Connah's Quay Low Carbon Power

Environmental Statement Volume II
Chapter 9: Noise and Vibration

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9. Noise and Vibration

9.1 Introduction

Overview

9.1.1 This chapter of the Environmental Statement (ES) presents an assessment of the likely significant environmental effects of the Connah's Quay Combined Cycle Gas Turbine (CCGT) fitted with Carbon Capture Plant (CCP) (hereafter referred to as the Proposed Development) with respect to Noise and Vibration during the construction, operation (including maintenance), and decommissioning phases of the Proposed Development. A description of the Proposed Development, including details of maximum parameters, is set out in **Chapter 4: The Proposed Development** (E**N010166/APP/6.2.4**). This chapter should be read in conjunction with the following Chapters, which contain information relevant to the noise and vibration assessment:

- **Chapter 10: Traffic and Transport** (**EN010166/APP/6.2.10**);
- **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**);
- **Chapter 17: Terrestrial Heritage** (**EN010166/APP/6.2.17**); and
- **Chapter 21: Human Health** (**EN010166/APP/6.2.21**).

9.1.2 This chapter is supported by the following figures in (**EN010166/APP/6.3**):

- **Figure 3-3: Areas Described in the ES**;
- **Figure 9-1: Noise Sensitive Receptors and Sound Monitoring Locations**;
- **Figure 9-2: Main Development Area and Construction Laydown Areas Noise Contours**; and
- **Figure 9-3: Main Development Area Operational Sound Contours**.

9.1.3 This chapter is supported by the following appendices in (**EN010166/APP/6.4**):

- **Appendix 1-A: Scoping Report**;
- **Appendix 2-A: Scoping Opinion**;
- **Appendix 2-B**: **Scoping Opinion Response**;
- **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics**;
- **Appendix 9-A: Noise and Vibration Methodology**;
- **Appendix 9-B: Baseline Sound Level Survey**;
- **Appendix 9-C: Construction Noise Assessment Effects and Assumptions**; and
- **Appendix 9-D: Operational Sound Information**.

Legislation, Policy and Guidance

9.1.4 Legislation, planning policy and guidance relating to noise and vibration and pertinent to the Proposed Development are listed in **Table 9-1**. Further detail regarding these can be found in **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**).

Table 9-1: Legislation, Planning Policy, and Guidance Relating to Noise and Vibration

Type	Legislation, Policy and Guidance
Legislation	• The Infrastructure Planning (Environmental Impact Assessment)) Regulations 2017 (Ref 9-1); • Environmental Protection Act 1990 (Ref 9-2); • Control of Pollution Act 1974 (Ref 9-3); • The Environmental Permitting (England and Wales) Regulations 2016 (Ref 9-4);
National Planning Policy	• Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 9-5); • The NPS for Natural Gas Electricity Generating Infrastructure (EN-2) (Ref 9-6); • The NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 9-7); • The NPS for Electricity Networks Infrastructure (EN-5) (Ref 9-8); • Noise and Soundscape Action Plan, 2023-2028 (Ref 9-9); • Planning Policy Wales (PPW) (Ref 9-10); • Technical Advice Note (TAN) 11: Noise (Ref 9-11);
Local Planning Policy	• Flintshire County Council (FCC) Local Development Plan (LDP) (2015-2030) (Ref 9-12);
National Guidance	• British Standard 7445-1:2003 and 7445-2:1991 (Ref 9-13); • British Standard 5228:2009-1+A1:2014 (Ref 9-14); • British Standard 5228:2009-2+A1:2014 (Ref 9-15); • British Standard 6472:2008 (Ref 9-16); • British Standard 7385:1993 (Ref 9-17); • British Standard 4142:2014+A1:2019 (Ref 9-18); • BS ISO 9613-2:2024: Attenuation of Sound during Propagation Outdoors (Ref 9-19); • Calculation of Road Traffic Noise (CRTN) (Ref 9-20); • Design Manual for Road and Bridges LA 111: Noise and Vibration (Revision 2) (Ref 9-21); • World Health Organization Guidelines for Community Noise (Ref 9-22); and

Type	Legislation, Policy and Guidance
	• IEMA[1] Guidelines for Environmental Noise Impact Assessment (Ref 9-23).

9.2 Consultation and Scope of Assessment

Consultation

EIA Scoping Opinion

9.2.1 A request for an EIA Scoping Opinion was sought from the Secretary of State (SoS) through the Planning Inspectorate (PINS) in February 2024 as part of the Environmental Impact Assessment (EIA) Scoping Process. The EIA Scoping Opinion was adopted on 20th March 2024 (**Appendix 1-B: Scoping Opinion** (**EN010166/APP/6.4**)).

9.2.2 Key issues raised in the EIA Scoping Opinion related to noise and vibration are summarised in **Table 9-2** along with a summary of how they have been addressed, where relevant. **Appendix 2-B: Scoping Opinion Response** (**EN010166/APP/6.4**) provides a full response to all comments received in the EIA Scoping Opinion. All issues have been considered during the EIA process.

Statutory Consultation

9.2.3 Statutory consultation was carried out in October and November 2024. A Preliminary Environmental Information Report (PEIR) was issued in support of that consultation. **Table 9-3** provides a summary of the comments received during the Statutory Consultation process and how regard has been had to these within the DCO application in relation to the noise and vibration technical topic.

Targeted Consultation

9.2.4 Following Statutory Consultation changes were made to the heights of the proposed absorber and HRSG stacks and the Applicant undertook further targeted consultation. This consultation included a Supporting Information Report which detailed the environmental considerations associated with these changes. This Targeted Consultation was held between Thursday 8 May to Friday 6 June 2025. Responses to this targeted consultation are presented in the **Consultation Report** (**EN010166/APP/5.1**) and **Table 9-4** below outlines how and where these comments have been addressed within this chapter of the ES.

Additional Relevant Engagement

9.2.5 Engagement has been undertaken with FCC to agree that the proposed monitoring locations in the EIA Scoping Opinion were suitable. Details of this are provided in Section 9.4 and **Appendix 9-B: Baseline Sound Survey**

[1] The Institute of Environmental Management Assessment (IEMA) has changed its name to the Institute of Sustainability and Environmental Professionals (ISEP). Where general reference is made to the institute in this document, the following distinction has been made: ISEP (formerly IEMA). When referencing legacy IEMA documents, this distinction is not made.

Information (**EN010166/APP/6.4**). Further engagement has been undertaken with FCC to discuss operational noise limits. This additional engagement is summarised in **Table 9-5.**

Table 9-2: EIA Scoping Opinion Responses

Comment ID	Consultee	Extract Comment	Response
3.2.1	PINS	'*The Inspectorate is content that no works are required to the existing project elements and therefore there would be no construction impacts. This matter therefore can be scoped out of the assessment. Noise and vibration emitted from the existing project elements should however form part of the baseline for the assessment*.'	Noise and vibration emitted from the existing project elements forms part of the baseline for the assessment as presented in Section 9.4.
3.2.3	PINS	'*The Inspectorate is content that the Proposed Development would not change the noise and vibration emissions currently experienced from the existing project elements. Therefore, this matter can be scoped out the assessment. Noise and vibration emitted from the existing project elements should however form part of the baseline for the assessment*.'	Noise and vibration emitted from the existing project elements forms part of the baseline for the assessment as presented in Section 9.4.
3.2.3	PINS	'*The Inspectorate is content that the level of traffic generated during operation is unlikely to result in a significant effect. However, the Inspectorate, noting the response by NRW [Natural Resources Wales] and recognising that there is the potential for in-combination/ cumulative effects and impacts as a result of other Proposed Developments within the vicinity of the site, deem that further information is required on the likely cumulative traffic effects before this matter can be scoped out for noise. The Applicant is encouraged to discuss this and seek agreement from relevant consultation bodies*.'	To present a worst-case assessment, the effects of operational traffic have been assessed in Section 9.6. **Chapter 10: Traffic and Transport** (**EN010166/APP/6.2.10**) has considered the cumulative effects of the operational phase of the Proposed Development, with reference to traffic data from surrounding committed developments.
3.2.4	PINS	'*The Inspectorate is content that there are to be no vibration creating sources introduced as part of the Proposed Development and therefore this matter can be scoped out of the assessment*.'	This point is acknowledged. Operational vibration has been scoped out of the assessment.

Comment ID	Consultee	Extract Comment	Response
3.2.5	PINS	'*The Inspectorate directs the Applicant to comments in ID 2.1.12 which should be addressed in the ES in relation to decommissioning and therefore does not agree to scope out this matter on the information provided*.'	An assessment of the decommissioning phase has been included in Section 9.6.
3.2.6	PINS	'*Table 7-1 [of the Scoping Report] sets out sensitive receptor locations within 300 m for the construction assessment and within 1 km for the operational assessment. The Applicant should clarify why impacts are likely beyond 300 m during operation but not during construction. Effort should be made to agree the study area(s) with relevant consultation bodies*.'	Section 9.4 identifies that the construction noise assessment study area was set at 300 m from the Order limits, based on BS 5228-1 guidance (Ref 9-14) regarding spatial limitations of the prediction method and the higher noise thresholds used for construction noise assessment compared with assessment of operational sound. However, the construction noise study area has been extended up to 1 km from the Main Development Area and a further 300 m from the connection corridors and Construction and Indicative Enhancement Area (C&IEA) that extend beyond the 1 km study area around the Main Development Area as part of sensitivity testing, to identify likely significant effects particularly when working outside core construction hours (when lower noise thresholds are applied).
N/A	FCC	'*Planning/site constraints and opportunities:* *TAN11 Noise generating Zone around some roads'*	This information is acknowledged. The assessment has been undertaken based on the methodologies in BS 5228 and BS 4142 as referenced in TAN 11.

Comment ID	Consultee	Extract Comment	Response
N/A	FCC	'*The Council have reviewed the Scoping Report Document (Reference 60717119) and the proposed methodologies within in it and can confirm that we have no adverse comments to make in terms of pollution control*.'	This is acknowledged. The assessment methodologies are set out in Section 9.3 and **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**).
N/A	Network Rail	'*The potential for any noise/ vibration impacts caused by the proximity between the proposed development and any existing railway must be assessed in the context of Planning Policy Wales and Technical Advice Notes which hold relevant national guidance information. The current level of usage may be subject to change at any time without notification including increased frequency of trains, night time train running and heavy freight trains*.'	The existing railway forms part of the baseline for the assessment presented in Section 9.4. If the current use of the railway increases, this could lead to an increase in the baseline sound levels. However the construction and operation thresholds are based on the existing baseline sound levels, which is conservative as it does not take account of future increases in sound levels.
N/A	Public Health Wales	'*We are encouraged that the relevant information has been included in the scoping document, such as the sections on Air Quality, Noise and Vibration and Health. We also welcome reference to the Wales Health Impact Assessment Support Unit Guidance and the Wellbeing of Future Generations Act in relation to formulating the human health impact assessment (HIA) for this project*.'	This is acknowledged. Effects on Human Health are assessed in Section 21.6 of **Chapter 21: Human Health** (**EN010166/APP/6.2.21**).
N/A	FCC	FCC confirmed that the monitoring proposed in the scoping opinion was suitable.	This is acknowledged. Details of baseline monitoring are provided in Section 9.4 and **Appendix 9-B: Baseline Sound Level Survey** (**EN010166/APP/6.4**).

Table 9-3: Statutory Consultee Responses

Consultee	Extract of Comment	Response
FCC	'*The submitted environmental statement will need to have regard for Planning Policy Wales (PPW) (edition 12, 2024) and any relevant legislation and guidance such a relevant Technical Advice Notes that is in force/adopted in Wales. Also the application should have regard to the respective and relevant policies within the Flintshire Local Development Plan (LDP) adopted by the Council on 24 January 2023.*'	The planning policies are provided in **Table 9-1**, **Chapter 7 Planning Policy and Need** (**EN010166/APP/6.2.7**) and **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**), which includes PPW, TAN 11 and Flintshire LDP have been taken into consideration throughout the assessment reported in this chapter, by minimising noise and vibration from the Proposed Development.
FCC	*'The applicants noise report indicates that a significant adverse impact is likely to multiple properties. Therefore, it is stated that during the final design process special attention will be given to:* • *enclosure of key sound sources;* • *use of quieter plant (including limits on sound emissions from plant and equipment at source);* • *orientation of plant within the site to provide screening of low-levels sound sources by other buildings, structures and dedicated barriers, or orientating fans and the air inlets away from sensitive receptors; and* • *use of additional acoustic barriers/screens or earth bunds to*	Details of operational noise and vibration effects are provided in Section 9.6 and additional mitigation measures are provided in Section 9.7 and detailed in the **Framework Construction Environmental Management Plan** (**CEMP**) (**EN010166/APP/6.5**). During detailed design, an operational noise control scheme (including noise limits agreed with the local authority) would be prepared, secured by a Requirement of the Development Consent Order (DCO).

Consultee	Extract of Comment	Response
	reduce transmission of sound from the Site to NSRs [Noise Sensitive Receptors (NSRs)]. We would therefore ask that prior to construction the applicant is required to submit a final design detailing proposed noise mitigation measures to be agreed with the LPA.'	
UK Health Security Agency	'*We note the applicant will confirm within the ES appropriate measures through further detailed assessment, as necessary, once construction plant and methods and construction traffic management, have been confirmed*.'	Details of construction noise and vibration effects are provided in Section 9.6 and additional mitigation measures are provided in Section 9.7.
Natural England	'*Noise impacts on SPA birds Natural England note that an assessment of the impact of noise and vibration on ecological receptors such as SPA qualifying bird species is not included within this chapter but is to be included within Chapter 11. We also note and welcome that baseline surveys have been undertaken at the ecological receptors, and that noise contour maps have been produced. We advise that an increase of 3dB at receptor (at bird) from baseline to predicted noise levels should be considered significant and warrant further analysis, with the ES and within the appropriate assessment stage of the HRA.*'	Baseline noise levels at ecological receptors are presented in Section 9.4 and **Appendix 9-B: Baseline Sound Survey Information** (**EN010166/APP/6.4**). The assessment of impact of noise and vibration on ecological receptors (including Special Protection Area (SPA) birds) is presented in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**) and within the **Report to Inform Habitats Regulation Assessment** (**EN010166/APP/6.12**)

Table 9-4: Targeted Consultation

Consultee	Summary of Comment	Response
Flint Town Council	**Mitigation, Monitoring, and Compensation**: The Council expects: Transparent, accountable mitigation strategies for all identified environmental risks—including noise and vibration (e.g., from pile driving) in relation to nearby Listed Buildings; Clear summaries of these assessments for public understanding; Full details of compensation mechanisms available to adversely affected residents and businesses, including: • How compensation will be calculated, • Who will administer the scheme, • How the public will be made aware of it. • Additionally, the Council requests: • Clarification on how often the project's environmental performance will be reviewed, and • How local residents will be kept informed of those findings.	Details of all mitigation and monitoring proposed is included within the **Commitments Register** (**EN010166/APP/6.10**).

Table 9-5: Additional Relevant Engagement

Consultee and date	Summary of Engagement	Response
FCC 14 January 2025	A meeting was held with FCC to discuss the operational sound impact assessment criteria for human NSRs. **To avoid significant adverse effects at human NSRs a target rating level over the background L_{A90} sound level of no greater than +8 dB (lower where practicable) is proposed.** FCC indicated agreement with the proposed +8 dB rating level target, and stated that the ES chapter would need to explain and justify the +8 dB rating level. Potential mitigation was also discussed and it was explained the Applicant is currently discussing the noise reductions with the project engineers. FCC confirmed there were no noise complaints regarding the existing power plant. The Applicant mentioned there have been three noise complaints over the plant's life, which were associated with the cooling tower and were responded to and mitigated accordingly.	The explanation for the +8dB target for Rating Level above background sound level is presented in Section 9.6.

Scope of the Assessment

9.2.6 Following the scoping process that has been undertaken and the feedback received from the consultees, the scope of the noise and vibration assessment is as follows:

- construction noise and vibration effects from the Proposed Development;
- operational sound effects from the Proposed Development; and
- decommissioning noise and vibration effects from the Proposed Development.

9.2.7 The following aspects have not been considered within the scope of the assessment in this chapter of the ES:

- noise and vibration effects from the existing project elements - as presented in the EIA Scoping Opinion (**Appendix 1-B: Scoping Opinion (EN010166/APP/6.4**)), PINS is content that no works are required to the existing project elements[2] and therefore there would be no construction impacts. PINS also state that noise and vibration emitted from the existing project elements should, however, form part of the baseline for the assessment; this approach has been adopted.
- operational vibration from the Proposed Development – as presented in the EIA Scoping Opinion (**Appendix 1-B: Scoping Opinion (EN010166/APP/6.4**), there are no significant vibration producing sources associated with the operation of the Proposed Development, therefore this matter has been scoped out as agreed by PINS.

9.2.8 The Accommodation Works Areas are excluded from the assessment for Noise and Vibration due to the limited number of movements (up to 30 two-way movements (60 movements total) per train over 12 months). The Abnormal Indivisible Loads (AILs), which arrive at the Port of Mostyn, Ellesmere Port or Connah's Quay North, would be offloaded using temporary mobile cranes and enter the Proposed Development via the AIL routes, facilitated by the Accommodation Works Areas. It is considered that road traffic noise from this potential source (individual infrequent, transient passbys), compared with baseline traffic flows and other existing area sound sources, would likely to be negligible (not significant) and therefore scoped out of further assessment.

9.3 Assessment Methodology

Impact Assessment

9.3.1 The approach to the assessment of noise and vibration from the Proposed Development follows the general process outlined in **Chapter 2: Assessment Methodology (EN010166/APP/6.2.2)**. This section describes the technical methods used to determine the baseline conditions, sensitivity

[2] The Existing Natural Gas Connection Corridor is no longer included in the Order limits, however the Repurposed CO_2 Connection Corridor is retained but no works are required within it.

of the receptors and magnitude of impacts, and sets out the significance criteria that have been used for the noise and vibration assessment.

9.3.2 The methodologies used in this chapter to assess the magnitude of noise and vibration impacts are presented in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**). For ease of understanding how the effects of the Proposed Development have been identified, the sensitivity of receptors and effect classifications have been outlined here.

9.3.3 The magnitude of impact ranges from Very Low to High over a four point scale (apart from the BS 4142 (Ref 9-18) assessment which has additional magnitude of impacts between the main four point scale).

Value/Sensitivity of Receptors

9.3.4 The significance of effects are classified based on the magnitude of the impact (see **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**)) for the various potential impacts during construction, operation (including maintenance) and decommissioning, and the sensitivity or value of the affected receptor. A scale of receptor sensitivity is presented in **Table 9-6**.

Table 9-6: Sensitivity/Value Criteria for Noise and Vibration Receptors

Sensitivity/Value	Description	Examples of receptor usage
Very High	Receptors where noise or vibration will significantly affect the function of a receptor.	• auditoria/studios; and • specialist medical/teaching centres, or laboratories with highly sensitive equipment.
High	Receptors where people or operations are particularly susceptible to noise or vibration.	• residential (including traveller's encampment) ; • quiet outdoor areas used for recreation; • conference facilities; • schools/educational facilities in the daytime; • hospitals/residential care homes; • places of Worship; and • libraries.
Medium	Receptors moderately sensitive to noise or vibration where it may cause some distraction or disturbance.	• offices; • restaurants/retail; and • sports grounds when spectator or noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf).

Sensitivity/Value	Description	Examples of receptor usage
Low	Receptors where distraction or disturbance of people from noise or vibration is minimal.	• residences and other buildings not occupied during working hours; • factories and working environments with existing high noise levels; and • sports grounds when spectator or noise is a normal part of the event.

Significance of Effects

9.3.5 The effect resulting from each individual potential impact type above has been classified according to the magnitude of the impact and the sensitivity or value of the affected receptor using the matrix presented in **Table 9-7**, but where necessary also considering the context of the acoustic environment.

Table 9-7: Classification of Effects for Noise and Vibration

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

9.3.6 The following terminology has been used in this assessment to define noise and vibration effects:

- adverse – detrimental or negative effects to an environmental resource or receptor;
- neutral – effects to an environmental resource or receptor that are neither adverse nor beneficial; or
- beneficial – advantageous or positive effect to an environmental resource or receptor.

9.3.7 Where adverse or beneficial effects have been identified, these have been assessed against the following significance scale, derived using the matrix presented in **Table 9-7**:

- negligible – imperceptible effect of no significant consequence;
- minor – slight, very short or highly localised effect of no significant consequence;
- moderate – limited effect (by extent, duration or magnitude), which may be considered significant; or

- major – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

9.3.8 For the purposes of this assessment, negligible and minor effects are considered to be not significant, whereas moderate and major effects are considered to be significant as indicated in light grey in **Table 9-7**.

Rochdale Envelope

9.3.9 The setting of design parameters using the Rochdale Envelope approach is described in **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**). The maximum parameters for the principal components of the Proposed Development are set out in the **Design Principles Document** (**EN010166/APP/7.8**) and are illustrated on the **Works Plans** (**EN010166/APP/2.4**) and the **Parameter Plans** (**EN010166/APP/2.5**). These parameters, together with assumptions regarding the future plans for the existing Connah's Quay Power Station set out in **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**) have been used to inform the representative worst-case scenario that has been assessed in this chapter, in order to provide a robust assessment of the impacts and likely significance of environmental effects of the Proposed Development at its current stage of design.

9.3.10 Focused use of the Rochdale Envelope has been adopted for the following aspects regarding the construction of the Proposed Development:

- construction activities have been assumed to take place throughout the Main Development Area and C&IEA;
- construction activities within the Main Development Area and C&IEA are modelled as area sources;
- construction away from the Main Development Area has been assumed to take place at the nearest part of the working area to NSRs; and

9.3.11 Focused use of the Rochdale Envelope has been adopted for the following aspects regarding the operation of the Proposed Development:

- based on the information available at the time of the assessment, an indicative layout has been modelled using the plant data listed in **Appendix 9-D: Operational Sound Information** (**EN010166/APP/6.4**[3]); and
- the modelled layout included two trains operating at the same time.

[3] If the layout or operational plant is revised during detailed design phases the same operational noise threshold limit of a Rating level of +8 dB above background sound level will still apply as set out within the **Design Principles Document** (**EN010166/APP/7.8**).

Assessment Assumptions and Limitations

Baseline Surveys

9.3.12 The baseline sound monitoring locations as shown on **Figure 9-1: Noise Sensitive Receptors and Sound Monitoring Locations** (**EN010166/APP/6.3**) and identified in **Table 9-8** and **Appendix 9-B: Baseline Sound Level Survey** (**EN010166/APP/6.4**) are the same as those set out in Chapter 7 of the EIA Scoping Report (**Appendix 1-A: Scoping Report** (**EN010166/APP/6.4**)) apart from:

- ST3 – a short-term measurement in place of LT7, on the basis that a secure place to leave the sound monitoring equipment could not be found;
- LT2 – a long-term measurement placed in the garden area of receptor R21 instead of R22, due to access availability; and
- Ecology 1 to 4 – replacing LT10 to provide additional baseline data for ecological assessments.

Construction phase assessment

9.3.13 Information on the expected construction programme and methods of working are based on the current understanding at this stage in the design of the Proposed Development. A detailed construction programme is not currently available as this is determined by the Principal Contractor. Where construction details cannot be confirmed, reasonable worst-case estimates have been made based on experience gained on similar developments and using professional judgement. Further details on the construction of the Proposed Development are set out in **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**).

9.3.14 At present, construction noise effects related to the Proposed CO_2 Connection Corridor, Electrical Connection Corridor and Water Connection Corridor are predicted on the assumption that construction activities may occur at the closest point along the Connection Corridor to each NSR (as a worst-case). Further refinement of these areas has the potential to increase the distance from the works to some NSRs. This would likely reduce the impact and associated adverse effects.

9.3.15 Details of the construction plant associated sound power levels (L_{WA}) and assumed percentage on-time for each construction plant item (i.e. how much of the working day each construction plant item would be used/operational) are presented in **Appendix 9-C: Construction Noise Effects and Assumptions** (**EN010166/APP/6.4**).

9.3.16 It is assumed that if any construction works are required outside of the core construction hours, they will be managed via the Final CEMP(s) to ensure the construction noise thresholds are not exceeded for the appropriate time period as detailed in Section 9.5.

Operational phase assessment

9.3.17 A full list of assumptions made during the noise modelling and operational assessment of the Proposed Development are detailed in the Modelling Assumptions sub-section of **Appendix 9-D: Operational Sound Information** (**EN010166/APP/6.4**).

9.3.18 It has been assumed that the Proposed Development would operate continuously at full load, 24 hours a day to present a worst-case assessment. However, this does not represent the predicted operation pattern of the Proposed Development as described in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**).

9.3.19 It has been assumed that potential operational sound of a tonal, impulsive or intermittent nature would be designed out of the Proposed Development during the detailed design phase by the selection of appropriate plant, building cladding, louvres and silencers/ attenuators as necessary. However, a +3 dB character correction for other distinctive sound has been included at NSRs where the predicted specific sound level is above the background sound levels identified in **Table 9-8**.

Decommissioning

9.3.20 Detailed information regarding the decommissioning works is not available at this stage. The assessment has been undertaken based on typical site clearance activities and demolition plant on the Main Development Area as it is assumed any connection corridor infrastructure would remain in-situ.

9.4 Baseline Conditions and Study Area

Study Area

9.4.1 The study area was defined to include the spatial extent of identified noise and vibration sensitive receptors with the potential to be significantly affected by direct or indirect impacts that might arise from the Proposed Development, termed the Zone of Influence (ZOI). The following ZOIs have been considered:

- construction noise: the construction noise assessment study area is typically 300 m (based on BS 5228-1 guidance (Ref 9-14)) from the Construction and Operation Area, however the construction noise study area has been extended up to 1 km from the Main Development Area and a further 300 m from the Proposed CO_2 Connection Corridor and C&IEA that extend beyond the 1 km study area of the Main Development Area;
- construction vibration: NSRs within 100 m (based on BS 5228-2 guidance (Ref 9-15)) from the closest construction activity with the potential to generate vibration;
- construction traffic: based on the spatial extent of traffic links in the transport model (as discussed in **Chapter 10: Traffic and Transport EN010166/APP/6.2.10**); and

- operational noise: NSRs within 1 km of the Main Development Area. This distance is based on professional judgement and AECOM's previous experience of CCGT and CCP projects and seeks to consider all potential impacts.

9.4.2 The representative receptors assessed within the study area are named as R1 to R33 and described in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**) and shown on **Figure 9-1: Noise Sensitive Receptor and Sound Monitoring Locations** (**EN010166/APP/6.3**). R33 is an additional receptor added since the Scoping Assessment to represent the residential properties on Bank Road in Connah's Quay.

Existing Baseline

9.4.3 A review of aerial imagery and observations during the site survey indicates that the dominant sources of sound in the area are existing infrastructure at and near the existing Connah's Quay Power Station (including National Grid substations), rail traffic and traffic on the local road network including the A548, B5129 and Chester Road.

9.4.4 The location of potential NSRs in proximity to the Proposed Development has been considered when assessing the effects associated with noise and vibration levels from the construction, operational and decommissioning phases of the Proposed Development.

9.4.5 NSRs include, but are not limited to, residential properties (including a travellers' encampment), education facilities, places of worship, health buildings / care homes and libraries. The sensitivity of receptor types is shown in **Table 9-6**.

9.4.6 The processed results from each sound survey position are provided in **Table 9-8**. The sound level metrics are described in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**). The $L_{Aeq,T}$ values presented combine all measurements taken in each time period (day 07:00 to 23:00 / night 23:00 to 07:00). The $L_{A90,T}$ values presented are those deemed to be representative of Background Sound Levels, for use in the BS 4142 (Ref 9-18) assessment. Representative Background Sound Levels have been selected through consideration of the outcome of analysing the mean, mode and 10th Percentile of the measured 15-minute measurement data.

9.4.7 Further details of the sound survey including observations, dates and durations of measurement, full data sets, data analysis and equipment details are available in **Appendix 9-B: Baseline Sound Level Survey** (**EN010166/APP/6.4**).

Table 9-8: Baseline Sound Survey Results[4]

Monitoring Location*	Representative of NSRs	Time Period	$L_{Aeq,T}$ dB	Highest L_{Amax} dB	$L_{A90,T}$ dB
LT1	R26, R27, R28, R29	Daytime	53	104	44
		Night-time	47	74	37
LT2	R19, R20, R21, R22, R23, R24, R25	Daytime	54	96	45
		Night-time	52	84	37
LT3	R17, R18	Daytime	49	91	39
		Night-time	52	84	36
LT4	R6, R7, R8, R9	Daytime	52	89	46
		Night-time	48	73	38
LT5	Connah's Quay Properties	Daytime	52	92	36
		Night-time	46	73	30
LT6	R33	Daytime	55	105	39
		Night-time	52	81	36
LT8	R30, R31	Daytime	57	89	45
		Night-time	54	87	35
LT9	R10, R11, R12, R13, R14, R15	Daytime	55	103	43
		Night-time	57	96	34
LT11	R4, R5, R16	Daytime	50	93	38
		Night-time	42	74	36
ST1	R1	Daytime	44	73	33
ST2	R2, R3	Daytime	44	57	40
ST3	Connah's Quay Properties, R32	Daytime	61	86	47
		Night-time	49	75	30
Ecological 1	Ecological receptors	Daytime	49	90	45
		Night-time	47	78	39
Ecological 2	Ecological receptors	Daytime	51	87	47
		Night-time	48	84	40
Ecological 3		Daytime	56	90	49

[4] Monitoring locations were identified in advance of the establishment of the travellers' encampment. LT2 is considered to be representative of the traveller's encampment on Kelsterton Road. Conclusions reached within this assessment for NSRs 21, 22 and 23 are considered to be representative of the significance of effects predicted for the travellers' encampment.

Monitoring Location*	Representative of NSRs	Time Period	$L_{Aeq,T}$ dB	Highest L_{Amax} dB	$L_{A90,T}$ dB
	Ecological receptors	Night-time	56	92	48
Ecological 4	Ecological receptors	Daytime	49	82	46
		Night-time	47	73	41

*LT= Long term, ST= Short Term, Daytime 07:00 to 23:00, Night-Time 23:00 to 07:00

Monitoring Locations Ecological 1 to 4 are not used in this chapter but are used to inform ecological assessments in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**) and **Chapter 12: Marine Ecology** (**EN010166/APP/6.2.12**). ST3 is in place of LT7 and Ecology 1 to 4 replaces LT10 - as detailed in paragraph 9.3.12 and **Appendix 9-B: Baseline Sound Level Survey** (**EN010166/APP/6.4**).

Future Baseline

9.4.8 In the absence of the Proposed Development, future baseline sound levels at NSRs would depend largely on traffic flows on surrounding road and rail networks and the future operations at the existing power station, as described in Section 2 of **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**) and other industrial and commercial premises in the area. As the future baseline sound levels are unknown at this stage, the construction and operation thresholds used in the assessment in this chapter are based on the existing baseline sound levels, which is conservative as it does not take account of potential future increases in sound levels.

9.5 Development Design and Embedded Mitigation

9.5.1 The Proposed Development has been designed, as far as possible, to avoid or minimise impacts and effects of noise and vibration through the process of design development, and by embedding measures into the design of the Proposed Development.

Construction

9.5.2 A **Framework CEMP** (**EN010166/APP/6.5**) is included as part of the DCO Application, which sets out the key measures to be employed during the construction of the Proposed Development, to control and minimise the impacts on the environment. The **Framework CEMP** (**EN010166/APP/6.5**) sets out how impacts upon NSRs would be managed during construction. A Final CEMP(s) would be prepared by the construction Contractor(s) in accordance with the **Framework CEMP** (**EN010166/APP/6.5**) prior to construction. The submission, approval, and implementation of the Final CEMP(s) is secured by a Requirement of the **Draft DCO** (**EN010166/APP/3.1**).

9.5.3 Construction of the Proposed Development would typically be carried out during core construction working hours 08:00 to 18:00 Monday to Friday

(except Bank Holidays) and 08:00 to 13:00 on Saturdays. However, it is likely that some construction activities may need to be undertaken outside of these core working hours. This is partly because certain construction activities cannot be stopped, such as concrete pouring, but also to manage the construction programme.

9.5.4 Where construction works are proposed outside core hours, additional noise assessments would be undertaken if the construction noise and vibration thresholds within **Table 9-10** are likely to be exceeded. The assessment would identify the requirements for additional mitigation measures to ensure that construction noise and vibration thresholds would not be exceeded outside of core hours. As detailed in the **Framework CEMP** (**EN010166/APP/6.5**), the assessments would be provided to FCC for approval.

9.5.5 Measures to mitigate noise and vibration would be implemented during the Proposed Development construction phase to minimise impacts at human and ecological receptors, particularly with respect to activities required outside of normal working hours. The construction noise models include 3 m high acoustic fencing along the northern boundary and western boundary of the Main Development Area and along the northern boundary of the C&IEA as shown on **Figure 5-3**: **Construction Areas** (**EN010166/APP/6.3**) and detailed in the **Framework CEMP** (**EN010166/APP/6.5**).

9.5.6 Mitigation (included in the **Framework CEMP** (**EN010166/APP/6.5**), **Framework Construction Worker Travel Plan** (**CWTP**) (**EN010166/APP/6.7**) or **Framework Construction Traffic Management Plan** (**CTMP**) (**EN010166/APP/6.6**) as relevant and henceforth in the final versions of those documents) includes, but is not limited to:

- abiding by agreed construction noise thresholds at nearby NSRs;
- avoidance of working in the more sensitive evening and night-times where practicable;
- making sure that processes are in place to minimise noise before works begin and that Best Practical Means (BPM) are being followed throughout the construction programme;
- using modern plant, complying with the latest European noise emission requirements (Ref 9-24) and selection of inherently quiet plant where practicable;
- hydraulic techniques for breaking to be used in preference to percussive techniques where practical;
- use of rotary bored rather than driven piling techniques (if required), where possible;
- off-site pre-fabrication where practical;
- all plant and equipment being used for the works to be properly maintained, silenced where appropriate, operated to prevent excessive noise and switched off when not in use;

- all contractors to be made familiar with current legislation and the guidance in BS 5228-1 and BS 5228-2 (Ref 9-14 and Ref 9-15);
- loading and unloading of vehicles, dismantling of site equipment such as scaffolding or moving equipment or materials within the Proposed Development to be conducted in such a manner as to minimise noise generation;
- where practicable, locating of the noisiest items of plant at the furthest distance from the nearby NSRs. Plant known to emit noise strongly in one direction would, where practicable, be orientated so that the noise is directed away from NSRs;
- shutting down of machines such as cranes that may be in intermittent use between work periods or would be throttled down to a minimum (machines would not be left running unnecessarily);
- appropriate routing of construction traffic on public roads and along access tracks, to minimise construction traffic noise levels at NSRs, as described in the **Framework CWTP** (**EN010166/APP/6.7**) and **CTMP** (**EN010166/APP/6.6**) (see **Chapter 10: Traffic and Transport** (**EN010166/APP/6.2.10**));
- consultation with the local authority (FCC) and local NSRs to advise of potential noisy works that are due to take place; and
- monitoring of noise complaints and reporting to the Principal Contractor for immediate investigation.

9.5.7 In addition to the measures described above, the following would be developed as part of the Final CEMP:

- method statements regarding construction management, traffic management and overall site management would be prepared prior to construction in accordance with best practice and relevant British Standards, to help minimise impacts of the construction works. One of the main aims of such method statements would be to minimise noise disruption to local NSRs during the construction phase; and
- regular communication with the local community throughout the construction period would also serve to publicise the works schedule, giving notification to NSRs regarding periods when higher levels of noise may occur during specific operations, and providing lines of communication where complaints can be addressed.

9.5.8 To assist in the preparation of the Final CEMP(s) and CTMP(s), further noise and vibration assessment may be undertaken as required, once the Principal Contractor is appointed, to identify specific mitigation measures and/or monitoring for the Proposed Development.

Operation

9.5.9 Details of the operational sound sources can be found in **Appendix 9-D: Operational Sound Information** (**EN010166/APP/6.4**).

9.5.10 As detailed in the **Consents Agreement Position Statement** (**EN010166/APP/3.3**) document, the control and monitoring of noise during operation would be controlled by an Environmental Permit and the operational sound limit

9.5.11 The Proposed Development would require an Environmental Permit and would comply with this under the Environmental Permitting (England and Wales) Regulations 2016. This would require operational noise from the power station to be controlled using BAT, which would be determined through the Environmental Permit application. The Applicant has also begun engagement with Natural Resources Wales and is preparing an application for an Environmental Permit.

9.5.12 The Proposed Development will be designed and subsequently operated such that noise emissions from all associated noise sources do not exceed the defined thresholds in Paragraph 9.6.40, at all NSR locations. The operator would implement and maintain an Environment Management System (EMS) which would be certified to ISO 14001 (Ref 9-26). The EMS would outline requirements and procedures required so that the Proposed Development is operating to the appropriate operational limits.

9.5.13 The operational assessment has assumed that potential sound of a tonal, impulsive or intermittent nature would be designed out of the Proposed Development during the detailed design phase by the selection of appropriate plant, building cladding, louvres and silencers/attenuators as necessary. However, for NSRs at which there is the potential to identify the new sound source within the existing acoustic environment, a +3dB correction for distinctive character has been applied to the *specific sound levels* predicted from the Proposed Development.

9.5.14 A number of operational sound mitigation measures have been embedded within the design including increased sound insulation and enclosure of plant and acoustic lagging, although additional and/or alternative solutions may be identified as the design evolves. Further measures would be defined as part of detailed design in accordance with the **Design Principles Document** (**EN010166/APP/7.8**).

Decommissioning

9.5.15 It is considered that embedded mitigation identified for the construction phase would also apply for decommissioning activities. This decommissioning phase is anticipated to involve the removal of all above surface structures and associated ground remediation as required to facilitate future re-use.

9.5.16 Decommissioning activities would be conducted in accordance with the appropriate guidance and legislation for the closure of the Proposed Development. A Decommissioning Environmental Management Plan (DEMP) would be prepared at the time of decommissioning which would consider in detail all potential environmental risks on the Proposed Development and contain guidance on how risks can be removed or mitigated. This would include details of how noise and vibration should be

managed on the Main Development Area during decommissioning. The requirement for a DEMP is secured by a requirement in the **Draft DCO** (**EN010166/APP/3.1**). Where decommissioning works are proposed outside core hours, additional noise assessments would be undertaken if the construction noise and vibration thresholds within **Table 9-10** are likely to be exceeded. The assessment would identify the requirements for additional mitigation measures to ensure that construction noise and vibration thresholds would not be exceeded outside of core hours. The assessment would be provided to FCC for approval.

9.6 Assessment of Likely Impacts and Effects

9.6.1 Taking into account the embedded mitigation measures as detailed in Section 9.5 above, the potential impacts and effects of the Proposed Development have been assessed using the methodology as detailed in Section 9.3 of this chapter and in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**), and with reference to **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**).

Construction Phase

Construction Noise Thresholds Definition

9.6.2 The construction noise assessment requires the calculation of noise emissions from the construction works based on the sound power levels associated with the plant or equipment to be used, and the propagation of noise from each noise source to the NSR locations. Sound power levels are taken from manufacturers data and/or archive data given in BS 5228-1 (Ref 9-14). The calculated levels are then compared to nominated criteria in BS 5228-1 (Ref 9-14) to determine whether an adverse impact is expected.

9.6.3 For residential NSRs, the 'ABC' method (detailed in BS 5228-1 Section E.3.2 (Ref 9-14)) sets construction noise thresholds for residential NSRs for different time periods (day, evening, night and weekends) based on the existing ambient noise levels. For the appropriate period (day, evening, night, weekend), the existing ambient noise levels are determined (through noise measurements at NSRs). The measured noise levels are then rounded to the nearest 5 dB and used to derive the appropriate noise threshold value using the construction noise thresholds set out in Table 3 in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**). The predicted construction noise levels are then compared with these construction noise threshold values to indicate whether a potentially **significan**t effect is likely to occur at residential NSRs.

9.6.4 As stated in the BS 5228-1 (Ref 9-14) ABC method and shown in Table 3 in **Appendix 9-A: Noise and Vibration Methodology EN010166/APP/6.4**), there are different noise thresholds for weekday daytime and Saturday morning periods (classed as weekdays (07:00 to 19:00) and Saturday mornings (07:00 to 13:00)) than for evening and weekend periods (classed as 19:00 to 23:00 weekdays, Saturday afternoons (13:00 to 23:00) and Sundays (07:00 to 23:00)). BS 5228-1 Section 6.3(d) (Ref 9-14) acknowledges this difference in receptor sensitivity at different times, stating

"*Hours of work. For any NSP* [noise sensitive premises]*, some periods of the day will be more sensitive than others. For example, levels of noise that would cause speech interference in an office during the day would cause no problem in the same office at night. For dwellings, times of site activity outside normal weekday and Saturday morning working hours will need special consideration*." Accordingly, the ABC method assigns evening and weekend periods a 10 dB lower threshold than weekday daytime and Saturday morning periods.

9.6.5 The measured baseline ambient sound levels have been used to determine indicative BS 5228-1 (Ref 9-14) 'ABC' noise threshold categories as shown in **Table 9-9** at each of the representative residential NSRs. Where baseline data is not available during the evening, weekend and night-time periods, limits have been assigned as category A.

Table 9-9: Measured Free-Field $L_{Aeq,T}$ Noise Levels and Associated 'ABC' Assessment Category - Residential Receptors

Measurement NSR Location	Receptor	Weekday daytime (07:00-19:00) and Saturday morning (07:00-13:00		Weekday evening (19:00-23:00)		Weekend (Saturday afternoon 13:00-23:00 and Sunday 07:00-23:00)		Night (23:00-07:00)	
		$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC
LT1	R26, R27, R28, R29, R30	54	A	49	A	49	A	47	B
LT2	R19, R20, R21, R22, R23, R24, R25	56	A	51	A	52	A	52	C
LT3	R17, R18	50	A	46	A	49	A	52	C
LT4	R6, R7, R8, R9	53	A	52	A	51	A	48	C
LT5	Connah's Quay Properties	54	A	43	A	47	A	46	B
LT6	Connah's Quay Properties, R33	56	A	50	A	51	A	52	C
LT8	R30, R31	59	A	55	B	55	B	54	C
LT9	R10, R11, R12, R13, R14, R15	56	A	53	B	52	A	57	C
LT11	R4, R5, R16	50	A	42	A	51	A	42	A
ST1	R1	44	A	-	A	-	A	-	A
ST2	R2, R3	44	A	-	A	-	A	-	A

Measurement NSR Location	Receptor	Weekday daytime (07:00-19:00) and Saturday morning (07:00-13:00		Weekday evening (19:00-23:00)		Weekend (Saturday afternoon 13:00-23:00 and Sunday 07:00-23:00)		Night (23:00-07:00)	
		$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC
ST3	Connah's Quay Properties, R32	61	A	-	A	-	A	49	C

9.6.6 Construction noise thresholds have been derived for each NSR in **Table 9-10** based upon the assigned BS 5228-1 (Ref 9-14) ABC category in **Table 9-9** (methodology described in **Appendix 9-A Noise and Vibration Methodology** (**EN010166/APP/6.4**).

9.6.7 The non-residential NSRs (R27 and R32, both educational use) have been assigned construction thresholds for daytime and evening/weekend periods, as a worst-case scenario.

Table 9-10: Indicative Construction Noise Thresholds for Human Noise Sensitive Receptors

	Construction Noise Threshold, $L_{Aeq,T}$ dB			
NSR	**Weekday daytime 07:00 – 19:00, Saturday morning 07:00 – 13:00**	**Evenings 19:00 – 23:00**	**Night 23:00 – 07:00**	**Saturday afternoon 13:00 – 23:00 and Sunday 07:00- 23:00)**
R26, R27*, R28, R29	65	55	50	55
R6, R7, R8, R9, R17, R18, R19, R20, R21, R22, R23, R24, R25, R32*, R33	65	55	55	55
R30, R31	65	60	55	60
R10, R11, R12, R13, R14, R15	65	60	55	55
R1, R2. R3, R4, R5, R16	65	55	45	55

*R27 and R32 are educational facilities

Construction Noise Impact Predictions

9.6.8 This section sets out the potential noise impacts on sensitive receptors arising during the construction of the Proposed Development. Construction noise impacts are assessed for:

- construction activities on the Main Development Area and C&IEA including the temporary Construction Laydown Areas;
- construction of the CO_2 Connection within the Proposed CO_2 Connection Corridor and construction activities on the Proposed CO_2 Connection Compound;

- construction of the Electrical Connection within the Electrical Connection Corridor; and
- construction activities within the Water Connection Corridor.

9.6.9 Noise levels experienced by NSRs during such works depend upon several variables, the most significant of which are:

- the noise generated by plant or equipment used on site, generally expressed as sound power levels;
- the periods of use of the plant on site, known as its on-time;
- the distance between the noise/vibration source and the receptor;
- the noise attenuation due to ground absorption, air absorption and barrier effects; and
- in some instances, the reflection of noise due to the presence of hard surfaces such as the sides of buildings.

9.6.10 Construction activities may take place across the full area of the Construction and Operation Area. Noise levels during construction have been predicted at a selection of representative NSRs located closest to the Construction and Operation Area. Distances between the NSRs and the closest construction areas can be found in Table 1 of **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**).

9.6.11 The indicative construction programme and the construction working hours for the Proposed Development are set out in **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**).

9.6.12 As exact construction activities are not confirmed at this stage, indicative predicted noise levels for the construction programme and methods of working are based on the current understanding at this stage in the design of the Proposed Development. This gives an indication of where construction noise is at risk of leading to potentially significant effects. These levels would be reviewed and reassessed if required as information becomes available once the Principal Contractor has been appointed.

9.6.13 The construction noise predictions have been undertaken using noise data for plant and calculation methodologies from BS 5228-1 (Ref 9-14). The Main Development Area and C&IEA proposed simultaneous construction works follows the plant list provided in Table 1 and Table 2 in **Appendix 9-C: Construction Noise Effects and Assumptions** (**EN010166/APP/6.4**), in combination with the areas shown in **Figure 5-3** (**EN010166/APP/6.3**). The construction works on the Main Development Area and C&IEA have been subdivided into three sub-activities: Site Enabling, Main Civils Works (including earthworks/site preparation) and Plant Installation. For the construction elements away from the Main Development Area and C&IEA it is assumed that all plant and activities take place at the closest point to each NSR along the Proposed CO_2, Water and Electrical Connection Corridors.

9.6.14 Based on the indicative construction programme for simultaneous construction in Table 5-2 in **Chapter 5: Construction Management and**

Programme (**EN010166/APP/6.2.5**), the following sub-activities may take place at the same time, and therefore a worst-case scenario is also predicted on this basis:

- main civils (including earthworks / site preparation);
- plant installation;
- works in the Water Connection Corridor; and
- CO_2 Connection Corridor Compound.

9.6.15 The predicted levels apply to normal weekday daytime (07:00 – 19:00) working, although they could equally apply to other time periods where working at the same rate and intensity is proposed. Details on the noise prediction methodology, including a full list of construction plant and associated sound power levels (L_{wA}) for each construction activity, are presented in **Appendix 9-C Construction Noise Effects and Assumptions** (**EN010166/APP/6.3**).

9.6.16 A summary of noise predictions for construction works at the Main Development Area and the C&IEA is presented in **Table 9-11** and noise predictions at NSRs located along the Proposed CO_2 Connection Corridor and the associated compound are presented in **Table 9-12**. Free-field noise levels have been predicted to allow subsequent comparison with the ABC categories derived from free-field baseline ambient noise levels at the residential NSRs. The predicted construction noise levels at all NSRs assessed is presented in **Appendix 9-C: Construction Noise Effects and Assumptions** (**EN010166/APP/6.4**).

9.6.17 As advised by BS 5228-1 (Ref 9-14), noise levels predicted at distances over 300 m (of which some NSRs for the Main Development Area are significantly greater than) should be treated with caution due to the increasing importance of meteorological effects.

9.6.18 Indicative noise predictions have been based on the current proposed temporary construction laydown areas.

9.6.19 The daytime construction noise contours for Main Civils Works (presented in **Figure 9-2: Main Development Area and Construction Laydown Areas Noise Contours** (**EN010166/APP/6.3**)) represent the predicted free-field construction noise levels at first floor level (4 m above ground) using a 10 m x 10 m colour grid. The contours are provided for illustrative purposes of the predominantly highest noise level construction activity assessed for the Main Development Area and C&IEA.

Table 9-11: Construction Noise Predictions for the Main Development Area and C&IEA

NSR	Predicted free-field noise level for daytime construction activity, dB $L_{Aeq,12h}$			
	Site Enabling	Main Civils Works	Plant Installation	Worst-case
R1	N/A	N/A	N/A	57
R2	N/A	N/A	N/A	56
R3	N/A	N/A	N/A	55
R4	N/A	N/A	N/A	49
R5	N/A	N/A	N/A	49
R15	49	49	49	52
R19	63	62	63	65
R20	58	58	58	61
R21	62	62	62	65
R22	62	62	62	65
R23	64	65	64	68
R25	52	52	52	56
R31	61	61	61	64
R33	57	57	57	60

Note: NSRs beyond 300 m of the construction works are only reported in this table if the predicted construction noise levels exceed the construction thresholds in **Table 9-10**. N/A is assigned where the NSR is beyond 300 m and the predicted construction noise level is below the construction threshold.

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Table 9-12: Construction Noise Predictions for Connection Corridor Construction

NSR	Predicted free-field noise level for daytime construction activity, dB $L_{Aeq,12h}$			
	Proposed CO_2 Connection	Proposed CO_2 Connection Compound	Water Connection	Electrical Connection
R1	56	57	N/A	N/A
R2	64	56	N/A	N/A
R3	59	54	N/A	N/A

NSR	Predicted free-field noise level for daytime construction activity, dB $L_{Aeq,12h}$			
	Proposed CO_2 Connection	Proposed CO_2 Connection Compound	Water Connection	Electrical Connection
R25	N/A	N/A	N/A	62
R28	N/A	N/A	N/A	61
R29	N/A	N/A	N/A	63
R30	N/A	N/A	N/A	61

Note: NSRs beyond 300 m of the construction works are only reported in this table if the predicted construction noise levels exceed the construction thresholds in **Table 9-10**. N/A is assigned where the NSR is beyond 300 m and the predicted construction noise level is below the construction threshold.

Construction Noise Effects

9.6.20 The effects of the predicted construction noise levels for the Main Development Area and C&IEA (as presented in **Table 9-11**) and the Connection Corridors construction (as presented in **Table 9-12**) have been classified by considering the construction noise thresholds in **Table 9-10** and using the semantic scales in **Table 9-7** and Table 4 in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**). These effects are presented in Tables 6 and 7 in **Appendix 9-C: Construction Noise Effects and Assumptions** (**EN010166/APP/6.4**).

9.6.21 For example, at Receptor R19, the predicted construction noise level in **Table 9-11** is 63 dB for the Site Enabling. This is 2dB below the threshold in **Table 9-10** and equals a low magnitude of impact (based upon Table 4 in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**)). A low magnitude of impact combined with a high sensitivity receptor (as shown in **Table 9-6**) equals a **minor adverse** (**not significant**) effect (based on the sematic scale in **Table 9-7**).

9.6.22 It would be necessary for some construction activities to take place continuously, including potentially evening and weekend and night-time periods. Construction noise thresholds for residential NSRs during evening and weekend and night-time periods have also been defined in **Table 9-10.** In the event that construction works were to occur outside the core working hours (including night time) with the same rate and intensity as assumed in the day period, there would be potential significant adverse effects at NSRs. The exact nature of works that may arise outside core hours is uncertain at this stage and it would be an uncommon occurrence.

9.6.23 With the embedded mitigation to secure that noise limits would not be exceeded, construction activities outside of normal working can be considered as having a **negligible** to **minor adverse** effect (**not significant**) at NSRs. Potential mitigation measures during the works have already been

discussed in Section 9.5. Further additional mitigation measures are discussed in Section 9.7.

9.6.24 There is the potential for **moderate adverse** (**significant**) noise effects during daytime at R23 (including the travellers' encampment) for the worst-case scenario (as described in paragraph 9.6.14) prior to the incorporation of additional mitigation measures which are included in Section 9.7.

9.6.25 Construction noise effects at all other representative receptors during construction works are predicted to be up to **minor** adverse (**not significant**) during the daytime period.

Construction Traffic Noise

9.6.26 The potential changes in road traffic noise as a result of the construction traffic due to the Proposed Development have been considered by calculating the Basic Noise Level (BNL) at 10 m from the road as per the methodology in CRTN (Ref 9-20). The approach uses the Annual Average Weekday Traffic (AAWT) for 'without Proposed Development construction flows' and 'with Proposed Development construction flows', percentage of Heavy Goods Vehicles (HGV) and speed for the peak construction year (2034) (as discussed in **Chapter 10: Traffic and Transport** (**EN010166/APP/6.2.10**)) and calculates the change in BNL. The potential changes in road traffic noise as result of the construction traffic from the Proposed Development is presented in **Table 9-13**. **Table 9-14** presents a sensitivity test scenario whereby the existing Connah's Quay Power Station requires maintenance, whilst construction of the Proposed Development is ongoing. This would include adding additional traffic associated with the maintenance to the peak construction traffic. Based on information provided regarding the planned maintenance outages during the operational phase, which are likely to occur approximately once every four years (per unit), it is envisaged that there could be approximately 300 additional temporary contractors / maintenance workers at the existing Connah's Quay Power Station, for approximately two months.

Table 9-13: Changes in Road Traffic Noise due to the Construction of the Proposed Development

Link	'Without' Proposed Development construction flows 2034			'With' Proposed Development construction flows 2034			Change in BNL, dB	Magnitude of impact
	AAWT	% HGV	Speed (km/h)	AAWT	% HGV	Speed (km/h)		
Kelsterton Road	404	20	48	1,958	13	48	6.3	High
A548 (West of Main Development Area Access)	15,789	8	86	16,266	8	86	0.1	Very low
A548 (East of Main Development Area Access)	14,877	7	112	15,347	8	112	0.1	Very low
B5129	10,546	13	39	11,152	12	39	0.2	Very low
Kelsterton Lane	1,466	11	56	1,938	8	56	1.7	Low
Allt Goch Lane	149	16	36	157	15	36	0.2	Very low
Golftyn Lane	7,894	9	32	7,894	9	32	0	Very low
Mold Road	8,523	8	41	8,523	8	41	0	Very low

Table 9-14: Changes in Road Traffic Noise due to the Construction of the Proposed Development Sensitivity Test (including Maintenance Outage at the Existing Connah's Quay Power Station)

Link	'Without' Proposed Development construction flows 2034			'With' Proposed Development construction flows 2034			Change in BNL, dB	Magnitude of impact
	AAWT	% HGV	Speed (km/h)	AAWT	% HGV	Speed (km/h)		
Kelsterton Road	404	20	48	2516	13	48	7.7	High
A548 (West of Main Development Area Access)	15,863	8	86	16,513	8	86	0.2	Very low
A548 (East of Main Development Area Access)	15473	6	112	16,108	8	112	0.2	Very low
B5129	10,546	13	39	11,372	12	39	0.3	Very low
Kelsterton Lane	1,466	11	56	2,109	8	56	2.2	Low
Allt Goch Lane	149	16	36	157	15	36	0.2	Very low
Golftyn Lane	7,894	9	32	7,894	9	32	0	Very low
Mold Road	8,523	8	41	8,523	8	41	0	Very low

9.6.27 For the Kelsterton Road traffic link there is a high magnitude of impact due to traffic flows of the Proposed Development, which would be classified as a potential major adverse increase in road traffic noise level at source. Although given the flows on Kelsterton Road are low, the change in road traffic noise levels at nearby NSRs (R21, R22 and R23 (including the travellers' encampment)) would be at least partially masked by noise from other road noise and industrial sound sources in the vicinity (including the adjacent A548 dual carriageway and existing power station). Therefore, further assessment of the change in road traffic noise levels at NSRs along Kelsterton Road has been undertaken.

9.6.28 For all other traffic links, the magnitude of impact is low or less. This would result in up to **minor adverse** (**not significant**) effects.

9.6.29 The noise model has been used to predict the road traffic noise at the NSRs on Kelsterton Road with and without construction traffic (including the additional traffic associated with maintenance outage). The road traffic noise level predicted at the NSRs includes contribution from traffic on all the roads in the vicinity, including the A548.

Table 9-15: Further assessment of Changes in Road Traffic Noise due to the Construction of the Proposed Development Sensitivity Test (Maintenance Outage at the Existing Connah's Quay Power Station)

NSR	Change in Road Traffic Noise, dB	Magnitude of impact
R21	4.2	Medium
R22	4.8	Medium
R23	1.4	Low

9.6.30 The further assessment has reduced the magnitude to impact from high to medium, which results in potential **moderate adverse** effect (s**ignificant**). The traffic data is based on a two month maintenance outage coinciding with the peak construction period and therefore the effects may be less for the majority of the construction period. Additional mitigation is discussed in Section 9.7.

Construction Vibration Impacts and Effects

9.6.31 The level of vibration impact magnitude at different receptors would be dependent upon a number of factors including the distance between the works and receptors, ground conditions, the nature and method of works required close to receptors and the specific activities being undertaken at any given time.

9.6.32 However, due to large distances (minimum of 150 m) between residential receptors and the plant that is likely to produce higher levels of vibration (e.g. piling rigs and vibratory rollers) on the Main Development Area, vibration effects on both humans and buildings are likely to be **negligible** (**not significant**).

9.6.33 R33 is the closest receptor to the construction plant likely to be associated with the construction laydown area, being approximately 30 m from laydown

areas (refer to **Figure 5-3: Construction Areas** (**EN010166/APP/6.3**). There may be a need for vibratory rollers during site clearance or levelling of the site when establishing the construction laydown area. Therefore, the magnitude of vibration impacts and the resulting significance of effects are also assessed in **Table 9-16.**

Table 9-16: Assessment of Construction Vibration

NSR	Construction Location	Vibratory equipment	Distance (m)	Peak particle velocity (V_{res}),(mm/s)	Magnitude of Impact	Classification of effect
R19	Construction and Indicative Enhancement Area	Vibratory Roller*	59	0.7	Low	Minor Adverse
R21	Construction and Indicative Enhancement Area	Vibratory Roller*	54	0.8	Low	Minor Adverse
R33	Construction and Indicative Enhancement Area	Vibratory Roller*	44	1.0	Medium	Moderate Adverse

*Predictions based on use of a Bomag BW203 Vibratory Roller on high amplitude mode

9.6.34 It may not be necessary for vibratory rolling to occur at the closest distance of the laydown areas to receptors, however, these shortest distances have been assessed as a worst-case. On this worst-case basis, up to **moderate adverse** (**significant**) vibration effects are predicted at receptor R33 during the use of a vibratory rolling at the closest point of the construction laydown area. However, the guidance in BS 5228-2 (Ref 9-15) states for peak particle velocity levels between 1.0 and <10 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'. Where possible, the use of vibratory rollers in close proximity to the NSRs would be avoided.

9.6.35 The vibration levels predicted are considerably below the thresholds for damage to buildings as presented in Table 7 in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**).

9.6.36 Additional mitigation measures to reduce vibration levels and likelihood of complaints from residents are discussed in Section 9.7.

Operational Phase

9.6.37 Operational sound modelling has been undertaken using available sound level data for the Proposed Development plant and information based on similar projects. The assessment presented below sets out the realistic worst-case potential magnitude of impacts and significance of effects associated with the operation of the Proposed Development.

9.6.38 Details of the sound source sound power level (L_{wA}) data, the settings used in the noise modelling software and the list of assumptions made are presented in **Appendix 9-D Operational Sound Information** (**EN010166/APP/6.4**).

9.6.39 The predicted free-field operational specific sound levels at the NSRs in the absence of any additional mitigation built into the Proposed Development design are presented in **Table 9-17.** The results presented are for the first floor of the representative receptors. Assuming continual 24-hr operation, the predicted sound levels apply to both the 1-hour daytime and the 15-minute night-time BS 4142 (Ref 9-18) assessment periods.

Operational Sound Limits

9.6.40 To avoid significant adverse effects at human NSRs an operational sound rating level that is no more than 8 dB higher than the background L_{A90} is proposed (lower where practicable). The +8 dB rating level difference lies between adverse and significant adverse impacts according to BS 4142 (Ref 9-19). In the case of the closest NSRs to the Proposed Development, context considerations (as per BS 4142 (Ref 9-19) guidance) reduce the likely impact to adverse, which is assessed as a minor adverse effect (not-significant).

9.6.41 Relevant contextual considerations include:

- character of the existing ambient sound environment – this is dominated by existing infrastructure at and near the existing Connah's Quay Power Station (including National Grid substations), rail traffic and traffic on the

local road network including the A548, B5129 and Chester Road. The Proposed Development is unlikely to alter the character of the area.

- historical context of the use of the area – since 1954 there have been industrial plant on the Connah's Quay Power Station site and the current gas fired power station has been operating since 1996.
- lack of complaints – there have been no recent noise complaints. There have been three complaints over during the operation of the existing Connah's Quay Power Station, which were associated with the cooling tower, were responded to, and mitigated accordingly.

9.6.42 Therefore, the operational sound limit of a +8 dB rating level above the representative background sound levels, along with context, is not significant. This operational sound limit is detailed in the **Design Principles Document** (**EN010166/APP/7.8)** which is secured via DCO Requirement.

BS 4142 Assessment Results

9.6.43 For the worst-case scenario based on basic embedded noise control measures the BS 4142 (Ref 9-18) assessment produces a range of impact magnitudes from low to high at the NSRs. This would result in effects ranging between **negligible** (**not significant**) to **major adverse** (**significant**), subject to consideration of context. Out of the 27 No. NSRs assessed, the initial BS 4142 (Ref 9-18) assessment indicated potential significant adverse effects, subject to consideration of context, at six NSRs during the daytime and at 12 No. NSRs during the night-time period as summarised in **Table 9-17** and **Table 9-18**. The magnitude of impact and significance of effect classifications have been included in the tables, to provide context for the BS 4142 (Ref 9-18) assessment outcomes, with reference to the semantic scales in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**).

9.6.44 The values presented are the differences between the representative *Background Sound Level* $L_{A90,T}$ at each NSR and the predicted *Rating Level* (the *Specific Sound Level* $L_{Aeq,T}$ plus the character correction). Positive values in the table indicate an excess of the *Rating Level* over the *Background Sound Level*.

9.6.45 The full BS 4142 (Ref 9-18) assessment for all 27 No. NSRs can be found in **Appendix 9-D: Operational Sound Information** (**EN010166/APP/6.4**).

9.6.46 The Main Development Area Operational Sound Contours (in **Figure 9-3: Main Development Area Operational Sound Contours** (**EN010166/APP/6.3**)) are provided for illustrative purposes to represent the free-field operational sound levels at first floor level (4 m above ground level) using a 10 m x 10 m colour grid.

9.6.47 The assessment has assumed that potential operational sound of a tonal, impulsive or intermittent nature would be designed out of the Proposed Development during the detailed design phase by the selection of appropriate plant, building cladding, louvres and silencers/ attenuators as necessary. However, inclusion of a +3 dB correction for other distinctive character has been included at this stage as a conservative approach. This has been applied for NSRs where the *Specific Sound Level* is equal to or

greater than the existing background sound level, as there is the potential to identify the new sound source in the existing acoustic environment.

Table 9-17: Summary of Potential Significant Adverse Effects- Daytime BS4142 Assessment

NSR	*Specific sound level* L_s ($L_{Aeq,Tr}$), (dB)	Acoustic feature correction, (dB)	*Rating level* ($L_{Ar,Tr}$), (dB)	Representative *background sound level* ($L_{A90,T}$), (dB)	Excess of rating level over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), (dB)	Magnitude of Impact	Initial classification of effect
R18	49	+3	52	39	+13	Medium / High	Moderate / Major Adverse
R19	49	+3	52	45	+7	Low / Medium	Minor / Moderate Adverse
R20	52	+3	55	45	+10	Medium	Moderate Adverse
R21	57	+3	60	45	+15	High	Major Adverse
R22	53	+3	56	45	+11	Medium	Moderate Adverse
R23	52	+3	55	45	+10	Medium	Moderate Adverse

Table 9-18: Summary of Potential Significant Adverse Effects - Night-time BS4142 Assessment

NSRS	Specific sound level *Ls* ($L_{Aeq,Tr}$), (dB)	Acoustic feature correction, (dB)	Rating level ($L_{Ar,Tr}$), (dB)	Representative background sound level ($L_{A90,T}$), (dB)	Excess of rating level over background sound level ($L_{Ar,Tr}$ - $L_{A90,T}$), (dB)	Magnitude of impact	Initial classification of effect
R10	38	+3	41	34	+7	Low / Medium	Minor / Moderate Adverse
R11	40	+3	43	34	+9	Medium	Moderate Adverse
R12	38	+3	41	34	+7	Low / Medium	Minor / Moderate Adverse
R13	38	+3	41	34	+7	Low / Medium	Minor / Moderate Adverse
R15	40	+3	43	34	+9	Medium	Moderate Adverse
R17	41	+3	44	36	+8	Low / Medium	Minor / Moderate Adverse
R18	49	+3	52	36	+16	High	Major Adverse
R19	49	+3	52	37	+15	High	Major Adverse
R20	52	+3	55	37	+18	High	Major Adverse
R21	57	+3	60	37	+23	High	Major Adverse
R22	53	+3	56	37	+19	High	Major Adverse
R23	52	+3	55	37	+18	High	Major Adverse

NSRS	Specific sound level *Ls* ($L_{Aeq,Tr}$), (dB)	Acoustic feature correction, (dB)	Rating level ($L_{Ar,Tr}$), (dB)	Representative background sound level ($L_{A90,T}$), (dB)	Excess of rating level over background sound level ($L_{Ar,Tr}$ - $L_{A90,T}$), (dB)	Magnitude of impact	Initial classification of effect
R24	47	+3	50	37	+13	High	Major Adverse
R25	45	+3	48	37	+11	Medium	Moderate Adverse
R26	43	+3	47	37	+9	Medium	Moderate Adverse
R28	41	+3	44	37	+7	Low / Medium	Minor / Moderate Adverse
R30	41	+3	44	35	+9	Medium	Moderate Adverse
R31	39	+3	42	35	+7	Low / Medium	Minor / Moderate Adverse

Consideration of Context

9.6.48 The existing Connah's Quay Power Station has been an operating industrial source in the study area since the original power station began operations in 1954, with the current gas fired power station operating since 1996. Additionally, on the Main Development Area is a gas treatment plant which was an additional industrial sound source in the area until 2023. This is likely to mean that residents currently living in the area are already accustomed to an industrial source.

9.6.49 To assist with consideration of context, **Table 9-19** and **Table 9-20** present the existing ambient sound levels and future predicted specific sound levels during the operation of the Proposed Development at NSRs with reference to the IEMA impact guidance as set out in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**).

Table 9-19: Comparison of Ambient Sound Levels during the Daytime

NSR	Existing Ambient Sound Level $L_{Aeq,T}$, (dB)	Predicted *Specific Sound Level*, Ls $L_{Aeq,T}$, (dB)	Logarithmic Sum of Existing Ambient Sound Level with Predicted *Specific Sound Level*, $L_{Aeq,T}$, (dB)	Predicted Increase in Ambient Sound Level due to the Proposed Development, $L_{Aeq,T}$, (dB)	Magnitude of Impact of Noise Change Using IEMA Guidelines
R11	54.8	39.6	54.9	0.1	Low
R15	54.8	39.5	54.9	0.1	Low
R18	49.1	48.6	51.9	2.8	Low
R19	54.2	48.4	55.2	1.0	Low
R20	54.2	51.7	56.1	1.9	Low
R21	54.2	56.5	58.5	4.3	Medium
R22	54.2	53.3	56.8	2.6	Low
R23	54.2	51.6	56.1	1.9	Low
R24	54.2	47.4	55.0	0.8	Low
R25	54.2	45.3	54.7	0.5	Low
R26	52.7	42.6	53.1	0.4	Low
R30	57.4	40.6	57.5	0.1	Low

Table 9-20: Comparison of Ambient Sound Levels during the Night-time

NSR	Existing Ambient Sound Level $L_{Aeq,T,}$ (dB)	Predicted *Specific Sound Level*, Ls $L_{Aeq,T,}$ (dB)	Logarithmic Sum of Existing Ambient Sound Level with Predicted *Specific Sound Level*, $L_{Aeq,T,}$ (dB)	Predicted Increase in Ambient Sound Level due to the Proposed Development, $L_{Aeq,T,}$ (dB)	Magnitude of Impact of Noise Change Using IEMA Guidelines
R11	57.3	39.6	57.4	0.1	Low
R15	57.3	39.5	57.4	0.1	Low
R18	52.1	48.6	53.7	1.6	Low
R19	51.9	48.4	53.5	1.6	Low
R20	51.9	51.7	54.8	2.9	Low
R21	51.9	56.5	57.8	5.9	High
R22	51.9	53.3	55.7	3.8	Medium
R23	51.9	51.6	54.8	2.9	Low
R24	51.9	47.4	53.2	1.3	Low
R25	51.9	45.3	52.8	0.9	Low
R26	46.9	42.6	48.3	1.4	Low
R30	54.4	40.6	54.6	0.2	Low

9.6.50 **Table 9-19** and **Table 9-20** show that the predicted change of ambient sound levels experienced at NSRs R11, R15, R18, R19, R20, R23 (including the travellers' encampment), R24, R25, R26 and R30 would represent a low magnitude of impact during both the day and night. This would likely reduce the overall effects at these NSRs from the initial BS 4142 (Ref 9-18) classification of effects. However, at R21 (day and night) and R22 (night-time only) (inclusive of the travellers' encampment) there is predicted medium or high magnitude of impact due to the increase in the ambient sound levels with the addition of sound from the Proposed Development, therefore effects at these NSRs may remain **moderate** to **major** adverse (**significant**) in line with the outcomes in **Table 9-17** and **Table 9-18**.

9.6.51 As significant adverse effects are predicted, potential options to reduce sound levels at NSRs from the Proposed Development are discussed in Section 9.7.

Non Residential Receptors

9.6.52 The BS 4142 (Ref 9-18) assessment applies to residential receptors only. There are two non-residential receptors in this assessment, both educational facilities (R27 and R32) as identified in Table 1 in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**). Design guides for good internal conditions in non-residential receptors are set based on indoor levels. Building Bulletin 93 (BB93) (Ref 9-25) specifies an internal noise level 35 dB $L_{Aeq,}$30 minutes in classrooms. Assuming that education facilities may have doors or windows open at some points during the year, the maximum external noise level (assuming 15 dB attenuation for a façade containing a partially open door or window as assumed by the World Health Organization (WHO)) before the design criterion would be exceeded would be 50 dB $L_{Aeq,30\ minutes}$. The predicted external specific sound levels from the Proposed Development at R27 and R32 are 40 dB $L_{Aeq,T}$ and 38 dB $L_{Aeq,T}$ respectively, which are well below the 50 dB $L_{Aeq,T}$ external criterion. The predicted external specific levels at R27 and R32 are also below the criterion of 55 dB for playgrounds and 50 dB for outdoor teaching areas.

Venting

9.6.53 Venting would be required as detailed in paragraphs 4.4.16 to 4.4.17 in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**). Potential noise associated with venting would be controlled by the Environmental Permit.

Operational Traffic Noise

9.6.54 The potential changes in road traffic noise levels due the operation of the Proposed Development have been considered by calculating the BNL at 10 m as per the methodology in CRTN (Ref 9-20) from each road link for both the 'without Proposed Development flows' and 'with Proposed Development flows' for the operational year. The potential changes in road traffic noise as result of the operational traffic from the Proposed Development are presented in **Table 9-21**.

Table 9-21: Changes in Road Traffic Noise due to the Operation of the Proposed Development

Link	'Without' Proposed Development operational flows 2036			'With' Proposed Development operational flows 2036			Change in BNL, (dB)	Magnitude of impact	Classification of effect
	AAWT	% HGV	Speed (km/h)	AAWT	% HGV	Speed (km/h)			
Kelsterton Road	409	20	48	531	18	48	1.1	Low`	Minor Adverse
A548 (West of Main Development Area Access)	16,061	8	86	16,099	8	86	0	Very low	Negligible
A548 (East of Main Development Area Access)	15,660	6	112	15,694	6	112	0	Very low	fNegligible
B5129	10,677	13	39	10,725	13	39	0	Very low	Negligible
Kelsterton Lane	1,485	11	56	1,522	11	56	0.2	Very low	Negligible
Allt Goch Lane	151	16	36	151	16	36	0	Very low	Negligible
Golftyn Lane	7,991	9	32	7,991	9	32	0	Very low	Negligible
Mold Road	8,629	8	41	8,629	8	41	0	Very low	Negligible

9.6.55 For all road links there is a predicted low change in road traffic noise levels (at worst) at NSRs due to operation of the Proposed Development. This would result in up to **minor adverse** (**not significant**) effects.

Decommissioning Phase

9.6.56 The effects of decommissioning noise associated with the CQLCP Abated Generating Station are considered to be comparable to, or less than, those assessed for construction activities and are therefore considered to be **not significant** during the daytime. However, if the decommissioning works are undertaken during evening, night or weekend periods at the same intensity as the daytime works, there is the potential for **significant** adverse effects.

9.6.57 The effects of decommissioning vibration are also potentially comparable to, or less than, those assessed for construction activities as set out in paragraphs 9.6.31 to 9.6.35.

9.6.58 Decommissioning would require submission of a DEMP to the relevant planning authority for its approval, which is secured by a Requirement in the **Draft DCO** (**EN010166/APP/3.1**). Appropriate best practice mitigation measures would be applied during any decommissioning works, as described in Section 9.5, and documented in a DEMP. This would include further assessment of works outside of core hours as identified in Section 9.5.

9.7 Additional Mitigation and Enhancement Measures

Construction

9.7.1 In addition to the noise control measures presented within Section 9.5 where significant construction effects are predicted, additional noise-control equipment such as jackets on pneumatic drills, acoustic covers on compressors, shrouds on piling rigs and cranes and potentially further refinement of construction works programme would be considered and implemented where practicable. The use of temporary acoustic fencing or screens may also provide additional mitigation. In combination, these additional mitigation measures can provide up to 15 to 20 dB sound level reduction (based on Table B.1 in BS 5228-1 (Ref 9-14)).

9.7.2 Appropriate measures would be confirmed through further detailed assessment, as necessary, once construction plant and methods and construction traffic management, have been confirmed. As detailed in the **Framework Construction Traffic Management Plan** (**CTMP**) (**EN010166/APP/6.6**) following further assessment of detailed construction traffic flows for each stage of the Proposed Development to determine whether further mitigation is required to reduce the potential impacts of construction traffic along Kelsterton Road.

9.7.3 Where construction works are proposed outside core hours, additional noise assessments would be undertaken if the construction noise and vibration thresholds within **Table 9-10** are likely to be exceeded. The assessment would identify the requirements for additional mitigation measures to ensure that construction noise and vibration thresholds would not be exceeded

outside of core hours. As detailed in the **Framework CEMP** (**EN010166/APP/6.5**), the assessment would be provided to FCC for approval.

9.7.4 Potentially significant vibration effects have been identified where vibratory rollers are required for establishment of construction laydown areas. This is based on predictions of the use of rollers on high amplitude. Where vibratory rollers are to be used within 50 m of receptors these would be required to be used on low amplitude mode and no vibratory rollers to be used with 16 m of NSRs. Potentially significant vibration effects would be controlled by requirements set out in the Final CEMP, to prevent significant adverse impacts at sensitive receptors.

Operation

9.7.5 Based on the current assessment, without the application of additional mitigation and enhancement measures, significant adverse effects are predicted during the daytime or night-time periods at up to two NSRs, all of which represent multiple properties. Up to 15 dB attenuation would be required at NSR 21 (NSR with the greatest potential adverse impact) to achieve the operational sound criteria of *rating level* no greater than +8 dB above the defined representative *background sound level* at each NSR.

9.7.6 To meet the proposed sound limit of a *rating level* no greater than +8 dB above the defined representative *background sound level* at each NSR , theoretical nominal reductions in the source sound power levels listed in **Appendix 9-D: Operational Sound Information** (**EN010166/APP/6.4**) of the key noise emitting plant are listed in **Table 9-22**.

Table 9-22: Potential attenuation requirements of plant items/ buildings

Plant Item	Number of Item of Plant	Attenuation required to achieve a Rating level no greater than +8dB above the defined representative background L_{A90}, (dB)
Flue Gas Blower	4	20
Cooling Tower	2	20
Cooling Make-up Tower	1	15
Make-up Transfer Pump	1	15
Rich Amine Pump	2	15
Knock Out Water Pump	4	15
Lean Amine Booster pump	2	15
cooling water pumps	6	15

Plant Item	Number of Item of Plant	Attenuation required to achieve a Rating level no greater than +8dB above the defined representative background L_{A90}, (dB)
Absorber Wash pump	4	10
Turbine Intake	2	10
Absorber acid wash pump	2	10
Lean Amine Circulation Pump	2	10
CO_2 Compression Walls	1	10
CO_2 Compression roof	1	10
HRSG Walls	2	10
Aux Cooling Water Pumps	1	10
CO_2 stripper reflux pump	1	10
HRSG Roof	2	10
DCC Backwash Pump	2	10
Gas Turbine Walls	2	10
Low Pressure Condensate Pump	2	10
Stripping Air Blower	2	10
Gas Turbine Roof	2	10
Absorber Stack	4	5
DCC Circulation Pump	2	10

9.7.7 During the detailed design stage mitigation measures to minimise operational sound would be considered. These measures may include, but not limited to the following depending on the potential benefits achievable:

- enclosure of key sound sources;
- use of quieter plant (including limits on sound emissions from plant and equipment at source);
- reducing air inlet noise emissions by addition of further in-line attenuation

- reducing stack noise emissions by addition of silencers or sound proofing panels;
- orientation of plant within the site to provide screening of low-height sound sources by other buildings, structures and dedicated acoustic fencing, or orientating fans and the air inlets away from sensitive receptors; and
- use of additional acoustic fencing/screens or earth bunds to reduce transmission of sound from the Proposed Development to NSRs.

9.7.8 During detailed design of the plant to satisfy the operational sound limit, it may be desirable or more practical to attenuate different plant items/buildings than suggested in **Table 9-22** and still achieve the operational sound criterion. Furthermore, during detailed design, an operational sound control scheme would be prepared to demonstrate how the operational sound limit will be achieved and is secured by a Requirement of the **Draft DCO** (**EN010166/APP/3.1**) through the **Design Principles Document** (**EN010166/APP/7.8**). The noise control scheme would set out the sound reduction measures to be incorporated into the Proposed Development and would demonstrate the use of Best Available Techniques (BAT) for the control of noise for the Environmental Permit.

Decommissioning

9.7.9 No additional mitigation for decommissioning of the Proposed Development beyond such best practice specified in BS 5228-1 and BS 5228-2 (Ref 9-14 and Ref 9-15) and Section 9.5 is considered necessary at this stage. However, if further assessment in the future, as part of the DEMP identifies potential significant effects, the additional mitigation measures listed in paragraphs 9.7.1 to 9.7.4 can be used during decommissioning to result in a finding of **no significant** effects on an equivalent basis to construction.

9.8 Summary of Residual Effects

9.8.1 **Table 9-23** and **Table 9-24** summarise the residual effects of the Proposed Development on noise and vibration sensitive receptors. In summary, no likely significant residual effects have been identified following the implementation of appropriately designed mitigation, with the exception of temporary construction traffic noise impacts at NSRs (R21 and R22 (inclusive of the traveller's encampment) along the Kelsterton Road to the Main Development Area. This is on the basis that the construction noise and vibration thresholds and operational sound limits are met through additional mitigation measures.

9.8.2 An assessment of cumulative effects with other proposed developments that could interact with the effects of this Proposed Development is detailed in **Chapter 24: Cumulative and Combined Effects**. **Chapter 24: Cumulative and Combined Effects** (**EN010166/APP/6.2.24**) and also assesses the in-combination effects of multiple aspects on one receptor.

Table 9-23: Summary of Residual Effects (Construction and Decommissioning)

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
R23 (including the travellers' encampment)	High	Medium magnitude of construction noise impacts for 'worst-case scenario' for construction works during core hours	Up to Moderate Adverse	In addition to the mitigation measures detailed in the CEMP, further detailed assessment to be undertaken as necessary once construction plant, methods and programme have been confirmed. Additional noise-control equipment such as jackets on pneumatic drills, acoustic covers on compressors, shrouds on piling rigs and cranes and potentially further refinement of construction works program would be considered and implemented where practicable	Low magnitude of impact or less on the basis that the BS 5228 ABC noise thresholds are not exceeded with additional mitigation in place	Minor Adverse or less (**Not Significant**)

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
All other NSRs	High	Up to low magnitude of construction noise impacts (and decommissioning) for construction works during core hours	Up to Minor Adverse	N/A	Low magnitude of impact or less	Up to Minor Adverse (**Not Significant**)
R33	High	Up to medium magnitude of vibration impact during construction (and decommissioning) of Construction and Indicative Enhancement Area	Up to Moderate Adverse	Use of vibratory rollers on low amplitude mode when within 50 m of residential receptors and no vibratory rollers to be used with 16 m of NSRs.	Low magnitude of impact or less	Minor Adverse or less (**Not Significant**)
All other NSRs	High	Up to low magnitude of vibration impact during construction (and decommissioning) of Main Development Area and C&IEA	Up to Minor Adverse	N/A	Low magnitude of impact or less	Minor Adverse or less (**Not Significant**)
R21, R22 (including the travellers' encampment)	High	Moderate magnitude of change in construction (and decommissioning)	Up to Moderate Adverse	Further detailed assessment as necessary once construction traffic	Medium magnitude of impact or less	Moderate Adverse (**Significant**) on Kelsterton

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
		road traffic noise level at source on Kelsterton Road (access road to Main Development Area)		management have been confirmed. If necessary and agreed with FCC, noise monitoring can be undertaken to assess the potential impacts of construction traffic along Kelsterton Road.		Road (access road to Main Development Area).
All other NSRs	High	Up to low magnitude of change in in road traffic source noise level during construction (and decommissioning)	Up to Minor Adverse	N/A	Low magnitude of impact or less	Minor Adverse or less (**Not Significant**)

Table 9-24: Summary of Residual Effects (Operation)

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
R21	High	Up to medium/high magnitude of noise impact during daytime operation.	Moderate / Major Adverse	Limits on sound emissions from plant and equipment at source. Acoustic fencing / screens or earth bunds to reduce transmission of sound from the Site to NSRs to ensure the operational sound limit of *rating level* no greater than +8 dB above the defined representative *background sound level* at each NSR is met Further assessment of mitigation as the design evolves, in conjunction with design engineers, to further reduce adverse effects. During detailed design, an operational sound control scheme would be prepared to ensure the operational sound limit of a Rating level of no greater than +8dB above the background level is met, which is secured by a Requirement of the	Low impact magnitude or less during daytime operation on the basis that the operational sound limit (*rating level* no greater than +8 dB above the defined representative *background sound level* at each NSR) is met.	Up to Minor Adverse (**Not Significant**)

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
				Draft DCO (**EN010166/APP/3.1**), demonstrating the use of Best Available Techniques (BAT) for the control of noise for the Environmental Permit.		
All other residential NSRs	High	Up to low magnitude of noise impact, after consideration of context is taken into account during daytime operation	Up to Minor Adverse	N/A	Up to low magnitude of noise impact, after consideration of context is taken into account during daytime operation	Minor Adverse or less (**Not Significant**)
R21, R22 (including the travellers' encampment)	High	Up to high magnitude of noise impact during night-time operation.	Major Adverse	Limits on noise emissions from plant and equipment at source. Acoustic fencing / screens or earth bunds to reduce transmission of sound from the Site to NSRs to ensure the operational sound limit of *rating level* no greater than +8 dB	Low impact magnitude or less during night-time operation on the basis that the	Up to Minor Adverse (**Not Significant**)

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
				above the defined representative *background sound level* at each NSR is met Further assessment of mitigation as the design evolves, in conjunction with design engineers, to further reduce adverse effects. During detailed design, an operational sound control scheme would be prepared to ensure the operational sound limit of a Rating level of no greater than +8dB above the background level is met, which is , secured by a Requirement of the **Draft DCO** (**EN010166/APP/3.1**), demonstrating the use of Best Available Techniques (BAT) for the control of noise for the Environmental Permit.	operational sound limit (*rating level* no greater than +8 dB above the defined representative *background sound level* at each NSR) is met.	
All other residential NSRs	High	Up to low magnitude of noise impact, after consideration of	Up to Minor Adverse	N/A	Up to low magnitude of noise	Minor Adverse or less (**Not Significant**)

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
		context is taken into account during night-time operation			impact, after consideration of context is taken into account during daytime operation	
R27, R23 (non residential NSRs)	High	Below the design criterion for indoor levels at schools	Not significant	N/A	Below the design criterion for indoor levels	**Not significant**
All NSRs	High	Venting controlled by Environmental Permit, Low impact	Not significant	N/A	Low impact	**Not significant**
All NSRs	High	Up to Low magnitude of impact due to changes in road traffic noise during operation.	Up to Minor Adverse	N/A	Low impact or less	Minor Adverse or less (**Not Significant**)

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