



**Draft Environmental Statement
Preliminary Environmental Information**

Volume 1

Part 1 of 3

Brechfa Forest Connection Project

November 2014

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1 Introduction

1.1 The PEI Report

- 1.1.1 This draft Environmental Statement (ES) forms the Preliminary Environmental Information (PEI) provided in part to satisfy the requirements of the Planning Act (2008) for consultation on the potential environmental effects of the development. PEI is “information referred to [*in Part 1 of Schedule 4 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009*] which has been compiled by the applicant; and is reasonably required to assess the environmental effects of the development”.
- 1.1.2 Guidance on the pre-application process (DCLG, 2013) advises Applicants to include sufficient PEI to enable consultees to develop an informed view of the project. The guidance does not specify how the information should be presented but this PEI report takes the form of a draft Environmental Statement (ES), which is based on the information available and current understanding of the Proposed Development and so will be subject to revision and updating in light of further information on the project and its implementation, and to take account of relevant feedback from the consultation.

1.2 The Applicant

- 1.2.1 Western Power Distribution (WPD) is the electricity distribution network operator (DNO) for the Midlands, South West and Wales. WPD delivers electricity to over 7.8 million customers over a 55,500 square kilometres service area, through a network of 221,000 kilometres of overhead lines (OHL) and underground cables, and 185,000 substations. WPD does not generate electricity and nor does it buy or sell electricity. It is solely concerned with operating the network of substations, OHL and underground cables to distribute electricity to customers.

1.3 Background to the Proposed Development

- 1.3.1 WPD is preparing the submission of an application for a development consent order (DCO) to the Secretary of State to develop a new electrical connection in Carmarthenshire, Wales. The Proposed Development would connect the consented wind farm at Brechfa Forest West, located in the Brechfa Forest, north of Carmarthen. The point of connection will be on to an existing overhead tower line near Llandyfaelog, situated approximately 10km south of Carmarthen. From there the electricity will be routed through the existing OHL network to the WPD substation called Swansea North, which is interconnected with the National Grid (refer to the location plan in Figure 1.1, contained in Volume 2). From here the electricity will be distributed to the Swansea and Carmarthen areas or, in periods of low demand, exported to the National Grid and transmitted to other areas in South Wales.
- 1.3.2 The developer of the wind farm is RWE Innogy UK Limited (RWE). RWE also have consent for a second smaller wind farm at Brechfa Forest East (which has been considered in the earlier stages of the Brechfa Forest Connection project). RWE have decided to phase the connection to the Brechfa Forest East Wind Farm development and have instructed WPD that the connection to Brechfa Forest East wind farm should no longer form part of this application.
- 1.3.3 The proposed Bryn Llywelyn wind farm was dismissed on Appeal, and the wind farm developer, RES has relinquished their grid connection offer, the connection to this wind farm is therefore no longer part of the application.
- 1.3.4 The connection of the wind farm to a connection point near Llandyfaelog (approximately 29 km) will require a combination of 132kV OHL supported by wooden poles (mostly the 'Trident' type) (approximately 25.2 km) together with sections of underground 132kV cable (approximately 3.4 km). WPD have carried out an extensive series of studies and consultation as described below. In addition to the new transmission infrastructure, there will be a need for some modification and upgrading to existing electrical infrastructure at certain places between

Llandyfaelog and the Swansea North substation. Full details of the Proposed Development are provided in Chapter 2 of this draft ES.

- 1.3.5 Following a period of strategic optioneering that identified a preferred connection option, the Proposed Development has been the subject of studies and consultation carried out according to a series of stages, which are illustrated in Figure 1.2 (Volume 2). These stages have sought to firstly identify and define a study area followed by broad route corridor options and then route alignment options, each approximately 300m wide, within the preferred corridor(s). Following selection of the preferred route alignment option, a preferred route alignment was derived, together with a limit of deviation. This preferred alignment (a corridor up to 25m wide for the OHL and up to 20m wide for underground sections (with a maximum working width of 16m) within which, subject to detailed design, the final OHL alignment and pole locations and underground sections will be located) will be used as the basis for the environmental impact assessment (EIA). An EIA study area will be defined (which may vary depending on the topic/ issue under consideration) either side of the Proposed Development.
- 1.3.6 As part of the process for selecting the preferred alignment, sections of the route alignment options were identified that would result in serious concerns for OHL. A ‘serious concern’ was understood to mean an adverse significant landscape and/or visual impact resulting from an OHL that cannot adequately be mitigated and is therefore unlikely to be acceptable in planning terms. WPD have therefore identified the undergrounding of the cable within these sections. Consistent with NPS EN-5¹ where there are serious concerns, the Planning Inspectorate will need “... to balance these against other relevant factors, including the need for the proposed infrastructure, the availability and cost of alternative sites and routes and methods of installation (including undergrounding)”.
- 1.3.7 Thus, the preferred alignment subject to EIA is a corridor up to 25 m wide containing an OHL mounted on wooden pole structures or in places an

¹ DECC, National Policy Statement for Electricity Networks Infrastructure (EN-5), July 2011

underground cable (within a corridor up to 20 m wide, with a maximum working width of 16 m). The preferred alignment includes information on all infrastructure necessary to construct the connection including for example pole locations and types, access points, cable routing and jointing boxes. Further detailed design and investigation where needed will confirm the exact pole locations and the actual alignment to be constructed within the limits of deviation.

- 1.3.8 This draft Environmental Statement (the PEI report) will be made available during the Stage 3 consultation on the Proposed Development, which will take place during late 2014/ early 2015. The information provided in this PEI report is by definition ‘preliminary’ and in line with PINS Advice Note 7², WPD is actively seeking comments on this information, with the opportunity for both the EIA and project design to take into consideration any comments received through this consultation.

1.4 Need for EIA

- 1.4.1 Environmental Impact Assessment (EIA) is a process for identifying the likely consequences on the existing biological, physical and human environment arising from construction, operation, and decommissioning of a development.
- 1.4.2 The EIA process is undertaken to ensure that the environmental effects of certain types of development proposal are fully investigated, understood and taken account of in the consenting and authorisation process. Information and feedback gathered at each stage of consultation (as shown in Figure 1.2) has influenced the project design. In addition, this draft ES forms the PEI for the stage 3 consultation.
- 1.4.3 The Brechfa Forest Connection is a Project subject to Development Consent under the Planning Act (2008). Under this Act, the EIA Regulations³ impose

² The Planning Inspectorate. Advice note seven: Environmental Impact Assessment: Screening, Scoping and Preliminary Environmental Information

³ The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (N.B. as amended in 2012), SI 2263/ 2009.

procedural requirements for carrying out EIA for nationally significant infrastructure projects (NSIPs) which fall to be considered as ‘EIA development’ under the EIA Regulations. Electricity transmission via overhead line is considered under Schedule 2 of the EIA Regulations.

- 1.4.4 PINS Advice Note 7 notes that Schedule 2 projects are only EIA development if the individual project is likely to have significant effects on the environment, but also notes that Schedule 2 (of the EIA Regulations) does not include applicable thresholds and criteria⁴ and that the European Court of Justice has held that the projects identified in Schedule 2 should be given a ‘wide scope and broad purpose’. Accordingly, WPD has, pursuant to Regulation 6(1)(b) issued a formal notification to PINS/ the Secretary of State that WPD proposes to provide an Environmental Statement in respect of the development.

1.5 Scope of the EIA

- 1.5.1 An EIA scoping report was submitted to PINS on 30th May 2014 but was subsequently withdrawn after the connection to the Bryn Llewellyn wind farm was removed from the project.
- 1.5.2 A revised EIA scoping report was submitted to PINS on 11th July 2014. PINS and their statutory consultees responded with a Scoping Opinion on 21st August 2014. Detail on this process and those documents are summarised in Chapter 6 of this draft ES.

1.6 The EIA Team

- 1.6.1 The EIA was commissioned by WPD and undertaken by a team led by RSK Environment Limited (RSK). Specialists from RSK undertook all aspects of the EIA apart from transport and planning (AMEC), and cultural heritage (Stonebow Heritage).

⁴ Unlike the Town and Country Planning (Environmental Impact Assessment) Regulations 2011.

- 1.6.2 Copper Consultancy have managed the consultation in order to engage and seek responses from the public, persons with an interest in land (PIL's) and other interested parties.

1.7 Structure of the PEI Report

- 1.7.1 The draft ES (PEI) is presented in 3 volumes:

- Volume 1: Environmental Statement
- Volume 2: Figures to accompany the ES
- Volume 3: Appendices

- 1.7.2 A Non-Technical Summary of the draft ES has been prepared as a separate document, to facilitate public consultation.

Volume 1

- 1.7.3 Volume 1 comprises 20 sections which are structured in the following manner.

- Section 1: Introduction - This section: introduces the Proposed Development and explains the underlying objectives of the proposals; describes the statutory basis for the EIA; and identifies the team responsible for undertaking and reporting the EIA.
- Section 2: The Proposed Development - This section: establishes the need for the Proposed Development; provides a detailed description of the key design components and characteristics of the Proposed Development and associated landtake; and outlines the planned timescales for construction and implementation.
- Section 3: Alternatives - summarises the main alternatives that have been considered in the development of a preferred design solution, including alternative sites/ locations, alternative technology solutions, alternative alignments and the decision to underground certain sections of OHL.

- Section 4: Consultation - This section summarises stakeholder consultation undertaken during development of the Proposed Development.
- Section 5: Overview of the Existing Environment - This section provides a description of the receiving environment in respect of: existing landform; topography; settlement and transportation patterns; land use; hydrology; and planning designations associated with land on, and in proximity to, where the Proposed Development will be located.
- Section 6: The Environmental Assessment Process - This section summarises: the scoping process undertaken to establish the scope of the EIA; the adopted approach to the EIA and format of the individual technical assessments; and modifications made to the EIA scope which have arisen during the development and assessment of the Proposed Development.
- Section 7: Planning Framework – summarises the policy context for the Proposed Development, including any relevant guidance documents.
- Sections 8 to 18: Technical Assessments - These sections report the findings of the environmental assessments carried out to date, and the residual effects on the environment predicted to occur as a result of implementation of the Proposed Development.
- Section 19: Cumulative Effects - This section identifies cumulative effects arising from the Proposed Development operating in combination with other consented and planned developments in the locality, and the interactions of predicted effects on environmental interests.
- Section 20: Conclusions and Summary of Environmental Commitments - This section provides a schedule of the environmental commitments (i.e. design and mitigation measures that are agreed and deliverable) identified in each technical assessment.

Volume 2

- 1.7.4 Volume 2 comprises a series of plans, figures and photographs - referenced in Volume 1 - which illustrate the relationship between the existing environment and the Proposed Development.

Volume 3

- 1.7.5 Volume 3 comprises technical appendices - referred to in Volume 1 - containing detailed reports of the individual environmental assessments and other relevant supporting documentation.

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No appendices

2 Project Description

2.1 Introduction

- 2.1.1 The description of the Proposed Development, including pole types and positions as well as underground sections and construction approach, suitable for specification in the DCO and for assessment in the EIA, is described in this Chapter.
- 2.1.2 The DCO will describe the limits of the Proposed Development in terms of the preferred alignment that will run within defined limits of deviation (LoD), which for overhead sections shall extend to a distance of no more than 12.5m either side of the preferred alignment. The conductors will remain within this LoD, including blow out¹, and therefore the pole will be inset sufficiently to achieve this. The lateral LoD for pole location is 5m in each direction along the preferred alignment. The vertical LoD is +/- 2m. The LoD for undergrounding sections will be 2m either side of the 16m working width. The preferred alignment and LoD are shown on Figure 2.1.

2.2 Site and alignment overview

- 2.2.1 The proposed development which is a 132kV single circuit connection will comprise both overhead line (OHL) and sections of underground cable (UGC). The description of this infrastructure including the location of the preferred alignment and each of its components are provided in later sections of this document.
- 2.2.2 The proposed southern connection to the EE route (at approximate Grid Reference 239734, 212646) is located approximately 10 km to the south of Carmarthen and approximately 3 km east of the River Towy estuary. The following paragraphs describe each main part of the route, from south to north.

¹ The horizontal distance that the conductor will swing out from its natural position in still air, calculated to a point at 45 degrees from vertical, this being the maximum swing.

- 2.2.3 From the connection point on the EE route (Tower EE42) the Proposed Development heads broadly northwards, passing under the existing 132kV and 400kV lines and then crossing the River Towy and passing to the east of Carmarthen in an underground section. After approximately 20 km the OHL turns east, in the vicinity of Alltwalis, and extends further to connect to the proposed wind farm substation at Brechfa West Wind Farm. To make these connections the preferred alignment will pass through four principal landscape areas (Landscape Character Map of Wales prepared by the Countryside Council for Wales in 2008):
- Between the southern connection point at Llandyfaelog and just east of Llangunnor (a distance of approximately 10 km) the route passes through the western fringes of the Gwendraeth Vales;
 - The route then passes north across the Towy Valley (a distance of approximately 3 km);
 - The route then gently climbs north over an area of the Carmarthenshire Foothills to reach the vicinity of Alltwalis (a distance of approximately 10 km); and
 - The final connection to the wind farm substation then head east around the fringes of the Cambrian Mountains.
- 2.2.4 The southern Gwendraeth Vales section passes through an area of rolling, pastoral countryside generally within a topographical range of approximately 40 m to 140 m AOD. The countryside comprises a field pattern of irregular, medium sized fields and, although tree cover is generally quite limited, hedgerows along the network of small lanes that criss-cross the area create some enclosure. Settlement is generally sparse with dispersed small villages and farmsteads.
- 2.2.5 The Towy Valley section comprises an area of flat, open, pastoral farmland at a general elevation of less than 10 m AOD and within between 1 and 2 km of Carmarthen and Tre-gynwr to the west. The valley features a reasonably large and sometimes geometric field pattern with some dispersed tree cover and scattered farmsteads (often located on the slightly more elevated ground to the

north and south of the river floodplain). The low-lying valley also accommodates important east-west road connections including the A40 (T) to the north of the river and the more local B4300 to the south, as well as a reasonably high frequency of historic buildings and structures. The flat valley floor is enclosed and contrasted by a series of distinct peaked hills, particularly on its northern side.

2.2.6 The Carmarthenshire Foothills section provides the link from the Towy valley northwards to the south western fringes of the Cambrian Mountains. Elevation rises from approximately 10 m AOD at the Towy valley up to approximately 200m AOD in the vicinity of Alltwalis. This is a varied area with a mix of agricultural influences as well as the presence of a series of settlements (most notably Peniel, Rhydargaeau and Pontarsais) associated with the route of the A485. Land cover is varied with alternating areas of open and more wooded countryside.

2.2.7 The northern Cambrian Mountain section ranges in elevation from approximately 200 m AOD to a maximum of approximately 320 m AOD. This area comprises a mix of high open moorland, extensive areas of coniferous forestry as well as agricultural slopes and farmed river valleys. Settlement principally comprises nucleated valley villages along the route of the River Cothi but with frequent dispersed farmsteads on the valley sides and peripheral western slopes. This area has stronger associations with visitors and recreational pursuits including many promoted cycleways within the forests.

2.3 Strategic optioneering

2.3.1 An initial review of a possible OHL connection was undertaken by WPD in 2009 during the preparation of the DCO application for the Brechfa Forest West wind farm, in order to demonstrate to the Infrastructure Planning Commission² (IPC) (now incorporated into PINS) that a grid connection was feasible and achievable from this particular development.

2.3.2 WPD commissioned a reconnaissance survey to identify a feasible route for a

² The IPC was the determining body for the Brechfa West Wind Farm DCO.

132,000 volt (132kV) OHL on wooden poles from the Brechfa Forest West wind farm to the existing Swansea North 132/275kV substation, located some 35 km to the south-east.

- 2.3.3 A combination of desk-based and site based surveys were undertaken to determine a conceptual route for the connection, the alignment of which sought to achieve a degree of compatibility with existing terrain, landform, land cover, environmental designations, existing utility infrastructure, and settlement patterns.
- 2.3.4 Given the later requirement to provide a means of electrical connection to the Brechfa East and Bryn Llywelyn wind farms (both of which have subsequently been dropped from the connection scheme), in addition to the Brechfa West wind farm, WPD decided to re-evaluate the alternatives by undertaking a wider strategic review of potential options, building on the high-level findings of the 2009 study.
- 2.3.5 A strategic optioneering report (SOR) was commenced by WPD in early 2012, which involved the identification and appraisal of feasible options across a wide geographical area that could potentially achieve the project objectives.
- 2.3.6 As part of this review, consideration was given to different technologies such as the full or partial use of underground cabling. Based on the review, it was decided by WPD that the starting point for the proposed grid connection should principally be achieved through the installation of an overhead 132kV single circuit connection³ supported on wooden poles.
- 2.3.7 WPD identified the Swansea North 132kV substation as the location where the generated electricity would need to be routed to before distribution back out onto the local network. This was accordingly adopted by the project team during the early stages of the study to identify feasible broad route corridors.
- 2.3.8 During this period, WPD continued to review and evaluate suitable network connection points for the wind farms. A feasible connection point emerged in the Llandyfaelog locality comprising an existing OHL tower circuit– the “EE route” –

³ A single circuit comprises 3 separate overhead wires (conductors), one for each phase of the alternating current (AC).

which is connected with other circuits directly to the Swansea North grid substation.

- 2.3.9 Following consideration of both options (direct to Swansea North or via the EE route) as part of the early stages of the feasibility study to identify areas suitable for an OHL (the Brechfa Forest Connection Project, route corridor study), WPD concluded that the Llandyfaelog connection point offered significant benefits over a direct route to the Swansea North substation in terms of utilising existing transmission infrastructure and reducing the overall length of new OHL in the proposed development. It was estimated that this would reduce the length of new build OHL by circa 20 km.
- 2.3.10 The review concluded that this option would achieve a better, more appropriate balance between WPD's technical, economic and environmental obligations. It was also considered that an overhead option connecting to the EE route would enable WPD to better accord with the objectives of national planning policy, as set out in the relevant National Policy Statements.
- 2.3.11 Notwithstanding this, WPD acknowledged as part of their strategic review that the adoption of an overhead solution could in certain areas potentially raise conflicts with national policies that seek the protection of amenity and other valued assets, given the receiving environment contains a diverse composite of interests such as designated landscapes and dispersed local communities.
- 2.3.12 The review concluded that consideration would potentially need to be given to the undergrounding of some sections of the OHL in locations where such conflicts may emerge. The justification for underground sections of cabling has been investigated and established for the Brechfa Forest Connection Project and comprises part of the proposed development and subject to the EIA.
- 2.3.13 A staged approach was developed for: the identification of environmental constraints and opportunities of the project area; the identification and refinement of potential broad route corridors; the drafting of route alignment options within the preferred corridor; and the selection of a preferred alignment for the proposed

scheme. These stages are briefly described below but it should be noted that these earlier stages of work assumed that up to three wind farms would need to be connected, which is not now the case.

Stage 1: Constraint and opportunities mapping

- 2.3.14 The first stage involved identification of “first tier” sites (i.e. those of international and national significance) and “second tier” sites (i.e. those of regional and local significance) associated with landscape, nature conservation, cultural heritage and land use/ planning interests.
- 2.3.15 Data collated from digital sources readily available on the internet and from requests to statutory consultees was gathered and mapped in this initial stage of the process.
- 2.3.16 The consultation at this stage set out to engage statutory consultees via meetings and workshops in order to: review the appropriateness and completeness of data gathered; establish a common understanding of environmental interests and their inter-relationships; contribute to identification of site-specific and area based sensitivities; and invite comment on the scope and methodology of work going forwards.
- 2.3.17 The methodology established that the adoption of GIS techniques would be appropriate to use during all stages of the appraisal, given that: considerable spatial extents would likely require consideration; many statutory agencies and websites provide GIS compatible data formats; and complex data and designation boundaries could be presented and interrogated digitally in ‘heat map’ form to readily identify development constraints, opportunities, priorities and conflicts during the development of the route corridors.

Stage 2: Development of route corridors

- 2.3.18 The prime objective of the second stage of the project was to develop a number of broad corridor options that, where possible, avoided key environmental

sensitivities and assets of acknowledged importance and value. The exercise was informed by giving due regard to established routeing guidelines such as the Holford Rules and similar guidance.

- 2.3.19 First and second tier data was reviewed, along with the findings of site visits, to identify route corridor options with the least constraints or greatest opportunity to accommodate overhead route alignments. The methodology recognised that second tier issues are likely to provide more of a basis for refining options and defining constraints of more local significance, should there be unavoidable conflicts with first tier constraints.
- 2.3.20 Site based reviews were undertaken jointly by project team members at this stage to facilitate comparison of sensitivities, and to set the ground for discussion of priorities as the refinement of options proceeded. The approach also allowed for engineering and operational constraints to be fed into the process.
- 2.3.21 The route corridor options (identified at the end of Stage 2a) were presented in the WPD report: *Brechfa Forest Connection Project. Route Corridor Options – Interim Report and Preliminary Environmental Information, June 2013*. The options included four possible crossings of the River Towy to the east of Carmarthen, linking to either a western or an eastern route corridor connecting via branches to the three wind farms (Figure 2.4).
- 2.3.22 The Route Corridor Options were the subject of informal consultation with statutory and non-statutory consultees and amenity groups.
- 2.3.23 A preferred route corridor option was selected following the consultation and more detailed analysis in Stage 2b, which resulted in the WPD report: *Brechfa Forest Connection Project. Route Corridor Selection Report and Preliminary Environmental Information, December 2013*. Although still very broad, the option selected at this stage included a crossing of the River Towy in the vicinity of Carmarthen and a western corridor northwards towards the three wind farms; two options for connection of the Brechfa East wind farm (options E1 and E2) were retained for further consideration (Figure 2.6).

Stage 3: Selection of potential route alignments

- 2.3.24 The objective of Stage 3a was to identify feasible route alignment options within the preferred route corridor (each approximately 300m wide) within which an acceptable alignment could be found. The approach taken in Stage 3a was a combination of desk-based work, using tools such as GIS and Google Earth; based on information gathered during earlier stages of the study (including information gathered during public consultation), and field work to check and refine the options. The appraisal was informed by various factors including:
- Physical factors (e.g. geology, landform/ land use type);
 - Landscape and visual aspects;
 - Ecological aspects including habitat and protected species records;
 - Cultural Heritage aspects such as impact on the setting of key resources;
 - Flood risk and hydrology;
 - Areas of peat deposits and historic and active landfills; and
 - Local Planning Allocations and recent planning applications.
- 2.3.25 Design workshops involving engineering and environmental specialists were held to discuss and refine various options. This stage culminated with the WPD report: *Brechfa Forest Connection Project. Route Alignment Options Report, February 2014.*
- 2.3.26 Subsequently the decision was made by the proponents of the Bryn Llywelyn wind farm (following rejection of the planning appeal) to withdraw their grid connection offer and so this portion of the route alignment option was removed. The route alignment options were the basis of the EIA Scoping Report (July 2014).
- 2.3.27 The feasible route alignment options identified in Stage 3a (Figure 2.7) were subject in Stage 3b to a comparative appraisal/ evaluation informed by further environmental and technical work and by the results of public consultation (which

ran from 15 February 2014 to 11 April 2014). This also included detailed consideration of the need for placing certain sections underground. The selection of the preferred route alignment was recommended in the WPD report: *Brechfa Forest Connection Project. Route Alignment Selection Report, August 2014*. Subsequently the developer for Brechfa East wind farm decided not to pursue a connection at the present time and hence the connection will only be between Brechfa West wind farm and Swansea North substation via connection with the EE route near Llandyfaelog. It remains the case that this connection route would be the preferred route for Brechfa West wind farm, irrespective of the fact that the Brechfa East and Bryn Llywelyn wind farms are no longer to be connected at this time.

- 2.3.28 The 300 m wide preferred route alignment was the subject of further refinement to produce the preferred alignment (with associated LoD) depicted in this draft ES, which is the subject of the Stage 3 public consultation during October 2014 and November 2014.
- 2.3.29 The preferred alignment will be subject to further testing and refinement where necessary during the EIA process.

2.4 Project components

- 2.4.1 The main components of the Brechfa Forest Connection project would include:
- Wooden pole structures (various configurations as described below and shown on the accompanying Figures 2.8 – 2.15) embedded into the ground and secured below ground level with timber baulks and steel braces;
 - Metal frame cross arms or headgear supported atop the wood pole structures upon which are insulator sets⁴ (one for each conductor wire);
 - Overhead conductor wires, all aluminium alloy conductor (AAAC), of

⁴ Insulator sets may be of different types (e.g. pin- / post- or pilot-insulators) depending on the pole location and function (i.e. 'in-line' or at an 'angle' or at a terminal pole), however the differences are small and often indistinguishable to a lay person.

200 sqmm cross section called Poplar, strung between adjacent poles and mounted atop the insulators, and a fibre optic cable embedded in one of the conductor wires;

- Cable stays for poles where necessary (usually two stays per pole at an ‘angle section’ (where the alignment changes direction) and at terminal structures when the OHL terminates or transitions to an underground cable);
- Where justified and technically appropriate⁵, underground cabling using either open cut or horizontal directional drilling (HDD) techniques;
- Permanent access; and
- Temporary access roads, storage/ laydown areas, and construction compounds.

2.4.2 The currently unused existing section of the network (the EE/W, V and C route connecting Llandyfaelog back to Swansea North) will need to be reconfigured in order to achieve the connection. Necessary works at or close to the New Lodge substation at Burry Port will require the following:

- Install circuit breaker within the New Lodge substation compound;
- Install underground cabling between towers W38, C6 and substation;
- Install sealing end platforms and connect underground cable to existing OHL;
- Install a new overhead span between towers W38 and C6;
- Dismantle a span of conductor between W40/EE5 and B5/C4.

2.4.3 All the above works will be assessed within the Environmental Statement.

2.4.4 The main permanent components are described in the following sections; the temporary components are described in the section on construction approach

⁵ As well as the section under the River Towy, there may also be a need to underground short lengths of existing OHL where the Brechfa Forest Connection crosses them, should there be insufficient vertical separation distance to ensure adherence to relevant safety requirements.

below.

Wind farm substation connection and transmission

- 2.4.5 The circuit will transmit electricity at 132,000 volts (132 kV) using a single 3-phase AC arrangement using both OHL and underground cable. The OHL sections of the line will comprise three separate overhead wires, called conductors, but there will no earth wire. The maximum capacity of the circuit will be 144MW of which up to 84MW will be required to serve the Brechfa West wind farm.
- 2.4.6 Electricity will be generated by the Brechfa Forest West wind farm, which is already consented and is not included in this application. The electricity generated by each of the 28 turbines will be routed by underground cable at 33kV to a single onsite substation owned by the wind farm developer. A transformer at the substation will step up the electrical voltage to 132kV and after metering it will be carried on busbars to a separate part of the substation, controlled by WPD, and then feed into the circuit (the proposed development) and exported to the substation at Swansea North.
- 2.4.7 Connection at the substation from the terminal pole will be either via OHL.
- 2.4.8 A fibre optic cable will be installed as part of the circuit; on the OHL this will be embedded in one of the phase wires. On underground sections it will run alongside the power cables (separately ducted but within the same trench or bore). The fibre optic cable will be used to transmit data along its length in relation to operation of the line, including fault detection during operation and to operate protection equipment in the event of a fault occurring.

OHL Infrastructure

- 2.4.9 The overhead line infrastructure is to conform to Electricity Network Association Technical Specification (ENA TS) 43 50 and British Standard (BS) 50341 part 3 section 9 UK NNA.
- 2.4.10 The overhead wires are likely to be ‘all aluminium alloy conductors’ (AAAC) having

a nominal cross sectional area of 200 mm² referred to as a ‘poplar conductor’⁶.

- 2.4.11 The conductors will be carried on wooden pole structures, predominantly the single ‘trident’ pole type where the three conductor wires are supported on insulators mounted on a galvanised steel cross-arm above the wooden pole with the outside insulators set at an outward 45 degree angle. These will be used along straight sections of the alignment as well as at angles where the OHL changes direction only slightly. Angle structures will have two wire stays per pole to prevent the pole toppling.
- 2.4.12 Twin pole structures known as ‘H-poles’ will be used at angle positions where the line direction changes markedly (each pole will have 2 wire stays, a total of 4 stays per structure). Twin wooden pole structures will also be used in areas of ‘severe environment’⁷ at an altitude exceeding 300m (at the approach to the Brechfa West wind farm). Terminal pole structures will be used where a section of OHL terminates (e.g. where the line changes to a section of underground cable). There will be a terminal H-pole structure connecting to the wind farm substation. Further details of pole types are provided below.

Pole types

- 2.4.13 The main pole types proposed for the Brechfa Connection project are illustrated in Figures 2.8 - 2.15.
- 2.4.14 The pole types are:
- Intermediate pole – around 65% of the poles will be of this type. They are used where the alignment is straight (i.e. the poles are in line) and the topography of the line is such that the spans and loadings are within the generic design parameters;
 - In-line (single) section pole – around 5% of the poles will be of this type. They

⁶ The diameter of each conductor wire will be approximately 16mm

⁷ ENA Technical Specification 43-50 documents extreme environments as being any UK location at an altitude exceeding 300m (200m in Scotland) but not exceeding 500m.

are structures that are required where the line continues in a straight line but the topography is outside the design parameters for a standard intermediate pole. In addition this type of structure is used to section off long lengths of straight line for conductor string purposes and failure containment. This type of structure may require stays and these will be decided during detailed design.

- Single angle pole/ H-pole angle pole – where the alignment changes direction and the structure is positioned on the bisect of the angle of deviation. About 12% of the poles would be single pole angle structures and another 8% would be H-pole angle structures. Single pole structures will be used for relatively shallow angles whereas H-pole structures will be needed for larger changes of direction. Two wire stays per pole will be required to balance the effect of tension and deviation angle;
- Intermediate H-poles in areas of ‘severe environment’ will be used on the approach to the Brechfa West wind farm; and
- Terminal pole structures – where the OHL ends (e.g. for connection to a substation, or at connection to another OHL, or where the OHL connects to an underground cable). The conductors will terminate normal to the structure (i.e. in line) and the structure will be stayed to support the terminal loads from the conductors. For an overhead connection from the terminal pole structure (either to another OHL or into a substation), an H-Pole structure would be used, with pilot insulators above the steel cross-arms that allow a through connection of the conductors into the substation or to droppers to connect to an adjacent OHL. For connection to an underground cable a four wood pole structure may be used. In this arrangement the conductors will terminate onto the two main wood poles with droppers connecting to the cable termination equipment. The cable termination equipment will be supported by 2 auxiliary wood poles and a steel frame attached to the main wood poles.

2.4.15 Lengths of the wooden poles will vary from 10 m to 17 m, but with 2.0 m to 2.5 m of that length buried underground.

- 2.4.16 Wooden poles typically do not require concrete foundations. A hole needs to be excavated so that about 2.0 m to 2.5 m of pole can be placed in the ground. In normal ground wooden poles will be direct buried and braced underground with a wooden baulk. H-poles may have additional galvanised steel cross braces connected underground. Where poor or waterlogged ground is encountered, modified foundations are to be designed on a site by site basis.

Insulators and conductors

- 2.4.17 For intermediate structures the conductor wires are each fixed upon a ‘pin’ or ‘post’ insulator set mounted on a galvanised steel cross-arm connected to each pole. The vertical height of the cross-arm structure and post insulator would add another approximately 1.8 m to the total height of the pole structure. Typically WPD would use polymeric insulator sets⁸ that are lighter and easier to handle than glass or porcelain, but the type of insulator will be subject to detailed design.
- 2.4.18 For section, angle and some terminal type structures the insulator sets are made from a combination of metal fittings and isolators assembled together to form an insulator string. The conductor is clamped using standard terminations to hold the conductor and these are then attached to the insulator set and mounted horizontally on the structures. The conductors continue via a jumper loop which is held in position using pilot insulators placed vertically above the structure.

The conductor wires will be 200 mm² All Aluminium Alloy Conductor (AAAC) “poplar” conductors. These are bare bundles comprising one or more concentric layers of helically arranged round or profiled wires composed of aluminium alloy.

- 2.4.19 It is envisaged the wooden poles together with the insulator sets will be mostly installed to achieve a height above ground of between 10 m and 17 m (measured to the highest point, i.e. the conductor string/ insulator set). In certain situations requiring greater vertical separation distance (e.g. to meet statutory clearance criteria or to address physical constraints such as steep gradients) taller structures

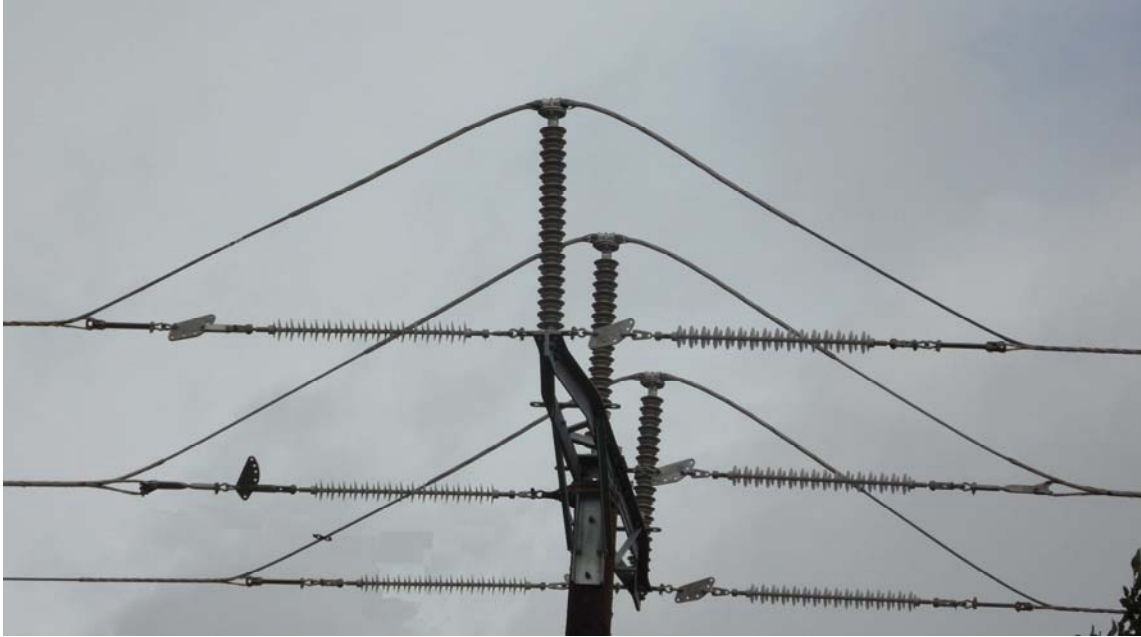
⁸ Polymeric insulators use composite polymers instead of traditional materials such as glass or porcelain.

may be used. For assessment purposes (assuming a worse case) an overall height up to 22 m above ground has been used.

- 2.4.20 The conductor wires will hang between the insulator sets on adjacent pole structures, and the extent of the ‘sag’ will depend on factors such as distance between adjacent poles (the span distance), the type of conductor (size/ weight/ composition), and weather conditions (e.g. ice formation could increase loading and hence increase the extent of the sag).

The OHL alignment

- 2.4.21 A maximum 12.5 m lateral limit of deviation (LoD) either side of the alignment/ pole positions will be included in the DCO limits. This area will be used where necessary to micro-site poles, where environmental constraints allow. Micro-siting is normally used to optimise the alignment and for ease of construction.
- 2.4.22 The most frequently used pole type (~65%) will be the single pole trident type, used for straight sections of the alignment and referred to as intermediate poles, see Figure 2.8.
- 2.4.23 Where local topography and loading requirements dictate a stronger pole type is needed, an in-line section pole will be used, which is very similar in appearance to an intermediate pole but is fitted with horizontally mounted tensioned insulators, with the conductors looping over the top of the pole of pilot insulators as shown in the example below.



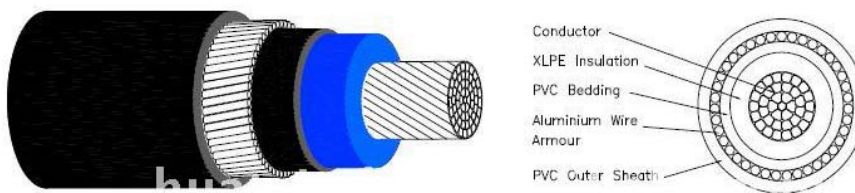
Example of Pilot Insulators

- 2.4.24 Where a change in direction of the OHL is necessary, steel wire cable stays anchored into concrete or wood cable stay blocks buried more than 1.5m below ground level will be used to support the load created by the line deviation and where uplift or out of balance longitudinal tension occurs. The cable stays would have a typical spread of 10-15 m. An angle pole structures are shown in Figure 2.10 and 2.11. A single angle pole would require two stay wires whereas an H pole angle structure would normally require 4 stay wires. Details of the number of stays at each pole location are shown on the pole schedule.
- 2.4.25 Two types of terminal structures are proposed. The through line/tee off terminal (for connection to another OHL or substation) will have two poles with galvanised steel cross-arms and stays to support the line tension. The underground cable to overhead line interface terminal structure will have four wood poles with galvanised steel work to support the conductors, cable terminations, surge arrestors and cable ladders together with stays to support the line tension. The terminal pole structure will not require fencing around the base.
- 2.4.26 The wooden poles will allow a maximum achievable span of 180 m (with span lengths between 88 m – 178 m and an average span of 130 m). The span

distance between each pole is shown on the pole schedule and will vary depending on existing topographical conditions, the conductor loading (depending on conductor number/ type) and climatic loadings. Spans will also vary to accommodate the need to cross or join other transmission infrastructure.

Underground cable infrastructure

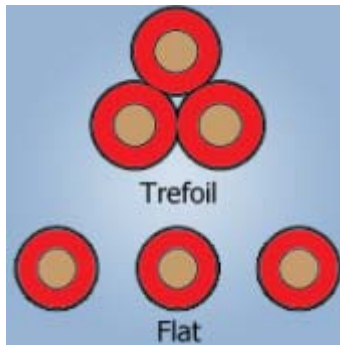
- 2.4.27 The underground cable will be a different material to that used for the overhead line conductor. The cable will be an XLPE⁹ insulated single core cable with copper conductor and lead sheath (for armouring). The underground cable and the overhead line conductor will be joined together above ground via a cable termination mounted on the terminal structure and screened with a cable guard.



Drawing illustrating typical components of a XLPE underground single core cable

- 2.4.28 Cables will be installed in either an open cut trench, or in ducts within a driven bore, driven by HDD or by hydraulic ram, also called thrust boring. In the case of HDD bores the cable will be ducted where polyvinyl chloride (PVC) or polyethylene (PE) tubes/ pipes will be pulled through the bore and then each cable will be pulled through its own pipe. In a trench the insulated underground cables will be laid either with or without ducts. The ducts/ cables will be laid in either a ‘trefoil’ or ‘flat’ formation.

⁹ XLPE is cross-linked polyethylene



Options for cable formation for underground sections

2.5 Construction

Overhead line

- 2.5.1 Construction of the overhead line will not require the formation of new permanent access tracks to enable construction teams to access each pole location given the nature of works required and vehicles to be used. Existing routes and farm or field entrances will be used wherever possible and the majority will not require special access arrangements. There may be a need to modify existing entrances and in some cases, for example trenching works, where it will be necessary to temporarily remove sections of hedgerow (maximum width of 8m to be removed at each crossing). If ground conditions require it, a temporary track, either metal, wood or plastic, will be used for vehicles to access the working areas. This will be removed once construction is complete. The construction team will access the working areas with construction plant, machinery and vehicles used to deliver, assemble and erect individual wood poles.



Photograph showing typical temporary access track (metal)



Photograph showing typical use of existing access track

2.5.2 The working area around each pole location is typically 25 m by 20 m. Installation

of the wooden poles will require excavation of a pole hole, on average 2 to 2.5 metres deep. The steel cross-bar, which will support the insulators and overhead wires, is attached while the pole is laid on the ground. The pole is then lifted into position. For wooden pole construction, there is typically no requirement for concrete foundations. Excavated earth is then used as backfill material. There may be a small amount of surplus excavated soil that will either be mounded around the pole base and this will subside over time. There will be no need to remove excavated spoil from the site unless it is contaminated or is likely to contaminate water courses.



Photograph showing typical twin wood pole being prepared with reinforcing beams at pole end, to be placed underground. NB most poles used in the Proposed Development will be single.



Photograph showing typical single 360 tracked excavator on site to dig out trench for pole and stay wires



Photograph showing typical completed pole location

- 2.5.3 Stay wires (for the Proposed Development these are likely to comprise 7-strand wound 4 mm wire) will be attached to the cross-arm structure with suitable fixings and insulators. For each angle pole the stay wires would typically have a 45° spread and extend 10 – 15 m from the pole. They would be anchored more than 1m below ground level by fixing into buried concrete or wooden blocks.
- 2.5.4 Once all the poles are in place, the conductors can be strung between the poles. Pulley wheels are attached to the steel structure at the top of the poles and lighter temporary wire called a pulling bond is first strung between the poles. The pulling bonds are then attached to the main conductors which are pulled into place using winches. Once the conductors are in place the pulley wheels are removed and the conductors attached to the insulators.



Photograph showing typical stringing activities of twin poles. NB most poles used for the Proposed Development will be single.

- 2.5.5 Cable drums are delivered using a tractor and cable trailer.



Photograph showing typical cable drums on site

2.5.6 Typical construction plant and vehicles include:

- JCB-type or tracked excavator to dig the holes in which the poles will sit.
- Support vehicle to deliver the poles to site, either a short wheel base lorry or tractor and trailer.
- Vans and 4x4 vehicles used by erection gangs travelling to the site.



Photographs showing typical construction plant and vehicles. Poles being delivered to site using lorry with Hiab to place them in field prior to being moved by a tractor or 4x4 vehicle into position. NB photographs show twin poles, whereas the majority of poles used will be single.

2.5.7 The overhead crossing of road corridors (there are no rail crossings) will be achieved through the construction of a temporary scaffold tunnel, as illustrated on the photograph below.



Photograph showing typical temporary scaffold tower

- 2.5.8 Where crossing an existing WPD OHL of lower capacity (below 132kV), the existing OHL will either be undergrounded or over-sailed. Where the new line crosses existing 400kV tower lines it will be routed under those existing circuits. Where it meets another 132kV OHL the method of crossing the circuit will be a matter for detailed site specific design but is expected to cross under the existing 132kV circuit which is on towers.
- 2.5.9 WPD typically do not remove hedgerows during construction of an OHL as they are able to span over them; hedgerows may be pruned to ensure sufficient clearance of 5 metres from conductors where required.
- 2.5.10 Removal or pruning of some trees will be required to ensure no trees that pose a risk to the new OHL are within toppling or contact distance of the overhead line. Where necessary, i.e. within a 5 m wide strip underneath the OHL, trees will be cleared down to the ground level and exceptionally root clearance may also be required. Other trees that could contact the OHL or pose a risk to the OHL should a tree (or tree limb) fall onto it, will be assessed and suitable action taken (which may include pruning, crowning or felling) to reduce the risk to an acceptable level.

- 2.5.11 Construction materials will be delivered to dedicated site storage or assembly areas (the main compound located at the central showground on the A48 to the west of Carmarthen, and another satellite compound, probably located in the Brechfa Forest) via the existing road network, and subsequently transferred to individual work sites by cross-country vehicles fitted with lifting apparatus. Tracked excavators will be used during installation to reduce ground compaction and damage, with any disturbed areas fully reinstated post construction.

Underground sections

- 2.5.12 Open cut trenching will be used to install the majority of the cable in relatively unconstrained areas and horizontal directional drilling (HDD) would be used to pass under significant environmental and physical features such as the River Towy or A40 road.

Open cut trenching

- 2.5.13 To lay 132 kV underground cable (which is insulated, not bare metal) in an open cut trench through agricultural land, the working area will be fenced off with stock-proof fencing. The construction working area will be about 16m wide, except where crossing a hedgerow where the maximum would be 8m wide. Within this working width a 1.5 m wide trench will be excavated with one 5 metre haul road alongside the trench. Top soil and sub soil would be separated in piles on either side of the trench.
- 2.5.14 In general it is assumed that vegetation over cable circuits will be managed for avoidance of disruption of the stabilised backfill and to reduce drying-out of the surrounding soil. Best practice will be followed where possible. In some areas it may be necessary for environmental reasons to provide continuity of field boundaries and hedgerows that cross the cable circuit. The proposed methods for reinstatement will require consideration with respect to the effects on thermal ratings.

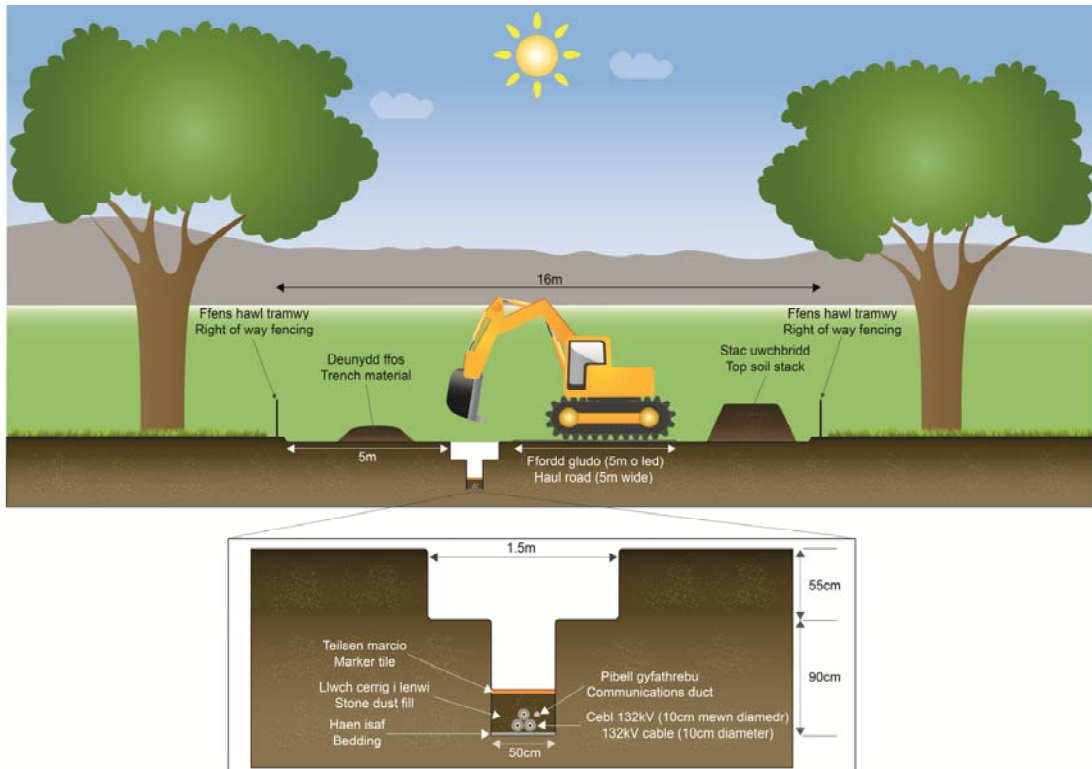


Illustration of a typical cable trench and working arrangement

- 2.5.15 The trench will be dug to a depth of about 1.5 m, and the width will vary depending on the kind of installation but typically would be about 1.5 m wide at the top. Cable installation would use either a cable buried direct or a ducted cable.
- 2.5.16 To bury a cable direct a trench is dug for the length of a section, usually a section length between 500-800 m. The trench is supported at the sides with timber, a process known as ‘shoring’. The trench is laid with a bedding material, often sand, the cables are then lowered into the trench using mechanical winches, and a stone dust fill is laid around the cables. A marker tile is placed on top of this and the trench is back filled using the excavated soil. The burial depth will be a minimum of 0.9m to the marker tiles in accordance with WPD standard practice and a minimum of 1m to the top of the cables to cope with agricultural land requirements.
- 2.5.17 In a ducted system, a shorter trench is dug and ducts installed. The excavated area is restricted to a length of 40-50 m at a time. The ducts are then buried and the cables inserted into the ducts.

- 2.5.18 The buried sections are connected and joint bays, measuring 6 m by 2 m in plan and 1.5 m deep, are installed, typically every 500-800 m or so, depending on delivered cable lengths. The joint bays are constructed with a 100mm thick concrete base and contain a sump at one corner. The precise location of joint bays will be determined at detailed design following agreement with landowners to minimise constraints on land use. The joint bays will be buried with no manhole covers or link boxes required. Joint bays are required on all underground sections.

Horizontal Directional Drilling (HDD)

- 2.5.19 HDD will take place at the following locations (shown on Figure 2.3):
- The River Towy
 - A40
- 2.5.20 A typical installation by HDD would involve the following: drilling a pilot hole from an entry pit, reaming (to make the hole bigger), pulling a ducting pipe through the reamed hole, and then pulling the cable through the conduit. The duct would accommodate all three cables although this will be a matter for detailed design. For assessment purposes it has been assumed the cables are to be installed at depths of 10 m to 18 m in a ducted trefoil formation within a 700 mm pipe, installed in a single bore to minimize the number of drilling operations. The cable depths for HDD sites are to be determined depending on the ground conditions, available area, location of the drive site and bending radius of the ducts.

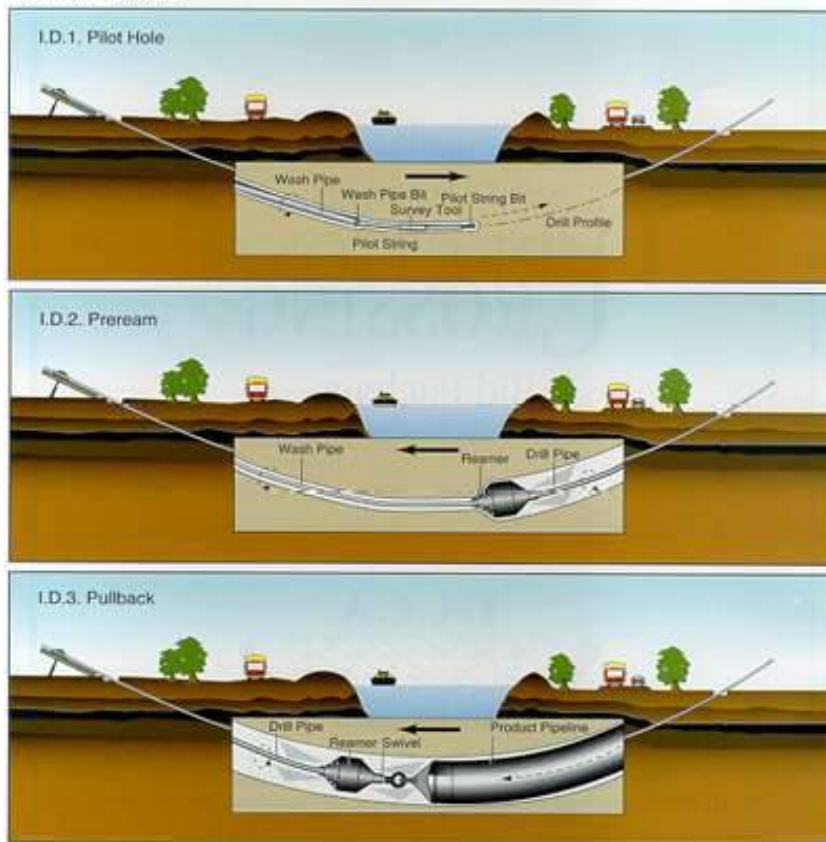


Illustration of typical HDD operation (not to scale)

- 2.5.21 The HDD “launch” (or entry location) site is set up on one side of the crossing and contains the plant associated with directional drilling; the site is typically 30 m by 30 m. This typically comprises the drill rig, two power units mounted on skids, bentonite storage tanks and mixing tanks, a filter for separating cuttings from the used drilling mud, control cab and ancillary equipment. A typical site arrangement is shown on the illustration below.

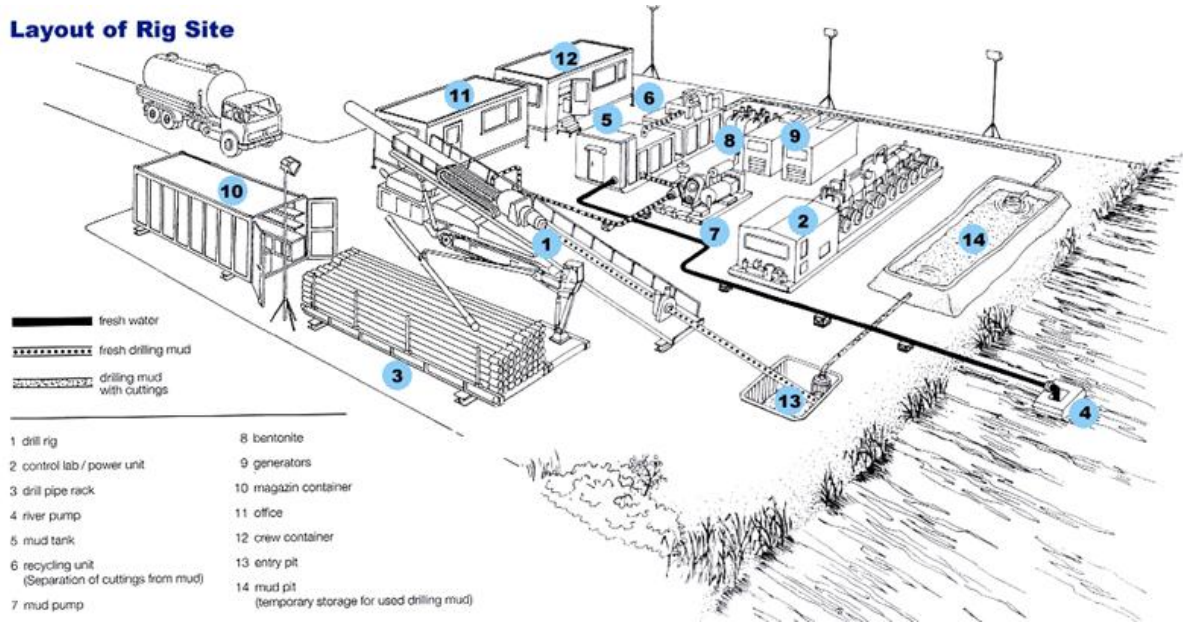


Illustration of typical HDD operation (not to scale)

2.5.22 The HDD exit location is set up on the other side of the crossing and contains the plant associated the exit pits; the site is typically 10 m by 10 m. This typically comprises the exit pit, one power unit mounted on skids, mud pits, an excavator and ancillary equipment. A typical site arrangement is shown on the illustration below.

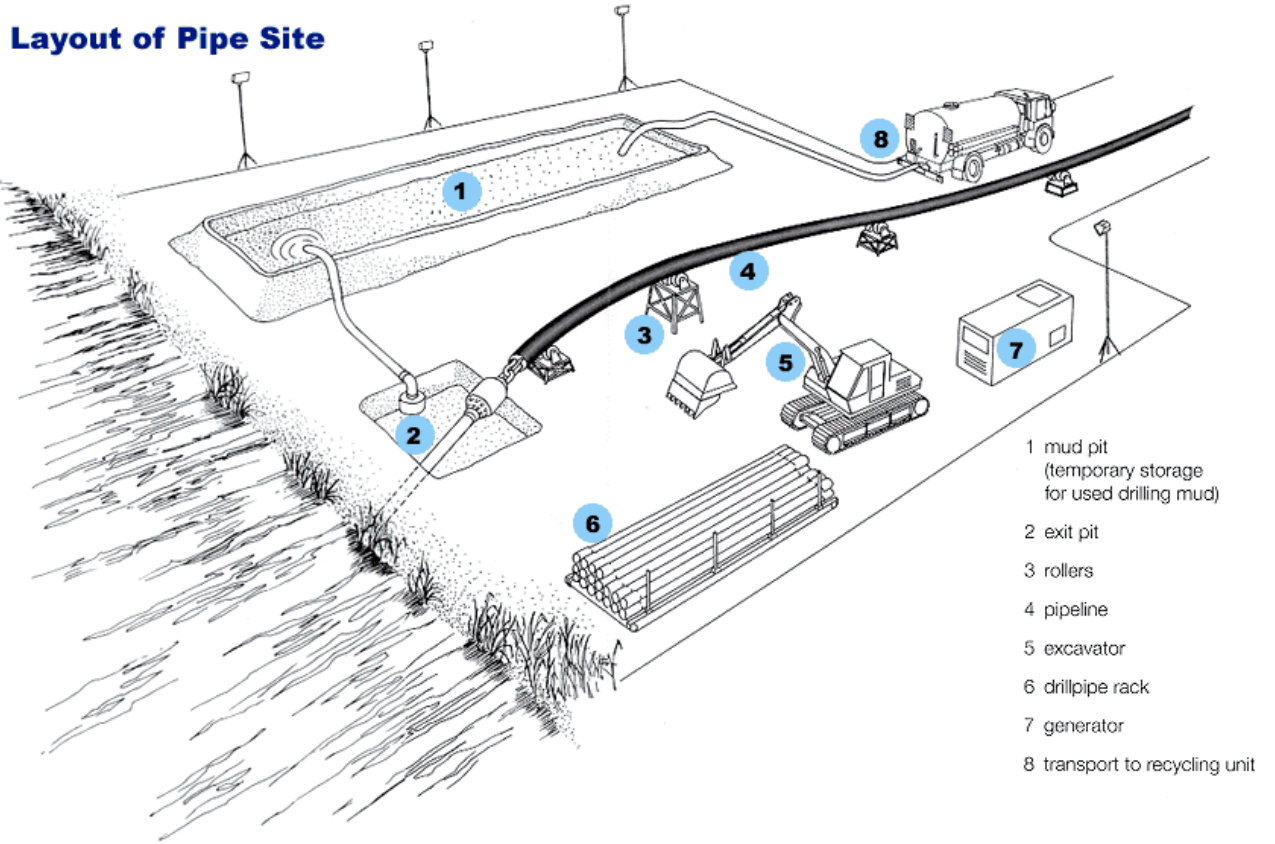


Illustration of typical HDD operation (not to scale)

2.5.23 Photographs of typical HDD drilling rig and mud recycling unit are shown below.



Photographs of typical HDD drilling rig and mud recycling unit

2.5.24 HDD operations will not be undertaken at night and therefore lighting around the site set ups is not required. Duration and times of work will be dependent on ground conditions, drill length and site, proximity of residential properties, though normal working hours and 6 week turnaround times can be used as a measure for the smaller drills.

Construction activity and programme

- 2.5.25 Construction of an OHL route (or underground sections) is not typically undertaken at night and therefore lighting around the pole positions or along the trenching/ cable route is not required. Teams will typically work a 10 hour day.
- 2.5.26 The main construction compound will be established at the Carmarthen showground and will act as a hub for the storage and distribution of materials and poles. Two Satellite construction compounds will be set up at required locations along the route. One will be located at Carmarthen Showground while the other will be associated with the undergrounding sections, both will include areas for:
- Temporary storage of materials and/or poles;
 - Site cabins/ offices and temporary accommodation;
 - Parking for staff members.

Delivery programme

- 2.5.27 The duration of the construction phase work can only be estimated at this stage. Based on a typical construction of an OHL of this type, it would take a construction crew (comprising 3 teams each of 4 persons) between 7 and 10 working days to complete approximately 2 km of line (around 20 pole positions). However, it is likely that more than one construction crew would be deployed to work on separate sections at the same time. An illustrative construction programme is included in Appendix 16.2, which shows an overall duration of around 9 months for completion of the installation of the whole project, including a month for reinstatement works as necessary.
- 2.5.28 The construction of underground sections in-river would take around a week to complete, and would be completed before mid-October. The undergrounding civils would start the following fortnight and last for about 4 months. The final month of which would overlap with the 6 weeks required for the installation of the underground cables.

- 2.5.29 Construction of the OHL would take approximately 6 months to complete, beginning just after preparation for underground sections commences. Pole erection typically takes 3 months, the second half of which would overlap with the OHL wiring, lasting around 5 months.
- 2.5.30 Works necessary to complete the connection to Swansea North substation, including upgrading the existing OHL are relatively minor and can also be completed within the overall construction time frame envisaged above.
- 2.5.31 The construction of the OHL and the underground sections will be undertaken by contractors under the direct supervision of WPD in accordance with the parameters that will be agreed in the DCO.

2.6 Operation and maintenance

- 2.6.1 An annual inspection of the transmission line will be undertaken to identify any damage or deterioration of the components, such as can occur from storm events and lightning strikes. Conductors and insulators are typically replaced after some 40 years of operation.
- 2.6.2 Where faults occur or components become damaged, they will need to be replaced. A line will only be replaced if its condition requires it and may only involve part of the line.
- 2.6.3 Inspection of the 132kV OHL on the network is undertaken annually. This alternates between foot patrol and helicopter inspections.
- 2.6.4 If a line outage occurs, WPD craftsmen would access and repair the fault. It is envisaged that such work would be infrequent, small scale and localised and would entail lesser (if any) environmental impact than the construction phase work.
- 2.6.5 Underground cables are not physically inspected as they are below ground but they are tested regularly during their lifespan which is typically 50-60 years.
- 2.6.6 Hedgerows and trees in proximity to the OHL would be added to the WPD tree

and hedgerow cutting schedule. This seeks to maintain appropriate clearances from the overhead line, typically done every five years. WPD look to maintain a minimum of 5 metre clearance from the conductor to the top of hedgerows.

2.7 Decommissioning

- 2.7.1 When the connection infrastructure is no longer required, it can be dismantled in a similar manner (and using similar equipment) to the construction phase. Poles would most likely be excavated to a metre below ground level and cut, with ground being reinstated. The poles would be removed from site and returned to an existing WPD depot, in this case Llanfihangel-ar-Arth, north of Pencader village, for safe disposal by an approved WPD contractor. Conductor wire would normally be cut into short sections and wound into bundles so it can be recycled, together with steelwork from the cross-arms. It is considered that the environmental impacts of the decommissioning the OHL would be temporary and would be no worse than during the construction phase.
- 2.7.2 For the underground sections, decommissioning would be subject to further design and agreement with landowners and regulators. Re-excavation of the cabling would be avoided unless proven necessary but as a worst-case the impacts would be no worse than during construction and installation of the cables. Under major crossings (the River Towy and the A40) it may be preferable to cut the cable and to leave it *in situ*.

2.8 Materials, Emissions and Waste

- 2.8.1 The following materials are anticipated to be used to construct the Proposed Development:
- Wooden poles, steel cross-arms, aluminium conductor cables, polymeric insulator sets, wire cable stays and associated hardware for the OHL
 - Insulating and protective materials (including plastics) for the underground cable and temporary use of wood for shoring of trenches

- Equipment lubricants and fuels
- Packaging materials, pallets and cable drums
- Sand/ stone dust for bedding cables and packing cable trenches
- Bentonite drilling mud (a natural clay product) for HDD (see below).

2.8.2 Where necessary, materials will be stored within bunded compounds. Contractors will implement a suitable waste management plan.

2.8.3 The only gaseous emissions are likely to be exhaust from plant and equipment and construction vehicles.

HDD operations

2.8.4 HDD operations will be managed to control pollution risks. All equipment containing hazardous fluids will have double skinned fuel tanks or be parked on drip trays with PVC berms to contain any fluid spills or storm water runoff. Spill kits are carried on all plant that operates with hazardous fluids.

2.8.5 Drill fluids are freshwater based, inert clay suspensions. The drilling fluids should be supplied in powder form. Mixing operations will be positioned and conducted so as to minimise the generation of airborne particulates.

2.8.6 Development of fluid pathways between the bore hole and surface (for instance where site investigation boreholes have been drilled and not sealed) may result in the venting, or “Frac-Out”, of drill fluid. Potential pathways and receptors will be identified for each site and a Frac-Out Contingency Plan will be implemented.

2.8.7 Material Data Safety Sheets, (MDSS), will be carried for all chemicals on site and Control of Substances Hazardous to Health (COSHH), regulations shall be complied with.

2.8.8 Engines on the mobile plant should be rated to European Union Stage III Emission Standards.

- 2.8.9 A source for water extraction has yet to be identified, although water for drilling operations may be sourced from a local hydrant or abstracted from local surface watercourses. The requirement for water comprises an initial volume to enable the mixing of drilling fluid; approximately 2 m³. From then on, the requirement for water is limited to the volume of hole drilled, and would be approximately 2m³ per day.

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Tables

Table 3.1	Options for grid connection at substations
Table 3.2	Options for OHL routes providing connection at Swansea North GSP

Figures

Figure 3.1	Substation locations and existing WPD network
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Appendices

Appendix 3.1	WPD’s Schedule 9 Statement
Appendix 3.2	A record of Change Requests to the preferred alignment

3 Project Alternatives

3.1 Introduction

- 3.1.1 In its capacity as the DNO for south Wales, WPD originally received and accepted a formal request to provide new connections onto the distribution network for three separate wind farm developments to be located in and around Brechfa Forest to the north of Carmarthen in South Wales¹. As the proposed Bryn Llywelyn wind farm was dismissed on Appeal, and the proponent has relinquished their grid connection offer, there are no current plans to provide a connection. In addition, the developer for the Brechfa Forest East wind farm (also the developer of Brechfa Forest West) recently decided not to construct the two wind farms simultaneously and WPD was requested to stop work on the submission of an application to connect Brechfa Forest East. Therefore, Brechfa Forest East does not now form part of this project and if it does go ahead in the future would be a separate DCO application. As a result, the Proposed Development is to provide a connection only for the Brechfa Forest West wind farm.
- 3.1.2 This chapter summarises the process undertaken to determine the best means of providing a suitable connection to distribute power generated by Brechfa Forest West as well as to the two wind farms which have been subsequently removed from the project. This is because the process of identifying and assessing alternatives began at the outset of the project, when the three separate wind farms formed part of the same connection.
- 3.1.3 The consideration of alternatives is a requirement of Schedule 4 paragraph 18 of the EIA Regulations 2009. This requires that an outline of the main alternatives studied by the applicant and an indication of the main reasons for the applicant's choice, taking into account the environmental effects is provided.

¹ Brechfa Forest West (maximum 84 MW) received Development Consent on 12 March 2013; Brechfa Forest East (maximum 36 MW) was granted planning permission on 17 December 2013; Bryn Llywelyn (maximum 55 MW) was dismissed at appeal on 06 May 2014.

3.1.4 NPS EN-1 at Paragraph 4.4.2 states:

‘The ES should in any case include an outline of the main alternatives studied by the applicant and an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects, and including, where relevant, technical and commercial feasibility.’

3.1.5 Whilst the consideration of alternatives began at the outset of this project the removal of first Bryn Llwyn and subsequently the Brechfa Forest East wind farm from the project has caused WPD to review the assumptions and constraints identified in the selection of the preferred alternative means of providing a suitable connection. This chapter therefore provides a summary of the review process undertaken to establish whether the decisions to remove proposed connections to the Bryn Llwyn wind farm and the Brechfa Forest East wind farm from the Proposed Development remain valid in the context of Brechfa Forest West wind farm.

3.2 Need for the Project

3.2.1 Connection offers to the developers of the three wind farms were made in February 2011 in accordance with the requirements of WPD’s distribution licence agreements as the DNO for the area. WPD has a statutory obligation to provide a connection that is the most economically viable having regard to all WPD’s other requirements and obligations under Schedule 9 of the Electricity Act 1989 which places a duty, when formulating proposals, to have regard to the environment (summarised in NPS EN-5 Paragraph 2.2.6). The ‘do nothing’ option (i.e. not provide a connection) is not possible under WPD’s statutory duties. It would also prevent the export of renewable energy to the network which would not support the policy ambitions of the UK and Wales Governments to increase the proportion of our energy generated by renewable means.

3.2.2 Where new infrastructure is required, WPD seeks to avoid nationally and internationally designated areas and to minimise the effects of new infrastructure on other sites of amenity and ecological value (refer to Appendix 3.1 for a copy of

WPD's Schedule 9 Statement).

- 3.2.3 The need for this connection project is the requirement to connect a new source of electricity generated by renewable energy (the need for which has been defined in NPS EN-1) to the network operated by WPD to allow efficient distribution to electricity end users.

3.3 The existing WPD grid network

- 3.3.1 Electricity is transmitted countrywide via the national grid at 275kV or 400kV. It is transformed to 132kV volts for regional distribution at substations known as Grid Supply Points (GSP). Where large scale generation is connected to the WPD network this is normally routed through a GSP thus enabling the electricity to be distributed to customers or transmitted through the national grid during periods of minimum load.
- 3.3.2 Distributed electricity is disseminated from the GSP to further substations via overhead lines or underground cables at 132kV. The voltage is reduced again to 66kV, 33kV or to 11kV so the local network can distribute electricity to individual towns and villages where smaller, local substations transform the voltage to that required by the end customer.
- 3.3.3 The existing distribution network close to the proposed wind farms at Brechfa consists of 132kV and 33kV circuits. The 132kV circuits run from Swansea North GSP (a National Grid substation), via Carmarthen and Rhos substations and are in excess of 50km in length. They are mostly overhead lines on steel lattice towers and wood poles. The 33kV circuits are derived from Carmarthen, Lampeter and Rhos substations and are mostly overhead lines on wooden poles.

3.4 Previous study

- 3.4.1 An initial review of a possible overhead connection was undertaken by WPD during the preparation of the DCO application for the Brechfa Forest West Wind

Farm by RWE npower renewables Limited², in order to demonstrate to the former Infrastructure Planning Commission (now a Directorate of PINS) that a connection was in principle feasible and achievable from this particular development.

- 3.4.2 Line Survey Transmission Consultancy Limited (LSTC) were commissioned by WPD in 2009 to undertake a reconnaissance survey into the feasibility of routeing a 132kV wood pole line from the wind farm substation to the existing Swansea North Substation, located some 35km south-east.
- 3.4.3 Given the formal requirement to provide a means of electrical connection to the Brechfa Forest West, Brechfa Forest East and Bryn Llywelyn wind farms, WPD elected to re-evaluate the feasibility of overhead routeing by undertaking a wider review of potential options (the Strategic Optioneering Study), building on the high-level findings of the 2009 LSTC study.

3.5 Strategic Optioneering Study

- 3.5.1 In June 2013 WPD published a Strategic Optioneering Report³ (SOR) that examined the engineering options available to connect the three proposed wind farms.
- 3.5.2 In parallel with the preparation of the SOR, WPD's environmental consultants undertook a desk-based assessment of environmental conditions within an area covering Brechfa Forest south to the Welsh coast (Stage 1a and 1b shown on Figure 1.2). This assessment identified internationally and nationally designated areas and features as well as local designations. The identification of such features and a high level assessment of their potential sensitivity to transmission infrastructure resulted in the selection of a study area that was considered to be an appropriate area of search for the necessary infrastructure.

² Now known as RWE Innogy Ltd.

³ <http://www.westernpower.co.uk/docs/About-us/Our-business/Our-network/Current-WPD-Planning/Library/Strategic-Optioneering-Report.aspx>

- 3.5.3 There are various different ways in which the connection can be made. These options were explored in detail in the SOR. The options include:
- Technology solutions, such as
 - i. Transfer using OHL or underground cables;
 - ii. Voltage of the connection (which would influence the number and type of electrical circuits (conductors) and the supporting infrastructure required.
 - Route options, including
 - i. Alternative connection points;
 - ii. Separate or combined route(s)/ connection points for the three wind farms (noting that this is a historic position and that the Proposed Development is now only for a single wind farm);
 - iii. Alternative alignments for the preferred route(s) between the wind farms and the connection point (noting that the Proposed Development is now only for a single wind farm).

Undergrounding

Technical and Commercial Feasibility

- 3.5.4 Engineering and financial studies confirmed that using underground cables for the whole connection route, given factors such as the terrain and local geology, would be much more expensive and would not be commensurate with meeting WPD's Schedule 9 obligations. Estimated costs for underground cables along the whole route provided in the SOR were found to be between 2.78 and 3.77 times more expensive than an OHL.

Environmental Considerations

- 3.5.5 Installation of an underground cable would result in environmental effects due to, amongst other things, stripping of vegetation, disturbance of soils, and operation of

heavy equipment. An entirely underground alignment could therefore result in overall greater level of impact than an OHL. Nevertheless, options to underground selected sections of the connection route have been further investigated where this would offer significant benefits compared to an OHL. Undergrounding is often considered for major crossings (e.g. main rivers) or to avoid unacceptably large impacts in highly valued landscapes.

3.5.6 During preparation of the SOR the preferred OHL alignment was not known and thus undergrounding was not considered in detail. Therefore, undergrounding was not directly a determining factor in option selection at this stage. Detailed consideration of undergrounding sections of the preferred alignment, undertaken later in the evaluation process, is discussed later in this chapter. Nevertheless, undergrounding of especially sensitive parts of the OHL was acknowledged at an early stage to be a viable means, subject to detailed evaluation, to avoid the most significant adverse landscape and visual effects of an OHL. Undergrounding was thus considered where it would enable a feasible connection option that would otherwise be unacceptable as an entirely overhead alignment.

3.5.7 The principal environmental benefits of undergrounding critical sections of an OHL include:

- No long term change to the character and appearance of a designated and highly valued landscape, especially on Special Landscape Areas and landscapes identified within LANDMAP as Outstanding;
- Absence of visual impacts on sensitive viewpoints (including for instance footpath users or highway users in noted scenic locations) and a number of residential locations.

3.5.8 The additional landscape and visual issues associated with undergrounding these sections would be limited to the temporary visual effects of construction activity.

Transmission voltage and electrical infrastructure rating

Technical and Commercial Feasibility

- 3.5.9 The SOR concluded that the electricity generated by the proposed wind farms needed to be exported at 132kV as this is the most efficient approach to exporting this quantum of power over large distances. The 132kV system is the highest voltage that WPD is licenced to operate on the distribution network.
- 3.5.10 Transmission at higher voltages was ruled out as this could only be achieved by the use of a larger substation at the wind farm and substantially larger supporting infrastructure such as steel lattice towers (pylons), which WPD does not propose to use, and as noted above, WPD is not licenced to transmit electricity at voltages higher than 132 kV.
- 3.5.11 The transformer capacity and circuit rating of the 33kV network in the area is inadequate to support additional generation capacity to be supplied by one or more wind farms. The 132/33kV transformers at Rhos and Lampeter substations are rated at 45 MVA and 30 MVA respectively⁴. This together with 33kV circuit ratings of 22 MVA, rules out direct connection to the 33kV network as this option could not provide sufficient capacity without the need for major substation works, the installation of additional transformers, either new or uprated, and at least five additional 33kV circuits.
- 3.5.12 Options for connection to the 132kV network have been actively pursued as this is considered to be the preferred engineering solution having regard to the potential generated load, either individually by any of the three wind farms or collectively, and the existing configuration of the WPD network.
- 3.5.13 There is no 66kV network within the Swansea North GSP network group and it was discounted. There would be no advantage to be derived from introducing 66kV apparatus to the network over and above a connection at 132kV which has a

⁴ MVA = Megavolt Ampere (or one million VA), which is the product of current (A) times voltage (V) and is a measure of the apparent power from which the loading on the electrical system, in particular transformers, can be calculated.

higher capacity.

- 3.5.14 The feasibility studies therefore determined that the best technological solution for the grid connection would be to use a single circuit OHL at 132 kV.
- 3.5.15 The conductor size at 132 kV considered in the SOR (carried on twin wooden poles) offered adequate capacity for the maximum power output of the three proposed wind farms.

Environmental Considerations

- 3.5.16 The SOR concluded that a 132kV OHL connection could be accommodated on wooden poles. At the time the SOR was prepared it was anticipated that these would be predominantly twin poles. A 132kV OHL connection can also be made using steel lattice towers, however the use of such material is considered to be less appropriate in environmental and visual terms. Steel lattice towers require concrete foundations resulting in additional vehicle movements compared to installation of wooden poles, and generally more disruptive and extensive construction works. Their metallic structures are considered to be less visually compatible with the rural, often wooded landscape found in the study area. Steel lattice towers tend to be much taller, so any negative landscape impacts would affect a much wider area. Their footprint on the landscape is also larger.

Connection to the grid via an existing substation

Technical and Commercial Feasibility

- 3.5.17 The configuration of the WPD network and existing connections is such that the electricity generated will need to be routed to Swansea North GSP substation. The SOR determined that Swansea North substation is the only location with the capacity to accommodate the generation from the proposed wind farms on the WPD network in the Brechfa Forest and Carmarthen area. (The SOR assumed that to handle the combined power output from the three wind farms (175 MW), the transformers at a receiving substation would need to accommodate power

loads up to 180 MVA). Also, as the Swansea North substation is a Grid Supply Point (GSP), it will allow electricity to be exported onto the wider transmission network during periods of minimum local electricity demand. The options examined in the SOR are summarised briefly below with the substation locations shown on Figure 3.1.

Table 3.1 – Options for grid connection at existing substations

Connect to	Comments
Swansea North Substation	Has adequate capacity and would require only limited upgrading within space available at the compound.
Rhos Substation	Would require major substation expansion and there is insufficient capacity in the 132kV H circuit to carry 180MVA and would require a complete rebuild of the dual circuit tower lines and a significant upgrading of the apparatus. This option was ruled out due to extensive works needed, which would be costly and is environmentally less desirable.
Carmarthen Substation	Would require major substation expansion and there is insufficient capacity in the 132kV B circuit to carry 180MVA and would require a complete rebuild of the dual circuit tower lines and a significant upgrading of the apparatus. This option was ruled out due to extensive works needed, which would be costly and is environmentally less desirable.
Ammanford Substation	Would require major substation expansion and there is insufficient capacity in the 132kV C circuit (east of the V route intersection) to carry 180MVA and would require a complete rebuild of the dual circuit tower lines and a significant upgrading of the apparatus. This option was ruled out due to extensive works needed, which would be costly and is environmentally less desirable.
Llanelli Substation	Would be a significantly longer route than other viable connections to Swansea North. There are capacity issues with the circuits on the XY route based on connection agreements with the Corus plant at Llanelli. This option was ruled out due to the longer length of OHL required, which would be costly and is environmentally less desirable.

Connect to	Comments
Ystradgynlais	Would be a significantly longer route than other viable connections to Swansea North and would require major substation expansion. There is insufficient capacity in the 132kV D & C (east of the V route intersection) circuits to carry 180MVA and would require a complete rebuild of the dual circuit tower lines. This option was ruled out due to the longer length of OHL required, and the extensive works needed, which would be costly and is environmentally less desirable.
New Lodge Substation	The substation at New Lodge is only a 33kV facility and a completely new 132kV substation would need to be constructed. This option was ruled out due to the extensive works needed, which would be costly and is environmentally less desirable.

Environmental Considerations

- 3.5.18 The option to connect to the grid at Swansea North substation would avoid environmental impacts associated with other possible options, including:
- Avoid the need for major substation expansion at existing substations with inadequate capacity;
 - Avoid the need for extensive rebuilding of existing tower lines.
- 3.5.19 Connection at Swansea North also provided the opportunity to use the existing EE route (see below), which would result in considerable environmental benefit and fewer impacts resulting from a shorter length of new OHL for the connection. Therefore a new 132 kV connection to Swansea North substation would entail the least environmental impact compared to the other options.

Separate or combined routes

Technical and Commercial Feasibility

- 3.5.20 Originally the connection studies considered connection of three wind farms. Each wind farm could be connected independently to the distribution network, either at

the same or at different points. However, due to the geographic proximity of the wind farms and in relation to the connection points, there would be no advantage to providing entirely separate connections. Indeed, this would be more expensive and visually intrusive as it would require longer length of OHL and other infrastructure and would still require substantial upgrading of existing infrastructure.

Environmental Considerations

- 3.5.21 Combining the connection route for the three wind farms would reduce the environmental impacts compared to three separate connection routes since the footprint and associated disruption during construction would be less, and in addition the overall length of line would be less for a combined route. By adopting a combined route there would be less affected landscape and fewer affected visual receptors. Also, any potential wirescape formation would be avoided in areas, such as on approach to the substation, where separate routes may otherwise converge. Providing a combined connection would not result in the need for any larger infrastructure since either separate or combined connection routes would require the use of wooden poles and 132 kV conductors. The proposal to combine the connections into one route is therefore environmentally preferable to independent connections.

Alternative routes

- 3.5.22 Having determined that a connection would only be feasible via the Swansea North GSP substation, various alternative routes were investigated that would seek to minimise the length of OHL (i.e. find a reasonably direct route) and would make use where possible of existing under-utilised infrastructure but without the need for significant and/ or extensive line upgrades.

Technical and Commercial Feasibility

- 3.5.23 The schematic plan of the WPD network indicates that there are a number of potential points to connect the wind farm to the grid via Swansea North GSP

substation either by way of a new overhead line route or by utilising the existing WPD 132kV network. There are however capacity issues on large parts of the WPD 132kV network in the Carmarthen, Llanelli and north Swansea areas. In summary, the main options that could be considered are to use:

- Redundant circuits (those not currently in use or under-utilised)
- Existing circuits (where spare capacity exists)
- Direct route (an entirely new OHL route)

3.5.24 The technical and commercial review of these options has been summarised in Table 3.2 below.

Table 3.2 – Options for OHL routes providing connection at Swansea North GSP

A: Redundant Circuits

Route via	Comments
EE circuit to C circuit at Burry Port	The EE circuit is a former CEGB dual circuit tower line built to 275kV construction but can carry lower voltages without modification. It is currently strung with conductor of 175mm. It is part of the WPD network but is only energised at 33kV. Although not necessary for this connection, the conductors on the towers could be upgraded if required, from 175mm to 200mm, to take 180MVA on the existing circuit, without upgrading the towers themselves. This is a viable point to connect to the network.
W, C & V circuits (part) from Burry Port to Swansea North	The W, C & V circuits are both dual circuit tower lines with an available circuit unused. These can be interlinked and connected to the EE route. This will provide a viable route into Swansea North.

B: Existing Circuits

Route via	Comments
C circuit on Betws Mountain	Insufficient capacity in the 132kV C circuit (east of the V route intersection) to carry 180MVA and would require a complete rebuild of the dual circuit tower lines. This was ruled out due to extensive works required, which would be costly and is a less desirable option for environmental reasons.
Intersection of C & PP circuits at Maes Llêch	Insufficient capacity in the 132kV PP circuit. It may require the construction of a switching station. This was ruled out due to extensive works required, which would be costly and is a less desirable option for environmental reasons.
Intersection of C & V circuits	There is capacity in the V circuit but it is a longer distance of new OHL than the route direct to the EE route. This was ruled out because a longer length of OHL would be needed, which would be more costly and is a less desirable option for environmental reasons.
XY circuit at Llanelli	There are capacity issues with the circuits on the XY route based on connection agreements with the Corus plant at Llanelli. It is a longer distance of new OHL than the route direct to the EE route. This was ruled out because a longer length of OHL would be needed, which would be more costly and is a less desirable option for environmental reasons.
W circuit on to XY circuit	There are capacity issues with the W circuit and circuits on the XY route based on connection agreements with the Corus plant at Llanelli. It is a longer distance of new OHL than the route direct to the EE route. This was ruled out because a longer length of OHL would be needed, which would be more costly and is a less desirable option for environmental reasons.
H circuit north of Carmarthen	There is insufficient capacity on the H & B circuits to carry 180MVA and would require a complete rebuild of the dual circuit tower lines. This was ruled out because of the need for extensive works, which would be more costly and is a less desirable option for environmental reasons.
B circuit south of Carmarthen	There is insufficient capacity on the B circuits to carry 180MVA and would require a complete rebuild of the dual circuit tower lines. This was ruled out because of the need for extensive works, which would be more costly and is a less desirable option for environmental reasons.

Route via	Comments
CC circuit into Rhos substation	This is a former CEGB 132kV wood pole line and there is insufficient capacity for 180MVA. It would require an upgrade to a dual circuit tower line. There are the associated issues relevant to Rhos substation and the H & B circuits. This was ruled out because of the need for extensive works, which would be more costly and is a less desirable option for environmental reasons.
T circuit into Rhos substation	This is the 132kV trident line that connects Altwallis ⁵ Wind Farm. There is insufficient capacity for 180MVA. It would require an upgrade to a dual circuit tower line. There are the associated issues relevant to Rhos substation and the H & B circuits. This was ruled out because of the need for extensive works, which would be more costly and is a less desirable option for environmental reasons.

C: New Direct OHL route

Route via	Comments
Direct Circuit to Swansea North	A direct route to Swansea North would require a significantly longer section of new build OHL than connecting to the EE route. This was ruled out because a longer length of OHL would be needed, which would be more costly and is a less desirable option for environmental reasons.

Environmental Considerations

3.5.25 Similar to the technical justifications provided above, the connection to the EE route is preferred on environmental grounds. All other possible options would entail greater construction phase disturbance due to the need to provide additional interconnection between, or extensive rebuilding of, the existing OHL. Also, some of the alternative options would require additional length of OHL to be constructed, which is not favoured on environmental grounds.

3.6 Preferred OHL connection option

⁵ Formerly called Blaengwen Wind Farm

- 3.6.1 The technical work undertaken has identified available capacity within specific existing 132kV circuits that will provide a dedicated route to Swansea North GSP Substation from an initial point of connection on the EE route at Llandyfaelog, approximately 10 kilometres south of Carmarthen, as follows.
- Utilisation of the existing OHL tower circuits using a connection to the ‘EE’ route and the interconnection with the existing ‘W’ / ‘V’ / ‘C’ routes for onward transmission to Swansea North substation. The sections of line to be used and energised at 132kV run from tower EE46 near Llandyfaelog to tower EE5 / W40 at Burry Port (circa 16km), where a connection between the W and C routes will be made by interconnecting towers W38 & C6 with the existing Burry Port substation; the connection will then continue onwards to Swansea North on the existing C and V routes (circa 16km).
 - Construct a new 132kV OHL on wooden poles from the EE route to the substation at the Brechfa Forest West wind farm.

Route identification and selection

- 3.6.2 The following description of the route selection process refers to three wind farms because they were considered together in the earlier stages of study. This section describes the process for identifying a suitable route for the new OHL between the connection point near Llandyfaelog and the wind farm(s).
- 3.6.3 Identifying a suitable connection route for the OHL from the wind farms to the identified grid connection point near Llandyfaelog commenced with a preliminary review of environmental constraints and technical constraints in the region (Stages 1a and 1b shown on Figure 1.2).
- 3.6.4 A preliminary area of search was defined through a combined review of desk-based mapping, known sensitive locations and their boundaries, existing topography, towns and villages, roads and railways and high-level technical information provided by WPD. Environmental information about landscape, ecology, cultural heritage and land use planning interests within the initial search

area was collected using desk-based studies and initial discussions with stakeholders.

- 3.6.5 The initial stage identified constraints that need to be avoided by the route wherever possible. This resulted in the identification of a study area within which it was considered a 132kV overhead line could be accommodated.
- 3.6.6 Subsequent to the identification of the study area, analysis allowed the identification of broad corridor options (Stage 2a; June 2013⁶). Environmental factors, in particular landscape and visual criteria, important cultural heritage features, and ecological value (sensitive habitats and potential for protected species) played a part in the selection process.
- 3.6.7 The review of the combined constraints for landscape, ecology, cultural heritage and land use planning interests noted the following:
- The River Towy valley and estuary presents a heavily constrained, specially protected river corridor running east-west across the entire width of the area of search; and
 - The Brechfa Forest area was identified as being dominated by established plantation woodland on highly variable upland topography.
- 3.6.8 High amenity value areas such as the Brecon Beacons National Park and areas containing important locations and specially protected environmental areas were initially marked on the maps. This resulted in pockets within the area of search being effectively discounted from the routeing exercise due to the potential for a degree of conflict with these important locations and environmental designations.
- 3.6.9 Site visits confirmed there to be potentially feasible routes through the approximately 2km wide corridors identified at this stage.

⁶ WPD. Brechfa Forest Connection Project: Route Corridor Options – Interim Report and Preliminary Environmental Information, June 2013. (<http://www.westernpower.co.uk/docs/About-us/Our-business/Our-network/Current-WPD-Planning/Library/Route-Corridor-Options-and-PEI-Report.aspx>)

- 3.6.10 In addition, informal meetings with the Local Authority and Natural Resources Wales resulted in additional route options being put forward, principally to the west of Carmarthen and a northerly option to connect between the Brechfa Forest East and West wind farms. Upon analysis, WPD decided to reject both route options on environmental grounds because:
- A route to the west of Carmarthen would entail a longer length of OHL, with additional landscape and visual effects, and crossing the highly valued and sensitive River Towy to the south of Carmarthen, which would have resulted in unacceptable ecological impacts due to conflict with internationally important conservation objectives.
 - The northerly route between the wind farms would be in conflict with established routeing principles, would be a much longer route option, would likely entail increased visual impact and does not appear to provide any significant environmental benefit over the other options considered.
- 3.6.11 The remaining broad options were further analysed by a process involving focused workshops in the local area (to derive local knowledge), further consultation with the relevant authorities, further site visits, and an overall route corridor options appraisal covering principally landscape and visual concerns, ecological concerns, cultural heritage concerns, and a range of other environmental considerations in connection with construction of a route in each corridor.
- 3.6.12 Following feedback received at the Stage 1 consultation a preferred corridor was selected (Stage 2b; December 2013⁷). For the part of the route between Brechfa Forest West wind farm and the connection to the EE route (now forming the Proposed Development), the option selected was the environmentally preferable option and included crossing the River Towy at a point in proximity to (and to the east of) Carmarthen.

⁷ WPD. Brechfa Forest Connection Project: Route Corridor Selection Report and Preliminary Environmental Information, December 2013. (<http://www.westernpower.co.uk/docs/About-us/Our-business/Our-network/Current-WPD-Planning/Library/Detailed-reports/Route-Corridor-Selection-Report-and-PEI.aspx>)

- 3.6.13 In the next stage 300 m wide route alignment options were developed within the preferred route corridor (Stage 3a; February 2014⁸). The approach taken in Stage 3a was a combination of desk-based work, using tools such as GIS and Google Earth, based on information gathered during earlier stages of the study, including information gathered during Stage 1 Consultation, and field work to verify that information and allow refinement of the options. Design workshops involving engineering and environmental specialists were held to discuss and refine various options based on potential lines of ‘least resistance’ (i.e. route options that optimise social and environmental outcomes as well as technical and economic considerations). In this way, all options retained at this stage were feasible and environmentally acceptable options, although some options were more preferable on environmental grounds to others. Work at this stage focused on determining the overall most environmentally preferable route alignment.
- 3.6.14 For the route alignment corridors taken forward as a basis for the Proposed Development, options were selected on environmental grounds from the available alternatives at five main areas:
- An alignment south east of Bancycafel that would have followed a lower lying route in a valley to avoid the more elevated plateau areas to the north west of this settlement was rejected due to likely effects on woodland and ecological interests in the valley;
 - Where the corridor crosses the A48, an alignment was discounted in favour of a route to the east, considered to have less impact on residential properties;
 - At the crossing of the River Towy, the most westerly of the alternatives was chosen to minimise ecological impacts;
 - On-site checks suggested that a route slightly further west of Peniel would have less impact on the valley landscape in this area; and

⁸ WPD. Brechfa Forest Connection Project: Route Alignment Options Report, February 2014. (<http://www.westernpower.co.uk/docs/About-us/Our-business/Our-network/Current-WPD-Planning/Stage-2-library/Detailed-reports/Route-Alignment-Options-Report.aspx>)

- An alignment option to the west of Pontarsais was rejected due to potential visibility of sloping ground and prominent hill landform to the north.

3.6.15 The 300 m wide route alignment options were the subject of Stage 2 consultation that took place from 17 February 2014 to 11 April 2014. The feedback from extensive consultation with statutory consultees, those people with an interest in the land (PILs) and with the general public, together with further assessments, informed the Stage 3b work to identify a preferred route alignment⁹.

3.6.16 At Stage 3b, further desk-based work was undertaken focussing particularly on landscape and visual, cultural heritage, and ecological aspects and sensitivities. The work also integrated previous desktop and field based work including further information from ongoing ecological surveys and landscape and visual site appraisal. Design workshops involving engineering and environmental specialists were held to discuss and compare the various options identified during the previous Stage 3a with respect to the important constraints identified during the appraisal process. Selection of the preferred 300 m wide route alignment also considered the case for undergrounding certain sections of each route alignment option (as discussed in the next section).

3.6.17 The preferred alignment of the OHL and sections of underground cable has been developed taking into account technical / engineering feasibility, cost, environmental and socioeconomic factors. The route has undergone a series of iterations reviewed by both the engineering and environmental teams.

3.6.18 A record of these iterations is presented in the form of change requests (Appendix 3.2). Change requests were generated by the project team to document the evolution of the alignment. In addition it gave an opportunity to optimise the alignment and to address factors such as:

- Tree loss;

⁹ WPD. Brechfa Forest Connection Project: Route Alignment Selection Report, August 2014. (<http://www.westernpower.co.uk/docs/About-us/Our-business/Our-network/Current-WPD-Planning/Library/September-2014/Route-Alignment-Selection-Report-Report-Only.aspx>)

- Heritage features;
- Important habitats; and
- Skylining¹⁰.

3.6.19 At each of the stages described above, the following main factors were evaluated:

- Technical complexity and capital/ recurrent (lifetime) costs;
- Buildability and maintainability particularly access;
- Health and safety aspects for construction and maintenance operations;
- Social, community and human factors;
- Physical factors (e.g. geology, landform/ land use type);
- Landscape and visual aspects;
- Ecological aspects including habitat information and protected species records;
- Cultural Heritage aspects such as impact on the setting of key receptors;
- Flood risk and hydrology;
- Areas of peat deposits and historic and active landfills; and
- Local planning allocations in the Development Plan and recent planning applications.

3.6.20 Having considered all the environmental factors listed above, the final selection of the preferred route alignment was driven largely by landscape and visual impact concerns; in all sections where there were options, the preferred option chosen was also preferred in landscape terms. The options which were preferred on either ecological or heritage grounds, but which were not selected, were of slight

¹⁰ Where the OHL is viewed with the sky in the background

or marginal preference and the adverse effects that could arise from the selected alignment were not considered to be a major constraint. It was felt that there was sufficient scope within the final alignment (following detailed design) to largely avoid, or adequately minimise, these adverse effects.

Effect of removing Bryn Llywelyn wind farm

- 3.6.21 In April 2014 the appeal by the wind farm developer (RES), against the decision of Carmarthenshire County Council to refuse planning permission for the Bryn Llywelyn wind farm, was dismissed. In May 2014 RES confirmed to WPD that they were withdrawing their request for a connection from the wind farm to the electricity network.
- 3.6.22 WPD then undertook a review of the SOR in the context of the connection requirement for two proposed wind farms with a maximum generation capacity of 120MW. The engineering review concluded that the quantum of generated electricity was such that a connection would still need to be at 132kV and that the point of connection would still be to the EE route, west of Llandyfaelog.
- 3.6.23 The review of the SOR concluded that the reduction in generated capacity down to 120MW from the two wind farms would mean that the conductor size could be reduced from 300mm to 200mm. This means that it would not need to be supported entirely on twin wooden poles but could use predominantly single poles with occasional twin poles on angles or sections. This type of construction is commonly referred to as 'trident' and it was decided that this would be adopted as the preferred engineering solution for the project. The maximum output/ level of generation from the wind farms of 120MW still necessitated the reconductoring of the EE route, but not to a larger size conductor.
- 3.6.24 The alignment corridors developed at this stage were also reviewed and it was concluded that their environmental credentials remained valid as the nature of the infrastructure required was broadly similar. In addition the replacement of predominantly twin wooden poles with predominantly single wooden poles was considered to be environmentally beneficial in that there would be fewer vehicle

movements generated during the construction phase, the scale of the structures would be reduced, therefore lessening the potential for visual impact and the potential for impacts upon the setting of historic features. The removal of the sections to Bryn Llywelyn did not influence decisions on the sections of route needed to provide a connection to the Brechfa Forest West and East wind farms.

Effect of removing Brechfa Forest East wind farm from this project

- 3.6.25 In October 2014 RWE confirmed to WPD that they were not going to develop the two wind farms simultaneously. Therefore, Brechfa Forest East does not now form part of this project and if it does go ahead in the future would be a separate DCO application. As a result, the Proposed Development is to provide a connection only for the Brechfa Forest West wind farm.
- 3.6.26 WPD has therefore reviewed the SOR and concluded that the connection will still need to be at 132kV and that it will still need to be constructed using trident wooden poles with 200mm conductor for the overhead line sections. This is the minimum construction standard and specification that WPD builds for 132kV overhead lines. It is also the case that this line will still need to export the generated output from the Brechfa Forest East wind farm when and if connected.
- 3.6.27 A review and back check of the existing WPD network was undertaken and concluded that there is still no capacity closer to the Brechfa Forest West wind farm for a point of connection than that identified at Llandyfaelog. This includes the closest substation to the wind farm, at Rhos or any options for exporting into the adjoining DNO operated by SP Manweb, who continue to export into WPD at this geographical location due to the high levels of generation in their area.
- 3.6.28 The alignment corridors developed at previous stages were also reviewed and it was concluded that they remained valid as the nature of the infrastructure required is the same, irrespective of whether one or more wind farms were to be connected. In addition, connection of Brechfa Forest East was premised on the earlier decision, on environmental grounds, to offer a combined route via Brechfa Forest West and hence the removal of the sections between Brechfa Forest West

and Brechfa Forest East did not influence decisions on the sections of route needed to provide a connection to the Brechfa Forest West wind farm.

3.7 Undergrounding options

3.7.1 National Policy Statement (NPS) EN-5 considers undergrounding in the context of the assessment of the landscape and visual impacts of electricity network infrastructure. Paragraph 2.8.2 of NPS EN-5 states:

Government does not believe that development of overhead lines is generally incompatible in principle with developers' statutory duty under section 9 of the Electricity Act to have regard to amenity and to mitigate impacts... In practice, new above ground electricity lines, whether supported by lattice steel towers/pylons or wooden poles, can give rise to adverse landscape and visual impacts, dependent upon their scale, siting, degree of screening and the nature of the landscape and local environment through which they are routed. For the most part these impacts can be mitigated, however at particularly sensitive locations the potential adverse landscape and visual impacts of an overhead line proposal may make it unacceptable in planning terms, taking account of the specific local environment and context.

3.7.2 Paragraphs 2.8.8 and 2.8.9 of NPS EN-5 discuss undergrounding and the need for a balanced consideration of relevant factors. Paragraph 2.8.8 states:

Although Government expects that fulfilling [the need for new electricity lines of 132kV and above] through the development of overhead lines will often be appropriate, it recognises that there will be cases where this is not so. Where there are serious concerns¹¹ about the potential adverse landscape and visual effects of a proposed overhead line, the [Planning Inspectorate] will have to balance these against other relevant factors,

¹¹ The term 'serious concerns' in EN-5 is taken to mean an adverse significant landscape and visual impact that cannot adequately be mitigated by feasible means and is therefore unlikely to be acceptable in planning terms

including the need for the proposed infrastructure, the availability and cost of alternative sites and routes and methods of installation (including undergrounding).

3.7.3 Paragraph 2.8.9 of NPS EN-5 expands on the factors that should be taken into account, noting that:

- The impacts and costs of both overhead and underground options vary considerably between individual projects (both in absolute and relative terms).
- Each project should be assessed individually on the basis of its specific circumstances and taking account of the fact that Government has not laid down any general rule about when an overhead line should be considered unacceptable.
- The benefits from the non-overhead line alternative should clearly outweigh any extra economic, social and environmental impacts and provided that any technical difficulties in undergrounding are surmountable.

3.7.4 Paragraph 2.8.9 of NPS EN-5 goes on to state that in comparing an OHL with an underground option, the Planning Inspectorate should consider:

- The landscape in which the proposed line will be set, (in particular, the impact on residential areas, and those of natural beauty or historic importance such as National Parks or AONBs);
- The additional cost of any undergrounding ... (which experience shows is generally significantly more expensive than overhead lines, but varies considerably from project to project depending on a range of factors, including whether the line is buried directly in open agricultural land or whether more complex tunnelling and civil engineering through conurbations and major cities is required. Repair impacts are also significantly higher than for overhead lines as are the costs associated with any later uprating); and
- The environmental and archaeological consequences (noting that undergrounding an OHL may mean disturbing a {wide} swathe of ground,

which can disturb sensitive habitats, have an impact on soils and geology, and damage heritage assets, in many cases more than an overhead line would).

- 3.7.5 The appraisal process in this case was driven by landscape and visual assessment, commencing with the derivation of ‘landscape character areas’ for the alignment corridor options within which sensitivity to an OHL could be assessed. Opportunities and constraints presented by cultural heritage (both buried archaeology and the setting of above-ground resources) and ecological features of interest were also included in the analysis.
- 3.7.6 The appraisal concluded¹² that the following sections of OHL, where the environmental benefits of undergrounding would outweigh the costs and other impacts, should be considered for undergrounding:
- Crossing the Towy Valley (east of Carmarthen);
 - Northern part of the Towy Valley (River Gwili);
 - Other sections identified are not now proposed to form part of this DCO and only applied to the Brechfa Forest East wind farm, which is no longer included in the Proposed Development).

3.8 Conclusion

- 3.8.1 The SOR has reviewed the engineering options available to WPD to make a connection to export the electricity generated at Brechfa West wind farm and has concluded that this should be using trident construction, on wooden poles with 200mm conductor. Where it is not possible for environmental or other justified reasons the circuit should use underground cable. Based on these engineering assumptions this draft ES considers the preferred alignment including the Limits of Deviation.

¹² WPD. Brechfa Forest Connection Project: Route Alignment Selection Report, September 2014. (<http://www.westernpower.co.uk/About-us/Our-Business/Our-network/Current-WPD-network-planning-consultations/Brechfa-Forest-Connection/Library.aspx>)

- 3.8.2 The alignment and this draft ES will be made available for the Stage 3 consultation. Following further appraisal of the feedback received any adjustments to the preferred alignment will be made where justified. This will then be assessed in the EIA. Detailed design will confirm the final alignment and location/ type¹³ of each pole structure and if required the termination points for each section of underground cable.

¹³ Intermediate or section pole; angle pole; or termination pole. Refer to the project description chapter for further details of the pole schedule.

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4 Consultation

4.1 Introduction

- 4.1.1 The purpose of this Chapter is to outline the consultation undertaken to date on environmental issues, including focussed consultation with statutory consultees to agree the scope of the draft ES.
- 4.1.2 Any overhead line project at a voltage of 132kV or more, which is greater than 2 km in length, is considered to be a Nationally Significant Infrastructure Project (NSIP) under The Planning Act 2008 and require an application to be made for a Development Consent Order (DCO).
- 4.1.3 Under Section 37(3) of the Planning Act 2008 it is required that a Consultation Report be submitted when an application for a DCO is made to the Planning Inspectorate (PINS), acting as the examining authority on behalf of the Secretary of State. This chapter of the draft ES has not been drafted to fulfil that purpose, but rather to summarise the main consultation process and outcomes that are relevant to the EIA and the avoidance of impacts through design evolution (primarily through changes in the route/ alignment).
- 4.1.4 Section 42 of the Act requires consultation to be undertaken with the council, statutory consultees and people with an interest in land. Section 47(1) of the Act requires consultation with people living in the vicinity of the land affected by the Proposed Development.
- 4.1.5 Under Section 49(2) of The Planning Act 2008, WPD has a duty to have regard to any relevant responses to all consultation and publicity undertaken.

4.2 Background

- 4.2.1 Consultation is acknowledged to form a key part of the route selection process at all stages. Accordingly, opportunities for stakeholder engagement have been

incorporated into each stage of the process to facilitate data collection and incorporation of the views of statutory bodies and other interested parties. The three-stage approach adopted by WPD ensures that stakeholders gradually move from being a source of information into a more central role as the project progresses through the key decision gates and development milestones.

- 4.2.2 Given the very large study area selected at the early stages of the project, which was progressively refined and reduced through the design development process, there was a need to identify and evaluate the constraints and other important environmental factors to be considered at each stage of the process. As the process moved from broad study area through agreed corridors to detailed potential alignments, an increased range of environmental topics were considered at each stage. An important aspect of the consultation concerning the route selection process has therefore been to agree with statutory consultees the level of environmental constraint information to be factored into each stage of the decision making process.
- 4.2.3 In addition to these main stages of consultation described in this chapter and the Scoping Report there has also been considerable informal and on-going consultation with a range of key consultees.
- 4.2.4 Consultees have been given the opportunity to agree assessment approaches, study areas and have also provided local information throughout the process. The responses have all been considered and incorporated where appropriate.
- 4.2.5 At each key decision point regarding identification and refinement of the route alignment such as selection of the preferred route corridor, a workshop was held with CCC, NRW, Cadw and Dyfed Archaeological Trust to explain the results of studies and key outcomes/ decisions, and the process involved in reaching those decisions. These were cross-discipline workshops held on the following dates:
- Methodology and constraint mapping (August 2012);
 - Route corridor options (April, 2013);

- Preferred route corridor selection (November, 2013);
- Route alignment options (January, 2014);
- Agreement of assessment scope (June – September 2014); and
- Preferred alignment selection and presentation of undergrounding sections (June, 2014).

4.3 Methodology and constraints mapping

4.3.1 Consultation on the outline methodology and the preliminary constraints data gathered within the area of search was undertaken on 9th August 2012 with stakeholders comprising NRW¹, Environment Agency Wales, and Cadw². The key objective of the workshop was to engage statutory bodies in such a way that they were actively involved in framing the process of route corridor identification (ahead of their more formal role later in the environmental impact assessment process).

4.3.2 The workshop also provided an opportunity to:

- Review the appropriateness and completeness of the primary data, and identify any additional datasets of relevance at this stage;
- Establish a common understanding of environmental, engineering and technical interests and their inter-relationships;
- Contribute to identification of site-specific and area based sensitivities relating to the various interests of workshop attendees; and
- Invite comment on the scope of the work going forwards, and explain/take views on the longer term assessment process and programme.

¹ Natural Resources Wales (NRW) became operational on 1st April 2013, and brings together the work of the former Countryside Council for Wales (CCW), Environment Agency Wales (EAW) and Forestry Commission Wales (FCW), as well as some functions of Welsh Government.

² Welsh Government's historic environment service.

- 4.3.3 A series of GIS outputs were produced for discussion purposes, which depicted areas of constraint under the key interests of Landscape, Ecology and Heritage. The constraints mapping, presented at Ordnance Survey 1:20,000 scale, was intended to enable clear identification of relevant environmental sensitivity.
- 4.3.4 Consultees made the following key observations in respect of the mapped constraints information.
- Clear justification would need to be provided for why the area of search extends towards the coast south of Carmarthen;
 - Use of LANDMAP³ data would be an important factor during the appraisal, with a possible approach suggested that builds upon landscape character and sensitivity;
 - Historic Landscape Areas, areas of semi-natural ancient woodland and open access areas should be marked on the constraints plans;
 - Visual aspects and dynamics form an important factor for consideration later in the appraisal process;
 - An expectancy from Cadw of no direct impacts on statutory designations, and avoidance where possible of indirect effects on the setting of historic assets; and
 - Aim to reduce effects on areas of Registered Historic Landscape, those at flood risk, and individual watercourses.
- 4.3.5 A key response from NRW was that potential route corridors need to be responsive to the above constraints, and therefore should not be defined by an arbitrary or uniform width.
- 4.3.6 In relation to the area of search, it was suggested by NRW that this be broadened

³ LANDMAP forms key landscape guidance for Wales, and comprises a GIS based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set.

to capture the western fringes of the Brecon Beacons National Park near Llandeilo, given the potential for indirect visual effects to occur from within this important area.

- 4.3.7 Other feedback suggested refinements be made to (a) extend the boundary westwards beyond Carmarthen, thus capturing part of the River Towy estuary, and to permit consideration of possible corridor options that may exist to the west of Carmarthen, and (b) to widen the coverage in the north-east towards the settlement of Llandysul.
- 4.3.8 A second similar meeting was held with representatives from Carmarthenshire County Council and the City and County of Swansea on 16th August 2012. In addition to the previously tabled information, WPD provided a brief summary of the feedback given by consultees from the previous week's meeting.
- 4.3.9 Additional points and observations raised were as follows.
- A recommendation to investigate the possibility of rationalising existing overhead lines as part of the project;
 - A need to map the existing transmission and distribution network, and other utility infrastructure, in order to factor in the locations and extent of overhead and underground connections;
 - The Towy Valley emerged as a key constraint requiring careful consideration, given its visual dynamics and designated status;
 - Consideration of strategic search areas, future developments and land allocations contained in relevant forward planning documents; and
 - A requirement to consider recreational interests (e.g. cycle routes and recognised viewpoints), albeit at later stages of the appraisal process.
- 4.3.10 Shortly after receipt of consultation feedback, the outline appraisal methodology was updated and finalised in early September 2012 prior to progression into activities associated with identifying route corridors.

4.4 Identification of route corridors

- 4.4.1 Identification of route corridor activities began with a Route Corridor Workshop being convened on 14th September 2012. The purpose of the workshop was to explore the appropriateness and completeness of data collected and mapped during the Stage 1 exercise, establish areas of constraint and opportunity within the refined area of search, and to develop and agree preliminary route corridors. Following the drafting of the preliminary 2km wide route corridors, the project team commenced a more detailed review of each route.
- 4.4.2 Environmental specialists and project managers from RSK Environment Ltd undertook a joint site survey over a two day period in mid October 2012, the purpose being to verify the preliminary route corridors in the field and undertake criteria based sieving of options.
- 4.4.3 Site visits were considered necessary in order to establish a thorough understanding of the locality and its associated sensitivities, and to build upon the constraints data gathered.
- 4.4.4 In addition, route inspections were undertaken by WPD in November 2012; these concluded there to be no overriding technical reasons why an existing section of overhead line near Llandyfaelog (the 'EE' route) could not be utilised as a viable connection point for the proposed scheme. It was therefore concluded by WPD that, for the purposes of route corridor appraisal, the preferred connection point going forwards for the proposed scheme would comprise the EE Route. Selection was predicated on the fact that it represents efficient use of existing under-utilised network infrastructure, and it presents a potentially more direct connection opportunity for the (at that time three) wind farm substations.
- 4.4.5 Key consultees previously engaged were accordingly contacted in December 2012 and January 2013 to inform them of the preferred connection point, and to update parties on the position regarding route corridor identification and appraisal.
- 4.4.6 Specialists within WPD and RSK Environment Ltd undertook fieldwork jointly on

11th January and 17th January 2013. Preliminary route corridors (and alternative corridors) between the three wind farms and the EE route connection point that remained following the comparative review were used as the basis for the refinement exercise. Following development, refinement and mapping of the Preliminary route corridors, an informal workshop was held in Carmarthenshire on 18th April 2013. Key members of the project team and environmental representatives from NRW and CCC attended the event.

4.4.7 The objectives of the workshop were as follows.

- To explain the methodology and process followed in the route corridor identification and appraisal process using descriptive and visual methods;
- To introduce, and explain the rationale behind, the preliminary route corridors that emerged from the appraisal process and how environmental, engineering, deliverability and cost factors formed key considerations in their development;
- To obtain initial feedback and opinion on the form and extent of the preliminary route corridors, and their relationship to existing environmental sensitivities;
- To clarify the key engineering aspects of the project in terms of connection points and how the connection would be made;
- To agree the appropriateness of selection and evaluation criteria proposed to be applied in the later stages of the appraisal, which would be used as the basis for selection of a preferred option;
- To agree the scope and extent of detailed environmental surveys which need to be done in the near future (due to seasonal constraints); and
- To present the programme for project delivery, and how the approach to continued stakeholder engagement would intensify with progression through the ensuing stages of evaluation and development of route alignments within a preferred corridor option.

4.4.8 Both NRW and CCC were provided copies of draft documents in advance of the

workshop to familiarise them with the status of the route corridor studies undertaken to date, and the proposed approach going forwards on the project in terms of how a preferred corridor would be determined.

- 4.4.9 CCC and NRW expressed satisfaction with the overall methodology adopted in selecting the proposed route corridors.
- 4.4.10 A number of key themes, topics, suggestions, recommendations and outcomes emerged during the workshop discussions which prompted debate within the session and/or gave rise to further corridor appraisal work shortly after the meeting.
- 4.4.11 In addition to the potential for interconnection of Bryn Llywelyn and Brechfa Forest West wind farms via a corridor to the northwest of Brechfa Forest, consultees advised that the preliminary route corridor plans be amended to include an additional indicative overhead or underground corridor connection between the Bryn Llywelyn and Brechfa Forest West wind farms, through Brechfa Forest.
- 4.4.12 Consultees welcomed the fact that the project team had directed considerable effort towards desk-based and site-based evaluation of the Towy Valley area, resulting in the identification of four potential crossing points.
- 4.4.13 The topic of undergrounding was raised in regard to methods for crossing the Towy Valley, especially in relation to the corridor boundary adjacent to Carmarthen, where it was felt that undergrounding could potentially bring considerable benefits over an overhead solution.
- 4.4.14 Discussion and detailed review of the preliminary route corridors and their associated constraints/ opportunities resulted in three additional routeing suggestions being put forward by consultees, some of which extended marginally beyond the study area extents.
- 4.4.15 These were reviewed and subsequently appraised but dismissed as possible options. The next stage was to select a preferred corridor, which would take into account the findings from the stage 1 consultation.

4.5 Stage 1 Consultation

- 4.5.1 The first round of consultation included connections to (in addition to Brechfa Forest West) two other wind farms, Bryn Llywelyn Wind Farm and Brechfa Forest East Wind Farm. The proposed Bryn Llywelyn Wind Farm was dismissed on Appeal, and the wind farm developer, RES, has relinquished their grid connection offer. The connection to this wind farm is therefore no longer part of the application. Brechfa Forest East Wind Farm was granted planning permission in December 2013, RWE have decided to phase the connection to the Brechfa Forest East Wind Farm development and have instructed WPD that the connection to Brechfa Forest East Wind Farm should no longer form part of this application.
- 4.5.2 Detailed constraints mapping, which considered community and environmental impacts and engineering and financial constraints, allowed identification of potential route corridors between Llandyfaelog and Brechfa Forest West Wind Farm which formed the background to the initial consultation (Stage 1) in summer 2013.

Consultation Process

- 4.5.3 The Stage 1 consultation was non-statutory (or informal) and with the purpose of gathering information to help inform the selection of a preferred route corridor to connect the wind farm to the electricity network.
- 4.5.4 Those consulted at this stage included:
- Members of Parliament;
 - Assembly Members;
 - Regional Assembly Members;
 - Local authority members;
 - Local authority planning department officers;

- Community councils;
- Specialist statutory consultees; and
- Local amenity user groups.

4.5.5 Consultation was undertaken through briefings and site visits for council members, MPs, AMs, RAMs, community council meetings, workshops with affected community councils and interest groups and correspondence with statutory consultees.

4.5.6 It also involved consulting statutory bodies on an early stage Preliminary Environmental Information (PEI) report.

Results

4.5.7 A total of 87 responses were received, including responses from 49 different statutory consultees.

4.5.8 The responses raised concerns focused on the visual impact the OHL could have in the landscape, and preference was expressed for placing the whole connection underground.

4.5.9 The preferred route corridor was announced in December 2013.

4.6 Identification of alignment options

4.6.1 The design development work progressed to identify potential route alignment options within the preferred route corridor that would meet the overall project objective of providing an efficient and economic grid connection which on balance would result where possible in the least disturbance to the receiving natural and built environment and those who live and work within it.

4.6.2 The objective was to identify feasible route alignment options (each approximately 300m wide) within which an acceptable alignment could be found for the installation of the necessary 132kV OHL within the preferred route corridor. The

appropriateness of undergrounding sections of the route would be considered after the Stage 2 Consultation.

4.6.3 The main assumptions in the approach to the identification of feasible route alignment options were as follows:

- The preferred route corridor(s) would be taken as the starting point;
- The basic principles (such as the Holford Rules) that were applied to the identification of route corridors, would also apply to the identification of route alignment options within the preferred corridor;
- Modifications or additions to the preferred corridor⁴ would be permissible if substantiated with sound reasons – for instance, flexibility would be allowed for an alignment to deviate outside a previously identified corridor if that would offer a better overall solution than an alignment wholly within a previously identified corridor; and
- Route alignment options were identified that were based on feasible options for an OHL. However, should certain options be chosen as the preferred option then potential mitigation (such as undergrounding of a section of OHL) may be required in order to develop an acceptable final alignment. The details of any specific mitigation would be confirmed after Stage 2 Consultation, when the final route alignment would be chosen.

4.6.4 The preliminary route alignment options were subjected to review and sequential appraisal by the various environmental specialists following site visits to check the alignment options. As a result of this appraisal, some modification to parts of each alignment option was identified; these adjustments are described in more detail below.

4.6.5 Where it was not possible to avoid known or potential constraints, then options were reviewed to seek opportunities to either (a) reduce the effect of (or if possible

⁴ Two minor modifications to the corridor boundary were made as it was recognised they may provide a better overall solution.

and practical, to overcome) a constraint so as to make an otherwise unfeasible route section feasible, or (b) address a potential issue to improve an already feasible option.

- 4.6.6 The identified alignments were presented to consultees in a workshop on 30th January 2014 and formed the basis for the Stage 2 Consultation.

4.7 Stage 2 Consultation

Consultation process

- 4.7.1 Stage 2 was a non-statutory consultation on the route alignment options, carried out from mid February 2014 to mid April 2014. The public and persons with an interest in the land (Section 44 of The Planning Act 2008) were consulted in addition to statutory consultees and public interest groups.
- 4.7.2 The purpose of the consultation was to seek comments and feedback on the identified alignment options within the preferred corridors.
- 4.7.3 Those consulted at this stage included:
- 250 landowners;
 - 11,700 households and businesses;
 - Members of Parliament;
 - Regional Assembly Members;
 - Ward councillors; and
 - Statutory consultees.
- 4.7.4 The consultation was undertaken through briefings and site visits for council members, MPs, AMs, RAMs, exhibitions (both events for the general public and specific events for relevant landowners), accessible information at key location points in Carmarthenshire, workshop and correspondence with statutory

consultees, media relations, and offers to provide meetings on request with community groups or councils.

- 4.7.5 The PEI for the route alignment options was presented for comments and feedback.

Results

- 4.7.6 A total of 273 responses were received during this stage of the consultation, of which 209 were from members of the public, 22 from statutory consultees and the remaining 42 from MPs, AMs, community councils and other organisations.
- 4.7.7 Similarly to the Stage 1 Consultation, the main concerns raised focused on the visual impact that the OHL would have on the landscape and view points, and the resultant effect that could have on tourism in the area. Many responses also expressed a preference for placing some or all of the connection underground.
- 4.7.8 A workshop was held with statutory consultees in June 2014 to present the selected preferred alignment and the proposed sections of undergrounding.
- 4.7.9 A preferred route alignment, announced in August 2014, was selected following the Stage 2 Consultation.

4.8 Scoping

- 4.8.1 A Scoping Report, based on the alignment options presented at Stage 2 Consultation was submitted to PINS in July 2014.
- 4.8.2 The Scoping Opinion, issued by PINS in August 2014, was accompanied by responses from key consultees that have also been taken into account as far as possible. Where any conflict has arisen between the Scoping Opinion and the responses from key consultees such as NRW or CCC, further consultation was undertaken to reconcile differences.
- 4.8.3 Additionally there has been on-going consultation specific to each discipline, to consult on any necessary changes to the route alignment and to determine areas

of the scope of the ES which had been left undefined in the Scoping Opinion.

These additional consultations included:

- Pre scoping report consultations with NRW and CCC – April and June 2014;
- Cadw correspondence – April, June, July and October 2014;
- Dyfed Archaeological Trust correspondence – June and October 2014;
- Meetings with NRW – September and October 2014;
- Local Planning Authority correspondence and meeting – September and October 2014;
- Correspondence with CCC – October 2014; and
- Post-scoping informal consultation (correspondence) with several interest groups relating to tourism and socio-economics in the area surrounding the Proposed Development – October 2014

4.9 Stage 3 Consultation

4.9.1 This draft Environmental Statement (ES) forms the Preliminary Environmental Information (PEI) to accompany Stage 3 Consultation. The PEI is provided in part to satisfy the requirements of the Planning Act (2008) for consultation on the potential environmental effects of the development. Stage 3 Consultation will be a formal, statutory consultation on the draft ES and the Proposed Development, including the detailed OHL and underground route and any ancillary work required.

4.9.2 The objectives of the statutory consultation are:

- To help local people understand the proposed scheme and their involvement in the consultation process;
- To provide information to all sections of the relevant communities on all aspects of the proposed scheme through a range of different formats;
- To provide opportunities for local people to put forward their views, engage

with the development process and have a role in refining the proposed scheme across areas they are able to influence;

- To provide opportunities for local people to meet and engage with WPD staff who are involved in the proposed scheme; and
- To respond to local people on issues relating to the proposed scheme.

4.9.3 WPD proposed that the Stage 3 Consultation should be designed to satisfy both Sections 42 and 47 of The Planning Act 2008 and involve councils, statutory consultees and people with an interest in land as well as people living in the vicinity of the development.

Consultation process

4.9.4 The following will therefore be consulted:

- Members of the public;
- Statutory consultees;
- Carmarthenshire County Council;
- Elected representatives (MPs, AMs, RAMs, MEPs and local authority members);
- Community councils;
- Landowners and other persons with an interest in the land (PILs);
- Relevant community groups, interest groups, local amenity user groups and representative bodies; and
- Hard-to-reach groups, such as people who are difficult to engage or those who might find it hard to take part in the consultation process.

4.9.5 The consultation will take place over a seven week period between 28 November 2014 and 16 January 2015. This will be publicised by a variety of means, including

press advertisements, posters, letters and social media, to ensure all who might be affected by the Proposed Development have a chance to engage with the consultation process.

4.9.6 The following consultation and communication methods will be used:

- Briefings and site visits for MPs, AMs, RAMs and Carmarthenshire County Councillors;
- Public exhibitions;
- Reports sent to statutory consultees;
- Access to information;
- Electronic copies made available on disk to all consultees and downloadable on the project website;
- Inspection copies of all materials made available to view at key locations around the proposed scheme, with the Overview Report and feedback forms available for members of the public to take away;
- Summary versions of technical documents, exhibition materials, project information leaflets and maps made available in Welsh;
- Press releases will be issued at the start of the consultation period; and
- Feedback will be welcomed through online and printed feedback forms, email and letters.

4.9.7 If, as a result of the consultation and the feedback received, WPD significantly changes the proposed scheme, further targeted consultation on those changes will take place.

4.9.8 A final Consultation Report will be produced by WPD and submitted to PINS as part of the DCO.

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Figure 5.1 Environmental Designations

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5 Environmental Setting

5.1 Site context

- 5.1.1 The Proposed Development is located wholly within Carmarthenshire in south-west Wales (see Figure 1.1). The Proposed Development would connect the Brechfa Forest West wind farm situated in the southern part of the Brechfa Forest, to a grid connection point on an existing overhead line near Llandyfaelog to the south of Carmarthen. Although the footprint of the actual connection when built would take up a minimal amount of land, a site area has been defined at this stage that encompasses the preferred alignment (which is subject to detailed design) plus a limit of deviation, within which the final scheme would be built. This, along with the routes required to access pole locations, is referred to in this document as the ‘the Proposed Development’. The Proposed Development is delimited by an indicative centre line and numbered pole positions.
- 5.1.2 The Proposed Development (see Figure 1.1) starts in relatively low lying agricultural fields to the south-west of Llandyfaelog, near the estuary of the River Towy. Up to pole number 20 the Proposed Development passes through and beside a small forested area, and the stream Nant Morlais. At pole number 16 the route crosses the A484, and runs north east, almost parallel with it until it reaches Carmarthen.
- 5.1.3 The Proposed Development, running eastwards from pole number 30 to pass round a small area of plantation forest and the town of Carmarthen, crosses the A48(T) at pole number 73. After pole number 86 the route travels underground, just before crossing the B4300, where it traverses the valley of the River Towy, the more urban fringe of Abergwili and the A40(T).
- 5.1.4 The route emerges at pole number 87 less than 2 km north of the A40(T), just to the west of the A485 travelling northwards. Passing through more agricultural land to the north of Carmarthen, the alignment runs beside several smaller settlements,

travelling parallel to the A485. At pole number 158 the route bends east towards Brechfa Forest, and from pole number 184 runs through forested areas before reaching the proposed Brechfa Forest West wind farm substation.

5.1.5 The landscape has been influenced over time by physical and human influences, resulting in a land use pattern increasingly dominated by agriculture to the south, interspersed with isolated settlements, villages and small towns and by plantation forestry to the north. The valley of the River Towy with its river, associated transport infrastructure and historical association forms an important and distinct linear landscape cutting across the alignment from west to east.

5.1.6 The existing Alltwalis Wind Farm east of the A485, and within 2 km north of the Proposed Development, between pole numbers 174 and 194, is a notable man-made influence in the landscape and visual environment surrounding Brechfa Forest. Other human influences include the National Grid high voltage overhead line to the southwest and the Alltwalis 132kV overhead line to the northwest and small scale local distribution lines.

5.2 Landform and topography

5.2.1 The surrounding topography is highly variable, demonstrated by the many complex landforms and steep gradients topped by exposed elevated areas of moorland. Many localised high points around Brechfa exceed elevations of 300 m AOD, dropping significantly in the low lying river valley floors, to sea level at the Towy estuary.

5.2.2 The southern section of the route, from the connection point to the Towy valley is known as the Gwendraeth Vales¹. The route would pass through an area of rolling, pastoral countryside generally within a topographical range of approximately 40 m to 140 m AOD. The countryside comprises a field pattern of irregular, medium sized fields and, although tree cover is generally quite limited, hedgerows along the network of small lanes that criss-cross the area create some

¹ The landscape of Wales has been characterised into a series of units known as landscape character areas (LCAs). This and the following references in this section refer to LCA's.

enclosure.

- 5.2.3 The Towy valley section of the route comprises an area of flat, open, pastoral farmland at a general elevation of less than 10 m AOD near Carmarthen and Tre-gynwr. The valley features a reasonably large and sometimes geometric field pattern with some dispersed tree cover and scattered farmsteads (often located on the slightly more elevated ground to the north and south of the river floodplain). The flat valley floor is dramatically enclosed and contrasted by a series of distinct peaked hills, particularly on its northern side.
- 5.2.4 The Carmarthenshire Foothills accommodates the link from the Towy valley northwards to the south western fringes of the Cambrian Mountains. Elevation rises from approximately 10 m AOD at the Towy valley up to approximately 200 m AOD in the vicinity of Alltwalis. This is an area with a mix of agricultural influences and land cover is varied with alternating areas of open and more wooded countryside.
- 5.2.5 The northern Cambrian Mountain landscape ranges in elevation from approximately 200 m AOD to a maximum of approximately 320 m AOD. This area comprises a mix of high open moorland, extensive areas of coniferous forestry as well as agricultural slopes and farmed river valleys.

5.3 Main settlements and transport links

- 5.3.1 The main settlement is Carmarthen and the region is characterised by scattered small towns and villages (such as Peniel) and small isolated settlements. Settlements are linked by a complex network of rural roads and lanes arising from major transport corridors such as the A40(T), A485 and A48(T) connecting Carmarthen to towns in the wider area.
- 5.3.2 Settlement around the southern Gwendraeth Vales section of the route is generally sparse with dispersed small villages and farmsteads. The transport network mainly consists of local roads, with some minor B-roads heading north towards Carmarthen.

- 5.3.3 The low-lying Towy valley section contains the main settlement of Carmarthen, with an approximate population of 15,000 people, which spreads over the River Towy. The Towy valley also accommodates important east-west road connections including the A40(T) to the north of the river, the more local B4300 to the south and the A48(T) further south of the valley. The alignment runs underground to cross the Towy valley.
- 5.3.4 The Carmarthenshire Foothills contains a series of settlements (most notably Peniel, Rhydargaeau and Pontarsais) associated with the route of the A485 as the Proposed Development loosely follows the road northwards. The alignment turns eastwards before it reaches the settlement of Alltwalis.
- 5.3.5 The northern Cambrian Mountains area is sparsely populated with frequent dispersed farmsteads. This area has stronger associations with visitors and recreational pursuits including many promoted cycleways within the forests.

5.4 Land use

- 5.4.1 The area of the Proposed Development is dominated by agriculture, interspersed with isolated settlements, villages and small towns in the western and southern parts, of the area and by plantation forestry in and around the Brechfa Forest in the northern part.
- 5.4.2 Agriculture is mostly unimproved or semi-improved pasture and grazing land. The majority of this land is classed as moderate to poor quality land.
- 5.4.3 The Proposed Development passes through a woodland block where it enters the Brechfa Forest at pole number 184, just to the east of Alltwalis, and terminates at pole number 203 still within the Forest. In all other locations it avoids blocks of woodland, such as between pole locations 50 and 73 just south of Carmarthen, where the Proposed Development curves eastward to avoid the Beaulieu Plantation.
- 5.4.4 Several areas cater for informal recreation including walking, horse-riding,

shooting and fishing, these being associated with the many kilometres of river valleys, tracks, footpaths and bridleways. There are many businesses in the area in the tourism sector.

5.5 Designations

5.5.1 There are several statutory and non-statutory designations within the vicinity of the Proposed Development.

5.5.2 The majority of the Towy valley is designated as Special Landscape Areas by both the Carmarthenshire County Council Unitary Development Plan (2006) and the Carmarthenshire Local Development Plan (2011).

5.5.3 There is one Historic Park and Garden, designated by Cadw, on the eastern fringe of Carmarthen, to the east of the underground section of the Proposed Development.

5.5.4 The Proposed Development crosses one Site of Special Scientific Interest (SSSI)/ Special Area of Conservation (SAC), where it traverses the River Towy. Within 1 km there are four other SSSIs:

- Glan Pibwr Stream Section, located approximately 2 km west of pole number 70;
- Allt Penycoed Stream Section, located within 500 m east of pole number 70;
- Bishops Pond, located to the east of the underground section, within the Towy valley;
- Rhosydd Llanpumsaint, located approximately 2 km west of pole number 130.

5.6 Hydrology

5.6.1 The area has incised valleys along several watercourses such as the River Cothi running south from the Brechfa locality to the broader, more visually exposed valley of the River Towy which flows westwards towards Carmarthen before

flowing southwards towards the estuary.

- 5.6.2 The Proposed Development crosses two main water courses: the River Towy and the River Gwili, as well as several smaller water courses and drainage channels. In addition there are a number of other hydrological features located within the vicinity, including springs, ponds and wells.

5.7 Land use planning status

- 5.7.1 In developing the design of the Proposed Development (including consideration of location, scale and alignment), areas of planned growth and existing settlements and properties have been avoided as far as possible.
- 5.7.2 This has been achieved through field work, and a desk-based planning review undertaken by RSK between October 2013 and October 2014 to identify existing and proposed (emerging draft) land use allocations for development and particular uses, and extant planning applications and permissions that have potential to influence the location of the Proposed Development.
- 5.7.3 The consideration of land use allocations included a review of the Carmarthenshire Unitary Development Plan (UDP) (adopted 19th July 2006) and the emerging Carmarthenshire Local Development Plan (LDP) (Deposit June 2011) and associated Examination documents, including the Council's Composite Plan (October 2013).
- 5.7.4 The consideration of planning applications for development included a desk-based planning application search utilising data provided by Carmarthenshire County Council. This process took into consideration planning applications (and other forms of application; for example, Prior Notification) that are currently pending consideration or that have been previously approved and remain capable of implementation. The PINS register of Nationally Significant Infrastructure Projects has also been considered.
- 5.7.5 Details of land use allocations and planning applications and permissions (for the

purposes of cumulative assessment) are described in Chapter 19 and are shown as Figures 19.1 and 19.2. For ease of reference the maps provided as Figure 19.1 and 19.2 should be read in conjunction with the following sections of this chapter.

- 5.7.6 As a result of careful design, the Proposed Development does not directly affect any land allocations for employment, residential, retail, mixed-use or recreation/ open space uses.
- 5.7.7 The Proposed Development passes through large areas of land allocated as Mineral Resource Safeguarding Areas (MRSA), where this is unavoidable in the context of the scale of those areas and the significance of other environmental considerations.
- 5.7.8 The southernmost part of the Proposed Development between Llandyfaelog and the south-eastern extent of Carmarthen is largely devoid of land use allocations for development, although areas identified as MRSA exist within 2 km of the Proposed Development, for sand and gravel, limestone, and sandstone.
- 5.7.9 Where the Proposed Development crosses the A48, it passes through a large east-west ‘ribbon’ of MRSA for sand and gravel. In the vicinity, and almost 2 km from the Proposed Development to the west, are residential allocations associated with the settlement of Cwmffryd.
- 5.7.10 Moving north, residential, mixed-use, retail and recreation/ open space allocations are associated with Carmarthen and the neighbouring settlements to the eastern side of Carmarthen, some of which fall within 2 km of the Proposed Development, but all of which are closely associated with existing settlements and built-up areas. The Proposed Development does not pass through or within close proximity to these areas.
- 5.7.11 Between the B4300, passing through the A40 near Abergwilli and as far north as the point at which the Proposed Development meets the A485, the Proposed Development passes through an extensive tract of MRSA for sand and gravel.
- 5.7.12 Moving further north there are very few land use allocations within 2 km of the

Proposed Development, and those that do exist are generally residential allocations associated with existing settlements, all of which the Proposed Development avoids.

- 5.7.13 To the north and south of Rhydargaeau the Proposed Development passes through an extensive MRSA for sandstone, and sand and gravel allocations (pole positions 138-141 also pass through a further extent of the same sand and gravel allocation further north), as well as passing the western edge of a smaller MRSA for sand and gravel at pole position number 118.
- 5.7.14 Further north and north-east of this part of the Proposed Development the land is again largely devoid of land use allocations for development, albeit that a number of MRSA exist within 2 km of the Proposed Development, all of which the Proposed Development avoids.
- 5.7.15 With regard to planning applications: those that are pending determination or which have been permitted and that may remain capable of being implemented have been considered and are shown on Figure 19.1. Applications of a range of types exist within 2 km of the Proposed Development and beyond, largely dispersed throughout the area but with clusters of applications and permissions within and in close proximity to existing settlements, built-up areas and existing properties.
- 5.7.16 The Proposed Development passes through or immediately adjacent to the application site boundaries of the following applications/ permissions (but not necessarily within the development area contained within that application boundary):
- Map ID 155, ref. W/25504 for the ‘Erection of one agricultural endurance e.3129 55kw wind turbine to reduce the burden of the farms electricity consumption’, Gelliddu, Bancyapel, SA32 8EB.
 - Map ID 217, ref. W/29015 for the ‘Installation of a single endurance e-3120 (50kw) wind turbine on a 24.6m hub height tower, total height to blade tip 34.2m, to provide

renewable electricity to the dairy farm’, land at Pentremawr, Rhydargaeau, SA33 6BH.

- Map ID 260, ref. W/17938 for the ‘Refurbishment of approximately 54 kilometres of existing 11kv wood pole overhead line’, parishes of, Llanfihangel ar Arth, Llangeler & Llanllawddog.
- Map ID 171, ref. W/26416 for the ‘Variation of condition no 1 of W/20848 - an extension to the met mast planning permission for a temporary period of 3 years to 13/05/2015’, Forestry Commission land, Brechfa Forest.
- Map ID 250, ref. W/30534 for the ‘Discharge of planning requirement of Planning Inspectorate application reference en010008 (European Protected Species)’, Brechfa Forest West Wind Farm, Land East of A485, Pencader.
- Map ID 275 ‘Development Consent Order to construct and operate an onshore wind farm- an electricity generating station- with an installed capacity of between 56 and 84 megawatts together with associated works and development’, at Brechfa Forest West Wind Farm, Land East of A485, Pencader.

5.7.17 The above and other relevant planning applications and permissions, and land use allocations, are considered in detail within Chapters 8-19 of this draft ES.

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Appendix 6.1 Copy of the Scoping Opinion

6 The Environmental Assessment Process

6.1 Scoping

- 6.1.1 An underlying principle of the EIA process is that it should concentrate on environmental issues where effects associated with a development proposal have the potential to be significant.
- 6.1.2 The proposed development was subject to a detailed scoping exercise in July 2014, in order to determine those issues which should be addressed in the EIA and the form that individual assessments should take.
- 6.1.3 The scoping exercise involved: a review of available documentation related to the existing environment; consultation with statutory and non-statutory agencies and other environmental bodies with knowledge of the site area and surrounding areas; preliminary desk-based and site-based appraisals and surveys; and utilising knowledge of the potential environmental implications of comparable schemes (based on direct past project experience and other published experience and guidance).
- 6.1.4 The following considerations were factored into the scoping process.
- The nature of the receiving environment and the type of operations associated with the Proposed Development are such that environmental effects could arise during construction, operation and decommissioning stages;
 - A requirement for early liaison with stakeholder and regulatory authorities (e.g. Natural Resources Wales) to input into the EIA and design development processes;
 - A need for early consultation and commencement of ecological surveys to accommodate data collection within seasonal and programme constraints.
- 6.1.5 The outcomes of scoping were collated in a Scoping Report; this accompanied a

formal request for a Scoping Opinion which was issued by WPD to the Secretary of State on 11th July 2014.

6.1.6 PINS engaged the following parties as part of the scoping process, and issued its Scoping Opinion to WPD on 21st August 2014:

- Natural Resources Wales (including the Environment Agency and Forestry Commission);
- Cadw;
- Carmarthenshire County Council and neighbouring local authorities;
- Relevant Community Councils; and
- Others listed in Appendix 1 of the Scoping Opinion.

6.1.7 A copy of the Scoping Opinion is contained in Appendix 6.1 in Volume 3. In summary the Secretary of State noted that the main potential issues are likely to be:

- Effects on land use (agriculture and forestry);
- Landscape and visual impacts; and
- Construction phase impacts, in particular those associated with biodiversity, noise, air quality, transport and access.

6.1.8 The issues that the Secretary of State has agreed can be scoped out of the EIA, as the residual effects after application of the necessary mitigation measures are concluded to not be significant, are as follows:

- Transboundary impacts on another EEA¹ state;
- Operation and maintenance impact of the OHL on land use, soils, agriculture or forestry;

¹ European Economic Area countries

- Individual receptors located more than 1km from the centreline of the final preferred alignment can be assessed (in terms of landscape and visual impacts) in terms of groups or specific agreed viewpoints rather than individually;
- Separate consideration of townscape effects (on the basis that relevant townscape receptors will be agreed and considered as part of the landscape assessment);
- Effects on nationally designated landscape areas;
- Surveys for Pine Marten and Red Squirrel (subject to agreement with relevant consultees);
- Assessment of impact on the great crested newt;
- Air quality impacts during the operational phase;
- Assessment of flood risk during operation (both risk posed by and risks to the proposed development);
- Aspects of mineral extraction, active or permitted;
- Impacts of operation and maintenance on ground conditions and hydrogeology;
- Operational noise effects, impacts on the ground environment of operation and maintenance of the proposed development;
- Transport and access impacts of the operational and maintenance phases;
- Assessment of employment, land use and access during operation; and
- EMF for the construction and decommissioning phases of the project.

6.1.9 WPD are of the opinion that certain other environmental aspects would be unlikely to result in any significant environmental effects and so would wish these aspects to be scoped out. The Secretary of State acknowledged (paragraph 3.39 of the

Scoping Opinion) that more detailed information would become available and that WPD could agree with the relevant consultees to scope matters out of the Environmental Statement (ES), where further evidence is provided to justify this approach.

6.1.10 The issues/ aspects subsequently agreed with relevant consultees to be scoped out include the following:

- CCC agreed that construction phase impacts on air quality (for overhead line sections) can be scoped out of the ES;
- CCC agreed that construction phase impacts on noise and vibration (for overhead line sections) can be scoped out of the ES;
- CCC agreed that noise and vibration impacts arising as a result of construction traffic can be scoped out of the ES;
- CCC agreed that operational noise impacts (as long as suitable justification provided) can be scoped out of the ES;
- CCC agreed that air quality impacts arising as a result of construction traffic can be scoped out of the ES;
- NRW agreed that consideration of Pine Marten, Red Squirrel and White Clawed Crayfish can be scoped out of the ES;
- NRW agreed that an assessment of the Allt Penycoed Stream Section SSSI (notified for its fossil assemblages) will not be impacted by the proposed overhead line and can be scoped out of the ES;
- NRW agreed that based on the results of the breeding and wintering bird surveys, that there is no evidence for species being present along the proposed route that are susceptible to electrocution impacts (i.e. larger species that perch or nest on wires or poles such as herons). In addition the most sensitive section of the route (for birds such as Herons) – the Towy crossing – will be undergrounded. Therefore, agreement that electrocution

impacts on birds can be scoped out of the ES.

- NRW agreed that the impact of single pole installation on wet habitats is likely to be minimal and can be mitigated through standard construction practices which will be detailed in the ES. A specific section in the ES to cover impacts on hydrological functioning of wet habitats is therefore no longer required; and
- NRW agreed that there should be no requirement for a Flood Consequence Assessment to cover the works in Flood Zone C2 around the Towy/Gwili confluence.

6.1.11 The scope of the individual assessments has been regularly reviewed throughout the EIA process to take account of: new published guidance and/or assessment methodologies; stakeholder feedback; new environmental data; and ongoing scheme design changes.

6.1.12 Explanations of the methods of assessment adopted and the issues identified are provided in Chapters 7 to 19 of this draft ES, which detail the findings in relation to the various environmental aspects considered in the EIA.

6.2 Delivery of the EIA

EIA Guidance

6.2.1 The EIA has been undertaken with regard to the following published best-practice guidance.

- Guidelines for Environmental Impact Assessment, published by IEMA (2004);
- Relevant PINS Advice Notes;
- Guidance available on PINS website²; and
- National Planning Practice Guidance³.

² <http://infrastructure.planningportal.gov.uk/>

- 6.2.2 Wherever practical, a common approach has been adopted in the undertaking and reporting of individual environmental assessments.

Establishment of the Baseline Environment

- 6.2.3 The EIA of scoped-in environmental aspects commenced with the identification and review of information relating to known, or the likely presence of, environmental receptors and resources within a defined study area in order to determine their relative value, importance and/or sensitivity towards change.
- 6.2.4 Environmental resources were defined as those environmental aspects that support and are essential to natural or human systems. These include areas or elements of population, ecosystems, watercourses, air and climatic factors, landscape, and material assets.
- 6.2.5 Environmental receptors were defined as people (i.e. occupiers of dwellings and users of recreational areas, places of employment and community facilities) and elements within the environment (e.g. flora and fauna) that rely on environmental resources.
- 6.2.6 Desk based data sources comprised: consultation responses; published literature; databases, records and schedules relating to environmental designations; national, regional and local policy documentation; historic and current mapping; aerial photography; and data gathered from previous environmental studies.
- 6.2.7 Site surveys were undertaken to verify and consolidate information gathered during the desk-based review, and to evaluate the relationships between specific environmental interests and their wider environmental value.
- 6.2.8 Study area extents vary in accordance with the environmental aspect being considered. For some topics, a study area has been defined as being relatively localised to the Proposed Development, whilst for others it has extended outward to capture the surrounding road network, distant communities, and

³ <http://planningguidance.planningportal.gov.uk/>

environmentally sensitive areas. The definition of each study area has been informed by a review of the relationship between the Proposed Development and the receiving environment, the outcomes of scoping, and also by reference to thresholds stipulated in topic-specific EIA guidance. Study areas are defined in each specialist topic chapter.

Impact Prediction and Assessment

6.2.9 Impacts comprise identifiable changes to the baseline environment. These can be either beneficial (e.g. introduction of planting to screen visually detracting elements) or adverse (e.g. loss of a valued environmental component), and can take the following forms.

- Direct [primary] (e.g. loss of habitat to accommodate the Proposed Development).
- Indirect [secondary] (e.g. pollution downstream arising from silt deposition during earthworks).
- Short-term/ temporary (e.g. dust generated during construction).
- Medium-term (e.g. cutting back of planting which is subsequently allowed to regenerate).
- Long-term/permanent (e.g. improvement in air quality).
- Cumulative (e.g. incremental changes caused by other past, present or reasonably foreseeable actions together with those associated with the Proposed Development, or where a receptor or resource is subject to a combination of individual impacts such as both noise and visual impact associated with the Proposed Development).

6.2.10 Impact assessments have been both quantitative and qualitative in nature, and based on comparisons between the environmental conditions immediately prior to the assumed construction of the Proposed Development and the predicted environmental conditions resulting from its implementation.

- 6.2.11 Impacts have been defined in accordance with accepted terminology and standardised methodologies to predict the magnitude of impact (or change) resulting from the Proposed Development.
- 6.2.12 Assessments have been undertaken for the year of operation. Some environmental aspects have required further assessment beyond the operational year to take account of factors such as growth of landscape planting, or activities associated with decommissioning of the Proposed Development.

Environmental Effects

- 6.2.13 Effects are defined as the consequence of impacts. They are formulated as a function of the receptor/resource value/ sensitivity, and the predicted magnitude of impact.
- 6.2.14 Professional judgement, defined thresholds, established criteria and standards have been used to report the environmental effects of impacts which can be referred to as either being prior to, or following establishment of, environmental mitigation.

Environmental Mitigation

- 6.2.15 Environmental mitigation measures have been developed to address potentially significant adverse environmental effects.
- 6.2.16 Mitigation can take the form of: agreed measures incorporated into the evolving design of the Proposed Development (e.g. environmental treatments or ‘embedded’ design elements); standard measures (e.g. best practice construction management to control dust emissions) which are enforceable through planning conditions; and measures proposed in outline (e.g. offsite planting to provide visual screening to nearby residential dwellings) which may require further development and formal agreement to ensure their implementation.
- 6.2.17 The principles adopted in the identification and development of environmental mitigation for the Proposed Development have been: avoidance (wherever

possible); reduction (where avoidance cannot be achieved); or compensation (where reduction is unachievable or would not achieve the required level of mitigation).

Significance of Environmental Effects

- 6.2.18 The significance of an environmental effect has been established by way of reference to: the importance/value of affected resources; the number and sensitivity of affected receptors; impact magnitude; duration, frequency and extent of effect; and the reversibility of effect.
- 6.2.19 Significance assumes only embedded and standard mitigation measures are in place; these being the measures for which delivery and implementation can be secured.
- 6.2.20 It is the residual effects (i.e. the post-mitigation effects) that the competent authority determining the planning application considers as part of the decision-making process.

6.3 Reporting of the Assessments

- 6.3.1 Each individual assessment follows a comparable format to ensure consistency in reporting the existing environmental conditions and the potential effects on them arising from implementation of the Proposed Development.
- **Introduction:** This sub-section introduces the assessment topic under consideration.
 - **Scope and Methodology:** This sub-section identifies and describes the scope of the assessment, the methods and criteria adopted, relevant guidance followed, and any assessment limitations, assumptions or difficulties encountered.
 - **Statutory and Planning Context:** This sub-section outlines statutes, guidance, policies and plans relevant to the environmental interests forming

the focus of the assessment.

- **Existing Environment:** This sub-section describes the features and characteristics associated with the baseline environment.
- **Predicted Impacts:** This sub-section reports the predicted impacts on the baseline environment during the construction, operational and decommissioning phases.
- **Mitigation:** This sub-section details all measures that have been incorporated into the design of the project and/or agreed as deliverable.
- **Summary of Effects:** This sub-section summarises the nature and significance of residual environmental effects that are predicted to remain, post-implementation of mitigation measures.

6.4 Assumptions, Uncertainties and Limitations

6.4.1 The EIA was undertaken, and the resulting draft ES has been compiled, using the material made available to the EIA team by the client and members of their project team, together with other readily available and publicly accessible material including existing literature and studies, as well as personal communication with local experts. To the best of our knowledge, the information used as a basis for the assessment is accurate and up to date. The team is not aware of any limitations of the underlying information or of any constraints that would materially affect the evaluations.

6.4.2 WPD has undertaken site visits, surveys and investigations at or in the vicinity of the site to provide more information for the assessments and to fill data gaps. This has resulted in a more complete and up to date set of baseline data to use as the basis for the impact assessment. Although the data have been collected over a period of time, WPD is of the opinion that the data is relevant and valid at the time of reporting. It should be pointed out that where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work. This draft ES has been based on the best available

information at the time of publication. However, further information may become available during the later design phases that will be used to inform the project if relevant. In addition, feedback from the consultation will be used where relevant to inform the Proposed Development and the resulting EIA will take any changes into account.

- 6.4.3 Assumptions adopted in the evaluation of impacts are reported in each of the relevant sections. However, these assumptions are often implicit and rely on expert judgement. Where technical deficiencies are known, or it has been necessary to make assumptions, these are documented.
- 6.4.4 The EIA has been undertaken during the initial design phase of the project and therefore some of the technical aspects of the construction and operation have yet to be determined. Where an alternative option could incur additional impacts, these are discussed within the relevant sections. Also, the EIA has taken a precautionary approach to adopt conservatism in the assumptions made and any scenarios assumed, so that in general a reasonable ‘worst-case’ scenario was assessed. In that way, inherent uncertainties are accounted for and subsequent modifications to the project during the later design phases are less likely to fall outside of the assumed envelope of the assessment parameters. For instance, if there is uncertainty about whether or not an impact would actually occur, then it has been assumed to have a 100% certain probability of occurrence as a worst case assumption.

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Table 7.1 NPS EN-1 Compliance Summary

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Appendix 7.1 Summary of Relevant Local Planning Policies

7 Planning Policy Context

7.1 Introduction

7.1.1 This chapter of the draft Environmental Statement (ES) presents a summary of the national and local planning policy relevant to the Proposed Development and explains how planning policy has framed WPD’s approach to identifying the environmental effects to be considered and the significance of those effects. Specific planning policies relevant to the environmental topics covered in this draft ES are summarised in the specialist topic chapters.

National Policy and Legislation

7.1.2 National Policy Statements (NPS) are of primary importance to the decision-making process when Development Consent Order (DCO) applications are under consideration. Section 104 of the Planning Act 2008 states:

“(2) In deciding the application the Secretary of State must have regard to –

(a) any national policy statement which has effect in relation to development of the description to which the application relates (a “relevant national policy statement”)

(3) The Secretary of State must decide the application in accordance with any relevant national policy statement, except to the extent that one or more of subsections (4) to (8) applies.”

7.1.3 For energy-related Nationally Significant Infrastructure Projects (NSIPs), there are two NPSs, designated on 19 July 2011, that are relevant to the Proposed Development: Overarching National Policy Statement for Energy (EN-1); and National Policy Statement for Electricity Networks Infrastructure (EN-5). Summaries of these policy documents are set out in Section 7.2 of this chapter.

7.1.4 In addition to the NPS, the Secretary of State is required to have regard to Section

66 of the Planning (Listed Buildings and Conservation Areas) Act 1990 section 66 which states that:

(1) In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.

7.1.5 Regard should also be given to Section 40 of the Natural Environment and Rural Communities Act 2006 which states that:

(1) Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.

(2) In complying with subsection (1), a Minister of the Crown, government department or the National Assembly for Wales must in particular have regard to the United Nations Environmental Programme Convention on Biological Diversity of 1992.

National Planning Policy

7.1.6 Planning Policy Wales (PPW) Edition 7 published in July 2014 sets out the Welsh Government's planning policies for Wales. It is supplemented by 21 Technical Advice Notes (TANs). Where applicable to the Proposed Development, relevant aspects of PPW and applicable TANs are summarised in Section 7.3 of this chapter.

7.1.7 The Wales Spatial Plan (WSP) 'People, Places, Futures' was first published in 2004 and subsequently updated in 2008. It sets a strategic framework to guide future development and policy interventions. It integrates the spatial aspects of national strategies for social inclusion and economic development, health, transport and environment, translating the Welsh Government's sustainable

development duty into practice. Where applicable to the Proposed Development, relevant aspect of the WSP are summarised in Section 7.3 of this chapter.

Local Planning Policy

- 7.1.8 The NPSs form the basis for decision making for NSIPs; the NSIPs are not subject to s38(6) of the Planning and Compulsory Purchase Act 2004, which states that determination of a planning application must be made in accordance with a local development plan, unless other material considerations indicate otherwise. Local planning policy does not therefore set the tests for the acceptability of NSIPs. However, some local plan policies may be relevant considerations where they inform the assessment of potential effects e.g. by identifying land allocations and environmentally sensitive areas. If there is a conflict between NPS and local policies, the NPS takes precedence.
- 7.1.9 The Proposed Development lies in the Brechfa Forest in the south west of Wales wholly within the administrative area of Carmarthenshire County Council. This is the ‘Local Planning Authority’ (LPA) as defined by Part 1(b) of the Town and Country Planning Act 1990.
- 7.1.10 The LPA has been engaged during various stages of the pre-application consultation for the Proposed Development and, in particular, were consulted during the non-statutory Stage 1 and Stage 2 Consultations and are being consulted at the Statutory Stage 3 Consultation as required under Sections 42 and 47 of the Planning Act 2008. Relevant local planning policies are set out in the following documents:
- Carmarthenshire Unitary Development Plan (CUDP) (adopted July 2006); and
 - Emerging policies in the Carmarthenshire Local Development Plan (LDP) which is currently undergoing Examination and was submitted to the Welsh Government in June 2013. The LDP is expected to be adopted by the end of December 2014.
- 7.1.11 Carmarthenshire County Council has also published Supplementary Planning

Guidance (SPG) that expands upon the CUDP policies. Appendix 7.1 provides a summary of the local planning policies relevant to the Proposed Development. Key themes from these policies have been identified and are provided at Section 7.4 of this chapter, together with an analysis of how they are addressed through the EIA.

7.2 National Policy Statements for Energy Infrastructure

- 7.2.1 National Policy Statements set out the national policy for nationally significant infrastructure projects. National Policy Statement EN-1 is the overarching national policy statement for energy whilst National Policy Statement EN-5 is specific to Electricity Networks Infrastructure. NPS EN-1 requires that the decision-maker (the Secretary of State) decide an application for energy infrastructure in accordance with the relevant NPSs, including NPS EN-1 subject to certain caveats. WPD has therefore undertaken to review the compliance of the ES against the relevant NPSs. A summary of this analysis is provided below.
- 7.2.2 NPS EN-1 contains two key parts relevant to the EIA and ES; Part 4 'Assessment Principles' and Part 5 'Generic Impacts'. In these parts, detailed requirements for the assessment process, addressing cross-cutting themes and carrying out topic specific assessments are provided. These requirements are summarised below.

EN-1 Part 4: Assessment Principles

- 7.2.3 The legislative requirements for specific topic areas to be covered in an EIA are established. Guidance is also provided on the nature of the assessments to be carried out, e.g. to include cumulative effects, secondary effects, and the inter relationship of effects.
- 7.2.4 These requirements have informed the scope and method of the assessment and all environmental topics identified in EIA legislation and by PINS are included in the ES. Interactions between topics are identified in each technical chapter as part of the consideration of cumulative effects where such interactions have been scoped into the assessment.

- 7.2.5 Each assessment and proposals for mitigation considers the construction, operation, and decommissioning effects where these development phases have been scoped in for consideration and assessment.
- 7.2.6 Part 4 also includes a requirement on the decision-maker to consider, prior to granting a DCO, whether the project may have a significant effect on a European site, under the Habitats and Species Regulations. To assist in this consideration, applicants are requested to provide information to support the preparation of a Habitat Regulations Assessment (HRA). WPD will provide this information as part of the DCO application.
- 7.2.7 The NPS also requires applicants to provide information about the alternatives that have considered in terms of the siting and design of their project. The alternatives considered for the Proposed Development are summarised in Chapter 3; further details of changes to design and how it responded to consultation are provided in the Consultation Report.
- 7.2.8 Part 4 of EN-1 requires applicants to demonstrate that their project is sustainable; that it is durable, attractive and adaptable as it can be; that it is going to be resilient to potential future natural events, such as flooding. WPD has undertaken a risk assessment of all of its electricity assets with respect to climate change (WPD Adaptation to Climate Change Report 2011). The report considers the resilience of infrastructure to the possible effects of climate change and its findings will be provided, and will inform, the final ES. For this Proposed Development, an FRA has been produced which includes for the effects of future climate change.

EN-1 Part 5: Generic Impacts

- 7.2.9 Part 5 includes a number of specific topics and describes what must be addressed in the assessment of each topic and what the decision-maker needs to consider in determining whether to grant the DCO.
- 7.2.10 Table 7.1 provides a brief summary of the EN-1 compliance, to provide an overview of how this document complies with the requirements of EN-1.

Table 7.1 – NPS EN-1 Compliance Summary

EN-1 Topic	ES Chapter/ Volume Reference	ES Compliance Summary
Air Quality and Emissions	Chapter 15	This draft ES describes and assesses significant emissions, mitigation and residual effects, including road traffic emissions.
Biodiversity and Geological Conservation	Chapter 10	There is one site of geological conservation importance within the Order Limits. Chapter 12 considers the potential geological impacts arising from the Proposed Development. Chapter 10 identifies the elements of the Proposed Development that are anticipated to have an effect on biodiversity and nature conservation.
Dust, odour, artificial light, smoke, steam and insect infestation	Chapter 15 and Chapter 13.	Dust has been addressed primarily within Chapter 15 and Chapter 13. Light, smoke, steam and insect infestation has been scoped from the assessment.
Flood Risk	Chapter 13	The application is accompanied by a Flood Risk Assessment and the findings of the assessment are discussed within Chapter 13.
Historic Environment	Chapter 11	Chapter 11 of the draft ES provides a description of the significance of the heritage assets affected by the Proposed Development. It includes a description of the contribution made by setting to the significance of assets affected by the Proposed Development.
Landscape and Visual Assessment	Chapter 9	The draft ES contains an assessment of the landscape and visual effects of the development in the construction and operational phases. Identification of national and locally designated areas has played a key role in defining the route of the Proposed development.

EN-1 Topic	ES Chapter/ Volume Reference	ES Compliance Summary
Land Use	Chapter 8	The effects of the Proposed Development on existing and proposed land uses have been taken into account. Chapter 8 also includes for consideration of the potential for impacts upon agriculture and forestry.
Noise and Vibration	Chapter 14	The effects arising from noise and vibration during the construction phase have been identified and assessed with Chapter 14 of this document.
Socio-Economic Impacts	Chapter 17	The potential for the Proposed development to affect local communities including businesses has been considered within the assessment. This consideration has included for the consideration of tourism which is recognised within policy as a key economic sector within the area.
Traffic and Transportation	Chapter 16	The likely impacts of the construction traffic associated with the Proposed Development have been identified and assessed within the this draft ES.
Waste	Chapter 2	Chapter 2: The Proposed Scheme sets out how any waste arising from the construction of the Proposed Development will be dealt with. Further information concerned with construction waste will be provided within the CEMP which will be submitted with the DCO application.
Water Quality and Resources	Chapter 13	The potential effects of the Proposed Development on water quality, water resources, and the physical characteristics of the water environment crossed or close to the Proposed Development have been assessed.

NPS EN-5

- 7.2.11 This NPS provides guidance that is specific to proposals relating to electricity networks infrastructure. It is to be read in conjunction with NPS EN-1. It advises

that applicants should ensure that their applications, and any accompanying supporting documents and information are consistent with the instructions and guidance given to applicant in this NPS. It sets out additional technologically-specific considerations on the following generic impacts considered within NPS EN-1.

- Climate change;
- Biodiversity and geological conservation;
- Landscape and visual;
- Noise and vibration.

7.2.12 In addition guidance is provided for the consideration of EMF.

7.2.13 The NPS requires applicants to demonstrate good design in respect of landscape and visual amenity and in the design of the project to mitigate adverse effects such as noise, vibration and electric magnetic fields (EMF). An understanding of baseline conditions related to the landscape, to visual matters, to ecology (biological and geology, together with additional consideration of matters such as the historic environment have informed the selection of the initial study area, of the corridor options, the preferred corridor and preferred alignment. The selection of the preferred alignment was informed additionally by the consideration of noise and vibration and EMF.

7.2.14 Resilience to climate change is highlighted as a key issue and the NPS advises that applicants should in particular set out how the proposal would be resilient to flooding; effects of wind and storms on overhead lines; higher average temperatures; and earth movement or subsidence caused by flooding or drought (for underground cables). In developing the Proposed Development, considerable informal consultation has taken place with the relevant statutory consultees. This has helped to inform the design and siting of the Proposed Development and has guided the scope of assessments and the choice of corridor and connection route. An FRA has been produced to accompany the application.

7.3 National Planning Policy

Planning Policy Wales

7.3.1 PPW 7 highlights the importance of delivering and planning for sustainable development and states a presumption in favour of sustainable development. PPW sets out the Welsh Government’s planning policies and how these are expected to be applied. It states that

“The planning system is necessary and central to achieving sustainable development in Wales. It provides the legislative and policy framework to manage the use and development of land in the public interest in way which is consistent with key sustainability principles and key policy objectives. In doing so, it helps to deliver our integrated sustainable development outcomes.”

(Paragraph 4.2.1)

7.3.2 One of the key sustainability principles is the respect for environmental limits, so that resources are not irrecoverably depleted or the environment irreversibly damaged.

7.3.3 In order to respect environmental limits, the design, construction, operation, and eventual decommissioning of the Proposed Development and the approach to the EIA, have taken into account the following relevant sections of PPW:

- Section 4: Planning for Sustainability;
- Section 5: Conserving and Improving Natural Heritage and the Coast
- Section 6: Conserving the Historic Environment;
- Section 8: Transport;
- Section 12: Infrastructure and Services; and
- Section 13: Minimising and Managing Environmental Risks and Pollution.

7.3.4 This draft ES includes assessments that consider the potential for effects arising

from the Proposed Development upon these topics and includes proposals for the mitigation of adverse effects.

TAN8 and TAN12

- 7.3.5 PPW is supported by a series of Technical Advice Notes (TANs) which provide detailed planning advice on a range of topics that need to be taken into account by local planning authorities when preparing their local development plans and are a material consideration in the determination of planning applications. TAN8 provides advice on ‘planning for renewable energy’ whilst TAN12 provides advice on good design.

Wales Spatial Plan

- 7.3.6 Wales Spatial Plan People, Places, Futures sets a strategic framework to guide future development and policy interventions. It integrates the spatial aspects of national strategies for social inclusion and economic development, health, transport and environment, translating the Welsh Government’s sustainable development duty into practice.

7.4 Local Planning Policy

- 7.4.1 Appendix 7.1 provides a summary of the Local Planning Policies of relevant to the EIA and ES.
- 7.4.2 Guidance contained within these local planning policies has been taken into account in the topic assessments, Chapters 8 to 18 of this draft ES. Within each topic chapter, a narrative is provided as to how policy has informed the assessment process. A brief description and discussion of policy relevant to each chapter is provided.

Land use, Agriculture and Forestry

- 7.4.3 Policies relate to the protection of better quality agricultural land from development unless there is an overriding need for the development or other land, of a lower

quality is not available. Policies also seek to protect amenity and other areas with public access from development whilst the council also provides protection to areas of mixed or broad-leaved woodland which are important for their contribution to amenity, character of the locality or which are important for their landscape, nature conservation value and public access. Areas identified within the local plan documents informed the EIA baseline and influenced the selection of the corridor options and preferred corridor.

Landscape and Visual

- 7.4.4 Policies seek to protect and enhance the natural environment including individual landscape features. A number of policies relate to specific special landscape areas which are designated at the local level. The policies provide a description of and identify features within these areas.
- 7.4.5 The sensitivity of each special landscape area and landscape features that contribute towards landscape character have been considered in Chapter 9 of this draft ES. Landscape features are included in the baseline for the chapter and the presence of such features and designated areas has informed the selection of the study area, corridor options and preferred corridor as well as the preferred alignment and areas to be undergrounded.

Ecology

- 7.4.6 Policies address the protection of the species, sites and habitat features. A number of policies relate specifically to the protection of designated sites, whilst others seek to ensure the overall protection of the natural environment.
- 7.4.7 Designated sites and other locally important sites were identified as part of the initial desk-top studies for the ecology assessment (see Chapter 10 of this draft ES). These were supplemented by extensive field studies to inform the identification of corridor options, the preferred corridor and ultimately the route alignment, including its subsequent design. Information gathered also identified receptors to inform part of the baseline data to be used in the biodiversity and

nature conservation assessment.

Historic Environment

- 7.4.8 Policies consider a variety of heritage resources including archaeological sites, conservation areas and listed buildings, non-designated historic features and the wider historic environment.
- 7.4.9 In the historic environment assessment which is set out in Chapter 11 of this draft ES, receptors were identified as part of the initial desk-based studies which identified listed buildings, conservation areas, scheduled and non-scheduled monuments as well as areas of known and potential archaeological remains. The information collated as part of these studies has been used to establish the baseline for the historic environment assessment and to inform the selection of the corridor options, preferred corridor and route alignment.

Geology, Hydrogeology and Ground Conditions

- 7.4.10 Policies seek the protection of groundwater and ground water sources and environmental protection. Certain policies relate specifically to the prevention of development that would adversely affect groundwater and groundwater quality. Others seek to prevent development that would result in pollution in general or harm to amenity.
- 7.4.11 As described in Chapter 12 of this draft ES, information was collated from the council and from statutory consultees to inform the identification of the corridor options, preferred corridor and route alignment.
- 7.4.12 Other relevant local planning policies relate to the protection of geological features and interests. Areas of geological interests, including some designated as SSSIs as well as other known geological features were identified during desk-based assessment and have informed the identification of the corridor options, preferred corridor and route alignment.

Hydrology Drainage and Flood Risk

- 7.4.13 A number of local planning policies are associated with flood risk, and more specifically minimising the risk and impact of flooding. An FRA for the Proposed Development will be provided within the final version of this draft ES. Information on flood risk within the Proposed Development study area has been collected from a range of sources, including the local authority, FRAs, Flood Management Plans, and information and mapping available from the NRW website. The information collated as part of the desk-based studies form part of the baseline for the hydrology assessment in Chapter 13 of this draft ES.
- 7.4.14 There are also a number of relevant policies relating to the protection of groundwater and ground water sources that seek to prevent development that would adversely affect groundwater and groundwater quality. As part of the initial desk-based assessment and studies, a number NRW maps were utilised including groundwater vulnerability maps and the online aquifer designation and groundwater source protection zone, these formed part of the baseline assessment and were complemented by information collated from other sources.

Noise and Vibration

- 7.4.15 A number of local planning policies seek to control the impact of noise, including in connection to transport, and more particularly ensuring adequate provision for transport is made in development, whilst minimising adverse impacts.
- 7.4.16 The noise and vibration assessment, set out in Chapter 14 of this draft ES, identified receptors as part of the baseline assessment. The predicted noise levels have been assessed for the construction period only and mitigation is proposed where noise is identified as a potential issue. This includes construction mitigation measures outlined in the CEMP to be submitted with the DCO application.

Air Quality

- 7.4.17 Policies set out to protect air quality from the generation of potentially polluting emissions recognising that the sources of pollution may come from transport and

construction related activities.

- 7.4.18 A desk-based air quality assessment has been undertaken and this is presented within Chapter 15 of this draft ES. The scope of the assessment was agreed with statutory consultees and it determines the potential air quality effects on receptors arising from construction only. Measures to mitigate emissions to air during the construction phase are outlined within the CEMP which will be submitted with the DCO application.

Transport and Access

- 7.4.19 A number of local planning policies relate to the preservation of the amenity and safety of public rights of way (PRoW) and other forms of access. PRoW and other public accesses have been identified as part of the baseline environment potential effects upon the users of PROWs are identified within the Socio-Economic Tourism and Recreation Chapter. Where the Proposed Development is considered to have an adverse effect on access (including PRoW), mitigation is proposed, including diversion routes proposed during construction, which will be detailed in the TMP to be submitted with the DCO application.
- 7.4.20 A number of policies consider the traffic impacts of development. Chapter 16 establishes the predicted number of construction vehicle movements and routing. Proposals to reduce the effects of construction will be provided within the TMP which will accompany the final ES and DCO application. Operational effects have been scoped from the assessment with the agreement of statutory consultees.

Socio-Economics, Tourism and Recreation

- 7.4.21 The policies highlight that new development should aim to avoid adversely impacting upon residential and environmental amenity and should not negatively affect existing businesses. Policies are also provided which seek to encourage the provision of community benefits where these are directly related to the development proposed. Policies are also included that seek to safeguard green infrastructure and community facilities; and encourage economic prosperity and

the development of skills. The effects of the Proposed Development on these groups of land use and socio-economic receptors have been assessed Chapter 17 of this draft ES. Community facilities and residential areas have been identified as part of the baseline. The importance of tourism within the study area has been quantified and the Chapter does assess the potential for effects recommending mitigation where appropriate.

7.5 Conclusion

National Policy

7.5.1 National Policy Statements are of primary importance to the decision-making process when Development Consent Order (DCO) applications are under consideration. Of relevance to the Proposed Development are NPS EN-1 and NPS EN-5. Both documents provide policy advice for the consideration of energy development and for energy transmission infrastructure. Contained within the policy guidance is advice on what the decision-maker should consider in relation to a number of environmental topics which have relevance to an applicant preparing a DCO application. The advice contained within both documents informed the scope of the EIA and consequently the scope of the chapters presented within this draft ES. The final ES, which will accompany the DCO application, will set out in detail, compliance with the NPS's.

National Planning Policy

7.5.2 PPW edition 7 published in July 2014 sets out the Welsh Government's planning policies for Wales. Whilst the above mentioned NPSs are the primary policy tools for determination of applications for development consent, PPW together with its supporting TANs and WSP, remains relevant in terms of shaping and guiding the environmental topic assessments. The relevant parts of PPW have been considered for each of the environmental topics in the ES.

Local Policy

7.5.3 As the NPSs form the basis for decision making on NSIPs, NSIPs are not subject to s38(6) of the Planning and Compulsory Purchase Act 2004, which states that determination of a planning consent must be made in accordance with a local development plan. Local planning policy does not therefore set the tests for the acceptability of NSIPs. However, local plan policies can be relevant where they inform the assessment of potential effects, e.g. by identifying land allocations and environmentally sensitive areas. If there is a conflict between NPS and local policies, the NSP takes precedence. Local planning policy has been used to inform the scope of the EIA and the assessments presented within this draft ES.

7.6 References

National Policy Statement (EN-1) Overarching National Policy Statement for Energy, DECC 2011

National Policy Statement (EN-5) Electricity Networks Infrastructure, DECC 2011

Wales Spatial Plan 2008 Update, Welsh Government
Planning Policy Wales (Edition 7) July 2014, Welsh Government

Technical Advice Note 8: Planning for Renewable Energy, July 2005, Welsh Assembly Government

Technical Advice Note 12: Design, (2014), Welsh Government

Carmarthenshire UDP (2006), Carmarthenshire County Council

Carmarthenshire LDP Composite Plan (October 2013), Carmarthenshire County Council

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No figures

Appendices

No appendices

8 Land Use, Agriculture and Forestry

8.1 Introduction

- 8.1.1 This chapter describes the assessment of the potential impacts of the Proposed Development on land uses (including planned land uses) within the study area and in particular the potential impact on agriculture and forestry (especially impacts on the forest resource and forest management). The term ‘land use’ in this context is applied to land used for human socioeconomic activity (as opposed to natural or ‘unused’ land).
- 8.1.2 Impacts on agricultural land and land management, including managed forestry plantations, are described in this chapter, whereas potential impacts on other socioeconomic uses of the land (for instance tourist related businesses, recreation, and access to open countryside) are addressed in Chapter 17. Potential impacts on natural ecosystems including ancient and semi-natural woodland are covered in Chapter 10; potential impacts on historic land are described in Chapter 11; and potential impacts on transport uses (e.g. roads) are addressed in Chapter 16. Impacts on minerals safeguarding areas are described in Chapter 12.
- 8.1.3 The Proposed Development is a linear scheme approximately 29 km long comprising an OHL (approximately 25.2 km) with some parts of the alignment underground (approximately 3.4 km). There are some additional necessary connection works required at and near to the New Lodge substation, Burry Port involving inter-connection of some existing grid infrastructure and installation of a short length of underground cabling (Figure 2.2). The Proposed Development does not include other associated infrastructure such as substations because these are either existing (operated by either WPD or the National Grid) or to be provided under the already consented Brechfa West wind farm. All proposed works needed to provide the connection have been assessed, including works to be done at New Lodge substation under WPD’s existing powers (e.g. under Permitted Development rights or as Exempted activity as a Statutory Undertaker of electrical distribution

works).

- 8.1.4 The actual footprint of an OHL is very small as it comprises only the limited area excavated for the placement of the wooden pole structures and, where required, the footing of tension wires for angle poles and termination poles. During the operation stage the presence of an OHL would not preclude access or most land uses such as agriculture although certain restrictions would apply to built development or planting of tall trees within proximity to the conductors.
- 8.1.5 The footprint of an underground cable section during the construction phase would be greater, depending on the construction method used (see the project description in Chapter 2). During the operation stage the presence of an underground cable would not preclude most types of land use except (to minimise risk of damage to the cable) for certain types of development and mineral extraction; and no trees or other deep-rooted species could be planted above an underground cable.
- 8.1.6 Land use in the area of the Proposed Development is predominantly rural in nature so the alignment avoids significant areas of built development.
- 8.1.7 Construction and operation of the OHL and/ or underground cable may result in a range of direct and indirect impacts on agricultural soils and forestry operations. All potentially significant impacts of the construction, operation and decommissioning of the Proposed Development have been identified and assessed in this chapter.

8.2 Legislation and policy context

- 8.2.1 A summary of relevant legislation, criteria and standards as well as national, regional and local policy is included here. Further discussion on policy is provided within Chapter 7.

National Policy

National Policy Statements

- 8.2.2 The Planning Act 2008 requires that when deciding an application the decision-

maker must have regard to the relevant National Policy Statement (in addition to the local impact report and other matters). NPS provide the primary policy basis for the consideration of nationally significant infrastructure projects. National Policy Statement EN-1 is the overarching national policy statement for energy whilst National Policy Statement EN-5 is specific to Electricity Networks Infrastructure.

Overarching National Policy Statement for Energy (EN-1)

8.2.3 Part 5.10 provides policy and guidance on land use as well as agricultural land.

Land Use, Agriculture and Forestry

8.2.4 Part 5.10 of the NPS states, at paragraph 5.10.5, that “the ES should identify existing and proposed land uses near the project, any effects of replacing an existing development or use of the site with the proposed project or preventing a development or use on a neighbouring site from continuing. Applicants should also assess any effects of precluding a new development or use proposed in the development plan.” In doing so it states that applicants should “use any up-to-date local authority assessment or, if there is none, provide an independent assessment to show whether the existing open space, sports and recreational buildings and land is surplus to requirements” (paragraph 5.10.6).

8.2.5 Paragraph 5.10.7 states that “applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations”.

8.2.6 Paragraph 5.10.23 states that “where a project has a sterilising effect on land use (for example in some cases under transmission lines) there may be scope for this to be mitigated through, for example, using or incorporating the land for nature conservation or wildlife corridors or for parking and storage in employment areas”.

8.2.7 Information on the land uses crossed by the Proposed Development is contained

within this chapter in response to these requirements whilst the scope of the assessment considers the extent to which land uses may or may not be affected by the development.

National Policy Statement for Electricity Networks Infrastructure (EN-5)

- 8.2.8 The National Policy Statement for Electricity Networks Infrastructure EN-5 does not provide technology-specific guidance in relation to the land use agriculture and forestry.

Other Planning Policy

- 8.2.9 Whilst the NPS provide the primary basis for the determination of applications for development consent the decision-maker can consider other matters which it considers both important and relevant to its decisions. These may include other national and local planning policy.

Wales Spatial Plan Update 2008

- 8.2.10 The Wales Spatial Plan identifies six sub-regions within Wales. The Proposed Development sits at the eastern edge of the ‘Pembroke – The Haven’ sub-region. The policy advice contained within the Plan has been taken into consideration in the preparation of this chapter.

Planning Policy Wales (Edition 7, July 2014)

- 8.2.11 Planning Policy Wales (PPW) contains guidance considered relevant to the scope of the environmental assessment. PPW is supported by a number of Technical Advice Notes (TANs).
- 8.2.12 PPW sets out that the planning system is necessary and central to achieving sustainable development, which is identified as having three dimensions: economic, social, and environmental. Paragraph 4.3.2 of PPW sets out the 11 principles which should underpin plan-making and decision-taking. Paragraph 4.4.3 sets out the 19 sustainability objectives derived from these principles. It identifies that planning

should proactively drive and support sustainable economic development to deliver infrastructure; and always seek a good standard of amenity for all existing and future occupants of land and buildings.

- 8.2.13 Section 4.10 of PPW notes that in planning policy and development management decisions considerable weight should be given to protecting the best and most versatile agricultural land from development because of its special importance and the presence or otherwise of such land is included within the scope of this chapter.
- 8.2.14 The PPW restricts reference to forestry in relation to the protection of forestry operations and its place within the green belt or within green wedges.

Local Policy

- 8.2.15 Nationally Significant Infrastructure Projects (NSIPs) are not subject to s38(6) of the Planning and Compulsory Purchase Act (2004), which states that determination of planning consent should be in accordance with the local development plan. Local planning policy does not therefore set the tests for the acceptability of NSIPs. However, as previously noted the decision-maker can consider other matters which it considers both important and relevant to its decisions. These matters may include local planning policy
- 8.2.16 The proposed development falls wholly within the boundary of Carmarthenshire County Council. As such, due consideration has also been given to the relevant policies in the adopted Carmarthenshire Unitary Development Plan (UDP) and the emerging Carmarthenshire Local Development Plan (LDP). It is anticipated that the latter document will be adopted by the end of December 2014.

Carmarthenshire Unitary Development Plan (Adopted 2006)

- 8.2.17 The relevant policies are listed below:
- CUDP9 – Landscape/Environment;
 - GDC1- Sustainable Development;

- GDC2 - Overall Development Policy;
- GDC3 – Development in the Countryside;
- EN12 – Agricultural Land.

Emerging Carmarthenshire Local Development Plan Composite Plan (October 2013)

8.2.18 The relevant policies are listed below:

- SP1 – Sustainable Places and Spaces;
- SP14 – Protection and Enhancement of the Natural Environment;
- GP1 – Sustainability and High Quality Design.

8.2.19 Local plan policy is consistent with national planning policy in that it provides specific protection for land use, agriculture and forestry (e.g. CUDP EN12 and eCLDP SP14). Policy protection is also provided to the amenity of adjacent land uses (e.g. CUDP GP1).

Policy Conclusions

8.2.20 The Planning Act 2008 requires that the decision-maker must decide an application for energy infrastructure in accordance with the relevant NPSs. NPS EN-1 provides policy and guidance on matters pertaining to land use, agriculture and forestry, and as such has informed both the scope of this chapter and the importance accorded to receptors. The decision-maker may also take into account other matters; these matters may include national and local planning policy. Relevant national and local planning policy has been reviewed and has also informed the scope of the assessment presented within this chapter.

Other relevant policy documents and plans

8.2.21 The Welsh Government’s ‘Woodlands for Wales’ strategy (July 2009) sets out the WG’s aims and objectives for all woodlands and trees in Wales, in both public and

private ownership. The 50-year strategy establishes the role that woodlands and trees can play in improving the lives of everyone in Wales, in addressing the impacts of climate change, sustaining the wider environment and in providing opportunities for people and communities. The Strategy is backed by a rolling 5-year action plan (Woodlands for Wales Action Plan 2010 – 2015, WG March 2012).

- 8.2.22 Brechfa Forest is managed according to two Forest Design Plans (FDPs) which show felling proposals for 30 years and future proposed species for restocking. The FDPs are approved every 10 years. Approval is given by NRW following consultation with statutory consultees and other stakeholders including members of the public.
- 8.2.23 Forest Stewardship Council (FSC) certification is widely regarded as an important initiative to promote responsible forest management worldwide. FSC provides internationally recognised standard setting, trademark assurance and accreditation services in relation to forestry management and forest products.
- 8.2.24 FSC has endorsed the UK Woodland Assurance Standard (UKWAS) which sets out the requirements which woodland owners and managers and certification bodies can use to certify woodland management in the UK. The standard has been designed to ensure that it reflects the requirements of the Government's UK Forestry Standard.
- 8.2.25 The UKWAS sets out the requirements which woodland owners and managers are obliged to comply with in order to obtain certification, and covers such aspects as management planning, environmental impact, conservation and enhancement of biodiversity, forest operations, community engagement and health and safety. The WG is committed to ensuring that its forests meet the requirements of the UKWAS. Brechfa Forest is certified under the auspices of the forest management certificate issued to NRW. Failure to meet a particular requirement can ultimately result in suspension of the certificate, potentially affecting timber sales as most timber processing customers demand FSC certificated timber.

8.3 Consultation and scoping overview

- 8.3.1 Consultation to date, which has been carried out in connection with the identification and selection of possible route corridors and alignment options, has involved the landowners and Natural Resources Wales (NRW, who are responsible for the forest management operations previously carried out by the Forestry Commission Wales) and has not identified any specific concerns related to potential impact on agriculture or forestry.
- 8.3.2 A meeting was held at the NRW offices in Llandovery on 16th October 2014 to discuss implications of proposed felling. The potential impact of wind damage was discussed along with the visual impact of linear corridor felling, plan details of measures to mitigate these impacts, and other areas of concern to NRW.
- 8.3.3 The Scoping Opinion (Appendix 6.1) received from the Secretary of State paragraphs 3.44 to 3.47 and paragraph 3.13) concludes that the following issues should be addressed in the EIA:
- Impacts on farm viability (farming operations and land management);
 - Impacts on ‘best and most versatile’ agricultural soils;
 - Indirect effects such as soil erosion from areas of newly exposed soil, particularly after felling of trees; and
 - Impacts of crossing main roads and watercourses.
- 8.3.4 Based on the Scoping Opinion received from the Secretary of State (paragraph 3.14) together with other consultation, it has been concluded that the following issues can be scoped out because they are not likely to result in significant environmental effects:
- Impacts arising during the operation and maintenance phases
- 8.3.5 Consideration will be given to impacts arising during the decommissioning phase as well as the construction phase.

8.4 Method of assessment

- 8.4.1 The assessment was based on professional judgement, site visits, and desktop review of relevant data/ maps and consultation. The assessment took account of national (UK and Wales) policy, guidance and advice, including guidance from NRW where applicable.
- 8.4.2 The assessment was informed by the following documents and data sources:
- Agricultural Land Classification Maps published by the Department of Environment, Food and Rural Affairs (DEFRA);
 - Ordnance Survey 1:25,000 scale maps illustrating broad land use types;
 - Google Earth and similar online aerial imagery resources;
 - NRW (Forestry Commission Wales) sub-compartment database;
 - GIS mapping;
 - NRW Forest Design Plans (FDP); and
 - NRW (Forestry Commission) Yield Models.
- 8.4.3 The assessment is qualitative/ descriptive apart from where quantitative baseline data are available. The assessment assumes a reasonable worst case and the confidence in the predictions was not therefore quantified.
- 8.4.4 Forestry particularly was assessed through a document review of the NRW sub-compartment database information, and GIS imagery which was undertaken prior to site survey. A ground truthing site survey was then undertaken along the Proposed Development to verify NRW inventory figures. A document review of NRW Forest Design Plans was also undertaken following the site survey.
- 8.4.5 Forestry issues considered included:
- Potential impacts of wind damage on remaining trees within sub-compartments through which the Proposed Development runs;

- Potential impacts on FSC certification;
- Potential impacts on current Forest Design Plans; and
- Compliance with Woodlands for Wales strategy 2009.

8.4.6 The study area for the purpose of this chapter includes the Proposed Development (including the stated limits of deviation), which is the land potentially directly affected by the Proposed Development, plus an area up to 25 m either side of this corridor to account for potential tree removal¹ adjacent to an OHL where the tree height exceeds the topple distance. The potential for indirect impacts to soils, agriculture or forestry over longer distances arising from the scheme is very low.

Identification and assessment of impacts and mitigation measures

- 8.4.7 Potential impacts on land use, agriculture and forestry were identified from considering the planned construction, operation and decommissioning of the proposed development. Decommissioning impacts were judged to be no different or worse than those likely to arise during the construction phase, most activities being the reverse of the construction phase activity. As such, decommissioning impacts are not considered separately.
- 8.4.8 The assessment considers activities that would result in impacts ranging from adverse to beneficial as well as acknowledging those that would have a negligible impact. The assessment includes primary/ direct impacts on receptors/ resources as well as secondary/ indirect impacts that may be mediated through a connected pathway (or ‘knock-on’ effects either from an impact source or as a side-effect of proposed mitigation). The assessment considers frequency and duration of the impact occurrence – either temporary (e.g. only during the construction phase activity) or permanent. Care was taken to identify and distinguish temporary actions that would result in an impact that could have a long term effect on the resource

¹ Note that this is assumed as a worst case but in reality trees do not necessarily need to be felled. Within a certain distance from a high voltage cable the vegetation is subject to a routine maintenance check and on-site decisions are taken as to the most appropriate and desirable approach to vegetation management, preferably by leaving in place (where tree location and health indicate that topple risk is low) and pruning/ lopping rather than total removal.

(e.g. tree felling). Also, impacts occurring at a high frequency (i.e. repeatedly) may have the same effect on a receptor/ resource as a permanent impact if the recovery time of the resource is greater than the frequency of the repeated impact event. Short term impacts (less than a season or year) were distinguished from medium term (up to 5 years) or long term (greater than 5 years).

- 8.4.9 Where applicable the extent of the impact was determined – ranging from a local level (confined to the ‘working width’ of the construction activity or affecting the adjacent local area); district level (e.g. relevant parish or Borough); regional level (e.g. Carmarthenshire); National level (Wales/UK); or International level. Where not stated explicitly then it has been assumed that direct impacts would be localised.
- 8.4.10 Significance was established as a function of sensitivity of the receptor and magnitude of change (impact) affecting the receptor, which is defined in the tables below. With respect to forestry operations, sensitivity of the receptor (i.e. the importance of forest resource) is considered to be of constant importance and ascribed a ‘medium’ rating since implementation of the Proposed Development will be achieved with the agreement of NRW forest managers and as such significance has been assigned largely as a function of magnitude of change.

Table 8.1 – Sensitivity/ importance of the environment

Receptor sensitivity/ importance	Description
High	Marginal agricultural holdings. High quality (Grade 1, 2 or 3a) Agricultural Land. Soils highly vulnerable to structural damage and erosion including peatlands.
Medium	Grade 3b Agricultural Land. Soils seasonally susceptible to structural damage or erosion.
Low	Large agricultural holdings. Grade 4 Agricultural Land. Soils with medium to coarse material with some resistance to structural damage.

Negligible	Agricultural Land poorer than Grade 4. Soils with greater resistance to structural damage.
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Table 8.2 – Magnitude of impact

Magnitude	Definition
High	Where the extent of impacts on land use and forestry is large in scale, and a large number of activities will be affected (either positively or negatively).
Medium	Where the extent of impacts on land use and forestry is small in scale, but a large number of activities will be affected (either positively or negatively). <i>Or:</i> Where the extent of impacts on land use and forestry is large in scale, but only a small number of activities will be affected (either positively or negatively).
Low	Where the extent of impacts on land use and forestry is small in scale, and will only affect a small number of activities (either positively or negatively).
Negligible	Where the extent of impacts on land use and forestry is barely noticeable in scale, and will only affect a very small number of activities (either positively or negatively).

Table 8.3 – Significance of potential effects

Magnitude	Sensitivity/ Importance			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible

Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

8.4.11 For assessment purposes environmental effects defined as ‘major’ in Table 8.3 are considered to be significant and would therefore require mitigation, sufficient to reduce the impact such that residual effects would be no greater than ‘moderate’.

Uncertainty and technical difficulties encountered

8.4.12 For the purposes of this chapter, it has been assumed that all identified impacts would occur (i.e. the likelihood of occurrence is certain). This is a worst case assumption but reduces the uncertainty of the impact assessment.

8.4.13 The Proposed Development incorporates a route alignment with a limit of deviation (LoD) within which the actual OHL or underground cable would be built. To avoid uncertainty, this assessment has accounted for the possibility that the completed connection could be built anywhere within the area bounded by the LoD.

8.5 Baseline conditions

8.5.1 Land use within the study area, determined from Ordnance Survey maps, online aerial mapping and verified by site visits, comprises mostly agricultural land, with a predominance of pasture/ silage in the southern sections and more rough grazing land on the northern upland sections. Most land comprises fields enclosed by hedgerows or woodland. About 7% of the length of the route would impinge on the Brechfa Forest plantation woodland. The route would also cross both major and minor roads and watercourses. There are no other major land uses directly affected by the Proposed Development.

8.5.2 A review of Agricultural Land Classification (ALC) maps indicates predominantly poor quality grade 4 land with patches of grade 3 land in the southern part of the route at lower elevation. The best and most versatile agricultural land falls within

ALC Grades 1 to 3a.

- 8.5.3 The Brechfa Forest covers some 6500 hectares and is managed woodland mostly under plantation and is looked after by Natural Resources Wales for the benefit of people, wildlife and timber production. There are bridleways, walking and mountain bike trails.
- 8.5.4 A ground truthing exercise was carried out during October 2014, involving brief sample plot data collection at points along the proposed route. NRW sub-compartment data was verified, and revealed an increase in top height since previous NRW inventory work, which was expected. Brechfa West is predominately planted with Sitka Spruce, which is the main species planted for rapid timber production on upland sites in the UK. This area of Brechfa Forest is midway through the second rotation, and mainly managed as even-aged, un-thinned high forest.
- 8.5.5 Apart from construction of the Brechfa Forest West wind farm, the study area would be expected to undergo minimal change in the absence of the Proposed Development. A review of the deposit version of the Carmarthenshire Local Development Plan and saved parts of the Unitary Development Plan indicates there would not be any major development in the area precluded by the Proposed Development.

Embedded mitigation

- 8.5.6 WPD has agreed that the following measures will be included in the design and operation of the Proposed Development. This EIA assumes implementation of these measures to avoid or control adverse impacts and hence is an assessment of a 'mitigated' scheme.
- 8.5.7 The alignment of the Proposed Development has been selected to avoid, so far as possible, areas of known built development (existing or planned) and areas of permanent active use including:
- Sport, leisure and recreational facilities (including caravan parks);

- Office, commercial (including retail) and industrial use (including mines and quarries, and waste infrastructure);
- Residential, healthcare, education/ Public/ Institutional (including civic amenity areas, museums, galleries etc); and
- Open space (e.g. common land, parks).

8.5.8 Furthermore, it is envisaged that unavoidable crossings of main roads and watercourses will be either by underground cable (most likely installed using HDD) or spanned in a manner that would not permanently affect the land use, and would have very little if any temporary impact on the feature being crossed during construction.

8.5.9 Where undergrounding is proposed, there may be temporary impacts from cable trenching/ ducting that would be managed via standard techniques such as construction management plans.

8.5.10 Other commitments are explained in the following table.

Table 8.4 – Committed/ embedded mitigation measures

Mitigation related to:	Embedded mitigation measures
Agricultural operations	General disruption impacts will be mitigated by allowing sufficient time between the serving of notice for entry to land and the commencement of on-site activities; this will allow farmers and landowners time to adapt their working practices in anticipation of the works.
Agricultural operations	Where temporary land take is required WPD will liaise with landowners and where necessary agree commercial terms with affected parties.
Agri-environmental schemes	In case of any temporary reduction in payments under the Glastir scheme, suitable allowance will be made in commercial negotiations with agreement holders and their advisors.
Construction management	A Construction Environmental Management Plan will be prepared in advance of construction that will include

measures to reduce the pollution risk from vehicles and equipment and reduce the risks to land and water courses from site runoff and soil erosion.

Invasive weeds and disease control

Good practice measures such as guidance provided by DEFRA and NRW/ EA will be followed in relation to control of invasive and injurious weeds if any are identified on site. Construction crews will adhere to guidance and control measures specified by NRW for controlling the spread of pathogens such as *Phytophthora ramorum* in forest areas.

Soil management

All soil handling, placing, compaction and management will be undertaken in accordance with good practice (DEFRA, 2009).

A Construction Management Plan will be prepared in advance of construction that will include specific measures (for pole installation or trenching or HDD works) to ensure protection, conservation and reinstatement of soil material as necessary. Mitigation measures to be specified may comprise the following:

- Topsoil from areas currently in agricultural use to be stripped from works areas before the start of general construction works;
- Soils shall be categorised on the basis of their condition and origin, and stockpiled/ stored in line with good practice;
- Construction vehicles and plant used for pole installation will be restricted to small 4-wheel drive or tracked/ wide-tyre vehicles to reduce soil compaction;
- Movement and transportation of soils to be kept to the absolute minimum to reduce the risk of cross-contamination between fields;
- Soils suitable for reuse as part of wider mitigation (e.g. planting areas) to be reused in a broadly similar location to their origin, and stored for the shortest amount of time; and
- Any surplus soils should be disposed of in an appropriate manner off-site.

Plant and traffic movements will be confined to designated

routes (e.g. haul routes and access points) to minimise the potential for soil disturbance, compaction and indirect contamination; geotextiles and/or temporary load spreading metal tracks or bog mats, to be used over soft ground as necessary.

Good practice measures for HDD

Pre-construction ground investigation to identify subsurface conditions, particularly any areas at greater risk of drilling fluid break-out.
 Other measures as above related to surface soils management.

Reinstatement following trenching works

An Agricultural Liaison Officer (ALO) will record existing crop regimes, position and condition of field boundaries, existing drainage and access arrangements and private water supplies and liaise with affected landowners to record potential constraints and mitigations to be entered into a pre-entry agreement.

The agreements will cover construction dates, marking existing land drains and construction of temporary drains where necessary, designated routes of plant and traffic movements across fields, appropriate soil management, and re-instatement of land post construction including hedgerows, field boundaries and stock fences, soil condition and soil profile to as near as practically possible to former condition.

Reinstatement after all works

Following the completion of all pole installation or cable construction works, the affected land will be fully reinstated as near as practically possible to its former condition. Hedgerow sections removed during the works will be replanted where suitable, with all field boundaries and stock fences reinstated.

Utilities

All potentially affected utility providers will be contacted and the location of existing services will be accurately identified on the ground prior to construction. All utility crossings will be undertaken in accordance with the standards defined by the utility owner/ operator.

Windthrow avoidance

If windthrow clearance is required, responsibility is to be agreed subject to further consultation with NRW. Should larger felling proposals be agreed scalloped restocking to break up linear power line corridors would be implemented.

Routing design

There are two areas in Brechfa Forest where minor routing amends were raised by NRW. WPD will consider these requests as part of the review of design following statutory

consultation. The final design will be presented in the final ES.

Land use during O&M

In relation to permanent land take requirements WPD will liaise with landowners to secure suitable rights to the land for development and agree commercial terms with affected parties.

Decommissioning

WPD will at least comply with all requirements applicable during the construction stage. Any new legislation or guidelines published prior to decommissioning will where relevant be adhered to and incorporated into mitigation design.

8.6 Assessment of impacts: Construction phase

8.6.1 Direct and indirect construction stage impacts may be of the following types:

Agricultural land impacts

- Temporary disturbance to farmland operation and management;
- Loss of or physical disturbance to soil, damage to soil structure or compaction by plant and machinery particularly when the ground is saturated;
- Soil erosion on newly exposed areas of soil²; and
- Potential for transmission of agricultural pests and diseases.

Forestry impacts

- Increased wind throw risk to trees on the edge of clearances;
- Implications for forest management best practice and conformance with the Forest Design Plans;
- Implications for adherence to Forestry Stewardship Council (FSC) certification requirements;
- Implications for adherence to 'Woodlands for Wales' strategy.

² Note that impacts on peat are addressed in Chapter 10 (Natural Environment) and Chapter 12 (Geology)

Construction impacts on agricultural land

- 8.6.2 The route crosses over mostly poor (Grade 4) agricultural land, although the route would cross over some land (in particular the land to the south of the River Towy) that would have somewhat better soils and agricultural quality³.
- 8.6.3 The direct impacts of the OHL installation would be limited to excavation at the locations of each wooden pole structure (from digging holes for installation of the poles and any necessary stay wires at angle poles) and from passage of construction vehicles. Given the poles would be approximately 80 m apart, and that only a small area would require excavation for pole installation (with subsequent reinstatement) there would be negligible impact on either farm management or loss of agricultural land and the amount of disturbed soils would be a small portion of the total land. Soils would be stockpiled whilst each pole is erected and backfilled around the pole immediately so erosion and loss of soil is not expected to be a problem. Use of off-road, tracked vehicles or agricultural tractors (and if necessary use of temporary access tracks) would avoid indirect impacts on agricultural soils. Direct and indirect impacts would therefore be of negligible significance.
- 8.6.4 For open cut sections of underground cable, having a total length of 3,370m (about two-thirds of which is through agricultural land) the trench width of only 1.5m and limited depth of excavation (1.5m) would directly disturb a small portion of agricultural land (about 0.4 to 0.5 ha); top-soil would be carefully stripped and set aside to be used for reinstatement. Following a period of settlement and re-vegetation the land should become suitable again for agricultural use including grazing. The limited working width of 16m needed to access and construct the cable run would not entail significant disruption to agricultural land management given the temporary nature and limited extent of work (about 5.4 ha forming the full working width). Direct and indirect impacts from trenching works are therefore expected to be of negligible significance.

³ The ‘best and most versatile’ agricultural land is defined as land in ALC categories 1, 2, and 3a. It should be noted that there is no land in the study area of Grade 1 or 2 quality. From a review of the provisional ALC classification maps and the 1988 MAFF guidance it is inferred that most land in the study area would comprise either of Grade 4 (poor) or Grade 3b (moderate) quality agricultural land.

- 8.6.5 Land temporarily excluded from agricultural production due to construction of HDD launch/ recovery sites would not exceed 0.2ha, which is a negligible proportion of the agricultural land in the area. The main construction at the central showground would not be on agricultural land; the additional ‘satellite’ compound located in Brechfa Forest would also not impinge upon arable or pasture land.
- 8.6.6 WPD has identified an area of search for an undergrounding construction compound located to the north of Abergwilli Road. This would be on land currently used for grazing. The precise location and size of the compound is yet to be confirmed and the potential for effects upon land use arising from this element of the Proposed Development will be assessed and presented within the final ES.
- 8.6.7 Although construction works may result in some temporary effects on land management, all works would be carried out with prior agreement of the landowners to minimise potential conflict with farm operations. On-going land management would not be adversely affected. The limited number of vehicles involved in the construction works and the use wherever possible of existing field access and tracks, would not result in adverse effects on soils (such as ground compaction) and where necessary temporary roadways would be laid.
- 8.6.8 With application of the relevant embedded mitigation measures specified in Table 8.4, the impacts on soils and on agricultural (farm) management (negligible scale of impacts on a resource of medium sensitivity) are both concluded to be negligible, given the scale and nature of the construction work. Prior consultation would be undertaken with the relevant landowners to agree any measures necessary to reduce risks of unforeseen consequences (including complying with standing advice and best practice for avoiding spread of animal and plant diseases). Prior consultation/ notification will also reduce conflict with existing farm operations.

Construction impacts on Forestry

- 8.6.9 The potential ecological impact of tree/ woodland or hedgerow loss is addressed in Chapter 10. The routing of an OHL through areas of forest plantation woodland will require a 50m wide swath of trees to be felled to minimise the risk of a mature tree

toppling onto the OHL. About 2 km of the route (~7%) runs through plantation in the Brechfa Forest and would require some tree felling, with precise route and felling width to be agreed with NRW. This planned loss of woodland has not been assessed as an impact as the cutting can be managed along with the existing commercial operation of the forest. Only unplanned losses have been assessed.

- 8.6.10 It should also be noted that, although the final alignment through wooded areas will require trees to be felled within a suitable setback distance (that is unlikely to exceed, and may be less than 25 m either side of the alignment, depending upon tree height), the area requiring clearance to ground level would be limited to access tracks and would therefore only be about 5 m wide. Although some large trees within 25 m of the OHL may need to be removed (if lopping/ pruning is not advised) then the area can be managed with vegetation of a lower height such as shrubs or coppice woodland.
- 8.6.11 The current proposed corridor alignment with a 50 m cut through Brechfa West will result in about 10 ha of timber to be felled, and about 0.4 ha of younger crops to be mulched.
- 8.6.12 Crop variability was noted through affected sub-compartments, both above and below yield class (YC) figures provided (growth rate expressed as m³ timber/ha/year) and ranges from YC 12 to 20. More accurate timber volume calculations will be provided for the final ES following inventory and survey of the final agreed route. The approximate volume of timber to be felled (requiring use of conventional harvesting machinery) would require approximately 15 days of harvesting and forwarding machinery input to deliver timber to ride side, and mulching of younger crops would require one purpose built machine for one day. This method may also be suitable within poor areas of older sub-compartments, to be confirmed at final inventory.
- 8.6.13 Windthrow describes the loss of trees due to either being blown over or snapped by high wind speeds. It can lead to economic losses due to degrading of windthrown timber and an increase in harvesting costs. Management activities that cause

disturbance of forest canopies and edges can initiate windthrow but good forest planning and management can help minimise windthrow risk, although it is not possible to forecast or to mitigate against catastrophic windthrow caused by extreme weather.

- 8.6.14 An area of wind throw was noted (in compartment 38A), due to recent clear felling of the adjacent crop. Felling had followed best practice and halted at a sub-compartment boundary and anticipated wind firm green edge. Soils appeared well drained, with functioning ride side drains, however Sitka spruce components are approaching critical height where the onset of wind damage can be expected, given NRW classification of windthrow hazard class 3. ForestGALES software was not used in this exercise to help determine vulnerability of Brechfa West to damage from wind, but felling of the proposed 50 m corridor will expose areas of non-wind firm edges. Given the observation of wind damage, it is anticipated that felling will cause further creeping wind throw into adjacent retained timber. Discussion with NRW is ongoing and a felling proposal, with the aim of avoiding the risk of large areas of wind thrown trees will be agreed and confirmed in the final ES. These increased felling proposals will also address points raised by NRW on the creation of linear features in the landscape, and could detail scalloped restocking as mitigation.
- 8.6.15 The Brechfa Forest is managed according to approved Forest Design Plans that are compliant with UK Forestry Standards and UK Woodland Assurance Standards, which have certain requirements regarding scale, design and timing of felling and restocking operations. These requirements relate to maximum size of felling coupes, timing of felling of adjacent coupes and species selection for restocking. The rationale for these requirements is based on avoidance of forest fragmentation and impacts associated with large scale clear felling on landscape aesthetics, water quality and local ecology and the promotion of diversity and continuity.
- 8.6.16 The majority of the area within Brechfa Forest which could be affected by the Proposed Development is not scheduled for felling until 2040/41. Current felling proposals for the OHL do have a locally significant impact on the Forest Design

Plans currently in place, shortening the expected rotation length by 25 years, albeit over a relatively small area in the context of Brechfa West as a whole (~0.2% of the Brechfa Forest area).

8.6.17 Conformity with the FSC certification status will be maintained by the following measures:

- Felling to clear the power line corridor will be undertaken by NRW/ WPD;
- Areas that will be restocked may have the timber produced from them sold as certified;
- Areas to be felled that must remain clear for power line clearances may not have their timber sold as certified, but this quantity will be of negligible significance compared to timber production across the entirety of Brechfa Forest.

8.6.18 The Woodlands for Wales strategy aims to prevent the permanent removal of woodland. The routing of the power line corridor will result in a 10 ha loss of forestry cover, until reinstatement; however this is of negligible significance when the management cycle of Brechfa West is considered.

Construction impacts on agriculture and soils at main crossings

8.6.19 The Secretary of State considers (paragraph 3.45 of the Scoping Opinion) that impacts should be assessed where the route crosses main roads and watercourses. Crossings would be achieved in one of the following of ways:

- An OHL spanning across a minor road or watercourse;
- Trenching across or along a minor track or road; or
- HDD underneath major roads and watercourses.

8.6.20 A single span of OHL would not have any effect on a road or watercourse crossing. Trenching works would not be used for crossing main roads or rivers and, with the application of standard construction management measures to control erosion of

exposed soils and reduce the risk of watercourse pollution, would not be expected to result in impacts of any more than minor significance. Such trenching works are regularly used to cross roads and waterways.

- 8.6.21 Using HDD to cross main roads and waterways is an acceptable solution that would result in temporary impacts at the HDD launch site and HDD exit site. Impacts would include temporary loss of land for the construction site and potential for loss of drilling fluids (bentonite mud) from the drill hole. The impacts on soils and agriculture would be localised and of low magnitude, resulting in effects of at most moderate and probably minor significance.
- 8.6.22 The Proposed Development would also include connection works at and close to the existing New Lodge substation involving dismantling/ installation of overhead connection spans and installation of a short length (200 – 300 m) of underground cabling and associated sealing end platforms. These works may entail some temporary short term disruption but would not have any long term effects. The works are not in an agricultural area.
- 8.6.23 In addition, there are several places where the alignment crosses existing assets including a 400kV OHL, a 132 kV OHL, a 33kV OHL and around 30 crossings of 11 kV OHL and other low voltage lines. At some of these crossing points a short length of the existing OHL may be placed underground (where a safe separation distance between conductors/ OHL cannot be achieved by other means). The undergrounding works would probably involve conversion to a terminal pole/ sealing end platform at two existing poles of a single span, and trenching of cable between them. The extent and duration of construction works for undergrounding such OHL would be quite limited and although causing some temporary disruption, would be unlikely to result in any permanent effects on land uses following site restoration.

8.7 Assessment of impacts: Operational phase

- 8.7.1 It is anticipated that the operation and maintenance of the OHL or underground cable would not result in any significant impacts on land use, soils, agriculture or forestry. No land will be permanently taken out of productive use, nor any access to

land permanently removed/ obstructed. WPD will seek to agree suitable access for essential maintenance activity through wayleaves and/or easements⁴ as necessary.

- 8.7.2 Land removed from productive forestry for installation of an OHL will not be allowed to be replanted within the felled corridor due to the risk of toppling. However, coppice or other vegetation of a lower height would be permitted except on any access track.
- 8.7.3 It has been agreed that this aspect can be scoped out of any further consideration in the EIA.

8.8 Assessment of impacts: Decommissioning phase

- 8.8.1 When the OHL and underground cable is decommissioned the impacts are likely to be similar to and no worse than during the construction phase.
- 8.8.2 The OHL sections would be the simplest to decommission, and could be accomplished with small teams accessing the pole locations with tracked vehicles. The conductors would be cut and removed from site for recycling and poles would be excavated and probably cut below ground level. It is anticipated that directly affected land could then be restored to former use.
- 8.8.3 Underground sections could either be disconnected and left in situ or the ducts could be re-excavated and removed, in a reverse process to the installation phase. Cables installed using HDD could be removed by excavating the cable at a suitable access point and pulling back through the duct, leaving the duct itself *in situ*.
- 8.8.4 There would be no long-term adverse impacts and the land can continue in productive use.

8.9 Mitigation measures

- 8.9.1 In order to minimise the impact on forest resources, the final alignment will need to

⁴ Within a permanent easement WPD will have the right to construct, maintain, repair and inspect the cable or OHL. A wayleave may grant certain access rights for maintenance if a permanent easement is not required.

be designed in discussion with forestry managers to determine a route that minimises impacts on the continued economic management of the forest. Although the EIA has determined that specific measures in addition to those specified in Table 8.4 are not necessary, the following will be followed during detailed design:

- Selecting a route and designing a forest felling plan to minimise wind-throw risks to adjacent stands;
- Minimising the areas required to be clear felled and designing a felling plan to be compatible, so far as possible, with the objectives and guidelines of the relevant Brechfa Forest Design Plan;
- Ensuring the felled areas along the alignment are planted and/ or managed for ecological gain according to a Habitat Management Plan⁵ consistent with objectives agreed with NRW and that do not preclude return to woodland following project decommissioning;
- Assessing the potential loss of FSC certification for certain stands of felled woodland; and
- Determining any need for planting new areas of woodland in compensation according to the Woodland for Wales strategy.

8.9.2 Standard best practice mitigation measures for soils management and agricultural liaison will be adhered to throughout the construction, operation and decommissioning of the proposed development (see Table 8.4). The EIA has determined that specific additional mitigation measures are not necessary.

8.9.3 Liaison with affected landowners will be undertaken with regard to identifying potential constraints and barriers to construction, appropriate planning and timing of works to reduce conflicts, and provision of temporary measures where necessary.

8.9.4 Implementation of the requisite mitigation measures will reduce all impacts to insignificant levels. Since all specified measures are straightforward to implement

⁵ See chapter 10 of this report.

and many are standard practice for works of this type, it is expected that there would be no problem in fully implementing all the measures. There would be no unintended consequential adverse effects of implementing the measures.

- 8.9.5 Decommissioning impacts would be similar in scale and nature to those likely to arise during the construction phase and so the same mitigation measures should be applied during this stage as well.
- 8.9.6 There would be no significant effects from the operation and maintenance phases so no mitigation measures over and above standard good practice are necessary.

8.10 Residual effects

- 8.10.1 With the implementation of the relevant mitigation measures specified in Table 8.4 (measures embedded in the project design) and the relevant measures specified in section 1.9, there will be no residual effects with a significance of more than ***negligible adverse***.

8.11 Cumulative effects

- 8.11.1 Cumulative effects of the project include (a) interaction effects where impacts of more than one type combine additively or synergistically to result in impacts of greater significance, and (b) in-combination effects of an impact together with other proposed or consented developments with which the project may interact. Potential impacts on land use, soils, agriculture and forestry operations are limited to direct construction phase impacts.
- 8.11.2 In this localised context there are no other projects or impact interactions that could combine to increase the significance of any cumulative effect. The felling associated with Brechfa Forest West Wind Farm is already underway, will not coincide with the felling for the OHL and is therefore considered to form part of the baseline environment. There are no impacts that could act together to increase the level of significance above ***minor adverse***.

8.12 Summary of effects

8.12.1 This assessment has concluded that with the application of standard mitigation measures and good site practices as set out in Table 8.4 and section 8.9 above, there will be no residual effects of any more than negligible significance.

Table 8.5 – Summary of predicted environmental effects

Impact description	Impact/ Effect	Mitigation measures	Residual effect
Land use	Temporary effect on existing agricultural operations	Prior consultation and implementation of agreements with landowners; adherence to agreed embedded design measures (Table 8.4)	Negligible
Soils	Temporary impact on resource or quality	Standard good practice e.g. adherence to DEFRA guidance as specified in the agreed embedded design measures (Table 8.4)	Negligible
Forest management	Impact on FDP and Woodlands for Wales Strategy	Local impact on Forest Design Plan due to shortening of rotation length over about 0.2% of Brechfa Forest area, but with negligible implications for Woodlands for Wales Strategy.	Negligible
Forest resources	Wind-throw impact	Agree felling plan with NRW to minimise windthrow and to avoid creation of linear feature in woodland.	Negligible
Forest resources	Impact on FSC status	Adhere to recommended measures to minimise impact on FSC certification.	Negligible

8.13 References

DECC. Overarching National Policy Statement for Energy (EN-1), July 2011

DECC. National Policy Statement for Electricity Networks Infrastructure (EN-5), July 2011

DEFRA. Construction Code of Practice for the Sustainable Use of Soils on Construction

Sites, 2009

MAFF. Revised guidelines and criteria for grading the quality of agricultural land, October 1988

Welsh Government. Planning Policy Wales Edition 7, July 2014

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9 Landscape and Visual Assessment

9.1 Introduction

General scope and structure

- 9.1.1 This chapter of the draft ES provides the findings of the landscape and visual effects assessment for the Brechfa Forest Connection (the Proposed Development). In so far as is necessary this chapter also provides an assessment of townscape effects.
- 9.1.2 The landscape and visual effects assessment considers:
- The effects of the Proposed Development on landscape elements, character and designations (the landscape resource); and
 - The effects of the Proposed Development on people's views.
- 9.1.3 The assessment considers the construction phase, operational phase and cumulative effects for the various identified landscape and visual receptors. The decommissioning phase of the development has not been considered in detail. The decommissioning phase effects of overhead sections of the development would be similar to those experienced during construction. The decommissioning phase effects of underground sections of the development would be considerably less than for the construction phase (on the assumption that obsolete underground cables would remain in situ).
- 9.1.4 The draft assessment of the landscape and visual effects of the Proposed Development comprises this main chapter plus a series of detailed tabulated Appendices which separately consider the various landscape and visual receptors that may be subject to change (i.e. landscape elements, landscape character areas, landscape designations, residential properties, footpaths users, road users and other recreational and visitor visual receptor locations).

- 9.1.5 In accordance with best practice the main chapter is structured to provide sequential consideration of baseline conditions, potential effects (construction and then operation), mitigation, the significance of residual effects, and finally cumulative effects. Within the detailed Appendices, however, the various parts of this assessment narrative are brought together in the context of each individual landscape or visual receptor - i.e. the description of the available views from a residential property, for example, its susceptibility to change, the potential visual effects upon it during construction and then operation, any mitigation, and the assessment of the significance of any residual and cumulative effects are all provided in tabulated form in one place. The detailed tabulated Appendices which cover all receptors then allow the main chapter to focus on the most significant issues and effects identified within them and to provide a concise summary of the effects most likely to be relevant to decision making.

The Proposed Development

- 9.1.6 The Proposed Development comprises a 132kV grid connection linking the national grid at Swansea North to the proposed substation at the Brechfa West wind farm north west of the village of Brechfa. Between Swansea North and Llandyfaelog this uses an existing overhead connection (the EE route). The whole of the Proposed Development assessed within this landscape and visual assessment (including some minor works necessary at Burry Port) is located within the jurisdiction of Carmarthenshire County Council (CCC) in south west Wales. The length of the new connection between Llandyfaelog and the Brechfa West wind farm substation is approximately 28.6 km and comprises a mixture of:
- Overhead sections totalling approximately 25.2 km principally comprising single wooden poles but with some double and four pole structures at severe environment, angle and termination points; and
 - An underground section of approximately 3.4 km to be achieved through a mixture of open trenching and horizontal directional drilling (the latter principally associated with underground cabling below the River Towy).

- 9.1.7 This draft assessment of landscape and visual effects is based on the alignment shown by Figure 9.1 (maps 1 to 4) for the Proposed Development for both the proposed overhead and underground sections of the connection, and a schedule of likely pole heights along the route. To allow for potential engineering design changes and to enable an assessment to be made of the potential, but reasonably likely, worst case landscape and visual effects, the design information is subject to the following limits of deviation:
- An additional 2m vertical limit of deviation has been added to all pole heights;
 - The alignment for overhead sections of the route sits within a horizontal limit of deviation totalling 25m in width (distributed equally with 12.5 m on each side of the proposed alignment); and
 - The alignment for underground sections of the route sits within a horizontal limit of deviation totalling 20 m in width (distributed equally with 10 m on each side of the proposed alignment).
- 9.1.8 With regard to the vertical limit of deviation this assessment of landscape and visual effects is therefore based on pole heights 2 m greater than may in due course be constructed. And with regard to the horizontal limits of deviation the assessment is based on the alignment shown but additionally identifies where effects may be significantly greater were the Proposed Development to be realigned within the 25 m and 20 m wide corridors.
- 9.1.9 Further key details of the components of the Proposed Development and how they are likely to interact with landscape and visual baseline conditions are provided later in this chapter, with a comprehensive project description (with typical images of similar developments and construction operations) set out within Chapter 2.

The route and the location of development activities

- 9.1.10 The route of the Proposed Development as currently proposed has been selected following an extensive process of option identification and assessment undertaken by the same professional team as has produced this assessment. The process

incorporated extensive consultation with statutory consultees, other interested parties and the public. Full details of the process followed and the reasoning underpinning the selected route are provided in Chapter 3 of the draft ES, with only a brief summary of this embedded mitigation presented within section 9 of this chapter.

9.1.11 The site for the construction and then operation of the Proposed Development comprises the following components:

- The connection alignment (represented by an identified proposed alignment plus a horizontal limit of deviation totalling 25 m (overhead) or 20 m (underground) as detailed within Chapter 2 of the draft ES (the working area for underground sections of the route would be 16 m in width within this 20 m limit of deviation);
- Vehicular access routes, on-line winch positions and on-line directional drilling compounds associated with the connection alignment (winch positions and directional drilling compounds would be located on-line and would not be located outside of the horizontal limit of deviation);
- Some minor additional areas associated with works to Western Power Distribution (WPD) assets that would be affected by the introduction of the connection (a number of existing 11 kV and low voltage overhead lines crossed by the Proposed Development may need to be placed underground). The extent of these works is yet to be determined;
- The site of a main central construction compound located off-line at the county showground off the A40 to the west of Carmarthen;
- The sites of two other off-line satellite construction compounds. One would be located within a forest clearing within Brechfa forest (approximately 300 m south of pole 191 within pLCA13). The location of the other of these satellite compounds has yet to be determined but is expected to be associated with the directional drilling and underground sections of the Proposed Development in the Towy valley;

- A 50 m wide zone of tree clearance in forested areas towards the northern end of the proposed alignment (agreed with the Forestry Commission);
- Some potential areas of additional forestry removal where the clearance of a 50 m wide area of forestry to accommodate the proposed alignment would expose additional forest areas to potential ‘wind-throw’ (the extent of this possible requirement has yet to be determined and the effects of any such tree removal have been excluded from this draft ES); and
- An area of works at and adjacent to the New Lodge substation at Burry Port necessary to upgrade the existing EE link to Swansea North.

9.2 Legislation and policy context

9.2.1 A summary of relevant legislation, criteria and standards as well as national, regional and local policy is included here. Furthermore in Chapter 3 a full assessment of compliance with relevant policies is completed.

National Policy

National Policy Statements

9.2.2 National Policy Statements set out the national policy for nationally significant infrastructure projects. National Policy Statement EN-1 is the overarching national policy statement for energy whilst National Policy Statement EN-5 is specific to Electricity Networks Infrastructure.

Overarching National Policy Statement for Energy (EN-1)

9.2.3 Paragraph 1.1.2 of NPS EN-1 requires that the decision-maker (the Secretary of State) decide an application for energy infrastructure in accordance with the relevant NPSs, including NPS EN-1 subject to certain caveats. Generic landscape and visual concerns are set out in Part 5.9 which contains the policy and guidance that are of relevance to the Brechfa Forest Connection.

Guidance for undertaking LVIA

- 9.2.4 Paragraph 5.9.5 of NPS EN-1 notes that a number of guides have been produced to assist in addressing landscape issues and specifically references the second edition of “Guidelines for Landscape and Visual Impact Assessment”. Since the publication of NPS EN-1 this edition has been superseded by the third edition. This paragraph also states that the assessment or LVIA should also include reference to any landscape character assessments and associated studies. In Wales this requires the use of LANDMAP aspect areas and supporting databases which have been utilised throughout the landscape assessment for the proposed Brechfa Forest Connection.
- 9.2.5 Paragraph 5.9.6 states that the LVIA should include the effects of the construction of the proposed development as well as the operation of the completed development. The LVIA has been structured to retain this distinction.
- 9.2.6 Paragraph 5.9.7 states that the landscape component of the LVIA should assess its effects upon landscape components and landscape character. The visual component of the LVIA must consider the visibility and conspicuousness of a proposed development including potential impacts upon views and visual amenity. These requirements have been met in the LVIA.

Landscape impact

- 9.2.7 Paragraph 5.9.8 emphasises that the landscape effects of any development are dependent upon existing local landscape character, its quality, its value and its capacity to accommodate change. Consequently all these factors need to be incorporated within the landscape assessment.
- 9.2.8 Paragraph 5.9.8 also acknowledges that national significant energy infrastructure projects will almost certainly have effects upon the landscape. As such these projects need to be designed to take account of their potential landscape impacts minimising harm upon the landscape through reasonable and appropriate mitigation. The LVIA demonstrates that the proposed Brechfa Forest Connection

has been developed to accord with this requirement.

Development proposed within nationally designated landscapes

- 9.2.9 Paragraph 5.9.10 notes that although National Parks and AONBs have the highest level of protection against development in relation to landscape and scenic beauty, development may be granted consent in these areas in exceptional circumstances.

Development outside nationally designated areas which might affect them

- 9.2.10 The duty set out in paragraph 9.2.10 also applies for proposed developments outside the boundaries of National Parks and AONBs which may have impacts inside these national designations. Such projects should be designed to avoid compromising the purpose of the designation. However paragraph 5.9.13 emphasises that the visibility of a proposed project from within a designated area should not in itself be a reason for refusing consent.

Development in other areas

- 9.2.11 Local landscapes outside national designations may be highly valued locally and protected by local landscape designation. Paragraph 5.9.14 states that where a local development plan in Wales has policies based upon landscape character i.e. LANDMAP, these should be paid particular attention. However it states that local landscape designations should not be used in themselves to refuse consent. Local landscape designations have been incorporated within the LVIA.

Visual impact

- 9.2.12 Paragraph 5.9.18 states that energy infrastructure is likely to have visual effects for many receptors and the decision-maker will have to judge whether visual effects on sensitive receptors outweigh the benefits of the project. Paragraph 5.9.19 requires that the visual assessment should draw attention to any examples of existing permitted infrastructure that has a similar impact upon sensitive receptors. The scope of the visual assessment contained within the LVIA covers

these requirements.

Mitigation

- 9.2.13 Paragraph 5.9.22 notes that adverse landscape and visual effects may be minimised through appropriate siting of the infrastructure, design including colours and materials, and landscaping schemes. Materials and designs of buildings should be given careful consideration. The landscape and visual assessment sets out the mitigation proposals adopted for the proposed Brechfa Forest Connection and incorporates them into the assessments for individual receptors.

National Policy Statement for Electricity Networks Infrastructure (EN-5)

- 9.2.14 The National Policy Statement for Electricity Networks Infrastructure EN-5 provides technology-specific guidance in relation to landscape and visual impacts. Part 2.8, highlights the possible landscape and visual issues associated overhead lines, stating that new above ground electricity lines can give rise to adverse landscape and visual impacts. As noted in paragraph 2.8.2 these impacts will be dependent upon a proposed overhead line's scale, siting, screening and the nature of the landscape through which they are routed. These considerations also apply to ancillary development such as substations and sealing end compounds. Cumulative impacts must also be included in the LVIA. These requirements have been incorporated into the scope and methodology utilised in the LVIA.
- 9.2.15 Paragraph 2.8.4 states that where it is likely that an overhead line's visual impact will be particularly significant, the ES should set out details of how consideration has been given to undergrounding to mitigate such impacts.
- 9.2.16 Paragraph 2.8.6 reiterates the Holford Rules and their continued relevance whilst paragraph 2.8.7 emphasises that the Holford Rules form the basis to routing new overhead lines as well as designing mitigation measures. In developing mitigation measures paragraph 2.8.10 emphasises the importance of the selection of the support structure, for example the use of wooden poles, in order to minimise the overall visual impacts. The LVIA explains the iterative design process that lead to

the selection of the final route and specification for the proposed Brechfa Forest Connection.

Wales Spatial Plan Update 2008

- 9.2.17 Whilst the NPS provide the primary basis for the determination of applications for development consent the decision-maker can consider other matters which it considers both important and relevant to its decisions. These may include other national and local planning policy.
- 9.2.18 The Wales Spatial Plan sets out national cross-cutting national spatial priorities and identifies six sub-regions within Wales. Under the topic, 'Valuing our Environment' a number of environmental challenges are presented. The proposed development sits at the eastern edge of the Pembroke – The Haven sub-region. Five priorities are listed under the sub-region topic 'Valuing our Environment':
- maximising the potential of environmental assets;
 - adapting to and mitigating against climate change;
 - ensuring that the man-made, natural and cultural environment of the area supports a high quality of life for residents and visitors;
 - facilitating sustainable development by effective forward planning and upfront investment in strategic infrastructure, and
 - protecting and enhancing the quality of the areas built and natural environment.

Planning Policy Wales

- 9.2.19 Edition 7 of Planning Policy Wales (PPW) issues in July 2014 contains guidance considered relevant to the scope of the environmental assessment. PPW is supported by a number of Technical Advice Notes (TANs). Whilst the NPSs are the primary policy documents for examination of applications for development consent, PPW, in particular Chapter 5 Conserving and Improving Natural Heritage

and the Coast remains relevant. Relevant sections of PPW are summarised below.

- 9.2.20 Section 5.1 sets out the main objectives which in paragraph 5.1.1 which in relation to landscape and visual issues are summarised as the embracement of *“the relationships between landform and landscape, habitat and wildlife, and their capacity to sustain economic activity and provide enjoyment and inspiration”*.
- 9.2.21 In accordance with the European Landscape Convention that the UK signed and ratified in 2007, PPW emphasises that the natural heritage and valued landscapes of Wales are not confined to statutorily designated sites but extend across Wales to include urban areas, coasts and countryside.
- 9.2.22 As stated at paragraph 5.1.2 one of the Welsh Government’s objectives for the conservation and improvement of natural heritage is to *“promote the conservation of landscape”*.
- 9.2.23 In Section 5.3 which sets out measures to conserve landscape and biodiversity, paragraph 5.3.2 sets out how national and local landscape designations should be considered by local planning authorities. It states that *“Whilst the value of all landscapes in Wales is recognised, local planning authorities should have regard to the relative significance of international, national and local designations ... and should take care to avoid unnecessary constraints on development.”*
- 9.2.24 Subsequent paragraphs address the role and weight to be attached to statutory landscape designations as they apply in Wales i.e. National Parks and Areas of Outstanding Natural Beauty (AONBs). With regard to National Parks paragraph 5.3.4 reiterates *“that the statutory purposes of National Parks are to conserve and enhance their natural beauty, wildlife and cultural heritage and to promote opportunities for public understanding and enjoyment of their special qualities.”* It also notes that *“National Park Authorities also have a duty to seek to foster the economic and social well-being of their communities.”* Similarly for AONBs as emphasised in paragraph 5.3.5 their primary purpose is *“the conservation and enhancement of their natural beauty.”* Finally paragraphs 5.3.6 and 5.3.7 notes

that both national designations are of equal status in terms of landscape and scenic beauty and that both must be afforded the highest status of protection from inappropriate developments. Also that *“the duty to have regard to National Park and AONB purposes applies to activities affecting these areas, whether those activities lie within or outside the designated areas.”* The latter quote is of particular relevance to the propose Brechfa Connection as its proposed route is outside national designations.

- 9.2.25 With regard to non-statutory designations, including local landscape, designations, paragraph 5.3.11 advises that *“local authorities should apply these designations to areas of substantial conservation value where there is good reason to believe that normal policies cannot provide the necessary protection. Such designations should not unduly restrict acceptable development.”* In paragraph 5.4.4 PPW notes that whilst non-statutory designations *“carry less weight than statutory designations, they should be given adequate protection in development plans.”*
- 9.2.26 The role of the LANDMAP system is set out in paragraph 5.3.13. It is described as describing and evaluating aspects of landscape and as providing *“the basis of a consistent Wales-wide approach to landscape assessment.”* LANDMAP is noted as helping to inform supplementary guidance upon landscape issues such as *“local distinctiveness, special landscape areas and design.”*
- 9.2.27 In Section 5.5 PPW states that *“... landscape considerations must be taken into account in determining individual applications and contributing to the implementation of specific projects.”* In paragraph 5.5.2 it is stated that *“when considering any development proposal (i.e. the proposed Brechfa Connection), local planning authorities should consider environmental impact (including landscape and visual impacts) so as to avoid, wherever possible, adverse effects upon the environment.”*

Technical Advice Note 12: Design (July 2014)

- 9.2.28 This Technical Advice Note (TAN) has some relevance to the LVIA for the proposed Brechfa Forest Connection. In Section 4: Delivering Good Design,

paragraph 4.11 states that appraisal of landscape “*should focus upon its quality in terms of geology and geomorphology, vegetation and habitats, visual and sensory quality and historical and cultural quality*”. LANDMAP is recommended as providing a “*framework and an information base*” for this purpose.

- 9.2.29 In Section 5: Conserving and Improving Natural Heritage and Coast, the need is emphasised that successful design is dependent upon there being an understanding of a development’s landscape context. A successful development will “*always be dependent on working within the natural constraints and historic character of the landscape ...*”. The intention must be to “*minimise environmental impact upon the landscape.*” With specific regard to rural areas paragraph 5.8.1 states that “*The special qualities of the rural landscape ... of Wales should be recognised. The qualities should be enhanced through conservation of the character of the countryside and by achieving quality in new development.*” An LVIA provides the means of demonstrating whatever or not these aspirations have been achieved.

Local Policy

- 9.2.30 Nationally Significant Infrastructure Projects (NSIPs) are not subject to s38(6) of the Planning and Compulsory Purchase Act (2004), which states that determination of planning consent should be in accordance with the local development plan. Local planning policy does not therefore set the tests for the acceptability of NSIPs. However, as previously noted the decision-maker can consider other matters which it considers both important and relevant to its decisions. These matters may include local planning policy.
- 9.2.31 The proposed development falls wholly within the boundary of Carmarthenshire County Council. As such, due consideration has also been given to the relevant policies in the adopted Carmarthenshire Unitary Development Plan (UDP) and the emerging Carmarthenshire Local Development Plan (LDP). It is anticipated that the latter document will be adopted by the end of December 2014. Those policies which are considered relevant to the scope of this chapter are listed below and

they are summarised in Appendix 7.1 of this draft ES.

Carmarthenshire Unitary Development Plan (Adopted 2006)

9.2.32 The relevant policies are listed below:

- CDUP9- Landscape/Environment
- GDC2- Overall Development Policy
- GDC3- Development in the Countryside
- GDC8- Visual Impact and Physical Topography
- GDC10- Ancillary Developments
- GDC19- Retention of Landscape Features
- GDC20- Landscape Design
- EN8- Landscape Features of Major Importance for Flora and Fauna
- EN16- Special Landscape Areas
- EN19- Historic Parks, Gardens and Landscapes
- UT2- Electricity Lines
- UT6 – Wind Energy.

Emerging Carmarthenshire Local Development Plan Composite Plan (October 2013)

9.2.33 The relevant policies are listed below:

Strategic Policies

- SP1- Sustainable Places and Spaces
- SP14- Protection and Enhancement of the Natural Environment

Specific Policies

- GP1- Sustainability and High Quality Design
- EQ1- Protection of Buildings, Landscapes and Features of Historic Importance
- EQ3- Regional and Local Designations
- EQ5- Corridors, Networks and Features of Distinctiveness
- EQ6- Special Landscape Areas
- EP1- Water and Environmental Capacity.

9.2.34 Local plan policy is consistent with national planning policy in that it provides specific protection to national and local landscape designations i.e. the 16 Special Landscape Areas listed under EQ6 of the eLDP and SLA's identified under EN16 of the UDP. Protection from development is also provided for undesignated areas under general development policies for the countryside. These policies are identified and discussed within Chapter 8: Planning Policy.

Natural Resources Wales

9.2.35 LANDMAP is a GIS based landscape resource developed by Natural Resources Wales (NRW), where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set. LANDMAP Guidance Note 1: Guidance for Wales LANDMAP and Special Landscape Areas presents the approach for using LANDMAP to identify local landscape designations, Special Landscape Areas (SLAs). LANDMAP Information Guidance Note 3: Guidance for Wales Using LANDMAP for Landscape and Visual Impact Assessment of Onshore Wind Turbines provides advice on how LANDMAP should be used within the Environmental Impact assessment (EIA) process for onshore wind farms and their surrounding infrastructure.

9.2.36 In April 2013 NRW took over the responsibilities of the Forestry Commission

Wales. The Forestry Commission Wales policy position on development affecting woodlands (2010) has been retained by NRW. This policy seeks to implement the principles set out in national policy through a range of means including, *‘aiming to achieve planning gain and mitigation that helps to deliver against the relevant statutory and policy considerations, including specific proposals for compensatory planting to achieve equivalent or greater public benefit’*.

WPD Policy

- 9.2.37 WPD’s schedule 9 statement sets out the company’s strategic aims for having regard to the desirability of preserving natural beauty and seeking to reasonably mitigate the effect of its activities on: the countryside; wildlife; and sites, structures or features of archaeological interest when installing electricity lines and or carrying out operation and maintenance works.

Other routeing and design guidance

General

- 9.2.38 Relevant landscape and visual guidance used in the routeing process for the Proposed Development (i.e. embedded mitigation) has included:
- The Holford Rules (reproduced in full in EN-5) – see below;
 - National Grid general approach to options appraisal and to the design and routeing of new electricity transmission lines, 2012; and
 - High Voltage Overhead Lines Environmental Concerns, Procedures, Impacts and Mitigations, Cigre, 1999.

The Holford Rules

- 9.2.39 The Holford Rules provide industry standard guidelines for routeing overhead line developments. They apply to overhead lines of all scales but must be applied differently in some detailed respects to an overhead line largely comprising below 20m high single wooden poles (as opposed, for example, to in excess of 50m high

steel lattice towers). The rules have been an important consideration in the iterative route selection process which has preceded this assessment, the outcome of which is presented here as embedded mitigation.

9.2.40 For clarity, the following table reproduces the Holford Rules and provides a summary of how each of the rules connects to the approach and criteria used in this assessment. In particular the table explains how the Holford Rules are reflected in the assessment criteria used to determine the susceptibility of different types of landscape to the Proposed Development and the degree of landscape and visual change that is predicted to occur (see also the method statement provided in section 4 of this chapter).

Table 9.1 – The Holford Rules and how they apply to the assessment

Holford Rule	Reflection in the assessment criteria used to determine the landscape and visual effects of the Proposed Development
1. Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if the total mileage is somewhat increased in consequence.	An evaluation of all landscape character areas and designations through which the Proposed Development would pass has been undertaken and alternative routes selected to avoid impacts on areas of highest amenity value (see chapter 3 of the draft ES).
2. Avoid smaller areas of high amenity value or scientific interests by deviation, provided this can be done without using too many angle towers, i.e. the bigger structures which are used when lines change direction.	The identification and assessment of individual visual receptor locations including footpath and cycle routes has been undertaken.
3. Other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers.	Degree of landscape and visual change criteria used in the assessment take account of the frequency of angle poles in any given area which may result in a higher degree of landscape and visual change.
4. Choose tree and hill backgrounds	Landscapes with visually prominent

in preference to sky backgrounds wherever possible. When a line has to cross a ridge, secure this opaque background as long as possible, cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.

steep slopes and skylines have been identified as more highly susceptible. Degree of landscape and visual change criteria used in the assessment take account of the likelihood that a backdrop of sky rather than land is likely to increase the level of landscape and visual change.

5. Prefer moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees.

Landscapes comprising moderately open valleys have been identified as lower susceptibility. Degree of landscape and visual change criteria used in the assessment also take account of the likelihood that following the grain of a moderately open valley is likely to reduce the level of landscape and visual change.

6. Where country is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration of lines or ‘wirescape’.

Landscapes with existing wirescape have been identified as higher susceptibility. Degree of landscape and visual change criteria used in the assessment also take account of the likelihood that avoiding wirescape conflicts is likely to reduce the level of landscape and visual change.

7. Approach urban areas through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach and the substation, carefully assess the comparative costs of undergrounding.

This rule has been of limited relevance to the assessment.

9.3 Consultation and scoping overview

The route selection process

9.3.1 The route selection process incorporated extensive engagement with statutory consultees, principally:

- Natural Resources Wales (NRW); and
- Carmarthenshire County Council (CCC).

9.3.2 NRW and CCC jointly instructed independent landscape consultants Anthony Jellard Associates LLP to provide coordinated consultation responses on their behalves at all stages of the project development including early landscape and visual constraint mapping; identification of broad potential corridors; identification and selection of preferred corridors and alignments; EA scoping and draft ES preparation.

9.3.3 The full range of landscape and visual considerations and assessment criteria for route selection was agreed with these parties. Full details of the process and of the reasoning which underpins the selection of the route for the Proposed Development are provided in chapter 3 of the draft ES.

The formal landscape and visual scoping process

9.3.4 A scoping request was submitted in July 2014 which included a landscape and visual chapter. This pre-dated the identification of the final preferred route of the Proposed Development upon which this draft ES is based and was instead based on a scoping boundary comprising a number of 300m wide corridor options. The formal scoping report followed extensive pre-scoping discussions with both NRW and CCC. These pre-scoping discussions tackled key matters including the recommended approach to the use of Landmap; proposed amendments to the boundaries of existing special landscape areas (SLAs); the identification of visual receptors and the likely required scope of the cumulative landscape and visual assessment. The scoping report also contained a preliminary schedule of proposed representative viewpoints for the visual assessment (the final schedule of representative viewpoints was agreed later following identification of the final route of the Proposed Development).

9.3.5 The formal scoping process provided the framework for agreeing relevant information sources and the study area for various aspects of the landscape and visual effects assessment. Key aspects included agreement that:

- An assessment of effects on landscape character was required only for those areas of landscape through which the final preferred alignment passes (i.e. no

requirement was identified to assess secondary effects on surrounding character areas); and

- The assessment of visual effects was agreed to require a focus on areas within 1 km of the proposed alignment (subject to various minor caveats covered elsewhere).

9.3.6 The formal landscape and visual scoping chapter was firstly reviewed by independent landscape consultants jointly instructed on their behalf by NRW and CCC and, drawing on their and other scoping responses, subsequently commented on by the SoS.

9.3.7 The following table identifies the key relevant landscape and visual aspects of the scoping opinion received from the SoS in August 2014, along with key earlier consultation comments, and summarises how the landscape and visual effects assessment contained within this chapter has responded:

Table 9.2 – Summary of consultation relating to landscape and visual effects

Date and consultation phase/type	Consultation and issue raised	Section where comment addressed
Early routing strategy consultations with NRW and CCC – early 2013	Reference to Landmap evaluations advocated across all five aspects to help determine preferred corridors and understand landscape susceptibility. Reference to Holford Rules advocated.	Assessment of effects on landscape character in Appendix 9.2. Also incorporated as embedded mitigation within the selection of the preferred corridor and alignment – see section 9.9.
Stage 1 workshops with community councils - July 2013	A number of constraints across the study area were identified	Reflected as embedded mitigation within the selection of the preferred corridor and alignment – see section 9.9. Visual receptors (including recreational and visitor locations) reflected in Appendices 9.5 to 9.8.

<p>Stage 2 public consultations – March 2014</p>	<p>A number of specific constraints across the study area were identified</p>	<p>Reflected as embedded mitigation within the selection of the preferred corridor and alignment – see section 9.9. Identified visual receptors (including recreational and visitor locations) reflected in Appendices 9.5 to 9.8.</p>
<p>Pre scoping report consultations with NRW and CCC – April 2014 (meeting held 28 April 2014)</p>	<p>Early schedule of proposed assessment viewpoints issued for comment – some alterations to schedule agreed</p>	<p>Discussions and agreement enabled photography of majority of viewpoints in April 2014 (i.e. early in the season before full foliage) (NB this preceded selection of preferred route and further agreement sought in September 2014 to final schedule of assessment viewpoints contained in Appendix 9.4).</p>
	<p>Reference to Landmap evaluations advocated across all five aspects but with focus on visual and sensory aspect</p>	<p>All evaluations referenced within assessment worksheets for pLCAs – see Appendix 9.2. Extent of pLCAs considered in Appendix 9.2 primarily based on visual and sensory aspect areas.</p>
	<p>Request for landscape character sensitivity study to inform route selection</p>	<p>Assessment of landscape sensitivity underpins preliminary landscape and visual assessment contained as Appendix 1.2 to the Preferred Alignment Selection Report, August 2014.</p>
	<p>Agreed that assessment would consider both existing adopted and proposed amended SLA designation boundaries</p>	<p>Assessment of effects on SLAs (including those proposed within the new local development plan) contained in Appendix 9.3.</p>

	Request that potential for overbearing effects on residential visual amenity be included for those properties within 100 m of overhead sections of the Proposed Development	Screening and assessment of closest properties undertaken in section 9.7.
	Request to include locally promoted trails within the scope of the visual assessment	Included in Appendix 9.6.
	Request to include some 'other' recreational and visitor locations in the visual assessment (i.e. in addition to residential locations, footpaths and road)	Agreed list included in Appendix 9.8.
	Request that scope of cumulative assessment include existing developments of relevant types (as well as consented and proposed) to enable an assessment of a past, present and foreseeable future change	Reflected in scope of cumulative assessment set out in section 9.11.
	Request that various types of developments be included within the scope of the cumulative assessment – in particular small scale wind, solar and telecommunications masts	Reflected in scope of cumulative assessment set out in section 9.11.
Pre scoping opinion consultations with NRW and CCC – June 2014	Request that cumulative assessment should combine both the additional and combined effects of existing, consented and proposed developments	Included in section 9.11.

<p>SoS scoping opinion (incorporating formal responses by NRW and CCC including Annex 1 to NRW scoping response) – August 2014</p>	<p>Agreement to scoping out of the following: Separate consideration of townscape effects; Effects on nationally designated landscapes; Indirect effects on landscape character. Detailed individual assessments for residential properties more than 1 km from the Proposed Development.</p>	<p>N/A</p>
	<p>SoS requests consideration of construction phase landscape and visual effects of both overhead and underground sections of the route (because limited information regarding construction compounds was included in the scoping report) (scoping report had recommended underground sections only)</p>	<p>Assessment of the construction phase effects of the overhead sections of the line included in section 9.6. However assessment of construction phase landscape character effects primarily focused on the three temporary off-line construction compounds. On-line construction phase landscape character and visual effects of overhead sections considered in general terms only.</p>
	<p>SoS requests consideration of visual effects at distances greater than 3 km</p>	<p>3 km has been agreed as adequate with statutory consultees. No assessments of visual effects beyond 3 km included in this draft ES chapter. All visual effects at such a distance would be negligible.</p>
	<p>SoS requests agreement of cumulative scope with consultees</p>	<p>Consultations underway and set out below and within section 9.11.</p>
	<p>SoS requires assessment</p>	<p>GLVIA3 compliant</p>

in accordance with GLVIA3	methodology set out in section 9.4 and agreed with consultees.
SoS requires clarity regarding the process followed to produce ZTVs	Methodology and technical information set out in section 9.4.
SoS recommends further agreement of viewpoints	Appendix 9.4.
SoS requests consideration of effects on residential visual amenity for properties within 100 m of the overhead sections of the Proposed Development	Section 9.7 and Appendix 9.5 (screening process undertaken and closest properties considered further).

Further agreement with statutory consultees

9.3.8 Since the formal scoping process and the SoS’s scoping opinion the following aspects of the landscape and visual effects assessment have been further agreed with the independent landscape consultants jointly instructed by CCC and NRW:

- The GLVIA3 compliant method statement and assessment criteria (see section 9.4);
- The extent of the thirteen project landscape character areas through which the Proposed Development would pass (see Appendix 9.2);
- The 28 representative viewpoint positions that have been used to inform the assessment of visual effects and the approach to project visualisations at each (see Appendix 9.4 and Figures 9.5 vps 1 to 28);
- The categories of visual receptors comprising residential locations (including holiday lets), footpaths (including promoted trails), roads (including any identified scenic drives) and any other miscellaneous recreational or visitor locations not otherwise captured (e.g. caravan sites, golf courses, combined on- and off-road cycle trails etc.) (see Appendix 9.8); and

- The schedule of both existing and proposed developments to be included within the scope of the cumulative landscape and visual assessment. Relevant categories of development were agreed as overhead lines, energy related development (wind and solar - including their grid connections) and telecommunications masts. No other existing vertical features or proposed large scale developments were identified as relevant to the cumulative assessment (see section 9.11).

9.4 Assessment methodology

Guidance

- 9.4.1 The methodology and criteria used for this assessment of landscape and visual effects has been developed based on the non prescriptive Guidelines for Landscape and Visual Impact Assessment, Third Edition, 2013 (GLVIA3). The GLVIA3 sets out the principles that underpin landscape and visual assessment but does not provide a formulaic recipe for reaching judgements about significance. Such judgements instead rely on reasoned and experienced professional judgement.
- 9.4.2 The following additional guidance has also informed detailed aspects of the approach taken to the assessment of the Brechfa Forest Connection:
- LANDMAP Methodology: Guidance for Wales, Natural Resources Wales, 2013;
 - Natural Resources Wales guidance documents regarding the application of Landmap (in particular Guidance Note 1: Landmap and Special Landscape Areas and Guidance Note 3: Using Landmap for Landscape and Visual Impact Assessment of Onshore Wind Turbines); and
 - Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity, The Countryside Agency, 2002.
- 9.4.3 The methodology used for this assessment has been tailored to the specific

requirements of the project and its location to ensure proportionate assessment and a focus on its most significant likely landscape and visual effects. The adopted assessment methodology has specifically focused on providing appropriate environmental information regarding the following potential landscape and visual implications of the Proposed Development:

- The permanent landscape and visual effects of installing linear wooden pole electricity infrastructure within an area of predominantly rural countryside of varying but sometimes high landscape value;
- The landscape and visual implications of tree removal along the linear development to enable construction and maintain a clear path for sections of overhead line;
- The largely temporary effects of constructing sections of underground cabling; and
- The potential cumulative effects with other associated changes in the area such as the consented wind farm development.

The purpose of the assessment

9.4.4 The purpose of the landscape and visual assessment is to identify the significant effects of the Proposed Development to inform decision making. This landscape and visual assessment categorises all landscape, visual and cumulative effects as follows:

- **Highly significant (major)** - it has been an objective of the route selection process to avoid any such effects;
- **Significant (moderate)** - it has been an objective of the route selection process and the focus of mitigation strategies to minimise any such effects; and
- **Not significant (minor or negligible)** - effects that are considered to not require further mitigation.

9.4.5 The following table provides an overview of the factors that contribute to an assessment of landscape and visual effects. It identifies the six principal considerations that are combined to reach a conclusion on significance. The weighting attributed to each of these six considerations requires the application of experienced professional judgement and may vary depending on the landscape or visual receptor or effect being assessed.

Table 9.3: Considerations in the overall assessment of significance

Nature of the receptor		Nature of the effect			
Susceptibility	Value	Degree of change	Extent	Duration	Reversibility
High	High	High	Extensive	Permanent	Irreversible
Medium	Medium	Medium	Limited	Long Term	Partially Reversible
or Low	or Low	Low or Negligible/No Change	Localised or Not Applicable	Medium Term or Short/Temporary	Reversible or Reversible

Significance / level of effect

Highly significant (major)
Significant (moderate)
Not significant (minor or negligible)
Negligible / Not Significant

9.4.6 Detailed criteria are provided below for the six main landscape and visual considerations listed in the middle row of this table along with an explanation of how these varied considerations are combined to reach an overall professional judgement on significance of effect. Separate criteria are provided for landscape and for visual effects.

Landscape assessment receptors and criteria

Landscape receptors

9.4.7 Landscape receptors in this assessment comprise:

- Landscape elements (principally woodlands, trees and hedgerows);

- Project landscape character areas (pLCAs); and
- Landscape designations (Special Landscape Areas - SLAs).

Landscape susceptibility criteria

9.4.8 The susceptibility of the character of different landscape areas to the potential effects of the Proposed Development is categorised as high, medium or low.

9.4.9 The characteristics of different landscape areas have been considered in relation to the following **indicators of higher susceptibility** to the changes likely to be associated with the introduction of the Proposed Development (these indicators have been informed by the Holford Rules):

- Areas of heavily undulating, steeply sloping or elevated topography and ridgelines combined with an open field pattern and prominent, open slopes and skylines – where skyline visibility could increase levels of perceived change in character;
- Absence of moderate levels of mature tree cover which would help to visually absorb the appearance of the overhead line whilst not necessitating substantial tree removal;
- Narrow, linear areas of common landscape character where the effects of a linear development (whether along or across the linear character area) might be exaggerated by topographical form or other linear landscape features (for example, distinct, narrow valleys framed by steeply sloping sides where the Proposed Development might result in disproportionate change compared to wider, less defined areas of landscape);
- Small scale, enclosed valleys (i.e. those that do not meet the Holford Rule test of being '*moderately open with woods*'); and
- Areas generally free of distinctly man-made or engineered features where the balance between human and natural influences tends more to the latter, where landscape patterns and forms tend to be organic rather than geometric (e.g.

including irregular field patterns) and where there is a general absence of prominent infrastructure.

9.4.10 The final indicator of higher susceptibility to the changes likely to be associated with the introduction of the Proposed Development may refer to the presence or otherwise of existing overhead electricity lines. In this regard the relationship between the presence of such features and landscape susceptibility is more complex:

- Landscapes entirely free of existing visible electricity infrastructure and telegraph poles (i.e. a complete absence of ‘wirescape’) are regarded to display high susceptibility;
- Settled landscapes with typical but relatively low levels of familiar existing electricity infrastructure and telegraph poles are regarded to display low susceptibility; and
- Landscapes with already high levels of prominent existing electricity infrastructure and telegraph poles (i.e. the presence or risk of an adverse ‘wirescape’ forming) may display high susceptibility.

Landscape evaluation criteria

9.4.11 The value (or importance) of different landscape areas to people is categorised as high, medium or low. The value of a landscape may sometimes vary considerably from the susceptibility of its character (e.g. the character of a very highly valued landscape may not be at all susceptible to the effects likely to arise as a result of a development).

9.4.12 The value of different landscape areas within this assessment has adopted the following terminology and criteria:

- High landscape value: Areas of landscape both designated as SLA and evaluated as either Outstanding or High by Landmap under relevant visual and sensory criteria.

- Medium landscape value: Areas of landscape not designated as SLA but evaluated as either Outstanding or High by Landmap under relevant visual and sensory criteria. Other areas of landscape where there is clear evidence of particular value being attributed at a local level.
- Low landscape value: Areas of landscape not designated as SLA and not evaluated as either Outstanding or High by Landmap under relevant visual and sensory criteria. Other areas of landscape where there is an absence of clear evidence of particular value being attributed at a local level.

Degree of landscape change criteria

9.4.13 The degree of landscape change likely to arise as a result of the Proposed Development within different landscape areas is categorised as high, medium, low or negligible/no change.

9.4.14 The assessment of landscape change takes account of what is taken away from the landscape; what is added to the landscape; and the degree to which this would result in a change to its character. The assessment therefore reflects the level of ‘consistency’ or ‘fit’ between the existing baseline characteristics of the landscape and anything introduced into it by the Proposed Development. This assessment has adopted the following terminology and criteria:

- High degree of landscape change: the Proposed Development would form a dominant or highly prominent landscape element and/or would result in substantial alteration to, or inconsistency with, an area’s key landscape characteristics. The fit between the existing landscape and the Proposed Development would be very poor.
- Medium degree of landscape change: the Proposed Development would form a reasonably conspicuous landscape element and/or would result in some alteration to, or inconsistency with, an area’s key landscape characteristics. The fit between the existing landscape and the Proposed Development would be slightly inadequate.

- Low degree of landscape change: the Proposed Development would form a reasonably inconspicuous landscape element and/or would result in only very minor alteration to, or inconsistency with, an area's key landscape characteristics. The fit between the existing landscape and the Proposed Development would be good.
- Negligible/no landscape change: The proposed development would be a barely perceptible landscape element and/or would not change an area's key landscape characteristics. The Proposed Development would be totally absorbed.

9.4.15 Specifically with regard to the overhead sections of the proposed development the following seven landscape circumstances are regarded as likely to result in a higher degree of landscape change:

- Where the overhead line would necessitate the removal of a substantial amount of trees and hedgerows;
- Where the overhead line would be introduced into an areas of open landscape with very limited tree cover;
- Where the overhead line would be introduced in areas of prominently sloping ground and the alignment would cut across the grain of the topography to cross skylines;
- Where the overhead line would coincide with landscapes of a relatively wild and unsettled character largely devoid of built landscape elements and infrastructure;
- Where the overhead line would coincide with areas largely devoid of vertical landscape elements;
- Where the overhead development features more frequent angles in its alignment; and
- Where the generally single pole overhead development features more

frequent double H or four pole structures.

Extent of landscape effect criteria

- 9.4.16 Consideration of the extent of landscape effect can either relate to the quantification of an effect on existing landscape elements (e.g. an area of tree cover to be removed) or to the extent of the geographical area over which a change in landscape character might be experienced.
- 9.4.17 The extent of landscape change likely to arise as a result of the Proposed Development upon either landscape elements or within different landscape areas is categorised as extensive, limited or localised. It is not possible to provide consistent criteria for these descriptive terms that apply in every instance (i.e. to different types of landscape receptors). Instead, the terms are used in the assessment of landscape effects as qualifiers that contextualise the preceding assessment of degree of landscape change such that:
- Where a high degree of landscape change is anticipated its localised extent may lead to a conclusion of not significant;
 - Where only a medium degree of landscape change is anticipated it is likely that the effect would need to be extensive to lead to a conclusion of highly significant (major) or significant (moderate); and
 - Where a low degree of landscape change is anticipated it is likely that the effects would have to be both extensive and upon a high value landscape area to lead to a conclusion of highly significant (major) or significant (moderate).

Duration of landscape effect criteria

- 9.4.18 The duration of the landscape effect likely to arise as a result of the Proposed Development on landscape elements or within different landscape areas is categorised as permanent, long term, medium term or short term/temporary. This is used to qualify and contextualise the assessment of degree of landscape change. The following definitions have been adopted within this assessment:

- Permanent landscape change: an effect of either infinite duration or likely to persist for more than twenty years;
- Long term landscape change: an effect of finite duration likely to persist for less than twenty years but more than five years;
- Medium term landscape change: an effect likely to persist for more than one year but less than five years; or
- Short term/temporary: an effect unlikely to persist for more than one year.

Reversibility of landscape effect criteria

9.4.19 Whatever the expected duration of a landscape effect, consideration of reversibility relates to whether a landscape effect could be reversed rather than will be reversed. This enables a distinction to be made between a new landscape element which is expected to be permanent but could nevertheless be removed without residual effect should it become unexpectedly obsolete, and landscape change that is practicably irreversible. The following criteria have been adopted within this assessment:

- Irreversible: Major changes in landform or the removal of landscape elements, such as veteran trees, that could not be replicated within twenty years;
- Partially reversible: Changes that could be largely reversed within twenty years (e.g. recreation of mature woodland areas of similar but not identical species mix and character); and
- Reversible: Changes that could be totally reversed within ten years (e.g. removal of introduced features or recreation of juvenile woodland).

Assessment of significance of landscape effect

Combining judgements

9.4.20 The level of landscape effect is categorised using a four point scale of major,

moderate, minor or negligible. The level of effect is assessed by combining all of the considerations and criteria set out above. This is described by GLVIA3 as an ‘overall profile’ approach to combining judgements and requires that all of the judgements against each of the identified criteria (susceptibility, value, degree, extent, duration and reversibility) are used within an informed professional assessment of the overall level of landscape effect.

- 9.4.21 The relative weight attributed to each of the six considerations is a matter for experienced professional judgement and will vary depending on the specific landscape receptor or effect being assessed. For example, susceptibility is more relevant to landscape character than to the removal of landscape elements such as tree cover and short term reversible effects on the landscape may still be judged to be significant. Where possible to do so with a reasonable level of professional objectivity the effects of the Proposed Development on the landscape are identified as likely to be generally considered positive (beneficial), neutral or negative (adverse).

Significance thresholds

- 9.4.22 The significance of landscape effects is categorised as highly significant (major), significant (moderate) or not significant (minor or negligible). GLVIA3 states the following with regard to the judgement of significant landscape effects: *‘There are no hard and fast rules about what makes a significant effect, and there cannot be a standard approach since circumstances vary with the location and landscape context and with the type of proposal. At opposite ends of a spectrum it is reasonable to say that:*
- *Major loss or irreversible negative effects, over an extensive area, on elements and/or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes are likely to be of the greatest significance;*
 - *Reversible negative effects of short duration, over a restricted area, on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the character of landscapes of community value are*

likely to be of the least significance and may, depending on the circumstances, be judged as not significant;

- *Where assessments of significance place landscape effects between these extremes, judgements must be made about whether or not they are significant, with full explanations of why these conclusions have been reached.'*

Visual assessment receptors and criteria

Visual Receptors

9.4.23 The assessment of visual effects considers how landscape change affects views experienced by people. Visual receptors in this assessment comprise the following categories:

- Residents (with a detailed tabulated assessment provided in Appendix 9.5);
- Footpath users (with a detailed tabulated assessment provided in Appendix 9.6);
- Road users (with a detailed tabulated assessment provided in Appendix 9.7);
and
- People located in other key recreational or visitor locations (with a detailed tabulated assessment provided in Appendix 9.8).

9.4.24 An understanding of how these receptors are likely to be visually affected is informed by a detailed assessment of the visual effects at representative viewpoints provided in Appendix 9.4. These viewpoints often represent effects on more than one category of visual receptor (e.g. both residential properties and a road). Further explanation of how the representative viewpoints have been used in this assessment is provided towards the end of this method statement.

Visual susceptibility, value and combined sensitivity criteria

9.4.25 The susceptibility of a visual receptor to the potential visual effects of the Proposed Development relates to the expectations of people in different locations

and engaged in different activities. This is determined by the category of visual receptor (e.g. resident, footpath users, road user or other). Unlike landscape character, the value attributed to a view is likely to closely follow the susceptibility of the category of visual receptor concerned (e.g. it is unlikely that a residential receptor, whatever their visual context, would attribute no value to their visual amenity). Nevertheless, there may be instances where lower value is likely to be attributed. Combined visual sensitivity is categorised as high, medium or low. Within this assessment the following categories of visual receptor are therefore generally regarded to display the following levels of visual susceptibility, visual value and, therefore, combined visual sensitivity:

9.4.26 High visual susceptibility, value and combined sensitivity:

- Residents (especially standalone properties in open rural locations and all properties known to be used as holiday lets);
- Footpath or trail users (including pedestrians, some cyclists and some horse riders) in areas of high value, open countryside that are generally agreed to be associated with recreational or tourist use (including those using some promoted or named long distance paths or trails);
- Promoted viewpoints (whether pedestrian or vehicular);
- Road users in cars using routes that are generally agreed to be associated with high levels of recreational or tourist use;
- Other tourist or recreational locations where visual amenity is likely to be highly valued (possibly including publically accessible locations of historic interest); and
- Publically accessible ornamental parks and gardens.

9.4.27 Medium visual susceptibility, value and combined sensitivity:

- Residents in built up locations with low levels of visual amenity (excluding any properties known to be used as holiday lets which will be always categorised

as high combined sensitivity);

- Incidental footpath users in areas of low value countryside or in built up areas;
- Cyclists and horse riders generally (including those using National Cycle Routes or promoted recreational routes where the clear focus is on sport/activity or transport rather than visual amenity).

9.4.28 Low visual susceptibility, value and combined sensitivity:

- People in their places of employment;
- Open spaces principally used for sport; and
- Road users in cars using routes that are not generally associated with recreational or tourist use.

9.4.29 The value of the available views view within a particular context may lead to occasional minor down or upgrading of typical assessments. In relation to visual value, typical assessments of the susceptibility of different categories of visual receptor are modified in the following circumstances to reach a combined assessment of sensitivity:

- Residential receptors may be assessed as being of only medium combined visual sensitivity where they are considered unlikely to attribute high value to their available views due to a degraded quality of existing visual amenity; or
- Road users may be assessed as being of high combined visual sensitivity where the route passes through an area likely to be particularly highly valued for its scenery and the quality of visual amenity it provides.

Degree of visual change criteria

9.4.30 The degree of visual change likely to arise as a result of the Proposed Development for different visual receptors is categorised as high, medium, low or negligible/no change.

9.4.31 The assessment of visual change takes account of what is taken away from the view; what is added to the view; and the degree to which this would result in a change to available views. The assessment therefore reflects the level of visibility of what is introduced into a view as well as the ‘consistency’ or ‘fit’ between the character of the existing baseline view and anything introduced into it by the Proposed Development. This assessment has adopted the following terminology and criteria:

- High degree of visual change: The visual changes associated with the Proposed Development would form a dominant or highly prominent element within the view and/or result in substantial change to the quality and character of the available view.
- Medium degree of visual change: The visual changes associated with the Proposed Development would form a reasonably conspicuous element within the view and/or result in some noticeable change to the quality and character of the available view.
- Low degree of visual change: The visual changes associated with the Proposed Development would form a visible but only very minor element within the view, without materially affecting the overall quality and/or character of the available view.
- Negligible/no visual change: The visual changes associated with the Proposed Development would be barely discernible or there would be no change at all to the existing available view.

Extent of visual effect

9.4.32 Consideration of the extent of visual effects relates to the geographic area over which changes in visual amenity may arise (i.e. it does not relate to the how much of a specific view is altered as this is included in the assessment of the degree of visual change). The extent of visual effect is not therefore relevant to the assessment of visual effects at specific viewpoints or upon specific visual

receptors in fixed locations. Its relevance as a consideration in determining significance is instead limited to the extent of a route which might be affected by visual change (i.e. sequential visual effects) or to a summary assessment of the overall effect of the Proposed Development on general visual amenity.

- 9.4.33 Where relevant, the extent of visual change likely to arise as a result of the Proposed Development is categorised as extensive, limited or localised. It is not possible to provide consistent criteria for these descriptive terms that apply in every instance. Instead, the terms are used in the assessment of visual effects as qualifiers that contextualise the assessment of individual viewpoints and receptors and provide reasoning within the combined assessment of significance.

Duration of visual effect criteria

- 9.4.34 The duration of the visual effect likely to arise as a result of the Proposed Development on different visual receptors is categorised as permanent, long term, medium term or short term/temporary. This is used to qualify and contextualise the assessment of degree of landscape change. The following definitions have been adopted within this assessment:

- Permanent visual change: an effect of either infinite duration or likely to persist for more than twenty years;
- Long term visual change: an effect of finite duration likely to persist for less than twenty years but more than five years;
- Medium term visual change: an effect likely to persist for more than one year but less than five years; or
- Short term/temporary: a visual effect unlikely to persist for more than one year.

Reversibility of visual effect criteria

- 9.4.35 Whatever the expected duration of a visual effect, consideration of reversibility relates to whether a visual effect could be reversed rather than will be reversed. This enables a distinction to be made between changes associated with the

introduction of something which is expected to be permanent but could nevertheless be removed without residual effect should it become unexpectedly obsolete and visual change that is practicably irreversible. The following criteria have been adopted within this assessment:

- Irreversible: Visual change associated with major changes in landform or the removal or landscape elements, such as veteran trees, that could not be replicated within twenty years;
- Partially reversible: Visual changes that could be largely reversed within twenty years (e.g. recreation of mature woodland areas of similar but not identical species mix and character); and
- Reversible: Visual changes that could be totally reversed within ten years (e.g. removal of introduced features or recreation of juvenile woodland).

Assessment of significance of visual effect

Combining judgements

9.4.36 The level of visual effect is categorised using a four point scale of major, moderate, minor or negligible. The level of effect is assessed by combining all of the considerations and criteria set out above. This is described by GLVIA3 as an ‘overall profile’ approach to combining judgements and requires that all of the judgements against each of the identified criteria (susceptibility, value, degree, extent, duration and reversibility) are used within an informed professional assessment of the overall level of visual effect.

9.4.37 The relative weight attributed to each of the six considerations is a matter for experienced professional judgement and will vary depending on the specific visual receptor or effect being assessed. For example, the geographical extent of visual change is more relevant to an area or route than to a fixed viewpoint and short term reversible visual effects may still be judged to be significant. Where possible to do so with a reasonable level of professional objectivity the visual effects of the Proposed Development are identified as likely to be generally considered positive

(beneficial), neutral or negative (adverse).

Significance thresholds

9.4.38 The significance of visual effects is categorised as highly significant (major), significant (moderate) or not significant (minor or negligible). GLVIA3 states the following with regard to the judgement of significant visual effects: *‘There are no hard and fast rules about what makes a significant effect, and there cannot be a standard approach since circumstances vary with the location and context and with the type of proposal. In making a judgement about the significance of visual effects the following points should be noted:*

- *Effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant;*
- *Effects on people at recognised and important viewpoints or from recognised scenic routes are more likely to be significant;*
- *Large-scale changes which introduce new, non-characteristic or discordant or intrusive elements into the view are more likely to be significant than small changes or changes involving features already present within the view.’*

Cumulative assessment methodology and criteria

General

9.4.39 The cumulative assessment considers both the combined and additional cumulative landscape and visual effects of the Proposed Development in relation to the foreseeable changes in current baseline conditions that are likely to arise as a result of consented and proposed (subject to planning application) developments. When assessing combined effects the specific contribution of the Proposed Development to the sum effect of all of the Proposed Development included in the assessment is made clear.

Cumulative assessment criteria

- 9.4.40 The assessment criteria used in the cumulative landscape and visual assessments is the same as that used in the non-cumulative assessment of the Proposed Development against the current baseline.

The iterative assessment and design process

- 9.4.41 Chapter 6 of the draft ES sets out the overall approach to the iterative assessment and design of the Proposed Development and explains the sequence of iterative stages that have been followed across all environmental parameters to identify the preferred technology (overhead line, or underground using either directional drilling or open trench) and preferred route alignment. It explains the relationship between the initial stages of assessment, design refinement, mitigation and assessment of the significance of residual effects.
- 9.4.42 The iterative design and assessment process for the project has been such that the potential landscape and visual effects of achieving the Proposed Development objectives has informed its design and routeing. The scheme parameters (such as the adoption of largely single wooden pole structures) and routing assessed within this draft ES therefore contain substantial embedded landscape and visual mitigation. Some elements of ‘additional’ landscape and visual mitigation may nevertheless be incorporated within the scheme as the assessment progresses (e.g. any areas of screen planting and/or replacement planting). Given that the greater part of the Proposed Development’s landscape and visual mitigation is embedded within the design being assessed within this draft ES rather than ‘additional’, the assessment largely focuses on residual effects in the first instance followed by a concise summary of all of the embedded and additional mitigation measures that had been incorporated to reach this assessment.

The use of representative viewpoints

- 9.4.43 The assessment of the effects on specific visual receptors is underpinned by a detailed assessment of the visual effects of the Proposed Development (overhead and underground, for the construction and operational phase and cumulative) at selected representative viewpoints, the locations of which were agreed with

statutory consultees. These representative viewpoints and their associated visualisations (see below) provide a detailed insight into the anticipated appearance of the visual changes likely to occur as a result of the Proposed Development in specific locations. Visual changes include those that would be both temporary and permanent and those that would arise as a result of vegetation removal, the introduction of the proposed infrastructure and any continuing constraints to the growth and reestablishment of vegetation along the route. The detailed assessment of the visual effects at representative viewpoints is contained in Appendix 9.4. The principal purpose of Appendix 9.4 is to focus on the degree of visual change that would be experienced in different locations, and principally as a consequence of the introduction of an overhead power line supported by largely single wooden poles within its specific, and often heavily wooded, landscape context. A significance of visual effect is not stated for each of the selected representative viewpoints. This is because each location may be associated with various categories of visual receptor (of varying visual susceptibility) and the varying significance of the visual effect on these different categories of visual receptor is assessed in the subsequent Appendices 9.5 to 9.8.

Visualisations of the Proposed Development

- 9.4.44 The assessment of the degree of visual change that would be experienced at each selected representative viewpoint is supported by the presentation of computer generated wirelines, and in selected cases photomontages, which illustrate the anticipated operational phase appearance of the Proposed Development (Figure 9.5 vps 1 to 28). These illustrations were used to assist the professional assessment but consideration of the potential visual effects was primarily based on professional observations made in the field with reference to these and other visual tools. Photomontages simply combine a photograph of an existing view with a computer-generated image of the Proposed Development to help stakeholders and decision makers to understand the likely appearance of the Proposed Development. They provide a reasonably photo-realistic representation of how the Proposed Development is likely to look in the context of the existing

landscape as it would be seen in a photograph, but can never fully represent how the Proposed Development would appear to the human eye and be experienced by the individual visual receptor in the field. As such, any unavoidable graphical limitations in the illustrative material provided do not represent a limitation in the professional assessment of the degree and subsequent significance of visual effects.

9.4.45 Project visualisations have been prepared consistent with the principles set out within the Landscape Institute's *Advice 01/11 – Photography and Photomontage in Landscape and Visual Impact Assessment*. In particular, the images presented in this draft ES adhere to the following technical specifications:

- Photography: A comprehensive photographic study of each viewpoint has been undertaken with 360-degree high-resolution digital photography taken using either a Canon EOS 550D digital SLR camera with a 30mm lens (to achieve the same view as that of a 50mm lens on a standard 35mm film SLR) or a Canon EOS 5D Mark II digital SLR camera with a 50mm lens. Wherever possible photography has been captured early or late in the season to minimise leaf cover, in reasonable weather and in good light conditions.
- Photo merging: Individual photographic images have been merged using AutoPano. Images have been merged in cylindrical projection.
- Wirelines: Computer generated wirelines illustrating the Proposed Development's approximate location and scale within the topographical context have been constructed using 3Ds Max and Vray software.
- The images provided: For every viewpoint a baseline panoramic photograph is presented alongside a reasonably accurately aligned and scaled computer generated wireline. For selected key viewpoints, a photomontage image is also provided on a separate sheet. These wirelines and photomontages illustrate the currently proposed alignment of the Proposed Development (which is subject to an up to 25m total limit of horizontal deviation) and a worst case pole height including the additional 2m limit of vertical deviation.

- Image size, field of view and approximate viewing distance: The illustrations are presented in hard copy on A3 sheets. Each image shows an approximately 75 degree field of view. These printed images provide a reasonable impression of the scale and distance of the Proposed Development when viewed at a comfortable distance from the eye of approximately 30cms.

Limitations to the assessment

9.4.46 This draft assessment of landscape and visual effects is subject to the following limitations:

- Desktop data: Landmap data is an inconsistent dataset and has not been recently updated. This assessment draws on the available Landmap data but principally relies for its assessments on project specific observations by the professional assessment team in the field.
- Public rights of way: A number of routes designated as public rights of way have proven to be un-signed and inaccessible in the field (either locked/gated or overgrown/impassable). Field assessment of these routes has not therefore been possible. This fact has been recorded in the assessment of visual effects on these routes (principally within Appendix 9.6). The assessment has generally concluded that routes which are not available for public use cannot be considered highly susceptible or valued and would not therefore be subject to significant visual effects. This assumption has not, however, significantly influenced routeing decisions.
- Seasonality and weather: Access in good clear weather conditions has not been possible in all instances. It is anticipated that the draft ES assessment may be supplemented by further site visits prior to the final assessment and submission of the DCO.

9.5 Baseline conditions

Introduction

- 9.5.1 This section of the landscape and visual chapter of the draft ES describes the landscape and visual baseline conditions against which the changes that will arise as a result of the Proposed Development have been assessed. The baseline date has been determined as prevailing landscape and visual conditions in Autumn 2014 (incorporating consideration of both winter and summer conditions during that year).
- 9.5.2 The description of baseline conditions along the approximately 28.6 km long route (comprising both overhead and underground sections) is divided into two principal sections comprising the landscape baseline (landscape elements (principally areas of woodland cover, tree groups, individual trees and hedgerows), character areas and designations) and the visual baseline (visual receptors comprising people in residential locations, using footpath routes, using roads and visiting other recreational and visitor destinations where their visual amenity may be important). The baseline landscape and visual conditions are generally described from south to north to reflect the required connection from the existing EE route at Llandyfaelog to the proposed wind farm substation at Brechfa West.
- 9.5.3 The assessment of the sensitivity of the landscape and visual baseline to the potential effects of the Proposed Development (both overhead and underground) is summarised later, principally in sections 9.6 and 9.7.

Landscape baseline conditions

Introduction

- 9.5.4 The description of baseline landscape conditions comprises:
- An initial general overview of the landscape along the route of the Proposed Development with reference to regional landscape character areas identified by the Landscape Character Map for Wales (derived from Landmap);
 - Identification and general description of landscape elements along the route

(principally woodlands, trees and hedgerows);

- Identification and description of the thirteen project landscape character areas (pLCAs) along the route; and
- Consideration of the one Special Landscape Area (SLA) designation on the route including reference to the relevant documentation that explains the reasons for its protection.

9.5.5 Figure 9.1 (maps 1 to 4) shows the route of the Proposed Development over an aerial photograph at a scale at which areas of woodland and trees are visible. Figure 9.2 (maps 1 to 4) then provides further description and analysis of baseline landscape conditions along the route by illustrating the topography; the principal areas of woodland cover; the extent of project landscape character areas (pLCAs); areas identified by Landmap as being of either high or outstanding landscape value (visual and sensory aspect); and the extent of the Special Landscape Area designated by CCC at the Towy valley.

Use of Landmap

- 9.5.6 Use of LANDMAP has been central to the initial desk based stage of the baseline study for the assessment. Visual and sensory aspect areas at level 3 were analysed in combination with SLA boundaries and field observations to define project Landscape Character Areas (pLCAs) (see Figure 1 of Appendix 9.2). Following the definition of pLCAs all five LANDMAP aspect areas were analysed to obtain an overview of the natural and cultural elements that make up the landscape character of each pLCA. Key information was taken from the aspect area descriptions based upon relevance to the Proposed Development in order to inform the landscape baseline description and, in turn, the assessments of landscape susceptibility and value.
- 9.5.7 Due to the nature of the Proposed Development the visual and sensory aspect areas were analysed in greatest detail, with consideration given to the overall evaluations of: scenic quality, integrity, character and rarity. In addition to these

key landscape characteristics, landscape pattern and scale, settlement patterns and qualities such as views, wildness, remoteness and tranquillity were also analysed.

9.5.8 Values were not generally noted for the geological, landscape habitat, historical and cultural aspect areas due to the complexity of combining multiple values for each area aspect area covered within the pLCA boundary. Due to the linear nature of the project, all of the pLCAs cross a number of aspect areas for each dataset (with the general exception of visual and sensory), therefore greatest weight was given to those aspect areas that cover the largest geographical area.

9.5.9 Geological data were considered in relation to landform and any special features that may be directly affected by the Proposed Development. Landscape habitats are covered by the ecological chapter of the environmental statement. However, aspect areas were considered in terms of the contribution they make to landscape character with relevant information extracted from the aspect area descriptions. The historical landscape is covered in more detail by the cultural heritage chapter of the environmental statement. Nevertheless, information from the aspect area descriptions was noted when relevant to the landscape and visual assessment of the Proposed Development. Cultural aspect areas were analysed and relevant information extracted in relation to the overall evaluation and key characteristics.

General landscape overview

9.5.10 The route of the Proposed Development passes through four regional landscape character areas identified by the Landscape Character Map for Wales prepared by the Countryside Council for Wales (now NRW) in 2008 based on Landmap:

- Between the southern connection point at Llandyfaelog and just east of Llangunnor (a distance of approximately 10 km) the route passes through the western fringes of the Gwendraeth Vales;
- The route then passes north across the Towy valley (a distance of approximately 5 km);

- The route then climbs gently north over an area of the Carmarthenshire Foothills to reach the vicinity of Alltwalis (a distance of approximately 11 km); and
- The final connection to the wind farm substation then heads east (a distance of approximately 3 km) through the fringes the Cambrian Mountains.

- 9.5.11 The southern Gwendraeth Vales section passes through an area of rolling, pastoral countryside generally within a topographical range of approximately 40 m to 140 m AOD. The countryside comprises a field pattern of irregular, medium sized fields and, although tree cover is generally quite limited, hedgerows along the network of small lanes that criss-cross the area create some enclosure. Settlement is generally sparse with dispersed small villages and farmsteads.
- 9.5.12 The Towy valley section comprises an area of flat, open, pastoral farmland at a general elevation of less than 10 m AOD and within between 1 and 2 kms of Carmarthen and Tre-gynwr to the west. The valley features a reasonably large and sometimes geometric field pattern with some dispersed tree cover and scattered farmsteads (often located on the slightly more elevated ground to the north and south of the river floodplain). The low-lying valley also accommodates important east-west road connections including the A40 (T) to the north of the river and the more local B4300 to the south. The flat valley floor is dramatically enclosed and contrasted by a series of distinct peaked hills, particularly on its northern side.
- 9.5.13 The Carmarthenshire Foothills landscape accommodates the link from the Towy valley northwards to the south western fringes of the Cambrian Mountains. Elevation rises from approximately 10 m AOD at the Towy valley up to approximately 200 m AOD in the vicinity of Alltwalis. This is a varied area with a mix of agricultural influences as well as the presence of a series of settlements (most notably Peniel, Rhydargaeau and Pontarsais) associated with the route of the A485. Land cover is varied with alternating areas of open and more wooded countryside.

- 9.5.14 The northern Cambrian Mountain landscape ranges in elevation from approximately 200 m AOD to a maximum of approximately 320 m AOD. This area comprises a mix of high open moorland, extensive areas of coniferous forestry as well as agricultural slopes and farmed river valleys. Settlement principally comprises frequent dispersed farmsteads on the valley sides and peripheral western slopes. This area has stronger associations with visitors and recreational pursuits including many promoted cycleways within the forests.
- 9.5.15 Further information regarding the landscape character of these four regional areas is provided in Appendix C of the scoping report. The information contained in Appendix C of the scoping report has also informed the more detailed baseline descriptions of project landscape character areas provided below and in Appendix 9.2 of this assessment.

Landscape elements (principally woodlands, trees and hedgerows)

- 9.5.16 The routeing process for the Proposed Development has sought to minimise its potential effects on landscape elements and where possible, balanced against a wide range of other environmental and technical considerations, has avoided areas of woodland, significant tree lines and high value trees. Nevertheless, the density and fine grain of landcover in Carmarthenshire means that some potential effects on landscape elements remain.
- 9.5.17 Appendix 9.1 provides a tabulated description and evaluation of the principal landscape elements located along the route of the Proposed Development and within each pLCA from south to north. These principally comprise areas of woodland, tree groups/lines, individual trees and (principally for the underground sections of the route) lengths of hedgerow. As well as general tree cover along largely open sections of the route Appendix 9.1 identifies eighteen 'key tree locations' (T1 to T18). These 'key tree locations' comprise the main bodies of tree cover in the vicinity of the proposed alignment identified using aerial photography. They were identified as potential 'key tree locations' from a landscape and visual perspective and may vary from those identified by the ecological assessment

contained in chapter 10 of the draft ES. Not all were subsequently assessed to comprise mature or high value trees, or to make a significant contribution to surrounding landscape character (i.e. some were subsequently identified by fieldwork as low in either stature or value). The location of these landscape elements can generally be seen on Figures 9.1 and 9.2 (maps 1 to 4). In addition, Appendix 9.1 contains a set of detailed plans (scale 1:2000 at A4) on which National Tree Map data showing the extent/spread and approximate height of trees along the route of the Proposed Development is shown over more detailed aerial photography. The plans also provide an indication of the topography in each area; show each pole number and height (including the 2 m vertical limit of deviation).

9.5.18 Baseline information contained in Appendix 9.1 regarding the presence, extent/scale and value of landscape elements along the route has been derived from the following sources:

- Aerial photography (the principal data source for the location and extent of tree cover);
- National Tree Map data (the principal data source for approximate height of trees);
- General site surveys by qualified landscape architects to determine the general landscape contribution and species make-up of the different elements; and
- More detailed (but nevertheless still quite general) surveys by qualified arborists to further assess the landscape value of the potentially affected trees in key locations.

9.5.19 As well as providing descriptive baseline information (extent, general height, maturity and species mix) Appendix 9.1 also contains an assessment of the value or importance of the various landscape elements along the route. Consideration of susceptibility to change is not meaningful in the context of landscape elements (i.e. the susceptibility of a tree to its removal is absolute). The assessment of the

effects of the Proposed Development on landscape elements is therefore substantially based on consideration of their landscape value. In this context consideration of landscape value is focused on the general amenity and landscape contribution of the elements identified rather than other factors such as their ecological value which is considered elsewhere (see chapter 10 of the draft ES).

9.5.20 The identification, description and evaluation of the landscape elements that are located along the route of the Proposed Development contained in Appendix 9.1 highlights the following:

- Vegetation cover tends to be relatively sparse along southern sections of the route with increasing frequency of woodlands and tree lines over the less intensely farmed landscape further north (i.e. within pLCAs 11, 12 and 13); and
- The avoidance of hedgerow trees by the route of the Proposed Development is largely achieved in southern sections of the route but there is an increasing presence of more heavily treed field boundaries further north.

9.5.21 The principal areas of more substantial and higher value trees and woodland identified along the route comprise the following (NB: these locations differ from those identified in the ecological assessment and some landscape and visual 'key tree locations' were identified during fieldwork as comprising lower value tree cover and are not included within this list). In some cases their importance and value reflects their proximity to accessible footpath and highway areas (e.g. T7 within pLCA6):

- The Nant Morlais woodland within pLCA1 (T1);
- Tree cover along the Nant Cwmffrwd woodland belt (T3), tree cover around Bwlchymynydd (T4) and at the A40 (T5) in pLCA4;
- Trees along the footpath route south of Pant at the boundary of pLCAs 5 and 6 (T7);

- Trees adjacent the minor road (Peniel Road) east of Uwchgwili at the southern end of pLCA9 (T10) and valley at Rhydfwyalchen (T11) also in pLCA9;
- Tree cover at Clyn Ceredig (T12) and pine stand at Blaengors (T13) in pLCA10;
- Tree cover within an extensive area of the Llanpumsaint basin at pLCA11 (T14);
- Tree cover in valley north of Penwaun in pLCA12 (T15);
- Trees on slopes south of Alltwalis in pLCA12 (T16 and T17); and
- Brechfa Forest in pLCA13 (T18).

Landscape character

9.5.22 The landscape through which the route of the Proposed Development passes has been divided into thirteen project landscape character areas (pLCAs). The extent of these pLCAs is shown on Figure 9.2 (maps 1 to 4). The delineation of the extent of the pLCAs used to assess the landscape character effects of the Proposed Development has principally been informed by Landmap visual and sensory aspect area boundaries combined with SLA boundaries and field observations along the specific route of the Proposed Development. The relationship between the extent of the thirteen pLCAs and Landmap visual and sensory aspect areas is shown by Figure 1 of Appendix 9.2. The delineation of the pLCAs has been reviewed and validated prior to this assessment by the independent landscape consultants jointly instructed by NRW and CCC.

9.5.23 Appendix 9.2 provides the detailed baseline description and analysis of the different pLCAs located along the route of the Proposed Development (for both the overhead and underground sections of the route). For each pLCA along the route a worksheet has been produced which brings together information from a number of different sources, principally:

- Contextual information from the Landscape Character Map for Wales;

- Detailed Landmap data for the relevant visual and sensory aspect area reviewed for its relevance to that part of the landscape through which the route of the Proposed Development would pass;
- Any Landmap data from other aspects that is pertinent to the assessment of the landscape and visual effects of the Proposed Development;
- Information regarding the Landmap evaluation of the area against a number of different criteria;
- Identification of whether the pLCA falls within an existing or proposed SLA;
- Landscape character observations derived from bespoke fieldwork; and
- Relevant information gleaned through the consultee and public consultation processes undertaken as part of the routeing process.

9.5.24 For each pLCA the information scheduled above has been combined by the assessors to reach an overall view regarding the key characteristics of the area and an understanding of the level of landscape value attributed (both through formal designation and as a result of consultations). In identifying key characteristics a focus has remained on those most likely to interact with the nature of the Proposed Development proposed (principally the introduction of an overhead line).

Landscape designations

9.5.25 There is one Special Landscape Area (SLA) designated by CCC that would be affected by the Proposed Development. This comprises:

- The Towy valley SLA (which coincides with pLCAs 5, 6, 7 and 8).

9.5.26 Amendments to the boundaries of the Towy Valley SLA are proposed as part of the review of the CCC Development Plan (currently in examination). Figure 9.2 (maps 1 to 4) shows both the existing designation (the CCC UDP of 2006) and the proposed boundary amendments (CCC LDP Deposit 2011). This assessment

focuses on the proposed new boundaries which are based on Landmap, are expected to be adopted shortly and which generally increase the extent of the designated area.

9.5.27 Appendix 9.3 provides a baseline description and analysis of the SLA that would be affected by the Proposed Development. Information regarding the SLA has been drawn from the following principal sources:

- Relevant CCC documentation (Special Landscape Areas, Carmarthenshire Local Development Plan, June 2011) which proposes the continued designation and associated boundary changes for each SLA. This document also provides a statement of value for each SLA which identifies the principal aspect of the landscape which designation seeks to protect;
- An overview of the landscape characteristics and evaluation for the relevant constituent pLCAs described in Appendix 9.2; and
- Observations in the field related to the specific parts of the SLA that would be potentially affected by the Proposed Development (the statement of value provided by CCC sometimes identifies general or location-specific matters that may not apply to that part of the SLA through which the Proposed Development would pass).

Visual baseline

Introduction

9.5.28 The description of baseline visual conditions comprises:

- A general overview of the topographical and landcover context that determines visual conditions along the route of the Proposed Development (provided below within this main chapter);
- Examination of the zone of theoretical visibility (ZTV) for the Proposed Development (Figure 9.3 maps 1 to 3) (although this graphic provides an expression of the potential effects of the Proposed Development, particularly

the extent of visual effects, it has also been used to help scope the visual receptors that have required assessment and for which descriptions of baseline visual conditions have been provided within Appendices 9.5 to 9.8) (provided below within this main chapter);

- A detailed baseline description of the available view from the agreed representative viewpoints along the route (included within the assessment sheet provided for each viewpoint in Appendix 9.4); and
- Detailed scheduling of the various visual receptors along the route (residents, footpath users, road users and other recreational and visitor locations) and baseline descriptions of the current views available to them (detailed assessment tables for these different categories of visual receptors are provided in Appendix 9.5 to 9.8).

9.5.29 Figure 9.4 (maps 1 to 4) describes the baseline visual conditions along the route of the Proposed Development including a topographical analysis of the landform, identification of principal areas of enclosing woodland and the location of the various representative viewpoints and individual visual receptor locations scheduled within Appendices 9.4 to 9.8.

General overview

9.5.30 Figure 9.4 (maps 1 to 4) provides a topographical analysis along the route of the Proposed Development describing variations in elevation and gradient. In general, northern sections of the route are more elevated and more frequently encounter areas of steeper gradient.

9.5.31 Dispersed vegetation throughout the route of the Proposed Development significantly influences the extent of potential visibility. Extent of tree cover is generally slightly higher to the north. However, even in the more open southern sections of the route dispersed vegetation and high hedgerows would significantly reduce the extent of the potential visibility of the proposed wooden pole structures.

Zone of Theoretical Visibility (ZTV)

- 9.5.32 A worst case ZTV of the Proposed Development has been produced based on the maximum vertical limit of deviation for each pole position. The extent of the ZTV is shown on Figure 9.3 (maps 1 to 3). The ZTV is based on bare earth topographical data and does not account for the screening effect of landcover. The ZTV extends to 3 km from the currently proposed alignment of the Proposed Development.
- 9.5.33 The following general observations can be made:
- The bare earth nature of the ZTV combined with the relatively low scale of the Proposed Development and extensive tree cover means that it considerably overstates the extent of actual visibility.

Representative viewpoints

- 9.5.34 Appendix 9.4 provides a schedule and baseline description of the 28 representative viewpoints along the route of the Proposed Development which have been agreed with CCC and NRW. Representative viewpoints are scheduled from south to north and, to assist legibility, listed within the pLCA that they fall. Representative viewpoint locations are shown on Figure 9.4 (maps 1 to 4). It should be noted that in some cases the selected viewpoints represent more than one potential category of visual receptors (e.g. both residents and road users in a particular location).
- 9.5.35 The panoramic baseline photographs provided by Figure 9.5 vps 1 to 28 and the description of the available view at each representative viewpoint location provided in Appendix 9.4 provide an introduction and overview to the prevailing visual conditions that exist in different locations along the route of the Proposed Development and within different pLCAs. They also provide a general understanding of the nature of the views that are available from the four specific categories of visual receptors considered below.

Residents

- 9.5.36 Appendix 9.5 provides a schedule and baseline description of views from residential locations along the route of the Proposed Development focusing on areas within 1 km of the proposed alignment. Those scheduled comprise a mix of settlements (S), groups of properties (G), individual properties (R) and known holiday accommodation is highlighted (H). Residential locations are scheduled from south to north and, to assist legibility, listed within the pLCA that they fall. Residential locations are shown on Figure 1 (maps 1 to 4) of Appendix 9.5.

Footpath users

- 9.5.37 Appendix 9.6 provides a schedule and baseline description of views from footpath routes along the route of the Proposed Development within 1 km of the proposed alignment. Footpaths are scheduled from south to north and, to assist legibility, listed within the pLCA that they principally fall. Footpath routes (included those which are locally promoted as named walks or trails) are annotated on Figure 9.4 (maps 1 to 4).

Road users

- 9.5.38 Appendix 9.7 provides a schedule and baseline description of views from highway routes along the route of the Proposed Development within 1 km of the proposed alignment. Roads are scheduled from south to north and, to assist legibility, listed within the pLCA that they principally fall. Highway routes can be identified on Figure 9.4 (maps 1 to 4).

Other recreational and visitor locations

- 9.5.39 Appendix 9.8 provides a schedule and baseline description of views from other recreational and tourist locations along the route of the Proposed Development including promoted cycle routes within 1 km of the proposed alignment. This schedule of miscellaneous additional visual receptor locations has been agreed in consultation with CCC and is intended to capture the visual effects on any receptor not already covered within Appendices 9.5 to 9.7. Locations are scheduled from

south to north and, to assist legibility, listed within the pLCA that they principally fall. The location of these additional visual receptors is shown on Figure 9.4 (maps 1 to 4).

Baseline conditions at the main and two satellite off-line construction compounds

- 9.5.40 Baseline conditions in these locations are identified as part of the assessment of construction phase landscape and visual effects contained in section 9.6.

Baseline conditions at New Lodge Substation, Burry Port

- 9.5.41 The upgrading works at Burry Port would take place in an area at and adjacent to the New Lodge substation. This is in an area of naturalised scrubby and juvenile wooded vegetation to the east of the town on the western fringes of Ashpits Pond Nature Reserve south of the A484. Access to the area is provided by a number of informal paths. The local landscape and the available views are characterised by the existing substation, a number of overhead power lines (steel towers) and a range of post industrial influences.

Cumulative baseline

- 9.5.42 Cumulative landscape and visual assessment requires that the effects of the Proposed Development are considered in the context of other relevant and reasonably foreseeable developments that are likely to take place nearby. The baseline for the cumulative assessment of the Proposed Development therefore comprises current conditions as modified by these foreseeable changes. Details of the approach to and scope of the cumulative assessment, including identification of the consented and proposed developments that have been added to current baseline conditions to determine the significance of potential cumulative landscape and visual effects, are provided in section 11 of this chapter.

The Proposed Development

Introduction

9.5.43 A full description of the Proposed Development is provided in chapter 2 of the draft ES including typical images of similar developments and associated construction operations. This section of this chapter provides a very brief overview of the main aspects of the Proposed Development that directly relate to its potential landscape and visual effects. It includes a summary of how the scheme parameters and both the horizontal and the vertical limits of deviation have been interpreted for the purposes of undertaking a worst case assessment of the likely landscape and visual effects of the Proposed Development.

General

9.5.44 The Proposed Development comprises three alternating sections of overhead and underground connection with a total length of approximately 28.6 kms. The section lengths divide as follows:

- An overhead section from Llandyfaelog to the south of the Towy valley of approximately 11.2 km in length and comprising 86 pole positions;
- An underground section across the Towy valley of approximately 3.4 km in length comprising a mix of horizontal directional drilling and open trench; and
- An overhead section from north of the Towy valley to the Brechfa West wind farm substation of approximately 14 km in length comprising 117 pole positions.

The overhead line

Pole heights

9.5.45 The landscape and visual assessment (including all visualisations) is based on a pole height range of 11.5m to 19m with the majority of poles proposed between 13m and 16.5m. These heights include the insulator arms and the additional 2m vertical limit of deviation. Only five out of 203 proposed poles exceed a height of 16.5 m (poles 82, 89, 99, 117 and 163).

Vegetation clearance assumptions

- 9.5.46 The landscape and visual assessment of overhead sections of the route takes account of a total 25 m horizontal limit of deviation assumed as located equally (12.5 m) on either side of the proposed alignment shown on plans and visualisations. Although currently proposed to be located along the shown alignment, the final alignment of the overhead line may fall elsewhere within this zone where particular technical requirements arise. Either side of the final alignment of the overhead line trees with the potential to adversely affect the operation of the line would be removed, branches lopped or overall crown height reduced. The extent of the clearance and other works required would be determined by WPD on a case by case basis based on topple distance, tree health and topography. As an absolute worst case, an area of up to 50 m in width would require clearance (this worst case outcome would only be associated with areas of mature, high coniferous plantation forest where adjacent existing tree cover may reach a height of 25 m). This clearance zone of 50 m has been agreed with NRW. However, some additional areas of clearance may become necessary where there is a potential for ‘wind-throw’ (no such locations have been identified to date and this assessment currently excludes any such tree removal).
- 9.5.47 The implications of the requirements set out above mean that any tree with a stem located within approximately 37.5 m of the currently proposed alignment of the Proposed Development could potentially be affected. This maximum area of potential effect is indicated along the route by the outer dotted line shown on Figure 1 within Appendix 9.1 and identifies trees subject to some degree of risk. However, the landscape and visual assessment has been based on the following pragmatic approach to identify the likely worst case effects of the Proposed Development on existing trees:
- It has been assumed that trees located within their own current height of the proposed alignment may be felled, lopped or crown-reduced (tree heights have been determined using the National Tree Map dataset); and
 - Where variations of alignment within the horizontal limit of deviation would

make a significant difference to the quantity and value of required tree removal and the significance of any effect (based on the assumption stated above) this is (i) highlighted within the assessment and (ii) in some instance presumed limitations on the limit of deviation have been identified as the basis of the assessment (i.e. the assessment identifies nearby trees that it has been assumed that the Proposed Development would successfully avoid an effect upon).

Pole types

9.5.48 The overhead line would comprise approximately 203 pole positions. These divide approximately as follows:

Llandyfaelog to south of the Towy valley (86 pole positions):

- 78 single poles;
- 6 double H poles (approximately 2 m apart);
- One double H terminal pole (at the connection with the EE route); and
- One four-pole terminal pole (approximately 2 m apart) (at the interface between the underground and overhead sections south of the Towy valley).

North of the Towy valley to the Brechfa West substation (117 pole positions):

- 90 single poles;
- 25 double H poles (approximately 2 m apart);
- Two four-pole terminals (approximately 2 m apart) (at the interface between the underground and overhead sections north of the Towy valley and at the Brechfa West sub-station).

9.5.49 The poles would carry three wires with one of these three incorporating a fibre optic cable (there would be no discernible difference in the appearance of each of the three lines).

Terminal poles

- 9.5.50 Terminal poles would be located at the interface between the overhead and underground sections of the route, at the southern connection to the EE route and at the Brechfa West substation. They would comprise either two or four poles. There is no requirement for fencing around the terminal poles. A typical image is provided in Chapter 2 of the draft ES.

Angle poles

- 9.5.51 Angle poles would be located where the route of the overhead line changes direction. They would typically comprise either a single or twin wooden pole with additional cable stays dependent on the angle of change in direction and the topographical characteristics of their position. Typical images are provided in Chapter 2 of the draft ES.

'Inters'

- 9.5.52 Poles between the angle or terminal poles would generally not require cable stays unless the topographical characteristics of their position demanded. Poles would generally be positioned at a typical distance apart within the range of 100m to 130m.

Access

- 9.5.53 Access for construction would typically use existing tracks and field access points. Any tree or hedgerow removal required to enable construction access has been highlighted but is anticipated to be minimal.

Winch positions

- 9.5.54 Winch positions are required along the route of the overhead line. These are located largely on-line but would lie adjacent to the route at angle positions. Details are provided in Chapter 2 of the draft ES.

Underground trenching

9.5.55 Underground trenching would typically require a clear working area of 16 m width plus a 2 m limit of deviation giving a total assessment width of up to 20 m. Some short sections of reduction in this working width is feasible in specific locations (e.g. to minimise the length of an affected important hedgerow the working width will be reduced to approximately 8 m).

9.5.56 The trench would be dug to a depth of 1.5 m with a width at ground level of 1.5 m.

Horizontal directional drilling

9.5.57 Horizontal directional drilling would require a working compound at each end of the drill section. The launch compounds would be approximately 30 m by 30 m and the exit compound approximately 10 m by 10 m. The location and extent of these directional drilling compounds is shown on Figures 9.1 to 9.3. Full details are provided in Chapter 2 of the draft ES.

9.5.58 The drill section would comprise a typical diameter of approximately 450 mm and would generally be at a depth of between 10 and 18 m (i.e. below the level at which effects on tree roots would occur).

Existing WPD assets

9.5.59 The installation of the Proposed Development will require some works to existing WPD assets where its route crosses existing overhead low voltage lines. Details of these works have yet to be agreed and have not been fully assessed within this landscape and visual draft ES chapter. In some instances the current design of the Proposed Development will be amended to adequately oversail these assets and appropriate minor amendments to the landscape and visual assessment will be made in due course. Any increase in pole heights however is unlikely to be significant and, were a significant increase in height be required in a sensitive location, the option of undergrounding the existing asset is likely to be chosen. Amendments to the assessment of construction phase visual effects will be undertaken in due course where short sections of existing low voltage overhead line in the vicinity of the Proposed Development will be placed underground.

Nevertheless, it can be broadly stated that works to existing WPD assets crossed by the Proposed Development are likely to result in a reduction in the current landscape and visual effect of these assets and are not likely to increase the operational phase effects of the Proposed Development identified within this chapter.

Central and other construction compounds

- 9.5.60 A central construction compound for the connection will be located at the county showground off the A40 to the west of Carmarthen (approximately 5 km away from the closest part of the scheme). There will be two other satellite compounds. One will be located within Brechfa Forest. The other location is still to be confirmed but will be associated with the undergrounding section.
- 9.5.61 It should be noted that these three main and satellite ‘off-line construction compounds’ are in addition to the smaller on-line compounds that will be required at either end of sections of directional drilling.

9.6 Construction phase effects

Introduction

- 9.6.1 In accordance with the SoS’s scoping opinion, the landscape and visual effects of the Proposed Development during construction of both the overhead and underground sections of the route have been considered within the detailed assessments contained in Appendices 9.1 to 9.8. It nevertheless remains the case that, putting aside the three off-line construction compounds that will be required, the on-line visual effects of constructing the overhead sections of the Proposed Development would be very limited due to the small scale of the equipment and activities required and to the short duration of the construction works within any individual location along the route. The on-line construction phase visual effects of the overhead sections of the Proposed Development are therefore considered only briefly for each of the viewpoints and visual receptors scheduled within Appendices 9.4 to 9.8. These assessments have concluded that

there is no visual receptor along the route of the Proposed Development (resident, footpath user, road user or other recreational or visitor location) that will experience a highly significant (major) or significant (moderate) visual effect as a result of the construction of an overhead section of the Proposed Development. A separate assessment is provided later of any visual effects that may arise specifically in relation to the three proposed off-line construction compounds.

9.6.2 The following construction phase landscape and visual effects of the Proposed Development have been identified as having greater potential to result in significant effects. They form the focus of the construction phase landscape and visual assessment and, in most cases, have been considered in detail within Appendices 9.1 to 9.8:

- The construction phase landscape and visual effects of the three temporary off-line construction compounds that would remain *in situ* for up to the full approximately nine month duration of the connection works (eight month construction plus one month reinstatement). The two smaller compounds, however, are more likely to be used for an approximate duration of three months. These effects are assessed below within this main chapter because Appendices 9.1 to 9.8 focus on the on-line landscape and visual receptors (for the avoidance of doubt, the effects of smaller on-line compounds associated with sections of directional drilling are included within the on-line assessments contained in Appendices 9.1 to 9.8).
- Any additional construction phase visual effects associated with undergrounding some existing WPD assets crossed by the Proposed Development. The extent of these works, however, is yet to be determined;
- The construction phase effects of both the underground and overhead sections of the Proposed Development on landscape elements along the route (principally woodlands, trees and hedgerows) – this is principally considered within Appendix 9.1;
- The visual effects of the construction phase for underground sections of the

Proposed Development – this is considered for the various representative viewpoints and visual receptors located close to the underground sections of the route in Appendices 9.4 to 9.8 (i.e. principally those visual receptors listed as being located within pLCAs 7 and 8 which coincide with the approximately 3.4 km length of underground cabling proposed across the Towy valley).

Construction phase landscape and visual effects associated with the three proposed off-line construction compounds

Introduction

- 9.6.3 Three temporary construction compounds are proposed. The detailed assessment of the landscape and visual effects of these compounds is not covered in Appendices 9.1 to 9.8. None of the agreed representative viewpoints is located at these off-line construction compounds (the level of anticipated effects and the limited duration of the works suggest that representative viewpoint coverage is not required).
- 9.6.4 The main central construction compound will be located at the county showground off the A40 to the west of Carmarthen (a distance of approximately 5 km from the closest part of the connection route – the underground cabling section at the Towy valley). One satellite compound would be located within Brechfa Forest. One additional smaller off-line satellite compound will be required but its location has yet to be determined.

General assessment factors

- 9.6.5 The duration of the presence of the construction compounds would be a maximum of approximately nine months anticipated to last from August 2016 to April 2017 (the main construction compound off the A40 is anticipated to operate for up to nine months with the two smaller compounds and directional drilling locations generally for no longer than three months). It is noted that the overall construction period is largely during a winter period.

Landscape effects identified – central construction compound

- 9.6.6 The site is located in an area of mixed landcover which, although predominantly agricultural, features some large scale urban features. The site is directly adjacent to the A40 road on its northern boundary and to the east is a large agricultural showground which includes an open area of land consisting of grassland, large car parks, and a small number of metallic agricultural buildings. There are also some large scale electrical infrastructure features such as a sub-station, located 0.5 km east; a double line of large-scale pylons, which pass through the substation at their nearest point to the site.
- 9.6.7 The site is located within the Lower Taf and Cywyn Valleys Visual and Sensory Aspect Area. This area is summarised as having an Overall Evaluation of Moderate. A specific reference is made to the Integrity of the area: *“Integrity is considered to be moderate as the landscape is interrupted in several places - e.g. the A40 and the new mart, and show ground.”*
- 9.6.8 The site is located adjacent to a major highway (the A40) in a location accustomed to housing temporary features and activities (the agricultural showground) which suggests low susceptibility to the type of change proposed. The site does not fall within a designated or otherwise valued landscape which denotes low landscape value. The degree of landscape change within this robust landscape context would be low. The extent of the compound within this large scale robust landscape context would be perceived as very localised. The duration of the temporary activities and features would be limited to nine months – short/temporary. All effects would be fully reversible. Taking account of all of these considerations, the effects of the temporary central construction compound on local landscape character would be minor and not significant.
- 9.6.9 Measures would be incorporated to ensure that the appearance of the compound within the surrounding landscape context would be consistent with good construction practice. No special additional mitigation of landscape effects would be required particularly given the relatively robust landscape context.

Landscape effects identified – two other construction compounds

- 9.6.10 The satellite construction compound proposed south of pole 191 within Brechfa Forest and within pLCA13 would be located within an existing forest clearing. It is not anticipated that any additional forest clearance would be required. This, combined with the visually enclosed location, would ensure that the construction phase landscape effects of this satellite compound would be negligible over the likely three month duration of the works.
- 9.6.11 The location of the second additional smaller temporary construction compound is yet to be determined but is likely to be associated with the undergrounding works in the Towy valley.

Visual effects identified – central construction compound

- 9.6.12 The site is located within a flat plain, through which the A40 passes in an east-west direction. The site is enclosed by low hills, approximately 0.4 km to the north and 1.0 km to the south, defining the visual envelope.
- 9.6.13 The landscape immediately surrounding the site, i.e. within an approximate 1.0 km radius, is well wooded, which further limits views of the site from the surrounding area. There are blocks of woodland scattered throughout the landscape, some of which are large in scale, and roads and field boundaries are defined by mature hedgerow and hedgerow trees. An agricultural showground is located adjacent to the eastern and southern boundaries of the site. This is an open area of land which includes large car parks, and a small number of metallic agricultural buildings. Aside from the showground, there are prominent additional built features in the immediate vicinity of the site, including: the A40 dual carriageway road directly adjacent to the northern boundary; a sub-station, located 0.5 km east; a double line of large-scale pylons, which pass through the substation at their nearest point to the site; and a petrol station within 0.25 km of the site.
- 9.6.14 There are a limited number of visual receptors identified within the vicinity of the site, and there are no landscape designations identified which would suggest any

notable value to views. The nearest receptor to the site is the A40 dual carriageway, which is directly adjacent to its northern boundary. This is a high speed road (national speed limit) and receptors are considered to be of low susceptibility to the types of changes proposed. The nearest residential receptors are: a farmhouse located 0.4 km north of the site, which is of high susceptibility to change, but has views of the site screened by intervening landform; and a farmhouse located 0.6 km west of the site, which is of high susceptibility to change, but has views of the site screened by intervening vegetation on field boundaries.

- 9.6.15 The main construction compound adjacent to the A40 would be in use during winter months and would require lighting. Given its proximity to a major highway route with high levels of traffic (this section of the A40 is not lit); its urban fringe location; and the distance to the closest residential properties; it is considered that the temporary visual effects of the construction compound lighting would be minor and not significant.
- 9.6.16 In summary, it is anticipated that there will not be any significant visual effects due to the proposed construction compound. This is a site which is enclosed by surrounding landform undulations and woodland cover. There are few visual receptors identified and the closest visual receptor identified, the A40 road is considered to be of low susceptibility to change and would experience a low degree of visual change. There are a small number of residential receptors identified, the closest of which is 0.4 km from the site, and which are of high susceptibility to change. However, given the limited scale of the proposed development and the presence of existing visual detractors such as pylons and the A40 road, there will be a low degree of change to their view. The effects identified would be temporary and fully reversible.
- 9.6.17 Measures would be incorporated to ensure that the appearance of the compound would be consistent with good construction practice. No special additional mitigation of visual effects would be required particularly given the limited number of receptors identified.

Visual effects identified – other construction compounds

- 9.6.18 The satellite construction compound proposed south of pole 191 within Brechfa Forest would be located within an existing forest clearing. The visually enclosed location and absence of nearby visual receptors would ensure that the construction phase visual effects of this satellite compound would be negligible over the likely three month duration of the works. Some visibility may occur for pedestrian users of forest tracks but the effect upon them would be minor and not significant.
- 9.6.19 The location of the other off-line construction compound has yet to be determined. Its scale and the temporary duration of the works suggest however that any construction phase visual effects would be minor and not significant.

Construction phase landscape and visual effects associated with upgrading works at New Lodge, Burry Port

Introduction

- 9.6.20 The upgrading works at Burry Port would take place in an area at and adjacent to the New Lodge substation. This is in an area of naturalised scrubby and juvenile wooded vegetation to the east of the town on the western fringes of Ashpits Pond Nature Reserve south of the A484. Access to the area is provided by the provision of a number of informal paths. The landscape character of the area and the available views feature the existing substation, a number of overhead power lines (steel towers) and a range of post industrial influences.

Effects

- 9.6.21 The proposed upgrading works would be limited in scale and extent and would be substantially confined to areas enclosed by the scrubby and juvenile woodland. Underground cabling would largely follow the existing tracks through this juvenile woodland and additional elements (additional equipment within an existing substation enclosure and sealing end platforms appended to the lower part of towers surrounded at similar height by tree cover) would be constructed in areas

of low landscape susceptibility and value. Visibility would be limited to users of footpaths within the nature reserve. The construction phase landscape and visual effects of the upgrading works at New Lodge substation, Burry Port would be minor and not significant.

The additional construction phase landscape and visual effects associated with undergrounding of existing WPD assets crossed by the Proposed Development

- 9.6.22 The assessment of the construction phase visual effects of undergrounding some existing WPD assets is not yet covered in Appendices 9.5 to 9.8. The design of these changes has yet to be determined. It is nevertheless anticipated that any additional construction phase landscape and visual effects to those already identified within this chapter would be minor and not significant.

The effects during construction on landscape elements (principally woodlands, trees and hedgerows)

Introduction

- 9.6.23 Appendix 9.1 provides a detailed assessment table which describes the effects of the Proposed Development on specific landscape elements along the route. The landscape elements principally comprise woodlands, trees and hedgerows. Its main purpose is to provide clear information regarding the quantity and landscape value of the vegetation that would potentially be removed along the route as a consequence of the Proposed Development. This initial assessment within Appendix 9.1 focuses on the intrinsic landscape value/amenity importance of the elements to be removed. A general summary of the significance of the effect on landscape elements within each pLCA is then provided (based simply on a quantification of the extent and value of the trees likely to be affected and excluding, at this stage, their wider contribution to landscape character). These conclusions then inform the assessments of operational phase effects on landscape character and on landscape designations provided in Appendices 9.2 and 9.3 and summarised later within this chapter.

Effects identified

- 9.6.24 The detailed assessment table provided in Appendix 9.1 summarises the effects on landscape elements within the thirteen pLCAs through which the route would pass. As well as a brief summary consideration of the largely open sections of the route (identified by the relevant pole numbering), the table contains more detailed consideration of eighteen ‘key tree areas’ comprising areas of woodland, boundary tree belts or more substantial tree groups along the alignment (T1 to T18). These key tree areas are those that it was not possible for the iterative route alignment process to avoid entirely and they have been the principal focus of the more detailed assessment work carried out in the field by both landscape and arboricultural assessors.
- 9.6.25 WPD’s approach to clearance would be informed by *The Energy Networks Association – Vegetation Management Near Electricity Equipment – Principles of Good Practice, Engineering Technical Report 136 (June 2007)* which sets out a number of mitigation guidelines for vegetation management including the following which are relevant to the proposed route:
- The aim of pruning is to achieve clearances in ways which minimise the aesthetic and physical impact on retained trees and shrubs;
 - Work should comply with BS3998: Recommendations for tree work (as amended);
 - Tree selection for retention should occur at an early stage. Good practice involves interventions over a number of cutting cycles trees and shrubs so that conflict with the OHL is minimised;
 - If pruning options are likely to severely reduce or unbalance a tree then coppicing, or felling and replacement planting is a better option.
- 9.6.26 The detailed assessment table contained in Appendix 9.1 identifies that the more substantial and potentially significant effects on landscape elements are likely to occur at the following locations and within the following pLCAs (the locations listed

generally relate to overhead sections of the route with very little loss or change to vegetation likely to arise as a result of underground sections of the Proposed Development within pLCAs 6 to 9). The assessment assumes that the Proposed Development would adhere to the alignment shown. With the exception of those locations stated later, realignment within the horizontal limit of deviation would not result in a significantly different level of effect elsewhere along the route:

pLCA1: Nant Morlais West of Llandyfaelog:

- Tree removal at Nant Morlais Woodland (T1); and
- Potential effects on the woodland edge in the vicinity of poles 8 to 10 (this should be avoidable if the northern area of the horizontal limit of deviation is not used).

pLCA9: West of Peniel:

- Trees adjacent Peniel Road (T10) (this tree loss is associated with the final northernmost underground section close to terminal pole 87 and may benefit from future design review).

pLCA10: Llanpumsaint Hills west of Rhydargaeau:

- Pine stand (T13) (the ecological value of adjacent damp grassland has led to the selection of a route that would require the felling of some of these visually prominent trees).

pLCA11: Llanpumsaint basin

- General tree cover (T14).

pLCA13: Brechfa Forest West:

- Brechfa Forest (T18). Removal of a large area of forestry.

9.6.27 Additional effects could arise in the following locations were the route to be realigned within the 25 m limit of deviation:

- pLCA 1 (T1);
- pLCA 6 (T7);
- pLCA 9 (T10, T11);
- pLCA 10 (T12); and
- pLCA 12 (T17).

9.6.28 These more substantial and potentially significant effects of the overhead sections of the Proposed Development on landscape elements were identified as unavoidable by the routeing study. This has been reviewed, and this draft ES assessment has concluded that further reduction of effects on landscape elements is not practicable through further route refinement.

9.6.29 Generally these more substantial and potentially significant effects on landscape elements are associated with the overhead sections of the Proposed Development. There is, however, one avoidable area of tree removal associated with the short northern underground section of the Proposed Development located at the southern end of pLCA9 (T10 - trees adjacent Peniel Road east of Uwchgwilli close to terminal pole 87). This will be reviewed as part of future iterations of the design prior to the DCO application.

Conclusion

9.6.30 The detailed assessment contained in Appendix 9.1 has concluded that in purely arboricultural terms the effects on landscape elements would not be significant at any key tree location or across any of the thirteen pLCAs along the route. The implications of these and other effects on landscape elements for wider landscape character and value are therefore considered later as part of the overall assessment of the operational phase effects of the Proposed Development on landscape character and designations (detail contained in Appendices 9.2 and 9.3).

The visual effects of the construction phase in the vicinity of underground

sections of the route

Introduction

9.6.31 Appendices 9.5 to 9.8 include an assessment of the significance of the visual effects of the construction of underground sections of the Proposed Development on a range of surrounding visual receptors. These visual receptors comprise residents, footpaths users, road users and people visiting other recreational or tourist locations in the vicinity of proposed underground sections of the route. They are located principally within pLCAs 7 and 8 which coincide with the approximately 3.4 km length of underground cabling proposed across the Towy valley with short additional lengths within the northernmost part of pLCA6 and southernmost part of pLCA9. The assessments of the significance of the visual effects on these specific visual receptors are supported by the assessment in Appendix 9.4 of the degree of visual change that would occur at those selected representative viewpoints that are located in the vicinity of underground sections of the route.

The representative viewpoint assessment

9.6.32 Representative viewpoints 11 to 17 in Appendix 9.4 are located in the vicinity of the underground section of the Proposed Development principally within pLCAs 7 and 8 at the Towy valley. In particular, viewpoints 11 and 12 are located relatively close to proposed directional drilling compounds. The location of the underground section of the Proposed Development and associated directional drilling compounds is annotated on Figures 9.5 vps 11 to 16. The detailed assessments contained in Appendix 9.4 highlight the following overarching observations regarding the degree of visual change that is predicted to occur in these locations during the construction of the underground sections of the Proposed Development:

- The landscape of the Towy valley floor is relatively open in character meaning that both the directional drilling and open trench construction activities would be visible from a number of surrounding properties, footpaths and roads;

- There are relatively few residential properties located close to the alignment of the proposed undergrounding works; and
- The directional drilling compounds are likely to be the most visually prominent aspect of the construction operations and, in particular, would be noticeable to users of the B4300 road to the south of the Towy valley close to the course of the river.

General assessment factors

9.6.33 The assessment of the significance of the visual effects of the underground sections of development during the construction phase takes account of all of the assessment considerations set out within the assessment methodology provided in section 4 of this chapter. In the context of this assessment the following general observations apply to all of the receptors and viewpoints considered:

- *Susceptibility* – in the context of construction phase visual effects the assessment places greatest weight on the category of visual receptor (e.g. resident, footpath users etc.). This is because the temporary nature of construction phase visual effects would affect different categories of visual receptor in different ways (i.e. residents would spend the greatest amount of time in the vicinity of the construction activity with limited choice available to them, whereas footpath and road users are likely to be able to adopt different routes during the temporary construction period should they wish).
- *Value* - the value attached to particular views has been given less weight in this assessment of the visibility and potential visual intrusiveness of temporary construction activity (open trenching and directional drilling activity) due to the temporary nature and reversibility of the effect.
- *Degree of change* - this criterion applies and includes consideration of the extent of the available view that would be affected during construction. The detailed assessment tables within Appendices 9.4 to 9.8 categorise the degree of change for different receptors and viewpoints as high, medium or low.

- *Extent* – in the assessment of an individual visual receptor this criterion does not apply (i.e. the criterion refers to the extent over which visual changes will be experienced by receptors in general rather than the extent of the construction works within a particular view (which is considered under the degree of change criterion);
- *Duration* – the duration of the underground cabling construction works likely to be visible from receptor locations is anticipated to be approximately six months. This is also anticipated to occur over a winter period from approximately September 2016 to February 2017.
- *Reversibility* – the visual effect of the temporary construction activity is deemed fully reversible for all of the visual receptors considered in Appendices 9.4 to 9.8. The longer lasting visual effects of any vegetation removed during the construction phase, permanent or longer lasting groundcover scarring or permanent changes in the view are considered later in the context of the operational phase landscape and visual effects of underground sections of the Proposed Development.

Effects identified

9.6.34 The detailed assessment of individual visual receptors provided in Appendices 9.5 to 9.8 identify a medium or high degree of visual change, albeit temporary, specifically associated with the construction of underground sections of the Proposed Development for the following visual receptors (visual receptors are listed from south to north along the underground section of the Proposed Development across the Towy valley):

- Users of FP26 within pLCA6.
- Users of FP31 PRoW Llangunnor 32 / Towy Trail and FP32 PRoW Carmarthen Town 26 / Towy Trail along the river Gwili within the open Towy valley floor in pLCA7;
- Users of FP36 PRoW Abergwili 1/ Towy Trail and FP42 PRoW Abergwili

7/Celtic Way west of Abergwili in PLCA8.

- Some residents on the western side of the river at Abergwili Bridge (those in peripheral areas with open views towards the course of the river) (notably G86 Stornaway , Penybont Farm, and residential properties on Cnwc y Gwili);
- Some residents on the eastern side of the river at Abergwili Bridge (those in peripheral areas with open views towards the course of the river) – G87;
- Users of a footpath just off the A485 just north of Glangwili Bridge (a signposted route) FP42 – limited effect at western end only;
- A single residential property adjacent to the A485 north of Glangwili Bridge (R96 – Frondeg - this property is located approximately 10m from the proposed underground route which follows the northern verge of the highway); and
- Users of a short footpath south east of Uwchgwili (FP44) – limited effect at northern end only close to terminal pole 87.

9.6.35 The detailed assessments suggest that the degree of visual change during the construction of the underground section of the Proposed Development at Bryn Towy (an elevated property between Pant and Llangunnor) and for users of the A40 would be low.

9.6.36 No significant construction phase visual effects have been identified in Appendix 9.7 (for road users) or 9.8 (for other recreational and visitor locations).

9.6.37 These assessments are supported by the degree of visual change identified during the construction phase at representative viewpoints 11 to 17 in Appendix 9.4 (all locations assessed as subject to a low or medium degree of visual change with no locations subject to a high degree of visual change).

Conclusions

9.6.38 Given the temporary nature of the construction activities (a maximum of nine

months and generally likely to be limited to periods of no more than three months for the smaller compounds and individual directional drilling locations), the distance from the line of most receptors and the limited extent of the works (whether the width of the open trenching working area or the size of the directional drilling compounds), the most significant (moderate) construction phase visual effect identified is that at the property adjacent to the A485 (R96 Frondeg) which is located in a slightly elevated position within approximately 10m of a section of open trenching proposed along the northern highway verge. Despite the proximity of this property to a section of proposed open trenching, the significance of the temporary visual effect here would be moderated by the main orientation of the building (the principal front and rear facades face along the road with a side of the property with relatively few and smaller windows facing the verge within which the closest operations would occur) and the presence of some tree cover and a reasonably substantial hedgerow providing a degree of visual separation.

9.6.39 Of the remaining visual receptors listed above:

- The temporary construction phase effects on all road users are not considered to be minor and not significant;
- Effects on footpath users at Pant, Glangwili Bridge and Uwchgwili are considered insufficiently extensive to be significant (routes at Glangwili Bridge and Uwchgwili are also local links that do not play an important connective role within the wider footpath network); and
- Properties at Abergwili Bridge are considered sufficiently distant for the temporary visual effect to be minor and not significant.

9.6.40 It is therefore concluded that the significant (moderate), albeit temporary, visual effects of constructing the underground section of the route across the Towy valley would be limited to Frondeg (R96) and to users of the footpath along the river Gwili south of Abergwili Bridge (the southern section of FP32 within the open flat valley floor of the Towy).

9.6.41 Significant (moderate) residual visual effects would temporarily occur on the stated visual receptors. The effects, however, would be limited to a maximum duration of approximately nine months (with the likelihood that the duration would be no greater than three months in any individual location) and are anticipated to often occur over a largely winter period. The proposed alignment and approach to construction has been reviewed in each case to ensure that no further reductions in the temporary but significant (moderate) visual effects identified are necessary and practicable. The footpath at the river Gwili is on the opposite side of the river to the proposed trenching works.

9.7 Operational phase effects

Introduction

9.7.1 The following operational phase effects of the Proposed Development have been assessed. In assessing operational phase effects the overhead sections of the Proposed Development have been assumed to be a permanent feature that will not be decommissioned and removed within a foreseeable timeframe:

- The operational phase landscape and visual effects of the upgrading works at New Lodge, Burry Port – assessed below;
- The operational phase landscape and visual effects of undergrounding existing WPD assets crossed by the Proposed Development – assessed below;
- The operational phase effects of the overhead sections of the Proposed Development on landscape character (including the longer lasting implications for landscape character of vegetation removed during construction and ongoing vegetation management around the overhead line) – assessed in detail in Appendix 9.2;
- The operational phase effects of the underground sections of the Proposed Development on landscape character (this assessment is brief and is limited to any longer lasting constraints that underground sections of the route would

have for the reestablishment and management of vegetation within various character areas) – assessed briefly within this main chapter with reference to Appendix 9.2;

- The combined operational phase effects of both overhead and underground sections of the Proposed Development for the character, integrity and value of landscape designations (SLAs) – assessed in detail in Appendix 9.3; and
- The operational phase visual effects of both the underground and overhead sections of the Proposed Development – assessed in detail in Appendices 9.4 to 9.8. This assessment is supplemented for the closest and most affected residential properties by a subsequent assessment of whether an unacceptable effect on residential visual amenity might occur.

The operational phase landscape and visual effects of upgrading works at New Lodge, Burry Port

9.7.2 The upgrading works at New Lodge, Burry Port would be limited in scale and extent and would be substantially confined to areas enclosed by scrubby and juvenile woodland. The additional equipment within an existing substation enclosure and sealing end platforms appended to the lower part of towers surrounded at similar height by existing tree cover would be located in areas of low landscape susceptibility and value. Visibility would be limited to users of footpaths within the nature reserve. Their combined sensitivity here is considered to be medium to low due to the post industrial and urban fringe setting. The degree of change in the appearance of existing features would be low. The works would lead to very limited landscape change. The new overhead span would be short, would be absorbed by surrounding elements of a similar appearance and balanced by the removal of conductor wires elsewhere. The operational phase landscape and visual effects of the upgrading works at Burry Port would be minor and not significant.

The operational phase landscape and visual effects of undergrounding existing WPD assets crossed by the Proposed Development

- 9.7.3 The assessment of the operational phase landscape and visual effects of undergrounding some existing WPD assets is not yet covered in Appendices 9.1 to 9.8. The design of these changes has yet to be determined. It is nevertheless anticipated that any additional operational phase landscape and visual effects to those already identified within this draft ES chapter would be minor and not significant.

The operational phase effects of overhead sections of the route on landscape character

Introduction

- 9.7.4 Appendix 9.2 provides the detailed assessment of the operational effects of the overhead sections of the Proposed Development on the eleven pLCAs identified along the overhead sections of the route. These comprise pLCAs 1 to 6 to the south of the Towy valley and pLCAs 9 to 13 to the north of the Towy valley.
- 9.7.5 A short section of the Proposed Development at the southern end of pLCA9 is also proposed to be placed underground. This is to ensure that the transition from underground to overhead would occur in a visually discreet location avoiding nearby areas of challenging topography at the precise interface between pLCA8 and 9. It is not indicative of this southern section of pLCA9 having been identified as generally displaying a high level of susceptibility and value consistent with adjacent areas of the Towy valley SLA in pLCA8 to the south. A similar situation occurs within a very short underground section at the northern end of pLCA6.
- 9.7.6 The detailed assessments in Appendix 9.2 take the form of a worksheet for each pLCA. They draw on the conclusions of the assessments of effects on landscape elements contained in Appendix 9.1 and also inform the assessment of effects on landscape designations contained in Appendix 9.3. The assessment of the significance of the operational phase landscape character effects contained in Appendix 9.2 combines consideration of the following aspects of the overhead sections of the route:

- The permanent effects on landscape character that would arise as a result of the introduction into the landscape of the new overhead line infrastructure (comprising terminal poles, angle poles, inters, cable stays, insulators and conductor wires);
- The continuing effects on landscape character that would be caused by vegetation removed during construction (woodlands, trees and any hedgerows that would not be replaced) (see Appendix 9.1); and
- Any ongoing landscape management requirements along the route that might constrain the re-establishment of any vegetation cut back or limit the long term future growth of surrounding trees (i.e. vegetation management to maintain required clearance standards for a 132kV overhead line).

9.7.7 The reader is reminded that the decision to place the Proposed Development overhead within pLCAs 1 to 6 and 9 to 13 was predicated on a preliminary assessment of the likely residual landscape and visual effects of an overhead development which was undertaken as part of the iterative route selection process. The landscape character susceptibility and landscape value in each of these eleven pLCAs had therefore already been identified as lower than elsewhere along the route and effects already identified as unlikely to result in serious landscape and visual concerns under terms set out in EN5.

General assessment factors

9.7.8 The assessment of the significance of the landscape character effects of the overhead sections of the Proposed Development during the operational phase takes account of all of the assessment considerations set out within the assessment methodology provided in section 4 of this chapter. In the context of this assessment the following general observations apply to all of the pLCAs considered:

- *Susceptibility* – Appendix 9.2 contains a detailed assessment of the susceptibility of the key characteristics of each pLCA to the likely effects of the

introduction of an overhead line. This assessment of the ‘fit’ between the present character of the landscape and the nature of the Proposed Development lies at the heart of the assessment of landscape character effects. The susceptibility of each pLCA is categorised as high, medium or low.

- *Value* – Appendix 9.2 contains a detailed assessment of landscape value for each pLCA drawing on a combination of desk assessment (principally reference to Landmap evaluations) and field observations. The landscape value of each pLCA is categorised as high, medium or low.
- *Degree of change* – within Appendix 9.2 the degree of change predicted for each pLCA is categorised as high, medium or low. This is based on criteria set out within the method statement in section 4 of this chapter including the seven landscape circumstances that are regarded as likely to result in a higher degree of landscape change
- *Extent of change* – within Appendix 9.2 the approximate length of overhead line that would fall within each landscape character area is given in kilometres rounded up to the nearest 100m. Consideration is also given to the approximate extent of the landscape character area over which change would be apparent (a product of topography and openness);
- *Duration of change* – for assessment purposes the presence of the overhead line has been treated as a permanent change within all pLCAs. It is therefore the case that no effect on landscape character has been downgraded from ‘significant’ to ‘not significant’ on the basis of limited duration of effect; and
- *Reversibility of change* – for assessment purposes the presence of the overhead line is treated as fully reversible within all landscape character areas (i.e. although the infrastructure is anticipated to be permanent it would remain the case that the changes associated with its introduction could be reversed at any time were the need for the connection to expire). Nevertheless, the approach taken within this assessment has been that no effect on landscape

character has been downgraded from ‘significant’ to ‘not significant’ solely on the basis of the theoretically possible but unlikely reversibility of the effect.

Effects identified

9.7.9 The detailed assessments of landscape character effects for the eleven pLCAs affected by overhead sections of the route are provided in Appendix 9.2 and are summarised in the following table. In reaching the overall judgement regarding the significance of the effects of the overhead line on landscape character the following overarching observations regarding the generally very limited degree of anticipated landscape change are considered important:

- Substantial areas of vegetation removal have largely been avoided through the selection of the route alignment;
- The limited scale of the Proposed Development limits the degree of landscape character change that is likely along the route;
- Generally high levels of tree cover along the route would generally contain the appearance of the Proposed Development and limit landscape change;
- The whole route passes through a settled and farmed rural and semi-rural landscape relatively close to major roads. No landscape areas along the route are identified as wild, unsettled and entirely devoid of built infrastructural elements;
- The frequency of alignment angles and two and four pole structures along the route is very limited (just 21 of the 203 proposed pole positions).

9.7.10 As a result of the general observations set out above, the degree of landscape change predicted to arise as a result of the introduction of overhead sections of the Proposed Development is assessed as low in respect of all of the pLCAs. No pLCA is identified as subject to a high or medium degree of landscape change.

Table 9.4 – Summary of operational effects of overhead sections of the Proposed Development on landscape character

Character area (pLCA), susceptibility and value	Proposed overhead development and assessed changes	Mitigation and significance of residual effect
<p>pLCA1: Nant Morlais West of Llandyfaelog Susceptibility : Medium Value: Medium</p>	<p>10 poles over approximately 1.3km 2 H poles, 8 single poles Substantially within valley Occasional effects on landscape elements (see Appendix 9.1). Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Permanent but reversible.</p>	<p>Embedded mitigation: Iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>
<p>pLCA2: Coastal Hills North West of Llandyfaelog Susceptibility : Medium Value: Medium</p>	<p>13 poles over approximately 1.7km 1 H pole, 12 single poles Substantially on open plateau. No substantial effects on landscape elements (see Appendix 9.1). Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Permanent but reversible.</p>	<p>Embedded mitigation: Iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>
<p>pLCA3: Southwest of Bancycafel Susceptibility : Medium Value: Medium</p>	<p>14 poles over approximately 1.8km 2 H poles, 12 single poles Substantially on open plateau. No substantial effect on landscape elements (see Appendix 9.1). Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Permanent but reversible.</p>	<p>Embedded mitigation: iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>

<p>pLCA4: Middleton Hills East of Cwmffrwd Susceptibility : Medium-low Value: Low</p>	<p>41 poles over approximately 5.3km 1 H pole, 40 single poles</p> <p>Generally limited effects on landscape elements (see Appendix 9.1). Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Mix of plateau and valley Permanent but reversible.</p>	<p>Embedded mitigation: Iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>
<p>pLCA5: Middleton Hills South of Llangunnor (Tyllwyd-mawr) Susceptibility : Medium-low Value: Medium–high</p>	<p>5 poles over approximately 0.7km 1 H pole, 4 single poles</p> <p>Very limited effects on landscape elements (see Appendix 9.1). Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Permanent but reversible.</p>	<p>Embedded mitigation: Iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>
<p>pLCA6: Tywi Valley Southern Slopes Susceptibility : Medium-low Value: High</p>	<p>3 poles over approximately 0.4km 1 four pole, 2 single</p> <p>Substantially in valley (not main Towy). Limited effects on landscape elements (see Appendix 9.1). Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Permanent but reversible.</p>	<p>Embedded mitigation: Iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>
<p>pLCA9: West of Peniel Susceptibility : Medium-</p>	<p>25 poles over approximately 3km</p>	<p>Embedded mitigation: Iterative design.</p>

<p>low Value: Medium-low</p>	<p>1 four pole, 1 H pole, 23 single poles. Mainly on plateau. Limited effects on landscape elements (see Appendix 9.1). Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Permanent but reversible.</p>	<p>Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>
<p>pLCA10: Llanpumsaint Hills west of Rhydargaeau Susceptibility : Medium-low Value: Medium-low</p>	<p>19 poles over approximately 2.3km 2 H poles, 17 single poles Mainly in valley. Limited effects on landscape elements (see Appendix 9.1). Low degree of landscape change. Permanent but reversible.</p>	<p>Embedded mitigation: Iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>
<p>pLCA11: Llanpumsaint Basin West Susceptibility : Medium-low Value: Medium</p>	<p>24 poles over approximately 3km 3 H poles, 21 single poles Mainly in valley Some effects on landscape elements over considerable length of route within the pLCA (see Appendix 9.1). Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Permanent but reversible.</p>	<p>Embedded mitigation: Iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>
<p>pLCA12: North East Llanpumsaint Basin - South of Alltwalis Susceptibility : Medium-low Value: Medium</p>	<p>19 poles over approximately 2.4km 1 H pole, 18 single poles Mainly in valley. Some effects on landscape elements (see Appendix 9.1).</p>	<p>Embedded mitigation: Iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)</p>

	Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Permanent but reversible.	significant (minor)
pLCA13: Brechfa Forest West Susceptibility : Medium – low Value: Medium	30 poles over approximately 3.3km 1 four pole, 18 H poles, 11 single poles Mainly on plateau Extensive effect on landscape elements (but commercial forest areas) (see Appendix 9.1). Moderate level of visual enclosure by surrounding landcover. Low degree of landscape change. Permanent but reversible.	Embedded mitigation: Iterative design. Additional mitigation: No replacement planting proposed at this stage within the pLCA. Residual effect: Not significant (minor)

9.7.11 The detailed assessments provided in Appendix 9.2 for the eleven pLCAs affected by overhead sections of the route do not identify any highly significant (major) or significant (moderate) landscape character effects. This reflects the scale of the proposed development and the careful approach taken to the design and routing of the Proposed Development (see section 9 of this chapter).

9.7.12 The degree of landscape change identified in the more highly valued pLCAs 5 and 6 (within both the existing designated and proposed Towy Valley SLA) is limited to low or low to medium and the effect on character is assessed as minor and not significant. This conclusion reflects the scale of the valley landform (a side valley to the main Towy valley), that the Proposed Development would generally be seen low within the valley against a backdrop of land, that the level of required tree removal would be limited and that the Proposed Development would generally be visually absorbed by relatively high levels of mature tree cover and woodland. The appearance of the Proposed Development in this vicinity is shown by the representative viewpoints illustrated by Figures 9.5 vps 9 (photomontage), 10

(wireline) and 11 (wireline). Wirelines looking back from within the Towy at vps 12 and 13 also show the relationship of the line to this side valley.

- 9.7.13 The Proposed Development would cross a ridgeline towards the southern end of pLCA5 and would therefore be seen on the skyline rather than against a backdrop of land. The localised degree of landscape change would be slightly higher in this location within the southern fringes of the SLA designation. It is nevertheless concluded that the landscape effect over this short extent of the route in the vicinity of poles 78 and 79 and in the context of surrounding urban fringe influences associated with the town of Carmarthen and the police headquarters and communications mast would not result in a significant effect on the character of the landscape or the SLA. The alignment crosses at the lowest available point within a slight saddle.

Conclusion

- 9.7.14 The detailed assessments contained in Appendix 9.2 do not identify any highly significant (major) or significant (moderate) residual landscape character effects along the overhead sections of the route.
- 9.7.15 In respect of pLCAs 1, 9 and 13 (subject to a slightly higher degree of landscape change – albeit only medium) a review has been undertaken to determine that:
- The slightly greater effect on landscape character in these areas is unavoidable through improved design or routeing; and
 - That the effect does not constitute ‘serious concerns’ in the context of EN5 triggering the need to further consider the case for undergrounding in these locations.
- 9.7.16 This has concluded that no further mitigation is necessary and that the level of landscape character effect in these locations does not come close to constituting ‘serious concerns’ under the terms of EN5 and does not justify undergrounding of the Proposed Development in these locations.

The operational phase effects of underground sections of the route on landscape character

Introduction

- 9.7.17 This short section of the assessment considers whether there would be any significant lasting operational phase landscape character effects on those pLCAs where the Proposed Development would be placed underground. These principally comprise pLCAs 7 and 8 across the main floor of the Towy valley but also include short sections at the northern end of pLCA6 and at the southern end of pLCA9 included to ensure that the transition from underground to overhead would occur in a visually discreet location and avoiding nearby areas of challenging topography.
- 9.7.18 The reader is reminded that the decision to place the Proposed Development underground within pLCAs 7 and 8 was predicated on a preliminary assessment of the likely residual landscape and visual effects of an overhead development in these locations which was undertaken as part of the iterative route selection process. The landscape character susceptibility (to an overhead line) and landscape value in these two pLCAs has therefore already been identified as higher than elsewhere along the route and effects of an overhead line here already identified as having the potential to result in serious landscape and visual concerns under terms set out in EN5.

Effects identified

- 9.7.19 The detailed assessments of operational phase landscape character effects on the very short northern section of pLCA6, on pLCAs 7, 8 and the short southern section in pLCA9 contained in Appendix 9.2 takes account of the conclusions of Appendix 9.1 with regard to any tree removal within these pLCAs. The assessments furthermore consider whether the presence of the underground cable would result in any lasting constraint to the recovery and growth of vegetation within the vicinity of the re-instated line. This includes consideration of any landcover scarring that might persist.

9.7.20 The assessments of the operational landscape character effects for the four pLCAs affected by underground sections of the route are provided in Appendix 9.2. The following table summarises the assessment contained therein.

Table 9.5 – Summary of operational effects of underground sections of the Proposed Development on landscape character

Character area (pLCA), susceptibility and value	Proposed underground development and assessed changes	Mitigation and significance of residual effect
pLCA6: Tywi Valley Southern Slopes (very short northern section underground) Susceptibility to operational effects of underground cabling: Low Value: High	Very short section underground to allow terminal pole to be placed in visually discreet location. Limited effects on existing landscape elements (see Appendix 9.1). Minimal constraint to future vegetation establishment over cable line. Very low degree of lasting landscape change. Permanent and irreversible.	Embedded mitigation: Route undergrounded and iterative design of cable route to avoid vegetation including root zones. Additional mitigation: No further mitigation proposed. Residual operational effect of underground cable: Not significant (negligible)
pLCA7: Tywi Valley Bottom Susceptibility to operational effects of underground cabling: Low Value: High	Approximately 1.2km of underground cabling. No substantial effects on existing landscape elements (see Appendix 9.1). Minimal constraint to future vegetation establishment over cable line. Very low degree of lasting landscape change. Permanent and irreversible.	Embedded mitigation: Route undergrounded and iterative design of cable route to avoid vegetation including root zones. Additional mitigation: No further mitigation proposed. Residual operational effect of underground cable: Not significant (negligible)
pLCA8: Abergwili Susceptibility to operational effects of underground cabling: Low	Approximately 2.4km of underground cabling. No substantial effects on existing landscape	Embedded mitigation: Route undergrounded and iterative design of cable route to avoid vegetation

Value: High	elements (see Appendix 9.1). Minimal constraint to future vegetation establishment over cable line. Very low degree of lasting landscape change. Permanent and irreversible.	including root zones. Additional mitigation: No further mitigation proposed. Residual operational effect of underground cable: Not significant (negligible)
pLCA9: West of Peniel (short southern section underground) Susceptibility to operational effects of underground cabling: Low Value: Medium	Short section of underground cabling. Localised effect on existing landscape elements (see Appendix 9.1). Some constraint to future vegetation establishment over cable line. Low degree of lasting landscape change. Permanent and irreversible.	Embedded mitigation: Route undergrounded and iterative design of cable route to largely avoid vegetation including root zones. Additional mitigation: No further mitigation proposed. Residual operational effect of underground cable: Not significant (minor)

- 9.7.21 The detailed assessments of landscape character effects on the very short northern section of pLCA6 and on pLCAs 7, 8 contained in Appendix 9.2 conclude that the permanent operational phase effects of the underground cabling on landscape character within these areas would be negligible and not significant.
- 9.7.22 The only notable effect identified by this assessment relates to the northern section of the underground cable route in the southern section of pLCA9, close to the termination pole. In this location the proposed cable route passes through an area of mature trees adjacent to a minor local road. This would have a minor, highly localised lasting effect on landscape character (due to it not being feasible to re-establish similar vegetation over the line) in this location but which is also assessed as not significant.

The operational phase effects of the Proposed Development on landscape designations (SLAs)

Introduction

9.7.23 Only one landscape designation is subject to potential effects. This is the Towy Valley SLA. The extent of the Towy Valley SLA (as proposed in 2011) coincides with the extent of pLCAs 5 to 8. The proposed development would be overhead within pLCA 5 and most of 6 and underground within the full extent of pLCAs 7 and 8.

Effect identified

9.7.24 Appendix 9.3 provides a detailed assessment of the baseline character, susceptibility and landscape value of the Towy Valley SLA – drawing on the County Council's statement of value and on the detailed individual assessment of landscape elements in Appendix 9.1 and each of the constituent pLCAs considered within Appendix 9.2. Appendix 9.2 concludes that the individual effect on each constituent pLCA would not be significant. This is principally because:

- Significant effects on landscape character within pLCAs 7 and 8 (the main open parts of the Towy valley floor) have been avoided by undergrounding the Proposed Development across this central part of the Towy Valley SLA; and
- The effects within pLCA5 and 6 would be limited due to the low degree of anticipated landscape change in these areas due to the design and routeing of the overhead line and to their topographical context (the overhead section of line within the SLA would be located within a visually enclosed side valley with a limited visual relationship with the more open main Towy valley floor to the north).

Conclusion

9.7.25 The assessment contained in Appendix 9.3 considers the combined operational phase effects of both the overhead and underground sections of the route on the character, quality and integrity of the Towy Valley SLA (as proposed in 2011). It concludes that the extent of undergrounding proposed in the principal areas of open valley floor within pLCA 7 and 8 and the design and selected alignment of

the overhead development within pLCAs 5 and 6 would mean that the effect would be minor and not significant.

The operational phase visual effects of the Proposed Development

Introduction

- 9.7.26 Appendices 9.4 to 9.8 include detailed assessments of the operational phase visual effects of the Proposed Development (both overhead and underground) at representative viewpoints and on various categories of visual receptor (residents, footpath users, road users and other recreational and visitor locations).
- 9.7.27 The assessment of the significance of the operational phase visual effects on specific receptors contained in Appendices 9.5 to 9.8 combines consideration of one principal and two secondary visual aspects of the Proposed Development, namely:
- The effect on available views that would arise as a result of the introduction of the new overhead line infrastructure (terminal poles, double poles, single poles, insulators and conductor wiring). This is the principal consideration and applies to overhead sections of the Proposed Development only;
 - The continuing effects on available views that would be caused by vegetation removed during construction (woodlands, trees and hedgerows). This applies to both overhead and underground sections of the Proposed Development and may vary over time – i.e. replacement vegetation would gain greater height over the early years of the operational period. These assessments have included consideration of any possible changes in tree removal that might arise as a result of alignment changes within the horizontal limit of deviation; and
 - The relatively minor visual effects of any ongoing landscape management requirements along the route (i.e. vegetation management to maintain required clearance standards for a 132kV overhead line and around the alignment of the underground cabling). This applies principally to overhead

sections of the Proposed Development but in occasional instances applies to the management of vegetation over underground cabling (excluding directional drilling locations where the underground cable would be too deep to represent an ongoing constraint to the operational acceptability of vegetation growth above the cable).

- 9.7.28 In most locations, however, the operational appearance of the Proposed Development would remain largely consistent over time.

General assessment factors

- 9.7.29 The assessment of the significance of the visual effects of the Proposed Development on specific visual receptors during the operational phase takes account of all of the assessment considerations set out within the assessment methodology provided in section 4 of this chapter. The following general observations apply to all of the visual receptors considered:

- *Combined sensitivity* – within Appendices 9.4 to 9.8 the combined sensitivity of each visual receptor to the operational phase visual effects of the Proposed Development is identified as high, medium or low. This assessment of combined visual sensitivity incorporates both the susceptibility of the category of visual receptor (e.g. resident, footpath users, road user etc.) and the value that is likely to be placed by them on the available view (i.e. in some cases the combined sensitivity may be downgraded from the typical level of visual susceptibility to reflect a low level of existing visual amenity associated with a particular location or direction of view). Separate constituent values for these two criteria are not given in the assessments in Appendices 9.4 to 9.8 because it is only in rare cases that the visual susceptibility based on category of receptors is at all modified by the nature and value of the available view (i.e. for example, in the context of rural Carmarthenshire there will be very few residential locations that are identified as falling within an area of low visual amenity and not determined to display both high susceptibility and combined visual sensitivity).

- *Degree of change* - this criterion applies and includes consideration of the extent of the available view that would be affected during operation. Appendices 9.4 to 9.8 categorise the degree of change for different receptors and viewpoints as high, medium or low.
- *Extent* – in the assessment of an individual fixed point visual receptor this criterion does not apply (i.e. the criterion refers to the extent over which visual changes will be experienced by receptors in general rather than the extent of the Proposed Development within a particular view (which is considered under the degree of change criterion). Extent is considered for visual effects along road and footpath routes (i.e. how much of a route would be visually affected);
- *Duration* – the operational duration of the Proposed Development has been assumed to be permanent for all visual receptors. Should the actual operational duration of the Proposed Development be reduced to a finite period it is not considered that identified significant visual effects would become insignificant. The conclusion of the assessments has not therefore been altered by consideration of this criterion.
- *Reversibility* – the visual effects of the installation of the Proposed Development is deemed to be theoretically fully reversible for all of the visual receptors considered in Appendices 9.4 to 9.8. However, the feasible (but unlikely) reversibility of the visual effects of the Proposed Development has not been used as a basis to downgrade the visual effect anticipated in any location from significant to not significant. The conclusion of the assessments has not therefore been altered by consideration of this criterion.

The representative viewpoint assessment

9.7.30 A description and assessment of the degree of visual change that would occur at each representative viewpoint along the route of the Proposed Development is provided in Appendix 9.4. Representative viewpoints 1 to 11 and 17 to 28 are located in the vicinity of the overhead section of the Proposed Development within pLCAs 1 to 6 and 9 to 13 and representative viewpoints 11 to 17 are located in the

vicinity of the underground section of the Proposed Development principally within pLCAs 7 and 8 at the Towy valley (viewpoints 11 and 17 are located close to the terminal poles which mark the interface between overhead and underground sections). An assessment of the significance of the visual effect at each of the representative viewpoint is not given in Appendix 9.4 but is included for the various visual receptors located near each viewpoint within Appendices 9.5 to 9.8.

- 9.7.31 A high degree of visual change during the operational phase of the Proposed Development is not identified at any of the 28 representative viewpoints. An important observation, therefore, is that the degree of visual change arising at the representative viewpoints is generally medium (twelve of the viewpoints) to low (eleven of the viewpoints). Furthermore, this conclusion should be considered in the context that, with the exception of vp12, viewpoints were specifically selected in locations that were generally in relatively close proximity to the proposed alignment and where visibility was anticipated (i.e. away from areas with particularly high levels of screening landcover). Appendix 9.4 highlights the following overarching observations regarding the degree of visual change that is predicted to occur during the operational phase of the Proposed Development:
- 9.7.32 For overhead sections of the route the assessment of the degree of visual change at the representative viewpoints show that:
- The general degree of visual change that would arise during the operational phase of the Proposed Development as a result of overhead sections of the route would often be low due to (i) the relatively small scale of the Proposed Development, (ii) the relatively high levels of tree and other vegetation cover that are present along much of the route (much of this tree cover would be similar or in excess of the height of the proposed poles as shown by the Figures contained in Appendix 9.1) and (iii) the location of much of the Proposed Development within localised valley landforms;
 - Changes associated with the removal of vegetation along the line would generally be successfully absorbed;

- The specific appearance of the overhead line supported by single wooden poles would generally be reasonably well accommodated and absorbed within the general scene, with a reasonable level of visual consistency with other existing landscape elements (including existing telegraph and low voltage lines). This would especially be the case where the overhead line would be seen against a backdrop of land and away from smaller scale landforms;
- Slightly higher levels of visual change would arise where the overhead line is seen against sky;
- Slightly higher levels of visual change would be associated with sections of double H poles and as a result of four pole termination poles. These would be relatively few and be associated with severe environment (principally to the north within pLCA13) and termination points in relatively discreet locations away from large numbers of visual receptors.

9.7.33 For underground sections of the route the assessment of the degree of visual change at the representative viewpoints show that:

- The degree of visual change that would persist during the operational phase of the Proposed Development as a result of underground sections of the route would generally be negligible. In a small number of locations constraints to the growth and reestablishment of vegetation close to the underground cable alignment would result in localised visual changes (e.g. viewpoints 14 and 15).

The significant operational phase visual effects identified

9.7.34 The detailed assessment tables for the four categories of visual receptor provided in Appendices 9.5 to 9.8 do not identify any highly significant (major) visual effects on any of the individual visual receptors considered. This conclusion reflects the iterative alignment design process which sought to minimise visual effects and which maintained a general distance of at least 60 m and preferably 100 m away from any residential property. Although footpath users in particular are identified as potentially highly susceptible to visual changes (particularly where the route is

promoted, named or part of a longer distance route) no locations have been identified where the presence of more substantial elements of the infrastructure (e.g. four pole terminal positions or double poles with multiple stays); the importance of the route; and the length of the route over which a high degree of visual change would occur; would combine to result in a highly significant (major) operational phase visual effect.

9.7.35 Significant (moderate) operational visual effects are identified within Appendices 9.5, 9.6 and 9.8 on the following residential, footpath and other recreational receptors. Where a pLCA is not listed below, no significant (moderate) visual effects have been identified. The locations of these receptors are identified within Appendices 9.5, 9.6 and 9.8:

- pLCA1: Residents of Penyback (R4), Cilwg (R5) and Fynnon Wen and Black Bush (G12).
- pLCA2: Residents of Lanfryn (R15) and Lygad Yr Efail, Llyswen, Star Forge (G18). Users of campsite at Llanygad-Yr-Efail (RT1).
- pLCA3: Residents at Bwlch-y-gwynt (R26). Users of FP12 PRoW Landyfaelog 10.
- pLCA4: Residents at Delfryn (R39), Ucheldir (R40), Gelliddu Farm (R41), Brynheulog and Beulah Fawr Farm (G60), Kings Oak and Plas y Wern (G63), Green Cottage, School House and Login Cottage (G67). Users of footpaths at FP19 Cistercian Way and FP22 PRoW Llangunnor 6.
- pLCA5: Residents of a single property at Tyllwyd Mawr (R71).
- pLCA6: Residents at Nant Farm (R79). Users of FP26 PRoW Llangunnor 20.
- pLCA9: Residents at Pengerddi (R102), Rhyd Fwyalchen (R109), Nantfelys (R110), Brynawel (R111) and users of footpaths at FP44 PRoW Abergwili 8, FP46 PRoW Bronwydd/Newchurch PP2 / CCC promoted Bronwydd walk and FP47 CCC Promoted Bronwydd Walk.

- pLCA10: Residents at Pentremawr (R134) and North of Rhydargaeau (Tiffany Lodge, Clos Yr Eos, Llwynreos) (G137). Users of CCC Promoted Cycle Route HP11 (CR6).
- pLCA11: Residents at Trewithina House and Haulfryn (G147), Glanboncath (R153), Troed-Rhiw- Newydd (R155), Nant y Boncath (R156) and Llywn Newydd (R161). Users of footpath at FP64 PPRoW Llanpumsaint 9. Users of CCC Promoted Cycle Route HP11 (CR6). In the case of Nant y Boncath (R156), potential visual changes at this farm would be as much associated with potential tree removal in the vicinity as with the appearance of the introduction of the overhead line. A commitment is in place to ensure that the alignment would not vary northwards within the limit of deviation (where it would affect trees along the watercourse).
- pLCA12: Residents at Dyffryn Croes, Dyffryn Croes House and 2 Dyffryn Croes (G169), Derlwyn Mansion and Derlwyn Cottage (G170), Cil Clyn (R171) and Llwynteg (R177). The potential visual effect at G169 would vary were the alignment to be relocated south within the horizontal limit of deviation. A commitment is in place to avoid any such deviation and preserve intervening tree cover.

9.7.36 No significant (moderate) visual effects have been identified on road users in Appendix 9.7. This reflects both the limited degree of visual change that would be experienced by road users and the absence of routes in proximity to the Proposed Development that have firm associations with high levels of tourist traffic within scenic areas. Only short sections of routes would experience a medium degree of visual change and this would not coincide with higher levels of combined visual sensitivity.

9.7.37 Other than users of one campsite and one promoted cycle route, no significant (moderate) visual effects have been identified on the additional recreational and visitor locations scheduled in Appendix 9.8. This conclusion is consistent with the expectation of CCC officers stated when the schedule of additional receptor locations was agreed in October 2014.

Conclusion

9.7.38 No highly significant (major) operational phase visual effects would arise as a result of the installation of the overhead line. Significant (moderate) residual visual effects would be experienced by the relatively small number of receptors identified above. The proposed routeing has been reviewed in each case to ensure that no further reductions the visual effects identified are practicable. No locations along the route have been identified as requiring the introduction of screen planting (see section 9.9).

Operational visual effect on residential visual amenity (overbearing effect on living conditions)

9.7.39 The general visual assessment provided above is supplemented here for the closest and most affected residential properties by an assessment of whether an unacceptable level of effect on residential visual amenity might result. This is deemed to occur where the visual effect on a property is likely to be generally regarded as resulting in it becoming an unsatisfactory place in which to live.

9.7.40 An unacceptable level of visual effect might theoretically arise in respect of two possible interrelated scenarios:

- Where overhead poles and lines would be located in such close proximity to the/a main outlook(s) from a private residential property (whether from internal areas or in important views from within the external curtilage) that it would be unduly dominated by them. This might include where the more substantial elements of overhead line infrastructure coincide at close proximity with principal views from a private residential property (e.g. a four pole termination point with several cable stays at close proximity within the centre of a principal view); and
- Where a very wide extent of the available view from a private residential property coincides with visibility of a substantial length of the overhead line - either panning across the available view or with a large number of poles visually stacked and receding into the far distance.

- 9.7.41 A screening process has been undertaken for residential properties that may be located within 100 m of overhead sections of the Proposed Development. Allowing for the horizontal limit of deviation, properties within 120 m of the proposed alignment have been included (a rounded-up precautionary distance which exceeds the necessary allowance of 112.5 m). Thirteen residential properties and five groups of properties are identified in Appendix 9.5 as being located within this distance (from south to north: G12, R14, R15, R27, G69, R79, G80, R109, R110, G137, R153, R154, R155, R156, R157, R161, G169 and R171). Despite their proximity, some of these properties are nevertheless identified in Appendix 9.5 as being subject to relatively low levels of visual change due to screening landcover.
- 9.7.42 No residential properties have been identified in Appendix 9.5 as likely to be subject to a highly significant (major) visual effect. A review of the closest properties that would be subject to a significant (moderate) visual effect has identified the following four locations that would potentially be subject to the highest degree of visual change along the route.
- pLCA6: Residents of a single property at Nant Farm (R79). This property is located within a valley and within approximately 110 m of the Proposed Development;
 - pLCA11: Residents of two properties within the valley at Nant y Boncath (Glanboncath – R153 and Nant y Boncath – R156). These properties are low lying below the elevation of the closest section of proposed overhead line at a distance of approximately 70 m and 100 m respectively. Glanboncath (R153) is considered further below. In the case of Nant y Boncath, visual changes at this farm would be as much associated with potential tree removal in the vicinity as with the appearance of the introduction of the overhead line. A commitment is in place to ensure that the alignment will not vary northwards (closer to trees along the watercourse) and the partial screening provided by this tree cover would remain; and

- pLCA12: Residents at Dyffryn Croes, Dyffryn Croes House and 2 Dyffryn Croes (G169) at a distance of 110 m or greater. A potential effect here is in part due to the potential removal of some intervening low tree and high hedgerow vegetation were the alignment to be relocated south within the horizontal limit of deviation. A commitment is in place to ensure that the alignment will not vary southwards (closer to the group of properties) and the partial screening provided by this vegetation will be retained.

9.7.43 The closest property with largely open views that would be subject to a significant (moderate) visual effect is that at Glanboncath (R153). The orientation of the building at a distance of approximately 70 m is such that the views from the front of the property would be aligned with a proposed section of overhead line between poles 145 and 146 passing across the view at approximately 90 degrees. Neither single angle pole 145 nor single ‘inter’ pole 146 would be located directly at the centre of the available views from the front of the property with the appearance of angle pole 145 at least partially softened by intervening hedgerow vegetation along the road. The view from the front of the property would be orientated towards the approximate mid-point between these poles (though with pole 146 closer to the centre of the view in a more open and visually prominent location). It is judged that an unacceptable effect on residential visual amenity would not arise in these circumstances due to the distance of 70 m and tangential alignment of the route. Further design review may result in some reduction in effect

9.7.44 In every case it has been concluded that an unacceptable effect on residential visual amenity would not occur. The principal reasons for this conclusion are that:

- The scale of the Proposed Development is simply not sufficiently substantial (i.e. a maximum of 19m in height) to result in an unacceptable level of visual dominance over the distances involved (the iterative route selection process sought to achieve a distance of at least 60 m from any property and preferably 100 m);
- All affected properties enjoy the benefits of at least some intervening

landcover that would soften or partially screen the appearance of the Proposed Development;

- The amenity of properties such as those at G169 is influenced by proximity to the main road (A485);
- There are no properties where the main aspect or orientation of the building is sufficiently aligned with the Proposed Development for visual dominance to arise;
- There are no instances where wide panoramas would coincide with unacceptably extensive lengths of overhead line or an unacceptable degree visual stacking of poles receding into the distance; and
- The general horizontal limit of deviation has been locally reduced in respect of some specific properties to ensure that potential tree and hedgerow removal would not occur and partial screening of the Proposed Development would be retained.

9.8 Decommissioning phase effects

- 9.8.1 The decommissioning phase landscape and visual effects of the Proposed Development have been scoped out and have not been assessed in detail. The decommissioning phase effects of overhead sections of the development would be similar to those experienced during construction. The decommissioning phase effects of underground sections of the development would be considerably less than for the construction phase (on the assumption that obsolete underground cables would remain in situ).

9.9 Mitigation measures

Embedded mitigation – design and alignment of the infrastructure

- 9.9.1 Mitigation of the landscape and visual effects of both the underground and overhead sections of the Proposed Development is primarily embedded within the

design of the infrastructure and its routeing. Details of the project design, route selection process and the landscape and visual criteria used for the selection of the final route are provided in chapter 3 of the draft ES.

9.9.2 The generally single wooden poles of up to 19 m in height have been selected as the preferred infrastructure solution as there will be some broad consistency with other (low voltage) overhead lines that are present in the general area and that are a familiar feature of most landscape types within agricultural, settled and urban fringe locations. The potential degree of landscape change likely to arise as a result of the introduction of this type of overhead line is therefore limited from the outset.

9.9.3 The design of the infrastructure and its routeing have avoided potentially highly significant (major) landscape and visual effects in the following locations:

- A potentially highly significant (major) effect on the Towy valley landscape and SLA has been avoided through the selection of a route close to Carmarthen and the adoption of a section of underground cabling; and
- The careful siting of the terminal poles at the transition between overhead and underground sections of the Proposed Development.

9.9.4 Furthermore, the landscape and visual effects have been further minimised in the following locations in particular:

- pLCA1: effects on trees in the vicinity of poles 2 to 4 has been minimised by following a route with less density of tree cover at Nant Morlais woodland (key tree location T1);
- pLCA5/6: the alignment at pole 84 has been chosen to minimise effects on tree cover along the public right of way (key tree location T7);
- pLCA9: the alignment at poles 99–100 has sought to minimise effects on higher value mature trees in this valley (key tree location T11); and
- pLCA11: the alignment in the vicinity of Llwyn Newydd (R161) has been

located down slope to minimise visual effects on this elevated property with open rear views across the valley.

- 9.9.5 The landscape effect on the stand of pine trees in pLCA10 (T13) has been considered carefully in light of the ecological value of the adjacent open damp habitat. The proposed removal of some of these visually prominent pine trees is in part justified by a drying out effect that they are currently having on the adjacent habitat (see chapter 10).

Embedded mitigation – working methods and landscape reinstatement of underground sections

- 9.9.6 Appropriate method statements for the landscape reinstatement of underground sections of the Proposed Development will be agreed with consultees in due course. All sections of affected hedgerow and low level groundcover would be restored without significant lasting effects on landscape character or views.

Additional mitigation - planting proposals along overhead sections of the Proposed Development

- 9.9.7 No locations have been identified where additional mitigation has been recommended (i.e. planting specifically to help soften or screen the appearance of specific components of the Proposed Development such as terminal or angle pole structures). The generally insignificant landscape and visual effects of the Proposed Development suggest that such planting is not critical to appropriately limit the effects of the Proposed Development and is unlikely to overcome objections that may arise from landowners where productive land is identified to undertake screen or replacement planting. The assessment of residual effects is not therefore based on any assumed planting.

9.10 Residual effects

- 9.10.1 The detailed assessment of effects contained in Appendices 9.1 to 9.8 and summarised in sections 6 to 8 of this chapter take account of all aspects of landscape and visual mitigation and are therefore in all cases statements of the

significance of the residual effects of the Proposed Development.

9.11 Cumulative effects

Introduction

9.11.1 The following potentially significant cumulative landscape and visual effects of the Proposed Development have been considered.

- Construction phase cumulative effects on landscape elements (principally with forest tree removal associated with related wind farm development);
- Operational phase cumulative effects on landscape character (overhead sections only);
- Operational phase cumulative effects on landscape designations (the Towy Valley SLA); and
- Operational phase cumulative visual effects (overhead sections only).

9.11.2 This section of the landscape and visual draft ES provides an initial assessment of these potential issues based on consideration of nine of the agreed representative viewpoints (vps 2, 4, 6, 7, 8, 22, 24, 25 and 28 – see Appendix 9.4). These viewpoints were selected based on their proximity and relevance to the various developments included within the scope of the cumulative assessment. It is anticipated that a review of the cumulative scope will be undertaken prior to the final DCO submission. Further consideration will then be given to these matters and, if necessary, illustrative material provided (this draft landscape and visual assessment does not provide cumulative wirelines or visualisations).

Approach

9.11.3 The purpose of the cumulative assessment is principally to identify the additional in-combination effects of the Proposed Development with other developments which are reasonably foreseeable but which are not yet present and visible within the existing landscape and visual baseline. However, in accordance with the

formal scoping response of CCC and NRW appended to the SoS's scoping opinion, and as agreed through consultation with their independent landscape consultants, this cumulative assessment also includes the following:

- The scope of the cumulative landscape and visual assessment includes some 'developments' (of particular and relevant types) that exist within the current landscape and visual baseline to identify the contribution of the Proposed Development to any ongoing processes of past, present and future landscape and visual change (i.e. existing overhead power lines, existing wind farms, existing small scale wind energy developments and existing telecommunications masts in the vicinity of the route (within 3 km for large scale wind energy developments (one or more turbines of over 50 m in height to tip) and within 1 km for other types of development)); and
- The significance of the specific contribution of the Proposed Development to such cumulative change is then set within the context of the combined (sum) effect of all of the developments included within the scope of the cumulative assessment.

9.11.4 Where both are considered, the combined 'sum' effect and the significance of the contribution of the Proposed Development are clearly differentiated to ensure that effects are not double-counted within the cumulative and non-cumulative assessments.

Existing 'developments' included in the scope of the cumulative assessment

9.11.5 On the specific request of the independent consultant acting on behalf of CCC and NRW, existing 'developments' (including those currently under construction) are identified as relevant to an assessment of the Proposed Development's contribution to a process of cumulative landscape and visual change over time. Of these the following are of greatest importance:

- All existing overhead electricity connections (11kV, 33kV, 132kV and 400kV based primarily on a review of existing WPD assets (WPD assets exclude the

one 400kV line which the proposed development crosses close to Llandyfaelog));

- The operational wind farm, permanent anemometer mast, substation and 132kV grid connection at Alltwalis; and
- A number of small scale wind energy schemes (below 50 m to tip) and telecommunications masts.

Reasonably foreseeable future developments included in the scope of the cumulative assessment

9.11.6 A review has been undertaken of planning applications and consents in the vicinity of the Proposed Development (generally extending to 1 km from the alignment but to 3 km for commercial scale wind farms). The review also looked at relevant development plan allocations but did not identify any. The following reasonably foreseeable future developments have been identified, and agreed with consultees, as relevant to an assessment of the cumulative landscape and visual effects of the Proposed Development:

- The Brechfa West wind farm, substation, temporary and permanent anemometer masts;
- A single large turbine at Nantycaws (77 m to tip at a distance of more than 1 km from the proposed development);
- A number of small scale wind and single turbine proposals (below 50 m to tip); and
- Two solar energy schemes (and any known associated grid connections) (the larger of these is just over 1 km from the alignment of the Proposed Development but has been included for completeness).

9.11.7 No other significant electricity infrastructure developments are consented or proposed. Refurbishment of 11kV lines in the vicinity of pLCAs 12 and 13 would replace like with like resulting in negligible landscape and visual change. No

additional telecommunication masts or other relevant large scale developments are consented or proposed.

9.11.8 The following table summarises the agreed scope of the cumulative assessment over the various pLCAs along the route of the Proposed Development (developments are generally listed once under the most relevant pLCA other than the Brechfa West and Alltwalis wind farms which would be reasonably widely visible from several of the northern pLCAs). Developments are listed under relevant categories (overhead lines, small scale wind, wind farms, solar, telecommunications and ‘other’). Planning application reference numbers are included where available. To provide a picture of cumulative development activity in the context of each pLCA the Proposed Development is listed as an undetermined planning application. The location of the developments is shown on Figure 9.6 Maps 1 to 4 and on Figure 19.1. The schedule has been agreed by the independent landscape consultants jointly appointed by NRW and CCC as an appropriate starting point for the cumulative assessment.

Table 9.6 – Scope of the cumulative assessment

Existing ‘developments’ within relevant categories	Consented planning applications	Undetermined planning applications
pLCA1: Nant Morlais West of Llandyfaelog		
Overhead lines: 11kV line running parallel to poles 1 to 4. 11kV line crossing development between poles 9 and 10. 33kV EE line pylons west of Nant Morlais woodland and immediately west of pole 1.	None.	The Proposed Development.
pLCA2: Coastal Hills North West of Llandyfaelog		
Overhead lines: Three 11kV lines in vicinity of poles 19 to 22. 132kV line pylons west of Tynwydd on PRow Llandyfaelog 20/1. 400kV line pylons north east of Upland Arms.	None.	The Proposed Development.

Telecommunications: Telecoms mast at entrance to Crugan-Fawr farm just off the A484 at Upland Arms.	None.	None.
pLCA3: Southwest of Bancycapel		
Overhead lines: No existing overhead lines.	None.	The Proposed Development.
Small scale wind energy: Two small wind turbines at Bryncoch Farm southwest of Bancycapel (185, 263 and 264 Map 8 W/27205 and W/28593) (two turbines only). Small single wind turbine west of Bancycapel, southeast of Plasgwyn farm (199 Map8 W/28096).	None.	None.
pLCA4: Middleton Hills East of Cwmffrwd		
Overhead lines: 11kV line at pole 48 (two lines meet nearby). 11kV line crossing development at pole 56. 11kV line to east of poles 62 to 64. 11kV line crossing development near pole 71. 11kV line crossing development between poles 72 and 73. 33kV line crossing development near pole 74. 11kV line crossing development near pole 76. Two 11kV lines south west of pole 78.	None.	The Proposed Development.
Small scale wind energy: Single small wind turbine southeast of Gelliddu Farm (155 Map 9 W/25504).	500 KW turbine at Nantycaws landfill site/household waste recycling centre (276 Map 13 W/26143) (2.5 km away from alignment – 77 m to tip, 49 m to hub).	Single 24m turbine Danybanc Farm (245 Map 9 W30122).
Solar: None.	Photovoltaic array, Brynmeusydd (164 Map 12 W/25826).	Large 6 MW solar development at Bryn Cymrau Isaf (just over 1 km from route) (247 Map 12 W30204).
Telecommunications: Telecoms mast (potentially smaller than 15m, but marked on OS) at Penycoed farm south of A48.	None.	None.

pLCA5: Middleton Hills South of Llangunnor (Tyllwyd-mawr)		
Overhead lines: 11kV line crossing development close to pole 60.	None.	The Proposed Development.
Telecommunications: Mast southeast of Tyllwd-mawr. Mast at police Headquarters northwest of Tyllwd-mawr.	None.	None.
pLCA6: Tywi Valley Southern Slopes		
Overhead lines: Three 11kV lines in vicinity of poles 85 to 86.	None.	The Proposed Development.
pLCA7: Tywi Valley Bottom		
Overhead lines: Three 11kV lines crossing the development (underground) plus one 11kV line within valley to east.	None.	(Development underground).
pLCA8: Abergwili		
Overhead lines: Four 11kV lines within vicinity of the development (underground)	None.	(Development underground).
pLCA9: West of Peniel		
Overhead lines: Two 11kV lines crossing development close to poles 87 and 88. 11kV line crossing development between poles 96 and 97. 11kV line crossing development between poles 102 and 103.	None.	The Proposed Development.
Telecommunications: Telecoms mast Awelfryn farm southwest of Peniel.	None.	None.
pLCA10: Llanpumsaint Hills west of Rhydargaeau		
Overhead lines: 11kV line crossing development between poles 115 and 116. 11kV line crossing development near pole 129.	Single additional pole (272 Map 24 W24324).	The Proposed Development.
Small scale wind energy: Single small wind turbine Allt y Fawnen, Pentremawr, Rhydargaeau (217 and 265 Map 21 W/29015).	None.	None.
pLCA11: Llanpumsaint Basin		

<p>Overhead lines: 11kV line crossing development near pole 137. 11kV line crossing development twice running west of poles 145 to 149. Two 11kv lines near pole 154.</p>	None.	The Proposed Development.
<p>Wind farms Alltwalis wind farm visible north east of Alltwalis.</p>	Brechfa West Windfarm at Brechfa Forest east of Alltwalis.	None.
<p>Small scale wind energy: None.</p>	None.	Single small wind turbine at Glancorwg west of Pontarsais (227 and 266 Map 24 W/29284).
pLCA12: North East Llanpumsaint Basin - South of Alltwalis		
<p>Overhead lines: 11kV line crossing development near pole 161. 11kv line crossing development between poles 168 and 169. 132 kV connection to Alltwalis wind farm substation.</p>	Refurbishment of approximately 54 km of 11 kV overhead line (260 Map28 W/17938).	The Proposed Development.
<p>Wind farms Alltwalis Wind Farm visible north east of Alltwalis.</p>	Brechfa West Wind Farm at Brechfa Forest east of Alltwalis.	None.
<p>Other: None.</p>	Tracks to facilitate timber harvesting work at Allt Garedig south west of Alltwalis (163 Map 28 W/25725) (some tree removal may arise).	None.
pLCA13: Brechfa Forest West		
<p>Overhead lines: No 11 kV lines. 132 kV connection to Alltwalis wind farm substation (259 Map 32 and 33 W19321).</p>	None.	The Proposed Development.
<p>Wind farms Very limited potential visibility of Alltwalis Wind Farm, Alltwalis.</p>	<p>Brechfa West Wind Farm at Brechfa Forest Alltwalis (275 Map 29 N/A).</p> <p>Brechfa West Wind Farm substation at pole 203 (275 Map 29 N/A).</p> <p>Met mast (extended) (171 and 270 Map 29 W26416 and W20848)</p>	None.
<p>Telecommunications:</p>		

Mast at Llancllyn-Adda.	None.	None.
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Construction phase cumulative effects on landscape elements (principally forest tree cover)

- 9.11.9 Forestry removal will be associated with the construction of Brechfa West wind farm (DCO consent) where individual turbines will be located within cleared ‘keyholes’. Access and other requirements at Brechfa West wind farm will also lead to some areas of tree removal. Forest track upgrades at Allt Garedig to the north west of poles 156 to 162 (W/25725) (approximately 3 km west of the affected area of forest at Brechfa West) are unlikely to result in significant amounts of tree removal and any removals would be confined to internal areas of a commercial forest block.

- 9.11.10 The Proposed Development would result in generally low levels of tree removal along the route but with a more extensive area of forestry clearance associated with the final section between poles 184 and 203. This would occur within relatively close proximity to both the Brechfa West wind farm and the forest tracks at Allt Garedig in the vicinity of pLCAs 12 and 13 at the northern ends of the route. The affected areas of tree cover are all areas of commercial forest plantation in relatively remote areas of which there would be limited visibility. This tree cover is considered to be low value in both landscape and visual terms. The combined effect of all tree removal associated with all of the developments included within the scope of the cumulative assessment would not be significant. Forestry clearance at the northern end of the Proposed Development would occur in close proximity to that directly arising from the construction of Brechfa West wind farm. Given the low landscape value of the affected trees and that the combined sum effect of both developments would not be significant; the contribution of the Proposed Development to any cumulative effect on landscape elements in this location would also not be significant.

Cumulative landscape character effects (overhead sections only)

Overhead lines

- 9.11.11 The effects of the Proposed Development on landscape character in the context of all existing overhead lines has been assessed as minor and not significant within the non cumulative assessments in sections 9.6 to 9.8 of this chapter. This includes the effects of the Proposed Development in the context of other existing overhead lines (11kV, 132kV and 400kV) which converge within relatively close proximity of the line within pLCA2 (north of Llandyfaelog) (see Figure 9.5 vp4). This assessment is based on the observations that:
- The Proposed Development would be on largely single wooden poles at a height of up to 19 m and would be distinctly different in scale and appearance to the existing steel tower supported 400kV and 132kV lines; and
 - The alignment of the proposed Development crosses these other lines tangentially (at close to 90 degrees) minimising the extent of its proximity and avoiding parallel lines over long distances.
- 9.11.12 There are no other consented or proposed overhead line developments proposed within the area to the north of Llandyfaelog within pLCA2.
- 9.11.13 Recent overhead line developments have included the 132kV connection to Alltwalis wind farm which terminates approximately 1 km north of pole 178 of the Proposed Development but which is visually separated from it by intervening topography and landcover. No additional overhead lines are proposed (an additional single pole (W/24324) and line refurbishments (W17938) would result in negligible landscape and visual change).
- 9.11.14 The sum cumulative landscape effect of all of the overhead lines included within the scope of this cumulative assessment would not be significant. This includes the effect of the Proposed Development's introduction into the landscape north of Llandyfaelog. Given this, and that there are no further overhead lines consented or proposed in the area, the Proposed Development would not be the cause of a significant cumulative effect.
- 9.11.15 No information has yet been identified regarding the likely grid connection that

may be associated with the proposed (undetermined) 6 MW solar scheme at Bryn Cynrau (approximately 1 km west of the Proposed Development in pLCA4).

Energy developments

- 9.11.16 Insufficient proximity and similarity would mean that the cumulative effects on landscape character between the Proposed Development, Brechfa West wind farm, small single turbines and two solar schemes would not be significant.

Cumulative effect on the Towy Valley SLA

- 9.11.17 The Proposed Development would be underground through much of the Towy Valley SLA. None of the existing or proposed developments included within the scope of the cumulative assessment is located within, or would have a significant effect upon, the Towy Valley SLA. There would be no sum cumulative effect on the landscape character, integrity and value of the Towy Valley SLA nor would the Proposed Development contribute to any cumulative effect.

Cumulative visual effects

- 9.11.18 Minor cumulative visual effects could occur for a small number of residential properties located towards the northern end of the Proposed Development where the proposed Development may be seen in the context of the existing wind farm at Alltwalis and/or the proposed wind farm at Brechfa West. The final section of the Proposed Development within pLCA12 and pLCA13 east of Alltwalis village is characterised by a scarcity of residential properties. There are some public footpaths in this area though some are blocked off suggesting low levels of use.
- 9.11.19 The separation distance between the Proposed Development and other energy related developments (including large and small scale wind energy and solar schemes) and the distinctly different appearance and scale of the proposed single pole overhead line suggests that cumulative visual effects (either sum or additional) would not be significant. The appearance of the single wooden pole infrastructure would have a limited visual association with the proposed

commercial scale wind turbines other than in the remote and visually contained eastern areas of pLCA13.

Conclusion

9.11.20 The initial review of the likely cumulative landscape and visual effects of the Proposed Development based on the identified scope agreed with consultees and undertaken as part of this draft ES suggests that no significant combined or additional cumulative landscape or visual effects with the Proposed Development would occur. The main issues relate to:

- Potential cumulative wirescape effects on landscape character towards the southern end of the Proposed Development in the countryside to the north of Llandyfaelog – these relate to existing overhead lines (no others are proposed) and have been judged within both the cumulative and non cumulative assessments as not significant; and
- Potential cumulative visual effects arising towards the northern end of the proposed development where combined visibility of existing and proposed wind farms and the Proposed Development may arise for some residents and users of public footpaths. These effects are considered likely to be generally minor and not significant because of the distances between the developments and their distinctly different appearances.

Inter-relationships

9.11.21 Inter-relationships occur where a specific receptor is affected in a number of different ways by the various environmental changes that a proposed development may cause. These potential environmental changes are represented by the various environmental parameters listed and considered within chapters 8 to 17 of this draft ES.

9.11.22 Landscape receptors (landscape elements, landscape character areas and landscape designations) are not subject to other categories of environmental effect. Ecological and historic aspects of the landscape and how it is

characterised, evaluated and effects upon it assessed, are an integral part of the landscape character approach and are reflected in the various Landmap aspects layers that have underpinned the assessment of landscape character effects provided in Appendix 9.2 of this assessment.

9.11.23 Visual receptors are people in various places. These are either fixed, essentially permanent locations (such as residents in their homes) or transitory (such as users of footpaths and roads). The same people in the same locations could be affected by other aspects of the Proposed Development in the following ways:

- They could be subject to changes in noise or air quality – this could potentially occur for residents living close to the construction of underground sections of the Proposed Development;
- Their use of roads could be affected by changes in levels of traffic during construction – this is unlikely to be significant in the context of this development (construction phase visual effects on road users would in any case be negligible); or
- Although strictly an indirect effect rather than an impact interaction effect, a socio-economic effect may arise where a property used as a holiday let or guest house is affected by a significant change in visual amenity.

9.11.24 The following receptors are identified as potentially subject to inter-relational effects:

- Residents at Frondeg (R96) – a property on the A485 north of Abergwili which is located within approximately 10 m of proposed trenching and may be subject to visual, noise and air quality effect (albeit probably in all cases minor and limited to a likely maximum three month period).

9.11.25 No properties known to be used as holiday lets or guest houses have been identified as subject to significant visual effects.

9.12 Summary of effects

9.12.1 The landscape and visual effects of the Proposed Development (including cumulative) have generally been identified as minor and not significant. This reflects the relatively small scale and wooden pole appearance of the proposed overhead infrastructure; the careful route alignment process undertaken; and the decision to underground the section of the route across most of the Towy valley SLA. Significant (moderate) effects would be limited to significant (moderate) visual effects for a relatively small number of residential properties, footpath users and other recreational and visitor locations (a campsite and some cycle paths). In undertaking this draft assessment consideration has been given to the need for and practicability of further design iterations to further reduce the effects identified.

9.13 References

Carmarthenshire County Council (2006) Adopted Carmarthenshire Unitary Development Plan

Carmarthenshire County Council (2011) Carmarthenshire Deposit Local Development Plan

Cigre (1999) High Voltage Overhead Lines Environmental Concerns, Procedures, Impacts and Mitigations

Council of Europe (2000) European Landscape Convention

Department for Communities and Local Government (2012) National Planning Policy Framework (NPPF)

Department for Energy and Climate Change (2011) Overarching National Policy Statement for Energy (EN-1)

Department for Energy and Climate Change (2011) National Policy Statement for Renewable Energy Infrastructure (EN-3)

Department for Energy and Climate Change (2011) National Policy Statement for Electrical Networks Infrastructure (EN-5)

National Grid (2012) General approach to options appraisal and to the design and routeing of new electricity transmission lines

Natural Resources Wales (2013) LANDMAP Guidance Note 1: Guidance for Wales LANDMAP and Special Landscape Areas

Natural Resources Wales (2013) LANDMAP Guidance Note 3: Using Landmap for Landscape and Visual Impact Assessment of Onshore Wind Turbines

Natural Resources Wales (2013) LANDMAP Methodology: Guidance for Wales

Scottish Natural Heritage and the Countryside Agency (2002) Landscape Character Assessment: Guidance for England and Scotland

SSE (2010) Design guidance for Scotland - High Voltage Wood Pole Transmission and Distribution Main Interconnector Lines In Rural Landscapes, Detailed Routeing Guidelines

The Countryside Agency (now Natural England) (2002) Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity

The Landscape Institute and the Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3)

The Landscape Institute (2011) Advice 01/11 – Photography and Photomontage in Landscape and Visual Impact Assessment

The Planning Inspectorate (2014) Scoping Opinion Proposed Brechfa Forest Connection Project

The Welsh Government (2014) Planning Policy Wales: Edition 7

The Welsh Government (2009) Woodlands for Wales, the Welsh Assembly Government's Strategy for Woodlands and Trees

Western Power Distribution (2014) EIA Scoping Report July 2014 - v.01

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10 Ecology

10.1 Introduction

- 10.1.1 This chapter of the draft ES assesses the predicted ecological impacts that may arise from construction and operation of the proposed grid connection. It does so by means of an Ecological Impact Assessment (EclA) following principles set out in the Guidelines for Ecological Impact Assessment published by the Chartered Institute of Ecology and Environmental Management (CIEEM 2006).

10.2 Legislation and policy context

- 10.2.1 A summary of relevant legislation, criteria and standards as well as national, regional and local policy is included here. Furthermore in Chapter 3 a full assessment of compliance with relevant policies is completed.

National Policy

National Policy Statements

- 10.2.2 The Planning Act 2008 requires that when deciding an application the decision-maker must have regard to the relevant National Policy Statement (in addition to the local impact report and other matters). NPS provide the primary policy basis for the consideration of nationally significant infrastructure projects. National Policy Statement EN-1 is the overarching national policy statement for energy whilst National Policy Statement EN-5 is specific to Electricity Networks Infrastructure.

Overarching National Policy Statement for Energy (EN-1)

- 10.2.3 Part 4 of the NPS provides policy and guidance concerning Habitats and Species Regulations and at Part 5 policy and guidance on biodiversity conservation.

Habitat and Species Regulations

- 10.2.4 Paragraph 4.3.1 states that under the Habitats and Species Regulations (2010), the decision-maker must consider whether the project will have significant effects on a European site or any site to which the same protection is applied, either alone or in combination with other plans or projects. If an Appropriate Assessment is required the applicant must provide information that would enable it to conduct such an assessment, which should include any mitigation measures proposed to minimise or avoid the likely effects.
- 10.2.5 Information has been provided by the applicant in response to this requirement and is contained within this chapter of the draft ES and the application will be accompanied by a HRA Screening report.

Biodiversity and Geological Conservation

- 10.2.6 Part 5.3 of the NPS states, at paragraph 5.3.3 that “where development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity” and demonstrate how the project has taken advantage of opportunities to conserve and enhance biodiversity conservation interests.
- 10.2.7 Such information is included within the scope of the assessment presented within this chapter along with the measures taken to conserve and enhance such interests.
- 10.2.8 Paragraph 5.3.8, states that the decision-maker will ensure that appropriate weight is attached to designated sites of international, national and local importance, protected species, habitats and biodiversity interests within the wider environment. This is highlighted further through section 5.3.9 to 5.3.17, which describes the above, their different levels of importance and how the decision-maker should decide on applications which impact different types of sites, species and habitats.
- 10.2.9 The scope of the assessment contained within this chapter includes for the

identification of designated and non-designated sites and habitats, protected and non-protected species present within the study area. It also assigns levels of importance to each.

National Policy Statement for Electricity Networks Infrastructure (EN-5)

- 10.2.10 The National Policy Statement for Electricity Networks Infrastructure EN-5 provides technology-specific guidance in relation to biodiversity conservation. Part 2.7, highlights the possible issues associated with large birds and overhead lines, stating that the applicant will need to consider whether the proposed line will cause problems at any point, with particular consideration of feeding and hunting grounds, migration corridors and breeding grounds. The decision-maker should ensure that the issues have been taken into consideration and appropriate mitigation measures are taken.
- 10.2.11 The potential for large birds to be affected by overhead lines has been included within the scope of the assessment presented in this chapter.

Other Planning Policy

- 10.2.12 Whilst the NPS provide the primary basis for the determination of applications for development consent the decision-maker can consider other matters which it considers both important and relevant to its decisions. These may include other national and local planning policy.

Wales Spatial Plan Update 2008

- 10.2.13 The Wales Spatial Plan identifies six sub-regions within Wales. The Proposed Development sits at the eastern edge of the ‘Pembroke – The Haven’ sub-region. The Plan identifies five priorities under the sub-region topic ‘Valuing our Environment’ which include for the protection of the natural environment. The policy advice contained within the Plan has been taken into consideration in the preparation of this chapter.

Planning Policy Wales (Edition 7, July 2014)

- 10.2.14 Planning Policy Wales (PPW) contains guidance considered relevant to the scope of the environmental assessment. PPW is supported by a number of Technical Advice Notes (TANs).

PPW Chapter 5 Conserving and Improving Natural Heritage and the Coast

- 10.2.15 Paragraph 5.1.2 sets out the Welsh Government’s objectives for the conservation and improvement of the natural heritage, which includes geology, landforms and biodiversity and Wales’ natural beauty and amenity:
- *“promote the conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats;*
 - *ensure that action in Wales contributes to meeting international responsibilities and obligations for the natural environment;*
 - *ensure that statutorily designated sites are properly protected and managed;*
 - *safeguard protected species, and to*
 - *promote the functions and benefits of soils, and in particular their function as a carbon store.”*
- 10.2.16 Like EN-1, PPW emphasises the hierarchy of conservation designations and it states that “The Welsh Government will ensure that international responsibilities and obligations for conservation are fully met, and that, consistent with the objectives of the designation, statutorily designated sites are protected from damage and deterioration, with their important features conserved by appropriate management.” It describes the same range of receptors as those listed in EN-1.
- 10.2.17 Section 5.5 refers specifically to development management and the conservation and improvement of the natural heritage. PPW states that biodiversity and landscape consideration must be taken into account when determining individual applications and that the effect of a development proposal on wildlife or landscape can be a material consideration although it does highlight the need to balance conservation objectives with the wider economic needs of local businesses and

communities. Paragraph 5.5.5 highlights that a statutory designation does not necessarily prohibit development but that proposals for development must be carefully assessed, with specific policy for National Parks, AONB and SSSIs.

- 10.2.18 PPW provides specific policy related to protected species. It states that the presence of species protected under European or UK legislation is a material consideration if there is likely to be disturbance or harm to the species or habitat.

Technical Advice Note 5: Nature Conservation and Planning (2009)

- 10.2.19 Technical Advice Note (TAN) 5 provides advice on how the land use planning system should contribute to protecting and enhancing biodiversity conservation.

- 10.2.20 The TAN provides advice for local planning authorities on matters including:

- the key principles of positive planning for nature conservation;
- nature conservation in development management procedures;
- development affecting protected internationally and nationally designated sites and habitats; and
- development affecting protected and priority habitats and species.

- 10.2.21 Matters listed for possible consideration within PPW and TAN 5, including designated and non-designated areas, sites and habitats, biodiversity, and features in the landscape of biodiversity importance such as trees and woodlands have been included within the scope of the assessment presented in this chapter.

Local Policy

- 10.2.22 Nationally Significant Infrastructure Projects (NSIPs) are not subject to s38(6) of the Planning and Compulsory Purchase Act (2004), which states that determination of planning consent should be in accordance with the local development plan. Local planning policy does not therefore set the tests for the acceptability of NSIPs. However, as previously noted the decision-maker can consider other matters which it considers both important and relevant to its

decisions. These matters may include local planning policy.

- 10.2.23 The Proposed Development falls wholly within the boundary of Carmarthenshire County Council. As such, due consideration has also been given to the relevant policies in the adopted Carmarthenshire Unitary Development Plan (UDP) and the emerging Carmarthenshire Local Development Plan (LDP). It is anticipated that the latter document will be adopted by the end of December 2014. Those policies which are considered relevant to the scope of this chapter are listed below and they are summarised in Appendix 7.1 of this draft ES.

Carmarthenshire Unitary Development Plan (Adopted 2006)

- 10.2.24 The relevant policies are listed below:

- CDUP9- Landscape/ Environment
- GDC2- Overall Development Policy
- GDC19- Retention of Landscape Features
- EN1- Site Protection- International Sites
- EN2- Site Protection- National Sites
- EN3- Site Protection- Regional/ Local Designations
- EN5- Protection and Enhancement of Flora and Fauna
- EN6- Retention of Habitats
- EN8- Landscape Features of Major Importance for Flora and Fauna
- EN9- Site Protection- Habitats and Species of Biodiversity Concern
- EN10- Protection of Controlled Waters and Water Resources
- EN11- Ancient, Broad-Leaved and Mixed Woodlands
- EN13- Hedgerows

- EN14- Tree Preservation Orders
- UT2- Electricity Lines
- UT12- Pollution

Emerging Carmarthenshire Local Development Plan Composite Plan (October 2013)

10.2.25 The relevant policies are listed below:

- SP1- Sustainable Places and Spaces
- SP14- Protection and Enhancement of the Natural Environment
- GP1- Sustainability and High Quality Design
- EQ3- Regional and Local Designations
- EQ4- Biodiversity
- EQ5- Corridors, Networks and Features of Distinctiveness
- EP1- Water and Environmental Capacity

10.2.26 Local plan policy is consistent with national planning policy in that it provides specific protection to designated areas, sites and habitats and to protected species (e.g. CUDP EN1-3 and eCLDP EQ3). Consistent with national planning policy however, the biodiversity value of the wider environment is also recognised (e.g. CUDP EN5-8 and eCLDP EQ5). Specific landscape features with a potential value as habitats such as watercourses, trees and hedgerows are also afforded local policy protection.

Policy Conclusions

10.2.27 The Planning Act 2008 requires that the decision-maker must decide an application for energy infrastructure in accordance with the relevant NPSs. NPS EN-1 and EN-5 provide policy and guidance on matters pertaining to biodiversity

conservation and as such have informed both the scope of this chapter and the importance accorded to receptors. The decision-maker may also take into account other matters; these matters may include national and local planning policy. National and local planning policy has been reviewed and has also informed the scope of the assessment presented within this chapter.

Legislation

- 10.2.28 The Conservation of Habitats and Species Regulations (2010) transposes the requirements of the Habitats Directive (1992) and the Birds Directive (2009) into UK law. Both are European Directives aimed at conserving species and habitats through the designation and protection of Special Areas of Conservation (SACs, Habitats Directive) and Special Protection Areas (SPA's, Bird Directive). These sites form part of the Natura 2000 network.
- 10.2.29 The Wildlife and Countryside Act (1981) provides a range of protection relating to wild birds, plants and other animals including bats, great crested newt, reptiles, badger and water vole. The Countryside & Rights of Way Act (2000) strengthens the protection of Sites of Special Scientific Interest (SSSI) and protected species although some provisions have now been superseded by the Natural Environment & Rural Communities (NERC) Act (2006).
- 10.2.30 The NERC Act imposes a duty for public bodies to conserve biodiversity, including a requirement to compile a list of habitats and species of principal importance for the purpose of conserving biodiversity. The list of Species and Habitats of Principal Importance in Wales (Section 42) is the definitive reference for all statutory and non-statutory bodies involved in operations that affect biodiversity in Wales. The habitats and species on this list are referred to in this report as Section 42 habitats and Section 42 species. The list contains all UK Biodiversity Action Plan priority habitats and species known to occur in Wales in addition to species of particular conservation significance in Wales. The Carmarthenshire BAP (www.carmarthenshirebiodiversity.co.uk) has nine habitat groups and seventeen individual species listed.

- 10.2.31 The Protection of Badgers Act (1992) protects Badgers from cruelty including injury, killing and disturbance and the Wild Mammals Act (1996) protects all other wild mammals from acts of unnecessary suffering.
- 10.2.32 The Salmon & Freshwater Fisheries Act (1975) provides a legislative framework within which Salmon and freshwater fisheries in Wales are regulated. The act controls the times and permissible methods for taking or destroying fish and the mechanisms by which the passage of fish may be obstructed. The EU Water Framework Directive (2000) aims to enhance the status and prevent further deterioration of aquatic ecosystems and to reduce pollution of waterbodies.
- 10.2.33 The Hedgerow Regulations (1997) provides criteria for identifying “Important hedgerows” and provisions for protection of hedgerows.

HRA Assessment

- 10.2.34 It is a requirement of the Habitats Directive (1992), under Article 6(3) that any developments that may affect a Natura 2000 site (SAC, SPA); either individually or in combination with other plans or projects, will require a separate Habitat Regulation Assessment. For Nationally Significant Infrastructure Projects (NSIPs) such as the Proposed Development, the relevant Secretary of State is the competent authority.

10.3 Consultation and scoping overview

- 10.3.1 Extensive consultation has taken place for the Proposed Development prior to the scoping phase of the EIA, this is outlined in the Consultation Report (WPD, 2014). As part of the scoping phase of the EIA, a Scoping Report was prepared to set out the proposed approach to EIA in respect of the Proposed Development. The Scoping Report was submitted to the Secretary of State in July 2014. A Scoping Opinion (PINS, 2014) was received from the Secretary of State in August 2014 incorporating comments from a wide range of consultees.
- 10.3.2 The information and advice received during the scoping process with regard to

Ecology is summarised in Table 10.1

Table 10.1 – Summary of consultation relating to Ecology

Date and consultation phase/ type	Consultation and issue raised	Section where comment addressed
NRW Scoping Response, 08.08.14 (General Comments)	ES should provide enough information to inform any HRA	HRA Screening Report (to be provided in the final ES submission)
NRW meeting 02.10.14	Outline of the proposed content of the HRA No Significant Effects Report (NSER) to be provided to NRW to comment on prior to its completion. Carmarthen Bay SAC should also be included in the NSER.	HRA Screening Report (to be provided in the final ES submission)
NRW Scoping Response, 08.08.14	EIA should contain a specific section on how hydrological functioning of wet habitats will be protected.	See below
NRW meeting 02.10.14	Single pole installation on wet habitats is likely to have minimal impact and can be mitigated through standard construction practices which will be detailed in the ES. A specific section in the ES to cover impacts on hydrological functioning of wet habitats is not required.	Paragraph 10.9.16
NRW Scoping Response, 08.08.14 (Birds)	All potential bird species impacted by the scheme have been identified.	Appendix 10.3 Bird Technical Report
NRW meeting 2.10.14	Based on the results of the breeding and wintering bird surveys, there is no evidence for species being present along the proposed route that are susceptible to	n/a – scoped out

Date and consultation phase/ type	Consultation and issue raised	Section where comment addressed
	electrocution impacts (i.e. larger species that perch or nest on wires or poles such as storks), Therefore electrocution impacts on birds can be scoped out of the ES.	
NRW Scoping Response, 08.08.14 (Fish)	Anglers should be consulted to ensure no interference to fishing rights.	Local angling groups were invited, and attended, Stage 1 and 2 consultation events.
NRW meeting 02.10.14	Main migration period for Shad on the River Towy is between April and June and HDD of the River Towy should be avoided during this period.	Paragraphs 10.9.34 to 10.9.38.
	All ‘in-stream river works’ should be completed before 15th October 2014. This embargo runs until the 15th April each year to protect spawning salmonids. Any open cut watercourse crossings should be completed outside of this period.	
NRW Scoping Response, 08.08.14 (Protected Species - Bats)	Riparian corridors fringed with trees should be considered as important features for bats alongside hedgerow trees, woodlands and hedgerow sections.	Appendix 10.1 Bat Technical Report
	Trees with potential to support bats and potentially affected by the development should be subject to more detailed surveys. This should include climbing	Appendix 10.1 Bat Technical Report

Date and consultation phase/ type	Consultation and issue raised	Section where comment addressed
	inspections, dawn re-entry surveys and/or dusk emergence surveys.	
NRW Scoping Response, 08.08.14 (Protected Species - Bats)	Manual transect and automated bat detector surveys should be carried out May to September inclusive to inform mitigation where roosts and/or foraging or commuting routes will be affected.	Appendix 10.1 Bat Technical Report
NRW meeting 19.9.14	<p>Hedgerows removal within the underground sections has been limited to 8 m, significantly reducing the potential impact on foraging and commuting bats, and removing the necessity for detailed bat activity surveys here.</p> <p>The scale of the clearance required within woodland blocks/riparian tree lines for the overhead sections has been significantly reduced and will focus on trees under and adjacent to the line that are tall enough to touch or fall on the line. Ground cover will always be present, large trees will be sensitively pruned (and retained wherever possible), and small trees such as hazel will be coppiced and encouraged to grow under the line. As a result, the installation of the overhead lines will not create gaps in flight lines and commuting routes for bats. Therefore</p>	Appendix 10.1 Bat Technical Report

Date and consultation phase/ type	Consultation and issue raised	Section where comment addressed
	the scope of bat activity surveys has been reduced.	
NRW Scoping Response, 08.08.14 (Protected Species - Bats)	Expect mitigation to comprise sensitive clearance of roosts as well as the provision of alternative roosts.	Paragraphs 10.9.22 to 10.9.24.
NRW Scoping Response, 08.08.14 (Protected Species - Dormice)	Both nest tube and nut searches should be used as survey methods. EIA to define what applicant considers to be 'sufficiently well connected' when describing areas selected for survey. The requirement for further survey should be guided by distribution of records. Mitigation methods should include sensitive clearance of Dormouse habitat and provision of replacement habitat.	Appendix 10.4 Dormouse Method Statement Appendix 10.4 Dormouse Method Statement Paragraphs 10.9.30 to 10.9.33
NRW meeting 19.9.14	Dormouse survey results will be reported within a Draft European Protected Species Licence and submitted as an appendix to the ES.	Appendix 10.4 Dormouse Method Statement
NRW Scoping Response, 08.08.14 – Otters and Water Vole	Survey proposals for Otter and Water Vole are welcomed.	Appendix 10.6 Otter & Water Vole Technical Report
NRW Scoping Response 08.08.14 – Great Crested Newts	Great Crested Newts can be scoped out of the EIA.	n/a – scoped out
NRW meeting 02.10.14	<i>[With reference to PINS Scoping Report Para 3.20]</i> Pine Martin and Red	Paragraphs 10.5.62 to 10.5.65

Date and consultation phase/ type	Consultation and issue raised	Section where comment addressed
	Squirrel should be scoped out from detailed surveys, based on reasons outlined in the Brechfa Scoping Report.	
NRW meeting 02.10.14	<i>[With reference to PINS Scoping Report Para 3.21]</i> There are no records of White-clawed crayfish from the Towy catchment. White-clawed crayfish can be scoped out of the EIA.	n/a – scoped out
NRW meeting 02.10.14	<i>[With reference to PINS Scoping Report Para 4.9]</i> Assessment of potential impacts and mitigation for the River Towy SSSI will be covered in the HRA NSER and the ES. Allt Penycloed Stream Section SSSI (notified for its fossil assemblages) will not be impacted by the proposed overhead line and can be scoped out of the EIA.	HRA Screening Report (to be provided in the final ES submission) n/a – scoped out
CCC Scoping Response 11.08.14 – Ecological Enhancement	Net gain for biodiversity should be explored through an Ecological Enhancement chapter or annex.	Section 1.9 and 1.10
CCC Scoping Response 11.08.14 – Biological Records	WWBIC to be contacted to provide updated biological records.	Paragraph 10.4.1
CCC Scoping Response 11.08.14 – Biological Records	ES to address impacts on relevant SAC or SSSI features.	Paragraphs 10.6.4 to 10.6.7
CCC Scoping Response 11.08.14 – Cumulative	Cumulative impact assessment should be	Section 10.12

Date and consultation phase/ type	Consultation and issue raised	Section where comment addressed
Impacts	undertaken.	
CCC Scoping Response 11.08.14 – Peat	Development on peat should be avoided.	Not applicable to the Proposed Development
CCC Scoping Response 11.08.14 – Hedgerows	No need to apply under the Hedgerow Regulations for hedgerow removals. Any proposals to widen existing access points through hedgerows should be set out in the ES. Maximise hedgerow retention. Any tree surgery required to permit the passage of construction vehicles should be done in winter and in accordance with BS 3998. Any hedgerow widening to take place outside the bird nesting season (late Feb/beginning of March to end of July) or under guidance of an ecologist.	For note Not applicable to the Proposed Development Paragraphs 10.9.27 to 10.9.29
CCC Scoping Response 11.08.14 – EIA Scoping Summary Report	Pollution control measures will need to be adequately addressed to inform the HRA for the River Towy crossing. Noise and vibration has the potential to affect ecological receptors, particularly in relation to the SAC and SSSI and must be addressed in the ES. Ecological impacts of transport and access must be adequately addressed in the ES.	Paragraph 10.9.3 Paragraph 10.9.1
CCC Scoping Response 11.08.14 –	Reference should be made to Otter being a feature of	Paragraph 10.5.3

Date and consultation phase/ type	Consultation and issue raised	Section where comment addressed
Comments on Ecological Section	the Afon Tywi SAC and impacts should be addressed in the ES and HRA. Cumulative impacts should also be considered with regard to Otter. Impacts to fish should be dealt with in the ES as well as the HRA.	Paragraphs 10.6.53 to 10.6.57

10.4 Assessment methodology

Establishment of Baseline Environment

Desk Based Assessment

- 10.4.1 Information on statutory and non-statutory sites, notable species and other details of relevance to the Proposed Development were requested from a number of sources listed in Table 10.2. The search area covered a 2 km buffer around the Proposed Development (a 5 km buffer was used for bats).

Table 10.2 – Summary of Ecology Desk Study Sources

Organisation	Contact and information provided
Natural Resources Wales (NRW)	Internet search included: <ul style="list-style-type: none"> • Statutory designated site GIS layers • Statutory designated site citations Jonathan Rothwell. Information included: <ul style="list-style-type: none"> • Phase 1 habitat GIS layers Huw Williams. Information included: <ul style="list-style-type: none"> • Protected and notable species records • Information of important habitats
West Wales Biodiversity Information Centre (WWBIC)	Vicky Swann. Information requested included: <ul style="list-style-type: none"> • Protected and notable species records • Non-statutory designated site locations • Non-statutory designated site citations

Organisation	Contact and information provided
National Biodiversity Network (NBN)	Internet search for specific species records in the region
Natural Resources Wales (NRW) /	Steven Pocock. Information included: <ul style="list-style-type: none"> • Ancient Woodland Inventory GIS layers • Protected and notable species records
Carmarthenshire County Council (CCC)	Internet search included: <ul style="list-style-type: none"> • Carmarthenshire Local Biodiversity Action Plan Richard Jones. Information included: <ul style="list-style-type: none"> • Protected and notable species records • Information on important habitats
Sam Bosanquet, Senior Habitat Surveyor, NRW	Information on ramparted peatlands or 'pingos'.

Ecological Surveys

- 10.4.2 Ecological scoping surveys were undertaken on the Proposed Development route between January 2013 and October 2014 by RSK. Surveys were undertaken at varying times of the year within this timeframe, subject to access provisions. The surveys an extended Phase 1 Habitat Survey to identify habitats of conservation value and to assess the suitability of the habitats for legally protected animals and notable species. These surveys identified where further survey effort was required.
- 10.4.3 The requirement for further surveys and recommended survey methodologies was outlined in the Scoping Report (WPD, 2014). As the Scoping Report was submitted prior to the completion of any Phase 1 surveys, the recommended surveys outlined in the Scoping Report were based on professional judgement, knowledge of the area and general habitats, and experience of similar schemes.
- 10.4.4 Following consultation responses to the scoping report and project refinements such as the removal of the Bryn Llywelyn wind farm connection, some revisions to the survey scope and methods were required. These are outlined in the consultation responses in Table 10.1.

- 10.4.5 A full list of agreed Phase 2 ecological surveys carried out on the proposed cable route between March 2013 and October 2014 is provided in Table 10.3. Detailed accounts of survey methodologies are provided in the appropriate technical reports provided in Appendix 10.1 to 10.6.

Table 10.3 – Phase 2 ecological surveys undertaken

Species/ Habitats	Description	Survey Period/s
National Vegetation Classification (NVC) Surveys	Focused on potentially valuable botanical sites identified during the Phase 1 Habitat Survey. Vegetation types at these sites were described using the methodology of the NVC and detailed lists of vascular plants and bryophytes were compiled.	July – September 2014
Hedgerow Survey (underground cable sections only)	Hedges were assessed against wildlife and landscape criteria in the Hedgerow Regulations 1997 to identify 'important' hedgerows.	July – September 2014
Badger	Locations of setts and foraging activity were recorded during animal walkover surveys. Any setts found were accurately mapped and assessed.	January 2013 – October 2014
Bat Tree Assessment	All mature trees suitable for roosting bats within falling distance of the OHL or within the working width of the underground sections were inspected from the ground using binoculars to identify any features that might be suitable for roosting bats. All trees were graded according to their	July 2013 – October 2014

Species/ Habitats	Description	Survey Period/s
	potential to support roosting bats, marked on maps, and tagged.	
Bat Tree Inspections	Trees assigned high potential for roosting bats (category 1 and 1*) were fully inspected for roosts by climbing survey (using ladders, ropes and harnesses).	September – November 2014
Bat Activity Survey	Activity surveys were undertaken where the route crossed woodlands with many mature trees (including riparian woodlands). A combination of static detectors and manual surveys were used.	August 2014, September 2014
Winter Bird Surveys	Transect surveys were carried out monthly during the survey period in key areas.	October 2013 – March 2014
Breeding Bird Surveys	A sample of 20 sites was selected to represent habitats across the route. These were surveyed monthly throughout the survey period.	April – June 2014
Raptor Vantage Point Surveys	Five vantage points were selected and surveyed monthly throughout the survey period.	March – July 2014
Dormouse	Dormouse tubes were positioned in suitable habitat and checked for nests between April and October. Nut searches were carried out in September 2014 in survey areas where fruiting hazel was present.	April 2014 – October 2014

Species/ Habitats	Description	Survey Period/s
Otter	Surveys concentrated in areas 100m upstream and 100m downstream of crossing points on all suitable watercourses. The watercourses were surveyed for signs of Otter including footprints (padding), droppings (spraints), feeding evidence, slides, paths and holts or lying-up places.	September - October 2014
Water Vole	Surveys concentrated in areas 100m upstream and 100m downstream of proposed crossing points on all suitable watercourses and involved systematic searching for Water Vole field signs including feeding signs, latrines, burrows, footprints, runways, food piles and actual sightings.	September - October 2014
Marsh Fritillary butterfly	Searches for larval webs on food plants were undertaken in three areas on the route.	September 2014

Identification and assessment of impacts and mitigation measures

- 10.4.6 The first stage of an ecological impact assessment (EclA), following the ‘Guidelines for Ecological Impact Assessment’ set out by the Chartered Institute of Ecology and Environmental Management (CIEEM 2006), is ‘determining value’ of ecological features or ‘receptors’. The CIEEM guidelines places the emphasis on identifying different aspects of ecological value including designations, biodiversity value, potential value, secondary or supporting value, social value, economic value, legal protection and multi-functional features. These values are applied to the receptors within a defined geographical context and examples can be seen in Table 10.4.

Table 10.4 – Receptor Sensitivity

Receptor Value	Examples
International (i.e. Europe)	<p>An internationally designated site or candidate site, or an area which the relevant statutory nature conservation organisation has determined meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified.</p> <p>A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole.</p> <p>A European protected species listed in the Conservation (Natural Habitats, &c.) Regulations 1994.</p>
National (i.e. Wales)	<p>A nationally designated site or a discrete area which NRW has determined as meeting the published selection criteria for national designation, e.g. SSSI selection guidelines (irrespective of whether it has yet been notified).</p> <p>A viable area of a Section 42 Habitat, or smaller areas of such habitat which are essential to maintain the viability of a larger whole.</p> <p>Any regularly occurring population of a Section 42 Species.</p>
Regional (i.e. South Wales)	<p>Viable areas of key habitat identified in the Regional BAP, but not identified as Section 42 Habitats, or smaller areas of such habitat that are essential to maintain the viability of a larger whole.</p> <p>Viable areas of key habitat identified as being of Regional value in the appropriate Natural Area profile.</p> <p>Any regularly occurring, locally significant population of a species listed as nationally scarce (present in 16-100 10km squares in the UK) or in a Regional Authority BAP or relevant Natural Area profile on account of its regional rarity or localisation.</p> <p>A regularly occurring, locally significant number of a species identified as important</p>

Receptor Value	Examples
	<p>(not identified as a Section 42 Species) on a regional basis.</p> <p>Any regularly occurring population of a nationally important species which is threatened or rare in the region.</p>
County (i.e. Carmarthenshire)	<p>County Council/Unitary Authority designated sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on defined ecological criteria and Wildlife Trust sites.</p> <p>Viable areas of habitat identified in a County BAP.</p> <p>A regularly occurring, locally significant number of a species identified as important (not identified as a Section 42 Species) on a county/metropolitan basis.</p> <p>Semi-natural woodland greater than 0.5 ha which is considered to be in 'good condition'.</p>
Local	<p>Semi-natural woodland smaller than 0.25 ha.</p> <p>Diverse and/or ecologically valuable hedgerows.</p> <p>Diverse and/or ecologically valuable grassland.</p> <p>Habitat included in an agri-environment scheme but not otherwise containing species or habitats listed above.</p> <p>Common species legally protected primarily for reasons of animal welfare (Badger, reptiles).</p> <p>Established semi-natural or artificial habitats of limited ecological value when assessed in isolation that nevertheless offer a range of opportunities for widespread and commonly occurring species within the wider landscape.</p>
Site	Features of value to the immediate area only.

10.4.7 The next stage of an EclA is to predict and characterise the likely change and impact on the ecological receptors identified. It is necessary to consider all of the following parameters;

- Whether the change is positive or negative;

- The magnitude or severity of the change;
- The extent of the area subject to a predicted impact;
- The duration the impact is expected to last prior to recovery or replacement of the resource or feature;
- Whether the impacts are reversible, with recovery through natural or spontaneous regeneration, or through the implementation of mitigation measures or irreversible, when no recovery is possible within a reasonable timescale or there is no intention to reverse the impact;
- The timing and frequency of the impact, i.e. conflicting with critical seasons or increasing impact through repetition.

10.4.8 The CIEEM Guidelines also stress consideration of the likelihood that ‘a change/activity will occur and also the degree of confidence in the assessment of the impact on ecological structure and function’. Likelihood is then specified using the following terms:

- certain (95% probability or higher);
- probable (50-94% probability);
- unlikely (5-49% probability); or
- extremely unlikely (less than 5% probability).

10.4.9 The final step is to assess whether impacts are ecologically significant or not. In this chapter, it is the assessment of the significance of residual impacts, i.e. the significance of the impacts that are predicted to remain after the implementation of mitigation measures.

10.4.10 Significance should be assessed solely on an ecological basis. There are two key aspects to this. Firstly, what constitutes a significant ecological impact is determined in relation to the concept of ‘integrity’. Secondly, it is always stated in relation to a geographical context i.e. whether the receptor is internationally,

nationally, locally etc important. Thus an impact is described as significant if it affects the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area. Integrity is defined as *‘the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.’* The impact is then significant at the level at which the ecological receptor has value, e.g. national for a SSSI. An impact that does not affect the integrity of a receptor may still be significant at some geographical level below that at which the receptor was deemed to be valuable, e.g. loss of common birds may not affect the integrity of an SPA valued at international level, but it may still be a significant impact at the local level.

Uncertainties

- 10.4.11 Sufficient data has been collected to inform the EclA. Further details on technical difficulties or uncertainties relating to the suite of ecological surveys undertaken are provided in the accompanying technical reports (Appendices 10.1 to 10.6).

10.5 Baseline conditions

- 10.5.1 Features of interest are described in ‘target notes’, which are also numbered, these are shown on the Phase 1 Habitat Survey Maps (Figure 10.2).

Statutory Designations

Afon Tywi SSSI/ SAC

- 10.5.2 The Afon Tywi (River Towy) is designated as a SAC and SSSI and qualifies as the Section 42 habitat ‘rivers’. However, the botanical interest at the crossing point is low as the banks are eroding and support mostly improved grassland or tall ruderal vegetation, together with the invasive plant *Fallopia japonica* (Japanese Knotweed).
- 10.5.3 The primary reason for the designation of this site as an SAC is its importance for

spawning *Alosa fallax* (Twaiite Shad) and for breeding and resting sites for Otter (both Annex II species). Additional qualifying features of the site are the presence of five other fish species of conservation significance: *Petromyzon marinus* (Sea lamprey), *Lampetra planeri* (Brook lamprey), *Lampetra fluviatilis* (River lamprey), *Alosa alosa* (Allis shad) and *Cottus gobio* (Bullhead).

Non Statutory Designations

10.5.4 There is no official list of Local Wildlife Sites for Carmarthenshire. However, the Guidelines for the Selection of Local Wildlife Sites in South Wales (incorporating Carmarthenshire) (The South Wales Wildlife Sites Partnership, 2004) were consulted in the evaluation of habitats and sites. Based on the primary criteria for Wildlife Site selection, specifically rarity, size, naturalness/typicalness and diversity, the following sites would clearly qualify as Local Wildlife Sites (LWSs);

- Bog at Rhydargaeau (Target Note 35) – degraded bog habitat referable to **M25 *Molinia caerulea-Potentilla erecta*** mire with associated pingos¹ and bog species. It is part of a larger habitat complex that extends to the west.
- Pingo complex at Alltwalis (centred at Target Note 44d) – several semi-improved or unimproved fields containing neutral and marshy grassland and flushes with underlying pingo topography. There are also populations of *Succisa pratensis* (Devil’s-bit Scabious), which is the larval food plant of the Marsh Fritillary butterfly, a Section 42 priority species.

Woodland & Scrub

Section 42 Habitats

10.5.5 The route generally avoids significant areas of semi-natural woodland, though woodland referable to the Section 42 habitats ‘lowland mixed deciduous woodland’ and ‘wet woodland’ is crossed at Target Notes 1, 27a and 48a.

¹ ‘Pingos’ are ring-shaped ridges of glacial soil formed at the last Ice Age. They are also referred to as Ramparted Ground-ice Depressions. They typically support bog vegetation.

- 10.5.6 Woodland at Target Note 1 is associated with a steep-sided stream valley, Nant Morlais. It has a semi-natural structure and species-composition in general, with ‘wet woodland’ along the stream referable to the NVC type **W7 *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland**, and drier ‘lowland mixed deciduous woodland’ on the upper slopes referable to **W8 *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland**. Though not listed as ancient woodland, the ground flora includes several ancient woodland indicators (AWI) species suggesting that the immediate stream corridor, at least, has been continuously wooded for a long time.
- 10.5.7 ‘Lowland mixed deciduous woodland’ at Target Notes 27a and 48a comprises narrow corridors less than 20 m wide. These woodland strips are associated with roadsides or ancient boundary features and have ground floras supporting several AWIs.
- Other Woodland & Scrub*
- 10.5.8 Other examples of broad-leaved semi-natural woodland on the route are very narrow corridors or small, fragmentary stands.
- 10.5.9 Plantation woodland includes extensive conifer plantations in Brechfa Forest, and a few small stands of mixed or coniferous species. Small portions individually have very low nature conservation value.
- 10.5.10 Areas of scrub on the route are of widespread and common types, small in extent, and of low nature conservation priority.
- 10.5.11 There are numerous mature trees associated with woods, hedges and watercourses, together with occasional individual trees in fields. Mature trees are important landscape features with intrinsic ecological value that cannot be replaced in the short-term.

Hedgerows

Section 42 Habitats

- 10.5.12 The landscape crossed by the route contains a dense network of hedges which, judged on their species diversity and presence of features such as banks, are mostly likely to be ancient and/or species-rich. With the exception of non-native ornamental hedges they qualify as Section 42 habitats ‘hedgerows’, and many are likely to be ‘Important’ hedges based on the wildlife and landscape criteria of The Hedgerow Regulations 1997. Detailed hedgerow surveys were not carried out at each hedgerow along the route of the OHL as they will not be directly impacted.
- 10.5.13 Six hedgerows were assessed within the proposed underground section in the Towy Valley. All qualified as ‘Important’ under the Hedgerow Regulations (1997).

Grassland & Marsh

Section 42 Habitats

- 10.5.14 Small remnants of ‘unimproved lowland acid grassland’ are found in a few field corners or in drier parts of marshy pastures, and are avoidable.
- 10.5.15 Species-rich unimproved neutral grassland is generally confined to marginal areas such as roadsides and field corners where it is not generally at risk of impacts. The largest areas are associated with the pingo complex south-west of Alltwalis (which is also assessed as a potential non-statutory site). They are grazed examples of **MG5c *Cynosurus cristatus* – *Centaurea nigra* grassland, *Danthonia decumbens* sub-community** and qualify as the Section 42 habitat ‘lowland meadows’.
- 10.5.16 Marshy grassland is a frequent habitat type on the route and accounts for most of the unimproved or poorly-drained pasture land encountered. The better examples are mostly referable to the NVC types **M23a *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community** or **M23b *Juncus effusus* sub-community**, or very locally **M25 *Molinia caerulea-Potentilla erecta* mire**, and qualify as the Section 42 habitat ‘purple moor grass and rush pasture’. These grasslands are the main habitat of *Carum verticillatum* (Whorled Caraway) on the route.

Other Grassland

- 10.5.17 Improved and poor semi-improved grasslands are the dominant habitat along the route, and amenity grassland is found in one location. They are of generally low botanical interest and have negligible nature conservation value.
- 10.5.18 Semi-improved neutral grasslands on the route have higher nature conservation than the predominant improved pastures, but they are generally species-poor and not especially sensitive to impacts from the proposed works.
- 10.5.19 Species-poor marshy grasslands referable to the NVC type **MG10 *Holcus lanatus*-*Juncus effusus* rush-pasture** have similar nature conservation value to the semi-improved grasslands.

Tall Herb & Fern

- 10.5.20 Dense species-poor stands of *Pteridium aquilinum* (Bracken), for example at Target Note 31a, are generally considered to have low nature conservation value.
- 10.5.21 Stands of tall ruderal species such as *Urtica dioica* (Common Nettle) and *Cirsium arvense* (Creeping Thistle) are ubiquitous in the UK lowlands and are of negligible nature conservation value.

Mire

Section 42 Habitats

- 10.5.22 Bog at Rhydargaeau is also assessed as a potential non-statutory site and comprises a degraded example of the Section 42 habitat ‘blanket bog’ that is more widely referable to ‘purple moor grass and rush pasture’. It is the only example of bog on the route.
- 10.5.23 Small areas of rush-pasture with Sphagnum moss at the pingo complex south-west of Alltwalis are examples of the NVC type **M6 *Carex echinata*-*Sphagnum recurvum/auriculatum* mire** and the Section 42 habitat ‘purple moor grass and rush pasture’. They add to the site diversity but are easily avoidable.

Ponds & Watercourses

Section 42 Habitats

- 10.5.24 The River Towy is designated as a SAC and SSSI and qualifies as the Section 42 habitat ‘rivers’. It is assessed in detail under statutory sites.
- 10.5.25 The pond at Target Note 44a is a Section 42 habitat ‘ponds’. However, it is more notable for its introduced and invasive plant species such as *Crassula helmsii* (New Zealand Pigmyweed) than it is for its native flora.

Other Watercourses

- 10.5.26 Other small watercourses crossed by the route are typical of small, lowland streams and usually have scrub or trees along their banks. The Afon Morlais at Target Note 1 is faster-flowing and has extensive semi-natural woodland on its valley slopes and a modest bryophyte interest.
- 10.5.27 Ditches in the Towy valley are largely dominated by the invasive plant *Impatiens glandulifera* (Himalayan Balsam), which is compromising their nature conservation value.

Notable Plant Species

- 10.5.28 No rare or uncommon plant species were recorded. However, *Carum verticillatum* (Whorled Caraway) is of interest as it is largely restricted to Wales and western regions within the UK. It is frequent and locally abundant in marshy grasslands on the route.

Invasive Plant Species

- 10.5.29 *Impatiens glandulifera* (Himalayan Balsam) is widespread and locally abundant along watercourses and *Fallopia japonica* (Japanese Knotweed) occurs as small scattered stands. *Crassula helmsii* (New Zealand Pigmyweed) and *Elodea canadensis* (Canadian Waterweed) are present in a pond.

Badgers

10.5.30 There are records of Badgers scattered across the desk-study data search area.

10.5.31 Badger surveys were completed during the ecological scoping surveys. Seventeen separate Badger setts were identified along the proposed route, although no setts or evidence of activity were found within the underground section at the Towy Valley. The details for each of the setts are summarised in Table 10.5. A confidential figure indicating locations of the setts is available on request.

10.5.32 Table 10.5 – Badger setts identified along proposed cable route

Sett number	Description	Sett Status
1	Recently dug Badger sett (one hole) – active	Annex Sett
2	Recently dug Badger sett (one hole) – active	Annex Sett
3	Four hole sett in hedge bank – active	Annex Sett
4	Three hole sett in hedge bank – active	Annex Sett
5	Four hole sett in hedge bank – active	Annex Sett
6	Two hole sett in hedge bank – active	Annex Sett
7	Three hole sett in hedge bank – active	Annex Sett
8	Two hole sett in hedge bank – active	Annex Sett
9	Disused Badger sett	Former Annex Sett
10	Disused Badger sett	Former Annex Sett
11	Two hole sett in hedge bank – active	Annex Sett
12	Four hole sett in hedge bank – active	Annex Sett
13	Two hole sett in hedge bank – active	Annex Sett
14	Single hole sett in hedge bank – active	Annex Sett
16	Two hole sett in hedge bank – active	Annex Sett

Sett number	Description	Sett Status
17	Single hole sett in hedge bank - active	Annex Sett

Bats

10.5.33 The following bat species are listed as Species of Importance in the Carmarthenshire LBAP:

- *Myotis bechsteinii* (Bechstein's Bat);
- *Nyctalus noctula* (Noctule);
- *Pipistrellus pygmaeus* (Soprano Pipistrelle);
- *Plecotus auritus* (Brown Long-eared Bat);
- *Rhinolophus ferrumequinum* (Greater Horseshoe Bat); and
- *Rhinolophus hipposideros* (Lesser Horseshoe Bat).

10.5.34 The background data search indicated that the following species had been recorded in the data search area (5km from the Proposed Development): *Rhinolophus ferrumequinum* (Greater Horseshoe), *Rhinolophus hipposideros* (Lesser Horseshoe), *Pipistrellus pygmaeus* (Soprano Pipistrelle), *Pipistrellus pipistrellus* (Common Pipistrelle), *Plecotus auritus* (Brown Long-eared), *Nyctalus noctula* (Noctule), *Myotis nattereri* (Natterer's), *Myotis daubentonii* (Daubenton's), *Myotis mystacinus* (Whiskered) and *Myotis brandtii* (Brandt's).

10.5.35 No bat roosts were found during the tree roost surveys.

10.5.36 Results from the static SM2Bat+ detectors show that the local area is utilised by a wide variety of different bat species. At least seven different species of bat were identified during the surveys across all locations. The identification of the following bat species (or genus) were ascertained from the recordings:

- Common Pipistrelle;

- Soprano Pipistrelle;
- Brown Long-eared;
- Noctule;
- Leisler's;
- Serotine; and
- Myotis sp.

10.5.37 Soprano Pipistrelle and Common Pipistrelle were the most commonly encountered species, occurring across all of the seven survey locations; followed by Noctule and bats belonging to the genus Myotis.

10.5.38 The highest activity levels were attributed to Soprano Pipistrelle (total of 15,402 passes across the entire survey period), followed by Common Pipistrelle (2,704), Myotis sp. (129) and Noctule (78). All other bat species occurred infrequently during the surveys (<20 passes over the entire survey period).

10.5.39 Bat activity levels varied across the seven different survey locations, ranging from 3,533 passes (Location 2) to just 24 passes (Location 4) in a single night. Locations 2 and 6 were identified as having the highest levels of bat activity with a mean frequency of 3,448 and 1,875 bat passes recorded respectively, across all nights.

10.5.40 Full details are provided in the accompanying Bat Technical Report at Appendix 10.1.

Birds

10.5.41 Species records received from Carmarthenshire County Records Centre within 2 km of the Proposed Development included the following notable species:

- Barn Owl (WCA Schedule 1, Amber list)
- Black Redstart (WCA Schedule 1, Amber list)

- Brambling (WCA Schedule 1)
- Bullfinch (UK BAP, Red list)
- Common Crossbill (WCA Schedule 1)
- Curlew (UK BAP, Red list)
- Dipper (Amber list)
- Fieldfare (WCA Schedule 1, Amber list)
- Golden Plover (Birds Directive Annex 1, Red list)
- Goldeneye (WCA Schedule 1)
- Goshawk (WCA Schedule 1)
- Grasshopper Warbler (Red list)
- Green Sandpiper (WCA Schedule 1)
- Hen Harrier (BD Annex 1, WCA Schedule 1, Red list)
- Hobby (WCA Schedule 1, Amber list)
- House Sparrow (UK BAP, Amber list)
- Jack Snipe (Amber list)
- Kestrel (Red list)
- Kingfisher (BD Annex 1, WCA Schedule 1, Amber list)
- Lapwing (UK BAP, Red list)
- Lesser Spotted Woodpecker (UK BAP, Red list)
- Little Egret (BD Annex 1)
- Manx Shearwater (Amber list)

- Marsh Tit (UK BAP)
- Merlin (BD Annex 1, WCA Schedule 1, Amber list)
- Peregrine Falcon (BD Annex 1, WCA Schedule 1)
- Red Kite (BD Annex 1, WCA Schedule 1, Amber list)
- Redwing (WCA Schedule 1, Amber list)
- Reed Bunting (UK BAP, Amber list)
- Sand Martin (Amber list), Skylark (UK BAP, Amber list)
- Snipe (Amber list)
- Snow Bunting (WCA Schedule 1, Amber list)
- Song Thrush (UK BAP, Amber list)
- Spotted Flycatcher (UK BAP)
- Starling (UK BAP, Red list)
- Swift (Amber list)
- Teal (Amber list)
- Tree Pipit (UK BAP, Amber list)
- Whimbrel (WCA Schedule 1, Amber list)
- Whooper Swan (BD Annex 1, WCA Schedule 1, Amber list)
- Wigeon (Amber list)
- Wood Warbler (UK BAP, Red list)
- Woodcock (Amber list)

10.5.42 The wintering and breeding bird surveys focused on a range of habitat types along the route.

- 10.5.43 The wintering bird assemblage recorded from the surveys was large and varied. The assemblage was more important in the lowland areas, particularly in the Towy Valley. Species included various water birds (gulls and wildfowl) and Peregrine and Red Kite. In the upland areas the assemblage recorded was mainly passerine species but included Goshawk and Red Kite.
- 10.5.44 The breeding bird assemblage recorded from our surveys was very diverse due to the various habitats covered. In particular, upland areas had important species assemblages. Numerous UK BAP and BoCC species were recorded.
- 10.5.45 Barn Owl, Common Crossbill, Goshawk, Kingfisher, Peregrine, and Red Kite are species protected under Schedule 1 of the Wildlife and Countryside Act 1981 and were recorded during surveys. Red Kite is the only species to be confirmed as breeding, but it is probable that all of these species breed in the area of the route.
- 10.5.46 Full details are provided in the accompanying Bird Technical Report in Appendix 10.3.

Dormouse

- 10.5.47 *Muscardinus avellanarius* (Dormouse) is listed as a Species of Importance in the Carmarthenshire LBAP. The background data search revealed six records for Dormouse within a 2 km buffer around the Proposed Development.
- 10.5.48 The phase 1 surveys identified areas on site that were suitable for Dormice. Generally these were areas of dense woody vegetation, with a wide diversity of woody species contributing to three-dimensional habitat complexity, a number of food sources, plants suitable for nest-building material, and good connectivity to other areas of suitable habitat. A total of 571 nest-tubes were placed at 13 locations along and adjacent to the proposed route during Dormouse surveys.
- 10.5.49 Dormouse presence was confirmed at one site only – Site 1 south of Carmarthen. This site had adults, juveniles and nests, indicating a healthy breeding population.
- 10.5.50 Nut searches did not show presence in any areas where Dormice had not

previously been recorded.

- 10.5.51 Nest tube surveys for Dormice were also carried out in and around Brechfa Forest by RWE in connection with the DCO application for the Brechfa West wind farm, which has been consented. No signs of Dormice were found.
- 10.5.52 Full details are provided in the Dormouse Technical Report in Appendix 10.4.

Fish

- 10.5.53 The background data search revealed records for *Anguilla Anguilla* (European Eel) and *Alosa sp* (Shad) within 2 km of the Proposed Development. Both are listed as Species of Importance in the Carmarthenshire LBAP.
- 10.5.54 The River Towy is designated as a SAC in part because it supports a large spawning population of Twaite Shad. It also supports Sea Lamprey, Brook lamprey, River Lamprey, Allis Shad and Bullhead. Twaite Shad, Allis Shad, River Lamprey and Sea Lamprey are listed as Species of Importance in the Carmarthenshire LBAP.
- 10.5.55 The River Towy is tidal at the location of the proposed underground crossing point and therefore conditions are not appropriate for Twaite Shad spawning grounds, although they will migrate through the river at this point.
- 10.5.56 Spawning habitat for salmonids including *Salmo trutta* (Brown/Sea Trout) and *Salmo salar* (Salmon) may be present in the smaller tributaries (Target Note 22 and 24). Both are listed as Species of Importance in the Carmarthenshire LBAP.

Marsh Fritillary Butterfly

- 10.5.57 The background data search identified five records of *Euphydryas aurinia* (Marsh Fritillary butterfly) within 2 km of the Proposed Development. Marsh Fritillary are listed as a Species of Importance in the Carmarthenshire LBAP.
- 10.5.58 No evidence of Marsh Fritillary butterfly caterpillars or larval webs could be located on individual Devil's-bit Scabious plants at any of the sites surveyed. It is therefore

assumed that this species is not present and need not be considered further. Full details are provided within Appendix 10.5 Marsh Fritillary butterfly Technical Report.

Otter

- 10.5.59 The background data search identified 48 records of *Lutra lutra* (Otter) from places within 2 km of the Proposed Development. Records were identified from the River Towy and River Gwili in addition to scattered records for some of the smaller watercourses. Otter are listed as a Species of Importance in the Carmarthenshire LBAP.
- 10.5.60 All areas of wetland and adjacent habitat were assessed on their suitability to support Otter during the Phase 1 Habitat surveys. This included an assessment of water depth, water quality, vegetation, and cover.
- 10.5.61 Nine sites were identified for further detailed survey. The sites are either crossed by the proposed route where cables are to be laid underground (and will therefore be subject to ‘open cut’ or HDD construction methods) or where the overhead line would cross significant riparian corridors where mature trees (and therefore potential holts or couches) may be removed.
- 10.5.62 Evidence of Otter was recorded on seven stretches; this included multiple spraints and footprints along the river banks and one resting place (couch). Site 1 (Nant Morlais at Target Note 1) had the only confirmed Otter couch, but the spraint inside the couch was old and severely degraded, suggesting that the location has not been used recently. The presence of spraints and footprints in the remaining sites (including the River Towy and Afon Gwilli) show that Otters are present in these areas, although no confirmed holts or potential resting places were recorded. These locations are likely to be used for commuting and foraging. Full details are provided in Appendix 10.6 Otter and Water Vole Technical Report.

Pine Martin

10.5.63 *Martes martes* (Pine Marten) is listed as a Species of Importance in the Carmarthenshire LBAP. The only records found within the 2 km search area were for Pine Marten boxes, erected by the Forestry Commission (now part of NRW), rather than individual sightings.

10.5.64 No detailed surveys were carried out for this species, although it is likely to reside in the Brechfa Forest area of the route in low population densities and is therefore included in the assessment.

Red Squirrel

10.5.65 *Sciurus vulgaris* (Red Squirrel) is listed as a Species of Importance in the Carmarthenshire LBAP. There are six desktop records of Red Squirrels from locations scattered across the search area. However, the Carmarthenshire Biodiversity Action Plan states that post-1990 records are mainly in the north of the county, away from the project area. Red Squirrels in Wales are now mostly restricted to large areas of conifer plantations.

10.5.66 No detailed surveys were carried out for this species, although it is likely to reside in the Brechfa Forest area of the route in low population densities and is therefore included in the assessment.

Reptiles

10.5.67 All four of the common reptile species; *Natrix natrix* (Grass Snake), *Anguis fragilis* (Slow-worm), *Zootoca vivipara* (Common Lizard) and *Vipera berus* (Adder) have been recorded within 2 km of the proposed cable route. However, the records are sparse and scattered over a wide area. All of these species are listed as Species of Importance in the Carmarthenshire LBAP.

10.5.68 No detailed surveys for reptiles have been carried out.

10.5.69 Habitat in the underground sections is generally suboptimal for reptiles as it comprises arable fields, improved grassland and existing trackways. However the A485 road verge and the six hedgerows crossed by the underground cables

provide more suitable foraging and hibernating habitat for reptiles.

Water Vole

- 10.5.70 The background data search did not identify any records of Water Vole (*Arvicola amphibious*) within 2 km of the proposed cable route. Water Vole are listed as Species of Importance in the Carmarthenshire LBAP.
- 10.5.71 During the Phase 1 Habitat surveys, all areas of wetland and adjacent habitat were assessed in respect of their suitability for Water Vole. This included an assessment of water quality, water-level regime, channel dimensions, bank material, vegetation, food sources, predation, competition, and land management.
- 10.5.72 Nine sites were identified for further detailed survey (the same sites that were identified for the detailed Otter surveys). The sites are either crossed by the proposed route where cables are to be laid underground or where the overhead line would cross significant riparian corridors.
- 10.5.73 No evidence of Water Vole was found during the detailed surveys. On the whole, the banks of the watercourses are dominated by bedrock and boulders and therefore unsuitable for Water Vole. Water flow was generally fast and suitable vegetation for feeding was limited. It is therefore assumed that Water Vole is not present and need not be considered further. Full details are provided in Appendix 10.6 Otter and Water Vole Technical Report.

Table 10.6 – Summary Assessment of Nature Conservation Value

Ecological Receptor	Value in context of development	Comments
River Towy SAC/ SSSI	Regional	Section 42 habitat 'rivers'. Negligible botanical interest at crossing point. Supports foraging and commuting Otters and migrating Twaite Shad.
Bog at Rhydargaeau	Regional	Site comprising modified example of Section 42 habitat 'blanket bog' which is more widely referable to 'purple moor grass and rush pasture'
Pingo Complex at Alltwalis	Regional	Site comprising semi-improved and unimproved fields with underlying pingo topography. Contains the only significant examples of the Section 42 habitats 'lowland meadows' and 'ponds' on the route, together with areas of 'purple moor grassland and rush pasture'.
Lowland mixed deciduous woodland	County	Section 42 habitat. Largest example at Nant Morlais west of Llandyfaelog. Other examples are very narrow corridors.
Wet woodland	County	Section 42 habitat. Only example of S42 habitat at Nant Morlais.
Hedgerows	County	Section 42 habitat. Landscape crossed by route contains dense network of (probably) ancient hedges, many of which are species-rich 'Important' hedges.
Lowland acid grassland	Local	Section 42 habitat. Only very small patches on the route which are easily avoidable.
Purple moor grass and rush pasture	County	Section 42 habitat. Concentrations occur to the west and north of Llandyfaelog, and at the pingo complex and bog sites (assessed separately).
Other broad-leaved semi-natural woodland	Local	Includes very narrow corridors of non-Section 42 woodland.

Ecological Receptor	Value in context of development	Comments
Plantation woodland	Site	Extensive, species-poor stands of <i>Picea sitchensis</i> (Sitka Spruce) in Brechfa Forest and smaller plantations elsewhere.
Scrub	Site	Very small areas of species-poor scrub.
Mature trees	Local	Numerous trees associated with woods, hedges and watercourses, and several scattered individuals in fields.
Improved and poor semi-improved grassland	Site	Ubiquitous and species-poor grasslands of negligible conservation value.
Semi-improved grassland	Local	Semi-improved grasslands with modest species-diversity.
Other marshy grassland	Local	Includes most stands of species-poor MG10 <i>Holcus lanatus</i>-<i>Juncus effusus</i> rush-pasture.
Tall herb & fern	Site	Species-poor stands of <i>Pteridium aquilinum</i> (Bracken) and tall ruderal herbs.
Other watercourses	Local	Several small watercourses.
Notable plant species	Local	<i>Carum verticillatum</i> (Whorled Caraway).
Invasive plant species	N/A	<i>Crassula helmsii</i> (New Zealand Pigmyweed), <i>Elodea canadensis</i> (Canadian Waterweed), <i>Fallopia japonica</i> (Japanese Knotweed) and <i>Impatiens glandulifera</i> (Himalayan Balsam).
Badger	Site	Seventeen setts identified within the vicinity of the route, widespread and common in the area.
Bats – Tree Roosts	Site	No tree roosts were found during surveys.

Ecological Receptor	Value in context of development	Comments
Bats – Foraging and Commuting	County	At least seven species of bat were recorded using woodlands along the route for foraging and commuting.
Birds – WCA Sch.1 species	County	Wildlife and Countryside Act 1981 – Schedule 1 species. Relatively common to Rare in area.
Birds – Other nesting birds	Up to County	UK BAP or Birds of Conservation Concern Red and Amber list species. Widespread in area
Dormouse	County	European Protected Species and Section 42 Priority Species for Wales. Present in relatively healthy numbers in Carmarthenshire.
Fish	National	Migrating Twaite Shad are present in River Towy and spawning salmonids may be present in the tributaries.
Otter	County	European Protected Species and Section 42 Priority Species for Wales. Widespread within the River Towy catchment.
Pine Marten	County	May be present at low population densities in Brechfa Forest.
Red Squirrel	County	May be present at low population densities in Brechfa Forest.
Reptiles	County	European Protected Species and Section 42 Priority Species for Wales. Present in relatively healthy numbers in Carmarthenshire.

Embedded mitigation

10.5.74 A route has been chosen that minimises impacts on ecology. Alignments and access routes have been selected to minimise the amount of habitat removal, e.g. where existing gaps in woodland have been utilised. Pole locations have been carefully sited to minimise impact on sensitive habitats (such as the bog at Rhydargaeau and the pingo complex at Alltwalis). Limits of deviation will be

restricted in these sensitive areas.

- 10.5.75 Embedded mitigation for the Afon Tywi SAC/SSSI has included a commitment to cross the river using horizontal directional drill. Impacts associated with bird collision in the Towy Valley have therefore been scoped out of this assessment.
- 10.5.76 The subsequent assessment stage of the EIA is based on the Proposed Development inclusive of the embedded mitigation described.

10.6 Assessment of impacts: Construction phase

- 10.6.1 Construction phase impacts have been quantified where possible. Where figures are given, these are based on a 25 m by 20 m working area around each pole and a 5 m wide access route for the OHL sections. This is a worst case figure and it is likely that the affected area will be smaller than this. Within the UG section figures are based on a 16 m working width.
- 10.6.2 Impacts associated with the main construction compound at Carmarthen Showground and the satellite compounds in Brechfa Forest and the Towy underground section will be assessed in the final ES submission, as these areas have not yet been subject to Phase 1 survey. However based on a review of aerial photography its unlikely there will be a significant impact on ecology from the use of these areas.
- 10.6.3 A review of any impacts associated with upgrading works at New Lodge will be undertaken for the final ES submission also. Again, no significant impact on ecology is anticipated.

Afon Tywi SSSI/SAC

- 10.6.4 The crossing method for the River Towy is horizontal directional drill (HDD). Therefore no habitat loss will occur within the SAC. Indirect impacts on features of the SAC (Twaite Shad and Otter specifically) would be likely if there were no mitigation.

- 10.6.5 Drilling activities could impact on migrating Twaite Shad which are highly sensitive to noise and vibration. The main migration period for Shad on the River Towy is between April and June.
- 10.6.6 Temporary disruption to commuting and foraging otters along the River Towy could occur as a result of construction activities.
- 10.6.7 There are three small tributaries within the UG section in the Towy Valley that flow directly into the SAC. The crossing method for these watercourses will be trenching or 'open cut'. This method has the potential to release sediment or pollution downstream of the crossing point into the River Towy SSSI/ SAC resulting in a direct impact on the site.

Bog at Rhydargaeau

- 10.6.8 There will be a temporary negative impact from the installation of two poles (25 m by 20 m working area around each pole) and associated access routes (up to 5 m wide) into and across the bog. This could affect up to 0.2 ha of blanket bog through compaction of the soil by construction vehicles and trampling of vegetation by site staff.
- 10.6.9 An additional 0.1 ha of plantation woodland on bog will be temporarily impacted through pole installation and construction access and trees will need to be removed (although these are of low nature conservation value).

Pingo Complex at Alltwallis

- 10.6.10 There will be a temporary negative impact from the installation of the poles and associated access routes on 0.18 ha of marshy grassland (including areas of Devil's-bit Scabious which are suitable for Marsh Fritillary butterfly). Compaction of the soil by construction vehicles and trampling of vegetation by site staff would be likely if there were no mitigation.

Habitats

Lowland Mixed Deciduous Woodland (and Wet Woodland)

- 10.6.11 The pole in woodland at Target Note 1 will be in a gap in the vegetation for an existing OHL connection. However a cleared area (approximately 6 m wide) through the woodland is required to facilitate access for cable winching and to ensure the line does not get tangled in vegetation during installation. This will result in a temporary loss of 0.1 ha of woodland. In addition to this a number of mature trees will need to be coppiced due to their proximity to the OHL.
- 10.6.12 The woodland strip at Target Note 27a is crossed at its narrowest point. This is part of the Towy Valley UG section, and a working width of 8 m will be required (reduced from the standard 16 m for woodland or hedgerow crossings) which equates to a temporary negative impact of less than 0.03 ha. However, the root protection zones of a number of mature trees are likely to be within the working width and therefore additional trees may be lost as a result of root damage from trenching activities.
- 10.6.13 An existing gap has been utilised through the woodland at Target Note 48a and the construction area for the pole installation will be in an adjacent semi-improved field. The construction impact will be limited to the access required for cable winching resulting in a temporary negative impact affecting less than 0.08 ha. However there may be mature trees that need to be pruned or coppiced due to their proximity to the OHL.

Other Woodland and Scrub

- 10.6.14 There are no woodland corridors, other than at Target Note 27a described above, within the UG sections.
- 10.6.15 In the OHL section, poles have been positioned to avoid woodland corridors or areas of dense scrub, and impacts are therefore limited to those associated with access for cable winching across the woodland between poles. Approximately 6 m width is required for winching and this generally applies over short distances as much of the woodland and scrub present are thin remnant corridors only.

However a temporary negative impact will occur.

- 10.6.16 In addition some mature trees may need to be coppiced or pruned due to their proximity to the OHL.

Hedgerows

- 10.6.17 For the proposed UG section, temporary negative impacts on six hedgerows will result from 8 m breaches for construction access.

Grassland and Marsh

- 10.6.18 Impacts on grasslands associated with the bog at Rhydargaeau and the pingo complex at Alltwalis are dealt with under those sites.
- 10.6.19 Negative impacts on marshy grassland will be temporary and associated with the 25 m by 20 m working area around each pole and any access routes required (there is no marshy grassland affected in the UG sections). It is unlikely that the whole working area will be affected during construction therefore any figures given are worst case.
- 10.6.20 There are four main areas of marshy grassland affected, details below:
- Target Note 2b – four poles required, resulting in approximately 0.45 ha of purple moor grass and rush pasture temporarily affected;
 - Target Note 2d – four poles required, resulting in approximately 0.4 ha of purple moor grass and rush pasture temporarily affected;
 - Target Note 2f – one pole required, resulting in approximately 0.1 ha of purple moor grass and rush pasture temporarily affected; and
 - Target Note 2g – one pole required, resulting in approximately 0.07 ha of purple moor grass and rush pasture temporarily affected.
- 10.6.21 An area of lowland meadow (Schedule 42 habitat) at Target Note 2a will be avoided.

- 10.6.22 Temporary negative impacts on improved and semi-improved grassland have not been quantified but they are associated with the working area required for pole installation and access.

Tall Herb & fern

- 10.6.23 Temporary negative impacts on areas of bracken or tall ruderal species have not been quantified but they are associated with the working area required for pole installation and access.

Ponds and Watercourses

- 10.6.24 Within the UG section, apart from the River Towy crossing identified for HDD, the default crossing method of watercourses will be trenching. There are three tributaries crossed (the one closest to the River Towy at Target Note 17 is crossed twice).
- 10.6.25 A temporary negative impact on watercourses and their immediate surroundings might result from flumed crossings (or equivalent), temporary bridges and trenching operations. Habitat removal will, where practicable, be restricted to 8 m.
- 10.6.26 There will be no impact on the pond at Target Note 44a.
- 10.6.27 Impacts on small watercourses crossed by the OHL are associated with vegetation removal required to install the OHL (as the majority of streams have scrub or trees along their banks). Fragments of vegetation can enter the streams causing them to become blocked and leading to increased nutrient loads.
- 10.6.28 In addition removal of tree stumps could also lead to erosion of the banks of the watercourse.
- 10.6.29 Tree removal can also affect microclimates within the stream; however this would be a positive permanent impact as it will allow light to penetrate to the stream-bed encouraging an increased diversity of aquatic plants.

Notable plants

- 10.6.30 Impacts to Whorled Caraway are closely correlated with the impacts described for marshy grassland habitats in paragraphs 10.6.16 – 10.6.18.

Invasive Plant Species

- 10.6.31 There is a potential risk that construction activity in areas where invasive species have been found along the route will result in the spread of these species through moving plant fragments or contaminated soil. This would result in a permanent negative impact.
- 10.6.32 Any activity that causes the spread of Japanese Knotweed, Himalayan Balsam, New Zealand Pigmyweed or Canadian Waterweed will contravene the WCA 1981.

Badgers

- 10.6.33 It is likely that a number of setts (up to fourteen currently) will experience temporary disturbance (as defined by Natural England in the Badger Disturbance Guidance document published in 2009) as a result of the construction of the Proposed Development.
- 10.6.34 There is no requirement to permanently close any setts to facilitate construction as poles and access routes will be micro-sited to avoid setts.
- 10.6.35 The impact to Badger foraging habitat will be minimal due to the small scale of works in relation to the extent of available Badger foraging habitat in the surrounding areas.
- 10.6.36 A temporary negative impact on this receptor is anticipated.

Bats

Roosting Bats

- 10.6.37 A small number of trees (number to be confirmed) that have been classified as having potential to support roosting bats will have to be removed to facilitate the

construction of the UG sections or due to their proximity to the OHL. However, no tree roosts were recorded within the survey area. Therefore, no impacts to known roosts are anticipated. However, bats are known to move roost frequently, and can switch roosts every three days. Therefore tree removal works may reduce the potential roost 'stock' of an area which is available to bats and therefore a permanent negative impact may occur.

Foraging and Commuting

- 10.6.38 To facilitate the construction of the UG sections, 8 m sections of hedgerow will be temporarily removed at six locations. Bats are known to use hedgerows to navigate around the landscape and some species are potentially sensitive to gaps in hedgerows. However a gap of 8 m is not wide enough to cause an effect. This assumption is based on the results of bat activity monitoring of hedgerow breaches prior to and following construction of the Milford Haven to Aberdulais gas pipeline. It was concluded from this monitoring that bats, including Horseshoe bats, were not dissuaded from crossing 20 m gaps.
- 10.6.39 Hedgerows within the OHL section will remain *in situ*. The impact to woodland blocks and riparian tree lines (also important commuting routes) is associated with the temporary clearance of a 6 m access for winching through the woodland, and the removal of mature trees within falling distance of the OHL.
- 10.6.40 A temporary 6 m gap through woodland corridors is not considered wide enough to cause an effect on commuting bats.
- 10.6.41 In addition although the removal of some large trees adjacent to the OHL will alter the habitat within the woodland, small trees and shrubs will remain and so ground cover will always be present. As a result, the installation of the OHL will not create gaps in flight lines and commuting routes for bats and no impact on commuting bats is anticipated.
- 10.6.42 The temporary clearance of 6 m for winching and the coppicing of tall trees will create a habitat similar to that of a woodland ride. Woodland rides are excellent

habitat for insects; therefore this will increase the foraging habitat available for bats at these locations and result in a permanent positive impact on foraging bats.

- 10.6.43 No lighting impacts are anticipated as only the main compound at the Carmarthen Showground will be lit and this site is adjacent to the A40 which is already lit.

Birds

- 10.6.44 Impacts from the construction of the OHL and UG section include habitat loss and disturbance. Collision risk impacts associated with the OHL are dealt with in Section 1.7 Assessment of Impacts: Operational Phase.

Schedule 1 Species

- 10.6.45 It is an offence to intentionally or recklessly disturb a Schedule 1 bird at, on or near an 'active' nest.
- 10.6.46 Goshawks were recorded at transects within the Brechfa Forest. Disturbance could have a high impact on Goshawks as they are a sensitive species and would be displaced from areas of human activity.
- 10.6.47 Red kite, Peregrine falcon and Barn Owl are also likely to be present in habitat along the entire route.
- 10.6.48 A temporary negative impact on Schedule 1 species as a result of disturbance during the nesting period may occur.

Other Nesting Birds

- 10.6.49 The removal of 8 m wide sections of hedgerows in the UG section will result in the temporary loss of potential nesting sites for birds during construction and the first few years of hedgerow restoration.
- 10.6.50 The impact will decrease as the hedgerow acquires structure. Essentially, similar considerations apply to loss of potential nesting habitat for ground-nesting birds although the majority of grassland within the UG section is improved pasture used

by cattle and sheep.

- 10.6.51 Construction of the OHL has the potential to cause temporary displacement of bird species associated with increased noise, activity and visual disturbance and may reduce the number of species and the absolute numbers of birds nesting close to works. However, the effect will be confined to the construction period, which involves only short periods of activity at any given location.
- 10.6.52 A temporary negative impact on nesting birds is likely to occur.

Dormouse

- 10.6.53 There are direct impacts associated with installing the OHL in woodland at Target Note 1 (the only confirmed dormouse area on the route) during the hibernation period for Dormice. Hibernation sites could be damaged or destroyed and hibernating animals on the ground would also be at risk of killing or injury.
- 10.6.54 Installation of the OHL through the middle of this woodland could also lead to fragmentation of habitats and the isolation of populations.
- 10.6.55 A temporary negative impact on this receptor is likely to occur.

Fish

- 10.6.56 Noise and vibration from the HDD has the potential to cause disturbance to fish present in the River Towy. Twaite Shad are highly sensitive to noise and vibration.
- 10.6.57 The remaining three watercourse crossings within the UG section will be crossed using an open-cut technique. This technique has the potential to disturb fish during works both directly and indirectly through pollution and increases in turbidity caused by sediment-laden run-off or disturbance to bed material.
- 10.6.58 A temporary negative impact on this receptor is likely to occur.

Otter

- 10.6.59 Construction impacts on Otters may include temporary disruption to movement and foraging along watercourses and possible disturbance at resting or breeding places such as couches and holts. No active resting or breeding places have been identified during surveys. Therefore only a temporary negative impact on this receptor is likely to occur.

Pine Marten

- 10.6.60 If Pine Martens are present daytime construction activities are unlikely to disturb or harm this species while active. Pine Martens are nocturnal and wide ranging and there are large areas of habitat available to them in the Brechfa Forest area. Therefore no impact is anticipated on this receptor.

Red Squirrel

- 10.6.61 If Red Squirrel is present construction activities could cause disturbance or harm to this species causing a temporary negative impact. However it is highly unlikely that they will be encountered during construction considering that RWE carried out extensive surveys in this area of the Brechfa Forest for them in connection with the DCO application for the Brechfa West wind farm, and found no evidence.

Reptiles

- 10.6.62 Direct impacts might be associated with potential injury or harm to individuals which could occur during vegetation clearance of the working areas including strimming of areas of rough grassland, patches of scrub, and removal of sections of hedgerow (in the UG sections).
- 10.6.63 Indirect impacts might be associated with the temporary loss of habitat as a result of vegetation clearance, which could restrict the breeding success of local populations of reptiles.
- 10.6.64 A temporary negative impact is anticipated for this receptor.

10.7 Assessment of impacts: Operational phase

- 10.7.1 Operational impacts are not anticipated for the following identified ecological receptors: habitats other than woodland and mature trees, Badgers, bats, fish, Marsh Fritillary butterfly, Otters, Pine Marten, Red Squirrel and reptiles.

Woodland, Hedgerows and Mature Trees

- 10.7.2 Vegetation in the vicinity of overhead lines is managed on a five year rotation.

Works will include the following:

- Hedgerow trimming to maintain a 5 m clearance zone between the top of the vegetation and the OHL;
- selection of trees for pruning or felling within the immediate engineering clearance zone (i.e. within falling distance of the OHL);
- selection of trees for pruning or felling outside the immediate engineering clearance zone, in order to allow development of strong and healthy vegetation;
- woodland thinning to create a wind-firm crop (forestry areas mainly);
- herbicide treatment of stumps and re-growth; and
- removing ivy, clematis or other climbers from poles.

- 10.7.3 No long term impact on hedgerows is anticipated as they are routinely managed in this way (i.e. trimming) across the UK.

- 10.7.4 Woodlands will be enhanced through the creation and management of ‘woodland ride habitats’ underneath the power lines resulting in a permanent positive impact.

Birds

Collision Risk

- 10.7.5 Impacts associated with bird collision in the Towy Valley have been scoped out as this section of the OHL will be undergrounded.

- 10.7.6 Table 10.7 below summarises the species recorded at raptor Vantage Point 1 and 2 and level of collision risk based upon observed heights of recorded flights. Full details are provided within the Bird Technical Report (Appendix 10.3). The vantage points are located in the Brechfa Forest near to the route of the Proposed Development.

Table 10.7– Breeding Raptor Species at Collision Risk in the Brechfa Forest

Species	Raptor Vantage Point 1	Raptor Vantage Point 2
Common Buzzard	Low collision risk	Low collision risk
Goshawk	Not at collision risk	Not at collision risk
Red Kite	Not at collision risk	Not at collision risk
Sparrowhawk	Low collision risk	Low collision risk

- 10.7.7 Goshawk and Red Kite were generally observed flying over the height of the tallest trees in the Brechfa Forest. Therefore they were not observed to be at risk of collision in the forestry areas.

Disturbance and Habitat Loss

- 10.7.8 Vegetation management on a five year rotation has potential to kill or injure nesting birds or damage or destroy nests or eggs. Schedule 1 nesting birds may also be disturbed by the works, causing them to abandon their nests.
- 10.7.9 A permanent negative impact on all bird species is associated with this ongoing management work.

Dormouse

- 10.7.10 Vegetation management on a five year rotation has potential to cause injury or harm to Dormice. Works can destroy breeding sites or hibernating sites on the ground, depending on the time of year the management is carried out.
- 10.7.11 A permanent negative impact on Dormouse would be associated with this ongoing

management work. The frequency of this impact will be once every five years.

10.8 Assessment of impacts: Decommissioning phase

Afon Tywi SSSI/ SAC

- 10.8.1 The cable installed underneath the River Towy generally will not be removed during the decommissioning phase. Therefore there are no impacts associated with decommissioning on this feature.

Habitats and Species

- 10.8.2 Disturbance may occur to habitats along the route as a result of poles being removed. The level of impact would be very similar to that already described for construction. Access to the poles by vehicles and a similar size working area around each pole (25 m by 20 m) will be required. All habitats and species discussed in the preceding sections have potential to be disturbed by pole removal. A separate assessment will be required to assess the impact of the decommissioning phase. This will consider the habitat and species present at the time of the works and identify any mitigation measures required.

10.9 Mitigation measures: Construction phase

Afon Tywi SSSI/ SAC

- 10.9.1 The HDD of the River Towy will take place outside of the migratory period for Twaite Shad (April to June). This will ensure that noise or vibration impacts to this species during sensitive periods in its life-cycle are avoided.
- 10.9.2 HDD drilling works will take place during normal working hours limiting the likelihood for disturbance to commuting and foraging otters (which are predominantly nocturnal).
- 10.9.3 During the open-cut crossings of the minor tributaries flowing into the River Towy, strict pollution prevention measures will be put in place to reduce the risk of any

sediment or pollution entering the River Towy SAC. See Chapter 13, Hydrology for further details.

- 10.9.4 To avoid impact on spawning salmonids, no ‘in-stream works’ such as open-cut crossings will be carried out in the minor tributaries between 15th October and the 15th April (any year).

Bog at Rhydargaeau

- 10.9.5 Poles have been sited in the least sensitive areas of the bog including an area which has been previously planted with Scots Pine and the dried out edges which are dominated by Purple Moor-grass tussocks.
- 10.9.6 Temporary protective surfacing will be used to allow vehicles to cross the bog during installation of the poles. This will minimise compaction and reduce the remaining impact associated with temporary construction access. Site staff will also be briefed to ensure they do not trample on vegetation outside of demarcated construction areas.

Pingo Complex at Alltwallis

- 10.9.7 Poles have been sited in the least sensitive areas of the complex, avoiding the pingo structures and unimproved neutral grassland. Temporary protective surfacing will be used to allow vehicles to cross the areas of marshy grassland during installation of the poles. This will minimise compaction and reduce the remaining impact associated with temporary construction access.

Habitats

Woodland & Trees

- 10.9.8 To minimise the required amount of vegetation removal, the pole in woodland at Target Note 1 has been positioned in a gap in the vegetation caused by an existing OHL connection.
- 10.9.9 Trees and shrubs will be coppiced to allow access for winch pulling and the 6 m

gap will be immediately re-planted with semi-mature shrubs and low growing trees such as Hazel once wires have been strung between the poles. Any mature trees to be removed will be coppiced, or they will be pruned and left in-situ to act as a monolith (or habitat pole).

- 10.9.10 The 8 m breach through woodland at Target Note 27a (UG section) will be immediately reinstated with semi-mature planting stock. Soil excavated from the woodland strip will be stored separately. This will protect any seeds which may be present within the woodland soil. Soil will be stored in a fenced-off area (to highlight its different origin to soil excavated outside of the woodland and prevent mixing of the two). The soil will be replaced on completion of the cable installation.
- 10.9.11 The roots of adjacent retained trees along the edge of the working width will be protected from soil compaction by the enforcement of root protection areas that will be fenced off from the construction (the extent of which will be calculated using guidance from BS 5837:2012). Branch pruning may be recommended where tree crowns are at risk from machinery or high-sided vehicles.
- 10.9.12 The gap created through woodland at Target Note 48a will be immediately reinstated with semi-mature planting stock consisting of low-growing species such as Hazel. Any mature trees to be removed will be coppiced, or they will be pruned and left in-situ to act as habitat poles.
- 10.9.13 This mitigation approach will be undertaken at all woodlands crossed by the OHL.

Hedgerows

- 10.9.14 For the six hedgerows crossed in the UG section in the Towy Valley, the following measures will be followed:
- the topsoil (including any bank) from beneath the hedgerow will be stripped and stored separately;
 - vegetation and topsoil from any associated ditch will be stripped and stored separately;

- soil storage areas will be clearly signed and demarcated to prevent any mixing with other soils;
- banks and ditches will be reformed to similar profiles as before;
- topsoil will be replaced after works;
- planting will use native species, preferably of local origin;
- planting will use shrubs of the same species and in the same general proportions as existed pre-construction; and
- to aid establishment of replanted trees and shrubs, they will be protected by stock-proof and either rabbit-proof fencing or tree guards.

10.9.15 The prompt reinstatement of hedge banks and ditches and planting of semi-mature shrubs should achieve some recovery in the first 2-3 years. The time required for overall recovery of the hedgerow to the original condition will depend upon the age, diversity and management history of the individual hedgerow, being longer for more species-rich and complex hedgerows.

Marshy Grassland

10.9.16 Light weight vehicles will be used to install poles in areas of marshy grassland and temporary protective surfacing will be laid across all access routes to provide additional protection to the vegetation. Site staff will be fully briefed to ensure they do not trample on vegetation and stay within the areas designated for construction.

Watercourses

10.9.17 At open cut watercourse crossing points, works will be undertaken as quickly as possible and detailed mitigation measures will be agreed with NRW before work commences. This is likely to include the following:

- crossing points will be chosen to minimise impacts and preserve valuable features as far as possible;

- bank-side vegetation will be retained, and trees and shrubs will be coppiced rather than grubbed-out where practicable;
- bank and bed materials removed for construction will be stored separately and replaced in their original relative positions, to promote the re-establishment of appropriate habitat;
- trees and shrubs will be replanted and the reinstated areas will be fenced off to prevent damage (including poaching) by livestock;
- geotextile matting will be used, wherever necessary, to reinforce banks during reinstatement;
- measures to minimise impacts due to sediment release or pollution will be implemented, with adherence to the relevant pollution prevention guidelines during construction;
- open-cut crossings will be completed in the shortest time possible, generally in a single day; and
- full passage of fish will be maintained as far as possible.

Invasive Species

- 10.9.18 Owing to the presence of invasive plant species along the proposed route an Invasive Species Management Plan will be prepared prior to construction and implemented in the highlighted areas. All mitigation measures outlined in this plan will be agreed with the EA.

Badger

- 10.9.19 Badgers are highly mobile species and can occupy their setts at different times over a number of years and seasons.
- 10.9.20 Owing to the length of time before construction commences all identified setts will be re-surveyed in a pre-construction walkover survey in order to assess their status and current use. Following this survey a method statement will be prepared

and submitted to NRW detailing outline construction methods to inform whether a disturbance licence will be required. The pre-construction walkover survey will also allow any newly excavated setts to be identified.

- 10.9.21 Licences allowing works to proceed close to active Badgers setts, as works that would cause disturbance, may be required. Licences for disturbance are normally only issued for the period 1st July – 30th November and any deviation from this period would need to be discussed and agreed in advance of submitting the licence application.

Bats

Roosting Bats

- 10.9.22 Unnecessary loss of trees will be avoided as much as possible through implementing a risk-based approach to vegetation management. However, impacts associated with the loss of bat roosts may occur. The following mitigation strategy will be employed to minimise impacts for roosting bats during construction of the UG section and OHL:
- inspect features using ladders or tree climbing equipment (this is best done during late summer or early autumn for fresh evidence and more reliable results);
 - where it is not possible to access features by climbing, conduct emergence surveys during the summer months to confirm presence or likely absence of bats; and
 - retain features which might be lost due to pruning or felling by retaining part of the tree (i.e. as a 'habitat pole') and re-attaching the feature.
- 10.9.23 If roosts are identified, and destruction cannot be avoided, further surveys may be necessary to inform the EPS licensing process.
- 10.9.24 Should this occur it will result in a permanent negative impact upon the bat population which, depending upon the bat species and number of individual bats

and roosts affected could be significant up to the County level.

Commuting and Foraging Bats

- 10.9.25 To compensate for the removal of sections of hedgerows along the UG route, once the ground works have finished, all gaps will be planted up using semi-mature native shrubs of local provenance.
- 10.9.26 Gaps created through woodland belts as a result of the construction of the OHL will also be planted with semi-mature native shrubs and low growing trees of local provenance.

Birds

- 10.9.27 All vegetation will be removed outside of the March – July bird nesting season.
- 10.9.28 If at any locations tree, woodland or hedgerow removal during the breeding season is unavoidable, surveys will be undertaken immediately prior to habitat removal to confirm that there are no occupied nests.
- 10.9.29 Should any occupied nests be identified, an appropriate buffer zone (determined on the basis of the species concerned and the location of the nest in the context of the surrounding vegetation, but no less than 5m) will be retained until the chicks have fledged.

Dormouse

- 10.9.30 All mitigation measures will be outlined in a Method Statement and agreed with NRW as part of the application process for the necessary European Protected Species (EPS) licence to undertake habitat management work.
- 10.9.31 Trees and shrubs in woodland at Target Note 1 will be cut down under licence between November and March inclusive. This will avoid the majority of the period when dormice might be found in nests above ground. Clearance will be done by hand and in a sensitive manner, to minimise the likelihood of disturbing or killing hibernating dormice (i.e. stumps will be left in place, heavy machinery will be

located outside of suitable hibernation habitat, and an ecologist will hand-search for nests prior to works commencing). Cut material will be left *in-situ* wherever possible as brush piles to maintain habitat connectivity until planted trees and shrubs have established.

10.9.32 The woodland habitat under and adjacent to the OHL will be cut on a 5-year rotation, which will maintain a coppiced habitat.

10.9.33 A monetary donation will be given by WPD to a local monitoring group. This will help fund monitoring surveys where known Dormouse populations are present.

Fish

10.9.34 HDD of the River Towy will be restricted to outside of the migratory period for spawning Twaite Shad (April to June).

10.9.35 Open cut crossings of minor tributaries in the UG section will take place before October 15th or after April 15th to avoid impact on spawning salmonids.

10.9.36 Mitigation measures outlined in paragraph 10.9.17, for watercourses will also mitigate impacts on fish species.

Otter

10.9.37 HDD drilling works at the River Towy will take place during normal working hours as will cable installation adjacent to the Afon Gwilli in the Towy Valley. This will limit the likelihood for disturbance to commuting and foraging otters in these areas.

10.9.38 Tree felling and vegetation clearance works in riparian woodlands along the route will also take place during normal working hours, again limiting the potential for disturbance to Otters. A pre construction survey will be carried out at these riparian woodlands if construction has not commenced within two years of the surveys being undertaken to ensure that no new holts or couches have been created at the crossing points prior to felling taking place.

Pine Marten & Red Squirrel

- 10.9.39 No mitigation is necessary in relation to Pine Marten or Red Squirrel.

Reptiles

- 10.9.40 To minimise any potential impact to reptiles, the working area for the underground cable installation adjacent to the A485 will be made unsuitable prior to any works by reducing cover as much as possible (by mowing or strimming to 10 mm above ground-level) to discourage reptiles from the area. This section will be left for one week after strimming to allow reptiles to move out of the area. The area will be hand searched by a suitably qualified ecologist prior to topsoil stripping of the working width.
- 10.9.41 Sections of hedge that are to be removed to facilitate construction will be coppiced using hand tools to prevent injuring any reptiles resting at the bases. Vegetation bases will only be removed once the area has been deemed clear of reptiles. These processes will be undertaken under a watching brief by a suitably qualified ecologist and any reptiles found will be transported to suitable habitat at least 50m away from construction works.
- 10.9.42 No mitigation is proposed for pole installation as the potential impact to reptiles is very low.

10.10 Mitigation: Operational phase

Woodland, Hedgerows and Mature Trees

- 10.10.1 Standard maintenance procedures for OHL in wooded areas will be followed. This involves surveying vegetation under and adjacent to the OHL on a five year rotation to assess risk ratings and identify any pruning or management required. Surveys are carried out by trained surveyors with arboricultural knowledge.
- 10.10.2 The Energy Networks Association – Vegetation Management Near Electricity Equipment – Principles of Good Practice, Engineering Technical Report 136 (June

2007) sets out a number of mitigation guidelines for vegetation management including the following which are relevant to the proposed route:

- the aim of pruning is to achieve clearances in ways which minimise the aesthetic and physical impact on retained trees and shrubs;
- work should comply with BS3998: Recommendations for tree work (as amended);
- tree selection for retention should occur at an early stage. Good practice involves interventions over a number of cutting cycles trees and shrubs so that conflict with the OHL is minimised;
- if pruning options are likely to severely reduce or unbalance a tree then coppicing, or felling and replacement planting is a better option.

10.10.3 Within the forestry sections long term management works will be focused on creating a wind-firm crop around the overhead line corridor. Low-growing shrubs such as Hazel, Hawthorn, Elder, Blackthorn, Guelder Rose, Rowan, Wayfaring Tree, Privet and Gorse will be maintained in an irregular coppice matrix, ensuring a five metre clearance area between the vegetation and the overhead cables.

Birds

10.10.4 Vegetation will be checked for nesting birds prior to any clearance works taking place. Surveyors will receive basic training in species and habitat recognition and will highlight sites requiring survey by specialist ecologists during the preliminary vegetation surveys.

Dormouse

10.10.5 Mitigation measures outlined in paragraphs 10.9.30 to 10.9.33 will be implemented during any vegetation management at the woodland at Target Note 1. Post development construction it may be possible for ongoing vegetation management to be carried out under a method statement approved by NRW. This would be as an alternative to applying for a separate EPS licence prior to each occurrence of

vegetation management.

10.11 Residual effects

10.11.1 Information on residual effects is contained in Table 10.8 for impacts during construction and Table 10.9 for impacts associated with the operation and maintenance of the connection.

Table 10.8 Summary of Residual Effects (Construction)

Ecological Receptor	Effect	Proposed Mitigation	Duration of Impact (post mitigation)	Likelihood of Impact	Significance of Residual Effect
River Towy SAC/ SSSI	Disturbance to Otters/ Twaite Shad Pollution	No night time working HDD outside of migratory period Pollution prevention measures	<6 months	Unlikely	No significant effect at any level
Bog at Rhydargaeu	Habitat disturbance (0.2 ha)	Lightweight vehicles and protective surfaces	< 1year until vegetation recovers	Probable	No significant effect at any level
Pingo Complex at Alltwalis	Habitat disturbance (0.18 ha)	Lightweight vehicles and protective surfaces	< 1year until vegetation recovers	Probable	No significant effect at any level
Lowland mixed deciduous woodland (and wet woodland)	Habitat loss (0.21 ha in total)	Coppice vegetation (OHL) Plant gap with low growing shrubs (OHL) Breach reduced to 8 m, woodland soils retained. Re-planted with	2-5 yrs until shrub establishment	Certain	Significant negative effect at a site level

Ecological Receptor	Effect	Proposed Mitigation	Duration of Impact (post mitigation)	Likelihood of Impact	Significance of Residual Effect
		semi-mature stock (UG section)			
Hedgerows	Habitat loss	Breach reduced to 8 m Re-planted with semi-mature stock	1-3 yrs until shrub establishment	Certain	Significant negative effect at a site level
Purple moor grass and rush pasture	Habitat disturbance (1.02 ha)	Lightweight vehicles and protective surfaces	< 1year until vegetation recovers	Probable	No significant effect at any level
Other broad-leaved semi-natural woodland and scrub	Habitat loss	Coppice vegetation (OHL) Plant gap with low growing shrubs (OHL)	2-5 yrs until shrub establishment	Certain	Significant negative effect at a site level
Plantation woodland	Habitat loss (18.98 ha)	Coppice vegetation Allow natural regeneration of low growing species	2-5 yrs until natural regeneration	Certain	Significant negative effect at a site level
Mature trees	Habitat loss	Mature trees to be coppiced/ retained as habitat poles	Permanent	Certain	Significant negative effect at a local level
Improved and poor semi-improved grassland	Habitat disturbance	No specific mitigation proposed	< 1year until vegetation recovers	Probable	No significant effect at any level
Semi-	Habitat	No specific	< 1year until	Probable	No significant

Ecological Receptor	Effect	Proposed Mitigation	Duration of Impact (post mitigation)	Likelihood of Impact	Significance of Residual Effect
improved grassland	disturbance	mitigation proposed	vegetation recovers		effect at any level
Other marshy grassland	Habitat disturbance	No specific mitigation proposed	< 1 year until vegetation recovers	Probable	No significant effect at any level
Tall herb & fern	Habitat disturbance	No specific mitigation proposed	< 1 year until vegetation recovers	Probable	No significant effect at any level
Other watercourses	Habitat disturbance Pollution Tree Removal	UG cabling crossing points reduced to 8 m and fully reinstated Pollution prevention measures followed during UG cabling and tree removal	1-3 yrs until establishment of shrubs/trees	Certain	No significant effect at any level
Invasive Plant Species	Causing species to spread	Invasive Species management Plan and detailed protection measures	1-2 yrs (throughout construction)	Unlikely	No significant effect at any level
Badger	Disturbance Loss of foraging habitat	Pre-construction survey Micrositing Disturbance licence (if required)	2-5 days at each pole location	Unlikely	No significant effect at any level
Bats – Tree Roosts	Loss of potential roost sites	Pre-felling inspections Retention of features as	Permanent	Probable	No significant effect at any level

Ecological Receptor	Effect	Proposed Mitigation	Duration of Impact (post mitigation)	Likelihood of Impact	Significance of Residual Effect
'habitat poles'					
Bats – Tree Roosts	Loss of commuting/ foraging habitat	Re-planting of low growing species in woodlands Management of new 'woodland rides' on a five yearly cycle	2-5 yrs until shrub establishment	Unlikely	No significant effect at any level
Birds – WCA Sch.1 species	Disturbance during nesting Collision with OHL	Vegetation removal outside nesting season Checks by an ecologist during nesting season No specific mitigation is proposed for collision with OHL	1-2 yrs (throughout construction) Permanent (for collision impacts)	Unlikely	No significant effect at any level
Birds – Other nesting birds	Injury/harm during nesting	Vegetation removal outside nesting season Checks by an ecologist during nesting season	1-2 yrs (throughout construction)	Unlikely	No significant effect at any level
Dormouse	Habitat loss Injury/ disturbance	Trees coppiced Nov to March only Where ever possible brash piles left in situ	2-5 yrs until shrub establishment	Probable	Significant negative effect at a local level
Fish	Habitat loss Disturbance to spawning grounds/ migration	HDD and open cut outside sensitive periods Pollution prevention	1-3 yrs until establishment of shrubs/ trees	Unlikely	No significant effect at any level

Ecological Receptor	Effect	Proposed Mitigation	Duration of Impact (post mitigation)	Likelihood of Impact	Significance of Residual Effect
		measures Full reinstatement of habitat			
Otter	Disturbance to commuting/ foraging	No night time working at HDD/open cut Pre-construction survey for breeding sites	1-2 yrs (throughout construction)	Unlikely	No significant effect at any level
Pine Marten	Disturbance	No night time working in forestry section	1-2 yrs (throughout construction)	Unlikely	No significant effect at any level
Red Squirrel	Disturbance / harm	No specific mitigation measures proposed	1-2 yrs (throughout construction)	Unlikely	No significant effect at any level
Reptiles	Habitat loss Injury/ harm	Habitat in UG sections will be reinstated Strimming/ hand search in high risk areas	< 1year until habitat regenerates	Unlikely	No significant effect at any level

Table 10.9 Summary of Residual Effects (Operation)

Ecological Receptor	Effect	Proposed Mitigation	Duration and Frequency of Impact	Likelihood of Impact	Significance of Residual Effect
Woodland, hedgerows and mature trees	Habitat loss	Sensitive pruning and woodland Management Risk based approach	Permanent, once every five years	Certain	Significant negative effect at a local level

Ecological Receptor	Effect	Proposed Mitigation	Duration and Frequency of Impact	Likelihood of Impact	Significance of Residual Effect
Birds	Injury/harm during nesting	Vegetation checks prior to clearance Training for vegetation surveyors	Permanent, once every five years	Unlikely	No significant effect at any level
	Collision risk	No specific mitigation proposed	Permanent	Unlikely	No significant effect at any level
Dormouse	Injury/disturbance	Clearance Nov to March only	Permanent, once every five years	Unlikely	Significant negative effect at a local level

During Decommissioning

10.11.2 Residual effects as a result of decommissioning works will mirror impacts described in this section for construction.

10.12 Cumulative effects

In-combination effects

10.12.1 A full list of planned developments within 2 km of the proposed route is provided in Chapter 19.

10.12.2 Out of the developments reviewed only the consented Brechfa West onshore wind farm and associated works will result in a cumulative loss of natural (forestry) habitat in Brechfa Forest. This habitat is subject to regular management practices including clear felling and re-planting on a rotational basis. As a result of the construction of the OHL there is potential for cumulative impacts on species including Red Squirrel, Pine Marten and Schedule 1 birds (Red Kite and Goshawk)

through disturbance and/or direct harm.

- 10.12.3 Discussions are ongoing with RWE and NRW forestry team and mitigation measures will be carefully designed to ensure that they provide a joined up approach particularly with regard to best practice construction measures and enhancing retained habitats for the key species listed above. With the implementation of a coordinated mitigation strategy there should be no significant cumulative impacts associated with habitat loss.
- 10.12.4 Collision risk assessments were undertaken for the Brechfa West Environmental Statement, these resulted in a negligible residual impact for all bird species assessed including Red Kite and Goshawk. Based on these findings and our own, no cumulative collision impacts are anticipated.

Inter-relationships

- 10.12.5 Hydrological impacts have potential to impact on the Afon Twyi SSSI/ SAC and associated species (Otter and fish species including Twaite Shad) during the construction phase. Impacts and mitigation measures are detailed in this chapter and also in Chapter 13: Hydrology.
- 10.12.6 No other interaction effects are predicted on any of the ecological receptors identified in this assessment.

10.13 Summary of effects

- 10.13.1 Significant effects during construction are associated with the loss of woodland, hedgerows and mature trees. Although mitigation through re-planting of semi-mature shrubs will help to reinstate the ‘gaps’ created to construct the OHL and underground cable, the need to periodically manage (i.e. fell or trim) these habitats will remain throughout the operational phase. A permanent negative impact, significant at a local level will therefore remain for these habitat types.
- 10.13.2 The impact to Dormouse will also occur during both construction and operational phases. An overall permanent negative impact, significant at a local level will

therefore occur.

10.14 References

Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment (June 2006)

Department for Energy and Climate Change, 'Overarching National Policy Statement for Energy (EN-1)' (July 2011)

Department for Energy and Climate Change, 'National Policy Statement for Renewable Energy Infrastructure (EN-3)' (July 2011)

Department for Energy and Climate Change, 'National Policy Statement for Electrical Networks Infrastructure (EN-5)' (July 2011)

Carmarthenshire County Council, Adopted Carmarthenshire Unitary Development Plan (July 2006)

Carmarthenshire County Council, Carmarthenshire Deposit Local Development Plan (June 2011)

The Conservation of Habitats and Species Regulations (2010)

Natural Environment and Rural Communities Act, Chapter 16, Part 3 (2006)

The Planning Inspectorate, 'Scoping Opinion Proposed Brechfa Forest Connection Project' (August 2014)

Western Power Distribution 'EIA Scoping Report July 2014 - v.01' (July 2014)