractor is appointed.

i. Inter-relationship effects

4.6.36 There is the potential for inter-relationship effects on amenity and recreation receptors, ecological receptors and heritage receptors as a result of noise and vibration impacts. These are considered within **Chapters 7**, **8** and **9** of this volume respectively. Inter-relationship effects on human health receptors are considered further in **Volume 2**, **Chapter 28** of this volume, and in **Volume 10, Chapter 2** of this **ES**.

d) Effects of changes within the site parameters

4.6.37 SZC Co. has adopted a parameters approach which identifies defined envelopes for the construction of the two village bypass within which future development would be undertaken. This is to allow for sufficient flexibility to accommodate minor design changes that may be required between the DCO being granted and construction commencing. The site parameters include the flexibility to alter the horizontal and vertical alignment of the route of the proposed two village bypass, within the parameters defined **section 2.3** of **Chapter 2** and on the Work Plans reproduced in **Appendix 2A** of this chapter.

4.6.38 In the event the vertical or lateral alignment of the route of the two village bypass shifted within the site parameters set out in **Chapter 2** of this volume, the potential for variations in noise levels is considered below.

i. Construction

4.6.39 During the site set-up and site clearance stage, the noisiest activities are associated with the vegetation clearance and establishment / removal of the temporary contractor compound, and based on the distance of receptors to site boundary where these works could extend up to, and therefore the reasonable worst-case scenario has already been assessed.

4.6.40 Any variation in alignment would not materially alter the predicted noise and vibration effects during the main construction phase.

ii. Operation

4.6.41 In the event that the vertical alignment of the route increased by up to 1m, there is the potential that the traffic noise level difference is likely to increase during each operational scenario, however this increase would be limited and would not materially alter the significance of effects.

4.6.42 Similarly, if the road alignment shifted laterally, as set out in the site parameters in **Chapter 2** of this volume, there may be limited traffic noise level differences depending on the direction the alignment shifted, however this effect would be limited and would not materially alter the significance of effects.

4.7 Mitigation and monitoring

a) Introduction

4.7.1 Where possible, mitigation measures have been proposed where a significant effect is predicted to occur. Primary and tertiary mitigation measures which have already been incorporated within the design of the proposed development are detailed in **section 4.5**. Where other mitigation is required to avoid a significant adverse effect, or mitigate and minimise adverse effects, this is referred to as secondary mitigation as described below.

b) Mitigation

i. Construction

4.7.2 Exact working methods and plant to be used will not be determined until a contractor is appointed, and therefore precise details of noise mitigation measures cannot yet be given. Accordingly, and as set out in the **CoCP** (Doc Ref. 8.11), it is likely the mitigation measures could include selection of alternative plant or working methods, barrier screening and/or stand-off margins and/or alternative plant.

4.7.3 Barrier screening and/or minimum stand-off margins could be provided, but the exact location and height of screening would be dependent on a number of factors, including:

- the detailed construction programme and equipment specifications;
- on-site constraints (space, topography or other ecological or geographical feature which may prevent or limit screening);
- the disbenefit arising from visual impact of screening;
- the environmental impact from the construction of screening; and
- the amount of time over which the reduction would be required.

4.7.4 A balance will need to be struck between the above factors to decide on the extent of screening in each set of circumstances. It is likely that some reduction would be possible in some locations during the construction phase, but the benefit of screening in relation to noise impact in some circumstances may be outweighed by the disbenefit in relation to visual impacts.

4.7.5 Reductions in noise levels at receptors may also be achieved by altering working methods, such as phased working, reduced complement of plant in close proximity and reducing or avoiding noisier activities during Saturday between 13:00 and 19:00 hours.

4.7.6 On Saturdays between 07:00 and 19:00 hours, there would be a significant adverse effect at Mollett's Farm during the site preparation phase. There would be no other significant effects at this or any other receptor during site preparation at this or any other time.

4.7.7 On Monday to Friday, 07:00 to 19:00 hours and between 07:00 and 13:00 hours on Saturdays, significant adverse effects are predicted during the main construction phase at the following receptors:

- Rec 1. Chapel Cottages
- Rec 2. Parkgate Farm
- Rec 5. Stratford Grange
- Rec 12. Pond Barn Cottages
- Rec 13. Farnham Hall
- Rec 14. Farnham Hall Farmhouse
- Rec 15. Mollett's Farm
- Rec 17. Friday Street Farm
- Rec 18. 51 Friday Street
- Rec 19. Rosehill Cottages
- Rec 33. Yew Tree Cottage

4.7.8 Between 13:00 and 19:00 hours on Saturdays, significant adverse effects are predicted during the main construction phase at the following receptors:

- Rec 1. Chapel Cottages

- Rec 2. Parkgate Farm
- Rec 3. The Stables
- Rec 4. The Red House
- Rec 5. Stratford Grange
- Rec 8. Long Row 2
- Rec 11. The Old Vicarage
- Rec 12. Pond Barn Cottages
- Rec 13. Farnham Hall
- Rec 14. Farnham Hall Farmhouse
- Rec 15. Mollett's Farm
- Rec 17. Friday Street Farm
- Rec 18. 51 Friday Street
- Rec 19. Rosehill Cottages
- Rec 25. Church Bungalow
- Rec 33. Yew Tree Cottage

4.7.9 Mitigation measures listed above and in the **CoCP** (Doc Ref. 8.11), should be capable of reducing levels such that they are no longer significant.

4.7.10 Mitigation should be considered as far as is reasonably practicable to minimise adverse effects. Examples of such mitigation are:

- During vegetation clearance work, including use of a chipper (for substantial stems and branches, not lightweight hedges), plant could be screened from the nearest affected receptors or positioned more remotely, so that the benefit of distance attenuation is maximised.

Screening could take the form of acoustic panel/pads attached to temporary fencing. There would be a potential for a 5dB ($L_{Aeq,T}$) benefit from a 2m tall screen arrangement.

- Creation of a minimum 20m buffer zone at the edge of the temporary contractors compound adjacent to Benhallstock Cottage and provision of screening in this area. The compound could be laid out and operated in a manner which minimises materials handling and vehicle movements in the north-east corner close to the property.

4.7.11 In summary, in accordance with the **CoCP** (Doc Ref. 8.11) construction mitigation measures could include screening and changing working methods and times, including limiting noisy activities on Saturday afternoons.

ii. Operation

4.7.12 No additional mitigation measures above those reported in **sections 4.5** are currently proposed to further reduce noise levels. However, once the contractor has been appointed and as part the detailed design, further consideration will be given to measures that could be implemented to further reduce traffic noise.

c) Monitoring

4.7.13 Routine monitoring of noise and vibration during construction will be carried out as proposed in the **CoCP** (Doc Ref. 8.11). Provision will be made as necessary for monitoring of noise and vibration levels in the event of complaints being received from occupiers of noise sensitive receptors.

4.8 Residual effects

4.8.1 The following tables (**Tables 4.21, 4.22, 4.23** and **4.24**) present a summary of the noise and vibration assessment.

4.8.2 Tables **4.21** and **4.23** identify the receptor(s) likely to be impacted, the level of effect and, where the effect is deemed to be significant, the tables include the mitigation proposed and the resulting residual effect. Receptor numerical coding for **Tables 4.21** and **4.23** are as per **Table 4.15**

4.8.3 During construction of the proposed development, no significant residual effects are anticipated at any receptors.

4.8.4 During operation of the proposed development, significant adverse residual effects are anticipated at the following receptors:

- During peak construction year (2028), significant effects are anticipated on receptors 2, 10, 11, 12, 13, 14, 15, 17, 18, 25 and 35.

- During the busiest period of peak construction year (2028), significant effects are anticipated at receptors 1, 2, 10, 11, 12, 13, 14, 15, 17, 18, 19, 25, 34 and 35.

- Once construction of Sizewell C (2034), significant effects are likely to remain at receptors 10, 12, 13, 14 and 35.

4.8.5 SZC Co will continue to seek reasonably practicable measures to further reduce or avoid these significant effects, through the **CoCP** (Doc Ref. 8.11) and the detailed design.

4.8.6 Tables **4.22** and **4.24** also relate to the construction and operational phases respectively, identifying the assessment outcomes against LOAEL and SOAEL.

Table 4.21: Summary of effects for the construction phase.

Receptor	Impact	Primary or Tertiary Mitigation.	Assessment of effects.	Additional Mitigation.	Residual Effects.
Preparatory Works (including main set-up and site clearance) and restoration.					
12, 13, 14, 15, 17, 18, 33	Noise (Monday to Friday 07:00 to 19:00 hours and Saturday 07:00 to 13:00 hours)	The standard of good practice outlined in BS 5228-1 will be followed, as set out in the **CoCP** (Doc Ref. 8.11).	Minor adverse	Screening, working methodology to be considered – to designed once details of construction approach has been further developed.	Minor adverse or negligible (**not significant**)
All other receptors			Negligible		Negligible (**not significant**)
15	Noise (Saturday 13:00 to 19:00 hours)	The standard of good practice outlined in BS 5228-1 will be followed, as set out in the **CoCP** (Doc Ref. 8.11).	Moderate adverse	Minimising noisy activities between 13:00 and 19:00 on Saturdays. Screening, working methodology to be considered – to designed once details of construction approach has been further developed.	Minor adverse or negligible (**not significant**)
12, 13, 14, 17, 18, 33			Minor adverse		Minor adverse or negligible (**not significant**)
All other receptors			Negligible		Negligible (**not significant**)

Receptor	Impact	Primary or Tertiary Mitigation.	Assessment of effects.	Additional Mitigation.	Residual Effects.
16	Vibration	The standard of good practice outlined in BS 5228-2 will be followed, as set out in the **CoCP** (Doc Ref. 8.11).	Moderate adverse	None. Works expected to occur for less than 10 days in a 15 consecutive day period and less than 40 days in a six month period.	Moderate adverse (**not significant**)
32			Minor adverse		Minor adverse (**not significant**)
All other receptors			Negligible		Negligible (**not significant**)
Main construction phase					
17, 18, 19	Noise (Monday to Friday 07:00 to 19:00 hours and Saturday 07:00 to 13:00 hours)	The standard of good practice outlined in BS 5228-1 will be followed, as set out in the **CoCP** (Doc Ref. 8.11).	Major adverse	Screening, working methodology to be considered – to designed once details of construction approach has been further developed.	Minor adverse (**not significant**)
1, 5, 12, 13, 14, 15, 33			Moderate adverse		Minor adverse or negligible (**not significant**)
2, 3, 4, 8, 11, 25			Minor adverse		Minor adverse or negligible (**not significant**)
All other receptors			Negligible		Negligible (**not significant**)
1, 2, 5, 12, 13, 14, 15, 17, 18, 19, 33	Noise (Saturday 13:00 to 19:00 hours)	The standard of good practice outlined in BS 5228-1 will be followed, as set	Major adverse	Minimising noisy activities between 13:00 and 19:00 on Saturdays.	Minor adverse (**not significant**)
3, 4, 8, 11, 25			Moderate adverse		Minor adverse or negligible (**not significant**)

Receptor	Impact	Primary or Tertiary Mitigation.	Assessment of effects.	Additional Mitigation.	Residual Effects.
All other receptors		out in the **CoCP** (Doc Ref. 8.11).	Negligible	Screening, working methodology to be considered – to designed once details of construction approach has been further developed.	Negligible (**not significant**)
All receptors	Vibration	The standard of good practice outlined in BS 5228-2 will be followed, as set out in the **CoCP** (Doc Ref. 8.11).	Negligible	None	Negligible (**not significant**)

Table 4.22: Summary of assessment against LOAEL / SOAEL for construction

Phase of Works or Activity	Assessment Against SOAEL/LOAEL	Comment
Noise from construction works	SOAEL expected to be not exceeded at any receptor during main weekday daytime works, with exceedances of the lower SOAELs outside the main	Any exceedance of the SOAELs will be avoided by managing the works in a way that avoids the noisiest activities at the most sensitive parts of the day, secured through the **CoCP** (Doc Ref. 8.11). Where such works cannot be managed in this manner, exceedances of the

Phase of Works or Activity	Assessment Against SOAEL/LOAEL	Comment
	weekday daytime works expected at 14 receptors. LOAEL likely to be exceeded at some points during construction works at all receptors.	SOAEL will be avoided through the provision of noise insulation under the noise mitigation scheme. Exceedances of the LOAEL will be mitigated and minimised through the adoption of the measures detailed in **section 4.5** of this chapter, and through the implementation of the **CoCP**.
Vibration from construction works	No exceedances of SOAEL expected. LOAEL likely to be exceeded at two receptors when works undertaken at shortest separation distances.	No actions required to avoid significant adverse effects on health or quality of life. Exceedances of the LOAEL will be mitigated and minimised through the adoption of the measures detailed in **section 4.5** of this chapter, and through the implementation of the **CoCP** (Doc Ref. 8.11).

Table 4.23: Summary of effects for the operational phase.

Receptor	Impact	Primary or Tertiary Mitigation.	Assessment of effects.	Additional Mitigation.	Residual Effects.
During the typical day of the peak construction year, 2028.					
2, 10, 12, 13, 14, 35	Noise	Alignment designed to avoid noise sensitive	Major adverse	Noise mitigation scheme to be applied as appropriate.	Major adverse **(significant)**
11, 15, 17, 18, 25	Noise		Moderate adverse		Moderate adverse (**significant**)

Receptor	Impact	Primary or Tertiary Mitigation.	Assessment of effects.	Additional Mitigation.	Residual Effects.
1, 19, 29, 30, 33, 34	Noise	receptors where reasonably practicable.	Minor adverse		Minor adverse (**not significant**)
5, 28	Noise		Negligible		Negligible (**not significant**)
31	Noise		Minor beneficial		Minor beneficial (**not significant**)
24	Noise		Moderate beneficial		Moderate beneficial (**significant**)
3, 4, 6, 7, 8, 9, 16, 20, 21, 22, 23, 26, 27, 32	Noise		Major beneficial		Major beneficial (**significant**)
During the busiest day of the peak construction year, 2028.					
2, 10, 12, 13, 14, 25, 35	Noise	Alignment designed to avoid noise sensitive receptors where reasonably practicable.	Major adverse	Noise mitigation scheme to be applied as appropriate.	Major adverse (**significant**)
1, 11, 15, 17, 18, 19, 34	Noise		Moderate adverse		Moderate adverse (**significant**)
29, 30, 33	Noise		Minor adverse		Minor adverse (**not significant**)
5, 28	Noise		Negligible		Negligible (**not significant**)
24, 31	Noise		Minor beneficial		Minor beneficial **(not significant**)
(none)	Noise		Moderate beneficial		Moderate beneficial (**significant**)

Receptor	Impact	Primary or Tertiary Mitigation.	Assessment of effects.	Additional Mitigation.	Residual Effects.
3, 4, 6, 7, 8, 9, 16, 20, 21, 22, 23, 26, 27, 32	Noise		Major beneficial		Major beneficial (**significant**)
During first year of power station operation, 2034.					
10, 12, 13, 14	Noise	Alignment designed to avoid noise sensitive receptors where reasonably practicable.	Major adverse	Noise mitigation scheme to be applied as appropriate.	Major adverse (**significant**)
35	Noise		Moderate adverse		Moderate adverse (**significant**)
2, 11, 17, 18, 25	Noise		Minor adverse		Minor adverse (**not significant**)
1, 5, 15, , 19, 28, 29, 30, 31, 33, 34	Noise		Negligible		Negligible (**not significant**)
24	Noise		Minor beneficial		Minor beneficial **(not significant**)
3, 8	Noise		Moderate beneficial		Moderate beneficial (**significant**)
4, 6, 7, 9, 16, 20, 21, 22, 23, 26, 27, 32	Noise		Major beneficial		Major beneficial (**significant**)

Table 4.24: Summary of assessment against LOAEL / SOAEL for operation

Phase of Works or Activity	Assessment Against SOAEL/LOAEL	Comment
Noise from operation of the proposed development.	SOAEL expected to be exceeded at one location in all scenarios. LOAEL likely to be exceed at most locations	Where the SOAEL is exceeded as a result of the proposed development, the **Noise Mitigation Scheme** will apply to avoid such outcomes. Adverse effects on health and quality of life will be mitigated and minimised through the measures set out in **section 4.5** of this chapter.

References

4.1 DECC (2011) Overarching National Policy Statement (NPS) for Energy (NPS EN-1) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Accessed July 2019]

4.2 DECC (2011) National Policy Statement for Nuclear Power Generation (NPS EN-6) https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure [Accessed July 2019]

4.3 Part III of the Control of Pollution Act 1974

4.4 British Standard BS 5228-1 Noise: 2009+A1: 2014 – Code of Practice for noise and vibration control at open construction sites – Noise

4.5 British Standard BS 5228-2 Vibration: 2009+A1: 2014 – Code of Practice for noise and vibration control at open construction sites – Vibration.

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