11. NOISE AND VIBRATION

11.1 Introduction

This chapter has been prepared by RPS Group and assesses the potential noise and vibration impacts associated with the Proposed Development during the construction and operational phases.

The policy context and legislation for noise assessments together with the methods and assessment criteria used to assess the potential noise and vibration effects are described. Noise surveys have been conducted to establish the typical baseline noise environment within the vicinity of the Hydrus Development Site. Baseline conditions are set out as measured noise levels with a description of the dominant noise. The potential impacts arising from the construction and the completed development are addressed, with appropriate mitigation measures recommended to prevent, reduce or offset the impacts. Where residual impacts (impacts after the implementation of mitigation measures) arise, the significance of these impacts is described in relation to standard criteria.

Consultations were held with an Environmental Health Officer of West Berkshire Council to discuss methodology and criteria. It was agreed to undertake noise surveys at the nearest noise sensitive receptors (NSRs).

There have been several previous noise surveys and assessments undertaken around the AWE Aldermaston Site, although the only surveys undertaken around the northern perimeter of the site were very short in duration. However, a survey previously undertaken over several days at the A340(N) Gate has been included in this chapter.

11.2 Planning Policy Context

11.2.1 National Planning Guidance

11.2.1.1 PPG 24: Planning and Noise

Principles and specific guidelines on noise and planning issues are given in the Department of the Environment document Planning Policy Guidance (PPG) 24 (Ref. 11-1). PPG24 represents published Government guidance on planning and noise, and contains the criteria most widely used in the UK for determining the suitability of sites for development. PPG24 outlines the considerations to be taken into account in determining planning applications both for noise sensitive development and for those activities that generate noise. It also advises on the use of conditions to minimise the impact. Section 10 of PPG24 considers the introduction of a noise generating development and advises that:

'Much of the development, which is necessary for the creation of jobs and the construction and improvement of essential infrastructure, will generate noise. The planning system should not place unjustifiable obstacles in the way of such development. Nevertheless, local planning authorities must ensure that development does not cause an unacceptable degree of disturbance. They should also bear in mind that a subsequent intensification or change of use may result in greater intrusion and they may wish to consider the use of appropriate conditions'.

Annex 3 of PPG24 also provides relevant advice and guidance on:

- Noise from construction sites;
- Noise from industrial and commercial developments; and
- Noise from road traffic.

11.2.2 Regional and Local Planning Policy

11.2.3 Regional Spatial Strategy

The *Regional Spatial Strategy* (Ref. 11-2) was adopted by the Government Office for the South East during 2009 replacing Regional Planning Guidance for the South East (RPG9).

Policy number NRM10 refers specifically to noise and states that measures will be developed at a regional and local level to address and reduce noise pollution.

11.2.3.1 West Berkshire District Local Plan

Policy OVS5 of the West Berkshire District Local Plan (Ref. 11-3), states that:

'The Council will only permit development proposals where they do not give rise to an unacceptable pollution of the environment. In order to minimise the adverse impact on the environment or loss of amenity proposals should have regard to:

- *the hours, days or seasons of operation, and*
- *locating potential nuisance or pollution activities onto the least sensitive parts of the site or where the impacts can be best contained by physical or other appropriate measures.'*

Policy OVS6, states that:

'The Council will require appropriate measures to be taken in the location, layout and operation of development proposals in order to minimise any adverse impact as a result of noise generated …'

Paragraph 1.12.11 relating to policy OVS6, states that:

'Noise can be a major 'nuisance'. Certain types of development are particularly sensitive to noise, for example housing, schools and hospitals. The background levels of noise in residential areas and the countryside are often low. The introduction of noisy activities into such areas can therefore be especially disruptive. The Council will pay particular attention to any likely increase in 'ambient' noise levels when considering planning applications. PPG 24 gives advice on how the planning system can be used to reduce the impact of noise on people. It also introduces the concept of 'noise exposure categories' to assist in the appraisal of noise sensitive developments near to existing noise sources.'

11.2.4 Legislation, British Standards and Other Guidance

11.2.4.1 The Control of Pollution Act (1974)

Relevant legislation which may be used to address noise from construction sites is outlined as follows:

- *Section 60, Part III of Chapter 40 of the Control of Pollution Act (CoPA) - Control of noise on construction sites* (Ref. 11-4) provides legislation by which local authorities can control noise from construction sites to prevent disturbance occurring;
- *Section 61, Part III of Chapter 40 of the CoPA - Prior consent for work on construction sites*. This provides a method by which a contractor can seek consent to undertake construction works in advance of their commencement. If consent is given, and the stated method and hours of work complied with, then the local authority cannot take action under Section 60.

11.2.4.2 BS 5228: Code of practice for noise and vibration control on construction and open sites

British Standard (BS) 5228-1: 2009 'Code of practice for noise and vibration control on construction and open sites' (Ref. 11-5), provides information and procedures for the control of noise and vibration from activities on construction sites. BS5228 also provides guidance on assessing significance of noise effects for construction noise and vibration. The standard contains detailed information on noise and vibration reduction measures and promotes a *'best practice means approach to control noise and vibration impacts on local receptors and construction workers'*.

BS5228-2: 2009 provides guidance on vibration effects. Piling and the use of other plant and machinery can generate ground-borne vibration at properties close to construction sites. The primary cause of community concern generally relates to building damage, although concerns are often expressed at levels of vibration significantly lower than those likely to cause damage. BS5228-2:2009 presents transient vibration guide values for cosmetic damage. These levels are described in terms of peak particle velocity (PPV) and are drawn from the guidance in BS7385-1:1990 (Ref. 11-6).

BS7385-1 'Guide for measurement of vibrations and evaluation of their effects on buildings', provides advice on measurement, measurement instrumentation, location and fixing of transducers and data evaluation. Annexes also provide advice on classifying buildings with regard to their likely sensitivity; estimating peak stress from peak particle velocity; random data; and a bibliography is also provided.

The guide levels given in BS7385-1:1990 and BS5228:2009 are presented in Table 11-1.

Table 11-1: Transient Vibration Guide Values for Cosmetic Damage (BS5228)

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Unreinforced or light framed structures Residential or light commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

BS5228-2: 2009 states that the guide values in Table 11-1 may need to be reduced by up to 50% where the vibration is continuous.

Table 11-2 summarises guidance on the effects of vibration levels and human response from BS5228-2: 2009.

Table 11-2: Guidance on Effects of Vibration Levels

Vibration level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level

11.2.4.3 BS7445: Description and measurement of environmental noise: 2003, 1991 and 1991

BS 7445 'Description and measurement of environmental noise' (BS7445) (Ref. 11-7) is a three-part standard which defines various acoustic parameters, including acoustic terminology, instrumentation, methodology procedures, information to be recorded, data acquisition and guidelines for the ways in which noise limits should be specified and the procedures to be used for checking compliance with such limits.

11.2.4.4 BS6472: Guide to evaluation of home exposure to vibration in buildings

The human body is an excellent detector of vibration, which can become perceptible at levels that are substantially lower than those that cause building damage. The human body is most sensitive to vibration in the vertical direction (foot to head). The effect of vibration on humans is guided by BS6472-1 (2008): 'Guide to evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting' (Ref. 11-8).

Where vibration is intermittent or occurs as a series of events, the use of the Vibration Dose Value (VDV) is recommended for the assessment of subjective response to vibration. The VDVs at which it is considered there would be a probability of adverse comment are presented in Table 11-3.

Table 11-3: Vibration Dose Value Ranges which might Result in Various Probabilities of Adverse Comment within Residential Buildings

Place and time	Low probability of adverse comment $m.s^{-1.75}$ 1)	Adverse comment possible $m.s^{-1.75}$	Adverse comment probable $m.s^{-1.75}$ 2)
Residential buildings 16 h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 h night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

NOTE For offices and workshops, multiplying factors of 2 and 4 respectively should be applied to the above vibration dose value ranges for a 16 h day.

1) Below these ranges adverse comment is not expected.
2) Above these ranges adverse comment is very likely.

11.2.4.5 BS4142: Method for rating industrial noise affecting mixed residential and industrial areas

BS4142 (1997): 'Method for rating industrial noise affecting mixed residential and industrial areas' (Ref. 11-9), has been extensively used by local authorities to rate noise from fixed installations, such as plant noise. The standard advocates the use of L_{Aeq}. The L_{Aeq} is either measured or calculated at a receptor location and this is termed the 'Specific Noise Level'. The Specific Noise Level may then be corrected for the character of the noise (with 5 dB(A) added for tonal or impulsive noise) and is then termed the 'Rating Level'.

When used to rate the likelihood of complaints, the Rating Level is determined and the L_{A90} background noise level is subtracted from it whereby the greater the difference, the greater the likelihood of complaints.

- A difference of around +10 dB or higher indicates that complaints are likely;
- A difference of around +5 dB is of marginal significance; and
- If the rating level is more than 10 dB below the measured background noise level then this is a positive indication that complaints are unlikely.

An explanation of the L_{Aeq} and L_{A90} can be found in *Technical Appendix D.1* of this Defence Exempt Environmental Appraisal (DEEA).

11.2.4.6 Calculation of Road Traffic Noise

The Department of Transport document 'Calculation of Road Traffic Noise' (CRTN) (Ref. 11-10), provides a methodology for predicting noise levels generated by road traffic. The methodology considers a wide variety of different factors when predicting road traffic noise. Some of the main issues are traffic flows, mix of vehicles and their speeds, local topography, type of road (elevated or in a cutting), and the proximity of any barriers.

11.3 Assessment Methodology and Significance Criteria

11.3.1 Assessment Methodology

11.3.1.1 Overview

Technical Appendix D of Volume II of this DEEA provides a brief qualitative description of noise and the units of measurements most widely used in its assessment.

The assessment of noise and vibration falls into the following categories:

- Noise and vibration impacts due to construction; and
- Noise and vibration impacts due to operation.

Guidance documents and British Standards referred to in this section are summarised in Section 11.2.

11.3.1.2 Construction Noise and Vibration Impact Assessment Methodology

Construction noise should be assessed in the context that it is temporary and unavoidable. PPG24, which is the national Planning and Policy Guidance on noise and described in Section 11.2.1.1, makes reference to methods from British Standard, BS5228, which can be employed to reduce the impact on local residents. BS5228 provides methods of assessment when considering the significance of noise effects, which are detailed in Section 11.2.4.2.

Vibration impacts due to construction are assessed in terms of the probability of human response, and building damage as detailed in BS5228 and summarised in Section 11.2.4.2.

11.3.1.3 Operational Noise and Vibration Impact Assessment Methodology

These impacts can be divided into two broad categories:

- Transportation noise;
- Plant noise and vibration impacts; and
- Noise from firings.

In the instance of the Proposed Development, road traffic noise has the potential to cause impact through the increase in traffic flows. PPG24 references CRTN for the prediction of road traffic noise, which also details criteria for the entitlement of noise insulation treatment; however, these criteria are specific to the Noise Insulation Regulations (NIR). The criteria provided in CRTN for the assessment of entitlement for noise insulation treatment is only applicable where there is new or altered highway. With respect to road noise, it is considered that the most appropriate method of assessment should make use of a semantic rating scale.

For industrial sources, PPG24 advocates the use of BS4142, which details methodology for assessing fixed plant noise. The impact from fixed plant is rated in terms of Rating Level above Background Level. It should be noted that BS4142 specifically advises that the assessment of community annoyance and nuisance are beyond its scope.

With respect to human response to vibration, PPG24 references BS6472, which details methodology to evaluate the likelihood of comment through human exposure to vibration in buildings.

In assessing noise and vibration, the most appropriate standard detailed above has been used for each of the different categories of noise and vibration generated by the development.

11.3.2 Significance Criteria

11.3.2.1 Construction Plant Noise

Annex E of BS5228-1: 2009 provides various significance criteria for construction noise impacts. Section E.3.3 of BS5228-1 methodology has been used as the basis for this assessment of significant impact:

'Noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,\ Period,}$ from construction noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant impact.'

This methodology does not provide a quantitative method for determining the scale and category of impact; however, BS5228-1: 2009 does recommend a pragmatic approach to construction noise impacts. Therefore, the scale and category will be determined qualitatively considering duration of the noise, the amount of NSRs affected, the time of day, and other factors that may affect the impact of the noise.

11.3.2.2 Construction Vibration

Significance for construction vibration should be considered using two criteria; human perception and building damage. It should be noted that humans will detect vibration at a much lower level than what will cause cosmetic building damage (which is the onset of building damage). If it is determined that the effects in relation to human perception are negligible, then the effects on building damage will also be negligible. The categories of significance with regards to human perception are shown in Table 11-2 and derived from BS5228 guidance reproduced in Table 11-4.

Table 11-4: Semantic Scale of Vibration Significance Criteria

Category	Vibration Level	Descriptor
Negligible Impact	< 1 mm/s	Vibrations above 0.3 mm/s will become just perceptible in residential environments
Minor to Major Impact	1.0 – 10 mm/s	Between 1.0 mm/s and 10 mm/s the category for significance would vary from minor to major significance at 10 mm/s
Major Impact	> 10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

The significance of vibration with regards building damage, expressed in terms of peak particle velocity (PPV), are shown in Table 11-5 and derived from BS5228 guidance reproduced in Table 11-4.

Table 11-5: PPV Values for the Onset of Minor Cosmetic Damage and Significance Criteria for Transient Vibration

Type of Building	Category	Peak component particle velocity in frequency range of predominant pulse*		Descriptor
		4 Hz to 15 Hz	15 Hz and above	
Reinforced or framed structures Industrial and heavy commercial buildings	Negligible Impact	< 50 mm/s at 4 Hz and above	< 50 mm/s at 4 Hz and above	No damage will result
	Minor Impact	50 mm/s to 100 mm/s at 4 Hz and above	50 mm/s to 100 mm/s at 4 Hz and above	Minor cosmetic damage is possible
	Moderate Impact	100 mm/s to 200 mm/s at 4 Hz and above	100 mm/s to 200 mm/s at 4 Hz and above	Minor building damage is possible
	Major Impact	> 200 mm/s at 4 Hz and above	> 200 mm/s at 4 Hz and above	Major building damage is possible
Unreinforced or light framed structures Residential or light commercial buildings	Negligible Impact	< 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	< 20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above	No damage will result
	Minor Impact	> 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz < 30 mm/s at 4 Hz increasing to 40 mm/s at 15 Hz	> 20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above < 40 mm/s at 15 Hz increasing to 100 mm/s at 40 Hz and above	Minor cosmetic damage is possible
	Moderate Impact	> 30 mm/s at 4 Hz increasing to 40 mm/s at 15 Hz < 60 mm/s at 4 Hz increasing to 80 mm/s at 15 Hz	> 40 mm/s at 15 Hz increasing to 100 mm/s at 40 Hz and above < 80 mm/s at 15 Hz increasing to 200 mm/s at 40 Hz and above	Minor building damage is possible
	Major Impact	> 60 mm/s at 4 Hz increasing to 80 mm/s at 15 Hz	> 80 mm/s at 15 Hz increasing to 200 mm/s at 40 Hz and above	Major building damage is possible

**Values to be reduced by up to 50 % where vibration is continuous*

11.3.2.3 Traffic Noise (Construction and Operational)

Traffic noise impacts through changes in operations are assessed by use of the semantic scale for rating noise impact, which has been adapted to describe noise change in terms of impact and presented in Table 11-6.

Table 11-6: Semantic Scale for Rating of Traffic Noise Impact

Predicted Change in L_{Aeq}	Semantic Scale Rating	Category	Significant?
Decrease of 3 dB or more	Significant Decrease	Beneficial Impact	Yes
Decrease of less than 3 dB	No significant change	Negligible	No
Increase of less than 3 dB	No significant change	Negligible	No
Increase of 3 – 5 dB	Slight Increase	Minor Adverse Impact	Yes
Increase of 5 – 10 dB	Moderate Increase	Moderate Adverse Impact	Yes
Increase of 10 – 15 dB	Major Increase	Major Adverse Impact	Yes
Increase of more than 15 dB	Severe Increase	Severe Adverse Impact	Yes

The Highways Agency 'Design Manual for Road and Bridges Volume 11 Section 3 Part 7-Traffic Noise and Vibration' (DMRB) (Ref. 11-11) states*: "In the period following a change in traffic flow, people may find benefits or dis-benefits when the noise changes are as small as 1 dB(A) – equivalent to an increase in traffic flow of 25% or a decrease in traffic flow of 20%. These effects last for a number of years".*

As such, where increases in traffic flows of less than 25% occur, it is considered that impact due to traffic noise is of negligible significance.

11.3.2.4 Operational Plant Noise

Table 11-7 is an adaptation showing the significance of fixed plant noise using guidance contained in BS4142.

Table 11-7: BS4142 Likelihood of Complaints and Significance Criteria

Rating Noise Level	Descriptor	Category	Significant?
> 10 dB below background noise level	Positive indication that complaints are not likely	Negligible Impact	No
10 dB below to 5 dB above background noise level	Less than marginal significance	Negligible Impact to Minor Impact	No
5 to 10 dB above background noise level	Greater than marginal significance but less than an indication that complaints are likely	Moderate Impact	Yes
> 10 dB above background noise level	An indication that complaints are likely	Major Impact	Yes

The category of effect shown in Table 11-7 is applicable to plant that operates frequently or continuously. Where plant does not operate frequently, the category of impact will be reduced proportionally to the infrequency of the event. An event that only occurs a few times in a month would downgrade the impact by one category.

It has been requested by WBC that internal and external noise levels at the nearest NSR should not exceed the World Health Organisation (WHO) guidance levels due to the Proposed Development. The WHO guidance levels are based upon Critical Health Effects. In this matter hotels should be treated the same as residential properties with exception of the WHO guidance for external noise levels, which would not need to meet any absolute limit. Tables 11-8 and 11-9 show the Guideline Values given by WHO (Ref. 11-12). Table 11-9 gives external noise levels that relate to internal noise levels assuming a partially open window. Therefore, the internal noise level impact can be assumed to be the same as the external noise level impact.

Table 11-8: WHO Guidance - Internal Noise Levels Based on Critical Health Effect

Noise Level	Descriptor	Category
< 35 dB $L_{Aeq,16\,h}$ during the day	Level required for 100 % speech intelligibility for a relaxed conversation	Negligible Impact
< 30 dB $L_{Aeq,8\,h}$ during night	Average and maximum levels required to avoid sleep disturbance.	
< 45 dB L_{Amax} during the night		
> 35 dB $L_{Aeq,16\,h}$ during the day	Level at which the possibility of reduced speech intelligibility for a relaxed conversation	Minor to Major Impact
> 30 dB $L_{Aeq,8\,h}$ during night	Average and maximum levels at which there is an increased possibility of sleep disturbance.	
> 45 dB L_{Amax} during the night		

Table 11-9: WHO Guidance - External Noise Levels Based on Critical Health Effect

Noise Level	Descriptor	Category
< 50 dB $L_{Aeq,16\,h}$ during the day	Level required to avoid moderate annoyance in external living areas	Negligible Impact
< 45 dB $L_{Aeq,8\,h}$ during the night	Average and maximum level required outside bedroom window (open) to avoid sleep disturbance.	
< 65 dB L_{Amax} during the night		
50 - 55 dB $L_{Aeq,8\,h}$ during day	Level at which there is an increased possibility of moderate annoyance	Minor Impact
> 45 dB $L_{Aeq,8\,h}$ during the night*	Average and maximum level at which there is an increased possibility of sleep disturbance.	
> 65 dB L_{Amax} during the night*		
> 55 dB $L_{Aeq,8\,h}$ during day	Level at which there is an increased possibility of serious annoyance	Moderate to Major Impact
> 45 dB $L_{Aeq,8\,h}$ during the night*	Level at which there is an increased possibility of sleep disturbance.	
> 65 dB L_{Amax} during the night*		

** During the night, the criteria values for Minor and Moderate to Major Impact are the same because WHO only provides one set of criteria for sleep disturbance.*

11.3.2.5 Operational Vibration

Minor impact should be considered to occur where the threshold values for the low probability of adverse comment are met, as shown in Table 11-10, derived from Table 1 of BS6472. All impacts given in the table are adverse. BS6472 assesses human exposure to vibration in buildings in terms of probability of adverse comment; therefore, impacts have been determined in terms of probability of adverse comment.

Table 11-10: Threshold Values of Vibration Dose Value (VDV) Ranges which might Result in Various Probabilities of Adverse Comments

Residential buildings 16 h day VDV ($ms^{-1.75}$)*	Residential buildings 8 h night VDV ($ms^{-1.75}$)*	Descriptor	Category	Significant
< 0.2	< 0.1	Adverse comment is not expected	Negligible Impact	No
0.2 - 0.4	0.1 – 0.2	Low probability of adverse comment	Minor Impact	No
0.4 – 0.8	0.2 – 0.4	Adverse comment probable	Moderate Impact	Yes
> 0.8	> 0.4	Adverse comment is very likely	Major Impact	Yes

** A description of the VDV unit can be found in Technical Appendix D of the DEEA*

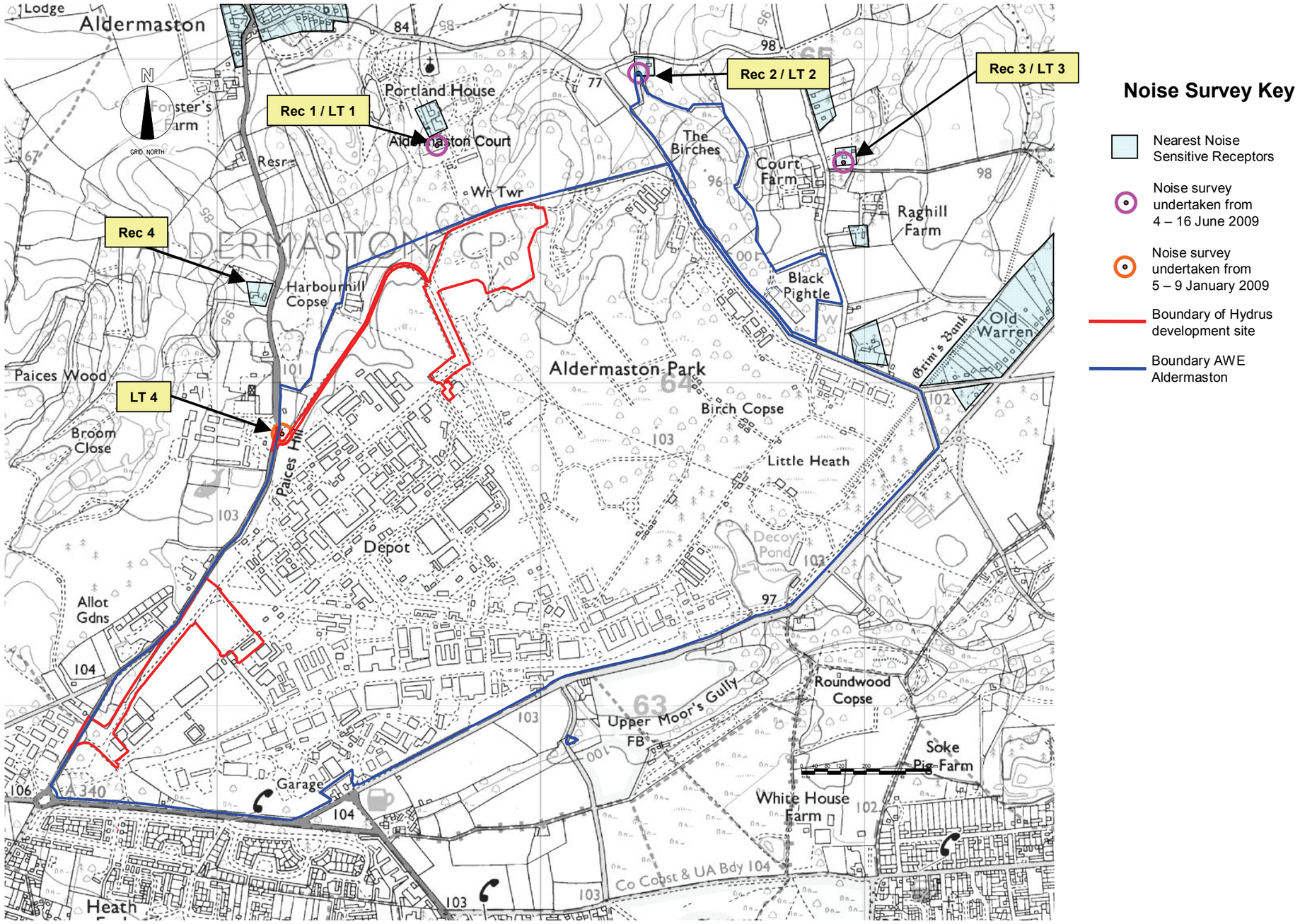
11.4 Baseline Conditions

For the purpose of baseline noise monitoring it is important to establish the noise level at the closest NSRs.

Four locations have been considered in this chapter in detail, these have been identified below and in Figure 11-1. With the exception of Receptor 4, which is just north of its corresponding noise survey, these locations have been chosen to represent the closest NSRs to the Proposed Development. Therefore, if it can be shown that noise and vibration levels are acceptable at these locations, then properties further away will also be subjected to acceptable levels of noise and vibration from the Proposed Development.

- Receptor 1: Aldermaston Manor House Hotel – located north of the AWE Aldermaston Site;
- Receptor 2: Spring Lane Cottage – located due north of the north-east corner of the AWE Aldermaston Site and due east of Receptor 1;
- Receptor 3: Rag Hill Cottage – located to the north east of the AWE Aldermaston Site and due south east of Receptor 2; and
- Receptor 4: Harbourhill Copse – located to the north west of the AWE Aldermaston Site and due south west of Receptor 1.

Figure 11-1: Baseline Noise Measurement Positions.



11.4.1 Baseline Noise Monitoring

Baseline noise surveys have been undertaken by RPS Group. Three noise surveys were made from 4 June 2009 to 16 June 2009. The fourth noise survey was undertaken from 5 January 2009 to 9 January 2009. The noise surveys positions are described in Table 11-11 below and shown in Figure 11-1. Figure 11-1 also shows all the nearest NSRs. All noise surveys were undertaken in accordance with BS7445.

Wind and rain have the potential to elevate noise levels recorded by the surveys. Weather conditions were monitored throughout the noise surveys. Where there was rain or high wind recorded, these data were excluded from the results.

Table 11-11: Noise Survey Description

ID	Description	Noise Environment
LT 1	Adjacent to the tennis courts at the Aldermaston Manor House Hotel approximately 40 m from the building.	Local vehicle movements. Occasional vehicle movements and other non-discernible noise from the main AWE Aldermaston site.
LT 2	In the garden of Spring Lane Cottage approximately 9 m to the west of the dwelling.	Vehicle movements on Spring Lane. Low level non-discernible noise from the main AWE Aldermaston site. Wind in trees and local wildlife.
LT 3	In the garden of Rag Hill Cottage approximately 15 m to the south of the dwelling.	Vehicle movements on Rag Hill. Wind in trees and local wildlife.
LT 4	Adjacent to the A340 Paices Hill Gate at AWE Aldermaston. It is considered that this position is representative of the noise levels at Harbourhill Copse (which was not accessible at the time of survey).	Vehicle movements on Paices Hill

Table 11-12 shows a summary of the noise levels measured. The complete noise results are presented in *Technical Appendix D* of this DEEA.

Table 11-12: Summary of Noise Levels

Noise Survey	Noise Unit	Daytime Level (dB)	Night-time Level (dB)
LT 1	L_{A90}	38	36
	L_{Aeq}	49	43
LT 2	L_{A90}	37	35
	L_{Aeq}	46	42
LT 3	L_{A90}	35	32
	L_{Aeq}	46	43
LT 4	L_{A90}	53	49
	L_{Aeq}	71	61

Potential Impacts and Mitigation Measures

11.4.2 Potential Impacts

11.4.2.1 Construction Phase

Construction Plant Noise

For the purposes of this assessment the impacts of construction noise and vibration have been assessed in broad terms. *Technical Appendix D* of Volume II of the DEEA provides a list of construction plant that has been used to assess the significance of noise impacts of the construction phases of the development according to the criteria described in Section 11.3.2.1.

The construction assessment has been made over seven distinct phases, shown in Table 11-13. There is more detail on these construction phases in *Chapter 6: Construction Phase* of this DEEA.

Table 11-13: Construction Phase Summary

	Phase Description
Phase 1	Enabling Works
Phase 2	Dewatering Piling
Phase 3	Substructure
Phase 4	Superstructure
Phase 5	Cladding and Roofing
Phase 6	Fit-out
Phase 7	Landscaping

The assessment has been made at the four nearest NSRs assuming a separation distance of 300 m, 500 m, 850 m and 500 m between the construction site and Receptors 1 – 4, respectively. These separation distances are the approximate distance between the boundary of the main construction enclave and the receptors. In reality, much of the plant and machinery will be operating at distances further away.

To remain compliant with the AWE Code of Construction Practice it has been assumed that any construction activities which have the potential to be audible outside the boundary of the site will only occur during daytime hours.

Calculations for construction noise include the following assumptions:

- One item of each plant detailed;
- Plant operating simultaneously; and
- 50% operational time i.e. each plant used for a total of half the working day.

For the piling required for dewatering the following assumptions have been made:

- 2 vibratory sheet piling rigs, 2 lorry mounted cranes
- Plant operating simultaneously at the closest point to the receptor
- 80% operational time i.e. the plant is used for 80% of the working day

Tables 11-14, 11-15, 11-16 and 11-17 shows a summary of the assessment of the construction activities at Receptors 1 to 4. More detail is shown in *Technical Appendix D* of Volume II of the DEEA.

Table 11-14: Construction Noise Assessment Summary at Receptor 1 (Aldermaston Manor House Hotel)

	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Phase 7**
Predicted Construction Noise Level (dB L_{Aeq})	58	57	59	55	55	59	46
Ambient Noise Level (dB L_{Aeq})	49						
BS5228 Trigger Noise Level (dB L_{Aeq})	65						
Total Noise Level Predicted plus Ambient (dB L_{Aeq})	58	57	59	56	56	60	51
Significance Rating	**Not Significant**						

NB. Numbers are rounded to the nearest dB, which has resulted in a difference between Phase 2 and Phase 5 Total Noise Level.

Table 11-15: Construction Noise Assessment Summary at Receptor 2 (Spring Lane Cottage)

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7
Predicted Construction Noise Level (dB L_{Aeq})	52	53	54	49	49	54	41
Ambient Noise Level (dB L_{Aeq})	46						
BS5228 Trigger Noise Level (dB L_{Aeq})	65						
Total Noise Level Predicted plus Ambient (dB L_{Aeq})	53	54	54	51	51	55	47
Significance Rating	**Not Significant**						

NB. Numbers are rounded to the nearest dB, which has resulted in a difference between Phase 2 and Phase 5 Total Noise Level.

*Table 11-16: Construction Noise Assessment Summary at Receptor 3 (*Rag Hill Cottage*)*

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7
Predicted Construction Noise Level (dB L_{Aeq})	46	46	48	43	44	48	35
Ambient Noise Level (dB L_{Aeq})	46						
BS5228 Trigger Noise Level (dB L_{Aeq})	65						
Total Noise Level Predicted plus Ambient (dB L_{Aeq})	49	49	50	48	48	50	46
Significance Rating	**Not Significant**						

NB. Numbers are rounded to the nearest dB

*Table 11-17: Construction Noise Assessment Summary at Receptor 4 (*Harbourhill Copse*)*

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7
Predicted Construction Noise Level (dB L_{Aeq})	52	53	54	49	49	54	41
Ambient Noise Level (dB L_{Aeq})	71						
BS5228 Trigger Noise Level (dB L_{Aeq})	76						
Total Noise Level Predicted plus Ambient (dB L_{Aeq})	71	71	71	71	71	71	71
Significance Rating	**Not Significant**						

NB. Numbers are rounded to the nearest dB

Tables 11-14 to 11-17 demonstrate that the noise from construction activities does not exceed the threshold of significance as defined in Section 11.3.2.1. Other NSRs are further away and there will be greater noise attenuation due to distance.

Therefore, the impact due to construction noise experienced at NSRs is considered to be of **negligible** significance.

Construction Traffic Noise

Construction vehicles, and in particular HGV movements, using the surrounding road network have the potential to adversely affect NSRs. Based on information provided in *Chapter 9: Transport* of this DEEA, peak construction vehicle movements are predicted to occur during 2014. Relative changes in road traffic noise levels have been calculated using methodologies derived from CRTN. Changes in baseline traffic flows (derived from traffic flow information from *Chapter 9: Transport* of this DEEA) have been used to estimate changes in noise levels.

Table 11-18 presents the estimated daily construction traffic analysis, with a predicted relative increase in road traffic noise levels. Details of calculations are provided in *Technical Appendix D* of Volume II of this DEEA.

Table 11-18: Road Traffic Noise Change in 2014 (Construction Period)

Road Section	2014 18-hour Road Traffic Flow – Baseline		2014 18-hour Road Traffic Flows – Baseline plus Construction Traffic Flows		Change in Road Traffic Noise Levels	Significance
	Flow	HGV %	Flow	HGV %		
1 – Aldermaston Village	13,286	5.5 %	13,326	5.9 %	0.2 dB	Negligible
2 – Paices Hill	10,758	5.6 %	10,816	6.1 %	0.1 dB	Negligible
3 – Link Road	1,463	2.3 %	1,463	2.3 %	0.0 dB	Negligible
4 – B3051 (east of Heath End roundabout (RBT))	12,120	1.6 %	12,122	1.6 %	0.0 dB	Negligible
5 – Heath End Road	8,074	1.2 %	8,075	1.2 %	0.0 dB	Negligible
6 – A340 (south of Aldermaston Gate)	9,714	5.5 %	9,716	5.5 %	0.0 dB	Negligible
7 – Aldermaston Road	17,985	3.5%	18,014	3.6 %	0.1 dB	Negligible
8 – A340 (Mulfords Hill)	18,715	3.2 %	18,742	3.3 %	0.0 dB	Negligible
9 – Reading Road (north of Main Gate)	9,216	3.1 %	9,218	3.1 %	0.0 dB	Negligible
10 – Soke Road (nr Red Lane)	2,538	2.6 %	2,538	2.6 %	0.0 dB	Negligible
11 – Reading Road (South of Soke Rd RBT)	11,160	3.2 %	11,162	3.2 %	0.0 dB	Negligible
12 – Soke Road (South of RBT)	4,181	1.9 %	4,181	1.9 %	0.0 dB	Negligible
13 – Welshmans Road	3,387	0.8 %	3,387	0.8 %	0.0 dB	Negligible
14 – Reading Road (North of Welshmans Rd)	10,842	2.7 %	10,843	2.7 %	0.0 dB	Negligible
15 – Red Lane	4,087	0.6 %	4,087	0.6 %	0.0 dB	Negligible
16 – Red Lane (North of Boiler House Gate)	3,225	2.4 %	3,225	2.4 %	0.0 dB	Negligible

The relative increase in traffic noise levels due to additional construction traffic is predicted to be less than 1 dB(A) along all surrounding roads. Based on the traffic noise significance criteria presented in Table 11-18, noise due to construction traffic is considered to have **no impact.**

Construction Vibration

It is considered that there are potentially three different vibration effects that may occur as a result of construction activity:

- Human response;
- Property damage; and
- The impact on sensitive equipment.

BS5228 indicates that construction activities (particularly piling) generally only generate significant vibration impacts when they are located less than 20m from sensitive locations. The impact depends on the type of piling, ground conditions, and receptor distance.

As the distance of the Application Site to the nearest NSRs is at least 300 metres, it is not expected that vibration levels will exceed any of the thresholds in Table 11-4 and Table 11-5.

Due to the nature of the on-site operations, construction works may potentially affect on-site noise and vibration sensitive laboratories elsewhere at AWE Aldermaston. The AWE Code of Construction Practice (CoCP) (Ref. 11-13) and Best Practicable Means (BPM) will be implemented to minimise any potential on-site noise and vibration impacts.

Therefore, impact due to construction vibration is considered to have **negligible** significance.

11.4.2.2 Operational Phase

Operational Traffic

Based on traffic data detailed in *Chapter 9: Transport* of this DEEA, there is expected to be no increase in operational traffic flows associated with the Proposed Development. As such, impact due to changes in operational traffic noise is considered to be of **negligible** significance.

Operational Noise – Non-Experiment / Firings Operations

There is fixed plant associated with the Operations Building and the Support Building, including an Electricity Substation, which will operate on a 24 hour basis. Noise from these operational plant sources will therefore exist for the majority of the time when tests are not being undertaken and have the potential to affect background noise levels at NSRs.

A prospective plant inventory for the Operations and Support Buildings has been supplied by the Design Team. The design has been informed by the following principles:

- A procurement specification strategy for selecting the quietest, appropriate plant;
- Provision of dedicated plant-rooms away from the building boundary for noisy plant items;
- Attenuated services connections to plant-room louvres;
- In-line duct attenuators, strategically positioned to prevent flanking (noise break-in to ventilation ductwork post attenuator);
- Anti-vibration mountings will be provided on equipment; and
- Flexible duct connections will be provided between distribution ductwork and fans.

The Design Team have also advised that there is an maximum design noise level within all plant rooms of $L_{Aeq,T}$ 80 dB. This has been used, together with spectrum to represent plant noise within all plant-rooms.

Noise levels at NSRs from general operation have been calculated. Details of calculations are provided in *Technical Appendix D* of Volume II of this DEEA.

Table 11-19 summarises the predicted sound power levels from general operations for each potential noise source.

Table 11-19: Predicted Sound Power Levels – General Operations

	Sound Power Level
Sound Power Level (SWL) of Operations Building Stack	94 dB(A)
SWL Main Operations Building	84 dB(A)
SWL of Support Building	79 dB(A)
SWL of Electrical Substation	56 dB(A)
SWL IVA chillers (x3)	92 dB(A)
Total SWL	97 dB(A)

Noise levels experienced at each NSR due to general operation have been calculated; these are compared to the existing background noise levels at NSRs, and the scale of impact has been assessed in line with the BS4142 assessment methodology presented in Section 11.3.2.4.

Table 11-20 summarises the predicted noise levels from general operations, predicted noise levels at NSRs, and the range of impacts.

Table 11-20: BS4142 Assessment – General Operations

Receptor	**Noise Level at Receptor Due to General Operations (LAeq)**	**Existing Background Noise Level (Day/Night) (LA90)**	**Difference to Background Noise Level (Day/Night)**	**Significance of Impact**
1 (Aldermaston Manor House Hotel)	31 dB	38 / 36 dB	-7 / -5 dB	Negligible to Minor
2 (Spring Lane Cottage)	25 dB	37 / 35 dB	-12 / -10 dB	Negligible
3 (Rag Hill Cottage)	22 dB	35 / 32 dB	-14 / -11 dB	Negligible
4 (Harbourhill Copse)	26 dB	53 / 49 dB	-27 / -23 dB	Negligible

Impacts due to operational noise during non-experiment / firings are predicted to be of **negligible** to **minor** significance at NSR 1, and of **negligible** significance at NSRs 2, 3 and 4.

In comparison the WHO noise level guidelines, impacts due to the operational noise during non-test operations correspond to that of **negligible** significance.

Operational Noise – Experiment / Firings

The Operational Building is anticipated to run approximately 10 open and contained / closed firings annually.

There are several sources of noise associated with firings. These include the following:

- Various audible warning devices prior to the Test Events;
- A rapid ventilation system (which can operate during or following the firings); and
- A detonation of conventional explosives test explosion within the hardened structure, simultaneously with the Induction Voltage Adder (IVA) x-ray generators.

The events will take place during the daytime, between 09:00 and 17:00 Mondays to Fridays only.

On the 18 August 2009 a measurement was made of a simulated firing at the existing facility. This included all noise sources with the exception of the detonation of conventional explosives and the x-ray generator. The proposed experiments and the sequence of events which will be adopted will be similar to existing experiments.

To simulate a firing, the ventilation system was turned on and operated throughout the duration of the simulated event. Approximately 9 minutes after the start of the simulation, a series of audible warnings were sounded and increased in number over a period of 9 minutes within and around the current facility. This

sequence of alarms was quiet relative to the ventilation system. The second phase of audible warnings was the sounding of two melodic air horns adjacent to the x-ray generators for around 4 minutes. There is then a short loudspeaker announcement and a klaxon burst from the support building immediately prior to the firing. Finally, after the firing, when the building is opened up, the first set of internal alarms sound again for a few minutes. The duration of the simulation from beginning to end was 28 minutes.

The contribution from the firing explosion itself is described anecdotally as 'no more than a dull thud audible at short distances from the building.' The noise which would be produced lasts for approximately 1 second. There would be approximately ten each year which will occur between 09:00 and 17:00 and not at weekends.

Table 11-21 includes all the alarms and events from the main test building. Table 11-22 includes the loudspeaker announcement and klaxon burst which originated from the support building. These measurements were taken to understand the noise levels and sequence of events that occurs during a firing.

Table 11-21: Summary of Short Term Noise Sources at Current Facility

Event	Approx. Measurement Distance	Duration	Sound Exposure Level (SEL) dB(A)
Ventilation System	40 m	28 minutes	93
Internal Alarms		9 minutes	Not measurable over the ventilation system
Melodic Horns		4 minutes	100
Total SEL		28 minutes	100

Table 11-22: Summary of Short Term Noise Sources at Current Support Building

Event	Approx. Measurement Distance	Duration	Sound Exposure Level dB(A)
Loudspeaker announcement	19 m	15 seconds	87
Klaxon alarm		15 seconds	100
Total SEL		30 seconds	100

An assessment of the effects of the audible warning devices has been carried out using the WHO guidelines and noise change as BS4142 is not applicable to non-industrial sources. It is recognised however that the WHO guidelines refer to average noise over the whole day, and do not provide guidance for short term events.

Table 11-23: Noise Assessment – Relative Changes in Short Term Noise Levels at Sensitive Receptors during Experiments / Firings (Audible Warning Alarms)

Receptor	Source	Ambient noise level day-time L_{Aeq}	1 Hour Equivalent Noise Level L_{Aeq}	Combined noise levels	Change dB(A)	Signif-icance
1 (Alder-maston Manor House Hotel)	Warning Alarms	49	43	49	+1 dB	Negligible
2 (Spring Lane Cottage)	Warning Alarms	46	36	46	0	Negligible
3 (Rag Hill Cottage)	Warning Alarms	46	31	46	0	Negligible
4 (Harbour-hill Copse)	Warning Alarms	71	36	71	0	Negligible

In terms of relative changes in short-term noise levels, noise impact from these operations is predicted to be of negligible significance at NSRs 1, 2, 3, and 4.

The impact of the industrial sources located at the Proposed Development affecting the NSRs has been assessed using BS4142 by calculating the effective 1-hour average noise level (the daytime reference period) at each receptor and adding 5 dB(A) to give a rating level reflecting the tonal and impulsive nature of these sources. The rating level has been compared to the existing background noise at each NSR to determine the significance of noise impact due to fixed plant.

Noise levels due to the stack have been predicted using data provided by the design team. The design of the stack has been informed by similar mitigation principles described above for the plant inventory of the Operations and Support Buildings.

The assessment of the combined noise levels from the alarms and the stack is predicted in Table 11-24. Additional calculation details are provided in *Technical Appendix D* of Volume II of this DEEA.

Table 11-24: BS4142 Noise Assessment – Relative Changes in Short Term Noise Levels at Sensitive Receptors during Experiments / Firings

Receptor	Source	Back-ground noise level day-time LA90	1 Hour Equivalent Noise Level LAeq	Tonal / Impulsive Correction factor dB(A)	Rating level dB(A)	BS4142 Significance
1 (Aldermaston Manor House Hotel)	Stack and Chiller Noise	38	33	5	38	Negligible to Minor
2 (Spring Lane Cottage)	Stack and Chiller Noise	37	27	5	32	Negligible to Minor
3 (Rag Hill Cottage)	Stack and Chiller Noise	35	24	5	29	Negligible
4 (Harbourhill Copse)	Stack and Chiller Noise	53	27	5	32	Negligible

In terms of relative changes in short-term noise levels in line with BS4142 assessment methodologies, noise impact from these operations is predicted to be of **negligible to minor** significance at NSRs 1 and 2 and and **negligible** significance at NSRs 3 and 4.

Operational Noise - Commissioning of the Operations Building

During the construction phase of the development, various plant used in the Operations Building will be commissioned. It may not be practical to commission plant during construction work and therefore some plant will be operated outside normal working hours. This will be a temporary arrangement and noise will be limited as far as practicable.

There is a possibility that this could cause disturbance and based upon it being localised and temporary in nature, potential impact is considered to be limited to **minor** significance.

Operational Noise – Induction Voltage Adder X-Ray Generators

The IVA machines are likely to be fired approximately 200 times a year, most of which will be for the purpose of testing them and on approximately 10 occasions when experiments are being undertaken. All such IVA tests will occur between 09:00 and 17:00 Monday to Friday. There may be 3 or 4 IVA tests in one day, but this would not occur for more than 2 days at a time. The IVA tests will not involve any explosive detonation.

The 'Mogul' X- ray generators, which are currently used at AWE Aldermaston are external to the building and during the firing process generate an audible sound. Using externally sited equipment, the audible sound arising from the chamber has been described by the technical experts standing outside at 20/30 metres from the facility, as a low frequency rumble which lasts for no more than 0.5 seconds. This is accompanied by a low frequency pulse from the x-ray machines as they discharge their energy in one go.

The IVA machines to be provided as part of Proposed Development will be enclosed within the Operations Building and it is unlikely that they will be heard outside. The noise from these operations is considered to be insignificant.

Before each IVA test, there will be klaxon sounded, as is currently the case for such testing carried out on site. This is to give a warning to personnel in the immediate area of the building. At the end of the test, an 'all clear message' will given. The effects of these warnings have been assessed above.

Plant associated with the IVAs, including vacuum pumps, is sited within the plant areas and has been considered as part of the general plant noise assessment.

Operational Vibration

Based upon the evidence from the current firings, and empirical measurements made at the existing facility (Ref. 11-14) due to the infrequent occurrence of the firings and the separation distances between the development and the nearest vibration sensitive receptors, it is considered highly unlikely that vibration from the Proposed Development will be significant in terms of the effects on either buildings or people.

Impact due to operational vibration is considered to be of **negligible** significance.

11.4.3 Mitigation Measures

11.4.3.1 Construction

Construction Noise

Normal working hours (as set out in the CoCP) are defined as 07:00 hours to 19:00 hours on weekdays and 07:00 hours to 16:00 hours on Saturdays, with no works taking place on Sundays or Bank Holidays. Noisy activities will not normally take place outside of these working hours. In exceptional circumstances where significant construction activities may have to occur outside normal hours notification will be given to WBC.

Where possible, deliveries will be controlled and scheduled during off peak hours, Monday to Friday 09:00 hours to 16:00 hours and Saturdays 07:00 hours to 13:00 hours. However, occasional late evening and/or Sunday deliveries may be necessary. No deliveries will take place during the night-time period (23:00 hours to 07:00 hours).

Site entrances/gates, storage areas, fixed plant, machinery and equipment will be positioned in such a manner as to minimise potential noise impacts on surrounding residential properties and other noise sensitive premises. Where practicable, quieter alternative methods or construction plant will be used to reduce the noise impact on sensitive receptors and where practicable, plant will be positioned away from noise sensitive areas.

The construction works will follow the Best Practicable Means (BPM) of Section 72 of the CoPA, to minimise noise and vibration impacts on sensitive receptors.

On the basis of this noise assessment it is considered that a Section 61 application will not be required due to noise.

Construction Vibration

Due to the distance between the works and the site boundary, vibration generated will not be significant at the closest off-site sensitive receptors. Therefore, no mitigation measures will be required to protect off-site vibration sensitive receptors during construction.

11.4.3.2 Operational

Operational Traffic

No mitigation measures are considered to be required.

Operational Noise – Non-Firing Operations

Mitigation has been designed into the plant and structure for the Operations and Support Buildings so that there is **negligible** impact at the NSRs.

Operational Noise – Firing Operations

Mitigation measures will be implemented to reduce the effects of the audible warnings associated with Firings. Where practicable, the use of external audible warning devices will be limited and the positioning and orientation of audible warning devices will be directed away from the nearest NSRs. The noise level of external audible warnings and the noise levels will be limited to the amount required to alert the relevant areas of the Proposed Development.

As discussed in the non-firing operation section the following mitigation will be implemented:

- A procurement specification strategy for selecting the quietest, appropriate plant;
- Provision of dedicated plant-rooms away from the building boundary for noisy plant items;
- Attenuated services connections to plant-room louvres;
- In-line duct attenuators, strategically positioned to prevent flanking (noise break-in to ventilation ductwork post attenuator);
- Anti-vibration mountings will be provided on equipment;
- Flexible duct connections will be provided between distribution ductwork and fans;
- Regular maintenance of noisy plant to ensure that there is no increase in noise; and
- Regular assessment of the effectiveness of noise control measures.

Operational Noise - Commissioning of the Operations Building

Details are not yet known on how the commissioning of plant in the Operations Building will be carried out. To reduce the probability of disturbance during the commissioning of plant, noise assessments will be carried out where necessary, for instance, where commissioning is unavoidably required to take place during sensitive hours of the day or night.

Operational Vibration

Due to the large distance between the works and the site boundary, the advice given in BS7385 notes that vibration generated will not be significant at the closest off-site sensitive receptors. Therefore, no mitigation measures will be required to protect off-site vibration sensitive receptors during operation of the Hydrus Facility.

11.5 Residual Impact Assessment and Conclusions

Construction impacts are considered to be of negligible significance with the proposed mitigation measures implemented. Although construction impacts are unlikely to affect off-site noise and vibration sensitive receptors, construction impacts do have the potential to affect on-site noise and vibration sensitive receptors. Appropriate mitigation measures will be implemented to minimise any potential noise and vibration impacts during construction.

Operational effects from traffic generated by the Proposed Development will be unchanged and therefore are not significant.

Implementation of the mitigation details specified will reduce effects of the general operation of the plant and will produce an overall plant noise level at all receptors which will be at least 5 dB below the night-time background noise levels at these locations. This will also reduce the noise levels from the firings. It is considered that with these mitigation measures implemented, impact due to operational plant noise is considered to be limited to that of **negligible** to **minor** significance.

The effects of the commissioning of plant are not known in detail. However, with mitigation in place, the commissioning of plant associated with the firings will have a low probability of causing an impact greater than that of a **minor adverse** significance.

Other fixed plant associated with the Proposed Development will be of an impact of **negligible** significance after mitigation measures are undertaken.

Table 11-25 provides a summary of the residual noise and vibration effects associated with the Proposed Development assuming that appropriate mitigation measures and guidance is employed for all sources of noise with the potential to adversely affect NSRs, as detailed above.

Table 11-25: Summary of Effects

Potential Impacts / Known Receptors	Mitigation	Nature of Impact	Scale	Significance of Residual Impact
Construction Noise / Residential Dwellings and Hotel	Follow BPM	Temporary	Local	Negligible
Construction Traffic Noise / Residential Dwellings and Hotel	None required	Temporary	Local	Negligible
Construction Vibration / Residential Dwellings and Hotel	None required	Temporary	Local	Negligible
Operational Traffic Noise / Residential Dwellings and Hotel	None required	No change	Local	No change
Noise from the normal operation of fixed plant / Residential Dwellings and Hotel	Plant design mitigation strategy	Direct	Local	Negligible
Noise from the operation alarms with firings / Residential Dwellings and Hotel	Design consideration to external alarm systems	Direct / Reversible	Local	Negligible
Noise from the operation of fixed plant associated firings / Residential Dwellings and Hotel	Plant design mitigation strategy	Direct	Local	Negligible to Minor
Noise during the commissioning of fixed plant associated with firings / Residential Dwellings and Hotel	Noise monitoring	Direct / Reversible	Local	Negligible / Minor

No significant long-term residual impacts are predicted. Temporary residual effects would occur during the construction phase of the Proposed Development, but no permanent residual effects have been identified.

Overall, the Proposed Development is not predicted to have significant noise and vibration impacts on local NSRs.

11.6 Cumulative Impact Assessment

The AWE Aldermaston & Burghfield Site Development Context Plan (SDCP08) 2000–2015 (Ref. 11-15) sets out the overall approach to the modernisation of AWE Aldermaston and AWE Burghfield, through the refurbishment and replacement of existing facilities.

The SDCP08 describes a number of proposals for new buildings at the AWE Burghfield and AWE Aldermaston Sites, plus demolition or refurbishment of existing buildings.

Due to the distance between AWE Burghfield and AWE Aldermaston, construction activities within the respective site boundaries will not cause a significant cumulative impact on noise at sensitive receptors.

It is possible that traffic associated with construction activities will share a portion of the major transport routes as they approach AWE Aldermaston. Noise generated by these vehicles is considered to be insignificant compared to that associated with base traffic flows along these major routes.

The SDCP08 indicates that the implementation of the programmes will result in no overall change in operational traffic. As such, the noise from cumulative operational traffic is expected to be limited to an impact of **negligible** significance.

11.7 References

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