MONA OFFSHORE WIND PROJECT

Environmental Statement

Volume 3, Chapter 9: Noise and Vibration

F02 (Clean)

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Image of an offshore wind farm

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Glossary

Term	Meaning
A-weighting	A frequency weighting devised to attempt to account for the fact that human response to sound is not equally sensitive to all frequencies. It consists of an electronic filter in a sound level meter which attempts to build this variability into the indicative sound level reading so that it will correlate, approximately, with the human response.
Ambient Sound Level, $L_{Aeq,T}$	The steady sound level which, over a period of time T, contains the same amount of A-weighted sound energy as the time varying sound over the same period. Also known as the equivalent continuous sound pressure level.
Background Sound Level, $L_{A90,T}$	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using fast time-weighting, F, and quoted to the nearest whole number of decibels.
Best Practicable Means (BPM)	Adopting the best available methods to reasonably control noise and vibration.
Basic Noise Level (BNL)	A measure of traffic source noise prior to development. It is calculated from traffic flows, road speed, and Heavy Goods Vehicle percentage.
Decibel (dB)	A unit used to measure or compare the intensity of a sound by comparing it with a given reference level on a logarithmic scale.
Intermittency	A measure of the ‘on/off’ nature of a sound source.
Impulsivity	A measure of the sharpness of sudden nature of a sound which is short in duration such as a gunshot or a blast.
Logarithmic averaging	A method by which sound levels in decibels (dB) can be averaged. This allows us to account for the fact that higher levels of sound will always dominate in the presence of lower sound levels.
Noise	An unwanted or unexpected sound.
Peak Particle Velocity (PPV)	An indicator of the magnitude of ground vibration which refers to the movement of molecular particles within the ground.
Residual Sound Level	The ambient sound level at a receptor in the absence of influence from the sound source under assessment.
Sound	Fluctuations of pressure within a medium (gas, solid or fluid) within the audible range of loudness and frequencies which excite the sensation of hearing.
Sound Power Level, L_w	The total sound energy emitted by a source per unit time.
Sound Pressure Level, L_p	The amount of force a sound wave exerts on a surface area perpendicular to the direction of travel. A measure of the variation of sound level over a distance.
Specific Sound Level	The equivalent continuous A-weighted sound pressure level produced by the specific noise source at the assessment location over a given reference time internal.
Tonality	A measure of sound quality that correlates to how humans perceive certain frequencies of sound. A sound is considered tonal if the frequency spectrum contains a lot of sound energy at a single frequency.

Acronyms

Acronym	Description
BNL	Basic Noise Level
BPM	Best Practicable Means
BS	British Standard
CCBC	Conwy County Borough Council
CEA	Cumulative Effects Assessment
CoCP	Code of Construction Practice
CoPA	Control of Pollution Act
DCC	Denbighshire County Council
DCO	Development Consent Order
DMRB	Design Manual Roads and Bridges
DRC	Dynamic Reactive Compensator
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
LDP	Local Development Plan
LOAEL	Lowest Observed Adverse Effect Level
LT	Long-term
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NGET	National Grid Electricity Transmission
NPS	National Policy Statement
OSP	Offshore Substation Platform
PPV	Peak Particle Velocity
SOAEL	Significant Observed Adverse Effect Level
ST	Short-term
TAN	Technical Advice Note

Units

Unit	Description
dB	Decibel
h	Hours

Unit	Description
kJ	Kilojoule
km	Kilometres
m	Metres
m^2	Metres squared
mph	Miles per Hour
mm/s	Millimetres per second
ms	Milliseconds
%	Percentage

9 Noise and vibration

9.1 Introduction

9.1.1 Overview

9.1.1.1 This chapter of the Environmental Statement presents the assessment of the potential impact of the Mona Offshore Wind Project on noise and vibration. Specifically, this chapter considers the potential impact of the Mona Offshore Wind Project landward of Mean High Water Springs (MHWS) during the construction, operations and maintenance, and decommissioning phases.

9.1.1.2 The assessment presented is informed by the following technical chapters:

- Volume 1, Chapter 3: Project description of the Environmental Statement
- Volume 3, Chapter 8: Traffic and transport of the Environmental Statement.

9.1.1.3 The baseline traffic flows and proposed construction traffic flows presented in this chapter have informed the assessment of noise impacts due to construction traffic.

9.1.1.4 This chapter also draws upon information contained within Volume 5, Annex 3.1: Underwater sound technical report of the Environmental Statement on offshore piling noise.

9.1.1.5 Consideration is also given to the impacts of construction noise due to offshore construction works.

9.1.1.6 This chapter focuses on the impacts of airborne noise only. The impacts of underwater noise on marine life are based on information contained within Volume 5, Annex 3.1: Underwater sound technical report of the Environmental Statement and assessed in:

- Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement
- Volume 2, Chapter 4: Marine mammals of the Environmental Statement
- Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement.

9.1.1.7 The impacts of airborne noise based on information contained within this chapter and associated annexes are presented in:

- Volume 3, Chapter 3: Onshore ecology of the Environmental Statement
- Volume 3, Chapter 4: Onshore and intertidal ornithology of the Environmental Statement.
- Volume 4, Chapter 4: Human Health Assessment.

9.2 Legislative and policy context

9.2.1 Legislation

Control of Pollution Act (CoPA) 1974

9.2.1.1 Section 60, Part III of the CoPA refers to the control of noise on construction sites. It outlines legislation by which Local Authorities can control noise from construction sites and prevent noise disturbance.

9.2.1.2 British Standards (BS) 5228-1:2009+A1:2014 and BS 5228 2:2009+A1:2014 were approved within The Control of Noise (Code of Practice for Construction and Open Sites) Order 2015 as suitable guidance on appropriate methods for the control of noise from construction and open sites in exercise of the powers conferred on the Secretary of State by sections 71(1)(b), (2) and (3) of the CoPA.

9.2.1.3 The CoPA provides a Local Authority the power to serve a notice imposing requirements for the way in which construction works are to be carried out in their jurisdiction. This notice can specify the following:

- The plant or machinery permitted for use
- The hours during which construction work may be undertaken
- Limits for the emission levels of noise and vibration due to the works at any time or spatial position on site
- Any other change in circumstance.

9.2.1.4 Section 61, Part III of the CoPA refers to prior consent for work on construction sites. It provides a method by which a contractor can apply for consent to undertake construction works in advance. Providing consent is granted, and compliance is maintained with the stated method and hours of work, no action may be taken by the Local Authority under Section 60.

9.2.1.5 Section 71, Part III of the CoPA refers to the preparation and approval of codes of practice for minimising noise.

9.2.1.6 Section 72, Part III of the CoPA refers to Best Practicable Means' (BPM), which is defined as:

'In that expression, 'practicable' means reasonably practicable, having regards among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications'. Whilst 'Means' includes 'the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures.'

Environmental Protection Act (EPA) 1990

9.2.1.7 Section 79 of the EPA contains a list of matters that amount to statutory nuisances and places a duty on Local Authorities to regularly inspect areas in their jurisdiction to determine where statutory nuisances may exist.

9.2.1.8 The Local Authority must serve an abatement notice where it is satisfied that a statutory nuisance does exist or is likely to occur/recur. Section 80, of the EPA provides Local Authorities with the power to serve an abatement to prohibit or restrict its occurrence or recurrence; and to carry out works or other action necessary to abate the nuisance.

9.2.1.9 Section 82, of the EPA allows a Magistrates' court to act on a complaint made by any person on the grounds that they are aggrieved by a statutory nuisance, such as noise.

9.2.1.10 The procedures for appeals against abatement notices are detailed in the Statutory Nuisance (Appeals) Regulations 1995.

9.2.2 Planning policy context

9.2.2.1 The Mona Offshore Wind Project will be located in Welsh offshore waters (beyond 12 nautical miles (nm) from the Welsh coast) and inshore waters, with the onshore infrastructure located wholly within Wales as set out in Volume 1, Chapter 1: Introduction of this Environmental Statement. As the Mona Offshore Wind Project is an offshore generating station with a capacity of greater than 350 MW located in Welsh waters, it is a Nationally Significant Infrastructure Project (NSIP) as defined by Section 15(3) of the Planning Act 2008 (as amended) (the 2008 Act). As such, there is a requirement to submit an application for a Development Consent Order (DCO) to the Planning Inspectorate to be decided by the Secretary of State for the Department for Energy Security and Net Zero.

9.2.3 National Policy Statements

9.2.3.1 There are currently six energy National Policy Statements (NPSs), three of which identify policy relevant to offshore wind development and the Mona Offshore Wind Project, specifically:

- Overarching NPS for Energy (NPS EN-1) which sets out the UK Government's policy for the delivery of major energy infrastructure (Department for Energy Security & Net Zero, 2024a)
- NPS for Renewable Energy Infrastructure (NPS EN-3) (Department for Energy Security & Net Zero, 2024b)
- NPS for Electricity Networks Infrastructure (NPS EN-5) (Department for Energy Security & Net Zero, 2024c).

9.2.3.2 NPS EN-1 and NPS EN-3 include guidance on what matters are to be considered in the assessment. This is summarised in Table 9-1 below. NPS EN-1 also highlights a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 9-2 below.

9.2.3.3 NPS EN-5 includes guidance on what matters are to be considered in the onshore assessment of electrical networks. These are summarised in Table 9-1 below.

Table 9-1: Summary of NPS EN-1, EN-3 and EN-5 provisions relevant to noise and vibration.

Summary of NPS EN-1, EN-3 and EN-5 provision	How and where considered in the Environmental Statement
NPS EN-1	
Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment: a description of the noise generating aspects of the development proposal leading to noise impacts	Noise sensitive receptors within the operational noise study area are outlined in Volume 7, Annex 9.3: Operational noise assessment of the Environmental Statement, as well as details of the noise generating equipment proposed for the operational phase of the Mona Onshore Substation. A baseline sound survey has been undertaken to characterise the existing acoustic environment and obtain representative background sound levels at these receptors and inform an assessment of the operational noise sources in line with the

Summary of NPS EN-1, EN-3 and EN-5 provision	How and where considered in the Environmental Statement
identification of noise sensitive receptors and noise sensitive areas that may be affected the characteristics of the existing noise environment a prediction of how the noise environment will change with the proposed development in the shorter term, such as during the construction period in the longer term, during the operating life of the infrastructure at particular times of day an assessment of the effect of predicted changes in the noise environment on noise-sensitive receptors, including an assessment of any likely impact on health and quality of life all reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life [Paragraph 5.12.6 of NPS EN-1]	BS 4142:2014+A1:2019 guidance. Full details of this survey are provided in Volume 7, Annex 9.1: Baseline Sound Survey of the Environmental Statement, with the representative levels derived presented in Table 9-14 of this chapter. The noise generating aspects of the Mona Offshore Wind Project during the construction, operation and maintenance, and decommissioning phases have been identified along with any potential noise and vibration impacts. Full details of the construction activities and associated sources can be found in section 9.9 of this chapter and Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement. Noise and vibration control measures will be outlined in the Construction Noise and Vibration Management Plan forming part of the Outline CoCP which will be secured as a requirement of the DCO to ensure the construction noise and vibration thresholds are not exceeded. A list of the proposed operational noise sources associated with the Mona Onshore Substation can be found in Volume 7, Annex 9.3: Operational Noise of the Environmental Statement. An assessment of the potential impacts at receptors during the most affected operational period (night-time) is provided in section 9.9 of this chapter, with full details of the methodology and results presented in Volume 7, Annex 9.3: Operational Noise of the Environmental Statement. Operational noise will be limited to a rating level of 34 dB $L_{Ar,Tr}$ at the nearest receptor. This operational noise criteria will be secured as a requirement of the DCO and agreed with the relevant stakeholders. Details of indicative mitigation measures which may be adopted as part of the design to ensure compliance are outlined in Volume 7, Annex 9.3: Operational Noise of the Environmental Statement. The impact assessment in section 9.9 of this chapter considers receptor sensitivity which details provided in Table 9-16 of this chapter. The future baseline acoustic environment is considered in section 0 of this chapter. An assessment of the impacts on marine life is presented in Volume 5, Annex 3.1: Underwater sound technical report of the Environmental Statement.
Applicants should consider the noise impact of ancillary activities associated with the development, such as increased road or rail traffic movements, or other forms of transportation. [Paragraph 5.12.8 of NPS EN-1]	An assessment of the impacts due to increased traffic flows on the local highway networks during the construction and decommissioning phases is presented in section 9.9 of this chapter. Full details are provided in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement. The change in noise level on local roads is not predicted to give rise to significant effects at nearby receptors due to the relatively high baseline traffic flows.
Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. For the prediction, assessment and management of construction noise, reference should be made to any British Standards and other guidance which also give examples of mitigation strategies. [Paragraph 5.12.9 of NPS EN-1]	The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project have been assessed using the principles in the relevant BS and nationally accepted guidance. Construction, operations and maintenance, and decommissioning noise and vibration impacts are assessed in section 9.9 of this chapter. In accordance with best practice, the noise and vibration assessment has been undertaken with reference to the following:

Summary of NPS EN-1, EN-3 and EN-5 provision	How and where considered in the Environmental Statement
	• BS 4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound' (British Standards Institution, 2019) • BS 5228-1:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise' (British Standards Institution, 2014a) • BS 5228-2:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration' (British Standards Institution, 2014b) • BS 7445:2003 – 'Description and measurement of environmental noise' (British Standards Institution, 2003) • BS 8233:2014 – 'Guidance on sound insulation and noise reduction for buildings' (British Standards Institution, 2014c) • Calculation of Road Traffic Noise (CRTN) (Department for Transport, 1988) • DMRB– LA111 – Noise and vibration (Highways England, Transport Scotland, Llwyodraeth Cymry, Department for Infrastructure, 2020). • ISO 9613-2:1996 – Acoustics – 'Attenuation of sound during propagation outdoors – Part 2: General method of calculation'(International Organisation for Standards, 1996). Details of the potential noise reduction achieved via BPM during the construction and decommissioning phases of the Mona Offshore Wind Project can be found in Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement. These measures will be outlined in the Construction Noise and Vibration Management Plan forming part of the Outline CoCP to be secured as a requirement of the DCO. Operational noise will be limited to a rating level of 34 dB $L_{Ar,Tr}$ at the nearest receptor. This operational noise criteria will be secured as a requirement of the DCO and agreed with the relevant stakeholders. The assessment outlined in Volume 7, Annex 9.3: Operational Noise of the Environmental Statement includes an iteration of the 3D acoustic modelling which predicts the level of noise reduction required from example mitigation measures which may be included as part of the design to ensure compliance.
Applicants should submit a detailed impact assessment and mitigation plan as part of any development plan, including the use of noise mitigation and noise abatement technologies during construction and operation. [Paragraph 5.12.12 of NPS EN-1] Mitigation measures may include one or more of the following: Engineering: reducing the noise generate at source and/or containing the noise generated Layout: where possible, optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose-built barriers, or other buildings Administrative: using planning conditions/obligations to restrict activities	Details of the mitigation measures adopted as part of the scheme are outlined in section 9.8 of this chapter. Construction noise and vibration control measures will be outlined in the Construction Noise and Vibration Management Plan forming part of the Outline CoCP to be secured as a requirement of the DCO. Operational noise will be limited to a rating level of 34 dB $L_{Ar,Tr}$ at the nearest receptor. This operational noise criteria will be secured as a requirement of the DCO and agreed with the relevant stakeholders. The losses associated with the various example mitigation options during the construction, decommissioning, and operational phases of the Mona Offshore Wind Project have been considered as part of the assessment of noise impacts. Full details are provided in: • Volume 7, Annex 9.2: Construction Noise and Vibration; and • Volume 7, Annex 9.3: Operational Noise of the Environmental Statement.

Summary of NPS EN-1, EN-3 and EN-5 provision	How and where considered in the Environmental Statement
allowed on the site at certain times and/or specifying permissible noise limits/noise levels, differentiating as appropriate between different times of day, such as evenings and late at night, and taking into account seasonality of wildlife in nearby designated sites Insulation: mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building. [Paragraph 5.12.14 of NPS EN-1]	The operational noise model has been constructed to include the various buildings associated with the Mona Onshore Substation and any changes in the landscaping to account for any potential screening of noise at the nearest receptors.
The project should demonstrate good design through the selection of the quietest cost-effective plant available, containment of noise within buildings wherever possible, optimisation of plant layout to minimise noise emissions and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission. [Paragraph 5.12.15 of NPS-EN-1].	The design of the Mona Onshore Substation is discussed in Volume 1, Chapter 3: Project description of the Environmental Statement. Details of the site selection process can be found in Volume 1, Chapter 4: Site Selection and Considerations of Alternatives of the Environmental Statement The full plant design including equipment selections, layouts, and mitigation measures have been assessed in section 9.9 of this chapter. The 3D acoustic model detailed in Volume 7, Annex 9.3: Operational Noise of the Environmental Statement has been constructed using proposed topography data to include the landscaping changes proposed and any potential losses due to screening.
NPS EN-3	
Proposals for renewable energy infrastructure should demonstrate good design to mitigate impacts such as noise. [Paragraph 2.5.2 of NPS EN-3]	The design of the Mona Onshore Substation is described in Volume 1, Chapter 3: Project description of the Environmental Statement. Construction noise and vibration control measures will be outlined in the Construction Noise and Vibration Management Plan forming part of the Outline CoCP to be secured as a requirement of the DCO. Operational noise will be limited to a rating level of 34 dB $L_{Ar,Tr}$ at the nearest receptor. This operational noise criteria will be secured as a requirement of the DCO and agreed with the relevant stakeholders. The noise reduction achieved by typical mitigation measures has been considered the assessment of noise impacts. Details of these measures can be found in Volume 7, Annex 9.2: Construction Noise and Vibration and Volume 7, Annex 9.3: Operational Noise of the Environmental Statement. The significance of the effects following adoption of these measures is presented in section 9.9 of this chapter.
Applicants should include in an Environmental Statement a noise assessment of the impacts on amenity in the case of excessive noise from a project in line with guidance set out in Section 5.12 in EN-1. [Paragraph 2.7.40 of NPS EN-3].	The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project have been assessed using the principles in the relevant BS. The assessment of the offshore and onshore elements of is presented in section 9.9 with details provided in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement, and Volume 7, Annex 9.3: Operational noise assessment of the Environmental Statement.

Summary of NPS EN-1, EN-3 and EN-5 provision	How and where considered in the Environmental Statement
NPS EN-5	
Reference is also made to audible noise effects from substation equipment such as transformers. The guidance states that the relevant assessment methodologies should be adopted and that appropriate mitigation options should be considered and adopted where required. [Paragraphs 2.9.37 and 2.9.38 of NPS EN-5]	The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project have been assessed using the principles in the relevant BS. The assessment of the offshore and onshore elements of is presented in section 9.9 of this chapter with details provided in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement, and Volume 7, Annex 9.3: Operational noise assessment of the Environmental Statement.

Table 9-2: Summary of NPS EN-1, NPS EN-3 and NPS EN-5 policy on decision making relevant to noise and vibration.

Summary of NPS EN-1, EN-3 and EN-5 provision	How and where considered in the Environmental Statement
NPS EN-1	
The Secretary of State should not grant development consent unless it is satisfied that the proposals will meet the following aims through the effective management and control of noise: Avoid significant adverse impacts on health and quality of life from noise Mitigate and minimise other adverse impacts on health and quality of life from noise Where possible, contribute to improvements to health and quality of life through the effective management and control of noise. [Paragraph 5.12.17 of NPS EN-1]. When preparing the Development Consent Order, the Secretary of State should consider including measurable requirements or specifying the mitigation measures to be put in place to ensure that noise levels do not exceed any limits specified in the development consent. [Paragraph 5.12.18 of NPS EN-1].	Construction noise and vibration control measures will be outlined in the Construction Noise and Vibration Management Plan forming part of the Outline CoCP to be secured as a requirement of the DCO. Operational noise will be limited to a rating level of 34 dB $L_{Ar,Tr}$ at the nearest receptor. This operational noise criteria will be secured as a requirement of the DCO and agreed with the relevant stakeholders. The noise reduction achieved by typical mitigation measures has been considered the assessment of noise impacts. Details of these measures can be found in Volume 7, Annex 9.2: Construction Noise and Vibration and Volume 7, Annex 9.3: Operational Noise of the Environmental Statement. The significance of the effects following adoption of these measures is presented in section 9.9 of this chapter. The impacts of noise and vibration on human health is considered in Volume 4, Chapter 4: Human Health Assessment of the Environmental Statement.
NPS EN-3	
The Secretary of State should consider the noise and vibration impacts according to Section 5.12 in EN-1 and be satisfied that noise and vibration will be adequately mitigated through requirements attached to the consent. [Paragraph 2.7.98 of NPS EN-3]	Construction noise and vibration control measures will be outlined in the Construction Noise and Vibration Management Plan forming part of the Outline CoCP to be secured as a requirement of the DCO. Operational noise will be limited to a rating level of 34 dB $L_{Ar,Tr}$ at the nearest receptor. This operational noise

Summary of NPS EN-1, EN-3 and EN-5 provision	How and where considered in the Environmental Statement
The Secretary of State should not grant development consent unless it is satisfied that the proposals will meet the aims set out in 5.12 of EN-1. [Paragraph 2.7.100 of NPS EN-3	criteria will be secured as a requirement of the DCO and agreed with the relevant stakeholders. The significance of the effects following adoption of these measures is presented in section 9.9 of this chapter. The impacts of noise and vibration on human health is considered in Volume 4, Chapter 4: Human Health Assessment of the Environmental Statement.
NPS EN-5	
The Secretary of State should ensure that appropriate assessment methodologies have been used in the evidence presented to it, and that the appropriate mitigation options have been considered and adopted. Where the applicant can demonstrate that appropriate mitigation measures will be put in place, the residual noise impacts are unlikely to be significant. [Paragraph 2.11.7 of NPS EN-5]	The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project have been assessed using the principles in the relevant BS. Construction noise and vibration control measures will be outlined in the Construction Noise and Vibration Management Plan forming part of the Outline CoCP to be secured as a requirement of the DCO. Operational noise criteria will be agreed with the relevant stakeholders and secured as a requirement of the DCO. The significance of the effects following adoption of these measures is presented in section 9.9 of this chapter. The impacts of noise and vibration on human health is considered in Volume 4, Chapter 4: Human Health Assessment of the Environmental Statement.

9.2.4 Planning Policy Wales (Edition 11)

9.2.4.1 Planning Policy Wales (Edition 11) sets out the land use planning policies of the Welsh government to ensure the sustainable delivery of any new development and ensure positive impacts on the social, economic, and cultural well-being of Wales. Key provisions are summarised in Table 9-3 below along with details as to how these have been addressed within this assessment.

Table 9-3: Summary of Planning Policy Wales (Edition 11) policy relevant to noise and vibration.

Summary of Planning Policy Wales (Edition 11) provision	How and where considered in the Environmental Statement
Paragraph 5.9.20 highlights the need to minimise impacts of Renewable and Low Carbon infrastructure on local communities, such as noise and air pollution, to safeguard the quality of life for existing and future generations.	The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project have been assessed using the principles in the relevant BS. The assessment of the offshore and onshore elements of is presented in sections 9.9.2 and 9.9.3 to 9.9.7, respectively, with details provided in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement, and Volume 7, Annex 9.3: Operational noise assessment of the Environmental Statement.
Paragraph 6.7.18 states that early consideration is required to ascertain whether the location and design of proposed development is acceptable where air pollution or noise generating development is likely to affect a protected species or a tranquil urban green space.	Noise impacts on wildlife are assessed in Volume 3, Chapter 3: Onshore ecology of the Environmental Statement and Volume 3, Chapter 4: Onshore and intertidal ornithology of the Environmental Statement.

Summary of Planning Policy Wales (Edition 11) provision	How and where considered in the Environmental Statement
Paragraph 6.7.21 highlights the need to consider the existing soundscape as part of development strategies prior to determining planning applications.	A baseline sound survey has been undertaken at locations representative of the nearest and most exposed noise-sensitive receptors the Mona Onshore Substation and construction areas at landfall. Details are provided in Volume 7, Annex 9.1: Baseline noise survey of the Environmental Statement.

9.2.5 Planning Guidance (Wales), Technical Advice Note 11 (TAN 11)

9.2.5.1 TAN 11 contains guidance on noise criteria and assessments for local planning authorities in Wales when preparing development plans and considering individual planning applications. The guidance is broken down into the following sections:

- Noise generating development
- Noise-sensitive development
- Measures to mitigate the impact of noise.

9.2.5.2 This document was updated in a letter to Local Authorities dated 25 November 2015 to address the need to update the supporting legislation and underpinning BS to the latest and most up-to-date versions.

9.2.5.3 The guidance recommends the use of BS 4142:2014+A1:2019 for the assessment of industrial and commercial noise and BS 5228:2009+A1:2014 for the assessment of construction noise. The guidance within these standards, as summarised in section 9.4.1, has been adopted as part of the noise and vibration assessment.

9.2.5.4 An update to TAN 11 is in production with a draft document currently available. This update is not intended to supersede existing TANs but rather extend the guidance to consider 'soundscape design' in the approach to new development defined as follows:

'Soundscape design augments traditional noise control practices by assessing the effects of the sound environment from the perspective of the user in context. Whereas traditional noise control approaches focus on predicting and/or measuring, assessing and reducing noise (i.e. unwanted or harmful sound), soundscape design focuses on understanding the impact of the sound environment on people's lived experience in a specific context. In other words, how the collective sounds of a place, together with any physical and/or non-physical non-acoustic factors (i) affect people's perception of those sounds; (ii) make people feel; and (iii) affect what they do.'

9.2.5.5 This updated guidance re-enforces the use of BS 4142:2014+A1:2019 as a method for assessing industrial and commercial noise and the importance of good design practices to ensure that adverse impacts are unlikely.

9.2.6 Local planning policies

9.2.6.1 The assessment of potential changes to noise and vibration has also been made with consideration to the specific policies set out in:

- Adopted Local Development Plans (LDPs) of Conwy County Borough Council (CCBC) (adopted in October 2013)
- Denbighshire County Council (DCC) (adopted in June 2013).

9.2.6.2 Key provisions are set out in Table 9-4 along with details as to how these have been addressed within the assessment.

Table 9-4: Local Planning Policy of relevant to noise and vibration.

Policy	Key provisions	How and where considered in the Environmental Statement
Conwy County Borough Council: Adopted Local Development Plan (October 2013)		
DP/1	Development will only be permitted where the risks of noise pollution have been accounted for and addressed.	The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project have been assessed using the principles in the relevant BS. The assessment of the offshore and onshore elements of the Mona Offshore Wind Project is presented in section 9.9 with details provided in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement and Volume 7, Annex 9.3: Operational noise assessment of the Environmental Statement. Noise impacts on wildlife have been assessed in: • Volume 3, Chapter 3 Onshore ecology of the Environmental Statement; and • Volume 3, Chapter 4 Onshore and intertidal ornithology of the Environmental Statement.
NTE/1	Conservation of the natural environment by preventing, reducing, or remedying all forms of pollution including air, light, noise, soil, and water.	Construction, operation and maintenance, and decommissioning phases of Mona Offshore Wind Project have been assessed using the principles in the relevant BS. The assessment of the offshore and onshore elements of the Mona Offshore Wind Project is presented in section 9.9 with details provided in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement and Volume 7, Annex 9.3: Operational noise assessment of the Environmental Statement. The assessment of construction noise impacts includes the noise reduction achieved via the implementation of BPM such as localised screening and acoustic enclosures. Similarly, the level of noise reduction required for the plant strategy of the Mona Onshore Substation has been calculated as part of the assessment of operational noise impacts. Noise impacts on wildlife have been assessed in: • Volume 3, Chapter 3: Onshore ecology of the Environmental Statement; and • Volume 3, Chapter 4: Onshore and intertidal ornithology of the Environmental Statement.
Denbighshire County Council: Adopted Local Development Plan (June 2013)		
RD 1	Development will only be permitted where the development does not unacceptably affect the amenity of local residents by virtue of noise.	Construction, operation and maintenance, and decommissioning phases of Mona Offshore Wind Project have been assessed using the principles in the relevant BS. The assessment of the offshore and onshore elements of the Mona Offshore Wind Project is presented in section 9.9 with details provided in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement and Volume 7, Annex 9.3: Operational noise assessment of the Environmental Statement. The assessment of construction noise impacts includes consideration of the noise reduction achieved by implementing BPM to reduce construction noise emission levels at receptors. Mitigation measures and the required levels of noise reduction for the plant strategy of the Mona Onshore Substation have been included in the assessment of operational noise impacts. The mitigation measures have been derived to avoid significant adverse effects on the amenity of local residents.

Policy	Key provisions	How and where considered in the Environmental Statement
VOE 10	Development proposals which promote the provision of renewable energy technologies may be supported providing they are located so as to minimise visual, noise and amenity impacts and demonstrate no unacceptable impact upon the interests of nature conservation, and wildlife.	Construction, operation and maintenance, and decommissioning phases of Mona Offshore Wind Project have been assessed using the principles in the relevant BS. The assessment of the offshore and onshore elements of the Mona Offshore Wind Project is presented in section 9.9 with details provided in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement and Volume 7, Annex 9.3: Operational noise assessment of the Environmental Statement. As stated above, the merits of construction and operational noise mitigation measures have been considered as part of the assessment to minimise impacts at the nearest receptors. Noise impacts on wildlife have been assessed in: • Volume 3, Chapter 3: Onshore ecology of the Environmental Statement; and • Volume 3, Chapter 4: Onshore and intertidal ornithology of the Environmental Statement.

9.3 Consultation

9.3.1.1 A summary of the key issues raised during consultation activities undertaken to date specific to noise and vibration is presented in Table 9-5 below, together with how these issues have been considered in the production of this Environmental Statement chapter. Engagement will continue with CCBC and DCC following the submission of the DCO.

Table 9-5: Summary of key consultation issues raised during consultation activities undertaken for the Mona Offshore Wind Project relevant to noise and vibration.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
June 2022	The Planning Inspectorate – Scoping Opinion	Table 8.12 of Part 3 of the Scoping Report (Mona Offshore Wind Ltd, 2022) contained proposals to scope out vibration impacts from additional vehicle movements on the local highway network during construction and decommissioning of the onshore transmission assets. The Planning Inspectorate highlighted that since vehicle routes are not yet known, the distance between any human receptor or historic asset is also unknown.	Information regarding construction traffic is provided in Volume 3, Chapter 21: Traffic and transport of the Environmental Statement. Construction traffic flow data will be reported in the Environmental Statement once the Mona Proposed Onshore Development Area has been refined. Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement will be updated to include an assessment of the noise impacts from construction traffic.
June 2022	The Planning Inspectorate – Scoping Opinion	Table 8.12 of Part 3 of the Scoping Report (Mona Offshore Wind Ltd, 2022) proposed that impacts on human receptors due to vibration generated during the operations and maintenance of the onshore transmission assets be scoped out of the assessment. The Planning Inspectorate is content that vibration from the operations and maintenance of the onshore export cable is unlikely to result in significant effects and can thus be scoped out. However, the Inspectorate is not content that impacts on human receptors due to vibration from the Mona Onshore Substation be scoped out since the distance to nearby receptors was not yet known.	An assessment of the potential impacts of vibration due to the Mona Onshore Substation has been undertaken based on the current Maximum Design Scenario (MDS) of the Mona Onshore Substation. Once plant selections have been confirmed, it will be demonstrated that operational vibration is unlikely to cause significant effects.
June 2022	The Planning Inspectorate – Scoping Opinion	Paragraphs 8.4.2.1 to 8.4.2.4 of Part 3 of the Scoping Report (Mona Offshore Wind Ltd, 2022) contained details of the proposed study area adopted for noise and vibration sensitive receptors. The Planning Inspectorate requested that the 50km noise and vibration study area proposed for the assessment of offshore generation assets where construction piling is required be justified based on the results of the noise modelling.	An indicative assessment of the noise impacts due to offshore piling works is presented in section 9.9.2.
June 2022	The Planning Inspectorate – Scoping Opinion	The Planning Inspectorate requested that information be provided on the types of vehicles and plant to be used during the construction phase. Where uncertainty exists, a 'worst-case' assessment should be undertaken considering the closest point to nearby receptors within the application boundary.	Information regarding construction traffic is provided in Volume 3, Chapter 21: Traffic and transport of the Environmental Statement. Construction traffic flow data will be reported in the Environmental Statement once the Mona Proposed Onshore Development Area has been refined. Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement will be updated to include an assessment of the noise impacts from construction traffic.
June 2022	The Planning Inspectorate – Scoping Opinion	The Planning Inspectorate requested that consideration be given to the noise and vibration effects on terrestrial ecological receptors.	Noise impacts on wildlife are assessed in Volume 3, Chapter 3: Onshore ecology and Volume 3, Chapter 4: Onshore and intertidal ornithology of the Environmental Statement.
September 2022	CCBC – Consultation via Email	Consultation was sought with the Environmental Health Department of CCBC to agree upon the proposed noise survey locations at landfall.	No response was received. Details of the survey can be found in Volume 7, Annex 9.1: Baseline noise survey of the Environmental Statement.
September 2022	DCC Environmental Health Department – Consultation via Email	Consultation was sought with the Environmental Health Department of DCC to agree upon the proposed noise survey methodology for receptors around the proposed substation locations. Mr Caldwell agreed with the proposal but requested that a long-term location be added to the receptor at Plas yr Esgob.	A long-term survey was undertaken at this position, as agreed. Details of the survey can be found in Volume 7, Annex 9.1: Baseline sound survey of the Environmental Statement.
September 2023	CCBC – Consultation via Email	Consultation was sought with the Environmental Health Department of CCBC to agree upon the proposed noise survey locations along the Mona Onshore Export Cable Corridor. Mr. Williams agreed with the proposal but requested consideration be given to the position at Sirior Bach since the original position proposed was not deemed suitably representative. This position was amended to a location more representative of the receptors in this area.	A long-term survey was undertaken with the position amended, as agreed. Details of the survey can be found in Volume 7, Annex 9.1: Baseline sound survey of the Environmental Statement.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
September 2023	DCC Environmental Health Department – Consultation via Email	Consultation was sought with the Environmental Health Department of CCBC to agree upon the proposed noise survey locations along the Mona Onshore Export Cable Corridor.	No response was received. Details of the survey can be found in Volume 7, Annex 9.1: Baseline sound survey of the Environmental Statement.
January 2024	DCC Environmental Health Department – Consultation via Conference Call	Consultation was sought to discuss the proposed operational noise criteria for the Mona Onshore Substation derived based on results of the 3D acoustic modelling works. Mr Caldwell agreed with the methodology and criteria proposed.	An operational noise impact assessment for the Mona Onshore Substation is presented in Volume 7, Annex 9.3: Operational noise of the Environmental Statement.

9.4 Baseline methodology

9.4.1 Relevant guidance

British Standard 4142

9.4.1.1 BS 4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound' provides a method for rating industrial and commercial sound and method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities.

9.4.1.2 In summary, this standard provides guidance on determining 'rating sound levels' by correcting the 'specific sound level' from the site or operations under consideration for acoustic character corrections such as tonality, impulsivity, and intermittency. The standard provides the following corrections to be applied where each is appropriate:

- '*Tonality -For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible*
- *Impulsivity - A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible*
- *Intermittency - When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. … If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied*
- *Other sound characteristics - Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.'*

9.4.1.3 An initial estimate of the impact of the source is obtained by subtracting the measured background sound level from the rating sound level of the proposed plant. Background sound levels at the receptors were identified from a Baseline noise survey undertaken in November 2022 (see Volume 7, Annex 9.1: Baseline Sound Survey of the Environmental Statement). Acoustic character corrections are applied to the specific sound level at the receptor.

World Health Organisation (WHO)

9.4.1.4 The World Health Organisation (WHO) 2018 Environmental Noise Guidelines provide recommendations for protecting human health from long-term noise exposure due to various sources. The guidance states the following regarding industrial noise:

"*The current environmental noise guidelines for the European Region supersede the CNG from 1999. Nevertheless, the GDG recommends that all CNG indoor guideline* *values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid."*

9.4.1.5 The previous WHO 1999 Community Noise Guidelines may be referred to for the consideration of the following:

- External daytime (7am-11pm) ambient noise limits with an upper limit of 55 dB $L_{Aeq,16h}$
- External night-time (11pm-7am) ambient noise limits of 45 dB $L_{Aeq,8h}$, corresponding to the level at which sleep disturbance may occur with windows open.

9.4.1.6 The WHO Night Noise Guidelines (2009) define effect thresholds or 'lowest observed adverse health effect levels' for both long-term adverse health effects and short-term sleep disturbance as follows:

- No effects expected to occur: External L_{night} level of less than 30 dB(A)
- Adverse effects start to occur (night-time 'lowest observed adverse effect level (LOAEL): External L_{night} level of 40 dB(A)
- Adverse effects are likely to occur frequently: External L_{night} level of 55 dB(A).

Guidelines for Environmental Noise Impact Assessment

9.4.1.7 The Guidelines for Environmental Noise Impact Assessment (IEMA) outline the key principles for a noise impact assessment of all development proposals where noise effects are likely to occur.

9.4.1.8 The guidelines provide specific support on how noise impact assessment fits within the Environmental Impact Assessment (EIA) process. They cover:

- how to scope a noise assessment;
- issues to be considered when defining the baseline noise environment;
- prediction of changes in noise levels as a result of implementing development proposals; and
- definition and evaluation of the significance of the effect of changes in noise levels (for use only where the assessment is undertaken within an EIA).

British Standard 5228

9.4.1.9 BS 5228 comprises two parts:

- BS 5228-1:2009+A1:2014 – '*Code of practice for noise and vibration control on construction and open sites'* – Part 1: Noise
- BS 5228-2:2009+A1:2014 – '*Code of practice for noise and vibration control on construction and open sites'* – Part 2: Vibration.

9.4.1.10 The Standard provides guidance, information, and procedures for the control of noise and vibration from demolition and construction sites. BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 gained approval as guidance on appropriate methods for minimising noise from construction and open sites under the relevant sections of the CoPA 1974.

9.4.1.11 There are no set standards for the definition of the significance of construction noise effects. However, noise example criteria are provided in BS 5228-1:2009+A1:2014

Annex E and vibration example criteria are provided in BS 5228-2:2009+A1:2014 Annex B.

9.4.1.12 BS 5228-1:2009+A1:2014 provides basic information and recommendations for methods of noise control relating to construction and open sites where work activities/operations generate significant noise levels. It includes sections on:

- Community relations
- Noise and persons on site
- Neighbourhood nuisance
- Project supervision
- The control of noise.

9.4.1.13 The annexes include information on legislative background, noise sources, remedies and their effectiveness (mitigation options); current and historic sound level data for on-site equipment and site activities; significance of noise effects; calculation procedures estimating sound emissions from sites and sound level monitoring; types of piling; and air overpressure.

9.4.1.14 BS 5228-2:2009+A1:2014 contains information and recommendations for basic methods of vibration control arising from construction and open sites where work activities/operations generate significant levels of vibration. It includes sections on community relations; vibration and persons on site; neighbourhood nuisance; project supervision; control of vibration and measurement. BS 5228-2:2009+A1:2014 refers to BS ISO 4866:2010; BS 7385-2:1993; BS 6472-1:2008, and BS 6472-2:2008 for further advice on the significance of vibration.

Design Manual for Roads and Bridges (DMRB) – LA111 – Noise and vibration

9.4.1.15 The DMRB LA111 (Highways England, Transport Scotland, Llwyodraeth Cymru Department for Infrastructure, 2020), provides on guidance on methods for assessing noise and vibration from construction traffic.

9.4.1.16 The magnitude of noise impacts is assessed using the predicted change in the Basic Noise Level (BNL) on the closest public roads to a receptor following the introduction of construction traffic.

9.4.1.17 The noise change is calculated using the methods outlined in the CRTN (Department for Transport, 1988) which considers the following:

- The change in traffic flow due to construction traffic
- Vehicle speed
- The percentage of Heavy Goods Vehicles (HGVs).

9.4.1.18 The methodology outlined in CRTN is valid for traffic flows greater than 50 movements per hour. The assessment of noise impacts where construction traffic flows on off-road access routes and the proposed haul road are less than 50 per hour has been undertaken with reference to the haul route methodology as detailed in Annex F of BS 5228-1:2009+A1:2014.

9.4.1.19 Paragraph 3.19 of DMRB LA111 states the following:

- *'Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding*:
  - *10 or more days or nights in any 15 consecutive days or nights;*
  - *A total number of days exceeding 40 in any 6 consecutive months*.'

9.4.1.20 Additional guidance is provided for the determination of construction noise impact criteria in terms of the Lowest Observed Adverse Effect Level (LOAEL) and the Significant Observed Adverse Effect Level (SOAEL). These are defined in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement.

9.4.2 Scope of the assessment

9.4.2.1 The scope of this noise and vibration assessment has been developed in consultation with relevant statutory and non-statutory consultees as detailed in Table 9-5.

9.4.2.2 Taking into account the scoping and consultation process, Table 9-6 summarises the issues considered as part of this assessment.

Table 9-6: Issued considered in this assessment.

Activity	Potential effects scoped into the assessment
Construction phase	
Foundations of the Offshore Substation Platform and wind turbines	Construction noise at noise sensitive receptors from offshore piling
Landfall	Construction noise and vibration at sensitive receptors from the installation of the onshore export cables
Trenchless techniques	Noise at sensitive receptors from the construction using trenchless techniques along the Onshore Cable Corridor and Mona Onshore Substation.
Mona Onshore Substation	Noise and vibration at sensitive receptors from the construction of the Onshore Substation platform and infrastructure.
Open cut trenching: • Onshore Cable Corridor • 400 kV Grid Connection Corridor	Construction noise and vibration at sensitive receptors
Construction traffic on local highway networks	Noise due to increased traffic flows due to construction traffic on local highway networks.
Operation and maintenance	
Mona Onshore Substation	Operational noise at noise sensitive receptors
Decommissioning	
Removal of onshore infrastructure (e.g. link boxes)	Decommissioning noise at noise sensitive receptors
Removal of Mona Onshore Substation	

9.4.2.3 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out, together with justification for scoping them out, is presented in Table 9-7.

Table 9-7: Impacts scoped out of the assessment for noise and vibration.

Potential impact	Justification
The impact on human receptors and historic assets arising from vibration generated during the operations and maintenance of the onshore transmission assets.	The operations and maintenance of the onshore transmission assets will not generate any significant levels of vibration. This was agreed with The Planning Inspectorate as outlined in Table 9-5 above.
The impact of noise and vibration generated during the operations and maintenance of the offshore and onshore export cables.	The buried cables will not generate any perceptible noise or vibration detected above the surface. This was agreed with The Planning Inspectorate as outlined in Table 9-5 above

9.4.3 Methodology to inform the baseline

9.4.3.1 Information regarding the baseline sound climate was collected through a mixture of desktop reviews and long-term and short-term sound measurements on site.

9.4.3.2 The desktop study was undertaken to review the nearest noise-sensitive receptors situated within the boundaries of the proposed noise and vibration study areas for sources of noise and vibration during the construction and operation and maintenance phases.

9.4.3.3 Subsequently, baseline surveys (Volume 7, Annex 9.1: Baseline Sound Survey of the Environmental Statement) were undertaken to obtain representative sound levels for human receptors near the Mona Onshore Development Area. The surveys considered receptors near landfall, along the Onshore Cable Corridor, and near the Mona Onshore Substation.

9.4.3.4 There are no significant existing sources of vibration impacting the nearest noise-sensitive receptors which require consideration. As such, no vibration survey is deemed necessary. This is in line with the approach set out in the Environmental Impact Assessment (EIA) Scoping Report (Mona Offshore Wind Ltd, 2022). No comments on this approach were raised by The Planning Inspectorate in their Scoping Opinion.

9.4.4 Study area

9.4.4.1 The noise and vibration study area focuses on noise and vibration sensitive receptors landward of MHWS where potential impacts are more likely to occur on receptors sensitive to noise and vibration.

9.4.4.2 A 1 km study area has been defined for the Mona Landfall due to the high noise emission levels and potential night-time works required for trenchless techniques at the Mona Landfall.

9.4.4.3 The study area along the Mona Onshore Cable Corridor has been defined as 300 m for noise and 100 m for vibration in line with the guidance in the Design Manual for Roads and Bridges (DMRB) – LA 111 – Noise and Vibration.

9.4.4.4 A study area of 50 km has been defined for the assessment of offshore piling noise to account for the potential for the long-range propagation of low frequency noise emissions which can travel large distances over water. This was agreed as part of the consultation process as outlined in Table 9-5.

9.4.4.5 The noise and vibration study area has been defined as:

- Noise and vibration sensitive receptors landward of MHWS within the area of land to be temporarily or permanently occupied during the construction, operations and maintenance and decommissioning of the Mona Offshore Wind Project (hereafter referred to as the Mona Onshore Development Area)
- Noise sensitive receptors located within 300 m of the Mona Onshore Development Area (excluding the Landfall and Mona Onshore Substation) (approximately 1,903 receptors) as presented in Figure 9.1. This area includes the locations of the construction compounds and the potential trenchless technique compounds
- Noise sensitive receptors located within 1 km of the Mona Landfall (approximately 147 receptors) and Mona Onshore Substation (40 receptors) as presented in Figure 9.2
- Noise sensitive receptors located within 50 km of the Mona Array Area where construction piling is required (receptor count not available due to limited address data) as presented in Figure 9.3
- Vibration sensitive receptors located within 100 m of construction activities within the Mona Onshore Development Area.(approximately 47 receptors) as presented in Figure 9.4.

9.4.4.6 The noise and vibration study area is shown on Figure 9.1 to Figure 9.4 below. The location of the receptors sensitive to noise and vibration are shown in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement.

9.4.4.7 All but three of the above descriptors have been refined from those presented in the EIA Scoping Report (Mona Offshore Wind Ltd, 2022). The study areas that remain unchanged include:

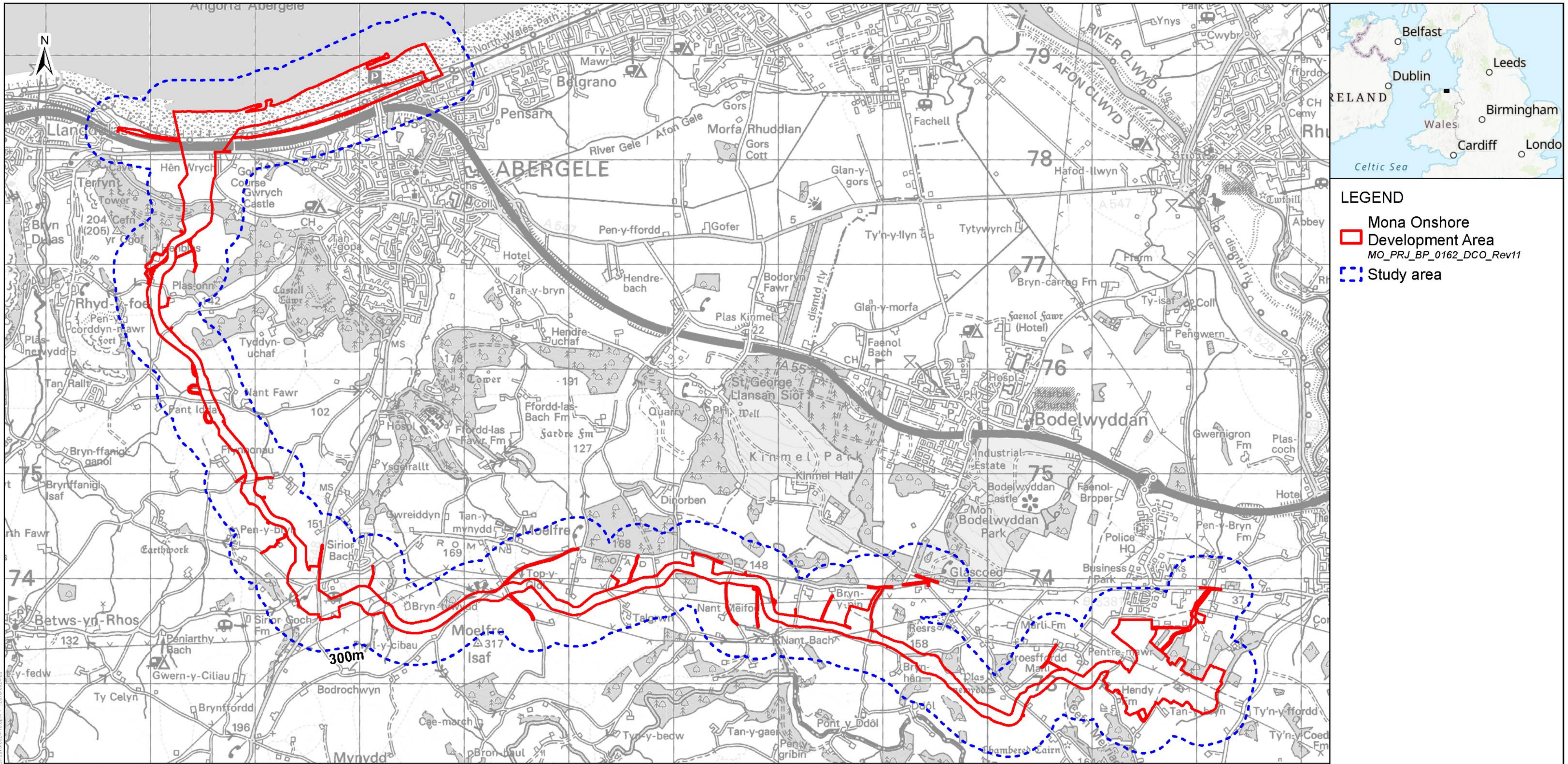
- Noise sensitive receptors located within 1 km of the Mona Landfall and Mona Onshore Substation
- Noise sensitive receptors located within 50 km of the Mona Array Area where construction piling is required
- Vibration sensitive receptors located within 100 m of construction activities.

9.4.4.8 The refined study areas are presented alongside those originally proposed in the EIA Scoping Report in Table 9-8 below, with a brief justification provided for context.

Table 9-8: Study area refinement

Study Areas		Justification
EIA Scoping Report	**ES**	
Noise sensitive receptors located within 250 m of the onshore cable corridor.	Noise sensitive receptors located within 300 m of the onshore cable corridor.	This study area has been increased to align with the guidance in Design Manual Roads and Bridges (DMRB) – LA 111 which states that: *'A study area of 300 m from the closest construction activity is normally sufficient to encompass noise sensitive receptors'.*

Study Areas		Justification
EIA Scoping Report	ES	
Noise sensitive receptors located within 2 km of the offshore export cable corridor.	Removed.	This study area has been removed from the assessment since the only offshore noise source requiring consideration is offshore piling activity. As such, any receptors included within this study area are now encompassed within the 50 km study area defined above.



Service Layer Credits: World Topographic Map: Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS World Hillshade: Esri, USGS	Data Sources: RPS / bp / EnBW	Geodetic Information: Datum: OSGB 1936. Projection: British National Grid. Scale@ 378.9mm x 214.9 mm 1:40,000	0 0.25 0.5 1 nm; 0 0.25 0.5 1 km
Project Name: MONA OFFSHORE WIND PROJECT	**Drawing Title:** NOISE STUDY AREA: MONA ONSHORE DEVELOPMENT AREA		**Drawing Number:** 12079-0624-10

VER	DATE	DETAILS	BY	CHECK
03	27/03/24	FINAL	OW	CR

Figure 9.1: Noise study area - Mona Onshore Development Area

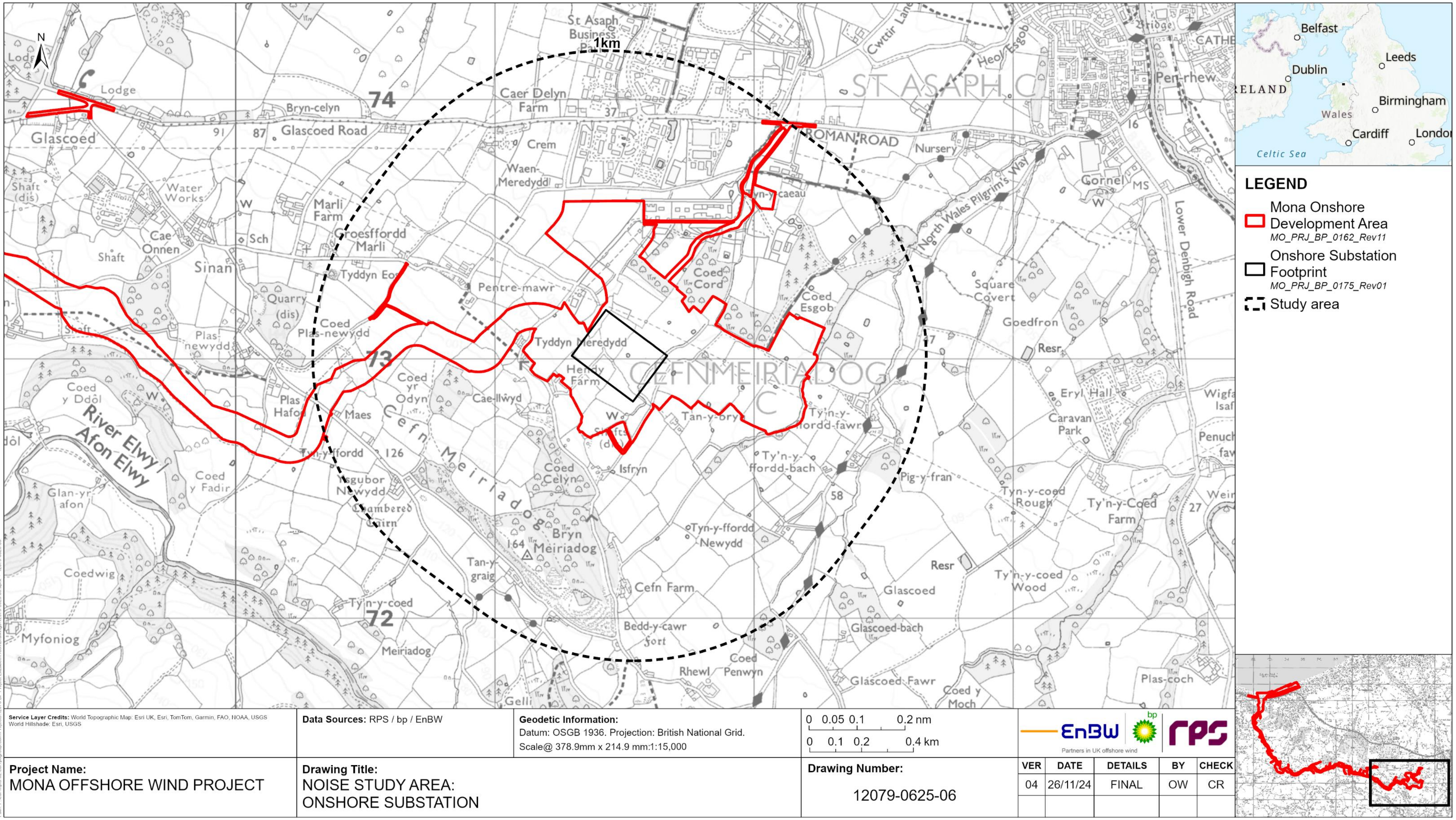


Figure 9.2: Noise and vibration study area – Mona Onshore substation

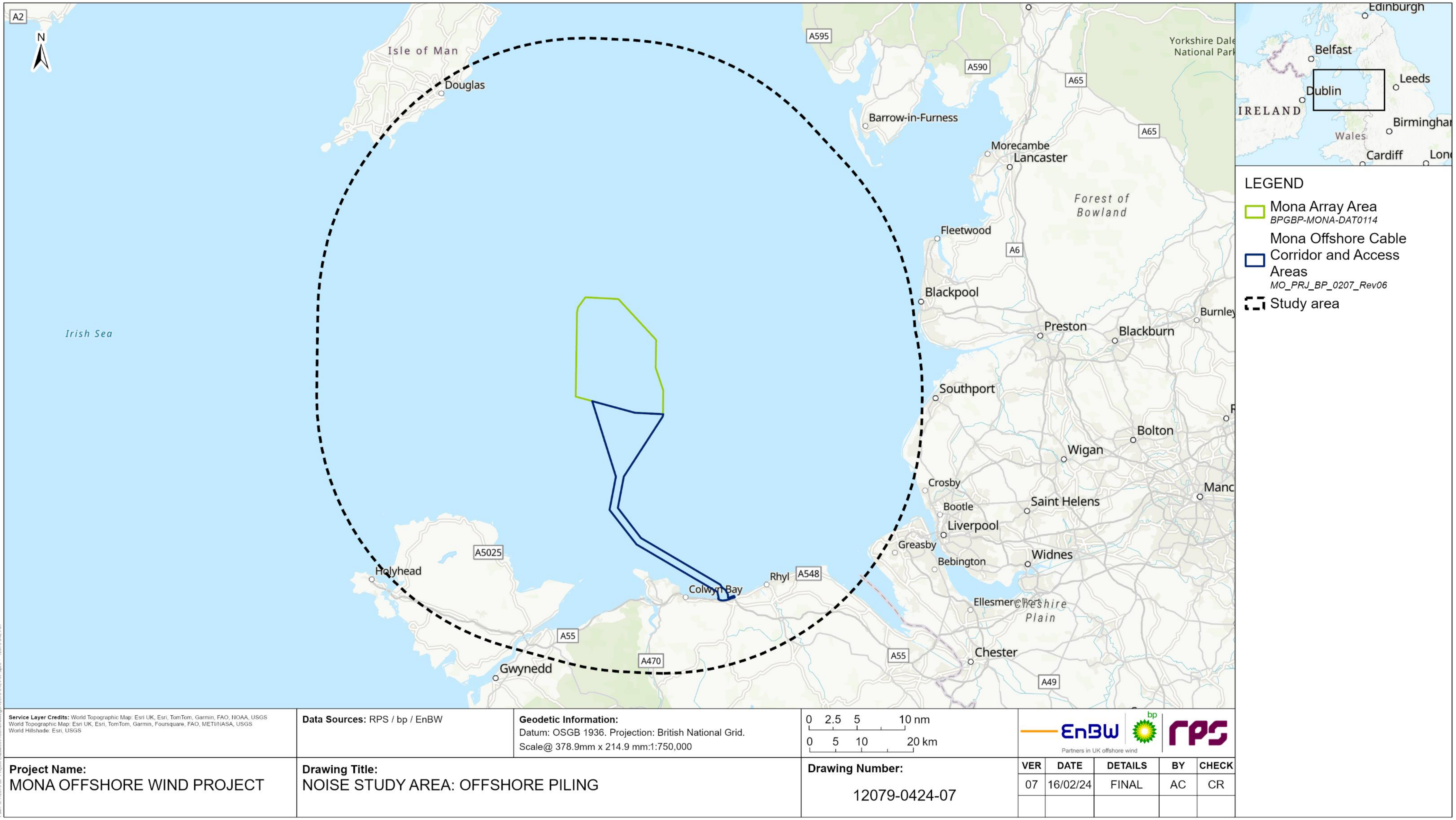


Figure 9.3: Noise and vibration study area – Offshore piling activities

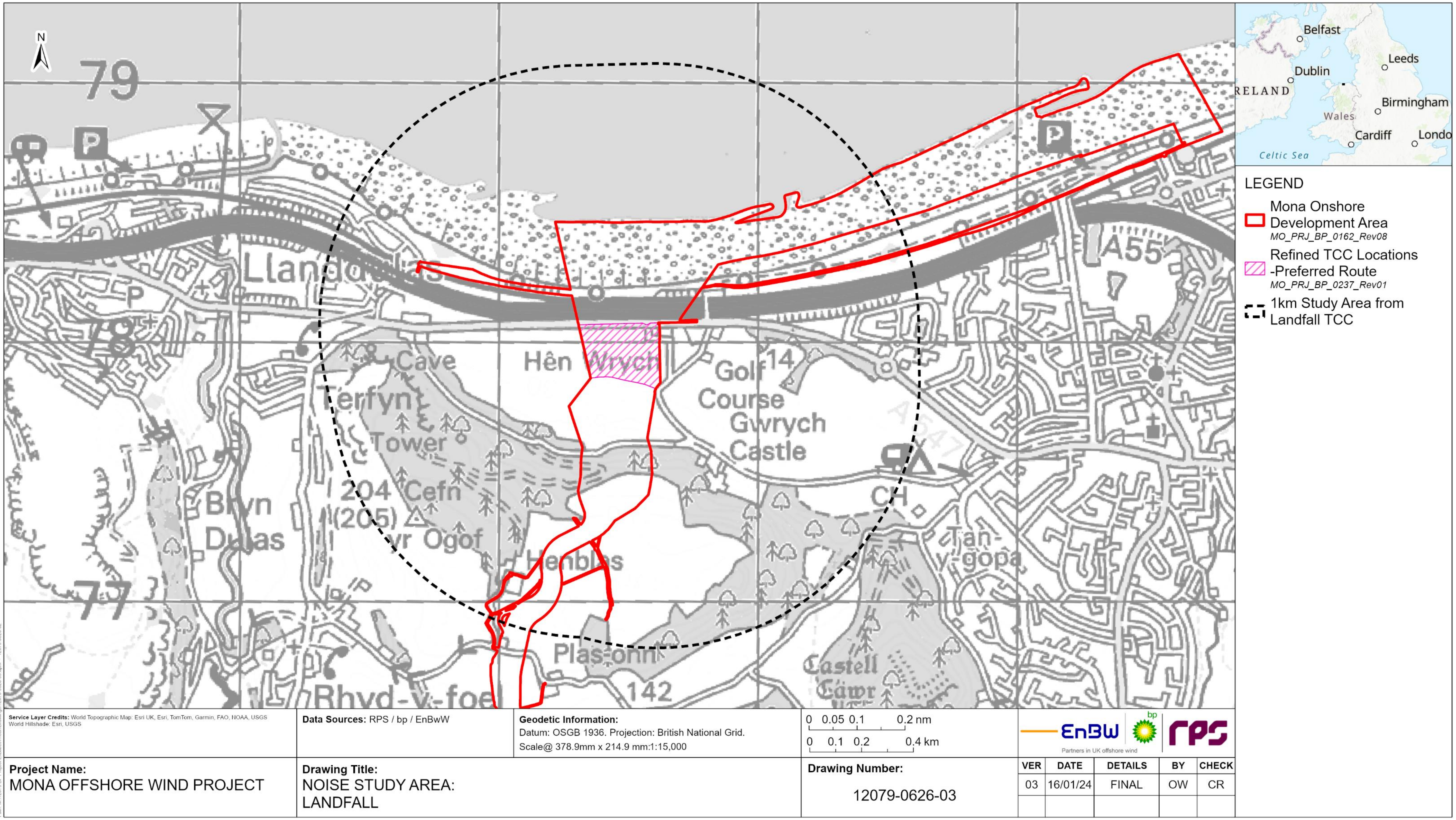
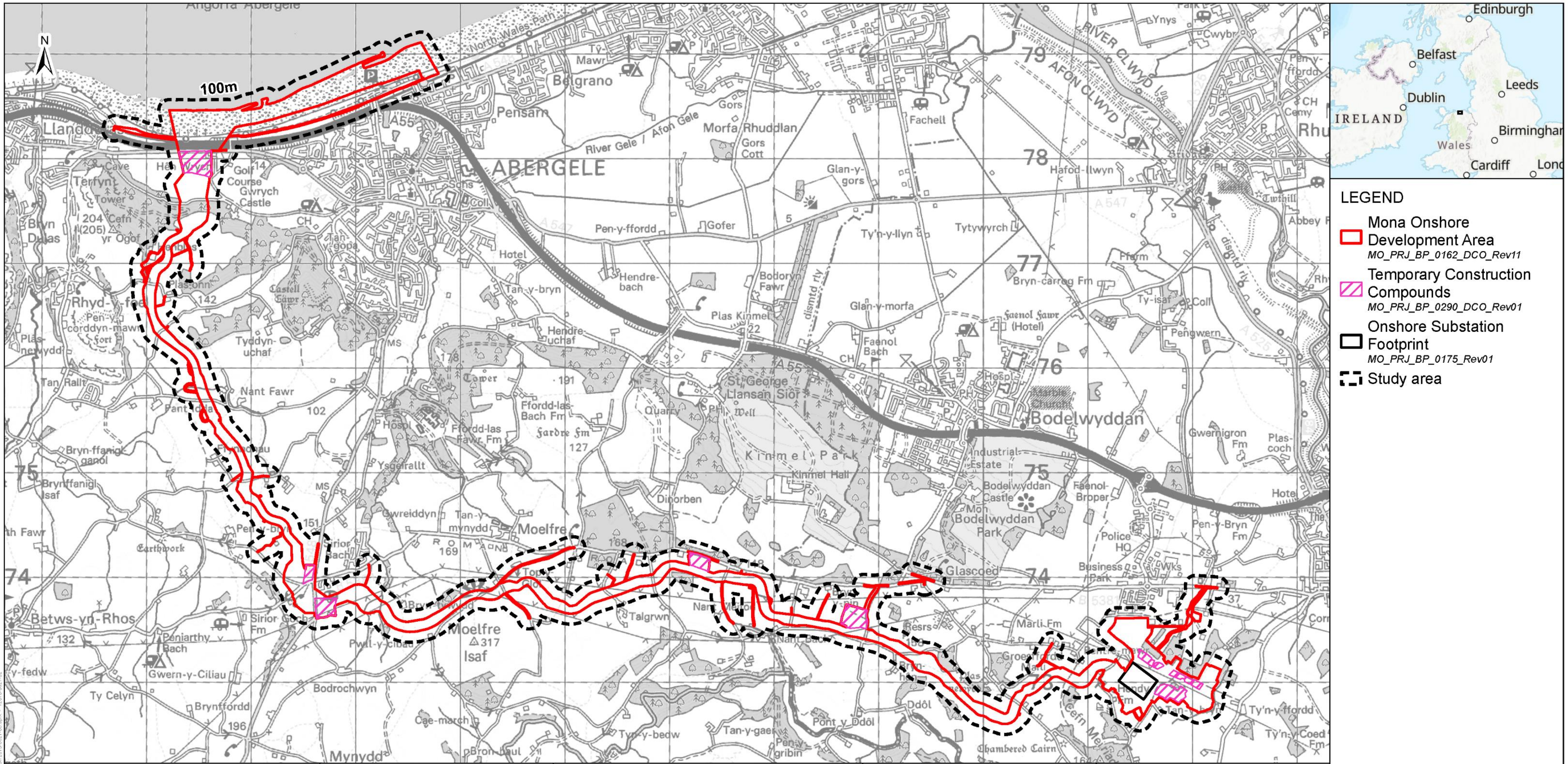


Figure 9.4: Noise and vibration study area – Landfall construction.



Service Layer Credits: World Topographic Map: Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS World Hillshade: Esri, USGS

Data Sources: RPS / bp / EnBW

Geodetic Information: Datum: OSGB 1936. Projection: British National Grid. Scale@ 378.9mm x 214.9 mm:1:40,000

0 0.25 0.5 1 nm
0 0.25 0.5 1 km

Project Name: MONA OFFSHORE WIND PROJECT

Drawing Title: VIBRATION STUDY AREA: ONSHORE DEVELOPMENT AREA

Drawing Number: 12079-0627-03

VER	DATE	DETAILS	BY	CHECK
03	20/03/24	FINAL	OW	CR

Figure 9.5: Vibration study area – Onshore development area.

9.4.5 Desktop study

9.4.5.1 Information on the nearest noise sensitive receptors within the noise and vibration study area was collected through a detailed desktop review of existing studies and datasets. These are summarised in Table 9-9 below.

Table 9-9: Summary of key desktop reports.

Title	Source	Year	Author
OS_MasterMap_Topography_Layer_780637_1046228.dwg	Ordinance Survey	2022	Ordinance Survey
OS Terrain 5	Ordinance Survey	2022	Ordinance Survey
Google Earth Imagery	Data SIO, NOAA, U.S Navy, NGA, GEBCO	2022	Google

9.4.6 Site specific surveys

9.4.6.1 In order to inform the Environmental Statement, site-specific surveys were undertaken, as agreed with the Local Authorities (see Table 9-5 for further details). A summary of the surveys undertaken to inform the noise and vibration impact assessment is outlined in Full details of the survey methodology are presented in Volume 7, Annex 9.1: Baseline noise survey, of the Environmental Statement. In summary, a mixture of long-term and short-term sound measurements were undertaken at locations representative of the nearest noise sensitive receptors to construction noise and vibration sources at the Mona Landfall, along the Mona Onshore Cable Corridor, and the Mona Onshore Substation.

9.4.6.2 The surveys comprised a combination of short-term and long-term sound monitoring at a total of 24 locations within the Mona Onshore Development Area across two surveys. The proposed monitoring locations were discussed with CCBC and DCC (see Table 9-5) and follows the approach set out in the Mona Offshore Wind EIA Scoping Report (Mona Offshore Wind Ltd, 2022).

9.4.6.3 The measurement positions are presented in Table 9-10 to Table 9-12 and displayed graphically in Figure 9.6 to Figure 9.8 below.

Table 9-10: Descriptions of long term (LT) and short term (ST) sound monitoring locations at the Mona Landfall.

Position	Location	Representative Receptor
LT1	North boundary of Abergele Golf Course.	Residential receptors on Tron Way.
LT2	West boundary of Abergele Golf Course.	Residential receptor at Gwyrch House.
ST1	North boundary of Castle Cove Caravan Park.	Static caravans at Castle Cove Caravan Park.
ST2	South boundary of land at Tan yr Ogof Farm.	Residential receptors at Tan yr Ogof Farm and Tan yr Ogof Caravan Park.

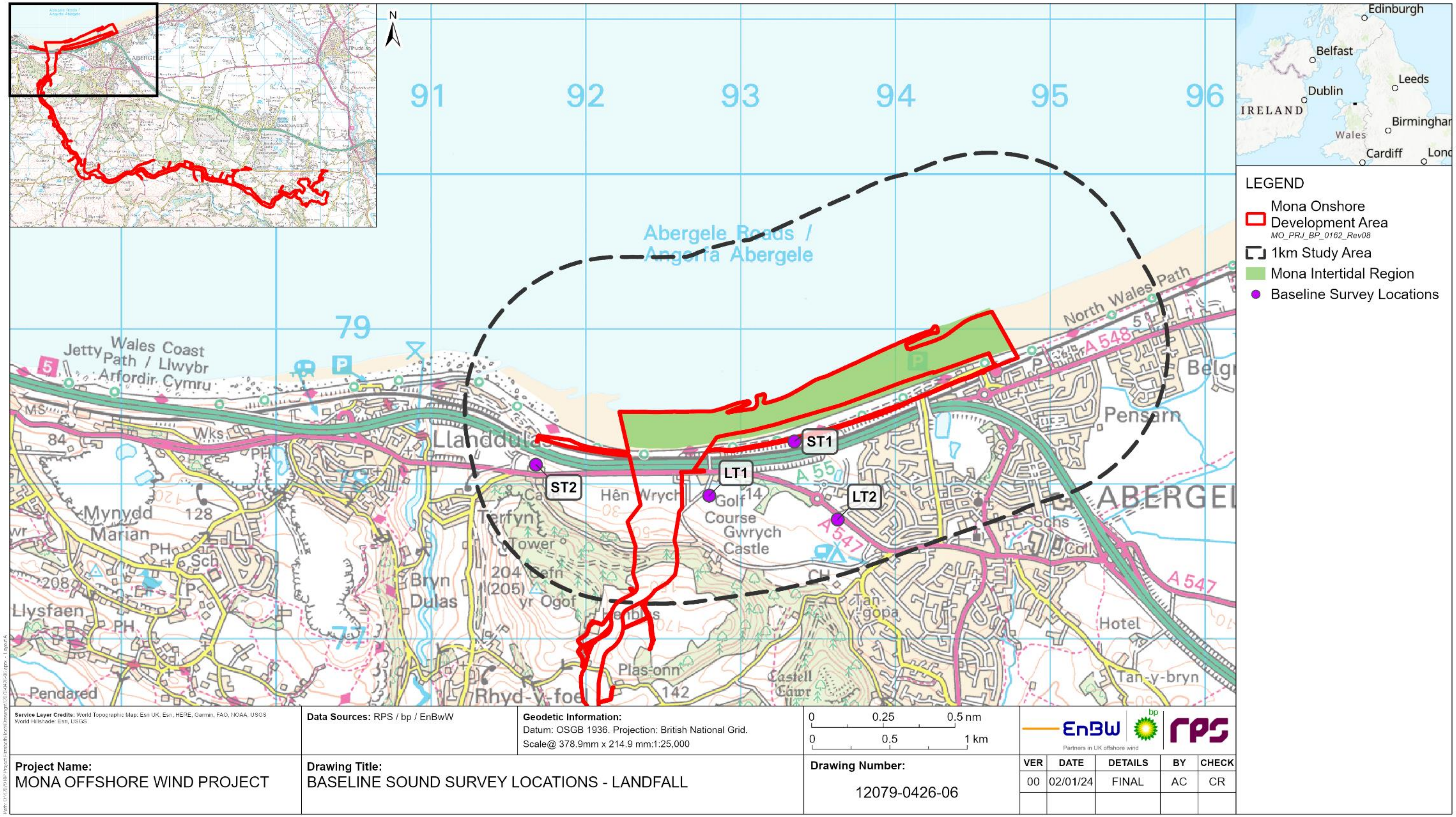


Figure 9.6: Baseline sound survey locations - landfall

Table 9-11: Descriptions of LT and ST sound monitoring locations near the Mona Onshore Substation.

Position	Location	Representative Receptor
LT3	Southwest boundary of the land west of Waen Meredydd.	Residential receptor at Waen Meredydd.
LT4	East boundary of the land west of Tyddyn Meredydd.	Residential receptor at Tyddyn Meredydd.
LT5	Rear garden of the property at Cae yr Haul, Lon Coed yr Esgob.	Residential receptors on Lon Coed yr Esgob and Glascoed Road.
LT6	West boundary of the land east of Plas yr Esgob.	Residential receptors at Plas yr Esgob and Coed yr Esgob.
LT7	East boundary of the land east of Tyn y Ffordd Fawr.	Residential receptors near Cefnmeiriadog and caravans at Lyons Eryl Hall Caravan Park and Country Club.
LT8	Southeast boundary of the land at Tyn y Ffordd Newydd.	Residential receptors at Tyn y Ffordd Newydd, Rhos Aber, and Isfryn.
ST3	South boundary of the land north of Coed yr Esgob.	Residential receptor at Coed yr Esgob.
ST4	West boundary of the land east of Tyn y Ffordd Fawr.	Residential receptors near Cefnmeiriadog.

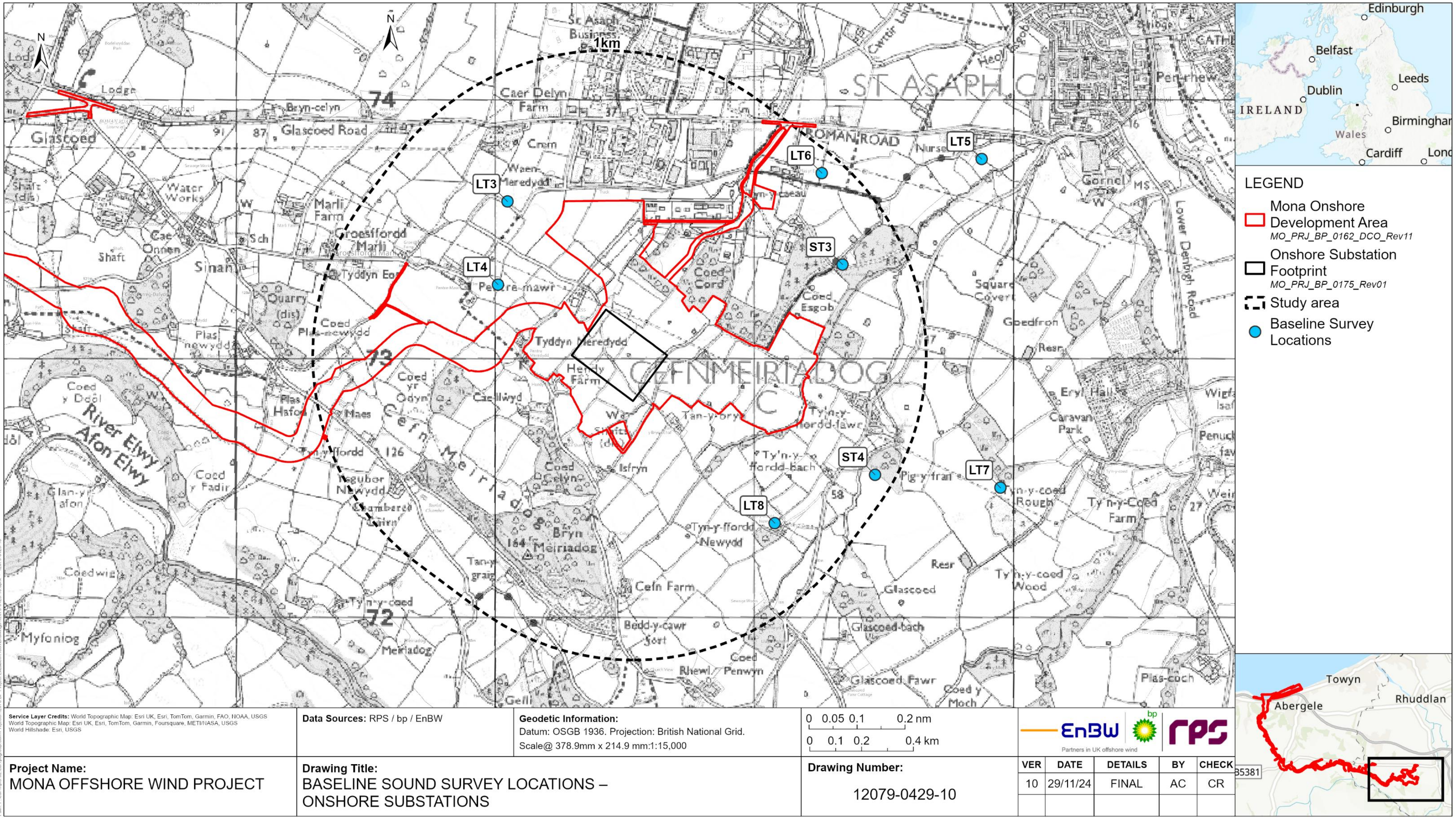


Figure 9.7: Baseline sound survey locations – Mona Onshore substation

Table 9-12: Descriptions of LT sound monitoring locations near the Mona Onshore Cable Corridor.

Position	Location	Representative Receptor
LT9	Southeast boundary of land at Llys Awel.	Noise sensitive receptors west of Rhyd-y-Foel.
LT10	South boundary of land to the north of Y Nentydd Road, Abergle.	Noise sensitive receptors around Y Nentydd Road.
LT11	North boundary of land to the east of Pen-y-Bryn Farm.	Noise sensitive receptors around Betws yn Rhos Road.
LT12	West boundary of land to the west of Penrefail Crossroads, Moelfre.	Noise sensitive receptors around Penrefail Crossroads.
LT13	South boundary of the land at Bryn Tywydd, Moelfre.	Noise sensitive receptors around Bryn Tywydd.
LT14	North boundary of Dinorben Farm, St George.	Noise sensitive receptors around Roman Road (B5381).
LT15	South boundary of land adjoining Tyn-y-Mynydd, Moelfre.	Noise sensitive receptors to the south of Tyn-y-Mynydd.
LT16	Northeast boundary of Dinorben Farm (Plas Bryn Celyn).	Noise sensitive receptors to the east of Dinorben Farm.
LT17	Northwest boundary of land ajoining Ddol Farm, Groesffordd Marli.	Noise sensitive receptors south of Roman Road (B5381).
LT18	Northwest boundary of Plas Hafod, Groesffordd Marli.	Noise sensitive receptors to the north in Groesffordd Marli.
LT19	East boundary of land at Maes Cefn, Meiriadog.	Noise sensitive receptors to the south of Groesffordd Marli.
LT20	North boundary of property at Tyddyn Meredydd, Cefmeiriadog.	Residential dwelling at Tyddyn Meredydd.

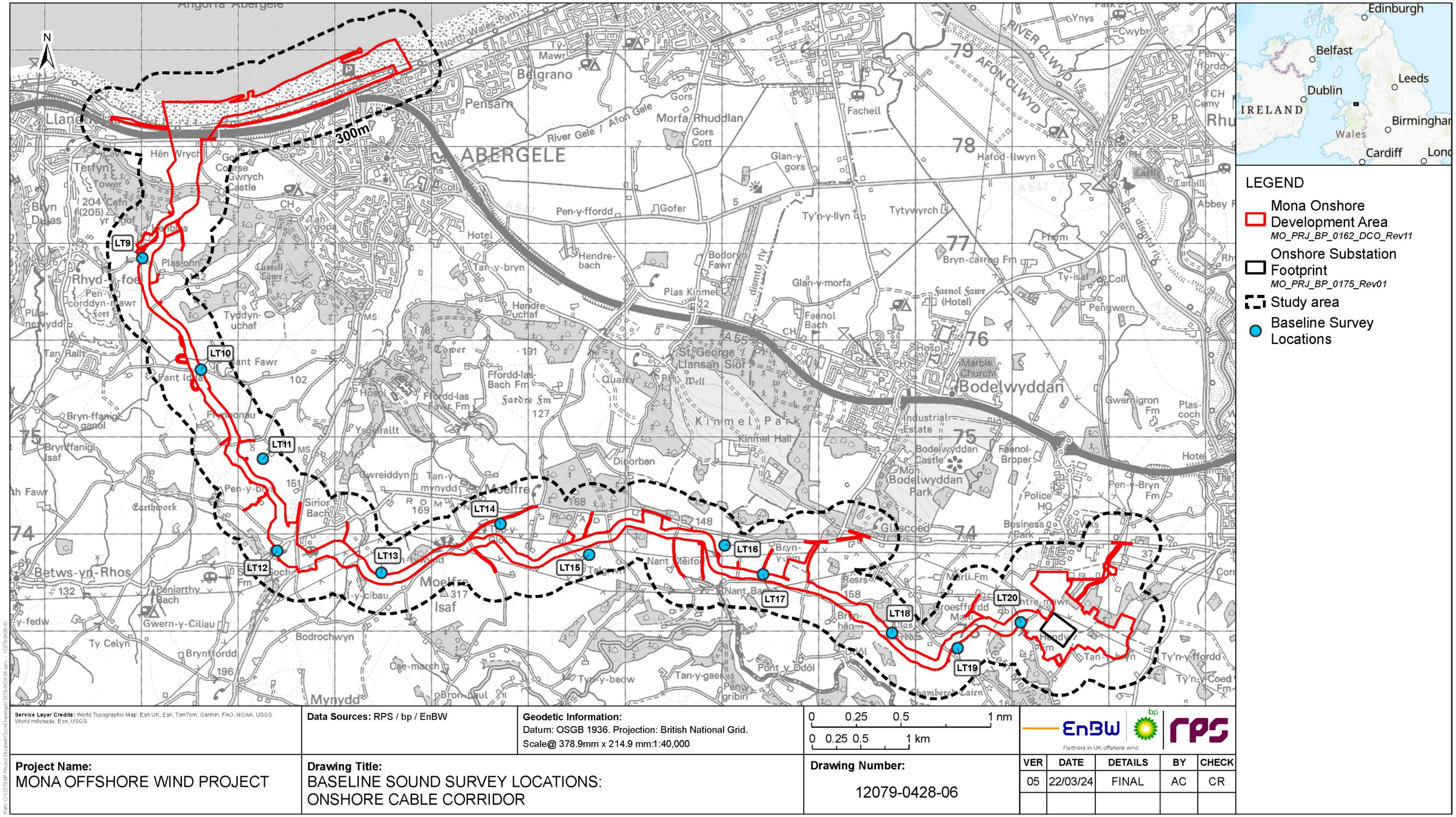


Figure 9.8: Baseline sound survey locations – Onshore cable corridor

Table 9-13: Summary of site-specific survey data.

Title	Extent of survey	Overview of survey	Survey contractor	Date	Reference to further information
Baseline noise survey	Mona Landfall.	Baseline sound survey at locations representative of the nearest noise-sensitive receptors to Mona Onshore Cable Corridor at landfall.	RPS	November 2022	Volume 7, Annex 9.1: Baseline sound survey of the Environmental Statement
	Mona Onshore Substation option locations	Baseline sound survey at locations representative of the nearest noise-sensitive receptors to the proposed Mona Onshore Substation.			
	Mona Onshore Cable Corridor	Baseline sound survey at locations representative of the nearest noise-sensitive receptors along Mona Onshore Cable Corridor between Landfall and the Mona Onshore Substation.	RPS/Tetra Tech	September 2023	

9.5 Baseline environment

9.5.1 Baseline characterisation

9.5.1.1 A summary of the measured baseline sound levels at the survey locations detailed in Table 9-10 to Table 9-12 above are presented in Table 9-14 below.

Baseline noise survey results (operational noise)

9.5.1.2 Representative baseline sound levels have been derived in accordance with the guidance presented in BS 4142:2014+A1:2019. The residual sound levels, $L_{Aeq,T}$, have been calculated by logarithmically averaging the measured data over 16-hour and 8-hour periods for the day and night-time, respectively.

9.5.1.3 The representative background sound levels, $L_{A90,T}$, have been derived through statistical analysis of the measured background sound level data. The guidance in BS 4142:2014+A1:2019 states the following:

'A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value.'

9.5.1.4 Detailed analysis of the baseline sound levels at each measurement position to determine the representative levels. The background sound level has been derived via the production of histograms and statistical analysis of the measured data during the day and night-time periods. At positions where the modal value occurs significantly more frequently than the next most frequently occurring level, this value has been taken as representative.

9.5.1.5 At positions where the frequency of occurrence is more evenly spread, the analysis has been undertaken on the lower quartile of values since the normally distributed values are skewed towards lower levels. In such instances, the representative background sound level has been derived by analysing the highest levels that are not exceeded by around 25% of the time during the relevant day or night-time period. These levels have been reviewed against the time-history graphs in Appendix B of Volume 7, Annex 9.1: Baseline Sound Survey of the Environmental Statement and are considered acceptable. The results are presented in Table 9-14 below.

Table 9-14: Baseline noise survey results (operational noise).

Location	Measured Sound Level, (dB)			
	Day (7am-11pm)		Night (11pm-7am)	
	Residual Sound Level, $L_{Aeq,16h}$	Background Sound Level, $L_{A90,15min}$	Residual Sound Level, $L_{Aeq,8h}$	Background Sound Level, $L_{A90,15min}$
LT3	42	33	36	30
LT4	44	37	40	35
LT5	47	38	37	32
LT6	45	36	38	31
LT7	43	34	35	30

Location	Measured Sound Level, (dB)			
	Day (7am-11pm)		Night (11pm-7am)	
	Residual Sound Level, $L_{Aeq,16h}$	Background Sound Level, $L_{A90,15min}$	Residual Sound Level, $L_{Aeq,8h}$	Background Sound Level, $L_{A90,15min}$
LT8	42	27	36	25
LT19	46	29	38	29
LT20	43	35	37	29

9.5.2 Future baseline scenario

9.5.2.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 requires that '*an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*' is included within the Environmental Statement. In the event that the Mona Offshore Wind Project does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.

9.5.2.2 The existing sound climate is dominated primarily by distant traffic on local roads. As the quantity of electric cars increases on roads, it is possible that traffic noise levels may reduce slightly due to the lower engine-noise levels, although at higher speeds there will still be influence from noise due to tyre-road interaction.

9.5.2.3 The A55 and A547 are well-trafficked roads with speed limits between 50 to 70mph. As such, it is not anticipated that that the future baseline scenario will change significantly in the absence of the development.

9.5.3 Data limitations

Baseline noise survey

9.5.3.1 All sound surveys are limited by the instrumentation used to undertake the measurements. Uncertainty may arise as a result of the internal processes within the sound level meter to measure and process the measured data into the relevant noise indices. However, modern sound level meters are precision instruments. The equipment used for the Baseline noise survey are Class 1 instruments according to BS EN 61672-1:2003, has a sampling cycle of 100 ms and a measurement range of A-weighted levels between 25 dB and 138 dB. The uncertainty due to fluctuations in temperature and humidity is ≤0.5 dB. The accuracy of the equipment used has been monitored via calibration both prior to and upon completion of the survey at each position.

9.5.3.2 There may be temporal and seasonal variations to the local noise climate. The temporal variation has been accounted for by undertaking long-term measurements over a period of two weeks. This allows for statistical analysis of any temporal variations in the noise climate to reduce uncertainty in the derivation of representative sound levels at nearby receptors. The seasonal variation in the local noise climate could be accounted for via additional sound surveys in spring/summer. However, there is likely to be a greater influence from traffic noise levels at these times due to the flux of tourists travelling via car along the A55. Whilst weather conditions are less favourable on average, it is possible that the adopted survey period presents a quieter period in the year. The above points were presented to the Environmental Health Officers at CCBC and DCC and the approach adopted mitigates the limitations as best as is practicable.

9.5.3.3 Any influence due to human error has been minimised by ensuring that all sound monitoring equipment was installed safely and securely. All measurements were undertaken at a minimum height of 1.5 m above local ground level and 3.5 m from other reflective surfaces to minimise interference from reflected sound waves.

Construction noise and vibration

9.5.3.4 The exact locations of the construction plant and associated works have not yet been confirmed. As such, construction noise and vibration impacts have been assessed by modelling construction plant close to the nearest and most exposed noise and vibration receptors within the Mona Onshore Development Area. For instance, construction plant associated with joint bay works have been assumed to be located approximately 10m from the edge of the Onshore Cable Corridor limits.

9.5.3.5 Some works are assumed to be spread along sections of the Onshore Cable Corridor. Construction noise levels for these works have been calculated at varying distances from the boundary of the temporary construction compounds which represents the MDS as stated in Table 9-22.

9.5.3.6 An indicative plant list has been provided and professional judgement applied to the assignment of appropriate sound level spectra and vibration levels (where appropriate) from BS 5228:2009+A1:2014 for each construction activity. This is a standard approach and is considered both robust and acceptable at this stage.

Source data

9.5.3.7 A list of the equipment forming the plant strategy for the Mona Onshore Substation has been provided along with a layout showing the quantities and heights. Broadband sound power levels have been provided based on the maximum noise level likely associated with each piece of equipment. However, no frequency content for each plant item is available since final plant selections have not been confirmed.

9.5.3.8 As such, the frequency content for each plant item has been obtained from similar projects and applied to the single-figure levels to obtain typical spectral noise levels and thus allow for a more robust assessment.

9.5.3.9 Of particular importance are the low frequency components of the Super Grid Transformers which are known to be tonal at frequencies of around 100 Hz. A spectrum has been used as measured by Gange (2011) which shows a clear tonal component at 100 Hz and subsequent harmonics.

Prediction methods

9.5.3.10 Uncertainty and limitations may arise during the modelling process due to the sound propagation models used to inform the calculations. The sound levels at the nearest receptors have been calculated using the internationally accepted guidance within ISO 9513-2:1996 which is implemented by the 3D acoustic modelling software (SoundPLAN) used to predict noise levels from the Mona Offshore Wind Project. This standard claims an accuracy of ±3 dB for source heights up to 30 m and propagation distances between 100 m and 1km.

9.5.3.11 The prediction of noise impacts due to offshore piling activities has been undertaken using numerical methods. The Crank-Nicholson Parabolic Equation has been solved in finite difference form to predict the reduction in noise levels due to long-range propagation over the sea surface. This method has the benefit of incorporating meteorological effects such as atmospheric turbulence, wind speeds, and temperature into calculations to predict the noise levels at onshore receptors. This method is limited at higher frequencies due to the low grid spacings required for the finite difference method and the associated computational power required for accurate predictions. As such, only frequencies up to 250 Hz have been included in the calculations. However, it is only the lower frequencies which would result in impacts onshore due to higher frequencies being reduced by propagation losses such as atmospheric absorption.

9.5.3.12 Vibration levels have been predicted at varying distances from the relevant construction activities using methods outlined in BS 5228-2:2009+A1:2014. These methods are applicable within a limited distance range and equipment parameters (e.g. piling hammer energy, width of vibratory roller). This has been considered within the assessment and conservative assumptions adopted for the equipment used.

9.6 Impact assessment methodology

9.6.1 Overview

9.6.1.1 The noise and vibration impact assessment has followed the methodology set out in Volume 1, Chapter 5: EIA methodology of the Environmental Statement. Specific to the noise and vibration impact assessment, the following guidance documents have also been considered:

- BS 4142:2014+A1:2019 – ‘Methods for rating and assessing industrial and commercial sound (British Standards Institution, 2019)
- BS 5228-1:2009+A1:2014 – ‘Code of practice for noise and vibration control on construction and open sites – Part 1: Noise’ (British Standards Institution, 2014a)
- BS 5228-1:2009+A1:2014 – ‘Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration’ (British Standards Institution, 2014b)
- BS 7385-2:1993 – ‘Evaluation and measurement of vibration in buildings – Part 1: Guide for measurement of vibrations and evaluation of their effects on buildings’ (British Standards Institution, 1993)
- DMRB – LA 111 Noise and vibration (Highways England, Transport Scotland, Llwyodraeth Cymry, Department for Infrastructure, 2020).

9.6.1.2 In addition, the noise and vibration impact assessment has considered the following legislative framework:

- Control of Pollution Act (1974), Chapter 40, Part III
- Environmental Protection Act (1990), Chapter 43, Part III.

9.6.2 Impact assessment criteria

Significance of effects

9.6.2.1 The criteria for determining the significance of effects is a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 5: EIA methodology of the Environmental Statement.

9.6.2.2 The criteria for defining magnitude in this chapter are outlined in Table 9-15 below.

Table 9-15: Definition of terms relating to the magnitude of an impact.

Magnitude of impact	Definition
High	An effect caused by a significant exceedance of a defined limit or standard.
Medium	An effect in relatively close agreement with a defined limit or standard. The range can be broad and thus emphasis is placed on demonstrating that the effect has been reduced to as low as is reasonably practical.
Low	An effect considered sufficiently small, with or without mitigation, to be well within accepted limits or standards. No action is required if it can be controlled by adopting practical means.
Negligible	An effect which is found to be insignificant in the context of the stakeholder and/or regulatory objectives or legislative requirements.
No change	No discernible effect.

9.6.2.3 The definitions in Table 9-15 refer to the assessment of adverse impacts only since it is unlikely that any significant beneficial noise and vibration effects will arise as a result of Mona Offshore Wind Project.

9.6.2.4 The criteria for defining sensitivity in this chapter are outlined in Table 9-16 below.

Table 9-16: Definition of terms relating to the sensitivity of the receptor.

Sensitivity	Definition
Very High	Very high importance and rarity, international scale, and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution
Medium	High or medium importance and rarity, regional scale, limited potential for substitution
Low	Low or medium importance and rarity, local scale
Negligible	Very low importance and rarity, local scale

9.6.2.5 The significance of the effect upon noise and vibration is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The particular method employed for this assessment is presented in Table 9-17. Where a range of significance of effect is presented in Table 9-17, the final assessment for each effect is based upon expert judgement.

9.6.2.6 For the purposes of this assessment, any effects with a significance level of minor or less have been concluded to be not significant in terms of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

Table 9-17: Matrix used for the assessment of the significance of the effect.

Sensitivity of receptor	Magnitude of impact				
	No Change	**Negligible**	**Low**	**Medium**	**High**
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major
Very High	No change	Minor	Moderate or Major	Major	Major

Noise and vibration assessment criteria

9.6.2.7 This section outlines how the qualitative impacts detailed in Table 9-15 can be translated into quantified criteria for use in the assessment of noise and vibration impacts.

Construction noise

9.6.2.8 Impact criteria for construction noise have been determined in accordance with the guidance in DMRB LA111 and Annex E of BS 5228-1:2009+A1:2014. Full details are provided in Volume 7, Annex 9.2: Construction noise and vibration of the Environmental Statement.

9.6.2.9 Section 3 of DMRB LA 111 states provides durations for considering the significance of effect of transient construction works. The construction activities required for the installation of the Mona Onshore Cable Corridor are indeed likely to be transient in nature including:

- Site preparation
  - Fencing
  - Topsoil strip.
- Haul road construction
- Trench excavation and duct installation
- Trench backfill
- Trench route and topsoil reinstatement
- Haul road removal.

9.6.2.10 As such, the following durations are considered in the assessment of significant effects:

'Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

1) 10 or more days in any 15 consecutive days or nights;

2) a total number of days exceeding 40 in any 6 consecutive months'

9.6.2.11 Construction activities, and associated equipment, within the temporary construction compounds are not considered to be transient in nature. However, works are likely to occur for a period of greater than 40 days within a 6-month period. As such, the same durations have been considered in the assessment of all construction activities within the temporary construction compounds.

9.6.2.12 Given the low ambient sound climate in the area surrounding the Mona Onshore Development Area, the lower cut-off values above provide the SOAEL against which construction noise impacts will be assessed.

9.6.2.13 The threshold value (SOAEL) for evenings and weekends applies to the time periods:

- 7pm-11pm on weekdays
- 1pm-11pm on Saturdays
- 7am-11pm on Sundays.

9.6.2.14 No onshore works are proposed on Sundays. However, standard construction working hours are 7am-7pm from Monday to Saturday. The LOAEL for the evenings and weekends has thus been selected as the representative evening levels at each position since this level was noted to be lower and allow for a more robust assessment of the quietest periods.

9.6.2.15 It should be noted that offshore construction works may be undertaken anytime over a 24-hour period and 7-days a week. This has been accounted for within the assessment of offshore piling noise impacts by assessing to the night-time impact criteria.

9.6.2.16 The impact criteria for receptors near the Mona Landfall, along the Onshore Cable Corridor, and around the Mona Onshore Substation location are presented in Table 9-18 below.

Table 9-18: Construction noise criteria

Receptor		LOAEL (dB)			SOAEL (dB)		
		Day $L_{Aeq,12h}$	Evenings and Weekends $L_{Aeq,4h}$	Night $L_{Aeq,8h}$	Day $L_{Aeq,12h}$	Evenings and Weekends $L_{Aeq,4h}$	Night $L_{Aeq,8h}$
Landfall	Troon Way	52	46	42	65	55	45
	Gwrych House	53	50	46	65	55	50
Onshore Cable Corridor	Llys Awel	44	36	35	65	55	45
	Nant Ganol	41	40	34	65	55	45
	Pen-y-Bryn Farm	48	40	38	65	55	45
	Sirior Bach	47	45	43	65	55	50

Receptor		LOAEL (dB)			SOAEL (dB)		
		Day $L_{Aeq,12h}$	Evenings and Weekends $L_{Aeq,4h}$	Night $L_{Aeq,8h}$	Day $L_{Aeq,12h}$	Evenings and Weekends $L_{Aeq,4h}$	Night $L_{Aeq,8h}$
	Bryn Tywydd	39	37	36	65	55	45
	Dinorben Farm	48	47	46	65	55	50
	Tyn-y-Mynydd	40	39	37	65	55	45
	Plas Bryn Celyn	46	43	38	65	55	45
	Ddol Farm	48	38	37	65	55	45
	Carreg Dafydd	40	35	34	65	55	45
	Maes Cefn	47	39	38	65	55	45
Substation	Tyddyn Meredydd	43	42	37	65	55	45
	Waen Meredydd	44	39	36	65	55	45
	Pentre Bach	45	41	40	65	55	45
	Lon Coed Esgob	46	40	37	65	55	45
	Plas yr Esgob	45	41	38	65	55	45
	Lyons Eryl Hall Caravan Park	44	40	35	65	55	45
	Tyn y Ffordd Newydd	43	39	36	65	55	45

Construction traffic

9.6.2.17 There may be a change in local noise levels due to contributions from construction traffic on local road networks and temporary diversion networks during the construction of the Mona Offshore Wind Project.

9.6.2.18 The impact assessment will take account of the absolute level of the road traffic noise and the existing sound levels at the nearest receptors.

9.6.2.19 Impact criteria for these changes have been obtained from the guidance in DMRB LA 111 and are presented in Table 9-19 below.

Table 9-19: Construction traffic criteria.

Magnitude of Impact	Increase in Basic Noise Level (BNL) of closest public road used for construction traffic (dB)
High	BNL ≥ 5
Medium	3 ≤ BNL < 5
Low	1 ≤ BNL < 3
Negligible	BNL < 1

Construction vibration

9.6.2.20 Impact criteria for vibration from construction have been identified based on guidance provided in BS 5228-2:2009+A1:2014. The following outline criteria in defined in Table 9-20 terms of peak particle velocity (PPV) can be used to identify potential significant impacts on nearby receptors.

Table 9-20: Construction vibration criteria.

Magnitude of Impact	Vibration Level, Peak Particle Velocity (PPV), mm/s
High	$1 \leq PPV < 10$
Medium	$0.3 \leq PPV < 1$
Low	$PPV < 0.3$
Negligible	$1 \leq PPV < 10$

Operational noise

9.6.2.21 The significance of noise effects associated with the operations and maintenance of the Mona Onshore Substation has been determined based upon the methodology outlined in BS 4142:2014+A1:2019. This methodology includes calculating the operational rating sound level $L_{Ar,Tr}$ predicted at nearby receptors due to the operation of the Mona Onshore Substation, defined as operational specific sound level plus any acoustic character corrections due to tonality, impulsivity, intermittency, or any other distinct acoustic characteristics.

9.6.2.22 The rating sound level is then compared to the representative background sound level $L_{A90,T}$ at the nearest receptors which is obtained via measurements of the baseline acoustic environment. The difference between the rating sound level and the representative background sound level is used to determine the impacts which can be assessed in accordance with Section 11 of BS 4142:2014+A1:2019, with consideration also required for the context in which the sound has been assessed.

9.6.2.23 Based on the above, the following impact criteria in Table 9-21 have been defined for operational noise.

Table 9-21: Operational noise criteria

Magnitude of impact	BS 4142:2014+A1:2019 semantic description	Difference Δ between rating sound level $L_{Ar,Tr}$ and background sound level $L_{A90,T}$ (dB)
High	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.	$\Delta \geq 10$
Medium	A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.	$5 \leq \Delta < 10$
Low	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.	$0 \leq \Delta < 5$
Negligible		$-10 \leq \Delta \leq 0$

Magnitude of impact	BS 4142:2014+A1:2019 semantic description	Difference Δ between rating sound level $L_{Ar,Tr}$ and background sound level $L_{A90,T}$ (dB)
No change	-	Δ < -10

9.7 Key parameters for assessment

9.7.1 Maximum design scenario

9.7.1.1 The maximum design scenarios identified in Table 9-22 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the Project Design Envelope provided in Volume 1, Chapter 3: Project description of the Environmental Statement. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g. different infrastructure layout), to that assessed here be taken forward in the final design scheme.

Table 9-22: Maximum design scenario considered for the assessment of potential impacts on noise and vibration.

[a] C=construction, O=operations and maintenance, D=decommissioning

Potential impact	Phase[a] C	O	D	Maximum Design Scenario	Justification
Noise impacts due to offshore piling.	✓	×	×	**Construction phase** Piling methods will be adopted for the installation of the foundations for the Offshore Substation Platform (OSP) and wind turbines. • A total of 96 wind turbines will be installed of which a maximum of 64 turbines will be installed using piled jackets, • The piles will be embedded up to 75 m below the seabed with a maximum hammer energy of 4,400 kJ at 16 wind turbine locations and the OSP foundations and 3,000 kJ at 48 turbine locations • The hammer ramp up to the standard operational level although it has been assumed that the hammer will operate at maximum energy for the duration of the piling activities • Two events may occur concurrently with a maximum separation distance of 15 km and a minimum separation distance of 1.4 km • There is potential for piling activities to be undertaken over a full 24-hour period • The strike rate will be up to 80 strikes per minute for approximately 6-hours equating to a total number of approximately 26,000 strikes • Noise levels have been predicted in downwind conditions assuming downward refraction and a flat sea surface.	**Construction phase** The MDS is that the pin piled jacket foundations will be driven into the seabed using piling techniques. – A typical sound power level of L_W = 132-134 dB (A) has been adopted for an indicative assessment obtained from estimations undertaken in liaison with Seiche Ltd and the results of numerical modelling for Volume 5, Annex 3.1: Underwater sound technical report of the Environmental Statement. Full details can be found in Volume 7, Annex 9.2: Construction noise of the Environmental Statement.
Noise and vibration impacts due to the onshore export cables at the Landfall.	✓	×	✓	**Construction phase** Trenchless techniques (e.g., HDD, thrust bore, or other trenchless techniques) will be adopted to construct the Landfall: • Up to four transition joint bays each measuring up to 300 m^2 and up to 4 m deep; with spacing of up to 10 m between each transition joint bay. • The temporary working area for trenchless technique working area will measure up to 2500 m^2	Trenchless techniques at the Mona Landfall represents the MDS as it uses of equipment with higher noise emission levels. It has been assumed that all construction plant will operate close to the boundary of the landfall construction compound nearest to noise sensitive receptors.

Potential impact	Phase[a] C	O	D	Maximum Design Scenario	Justification
				• Major trenchless technique works may require 24-hours works dependent upon requirements • Trenchless techniques to drill the boreholes from the Landfall compound to the subtidal area will be up to nine months in duration split over up to a 24-month period. The installation and jointing of the onshore and export cables at the Transition Joint Bay will be approximately 33 months in duration. • Dewatering of the transition joint bays will be required. • Vibratory piling techniques will be used for the installation of the trenchless techniques entry/exit pits. • Dynamic compaction using vibratory rollers will be required for the installation of the haul road, access routes, and the construction of the construction compound at Landfall. **Decommissioning phase** • It has been assumed that the piles will be removed using vibratory extraction and a mobile crane.	The works have potential for night-time working and thus the assessment has been undertaken with reference to the night-time construction noise impact magnitude criteria. Typical noise levels for the indicative construction plant list have been obtained from the equipment details outlined in BS 5228:2009-1+A1:2014. The assessment of construction vibration impacts has been undertaken based on the guidance in BS 5228:2009-2+A1:2014. A 16-tonne vibratory roller with drum width 2.2 m has been assumed for the dynamic compaction works which is the upper limit at which the equations presented in BS 5228 are valid. Both the assessment of vibratory compaction and vibratory piling impacts have been undertaken assuming a probability of exceedance of 5%.
Vibration impacts due to the Mona Onshore Cable Corridor landward of the transition joint bay.	✓	×	✓	**Construction phase** The construction of the temporary construction compounds and haul road, backfilling of the trenches, and construction of the Mona Onshore Substation Platform groundworks may require the use of vibratory compaction techniques. • The predicted levels of vibration have been undertaken at various distances from the boundary of the temporary construction compounds, Mona Onshore Development Area, and Mona Onshore Substation platform area. • A roller with a mass of up to 20-tonnes may be used to undertake the works.	The MDS is that the trenchless techniques exit pits along the Onshore Cable Corridor will be installed using vibratory piling techniques which can result in high levels of vibration. Typical vibration levels for the indicative construction plant list have been obtained from BS 5228:2009- 2+A1:2014. Dynamic compaction using vibratory rollers represents the MDS since it can generate high levels of vibration for long periods. A 16-tonne roller has been assumed as a

Potential impact	Phase[a] C	O	D	Maximum Design Scenario	Justification
				Decommissioning phase • Mona Onshore Substation facilities will be removed, and the site restored to a comparable condition – Decommissioning has been assessed on the basis that the concrete foundations may be broken up using hydraulic peckers and breakers as well as a pulveriser. The demolished materials may be processed on-site using crushers and screens for disposal as recycled materials. This is unlikely to generate high levels of vibration.	compromise between the levels of vibration potentially generated and the duration for which the plant will be in operation. A roller with a lower mass will generate less vibration, whereas a larger roller will have a larger drum width resulting in vibration generated for a shorter period.
Noise impacts due to the Mona Onshore Cable Corridor landward of the transition joint bay.	✓	×	✓	**Construction Phase** Open cut trenching is proposed to construct the majority of the Mona Onshore Cable Corridor: • The area of the permanent Mona Onshore Cable Corridor is up to 450,000 m^2 based on a corridor measuring 30 m wide and 15 km in length. The temporary working corridor requires an additional 44 m wide corridor making the total width of the Mona Onshore Cable Corridor (temporary and permanent requirements) 74 m wide representing an area up to 1,110,000 m^2 • There are up to four cable trenches within the permanent Mona Onshore Cable Corridor, each trench measures up to 2.5 m wide at the top, up to 1.5 m at the base and the depth is approximately 1.8 m • The maximum number of joint bays along the Onshore Cable Corridor is 80 (based on a minimum distance of 750 m between each joint bay). • The maximum number of link boxes along the Onshore Cable Corridor is 96 (based on a distance of 750 m between each link box) • Dewatering of cable trenches, joint bays and link boxes will be required • A topsoil bund will be in place at a majority of locations along the boundary of the Onshore Cable Corridor Order Limits where open cut trenching works are planned. The topsoil bund will be a maximum of 10m in width and will not exceed 3 m in height. In locations where topsoil	The maximum area required for the construction of the Mona Onshore Cable Corridor, Mona 400kV Grid Connection Corridor and associated infrastructure represent the largest construction area. The working hours and duration of construction present the MDS for noise generation. The MDS is for up to 244 obstacles along the Onshore Cable Corridor and the 400kV Grid Connection Corridor to be crossed using trenchless techniques. Not all locations are known at this stage and the MDS assumes the locations to be coincident with those in Volume 5, Annex 4.3: Onshore Crossing Schedule (F5.4.3 F02). Trenchless techniques requires plant with higher noise levelsThe following indicative plant items and operations would be required: • Trenchless technique locations at Landfall and Gwrych Hill may require 24-hour works with generators in operation to power security lighting

Potential impact	Phase[a] C	O	D	Maximum Design Scenario	Justification
				bunds cannot be installed for operational reasons, alternative measures providing an equivalent level of noise reduction will be considered. • Trenches will be excavated using a mechanical excavator or trenchers and the ducts will be installed from a cable drum trailer into the open trench. The depth of stabilised backfill in each of the four onshore cable trenches is up to 600 mm. Surplus subsoil and topsoil material excavated from the cable trenches, joint bays and link boxes will be spread on site. <u>Open cut trenching along the 400kV Grid Connection Cable Corridor:</u> • The area of the permanent 400kV Grid Connection Cable Corridor is 16,000 m^2 based on a corridor measuring 16 m wide and 1 km in length. The temporary working corridor requires an additional 32 m wide corridor making the total width of the route to grid connection (temporary and permanent requirements) 48 m wide representing an area of up to 64,000m^2 • There are up to two cable trenches within the permanent 400kV Grid Connection Cable Corridor, each trench measures up to 2.5 m wide at the top, up to 1.5 m at the base and the depth is approximately 1 .8 m • The maximum number of joint bays along the 400 kV Grid Connection Cable Corridor is two • The maximum number of link boxes along the 400 kV Grid Connection Cable Corridor is two • Dewatering of cable trenches, joint bays and link boxes will be required • Trenches will be excavated using a mechanical excavator or trenchers and the ducts will be installed into the open trench. The depth of stabilised backfill in each of the two onshore cable trenches is up to 600 mm Surplus subsoil and topsoil material excavated from the cable trenches, joint bays and link boxes will be spread on site. <u>Trenchless techniques</u> • A maximum of 244 obstacles along the Onshore Cable Corridor and the 400kV Grid Connection Corridor are to be crossed using trenchless	• Water/mud pumps will be in operation 24-hours a day • Mixing and recycling systems will operate 24-hours a day. The MDS is for up to 80 joint bays along the Onshore Cable Corridor and two along the 400kV Grid Connection Cable Corridor. Not all locations are known at this stage and is assumed that these will be located approximately 10m from the edge of the Onshore Cable Corridor and 400kV Grid Connection Cable Corridor limits. Water pumps will be in operation 24 hours a day at joint bays along the Onshore Cable Corridor. The MDS assumes a topsoil bund of maximum 10m width (Document reference S_D1_5.6) will be in place along a majority of the boundary of the Onshore Cable Corridor Order Limits during the construction works associated with open cut trenching. Paragraph 1.11.2.1 of the Outline Soil Management Plan specifies that the height of the topsoil bund will not exceed 3m in height. The height of the bund in assumed in the construction noise assessment has been conservatively set at 2.5m. In locations where topsoil bunds cannot be installed for operational reasons, alternative measures

Potential impact	Phase[a] C	O	D	Maximum Design Scenario	Justification
				techniques. The temporary works area for trenchless techniques will measure up to 2,500 and will be located within the temporary construction corridor. Haul road • There is one haul road within the Mona Onshore Cable Corridor and Mona 400 kV Grid Connection Cable Corridor for the length of the corridor; up to 6 m wide excluding passing places. It will be constructed using imported engineered granular fill with geotextile layers with a nominal thickness of 400 mm and a maximum thickness of up to 1000 mm. Construction compounds • One primary construction compound (measuring up to 22,500 m^2) and up to four secondary construction compounds (each measuring up to 15,000 m^2) will be located within the Mona Onshore Development Area. Soils will be removed and stored for future reinstatement, Crushed stone or other suitable material will be used to create the required hardstanding. Duration and timing of works • The installation duration will be around 33 months • The works will be undertaken continuously at multiple locations between 7am and 7pm Monday to Saturday. No works are proposed on Sundays. Some trenches may require water to be removed whereby a pump, welfare unit, and generator will be installed to undertake the works. Water pumping may require that works be undertaken over a full 24-hour period. **Decommissioning phase** • The onshore cable and Mona 400kV Grid Connection Cable will remain in situ but other onshore infrastructure (e.g. the link boxes) may be removed.	providing an equivalent level of noise reduction will be considered. An indicative construction plant list has been applied and typical noise levels obtained from BS 5228:2009-1+A1:2014

Potential impact	Phase[a] C	O	D	Maximum Design Scenario	Justification
Noise impacts due to construction vehicles on the local highway networks.	✓	×	✓	**Construction phase** • Construction traffic (HGVs, construction plant, etc.) will contribute to increased vehicular flows on local highway networks thus leading to a potential increase in local traffic noise levels. • Baseline traffic flows and predicted construction traffic flows have been assessed assuming a construction year of 2026. • The maximum duration of construction of the Mona Onshore Cable Corridor will be 33 months. • The number of HGVs on local highway networks is expected to increase by up to 41%. **Decommissioning phase** • Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).	The assessment has been undertaken assuming a construction year of 2026 to account for any potential increases in traffic flows. Decommissioning is likely to operate within the parameters identified for construction.
Noise impacts due to the Onshore Substation.	✓	✓	✓	**Construction phase** • The maximum footprint of the Onshore Substation will measure 65,000 m^2: this area will include the substation buildings. The earthworks to create the platform will measure up to 75,000 m^2. The Mona Onshore Substation will comprise up to four buildings. The maximum dimensions of the main building are 15 m high, 40 m wide and 90 m long • Access to the substation will be via a new permanent access road measuring up to 15 m wide and 800 m in length.The maximum area for attenuation pond is 10,000 m^2 • A temporary works area of 150,000 m^2 will be required to support the construction of the substation. • Abnormal load trailers will be required to transport elements of the substation plant to site	The assessment has considered the following: • Site clearance using CAT 320 tracked excavators and rock breakers • Piling using a four-tonne hydraulic hammer rig. This is not the most likely piling method but has been adopted as the MDS • Dewatering pumps may be in operation 24-hours a day • Diesel generators for welfare and storage areas, as well as security lighting in operation 24-hours a day

Potential impact	Phase[a] C	O	D	Maximum Design Scenario	Justification
				• Significant noise-generating items include rock breakers/concrete munchers, piling rigs, trenchless technique drilling rigs, and plant such as diesel-powered generators, diesel compressors, and pumps • The construction works are likely to last for up to 33 months. **Operations and maintenance phase** • The following items are to be installed externally: – Super Grid Transformers (inc. Coolers) – Shunt Reactors (inc. Coolers) – Dynamic reactive power compensator (DRC) phase reactors (inc. Coolers) – Mechanically switched reactors – Harmonic filters – Auxiliary transformers – DRC and control building heating, ventilation, and air-conditioning units • The proposed substation plant will have distinct acoustic characteristics and will require corrections in line with the guidance in BS 4142:2014+A1:2019: – The Super Grid Transformers and Shunt Reactors have tonal components at the lower frequencies of their noise emission spectra. A +4d B acoustic character correction has been applied to the level predicted at all receptors where noise from these plant items have the highest contribution. This corresponds to a 'clearly perceptible' tonal component in terms of BS 4142:2014+A1:2019 – Most plant items will operate intermittently and thus a +3 dB acoustic character correction has been applied to the predicted level at all receptors when the specific sound level (without character corrections) exceeds the background sound level	• Equipment installation using articulated trucks and cranes. • An indicative construction plant list has been required and typical noise levels obtained from BS 5228:2009-1+A1:2014. It is unlikely that the works will be undertaken along the boundary of the construction compounds however this represents the shortest distance to nearby receptors. A detailed assessment of the operation of the Mona Onshore Substation has been undertaken by applying representative frequency content for similar plant items to the indicative, broadband (single-figure) noise levels provided by the Applicant. The acoustic characteristics may not be as influential once the plant is enclosed within acoustic enclosures however this represents the MDS.

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				– The predicted level at receptors where the Super Grid Transformers and/or Shunt Reactors dominate and where the rating sound level exceeds background sound level has been corrected by +7dB to account for both of the above acoustic characteristics. **Decommissioning phase** • Mona Onshore Substation facilities will be removed, and the site restored to a comparable condition – Decommissioning has been assessed on the basis that the concrete foundations will be broken up using hydraulic breakers and munchers. The demolished materials may be processed on-site using crushers and screens for disposal as recycled materials. – Lorries will be used to remove the materials and equipment from the site.	

9.8 Measures adopted as part of the Mona Offshore Wind Project

9.8.1.1 For the purposes of the EIA process, the term 'measures adopted as part of the project' is used to include the following measures (adapted from IEMA, 2016):

- Measures included as part of the project design. These include modifications to the location or design of the Mona Offshore Wind Project which are integrated into the application for consent. These measures are secured through the consent itself through the description of the development and the parameters secured in the DCO and/or marine licences (referred to as primary mitigation in IEMA, 2016)
- Measures required to meet legislative requirements, or actions that are generally standard practice used to manage commonly occurring environmental effects and are secured through the DCO requirements and/or the conditions of the marine licences (referred to as tertiary mitigation in IEMA, 2016).

9.8.1.2 A number of measures (primary and tertiary) have been adopted as part of the Mona Offshore Wind Project to reduce the potential for impacts on noise and vibration. These are outlined in Table 9-23 below. As there is a commitment to implementing these measures, they are considered inherently part of the design of the Mona Offshore Wind Project and have therefore been considered in the assessment presented in section 9.9 below (i.e. the determination of magnitude and therefore significance assumes implementation of these measures).

Table 9-23: Measures adopted as part of the Mona Offshore Wind Project.

Measures adopted as part of the Mona Offshore Wind Project	Justification	How the measure will be secured
Primary measures: Measures included as part of the project design		
The following noise control measures will be considered in the design of the Mona Onshore Substation to achieve the operational noise limit of 34dB(A): • The orientation and layout of the Mona Onshore Substation will be designed to minimise noise levels at nearby receptors • Quieter equipment will be selected, where available and practicable (e.g. the inclusion of harmonic filters in the plant strategy) and mitigation measures such as acoustic barriers and enclosures will be specified where necessary • The main equipment will either be housed within a single or multiple buildings, in an open space or a combination of buildings and open space. There may also be some smaller buildings required to house components such as smaller equipment and control rooms.	To minimise noise and vibration, where reasonably practicable.	The layout and orientation of the Mona Onshore Substation will be secured in the design principles document (Document J3). Operational limit will be secured as a requirement of the DCO.
Tertiary measures: Measures required to meet legislative requirements, or adopted standard industry practice		
A Construction Noise and Vibration Plan will be prepared; it will be in line with the Outline Construction Noise and Vibration Plan (Document Reference J26.3) It will include construction noise and vibration limits and BPM to mitigate noise from construction activities associated with the Mona Offshore Wind Project.	To ensure compliance with local authority requirements. Minimisation of noise impacts due to construction noise and vibration.	A CoCP will be secured as a requirement of the DCO and will include a Construction Noise and Vibration Management Plan outlining details of BPM to be adopted to minimise noise and vibration impacts at nearby receptors.

Measures adopted as part of the Mona Offshore Wind Project	Justification	How the measure will be secured
The Mona Onshore Substation will operate within the noise limit of 34 dB(A).	Minimisation of noise impacts due to operational noise and vibration.	The operational noise limit will be agreed with DCC and secured as a requirement of the DCO.

9.8.1.3 Where significant effects have been identified, further mitigation measures (referred to as secondary mitigation in IEMA, 2016) have been identified to reduce the significance of effect to acceptable levels following the initial assessment. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment. These measures are set out, where relevant, in section 9.9 below.

9.9 Assessment of significant effects

9.9.1 Overview

9.9.1.1 The impacts of the construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project have been assessed on noise and vibration. The potential impacts arising from the construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project are listed in Table 9-22, along with the MDS against which each impact has been assessed.

9.9.1.2 A description of the potential effect on noise and vibration receptors caused by each identified impact is given below.

9.9.2 Noise impacts due to the offshore piling

9.9.2.1 The construction of offshore foundations and wind turbines may lead to negligible impacts during the day, evening, and night-time periods. The MDS is represented by the installation of the pin-piled jacket foundations via piling methods as presented in Table 9-22.

9.9.2.2 The exact location and techniques adopted for the piling works is not yet known and thus predictions have been undertaken for construction noise levels over a range of distances to determine at what distances impacts are reduced. Only the night-time construction criteria have been considered for this activity since this is when impacts are likely to be greater.

9.9.2.3 Operational noise impacts due to the Offshore Cable Corridor and Array Area have been scoped out of this assessment and thus only construction noise impacts are considered.

Construction phase

Magnitude of impact

9.9.2.4 The distance between the boundary of the Mona Offshore Array Area and onshore receptors is approximately 34 km The prediction of noise levels onshore due to the piling activities have been calculated assuming downwind conditions which results in a slower rate of attenuation of the sound waves propagating towards the receptor. Full details are provided in Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement.

9.9.2.5 The higher sound frequencies (above around 4 kHz), the majority of the sound energy is attenuated via atmospheric absorption. The energy at lower frequencies is highly attenuated due to the large source-receiver separation distances.

9.9.2.6 The results show that no high impacts are predicted at distances greater than 4 km from the boundary of the Mona Array Area, with no medium impacts beyond 9 km. As such, the magnitude of impact is predicted to be **negligible**.

Sensitivity of the receptor

9.9.2.7 The nearest receptors are residential in nature with works assumed to be undertaken during night-time periods where residents are likely to be more sensitive to noise. As such, the sensitivity of the receptors is considered to be **high**.

Significance of the effect

9.9.2.8 The exact equipment required and the location of works are not yet known and thus there is a degree of uncertainty to the significance of effects determined. This has been addressed by adopting precautionary thresholds, predicting the source noise levels by scaling the levels of high-energy piling equipment (see Volume 7, Annex 9.2: Construction Noise and Vibration of the ES), and considering the distances at which the various effects might occur.

9.9.2.9 Overall, the magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be high. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Decommissioning phase

9.9.2.10 Decommissioning is likely to operate within the parameters identified for construction. As such, decommissioning activities for the offshore elements will be limited to within the construction working areas and require a duration no greater than the activities assessed as part of the construction phase.

9.9.2.11 Overall, the magnitude of the impact is negligible and the sensitivity of the residential receptors is high. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

9.9.3 Noise impacts due to the onshore export cables at Landfall

9.9.3.1 The construction works at Landfall will comprise the following:

- Establish access and construct the temporary construction compound
- Transition joint bay excavation
- Transition joint bay and base construction
- Trenchless techniques and associated works to drill the boreholes followed by the pull through of the offshore export cables.
- Connection of onshore and offshore export cables
- Backfill over the Transition joint bay.

9.9.3.2 The exact locations where works will be carried out is not yet known and thus predictions have been undertaken assuming all plant will be situated along the boundary of the landfall construction compound closest to receptors. Full details of the construction noise and vibration impact assessment are provided in Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement.

9.9.3.3 Measures to manage construction noise and vibration will be set out in a Construction Noise and Vibration Management Plan which forms part of the Outline CoCP. Example measures and the typical noise reduction losses achievable by these measures have been included in the assessment based on the guidance presented in Annex B of BS 5228 – 1:2009+A1:2014. The losses assumed are those typically associated with the BPM outlined in the Outline CoCP (Document Reference J26). Full details of the mitigation measures assumed can be found in Construction Noise and Vibration Plan (Document Reference J26.3).

9.9.3.4 Operational noise impacts due to the onshore export cable have been scoped out of this assessment and thus only construction noise impacts are considered.

Construction phase

Magnitude of impact

9.9.3.5 The noise impacts due to construction activities at landfall have been predicted at receptors within the noise and vibration study area.

9.9.3.6 The maximum predicted noise levels due to construction works within the landfall compound area during the relevant construction period are presented in Table 9-24 below. The periods assessed include:

- Day:
  - 7am to 7pm on weekdays
  - 7am to 1pm on Saturdays
- Evening and weekends:
  - 7pm to 11pm on weekdays
  - 1pm to 11pm on Saturdays
  - 7am to 11pm on Sundays

9.9.3.7 The construction activities likely to require night-time working are those associated with trenchless techniques and dewatering of excavations. As such, the night-time period (11pm to 7am every day) has also been considered as part of the assessment of noise impacts from these construction activities and these are presented in Table 9-25 and Table 9-26 respectively .

Table 9-24: Construction noise impacts at receptors near Landfall (except night-time dewatering of excavations and trenchless techniques)

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Caravans (Castle Cove Holiday Park)	Establish access and temporary construction compounds	Day	35	53	65	**Negligible**
		Evening/Weekend	35	50	55	**Negligible**
Dwellings on Cae Eithin (South)	Establish access and temporary construction compounds	Day	37	52	65	**Negligible**
		Evening/Weekend	37	46	55	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Dwellings on Cae Eithin (West)	Establish access and temporary construction compounds	Day	38	52	65	**Negligible**
		Evening/Weekend	38	46	55	**Negligible**
Gwrych Castle	Establish access and temporary construction compounds	Day	34	53	65	**Negligible**
		Evening/Weekend	34	50	55	**Negligible**
Gwyrch Cottage	Establish access and temporary construction compounds	Day	47	53	65	**Negligible**
		Evening/Weekend	47	50	55	**Negligible**
Gwyrch House	Establish access and temporary construction compounds	Day	45	53	65	**Negligible**
		Evening/Weekend	45	50	55	**Negligible**
Hen Wrych Farm	Establish access and temporary construction compounds	Day	43	53	65	**Negligible**
		Evening/Weekend	43	50	55	**Negligible**
Hen Wrych Hall	Establish access and temporary construction compounds	Day	40	53	65	**Negligible**
		Evening/Weekend	40	50	55	**Negligible**
Hen Wrych Lodge	Establish access and temporary construction compounds	Day	44	53	65	**Negligible**
		Evening/Weekend	44	50	55	**Negligible**
Henblas	Joint Bay Base Construction	Day	45	44	65	**Low**
		Evening/Weekend	45	36	55	**Low**
Justholme	Establish access and temporary construction compounds	Day	43	53	65	**Negligible**
		Evening/Weekend	43	50	55	**Negligible**
North Wales Business Park	Establish access and temporary construction compounds	Day	35	52	65	**Negligible**
		Evening/Weekend	35	46	55	**Negligible**
Northern Towers	Establish access and temporary construction compounds	Day	36	53	65	**Negligible**
		Evening/Weekend	36	50	55	**Negligible**
Nursery Cottage	Establish access and temporary construction compounds	Day	49	53	65	**Negligible**
		Evening/Weekend	49	50	55	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Plas Tan yr Ogof	Establish access and temporary construction compounds	Day	36	53	65	**Negligible**
		Evening/Weekend	36	50	55	**Negligible**
Ty Crwn	Establish access and temporary construction compounds	Day	39	53	65	**Negligible**
		Evening/Weekend	39	50	55	**Negligible**

Table 9-25: Construction noise impacts at receptors near Landfall due to trenchless techniques

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Caravans (Castle Cove Holiday Park)	Trenchless techniques	Day	33	53	65	**Negligible**
		Evening/Weekend	33	50	55	**Negligible**
		Night	33	46	50	**Negligible**
Dwellings on Cae Eithin (South)	Trenchless techniques	Day	33	52	65	**Negligible**
		Evening/Weekend	33	46	55	**Negligible**
		Night	33	42	45	**Negligible**
Dwellings on Cae Eithin (West)	Trenchless techniques	Day	35	52	65	**Negligible**
		Evening/Weekend	35	46	55	**Negligible**
		Night	35	42	45	**Negligible**
Gwrych Castle	Trenchless techniques	Day	30	53	65	**Negligible**
		Evening/Weekend	30	50	55	**Negligible**
		Night	30	46	50	**Negligible**
Gwrych Cottage	Trenchless techniques	Day	43	53	65	**Negligible**
		Evening/Weekend	43	50	55	**Negligible**
		Night	43	46	50	**Negligible**
Gwrych House	Trenchless techniques	Day	41	53	65	**Negligible**
		Evening/Weekend	41	50	55	**Negligible**
		Night	41	46	50	**Negligible**
Hen Wrych Farm	Trenchless techniques	Day	39	53	65	**Negligible**
		Evening/Weekend	39	50	55	**Negligible**
		Night	39	46	50	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Hen Wrych Hall	Trenchless techniques	Day	38	53	65	**Negligible**
		Evening/Weekend	38	50	55	**Negligible**
		Night	38	46	50	**Negligible**
Hen Wrych Lodge	Trenchless techniques	Day	41	53	65	**Negligible**
		Evening/Weekend	41	50	55	**Negligible**
		Night	41	46	50	**Negligible**
Henblas	Trenchless techniques	Day	44	44	65	**Low**
		Evening/Weekend	44	36	55	**Low**
		Night	44	35	45	**Low**
Justholme	Trenchless techniques	Day	40	53	65	**Negligible**
		Evening/Weekend	40	50	55	**Negligible**
		Night	40	46	50	**Negligible**
North Wales Business Park	Trenchless techniques	Day	32	52	65	**Negligible**
		Evening/Weekend	32	46	55	**Negligible**
		Night	32	42	45	**Negligible**
Northern Towers	Trenchless techniques	Day	34	53	65	**Negligible**
		Evening/Weekend	34	50	55	**Negligible**
		Night	34	46	50	**Negligible**
Nursery Cottage	Trenchless techniques	Day	44	53	65	**Negligible**
		Evening/Weekend	44	50	55	**Negligible**
		Night	44	46	50	**Negligible**
Plas Tan yr Ogof	Trenchless techniques	Day	34	53	65	**Negligible**
		Evening/Weekend	34	50	55	**Negligible**
		Night	34	46	50	**Negligible**
Ty Crwn	Trenchless techniques	Day	35	53	65	**Negligible**
		Evening/Weekend	35	50	55	**Negligible**
		Night	35	46	50	**Negligible**

Table 9-26 Construction noise impacts at receptors near Landfall due to dewatering of excavations during night-time

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Caravans (Castle Cove Holiday Park)	Dewatering of excavations	Night	33	46	50	**Negligible**
Dwellings on Cae Eithin (South)	Dewatering of excavations	Night	33	42	45	**Negligible**
Dwellings on Cae Eithin (West)	Dewatering of excavations	Night	35	42	45	**Negligible**
Gwrych Castle	Dewatering of excavations	Night	30	46	50	**Negligible**
Gwyrch Cottage	Dewatering of excavations	Night	43	46	50	**Negligible**
Gwyrch House	Dewatering of excavations	Night	41	46	50	**Negligible**
Hen Wrych Farm	Dewatering of excavations	Night	39	46	50	**Negligible**
Hen Wrych Hall	Dewatering of excavations	Night	38	46	50	**Negligible**
Hen Wrych Lodge	Dewatering of excavations	Night	41	46	50	**Negligible**
Henblas	Dewatering of excavations	Night	38	35	45	**Low**
Justholme	Dewatering of excavations	Night	40	46	50	**Negligible**
North Wales Business Park	Dewatering of excavations	Night	32	42	45	**Negligible**
Northern Towers	Dewatering of excavations	Night	34	46	50	**Negligible**
Nursery Cottage	Dewatering of excavations	Night	44	46	50	**Negligible**
Plas Tan yr Ogof	Dewatering of excavations	Night	34	46	50	**Negligible**
Ty Crwn	Dewatering of excavations	Night	35	46	50	**Negligible**

Sensitivity of the receptor

9.9.3.8 The nearest receptors to the Mona Landfall are predominantly residential in nature and the works are proposed to be undertaken during the daytime. As such the receptors are considered to be of **medium** sensitivity for all works except trenchless techniques. This includes commercial receptors on North Wales Business Park.

9.9.3.9 The trenchless techniques works are likely to require night-time working. As such, the receptors are considered to be of **high** sensitivity at night.

Significance of the effect

9.9.3.10 The results in Table 9-24 above show that the highest impacts at a majority of receptors are predicted to arise from the works required to establish the temporary construction compound and access at the Mona Landfall. However, the baseline sound survey results show that the ambient noise levels at these receptors is generally higher due to their proximity to the A547 and A55 and thus resulting impacts are negligible The exception is Henblas at which a low impacts is predicted to be from the construction of a joint bay base close to the property.

9.9.3.11 Two non-residential properties, namely Gwrych Castle and North Wales Business Park have been considered. The impacts at North Wales Business Park have been considered during the daytime only since the buildings are unlikely to be occupied during the evening or weekend periods. Gwrych Castle is open to the public on weekends until 5pm and thus has been assessed to the evening and weekend noise thresholds. The impacts at these properties are predicted to be negligible.

9.9.3.12 Overall, the magnitude of impact is **low** overall during the daytime and weekend periods. The receptors are of medium sensitivity during this period and thus the effect will therefore be of **minor adverse** significance, which is not significant in EIA terms.

9.9.3.13 The results in Table 9-25 above show that with the mitigation measures in the Outline Construction Noise and Vibration Plan (Document Reference J26.3) in place, the impacts due to trenchless techniques are predicted to be low to negligible during the daytime, weekend and night-time periods. Low to negligible impacts are also predicted to occur due to the dewatering of excavations during the night-time period, as shown in Table 9-26.

9.9.3.14 As stated in paragraph 9.9.3.9 above, the receptors are considered to be of high sensitivity during the night-time period and thus the effect will be of minor or moderate adverse significance at receptors where impacts magnitudes are low.

9.9.3.15 It should be noted that all construction activities within at the Mona Landfall compound have been modelled assuming the construction plant will be close to the site boundary next to the most exposed noise-sensitive receptors. This is unlikely to be the case and the construction works will more likely be spread across the whole landfall construction compound.

9.9.3.16 As such, the overall effect due to trenchless techniques and dewatering of excavations will be of **minor adverse** significance which is not significant in EIA terms.

Decommissioning phase

9.9.3.17 Decommissioning works at the Mona Landfall will be limited to the removal of the link boxes adjacent to each Transition Joint Bay (TJB). As such, decommissioning activities will be limited to within the construction working areas and require a duration no greater than the activities assessed as part of the construction phase.

9.9.3.18 Overall, the magnitude of the impact is negligible and the sensitivity of the residential receptors is high. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

9.9.4 Future monitoring

9.9.4.1 Depending on the locations of the construction works and the activities required, a noise monitoring strategy will be agreed as part of the Construction Noise and Vibration Plan (Document Reference J26.3) with the relevant stakeholders to ensure compliance with the agreed noise threshold values.

9.9.5 Noise impacts due to the Mona Onshore Cable Corridor landward of the transition joint bay

9.9.5.1 The majority of the Mona Onshore Cable Corridor will be installed using open-cut trenching techniques with trenchless techniques adopted at locations identified within the crossing register.

9.9.5.2 Two methodologies have been adopted to determine the potential noise impacts depending on whether the activity is likely to be concentrated within a single area or spread along sections of the Onshore Cable Corridor. full details outlined in Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement.

9.9.5.3 Some construction activities will require works to be concentrated in one area along the Mona Onshore Cable Corridor. The construction noise impacts have been predicted via 3D acoustic modelling using SoundPLAN v8.2. The construction activities assessed via this method include:

- Establishing access and temporary construction compounds
- Transition Joint Bay (TJB) and joint bay excavation
- TJB and joint bay base construction
- Jointing of cables in TJBs and joint bays
- Backfill over TJB and joint bays
- Trenchless technique compounds entry/exit pits
- Onshore Substation construction:
  - Groundworks
  - Building foundation works
- Building fabrication and plant installation

9.9.5.4 Since the open cut trenching works are transient in nature and will be spread along the full length of the Onshore Cable Corridor, an alternative assessment methodology has been adopted. A calculation of the noise impacts has been undertaken at various distances from the boundary of the Mona Onshore Cable Corridor and, subsequently, analysis of the number of residential receptors where a significant impact is predicted has been undertaken using Ordinance Survey (OS) AddressBase Plus data and Geographic Information System (GIS) software. The works assessed using this method include:

- Site clearance
  - Fencing
  - Topsoil strip and bunding.
- Haul road construction
- Trench excavation and duct installation

- Trench backfill
- Trench route and topsoil reinstatement
- Haul road removal.

9.9.5.5 The assessment includes the typical losses associated with best practicable means such as acoustic barriers, acoustic sheds around bore drills, and more efficient exhausts on moving plant. Full details are provided in Construction Noise and Vibration Plan (Document Reference J26.3).

9.9.5.6 Finally, the introduction of additional construction vehicles on local highways may increase noise levels at receptors close to the road. A construction traffic noise assessment has been undertaken and is detailed in Volume 7, Annex 9.2: Construction Noise and Vibration Plan of the Environmental Statement.

Construction phase

Magnitude of impact

9.9.5.7 The noise impacts due to construction activities concentrated to within one area along the Mona Onshore Cable Corridor and near to Onshore Substation have been predicted at receptors within the noise and vibration study area. The results for the worst-case activities concentrated are presented in Table 9-27 and Table 9-28 below for all activities except trenchless techniques which are reported in Table 9-29 (receptors along Onshore Cable Corridor) and Table 9-31 (receptors near to the Onshore Substation). However, the trenchless techniques works planned along the Onshore Cable Corridor are non-complex and such works will be undertaken in accordance with the working hours in Requirement 14(1) of the dDCO. If trenchless techniques works are required outside of these working hours in these non-complex locations, the relevant planning authority will be notified in accordance with Requirement 14(3) or 14(5) of the dDCO.

9.9.5.8 However, there is the potential for dewatering of excavations to be undertaken during night-time hours and impacts from this activity is presented in Table 9-30 (receptors along Onshore Cable Corridor) and Table 9-32 (receptors near to Onshore Substation).

Table 9-27: Construction noise impacts at receptors along the Onshore Cable Corridor for activities concentrated in one area (Onshore Cable Corridor).

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Bryn Bela	Establish access and temporary construction compounds	Day	41	39	65	**Low**
		Evening/Weekend	41	37	55	**Low**
Roberts Caravan Park	Joint bay base construction	Day	50	47	65	**Low**
		Evening/Weekend	50	45	55	**Low**
Penrefail Cottage		Day	48	47	65	**Low**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
	Establish access and temporary construction compounds	Evening/Weekend	48	45	55	**Low**
Sirior Bach	Establish access and temporary construction compounds	Day	38	47	65	**Negligible**
		Evening/Weekend	38	45	55	**Negligible**
Ffynnon Meifod	Joint bay base construction	Day	40	40	65	**Negligible**
		Evening/Weekend	40	39	55	**Low**
Meiford Lodge	Joint bay base construction	Day	49	46	65	**Low**
		Evening/Weekend	49	43	55	**Low**
Nant Meifod	Joint bay base construction	Day	37	40	65	**Negligible**
		Evening/Weekend	37	39	55	**Negligible**
Sarn Rug	Establish access and temporary construction compounds	Day	46	46	65	**Low**
		Evening/Weekend	46	43	55	**Low**
The Barn	Joint bay base construction	Day	40	40	65	**Low**
		Evening/Weekend	40	39	55	**Low**
The Gardeners Cottage	Joint bay base construction	Day	40	40	65	**Negligible**
		Evening/Weekend	40	39	55	**Low**
Bryn Hen	Joint bay base construction	Day	46	40	65	**Low**
		Evening/Weekend	46	35	55	**Low**
Bryn y Pin	Establish access and temporary construction compounds	Day	40	46	65	**Negligible**
		Evening/Weekend	40	43	55	**Negligible**
Bryn y Pin Cottage	Joint bay base construction	Day	40	46	65	**Negligible**
		Evening/Weekend	40	43	55	**Negligible**
Bryn y Pin Mawr	Joint bay base construction	Day	41	46	65	**Negligible**
		Evening/Weekend	41	43	55	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Grouse Lodge	Joint bay base construction	Day	42	46	65	**Negligible**
		Evening/Weekend	42	43	55	**Negligible**
Llys Awel	Joint bay base construction	Day	40	44	65	**Negligible**
		Evening/Weekend	40	36	55	**Low**
Ffynnonau Farm	Joint bay base construction	Day	44	48	65	**Negligible**
		Evening/Weekend	44	40	55	**Low**
Springhill	Joint bay base construction	Day	45	48	65	**Negligible**
		Evening/Weekend	45	40	55	**Low**
Tan y Bryn	Joint bay base construction	Day	39	43	65	**Negligible**
		Evening/Weekend	39	42	55	**Negligible**
Bryntwydd	Joint bay base construction	Day	36	39	65	**Negligible**
		Evening/Weekend	36	37	55	**Negligible**
Pwll Y Cibau Bach	Joint bay base construction	Day	49	39	65	**Low**
		Evening/Weekend	49	37	55	**Low**
Bryn Gwynt	Joint bay base construction	Day	48	48	65	**Low**
		Evening/Weekend	48	47	55	**Low**
Merlyn	Joint bay base construction	Day	52	48	65	**Low**
		Evening/Weekend	52	47	55	**Low**
Gwel Y Mor	Joint bay base construction	Day	40	48	65	**Negligible**
		Evening/Weekend	40	47	55	**Negligible**
Glandyfr	Joint bay base construction	Day	46	48	65	**Negligible**
		Evening/Weekend	46	47	55	**Negligible**
Ffynnon Dyfyr		Day	46	48	65	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
	Joint bay base construction	Evening/Weekend	46	47	55	**Negligible**
Ffynnon Wen	Joint bay base construction	Day	31	40	65	**Negligible**
		Evening/Weekend	31	39	55	**Negligible**
Tyn Y Mynydd	Joint bay base construction	Day	30	40	65	**Negligible**
		Evening/Weekend	30	39	55	**Negligible**
Pistyll	Joint bay base construction	Day	35	40	65	**Negligible**
		Evening/Weekend	35	39	55	**Negligible**
Nant Bach	Joint bay base construction	Day	44	46	65	**Negligible**
		Evening/Weekend	44	43	55	**Low**
Caer Clawdd	Joint bay base construction	Day	50	46	65	**Low**
		Evening/Weekend	50	43	55	**Low**
Plas Hafod	Joint bay base construction	Day	44	47	65	**Negligible**
		Evening/Weekend	44	39	55	**Low**
Plas Newydd	Joint bay base construction	Day	41	40	65	**Low**
		Evening/Weekend	41	35	55	**Low**
Carreg Dafydd	Joint bay base construction	Day	48	40	65	**Low**
		Evening/Weekend	48	35	55	**Low**
Nant Ganol	Joint bay base construction	Day	47	41	65	**Low**
		Evening/Weekend	47	40	55	**Low**

Table 9-28 Construction noise impacts at receptors near Onshore Substation for activities concentrated in one area

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Bryn Arian	Joint bay base construction	Day	36	45	65	**Negligible**
		Evening/Weekend	36	41	55	**Negligible**
Cae Llwyd	Establish access and temporary construction compounds	Day	41	43	65	**Negligible**
		Evening/Weekend	41	42	55	**Negligible**
Cae Pwll	Establish access and temporary construction compounds	Day	30	43	65	**Negligible**
		Evening/Weekend	30	39	55	**Negligible**
Caer Delyn	Establish access and temporary construction compounds	Day	37	46	65	**Negligible**
		Evening/Weekend	37	40	55	**Negligible**
Carreg Wen	Establish access and temporary construction compounds	Day	35	46	65	**Negligible**
		Evening/Weekend	35	40	55	**Negligible**
Cefn Farm	Establish access and temporary construction compounds	Day	33	43	65	**Negligible**
		Evening/Weekend	33	39	55	**Negligible**
Craig Llwyd	Joint bay base construction	Day	38	45	65	**Negligible**
		Evening/Weekend	38	41	55	**Negligible**
Derwen Deg	Establish access and temporary construction compounds	Day	36	46	65	**Negligible**
		Evening/Weekend	36	40	55	**Negligible**
Groesffordd Farm	Establish access and temporary construction compounds	Day	36	45	65	**Negligible**
		Evening/Weekend	36	41	55	**Negligible**
Isfryn	Establish access and temporary construction compounds	Day	40	47	65	**Negligible**
		Evening/Weekend	40	39	55	**Low**
Maes	Joint bay base construction	Day	57	47	65	**Low**
		Evening/Weekend	57	39	55	**Medium**
Pant Farm	Joint bay base construction	Day	26	43	65	**Negligible**
		Evening/Weekend	26	39	55	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Pentre Bach	Joint bay base construction	Day	46	45	65	**Low**
		Evening/Weekend	46	41	55	**Low**
Pentre Mawr Farm	Joint bay base construction	Day	41	45	65	**Negligible**
		Evening/Weekend	41	41	55	**Low**
Pentre Meredydd	Joint bay base construction	Day	47	43	65	**Low**
		Evening/Weekend	47	42	55	**Low**
Plas yr Esgob	Establish access and temporary construction compounds	Day	35	46	65	**Negligible**
		Evening/Weekend	35	40	55	**Negligible**
Rhos Aber	Establish access and temporary construction compounds	Day	30	43	65	**Negligible**
		Evening/Weekend	30	39	55	**Negligible**
Squirrels Lodge	Establish access and temporary construction compounds	Day	30	43	65	**Negligible**
		Evening/Weekend	30	39	55	**Negligible**
Tan y Bryn	Joint bay base construction	Day	39	43	65	**Negligible**
		Evening/Weekend	39	42	55	**Negligible**
Tan y Bryn Uchaf	Establish access and temporary construction compounds	Day	41	43	65	**Negligible**
		Evening/Weekend	41	42	55	**Negligible**
Tan y Graig	Joint bay base construction	Day	30	43	65	**Negligible**
		Evening/Weekend	30	39	55	**Negligible**
Trebanog	Joint bay base construction	Day	36	45	65	**Negligible**
		Evening/Weekend	36	41	55	**Negligible**
Ty Celyn	Establish access and temporary construction compounds	Day	37	43	65	**Negligible**
		Evening/Weekend	37	39	55	**Negligible**
Tyddyn Meredydd		Day	54	43	65	**Low**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
	Joint bay base construction	Evening/Weekend	54	42	55	**Low**
Tyn y Caeau	Establish access and temporary construction compounds	Day	34	46	65	**Negligible**
		Evening/Weekend	34	40	55	**Negligible**
Tyn y Ffordd	Joint bay base construction	Day	40	47	65	**Negligible**
		Evening/Weekend	40	39	55	**Low**
Tyn y Ffordd Bach	Establish access and temporary construction compounds	Day	31	44	65	**Negligible**
		Evening/Weekend	31	40	55	**Negligible**
Tyn y Ffordd Fawr	Establish access and temporary construction compounds	Day	29	44	65	**Negligible**
		Evening/Weekend	29	40	55	**Negligible**
Tyn y Ffordd Newydd	Establish access and temporary construction compounds	Day	29	43	65	**Negligible**
		Evening/Weekend	29	39	55	**Negligible**
Waen Meredydd	Establish access and temporary construction compounds	Day	40	44	65	**Negligible**
		Evening/Weekend	40	39	55	**Low**
Ysgubor EOS	Joint bay base construction	Day	33	45	65	**Negligible**
		Evening/Weekend	33	41	55	**Negligible**
Ysgubor Newydd	Joint bay base construction	Day	28	47	65	**Negligible**
		Evening/Weekend	28	39	55	**Negligible**

Table 9-29: Construction noise impacts at receptors along the Onshore Cable Corridor due to trenchless techniques.

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Bryn Bela	Trenchless techniques	Day	38	39	65	**Negligible**
		Evening/Weekend	38	37	55	**Low**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Roberts Caravan Park	Trenchless techniques	Day	48	47	65	**Low**
		Evening/Weekend	48	45	55	**Low**
Penrefail Cottage	Trenchless techniques	Day	44	47	65	**Negligible**
		Evening/Weekend	44	45	55	**Negligible**
Sirior Bach	Trenchless techniques	Day	40	47	65	**Negligible**
		Evening/Weekend	40	45	55	**Negligible**
Ffynnon Meifod	Trenchless techniques	Day	37	40	65	**Negligible**
		Evening/Weekend	37	39	55	**Negligible**
Meiford Lodge	Trenchless techniques	Day	48	46	65	**Low**
		Evening/Weekend	48	43	55	**Low**
Nant Meifod	Trenchless techniques	Day	36	40	65	**Negligible**
		Evening/Weekend	36	39	55	**Negligible**
Sarn Rug	Trenchless techniques	Day	46	46	65	**Negligible**
		Evening/Weekend	46	43	55	**Low**
The Barn	Trenchless techniques	Day	37	40	65	**Negligible**
		Evening/Weekend	37	39	55	**Negligible**
The Gardeners Cottage	Trenchless techniques	Day	37	40	65	**Negligible**
		Evening/Weekend	37	39	55	**Negligible**
Bryn Hen	Trenchless techniques	Day	42	40	65	**Low**
		Evening/Weekend	42	39	55	**Low**
Bryn y Pin		Day	33	46	65	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
	Trenchless techniques	Evening/Weekend	33	43	55	**Negligible**
Bryn y Pin Cottage	Trenchless techniques	Day	36	46	65	**Negligible**
		Evening/Weekend	36	43	55	**Negligible**
Bryn y Pin Mawr	Trenchless techniques	Day	31	46	65	**Negligible**
		Evening/Weekend	31	43	55	**Negligible**
Grouse Lodge	Trenchless techniques	Day	31	46	65	**Negligible**
		Evening/Weekend	31	43	55	**Negligible**
Llys Awel	Trenchless techniques	Day	46	44	65	**Low**
		Evening/Weekend	46	36	55	**Low**
Ffynnonau Farm	Trenchless techniques	Day	42	48	65	**Negligible**
		Evening/Weekend	42	40	55	**Low**
Springhill	Trenchless techniques	Day	43	48	65	**Negligible**
		Evening/Weekend	43	40	55	**Low**
Tan y Bryn	Trenchless techniques	Day	33	43	65	**Negligible**
		Evening/Weekend	33	42	55	**Negligible**
Bryntwydd	Trenchless techniques	Day	38	39	65	**Negligible**
		Evening/Weekend	38	37	55	**Low**
Pwll Y Cibau Bach	Trenchless techniques	Day	46	39	65	**Low**
		Evening/Weekend	46	37	55	**Low**
Bryn Gwynt	Trenchless techniques	Day	48	48	65	**Low**
		Evening/Weekend	48	47	55	**Low**
Merlyn		Day	51	48	65	**Low**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
	Trenchless techniques	Evening/Weekend	51	47	55	**Low**
Gwel Y Mor	Trenchless techniques	Day	44	48	65	**Negligible**
		Evening/Weekend	44	47	55	**Negligible**
Glandyfr	Trenchless techniques	Day	44	48	65	**Negligible**
		Evening/Weekend	44	47	55	**Negligible**
Ffynnon Dyfyr	Trenchless techniques	Day	43	48	65	**Negligible**
		Evening/Weekend	43	47	55	**Negligible**
Ffynnon Wen	Trenchless techniques	Day	45	40	65	**Low**
		Evening/Weekend	45	39	55	**Low**
Tyn Y Mynydd	Trenchless techniques	Day	43	40	65	**Low**
		Evening/Weekend	43	39	55	**Low**
Pistyll	Trenchless techniques	Day	33	40	65	**Negligible**
		Evening/Weekend	33	39	55	**Negligible**
Nant Bach	Trenchless techniques	Day	41	46	65	**Negligible**
		Evening/Weekend	41	43	55	**Negligible**
Caer Clawdd	Trenchless techniques	Day	46	46	65	**Low**
		Evening/Weekend	46	43	55	**Low**
Plas Hafod	Trenchless techniques	Day	43	47	65	**Negligible**
		Evening/Weekend	43	39	55	**Low**
Plas Newydd	Trenchless techniques	Day	39	40	65	**Negligible**
		Evening/Weekend	39	35	55	**Low**
Carreg Dafydd	Trenchless techniques	Day	45	40	65	**Low**
		Evening/Weekend	45	35	55	**Low**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Nant Ganol	Trenchless techniques	Day	43	41	65	**Low**
		Evening/Weekend	43	40	55	**Low**

Table 9-30 Construction noise impacts at receptors along the Onshore Cable Corridor due to dewatering of excavations during night-time

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Bryn Bela	Dewatering of excavations	Night	32	36	45	**Negligible**
Roberts Caravan Park	Dewatering of excavations	Night	41	43	50	**Negligible**
Penrefail Cottage	Dewatering of excavations	Night	38	43	50	**Negligible**
Sirior Bach	Dewatering of excavations	Night	27	43	50	**Negligible**
Ffynnon Meifod	Dewatering of excavations	Night	31	37	45	**Negligible**
Meiford Lodge	Dewatering of excavations	Night	41	38	45	**Low**
Nant Meifod	Dewatering of excavations	Night	29	37	45	**Negligible**
Sarn Rug	Dewatering of excavations	Night	34	38	45	**Negligible**
The Barn	Dewatering of excavations	Night	32	37	45	**Negligible**
The Gardeners Cottage	Dewatering of excavations	Night	31	37	45	**Negligible**
Bryn Hen	Dewatering of excavations	Night	37	34	45	**Low**
Bryn y Pin	Dewatering of excavations	Night	25	38	45	**Negligible**
Bryn y Pin Cottage	Dewatering of excavations	Night	31	38	45	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Bryn y Pin Mawr	Dewatering of excavations	Night	32	38	45	**Negligible**
Grouse Lodge	Dewatering of excavations	Night	33	38	45	**Negligible**
Llys Awel	Dewatering of excavations	Night	32	35	45	**Negligible**
Ffynnonau Farm	Dewatering of excavations	Night	35	38	45	**Negligible**
Springhill	Dewatering of excavations	Night	36	38	45	**Negligible**
Tan y Bryn	Dewatering of excavations	Night	31	37	45	**Negligible**
Bryntwydd	Dewatering of excavations	Night	28	36	45	**Negligible**
Pwll Y Cibau Bach	Dewatering of excavations	Night	40	36	45	**Low**
Bryn Gwynt	Dewatering of excavations	Night	39	46	50	**Negligible**
Merlyn	Dewatering of excavations	Night	44	46	50	**Negligible**
Gwel Y Mor	Dewatering of excavations	Night	31	46	50	**Negligible**
Glandyfr	Dewatering of excavations	Night	38	46	50	**Negligible**
Ffynnon Dyfyr	Dewatering of excavations	Night	37	46	50	**Negligible**
Ffynnon Wen	Dewatering of excavations	Night	22	37	45	**Negligible**
Tyn Y Mynydd	Dewatering of excavations	Night	22	37	45	**Negligible**
Pistyll	Dewatering of excavations	Night	26	37	45	**Negligible**
Nant Bach	Dewatering of excavations	Night	35	38	45	**Negligible**
Caer Clawdd	Dewatering of excavations	Night	41	38	45	**Low**
Plas Hafod	Dewatering of excavations	Night	36	38	45	**Negligible**
Plas Newydd	Dewatering of excavations	Night	32	34	45	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Carreg Dafydd	Dewatering of excavations	Night	39	34	45	**Low**
Nant Ganol	Dewatering of excavations	Night	38	34	45	**Low**

Table 9-31: Construction noise impacts at receptors near the Onshore Substation due to trenchless techniques. [1]

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Bryn Arian	Trenchless techniques	Day	40	45	65	**Negligible**
		Evening/Weekend	40	41	55	**Negligible**
Cae Llwyd	Trenchless techniques	Day	37	43	65	**Negligible**
		Evening/Weekend	37	42	55	**Negligible**
Cae Pwll	Trenchless techniques	Day	25	43	65	**Negligible**
		Evening/Weekend	25	39	55	**Negligible**
Caer Delyn	Trenchless techniques	Day	38	46	65	**Negligible**
		Evening/Weekend	38	40	55	**Negligible**
Carreg Wen	Trenchless techniques	Day	35	46	65	**Negligible**
		Evening/Weekend	35	40	55	**Negligible**
Cefn Farm	Trenchless techniques	Day	29	43	65	**Negligible**
		Evening/Weekend	29	39	55	**Negligible**
Craig Llwyd	Trenchless techniques	Day	40	45	65	**Negligible**
		Evening/Weekend	40	41	55	**Negligible**
Derwen Deg		Day	33	46	65	**Negligible**

1

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
	Trenchless techniques	Evening/Weekend	33	40	55	**Negligible**
Groesffordd Farm	Trenchless techniques	Day	40	45	65	**Negligible**
		Evening/Weekend	40	41	55	**Negligible**
Isfryn	Trenchless techniques	Day	32	47	65	**Negligible**
		Evening/Weekend	32	39	55	**Negligible**
Maes	Trenchless techniques	Day	51	47	65	**Low**
		Evening/Weekend	51	39	55	**Low**
Pant Farm	Trenchless techniques	Day	27	43	65	**Negligible**
		Evening/Weekend	27	39	55	**Negligible**
Pentre Bach	Trenchless techniques	Day	44	45	65	**Negligible**
		Evening/Weekend	44	41	55	**Low**
Pentre Mawr Farm	Trenchless techniques	Day	40	45	65	**Negligible**
		Evening/Weekend	40	41	55	**Negligible**
Pentre Meredydd	Trenchless techniques	Day	45	43	65	**Low**
		Evening/Weekend	45	42	55	**Low**
Plas yr Esgob	Trenchless techniques	Day	33	46	65	**Negligible**
		Evening/Weekend	33	40	55	**Negligible**
Rhos Aber	Trenchless techniques	Day	26	43	65	**Negligible**
		Evening/Weekend	26	39	55	**Negligible**
Squirrels Lodge	Trenchless techniques	Day	26	43	65	**Negligible**
		Evening/Weekend	26	39	55	**Negligible**
Tan y Bryn	Trenchless techniques	Day	33	43	65	**Negligible**
		Evening/Weekend	33	42	55	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Tan y Bryn Uchaf	Trenchless techniques	Day	35	43	65	**Negligible**
		Evening/Weekend	35	42	55	**Negligible**
Tan y Graig	Trenchless techniques	Day	28	43	65	**Negligible**
		Evening/Weekend	28	39	55	**Negligible**
Trebanog	Trenchless techniques	Day	42	45	65	**Negligible**
		Evening/Weekend	42	41	55	**Low**
Ty Celyn	Trenchless techniques	Day	29	43	65	**Negligible**
		Evening/Weekend	29	39	55	**Negligible**
Tyddyn Meredydd	Trenchless techniques	Day	49	43	65	**Low**
		Evening/Weekend	49	42	55	**Low**
Tyn y Caeau	Trenchless techniques	Day	35	46	65	**Negligible**
		Evening/Weekend	35	40	55	**Negligible**
Tyn y Ffordd	Trenchless techniques	Day	40	47	65	**Negligible**
		Evening/Weekend	40	39	55	**Low**
Tyn y Ffordd Bach	Trenchless techniques	Day	26	44	65	**Negligible**
		Evening/Weekend	26	40	55	**Negligible**
Tyn y Ffordd Fawr	Trenchless techniques	Day	25	44	65	**Negligible**
		Evening/Weekend	25	40	55	**Negligible**
Tyn y Ffordd Newydd	Trenchless techniques	Day	27	43	65	**Negligible**
		Evening/Weekend	27	39	55	**Negligible**
Waen Meredydd	Trenchless techniques	Day	47	44	65	**Low**
		Evening/Weekend	47	39	55	**Low**
Ysgubor EOS		Day	36	45	65	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
	Trenchless techniques	Evening/Weekend	36	41	55	**Negligible**
Ysgubor Newydd	Trenchless techniques	Day	29	47	65	**Negligible**
		Evening/Weekend	29	39	55	**Negligible**

Table 9-32 Construction noise impacts at receptors near to Onshore Substation due to dewatering of excavations during night-time

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Bryn Arian	Dewatering of excavations	Night	27	40	45	**Negligible**
Cae Llwyd	Dewatering of excavations	Night	30	37	45	**Negligible**
Cae Pwll	Dewatering of excavations	Night	18	36	45	**Negligible**
Caer Delyn	Dewatering of excavations	Night	24	37	45	**Negligible**
Carreg Wen	Dewatering of excavations	Night	22	37	45	**Negligible**
Cefn Farm	Dewatering of excavations	Night	20	36	45	**Negligible**
Craig Llwyd	Dewatering of excavations	Night	29	40	45	**Negligible**
Derwen Deg	Dewatering of excavations	Night	21	37	45	**Negligible**
Groesffordd Farm	Dewatering of excavations	Night	23	40	45	**Negligible**
Isfryn	Dewatering of excavations	Night	24	38	45	**Negligible**
Maes	Dewatering of excavations	Night	45	38	45	**Medium**
Pant Farm	Dewatering of excavations	Night	17	36	45	**Negligible**
Pentre Bach	Dewatering of excavations	Night	37	40	45	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, LAeq,T (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Pentre Mawr Farm	Dewatering of excavations	Night	32	40	45	**Negligible**
Pentre Meredydd	Dewatering of excavations	Night	37	37	45	**Negligible**
Plas yr Esgob	Dewatering of excavations	Night	23	37	45	**Negligible**
Rhos Aber	Dewatering of excavations	Night	19	36	45	**Negligible**
Squirrels Lodge	Dewatering of excavations	Night	20	36	45	**Negligible**
Tan y Bryn	Dewatering of excavations	Night	31	37	45	**Negligible**
Tan y Bryn Uchaf	Dewatering of excavations	Night	25	37	45	**Negligible**
Tan y Graig	Dewatering of excavations	Night	21	36	45	**Negligible**
Trebanog	Dewatering of excavations	Night	27	40	45	**Negligible**
Ty Celyn	Dewatering of excavations	Night	22	36	45	**Negligible**
Tyddyn Meredydd	Dewatering of excavations	Night	45	37	45	**Medium**
Tyn y Caeau	Dewatering of excavations	Night	21	37	45	**Negligible**
Tyn y Ffordd	Dewatering of excavations	Night	31	38	45	**Negligible**
Tyn y Ffordd Bach	Dewatering of excavations	Night	20	35	45	**Negligible**
Tyn y Ffordd Fawr	Dewatering of excavations	Night	21	35	45	**Negligible**
Tyn y Ffordd Newydd	Dewatering of excavations	Night	19	36	45	**Negligible**
Waen Meredydd	Dewatering of excavations	Night	28	36	45	**Negligible**
Ysgubor EOS	Dewatering of excavations	Night	25	40	45	**Negligible**
Ysgubor Newydd	Dewatering of excavations	Night	19	38	45	**Negligible**

9.9.5.9 The results of the assessment of works spread along sections of the Onshore Cable Corridor are presented in Table 9-33 and Table 9-34 below as the distance from the Mona Onshore Development Area at which the magnitude of impact changes and the number of receptors within each impact magnitude band. The results are presented graphically in Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement.

Table 9-33: Daytime construction noise impact magnitude and number of receptors per impact magnitude band.

Location	Impact Magnitude Band Distance (m)			Number of receptors per impact magnitude band		
	High	Medium	Low	High	Medium	Low
Haul Road Construction						
TCC1	6	9	12	0	0	4
TCC2	6	9	12	0	0	4
TCC4	4	6	18	0	0	4
TCC5	4	6	18	0	0	4
Site Preparation (including Fencing and Topsoil Strip)						
Onshore cable corridor	43	75	335	19	11	85
Onshore substation				2	4	22
Trench Excavation and Duct Installation						
Onshore cable corridor	33	59	266	19	4	76
Onshore substation				2	4	76
Trench Backfill						
Onshore cable corridor	33	59	266	19	4	76
Onshore substation				2	4	76
Topsoil Reinstatement						
Onshore cable corridor	43	75	335	19	11	85
Onshore substation				2	4	22
Haul Road Removal						
Onshore cable corridor	47	84	375	20	16	109
Onshore substation				2	5	24

Table 9-34: Evening/weekend construction noise impact magnitude and number of receptors per impact magnitude band.

Location	Impact Magnitude Band Distance (m)			Number of receptors per impact magnitude band		
	High	Medium	Low	High	Medium	Low
Haul Road Construction						
TCC1	6	9	12	0	0	4

Location	Impact Magnitude Band Distance (m)			Number of receptors per impact magnitude band		
	High	Medium	Low	High	Medium	Low
TCC2	6	9	12	0	0	4
TCC4	4	6	18	0	0	4
TCC5	4	6	18	0	0	4
Site Clearance (including Fencing and Topsoil Strip)						
Onshore cable corridor	134	238	669	54	41	173
Onshore substation				13	3	37
Trench Excavation and Duct Installation						
Onshore cable corridor	105	188	530	45	24	152
Onshore substation				10	24	24
Trench Backfill						
Onshore cable corridor	105	188	530	45	24	152
Onshore substation				10	24	24
Topsoil Reinstatement						
Onshore cable corridor	134	238	669	54	41	173
Onshore substation				13	3	37
Haul Road Removal						
Onshore cable corridor	149	266	749	58	41	213
Onshore substation				13	6	52

Sensitivity of the receptor

9.9.5.10 The nearest receptors are residential in nature and are thus deemed to be of **medium** sensitivity for all works except trenchless techniques.

9.9.5.11 As above, the trenchless techniques works are likely to require night-time working and thus receptors are considered to be of **high** sensitivity during this period.

Significance of the effect

9.9.5.12 The results in Table 9-27 and Table 9-28 above show the receptors in closest proximity to temporary construction compound areas are predicted to experience their highest noise levels from these works. Despite this, the impacts associated with such works are low to negligible during the daytime and evening/weekend period.

9.9.5.13 Similarly, those receptors situated close to potential joint bay locations along the onshore cable route are predicted to experience their highest noise levels from joint bay construction works, particularly those associated with the construction of the joint bay bases. The impacts associated with these works are low to negligible overall.

9.9.5.14 The results in Table 9-30 and Table 9-32 indicate that the operation of dewatering pumps will result in low to negligible impacts during the night time at all but two properties. Medium impacts during the night time are predicted to result for the operation of pumps at Tyddyn Meredydd and Maes Cefn.

9.9.5.15 The joint bay locations included within the model have been sited 10 m from the onshore cable corridor boundary to provide a reasonable worst case construction noise impact at nearby receptors. However, joint bays are unlikely to be sited in this location within the onshore cable corridor and will therefore be located further away from receptors than assumed in the construction noise model resulting in the impacts being lower than predicted.

9.9.5.16 In particular, joint bays have been modelled close to Tyddyn Meredydd and Maes Cefn. However, trenchless technique works are planned close to these properties and it is unlikely joint bays would be situated in the same locations. Therefore, the impacts during the night time at these receptors due to the operation of pumps are likely to reduce to low.

9.9.5.17 The results in Table 9-33 and Table 9-34 show the number of receptors impacted by construction each of the more transient construction activities along the Mona Onshore Cable Corridor during the day and weekend periods, respectively. High impacts are predicted at between 45 and 54 receptors with medium impacts predicted at between 24 and 41 receptors along the length of the Mona Onshore Cable Corridor.

9.9.5.18 The calculation of noise impacts due to transient works has been undertaken assuming all equipment will be in operation at the boundary of the Mona Onshore Development Area. This is unlikely to be the case in reality since the works will be spread along the full width and length of the Mona Onshore Cable Corridor.

9.9.5.19 Furthermore, since trenching works along the Onshore Cable Corridor are likely to be transient in nature, they will not be undertaken at a single location for the full construction period.

9.9.5.20 As such, the overall impact is likely to be reduced to **low** at the affected receptors and the effects will be of **minor adverse** significance for standard construction methods (excluding trenchless techniques) which is not significant in EIA terms.

9.9.5.21 The results in Table 9-29 and Table 9-31 above show the impacts due to construction works requiring trenchless techniques during the daytime and evening/weekend periods are predicted to be negligible at the majority of receptors , with negligible to low impacts are predicted at those receptors which are located close to planned trenchless techniques works.

9.9.5.22 Based on the above, the overall impacts during the daytime and evening/weekend periods due to trenchless techniques are negligible and the effects will be of **minor adverse** significance which is not significant in EIA terms.

Decommissioning phase

9.9.5.23 The MDS is represented by the removal of the link boxes at the end of the operational lifetime of the Mona Offshore Wind Project. The decommissioning of the Mona Onshore Cable Corridor is likely to be undertaken within the parameters identified for construction. As such, decommissioning activities will be limited to within the construction working areas and require a duration no greater than the activities assessed as part of the construction phase.

9.9.5.24 A decommissioning plan will be submitted prior to decommissioning in accordance with a requirement in the DCO.

9.9.5.25 The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

9.9.6 Future monitoring

9.9.6.1 Depending on the locations of the construction works and the activities required, a noise monitoring strategy will be agreed as part of the Construction Noise and Vibration Plan (Document Reference J26.3) may be agreed upon with the relevant stakeholders to ensure compliance with the agreed noise threshold values.

9.9.7 Noise impacts due to construction traffic on local highway networks

9.9.7.1 The introduction of additional construction vehicles on local highways may increase noise levels at receptors close to the road. A construction traffic noise assessment has been undertaken and is detailed in Volume 3, Annex 9.2: Construction Noise and Vibration technical report of the Environmental Statement.

Construction phase

Magnitude of impact

9.9.7.2 The existing baseline traffic flows on local highway networks are generally high with a minimum BNL of 60 dB(A) and a maximum BNL of 81 dB(A). As such, the introduction of construction vehicles to these networks does not contribute to a great increase to the BNL on the highway links for which baseline data is available.

9.9.7.3 As such, overall, the magnitude of impact is predicted to be **low**.

Sensitivity of receptor

9.9.7.4 The nearest receptors are residential in nature and are thus deemed to be of medium sensitivity.

Significance of effect

9.9.7.5 The Outline CoCP will contain a Construction Traffic Management Plan (CTMP) outlining methods to control construction traffic. The measures to be adopted to control construction traffic are presented in Volume 3, Chapter 8: Traffic and Transport of the Environmental Statement.

9.9.7.6 Moreover, the use of a haul road will result in less construction traffic on local highway networks.

9.9.7.7 As such, the overall impact is predicted to be negligible and the effect will be of **minor adverse** significance which is not significant in EIA terms.

9.9.8 Vibration impacts due to the Mona Onshore Cable Corridor landward of transition joint bay

9.9.8.1 The construction of the Mona Onshore Cable Corridor and the Onshore Substation will require the use of vibration-generating equipment. There are two primary sources of consideration which include the following:

- the use of vibratory piling techniques for the installation of trenchless techniques entry and exit pits at the Mona Landfall
- the use of vibratory rollers for the dynamic compaction of the haul road, temporary construction compounds, and the Mona Onshore Substation Platform during the groundworks phase of construction.

9.9.8.2 Noise impacts due to the construction of the Mona Onshore Substation are assessed in section 9.9.9. However, the impacts due to construction vibration are presented separately in this section for ease of reference.

9.9.8.3 The impacts have been assessed for both scenarios based upon the methodology detailed in BS 5228-2:2009+A1:2014. Full details of the vibration impact assessment methodology are presented in Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement.

Construction phase

Magnitude of impact

9.9.8.4 The impact magnitudes for both vibratory piling and dynamic compaction techniques are presented in Table 9-35 below. The calculations have been undertaken based upon the upper threshold scaling factors outlined in Annex E of BS 5228-2:2009+A1:2014 which correspond to a 5% probability of exceedance as a conservative approach.

9.9.8.5 The vibration impacts due to dynamic compaction have been predicted from the boundary of the Onshore Substation platform and vibratory piling techniques from the boundaries of the temporary construction compounds.

Table 9-35: Construction vibration impact magnitudes

Location	Impact Magnitude Band Distance (m)			Number of receptors per impact magnitude band		
	High	Medium	Low	High	Medium	Low
Dynamic Compaction						
Haul Road	13	71	160	4	40	48
Temporary construction compounds (onshore cable corridor).				2	1	2
Temporary construction compounds (onshore substation).				0	0	2
Onshore substation platform.				0	0	2
Vibratory Piling						
Trenchless technique entry/exit pit at Mona Landfall	12	73	186	0	4	26
Onshore substation platform.				0	0	0

Sensitivity of the receptor

9.9.8.6 The nearest receptors are residential in nature and works are assumed to be undertaken during the daytime only. As such, the receptors are considered to be of **medium** sensitivity.

Significance of the effect

9.9.8.7 The results of the assessment of impacts due to dynamic compaction in Table 9-35 above show that high impacts are predicted at four receptors (Llys Awel, Penrefail Cottage, Roberts Caravan Park and Maes Cefn) during the construction of the haul road, with medium impacts predicted at a total of 40 receptors.

9.9.8.8 High impacts are predicted at two receptors (Penrefail Cottage and Roberts Caravan Park) during the dynamic compaction works for the temporary construction compounds, with medium impacts at one receptor (Sarn Rug).

9.9.8.9 It should be noted that in the assessment of impacts due to construction vibration has been undertaken from the boundary of the Mona Onshore Development Area for the haul road and the temporary construction compounds. It is unlikely that the dynamic compaction works will be undertaken for any extended period along the boundary. Furthermore, the receptors affected during the construction of the haul road are situated along the access routes to the Mona Onshore Development Area and thus are likely to be situated a lot further from the construction works then assessed. Any compaction works required along these access routes will be short-term in duration and thus receptors are unlikely to be affected for an extended period.

9.9.8.10 Medium impacts from vibratory piling associated with the trenchless technique compounds have been predicted at four properties. As with dynamic compaction works, vibratory piling is unlikely to be required as close to the boundary of the trenchless technique compounds as has been assessed. Any works required will also be short-term in duration.

9.9.8.11 The Construction Noise and Vibration Plan (Document Reference J26.3) outlines measures proposed to control vibration such as the use of low-vibration equipment, alternative methods (where appropriate), and cut-off trenches to interrupt the direct transmission path of vibrations between source and receiver. These measures have not been included in the assessment since there is a high degree of uncertainty in quantifying the potential reduction in vibration levels.

9.9.8.12 Based on the above, the overall impact due to construction vibration will be low and the effect is considered to be of **minor adverse** significance which is not significant in EIA terms.

9.9.9 Noise impacts due to the Onshore Substation

9.9.9.1 The construction of the Onshore Substation has been assessed across four phases:

- Groundworks
- Building foundation works
- Access road and car park works
- Building fabrication and high-voltage plant installation.

9.9.9.2 The exact locations where works will be carried out is not yet known and thus predictions have been undertaken assuming all plant will be situated along the boundaries of the Onshore Substation temporary construction compounds closest to receptors. Full details of the construction noise and vibration impact assessment are provided in Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement.

9.9.9.3 Noise control measures have been included as presented in Annex B of BS 5228 – 1:2009+A1:2014. The losses assumed are those typically associated with the BPM outlined in the CoCP. Full details of the mitigation measures assumed can be found in Construction Noise and Vibration Management Plan (Document Reference J26.3) included as part of the Outline CoCP which will be secured as a requirement of the DCO.

9.9.9.4 The operational noise impacts have been assessed in line with the guidance presented in BS 4142:2014+A1:2019. The assessment has been undertaken based on the noise emission levels in the upper range for the plant items to be installed.

9.9.9.5 As stated in Table 9-23, the design will incorporate noise control measures, where practicable or feasible, to ensure compliance with the operational noise limit of 34dBA to be secured as part of the DCO. As such, indicative mitigation measures which may be incorporated as a primary mitigation measure (as part of the design) have been included within the assessment. These include :

- Acoustic enclosures
- Acoustic barriers
- Quieter plant selections

9.9.9.6 The results of the baseline scenario without mitigation and the scenario with mitigation measures included are provided in Volume 7, Annex 9.3: Operational Noise of the Environmental Statement.

Construction phase

Magnitude of impact

9.9.9.7 The results of the construction noise assessment for the worst-case activities at each receptor are presented in Table 9-36 below. As with the assessment outlined in section 9.9.5 above, trenchless techniques have been considered separately due to the requirement of night-time works.

Table 9-36: Construction noise impacts at receptors near the Onshore Substation

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Bryn Arian	Groundworks	Day	41	45	65	**Negligible**
		Evening/Weekend	41	41	55	**Low**
Cae Llwyd	Groundworks	Day	48	43	65	**Low**
		Evening/Weekend	48	42	55	**Low**
Cae Pwll	Groundworks	Day	38	43	65	**Negligible**
		Evening/Weekend	38	39	55	**Negligible**
Caer Delyn	Groundworks	Day	42	46	65	**Negligible**
		Evening/Weekend	42	40	55	**Low**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Carreg Wen	Access road and car parking works	Day	41	46	65	**Negligible**
		Evening/Weekend	41	40	55	**Low**
Cefn Farm	Groundworks	Day	45	43	65	**Low**
		Evening/Weekend	45	39	55	**Low**
Craig Llwyd	Groundworks	Day	43	45	65	**Negligible**
		Evening/Weekend	43	41	55	**Low**
Derwen Deg	Access road and car parking works	Day	52	46	65	**Low**
		Evening/Weekend	52	40	55	**Low**
Groesffordd Farm	Groundworks	Day	41	45	65	**Negligible**
		Evening/Weekend	41	41	55	**Low**
Isfryn	Groundworks	Day	52	47	65	**Low**
		Evening/Weekend	52	39	55	**Low**
Maes	Access road and car parking works	Day	26	47	65	**Negligible**
		Evening/Weekend	26	39	55	**Negligible**
Pant Farm	Groundworks	Day	28	43	65	**Negligible**
		Evening/Weekend	28	39	55	**Negligible**
Pentre Bach	Groundworks	Day	46	45	65	**Low**
		Evening/Weekend	46	41	55	**Low**
Pentre Mawr Farm	Groundworks	Day	43	45	65	**Negligible**
		Evening/Weekend	43	41	55	**Low**
Pentre Meredydd	Foundation	Day	53	43	65	**Low**
		Evening/Weekend	53	42	55	**Low**
Plas yr Esgob	Access road and car parking works	Day	46	46	65	**Low**
		Evening/Weekend	46	40	55	**Low**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Rhos Aber	Groundworks	Day	38	43	65	**Negligible**
		Evening/Weekend	38	39	55	**Negligible**
Squirrels Lodge	Groundworks	Day	40	43	65	**Negligible**
		Evening/Weekend	40	39	55	**Low**
Tan y Bryn	Foundation	Day	47	43	65	**Low**
		Evening/Weekend	47	42	55	**Low**
Tan y Bryn Uchaf	Foundation	Day	54	43	65	**Low**
		Evening/Weekend	54	42	55	**Low**
Tan y Graig	Groundworks	Day	26	43	65	**Negligible**
		Evening/Weekend	26	39	55	**Negligible**
Trebanog	Groundworks	Day	39	45	65	**Negligible**
		Evening/Weekend	39	41	55	**Negligible**
Ty Celyn	Groundworks	Day	46	43	65	**Low**
		Evening/Weekend	46	39	55	**Low**
Tyddyn Meredydd	Groundworks, Foundation and Building fabrication and plant installation	Day	53	43	65	**Low**
		Evening/Weekend	53	42	55	**Low**
Tyn y Caeau	Access road and car parking works	Day	47	46	65	**Low**
		Evening/Weekend	47	40	55	**Low**
Tyn y Ffordd	Groundworks	Day	27	47	65	**Negligible**
		Evening/Weekend	27	39	55	**Negligible**
Tyn y Ffordd Bach	Groundworks	Day	40	44	65	**Negligible**
		Evening/Weekend	40	40	55	**Low**
	Groundworks	Day	39	44	65	**Negligible**

Receptor	Activity	Period	Predicted Noise Level, $L_{Aeq,T}$ (dB)	LOAEL (dB)	SOAEL (dB)	Magnitude of Impact
Tyn y Ffordd Fawr		Evening/Weekend	39	40	55	**Negligible**
Tyn y Ffordd Newydd	Groundworks	Day	36	43	65	**Negligible**
		Evening/Weekend	36	39	55	**Negligible**
Waen Meredydd	Groundworks	Day	43	44	65	**Negligible**
		Evening/Weekend	43	39	55	**Low**
Ysgubor EOS	Groundworks	Day	35	45	65	**Negligible**
		Evening/Weekend	35	41	55	**Negligible**
Ysgubor Newydd	Groundworks	Day	29	47	65	**Negligible**
		Evening/Weekend	29	39	55	**Negligible**

Sensitivity of the receptor

9.9.9.8 The nearest receptors are residential in nature and are thus deemed to be of **medium** sensitivity for all works associated with the Onshore Substation construction.

Significance of the effect

9.9.9.9 The results of the Onshore Substation construction noise impact assessment in Table 9-36 show that the activity most likely to impact receptors will be the substation groundworks, access road and car parking works, and the building fabrication and plant installation.

9.9.9.10 The assessment has been undertaken based on the assumption that plant will be situated close to the boundary of the Onshore Substation footprint close to receptors with indicative mitigation measures included. It is likely that works will be undertaken along the Onshore Substation footprint boundary during the groundworks phase. It is also unlikely that all plant will be in operation along a single boundary at any point in the construction period.

9.9.9.11 The impacts predicted at all receptors are predicted to be negligible to low overall and the effect will be of **minor adverse** significance which is not significant in EIA terms.

Operations phase

Magnitude of impact

9.9.9.12 The results of the operational noise impact assessment during the night-time period (where background sound levels are lower) with the indicative mitigation measures included are presented in Table 9-37 below.

9.9.9.13 The rating levels calculated at the most affected receptors where the specific sound levels are equal to or greater than the background sound level with mitigation included include a correction of +3 dB to account for the fact that the operational noise emissions from the Mona Onshore Substation are not in keeping with the existing baseline sound environment. This is a conservative approach and is considered robust.

Table 9-37: Operational noise impacts due to the Mona Onshore Substation

Receptor	Background Sound Level, $L_{A90,T}$ (dB)	Specific Sound Level, $L_{Aeq,T}$	Acoustic Character Correction (dB)	Rating Level, $L_{Ar,T}$ (dB)	Difference Δ Between Rating Level and Background Level (dB)	Magnitude of Impact
Bryn Arian	35	17	0	17	-18	**Negligible**
Cae Llwyd	30	27	0	27	-3	**Negligible**
Cae Pwll	30	16	0	16	-14	**Negligible**
Caer Delyn	32	16	0	16	-16	**Negligible**
Carreg Wen	32	14	0	14	-18	**Negligible**
Cefn Farm	30	20	0	20	-10	**Negligible**
Craig Llwyd	35	18	0	18	-17	**Negligible**
Derwen Deg	32	16	0	16	-16	**Negligible**
Groesffordd Farm	35	16	0	16	-19	**Negligible**
Hendy Farm	30	31	3	34	4	**Low**
Isfryn	30	27	0	27	-3	**Negligible**
Maes	30	12	0	12	-18	**Negligible**
Pant Farm	30	2	0	2	-28	**Negligible**
Pentre Bach	35	21	0	21	-14	**Negligible**
Pentre Mawr Farm	35	19	0	19	-16	**Negligible**
Pentre Meredydd	30	28	3	31	1	**Low**
Plas yr Esgob	32	17	0	17	-15	**Negligible**
Rhos Aber	30	16	0	16	-14	**Negligible**
Squirrels Lodge	30	17	0	17	-13	**Negligible**
Tan y Bryn	30	27	3	30	0	**Low**
Tan y Bryn Uchaf	30	31	3	34	4	**Low**
Tan y Graig	30	0	0	0	-30	**Negligible**
Trebanog	35	15	0	15	-20	**Negligible**

Receptor	Background Sound Level, $L_{A90,T}$ (dB)	Specific Sound Level, $L_{Aeq,T}$	Acoustic Character Correction (dB)	Rating Level, $L_{Ar,T}$ (dB)	Difference Δ Between Rating Level and Background Level (dB)	Magnitude of Impact
Ty Celyn	30	22	0	22	-8	**Negligible**
Tyddyn Meredydd	30	25	0	25	-5	**Negligible**
Tyn y Caeau	32	17	0	17	-15	**Negligible**
Tyn y Ffordd	30	5	0	5	-25	**Negligible**
Tyn y Ffordd Bach	30	18	0	18	-12	**Negligible**
Tyn y Ffordd Fawr	30	17	0	17	-13	**Negligible**
Tyn y Ffordd Newydd	30	16	0	16	-14	**Negligible**
Waen Meredydd	30	18	0	18	-12	**Negligible**
Ysgubor EOS	35	14	0	14	-21	**Negligible**
Ysgubor Newydd	30	3	0	3	-27	**Negligible**

Sensitivity of receptor

9.9.9.14 The nearest receptors are residential in nature and the MDS is represented by the substation will operate 24/7. The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effect

9.9.9.15 The final design of the Onshore Substation will incorporate measures such as those outlined in Table 9-23 to ensure that the operational noise criteria secured as a requirement of a DCO are achieved at all receptors. The overall impact is therefore considered to be **low** and the effect will be of minor or moderate significance.

9.9.9.16 The mitigation measures adopted as part of the assessment have been obtained based on realistic measures adopted from similar schemes.

9.9.9.17 The Super Grid Transformers and shunt reactors have been assumed to be enclosed within an acoustic enclosure that can achieve a noise reduction of 20 dB in the 100 Hz frequency band. The attenuation at higher frequencies will be greater since the low frequency components of the noise are more difficult to attenuate. However, a 20 dB reduction across all frequency bands has been assumed as a conservative approach.

9.9.9.18 As stated in paragraph 9.9.9.4, the unmitigated source noise levels are based upon the upper range of typical sound power levels associated with the proposed plant strategy for the Onshore Substation. The reductions required for each plant item (see

Volume 7, Annex 9.3: Operational Noise of the Environmental Statement for details) will be included during the substation design process to ensure compliance with the operational noise limits to be secured as requirement of the DCO.

9.9.9.19 Overall, the effect will be of **minor adverse** significance which is not significant in EIA terms.

Maintenance phase

9.9.9.20 The Mona Onshore Substation will typically be unmanned and the onshore infrastructure monitored remotely.

9.9.9.21 Operations and maintenance staff will attend site to undertake mainly non-intrusive inspections of the equipment during daytime hours and infrequent works to remedy any potential defects noted.

9.9.9.22 The Operational Noise and Vibration Management Plan will outline the need for site personnel to be trained appropriately on the potential health hazards of excessive noise to ensure that impacts are minimised during any works required. Example measure include the appointment of a community liaison officer, the use of quieter equipment, and undertaking works away from receptors where possible.

9.9.9.23 Based on the above, the effect will be of **minor adverse** significance which is not significant in EIA terms.

Decommissioning phase

Mona Onshore substation

9.9.9.24 As outlined in Table 9-22, the MDS is represented by complete decommissioning of the Mona Onshore Substation which will require:

- The removal of all electrical infrastructure
- The removal of waste from the site for disposal
- Breaking up the foundations and reinstating the site to its original condition or for an alternative use
- The removal of the permanent access road and its associated services.

9.9.9.25 All of the electrical infrastructure will be removed and any waste arising disposed of in accordance with relevant regulations.

9.9.9.26 Decommissioning is likely to be undertaken within the parameters identified for construction. As such, decommissioning activities will be limited to within the construction working areas and require a duration no greater than the activities assessed as part of the construction phase.

9.9.9.27 A decommissioning plan will be required to be submitted prior to decommissioning in accordance with a requirement in the DCO.

9.9.9.28 The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

9.10 Cumulative Effect Assessment methodology

9.10.1 Methodology

9.10.1.1 The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Mona Offshore Wind Project together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 5, Annex 5.1: CEA screening matrix of the Environmental Statement). Each project has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

9.10.1.2 The noise and vibration CEA methodology has followed the methodology set out in Volume 1, Chapter 5: EIA methodology of the Environmental Statement. As part of the assessment, all projects and plans considered alongside the Mona Offshore Wind Project have been allocated into 'tiers' reflecting their current stage within the planning and development process, these are listed below.

9.10.1.3 A tiered approach to the assessment has been adopted, as follows:

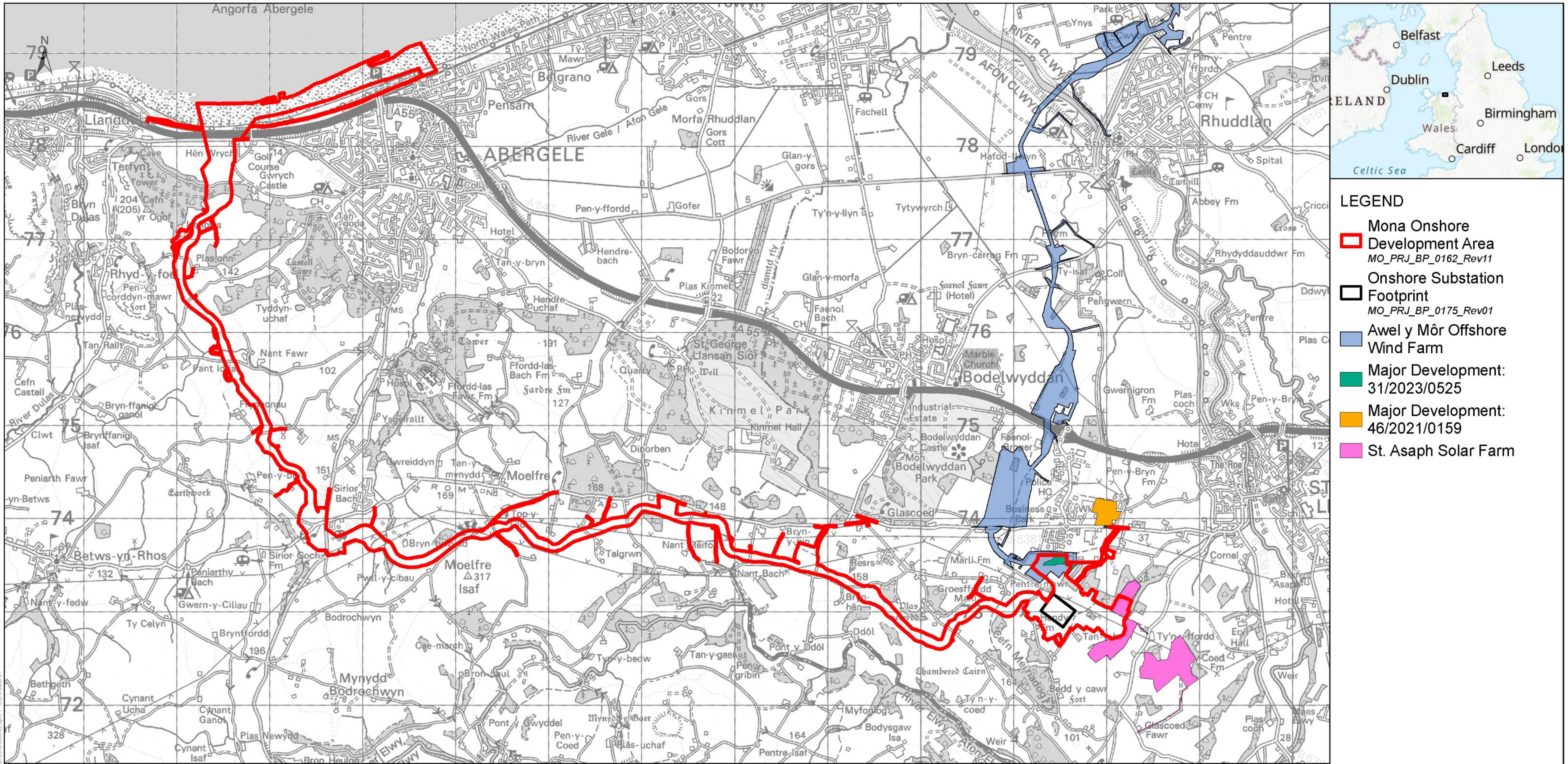
- Tier 1
  - Under construction
  - Permitted application
  - Submitted application
  - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact
- Tier 2
  - Scoping report has been submitted and is in the public domain
- Tier 3
  - Scoping report has not been submitted
  - Identified in the relevant Development Plan
  - Identified in other plans and programmes.

9.10.1.4 This tiered approach is adopted to provide a clear assessment of the Mona Offshore Wind Project alongside other projects, plans and activities.

9.10.1.5 The specific projects, plans and activities scoped into the CEA, are outline in Table 9-38.

Table 9-38: List of other projects, plans and activities considered within the CEA.

Project/Plan	Status	Distance from the Mona Array Area (km)	Distance from the Mona Onshore Development Area (km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Mona Offshore Wind Project
Tier 1							
Awel y Môr Offshore Windfarm (Onshore Infrastructure)	Permitted but not yet implemented	12.2	62.1	Application for the construction of a offshore windfarm. Applicant expects consent in Q3 2023 of 2023.	Construction to commence in 2026.	Site to be commissioned by 2030.	Yes
Major Development: 46/2021/0159	Pre-Construction	40.1	8.8	Erection of a commercial vehicles sales unit (*sui generis*) - Formation of associated parking area, landscaping and associated works. Outline Planning application for the erection of 5 no. business buildings (Use Class B1 and B2) with all other matters reserved for further approval	Construction to commence in 2026.	Site to be commissioned by 2030.	Yes
Tier 3							
St Asaph Solar Farm	Pre-Application	46.1	0	Development of National Significance (DNS): The Proposed Development includes the construction, operation and decommissioning of a solar farm with a potential generating capacity of between 10MW and 350MW.	Construction to commence in 2026	Site to be commissioned in 2030	Yes
NGET: 31/2023/0525	Pre-Application	45.7	0.08	Extension to the existing Bodelwyddan electricity substation (EIA Screening Opinion request).	Construction to commence in 2026.	Site to be commissioned by 2030.	Yes
NGET	Pre-application	0.03	0.41	Application under section 37 of the Electricity Act 1989 for the installation of new overhead lines.	Not provided but assumed to overlap with Mona Offshore Wind Project	Not provided but assumed to overlap with Mona Offshore Wind Project	Yes
NGET	Pre-application	0.03	0.41	Permitted development comprising extension to the GIS hall required to facilitate the extension to the existing Bodelwyddan electricity substation	Not provided but assumed to overlap with Mona Offshore Wind Project	Not provided but assumed to overlap with Mona Offshore Wind Project	Yes



Service Layer Credits: World Topographic Map: Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Hillshade: Esri, USGS

Data Sources: RPS / bp / EnBW

Geodetic Information:
Datum: OSGB 1936. Projection: British National Grid.
Scale@ 378.9mm x 214.9 mm: 1:45,000

Project Name:
MONA OFFSHORE WIND PROJECT

Drawing Title:
PROJECTS SCREENED INTO THE CUMULATIVE EFFECTS ASSESSMENT

Drawing Number:
12079-0689-02

VER	DATE	DETAILS	BY	CHECK
01	20/03/24	FINAL	JP	CR

Figure 9.9 Projects screened into cumulative effects assessment.

9.10.2 Maximum design scenario

9.10.2.1 The MDSs identified in Table 9-39 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the Project Design Envelope provided in Volume 1, Chapter 3: Project Description, of the Environmental Statement as well as the information available on other projects and plans, in order to inform an MDS. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g. different wind turbine layout), to that assessed here, be taken forward in the final design scheme.

9.10.2.2 The CEA has considered the Mona Offshore Wind Project, alongside the National Grid Bodelwyddan substation extension proposal. The CEA has been undertaken on the basis of the latest available information in the public domain, which is the Autumn 2023 consultation material. It is understood that the application for the proposal is imminent. If further information is available for the proposal before the Mona Offshore Wind Project receives Development Consent, the Applicant will provide an update to the cumulative assessment presented within this chapter.

9.10.2.3 The only potential cumulative noise impacts identified are those associated with noise from the Mona Onshore Substation and other nearby developments. No other developments have been identified within 1 km of the Mona Onshore Development Area which are likely to give rise to significant cumulative effects.

9.10.2.4 The MARES Connect project is proposing to submit a planning application in 2024 for an interconnector cable, landfall and onshore substation with connection to the National Grid. The project has identified several landfall zones and zones for its onshore substation and there is the potential for overlap with the Mona Onshore Development Area. The CEA has not considered the Mona Offshore Wind Project, alongside the MARES Connect project as insufficient information was publicly available prior to the Mona Offshore Wind Project DCO submission (see Volume 1, Chapter 3: Environmental Impact Assessment Methodology of the Environmental Statement). However, if further information becomes available for the proposal before the Mona Offshore Wind Project receives Development Consent, the Applicant will review the information and provide any update needed to the CEA.

Table 9-39: Maximum design scenario considered for the assessment of potential cumulative effects on noise and vibration.

[a] C=construction, O=operations and maintenance, D=decommissioning

Potential cumulative effect	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
Noise impacts due to the Mona Onshore Substation.	✓	✓	×	MDS as described for the Mona Offshore Wind Project (Table 9-22) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Windfarm (Onshore Infrastructure) • Major Development: 46/2021/0159 **Tier 3** • St Asaph Solar Farm • Major Development: 31/2023/0525 (NGET – extension) • NGET – overhead lines • NGET – Permitted development	• Outcome of the CEA will be greatest when the greatest number of other schemes are considered • Volume 3, Chapter 10: Noise and vibration of the Awel y Môr Offshore Wind Farm Environmental Statement shows common receptors at Caer Delyn for the Onshore Substation. • Substation groundworks to be undertaken simultaneously where impacts are likely to be greatest. • Developments operating simultaneously with the Mona Onshore Substation will likely result in the greatest noise impacts.

9.11 Cumulative Effects Assessment

9.11.1 Overview

9.11.1.1 A description of the significance of cumulative effects upon noise and vibration receptors arising from each identified impact is given below.

9.11.2 Noise impacts due to the Onshore Substation

Tier 1

Awel y Môr Offshore Windfarm

Construction phase

Magnitude of impact

9.11.2.1 Caer Delyn has been identified as a common receptor for the onshore substation groundworks for both the Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project. It has been assumed that the works will be undertaken against the weekend construction noise threshold values to assess the period where impacts are most likely.

9.11.2.2 Volume 3, Chapter 10: Noise and Vibration of the Awel y Môr Offshore Wind Farm Environmental Statement predicts the following night-time noise level in Table 9-40 at Caer Delyn. The levels predicted as part of the construction noise and vibration assessment detailed in Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement are also presented to inform a calculation of the cumulative level.

Table 9-40: Construction noise levels at Caer Delyn.

Receptor	Noise Level, $L_{Aeq,T}$ (dB)		Cumulative Level (dB)
	Mona Offshore Wind Project	Awel y Môr Offshore Wind Farm	
Caer Delyn	54	47	55

9.11.2.3 The individual impact of each development is predicted to be negligible. However, the cumulative level increases slightly such that the cumulative impact is predicted to be **low**.

Sensitivity of the receptor

9.11.2.4 Caer Delyn is the closest common residential receptor to the proposed works and is residential in nature. The works are proposed during the daytime only and thus are considered to be of **medium** sensitivity.

Significance of effect

9.11.2.5 The CoCP for each development will include a noise management plan which will outline measures required such as the use of quieter equipment, acoustic screens, agreed working hours, and communication with the local community.

9.11.2.6 Overall, the magnitude of the impact for concurrent construction between Awel y Môr and the Mona Offshore Wind Project is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Operational phase

9.11.2.7 As above, the common receptor for the Mona Offshore Wind Proect and Awel y Môr Offshore Wind Farm has been identified as Caer Delyn.

9.11.2.8 The operational noise levels due to each onshore substation and the subsequent cumulative level are presented in Table 9-41.

Table 9-41: Operational noise levels at Caer Delyn.

Receptor	Rating Level, $L_{Ar,T}$ (dB)		Cumulative Level (dB)
	Mona Offshore Wind Project	Awel y Môr Offshore Wind Farm	
Caer Delyn	16	24	25

9.11.2.9 The individual impact of each development is predicted to be negligible. However, the cumulative level increases slightly such that the cumulative impact is predicted to be **low**.

Sensitivity of the receptor

9.11.2.10 Caer Delyn is the closest common residential receptor to the proposed works and is residential in nature. The substations will operate 24/7 and thus receptors are considered to be of **high** sensitivity.

Significance of effect

9.11.2.11 Both substations will be designed to achieve operational noise limits at the nearest receptors. These limits will be secured as a requirement of the DCO and achieved via the implementation of mitigation measures and substation design. The predicted levels at Caer Delyn fall well below the representative background sound level during the night-time and, thus, the magnitude of the impact for concurrent operation of Awel y Môr and the Mona Offshore Wind Project is deemed to be negligible.

9.11.2.12 As such, the effect will be of **minor** significance. which is not significant in EIA terms.

Decommissioning phase

9.11.2.13 Decommissioning is likely to operate within the parameters identified for construction. As such, decommissioning activities will be limited to within the construction working areas and require a duration no greater than the activities assessed as part of the construction phase.

9.11.2.14 Overall, the magnitude of the impact is negligible and the sensitivity of the residential receptors is medium. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Major Developments 46/2021/0159

Construction phase

Magnitude of impact

9.11.2.15 It has been assumed that construction will be undertaken concurrently with the Mona Onshore Substation. The closest common receptor has been identified as Derwendeg. The construction noise levels are not available as part of the planning application information available. However, the construction method statement states that foundations will not be installed using any piling methods and that general good practice measures will be implemented for the control of pollution.

9.11.2.16 As such, the predicted construction noise level at Derwendeg of 46 dB $L_{Aeq,T}$ will unlikely be significantly exceeded as a result of the construction works proposed. The cumulative impact is therefore predicted to be **low**.

Sensitivity of the receptor

9.11.2.17 Derwendeg is the closest common residential receptor to the proposed works and is residential in nature. The works are proposed during the daytime only and thus are considered to be of **medium** sensitivity.

Significance of effect

9.11.2.18 The CoCP/method statement for each development will outline measures required such as the use of quieter equipment, acoustic screens, agreed working hours, and communication with the local community.

9.11.2.19 Overall, the magnitude of the impact for concurrent construction of both developments is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Operational phase

9.11.2.20 As above, the common receptor for the Mona Offshore Wind Project and Major Developments 46/2021/0159 is identified as Derwendeg.

9.11.2.21 A noise impact assessment has been submitted as part of the planning application for Major Developments 46/2021/0159.

9.11.2.22 The operational noise levels due to the Mona Onshore Substation, the proposed industrial facility, and the subsequent cumulative level are presented in Table 9-42.

Table 9-42: Operational noise levels at Derwendeg.

Receptor	Rating Level, $L_{Ar,T}$ (dB)		Cumulative Level (dB)
	Mona Offshore Wind Project	Major Developments 46/2021/0159	
Derwendeg	17	38	38

9.11.2.23 The representative background sound level during the daytime was measured to be 38 dB L_{A90}. As such, the cumulative level is predicted to be equal to the existing background level and the cumulative impact is predicted to be **low**.

Sensitivity of the receptor

9.11.2.24 Derwendeg is the closest common residential receptor to the proposed works and is residential in nature. The industrial facility will operate during the daytime only and thus receptors are considered to be of **medium** sensitivity.

Significance of effect

9.11.2.25 Overall, the magnitude of the impact for concurrent operation of both developments is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Decommissioning phase

9.11.2.26 Decommissioning is likely to operate within the parameters identified for construction. As such, decommissioning activities will be limited to within the construction working areas and require a duration no greater than the activities assessed as part of the construction phase.

9.11.2.27 Overall, the magnitude of the impact is negligible and the sensitivity of the residential receptors is medium. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Tier 3

Construction phase

9.11.2.28 The construction phase for the St Asaph Solar Farm and Major Development 31/2023/0525 have been addressed within the EIA screening opinion request letters for each respective development.

9.11.2.29 The works will be undertaken adopting best practicable means principles as outlined in BS 5228:2009+A1:2014 to control noise levels and minimise noise impacts at receptors. A CoCP (or similar) will be implemented outlining the measures to be implemented to control construction noise and vibration at nearby receptors.

9.11.2.30 As such, it is unlikely that the cumulative construction noise impacts will give rise to significant cumulative effects at common receptors within the construction noise and vibration study area for the Mona Onshore Substation.

9.11.2.31 As such, the effects due to construction are considered to be of **minor adverse** significance which is not significant in EIA terms.

Decommissioning phase

9.11.2.32 Decommissioning is likely to operate within the parameters identified for construction. As such, decommissioning activities will be limited to within the construction working areas and require a duration no greater than the activities assessed as part of the construction phase.

9.11.2.33 The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

St Asaph Solar Farm

Operational phase

Magnitude of impact

9.11.2.34 The cumulative noise impacts due to the operation of the Mona Onshore Substation and the St Asaph Solar farm have been considered at Tyn y Ffordd Bach, which is a common receptor between the two developments.

9.11.2.35 The representative background sound level at Tyn y Ffordd Bach during the night-time period, where impacts are likely to be highest, is 30 dB L_{A90}. The MDS is assumed to be that the maximum permitted noise level for the St Asaph Solar Farm will be a rating level which is no greater than +5 dB above the representative background sound level, such that adverse impacts are avoided when assessed in terms of BS 4142:2014+A1:2019. The assumed rating level is thus assumed to be 34 dB(A) at Tyn y Ffordd Bach.

9.11.2.36 The operational noise levels due to the Mona Onshore Substation at Tyn y Ffordd Bach are presented alongside the cumulative level in Table 9-43 below.

Table 9-43: Operational noise levels at Tyn y Ffordd Bach.

Receptor	Rating Level, $L_{Ar,T}$ (dB)		Cumulative Level (dB)
	Mona Offshore Wind Project	St Asaph Solar Farm	
Tyn y Ffordd Bach	17	34	34

9.11.2.37 The cumulative rating level of 34 dB(A) is +4 dB above the representative night-time level at the nearest receptor. The magnitude of the cumulative impact is therefore considered to be **low**.

Sensitivity of the receptor

9.11.2.38 Tyn y Ffordd Bach is the closest common residential receptor to the proposed works and is residential in nature. The substation and solar farm will operate 24/7 and thus receptors are considered to be of **high** sensitivity.

Significance of effect

9.11.2.39 Overall, the magnitude of the impact for concurrent operation of St Asaph Solar Farm and the Mona Offshore Wind Project is deemed to be low, and the sensitivity of the receptor is considered to be high. The effect will, therefore, be of minor or moderate adverse significance.

9.11.2.40 The cumulative level predicted is entirely dominated by noise emission levels from the St Asaph Solar Farm. Both developments will be designed such that significant adverse effects are avoided via the implementation of mitigation measures and layout design. As such, the effect will be of **minor adverse** significance, which is not significant in EIA terms.

Major Development 31/2023/0525

Operational phase

Magnitude of impact

9.11.2.41 The EIA screening opinion request submitted states that the nearest receptors to the Bodelwyddan Substation Extension are situated on Lon Coed Esgob, approximately 190 m northeast of the proposed development. The nearest common receptor between the Mona Onshore Substation and the Bodelwyddan Substation Extension has been identified via analysis of OS AddressBase Plus data as Plas yr Esgob.

9.11.2.42 As such, the cumulative noise impacts due to the operation of the Mona Onshore Substation and the Bodelwyddan Substation Extension have been considered at this receptor.

9.11.2.43 The representative background sound level at Plas yr Esgob during the night-time period, where impacts are likely to be highest, is 32 dB L_{A90}. The EIA screening opinion request submitted states that:

"*Operational noise levels are anticipated to be at or below the current levels.*"

9.11.2.44 As such, the MDS is represented by a rating noise level which is equal to the existing background sound level at Plas yr Esgob during the night-time period. This assumption is based upon the fact that the substation was in operation during the baseline sound survey and thus will be included in the baseline levels measured.

9.11.2.45 The operational noise levels due to the Mona Onshore Substation at Plas yr Esgob are presented alongside the cumulative level in Table 9-44 below.

Table 9-44: Operational noise levels at Plas yr Esgob.

Receptor	Rating Level, $L_{Ar,T}$ (dB)		Cumulative Level (dB)
	Mona Offshore Wind Project	Major Development 31/2023/0525	
Plas yr Esgob	17	32	32

9.11.2.46 The cumulative rating level of 32 dB(A) is equal to the representative night-time background sound level at the nearest receptor. The magnitude of the cumulative impact is therefore considered to be **low**.

Sensitivity of the receptor

9.11.2.47 Plas yr Esgob is the closest common residential receptor to the proposed works and is residential in nature. The substations will operate 24/7 and thus receptors are considered to be of **high** sensitivity.

Significance of effect

9.11.2.48 Overall, the magnitude of the impact for concurrent operation of the Bodelwyddan Substation Extension and the Mona Offshore Wind Project is deemed to be low, and the sensitivity of the receptor is considered to be high. The effect will, therefore, be of minor or moderate adverse significance, which is not significant in EIA terms.

9.11.2.49 The representative background sound level is unlikely to be exceeded by the cumulative operation of both developments since they will be designed such that significant adverse effects are avoided via the implementation of mitigation measures and layout design. As such, the effect will be of **minor adverse** significance, which is not significant in EIA terms.

9.12 Transboundary effects

9.12.1.1 A screening of transboundary impacts has been carried out and has identified that there was no potential for significant transboundary effects with regard to noise and vibration from the Mona Offshore Wind Project upon the interests of other states.

9.13 Inter-related effects

9.13.1.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposal on the same receptor. These are considered to be:

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Mona Offshore Wind Project (construction, operations and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases (e.g. subsea noise effects from piling, operational wind turbines, vessels and decommissioning).
- Receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on noise and vibration, such as noise from the construction plant, may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.

9.13.1.2 A description of the likely interactive effects arising from the Mona Offshore Wind Project on noise and vibration is provided in Volume 3, Chapter 11: Inter-related effects of the Environmental Statement - Onshore.

9.14 Summary of impacts, mitigation measures and monitoring

9.14.1.1 Information on noise and vibration within the noise and vibration study area was collected through desktop review and site surveys.

- Table 9-45 presents a summary of the potential impacts, measures adopted as part of the project and residual effects in respect to noise and vibration. The impacts assessed include:
  - Noise impacts due to offshore piling.
  - Noise impacts due to the onshore export cables at the Mona Landfall.
  - Noise impacts due to the Mona Onshore Cable Corridor landward of MHWS.
  - Vibration impacts due to the Mona Onshore Cable Corridor landward of MHWS; and
  - Noise impacts due to the Mona Onshore Substation.
- Overall, it is concluded that there will be no significant effects arising from the Mona Offshore Wind Project during the construction, operation and maintenance, or decommissioning phases.

- Table 9-46 Table 9-46 presents a summary of the potential cumulative impacts, mitigation measures, and residual effects. The cumulative impacts assessed include:
  - Noise impacts due to the Mona Onshore Substation.
- Overall it is concluded that there will be no significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.

Table 9-45: Summary of potential environmental effects, mitigation and monitoring.

[a] C=construction, O=operations, M=maintenance, D=decommissioning

Description of impact	Phase[a] C	O	D	Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Noise impacts due to offshore piling.	✓	×	✓	Noise control measures will be implemented as outlined in the Construction Noise and Vibration Management Plan (Document J26.3) as part of the Outline CoCP. The CoCP will be secured as a requirement of the DCO.	C: Negligible D: Negligible	C: High D: High	C: Minor adverse D: Minor Adverse	None.	C: Minor adverse D: Minor Adverse	None.
Noise impacts due to the onshore export cable at the Mona Landfall	✓	×	✓	Noise control measures will be implemented as outlined in the Construction Noise and Vibration Management Plan (Document J26.3) as part of the Outline CoCP. The CoCP will be secured as a requirement of the DCO.	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor Adverse	None.	C: Minor adverse D: Minor Adverse	A noise monitoring strategy may be agreed upon with the relevant stakeholders to ensure compliance with the agreed noise threshold values.
Noise impacts due to the onshore export cable at the Mona Landfall (trenchless techniques)	✓	×	✓	Noise control measures will be implemented as outlined in the Construction Noise and Vibration Management Plan (Document J26.3) as part of the Outline CoCP. The CoCP will be secured as a requirement of the DCO.	C: Low D: Low	C: High D: Medium	C: Minor adverse D: Minor Adverse	None.	C: Minor adverse D: Minor Adverse	A noise monitoring strategy may be agreed upon with the relevant stakeholders to ensure compliance with the agreed noise threshold values.
Noise impacts due to the Mona Onshore Cable Corridor landward of the transition joint bay	✓	×	×	Noise control measures will be implemented as outlined in the Construction Noise and Vibration Management Plan (Document J26.3) as part of the Outline CoCP. The CoCP will be secured as a requirement of the DCO.	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor Adverse	None.	C: Minor adverse D: Minor Adverse	A noise monitoring strategy may be agreed upon with the relevant stakeholders to ensure compliance with the agreed noise threshold values.
Noise impacts due to the Mona Onshore Cable Corridor landward of the transition joint bay (trenchless techniques).	✓	×	✓	Noise control measures will be implemented as outlined in the Construction Noise and Vibration Management Plan (Document J26.3) as part of the Outline CoCP. The CoCP will be secured as a requirement of the DCO.	C: Low D: Low	C: High D: Medium	C: Minor adverse D: Minor Adverse	None.	C: Minor adverse D: Minor Adverse	A noise monitoring strategy may be agreed upon with the relevant stakeholders to ensure compliance with the agreed noise threshold values.
Noise impacts due to construction traffic on local highway networks	✓	×	×	The Outline CoCP will be secured as a requirement of the DCO and contain a Construction Traffic Management Plan (CTMP) outlining methods to control construction traffic.	C: Negligible	C: Medium	C: Minor adverse	None	C: Minor adverse	None.
Vibration impacts due to the Mona Onshore Cable Corridor landward of the transition joint bay.	✓	×	✓	Vibration control measures will be implemented as outlined in the Construction Noise and Vibration Management Plan (Document J26.3) as part of the Outline CoCP. The CoCP will be secured as a requirement of the DCO.	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor Adverse	None.	C: Minor adverse D: Minor Adverse	A vibration monitoring strategy may be agreed upon with the relevant stakeholders to ensure compliance with the agreed noise threshold values.
Noise impacts due to the Mona Onshore Substation.	✓	✓	✓	Noise control measures will be implemented as outlined in the Construction Noise and Vibration Management Plan (Document J26.3) as part of the Outline CoCP. The CoCP will be secured as a requirement of the DCO. The Mona Onshore Substation will be designed to ensure compliance with operational noise limits at the nearest noise-sensitive receptors. These limits will be agreed with DCC and secured as a requirement of the DCO.	C: Low O: Low M: Negligible D: Low	C: High O: High M: Medium D: High	C: Minor adverse O: Minor adverse M: Minor adverse D: Minor adverse	None.	C: Minor adverse O: Minor adverse M: Minor adverse D: Minor adverse	A noise and vibration monitoring strategy during the construction phase may be agreed upon with the relevant stakeholders to ensure compliance with the agreed noise threshold values.

Table 9-46: Summary of potential cumulative environmental effects, mitigation and monitoring.

Description of effect	Phase[a] C	O	D	Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Tier 1										
Noise impacts due to the Mona Onshore Substation.	✓	✓	✓	Noise control measures will be implemented as outlined in the Construction Noise and Vibration Management Plan (Document J26.3) as part of the Outline CoCP. The CoCP will be secured as a requirement of the DCO. The Mona Onshore Substation will be designed to ensure compliance with operational noise limits at the nearest noise-sensitive receptors. These limits will be agreed with DCC and secured as a requirement of the DCO..	C: Low O: Low D: Low	C: Medium O: High D: Medium	C: Minor adverse O: Minor adverse D: Minor adverse	None.	C: Minor adverse O: Minor adverse D: Minor adverse	A noise and vibration monitoring strategy during the construction phase may be agreed upon with the relevant stakeholders to ensure compliance with the agreed noise threshold values.
Tier 3										
Noise impacts due to the Mona Onshore Substation.	✓	✓	✓	Noise control measures will be implemented as outlined in the Construction Noise and Vibration Management Plan (Document J26.3) as part of the Outline CoCP. The CoCP will be secured as a requirement of the DCO. The Mona Onshore Substation will be designed to ensure compliance with operational noise limits at the nearest noise-sensitive receptors. These limits will be agreed with DCC and secured as a requirement of the DCO.	C: Low O: Low D: Low	C: Medium O: High D: Medium	C: Minor adverse O: Minor adverse D: Minor adverse	None.	C: Minor adverse O: Minor adverse D: Minor adverse	A noise and vibration monitoring strategy during the construction phase may be agreed upon with the relevant stakeholders to ensure compliance with the agreed noise threshold values.

[a] C=construction, O=operations and maintenance, D=decommissioning

9.15 References

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British Standards Institution (2014), '*British Standard 5228-1:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'*

British Standards Institution (2014), '*British Standard 5228-2:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'*

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