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DOCUMENT 9.5

Draft Route Alignment Report Wylfa to the Menai Crossing Area (2016)

National Grid (North Wales Connection Project)

Regulation 5(2)(q) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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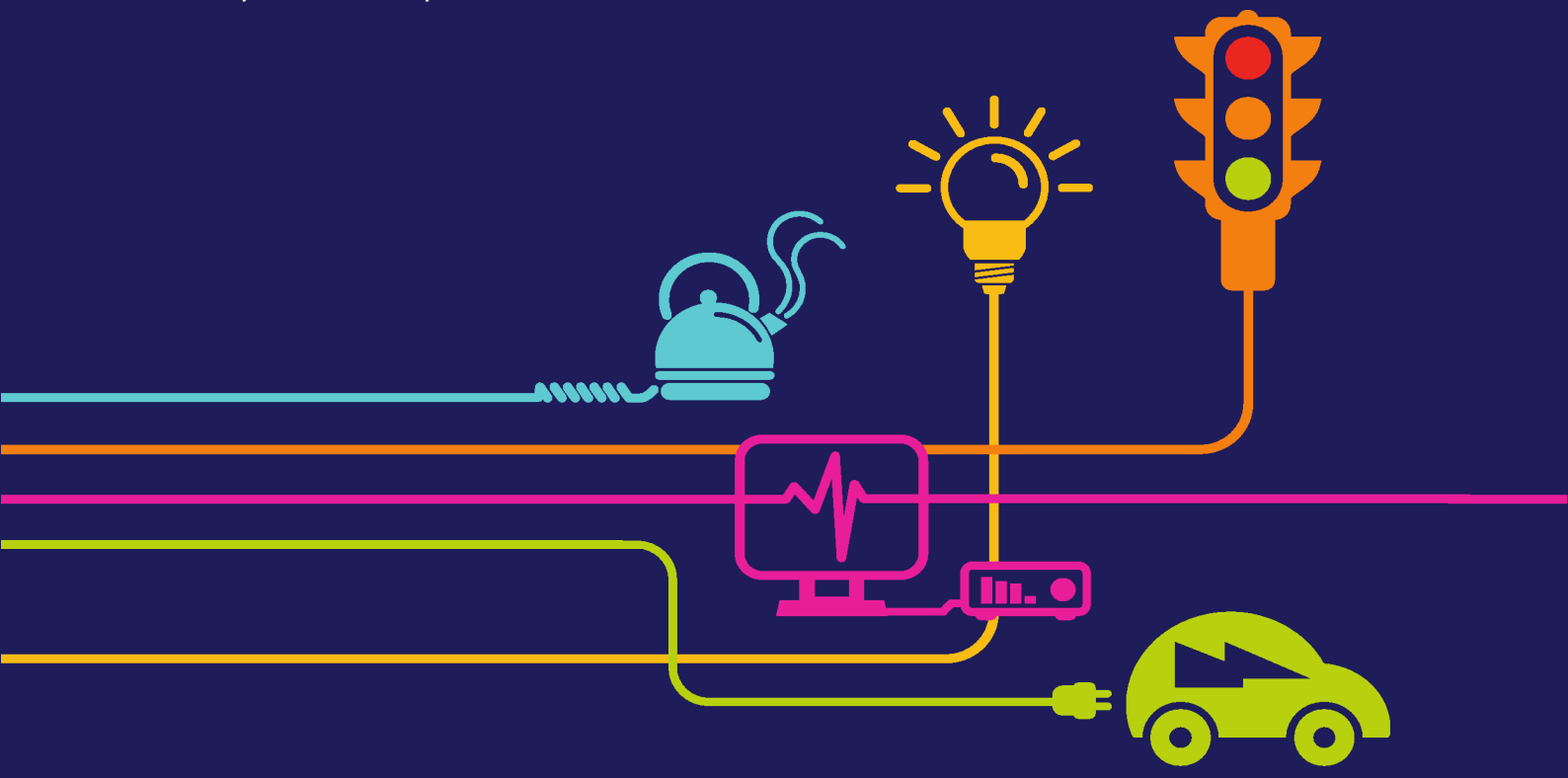

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OVERVIEW

This Report provides a description of the proposed design for a new 400kV overhead electricity line within Sections A - D of the route between Wylfa, on the north coast of Anglesey, and Pentir, on the Gwynedd mainland. Sections A-D of the route run between Wylfa and Ceint, to the east of Llangefni.

The design of the Connection within Sections E and F of the Route, covering the remainder of the Connection to Pentir, are described in National Grid's 'Menai Crossing Report'[1]. Together these two Reports describe the proposed design of National Grid's North Wales Connection Project, which is to be consulted upon under the 2008 Planning Act. They form part of a larger 'Consultation Reference Pack' which can be inspected at venues in the area during the Stage 3 Consultation period and online at NorthWalesConnection.com.

This Report gives a brief overview of the design process to date. It summarises how appraisal results and consultation feedback have helped inform the design of the North Wales Connection in Sections A - D of the Route, as the project has evolved and become more defined. In this way mitigation through design has already helped to avoid and mitigate the potential effects of the Connection.

The Report takes as its starting point the preferred Route Option identified for Sections 1 -4 of the 'orange' route corridor. The considerations that led to the selection of this Route Option are set out in National Grid's 'Wylfa to Pentir Route Options Report'[2] and 'Preferred Route Options Selection Report'[3].

This Report summarises the main design considerations for Route Sections A to D from a technical, environmental and socio-economic perspective in light of appraisals and consultation feedback received to date. It goes on to explain how the proposed detailed design (both of the permanent and temporary works) has responded to these considerations.

This Report also highlights the role that the opportunity for the new line to closely parallel the existing overhead line for much of the route has played in the design considerations. It goes on to explain how the proposed detailed design now presented seeks to synchronise the design of the parallel sections of the new and existing lines so as to further reduce the potential environmental and socio-economic effects of the Connection.

The report is intended to assist the reader's understanding of the proposed design and better inform responses to Stage 3 Consultation. Feedback from the Consultation will inform a design review so that the final proposal for which a Development Consent Order (DCO) will be sought would represent the most appropriate overall design solution.

[1] 'Menai Crossing Report' (September 2016)

[2] Wylfa to Pentir Route Options Report (October 2015)

[3] 'Preferred Route Options Selection Report' (September 2016)

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1 INTRODUCTION

1.1 Purpose of this Report

1.1.1 This Draft Route Alignment Report has been prepared by National Grid to explain the design rationale for a substantive part of the new electricity transmission connection that National Grid is proposing to develop between substations located at Wylfa, on the north coast of the island of Anglesey, and Pentir, on the mainland in Gwynedd.

1.1.2 The Report focusses on the local environmental, socio-economic and technical considerations that have helped to shape the draft route alignment proposal that is now being brought forward for formal statutory consultation under the 2008 Planning Act. It is intended to provide an explanation for stakeholders, residents and people with an interest in land to understand why both the permanent and temporary aspects of the design are as proposed.

1.1.3 The Report makes reference to previous stages in the evolution of the design for the new overhead line. However it does not consider wider routeing issues that have influenced the selection of a preferred route corridor and subsequent route option for the new connection. This Report takes as its starting point the preferred 'route option' identified within each of Sections 1-4 of the preferred 'orange route corridor'.

1.1.4 The basis for the identification of the preferred route corridor is set out in National Grid's 'Wylfa -Pentir Preferred Route Corridor Selection Report' (October 2015)[4] and the basis for the selection of the preferred route option within that corridor is set out in National Grid's 'Preferred Route Option Selection Report'[5], which is now being presented for consultation.

1.1.5 National Grid is currently of the view that an overhead line crossing of the Anglesey Area of Outstanding Natural Beauty (AONB) in the vicinity of the Menai Strait would be likely to conflict with national planning policy and National Grid's statutory duties. As such National Grid has undertaken significant work to identify the most appropriate means of installing cables beneath the AONB and across the Strait. The complex challenges associated with this aspect of the connection between Wylfa and Pentir, and the interaction with the routeing and design of the proposed overhead line as it approaches the underground section of the route, is

[4] Wylfa -Pentir Preferred Route Corridor Selection Report (October 2015)

[5] Preferred Route Option Selection Report. Wylfa to the Menai Crossing Area (September 2016)

explained in a companion Report; National Grid's 'Menai Strait Crossing Report' (September 2016), which is also now presented for consultation.

1.1.6 This Report is concerned with Sections A – D of the North Wales Connection Project, located between Wylfa and Ceint, to the east of Llangefni. These Sections broadly align with Sections 1 - 4 of the route as previously presented. The amendment to the designation of the Route sections is explained in Section 3.7 of this Report.

1.1.7 This Report together with the related Preferred Route Option Selection Report provides an explanation of how the draft alignment has been identified within these four Sections.

1.1.8 The Menai Crossing Report provides an explanation of the design and appraisal work that has led to the identification of the proposed route alignment as the connection approaches and crosses the Menai Straight into Pentir Substation (Sections E and F).

1.1.9 This Report does not seek to assess the likely environmental or socio-economic effects of the proposed connection. Preliminary Environmental Information based on the findings of assessments carried out to date can be found in Volumes 2.4 of National Grid's Stage 3 Consultation Pack.

1.2 Structure of the Report

1.2.1 The first four chapters of this Report provide background information concerning the development of the North Wales Connection project to date. They go on to describe generic design objectives and the approach taken to identifying the proposed detailed design now presented. Chapters 5 - 9 relate specifically to the proposed design within each of the four route sections considered in this Report.

1.2.2 The report is structured as follows:

- Chapter 2: provides the background to the Project, looking at the need for the proposed development and key stages in the Project's development.
- Chapter 3: sets out the generic design considerations for the detailed design now proposed. It gives an overview of relevant policy and duties that have been considered and explains the design principles that have generally applied throughout the Route Sections.
- Chapter 4: explains various aspects of the proposed design that are being presented at Stage 3 Consultation.

- Chapters 5 to 8: sets out the main design considerations specific to Sections A - D of the route respectively, based on appraisal findings and consultation feedback to date. It goes on to describe the proposed design in the Route Section and how this has responded to the generic and section-specific design considerations.
- Chapter 9: describes the requirement for a temporary Main Construction Compound on Anglesey, and explains why the proposed compound site in Section D of the route has been selected.
- Chapter 10: provides a summary of the full proposed design in Sections A to D of the route, describes the elements that make up the proposed design selected route option between Wylfa and the Menai crossing area that is the subject of the current round of consultation.
- Chapter 11: presents a summary of the next steps for the Project.

1.3 Relationship to other Documents

1.3.1 To explain how we have developed our proposals, a series of documents, including maps and plans have been prepared which together form a Consultation Reference Pack. The information in these documents may be useful in responding to the Stage 3 Consultation on the proposed project. The documents are split into four volumes:

- Volume 1: Community documents
- Volume 2: Reports
- Volume 3: Plans
- Volume 4: Our approach to consultation

1.3.2 This Report is one of seven main documents within Volume 2 of the Reference Pack. The other documents in the Volume are:

- **2.1 Preferred Route Option Selection Report:** explains the reasons for selecting the preferred route option (a route corridor about 100mwide within which the pylons will be sited) in sections A - D of the route. This forms the foundation for the more detailed design work presented in this Report.

- **2.2 Draft Route Alignment Report:** this Report

- **2.3 Menai Strait Crossing** Report: explains the options considered for crossing the Menai Strait (Sections E-F of the route), the options assessment undertaken and the selection of the preferred option. This includes information on siting of tunnel head houses, sealing end compounds and other supporting works required for the transitions from overhead to

underground, together with the two sections of overhead line that link to the sealing end compounds.

- **2.4 Preliminary Environmental Information Report (PEIR):** The findings of our environmental surveys and assessments up to now are set out in a Preliminary Environmental Information Report (PEIR).The PEIR explains our preliminary assessment of the likely effects the proposed project would have on the environment and the measures we are proposing to limit these effects where we can, based on our assessments to date.
- **2.5 Strategic Options Report:** explains the connection options looked at. It comprises both the Strategic Options Report, 2015 and the Strategic Options Report Update 2016

- **2.6 Need Case, updated 2016:** explains why the North Wales Connection project and the work we have to carry out is needed.

- **2.7 Project Glossary:** provides an expansion on, and explanation of, the terms used across all documents published for this consultation.

1.3.3 All of the Reports detailed above can be viewed online at the project website: northwalesconnection.com. They are also available on a USB memory stick free of charge. Reference copies will also be available at consultation events and at various venues in the area for the duration of the Stage 3 Consultation.

1.3.4 The Reports detailed above follow a series of earlier Reports that presented information from previous stages of the Project. These earlier Reports, which are also available on the project website, are:

- Wylfa-Pentir Initial Route Corridor Report, October 2012

- Wylfa-Pentir Preferred Route Corridor Selection Report, October 2015

- Wylfa-Pentir Route Options Report, October 2015

2 BACKGROUND

2.1 Introduction

2.1.1 This Chapter summarises the design evolution of the North Wales Connection Project from 2012 to the point where a single preferred route option was identified. It refers to the two stages of public consultation that National Grid has already carried out and how these have helped shape the current design. It also explains how National Grid has applied its 'Approach to Options Appraisal' to ensure that relevant environmental, socio-economic, technical and cost factors have been weighed in the balance to help define the current proposal.

2.1.2 The Chapter concludes by summarising the design proposal at the time that the preferred route option was identified and how this forms the starting point for the detailed engineering design that is now presented.

2.1.3 Detail on the broader background to the project, including the need for the connection, is only summarised within this section, a more detailed account (including background to National Gird, planning policy considerations and background to the project), is provided within the Preferred Route Option Selection Report[6].

2.2 Need for the Project and Preferred Strategic Design Decision

2.2.1 Wylfa has been identified as a potential location for a new nuclear power station. Horizon Nuclear Power (HNP) has concluded an agreement with National Grid to connect its proposed Wylfa Newydd Station to the national transmission system, in 2024 and 2025. Due to the capacity of the existing transmission system at Wylfa power from the Wylfa Newydd station cannot be accommodated. Accordingly a new electricity connection from Wylfa to the mainland transmission system is needed by 2024 to allow the export of power from Horizon's proposed new nuclear station. The need for the project is addressed in more detail in National Grid's Project 'Need Case' document (updated, October 2016).

2.2.2 In 2012 National Grid identified a number of ways in which a new connection could be made from Wylfa. Having spoken with stakeholders and undertaken an appraisal of the options and their likely environmental, socio-economic, technical and cost implications National Grid concluded that a new connection between Wylfa and an existing National Grid substation at Pentir (located to the south-

[6] Preferred Route Option Selection Report (September 2016)

west of Bangor, in Gwynedd) was likely to represent the most appropriate design solution.

2.2.3 The Strategic Options considered and the reason for favouring an overhead line connection to Pentir are presented in National Grid's updated 'Strategic Options Report'[7], updated in September 2015, which concluded that :

> *National Grid believes that Strategic Option 3 - Overhead Line, can be designed and is capable of being mitigated in such a way as to ensure compliance with the national planning policies set out in National Policy Statements EN-1 and EN-5 relating to energy developments, against which any application for development consent will be considered by the Secretary of State.*

2.3 Stage 1 Consultation and the Preferred Route Corridor Design Decision

2.3.1 In October 2012 National Grid presented at Stage 1 Consultation the preferred strategic option and four possible corridors within which a new overhead electricity line might be routed between Wylfa and Pentir. These had been identified so as to avoid, as far as possible, the most sensitive sites and features, whilst also presenting a number of alternative corridors in which the Connection might be achieved. This work was documented in the Wylfa-Pentir Initial Route Corridor Report[8].

2.3.2 Having considered the findings of environmental and socio-economic appraisals and reviewed feedback received to the Stage 1 Consultation National Grid announced in January 2015, a preferred route corridor. The preferred 'orange' route corridor broadly follows the route of the existing 400 kilovolt (kV) overhead line between the two substations. The reasons for preferring this route corridor are set out in National Grid's Wylfa-Pentir Preferred Route Corridor Selection Report[9] which concluded…

> *…that the potential cumulative effects of constructing a second overhead line within the Orange Route Corridor, once detailed design and mitigation measures had been developed, would not be so great as to negate the advantages that the Orange Route Corridor offered over the three alternative corridors considered.*

2.3.3 At that time, National Grid also expressed the view that an overhead line crossing of the Anglesey Area of Outstanding Natural Beauty (AONB) in the vicinity of the

[7] 'Strategic Options Report' September 2015.

[8] Wylfa-Pentir Initial Route Corridor Report, October 2012

[9] Wylfa-Pentir Preferred Route Corridor Selection Report, October 2015

Menai Strait would be likely to conflict with national planning policy and National Grid's statutory duties. Consequently National Grid began work to identify a search area and possible methods for crossing the AONB and Strait using buried cables.

2.3.4 At the same time National Grid identified potential route options, within the preferred 'orange' route corridor, for a new overhead line between the Wylfa substation and the Anglesey AONB at the Menai Strait, and also between the Menai Strait and Pentir substation.

2.3.5 The design of the route options for the overhead line was informed by a range of environmental, socio-economic, technical and cost considerations identified through data gathering and site visits, as well as feedback from the Stage 1 Consultation. Further information on the identification of the route options can be found in National Grid's Wylfa-Pentir Route Options Report.[10]

2.4 Stage 2 Consultation and the Preferred Route Option Design Decision

2.4.1 The identified Route Options were presented at the Stage 2 Consultation in October 2015, together with sealing end compound search areas required for the proposed cabled crossing of the Anglesey AONB.

2.4.2 Further appraisals and assessment together with feedback from the Stage 2 Consultation helped inform the selection of a preferred Route Option within the 'orange' route corridor. Further information is provided in the Preferred Route Option Selection Report[11] issued alongside this report for consultation.

2.4.3 The preferred route option selected runs broadly parallel to the existing overhead line throughout Sections A - D of the route, with the exception of around 2.5 kilometres to the east of Capel Coch in Section C. Here the Route Option deviates away from the existing line to avoid routeing through the Cors Erddreiniog SSSI, National Nature Reserve and European habitat site.

2.4.4 The preferred Route Option which forms the basis for the proposed detailed design now presented for Stage 3 Consultation is shown at Figure A-1 in Appendix A.

2.5 Consultation Feedback, Options Appraisal and Design Decisions

2.5.1 Feedback from the Stage 2 consultation has informed the detailed design and siting of proposed pylons presented at Stage 3 Consultation and explained in this Report. Where possible, pylon locations have been identified to avoid sensitive

[10] Wylfa-Pentir Route Options Report, October 2015

[11] Preferred Route Option Selection Report, September 2016.

sites and features and reduce potential environmental effects. Some of the high level themes from consultation relevant to the Route Section under consideration are set out in Chapters 6-8 of this Report.

2.5.2 Following the Stage 2 consultation, National Grid has continued to engage with stakeholders, and visits have been made to many properties adjacent to the Route Options. These visits have helped provide a better understanding of residents' concerns and of local conditions so as to better refine the proposed design now presented from an individual householder perspective. Feedback from these individual discussions is not presented in this Report, but has helped to shape the detailed design proposals being brought forward for Stage 3 Consultation.

3 GENERIC DESIGN CONSIDERATIONS

3.1 Introduction

3.1.1 The process of identifying the draft alignment from the preferred route option has required a difficult balance between National Grids duties and obligations, consultation feedback, and the need to minimise potential negative effects. National Grid must also ensure that a technically feasible and safe connection is progressed. The following Chapter provides a summary account of how the alignment was identified and the broad design objectives which led to its selection for formal consultation.

3.1.2 The Chapter also sets out the key policy and guidance relating to design matters that National Grid has had regard to when making the design choices to date.

3.2 Planning Policy and Guidance Relating to Design

3.2.1 In developing the detailed design proposal to be presented for Stage 3 Consultation, National Grid has had regard to the policies set out in the National Policy Statements relevant to the North Wales Connection Project.

3.2.2 Six National Policy Statements (NPSs) for energy infrastructure were designated by the Secretary of State in 2011. The NPSs are the primary policy documents for the purpose of determining applications for Development Consent Orders (DCOs) for Nationally Significant Infrastructure Projects (NSIPs) such as new overhead transmission lines greater than 2 kilometres in length. The Secretary of State must decide such applications in accordance with the relevant NPSs.

3.2.3 The most relevant NPSs for the North Wales Connection Project are the Overarching NPS for Energy (EN-1)[12] and the NPS for Electricity Networks Infrastructure (EN-5)[13].

3.2.4 Both documents refer to the importance of good design in energy projects. Section 4.5 of EN-1 sets out criteria for "good design" in energy projects. Extracts from the policy are reproduced below:

> *4.5.1 ……..Applying "good design" to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible. It is acknowledged, however that the nature of much energy infrastructure*

[12] Overarching NPS for Energy (EN-1)

[13] NPS for Electricity Networks Infrastructure (EN-5)

development will often limit the extent to which it can contribute to the enhancement of the quality of the area.

4.5.2 Good design is also a means by which many policy objectives in the NPS can be met, for example the impact sections show how good design, in terms of siting and use of appropriate technologies can help mitigate adverse impacts such as noise.

4.5.3 ……..Whilst the applicant may not have any or very limited choice in the physical appearance of some energy infrastructure, there may be opportunities for the applicant to demonstrate good design in terms of siting relative to existing landscape character, landform and vegetation. Furthermore, the design and sensitive use of materials in any associated development such as electricity substations will assist in ensuring that such development contributes to the quality of the area

4.5.4 …….applicants should be able to demonstrate in their application documents how the design process was conducted and how the proposed design evolved. Where a number of different designs were considered, applicants should set out the reasons why the favoured choice has been selected. In considering applications the IPC should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements which the design has to satisfy..

3.2.5 When considering the effects that any energy project may have upon local landscapes, NPS EN-1 also advises at paragraph 5.9.17 that:

The IPC should consider whether the project has been designed carefully, taking account of environmental effects on the landscape and siting, operational and other relevant constraints, to minimise harm to the landscape, including by reasonable mitigation.

3.2.6 National Policy Statement EN-5 at Section 2.5 reiterates the advice set out in EN-1:

2.5 Consideration of good design

2.5.1 Section 4.5 of EN-1 sets out the principles for good design that should be applied to all energy infrastructure.

2.5.2 Proposals for electricity networks infrastructure should demonstrate good design in their approach to mitigating the potential adverse impacts which can be associated with overhead lines….

3.2.7 Addressing Landscape and Visual Effects of energy network infrastructure EN-5 advises:

Guidelines for the routeing of new overhead lines, the Holford Rules[14], were originally set out in 1959 by Lord Holford, and are intended as a common sense approach to the routeing of new overhead lines. These guidelines were reviewed and updated by the industry in the 1990s and should be followed by developers when designing their proposals.

2.8.6 In overview, the Holford Rules state that developers should:

● avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if total mileage is somewhat increased in consequence;

● avoid smaller areas of high amenity value or scientific interest by deviation, provided this can be done without using too many angle towers i.e. the bigger structures which are used when lines change direction;

● other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers;

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

● prefer moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees;

● where country is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration of lines or "wirescape"; and

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

3.2.8 Of particular note to the current stage of the design process is Holford Rule 6 which states;

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

[14] The Holford Rules

3.2.9 The accompanying Note to Rule 6 goes on to advise that:

> *In all locations minimise confusing appearance. Arrange wherever practicable that parallel or closely related routes are planned with tower types, spans and conductors forming a coherent appearance; where routes need to diverge, allow where practicable sufficient separation to limit the effects on properties and features between the lines.*

3.2.10 In developing the detailed design now presented for Stage 3 Consultation the design principles set out in the two National Policy Statements have been used to inform and guide the design process.

3.2.11 In addition due consideration has been given to the guidance contained in the Holford Rules where this can be applied to the current stage of design. In particular the design has sought to adhere to the advice contained within the Note attached to 'Rule 6' as set out above.

3.3 National Grid's Amenity Duties

3.3.1 As the holder of the electricity transmission licence for England and Wales, National Grid has a statutory duty to consider the amenity impacts of its work. When formulating proposal to develop an overhead electricity line, or carry out other works to the transmission system, Schedule 9(1) in Section 38 of the Electricity Act 1989 specifically requires National Grid to:

> *"have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and or protecting sites, buildings and objects of architectural, historic or archaeological interest; and shall do what it reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside on such flora, fauna, features, sites, buildings or objects."*

3.3.2 When determining any application for consent to undertake works to the transmission system, the Secretary of State for Energy and Climate Change must also consider the extent to which National Grid has complied with these duties.

3.3.3 As a statutory undertaker, National Grid also has other duties relating to amenity and environmental considerations. In relation to designated landscapes, the National Parks and Access to the Countryside Act 1949 and the Countryside and Rights of Way Act2000, require all statutory undertakers to have regard to the purposes of National Parks and AONBs respectively when carrying out their statutory duties. Government guidance acknowledges that

> *"the duties do not override particular obligations or considerations which have to be taken into account by relevant authorities in carrying out any function",*

but goes on to explain that the purposes of designating nationally protected landscapes need to be

"recognised as an essential consideration in reaching decisions or undertaking activities that impact on those areas".

3.3.4 These statutory duties have been considered as part of the overall design process, from the outset of the project to the development of the detailed design proposal presented at Stage 3 Consultation.

National Grid's Amenity Policy Stakeholder, Community and Amenity Policy.

3.3.5 National Grid's Stakeholder, Community and Amenity Policy sets out how the company will work with stakeholders and communities to meet the environmental duties placed on it by Schedule 9 of the Electricity Act and includes ten commitments. Of particular relevance to this stage of project development are the following:

- Involving stakeholders and communities.
- Routeing of networks and site selection – seeking to avoid areas which are nationally or internationally designated for their landscape, wildlife or cultural significance.
- Minimising the effects of works and new infrastructure on communities, by having particular regard to safety, noise and construction traffic, and on areas which are nationally or internationally designated for their landscape, wildlife or cultural significance and other sites valued for their amenity such as listed buildings, conservation areas, areas of archaeological interest, local wildlife sites, historic parks and gardens and historic battlefields (taking into account the significance of these and other areas through consultation with local authorities and other stakeholders with particular interests in such sites).
- Mitigating adverse effects of works through the application of environmental assessment techniques.

3.3.6 The corridor and route options that have been identified and subsequently taken forward through the Options Appraisal process have in most part avoided nationally and internationally designated sites and features. However the iterative detailed design process placed significant weight on the need to further minimise more immediate effects upon sensitive local receptors, in line with National Grid's amenity policy. Examples include:

- Individual properties where the design seeks to avoid oversailing residential curtilages wherever possible, or site individual pylons out of principle viewpoints.

- Local woodland blocks, where the design seeks to avoid or reduce the amount of tree loss that could result from the development of the proposed new line
- Seeking to avoid the need to route construction traffic on the most sensitive parts of the local road network by laying out construction haul roads that provide alternative means of access to the proposed construction areas.

NGC Substations and The Environment: Guidelines on Siting and Design[15]

3.3.7 This document provide guidance to assist with the siting and designing of substations to mitigate the environmental effects of such developments The document complements the Holford Rules guidelines on the routeing of high voltage transmission lines.

3.3.8 The Guidelines have been used to assist in the selection of the proposed location for the Main Construction Compound, located within Section D of the route and described at Chapter 9 of this Report.

Wind Turbines and Pylons. Guidance on the Application of Separation Distances from Residential Properties (Gillespies, 2014).

3.3.9 Gwynedd Council, Isle of Anglesey County Council and Snowdonia National Park Authority commissioned this study to determine the appropriateness of applying minimum separation distances between wind turbines or pylons and residential properties, to protect residential visual amenity. The Gillespies Wind Turbines & Pylons Guidance on the Application of Separation Distances from Residential Properties study contributes to the evidence base for the emerging JLDP and concludes, among other things, that there is

> *"no conclusive evidence to support the strict application of minimum separation distances between residential properties [and] pylons in terms of visual residential amenity".*

3.3.10 National Grid agrees that it would be inappropriate to set an absolute minimum separation distance between the proposed new overhead line and residential properties. The distance between overhead line development and residential properties should instead be informed by an assessment of the effects likely to occur as a result of the development, and the degree to which these effects would impact residential amenity. This will be determined by the individual nature

[15] NGC Substations and The Environment: Guidelines on Siting and Design

of the development proposed and the residential property affected. Where possible such matters have been considered at the current detailed design stage.

3.4 Parallel & Synchronised Designs

Parallel Route Considerations to Date

3.4.1 In identifying the preferred route corridor, desk and field based reviews confirmed the potential to achieve a broadly close parallel line within the Orange Route Corridor. It was acknowledged that the presence of the existing National Grid 400kV line within the Orange Route Corridor provided both an opportunity and a constraint to the development of any new overhead line.

3.4.2 By constructing the new overhead line close to the existing line it was considered that the spread of transmission development, both within the corridor and across the wider island, would be minimised. Whilst this would increase the effects of transmission development within the vicinity, it was generally considered that the cumulative effect would be less than the additional effects of a new overhead line built in one of the alternative route corridors presently unaffected by transmission development.

3.4.3 In principle, the more closely that the new overhead line can follow the route of the existing overhead line, the more limited will be the area affected by transmission infrastructure. This was an important factor in identifying the orange route corridor as preferred as set in the Preferred Route Corridor Selection Report[16].

3.4.4 The Route Option Identification Report acknowledged that the existing overhead line passes through three pinch points defined by the proximity of nationally designated sites and existing settlements (Tregele; Rhosgoch and Rhosybol; and Talwrn), which had already restricted the extent of the Orange Route Corridor. These sites and settlements also limited the route options for a new overhead line within the corridor to the area close to the existing line.

3.4.5 Holford Rule 3 advises to choose the most direct line, with no sharp changes of direction and thus with fewer angle towers. Therefore it was considered that, parallel or closely related route options leading into and out of these pinch points would potentially comply with Holford Rule 3 better than any nonparallel routes that may require sharp changes and angle pylons in their approach to these points.

[16] [16] Wylfa-Pentir Preferred Route Corridor Selection Report, October 2015

3.4.6 The principle behind following the existing overhead line corridor was carried forward to inform the identification of broadly parallel route options within the preferred route corridor. It was considered that, all other things being equal, the introduction of a closely routed overhead line is likely to give rise to a lower magnitude of change to local sites and features than the insertion of a new line in the wider corridor. It was however acknowledged that the appropriateness of such an assumption needed to be appraised for each of the route options considered.

3.4.7 The general route of the existing overhead line largely avoids significant sites and features that might preclude the routeing of a new line. In many instances, where local features such as woodland or residential properties encroach close to the existing line it was possible to identify a parallel route option on the side of the existing line furthest from the feature.

3.4.8 The opportunity that closely parallel routes provided to limit and mitigate the effect of the new Connection was recognised both in consultation feedback and in National Grid's appraisals of the Route Options. This was a significant consideration in the selection of the Preferred Route Option that has now been subject to detailed engineering design. This is explained in more detail in the Preferred Route Option Selection Report[17] (September 2016)

3.4.9 The Preferred Route Option Selection Report recognised that the close parallel nature of much of the preferred route option appeared to present significant opportunities to synchronise the designs of the existing and proposed new line. Of the total 24.4 km length of the preferred Route Option in Sections A-D selected at the Route Option stage, 19.3 kilometres is considered to be a close parallel alignment (for the purposes of this Report taken to be within 100 meters of the existing line). A further 2.5 km is considered to be more broadly parallel (i.e. parallel but beyond the 100 m), and the final 2.6 km of the proposed route forms the wider deviation away from the existing line proposed on environmental grounds to avoid routeing through Cors Erddreiniog SAC and NNR. Accordingly around 90% of the route would appear to provide opportunities to synchronise the design of the two lines.

3.4.10 However, local constraints to the siting of pylons in some parts of the route might in some instances limit opportunities to site new and existing pylons side by side. It was recognised that further design, consultation and appraisal would be needed to fully understand the nature of these limitations.

The Preferred Parallel Route Option and Detailed Design Considerations

[17] Preferred Route Option Selection Report, September 2016

3.4.11 In respect of the most recent phase of detailed engineering design, the Note to Holford Rule 6 as referenced previously has been of particular importance. This advises:

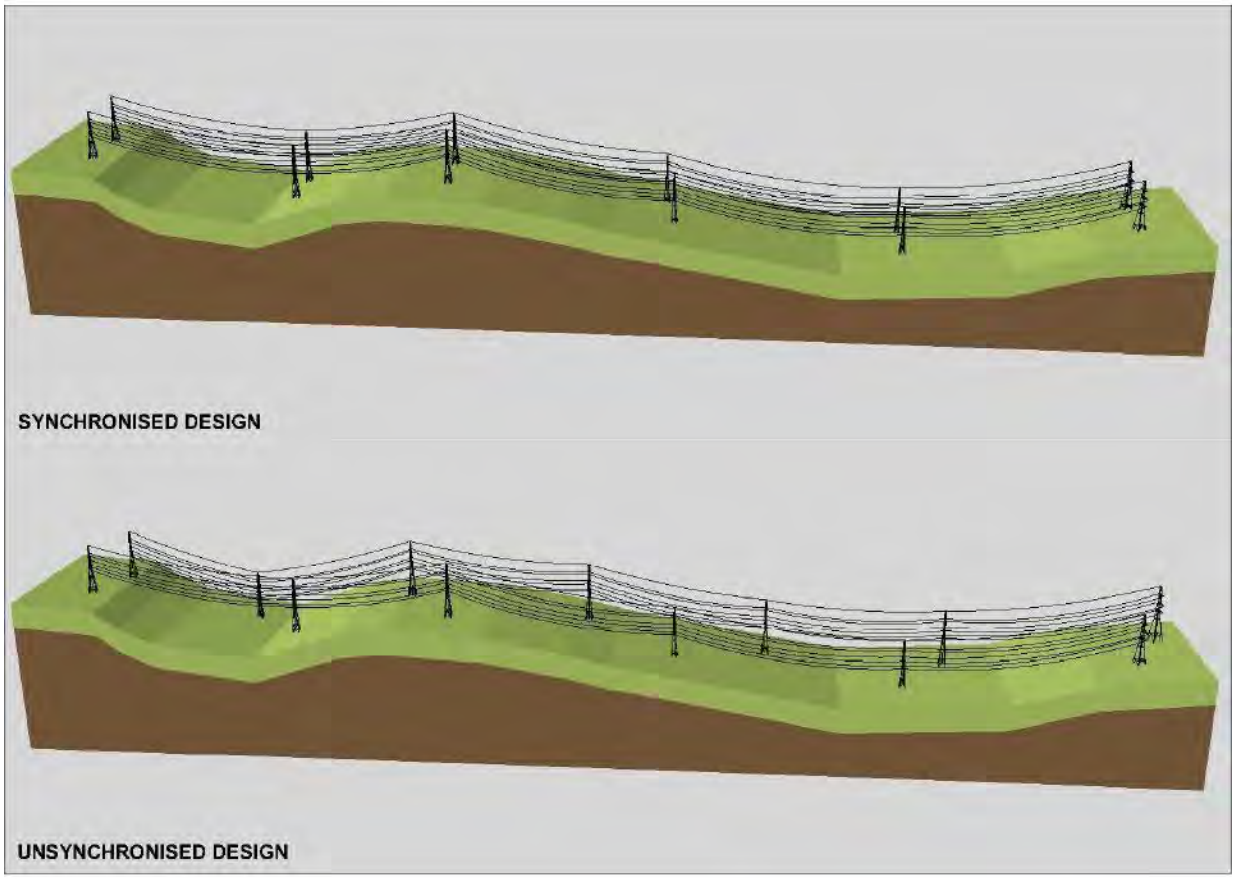
> *Arrange wherever practicable that parallel or closely related routes are planned with pylon types, spans and conductors forming a coherent appearance*

3.4.12 One of the most important considerations in determining the degree of benefit afforded by the preferred close parallel route option is the relationship of the new pylons with the existing pylons. The importance of selecting a design for the new pylons appropriate to the route option under consideration has been described in Chapter 6 of the Preferred Route Option Selection Report. Having considered a range of factors National Grid believes that the lattice steel L12 pylon design is the most appropriate design, especially in the case of the close or more broadly parallel route options. The detailed design now proposed utilises the standard L12 pylon design throughout all sections of the Route. This design is similar in form to the existing L6pylons, but lighter in design and appearance than the larger L13 pylon design which is the modern equivalent of the L6 design.

3.4.13 A drawing comparing the proposed L12 suite of pylon designs with the equivalent L6 pylon which form the existing overhead line can be found at Figure B-1 in Appendix B of this Report.

3.4.14 Turning to the design and siting of individual pylons, the upper illustration in Figure 3.1 below the design principles that the guidance note advocates, with pylons in adjacent routes closely 'paired', resulting in similar span lengths, pylon heights and a coherent rise and fall of the supported conductors. The lower image demonstrates the less coherent appearance of two parallel lines that are not co-ordinated in this way. The apparent reduction of distance between pylons increases the sense of enclosure, restricting the openness of views between pylons. The resultant wirescape is also less synchronised.

Figure 3. 1. Example of Coherent Appearance Achieved through Synchronised Design



3.4.15 The degree to which two parallel or closely related lines mange to achieve a coherent appearance in a landscape is a matter of subjective judgement and will vary according to the angle of the view considered. However, in pairing pylons in the way advocated, wider landscape and visual effects can be reduced.

3.4.16 A schedule of the pylon type and pylon height for each of the proposed new and existing pylons on both routes can be found at Appendix L.

3.4.17 Other less important opportunities to reduce the environmental effects of transmission development might also be realised through the adoption of a closely related route, such as the potential for established and agreed access routes, used for the inspection and maintenance of the existing line, to be used for the construction of a new line.

3.4.18 The detailed design work undertaken to identify the overhead line design now proposed has set out to develop a synchronised design wherever practicable along the route. As acknowledged previously localised constraints to the siting of individual pylons may preclude this or suggest that an unpaired or less synchronised design would be locally preferable based upon the nature of the receptors local to a given pylon.

3.4.19 National Grid has applied this approach to the development of several transmission routes in England and Wales, with examples of new parallel routes being developed over the past 20 years in North Lincolnshire and County Durham. Earlier examples of closely routed 400kV transmission lines can be found in Pembrokeshire, where the routes connect power generation at Pembroke to the wider transmission system, and in Suffolk, where the lines connect to the Sizewell Nuclear Power Station.

3.5 Other Technical Design Principles Applied

Clearances between the Existing and Proposed New Overhead Lines

3.5.1 A design objective for the proposed new line was to route parallel at approximately 85 metre separation to the existing overhead line where possible. The 85 metre separation was identified as being optimal so as to allow construction and works to the existing and proposed overhead line to be carried out from the area between the two routes, without the potential for construction cranes to fall and damage both lines at the same time.

3.5.2 Where an 85 meter separation distance could not be achieved due to the location of a local site or feature that restrict either the siting of a pylon or the route of oversailing conductors, the separation distance between the two lines was reduced to as little as 65 metre. This would still provide the safe working environment where construction cranes can be located on the opposite side of the line being worked upon, thus also avoiding damage to both lines in the rare occurrence that a crane may fall.

3.6 Process of Identifying Alignment

3.6.1 In order to better inform the selection of the most appropriate Route Option for the new connection between Wylfa and Pentir, assumed alignments within each of the Route Options had already been identified. These assumed alignments are shown in the Preferred Route Option Selection Report, September 2016.

3.6.2 Having selected the preferred Route Option, the related assumed alignment was reviewed and changes made to reflect the connections now known to be needed between sections of the Route, and any preferred transposition designs. This modified alignment formed a baseline for subsequent design review and iterative refinement.

3.6.3 This iterative refinement took the form of a series of brief, multi-disciplinary workshops, collaboratively looking at environmental, socio-economic and technical factors that could lead to a design enhancement or a lessening of

environmental or socio-economic effects. This collaborative approach was needed to ensure that any proposed refinement would not have knock-on adverse impacts upon another aspect of the appraisal or pose technical engineering challenges.

3.6.4 The above iterative process of establishing a baseline design and then subjecting this to environmental review and design refinement concluded with the identification of the proposed route design presented for Stage 3 consultation.

3.6.5 The design considerations that have informed the detailed design within Sections A – D of the route are described in Chapters 5-8 of this Report.

4 ASPECTS OF THE PROPOSED DESIGN

4.1 Introduction

4.1.1 In order to gain a fuller understanding of the detailed design and alignment now presented for Stage 3 Consultation, it is helpful to understand certain characteristics of overhead transmission lines which underpin the design decisions made. This Chapter sets out to explain some of those principle aspects of the design and construction of overhead transmission lines, and how the development consents and land rights necessary to construct those lines are defined.

4.2 Aspects of the Enduring Design Presented

4.2.1 **Transpositions.**

4.2.2 As a result of the preferred combination of Route Options selected at the Route Options appraisal stage, three transpositions are needed within Sections A - d of the route to allow the proposed new route to move from one side of the existing overhead line to the other.

4.2.3 In Section A of the Route, the proposed section of new overhead line changes from the north and east of the existing line, to the south and west to optimise the connection into Wylfa Substation. The design rationale for this transposition is set out in Chapter 5 of this Report.

4.2.4 The remainder of the preferred Route Option in Section A lies to the north of the existing line. The preferred Route Option in Section B of the route runs parallel to and south of the existing overhead line. As a consequence a transposition is required in the vicinity of Rhosgoch at the start of Section B of the route. The design rationale for this transposition is set out in Chapter 6 of this Report.

4.2.5 Further east as the route enters Section C, a further transposition is required to move the proposed new section of line back to run to the north and east of the existing line, as it passes the community of Llandyfrydog. As the proposed route then turns southwards a second transposition is need to move the new line back to the west of the existing in order to avoid routeing into the designated habitat at Cors Erddreiniog The design approach to these transpositions is described in Chapter 7of this Report.

4.2.6 **Pylon Designs**. A detailed appraisal of the pylon design options that are available to meet the technical needs of the North Wales Connection Project is set out in Chapter 6 of the Preferred Route Option Selection Report, September

2016. This concluded that the standard L12 lattice steel pylon design would be the most appropriate design having regard to a range of environmental, socio-economic, technical and cost considerations and feedback from consultation.

4.2.7 A schedule of the proposed new and retained existing pylons is included at Appendix L of this Report. As well as detailing whether the pylon is a new or existing pylon, the schedule provides the type of pylon design and whether it is a straight line ‘suspension’ pylon (indicated by a D 'type') or a larger angle pylon (indicated by a D followed by a number, which indicates the maximum angle of route deviation that the pylon could accommodate. Larger numbers indicate a broader, bulkier pylon form).

4.2.8 The schedule also indicates those pylons that are, for the sake of this Report, referred to as 'paired'. This refers to those pylons that are located closer than 50 metres longitudinally to the position of the pylon on the adjacent line. It is acknowledges that whether or not two pylons are synchronised or 'paired' is a matter of judgement, but the 50 metre offset is a useful threshold against which these matters can be reported. The schedule also provides details of the anticipated pylon heights.

4.2.9 Outlines of the pylons proposed for use are included at Figure C-1 of Appendix C to this Report, which compares the L12 design suite with that of the L6 pylons that make up the existing line.

4.2.10 **Pylon Positions**. Lattice steel pylons are comprised of four main legs. These splay out from the pylon body to a greater or lesser extent, dependent upon the sideways tension being applied by the conductors (wires). This tension varies according to the severity of change in route direction, with greater angles of route change increasing the tension. The dimension of the above ground elements at the base of the pylon therefore vary according to both the degree of change in the route direction and the height of the pylon. These dimensions are also shown at Figure C-1.

4.2.11 The legs are supported by buried foundations which generally continue the angle of splay below ground, increasing the size of the pylon base when measured to the outer edge of the foundation blocks or piles. The type and extent of these foundations is determined by the ground conditions as well as the pylon that they support.

4.2.12 The location of both the proposed new and existing pylons are shown on the figures at Appendices B, and D-G of this Report.

4.2.13 **Centreline**. This is generally taken to represents the alignment for the route and usually aligns with the position of the earth wire supported on the central peak of the pylons. However the overall area above which the conductors supported by the pylon would pass is considerably wider.

4.2.14 **Conductor Positions**. The conductors (wires) need to be held away from the pylon body and are supported on cross arms projecting out from the body. As a result of this need to maintain electrical clearances the overall width of the land between the outermost conductors on either side of the pylon is approximately 18 metres when hanging vertically between straight line L12 pylons. This width varies according to the type of pylon concerned. The width of the widest cross arms for each of the pylon designs proposed is shown at Figure C-1 in Appendix C of this Report.

4.2.15 **Conductor Sag and Swing**. The conductors are only attached at the pylons and the wires therefore sag in the span between the two supporting pylons. The distance between the wires and the ground is greatest at the pylon and least in the middle of the span. The height and distance between the supporting pylons is designed to maintain safe clearances from the wires during all operating conditions. Thus the height of each of the pylons proposed, as set out in Appendix L, has been calculated based on the clearance required to the topography beneath each span of the proposed line. These clearance distances are summarised in Table 4.1 below and are in part illustrated in Figure 4.1.

4.2.16 In addition to sagging, the wires are also moved horizontally by the wind. The amount of movement is again minimal at the pylon where the wires are attached, but increases towards the middle of the span. This results in a crescent shaped area between pylons that could be crossed (‘oversailed’) by conductors when the wind is blowing at right angles to the line route. In order to avoid the conductors passing above a particular site or feature, such as the curtilage of a property, allowance needs to be made for this swing. The potential maximum swing for each span of the proposed route has been considered as part of the detailed design. This has helped inform the maximum lateral extent of any land over which land rights might be needed to accommodate this infrequent swung conductor condition.

4.2.17 **Conductor Clearances**. As mentioned above, electrical clearances have to be maintained at all times. These clearances vary according to the object crossed. The sag of the wires will increase with higher air temperatures or when carrying greater amounts of power. The line is therefore designed to allow safe operation at the highest potential temperatures. Clearances will therefore be greater under average conditions when the wires will sag less. Where necessary greater clearances can be designed into the line, but this is likely to increase the height of

the supporting pylons, potentially increasing the environmental effects (primarily effects upon views and the landscape).

4.2.18 In order to allow the line to be constructed, underlying vegetation may need to be trimmed or removed. Trees and shrubs beneath the line will need to be managed periodically to maintain safe clearances as they grow. Where the proposed route passes through or close to areas of woodland, design clearances have been considered. A number of these design clearance drawings are included at Appendix H of this Report.

4.2.19 Electrical Clearances to different objects are set out in Table 4.1 and clearances to ground and nearby trees are illustrated at Figure 4.1 below.

Figure 4.1. Overhead Line Clearance Requirements to Underlying Vegetation

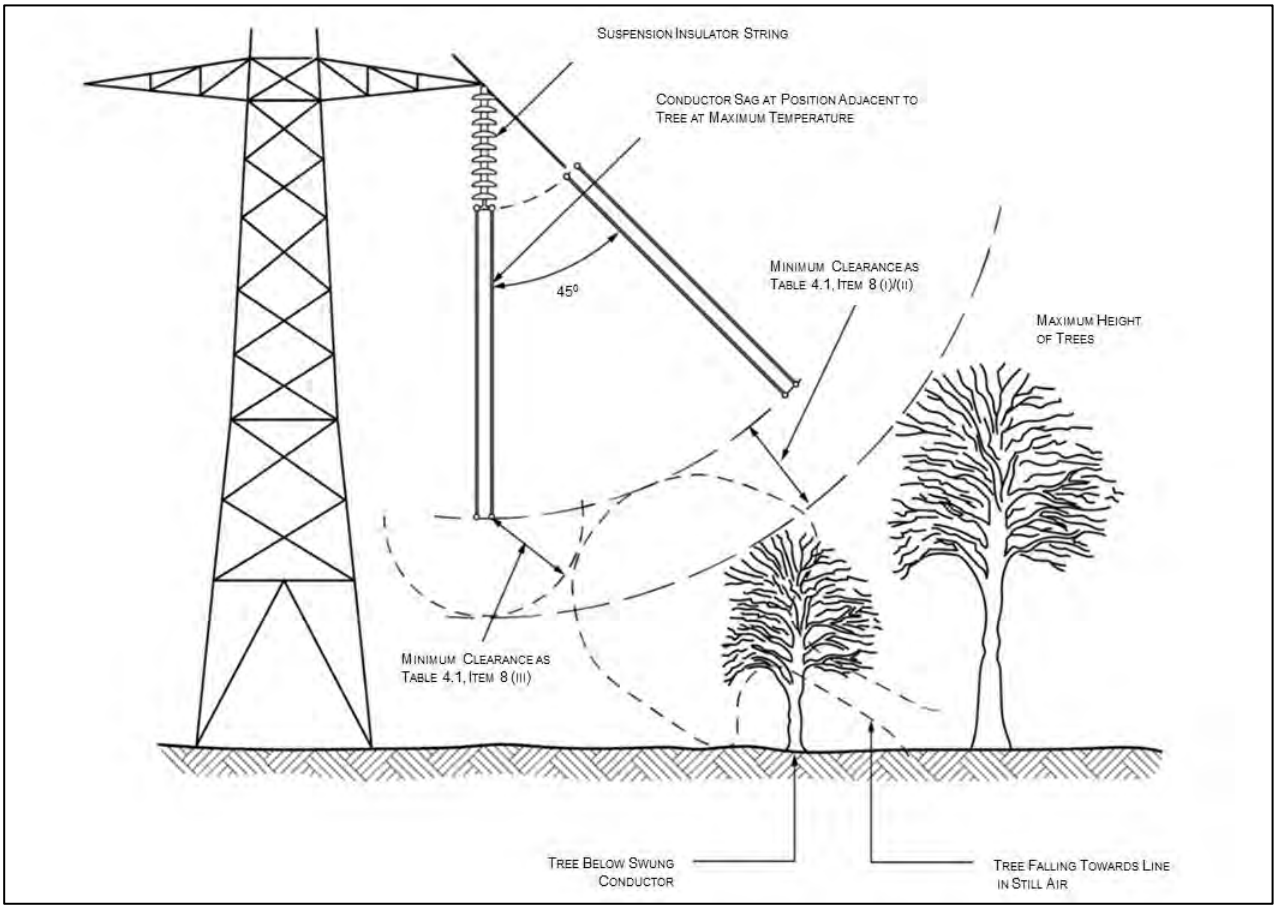


Table 4.1. 400kV Clearances taken from EN A Technical Specification 43-8. Issue 4 2015

	Description of clearance	Minimum clearance (m) For Nominal 400 kV Operation
1	Line conductor at any point not over road.	7.3
2	Line conductor to road surface other than as specified in 3, 4, and 5.	8.1
3	Line conductor to road surface of designated '6.1 m high load vehicle' routes.	9.2
4	Line conductor to motorway or other road surface where 'Skycradle' can be used.	10.5
5	Line conductor to motorway road surface where scaffolding is to be used on: a) Normal 3 lane motorways. b) Elevated 2 lane motorways	 16.3 13.3
6	Line conductor to any object which is ordinarily accessible (including permanently mounted ladders and access platforms) or to any surface of a building.	5.3
7	Line conductor to any object to which access is not required AND on which a person cannot stand or lean a ladder.	3.1
8	Line conductors to that part of a tree under / adjacent to line and: (i) Unable to support ladder/climber. (ii) Capable of supporting ladder/climber. (iii) Trees falling towards line with conductors hanging vertically only.	 3.1 5.3 3.1
9	Line conductors to trees in Orchards and Hop Gardens.	5.3
10	Line conductors to irrigators, slurry guns and high pressure hoses	30.0
11	Line conductor to street lighting standards with: (i) Standard in normal upright position. (ii) Standard falling towards line with conductor hanging vertically only. (iii) Standard falling towards line.	 4.0 4.0 1.9

4.3 Aspects of the Construction Design Presented

Works Proposed to the Existing Overhead Line.

4.3.1 **Crane and Construction Accesses**. National Grid's general preference is to construct new pylons using mobile cranes. Due to the reach and carrying capacity required, these can be large HGVs, requiring a good standard of temporary access track to be formed between the public highway and the pylon construction sites. These are generally formed from crushed stone laid on a geotextile following soils strip and storage.

4.3.2 Other engineering works may also be required along the access route such as the culverting of watercourses that are crossed and the construction of new 'bell-mouth' access points onto the public highway. Construction accesses are generally removed and the land reinstated following construction of the line.

4.3.3 Two general approaches can be taken to the identification of construction access routes. Long linear accesses can be identified where one or two access points lead to many pylon construction sites, running along a long section of the route. Opportunities to construct a linear access road may be limited by intervening obstacles such as major rivers or sensitive and protected sites. Alternatively each pylon site can be accessed by a dedicated access 'spur' from the nearest public highway.

4.3.4 Often construction effects can be reduced by limiting the number of access points established and reducing the length of new access tracks created. The length of the accesses needing to be constructed will be dependent upon the proximity of the new line to the nearest road and the layout of the wider highway network.

4.3.5 Discussion concerning the approach taken to the design of temporary construction accesses in each section of the route is provided in Chapters 5-8 of this Report. Proposed access routes for third party works are shown at Appendix F whilst those proposed for the main transmission construction activities are shown at Appendix G.

4.3.6 **Pulling Positions**. In order to keep construction disturbance to a minimum and ensure that all conductors are installed in a clean condition, conductors are not laid out on the ground before being winched up onto the pylon cross arms. Instead a thinner wire is laid out and lifted into place in pulleys attached to the pylon arms. This wire is attached to the conductors delivered to site on large drums. The wire is then pulled by a winch located at the far end of a length of the line, from the drum located at the other end, through the pulleys on each pylon until it reaches the final pylon in that line length . The conductor is then attached

to the strings of insulators hanging from each cross arm on the start and end pylons. The winches pull the conductor through a gentle slope from the cross arms, and therefore need to be sited some distance back from the tension pylon itself. Once the conductors are installed and connected so as to achieve the correct sag between each pylon, the position of the drums and winches are re-set to continue installing conductors on the next length of the route. This continues until conductors have been installed throughout the route. At this point the individual conductor lengths are connected together by clamping a short length of conductor between each, hanging below the cross arms of each of the tension pylons.

4.3.7 The locations of the proposed conductor pulling positions are shown on the Figures included at Appendix G.

4.3.8 **Scaffold Protection**. Further safeguarding measures may be needed when installing conductors or earthwires above items of existing infrastructure (such as wooden pole electricity lines, or telephone wires), public highways or other rights of way and buildings. This normally takes the form of temporary nets located above the feature and supported by scaffold structures on either side. Scaffold protection measures have to be designed to take account of the local features and topography and this could include the need to set the scaffolds back from the edge of the public highway, pylons and working areas.

4.3.9 Scaffold protection measures have to be designed to take account of the local features and topography and this could include the need to set the scaffolds back from the edge of the public highway or other feature.

4.3.10 Minor access routes, farm tracks and public rights of way will generally not require scaffold protection, and would be managed on a site specific local basis. For example, crossing points might be manned and controlled for a short duration whilst conductors are being pulled across the path or track.

4.3.11 Alternative methods are available where the use of scaffold towers is not technically viable or where their use would give rise to particularly significant effects. The alternative method generally involves running the conductors being installed through a series of supporting frames that are in turn suspended from a temporary support wire installed between pylons.

4.3.12 Proposed footprints within which for scaffold constructions could be sited are shown on the construction plans at Appendix G.

4.3.13 **Utility Crossings**. Rather than installing netting or using alternative support systems above existing overhead infrastructure National Grid's general

preference is to seek the removal of such equipment. This simplifies both the initial construction activities for the new overhead line, as well as all subsequent maintenance operations. Removal of the third party above ground equipment normally involves burying the service in a trench. However it may simply require the reconfiguration of the local utility network to allow the section of equipment crossed by the proposed new line to be entirely removed.

4.3.14 The modifications required to existing third party equipment along the proposed route may be carried out prior to commencement of construction for the new 400kV Wylfa-Pentir connection. Proposed access routes and working areas for the modifications of third party equipment have been included within the proposed project boundary following initial discussions with a number of utility companies. These are shown on the figures included at Appendix F of this Report. However these proposals will need reviewing in light of feedback following Stage 3 Consultation.

4.3.15 As the equipment to be removed is owned by other utilities the final design and routeing of the replacement equipment needs to be agreed with these third party companies. Utilities, like SP Manweb, may also choose to manage their own land access arrangements.

4.4 Aspects of the Consenting and Land Rights Process Presented

4.4.1 **Development Consent Order**s. The construction of a new 400klv overhead electricity line generally requires development consent in accordance with the provisions of the Planning Act 2008. The development consent is issued in the form of a Development Consent Order, which is drafted by the applicant, considered by Government Planning Inspectors and finally confirmed or rejected by the Secretary of State. In addition to granting planning permission for the development the Planning Act allows National Grid and other infrastructure developers to seek compulsory rights over land to ensure that the construction of an approved nationally significant infrastructure project can proceed. More information can be found on the Planning Inspectorate's website at https://infrastructure.planninginspectorate.gov.uk/

4.4.2 **Limits of Deviation**. To provide some degree of flexibility when it comes to the construction of any new overhead electricity line, National Grid normally seeks a 'Limit of Deviation'. This represents a defined zone within which the new equipment must be sited. The limits are needed to allow the design to change to avoid previously unrecorded features such as important archaeological remains or protected species that may have moved into the area after the application has been submitted. This is important as there may be some years

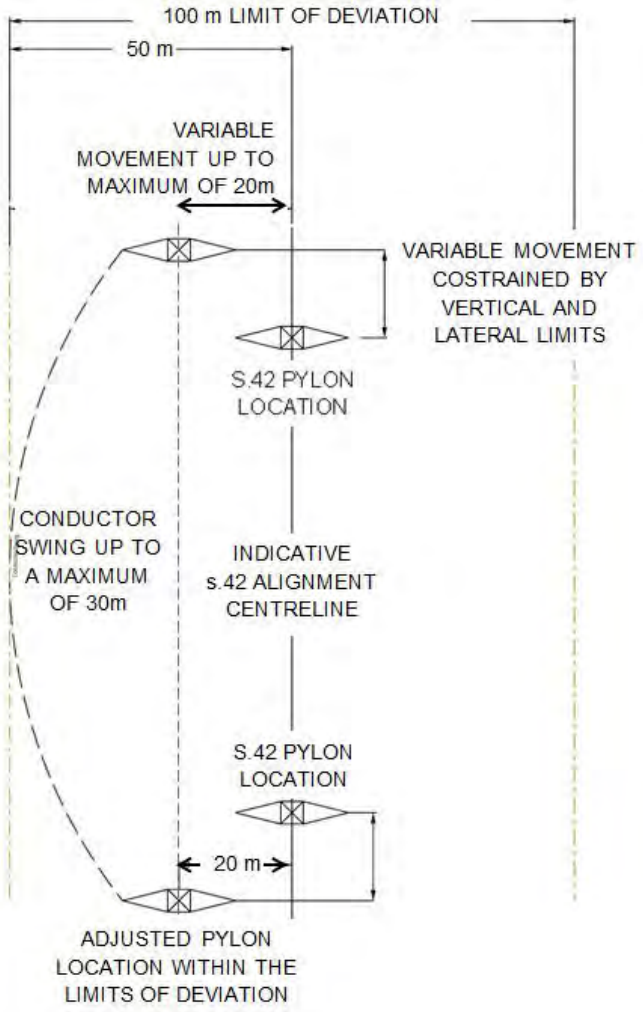
between the date that the application is submitted and the time that construction activities begin. However unless there is good reason to do otherwise National Grid would seek to construct the development as per the detailed design submitted.

4.4.3 Figure 4.2 below illustrates the construction flexibility that a 50 meter Limit of Deviation from a proposed centreline position could provide for pylons supporting a long span. As described previously, conductors are held away from the body and centreline of the pylon, and in addition may be blown sideways by the wind. For particularly long span lengths these two factors mean that the outer edge of the widest conductor could, under some conditions, be located up to 30 meters from the route centreline in the centre of the spans. With an application for a 50 metre Limit of Deviation from a route centreline this could mean that the location of some pylons may not be able to move by more than 20 metres from their originally proposed location. This distance could be slightly greater where spans are shorter or where attached to a tension pylon. The extent to which any particular pylon could be relocated would be determined by the nature of the span that its supports and the maximum outer limit of this conductor.

4.4.4 National Grid considers that a 50 meter lateral Limit of Deviation provides the right balance between design certainty and construction flexibility for much of the route on the North Wales Project. However where the proposed new line passes close to more sensitive sites and features such as properties or areas of woodland a more restricted Limit of Deviation might be appropriate, to provide greater certainty about the final position of any transmission equipment.

4.4.5 The Limits of Deviation sought for Sections A-D of the route are shown on the figures included at Appendix E of this Report. An explanation of the reason for restricting the Limits of Deviation in certain locations is provided in Chapters 5-8.

Figure 4.2. Construction Flexibility and Limits of Deviation.



4.4.6 **Proposed Project Boundary**. The proposed project boundary encloses all areas of land needed to carry out the construction and operation of the proposed new overhead line. This is shown on the plans at Appendices E, F and G. It includes areas required for both permanent and temporary activities, for both National Grid and third party works, as well as all access routes from the public highway to the construction areas. The authorised project has to be carried out within this boundary. The boundary allows for the construction works to be carried out to either side limit of the Limits of Deviation Sought, and this often creates a stepped outer profile to the boundary.

4.4.7 **Permanent and Temporary Land Rights**. Rights will be needed to construct, operate, maintain and dismantle the proposed overhead line within the project boundary will be needed. Property rights may be needed for temporary uses (e.g. the main construction compound or access routes) or permanent uses (e.g. in the case of access routes needed for regular inspection or maintenance

activities, or for the siting of the new pylons and route of the overhead conductors above the land). In some limited cases the land may need to be acquired outright (e.g. for the site of new permanent compounds or extensions to substations). National Grid's policy is to seek voluntary agreements with affected landowners and others with an interest in the affected land.

4.4.8 **Third Party Works**. National Grid is currently in discussion with other utility companies to determine how the third party works might be secured. It may be that other utilities wish to secure their own agreements to undertake this work or propose work in a different location or of a different form e.g. reconfiguring a network to do away with equipment rather than simply burying it. This will be further reviewed as part of the Consultation feedback process. .

4.5 Design Detail Presented in this Report.

4.5.1 This Report seeks to provide an overview of the proposed overhead line design as it is presented for feedback as part of National Grid's Stage 3 consultation. This is expected to be the final consultation on the route between Wylfa and Pentir in its entirety before a final design is achieved for which development consent would be sought.

4.5.2 The design details provided in this Report are presented according to the three construction stages:

- advanced facilitation works to be undertaken by third parties (such as the removal of existing overhead infrastructure along the route);
- the main construction works to be undertaken by National Grid and;
- the final design arrangement, including any proposed latitude (or 'Limit of Deviation') that might be sought to give some design flexibility when National Grid come to undertake the work

4.5.3 Drawings showing these design details are included in Appendices F, G and E of this Report respectively. Descriptions of these aspects of the design within the four route sections considered by this Report are included at Chapters 4, 5, 6 and 7.

4.5.4 In addition to these aspects of the design that apply throughout the route, this Report also provides an explanation of any significant changes to the proposed design that have been made since the preferred Route Option was selected. This particularly relates to the proposed design of the line in Section B to the south of Rhosgoch and Rhosybol as described in Chapter 5.

4.5.5 In several cases where the significance of the effects that could arise are particularly dependent upon the precise design proposed, engineering details such as vertical and horizontal clearance distances from the proposed line and conductors have been modelled. A number of these design drawings are presented at Appendix H.

4.5.6 **Main Construction Compound**. Large temporary construction compounds will be needed during the main construction period of the new overhead line. These would accommodate the main construction offices, parking and materials yard. One such Construction Compound is proposed on Anglesey in Section D of the route and is described in more detail at Chapter 9 of this Report.

4.5.7 **Route Sections**. As previously described, this Report addresses the design detail for the proposed overhead line between its connection to the Wylfa Substation and Ceint, to the north west of Llanfair PG. This substantial part of the Route on Anglesey has been nominally divided into four sections, referred to as Sections A, B, C and D. This division serves to assist in the reporting of, and consultation on, the design proposals. The location where the sections change from one to another are indicated on the Figures included at Appendices E, F and G of this Report.

4.5.8 The remainder of the Connection to Pentir has been divided into two sections; Sections E and D. Section E covers the remainder of the overhead line route on Anglesey as it approaches the proposed sealing end compound where the line would connect onto underground cables. Section F then covers the remainder of the route, including the proposed tunnel beneath Menai Strait, and the final section of overhead line from the end of the tunnel to its connection into Pentir Substation. Sections E and F of the connection are described in the 'Menai Strait Connection Report (September 2016)', which has been published at the same time this Report.

4.5.9 Previously the route corridor between Wylfa and Pentir had been divided into five sections (Sections 1 -5). The boundaries of these sections were partly determined by locations where the connection of route options within one section to those in the next section would give rise to the fewest possible route combinations. Having selected a preferred route option, the rationale for the location of the boundaries between sections was reviewed.

4.5.10 On reviewing the boundaries between route sections, minor changes have been made to assist in land referencing and engineering design. Changes made as a result of this review are as follows:

- Section A to Section B (formerly Section 1 to Section 2). This boundary has moved eastwards by approximately 1.5 kilometres. This places the new Section A to Section B boundary to the eastern edge of the proposed Mynydd Mechell Special Landscape Area, but still some 350 metres north west of the village of Rhosgoch.
- Section B to Section C (formerly Section 2 to Section 3). This boundary has moved south eastwards by approximately 0.6 kilometres.
- Section C to Section D (formerly Section 3 to Section 4). This boundary has moved south eastwards by approximately 0.4 kilometres.
- Section D to Menai Crossing Area (formerly Section 4 to Section 5). The southern extent of Section D now ends at Ceint. Previously the boundary between Sections 4 and 5 of the corridor overlapped from Ceint for approximately 1.5 kilometres to the south.

4.5.11 **Route and Pylon Naming Convention**. In order to allow each proposed or existing pylon location to be identified a unique reference has been applied. All of National Grid's overhead transmission lines are given a unique route identifier, and pylons are (generally) numbered sequentially along the route.

4.5.12 In the case of the North Wales Connection, two routes would be established, and these have been allocated the route identifiers of '4ZA' and '4AP', with the 4AP route being the western route and the 4ZA the eastern. Both routes would consist of both new and existing pylons. New pylons are referred to in this Report and its Appendices by reference to their proposed new route and pylon identifiers.

4.5.13 A full schedule of the existing and proposed pylons on both new routes is provided at Appendix L of this Report. This schedule provides the unique pylon reference, together with the design type and height of the pylon proposed.

4.5.14 The existing overhead line between Wylfa and Pentir currently also uses the 4ZA identifier. Accordingly existing pylons may be renamed as 4AP# or have a new 4ZA number assigned depending upon which new route they would become part of. Where referencing existing pylons this Report seeks to refer to them using the new rather than existing pylon identifiers.

4.6 Further Design Detail Presented at Section 42

4.6.1 As described at Section 1.3 of this Report greater design detail can be found in the large suite of design documents that form part of National Grid's Stage 3 Consultation documentation. The nature and location of this further design detail is set out in Appendix M of this Report.

5 SECTION A: WYLFA TO RHOSGOCH

5.1 Introduction

5.1.1 Section A of the route starts at the Wylfa Substation and extends in a south-easterly direction towards Rhosgoch, passing to the north and east of the villages of Tregele and Llanfechell.

5.1.2 Two potential Route Options were identified in Section A (then Section 1) of the route, Route Option 1A was taken forward to detailed design and subsequently to formal Stage 3 consultation because;

> *it is considered that it provides the best opportunity to reduce the effects on the surrounding area. It lies to the east of Llanfechell, with its large number of residential properties, socio-economic receptors, listed buildings and conservation area whilst still keeping close to the existing overhead line. Option 1A also avoids areas of ancient woodland[18].*

5.1.3 Following the outcome of options appraisal, it was considered that the Route would present significant opportunities to synchronise its design with that of the existing overhead line. However it was recognised that

> *local features to the south of Cemaes and west of Llanfechell may pose constraints to the siting of a small number of new pylons immediately adjacent to those of the existing line.*

5.1.4 Route Option 1A is shown at Figure A-1 of Appendix A.

5.2 Wylfa Substation Design

5.2.1 The proposed new overhead line route to Pentir would carry two new electrical circuits. In order to connect one of these two new circuits to Wylfa, an extension will be required to the existing Substation. It is proposed that the other three circuits between Wylfa and Pentir (the two carried by the existing overhead line and the second new circuit) would connect onto an existing series of electrical components or 'substation bays'. Two of these bays already connect the two existing circuits to the substation. The third existing bay is currently used to connect an electrical transformer at the site, but this is expected to be vacant by the time that the new connection is required.

[18] North Wales Connection. Preferred Route Option Selection Report. Sections 1 – 4. (September 2015).

5.2.2 The substation extension would comprise two main elements:

1. **A lean-to building extension** on the south west elevation of the existing substation building. The proposed extension would have a footprint of 10 metres by 18.5 metres. The building would be around 12 metres in height. This compares with the existing Wylfa Substation building height of around 24 metres. The extension would accommodate new electrical equipment that together would comprise a new bay connected both to the existing substation and the second new circuit to Pentir. The final architectural treatment of the building extension has yet to be finalised, but is currently proposed to match the green sheet cladding of the existing building.

2. **A new secure compound** that would allow the second new overhead circuit to Pentir to connect to cables which then connect on to the new substation bay contained within the building extension.

5.2.3 In addition a small prefabricated building measuring 10 metres x 3.5 metres would also be located adjacent to the south west side of the existing substation building. This 'Portable Relay Room' would contain monitoring and control systems associated with the new substation bay

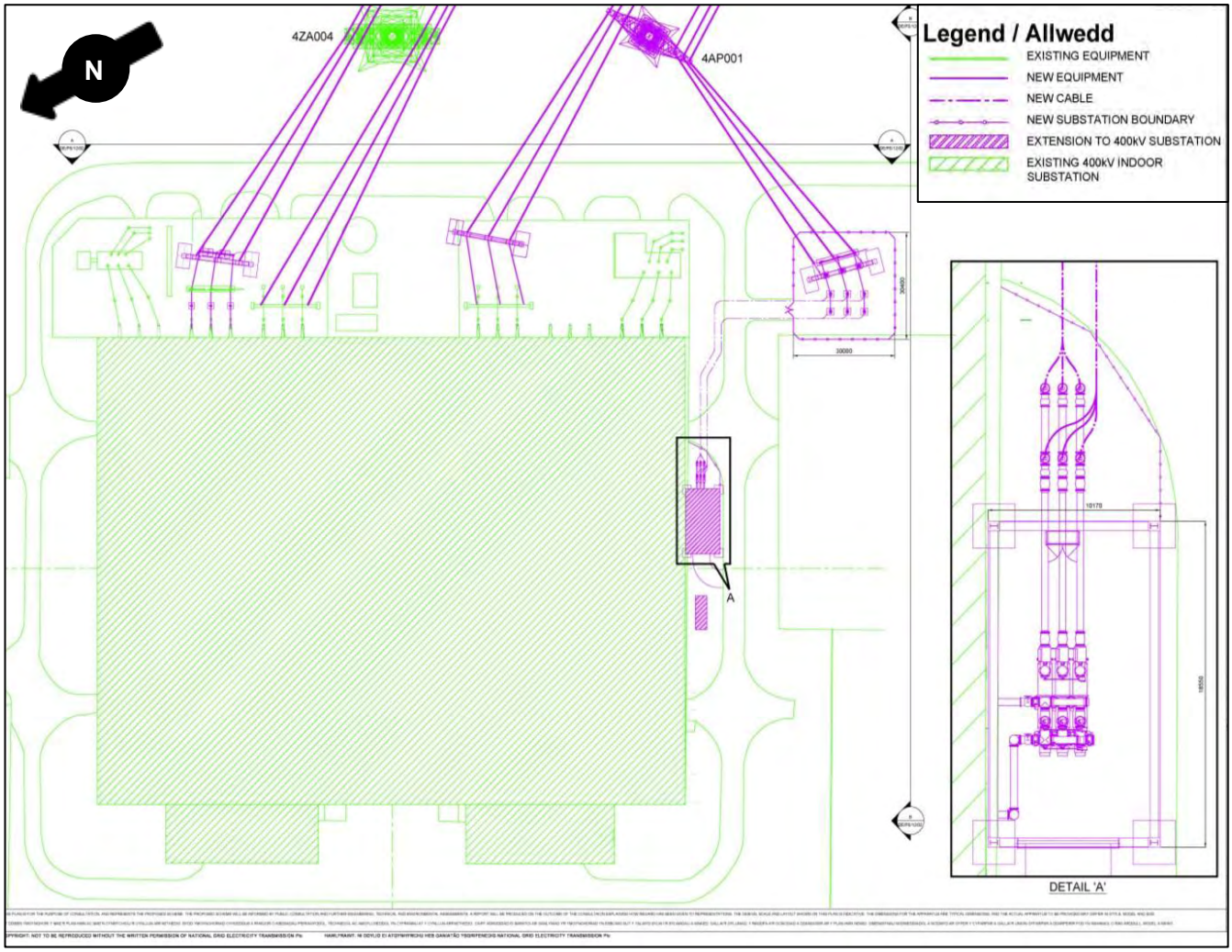
5.2.4 The layout of these elements is shown in Figure 5.1 below. More design details can be found in Volume 3 of National Grid's Consultation Reference Pack;, more specifically 'Volume 3.1: Works Plans' and 'Volume 3.10: Design Plans'

5.2.5 Amenity considerations have influenced several of the design choices at Wylfa. Two aspects of the design choices made are of particular note:

- It is proposed that the new electrical equipment required would largely comprise compact, gas insulted equipment rather than the more traditional air insulated equipment that makes up the existing substation at Wylfa. In this way the height and footprint of the proposed building extension needed to accommodate the equipment is significantly smaller than would otherwise be the case.
- The proposed substation extension has been located on the south west rather than the north east elevation of the existing substation building. This design decision was taken because there is more open land to this side of the site and because it was considered that the new line entry would be better routed to the south of the existing terminal pylon (which would remain) rather than to the north. In this way this short section of new overhead line would better follow the topography of the existing screening mounds to the east of the site helping reduce the extent of tree clearance required. The south west elevation of the existing building will also be better screened from

publicly accessible viewpoints to the north of the site, especially when considered in the context of the proposed Wylfa Newydd development.

Figure 4.1. Proposed Extension to Wylfa Substation.



5.3 Section-Specific Design Considerations

Consultation Feedback

5.3.1 The Historic Environment Branch of Cadw and Gwynedd Archaeological Planning Service both expressed concern that the proposed overhead line would exacerbate the adverse visual impact of the existing line especially upon schedule monuments to the north east and North West of Llanfechell, and the Pen-y-Morwyd Round Barrow and Llifad earthwork on high ground approximately 1.5 kilometres to the east. These sites are shown in Appendix B.

5.3.2 However Cadw commented that a parallel alignment would be preferable to reduce the spread of potential impacts to areas currently unaffected by the existing line. Other respondents also stated their preference for closely following the existing line.

5.3.3 The most common environmental concern raised by respondents was the visual effect of the proposed line on the local landscape and views. Some respondents were also concerned about the cumulative effect a second line may have on the amenity of the area or their properties.

5.3.4 Respondents noted concern regarding proximity to Llanfechell and requested that the proposed overhead line avoid properties, citing concerns about the impact the proposed line may have on local residents in terms of quality of life, health and property prices.

5.3.5 More recent discussions with Welsh Water have highlighted the routeing of both an existing and a proposed new major water supply pipe running from Llyn Alaw Reservoir to Wylfa, and the need to avoid conflict between National Grid's proposal and the supply pipes as they run north of Tregele.

5.3.6 Welsh Water have also indicated that National Grid's proposed design should not conflict with operational activities at Llanfechell Water Treatment Works, located to the east of the village.

5.3.7 For a full description of all feedback received during Stage 2 consultation relating to this section of the route corridor and all Route Options presented within it please refer to National Grid's 'Stage 2 Consultation Feedback Report' (May 2016)[19].

Environmental and Socio-Economic Considerations

5.3.8 Environmental and Socio-Economic Sites and features within this section of the route are shown on the figures included at Appendix B of this Report. Those of note in this section include:

- Views from the settlements of Tregele, and Llanfechell, and from isolated properties and groups of properties throughout the Route Section.
- The proximity of a small number of properties either adjacent to or within the original Route Option

[19] North Wales Connection Stage 2 Consultation Feedback Report (May 2016)

- Views from and potential impacts on the settings of scheduled monuments to the east north east and north west of Llanfechell
- There are also several listed buildings in the area, including Cemaes Bay windmill to the north, the Grade II* Church of St Mechell in Llanfechell Church and other buildings associated with the Conservation Area in the village, and the listed house at Brynn Ddu further to the east.
- Potential impacts to small areas of woodland close to the preferred Route option associated with Bryn Ddu to the east of Llanfecehell, some of which are subject to Tree Preservation Orders (TPOs)
- The eastern end of the Route Option passes close to the boundary of the Mynedd Mechell proposed Special Landscape Area, albeit it on the far side of the existing line. This would give rise to additional effects from transmission infrastructure upon views and landscape character in the area.

Technical Considerations

5.3.9 From a technical perspective there are twelve overhead utility services that the Route Option crosses in Section A.

5.3.10 From a highways perspective, at the western end, as the route heads east from Wylfa, the route crosses the A 5025. The route then crosses Ffordd y Felin between Cemaes and Tregele and further to the east one further minor road that links Bodewryd to Llanfechell.

5.3.11 Potential access for HGVs is good at the western end of the route, with direct access from the A5025. However east of Llanfechell the road network close to the proposed overhead line route becomes increasingly rural, with a small number of country lanes, where passing traffic can be restrictive

5.3.12 In addition discussions with Welsh Water have raised concerns about potential conflicts between the new route and both an existing and proposed new major water supply pipes running between Llyn Alaw and Wylfa. The preferred RO also passes immediately to the south of Llanfechell Water Treatment Works. National Grid has been asked to ensure that the final proposed overhead line design would not conflict with Welsh Water's operations at this site. Has to connect to right point (bays) in Wylfa Substation,

5.3.13 The proposed route passes through the site of existing meteorological mast associated with the Wylfa A Power Station. This would need to be removed or relocated in advance of the overhead line construction. However it is understood that this is likely to have been de-commissioned prior to the start of construction.

5.3.14 The existing 4ZA overhead line runs in close proximity to the south and west of the proposed new line, limiting the ability to locate new pylons in this direction.

5.4 Route Design Response

5.4.1 The proposed temporary and permanent design detail for Section A of the Route is shown at Figures 1, 2 and 3 of Appendices E, F and G of this Report. The remainder of this Chapter needs to be considered by reference to those Figures.

Description of Works

5.4.2 In this Section of the route, two new sections of overhead line are proposed. The first would comprise a single new span of line running from a new terminal pylon located to the south east of the existing terminal pylon at Wylfa. This new pylon 4AP4001 would connect to existing pylon 4AP002, and would facilitate an amended connection of the existing line to the Substation.

5.4.3 The longer new section of overhead line proposed in this Section would start at the existing pylon 4ZA004 and then run to south east, parallel to and on the north and east side of the existing line to the final new pylon in Section A east of Rhosgoch.

5.4.4 Works are also proposed to replace the earth wire on the existing line within this Route Section, between pylons 4AP001 and 4AP021.

5.4.5 A summary of the proposed works in this Section of the Route is included at Table 5.1 below.

Table 5.1. Summary of the Proposed Works in Section A.

	Works to Existing Line	Works to New line
Number of new pylons	N/A	22
Number of retained pylons	21	N/A
Number of dismantled pylons	None	N/A
Total Length of new line build	N/A	6.8km
Length of existing line retained	6.6km	N/A
Length of existing line with works	6.6 km	N/A
Length of line to be dismantled	279m	N/A
Height of tallest retained / proposed new pylon	59.2m [4AP008 & 4AP016]	52.5m[4ZA016]

Alignment

5.4.6 At Wylfa National Grid is proposing to build a single span of new overhead line to the west of the existing line. This would have the following benefits:

- reduce the effects upon the woodland located on the screening mounds to the south east of the site
- avoid the need to carry out any significant re-profiling of the mound, which an alternative alignment to the north east would have necessitated
- It ties in with the proposed design for the substation extension at Wylfa, which is considered to be better located to the south west of the existing building for the reasons already set out at Section 5.2 of this Chapter.

5.4.7 The proposed and existing conductor clearance to the trees on the screening mounds is shown at Figure H-2 in Appendix H to this Report, and was produced to aid the assessment of likely effects upon this area. From this it can be seen that some tree clearance would be needed, especially in the immediate vicinity of the substation, but that a new route to the north of the existing final span would have located a new pylon on higher ground or required more extensive re-profiling.

5.4.8 As the route heads south east from Wylfa the two lines diverge by a few meters, but generally run at a distance of between 80 – 90 meters apart. With the change in route direction as the lines cross the A5025, the two lines come within the minimum allowable 65 metres of each other, allowing the new route to pass to the south of the property at Llety, the curtilage of which may otherwise have been oversailed. The routes then diverge slightly to a small change in route direction to the east of Ffordd y Felin. This allows the new route to pass to the north of the property at Cae Adda Fach, and to the south west of Ty Newydd further to the north

5.4.9 As the proposed new overhead line route passes Llanfechell Water Treatment Works and Dymchwa the proposed distance between the new and existing overhead line has been substantially reduced to move the alignment south westwards away from the Works and, further along the route, away from the residence.

5.4.10 In order to demonstrate the clearances required to the overhead line in the vicinity of the Water Treatment Works, National Grid has modelled the conductor sag and swing in this section of the route. This is shown at Figure H-4 in Appendix H of this Report. This has helped inform ongoing discussions with Welsh Water about any potential restriction on their operations at the site, and

the assessment of possible trees loss within the woodland subject to a TPO to the east of the Works.

Limits of Deviation (LOD)

5.4.11 The Limit of Deviation (LOD) being sought for this Section of the route is generally 50 metres either side of the proposed alignment as explained at Section 4.4 of this Report. However as the route passes the properties previously referred to, the proposed LOD is significantly restricted in order to prevent the route from oversailing the curtilages of the properties

5.4.12 Further to the east there are similar restrictions to the proposed LOD as the route passes the properties at Gors, north of Llanfechell and at Dymchwa, to the east of the village, for the same reasons.

Pylon Locations

5.4.13 The proposed design would see the new overhead line design run close parallel throughout Section A of the route. Within this Route Section the proposed design achieves 19 pairs of aligned pylons (based on a maximum 50 meter difference in longitudinal alignment), where it is considered that the design of the two lines could be effectively synchronised.

5.4.14 As the summary table at Appendix L demonstrates, this is particularly the case at the eastern end of the route, as the proposed line passes close to the boundary of the proposed Mynydd Mechell SLA, helping to lessen any adverse effects upon views and landscape character in the area.

5.4.15 South of Llety between Tregele and Cemaes, it has not been possible to align proposed pylon 4ZA008 with existing pylon 4AP005 due to the route of the main water supply pipe previously mentioned. Discussions with Welsh Water are ongoing about this existing supply pipe, but National Grid expects that the proposed new water supply pipe would not conflict with National Grid's proposed new overhead line design.

5.4.16 South of Cemaes the design objective not to oversail the curtilages of properties has led to the introduction of an additional pylon to more precisely align the route between properties at Cae Adda Fach and Ty Newydd on Ffordd y Felin. Accordingly neither pylon 4ZA 010 or 4ZA011 are aligned with existing pylons. The proposed location of 4ZA010 has been set one field further back from the lane in order to provide sufficient space to establish a conductor pulling position. This has also increased the distance of the pylon form the properties.

5.4.17 The nearest proposed pylon (4ZA016) to Dymchwa would be located immediately to the south west of the property, limiting the potential sideways movement of the conductors, and the required minimum LOD. The pylon has not been aligned precisely with the existing pylon to the south (4AP012) but has been sited slightly further to the north west, with the intention that it should be kept out of the immediate southerly outlook from the property. Further movement to the north west is restricted by the access road leading to the property.

5.4.18 In summary other design considerations have led to the following new pylon positions not being paired in Section A of the route:

- 4ZA008: This pylon has been located further to the south than the 'paired' pylon location would be in order to avoid the existing Welsh Water supply pipe in this area.
- 4ZA010 and 4ZA011: As discussed above the design objective not to oversail the curtilages of properties has led to the introduction of an additional pylon to the south of Cemaes to more precisely align the route between properties at Cae Adda Fach and Ty Newydd on Ffordd y Felin.

5.5 Construction Design Response

Pulling Positions

5.5.1 Pulling positions for conductor and earthwire stringing work have been allowed for at tension pylon locations. The location of pulling positions enables some flexibility during the construction phase. These are shown at FiguresG-1, G-2 and G-3.

5.5.2 Pulling positions have not been proposed at tension pylons 4ZA005 and 4ZA007 due to the close proximity of roads.

Accesses

5.5.3 The existing minor roads to the south of the proposed development from Tregele to Rhosgoch (via Llanfechell) are typically narrow with limited visibility and poor verges. These roads are deemed unsuitable for heavy construction traffic and it is proposed to run long linear lengths of temporary access road parallel to the development in this location. The primary access point for this route would be the A5025 at Tregele, with a proposed crossing of the public highway on Ffordd y Felin. This would assist in removing overhead line construction traffic from the local roads.

Crossings and Scaffolds

5.5.4 Initial Preference (to underground) to existing SPEN 11kV and BT lines on NPS land, to south of Cemaes, and west of Llanfechell for construction purposes.

5.5.5 Scaffolds with nets would be required at three locations on the new build 4ZA line and for the works to the retained 4AP line to provide protection at road crossings and at the Llanfechell Water Treatment Works. The footprints for these scaffolds are shown on the figures at Appendix G.

5.5.6 No further scaffolds are currently proposed in Section A of the route.

5.5.7 There are ten discrete areas within Section A where National Grid proposes to seek modifications to above ground equipment owned by third parties as part of the consent process. These are shown on the figures F-1, F-2 and F-3 included at Appendix F

5.5.8 The modification to existing 3rd Party assets could be carried out as enabling works prior to the actual commencement of the new Wylfa-Pentir connection. Utilities, like SPEN, may have their own landowner access arrangements in place.

5.5.9 At this stage estimated allowances for access locations and lengths to get to 3rd Party assets have been included and will need refining with all interested parties. These are also shown in Appendix F and have been included within the proposed project boundary.

6 SECTION B: RHOSGOCH TO LLANDYFRYDOG

6.1 Introduction

6.1.1 Section B of the route runs in a north-west to south-east direction along the route of the existing overhead line from a location south of Bodewryd, where Section A changes into Section B, then heading south-east to pass immediately south of Rhosgoch and Rhosybol before reaching Llandyfrydog where Section B ends and Section C begins.

6.1.2 Four Route Options had previously been identified in Section B (then Section 2) of the corridor, with a number of design options for transposing (swapping over) to the far side of the existing line. Route Options 2A and 2B required a transposition to swap from the eastern to the western side of the existing 400kV overhead line. Route Options 2C and 2D remained on the eastern side of the existing 400kV overhead line for the entirety of the section and did not require a transposition.

6.1.3 Route Option 2B was taken forward to detailed design and subsequently to formal Stage 3 consultation because;

> *East of the ridge at Rhosgoch, the westernmost section of Route Option 2B provides similar opportunities to synchronise the design, running close parallel on the south west side of the existing line. This section of Route Option 2B would not encircle properties (and therefore not encroach into unaffected views of Llyn Alaw) nor result in overhead line development moving significantly closer to Llyn Alaw SSSI.*
>
> *The remainder of Route Option 2B runs close parallel to the existing line, with no significant constraints likely to prevent the adoption of a synchronised design.*
>
> *This easternmost part of Route Option 2B was considered to have the lowest adverse environmental and socio-economic effects of all four route options in the area around, and to the north of, Llandyfrydog, at the eastern end of this corridor section*

6.1.4 In the centre of the route the short section of close parallel route in Route Options 2C and 2D located to the south west of Rhosybol was considered to provide an opportunity to maintain a close parallel alignment, without surrounding properties. However this would require Route Option 2B to transpose to the north of the existing line for a short length before transposing back onto the parallel section of Route Option 2B further to the south east.

6.1.5 The benefits of this modified design from a routeing, environmental and socio-economic perspective were considered to outweigh the increased technical complexity and cost that would result. It was acknowledged that such an arrangement would need further detailed design before confirming whether to take it forward for public consultation but that such work might also achieve synchronised overhead line designs in this area. This further design work is summarised in this Chapter.

6.1.6 Route Option 2B is shown at Figure A-1 of Appendix A.

6.2 Section-Specific Design Considerations

Consultation Feedback

6.2.1 Some respondents raised concern regarding the potential visual impact and made specific reference to views to Snowdonia and views from Parys Mountain. There was a general preference for the route to closely follow the existing line.

6.2.2 Respondents commented on potential impacts on properties and communities, noting concern regarding the proximity of a potential overhead line to their own specific property and potential impact on property prices.

6.2.3 Concerns were raised about potential effects on the business at Bryn Goleu Caravan Park, to the east of Bodneithior, as shown at Figure B-9 in Appendix B. Concerns were also raised about the effects upon the residential properties immediately to the north of the Park.

6.2.4 For a full description of all feedback received during Stage 2 consultation relating to this section of the route corridor and all Route Options presented within it please refer to National Grid's 'Stage 2 Consultation Feedback Report' (May 2016)[20].

Environmental and Socio-Economic Considerations

6.2.5 Environmental and Socio-Economic Sites and features within this section of the route are shown on the figures included at Appendix B of this Report. Those of note in this section include:

- The settlements of Rhosgoch and Rhosybol are located on areas of higher ground and from the edge of the settlements enjoying extensive views.

[20] North Wales Connection Stage 2 Consultation Feedback Report (May 2016)

- There are many scattered individual and small groups of properties to the south of the two villages. In this respect the properties on the road through Rhosgoch forming intermittent linear development are of note, with open views. There are also properties located along the minor road between the two villages, further to the south east, many of whom also enjoy open views toward Llyn Alaw.
- The SSSI of Llyn Alaw is located approximately 1 kilometre to the south of the proposed route, and supports important populations of overwintering wildfowl.
- Further to the south west is the small community of Llandyfrydog with its Grade II* listed Church of St Tyfrydog and associated group of Grade II listed buildings.
- There are also two scheduled monuments to the south west of the settlement .
- To the north east of the settlement lies Bryn Goleu static Caravan Park, which the existing overhead line passes over on the southern boundary. To the north of this are a small group of further residential properties.
- There are also isolated farmsteads scattered throughout this section of the route.

Technical Considerations

6.2.6 Section B provided a number of technical challenges. The following design considerations were assessed prior to, and during alignment design:

- The requirement for a transposition (swap over of circuits) taking into account the design and orientation of the existing pylons to allow re-use where possible;
- The added complexity of dismantling the existing 400kV overhead line and the need for temporary pylons to allow power supplies to Anglesey to be maintained during the course of the construction works in this section;
- Re-use of existing 400kV pylons in the section where new conductors, insulators, fittings and earthwire are required;
- To minimise the amount of angle pylons in accordance with Holford Rule 3 which advises that '*Other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers*'
- To maintain close parallel with the existing line and pair pylons where possible;

- The wish to minimise or avoid potential conductor oversail of property curtilages

6.3 Route Design Response

6.3.1 The proposed temporary and permanent design detail for Section B of the Route is shown at Figures 3, 4 and 5 of Appendices E, F and G of this Report. The remainder of this Chapter needs to be considered by reference to those Figures.

Description of Works

6.3.2 In this Section of the route, three new sections of overhead line are proposed.

6.3.3 The first would be a continuation of the new build section of overhead line running from Wylfa at pylon 4ZA004 through Section A of the route and onwards into Section B to a point south of Rhosybol, where the line would connect to the existing overhead line route at existing pylon 4ZA035.

6.3.4 The second length of new build overhead line would run from existing pylon 4ZA023, continuing the alignment of the existing line in a south easterly direction for a single span, before turning more to the east and running closely parallel and to the south of, the first section of new build overhead line.

6.3.5 This second section of new build overhead line would continue to closely parallel the retained section of existing line beyond existing pylon 4ZA035 until a point where it re-joined the alignment of the existing line at proposed new pylon 4AP037, and would connect onwards to existing pylon 4AP038.

6.3.6 The third length of new overhead line in this section of the route would run from existing pylon 4ZA040 and run close parallel to the north and east of the existing line into Section C of the route.

6.3.7 The proposed design in this Section of the route involves the dismantling of two sections of the existing line: a 2.3 kilometre section to the south of Rhosgoch and Rhosybol and a shorter 0.3 km single span to the north west of Llandyfrydog. This would facilitate the establishment of a new close parallel alignment throughout Section B of the route.

6.3.8 A temporary overhead line of approximately 2.2km in length would also be needed to the south of Rhosgoch and Rhosybol to carry one circuit whilst the dismantling and new build works take place. The temporary circuit is required to maintain electricity supplies on to Anglesey from the mainland during the works

6.3.9 Works are also proposed to all three sections of the existing line that would be retained in this section of the route.

6.3.10 A summary of the proposed works in this Section of the Route is included at Table 6.1 below.

Table 6.1. Summary of the Proposed Works in Section B.

	Works to Existing Line	Works to New line
Number of new pylons	N/A	25
Number of retained pylons	9	N/A
Number of dismantled pylons	8	N/A
Total Length of new line build	N/A	8.6km
Length of existing line retained	3.15 km	N/A
Length of existing line with works	3.15 km	N/A
Length of line to be dismantled	2.3km	N/A
Height of tallest retained / proposed new pylon	65.3m [4AP038]	58.5m [4ZA026]

6.3.11 In total, 25 new pylons and 2 temporary pylons are proposed, 9 existing pylons are to be retained and re-used and 8 existing pylons are to be dismantled.

Transposition Designs

6.3.12 At the eastern end of this Section a transposition is required. At the time of the Route Options appraisal two designs had been identified for this transposition; Transposition Options T1A and T1B. Details of these two transpositions are included on figures D-1 and D-2 in Appendix D to his Report.

6.3.13 Following appraisal of these options and further engineering design, a modified version of Option T1B is being proposed. This option would encircle one fewer property than option T1A, and avoid a sharper change in route direction. It would also allow existing pylon 4AP023 to be retained to form part of the transposition. This transposition is an intrinsic part of the works already described above.

6.3.14 Following the outcome of the options appraisal process and the selection of a preferred Route Option an area to the south of Rhosybol was thought to provide an opportunity to closely parallel to the north of the existing line rather than follow a large 'dog-leg' in Route Option 2B which may have conflicted with the guidance set out in Holford Rule 3 and would have surrounded a number of properties.

However this would have required Route Option 2B to transpose to the north of the existing line for a short length before transposing back onto the parallel section of Route Option 2B further to the south east.

6.3.15 The benefits of this modified design from a routeing, environmental and socio-economic perspective were considered to outweigh the increased technical complexity and cost that would result. It was acknowledged that such an arrangement would need further detailed design.

6.3.16 Following the decision to prefer a modified Route Option 2B further engineering design work was undertaken and an initial baseline design was produced. This design is shown in the first image on Figure I-1 in Appendix I of this Report. Given the short distance over which the rote transposes to the north and back to the south of the existing line the design effectively comprise the diversion of four spans of the existing line northward rather than a true transposing of the routes and involved the replacement of five existing pylons. Whilst such an arrangement would have achieved the close parallel design sought and have avoided encircling properties to the south, it would have introduced three new angle pylons into the existing route, and slightly closer to Rhosybol. It was also apparent that only two existing L6 pylons and two spans using quad conductors were left in place between the newly diverted section of the route and the new build section of line to the west.

6.3.17 As a result of the above considerations and further engineering and environmental appraisal the further enhancement to the design represented in the lower image on Figure I-1 was identified and is now proposed. This would have the advantage of achieving a closely parallel alignment, on a straighter route in accordance with the recommendations set out in the Holford Rules, and has reduced the number of angle pylons by two. This facilitated two new L12 sections of overhead line to be routed in parallel, with pylons to be paired where possible.

6.3.18 The modified design does add further engineering complexity including the need to construct two temporary pylons and reconfigure a single circuit on others for the duration of the works to ensure that electricity supplies are maintained to Anglesey. It was considered however that the reduced environmental and socio-economic effects of this final design proposal more than justified this complexity and the additional costs of replacing three further pylon

6.3.19 A further transposition is also need at the eastern end of this route section, to the north of Llandyfrydog. This would allow the new build line section to move from the south of the existing line after it has passed Bryn Goleu Caravan Park, northwest of Llandyfrydog, to the north and east side of the existing line. This

allows the new line to be built on the far side of the existing line as it passes both Bryn Goleu and Llandyfrydog.

6.3.20 Two transposition design options were identified for this transposition; T2D and T2G. These are shown at Figures D-5 and D-6 in Appendix D. They vary only slightly in terms of the position of the angle pylons on the southern alignment. Transposition Option T2G has been proposed as the basis of the design being taken forward to Stage 3 Consultation partly because it was considered that this design would give rise to less adverse ecological effects due to the more sensitive siting of pylon 4ZA041.

Alignment

6.3.21 As a result of the iterative design process undertaken as detailed above in the full length of proposed new line would run in close parallel through this section of the route

Limit of Deviation (LOD)

6.3.22 In the span between proposed pylons 4ZA026 – 4ZA027 the proposed standard LOD has been limited on both sides of the 4ZA route so as to ensure that the route would not infringe the curtilages of the two properties immediately to the north east of the route, on the western edge of Rhosgoch.

6.3.23 To the south west of the route at Rhosgoch the LOD has also been restricted so as to ensure that the outermost conductor would not oversail the property at Bryn Alaw.

6.3.24 The proposed LOD has also been reduced to the south of Rhosybol where the two new routes would run close to properties located on the road to Rhosgoch. Again this is to ensure that no part of the development would infringe upon the property curtilages.

Pylon Locations

6.3.25 Within Section B of the route fourteen pylon locations would be paired with adjoining pylons. Of these six would comprise pairs of new L12 pylon designs and a further seven new pylons would be paired with existing pylons.

6.3.26 Full details concerning the pylons proposed in his section of the route are provided at Appendix L.

6.3.27 There are four further proposed new pylons that would not be located immediately adjacent to existing pylons in this section. These are detailed below together with an explanation of the reasons that local siting considerations have

been given more weight in the design process than the general objective of achieving a fully synchronised design. .

6.3.28 The location of proposed pylons 4AP023 & 4ZA027 and 4AP024 / 4ZA028 are not paired so as to achieve an optimum design for the transposition as the route crosses the road at Rhosgoch. The siting of proposed new pylon 4ZA028 has also been restricted by the proximity of the public highway

6.3.29 4AP036 was sited to avoid placing the pylon adjacent to an existing pylon at 4ZA040, which would have resulted in the new pylon being constructed in an area of higher biodiversity value. Thus 4AP036 is located further to the northwest away from this more sensitive habitat.

6.3.30 It is proposed that existing pylons would be retained in the line section between 4ZA034 and 4ZA040. However the final existing pylon in this section is not of a design that could cope with the stresses associated with supporting two different forms of conductor bundle.

6.3.31 Rather than the replacing the pylon for a structurally stronger design it is proposed that this short section of retained line would instead have the smaller conductor system fitted throughout. In this way the visual effect of a heavier replacement pylon would be avoided, as would the cost of that work.

6.4 Construction Design Response

Pulling Positions

6.4.1 Pulling positions for phase conductor and earthwire stringing work have been allowed for at angle tension pylon locations. The location of pulling positions enables some flexibility during the construction phase and is indicated on Figures G-3, G-4 and G-5.

Temporary Lines

6.4.2 As already described a section of existing overhead line to the south east of Rhosgoch and south of Rhosybol involving 8 spans of conductor and 7 pylons is proposed to be dismantled. This will allow the build of new sections of 4ZA and 4AP overhead line in close parallel on the proposed new alignments.

6.4.3 Electricity supplies on to Anglesey from the mainland, supplied by the existing overhead line, must be maintained even when the line is in the process of being dismantled. To ensure that electricity supplies are maintained a temporary 2.2km single circuit overhead line is proposed.

6.4.4 The temporary overhead line has been engineered to make use of new build pylons which later on form part of the finished 4ZA route realignment. Two temporary pylons are proposed, one each at either end of the temporary line. Temporary pylons capable of acting as termination structures are preferred. The alternative temporary mast structures require a greater land footprint, are not suitable in terminal loading conditions or generally used for long term durations especially where the use of temporary masts would extend into the late autumn/winter/early spring months and beyond.

6.4.5 The use of two temporary pylons and construction of new build pylons in between will enable the construction of the greater part of the 2.2km temporary overhead line to be installed before needing to start to dismantle the existing line.

6.4.6 The temporary diversion would be off the northern circuit of the existing 4ZA route and would span between old pylon X4ZA028 (which would later be dismantled) and 4ZA035, utilising proposed new pylons 4ZA031 to 4ZA033 as well as temporary pylons 4ZA030T and 4ZA034T. These are shown at Figures E and G, 3 and 4.

6.4.7 Temporary ground anchors to hold wired guy ropes would be necessary at some pylons to retain conductor tension, whilst the diversion is installed. Temporary ground anchors would also be necessary at pylon 4AP023 and proposed new pylon 4ZA034 during the staging of the construction.

Accesses

6.4.8 The local road network servicing the settlements of Rhosgoch and Rhosybol provide local access points to the majority of the works in this section. Bell-mouths are positioned to enable access off the public highway to the access roads. From these locations it is proposed to run lengths of temporary access road to carry HGV construction traffic to the area of the works within the proposed development.

6.4.9 The proposed access to the area for the dismantling of the existing 4ZA Route pylons, the temporary works, and new build section of two new overhead lines will require the access to cross the disused railway line to the south of the existing bridge in span 4AP025 to 4AP026.

Scaffolds and Utility Crossings

6.4.10 Scaffolds with nets are proposed at six broad locations on the new build 4ZA and retained 4AP lines to provide protection at road crossings in Section B as shown in Figures G-3, G-4 and G-5.

6.4.11 No further scaffolds are currently proposed in Section A of the route.

6.4.12 Minor access routes, farm tracks and affected PRoW will generally not require scaffold protection, but can be managed on a site specific local basis such as manned crossing points during the actual conductor pulling operations.

6.4.13 The proximity of new build pylons, both temporary and permanent, to each other and/or to existing pylons and working areas in the central part of Section B will require more complex contractor led protection solutions.

6.4.14 The installation of new conductors over Bryn Goleu Caravan Park will require discussions with affected parties to agree the positioning of protection measures.

6.4.15 There are eight discrete areas within Section B where National Grid proposes to seek modifications to above ground equipment owned by third parties as part of the consent process. These are shown on the figures F-3, F-4 and F-5 included at Appendix F

6.4.16 Of particular note in Section B is the crossing of the existing 132V overhead line operated by SP Manweb (SPEN) to the east of Rhosgoch which is crossed in spans 4AP021-022 and 4ZA025-026

6.4.17 The modification to existing 3rd Party assets could be carried out as enabling works prior to the actual commencement of the new Wylfa-Pentir connection. Utilities, like SPEN, may have their own landowner access arrangements in place.

6.4.18 At this stage estimated allowances for access locations and lengths to get to 3rd Party assets have been included and will need refining with all interested parties. These accesses have also been shown on the figures at Appendix F and are included within the proposed project boundary.

7 SECTION C: LLANDYFRYDOG – B5110 NORTH OF TALWRN

7.1 Introduction

7.1.1 Section C of the route starts to the east of Llandyfrdog and extends in a south-easterly direction towards the hamlet of Maenaddwyn, passing to the west of Hebron and then to the north of the village of Capel Coch . The route then turns south, to pass to the immediate west of Cors Erddreiinig, a designated fenland habitat of international value.

7.1.2 At the southern end of the fenland, the route then again turns south eastwards, to converge with the existing line at Maen Eryr. The route then runs close parallel to the western side of the existing line to a point south of the B5110.

7.1.3 Three potential Route Options were identified in Section C (then Section 3) of the route. A combination of Route Option 3c and 3B was taken forward to detailed design and subsequently to formal Stage 3 consultation because it would;

> *avoid properties in Maenaddwyn and keeps outside the protected Cors Erddreiniog site. This route is also further from some B&Bs and holiday lets near Llandyfrydog. The views from Capel Coch are something that National Grid are continuing to consider carefully as more detailed plans are developed.*

7.1.4 Route Options 3C and 3D are shown at Figure A-1 of Appendix A

7.2 Section-Specific Design Considerations

Consultation Feedback

7.2.1 Respondents noted their general concern regarding cumulative visual impact within this section of the route. Some comments specifically referenced potential impacts on Anglesey AONB at Mynydd Bodafon as a result of the proximity of the proposed overhead line, as shown at Figure B-9 in Appendix B

7.2.2 Others noted that Capel Coch's elevated position would make the proposed line visible from a number of locations and would affect views towards Snowdonia and Cors Erddreiniog, a designated National Nature Reserve, Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) and Ramsar site. Môn a Gwynedd Friends of the Earth also expressed concern that the route

would be too close to Cors Erddreiniog. These areas are also shown at Figure B-9.

7.2.3 Concern was raised regarding the potential impact on places of cultural and historical significance. Specific sites of concern included the church of Llandyfrydog, a listed windmill in Capel Coch and two religious springs at the bridge at Clorach. The Historic Environment Branch of Cadw noted that the setting of Maen Addwyn standing stone scheduled monument north of Capel Coch could be affected. This site is also shown on Figure B-9.

7.2.4 Feedback also identified the importance of the Tre-Ysgawen Hall Country Hotel and Spa, noting the approach to the hotel and its setting are important. This is shown to the south west of Capel Coch on Figure B-12 of Appendix B.

7.2.5 For a full description of all feedback received during Stage 2 consultation relating to this section of the route corridor and all Route Options presented within it please refer to National Grid's 'Stage 2 Consultation Feedback Report' (May 2016)[21].

Environmental and Socio-Economic Considerations

7.2.6 Environmental and Socio-Economic Sites and features within this section of the route are shown on the figures included at Appendix B of this Report. Those of note in this section include:

- Views from the settlements of Llandyfrydog, Maenaddwyn, and Capel Coch at the northern end of the route.
- Isolated residential properties forming a broken ribbon-development to the north of Capel Coch
- Extensive open views from within the Anglesey AONB at Mynydd Bodafon.
- The Maen Addwyn standing stone designated as schedule monument on the roadside to the north of Capel Coch.
- The Cors Erddreiniog fenland, which is designated a SSSI and National Nature Reserve managed by Natural Resources Wales, as well as a Special Area of Conservation and Ramsar site.
- Isolated farmsteads to the south of Cors Erddreioniog

[21] North Wales Connection Stage 2 Consultation Feedback Report (May 2016)

7.3 Route Design Response

7.3.1 The proposed temporary and permanent design detail for Section C of the Route is shown at Figures 5 - 9 of Appendices E, F and G of this Report. The remainder of this Chapter needs to be considered by reference to those Figures.

Description of Works

7.3.2 The proposed new section of overhead line enters Section C of the route running parallel to the northern and eastern side of the existing overhead line. This arrangement continues until the location of an existing pylon (X4ZA044) that would be removed and replaced with a new L12 pylon.

7.3.3 At this point the main section of proposed new overhead line build would move to the western side of the existing line, from where it would continue to the west of the line for the full distance to the Menai Crossing area. This section of new build line commences at pylon 4AP041, which would replace X4ZA044.

7.3.4 The section of proposed new build to the east of the existing line running from Section B of the route, would reconnect to the existing line at pylon 4ZA047, which would need some minor modifications. The existing 4ZA overhead line then continues south from this point to Pentir. No part of the reminder of the route would require works part of the project until the connection point at Pentir.

7.3.5 This design arrangement to the west of Maenaddwyn achieves the transposition of the new line form the eastern to western side of the existing line.

7.3.6 A summary of the proposed works in this Section of the route is provided at Table 7.1 below. Details concerning the proposed pylon in this section of the route are provided at Appendix L of the Report.

Table 7.1. Summary of the Proposed Works in Section C.

	Works to Existing Line	New Line Build
Number of new pylons	N/A	26
Number of retained pylons	20	N/A
Number of dismantled pylons	2	N/A
Total Length of new line build	N/A	9.15km
Length of existing line retained	7.5 km	N/A
Length of existing line with works	0.9 km	N/A
Length of line to be dismantled	0.7 km	N/A
Height of tallest retained / proposed new pylon	59m [4ZA048,4ZA064]	58.5m [4AP062]

Transpositions

7.3.7 The transposition design described above represents a modified version of Transposition Option T3C that had previously been considered as one of three transposition options in the area to the north of Capel Coch. Transposition Options T3A, T3B and T3C are shown at Appendix D of this Report. The modified version of T3C as now proposed is also reproduced in the Appendix and provides a simper means of understanding the design objective achieved.

7.3.8 The design of the transposition was modified in response to the iterative design process, lengthening the distance over which the transposition would be achieved. This has the benefit of allowing the re-use of existing pylon 4ZA047 as one of the angle pylons needed to achieve the transposition, helping to further reduce the landscape and visual effects of the connection in this area, close to Mynydd Bodafon and the community of Hebron.

Alignment

7.3.9 At the northern end of Section C the new and existing lines are aligned parallel to one another at a distance of approximately 80 metres. However further to the south the two lines begin to slowly diverge to the west of Hebron so that as the routes cross the pubic highway to the north of Capel Coch they are more widely parallel at a distance of some150 metres

7.3.10 In this way the proposed new line passes obliquely to the south and west of the four properties located on the east side of the road from Capel Coch and the converted former schoolhouse further to the north.

7.3.11 The proposed new route then runs parallel to the existing line for approximately two spans at a distance of some 80 metres before diverging away in a southerly direction to avoid Cors Erddreiniog. The alignment then follows two straight line route sections so as to achieve the most direct route around the protected habitat before re-joining the existing line after a route distance of approximately 2.6 kilometres. This alignment also increases the distance between the proposed new line and the village of Capel Coch, which increases to the south.

7.3.12 From the point that the two line routes recombine east of Maen Eryr the proposed new line continues close parallel to the western side of the existing line at a distance of approximately 75 meters for the remainder of Section C.

Limits of Deviation (LOD)

7.3.13 The proposed LOD in Section D of the route is in most places the standard 50 metres either side of the route centreline that has been proposed elsewhere. However in two locations the LOD has been restricted within Section D to give greater certainty concerning the final location of the proposed works.

7.3.14 At the northern end of Capel Coch, the LOD has been restricted adjacent to the new property at Cae Fabli in the span between proposed pylons 4AP045 and 4AP046 so as to ensure that the conductors would not in any conditions oversail the property itself.

7.3.15 Further to the south, adjacent to proposed pylon 4AP048, the proposed LOD that would be sought has again been restricted to avoid the conductors encroaching into an area of woodland located within the boundary of the protected sites at Cors Erddreiniog.

Pylon Locations

7.3.16 Within Section C of the route there would be fifteen pairs of pylons 'paired' in siting terms. Of these pairs, two would comprise a pair of proposed new L12 pylons, whilst the remainder would be a combination of new and existing pylon.

7.3.17 A further eleven proposed new pylons would not be paired with an adjacent pylon. Of these, seven would be located in the section of new line that diverted away from the existing line so as to avoid Cors Erdreinniog for the reasons stated above.

7.3.18 Proposed pylon 4AP060 has been sited to the north of the B5110 to maximise the clearance of conductors to a large conifer hedge that provides effective screening to the property, Lloches, to the south west. The clearances in this area were considered in detail to aid the ongoing assessments of the project. The design drawing, which demonstrates that the hedge would not infringe clearances, is included at Appendix H.

7.4 Construction Design Response

Pulling Positions

7.4.1 Pulling positions for phase conductor and earthwire stringing work have been allowed for at angle tension pylon locations. The location of pulling positions enables some flexibility during the construction phase.

Temporary Lines

7.4.2 The proposed development in this section of the route does not include replacement or route transposition works and temporary structures are not envisaged for the construction of the new 4AP overhead line in this section.

Temporary ground anchors may be required to counteract out of balance loads on proposed angle pylons where those pylons are used as stringing locations.

Accesses

7.4.3 The existing roads serving Capel Parc, Maenaddwyn and Capel Coch are suitable for heavy construction traffic. Although the other minor road accesses in the locality are not considered suitable, therefore the temporary access has been routed to avoid them.

7.4.4 The existing road to the south of proposed pylon 4AP042 runs between Maenaddwyn (to the east) and Bachau (to the west). Due to restrictions in road width through both of these residential areas, the road is not deemed suitable for heavy construction traffic.

7.4.5 Straight across type bell-mouths are propose in order to allow heavy construction traffic to cross straight across this road. However, light vehicles such as emergency access vehicles, scaffold deliveries and staff transport may use these points for accessing the work.

7.4.6 Just south of proposed new pylon 4AP051 there is an existing beck crossing consisting of concrete foundations supporting steel primary support beams, with timber sleepers forming the deck of the crossing. It is not anticipated that this

would be suitable for supporting the proposed construction traffic, but would need more detailed structural assessment to either confirm or discount use for construction traffic.

7.4.7 The existing access track to residential properties adjacent to proposed new pylon 4AP060 has a culverted crossing over a stream that appears to be inadequate for heavy construction traffic. The proposed temporary access has been routed to the north to avoid disruptive improvement works to this existing crossing.

7.4.8 A buried gas main is noted to the north west of existing pylon 4ZA064 which will need to be considered for any access works in this area.

Scaffolds and Utility Crossings

7.4.9 Scaffolds with nets are proposed at just four broad locations on the new build 4ZA and retained 4AP lines to provide protection at road crossings in Section C, as shown in Figures G-3, G-4 and G-5. No works are proposed to the 4ZA route south of 4ZA047, thus helping to reduce the extent of scaffolding proposed in this section of the route.

7.4.10 However where the proposed new line crosses the B5510 in spans 4AP060 – 4AP062 the arrangement of the road relative to the line could necessitate more extensive scaffold constructions. The footprints of these are shown at Figure G-9. Alternative more complex contractor led protection solutions will also be investigated to see if this need can be reduced or avoided.

7.4.11 No further scaffolds are currently proposed in Section C of the route.

7.4.12 Minor access routes, farm tracks and affected PRoW will generally not require scaffold protection, but can be managed on a site specific local basis such as manned crossing points during the actual conductor pulling operations.

7.4.13 There are seven discrete areas within Section C where National Grid proposes to seek modifications to above ground equipment owned by third parties, as part of the consent process. These are shown on figures F-5 to F-9 included at Appendix F.

7.4.14 The modification to existing 3rd Party assets could be carried out as enabling works prior to the actual commencement of the new Wylfa-Pentir connection. Utilities, like SPEN, may have their own landowner access arrangements in place.

7.4.15 At this stage estimated allowances for access locations and lengths to get to 3rd Party assets have been included and will need refining with all interested parties. These are also shown in Appendix F and have been included within the proposed project boundary.

8 SECTION D: B5110 NORTH OF TALWRN TO CEINT (WEST OF STAR)

8.1 Introduction

8.1.1 Section D of the route starts approximately two kilometres to the north of Llangefni and runs in a south-easterly direction to the west of the village of Talwrn. This is a relatively short section of the route, extending for approximately 3.5 kilometres to a point just south of the B5420 road that runs between Four Crosses and Llangefni.

8.1.2 Two potential Route Options were identified in Section D (then Section 4) of the route. Route option 4B was taken forward to detailed design and Stage 3 consultation.

8.1.3 Route Option 4B was taken forward to detailed design and subsequently to formal Stage 3 consultation because it;

> *would keep the new connection close to the existing line and present significant opportunities to synchronise the designs of the existing and proposed new line. This option will limit effects on views from Llangefni, while also staying west of the existing line from Talwrn*

8.1.4 However it was recognised that;

> *option 4B would result in the loss of some trees within the Gylched Covert County Wildlife Site. It would also pass close to some individual properties and therefore National Grid will continue to look carefully at the setting of these as we develop a detailed design.*

8.1.5 Route Option 4B is shown at Figure A-1 of Appendix A.

8.2 Section-Specific Design Considerations

Consultation Feedback

8.2.1 The cumulative impact of overhead lines has been stated as a concern in this area. General concern was also noted due to the perceived impact on individual properties and businesses in close proximity.

8.2.2 Natural Resources Wales expressed concern about potential impacts on several designated sites including Caeau Talwrn Site of Special Scientific Interest (SSSI) (which is part of the Anglesey Fens Special Area of Conservation (SAC), and Anglesey and Llyn Fens Ramsar Site). This site lies approximately 250 metres to

the east of the proposed route alignment, east of Talwrn, and is shown on Figure B-13 in Appendix B.

8.2.3 Respondents highlighted the need to avoid removal of trees from woodland at Gylched Covert, or to mitigate any removal of trees through replanting of native tree species. This site is shown on the same Figure.

8.2.4 For a full description of all feedback received during Stage 2 consultation relating to this section of the route corridor and all Route Options presented within it please refer to National Grid's 'Stage 2 Consultation Feedback Report' (May 2016)[22].

Environmental and Socio-Economic Considerations

8.2.5 Environmental and Socio-Economic Sites and features within this section of the route are shown on the figures included at Appendix B of this Report. Those of note in this section include:

- The route passes close to the west of the village of Talwrn. Properties on the eastern edge of the village have views towards and along the existing line and proposed new line route.
- There are a number of individual properties to the north of the B5109 which are located close to the west of the existing 4ZA overhead line. The proposed new line passes between these properties and the 4ZA line
- Gylched Covert, a mature broadleaf woodland, lies to the south west of Talwrn. This is a County Wildlife Site designated by the local authority for its ecological value.
- Hendre Hywel is a Grade II listed property to the south of the B5109, approximately 270 metres west of the existing 4ZA overhead line.
- Further to the west, north of the B5109, lies the Caeau Talwrn SSSI, which also forms part of the Anglesey Fens Special Area of Conservation. This is around 350 metres to the west of the existing 4ZA overhead line.

Technical Considerations

8.2.6 Technical considerations specific to Section D of the Route are set out below:

- From a technical perspective there are four overhead utility services that the Route Option crosses in Section D.

[22] North Wales Connection Stage 2 Consultation Feedback Report (May 2016)

- The proposed new 4AP line crosses both the B5420 and B5109, which are busy local roads.
- Constraints to the routeing of the new line to the west of the existing line suggest that a limited separation distance between the lines would be required, restricting some potential construction arrangements.
- There is a high pressure gas pipeline present to the west of proposed new pylon 4AP071 which will be crossed by the proposed temporary access described below. Appropriate protection measures would need to be agreed and put in place.

8.3 Route Design Response

8.3.1 The proposed temporary and permanent design detail for Section D of the Route is shown at Figures 9,10 and 11 of Appendices E, F and G of this Report. The remainder of this Chapter needs to be considered by reference to those Figures.

Description of Works

8.3.2 The 4ZA line uses the existing pylons and in this section does not form part of the proposed development.

8.3.3 The proposed new overhead line would run to the west of the existing line, between proposed pylons 4AP062 at the southern end of Section C of the route, and 4AP073.

8.3.4 From here the new line would continue to run south, parallel to the existing line, until proposed pylon 4AP77. At this point the new line would diverge away from the existing 4ZA line to pick up the Menai Crossing route design, heading toward the proposed Sealing End Compound and Tunnel Shaft site.

8.3.5 A temporary site construction compound is proposed in fields located to the west of pylons 4AP071 and 4AP072, immediately adjacent to B5420. The need for, nature of and reasons for the siting of this construction compound are set out in more detail in Chapter 9 of this Report.

Table 8.1. Summary of the Proposed Works in Section D.

	Works to Existing Line	New Line Build
Number of new pylons	N/A	11
Number of retained pylons	10	N/A
Number of dismantled pylons	None	N/A
Length of new line build	N/A	3.5km
Length of existing line retained	3.4 km	N/A
Length of existing line with works	Nil	N/A
Length of line to be dismantled	Nil	N/A
Height of tallest retained / proposed new pylon	59.7m [4ZA071]	58.5m [4AP069]

Alignment

8.3.6 The proposed 4AP overhead line runs parallel to the western side of the existing 4ZA line through Section D of the route. The typical separation distance between the two lines is approximately 65 metres. This is the minimum distance that could be achieved between the routes, and is proposed in order to limit effects upon receptors further to the west as far as practicable.

8.3.7 In the northern part of Section D this separation distance allows the proposed line route to pass as far to the east of the property at Ty Mawr as is possible without adopting an alternative Route Option to the east of the existing line which has previously not been taken forward.

8.3.8 Further to the south the route tasks a slight dog-leg to the west, in order to avoid conductors oversailing the immediate curtilages or gardens of properties at Madwyn and Dolyd Newydd on the B5109 west of Talwrn.

8.3.9 In the proposed span between pylons 4AP068 and 4AP069, the proposed line passes through the eastern edge of Gylched Covert. Again the minimum separation distance between the proposed and existing lines has helped reduce the potential extent of vegetation clearance that might be required within the Covert.

8.3.10 In order to gain a better understanding of the likely extent of this tree loss a clearance and conductor swing drawing was produced for the overhead line span through the woodland. This is shown in Appendix H.

Limits of Deviation (LOD)

8.3.11 The proposed LOD in Section D of the route is in most places the standard 50 metres either side of the route centreline that has been proposed elsewhere. However in two locations the LOD has been restricted within Section D to give greater certainty concerning the final location of the proposed works.

8.3.12 Both restrictions are within proposed span 4AP064 to 4P065. The western extent of the LOD has been restricted so as to ensure that the proposed route would not infringe upon the garden at Madwyn. Similarly slightly further to the south the proposed LOD has also been restricted to the eastern side of the route to ensure that the curtilage of the property at Dolydd Newydd is not infringed.

8.3.13 The proposed LOD in Section D of the route is shown at Figures G-9,G-10 and G-11 of this Report.

Pylon Locations

8.3.14 Within Section D of the route there would be nine new L12 pylons 'paired' in siting terms with nine existing L6 pylons. Details of the pylons in this location are set out in Appendix L. Two proposed new pylons would not be paired in this way, the reasons for which are explained below.

8.3.15 To the north of the B5109 an additional pylon has been proposed in the new 4AP route. Pylon 4AP065 has been located so at to avoid oversailing the garden of the property at Madwyn. It also achieves greater conductor clearances above the barn to the rear of the property.

8.3.16 A proposed angle pylon 4AP066 to the south has been sited so as to again avoid any conductor oversailing the curtilage of Dolydd Newydd. The pylon has been sited further north from the B4109 so as to move it out of the immediate views southwards from the front elevation of the property.

8.3.17 Pylon 4AP068 is located just to the north of the Glyched Covert local wildlife site rather than being opposite pylon 4ZA069. Constructing the pylon in this location would have involved construction works within the woodland itself, necessitating a larger area of vegetation management.

8.3.18 The position of the remaining pylons south along the route of the proposed 4AP line has been informed by the parallel nature of the alignment and the

opportunities to site side by side with the existing pylons on the 4ZA route to the end of this section at 4AP073.

8.4 Construction Design Response

Pulling Positions

8.4.1 Pulling positions for phase conductor and earthwire stringing work have been allowed for at angle tension pylon locations with the exception of 4AP068, which is close to road B5109. There are also proposed conductor pulling positions either side at 4AP067 and 4AP069. The location of pulling positions enables some flexibility during the construction phase.

Temporary Lines

8.4.2 The proposed development in this section of the route does not include replacement or route transposition works and temporary structures are not envisaged for the construction of the new 4AP overhead line in this section.

8.4.3 Temporary ground anchors may be required to counteract out of balance loads on proposed angle pylons where those pylons are used as stringing locations.

Accesses

8.4.4 The existing roads leading to the B5420 Llangefni to Four Crosses road are considered suitable for heavy construction traffic. The B5420 itself is also of a good standard for HGV traffic. The imminent completion of the Llangefni Relief Road, to the east of Llangefni, would further improve connectivity to the B5420. Other minor roads in the locality are not considered suitable for large volumes of construction traffic.

8.4.5 In consideration of the highway constraints, and seeking to avoid the need to route substantial volumes of construction traffic through communities wherever practicable, National Grid proposes to establish a single new linear access route for the works throughout this section of the route.

8.4.6 This linear access would connect to the B5420 to the west of Ceint, using the same access point as that used for the main temporary construction compound referred to previously and described in Chapter 9. This direct access to the main construction compound would be a further benefit for traffic management in Section D of the route.

Scaffolds and Utility Crossings

8.4.7 Scaffolds with nets are proposed at just three broad locations on the new build 4AP line to provide protection at road crossings in Section D, as shown in Figures G-9, G-10 and G-11.

8.4.8 The span of conductors between proposed new pylons 4AP064 and 4AP065 passes over the northern corner of a clad steel framed agricultural building to the west of Talwrn. Protective scaffold measures would need to be put in place for the crossing of this building.

8.4.9 No further scaffolds are currently proposed in Section D of the route.

8.4.10 There are seven discrete areas within Section D where National Grid proposes to seek modifications to above ground equipment owned by third parties as part of the consent process. These are shown on figures F-9, F-10 and F-11 included at Appendix F.

8.4.11 The modification to existing 3rd Party assets could be carried out as enabling works prior to the actual commencement of the new Wylfa-Pentir connection. Utilities, like SPEN, may have their own landowner access arrangements in place.

8.4.12 At this stage estimated allowances for access locations and lengths to get to 3rd Party assets have been included and will need refining with all interested parties. These are also shown in Appendix F and have been included within the proposed project boundary.

9 TEMPORARY CONSTRUCTION COMPOUND

9.1 Introduction

9.1.1 Large temporary construction compounds will be needed during the main construction of any new overhead line. These would accommodate the main construction offices, parking and materials yard. Bulk delivery of construction materials such as pylon steelwork and components would be made to these compounds, from where it would be despatched to individual construction sites along the route.

9.1.2 The area of any compound would be stripped of topsoil, and a geotextile membrane topped with crushed stone would be installed. Soil would be stored and managed in a perimeter bund, and the site would be securely fenced. The compound would be permanently manned during the course of the construction activities. Utility services, including water, electricity and telecommunications, would also need to be connected at the site.

9.1.3 In order to minimise the extent of the civil engineering needed, a relatively flat site is to be preferred. Given that the compound will be the main focus of traffic movements and deliveries throughout the construction period a site should have good access to the public highway network, and there should be opportunities to identify principal traffic routes that would avoid residential and built-up areas if possible.

9.1.4 The sites would be sited at locations to optimise deliveries throughout the route, for example close to the centre

9.1.5 The function of the construction compounds will be to provide the support including site offices, welfare facilities and storage of materials for the construction of the overhead line. These would be temporary and the land reinstated on completion of construction

9.2 Description of Construction Compound

9.2.1 A typical arrangement for a main construction compound required for a large overhead line construction project is shown at Figure J-1 in Appendix J. The compound location would be surrounded by security fencing, which would encompass the following facilities:

- Security / gate house

- An open laydown area for the temporary storage of construction materials, prior to delivery to individual pylon construction sites along the line route.
- Site offices and welfare facilities
- Lockable containers
- Parking
- Storage area
- Bunded fuel storage tanks
- Wheel wash
- Spoil storage prior to offsite disposal

9.3 Siting Criteria

9.3.1 Two construction compounds are required to facilitate the construction of the overhead line between Wylfa and Pentir. These compounds would typically occupy an area of approximately 2 - 2.5 hectares (5 - 6 acres) dependent upon the dimensions of any particular site and would ideally be broadly square or rectangular in shape. One compound is required to be located near Pentir and the other one at a point where it could effectively serve all of the proposed overhead line construction areas on Anglesey. The site to be located near Pentir is described in the Menai Straight Crossing Report.

9.3.2 The construction compound needs to be located on flat ground sited in accordance with the Horlock rules and will need to be located close to a main road suitable to be accessed by HGVs from the A55, which is the principal arterial route onto Anglesey.

9.3.3 The Horlock Rules are internal National Grid guidelines for the sensitive siting and design of permanent facilities such as substations, so as to reduce or avoid the environmental effects of such developments. Whilst the siting study does not relate to a permanent substation development the principles contained in these guidelines can be applied to the siting of large temporary sites such as main construction compounds. Those guidance points from the Rules that are considered of particular relevance to the siting of the main construction compounds are reproduced below:

Amenity, Cultural or Scientific Value of Sites

2 The siting of new NGC substations, sealing end compounds and line entries should as far as reasonably practicable seek to avoid altogether

internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections.

3 Areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas should be protected as far as reasonably practicable.

Local Context, Land Use and Site Planning

4 The siting of substations, extensions and associated proposals should take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum.

5 The proposals should keep the visual, noise and other environmental effects to a reasonably practicable minimum.

6 The land use effects of the proposal should be considered when planning the siting of substations or extensions.

Design

7 In the design of new substations or line entries, early consideration should be given to the options available for terminal towers, equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum.

8 Space should be used effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation.

9 The design of access roads, perimeter fencing, earth shaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings.

9.3.4 The Horlock Rules together with their supporting notes are available on National Grid's website[23]

9.4 Study Approach and Methodology

Defining the Study Areas

9.4.1 The first stage in identifying a suitable site for the temporary construction compound was establishing study areas on Anglesey within which potentially

[23] [23] NGC Substations and the Environment: Guidelines on Siting and Design

suitable sites might be found. The study area is an area in which the required infrastructure could be located. Five search areas were identified, referred to as Areas 1-5. These are described in more detail below.

Identification of Construction Compound Siting Options

9.4.2 Further study of the search area and technical review of the requirements was undertaken to identify construction compound siting options in each search area. This was largely based on the identification of opportunity sites that might best fulfil the above criteria many of which arose during conversations with landowners within the wider route corridor. This resulted in 16 construction compounds being identified in the 5 search areas. The location of the search areas and identified site options is shown at Appendix J-2 in Appendix J.

9.4.3 The following section provides a broad description of each of the search areas.

9.4.4 The five Search Areas were then considered in further detail to identify possible construction compound options

9.5 Search Areas

9.5.1 Five broad search areas were identified broadly aligned along the proposed overhead line route. These are illustrated at Figure J-2 of Appendix J and are summarised below.

Search Area 1

9.5.2 Search Area 1 is centred around Pentir Substation and bounded by the A55 and A4087 to the north the B4547 to the west, and the A4244 to the south and east. One siting option was identified in the south west of the Search Area, close to the existing Pentir Substation.

Search Area 2

9.5.3 Search area two is located to the north of the A55 and centred around the A5025, A 51141, B5019 and the B5420. The search area is bounded to the south by the A55 the west and north by the B5109 and the east by the A525. The B5420 runs through the centre of the search area between Llangefni and Menai Bridge. Seven site options were identified in Search Area 2

Search Area 3

9.5.4 Search area three is located along the B5111 between Llangefni and Llanerchymedd and Llangefni and Brynteg. The search area follows the alignment of the B5111 between these settlements. Five siting options were identified in Search Area 3

Search Area 4

9.5.5 Search area four is located around the A5025 the B5111 junction to the south of Amlwch. The search area is bounded by the Parys Mountain to the south, the minor road between Rhosgoch and Amlwch to the west and the minor road between Amlwch and Penysarn to the east. Two siting options were identified in Search Area 4.

Search Area 5

9.5.6 Search Area 5 is centred around the A5025 between the settlements of Cemaes and Llanfechell. One siting option was identified in the west of the search area, close to the A5025.

9.6 Technical Suitability Criteria

9.6.1 The identified compound site options were appraised against the criteria set out below and the proposed Main Construction Compound was selected using professional judgement based on the appraisal findings for each of the site options.

Disruption to Local Residents

9.6.2 The most direct approaches to the sites via public roads were assessed and any residential areas on the approaches noted. Sites with access routes that avoid residential areas were favoured to minimise disruption to local residents. Although less ideal, some sites may be accessed via less direct (longer) routes that would also avoid residential areas.

Road Accessibility

9.6.3 The site locations were assessed for the suitability of the primary access route using public roads. Sites that can be easily accessed using main A and B roads were favoured. It was noted that many of the existing minor roads would not be suitable for heavy construction traffic (articulated lorries, large cranes, etc.).

Proximity to Line

9.6.4 The sites were assessed for the proximity of the compound to the proposed line / nearest access haul road. Locations within 3km of the line were deemed 'good', and those within 5km were deemed 'reasonable' in terms of proximity. Locations closer to the proposed line were favoured in order to minimise the disruption and environmental impact associated with construction traffic between the compound and the main construction areas.

Approach Road Visibility

9.6.5 Sites were assessed for the visibility of potential site bell-mouths onto the existing public highway. Sites with good visibility (onto low speed roads where possible) were favoured in order to minimise traffic management requirements.

Site Topography

9.6.6 The amount of earthworks and drainage works that would be required to establish the site were considered for each location. Identified site options ranged from existing areas of level tarmac and hard standings to sloping rough pasture. Although in most cases it would be possible to carry out earthworks to provide flat compound areas, this may prove costly in cases where there is significant topography and would give rise to greater environmental effects associated with the formation of the compound.

9.6.7 The presence of known existing services across the sites was also considered (i.e. buried gas mains, overhead LV lines, etc.). Again, it would be possible to protect and incorporate most services into the arrangement of the site layout, but this may impose a constraint to the optimum layout for a particular site and is likely to increase cost.

Visibility

9.6.8 The visibility of sites was also considered. Sites that are already well screened or remote from public viewpoints, especially residential properties and settlements, were favoured in order to minimise visual impact. Whilst the main construction compound would be a temporary use for the duration of the works only, it is probable that the compound would be lit at night to ensure the safety of security staff. This then further emphasised the importance of selecting a site that would not give rise to significant temporary visual effects on nearby properties.

9.7 Appraisal Outcome

The Preferred Construction Compound Location

9.7.1 Following an appraisal of the siting options identified National Grid is proposing to utilise Site Option 2.2 in Search Area 2 as the Main Construction compound site on Anglesey. The outcome of the environmental, socio-economic and technical appraisal of this site is summarised below in Table 9.1.

Environmental and Socio-Economic Appraisal Findings.

9.7.2 Table 9.1below provides a summary of the environmental and socio-economic appraisal findings for the preferred main construction compound site.

Table 9.1: Summary of Environmental Socio-economic and Technical Appraisal for Proposed Main Construction Compound Site east of Llangefni.

Topic	Summary of Appraisal
Landscape and Visual	A large area to the east of Llangefni, this site is the only one which is located in an area which will already be affected by construction of the overhead line, reducing the overall spread of the works across the island. The site comprises a number of large fields with hedgerow boundaries with trees which will need to be protected.
Historic Environment	There are no designated heritage assets within the immediate vicinity of the site. A scheduled Standing Stone is located approximately 500 meters to the south. There are no undesignated assets recorded on the Historic Environment Record and historic mapping does not identify any structures or features other than a small quarry. Archaeological assessment and mitigation may be required.
Ecology and Nature Conservation	This compound area lies within an area of mostly improved grassland fields, but also small areas of woodland and possible marshy grassland. A river lies on the eastern boundary and the site is close to areas of marshy grassland, and 700 m to the south of Caeau Talwrn SSSI and Tir Pori Talwrn County Wildlife Site (CWS). The site is located 1.6km from the Anglesey Fens SAC and Ramsar and the Cors Bodeilio SSSI. The site is also 750 m from the Cors Tregarnedd Fawr CWS but it is not hydrologically linked; - some 750 m south of semi-natural woodland CWS Gylched Covert however the proposed overhead line goes through here; - potential pond on site, others in vicinity that have not yet been assessed; - adjacent to a Land Stewardship Parcel (across road) of unknown type. Potential to affect protected species including barn owl, birds, badger, otter, water vole, reptiles, invertebrates, red squirrel, GCN and bats (habitats suitable for supporting these species is within and adjacent to the site).
Geology, Hydrogeology and Ground Conditions	Located on Glacial Till overlying Limestone. Depending on the thickness and permeability of Glacial Till low risk to groundwater if spillages/ leakages from plant/ fuel tanks etc. Appropriate hard standing and drainage would be required for storage refuelling area/ car park if Glacial Till shown to be thin/ permeable.
Hydrology	The site is bisected by an area of Flood Zone 3 and 2, the remaining 70% of the site, split either side of this is in Flood Zone

Table 9.1: Summary of Environmental Socio-economic and Technical Appraisal for Proposed Main Construction Compound Site east of Llangefni.

Topic	Summary of Appraisal
	The site is located in the headwaters of the Afon Ceint WFD catchment. From a desk based assessment, the site drains to the Afon Ceint, 1km to the southwest, which has a moderate WFD status, not achieving good status due to the need for ecological mitigation (Heavily Modified Water Body for flood defence). The site is upstream of the Malltreath Marsh (SSSI). The construction areas would need to avoid small field drains located on the site.
Traffic Transport and Access	This site would be accessed via B5420 from A55 and A5025 and could route via Four Crosses roundabout through Penmynydd towards Llangefni. A bespoke access junction is likely to be required. The Llangefni link road (under construction and due to open in 2017) would allow for access to the site from the A55 J6 avoiding routeing through Llangefni and benefits from a shorter journey to the A55 rather than routeing along the B5420 to Junction 8 as would be necessary without the proposed link road.
Air Quality	Located within 100m of the nearest dust sensitive receptors. Dust mitigation measures will need to be of a level that controls emissions to the extent that a significant dust impact does not occur. It is assumed that construction traffic will access the compound from the A55, via the B5420. The most direct route for which would be through the town of Llangefni, where there are a number of air quality sensitive receptors located in close proximity to the road. Accessing the site from the east would have less air quality impact, although there are still a number of receptors located adjacent to the road (particularly in Penmynydd). Accessing the site from the east would also likely increase the number of vehicle kilometres travelled and total emissions. Impacts of construction vehicle emissions on receptors located in close proximity to the A55 and local roads near to the construction works are still likely to occur.
Construction Noise	A large site situated some 2.2 km east of Llangefni on isolated remote farmland and partially under the existing overhead line to Wylfa. There appears to be a cottage adjacent to the proposed boundary next to the B5420 and other properties within 300 m of the compound boundary. On the basis that there was some flexibility on the location of the boundary, there are no specific concerns.
Socio Economics	The site is located adjacent to woodland and the SSSI (Caeau Talwrn) to the north of the site. A civil engineering business is located to the north of the site. Hirdre-Faig standing stone is located to the south of the site.
Agriculture and Land Use	Peaty soils and ALC Grade 3 (potential BMV land) have been identified on the site.

Table 9.1: Summary of Environmental Socio-economic and Technical Appraisal for Proposed Main Construction Compound Site east of Llangefni.

Topic	Summary of Appraisal
Technical Considerations	The site is situated in pasture and slopes gently away to either side of the proposed access route. Therefore some minimal re-grading is likely to be required. A new access point would be required onto the B5420 public highway for the proposed construction access road serving pylon construction areas in Section D of the route. Therefore this access point could also be utilised for the main construction compound. The extent of the site within the Proposed Project Boundary provides flexibility to optimise the local siting and layout of the final compound

9.8 Conclusion.

9.8.1 Following the identification and appraisal of a range of potential sites for the temporary main construction compound on Anglesey, site Option 2.2 is preferred and is brought forward as part of the proposed project for Stage 3 Consultation.

9.8.2 The site meets all of the siting criteria. It is ideally located in proximity to the road network, with traffic being able to access the site from the A55 via the Llangefni Relief Road, currently under construction. This would allow delivery construction vehicles visiting the site to avoid passing through local residential areas. The site and the access route from the A55 is shown on Figure J-3 of Appendix 3.

9.8.3 The site is also located towards the centre of the overhead line construction area, but somewhat closer to the A55 which will be the main arterial route for deliveries onto the island. The site would prove an effective logistics centre to receive bulk deliveries and consolidate loads for onwards distribution to local construction sites.

9.8.4 The site whilst not naturally screened is relatively remote from sensitive receptors. The large area of open land would allow flexibility to sympathetically locate the main compound so as to further reduce any temporary effects.

9.8.5 The site is relatively flat and there are no expected engineering challenges in establishing the compound in this location.

9.8.6 It is acknowledged that appropriate traffic management measures such as prohibited vehicle routes would need to be agreed.

10 OVERVIEW OF PROPOSED ALIGNMENT

10.1 Introduction

10.1.1 The proposed alignment provides for new build overhead line works and works to the existing Wylfa - Pentir 400kV overhead line, including transpositions where the new overhead line would transfer from one side of the existing 400kV overhead line to the other. Accordingly the two routes that would be formed between Wylfa and Pentir would comprise both new and existing pylons and sections of line (and in the case of the western route, a 4.2 kilometre section of underground cable at the Menai Strait Crossing Area).

10.1.2 As referenced at Section 3.4 of this Report, 19.3 kilometres of the 24.4 kilometre preferred Route Option identified in Sections A-D is considered a close parallel alignment. A further 2.5 km is considered to be broadly parallel whilst the remaining 2.6 km of the proposed route forms the wider deviation away from the existing line to avoid routeing through Cors Erddreiniog SAC and NNR. Accordingly around 90% of the route would appear to provide opportunities to synchronise the design of the two lines all other things being equal.

10.1.3 Having defined the detailed design now proposed it is appropriate to review to what extent a closely synchronised design has been achieved and where local considerations have had a bearing on the design such that pylons have been positioned to take account of these. It is also possible to understand exactly how the two routes between Wylfa and Pentir would be formed as a result of the proposed new overhead line build. This information is set out in this Chapter.

10.2 Parallel and Synchronised Design

10.2.1 The proposed design within Sections A-D of the route that is now being brought forward for Stage 3 Consultation involves 144 proposed or existing pylons. Of these, 98 pylons (i.e. 46 pairs) have been referred to as ‘synchronised’ locations for the purpose of this report.

10.2.2 However 19 existing pylons and 27 new pylons (46 in total) would not be located within 50 metres longitudinally of the nearest pylon on the adjacent line and might not therefore be regarded as substantially synchronised. Inevitably however this will be a somewhat subjective judgement and will be heavily influenced by the angle from which the lines and pylons are being viewed.

10.2.3 Of the 46 pylons which are not within 50 metres longitudinally of another pylon on the adjoining route, 12 (5 existing and 7 proposed) are located within the section of the route where the proposed new line diverts away from the existing line to

avoid direct impacts upon the Cors Erddreiniog SAC and NNR. Therefore within Sections A to D of the route, where the alignment affords the opportunity to develop a synchronised design, approximately three quarters of the existing and proposed pylons would be synchronised.

10.2.4 Where this is not the case judgements have been made regarding the siting and design of each pylon that is not synchronised to this same extent. In these cases National Grid believes that the overall effects of the proposed new line would be reduced if greater weight were given to local siting constraints rather than rigidly adhering to the design objective of synchronising the two lines. This judgement is based upon the findings of ongoing assessments, consultation feedback and professional judgement, having regard to all of the design considerations set out in Chapter 3.

10.2.5 The extent to which it has been possible to develop a synchronised design proposal within the preferred Route Option for most of the route length has gone some way towards reducing the significance of the potential environmental and socio-economic effects within the wider area.

10.2.6 Having given consideration to the ways in which the detailed design might assist in reducing or mitigating the socio-economic and environmental effects of the proposed new line, in no location is it currently considered necessary to amend the design such that the alignment would extend beyond the broader preferred Route Options previously identified.

10.2.7 These outcomes serve to confirm the validity of assumptions made at earlier stages of the project concerning the likelihood of being able to identify an acceptable closely routed alignment.

10.2.8 The degree to which the proposed design achieves a coherent appearance can best be judged through the use of illustrative materials. National Grid has produced a large number of photomontages of the proposed new line which can be found at Volume 2.4.5 of the Preliminary Environmental Information in the Stage 3 Consultation Reference Pack.

10.2.9 National Grid has also produced a computer generated 3D landscape for the whole of the North Wales Connection route, which allows the viewer to ‘see’ the proposed design within its landscape setting. This model will be available to view at Consultation Events. Video clips taken from the model showing some of the more significant viewpoints will also be available to view online at www.northwalesconnection.com.

10.3 Overview of Route in Sections A-D

10.3.1 An overview of the proposed new sections of overhead line in Sections A-D of the route is shown on Figure K-1 in Appendix K to this Report. Table 10.1 below provides a summary of the lengths of each of the proposed sections of new overhead line.

Table 10.1. Summary of Proposed Routes between Wylfa and Pentir

New build lengths (5 lengths):		
4AP: Wylfa Line Entry (west)	Section A	0.3 km
4ZA: New Line Length East	Sections A & B	10.2 km
4AP: New Line Length West	Section B	4.9 km
4ZA: New Line Length East	Section C	2.4 km
4AP: New Line Length West	Sections C, D and E	15.8 km
4AP: (New Line Length Gwynedd)	(Section F)	**1.3 km**
		34.9 km
Removed line lengths (4 lengths):		
Wylfa Line Entry	Section A	0.3
Existing Line (Rhosybol)	Section B	2.3
Existing Line (Llandyfrydog Transposition)	Section C	0.3
Existing Line (Maenaddwyn Transposition)	Section C	0.7
		3.6km
Retained line with work (3 lengths):		
4AP: Existing Line West	Section A	7.1km
4ZA: Existing Line East	Section B	2.2 km
4AP: Existing Line West	Section C	1.4 km
		10.7km
Retained line: no work (1 length):		
4ZA: Existing Line East	Sections C, D and E (Anglesey) and Section F (Gwynedd)	20.9km

10.3.2 In combination, the proposed new and retained existing lengths of overhead line set out in the table above will form the two overhead line routes needed between Wylfa and Pentir.

10.3.3 The southern and western route would be known as the 4AP route and would comprise a mix of new L12 and existing L6 pylons. On the Anglesey side between Wylfa and the proposed Sealing End Compound and Tunnel Shaft Site the line would be 29.3 kilometres in length.

10.3.4 The second route, running to the north and east of the 4AP, would be known as the 4ZA route. This would also comprise a mix of new L12 and existing L6 pylons. The continuous route length between Wylfa and Pentir would be 35.4 kilometres in length.

11 NEXT STEPS

11.1 Introduction

11.1.1 The current stage of consultation forms the statutory consultation required under the Planning Act 2008 and is supported by the detailed design and environmental assessment work undertaken to date.

11.1.2 National Grid has already undertaken two stages of consultation on the North Wales Connection Project. This is the Stage 3 consultation and is likely to be the last consultation on the whole project.

11.1.3 Following close of the consultation National Grid will consider all feedback received. Further appraisal of the proposals will be carried out in relation to environmental, socio-economic, technical and cost in the context of the policies set out in NPS EN-1 and EN-5, as well as National Grid's statutory duties. The outcomes of this further appraisal work will be considered alongside the consultation feedback received.

11.1.4 A final design will be identified and an application for a Development Consent Order (DCO) prepared and submitted to the Planning Inspectorate for consideration. To support the application an Environmental impact assessment will be carried out

11.1.5 Further information on the consultation and the DCO process is provided in the following sections of this chapter.

11.2 Stage 3 (Statutory) Consultation

11.2.1 This stage of consultation seeks feedback on the project and the detailed design that is being taken forward for environmental assessment.

11.2.2 The project proposals will be considered in light of feedback received and if necessary further survey design and appraisal work would be carried out. It is expected that changes will be made to the design following review of consultation feedback and this is likely to include both change to the design and mitigation

11.2.3 The consultation feedback received would be used alongside detailed survey and assessment work to assist in optimising the scheme design in relation to the human, built and natural environment, taking account of economic and technical factors

11.2.4 As part of the consultation process discussions will be held with people who have an interest in the land where equipment, both temporary and permanent, is likely to be sited. All consultation feedback from people with an interest in land will be

used to review the design and if necessary further assessment work will be undertaken to inform changes.

11.2.5 A Consultation Feedback report, setting out all of the feedback received, will be published to support the DCO application in 2017.

11.2.6 The final design to support the DCO application will be presented in a similar level of detail as that presented for the Stage 3 consultation.

11.3 Mitigation Measures to Limit Effects of the Project

11.3.1 A full range of mitigation measures is being developed to reduce all aspects of the environmental and social-economic effects of the final proposal. This could include, for example, the application of detailed construction phase environmental management and traffic management plans. Other measures will be developed in discussion with statutory and other stakeholders on topics including cultural heritage, ecology and socioeconomic effects. A number of specific measures are discussed in more detail below.

Screen Planting

11.3.2 Where particularly sensitive or adversely-affected viewpoints are identified, the planting of vegetation to screen or break-up the view may be appropriate. This may be effective, for example, to screen individual pylons that would be visible from the principal outlook of residential properties or associated gardens. Such mitigation might be carried out within the residential curtilage in agreement with the householder, or could take place on third party land with appropriate landowner agreement. Examples might include the establishment of hedgerows and hedgerow trees in the highway boundary opposite the property or small copses in adjoining field corners.

Landscape Enhancement / Restoration Strategies

11.3.3 Where screen planting is undesirable or cannot be effectively implemented, the development and implementation of landscape enhancement could prove effective to reduce the effects of any new line. At the small scale this could simply involve introducing new focal points into garden landscaping. On a wider scale, landscape strategies might include extensive planting initiatives involving the creation, enhancement and management of woodland blocks, hedgerows and other habitats. Any such initiative would need to take account of the landscape characteristics and management objectives for the area, as set out in the Councils' landscape strategies, but could be effective in the medium and long-term to better accommodate the line within the surrounding landscape.

Residential Amenity

11.3.4 The Isle of Anglesey and Gwynedd Councils, together with the Snowdonia National Park Authority, have commissioned a study to consider whether it would be appropriate, to maintain residential amenity, for the Councils to establish a minimum separation distance between wind turbines or pylons and residential properties. This report, published in July 2014 as part of the evidence base for the new JLDP, concluded that "...there is no conclusive evidence to support the application of a strict separation distance...in terms of visual residential amenity. For this reason it is recommended that each proposed development should be considered on its own merits on a case by case basis". However, the report did suggest that the Councils may wish to adopt a 'trigger distance' within which the developer should carry out a 'visual residential impact assessment' for those affected properties. National Grid advisors have such an assessment in preparation for the wider EIA of any final overhead line proposal.

11.3.5 When selecting and refining any final design proposal, National Grid will strive not to oversail the curtilages of any residential property with the new line except where prior agreement could be voluntarily reached with the affected householder. Even in these circumstances an oversail would only be proposed where:

- such a design might offer clear advantages over alternatives that would avoid any such oversail; and
- any resultant impact upon residential amenity could be justified in accordance with NPS EN-1 and EN-5.

Use of Alternative Technologies to Avoid Effects of Route Options

11.3.6 The use of buried cables, or other non-overhead technologies, will continue to be assessed in detail to establish if there are any areas within the project where the selection of the optimum overhead route option and the application of good design principles or detailed mitigation measures would still result in an overhead line design conflicting with national planning policy or other statutory considerations. A careful judgement would be made as to the appropriateness of the alternative technologies, in accordance with the balance of considerations set out in paragraphs 2.8.8 and 2.8.9 of NPS EN-5. This is in addition to the already acknowledged need to use underground technology for the AONB and Menai Strait crossing.

11.4 Environmental Impact Assessment

11.4.1 Environmental Impact Assessment (EIA) is a process for assessing the likely significant environmental effects of a proposed project.

11.4.2 Environmental studies have been undertaken in support of the appraisal of the options considered to date and National Grid's ongoing work, and these will continue and be further extended during the EIA stage of the pre-application process. Consultation is ongoing with stakeholders on the scope and methodologies to be employed for the environmental assessments.

11.4.3 The Preliminary Environmental Report that forms one of the Stage 3 consultation document sets out what environmental assessment work has been undertaken to date and how the project will be subject to further detailed environmental assessment.

11.4.4 The assessment of the environmental impacts associated with the final development proposal for which a DCO is being sought will be published in an Environment Statement to accompany the application for development consent.

11.5 The DCO Application and timeline

11.5.1 The DCO pre-application process is a significant component of the application programme. It involves the development of a scheme that has been tested and subjected to review, consultation and environmental assessment. The intention is to ensure that when a DCO application is submitted, the scheme represents the optimum balance of environmental, socio-economic, technical and economic factors, taking account of consultation feedback through statutory and non-statutory routes. The pre-application work also includes surveys, environmental assessments and the preparation of all DCO application documents.

11.5.2 Once the design proposal has been finalised, a draft Development Consent Order is prepared. The draft Order sets out the nature of the development for which consent is being sought together with any accompanying property rights sought over land within the geographical limits defined by the Order.

11.5.3 The application seeking development consent is then submitted to the Planning Inspectorate with significant supporting information for examination. Stakeholders have the opportunity to register themselves as interested parties and to make representations as part of the examination process.

11.5.4 Having heard submission from all interested parties the Examining Authority produces a report and recommendation for the Secretary of State to consider. It is the Secretary of State who then makes a final decision whether or not to confirm the DCO.

11.5.5 A high level summary of the DCO programme for the North Wales Connection project is presented in Table 15.1 below.

Figure 15.1. The anticipated DCO Programme.

Stage of the Process	Timescale	Indicative Programme Dates	Features
Pre-Application	No time limit	Work in progress, progressing until late 2017, with formal pre-application consultations during 2016.	Applicant develops proposal and carries out pre-application consultation. Includes surveys, environmental assessments and preparation of all DCO application documents.
Application	No time limit	Late 2017	Application for development consent made to the Secretary of State.
Acceptance by the Planning Inspectorate	Up to 28 days	Late 2017	Secretary of State has 28 days to review application and decide whether to accept it for consideration, or reject it.
Pre-examination	Two to four months	Late 2017 – Early 2018	Examining Authority of Government inspectors appointed to assess issues and hold preliminary hearing. Preliminary meeting – procedural decision on how the application is to be examined.
Examination	Up to six months	Mid 2018	Six months to carry out the examination, including all hearings.
Report and recommendation	Up to three months	Late 2018 – Early 2019	Report and recommendations of the Examining Authority drafted and issued to the Secretary of State.
Decision	Up to three months	Early – Mid 2019	Decision and statement of reasons drafted and issued by the Secretary of State.

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Appendix A. **Route Option Selected for Detailed Design**

Appendix B. **Environmental and Socio-Economic Sites and Features along the Route.**

Appendix C. **Comparison Drawing Showing L6 (Existing) and L12 (Proposed) Pylon Designs**

Appendix D. **Transposition Design Drawings**

Appendix E. **Proposed Detailed Alignment Drawings**

Appendix F. **Third Party Works Construction Drawings**

Appendix G. **National Grid Works Construction Drawings**

Appendix H. **Detailed Clearance Designs for locations along the route.**

Appendix I. **Overhead Line Design Evolution in the Rhosgoch and Rhosybol areas.**

Appendix J. **Construction Compound: Generic Layout, Site Options and Access to Preferred Site.**

Appendix K. **Overview of Proposed Alignments between Wylfa and Menai Crossing Area.**

Appendix L. **Route-Specific Pylon Design Summary Table**

Appendix M. **Table Summarising Other Drawings Available at Stage 3 (statutory) Consultation.**

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APPENDIX A.

ROUTE OPTION SELECTED FOR DETAILED DESIGN

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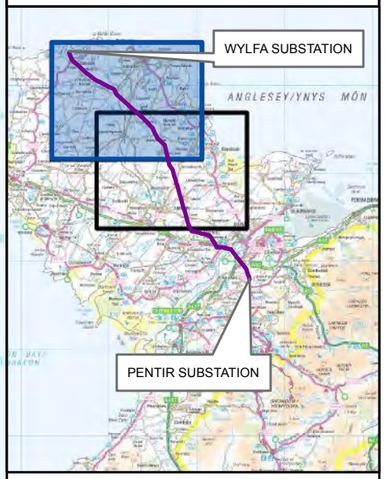
FIGURE A-1



Legend

- EXISTING WYLFA SUBSTATION
- PREFERRED ROUTE CORRIDOR FOLLOWING ROUTE OPTIONS APPRAISAL
- INDICATIVE NEW BUILD OVERHEAD LINE CENTRELINE
- EXISTING 4ZA OVERHEAD LINE CENTRELINE
- INDICATIVE EXISTING 4ZA OVERHEAD LINE CENTRELINE TO BE DISMANTLED

Notes

0 0.5 1 2 km

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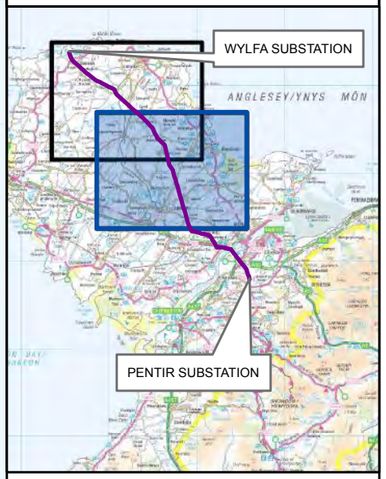
FIGURE A-1



Legend

- EXISTING WYLFA SUBSTATION
- PREFERRED ROUTE CORRIDOR FOLLOWING ROUTE OPTIONS APPRAISAL
- INDICATIVE NEW BUILD OVERHEAD LINE CENTRELINE
- EXISTING 4ZA OVERHEAD LINE CENTRELINE
- INDICATIVE EXISTING 4ZA OVERHEAD LINE CENTRELINE TO BE DISMANTLED

Notes

0 0.5 1 2 km

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APPENDIX B.

ENVIRONMENTAL AND SOCIO-ECONOMIC SITES AND FEATURES ALONG THE ROUTE

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Figure B-1

N

ARFORDIR MYNYDD Y WYLFA - TRWYN PENRHYN COUNTY WILDLIFE SITE

ARFORDIR TRWYN Y BUARTH - PORTH WEN COUNTY WILDLIFE SITE

TIR LLEIDIOG LLANLLEIANA COUNTY WILDLIFE SITE

ARFORDIR TRWYN Y BUARTH - PORTH WEN COUNTY WILDLIFE SITE

PORTH WEN BRICKWORKS SAM

LLANBADRIG - DINAS GYNFOR SSSI

CORS CAE OWEN COUNTY WILDLIFE SITE

ARFORDIR MYNYDD Y WYLFA - TRWYN PENRHYN COUNTY WILDLIFE SITE

LLANBADRIG - DINAS GYNFOR SSSI

Wylfa Power Station

Wylfa Substation

4ZA004

TIRGWLYB TEILIA NEUADD COUNTY WILDLIFE SITE

TIR LLEIDIOG TY DU COUNTY WILDLIFE SITE

TRWYN PENCARREG COUNTY WILDLIFE SITE

TY CEFN LB

TRE'R GOF SSSI

CESTYLL

Tregele

CEMAES MILL LB

Afon Wygr

AFON WYGYR COUNTY WILDLIFE SITE

Carrog

STANDING STONES SAM

STANDING STONE 410M NORTH OF CHURCH SAM

CORS CROM LECH COUNTY WILDLIFE SITE

CAE GWYN SSSI

RECTORY LB

WAR MEMORIAL LB

CHURCH OF ST MECHELL LB

PEN-Y-MORWYD ROUND BARROW SAM

LLIFAD, CARREGLEFN SAM

Bodewryd

LLYN LLYGEIRIAN SSSI

MYNEDD MECHELL & SURROUNDS PSLA

BODEWRYD STANDING STONE SAM

RHOSTIR MYNYDD MECHELL COUNTY WILDLIFE SITE

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line

Designations

- Area of Outstanding Natural Beauty
- Proposed JDPD Special Landscape Area
- Scheduled Ancient Monuments
- Scheduled Ancient Monuments
- Listed building (LB) - Grade I
- Listed building (LB) - Grade II*
- Listed building (LB) - Grade II
- Registered Parks and Gardens (RPG)
- Landscape of Historic Interest
- Conservation Area
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Sites of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- Ramsar
- National Nature Reserve (NNR)
- Ancient Woodland
- County Wildlife Site
- Tree Preservation Orders
- Wales Coast Path
- National Cycle Routes

0 250 500 1,000
Metres

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N

Wylfa Power Station

Wylfa Substation

4AP001

4ZA004

Tregele

Wind Farm

Wind Farm

Ferm Wynt Wind Farm

Afon Wygr

Carrog

Llanfechell

Waste TreatmentWorks

Bodewryd

Mynydd Mechell

0 250 500 1,000
Metres

Figure B-2

Legend

- Wylfa Substation/Power Station
- 132kV Overhead Line
- 132kV Overhead Line (SPEN Asset)
- 132kV Underground Cable
- Proposed Locations of New Pylons
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Existing National Grid 400 kV overhead line

Constraints

- Disused Railway
- Water Treatment Works
- NRW Flood Zones 2 & 3
- A Road
- B Road

Elevation (m)

0 - 10	40 - 50	90 - 100
10 - 20	50- 60	100 - 110
20 - 30	60 - 70	110 - 120
30 - 40	70- 80	120 - 130
	80 - 90	130m+

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Figure B-3

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
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- Settlement
- Hotels, B&B and Apartments
- Caravan, Camping or Holiday Park
- Visitor Attraction
- Golf Course
- Sports or Leisure
- Public Rights of Way
- National Cycle Routes
- Wales Coast Path
- Nature Reserve
- Housing
- Employment

Wylfa Power Station

Wylfa Substation

4ZA004

4AP001

Tregele

Carrog

Afon Wygr

Llanfechell

Bodewryd

Wylfa Head

Cemaes Bay

Cemaes

LLANBADRIG G.C.

MECHELL C.

Mynydd Mechell

Fferm Wynt Rhyd-y-groes (Wind Farm)

0 250 500 1,000

Metres

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Figure B-4

MYNEDD MECHELL & SURROUNDS PSLA

BODEWRYD STANDING STONE SAM

Gwredog

PARYS MOUNTAIN: WINDMILL, ENGINE HOUSE, PRECIPITATION PITS AND GREAT OPENCAST SAM

MONA MINE KILNS AND SUBLIMATION CHAMBERS, MYNYDD PARYS SAM

PARYS MOUNTAIN: WINDMILL, ENGINE HOUSE, PRECIPITATION PITS AND GREAT OPENCAST SAM WILDLIFE SITE

MYNYDD PARYS COUNTY WILDLIFE SITE

MYNYDD PARYS SSSI

MYNYDD PARYS SSSI

LLYN HAFODOL AND CORS CLEGYROG SSSI

4ZA025

Hafodol-ganol

Rhosgoch

4ZA026

PARYS MOUNTAIN & SLOPES PSLA

4AP023

PEN-Y-FYNWENT BARROW SAM

PEN-Y-FYNWENT ENCLOSURE SAM

LLYN HAFODOL AND CORS CLEGYROG SSSI

Rhosybol

Lletty

Afon Goch

Capel Parc

Llyn Alaw

Llyn Alaw Reservoir

LLYN ALAW SSSI

Bodneithior

4AP037

LLYS EINION STANDING STONE SAM

MAEN CHWYF SAM

COED CAE MAWR COUNTY WILDLIFE SITE

Llandyfrydog

4ZA042

CHURCH OF ST TYFRYDOG LB

RECTORY LB

Afon Alaw

LLYN ALAW SSSI

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line

Designations

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- Proposed JDPD Special Landscape Area
- Scheduled Ancient Monuments
- Scheduled Ancient Monuments
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- Listed building (LB) - Grade II*
- Listed building (LB) - Grade II
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- Conservation Area
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Sites of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- Ramsar
- National Nature Reserve (NNR)
- Ancient Woodland
- County Wildlife Site
- Tree Preservation Orders
- Wales Coast Path
- National Cycle Routes

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Gwredog
Parys Mountain
4ZA025
Hafodol-ganol
Rhosgoch
4ZA026
Wind Farm
4AP023
Wind Farm
Rhosybol
Lletty
Llyn Alaw
Afon Goch
Capel Parc
Bodneithior
4AP037
Llandyfrydog
4ZA042
Afon Alaw

Figure B-5

Legend

- Wylfa Substation/Power Station
- 132kV Overhead Line
- 132kV Overhead Line (SPEN Asset)
- 132kV Underground Cable
- Proposed Locations of New Pylons
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Existing National Grid 400 kV overhead line

Constraints

- Disused Railway
- Water Treatment Works
- NRW Flood Zones 2 & 3
- A Road
- B Road

Elevation (m)

0 - 10	40 - 50	90 - 100
10 - 20	50- 60	100 - 110
20 - 30	60 - 70	110 - 120
30 - 40	70- 80	120 - 130
	80 - 90	130m+

0 250 500 1,000 Metres

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Figure B-6

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Residential Property (Dwelling)
- Settlement
- Hotels, B&B and Apartments
- Caravan, Camping or Holiday Park
- Visitor Attraction
- Golf Course
- Sports or Leisure
- Public Rights of Way
- National Cycle Routes
- Wales Coast Path
- Nature Reserve
- Housing
- Employment

Gwredog
Parys Mountain
4ZA025
Hafodol-ganol
Rhosgoch
4ZA026
4AP023
Rhosybol
Lletty
Llyn Alaw
Afon Goch
Capel Parc
Bodneithior
4AP037
Llandyfrydog
4ZA042
Afon Alaw

0 250 500 1,000
Metres

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Figure B-7

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line

Designations

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- Proposed JDPD Special Landscape Area
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- Scheduled Ancient Monuments
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- Listed building (LB) - Grade II*
- Listed building (LB) - Grade II
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- Landscape of Historic Interest
- Conservation Area
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Sites of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- Ramsar
- National Nature Reserve (NNR)
- Ancient Woodland
- County Wildlife Site
- Tree Preservation Orders
- Wales Coast Path
- National Cycle Routes

Bodneithior
4AP037
Llandyfrydog
4ZA042
4ZA043
RECTORY LB
CHURCH OF ST TYFRYDOG LB
LLYS EINION STANDING STONE SAM
MAEN CHWYF SAM
COED CAE MAWR COUNTY WILDLIFE SITE
BODAFON-Y-GLYN WOOD COUNTY WILDLIFE SITE
PLAS BODAFON, STANDING STONE TO WNW OF SAM
PENRHOS LLIGWY SSSI
Mynydd Bodafon
MYNYDD BODAFON COUNTY WILDLIFE SITE
BODAFON MOUNTAIN HUT GROUPS SAM
BODAFON MOUNTAIN EARLY MEDIEVAL HOMESTEAD SAM
Llwydiarth Esgob Farm
CARREG LEIDR SAM
LLWYDIARTH ESGOB FARMHOUSE LB
TYDDYN Y WAEN SSSI
LLYN LLWYN-CRWN A SGARP CAERHOS LLIGWY COUNTY WILDLIFE SITE
RHOSTIR PONCIAU COUNTY WILDLIFE SITE
Llanerchymedd
PARCIAU ESTATELANDS PSLA
GRAIGFRYN COUNTY WILDLIFE SITE
CORS FRIGAN COUNTY WILDLIFE SITE
MAEN ADDWYN SAM
LLECH GOLMAN SAM
Cae Fabli
COED CEFN-DU COUNTY WILDLIFE SITE
CORS ERDDREINIOG SSSI
CORSYDD MON I ANGLESEY FENS SAC
Capel Coch
MAEN GWYN SSSI
PARCIAU ESTATELANDS PSLA

0 250 500 1,000
Metres

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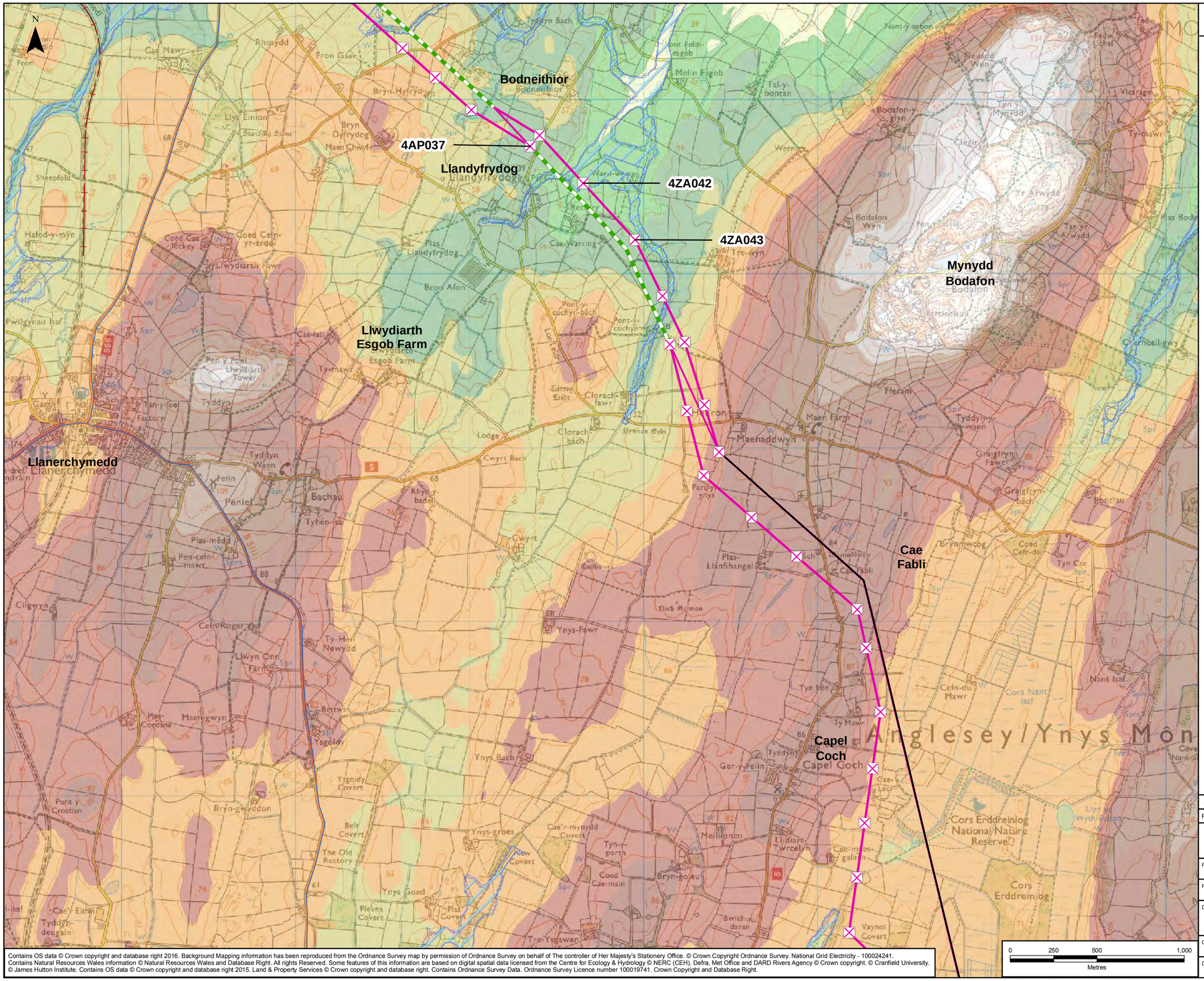

Figure B-8

Legend

- Wylfa Substation/Power Station
- 132kV Overhead Line
- 132kV Overhead Line (SPEN Asset)
- 132kV Underground Cable
- Proposed Locations of New Pylons
- Proposed Alignment of New Section of 400 kV Overhead Line
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- Unaffected Section of Existing 4ZA Overhead Line
- Existing National Grid 400 kV overhead line

Constraints

- Disused Railway
- Water Treatment Works
- NRW Flood Zones 2 & 3
- A Road
- B Road

Elevation (m)

0 - 10	40 - 50	90 - 100
10 - 20	50- 60	100 - 110
20 - 30	60 - 70	110 - 120
30 - 40	70- 80	120 - 130
	80 - 90	130m+

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Figure B-9

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
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- Settlement
- Hotels, B&B and Apartments
- Caravan, Camping or Holiday Park
- Visitor Attraction
- Golf Course
- Sports or Leisure
- Public Rights of Way
- National Cycle Routes
- Wales Coast Path
- Nature Reserve
- Housing
- Employment

Bodneithior
4AP037
Llandyfrydog
4ZA042
4ZA043
Mynydd Bodafon
Llwydiarth Esgob Farm
Llanerchymedd
Cae Fabli
Capel Coch
Anglesey/Ynys Môn
Cors Erddreiniog National Nature Reserve
Cors Erddreiniog

0 250 500 1,000
Metres

Rev	Date	Description	GIS	Chk	App
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Figure B-10

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line

Designations

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- Proposed JDPD Special Landscape Area
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- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
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- Ramsar
- National Nature Reserve (NNR)
- Ancient Woodland
- County Wildlife Site
- Tree Preservation Orders
- Wales Coast Path
- National Cycle Routes

LLECH GOLMAN SAM
CHWAREL FRIGAN COUNTY WILDLIFE SITE
CORS ERDDREINIOG SSSI
MAEN GWYN SSSI
Capel Coch
CORSYDD MON / ANGLESEY FENS SAC
PARCIAU ESTATELANDS PSLA
CORS GOCH SSSI
Afon Cefni
Afon Erddreiniog
Tregaian
MAEN ERYR COUNTY WILDLIFE SITE
PRYSAN/GALCHFAEN / FAGWYR FAWR COUNTY WILDLIFE SITE
CRAIG WEN/CORS CASTELL SSSI
ISLE OF ANGLESEY / SIR YNYS MON
CLEGYRDY BACH / NEUADD WEN / TY'N BEUDY COUNTY WILDLIFE SITE
CORS Y FARL SSSI
CAEAU TALWRN SSSI

0 250 500 1,000
Metres

Rev	Date	Description	GIS	Chk	App
JF	14/09/2016	Initial Issue	JF	JB	CC

nationalgrid

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT CONSTRAINTS DRAWINGS

Document Title: WYLFA-PENTIR SECTION 3 (SOUTH) OPTIONS LANDSCAPE, ECOLOGY AND CULTURAL HERITAGE FEATURES

Creator:	Date:	Checker:	Date:	Approver:	Date:
JF	12/09/2016	JB	12/09/2016	CC	14/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	4 of 5	0

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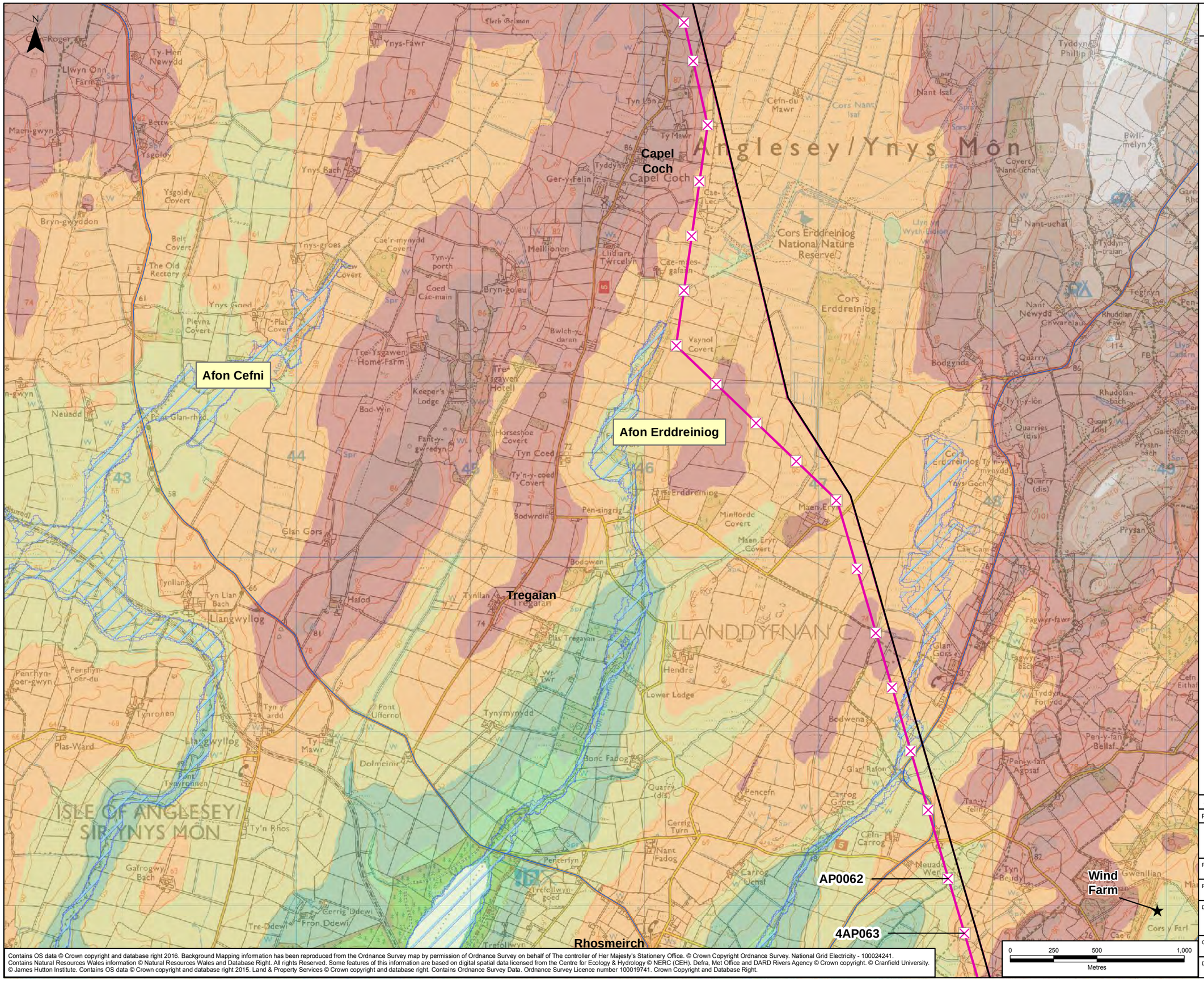

Figure B-11

Legend

- Wylfa Substation/Power Station
- 132kV Overhead Line
- 132kV Overhead Line (SPEN Asset)
- 132kV Underground Cable
- Proposed Locations of New Pylons
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Existing National Grid 400 kV overhead line

Constraints

- Disused Railway
- Water Treatment Works
- NRW Flood Zones 2 & 3
- A Road
- B Road

Elevation (m)			
0 - 10	30 - 40	60 - 70	90 - 100
10 - 20	40 - 50	70- 80	100 - 110
20 - 30	50- 60	80 - 90	110 - 120
			120 - 130
			130m+

0 250 500 1,000
Metres

Rev	Date	Description	GIS	Chk	App
JF	12/09/2016	Initial Issue	JF	JB	CC

nationalgrid

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT CONSTRAINTS DRAWINGS

Document Title: WYLFA-PENTIR SECTION 3 (SOUTH) OPTIONS ELEVATION, INFRASTRUCTURE AND FLOOD RISK

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FIGURE	1:20,000	A3	4 of 5	0

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Figure B-12

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Residential Property (Dwelling)
- Settlement
- Hotels, B&B and Apartments
- Caravan, Camping or Holiday Park
- Visitor Attraction
- Golf Course
- Sports or Leisure
- Public Rights of Way
- National Cycle Routes
- Wales Coast Path
- Nature Reserve
- Housing
- Employment

Afon Cefni

Afon Erddreiniog

Capel Coch

Tregaian

AP0062

4AP063

0 250 500 1,000
Metres

Rev	Date	Description	GIS	Chk	App
JF	14/09/2016	Initial Issue	JF	JB	CC

nationalgrid

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT CONSTRAINT DRAWINGS

Document Title: WYLFA-PENTIR SECTION 3 (SOUTH) OPTIONS PLANNING AND TOURISM

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JF	12/09/2016	JB	12/09/2016	CC	14/09/2016

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FIGURE	1:20,000	A3	4 of 5	0

Document Path: F:\Proposal\3512\North Wales Connection - NG\GIS\02 Maps\All Disciplines_Route Options Figures\Draft Route Alignment Report - Constraints - Planning_and_Tourism_20160912_JF.mxd

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Figure B-13

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line

Designations

- Area of Outstanding Natural Beauty
- Proposed JDPD Special Landscape Area
- Scheduled Ancient Monuments
- Scheduled Ancient Monuments
- Listed building (LB) - Grade I
- Listed building (LB) - Grade II*
- Listed building (LB) - Grade II
- Registered Parks and Gardens (RPG)
- Landscape of Historic Interest
- Conservation Area
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Sites of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- Ramsar
- National Nature Reserve (NNR)
- Ancient Woodland
- County Wildlife Site
- Tree Preservation Orders
- Wales Coast Path
- National Cycle Routes

CLEGYRDY BACH / NEUADD WEN / TY'N BEUDY COUNTY WILDLIFE SITE
CORSYDD MON / ANGLESEY FENS SAC
CORS Y FARL SSSI
LLANDDYFNAN STANDING STONE SAM
GWENFRO AND RHOS Y GAD SSSI
CORS BODEILIO SSSI
CAEAU TALWRN SSSI
Rhosmeirch
Afon Clai
Talwrn
TIR PORI TALWRN COUNTY WILDLIFE SITE
Hendre Hywel
Y DINGLE COUNTY WILDLIFE SITE
Llangefni
COED TY FRY COUNTY WILDLIFE SITE
GORCHUDDEN GYLCHED COUNTY WILDLIFE SITE
Afon Ceint
Ceint
TRE-GARNEDD MOATED SITE SAM
4AP073
HIRDRE-FAIG STANDING STONE SAM
4AP074
Penmynydd
CORS TREGARNEDD FAWR COUNTY WILDLIFE SITE
MALLTRAETH MARSH/CORS DDYGA SSSI
OLD PARISH CHURCH & CHURCHYARD SAM
CORS BOD-YNYS COUNTY WILDLIFE SI

Rev	Date	Description	GIS	Chk	App
JF	14/09/2016	Initial Issue	JF	JB	CC

nationalgrid

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT CONSTRAINTS DRAWINGS

Document Title: WYLFA-PENTIR SECTION 4 OPTIONS LANDSCAPE, ECOLOGY AND CULTURAL HERITAGE FEATURES

Creator:	Date:	Checker:	Date:	Approver:	Date:
JF	12/09/2016	JB	12/09/2016	CC	14/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	5 of 5	0

0 250 500 1,000 Metres

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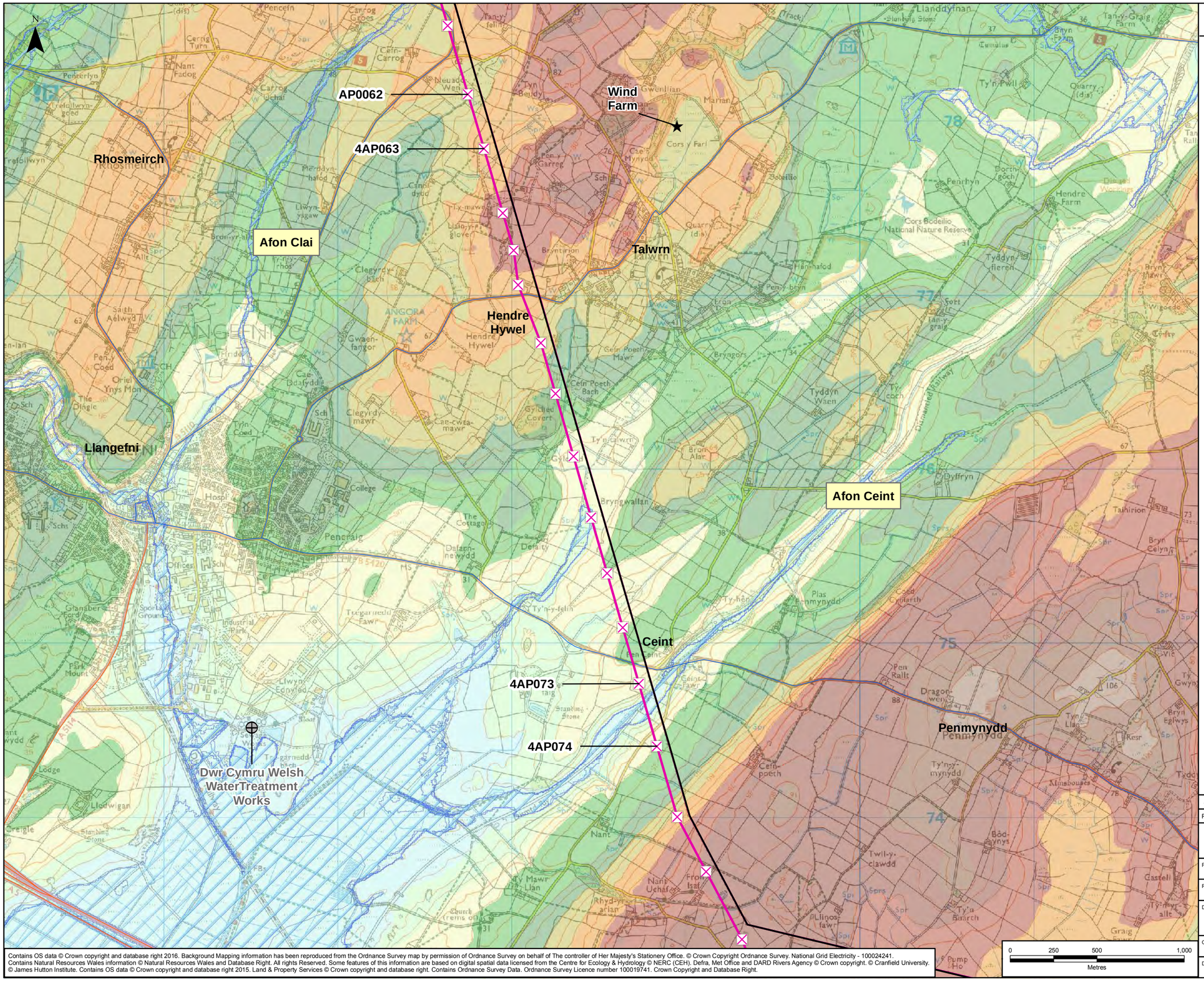
Figure B-14



Legend

- Wylfa Substation/Power Station
- 132kV Overhead Line
- 132kV Overhead Line (SPEN Asset)
- 132kV Underground Cable
- Proposed Locations of New Pylons
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Existing National Grid 400 kV overhead line

Constraints

- Disused Railway
- Water Treatment Works
- NRW Flood Zones 2 & 3
- A Road
- B Road

Elevation (m)

0 - 10	40 - 50	90 - 100
10 - 20	50- 60	100 - 110
20 - 30	60 - 70	110 - 120
30 - 40	70- 80	120 - 130
	80 - 90	130m+

Rev	Date	Description	GIS	Chk	App
JF	12/09/2016	Initial Issue	JF	JB	CC

nationalgrid

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT CONSTRAINTS DRAWINGS

Document Title: WYLFA-PENTIR SECTION 4 OPTIONS ELEVATION, INFRASTRUCTURE AND FLOOD RISK

Creator:	Date:	Checker:	Date:	Approver:	Date:
JF	12/09/2016	JB	12/09/2016	CC	12/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	5 of 5	0

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Figure B-15

Legend

- Wylfa Substation/Power Station
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Residential Property (Dwelling)
- Settlement
- Hotels, B&B and Apartments
- Caravan, Camping or Holiday Park
- Visitor Attraction
- Golf Course
- Sports or Leisure
- Public Rights of Way
- National Cycle Routes
- Wales Coast Path
- Nature Reserve
- Housing
- Employment

AP0062
4AP063
Rhosmeirch
Afon Clai
Talwrn
Hendre Hywel
Llangefni
Afon Ceint
Ceint
4AP073
4AP074
Penmynydd

0 250 500 1,000
Metres

Rev	Date	Description	GIS	Chk	App
JF	14/09/2016	Initial Issue	JF	JB	CC

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT CONSTRAINT DRAWINGS

Document Title: WYLFA-PENTIR SECTION 4 OPTIONS PLANNING AND TOURISM

Creator:	Date:	Checker:	Date:	Approver:	Date:
JF	12/09/2016	JB	12/09/2016	CC	14/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	5 of 5	0

Document Path: F:\Proposal\3512\North Wales Connection - NG\GIS\02 Maps\All Disciplines_Route Options Figures\Draft Route Alignment Report - Constraints - Planning_and_Tourism_20160912_JF.mxd

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APPENDIX C.

COMPARISON OF L6 (EXISTING) AND L12 (PROPOSED) PYLON DESIGNS

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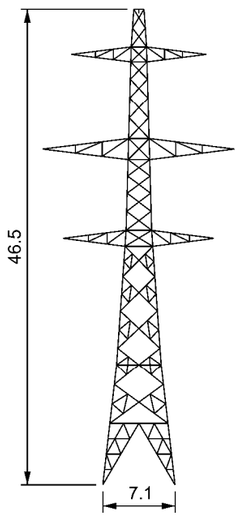
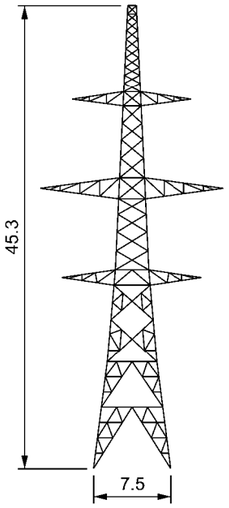
FIGURE C-1

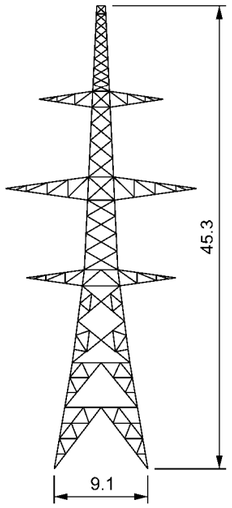
Legend



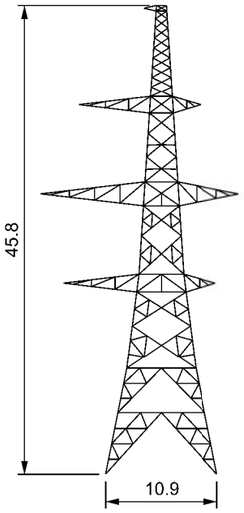
D STD SUSPENSION
(STRAIGHT LINE)



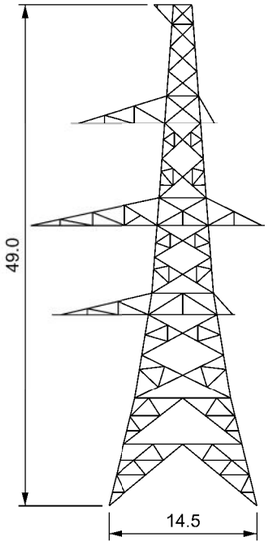
D10 ANGLE
(0° - 10°)



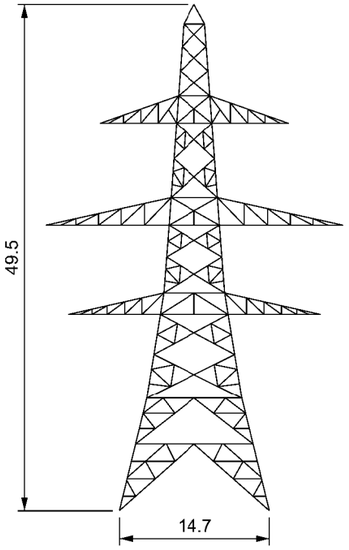
D25 ANGLE
(10° - 25°)



D55 ANGLE
(25° - 55°)

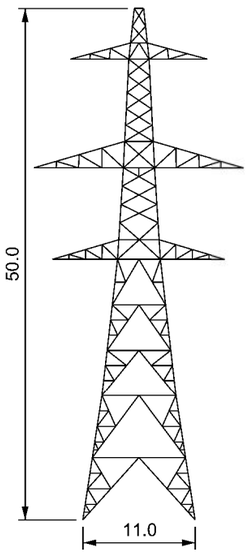


D90 ANGLE
(55° - 90°)

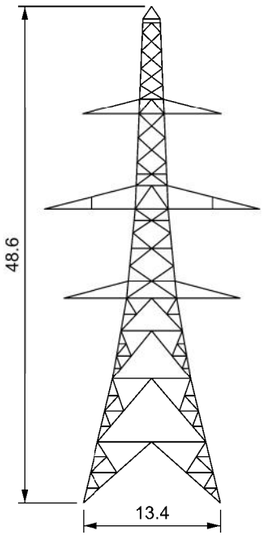


DT
(TERMINAL)

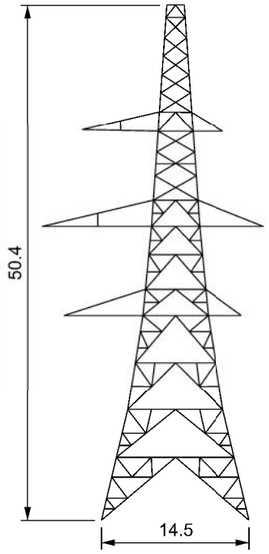
PROPOSED NEW SECTIONS OF LINE - L12 PYLON SUITE



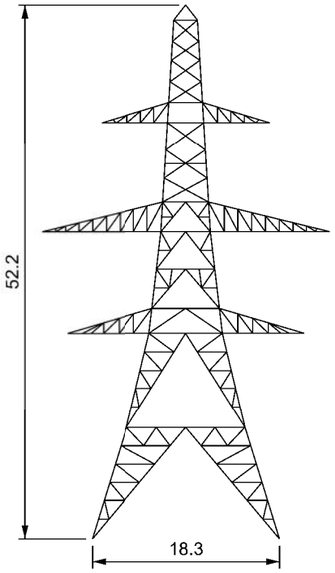
D STD SUSPENSION
(STRAIGHT LINE)



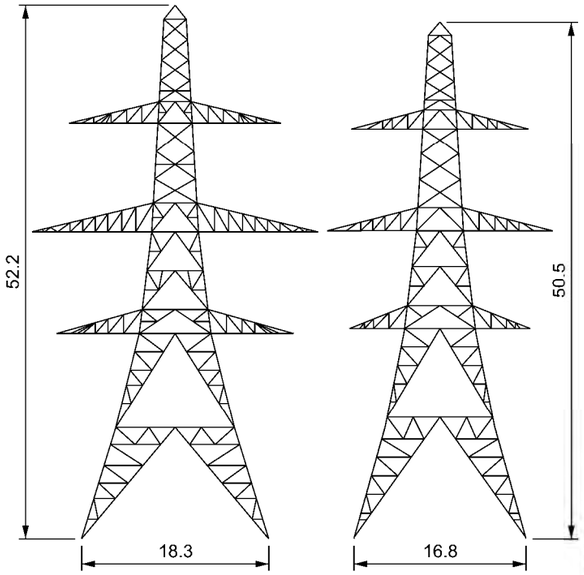
D30 ANGLE
(0° - 30°)



D60 ANGLE
(30° - 60°)



D90 ANGLE
(60° - 90°)



DJT
(JUNCTION / TERMINAL)

DT
(TERMINAL)

EXISTING AND RETAINED SECTIONS OF LINE L6(BB) PYLON SUITE

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED
2. STANDARD HEIGHT (STD) PYLONS SHOWN IN EACH CASE
3. THIS FIGURE SHOULD NOT BE USED FOR CARRYING OUT OPERATIONAL ASSESSMENT AND NATIONAL GRID SHOULD BE CONTACTED FOR FURTHER DETAIL IF REQUIRED

Rev	Date	Description	Drwn	Chk	App
A.	22/09/2016	FIRST ISSUE	AJD	SF	GDS

nationalgrid

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: COMPARISON OF L6 (EXISTING) AND L12 (PROPOSED) PYLON DESIGNS

Creator:	Date:	Checker:	Date:	Approver:	Date:
AJD	22/09/2016	SF	22/09/2016	GDS	22/09/2016

FIGURE C-1	Scale: 1:600	Format: A3	Sheets: SHEET 1 of 1	Rev: A

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APPENDIX D.

TRANSPOSITION DESIGN DRAWINGS

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T1A

Notes

* If this transposition was adopted the existing 4ZA pylons require further detailed PLS analysis and wire clearance checks to confirm any modifications required. The design checks and review could lead to the proposal for a replacement pylon. PLS analysis undertaken to date is high level only and provides an indicative/initial result.

All outline proposals are subject to design assesment.

Comments

The pylon reference annotations refer to the existing 4ZA overhead line only.

4ZA023

4ZA024

4ZA025

4ZA026

4ZA027

0 50 100 200 m

Legend

- EXISTING 4ZA OHL TO BE UTILISED
- EXISTING 4ZA TO BE REMOVED
- NEW PROPOSED OHL
- EXISTING 4ZA ANGLE PYLON TO BE UTILISED - SUBJECT TO DESIGN CHECKS OTHERWISE REPLACE WITH NEW ANGLE PYLON
- EXISTING 4ZA SUSPENSION PYLON TO BE REPLACED WITH NEW ANGLE PYLON
- EXISTING 4ZA ANGLE PYLON TO BECOME INLINE TENSION PYLON - SUBJECT TO DESIGN CHECKS
- EXISTING 4ZA ANGLE PYLON REQUIRING MODIFICATION - SUBJECT TO FURTHER DESIGN CHECKS AND WIRE CLEARANCE CHECKS*
- EXISTING 4ZA REPLACEMENT PYLON- SUBJECT TO FURTHER DESIGN CHECKS AND REVIEW
- EXISTING 4ZA ANGLE PYLON TO BE REMOVED
- EXISTING 4ZA SUSPENSION PYLON TO BE REMOVED
- NEW PROPOSED ANGLE PYLON
- NEW PROPOSED SUSPENSION PYLON

THE NATIONAL GRID
NORTH WALES CONNECTION PROJECT
TRANSPOSITION T1A
RHOSGOCH

Date	Description	Drwn	Chk	App
22/09/2016	Initial Issue	TF	SF	GDS

Creator:	Date:	Checker:	Date:	Approver:	Date:
TF	22/09/2016	SF	22/09/2016	GDS	22/09/2016

FIGURE D-1	Scale:	Format:	Sheets:	Rev:
	1:3,500	A3	1 OF 1	A

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: TRANSPOSITION T1A

nationalgrid

FIGURE D-1

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T1B

4ZA023

4ZA024

4ZA025

4ZA026

4ZA027

4ZA028

4ZA029

Notes

* If this transposition was adopted the existing 4ZA pylons require further detailed PLS analysis and wire clearance checks to confirm any modifications required. The design checks and review could lead to the proposal for a replacement pylon. PLS analysis undertaken to date is high level only and provides an indicative/initial result.

All outline proposals are subject to design assesment.

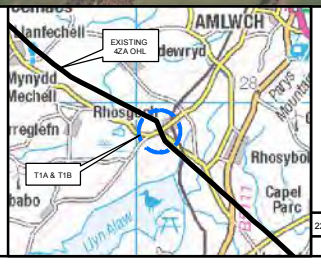
Comments

The pylon reference annotations refer to the existing 4ZA overhead line only.

0 50 100 200 m

Legend

- EXISTING 4ZA OHL TO BE UTILISED
- EXISTING 4ZA TO BE REMOVED
- NEW PROPOSED OHL
- EXISTING 4ZA ANGLE PYLON TO BE UTILISED - SUBJECT TO DESIGN CHECKS OTHERWISE REPLACE WITH NEW ANGLE PYLON
- EXISTING 4ZA SUSPENSION PYLON TO BE REPLACED WITH NEW ANGLE PYLON
- EXISTING 4ZA ANGLE PYLON TO BECOME INLINE TENSION PYLON - SUBJECT TO DESIGN CHECKS
- EXISTING 4ZA ANGLE PYLON REQUIRING MODIFICATION - SUBJECT TO FURTHER DESIGN CHECKS AND WIRE CLEARANCE CHECKS*
- EXISTING 4ZA REPLACEMENT PYLON- SUBJECT TO FURTHER DESIGN CHECKS AND REVIEW
- EXISTING 4ZA ANGLE PYLON TO BE REMOVED
- EXISTING 4ZA SUSPENSION PYLON TO BE REMOVED
- NEW PROPOSED ANGLE PYLON
- NEW PROPOSED SUSPENSION PYLON



THE NATIONAL GRID
NORTH WALES CONNECTION PROJECT
TRANSPOSITION T1B
RHOSGOCH

Date	Description	Drwn	Chk	App
22/09/2016	Initial Issue	TF	SF	GDS

Creator: TF	Date: 22/09/2016	Checker: SF	Date: 22/09/2016	Approver: GDS	Date: 22/09/2016
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Project Name: NORTH WALES CONNECTION PROJECT
Report Title: DRAFT ROUTE ALIGNMENT REPORT
Document Title: TRANSPOSITION T1B

nationalgrid

FIGURE D-2

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T2D

4ZA039

4ZA040

Notes

* If this transposition was adopted the existing 4ZA pylons require further detailed PLS analysis and wire clearance checks to confirm any modifications required. The design checks and review could lead to the proposal for a replacement pylon. PLS analysis undertaken to date is high level only and provides an indicative/initial result.

All outline proposals are subject to design assesment.

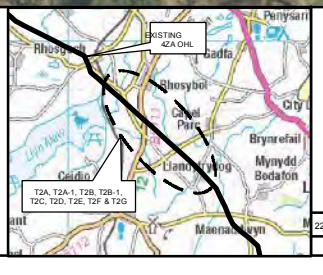
Comments

The pylon reference annotations refer to the existing 4ZA overhead line only.

0 30 60 120 m

Legend

- EXISTING 4ZA OHL TO BE UTILISED
- EXISTING 4ZA TO BE REMOVED
- NEW PROPOSED OHL
- EXISTING 4ZA ANGLE PYLON TO BE UTILISED - SUBJECT TO DESIGN CHECKS OTHERWISE REPLACE WITH NEW ANGLE PYLON
- EXISTING 4ZA SUSPENSION PYLON TO BE REPLACED WITH NEW ANGLE PYLON
- EXISTING 4ZA ANGLE PYLON TO BECOME INLINE TENSION PYLON - SUBJECT TO DESIGN CHECKS
- EXISTING 4ZA ANGLE PYLON REQUIRING MODIFICATION - SUBJECT TO FURTHER DESIGN CHECKS AND WIRE CLEARANCE CHECKS*
- EXISTING 4ZA REPLACEMENT PYLON- SUBJECT TO FURTHER DESIGN CHECKS AND REVIEW
- EXISTING 4ZA ANGLE PYLON TO BE REMOVED
- EXISTING 4ZA SUSPENSION PYLON TO BE REMOVED
- NEW PROPOSED ANGLE PYLON
- NEW PROPOSED SUSPENSION PYLON



THE NATIONAL GRID
NORTH WALES CONNECTION PROJECT
TRANSPOSITION T2D
RHOSYBOL

Date	Description	Drwn	Chk	App
22/09/2016	Initial Issue	TF	SF	GDS

Creator:	Date:	Checker:	Date:	Approver:	Date:
TF	22/09/2016	SF	22/09/2016	GDS	22/09/2016

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Project Name: NORTH WALES CONNECTION PROJECT
Report Title: DRAFT ROUTE ALIGNMENT REPORT
Document Title: TRANSPOSITION T2D

nationalgrid

FIGURE D-3

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T2G

4ZA037

4ZA038

4ZA039

4ZA040

Notes

* If this transposition was adopted the existing 4ZA pylons require further detailed PLS analysis and wire clearance checks to confirm any modifications required. The design checks and review could lead to the proposal for a replacement pylon. PLS analysis undertaken to date is high level only and provides an indicative/initial result.

All outline proposals are subject to design assesment.

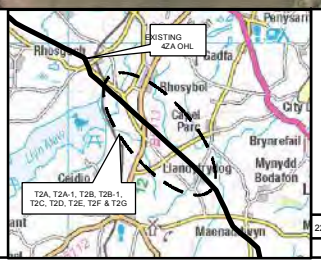
Comments

The pylon reference annotations refer to the existing 4ZA overhead line only.

0 50 100 200 m

Legend

- EXISTING 4ZA OHL TO BE UTILISED
- EXISTING 4ZA TO BE REMOVED
- NEW PROPOSED OHL
- EXISTING 4ZA ANGLE PYLON TO BE UTILISED - SUBJECT TO DESIGN CHECKS OTHERWISE REPLACE WITH NEW ANGLE PYLON
- EXISTING 4ZA SUSPENSION PYLON TO BE REPLACED WITH NEW ANGLE PYLON
- EXISTING 4ZA ANGLE PYLON TO BECOME INLINE TENSION PYLON - SUBJECT TO DESIGN CHECKS
- EXISTING 4ZA ANGLE PYLON REQUIRING MODIFICATION - SUBJECT TO FURTHER DESIGN CHECKS AND WIRE CLEARANCE CHECKS*
- EXISTING 4ZA REPLACEMENT PYLON- SUBJECT TO FURTHER DESIGN CHECKS AND REVIEW
- EXISTING 4ZA ANGLE PYLON TO BE REMOVED
- EXISTING 4ZA SUSPENSION PYLON TO BE REMOVED
- NEW PROPOSED ANGLE PYLON
- NEW PROPOSED SUSPENSION PYLON



THE NATIONAL GRID
NORTH WALES CONNECTION PROJECT
TRANSPOSITION T2G
CAPEL PARC

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22/09/2016	Initial Issue	TF	SF	GDS

Creator:	Date:	Checker:	Date:	Approver:	Date:
TF	22/09/2016	SF	22/09/2016	GDS	22/09/2016

FIGURE D-6	Scale:	Format:	Sheets:	Rev:
	1:3,000	A3	1 OF 1	A

Project Name: NORTH WALES CONNECTION PROJECT

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FIGURE D-4

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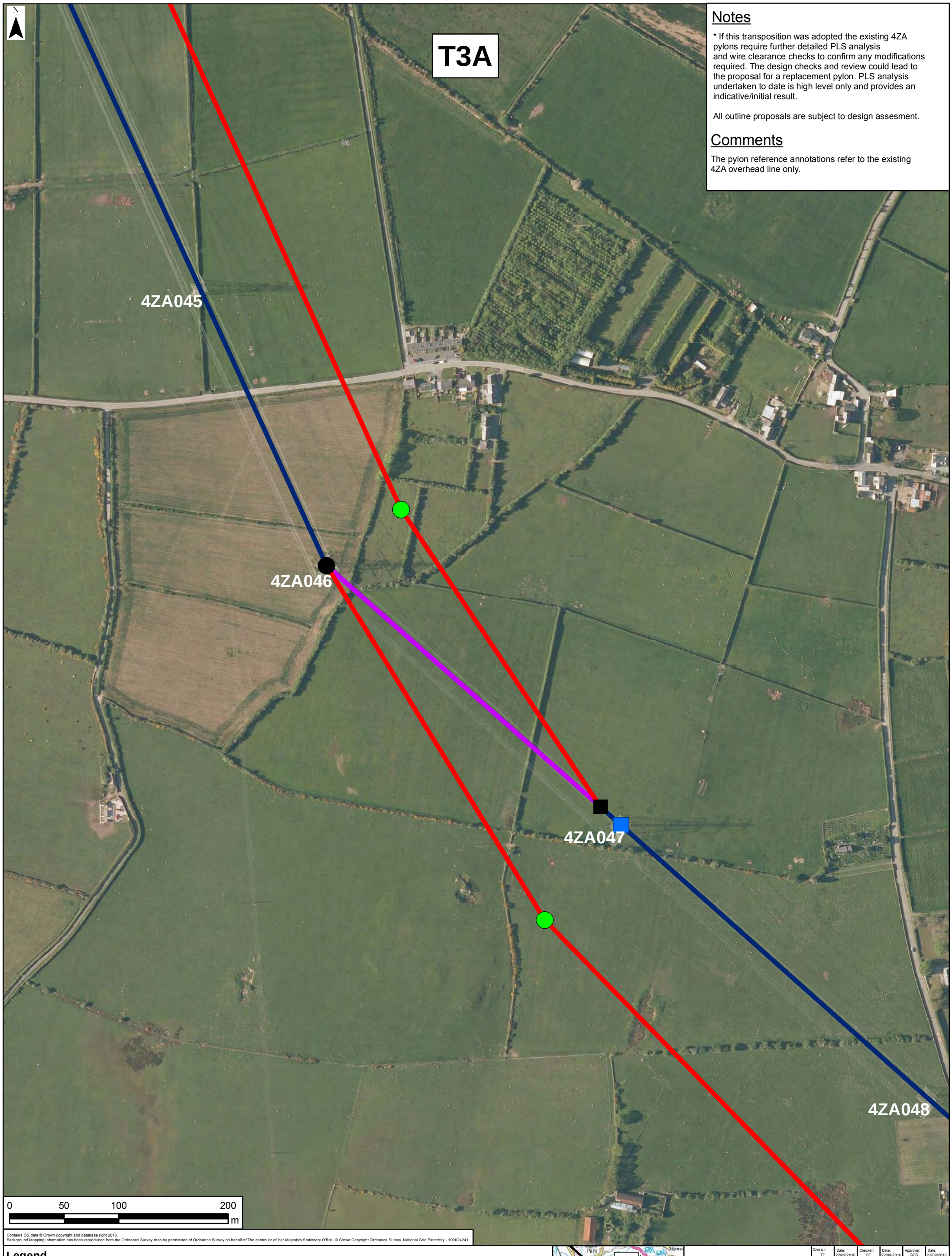


Notes

* If this transposition was adopted the existing 4ZA pylons require further detailed PLS analysis and wire clearance checks to confirm any modifications required. The design checks and review could lead to the proposal for a replacement pylon. PLS analysis undertaken to date is high level only and provides an indicative/initial result.

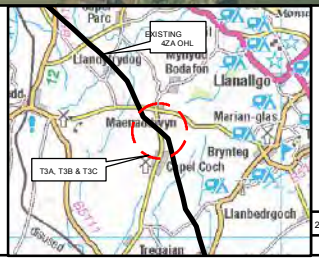
All outline proposals are subject to design assesment.

Comments

The pylon reference annotations refer to the existing 4ZA overhead line only.

Legend

- EXISTING 4ZA OHL TO BE UTILISED
- EXISTING 4ZA TO BE REMOVED
- NEW PROPOSED OHL
- EXISTING 4ZA ANGLE PYLON TO BE UTILISED - SUBJECT TO DESIGN CHECKS OTHERWISE REPLACE WITH NEW ANGLE PYLON
- EXISTING 4ZA SUSPENSION PYLON TO BE REPLACED WITH NEW ANGLE PYLON
- EXISTING 4ZA ANGLE PYLON TO BECOME INLINE TENSION PYLON - SUBJECT TO DESIGN CHECKS
- EXISTING 4ZA ANGLE PYLON REQUIRING MODIFICATION - SUBJECT TO FURTHER DESIGN CHECKS AND WIRE CLEARANCE CHECKS*
- EXISTING 4ZA REPLACEMENT PYLON- SUBJECT TO FURTHER DESIGN CHECKS AND REVIEW
- EXISTING 4ZA ANGLE PYLON TO BE REMOVED
- EXISTING 4ZA SUSPENSION PYLON TO BE REMOVED
- NEW PROPOSED ANGLE PYLON
- NEW PROPOSED SUSPENSION PYLON



THE NATIONAL GRID
NORTH WALES CONNECTION PROJECT
TRANSPOSITION T3A
MAENADDWYN

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FIGURE D-7	Scale:	Format:	Sheets:	Rev:
	1:3,000	A3	1 OF 1	A

Project Name: NORTH WALES CONNECTION PROJECT
Report Title: DRAFT ROUTE ALIGNMENT REPORT
Document Title: TRANSPOSITION T3A

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FIGURE D-5

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T3B

4ZA048

4ZA050

4ZA051

Notes

* If this transposition was adopted the existing 4ZA pylons require further detailed PLS analysis and wire clearance checks to confirm any modifications required. The design checks and review could lead to the proposal for a replacement pylon. PLS analysis undertaken to date is high level only and provides an indicative/initial result.

All outline proposals are subject to design assesment.

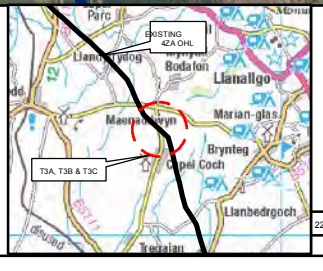
Comments

The pylon reference annotations refer to the existing 4ZA overhead line only.

0 50 100 200 m

Legend

- EXISTING 4ZA OHL TO BE UTILISED
- EXISTING 4ZA TO BE REMOVED
- NEW PROPOSED OHL
- EXISTING 4ZA ANGLE PYLON TO BE UTILISED - SUBJECT TO DESIGN CHECKS OTHERWISE REPLACE WITH NEW ANGLE PYLON
- EXISTING 4ZA SUSPENSION PYLON TO BE REPLACED WITH NEW ANGLE PYLON
- EXISTING 4ZA ANGLE PYLON TO BECOME INLINE TENSION PYLON - SUBJECT TO DESIGN CHECKS
- EXISTING 4ZA ANGLE PYLON REQUIRING MODIFICATION - SUBJECT TO FURTHER DESIGN CHECKS AND WIRE CLEARANCE CHECKS*
- EXISTING 4ZA REPLACEMENT PYLON- SUBJECT TO FURTHER DESIGN CHECKS AND REVIEW
- EXISTING 4ZA ANGLE PYLON TO BE REMOVED
- EXISTING 4ZA SUSPENSION PYLON TO BE REMOVED
- NEW PROPOSED ANGLE PYLON
- NEW PROPOSED SUSPENSION PYLON



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TRANSPOSITION T3B
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Project Name: NORTH WALES CONNECTION PROJECT
Report Title: DRAFT ROUTE ALIGNMENT REPORT
Document Title: TRANSPOSITION T3B

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FIGURE D-6

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T3C

4ZA044

4ZA045

Notes

* If this transposition was adopted the existing 4ZA pylons require further detailed PLS analysis and wire clearance checks to confirm any modifications required. The design checks and review could lead to the proposal for a replacement pylon. PLS analysis undertaken to date is high level only and provides an indicative/initial result.

All outline proposals are subject to design assesment.

Comments

The pylon reference annotations refer to the existing 4ZA overhead line only.

0 50 100 200 m

Legend

- EXISTING 4ZA OHL TO BE UTILISED
- EXISTING 4ZA TO BE REMOVED
- NEW PROPOSED OHL
- EXISTING 4ZA ANGLE PYLON TO BE UTILISED - SUBJECT TO DESIGN CHECKS OTHERWISE REPLACE WITH NEW ANGLE PYLON
- EXISTING 4ZA SUSPENSION PYLON TO BE REPLACED WITH NEW ANGLE PYLON
- EXISTING 4ZA ANGLE PYLON TO BECOME INLINE TENSION PYLON - SUBJECT TO DESIGN CHECKS
- EXISTING 4ZA ANGLE PYLON REQUIRING MODIFICATION - SUBJECT TO FURTHER DESIGN CHECKS AND WIRE CLEARANCE CHECKS*
- EXISTING 4ZA REPLACEMENT PYLON - SUBJECT TO FURTHER DESIGN CHECKS AND REVIEW
- EXISTING 4ZA ANGLE PYLON TO BE REMOVED
- EXISTING 4ZA SUSPENSION PYLON TO BE REMOVED
- NEW PROPOSED ANGLE PYLON
- NEW PROPOSED SUSPENSION PYLON

THE NATIONAL GRID
NORTH WALES CONNECTION PROJECT
TRANSPOSITION T3C
MAENADDWYN

Date	Description	Drwn	Chk	App
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Creator: TF	Date: 22/09/2016	Checker: SF	Date: 22/09/2016	Approver: GDS	Date: 22/09/2016
FIGURE D-9	Scale: 1:2,000	Format: A3	Sheets: 1 OF 1	Rev: A	

Project Name: NORTH WALES CONNECTION PROJECT
Report Title: DRAFT ROUTE ALIGNMENT REPORT
Document Title: TRANSPOSITION T3C

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FIGURE D-7

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4ZA024
4AP020
4ZA025
4AP021
4ZA026
4AP022
4AP023
4ZA027
X4ZA027
4AP024
4ZA028
4ZA029
X4ZA028
4AP025
4ZA030
X4ZA029
4AP026
4ZA031
4AP027
X4ZA030
4ZA032
4AP028
X4ZA031
4ZA033
4AP029
X4ZA032
4ZA034
X4ZA033
4AP030
4ZA035
4AP031

N

FIGURE D-10

Legend

- PROPOSED LATTICE PYLON (L12)
- EXISTING LATTICE PYLON TO BE REMOVED (L6)
- EXISTING LATTICE PYLON TO BE MODIFIED (L6)
- EXISTING LATTICE PYLON NOT AFFECTED (L6)
- PROPOSED LATTICE PYLON (L6)
- PROPOSED OVERHEAD LINE
- EXISTING OVERHEAD LINE TO BE REMOVED
- EXISTING OVERHEAD LINE TO BE MODIFIED
- EXISTING OVERHEAD LINE NOT AFFECTED

Notes

'X' prefix on pylon number denotes an existing 4ZA pylon to be removed.

0 125 250 500 m

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Project Name: NORTH WALES CONNECTION PROJECT

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Document Title: TRANSPOSITION T1B AMENDED

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FIGURE D-8	Scale: 1:10,000	Format: A3	Sheets: SHEET 1 OF 1	Rev: A

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FIGURE D-12

Legend

- PROPOSED LATTICE PYLON (L12)
- EXISTING LATTICE PYLON TO BE REMOVED (L6)
- EXISTING LATTICE PYLON TO BE MODIFIED (L6)
- EXISTING LATTICE PYLON NOT AFFECTED (L6)
- PROPOSED LATTICE PYLON (L6)
- PROPOSED OVERHEAD LINE
- EXISTING OVERHEAD LINE TO BE REMOVED
- EXISTING OVERHEAD LINE TO BE MODIFIED
- EXISTING OVERHEAD LINE NOT AFFECTED

Notes

'X' prefix on pylon number denotes an existing 4ZA pylon to be removed.

0 62.5 125 250 m

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: TRANSPOSITION T3C AMENDED

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FIGURE D-9	Scale: 1:5,000	Format: A3	Sheets: SHEET 1 OF 1	Rev: A

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APPENDIX E.

PROPOSED DETAILED ALIGNMENT DRAWINGS

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Figure E-1

Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Wylfa Substation
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Indicative Downlead Positions
- Indicative Downleads to be Removed
- Landscape Mitigation Areas
- Drainage Mitigation Areas
- Indicative Limits of Deviation
- A Road

4ZA004
4AP001
4ZA005
4AP002
4AP003
4ZA006
4AP004
4ZA007
4AP005
4ZA008
4ZA009
4AP006
4ZA010
4AP007
4ZA011
4ZA012
4AP008

0 250 500 1,000
Metres

Rev	Date	Description	GIS	Chk	App
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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: PROPOSED DETAILED ALIGNMENT DRAWINGS WYLFA TO GORS

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Figure E-2

4ZA010
4ZA011
4ZA012
4AP008
4ZA013
4AP009
4ZA014
4AP010
4ZA015
4AP011
4ZA016
4AP012
4ZA017
4AP013
4ZA018
4AP014
4ZA019
4AP015
4ZA020
4AP016
4AP017
4AP018

Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Wylfa Substation
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Indicative Downlead Positions
- Indicative Downleads to be Removed
- Landscape Mitigation Areas
- Drainage Mitigation Areas
- Indicative Limits of Deviation
- A Road

0 250 500 1,000
Metres

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: PROPOSED DETAILED ALIGNMENT DRAWINGS GORS TO PENTREHEULYN

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Figure E-3

Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Wylfa Substation
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Indicative Downlead Positions
- Indicative Downleads to be Removed
- Landscape Mitigation Areas
- Drainage Mitigation Areas
- Indicative Limits of Deviation
- A Road

4ZA020
4ZA021
4ZA022
4AP018
4ZA023
4AP019
4ZA024
4AP020
4ZA025
4AP021
4AP022
4ZA026
4AP023
4ZA027
4AP024
4ZA028
4ZA029
4AP025
4ZA030
4AP026
4ZA031
4AP027

SECTION A
SECTION B

Bodewryd
Standing Stone
Gorsedd Wygyr
Gwredog
Tafarn-hwyaid
Pyllau budron
Glan-y-gors
Tyddyn-y-pandy
Pant-y-Gist
Bryn Du
Cae Coch
Maen y Goges
Hafodol
Hafodol-ganol
Four Crosses
Rhosgoch
Tan-y-four
Glasgraig Isaf
Geufron
Hafodol Llyn
Llyn Hafodol
Tyn-rhos
Rhos-wen
Rhos-Engan
Yr-ynys
Rhyd Dafydd
Penbol
Pen-yr-or

0 250 500 1,000
Metres

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: PROPOSED DETAILED ALIGNMENT DRAWINGS PENTREHEULYN TO RHOSYBOL

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Document Type:	Scale:	Format:	Sheets:	Rev:
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Figure E-4

Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Wylfa Substation
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Indicative Downlead Positions
- Indicative Downleads to be Removed
- Landscape Mitigation Areas
- Drainage Mitigation Areas
- Indicative Limits of Deviation
- A Road

4ZA029 4ZA030 4AP026 4ZA031 4AP027 4ZA032 4AP028 4ZA033 4AP029 4ZA034 4AP030 4ZA035 4AP031 4ZA036 4AP032 4ZA037 4AP033 4ZA038 4AP034 4ZA039

Rhosybol Pen-yr-orsedd Pen-y-fynwent Taldrwst Bach Melin-Trysglwyn Wind Farm Rhiwmoel Fawr Rhiwmoel Bach Penygraig Glasgraig Fawr Gorslwyd Bach Gorslwyd Fawr Pen-gwydd Penrhos Farm Lletty Penrhyn Hafod-y-gors Afon Goch Caeau-gleision Stepping Stones Pwllcoch Ochaf Pen Coch Isaf Quarry (dis) Cors-y-bol Ty'n-y-ffrŵd Gaer Farm Tyn Cae Railway (disused) Ceidio-Isaf Isfron-Ceidio Fron Cae Mawr Rhosydd Fron Gaer Tyddyn

0 250 500 1,000 Metres

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: PROPOSED DETAILED ALIGNMENT DRAWINGS RHOSYBOL TO RHOSYDD

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Figure E-5

Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Wylfa Substation
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Indicative Downlead Positions
- Indicative Downleads to be Removed
- Landscape Mitigation Areas
- Drainage Mitigation Areas
- Indicative Limits of Deviation
- A Road

4ZA036, 4ZA037, 4ZA038, 4ZA039, 4ZA040, 4ZA041, 4ZA042, 4ZA043, 4ZA044, 4ZA045

4AP032, 4AP033, 4AP034, 4AP035, 4AP036, 4AP037, 4AP038, 4AP039, 4AP040, 4AP041

SECTION B

SECTION C

0 250 500 1,000 Metres

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Project Name: NORTH WALES CONNECTION PROJECT

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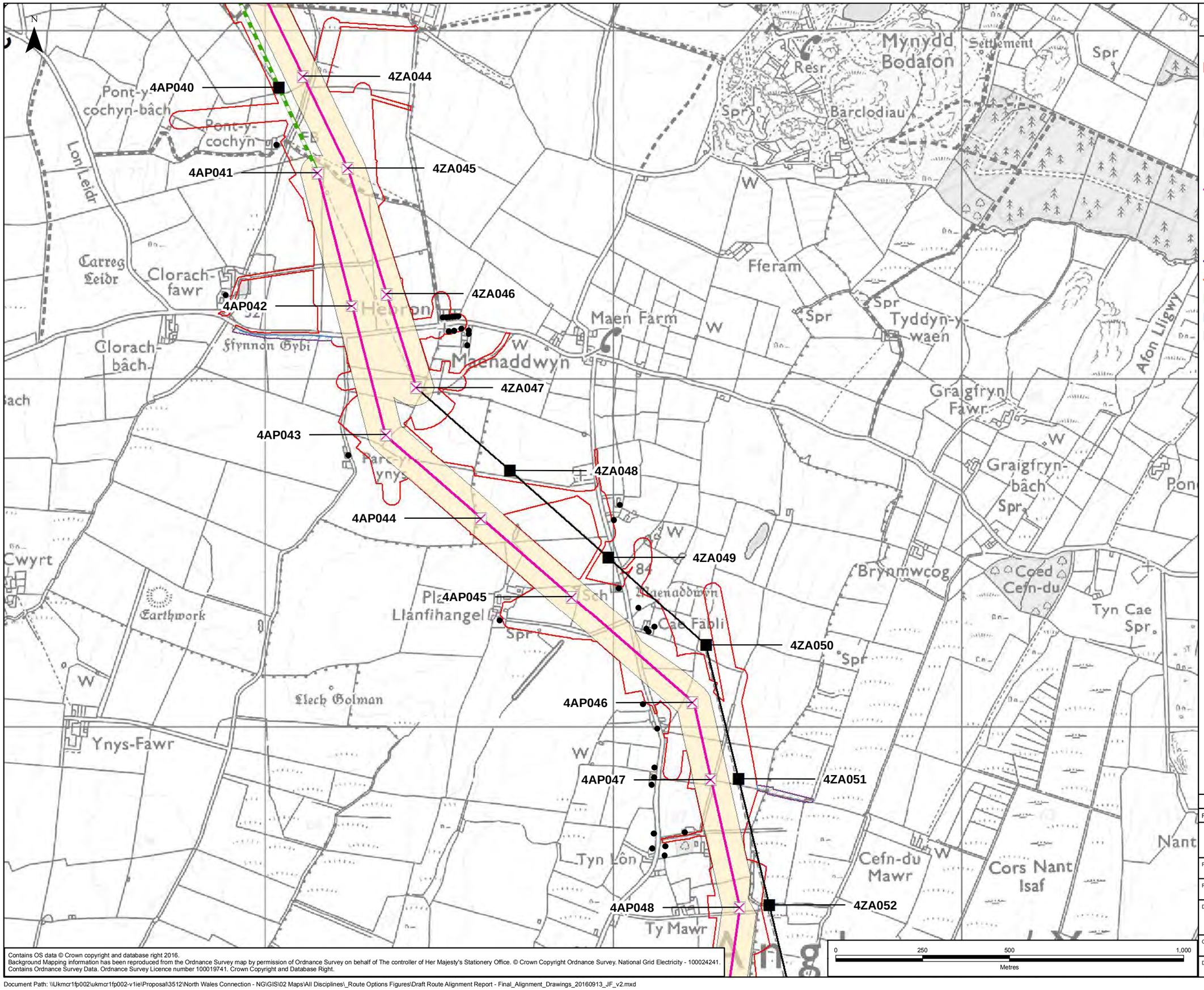

Figure E-6

Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Wylfa Substation
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Indicative Downlead Positions
- Indicative Downleads to be Removed
- Landscape Mitigation Areas
- Drainage Mitigation Areas
- Indicative Limits of Deviation
- A Road

Rev	Date	Description	GIS	Chk	App
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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: PROPOSED DETAILED ALIGNMENT DRAWINGS PONT-Y-COCHYN TO TYN LÔN

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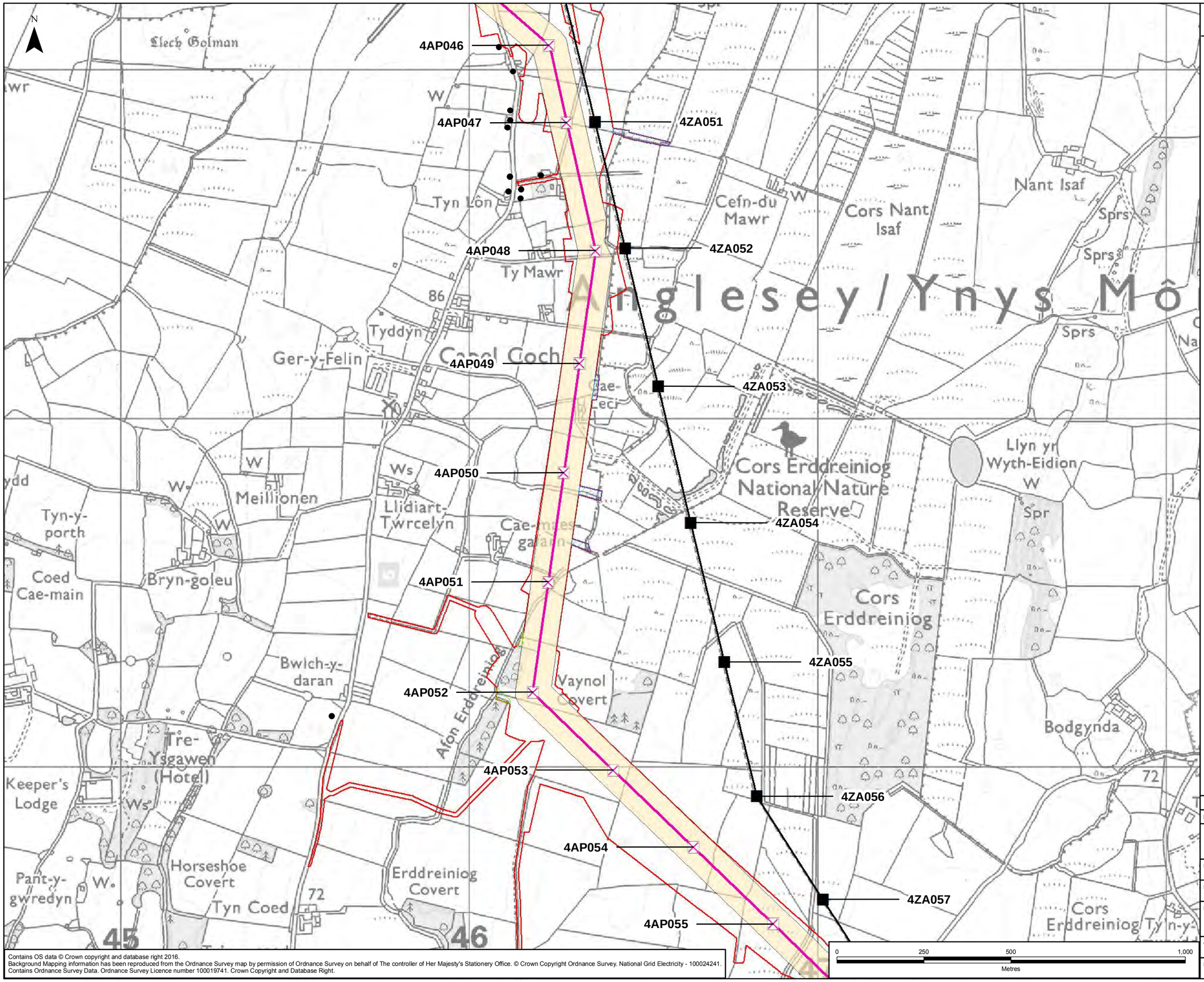
Figure E-7



Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Wylfa Substation
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Indicative Downlead Positions
- Indicative Downleads to be Removed
- Landscape Mitigation Areas
- Drainage Mitigation Areas
- Indicative Limits of Deviation
- A Road

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

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Figure E-8

N

4ZA055
4AP052
4AP053
4ZA056
4AP054
4ZA057
4AP055
4ZA058
4AP056
4AP057
4ZA059
4ZA060
4AP058
4AP059
4ZA061
4AP060
4ZA062

Bwlch-y-daran
Afon Erddreiniog
Vaynol Covert
Tre-Ysgawen (Hotel)
Bodgynda
Quarry
72
Ty'n-y-lôn
Horseshoe Covert
Tyn Coed
Erddreiniog Covert
46
Quarries (dis)
Cors Erddreiniog
Ty'n-y-mynydd
Ty'n-y-coed Covert
Ynys Goch
47
48
Quarry (dis)
Erddreiniog
Pen-singrig
Bodwrdin
Minffordd Covert
Maen Eryr
Maen Eryr Covert
Cae-Cam
Bodowen
Spr
Tregaian
Fagwyr-fawr
Plâs Tregayan
Glan Gors
Fagwyr-bach
Hendre
Wr Twr
Lower Lodge
Tyddyn Forfydd
Tynymynydd
Afon Erddreiniog
Bodwena
Bonc Fadog
Glan Rafon
Pen-y-fan Agosaf
Quarry
Pencefn
Carrog Foes

LLANDDYFNAN C

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0 250 500 1,000
Metres

Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Wylfa Substation
- Proposed Locations of New Pylons
- Unaffected 400 kV Pylon
- Proposed Alignment of New Section of 400 kV Overhead Line
- Sections of Existing 400 kV Overhead Line with with Works
- Unaffected Section of Existing 4ZA Overhead Line
- Indicative Downlead Positions
- Indicative Downleads to be Removed
- Landscape Mitigation Areas
- Drainage Mitigation Areas
- Indicative Limits of Deviation
- A Road

Rev	Date	Description	GIS	Chk	App
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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: PROPOSED DETAILED ALIGNMENT DRAWINGS BODGYNDA TO TO BODWENA

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Figure E-9

N

4AP059
4ZA061
4AP060
4ZA062
4AP061
4ZA063
AP0062
SECTION C
SECTION D
4AP063
4ZA065
4AP064
4ZA066
4AP065
4ZA067
4AP066
4ZA068

Bodwena
Fagwyr-bâch
Tyddyn-Forfydd
Cefn Eithaf
Pen-y-fan Bellaf
Pen-y-fan Agosaf
Glan Rafon
Pencefn
Carrog Gloes
Tan-y-felin
Cefn-Carrog
Carrog Uchaf
Neuadd Wen
Tyn Beudy
Plas Llanddyfnan
Gwenllian
Marian
Bryn-seiri
Llwyn Bwbach (Track)
Merddyn-hafod
Canol-dydd
Llwyn-ysgaw
Ty-mawr
Llain-y-pwll-glover
Ty-n-y-rhos
Clegyrdy-bâch
Bryntirion
Talwrn
Cae'r Mynydd
Cors y Farl
Bodeilio
Quarry (dis)
Hên-hafod
Pen-y-bryn
Fron Deg
Cefn Poeth
Gwaen-
Hendre
ANGORA FARM

Legend

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0 250 500 1,000
Metres

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Figure E-10

Legend

- Proposed Project Boundary
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- Landscape Mitigation Areas
- Drainage Mitigation Areas
- Indicative Limits of Deviation
- A Road

4AP065 4AP066 4AP067 4AP068 4AP069 4AP070 4AP071 4AP072

4ZA067 4ZA068 4ZA069 4ZA070 4ZA071 4ZA072 4ZA073

Llain-y-glover, Bryntirion, Quarry (dis), Talwrn, Hên-hafod, Pen-y-bryn, Clegyrdy-bâch, ANGORA FARM, Fron Deg, Gwaen-fangor, Hendre Hywel, Cefn Poeth Mawr, Bryngors, Cae-Ddafydd, Cefn Poeth Bach, Tyddyn Waen, Gylchel Covert, Clegyrdy-mawr, Cae-cwta-mawr, Ty'n-talwrn, Bron Alar, College, Bryngwallan, The Cottage, Pencraig, Defaity, Dafarn-newydd, Aion Ceint, Ty'n-y-felin, Ty-hên, Plas Penmynydd, Tregarnedd Fawr, Pen Ceint

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Figure E-11

4AP071
4ZA072
4AP072
4ZA073
4AP073
4ZA074
4AP074
4ZA075
4AP075
4ZA076
4AP076
4ZA077
4AP077
4ZA078
4ZA079
4AP078

SECTION D
SECTION E

Tregarnedd Fawr
Ty'n-y-felin
Ty-hên
Plas Penmynydd
Pen Ceint
Hirdre-faig
Standing Stone
Pen Rallt
Cefn-poeth
Nant
Ty Mawr Llan
Nant Uchaf
Fron Isaf
Rhyd-yr-arian
Church (rems of)
Tyddyn Mawr
Twll-y-clawdd
Llinos-fawr
Cefn Du Isaf
Fron-Deg
Penrhyn-bach
Bwlch-gwyn
Quarry (disused)
Dismtd Rly

Legend

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- Indicative Limits of Deviation
- A Road

0 250 500 1,000
Metres

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Project Name: NORTH WALES CONNECTION PROJECT

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APPENDIX F.

THIRD PARTY WORKS CONSTRUCTION DRAWINGS

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Figure F-1

N

Cemaes Bay

Porth Wnal Sewage Works

Trwyn y Galen-ddu

Porth y Galen-ddu

Ynys yr Ŵyn

Porth yr Ogof

Trwyn y Parc

Porth y Gwartheg

LoAC Path

Porth Wylfa

Trwyn y Penrhyn

Cerrig Brith

Wylfa Power Station

Penrhyn

Porth-y-pistyll

Trwyn Pencarreg

Park Lodge

Tre'r-gôf-isaf

Cestyll

Simdda-wen

Cemaes

Felin Gafnan

Tan-yr-allt

Tre'r-Gof

Pont Cafnan

Pentregof

Cafnan

Pennant

Pol-Sta

The Firs

Gwyddelyn Fawr

Sch

Rhwng Dau Fynydd

Cefn Helyg

Tyddyn-gele

Tregele

Cemaes Mill

Penrallt

Wr Twr

Caerdegog Isaf

Bryngwyn

FB

Cefn Helyg Cyll

Burial Chamber (remains of)

Gors

Mynydd-Ithel

Foel Fawr

Cromlech

Tyddyn-Paul

Caerdegog Uchaf

Groes-fechan

Standing Stone

0 250 500 1,000

Metres

Legend

- Proposed Project Boundary
- Section Cutlines
- Existing National Grid 400 kV overhead line
- Indicative Concept Design Freeze Alignment 4ZA
- Indicative Concept Design Freeze Alignment 4AP
- 3rd Party Assets
- Indicative Access Route for 3rd Party Works
- Indicative Potential Area for Third Party Asset Modifications

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Figure F-2

Legend

- Proposed Project Boundary
- Section Cutlines
- Existing National Grid 400 kV overhead line
- Indicative Concept Design Freeze Alignment 4ZA
- Indicative Concept Design Freeze Alignment 4AP
- 3rd Party Assets
- Indicative Access Route for 3rd Party Works
- Indicative Potential Area for Third Party Asset Modifications

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Project Name: NORTH WALES CONNECTION PROJECT

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Figure F-3

Legend

- Proposed Project Boundary
- Section Cutlines
- Existing National Grid 400 kV overhead line
- Indicative Concept Design Freeze Alignment 4ZA
- Indicative Concept Design Freeze Alignment 4AP
- 3rd Party Assets
- Indicative Access Route for 3rd Party Works
- Indicative Potential Area for Third Party Asset Modifications

SECTION A

SECTION B

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Project Name: NORTH WALES CONNECTION PROJECT

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Figure F-4

Legend

- Proposed Project Boundary
- Section Cutlines
- Existing National Grid 400 kV overhead line
- Indicative Concept Design Freeze Alignment 4ZA
- Indicative Concept Design Freeze Alignment 4AP
- 3rd Party Assets
- Indicative Access Route for 3rd Party Works
- Indicative Potential Area for Third Party Asset Modifications

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Document Title: THIRD PARTY WORKS CONSTRUCTION DRAWINGS RHOSYBOL TO RHOSYDD

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Figure F-5

Legend

- Proposed Project Boundary
- Section Cutlines
- Existing National Grid 400 kV overhead line
- Indicative Concept Design Freeze Alignment 4ZA
- Indicative Concept Design Freeze Alignment 4AP
- 3rd Party Assets
- Indicative Access Route for 3rd Party Works
- Indicative Potential Area for Third Party Asset Modifications

N

Gaer Farm
Tyn Cae
Pandy Parc
Tyddyn Bach
Rhosydd
Fron Gaer
Bryn-Hyfryd
Bodneithior
Melin Esgob
Tal-y-bontan
Bryn Dyfrydog
Maen Chwyf
Standing Stone
Llandyfrydog
Waen-wen
Rectory
Cae-Warring
Tre-wyn
Plas Llandyfrydog
Coed Cefn-yr-ardd
Bron Afon
Pont-y-cochyn-bâch
Cae-lati
Llwydiarth Esgob Farm
Ty-mawr
Foel Llwydiarth Tower
Carreg Leidr
Clorach-fawr
Lon Leidr
SECTION B
SECTION C

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Metres

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Figure F-6

Legend

- Proposed Project Boundary
- Section Cutlines
- Existing National Grid 400 kV overhead line
- Indicative Concept Design Freeze Alignment 4ZA
- Indicative Concept Design Freeze Alignment 4AP
- 3rd Party Assets
- Indicative Access Route for 3rd Party Works
- Indicative Potential Area for Third Party Asset Modifications

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Figure F-7

Legend

- Proposed Project Boundary
- Section Cutlines
- Existing National Grid 400 kV overhead line
- Indicative Concept Design Freeze Alignment 4ZA
- Indicative Concept Design Freeze Alignment 4AP
- 3rd Party Assets
- Indicative Access Route for 3rd Party Works
- Indicative Potential Area for Third Party Asset Modifications

N

Llech Golman
Tyn Lôn
Ty Mawr
Cefn-du Mawr
Cors Nant Isaf
Nant Isaf
Sprs
Anglesey / Ynys Môn
Tyddyn
Ger-y-Felin
Capel Coch
Cae-Leci
Cors Erddreiniog National Nature Reserve
Llyn yr Wyth-Eidion
Spr
Meillionen
Llidiart-Twrcelyn
Cae-maes-gafarn
Tyn-y-porth
Coed Cae-main
Bryn-goleu
Bwlch-y-daran
Afon Erddreiniog
Vaynol Covert
Cors Erddreiniog
Bodgynda
Tre-Ysgawen (Hotel)
Keeper's Lodge
Horseshoe Covert
Erddreiniog Covert
Pant-y-gwredyn
Tyn Coed
Cors Erddreiniog Tyn-y-
45
46
72
86

0 250 500 1,000
Metres

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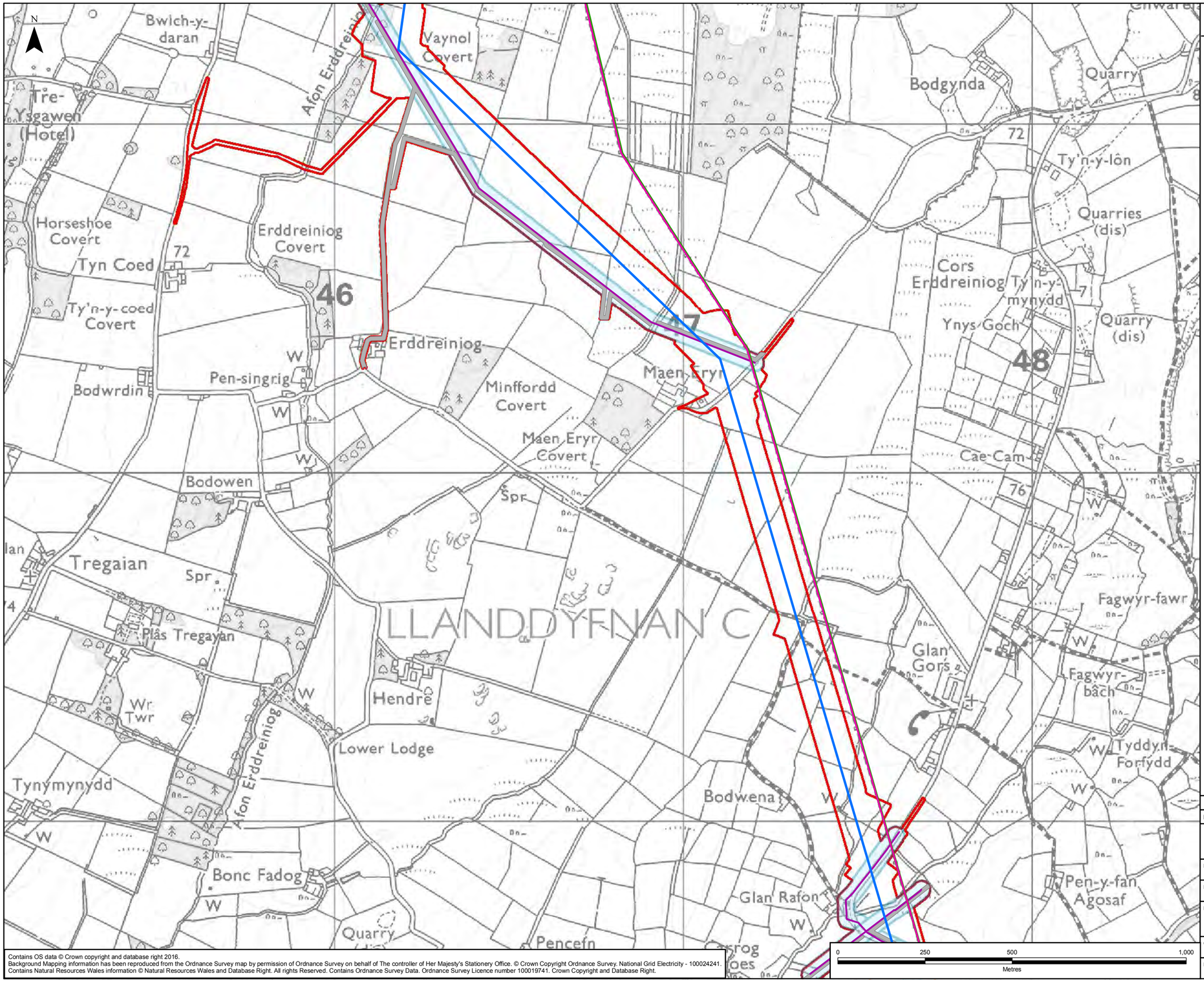
Figure F-8



Legend

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- Indicative Concept Design Freeze Alignment 4AP
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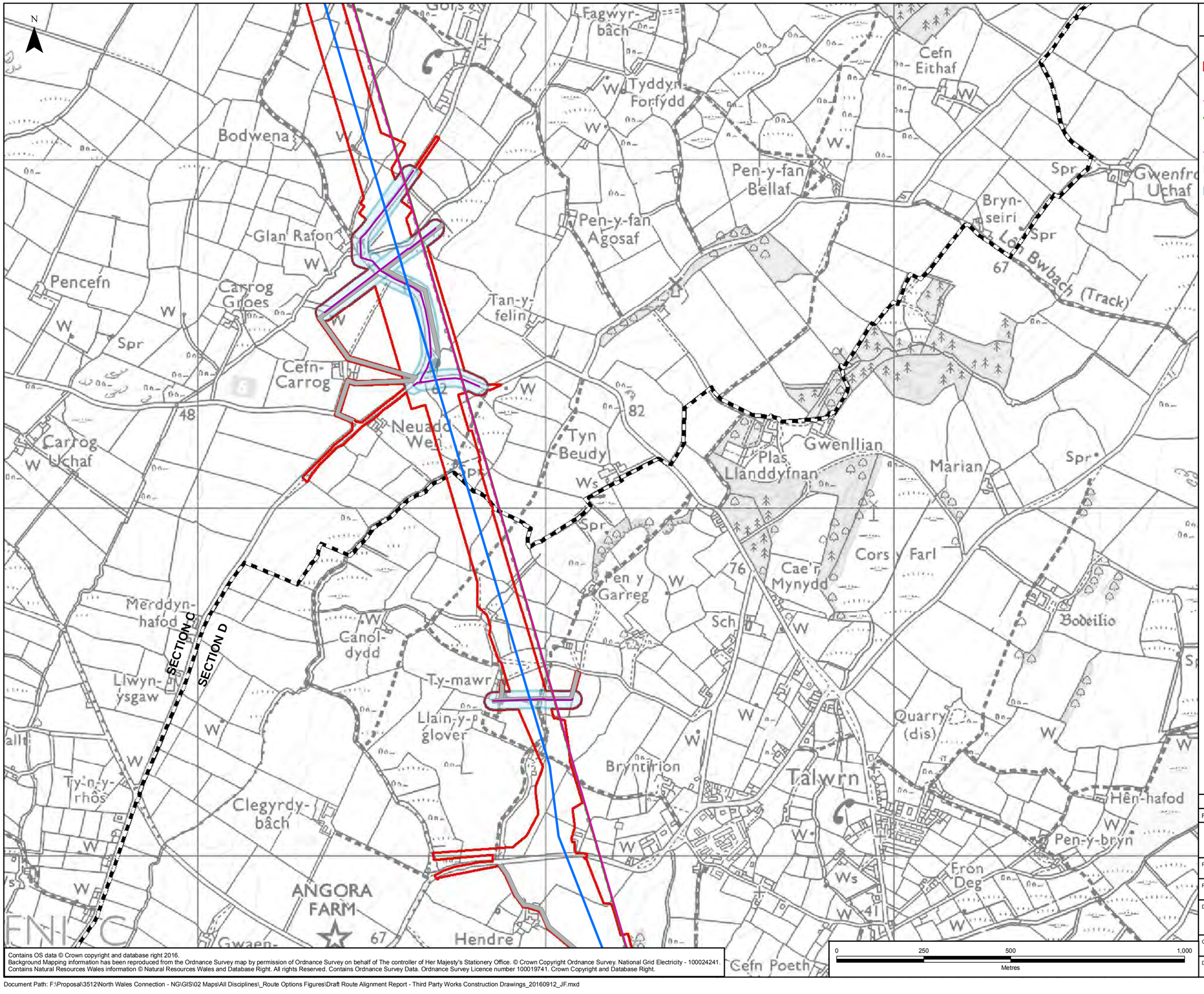
Figure F-9



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Metres

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Figure F-10

Legend

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- Indicative Access Route for 3rd Party Works
- Indicative Potential Area for Third Party Asset Modifications

SECTION C
SECTION D
SECTION D
SECTION E

Llain-y-glover
Bryntirion
Quarry (dis)
Talwrn
Hên-hafod
Pen-y-bryn
Fron Deg
Clegyrdy-bâch
ANGORA FARM
Gwaen-fangor
Hendre Hywel
Cefn Poeth Mawr
Bryngors
Cae-Ddafydd
Cefn Poeth Bach
Tyddyn Waen
Gylched Covert
Clegyrdy-mawr
Cae-cwta-mawr
Ty'n-talwrn
Bron Alar
Gylched
College
Bryngwallan
The Cottage
Pencraig
Defaity
Dafarn-newydd
Aion Ceint
Ty-hên
Plas Penmynydd
Tregarnedd Fawr
Ty'n-y-felin
Pen Ceint
Ceint Fawr

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Figure F-11

Legend

- Proposed Project Boundary
- Section Cutlines
- Existing National Grid 400 kV overhead line
- Indicative Concept Design Freeze Alignment 4ZA
- Indicative Concept Design Freeze Alignment 4AP
- 3rd Party Assets
- Indicative Access Route for 3rd Party Works
- Indicative Potential Area for Third Party Asset Modifications

SECTION D
SECTION E
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0	14/09/2016	Initial Issue	JF	JB	CC

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: THIRD PARTY WORKS CONSTRUCTION DRAWINGS TY-HÊN TO CEFN DU ISAF

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APPENDIX G.

NATIONAL GRID WORKS CONSTRUCTION DRAWINGS

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Figure G-1

N

4AP001
4AP002
4ZA004
4ZA005
4ZA006
4ZA007
4ZA008
4ZA009
4ZA010
4ZA011
4ZA012
4ZA01

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Metres

Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Indicative Concept Design Freeze Alignment 4ZA Pylons
- Indicative Concept Design Freeze Alignment 4ZA
- Indicative Concept Design Freeze Alignment 4AP Pylons
- Indicative Concept Design Freeze Alignment 4AP
- Existing 400kV Pylon to be Removed
- Pylon Working Areas
- Potential Zone for Scaffolded Netting Support
- Indicative Downlead Positions
- Existing Downlead to be Dismantled
- Existing Overhead Line To Be Removed
- Temporary Pylons
- Temporary Overhead Line Diversion
- Indicative Access
- Principal Site Compounds and Work Areas
- Non Linear Work Areas
- National Grid Construction Area
- Proposed Conductor Pulling Position
- A Road
- Railway Track

Rev	Date	Description	GIS	Chk	App
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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: NATIONAL GRID WORKS CONSTRUCTION DRAWINGS WYLFA TO GORS

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Figure G-2

4ZA010
4ZA011
4ZA012
4ZA013
4ZA014
4ZA015
4ZA016
4ZA017
4ZA018
4ZA019
4ZA020
4ZA021

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

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Figure G-3

4ZA020
4ZA021
4ZA022
4ZA023
4ZA024
4ZA025
4ZA026
4ZA027
4ZA028
4ZA029
4ZA030
4ZA031
4AP023
4AP024
4AP025
4AP026
4AP027
SECTION A
SECTION B

Bodewryd
Gorsedd Wygyr
Standing Stone
Tafarn-hwyaid
Pyllau budron
Glan-y-gors
Tyddyn-y-pandy
Pant-y-Gist
Bryn Du
Cae Coch
Maen y Goges
Hafodol Isaf
Hafodol-ganol
Hafodol Llyn
Llyn Hafodol
Tyn-rhos
Rhos-wen
Rhos-Engan
Yr-ynys
Rhyd Dafydd
Penbol
Rhosgoch
Rhosgoch Fawr
Four Crosses
Tan-y-four
Glasgraig Isaf
Glasgraig Fawr
Pen-yr-orsedd
Geufron
Cwredog

Legend

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- Non Linear Work Areas
- National Grid Construction Area
- Proposed Conductor Pulling Position
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Project Name: NORTH WALES CONNECTION PROJECT

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Figure G-4

Legend

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- Temporary Overhead Line Diversion
- Indicative Access
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- Non Linear Work Areas
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- Proposed Conductor Pulling Position
- A Road
- Railway Track

4ZA029 4ZA030 4ZA031 4ZA032 4ZA033 4ZA034

4AP025 4AP026 4AP027 4AP028 4AP029 4AP030 4AP031 4AP032 4AP033 4AP034

Rhosybol Rhiwmoel Fawr Rhiwmoel Bach Wind Farm Pen-y-fynwent Taldrwst Bach Melin-Trysglwyn Penygraig Penrhos Farm Pen-gwydd Gorslwyd Fawr Glasgraig Fawr Lletty Penrhyn Hafod-y-gors Afon Goch Caeau-gleision Stepping Stones Quarry (dis) Pwllcoch Uchaf Cors-y-bol Ty'n-y-ffrŵd Gaer Farm Tyn Cae Railway (disused) Ceidio-Isaf Isfron-Ceidio Fron Cae Mawr Rhosydd Fron Gaer Tyddyn

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

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Figure G-5

4AP032
4AP033
4AP034
4AP035
4AP036
4AP037
4AP041
4AP042
4ZA041
4ZA042
4ZA043
4ZA044
4ZA045
SECTION B
SECTION C

Gaer Farm
Tyn Cae
Pandy Parc
Tyddyn Bach
Rhosydd
Fron Gaer
Bryn-Hyfryd
Bodneithior
Melin Esgob
Tal-y-bontan
Bryn Dyfrydog
Maen Chwyf
Standing Stone
Llandyfrydog
Waen-wen
Rectory
Cae-Warcing
Tre-wyn
Plas Llandyfrydog
Coed Cefn-yr-ardd
Bron Afon
Pont-y-cochyn-bâch
Pont-y-cochyn
Cae-Iati
Llwydiarth Esgob Farm
Ty-mawr
Foel Llwydiarth Tower
Carreg Leidr
Clorach-fawr
Lon Leidr

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Figure G-6

N

4ZA044
4ZA045
4ZA046
4ZA047
4AP041
4AP042
4AP043
4AP044
4AP045
4AP046
4AP047
4AP048

Pont-y-cochyn-bâch
Pont-y-cochyn
Lon Leidr
Carreg Leidr
Clorach-fawr
Clorach-bâch
Ffynnon Gybi
Maen Farm
Machaddwyn
Mynydd Bodafon
Resr
Barclodiau
Settlement
Fferam
Tyddyn-y-waen
Afon Lligwy
Graigfryn Fawr
Graigfryn-bâch
Brynmwcog
Coed Cefn-du
Tyn Cae
Cae Fabli
Llanfihangel
Llech Golman
Earthwork
Ynys-Fawr
Cwyrt
Tyn Lôn
Cefn-du Mawr
Cors Nant Isaf
Ty Mawr

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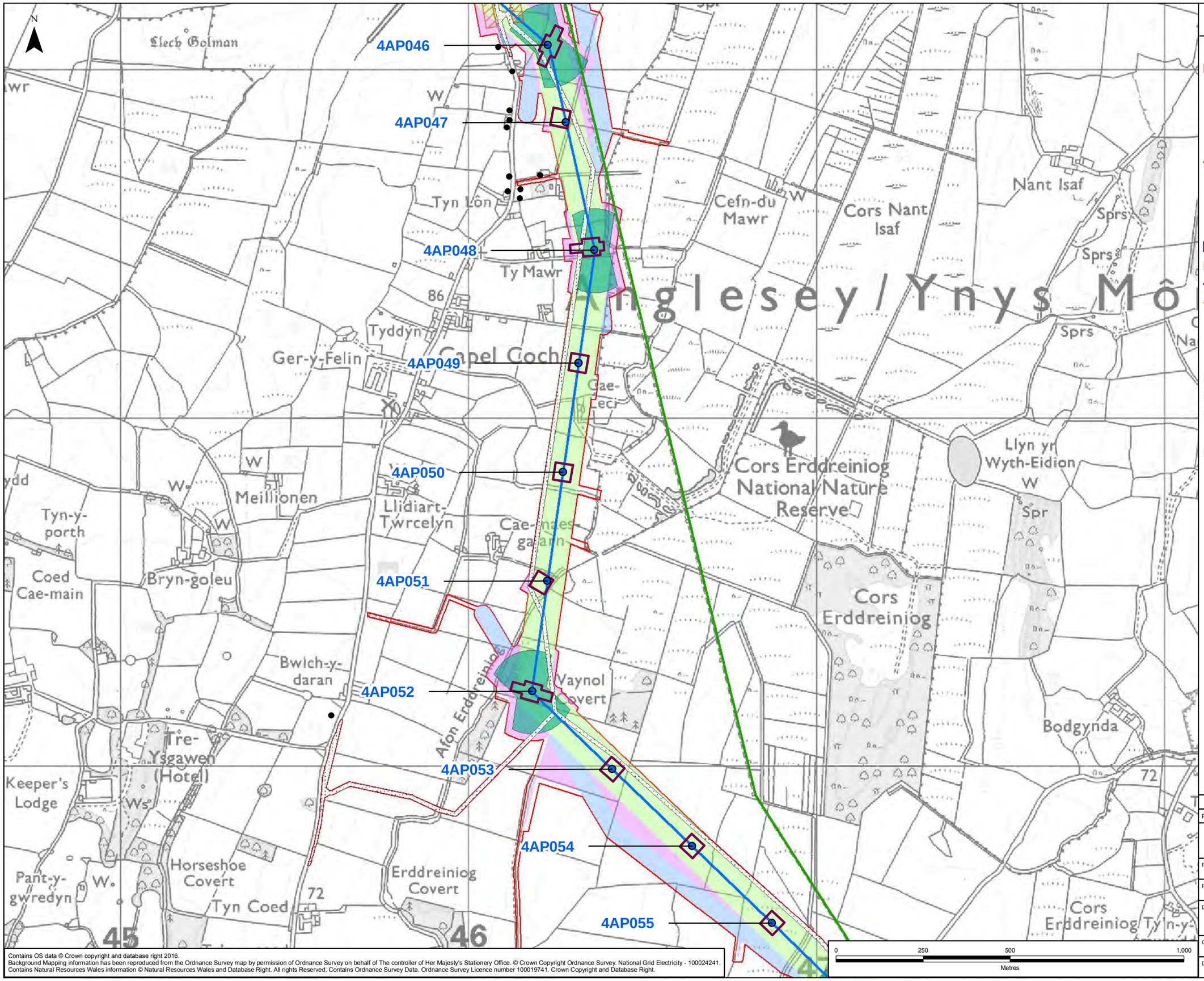

Figure G-7

Legend

- Proposed Project Boundary
- Section Cutlines
- Residential Property (Dwelling) within 50 m of the Proposed Project Boundary
- Indicative Concept Design Freeze Alignment 4ZA Pylons
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Figure G-8

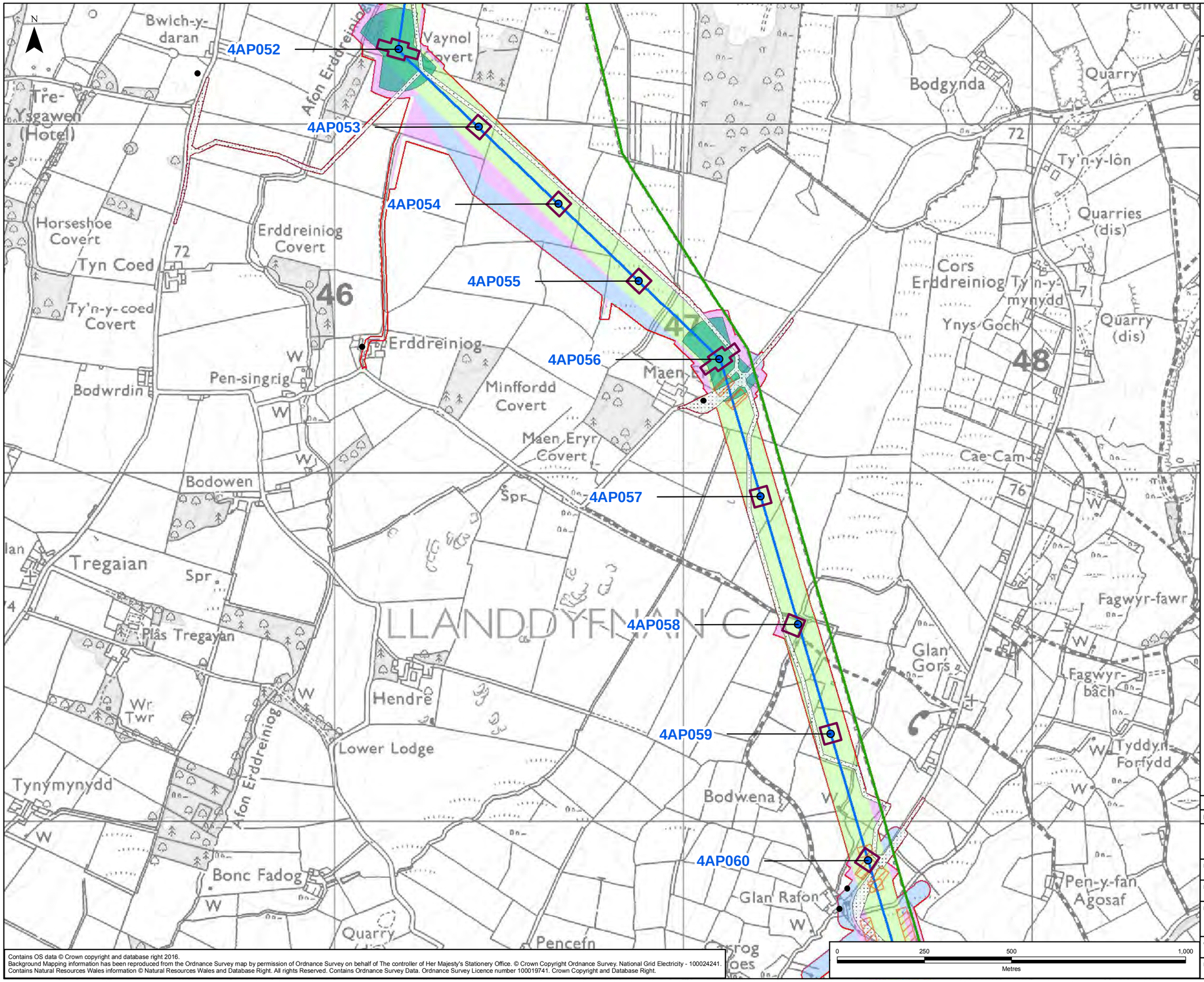

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Figure G-9

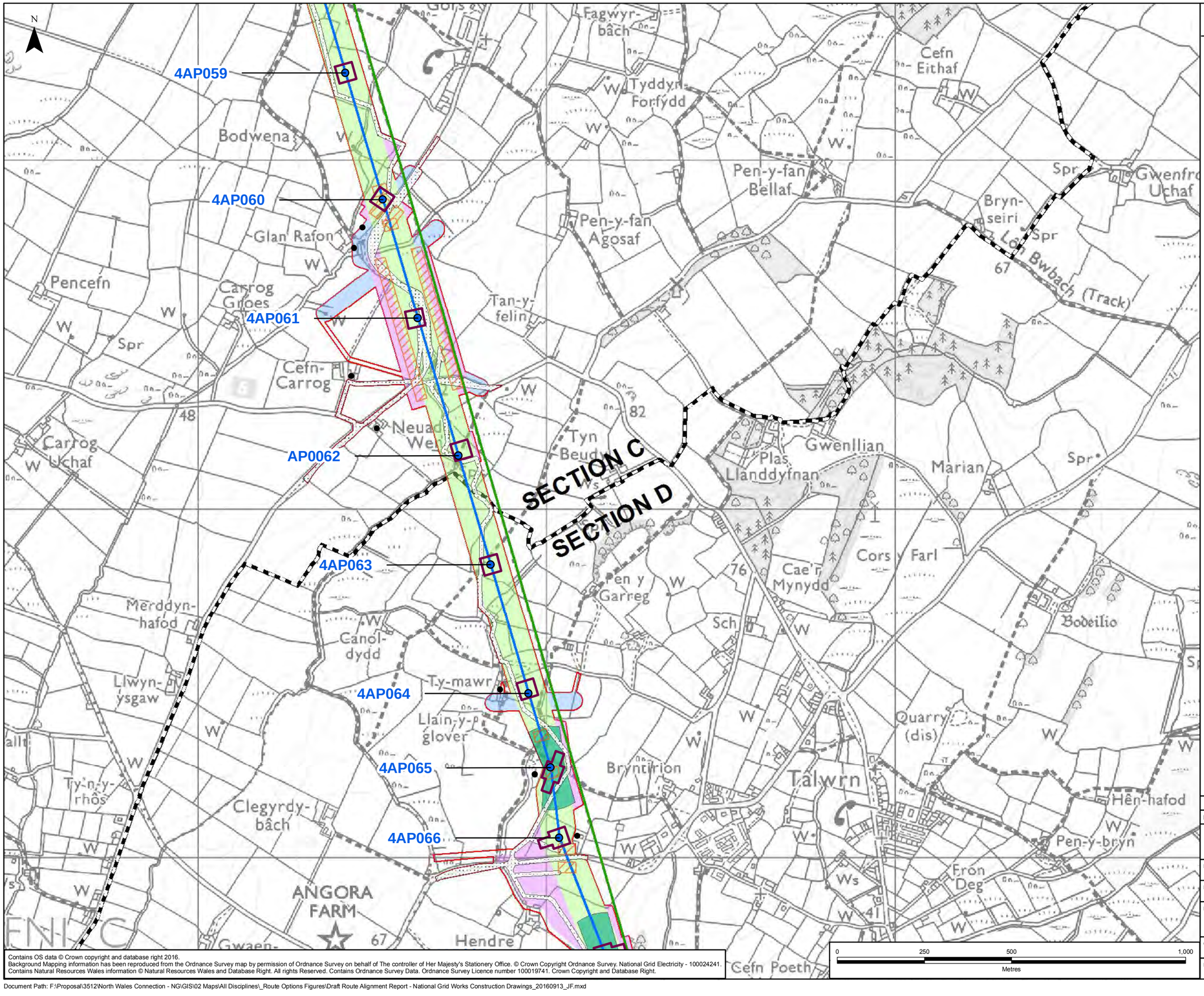

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Figure G-10

4AP064
4AP065
4AP066
4AP067
4AP068
4AP069
4AP070
4AP071
4AP072

Llain-y-glover
Clegyrdy-bâch
Bryntirion
Quarry (dis)
Talwrn
Hên-hafod
Pen-y-bryn
Fron Deg
ANGORA FARM
Gwaen-fangor
Hendre
Cefn Poeth Mawr
Bryngors
Cae-Ddafydd
Cefn Poeth Bach
Tyddyn Waen
Clegyrdy-mawr
Cae-cwta-mawr
Gylche Covert
Ty'n-talwrn
Bron Alar
College
The Cottage
Pencraig
Bryngwallan
Dafarn-newydd
Defaity
Alon Ceint
Ty-hên
Plas Penmynydd
Tregarnedd Fawr
Ty'n-y-fel
Ceint
Geint Fawr

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Project Name: NORTH WALES CONNECTION PROJECT

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Figure G-11

4AP071
4AP072
4AP073
4AP074
4AP075
4AP076
4AP077
4AP078

SECTION D
SECTION E

Tregarnedd Fawr
Ty-hên
Plas Penmynydd
Pen Rallt
Hirdd faig
Standing Stone
Geint-Fawr
Cefn-poeth
Nant
Nant Uchaf
Fron Isaf
Ty Mawr Llan
Rhyd-yr-arian
Church (rems of)
Tyddyn Mawr
Penrhyn-bach
Quarry (disused)
Bwlch-gwyn
Twll-y-clawdd
Llinos-fawr
Cefn Du Isaf
Fron-Deg

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APPENDIX H.

DETAILED CLEARANCE DESIGNS FOR LOCATIONS ALONG THE ROUTE

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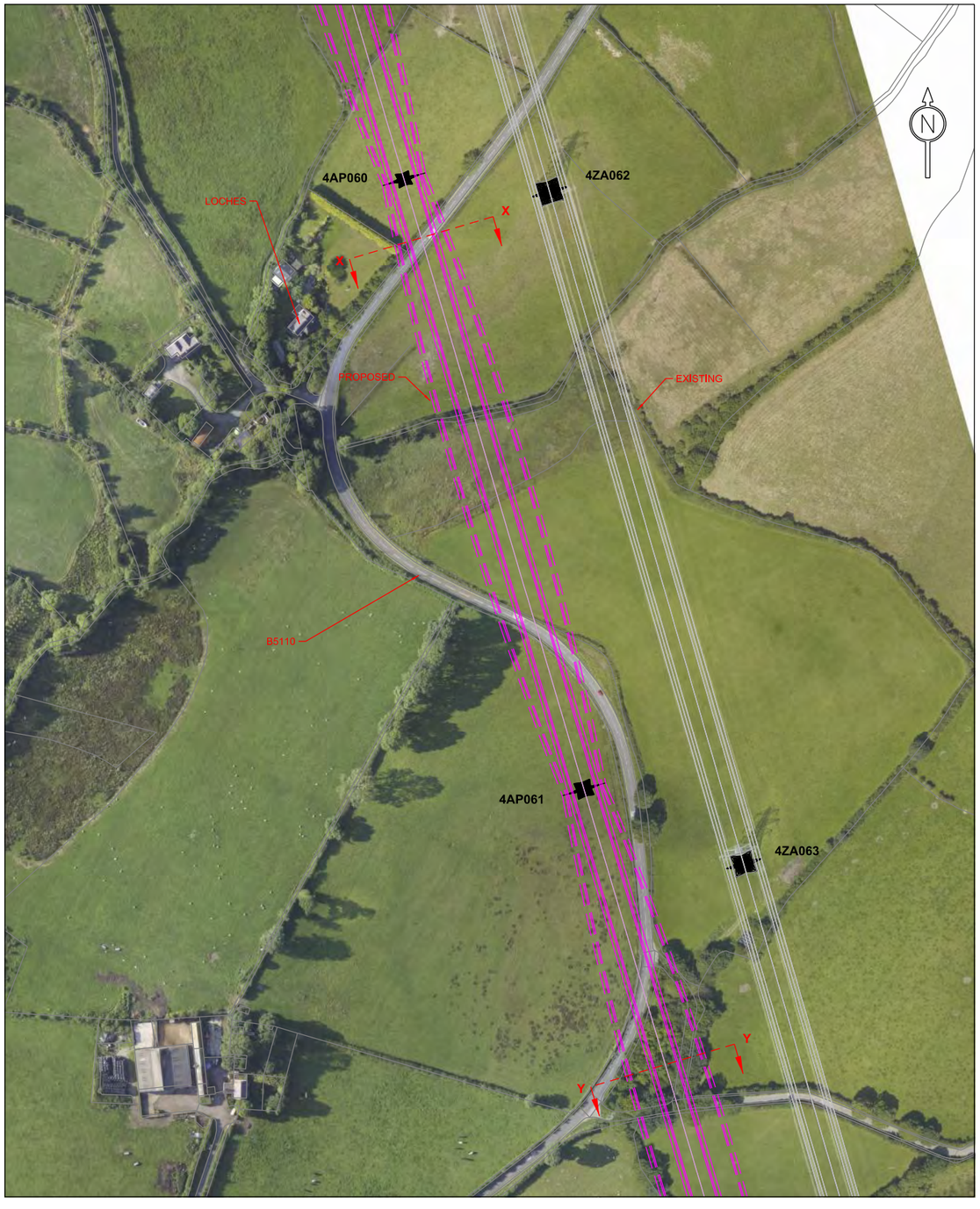
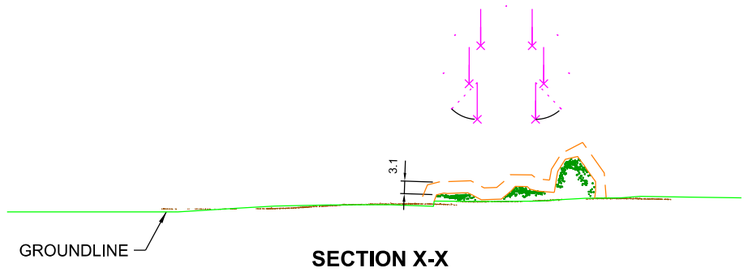
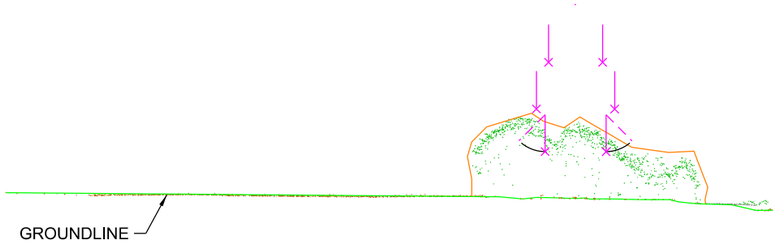


PLAN

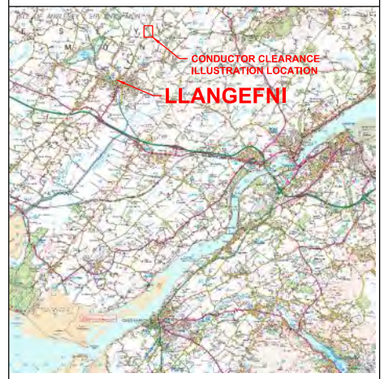


SECTION X-X



SECTION Y-Y

FIGURE H-1



1:50,000

Legend

- GROUNDLINE
- APPROXIMATE EXTENT OF VEGETATION
- 3.1m VERTICAL CLEARANCE ABOVE VEGETATION
- STILL AIR CONDUCTOR
- SAG OF CONDUCTOR AND INSULATOR AT MAXIMUM TEMPERATURE
- CROSSING POSITION OF CONDUCTOR AT MAXIMUM TEMPERATURE
- SWEEP OF LOWEST CONDUCTOR

Notes:

1. THIS FIGURE SHOULD NOT BE USED FOR CARRYING OUT OPERATIONAL ASSESSMENT AND NATIONAL GRID SHOULD BE CONTACTED FOR FURTHER DETAIL IF REQUIRED.
2. EXISTING PYLONS ARE NOT SHOWING ON SECTIONS
3. CONDUCTOR POSITION ON EXISTING ROUTE AS SHOWN BY LIDAR

Rev	Date	Description	Drwn	Chk	App
A	22/09/2016	FIRST ISSUE	IW	SF	GDS

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Project Name:	NORTH WALES CONNECTION PROJECT
Report Title:	DRAFT ROUTE ALIGNMENT REPORT
Document Title:	DETAILED CLEARANCE DESIGN: ILLUSTRATION DEMONSTRATING CONDUCTOR CLEARANCE TO EXISTING VEGETATION ALONG B5110

Creator	Date:	Checker	Date:	Approver:	Date:
IW	22/09/2016	SF	22/09/2016	GDS	22/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE H-1	1:1500	A3	SHEET 1 of 1	A

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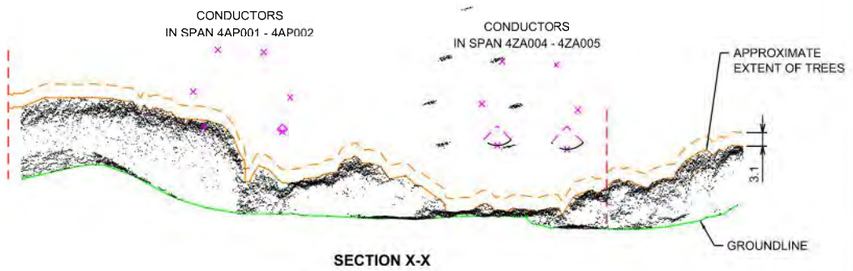
FIGURE H-2

PLAN



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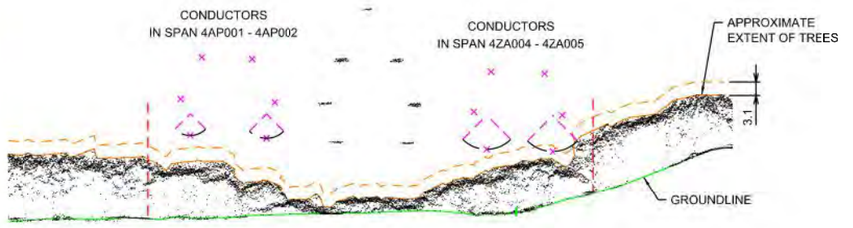
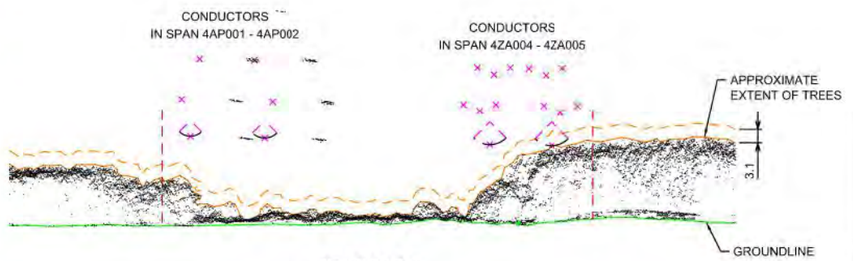
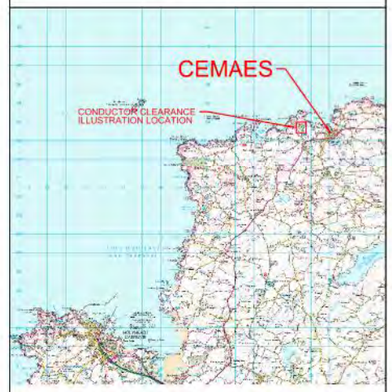


SECTION Y-Y



SECTION Z-Z



1:50,000

Legend

- GROUNDLINE
- APPROXIMATE EXTENT OF TREES
- 3.1m VERTICAL CLEARANCE ABOVE TREES
- STILL AIR CONDUCTOR
- SAG OF CONDUCTOR AND INSULATOR AT MAXIMUM TEMPERATURE
- SWEEP OF LOWEST CONDUCTOR
- AREA REQUIRING VEGETATION MANAGEMENT
- CROSSING POSITION OF CONDUCTOR AT MAXIMUM TEMPERATURE

Notes:

1. THIS FIGURE SHOULD NOT BE USED FOR CARRYING OUT OPERATIONAL ASSESSMENT AND NATIONAL GRID SHOULD BE CONTACTED FOR FURTHER DETAIL IF REQUIRED.
2. EXISTING PYLONS ARE NOT SHOWING IN SECTIONS.
3. CONDUCTOR POSITIONS ON EXISTING ROUTE AS SHOWN BY LIDAR.

Rev	Date	Description	Drwn	Chk	App
A	22/09/2016	FIRST ISSUE	RTM	SF	GDS

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: DETAILED CLEARANCE DESIGN: ILLUSTRATION OF VEGETATION CLEARANCE REQUIREMENTS THROUGH LANDSCAPE MOUNDS AT WYLFA SUBSTATION

Creator	Date:	Checker	Date:	Approver:	Date:
RTM	22/09/2016	SF	22/09/2016	GDS	22/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE H-2	1:1000	A3	SHEET 1 of 1	A

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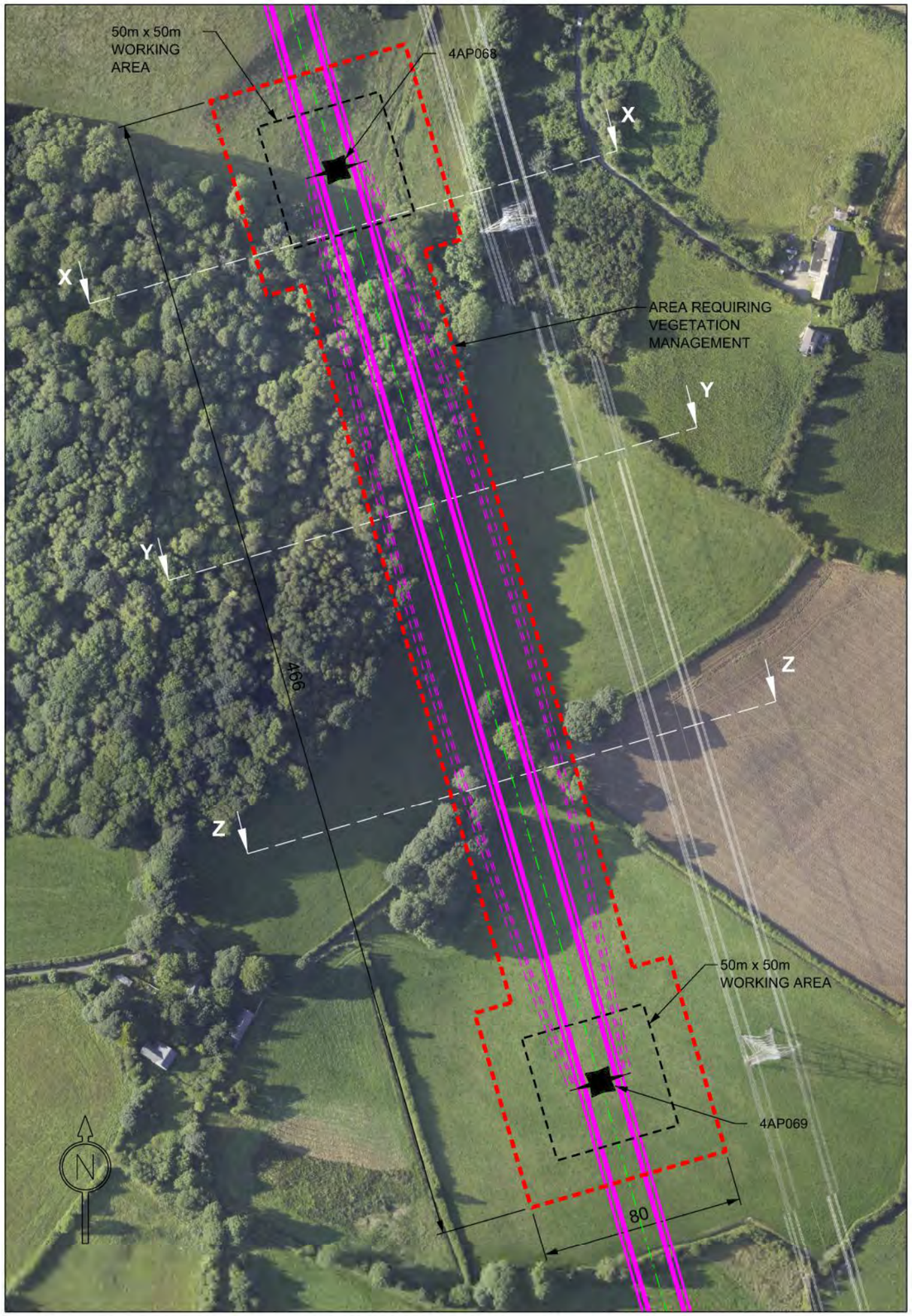
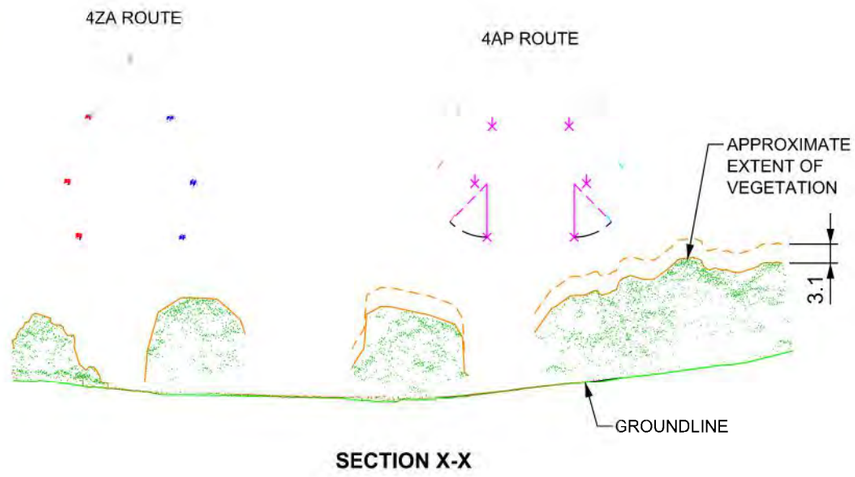
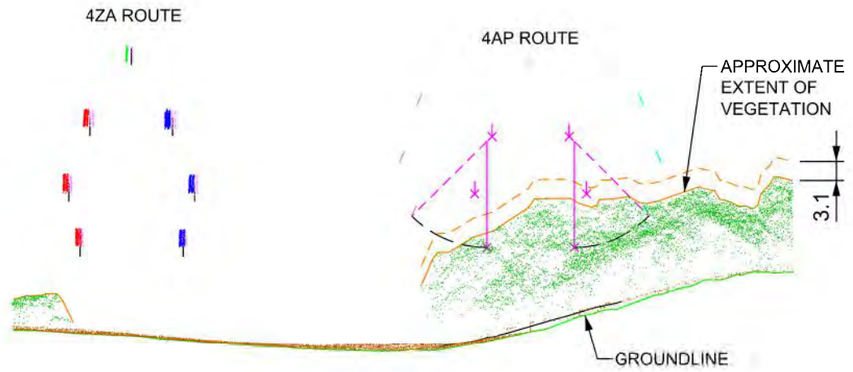
PLAN (SCALE - 1:200)

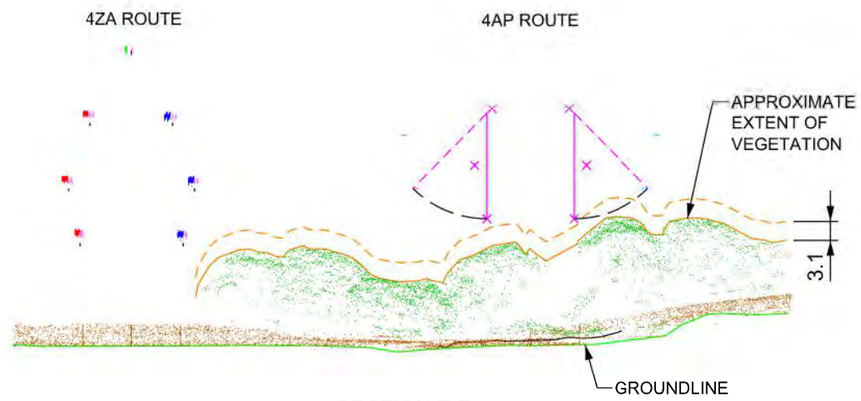




SECTION X-X



SECTION Y-Y



SECTION Z-Z

FIGURE H-3

Legend

- GROUNDLINE
- APPROXIMATE EXTENT OF VEGETATION
- 3.1m VERTICAL CLEARANCE ABOVE VEGETATION
- STILL AIR CONDUCTOR
- SAG OF CONDUCTOR AND INSULATOR AT MAXIMUM TEMPERATURE
- SWEEP OF LOWEST CONDUCTOR
- CROSSING POSITION OF CONDUCTOR AT MAXIMUM TEMPERATURE

GENERAL NOTES:

1. THIS FIGURE SHOULD NOT BE USED FOR CARRYING OUT OPERATIONAL ASSESSMENT AND NATIONAL GRID SHOULD BE CONTACTED FOR FURTHER DETAIL IF REQUIRED
2. EXISTING PYLONS ARE NOT SHOWING IN SECTIONS.
3. CONDUCTOR POSITION ON EXISTING ROUTE AS SHOWN BY LIDAR

Rev	Date	Description	Drwn	Chk	App
A	22/09/2016	Initial Issue	RTM	SF	GDS

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: DETAILED CLEARANCE DESIGN: PROPOSED OHL SPAN 4AP068 - 4AP069 (GLYCHED COVERT)

Creator	Date:	Checker	Date:	Approver:	Date:
RTM	22/09/2016	SF	22/09/2016	GDS	22/09/2016

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FIGURE H-3	1:100	A3	1 of 1	A

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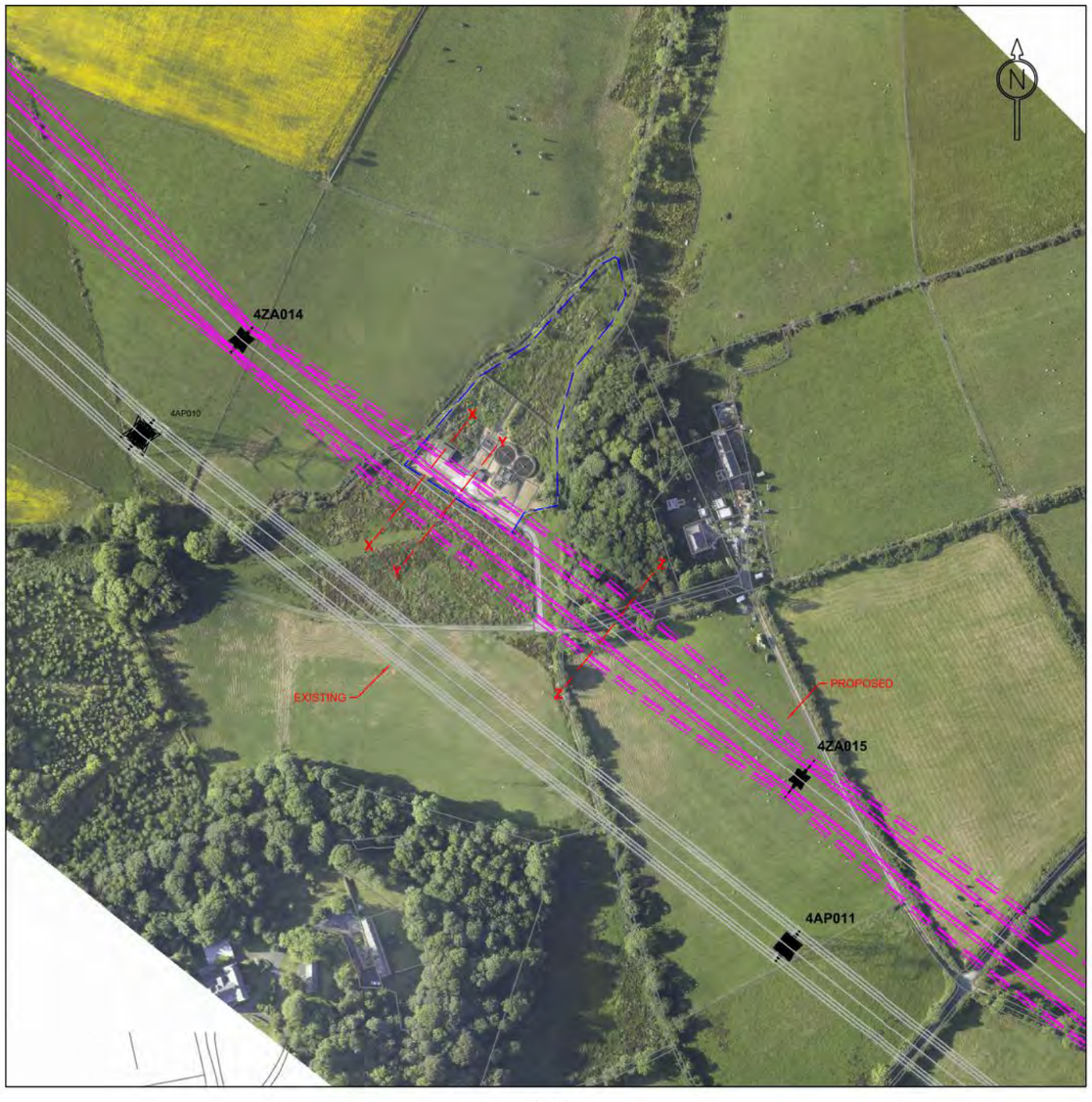

PLAN

SECTION X-X

SECTION Y-Y

SECTION Z-Z

FIGURE H-4

1:50,000

Legend

- GROUNDLINE
- APPROXIMATE EXTENT OF VEGETATION
- APPROXIMATE EXTENT OF BUILDING
- STILL AIR CONDUCTOR
- APPROXIMATE PROPERTY BOUNDARY OF LLANFCHELL WATER TREATMENT WORKS
- SWEEP OF LOWEST CONDUCTOR
- CROSSING POSITION OF CONDUCTOR AT MAXIMUM TEMPERATURE
- EXCLUSION ZONE NO VEHICLES OR PLANT
- VEHICLE AND MOBILE PLANT USE PERMITTED
- BUILDINGS IN SECTION VIEW

Notes

1. THIS FIGURE SHOULD NOT BE USED FOR CARRYING OUT OPERATIONAL ASSESSMENT AND NATIONAL GRID SHOULD BE CONTACTED FOR FURTHER DETAIL IF REQUIRED
2. EXISTING PYLONS ARE NOT SHOWING IN SECTIONS
3. CONDUCTOR POSITIONS ON EXISTING ROUTE AS SHOWN BY LIDAR

Rev	Date	Description	Drwn	Chk	App
A	22/09/2016	FIRST ISSUE	MJM	SF	GDS

nationalgrid

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: DETAILED CLEARANCE DESIGN: FIGURE ILLUSTRATING CLEARANCE TO WELSH WATER OPERATIONS AT WASTE WATER TREATMENT WORKS

Creator	Date:	Checker	Date:	Approver:	Date:
MJM	22/09/2016	SF	22/09/2016	GDS	22/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE H-4	1:1500	A3	SHEET 1 of 1	A

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APPENDIX I.

OVERHEAD LINE DESIGN EVOLUTION IN THE RHOSGOCH AND RHOSYBOL AREAS

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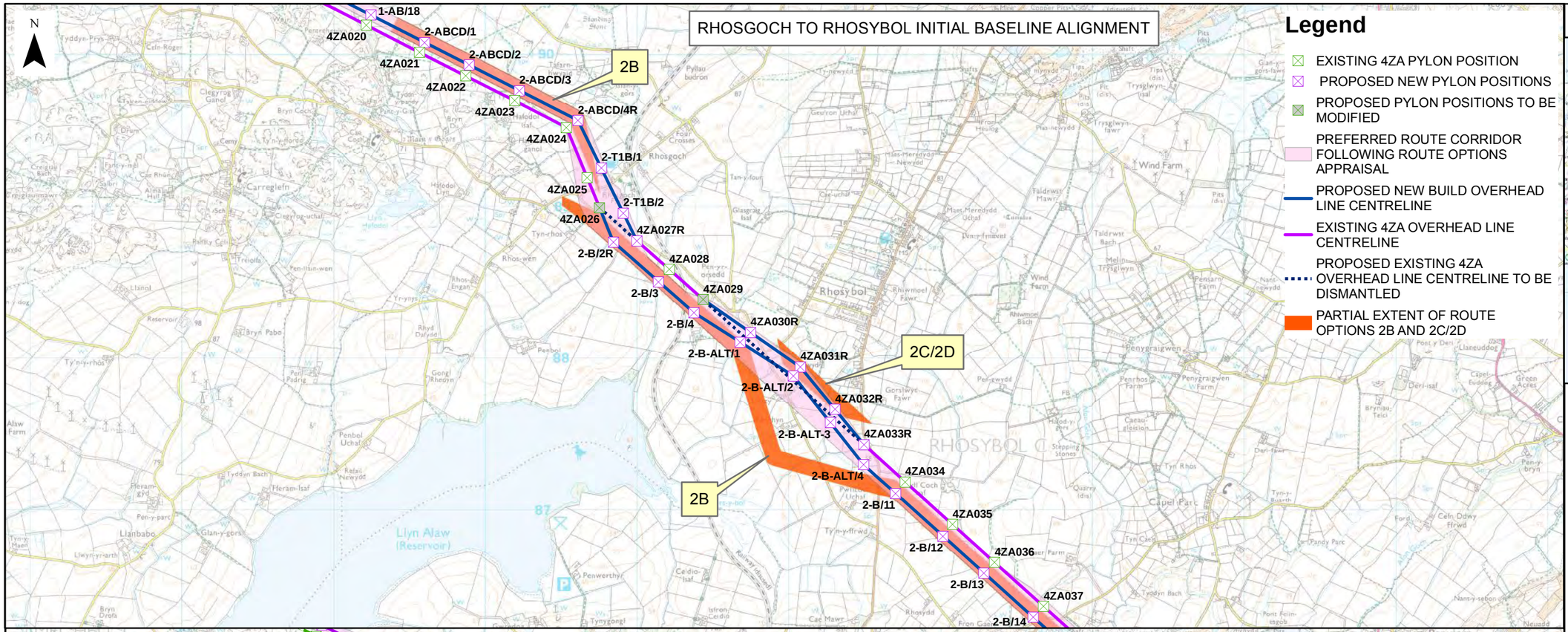
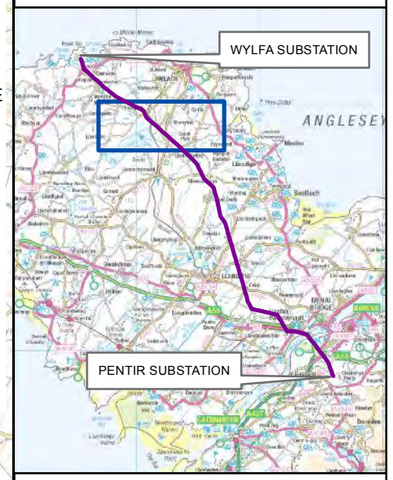
FIGURE I-1

RHOSGOCH TO RHOSYBOL INITIAL BASELINE ALIGNMENT

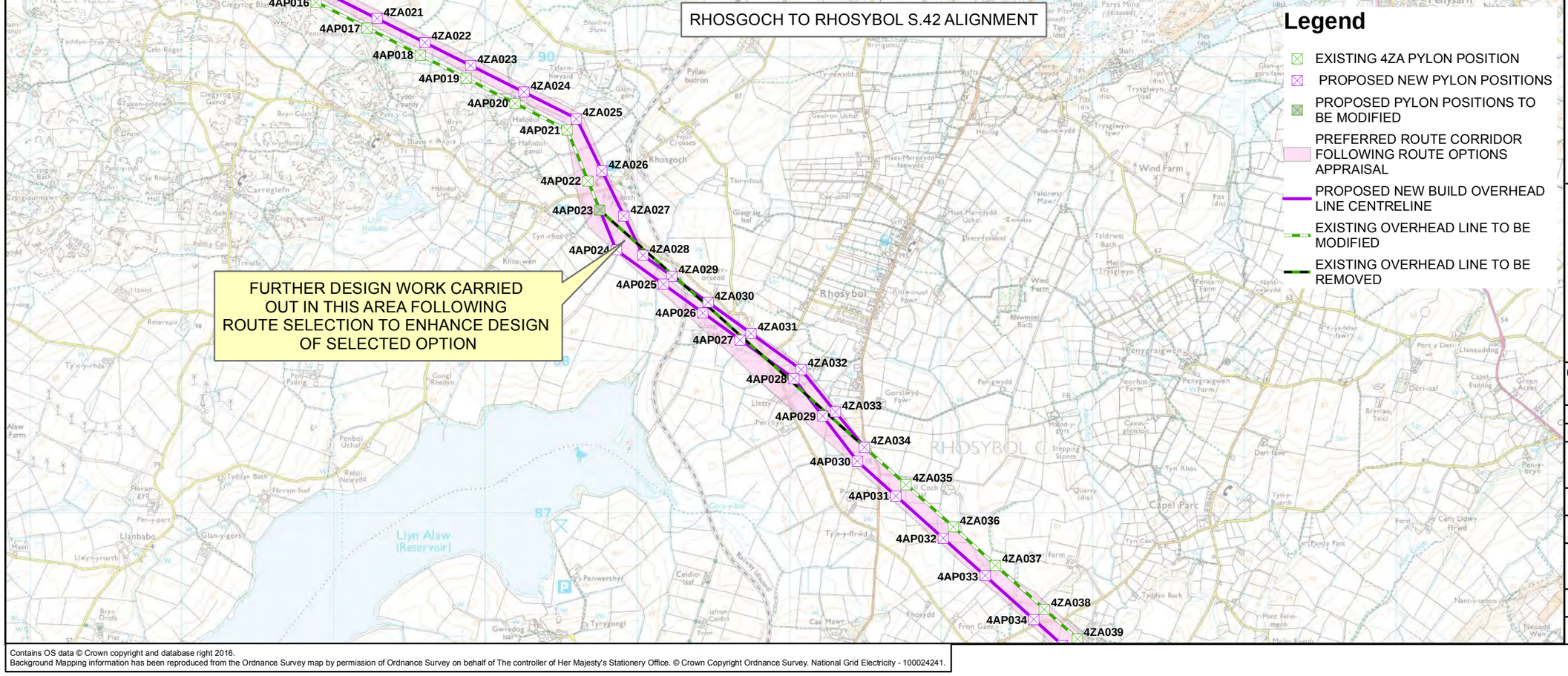


Legend

- EXISTING 4ZA PYLON POSITION
- PROPOSED NEW PYLON POSITIONS
- PROPOSED PYLON POSITIONS TO BE MODIFIED
- PREFERRED ROUTE CORRIDOR FOLLOWING ROUTE OPTIONS APPRAISAL
- PROPOSED NEW BUILD OVERHEAD LINE CENTRELINE
- EXISTING 4ZA OVERHEAD LINE CENTRELINE
- PROPOSED EXISTING 4ZA OVERHEAD LINE CENTRELINE TO BE DISMANTLED
- PARTIAL EXTENT OF ROUTE OPTIONS 2B AND 2C/2D



RHOSGOCH TO RHOSYBOL S.42 ALIGNMENT



Legend

- EXISTING 4ZA PYLON POSITION
- PROPOSED NEW PYLON POSITIONS
- PROPOSED PYLON POSITIONS TO BE MODIFIED
- PREFERRED ROUTE CORRIDOR FOLLOWING ROUTE OPTIONS APPRAISAL
- PROPOSED NEW BUILD OVERHEAD LINE CENTRELINE
- EXISTING OVERHEAD LINE TO BE MODIFIED
- EXISTING OVERHEAD LINE TO BE REMOVED

Notes

0 0.4 0.8 1.6 km

Rev	Date	Description	Drwn	Chk	App
A	22/09/2016	Initial Issue	JH	SF	GDS

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: OVERHEAD LINE DESIGN EVOLUTION IN THE RHOSGOCH AND RHOSYBOL AREAS

Creator:	Date:	Checker:	Date:	Approver:	Date:
JH	22/09/2016	SF	22/09/2016	GDS	22/09/2016

Figure	Scale:	Format:	Sheets:	Rev:
FIGURE I-1	1:30,000	A3	SHEET 1 OF 1	A

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APPENDIX J.

CONSTRUCTION COMPOUND: GENERIC LAYOUT, SITE OPTIONS AND ACCESS TO PREFERRED SITE

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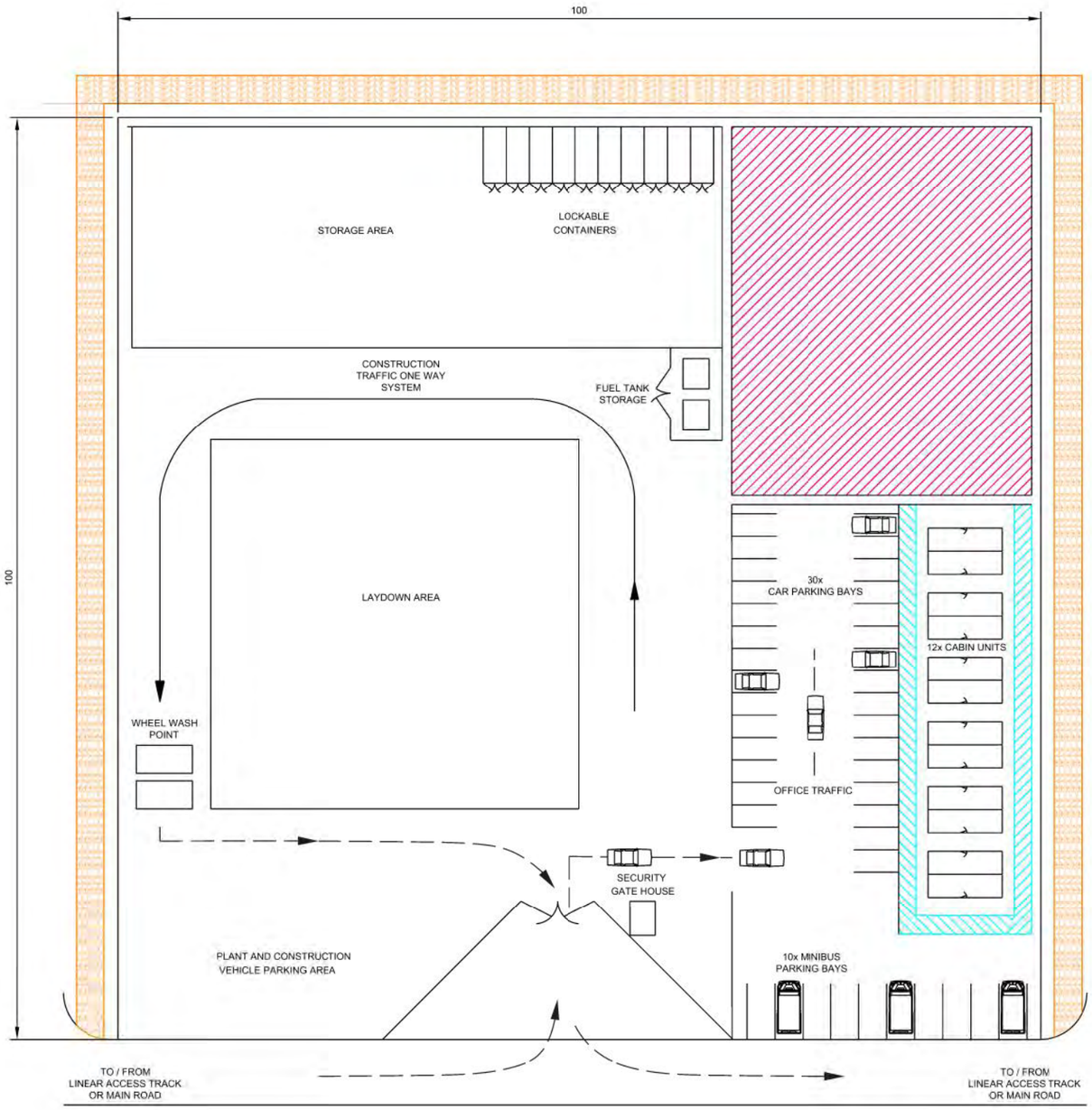

FIGURE J-1

LEGEND

PEDESTRIAN ACCESS

SOIL BUND

SPOIL

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED
2. DIMENSIONS AND LAYOUT ARRANGEMENT SHOWN IS INDICATIVE ONLY. DESIGN WILL VARY ACCORDING TO THE AVAILABLE AREA, THE SPECIFIC SITE CONSTRAINTS AND THE CONSTRUCTION CONTRACTORS REQUIREMENTS.
3. CABIN UNITS MAY BE DOUBLE STOREY AND MAY BE RAISED TO TAKE ACCOUNT OF POTENTIAL FLOOD RISK AT CERTAIN LOCATIONS.
4. SOIL BUND WILL BE DESIGNED WITH SUITABLE GAPS / DRAINAGE PIPES TO ALLOW WATER FLOW IN FLOOD CONDITIONS.
5. THIS DRAWING SHOWS A TYPICAL OVERHEAD LINE CONSTRUCTION COMPOUND, WHICH WILL BE IN PLACE DURING CONSTRUCTION OF THE OVERHEAD LINE.

Rev	Date	Description	Drwn	Chk	App
A	27/09/2016	FIRST ISSUE	JH	SF	GDS

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NORTH WALES CONNECTION PROJECT

Report Title:

DRAFT ROUTE ALIGNMENT REPORT

Document Title:

CONSTRUCTION COMPOUND: GENERIC LAYOUT

Creator:	Date:	Checker:	Date:	Approver:	Date:
JH	27/09/2016	SF	27/09/2016	GDS	27/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE J-1	1:600	A3	1 OF 1	A

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N

Site 4.2

Site 5.1

Site 4.1

Site 3.5

Site 3.4

Site 3.3

Site 3.2

Site 3.1

Site 2.4

Site 2.2

Site 2.5

Site 2.3

Site 2.6

Site 2.1

Site 2.7

Site 1.1

0 2 4 8

Kilometers

Figure J-2

Legend

- Existing National Grid 400 kV overhead line
- Construction Compound Site Option

Rev	Date	Description	GIS	Chk	App
0	16/09/2016	Initial Issue	JF	JB	CC

nationalgrid

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: CONTRUCTION COMPOUND SITE OPTIONS

Creator:	Date:	Checker:	Date:	Approver:	Date:
JF	16/09/2016	JB	16/09/2016	CC	16/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:100,000	A3	1 of 1	0

Document Path: \\Ukmcr1fp002\UKMCR1FP002-V1IE\Proposal\3512\North Wales Connection - NG\GIS\02 Maps\All Disciplines_Route Options Figures\Preferred Route Option Selection Report - Construction Compounds_20160916_JF.mxd

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Figure J-3

Legend

- Proposed Project Boundary
- Existing National Grid 400 kV overhead line
- Proposed Site for Main Overhead line Construction Compound
- Settlement
- A55
- Llangefni Relief Road (LRR)
- A Road
- B Road
- Other Road

Llangefni
LLAN GEFNI
LRR
B5420
A5114
A55
Gaerwen
Llanfair
Llanddaniel Fab
Anglesey / Ynys Môn
Cefni Reservoir
Rhosmeirch
Talwrn
Rhostrehwfa
Penmynydd
Menai Strait / Afon Menai

0 250 500 1,000
Metres

Rev	Date	Description	GIS	Chk	App
JF	14/09/2016	Initial Issue	JF	JB	CC

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Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: ACCESS TO PREFERRED SITE

Creator:	Date:	Checker:	Date:	Approver:	Date:
JF	12/09/2016	JB	12/09/2016	CC	14/09/2016

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:30,000	A3	1 of 1	0

Document Path: \\Ukmcr1fp002\ukmcr1fp002-v1ie\Proposal\3512\North Wales Connection - NG\GIS\02 Maps\All Disciplines_Route Options Figures\Draft Route Alignment Report - A55_20160912_JF.mxd

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APPENDIX K.

OVERVIEW OF PROPOSED ALIGNMENTS BETWEEN WYLFA AND MENAI CROSSING AREA

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N

WYLFA SUBSTATION

AMLWCH

ANGLESEY / YNYS MON

ANGLESEY / YNYS MON

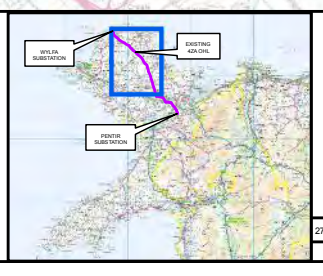
ISLE OF ANGLESEY / SIR YNYS MON

LLANGEFNI

0 0.25 0.5 1 Km

Legend

- EXISTING OVERHEAD LINE CENTRELINE
- INDICATIVE NEW BUILD OVERHEAD LINE CENTRELINE
- EXISTING OVERHEAD LINE CENTRELINE TO BE MODIFIED



Date	Description	Drwn	Chk	App
27/09/2016	Initial Issue	JH	SF	GDS

Creator:	Date:	Checker:	Date:	Approver:	Date:
JH	27/09/2016	SF	27/09/2016	GDS	27/09/2016

FIGURE K-1	Scale:	Format:	Sheets:	Rev:
	1:55,000	A3	1 OF 1	A

Project Name: NORTH WALES CONNECTION PROJECT

Report Title: DRAFT ROUTE ALIGNMENT REPORT

Document Title: OVERVIEW OF PROPOSED ALIGNMENTS BETWEEN WYLFA AND MENAI CROSSING AREA

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FIGURE K-1

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APPENDIX L.

ROUTE-SPECIFIC PYLON DESIGN SUMMARY TABLE

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4AP Pylon Number	Design	Type	Extension	Height (m)	PAIRED	4ZA Height (m)	Extension	Type	Design	Pylon Number
4AP001	L12	DT	M3	46	⟷	55.3	E10	DJT	L6	4ZA004
4AP002	L6	D30	E10	51.6	⟷	48.3	E3	D25	L12	4ZA005
4AP003	L6	D	E20	56.1	⟷	46.5	STD	D	L12	4ZA006
4AP004	L6	D30	STD	48.6	⟷	42.3	M3	D25	L12	4ZA007
4AP005	L6	D	E20	56.1						
						48.3	E3	D10	L12	4ZA008
4AP006	L6	D	E20	56.1	⟷	46.5	STD	D	L12	4ZA009
						48.3	E3	D10	L12	4ZA010
4AP007	L6	D	E20	56.1						
						46.5	STD	D	L12	4ZA011
4AP008	L6	D	E30	59.2	⟷	46.5	STD	D	L12	4ZA012
4AP009	L6	D	E20	56.1	⟷	49.5	E3	D	L12	4ZA013
4AP010	L6	D30	E10	51.6	⟷	51.3	E6	D10	L12	4ZA014
4AP011	L6	D	STD	50	⟷	49.5	E3	D	L12	4ZA015
4AP012	L6	D	E10	53.1	⟷	52.5	E6	D	L12	4ZA016
4AP013	L6	D	STD	50	⟷	49.5	E3	D	L12	4ZA017
4AP014	L6	D30	STD	48.6	⟷	51.3	E6	D25	L12	4ZA018
4AP015	L6	D	E10	53.1	⟷	49.5	E3	D	L12	4ZA019
4AP016	L6	D	E30	59.2	⟷	49.5	E3	D	L12	4ZA020
4AP017	L6	D	E20	56.1	⟷	46.5	STD	D	L12	4ZA021
4AP018	L6	D	E30	59.2	⟷	49.5	E3	D	L12	4ZA022
4AP019	L6	D	E10	53.1	⟷	52.5	E6	D	L12	4ZA023
4AP020	L6	D	E20	56.1	⟷	52.5	E6	D	L12	4ZA024
4AP021	L6	D60	E10	53.4	⟷	51.8	E6	D55	L12	4ZA025
End of Section A										
4AP022	L6	D	STD	50	⟷	58.5	E12	D	L12	4ZA026
4AP023	L6	D30	STD	48.6						
						55.5	E9	D	L12	4ZA027
4AP024	L12	D55	E3	48.8						
						42.3	M3	D25	L12	4ZA028
4AP025	L12	D	E9	55.5	⟷	49.5	E3	D	L12	4ZA029
4AP026	L12	D	M3	43.5	⟷	43.5	M3	D	L12	4ZA030
4AP027	L12	D	E9	55.5	⟷	52.5	E6	D	L12	4ZA031
4AP028	L12	D25	E9	54.3	⟷	57.3	E12	D25	L12	4ZA032
4AP029	L12	D	E9	55.5	⟷	52.5	E6	D	L12	4ZA033
4AP030	L12	D10	E6	51.3	⟷	51.3	E6	D10	L12	4ZA034
4AP031	L12	D	E6	52.5	⟷	56.1	E20	D	L6	4ZA035
4AP032	L12	D	E9	55.5	⟷	59.2	E30	D	L6	4ZA036
4AP033	L12	D	E9	55.5	⟷	59.2	E30	D	L6	4ZA037
4AP034	L12	D	E6	52.5	⟷	59.2	E30	D	L6	4ZA038
4AP035	L12	D	M3	43.5	⟷	59.2	E30	D	L6	4ZA039
4AP036	L12	D10	E12	57.3						
						48.6	STD	D30	L6	4ZA040
4AP037	L12	D25	E6	51.3	⟷	51.3	E6	D10	L12	4ZA041
4AP038	L6	D	E50	65.3	⟷	55.5	E9	D	L12	4ZA042
End of Section B										

4AP Number	Design	Type	Extension	Height (m)	PAIRED	4ZA Height (m)	Extension	Type	Design	Pylon Number
4AP039	L6	D30	E30	57.7	⟷	57.3	E12	D10	L12	4ZA043
4AP040	L6	D	STD	50	⟷	46.5	STD	D	L12	4ZA044
4AP041	L12	D10	E9	54.3	⟷	48.3	E3	D10	L12	4ZA045
4AP042	L12	D	E3	49.5	⟷	52.5	E6	D	L12	4ZA046
4AP043	L12	D55	E6	51.8	⟷	54.4	E20	D30	L6	4ZA047
4AP044	L12	D	E9	55.5	⟷	59	E30	D	L6	4ZA048
4AP045	L12	D	E9	55.5	⟷	56	E20	D	L6	4ZA049
						56.3	E20	D60	L6	4ZA050
4AP046	L12	D55	E9	54.8						
4AP047	L12	D	E3	49.5	⟷	58.4	E30	D	L6	4ZA051
4AP048	L12	D25	E6	51.3	⟷	54.8	E20	D	L6	4ZA052
4AP049	L12	D	E6	52.5						
						52.8	E10	D	L6	4ZA053
4AP050	L12	D	STD	46.5						
						52.8	E10	D	L6	4ZA054
4AP051	L12	D	E3	49.5						
						55.8	E20	D	L6	4ZA055
4AP052	L12	D55	STD	45.8						
4AP053	L12	D	E3	49.5						
						51.2	E10	D30	L6	4ZA056
4AP054	L12	D	E6	52.5						
4AP055	L12	D	STD	46.5						
						52.8	E10	D	L6	4ZA057
4AP056	L12	D55	E3	48.8	⟷	51.2	E10	D30	L6	4ZA058
4AP057	L12	D	E9	55.5	⟷	58.9	E30	D	L6	4ZA059
4AP058	L12	D	E6	52.5	⟷	55.2	E20	D	L6	4ZA060
4AP059	L12	D	E3	49.5	⟷	58.7	E30	D	L6	4ZA061
4AP060	L12	D	E3	49.5	⟷	55.9	E20	D	L6	4ZA062
4AP061	L12	D	E9	55.5						
						52.8	E10	D	L6	4ZA063
4AP062	L12	D	E12	58.5	⟷	59	E30	D	L6	4ZA064
End of Section C										
4AP063	L12	D	STD	46.5	⟷	54.3	E20	D30	L6	4ZA065
4AP064	L12	D	E3	49.5	⟷	55.9	E20	D	L6	4ZA066
4AP065	L12	D10	M3	42.3						
						55.8	E20	D	L6	4ZA067
4AP066	L12	D25	STD	45.3						
4AP067	L12	D10	E6	51.3	⟷	49.7	STD	D	L6	4ZA068
4AP068	L12	D	E9	55.5	⟷	55.6	E20	D	L6	4ZA069
4AP069	L12	D	E12	58.5	⟷	52.9	E10	D	L6	4ZA070
4AP070	L12	D	E6	52.5	⟷	59.7	E30	D	L6	4ZA071
4AP071	L12	D	E3	49.5	⟷	52.7	E10	D	L6	4ZA072
4AP072	L12	D	E6	52.5	⟷	52.7	E10	D	L6	4ZA073
4AP073	L12	D	E6	52.5	⟷	56.5	E20	D	L6	4ZA074
End of Section D										

Existing Pylon

New Pylon

Pylons from 4ZA078 to 4ZA109 are not paired with any 4AP Pylons.

nationalgrid

NORTH WALES CONNECTION PROJECT
DRAFT ROUTE ALIGNMENT REPORT.

APPENDIX L.

PYLON DESIGN SUMMARY TABLE.

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APPENDIX M.

SUMMARY OF OTHER DRAWINGS AVAILABLE AT STAGE 3 (STATUTORY) CONSULTATION

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Available Plans

We will submit a series of plans as part of our application for consent. We've prepared draft versions of some of these plans for this stage of consultation using the information we currently have so that people can understand our proposals.

Whilst the plans illustrate many aspects of the proposed project design they do not explain the rationale for that design. This can be found in National Grid's 'Draft Route Alignment Report' which has been published to accompany the consultation. A preliminary assessment of the environmental effects that the project could have are set out in some detail in a 'Preliminary Environmental Impact Report' and are summarised in its accompanying 'Non-Technical Summary', which have also been published as part of the consultation

The plans published for consultation are:

3.1 Works Plans: these show the proposed project boundary within which we propose to build the connection and the proposed route for the second connection.

3.2 Land Plans: show the types of proposed land use within the proposed project boundary.

3.3 Land Affected Plans: show the proposed project boundary and land affected by the proposed design for the second connection.

3.4 Crown and Special Category Land Plans: show the proposed project boundary and affected special category land such as common land, and land owned by special bodies such as the National Trust. They also show Crown land that may be affected by our proposals.

3.5 Access and Rights of Way Plans: show our proposed access points from the public highway, and public rights of way we currently know of, that may be affected by our proposal.

3.6 Sites or Features of Nature Conservation, Habitats and Water Bodies Plans: show areas of particular environmental importance including areas that are important for nature conservation or are protected habitats in the vicinity of our proposals.

3.7 Sites or Features of Historic Environment Plans: show areas of particular environmental importance including important historical areas in the vicinity of our proposals.

3.8 Other Environmental Features Plans: show other areas of particular environmental importance in the vicinity of our proposals.

3.9 Trees and Hedges Potentially Affected Plans: show the trees and hedges which may be affected by the proposed connection.

3.10 Design Plans: provide details of our proposed equipment.

3.11 Consultation Plans: these show an overview of many aspects of the proposed connection and how they inter-relate. They show the proposed project boundary within which we propose to build the connection; this includes important elements of the permanent and temporary works, including pylon positions, conductor pulling positions and access roads.

All of these plans are split into sections, so you can easily identify which parts of our work relate to the area of most interest to you, with the exception of Design Plans (collection 3.10), which show generic detail relating to the proposed route. Each set of plans is accompanied by a key to help you understand what they show.

The different sections are:
Section A: Wylfa to Rhosgoch
Section B: Rhosgoch to Llandyfrydog
Section C: Llandyfrydog to B5110 north of Talwrn
Section D: B5110 north of Talwrn to Ceint
Section E: Ceint to the Afon Braint
Section F: Afon Braint to Pentir

All of these plans are available on the project website, on USB sticks and at our events. Paper reference copies are also available for the duration of the consultation at venues in the area, listed at the end of this booklet.

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