



SP MANWEB

The North Wales Wind Farms Connection Project

Environmental Statement Chapter 10 - Land Use and Agriculture

Application reference: EN020014

March 2015



Regulation reference: The Infrastructure Planning
(Applications: Prescribed Forms and Procedure)
Regulations 2009 Regulation 5(2)(a)

Document reference 6.10

North Wales Wind Farms Connection Project

Environmental Statement

Chapter 10 Land Use and Agriculture

March 2015

PINS Reference: EN020014

Document Reference: 6.10

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

The Planning Act 2008

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure)
Regulations 2009**

Regulation 5(2)(a)

The North Wales Wind Farms Connection Project

Environmental Statement

Chapter 10 Land use and Agriculture

Document Reference No.	6.10
Regulation No.	Regulation 5(2)(a)
Author	Gillespies
Date	March 2015
Version	01
Planning Inspectorate Reference No.	EN020014

Table of Contents

10	Land Use and Agriculture	1
10.1	Introduction	1
10.2	Legislation and Policy Background	1
10.3	Consultation.....	4
10.4	Methodology	1
10.5	Baseline Context.....	2
10.6	Embedded Mitigation Measures	8
10.7	Assessment of Effects	10
10.8	Specific Mitigation Measures	12
10.9	Cumulative Effects.....	12
10.10	Residual Effects.....	16

Environmental Statement Documents

Volume 6: Environmental Statement		
Document Reference	Chapter	Document
6.1	1	Introduction
6.2	2	Description of the Proposed Development
6.3	3	Alternatives and Design Evolution
6.4	4	EIA Methodology
6.5	5	Planning Policy Considerations
6.6	6	Ecology and Biodiversity
6.7	7	Landscape and Visual
6.8	8	Historic Environment
6.9	9	Flood Risk and Water Resources
6.10	10	Land Use and Agriculture
6.11	11	Socio-Economics and Tourism
6.12	12	Traffic and Transport
6.13	13	Emissions
6.14	14	Electric and Magnetic Fields
6.15	15	Summary of Environmental Effects
6.16		Environmental Statement Figures
6.17 – 6.26		Appendices
6.27		Glossary
6.28		Non-Technical Summary

This Chapter includes the following Appendices:

DCO Document Reference	Appendix	Document
6.22	10.1	Geotechnical Desk Study; August 2014

Reference is also made to the following documents:

DCO Document Reference	Document
2.4	Access and Right of Way Plans
6.17	Proposed Works at St Asaph Substation (Appendix 1.1 to this ES)
	Proposed Underground Cable; St Asaph Substation to the Terminal Point (Appendix 1.2 to this ES)
	Proposed Collector Substation; Clocaenog Forest; Environmental Report (Appendix 1.3 to this ES)
	Lower Voltage Diversions (Appendix 1.4 to this ES)
	Potential Connection Routes for the Derwydd Bach, Nant Bach and Brenig Wind Farms (Appendix 1.5 to this ES)
6.18	Construction Environmental Management Plan (Appendix 2.1 to this ES)
6.19	Arboricultural Survey Report 2014 (Appendix 6.9 to this ES)
6.30	Planning Inspectorate: North Wales Wind Farm Connections Project; Scoping Opinion: (February 2014)

10 LAND USE AND AGRICULTURE

10.1 Introduction

- 10.1.1 The chapter assesses the likely significant environmental effects of the Proposed Development arising from the construction, operation and decommissioning on land use and agriculture. It identifies the mitigation and compensation measures that will be implemented.
- 10.1.2 As geology influences soil type and therefore agricultural uses an overview of the geology and ground conditions within the Order Limits has also been included in this Chapter. In addition 'Geology and Ground Conditions' have a significant influence on potential construction techniques and therefore temporary land take required.

10.2 Legislation and Policy Background

- 10.2.1 The area within which the Proposed Development is set is predominantly rural and agricultural.
- 10.2.2 The Overarching National Policy Statement for Energy (EN-1) makes reference to Land Use. Compliance with this document is summarised in Table 10.1 below.
- 10.2.3 The National Policy Statement for Electricity Networks (EN-5) does not identify 'Land Use' as a specific consideration, identifying that '*all of the generic impacts covered in EN-1 are likely to be relevant*' (Para 2.6.1).

Table 10.1: Compliance with NPS EN-1 Requirements

Compliance with NPS (EN-1) Requirements	
NPS EN-1 Section	Covered in ES Section
<p>Para 5.3.1 Geological conservation relates to the sites that are designated for their geology and/or their geomorphological importance.</p> <p>Para 5.3.8 In taking decisions, the IPC should ensure that appropriate weight is attached to designated sites of international, national and local importance;and to biodiversity and geological interests within the wider environment.</p>	<p>Designated sites of geological interest have been identified in Section 10.5 below.</p>
<p>Para 5.10.5 The ES should identify existing and proposed land uses near the project, any effects of replacing an existing development</p>	<p>Existing land uses within the Proposed Route Alignment (1km) are identified in Baseline Conditions.</p> <p>No planned or existing uses are</p>

Compliance with NPS (EN-1) Requirements	
NPS EN-1 Section	Covered in ES Section
or use of the site with the proposed project or preventing the development or use on a neighbouring site from continuing.	prevented on neighbouring sites.
Para 5.10.8 Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as grades 1,2,and 3a of the Agricultural Land Classification)....Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed.	The Agricultural Land Classification (ALC) within the Order Limits is described below (Baseline Context) together with the mitigation measures proposed
5.10.9 Applicants should safeguard any mineral resources on the proposed site as far as possible taking into account the long-term potential of the land use after any future decommissioning has taken place.	Avoidance of mineral resources was taken into account in the routing of the Project however EN-5 recognises that 'The general location of electricity networks projects is often determined by the location, or anticipated location, of a particular generating station and the existing network infrastructure taking electricity to centres of energy use. This gives a locationally specific beginning and end to a line (para 2.2.2).
5.10.15 The IPC should ensure that applicants do not site their scheme on the best and most versatile agricultural land without justification. It should give little weight to the loss of poorer quality agricultural land (in grades 3b, 4 and 5), except in areas (such as uplands) where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy.	The Order Limits are not located on BMV land]

10.2.4 EN-1 also states at paragraph 4.1.5 that:

'Other matters that the Infrastructure Planning Commission (IPC) may consider important and relevant to its decision-making may include Development Plan Documents or other documents in the Local Development Framework. In the event of a conflict between these or any other documents and an NPS, the NPS prevails for the purposes of IPC decision making given the national significance of the infrastructure'.

10.2.5 Local Development Plan policies have been identified in Chapter 5 'Planning Policy Considerations' (DCO Document Ref 6.5), and, were applicable within the individual topic chapters of this ES. Policies of particular relevance to this chapter are identified below.

10.2.6 Denbighshire County Council Local Development Plan (LDP) includes the following policies:

Policy PSE 15 - Safeguarding Minerals - *"High quality resources of minerals, including limestone, sand and gravel, Denbigh Gritstones, igneous and volcanic deposits will be safeguarded from development that would result in its permanent loss or hinder future extraction. Development will only be permitted where:*

- i) it can be demonstrated that the need for the development outweighs the need to protect the mineral resource; or*
- ii) where such development would not have a significant impact on the viability of that mineral being worked; or*
- iii) where the mineral is extracted prior to the development*

The justification for this policy states that *'small scale developments may be suitably located so as to minimise impacts on the mineral reserve and its likelihood of being worked in the future'*.

Policy PSE 17 - Future Mineral Extraction

Although this policy relates to the working of minerals, the Proposals Map identifies areas safeguarded for limestone.

10.2.7 Conwy County Borough Council LDP includes the following policies:

Policy MWS/3 - Safeguarding Hard Rock And Sand And Gravel Resources

1. *The following resources and related facilities are included within the Safeguarded Hard Rock or Sand and Gravel designation:...*

- e) Additional hard rock as identified on the Proposals Map*
- f) Sand and Gravel resources as identified on the Proposals Map.*

2. *Planning permission will not be granted for any development within the Safeguarded Hard Rock or Sand and Gravel designation which could directly or indirectly harm the long-term viability of working those resources unless:*

- a) *It can be demonstrated that the need for development outweighs the need to protect the mineral resource or;*
- b) *Where such development would not have a significant impact on the viability of the mineral being worked or;*
- c) *Where the mineral is extracted prior to the development.*

10.3 Consultation

10.3.1 The following table summarises the points raised by the Secretary of State (SoS) in the Scoping Opinion.

Table 10.2: Issues Raised and Responses to the SoS Scoping Opinion

Issues Raised and Responses to the SoS Scoping Opinion	
Issue Raised by SoS	Response
Para 3.6.1. The study area for this assessment is not defined in this section. It should be clearly defined and justified in the ES.	The Study Area has been defined and is referred to in Section 10.5 below.
Para 3.6.2 All sources of advice and guidance relied on in the ES should be fully referenced	References have been included.

10.3.2 Responses received from consultees are summarised in Table 10.3 below.

Table 10.3: Responses to Consultation

Organisation	Issue raised	Response
Denbighshire County Council	<i>'the geology assessment should be expanded so that it also assess the impact of the project on hydrology and hydrogeology'</i> . (Response to Scoping)	Potential impacts on hydrology and hydrogeology are covered in Chapter 9 'Flood Risk and Water Quality' of this ES.
	<p>Potential Effects (Agricultural)</p> <p>Sources of supply are used for private water supply or properties and premises – these should be included separately (Response to Scoping).</p> <p>.... many sources of supply are used for private water supply for properties and premises - these would need to be listed separately to water supplies for farming operations (Comment on the PEIR)</p>	<p>These are identified in Chapter 9 'Flood Risk and Water Quality' of this ES.</p> <ul style="list-style-type: none"> • Although discussions have been held with landowners and tenants it has not been possible to identify which of these supplies are used solely for properties or agricultural purposes.
	<p>Mineral Safeguarding Areas</p> <p><i>'the route alignment crosses a number of Mineral Safeguarding Areas identified in the Denbighshire Local Development Plan (LDP). The EIA process should consider whether the North Wales Wind Farms Connections project would undermine the policy objectives for mineral safeguarding areas'</i></p> <p>...</p>	<p>The Policy is identified in Chapter 5 'Planning Considerations' of the ES.</p> <p>The potential effects on these areas is identified in this Chapter.</p>

Organisation	Issue raised	Response
National Farmers Union Cymru	<p>.... Farming under overhead transmission lines and around pylons poses considerable operational difficulties and additional costs for farmers. For this reason we would prefer to see underground cabling.</p>	<p>The Second Strategic Options Report explains why the undergrounding of the cable is not acceptable for the 132 kV Overhead Line. Should the DCO be granted the proposed 132 kV Overhead Line will be constructed in accordance with current safety guidelines. Where possible SP Manweb have also sought to incorporate feedback submitted by landowners and occupiers with a view to reducing the impact of the proposals on the land and general agricultural practices.</p>
	<p>We cannot accept that it is too expensive to consider that the whole route should or could be underground at the start of this process. Information from the continent would suggest that the cost of undergrounding is just five times that of overhead lines presenting a much lower estimate to that presented to us previously by electricity companies.</p>	<p>SP Manweb is governed by the terms of the Electricity Act 1989 (as amended) and as a regulated business, must ensure that proposals are economic, efficient and coordinated. Further information on the decision to proceed with an overhead line is explained in the Second Strategic Options Report.</p>
	<p>Many farms within potential route corridors participate in agri-environment schemes. There will be potential disruption to these schemes. It is important that SP Manweb approach the Welsh Government about making changes to agri-environment agreements, as usually the opportunity</p>	<p>Farms under agri-environment schemes have been identified through discussions between landowners and tenants.</p> <p>In line with agri-environment scheme guidance the responsibility falls to each</p>

Organisation	Issue raised	Response
	to amend contracts during the agreement period is very limited.	individual scheme member to notify the appropriate department of any changes in circumstance.
	<p>Operational Issues</p> <p>We are very conscious of the potential health & safety threats posed by farming the land beneath overhead power lines. Pylons can potentially cause an obstruction for larger machinery and the cables could pose a health and safety risk.</p>	<p>The 132 kV Overhead Line will be constructed to SP Manweb's specification which is derived from Energy Networks Association guidelines. Safety advice on working in proximity to overhead lines is available for view on the SP Energy Networks website. SP Manweb are in discussions with landowners and will ensure that the poles are positioned to minimise disruption to them, as far as reasonably practicable.</p>
	<p>Management of Pylon Bases</p> <p>Following consultation with farmers in other areas who already have pylons on their land we would wish to highlight the potential for weed burdens to build quite considerably under pylon bases. These areas are not accessible to efficient means of weed control and will potentially lead to more labour intensive methods, increased management costs and other problems associated with weed control.</p>	<p>Should the DCO be granted there will be no restrictions around the base of the poles or stays for grazing livestock. Following the completion of the Proposed Development the land will be made good and/or compensation paid. SP Manweb would also consider any other reasonable heads of claim on a case by case basis.</p>

Organisation	Issue raised	Response
	<p>Noise</p> <p>We are aware that pylons do generate a degree of noise particularly during damp weather and this could be to an unacceptable high level when pylons are placed in valleys which are remote and tranquil and naturally silent. We would also wish to highlight the potential for the level of noise to impact on property and livestock, particularly milk production.</p>	<p>Potential noise effects are covered in Chapter 13 'Emissions' of this ES</p>
	<p>Compensation</p> <p>Compensation packages must be an integral part of the equation and reflect the inconvenience and effect of electricity transmission from renewable energy projects. Our members seek assurances that the compensation mechanism will adequately reflect land values and the considerable long term disruption that would be caused by the grid connection project.</p>	<p>SP Manweb will agree compensation with affected persons in accordance with the compulsory purchase code. It will seek to reach agreement with as many affected persons as possible rather than rely on powers of compulsory acquisition.</p>
NRW	<p>Groundwater and Potential Contamination</p> <p>...the report contains no mention of potential effects to groundwater resources...we did not agree that water quality and resources be scoped out of the EIA.</p> <p>...risks to groundwater resources and quality should be further considered, particularly as part of the route passes over a Principal Aquifer, and the nature of the work which includes below ground</p>	<p>Potential effects on hydrogeology are included this Chapter.</p> <p>Potential effects on private water supplies are covered in Chapter 9 'Flood Risk and Water Quality' of this ES.</p>

Organisation	Issue raised	Response
	<p>excavation for cables (in places) and construction on land which may be contaminated has the potential to cause pollution if suitable mitigation is not in place. This should include an assessment of any impacts on private water supplies which could be affected by the construction activities.</p>	
	<p>Peat - ...reference is made to the existence of peat deposits in the development area.</p> <p><i>NRW therefore supports its legacy body CCW's Position Statement on Peat Conservation in Wales, and its Guidance Note</i></p> <p>...recommend that prior to siting, potential pole base locations are surveyed for the presence of peat ...and that bases are positioned to avoid peat wherever possible.</p>	<p>The geology maps reviewed at desk study stage did not indicate any peat within the Order Limits. A site walkover with probing would be necessary in order to confirm the presence or absence of peat at each individual tower location. This will be done at the Detailed Design stage, when poles can be re-positioned to avoid peat areas.</p>

10.4 Methodology

Land Use and Agriculture

- 10.4.1 The Study Area for the assessment is based on the 1km wide Proposed Route Alignment. This Study Area recognises that the Proposed Development has the potential to affect land beyond the Order Limits. Planning Applications within and in the vicinity of the Order Limits have also been reviewed and where applicable such proposed developments have been considered as part of the Cumulative Assessment.
- 10.4.2 The potential effects of the Proposed Development on agriculture, relates to land take, effects upon farming practices, and economic effects.
- 10.4.3 There are a number of factors which influence the value and sensitivity ascribed to various land use and agricultural receptors. These include the quality of agricultural land and land under environmental stewardship schemes. The magnitude of any effect reflects physical extent and duration. The significance of the effects can be identified by considering the sensitivity and magnitude of any effects.
- 10.4.4 The assessment has been undertaken largely by means of a desk study, utilising information from published sources and from specific liaison and consultation. Information has been obtained from farmers and farm tenants, via consultations between them and their land agents. More detailed information on agri-environment schemes and organic land has been obtained via discussions with farmers, and from information available through the Welsh Government website.
- 10.4.5 As the permanent land take for the Proposed Development is only the footprint of the double wood poles and a small number of new permanent access tracks the assessment uses professional judgement rather than any formal methodology.

Geology and Ground Conditions

- 10.4.6 The review of geology and ground conditions has been undertaken by means of desk top study and walk over observations. A Geotechnical Desk Study¹ has been undertaken, and is included as Appendix 10.1 (DCO Document Ref 6.22). The results are summarised below in the relevant sections of the 'Baseline Context'.

¹ North Wales Wind Farm Connections Project; Geotechnical Desk Study; Mott MacDonalds (August 2014).

10.5 Baseline Context

Land Use and Agriculture

Agriculture

- 10.5.1 Owing to the predominantly rural nature of the area within which the Order Limits are located, land use is dominated by a mix of pasture for grazing and arable land. Farm holdings vary in size and are predominantly stock holdings with cattle, sheep and some arable. There are also a number of dairy farms including, Bryn Hen, Bodysgaw, Croenllwm, Gwaenynog Bach, and a broiler unit near Bryn Golau, Saron.
- 10.5.2 The Clocaenog Forest, a large coniferous plantation under the control of NRW (formerly the Forestry Commission) lies at the southern extent of the Order Limits. The forest covers over 100km², and the majority lies at over 350m AOD. It was planted in 1905 on what was mostly moorland and is a well-managed plantation. The area of the Forest lying to the east of Llyn Brenig Reservoir is publically accessible, providing various opportunities for public recreation (see Chapter 11 'Socio-economic and Tourism' (DCO Document Ref 6.11)).
- 10.5.3 Some areas of coniferous forest and small pockets of woodland will need to be removed. Discussions have been held with NRW (formerly the Forestry Commission) and other landowners and an arboricultural survey undertaken².
- 10.5.4 The Agricultural Land Classification (ALC) provides information on agricultural land and its quality. There are five classifications of agricultural land (six with a subsequent subdivision of Grade 3) with Grades 1, 2 and 3a land currently defined as 'best and most versatile' (BMV). Provisional reclassification by the Department for Environment, Food and Rural Affairs (DEFRA) to-date has removed sub-classifications within Grade 3, considering Grades 1 and 2 as 'Best and Most Versatile' (BMV) land
- 10.5.5 The classification is based on the long term physical limitations of land for agricultural use. Factors affecting the Grade are climate, site and soil characteristics. The ALC system is used by Defra and others to give advice to Local Planning Authorities, developers and the public if development is proposed on agricultural land or other 'Greenfield' sites that could grow crops.

² Appendix 6.9 Arboricultural Survey Report 2014; Peak Ecology (DCO Document Ref 6.19)

10.5.6 The grades of agricultural land are described in Table 10.4 below.

Table 10.4: Definitions of Agricultural Land Classification Grades³

Grade	Definition
Grade 1 – Excellent Quality Agricultural Land	Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.
Grade 2 – Very Good Quality Agricultural Land	Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.
Grade 3 – Good to Moderate Quality Agricultural Land	Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.
Grade 4 – Poor Quality Agricultural Land	Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops, the yields of which are variable. The grade includes very droughty arable land.
Grade 5 – Very Poor Quality Agricultural Land	Land with very severe limitations, which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

³ Source: Defra

10.5.7 In summary, within the 1km Proposed Route Alignment, the ALC is as follows, (and illustrated on Figure 10.1):

- Clocaenog to Bwlch – the Order Limits commences in an area of forestry, running through it for approximately 500m. There is no ALC classification for this land. It then crosses Grade 3 (Good to Moderate) and 4 (Poor) agricultural land for c2.8km;
- Bwlch to Eriviat – the Order Limits crosses some Grade 4 (Poor) agricultural land for c.600m before running through c.4.4km of Grade 3 (Good to Moderate) agricultural land. The Order Limits crosses an area of woodland at Pandy to the south east of the Afon Ystrad;
- Eriviat to Plas Buckley – the Order Limits cross c4.6km of Grade 3 (Good to Moderate) agricultural land. The Order Limits also cross woodland at Coed Wern Ddu (ASNW), Hafod (ASNW) and to the west of Eriviat Bach. Some felling will be required;
- Plas Buckley to Groesfford Marli - the Order Limits cross c3.5km of Grade 3 (Good to Moderate) agricultural land. The Order Limits also cross mixed woodland south west of the Afon Elwy at Coedwig and Coed y Fadir, including ASNW. Tree felling will be required on the steep valley slopes.

10.5.8 Glastir is the sustainable land management scheme, through which the Welsh Government offers financial support to farmers and land managers. A number of landowners within the Order Limits have identified that they are part of the scheme. Areas covered by Glastir are shown on Figure 10.2).

10.5.9 The location of private water supplies has been identified in Chapter 9 'Flood Risk and Water Quality' of this ES. These include water supplies for properties and for agricultural purposes.

Other Land Uses

10.5.10 The Study Areas also includes a number of other small scale land uses in keeping it its rural nature including residential properties, recreational uses, Public Rights of Way⁴ and businesses.

Local Development Plan Allocations

10.5.11 The Local Development Plans for Denbighshire and Conwy have identified a number of areas for safeguarding minerals', policy references are included in Chapter 5 'Planning Considerations'. Land within the Order Limits falls within areas allocated.

10.5.12 Within Denbighshire the Order Limits cross an area safeguarded for sand and gravel between Plas Captain and Pandy Wood, and an area safeguarded for limestone between the River Elwy and the Terminal Point.

⁴ See Chapter 2 'Project Description (DCO Document Ref 6.2)

- 10.5.13 Within Conwy the Order Limits skirt two small areas safeguarded for sand and gravel at Pandy Wood and Erviat Hall, before crossing an area to the north of Erviat Bach Isaf on the approach to Hafod. The Order Limits then, skirt another area to east near Llechwryd before crossing a small area north of Berain near Tyddyn Bartley, and skirt to the east of a further small area at Plas Buckley.
- 10.5.14 The Order Limits also cross an area of safeguarded hard rock between the approach to Bod-ysgawenisaf and the River Elwy.

Geology and Ground Conditions

- 10.5.15 The Coedydd ac Ogofâu Elwy a Meirchion SSSI is located 5 km north-west of Denbigh, north of the village of Henllan. The site is of interest, partly for the geological and palaeontological interest of Galltfaenan, Cefn and Pontnewydd Caves.
- 10.5.16 The citation states that:
- “The north and east of the site is underlain by Carboniferous limestone which forms the valley sides of the River Meirchion and River Elwy. Rock outcrops, limestone ridges and sheer cliff faces are frequent and there are also several small areas of wooded limestone pavement. West of the River Meirchion, more gently sloping Silurian shales and mudstones occur. The soils vary with the topography; calcareous brown earths are present over much of the southern area of the site, particularly where it is flushed with base-enriched water. On the steeper limestones found across the remainder of the site, thin soils prevail”.*
- 10.5.17 Four Geological Conservation Review (GCR) sites lie within this SSSI and are important for the Pleistocene sediments and vertebrate mammalian fossils found within the caves. Pontnewydd Cave is internationally valued for its extensive Pleistocene record which includes evidence of the oldest-known human remains in Wales.
- 10.5.18 Cefn and Galltfaenan Cave (Pleistocene Vertebrata) comprises a cave system of interconnecting passages, with multiple entrances. It is of particular importance in that it has yielded faunas from distinct horizons of both Ipswichian and Devensian age. The Ipswichian Interglacial fauna includes hippopotamus and straight-tusked elephant, while horse, woolly rhinoceros, mammoth and reindeer are recorded from the deposits of the Devensian cold stage. Galltfaenan Cave contains deposits which have yielded remains of hyena, bear and reindeer of presumed Devensian age.
- 10.5.19 This SSSI is approximately 700m from the Order Limits and there will be no effects on the designated site.
- 10.5.20 No Regionally Important Geological Sites have been identified.

Geology

- 10.5.21 Superficial deposits underlying the Order Limits predominately comprise Devensian Till (glacial sediment generally comprising clay, silt, sand and gravel). Several pockets of Flandrian aged alluvium (clay, silt, sand and gravel) and Quaternary aged alluvial fan deposits (sand and gravel) are also encountered.
- 10.5.22 The Order Limits also pass through a number of areas where no superficial deposits are recorded. These locations are approximate and are as follows⁵ :
- Poles 6 – 9;
 - Poles 48 – 59;
 - Poles 151 – 164;
 - Poles 194 – 196; and
 - Poles 215 – 217.
- 10.5.23 The bedrock underlying the Order Limits predominantly belong to the Elwy Formation, sedimentary bedrock (mudstone, siltstone and sandstone) formed in the Silurian Period.
- 10.5.24 A change in bedrock formation occurs at the northern end of the Order Limits. The Clwyd Limestone Group, sedimentary bedrock (limestone) formed in the Carboniferous Period is the predominant bedrock underlying approximately the northernmost 2km of the Order Limits.
- 10.5.25 The Ffernant Formation, sedimentary bedrock (mudstone, siltstone and sandstone, formed in the Carboniferous Period is also present as a thin intrusion between Poles 193 – 195 and Poles 199 -202 approximately.
- 10.5.26 Bedrock faulting is indicated to be very prominent along the length of the Order Limits.

Hydrogeology

- 10.5.27 Devensian Till underlying the Order Limits is classified as 'unproductive strata'. The pockets of alluvium and alluvial fan deposits are classified as 'secondary aquifers'.
- 10.5.28 The British Geological Society (BGS) Hydrogeology viewer indicates that the majority of the Order Limits is underlain by a low productivity aquifer associated with the Elwy Formation bedrock and described as 'highly indurated argillaceous rocks with limited groundwater'. There is a change in hydrogeology which coincides with the change in bedrock formation at the northern end of the route. The section of the Order Limits (from Pole 193) is underlain by a moderately productive aquifer described as 'massive karstic limestone aquifer with rapid response to rainfall. Yields are noted to be highly variable from dry to 40 L/s.

⁵ Indicative pole locations are shown on Figure 2.2 (DCO Document Ref 6.16)

Historical Ground Investigations

- 10.5.29 A review of historical ground investigation data available from the BGS Geology of Britain viewer has been undertaken for a study area of 3km centred approximately on the Order Limits. The findings are summarised in Appendix 10.1 (DCO Document Ref 6.22).

Mining and Quarrying

- 10.5.30 The Order Limits are within an area which is not expected to be affected by Coal Mining.
- 10.5.31 A number of historic quarrying sites have been identified and are listed in Table 10.5 below.

Table 10.5: Location of Historic Quarrying Sites

Site Name	Commodity	Approximate Location
Hafoty-Las Opencast	Slate	100m west of Poles 6 and 7
Pant-Y-Foel Opencast	Sandstone	100m east of Poles 26 and 27
Bodeiliog-Uchaf Opencast	Sandstone	200m west of Pole 102
Gwaenynog-Bach Gravel Pit Opencast	Sand and Gravel	300m east of Poles 113 and 114
Solfa Waen Gravel Pit	Sand and Gravel	450m west of Poles 117 and 118
Unspecified Quarry	Unknown	10-20m west of Poles 195 and 196
Maes Opencast	Limestone	150m east of Poles 214 and 215
Plas-Newydd	Lead	500m west of Pole 216
Unspecified Quarry	Unknown	250m east of Pole 216
Coed Plas-Newydd Opencast	Limestone	500m west of Pole 218
Unspecified Quarry	Unknown	250m north east of Pole 218
Unspecified Quarry	Unknown	250m north west of Pole 218

Ground Conditions

- 10.5.32 A preliminary geotechnical assessment has been undertaken and the results provided in Appendix 10.1 (DCO Document Ref 6.22).
- 10.5.33 In summary, superficial deposits comprising clay, silt, sand and gravel (glacial till) underlie much of the Order Limits and these soils may provide an adequate stratum for the installation of the wooden pole structures and foundations. In these areas the Limits of Deviation are typically 20m. These areas account for 180 wood pole positions out of a total of 218.

- 10.5.34 There are also localised areas of weak / loose ground (i.e. compressible alluvium) and shallow near-surface bedrock area also anticipated to underlie some of the pole positions. In these cases it is considered that special foundation designs or installation techniques may be required. In these areas the lateral Limits of Deviation are typically 40m. A total of 29 of the wood pole positions are situated in areas of poor ground conditions and for a further 8 wood pole positions stabilization measures may be required due to the presence of ditches and streams.
- 10.5.35 Construction of the foundations for pole positions in moderate ground conditions will consist of timber foundation baulks and backfilled with the excavated soil.
- 10.5.36 For areas of poor ground conditions, where the excavated material is considered not to possess the required bearing strength characteristics it will be necessary to replace it with a granular material which will be imported to site. For some areas where the ground is very poor it may be necessary to install additional measures such as a concrete or screw anchor pile foundations.
- 10.5.37 In areas where rock is present an excavator-mounted hydraulic jackhammer will be required to break out the rock. This excavated material will not be suitable as back-fill due to its large size. In this case, and as for poor ground conditions, it will be necessary to use a granular backfill material.
- 10.5.38 Within the Elwy Valley tree removal works are proposed but the root systems will be left in place and this will ensure that the slope remains stable.

10.6 Embedded Mitigation Measures

- 10.6.1 Mitigation has been provided through the routing and design process which is further described in Chapter 3 'Alternatives and Design Evolution' of this ES (DCO Document Ref 6.3).

Land Use and Agriculture

- 10.6.2 The majority of pole positions would be accessed by existing farm access arrangements and field gates. The access arrangements are shown on the Access and Right of Way Plans (DCO Document Ref 2.4).
- 10.6.3 SP Manweb will arrange pre-entry meetings with owners and occupiers of land or their agents to ensure that disruption to farming activities is kept, where possible, to a minimum and there will be liaison with farmers and / or their agents throughout.
- 10.6.4 SP Manweb will ascertain, with the assistance of the landowner/occupier, the location of any field drains which could be damaged by the construction works. These drains may be diverted at pole sites and protected elsewhere. Any damage to land drainage caused by the construction works will be reinstated and/or compensation paid as appropriate.
- 10.6.5 On grassland, where required, the agreed access routes will be clearly delineated. Any area damaged by the works and agreed to be not in the permanent use of SP Manweb will be reinstated and/or reseeded, to bring it back into agricultural use. Care will be taken to prevent the disturbance and straying of livestock. In the interests of security, all field gates will be kept shut unless otherwise requested.

- 10.6.6 Any hedges or fences will be replaced, as appropriate, where breached for access and construction purposes.
- 10.6.7 Care will be taken in locating the temporary lay down areas, and in storing soil or stone away from water courses and standing water.
- 10.6.8 Wood pole erection sites and other work areas will be demarcated where necessary.
- 10.6.9 Topsoil and subsoil from the pole foundations will be stored separately. Any surplus subsoil or rock following backfilling, will be removed to a licensed tip or otherwise disposed of as agreed in consultation with the landowner/occupier and / or agent.
- 10.6.10 Any timber cut will remain the landowner's property and will be stacked at a convenient location in accordance with the landowner/occupiers reasonable requirements unless removal is requested.
- 10.6.11 Prior to work commencing, the land will be inspected and a detailed record of its condition noted, including private roads, gateways and fences along the route of the line and access routes.
- 10.6.12 Biosecurity measures are included within the Construction Environmental Management Plan (CEMP) (see Appendix 2.1; DCO Document Ref 6.18).

Forestry and Woodland

- 10.6.13 There is a requirement to remove a small section of recently planted forestry. The site presents no particular difficulties in terms of terrain or steepness of slope. Nevertheless, there are a range of environmental protection measures which are becoming standard for such operations and which will be employed to minimise the risk of environmental damage.
- 10.6.14 These measures are included within the CEMP (Appendix 2.1; DCO Document Ref 6.18)
- 10.6.15 All harvesting will be carried out in accordance with the Forestry Commission's Forest and Water Guidelines (2011). The following measures will be employed:
- *Protection of soil structure:* Upland soils with a moderate to high peat or clay content can be vulnerable to structural damage from excessive trafficking by heavy machines. This can promote soil erosion and reduce soil fertility. Damage will be minimised by the use of 'brash mats' which consist of branches and treetops with no commercial value. The brash is formed into mats on the access and extraction routes upon which the harvesters and forwarders travel within harvesting areas. This increases the ground bearing capacity of the soil.
 - *Protection of watercourses:* It may be necessary for extraction routes to cross rivers and streams. The frequent passage of machines can cause siltation of stream water. Watercourses will be bridged, where appropriate, to minimise the risk of siltation. On the completion of operations bridges will be removed.

- *Protection against spillage:* The fuelling and servicing of machines on-site will be carried out in designated locations well away from watercourses. Fuel and diesel bowsers will be bunded against accidental spillage. Machines will carry appropriate spillage kits and there will be additional spillage equipment kept on site. Operators will be provided with the contact details of relevant organisations, including NRW, who will be contacted in the event of a spillage occurring.

10.6.16 Where woodland and trees are directly affected and removed (other than within areas of commercial forestry) SP Manweb will replace the trees lost on a two for one basis, in agreement with local landowners and the local community;

Geology and Ground Conditions

10.6.17 It is expected that the overall construction period for the 132 kV Overhead Line could last approximately 16 months although there will not be 12 months of consecutive activity at any one location. As outlined above, the implementation of good working practices in accordance with the CEMP and construction method statements will ensure that construction effects are minimised.

10.7 Assessment of Effects

Land Use and Agriculture

10.7.1 There is no BMV land affected by the Proposed Development. Therefore the likely significant of effect is minor.

10.7.2 The majority of effects on farming operations will arise during the construction and decommissioning phases. Effects associated with decommissioning are anticipated to be broadly similar to those for construction. Potential effects include:-

- Temporary loss of grazing - the temporary loss of limited areas of grazing will occur along temporary access tracks and within working areas surrounding pole locations. This will be during the construction phase for a short period following reinstatement as the ground settles and re-establishes;
- Disturbance during lambing season, depending on the time of the works;
- Disruption to field drainage and water supplies, which may require diversion or repair;
- Impact on the commitments made by the farmers/landowners, etc. with regard to Agri-Environmental Schemes; and
- Increased risk of disease transmission and transfer of invasive weeds associated with vehicle movements along the working corridor.

10.7.3 Potential operational effects on agriculture and forestry as a result of the Proposed Development are associated with the permanent loss of small areas of operational agricultural land associated with the footprints of the wood poles and stays. The presence of wood poles within the fields causes inconvenience to agricultural operations, for example during grass cutting.

- 10.7.4 The Project is however designed as a double wood pole overhead line and land take will therefore be relatively limited, although the angle, section, failure containment and terminal poles will be stayed, increasing the area of land taken. The Proposed Development has been designed to minimise angle poles and overall the impacts on land use are minor and not significant.
- 10.7.5 Further discussions will be held with landowners and tenants on an individual basis to optimise pole locations where possible, within the Limits of Deviation, in order to minimise further effects on agricultural land take and operations.
- 10.7.6 The development of the route of the 132 kV Overhead Line, resulting in the Final Route Alignment, as well as seeking to avoid specific constraints, has also reduced the need to remove areas of established broad leaved woodland and the effects on commercial forestry operations. Some areas of forestry and small pockets of woodland will however still need to be removed.
- 10.7.7 Overall the impacts are not likely to result in significant effects and residual effects will be similar to those from existing overhead lines that can be found throughout the area.
- 10.7.8 Overhead lines present a potential hazard of contact or flashover between tall agricultural equipment and the conductors. Once an overhead power line is operational, it is necessary to maintain safety clearances. This may limit the use of certain types of agricultural equipment or operations under or adjacent to the line however the risks are greater for arable farming, where larger equipment tends to be used.
- 10.7.9 To compensate the landowner for effects upon the agricultural land, a capital payment is made in return for the granting of permanent easement. An element of these payments reflects the crop losses and disturbance suffered during normal agricultural use of the land.

Local Development Plan Allocations

- 10.7.10 Presence of potential mineral resources is not a key routing criterion and consequently resources have not been specifically avoided. However, even if plans to exploit the mineral resource are brought forward then typically the extraction can accommodate existing overhead transmission. The Proposed Development does not therefore affect the Safeguarded Areas and potential effects are minor and not significant.

Geology and Ground Conditions

- 10.7.11 Due to the distance to the geological elements of the SSSI identified above (Coedydd ac Ogofâu Elwy a Meirchion), there will be no significant effects.
- 10.7.12 Presence of potential mineral resources is not a key routing criterion and consequently resources have not been specifically avoided. There is no certainty that potential resources will be exploited, or when, and extraction can typically accommodate existing overhead transmission.

- 10.7.13 The magnitude of effect on mineral resources is related to the footprint (land area) required for the Proposed Development. This would be very small comprising the support pole locations only. The proportion of the resource directly affected would therefore be extremely low. An indirect effect may be caused by the conductors which could pose a constraint upon extraction activities. As a proportion of the overall resource, this is considered to be a small scale effect.
- 10.7.14 The effect upon mineral resources is of **minor** significance and could be adequately mitigated.

10.8 Specific Mitigation Measures

- 10.8.1 Mitigation has been provided through the routeing and design process. No further specific mitigation measures are proposed associated with the existing land use an agricultural operations.

Geology and Ground Conditions

- 10.8.2 A site walkover will be undertaken by a Geotechnical Engineer to visually examine ground conditions at the proposed pole locations. Field tests will be undertaken (comprising hand vane and / or probing) to more accurately estimate the composition and strength of the near surface soils, and to probe for the potential presence of shallow bedrock. A visual inspection of the surrounding area would also be undertaken to assess the potential risk of slope stability and other ground related hazards.

10.9 Cumulative Effects

- 10.9.1 A two stage approach to the assessment of cumulative effects has been adopted as described in Chapter 4 'EIA Methodology' (DCO Document Ref 6.4):
- 10.9.2 Table 10.6 below summarises the Stage 1 and Stage 2 developments that are identified for consideration within the ES. It also provides further details on each of the developments, data sources and relevant comments. Some of these developments have not been taken forward for consideration, where this is the case a reason has been included in the comments box.
- 10.9.3 In summary the adopted two stage approach is as follows:-
- **Stage 1** – assessed the Proposed Development + the Wider Scheme (Collector Substation + the underground cable route + works at St Asaph substation + lower voltage overhead line diversions + temporary storage areas within the two substations) + the Wind Farms;
 - **Stage 2** – assessed the proposals in Stage 1 together with other developments.

Table 10.6: Stage 1 and Stage 2 Developments

Development	Description	Comments
Development considered at Stage 1		
Collector Substation	SP Manweb development	<p>The combination of the developments which form part of the Wider Scheme will require a greater land take than that required for the Proposed Development. Information on the proposed works for the Collector Substation is provided within Appendix 1.3 (DCO Document Ref 6.17)</p> <p>The Collector substation requires a permanent land take of approximately 0.4ha.</p> <p>Implementation of good working practices in accordance with a CEMP and construction method statements will ensure that construction effects for geology and ground conditions are minimised.</p> <p>Minor cumulative effects for land use and geology are anticipated due to the combined land take in this area.</p>
Underground Cable	SP Manweb development	<p>As above the combination of the developments which form part of the Wider Scheme will require a greater land take than that required for the Proposed Development. There will be no change to the existing land use once the cables are in-situ and only approx. 200m of the cable will be laid in agricultural land. Information on the proposed works are the underground cable are provided within Appendix 1.2 (DCO Document Ref 6.17)</p> <p>No permanent land take is required</p>

Development	Description	Comments
Development considered at Stage 1		
		<p>Implementation of good working practices in accordance with the CEMP will ensure that construction effects for geology and ground conditions are minimised.</p> <p>Minor cumulative effects for land use and geology are anticipated due to the combined land take in this area.</p>
Works at St Asaph Substation	SP Manweb development	<p>The works proposed are within the curtilage of the existing St Asaph substation. Information is provided within Appendix 1.1 (DCO Document Ref 6.17)</p> <p>No cumulative effects are land use and geology are anticipated as the works are being undertaken within the boundary of the existing substation.</p>
Clocaenog Forest Wind Farm and substation	Connection to the SP Manweb Collector substation by underground cable.	Minor cumulative effects are anticipated for land use and geology due to combined land take. Clocaenog Forest Wind Farm does not require a connection route as the wind farm substation is located next to the Collector Substation.
Brenig Wind Farm and substation	Connection to SP Manweb Collector substation by underground cable (see Appendix 1.5).	Minor cumulative effects are anticipated for land use and geology due to combined land-take. The connection into the Collector substation will be by underground cable along existing forest tracks thereby reducing potential effects
Developments Considered But Not Included		
Nant Bach Wind Farm	Connection to SP Manweb Collector substation by underground cable (see Appendix 1.5).	As stated in the PEIR, Nant Bach wind farm is considered to be too far from the Proposed Development to give rise to any significant effects

Development	Description	Comments
Development considered at Stage 1		
Derwydd Bach Wind Farm	Connection to SP Manweb Collector substation by underground cable (see Appendix 1.5).	As stated in the PEIR, Derwydd Bach wind farm is considered to be too far from the Proposed Development to give rise to any significant effects.
Developments Considered in Stage 2		
Hafod Ty Ddu Wind Turbine	Single wind turbine located in relatively close proximity to the 132kV Overhead Line.	No cumulative effects are anticipated due to the scale of the development.
Tyn y ffynnon Wind Turbine	Single wind turbine	No cumulative effects are anticipated due to the scale of the development.
Meifod Farm, Saron, Wind Turbine	Single wind turbine.	No cumulative effects are anticipated due to the scale of the development.
Pant y Maen Wind Farm	8no. wind turbines in SSA A.	No cumulative effects are anticipated due to the distance from the Proposed Development.
Bryn Cocyn Wind Turbine	Single wind turbine	No cumulative effects are anticipated due to the scale of the development.
Burbo Bank Extension (including onshore substation)	Extension to existing offshore wind farm and proposed substation near the northern end of the Proposed Development.	No cumulative effects are anticipated due to distance from the Proposed Development.
Developments Considered But Not Included in the Stage 2		
Llys Dymper Wind Farm	10no. wind turbines to be connected to the National Grid locally at Llansannan.	Conwy Council requested the inclusion of the Llys Dymper wind farm in the cumulative assessment. Given the distance from the Proposed Development no cumulative effects are anticipated.
Land to south of Glascoed Road	Crematorium proposal	No cumulative effects are anticipated due to the distance from the Proposed Development.

Development	Description	Comments
Development considered at Stage 1		
Pilkington Playing fields site, St Asaph business park	Development of 3.9ha of land for office/light industrial use (Class B1).	No cumulative effects are anticipated due to the distance from the Proposed Development.
Bodelwyddan Key Strategic Site A	Development Plan allocation. Development brief adopted by Denbighshire CC for a mixed use development.	No cumulative effects are anticipated due to the distance from the Proposed Development.
Application for residential development at former H M Stanley Hospital site, Upper Denbigh Rd, St Asaph	Conversion of former St Asaph hospital into a housing development (85 homes)	No cumulative effects are anticipated due to distance from the Proposed Development.

10.9.4 Overall the combined effects of the Wider Scheme and the two Wind Farms (Clocaenog and Brenig), although they result in a greater combined land take are considered to be minor for land use and geology. Although the Collector Substation requires a permanent land take of 0.4ha this is within an area of commercial forestry. The footprint of the individual turbines for the wind farms is relatively small and is within areas of upland and commercial forestry. Land take for the Wider Scheme for example the underground cable and the lower voltage diversions is also limited.

10.9.5 The cumulative effects of the Proposed Development, the Wider Scheme, the two Wind Farms and the Stage 2 developments is considered to be minor and not significant.

10.10 Residual Effects

10.10.1 Through the implementation of the embedded mitigation measures potential adverse effects on 'land use and agriculture' and 'geology and ground conditions' will be reduced to a level that means that there will be no significant effects.