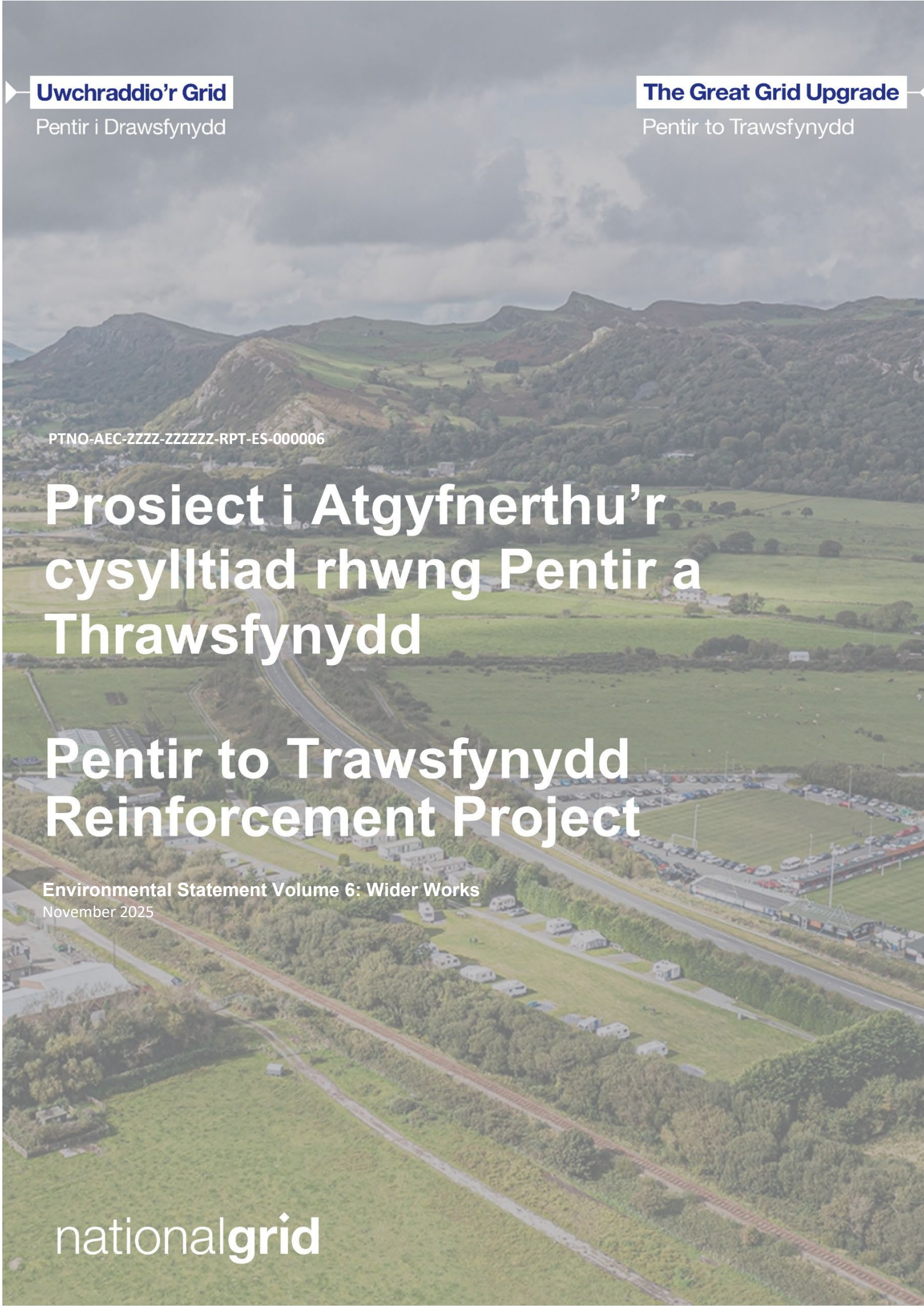
Uwchraddio'r Grid
Pentir i Drawsfynydd

The Great Grid Upgrade
Pentir to Trawsfynydd



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Pentir to Trawsfynydd Reinforcement Project

Environmental Statement Volume 6: Wider Works
November 2025

nationalgrid

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Executive Summary

Background

Introduction

i. This document (Volume 6 – Wider Works forms part of the Environmental Statement which accompanies applications by National Grid Electricity Transmission plc to construct and operate developments which comprise parts of the Pentir to Trawsfynydd Reinforcement Project (the 'Project'). Volume 6 focuses on where works are expected to be required for the reinforcement works required to the existing 4ZC overhead line (OHL) knowns as the Wider Works.

Wider Works Location

ii. The western section of the 4ZC overhead line is approximately 35.7 kilometres (km) long and is in the administrative district of Gwynedd Council. It runs between Wern Cable Sealing End Compound (CSEC) (SH 543 402), approximately 2.5 km northwest of Porthmadog (SH 543401) and Pentir Substation (SH 559 677), approximately 4.5 km southwest of Bangor.

iii. The eastern section of the 4ZC overhead line is approximately 9.9 km long and runs between Trawsfynydd Substation (SH 691 384), approximately 1.2 km south of Gellilydan and Garth CSEC (SH 596 388), approximately 2.5km east of Porthmadog. Following completion of the EVIP Project, the eastern section of overhead line will run between Trawsfynydd Substation and Cilfor CSEC and will be approximately 6.7 km long. The CSECs provide an interface arrangement allowing for the Glaslyn Cables to connect both east and west sections of the 4ZC overhead line.

Wider Works

iv. The Wider Works comprise two types of activity that will be undertaken on sections of the existing Pentir to Trawsfynydd 4ZC overhead line route. The route is formed by a double circuit, steel tower overhead line, designed to have a maximum operating voltage of 400,000 Volts (400 kV)

v. The line comprises steel towers (pylons), supporting a conductor system (wires). The conductor system is arranged in two groups (circuits) of three conductor bundles (phases) each supported from crossarms attached to either side the tower bodies. In addition to the main conductor system, a protective earthwire runs between the tower peaks for the purpose of shielding the conductor bundles from lightning strikes. For telemetry and control purposes, a special earthwire with an embedded fibre optic communications cable (OPGW) can be installed or, alternatively, by tightly wrapping a fibre optic cable around the existing earthwire ("wrapped earthwire").

vi. The inland circuit (**Circuit B**) operates at 400 kV between Trawsfynydd (4ZC5) and Pentir (4ZC157).

vii. Circuit A, between towers 4ZC70 and 4ZC140, has a 400 kV conductor system installed but is presently electrically disconnected from the wider power network. Jumper installation work will be undertaken at towers 4ZC70 and 4ZC140 to restore this part of the line to 400 kV operation.

viii. The Eryri Visual Impact Provision (EVIP) Project in construction will remove a section of existing overhead line running between tower 4ZC27 (tower located approximately 500 metres northeast of Cilfor village) and Garth CSEC (4ZC37). To allow removal of the section of overhead line, a tunnel and cables installation will be constructed between a CSEC and tunnel headhouse (THH) to be established near tower 4ZC27 ("Cilfor CSEC") and a CSEC and THH to be established near Minffordd village ("Minffordd CSEC").

ix. The Wider Works on the Pentir to Trawsfynydd route will be split into two types of work activity.

Reconductoring

x. Reconductoring of the coastal circuit (Circuit A) between towers 4ZC5 to 4ZC27 and towers 4ZC44 to 4ZC70, totalling 14.8 km is required to replace and upgrade the conductor system.

xi. The majority of reconductoring work will be undertaken using a technique called continuous tension stringing.

xii. Generally, the reconductoring works will be carried out in the following sequence:

- Access and enabling works, including vegetation clearance.
- Scaffolding and crossing protection.
- Overhead line tower steelwork and foundation surveys and strengthening.
- Overhead line continuous tension stringing.
- Removal of scaffolds and access and enabling works.

Fibre Optic Installation

xiii. The following works will be required to connect the proposed Bryncir Substation to National Grid's operational telecommunication's network:

- A section of underground fibre optic cable between the proposed Bryncir substation and the proposed relocated tower 4ZC67 (see **Volume 3: Bryncir Works**).
- The replacement 8.1 km of existing earthwire in spans 4ZC44 to 4ZC70 with a new fibre optic OPGW earthwire.
- The installation of a fibre wrapped cable to the 23.0 km length of existing earthwire between towers 4ZC70 and 4ZC140.
- The fibre optic wrap will be installed in approximate 2 km sections.
- Where wrapping of the existing earthwire is to take place, a special tug will be deployed along the earthwire carrying reels of fibre optic cable. The tug will ensure the fibre optic cable is wrapped tightly around the earthwire. Access will be required at all tower sites to transfer the tug over the tower peaks. Approximately every 8-10 spans, the tug will be reloaded with fresh reels of fibre optic cable. The jointing of reels of fibre optic cable will take place lower down in the base of the tower (Ref 2.2).
- The fibre optic wrapping system requires no crossing protection measures although significant crossings (i.e. A and B roads, and rivers) will be monitored.

- Access and enabling works will be minimal. Where required, the equipment will be delivered by lorry loader or pick-up with tractor and all-terrain vehicle (ATV) support. At optical joint towers, for launching the tug unit, access will be required for larger vehicles (tractors and 3.5 tonne pick-ups). Access will be required to all other towers to transfer the tug unit over the tower peak.

Access and Enabling Works

xiv. Access routes will be required to each tower and haul roads will utilise routes from the nearest A or B road along unclassified roads to the site access point at the end of the public highways .

xv. Bellmouth widening and vegetation clearance for visibility splays may be required at the access points from the highway onto private roads.

xvi. Where the ground is unsuitable for temporary access panels, All-Terrain Vehicles (ATVs) may be used for the transport of personnel. For the delivery of heavier loads, such as materials and equipment, four-wheel drive tractors or “Hagglund” type tracked vehicles will be utilised.

xvii. Where access routes cross watercourses, the existing crossings will be assessed for suitability for the proposed vehicles and upgraded where required. Upgrade options will depend on size and frequency of vehicles required to cross and could include new or replacement culverts; overbridging; steel or polymer road-plates; and/or temporary culverts.

Wider Works Site Layout

xviii. Indicatively, a main compound near Porthmadog and two satellite compounds, one near the Bryncir works site and one near Tower 4ZC027, would likely be used.

xix. There would be tower working at every tower between towers 4ZC5 to 4ZC27 and 4ZC44 to 70 for reconductoring work and towers 4ZC70 to 4ZC140 for earthwire fibre wrapping work.

xx. Laydown and storage areas would be at regular intervals along the length of the Wider Works site.

xxi. Scaffold areas are required at all locations where the 4ZC overhead line passes over a highway, watercourse or other overhead line.

xxii. Equipotential zones (EPZ) will be required at all puller or tensioner sites.

Programme

xxiii. The Wider Works are planned to be undertaken over a period of approximately 50 months from Q2 2026 – Q3 2029. The Wider Works will occur in phases,

Staffing and Employment

xxiv. The number of staff on the Wider Works site would vary according to the phase and activities being undertaken; some activities may be run concurrently. The peak construction staff would be between 20 and 50 workers.

xxv. Generally, the works will be undertaken during daytime periods only, from Monday to Friday 7.00 am – 7.00 pm. Some weekend working may be required to meet operational and programme requirements.

xxvi. The OHL works will be on a 10-days-on- two-days-off programme.

Operation

xxvii. No change in the current frequency of inspection or maintenance to the line is expected. Maintenance would be required through issues arising from inspection.

Electric and Magnetic Fields

xxviii. All equipment that generates, distributes or uses electricity produces electric and magnetic fields (EMFs). A separate EMF report has been produced which sets out the technical specifications of the Wider Works and how it complies with EMF exposure guidelines.

Alternatives

xxix. The works are required on the existing 4ZC OHL and there are no reasonable alternatives to the works identified.

Key Findings of the Environmental Impact Assessment

xxx. Potential effects could arise from the Wider Works on the following topics:

- Ecology and Nature Conservation.
- Historic Environment.
- Air Quality and Emissions.
- Climate Change.

xxxi. All other topics were scoped out of the assessment:

Ecology and Nature Conservation

xxxii. The Study Area for Ecology and Nature Conservation varies for different receptors. A desk study was carried out to identify sites designated for nature conservation and records of protected or notable habitats and species (important ecology features) and INNS that are relevant to Wider Works site. Various field studies were also carried out.

xxxiii. There are 17 international statutory sites for nature conservation (i.e. SAC, SPA and Ramsar sites) Study Area and one additional SAC designated for bats within 30 km of the Wider Works site. Fifty other statutory designated sites for nature conservation (SSSI, NNR, LNR) are in the Study Area. There are 282 non-statutory sites designated for nature conservation within the 2 km Study Area and 42 are in the Wider Works site.

xxxiv. There are two North Wales Wildlife Trust (NWWT) sites in the 2 km Study Area -

xxxv. There are 19 sites of Ancient Woodland in the Study Area, comprising six sites of Restored Ancient Woodland, 10 sites of Ancient Semi-Natural Woodland and three sites of Ancient Woodland of Unknown Category. There are two ancient and four veteran trees present within the Wider Works site.

xxxvi. Ther are various Habitats of Principal Importance (HoPI) and broad terrestrial habitats in the Study Area.

xxxvii. The desk study returned records of protected and notable species within the 2 km Study Area for the preceding 10 years.

xxxviii. The proposed works have the potential to affect ecology and nature conservation through habitat loss (temporary and permanent), disturbance (light, noise, vibration and human activity), habitat degradation, species mortality and spread of INNS during construction.

xxxix. Embedded mitigation includes but is not limited to:

- Root Protection Areas (RPA) of trees will be protected where practicable
- Hedgerows will be retained and buffered by a minimum of 5 m where practicable
- Vegetation clearance will avoid the core nesting bird period
- Sensitive habitats, will be protected through the use of an appropriate temporary ground protection trackway or matting to limit damage to the existing habitat and to ensure that vehicles use the same route.

xl. Additional mitigation measures will minimise any potential adverse effects on marsh fritillary butterflies, roosting bats, badgers, water vole, otter, great crested newt and fish, should they be present within the Wider Works site, including completing a pre-construction check amongst other measures.

xli. The assessment concludes that, with the incorporation of embedded and additional mitigation measures, significant effects are unlikely for Ecology and Nature Conservation

Historic Environment

xlii. A Study Area of 3 km from the Wider Works site has been defined to provide historical and archaeological context and to identify designated assets with the potential to be affected by the Wider Works and 500 m for non-designated assets.

xliii. The Wider Works are proposed in a varied landscape ranging from mountainside heath, small river valleys, woodland, and farmland. The overall settlement pattern is that of substantial 19th-century farmhouses and outbuildings interspersed with hamlets and villages. Prehistoric settlements (hut groups and small forts) are dotted across the landscape, usually in the corners of fields.

xliv. There are three Scheduled Monuments, one Registered Historic Park and Garden (Grade II*) and 35 non-designated historic assets in the Wider Works site. A further 637 non-designated archaeological assets and 16 Scheduled Monuments have been identified in the 500 m Study Area.

xlv. There is one World Heritage Site – the Slate Landscape of North West Wales (**UNESCO 1633**) in the 500 m Study Area.

xlvi. There are two Registered Historic Park and Gardens and 90 Listed Buildings in 500 m of the Wider Works site. These include five Grade II* and 85 Grade II listed buildings.

xlvii. The Gwynedd Historic Landscape Characterisation (GHLC) forms part of a national project to characterise the historic landscape. The GHLC is formed of an assessment of historic and current mapping that separated blocks of landscape into types based upon land forms and land use. A number of GHLC types were identified in the Wider Works site.

xlviii. The Wider Works site is in a number of registered historic landscapes.

xlix. Most historic assets (both designated assets and non-designated assets) were scoped out of further assessment in the baseline studies due to the lack of potential for impacts resulting from the Wider Works.

l. The sources of potential Historic Environment effects during the construction phase of the Project include:

- Temporary short-term impacts to historic assets as a result of change to their setting.
- Permanent impacts to historic assets as a result of change to their setting.
- Permanent physical impacts to below ground archaeological remains.

li. Embedded mitigation includes avoidance by design.

lii. Potential impacts to below ground archaeological remains that cannot be avoided by design can be mitigated through a proportionate programme of archaeological investigation, recording and reporting, such as archaeological monitoring and/or excavation in advance of construction, which would form additional mitigation measures. This would not result in a reduction in the physical impacts to archaeological remains but would mitigate the impact by providing a greater understanding and appreciation of the evidential value of archaeological remains.

liii. All identified impacts are limited to physical impacts during the construction phase. No significant effect has been identified on potential below ground archaeological remains along the Wider Works component of the Project.

Air Quality

liv. The Study Area for this assessment is the area over which potential direct and indirect effects of the Wider Works on local air quality are predicted to occur, noting that operation of the refurbished overhead line has been scoped out of the assessment. Various Study areas are used for differing receptors for Air Quality.

lv. A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces.

lvi. As expected for all pollutants, background concentrations in the Study Area are low, due to the predominantly rural nature of the area.

lvii. The sources of potential Air Quality and Emissions effects during the works include:

- Dust emissions.
- Site plant emissions.

lviii. Embedded mitigation measures include but are not limited to:

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Sustainable power sources (solar panels etc.) to be used where practicable. Where available, generators are to be low emission with hybrid battery systems (or to current best practice).
- Use enclosed chutes and conveyors (if used) and covered skips.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.

lix. Due to the length of the Project works site, there are amenity, air quality and ecology receptors close enough to the Project works site that are sensitive to changes in air quality emissions. However, provided all construction activities adhere to the mitigation measures listed in the CEMP, the potential magnitude of impacts will be negligible and not significant.

lx. The impact of construction equipment and machinery emissions is anticipated to be not significant. This is due to the good standard of baseline air quality and the limited duration of time in which such machinery will be operation, and the effectiveness of standard practice emissions control measures.

lxi. Construction road traffic emissions and operational road traffic emissions impacts were screened out of the assessment.

Climate Change

lxii. For the GHG assessment, the existing baseline refers to the current conditions at the Wider Works site. This includes the carbon stock and sources of GHG emissions within the boundary of existing on-site activities.

lxiii. The current baseline for the CCRA and ICCI assessments is based on historic climate data obtained from the Met Office website recorded at the closest meteorological station to the Wider Works site (Cwmystradllyn).

lxiv. A separate GHG assessment for the Wider Works was not undertaken, as no materially different emissions sources or working methods were identified that would justify a standalone assessment.

lxv. However, a separate CCRA was undertaken for the Wider Works to reflect its specific location, design, and exposure to climate-related hazards.

lxvi. It is estimated that the bulk of emissions (estimated around 95%) from the Wider Works will come from the A0 – A5 lifecycle stages (pre-works, product and works process stages).

lxvii. Based on a qualitative assessment, the magnitude of GHG emissions is not material in the context of the UK and Welsh carbon budgets. The Wider Works are consistent with applicable UK and Welsh Government climate change policy and legislation.

lxviii. The Project will support the UK's transition to net zero by providing the necessary infrastructure to enable the increased transmission of low-carbon electricity. As renewable energy generation increasingly replaces higher-carbon energy sources, this aligns with the UK Government's goal of achieving an electricity system independent of fossil fuels by 2035.

lxix. The Wider Works will be designed and operated in accordance with the risks and mitigation measures outlined in NGETs Climate Resilience Strategy.

lxx. No significant effects were identified for greenhouse gases or in the CCRA, therefore no additional mitigation is required.

1. Introduction

1.1.1 Volume 6 (this document) forms part of the Environmental Statement (ES) that accompanies applications by National Grid Electricity Transmission plc (NGET) to construct and operate the Pentir to Trawsfynydd Reinforcement Project (the 'Project').

1.1.2 This volume describes anticipated effects from activities that will comprise part of the Project which are not development and so do not require planning permission. The purpose of this volume is to allow decision-makers, determining applications for consent for development, to take account of these activities. The works described in this volume are not development but comprise refurbishment activities necessary for the safe and long term operation of existing overhead line assets. Previously, similar refurbishment activities have occurred on this route and, irrespective of the Project, would be necessary in the future.

1.1.3 A description of the works is provided in **Chapter 2: Wider Works**.

1.1 Structure of the Volume

1.1.4 This volume is structured as follows:

- **Chapter 1: Introduction.**
- **Chapter 2: Wider Works.**
- **Chapter 3: Assessment of Alternatives.**
- **Chapter 4: Scope of Assessment.**
- **Chapter 5: Likely Significant Effects.**
- **Chapter 6: In-Combination and Cumulative Effects.**

1.2 Figures and Appendices

1.1.5 All figures noted in this volume are in an appendix attached to this volume in addition to a summary appendix (**Appendix A**) of the study area and baseline specific to this volume. All other supporting documents are compiled in **Volume 8: Appendices**.

1.1.6 The figure numbering system is as follows: Volume number, chapter number then 1, 2, 3 etc. For example, **Figure 6.1.1**.

1.1.7 The appendix numbering system is as follows: Volume number, chapter number, then A, B, C etc. For example, **Appendix 6.1.A**. All figures associated with a given appendix will follow the same system, followed by the figure number, for example, a figure to Appendix 6.1.A would be Figure 6.1.A.1, 2, 3 etc.

2. Wider Works

2.1 Introduction

2.1.1 This chapter provides a description of the locations where works are expected to be required for the reinforcement works required to the existing 4ZC overhead line (OHL) knowns as the Wider Works.

2.2 Wider Works Location

2.2.1 The western section of the 4ZC overhead line is approximately 35.7 kilometres (km) long and is in the administrative district of Gwynedd Council. It runs between Wern Cable Sealing End Compound (CSEC) (SH 543 402), approximately 2.5 km northwest of Porthmadog (SH 543401) (**see Volume 4: Glaslyn Cables Works**) and Pentir Substation (SH 559 677), approximately 4.5 km southwest of Bangor.

2.2.2 The eastern section of the 4ZC overhead line is approximately 9.9 km long and runs between Trawsfynydd Substation (SH 691 384), approximately 1.2 km south of Gellilydan and Garth CSEC (SH 596 388), approximately 2.5km east of Porthmadog. Following completion of the EVIP Project, the eastern section of overhead line will run between Trawsfynydd Substation and Cilfor CSEC and will be approximately 6.7 km long. The CSECs provide an interface arrangement allowing for the Glaslyn Cables to connect both east and west sections of the 4ZC overhead line (**see Volume 4: Glaslyn Cables Works**).

2.2.3 The locations of the proposed Wider works are illustrated on **Figure 6.2.1**, (the 'Wider Works site').

2.2.4 The Wider Works site passes through undulating land with a high point of 230 metres (m) Above Ordnance Datum (AOD) at Tower 4ZC113, west of Penffridd. The elevation of the Wider Works site gradually reduces to 10 m AOD at the Wern CSEC, where the works meet the Glaslyn Cables Works (ES **Volume 4**). As the Wider Works site continues east towards Trawsfynydd Substation, the elevation increases from 3 m AOD at Minffordd CSEC to 180 m AOD at Trawsfynydd Substation.

2.2.5 The Wider Works site intersects 71 Public Rights of Way (PRoW) including footpaths, bridleways and byways (open and restricted) along its length. The Wider Works site also intersects National Cycle Network (NCN) route 61, south of the A4085; NCN route 8 on four separate occasion, which broadly runs along the A487 between Bontnewydd and Penrhyndeudraeth; and NCN route 82 to the east of Minffordd.

2.2.6 The Wider Works site is characterised by predominantly rural land uses with scattered woodland. The Wider Works site runs through Grade 3a (good to moderate quality), Grade 3b (moderate quality), Grade 4 (poor quality) and Grade 5 (very poor quality) agricultural land as identified by Agricultural Land Classification (ALC) data (Ref 2.1).

2.2.7 The Wider Works site crosses numerous designated Main Rivers and their associated tributaries. Llyn Tecwyn-uchaf is also spanned by the Wider Works. The Wider Works also spans low, medium and high flood risk areas.

2.2.8 The Wider Works site passes through the Afon Gwyrfai a Llyn Cwellyn SSSI and Special Area of Conservation (SAC), Glaslyn SSSI, Coedydd De Dyffryn Maentwrog SSSI, Ysbyty Bron y Garth SSSI, Ceunant Llennyrch National Nature Reserve (NNR) and Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat Sites SAC. Further designated sites are in the surrounding area. The Wider Works site also intersects multiple non-statutory Local Wildlife Sites (LWS) (candidate and confirmed) along its length. The Wider Works site and surrounding area also contain a variety of resources, including priority or notable habitats and records of protected or notable species.

2.3 Proposed Wider Works

2.3.1 The Wider Works comprise two types of activity that will be undertaken on sections of the existing Pentir to Trawsfynydd 4ZC overhead line route (**Figure 6.2.2**). The route is formed by a double circuit, steel tower overhead line, designed to have a maximum operating voltage of 400,000 Volts (400 kV)

2.3.2 The line comprises steel towers (pylons), supporting a conductor system (wires). The conductor system is arranged in two groups (circuits) of three conductor bundles (phases) each supported from crossarms attached to either side the tower bodies. For this type of construction, four individual wires make up each conductor bundle. Insulator strings and other fittings also form part of the overhead line construction. A ‘jumper’ is a short length of conductor used to create a temporary or permanent connection between two points. It is typically used to bypass a component or section of the line for maintenance works. In addition to the main conductor system, a protective earthwire runs between the tower peaks for the purpose of shielding the conductor bundles from lightning strikes. For telemetry and control purposes, a special earthwire with an embedded fibre optic communications cable (OPGW) can be installed or, alternatively, by tightly wrapping a fibre optic cable around the existing earthwire (“wrapped earthwire”).

2.3.3 The inland circuit (**Circuit B**) operates at 400 kV between Trawsfynydd (4ZC5) and Pentir (4ZC157).

2.3.4 The coastal circuit (**Circuit A**) is complicated as, amongst other things, a section of the route between Pentir and Trawsfynydd currently provides access for a Scottish Power 132 kV circuit. As part of this Project, the 132 kV circuit will be restored to National Grid for 400 kV operation. For this Environmental Statement, the work requirements on Circuit A addressed in this ES are set out in **Table 2-1** below.

Table 2-1 – Route sections and scopes of work

Route section (circuit A)	Design voltage	Operating voltage (current)	Operating voltage (post works)	Scope of works
Trawsfynydd (4ZC5) to Cilfor CSEC (4ZC27)	400 kV	132 kV	400 kV	New circuit conductors and OPGW earthwire
Wern CSEC (4ZC44) to 4ZC70	400 kV	132 kV	400 kV	New circuit conductors and OPGW earthwire
4ZC70-4ZC140	400 kV	Electrically disconnected	400 kV	New fibre optic wrap to existing earthwire plus jumper work
4ZC140-Pentir (4ZC157)	400 kV	400 kV	400 kV	Currently in use, no proposals.

2.3.5 Circuit A, between towers 4ZC70 and 4ZC140, has a 400 kV conductor system installed but is presently electrically disconnected from the wider power network. Jumper installation work will be undertaken at towers 4ZC70 and 4ZC140 to restore this part of the line to 400 kV operation. Presently, there are no earthwire based fibre optic communication cables installed on this section of the overhead line.

2.3.6 The existing 4ZC overhead line comprises two separate sections. The **eastern section** running between Trawsfynydd Substation (4ZC5) and Garth Cable Sealing End Compound (CSEC) (4ZC37) and the **western section** running between Wern CSEC (4ZC44) and Pentir Substation (4ZC157). The existing Glaslyn Cables (see ES **Volume 3**) run between Garth CSEC and Wern CSEC.

2.3.7 The Eryri Visual Impact Provision (EVIP) Project in construction will remove a section of existing overhead line running between tower 4ZC27 (tower located approximately 500 metres northeast of Cilfor village) and Garth CSEC (4ZC37). To allow removal of the section of overhead line, a tunnel and cables installation will be constructed between a CSEC and tunnel headhouse (THH) to be established near tower 4ZC27 (“Cilfor CSEC”) and a CSEC and THH to be established near Minffordd village (“Minffordd CSEC”). The replacement Glaslyn Cables (see ES **Volume 4**) will run between an extended Wern CSEC and the Minffordd CSEC where they will connect to the EVIP cables.

2.3.8 On completion of the EVIP works, the eastern section of the 4ZC overhead line will run from Trawsfynydd Substation (4ZC5) to Cilfor THH (4ZC27). The location of the towers are shown on **Figure 6.2.2**.

2.3.9 The Wider Works on the Pentir to Trawsfynydd route will be split into two types of work activity.

2.3.10 Work activity 1 will comprise reconductoring of Circuit A (currently operating at 132 kV but to return to service at 400 kV): the replacement of conductor insulators and fittings on the eastern section of line running between Trawsfynydd substation (4ZC5) and

tower 4ZC27 and the western section of line running between Wern CSEC (4ZC44) and tower 4ZC70. In addition to the main reconductoring works, a new OPGW earthwire will be installed between Wern (4ZC44) and tower 4ZC70.

2.3.11 Work activity 2 will comprise the installation of a communications cable by wrapping a fibre optic cable around the existing earthwire, i.e. a “wrapped earthwire”, running between towers 4ZC70 and 4ZC140.

Reconductoring

2.3.12 Reconductoring of the coastal circuit (Circuit A) between towers 4ZC5 to 4ZC27 and towers 4ZC44 to 4ZC70, totalling 14.8 km is required to replace and upgrade the conductor system as set out in **Volume 1: Project Introduction**.

2.3.13 During the works, the Contractor would operate under a site-specific Works Environmental Management Plans (WEMP). The WEMP would set out a variety of control measures for managing the potential environmental effects of the works including control and management of noise, dust, surface water runoff, waste and pollution control. All necessary licenses and permissions will be sought before work starts.

2.3.14 The majority of reconductoring work will be undertaken using a technique called continuous tension stringing. By this method, the existing conductors will be used as a hauling bond to pull through new conductors. The conductor arrangement will be kept under tension at all times using special puller/tensioner machines and will remain aloft.

2.3.15 Where necessary, at locations such as road, utility and property crossings, additional protection such as scaffolding shall be provided to afford a safe system of work.

2.3.16 Generally, the reconductoring works will be carried out in the following sequence:

- Access and enabling works, including vegetation clearance.
- Scaffolding and crossing protection.
- Overhead line tower steelwork and foundation surveys and strengthening.
- Overhead line continuous tension stringing.
- Removal of scaffolds and access and enabling works.

2.3.17 To cater for the overhead line topography, the work will be split into separate **pulling sections** of approximately 2-3 km each. At one end of each pulling section will sit a **tensioner machine** for feeding in drums of new conductor and at the other end will sit a **pulling machine** for the recovery and drumming of old conductor.

2.3.18 Intermediate towers will have pulley wheels or “blocks” fitted to permit the smooth passage of conductors.

Overhead Line Tower Steelwork and Foundation Surveys and Strengthening

2.3.19 Condition surveys will be carried out prior to the commencement of works, which will involve climbing each tower. Foundation intrusive investigations will be done at approximately 5% of towers along the route and will involve excavating to the bottom of the foundation concrete on one leg of the selected towers.

2.3.20 Prior to the installation of the new conductors: any damaged, corroded or overloaded bars will be replaced throughout the route. This will require access using tractors and vans. The towers are not expected to require significant modification, but in the event this is required, due to corrosion or damage of existing bars, heavier machinery may be required; this could include cranes and lorry loaders.

Overhead Line Tension Stringing

2.3.21 The overhead line reconductoring will follow the sequence shown in **Table 2-1**. There will be as much overlap between the sections as possible.

Table 2-2 – Sequence of overhead line tension stringing

Sequence	Activity	Locations	Machinery requirements
1	Installation of earths to conductors.	All towers.	Tractor and van.
2	Remove spacers using trolley running along the conductors.	All tension towers (trolleys will travel past suspension towers on the conductors).	Tractor and 3.5 tonne pick-up to each tension tower.
3	Put the conductors in “running out blocks” (pulleys).	Suspension and intermediate tension towers.	Tractor and van.
4	Set up tension towers for pulling.	All tension towers.	18 or 26 tonne lorry loader, vans, tractors.
5	Setting up the puller/tensioner sites, including equipotential zones and drum storage areas	At the tension towers at each end of the pulling section.	18 or 26 tonne lorry loader, vans, tractors. Larger flatbeds for conductor drums if accesses allow. 20 tonne puller/tensioners.
6	Remove tension insulators and install running out blocks.	All tension towers.	18 or 26 tonne lorry loader, vans, tractors.
7	Using old conductor system, pull through new conductors.	Pulling section.	18 or 26 tonne lorry loader, vans, tractors.
8	Demobilise and move to next section.	All tension towers.	18 or 26 tonne lorry loader, vans, tractors. Larger flatbeds for scrap conductor drums if accesses allow. 20 tonne puller – tensioners moved with flat-bed or tractor.

Sequence	Activity	Locations	Machinery requirements
9	Clip in suspension towers.	Suspension towers.	Tractor and van.
10	Install new spacers (if required).	All tension towers (trolleys will travel past suspension towers on the conductors).	Tractor and 3.5 tonne pick-up to each tension tower.
11	Removal of earths to conductors.	All towers.	Tractor and van.

2.3.22 To provide a safe working area for operatives, the puller/tensioner machines are each located on an “equipotential zone”, these comprise load bearing, electrically conductive panels, bonded to equipment within the working area.

2.3.23 To resists the pulling forces imposed on the machines during stringing operations, the puller/tensioners are attached to four sledge mounted concrete blocks of around 8 tonnes each. The sledges are fitted with spikes to gain additional ground anchorage.

Vegetation Clearance

2.3.24 The estimated vegetation loss required for each working area type is detailed below:

- Equipotential zone (EPZ) = 100%.
- Access roads (approx. 3 m width) = 100% including overhanging branches to approximately 4 m above road surface for suspension towers or 5 m for accesses to angle towers and EPZs. This would typically involve trackway or driving tracked vehicles directly on ground.

2.3.25 Tower working areas = 60%. In tower working areas (including scaffolds and laydown areas) low level vegetation will be cleared to ankle height is required to allow safe access by foot. There will be some tree losses but these will be kept to a minimum and all necessary pre-construction surveys, licenses and permissions will be sought before work removal

- Scaffold (low vegetation) = 60%, (high vegetation) = 80%. Vegetation would be removed where it interferes with the scaffold structure or backstay anchors, but generally this will involve strimming to below ankle height to reduce tripping hazard and allowed to grow back while the scaffold is in place. Anchors could be concrete blocks or “duck-bill” type driven anchors.

Removal of Scaffolds and Access and Enabling Works

2.3.26 The Wider Works site will be cleared of all temporary access equipment including scaffolds, trackway and fences. The Wider Works site will be cleared with metal detectors to ensure all components are removed. Re-seeding and re-planting will be carried out in line with the WEMP.

Scaffolding and Crossing Protection

2.3.27 To provide a safe system of work, scaffolding structures will be erected where the overhead line passes over utilities, roads or watercourses. The structures will comprise

“tube and clip” type scaffold towers, either singly or on each side of the crossing depending on the obstacle to be protected. For longer crossings, such as highways, the scaffold towers may support a net held by catenary wires. An example of such a structure is shown on **Plate 2-1**.



Plate 2-1– Example of scaffold structure

2.3.28 Ground reinforcement may be required prior to the installation of the scaffold: this may consist of trackway panels, stone pads or screwpile foundations.

2.3.29 Scaffold structures will be erected by hand to full height (under an electrical outage if required due to clearance). The catenary wires supporting the net will be pulled out by hand under a road-closure or utility outage and the nets pulled out and secured. These will be in place for approximately the duration of the section wiring works (2-3 weeks) plus a few weeks either side. SP Energy Networks (SPEN) may underground some of their lines prior to this work to avoid clashes.

2.3.30 Scaffolds will be dismantled in reverse procedure to the above.

Fibre Optic Installation

2.3.31 The following works will be required to connect the proposed Bryncir Substation to National Grid’s operational telecommunication’s network:

- A section of underground fibre optic cable between the proposed Bryncir substation and the proposed relocated tower 4ZC67 (see **Volume 3: Bryncir Works**).
- The replacement 8.1 km of existing earthwire in spans 4ZC44 to 4ZC70 with a new fibre optic OPGW earthwire.
- The installation of a fibre wrapped cable to the 23.0 km length of existing earthwire between towers 4ZC70 and 4ZC140.
- The fibre optic wrap will be installed in approximate 2 km sections.

- Where wrapping of the existing earthwire is to take place, a special tug will be deployed along the earthwire carrying reels of fibre optic cable. The tug will ensure the fibre optic cable is wrapped tightly around the earthwire. Access will be required at all tower sites to transfer the tug over the tower peaks. Approximately every 8-10 spans, the tug will be reloaded with fresh reels of fibre optic cable. The jointing of reels of fibre optic cable will take place lower down in the base of the tower (Ref 2.2).
- The fibre optic wrapping system requires no crossing protection measures although significant crossings (i.e. A and B roads, and rivers) will be monitored.
- Access and enabling works will be minimal. Where required, the equipment will be delivered by lorry loader or pick-up with tractor and all-terrain vehicle (ATV) support. At optical joint towers, for launching the tug unit, access will be required for larger vehicles (tractors and 3.5 tonne pick-ups). Access will be required to all other towers to transfer the tug unit over the tower peak.

Access and Enabling Works

2.3.32 Access routes will be required to each tower as set out in **Table 2-1**. Access routes would follow existing farmer's tracks, wherever possible and will be a mix of stone road, trackway or ATV access. Where there is an existing stone road, this may be scraped clean of soil and dressed with a layer of new stone to make it suitable for the works traffic.

2.3.33 Haul roads will utilise routes from the nearest A or B road along unclassified roads to the site access point at the end of the public highways. No work will be required on the haul roads except where the responsible authority has allowed overhanging vegetation to grow below the standard minimum clearance.

2.3.34 Bellmouth widening and vegetation clearance for visibility splays may be required at the access points from the highway onto private roads. The Contractor will determine where this is required and carry it out under temporary traffic management on the public highway. Planning consent will be obtained where required for any temporary works.

2.3.35 Access routes would follow existing farmer's tracks, wherever possible and will be a mix of stone road, trackway or ATV access. Where there is an existing stone road, this may be scraped clean of soil and dressed with a layer of new stone to make it suitable for the works traffic.

2.3.36 Where required, load spreading temporary access panels, such as "Trackway", will be used to protect sensitive habitats along access routes. The access panels will be installed using a Hiab type crane mounted on a flat-bed lorry.

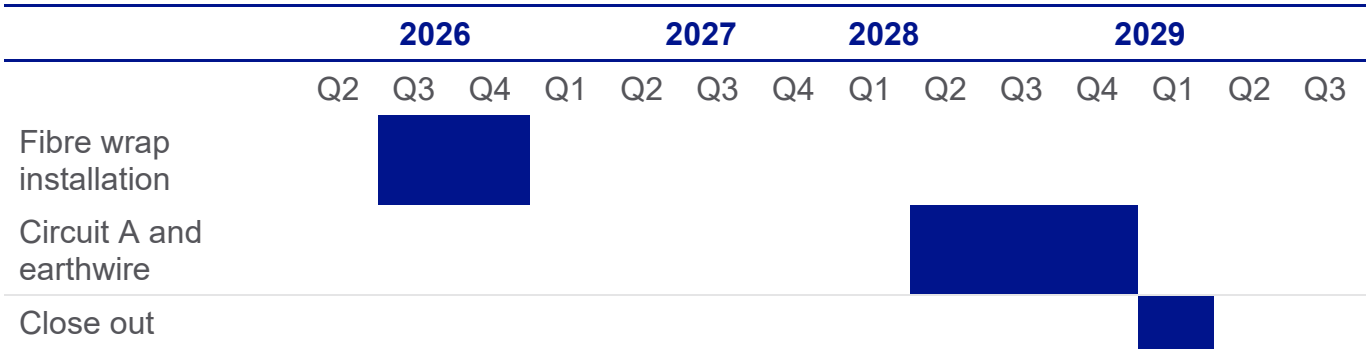
2.3.37 Where the ground is unsuitable for temporary access panels (due to steepness, or being partially submerged), ATVs such as "Mule" or "Argocat" type vehicles may be used for the transport of personnel. For the delivery of heavier loads, such as materials and equipment, four-wheel drive tractors or "Hagglund" type tracked vehicles will be utilised.

2.3.38 Where access routes cross watercourses, the existing crossings will be assessed for suitability for the proposed vehicles and upgraded where required. Upgrade options will depend on size and frequency of vehicles required to cross and could include new or

replacement culverts; overbridging; steel or polymer road-plates; and/or temporary culverts.

Programme

2.3.39 The Wider Works are planned to be undertaken over a period of approximately 50 months from Q2 2026 – Q3 2029 to coordinate with the wider Project. The Wider Works will occur in phases, which will include activities summarised below.



Wider Works Site Layout

Wider Works Compounds

2.3.40 Indicatively, a main compound near Porthmadog and two satellite compounds, one near the Bryncir works site and one near Tower 4ZC027, would likely be used. These compound locations would be used with consent by the landowner and occupied as required.

Tower Working Areas

2.3.41 There would be tower working areas (sites vary in size but are typically between 100m x 40 m) at every tower between towers 4ZC5 to 4ZC27 and 4ZC44 to 70 for reconductoring work and towers 4ZC70 to 4ZC140 for earthwire fibre wrapping work (Approx 40 m x 40 m). Where possible, tower working areas are beneath the OHL.

Laydown Areas

2.3.42 Laydown and storage areas (approximate 15 m x 15 m) would be at regular intervals along the length of the Wider Works site. They would be adjacent to the access track, either at access entrances off the main road or next to the 4ZC tower within the working areas.

Scaffold Areas

2.3.43 Scaffold areas are required at all locations where the 4ZC overhead line passes over a highway, watercourse or other overhead line.

EPZ Areas

2.3.44 Equipotential zones (EPZ) will be required at all puller or tensioner sites.

Staffing and Employment

2.3.45 The number of staff on the Wider Works site would vary according to the phase and activities being undertaken; some activities may be run concurrently. It is anticipated that the following would be required for each phase of works:

- Vegetation clearance – six workers.
- Trackway contractors – four to eight workers.
- General civils works i.e. bellmouths, levelling minor works – six workers.
- Scaffolders – 20 workers.
- Overhead line tension stringing:
  - 30 line workers.
  - 10 engineers.
  - 10 support operatives.

Hours of Working

2.3.46 Generally, the works will be undertaken during daytime periods only, from Monday to Friday 7.00 am – 7.00 pm. Some weekend working may be required to meet operational and programme requirements.

2.3.47 During the works, the Contractor would operate under a site-specific Works Environmental Management Plans (WEMP). The WEMP would set out a variety of control measures for managing the potential environmental effects of the works including control and management of noise, dust, surface water runoff, waste and pollution control. All necessary licenses and permissions will be sought before work commences.

2.3.48 The OHL works will be on a 10-days-on- two-days-off programme.

2.4 Operation (Including Maintenance)

2.4.1 Visual inspections of the overhead line would be undertaken on an annual basis in line with current practices. Vegetation management would be undertaken, where required, to keep overgrowing vegetation away from the overhead line as is routine maintenance on all overhead lines. Given the works will not introduce any new operational or maintenance activities, operational impacts are scoped out of assessment for the Wider Works.

2.5 Electric and Magnetic Fields

2.5.1 All equipment that generates, distributes or uses electricity produces electric and magnetic fields (EMFs). A separate EMF report has been produced which sets out the technical specifications of the Wider Works and how it complies with EMF exposure guidelines. This report is in **Volume 8, Appendix 7.1.A: Electric and Magnetic Field Assessment.**

3. Assessment of Alternatives

3.1 Introduction

3.1.1 This chapter outlines the alternatives to the Wider Works that have been considered by NGET.

3.2 Requirement for the Consideration of Alternatives

3.2.1 Part 5, 17 (3)(d) of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (the '2017 TCP EIA Regulations') (Ref 3.1) states that an ES should include:

"*a description of the reasonable alternatives studied by the applicant or appellant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the significant effects of the development on the environment*."

3.3 Design Alternatives

3.3.1 The works are required on the existing 4ZC OHL and there are no reasonable alternatives to the works identified.

4. Scope of Assessment

4.1.1 Account has been taken of the proposed Wider Works as described in **Chapter 2 Wider Works**, their temporary duration and the baseline environment affected as summarised in **Appendix A**. **Table 4-1** below considers potential receptors and likely significant effects and whether these have been scoped in or scoped out of further assessment.

4.1.2 Given the works will not introduce any new operational activities, operational impacts are scoped out of assessment for the Wider Works.

Table 4-1 – Scope of assessment for the Wider Works

Receptor	Scoped in/out	Justification
Landscape and Visual Amenity		
Landscape character and visual amenity	**Scoped Out**	No discernible impacts are anticipated on landscape character and visual amenity as the works comprise temporary short-term refurbishment works and no new permanent structures are required.
Ecology and Nature Conservation		
Statutory designated sites 10 km (international) and 5 km (national and local) of the Wider Works site (extended to 30 km for international sites designated for bats).	**Scoped In:** • Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat Sites SAC (in Wider Works site). • Coedydd De Dyffryn Maentwrog SSSI (in Wider Works site). • Ceunant Llennyrch National Nature Reserve (NNR) (in Wider Works site).	Works are proposed in Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat Sites SAC, Coedydd De Dyffryn Maentwrog SSSI, and Ceunant Llennyrch NNR. There is potential for temporary habitat loss through vegetation management. Works are also proposed on the boundary of Llystan Isaf SSSI. Habitat degradation could result from water quality impacts due to pollution and runoff, and from air quality impacts associated with dust. Potential injury, mortality or disturbance of associated bat species at Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat Sites SAC and Coedydd De Dyffryn Maentwrog

Receptor	Scoped in/out	Justification
	• Llystyn Isaf SSSI (immediately adjacent to the Wider Works site).	SSSI (including lesser horseshoe bat (*Rhinolophus hipposideros*) could also occur). The introduction of invasive non-native species (INNS) or further spread (where already present) during the works through the movement of machinery, vehicles and people could impact statutory designated sites through habitat degradation.
	Scoped In: • Afon Gwyrfai a Llyn Cwellyn SAC and SSSI (in Wider Works site). • Corsydd Eifionydd/Eifionydd Fens SAC (0.11 km south-west). •	The Wider Works site crosses Afon Gwyrfai a Llyn Cwellyn SAC and SSSI between Towers 4ZC120 – 4ZC121. No works are proposed in the SAC/SSSI boundaries and no habitat loss or fragmentation will occur. Habitat degradation could result from water quality impacts due to pollution and runoff, from air quality impacts associated with dust and the introduction or spread (where already present) of INNS. Potential injury, mortality or disturbance of species associated with Afon Gwyrfai a Llyn Cwellyn SAC (otter, Atlantic salmon (*Salmo salar*) and floating water plantain (*Luronium natans*)) could occur. One of the qualifying features of Corsydd Eifionydd/Eifionydd Fens SAC is the marsh fritillary butterfly (*Euphydryas aurinia*), whose main habitat type in Wales is Rhôs pasture - a distinctive, Welsh marshy grassland habitat. This habitat is usually dominated by tussocks of purple moor-grass and various rush (*Juncus*) species. Suitable habitats up to 2 km (marsh fritillary colonies vary in size with individuals rarely moving more than 1 km in their lifetime. However movements of up to 5 km is possible and 2 km has been adopted on a precautionary basis) of occupied sites can serve as functionally linked habitat (FLH) for this species; and such habitats are in the Wider Works site. The works have the potential to directly and indirectly impact this qualifying feature through potential injury, mortality or disturbance and temporary loss of functional habitat.
	Scoped In:	These statutory sites are more than 0.3 km from the Wider Works site and no habitat loss or fragmentation or injury or mortality to

Receptor	Scoped in/out	Justification
	• Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC (0.33 km north, at its closest point). • Morfa Harlech SSSI (0.33 km north), Morfa Harlech a Morfa Dyffryn NNR (2.42 km west) and SAC (4.67 km south-east). • Cors Gyfelog SSSI and NNR (0.11 km south-west). • Pant Cae Haidd SSSI (0.10 km south-west).	associated species is anticipated in these sites. Otter are associated with some of these statutory designated sites and use water bodies and riparian habitats in the Wider Works site. No otter resting sites have been recorded in the Wider Works area, and injury or mortality of this qualifying species is not anticipated. No air quality impacts associated with dust are anticipated. Hydrological connections between these statutory designated sites and the Wider Works site exist, and there is the potential for habitat degradation from impacts to water quality due to potential pollution events and run-off. There is potential for disturbance to associated species (otter) from noise, lighting or visual effects outside these sites. Impacts to bird species for Morfa Harlech SSSI are not anticipated due to the limited amount of suitable habitat available to qualifying birds associated with this site across the Wider Works site. Should any qualifying birds be present in or adjacent to the Wider Works site, they would be in very low numbers.
	Scoped In: • Glynllifon SAC and SSSI (0.89 km north-west). • Coedydd Dyffryn Ffestiniog (Gogleddol) SSSI (0.91 km north-west). • Dolorgan Barn SSSI (2.12 km south).	There will be no direct loss or fragmentation of habitats in Glynllifon SAC and SSSI, Coedydd Dyffryn Ffestiniog (Gogleddol) SSSI or Dolorgan Barn SSSI. Due to the distance of these sites from the Wider Works site and lack of hydrological connection, air quality impacts associated with dust and impacts to water quality from pollution events or run-off are not anticipated. The SAC and SSSIs comprise maternity roosts and hibernation sites for lesser horseshoe bats. Bats are not only dependent on their roosts and foraging habitat inside the SAC and SSSIs; feeding areas and commuting routes (flightlines) outside the designations may also be integral to sustaining the bat population. The Bat Conservation Trust (BCT) have defined Core Sustenance Zones (CSZ) for different bat species (Ref 4.1). A CSZ, as applied to bats, refers to the area surrounding a communal bat roost in which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. The BCT identifies a weighted average CSZ of 2 km for lesser horseshoe bats. It is a species that will forage during winter at

Receptor	Scoped in/out	Justification
		which time its core foraging range is reduced to 1.2 km from the hibernation site. There will be no direct disturbance to maternity and hibernation roosts but it is feasible that the Wider Works could result in likely significant effects (LSEs) on foraging bats for example, through additional lighting. These SAC and SSSIs are scoped in.
	Scoped In: • Migneint-Arenig-Dduallt SPA and SSSI (1.68 km east). • Eryri SSSI (2.29 km east).	There will be no direct loss or fragmentation of habitats in Migneint-Arenig-Dduallt SPA and SSSI or Eryri SSSI. Due to the distance of these sites from the Wider Works site and lack of hydrological connection, air quality impacts associated with dust and impacts to water quality from pollution events or run-off are not anticipated. Potential impacts from noise and visual disturbance to breeding hen harrier (*Circus cyaneus*), chough (*Pyrrhocorax pyrrhocorax*), merlin (*Falco columbarius*) or peregrine (*Falco peregrinus*), for which these sites are designated, could occur should these species nest in proximity (species dependant) to the Wider Works.
	Scoped In: • Afon Ddu SSSI (1.71 km north) • Llyn Padarn SSSI (1.39 km south-east)	There will be no direct loss or fragmentation of habitats in Afon Ddu SSSI or Llyn Padarn SSSI. Due to the distance of these sites from the Wider Works site and because they are upstream, air quality impacts associated with dust and impacts to water quality from pollution events or run-off are not anticipated. Afon Ddu SSSI is designated for its freshwater pearl mussel, and although this species would not be directly impacted by the Wider Works, it is dependent on the presence of salmonids within the watercourse to fulfil its life cycle. The outflow of Llyn Padarn SSSI is one of the most important spawning sites for salmon and sea trout (*Salmo trutta trutta*) in north Gwynedd. Any impacts downstream to salmonids from the Wider Works could potentially impact this species and these statutory sites are scoped in.
	Scoped out: • Coed Camlyn NNR (1.02 km north).	These statutory designated sites are over 1 km from the Wider Works site. There will be no direct loss or fragmentation of habitats in these sites or air quality impacts associated with dust from the Wider Works. The sites possess no hydrological connection to the

Receptor	Scoped in/out	Justification
	• Coed y Rhygen SSSI and NNR (1.10 km south). • Migneint-Arenig-Dduallt SAC (1.68 km east). • Coed Tremadog SSSI and NNR (1.57 km east) • Eryri/Snowdonia SAC (2.29 km east). • Parc y Borth LNR (2.66 km south-east). • Rhinog SAC and SSSI (3.33 km south). • Pen y Banc LNR (3.08 km south-east). • Coed Cymerau NNR (3.45 km north). • Rhosgyll Fawr SSSI (3.22 km south-west). • Caeau Tan y Bwlch SSSI (3.53 km west). • Afon Eden - Cors Goch Trawsfynydd SAC and SSSI (3.63 km south). • Cwm Cynfal SSSI (5.09 km north-east). • Y Twyni o Abermenai i Aberffraw/ Abermenai to Aberffraw Dunes SAC (6.10 km west). • Glannau Mon: Cors heli/ Anglesey Coast: Saltmarsh SAC (6.67 km north-west).	Wider Works site and are not designated for mobile species (bats, birds or marsh fritillary butterfly). The Wider Works will have no direct or indirect impacts on these statutory designated sites or their ecological features and they are scoped out from further assessment.

Receptor	Scoped in/out	Justification
	• Llyn Idwal Ramsar (9.98 km south-east).	
	Scoped out: • Northern Cardigan Bay/Gogledd Bae Ceredigion SPA (2.53 km south). • Traeth Lafan/Lavan Sands, Conway Bay SPA (9.90 km north-east).	Due to the distance from the Wider Works site, there will be no direct loss or fragmentation of habitats in these statutory sites or air quality impacts associated with dust from the Wider Works. Northern Cardigan Bay/Gogledd Bae Ceredigion SPA is designated for its overwintering population of red-throated diver (*Gavia stellata*), a species that primarily inhabits coastal areas during the winter months. Marine activity is being its primary source of disturbance. Traeth Lafan/Lavan Sands SPA is designated for its populations of wading birds. The Wider Works are inland and over 2 km from these SPAs. There will be no impacts on the species for which these sites are designated, including any noise or visual disturbance on functionally linked land. The Wider Works will have no direct or indirect impacts on these statutory designated sites or their ecological features and they are scoped out from further assessment.
	Scoped out: • Tiroedd a Glannau Rhwng Cricieth ac Afon Glaslyn SSSI (0.86 km south-east). • Maes Meillion a Gefail-y-cwm SSSI (2.135km south). • Glanllynnau a Glannau Pen-ychain i Gricieth SSSI (2.86 km south-west). • Talhenbont SSSI (2.74 km south-west). • Y Fenai a Bae Conwy/Menai Strait and	These statutory sites are designated for their habitats. Due to the distance from the Wider Works site, there will be no direct loss or fragmentation of habitats within these statutory sites or air quality impacts associated with dust from the Wider Works. The sites are hydrologically linked to the Wider Works site but the closest is more than 1.5 km downstream. Ad any potential effects (should they occur) would be sufficiently diluted to ensure that there would be no adverse impact on these designated sites. The Wider Works will have no direct or indirect impacts on these statutory designated sites or their ecological features and are scoped out from further assessment.

Receptor	Scoped in/out	Justification
	Conwy Bay SAC (4.15 km north-west).	
	Scoped out: • Glaslyn SSSI (2.43 km north-west). • Y Foryd SSSI (4.83 km north-west) and Local Nature Reserve (LNR) (4.94 km north-west).	Due to the distance from the Wider Works site, there will be no direct loss or fragmentation of habitats in these statutory sites or air quality impacts associated with dust from the Wider Works. Y Foryd SSSI and LNR is hydrologically linked to the Wider Works site but is more than 4 km downstream, and any potential effects (should they occur) would be sufficiently diluted to ensure that there would be no adverse impact. Glaslyn SSSI is designated for its overwintering wildfowl and waders and breeding birds of lowland damp grassland. The Wider Works are over 2 km from this SSSI and there will be no impacts on the species for which these sites are designated, including any noise or visual disturbance. Glaslyn SSSI is also designated for lesser horseshoe bats, however, as it is beyond the 2 km CSZ for this species there is no potential for the Wider Works to result in significant effects to this species due to disturbance. Y Foryd SSSI and LNR is designated for its wintering wildfowl and waders; given the distance from the Wider Works site and the minimal nature of the works in this section (fibre wrap) no impacts are anticipated on the species for which this site is designated from the Wider Works, including noise or visual disturbance. The Wider Works will have no direct or indirect impacts on these statutory designated sites or their ecological features and they are scoped out from further assessment.
	Scoped out: • Ysbyty Bron y Garth SSSI (2.22 km north-west). • Mwyngloddiau Llanfrothen SSSI (2.21 km north-west). • Coedydd Maentwrog NNR (2.60 km south).	Due to the distance from the Wider Works site, there will be no direct loss or fragmentation of habitats within these sites or air quality impacts associated with dust. These sites are not hydrologically linked to the Wider Works site and there will be no impacts to water quality from pollution events or run-off. These sites are designated for lesser horseshoe bats, however, as they are beyond the 2 km CSZ for this species there is no potential for the Wider Works to result in significant effects due to disturbance.

Receptor	Scoped in/out	Justification
	• Aberdunant SSSI (3.84 km north-east). • Glyn Cywarch SSSI (3.91 km south-west). • Mwyngloddiau Fforest Gwydir/ Gwydyr Forest Mine SAC (19.87 km north).	The Wider Works will have no direct or indirect impacts on these statutory designated sites or their ecological features and they are scoped out from further assessment.
	Scoped out: • Cors y Wlad SSSI (2.51 km north-west).	Due to the distance from the Wider Works site, there will be no direct loss or fragmentation of habitats within this site or air quality impacts associated with dust. The site is not hydrologically linked to the Wider Works site and there will be no impacts to water quality from pollution events or run-off. This site is designated for marsh fritillary butterfly however, as it is beyond the 2 km buffer accepted as FLH for this species there is no potential for the Wider Works to result in significant effects due to disturbance or loss of FLH. The Wider Works will have no direct or indirect impacts on this statutory designated site or its ecological features and they are scoped out from further assessment.
	Scoped out: • Cors Llanllyfni SSSI (0.90 km east). • Cors Graianog SSSI (1.66 km east). • Llwyn y Coed SSSI (1.54 km south-east). • Ffriddoedd Garndolbenmaen SSSI (2.01 km north-east).	Due to the distance from the Wider Works site, there will be no direct loss or fragmentation of habitats in these sites or air quality impacts associated with dust. These statutory sites are hydrologically linked to the Wider Works site but are upstream and not designated for migratory species that could potentially be affected downstream by the Wider Works. They are not designated for terrestrial mobile species (bats, birds or marsh fritillary butterfly). The Wider Works will have no direct or indirect impacts on these statutory designated sites or their ecological features and they are scoped out from further assessment.

Receptor	Scoped in/out	Justification
	• Ceunant Cynfal SSSI (2.17 km north) and NNR (2.30 km north-east). • Coed Dinorwig SSSI (3.70 km south-east) and LNR (3.62 km south-east).	
Non-statutory designated sites (Wildlife Sites (WS), candidate Wildlife Sites (cWS), North Wales Wildlife Sites (NWWT)) in 2 km of the Wider Works site and Ancient Woodland	**Scoped in:** • For direct effects: – 42 WS and cWS are in the Wider Works site. – Two ancient woodland sites are in the Wider Works site. • For indirect effects: – All WS, cWS and ancient woodland in 50 m, and all with hydrological links. **Scoped out:** All remaining WS, cWS and ancient woodland further than 50 m from the Wider Works site that are not hydrologically linked. All NWWT are these sites are more than 1 km from the Wider Works site.	Non-statutory designated sites and ancient woodland that are in the Wider Works site could be directly impacted through temporary vegetation management. The introduction or further spread (where already present) of INNS through the movement of machinery, vehicles and people could also impact non-statutory designated sites and ancient woodland through habitat degradation. Non-statutory designated sites and ancient woodland which are hydrologically linked to the Wider Works site could potentially be indirectly impacted through changes to water quality. Sites within 50 m could potentially be indirectly impacted by dust.
Habitats of Principal Importance (HoPI)	**Scoped in:** • Coastal floodplain and grazing marsh.	HoPI that are in the Wider Works site could be directly impacted during the works through temporary vegetation management. Those which are hydrologically linked to the Wider Works site could potentially be indirectly affected through changes to water quality. The introduction or further spread (where already present)

Receptor	Scoped in/out	Justification
	• Lowland dry acid grassland. • Lowland fen. • Lowland heathland. • Lowland meadow. • Lowland mixed deciduous woodland. • Purple moor-grass and rush pasture. • Rivers. • Upland oakwood. • Wet woodland. • Wood pasture and parkland. • Standing water. • Hedgerows and Cloddiau.	of INNS during the works through the movement of machinery, vehicles and people could also indirectly impact HoPI through habitat degradation.
Habitats (non-HoPI)	**Scoped in:** • Broadleaved semi-natural woodland. • Broadleaved plantation woodland. • Mixed semi natural woodland. • Mixed plantation woodland. • Scattered trees (including ancient and veteran). • Neutral semi-improved grassland. **Scoped out:** • Scrub.	Habitats (non-HoPI) that are in the Wider Works site could be directly impacted during the works through temporary vegetation management. Those which are hydrologically linked to the Wider Works site could also potentially be indirectly affected through changes to water quality. The introduction or further spread (where already present) of INNS during the works through the movement of machinery, vehicles and people could also indirectly impact these habitats through habitat degradation. Based on Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (Ref 4.2) and using professional judgement, features of Site importance, i.e. less than Local (Low) importance, have been scoped out of further assessment.

Receptor	Scoped in/out	Justification
	• Improved grassland. • Poor semi-improved grassland. • Buildings, fences, walls and dry ditches.	
Protected and notable species.	**Scoped In:** • Terrestrial invertebrates. • Fish. • Aquatic. macroinvertebrates. • Aquatic macrophytes. • Breeding and non-breeding birds. • Bats. • Badger. • Otter. • Water vole. • Great crested newt. • Other mammals (hedgehog, brown hare and polecat). • Reptiles. • Common amphibians. • Notable flora, fungi and lichen. **Scoped out:** • Red squirrel. • Hazel dormouse.	The Wider Works have the potential to impact protected and notable species (where present or potentially present) through temporary vegetation management, replacement of culverts and, fragmentation and disturbance. The works also have the potential to result in incidental mortality of species and could also disturb protected and notable species through increased noise and vibration, lighting and through visual disturbance.

Receptor	Scoped in/out	Justification
Historic Environment		
World Heritage Site	**Scoped Out**	No physical or additional setting impacts on the World Heritage Site.
Scheduled Monuments	**Scoped In**	The works have the potential for temporary short term impacts upon the character and setting of Scheduled Monuments.
Listed Buildings	**Scoped Out**	No physical or additional setting impacts on Listed Buildings.
Registered Parks and Gardens	**Scoped Out**	No physical or additional setting impacts on Registered Parks and Gardens.
Conservation Areas	**Scoped Out**	No physical or additional setting impacts on Conservation Areas.
Historic Landscapes	**Scoped Out**	No physical or additional setting impacts on Historic Landscapes.
Historic non-designated assets	**Scoped In**	The works have the potential to impact, truncate or remove buried archaeological remains.
Unknown archaeological/ buried archaeological remains	**Scoped In**	The works have the potential to impact, truncate or remove buried archaeological remains.
Geology, Hydrogeology, Land Use and Agriculture (Soils)		
Geology		
Geology	**Scoped Out**	The Wider Works are above ground and no impacts are anticipated to underlying geology.
Sites designated for geodiversity interest	**Scoped Out**	No sites designated for geodiversity interest have been identified across the Wider Works, therefore impacts have been scoped out.
Ground stability	**Scoped Out**	No breaking ground or construction of additional structures are anticipated for the Wider Works therefore impacts have been scoped out.

Receptor	Scoped in/out	Justification
Hydrogeology		
Groundwater – Secondary A and undifferentiated aquifers and industrial, commercial and public services groundwater abstraction	**Scoped Out**	The works will be above ground where no pathway can be created to impact groundwater across the Wider Works.
Groundwater – In vicinity of the residential PWS	**Scoped Out**	
Mineral Safeguard Areas		
MSA	**Scoped Out**	No impacts are anticipated to MSA's or preferred areas for minerals across the Wider Works as the works are above ground.
Preferred areas for minerals	**Scoped Out**	
Agricultural Soils		
Agricultural land	**Scoped Out**	No impacts are anticipated to agricultural land across the Wider Works
Receptors to Land Contamination		
Project workers	**Scoped Out**	No impacts are anticipated with regards to receptors of contaminated land across the Wider Works as works will be undertaken above ground.
Maintenance workers	**Scoped Out**	
Off-site human health receptors (isolated farms and residential over 250 m away)	**Scoped Out**	
Off-site human health receptors (agricultural land users)	**Scoped Out**	

Receptor	Scoped in/out	Justification
Surface water -Unnamed watercourses in the Wider Works site and 250 m Study Area	**Scoped Out**	
Development infrastructure (foundations and underground cables)	**Scoped Out**	
Ecological sites/flora and fauna (cWS and ancient woodland)	**Scoped Out**	
Water Quality, Resources and Flood Risk		
Flood risk	**Scoped Out**	**Fluvial and Surface Water Flood Risk** There are no proposed activities that are anticipated to affect flood risk. There are no proposed new permanent impermeable areas, raised structures in flood zones, stockpiles of excavated material in flood zones or new watercourse crossings and culverts anticipated. Contractors should sign up to Met Office Weather reports and NRW flood warnings, and in the event of heavy rain being forecast they should leave the site.
Aquatic environment	**Scoped Out**	**WFD Groundwater Bodies** The WFD waterbody is of Poor Status, and due to the works being non-intrusive and the limited extent of proposed works compared to the area of the groundwater body and the low permeability of bedrock, and anticipated effectiveness of environmental embedded measures, there are no anticipated risks to the WFD waterbody's current status or reduction in its ability to meet good in future.
		WFD Surface Water bodies Although the proposed works cross and are in proximity to multiple WFD Surface Water bodies, there are no intrusive works proposed, and all overhead line crossings of the water bodies are already present. There are no proposed

Receptor	Scoped in/out	Justification
		changes to any watercourse crossings and culverts, and temporary working and storage areas will be appropriately located away from WFD Surface Water bodies. The implementation of the mitigation measures included within the Environmental Management Plan (EMP) and the production of a Pollution Prevention Plan (PPP) and the scheme design with no new watercourses crossings, or changes to existing watercourse crossings being proposed will ensure that there are no impacts to water quality or quantity that could risk the current or future status of WFD surface water bodies within the Study Area.
		Conservation Sites The proposed works cross and are in proximity to multiple designated conservation sites, however, there are no intrusive works proposed, and all overhead line crossings of the conservation sites are already present. There are no proposed changes to any watercourse crossings and culverts, and temporary working and storage areas will be appropriately located. The implementation of the mitigation measures included within the EMP and PPP will ensure that there are no impacts to water quality or quantity that could affect conservation sites within the Study Area.
Water resources	**Scoped Out**	**Private Water Supplies** There are no anticipated effects to the quality or availability of water supplies. Embedded environmental measures (detailed within the EMP) and the scheme design which avoids works in close proximity to private water supplies, so as to prevent any significant impacts on local groundwater quality, quantity or resource availability. In line with good practice, PPPs will be developed to detail how ground and surface waters will be protected from construction and operation related pollution. These will include information on the use and storage of any fuels, oils and other chemicals, and pollution incidence response planning.
		Licensed Abstractions There will be no effects on channel conveyance and water availability, and there will be no release of sediment into the watercourse that could affect the quality of an

Receptor	Scoped in/out	Justification
		abstraction. A PPP will detail pollution prevention measures for all works to mitigate against water quality impacts that may impact the abstractions.
		NRW Consented Discharges There are no planned project activities in close proximity to any licensed discharges in the Study Area that will cause physical disruption to existing discharge infrastructure. The location of statutory undertaker assets (including water supply and sewer pipes, water and waste treatment works etc.) will be confirmed through inspection of detailed plans from the undertakers. All assets potentially affected by the Proposed Development will be identified.
Traffic and Transport		
Severance	**Scoped Out**	Due to the expected n traffic volumes and the spread of the works geographically and over time, it is not anticipated that there will be significant impacts on severance.
Driver Delay	**Scoped Out**	Due to the expected traffic volumes and the spread of the works geographically and over time, it is not anticipated that there will be significant impacts on driver delay due to congestion at key junctions.
Pedestrian Delay	**Scoped Out**	Due to the expected traffic volumes and the spread of the works geographically and over time, it is not anticipated that there will be significant impacts on pedestrian delay.
Non-motorised user (NMU) amenity	**Scoped Out**	Due to the expected traffic volumes and the spread of the works geographically and over time, it is not anticipated that there will be significant impacts on pedestrian and cyclist amenities that would affect safety and comfort of non-motorised users.
Fear and intimidation	**Scoped Out**	Due to the expected traffic volumes and the spread of the works geographically and over time, it is not anticipated that there will be significant impacts on fear and intimidation for vulnerable road

Receptor	Scoped in/out	Justification
		users.
Road safety and accidents	**Scoped Out**	Due to the expected traffic volumes and the spread of the works geographically and over time, it is not anticipated that there will be significant impacts on road safety.
Total traffic increase	**Scoped Out**	Due to the expected traffic volumes and the spread of the works geographically and over time, it is not anticipated that there will be significant impacts as a result of an total traffic increase.
Heavy Goods Vehicles (HGV) increase	**Scoped Out**	Due to the expected traffic volumes and the spread of the works geographically and over time, it is not anticipated that there will be significant impacts as a result of HGV increase.
Hazardous loads	**Scoped Out**	There are no nearby road features which suggest that the transfer of hazardous materials poses a risk beyond that which would be expected on the general highway network, indicating no significant impacts.
Air Quality and Emissions		
Designated/candidate wildlife sites and priority habitats	**Scoped In**	The Wider Works site passes over numerous designated and candidate Wildlife Sites and priority habitats and there is potential for the works to generate dust emissions which may impact the sites.
Residential properties	**Scoped In**	There are a large number of residential properties or other amenity and human health sensitive receptors in the indicative Wider Works site that have the potential to experience effects related to dust and emissions.
Human health (from emissions from works traffic)	**Scoped Out**	Given the extent of the works, significant air quality effects are unlikely, particularly as the Wider Works site runs through rural areas for the most part. The Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) guidance screens out road traffic emissions impacts on human health

Receptor	Scoped in/out	Justification
		receptors where average development HGV flows are less than 100 two-way movements per day on any given road link. For nature conservation impacts, we would refer to Design Manual for Roads and Bridges (DMRB) guidance (LA 105 Standard for Air Quality (Ref 4.3), which screens out road traffic emissions where development HGV flows (and cumulative flows associated with committed and reasonably foreseeable development in the area) are less than 200 two-way movements per day on any given road link. **Chapter 2 Wider Works** states that the Wider Works will generate four two-way HGV movements per day, a value well below the screening criteria.
Noise and Vibration		
Residential Receptors	**Scoped Out**	Potential temporary noise and vibration effects may result from the works. The works would be minor and temporary, and would not generate high levels of noise. Additionally, workforce numbers and deliveries are low, so levels of traffic would be sufficiently low such that they would not have a material effect on noise.
Socio-Economics		
Employment generation during works phase and operational phase (direct, indirect and induced impacts)	**Scoped Out**	The Wider Works are likely to generate a limited number of jobs, relative to the existing workforce within the Principal Economic Impact Area. Employment impacts are likely to be beneficial but not significant.
Skills and training	**Scoped Out**	Due to the works being refurbishment the workforce is limited, effects on skill levels and training are unlikely to be significant.
Gross Value Added	**Scoped Out**	GVA generated is proportionate to the size of the workforce; as for employment impacts any effects in this context are anticipated to be not significant relative to the size of the Principal Economic Impact Area.
Local accommodation	**Scoped Out**	Due to the limited size of the workforce, there is unlikely to be

Receptor	Scoped in/out	Justification
facilities		pressure on the local temporary accommodation sector. Furthermore, as identified in Section 12.5, there is considerable capacity in a 30-minute and 60-minute drive time to accommodate workers.
Public Rights of Way (PRoW) and recreational routes	**Scoped Out**	There are 71 PRoWs, National Cycle Route (NCR) 8 and NCR 61 that cross the Wider Works site, with a substantial number of PRoWs in the wider area. Although some PRoWs may need to be crossed during works at which time a short duration closure will be in place for safety purposes and thus no significant effects are anticipated.
Other private and community assets (residential properties, business premises, community facilities, open space, agricultural land holdings, development land)	**Scoped Out**	There are a number of private and community assets within the Wider Works site and Study Area, however given the contained and temporary nature of the Wider Works, no significant effects are anticipated.
Climate Change		
Global atmosphere (Greenhouse Gas (GHG) Assessment)	**Scoped In**	A GHG Assessment has been scoped into the climate assessment to evaluate the potential GHG emissions associated with the Wider Works.
The Wider Works (Climate Change Risk Assessment (CCRA))	**Scoped In**	A CCRA has been scoped in to assess the potential climate risks associated with the Wider Works.
Various identified by each discipline in their assessment (In-combination Climate Change Impacts (ICCI) Assessment).	**Scoped Out**	It is not anticipated there will be any ICCIs on the receptors in the surrounding environment and an ICCI Assessment has been scoped out of the climate assessment.

4.1.3 For the Wider Works component of the Project assessment of Landscape and Visual Amenity, Geology, Hydrogeology, Land Uses and Agriculture, Traffic and Transport, Noise and Vibration, Socio-Economics, and Materials and Waste effects have been scoped out of the ES as no discernible impacts are anticipated .This is because the works will be temporary and in operation, the reconductored overhead line sections including the section installed with the fibre optic cable would be very similar to the existing overhead line with no discernible impact.

5. Likely Significant Effects

5.1.0 This chapter presents an assessment of the likely significant effects that could arise from the Wider Works as described in **Chapter 2: Wider Works**.

5.1 Ecology and Nature Conservation

5.1.1 Effects on ecology can arise from direct and indirect impacts upon designated sites, habitats or species, and be temporary or permanent. Indirect effects can occur through pollution of air and water and via changes in lighting, noise or hydrology. This section is supported by information in:

- **Figure 6.5.1:** Statutory Designated Sites for Nature Conservation in the Wider Area (up to 30 km).
- **Figure 6.5.2**: Statutory Designated Sites for Nature Conservation within 5 km.
- **Figure 6.5.3**: Non-Statutory Sites Designated for Nature Conservation within 2 km.
- **Figure 6.5.4**: Ancient Woodland and Habitats of Principal Importance within 50 m.
- **Volume 8, Appendix 1.1.A**: **Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 6.5.A: Habitat Survey Report.**
- **Volume 8, Appendix 6.5.B: Aquatic Survey Report.**
- **Volume 8, Appendix 6.5.C: Bat Survey Report.**
- **Volume 8, Appendix 6.5.D: Badger Survey Report (Confidential).**
- **Volume 8, Appendix 6.5.E: Riparian Mammals Survey Report (Confidential).**
- **Volume 8, Appendix 6.5.F: Great Crested Newt Survey Report.**
- **Volume 8, Appendix 6.5.G: Statutory Designated Site Citations.**
- **Volume 8, Appendix 6.5.H: High Level Arboriculture Impact Assessment.**
- **Section 5.4: Air Quality and Emissions.**
- **Section 5.5: Climate Change.**

Legislation and Planning Policy

5.1.2 This section summarises the legislation and planning policy framework that is relevant to the Ecology and Nature Conservation assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

5.1.3 The following legislation is relevant to Ecology and Nature Conservation:

- The Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) (Ref 5.1).

- Ramsar Convention (Ref 5.2).
- Convention on Biological Diversity 1992 (Ref 5.3).
- Wildlife and Countryside Act 1981 (WCA) (as amended) (Ref 5.4).
- The Environment Act 2021 (Ref 5.5).
- The Environment (Wales) Act 2016 (Ref 5.6).
- The Countryside and Rights of Way Act 2000 (Ref 5.7).
- The Protection of Badgers Act 1992 (Ref 5.8).
- The Hedgerows Regulations 1997 (Ref 5.9).
- The Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended) (Ref 5.10).
- Animal Welfare Act 2006 (Ref 5.11).
- Salmon and Freshwater Fisheries Act 1975 (Ref 5.12).
- Eels (England and Wales) Regulations 2009 (Ref 5.13).
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 5.14).
- Convention on the Conservation of Migratory Species (CMS) of Wild Animals 1979 (or Bonn Convention) (Ref 5.15).
- The Council of Europe's Convention on the Conservation of European Wildlife and Natural Habitats 1979 (or Bern Convention) (Ref 5.16).
- Natural Environment and Rural Communities Act 2006 (Ref 5.17).

National Policy

5.1.4 The following National policy is relevant to Ecology and Nature Conservation:

- Planning Policy Wales (PPW) – Edition 12 (2024) (Ref 5.18).
- The Nature Recovery Action Plan for Wales 2020 – 2021 (Ref 5.19).
- Future Wales: The National Plan 2040 (Ref 5.20).

Local Policy

5.1.5 The following local policy is relevant to Ecology and Nature Conservation:

- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Ref 5.21).
- Anglesey and Gwynedd Joint Local Development Plan Review Report (Ref 5.22).
- Eryri Local Development Plan 2016 – 2031 (Ref 5.23).
- Eryri Local Development Plan Review Report 2023 (Ref 5.24).

Guidance

5.1.6 The following guidance is relevant to Ecology and Nature Conservation:

- Environmental Improvement Plan 2023 (Ref 5.25).

- Cyfoeth Naturiol Cymru/Natural Resources Wales (NRW) Protected Species Licensing (Ref 5.26).
- Birds of Conservation Concern (BoCC) (Ref 5.27).
- Birds of Conservation Concern Wales (BoCCW) (Ref 5.28).
- The International Union for Conservation of Nature Red List of Threatened Species 2025 (Ref 5.29).
- UK Biodiversity Framework (JNCC) on Behalf of the Four Countries' Biodiversity Group (2024) (Ref 5.30).
- Nature Gwynedd Biodiversity Action Plan (Ref 5.31).
- Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Ref 5.32).
- Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Ref 5.33).
- Institute of Lighting Professionals Guidance Note 08/23 Bats and Artificial Lighting at Night (Ref 5.34).
- Institute of Lighting Professionals. Guidance Note 1 for the Reduction of Obtrusive Light (Ref 5.35).

5.1.7 Ecological Impact Assessment Methodologies are detailed in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

5.1.8 Guidance and methodologies used for ecological surveys are detailed in their respective reports as included in **Volume 8, Appendices 6.5.A – 6.5.I**.

Assumptions, Limitations and Uncertainties

5.1.9 The assessment presented in this section reflects the information obtained and evaluated at the time of reporting (July 2025), and references published data, records and web-based information. Due to an evolving design, as well as the land access available within survey seasons, a full suite of surveys has not been undertaken for the Wider Works. The assessment is based on the information gathered, with assumptions and extrapolations where necessary. Pre-commencement surveys will inform the works, mitigation and any licences required.

5.1.10 As noted in **Chapter 2: Wider Works**, the earliest works could start is in 2026. Works are anticipated to require at least three years, with operation anticipated to commence in 2029. Should the works programme be extended this will not change the results of the Ecological Impact Assessment (EcIA) with respect to flora, as the impact is not affected by the duration of activity but rather the change or loss of any habitats. The impact on fauna is likely to be similar if the works period is extended, with respect to any temporary habitat disturbance. The assessment also represents a worst case in terms of impacts to species. For example, although it is acknowledged that a longer works period could result in prolonged disturbance, this is unlikely to occur for most of the Wider Works site due to the sequential nature of the works.

5.1.11 Specific assumptions and limitations relevant to each survey, including how any limitations have been overcome, are included in the relevant technical reports presented in **Volume 8, Appendices 6.5.A – 6.5.F**. There are no survey-specific constraints that

represent a significant limitation or data gap and the baseline that has been established is suitably robust.

5.1.12 The assessment is also based on the following assumptions in the design with regards to ecology:

- No work will be required on the haul roads when identified except where the responsible authority have allowed overhanging vegetation to grow below the standard minimum clearance (standard minimum clearance 5.03 m height and 3 m width).
- The working area for Tower 4ZC007 is on the edge of ancient woodland. No works will take place or vegetation removal or strimming in this ancient woodland and access is not required through this woodland.
- In order to access Towers 4ZC017 – 19, access will be required through Fen-valley mire habitat. Habitat trimming or use of bog mats will be required due to dense vegetation.
- Existing access routes will be used and there will be requirement to upgrade existing tracks in some locations but will largely remain unaltered. In some areas stone will be laid to enable access for vehicles.
- In working areas (including at the base of each tower, scaffolds and laydown areas) low level vegetation will be strimmed to allow safe access by foot. Trees will, in most cases, be worked around. Where they are identified for full or partial removal in the works area the contractor will undertake all necessary surveys and apply for appropriate licenses to remove the trees**.**
- Tree removal is minimal and will only take place at Towers 4ZC023, 4ZC045, 4ZC046, 4ZC059 and 4ZC061 with some trimming of trees at Towers 4ZC006, 4ZC016, 4ZC026 and 4ZC060.
- Hedgerows will not be removed as existing access routes will be used (using existing gaps or gates). Hedgerow surveys were not carried out to inform this assessment.
- Works on the edge of Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat Sites SAC and Coedydd De Dyffryn Maentwrog SSSI will be minimal and temporary and only take place between Towers 4ZC014 and 4ZC016, comprising works to Tower 4ZC015 and provision of an access track, which will require trimming of overhanging branches only and strimming of vegetation around the towers. There will be no tree or vegetation removal. The Wider Works site crosses over the SAC and SSSI between Towers 4ZC012 and 4ZC013, however this is over a ravine and no works will take place in the SAC and SSSI at this location. An existing access from Towers 4ZC015 and 4ZC016 that passes through ancient woodland may be temporarily utilised by ATV, trimming of overhead branches may be required to allow access but no other vegetation or trees will be removed.
- The Wider Works site crosses over Afon Gwyrfai a Llyn Cwellyn SAC and SSSI between Towers 4ZC120 and 4ZC121, however there will be no works in the SAC or within 150 m of the SAC or SSSI.
- Llystyn Isaf SSSI is east of Tower 4ZC071. No works will take place in this SSSI, therefore no permanent or temporary habitat loss.

- Works within WS and cWS will be avoided, where possible. Any works within WS and cWS will be minimal and temporary in nature.

5.1.13 Access was not possible between the following locations and could not be surveyed:

- Land between Tower 4ZC050 and 4ZC052.
- A section of land north of Tower 4ZC057.
- A section of land west of Tower 4ZC071.
- Land between Tower 4ZC075 and 4ZC078.
- Land between Tower 4ZC089 and 4ZC090.
- A section of land between Tower 4ZC103 and 4ZC104.
- A section of land between Tower 4ZC129 and 4ZC131.
- A section of land west between Tower 4ZC132 and 4ZC133.

5.1.14 Desk based assessments were conducted for these areas to identify designated sites for nature conservation and HoPI. Coastal and floodplain grazing marsh is potentially present at Tower 4ZC027, Derwin cWS (marshy grassland, wet heath and acid grassland), purple moor grass and rush pasture is potentially present at Tower 4ZC075, Derwyn-fawr (marshy grassland and acid grassland) and purple moor grass and rush pasture is potentially present at Tower 4ZC078, Below Bron Haul cWS (marshy grassland), purple moor rush grass and rush pasture and lowland acid grassland is potentially present between Towers 4ZC089-90. The assessment section takes into account these cWS and habitats and appropriate mitigation where necessary is included. In addition the proposed works between Towers 4ZC070-140 are minimal and comprise new fibre optic wrap and jumper work.

5.1.15 Preconstruction surveys will be carried out to confirm habitat types and inform any mitigation required in these areas.

Future Baseline

5.1.16 This section considers changes to the baseline conditions, previously described, that might occur in the absence of the Wider Works and during the period over which the Wider Works would have been in place.

5.1.17 Some changes in habitat extent, composition and structure would occur naturally over time because of ecological succession e.g. the gradual establishment of tree and scrub in marshy grassland areas, woodland areas and along hedgerows. INNS may also spread across the Wider Works site. These resultant gradual changes in habitat composition are unlikely to alter materially the ecological baseline and the habitats and species present are very unlikely to undergo significant change prior to the start of works or during the works period.

5.1.18 Other potential changes may arise due to farming practices and as a result of climate change which may influence the resilience of certain habitats and species adjacent to the Wider Works site. Habitats such as broadleaved trees and scrub would be more mature but are likely to support a broadly similar species assemblage and farmland will also be managed accordingly, maintaining broadly similar species assemblages. Notwithstanding, it is acknowledged that in the absence of the Project, reconductoring works and fibre wrap replacement of fibre optic cable would take place as part of

maintenance of the existing overhead line and would result in the same or similar effects as identified in this assessment.

Consultation

5.1.19 Consultation in relation to Ecology and Nature Consultation has been carried out with stakeholders. **Table 5-1** provides an overview of consultation and the actions taken to address any responses within the assessment.

Table 5-1 – Consultation and stakeholder engagement

Consultee	Date and nature of consultation	Summary of response	How and where addressed
NRW	12/09/2024	Knowledge sharing	N/A
Gwynedd County Council	29/05/2024	Project introduction	N/A
Eryri National Park	07/10/2024	Project introduction	N/A

Methodology

5.1.20 Details of the technical methods used to determine the baseline conditions of the Wider Works site are provided in **Section 5.5** and technical appendices ES **Volume 8, Appendices 6.5.A – 6.5.G**. Details regarding assessment methods including sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the ecology assessment are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

Potential Effects

5.1.21 The proposed works associated with the Wider Works have the potential to affect important ecology features (positively or negatively):

- Habitat loss (temporary and permanent) – direct impacts associated with changes in land use resulting from the Wider Works.
- Disturbance – indirect impacts resulting from a change in normal conditions (i.e. increased light, noise, vibration, human activity) that result in individuals or populations of species changing behaviour or range.
- Habitat degradation – direct or indirect impacts resulting in the reduction in the condition of a habitat and its suitability for some or all of the species it supports, e.g. changes in air quality affecting woodland from dust or changes in water quality due to contamination.
- Species mortality – direct impacts on species populations associated with mortalities due to works activities, e.g. site clearance.
- Spread of INNS – working methods resulting in spread of INNS.

Embedded Mitigation

5.1.22 It is anticipated that where practicable, mitigation measures will be incorporated into the Wider Works design and how it will be constructed. Potential impacts have been predicted on this basis and opportunities to mitigate them identified with the aim of preventing or reducing impacts as far as practicable. This approach provides the opportunity to prevent or reduce potential adverse impacts from the outset. This embedded mitigation and mitigation by design approach has been considered when evaluating the significance of the potential effects on important ecological features (IEFs).

5.1.23 The primary avoidance and mitigation measures that will be embedded into the Wider Works to minimise impacts on IEFs are presented in the following sections.

Project Design and Habitat Avoidance

5.1.24 The root protection areas (RPA) of trees will be protected where practicable. However, some tree removal will be unavoidable, limited to locations at Towers 4ZC023, 4ZC045, 4ZC059 and 4ZC061.

5.1.25 Details regarding unavoidable works in tree RPAs is contained in the High-Level Arboricultural Impact Assessment report (**Volume 8, Appendix 6.5.H: High Level Arboricultural Impact Assessment**). Precautionary measures discussed in that report include protective fencing and temporary ground protection measures (where necessary) and ensuring all soil storage remains outside tree RPAs.

5.1.26 Hedgerows and cloddiau will be retained and buffered by a minimum of 5 m where practicable.

5.1.27 Watercourses will be protected by 10 m buffers as far as practicable. However, works to replace culverts may be required in Derwyn-fawr candidate Wildlife Site (cWS), Ystumcegid-isaf cWS and Gwernddwyryd cWS. Works will be designed to avoid affecting the banks of the watercourses with working areas, laydown areas, positioning of vehicles and machinery outside of the cWS.

Works Environmental Management Plan

5.1.28 A WEMP that includes measures to manage the environmental effects of the Wider Works and demonstrate compliance with environmental legislation will be implemented. The WEMP will detail the measures required to mitigate works-related effects on IEFs, including those associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration. The WEMP will detail how habitats will be maintained and managed to enhance biodiversity and ecology.

Vegetation Clearance and Works – Protected Species

5.1.29 Vegetation clearance will avoid the core nesting bird period (i.e. March to August inclusive). Where vegetation clearance cannot avoid the core nesting bird period, a check for the presence of any active nests would be carried out by a suitably experienced ornithologist, prior to vegetation removal. Pre-works checks of pylons and any other suitable nesting structures (none currently known) up to 500 m of works will also take place to determine the status of peregrine. If active nests are found, then appropriate buffer zones (species dependent) where no works take place would be marked out and the area monitored until the young birds have fledged. In areas suitable for reptiles, clearance would be carried out at an appropriate time of year, concordant with requirements for nesting birds.

5.1.30 Precautionary working methods will be adhered to in areas of habitat suitable for reptiles, common amphibians and common mammals (including tall grassland, marshy grassland, hedgerows and riparian habitat) to avoid the incidental killing or injury of any such species that may be present. All habitats suitable for reptiles, common amphibians and common mammals will be subject to two-stage habitat manipulation. Firstly, vegetation will be cut to approximately 150 millimetres (mm) (with the arisings removed), overseen by a suitably experienced appointed ecologist and the area left for a minimum of one day to allow any such species to naturally disperse. Secondly, vegetation will be cleared down to ground level, which will be overseen by the ecologist. Vegetation will be cleared using appropriate equipment based on the type of vegetation to be removed, the area affected, and the risk of killing or injuring reptiles, common amphibians and common mammals. Works can commence immediately after completion of the second stage. Reptile hibernacula will be retained and protected during the works where practicable. Any habitat features which could be concealing sheltering reptiles and amphibians (e.g. log piles, rubble mound bunds, any other debris) would not be dismantled during their inactive season (i.e. November to February inclusive) if they cannot be retained.

Habitats

5.1.31 There will be no vegetation clearance or removal apart from strimming to allow access along existing tracks and roads and to existing tower locations. This will be minimal and localised and vegetation will be allowed to re-establish, vegetation will be reinstated where necessary. Branches of trees will be trimmed back to allow access at Towers 4ZC006, 4ZC016, 4ZC026 and 4ZC060 only. Tree removal is required at Towers 4ZC023, 4ZC045, 4ZC046, 4ZC059 and 4ZC061 only.

5.1.32 Sensitive habitats, including habitats in WS and cWS will be protected through the use of an appropriate temporary ground protection trackway or matting to limit damage to the existing habitat and to ensure that vehicles use the same route through the WS or cWS and stay in defined working areas.

Lighting

5.1.33 It is anticipated that the works will be restricted to daylight hours wherever practicable, to remove the need for artificial lighting, with focussed task-specific lighting provided where this is not practicable. However task specific and fixed ‘general’ lighting will likely be required in months with reduced daylight hours (early mornings and up to 7.00 pm for general workforce) to meet safety requirements. General low-level lighting for access will be required at the temporary works compounds.

5.1.34 Where lighting is required, it will conform to best practice guidelines with respect to minimising light spill into adjacent habitats and preventing disturbance to bats and other species, including Institute of Lighting Professionals Guidance Notes (in particular GN08/23 Bats and Artificial Lighting at Night (Ref 5.34)). This guidance, was produced in collaboration with the Bat Conservation Trust, and GN-1: Reduction of Obtrusive Light (Ref 5.35), will be followed in so far as it is reasonably practicable.

Wildlife Legislation Compliance

5.1.35 To comply with relevant wildlife legislation, relevant pre-works surveys, such as an updated Phase 1 habitat survey, check for badger (*Meles meles*) setts, otter (*Lutra lutra*) resting sites or holts and bat roost assessments of any affected trees or structures near to the Wider Works, will be undertaken to support the baseline findings. Checks for nesting birds (including nesting peregrine on pylons) will also be undertaken. The purpose of these pre-works surveys is to ensure mitigation during the works is based on

the latest protected species information. This will also be required for any protected species licensing that may be identified as being necessary prior to commencement of works. These surveys will also provide an update on the presence and location of any INNS, the findings of which will inform the implementation of measures to prevent their spread into the wild and will be secured through the WEMP.

5.1.36 During the works and ongoing operation Reasonable Avoidance Measures (RAM), including 15 m buffers around trees with bat roost suitability, will be implemented where possible.

5.1.37 Implementation of measures to avoid animals being injured or killed in working areas, such as through the inclusion of perimeter fencing and covering excavations or providing a means of escape, will exclude them from such areas and prevent them from becoming trapped or injured. Such measures will be included in the WEMP.

5.1.38 Good industry practice works methods will be set out in the WEMP and will include measures to minimise noise, lighting and vibration disturbance to protected and notable fauna. Measures will ensure that, where the Wider Works are carried out during key seasons for protected and notable fauna (e.g. the breeding bird season (typically March to August, inclusive) or reptile inactive season (typically November to February, inclusive)), appropriate controls are in place to safeguard species and ensure legal compliance. Soil storage and bunds will be secured to prevent their deterioration that would cause sedimentation into adjacent habitats.

5.1.39 The Wider Works design retains habitats, including woodland, species-rich marshy grasslands, grassland margins, watercourse and ditch margins, scrub and hedgerows. However, some temporary disturbance and minor loss (trees only).

5.1.40 **Table 5-2** provides a summary of the magnitude of impacts and likely significance of effects on IEFs during the works, taking into account the embedded mitigation.

Table 5-2 – Assessment of impacts and significance of effects of the Wider Works

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC Coedydd De Dyffryn Maentwrog SSSI, Ceunant Llennyrch NNR and Llystyn Isaf SSSI	International (Very High) National (High)	Habitat loss (temporary)	Works on the edge of this SAC, SSSI and NNR as part of the Wider Works will be temporary and minimal, comprising works to Tower 4ZC015 and provision of an access track, which may require strimming of overhanging branches and strimming of vegetation around the tower. The Wider Works site crosses over the SAC, SSSI and NNR between Towers 4ZC012 – 4ZC013, however this is over a ravine and no works will take place in the SAC, SSSI or NNR. There will be no habitat loss in Llystyn Isaf SSSI.	Low	Minor Adverse	No
		Habitat degradation - impacts to water quality through pollution and run off and air quality from dust (temporary)	There is potential for dust emissions, noise and vibration disturbance and impacts to water quality due to the proximity of Wider Works activities. Standard environmental protection measures will be implemented. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	No
		Injury or mortality of associated species	All trees in the SAC, SSSI and NNR will be protected and retained as part of the Wider Works. No trees with potential roost features (PRFs) suitable for bats have been identified. It is highly unlikely that roosting bats would be directly impacted, causing injury or mortality. Pre-works surveys will be carried out as required to support the baseline survey findings and inform any additional mitigation or licencing requirements.	Low	Minor Adverse	No
		Disturbance to associated species through noise, lighting, or visual disturbance (temporary)	No lighting will be required for the Wider Works site, proposed and noise levels will be kept to a minimum, being no higher than 95 decibels (dB). As described in **Chapter 2: Wider Works**, works will be scheduled during core (daytime) working hours.	Low	Minor Adverse	No
Afon Gwyrfai a Llyn Cwellyn SAC and SSSI	International (Very High) and National (High)	Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	Hydrological connections exist between the Wider Works site and these designated sites via the natural drainage network. Standard environmental protection measures will be implemented during the works.	Very Low	Minor Adverse	No
		Disturbance to associated species through noise, lighting, or visual disturbance (temporary)	Otter are associated with these statutory sites and use water bodies and riparian habitats in the Wider Works site. No otter resting sites have been recorded in the Wider Works site and planned works (which are at height and comprise minor fibre wrap works) will not prevent otter movement across the landscape. Pre-works surveys will be carried out as required to support the baseline survey findings and inform any additional mitigation or licensing requirements to reduce the likelihood that otters are disturbed by the Wider Works. Atlantic salmon and floating water plantain are also designated features of these statutory sites. Atlantic salmon	Very Low	Minor Adverse	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
			have been recorded both up and downstream from the Afon Gwyrfai crossing during NRW surveys completed in 2018 and 2024 respectively. Both sites fall outside of the 2 km buffer (approximately 2.3 km upstream and 2.6 km downstream) but indicate that Atlantic salmon migrate pass the Afon Gwyrfai crossing point. That said, the planned works (which are at height and comprise minor fibre wrap works with support netting to protect watercourses) reduce the likelihood that Atlantic salmon will be disturbed by the Wider Works. NRW macrophyte surveys were completed 120 m downstream from the Afon Gwyrfai crossing point in 2015 with floating water-plantain not being identified. Given the lack of records in the Study Area and this species preference to lake habitats or small stream immediately downstream of lakes, they are assumed absent from the Wider Works area. Standard environmental protection measures will be implemented during the works and ensure their protection.			
Corsydd Eifionydd/Eifionydd Fens SAC	International (Very High)	Habitat degradation-impacts to water quality through pollution and run off and air quality from dust (temporary)	A Wider Works access track is likely required on the edge of Corsydd Eifionydd/ Eifionydd Fens SAC west of Tower 4ZC081. There is potential for dust emissions and impacts to water quality due to the proximity of works activities. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Very Low	Minor Adverse	No
		Loss of FLH for marsh fritillary	The SAC is designated for its marsh fritillary butterfly and suitable FLH for this species is in the Wider Works site. No permanent habitat loss will be required for the Wider Works, vegetation management will take place in working areas, and will be left to re-establish. The use of suitable trackway or matting will limit damage to the existing habitat where it is appropriate for the temporary works, and vehicles will stay in defined working areas. Pre-works surveys to check for the presence of marsh fritillary larval webs will be carried out at a suitable time of year (mid to late August or September) prior to any works taking place in suitable habitat for this species (Rhôs pasture or marshy grassland habitat dominated by tussocks of purple moor-grass and various rush species), where their favoured food plant, devils bit scabious (*Succisa pratensis*) is also present. If marsh fritillary are subsequently confirmed to be present, then further measures will be taken to avoid damaging food or larval plants.	Low	Minor Adverse	No
Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	International (Very High)	Habitat degradation-impacts to water quality through pollution and run off (temporary)	There are hydrological connections between these statutory designated sites and the Wider Works site. Standard environmental protection measures will be implemented	Very Low	Minor Adverse	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
Morfa Harlech a Morfa Dyffryn SAC Morfa Harlech SSSI and Morfa Harlech a Morfa Dyffryn NNR Cors Gyfelog SSSI and NNR Pant Cae Haidd SSSI	National (High)		during the works. This will include suitable measures to reduce spillage risk and water pollution risk.			
		Temporary disturbance to qualifying species of the (otter, breeding waders and wintering birds) through noise, visual disturbance or lighting	Otters are associated with these statutory sites and use water bodies and riparian habitats in the Wider Works site. No otter resting sites have been recorded in the Wider Works site and the Wider Works will not prevent otter movement across the landscape. No night time works will be carried out, when otters are generally more active and artificial lighting will not be required. Pre-works surveys will be carried out as required to support the baseline survey findings and inform any additional mitigation or licensing requirements to reduce the likelihood that otters are disturbed by the Wider Works.	Very Low	Minor Adverse	No
Glynllifon SAC and SSSI Coedydd Dyffryn Ffestiniog (Gogleddol) SSSI Dolorgan Barn SSSI	International (Very High) and National (High	Temporary disturbance to qualifying species of the (lesser horseshoe bat) through noise, visual disturbance or lighting	The SAC and SSSIs comprise maternity roosts and hibernation sites for lesser horseshoe bats and the Wider Works site is in the potential CSZ for this species. No night time working is required for the Wider Works and artificial lighting will not be required as works will be completed in day light hours. Noise levels will be kept to a minimum, being no higher than 95 db.	Very Low	Minor Adverse	No
Migneint-Arenig-Dduallt SPA and SSSI Eryri SSSI	International (Very High) and National (High)	Temporary disturbance to qualifying species (hen harrier, chough, merlin, peregrine) through noise or visual disturbance	Potential impacts from noise and visual disturbance produced by the Wider Works could occur should these species nest in proximity (species dependant) to the Wider Works including using pylons for nesting sites (notably peregrine). However, the Wider Works site is 1.68 km from Migneint-Arenig-Dduallt, and provides comparatively suboptimal nesting habitat (pylons) to that present in the designate site. Furthermore, should any nesting peregrines use pylons in or adjacent to the Wider Works site, it will likely be fewer than 1% of the national population, and thus not significant. Standard environmental protection measures will be implemented during the works where necessary and will include measures to reduce noise and visual disturbance.	Low	Minor Adverse	No
Afon Ddu SSSI	National (High)	Temporary disturbance to qualifying species of the (freshwater pearl mussel, salmon and sea-trout) through impacts to water quality	Although this statutory site is upstream of the Wider Works, impacts to connecting watercourses downstream could potentially impact migratory salmonids and therefore the qualifying features of these SSSI. Standard environmental protection measures will be implemented during the works. This will include suitable measures to reduce spillage risk and water pollution risk.	Very Low	Minor Adverse	No
Llyn Padarn SSSI	National (High)	Temporary disturbance to qualifying species of the (Arctic charr (*Salvelinus alpinus*) and Floating water-plantain) through impacts to water quality	Although this statutory site is upstream of the Wider Works, impacts to connecting watercourses downstream could potentially impact the qualifying features of these SSSI. Standard environmental protection measures will be implemented during the works. This will include suitable measures to reduce spillage risk and water pollution risk.	Very Low	Minor Adverse	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
Afon Dwyfach cWS Afon Rhythallt Mosaic cWS Below Bron Haul cWA Bont y Chrychddwr cWS Braich-y-saint cWS Bryncir cWS Bryn-ychain cWS Cae Haidd cWS Carmel cWS Coed Bryn-twr / Wern cWS Coed yr Eglwys cWS Derwin cWS Derwyn-fawr cWS Dolwar Heath cWS Dol-wenith cWS Ffynnon Beuno cWS Glanrafon Bach cWS Glan-yr-afon cWS Gwernddwyryd cWS Hafod-rhug isaf cWS Llecheiddior Ganol cWS Llystyn Isaf cWS Moel Bron-y-rhiw (West) cWS North of Caerau cWS Tan y Coed Terrace cWS Ty'n-y-berllan cWS West bank of Afon Dwyfor cWS Ymwlch Fawr cWS Ynys-ddu cWS Ystumcegid-isaf cWS	County (Medium)	Temporary habitat disturbance and loss Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	The Wider works will result in localised temporary habitat disturbance through the use of vehicles and machinery. Temporary habitat strimming will also be required to enable access to tower working areas, installation of scaffold and the creation of discrete laydown and EPZ areas. The use of a suitable temporary ground protection trackway or matting will limit damage to the existing habitat where appropriate and ensure that vehicles use the same route through the Wider Works site and stay in defined working areas. All habitats will be reinstated or allowed to re-establish on completion. Habitats that form a component of these WS and cWS comprise semi-natural woodland, coniferous woodland, semi-improved neutral, acid and marshy grassland and acid and neutral flush.	Low	Minor Adverse	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
Ancient woodland	Up to National (High)	Habitat loss. Permanent and temporary. Habitat degradation-impacts to water quality through pollution and run off and air quality from dust (temporary)	In the Wider Works site, the working area for Tower 4ZC007 is on the edge of ancient woodland, no works will take place or vegetation removal or strimming in this ancient woodland. Access is not required through this woodland. An existing access from Tower 4ZC015 – 4ZC016 that passes through ancient woodland may be temporarily utilised by ATV, trimming of overhead branches may be required to allow access but no other vegetation or trees will be removed.	Low	Minor Adverse	No
Veteran or ancient trees	Up to National (High)	Habitat degradation-impacts to water quality through pollution and run off and air quality from dust (temporary)	There are four veteran trees in the Wider Works site. These trees will not be removed and will be protected using measures set out in the High Level Arboricultural Impact Assessment report (**Volume 8, Appendix 6.5.H: High Level Arboricultural Impact Assessment**). Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	Yes
HoPI Coastal floodplain grazing marsh	County (Medium)	Habitat fragmentation and loss. Habitat degradation-impacts to water quality through pollution and run off and air quality from dust (temporary)	Vegetation management of this habitat will take place in working areas to allow access. However this will be temporary and be minimised where practicable and vegetation will be allowed to re-establish. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	No
HoPI Lowland dry acid grassland/purple moor-grass and rush pasture	County (Medium)	Habitat fragmentation and loss. Habitat degradation-impacts to water quality through pollution and run off and air quality from dust (temporary)	Vegetation management of this habitat will take place in working areas to allow access. However this will be temporary and be minimised where practicable and vegetation will be allowed to re-establish. Between Towers 4ZC017 – 4ZC021 habitat will be protected through the use of an appropriate temporary ground protection trackway or matting to limit damage to the existing habitat and to ensure that vehicles use the same route through the area and stay in defined working areas. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	No
HoPI Lowland fen	County (Medium)	Temporary habitat disturbance and loss. Habitat degradation-impacts to water quality through pollution and run off and air quality from dust (temporary)	Vegetation management of this habitat will take place in working areas to allow access. However, this will be temporary and be minimised where practicable and vegetation will be allowed to re-establish. Between Towers 4ZC017 – 4ZC021 habitat will be protected through the use of an appropriate temporary ground protection trackway or matting to limit damage to the existing habitat and to ensure that vehicles use the same route through the area stay in defined working areas.	Low	Minor Adverse	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
			Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.			
HoPI Lowland heathland	County (Medium)	Temporary habitat fragmentation, disturbance and loss. Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	Vegetation management of this habitat will take place in working areas to allow access. However, this will be temporary and be minimised where practicable and vegetation will be allowed to re-establish. Between Towers 4ZC017 – 4ZC021 habitat will be protected through the use of an appropriate temporary ground protection trackway or matting to limit damage to the existing habitat and to ensure that vehicles use the same route through the area stay in defined working areas. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Very Low	Negligible	No
HoPI Lowland meadow	County (Medium)	Temporary habitat disturbance, fragmentation and loss. Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	Vegetation management of this habitat will take place in working areas to allow access. However, this will be temporary and be minimised where practicable and vegetation will be allowed to re-establish. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Very Low	Negligible	No
HoPI Semi-natural broadleaved woodland (Upland oakwood, Lowland mixed deciduous woodland, Wet woodland and Wood pasture and parkland)	County (Medium)	Habitat, fragmentation, disturbance and loss. Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	There will be no loss of woodland in the Wider Works site. No loss of trees or trimming of trees in HoPI woodlands. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	No
HoPI Running water, including wet ditches	Larger watercourses - County (Medium) Smaller watercourses - Local (Low) Wet ditches or drains (smaller watercourses) – Local (Low)	Habitat loss and fragmentation Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	There will be no loss of running water or fragmentation of running water in the Wider Works site. Culverts will need to be replaced in some locations however this only applies where necessary and on small streams and wet ditches. Works to replace culverts will follow measures to ensure watercourses and ditches are not damaged and habitats will be reinstated. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	No
HoPI	County (Medium)	Temporary and permanent habitat loss.	There will be no loss of hedgerows or Cloddiau in the Wider Works site.	Low	Minor Adverse	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
Hedgerows and Cloddiau		Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.			
HoPI Standing water	Local (Low)	Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	No ponds will be directly affected. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	No
Non-HoPI Woodland (broadleaved semi-natural woodland, broadleaved plantation woodland, mixed semi-natural woodland, mixed plantation woodland, scattered trees)	Local (Low)	Habitat disturbance, fragmentation and loss. Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	A small number of trees will be lost to facilitate access in broadleaved semi-natural woodland at two locations only: Towers 4ZC023 and 4ZC046. There will be no other loss of woodland in the Wider Works site. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	No
Non-HoPI Neutral semi-improved grassland	Local (Low)	Habitat disturbance, fragmentation and loss. Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	Vegetation management of this habitat will take place in working areas to allow access. However this will be temporary and be minimised where practicable and vegetation will be allowed to re-establish. Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	No
HoPI in the Wider Works site or in a 50 m buffer of the Wider Works site or are hydrologically linked.	County (Medium)	Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary)	Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk.	Low	Minor Adverse	No
Protected or notable terrestrial invertebrates	Up to County (Medium) for marsh and pearl-bordered fritillary (*Boloria euphrosyne*). Local (Low) for general assemblage	Loss and fragmentation of habitat used by terrestrial invertebrates resulting in species mortality - permanent and temporary. Habitat degradation due to dust and other pollutants (temporary)	There are habitats present in the Wider Works site that could support notable terrestrial invertebrates, including marsh fritillary and small pearl-bordered fritillary. There will be no permanent habitat loss, only vegetation management at tower base locations to enable access. Vegetation will be allowed to re-establish. The use of suitable trackway or matting will limit damage to the existing habitat where appropriate and vehicles will remain in defined working areas. Pre-works surveys to check for the presence of marsh fritillary larval webs will be carried out at a suitable time of year (mid to late August or September) prior to any works taking place in suitable habitat for this species (Rhôs pasture or marshy grassland habitat dominated by tussocks	Low	Minor Adverse	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
			of purple moor-grass and various rush species), where their favoured food plant, devils bit scabious is also present. If marsh fritillary are subsequently confirmed to be present, then further measures will be taken to avoid damaging food or larval plants. Standard environmental protection measures will be implemented during the works. Details regarding effects on marsh fritillary and small pearl-bordered fritillary are provided in **Volume 3: Bryncir, Chapter 5: Ecology and Nature Conservation.**			
Aquatic macroinvertebrates	National (High) importance for freshwater pearl mussel District (Medium) importance for the scarce blue-tailed damselfly, the Iron Blue Mayfly and the nationally important species Local (Low) for all other species	Habitat loss (temporary and permanent) through construction of works access roads over watercourses	Thirty-two watercourses are being crossed to provide temporary and upgraded permanent access to the towers across the Wider Works. All existing crossing points (culverts and Terrafirma panels) will be tested for their suitability and upgraded where required. Existing crossing points are being utilised where possible and the aquatic habitat associated with them are already deemed impacted, the habitat loss associated with these works are likely to be negligible with the macroinvertebrate assemblage able to recolonise from both up and downstream. The identified macroinvertebrate assemblage from the Wider Works are common and widespread in the area (see **Volume 8, Appendix 6.5.B: Aquatic Survey Report**). Further, these crossings will be small in the context of the extent of the watercourses with habitats being reinstated after the works. The macroinvertebrate community will be able to naturally recolonise, and this is deemed a negligible impact. The Freshwater Pearl Mussel population in the Afon Ddu and its subsequent rivers (Afon Henwy and Afon Dwyfor) are not being crossed for access and will not be impacted.	Very Low	Negligible (for Fresh water pearl mussel – reduced on professional judgement – and all other species)	No
		Direct impact on species assemblage through disturbance and mortality (Temporary) during construction of temporary access roads	Construction of the one new watercourse crossing and potential upgrades to the existing 31 crossings, will require watercourses to be culverted (new or upgraded) or the installation of Terrafirma panels to enable access for works vehicles for the works. The identified macroinvertebrate assemblage from across the Wider Works are common and widespread in the area (see **Volume 8, Appendix 6.5.B: Aquatic Survey Report**). Further, these crossings will be small in the context of the extent of the watercourses with habitats being reinstated after the works. The macroinvertebrate community will be able to naturally recolonise, and this is deemed a negligible impact. The Freshwater Pearl Mussel population in the Afon Ddu and its subsequent rivers (Afon Henwy and Afon Dwyfor) are not being crossed for access and will not be impacted.	Very Low	Negligible (for Fresh water pearl mussel – reduced on professional judgement – and all other species)	No
		Habitat degradation - impacts to water quality	Standard environmental protection measures will be implemented during the works. This will include suitable	Very Low	Negligible (for Fresh water pearl	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
		through pollution of watercourses leading to mortality of macroinvertebrates. Temporary (short-term), reversible	measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk, including where practicable, 10 m stand-off buffers from watercourses.		mussel – reduced on professional judgement – and all other species)	
Aquatic macrophytes	County (Medium) importance for pale scalewort Local (Low) importance for all other species	Habitat loss (temporary and permanent) through construction of access roads over watercourses	Thirty-two watercourses are being crossed to provide temporary and permanent works access to the towers across the Wider Works. All existing crossing points (culverts and Terrafirma panels) will be tested for their suitability and upgraded where required. Existing crossing points are being utilised where possible and the aquatic habitats associated with them are already deemed impacted and the habitat loss associated with these works are likely to be negligible with the macrophyte assemblage able to recolonise from both up and downstream. The identified macrophyte assemblage from the Wider Works are common and widespread in the area except for the pale scalewort (see **Volume 8, Appendix 6.5.B: Aquatic Survey Report**). Further, these crossings will be small in the context of the extent of the watercourses with habitats being reinstated after the works. The macrophyte community will be able to naturally recolonise, and this is deemed a negligible impact.	Very Low	Negligible (for all species)	No
		Direct impact on species assemblage through disturbance and mortality (Temporary) during construction of temporary access roads	Construction of the one new watercourse crossing and potential upgrades to the existing 31 crossings, will require watercourses to be culverted (new or upgraded) or the installation of Terrafirma panels to enable access for works vehicles for the works. The identified macrophyte assemblage from across the Wider Works are common and widespread in the area except for the pale scalewort (see **Volume 8, Appendix 6.5.B: Aquatic Survey Report**). Further, these crossings will be small in the context of the extent of the watercourses with habitats being reinstated after the works. The macrophyte community will be able to naturally recolonise, and this is deemed a negligible impact.	Very Low	Negligible (for all species)	No
		Habitat degradation-impacts to water quality through pollution (i.e. dust, oil, sediments spills from, surface run-off, pre-works on compounds/site clearance and general plant movement) leading to mortality of macroinvertebrates.	Standard environmental protection measures will be implemented during the works. This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk, including where practicable, 10 m stand-off buffers from watercourses.	Very Low	Negligible (for all species)	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
		Temporary (short-term), reversible				
Fish	National (High) importance for the migratory fish assemblage Local (Low) importance for all other species	Habitat degradation- impacts to water quality through pollution (i.e. dust, oil, sediments spills from, surface run-off, pre-works on compounds/site clearance and general plant movement) leading to mortality of fish. Temporary (short-term), reversible	Standard environmental protection measures will be implemented during the works . This will include suitable measures to suppress dust, reduce site runoff and reduce spillage risk and water pollution risk, including where practicable, 10 m stand-off buffers from watercourses.	Very Low	Minor Adverse for Nationally important species Negligible for all other species	No No
		Direct mortality or disturbance to fish species due to the installation and/or updating of watercourse crossings. Temporary (short-term), reversible	Where new or updating existing watercourse crossings are proposed, there is a risk that this work would result in disturbance and/or mortality to fish species through the removal of aquatic habitat. The specific type of watercourse crossing being installed is being determined following a visit by engineers. As such, this potentially presents an unknown impact to a single cohort of both Nationally and Locally important fish species and therefore additional mitigation may be required depending on the design.	Low	Moderate Adverse for Nationally important species Negligible for all other species	Yes No
		Disturbance to fish species from work activities (i.e. lighting, noise, vibration, human activity). Temporary	Works taking place near to, or over watercourses as part of the Wider Works could disturb fish during migration and spawning. Existing measures are in place to ensure disturbance is kept to a minimum such as: • A minimum of 10 m from watercourses (bank top) where practicable. • Where lighting is required, it will conform to best practice guidelines with respect to minimising light spill into adjacent habitats and preventing disturbance to species. • Works over watercourses will install support netting to protect watercourses during oversailing. Works at towers that may involve works over main/large watercourses (Tower 4ZC023 – 4ZC027 (Nant yr Efail), Tower 4ZC048 (Afon Bontfaen), Tower 4ZC070 (Afon Dwyfach), Tower 4ZC081 (tributary of Afon Dwyfach), Tower 4ZC093 (Afon Crychddwr), 4ZC097 (trib of Afon Llyfni), 4ZC109 (Afon Llifon)) could disturb the migration and/or spawning of fish species which may result in a single cohort of both Nationally and Locally important fish species being impacted.	Low	Moderate Adverse for Nationally important species Negligible for all other species	Yes No
Breeding birds	Local (Low)	Loss and fragmentation of habitats used by breeding	Breeding bird surveys were not completed for Wider Works. Low numbers of common birds of no or low conservation concern may use the habitats in or adjacent to these	Medium	Minor Adverse	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
		birds, resulting in species mortality. Direct loss of nests and young through tree and vegetation removal or reduction, which could result in injuring or killing birds. Temporary noise and visual disturbance, including to nesting WCA Schedule 1 birds such as peregrine	components for occasional foraging or nesting but are unlikely to depend on these for their survival or proliferation, and will have access to habitat of equal and better quality in the surrounding landscape. Schedule 1 (WCA) birds could be present, including using pylons for nesting sites (notably peregrine). Standard environmental protection measures will be implemented during the works to minimise noise, lighting and vibration disturbance to birds. These measures will ensure that, where works are carried out during the breeding bird season (typically March to August, inclusive), disturbance to breeding birds in adjacent and retained habitats will be minimised.			
Non-breeding birds	Local (Low)	Noise or visual disturbance (temporary).	Surveys for non-breeding (outside the cored breeding bird season) were not completed for the Wider Works. Low numbers of common birds of no or low conservation concern may use the habitats in or adjacent to these components for occasional foraging or sheltering but are unlikely to depend on these for their survival or proliferation and will have access to habitat of equal and better quality in the surrounding landscape. Standard environmental protection measures will be implemented during the works to minimise noise, lighting and vibration disturbance to birds. These measures will ensure that disturbance to birds in adjacent and retained habitats will be minimised.	Very Low	Negligible	No
Bats	Foraging and commuting habitat for the overall bat assemblage – Regional (Medium) Importance in the SAC and County or District (Medium)	Direct loss of roosts through tree removal, which could result in injuring or killing bats (permanent) Disturbance to roosting bats due to noise or lighting during the works (temporary) Loss or severance of foraging or commuting habitat (e.g. hedgerows, watercourses, grasslands) (temporary and permanent)	Tree removal will only be required where necessary and at the following towers 4ZC023, 4ZC045, 4ZC046, 4ZC059, 4ZC061. Trees will be trimmed at 4ZC006, 4ZC016, 4ZC026 and 4ZC060. Trees with PRFs are present in working area at tower 4ZC023 (groups of trees), 4ZC046 (one tree), 4ZC059 (one tree), 4ZC060 (group of trees), 4ZC061 (five trees). Further surveys will be required to determine presence/absence of roosting bats for any trees with PRFs which will be removed or trimmed. Should roosting bats be present then a mitigation licence from NRW will be required. Standard environmental protection measures will be implemented during the works. Impacts on foraging and commuting bats will be limited and managed in accordance with the measures to be set out in the WEMP. Impacts on habitats suitable for foraging and commuting bats will be largely temporary.	Low	Minor Adverse	No
Badger	Local (Low)	Damage or disturbance (noise, vibration or lighting) to active badger setts which could result in injuring or killing badgers.	Two badger setts (main and subsidiary) were recorded in the Wider Works site.. The subsidiary badger sett will not require closure. The main sett may be subject to disturbance. A pre-works badger survey will be carried out to confirm the presence or absence of badger setts up to 30 m of Wider Works locations. Where an active badger sett is at risk of	Low	Minor Adverse	Yes

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
		Habitat loss or fragmentation (temporary)	being disturbed or destroyed then an NRW licence would be required, and mitigation measures would be updated accordingly. The Wider Works will not result in any permanent loss of badger foraging habitat and there will be no fragmentation of badger territory or restrict access to foraging and water resources.			
Otter	District (Medium)	Habitat loss or degradation where the Wider Works cross or lie near to watercourses (permanent and temporary). Disturbance to commuting, foraging or resting otter through noise, lighting or visual disturbance in or near to watercourses (temporary). Habitat degradation impacts to water quality through pollution of watercourses (temporary)	Otter presence was recorded in watercourses 6.40, 6.41 and 6.43 in the Wider Works site; no holts were identified. No works are proposed in the vicinity (a buffer of at least 10 m) of watercourse 6.40 or 6.43. these watercourses. A suitable buffer of a least 10 m from watercourse 6.41 will be maintained and follow standard environmental protection measures will be implemented during the works. Pre-commencement surveys will be carried out in advance of the works to check if the distribution of otter remains the same and that any mitigation proposed is appropriate. Connectivity for otter will be maintained along water courses. Impacts on foraging and commuting otter will be limited and managed in accordance with the measures to be set out in the WEMP. Impacts on habitats suitable for foraging and commuting otter will be largely temporary.	Low	Minor Adverse	No
Water vole (*Arvicola amphibius*)	District (Medium)	Disturbance to commuting, foraging or resting water vole through noise, lighting or visual disturbance in or near to watercourses (temporary). Habitat degradation impacts to water quality through pollution of watercourses (temporary)	Water vole presence was recorded in watercourses 6.7a, 6.8, 6.9, 6.10, 6.11, 6.17, 6.20, 6.31 and 6.38 in the Wider Works site. There will be no Wider Works in 10 m of watercourses 6.8, 6.20 and 6.31. Pre-commencement surveys will be carried out in advance of the works to check if the distribution of water vole remains the same and that any mitigation proposed is appropriate. Standard environmental protection measures will be implemented during the Wider Works.	Low	Minor Adverse	No
Great crested newt (*Triturus cristatus*)	District (Medium)	Loss or fragmentation of terrestrial and aquatic habitats used by great crested newts for foraging, breeding, or shelter (temporary). Incidental killing, injury or disturbance of great crested newts present in habitats on Site	One pond (P6.68) within 50 m of the Wider Works site returned a positive eDNA result (north of Towers 4ZC008 and 4ZC009) , confirming presence, and further pre-works surveys will be required to determine population size and presence/absence surveys on ponds in 250 m with habitat connectivity to the Wider Works. There will be no permanent terrestrial or aquatic habitat loss in the Wider Works site. Impacts are associated with vegetation management only and for access requirements. Mitigation for great crested newt will be carried out under a European Protected Species (EPS) Mitigation Licence from NRW where necessary. Standard environmental protection measures will be implemented during the works at this location.	Low	Minor Adverse	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
Other mammals (hedgehog (*Erinaceus europaeus*), brown hare (*Lepus europaeus*), and polecat (*Mustela putorius*)) and common amphibians	Local (Low)	Permanent and temporary loss and disturbance of habitats which may be used by these species	Other mammals (as described) are potentially present throughout the Wider Works site. There will be no permanent habitat loss. Temporary vegetation management will take place in habitats suitable to support these species. Precautionary working methods that will be adhered to for other species, including badger, reptiles and birds when impacting areas of suitable habitat (e.g. hedgerows, woodland, scrub, grasslands) will also be of benefit to other mammals and common amphibians.	Low	Minor Adverse	No
Reptiles	Local (Low)	Loss or fragmentation of terrestrial and aquatic habitats used by reptiles for foraging, breeding, or shelter. Incidental killing, injury or disturbance of reptiles present in habitats on Site (temporary).	No reptile surveys have taken place for Wider Works but incidental sightings of adder have been recorded between towers 4ZC069 and 70. There will be no permanent loss of suitable reptile habitat in the Wider Works site. Temporary vegetation management will take place in habitats suitable to support reptile. Precautionary working methods will be adhered to in areas of suitable reptile habitat. Works in areas suitable for reptiles will be carried out at an appropriate time of year, concordant with requirements for other species (such as nesting birds), in a phased approach.	Low	Minor Adverse	No
Notable flora, fungi and lichen	Up to County (Medium)	Disturbance or loss of notable flora, fungi and lichen due to habitat loss (temporary). Habitat degradation- impacts to water quality through pollution and run off and air quality from dust (temporary).	Waxcaps were identified between towers 4ZC013 and 16. There will be no permanent habitat loss in the Wider Works site. Impacts are associated with vegetation management only and for access requirements. Care will be taken to avoid areas where waxcaps are present. Standard environmental protection measures will be implemented during the works.	Low	Minor Adverse	No

Mitigation and Residual Effects

Additional Mitigation

5.1.41 Additional mitigation measures are measures that will be carried out to further reduce the magnitude of effects for certain ecological features and are in addition to embedded mitigation measures.

5.1.42 Additional mitigation is required where significant effects are identified following the application of embedded mitigation measures.

Marsh fritillary butterfly

5.1.43 Additional mitigation measures will minimise any potential adverse effects on marsh fritillary butterflies, should they be present in the Wider Works site. Works have the potential to kill or injure these butterfly species (if present) through the disturbance or clearance of suitable vegetation, including plants used for egg laying and feeding. Temporary loss and disturbance of vegetation used by these butterflies could also reduce the availability of suitable foodplants. Additional mitigation measures will comprise:

- A pre-works check will be carried out in areas of suitable habitat at the appropriate time of year to look for any visible larval webs, with a view to avoid such areas, if possible. The use of appropriate temporary ground protection matting, to limit damage to existing habitat and to ensure that vehicles use the same route through the works site. A suitably experienced ecologist will be on site to guide the implementation of the works access route through any potential suitable habitat, with a view to avoid or reduce potential impacts where possible.
- Patches of dense or abundant devil's bit scabious (*Succisa pratensis*) are avoided (i.e. routed around or avoided by temporary plant) in order to preserve the larval food plant of the marsh fritillary. Areas required for preservation would be identified on the ground by an Ecological Clerk of Works (ECoW) prior to works commencing in a given location.
- Where devil's bit scabious is identified in works areas, translocation of the larval webs and plants that contain marsh fritillary eggs may be required, although in general the simpler approach would be to micro-site the works around any identified populations.
- Once works are complete the works areas would then be required to be reinstated to the condition it was in prior to the works.
- Pre-works surveys to check for the presence of marsh fritillary larval webs will also be carried out at a suitable time of year (mid to late August or September (Ref 5.36)) prior to any works taking place. If confirmed to be present, then further measures will be taken to avoid damaging food plants where they are present.
- Machinery or materials will not be stored on site in areas of suitable habitat.
- Suitable timings of works, where practicable, to avoid impacting foodplants when eggs or larval webs may be present.
- Mitigation measures will be detailed in the WEMP.

5.1.44 With the implementation of additional mitigation, the magnitude of impact to marsh fritillary is Very Low, with a resulting Negligible effect, which is not significant.

Roosting bats

5.1.45 Further pre-works surveys will be carried out to support the baseline survey findings for Wider Works where tree removal or reduction cannot be avoided, including where trimming of trees for access will be required. Where impacts to roosting bats cannot be avoided a licence from NRW will be obtained and suitable mitigation put in place. Mitigation will likely include the requirement to install bat boxes in the area.

5.1.46 Where the removal or reduction of trees with PRFs but not confirmed as supporting bat roosts, these trees will be section felled in accordance with an approved Method Statement, under an ecological watching brief delivered by a suitably licensed ecologist.

5.1.47 With the implementation of additional mitigation under a NRW licence, if required, the magnitude of impact to roosting bats will be Very Low for Wider Works with a resulting Negligible effect, which is not significant.

Badger

5.1.48 At the Wider Works site, disturbance could occur to a main badger sett (as detailed in the confidential badger **Volume 8, Appendix 6.5.D: Ecology Report: Badger Survey**) and may require an NRW disturbance licence, requiring mitigation including timing restrictions on the works in this location to ensure the sett is not disturbed between November and July. Prior to the works options for moving works to at least 30 m from the sett to avoid disturbance if possible, or minimising works required within this distance to a level that would not affect the sett will be explored.

5.1.49 Pre-works surveys will be carried out to confirm the latest status of each sett (active to disused), presence of any new setts, and which setts will be directly impacted, not directly impacted but at risk of disturbance, and not impacted directly or disturbed.

5.1.50 To minimise disturbance at other badger setts, 30 m exclusion zones around sett entrances will be enforced. The exclusion zones will be delineated by appropriate above ground fencing or ground markings, agreed with the ECoW, who will manage works activities alongside the contractor(s). Where the 30 m exclusion zones cannot be adhered to then a licence from NRW may be required and will be assessed on a case-by-case basis by the appointed experienced ecologist, depending on the works proposed in that area.

5.1.51 With the implementation of additional mitigation under a NRW licence, if required, the magnitude of impact to badger for Wider Works will be Low, with a resulting Negligible effect, which is not significant.

Water vole

5.1.52 Pre-works surveys will be required to support baseline survey findings for Wider Works.

5.1.53 Any replacement of culverts or watercourse crossings will be designed to maintain downstream flows and to allow continued and unobstructed passage for mammals using river corridors. Alternatives such as temporary clear span bridges or alternative access routes will be investigated to see if water vole burrows can be avoided. At watercourses where water vole are present and will be affected (habitat disturbance, temporary loss of habitat), a mitigation licence from NRW will be required. The licence will detail the appropriate timing and an ecological watching brief to permit the temporary dispersal of water vole from the working area. Habitat enhancement in the vicinity of the culvert may be required in advance of works in these instances. Habitat will be reinstated or enhanced following completion of the works. The WEMP details measures to prevent and control pollution during the works.

5.1.54 With the implementation of additional mitigation under a NRW licence, if required, the magnitude of impact to water vole will be Low, with a resulting Minor Adverse effect, which is not significant.

Otter

5.1.55 Pre-works surveys will be carried out to support the baseline survey findings for Wider Works. Where direct impacts to newly identified otter resting places (should they be present) cannot be avoided a licence from NRW will be obtained and suitable mitigation put in place.

5.1.56 Where indirect impacts such as disturbance to newly identified otter resting places are unavoidable, further mitigation will be put in place, such as temporary acoustic fencing.

5.1.57 With the implementation of additional mitigation, the magnitude of impact to otter is Very Low, with a resulting Negligible effect, which is not significant.

Great crested newt

5.1.58 One pond in the Wider Works site returned a positive eDNA result, confirming great crested newt presence, and further pre-construction surveys will be required to determine the status of this species in other areas of the Wider Works site, and the size of the populations present.

5.1.59 Mitigation for great crested newt will be carried out under an EPS Mitigation Licence from NRW. Mitigation will be specified in the licence but may require the trapping and translocation of great crested newts from working areas and access routes within 250 m of ponds confirmed to support this species. In this instance, a suitable translocation area would need to be identified as part of the licence.

5.1.60 With the implementation of additional mitigation, the magnitude of impact to great crested newt is Very Low, with a resulting Negligible effect, which is not significant.

Fish

5.1.61 Pre-construction fish rescues will be required at all temporary and permanent watercourse crossings (including both new and updated culverts). These surveys will need to be completed immediately before culvert installation to ensure all fish within the impacted area are safely removed to avoid injury and/or mortality.

5.1.62 Post-construction fish rescues will also be required during the decommissioning of all temporary watercourse crossings. These surveys will need to be completed immediately before culvert removal to ensure all fish within the impacted area are safely removed to avoid injury and/or mortality.

5.1.63 Where the new and updated culverts are proposed for watercourse crossings, culvert design will need to comply with best practise for fish passage which involves installing either box culverts or bottomless arch culverts. Where this is not possible then the culvert invert will need to be set below the existing watercourse bed to ensure continued longitudinal connectivity and fish passage through the culvert.

5.1.64 Pre-construction fish surveys are required at the drain of Afon Dwyfach adjacent to 4ZC071 to support the baseline findings and inform any mitigation requirements given that the Tower Working Area is within 10 m of this watercourse.

5.1.65 Pre-construction fish habitat surveys are required where Tower Working Areas are proposed to be within 10 m of a watercourse (4ZC070 (Afon Dwyfach), 4ZC093 (Afon Crychddwr), 4ZC109 (Afon Lilfon), 4ZC081 (Trib of Afon Dwyfach) and 4ZC071 (drain of

Afon Dwyfach)) and at all temporary and permanent watercourse crossings (including both new and updated culverts). Results will support the baseline survey findings and inform the presence of suitable spawning habitat and any additional mitigation requirements.

5.1.66 In watercourses deemed suitable for the migratory fish assemblage, works near (Tower Working Areas) or in water (temporary and permanent watercourse crossings) will need to be completed during suitable times of year to avoid the below ecological sensitive windows (migration) where possible. However, where these species are absent, these timings will not need to be considered. These timings represent worst case scenarios that account for environmental variability that trigger the cues in migration i.e. temperature and flow. Consultation with NRW personnel will streamline these months based on local/expert knowledge on migration runs and identify months that represent the least possible ecological harm.

- Atlantic salmon (smolt): March to May.
- Atlantic salmon (adult – main run): August to November.
- Sea trout (smolt): March to May.
- Sea trout (adult): June to October.
- River lamprey (adult): October to December.
- River lamprey (transformer): January to March.
- European eel (elver/glass eel): April to October.
- European eel (silver eel): August to October.

5.1.67 Where suitable spawning habitat is found for the protected migratory fish assemblage, then suitable timings of works, where practicable, should be implemented to avoid impacting the spawning of these species (see below). However, where this habitat is absent, these timings will not need to be considered.

- Brown/sea trout – October to December.
- Atlantic salmon – November to December.
- Brook lamprey – March to April.
- River lamprey – March to April.

5.1.68 With the implementation of this additional mitigation, the magnitude of impact to the migratory fish assemblage is Very Low, with a resulting Minor Adverse effect, which is not significant.

Biosecurity Management Plan

5.1.69 The implementation of a Biosecurity Management Plan that will set out procedures to ensure that no INNS are brought into the Wider Works area or areas of existing INNS are spread, will demonstrate compliance with legislation. Pre-works surveys will be carried out to provide an update on the presence and location of any INNS previously identified. This will inform the implementation of measures to prevent their further spread, such as biosecurity measures, exclusion zones or treatment. These procedures will be outlined in the WEMP.

Monitoring

Pre-works

5.1.70 Pre-works surveys will be carried out during the appropriate seasons prior to the Wider Works. These will inform detailed design where needed, provide up to date status of protected species that require mitigation during site clearance, and inform any protected species licensing that may be required should species distribution change or detailed design result in licencing requirements for species such as otter.

Post-Works

5.1.71 Post-works monitoring will be carried out in accordance with protected species licences granted for the works.

Summary

5.1.72 The assessment concludes that, with the incorporation of embedded and additional mitigation measures, significant effects are unlikely for Statutory and Non-Statutory nature conservation sites, ancient woodlands, and HoPI within the Wider Works site and Study Area. Similarly, significant effects are considered unlikely for protected and notable species and habitats identified within the Wider Works site and study area.

5.2 Historic Environment

5.2.1 This section presents an assessment of the likely Historic Environment effects that could arise from the proposed works as described in **Chapter 2: Wider Works**.

5.2.2 This section is supported by appendices as listed below:

- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 6.5.I: Historic Environment Desk Based Assessment (Wider Works).**
- **Volume 8, Appendix 6.5.J: Gazetteer of Historic Assets and Archaeological Investigations (Wider Works).**

Legislation and Planning Policy

5.2.3 This section summarises the legislation and planning policy framework that is relevant to the Historic Environment assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

5.2.4 The following legislation was relevant to Historic Environment:

- Historic Environment (Wales) Act 2023 (Ref 5.37).

National Policy

5.2.5 The following national policy was relevant to Historic Environment:

- PPW – Edition 12 (Ref 5.18).
- Future Wales: The National Plan to 2040 (Ref 5.20).
- TAN 24: The historic environment (Ref 5.38).

Local Policy

5.2.6 The following local policy was relevant to Historic Environment:

- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Ref 5.21).
- Eryri Local Development Plan 2016 – 2031 (Ref 5.23).

Guidance

5.2.7 The following guidance was relevant to Historic Environment:

- Conservation Principles for the Sustainable Management of the Historic Environment in Wales (Ref 5.39).
- Heritage Impact Assessment in Wales (Ref 5.40).
- Managing Change to Listed Buildings in Wales (Ref 5.41).
- Managing Change to Registered Historic Parks and Gardens in Wales (Ref 5.42).
- Managing Conservation Areas in Wales (Ref 5.43).
- Managing Historic Character in Wales (Ref 5.44).
- Managing Lists of Historic Assets of Special Local Interest (Ref 5.45).
- Setting of Historic Assets in Wales (Ref 5.46).
- Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk-based Assessment (Ref 5.47).

Assumptions and Limitations

5.2.8 A Zone of Theoretical Visibility (ZTV) was not prepared as part of Landscape and Visual Amenity Assessment as likely significant impacts were scoped out.

Future Baseline

5.2.9 This section considers any changes to the baseline conditions that might occur over the lifespan of the Wider Works, but in the absence of the Wider Works (i.e. in the event that the Wider Works are not undertaken).

Existing Baseline (2024)

5.2.10 Based on available information, there are no reasons to expect that there would be any marked change in the historic environment baseline in the absence of the Wider Works. Land-uses within the Wider Works site would remain as they are currently, which would retain the existing settings of built historic assets and impacts to below ground archaeological remains would be minimal and limited to taphonomic processes (i.e. erosion, degradation, corrosion etc.).

Future Baseline

5.2.11 This assessment of future baseline conditions recognises that below ground archaeological remains reach an equilibrium with their environment and tend to not experience noticeable change, unless their environment changes as a result of human or natural intervention. Similarly, it is recognised that for above ground historic assets, there may be some decay over time in the absence of the Wider Works as they near the natural end of their design lifespan. In addition, it is not considered likely that significant numbers of historic assets will be added to the baseline during the future baseline scenario. The future baseline is unlikely therefore to undergo significant change although it is acknowledged that in the absence of the Project, reconductoring works and fibre wrap replacement of fibre optic cable would take place as part of maintenance of the existing overhead line and would result in the effects identified in this assessment.

Consultation

5.2.12 **Table 5-3** sets out consultation undertaken with relevant stakeholders on Historic Environment.

Table 5-3 – Consultation in response to Historic Environment

Consultee	Date and nature of consultation	Summary of response	How and where addressed
Senior Archaeologist Heneb	11 September 2024. Email correspondence.	AECOM sent an email to Heneb requesting feedback regarding the Study Areas to be used in the DBA and ES, and if a Written Scheme of Investigation (WSI) was required in advance of Historic Environment Record (HER) data request.	The DBA (**Volume 8, Appendix 6.5.I: Historic Environment Desk-based Assessment** of the ES) has been carried out in accordance with a WSI agreed with Heneb. The DBA's Study Area has been agreed with Heneb.
HER Officer Heneb	11 September 2024. Email correspondence.	A data request for HER data within the Project work site and within 500 m of the Wider Works site was requested.	HER data received from Heneb was used in the DBA assessment (**Volume 8, Appendix 6.5.I: Historic Environment Desk-based Assessment**) and to support the ES.

Methodology

5.2.13 Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the Historic Environment assessment can be found in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

Potential Effects

5.2.14 The anticipated effects resulting from the loss or change to Historic Environment elements and features during the Wider Works are outlined as follows.

5.2.15 The sources of potential Historic Environment effects during the works include:

- Temporary short-term impacts to historic assets as a result of change to their setting.
- Permanent physical impacts to below ground archaeological remains.

Designated Historic Assets – Within the Wider Works site

Hut Group Near Tan-y-Coed Pont Rhythallt (CN232)

5.2.16 A hut-circle settlement probably dating to the Iron Age or Romano-British period. There are at least seven circular stone-walled huts, measuring from 3 m to 9 m in diameter, some linked by low stony banks, set in a compact group around a central 'courtyard' area. To the west are three circular stony platforms, possibly the remains of other huts.

5.2.17 The monument is of national importance for its potential to enhance our knowledge of Iron Age or Romano-British settlement. It retains significant archaeological potential, with a strong probability of the presence of associated archaeological features and deposits. The structures themselves may be expected to contain archaeological information concerning chronology and building techniques.

5.2.18 The asset holds archaeological interest, with its value derived from its ability to inform on Iron Age or Romano-British settlement activity. The asset is of high value.

5.2.19 The access route to Tower 4ZC141 runs along existing trackway that is outside the northern edge of the Scheduled Monument. No upgrade to the existing track is expected, with access anticipated to be achieved using ATV if the existing track is unsuitable for standard vehicular access. No change is expected on this asset.

Caer Engan (CN148)

5.2.20 The monument comprises the remains of an Iron Age hillfort measuring some 120 m by 64 m, occupying a rocky knoll and defended by a double rampart best preserved on the west and east sides. The ramparts make use of natural outcrops and shelves, and these are supplemented by artificial banks of earth.

5.2.21 The monument is of national importance for its potential to enhance our knowledge of later prehistoric defensive organisation and settlement. The site forms an important element within the wider later prehistoric context and within the surrounding landscape. The site is well preserved and retains considerable archaeological potential. There is a strong probability of the presence of evidence relating to chronology, building techniques and functional detail.

5.2.22 The asset holds archaeological interest, with its value derived from its ability to inform on Iron Age settlement activity. The asset is of high value.

5.2.23 The access route to Tower 4ZC098 is anticipated to run along existing trackway, as well as pasture (which is rough and uneven in places). No upgrade to the existing track is expected, with access anticipated to be achieved using ATV if the existing track is unsuitable for standard vehicular access. There is no requirement for the removal of sections of dry-stone walls to achieve access. Although a portion of the indicative working area for Tower 4ZC098 is in the area of the Scheduled Monument, the works

proposed (i.e. personnel accessing the existing tower) do not involve any ground disturbing activities and so these are not expected to impact on any buried archaeological remains that might exist in the area. The land within the working area is also likely to have been previously disturbed when the OHL was initially installed. No change is expected on this asset.

Caerau Ancient Village (CN067)

5.2.24 The monument comprises the remains of an enclosed Iron Age settlement of multiple hut circles and early fields on the lower slopes of Mynydd Craig Goch. The scheduled area includes two of the settlement sites and a part of the associated fields. The settlement may have been enclosed but it was probably not a defensive site, whilst long views especially to the west are important, the significant views would have been medium and short over the fields that would have been farmed from the settlement. These views are also primarily to the west.

5.2.25 The monument is of national importance for its potential to enhance our knowledge of prehistoric settlement practices. It is an important relic of the prehistoric landscape and retains significant archaeological potential. There is a strong probability of the presence of environmental and structural evidence, including preserved internal and external floor levels.

5.2.26 The asset holds archaeological interest, with its value derived from its ability to inform on Iron Age settlement activity. The asset is of high value.

5.2.27 The access route to Tower 4ZC086 runs across rough pasture within the area of the Scheduled Monument. Access is anticipated to be achieved using ATV if the pasture conditions are unsuitable for standard vehicular access. No materials will be laid down within the Scheduled Monument area. No change is expected on this asset.

Non-designated Historic Assets – Within the Wider Works site

Part of Roman Road, Segontium - Bryn-y-gefeiliau (PRN 17824)

5.2.28 Part of a Roman Road which linked Segontium with Bryn-y-gefeiliau is projected to run across the access route to Tower 4ZC125 and a short distance north-west (approximately 7 m) of the working area for the same tower in a north-west to south-east orientation. The asset holds archaeological interest as it may help to inform on Roman settlement and communication routes within Gwynedd. The asset is of medium value.

5.2.29 The access route to Tower 4ZC125 runs across rough pasture where it meets the projected line of the Roman Road. A new temporary stone road or trackway panels laid directly onto the ground may be required. Access is anticipated to be achieved using ATV if the pasture conditions are unsuitable for standard vehicular access. No change is expected on this asset.

Hut Group, South-West of Penyffridd, Rhosgadfan (PRN 741)

5.2.30 Enclosed hut group west of Pen y Ffridd at 230 m AOD on ground falling gently to the west. The enclosure is roughly rectangular, 29 m long north-south and 17 m wide. The enclosing wall is only preserved on the east and south, and even on the east it is broken though by a modern track and overlain by an old field wall. The condition of the archaeological site is ruined and partly destroyed. The asset holds archaeological interest as it may help to inform on Romano-British settlement within Gwynedd. The asset is of medium value.

5.2.31 The access route to Tower 4ZC113 crosses the area of the enclosed hut group. Access is anticipated to be achieved using ATV if the pasture conditions are unsuitable for standard vehicular access. No change is expected on this asset.

Hut Group, South-West of Penyffridd, Rhosgadfan (PRN 742)

5.2.32 An unenclosed hut group south-west of Pen y Ffridd comprise three round huts close together in line on top of a slight ridge. The western hut, now crossed by a modern field wall is 6 m in diameter, a few inner facing stones remain in the wall, and there is a probable entrance 6 m wide on the south-west. The middle hut is 7.6 m in diameter and the eastern hut is 20 m. Possibly Romano-British in date, but occupation of the site may extend into other periods. The asset holds archaeological interest as it may help to inform on Romano-British settlement within Gwynedd. The asset is of medium value.

5.2.33 The access route to Tower 4ZC112 crosses the area of the unenclosed hut group. Access is anticipated to be achieved using ATV if the pasture conditions are unsuitable for standard vehicular access. No change is expected on this asset.

Part of a Roman Road, Segontium to Pen Llystyn to Tomen y Mur (PRN 36434)

5.2.34 Part of a Roman Road is projected to run across an access route to Tower 4ZC095 and the working area of Tower 4ZC092 in a north-south orientation, as well as bordering a laydown area in proximity to Tower 4ZC092. It runs parallel to another project Roman Road (PRN 17822) which also runs through the same working area in a similar orientation. The asset holds archaeological interest as it may help to inform on Roman settlement and communication routes within Gwynedd. The asset is of medium value.

5.2.35 Access is anticipated to be achieved using ATV if the ground conditions are unsuitable for standard vehicular access. No change is expected on this asset.

Part of Roman Road, Segontium to Pen Llystyn to Tomen y Mur (PRN 17822)

5.2.36 Part of a Roman Road which linked Segontium to Pen Llystyn to Tomen y Mur is projected to run across an access route to Tower 4ZC095 and the working area of Tower 4ZC092 in a north-south orientation. It runs parallel to another project Roman Road (PRN 36434) which also runs through the same working area in a similar orientation. The asset holds archaeological interest as it may help to inform on Roman settlement and communication routes within Gwynedd. The asset is of medium value.

5.2.37 Access is anticipated to be achieved using ATV if the ground conditions are unsuitable for standard vehicular access. No change is expected on this asset.

Stone Gateposts, East of Bodychain Isaf (PRN 33995)

5.2.38 The three large stones that form gateposts for two adjacent gates. Oral evidence suggests that the stones were erected in 1847. Their size and state of weathering, apart from the west facing face of the southernmost stone, suggest that they were shaped in antiquity and may have been relocated following improvements to the road. The asset holds archaeological interest as it may help to inform on prehistoric activity within Gwynedd. The asset is of low value.

5.2.39 The access route to Tower 4ZC087 utilises these two adjacent gates, and a laydown (approximately 13 m x 8 m in extent). This may involve ground disturbance such as stripping of topsoil for new temporary access tracks. This would impact on any buried archaeological remains that might exist in the area. However, given the limited width of the Wider Works in this area of the Wider Works, it is unlikely that total loss of these

assets will occur. Therefore, the magnitude of impact is low, which on assets of low value, would result in a negligible significance of effect, which is not significant.

Field System, Caerau (PRN 3319)

5.2.40 This prehistoric field system lies on both sides of the old road that runs north to Nazareth. The hill slope here is crossed by three strip lynchets with perhaps a fourth running in a more or less continuous series. The fields are well preserved. The asset holds archaeological interest, with its value derived from its ability to inform on Iron Age settlement activity. This field system is associated with the Caerau Ancient Village (CN067), a scheduled monument approximately 260 m to the north. The asset holds archaeological interest as it may help to inform on prehistoric settlement in Gwynedd. The asset is of high value.

5.2.41 The access route to Tower 4ZC084 runs across rough pasture within the area of the prehistoric field system. Access is anticipated to be achieved using ATV if the existing pasture conditions are unsuitable for standard vehicular access. No change is expected on this asset.

Roman Fort (Possible), North of Derwin Bach (PRN 789)

5.2.42 The possible remains of a Roman temporary camp is on Derwin Bach Farm. The best-preserved length of the earthwork lies towards the north-west end of a field in an unploughed part now covered by reeds. The rampart (3 m wide and up to 0.3 m high) and ditch (2.5 m wide) can be traced for a straight length of 35 m at the north-west side, at the north-west angle, and for approximately 72 m of the south-west side. The asset holds archaeological interest as it may help to inform on Roman military activity and settlement in Gwynedd. The asset is of medium value.

5.2.43 The access route to Tower 4ZC075 runs across rough pasture within the area of the possible Roman Fort. Access is anticipated to be achieved using ATV if the existing conditions are unsuitable for standard vehicular access. No change is expected on this asset.

POW Camp Site of, Bryncir (PRN 7878)

5.2.44 The location of a WWI prisoner of war camp is recorded on site. It was a work camp affiliated to Frongoch, another prisoner of war camp in Gwynedd, and opened by June 1919. It held 36 prisoners carrying out agricultural work. It possibly closed in October 1919. No other details are available on the layout and form of the camp. The asset holds archaeological interest as it may help to inform on military activity in Gwynedd following World War I. The asset would likely hold local interest and is of low value.

5.2.45 The access route to Tower 4ZC070 runs across rough pasture within the area of the POW camp site. Trackway panels may need to be laid directly onto the ground to form a new track. This may involve ground disturbance such as stripping of topsoil for the new temporary access tracks. This would impact on any buried archaeological remains that might exist in the area. However, given the limited width of the Wider Works in this area of the Wider Works, it is unlikely that total loss of these assets will occur. The magnitude of impact is low, which on assets of low value, would result in a negligible significance of effect, which is not significant.

Route of old road, Garn Dolbenmaen (PRN 62168)

5.2.46 The tithe map of Dolbenmaen Parish (1844) (see **Figure 3.6J.3 in Volume 8, Appendix 6.5.I**) shows an old meandering road from Garn Dolbenmaen via Glan

Dwyfach to Dafarn Faig passing on the north side of Bryn-'refail-ganol farm. The value of the asset is derived from its archaeological interest as part of the post-medieval settlement pattern in the area during 19th century and even earlier. The asset would likely hold local interest and is of low value.

5.2.47 The route of the old road runs across the working area for Tower 4ZC067. The movement of vehicles would potentially impact on any buried archaeological remains that might exist in the area.

5.2.48 The access route to Tower 4ZC066 also crosses the route of the old road. Trackway panels laid directly onto the ground may be required. This may involve ground disturbance such as stripping of topsoil for the new temporary access tracks.

5.2.49 One of the indicative laydown areas (approximately 17 m by 10 m), is also on the line of the old road. This may impact on any buried archaeological remains that might exist in the area.

5.2.50 However, given the extent of the Wider Works in this area, it is unlikely that total loss of these assets will occur. The magnitude of impact is low, which on assets of low value, would result in a negligible significance of effect, which is not significant.

Tank, East of Gwern-ddwyryd (PRN 25574)

5.2.51 A tank is marked on the Ordnance Survey second edition map of 1900-01. The value of the asset is derived from its archaeological interest as part of the post-medieval settlement during the late 19th and early 20th centuries. The asset would likely hold local interest and is of low value.

5.2.52 The access route to Tower 4ZC047 runs across rough pasture within the area of the tank. Trackway panels laid directly onto the ground may be required. This may involve ground disturbance such as stripping of topsoil for new temporary access tracks. This would impact on any buried archaeological remains that might exist in the area. However, given the limited width of the Wider Works in this area of the Wider Works, it is unlikely that total loss of these assets will occur. The magnitude of impact is low, which on assets of low value, would result in a negligible significance of effect, which is not significant.

Building and Paddock, Cefn Faes (PRN 1814)

5.2.53 The remains of a rectangular stone building approximately 6 m x 9.5 m comprising large boulder and rubble walls to a max height of 0.5 m with a probable entrance in the middle of the north side. Attached to it on the south side is a large rectangular level platform, 18.7 m long and varying between 10 to 13 m in width. They are the remains of a farm building and paddock for corralling animals, probably medieval in date. The asset holds archaeological interest as it may help to inform on medieval settlement within Gwynedd. The asset is of medium value.

5.2.54 The access route to Tower 4ZC012 crosses the area of the building and paddock. As the access route crosses pasture, trackway panels laid directly onto the ground may be required. This may involve ground disturbance such as stripping of topsoil for the new temporary access tracks. This would impact on any buried archaeological remains that might exist in the area. However, given the limited width of the Wider Works in this area of the Wider Works, it is unlikely that total loss of these assets will occur. The magnitude of impact is low, which on assets of medium value, would result in a minor adverse significance of effect, which is not significant.

Sheepfold, South of Gwylan, Trawsfynydd (PRN 90398)

5.2.55 A sheepfold is marked on the Ordnance Survey first edition map of 1889. The value of the asset is derived from its archaeological interest as evidence of post-medieval agricultural activity during 19th century and even earlier. The asset would likely hold local interest and is of low value.

5.2.56 The site of the sheepfold is in the working area for Tower 4ZC006. The movement of vehicles would potentially impact on any buried archaeological remains that might exist in the area. Given the extent of the Wider Works in this area, it is unlikely that total loss of these assets will occur. The magnitude of impact is low, which on assets of low value, would result in a negligible significance of effect, which is not significant.

Mitigation and Residual Effects

5.2.57 Potential impacts to below ground archaeological remains that cannot be avoided by design can be mitigated through a proportionate programme of archaeological investigation, recording and reporting, such as archaeological monitoring and/or excavation in advance of the works, which would form additional mitigation measures. This would not result in a reduction in the physical impacts to archaeological remains but would mitigate the impact by providing a greater understanding and appreciation of the evidential value of archaeological remains.

5.2.58 No significant effect has been identified on the setting of the World Heritage Site, Scheduled Monuments, Listed Buildings or historic landscapes, during the Wider Works.

5.2.59 The scope of mitigation will be set out in a WSI and agreed with the Archaeological Advisor for Heneb, prior to works commencing.

Summary

5.2.60 The assessment examined previously recorded assets within a 500 m Study Area of the Wider Works, with data collected from Heneb (non-designated historic assets) and within a wider 3 km Study Area with data collected both from Heneb and Cadw (designated historic assets). This data was supplemented by a review of historic mapping, documentary sources, and a walkover survey.

5.2.61 All identified impacts are limited to physical impacts during the Wider Works. No significant effect has been identified on potential below ground archaeological remains along the Wider Works.

5.2.62 A full programme of mitigation will be agreed with Heneb Gwynedd Archaeology prior to works commencing and will be covered by a WSI.

5.3 Air Quality and Emissions

5.3.1 This section presents an assessment of the likely Air Quality and Emissions effects that could arise from the Wider Works as described in **Chapter 2: Wider Works**.

5.3.2 This section is supported by figures and appendices as listed below:

- **Figure 6.5.5: Construction Dust Assessment.**
- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

Legislation and Planning Policy

5.3.3 This section summarises the legislation and planning policy framework that is relevant to the Air Quality and Emissions assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

5.3.4 The following legislation is relevant to Air Quality and Emissions:

- The Environment Act 1995 (Ref 5.48).
- The Environment (Wales) Act 2016 (Ref 5.6).
- The Environment Act 2021 (Ref 5.5).
- Environment (Air Quality and Soundscapes) (Wales) Act 2024 (Ref 5.49).
- The Air Quality (Wales) Regulations 2000 (Ref 5.50).
- The 2007 Air Quality (England) Strategy England, Scotland, Wales and Northern Ireland (Ref 5.51).
- The Air Quality Standards Regulations 2010 as amended (Ref 5.52).
- The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (Ref 5.53).
- Well-being of Future Generations (Wales) Act 2015 (Ref 5.54).

5.3.5 **Table 5-4** provides the Air Quality Standards (AQS) and Air Quality Objectives (AQO) relevant to this assessment.

Table 5-4 – Relevant AQS and AQO

Pollutant	Averaging period	Value (micrograms per metre cubed (µg/m^3))
Nitrogen Dioxide (NO_2)	Annual mean	40
	1-hour mean (not to be exceeded more than 18 times per year)	200
Particulate Matter (PM_{10})	Annual mean	40
	24-hour mean (not to be exceeded more than 35 times per year)	50
$PM_{2.5}$	Annual mean	20
	Annual mean (by 2040)	10
	Interim target (by end of January 2028)	12

National Policy

5.3.6 The following national policy is relevant to Air Quality and Emissions:

- PPW – Edition 12 (Ref 5.18).
- The Clean Air Plan for Wales (Ref 5.55).
- Future Wales – The National Plan 2040 (Ref 5.20).

Local Policy

5.3.7 The following local policy is relevant to Air Quality and Emissions:

- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Ref 5.22).
- Eryri Local Development Plan 2016 – 2031 (Ref 5.23).

Guidance

5.3.8 The following guidance is relevant to Air Quality and Emissions:

- IAQM Guidance on the assessment of dust from demolition and construction (Reg 5.33).
- IAQM and Environmental Protection UK (EPUK) Land-Use Planning & Development Control: Planning For Air Quality (Ref 5.56).

Assumptions and Limitations

5.3.9 The dust assessment methodology is informed by professional judgement, including consideration of estimates of the works activities, vehicle movements and number of plant at Wider Works site, the area of ground to be worked, and the volume of structures erected. Where exact data has not been available, precautionary assumptions have been made to ensure the potential for impact is over-estimated, rather than under-estimated.

Future Baseline

5.3.10 Future baseline conditions are assumed to be similar to existing baseline conditions although concentrations of NO_2 and NO_X are expected to fall in future years, due to decarbonisation of the transport and energy sectors. This decrease is likely to be larger in urban areas and smaller in rural areas. Notwithstanding, it is acknowledged that in the absence of the Project, reconductoring works and fibre wrap replacement of fibre optic cable would take place as part of maintenance of the existing overhead line and would result in the same or similar effects as identified in this assessment.

Methodology

5.3.11 Details of the technical methods used to determine the baseline conditions, sensitivity of receptors, magnitude of effects and the significance criteria that have been used for the Air Quality assessment can be found in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

Potential Effects

5.3.12 The anticipated effects resulting from the change to Air Quality during the Wider Works are outlined as follows.

5.3.13 The sources of potential Air Quality and Emissions effects during the works include:

- Dust emissions.
- Site plant emissions.

5.3.14 Works traffic emissions are not considered as they have been scoped out of this assessment. The expected number of vehicle movements generated by the Wider Works will not exceed the criteria set by guidance to suggest a significant effect from such emissions could occur.

Dust Emissions

5.3.15 The assessment considers the potential impact for the area surrounding the Wider Works site.

5.3.16 As described in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, the dust and particulate matter assessment follows the step-by-step approach set out in relevant IAQM guidance (Ref 5.51). This process is summarised in the sub-sections below.

Step 1: Screen the requirement for a detailed assessment

5.3.17 Step 1 of the IAQM construction dust guidance is to screen the requirement for a more detailed assessment. According to the guidance, no further assessment is required if there are no receptors within a specified distance of the works. The screening distances set by the IAQM guidance (Ref 5.33) are:

- Receptors sensitive to amenity and human health impacts within 250 m of the Wider Works site or within 50 m of a public road used by works traffic that is within 250 m of the site entrance(s).
- Nature conservation receptors within 50 m of the Wider Works site or within 50 m of a public road used by works traffic that is within 250 m of the site entrance(s).

5.3.18 **Figure 6.5.5** shows a 250 m buffer from the edge of the Wider Works site in which human health and amenity receptors may be impacted by work activities. The Wider Works area is predominantly rural, however there are residential properties and other sensitive receptors within 250 m of the Wider Works site.

5.3.19 There are two SAC, four SSSI, one NNR and 25 sites of Ancient Woodland within 20 m of the Wider Works site.

5.3.20 Due to the presence of the high sensitivity amenity, human health receptors and ecologically sensitive sites within the screening distances set by the guidance, the more detailed assessment of dust is required and set out below.

Step 2: Assess the Risk of Dust Impacts

Step 2A: Determine the Dust Emissions Magnitude

5.3.21 Step 2A requires the determination of the dust emission magnitude, as set out in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, which the guidance states is based on the scale of the anticipated works with the following activities: demolition; earthworks; construction (i.e. the building and erection of structures); and trackout (the deposition of dust and particulate matter onto public roads by works vehicles). The dust emission magnitude should be classified as Small, Medium, or Large.

5.3.22 Activities associated with the Wider Works are described in **Chapter 2: Wider Works**. Works include temporary establishment and operation of works compounds, earthworks associated with the reconductoring of overhead lines and the upgrading of access roads.

Demolition

5.3.23 There will be no demolition works and this activity is not considered further in this assessment.

Earthworks

5.3.24 The site is anticipated to require earthworks associated with the removal of topsoil and formation of works compounds and temporary storage. Given that the total area of the Wider Works site is considered to exceed the 110,000 metres squared (m^2) criteria set by the IAQM guidance (Ref 5.57), the dust emissions magnitude effect for earthworks is Large.

Construction

5.3.25 The Wider Works do not involve building and erection of any permanent structures and the majority of the works will be undertaken using materials with a low potential to generate dust. Also, whilst the area of the Wider Works site is large, the volume of work is limited to small sections within that Wider Works site. As such, and in line with the IAQM construction dust guidance (Ref 5.33), summarised in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, the dust emissions magnitude assigned for construction is Small.

Trackout

5.3.26 Trackout is associated with the deposition of mud and potentially dusty material onto the public network from works vehicles leaving site. On average, there is anticipated to be more than two outward works-related HDV (all vehicles >3.5 tonnes) movements per day. This falls within the lowest dust emissions category defined in the IAQM construction dust guidance (Ref 5.33), summarised in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. The dust emission magnitude for trackout is therefore assigned as Small.

Step 2B: Determine the Sensitivity of the Area

5.3.27 Step 2B of the IAQM construction dust guidance, as described in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, requires the determination of the sensitivity of the area to construction dust impacts. According to the guidance, this is based on the sensitivity of individual receptors, the proximity and number of those receptors, background PM_{10} concentrations and site-specific factors, such as local terrain, meteorology and natural and existing windbreaks.

5.3.28 The IAQM criteria breaks up sensitivity into determining the sensitivity of the area on dust soiling and based on human health sensitivities of PM_{10}. **Table 5-5** summarises the distribution of receptors to dust soiling, **Table 5-6** presents the distribution of receptors which are sensitive to the health effects of PM_{10} and **Table 5-7** shows the distribution of ecological sensitive receptors.

Table 5-5 – Receptors sensitive to dust soiling

Receptor sensitivity	Distance from the Wider Works site			
	0 – 20 m	20 – 50 m	50 – 100 m	100 – 250 m
High	97	110	203	709
Medium	2	7	2	15
Low	2	1	2	5

Table 5-6 – Receptors sensitive to human health effects from PM_{10}

Receptor sensitivity	Distance from the Wider Works site			
	0 – 20 m	20 – 50 m	50 – 100 m	100 – 250 m
High	95	107	200	693
Medium	2	3	3	16
Low	4	4	3	20

Table 5-7 – Receptors sensitive to ecological impacts

Receptor Sensitivity	Distance from the Wider Works site	
	0 – 20 m	20 – 50 m
High	2	0
Medium	4	1
Low	44	4

5.3.29 There are between 10 – 100 high sensitivity amenity and human health receptors within 20 m of the Wider Works site. In line with the IAQM construction dust guidance (Ref 5.33), summarised in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, this equates to an area of High sensitivity for dust soiling amenity impacts.

5.3.30 Background PM_{10} concentrations are estimated to be below 24 µg/m^3 in and <100 high sensitivity receptors within 20 m of the Wider Works site. In line with the IAQM construction dust guidance (Ref 5.33), summarised in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, this equates to an area of Low sensitivity for human health impacts.

5.3.31 There are two high sensitivity nature conservation receptors within 20 m of the Wider Works site: the Afon Gwyrfai a Llyn Cwellyn SAC and the Coedydd Derw a Safleoedd Ystlumod Meirion SAC. In line with the IAQM construction dust guidance, this equates to an area of High sensitivity for nature conservation impacts.

Step 2C: Determine the Risk of Dust Impacts

5.3.32 Step 2C of the IAQM guidance concerns the determination of the risk of dust impacts, which is informed by the dust emission magnitude identified in Step 2A and the sensitivity of the area identified in Step 2B.

5.3.33 In this instance, the Large dust emissions magnitude associated with earthworks, and the High sensitivity of the area to dust soiling and ecology impacts, equates to a High risk of amenity impacts and ecology impacts occurring. Due to the good standard of existing air quality, the Large dust emissions magnitude associated with earthworks, and the Low sensitivity of the area to human health impacts, equates to a Low risk of human health impacts occurring.

5.3.34 The Small dust emissions magnitude assigned to both ‘construction’ and trackout, and the High sensitivity of the area to dust soiling, human health and ecology impacts, equates to a Low risk of amenity, human health and ecology impacts occurring, during these activities.

Works Site Plant and Non-Road Mobile Machinery (NRMM) Emissions

5.3.35 According to the IAQM guidance (Ref 5.33) exhaust emissions from on-site plant (and NRMM) and site traffic are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. This is the case for the Wider Works, due to the transient and intermittent nature of emissions from site plant and NRMM, operating when and where required.

5.3.36 A review of site plant and NRMM machines has deemed that the effect of impacts will not be significant on the receptors considered in this assessment, in line with the IAQM guidance, for the following reasons:

- The very good standard of baseline air quality.
- The transient and intermittent nature of emissions.
- The limited duration of time in which site plant and NRMM emissions will be present at any one location close to sensitive receptors.
- The distance between emissions sources and the nearest high sensitivity receptors at the majority of locations.
- The effectiveness of standard practice emission control measures, including:
  - Use of plant with low NO_X, PM_{10} and $PM_{2.5}$ emissions.
  - Prohibiting unnecessary idling.
  - Prohibiting unnecessary NRMM movements.
  - Keeping plant and NRMM in a good state of repair.

Mitigation and Residual Effects

5.3.37 As discussed in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, the dust assessment follows a step-by-step approach to determine the level of mitigation required to ensure that a significant effect will not occur. Step 3 of the IAQM guidance relates to the level of mitigation required following consideration of the risk of impacts identified during Step 1 and Step 2, which are described in above.

5.3.38 The following mitigation measures are highly recommended by the IAQM and will be adopted during the works:

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the works compound fence. This may be the environment manager or environmental engineer or the site manager.
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authorities when asked.
- Record any exceptional incidents that cause dust or air emissions, either on- or off-site, and the action taken to resolve the situation in the logbook.

- Undertake daily on-site and off-site inspection (including roads), where receptors are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked.
- Carry out regular site inspections to monitor compliance with the WEMP commitments, record inspection results, and make an inspection log available to the Local Authorities when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Sustainable power sources (solar panels etc.) to be used where practicable. Where available, generators are to be low emission with hybrid battery systems (or to current best practice).
- Use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust and particulate matter suppression mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors (if used) and covered skips.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Avoid site runoff of water or mud.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

5.3.39 Step 4 of the IAQM construction dust guidance is to determine whether the effects, after the application of the identified level of mitigation are significant or not. The IAQM guidance states that:

"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'".

5.3.40 The implementation of the identified dust mitigation above will result in the residual effects from the Wider Works being negligible and not significant.

Summary

5.3.41 Existing air quality in the Study Area is of a very good standard, with pollutant concentrations well within the objective values set for the protection of human health. Much of the land within and around the site works is rural in nature. Due to the length of the Wider Works site, there are amenity, air quality and ecology sensitive receptors close enough to the Wider Works site that could be adversely impacted by the works.

5.3.42 The assessment has followed the IAQM guidance on assessing works site air quality impacts. It has determined that, providing all work activities adhere to the mitigation measures listed in this section, the potential magnitude of impacts will be negligible and not significant.

5.3.43 The impact of NRMM emissions is anticipated to be not significant. This is due to the good standard of baseline air quality, the transient and intermittent nature of emissions from this source, the limited duration of time in which such machinery will be operation, and the effectiveness of standard practice emissions control measures.

5.3.44 Works road traffic emissions and operational road traffic emissions impacts were screened out of the assessment. The increase in traffic during the works is such that there is no potential for them to contribute to a significant effect on local air quality and no change is expected for operational road traffic. There is no potential for a significant effect on local air quality from a change in emissions.

5.4 Climate Change

5.4.1 This section presents an assessment of the likely Climate effects that could arise from the work activities described in **Chapter 2: Wider Works**.

5.4.2 The assessment is consistent with the ruling by the Supreme Court in the Finch Case (Ref 5.58), in that it addresses all relevant direct and indirect environmental impacts, whether these are upstream or downstream of the Wider Works.

5.4.3 This section is supported by the appendices as listed below:

- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 6.5.K: Climate Change Risk Assessment.**

Legislation and Planning Policy

5.4.4 This section summarises the legislation and planning policy framework that is relevant to the climate assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

5.4.5 The following legislation is relevant to Climate Change:

- United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement (Ref 5.59).
- UK Nationally Determined Contribution (Ref 5.60).
- Climate Change Act 2008 (as amended) (Ref 5.61).
- The Climate Change (Interim Emissions Targets) (Wales) (Amendment) Regulations 2021 (Ref 5.62).
- Environment (Wales) Act 2016 (Ref 5.6).
- Well-being of Future Generations (Wales) Act 2015 (Ref 5.54)

5.4.6 To align with the requirements of 2017 TCP EIA Regulations') (Ref 3.1), the climate assessment is required to consider the following aspects:

- Greenhouse Gas (GHG) Assessment – considers the impact on the climate of GHG emissions arising from the Wider Works during its lifetime. This considers the Wider Works in the context of the UK and Welsh carbon budgets and how it would affect the ability of the Government to meet its carbon reduction targets.
- Climate Change Risk Assessment (CCRA) – considers the resilience of the Wider Works to climate change impacts, including how the Wider Works are designed to reduce its vulnerability to the projected impacts of climate change.
- In-combination Climate Change Impact (ICCI) Assessment – the combined impact of the Wider Works and future climate change on receptors in the surrounding environment.

National Policy

5.4.7 The following national policy is relevant to Climate Change:

- Working Together to Reach Net Zero: All-Wales Plan April 2022 Update (Ref 5.63).
- PPW – Edition 12 (February 2024) (Ref 5.18).
- Future Wales – the National Plan 2040 (Ref 5.20).

Guidance

5.4.8 The following guidance is relevant to Climate Change:

- Institute of Environmental Management and Assessment (IEMA)[1] – Environmental Impact Assessment Guide to: Climate Change Resilience and Adaption (Ref 5.64).
- IEMA – Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition (Ref 5.65).

Assumptions and Limitations

GHG Assessment

5.4.9 Granular activity data required for a quantitative GHG assessment was not available to inform the assessment. Consequently, a qualitative approach was adopted to identify GHG emission sources. Further details on the approach taken for the qualitative GHG Assessment are provided in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

CCRA

5.4.10 The start date of the CCRA will be the start of the Wider Works. In line with the programme, the Wider Works are assumed to take place from Q1 2026 to Q2 2029.

5.4.11 For the purposes of the CCRA a reference operational period of 40 years was assumed, in accordance with asset lifespans.

5.4.12 The CCRA has been carried out using the most up to date, reliable and publicly available climate data. Information has also been taken from internal documents provided by the client and relevant ES chapters.

[1] The Institute of Environmental Management and Assessment (IEMA) changed its name to the Institute of Sustainability and Environmental Professionals on 17 July 2025. At the time of writing, guidance was still IEMA branded and will be referred to throughout this volume.

5.4.13 Climate change projections, by their very nature, are associated with a range of assumptions and limitations. There are inherent uncertainties associated with climate projections. Climate projections are not predictions of the future but are rather a projection based on the best available data and science.

5.4.14 UK Climate Projections 2018 (UKCP18) data were collected for the periods 2020–2049, 2040–2069, and 2070–2099 to adequately account for both the short-term Wider Works and the long-term operational period of the refurbished overhead line.

5.4.15 A 'high' emissions scenario, Representative Concentration Pathway (RCP) 8.5[2], has been used in the assessment. This reflects a high level of GHG emissions, which has been applied at the 10%, 50%, and 90% probability levels to assess the impact of climate change during the Wider Works and operation of the refurbished overhead line.

Future Baseline

GHG Assessment

5.4.16 The future baseline for assessing the impact of the Wider Works on climate change is based on a 'business as usual' scenario, where the Wider Works are not undertaken. In this scenario, the future baseline assumes the continued operation of the existing transmission and distribution infrastructure.

CCRA and ICCI assessment

5.4.17 The future baseline for the CCRA and ICCI assessments is based on UKCP18 data from the Met Office (Ref 5.66) for the 25 km grid square in which the Wider Works site is located.

5.4.18 This projection data provides probabilistic indications of how global climate change is likely to affect areas of the UK using pre-defined climate variables and time periods. Projected climate data is presented in **Table 5-9**. Climate parameters considered in the CCRA include the following:

- Mean annual temperature.
- Mean summer temperature.
- Mean winter temperature.
- Number of frost days per annum.
- Maximum summer temperature.
- Minimum winter temperature.
- Mean annual precipitation.
- Mean summer precipitation.
- Mean winter precipitation.
- Extreme weather events (e.g. storms).

5.4.19 The historic and future baseline for the site location is presented in **Table 5-8** below.

[2] RCP 8.5 is a high global emissions scenario developed by the Intergovernmental Panel on Climate Change (IPCC), commonly used to assess potential climate impacts in a future with no mitigation of GHG emissions.

5.4.20 For the GHG and the CCRA and ICCI assessments, it is acknowledged that in the absence of the Project, reconductoring works and fibre wrap replacement of fibre optic cable would take place as part of maintenance of the existing overhead line and would result in the same or similar effects as identified in this assessment.

Table 5-8 – Climate change baseline and projection

Climatic variable	Baseline data	Projection (change)				Projected trend	Source
	1981-2010	2020 - 2049	2040 - 2069	2070-2099	Beyond 2100		
Temperature							
Mean annual maximum daily temperature (°C)	12.4	+0.9 (+0.4 to +1.5)	+1.6 (+0.8 to +2.5)	+3.4 (+1.8 to +4.9)	No projection data is available beyond 2100, trend towards increasing temperatures is expected to continue.	↑	UKCP18
Mean summer maximum daily temperature (°C)	17.9	+0.9 (+0.1 to +1.8)	+1.8 (+0.5 to +3.2)	+3.9 (+1.6 to +6.5)		↑	UKCP18
Mean winter minimum daily temperature (°C)	2.2	+0.8 (+0.1 to +1.6)	+1.5 (+0.4 to +2.6)	+2.7 (+1.0 to +4.6)		↑	UKCP18
Number of days of air frost per annum	No data recorded.	Reports have shown that the number of frost air and ground frost days has decreased since the 1960s. Combined with detailed studies, these long-term trends point to a long-term warming trend of the UK's climate and a reduction in cold events.				↓	Met Office
Highest temperature for baseline period (°C)	18.7 (August)	+1.1 (+0.1 to +2.2)	+1.9 (+0.2 to +3.8)	+4.4 (+1.3 to +7.5)	No projection data is available beyond 2100, trend towards increasing temperatures is expected to continue.	↑	UKCP18
Lowest temperature for baseline period (°C)	1.8 (February)	+0.8 (-0.1 to +1.8)	+1.5 (+0.2 to +2.7)	+2.7 (+0.7 to +4.8)		↑	UKCP18

Climatic variable	Baseline data	Projection (change)				Projected trend	Source
	1981-2010	2020 - 2049	2040 - 2069	2070-2099	Beyond 2100		
Precipitation[3]							
Mean annual rainfall (mm)	1944.5	+0.7% (-4.5% to +6.4%)	+1.5% (-5.1% to +8.5%)	+3.2% (-7.0% to +13.8%)	No projection data is available beyond 2100. However, there is potential for a continued slight increase in rainfall overall.	↑	UKCP18
Mean summer rainfall (mm)	143.3	-6.8% (-22.1% to +8.6%)	-15.5% (-35.5% to +4.3%)	-30.8% (-53.9% to -4.6%)	No projection data is available beyond 2100, but the decreasing trend in summer rainfall could potentially continue beyond this period.	↓	UKCP18
Mean winter rainfall (mm)	176.4	+2.4% (-7.3% to +13.5%)	+9.1% (-3.4% to +24.1%)	+18.7% (-2.1% to +43.2%)	No projection data is available beyond 2100, but it is possible that the trend of increasing winter rainfall could persist beyond this period.	↑	UKCP18
Wettest month on average (mm)	220 (October)	+7.8% (-12.6% to +30.4%)	+13.8% (-9.1% to +39.4%)	+17.7% (-14.6% to +58.3%)	No projection data is available beyond 2100. An increase in rainfall during the month of October is possible.	↑	UKCP18

[3] Changes in precipitation across climate projection periods are measured and reported as percentage change (%).

Climatic variable	Baseline data	Projection (change)				Projected trend	Source
	1981-2010	2020 - 2049	2040 - 2069	2070-2099	Beyond 2100		
Driest month on average (mm)	104.7 (May)	+2.8% (-18.0% to +22.6%)	-1.1% (-26.7% to +23.5%)	-9.1% (-41.1% to +24.4%)	No projection data is available beyond 2100. A decrease in rainfall during the month of May is possible.	↓	UKCP18
Other							
Droughts	The Met Office has projected a trend towards drier summers on average, with the trend being stronger under a high GHG emission scenario compared to a low one. However, it is the distribution of rainfall throughout the seasons that will determine UK drought risk (Ref 5.67).					↑	Met Office
Storms	The Met Office projects that climate change will likely lead to more frequent and intense winter storms in the UK, driven by factors such as rising sea surface temperatures and changes in the jet stream. While past data shows no clear trend in storm frequency or intensity, future projections indicate an increase in severe storms, particularly during winter, with stronger winds and heavier rainfall, which could also worsen coastal flooding due to rising sea levels (Ref 5.68).					↑	Met Office
Wildfires	The wildfire hazard is classified as high according to the information that is currently available to the Think Hazard tool (Ref 5.69). This means that there is greater than 50% chance of experiencing weather that could support a hazardous wildfire that may pose some risk of life and property loss in any given year.					↑	Think Hazard

5.4.21 Some of the key trends that were identified from collected quantitative data were an increase in temperature variables, a decline in summer rainfall and an increase in winter rainfall, for all future time periods.

5.4.22 Qualitative climate projection data was also gathered, which is summarised below:

- Heatwaves: Under a high emissions scenario, it is estimated that by the end of the 21st century, all areas of the UK are projected to be warmer with hotter and drier summers likely to become more common (Ref 5.70). According to the World Bank's Think Hazard Tool, the heatwave hazard for the area including the Wider Works site is classified as 'Low' (Ref 5.69).
- Snow fall: The Met Office projects under a moderate and high emissions scenario that regional and local projections show a decrease in falling and lying snow across the UK for the period 2061-2080 relative to the 1981-2000 baseline (Ref 5.69).
- Drought: The Met Office has projected a trend towards drier summers on average, with the trend being stronger under a high GHG emission scenario compared to a low one. However, it is the distribution of rainfall throughout the seasons that will determine UK drought risk (Ref 5.67).
- Frost days per annum: Reports have shown that the number of frost air and ground frost days has decreased since the 1960s. Combined with detailed studies, these long-term trends point to a long-term warming trend of the UK's climate and a reduction in cold events (Ref 5.72).
- Sea level rise: The Met Office predicts sea levels may rise by 98 cm by the end of the 21st century under a high emissions scenario (Ref 5.68). According to the World Bank's Think Hazard Tool, the coastal flood hazard for the area including the Wider Works site is classified as 'High' (Ref 5.71).
- Storms: The Met Office projects that climate change will likely lead to more frequent and intense winter storms in the UK, driven by factors such as rising sea surface temperatures and changes in the jet stream. While past data shows no clear trend in storm frequency or intensity, future projections indicate an increase in severe storms, particularly during winter, with stronger winds and heavier rainfall, which could also worsen coastal flooding due to rising sea levels (Ref 5.72).
- Wildfires: Climate projections indicate that wildfire risk may increase in future decades. UKCP18 indicates a large future increase in hazardous fire weather conditions in summer. At 2°C global warming, the probability of days with "very high" fire danger is predicted to double compared to the historical period of 1981-2010. This probability increases by a factor of 5 at 4°C of warming (Ref 5.72). According to the World Bank's Think Hazard Tool, the wildfire hazard for the area including the Wider Works site is classified as 'Medium' (Ref 5.69).
- Landslides: According to the World Bank's Think Hazard Tool, the landslide hazard for the area including the Wider Works site is classified as 'Medium' (Ref 5.69).

Methodology

5.4.23 The purpose of the climate assessment is to assess the potential effects of the Wider Works on the climate and of climate change on the Wider Works.

5.4.24 The methodology is provided for both the CCRA and GHG Assessments. It includes details of the technical methodology used to determine baseline conditions, receptor sensitivity, magnitude of effects, and significance criteria for the climate assessments.

These details can be found in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

Potential Effects

5.4.25 A separate GHG assessment for the Wider Works was not undertaken, as no materially different emissions sources or working methods were identified that would justify a standalone assessment.

5.4.26 However, a separate CCRA was undertaken for the Wider Works to reflect its specific location, design, and exposure to climate-related hazards. The associated risk assessment is presented in **Volume 8, Appendix 6.5.K: Climate Change Risk Assessment**.

GHG Assessment

5.4.27 The GHG emissions are reported in line with the lifecycle stages of the civil engineering works assessment, as outlined in the Publicly Available Specification 2080:2023 Guidance (Ref 5.73). Additionally, the Royal Institution of Chartered Surveyors Guidance for whole life GHG assessments (Ref 5.74) have been integrated to inform the scope and reporting framework of the GHG assessment.

5.4.28 **Table 5-9** qualitatively summarises the GHG emissions associated with the Wider Works and operation of the refurbished overhead line.

Table 5-9 – Qualitative lifecycle GHG assessment of the Wider Works

Lifecycle stage	Qualitative assessment	Estimated GHG % contribution to the Wider Works
Pre-works stage (A0)	The pre-works stage is expected to contribute very minimally to the overall GHG emissions of the Wider Works.	<1%
Product stage (A1 – A3)	Based on previous lifecycle GHG assessments, embodied GHG emissions from the product stage are expected to represent the largest source of emissions over the lifecycle of the Wider Works. This stage includes the extraction, transportation, and manufacturing of raw materials. However, due to the scale of the Wider Works, emissions from the product stage are not anticipated to be substantial in the context of Wales and UK carbon budgets. Furthermore, GHG emissions associated with the product stage are expected to be controlled and reduced through various mechanisms, including NGET's internal climate policies and relevant national policies, as discussed below.	~70%
Works process stage (A4 – A5)	Based on similar-scale projects, GHG emissions from carrying out the Wider Works are expected to be the second largest contributor of GHG emissions.	~20%

Lifecycle stage	Qualitative assessment	Estimated GHG % contribution to the Wider Works
	A WEMP will be prepared before start of the Wider Works, including measures like sourcing local materials to reduce GHG emissions.	
Operation stage (B1 – B7)	The operational stage of the Wider Works is expected to be the third largest contributor to GHG emissions, primarily due to maintenance activities, equipment replacement, transmission losses, and worker transport. However, energy consumption during operation is anticipated to be minimal, as the works are designed to transmit rather than consume electricity. Operational energy use will be limited to control systems and auxiliary services, which are energy-efficient and require only a small amount of power. As such, associated emissions are expected to be negligible, particularly in the context of the ongoing decarbonisation of the electricity grid. Operational emissions are therefore unlikely to materially affect the overall GHG profile of the Wider Works. While these emissions are unlikely to substantially impact the UK's or Wales' net-zero targets, the Wider Works are expected to deliver wider indirect benefits by enabling the expansion of onshore and offshore renewables. This will support continued decarbonisation of the UK power grid through increased generation of low-carbon electricity. Operational efficiency will be maintained through regular inspections, with component replacement undertaken as needed to prevent deterioration.	~10%

5.4.29 As detailed in **Table 5-9**, it is estimated that the bulk of emissions (estimated around 95%) from the Wider Works will come from the A0 – A5 lifecycle stages.

5.4.30 NGET is committed to achieving carbon neutrality across all its construction projects by 2025/26 (Ref 5.75), focusing on reducing the carbon intensity of construction materials and the phasing out of diesel-powered works plant. In addition, NGET has committed to phasing out the sending of waste to land fill by 2028 (Ref 5.75).

5.4.31 The Transport Decarbonisation Plan (TDP) (Ref 5.76) supports national net-zero targets by committing to reduce transport-related GHG emissions. The TDP outlines measures to support a shift towards low-carbon transportation, such as increasing the use of electric vehicles. GHG emissions from worker and materials transportation are anticipated to decrease in line with government policy in the TDP.

5.4.32 The UK Government's Net Zero Strategy (Ref 5.77) sets out plans to reduce GHG emissions across all sectors to meet national net-zero targets. This includes initiatives to decarbonise construction material supply chains. As a result, GHG emissions from maintenance activities, including component replacements, are expected to decrease.

5.4.33 The Project will support the UK's transition to net zero by providing the necessary infrastructure to enable the increased transmission of low-carbon electricity. As

renewable energy generation increasingly replaces higher-carbon energy sources, this aligns with the UK Government's goal of achieving an electricity system independent of fossil fuels by 2035.

5.4.34 IEMA GHG Assessment guidance (Ref 5.65) states that assessing the significance of a project's impact on the climate should not be based solely on the magnitude of emissions emitted, but also on how these emissions align with national policies and the path towards net zero. The assessment must therefore determine whether the Wider Works could negatively affect Wales and the UK's ability to meet legislated carbon budgets and net-zero targets.

5.4.35 Based on a qualitative assessment, the magnitude of GHG emissions is not material in the context of the UK and Welsh carbon budgets. The Wider Works are consistent with applicable UK and Welsh Government climate change policy and legislation. In accordance with the IEMA GHG Guidance (see **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**), the effect of GHG emissions associated with the Wider Works is deemed minor adverse (not significant).

5.4.36 While not legally binding, NGET has also demonstrated a commitment to reduce GHG emissions through the setting of validated Science-Based Targets (Ref 5.78), aligning NGET with the Paris Commitment (Ref 5.59). These targets are as follows:

- Scope 1[4] and 2[5] GHG emissions: Reduce absolute scope 1 and 2 emissions by 60% by 2030 from a 2018 base year.
  - Scope 1 emissions from power generation: Reduce scope 1 GHG emissions by 90% per Megawatt hour (MWh) by 2030 and 92% per MWh by 2033, both from a 2018 base year.
  - Other Scope 1 and 2 emissions: Reduce all other absolute Scope 1 and 2 GHG emissions by 50% by 2030 from the 2018 base year.

5.4.37 Scope 3[6] emissions: Reduce Scope 3 category 3 GHG emissions from all generated and sold electricity by 86% per MWh by 2033 from a 2018 base year and reduce all absolute scope 3 GHG emissions by 37.5% by 2033 from a 2018 base year.

CCRA

5.4.38 This section summarises the climate risks identified for the Wider Works. The majority of climate risks relate to changes in temperature and precipitation, flooding, storm events, drought, and wildfires.

5.4.39 The Wider Works will be designed and operated in accordance with the risks and mitigation measures outlined in NGETs Climate Resilience Strategy (Ref 5.79). This approach enables the Wider Works to withstand the climatic conditions projected for the end of its design life. Additionally, a WEMP will be developed to incorporate measures aimed at reducing the impact of climate-related risks during the Wider Works

5.4.40 In accordance with IEMA CCRA Guidance (Ref 5.64) (see **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**), the climate risks for Wider Works are assessed as

[4] Scope 1: Direct emissions from sources that are owned or controlled by the organisation.

[5] Scope 2: Indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting organisation.

[6] Scope 3: All other indirect emissions that occur in the value chain of the reporting company, both upstream and downstream. Scope 3 Category 3 covers the upstream extraction, production, transport, and transmission losses associated with the fuels and energy purchased by the company.

moderate, unlikely, or rare. While the climate event is possible, its occurrence is infrequent, with some evidence suggesting a potential shift from business as usual. The likelihood of the event is estimated to be between 0% and 50%. The consequence of climate change impacts was identified as insignificant and minor in terms of their impact on the Wider Works. As a result, the climate risks identified during the Wider Works and operation of the refurbished overhead line are not significant.

Mitigation and Residual Effects

GHG Assessment

5.4.41 As no significant impacts have been identified in the GHG Assessment, no additional mitigation is required. WEMPs will be produced before the Wider Works commence and will include mitigation measures to reduce GHG emissions . The standard measures typically implemented by NGET to reduce GHG emissions during the Wider Works and operation of the refurbished overhead line are sufficient.

CCRA

5.4.42 No significant climate risks were identified in the CCRA for the Wider Works component of the Project. No specific mitigation measures are required for these components of the Wider Works.

Summary

5.4.43 Overall, the GHG impact of the Wider Works has been evaluated as minor adverse (not significant). The Project will bring long-term benefits to the UK and Wales by upgrading energy-related infrastructure. This is essential for integrating new sources of renewable energy and upgrading NGETs capacity to facilitate the electrification of the broader economy. This, in turn, will support the transition away from fossil fuels and help achieve net-zero emissions across Wales and the UK.

5.4.44 The CCRA did not identify any significant climate risks for the Wider Works components of the Project. The climate risks for these components of the Wider Works are considered not significant.

6. In-Combination and Cumulative Effects

6.1 Introduction

6.1.1 This chapter introduces the likely in-combination and cumulative effects that could arise from the Wider Works as described in **Chapter 2: Wider Works** and how it is assessed in this ES.

6.1.2 In-combination effects occur where a single receptor is affected by more than one type of effect arising from different aspects of the Wider Works. An example of an in-combination effect would be where a local resident is affected by temporary visual effects of construction works, noise and traffic disruption during the construction of a scheme, with the resulting effect being greater than each individual effect alone.

6.2 Legislation and Planning Policy

6.2.1 This section summarises the legislation and planning policy framework that is relevant to the In-combination and cumulative effects assessment. Full details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

6.2.2 The following legislation is relevant to In-combination effects:

- 2017 TCP EIA Regulations (Ref 6.1).
- Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2017 (Ref 6.2)

National Policy

6.2.3 The national policy is relevant to In-combination and cumulative effects:

- PPW – Edition 12 (Ref 6.3).
- Future Wales: The National Plan 2040 (Ref 6.4).

6.3 Methodology

6.3.1 There is no established EIA methodology for assessing and quantifying the effects of a number of individual impacts on the same sensitive receptors. The methodology used to undertake the in-combination effects assessment is based on previous experience and professional judgement. A full description of the methodology used for in-combination effects is outlined in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

6.3.2 A range of public sector and industry-led guidance is available on the approach to assessing in-combination effects but at present there is no single, agreed industry standard method. Whilst the Wider Works or the wider Project as a whole are not classed as a Nationally Significant Infrastructure Project, the approach to the assessment of in-combination effects broadly follows the Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment guidance (Ref 6.5). A

full description of the methodology used for in-combination effects is outlined in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

6.4 Assessment

6.4.1 A full assessment of the potential in-combination and cumulative effects is undertaken at a Project level and is discussed in **Volume 7: The Project and Cumulative Effects.**

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Figures

Figure 6.2.1: Location of the Wider Works.

Figure 6.2.2: Wider Works Site.

Figure 6.5.1: Statutory Designated Sites for Nature Conservation in the Wider Area.

Figure 6.5.2: Statutory Designated Sites for Nature Conservation.

Figure 6.5.3: Non-Statutory Designated Sites for Nature Conservation.

Figure 6.5.4: Habitats of Principal Importance and Ancient Woodland.

Figure 6.5.5: Construction Dust Assessment.

Appendix A: Study Area and Baseline

A.1 Landscape and Visual Amenity

Study Area

A.1.1 Guidelines for Landscape and Visual Impact Assessment (GLVIA3) Third Edition (Ref A.1) suggests that the Study Area should be proportionate to the Wider Works and may include refinement by professional judgement. In the case of the Wider Works, the Study Area has been defined using professional judgement as a 1 km radius from the Wider Works site.

Designations

A.1.2 Part of the indicative Wider Works site lies within the Eryri National Park. There are a number of ecological and cultural heritage designations within the vicinity of the Wider Works, and these can inform landscape value and are of importance in terms of visitor destinations and visual amenity for the area.

Landscape Character

A.1.3 The landform of the indicative Wider Works site is undulating with a high point of 230 m AOD at Tower 4ZC113, west of Penffridd, dropping to 10 m AOD at the Wern CSEC as the Wider Work continues east towards the Trawsfynydd Substation the elevation increases from 3 m AOD at the proposed Minffordd CSEC to 180 m ADO near Trawsfynydd Substation. The landform of the Study Area is gently undulating with small hills and typical of the lowlands areas in the foothills of the Eryri National Park. Land use is predominantly agricultural, consisting of a series of medium scale fields. There are occasional woodland blocks and linear belts of woodland along the many watercourses within the area. These provide a local sense of enclosure within an otherwise open agricultural landscape.

National Landscape Character

A.1.4 The Wider Works site and the Study Area lies within the National Character Areas (NLCA) 03 Arfon, 05 Tremadoc Bay and 06 Eryri. The key characteristics for each of the NLCA is set out below.

A.1.5 NLCA 03 Arfon key characteristics are:

- *“Pastoral land cover – predominates;*
- *Lowland – upland contrasts – from the intimate, wooded, lush, soft, sheltered lowland and pastures to the exposed, open, heavily grazed, marginal upland fringes; and*
- *mosaic of small fields becomes apparent, primarily pastoral, bounded by combinations of hedgerows, cloddiau and stone walls, and interspersed with hedgerow trees and small coverts.”*

A.1.6 NLCA 05 Tremadoc Bay key characteristics are:

- *"a lowland coastal region of exceptional interest and scenic beauty".*
- *The NLCA "forms the land between the sea and the mountains".*
- *"Hemmed in by steeply rising uplands of both Llŷn and Snowdonia".*
- *Areas of "Lowland pastoral and hill sheep grazing" to the west where there is a "more extensive lowland hinterland".*
- *"The fantasy Italianate village of Portmerion" is a significant tourist destination near Minfforfdd.*

A.1.7 NLCA 06 Eryri key characteristics are:

- *"A mountainous topography;*
- *An upland character to principle land cover elements - including hill sheep grazing, forestry, heather dominated moorland and upland grassland;*
- *Sparsely populated/few large settlements;*
- *Rivers, lakes, waterfalls; and*
- *Sublime, picturesque, iconic visual and sensory landscape of great drama".*

The Registered Landscapes of Outstanding and of Special Interest in Wales

A.1.8 The Wider Works site is in the Trawsfynydd Basin and Cwm Prysor Registered Historic Landscape where the landscape is described as *"characteristically upland and remote area of Wales".* The Wider Works site is also in the Dinorwig Registered Historic Landscape, where many of the elements associated with this listing including the *"scenic grandeur of the area"* remain as part of the rural character of the area.

Local Landscape Character – Gwynedd Council

A.1.9 LANDMAP is a tool produced by Natural Resources Wales to inform sustainable decision making and planning, from national to local levels (Ref A.2). LANDMAP describes the key characteristics, qualities, and components of the datasets relating to geological, visual, historic, sensory and cultural elements. These are often used to understand and inform landscape character at the local level.

A.1.10 At the Unitary authority level, the Wider works site and Study Area incorporates Landscape Character Areas (LCAs). LCAs are defined in the Gwynedd Landscape Strategy Update 2012. The following LCA lie within the Wider Works site and Study Area:

- LCA 4 Caernarfon-Coast and Plateau.
- LCA 5 Snowden Massif.
- LCA 8 Pwllheli-Criccieth Coast.
- LCA 9 Porthmadog.
- LCA 10 Central Llyn.

A.1.11 LCA 04 Caernarfon-Coast and Plateau is characterised by:

- *"A long broad fringe adjacent to the Menai Coast LCA, extending to the upland fringes of MoelTryfan and Mynydd y Cillgwyn; and*

- *Character of landscape influenced by glacial actions and resultant deposits and landforms".*

A.1.12 LCA 5 Snowden Massif is characterised by:

- *"Small, fringe area on the western edge of Snowdonia National Park.*
- *Upland, mountain character.*
- *Includes former slate workings in DyffrynNantlle.*
- *Vernacular boundaries: dry stone walls".*

A.1.13 LCA 8 Pwllheli-Criccieth Coast is characterised by:

- *"Narrow, lower lying coastal plain lying below the 50 metre contour*
- *Dissected by a number of small river valleys such as the AfonErch, AfonDwyfach and AfonDwyfor*
- *Area exhibits a variety of habitats from outer tidal areas, dune systems extending inland to more typical agricultural landscapes*
- *Tourism is an important feature within the landscape ranging from the 19th century development of Pwllheli and Criccieth to the more recent holiday camp at Penychain".*

A.1.14 LCA 9 Porthmadog is characterised by:

- *"The area directly abuts Snowdonia National Park and offers spectacular views of the mountain core".*
- *Consider the "area as a 'buffer zone' to the National Park and ensure all development proposals address this relationship".*
- *The "flat, open character" around the Glaslyn estuary is visually prominent requiring "visual impacts are minimised by careful consideration of location and views from the wider landscape".*

A.1.15 LCA 10 Central Llyn is characterised by:

- *"Generally homogenous area interspersed by prominent hills".*
- *"Essentially agricultural in nature".*
- *"forms an important buffer zone between the Llŷn Area of Outstanding Natural Beauty to the west and Snowdonia National Park to the east.".*
- *"Views into and out from the area from the two protected landscapes are therefore very important".*

Local Landscape and Seascape Character – Snowdonia National Park Authority

A.1.16 Seascape Character Area (SCA) and LCA as defined in the Snowdonia National Park Supplementary Planning Guidance 7 – Landscape and Seascapes of Eryri (Ref A.3) consider the setting of the National Park. The following SCA and LCA lie within the Wider Works site and Study Area:

- LCA 04 Moel Hebog Uplands.

- LCA 08 Vale of Ffestiniog.
- LCA 10 Morfa Harlech.
- LCA 12 Ardudwy Coastal Hinterland.
- LCA 13 Rhinog Mountains
- SCA 19 Criccieth to Mochhras.
- SCA 20 Porthmadog and Glaslyn Estuary.
- SCA 21 Dwyryd Estuary and Morfa Harlech.

A.1.17 LCA 04 Moel Hebog Uplands is characterised by:

- *"Classic U-shaped valleys carving through the mountains;*
- *Unenclosed mountain summits surrounded by large-scale regular enclosures of ffridd;*
- *Rough common land grazing by sheep on the mountains, with semi-improved pastures and rough grassland fields on lower slopes; and*
- *Valleys defined by a small-scale historic field pattern".*

A.1.18 LCA 08 Vale of Ffestiniog is characterised by:

- *"Complex topography defined by the broad tidal form of the Afon Dwyryd and its tributaries".*
- *"Steep valley sides cloaked in woodland".*
- *"A strongly rural landscape framed by scenic views of the surrounding mountains".*

A.1.19 LCA 10 Morfa Harlech is characterised by:

- *"Low-lying coastal landscape.*
- *Landscape dominated by the expanse of the Dwyryd Estuary.*
- *Extensive views across the broad open dunes and estuary of the Afon Glaslyn, backed by the mountains of the Snowdonia core and the distinctive outline of the Llŷn Peninsula".*

A.1.20 LCA 12 Ardudwy Coastal Hinterland is characterised by:

- *"A rolling landscape of seaward facing hills.*
- *Extensive broadleaved woodland cover clothing valley sides".*

A.1.21 LCA 13 The Rhinog Mountains is characterised by:

- "*Numerous cliffs and rock outcrops forming a rugged topography.*
- *Frequent glacial oligotrophic lakes feeding numerous fast-flowing streams draining from the uplands.*
- *A number of prominent conifer plantations and extensive areas of both broadleaved and coniferous woodland on valley sides*".

A.1.22 SCA 19 Criccieth to Mochhras is characterised by:

- *"Open and large scale views of wide beaches and Tremadog bay.*
- *Sweeping bay focuses views along it.*
- *landscape setting creates a dramatic and relatively wild backdrop to views from the coast and from the sea".*

A.1.23 SCA 20 Porthmadog and Glaslyn Estuary is characterised by:

- *"A broad, flat valley floor landform.*
- *Land use almost entirely grazing marsh.*
- *A large scale landscape, with views framed by surrounding hills, creating a sense of enclosure.*
- *a relatively inaccessible landscape with a sense of remoteness and tranquillity.*
- *views from surrounding hills, the visual and physical relationship between this SCA and the sea can be appreciated".*

A.1.24 SCA 21 Dwyryd Estuary and Morfa Harlech is characterised by:

- *"Predominantly low-lying landform, comprising the broad estuary and its associated marshes and dunes.*
- *Views inland are picturesque, with attractive compositions of valley floor and surrounding hills.*
- *The SCA is also an important feature in views from the surrounding hills, where it appears in its coastal context".*

Local Marine Character – Natural Resources Wales

A.1.25 Marine Character Area (MCA) as defined in the National Seascape Assessment for Wales – Natural Resources Wales (Ref A.4) consider the marine characteristics of the Welsh coastline. Only one MCA lies within the Wider Works Study Area:

A.1.26 MCA 14 Tremadog Bay & Dwyryd Estuary is characterised by:

- *"Sweeping, shallow bay with wide sandy beaches.*
- *Long views across the length of the sweeping bay create an open quality and large scale."*

Landscape Designations

Statutory Designations

A.1.27 Part of the Study Area lies within the Eryri National Park described in more detail below.

A.1.28 The Snowdonia National Park Authority published Cynllun Eryri The Snowdonia National Park Partnership Plan 2020 (the Plan), a "partnership plan to identify and protect Eryri's special qualities for the future" in September 2020 (Ref A.5).

A.1.29 The Plan sets out an approach to conserve and enhance the National Park's natural beauty, wildlife and cultural heritage which is a statutory function of National Parks. The plan seeks to promote opportunities for the understanding and enjoyment of the special qualities of National Parks by the public.

A.1.30 The Plan also sets out the special qualities of Eryri National Park. Those focused on landscape and visual elements are listed in **Table A-1** below along with a summary description.

Table A-1 – Special qualities of the Eryri National Park

Special quality	Summary
1. Diverse Landscapes	The special quality description in the plan sets out the "diverse mix of landscapes many of which are highly valued for their natural beauty and tranquillity" noting how this historically has, and continues to "inspire artists, scientists, residents and visitors".
5. Tranquillity & Solitude	The special quality description in the plan sets out the perceptual qualities of *"silence, tranquillity and solitude"* afforded by the landscape that promote *"vital aspects of health, well-being and personal reflection"*.
6. Extensive Recreational Opportunities	The special quality description in the plan sets out the *"Extensive opportunities for recreation, leisure and learning for people of all ages and abilities."* The plan also states how it will make activities in Eryri more accessible.
7. Historic Landscapes	The special quality description in the plan reinforces the cultural and perceptual benefits the National Park brings by connecting visitors to their historic identity and continuing to create a sense of place through our ongoing relationship and continued engagement with the landscape of the National Park.

Non-statutory Designations

A.1.31 There are non-statutory landscape designations covering the Wider Works site and Study Area. These include Special Landscape Area (SLA), Historic Landscape, Registered Historic Parks and Gardens and a World Heritage site designation.

A.1.32 PPW – Edition 12 (Ref A.6) defines SLAs as "non-statutory designations that define local areas of high landscape importance, which may be unique, exceptional or distinctive to the area. Planning authorities should apply these designations where there is good reason to believe that normal planning policies cannot provide the necessary protection."

A.1.33 SLAs are defined in the Review of Special Landscape Areas in Gwynedd and Anglesey (Ref A.7). The following SLAs lie within the Project Study Area:

- SLA 02 Porthmadog and Tremadog Bay.
- SLA 03 Glaslyn & Dywryd Estuary Landscapes.
- SLA 07 North-Western Fringes of Snowdonia.

A.1.34 SLA 02 Porthmadog and Tremadog Bay is considered "a distinctive landscape which forms a transition from the mountains of Snowdonia to the coast". Its special qualities include:

- *"The rural and tranquil character of the landscape.*

- *The long, sweeping views across the Afon Glaslyn estuary, Traeth Bach, the coast and the mountains of Snowdonia.*
- *The landscape's important role as a setting to Snowdonia National Park".*

A.1.35 SLA 03 Glaslyn & Dwyryd Estuary Landscapes is considered "a culturally and visually distinctive landscape". Its special qualities include:

- *"The peaceful, rural and generally open character of the landscape.*
- *The strong cultural and visual relationship between the SLA and the National Park.*
- *The historic and cultural significance of the landscape, entirely within the Aberglaslyn Landscape of Outstanding Historic Interest in Wales".*

A.1.36 SLA 07 North-Western Fringes of Snowdonia is considered "a culturally and visually distinctive landscape". Its special qualities include:

- *"Hill summits provide expansive views across the surrounding landscapes.*
- *Large tracts of unenclosed rough grazing land, scrub and heathland.*
- *Include the dramatic relicts of the slate quarrying industry which contribute to the landscape's strong cultural heritage and its distinctive sense of place*".

A.1.37 Cadw has produced a non-statutory Register of Landscapes of Historic Interest in Wales. There are three historic landscape areas in the Study Area:

- HLW (Gw) 2 Ardudwy *"has retained a natural integrity as a territory, probably since prehistoric times, because topography has strongly constrained both access and settlement in the area"* (Ref A.8).
- HLW (Gw) 7 Aberglaslyn comprises *"the former tidal estuary at the mouth of the River Glaslyn which flows south from Snowdonia into Tremadog Bay. The area represents probably one of the most ambitious 19th century land reclamation schemes, certainly in Wales, if not in Britain"* (Ref A.9).
- HLW (GW) 9 Nantlle Valley comprises *"glaciated valley with steeply rising sides, the area contains extensive and well-preserved remains associated with the industrial extraction of slate, which, because of the way in which the quarrying was organised, has created a landscape of distinctly different character to those of the other slate areas"* (Ref A.10).

A.1.38 There are two Registered Historic Parks and Gardens within the Study Area. Cadw considers registration to help "manage change and protect the park or garden, its setting and its features from unsympathetic works that could damage its special interest". Registered Historic Parks and Gardens of interest are as follows:

- Former Trawsfynydd Nuclear Power Station.
- Wern.

Visual Amenity

A.1.39 Visual receptors are the people who would potentially be affected by changes to views or visual amenity as a result of the Wider Works. Visual receptors can be static or dynamic and can be largely placed in the following groups:

- Residents within settlements and rural properties.

- People using recreational routes such as footpaths and cycleways.
- People at work, including those working in the landscape.
- People in vehicles and others using public roads.

A.2 Ecology and Nature Conservation

Study Area

A.2.1 The Study Area was defined to include ecological features that may be at risk from direct and indirect impacts that might arise from the Wider Works and is the initial basis for determining a Zone of Influence (ZoI). CIEEM guidance (Ref A.11) defines a ZoI as:

"…the area over which biodiversity features may be affected by biophysical changes as a result of the proposed project and associated activities".

A.2.2 The ZoI is based on the:

- Nature of the Wider Works, activities, and the potential for effects during the Wider Works.
- Nature of the land use and nearby habitats, the number of watercourses and water bodies, their connectivity in and outside of the Wider Works area and how they may be used by different species or species groups.
- Habitats, behaviours and preferences of different species or species groups and whether these could be affected both spatially and temporally.

A.2.3 All designated sites, sensitive habitats, and protected and notable species that occur in the ecological ZoI of the Wider Works have been considered in this assessment.

A.2.4 For the Wider Works site, the ecological Study Areas are defined below:

- 10 km from the Wider Works site for all statutory designated sites of international nature conservation value (e.g. Special Areas Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites, as well as proposed or potential sites). This is extended to 30 km for SAC designated for bats, or where bats are listed as a qualifying feature.
- 5 km from the Wider Works site for other statutory designated sites of national nature conservation value (e.g. Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR)).
- 2 km from the Wider Works site for non-statutory sites for nature conservation (e.g. Wildlife Sites (WS), candidate Wildlife Site (cWS) and Sites of Importance for Nature Conservation (SINC)).
- In the Wider Works site or 50 m from the Wider Works site for ancient woodland.
- In the Wider Works site or 50 m from the Wider Works site for records of Invasive Non-Native Species (INNS), and protected and notable plant/fungi species (dated 2014 onwards to cover at least the last 10 years).
- In the Wider Works site or 50 m from the Wider Works site for Habitats of Principal Importance (HoPI), as listed under Section 7 of the Environment (Wales) Act 2016 (Ref A.12).

- 2 km from the Wider Works site for records of protected and notable species or the closest hydrologically connected monitoring location in the case of aquatic ecological records (dated 2014 onwards to cover at least the last 10 years).
- 2 km from the Wider Works site for the status of water bodies subject to the Water Framework Directive (WFD) (Ref A.13) see **Volume 8, Appendix 6.5.M**. As water pollution may spread downstream or there could be downstream flood risk effects, to identify all the relevant ecological, chemical and physical features of water bodies that may be impacted and that contribute to the water bodies' overall importance, the Study Area was extended beyond 2 km for hydrologically-linked surface water bodies.
- In the Wider Works site or 50 m from the Wider Works site for ancient and veteran trees not in areas of ancient woodland.
- In the Wider Works site or 50 m from the Wider Works site for other habitats not listed above.

A.2.5 These distances reflect standard professional good practice for identification of features within and external to the Wider Works site that could be affected.

A.2.6 The avoidance of potential effects through implementation of good practice measures, such as those that would be contained in a site-specific WEMP (e.g. control measures for dust suppression), have been considered during the determination of the ZoI for ecological features and biophysical changes.

A.2.7 The ZoI with regard to habitats and sedentary species lost to site clearance for the Wider Works are easiest to define as they should be restricted to the footprint of the Wider Works. However, for those biophysical changes that can extend beyond the boundary of the Wider Works, the ZoI has been determined by the nature of the biophysical change and the sensitivity to this change of the ecological feature in question. For example, a badger (*Meles meles)* may be subject to disturbance from light pollution impacting their sett or foraging area, whereas other species, such as certain bat species, may avoid lit areas by a much greater distance.

A.2.8 Taking account of this, the extent of the ZoI beyond the Wider Works site was determined based on professional judgement, with reference to data (where available) relating to the sensitivity of specific ecological features, and in consultation with other environmental technical specialists (i.e. for air quality and water).

A.2.9 The Study Areas described are representative of the ZoI for those receptors identified as important ecological features (IEF[7]).

Methods

Desk Study

A.2.10 A desk study was carried out to identify sites designated for nature conservation and records of protected or notable habitats and species (important ecology features) and INNS that are relevant to Wider Works site. The desk study also identified the status of

[7] Important ecological features are habitats, species, ecosystems and their functions and processes that are of conservation importance and could potentially be affected by the proposed works.

water bodies covered by the WFD (Ref A.13) to identify those likely to be impacted from an ecological perspective.

A.2.11 The Study Areas apply to different ecological features.

A.2.12 Cofnod, the local biological records centre, was contacted in June 2023 to obtain information on pre-existing ecological data (i.e. locations of locally designated sites, HoPI, ancient woodland and existing records of protected and notable species, and INNS within 2 km of the Wider Works site). This data was refreshed on a six monthly basis; the latest refresh was November 2024, which has been used to inform the assessment.

A.2.13 Online data resources that were reviewed for the desk study include:

- Natural Resources Wales website (Ref A.14) for information on statutory designated sites of nature conservation interest and to confirm reasons for their designation.
- Joint Nature Conservation Committee (JNCC) website (Ref A.15) for site information and designation details of SACs, SPAs and Ramsar Sites identified in the relevant Study Areas.
- DataMapWales website (Ref A.16) for information on the location and extent of HoPI.
- Woodland Trust Ancient Tree Inventory website (Ref A.17) for records of veteran and ancient trees in and up to 50 m from the Wider Works site.
- National Biodiversity Network (NBN) Atlas website (Ref A.18) for records of notable aquatic species and INNS, where data licensing conditions allow.
- NRW DataMapWales website for records of fish, macroinvertebrate and macrophytes (Ref A.19).
- Natur Gwynedd Biodiversity Action Plan (BAP) website (Ref A.20) for biodiversity action plan habitats and species.
- Eryri BAP website (Ref A.21) for biodiversity action plans relating to habitats and species.

A.2.14 Protected and notable habitats and species comprise those listed under Schedules 1, 5 and 8 of the WCA 1981 (as amended) (Ref A.22); Schedules 2, 4 and 5 of the Habitats Regulations (Ref A.23); and species and HoPI for nature conservation in Wales listed pursuant to Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Other habitats and species are also considered and have been assessed, e.g. those included in national, regional or local Red Data Books and Lists but not protected by legislation.

A.2.15 Records of INNS, as listed under Schedule 9 of the WCA 1981 (as amended) (Ref A.22), have been considered when assessing the likely significant ecological effects of the Wider Works. The presence of such species generally has a detrimental impact on natural habitats and legislation is in place to control their spread. It is important to consider the potential for the spread of INNS, the likely significant effects resulting from this, and any mitigation measures.

A.2.16 The removal of such species may be desirable and beneficial for ecology. Likewise, measures will be taken to ensure that invasive species are not inadvertently brought onto the Wider Works site. The species concerned are not relevant ecological features

for the purposes of EcIA but need to be considered for legislative compliance (see **Volume 8, Appendix 1.4.A: Legislation, Policy and Guidance**), for their potential to contribute to the amplification of any adverse effects arising from the Wider Works, or their potential to conflict with biodiversity mitigation including enhancement proposals.

Field Surveys

A.2.17 The requirement for ecological field surveys was informed by the desk study and extended Phase 1 habitat survey (as presented in **Volume 8, Appendix 6.5.A: Habitats Report**) in addition to analysis of the Wider Works design.

A.2.18 Ecological surveys were carried out to characterise the ecological baseline within the relevant Survey Areas, as presented in **Table A-2**. Further details regarding the definition of these Survey Areas and any limitations are presented in the associated survey reports within **Volume 8, Appendices 6.5.A – 6.5.F.**

A.2.19 Aquatic scoping surveys were completed to assess the quality of targeted aquatic habitats (watercourses and ditches). This involved conducting a habitat appraisal at water bodies being crossed within the Study Area and so may be impacted, and to assess the potential for water bodies to support protected or notable species to inform further survey work. Where deemed suitable, aquatic macroinvertebrate, macrophyte, and fish surveys were scoped in on selected water bodies (described in **Volume 8, Appendix 6.5.B: Aquatic Survey Report**).

A.2.20 Detailed field surveys for terrestrial invertebrates were not conducted. The Wider Works site contains a variety of habitats that, in certain locations, could support a notable invertebrate assemblage including marsh fritillary. Habitat that may support notable terrestrial invertebrates or invertebrate communities (e.g. riverbanks, wetland, species-rich marshy grassland, woodland, and scrub) will be retained. Vegetation will be cut to ground level around existing tower bases to allow access however this will be temporary in nature and reinstated where needed.

A.2.21 Detailed field surveys for reptiles were not carried out. Most habitats used by reptiles (such as field margins, hedgerow bases, ditches and woodland areas) will be retained and protected during the Wider Works or will be subject to only temporary disturbance. Consideration for any embedded mitigation required for reptiles, which would be secured through production of a WEMP, is included in **Section 5.1** of this report.

A.2.22 Separate species-specific surveys for hedgehog, brown hare and polecat were not undertaken as part of the assessment, as observations of these species have been obtained through the desk study and recorded during other ecological field surveys of the Wider Works site. Hedgehog, brown hare and polecat are assumed to be present. Consideration for any embedded mitigation required for hedgehog, brown hare and polecat, which would be secured through production of a WEMP, is included in **Section 5.1** of this report.

A.2.23 Surveys for hazel dormouse (*Muscardinus avellanarius*) were not undertaken as part of the assessment. No existing records of this species were identified during the desk study (including designated sites that support hazel dormouse). Hazel dormouse are considered rare in North Wales and confined to known pockets of populations that are regularly monitored, none of which are in the Wider Works site (Ref A.24).

A.2.24 Surveys for breeding and non-breeding birds were not carried out due to the minimal predicted impacts on breeding and non-breeding birds. In addition, vegetation

management will be localised around tower bases and for compounds, and will be temporary in nature. Breeding and non-breeding birds will use the habitats in or adjacent to the Wider Works site for foraging or nesting and will have access to habitat of equal and better quality in the surrounding landscape. Mitigation, including timings of works outside the typical bird nesting season (March to August, inclusive) and pre-works checks (including vegetation, and pylons for nesting peregrine), will be implemented for the Wider Works, thus safeguard birds from negative effects.

A.2.25 Detailed bat roost assessment surveys were not carried out as tree removal locations were unknown at the time of the ecology baseline surveys. There will be no removal of buildings or structures in the Wider Works site. Tree removal or pruning will be minimal and restricted to areas directly around existing pylons or to allow access on access roads or haul roads (at Towers 4ZC006, 4ZC016, 4ZC023, 4ZC026, 4ZC045, 4ZC046, 4ZC059, 4ZC060 and 4ZC061). No tree clearance is anticipated between Towers 4ZC070 and 4ZC140.

A.2.26 Surveys have not been carried out in specific relation to more widespread amphibian species (e.g. common frog (*Rana temporaria*), common toad (*Bufo bufo*), smooth newt (*Lissotriton vulgaris*) and palmate newt (*Lissotriton helveticus*)). Ponds and ditches in and close to the Wider Works site may support more widespread amphibian species and observations of these species have been obtained through the desk study. The Wider Works site also contains suitable terrestrial habitats for these species throughout in the form of grassland, hedgerows, scrub and woodland. The mitigation proposed for reptiles and other species, which would be secured through production of a WEMP, will also reduce potential effects on common amphibian species, along with the retention of and buffers applied to the ponds and ditches present in the Wider Works site.

A.2.27 **Table A-2** presents details of the coverage, methods and survey periods of field surveys conducted in their relevant Survey Areas.

Table A-2 – Ecological surveys undertaken to characterise baseline conditions

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
Extended Phase 1 habitat survey. INNS were also recorded where observed. Presented in **Volume 8, Appendix 6.5.A: Habitats Report.**	Extended Phase 1 habitat survey was conducted in accordance with the JNCC method (Ref A.25).	May and September 2024.	Wider Works site and to a maximum of 50 m from the Wider Works site, where viewable or access was permitted.	Habitats that are likely to be impacted by the Wider Works are in the Wider Works site.
Targeted habitat survey. Presented in **Volume 8, Appendix 6.5.A: Habitats Report**.	Selected habitats of greater botanical interest, where likely to be impacted by the Wider Works, were surveyed in greater detail (i.e. detailed botanical species lists to ensure correct classification of habitats) to help inform mitigation.	July to September 2024.	The habitats subjected to enhanced vegetation surveys in the Wider Works site were identified from the initial Phase 1 habitat survey and desk study information.	Habitats that are likely to be impacted by the Wider Works are in the Wider Works site.
Targeted surveys for waxcaps	Cofnod returned records of waxcaps in the boundary of the Wider Works between Towers 4ZC013 – 4ZC015. Target surveys for waxcaps were carried out between Towers 4ZC013 – 4ZC015 in suitable habitat. Any incidental sights of waxcaps were recorded during the extended Phase 1 habitat surveys. Locations of waxcaps recorded during field surveys and desk study records are shown on **Figure 6.5.A.5 in Volume 8, Appendix 6.5.A Habitats Report**.	October 2024.	Suitable habitats between Towers 4ZC013 – 4ZC15.	No further records of waxcaps were returned from Cofnod.
Aquatic scoping survey.	Walking accessible and safe stretches of targeted water body banks, noting	June – September 2024.	In the Wider Works site.	The surveys targeted main water bodies in the Wider

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
Presented in **Volume 8, Appendix 6.5.B: Aquatic Survey Report**.	physical habitat features (such as riparian cover, channel substrate, habitat type, modifications, and in-stream vegetation) to assess the potential for water bodies to support protected, notable or invasive species and inform further survey work.			Works site that are being crossed and subject to impacts, such as culverting.
Aquatic macrophyte surveys Presented in **Volume 8, Appendix 6.5.B: Aquatic Survey Report.**	During the aquatic scoping surveys where the habitat was deemed suitable, surveys for macrophytes were carried out over a 100 m representative stretch of watercourses following the UK Technical Advisory Group (UKTAG) River Assessment Method for Macrophytes and Phytobenthos (Ref A.26).	June – September 2024.	In the Wider Works site.	The surveys targeted main water bodies in the Wider Works site that are being crossed and subject to impacts, such as culverting.
Aquatic macroinvertebrate surveys. Presented in **Volume 8, Appendix 6.5.B: Aquatic Survey Report**.	During the aquatic scoping surveys where the habitat was deemed suitable, surveys for macroinvertebrates were carried out over a 100 m representative stretch of watercourses following the UKTAG River Assessment Methods for Benthic Invertebrate Fauna (Ref A.27).	Spring (March to May) and Autumn (September to November) 2024.	In the Wider Works site.	The surveys targeted main water bodies in the Wider Works site that are being crossed and subject to impacts, such as culverting.
Fish surveys. Presented in **Volume 8, Appendix 6.5.B: Aquatic Survey Report**	During the aquatic scoping surveys where habitat was deemed suitable for protected and notable species, surveys for fish were scoped in. These surveys were undertaken over a 100 m representable stretch of watercourses following the UKTAG Rivers Assessment Methods for Fish Fauna (Ref A.28).	June – September 2024.	In the Wider Works site.	The surveys targeted main water bodies in the Wider Works site that are being crossed and subject to impacts, such as culverting.

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
Bats – Ground Level Tree Assessments (GLTA) Presented in **Volume 8, Appendix 6.5.C: Bat Survey Report.**	GLTA were undertaken of targeted trees, following guidance as described in the Bat Conservation Trust (BCT) guidelines (Ref A.29).	July 2024.	Trees around Towers 4ZC005 – 4ZC027, plus a 50 m buffer.	The surveys targeted trees which are likely to be impacted by the Wider Works. Information was collated on the location of trees identified as potentially affected and were assessed for their suitability for roosting bats where information was available.
Bats – Foraging/Commuting Presented in **Volume 8, Appendix 6.5.C: Bat Survey Report.**	Night-time bat walkover (NBW) surveys were undertaken in area where the edge of the Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat Sites SAC overlaps with the Wider Works site between Towers 4ZC014 – 4ZC016. Surveys were carried out in line with the BCT 2023 guidelines (Ref A.29). The surveys were supplemented by the deployment of one static bat detector in spring, summer and autumn.	July, August and September 2024.	One targeted area within the Wider Works site.	Loss of habitat suitable for foraging and commuting bats will be minimal and will be temporary. The NBW Survey Area and survey effort was determined through consideration of the nature and areas of the Wider Works, in accordance with the criteria described in the BCT guidelines (Ref A.29) and also informed by statutory designated sites and their qualifying features.
Badger. Presented in **Volume 8, Appendix 6.5.D: Badger Survey Report (Confidential).**	A walkover survey searching for signs of badger activity as described in the Mammal Society's Surveying Badgers publication (Ref A.30). The survey was	Between May and September 2024.	Wider Works site and up to a maximum of 50 m from the Wider Works site, where viewable or access was permitted.	50 m is an appropriate Survey Area as it covers the 30 m distance at which direct effects could occur and acknowledges that setts present beyond this

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
	carried out in combination within the extended Phase 1 habitat survey.			distance are unlikely to be impacted by the Wider Works, e.g. through disturbance.
Riparian Mammals (Otter and water vole). Presented in **Volume 8, Appendix 6.5.E: Riparian Mammals Survey Report (Confidential).**	The survey involved a habitat suitability assessment and searching for field signs for otter and water vole along targeted watercourses where impacts were likely, in accordance with standard industry guidance (Ref A.31, Ref A.32, Ref A.33, Ref A.34 and Ref A.35).	For water vole, two surveys were undertaken on each targeted watercourse and ditch: one between April and June 2024 and the second between July and September 2024 where access was possible. Otter surveys were undertaken in combination with the water vole surveys.	All water bodies in the Wider Works site between Towers 4ZC005 – 4ZC027 and between Towers 4ZC044 – 4ZC070 were assessed for their suitability to support water vole and otter.	The Survey Area is sufficient to determine presence or absence of otter and water vole and to assess potential impacts on both species as a result of the Wider Works.
Great crested newt Habitat Suitability Index (HSI) Presented in **Volume 8, Appendix 6.5.F: Great Crested Newt Survey Report.**	An HSI survey of accessible water bodies in and up to 250 m of the Wider Works site, and with habitat connectivity, was undertaken in accordance with Oldham et al (Ref A.36). The aim of the survey was to evaluate the suitability of water bodies to support great crested newt.	May and June 2024.	Wider Works site and up to 250 m from the Wider Works site.	The Survey Area is sufficient to determine presence or absence of great crested newt and to assess potential impacts on this species. Terrestrial habitat disturbance associated with the Wider Works site is localised and relatively small (typically between

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
				500 and 5,000 m^2 at each tower location), with vegetation temporarily managed or removed to facilitate the works and then replaced. There will also be temporary access routes required for each working area location; however, these will primarily use existing farm tracks and roads wherever available. No ponds will be directly impacted.
Great crested newt eDNA. Presented in **Volume 8, Appendix 6.5.F: Great Crested Newt Survey Report.**	Further to the results of the great crested newt HSI survey, an eDNA survey was carried out at accessible water bodies that were identified as potentially suitable for this species.	May and June 2024.	Wider Works and up to 250 m from Wider Works.	As above
INNS Presented in **Volume 8, Appendix 6.5.A: Habitats Report.**	INNS species observations were recorded when noted during the Phase 1 habitat survey. They will also be recorded in pre-works surveys and during the works.	Between May and September 2024.	Wider Works site and to a maximum of 50 m from the Wider Works site, where viewable or access was permitted.	All areas of the Wider Works site will require ongoing INNS monitoring to avoid the spread of any INNS species before, during and after the works.

Statutory Sites Designated for Biodiversity Importance

A.2.28 There are 17 international statutory sites for nature conservation (i.e. SAC, SPA and Ramsar sites) in the 10 km Study Area and one additional SAC designated for bats within 30 km of the Wider Works site.

A.2.29 Fifty other statutory designated sites for nature conservation (SSSI, NNR, LNR) are in the 5 km Study Area.

A.2.30 The locations of these statutory sites are shown in **Figure 6.5.1** and **Figure 6.5.2.** Designation details of all statutorily designated sites are summarised in **Volume 8, Appendix 6.5.G: Statutory Designated Site Citations**.

Non-Statutory Sites Designated for Biodiversity Importance

A.2.31 There are 282 non-statutory sites designated for nature conservation within the 2 km Study Area and 42 are in the Wider Works site.

A.2.32 These sites have been designated as WS and cWS for their biodiversity value at a local level and are known to have, or have the potential for supporting, value to a wide variety of protected and ecologically important species or habitats. It is noted that cWS have not yet been designated, but are considered within this report, as they are being considered for designation and may become so within the lifetime of the Wider Works.

A.2.33 These sites are shown on **Figure 6.5.3** and are summarised in **Volume 8, Appendix 6.5.G: Statutory Designated Site Citations.**

Wildlife Trust Sites

A.2.34 There are two North Wales Wildlife Trust (NWWT) sites in the 2 km Study Area - Gwaith Powdwr 0.76 km north-west of the Wider Works site and Bryn Ifan 1.97 km west of the Wider Works site (shown in **Figure 6.5.3**).

Ancient Woodland

A.2.35 There are 19 sites of Ancient Woodland in the Study Area, comprising six sites of Restored Ancient Woodland, 10 sites of Ancient Semi-Natural Woodland and three sites of Ancient Woodland of Unknown Category.

A.2.36 A review of the Woodland Trust, Ancient Tree Inventory (Ref A.17) indicates two ancient, and four veteran trees in the Wider Works site.

A.2.37 The Arboricultural assessment (**Volume 8, Appendix 6.5.H: High Level Arboricultural Impact Assessment**) identified four veteran trees at Tower 4ZC044 and along the access track in the Wider Works site.

Habitats of Principal Importance (HoPI)

A.2.38 Data supplied by Cofnod and Datamap Wales (Ref A.16) identified the following potential HoPI in the Study Area. The locations of these habitats are shown in **Figure 6.5.4**:

- Blanket bog between Towers 4ZC020 – 4ZC021, including partially in the working areas around the towers (this area was surveyed and the habitat recorded as Purple moor-grass and rush pasture).
- Coastal floodplain and grazing marsh around Tower 4ZC027, extending southwards and immediately adjacent to Tower 4ZC044.
- Lowland dry acid grassland, numerous areas of this habitat throughout the Wider Works site, including in the working areas around the towers.
- Lowland fens and reedbeds, between Towers 4ZC010 – 4ZC11, 4ZC016 – 4ZC019, 4ZC023 – 4ZC027, south of Tower 4ZC062, east of Tower 4ZC122 and south-west of Tower 4ZC127. Also partially in working area around Tower 4ZC011, 4ZC017 – 4ZC019, 4ZC023 and 4ZC026.
- Lowland heathland between Towers 4ZC016 – 4ZC026, 4ZC060 – 4ZC061, 4ZC075 – 4ZC076, 4ZC080 – 4ZC081, 4ZC082 – 4ZC083 and north-east of Tower 4ZC070. Also partially in working area around Tower 4ZC016, 4ZC018 and 4ZC020 – 4ZC024.
- Purple moor-grass and rush pasture, numerous areas of this habitat throughout Wider Works site, including in the working areas around the towers.
- Raised bog between Towers 4ZC020 – 4ZC021, including partially in the working areas around the towers (this area was surveyed and the habitat recorded as Purple moor-grass and rush pasture).
- Traditional orchard between Towers 4ZC099 – 4ZC100 and just north of Tower 4ZC100, including in the working area (this area was surveyed and the habitat recorded as scrub, grassland and bracken).
- Rivers: (Afon Tafarn-helyg, Afon Prysor, Afon ElynNant, yr Efail, Afon Bontfaen, Afon Cedran, Afon Rhyhalltt, Afon Cegin, Afon Dwyfor, Nant yr Afon-oer, Afon Dwyfach, Afon Llyfni, Afon Gwyrfai and Afon Llyfon and their tributaries) throughout the Wider Works site.

Broad Terrestrial Habitats

A.2.39 The broad terrestrial habitat types present in the Wider Works site were identified during the Phase 1 habitat survey. These habitats were further defined by detailed habitat surveys, where required, such as for selected grassland areas, see **Volume 8, Appendix 6.5.A: Habitats Report.**

A.2.40 **Table A-3** presents a summary of the habitats present in Wider Works site and an evaluation including importance.

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Table A-3 – Broad habitat types in Wider Works and their biodiversity importance

Habitat	Biodiversity importance	Rationale
A1.1.1 Semi-natural broadleaved woodland	Up to County (Medium)	Numerous areas of semi-natural woodland are present throughout the Wider Works site, the majority qualifies as HoPI: Upland oakwood, Lowland mixed deciduous woodland, Wet woodland or Wood pasture. Wood pasture and parkland, Upland oakwood, Wet woodland and Lowland mixed deciduous woodland are HoPI listed under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Upland oakwood and Wet woodland are listed in the Gwynedd BAP (Ref A.20).
A1.1.2 - Broadleaved woodland - plantation	Local (Low)	A single parcel of sycamore plantation is present between Towers 4ZC061 – 4ZC062. Not a HoPI.
A1.3.1 - Mixed woodland - semi-natural	Local (Low)	A small section of mixed semi-natural woodland is present between Towers 4ZC006 – 4ZC009. Not a HoPI.
A1.3.2 - Mixed woodland - plantation	Local (Low)	A single small copse of mixed plantation woodland is present between Towers 4ZC063 – 4ZC064, with non-native conifers and natural native species regeneration. Not a HoPI.
A2.1 Dense or continuous scrub and A2.2 Scattered scrub	Site (Very Low)	Common and widespread. Numerous areas of scrub are present throughout the Wider Works site. Not a HoPI.
A3.1 - Broadleaved parkland or scattered trees	National (High) for veteran or ancient trees. Otherwise of Site (Very Low) to Local (Low) importance	Not a HoPI, but ancient and veteran trees are irreplaceable habitat Scattered broadleaved trees are present throughout the Wider Works site, predominantly at field boundaries, and regularly forming linear features providing connectivity throughout the landscape.

Habitat	Biodiversity importance	Rationale
A3.2 - Coniferous parkland or scattered trees	Local (Low)	Irregular, non-native coniferous trees are present at field boundaries. Not a HoPI.
A4.2 - Coniferous woodland - recently felled	Site (Very low)	An area of recently felled conifer plantation is present adjacent to Tower 4ZC009. Not a HoPI.
B1.1 - Acid grassland - unimproved	Local (Low)	A single parcel of unimproved acid grassland is present around Tower 4ZC015, in a clearing at the edge of woodland. Lowland dry acidic grassland is a HoPI.
B1.2 - Acid grassland - semi-improved	Up to County (Medium)	Numerous areas of acidic grassland are present with some evidence of nutrient enrichment (semi-improved). Many of these grasslands qualify as Lowland dry acidic grassland HoPI. The acidic grassland between Towers 4ZC013 – 4ZC015 were found to contain at least three species of waxcap and other grassland fungi.
B2.1 - Neutral grassland – unimproved	Up to County (Medium)	A single species-rich, unimproved grassland is present just south of Tower 4ZC120. This qualifies as Lowland meadow HoPI.
B2.2 - Neutral grassland - semi-improved	Local (Low)	Numerous areas of neutral grassland are present with some evidence of nutrient enrichment (semi-improved). Not an HoPI.
B4 Improved grassland	Site (Very Low)	Numerous areas of improved grassland with a high incidence of competitive grass and forb species are present, either grazed or managed as a grass crop. Not a HoPI.
B5 Marsh or Marshy grassland	Up to County (Medium)	Numerous areas of marshy grassland are present throughout the Wider Works site, the majority of which qualify as either purple moor-grass and rush pastures or Coastal floodplain grazing marsh HoPI.
B6 Poor semi-improved grassland	Site (Very Low)	Numerous areas of species-poor, semi-improved grassland are present, either grazed or managed as a grass crop. Not a HoPI.

Habitat	Biodiversity importance	Rationale
C1.1 - Bracken – continuous	Site (Very Low)	Numerous areas of dense bracken are present, either at field boundaries or as part of a heathland and acid grassland mosaic. Where part of a mosaic, it usually contributes to the HoPI (Lowland dry acid grassland or Lowland heathland).
C3.1 - Other tall herb and fern – ruderal	Site (Very Low)	Numerous isolated areas of dense tall ruderal herbs are present, generally adjacent to highways. Not a HoPI.
D2 - Wet dwarf shrub heath	Up to County (Medium)	Small examples of this habitat are present in marshy grassland habitats, and a larger expanse is part of a Lowland heath mosaic between Towers 4ZC016 – 4ZC019: It qualifies as Lowland fen HoPI in this area and contributes to other adjacent HoPIs (purple moor-grass rush pasture and Lowland heath) in other areas.
D5 - Dry heath and acid grassland	Up to County (Medium)	Isolated patches of dry heath contribute to wider heathland mosaics, particularly between Towers 4ZC016 – 4ZC018. It qualifies as Lowland heathland HoPI.
D6 - Wet heath and acid grassland	Up to County (Medium)	An area of wet heath and acid grassland mosaic is present between Towers 4ZC109 – 4ZC110, where it qualifies as Lowland heathland HoPI.
E2.1 - Flush and spring - acid and neutral flush	Up to County (Medium)	Isolated patches of acidic flush are present in marshy grassland and fen habitats, contributing to purple moor-grass and rush pasture and Lowland fen HoPIs. The majority of these are found between Towers 4ZC081 – 4ZC084.
E3 – Fen	Up to County (Medium)	Small examples of this habitat are present in marshy grassland habitats (E3.2 Fen - basin mire, contributing to purple moor-grass and rush pasture HoPI) and adjacent to watercourses (E3.2 -Fen - flood plain mire, qualifying as Lowland fen HoPI). A larger expanse is part of a Lowland heath mosaic between Towers 4ZC016 – 4ZC019 (E3.1 Fen - Valley mire): It qualifies as Lowland fen HoPI in this area.
G1 – Standing water	Local (Low)	The Llyn Tecwyn Uchaf reservoir is in the Wider Works site between Towers 4ZC021 – 4ZC022. There are several ponds in the Wider Works site, largely small ephemeral ponds. Any ponds in the Wider Works site will be retained. Ponds can be defined as permanent (or seasonal) water bodies up to 2 ha in extent and qualify as being a HoPI if they meet one or more criteria for UKBAP classification (Ref A.37), including supporting species of high conservation

Habitat	Biodiversity importance	Rationale
		importance. These ponds are generally very shallow and densely vegetated. Drainage ditches holding standing water are also in the Wider Works site. No botanical species of high conservation importance were recorded in association with these water bodies. Water bodies in the Wider Works site and in the wider Survey Area are unlikely to reach the required level to fulfil the criteria of a HoPI and are of no more than Local importance.
G2 Running water (including rivers and field drains and streams)	The Afon Prysor is of International importance forming a component of Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC, and also Coedydd De Dyffryn Maentwrog SSSI and Ceunant Llennyrch NNR. Afon Gwyrfai is of National importance forming a component of Afon Gwyrfai a Llyn Cwellyn SAC and also Afon Gwyrfai a Llyn Cwellyn SSSI. Larger watercourses are up to County (Medium) importance. Smaller watercourses are of Local (Low) importance only.	Rivers are HoPI listed under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). River corridors are listed in the Gwynedd BAP (Ref A.20). Numerous streams were present throughout the surveys. Some with slow or no-perceptible flows (in marshy grassland and Wet heath habitats, and some faster flowing streams with rocky substrates). Some larger rivers (up to 15 m width) were also recorded. Smaller watercourses and streams are common and widespread throughout the Wider Works site and are not a HoPI.
J1.1 – Cultivated and disturbed land – arable	Arable – Site (Very Low)	A low abundance of arable land was recorded in the Wider Works site, limited to a low number of arable fields. Not a HoPI, given the lack of botanical diversity.

Habitat	Biodiversity importance	Rationale
J1.2 – Cultivated and disturbed land – amenity grassland	Site (Very Low)	Present throughout the Wider Works site. Not a HoPI, given the lack of botanical diversity.
J2.1.2 Intact and defunct hedge – species-poor	Up to County (Medium)	Hedges are present throughout the Wider Works site and are HoPI.
J2.1.1 Intact and defunct hedge – native species-rich	Up to County (Medium)	Hedges are present throughout the Wider Works sites and are HoPI.
J2.5 Wall	Site (Very Low)	Numerous drystone walls bisect farmland and act as boundaries to heathland and woodland habitat. Not a HoPI.
J2.6 Dry ditch	Site (Very Low)	Common and widespread. Not a HoPI. Some open field drains were found to be dry during surveys; they are mapped as dry ditches but may hold water periodically through wetter periods.
J2.8 Earth bank	Up to County (Medium)	Many of the field boundaries are earth banks, or Cloddaia; historic field boundaries with stone and earth (usually with stock fences atop). These features provide significant ecological value, and many feature more floristically diverse habitats than the adjacent field parcels; species of lower nutrient input or remnant woodland indicator species.
J3.6 Buildings	Site (Very Low)	Numerous buildings (agricultural and residential) are present in the Wider Works site.
J4 Bare ground	Site (Very Low)	Common and widespread. Not a HoPI. Some patches of bare ground are present due to farming practice (poaching and vehicle access) – the majority of this habitat is unmapped and included in adjacent habitat descriptions.
Hardstanding	N/A	Not considered in the assessment further. Numerous hardstanding features are present: from sealed major highways, to unsealed access tracks.

Legally Protected and Notable Species and INNS

A.2.41 The desk study returned records of protected and notable species within the 2 km Study Area for the preceding 10 years. These protected and notable species, including species of biodiversity importance are summarised in relevant technical reports, included as **Volume 8, Appendices 6.5.A**.

A.2.42 **Table A-4** presents a summary of the protected or notable animal species that have been identified as present, or potentially present, within the Wider Works site. The table also presents an evaluation of importance of each species or species group and associated rationale. Full descriptions of the baseline conditions are presented in **Volume 8, Appendices 6.5.A to 6.5.F.**

Table A-4 – Summary of baseline details for legally protected and notable species, alongside assessment of biodiversity importance and rationale

Ecological feature	Baseline detail	Biodiversity importance	Rationale
Terrestrial invertebrates	The desk study returned records of over 120 notable terrestrial invertebrate species in the 2 km Study Area (within the last 10 years, up to 2024). No existing records of notable terrestrial invertebrates were returned for the Wider Works site. There are records of marsh fritillary in the Study Area between Towers 4ZC060 – 4ZC096, the closest record is 0.77 km west. There are no existing records for this species in the Wider Works site. Corsydd Eifionydd/Eifionydd Fens SAC is approximately 0.11 south-west from the Wider Works site (at its closest point, access road, nearest Tower 4ZC081). Marsh fritillary is one of the species that is a primary reason for selection of this site for designation. Marsh fritillary are also noted as being present in Cors Gyfelog NNR (approximately 0.32 km west of the Wider Works site), Cors Gyfelog SSSI (approximately 0.11 km south-west of the Wider Works site), Cors Graianog SSSI (approximately 1.66 km east of the Wider Works site) and Cors y Wlad SSSI (approximately 2.5 km north-west of the Wider Works site). The mosaic of habitats in the Wider Works site are considered to offer suitable habitat to support terrestrial invertebrates, including notable species. Habitat disturbance will be minimal and temporary in nature, and largely	Up to County (Medium)	The desk study recorded 120 species listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). The marsh fritillary receives full protection under the WCA 1981 (Ref A.22) and is listed on the Species Action Plan (SAP) list of the Gwynedd BAP (Ref A.20). Marsh fritillary is also identified as a priority species within the Eryri National Park (Ref A.21).

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	comprise of strimming vegetation of more common and widespread habitats such as improved grassland and scrub. Habitats that could support more notable terrestrial invertebrate species will be retained.		
Aquatic macroinvertebrates as presented in **Volume 8, Appendix 6.5.B: Aquatic Survey Report**.	The desk study returned three records of freshwater pearl mussel *Margaritifera margaritifera* 1.67 km north of the Wider Works, in the Afon Ddu with no records within the Wider Works site. In addition, 14 nationally important species were identified: • The scarce blue-tailed damselfly *Ischnura pumilio*; the nationally rare crane fly *Antocha vitripennis.* • The nationally scarce River Skater *Aquarius najas*, black-legged water-snipefly *Ibisia marginata*, comb-legged sedgesitter *Platycheirus immarginatus*, and the caddis flies *Limnephilus fuscicornis* and *Tinodes assimilis.* • The nationally notable Verbeke's spotwing snailkiller *Chloriona dorsata*, the mayfly *Paraleptophlebia werneri*, and the true flies *Cheilotrichia imbuta, Phylidorea abdominalis*, *Phylidorea longicornis*, *Pilaria meridiana*, and *Tipula yerburyi*. All these records were recorded within 2 km of the Wider Works site (in the last 10 years, up to 2024).	National (High) importance for freshwater pearl mussel. District (Medium) importance for the scarce blue-tailed damselfly, the Iron blue mayfly and the nationally important species.	Freshwater pearl mussel is listed on Schedule 5 of the WCA 1981 (Ref. A.22) and listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12), Annex II and V of the Habitats Directive (Ref A.38), Section 7 species of Principal Importance under the Environment (Wales) Act 2016 (Ref A.12), UKBAP 2007 (Ref A.37), Appendix III of the Bern Convention 1979 (Ref A.39), Global red list post 2001-Critically endangered (Ref A.40) and listed as Nationally rare. Blue-tailed damselfly is listed as Least Concern by the International Union for Conservation of Nature (IUCN) (Ref A.41) and Near Threatened British Odonata Red List 2008 (Ref A.42). This species is also listed under the Gwynedd BAP (Ref A.20). The iron blue mayfly is a Biodiversity Action Plan UK List priority species and a Section 7 species of Principal Importance under the Environment (Wales) Act 2016 (Ref A.12).

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	During the field surveys, four notable species were identified, the mayflies iron blue mayfly *Baetis niger* and *Paraleptophlebia werneri*, the snail *Menetus dilatatus*, and the chronomid *Metalype fragilis.*	Local (Low) for all other species.	
Aquatic macrophytes as presented in **Volume 8, Appendix 6.5.B: Aquatic Survey Report.**	The desk study returned records of two notable aquatic macrophyte/bryophytes species: the pale scalewort *Radula voluta* and corn mint *Mentha arvensis*. These records were recorded within 2 km of the Wider Works site (in the last 10 years, up to 2024). Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat Sites SAC are noted for their watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. No other notable aquatic macrophytes or bryophytes were recorded in the 2 km study area (in the last 10 years, up to 2024). No notable macrophytes nor bryophytes were identified during the field surveys.	County (Medium) importance for pale scalewort. Local (Low) importance for all other species.	Pale scalewort is classified as Near Threatened on the Global Red List post 2001 (Ref A.40) and listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Corn mint is listed as Least Concern on the on the Global Red List post 2001 (Ref A.40).
Fish as presented in **Volume 8, Appendix 6.5.B: Aquatic Survey Report.**	The desk study returned records of four notable fish species: European eel *Anguilla anguilla*, brown/sea trout *Salmo trutta*, Atlantic salmon *Salmo salar* and Lamprey species *Lampetra* sp., a genus of lampreys in the family Petromyzontidae which covers both brook lamprey *Lampetra planeri* and river lamprey *Lampetra fluviatilis* within the UK. Due to the difficulty in identifying between these two species, these are grouped together and	National (High) importance for European eel, brown/sea trout, Atlantic salmon, and lamprey species. Local (Low) importance for all other species	The notable fish identified represent migratory species which are all protected by both national and European legislation (outlined below). In addition, both salmonids (Atlantic salmon and brown/sea trout) are mentioned within the Afon Ddu SSSI citation and have local species action plans. All lamprey species also have local species action plans. All fish and their habitats are protected under the Salmon and Freshwater Fisheries

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	are assumed to be present following the precautionary approach for this assessment. All of these desk study records were recorded within 2 km of the Wider Works site (in the last 10 years, up to 2024). During the field surveys, the same four notable species highlighted in the desk study (European eel, Atlantic salmon, brown/sea trout, and the aforementioned lamprey species) were identified.		Act 1975 (Ref A.43). It is an offence to wilfully disturb spawn, spawning fish or spawning areas, cause pollution likely to harm fish, and to cause impedance to fish passage (notably salmon or trout). There are other offences in relation to specific fish species. European eel are protected by the Eel Regulations 2009 (Ref A.44), Bonn Convention (Appendix II; Ref A.45)), Section 41 species (previously UKBAP) under the Natural Environment and Rural Communities Act 2006 (Ref A.46), listed in CITES Appendix II and in the EU implementation of CITES rules (Annex B to Council Regulation (EC) No 338/97; EU, 1996; Ref A.47), and listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Brown and sea trout are the same species (*Salmo trutta*) listed as a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Atlantic salmon are protected under the Salmon Act 1986 (Ref A.48), Habitats Directive (Annexes II and V; Ref A.38), Bern Convention (Appendix III; Ref A.39), The Conservation of Habitats and Species Regulations 2018 (Schedule 4; (Ref A.23). They are also listed as a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12).

Ecological feature	Baseline detail	Biodiversity importance	Rationale
			River lamprey are protected under the Habitats Directive (Annexes II and V; (Ref A.38), Bern Convention (Appendix III; Ref A.39), The Conservation of Habitats and Species Regulations 2017 (Schedule 4; Ref A.23). They are also listed as a Species of Principal Importance Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Brook lamprey are protected under the Habitats Directive (Annex II; Ref A.38) and the Bern Convention (Appendix III; (Ref A.39).
Birds	The desk study returned records of over 150 bird species in the 2 km Study Area (in the last 10 years, up to 2024). Nineteen of the species are listed on Schedule 1 of the WCA 1981 (as amended) (Ref A.22); 5 species recorded in the Wider Woks site and 14 species recorded between the Wider Works site and 2 km Study Area. Of the 5 Schedule 1 species in the Wider Works site, two of these (redwing (*Turdus iliacus*) and fieldfare (*Turdus pilaris*)) do not typically breed in Wales or Great Britain. Twenty-nine species are listed as Priority Species in Wales (Ref A.12); 13 species are included on the Birds of Conservation Concern (BoCC) Red List (Ref A.49); 4 species on the BoCC Red Wales list (Ref A.50), 45 species are included on the BoCC Amber List (Ref A.49) and 11 species are on the BoCC Amber Wales list (Ref A.50). Suitable habitat for a wide range of typically common and widespread breeding and non-	Local (Low)	In the UK, breeding birds are protected under several key legislative frameworks designed to conserve avian populations and their habitats. The WCA 1981 (as amended) (Ref A.22) is the primary legislation safeguarding all wild birds, making it an offence to intentionally kill, injure, or take any bird, as well as to damage or destroy their nests or eggs. Additional protection is afforded to species listed under Schedule 1 of the Act, which prohibits disturbance at nest sites or while dependent young are present. The Conservation of Habitats and Species Regulations 2017 (as amended) (Ref A.23) transposes the EU Birds Directive into domestic law, ensuring the protection of species of European importance, including their breeding sites and resting places. Furthermore, the Environmental (Wales) Act 2016 (Ref A.12) imposes duties on public bodies to conserve biodiversity, reinforcing

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	breeding bird species is present throughout the Wider Works site. It is unlikely that significant (1% or more of national populations) numbers of any bird species would be supported by the habitats in the Wider Works site due to the relatively narrow width of and extent of each habitat area. Based on the habitats present, and their extents, and the desk study results, the Wider Works site is of Local biodiversity importance.		the protection of breeding birds and their habitats. These legal frameworks collectively form a robust protection mechanism, regulating activities such as development, land management, and research to mitigate adverse impacts on breeding bird populations.
Bats as presented in **Volume 8, Appendix 6.5.C: Bat Survey Report.**	The desk study returned existing records of pipistrelle species *Pipistrellus* sp., *Myotis* species, noctule bat (*Nyctalus noctula*) and soprano pipistrelle *Pipistrellus pygmaeus* in the Wider Works site. Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat Sites SAC and Coedydd De Dyffryn Maentwrog SSSI are partly in the Wider Works site. Lesser horseshoe bat *Rhinolophus hipposideros.* is a qualifying feature of this SAC/SSSI. Glynllifon SAC/SSSI is 0.89 km north-west of the Wider Works site. Lesser horseshoe bat is a qualifying feature of this SAC/SSSI. Mwyngloddiau Fforest Gwydir/Gwydyr Forest Mines SAC is 19.87 km north of the Wider Works site. Lesser horseshoe bat is a qualifying feature of this SAC. Coedydd Dyffryn Ffestiniog (Gogleddol) SSSI is 0.91 km north-west of the Wider Works site. Colonies of lesser horseshoe bats with	Precautionary - foraging and commuting habitat for the overall bat assemblage – Regional (Medium) Importance within the SAC County or District (Medium) within the remaining Wider Works site. Precautionary - roosting bats – Up to County	All bat species and their roosts are legally protected in the UK under the WCA 1981 (as amended) (Ref A.22) and Habitats Regulations (Ref A.23). Eight of these bat species are also listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Lesser horseshoe bat is listed on the SAP list of the Gwynedd BAP (Ref A.20) and the Eryri BAP (Ref A.21). Natterer's bat (*Myotis nattereri*), noctule bat and common pipistrelle bat are also included in the Eryri BAP (Ref A.21). Biodiversity importance of foraging and commuting bats is based on species rarity, estimated numbers of bats, presence of possible roosts and the type or complexity of commuting or foraging features. Tree removal will only be required where necessary and at the following Towers 4ZC023, 4ZC045, 4ZC046, 4ZC059 and 4ZC061. Trees will be trimmed at Towers 4ZC006, 4ZC016, 4ZC026 and 4ZC060.

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	nurseries have been recorded in suitable buildings in the SSSI. Coed y Rhygen SSSI is 1.10 km south of the Wider Works site and forms part of the Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites. Dolorgan Barn SSSI is 2.12 km south of the Wider Works site. A known breeding roost of lesser horseshoe bats has been recorded in Dolorgan Barn, and is also used as a roost site by a small number of brown long-eared bats (*Plecotus auritus*) and unidentified bat species of the genus *Myotis*. Ysbyty Bron y Garth SSSI is 2.22 km north-west of the Wider Works site. The site is known to support lesser horseshoe bat maternity and hibernation roosts and brown long-eared bat summer roosts. Mwyngloddiau Llanfrothen SSSI is 2.12 km north of the Wider Works site. Abandoned mines within the SSSI are known to provide important hibernation roosts for a large population of lesser horseshoe bats. Glaslyn SSSI is 2.43 km south-east of the Wider Works site. The SSSI supports two nursery roosts of lesser horseshoe bats, and roosts from brown long-eared bats, Daubenton's bats *Myotis daubentonii* and bats from the *Pipistrellus* genus. Ceunant Cynfal SSSI is 2.64 km north of the Wider Works site and forms part of the		Trees with PRFs are present in working area at Towers 4ZC023 (groups of trees), 4ZC046 (one tree), 4ZC059 (one tree), 4ZC060 (group of trees) and 4ZC061 (five trees). Suitable habitat for roosting bats is likely to be present throughout the Wider Works site.

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites. Aberdunant SSSI is 3.84 km east of the Wider Works site. The SSSI is known to support hibernating and summer roosts of lesser horseshoe bats. Glyn Cywarch SSSI is 3.91 km south of the Wider Works site. The SSSI supports a breeding roost of lesser horseshoe bats, and pipistrelle and long-eared bat roosts. Surveys carried out in 2024 identified 75 trees with potential roost features (PRF) for bats, shown on **Figure 6.5.C.3** in **Volume 8, Appendix 6.5.C: Bat Survey Report**. Species recorded during the activity surveys (NBW and static bat detectors) in 2024 were common pipistrelle, soprano pipistrelle, unidentified pipistrelle species (but likely to be common or soprano), noctule, brown long-eared, *Myotis* species, serotine (*Eptesicus serotinus*), Leisler's (*Nyctalus leisleri*) and lesser horseshoe.		
Badger as presented in **Volume 8, Appendix 6.5.D: Badger Survey Report (Confidential).**	The desk study returned badger records in the 2 km Study Area, dated in the last 10 years, up to 2024. There are several existing records within 50 m of the Wider Works site, including badger latrines, a dead badger, and a badger sighting. The field surveys carried out in 2024 identified one active main sett and one active subsidiary setts within the Survey Area, location shown in	Local (Low)	Badgers are protected under The Protection of Badgers Act 1992 (Ref A.52). Badgers are relatively common in a local, regional and national context.

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	Confidential Figure 6.5.D.2 in **Volume 8, Appendix 6.5.D: Badger Survey Report**.		
Water vole and otter as presented in **Volume 8, Appendix 6.5.E: Riparian Mammals Survey Report (Confidential).**	The desk study returned three records of water vole in the 2 km Study Area dated in the last 10 years, up to 2024 approximately 0.66 km east, 1.42 km west and 1.93 km north. Numerous records of otter were returned for the Study Area, the closest record was approximately 45 m west of an otter at Afon Llyfni between Tower 4ZC098 and 4ZC099.. American mink (*Neovison vison*) (which preys on water vole) was recorded at seven locations dated in the last 10 years, up to 2024, the closest record is located in the Wider Works site closest Tower is 4ZC012. The Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC is approximately 336 m downstream of the Wider Works site and linked by the Afon Dwyfach. The Afon Gwyrfai a Llyn Cwellyn SAC is oversailed by the existing 4ZC. Otter is a qualifying feature of both of these SAC. Otter has been recorded in Coedydd De Dyffryn Maentwrog SSSI, Coedydd Dyffryn Ffestiniog (Gogleddol) SSSI and Llyn Padarn SSSI which are all in 2 km of the Wider Works site. Both otter and water vole have been recorded in Afon Gwyrfai a Llyn Cwellyn SSSI, Cors Gyfelog SSSI, Tiroedd a Glannau Rhwng Cricieth ac Afon Glaslyn SSSI, Glynllifon SSSI, Afon Ddu SSSI and Migneint - Arenig – Dduallt	District (Medium) (otter and water vole)	Otter is protected under Schedule 5 of the WCA 1981 (as amended) (Ref A.22) and Habitats and Species Regulations (Ref A.23). Otter is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12) and is listed on the SAP list of the Gwynedd BAP (Ref A.20) and Eryri BAP (Ref A.21), and are listed as Vulnerable on the Red List for Wales (Ref. A.51). Water vole is protected under the WCA 1981 (as amended) (Ref A.22). Water vole is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Water vole is listed on the SAP list of the Gwynedd BAP (Ref A.20) Eryri BAP (Ref A.21) and are Endangered on the Red List for Wales (Ref A.51).

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	SSSI which are all within 2 km of the Wider Works site. Morfa Harlech SSSI 336 m north of the Wider Works site is an important breeding and feeding habitat for otter, and also offers suitable habitat for water vole. Water vole field signs were recorded in the following watercourses: 6.7a, 6.8, 6.9, 6.10, 6.11, 6.17, 6.20, 6.31 and 6.38, shown on **Figure 6.5.E.2** in **Volume 8, Appendix 6.5.E: Riparian Mammals Survey Report**. Otter field signs were recorded in the following watercourses: 6.40, 6.41 and 6.43, shown on **Figure 6.5.E.3** in **Volume 8, Appendix 6.5.E: Riparian Mammals Survey Report**. No otter holts or lay ups were identified.		
Great crested newt as presented in **Volume 8, Appendix 6.5.F: Great Crested Newt Survey Report.**	The desk study returned no records of great crested newt in the 2 km Study Area (in the last 10 years, up to 2024). During surveys, only nine ponds were subject to HSI assessments due to access restrictions. The proposed access road and laydown area locations were identified in August 2024 after the great crested newt surveys were completed and outside of the survey window. Of the nine ponds that were subject to HSI assessment, seven were subject to eDNA survey due to access restrictions (access was granted for the HSI but was not granted for eDNA sampling). Further information on pond locations and presence of scoped in and scoped out ponds and ponds that require	District (Medium)	Great crested newt is protected in the UK under the WCA 1981 (as amended) (Ref A.22) and Habitats Regulations (Ref.A.23). They are also listed as a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref. A.12). Great crested newt is listed on the Eryri BAP (Ref A.21).

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	surveys for great crested newt are presented within **Volume 8 Appendix 6.5.F: Great Crested Newt Survey Report.** Great crested newt presence was confirmed in one pond through eDNA survey – P6.68. Ponds scoped in for surveys are shown on **Figure 6.5.F.1** in **Volume 8, Appendix 6.5.F: Great Crested Newt Survey Report**, which also presents the results of the surveys carried out to date.		
Red squirrel (*Sciurus vulgaris*)	The desk study returned no records of red squirrel in the 2 km Study Area (in the last 10 years, up to 2024). There are several records of grey squirrel (*Sciurus carolinensis*) throughout the study area, which often indicates the absence of red squirrel.	N/A	Red squirrel is protected under Schedule 5 of the WCA 1981 (Ref A.22) and are listed as a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Red squirrel is identified as priority species within the Eryri National Park (Ref A.21). The Wider Works site, where mostly temporary land take is required, is predominantly grassland and sub optimal for red squirrel. Given the lack of red squirrel records in the Study Area, and the prevalence of grey squirrel records from the locality, red squirrels are considered unlikely to be present in Wider Works site.
Hedgehog	The desk study returned numerous records of hedgehog in the 2 km Study Area (in the last 10 years, up to 2024). None of these records are in the Wider Works site; the closest records are within 50 m, in the northern section by Pentir Substation.	Local (Low)	Hedgehog is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12). Hedgehog is widespread and abundant across the UK, but declining.

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	An assessment of the mix of hedgerow, woodland, scrub and grassland habitat present in the Wider Works site and likelihood for hedgehog to occur, has concluded that hedgehog is likely to be present.		An assumption has been made that this species is likely to be present across the Wider Works site.
Brown hare	The desk study returned records of brown hare in the 2 km Study Area dated in the last 10 years, up to 2024, several of which were in the Wider Works site. An assessment of the mix of hedgerow, and grassland habitat present and likelihood for brown hare to occur, has concluded that brown hare is likely to be present in the Wider Works site.	Local (Low)	Brown hare is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12) and listed on the SAP list of the Gwynedd BAP (Ref A.20) and Eryri BAP (Ref A.21). Brown hare is widespread and abundant across the UK. An assumption has been made this species is likely to be present across the Wider Works site.
Polecat	The desk study returned records of several records of polecat in the 2 km Study Area dated in the last 10 years, up to 2024. None of these records are in the Wider Works site; the closest record is approximately 409 m north-east closest Tower is 4ZC052. An assessment of the mix of farmland, hedgerow and woodland habitat present and likelihood for polecat to occur, has concluded that polecat is likely to be present in the Wider Works site.	Local (Low)	Polecat is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12) and listed on the SAP list of the Gwynedd BAP (Ref A.20) and Eryri BAP (Ref A.21). Polecats are found throughout Wales where valleys and farms are favoured. Historically, Gwynedd is considered a Welsh stronghold for polecat (Gwynedd BAP) (Ref A.20). An assumption has been made this species is likely to be present across the Wider Works site.
Reptiles	The desk study records slow worm (*Anguis fragilis*), common lizard (*Zootica vivipara*), grass snake (*Natrix helvetica*) and adder (*Vipera berus*) in the 2 km Study Area (in the	Local (Low)	All reptiles are protected from intentional injuring or killing under the WCA 1981 (as amended) (Ref A.23) and are Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref A.12).

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	last 10 years, up to 2024). No records are in the Wider Works site in the last 10 years. The Wider Works site has suitable habitat for reptile species such as slow worm, common lizard, grass snake and adder. The most suitable reptile habitat in the Wider Works site for reptiles (e.g. along field margins, marshy grassland, heath, hedgerow bases, scrub boundaries, ditches and woodland) will be retained and protected, or will be subject to temporary disturbance impacts during the works rather than permanent loss. Reptile presence or absence surveys have not been carried out for the Wider Works site, however incidental sighting of adder have been recorded between Towers 4ZC069 – 4ZC070.		Adder is listed on the SAP list of the Gwynedd BAP (Ref A.20). Species of reptile (such as slow worm, common lizard and grass snake) are likely to be present but are unlikely to occur in significant numbers or assemblages due to the suitability of the habitats present within Wider Works. Adder was recorded at one location in the Wider Works site. The following reptile species would not be present in the Wider Works site– smooth snake *Coronella austriaca* or sand lizard *Lacerta agilis* due to the lack of suitable habitats for these species. In addition smooth snake are only found in isolated pockets of Dorset, Devon, Hampshire, Surrey and West Sussex.
Other (more commonly recorded) amphibians	The desk study returned records of common frog, common toad and palmate newt in the 2 km Study Area (dated in the last 10 years, up to 2024). Records of common frog are located in the Wider Works site, the closest records are dated 2014 and are located east of Tower 4ZC084 and 4ZC086. Ponds, watercourses and ditches in and close to the Wider Works site may support more common amphibian species. Ponds, watercourses and ditches will be retained. Suitable terrestrial habitats in the form of hedgerows, scrub, semi-improved grassland and woodland are also present in the Wider Works site. Such areas will be retained and protected or will be subject to temporary	Local (Low)	Common amphibians are protected by the WCA 1981 (as amended) (Ref A.22), prohibiting their advertisement and sale. The common toad is a Species of Principal Importance under Section 7 of the Environment (Wales) Act (Ref A.12). These species are common in a local and national context.

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	disturbance impacts during the works rather than permanent loss.		
Flora, Lichen and Fungi	The desk study returned records of the following protected or notable plant species in the Study Area (dated in the last 10 years, up to 2024), comprising waxcaps, flexuous bog-moss (*Sphagnum flexuosum)*, bluebell (*Hyacinthoides non-scripta*) and wood-bitter vetch (*Vicia orobus).* None were recorded in the Wider Works site. Several species of waxcaps have been recorded within the Study Area (dated in the last 10 years, up to 2024). Waxcaps have been recorded in the Wider Works site at the following locations: between Towers 4ZC013 – 4ZC016.	Up to County (Medium)	Rare plants are protected by Schedule 8 of the WCA 1981 (as amended) (Ref A.22). Notable plants are listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act (Ref A.12). A Species Action Plan for waxcaps is included within the Gwynedd BAP (Ref A.20).
INNS	The desk study returned records of the following INNS species in the Study Area (dated in the last 10 years, up to 2024), which are listed on Schedule 9 of the of the WCA Act 1981 (as amended) (Ref 4.22) and The Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref A.52): • American mink (in the Wider Works site). • Canada goose (*Branta canadensis*) (in the Wider Works site). • Grey squirrel (in the Wider Works site). • Himalayan balsam (*Impatiens glandulifera)* (in the Wider Works site). • Japanese knotweed (*Reynoutria japonica)*(in the Wider Works site).	N/A	Several confirmed INNS species are listed in Schedule 9 of the WCA 1981 (as amended) (Ref A.22). There are statutory constraints regarding their potential spread (as set out in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance**). It is illegal to deliberately spread invasive species, and mitigation will be required during the works to prevent their spread in the Wider Works site.

Ecological feature	Baseline detail	Biodiversity importance	Rationale
	Furthermore, the INNS American skunk-cabbage (*Lysichiton americanus)* was recorded on watercourses in the Wider Works site. Although not listed on Schedule 9 of the WCA 1981 (as amended) (Ref A.22), this species is listed as an invasive non-native species of interest to Wales. The three non-native aquatic species New Zealand mud snail (*Potamopyrgus antipodarum*), the bladder snail of either of the two *Physella* species, and *Crangonyx pseudogracilis/floridanus* were also identified. Field surveys recorded the following non-native plant species: Pontic rhododendron, Himalayan balsam, Japanese knotweed and Montbretia. American skunk-cabbage was not recorded during the field surveys in 2024.		

A.3 Historic Environment

Study Area

Designated Historic Assets

A.3.1 A Study Area of 3 km from the Wider Works site has been defined to provide historical and archaeological context and to identify designated assets with the potential to be affected by the Wider Works (refer to **Figure 6.5.I.1**).

A.3.2 The settings of designated assets of the highest value (i.e., World Heritage Sites, scheduled monuments, Grade I and II* listed buildings, Registered Parks and Gardens and Conservation Areas containing a number of assets of the highest value) will be considered, up to 3 km from the Wider Works site. These assets will be considered as the Wider Works has the potential to result in long-term change to the settings of designated assets, some of which may be at distance from the Wider Works site.

Non-designated Historic Assets

A.3.3 A Study Area of 500 m from the Wider Works site has been defined to provide historical and archaeological context and to identify non-designated assets with the potential to be affected by the Wider Works (refer to **Figure 6.5.I.1**). This Study Area will allow for non-designated historic assets to be set within their wider context and allow for the assessment of archaeological potential within the Wider Works site.

Historic Assets

A.3.4 A detailed baseline for the Wider Works site is set out in **Volume 8: Appendix 6.5.I: Wider Works Historic Environment Desk-based Assessment** (DBA). The DBA sets out a chronological narrative of known assets and assesses the potential for unknown historic assets to be present within the Wider Works site.

A.3.5 Most historic assets (both designated assets and non-designated assets) were scoped out of further assessment in the baseline studies due to the lack of potential for impacts resulting from the Wider Works. Only those assets that have the potential to be impacted by the Wider Works are discussed in this section.

A.3.6 The principal historic assets to be considered are listed in **Table A-5**. It has been assessed that there is potential for physical and setting impacts to the assets as a result of the Wider Works.

Table A-5 – Assets scoped into further assessment

Reference	Designation and grade	Name	Location
CN232	Scheduled Monument	Hut Group Near Tan-y-Coed Pont Rhythallt	Within Wider Works site
CN067	Scheduled Monument	Caerau Ancient Village	Within Wider Works site
CN148	Scheduled Monument	Caer Engan	Within Wider Works site

Reference	Designation and grade	Name	Location
PRN 17824	Non-designated asset	Part of Roman road, Segontium - Bryn-y-gefeiliau	Within Wider Works site
PRN 17822	Non-designated asset	Part of Roman Road, Segontium to Pen Llystyn to Tomen y Mur	Within Wider Works site
PRN 36434	Non-designated asset	Part of a Roman road	Within Wider Works site
PRN 741	Non-designated asset	Hut Group, SW of Penyffridd, Rhosgadfan	Within Wider Works site
PRN 742	Non-designated asset	Hut Group, SW of Penyffridd, Rhosgadfan	Within Wider Works site
PRN 33995	Non-designated asset	Stone Gateposts, E of Bodychain Isaf	Within Wider Works site
PRN 3319	Non-designated asset	Field System, Caerau	Within Wider Works site
PRN 789	Non-designated asset	Roman Fort (Possible), North of Derwin Bach	Within Wider Works site
PRN 7878	Non-designated asset	POW Camp Site of, Bryncir	Within Wider Works site
PRN 62168	Non-designated asset	Route of old road, Garn Dolbenmaen	Within Wider Works site
PRN 25574	Non-designated asset	Tank, East of Gwern-ddwyryd	Within Wider Works site
PRN 1814	Non-designated asset	Building and Paddock, Cefn Faes	Within Wider Works site
PRN 90398	Non-designated asset	Sheepfold, South of Gwylan, Trawsfynydd	Within Wider Works site

A.4 Geology, Hydrogeology, Land Uses and Agriculture (Soils)

Study Area

A.4.1 The Study Area for this assessment is the area over which the potential direct and indirect effects of the Wider Works are predicted to occur.

A.4.2 The direct effects on Geology, Hydrogeology Land Uses and Agriculture (Soils) are those that may arise during the Wider Works.

A.4.3 The indirect effects involve disturbing the ground in such a way that contaminant linkages (source-pathway-receptor) are created, for example, introducing a new pathway allowing potentially contaminated dusts to migrate offsite to nearby residential or commercial properties during the Wider Works.

A.4.4 The Study Area for Geology, Hydrogeology, Land Uses and Agriculture (Soils) is the Wider Works site (**Figure 6.A.1**), along with a buffer extending to 250 m around the Wider Works site to identify potential off-site sources of contamination to inform the baseline condition in and adjacent to the Wider Works site, including temporary works. With regards to hydrogeological aquifer designations, groundwater abstractions and Source Protection Zones (SPZs) the Study Area will include a buffer extending 1 km beyond the Wider Works site.

A.4.5 Impacts from the Wider Works on geological features and sites and mineral safeguarding and preferred areas will typically occur directly within the Wider Works site where the temporary works activities would take place or interface directly with these receptors. However, for the purposes of determining the wider geological context, geodiversity and to support the conceptual understanding of the ground model, the geological features and sites and minerals baseline will consider an extended 250 m Study Area from the Wider Works site.

A.4.6 Impacts to soils in relation to agricultural land typically occur only on the land directly impacted by the Wider Works, including land used for access and compounds. A wider Study Area is not applied when describing and considering agricultural soils unless stripped soil is transported off-site.

A.4.7 These Study Areas are appropriate for the assessment of Geology, Hydrogeology, Land Use and Agriculture (Soils) in accordance with methodology set out in the DMRB LA 109 Geology and Soils (Ref A.54). The DMRB LA109 (Ref A.54) is aimed at road projects but it is considered reasonable to reference this document in the absence of any other guidance on the assessment of potential direct and indirect effects on Geology, Hydrogeology, Land Use and Agriculture (Soils) from the Wider Works.

A.4.8 The Study Area distance has been used to identify potential receptors, such as designated sites, as well as identifying potential sources of contamination, such as landfills. The environmental datasets obtained include a 250 m, 500 m and 1 km (for water abstractions) buffer for the Wider Works site. The Study Areas are also based on professional judgement by competent experts with relevant and appropriate experience of assessing land contamination.

A.4.9 The baseline presented is based on data gathered through desktop research.

A.4.10 The following section provides a summary of the existing ground conditions within the respective subtopic Study Area for the Wider Works site. The information is presented based on the division of significant sources and receptors. Generally, the baseline conditions presented refer to sources and receptors within the Wider Works site; however, relevant significant sources and receptors outside the Wider Works site that may affect or be affected by the Wider Works, are also identified in the baseline.

Data Sources

A.4.11 The known or predicted current and future baseline environment described in this section has informed by the following data sources:

- British Geological Survey (BGS) 1:50,000 mapping:
  - Sheet 106 Bangor (Ref A.55).
  - Sheet 118 Nefyn and part of Caemarfon (Ref A.56).
  - Sheet 119 Snowden (Ref A.57).
- BGS 1:10,000 mapping (Ref A.58):
  - SH56NE.
  - SH56SW.
  - SH44SE.
  - SH54SW.
  - SH53NE.
  - SH63NE.
  - SH63NW.
  - SH55NW.
- Geological Memoirs Geology of the country around Bangor 1985 (Ref A.59).
- Geological Memoirs Geology of the country around Snowden 1987 (Ref A.60).
- BGS GeoIndex Online Mapping Service (Ref A.61).
- Groundsure Free Data Viewer (Ref A.62).
- Welsh Government (DataMapWales) for geological SSSI, Geological Conservation Review (GCR) sites, Regionally Important Geodiversity Sites (RIGS), SPZ and Licensed Water Abstractions (Ref 5.30).
- Unexploded Ordnance (UXO) Risk Map Risk Maps | Zetica UXO (Ref A.63).
- Mineral Safeguarding Areas (MSA) GIS data from Gwynedd Council received 31 May 2024 (Ref A.64).
- Mining Remediation Authority Map Viewer (Ref A.65).
- Private Water Abstraction Record from Gwynedd Council received 26 November 2024 (Ref A.66).
- Potential Land Contamination Points from Gwynedd Council received 23 January 2025 (Ref A.67).
- Defra MAGIC maps (Ref A.68).
- Natural Resource Wales (NRW), LANDMAP (Ref 4.17).
- DataMapWales (Ref 5.30) Groundsure Enviro, Geo and Map Insight data referenced GSIP-2024-16474-21178 and 21179 (provided as GIS data on 21 November 2024) (Ref A.692).

Geology

Published records

A.4.12 The following indicates the Wider Works site is underlain by geological succession as shown on **Figure 6.A.1** and **Figure 6.A.2:**

- The published 1:50,000 scale geological map of the area Sheet 106 – Bangor (Ref A.55), Sheet 18 – Nefyn and part of Caemarfon (Ref A.56) and Sheet 119 – Snowdon (Ref A.57).
- The published 1:10,000 scale geological map of the area (Ref A.58): SH56NE SH56NE, SH56SW, SH44SE, SH54SW, SH53NE, SH63NE, SH63NW and SH55NW.
- GIS data sourced from the BGS online (Ref A.61).

Faults and Linear Features

A.4.13 The published 1:50,000 scale geological map of the area (Ref A.55, Ref A.56 and Ref A.57) indicates there are faults and linear features in the 250 m study area of the Wider Works, which are shown on **Figure 6.A.2.**

Historical BGS Borehole Logs

A.4.14 Historical BGS borehole logs across the Wider Works are shown on **Figure 6.A.1**

Ground Stability

A.4.15 Ground stability across the Wider Works is shown on **Figure 6.A.3**.

Soils

A.4.16 Preliminary modelled data for agricultural land classification is shown in **Figure 6.A.7.**

Sites Designated for Geodiversity Interest

A.4.17 A review of currently available information on DataMapWales (Ref A.16) did not identify any specific sites of interest, including geological SSSI, GCR sites or RIGS in the Wider Works site or in the 250 m Study Area.

Mineral, Quarrying and Mineral Resource and Safeguarding Areas

A.4.18 Historical and current surface ground workings, underground workings and non-coal mining, mineral safeguarding resources area are show on **Figure 6.A.5.**

Hydrogeology

A.4.19 Aquifer designations and Groundwater Vulnerability across the Wider Works site and Study Area are shown on **Figure 6.A.4.**

Hydrology

A.4.20 Details regarding hydrological features across the Wider Works site are presented in **A.10 Water Quality, Resources and Flood Risk.**

Ground Investigation Information

A.4.21 No information has been received regarding previous ground investigations across the Wider Works site.

Unexploded Ordnance

A.4.22 Online Zetica UXO risk mapping (Ref A.63) shows 'Low Risk' for the whole Study Area of the Wider Works. A pre-desk study assessment was obtained from Zetica and recommends that 'while always prudent, a detailed desk study is not considered essential in this instance'.

Waste Sites and Landfilling

A.4.23 Areas of where landfill and waste occur across the Wider Works site and within the 250 m Study Area are shown in **Figure 6.A.6.**

Ground Gas

A.4.24 No significant potential sources of ground gas have been identified.

A.4.25 The potential for gas generation has been assessed based on the possible sources identified using guidance provided in BS 8576 (Ref A.53). Alluvium and Peat have been identified, mapped across limited areas of the Wider Works site. BS 8576 (Ref A.53) indicates that natural soil strata such as peat and alluvium with a low degradable organic content would have a very low gas generation. Made Ground is likely to be present across the Wider Works in association with pylon bases (albeit anticipated to be limited in thickness) which is anticipated to have a low degradable organic carbon and represent a very low gas generation potential.

Radon

A.4.26 Radon levels across the Wider Works and within the 250 m Study area are shown on **Figure 6.A.6**.

Site History and Potential Sources of Contaminated Land

A.4.27 Site history and potential sources of contaminated land including regulated activities and environmental sensitivities are shown on **Figure 6.A.6.**

Contaminated Land Risk Assessment

A.4.28 A contaminated land risk assessment has not been undertaken for the Wider Works as the Wider Works are scoped out of the assessment.

A.5 Traffic and Transport

Study Area

A.5.1 The Study Area for these works incorporates roads that facilitate access to the individual sites, including local and strategic routes near the scattered work locations. Roads within the Study Area include sections of the A487, A470, A4085, A4086, and

other smaller roads providing direct access to work areas, as well as temporary access roads where required for the Wider Works.

A.5.2 The Wider Works Study Area reflects the dispersed nature of the Project, integrating the key road links and access points necessary for the Wider Works.

A.5.3 Given the extensive geographical scope and limited traffic activity of the Wider Works, it has not been feasible or imperative to conduct the same level of detailed quantitative analysis as presented in **Volumes 2-5, Chapter 9: Traffic and Transport**. Consequently, this section seeks to amalgamate information from these Volumes, providing a high-level overview to consider the anticipated impacts across the Study Area.

A.5.4 Within **Volumes 2-5**, baseline conditions have been assessed using traffic data collected by Road Data Services Ltd., with the assumption that the road network and local services will remain unchanged, while ensuring to apply a future baseline growth factor to capture the growth in transport demand. Where applicable, traffic data and findings from the **Volume 2-5** have been used as proxies to infer broader impacts within the Study Area.

A.6 Air Quality and Emissions

Study Area

A.6.1 The Study Area for this assessment is the area over which potential direct and indirect effects of the Wider Works on local air quality are predicted to occur, noting that operation of the refurbished overhead line has been scoped out of the assessment.

A.6.2 The methodological approach to defining the spatial extent of the Study Area for air quality has been informed by the IAQM and Environmental Protection UK (Ref A.70). An area within 10 km of the Wider Works site has been considered with respect to published baseline information on existing air quality. The following Study Areas have been used where an assessment of dust emissions generated by Wider Works activities is required.

A.6.3 An amenity or human health sensitive receptor within:

- 250 m of the limits of works activity in the Wider Works site; or
- 50 m of the works route on the public highway, up to 500 m from the Wider Works site entrance(s).

A.6.4 An ecological receptor within:

- 50 m of the limits of works activity in the Wider Works site; or
- 50 m of the works route on the public highway, up to 500 m from the Wider Works site entrance(s).

A.6.5 The Study Area is effectively 250 m from the Wider Works site and this is illustrated in **Figure 6.5.5**, along with surrounding air quality-related constraints.

Sensitive Receptors

Dust Soiling Receptors

A.6.6 Dust soiling receptors are land uses that are susceptible to harm to amenity from the deposition of dust to property. 1,155 receptors have been identified within 250 m of the Wider Works site that have sensitivity to dust soiling impacts. Some of these receptors have high sensitivity, such as residential properties and schools, whereas the rest have lower sensitivity such as farm buildings, outdoor sports facilities and car parks.

Receptors Sensitive to the human health impact of PM_{10}

A.6.7 Receptors sensitive to human health impacts are land uses where members of the public are present for a period of time comparable to the averaging periods of the short-term PM_{10} air quality objective (24-hours). 1,150 receptors have been identified within 250 m of the Wider Works site which will have sensitivity to human health impacts of increased PM_{10} caused by the works dust. Some of these receptors have high sensitivity such as residential properties or schools, whereas the rest have lower sensitivity such as religious buildings, garden centres and public houses.

Ecological Receptors

A.6.8 Ecological receptors are designated nature conservations sites and priority habitats. Seven National Designations have been identified within 20 m of the Wider Works site as well as 25 areas of ancient woodland, which will have potential sensitivity to the impacts of dust settling either directly (through smothering or changes in acidity) or indirectly through increased stresses on the plants. The SAC habitat has high sensitivity to dust impacts, the SSSI habitat medium sensitivity, and the ancient woodland low sensitivity.

Summary of Data Sources

A.6.9 The following data sources have been used to inform the air quality baseline:

- North Wales Authorities Collaborative Project 2023 Air Quality Progress Report (Ref A.71).
- Mapped estimates of background concentrations provided by Defra's UK Air Information Resource (UK-AIR) (Ref A.72).
- Defra MAGIC maps (Ref A.68).

Dust Deposition

A.6.10 A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can be affected by long range transport of dust from distant sources into the local vicinity. The concentrations of dust can vary depending on a range of parameters, such as meteorological conditions and time of year.

A.6.11 Ambient dust deposition rates are not monitored extensively in the UK. Monitoring that is undertaken is usually connected with specific activities such as mining and mineral extraction operations or specific large-scale construction programmes. Dust monitoring may also be undertaken to investigate specific complaints received by local authorities, who are then required to investigate dust nuisance under the Environmental Protection

Act 1990 (Ref A.73). There is currently no quantitative baseline information for dust deposition available in the Study Area.

Pollutant Concentrations

A.6.12 The Study Area for the air quality assessment covers an area within the local authority area of Gwynedd Council.

A.6.13 As part of Local Air Quality Management (LAQM) duties, local authorities are required to monitor pollutant concentrations. Fourteen Gwynedd Council monitoring sites are within 10 km of the Wider Works site as well as one Isle of Anglesey County Council monitoring site. The most recent monitoring data for these 15 sites are shown in **Table A-6.** The most recent publicly available data is from 2022 and shows that concentrations within 10 km of the Study Area are all below 50% of the Air Quality Objective.

Table A-6 – Local authority monitoring

Site ID	Easting	Northing	2022 NO_2 concentration
Gwynedd Council			
02	248273	362132	19.2
03	248480	363456	6.3
05	248892	364120	12.2
08	257587	371543	15.8
011	256292	371663	15.5
012	254286	368835	18.6
013	261529	367380	14.7
015	247770	358663	7.8
037	248022	362757	15.1
038	256871	369493	18.7
039	256871	369493	18.4
041	248514	362795	7.5
042	249647	362923	7.8
043	249634	362917	8.2
Isle of Anglesey County Council			
083	253057	372313	8.0

The UK-AIR (Ref A.72) website provides data for background concentrations of Nitrogen Oxides (NO_X), NO_2, PM_{10} and $PM_{2.5}$. These background concentrations represent 1 kilometre squared (km^2) grid squares. **Table A-7** shows the estimated background concentrations within the Study Area in 2024. As expected for all pollutants, background concentrations in the Study Area are low, due to the predominantly rural nature of the area.

Table A-7 Defra mapped pollutant background concentrations throughout the Study Area

NO_2 (µg/m^3)	NO_x (µg/m^3)	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
2.45 – 3.46	3.00 – 4.28	7.92 – 8.72	5.09 – 5.74

A.7 Noise and Vibration

Study Area

A.7.1 The Study Area has been defined to include sensitive receptors that may be at risk from possible direct and indirect impacts that might arise from the Wider Works. For works noise effects, the area for which impacts are expected is 300 m from the Wider Works site, based on guidance in BS 5228-1:2009+A1:2014 (Ref A.74), which states construction noise predictions are generally reliable up to 300 m. For works vibration, it is expected that receptors at a distance of at least 100 m would not experience perceptible levels of vibration. This Study Area is referenced from the DMRB LA 111 (Ref A.74), which, although the document is aimed at road projects, is considered reasonable to reference in the absence of any other guidance on vibration from the works activities proposed.

Noise Sources

A.7.2 The existing land use of the Site is primarily agricultural. Nearby recreational and residential receptors include (but are not limited to):

- Isolated farms and rural properties;
- The villages of Llanrug, Talysarn, Penygroes, Llanllyfni, Carmel and Rhosgadfan;
- The PRoW (Public Right of Way) network; and
- Quiet rural lanes.

A.7.3 The main sources of sound in the area are:

- Traffic on minor roads making up the local road network;
- Traffic on major roads such as the A4086, the A4085, the A487, the B4418 and the B4411;
- Existing overhead line infrastructure; and
- Agricultural activities associated with farms and fields.

A.8 Socio-Economics

Study Area

A.8.1 The impacts of the Wider Works with respect to Socio-Economics are considered at varying spatial levels according to the likely extent of the effect under consideration. This approach is consistent with the Homes and Communities Agency (HCA), now known as Homes England, guidance entitled ‘Additionality Guide, A Standard Approach to Assessing the Additional Impact of Projects, 4th Edition’ (Ref A.75). This guidance is applicable in Wales as well as England, as it follows principles outlined in His Majesty’s Treasury’s Green Book (Ref A.76), which is used across the UK for project appraisal

and evaluation. **Table A-8** presents the different components of the Socio-Economics assessment of effects, the geographical scale at which each component is assessed, and the rationale behind these geographical scales.

Table A-8 – Assessment of effects Study Areas

Impact	Geographic Study Area	Rationale for Study Area
Employment generation during the Wider Works (direct, indirect and induced impacts). Skills and training Gross Value Added	60-minute drive area (Principal Economic Impact Area).	Research by Chartered Institute of Personnel and Development (CIPD) found that 90% of national employees commuted for 60 minutes or less each way. This was reported by CIPD in the 2018 Employee outlook 'Employee views on working life'. The 60-minute drive area represents the principal labour market catchment area for the Wider Works.
Temporary accommodation services	30-minute and 60-minute drive area.	Professional judgement and experience from other proposed developments in the UK.
PRoW and Recreational Routes	Within and up to 500 m radius from the site.	Professional judgement and experience from other proposed developments in the UK.
Agricultural land holdings (farms)	Within and up to 500 m radius from the site.	Professional judgement and experience from other proposed developments in the UK.
Community facilities	Within and up to 1 km radius from the site.	Professional judgement and location of sensitive receptors for impacts arising from the Wider Works as informed by other assessments. Community facilities are likely to be accessed by residents from a wider catchment, especially in rural areas, owing to a tendency for provision to be sparse. A wider radius has been considered for this receptor to fully appreciate the effect of severance on access to these facilities.
Other private and community assets (residential properties, business premises, visitor attractions, development land)	500 m radius from the site	Professional judgement and experience from other proposed developments in the UK.

Population and the Economy

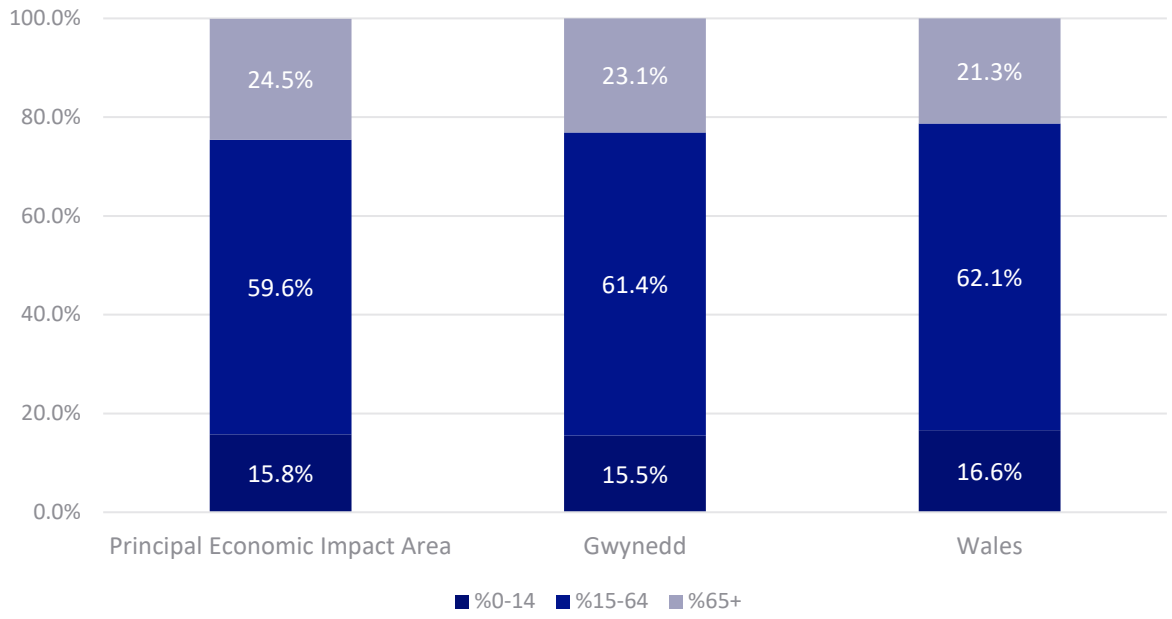
A.8.2 This section first describes the population and the economy local to the Wider Works site. The baseline is described relative to three geographies. The Principal Economic Impact Area is defined as a 60-minute drive time from the Wider Works site; this consists of 326 Lower Layer Super Output Areas (LSOAs) and as shown in **Figure 6.A.11** this takes in all of Anglesey and most of Gwynedd, Denbighshire, Conwy, and Flintshire, as well as parts of Powys, Ceredigion, Wrexham, and Chesire. Data is also provided for Gwynedd local authority and for the National comparator, Wales.

A.8.3 The section goes on to identify Socio-Economic assets and resources local to the site (within a 500 m or 1 km radius as appropriate) which could be affected by the Wider Works either directly (i.e. via land take) or indirectly (via severance associated with transport impacts). The land use receptors identified include PRoW, open spaces, community facilities, residential properties, visitor attractions, business premises, agricultural land holdings, and development land.

Population Demographics

A.8.4 The 2021 Census provides data on the population of the Principal Economic Impact Area and the comparator geographies; this can be seen in **Plate A-1** (Ref A.77). The Principal Economic Impact Area had a population of 546,628 in 2021, while Gwynedd's population was smaller (117,393). The Principal Economic Impact Area constituted approximately 17.6% of Wales' population (3,107,494). In the Principal Economic Impact Area, 24.5% of the population were aged over 65, a higher proportion than Gwynedd (23.1%) and Wales (21.3%). The Principal Economic Impact Area had a smaller proportion of working age residents (59.6%) than Gwynedd (61.4%) and Wales (62.1%) **Plate A-1** displays the population age profile across the three geographies.

Plate A-1– Population age profile



Economic Activity

A.8.5 **Table A-9** displays economic activity rates across the three geographies using Census 2021 data (Ref A.78). The Principal Economic Impact Area has a similar proportion of economically active individuals to Gwynedd, (56.2% and 56.1%, respectively), and a slightly lower proportion than Wales (56.6%). Of those who are economically active, the Principal Economic Impact Area had a slightly higher proportion of unemployed individuals (2.9%), compared to Gwynedd and Wales (3.2% and 3.1%). 30.4% of the Principal Economic Impact Area's population worked full-time, compared to 28.0% in Gwynedd and 32.2% in Wales.

Table A-9 – Economic activity

Economic Activity	Principal Economic Impact Area	Gwynedd	Wales
Economically Active (%)	56.2	56.1	56.6
Employee: Part-time (%)	13.1	13.5	13.0
Employee: Full-time (%)	30.4	28.0	32.2
Self-employed (%)	9.8	11.2	8.3
Unemployed (%)	2.9	3.2	3.1
Economically inactive (%)	43.8	43.9	43.5

Economic activity rate is the proportion of working aged people (i.e., people aged 16-64) who are active or potentially active members of the labour market (i.e., people who are employed or unemployed). Examples of people who may not count as economically active include students, early retirees, carers and people with a long-term sickness or disability. Note: some columns on the table may not sum due to rounding.

Qualifications

A.8.6 **Table A-10** categorises the over 16 population of the Principal Economic Impact Area and the comparator geographies according to the highest level of qualification they have achieved, using 2021 Census data (Ref A.79). 31.8% of the Principal Economic Impact Area are qualified to level 4+, greater than the average across Wales (31.5%) but less than that in Gwynedd (34.5%). Of the three geographies, the Principal Economic Impact Area had the highest proportion of individuals with apprenticeships (6.3%). Generally, the Principal Economic Impact Area is less qualified than Gwynedd, but more qualified than Wales as a whole.

Table A-10 – Highest level of qualification

Level of Qualification	Principal Economic Impact Area	Gwynedd	Wales
No qualifications (%)	18.2	16.3	19.9
Level 1 and entry level qualifications (%)	8.7	7.6	8.7
Level 2 qualifications (%)	14.8	14.6	14.4
Apprenticeship (%)	6.3	5.8	5.6
Level 3 qualifications (%)	17.4	18.8	17.2
Level 4 qualifications+ (%)	31.8	34.5	31.5
Other qualifications (%)	2.8	2.5	2.7

Employment by Industry

A.8.7 The 2021 Census provides data on employment by industry, classifying industries by their Standard Industrial Classification, as seen in **Table A-11** (Ref A.80). In the Principal Economic Impact Area, the largest industry is Q: human health and social activities (17.3% of employment); this is also the largest industry in Gwynedd (16.6%) and Wales (17.0%). Industry G: Wholesale and retail trade; repair of motor vehicles and motor cycles is the second largest industry in all three geographies. Industry P: Education is the third largest industry in all three geographies. In general, the distribution of employment across industries is relatively similar between all three geographies. Industry I: Accommodation and food service activities has a greater proportion of employment in Gwynedd (8.5%) compared to the Principal Economic Impact Area (6.6%); Wales has the lowest proportion of all three geographies (5.2%).

Table A-11 – Employment by industry

Industry	Principal Economic Impact Area	Gwynedd	Wales
A Agriculture, forestry and fishing (%)	3.1	3.9	1.8
B Mining and quarrying (%)	0.3	0.3	0.2
C Manufacturing (%)	8.4	5.2	8.7
D Electricity, gas, steam and air conditioning supply (%)	0.8	0.9	0.7

Industry	Principal Economic Impact Area	Gwynedd	Wales
E Water supply; sewerage, waste management and remediation activities (%)	1.0	1.3	1.0
F Construction (%)	9.0	9.7	8.6
G Wholesale and retail trade; repair of motor vehicles and motor cycles (%)	14.6	13.3	14.5
H Transport and storage (%)	3.7	2.9	3.8
I Accommodation and food service activities (%)	6.6	8.5	5.2
J Information and communication (%)	2.2	2.3	2.7
K Financial and insurance activities (%)	1.7	0.8	2.9
L Real estate activities (%)	1.4	1.5	1.3
M Professional, scientific and technical activities (%)	4.1	3.6	4.4
N Administrative and support service activities (%)	4.4	4.3	4.2
O Public administration and defence; compulsory social security (%)	7.9	8.4	9.2
P Education (%)	9.6	11.4	9.6
Q Human health and social work activities (%)	17.0	16.6	17.0
R, S, T, U Other (%)	4.5	5.2	4.2

Note: some columns on the table may not sum due to rounding.

Gross Value Added (GVA)

A.8.8 The Office for National Statistics (ONS) published data on GVA in 2024 for the year 2022 (Ref A.81). Gwynedd's GVA per person (£22,206) was lower than the average across Wales (£23,804) (Ref A.81). **Table A-12** presents the composition of GVA by industry in Gwynedd and Wales (Ref A.82). The largest industry by GVA in Gwynedd was Industry Q: Human health and social work activities (14.4%), followed by Industry L Real estate activities (marginally lower at 14.3%). Wales had a notably larger industry by GVA in industry C manufacturing (15.4%) compared to Gwynedd (7.5%). Gwynedd however had a much larger industry I accommodation and food services (8.4%) compared to Wales (3.7%).

Table A-12 – GVA by industry

Industry	Gwynedd	Wales
A Agriculture, forestry and fishing (%)	4.3	1.6
B Mining and quarrying (%)	N/A	0.3
C Manufacturing (%)	7.5	15.4

Industry	Gwynedd	Wales
D Electricity, gas, steam and air conditioning supply (%)	3.5	1.4
E Water supply; sewerage, waste management and remediation activities (%)	N/A	1.8
F Construction (%)	7.7	6.4
G Wholesale and retail trade; repair of motor vehicles and motor cycles (%)	8.8	10.0
H Transport and storage (%)	1.2	2.9
I Accommodation and food service activities (%)	8.4	3.7
J Information and communication (%)	3.1	2.9
K Financial and insurance activities (%)	0.5	6.1
L Real estate activities (%)	14.3	11.2
M Professional, scientific and technical activities (%)	2.0	4.1
N Administrative and support service activities (%)	1.4	3.2
O Public administration and defence; compulsory social security (%)	10.1	8.
P Education (%)	9.0	6.3
Q Human health and social work activities (%)	14.4	11.1
R Arts, entertainment and recreation (%)	2.2	1.2
S Other service activities (%)	1.7	1.6
T Activities of Households (%)	0.1	0.1

Deprivation

A.8.9 The 2019 Welsh Index of Multiple Deprivation presents deprivation data at LSOA level (Ref A.83). There are 1,909 LSOAs across Wales; the average rank of the LSOAs comprising Gwynedd was 1,080 (with 1 being the most deprived). Scores are also given for each LSOA, with 0 being the least deprived and 100 the most deprived. The average score across the Gwynedd LSOAs was 16.8. Furthermore, the median deprivation decile for Gwynedd's LSOAs was 6; this indicates that the average LSOA in Gwynedd is less deprived than 60% of LSOAs in Wales. Overall, Gwynedd is relatively less deprived on average.

Local Accommodation Capacity

A.8.10 Analysis of the hotel, bed and breakfast and inns accommodation sector has been undertaken to consider the likely capacity in the context of potential demand from the workforce for the Wider Works. Data on the number of rooms available within a 30 and 60-minute drive area in the hotel, bed and breakfast and inns accommodation sector has been sourced from CoStar, a property resource website (Ref A.84). Typical room occupancy is sourced from the Welsh Government's accommodation occupancy survey for 2023 (Ref A.85). As of 2024, there are 2,543 rooms in local hotel, bed and breakfast and inns accommodation within a 30-minute drive of the site, as well as 7,938 rooms within a 60-minute drive of the site. This number has been adjusted in **Table A-13** and **Table A-14** to reflect the typical availability based on seasonal occupancy rates.

Table A-13 – Accommodation capacity within a 30-minute drive time

Month	Typical room occupancy (%)	Inventory rooms	Rooms available after existing demand
January	47	2,543	1,348
February	56	2,543	1,119
March	59	2,543	1,043
April	63	2,543	941
May	69	2,543	788
June	71	2,543	737
July	76	2,543	610
August	80	2,543	509
September	75	2,543	636
October	66	2,543	865
November	56	2,543	1,119
December	60	2,543	1,017

Table A-14 – Accommodation capacity within a 60-minute drive time

Month	Typical room occupancy (%)	Inventory rooms	Rooms available after existing demand
January	47	7,938	4,207
February	56	7,938	3,493
March	59	7,938	3,255
April	63	7,938	2,937
May	69	7,938	2,461
June	71	7,938	2,302
July	76	7,938	1,905
August	80	7,938	1,588
September	75	7,938	1,985
October	66	7,938	2,699
November	56	7,938	3,493
December	60	7,938	3,175

PRoW and Recreational Routes

A.8.11 There are 71 PRoW that cross the Wider Works. All PRoWs are listed in **Volume 8, Appendix 6.5.L: Wider Works Socio-Economic Land Use Receptors**.

A.8.12 Within 500 m of the Wider Works site, there are a substantial number of PRoW, these are shown in **Figure 6.A.13: Public Rights of Way**.

A.8.13 The NCN route 8 and route 61 both cross the Wider Works site.

Open Space

A.8.14 There is one open space, the Llanrug United FC Eithin Duon Football Ground, within the Wider Works site.

A.8.15 There are a further 25 open spaces within 500 m of the Wider Works site. These are identified in **Volume 8, Appendix 6.5.L: Wider Works Socio-Economic Land Use Receptors.**

Community Facilities

A.8.16 There are 37 community facilities within 1 km of the Wider Works site. These receptors are identified in **Volume 8, Appendix 6. 5.L: Wider Works Socio-Economic Land Use Receptors.**

Residential Properties

A.8.17 There are several towns and villages within 500 m of the Wider Works site, where residential properties are concentrated:

- Pentrefelin.
- Llanllyfni.
- Penygroes.
- Carmel.
- Penyffridd.
- Rhostryfan.
- Waunfawr.
- Bro Rhythallt.
- Penisa'r Waun.

A.8.18 There is also a substantial number of isolated houses within 500 m of the Wider Works site. These are visible in **Figure 6.A.11**.

Visitor Attractions

A.8.19 There are 45 hospitality facilities providing visitor accommodation within 500 m of the Wider Works site. These are identified in **Volume 8, Appendix 6.5.L: Wider Works Socio-Economic Land Use Receptors.**

Business Premises

A.8.20 There are 24 business premises within 500 m of the Wider Works site. These are identified in **Volume 8, Appendix 6.5.L: Wider Works Socio-Economic Land Use Receptors**.

Agricultural Land Holdings

A.8.21 Most of the land that the Wider Works site crosses is agricultural pastoral land or moor and heathland.

A.8.22 There are approximately 280 land ownership parcels that overlap the Wider Works site, with a substantial additional number within 500 m.

Development Land

A.8.23 Development land refers to sites on which there are planning applications and planning permissions. The assessment considers the potential for the Wider Works to conflict with, hinder or otherwise adversely affect development land within or nearby to the wider works site.

A.8.24 Twelve MSAs are within 500 m of the Wider Works site. Nine of these are for sand and gravel, with four of these crossing the Wider Works site. The three other MSAs are for dolerite intrusions, none of which cross the Wider works site. There are also three mineral buffer zones within 500 m, one of which crosses the Wider Works site.

A.8.25 Two proposed developments have been identified within 500 m of the Wider Works site: an application for a vertical extension of existing sand and gravel pit; and the proposed siting of 323 holiday caravans/lodges across Brynteg Holiday Park, to include western former golf course area. Neither of these intersect the Wider Works site.

A.9 Climate Change

GHG Assessment

A.9.1 For the GHG assessment, the existing baseline refers to the current conditions at the Wider Works site. This includes the carbon stock and sources of GHG emissions within the boundary of existing on-site activities.

A.9.2 The Wider Works site is predominantly rural, comprising agricultural land, scattered woodland, hedgerows, and marshy grassland. This environment supports a relatively high carbon sink potential. The Wider Works site also includes areas used for the operation of transmission and distribution infrastructure.

CCRA and ICCI assessment

A.9.3 The CCRA and ICCI assessments consider how resilient the Wider Works and surrounding environment are to the current and projected future climate hazards. The receptor for the CCRA is the Wider Works including its assets and associated users. For the ICCI assessment receptors are as defined in the applicable technical chapters of this ES.

A.9.4 The current baseline for the CCRA and ICCI assessments is based on historic climate data obtained from the Met Office website recorded at the closest meteorological station to the Wider Works site (Cwmystradllyn) (Ref A.86). This is approximately 13 km north-west from the Wider Works site. The climate data covers the 30-year period 1981 to 2010 as detailed in **Table A-15**.

Table A-15 – Historical climate data for the Wider Works site

Climatic Variable	Baseline data 1981-2010
Mean Annual Max Temp (°C)	12.4
Mean Annual Min Temp (°C)	6.3
Mean summer maximum daily temp (°C)	17.9
Mean winter minimum daily temp (°C)	2.2
Warmest Month on Average (°C)	18.7
Warmest Month on Average (Month)	August
Coldest Month on Average (°C)	1.8
Coldest Month on Average (Month)	February
Frost days per annum	No data recorded
Mean annual Rainfall levels (mm)	1944.5
Mean summer rainfall (mm)	143.3
Mean winter rainfall (mm)	176.4
Wettest Month on Average (mm)	220
Wettest Month on Average (Month)	October
Driest Month on Average (mm)	104.7
Driest Month on Average (Month)	May

A.9.5 Qualitative information for other climate variables such as heatwaves, snowfall and storms is summarised below.

- Heatwaves: Annually, the Royal Meteorological Society publishes a report on the State of the Climate to highlight how the UK's weather and climate have deviated from historical averages. Since 1884, the top 10 warmest years in the UK have all occurred after 2002 (Ref A.87).
- Snowfall: The Met Office states that there is high confidence that spring snow cover extent in the Northern Hemisphere has decreased substantially since 1978 and that the number and severity of snow events have generally declined since the 1960s (Ref A.88).
- Storms: The Met Office states that there are no studies so far providing a link between changes in UK storminess and climate change (Ref A.89). This is because of the difficulty in detecting windstorms which means there is a lack of observed trends. However, solely focusing on wind speed, the State of the UK Climate 2023 report (Ref A.88) highlights that from 1969 to 2023, the UK annual mean wind speed demonstrates a downward trend, consistent with that observed globally.
- Landslides: Research shows that based on the British Geotechnical Association's National Landslide Database, there has been 2,735 previous landslides in Wales up until 2023, of which 182 are dated (Ref A.90).

A.9.6 In addition to historic climate data, information was also gathered on extreme weather events that have occurred at or near the Proposed Development within the past five years (2019–2024).

A.9.7 The events included were selected based on their geographic proximity to the site, their potential to disrupt transmission and distribution infrastructure, and their relevance to key climate-related hazards (e.g. flooding, high winds, landslides, and heatwaves). This non-exhaustive list of events provides additional context on the types of climate hazards that may pose operational and construction-phase risks:

- Storm Darragh (December 2024): Strong winds, heavy rain, and snow affected Wales, caused significant transport disruption, power outages, and fatalities. A rare red alert for wind was issued, warning of potential life-threatening conditions (Ref A.91).
- Storm Bert (November 2024): A multi-hazard storm brought strong winds, heavy rain, and snow causing disruption to road and rail transport. Several areas in Wales also faced severe flooding and landslides (Ref A.92).
- Heatwave (July 2024): Hot temperatures and dry conditions experienced across the UK, with temperatures over 25°C in Wales. Following the heatwaves, the Met Office issued a yellow alert across the UK including North Wales for thunderstorms and heavy rainfall (Ref A.93).
- Storm Ciaran (November 2023): The area close to the Wider Works experience extreme rainfall and strong winds, leading to widespread flooding across parts of Wales, including Porthmadog (Ref A.94).
- Cold days (later November 2023): Porthmadog experienced consecutive cold days with minimum temperatures reaching between -1°C to -3°C (Ref A.95).
- Unseasonably mild autumn (November 2022): Temperatures in Porthmadog reached 21.2°C on November 13, 2022 (Ref A.96).
- Storm Arwen (November 2022): Strong winds and heavy rainfall led to power outages and damage across parts of Wales, including Porthmadog (Ref A.97).

A.9.8 Although it falls outside the defined research period of 2019–2024, a 2018 landslide on Garth Road leading to Pen-y-Banc (between Porthmadog and Borth-y-Gest) is of contextual relevance. The 30-tonne landslip left residents cut off from access, with some unable to leave their properties, and involved the electricity board due to potential damage to underground power cables (Ref A.98). This event highlights the potential vulnerability of local infrastructure to ground movement and disruption during periods of extreme weather.

A.10 Water Quality, Resources and Flood Risk

Study Area

A.10.1 For the purposes of this assessment a Study Area of 1km from the Proposed Works has been set and is shown in (**Figure 6.A.14**).

Climate

A.10.2 The Meteorological Office (Met Office) website holds the latest set of 30-year rainfall averages, covering the period 1991-2020 (Ref A.99). Average annual rainfall of 1,100 millimetres per annum (mm/a) was recorded for the Llanbedr Airfield climate station, and an average annual rainfall of 1988 mm/a was recorded for the Cwmystradllyn climate station. It is important to highlight that the rainfall in the Snowdon catchment

more accurately reflects the Glaslyn system functions, colloquially values of up to 3,000mm to 5,000mm a year are quoted at Snowdon the source of the Afon Glaslyn.

Hydrology

A.10.3 The following section describes the hydrology associated with the proposed cable route. An overview can also be seen on **Figure 6.A.14**

A.10.4 The 4ZC cable route crosses multiple watercourses, however, due to the nature of works and existing infrastructure, no new watercourse crossings will be required. The overhead cables of the 4ZC cable route currently cross over the following Natural Resources Wales (NRW) Main Rivers:

- Cegin
- Seiont
- Glan Yr Fach
- Gwyrfai
- Rhyd
- Llyfni
- Cae'r Hen Gaer
- Crychddwr
- Cwm Dulyn
- Dwyfach
- Dwyfor
- Prysor

A.10.5 The route also intersects multiple Ordinary Watercourses and field drainage ditches (see **Figure 6.A.14**).

A.10.6 The main watercourse crossing associated with the overall Pentir to Trawsfynydd reinforcement project is the crossing of the Glaslyn. However, this crossing is assessed within a separate part of the cable route to the 4ZC cable section and is covered within **Volume 4 – Glaslyn Cables Works**. As such, this crossing will not be assessed as part of this Volume.

Geology, Hydrogeology and Soils

Geology

A.10.7 This section provides a summary of the bedrock and superficial deposits within the Water Quality, Resources and Flood Risk Study Area.

A.10.8 **Table A-16** provides a summary of the bedrock and superficial deposits underlying the Water Quality, Resources and Flood Risk Study Area from BGS geology data (Ref A.100).

Table A-16 - Bedrock and superficial deposits

Cable route section	Bedrock geology	Superficial deposits
4ZC140- 4ZC044	Lower cambrian rocks (undifferentiated) - mudstone, siltstone and sandstone	Glacial sand and gravel
	Upper cambrian, including tremadoc - sandstone and conglomerate, interbedded	Till diamicton
	Unnamed extrusive rocks, ordovician - Felsic Tuff	Peat
	Lower cambrian rocks (undifferentiated) - sandstone and conglomerate, interbedded	
	Llanvirn rocks (undifferentiated) - mudstone, siltstone and sandstone	
	Caradoc rocks (undifferentiated) - mudstone, siltstone and sandstone	
	Tremadoc rocks (undifferentiated) - mudstone, siltstone and sandstone	
4ZC027 – 4ZC05	Lower cambrian rocks (undifferentiated) – sandstone and conglomerate, interbedded	Alluvium – Clay, Silt and Sand
	Middle cambrian - mudstone, siltstone and sandstone	Till Diamicton
	Upper cambrian, including tremadoc - mudstone, siltstone and sandstone	

Hydrogeology

Aquifer status

A.10.9 The aquifer status of the Bedrock and superficial deposits on the cable route are provided in **Table A-17**.

Table A-17 - Aquifer status

Cable route section	Bedrock aquifer status	Superficial deposits aquifer status
4ZC146- 4ZC044	Secondary B	Secondary A
		Unproductive
	Secondary A	Secondary (undifferentiated)
4ZC029 – 4ZC05	Secondary B	Secondary (undifferentiated)

Aquifer vulnerability

A.10.10 The bedrock and superficial deposits aquifer vulnerabilities along the cable route are shown in **Table A-18**.

Table A-18 - Aquifer vulnerability

Cable route section	Bedrock vulnerability	Superficial deposits vulnerability
4ZC135- 4ZC044	Low, medium and high	Low, medium and high
4ZC029 – 4ZC05	Medium and high	Medium and high

Soils

A.10.11 This section provides a summary of the soils (Ref A.101) within the Water Quality, Resources and Flood Risk Study Area.

- 4ZC146- 4ZC044
  - Freely draining slightly acid loamy soils;
  - Slowly permeable wet very acid upland soils with a peaty surface;
  - Loamy and clayey floodplain soils with naturally high groundwater;
  - Shallow very acid peaty soils over rock;
  - Freely draining acid loamy soils over rock;
  - Slowly permeable seasonally wet acid loamy and clayey soils;
  - Very acid loamy upland soils with a wet peaty surface;
  - Blanket bog peat soils; and
  - Loamy and clayey soils of coastal flats with naturally high groundwater.
- 4ZC029 – 4ZC05
  - Freely draining acid loamy soils over rock; and
  - Slowly permeable seasonally wet acid loamy and clayey soils.
  - Bryncir Substation
  - Slowly permeable wet very acid upland soils with a peaty surface; and
  - Freely draining slightly acid loamy soils

Abstractions and Discharges

A.10.12 Licenced abstractions and discharges data within the Water Quality, Resources and Flood Risk Study Area have been obtained from NRW and are presented in **Figure 6.A.15**.

Abstractions

A.10.13 NRW data shows that there are 11 surface water licensed abstractions within Water Quality, Resources and Flood Risk Study Area. These abstractions are associated with mining operations, energy production and public water supply:

- 6 abstractions for industrial, commercial and public services.
- 2 abstractions for energy production.
- 2 abstractions for public water supply.
- 1 abstraction for impounding.

A.10.14 There are no groundwater abstractions present within the Water Quality, Resources and Flood Risk Study Area.

Discharges

A.10.15 There are 52 licensed discharges in the Water Quality, Resources and Flood Risk Study Area. NRW data shows that these include sewage from water undertakers and non-water undertakers, and trade discharges:

- 15 sewage dischargers from non-water undertakers.
- 20 sewage discharges from water undertakers.
- 3 discharges from sewage and trade.
- 14 discharges from trade.

Private water supplies

A.10.16 Private Water Supply (PWS) data has been requested from local councils, and are presented in **Figure 6.A.16**. In total there are 69 PWSs within Water Quality, Resources and Flood Risk Study Area.

Water Dependant Designated Sites

Conservation Sites

A.10.17 An analysis of statutory and non-statutory conservation sites (Ref A.102) was undertaken to assess the water dependency of conservation sites within the Water Quality, Resources and Flood Risk Study Area (conservation sites with no water dependency were screened out):

- Four National Nature Reserves (NNR);
- Four Special Areas of Conservation (SAC);
- Ten Sites of Special Scientific Interest (SSSI);
- No Ramsar or Special Protection Areas (SPA);
- No Local Nature Reserves (LNR);

Table A-19 - Water dependant conservation sites

Site name	Designation	Water dependency
Cors Gyfelog	National Nature Reserve	Swamp
Coed Y Rhygen	National Nature Reserve	Atlantic rainforest
Morfa Harlech	Site of Special Scientific Interest	Estuarine saltmarsh

Ceunant Llennyrch	National Nature Reserve	Atlantic rainforest
Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau	Special Area of Conservation	Marine
Corsydd Eifionydd / Eifionydd Fens	Special Area of Conservation	Transition mires and quaking bogs
Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites	Special Area of Conservation	Sites within the SAC have a water designation
Afon Gwyrfai a Llyn Cwellyn	Special Area of Conservation	Consists of two lakes and a river
Afon Gwyrfai a Llyn Cwellyn	Site of Special Scientific Interest	Site includes areas of running and standing water
Coedydd Dyffryn Ffestiniog (Gogleddol)	Site of Special Scientific Interest	Wet woodland
Coedydd De Dyffryn Maentwrog	Site of Special Scientific Interest	Wet woodland
Cors Gyfelog	Site of Special Scientific Interest	Swamp and mire
Cors Llanllyfni	Site of Special Scientific Interest	Wet heath habitat
Glaslyn	Site of Special Scientific Interest	Various water environment features including wet woodland, floodplain and riverine habitat
Llystyn Isaf	Site of Special Scientific Interest	Wetland habitat
Morfa Harlech	Site of Special Scientific Interest	Geomorphological features and saltmarsh
Pant Cae Haidd	Site of Special Scientific Interest	Fen Meadow
Tiroedd a Glannau Rhwng Cricieth ac Afon Glaslyn	Site of Special Scientific Interest	Reedswamp, grazing marsh, fen meadow and fen woodland

Bathing Waters

A.10.18 There are no designated bathing waters within the Water Quality, Resources and Flood Risk Study Area.

Water Quality and Water Framework Directive Assessment

A.10.19 A full WFD assessment is included in **Volume 8, Appendix 6.5.M**, however, a summary of the WFD water bodies is intersected by the 4ZC cable route is provided in **Table A-20**. An overview can also be seen on **Figure 6.A.16.**

Table A-20 - WFD water bodies intersected by the 4ZC cable route

WFD Waterbody Name	Waterbody ID	Waterbody Type
Nant-y-Garth (Menai Strait)	GB110065058490	River
Cegin	GB110065058540	River
Seiont	GB110065054040	River
Gwyrfai - downstream of Cwellyn	GB110065054190	River
Carrog	GB110065053990	River
Llifon	GB110065053980	River
Llyfni	GB110065053970	River
Dwyfach	GB110065053730	River
Dwyfawr - lower	GB110065053660	River
Cwmystradllyn	GB110065053690	River
Porthmadog Cut	GB110065053800	River
Llyn and Eryri	GB41002G204600	Groundwater
Llyn Tecwyn Uchaf	GB31034866	Lake
Llyn Trawsfynydd	GB31034870	Lake
Glaslyn	GB511006507300	Transitional

Flood Risk

Fluvial, tidal and surface water flood risk

A.10.20 An analysis of flood risk was undertaken for the Proposed Works through an analysis of NRW flood mapping. **Annex A** details instances of where Proposed Works intersect areas at risk of fluvial and surface water flooding as shown on NRW flood mapping. An overview can also be seen on **Figure 6.A.17.**

Groundwater flood risk

A.10.21 Areas at risk of flooding from groundwater are generally located in valley bottoms and topographic low points, all infrastructure associated with the Proposed Works will be raised above these areas.

Sewer flood risk

A.10.22 No specific sewer flood risk data is available for within the Study Area, however given the rural setting of the proposed development and raised nature of all infrastructure, sewer flooding is unlikely to cause a significant risk.

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Annex A Fluvial and surface water flood risk

Table AA-1 lists the areas of mapped NRW fluvial and surface water flood risk which intersects the Proposed Works. The table is divided by drawing sheet number based on design drawings 30003543-BHK-XX-XX-DR-HV- 1057 to 1081 (sheets 1 to 25), with the corresponding sheets on **Figure 6.A.17** also included.

Table AA-1 – Mapped fluvial and surface water flood risk which intersects the Wider Works

Figure 6.A.17 sheet no.	Areas of flood risk	Wider Works intersect
1	Surface water FZ3	Towers (140R/141/145) CDM Area (140R/141/145) Installing fibre wrap on existing earthwire (146 - 143) Access road
	Surface water FZ2	Towers (140R & 141) CDM Area (140R & 141) Installing fibre wrap on existing earthwire (146 - 143) Access road
	Fluvial FZ3	Installing fibre wrap on existing earthwire (140R - 139) Access road
	Fluvial FZ2	Towers (140R) CDM Area (140R) Installing fibre wrap on existing earthwire (140R - 139) Access road
1	Surface Water FZ3	Installing fibre wrap on existing earthwire (135 – 134 & 134 – 133)
	Surface Water FZ2	Installing fibre wrap on existing earthwire (135 – 134 & 134 – 133) Access road
1	Surface water FZ3	Towers (130) CDM Area (130) Installing fibre wrap on existing earthwire (131 – 130 & 129 – 128) Access road Scaffold area
	Surface water FZ2	Towers (130)

Figure 6.A.17 sheet no.	Areas of flood risk	Wider Works intersect
		CDM Area (130) Installing fibre wrap on existing earthwire (132-126) Access road Scaffold area
1	Surface water FZ3	Installing fibre wrap on existing earthwire (126-125) Access roads
	Surface water FZ2	Tower (122 & 124) CDM Area (122 & 124) Installing fibre wrap on existing earthwire (122-121 &126-125)
	Fluvial FZ3	Overhead line restringing works (121-120) Installing fibre wrap on existing earthwire (121-120)
	Fluvial FZ2	Installing fibre wrap on existing earthwire (121-120)
1	Surface water FZ3	Installing fibre wrap on existing earthwire (117-116)
	Surface water FZ2	Tower (117) CDM area (117) Installing fibre wrap on existing earthwire (119-116)
1	Surface water FZ3	Tower (115) CDM area (115) Installing fibre wrap on existing earthwire (115-112 & 111-110)
	Surface water FZ2	Tower (115) CDM area (115) Installing fibre wrap on existing earthwire (116-114 & 113-110)
1 & 2	Surface water FZ3	Tower (109) CDM area (110, 109 &106) Installing fibre wrap on existing earthwire (110-108 & 107-105) Scaffold area Access roads
	Surface water FZ2	Tower (109) CDM area (108. 109) Installing fibre wrap on existing earthwire (110-108 & 107-105)

Figure 6.A.17 sheet no.	Areas of flood risk	Wider Works intersect
		Scaffold area Access roads
2	Surface water FZ3	Installing fibre wrap on existing earthwire (106-105 & 104-103)
	Surface water FZ2	Tower (105) CDM area (105) Installing fibre wrap on existing earthwire (106-103) Access roads
2	Surface water FZ3	Tower (097) CDM area (097) Installing fibre wrap on existing earthwire (097-095) Access roads
	Surface water FZ2	Tower (097) CDM area (097) Installing fibre wrap on existing earthwire (098-095) Access roads
	Fluvial FZ3	CDM area (097) Installing fibre wrap on existing earthwire (099-098, 097-095)
	Fluvial FZ2	CDM area (097) Installing fibre wrap on existing earthwire (099-098, 097-095)
	Reservoir	Tower (097) CDM area (097) Installing fibre wrap on existing earthwire (098-096)
2	Surface water FZ3	Installing fibre wrap on existing earthwire (094-092) Access roads
	Surface water FZ2	Tower (092 & 95) CDM area (092 & 95) Installing fibre wrap on existing earthwire (095-090) Access roads
	Fluvial FZ3	Tower (093)

Figure 6.A.17 sheet no.	Areas of flood risk	Wider Works intersect
		CDM area (093) Installing fibre wrap on existing earthwire (094-092) Access roads
	Fluvial FZ2	Tower (093) CDM area (093) Installing fibre wrap on existing earthwire (094-092) Access roads
2	Surface water FZ3	Tower (089, 088 & 085) CDM (089, 088 & 085) Installing fibre wrap on existing earthwire (090-087 & 086-085). Access roads
	Surface water FZ2	Tower (089, 088 & 085) CDM (089, 088 & 085) Installing fibre wrap on existing earthwire (090-087 & 086-085). Access roads
	Fluvial FZ3	Installing fibre wrap on existing earthwire (090-089)
	Fluvial FZ2	Installing fibre wrap on existing earthwire (090-089)
2 & 3	Surface water FZ3	Tower (085, 082 &0 81) CDM (085, 082 &0 81) Installing fibre wrap on existing earthwire (085-081).
	Surface water FZ2	Tower (085, 082 &081) CDM (085, 082 &081) Installing fibre wrap on existing earthwire (085-081).
3	Surface water FZ3	Tower (081 & 080) CDM (081, 080, 079 & 078) Installing fibre wrap on existing earthwire (081-077). Access roads
	Surface water FZ2	Tower (081 & 080) CDM (081, 080, 079 & 078) Installing fibre wrap on existing earthwire (081-077). Access roads

Figure 6.A.17 sheet no.	Areas of flood risk	Wider Works intersect
	Fluvial FZ3	CDM area (080) Installing fibre wrap on existing earthwire (080-079). Access roads
	Fluvial FZ2	CDM area (080) Installing fibre wrap on existing earthwire (080-079). Access roads
3	Surface water FZ3	CDM area (075 & 073) Installing fibre wrap on existing earthwire (075-072). Access roads
	Surface water FZ2	CDM area (075 & 073) Installing fibre wrap on existing earthwire (075-072). Access roads
	Fluvial FZ3	Tower (073 & 072) CDM area (073 & 072) Installing fibre wrap on existing earthwire (074-071). Access roads
	Fluvial FZ2	Tower (073 & 072) CDM area (073 & 072) Installing fibre wrap on existing earthwire (074-071). Access roads
3	Surface water FZ3	Bryncir Substation Tower (070) Tower laydown area (070) CDM area (070 & 067) Installing fibre wrap on existing earthwire (071-070) Installing new overhead line (070-069 &067-066). Access roads
	Surface water FZ2	Bryncir Substation Tower (070) Tower laydown area (070) CDM area (070 & 067) Installing fibre wrap on existing earthwire (071-070) Installing new overhead line (070-069 &067-066). Access roads

Figure 6.A.17 sheet no.	Areas of flood risk	Wider Works intersect
	Fluvial FZ3	Tower (070 &71) Tower laydown area (070) CDM area (070 & 071) Installing fibre wrap on existing earthwire (072-070) Installing new overhead line (070-066). Access roads
	Fluvial FZ2	Tower (070 &71) Tower laydown area (070) CDM area (070 & 071) Installing fibre wrap on existing earthwire (072-070) Installing new overhead line (070-066). Access roads
3	Surface water FZ3	CDM area (065) Installing new overhead line (067-065 & 62-61) Access road
	Surface water FZ2	CDM area (065) Installing new overhead line (067-065 & 62-61) Access road
	Fluvial FZ3	Installing new overhead line (062-061)
	Fluvial FZ2	Installing new overhead line (062-061)
3	Surface water FZ3	Installing new overhead line (062-060) Tower laydown area (061) Access road
	Surface water FZ2	Installing new overhead line (062-060) Tower laydown area (061) Access road Tower (061) CDM area (061) Installing new overhead line (062-060) EPZ areas (061)
	Fluvial FZ3	Tower (061) CDM area (061) Installing new overhead line (062-060)

Figure 6.A.17 sheet no.	Areas of flood risk	Wider Works intersect
		EPZ areas (061)
	Fluvial FZ2	Tower (061) CDM area (061) Installing new overhead line (062-060) EPZ areas (061)
3	Surface water FZ3	Installing new overhead line (056-055) EPZ area (052)
	Surface water FZ2	Installing new overhead line (056-055)
3	Surface water FZ3	CDM area (048) Installing new overhead line (052-050, 049-046)
	Surface water FZ2	CDM area (048) Installing new overhead line (052-050, 049-046)
3	Surface water FZ2	Installing new overhead line (045-044)
	Coastal	CDM area – (044) and Wern cable site EPZ area – Wern cable site Tower laydown area – Wern cable site
4	Surface water FZ3	Tower (027 & 026) CDM area (027 & 026) Tower laydown area (029, 028 and 27) Installing overhead lines and modifying overhead lines (0260-025)
	Surface water FZ2	Tower (027 & 026) CDM area (027 & 026) Tower laydown area (029, 028 and 27) Installing overhead lines and modifying overhead lines (0260-025)
	Tidal	CDM area (027) Tower laydown area (029, 028 & 027)
4	Surface water FZ3	CDM area (025, 024, 023 & 22) Installing overhead lines and modifying overhead lines (026-020)

Figure 6.A.17 sheet no.	Areas of flood risk	Wider Works intersect
	Surface water FZ2	CDM area (025, 024, 023 & 22) Installing overhead lines and modifying overhead lines (026-020
4	Surface water FZ3	Tower (019) CDM area (019, 015 & 014) Installing overhead lines and modifying overhead lines (020-016 & 015-014) Access roads
	Surface water FZ2	Tower (019) CDM area (019, 015 & 014) Installing overhead lines and modifying overhead lines (020-016 & 015-014) Access roads
4	Surface water FZ3	Tower (010) CDM area (014, 011, 010) Installing overhead lines and modifying overhead lines (013 -019) EPZ area (014) Access roads
	Surface water FZ2	Tower (010) CDM area (014, 011, 010) Installing overhead lines and modifying overhead lines (013 -019) EPZ area (014) Access roads
	Fluvial FZ3	Installing overhead lines and modifying overhead lines (013 -012)
	Fluvial FZ2	Installing overhead lines and modifying overhead lines (013 -012)
4	Surface water FZ3	CDM area (007, 006 & 005) Installing overhead lines and modifying overhead lines (009 -005) EPZ area (007) Access roads
		CDM area (007, 006 & 005)

Figure 6.A.17 sheet no.	Areas of flood risk	Wider Works intersect
	Surface water FZ2	Installing overhead lines and modifying overhead lines (009 -005) EPZ area (007) Access roads

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