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# Pentir to Trawsfynydd Reinforcement Project

Environmental Statement Volume 7: The Project and Cumulative Effects  
September 2025

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# 1. Introduction

## 1.1 Introduction

- 1.1.1 Volume 7 (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 presents an assessment of the effects of the Project as a whole (to account for individual components of the Project impacting the same receptor), an in-combination effects assessment (to account for receptors being impacted by multiple sources of effect), and a cumulative effects assessment (to identify where other projects potentially impact receptors that are also impacted by the Project). It provides an assessment of likely effects that could arise from the construction (including decommissioning of existing infrastructure), and operation and maintenance of the Project. A description of the Project is provided in **Chapter 2: The Project**.
- 1.1.3 The impacts of the individual components of the Project are assessed in **Volume 2: Pentir Works, Volume 3: Bryncir Works, Volume 4: Glaslyn Cables Works, Volume 5: Trawsfynydd Works and Volume 6: Wider Works**. This volume considers the conclusions of **Volumes 2 – 6** to inform this assessment of the Project as a whole.
- 1.1.4 This volume is supported by **Appendices 7.1.A Electro-Magnetic Field (EMF) study, 7.1.B Report to Inform Habitats Regulation Assessment (HRA), 7.4.A: Screening for In-Combination Effects and 7.4.B Cumulative Effects Assessment**.

## 1.2 Structure of the Volume

- 1.2.1 This volume is structured as follows:
- **Chapter 1: Introduction.**
  - **Chapter 2: The Project.**
  - **Chapter 3: Project Wide Effects.**
  - **Chapter 4: In-Combination Effects.**
  - **Chapter 5: Cumulative Effects.**

## 1.3 Figures and Appendices

- 1.3.1 All figures noted in this volume are in an appendix attached to this volume. All other supporting documents are compiled in **Volume 8: Appendices**.
- 1.3.2 The figure numbering system is as follows: volume number, chapter number then 1, 2, 3 etc. For example, **Figure 7.1.1**.

- 1.3.3 The appendix numbering system is as follows: volume number, chapter number, then A, B, C etc. For example, **Appendix 7.1.A**. All figures associated with a given appendix will follow the same system, followed by the figure number, for example, a figure to Appendix 7.1.A would be Figure 7.1.A.1, 2, 3 etc.

## 2. The Project

### 2.1 Introduction

- 2.1.1 This chapter provides a summary description of the location of the Project, the infrastructure is proposed and construction and operational details.

### 2.2 Project Location

- 2.2.1 The works comprising the Project are proposed at sites in North West Wales between Pentir Substation (SH 559677), approximately 4.5 km south-west of Bangor and Trawsfynydd Substation (SH 691384), approximately 1.2 km south of Gellilydan. Most of the works that comprise the Project are in the district of Gwynedd Council and some in Eryri National Park. The locations of the works in the Project are illustrated on **Figure 1.2.1** (the 'Project work site').
- 2.2.2 The Project work site passes through undulating land with a high point of 230 metres (m) Above Ordnance Datum (AOD) at Tower 4ZC113, east of Penffridd. The elevation of the Project work site gradually reduces to 0 m AOD where the Project intersects the Glaslyn Site of Special Scientific Interest (SSSI), east of Porthmadog. As the Project work site continues east towards Trawsfynydd, the elevation increases to 180 m AOD at Trawsfynydd Substation.
- 2.2.3 The Project work site intersects numerous Public Rights of Way (PRoW) including footpaths, bridleways and byways (open and restricted) along its length. The Project work site intersects National Cycle Route (NCR) 61, south of the A4085; NCR 8 on four separate occasions, which broadly runs along the A487 between Bontnewydd and Penrhyndeudraeth; and National Cycle Route 82 to the east of Minffordd.
- 2.2.4 The Project work site is characterised by predominantly rural land uses with scattered woodland. The Project work 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).
- 2.2.5 The Project work site crosses numerous designated Main Rivers and their associated tributaries. Llyn Tecwyn-uchaf is also spanned by the Project. The Project spans low, medium and high flood risk areas.
- 2.2.6 The Project work 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 Project work site intersects multiple non-statutory Local Wildlife Sites (LWS) (candidate and confirmed) along its length. The Project work site and surrounding area contain a variety of resources, including priority or notable habitats and records of protected or notable species.

## 2.3 Project Description

- 2.3.1 The Project work site covers an area of approximately 356 hectares (ha) and includes the Pentir, Bryncir, Glaslyn and Trawsfynydd work sites as well the Wider Works site.

### Pentir Substation Works

- 2.3.2 The Pentir Substation Works are in the existing Pentir substation compound and comprise replacement of existing underground cables; installation of new cross-site underground cables; and related works. Details are provided in **Volume 2**.

### Bryncir Works

- 2.3.3 The Bryncir Works are summarised below with details provided in **Volume 3**:
- New substation, including a new permanent access road.
  - New section of underground cable.
  - Removal of existing Tower 4ZC067 and installation of a replacement tower 80 m north-west of its current position.
  - Realignment of the DB 132 kV route and decommissioning and removal of a redundant section.
  - Permanent diversion of the Dolbenmaen No 18 footpath.
  - New landowner access track.
  - Reinstatement of working areas.

### Glaslyn Cables Works

- 2.3.4 The Glaslyn Cables Works are summarised below with details provided in **Volume 4**:
- An extension to the Wern CSEC, including a permanent new access road.
  - Installation of replacement underground cable by open cut trenching and trenchless (Horizontal Directional Drilling (HDD)) techniques.
  - Installation of the Minffordd CSEC and a new THH, previously consented as part of the Eryri Visual Impact Provision (EVIP) project with an increased floor height.
  - Decommissioning of the existing 132 kV and 400 kV cable circuits as well as the Garth CSEC.
  - Reinstatement of working areas.

### Trawsfynydd Substation Works

- 2.3.5 The Trawsfynydd Substation Works are summarised below with details provided in **Volume 5**:
- Removal of redundant cables.
  - Installation of new 400 kV cables, a shunt reactor and gantry.

- Replacement downleads from Tower 4ZC005.
- Alterations to the fence alignment.
- Reinstatement of working areas in the substation.

## Wider Works

- 2.3.6 As part of the Project, NGET intends to replace the conductors on the existing 'coastal' circuit between Towers 4ZC005 – 4ZC027 and Towers TZC044 to 4ZC070 (the 'Wider Works'), and to install a 23 km length of wrapped fibre optic connection between Tower 4ZC070 and Tower 4ZC140. Details are in **Volume 6**.

## 3. Project Wide Effects

### 3.1 Approach and Methodology

- 3.1.1 Planning Inspectorate's Advice Note Nine Rochdale Envelope (The Planning Inspectorate, 2018) (Ref 3.1) states:

*"The ES should not be a series of separate unrelated topic reports. The inter-relationship between aspects of the proposed development should be assessed and careful consideration should be given by the developer to explain **how inter-relationships have been assessed in order to address the environmental impacts of the proposal as a whole**. It need not necessarily follow that the maximum adverse impact in terms of any one topic impact would automatically result in the maximum potential impact when a number of topic impacts are considered collectively. In addition, individual impacts may not be significant when their inter-relationship is assessed. It will be for the developer to demonstrate that the likely significant impacts of the project have been properly assessed."* (Our emphasis)

- 3.1.2 The Planning Inspectorate's advice on the assessment of cumulative effects in National Significant Infrastructure Project (NSIP): Advice on Cumulative Effects Assessment (Planning Inspectorate, 2024) (Ref 3.2) includes the following:

*"Development related to the NSIP (including permitted development)*

*A proposed NSIP may comprise multiple sites in different locations, for example where offsite highways improvements are required. This may include development where consent is sought under a different planning regime such as the Town and Country Planning Act 1990. In these circumstances, **the applicant should consider if cumulative effects could arise from the different development components of their NSIP, as well as with other existing and, or approved development**."* (Our emphasis)

- 3.1.3 The Project is not an NSIP however the principle of assessing all the 'different development components' applies similarly to the component parts of the Project presented in **Volumes 2 – 6**.
- 3.1.4 Where project components are assessed individually, there is a need to consider potential significant effects that could arise at the project-wide level, but which are not apparent when focusing on the individual components. For the Project, the ES is split across five components set out at 2.3 above. The first four components listed are geographically separated but the Wider Works interface at the Bryncir Works, at the two CSECs at the Glaslyn Cables Works and at the Trawsfynydd Works. There are also circumstances where a widespread terrestrial resource could exceed a threshold for significance which is not apparent when considering one component in isolation.
- 3.1.5 To undertake this project-wide assessment, the findings of the individual chapters, for those receptors screened in (see **Table 3-2**), have been reviewed to understand and interpret the potential additional effects that may be of greater significance when compared to individual effects arising from one of the five components of the Project.



Where additional effects are identified, these are considered additively and qualitatively using professional judgement.

- 3.1.6 The approach undertaken for this assessment has two stages.
- **Stage 1:** Review and identification of shared receptors from assessments undertaken for each technical chapter in **Volumes 2 – 6** at the interface locations.
  - **Stage 2:** Assessment of project-wide effects for any shared receptors identified under Stage 1.
- 3.1.7 **Table 3-1** considers potential pathways for a project-wide effect to occur on receptor groups between component parts. The receptor groups were identified using the professional judgement of technical specialists who identified receptor categories that might be relevant, for any project. These were further reviewed to determine whether, in the case of the Project, circumstances arise where a potential effect could occur.

Table 3-1 Potential for project-wide effects between component parts

Receptor groups	Potential for a project-wide effect
Landscape elements	<p>There are defined landscape resources, (e.g. Landscape Character Areas (LCAs)) extending across more than one project component Study Area. The potential for increased impacts will be assessed further.</p> <p>Whilst there is intervisibility between Wider Works and each of the Project components, due to the nature of the Wider Works being works along an existing overhead line that forms part of the assessment baseline, it considered that there would be no increase in the magnitude of impact already identified in <b>Volumes 2-6</b> and no change in impact significance.</p>
Residential receptors or communities	<p>Shared residential or community receptors have only been identified between Wider Works and each of the Project components. Due to the nature of the Wider Works being works along an existing overhead line that forms part of the assessment baseline, it considered that there would be no increase in the magnitude of impact already identified in <b>Volumes 2-6</b> and no change in impact significance.</p>
Commercial receptors	<p>Shared commercial receptors have only been identified between Wider Works and each of the Project components. Due to the nature of the Wider Works being works along an existing overhead line that forms part of the assessment baseline, it considered that there would be no increase in the magnitude of impact already identified in <b>Volumes 2-6</b> and no change in impact significance.</p>
Statutory or non-statutory sites	<p>There are shared statutory and non-statutory sites extending across more than one project component Study Area. The potential for increased impacts will be assessed further.</p>

Receptor groups	Potential for a project-wide effect
Terrestrial and aquatic ecological receptors or notable habitats	There are terrestrial and aquatic ecological receptors or notable habitats present across more than one project component Study Area. The potential for increased impacts will be assessed further.
Designated heritage assets or non-designated heritage assets	Shared heritage assets have only been identified between Wider Works and each of the Project components. Due to the nature of the Wider Works being works along an existing overhead line that forms part of the assessment baseline, it considered that there would be no increase in the magnitude of impact already identified in <b>Volumes 2-6</b> and no change in impact significance.
Water resources (existing abstractions and discharges or watercourses or flood risk receptors or ground water)	Shared water resources have only been identified between Wider Works and each of the Project components. Due to the nature of the Wider Works being works along an existing overhead line that forms part of the assessment baseline, it considered that there would be no increase in the magnitude of impact already identified in <b>Volumes 2-6</b> and no change in impact significance.
Agricultural land or soils	Shared agricultural land and soils receptors have only been identified between Wider Works and each of the Project components. Due to the nature of the Wider Works being works along an existing overhead line that forms part of the assessment baseline, it considered that there would be no increase in the magnitude of impact already identified in <b>Volumes 2-6</b> and no change in impact significance.
PRoW or cycle paths or roads	Shared PRoWs, Cycle Routes and roads have only been identified between Wider Works and each of the Project components. Due to the nature of the Wider Works being works along an existing overhead line that forms part of the assessment baseline, it considered that there would be no increase in the magnitude of impact already identified in <b>Volumes 2-6</b> and no change in impact significance.
Geology	Shared geological resources have only been identified between Wider Works and each of the Project components. Due to the nature of the Wider Works being works along an existing overhead line that forms part of the assessment baseline, it considered that there would be no increase in the magnitude of impact already identified in <b>Volumes 2-6</b> and no change in impact significance.
Greenhouse Gas (GHG) Emissions	The nature of GHGs is such that their impact on receptors (the global climate) is not affected by the location of their source. The individual GHG emissions assessments by their nature consider whether the Project would contribute significantly to emissions on a national level and therefore it is screened out of further assessment in this volume. Individual GHG assessments have been carried out in <b>Chapter 13: Climate Change of Volumes 2-5</b> and <b>Chapter 5 of Volume 6</b> .

- 3.1.8 **Table 3-1** demonstrates that there are shared receptors between the various components of the Project. Although Pentir, Trawsfynydd, Glaslyn Cables and Bryncir Works are geographically separated, there is a potential for each component to combine to generate new significant project-wide effects, particularly where regionally or nationally important receptors are present.

## 3.2 Assessment of Project-wide Effects

- 3.2.1 The assessment of the project-wide effects of the Project, described in this section, considers the embedded mitigation, control and management measures, and any additional mitigation measures, identified within the technical assessment chapters of **Volumes 2 – 6**.

### Stage 1 Screening and Review of Shared Receptors

- 3.2.2 **Table 3-2** presents a screening of the receptors identified as having the potential for project-wide effects.

Table 3-2 Screening of shared receptors

Receptor Group	Pentir Works	Bryncir Works	Glaslyn Cables Works	Trawsfynydd Works	Wider Works
Landscape elements	1. NLCA 03 Arfon	1. NLCA 03 Arfon	1. NLCA 05 Tremadoc Bay	1. NCLA 06 Eryri	1. NLCA 03 Arfon,
1. National Landscape Character Areas (NLCA)		NLCA 05 Tremadoc Bay	NLCA 06 Eryri	2. E LCA 08 Vale of Ffestiniog	NLCA 05 Tremadoc Bay
2. Local Landscape Character Areas (LCA) Gwynedd (G) and Eryri (E)		NCLA 06 Eryri	2. G LCA 10 Central Llyn		NLCA 06 Eryri
		2. G LCA 10 Central Llyn.	E LCA 04 Moel Hebog Uplands.		2. G LCA 10 Central Llyn.
		E LCA 04 Moel Hebog Uplands.	E LCA 08 Vale of Ffestiniog		E LCA 04 Moel Hebog Uplands.
					E LCA 08 Vale of Ffestiniog.
Statutory or non-statutory sites	1. N/A	1. Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	1. Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	1. N/A	1. Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC
1. International and National Statutory Sites					
Terrestrial and aquatic ecological receptors or notable habitats	1. N/A	1. Veteran Trees	1. Veteran Trees	1. Veteran Trees	1. Veteran Trees
	2. Lowland dry acid grassland/purple moor-grass and rush pasture	2. Lowland dry acid grassland/purple moor-grass and rush pasture	2. Lowland dry acid grassland/purple moor-grass and rush pasture	3. Hedgerow and Cloddiau	2. Lowland dry acid grassland/purple moor-grass and rush pasture
1. Veteran or Ancient Trees				Non-HoPI Woodland	
2. Habitats of Principal Importance	Semi-natural broadleaved woodland (Upland	Semi-natural broadleaved woodland (Upland	3. Running water Hedgerow and Cloddiau	(broadleaved semi-natural woodland, broadleaved	Semi-natural broadleaved woodland (Upland
3. Other Notable Habitats					

Receptor Group	Pentir Works	Bryncir Works	Glaslyn Cables Works	Trawsfynydd Works	Wider Works
4. Terrestrial and Aquatic Ecological Receptors	oakwood, Lowland mixed deciduous woodland, Wet woodland and Wood pasture and parkland)	oakwood, Lowland mixed deciduous woodland, Wet woodland and Wood pasture and parkland)	Standing water Non-HoPI Neutral semi-improved grassland Ancient woodland	plantation woodland, mixed semi-natural woodland, mixed plantation woodland, individual trees)	oakwood, Lowland mixed deciduous woodland, Wet woodland and Wood pasture and parkland)
	3. Running water Hedgerow and Cloddiau Standing water Non-Habitats of Principal Importance (HoPI) Woodland (broadleaved semi-natural woodland, broadleaved plantation woodland, mixed semi-natural woodland, mixed plantation woodland, individual trees	3. Running water Hedgerow and Cloddiau Non-HoPI Woodland (broadleaved semi-natural woodland, broadleaved plantation woodland, mixed semi-natural woodland, mixed plantation woodland, individual trees	4. Fish Bats Breeding Birds Non-Breeding Birds Reptiles Notable flora, fungi and lichen Otter Other mammals (hedgehog, brown hare, harvest mouse and polecat) and common amphibians Aquatic macrophytes	Non-HoPI Neutral semi-improved grassland 4. Bats Breeding Birds Non-Breeding Birds Reptiles Notable flora, fungi and lichen Aquatic macrophytes	3. Running water Hedgerow and Cloddiau Standing water Non-HoPI Woodland (broadleaved semi-natural woodland, broadleaved plantation woodland, mixed semi-natural woodland, mixed plantation woodland, individual trees) Non-HoPI Neutral semi-improved grassland
	4. Bats Breeding Birds	4. Fish Bats Breeding Birds Non-Breeding Birds			

Receptor Group	Pentir Works	Bryncir Works	Glaslyn Cables Works	Trawsfynydd Works	Wider Works
	Non-Breeding Birds	Reptiles			Ancient woodland
	Reptiles	Notable flora, fungi and lichen			4. Fish
	Notable flora, fungi and lichen	Otter			Bats
	Otter				Breeding Birds
					Non-Breeding Birds
					Reptiles
					Notable flora, fungi and lichen
					Otter
					Other mammals (hedgehog, brown hare, harvest mouse and polecat) and common amphibians

- 3.2.3 **Table 3-2** identifies the receptor groups that may be impacted by more than one element of the proposed Project. These receptor groups have progressed for further assessment in Stage 2.

## Table 3-2 Stage 2 Identification of Source-Pathway-Receptors.

### Landscape Elements

- 3.2.4 **Table 3-2** identifies three NLCAs and three LCAs that extend across multiple components of the Project, with the potential for project-wide effects.
- 3.2.5 While NCLAs and LCAs are identified at Pentir and Trawsfynydd, the impacts were assessed as not significant and scoped out of further assessment in **Volumes 2 and 5** due to the surrounding topography and land cover acting as a natural screening of these sites. Similarly, the Wider Works assessment (**Volume 6**) scoped out landscape elements for further assessment due to works being limited to the existing overhead line network, and the temporary and minor nature of the proposed works.
- 3.2.6 The proposed Glaslyn Cables works fall in the NLCA 05 Tremadoc Bay, with a small part of the outer extent of the Study Area in NLCA 06 Eryri. The Glaslyn works site and Study Area covers the LCA 09 Porthmadog and a smaller part of the eastern extents of the Study Area lies within LCA 10 Central Llyn. Part of the Study Area to the north of the Wern CSEC and area adjacent to the Glaslyn works site is in LCA 04 Moel Hebog Uplands.
- 3.2.7 The proposed Bryncir Works fall in NLCA 05 Tremadoc Bay with a small part of the outer extent of the Study Area in NLCA 03 Arfon and NLCA 06 Eryri. The Bryncir works site and Study Area covers LCA 10 Central Llyn, whilst LCA 04 Moel Hebog Uplands lies in the north-east of the Study Area.
- 3.2.8 Impacts expected on these landscape character areas are temporary and largely restricted to the construction period, resulting from clearance of vegetation, utility diversions, presence of work sites and construction compounds, construction activity, scaffolding, diversion or closure of PRoWs and construction lighting. Once operational, there will be permanent impacts due to new above ground infrastructure at Glaslyn and Bryncir.
- 3.2.9 Based on the above, it can be concluded that the project-wide effect on the landscape elements are not greater than the assessed impacts in ES **Volumes 3 and 4**, which identify that during construction these temporary impacts are assessed as minor to moderate adverse, with the permanent operational phase impacts assessed as negligible adverse.

### Statutory and non-statutory sites

- 3.2.10 The Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC falls in the 10 km statutory site Study Area for Glaslyn, Bryncir and the Wider Works. A hydrological connection exists between the proposed works sites and the designated site via the natural drainage network. This hydrological connectivity has the potential to result in habitat degradation impacts through runoff during construction. However, due to the distance of the works from SAC, direct impacts through mortality and disturbance impacts (lighting, noise or visual effects) are not expected.

- 3.2.11 Based on the above, it has been concluded that the project-wide effect on statutory and non-statutory sites remains minor adverse and temporary during construction works, as set out in ES **Volume 3 and 4**.

### Terrestrial and aquatic ecological receptors or notable habitats

#### Veteran and ancient trees

- 3.2.12 Veteran and ancient trees have been identified in the Study Area of the Bryncir, Glaslyn, Trawsfynydd and Wider Works sites. No direct works are proposed to any ancient or veteran trees at Glaslyn, Trawsfynydd or the Wider Works, with minor indirect impacts to root protection areas. One veteran tree will be translocated from the works area at Bryncir.
- 3.2.13 Based on the above, the project-wide effect on veteran and ancient trees remains no greater than the impact assessed at Bryncir in **ES Volume 3**.

#### Habitats of Principal Importance

- 3.2.14 Two HoPI occur across the Project Study Area: lowland dry acid grassland/purple moor-grass and rush pasture, and semi-natural broadleaved woodland (Upland oakwood, Lowland mixed deciduous woodland, Wet woodland and Wood pasture and parkland).
- 3.2.15 The impacts likely to arise on these HoPI from the proposed works are habitat loss, fragmentation and degradation. Although it is recognised that the combination of the Project components would result in a total combined area of HoPI lost greater than that of the individual assessments; the proportion of the loss against the total area of HoPI in the Study Area remains such that the project-wide impact stays minor adverse as set out in ES **Volumes 3 and 4**. The mitigation set out in the ES **Volumes 2- 6** is key to ensuring the loss is avoided or minimised, with appropriate reinstatement management.

#### Other Notable Habitats

- 3.2.16 Similar to HoPIs, there are a number of other notable habitats consistent across various components of the Project, where impacts of habitat loss, fragmentation or degradation may occur as a result of the Project. The project-wide impact, however, would remain minor adverse as set out in ES **Volumes 2-6**, with appropriate embedded and additional mitigation measures key to avoiding and minimising loss, and ensuring appropriate reinstatement management.

#### Terrestrial and Aquatic Ecological Receptors

- 3.2.17 There are a number of terrestrial and aquatic ecological receptors with the Study Area of the Project that may be impacted by the proposed works either directly or indirectly. Impacts include loss or damage to supporting habitats, mortality and disturbance. The mitigation set out in the ES **Volumes 2 – 6** is key to ensuring impacts are avoided or minimised. It is expected that impacts to terrestrial and aquatic ecological receptors will be no greater than the assessed significance in the individual Volumes.



## 4. In-Combination Effects

### 4.1 Introduction

- 4.1.1 This chapter assesses the likely in-combination effects that could arise from the construction, operation and maintenance of the proposed works and considers all effects described in **Volume 2: Pentir Works, Volume 3: Bryncir Works, Volume 4: Glaslyn Cables Works, Volume 5: Trawsfynydd Works and Volume 6: The Wider Works**.
- 4.1.2 In-combination effects occur where a single receptor is affected by more than one type of effect arising from different aspects of a project. 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.

### 4.2 Legislation and Planning Policy

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

#### Legislation

- 4.2.2 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (Ref 4.1) and the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2017 (Ref 4.2) legislation are relevant to In-combination Effects.

#### National Policy

- 4.2.3 Planning Policy Wales (PPW) - Edition 12 (Ref 4.3) is national policy relevant to In-combination Effects.

### 4.3 Methodology

- 4.3.1 There is no established Environmental Impact Assessment (EIA) methodology for assessing and quantifying the effects of a number of individual impacts on the same sensitive receptors.
- 4.3.2 Some topic assessments inherently consider in-combination effects as part of their assessment methodology. The assessment of impacts on the historic environment, for example, includes consideration of potential impacts to setting from air quality, noise and visual changes. To capture any such impacts not already factored into the individual assessments, a review of receptors that could experience in-combination effects was conducted.
- 4.3.3 The methodology used to undertake the in-combination effects assessment is based on previous experience and professional judgement. A description of the methodology used for in-combination effects is outlined in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

## Stage 1 – Screening

- 4.3.4 The outcome of the stage 1 screening assessment is presented in Table 4-1 and Table 4-2, which summarise whether a sensitive receptor is exposed to more than one type of residual effect, considered to be of minor/slight, moderate or major significance during the construction and operational phases of the Project.
- 4.3.5 The stage 1 – screening assessment can be found in **Volume 8, Appendix 7.4.A: Screening for In-Combination Effects**.

Table 4-1– Summary of In-Combination Construction Effects between common sensitive receptors

Receptor	Landscape and Visual	Ecology and Nature Conservation	Historic Environment	Geology, Hydrogeology, Land Use and Agriculture (Soils)	Water Quality, Resources and Flood Risk	Traffic and Transport	Air Quality and Emissions	Noise and Vibration	Socio-Economics	Climate Change	Materials and Waste
<b>Construction</b>											
Landscape character	X										
Visual Amenity	X										
Statutory designated sites		X			X						
Non-statutory designated sites											
Habitats		X									
Protected and notable species		X									
Aquatic species		X									
Designated heritage assets			X								
Non-designated heritage assets			X								
Geology				X							

Receptor	Landscape and Visual	Ecology and Nature Conservation	Historic Environment	Geology, Hydrogeology, Land Use and Agriculture (Soils)	Water Quality, Resources and Flood Risk	Traffic and Transport	Air Quality and Emissions	Noise and Vibration	Socio-Economics	Climate Change	Materials and Waste
Hydrology and hydrogeology		X		X							
Mineral resources				X							
Construction workers				X							
Flood Risk					X						
Aquatic Environment					X						
Residential properties								X	X		
Educational/ community facilities								X	X		
Business premises								X	X		
Medical facilities								X			
Places of worship								X			
Local economy									X		
PRoW and recreational routes									X		
Agricultural land holdings									X		
Open space									X		
Visitor attractions									X		
Private and community assets									X		
Global atmosphere										X	
Materials and waste											X

Table 4-2 Summary of In-Combination Operation Effects between common sensitive receptors

Receptor		Landscape and Visual	Ecology and Nature Conservation	Historic Environment	Geology, Hydrogeology, Land Use and Agriculture (Soils)	Water Quality, Resources and Flood Risk	Traffic and Transport	Air Quality and Emissions	Noise and Vibration	Socio-Economics	Climate Change	Materials and Waste
Operation												
Landscape character		X										
Visual amenity		X										
Protected and notable species			X									
Geology					X							
Hydrology and hydrogeology					X							
Mineral resources					X							
Construction workers					X							
Flood risk						X						
Aquatic environment						X						
PRoW and recreational routes										X		
Agricultural land holdings										X		
Global atmosphere											X	
Climate change risk assessment											X	
4.3.6	Where there is no potential for In-combination effects to occur, the receptors have not been assessed further.											
4.3.7	Following the stage 1 screening assessment, the following sensitive receptors during the construction phase have been taken forward into stage 2 for further assessment:											

- Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC.
- Glaslyn SSSI.
- Running water, including wet ditches.
- Residential properties.
- Educational/community facilities.
- Business premises.

4.3.8 No in-combination effects have been identified during operation. Hydrology and hydrogeology show more than one type of residual effect but the effects do not impact the same receptors and no in-combination effects would occur. See **Volume 8, Appendix 7.4.A: Screening for in-Combination Effects** for details.

## Stage 2 – Assessment

- 4.3.9 A qualitative assessment of the overall significance of the in-combination effects on common sensitive receptors identified at the screening stage has been undertaken based on technical information provided in the **Volumes 2 – 7** and supporting appendices, as well as professional judgement.
- 4.3.10 The results of this qualitative assessment are presented in a summary of in-combination effects for the construction and operation phases in **Table 4-3**.

Table 4-3 – In-Combination residual effect interactions during the construction phases of the Project

Receptor	In-combination residual effect on the common receptor	Combined residual effect
Statutory designated sites		
Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC	<p><b>Ecology and Nature Conservation</b></p> <p>Habitat degradation – impacts to water quality through pollution and construction run off and air quality from construction dust.</p> <p>Injury or mortality of associated species.</p> <p>Disturbance to associated species through noise, lighting, or visual disturbance.</p> <p><b>Water Quality, Resources and Flood Risk</b></p> <p>Reduction of water availability to support existing groundwater or surface water designated sites, ecosystems and features. This could arise from dewatering of the</p>	Each of the identified residual effects on the receptor are minor adverse and are limited to the Glaslyn Cables element of the Project. Following the implementation of mitigation measures it is not anticipated that these effects would result in a worse combined significant effect. There would be a combined minor adverse effect.

Receptor	In-combination residual effect on the common receptor	Combined residual effect
	trenched excavations for cabling, ground disturbance for the development of temporary access track establishment, or the leakage or spillage of fuels and chemicals onsite. This includes the potential for breakout and leakage of bentonite during trenchless crossing.	
Glaslyn SSSI	<p><b>Ecology and Nature Conservation</b></p> <p>Temporary and permanent habitat loss.</p> <p>Habitat degradation – impacts to water quality through pollution and construction run off (sediment) and air quality from construction dust.</p> <p>Injury or mortality of associated species.</p> <p>Disturbance to cited species (such as otter and bats) through noise, lighting or visual disturbance.</p> <p><b>Water Quality, Resources and Flood Risk</b></p> <p>Reduction of water availability to support existing groundwater or surface water designated, ecosystems and features. This could arise from dewatering of the trenched excavations for cabling, ground disturbance for the development of temporary access track establishment, or the leakage or spillage of fuels and chemicals onsite. This includes the potential for breakout and leakage of bentonite during trenchless crossing.</p>	Each of the identified residual effects on the receptor are minor adverse and are limited to the Glaslyn Cables element of the Project. Following the implementation of mitigation measures it is not anticipated that these effects would result in a worse combined significant effect. There would be a combined minor adverse effect.
<b>Hydrology and hydrogeology</b>		
Running water, including wet ditches	<p><b>Ecology and Nature Conservation</b></p> <p>Habitat degradation due to construction pollution or siltation.</p> <p>Habitat loss or fragmentation.</p>	Reduced water flow in surface water bodies from dewatering is the same as habitat loss or fragmentation, which has already been considered in the Ecology and Nature Conservation assessment.

Receptor	In-combination residual effect on the common receptor	Combined residual effect
	<b>Geology, Hydrogeology, Land Use and Agriculture (Soils)</b> Requirement for dewatering, reducing flow to surface water bodies.	No additional in-combination effects are anticipated.
<b>Residential properties</b>		
Residential properties	<b>Noise and Vibration</b> Residential receptors would experience minor adverse effects from noise-generating activities. <b>Socio-Economics</b> The residence in the former Porthmadog Golf Range has the potential to be affected by the construction work, for example through access restrictions, disruption or disturbance to the individual(s) living there.	The in-combination effects have already been considered within the Socio-Economics assessment.
<b>Educational/community facilities</b>		
Schools	<b>Noise and Vibration</b> Educational/community receptors would experience minor adverse effects from noise-generating activities. <b>Socio-Economics</b> Sections of the car park in the Ysgol Eifionydd Secondary School will be temporarily closed and fenced off to accommodate minor works to the existing cable. Works may include the use of an excavator.	The in-combination effects have already been considered within the Socio-Economics assessment.
<b>Business premises</b>		
Hotels EVIP Hochtief site office	<b>Noise and Vibration</b> Business receptors would experience minor adverse effects from noise-generating activities. <b>Socio-Economics</b> The Hochtief site office for the EVIP project is in the Glaslyn works site. The Applicant will co-ordinate with the EVIP scheme to ensure any	The in-combination effects have already been considered within the Socio-Economics assessment.

Receptor	In-combination residual effect on the common receptor	Combined residual effect
	potential disruption to its activities are anticipated and mitigated.	

4.3.11 As no significant combined residual effects are predicted, no additional mitigation measures are required.



# 5. Cumulative Effects

## 5.1 Introduction

- 5.1.1 This chapter assesses the likely cumulative effects that could arise from the construction (including decommissioning of existing infrastructure), and operation and maintenance of the Project as described in **Chapter 2: The Project** and in **Chapter 2** in **Volumes 2 – 7**.
- 5.1.2 Cumulative effects occur when two or more planned developments have an effect on the same receptor leading to an increase in the effect, and possibly an effect of greater significance. It is possible that individually the developments might not result in significant effects, but when considered together they could create significant effects on a shared receptor; this would typically result from an overall increase in the magnitude (scale, duration, etc.) of effects.

## 5.2 Legislation and Planning Policy

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

### Legislation

- 5.2.2 The Town and Country Planning (TCP) (Environmental Impact Assessment) Regulations 2017 (Ref 4.1) and the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2017 (Ref 4.2) legislation are relevant to Cumulative Effects.

### National Policy

- 5.2.3 The national policy relevant to Cumulative Effects is PPW – Edition 12 (Ref 4.3).

## 5.3 Study Area

- 5.3.1 This chapter has used a 2 km buffer from the Project work site to assess the cumulative effects. A 2 km Study Area was deemed appropriate given the nature of the works and its predominantly rural setting.

## 5.4 Methodology

- 5.4.1 A range of public sector and industry-led guidance is available on the approach to assessing cumulative effects but at present there is no single, agreed industry standard method. The Project is not a Nationally Significant Infrastructure Project (NSIP) although the approach to the assessment of cumulative effects has considered that set out in the Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment guidance (Ref 5.1). A description of the methodology used for cumulative effects is outlined in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

## Stage 1: Establishment of a Long List

- 5.4.2 In line with Schedule 3 of the 2017 TCP EIA Regulations, a qualitative appraisal has been undertaken of other developments that have the potential for cumulative effects in conjunction with the Project. This appraisal is based on publicly available information and assumes that an appropriate level of assessment has been undertaken for all identified developments.
- 5.4.3 As of the 15 August 2025, eight planning applications within the 2 km buffer zone that have been validated within the last two years have been identified on the Gwynedd Council (Ref 5.2) and Eryri National Park (Ref 5.3) planning portals (see **Volume 8, Appendix 1.4.A: Topic Assessment Methodology** for details).
- 5.4.4 The Planning Inspectorate website (Ref 5.4) was also checked for NSIPs on the 15 August 2025. No NSIPs were identified within 2 km of the Project.

## Stage 2: Establishment of a Short List

- 5.4.5 Six of the developments identified in the long list (**Table 14-1 in Volume 8, Appendix 1.4.A: Topic Assessment Methodology**) have been scoped out of further assessment based on their distance from the Project work site, nature and scale of the proposed works and unlikely potential for interactions with Project that may result in cumulative effects. **Table 5-1** details the developments that have been considered as part of the cumulative effects assessment.

Table 5-1 – Developments to assessed for cumulative effects

Application	Description	Location	Status
C24/0532/25/LL	Proposed Energy Storage facility, related access, landscaping, infrastructure, ancillary equipment, with a grid connection import and export capacity of 57MWac.	230 m north-west of the Pentir works site, Pentir Substation	Approved with conditions
C16/0886/15/LL	Application for the installation of underground 132 kV grid connection cables between the Glyn Rhonwy Storage Facility and the Pentir Substation. Two applications to extend the commencement period have been submitted: C21/0934/15/AC and C23/0959/15/AC	Land At Pentir Substation, Pentir, Bangor, LL57 4ED	Approved with conditions
C25/0266/18/LL	Temporary planning permission for a period of 40 years for the erection of an Energy Storage System (ESS), together with associated infrastructure, site access, landscaping and ancillary works.	Immediately south of the Pentir Substation access road	Awaiting decision
C25/0277/18/LL	Proposed development of a battery energy storage system, associated	30 m south-east of the Site, Pentir Substation	Awaiting decision

Application	Description	Location	Status
	infrastructure, access and landscaping.		
C23/0852/23/TC	The proposed siting of 323 holiday caravans/lodges across Brynteg Holiday Park, to include western former golf course area (area hatched green).	210 m east of the site, near Tower 4ZC134	Awaiting decision
C24/0360/22/LL	Erection of 4 no. linked light industrial, storage and distribution units with integral office space as follows: a. 4no. 5M units 1no. 8M unit b. 2no. 2 storey/office c. 4no. 5M units d. 4no. 5M units all to be use class B1 and B8.	640 m west of the site, near Tower 4ZC097	Approved with conditions
C23/0549/08/LL	Erect 8 new flexible business/industrial units (Use class B1, B2, B8) with associated parking and landscaping.	560 m south-east of the Site, Minffordd	Approved with conditions
C25/0554/18/LL	Installation of underground electricity cable in association with Pentir BESS energy storage scheme	Immediately west of the Pentir Substation	Awaiting decision

5.4.6 In addition to the identified planning applications, the following other developments have also been considered:

- EVIP (in construction). This project comprises the installation of a tunnel accommodating cables beneath the Dwyrdd Estuary between Minffordd to Llandecwyn and removing the existing overhead line to reduce visual impacts.
- Natural Resources Wales – Porthmadog Flood Defence Works . This project is currently undergoing options appraisals, including an assessment of a range of long-term options to reduce risk of river and sea flooding to Porthmadog and surrounding communities. Natural Resources Wales are in the process of drafting a recommended short list of options for further consideration.

### Stage 3: Assessment

5.4.7 An assessment of the cumulative effects is detailed in **Volume 8, Appendix 7.4.B: Cumulative Effects Assessment**; the findings of the assessment are summarised in **Table 5-2**. **Table 5-2** includes the planning application references, full descriptions can be found in **Table 5-1**.

Table 5-2 – Summary of the cumulative effects assessment

Common Receptor	Cumulative effect of the Project and other developments								
	C24/0532/25/L L	C16/0886/15/L L	C25/0277/18/L L	C23/0852/23/T C	C24/0360/22/L L	C23/0549/08/L L	C25/0554/18/LL - storage scheme	EVIP	Natural Resources Wales – Porthmadog Flood Defence Works
Construction									
LCA 09 Porthmadog	-	-	-	-	-	-	-	Moderate adverse	-
SCA 20 Porthmadog and Glaslyn Estuary	-	-	-	-	-	-	-	-	-
Viewpoint 1: Garndolbenmaen local road	-	-	-	-	-	-	-	-	-
Viewpoint 9: Wales Coast Path – The Cob (eastern end), Porthmadog.	-	-	-	-	-	-	-	Moderate adverse	-
Viewpoint 10: ffordd Tan-y-Glannau, Minffordd	-	-	-	-	-	-	-	Moderate adverse	-
Ancient woodland	-	-	-	-	-	-	-	-	-
Ancient and veteran trees	-	-	-	-	-	-	-	-	-
Wern Manor (Cadw 4626) (Grade II*) (PGW(Gd)19 (GWY)) (Grade II*)	-	-	-	-	-	-	-	-	-
Operation									

Common Receptor	Cumulative effect of the Project and other developments								
	C24/0532/25/L L	C16/0886/15/L L	C25/0277/18/L L	C23/0852/23/T C	C24/0360/22/L L	C23/0549/08/L L	C25/0554/18/LL - storage scheme	EVIP	Natural Resources Wales – Porthmadog Flood Defence Works
Operation year 1 (winter) – Viewpoint 1: Garndolbenmaen local road	-	-	-	-	-	-	-	-	-
Operation year 1 (winter) – Viewpoint 2: A487 settlement edge in near Glan-Dwyfach	-	-	-	-	-	-	-	-	-
Flooding (coastal, pluvial & fluvial)	-	-	-	-	-	-	-	-	-
Extreme rainfall	-	-	-	-	-	-	-	-	-
Changing temperatures	-	-	-	-	-	-	-	-	-
Increasing temperatures coupled with changing precipitation patterns	-	-	-	-	-	-	-	-	-
Storm events	-	-	-	-	-	-	-	-	-

5.4.8 Table **5-2** demonstrates that significant adverse cumulative effects during the construction phase are anticipated on the following common receptors:

- LCA 09 Porthmadog.
- Viewpoint 9: Wales Coast Path – The Cob (eastern end), Porthmadog.
- Viewpoint 10: ffordd Tan-y-Glannau, Minffordd.

5.4.9 No significant cumulative effects during operation are anticipated.

### Proposed Mitigation

5.4.10 No additional mitigation beyond that proposed in this ES and in the environmental documents of the other developments within this chapter has been recommended as it is considered that there is no practicable further mitigation measures to address the cumulative effects that have been identified.

# Bibliography

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- Ref 16.2 – CynGor Gwynedd. *View planning applications*. Available at: <https://www.gwynedd.llyw.cymru/en/Residents/Planning-and-building-control/Planning/View-planning-applications-Track-and-Trace.aspx>. Accessed June 2025.
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