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Environmental Statement Document 5.0 Non-Technical Summary

National Grid (North Wales Connection Project)

Regulation 5(2)(a) including (l) and (m) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Application Reference EN020015

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North Wales Connection Project

Volume 5

Document 5.0 Environmental Statement Non-Technical Summary

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1 Introduction

1.1 INTRODUCTION

1.1.1 This document is a summary, in non-technical language, of the Environmental Statement (ES) for the North Wales Connection Project, which would be developed by National Grid Electricity Transmission plc (National Grid).

1.2 NATIONAL GRID

- 1.2.1 National Grid owns the high voltage electricity transmission system in England and Wales, and operates the high voltage electricity network in Great Britain. The system operates at 400,000 and 275,000 volts, connecting electricity generators to substations where higher voltages are transformed to lower voltages, enabling the power to be distributed to homes and businesses by the Distribution Network Operators (DNO). It has a statutory duty to maintain 'an efficient, co-ordinated and economical' system of electricity transmission.
- 1.2.2 National Grid is also required, under the terms of the Electricity Act, 1989, to take into account preserving the environment and to do what it reasonably can to reduce the effects on the environment when putting together new proposals to transmit electricity.

1.3 **NEED FOR THE PROJECT**

1.3.1 Under the terms of its licence, National Grid has a statutory duty to anyone who applies for a connection to the transmission system. Horizon Nuclear Power (HNP) has applied to National Grid to connect their proposed new nuclear power station at Wylfa on the Isle of Anglesey (Wylfa Newydd Power Station) to the high voltage national transmission network. The existing overhead line between Wylfa Substation and the mainland does not have sufficient capacity to be securely used to carry all the electricity that would be generated. A new electricity connection to the mainland high voltage national transmission network is therefore needed to allow the export of power. National Grid is under contract to connect the new Wylfa Newydd Power Station to the national transmission network in North Wales, therefore National Grid needs to gain consent for, and build, a new second connection. Further details are provided in the Need Case (**Document 7.1**).



Photograph 1: Aerial View of the Existing Wylfa Nuclear Power Station

1.4 **PROJECT OVERVIEW**

- 1.4.1 The North Wales Connection Project (the 'Proposed Development') is a proposal to develop a new 400,000 volt (400 Kilovolt (kV)) connection between the existing 400 kV substation at Wylfa on Anglesey and Pentir Substation in Gwynedd. This would allow the power from the proposed Wylfa Newydd Power Station to be exported. An aerial view of the existing Wylfa Nuclear Power station with part of the existing overhead line between Wylfa Substation and Pentir Substation is shown in Photograph 1.
- 1.4.2 The main parts of the Proposed Development are:
 - modifications to the existing substation at Wylfa;
 - sections of new 400 kV overhead line between Wylfa Substation and Braint Tunnel Head House and Cable Sealing End Compound on Anglesey including modifications to parts of the existing 400 kV overhead line between Wylfa Substation and Pentir Substation;
 - Braint Tunnel Head House and Cable Sealing End Compound on Anglesey;
 - a tunnel between Braint and Tŷ Fodol Tunnel Head Houses;

- Tŷ Fodol Tunnel Head House and Cable Sealing End Compound in Gwynedd;
- new section of overhead line between Tŷ Fodol Tunnel Head House and Cable Sealing End Compound and Pentir Substation;
- extension to the existing substation at Pentir; and
- temporary construction compounds, access tracks, construction working areas, localised widening of the public highway and third party works that are required to construct the infrastructure listed above.
- 1.4.3 As part of the Proposed Development comprises an overhead line with a voltage greater than 132 kV, which is longer than 2 kilometre (km); it is classed as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008. NSIP require an application to be made to the Planning Inspectorate for a Development Consent Order (DCO) authorised by the Secretary of State for Business, Energy and Industrial Strategy (BEIS).
- 1.4.4 As part of the application for a DCO, an Environmental Impact Assessment (EIA) has been undertaken, which is reported in the ES, in accordance with the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended). Although the 2009 Regulations have been replaced by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, the 2009 regulations apply to the Proposed Development due to the scoping opinion being requested before the 2017 regulations came into force.

1.5 WHAT IS ENVIRONMENTAL IMPACT ASSESSMENT (EIA)?

- 1.5.1 EIA is the process of identifying, evaluating and mitigating, where possible, likely significant environmental effects of a project. It promotes the early identification and evaluation of likely significant effects on the environment and enables appropriate mitigation (i.e. measures to avoid, reduce or offset negative effects or increase positive effects) to be identified and incorporated into the design of a project, or commitments to be made to other mitigation, such as environmentally sensitive construction methods and practices.
- 1.5.2 The EIA of the Proposed Development has been undertaken at the same time as the design process to maximise opportunities to reduce likely significant effects as they have been identified. This approach has ensured that mitigation is included in the design of the Proposed Development and forms an important part of it.

1.5.3 The results of the EIA also makes sure that decision makers, such as the Secretary of State and statutory consultees, as well as other interested parties including local communities, are aware of the Proposed Development's likely environmental effects and whether these may be significant or not, so that they may be considered in the determination of the application for the DCO.

1.6 THE ENVIRONMENTAL STATEMENT (ES)

- 1.6.1 The ES consists of a number of documents that have been prepared by National Grid and which are submitted alongside the application for a DCO.
- 1.6.2 The ES provides an overview of the Proposed Development, the main alternatives considered when developing the project, information about the existing environment, and an assessment of the likely significant effects of the Proposed Development. Where appropriate, mitigation measures have been identified to avoid, reduce or remedy significant adverse environmental effects.
- 1.6.3 In the development of the ES, National Grid has consulted with the general public, stakeholders and relevant public authorities, including Isle of Anglesey County Council and Gwynedd Council.
- 1.6.4 The ES forms **Volume 5** of the DCO application.

1.7 THE NON TECHNICAL SUMMARY

- 1.7.1 Although the ES is written in a way that is as clear and understandable as possible, it nevertheless is a large document, which includes some detailed technical information and which often requires the use of technical language. The Non-Technical Summary provides a summary of the content of the ES in a way which is intended to be readily accessible to all readers by avoiding, where possible, the use of overly technical language.
- 1.7.2 The remainder of the Non-Technical Summary is structured as follows:
 - Section 2: The Proposed Development. This section provides a description of each element of the North Wales Connection Project, including how it would be constructed.
 - Section 3: Project History and Alternatives. This section describes the evolution of the design of the Proposed Development.
 - Section 4: About EIA. This section describes the EIA process including how effects are identified, assessed and mitigated.

- Section 5: Results of the EIA. This section describes the results of the assessments for each environmental topic.
- Section 6: Next Steps. The section explains the next steps in the application process.

2 The Proposed Development

2.1 PROPOSED DEVELOPMENT OVERVIEW

- 2.1.1 The Proposed Development would provide a new 400 kV connection between the existing substations at Wylfa and Pentir and includes the following:
 - extension to the existing substation at Wylfa;
 - sections of new 400 kV overhead line between Wylfa Substation and Braint Tunnel Head House and Cable Sealing End Compound on Anglesey including modifications to parts of the existing 400 kV overhead line between Wylfa Substation and Pentir Substation;
 - Braint Tunnel Head House and Cable Sealing End Compound, on Anglesey;
 - a tunnel between Braint and Tŷ Fodol Tunnel Head Houses;
 - Tŷ Fodol Tunnel Head House and Cable Sealing End Compound in Gwynedd;
 - new section of overhead line between Tŷ Fodol Tunnel Head House and Cable Sealing End Compound and Pentir Substation;
 - extension to the existing substation at Pentir; and
 - temporary construction compounds, access tracks, construction working areas, localised widening of the public highway and third party works that are required to construct the infrastructure listed above.
- 2.1.2 The Order Limits define the full area required to locate and construct all the parts of the Proposed Development. The Order Limits are shown on Figure 1.

2.2 LIMITS OF DEVIATION AND PARAMETERS

2.2.1 Rather than applying for a fixed route for the overhead line and tunnel, or for the detailed design of buildings (non-linear elements) (e.g. the tunnel head house and cable sealing end compounds), the application has been made

for a slightly larger area, which would allow for some flexibility for the routeing of the connection and/or size of non-linear elements.

- 2.2.2 This flexibility is needed to allow for small changes during detailed design, or even once on-site, to work around unexpected limitations, for example the identification of challenging ground conditions or buried archaeology features. The term 'Limit of Deviation' is used to describe this larger area where the overhead line or tunnel could be routed and constructed. The term 'parameter' is used to describe this larger area where the non-linear elements of the connection (buildings) are to be located.
- 2.2.3 The Limits of Deviation and parameters provide a maximum distance or measurement of change within which all the permanent works must be constructed. The Limits of Deviation for the Proposed Development are generally as follows:
 - Overhead Line Limits of Deviation of approximately 100 metres (m) (50 m either side of the centre line) with no limit on the movement of a pylon along the centreline. The Limit of Deviation upwards for the height of a pylon is 6 m; and
 - Tunnel The tunnel would be constructed within the limit of Deviation identified on Figure 1 which is approximately 750 m at its widest point. The top of the tunnel would maintain a minimum of 10 m of bedrock cover to either the surface level or Menai Strait. No lowest vertical Limit of Deviation has been identified.
- 2.2.4 The Order Limits applied for include these Limits of Deviation, but also areas of land needed temporarily for construction, for example to construct temporary access tracks. There is also flexibility in terms of the location of temporary works within the Order Limits. The Order Limits are shown on Figure 1.
- 2.2.5 The results of the EIA reported in the ES have taken account of the Limits of Deviation and parameters, in identifying whether effects would be significant. Detailed consideration of the Limits of Deviation and parameters are included to ensure that the assessment is robust and has considered a realistic worst case for the final built development.

2.3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

Overhead Line

2.3.1 The proposed overhead line is routed from Wylfa Substation on the north coast of Anglesey to the Braint Tunnel Head House and Cable Sealing End

Compound, to the south-west of Llanfairpwll. The connection would then be placed in a tunnel to $T\hat{y}$ Fodol Tunnel Head House and Cable Sealing End Compound, located south of A4087 in north-west Gwynedd. A further section of overhead line from the cable sealing end compound to Pentir Substation would then be required. Where possible the new overhead line has been routed in parallel with the existing 400 kV overhead line between Wylfa Substation and Pentir Substation.

- 2.3.2 To avoid the need for the overhead line route to 'duck-under' or cross the existing overhead line running across Anglesey, a number of rearrangements of the existing overhead line would take place. These rearrangements would involve the removal of sections of the existing line and the reconnection of the sections remaining with the new line.
- 2.3.3 This means that sections of the existing overhead line would be carried on new pylons and sections of the new overhead line would be carried on existing pylons. These are known as transposition points and are illustrated in Image 1.



Image 1: Illustration of a Transposition Points

- 2.3.4 Once the new infrastructure is in place there would be two overhead lines; referred to as the western (4AP) and eastern (4ZA) alignments. Figure 1 illustrates where the new and existing sections would be located.
- 2.3.5 Within the Limits of Deviation there are two overhead line options being applied for: Option A which would go over a property at Talwrn; and Option B which would go round the property but would include an additional pylon. Options A and B are illustrated on Figure 1.
- 2.3.6 The western alignment would be made up of 65 new pylons and 35 existing pylons (two of which would be modified) giving 100 in total (Option A) or 66 new pylons and 35 existing pylons (two of which would be modified), giving 101 pylons in total (Option B).
- 2.3.7 The eastern alignment would be made up of 35 new pylons and 70 existing pylons (three of which would be modified), giving 105 pylons in total for both Options A and B.
- 2.3.8 The proposed pylons would be of a steel lattice type, similar to those on the existing overhead line across Anglesey. Photograph 2 shows part of the existing 400 kV overhead line between Wylfa Substation and Pentir Substation in the vicinity of Tregele. The average height of the pylons would be approximately 50 m with an approximate 7 m x 7 m base. Pylons are either suspension pylons, from which the wires (conductor) is simply suspended, or tension pylons, which are more robust structures that hold conductors in tension where the overhead line changes direction or to maintain tension in long straight sections.



Photograph 2: Existing 400 kV Overhead Line between Wylfa Substation and Pentir Substation in the Vicinity of Tregele.

Tunnel

- 2.3.9 National Grid has committed to the use of underground cables through the Anglesey Area of Outstanding Natural Beauty (AONB), and across the Menai Strait, to reduce effects on the landscape and to protect iconic views. In order to place the connection in the tunnel the following are required:
 - Braint Tunnel Head House and Cable Sealing End Compound on Anglesey;
 - Tunnel containing the underground cables between Braint and Tŷ Fodol Tunnel Head Houses; and
 - Tŷ Fodol Tunnel Head House and Cable Sealing End Compound in Gwynedd.
- 2.3.10 Where the connection changes from overhead line to underground cable a cable sealing end compound is required to provide a point of connection.
- 2.3.11 Tunnel head houses are required to provide maintenance access to the tunnel and tunnel shafts. They contain ventilation equipment to control the temperature in the tunnel as well as pumping equipment to remove any water from the tunnel.

- 2.3.12 The Tunnel Head House and Cable Sealing End Compounds at Braint and Tŷ Fodol would be located next to each other, the locations of which, along with an indicative alignment of the tunnel, are illustrated on Figure 1.
- 2.3.13 The area inside of the security fence would include the gantries, cable sealing end equipment, Distribution Network Operator's (SP Manweb) supply and compound, portable relay room, tunnel head houses, 400 kV underground cables, firefighting water tank (if required) and access track.
- 2.3.14 The Braint Tunnel Head House and Cable Sealing End Compound layout is illustrated in Figure 2 and would cover approximately 8,640 square metres (m²). The maximum height of the tunnel head house would be 8 m and would be designed to match local farm buildings. The gantries would be approximately 15 m in height. Tree and wild flower planting, as well as earth mounding, is proposed around the operational compound within the site boundary. A new access track would connect the site to the public highway.
- 2.3.15 The Tŷ Fodol Tunnel Head House and Cable Sealing End Compound layout is illustrated on Figure 3 and would cover approximately 8,640 m². The maximum height of the tunnel head house would be 11 m and would be designed to match local farm buildings. This tunnel head house would be higher than the Braint Tunnel Head House and Cable Sealing End Compound as it would house the tunnel ventilation fans to keep the tunnel at the correct temperature so the cables do not overheat. The gantries would be approximately 15 m in height. Mounding and planting is proposed around the operational compound within the site boundary. A new access track would connect the site to the public highway.
- 2.3.16 The tunnel would have an internal diameter of approximately 4 m and would be approximately 4 km in length. The tunnel shafts would be approximately 75 m deep at Braint and 95 m deep Tŷ Fodol. Both shafts would have a width of 15 m.

Substations

2.3.17 As part of the Proposed Development, works would be required to both the existing Wylfa Substation and Pentir Substation. This would involve the installation of additional equipment including gantries and switchgear and the removal of existing equipment such as cables, steelwork and foundations. Wylfa substation would be extended, but only to allow a fence line to be moved. Pentir Substation would be extended to the north-west and south-east to accommodate the additional equipment required. Pentir Substation is illustrated on Figure 4 (**Document 5.0.1.4**).

2.4 CONSTRUCTING THE PROPOSED DEVELOPMENT

Temporary Construction Compounds

- 2.4.1 Two temporary construction compounds would be required for the overhead line works. These would be located away from the pylon working areas; one being east of Llangefni on Anglesey (Penmynydd Road), and the other one directly south of Pentir Substation in Gwynedd (see Figure 1). They would be used from the start of the overhead line construction throughout the construction period and would include temporary site offices, welfare facilities and storage areas.
- 2.4.2 Two construction compounds for the tunnel, tunnel head house and cable sealing end compounds, located adjacent to the compounds, would also be required. They would be in place for the whole of the construction period for the tunnel and would include temporary site offices, welfare facilities and storage areas. Construction compounds adjacent to each of the substations, for the works required at the substations would also be needed (see Figure 1).

Temporary Working Areas

2.4.3 In addition to the main construction compounds, there would be areas where temporary working areas would be required. Temporary working areas would be required to construct individual pylons; stringing the conductors, gaining access to work areas and installing drainage. These could extend up to the Order Limits and would be located along the length of the Proposed Development. These temporary working areas are illustrated on Figure 1.

Overhead Line

- 2.4.4 Construction activities would begin with the preparation and setup of the construction compounds. Following the establishment of the compounds the construction of the overhead line would generally follow the following order of events:
 - installation of access roads and soil stripping;
 - creation of pylon working areas:
 - installation of pylon foundations;
 - layout of steelwork in preparation for building the pylon;

- building of the pylon steelwork (see Photograph 3 typical overhead line pylon construction);
- installation of insulators;
- conductor stringing including positioning protection and setting up machine sites for the stringing; and
- removal of construction equipment and accesses and reinstatement of pylon working areas and construction compounds (returning the land to its previous state).
- 2.4.5 Vegetation clearance may be undertaken prior to or during any of the activities identified above.



Photograph 3: Typical Overhead Line Pylon Construction

Tunnel

- 2.4.6 Construction activities would begin with the preparation and setup of the access roads and construction compounds at each end of the tunnel.
- 2.4.7 Vertical tunnel shafts would be constructed at each end of the tunnel, the construction method used would likely be the 'drill and blast' approach (which would involve the controlled use of explosives). The shafts would

allow access for the construction of the tunnel which would be undertaken using either a tunnel boring machine or by the 'drill and blast' approach.

- 2.4.8 Disposal of waste material from the shaft and tunnel construction would be necessary. Some of the material would be used on-site to create earth mounds around the operational compounds; however, the rest would be removed off-site, involving a number of lorry movements to allow as much of the waste material as possible to be recycled.
- 2.4.9 Once the shafts and the tunnel were constructed the cables would be delivered to site on cable drums. The drums would be lowered down the access shafts and specialist cable pulling machines would be used to tow the cables into position.
- 2.4.10 Tunnel head houses would be constructed over both access shafts; these would contain shaft ventilation equipment and would provide a means of access to the shafts and tunnel for inspection and maintenance activities. Tŷ Fodol Tunnel Head House would also contain tunnel ventilation fans to keep the tunnel at the correct temperature so the cables do not overheat.
- 2.4.11 Following completion of the tunnel and installation of the cable, the land on which the construction compounds were sited, and the temporary access roads, would be reinstated. The permanent tunnel head houses and the accesses to them would remain.

Cable Sealing End Compounds

- 2.4.12 The construction of both Braint and Tŷ Fodol Cable Sealing End Compounds would be undertaken after completion of the tunnel and would use the same construction compounds and temporary access tracks as the tunnel. The 'terminal pylon', or 'gantry', and other electrical equipment would be built and concrete troughs for the underground cables would be installed underground. The underground cables would be guided via the trenches onto the cable sealing end structures.
- 2.4.13 The temporary site installation facilities would be removed and, where required, temporary working areas would be returned to their original condition. The permanent site boundary security fence would be erected and the permanent access road to the cable sealing end compound would remain, this would be shared with the permanent access roads to the tunnel head houses. Landscaping in the form of planting and earth mounding would also be implemented.

Substations

- 2.4.14 Wylfa Substation requires items of existing equipment to be removed and new equipment installed. There would be a small change to the existing fence line.
- 2.4.15 Following the establishment of construction compounds at Pentir Substation and initial preparation of the site, including topsoil removal, disused substation equipment would be removed and the new equipment would be installed. The fence around the substation would be extended to go round the new equipment, the existing access road, hard standing and drainage would be modified and areas either side of the substation would be planted with woodland, hedgerows and grassland.

2.5 CONSTRUCTION TRAFFIC ROUTES

- 2.5.1 Construction traffic routes are the public roads upon which construction vehicles would travel to site, having left the A55. The proposed construction traffic routes are shown on Figure 5.
- 2.5.2 An Outline Construction Traffic Management Plan (OCTMP) has been prepared which details the measures which would be put in place during construction to lessen the impact of traffic generated during the construction phase of the Proposed Development.

2.6 THIRD PARTY ASSETS

- 2.6.1 To build the Proposed Development existing third party services, (for example low voltage power lines or telephone lines) would need to be changed either by placing an existing above ground line underground or re-routeing an existing underground cable.
- 2.6.2 The works would most likely be undertaken by the service owners prior to construction of the Proposed Development. Temporary access using existing gates and tracks where possible would be used, a trench would be dug (either for the cable re-route or transfer of overhead services) and cables laid in it before it is back filled. Overhead lines would be switched off and removed, existing cables would be left where they are; however, oil in the cables would be drained and disposed of appropriately.

2.7 CONSTRUCTION PROGRAMME

2.7.1 The temporary access tracks and construction compounds for the tunnel, tunnel head house and cable sealing end compounds would be put in place between in 2020 and 2021. The tunnel including its shaft would take

approximately 4 years to construct up 2025. Once the tunnel has been completed the tunnel head house and cable sealing end compounds would be built, with final reinstatement expected to be complete by 2026.

- 2.7.2 The installation of the construction compounds and temporary access tracks for the overhead line would start in 2022, with construction and reinstatement of the overhead line elements completed in 2026.
- 2.7.3 The Wylfa Substation works would be scheduled between 2024 and 2026. The Pentir Substation works would be undertaken between 2023 and 2026.

2.8 MAINTENANCE AND OPERATION

Overhead Line

- 2.8.1 During operation the 400 kV overhead line would transmit electricity from Wylfa Substation to Pentir Substation.
- 2.8.2 The overhead line would be inspected annually from the ground or by helicopter. The inspections would identify if there were any visible faults or signs of wear and would also indicate if changes in plant or tree growth or development had occurred which may risk safety clearances. Inspections would confirm when refurbishment was required.
- 2.8.3 Minor repairs or modifications may be required from time to time, these repairs and routine vegetation removal would be undertaken using pickup trucks and vans to access site along routes agreed with landowners.
- 2.8.4 Refurbishment work would typically be undertaken on one side of a pylon at a time, so that the other side can be kept in use. Refurbishment work can involve:
 - the replacement of conductors and earth wires (wire at the top of the pylon);
 - the replacement of insulators and steelwork that holds the conductors and insulators in place, and conductor fittings;
 - painting or replacement of the pylon steelwork; and
 - replacement of telecommunication equipment.
- 2.8.5 During refurbishment there could be activity along the length of the overhead line. Vans would be used to carry workers in and out of the site and trucks would be used to bring new materials and equipment to site and

remove old equipment. Temporary works including access routes and scaffolding to protect roads and railways may be required.

Tunnel

- 2.8.6 The tunnel would be unmanned during normal operation. Ventilation fans located within the Tŷ Fodol Tunnel Head House would draw air through the tunnel in order to maintain the required temperature in the shafts and tunnel to ensure the cables did not overheat.
- 2.8.7 The cables in the tunnel would be inspected at least annually to report on any changes which may need repairs or replacements. Access would be gained via the tunnel head houses.
- 2.8.8 Any replacements of cables within the tunnels, or larger equipment within the tunnel head houses, would require a temporary construction compound. Access would be gained via the permanent access road. At the end of their operational life cables may require replacing. If the old cables needed to be removed then a similar method would be followed as for installation of the cables within the completed tunnel.

Tunnel Head Houses and Cable Sealing End Compounds

- 2.8.9 The tunnel head houses and cable sealing end compounds would be unmanned during normal operation.
- 2.8.10 Regular maintenance checks of the fans, lighting and pumps and other equipment would be undertaken at the tunnel head houses.
- 2.8.11 Infrequent visits would be made to the cable sealing end compounds to monitor the overhead elements, underground cables and carry out maintenance and checks on electrical equipment.
- 2.8.12 Should refurbishment and/or replacement works be required, vans would be used to carry workers in and out of the site and trucks would be used to bring new materials and equipment to site and remove old equipment. Temporary scaffolding may be required to protect any infrastructure around the site.

Substations

- 2.8.13 The substations would continue to be operated as they are at present.
- 2.8.14 Maintenance of the substations would continue to be undertaken approximately every three years. Visual checks would be undertaken on a monthly inspection visit to the site. If the substation required refurbishment

or replacement works, vehicles would be used to carry workers in and out of the site and suitable vehicles would be used to bring new materials and equipment to site and remove old equipment.

2.9 DECOMMISSIONING

Overhead Line

2.9.1 If the Proposed Development were no longer required and the 400 kV operating requirements allowed, the overhead line may be removed. Upon removal much of the materials would be taken for recycling. Similar accesses would be required as outlined for construction. In general the foundations would be removed to approximately 1.5 m deep and subsoil and topsoil returned.

Tunnel & Tunnel Head House

2.9.2 If the 4AP connection were no longer required, the underground cable would be decommissioned. Cables would be removed from the tunnel and the shafts either capped or backfilled. The tunnel head houses and associated equipment would be removed and materials would be taken for recycling. The tunnel itself would remain.

Cable Sealing End Compounds

2.9.3 Similar methods and equipment would be required for dismantling the cable sealing end compounds as outlined for construction. Materials would be removed and taken for recycling. Should the site no longer be required the land would be reinstated.

Substations

2.9.4 If the elements of either substation that form part of the Proposed Development were no longer required, the equipment would be safely disconnected and removed. Much of the material would be taken for recycling. Similar methods and equipment would be required for dismantling as for construction. Photograph 4 shows a view toward the existing Pentir Substation.



Photograph 4: View of Pentir Substation

3 Project History and Alternatives

- 3.1.1 The Proposed Development is the result of a number of rounds of design development which considered consultation feedback, environmental factors such as protected sites for natural conservation, protected plants and animals, the landscape, visual effects, historic sites, technical factors, and cost in accordance with National Grid's statutory obligations. National Grid has considered ways to achieve good design through the careful consideration of route corridors and alignments which have been the topic of consultations held.
- 3.1.2 The design evolution of the Proposed Development has been guided by the following steps:
 - Need case: to confirm the need to develop the high voltage transmission system to provide a secure connection for the Wylfa Newydd Power Station;
 - Strategic optioneering: to develop and assess strategic options that would meet the identified need, including assessment of alternative technologies and selection of an option to take forward;
 - Route corridor study: to take account of environmental constraints and define potential areas of land or 'route corridors' for the new OHL and identify the most appropriate option to meet the need;
 - Initial consultation stages: to obtain the views of statutory bodies, other agencies and the general public on the strategic options, the preferred strategic connection option and route corridor options;
 - Route corridor selection: to consider which of the possible route corridors is preferred and announce the preferred corridor;
 - Informal consultation: to obtain the views of statutory bodies, other agencies and the general public on the route options within the preferred route corridor and upon search areas for operational compounds; draft route: to develop the connection detail within the preferred route corridor and to consult on this;
 - EIA Scoping Report: to outline the approach and scope of the EIA for the Proposed Development;

- Statutory pre-application consultation: to consult statutory bodies, other agencies and the general public on the details of the proposed application;
- Consultation feedback report: review of representations received during statutory pre-application consultation and consideration of suggestions to amend the Proposed Development; and
- Back-check and review of options: to take the opportunity to verify that the need case and decisions made in the options and routeing reports remain valid in light of any changes in circumstances.
- 3.1.3 The flowchart below illustrates how National Grid has implemented the above steps.



4 About EIA

4.1.1 An EIA is undertaken to identify the likely significant effects of a project, which are then reported in an ES.

4.2 SCOPING

- 4.2.1 Scoping helps to ensure that the topics covered, baseline information and methods of assessment to be used in the EIA are appropriate and have taken into account the views of consultees and decision makers, where appropriate.
- 4.2.2 A Scoping Report for the Proposed Development was prepared and issued to the Planning Inspectorate which identified the scope of issues that National Grid considered should be covered by the EIA. This was based on initial consultation, data searches and baseline surveys. A Scoping Opinion was issued by the Secretary of State, which identified what the Secretary of State required the EIA to cover, having consulted a range of statutory bodies and taken into account the information provided in the Scoping Report.
- 4.2.3 At the beginning of each chapter of the ES there is a table setting out the points made in the Secretary of State's Scoping Opinion, and explaining how each point has been addressed.

4.3 THE EIA PROCESS

4.3.1 The main stages in the assessment process are set out below:

Baseline The existing environment which may be affected is assessed in order to establish its value and/or sensitivity.

Identification of Potential Environmental Impacts

The potential effects of the development are identified in order to consider possible interactions between it and the existing environment.

Prediction of Potential Environmental Impacts

The potential positive and negative effects are assessed using criteria based on accepted guidance and good practice in order to identify likely significant effects.

Identification of Mitigation Measures and Modifications to the Design

Alterations to the design of the development and mitigation measures are then identified in order to avoid, reduce or offset negative effects and enhance positive effects.

Evaluation and Assessment of Significance

The significance of environmental effects is then assessed in line with accepted guidance, taking account of the final design of the development including all committed mitigation measures (residual effects).

Cumulative Effects

Inter-project effects (the combined effects of the development with other developments) and Intra-project effects (the combined effects arising as a result of the development, for example upon a single receptor or resource) are also assessed.

Presentation of results of the EIA in the Environmental Statement

4.3.2 The EIA Regulations require the likely significant effects of the Proposed Development to be identified. The EIA identifies the positive and negative effects of the Proposed Development and assesses their significance, typically based on a combination of the sensitivity or value of the baseline feature or resource being affected (also known as the receptor) and the magnitude of the effect that would occur (also known as the scale of change) or the actual change taking place to the environment. The assessment takes into account a range of different factors including:

- legislation, policy standards, guidelines or the environmental value of the receptor;
- the ability of the receptor to absorb change and its ability to recover from this change; and
- the likelihood of an effect occurring as well as its duration (whether it would be temporary or permanent).
- 4.3.3 Likely significant effects are assessed for all phases of a development (construction, operation, maintenance and decommissioning). Construction effects will often be temporary, short-term effects limited to the construction phase only. Permanent effects are those that may start during construction, but would then continue beyond the construction period, into a medium or long-term. Operational effects are those which occur once the development is in operation. A significant negative effect is not necessarily one that would make the Proposed Development unacceptable, nor is a significant positive effect necessarily one that would make the Propose of identifying the significant effects (positive and negative) is to ensure that all parties, in particular decision makers, are aware of the environmental impacts (in particular those which are likely to be significant) of a development and consider these alongside other considerations in the determination of an application for a DCO.
- 4.3.4 The EIA process and its results are reported in detail within the ES. The results are presented as residual effects (those remaining following mitigation).

4.4 MITIGATION

- 4.4.1 Through the EIA Process, a range of mitigation measures have been identified and incorporated into the design, construction, operation, maintenance and decommissioning of the Proposed Development. A standard approach to developing mitigation has been adopted:
 - <u>Mitigation by Design</u>: These are measures that have been built into the design of the Proposed Development, such as routeing the overhead line to avoid as many sensitive locations as possible.
 - <u>Control and Management Measures</u>: These are measures such as the use of road sweepers etc, which are included within the Construction Environmental Management Plan and other control and management plans.

- <u>Mitigation Measures</u>: These are measures over and above mitigation by design, for example anything that has been added to the design purely to lessen an effect such as landscape planting.
- 4.4.2 The mitigation measures would be committed to through specific Requirements included within the draft DCO. Once the DCO is granted the Requirements would be legally binding.

5 Results of the EIA

5.1 OVERVIEW

- 5.1.1 The ES provides details of the baseline information gathered and the assessment undertaken, identifying likely significant effects and mitigation required to lessen identified negative effects or to maximise positive effects.
- 5.1.2 The following topics are included in the ES:
 - Landscape Assessment;
 - Visual Assessment;
 - Ecology and Nature Conservation;
 - Historic Environment;
 - Geology, Hydrogeology and Ground Conditions;
 - Water Quality, Resources and Flood Risk;
 - Traffic and Transport;
 - Air Quality and Emissions;
 - Construction Noise and Vibration;
 - Operational Noise;
 - Socio-economics;
 - Agriculture; and
 - Cumulative Effects.

5.2 LANDSCAPE ASSESSMENT

5.2.1 This section presents a summary of the assessment of potentially significant effects arising from the Proposed Development, particularly on the designations, character and key features of the existing landscape.

Summary of Baseline

- 5.2.2 The Proposed Development crosses the eastern half of the landscape of Anglesey, which includes rolling lowland landform, interrupted with the elevated and isolated rocky outcrops of Parys Mountain and Mynydd Bodafon. The island of Anglesey typically slopes from north-east to southwest, with ridgelines and watercourses generally following the same pattern. The proposed overhead line on Anglesey would cross the island in a general north-west to south-east direction toward the Menai Strait. It would then go under the Strait in a tunnel and re-emerge as an overhead line on the mainland in Gwynedd where the rolling landform changes towards the upland borders of Snowdonia. The landform generally falls from the mountainous area of Snowdonia to the coast and estuaries of the north and west. Much of the route would run broadly parallel to the existing 400 kV overhead line between Wylfa and Pentir Substations.
- 5.2.3 The landscape is rural and relatively sparse of tree cover in the north but tree cover increases towards the south of the area. Field boundaries include a mix of hedgerows, stone walls, cloddiau (a dry stone outer with a compacted earth, or earth/rubble core) and post and wire fencing.
- 5.2.4 There are a number of landscape designations in the vicinity of the Proposed Development including Anglesey Area of Outstanding Natural Beauty, which the tunnel goes under at the Menai Strait, eight Special Landscape Areas of which the Proposed Development passes through one and under another, and the North Anglesey Heritage Coast, which is 440 m from the Order Limits. At its closest point, Snowdonia National Park lies approximately 6 km to the south of the Proposed Development.
- 5.2.5 Landmap Visual and Sensory Aspect Areas¹ have been used to describe the value of the landscape character, 51 such areas have been considered within the assessment.

Mitigation and Residual Effects

Construction

5.2.6 During the construction phase of the Proposed Development significant negative effects resulting from the loss of trees within the Order Limits (between Wylfa and Pentir Substations) are predicted. These effects would

¹ The Visual and Sensory aspect is a process of mapping what is noticed through senses, from landform and land cover characteristics, their patterns and their links in areas.

be short-term as trees would be replaced as nearby as possible to where they were removed. The loss of trees has been minimised by careful routeing and siting of the different parts of the Proposed Development and the implementation of the Construction Environmental Management Plan (**Document 7.4**) which would ensure vegetation near to construction activities would be protected if possible.

- 5.2.7 Trees and hedgerows removed would be replaced/replanted in their original position where possible. Whilst some vegetation would be removed, mitigation planting at Braint and Tŷ Fodol Tunnel Head House and Cable Sealing End Compounds and Pentir Substation would mean that following construction there would be more vegetation than there is currently.
- 5.2.8 Construction activities including the presence of construction vehicles, equipment, construction compounds and accesses are predicted to have significant negative effects on the Central Smooth Belt, South-West Ridges; and Bethel (between Clynnog and Bangor) Visual and Sensory Aspect Areas.
- 5.2.9 It is anticipated that there would be significant negative effects on the Southern Anglesey Estatelands Special Landscape Area due to the construction of the Braint Tunnel Head House and Cable Sealing End Compound, the Braint Construction Compound and associated access tracks within the area. As described in section 2.4.13 the areas used temporarily for construction would be put back to their original use once construction has finished however, the tunnel head house and cable sealing end compound, and permanent access road would remain.
- 5.2.10 There would be no significant effects during construction on Snowdonia National Park, Anglesey AONB or the North Anglesey Heritage Coast or any of the other Visual and Sensory Aspect Areas and Special Landscape Areas assessed. There would also be no significant effects on field boundaries, or landform during construction.

Operation

- 5.2.11 Significant negative effects have been avoided through the design of the Proposed Development so it runs next to the existing overhead line as much as possible, by directing the overhead line so as to avoid vegetation loss wherever possible, avoiding important landscape features such as rocky outcrops and putting the connection in a tunnel to avoid crossing the Menai with an overhead line.
- 5.2.12 At operation in year 1 it is anticipated that there would be significant negative effects on the Central Smooth Belt Visual and Sensory Aspect
Area due to the overhead line conflicting with the landform at Capel Coch and being away from the existing overhead line to the east of Capel Coch. By year 15 when planting has established, effects would be reduced as the planting would blend the overhead line into the landscape. Similarly the predicted effects caused by the Braint Tunnel Head House and Cable Sealing End Compound on the South-West Ridges Visual and Sensory Aspect Areas would reduce from significant negative effects to not significant negative effects when planting has matured. However, effects on the South-West Ridges Visual and Sensory Aspect Areas due to the overhead line would be significant throughout the operational phase.

- 5.2.13 Significant negative effects on the Eastern Smooth Belt Visual and Sensory Aspect Area are expected due to effects of the new and existing overhead lines being spread caused by the lines not being side by side in this area.
- 5.2.14 It is anticipated that there would be significant negative effects on the Southern Anglesey Estatelands Special Landscape Areas due to the presence of the overhead line, Braint Tunnel Head House and Cable Sealing End Compound, and its access track within the area. These elements would have a locally negative effect on the quality, sense of place, and tranquillity of the landscape.
- 5.2.15 Although the planting around Tŷ Fodol Tunnel Head House and Cable Sealing End Compound and Pentir Substation Extension would help to blend these elements into the Bethel Visual and Sensory Aspect Area, significant negative effects on the area are predicted at both year 1 and 15 due to these and the overhead line.
- 5.2.16 New planting at Braint and Tŷ Fodol Tunnel Head House and Cable Sealing End Compounds would be designed to help blend the buildings into the landscape. Land at these locations would also be shaped to help screen the buildings from the surrounding areas. New planting at Pentir Substation would mitigate the loss of existing screening and the landscape effects of the extension.
- 5.2.17 There would be no significant effects on Snowdonia National Park, Anglesey AONB or the North Anglesey Heritage Coast or any of the other Visual and Sensory Aspect Areas and Special Landscape Areas during the operational phase of the Proposed Development. There would also be no significant effects on field boundaries or landform during operation and by operation year 15 there would be no significant effects on tree cover.

Maintenance and Decommissioning

5.2.18 It is anticipated that maintenance and decommissioning activities would result in effects no greater than those anticipated during construction as activities would take place over a shorter timescale and would be less intrusive than those required for construction. No significant effects are predicted on tree cover, field boundaries or landform during maintenance or decommissioning.



Photograph 5: Existing 400 kV Overhead Line between Wylfa Substation and Pentir Substation Talwrn to Llangefni

5.3 VISUAL ASSESSMENT

5.3.1 The visual assessment concentrates on how the surroundings of individuals or groups of people, including people living, taking part in recreational activities or travelling through the area, may be affected by changes in views.

Summary of Baseline

- 5.3.2 The rolling lowland landform and open nature of much of Anglesey allows long distance views both towards and along the existing overhead line particularly to the north of the island where tree cover is limited.
- 5.3.3 Landform typically falls from north-east to south-west across Anglesey; with ridgelines and watercourses following the same pattern. The local road network on Anglesey often runs along the top of ridgelines. There are long

distance, wide angle views from high locations along these low ridgelines, from the high and rocky outcrops of Parys Mountain and Mynydd Bodafon and from the hills of Mynydd Eilian and Mynydd y Garn. Longer distance views from some of the lower lying areas such as Malltraeth Marsh are also present.

- 5.3.4 On Anglesey, the existing overhead line is most visible on the skyline where it crosses over the north-east to south-west low ridgelines, in particular at Rhosgoch, Capel Coch and the upland/ridgeline to the north-west of Llanfairpwll.
- 5.3.5 To the south of the Menai Strait in Gwynedd, a more rolling landform changes towards the upland borders of Snowdonia. Long distance views from these uplands, back towards Anglesey in the north are present. The existing 400 kV overhead line is noticeable on the skyline in some views from Gwynedd. Long distance views of the existing 400 kV overhead line located within Gwynedd are limited due to landform and woodland areas that screen, filter, and direct views. There are, however, some long distance views of the existing 400 kV overhead line, as it approaches Pentir Substation, from higher ground. Pentir Substation is particularly well screened by vegetation although views from higher or more elevated locations do look down onto the substation. A section of the existing 400 kV overhead line between Wylfa Substation and Pentir Substation between Talwrn and Llangefni is shown in Photograph 5.

Mitigation and Residual Effects

Construction

- 5.3.6 Construction activity along the length of the overhead line and at the tunnel construction compounds are likely to affect views in the construction phase due to the removal of vegetation, earthworks, construction traffic and equipment movements and the presences of temporary site accesses and compounds. Construction effects would be short-term with construction areas and any trees and hedges removed being put back near to where they were removed following the end of the construction period. During construction, significant negative effects are limited to communities very near to the Proposed Development.
- 5.3.7 Of the 51 communities included within the assessment, 15 have been identified as having significant negative visual effects during construction. These are:
 - Cemaes;

- Tregele;
- Bodewryd;
- Llanfechell;
- Rhosgoch & Four Crosses;
- Rhosybol;
- Llandyfrydog;
- Hebron & Maenaddwyn;
- Capel Coch;
- Cefniwrch;
- Talwrn;
- Star;
- Llanddaniel Fab;
- Pentir; and
- Rhiwlas.
- 5.3.8 These effects would be due to construction activities at pylon locations, the presence of access tracks, scaffolding, equipment and the movement of construction vehicles. At locations further from the Proposed Development negative effects would be due to taller construction equipment being seen at pylon sites.
- 5.3.9 One community, Pentir, is predicted to have local significant negative effects due to the construction activity related to the Tŷ Fodol Construction Compound, the construction accesses and traffic movements associated with the tunnel as well as the extension to Pentir Substation.
- 5.3.10 No significant effects were predicted for the other communities assessed as these communities are either far enough away from the Proposed Development not to be effected, their views were in a different direction to the Proposed Development or buildings and/or vegetation prevent the Proposed Development being seen.
- 5.3.11 View experienced from a number of properties would also be negatively affected. Properties which are close to construction activity, have views

over a number of construction areas/are surrounded by activity and properties close to the tunnel head house and sealing end compound sites would be affected due to the length of time construction activities would take place at these locations and the amount of construction traffic.

- 5.3.12 During construction, 17 of the assessed public rights of way are predicted to experience significant negative effects as they run next to the Proposed Development or have close views along a section of the route.
- 5.3.13 The National Cycle Route 5 and Hebog Local Cycle Route which pass through Capel Coch and Nico Local Cycle Route which passes between Rhosgoch and Rhosybol would have significant negative effects during construction as they are in close proximity of construction works and in the case of the Nico Local Cycle Route travels next to the construction work for a large portion of its length.
- 5.3.14 The promoted viewpoint² near Gaerwen would experience significant negative effects during the construction of the Proposed Development as there would be a bellmouth at this location. Views would therefore include access tracks and construction activity.
- 5.3.15 During construction, 11 roads which run alongside the Proposed Development and have views along long sections of the overhead line or are close to the tunnel construction compounds would have significant negative effects.

Operation

- 5.3.16 The permanent presence of the overhead line, tunnel head house and cable sealing end compounds and the removal of hedgerows and trees to make way for the overhead line and to maintain safety clearance distances to the overhead line would be likely to cause longer-term effects by changing the existing views. The design of the Proposed Development, being next to the existing overhead line helps to lessen visual effects.
- 5.3.17 During operation, 12 communities have been identified as having significant negative visual effects. These are:
 - Cemaes;

² Promoted Viewpoints are viewpoints which are promoted by brown tourist information signage on the road network, are identified on road maps as a viewpoint and may have interpretation boards and associated car parking.

- Tregele;
- Llanfechell;
- Rhosgoch & Four Crosses;
- Rhosybol;
- Llandyfrydog;
- Hebron & Maenaddwyn;
- Capel Coch;
- Cefniwrch;
- Talwrn;
- Llanddaniel Fab; and
- Rhiwlas.
- 5.3.18 Two communities, Star and Pentir, are predicted to have a significant negative effects. In Star, these effects are, due to the Proposed Development moving away from the existing overhead line combined with higher ground providing long distance views towards Snowdonia. Within Pentir, the proposed overhead line would affect long distance views towards Anglesey, however, effects would reduce as the proposed planting grows.
- 5.3.19 No significant effects were predicted for the other communities assessed as these communities are either far enough away from the Proposed Development not to be effected, their views were in a different direction to the Proposed Development or buildings and/or vegetation prevent the Proposed Development being seen.
- 5.3.20 Private views from a number of properties would also experience significant effects where they would be very close to the proposed overhead line or would have the overhead line obviously in their view. Properties which have been identified as having negative effects would be able to have planting to soften the effect of the new overhead line whilst providing some screening to receptors.
- 5.3.21 During operation, 21 PRoW would have significant negative effects due to the path passing under or very near to the overhead line. These are generally located in more open areas with limited vegetation cover in the north of Anglesey.

- 5.3.22 Even though many of the cycle routes identified by the assessment pass beneath the Proposed Development, as views are brief effects are not significant during operation.
- 5.3.23 During operation, new pylons would be noticeable in the promoted viewpoint near Gaerwen and would increase visual effects already experienced due to the existing overhead line. Therefore there would be a significant negative effect on receptors at this viewpoint.
- 5.3.24 During operation, three roads, near to Tŷ Fodol Tunnel Head house and Cable Sealing End Compound have been identified as having significant negative effects, however, these would lessen as mitigation planting grows.

Maintenance and Decommissioning

5.3.25 It is anticipated that maintenance and decommissioning activities would result in effects no greater than those anticipated during construction as activities would take place over a shorter timescale and would be less intrusive than those required for construction. The effects of decommissioning would not be significant in the long-term, as pylons would be removed from views, returning them to the baseline, with the exception of any vegetation removal required.

5.4 ECOLOGY AND NATURE CONSERVATION

5.4.1 This section presents a summary of the predicted effects resulting from the Proposed Development on protected plants and animals, and areas protected for their nature conservation value.

Summary of Baseline

- 5.4.2 A variety of habitats (areas in which plants and animals live) typical of rural farmland have been identified along the route of the Proposed Development. These are largely characterised by improved grassland, grazed by cattle and sheep. Field boundaries typically comprise fences, hedgerows, dry stone walls and cloddiau (a dry stone outer wall with a compacted earth, or earth/rubble core). Semi-natural vegetation includes a variety of grassland types; with scrub and heathland scattered amongst the grasslands. Heathland habitat is rare along the route; however fragments of the habitats are present on the boundaries of fields.
- 5.4.3 Extensive tree cover is generally uncommon, particularly towards the northern extent of the Proposed Development. Woodland habitat is more widespread within southern areas. Areas of ancient semi-natural woodland, including restored examples, are present along the Menai Strait and within

Vaynol Park, and small pockets are also present along the proposed route. Plantation woodlands, including ancient woodland, are more frequent towards the southern part of the Proposed Development, particularly in Gwynedd.

- 5.4.4 Watercourses, drains and ponds are scattered along the length of the Proposed Development.
- 5.4.5 Parts of the Proposed Development fall within designated sites and other sites are also present in close proximity of the Proposed Development. Sites include, but not restricted to:
 - Corsydd Mon/Anglesey Fens Special Areas of Conservation (SAC);
 - Menai Strait and Conwy Bay (SAC);
 - North Anglesey Marine cSAC
 - Corsydd Môn a Llyn/Anglesey and Llyn Fens Ramsar;
 - Tre'r Gof Site of Special Scientific Interest (SSSI);
 - Cors Erddreiniog SSSI;
 - Caeau Talwrn SSSI;
 - Cors Erddreiniog National Nature Reserves (NNR) (see Photograph 6);
 - Maen Eryr County Wildlife Site (CWS);
 - Gylched Covert CWS;
 - Coed Ty'n-llwyn cCWS;
 - Coed Rhos-fawr cCWS;
 - Pentir Substation cCWS; and
 - Parc Nant-y-garth cCWS, among others.
- 5.4.6 Ecology surveys have confirmed that protected and important animals are present in the vicinity of the Proposed Development including badger, otter, water vole, bats, red squirrel, brown hare, great crested newts, reptiles, birds, fish and invertebrates.



Photograph 6: Cors Erddreiniog National Nature Reserve

- 5.4.7 The Menai Strait is a narrow body of coastal water that separates Anglesey from mainland Wales. It includes a varied collection of intertidal (the area that is above water at low tide and under water at high tide) and subtidal (area below the low tide water line) habitats. It is part of the European designated Menai Strait and Conwy Bay SAC for the variety and quality of the marine habitats situated at the lowest level of the water.
- 5.4.8 The Strait is an important traveling route for Atlantic salmon and sea trout and supports a varied community of marine fish species. Areas of the Strait also support valuable commercial shellfish fisheries. Harbour porpoise, bottlenose dolphin and grey seals are also known to occasionally pass through the Strait.

Mitigation and Residual Effects

Construction

5.4.9 The routeing of the Proposed Development has reduced direct effects to designated sites and other key habitats, such as trees and hedgerows. However, habitat loss, including small areas within a designated site, due to ground and vegetation clearance works and temporary land take would occur. Habitats would mainly be restored once construction was complete and where possible improved. A pond would be temporarily lost during

construction however, this would be replaced upon completion of the construction phase.

- 5.4.10 Clearance of areas of habitat for construction could lead to severance (division) and fragmentation (breaking up) of any remaining habitat in the local area and the severance and fragmentation of passage, food and/or traveling routes. In general, with the exception of some woodland areas, land would be returned to its previous state following construction, therefore although there would be some minor effects, they are not considered to be significant.
- 5.4.11 There would be no significant effect on any protected or important animals, including birds, as a result of the Proposed Development. Individuals or small numbers of some animals and birds could, though, be temporarily affected during construction due to ground and vegetation clearance works and the need for watercourse crossings. Disturbance could result from noise, visual, obstructions and habitat alterations, the loss of foraging habitat (locations searched for food). At most these effects are considered to be minor, and they are not significant.
- 5.4.12 Habitats supporting animals and birds would be replaced, or improved where possible, with locally occurring plants being used, which provide a range of food sources for local animals and birds. Mitigation measures included in the Construction Environmental Management Plan (Document 7.4) and the Biodiversity Mitigation Strategy (Document 7.7) would reduce potential disturbance and risk of direct harm so no significant effects would occur to habitats and species.
- 5.4.13 There would be a significant effect on the Gylched Covert CWS, due to the amount of woodland within the designated area that would need to be removed, although replacement trees would also be planted. A management plan would be put in place to manage and improve the condition of the new and remaining habitat within this CWS.
- 5.4.14 The habitat and animals in the Menai Strait may be affected in the unlikely event of a blowout of drilling slurry during the construction of the tunnel by a tunnel boring machine. However blowouts are rare, and taking into account the depth of the tunnel alignment below the sea bed, and the measures set out in the Construction Environmental Management Plan no significant effects are predicted.
- 5.4.15 The potential effects of noise and vibration as a result of the construction of the tunnel under the Menai Strait using the 'drill and blast' method has been assessed. With mitigation in place the effects on marine mammals and

migratory fish is considered to be negligible and not significant. Blasting could affect non-migratory fish, but the effects would be minor at most.

Operation

- 5.4.1 No significant effects are predicted on ecological receptors in the operational phase with the exception of the significant effect of habitat loss on the Gylched Covert CWS due to the amount of woodland within the designated site that be permanently lost. However, as stated above, a management plan would be put in place to manage and improve the condition of the new and remaining habitat within this CWS.
- 5.4.2 There would be small areas of permanent habitat loss due to the pylon foundations, tunnel head house and cable sealing end compounds and Pentir Substation extension. The planting of trees, hedgerows, scrub and grassland, means there would be a small improvement in biodiversity at the local level in these locations.
- 5.4.3 Some woodland and trees removed during construction would not be replanted due to the need to maintain a low level of height in the vegetation beneath the overhead line. Where possible, these would be replanted close to where they were removed.
- 5.4.4 An assessment of collision risk has been undertaken based on bird activity surveys. As the Proposed Development follows the existing overhead line for most of its length, the overall visibility of the overhead lines would increase and birds are used to the presence of pylons and conductors in the area. Therefore due to these reasons and based on bird flight activity the collision risk for all bird species would not be significant.
- 5.4.5 There could be a potential for electromagnetic field generation when the underground cables are in operation. Effects are not predicted to be significant due to the low use of the Menai Strait by marine mammals and the predicted very low levels of the electromagnetic field as a result of the depth of the tunnel below the seabed.

Maintenance and Decommissioning

5.4.6 Decommissioning effects would be broadly the same as construction effects, though with no further permanent land loss. Maintenance and decommissioning effects may result if restored accesses need to be reopened or further land take was required for refurbishment or removal of infrastructure. These effects would not be significant due to the small areas involved and the temporary nature of the effects where land would be used for temporary construction activities but subsequently reinstated.

5.4.7 No effects on the marine environment are predicted during tunnel maintenance or the decommissioning phase.

5.5 HISTORIC ENVIRONMENT

5.5.1 This section summarises the effects of the Proposed Development on archaeology and cultural heritage.

Summary of Baseline

5.5.2 Anglesey and north Gwynedd have a rich historic background from a long history of human use and occupation. There are a number of prehistoric funerary (relating to the commemoration of the dead) and other ritual monuments, including chambered tombs and standing stones. Photograph 7 shows Bryn Celli Ddu burial chamber and henge which is a Scheduled Monument. There is evidence of past settlements and the type of land use and management over the years has ensured that archaeological remains are often well-preserved.



Photograph 7: Bryn Celli Ddu Burial Chamber and Henge

- 5.5.3 A number of larger estates developed within the post medieval period such as Plas Newydd and Vaynol (Grade I Registered Parks and Gardens) which occupy opposite shores of the Menai Strait and contain well-preserved designed landscapes.
- 5.5.4 The Proposed Development would be close to a number of archaeological and cultural heritage assets. These assets vary from specific places where artefacts indicating human activity have been found to settlement sites representing permanent occupation. The features identified date from the prehistoric period onwards.
- 5.5.5 Designated (assets protected by legislation) and non-designated heritage assets have been identified in the vicinity of the Proposed Development and they include listed buildings, Scheduled Monuments, Registered Historic Landscapes, Parks and Gardens, Conservation Areas and a Landscape of Outstanding Historic Interest. There is also the potential for previously unrecorded remains throughout the area of the Proposed Development.

Mitigation and Residual Effects

Construction

- 5.5.6 There would be no significant effects on designated or non-designated assets as a result of direct disturbance.
- 5.5.7 A programme of archaeological data collection has identified a number of areas of archaeological interest within the Order Limits. Where possible, the Proposed Development has been designed to avoid loss of or disturbance to these. However, construction would involve the permanent loss of some archaeological remains.
- 5.5.8 Where construction would involve the disturbance of areas of known or potential archaeological interest then a targeted programme of 'Strip, Map and Sample' would be undertaken with work being overseen by an on-site archaeologist (referred to as a 'watching brief') in other locations. Any archaeological areas that are outside the construction areas but close by would be clearly marked on site plans, and would be avoided. If there was a risk of accidental damage these areas would be fenced off during construction. Arrangements would be made for the identification and recording of remains before and during construction. There is also potential for previously unidentified archaeological remains to be found during construction. Where suitable, these may be avoided by changing the route or layout (within the limit of deviation) of the Proposed Development or they would be recorded before being lost.

- 5.5.9 Creation of access tracks would involve cutting sections through a number of field boundaries of historic interest, including cloddiau boundaries. These would be restored when the access tracks were no longer required following completion of construction.
- 5.5.10 Significant negative indirect effects are predicted to occur on the settings of 'Llwyn-onn Farm: Grade II Listed Building' and 'Coed Nant-y-garth, standing stone Scheduled Monument' (CN 375)during construction due to works at the tunnel head house and cable sealing end compounds. These changes to the setting, would be temporary and limited to when construction occurs in these areas.

Operation

- 5.5.11 The area around the Menai Strait is of historic interest, mainly due to the Grade I registered parks and gardens of Plas Newydd and Vaynol on the shores of the Strait. The use of a tunnel underneath the Menai Strait and beyond would avoid significant effects on these parks and their settings.
- 5.5.12 The Proposed Development has been designed so that it would run next to the existing overhead line as much as possible. This would lessen effects on the setting of historical assets as the overhead line would be seen next to an existing line rather than in an area where one is not already present.
- 5.5.13 However, where the Proposed Development would be new in an area, significant negative effects on the settings of designated assets are predicted. The setting of the 'Coed Nant-y-garth standing stone Scheduled Monument', would be significantly negatively affected by the presence of the Tŷ Fodol Tunnel Head House and Cable Sealing End Compound and the overhead line leading to Pentir Substation.
- 5.5.14 The settings of the 'Standing Stone 410 m north of Church Scheduled Monument' (AN 080) north of Llanfechell and the 'Rectory and agricultural range Grade II Listed Buildings, Llandyfrydog' would be significantly negatively affected as a result of the Proposed Development being close to these assets.
- 5.5.15 The setting of 'Maen Addwyn Scheduled Monument', south of the settlement of Maenaddwyn, the 'Church of St Michael Grade II Listed Building' located on the west side of the Maenaddwyn to Capel Coch road and 'Bryn-Celli-Ddu Burial Chamber Scheduled Monument' located in the south-eastern part of Anglesey, approximately 1.5 km from the Menai Strait, would be significantly negatively affected by the additional overhead line adding to the wirescape (other electrical overhead lines on pylons and wood poles as well as telephone lines) causing clutter in the view.

5.5.16 Part of the Proposed Development would be located within the Dinorwig Landscape of Outstanding Historic Interest, however, no significant effects are predicted due to the reduced amount of direct and indirect effects, the lack of view of the Proposed Development and the presence of existing modern elements.

Maintenance and Decommissioning

- 5.5.17 These would be limited to effects on the setting of assets. Any change to the historic setting of an asset during maintenance would be temporary and limited to a short period of time which would not result in any significant effects.
- 5.5.18 Effects on the setting of assets during decommissioning activity would be similar to those of the construction phase. However, decommissioning would also reverse any change to the setting of assets due to the presence of the Proposed Development

5.6 GEOLOGY, HYDROGEOLOGY AND GROUND CONDITIONS

5.6.1 This section presents information about the potential effects on geological (underlying soil and rock) or hydrogeological (groundwater) features that have been identified, and also whether there is existing ground contamination that could affect the Proposed Development or construction workers and other people near to the works.

Summary of Baseline

- 5.6.2 The soils along the route of the Proposed Development are mainly freely draining typical brown earths and slowly permeable (allowing liquids or gases to pass through) soils; with isolated patches of amorphous (lacking a clear structure and semi-fibrous) peat at Capel Coch and Talwrn.
- 5.6.3 The Proposed Development would be underlain by a variety of shallow deposits generally consisting of clay. There are areas of sand, gravel and silt next to streams and rivers and the coast. Bedrock geology underlying the Proposed Development would be varied and includes sandstone and limestone of varying ages.
- 5.6.4 There are no Geological SSSIs or Regionally Important Geological Sites (RIGS) within 1 km of the Order Limits of the Proposed Development. The whole of Anglesey is designated as a Geopark (GeoMôn), which is a designated area containing one or more sites of particular geological importance. None of the sites of geological importance are within the Order Limits.

- 5.6.5 Seven designated sites which are reliant on fresh water with a water movement pathway from the Proposed Development have been identified. There could be a potential for pollutants from existing contaminated ground to reach these designated sites due to a link with either water on the surface or underground.
- 5.6.6 The Proposed Development would be underlain by a variety of Principal, Secondary A, B and Undifferentiated (where it is has not been possible to attribute either category A or B to a rock type) aquifers (underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials).
- 5.6.7 Private water supplies are present within 1 km of the Proposed Development. No groundwater abstractions are present with 1 km of the Proposed Development.
- 5.6.8 Although there are very few indicators of potentially contaminated land, there are a number of active discharge consents, integrated pollution and prevention control records, records of pollution incidents and registered radioactive substances within 1 km of the Order Limits.
- 5.6.9 The area within 1 km of the Proposed Development has been subject to numerous small-scale quarrying activities over its history and numerous localised potentially contaminative historical land uses, including quarries and pits are present.
- 5.6.10 Current potentially contaminative land uses are likely to be generally confined to agriculture, sewage works, petrol filling stations, electricity substations and the continuing decommissioning of the existing Wylfa Nuclear Power Station.
- 5.6.11 Records held by the Coal Authority show that part of the Order Limits are inside a Coal Mining Reporting Area, Surface Coal Resource Area and Development High Risk Area this is situated to the east of Llandgefni.

Mitigation and Residual Effects

Construction

5.6.12 During construction potential effects would be associated with spillages and leaks of fuels and chemicals for construction equipment. The movement of soils and construction machines moving on top of the soil may reduce the quality of soil and groundwater levels may change due to the removal of water from the construction area. However the adoption of good working practices during construction means any effects are unlikely to occur, and if

they did, they are unlikely to be widespread, and therefore effects are not significant.

- 5.6.13 There are some areas of potentially contaminated land resulting from previous land uses, if these areas are disturbed during construction they could effects soils, groundwater and construction workers. There would be potential limited effects on construction workers and pylon stability from shallow mine workings. These effects would be controlled through standard mitigation measures in the Construction Environmental Management Plan (Document 7.4) and the residual effects are considered to be not significant.
- 5.6.14 Further ground investigation will reduce the risk of unearthing previously unexpected contaminated soils. Any contaminated land identified would be cleaned up prior to or during construction using proven remediation techniques.

Operation

5.6.15 The only operational effect identified would be the potential for the foundations of the tunnel head house and cable sealing end compounds, pylons, gantries or equipment in the substations to provide a pathway for contaminants to travel to uncontaminated soils, geology and groundwater. However, these effects are predicted to be not significant.

Maintenance and Decommissioning

- 5.6.16 No significant effects have been predicted to result from general maintenance, though refurbishment work would require heavier plant and machinery and would therefore bring a low risk of spillages.
- 5.6.17 The effects of decommissioning of the Proposed Development would generally reflect those for construction as similar access and working areas would be required. If contaminated stone or soil were used for access roads or to backfill the tunnel, this could pose a potential risk to human health, geology and ground water. Mitigation of these effects would mainly consist of good site practice and a Waste Management Plan (**Document 7.11**).

5.7 WATER QUALITY, RESOURCES AND FLOOD RISK

5.7.1 This section provides environmental information regarding potential effects on water quality, resources and flood risk receptors resulting from the Proposed Development.

Summary of Baseline

- 5.7.2 The Proposed Development falls within the following catchments:
 - Afon Wygyr;
 - Llyn Alaw Reservoir;
 - Afon Goch River;
 - Cefni Reservoir;
 - Goch Dulas;
 - Lligwy;
 - Afon Cefni River;
 - Ceint River;
 - the upper Braint;
 - the Southern Braint;
 - Braint catchment; and
 - the Nant y Garth.
- 5.7.3 There are numerous small tributary watercourses and drainage ditches within these catchments. These catchments are all currently achieving moderate or good overall water quality status.
- 5.7.4 Parts of the Proposed Development would fall within Cors Erddreiniog which is part of the Anglesey Fens SAC, RAMSAR and SSSI wetland habitat around Capel Coch, to the west of Mynydd Bodafon, Caeau Talwrn (SSSI) & Corsydd Mon which forms part of the Anglesey Fens complex and the Cors Tregarnedd Mawr Wildlife Site.
- 5.7.5 The following designated sites: Llyn Alaw SSSI and Drinking Water Protected Area (DWPA), Y Fenai a Bae Conwy/Menai Strait and Conwy Bay SAC and Malltraeth Marshes SSSI are linked to the Proposed Development by a surface water pathway such as a stream or ditch.
- 5.7.6 There are three large surface water abstractions within the area, two of which are associated with public water supply, and there are three private surface water abstractions. Two discharges are located downstream of the Proposed Development.

5.7.7 The Proposed Development would largely be situated inland and away from large undefended areas of coastal/tidal flooding. Watercourse crossings tend to be broadly at a right angle to the main flow direction and therefore the Proposed Development briefly crosses multiple flood zones.

Mitigation and Residual Effects

Construction

- 5.7.8 The Proposed Development would cross a number of watercourses and drainage ditches. Many of the crossings would involve only the overhead line crossing the river or ditch with no physical works to the watercourse itself, and would result in little or no effect and are therefore not significant. However, some infrastructure would directly interact with watercourses, for example where there would be a need for temporary construction access tracks to cross watercourses via a culvert or bridge.
- 5.7.9 Measures to minimise the number of temporary access watercourses crossings required, designing and constructing watercourse crossings to suit the type of watercourse that is being crossed and standard construction mitigation including storing fuel and chemicals correctly, inspecting machinery before use to check for leaks, and preventing waste from entering watercourses would ensure that these effects are not significant.
- 5.7.10 Potential effects on the surface water environment could include:
 - changes in water quality as a result of construction works;
 - chemical or fuel spillages;
 - changes in the volumes of water flowing along watercourses from site drainage or dewatering works;
 - works in or near to watercourses changing the volume of water and how it flows along the watercourse;
 - increases in runoff rates and volumes (the speed and volume of rainfall that 'runs off' as surface water) as a result of changes in land cover type;
 - changes in the ability of the floodplain to deal with floodwater; and
 - indirect effects that these could have on ecology, people, property and infrastructure.

5.7.11 These effects would be controlled through standard mitigation measures and implementation of a Drainage Management Plan. Therefore residual effects are considered to be not significant.

Operation

5.7.12 Replacing vegetation and putting soils back following construction would avoid longer-term changes in water quality or shape as a result of the presence of the operating Proposed Development. There is the potential for effects associated with drainage from the tunnel head house and cable sealing end compound sites and the removal of water which has seeped into the tunnel however, the tunnel head house Drainage Management Plan would reduce any longer-term changes in water quality effects would not be significant. The tunnel head house and cable sealing end compounds are located in areas with the lowest possible flood risk and the raising of flood sensitive equipment within the extension to Pentir Substation would minimise the risk of flooding.

Maintenance and Decommissioning

- 5.7.13 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction.
- 5.7.14 The effects during decommissioning would be broadly the same as those associated with construction. They would be managed to an acceptable level through good practice measures as employed during the construction phase.

5.8 TRAFFIC AND TRANSPORT

5.8.1 This section presents the potential environmental effects resulting from traffic generated by the Proposed Development.

Baseline Summary

- 5.8.2 The local traffic and transport network that has the potential to be affected by the Proposed Development covers major (A Roads), minor (B Roads and C Roads) and unnamed roads (UR) (unclassified) forming the road network local to the Proposed Development. The A55 is shown in Photograph 8.
- 5.8.3 A number of public rights of way and cycle routes would also be crossed by the Proposed Development or be close to construction traffic routes.





Photograph 8: A55

Mitigation and Residual Effects

Construction

- 5.8.4 The main traffic and transportation effects associated with the Proposed Development would be due to an increase in traffic flows on surrounding roads used by construction vehicles. The increases in traffic flows would be associated with the installation of access points and roads, pylon foundations, pylon assembly and erection, cable installation, access reinstatement, access road removal and construction employee vehicle movements. During the construction the Proposed Development would affect road users on 'A', 'B' and unnamed roads. Users include other drivers using the roads, cyclists, pedestrians, and the effects would include delays, difficulty in reaching local amenities or accessing roads, or real or perceived increases in accident risk.
- 5.8.5 When identifying access routes, minor roads and settlements have been avoided, wherever possible. The number of construction vehicle trips would vary along these roads throughout the construction period, being higher closer to the construction compounds and tunnel head house and cable sealing end compound/ locations and lower close to more isolated pylons. The tunnel and tunnel shaft activities are expected to generate a high

number of daily Heavy Goods Vehicle movements, due to the large volume of material being removed.

- 5.8.6 Negligible increases (not significant) in the accident rate along the proposed construction routes have been concluded. All roads except Pont Rhonwy Link were assessed as having no significant effects. In the case of Pont Rhonwy Link significant effects on pedestrian and driver delay, difficulty in reaching local amenities, and pedestrian comfort were concluded. An Outline Construction Traffic Management Plan (**Document 7.5**) has been prepared. The Out;ine Construction Traffic Management Plan outlines the measures which have been included within the design of the Proposed Development and which would be implemented to reduce effects of traffic during the construction phase of the Proposed Development. The final plan would be developed by the contractor.
- 5.8.7 No significant effects on Public Rights of Way or cycle routes are identified. A Public Rights of Way Management Plan (**Document 7.6**) would be implemented during construction to keep users of the public rights of way safe and to reduce disruption to the routes.

Operation

5.8.8 Once the construction works are complete the operation of the Proposed Development will not generate traffic movements, however routine inspections, servicing and maintenance would be required.

Maintenance and Decommissioning

- 5.8.9 Traffic associated with regular inspections and maintenance would be very low. Non routine refurbishment work would be likely to be of a larger scale however the amount of traffic would typically be much lower, more localised and of shorter duration than those predicted for the construction stage. In addition, the traffic related to tunnel construction would never recur. The effects are likely to be of a lower significance than those of the construction stage therefore these effects have not been assessed.
- 5.8.10 Decommissioning effects are expected to be similar to those experienced during construction, though much less in terms of the tunnel, as there would be no material to be removed and only limited material needed to either cap or backfill the tunnel shafts therefore effects are unlikely to be significant.

5.9 AIR QUALITY AND EMISSIONS

5.9.1 This section presents information about the potential air quality and emissions effects that would result from the Proposed Development.

Baseline Summary

- 5.9.2 Throughout the study area, existing air quality is generally of good standard. A background level of dust already exists, as is typical of locations in the UK however levels are well below what is likely to cause complaints from members of the public.
- 5.9.3 No Air Quality Management Areas have been declared within either Anglesey's or Gwynedd administrative areas and no air quality objectives are known to be exceeded where there is human health sensitive exposure. Higher levels of nitrogen dioxide was measured at locations immediately adjacent to the A55 and A5025, where there is no relevant exposure.
- 5.9.4 Baseline assessment has identified that the relevant air quality objective values at some sensitive ecological sites within the study area have been surpassed.

Mitigation and Residual Effects

Construction

- 5.9.5 Works associated with the construction of the overhead line, tunnel, tunnel head house and cable sealing end compounds and substations have the potential to generate dust and emissions from earthworks, the building of foundations, tunnelling, building of structures and construction vehicle movements.
- 5.9.6 The assessment of dust and particulate matter has informed the level of mitigation required to control emissions to ensure that a significant effect would not occur. The dust mitigation measures are set out within the Construction Environmental Management Plan (**Document 7.4**) for the Proposed Development and a dust management plan would be implemented. Effects on all receptors from increased dust and particulate matter in the air would not be significant.
- 5.9.7 An assessment of road traffic and emergency generator emissions identified that there are no exceedances of the national air quality objective values at any human sensitive receptors. Some ecological sites located adjacent to the construction traffic routes were predicted to be effected however, effects on all receptors would not be significant.

Operation

5.9.8 During its operation phase the Proposed Development would have limited impacts on local air quality, which would not be significant.

Maintenance and Decommissioning

5.9.9 Minor maintenance work is not likely to produce emissions to air that would result in a significant effect. Major refurbishment works could produce similar effects to the construction stage. Decommissioning would have less of an effect than construction but the same approach to mitigation would apply. As such, effects would not be significant.

5.10 CONSTRUCTION NOISE AND VIBRATION

5.10.1 This section presents information about construction noise and vibration effects that would result from the Proposed Development.

Baseline Summary

- 5.10.2 Anglesey is a rural island mainly occupied by farmland, with some areas managed for their nature conservation. The area of the Proposed Development in Gwynedd is also generally rural. Consequentially much of the area is subject to low levels of existing sound during the daytime and very low levels during the night-time. Although there are some busy main roads, including the A5, A55, A487 and B4547, the noise level from traffic is likely to drop in the late evening and night-time.
- 5.10.3 Residential properties and animal species within nature conservation sites within 250 m of the Proposed Development have the most potential to be sensitive to construction noise.

Mitigation and Residual Effects

Construction

- 5.10.4 Potential noise effects would result from the construction activities at the substations and tunnel head house and cable sealing end compounds, pylon sites, when installing access tracks, at the construction compounds during the drilling of the tunnel and due to construction traffic on access tracks and public roads.
- 5.10.5 The Construction Environmental Management Plan (**Document 7.4**) and Noise and Vibration Management Plan (**Document 7.9**) set out measures to reduce noise and vibration effects, such as using quieter equipment and the use of noise barriers at long-term construction areas.
- 5.10.6 The majority of receptors would be exposed to noise and vibration effects that would not be significant however, 25 receptors would experience potentially significant effects. Of these, 24 would only experience construction noise effects over a short period, as they relate to pylon

construction or dismantling works; for these the overall effect is considered not to be significant. This leaves only one receptor where there would be a significant effect as a result of construction noise. Although this effect also relates to pylon construction, and would therefore be of a short duration, the noise levels would be such that the effect would still be significant.

5.10.7 Increased traffic flows on local roads, due to construction traffic, would lead to increased noise and vibration. The selection of appropriate transport routes has sought to reduce these effects and as a result there are no receptors that would experience a significant effect from traffic on public roads; however, construction traffic on access tracks would give rise to significant noise effects at one location. This location would be close to the Tŷ Fodol site access, therefore effects could last for the majority of the construction period, particularly if Tŷ Fodol were used as the drive site for the tunnelling works.

Maintenance and Decommissioning

5.10.8 Routine maintenance would not lead to effects of any significance; however refurbishment works and decommissioning would potentially lead to noise and vibration effects similar to those experienced during construction. In both cases the effects are likely to be of a shorter duration, and effects related to the tunnel construction would not recur.

5.11 OPERATIONAL NOISE

5.11.1 This section presents information about the operational noise and vibration effects that would result from the Proposed Development.

Baseline Summary

- 5.11.2 Anglesey is a rural island mainly occupied by farmland, with some areas of land designated for nature conservation. The area of the Proposed Development in Gwynedd is also generally rural. Consequentially much of the island is subject to low levels of existing noise during the daytime and very low levels during the night-time. Although there are some busy main roads, including the A5, A55, A487 and B4547, the noise level from traffic is likely to drop in the late evening and night-time.
- 5.11.3 The majority of receptors identified along the route of the Proposed Development, are residential properties.

Mitigation and Residual Effects

Operation

- 5.11.4 Noise from the operation of the overhead line, substations, tunnel head house and cable sealing end compounds have been identified as potential sources of noise.
- 5.11.5 The potential for noise emissions has been mitigated through the design process. For example the proposed pylon equipment has been designed to reduce the wind noise and is the quietest equipment National Grid can install.
- 5.11.6 For 18 receptors there was calculated to be a potentially significant effect as a result of operational noise resulting from the overhead line. However, as this noise would only occur infrequently, and taking into account very low background levels, it was considered that in each case effects would not be significant.
- 5.11.7 It is not anticipated that any receptor would be exposed to a significant negative effect due to the overhead line, Braint Tunnel Head House and Cable Sealing End Compounds and Pentir Substation.
- 5.11.8 Two receptors (Garth Bach and Lleifior) would be exposed to a potentially significant negative effects due to the operation of Tŷ Fodol Tunnel Head House and Cable Sealing End Compounds, when a worst case operating scenario is applied. This worst case scenario would be infrequent, however, and under normal operating conditions, operational noise resulting from the Tŷ Fodol Tunnel Head House and Cable Sealing End Compound would not result in a significant negative effect. Noise levels from Tŷ Fodol Tunnel Head House and Cable Sealing End Compounds during the night-time period would be well below the level for the onset of sleep disturbance.

Decommissioning

5.11.9 Following decommissioning any operational noise effects would cease.

5.12 SOCIO-ECONOMICS

- 5.12.1 This section presents information about the socio-economic effects that have been identified, resulting from the Proposed Development.
- 5.12.2 Socio-economic effects can be caused by social impacts such as changes to ways in which people live, work and interact; and economic impacts such as employment, expenditure and impacts on certain economic sectors.

5.12.3 A separate Welsh Language Impact Assessment has been undertaken for the Proposed Development, which has informed the socio-economic chapter.

Baseline Summary

- 5.12.4 The majority of Anglesey and the north-west of Gwynedd are rural in nature, covered by a mixture of arable and pasture farmland. The largest settlements are those surrounding the Menai Bridge and Menai Strait, including Llanfairpwll, with Bangor, Llangefni, Caernarfon and Holyhead being well-established settlements.
- 5.12.5 Anglesey has the smallest resident population of all counties in North Wales and has a low population density of 1 person per hectare, compared with 1.5 persons per hectare for Wales as a whole. The population of Anglesey and Gwynedd grew by 4.4% and 4.3% respectively between the 2001 and 2011 Census, compared with an average growth of 5.5% across Wales as a whole. The proportion of male and female residents in 2011 was very similar to national, regional and local averages.
- 5.12.6 Anglesey has the smallest economy in Wales, accounting for just 1.7% of Wales' total economic output while Gwynedd's economy accounted for 4.2%.
- 5.12.7 In 2016, 7.5% of workers in Anglesey are construction workers compared to an average 5.4% for Wales. Gwynedd has a lower proportion of the population working in construction with 5.8%, broadly in line with the national average.
- 5.12.8 Anglesey and the Menai Strait coastline are important tourist destinations and tourism is of significant importance within the local economy. Tourism is also important to the local economy of Gwynedd. However, the majority of the major tourist destinations within Gwynedd fall outside of the study area.
- 5.12.9 The port of Holyhead provides an important link from North Wales to Dublin Bay in Ireland. Tourists and other passengers arriving or departing at Holyhead are likely to access the port along the A55 trunk road, which runs from Holyhead to the mainland and into the north-west of England. Further transport links are provided by Anglesey Airport, located to the south-west of the island at RAF Valley, and the local rail network, which runs from Holyhead to Bangor in Gwynedd.

Mitigation and Residual Effects

Construction

- 5.12.10 There would be positive effects on local and national employment during the construction of the Proposed Development. It is expected that, 10% of jobs would be filled by local people and jobs would be created indirectly through the increase in local trade. However, this beneficial effect would not be significant.
- 5.12.11 Due to the specialised nature of some parts of the construction of the Proposed Development a proportion of the workforce would come from outside of the local area. This has the potential to contribute to the local economy due to the requirement for accommodation and increased use of the service sector (restaurants, shops etc.). However, this would be temporary and localised and, the overall beneficial effect would not be significant.
- 5.12.12 Anglesey and the Menai Strait coastline are key tourist destinations, and tourism is very important to the local economy. Various potential effects on tourism have been considered including effects on the amenity of tourist attractions and recreational resources and the availability of tourism accommodation potentially discouraging visitors to the area. Only a relatively small proportion of tourism accommodation bed spaces would be taken by construction workers, and the effect would therefore not be significant. There is not likely to be significant disruption to the amenity of tourist attractions and recreational resources located within 10 km of the Proposed Development; of the 37 attractions considered, seven would have a minor effect and the rest would be negligible.
- 5.12.13 Effects on local businesses have been considered. Of the 55 tourism related businesses within the study area only two would be affected significantly; 11 would have a minor effect and 42 would have a negligible effect. Of the non-tourism related businesses the majority considered would have either a negligible effect on them, or no effect at all; only three were found to have a minor effect.
- 5.12.14 Overall no significant effect on visitor numbers is expected.
- 5.12.15 There is also some potential for workers requiring accommodation to add pressure to the supply of private rented accommodation. Taking into consideration the likely number of workers likely to rent private accommodation and the availability of this type of accommodation, it is considered that there would be no significant effects.

- 5.12.16 The Proposed Development would cross a number of national cycle routes and public rights of way and the combination of environmental effects relating to increased traffic, noise and visual effects during construction could result in potentially significant amenity effects on recreational users. However, following the implementation of the Public Rights of Way Management Plan (**Document 7.6**), effects on public rights of ways and cycle routes, would not be significant.
- 5.12.17 Measures to address socio-economic effects include development of a supply chain strategy, measures in the traffic management plan to minimise effects of construction traffic, local sourcing of construction materials and development of a worker accommodation strategy (during construction).
- 5.12.18 The Welsh Language Impact Assessment concluded there would be no significant effects of the Proposed Development on the Welsh Language. Therefore no specific mitigation measures have been developed.
- 5.12.19 There would be some effects on community amenity arising from a combination of visual, traffic, air quality and noise effects during construction. Of the 50 communities assessed, 13 would have minor effects and the other 37 would have negligible effects.
- 5.12.20 Land use effects arise when land-take or access could disrupt the existing use of the land. There are no land use effects that would result in a temporary or permanent restriction or change to the current use of land, and there is no severance of access.

Operation

- 5.12.21 During operation there would be effects on community amenity from a combination of visual and operational noise effects. Of the 49 communities that could be affected during operation, 10 would have a minor effect and the other 39 would have a negligible effect.
- 5.12.22 Amenity effects on public rights of way, cycle routes and other footpaths would be negligible during operation of the Proposed Development.
- 5.12.23 Four tourist attractions would have a minor effect during operation, but the majority would either have a negligible effect.
- 5.12.24 There would be 13 tourism related businesses that would experience a significant effect due to the presence of the Proposed Development and a further 19 with minor or negligible effects, however these business sectors as a whole would not experience a significant effect.

- 5.12.25 During operation there would be four non-tourism related businesses that would experience a minor effect, with the remainder all being negligible.
- 5.12.26 Maintenance and Decommissioning Routine maintenance work would be very small scale and effects would be negligible at most.
- 5.12.27 Refurbishment work could lead to some effects similar to those experienced during construction, however they would be most likely be smaller in scale, more localised and very infrequent.
- 5.12.28 Decommissioning of the Proposed Development would be likely to result in similar effects to those identified for construction though some effects would not recur, such as those related to the initial tunnel excavation. On completion of the decommissioning work, any noise or visual effects resulting from the presence of the Proposed Development would no longer occur.

5.13 AGRICULTURE

5.13.1 This section presents information about the agricultural effects that could result from the Proposed Development.

Baseline Summary

- 5.13.2 The majority of agriculture within the vicinity of the Proposed Development is typical for Anglesey and Gwynedd, and is primarily comprised of pasture land grazing sheep and cattle, with areas of mixed and arable land growing foods for stock-feeding (to support the dairy stock), spring barley, wheat, maize, winter barley, oilseed rape and potatoes The Agricultural Land Classification system (ALC) mapping shows that agricultural land is mainly Grade 4 (poor quality) and Grade 5 (very poor quality) with small areas of Grade 3a (good quality) and Grade 3b (moderate quality). Photograph 9 shows a view of the existing overhead line between Wylfa Substation and Pentir Substation over agricultural fields in the Llanfechell area.
- 5.13.3 The soils along the route of the Proposed Development are mainly freely draining typical brown earths and slowly permeable (allowing liquids or gases to pass through) soils; with isolated patches of amorphous (lacking a clear structure and semi-fibrous) peat at Capel Coch and Talwrn.
- 5.13.4 Some areas of land affected by the Proposed Development have been identified as participating in agri-environment schemes where the farmer is given additional payments to manage the land for its nature conservation value.

Mitigation and Residual Effects

Construction

- 5.13.5 There would be some temporary loss of agricultural land, with land excluded from agricultural use only for the duration of construction. This land would be brought back into use following construction therefore no significant effects are predicted.
- 5.13.6 The Outline Soil Management Plan (**Document 7.10**) sets out the general methods for handling, excavation, storage and reinstatement of soils and peat.
- 5.13.7 Through the implementation of control and management measures for the handling and storage of soil, soil loss, and the disturbance of soil resources (resulting in damage of their function, quality and resilience), would be reduced and therefore would not be significant. Most of the soils affected by construction activities would be kept and put back within the same area; therefore effects would not be significant.
- 5.13.8 Agricultural drainage systems may be disturbed due to temporary removal or blocking during construction. Effects would not be significant as the presence of drains would be identified prior to construction and standard measures e.g. re-routeing the drain and replacing after the construction period would be incorporated in to the Construction Environmental Management Plan (**Document 7.4**), and a Drainage Management Plan would be prepared prior to the commencement of works which would identify measures to reduce effects.
- 5.13.9 Five agri-environment schemes would experience temporary disturbance as a result of the construction of the Proposed Development. Mitigation measures to ensure that soil resources retain their quality once the temporary areas are restored would allow the land to be returned to the same quality and condition as it was prior to construction; and thereby regain eligibility to the agri-environment schemes following construction. Therefore, effects are not considered significant.

Operation

5.13.10 There would be some permanent loss of agricultural land under each pylon, at the tunnel head house and cable sealing end compounds and at the extended substation locations however, the careful placement of permanent elements of the Proposed Development has reduced potential effects. Permanent loss of the best and most versatile agricultural land due to the Proposed Development would be up to 3.1 hectares in the worst case. This would be below the 20 hectare loss of best and most versatile agricultural land that is typically taken as an indication of significant agricultural land loss; therefore the effects are not significant.

Maintenance and Decommissioning

5.13.11 Decommissioning effects would be broadly the same as construction effects, though with no further permanent land loss. Furthermore, areas permanently removed from agricultural use as a result of the development could be released back to agricultural use. The overall effect of decommissioning would therefore be to neutralise the original effects. The temporary loss of agricultural land due to maintenance would be unlikely to be significant.



Photograph 9: View of the Existing Overhead Line between Wylfa Substation and Pentir Substation over Agricultural Fields in the Llanfechell Area

5.14 INTRA-PROJECT CUMULATIVE EFFECTS

5.14.1 An intra-project effect is a type of cumulative effect which occurs where two or more different environmental impacts resulting from the Proposed Development affect a single receptor or resource. A typical example would be a resident, who could potentially experience effects of reduced air quality, increased noise, and reduced visual amenity, leading a greater overall amenity effect.

- 5.14.2 The assessment has identified the shared receptors (receptors that are identified in more than one chapter) which need to be assessed in the intraproject cumulative effects assessment; these are residential receptors (during construction and operation) road users (construction only) and community facilities (schools, hospitals, places of worship etc.).
- 5.14.3 Residential receptors could experience construction noise, visual effects, and air quality effects and impacts related to roads could include typical traffic related impacts (driver delay or difficulty accessing roads, pedestrian amenity and fear and intimidation etc.) as well as visual effects.
- 5.14.4 760 residential properties were initially considered and of these 149 were considered to have some potential for cumulative effects, during construction or operation. Of these there were 13 residential properties that were considered likely to experience a cumulative effect of greater significance than the individual effects during construction of the Proposed Development. During operation of the proposed development 17 properties were considered likely to experience a cumulative effect of greater significance than the individual effects.
- 5.14.5 In all cases the cumulative effects on road users during construction were considered not to be significantly greater than the effects when considered separately.
- 5.14.6 In all cases there was considered to be no potential for cumulative effects on community facilities.

5.15 INTER-PROJECT CUMULATIVE EFFECTS

- 5.15.1 Inter-project cumulative effects occur when the environmental effects from two or more separate developments cause an overall effect of greater significance than those resulting individually.
- 5.15.2 Factors that can lead to cumulative inter-project cumulative effects include where the development is located close to the Proposed Development, whether the construction, operation and decommissioning programmes overlap, whether the other development affects the same receptors as the Proposed Development, and also the size and type of development.
- 5.15.3 The assessment identified significant landscape, visual and cultural heritage cumulative effects.

5.15.4 There would be cumulative effects on local landscape character in the north of Anglesey due to effects of the Proposed Development with Wylfa Newydd Power Station, Wylfa Nuclear Power Station Decommissioning, Rhyd-y-Groes Re-power and Llanbadrig Solar Farm. Localised cumulative effects would impact Anglesey AONB as a result of the effects the Proposed Development with Wylfa Newydd Power Station, Wylfa Nuclear Power Station Decommissioning and Rhyd-y-Groes Re-Power. There would also be cumulative effects in relation to landscape character in Gwynedd due to

the Proposed Development together with the A487 Caernarfon to Bontnewydd Bypass during construction and the Green Wire development.

- 5.15.5 Significant cumulative visual effects were identified. In the north of Anglesey, the developments of Wylfa Newydd Power Station, Rhyd-y-Groes Re-power in additional to Llanbadrig Solar Farm and the Proposed Development would be a large change, both for receptors viewing the developments sequentially along the A5025 and users of the Wales Coast Path. Around Pentir, the developments of Green Wire, Dinorwig Cables, Underground Grid Connection between Glyn Rhonwy Pumped Storage Development and Pentir Substation in addition to the Proposed Development could have a greater cumulative visual effect on the community of Pentir.
- 5.15.6 There could be a significant cumulative effect on Standing Stones Scheduled Monument (AN 030), due to a combination of the Wylfa Newydd Power Station and the new overhead line which would increase the visibility of modern energy infrastructure in views from the north to the south-east.
- 5.15.7 In all other instances, although there could be some cumulative effect in some instances, the significance of the effect would be no greater than the effects of the developments considered separately.

5.16 STATEMENT OF COMBINED EFFECTS WITH THE WIDER WORKS

Description of the Wider Works

5.16.1 In addition to the connection between Wylfa Substation and Pentir Substation, work would be required to strengthen National Grid's existing electricity network between Pentir Substation and Trawsfynydd Substation to ensure that all of the power generation in North Wales can be accommodated on the transmission system following the connection of Wylfa Newydd Power Station. These works are referred to as the 'Wider Works' and are not part of the application for Development Consent for the Proposed Development.

- 5.16.2 The following works would be needed, which are illustrated on Figure 6:
 - a new substation at Bryncir;
 - a new section of wood pole overhead line between the new Bryncir Substation and the existing 132 kV overhead line and removal of a section of existing 132 kV overhead line no longer required;
 - replacement of one existing pylon at Bryncir to connect to the new substation;
 - upgrading/replacement of cables at the Glaslyn Estuary;
 - upgrades to the existing cable sealing end compounds at Wern and Garth;
 - extension within the existing substation boundary at Trawsfynydd; and
 - replacing the conductors of one circuit on the existing overhead line between Penisa'r Waun and Trawsfynydd Substation (4ZC).
- 5.16.3 It is possible that some of the environmental effects resulting from the Proposed Development and the Wider Works separately could combine to generate an overall effect of greater significance. Therefore an assessment of combined effects has been undertaken.
- 5.16.4 The assessment has concluded that there would be no combined effects that would increase the significance of the effects of the Proposed Development considered alone. This is largely due to the distance between the Proposed Development and elements on the Wider Works, which for the most part are separated by many kilometres.

6 Summary and Next Steps

6.1 SUMMARY

- 6.1.1 This section provides a high level summary of the results of the topic assessments and whether or not they have identified significant effects. It also identifies whether the significant effects occur during construction or operation.
- 6.1.2 Table 6.1 sets out the results of the assessment taking into account mitigation (mitigation by design, control and management measures and mitigation measures). The table shows which topics have predicted that significant effects would occur and during which stage of the Proposed Development.

Table 6.1: Summary of Significant Impacts			
Торіс	Construction	Operation	Decommissioning/ Maintenance
Landscape Assessment	*	1	x
Visual Assessment	✓	✓	x
Ecology and Nature Conservation	х	x	x
Historic Environment	✓	✓	x
Geology, Hydrogeology and Ground Conditions	х	x	x
Water Quality, Resources And Flood Risk	x	x	x
Traffic and Transport	✓	x	x
Air Quality and Emissions	X	X	X
Construction Noise and Vibration	~	N/A	1
Operational Noise and Vibration	N/A	✓	x
--	-----	---	---
Socio-economics	Х	X	X
Agriculture	Х	X	x
Cumulative Effects (Intra- project)	X	x	x
Cumulative Effects (Inter- project)	✓	✓	✓
Statement of Combined Effects With the Wider Works	x	x	x

*Key: **X** = No significant impacts recorded; ✓ = One or more significant impacts recorded

- 6.1.3 The EIA of the Proposed Development has identified and assessed the likely significant effects that would result from its construction, operation, maintenance and decommissioning and these have been presented in detail in the ES. Through careful siting and routeing as well as control and management measures and mitigation measures, it has been possible to prevent or reduce a number of potentially significant environmental effects. However, given the scale and nature of the Proposed Development some significant environmental effects do still remain following the application of mitigation measures.
- 6.1.4 As set out above, a number of the significant environmental effects would occur during construction of the Proposed Development and whilst significant they would not be permanent. These include effects on residents and visitors in proximity of the Proposed Development who may experience significant noise effects It should also be noted that whilst some significant environmental effects are predicted related to the overhead line, these would not occur along the full length of the Proposed Development at the same time or for the full duration of the construction period; they are more likely to occur for shorter periods of time whilst sections of the overhead line are constructed.
- 6.1.5 Permanent significant environmental effects are predicted for some landscape and visual receptors and due to effects on the setting of some historical assets.

6.1.6 Some mitigation measures have been incorporated into the design of the Proposed Development and others require the implementation of various measures during construction. Should the DCO for the Proposed Development be granted National Grid is committed to working with their appointed Contractor(s) to further reduce the environmental effects of the Proposed Development as far as practicable when finalising the detailed design and undertaking construction works. This approach would ensure that the actual effects of the Proposed Development would be no greater than the effects reported in the ES.

6.2 NEXT STEPS

- 6.2.1 This document has provided a summary of the Proposed Development, including a description of the EIA process and a summary the findings of the assessment undertaken for the Proposed Development.
- 6.2.2 The ES, along with a number of other documents, will be submitted as part of the application for a DCO. The Planning Inspectorate has 28 days to review the application and decide whether or not to accept it for examination. If accepted there will be an examination in public which will be undertaken by one or more examiners, to be appointed by the Planning The appointed examiner(s) will then undertake their Inspectorate. examination, largely through submission of written questions and responses, however there will also be general and topic specific public Once the various submissions have been completed the hearings. examiner(s) will make a recommendation to the Secretary of State for Business, Energy and Industrial Strategy. The final decision as to whether to grant the DCO will be made by the Secretary of State for Business, Energy and Industrial Strategy.
- 6.2.3 An outline programme is shown below which illustrates the key stages for the Proposed Development going forward.





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C. C. Maria	NWC ROUTE LEGEND		
	ANGLESEY / Y		
- 1 P			
	Proposed		
	Low Maintenance Grass		
	Wild-flower Planting		
	Low Planting		
X	Woodland Planting		
	Clawdd (Stone faced earth embankment with hedgerow)		
	Tree Planting		
1	Attenuation Pond with Wetland Planting		
	Saline Treatment Area		
	Buildings		
	Access Tracks		
//	Proposed Contours		
//	Reinstated to Pasture		
	Proposed Overhead Line		
	Proposed Electrical Infrastructure		
	Section Line		
	Existing		
	Tree		
	Existing Contours		
	A 30/08/2018 ENVIRONMENTAL STATEMENT JF JK CC Rev Date Description GIS Chk App		
	nationalgrid		
	Scheme: NORTH WALES CONNECTION PROJECT		
	Document Number: 5.0.1.2		
	Document Title: FIGURE 2 VISUALISATION OF BRAINT TUNNEL HEAD HOUSE		
) 20 30 40 50	Creator: Date: Checker: Date: Approver: Date: JF 30/08/2018 JK 30/08/2018 CC 30/08/2018		
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Proposed Low Maintenance Grass Wild-flower Planting Low Planting 23 Woodland Planting Clawdd (stone faced earth embankment with hedgerow) Tree Planting Attenuation Pond with Wetland Planting Saline Treatment Area EX. Buildings Access Tracks Proposed Contours 1 Proposed Overhead Line 111 Proposed Electrical Infrastructure Section Line Existing E-4 Existing Contours A 30/08/2018 ENVIRONMENTAL STATEMENT JF JK CC GIS Chk App Description Rev Date nationalgrid Scheme: NORTH WALES CONNECTION PROJECT Ocument Number 5.0 Ocument Title: FIGURE 3 VISUALISATION OF TŶ FODOL TUNNEL HEAD HOUSE Date: 30/08/2018 Checker: JK reator: JF pprover: CC 50 30/08/2018 80/08/2018

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